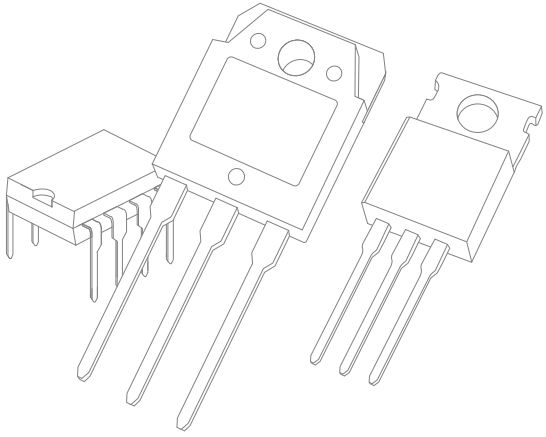
SAMWIN® 产品手册

XI'AN SEMIPOWER ELECTRONIC TECHNOLOGY CO.,LTD.



芯派科技 SEMiPOWER

芯源科技 SAMWIN

SAMWIN®产品手册

CATALOG OF SAMWIN

西安芯派电子科技有限公司是一家专业从事功率场效应管及电源管理IC研发、生产和销售的高新技术企业。

公司于2008年在西安高新技术产业开发区注册成立，位于高新区创新大厦。高新区优惠的扶持政策、西安丰富的人力资源和公司对创新型、高品质产品的坚持，使公司迅速成长为国内一流的功率器件供应商。公司拥有的自主品牌 Samwin® 系列产品已在手机充电器、UPS电源、便携及台式计算机电源、汽车逆变电源、HID汽车照明、LED照明以及电动车、手持电动工具等多个领域得到广泛应用。国际国内知名品牌APPLE、SAMSUNG、联想、华为、小米、OPPO、魅族等手机的充电器，飞利浦的节能灯、LED照明电源、蓝光DVD，GE的LED照明电源，惠普、华硕电脑的电源适配器，乐视的机顶盒，NFA的车用逆变电源，科士达的UPS等电子产品中已大量使用 Samwin® 品牌的产品。公司良好的企业信誉及稳定的产品质量，在电源行业得到了普遍的认同并赢得广泛赞誉。

2011年7月，公司携手西安高新创业园，总投资3500万元建立了国内首家半导体功率器件及电源管理集成电路测试应用中心。依托先进的实验设备和能力，以及所拥有的优秀核心技术团队，芯派科技能够为广大客户和提供更为专业、更为完整的数据分析、产品性能对比、可靠性试验、失效分析、完整解决方案等技术支持，为我们的合作伙伴提供更为高效可靠的测试与分析服务。

公司本着“创新、诚信、和谐、感恩”的经营理念，将一如既往地为客户提供优质的产品、完善的服务及全方位的技术支持。愿芯派科技成为您忠诚的合作伙伴，愿 Samwin® 系列产品成为您绿色电源系统的最佳选择。

合作高校

西北大学 信息科学与技术学院 软件学院 NORTHWEST UNIVERSITY
西北工业大学 软件与微电子学院
西安理工大学 XI'AN UNIVERSITY OF TECHNOLOGY
西安电子科技大学 微电子学院 XIDian University School Of Microelectronics
西安交通大学 电子与信息工程学院微电子系 XI'AN JIAOTONG UNIVERSITY
西安邮电大学 电子工程学院
西安科技大学 电气与控制工程学院
长安大学 电子与控制工程学院

联合实验室

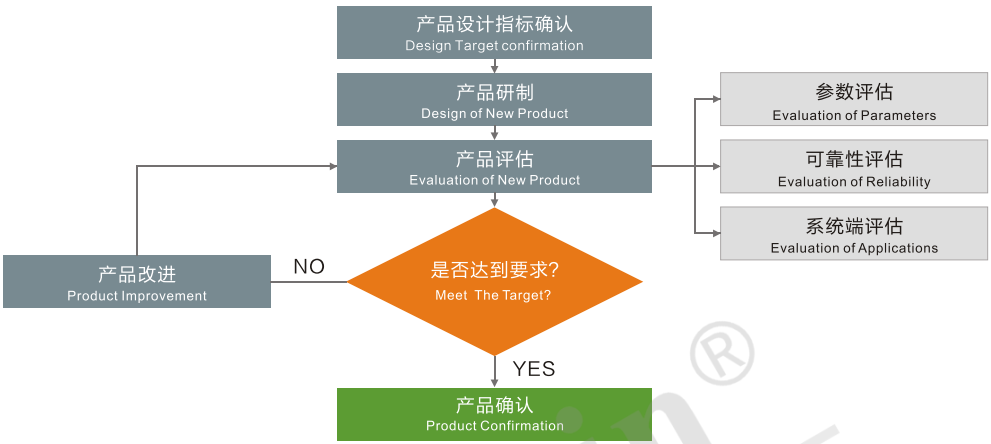
美国STI公司 Scientific Test, Inc.
美国ITC公司
Qualmark Accelerated Reliability Testing Systems
Vötsch Industrietechnik 德国富奇公司
PVA TePla
ANALYSI TECH
HIRAYAMA
Agilent Technologies

公司荣誉

- 国家级高新技术企业
- 国家集成电路设计企业
- 国家CNAS认证实验室
- 国家发改委专项资金支持企业
- 中国电源协会常务理事单位
- 科技部指定大学生科技创业见习基地
- 陕西省半导体功率器件测试应用中心
- 陕西省半导体行业协会常务理事单位
- 西安市企业技术中心
- 西安市科技局专项资金资助企业
- 通过ISO9001:2008质量管理体系认证
- 通过ISO14001:2004环境管理体系认证
- 产品通过国防科工委可靠性评测
- 产品全线通过RoHS、REACH、无卤HF认证

产品设计流程

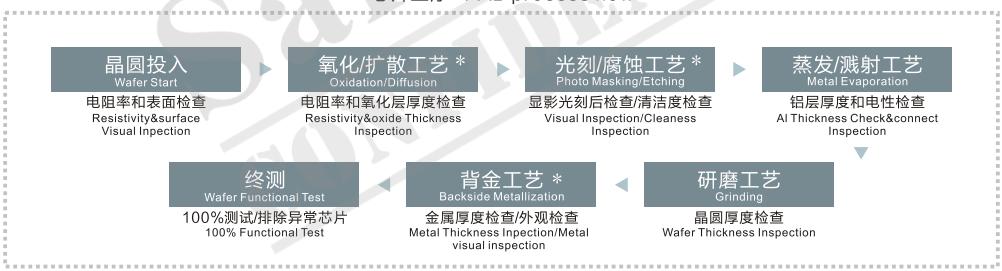
PRODUCT DESIGN PROCESS



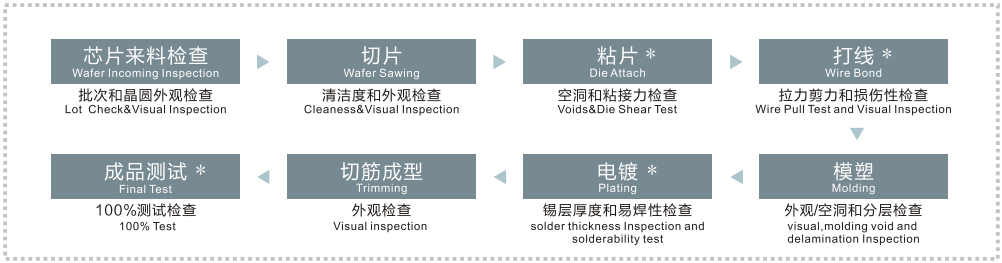
产品工序流程

PRODUCT PROCESS FLOW

芯片工序 FAB process flow



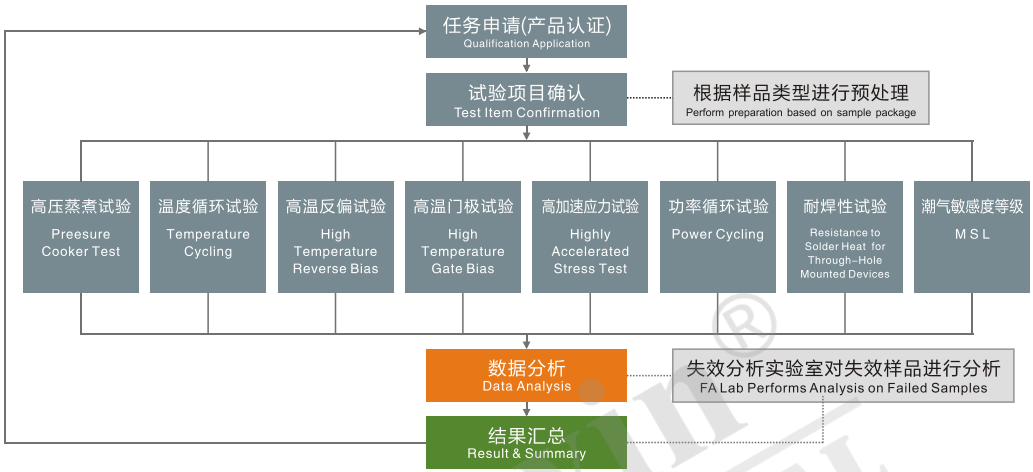
封装工序 Assembly process flow



*：Critical-To-Quality 品质关键点。

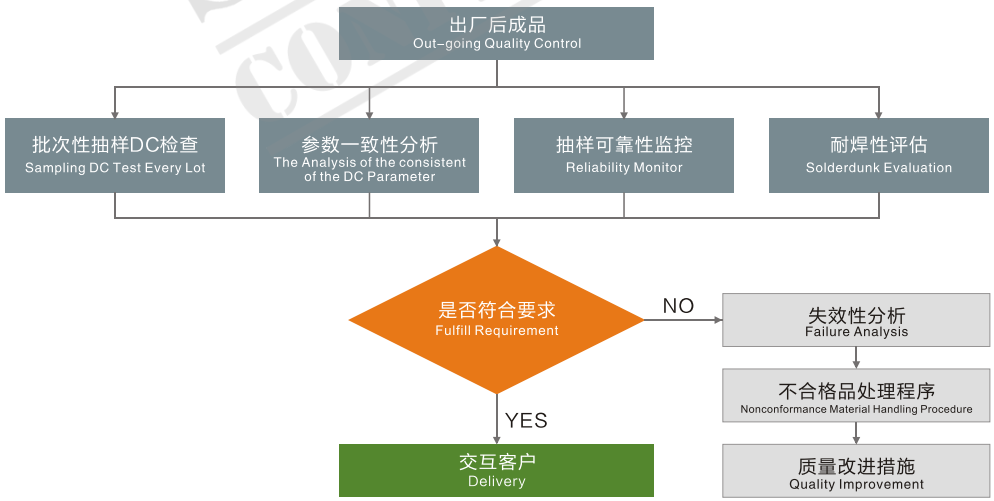
产品认证流程

PRODUCT QUALIFICATION PROCESS



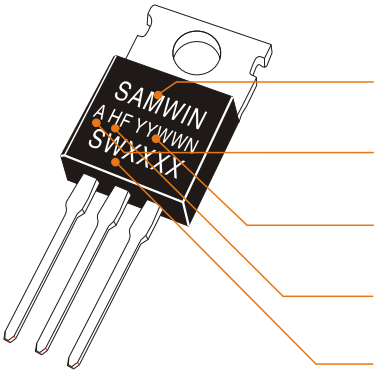
出厂质量控制体系

OUT-GOING QUALITY CONTROL



激光打印说明

DESCRIBE LASER MARKING



Samwin®商标
Brand

版本编号
Tech. Platform

生产批号
Process code included date info.

HF无卤标识
Halogen Free

产品型号
Product part number

产品编码说明

DESCRIPTION OF PRODUCT PART NUMBER

SW P 4 N 60 A

版本编码 Tech.Platform

耐压（X10） Breakdown Voltage Rating(divided by 10)

沟道类型 Channel Type

电流 Current Rating

Samwin®

封装类型 Package Type

TO-220	P
TO-220F	F
TO-251	I
TO-252	D
TO-126	L
TO-92	C
TO-262	U
TO-263	B
TO-3P	W

...

西安功率器件测试应用中心

XI'AN SEMIPOWER TESTING AND APPLICATION CENTER

- 应用/系统测试实验室
- 可靠性实验室
- 器件测试实验室
- 失效分析实验室

西安市半导体功率器件测试应用中心是一家提供半导体功率器件和电源管理集成电路测试及分析的开放型中心，由西安芯派电子科技有限公司与西安高新创业园合作建设。测试应用中心总投资3500万元，实验室面积1000平方米，由应用/系统测试实验室、可靠性实验室、器件测试实验室和失效分析实验室四个部分构成。中心拥有经验丰富的专业人员和先进的设施设备，通过产品测试、系统测试、性能研究、可靠性实验、失效分析等技术手段，从行业需求出发，为半导体功率器件的设计、生产和应用提供完整的设计开发验证、生产质量监测、产品认证、成品测试、应用测试和客户技术支持等全方位的服务。

作为开放型测试应用中心，我们本着尊重科学，共同发展的理念，与国内外企业、学校、科研单位展开了广泛的合作，推动产品创新、科研成果产业化、行业人才培养和技术交流。我们热忱地欢迎有志于功率器件研究与发展的广大工程师朋友们，以中心为平台，以设备为工具，与我们一起用我们敏锐的双眼，勤劳的双手和聪慧的大脑，去探索功率器件世界的无穷奥秘。

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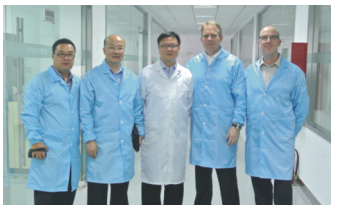
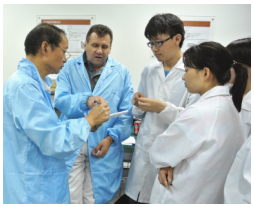
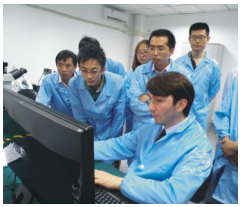
SEMiPOWER







目录 Catalog

产品方案应用 PRODUCTS APPLICATION

MOSFET规格书 MOSFET SPECIFICATION

目录 Catalog

产品封装说明 PACKAGE OUTLINE DIMENSIONS

目录 Catalog

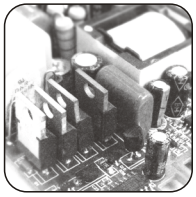
选型指南 PRODUCT SELECTION GUIDE

参数中英文对照

PARAMETERS (CHINESE/ENGLISH)

简称	英文说明	中文说明	单位
绝对最大额定参数			
V_{DSS}	Drain to Source Voltage	漏极电压	V
I_D	Continuous Drain Current (@Tc=25℃)	漏极连续电流	A
	Continuous Drain Current (@Tc=100℃)	漏极连续电流	A
I_{DM}	Pulsed Drain Current	漏极脉冲电流	A
V_{GS}	Gate to Source Voltage	栅极电压	V
E_{AS}	Single Pulsed Avalanche Energy	单脉冲雪崩能量	mJ
E_{AR}	Repetitive Avalanche Energy	重复脉冲雪崩能量	mJ
dv/dt	Peak Diode Recovery dv/dt	二级管转换速率	V/ns
P_D	Total Power Dissipation (@Tc=25℃)	总耗散功率	W
	Derating Factor above 25℃	超过 25℃时功耗降额系数	W/℃
T_{STG},T_J	Operating junction temperature & Storage temperature	工作结温及储藏温度	℃
T_L	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds.	最高焊接转导温度	℃
热特性参数			
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	热阻，结到管壳	℃/ W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	热阻，结到环境	℃/ W
电性能参数（关断参数）			
BV_{DSS}	Drain- Source Breakdown Voltage	漏极击穿电压	V
$\triangle BV_{DSS}/\triangle Tj$	Breakdown Voltage Temperature coefficient	击穿电压温度系数	V/℃
I_{DSS}	Drain-Source Leakage Current	漏极-源极漏电流	uA
I_{GSS}	Gate-Source Leakage Current	栅极-源极漏电流	nA
	Gate-Source Leakage Reverse	栅极-源及反向漏电流	nA
电性能参数（开启参数）			
V_{GS}(th)	Gate Threshold Voltage	栅极开启电压	V
$R_{DS(ON)}$	Static Drain-Source On-state Resistance	静态漏极-源极导通电阻	ohm
G_{fs}	Forward transconductance	正向跨导	S
动态参数			
Ciss	Input Capacitance	输入电容	pF
Coss	Output Capacitance	输出电容	
Crss	Reverse Transfer Capacitance	反向传输电容	
$t_{d(on)}$	Turn-on Delay Time	导通延迟时间	ns
t_r	Rise Time	上升时间	
$t_{d(off)}$	Turn-off Delay Time	关断延迟时间	
t_f	Fall Time	下降时间	
Qg	Total Gate Charge	栅极总电荷	nc
Qgs	Gate-Source Charge	栅极-源极电荷	
Qgd	Gate-Drain Charge (Miller Charge)	栅极-源极电荷：米勒电荷	
源极-漏极寄生二极管额定参数			
I_S	Continuous Source Current	源极连续电流	A
I_{SM}	Pulsed Source Current	源极脉冲电流	
V_{SD}	Diode Forward Voltage	寄生二极管电压	V
t_{rr}	Reverse Recovery Time	反向恢复时间	ns
Q_{rr}	Reverse Recovery Charge	反向恢复电荷	uc

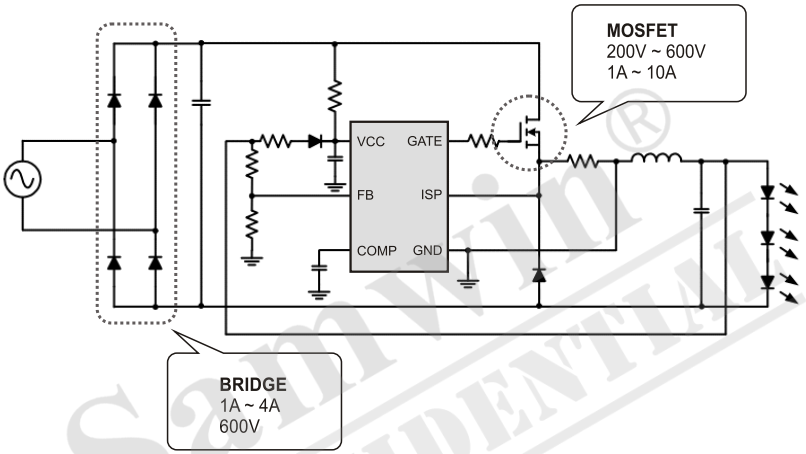
Samwin® 产品方案应用


PRODUCTS APPLICATION

LED照明 (LED lighting)

LED照明的应用，开创了人类照明的新纪元。SEMIPOWER生产的SW系列高低压MOSFET，可满足室内照明、商业照明、室外照明等多样化的照明驱动需求，为您高效的照明系统提供高可靠性的功率器件。



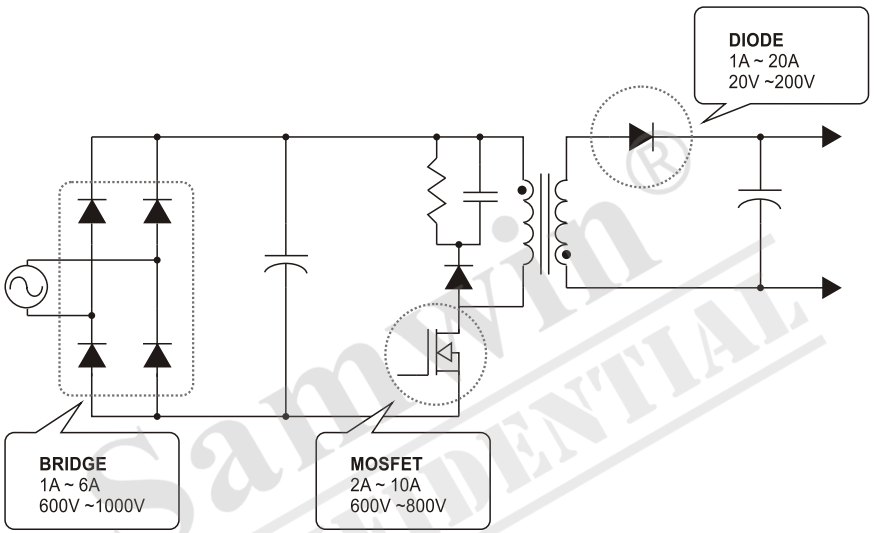
常用器件型号
PART NUMBER OF GENERAL DEVICES

型号 PART NUMBER	耐压 [BV_{DSS}]	电流 [I_D]	电阻 [$R_{DS(ON)}$]	封装形式 PACKAGE
SW5N30	300V	5A	0.9Ω	TO-251
SW830	500V	5.5A	1.5Ω	TO-220/TO-220F
SW840	500V	8.5A	0.85Ω	TO-220/TO-220F
SW2N60	600V	2A	4.5Ω	TO-220F/TO-251/TO-252/TO-126
SW4N60	600V	4A	2.2Ω	TO-220F,TO-251/TO-252
SW7N60	600V	7A	1.20Ω	TO-220,TO-220F
SW10N60	600V	10A	0.9Ω	TO-220/TO-220F
SW2N65	650V	2A	5.5Ω	TO-220/TO-220F
SW4N65	650V	4A	2.6Ω	TO-220F/TO-251/TO-252/TO-251S
SW7N65	650V	7A	1.40Ω	TO-220F/TO-251/TO-252
SW10N65	650V	10A	1.1Ω	TO-220/TO-220F
SW12N65	650V	12A	0.8Ω	TO-220/TO-220F

备注：整流器件选型参考附录1-附录9。

适配器/充电器 (Adapter/Charger)

小体积、低成本的竞争在Adapter市场愈演愈烈。 SEMIPOWER在不断提高产品可靠性的同时努力降低客户的综合成本，为您的产品提供最具性价比的优秀半导体器件。



常用器件型号

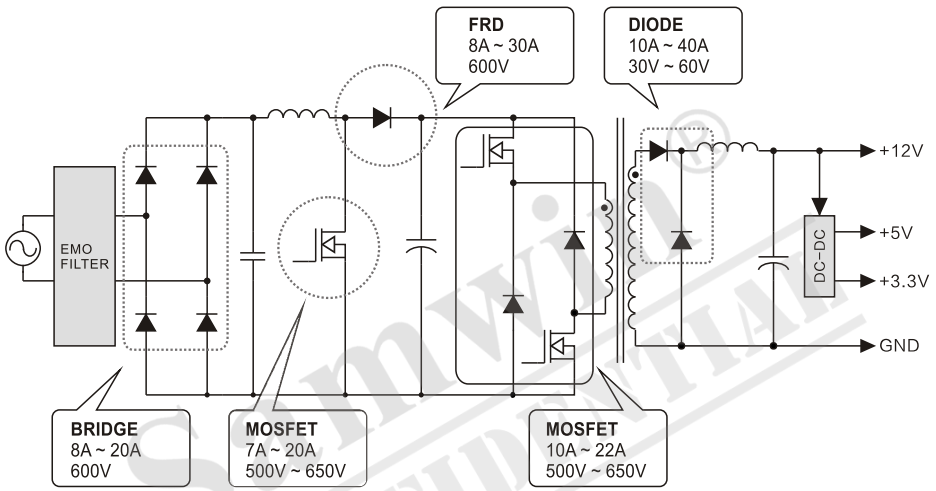
PART NUMBER OF GENERAL DEVICES

型号 PART NUMBER	耐压 [BV_{DSS}]	电流 [I_D]	电阻 [$R_{DS(ON)}$]	封装形式 PACKAGE
SW1N60	600V	1A	9Ω	TO-251/TO-252/TO-92
SW2N60	600V	2A	4.5Ω	TO-220F/TO-251/TO-252/TO-126
SW6N60	600V	6A	1.5Ω	TO-220F/TO-251/TO-252
SW10N60	600V	10A	0.9Ω	TO-220/TO-220F
SW2N65	650V	2A	5.5Ω	TO-220/TO-220F
SW7N65	650V	7A	1.40Ω	TO-220F/TO-251/TO-252
SW10N65	650V	10A	1.1Ω	TO-220/TO-220F
SW1N70C	700V	0.8A	16Ω	TO-92
SW2N70	700V	2A	6.2Ω	TO-251/TO-252
SW6N70	700V	6A	1.7Ω	TO-251S/TO-252/TO-220F
SW8N70	700V	8A	1.20Ω	TO-220F

备注：整流器件选型参考附录1~附录9。

PC电源 (PC power)

科学技术的飞速发展，给PC电源带来了新的挑战。SEMIPOWER结合PC电源的特点推出的高压系列MOSFET，让您轻松实现高效能、低成本的完美设计。



常用器件型号

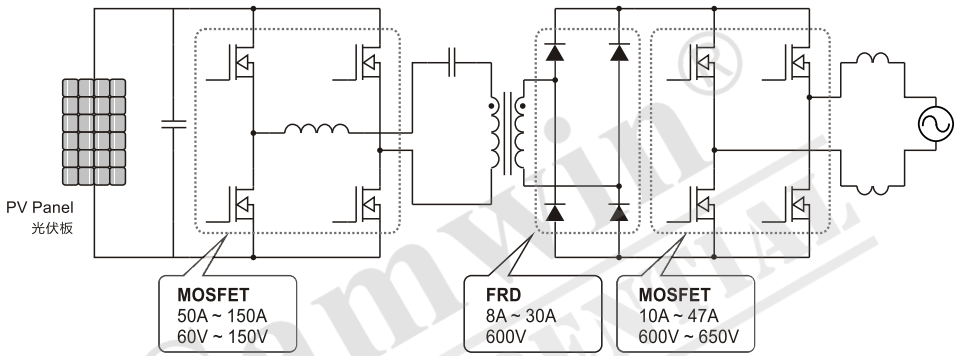
PART NUMBER OF GENERAL DEVICES

型号 PART NUMBER	耐压 [BV_{DSS}]	电流 [I_D]	电阻 [$R_{DS(ON)}$]	封装形式 PACKAGE
SW9N50	500V	9A	0.8Ω	TO-220/TO-220F
SW13N50	500V	13A	0.48Ω	TO-220F
SW15N50	500V	15A	0.32Ω	TO-220F
SW20N50	500V	20A	0.27Ω	TO-3P
SW10N60	600V	10A	0.9Ω	TO-220/TO-220F
SW12N60	600V	12A	0.7Ω	TO-220/TO-220F
SW20N60	600V	20A	0.3Ω	TO-3P
SW7N65	650V	7A	1.32Ω	TO-220/TO-220F
SW8N90	900V	8A	1.5Ω	TO-220F
SW9N90	900V	9A	1.45Ω	TO-3P

备注：整流器件选型参考附录1-附录9。

太阳能供电 (Solar power)

移动照明、野外监控、通信中继等一系列野外偏远供电的市场需求促生了太阳能微型供电系统的发展，SEMIPOWER深耕于绿色能源，为免维护型太阳能供电系统提供高效、可靠、全面的功率器件支持。



常用器件型号

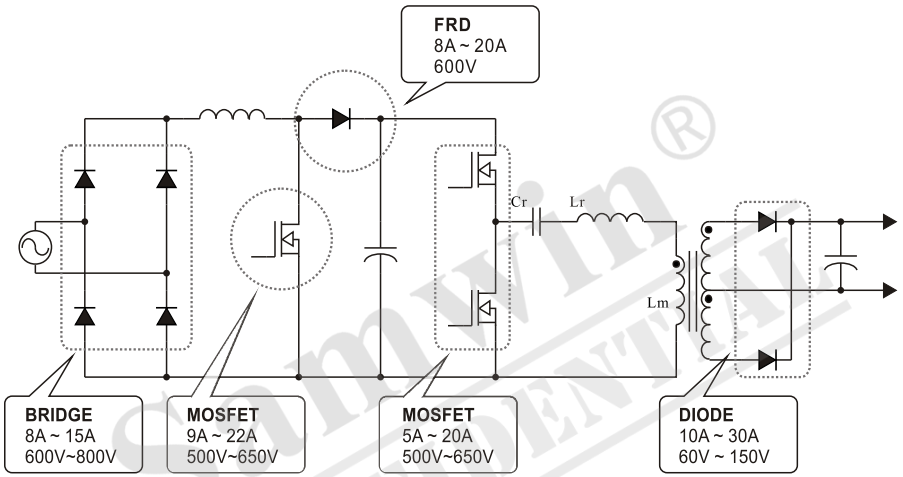
PART NUMBER OF GENERAL DEVICES

型号 PART NUMBER	耐压 [BV_{DSS}]	电流 [I_D]	电阻 [$R_{DS(ON)}$]	封装形式 PACKAGE
SW50N06	60V	50A	0.023Ω	TO-220/TO-220F
SW60N06V	60V	60A	0.012Ω	TO-251S,TO-252/TO-220
SW3205N	60V	110A	0.0105Ω	TO-220
SW75N75	75V	75A	0.008Ω	TO-220
SW75N08	80V	75A	0.011Ω	TO-220
SW110N08A	80V	110A	0.0072Ω	TO-220
SW4015	150V	40A	0.045Ω	TO-263
SW20N60	600V	20A	0.3Ω	TO-3P
SW22N60U	600V	22A	0.35Ω	TO-3P
SW10N65	650V	10A	1.1Ω	TO-220/TO-220F
SW12N65	650V	12A	0.8Ω	TO-220/TO-220F

备注：整流器件选型参考附录1-附录9。

电视电源 (TV power)

TV等消费类电子产品消耗宝贵的能源。伴随着能效等级、功率密度的提升使得电子产品设计人员面临的挑战不断增加。SEMIPOWER采用最先进半导体技术，帮助设计人员轻松应对各种挑战，为创新消费类电子产品提供最苛刻的可靠性和质量要求的功率器件。



常用器件型号

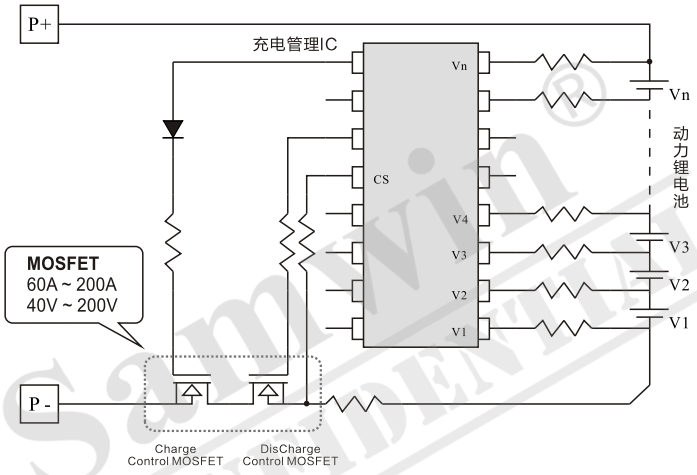
PART NUMBER OF GENERAL DEVICES

型号 PART NUMBER	耐压 [BV_{DSS}]	电流 [I_D]	电阻 [$R_{DS(ON)}$]	封装形式 PACKAGE
SW19N10	100V	19A	0.12Ω	TO-220/TO-252
SW7N60	600V	7A	1.3Ω	TO-220/TO-220F
SW8N60	600V	8A	1.3Ω	TO-220F
SW10N60	600V	10A	0.9Ω	TO-220/TO-220F
SW12N60	600V	12A	0.7Ω	TO-220/TO-220F
SW4N65	650V	4A	2.6Ω	TO-220/TO-220F
SW7N65	650V	7A	1.32Ω	TO-220/TO-220F
SW8N65B	650V	8A	1.5Ω	TO-220F
SW10N65	650V	10A	1.1Ω	TO-220/TO-220F
SW12N65	650V	12A	0.8Ω	TO-220/TO-220F
SW10N80	800V	10A	1.1Ω	TO-220F

备注：整流器件选型参考附录1-附录9。

锂电池保护 (Li-ion battery protection)

伴随着人类对环境的重视，轻型电驱交通工具逐渐取代了油驱，SEMIPOWER密切关注环境问题，SW中低压系列MOSEFT，给您的电驱动系统中的电池保护电路提供环保、可靠的功率器件。

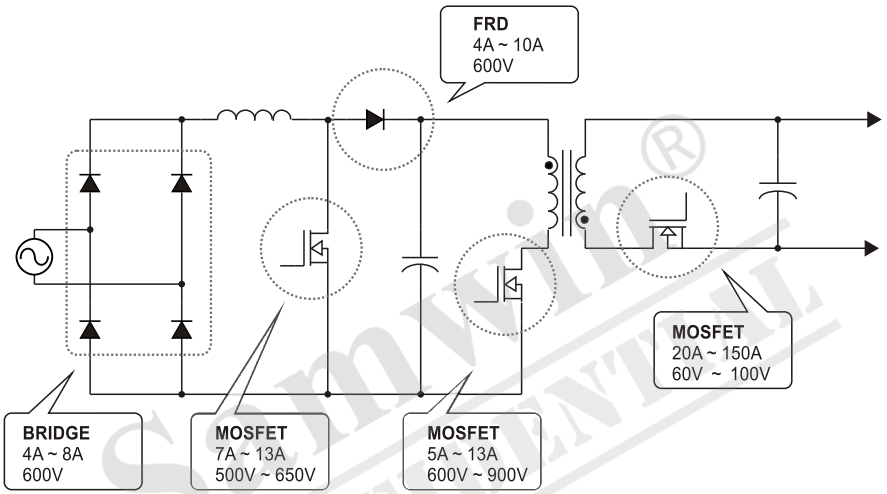


常用器件型号
PART NUMBER OF GENERAL DEVICES

型号 PART NUMBER	耐压 [BV_{DSS}]	电流 [I_D]	电阻 [$R_{DS(ON)}$]	封装形式 PACKAGE
SW60N06	60V	60A	0.008Ω	TO-220
SW3205N	60V	110A	0.0105Ω	TO-220
SW150N06	60V	150A	0.006Ω	TO-220
SW75N75	75V	75A	0.008Ω	TO-220
SW180N75	75V	180A	0.0045Ω	TO-220
SW75N08	80V	75A	0.011Ω	TO-220
SW80N08	80V	80A	0.0085Ω	TO-220
SW110N08	80V	110A	0.0072Ω	TO-220
SW150N08	80V	150A	0.0051Ω	TO-220
SW100N10	100V	100A	0.011Ω	TO-220

工业电源 (Industrial power)

工业发展的程度从侧面反应出一个国家的强盛程度。SEMIPOWER针对工业电源推出了全系列高可靠性的MOSFET产品。为科技兴国尽芯派企业的绵薄之力。



常用器件型号

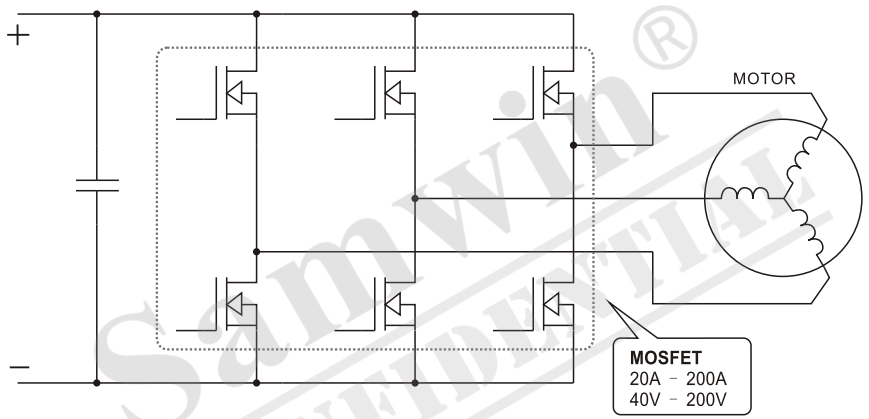
PART NUMBER OF GENERAL DEVICES

型号 PART NUMBER	耐压 [BV_{DSS}]	电流 [I_D]	电阻 [$R_{DS(ON)}$]	封装形式 PACKAGE
SW50N06	60V	50A	0.023Ω	TO-220/TO-220F
SW3205N	60V	110A	0.0105Ω	TO-220
SW80N07	70V	80A	0.0082	TO-220
SW9N50	500V	9A	0.8Ω	TO-220/TO-220F
SW13N50	500V	13A	0.48Ω	TO-220F
SW15N50	500V	15A	0.32Ω	TO-220F
SW2N60	600V	2A	5Ω	TO-220/TO-220F/TO-251
SW4N60	600V	4A	2.2Ω	TO-220/TO-220F
SW10N60	600V	10A	0.9Ω	TO-220/TO-220F
SW12N65	650V	12A	0.8Ω	TO-220/TO-220F

备注：整流器件选型参考附录1-附录9。

无刷电机 (Brushless motor)

铝铁硼等永磁材料价格的降低大大的推动了无刷电机的发展。医疗器械、交通工具、楼宇控制、工业自动化、电动工具等各行业都可以看到永磁电机的身影。SEMIPOWER全面的低压产品系列可以满足各种环境下对功率及效率的要求，为客户生产高可靠性的控制系统奠定基石。



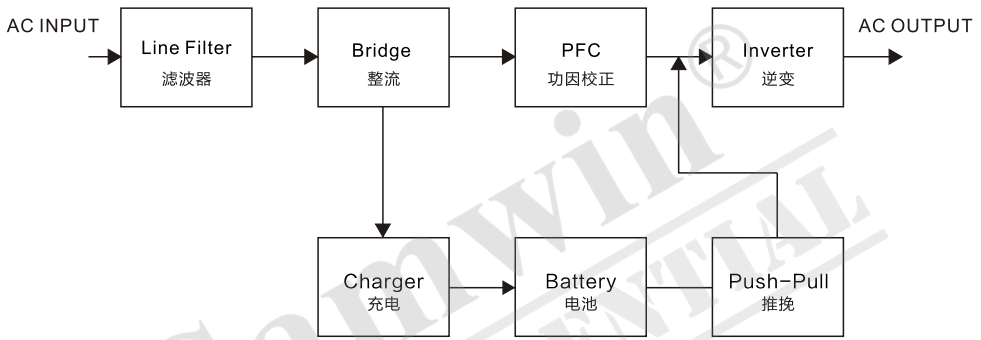
常用器件型号

PART NUMBER OF GENERAL DEVICES

型号 PART NUMBER	耐压 [BV_{DSS}]	电流 [I_D]	电阻 [$R_{DS(ON)}$]	封装形式 PACKAGE
SW120N04	40V	120A	5.0mΩ	TO-220
SW210N04	40V	210A	2mΩ	TO-220
SW3205N	60V	110A	0.0105Ω	TO-220
SW50N06	60V	50A	0.023Ω	TO-220/TO-220F
SW80N08	80V	80A	0.0085Ω	TO-220
SW110N08	80V	110A	0.0072Ω	TO-220
SW100N10	100V	100A	0.011Ω	TO-220
SW150N10	100V	150A	0.0056Ω	TO-220

UPS (Uninterruptible Power Supply)

功率密度及能效的提高给UPS(Uninterruptible Power Supply)的设计带来了新的挑战，SEMIPOWER 高可靠性的MOSFET系列产品助您全面提升产品性能，轻松应对各种挑战。



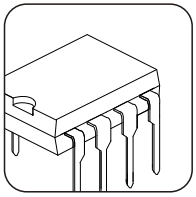
常用器件型号

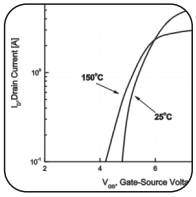
PART NUMBER OF GENERAL DEVICES

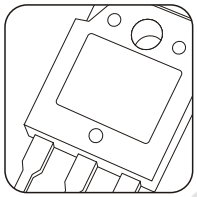
型号 PART NUMBER	耐压 [BV_{DSS}]	电流 [I_D]	电阻 [$R_{DS(ON)}$]	封装形式 PACKAGE	电路单元 CIRCUIT UNIT
SW50N10	100V	50A	0.017Ω	TO-220	Push-Pull
SW3710	100V	57A	0.023Ω	TO-220	Push-Pull
SW150N10	100V	150A	0.0056Ω	TO-220	Push-Pull
SW10N65	650V	10A	1.1Ω	TO-220/TO-220F	PFC
SW12N65	650V	12A	0.8Ω	TO-220/TO-220F	PFC
SW8N70	700V	8A	1.6Ω	TO-220F	Charger
SW10N80	800V	10A	1.1Ω	TO-220F	Charger
SW7N90	900V	7A	1.8Ω	TO-3P	Charger
SW8N90	900V	8A	1.5Ω	TO-220F	Charger
SW9N90	900V	9A	1.45Ω	TO-3P	Charger

备注：整流器件选型参考附录1-附录9。

Samwin® MOSFET规格书





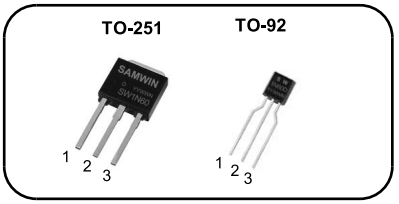


MOSFET SPECIFICATION

N-channel Enhanced mode TO-251/TO-92 MOSFET

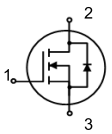
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 6.6Ω)@V_{GS}=10V
- Low Gate Charge (Typ 6.8nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:Charger



1. Gate 2. Drain 3. Source

BV_{DSS} : 600V
I_D : 1A
$R_{DS(ON)}$:6.6Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW I 1N60D	SW1N60D	TO-251	TUBE
2	SW C 1N60D	SW1N60D	TO-92	TAPE

Absolute maximum ratings

Symbol	Parameter		Value		Unit
			TO-251	TO-92	
V_{DSS}	Drain to source Vvoltage		600		V
I_D	Continuous drain current (@T_C=25°C)		1*		A
	Continuous drain current (@T_C=100°C)		0.6*		A
I_{DM}	Drain current pulsed	(note 1)	4		A
V_{GS}	Gate to source voltage		±30		V
E_{AS}	Single pulsed avalanche energy	(note 2)	68		mJ
E_{AR}	Repetitive avalanche energy	(note 1)	8		mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5		V/ns
P_D	Total power dissipation (@T_C=25°C)		65.9	4.2	W
	Derating factor above 25°C		0.53	0.03	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150		°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300		°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value		Unit
		TO-251	TO-92	
R_{thjc}	Thermal resistance, Junction to case	1.9		°C/W
R_{thja}	Thermal resistance, Junction to ambient	90	113.5	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	600			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.51		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=600V, V_{GS}=0V			1	uA
		V_{DS}=480V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 0.5A		6.6	8.5	Ω
G_{fs}	Forward transconductance	V_{DS} = 30 V, I_D = 0.5A		0.96		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		150		pF
C_{oss}	Output capacitance			28		
C_{rss}	Reverse transfer capacitance			9		
$t_{d(on)}$	Turn on delay time	V_{DS}=300V, I_D=1A, R_G=25Ω V_{GS}=10V (note 4, 5)		5		ns
t_r	Rising time			20		
$t_{d(off)}$	Turn off delay time			12		
t_f	Fall time			23		
Q_g	Total gate charge	V_{DS}=480V, V_{GS}=10V, I_D=1A (note 4, 5)		6.8		nC
Q_{gs}	Gate-source charge			1.3		
Q_{gd}	Gate-drain charge			3.7		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			1	A
I_{SM}	Pulsed source current				4	A
V_{SD}	Diode forward voltage drop.	I_S=1A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=1A, V_{GS}=0V, dI_F/dt=100A/us		174		ns
Q_{rr}	Reverse recovery charge			1139		nC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 135mH, I_{AS} = 1A, V_{DD} = 25V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 1A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

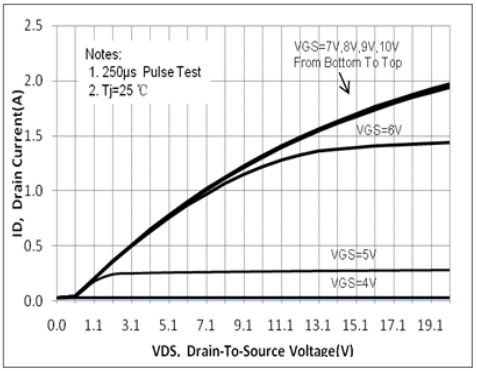


Fig. 2. On-resistance variation vs. drain current and gate voltage

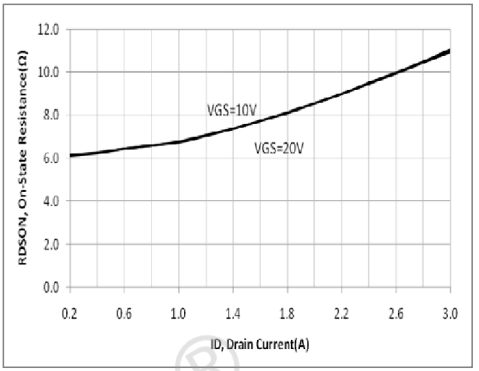


Fig. 3. Gate charge characteristics

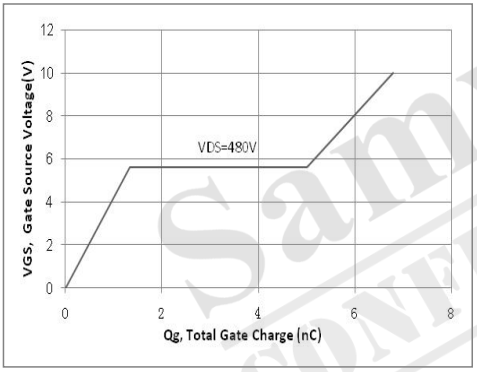


Fig. 4. On state current vs. diode forward voltage

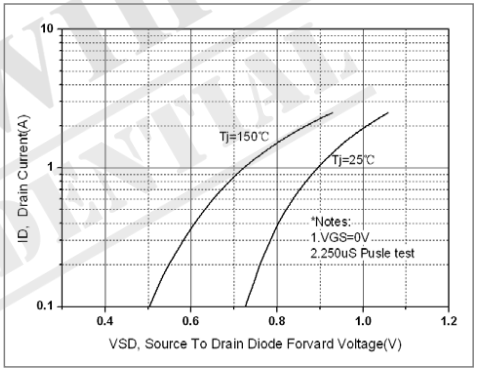


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

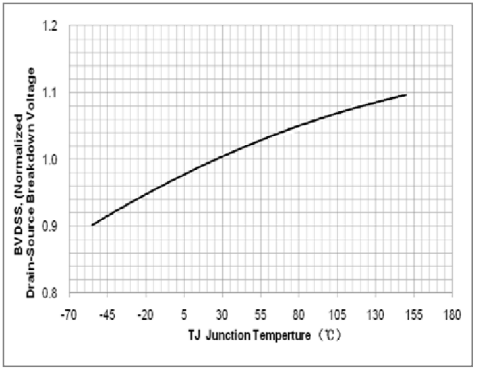


Fig. 6. On resistance variation vs. junction temperature

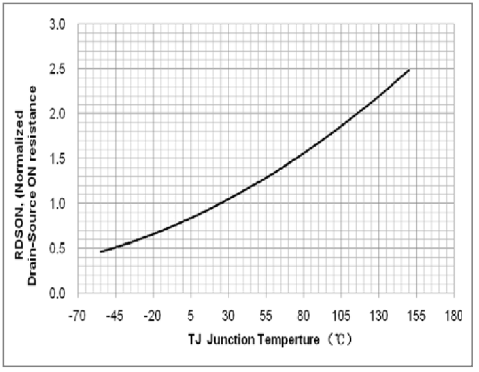


Fig. 7. Maximum safe operating area(TO-251)

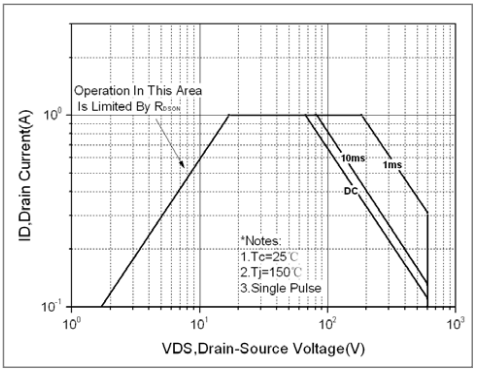


Fig. 8. Transient thermal response curve(TO-251)

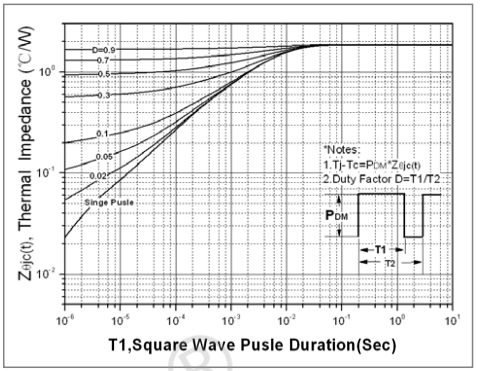


Fig. 9. Maximum safe operating area(TO-92)

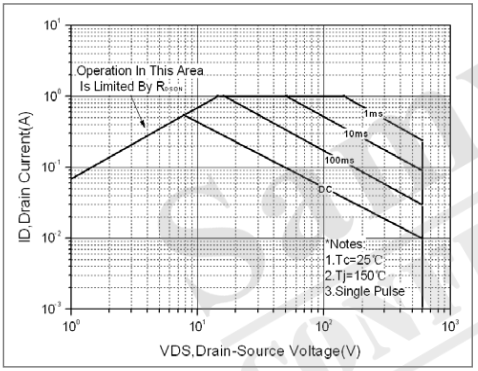


Fig. 10. Transient thermal response curve(TO-92)

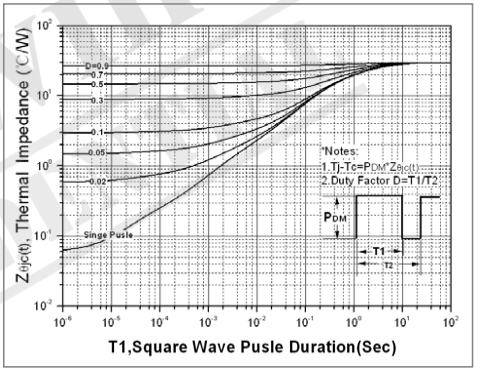


Fig. 11. Capacitance Characteristics

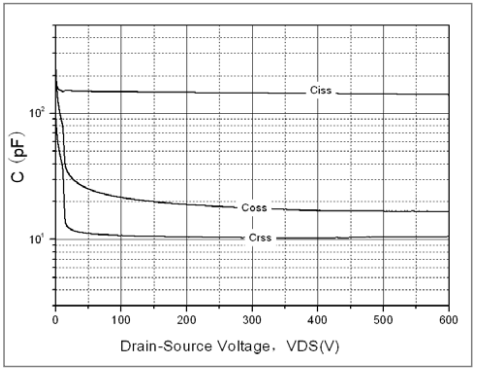


Fig. 12. Gate charge test circuit & waveform

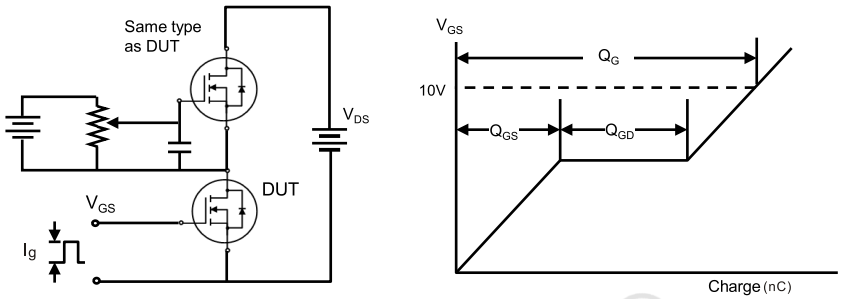


Fig. 13. Switching time test circuit & waveform

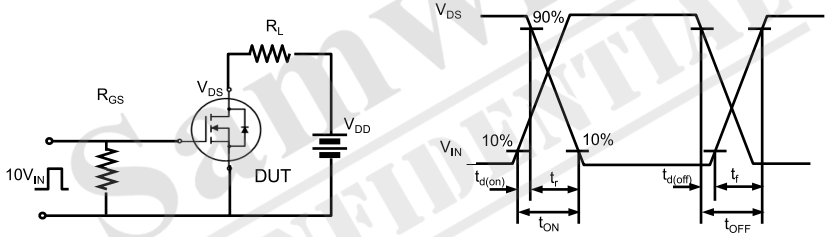


Fig. 14. Unclamped Inductive switching test circuit & waveform

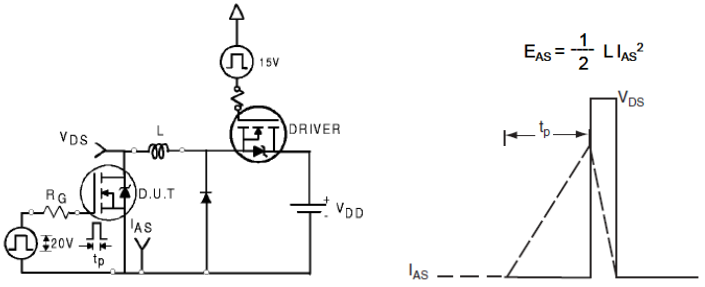
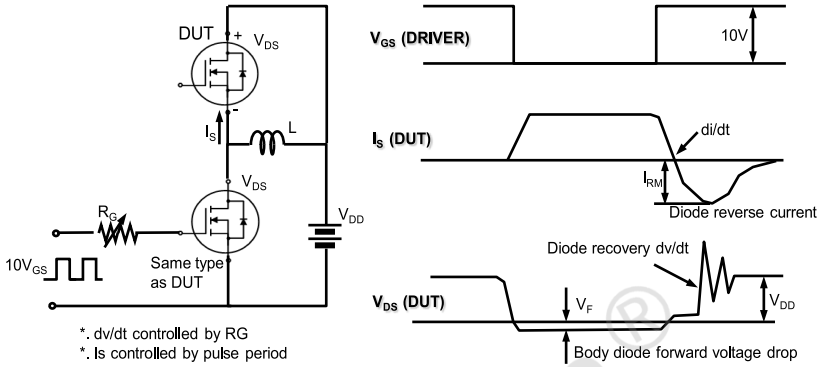


Fig. 15. Peak diode recovery dv/dt test circuit & waveform



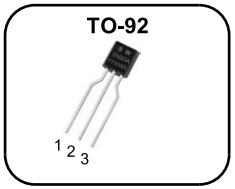
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-92 *MOSFET*

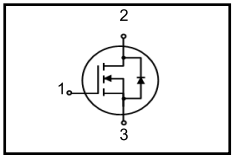
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 13.6Ω)@V_{GS}=10V
- Low Gate Charge (Typ 6nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:Adapter,LED,Charger



1. Gate 2. Drain 3. Source

BV_{DSS} : 800V
I_D : 1.0A
$R_{DS(ON)}$: 13.6Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW C 1N80A	SW1N80A	TO-92	TAPE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		800	V
I_D	Continuous drain current (@T_C=25°C)		1.0*	A
	Continuous drain current (@T_C=100°C)		0.6*	A
I_{DM}	Drain current pulsed	(note 1)	3.0	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	62	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	4.8	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		3.9	W
	Derating factor above 25°C		0.031	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjl}	Thermal resistance, Junction to Lead Max	32	°C/W
R_{thja}	Thermal resistance, Junction to ambient	135	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	800			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.082		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=800V, V_{GS}=0V			1	uA
		V_{DS}=640V, T_C=125°C			10	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=50uA	3.0		5.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 0.5A		13.6	16	Ω
G_{fs}	Forward transconductance	V_{DS} = 40 V, I_D = 0.5A		0.6		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		180		pF
C_{oss}	Output capacitance			30		
C_{rss}	Reverse transfer capacitance			10		
$t_{d(on)}$	Turn on delay time	V_{DS}=400V, I_D=1A, R_G=25Ω V_{GS}=10V (note 4,5)		6.3		ns
t_r	Rising time			20		
$t_{d(off)}$	Turn off delay time			15		
t_f	Fall time			26		
Q_g	Total gate charge	V_{DS}=640V, V_{GS}=10V, I_D=1A (note 4,5)		6		nC
Q_{gs}	Gate-source charge			1.7		
Q_{gd}	Gate-drain charge			3.1		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			1	A
I_{SM}	Pulsed source current				4	A
V_{SD}	Diode forward voltage drop.	I_S=1A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=1A, V_{GS}=0V, dI_F/dt=100A/us		301		ns
Q_{rr}	Reverse recovery charge			740		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 124mH, I_{AS} = 1A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 1A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

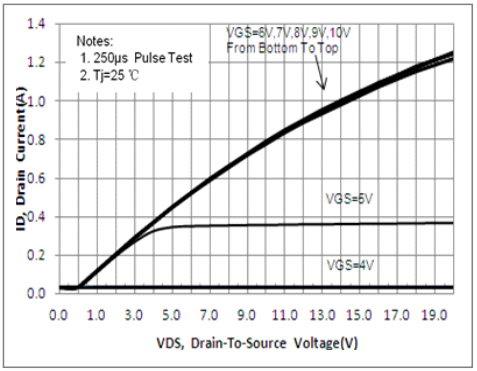


Fig. 2. On-resistance variation vs. drain current and gate voltage

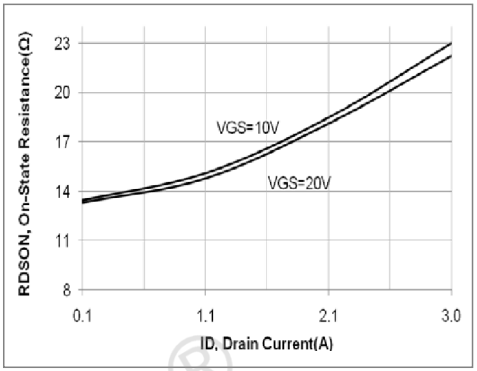


Fig. 3. Gate charge characteristics

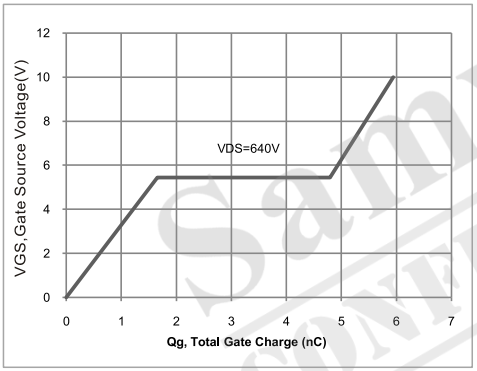


Fig. 4. On state current vs. diode forward voltage

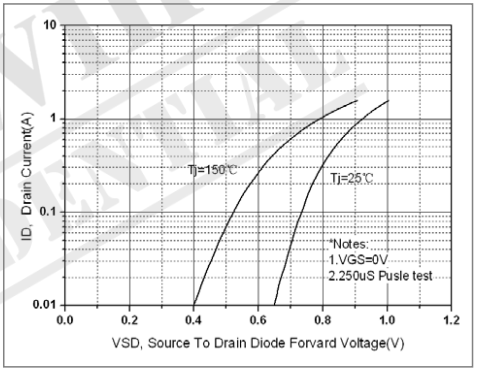


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

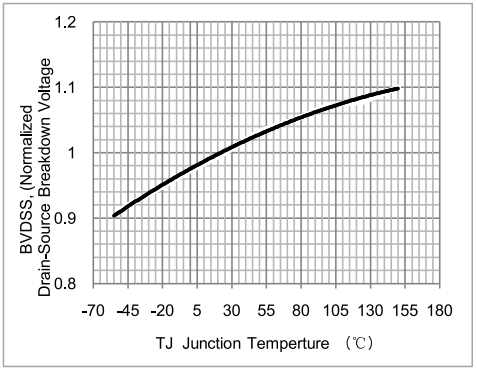


Fig. 6. On resistance variation vs. junction temperature

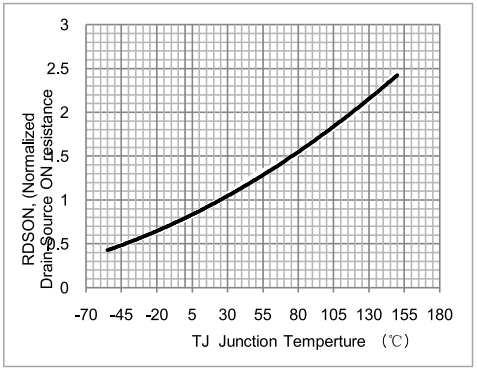


Fig. 7. Maximum safe operating area

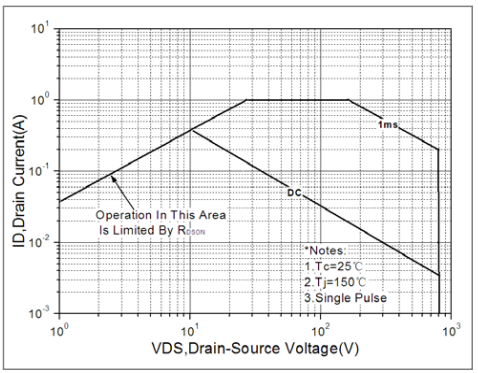


Fig. 8. Transient thermal response curve

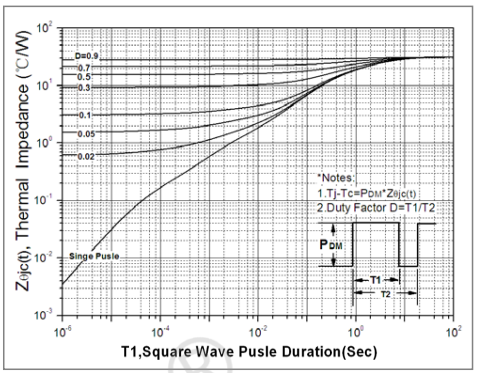


Fig. 9. Capacitance Characteristics

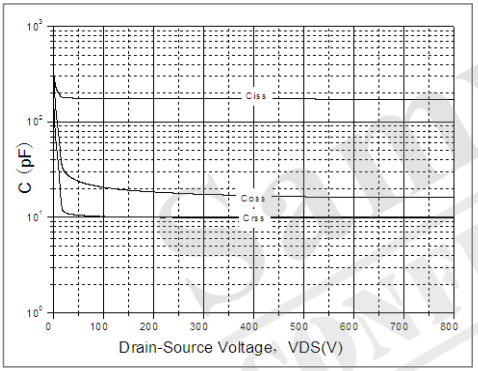
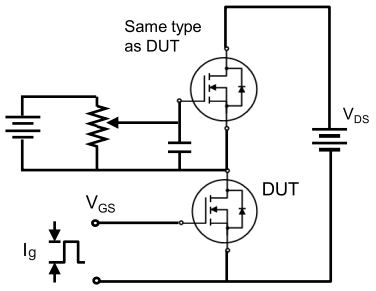


Fig. 10. Gate charge test circuit & waveform



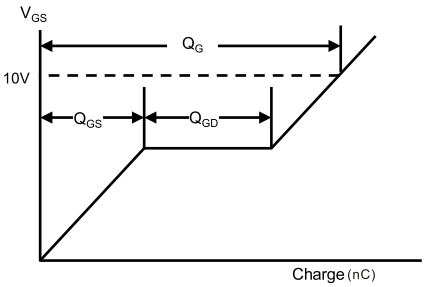


Fig. 11. Switching time test circuit & waveform

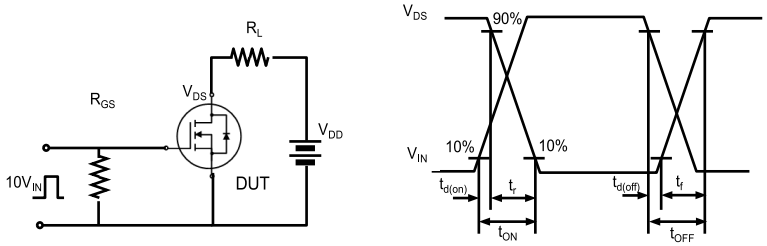


Fig. 12. Unclamped Inductive switching test circuit & waveform

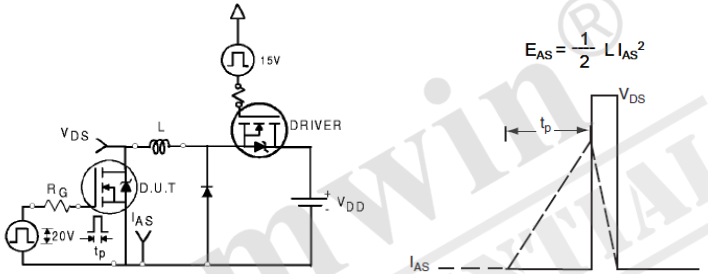
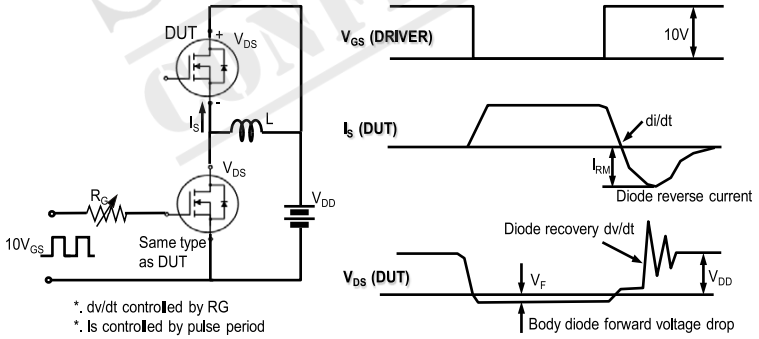


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



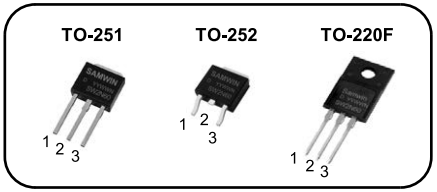
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-251/TO-252/TO220F MOSFET

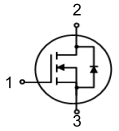
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 3.7Ω)@V_{GS}=10V
- Low Gate Charge (Typ 9nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:Adapter,LED



1. Gate 2. Drain 3. Source

BV_{DSS} : 600V
I_D : 2A
$R_{DS(ON)}$: 3.7Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW I 2N60D	SW2N60D	TO-251	TUBE
2	SW D 2N60D	SW2N60D	TO-252	REEL
3	SW F 2N60D	SW2N60D	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value			Unit
			TO-251	TO-252	TO220F	
V_{DSS}	Drain to source voltage		600			V
I_D	Continuous drain current (@T_C=25°C)		2*			A
	Continuous drain current (@T_C=100°C)		1.3*			A
I_{DM}	Drain current pulsed	(note 1)	8			A
V_{GS}	Gate to source voltage		±30			V
E_{AS}	Single pulsed avalanche energy	(note 2)	80			mJ
E_{AR}	Repetitive avalanche energy	(note 1)	11			mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5			V/ns
P_D	Total power dissipation (@T_C=25°C)		88.7	85.5	17.45	W
	Derating factor above 25°C		0.71	0.68	0.14	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150			°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300			°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value			Unit
		TO-251	TO-252	TO220F	
R_{thjc}	Thermal resistance, Junction to case	1.41	1.46	7.16	°C/W
R_{thja}	Thermal resistance, Junction to ambient	90.6	86.6	49.8	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	600			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.46		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=600V, V_{GS}=0V			1	uA
		V_{DS}=480V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 1A		3.7	4.5	Ω
G_{fs}	Forward transconductance	V_{DS} = 20 V, I_D = 1A		1.5		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		306		pF
C_{oss}	Output capacitance			43		
C_{rss}	Reverse transfer capacitance			14		
$t_{d(on)}$	Turn on delay time	V_{DS}=300V, I_D=2A, R_G=25Ω V_{GS}=10V (note 4,5)		8		ns
t_r	Rising time			22		
$t_{d(off)}$	Turn off delay time			24		
t_f	Fall time			24		
Q_g	Total gate charge	V_{DS}=480V, V_{GS}=10V, I_D=2A (note 4,5)		9		nC
Q_{gs}	Gate-source charge			2		
Q_{gd}	Gate-drain charge			4		

Source to drain diode ratings characteristicsa

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			2	A
I_{SM}	Pulsed source current				8	A
V_{SD}	Diode forward voltage drop.	I_S=2A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=2A, V_{GS}=0V, dI_F/dt=100A/us		320		ns
Q_{rr}	Reverse recovery charge			2.2		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 40mH, I_{AS} = 2A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 2A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

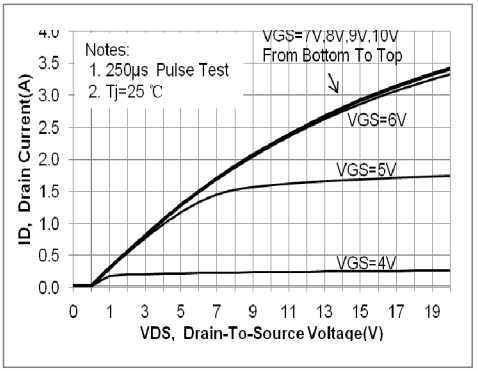


Fig. 2. On-resistance variation vs. drain current and gate voltage

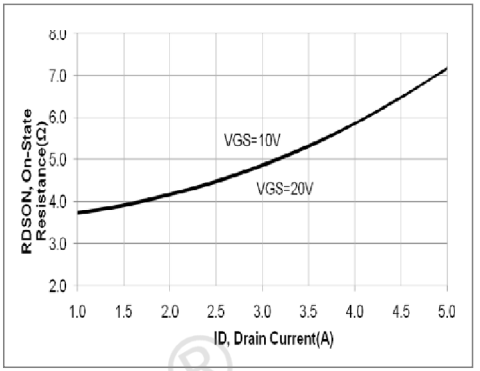


Fig. 3. Gate charge characteristics

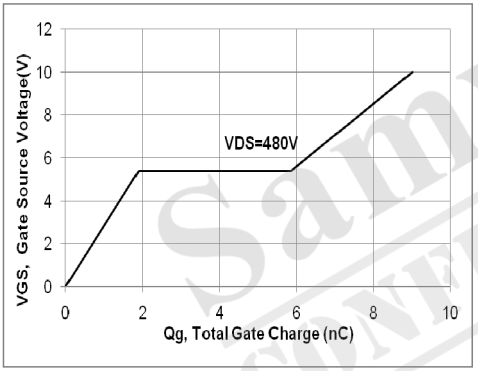


Fig. 4. On state current vs. diode forward voltage

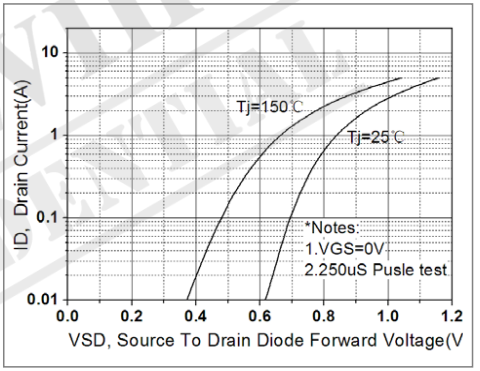


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

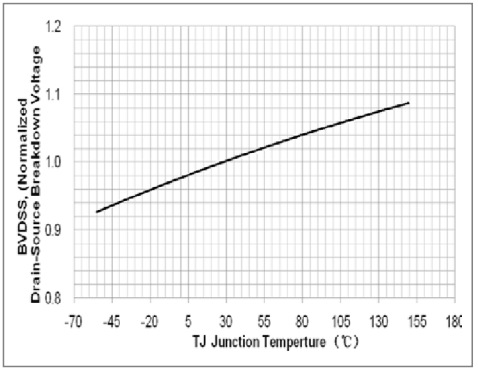


Fig. 6. On resistance variation vs. junction temperature

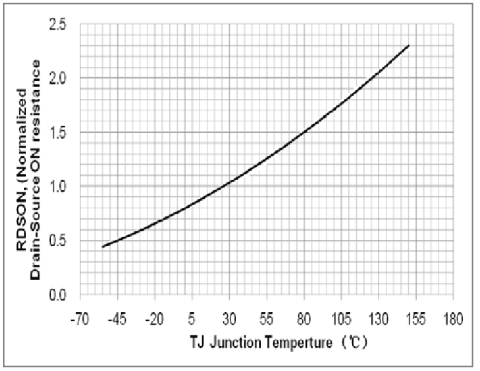


Fig. 7. Maximum safe operating area（TO-251）

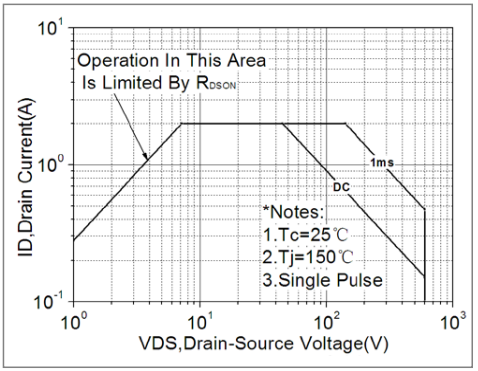


Fig. 8. Transient thermal response curve （TO-251）

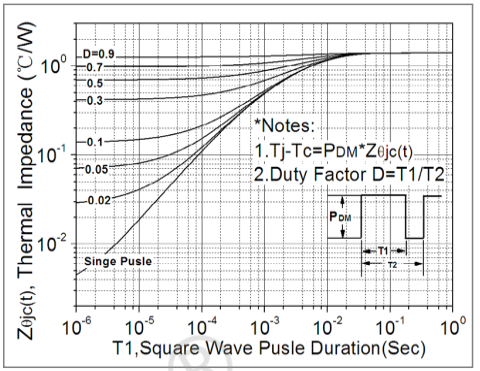


Fig. 9. Maximum safe operating area（TO-252）

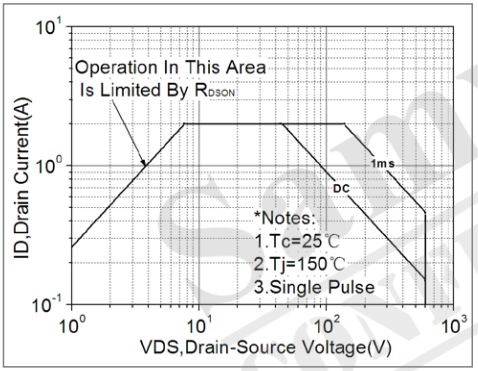


Fig. 10. Transient thermal response curve （TO-252）

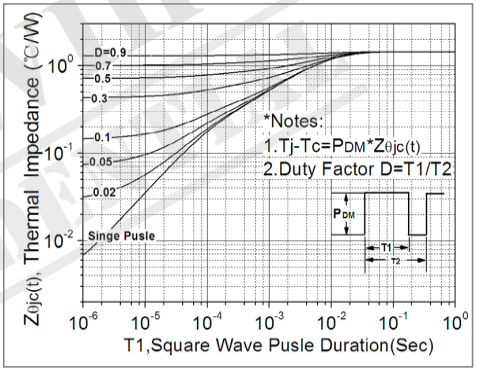


Fig. 11. Maximum safe operating area (TO-220F)

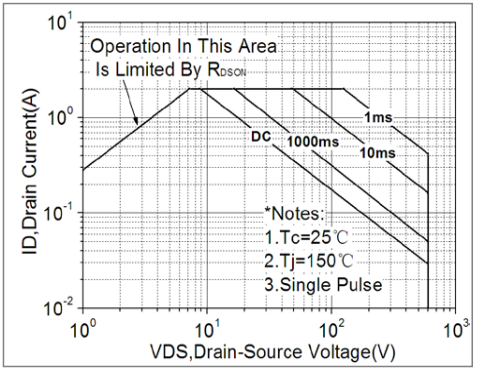


Fig. 12. Transient thermal response curve (TO-220F)

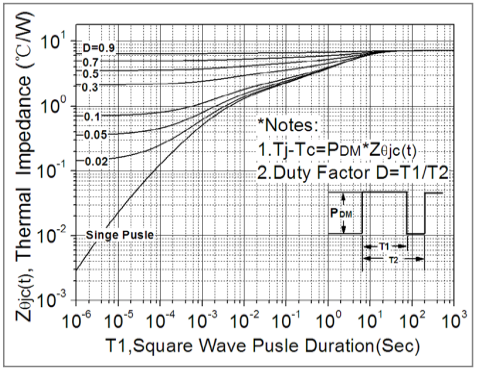


Fig. 13. Capacitance Characteristics

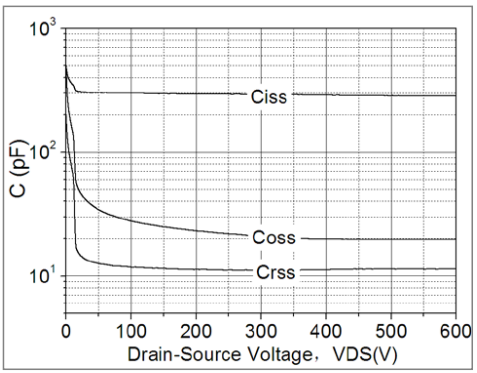


Fig. 14. Gate charge test circuit & waveform

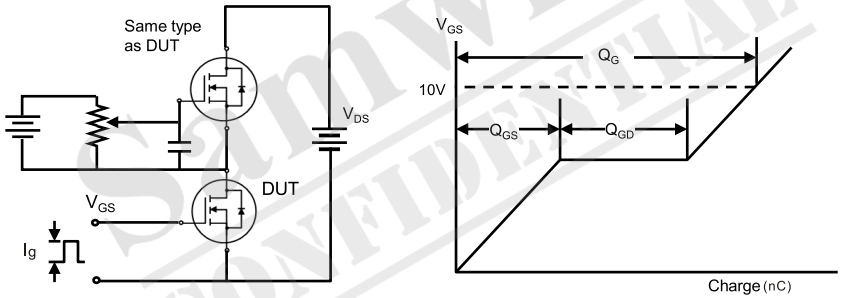


Fig. 15. Switching time test circuit & waveform

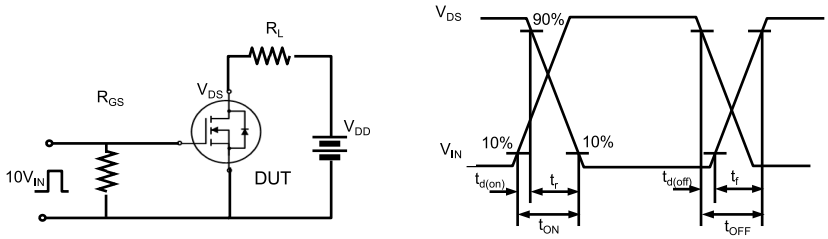


Fig. 16. Unclamped Inductive switching test circuit & waveform

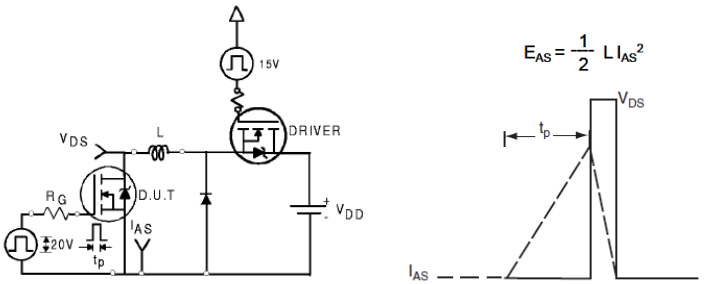
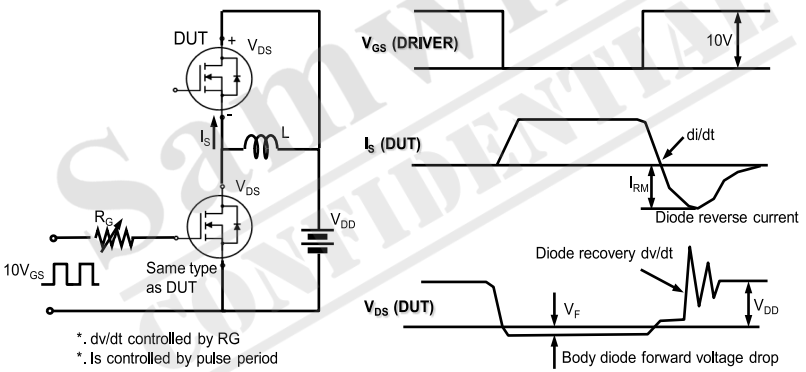


Fig. 17. Peak diode recovery dv/dt test circuit & waveform



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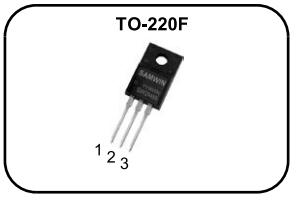
N-channel Enhanced mode TO-220F MOSFET

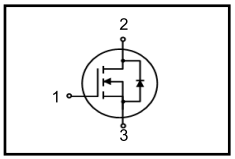
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 3.9Ω)@V_{GS}=10V
- Low Gate Charge (Typ 9nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:Adapter,LED



1. Gate 2. Drain 3. Source

BV_{DSS} : 650V
I_D : 2A
$R_{DS(ON)}$: 3.9Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 2N65D	SW2N65D	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		650	V
I_D	Continuous drain current (@T_C=25°C)		2*	A
	Continuous drain current (@T_C=100°C)		1.3*	A
I_{DM}	Drain current pulsed	(note 1)	8	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	80	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	11	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		17.45	W
	Derating factor above 25°C		0.14	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	7.16	°C/W
R_{thja}	Thermal resistance, Junction to ambient	49.8	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	650			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.46		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=650V, V_{GS}=0V			1	uA
		V_{DS}=520V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D=1A		3.9	4.5	Ω
G_{fs}	Forward transconductance	V_{DS}=20V, I_D=1A		1.5		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		306		pF
C_{oss}	Output capacitance			43		
C_{rss}	Reverse transfer capacitance			14		
$t_{d(on)}$	Turn on delay time	V_{DS}=325V, I_D=2A, R_G=25Ω, V_{GS}=10V (note 4,5)		8		ns
t_r	Rising time			22		
$t_{d(off)}$	Turn off delay time			24		
t_f	Fall time			24		
Q_g	Total gate charge	V_{DS}=520V, V_{GS}=10V, I_D=2A (note 4,5)		9		nC
Q_{gs}	Gate-source charge			2		
Q_{gd}	Gate-drain charge			4		

Source to drain diode ratings characteristicsa

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			2	A
I_{SM}	Pulsed source current				8	A
V_{SD}	Diode forward voltage drop.	I_S=2A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=2A, V_{GS}=0V, dI_F/dt=100A/us		320		ns
Q_{rr}	Reverse recovery charge			2.2		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 40mH, I_{AS} = 2A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 2A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

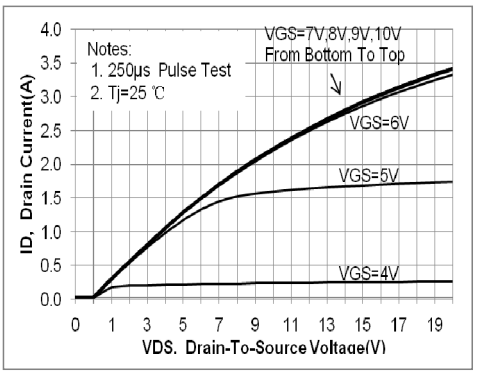


Fig. 2. On-resistance variation vs. drain current and gate voltage

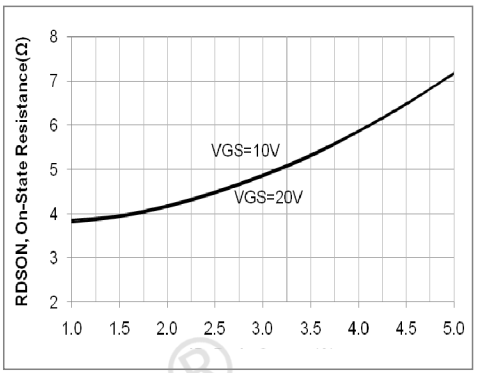


Fig. 3. Gate charge characteristics

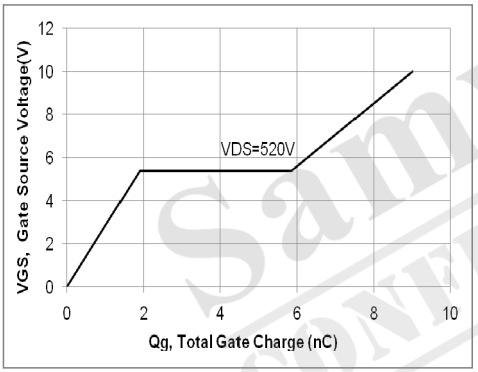


Fig. 4. On state current vs. diode forward voltage

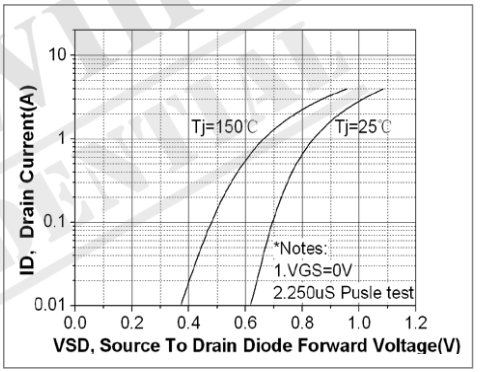


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

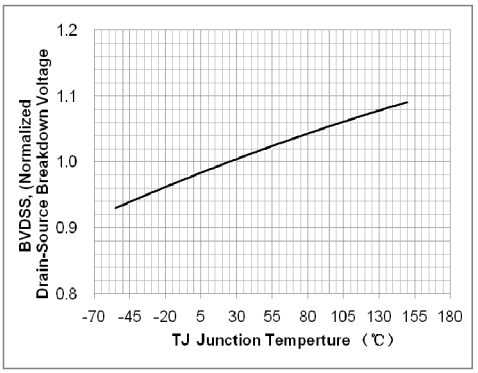


Fig. 6. On resistance variation vs. junction temperature

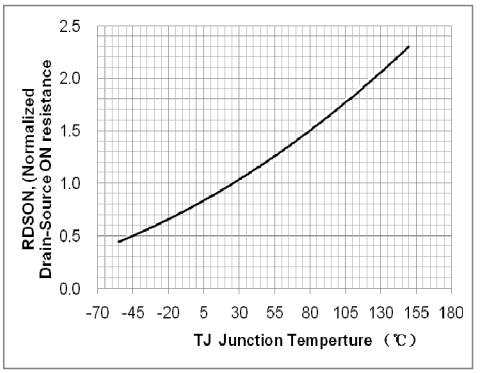


Fig. 7. Maximum safe operating area

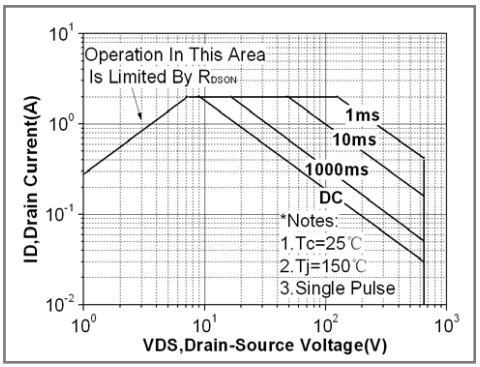


Fig. 8. Capacitance Characteristics

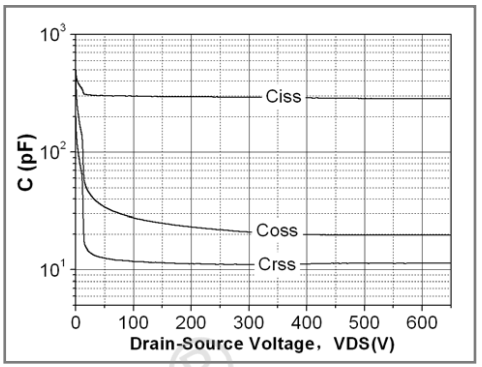


Fig. 9. Transient thermal response curve

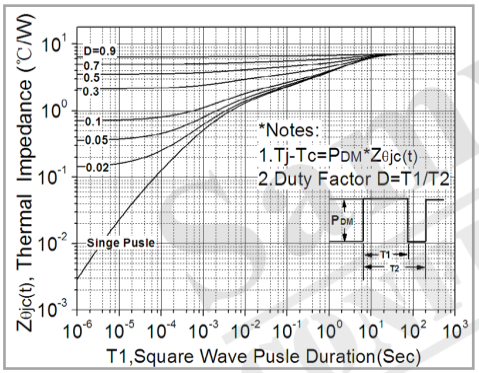
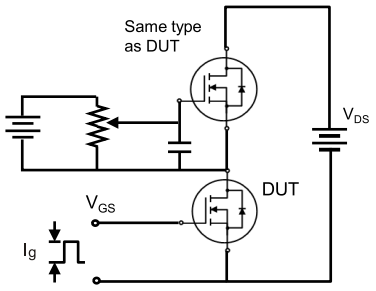


Fig. 10. Gate charge test circuit & waveform



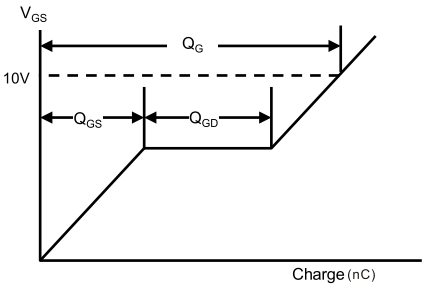


Fig. 11. Switching time test circuit & waveform

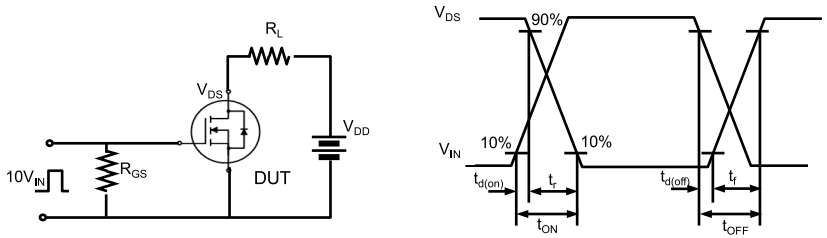


Fig. 12. Unclamped Inductive switching test circuit & waveform

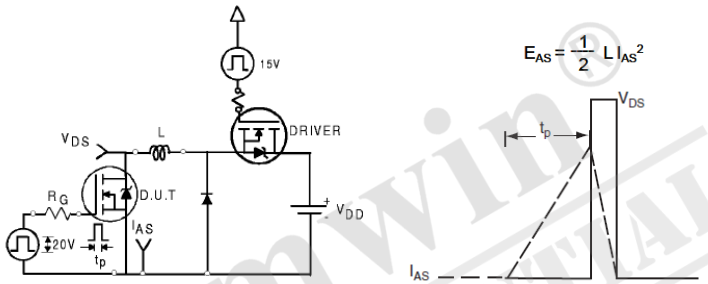
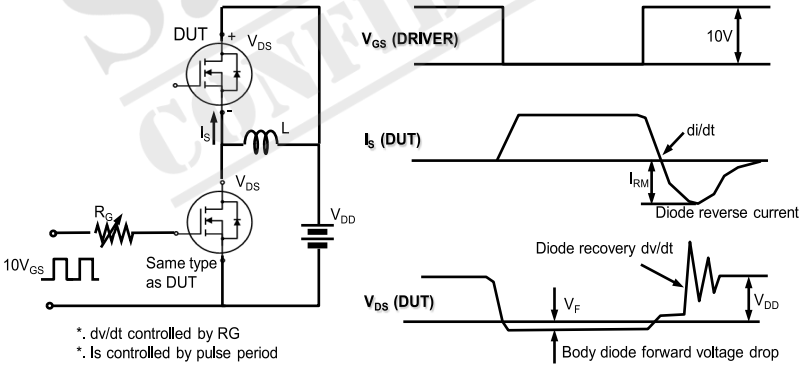


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



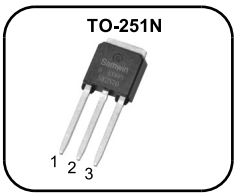
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-251N MOSFET

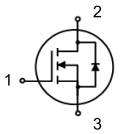
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 5Ω)@V_{GS}=10V
- Low Gate Charge (Typ 11nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: Charger,LED



1. Gate 2. Drain 3. Source

BV_{DSS} : 700V
I_D : 2A
$R_{DS(ON)}$: 5Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW I 2N70D	SW2N70D	TO-251N	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		700	V
I_D	Continuous drain current (@T_C=25°C)		2*	A
	Continuous drain current (@T_C=100°C)		1.2*	A
I_{DM}	Drain current pulsed	(note 1)	8	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	50	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	5	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		76	W
	Derating factor above 25°C		0.6	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	82.8	°C/W
R_{thja}	Thermal resistance, Junction to ambient	1.6	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	700			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C				V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=700V, V_{GS}=0V			1	uA
		V_{DS}=560V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 1A		5	6.2	Ω
Gfs	Forward transconductance	V_{DS} = 30 V, I_D = 1 A		1.9		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		360		pF
C_{oss}	Output capacitance			42		
C_{rss}	Reverse transfer capacitance			13		
$t_{d(on)}$	Turn on delay time	V_{DS}=350V, I_D=2A, R_G=25Ω V_{GS}=10V (note 4,5)		7		ns
t_r	Rising time			22		
$t_{d(off)}$	Turn off delay time			26		
t_f	Fall time			24		
Q_g	Total gate charge	V_{DS}=560V, V_{GS}=10V, I_D=2A (note 4,5)		11		nC
Q_{gs}	Gate-source charge			2		
Q_{gd}	Gate-drain charge			5.5		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			2	A
I_{SM}	Pulsed source current				8	A
V_{SD}	Diode forward voltage drop.	I_S=2A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=2A, V_{GS}=0V, dI_F/dt=100A/us		260		ns
Q_{rr}	Reverse recovery charge			1.3		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 25mH, I_{AS} = 2A, V_{DD} = 25V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 2A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

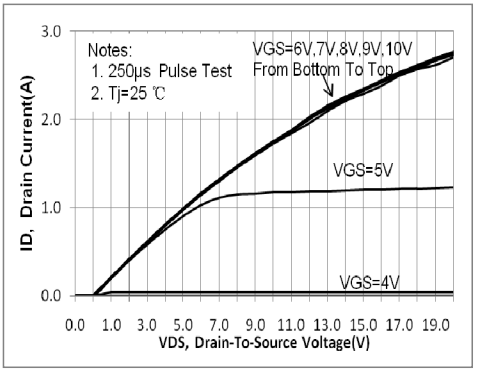


Fig. 2. On-resistance variation vs. drain current and gate voltage

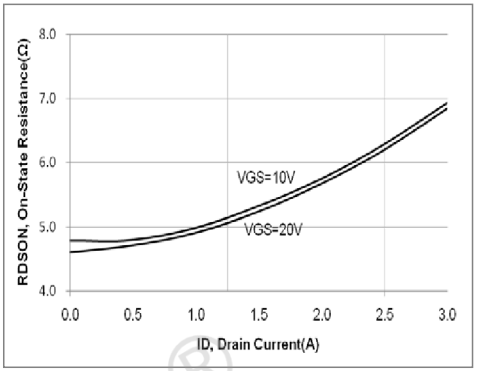


Fig. 3. Gate charge characteristics

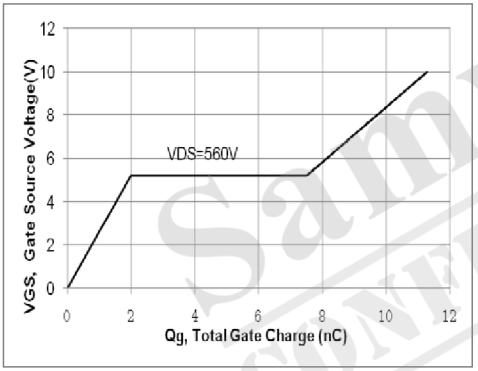


Fig. 4. On state current vs. diode forward voltage

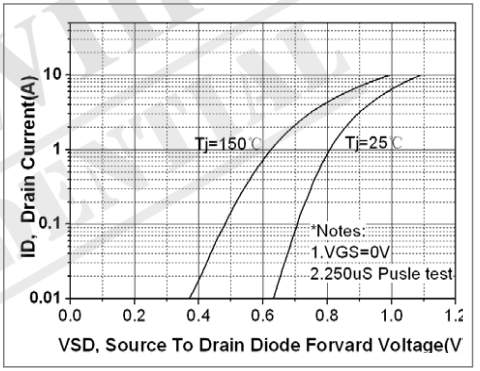


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

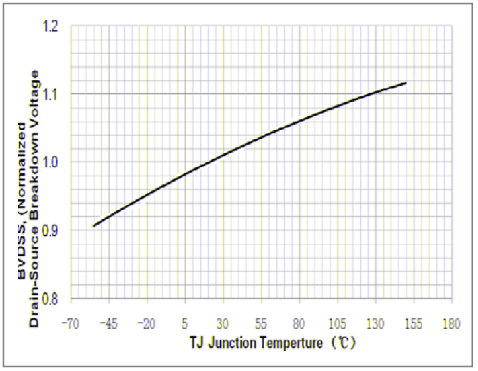


Fig. 6. On resistance variation vs. junction temperature

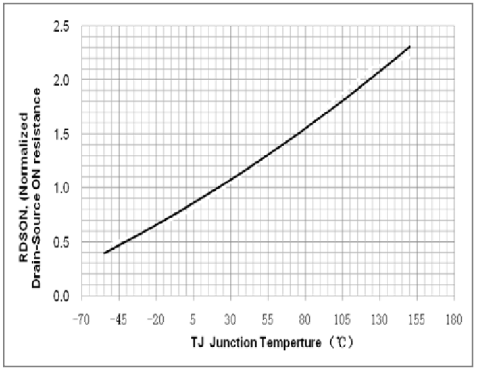


Fig. 7. Maximum safe operating area

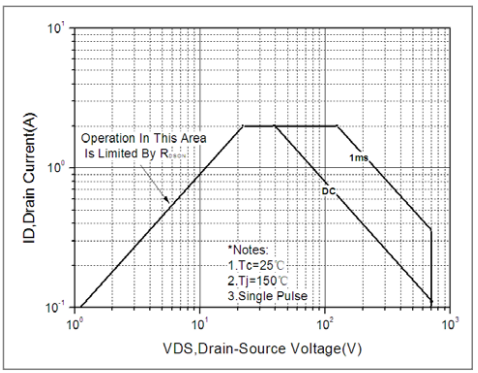


Fig. 8. Transient thermal response curve

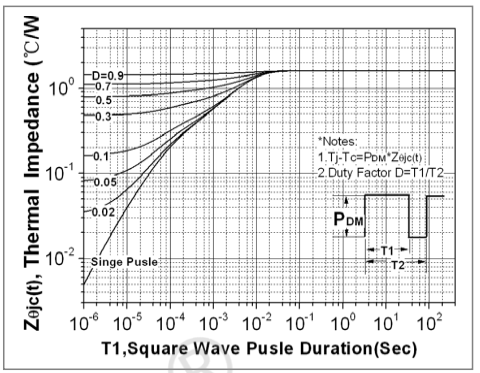


Fig. 9. Capacitance Characteristics

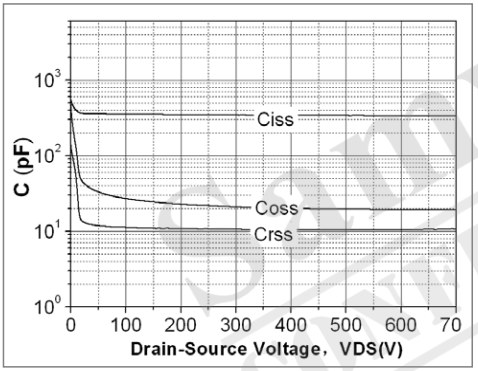
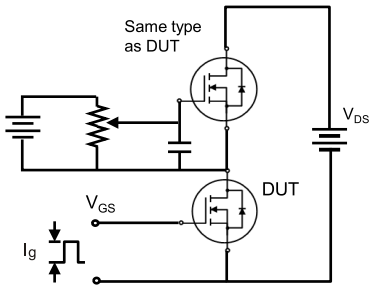


Fig. 10. Gate charge test circuit & waveform



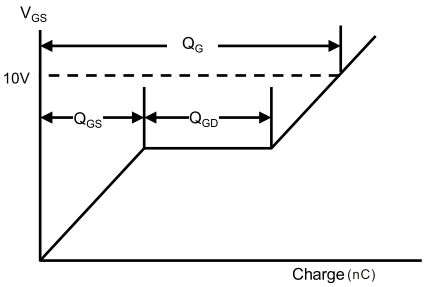


Fig. 11. Switching time test circuit & waveform

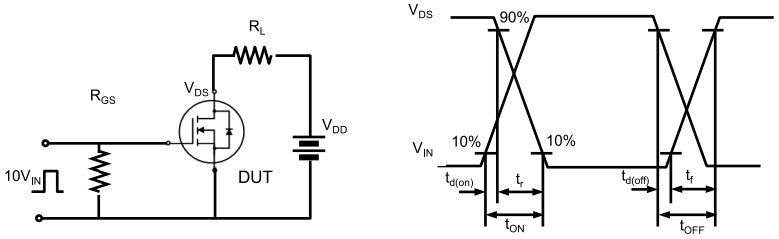


Fig. 12. Unclamped Inductive switching test circuit & waveform

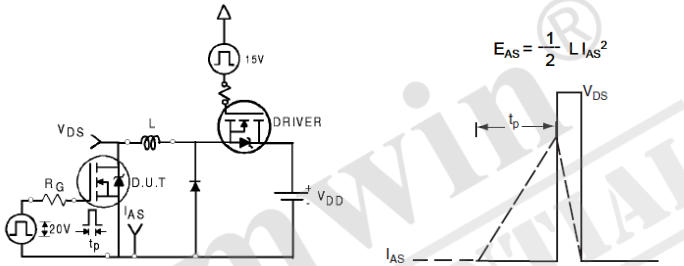
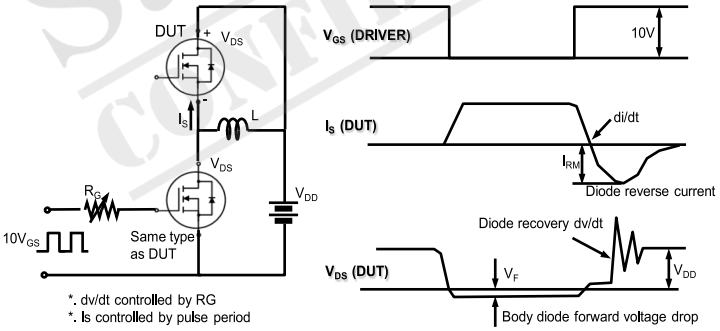


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



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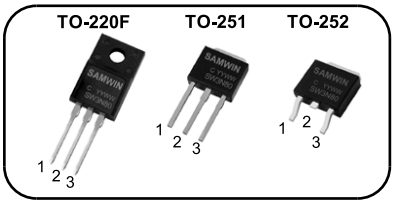
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F/TO-251/TO-252 MOSFET

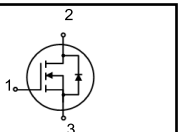
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 3.9Ω)@V_{GS}=10V
- Low Gate Charge (Typ 12nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: Industrial power, LED,Adapter



1. Gate 2. Drain 3. Source

BV_{DSS} : 800V
I_D : 3.0A
$R_{DS(ON)}$: 3.9Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 3N80C	SW3N80C	TO-220F	TUBE
2	SW I 3N80C	SW3N80C	TO-251	TUBE
3	SW D 3N80C	SW3N80C	TO-252	REEL

Absolute maximum ratings

Symbol	Parameter		Value		Unit
			TO-220F	TO-251/TO-252	
V_{DSS}	Drain to source voltage		800		V
I_D	Continuous drain current (@T_C=25°C)		3.0*		A
	Continuous drain current (@T_C=100°C)		1.9*		A
I_{DM}	Drain current pulsed	(note 1)	12		A
V_{GS}	Gate to source voltage		±30		V
E_{AS}	Single pulsed avalanche energy	(note 2)	260		mJ
E_{AR}	Repetitive avalanche energy	(note 1)	20		mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5		V/ns
P_D	Total power dissipation (@T_C=25°C)		18.4	147	W
	Derating factor above 25°C		0.15	1.1	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150		°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300		°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value		Unit
		TO-220F	TO-251/TO-252	
R_{thjc}	Thermal resistance, Junction to case	6.8	0.85	°C/W
R_{thja}	Thermal resistance, Junction to ambient	50	70	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	800			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.95		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=800V, V_{GS}=0V			1	uA
		V_{DS}=640V, T_C=125°C			20	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.0		4.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 1.5A		3.9	4.9	Ω
G_{fs}	Forward transconductance	V_{DS} = 40 V, I_D = 2 A		2.2		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		410		pF
C_{oss}	Output capacitance			60		
C_{rss}	Reverse transfer capacitance			13		
$t_{d(on)}$	Turn on delay time	V_{DS}=400V, I_D=3.0A, R_G=25Ω V_{GS}=10V (note 4,5)		11		ns
t_r	Rising time			26		
$t_{d(off)}$	Turn off delay time			26		
t_f	Fall time			25		
Q_g	Total gate charge	V_{DS}=640V, V_{GS}=10V, I_D=3.0A (note 4,5)		12.5		nC
Q_{gs}	Gate-source charge			3		
Q_{gd}	Gate-drain charge			8		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			3	A
I_{SM}	Pulsed source current				12	A
V_{SD}	Diode forward voltage drop.	I_S=3.0A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=3.0A, V_{GS}=0V, dI_F/dt=100A/us		470		ns
Q_{rr}	Reverse recovery charge			2.1		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 57mH, I_{AS} = 3.0A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 3.0A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

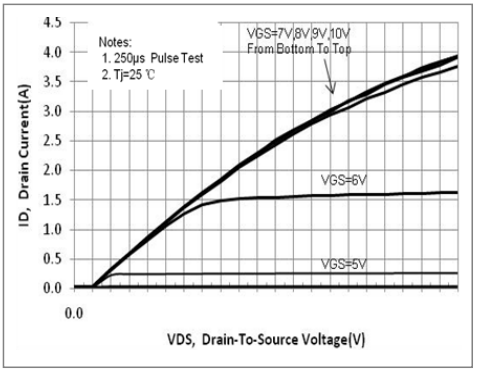


Fig. 2. On-resistance variation vs. drain current and gate voltage

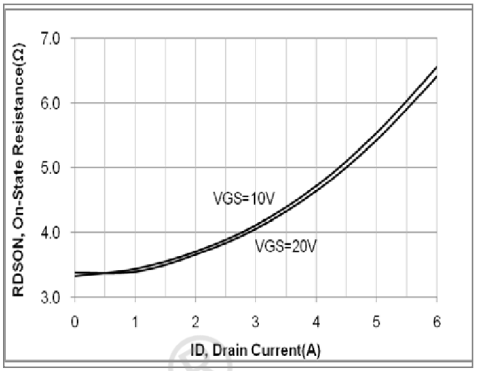


Fig. 3. Gate charge characteristics

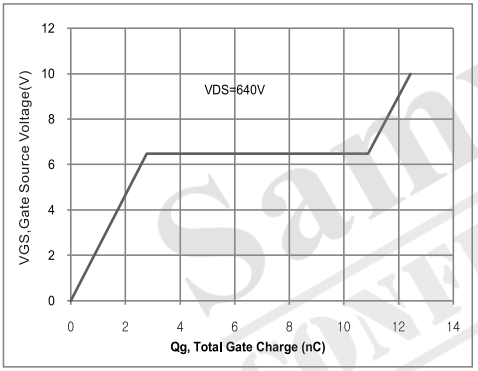


Fig. 4. On state current vs. diode forward voltage

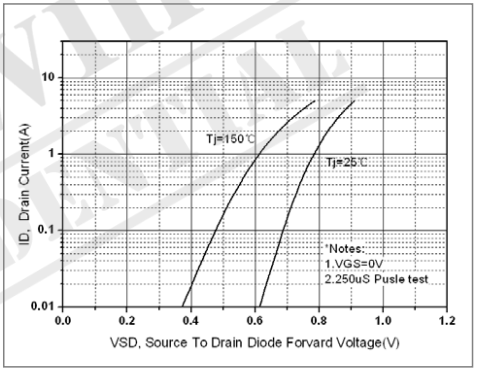


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

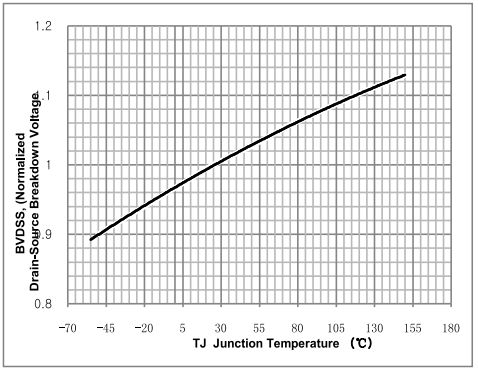


Fig. 6. On resistance variation vs. junction temperature

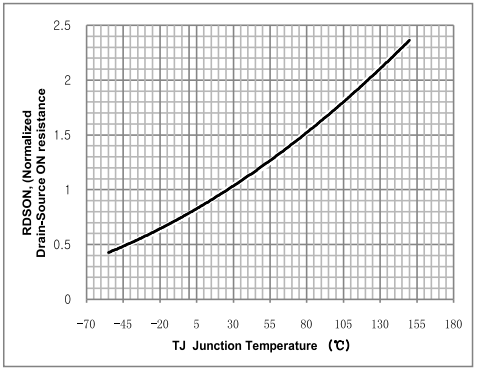


Fig. 7. Maximum safe operating area (TO-220F)

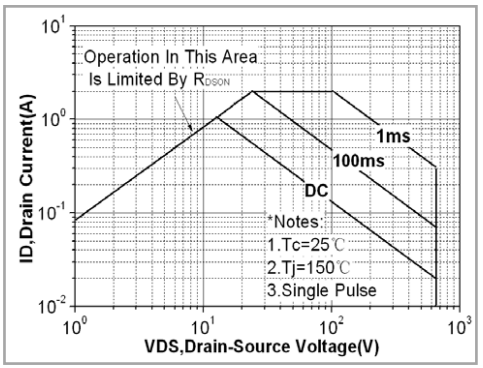


Fig. 8. Transient thermal response curve(TO-220F)

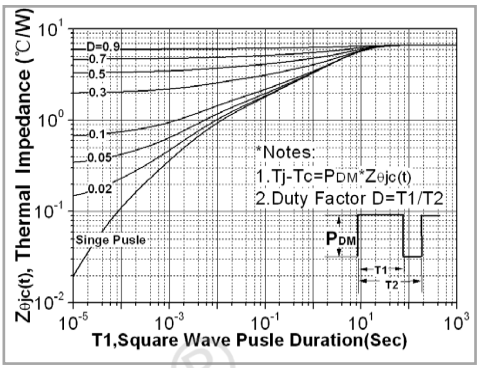


Fig. 9. Maximum safe operating area (TO-251/TO-252)

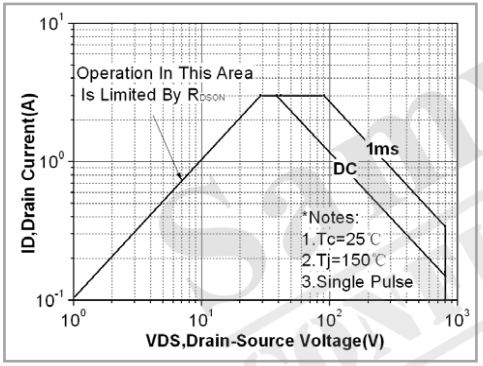


Fig. 10. Transient thermal response curve (TO-251/TO-252)

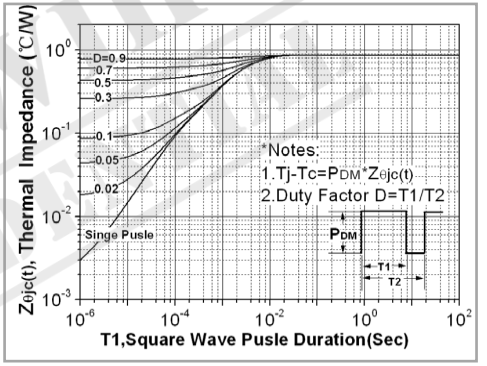


Fig. 11. Capacitance Characteristics

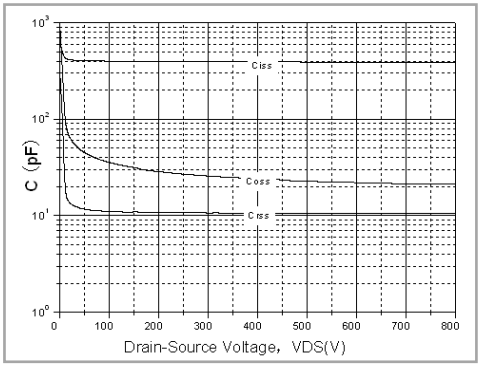


Fig. 12. Gate charge test circuit & waveform

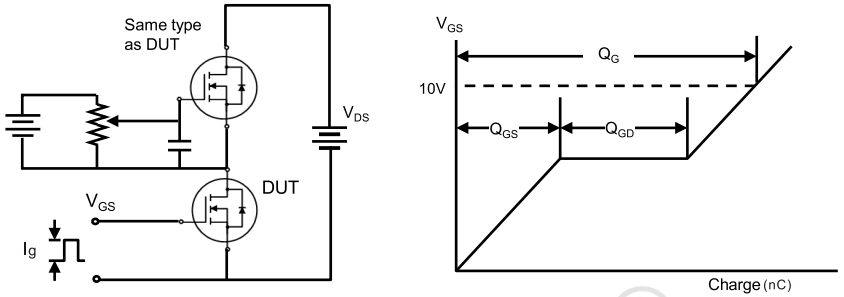


Fig. 13. Switching time test circuit & waveform

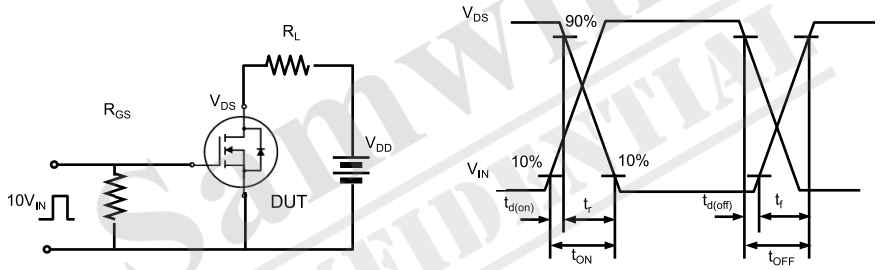


Fig. 14. Unclamped Inductive switching test circuit & waveform

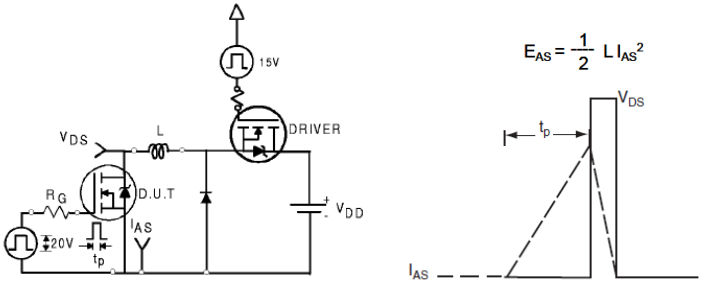
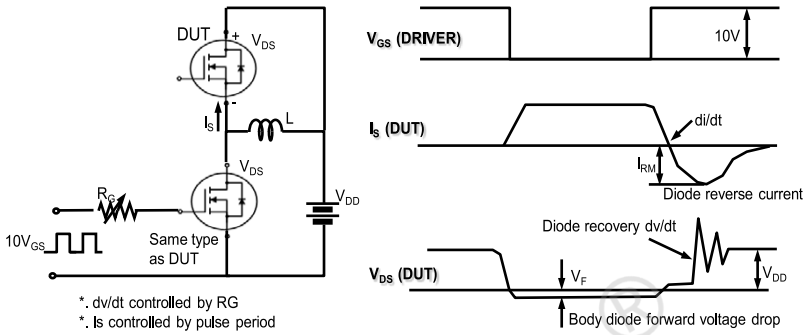


Fig. 15. Peak diode recovery dv/dt test circuit & waveform



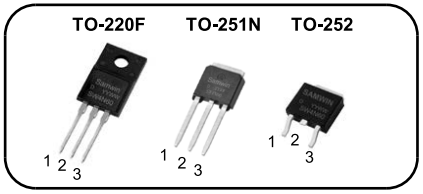
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F/TO-251N/TO-252 MOSFET

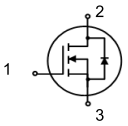
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 2.0Ω)@V_{GS}=10V
- Low Gate Charge (Typ 18nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:Adapter,LED,Charger



1. Gate 2. Drain 3. Source

BV_{DSS} : 600V
I_D : 4A
$R_{DS(ON)}$: 2.0Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 4N60D	SW4N60D	TO-220F	TUBE
2	SW I 4N60D	SW4N60D	TO-251N	TUBE
3	SW D 4N60D	SW4N60D	TO-252	REEL

Absolute maximum ratings

Symbol	Parameter	Value			Unit
		TO-220F	TO-251N	TO-252	
V_{DSS}	Drain to source voltage	600			V
I_D	Continuous drain current (@T_C=25°C)	4*			A
	Continuous drain current (@T_C=100°C)	2.5*			A
I_{DM}	Drain current pulsed (note 1)	16			A
V_{GS}	Gate to source voltage	±30			V
E_{AS}	Single pulsed avalanche energy (note 2)	184			mJ
E_{AR}	Repetitive avalanche energy (note 1)	55			mJ
dv/dt	Peak diode recovery dv/dt (note 3)	5			V/ns
P_D	Total power dissipation (@T_C=25°C)	23.5	152.6	141.0	W
	Derating factor above 25°C	0.19	1.22	1.13	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature	-55 ~ + 150			°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.	300			°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value			Unit
		TO-220F	TO-251N	TO-252	
R_{thjc}	Thermal resistance, Junction to case	5.31	0.82	0.89	°C/W
R_{thja}	Thermal resistance, Junction to ambient	47.1	83.5	79.0	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	600			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.47		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=600V, V_{GS}=0V			1	uA
		V_{DS}=480V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 2A		2.0	2.2	Ω
G_{fs}	Forward transconductance	V_{DS} = 30 V, I_D = 2 A		3.9		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		522		pF
C_{oss}	Output capacitance			57		
C_{rss}	Reverse transfer capacitance			49		
$t_{d(on)}$	Turn on delay time	V_{DS}=300V, I_D=4A, R_G=25Ω V_{GS}=10V (note 4,5)		10		ns
t_r	Rising time			25		
$t_{d(off)}$	Turn off delay time			37		
t_f	Fall time			25		
Q_g	Total gate charge	V_{DS}=480V, V_{GS}=10V, I_D=4A (note 4,5)		18		nC
Q_{gs}	Gate-source charge			3		
Q_{gd}	Gate-drain charge			9		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			4	A
I_{SM}	Pulsed source current				16	A
V_{SD}	Diode forward voltage drop.	I_S=4A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=4A, V_{GS}=0V, dI_F/dt=100A/us		233		ns
Q_{rr}	Reverse recovery charge			1.6		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 22.8mH, I_{AS} = 4A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 4A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

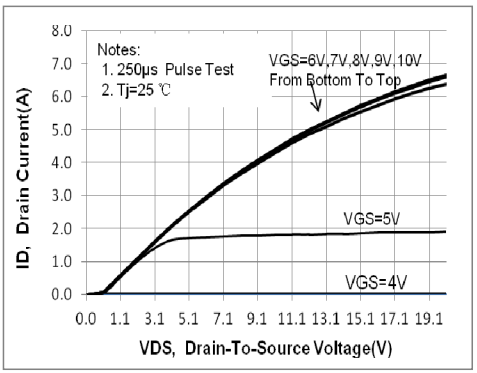


Fig. 2. On-resistance variation vs. drain current and gate voltage

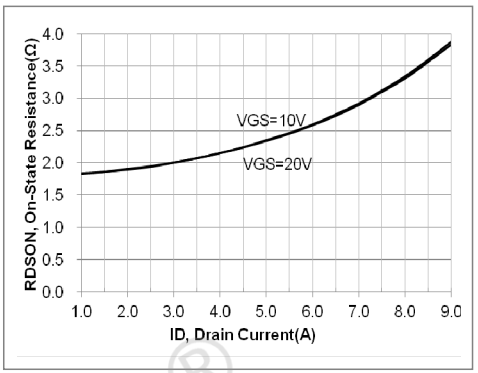


Fig. 3. Gate charge characteristics

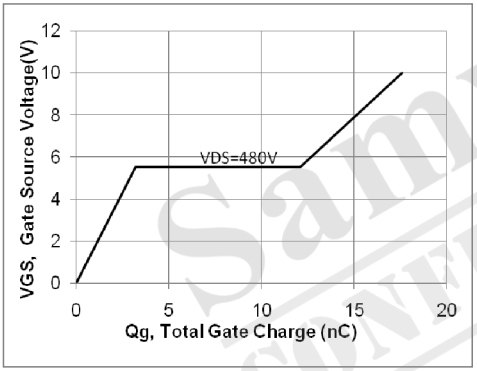


Fig. 4. On state current vs. diode forward voltage

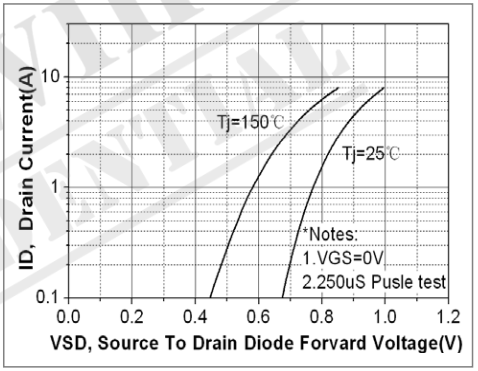


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

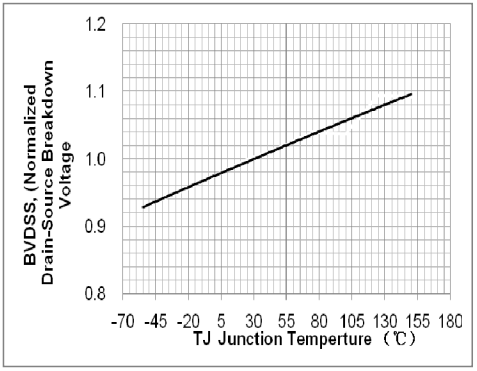


Fig. 6. On resistance variation vs. junction temperature

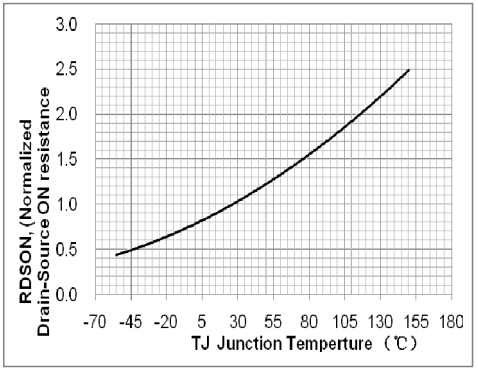


Fig. 7. Maximum safe operating area（TO-220F）

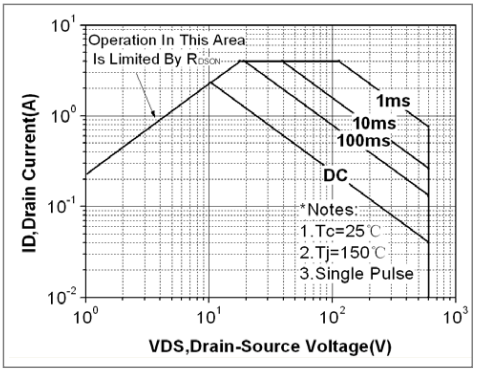


Fig. 8. Transient thermal response curve(TO-220F)

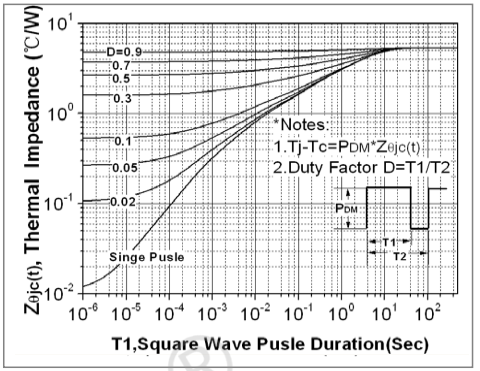


Fig. 9. Maximum safe operating area（TO-251N）

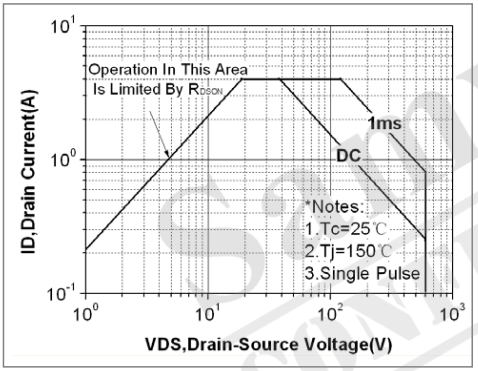


Fig. 10. Transient thermal response curve(TO-251N)

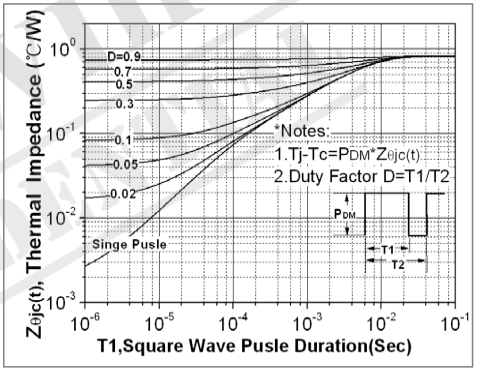


Fig. 11. Maximum safe operating area（TO-252）

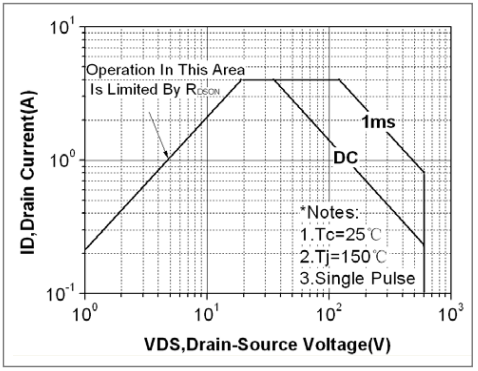


Fig. 12. Transient thermal response curve(TO-252)

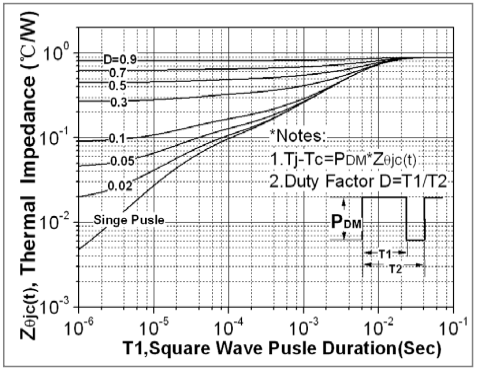


Fig. 13. Capacitance Characteristics

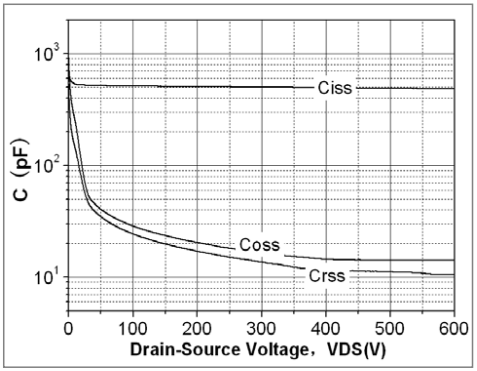


Fig. 14. Gate charge test circuit & waveform

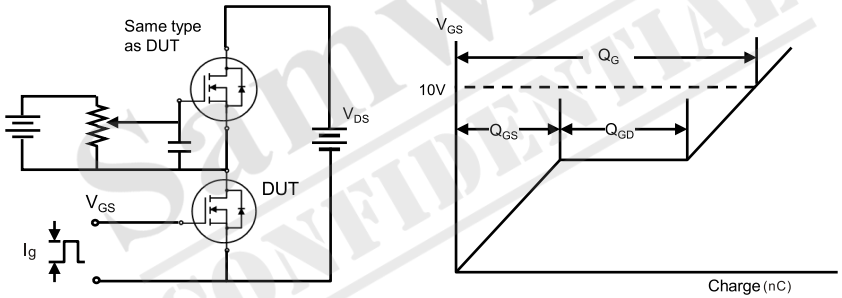


Fig. 15. Switching time test circuit & waveform

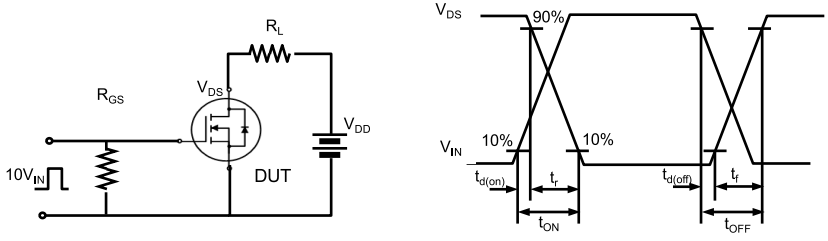


Fig. 16. Unclamped Inductive switching test circuit & waveform

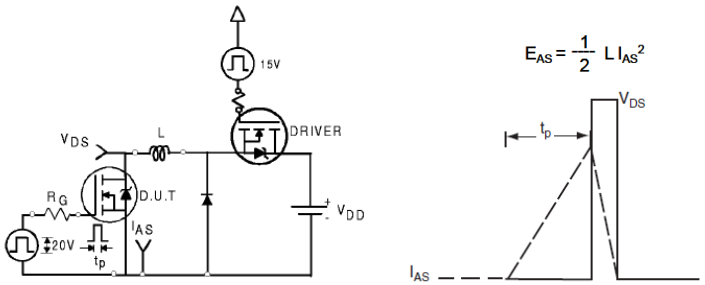
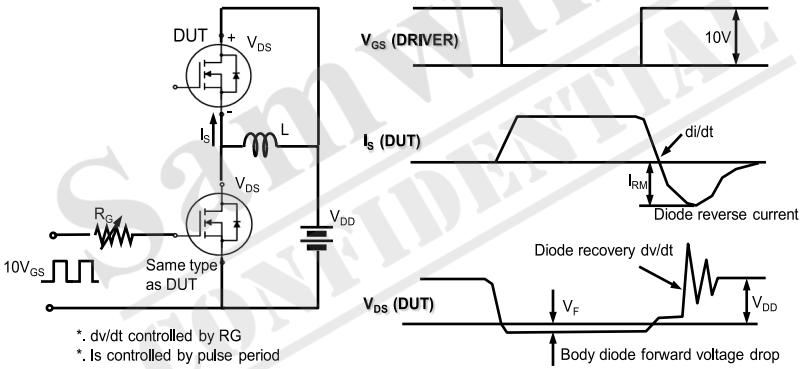


Fig. 17. Peak diode recovery dv/dt test circuit & waveform



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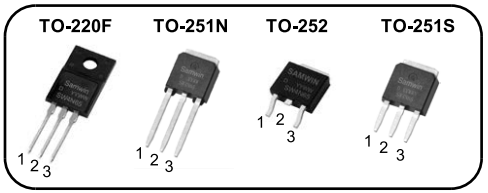
N-channel Enhanced mode TO-220F/TO-251N/TO-252/ TO-251S MOSFET

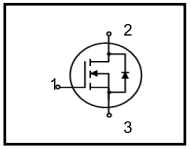
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 2Ω)@V_{GS}=10V
- Low Gate Charge (Typ 15nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: Charger,TV-POWER



1. Gate 2. Drain 3. Source

BV_{DSS} : 650V
I_D : 4A
$R_{DS(ON)}$: 2Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 4N65D	SW4N65D	TO-220F	TUBE
2	SW I 4N65D	SW4N65D	TO-251N	TUBE
3	SW D 4N65D	SW4N65D	TO-252	REEL
4	SW S 4N65D	SW4N65D	TO-251S	TUBE

Absolute maximum ratings

Symbol	Parameter		Value				Unit
			TO-220F	TO-251N	TO-252	TO-251S	
V_{DSS}	Drain to source voltage		650				V
I_D	Continuous drain current (@T_C=25°C)		4*				A
	Continuous drain current (@T_C=100°C)		2.5*				A
I_{DM}	Drain current pulsed	(note 1)	16				A
V_{GS}	Gate to source voltage		±30				V
E_{AS}	Single pulsed avalanche energy	(note 2)	184				mJ
E_{AR}	Repetitive avalanche energy	(note 1)	15				mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5				V/ns
P_D	Total power dissipation (@T_C=25°C)		23.3	157.1	144.4	157.1	W
	Derating Factor above 25°C		0.19	1.26	1.15	1.26	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150				°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300				°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value				Unit
		TO-220F	TO-251N	TO-252	TO-251S	
R_{thjc}	Thermal resistance, Junction to case	5.36	0.80	0.87	0.80	°C/W
R_{thja}	Thermal resistance, Junction to ambient	48.7	81.4	79.6	81.4	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	650			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.48		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=650V, V_{GS}=0V			1	uA
		V_{DS}=520V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D=2A		2	2.6	Ω
Gfs	Forward transconductance	V_{DS}=30V, I_D=2A		3.8		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		531		pF
C_{oss}	Output capacitance			60		
C_{rss}	Reverse transfer capacitance			50		
$t_{d(on)}$	Turn on delay time	V_{DS}=325V, I_D=4A, R_G=25Ω V_{GS}=10V (note 4,5)		11		ns
t_r	Rising time			26		
$t_{d(off)}$	Turn off delay time			42		
t_f	Fall time			27		
Q_g	Total gate charge	V_{DS}=520V, V_{GS}=10V, I_D=4A (note 4,5)		15		nC
Q_{gs}	Gate-source charge			5.5		
Q_{gd}	Gate-drain charge			4.9		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			4	A
I_{SM}	Pulsed source current				16	A
V_{SD}	Diode forward voltage drop.	I_S=4A, V_{GS}=0V			1.4	V
T_{rr}	Reverse recovery time	I_S=4A, V_{GS}=0V, dI_F/dt=100A/us		229		ns
Q_{rr}	Reverse recovery charge			1.6		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 22.8mH, I_{AS} = 4A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 4A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

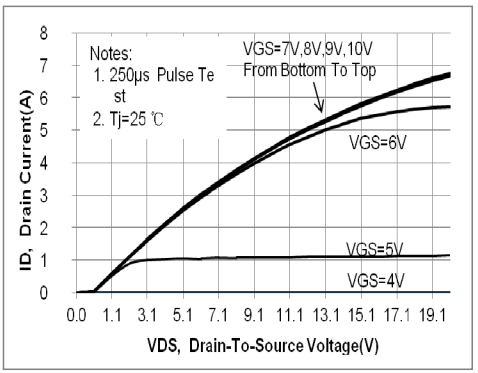


Fig. 2. On-resistance variation vs. drain current and gate voltage

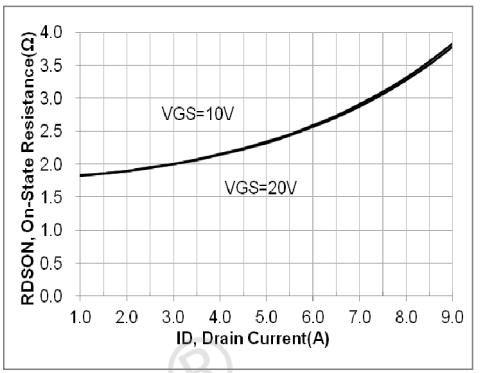


Fig. 3. Gate charge characteristics

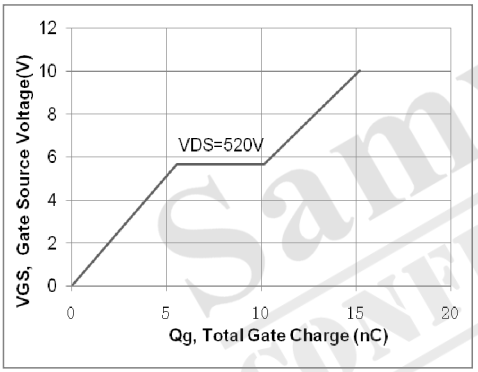


Fig. 4. On state current vs. diode forward voltage

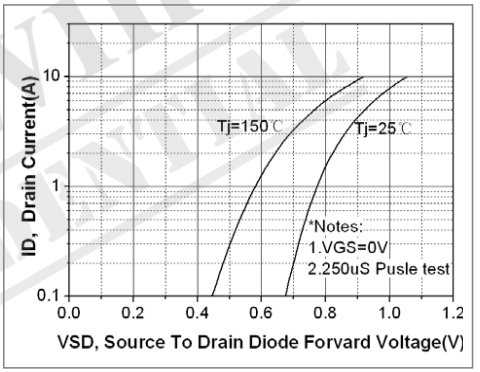


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

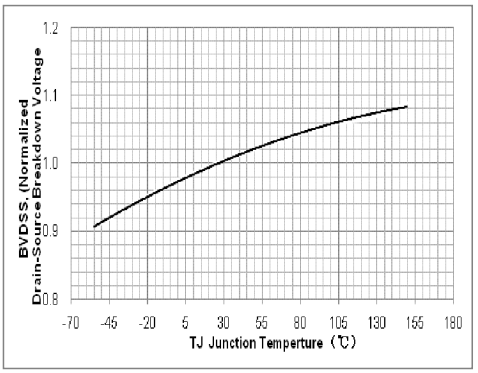


Fig. 6. On resistance variation vs. junction temperature

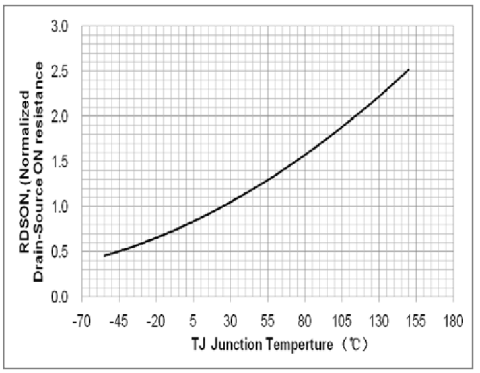


Fig. 7. Maximum safe operating area（TO-220F）

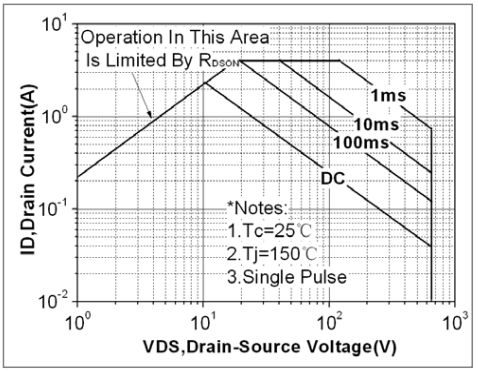


Fig. 8. Transient thermal response curve（TO-220F）

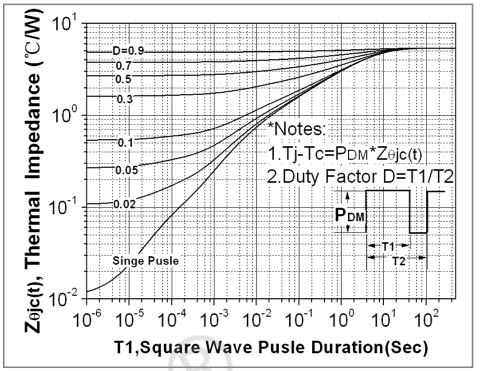


Fig. 9. Maximum safe operating area（TO-251N&TO-251S）

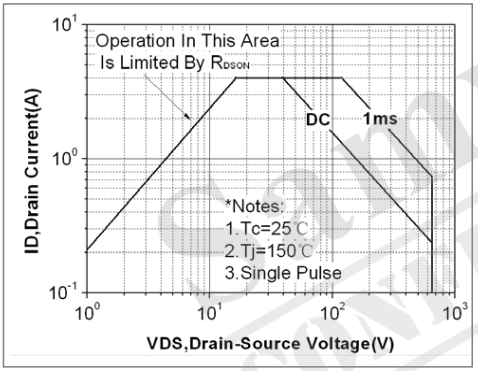


Fig. 10. Transient thermal response curve（TO-251N&TO-251S）

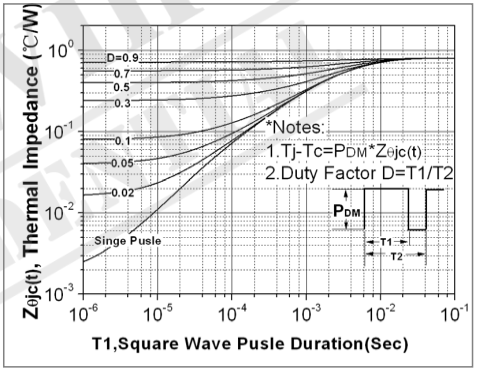


Fig. 11. Maximum safe operating area（TO-252）

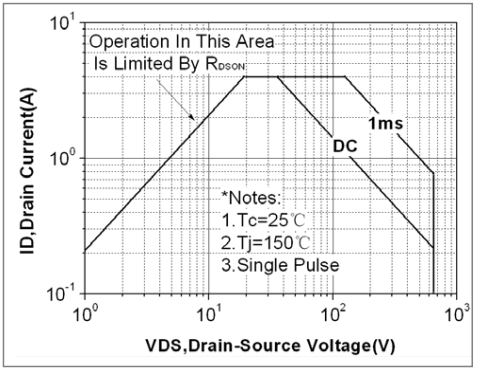


Fig. 12. Transient thermal response curve（TO-252）

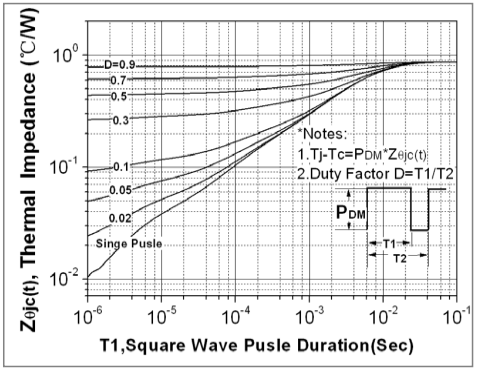


Fig. 13. Capacitance Characteristics

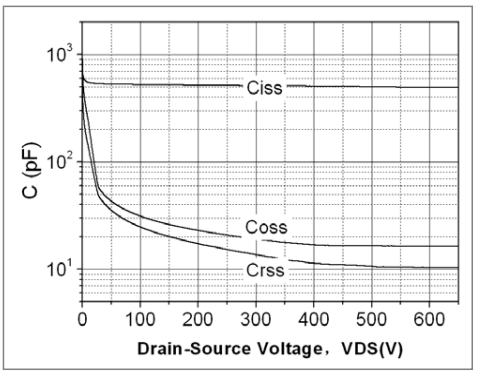


Fig. 14. Gate charge test circuit & waveform

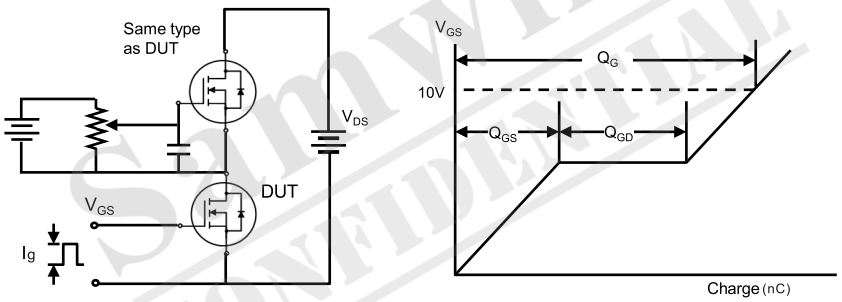


Fig. 15. Switching time test circuit & waveform

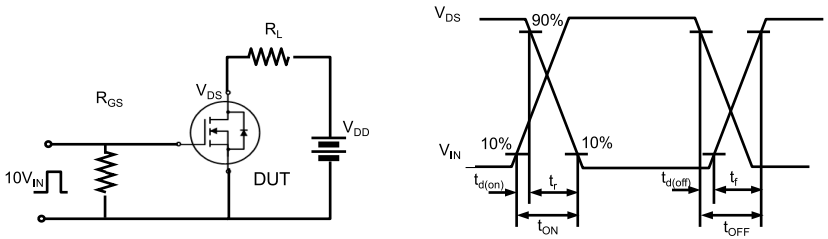


Fig. 16. Unclamped Inductive switching test circuit & waveform

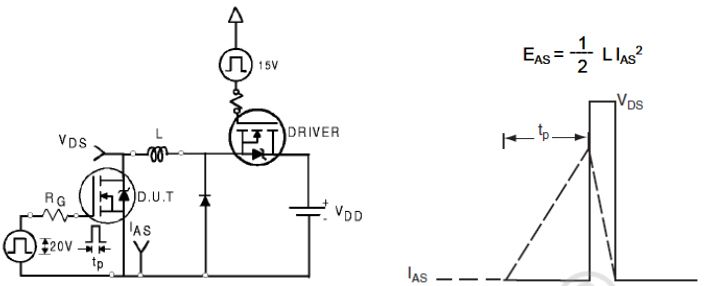
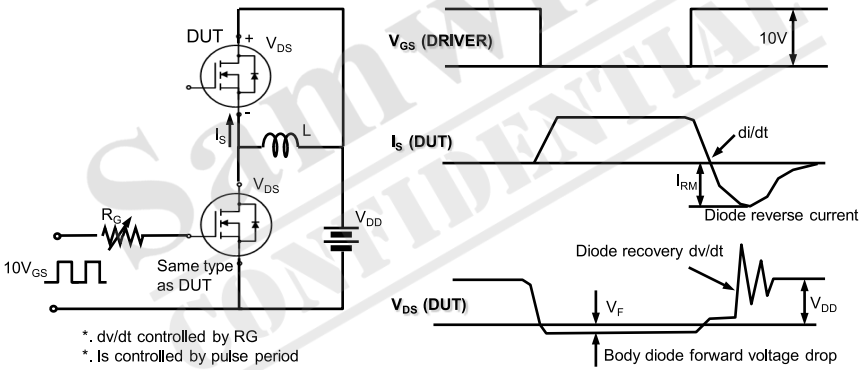


Fig. 17. Peak diode recovery dv/dt test circuit & waveform



DISCLAIMER

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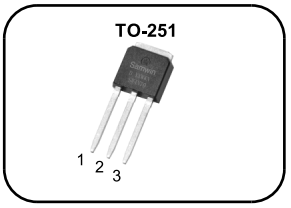
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-251 MOSFET

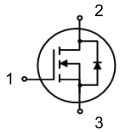
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 2.3Ω)@V_{GS}=10V
- Low Gate Charge (Typ 20nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:Charger,LED



1. Gate 2. Drain 3. Source

BV_{DSS} : 700V
I_D : 4A
$R_{DS(ON)}$: 2.3Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW I 4N70D	SW4N70D	TO-251	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		700	V
I_D	Continuous drain current (@T_C=25°C)		4*	A
	Continuous drain current (@T_C=100°C)		2.5*	A
I_{DM}	Drain current pulsed	(note 1)	16	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	200	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	10	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		145	W
	Derating factor above 25°C		1.16	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	0.86	°C/W
R_{thja}	Thermal resistance, Junction to ambient	81.4	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	700			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C				V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=700V, V_{GS}=0V			1	uA
		V_{DS}=560V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D =2A		2.3	2.7	Ω
Gfs	Forward transconductance	V_{DS} = 30V, I_D =2 A		3.3		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		790		pF
C_{oss}	Output capacitance			72		
C_{rss}	Reverse transfer capacitance			16		
$t_{d(on)}$	Turn on delay time	V_{DS}=350V, I_D=4A, R_G=25Ω V_{GS}=10V (note 4,5)		13		ns
t_r	Rising time			26		
$t_{d(off)}$	Turn off delay time			51		
t_f	Fall time			28		
Q_g	Total gate charge	V_{DS}=560V, V_{GS}=10V, I_D=4A (note 4,5)		20		nC
Q_{gs}	Gate-source charge			4.5		
Q_{gd}	Gate-drain charge			9		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			4	A
I_{SM}	Pulsed source current				16	A
V_{SD}	Diode forward voltage drop.	I_S=4A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=4A, V_{GS}=0V, dI_F/dt=100A/us		290		ns
Q_{rr}	Reverse recovery charge			2.5		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 25mH, I_{AS} = 4A, V_{DD} =100 V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 4A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

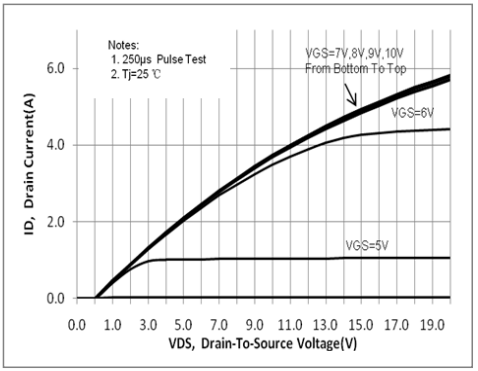


Fig. 2. On-resistance variation vs. drain current and gate voltage

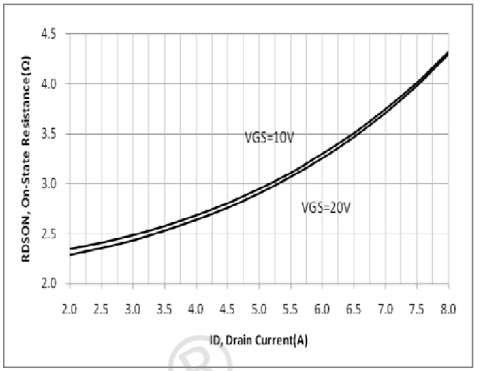


Fig. 3. Gate charge characteristics

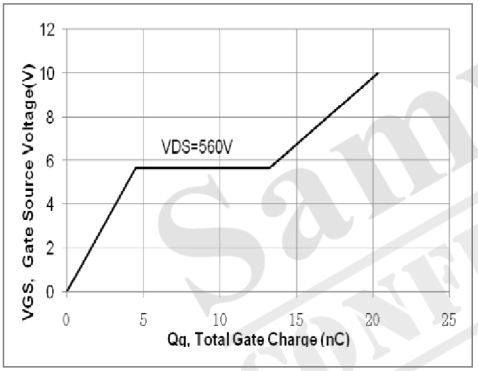


Fig. 4. On state current vs. diode forward voltage

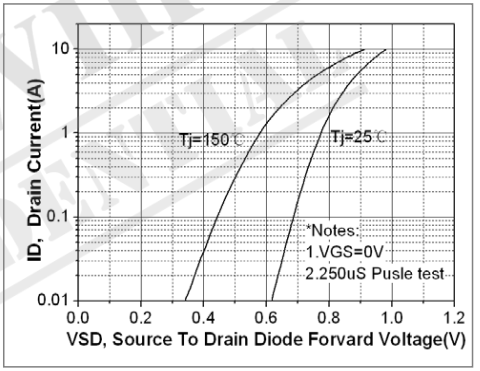


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

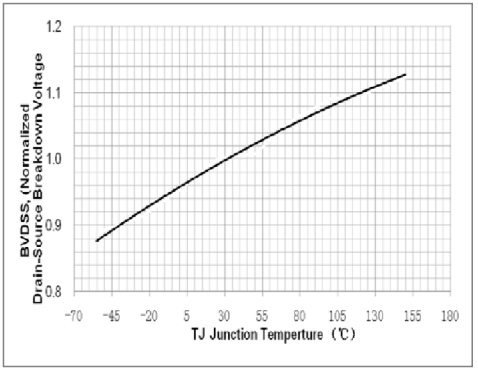


Fig. 6. On resistance variation vs. junction temperature

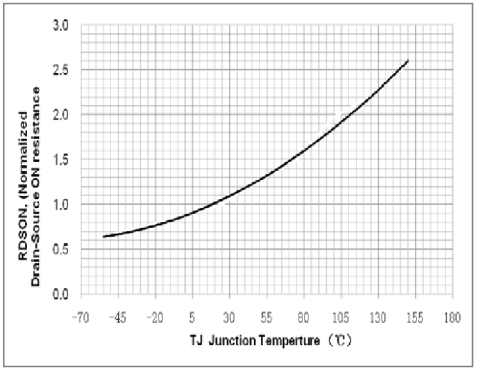


Fig. 7. Maximum safe operating area

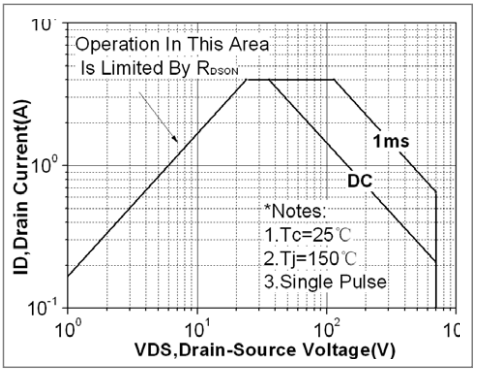


Fig. 8. Transient thermal response curve

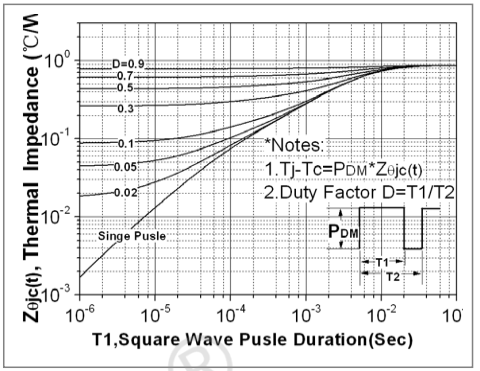


Fig. 9. Capacitance Characteristics

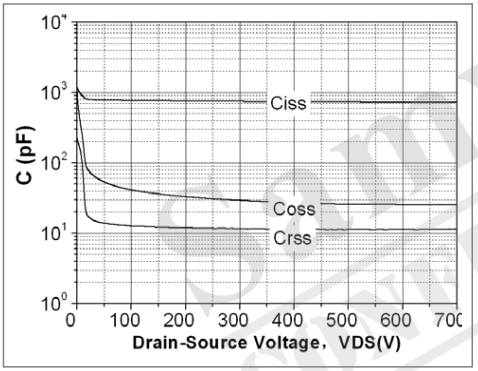
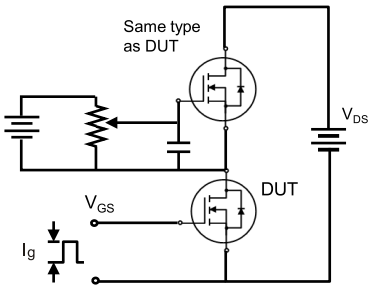


Fig. 10. Gate charge test circuit & waveform



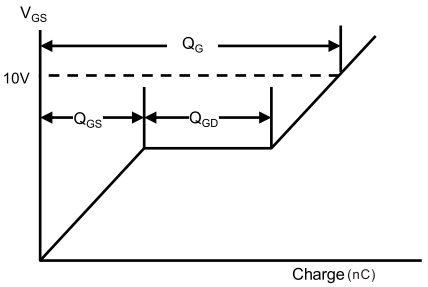


Fig. 11. Switching time test circuit & waveform

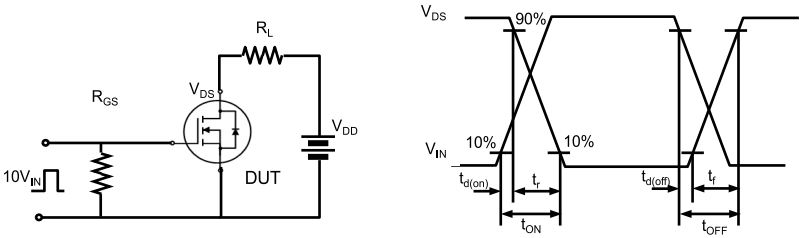


Fig. 12. Unclamped Inductive switching test circuit & waveform

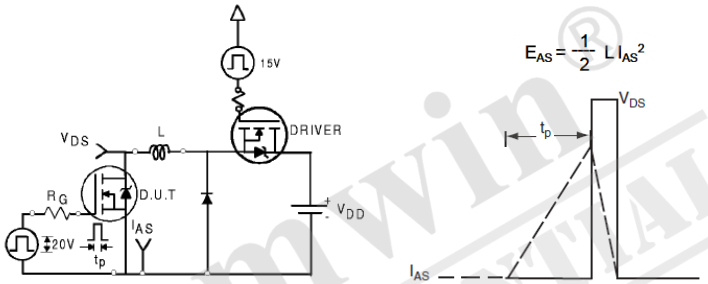
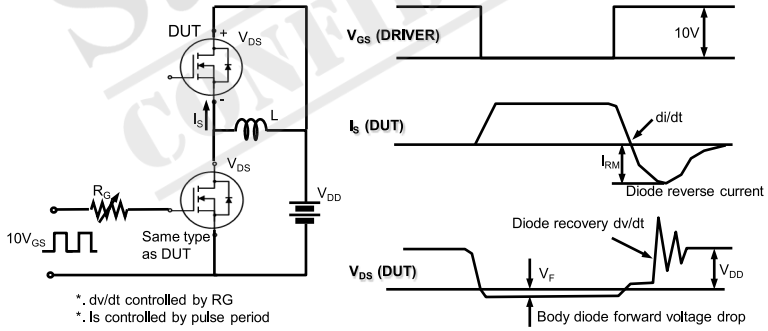


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



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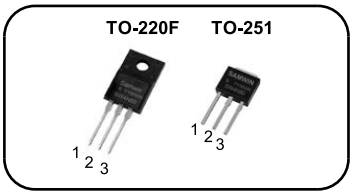
N-channel Enhanced mode TO-220F / TO-251 MOSFET

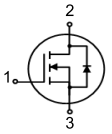
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 3.3Ω)@V_{GS}=10V
- Low Gate Charge (Typ 13nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: Industrial power, LED,Adapter



1. Gate 2. Drain 3. Source

BV_{DSS} : 800V
I_D : 4A
$R_{DS(ON)}$: 3.3Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 4N80B	SW4N80B	TO-220F	TUBE
2	SW I 4N80B	SW4N80B	TO-251	TUBE

Absolute maximum ratings

Symbol	Parameter		Value		Unit
			TO-220F	TO-251	
V_{DSS}	Drain to source voltage		800		V
I_D	Continuous drain current (@T_C=25°C)		4*		A
	Continuous drain current (@T_C=100°C)		2.5*		A
I_{DM}	Drain current pulsed	(note 1)	16		A
V_{GS}	Gate to source voltage		±30		V
E_{AS}	Single pulsed avalanche energy	(note 2)	227		mJ
E_{AR}	Repetitive avalanche energy	(note 1)	24		mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5		V/ns
P_D	Total power dissipation (@T_C=25°C)		20.8	125	W
	Derating factor above 25°C		0.17	1.0	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150		°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300		°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value		Unit
		TO-220F	TO-251	
R_{thjc}	Thermal resistance, Junction to case	6.0	1.0	°C/W
R_{thja}	Thermal resistance, Junction to ambient	46.8	77.5	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	800			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.86		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=800V, V_{GS}=0V			1	uA
		V_{DS}=640V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2		4	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 2A		3.3	3.78	Ω
G_{fs}	Forward transconductance	V_{DS} = 30 V, I_D = 2 A		2.8		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		539		pF
C_{oss}	Output capacitance			65		
C_{rss}	Reverse transfer capacitance			12		
$t_{d(on)}$	Turn on delay time	V_{DS}=400V, I_D=4A, R_G=25Ω V_{GS}=10V (note 4,5)		7		ns
t_r	Rising time			21		
$t_{d(off)}$	Turn off delay time			31		
t_f	Fall time			24		
Q_g	Total gate charge	V_{DS}=640V, V_{GS}=10V, I_D=4A (note 4,5)		13		nC
Q_{gs}	Gate-source charge			3		
Q_{gd}	Gate-drain charge			6		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			4	A
I_{SM}	Pulsed source current				16	A
V_{SD}	Diode forward voltage drop.	I_S=4A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=4A, V_{GS}=0V, dI_F/dt=100A/us		335		ns
Q_{rr}	Reverse recovery charge			2.2		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 28.4mH, I_{AS} = 4A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 4A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

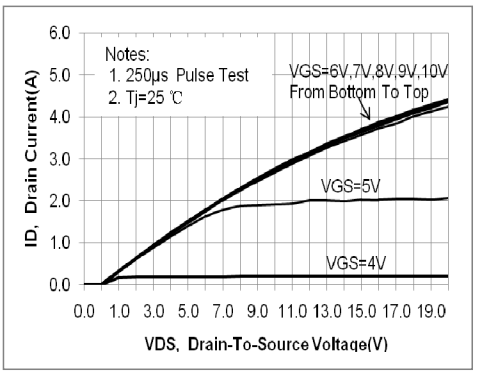


Fig. 2. On-resistance variation vs. drain current and gate voltage

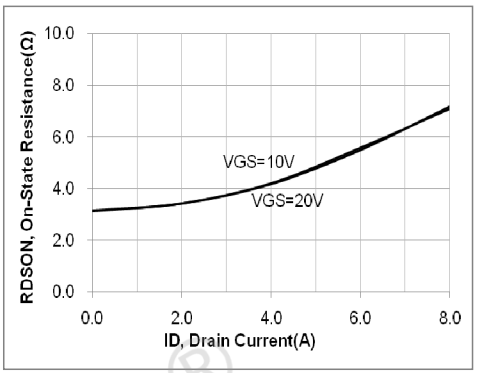


Fig. 3. Gate charge characteristics

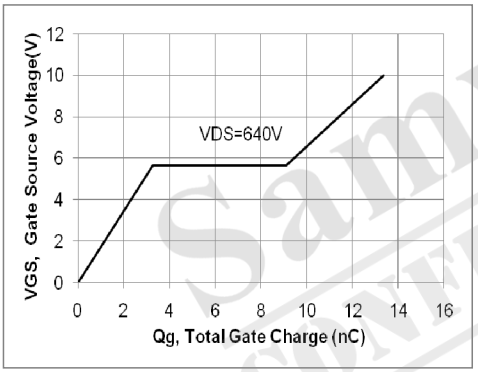


Fig. 4. On state current vs. diode forward voltage

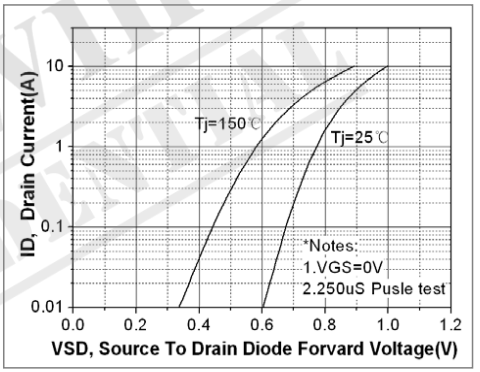


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

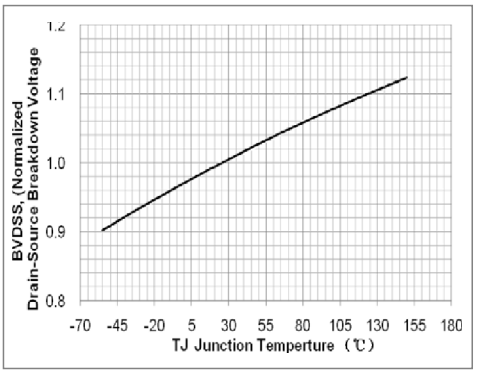


Fig. 6. On resistance variation vs. junction temperature

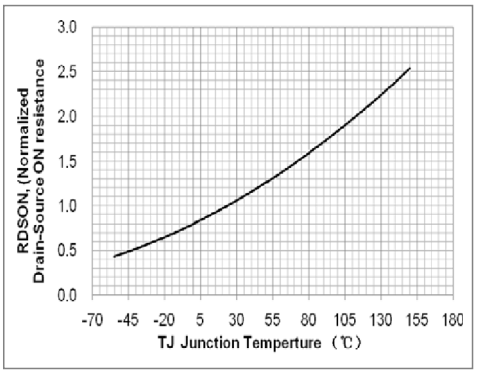


Fig. 7. Maximum safe operating area（TO-220F）

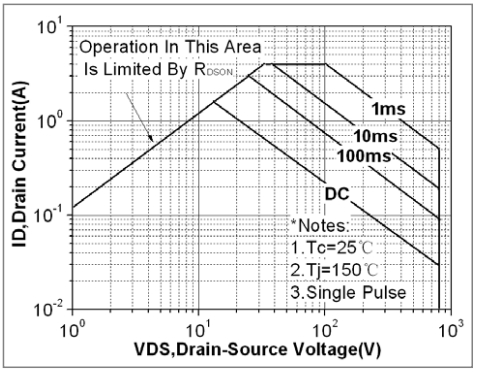


Fig. 8. Transient thermal response curve（TO-220F）

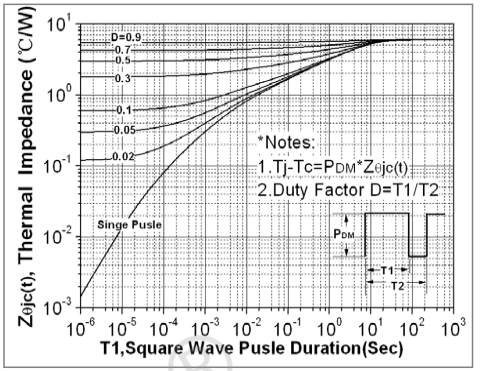


Fig. 9. Maximum safe operating area（TO-251）

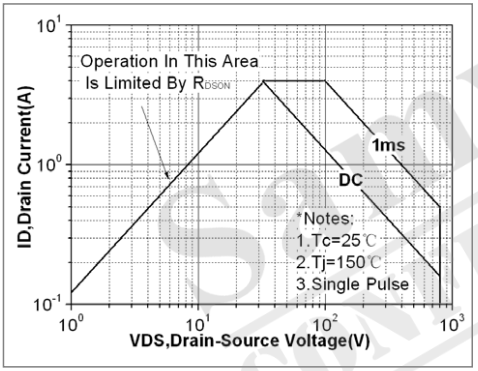


Fig. 10. Transient thermal response curve（TO-251）

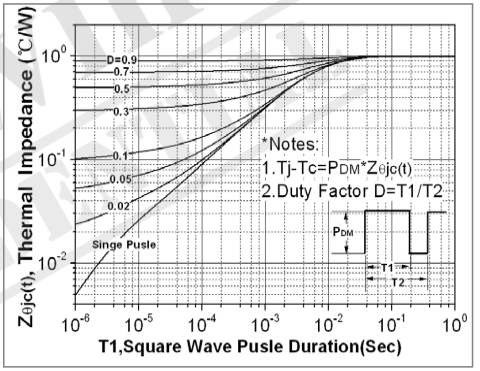


Fig. 11. Capacitance Characteristics

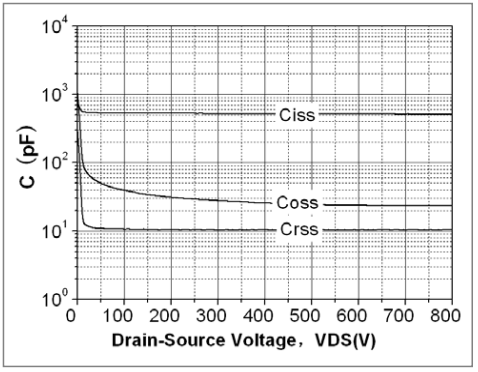


Fig. 12. Gate charge test circuit & waveform

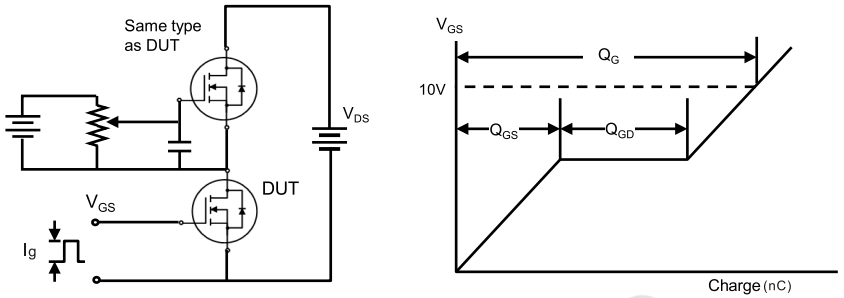


Fig. 13. Switching time test circuit & waveform

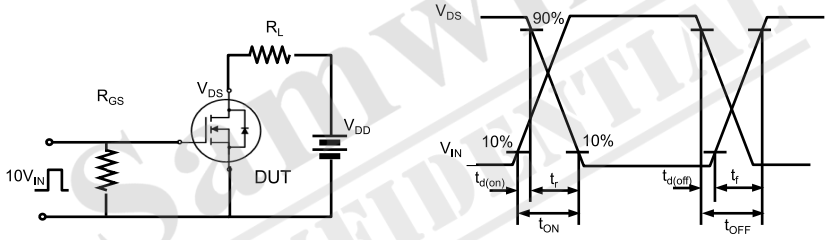


Fig. 14. Unclamped Inductive switching test circuit & waveform

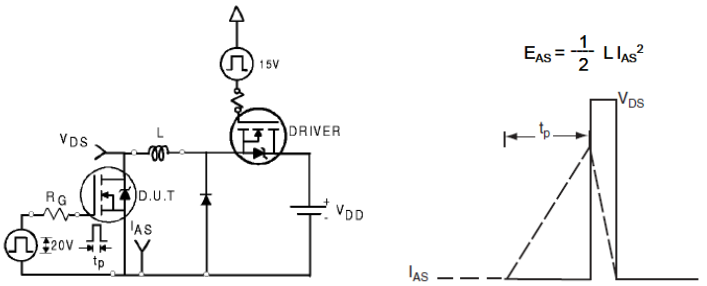
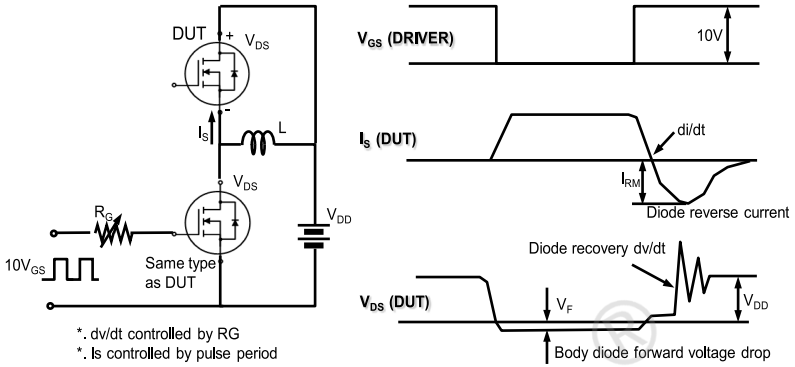


Fig. 15. Peak diode recovery dv/dt test circuit & waveform



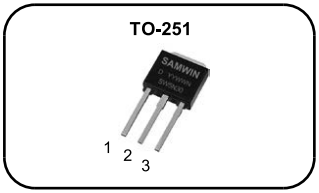
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-251 MOSFET

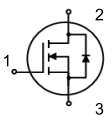
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.76Ω)@V_{GS}=10V
- Low Gate Charge (Typ 12nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:DC-DC,LED



1. Gate 2. Drain 3. Source

BV_{DSS} : 300V
I_D : 5 A
$R_{DS(ON)}$: 0.76Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW I 5N30D	SW5N30D	TO-251	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		300	V
I_D	Continuous drain current (@T_C=25°C)		5*	A
	Continuous drain current (@T_C=100°C)		3.2*	A
I_{DM}	Drain current pulsed	(note 1)	20	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	154	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	20	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		83	W
	Derating factor above 25°C		0.68	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	1.5	°C/W
R_{thja}	Thermal resistance, Junction to ambient	85	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	300			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.36		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=300V, V_{GS}=0V			1	uA
		V_{DS}=240V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 2.5A		0.76	0.9	Ω
G_{fs}	Forward transconductance	V_{DS} = 30 V, I_D = 2.5A		3.2		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		475		pF
C_{oss}	Output capacitance			71		
C_{rss}	Reverse transfer capacitance			17		
$t_{d(on)}$	Turn on delay time	V_{DS}=150V, I_D=5A, R_G=25Ω V_{GS}=10V (note 4,5)		8		ns
t_r	Rising time			25		
$t_{d(off)}$	Turn off delay time			25		
t_f	Fall time			23		
Q_g	Total gate charge	V_{DS}=240V, V_{GS}=10V, I_D=5A (note 4,5)		12		nC
Q_{gs}	Gate-source charge			4		
Q_{gd}	Gate-drain charge			7		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			5	A
I_{SM}	Pulsed source current				20	A
V_{SD}	Diode forward voltage drop.	I_S=5A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=5A, V_{GS}=0V, dI_F/dt=100A/us		170		ns
Q_{rr}	Reverse recovery charge			0.88		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 12.3mH, I_{AS} = 5A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 5A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

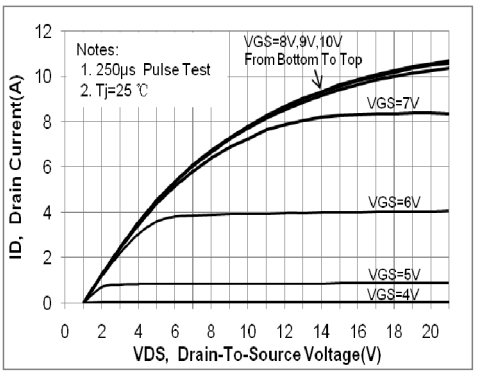


Fig. 2. On-resistance variation vs. drain current and gate voltage

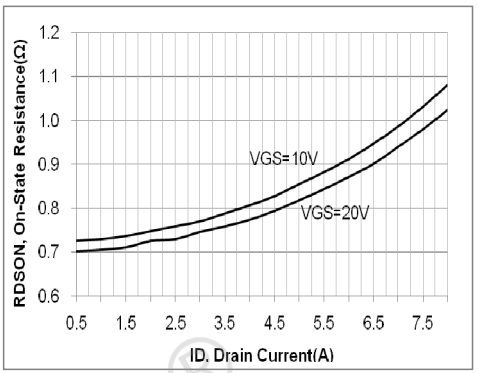


Fig. 3. Gate charge characteristics

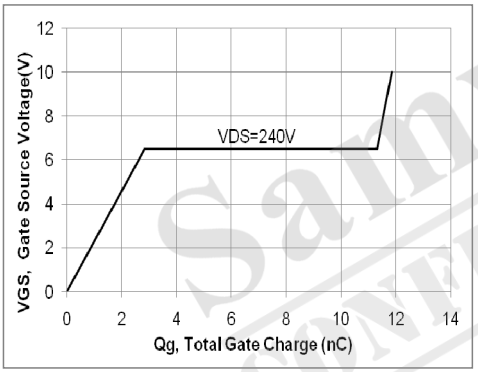


Fig. 4. On state current vs. diode forward voltage

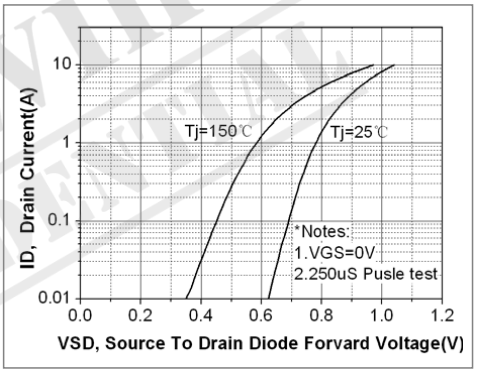


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

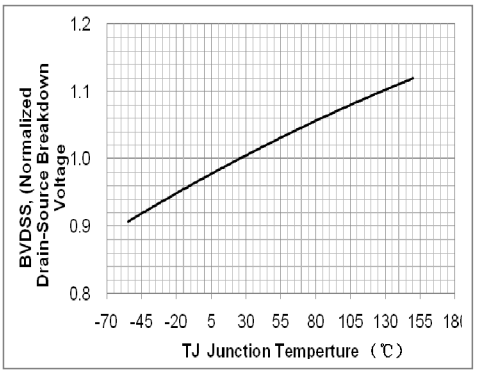


Fig. 6. On resistance variation vs. junction temperature

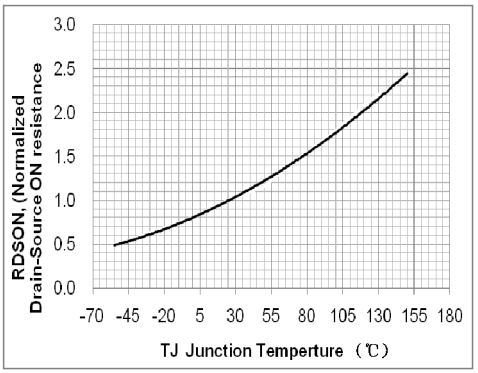


Fig. 7. Maximum safe operating area

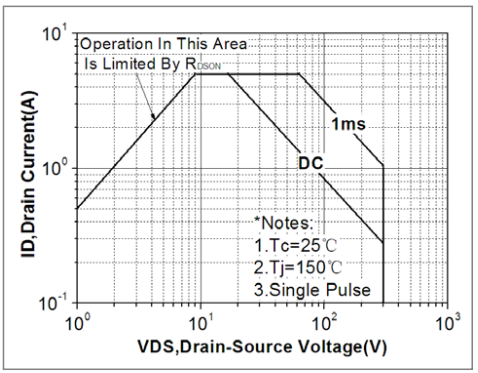


Fig. 8. Transient thermal response curve

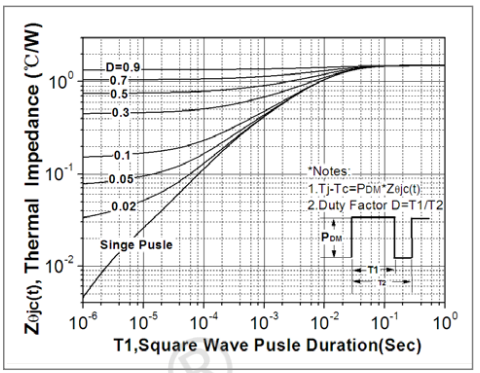


Fig. 9. Capacitance Characteristics

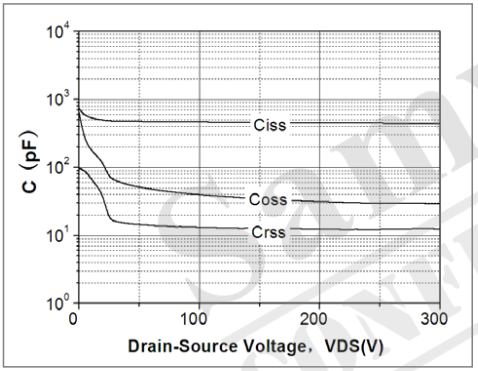
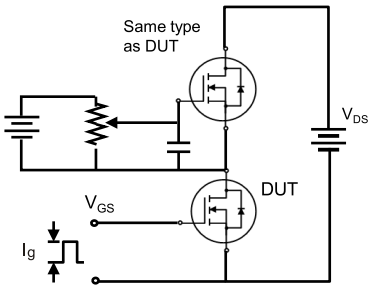


Fig. 10. Gate charge test circuit & waveform



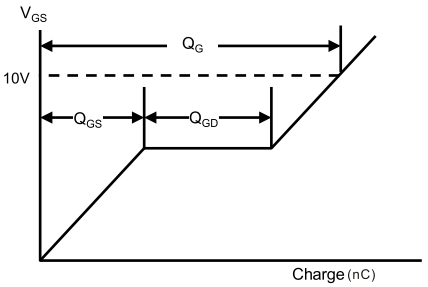


Fig. 11. Switching time test circuit & waveform

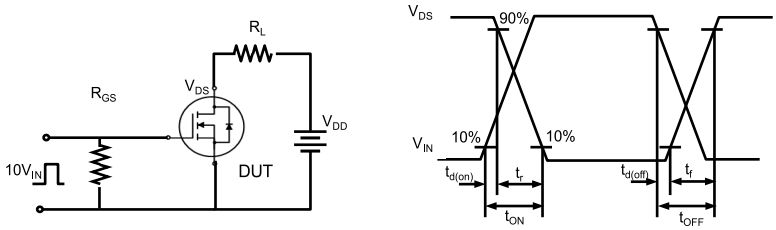


Fig. 12. Unclamped Inductive switching test circuit & waveform

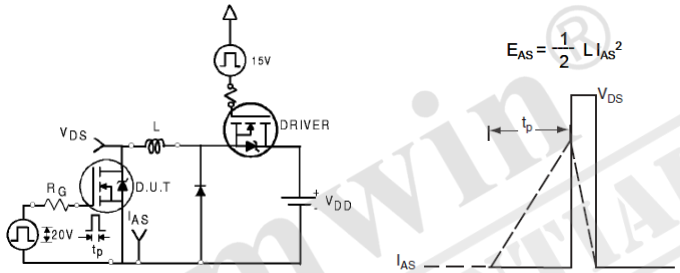
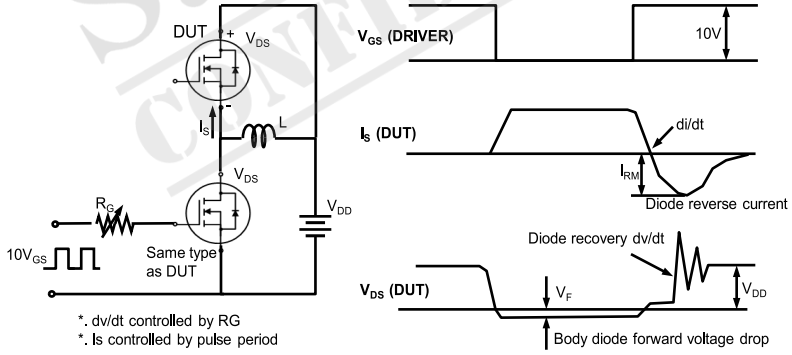


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



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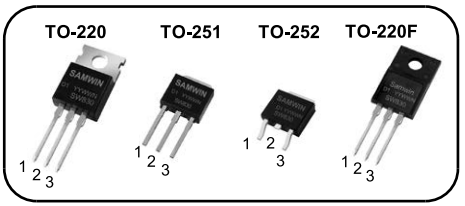
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220/TO-251/TO-252/TO-220F MOSFET

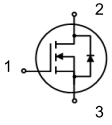
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.33Ω)@V_{GS}=10V
- Low Gate Charge (Typ 17nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: DC-DC , LED , PC



1. Gate 2. Drain 3. Source

BV_{DSS} : 500V
I_D : 5A
$R_{DS(ON)}$: 1.33Ω



Pb LEAD-FREE

RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW P 830D1	SW830D1	TO-220	TUBE
2	SW I 830D1	SW830D1	TO-251	TUBE
3	SW D 830D1	SW830D1	TO-252	REEL
4	SW F 830D1	SW830D1	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter	Value				Unit
		TO-220	TO-251	TO-252	TO-220F	
V_{DSS}	Drain to source voltage	500				V
I_D	Continuous drain current (@T_C=25°C)	5*				A
	Continuous drain current (@T_C=100°C)	3.2*				A
I_{DM}	Drain current pulsed (note 1)	20				A
V_{GS}	Gate to source voltage	±30				V
E_{AS}	Single pulsed avalanche energy (note 2)	320				mJ
E_{AR}	Repetitive avalanche energy (note 1)	30				mJ
dv/dt	Peak diode recovery dv/dt (note 3)	5				V/ns
P_D	Total power dissipation (@T_C=25°C)	123.6	101.9	113.4	18.7	W
	Derating factor above 25°C	1.0	0.8	0.9	0.15	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature	-55 ~ + 150				°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.	300				°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value				Unit
		TO-220	TO-251	TO-252	TO-220F	
R_{thjc}	Thermal resistance, Junction to case	1.01	1.23	1.10	6.7	°C/W
R_{thja}	Thermal resistance, Junction to ambient	56.7	75.9		47	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	500			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.42		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=500V, V_{GS}=0V			1	uA
		V_{DS}=400V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 2.5A		1.33	1.54	Ω
G_{fs}	Forward transconductance	V_{DS} = 30 V, I_D = 2.5A		3.5		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		519		pF
C_{oss}	Output capacitance			76		
C_{rss}	Reverse transfer capacitance			19		
$t_{d(on)}$	Turn on delay time	V_{DS}=250V, I_D=5A, R_G=25Ω V_{GS}=10V (note 4,5)		11		ns
t_r	Rising time			28		
$t_{d(off)}$	Turn off delay time			36		
t_f	Fall time			26		
Q_g	Total gate charge	V_{DS}=400V, V_{GS}=10V, I_D=5A (note 4,5)		17		nC
Q_{gs}	Gate-source charge			4		
Q_{gd}	Gate-drain charge			8		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			5	A
I_{SM}	Pulsed source current				20	A
V_{SD}	Diode forward voltage drop.	I_S=5A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=5A, V_{GS}=0V, dI_F/dt=100A/us		319		ns
Q_{rr}	Reverse recovery charge			3.9		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 40mH, I_{AS} = 4A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 5A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

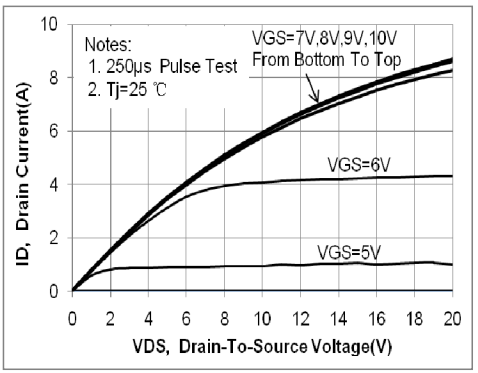


Fig. 2. On-resistance variation vs. drain current and gate voltage

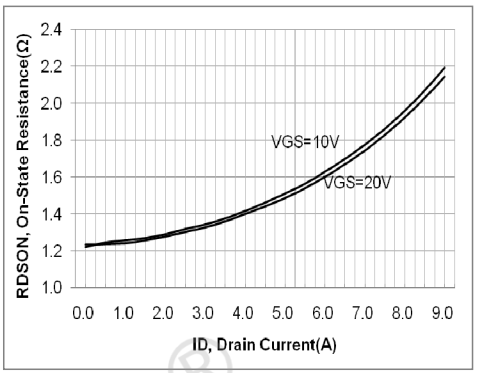


Fig. 3. Gate charge characteristics

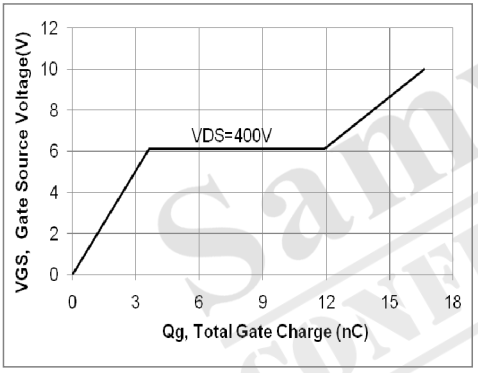


Fig. 4. On state current vs. diode forward voltage

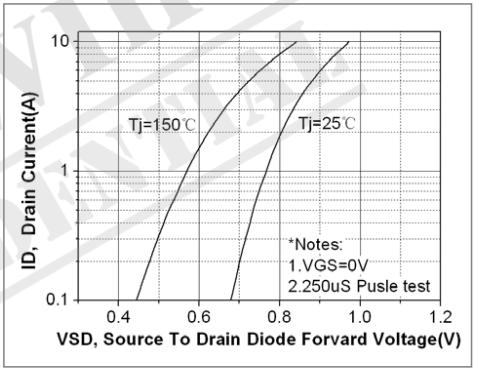


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

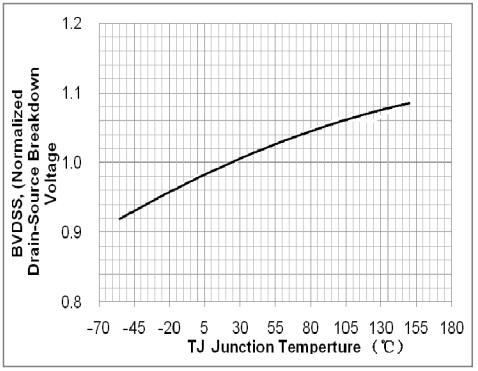


Fig. 6. On resistance variation vs. junction temperature

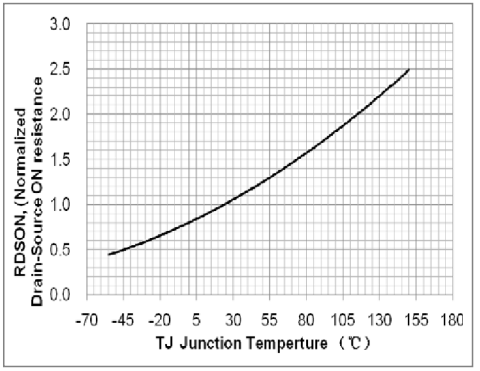


Fig. 7. Maximum safe operating area(TO-220)

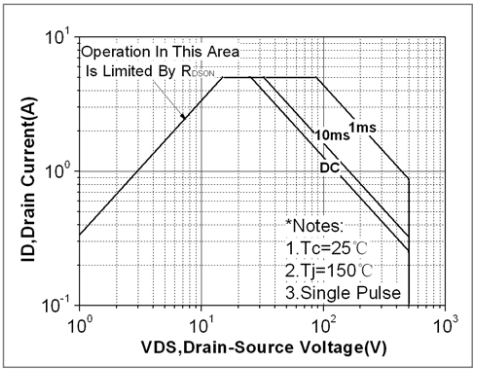


Fig. 8. Transient thermal response curve(TO-220)

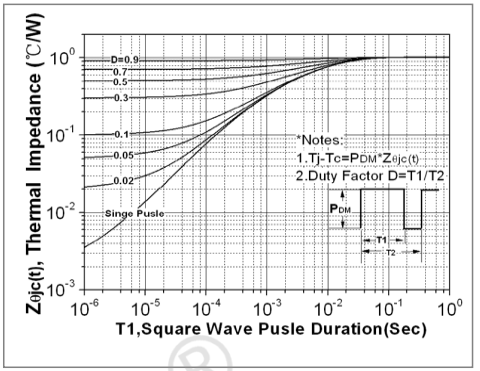


Fig. 9. Maximum safe operating area(TO-251)

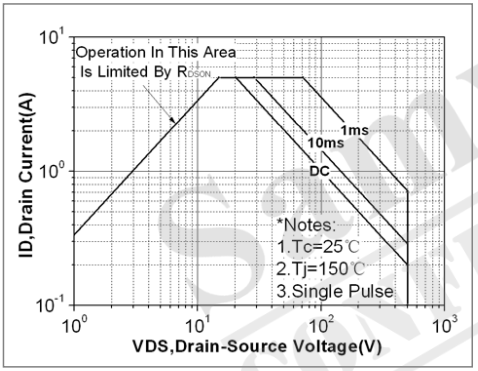


Fig. 10. Transient thermal response curve(TO-251)

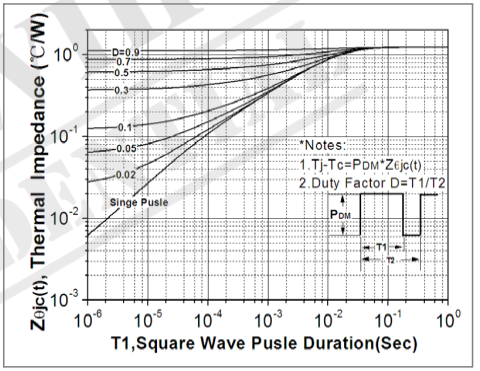


Fig. 11. Maximum safe operating area(TO-252)

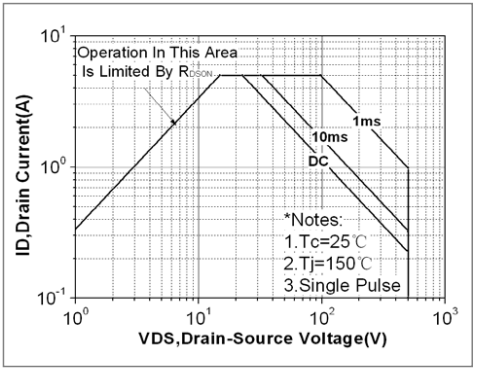


Fig. 12. Transient thermal response curve(TO-252)

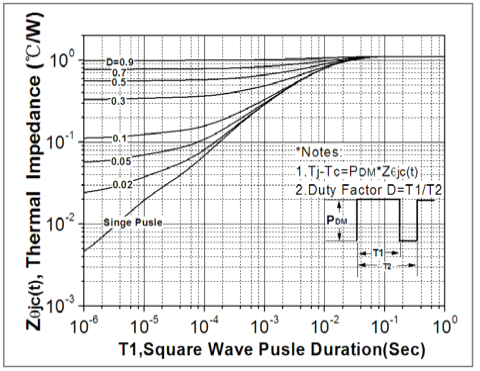


Fig. 13. Maximum safe operating area(TO-220F)

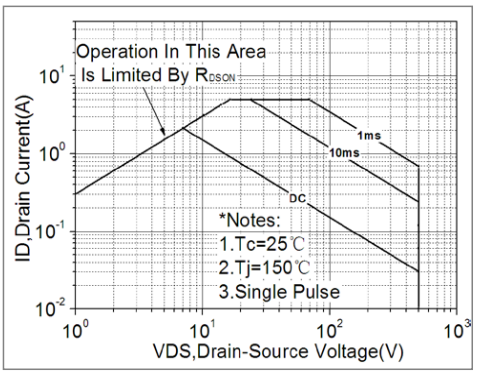


Fig. 14. Transient thermal response curve(TO-220F)

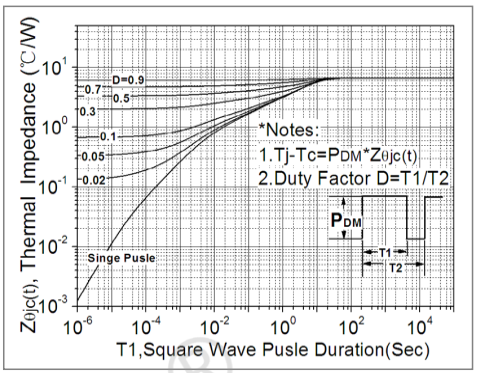


Fig. 15. Capacitance Characteristics

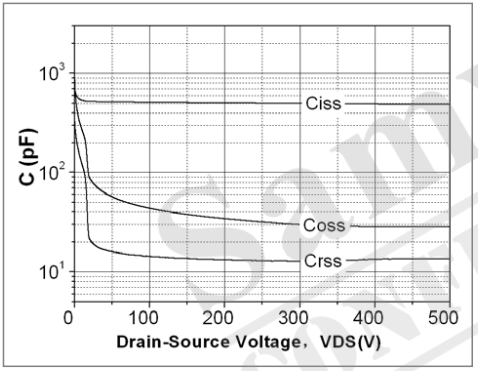
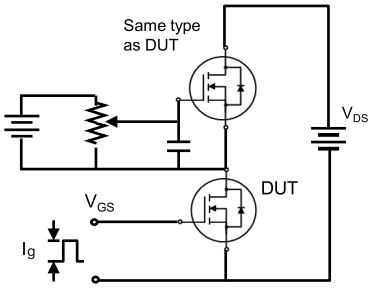


Fig. 16. Gate charge test circuit & waveform



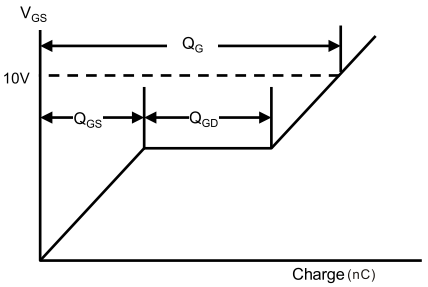


Fig. 17. Switching time test circuit & waveform

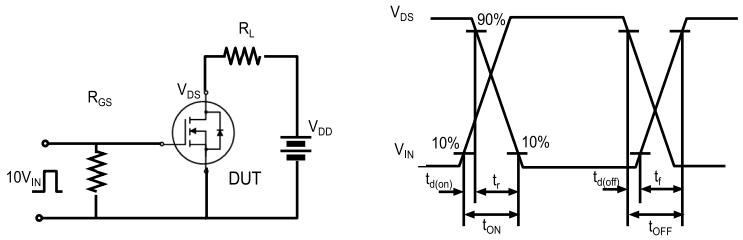


Fig. 18. Unclamped Inductive switching test circuit & waveform

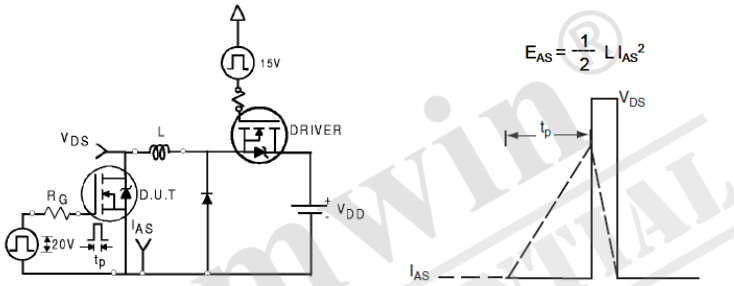
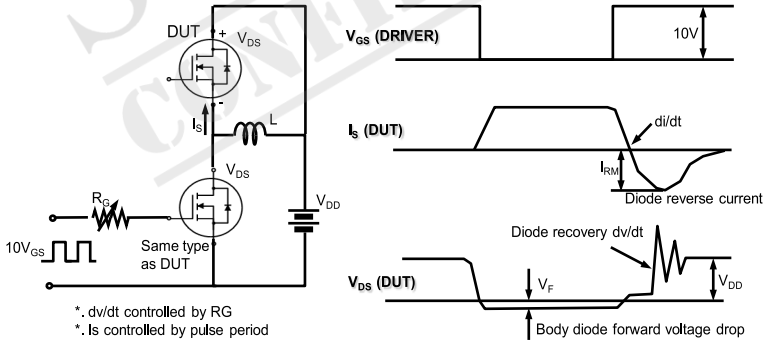


Fig. 19. Peak diode recovery dv/dt test circuit & waveform



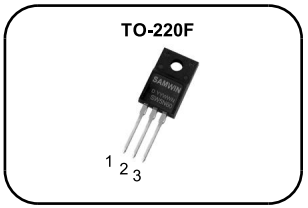
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F MOSFET

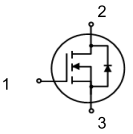
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.9Ω)@V_{GS}=10V
- Low Gate Charge (Typ 17nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:LED,Charger



1. Gate 2. Drain 3. Source

BV_{DSS} : 600V
I_D : 5A
$R_{DS(ON)}$: 1.9Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 5N60D	SW5N60D	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		600	V
I_D	Continuous drain current (@T_C=25°C)		5*	A
	Continuous drain current (@T_C=100°C)		3.2*	A
I_{DM}	Drain current pulsed	(note 1)	20	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	166	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	15	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		19.5	W
	Derating factor above 25°C		0.16	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	6.42	°C/W
R_{thja}	Thermal resistance, Junction to ambient	47.8	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	600			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.5		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=600V, V_{GS}=0V			1	uA
		V_{DS}=480V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D =1A		1.9	2.0	Ω
G_{fs}	Forward transconductance	V_{DS}= 30V, I_D = 1A		4.1		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		555		pF
C_{oss}	Output capacitance			70		
C_{rss}	Reverse transfer capacitance			18		
$t_{d(on)}$	Turn on delay time	V_{DS}=300V, I_D=5A, R_G=25Ω V_{GS}=10V (note 4,5)		8		nS
t_r	Rising time			23		
$t_{d(off)}$	Turn off delay time			40		
t_f	Fall time			26		
Q_g	Total gate charge	V_{DS}=480V, V_{GS}=10V, I_D=5A (note 4,5)		9.9		nC
Q_{gs}	Gate-source charge			0.96		
Q_{gd}	Gate-drain charge			9.5		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			5	A
I_{SM}	Pulsed source current				20	A
V_{SD}	Diode forward voltage drop.	I_S=5A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=5A, V_{GS}=0V, dI_F/dt=100A/us		270		ns
Q_{rr}	Reverse recovery charge			2		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L =13.3mH, I_{AS} = 5A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 5A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

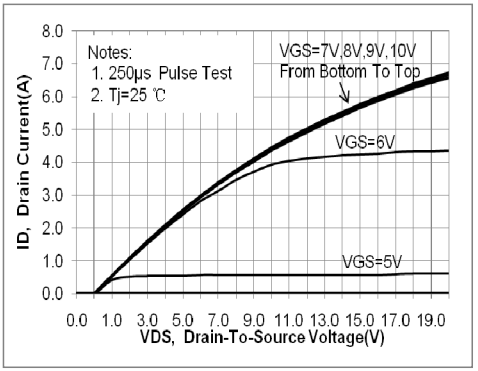


Fig. 2. On-resistance variation vs. drain current and gate voltage

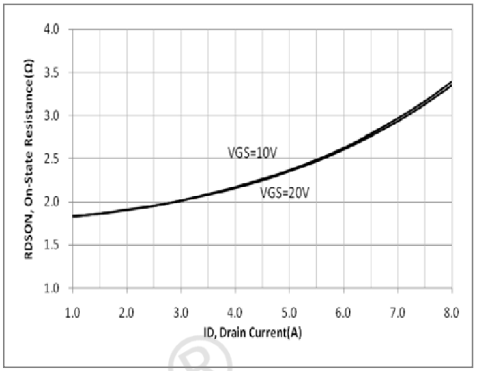


Fig. 3. Gate charge characteristics

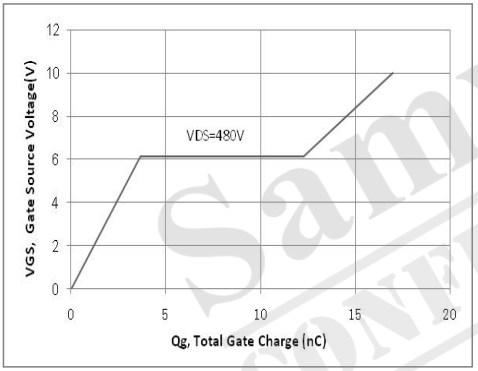


Fig. 4. On state current vs. diode forward voltage

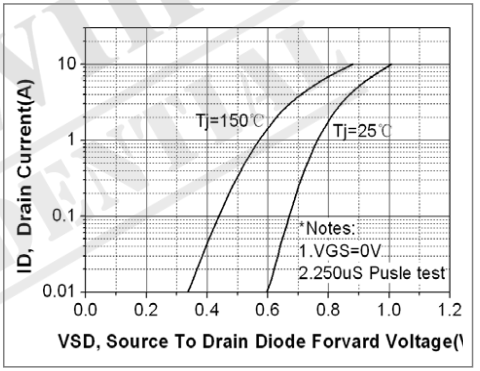


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

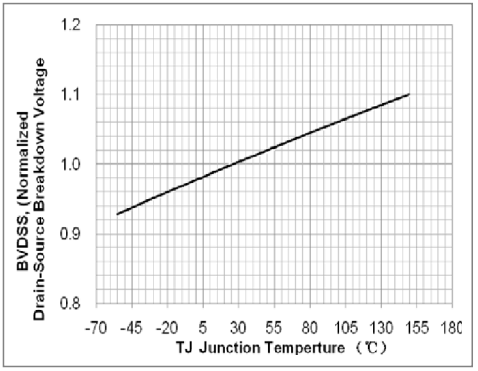


Fig. 6. On resistance variation vs. junction temperature

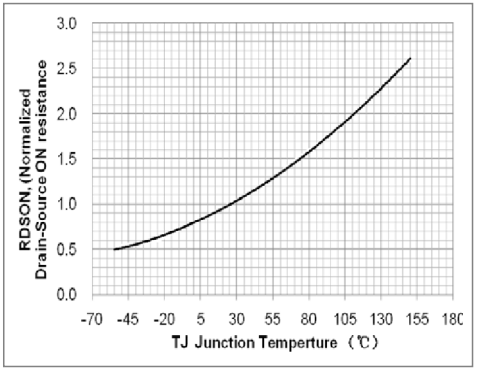


Fig. 7. Maximum safe operating area

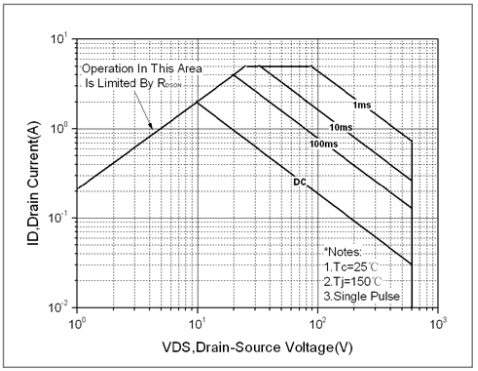


Fig. 8. Transient thermal response curve

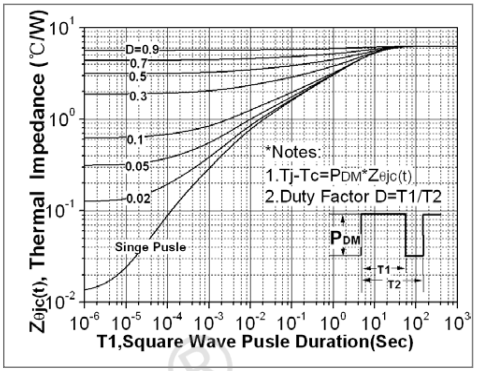


Fig. 9. Capacitance Characteristics

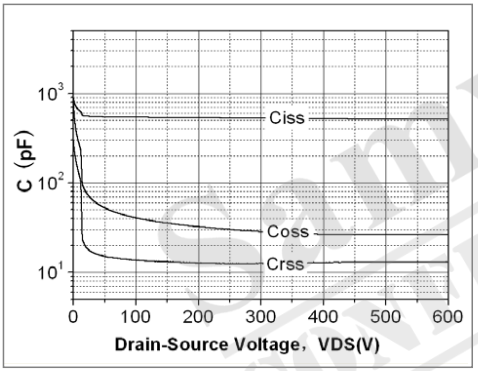
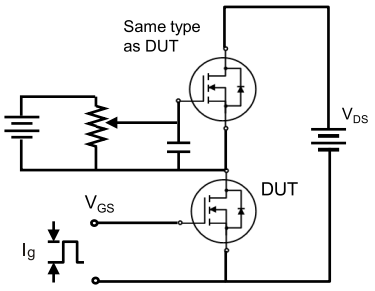


Fig. 10. Gate charge test circuit & waveform



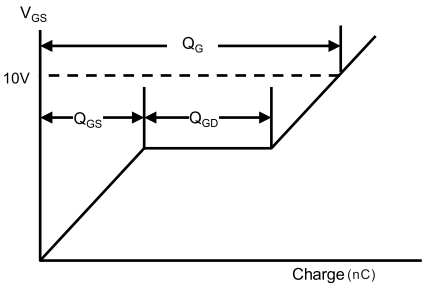


Fig. 11. Switching time test circuit & waveform

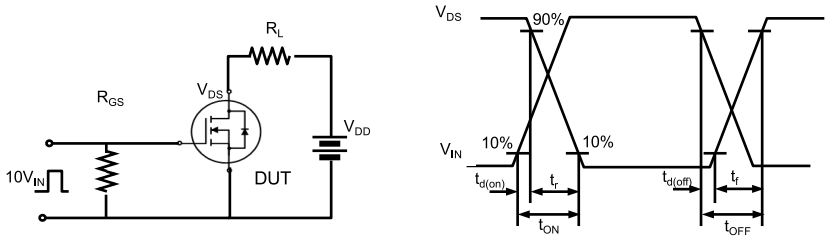


Fig. 12. Unclamped Inductive switching test circuit & waveform

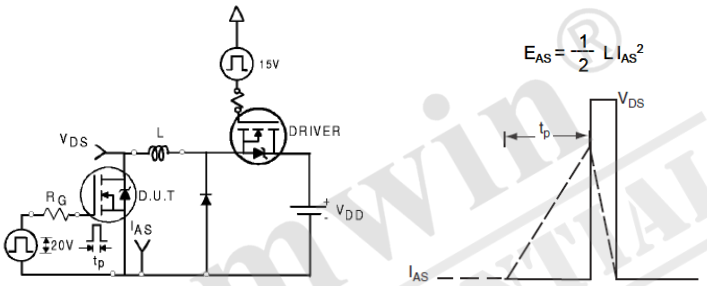
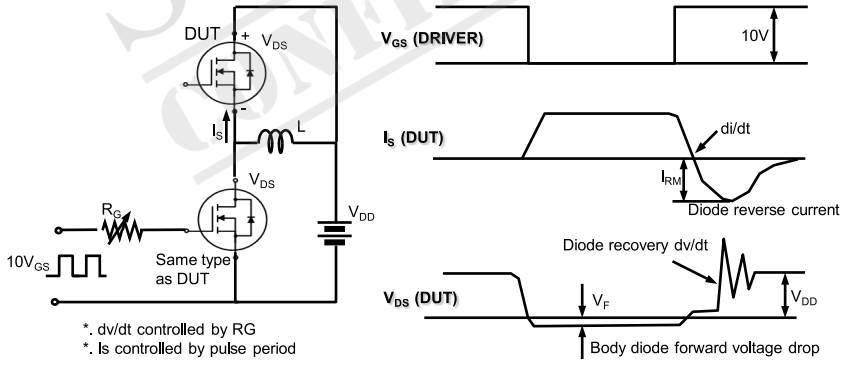


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



DISCLAIMER

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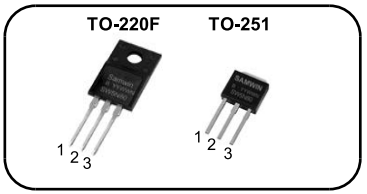
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F /TO-251MOSFET

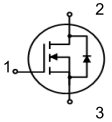
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 2.24Ω)@V_{GS}=10V
- Low Gate Charge (Typ 18nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: Industrial power, LED,Adapter



1. Gate 2. Drain 3. Source

BV_{DSS} : 800V
I_D : 5A
$R_{DS(ON)}$: 2.24Ω



Pb LEAD-FREE

RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 5N80B	SW5N80B	TO-220F	TUBE
2	SW I 5N80B	SW5N80B	TO-251	TUBE

Absolute maximum ratings

Symbol	Parameter	Value		Unit
		TO-220F	TO-251	
V_{DSS}	Drain to source voltage	800		V
I_D	Continuous drain current (@T_C=25°C)	5*		A
	Continuous drain current (@T_C=100°C)	3.15*		A
I_{DM}	Drain current pulsed (note 1)	20		A
V_{GS}	Gate to source voltage	±30		V
E_{AS}	Single pulsed avalanche energy (note 2)	310		mJ
E_{AR}	Repetitive avalanche energy (note 1)	30		mJ
dv/dt	Peak diode recovery dv/dt (note 3)	5		V/ns
P_D	Total power dissipation (@T_C=25°C)	22.3	173.6	W
	Derating factor above 25°C	0.18	0.39	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature	-55 ~ + 150		°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.	300		°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value		Unit
		TO-220F	TO-251	
R_{thjc}	Thermal resistance, Junction to case	5.6	0.72	°C/W
R_{thja}	Thermal resistance, Junction to ambient	46.6	80.5	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	800			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.77		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=800V, V_{GS}=0V			1	uA
		V_{DS}=640V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2		4	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 2.5A		2.24	2.68	Ω
G_{fs}	Forward transconductance	V_{DS} = 30 V, I_D = 2.5A		3.6		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		743		pF
C_{oss}	Output capacitance			85		
C_{rss}	Reverse transfer capacitance			13		
$t_{d(on)}$	Turn on delay time	V_{DS}=400V, I_D=5A, R_G=25Ω V_{GS}=10V (note 4,5)		9		ns
t_r	Rising time			22		
$t_{d(off)}$	Turn off delay time			46		
t_f	Fall time			28		
Q_g	Total gate charge	V_{DS}=640V, V_{GS}=10V, I_D=5A (note 4,5)		18		nC
Q_{gs}	Gate-source charge			4.4		
Q_{gd}	Gate-drain charge			7.5		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			5	A
I_{SM}	Pulsed source current				20	A
V_{SD}	Diode forward voltage drop.	I_S=5A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=5A, V_{GS}=0V, dI_F/dt=100A/us		356		ns
Q_{rr}	Reverse recovery charge			2.8		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 24.8mH, I_{AS} = 5A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 5A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

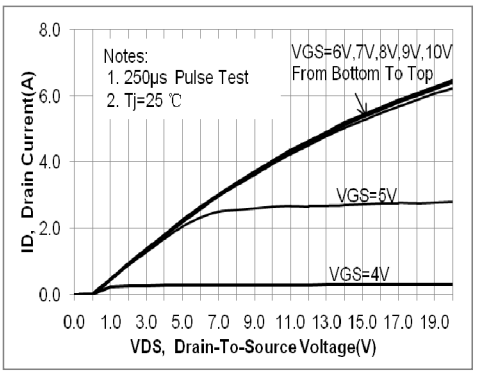


Fig. 2. On-resistance variation vs. drain current and gate voltage

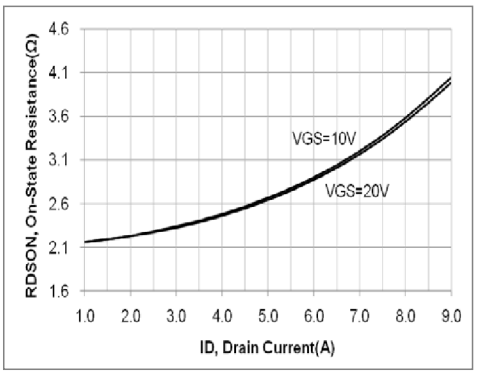


Fig. 3. Gate charge characteristics

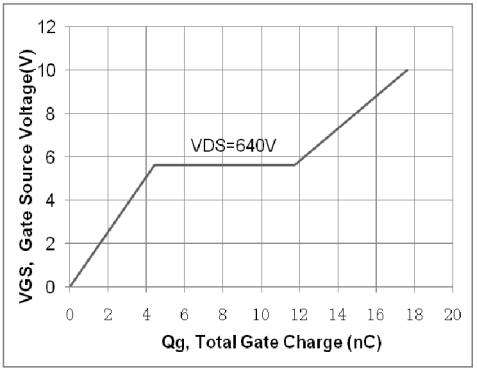


Fig. 4. On state current vs. diode forward voltage

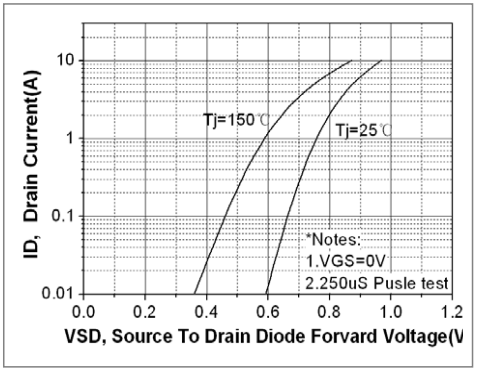


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

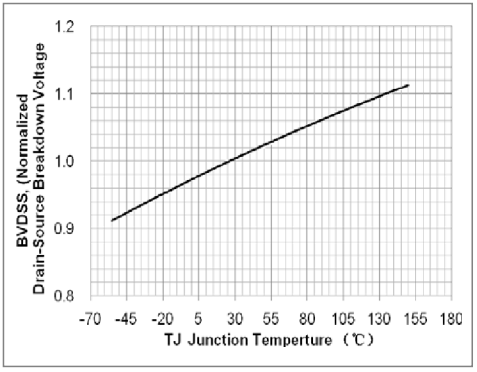


Fig. 6. On resistance variation vs. junction temperature

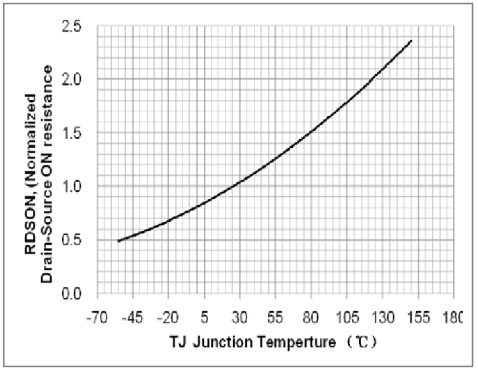


Fig. 7. Maximum safe operating area（TO-220F）

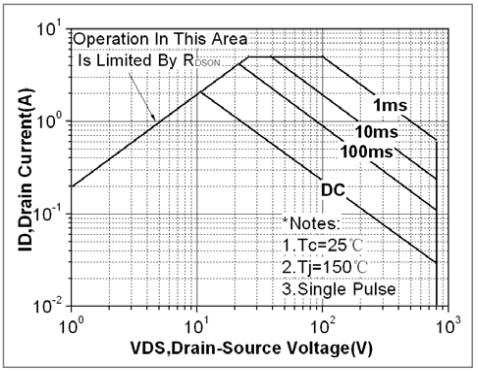


Fig. 8. Transient thermal response curve（TO-220F）

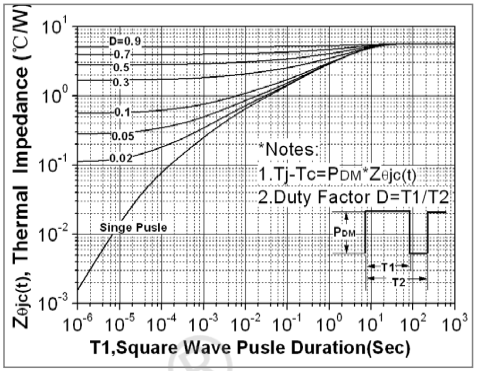


Fig. 9. Maximum safe operating area（TO-251）

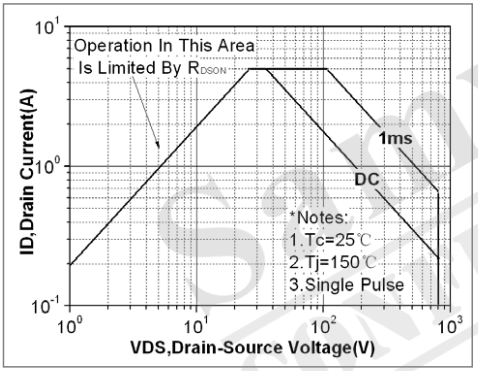


Fig. 10. Transient thermal response curve（TO-251）

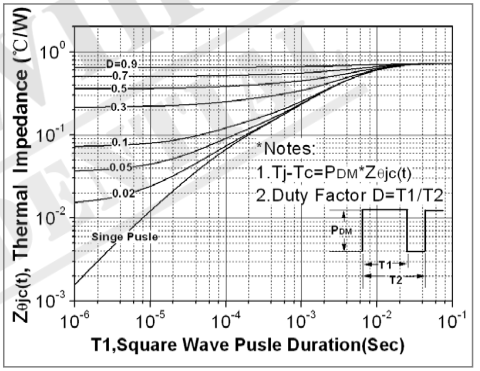


Fig. 11. Capacitance Characteristics

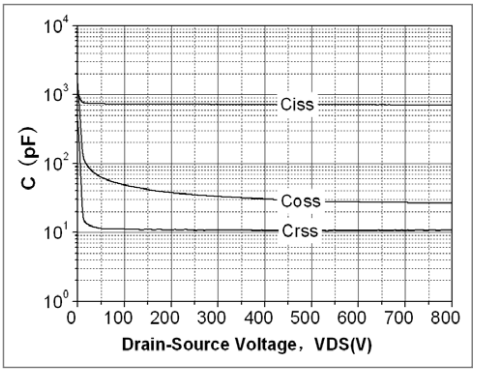


Fig. 12. Gate charge test circuit & waveform

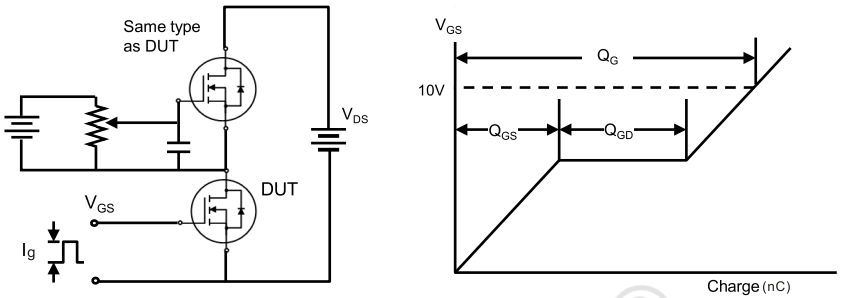


Fig. 13. Switching time test circuit & waveform

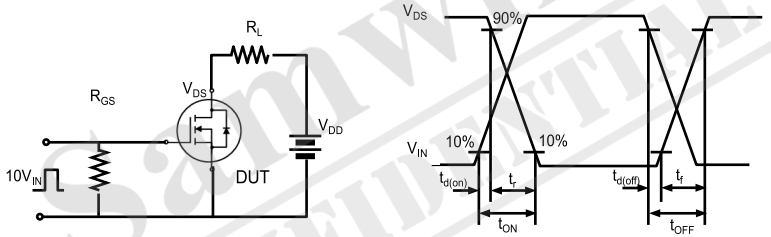


Fig. 14. Unclamped Inductive switching test circuit & waveform

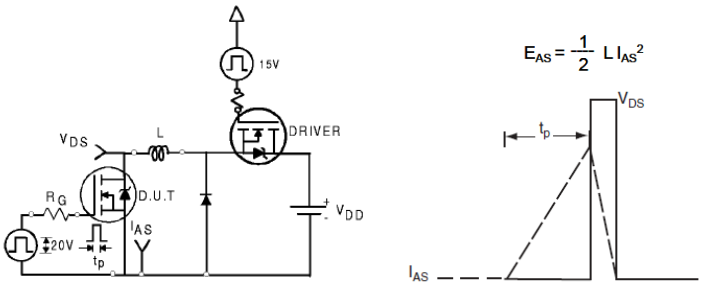
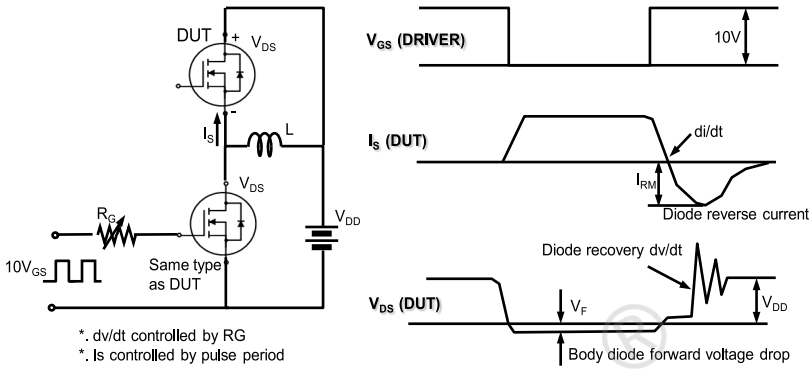


Fig. 15. Peak diode recovery dv/dt test circuit & waveform



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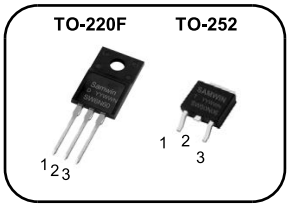
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F/TO-252 MOSFET

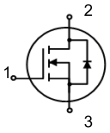
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.4Ω)@V_{GS}=10V
- Low Gate Charge (Typ 23nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: UPS,Inverter,TV-POWER



1. Gate 2. Drain 3. Source

BV_{DSS} : 600V
I_D : 6A
$R_{DS(ON)}$:1.4Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 6N60D	SW6N60D	TO-220F	TUBE
2	SW D 6N60D	SW6N60D	TO-252	REEL

Absolute maximum ratings

Symbol	Parameter		Value		Unit
			TO-220F	TO-252	
V_{DSS}	Drain to source voltage		600		V
I_D	Continuous drain current (@T_C=25°C)		6*		A
	Continuous drain current (@T_C=100°C)		3.8*		A
I_{DM}	Drain current pulsed	(note 1)	24		A
V_{GS}	Gate to source voltage		±30		V
E_{AS}	Single pulsed avalanche energy	(note 2)	215		mJ
E_{AR}	Repetitive avalanche energy	(note 1)	30		mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5		V/ns
P_D	Total power dissipation (@T_C=25°C)		24	205	W
	Derating factor above 25°C		0.19	1.64	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150		°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300		°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value		Unit
		TO-220F	TO-252	
R_{thjc}	Thermal resistance, Junction to case	5.20	0.61	°C/W
R_{thja}	Thermal resistance, Junction to ambient	47.8	79.1	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	600			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.52		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=600V, V_{GS}=0V			1	uA
		V_{DS}=480V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D =3A		1.4	1.7	Ω
G_{fs}	Forward transconductance	V_{DS} = 30V, I_D =3 A		5		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		794		pF
C_{oss}	Output capacitance			94		
C_{rss}	Reverse transfer capacitance			21		
$t_{d(on)}$	Turn on delay time	V_{DS}=300V, I_D=6A, R_G=25Ω V_{GS}=10V (note 4, 5)		10		ns
t_r	Rising time			25		
$t_{d(off)}$	Turn off delay time			58		
t_f	Fall time			30		
Q_g	Total gate charge	V_{DS}=480V, V_{GS}=10V, I_D=6A (note 4, 5)		23		nC
Q_{gs}	Gate-source charge			4.7		
Q_{gd}	Gate-drain charge			12		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			6	A
I_{SM}	Pulsed source current				24	A
V_{SD}	Diode forward voltage drop.	I_S=6A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=6A, V_{GS}=0V, dI_F/dt=100A/us		295		ns
Q_{rr}	Reverse recovery charge			2.6		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 12mH, I_{AS} = 6A, V_{DD} =50 V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 6A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

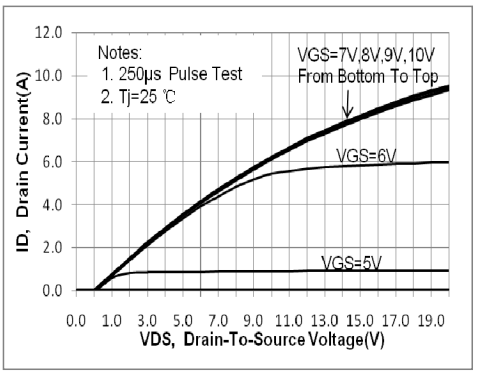


Fig. 2. On-resistance variation vs. drain current and gate voltage

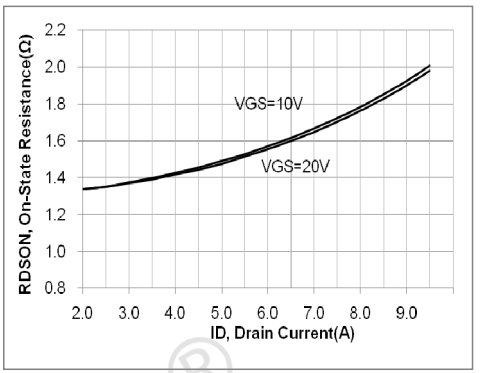


Fig. 3. Gate charge characteristics

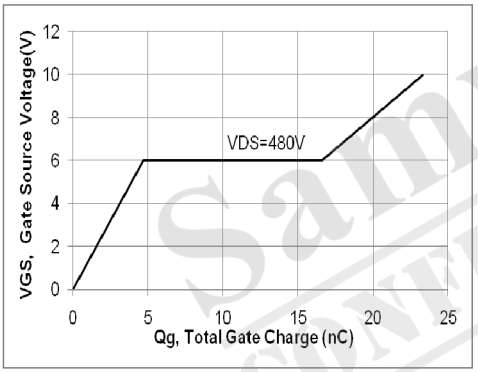


Fig. 4. On state current vs. diode forward voltage

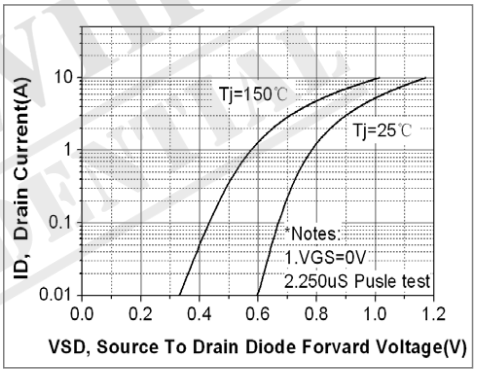


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

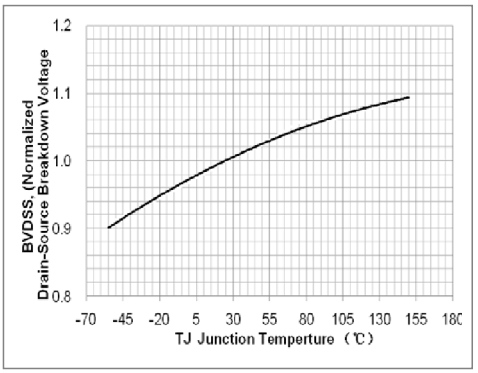


Fig. 6. On resistance variation vs. junction temperature

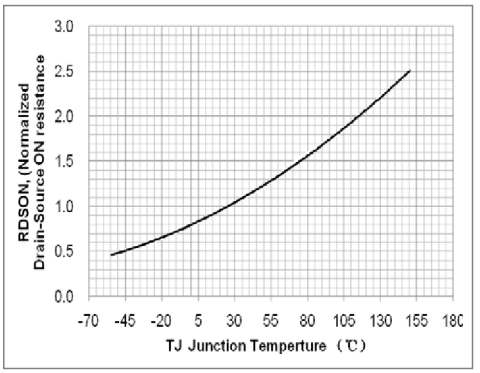


Fig. 7. Maximum safe operating area （TO-220F）

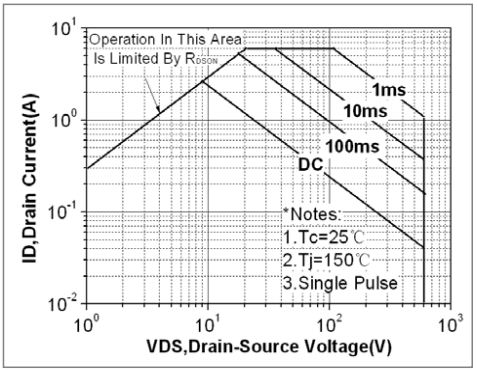


Fig. 8. Transient thermal response curve（TO-220F）

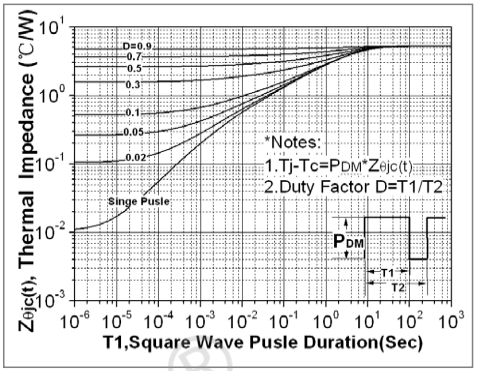


Fig. 9. Maximum safe operating area （TO-252）

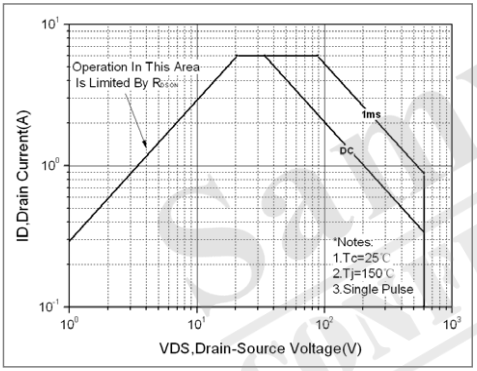


Fig. 10. Transient thermal response curve（TO-252）

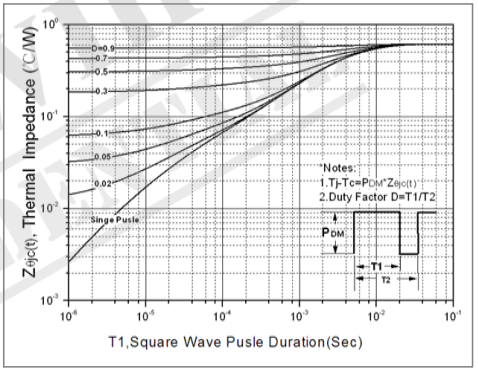


Fig. 11. Capacitance Characteristics

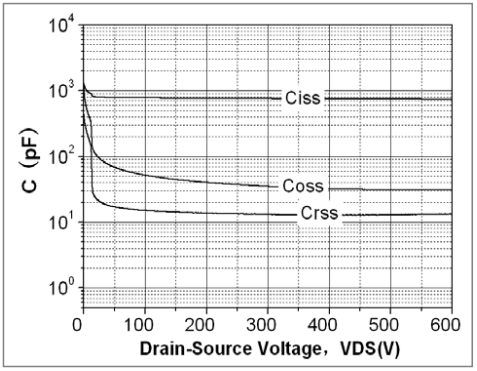


Fig. 12. Gate charge test circuit & waveform

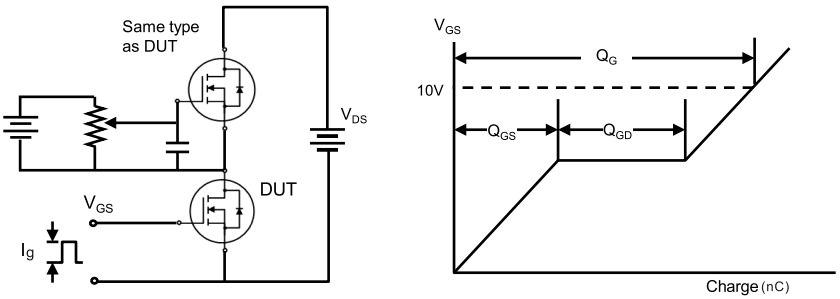


Fig. 13. Switching time test circuit & waveform

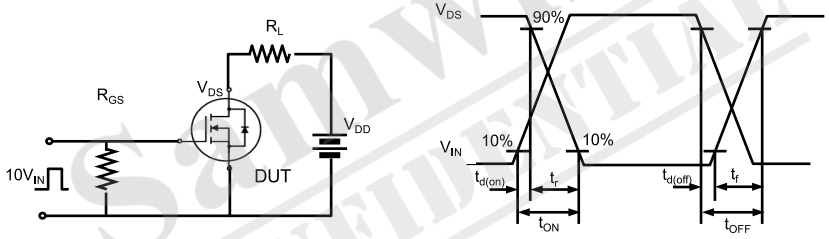


Fig. 14. Unclamped Inductive switching test circuit & waveform

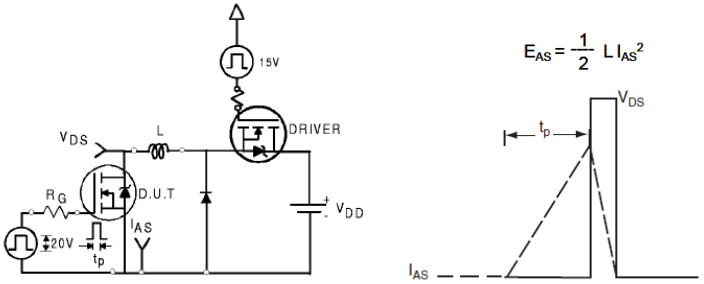
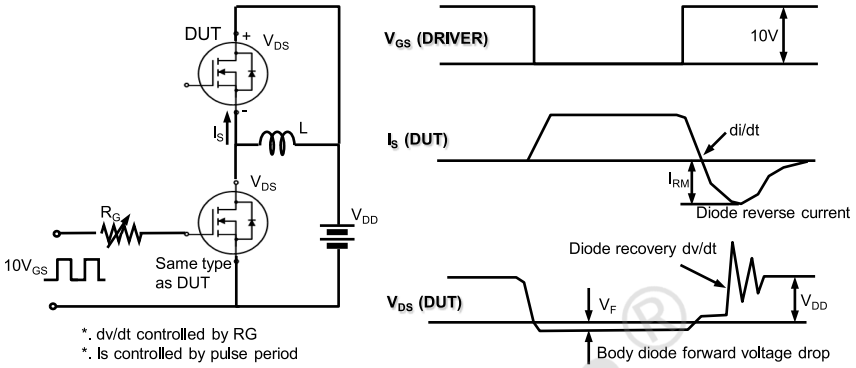


Fig. 15. Peak diode recovery dv/dt test circuit & waveform



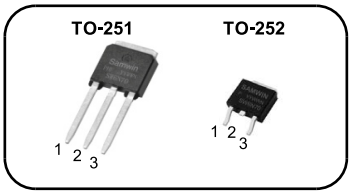
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-251/TO-252 MOSFET

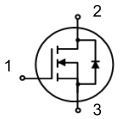
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.42Ω)@V_{GS}=10V
- Low Gate Charge (Typ 20nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: Charger,Inverter,Industrial power



1. Gate 2. Drain 3. Source

BV_{DSS} : 700V
I_D : 6A
$R_{DS(ON)}$: 1.42Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW I 6N70P	SW6N70P	TO-251	TUBE
2	SW D 6N70P	SW6N70P	TO-252	REEL

Absolute maximum ratings

Symbol	Parameter	Value		Unit
		TO-251	TO-252	
V_{DSS}	Drain to source voltage	700		V
I_D	Continuous drain current (@T_C=25°C)	6*		A
	Continuous drain current (@T_C=100°C)	3.7*		A
I_{DM}	Drain current pulsed (note 1)	24		A
V_{GS}	Gate to source voltage	±30		V
E_{AS}	Single pulsed avalanche energy (note 2)	390		mJ
E_{AR}	Repetitive avalanche energy (note 1)	87.8		mJ
dv/dt	Peak diode recovery dv/dt (note 3)	5		V/ns
P_D	Total power dissipation (@T_C=25°C)	137.5	192.3	W
	Derating factor above 25°C	1.1	1.5	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature	-55 ~ + 150		°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.	300		°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value		Unit
		TO-251	TO-252	
R_{thjc}	Thermal resistance, Junction to case	0.91	0.65	°C/W
R_{thja}	Thermal resistance, Junction to ambient	78.8	81.6	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	700			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.76		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=700V, V_{GS}=0V			1	uA
		V_{DS}=560V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2		4	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 3A		1.42	1.7	Ω
G_{fs}	Forward transconductance	V_{DS} = 20 V, I_D = 3 A		3.5		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		995		pF
C_{oss}	Output capacitance			93		
C_{rss}	Reverse transfer capacitance			4		
$t_{d(on)}$	Turn on delay time	V_{DS}=350V, I_D=6A, R_G=25Ω V_{GS}=10V (note 4,5)		15		ns
t_r	Rising time			25		
$t_{d(off)}$	Turn off delay time			38		
t_f	Fall time			26		
Q_g	Total gate charge	V_{DS}=560V, V_{GS}=10V, I_D=6A (note 4,5)		20		nC
Q_{gs}	Gate-source charge			6		
Q_{gd}	Gate-drain charge			7		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			6	A
I_{SM}	Pulsed source current				24	A
V_{SD}	Diode forward voltage drop.	I_S=6A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=6A, V_{GS}=0V, dI_F/dt=100A/us		344		ns
Q_{rr}	Reverse recovery charge			3.4		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 21.7mH, I_{AS} = 6A, V_{DD} = 100V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 6A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

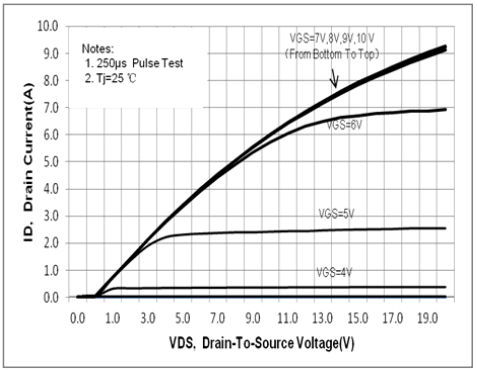


Fig. 2. On-resistance variation vs. drain current and gate voltage

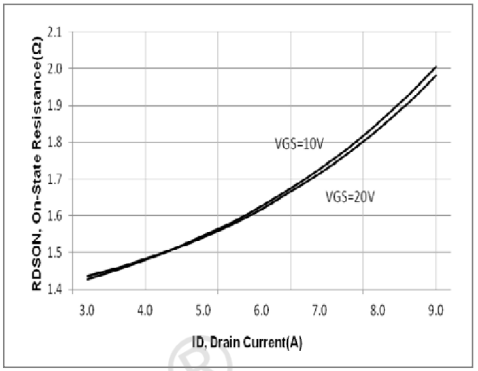


Fig. 3. Gate charge characteristics

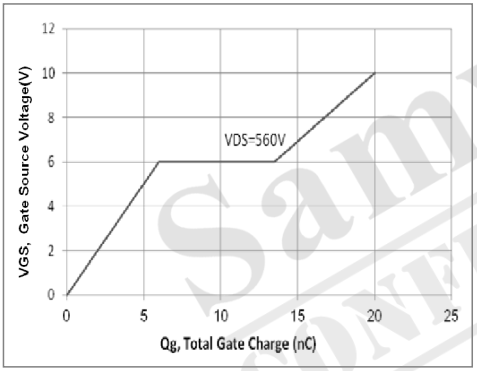


Fig. 4. On state current vs. diode forward voltage

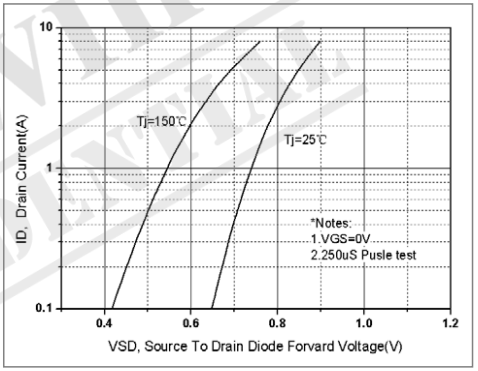


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

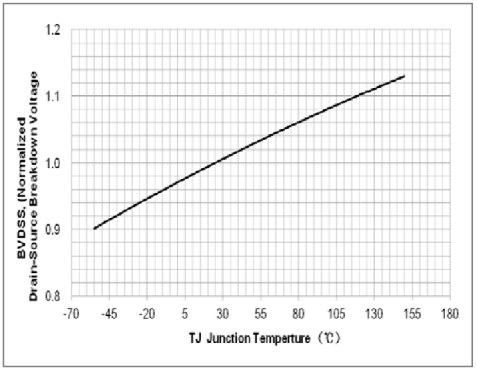


Fig. 6. On resistance variation vs. junction temperature

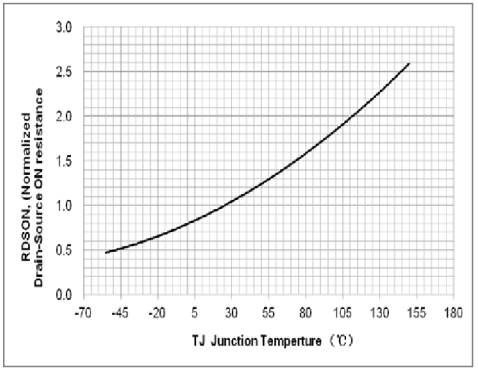


Fig. 7. Maximum safe operating area（TO-251）

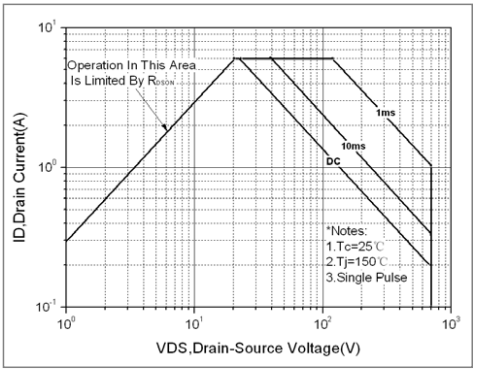


Fig. 8. Transient thermal response curve（TO-251）

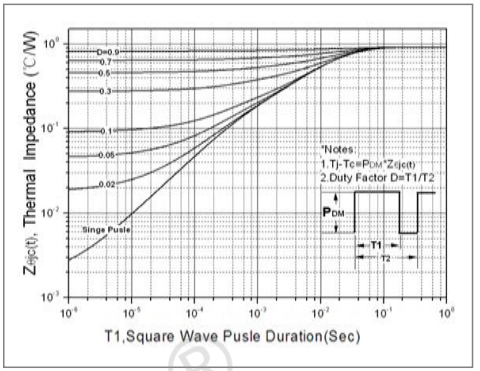


Fig. 9. Maximum safe operating area（TO-252）

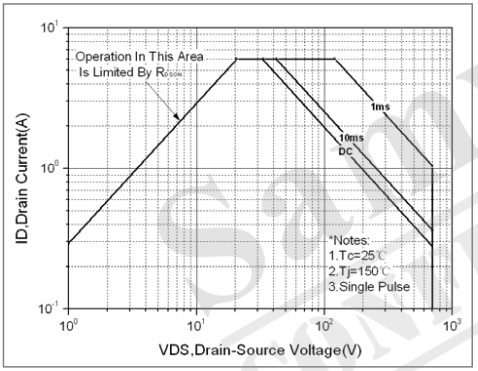


Fig. 10. Transient thermal response curve（TO-252）

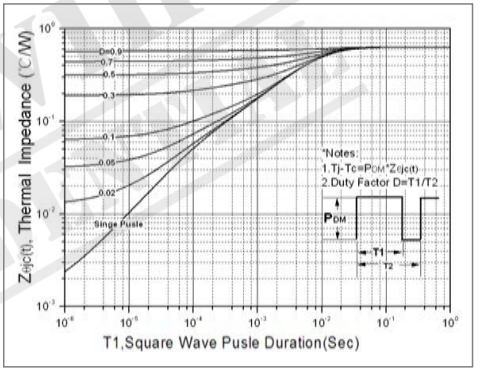


Fig. 11. Capacitance Characteristics

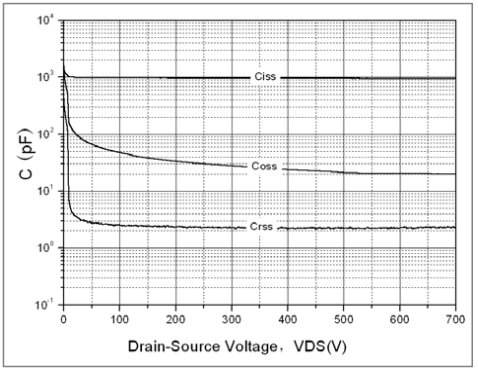


Fig. 12. Gate charge test circuit & waveform

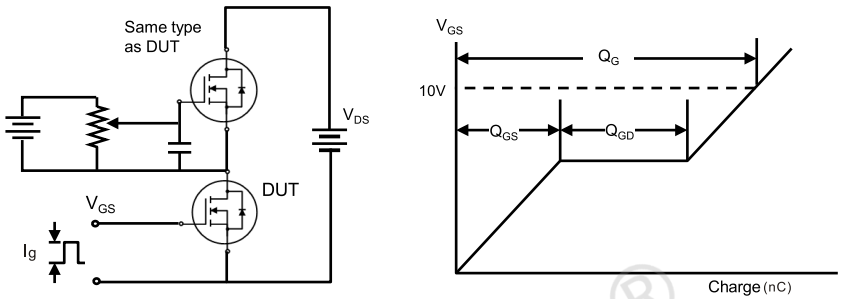


Fig. 13. Switching time test circuit & waveform

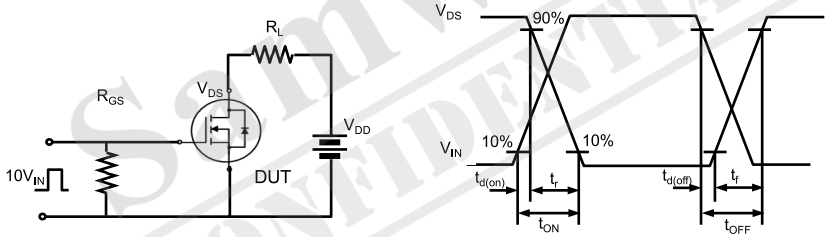


Fig. 14. Unclamped Inductive switching test circuit & waveform

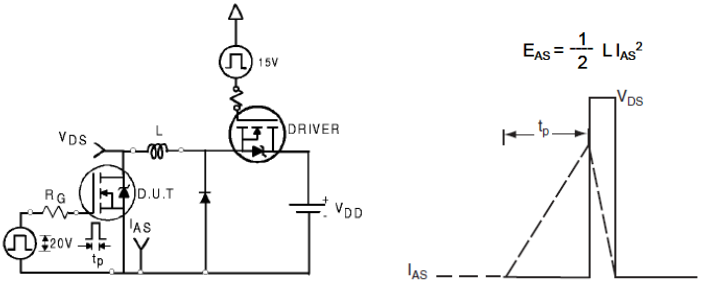
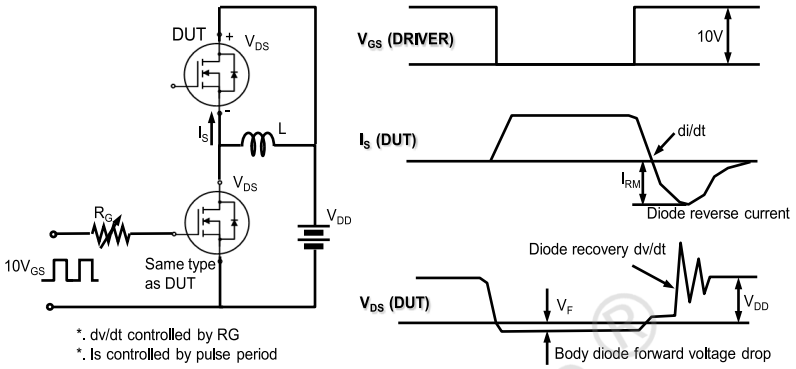


Fig. 15. Peak diode recovery dv/dt test circuit & waveform



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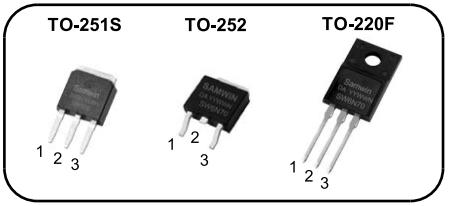
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-251S/TO-252/TO-220F MOSFET

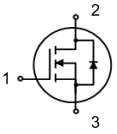
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.67Ω)@V_{GS}=10V
- Low Gate Charge (Typ 26nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: Charger,LED,PC-POWER



1. Gate 2. Drain 3. Source

BV_{DSS} : 700V
I_D : 6A
$R_{DS(ON)}$: 1.67Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW SI 6N70DA	SW6N70DA	TO-251S	TUBE
2	SW D 6N70DA	SW6N70DA	TO-252	REEL
3	SW F 6N70DA	SW6N70DA	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter	Value			Unit
		TO251S	TO252	TO220F	
V_{DSS}	Drain to source voltage	700			V
I_D	Continuous drain current (@T_C=25°C)	6*			A
	Continuous drain current (@T_C=100°C)	3.8*			A
I_{DM}	Drain current pulsed (note 1)	24			A
V_{GS}	Gate to source voltage	±30			V
E_{AS}	Single pulsed avalanche energy (note 2)	216			mJ
E_{AR}	Repetitive avalanche energy (note 1)	20			mJ
dv/dt	Peak diode recovery dv/dt (note 3)	5			V/ns
P_D	Total power dissipation (@T_C=25°C)	219	195.3	21.9	W
	Derating factor above 25°C	1.75	1.56	0.18	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature	-55 ~ + 150			°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.	300			°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value			Unit
		TO251S	TO252	TO220F	
R_{thjc}	Thermal resistance, Junction to case	0.57	0.64	5.7	°C/W
R_{thja}	Thermal resistance, Junction to ambient	81.4	82	46.9	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	700			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.42		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=700V, V_{GS}=0V			1	uA
		V_{DS}=560V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D =3A		1.67	1.9	Ω
G_{fs}	Forward transconductance	V_{DS} = 30V, I_D =3 A		5		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1040		pF
C_{oss}	Output capacitance			88		
C_{rss}	Reverse transfer capacitance			18		
$t_{d(on)}$	Turn on delay time	V_{DS}=350V, I_D=6A, R_G=25Ω V_{GS}=10V (note 4,5)		21		ns
t_r	Rising time			34		
$t_{d(off)}$	Turn off delay time			65		
t_f	Fall time			33		
Q_g	Total gate charge	V_{DS}=560V, V_{GS}=10V, I_D=6A (note 4,5)		26		nC
Q_{gs}	Gate-source charge			5.5		
Q_{gd}	Gate-drain charge			11		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			6	A
I_{SM}	Pulsed source current				24	A
V_{SD}	Diode forward voltage drop.	I_S=6A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=6A, V_{GS}=0V, dI_F/dt=100A/us		315		ns
Q_{rr}	Reverse recovery charge			2.95		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 12mH, I_{AS} = 6A, V_{DD} =100 V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 6A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

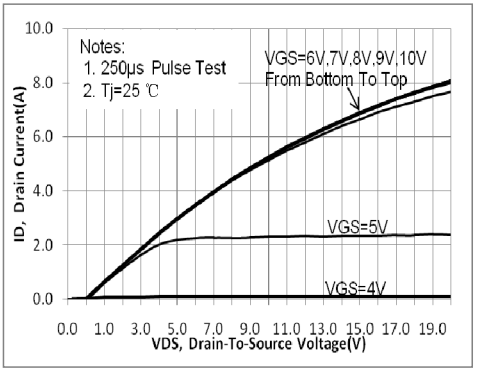


Fig. 2. On-resistance variation vs. drain current and gate voltage

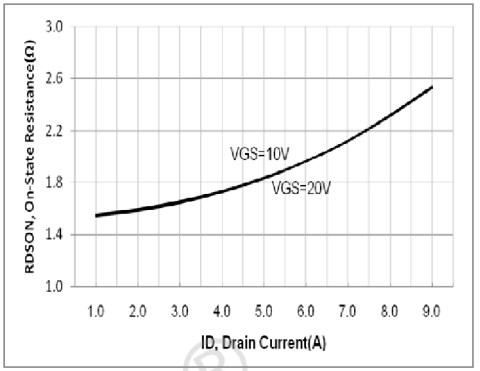


Fig. 3. Gate charge characteristics

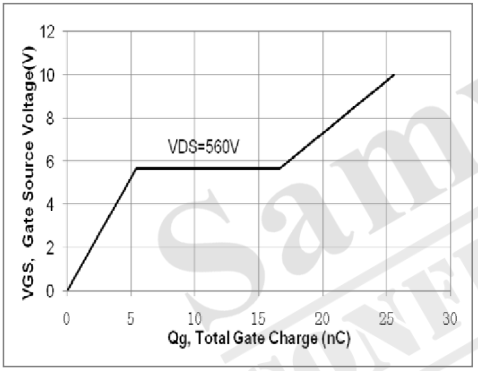


Fig. 4. On state current vs. diode forward voltage

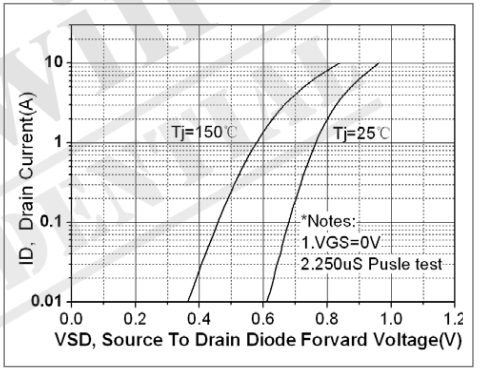


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

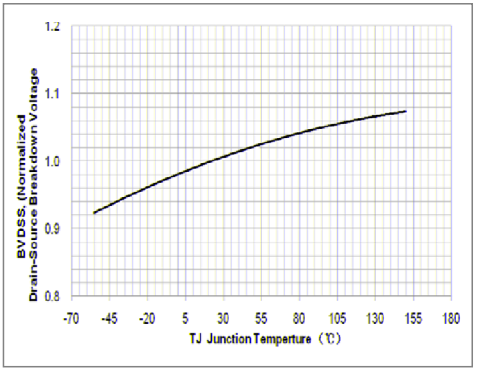


Fig. 6. On resistance variation vs. junction temperature

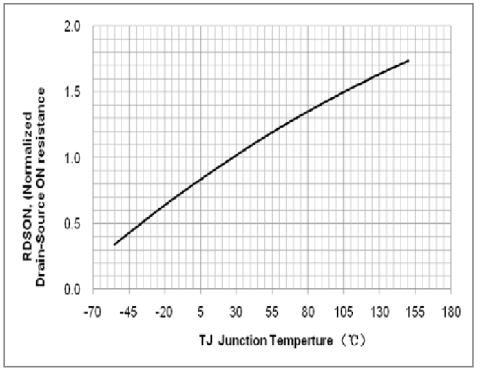


Fig. 7. Maximum safe operating area (TO251S)

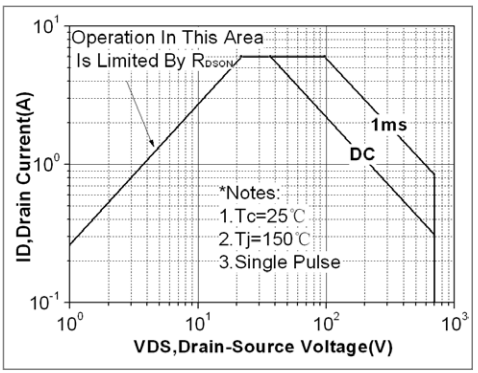


Fig. 8. Transient thermal response curve (TO251S)

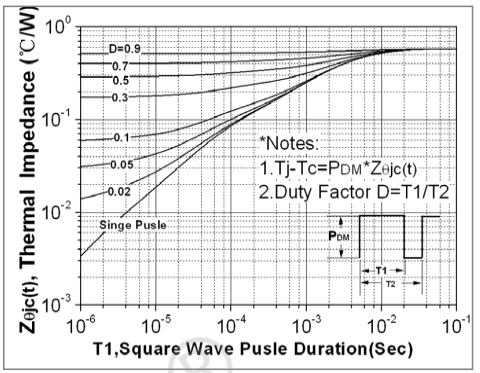


Fig. 9. Maximum safe operating area (TO220F)

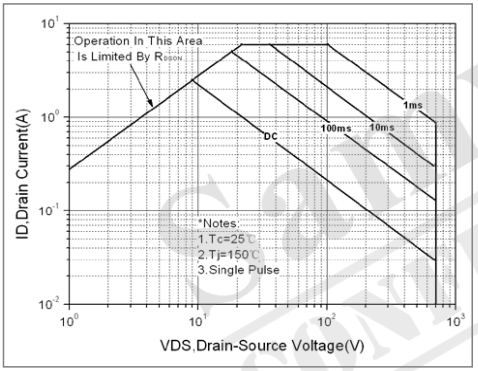


Fig. 10. Transient thermal response curve (TO220F)

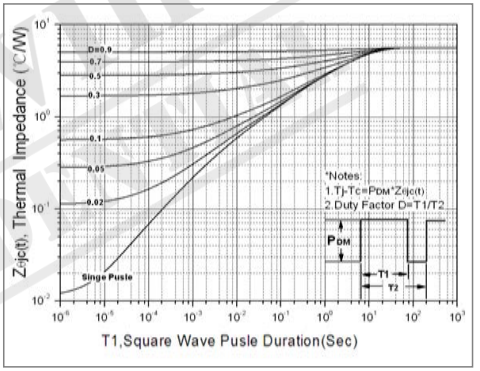


Fig. 11. Maximum safe operating area (TO252)

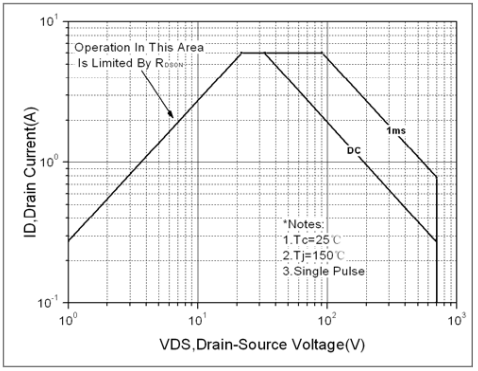


Fig. 12. Transient thermal response curve (TO252)

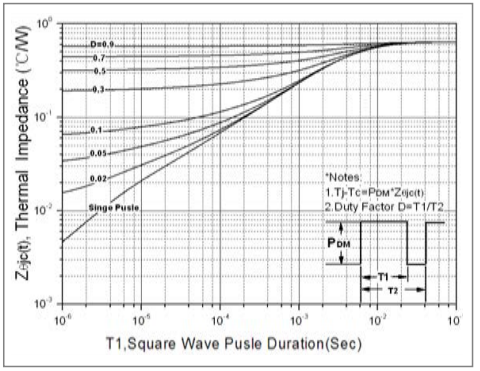


Fig. 13. Capacitance Characteristics

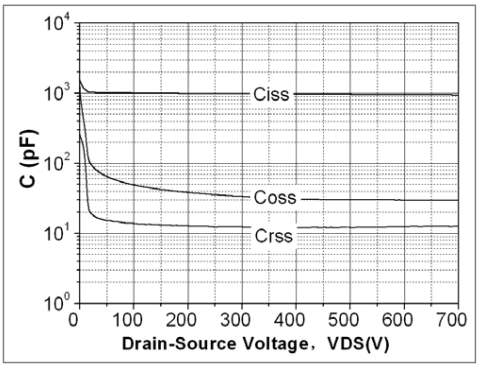


Fig. 14. Gate charge test circuit & waveform

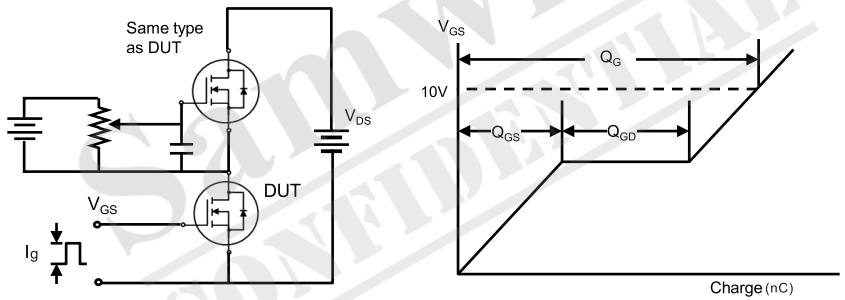


Fig. 15. Switching time test circuit & waveform

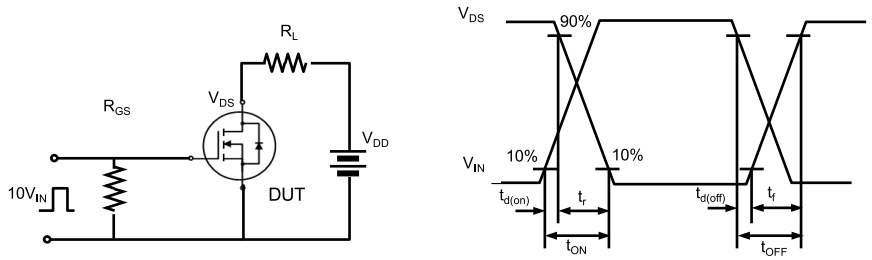


Fig. 16. Unclamped Inductive switching test circuit & waveform

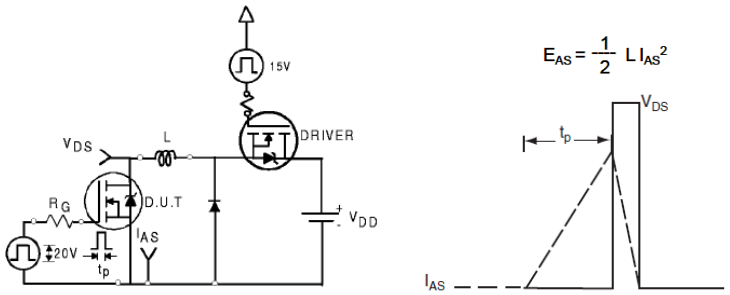
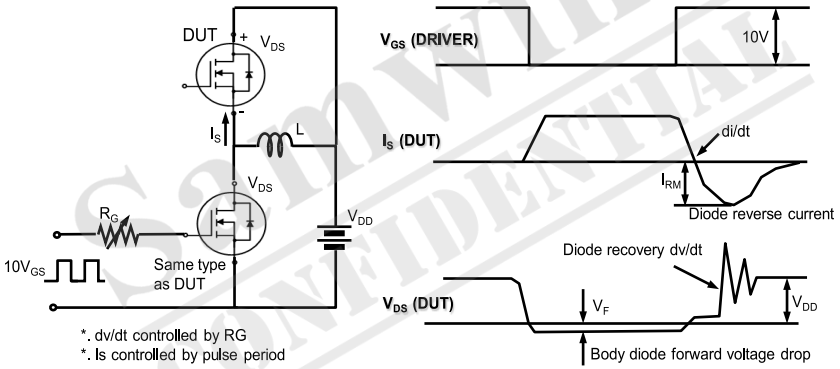


Fig. 17. Peak diode recovery dv/dt test circuit & waveform



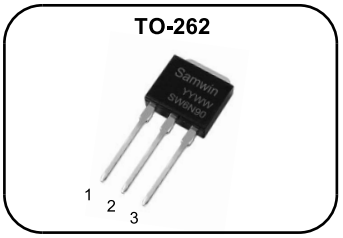
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-262 MOSFET

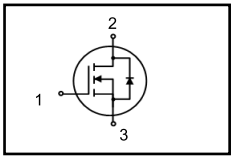
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.8Ω)@V_{GS}=10V
- Low Gate Charge (Typ 40nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: LED、UPS



1. Gate 2. Drain 3. Source

BV_{DSS} : 900V
I_D : 6.0A
$R_{DS(ON)}$: 1.8Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW U 6N90	SW6N90	TO-262	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		900	V
I_D	Continuous drain current (@T_C=25°C)		6.0*	A
	Continuous drain current (@T_C=100°C)		3.78*	A
I_{DM}	Drain current pulsed	(note 1)	24	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	550	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	150	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		231	W
	Derating factor above 25°C		1.85	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	0.54	°C/W
R_{thja}	Thermal resistance, Junction to ambient	65	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	900			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.91		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=900V, V_{GS}=0V			1	uA
		V_{DS}=720V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	3.0		5.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 3A		1.8	2.3	Ω
G_{fs}	Forward transconductance	V_{DS} = 40 V, I_D = 3 A		7		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1470		pF
C_{oss}	Output capacitance			120		
C_{rss}	Reverse transfer capacitance			20		
$t_{d(on)}$	Turn on delay time	V_{DS}=450V, I_D=6A, R_G=25Ω V_{GS}=10V (note 4,5)		23		ns
t_r	Rising time			26		
$t_{d(off)}$	Turn off delay time			58		
t_f	Fall time			24		
Q_g	Total gate charge	V_{DS}=720V, V_{GS}=10V, I_D=6A (note 4,5)		40		nC
Q_{gs}	Gate-source charge			8		
Q_{gd}	Gate-drain charge			19		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			6.0	A
I_{SM}	Pulsed source current				24.0	A
V_{SD}	Diode forward voltage drop.	I_S=6.0A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=6.0A, V_{GS}=0V, dI_F/dt=100A/us		436		ns
Q_{rr}	Reverse recovery charge			5.2		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 30mH, I_{AS} = 6.0A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 6.0A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

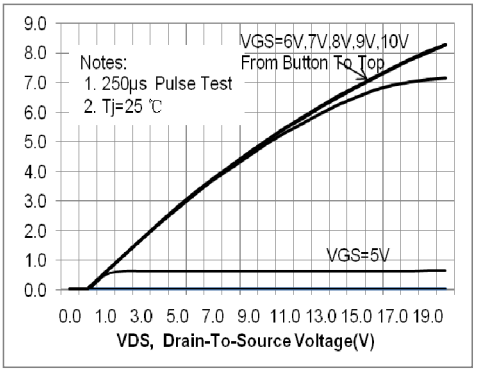


Fig. 2. On-resistance variation vs. drain current and gate voltage

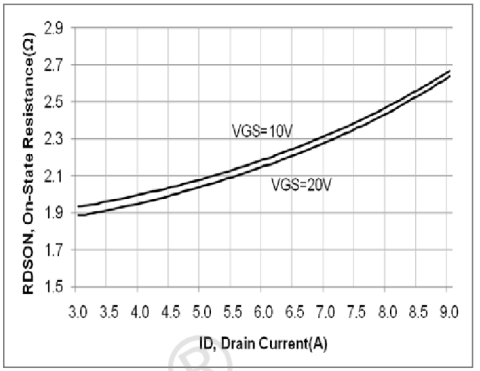


Fig. 3. Gate charge characteristics

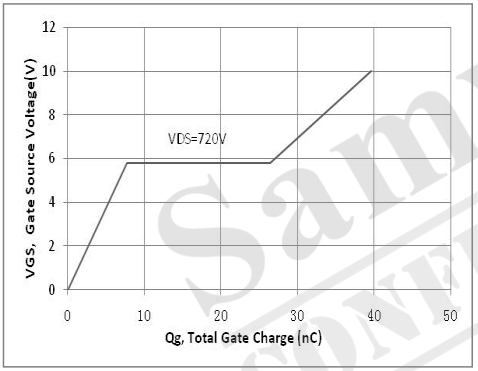


Fig. 4. On state current vs. diode forward voltage

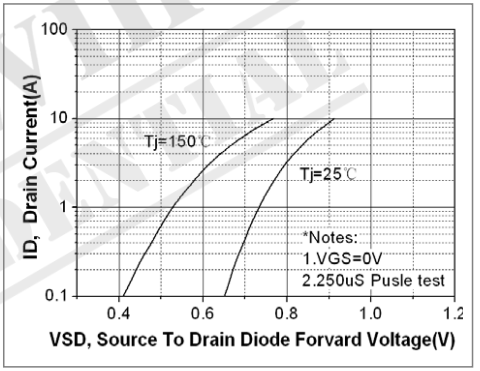


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

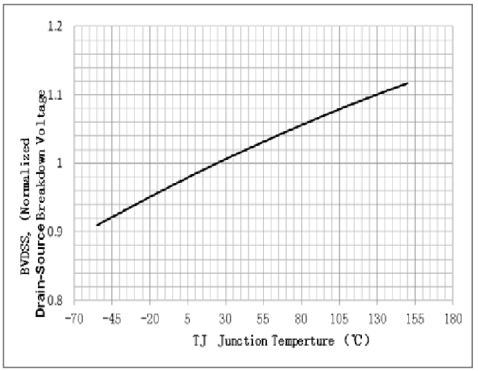


Fig. 6. On resistance variation vs. junction temperature

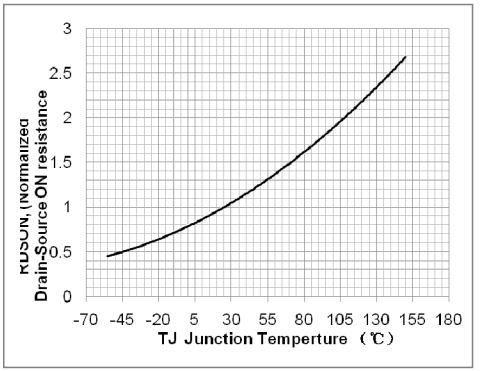


Fig. 7. Maximum safe operating area

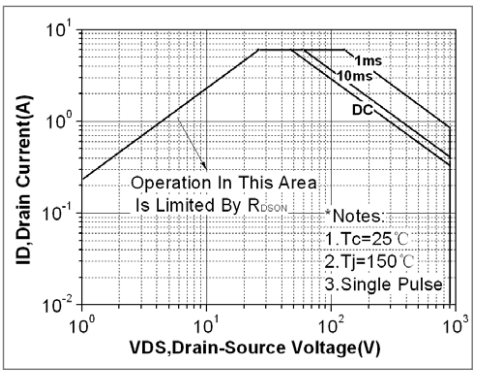


Fig. 8. Transient thermal response curve

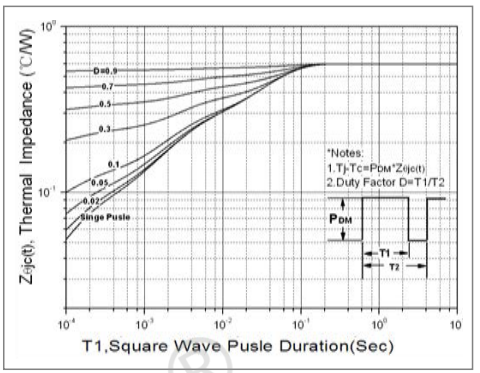


Fig. 9. Capacitance Characteristics

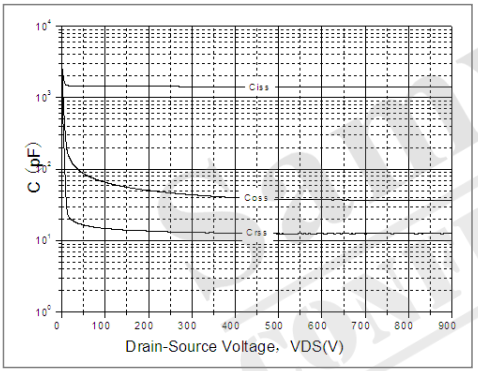
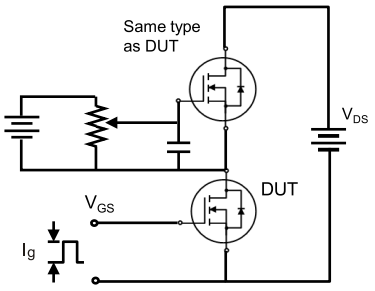


Fig. 10. Gate charge test circuit & waveform



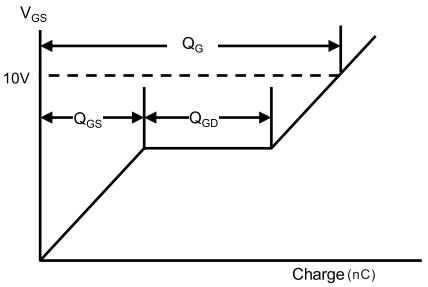


Fig. 11. Switching time test circuit & waveform

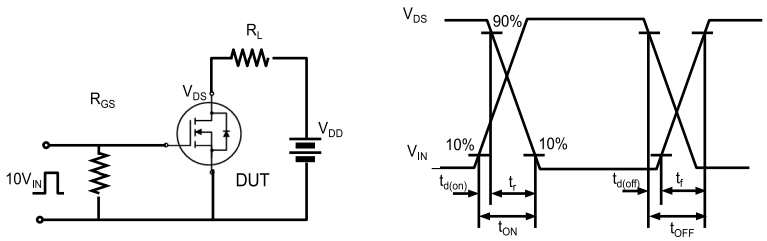


Fig. 12. Unclamped Inductive switching test circuit & waveform

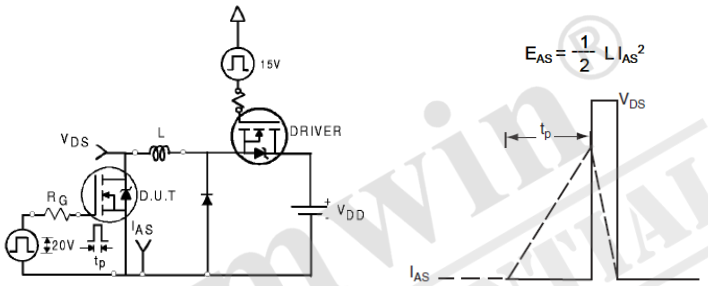
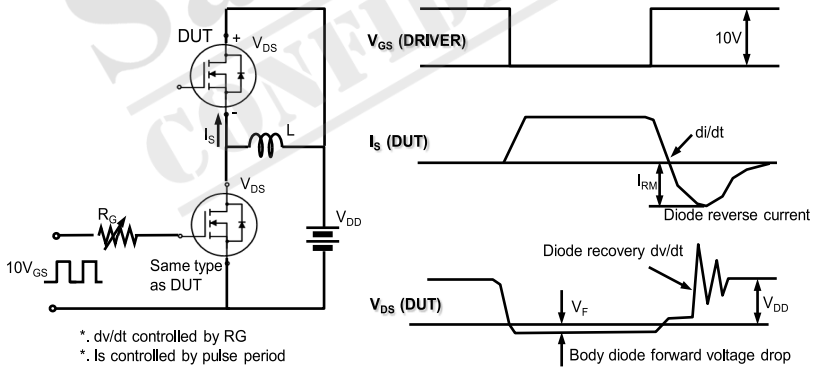


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



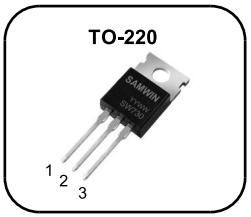
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220 MOSFET

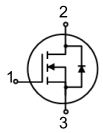
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.8Ω)@V_{GS}=10V
- Low Gate Charge (Typ 33nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:DC-DC,LED



1. Gate 2. Drain 3. Source

BV_{DSS} : 400V
I_D : 6.5A
$R_{DS(ON)}$: 0.8Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW P 730	SW730	TO-220	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		400	V
I_D	Continuous drain current (@T_C=25°C)		6.5*	A
	Continuous drain current (@T_C=100°C)		3.8*	A
I_{DM}	Drain current pulsed	(note 1)	26	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	265	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	20	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	4.5	V/ns
P_D	Total power dissipation (@T_C=25°C)		192	W
	Derating factor above 25°C		1.54	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	0.65	°C/W
R_{thja}	Thermal resistance, Junction to ambient	65	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	400			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.48		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=400V, V_{GS}=0V			1	uA
		V_{DS}=320V, T_C=125°C			20	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.0		4.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D=3.25A		0.8	1.0	Ω
G_{fs}	Forward transconductance	V_{DS} =40V, I_D=3.25A		3.5		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		750		pF
C_{oss}	Output capacitance			100		
C_{rss}	Reverse transfer capacitance			35		
$t_{d(on)}$	Turn on delay time	V_{DS}=200V, I_D=6.5A, R_G=25Ω V_{GS}=10V (note 4,5)		12		ns
t_r	Rising time			33		
$t_{d(off)}$	Turn off delay time			102		
t_f	Fall time			38		
Q_g	Total gate charge	V_{DS}=320V, V_{GS}=10V, I_D=6.5A (note 4,5)		33		nC
Q_{gs}	Gate-source charge			4		
Q_{gd}	Gate-drain charge			17		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			6.5	A
I_{SM}	Pulsed source current				26	A
V_{SD}	Diode forward voltage drop.	I_S=6.5A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=6.5A, V_{GS}=0V, dI_F/dt=100A/us		225		ns
Q_{rr}	Reverse recovery charge			1.94		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 12.5mH, I_{AS} = 6.5A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 6.5A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

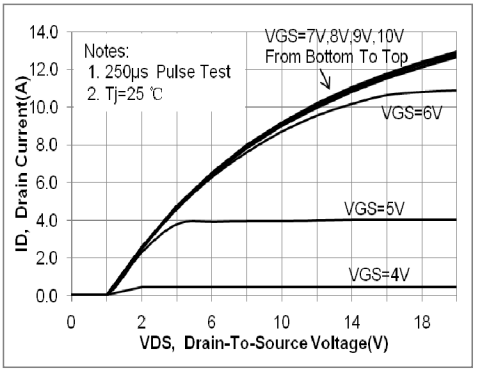


Fig. 2. On-resistance variation vs. drain current and gate voltage

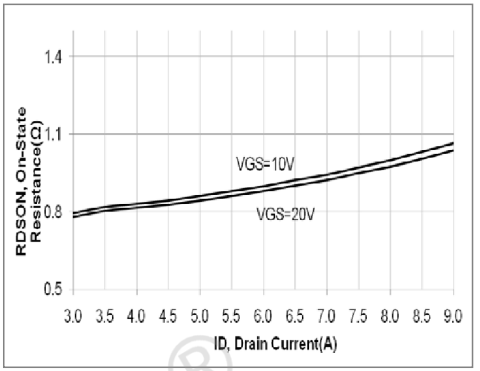


Fig. 3. Gate charge characteristics

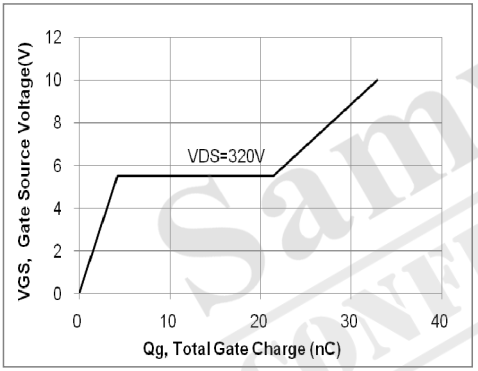


Fig. 4. On state current vs. diode forward voltage

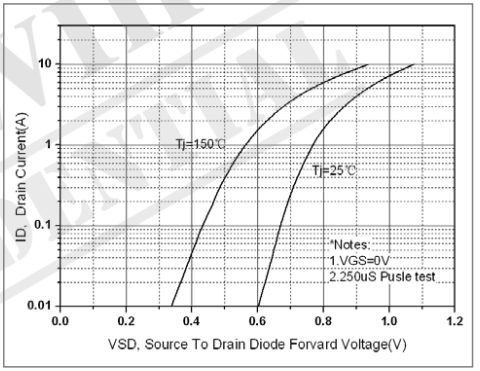


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

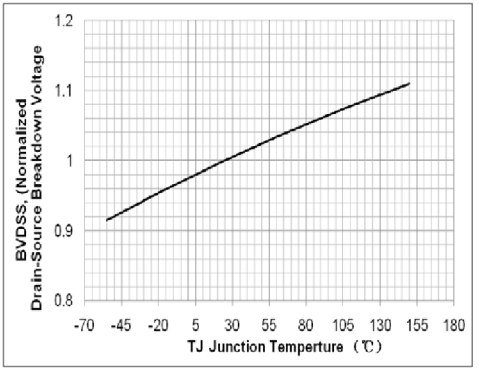


Fig. 6. On resistance variation vs. junction temperature

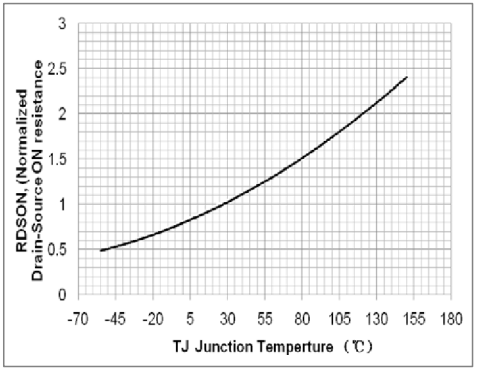


Fig. 7. Maximum safe operating area

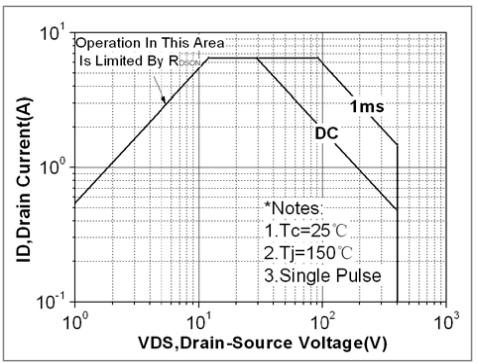


Fig. 8. Transient thermal response curve

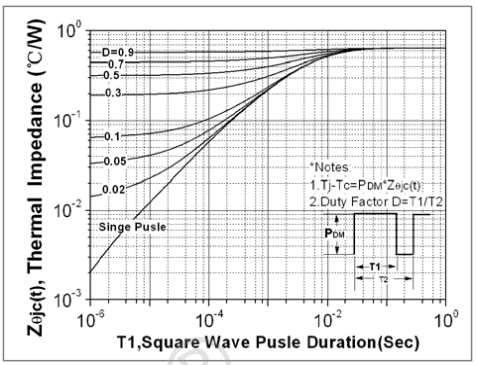


Fig. 9. Capacitance Characteristics

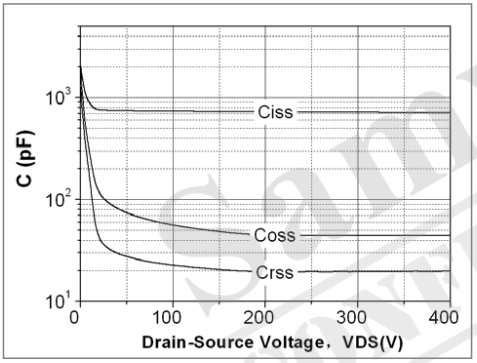
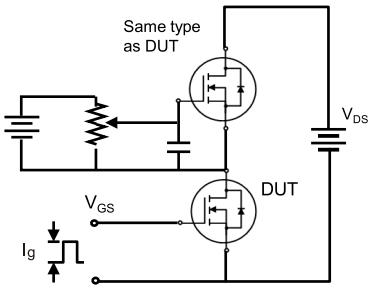


Fig. 10. Gate charge test circuit & waveform



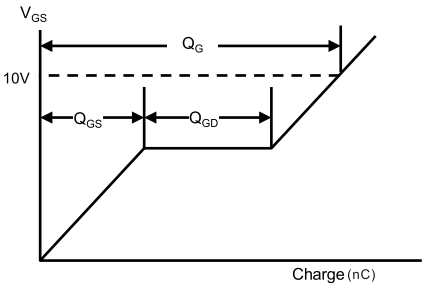


Fig. 11. Switching time test circuit & waveform

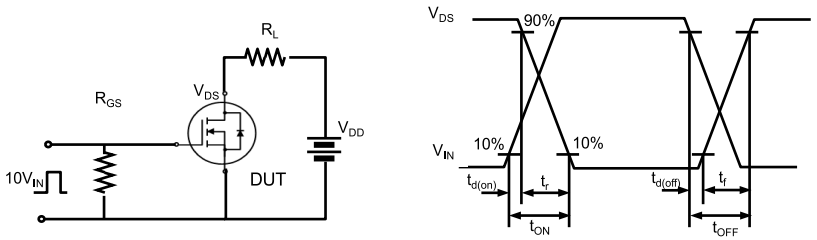


Fig. 12. Unclamped Inductive switching test circuit & waveform

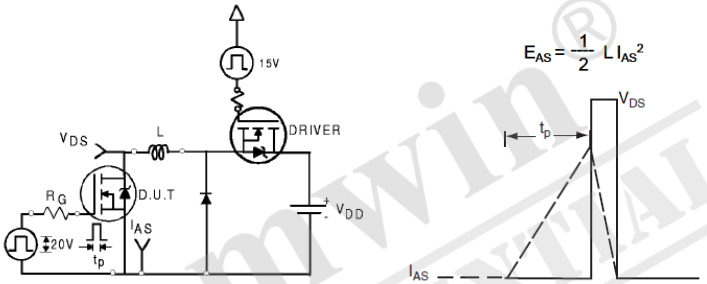
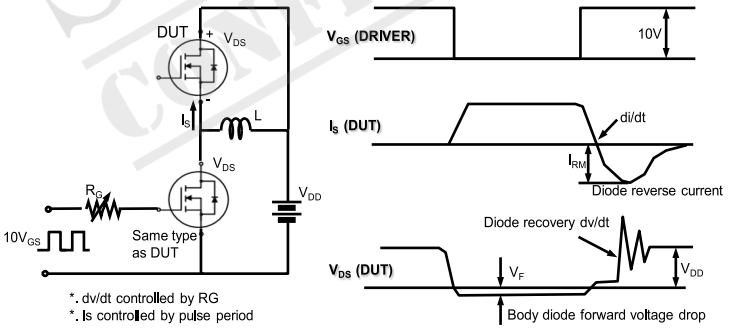


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



DISCLAIMER

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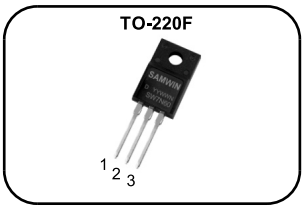
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F MOSFET

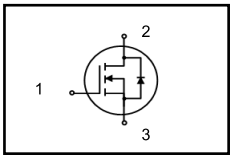
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.1Ω)@V_{GS}=10V
- Low Gate Charge (Typ 30nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: UPS, Inverter, TV-POWER



1. Gate 2. Drain 3. Source

BV_{DSS} : 600V
I_D : 7 A
$R_{DS(ON)}$: 1.1Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 7N60D	SW7N60D	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		600	V
I_D	Continuous drain current (@T_C=25°C)		7	A
	Continuous drain current (@T_C=100°C)		4.2	A
I_{DM}	Drain current pulsed	(note 1)	28	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	420	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	49	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		23.76	W
	Derating factor above 25°C		0.19	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from Case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	5.26	°C/W
R_{thja}	Thermal resistance, Junction to ambient	49.21	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	600			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.47		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=600V, V_{GS}=0V			1	uA
		V_{DS}=480V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 3.5A		1.1	1.2	Ω
G_{fs}	Forward transconductance	V_{DS} = 30 V, I_D = 3.5 A		6.2		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1000		pF
C_{oss}	Output capacitance			115		
C_{rss}	Reverse transfer capacitance			25		
$t_{d(on)}$	Turn on delay time	V_{DS}=300V, I_D=7A, R_G=25Ω V_{GS}=10V (note 4,5)		14		ns
t_r	Rising time			32		
$t_{d(off)}$	Turn off delay time			67		
t_f	Fall time			35		
Q_g	Total gate charge	V_{DS}=480V, V_{GS}=10V, I_D=7A (note 4,5)		30		nC
Q_{gs}	Gate-source charge			5		
Q_{gd}	Gate-drain charge			15		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			7	A
I_{SM}	Pulsed source current				28	A
V_{SD}	Diode forward voltage drop.	I_S=7A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=7A, V_{GS}=0V, dI_F/dt=100A/us		315		ns
Q_{rr}	Reverse recovery charge			3.1		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 17.7mH, I_{AS} = 7A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 10A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

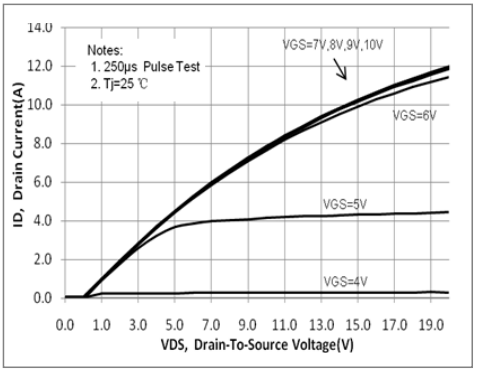


Fig. 2. On-resistance variation vs. drain current and gate voltage

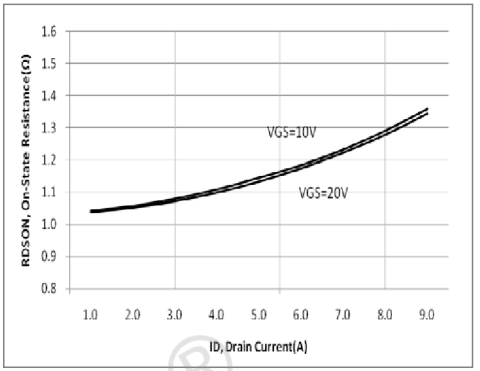


Fig. 3. Gate charge characteristics

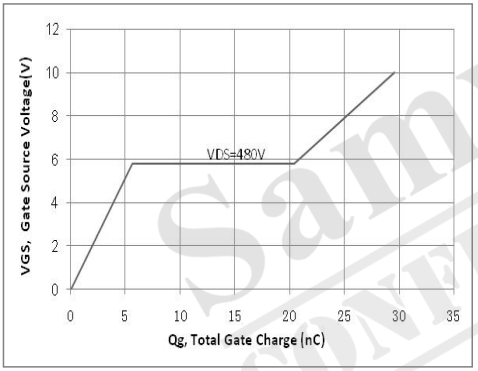


Fig. 4. On state current vs. diode forward voltage

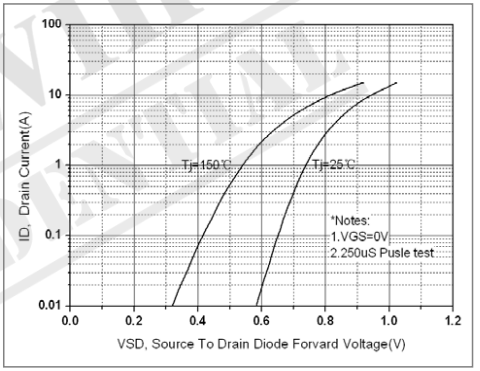


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

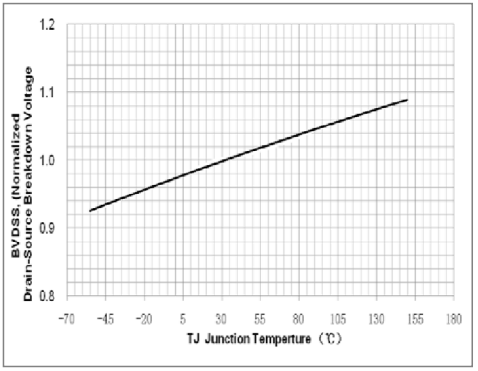


Fig. 6. On resistance variation vs. junction temperature

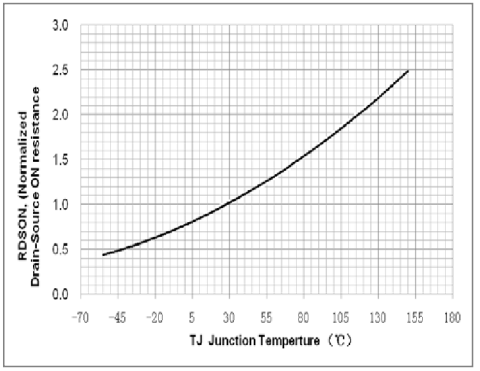


Fig. 7. Maximum safe operating area

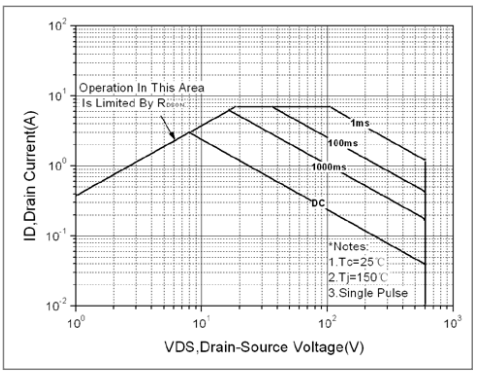


Fig. 8. Transient thermal response curve

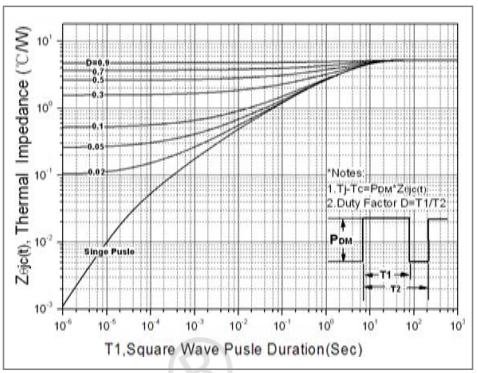


Fig. 9. Capacitance Characteristics

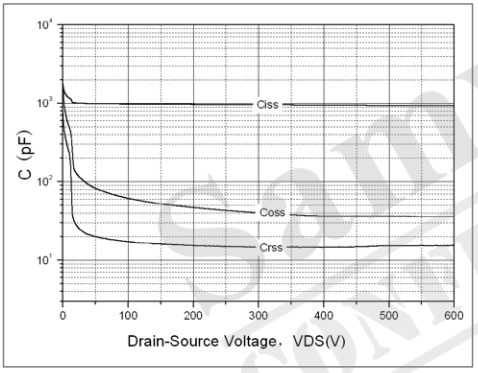
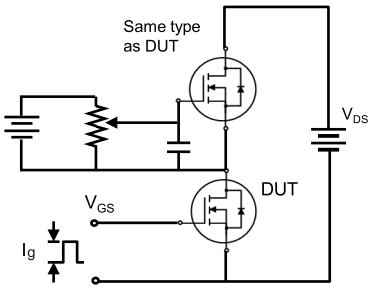


Fig. 10. Gate charge test circuit & waveform



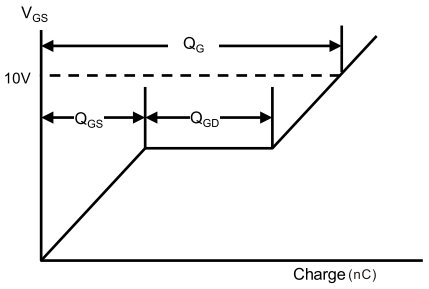


Fig. 11. Switching time test circuit & waveform

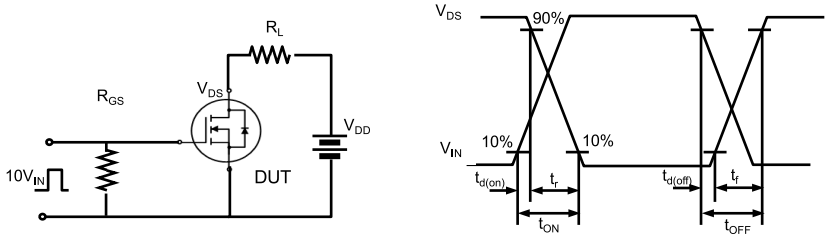


Fig. 12. Unclamped Inductive switching test circuit & waveform

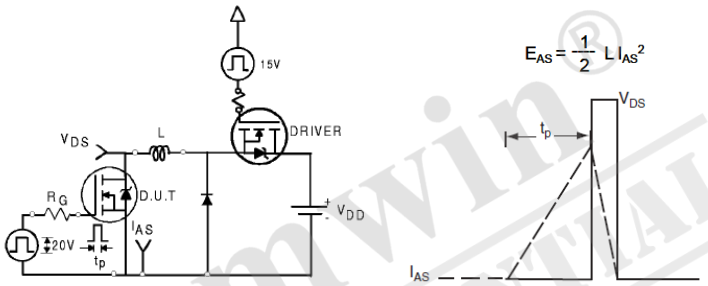
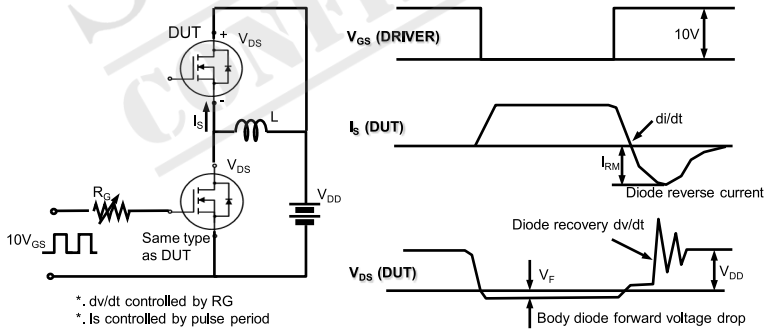


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



DISCLAIMER

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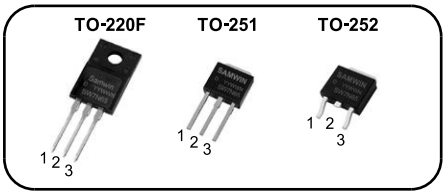
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F/TO-251/TO-252 MOSFET

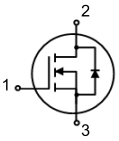
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.1Ω)@V_{GS}=10V
- Low Gate Charge (Typ 30nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: Charger,TV-POWER



1. Gate 2. Drain 3. Source

BV_{DSS} : 650V
I_D : 7A
$R_{DS(ON)}$: 1.1Ω



General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 7N65D	SW7N65D	TO-220F	TUBE
2	SW I 7N65D	SW7N65D	TO-251	TUBE
3	SW D 7N65D	SW7N65D	TO-252	REEL

Absolute maximum ratings

Symbol	Parameter	Value			Unit
		TO-220F	TO-251	TO-252	
V_{DSS}	Drain to source voltage	650			V
I_D	Continuous drain current (@T_C=25°C)	7*			A
	Continuous drain current (@T_C=100°C)	4.4*			A
I_{DM}	Drain current pulsed (note 1)	28			A
V_{GS}	Gate to source voltage	±30			V
E_{AS}	Single pulsed avalanche energy (note 2)	429			mJ
E_{AR}	Repetitive avalanche energy (note 1)	41			mJ
dv/dt	Peak diode recovery dv/dt (note 3)	5			V/ns
P_D	Total power dissipation (@T_C=25°C)	27.9	173.6	255.1	W
	Derating factor above 25°C	0.22	1.39	2.04	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature	-55 ~ + 150			°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.	300			°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value			Unit
		TO-220F	TO-251	TO-252	
R_{thjc}	Thermal resistance, Junction to case	4.47	0.72	0.49	°C/W
R_{thja}	Thermal resistance, Junction to ambient	49.5	81.4	77.2	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	650			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.51		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=650V, V_{GS}=0V			1	uA
		V_{DS}=520V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 3.5A		1.1	1.4	Ω
G_{fs}	Forward transconductance	V_{DS} = 30V, I_D = 3.5A		5.5		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		950		pF
C_{oss}	Output capacitance			108		
C_{rss}	Reverse transfer capacitance			16		
$t_{d(on)}$	Turn on delay time	V_{DS}=325V, I_D=7A, R_G=25Ω V_{GS}=10V (note 4,5)		16		ns
t_r	Rising time			36		
$t_{d(off)}$	Turn off delay time			83		
t_f	Fall time			40		
Q_g	Total gate charge	V_{DS}=520V, V_{GS}=10V, I_D=7A (note 4,5)		30		nC
Q_{gs}	Gate-source charge			5		
Q_{gd}	Gate-drain charge			15		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			7	A
I_{SM}	Pulsed source current				28	A
V_{SD}	Diode forward voltage drop.	I_S=7A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=7A, V_{GS}=0V, dI_F/dt=100A/us		436		ns
Q_{rr}	Reverse recovery Charge			8.7		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 17.5mH, I_{AS} = 7A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 7A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

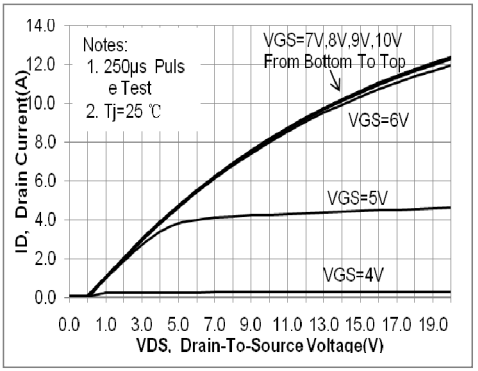


Fig. 2. On-resistance variation vs. drain current and gate voltage

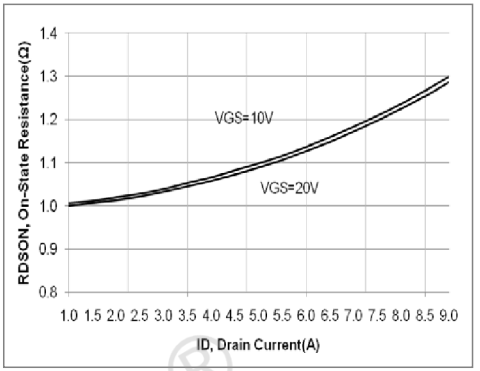


Fig. 3. Gate charge characteristics

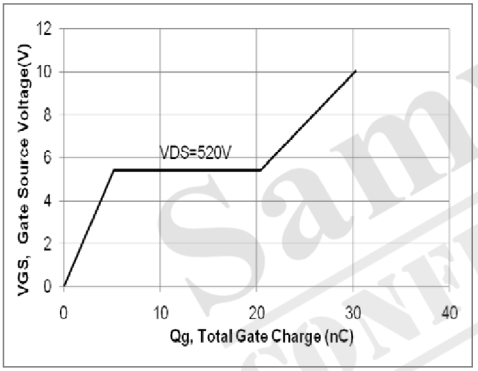


Fig. 4. On state current vs. diode forward voltage

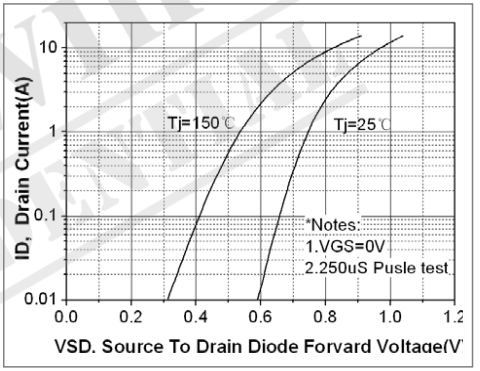


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

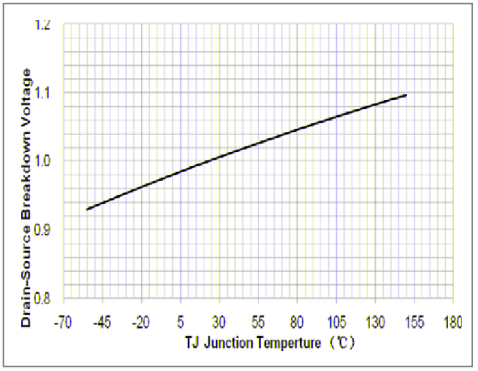


Fig. 6. On resistance variation vs. junction temperature

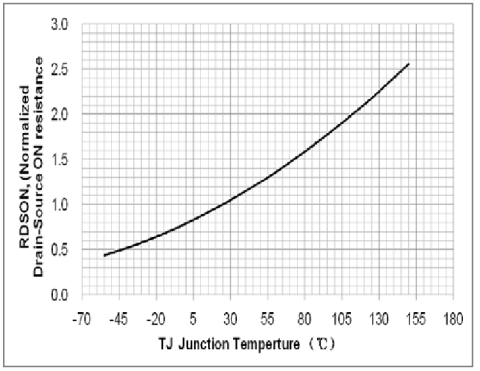


Fig. 7. Maximum safe operating area（TO-220F）

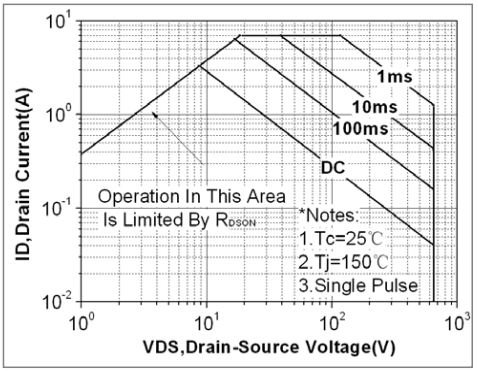


Fig. 8. Transient thermal response curve（TO-220F）

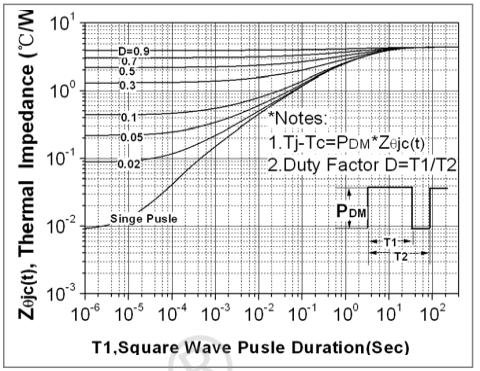


Fig. 9. Maximum safe operating area（TO-251）

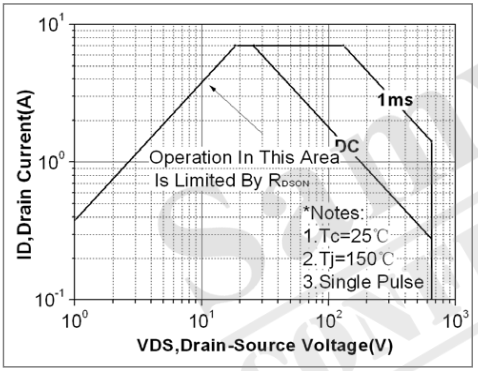


Fig. 10. Transient thermal response curve（TO-251）

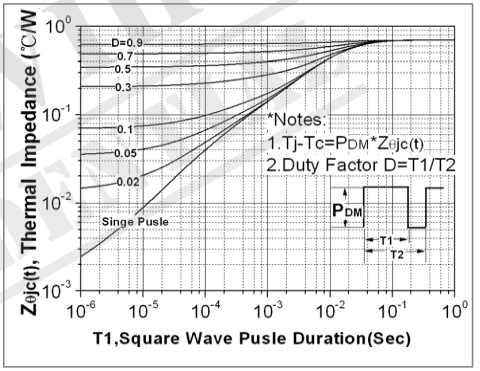


Fig. 11. Maximum safe operating area（TO-252）

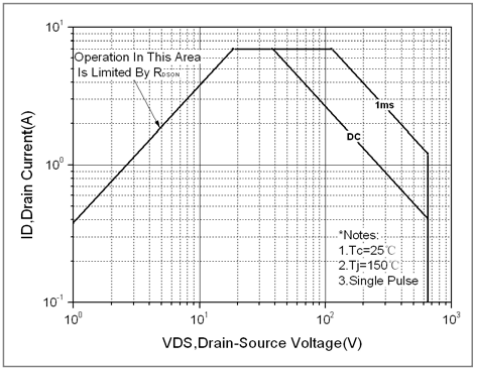


Fig. 12. Transient thermal response curve（TO-252）

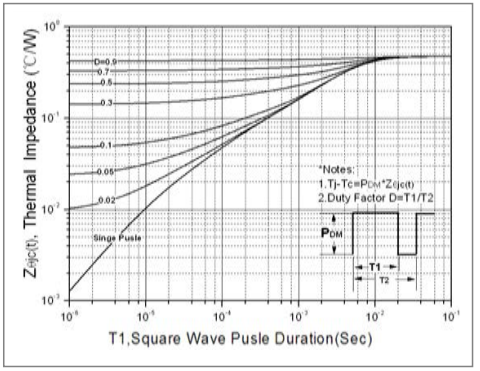


Fig. 13. Capacitance Characteristics

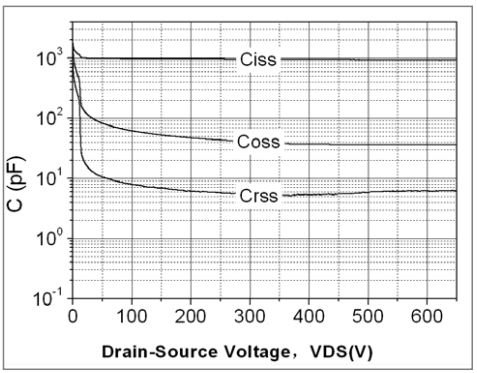


Fig. 14. Gate charge test circuit & waveform

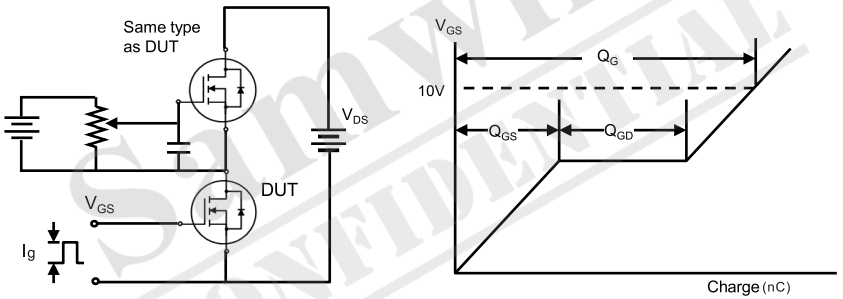


Fig. 15. Switching time test circuit & waveform

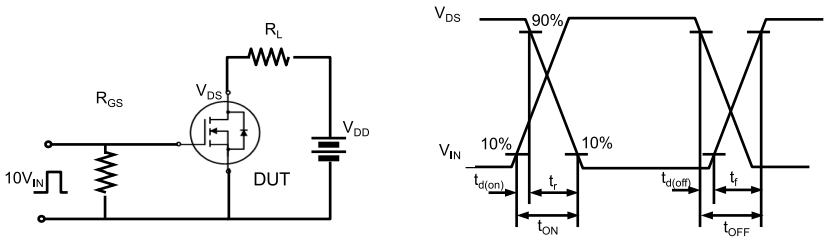


Fig. 16. Unclamped Inductive switching test circuit & waveform

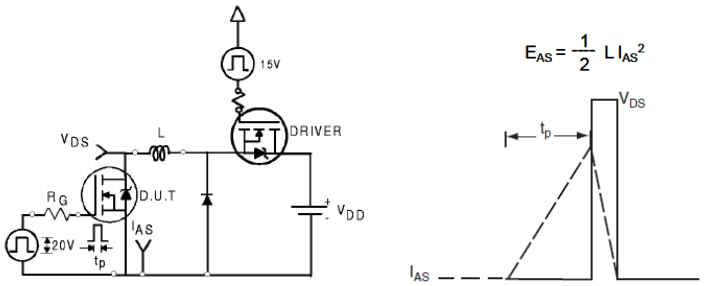
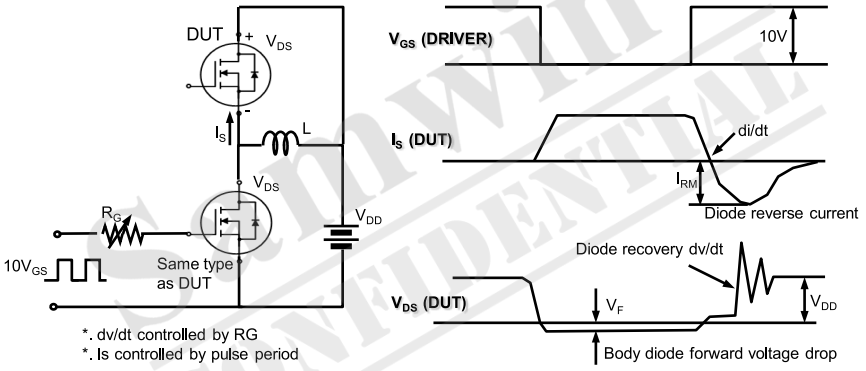


Fig. 17. Peak diode recovery dv/dt test circuit & waveform



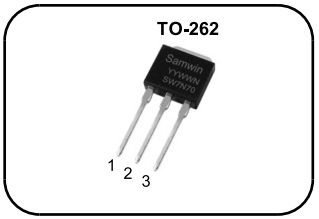
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-262 MOSFET

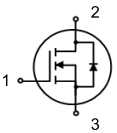
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.2Ω)@V_{GS}=10V
- Low Gate Charge (Typ 32nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: Charger,LED



1. Gate 2. Drain 3. Source

BV_{DSS} : 650V
I_D : 7A
$R_{DS(ON)}$: 1.2Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW U 7N70	SW7N70	TO-262	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		650	V
I_D	Continuous drain current (@T_C=25°C)		7.0*	A
	Continuous drain current (@T_C=100°C)		4.4*	A
I_{DM}	Drain current pulsed	(note 1)	28	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	84	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	14.5	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		247	W
	Derating factor above 25°C		1.98	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	0.51	°C/W
R_{thja}	Thermal resistance, Junction to ambient	63.6	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	650			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.67		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=650V, V_{GS}=0V			1	uA
		V_{DS}=520V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.0		4.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 3.5A		1.2	1.4	Ω
G_{fs}	Forward transconductance	V_{DS}= 20 V, I_D = 3.5A		7.6		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1160		pF
C_{oss}	Output capacitance			110		
C_{rss}	Reverse transfer capacitance			17		
$t_{d(on)}$	Turn on delay time	V_{DS}=350V, I_D=7A, R_G=25Ω V_{GS}=10V (note 4,5)		14.5		ns
t_r	Rising time			28		
$t_{d(off)}$	Turn off delay time			76		
t_f	Fall time			34		
Q_g	Total gate charge	V_{DS}=560V, V_{GS}=10V, I_D=7A (note 4,5)		32		nC
Q_{gs}	Gate-source charge			6		
Q_{gd}	Gate-drain charge			13		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			7.0	A
I_{SM}	Pulsed source current				28.0	A
V_{SD}	Diode forward voltage drop.	I_S=7A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=7A, V_{GS}=0V, dI_F/dt=100uA/us		374		ns
Q_{rr}	Reverse recovery charge			4.02		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 3.4mH, I_{AS} = 7A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 7A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

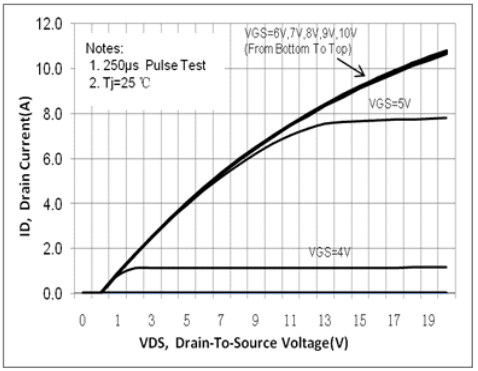


Fig. 2. On-resistance variation vs. drain current and gate voltage

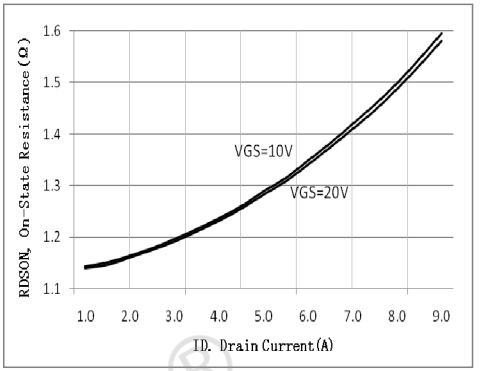


Fig. 3. Gate charge characteristics

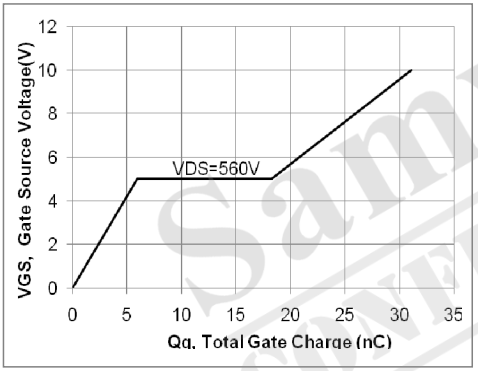


Fig. 4. On state current vs. diode forward voltage

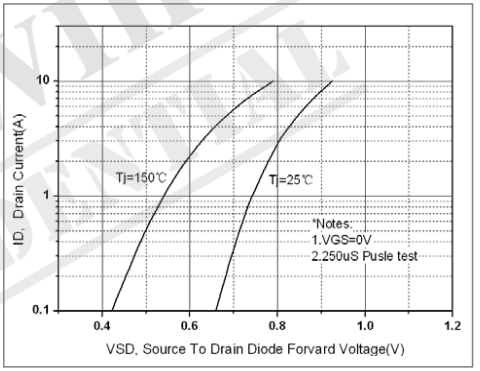


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

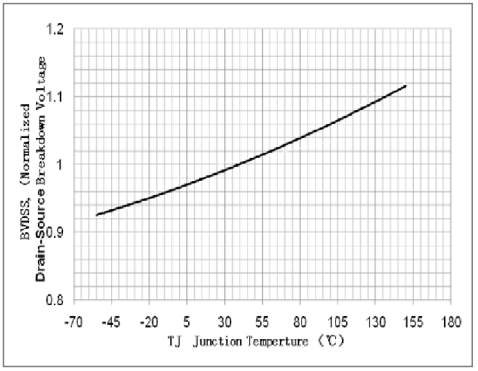


Fig. 6. On resistance variation vs. junction temperature

Fig. 7. Maximum safe operating area

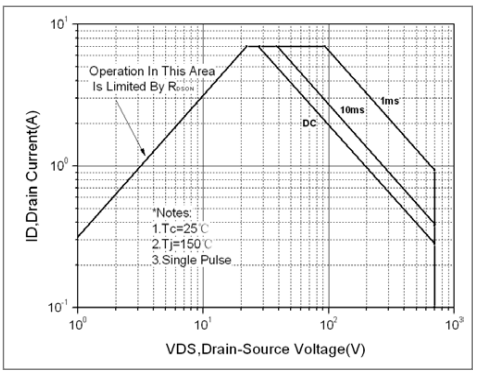


Fig. 8. Transient thermal response curve

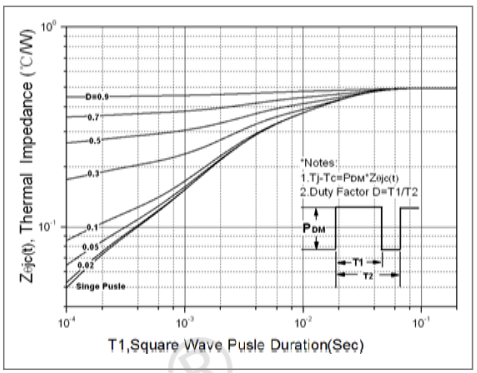


Fig. 9. Capacitance Characteristics

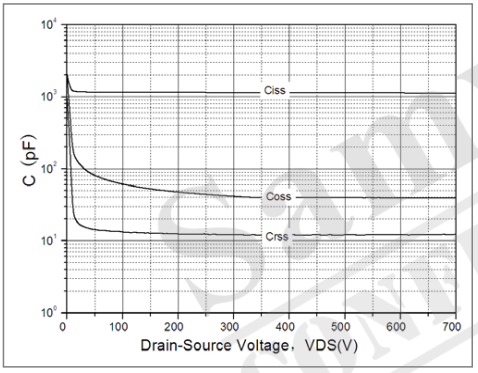
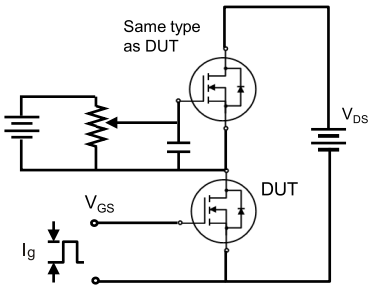


Fig. 10. Gate charge test circuit & waveform



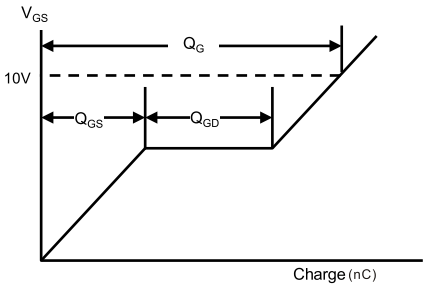


Fig. 11. Switching time test circuit & waveform

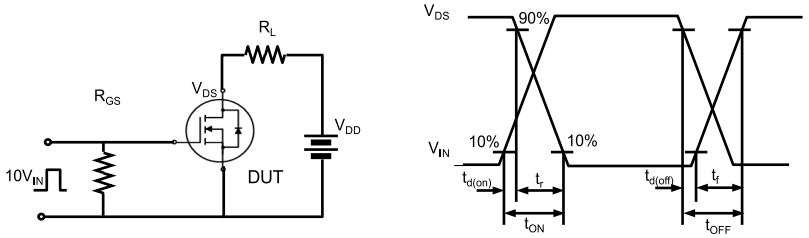


Fig. 12. Unclamped Inductive switching test circuit & waveform

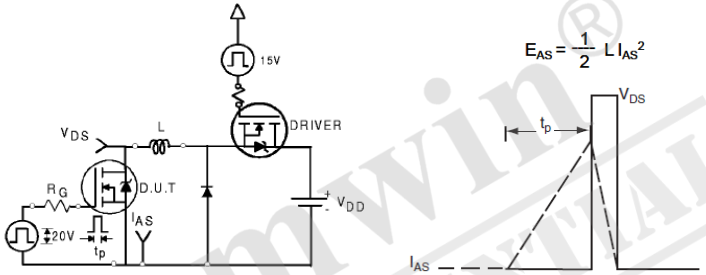
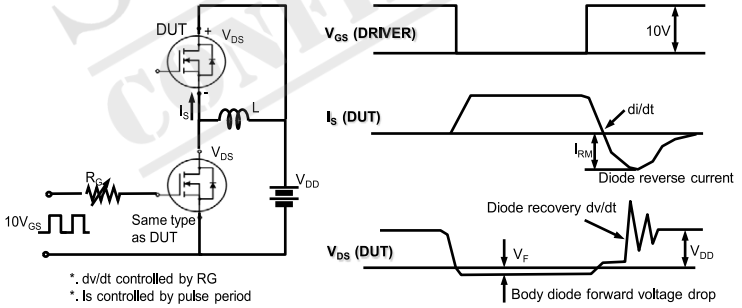


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



DISCLAIMER

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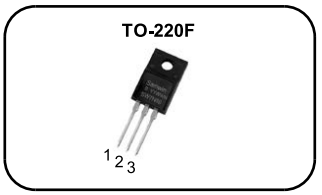
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F MOSFET

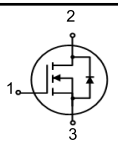
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.43Ω)@V_{GS}=10V
- Low Gate Charge (Typ 25nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: Industrial power, LED,Adapter



1. Gate 2. Drain 3. Source

BV_{DSS} : 800V
I_D : 7A
$R_{DS(ON)}$: 1.43Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 7N80B	SW7N80B	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		800	V
I_D	Continuous drain current (@T_C=25°C)		7*	A
	Continuous drain current (@T_C=100°C)		4.4*	A
I_{DM}	Drain current pulsed	(note 1)	28	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	460	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	50	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		48	W
	Derating factor above 25°C		0.38	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	2.6	°C/W
R_{thja}	Thermal resistance, Junction to ambient	45.5	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	800			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.76		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=800V, V_{GS}=0V			1	uA
		V_{DS}=640V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2		4	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 3.5A		1.43	1.59	Ω
G_{fs}	Forward transconductance	V_{DS} = 30 V, I_D = 3.5A		5.4		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1150		pF
C_{oss}	Output capacitance			117		
C_{rss}	Reverse transfer capacitance			13		
$t_{d(on)}$	Turn on delay time	V_{DS}=400V, I_D=7A, R_G=25Ω V_{GS}=10V (note 4,5)		12		ns
t_r	Rising time			24		
$t_{d(off)}$	Turn off delay time			74		
t_f	Fall time			35		
Q_g	Total gate charge	V_{DS}=640V, V_{GS}=10V, I_D=7A (note 4,5)		25		nC
Q_{gs}	Gate-source charge			6		
Q_{gd}	Gate-drain charge			10		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			7	A
I_{SM}	Pulsed source current				28	A
V_{SD}	Diode forward voltage drop.	I_S=7A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=7A, V_{GS}=0V, dI_F/dt=100A/us		388		ns
Q_{rr}	Reverse recovery charge			4.1		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 18.7mH, I_{AS} = 7A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 7A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

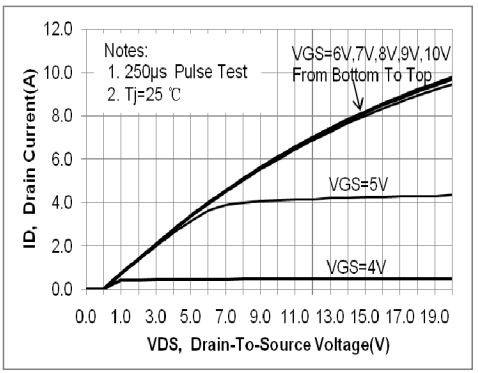


Fig. 2. On-resistance variation vs. drain current and gate voltage

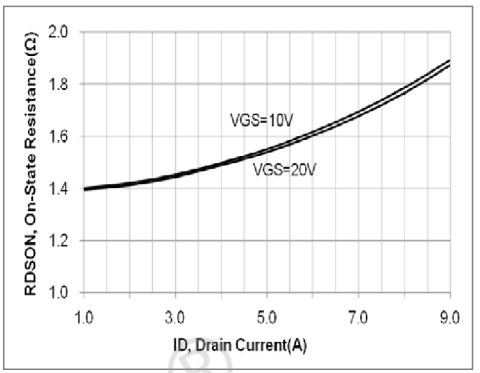


Fig. 3. Gate charge characteristics

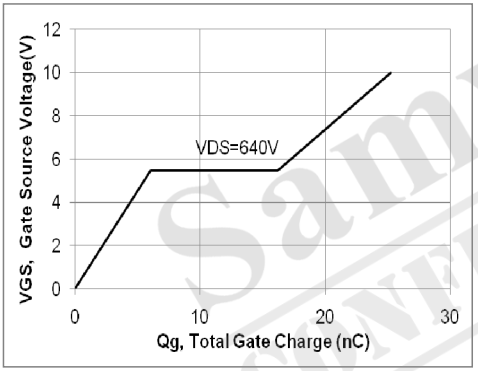


Fig. 4. On state current vs. diode forward voltage

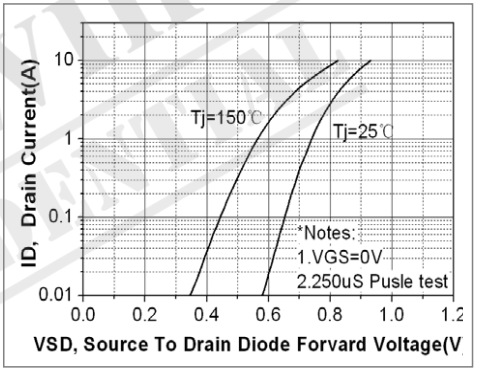


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

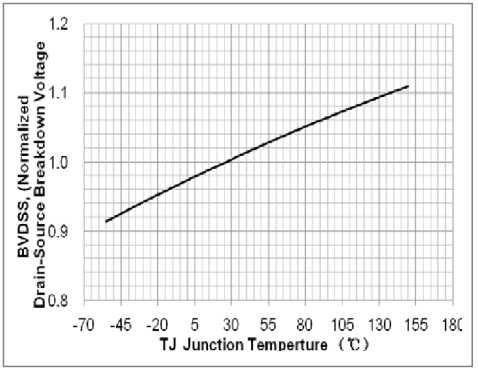


Fig. 6. On resistance variation vs. junction temperature

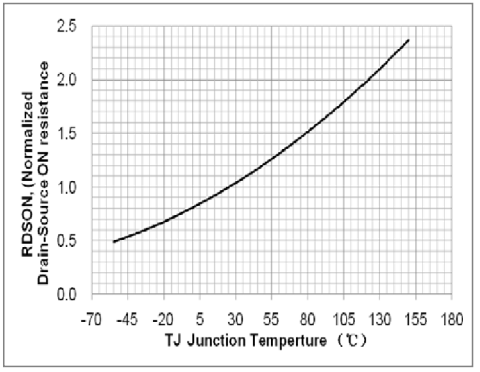


Fig. 7. Maximum safe operating area

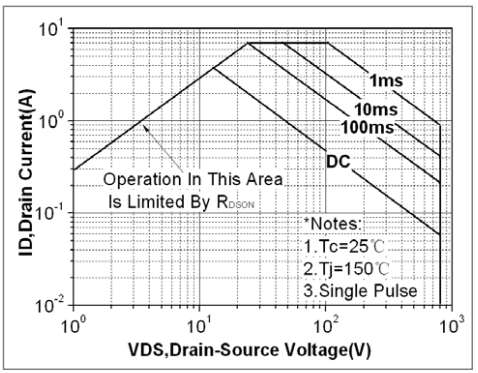


Fig. 8. Transient thermal response curve

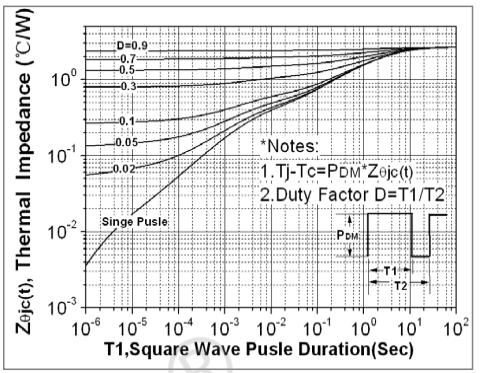


Fig. 9. Capacitance Characteristics

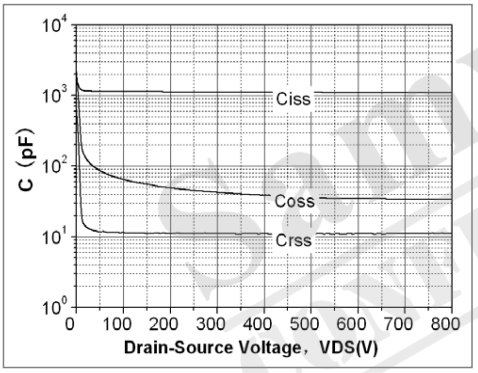
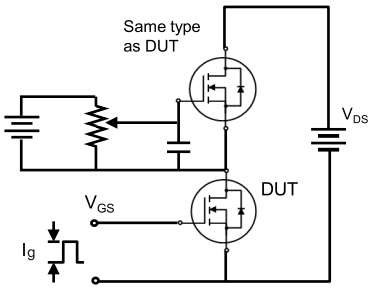


Fig. 10. Gate charge test circuit & waveform



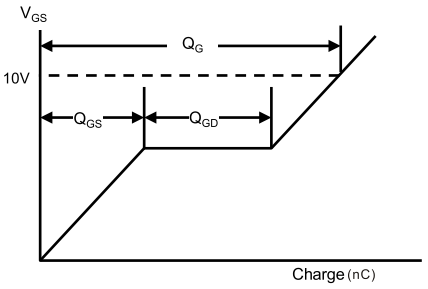


Fig. 11. Switching time test circuit & waveform

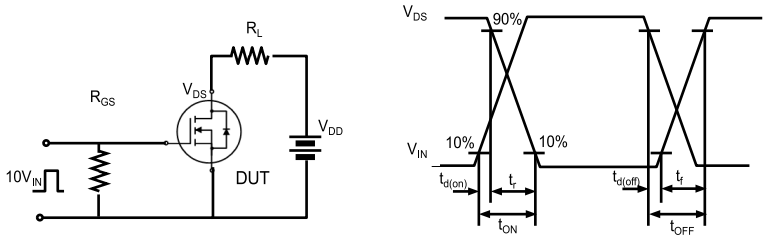


Fig. 12. Unclamped Inductive switching test circuit & waveform

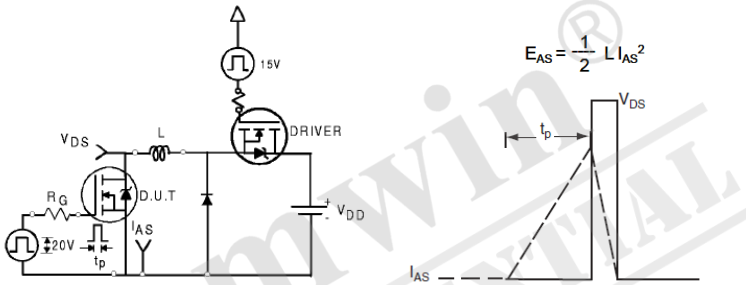
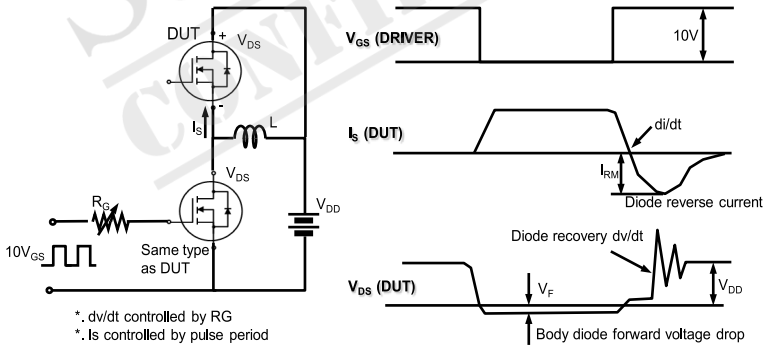


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



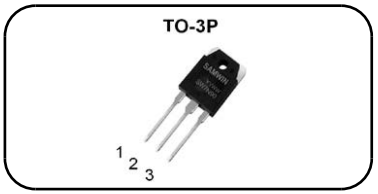
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced modeTO-3P MOSFET

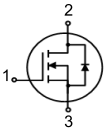
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.1Ω)@V_{GS}=10V
- Low Gate Charge (Typ 50nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:Adapter,LED,Charger



1. Gate 2. Drain 3. Source

BV_{DSS} : 900V
I_D : 7.0A
$R_{DS(ON)}$: 1.1Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable power MOSFET to have better characteristics, such as fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW W 7N90	SW7N90	TO-3P	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		900	V
I_D	Continuous drain current (@T_C=25°C)		7.0*	A
	Continuous drain current (@T_C=100°C)		4.4*	A
I_{DM}	Drain current pulsed	(note 1)	28	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	580	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	72	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	2	V/ns
P_D	Total power dissipation (@T_C=25°C)		357	W
	Derating factor above 25°C		2.86	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	0.35	°C/W
R_{thja}	Thermal resistance, Junction to ambient	50	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	900			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.85		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=900V, V_{GS}=0V			10	uA
		V_{DS}=720V, T_C=125°C			100	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	3.0		5.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 3.5A		1.1	1.8	Ω
G_{fs}	Forward transconductance	V_{DS} = 40 V, I_D = 3.5A		3		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1780		pF
C_{oss}	Output capacitance			145		
C_{rss}	Reverse transfer capacitance			23		
$t_{d(on)}$	Turn on delay time	V_{DS}=450V, I_D=7A, R_G=25Ω V_{GS}=10V (note 4,5)		33		ns
t_r	Rising time			35		
$t_{d(off)}$	Turn off delay time			130		
t_f	Fall time			38		
Q_g	Total gate charge	VDS=720V, VGS=10V,ID=7A (note 4,5))		50		nC
Q_{gs}	Gate-source charge			11		
Q_{gd}	Gate-drain charge			23		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			7	A
I_{SM}	Pulsed source current				25.6	A
V_{SD}	Diode forward voltage drop.	I_S=7A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=7A, V_{GS}=0V, dI_F/dt=100A/us		400		ns
Q_{rr}	Reverse recovery charge			3.8		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 23.6mH, I_{AS} = 7A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 7A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

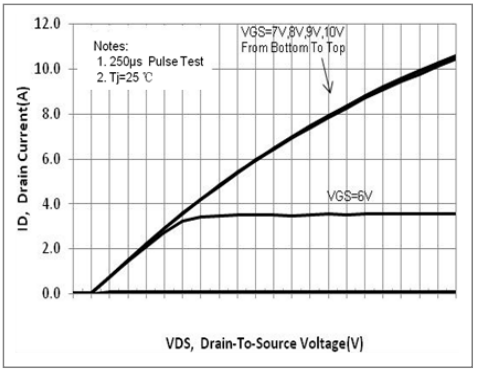


Fig. 2. On-resistance variation vs. drain current and gate voltage

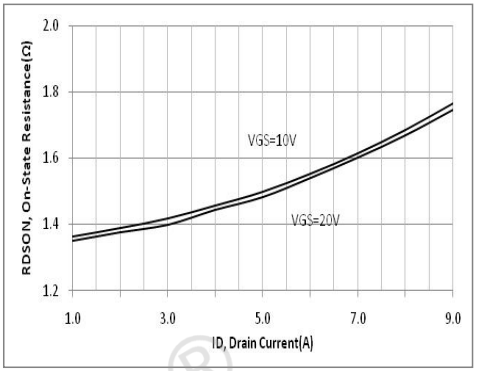


Fig. 3. Gate charge characteristics

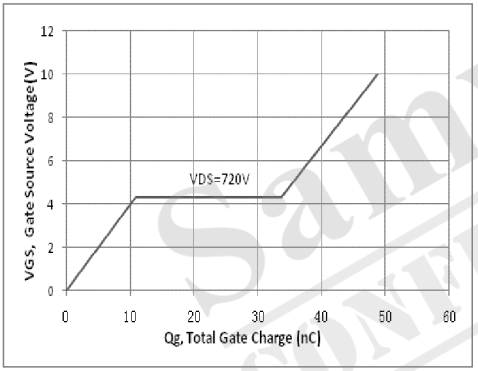


Fig. 4. On state current vs. diode forward voltage

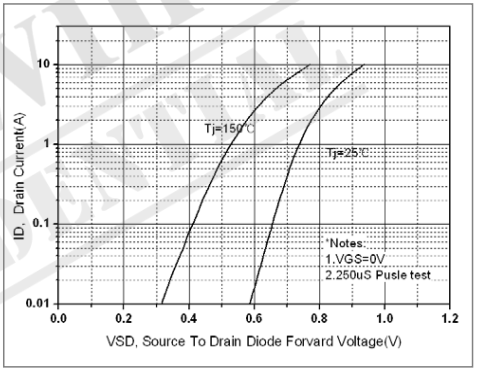


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

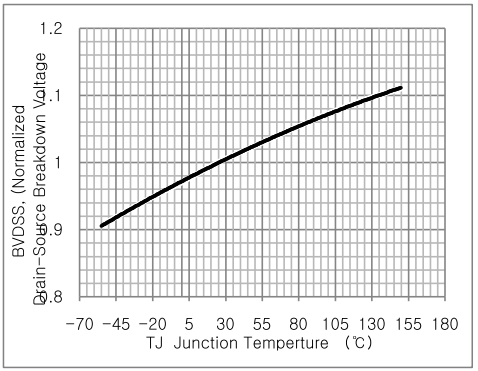


Fig. 6. On resistance variation vs. junction temperature

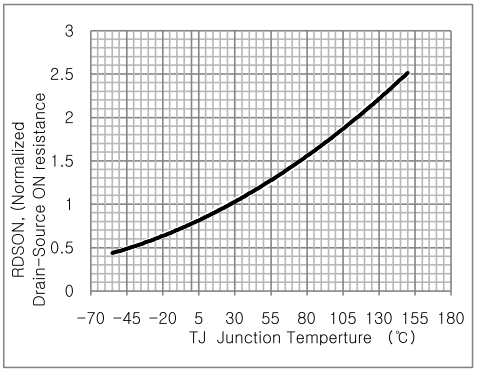


Fig. 7. Maximum safe operating area

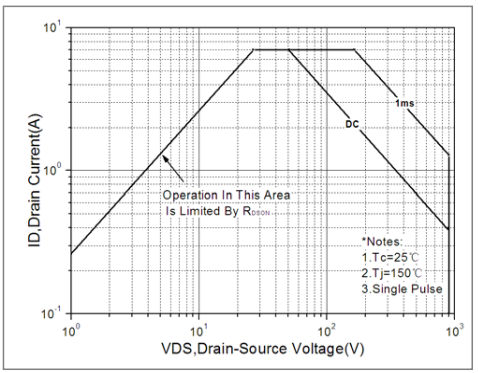


Fig. 8. Transient thermal response curve

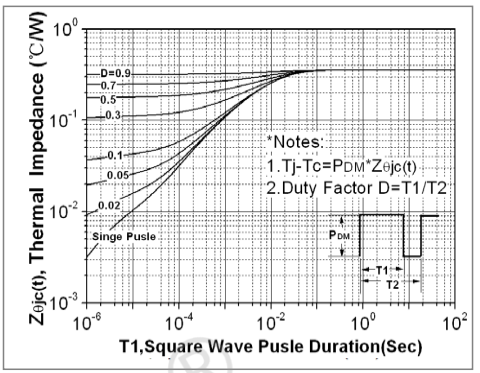


Fig. 9. Capacitance Characteristics

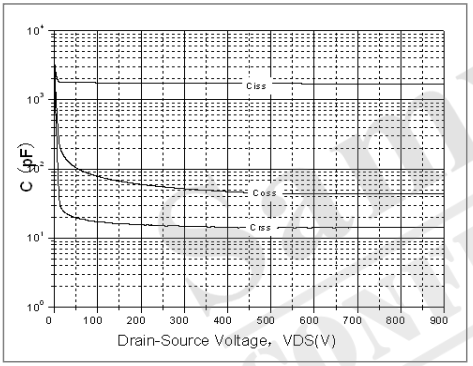
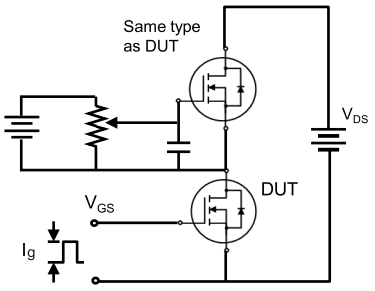


Fig. 10. Gate charge test circuit & waveform



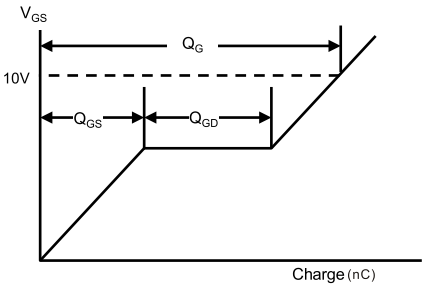


Fig. 11. Switching time test circuit & waveform

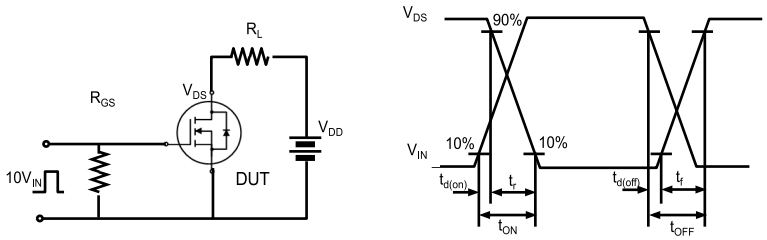


Fig. 12. Unclamped Inductive switching test circuit & waveform

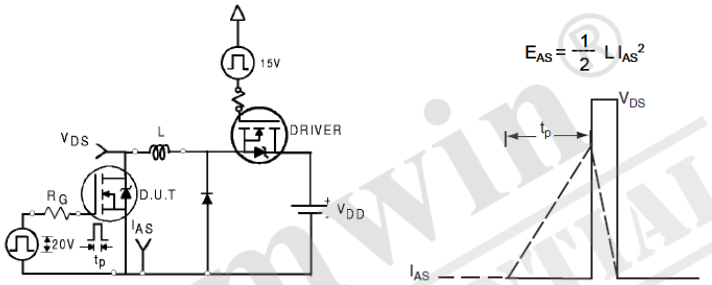
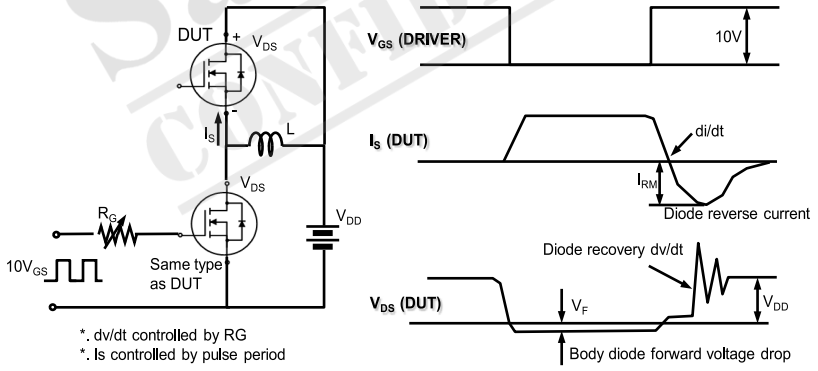


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



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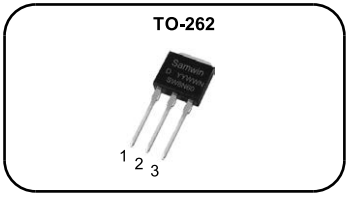
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-262 MOSFET

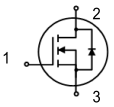
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.9Ω)@V_{GS}=10V
- Low Gate Charge (Typ 30nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:LED, PC Power, Charge



1. Gate 2. Drain 3. Source

BV_{DSS} : 600V
I_D : 8A
$R_{DS(ON)}$: 0.9Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW U 8N60D	SW8N60D	TO-262	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		600	V
I_D	Continuous drain current (@T_C=25°C)		8*	A
	Continuous drain current (@T_C=100°C)		5*	A
I_{DM}	Drain current pulsed	(note 1)	32	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	420	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	49	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		178.6	W
	Derating factor above 25°C		1.43	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	0.7	°C/W
R_{thja}	Thermal resistance, Junction to ambient	50	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	600			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.47		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=600V, V_{GS}=0V			1	uA
		V_{DS}=480V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D=4A		0.9	1.0	Ω
G_{fs}	Forward transconductance	V_{DS}=30V, I_D=4A		7		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1000		pF
C_{oss}	Output capacitance			115		
C_{rss}	Reverse transfer capacitance			25		
$t_{d(on)}$	Turn on delay time	V_{DS}=300V, I_D=8A, R_G=25Ω, V_{GS}=10V (note 4,5)		14		ns
t_r	Rising time			32		
$t_{d(off)}$	Turn off delay time			67		
t_f	Fall time			35		
Q_g	Total gate charge	V_{DS}=480V, V_{GS}=10V, I_D=8A (note 4,5)		30		nC
Q_{gs}	Gate-source charge			5		
Q_{gd}	Gate-drain charge			15		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			8	A
I_{SM}	Pulsed source current				32	A
V_{SD}	Diode forward voltage drop.	I_S=8A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=8A, V_{GS}=0V, dI_F/dt=100A/us		315		ns
Q_{rr}	Reverse recovery charge			3.1		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 13.3mH, I_{AS} = 8A, V_{DD} =50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 8A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

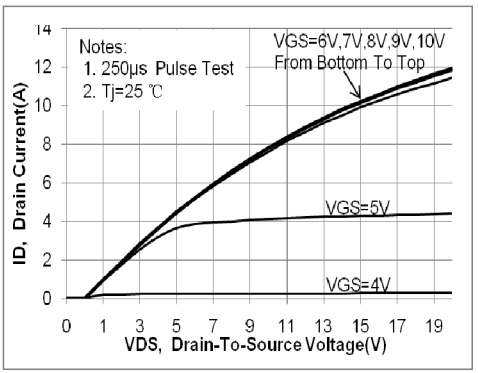


Fig. 2. On-resistance variation vs. drain current and gate voltage

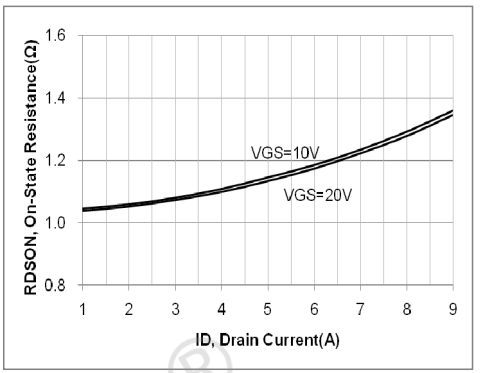


Fig. 3. Gate charge characteristics

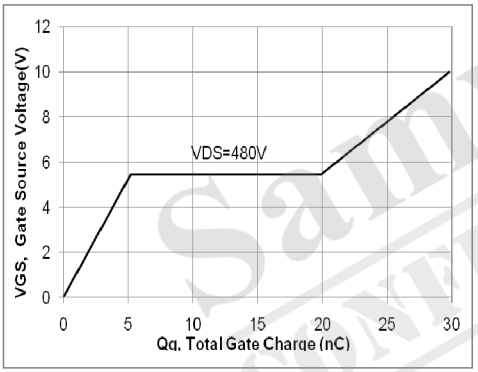


Fig. 4. On state current vs. diode forward voltage

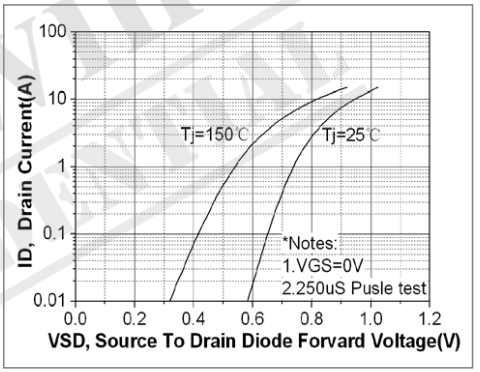


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

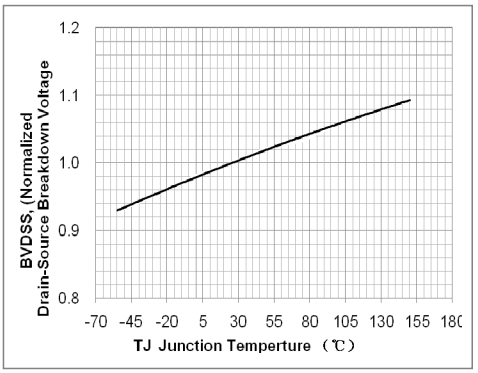


Fig. 6. On resistance variation vs. junction temperature

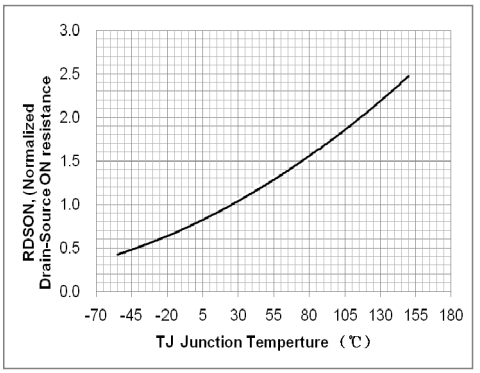


Fig. 7. Maximum safe operating area

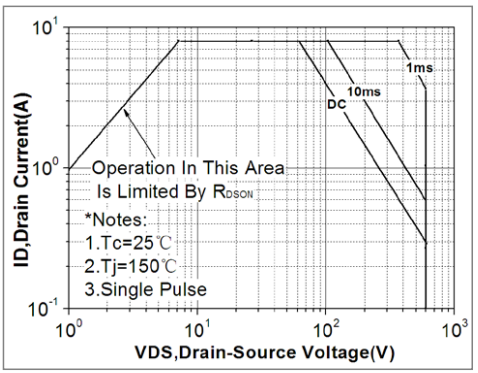


Fig. 8. Transient thermal response curve

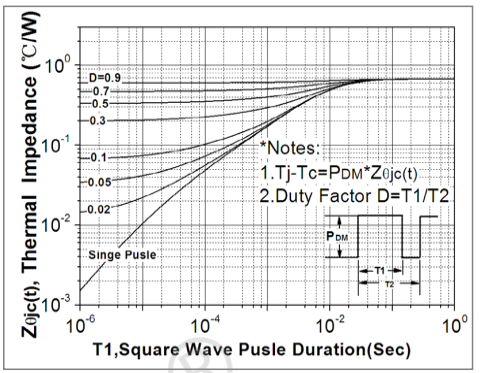


Fig. 9. Capacitance Characteristics

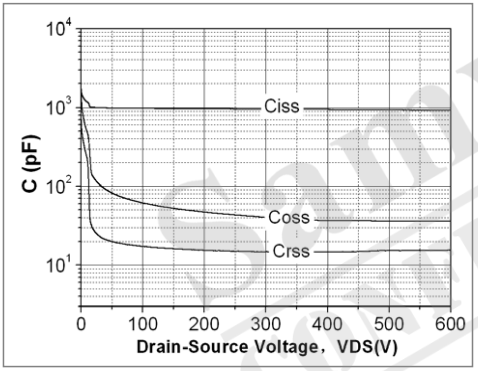
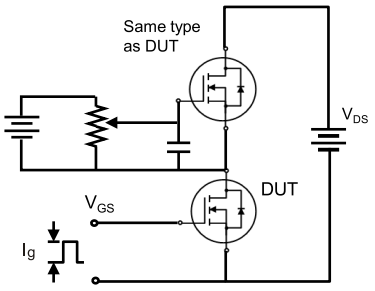


Fig. 10. Gate charge test circuit & waveform



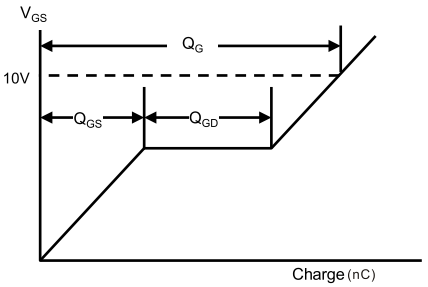


Fig. 11. Switching time test circuit & waveform

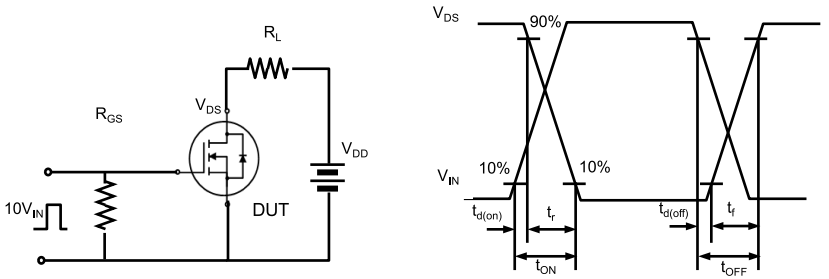


Fig. 12. Unclamped Inductive switching test circuit & waveform

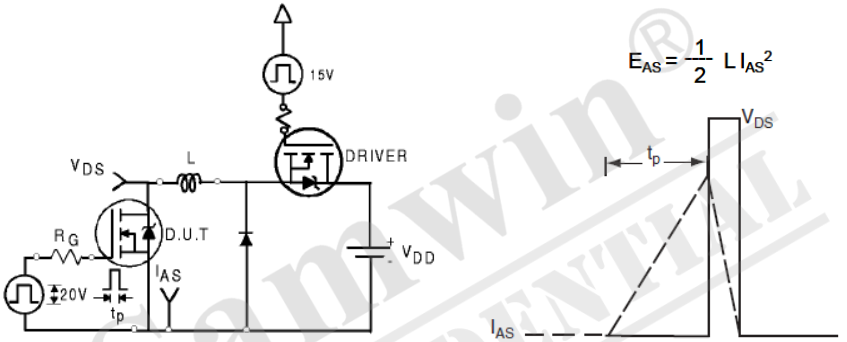
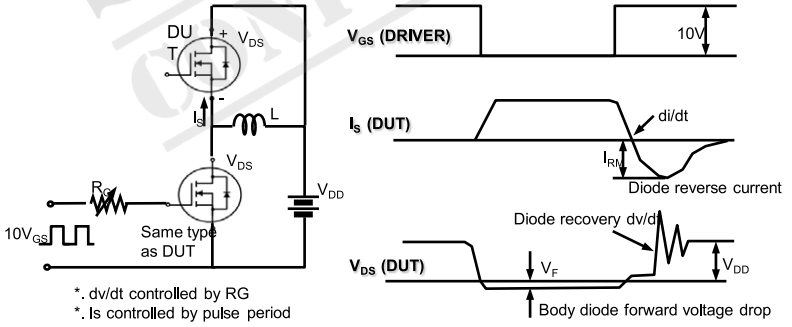


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



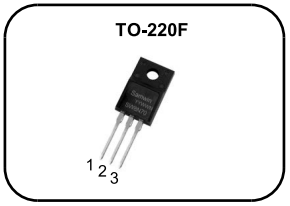
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F MOSFET

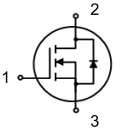
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.0Ω)@V_{GS}=10V
- Low Gate Charge (Typ 25nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: Charger,LED



1. Gate 2. Drain 3. Source

BV_{DSS} : 700V
I_D : 8A
$R_{DS(ON)}$: 1.0Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 8N70A	SW8N70A	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		700	V
I_D	Continuous drain current (@T_C=25°C)		8*	A
	Continuous drain current (@T_C=100°C)		5.04*	A
I_{DM}	Drain current pulsed	(note 1)	32	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	500	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	76	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		39.8	W
	Derating factor above 25°C		0.3	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	3.14	°C/W
R_{thja}	Thermal resistance, Junction to ambient	46.7	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	700			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.73		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=700V, V_{GS}=0V			1	uA
		V_{DS}=560V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.1		4	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D =4A		1.0	1.2	Ω
Gfs	Forward Transconductance	V_{DS} = 30V, I_D =4A		5.1		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1660		pF
C_{oss}	Output capacitance			134		
C_{rss}	Reverse transfer capacitance			9		
$t_{d(on)}$	Turn on delay time	V_{DS}=350V, I_D=8A, R_G=25Ω V_{GS}=10V (note 4, 5)		14		ns
tr	Rising time			25		
$t_{d(off)}$	Turn off delay time			61		
t_f	Fall time			30		
Q_g	Total gate charge	V_{DS}=560V, V_{GS}=10V, I_D=8A (note 4, 5)		25		nC
Q_{gs}	Gate-source charge			10		
Q_{gd}	Gate-drain charge			8		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			8	A
I_{SM}	Pulsed source current				32	A
V_{SD}	Diode forward voltage drop.	I_S=8A, V_{GS}=0V			1.15	V
T_{rr}	Reverse recovery time	I_S=8A, V_{GS}=0V, dI_F/dt=100A/us		375		ns
Q_{rr}	Reverse recovery Charge			4.45		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 15.6mH, I_{AS} =8A, V_{DD} =50 V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 8A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

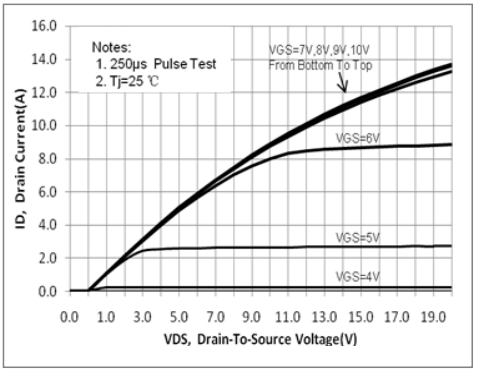


Fig. 2. On-resistance variation vs. drain current and gate voltage

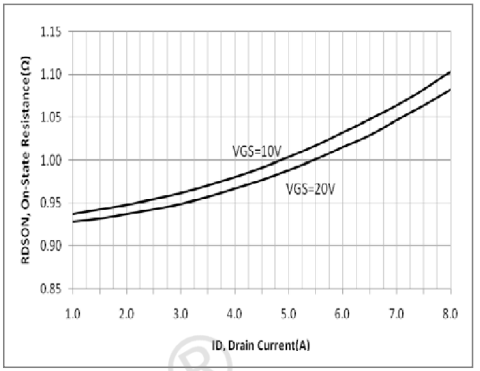


Fig. 3. Gate charge characteristics

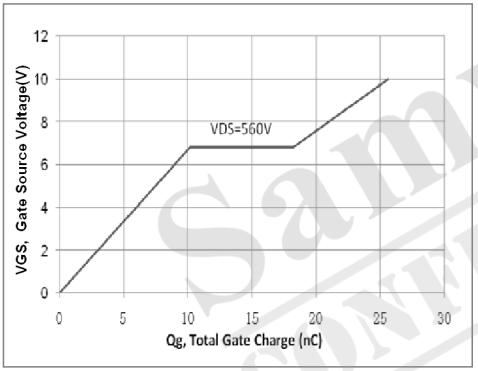


Fig. 4. On state current vs. diode forward voltage

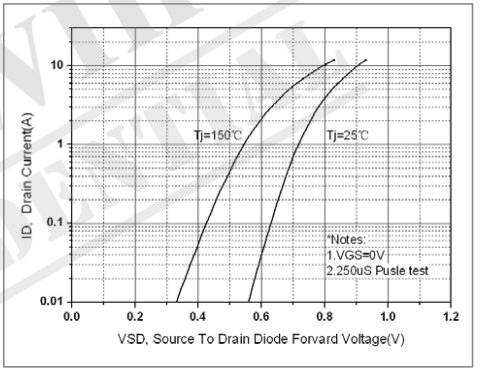


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

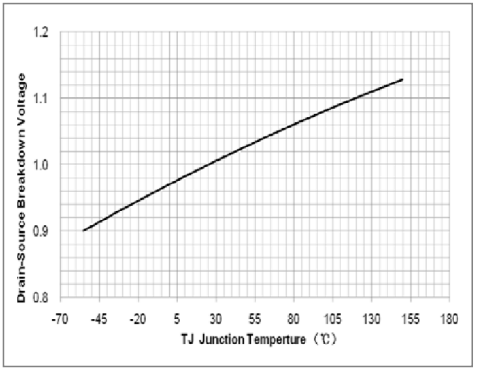


Fig. 6. On resistance variation vs. junction temperature

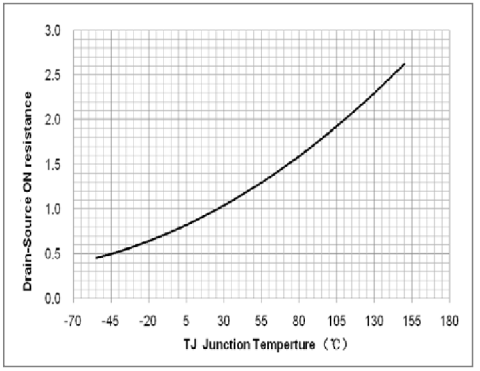


Fig. 7. Maximum safe operating area

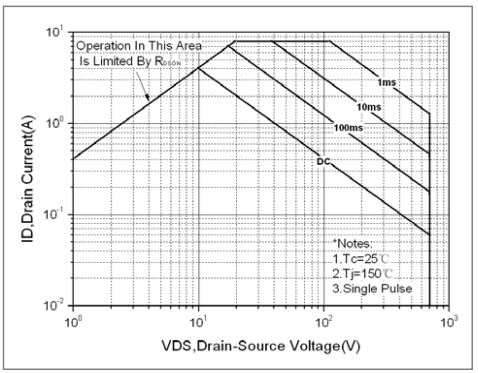


Fig. 8. Transient thermal response curve

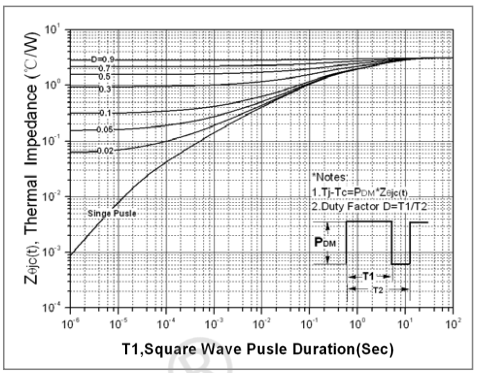


Fig. 9. Capacitance Characteristics

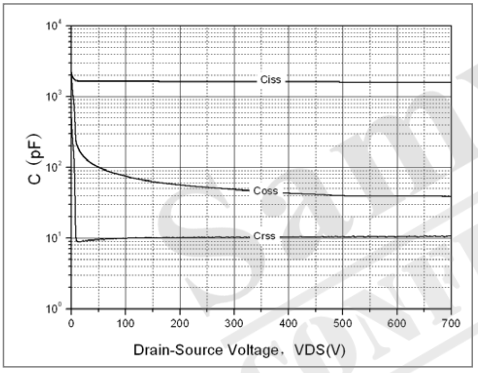
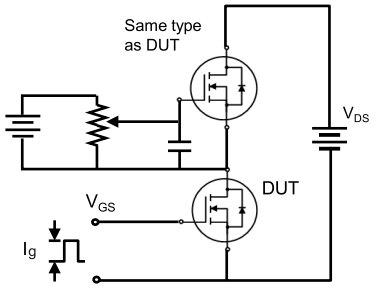


Fig. 10. Gate charge test circuit & waveform



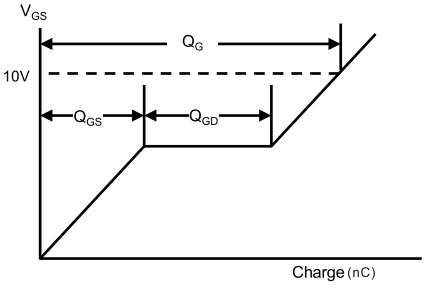


Fig. 11. Switching time test circuit & waveform

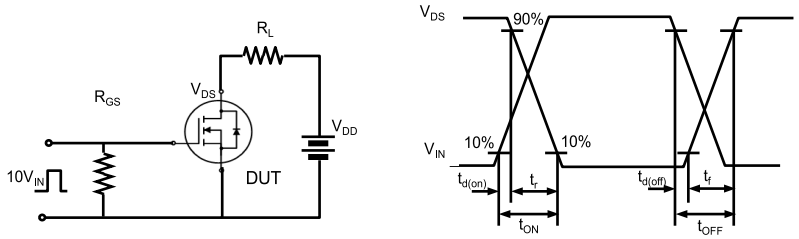


Fig. 12. Unclamped Inductive switching test circuit & waveform

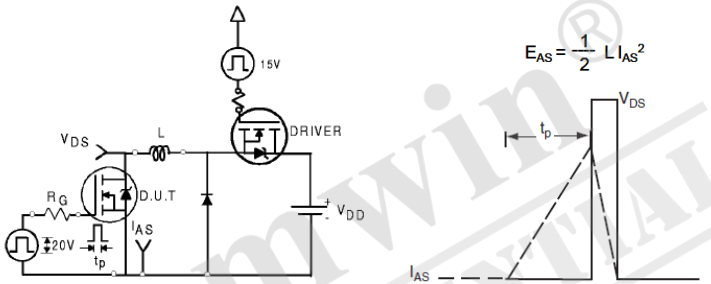
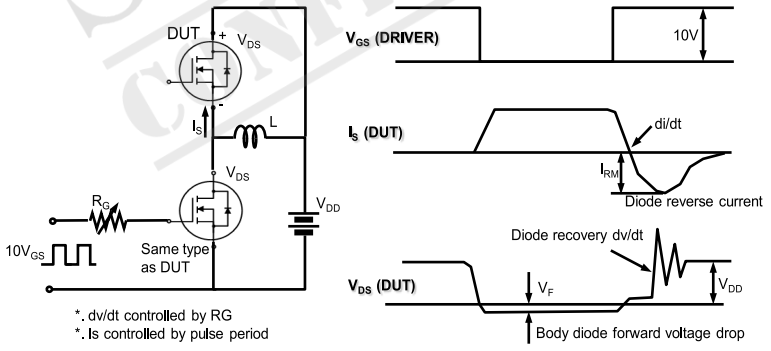


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



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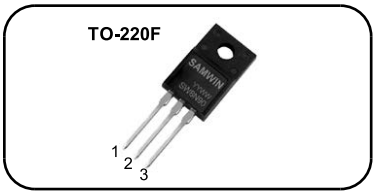
* Qualification Standards can also be found on the Web site (http://www.semipower.com.cn).
* Any advice, please send your proposal to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F MOSFET

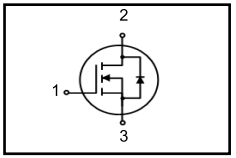
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.1Ω)@V_{GS}=10V
- Low Gate Charge (Typ 57nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: LED, UPS



1. Gate 2. Drain 3. Source

BV_{DSS} : 900V
I_D : 8.0A
$R_{DS(ON)}$: 1.1Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 8N90	SW8N90	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		900	V
I_D	Continuous drain current (@T_C=25°C)		8.0*	A
	Continuous drain current (@T_C=100°C)		5*	A
I_{DM}	Drain current pulsed	(note 1)	32	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	928	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	130	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		69	W
	Derating factor above 25°C		0.5	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	1.8	°C/W
R_{thja}	Thermal resistance, Junction to ambient	46.7	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	900			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.93		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=900V, V_{GS}=0V			1	uA
		V_{DS}=720V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.0		4.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 4A		1.1	1.5	Ω
G_{fs}	Forward transconductance	V_{DS} = 20 V, I_D= 4A		10		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		2080		pF
C_{oss}	Output capacitance			170		
C_{rss}	Reverse transfer capacitance			25		
$t_{d(on)}$	Turn on delay time	V_{DS}=450V, I_D=8.0A, R_G=25Ω V_{GS}=10V (note 4,5)		30		ns
t_r	Rising time			40		
$t_{d(off)}$	Turn off delay time			123		
t_f	Fall time			41		
Q_g	Total gate charge	V_{DS}=720V, V_{GS}=10V, I_D=8.0A (note 4,5)		57		nC
Q_{gs}	Gate-source charge			13		
Q_{gd}	Gate-drain charge			27		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			8.0	A
I_{SM}	Pulsed source current				32	A
V_{SD}	Diode forward voltage drop.	I_S=8.0A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=8.0A, V_{GS}=0V, dI_F/dt=100A/us		497		ns
Q_{rr}	Reverse recovery charge			7.2		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 29mH, I_{AS} = 8.0A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 8.0A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

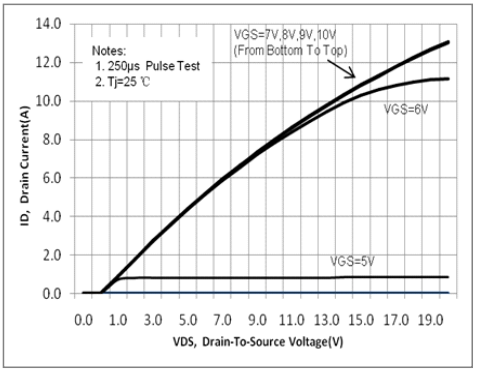


Fig. 2. On-resistance variation vs. drain current and gate voltage

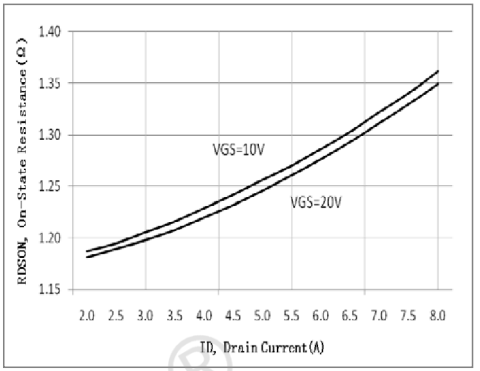


Fig. 3. Gate charge characteristics

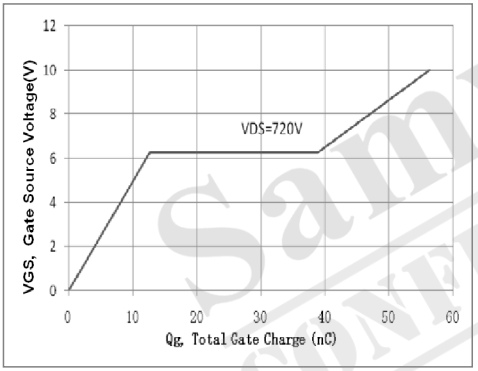


Fig. 4. On state current vs. diode forward voltage

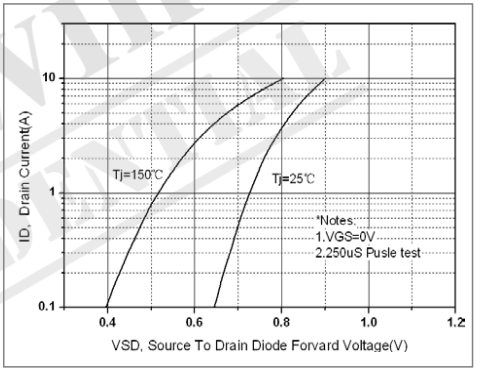


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

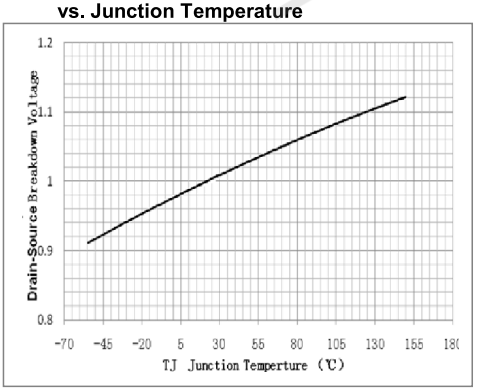


Fig. 6. On resistance variation vs. junction temperature

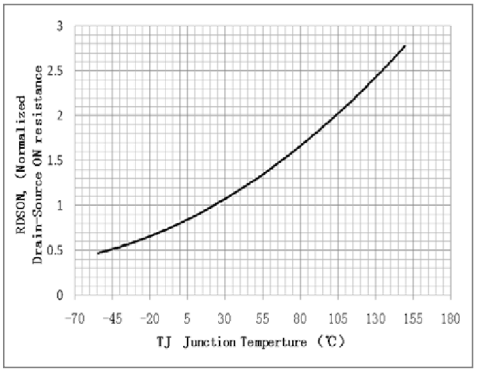


Fig. 7. Maximum safe operating area

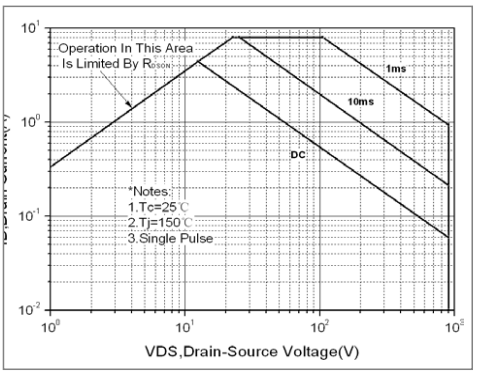


Fig. 8. Transient thermal response curve

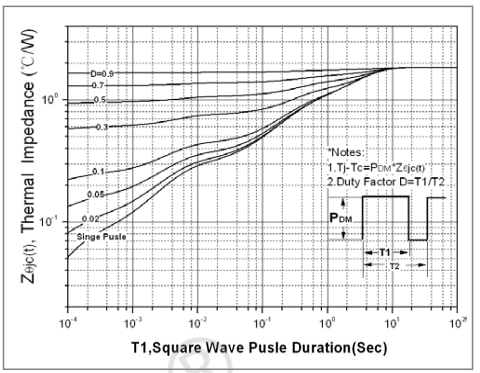


Fig. 9. Capacitance Characteristics

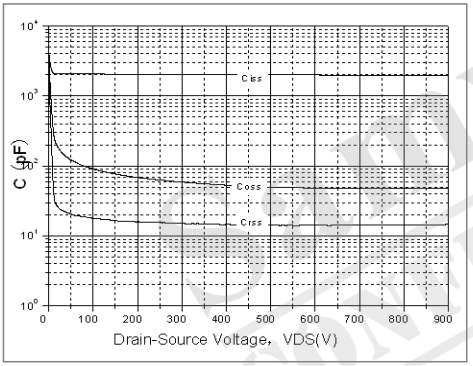
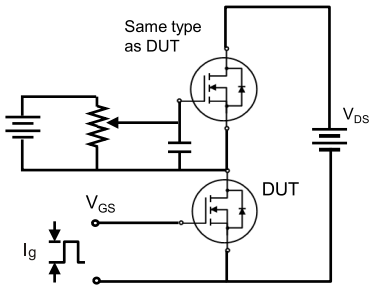


Fig. 10. Gate charge test circuit & waveform



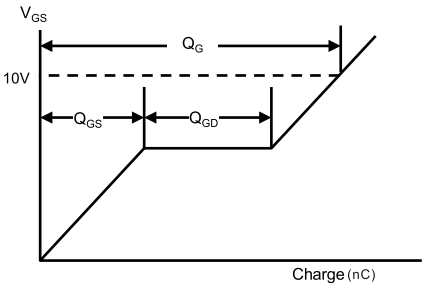


Fig. 11. Switching time test circuit & waveform

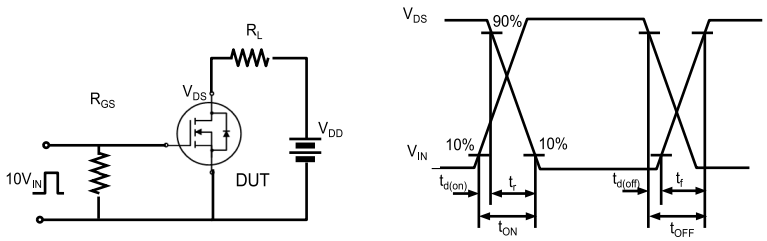


Fig. 12. Unclamped Inductive switching test circuit & waveform

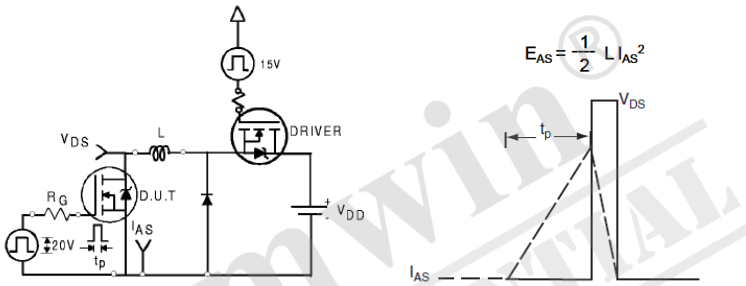
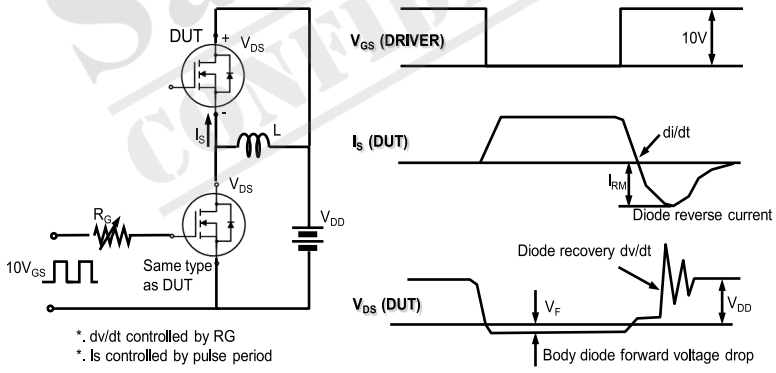


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



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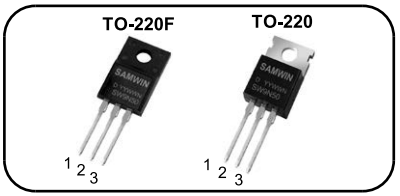
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F/TO-220 MOSFET

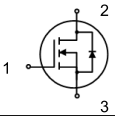
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.68Ω)@V_{GS}=10V
- Low Gate Charge (Typ 31nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: DC-DC， LED， PC



1. Gate 2. Drain 3. Source

BV_{DSS} : 500V
I_D : 9A
$R_{DS(ON)}$: 0.68Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 9N50D	SW9N50D	TO-220F	TUBE
2	SW P 9N50D	SW9N50D	TO-220	TUBE

Absolute maximum ratings

Symbol	Parameter	Value		Unit
		TO-220F	TO-220	
V_{DSS}	Drain to source voltage	500		V
I_D	Continuous drain current (@T_C=25°C)	9*		A
	Continuous drain current (@T_C=100°C)	5.4*		A
I_{DM}	Drain current pulsed (note 1)	36		A
V_{GS}	Gate to source voltage	±30		V
E_{AS}	Single pulsed avalanche energy (note 2)	462		mJ
E_{AR}	Repetitive avalanche energy (note 1)	64		mJ
dv/dt	Peak diode recovery dv/dt (note 3)	5		V/ns
P_D	Total power dissipation (@T_C=25°C)	23.3	200	W
	Derating factor above 25°C	0.19	1.6	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature	-55 ~ + 150		°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.	300		°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value		Unit
		TO-220F	TO-220	
R_{thjc}	Thermal resistance, Junction to case	5.36	0.63	°C/W
R_{thja}	Thermal resistance, Junction to ambient	53	60	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	500			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.57		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=510V, V_{GS}=0V			1	uA
		V_{DS}=408V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 4.5A		0.68	0.8	Ω
G_{fs}	Forward transconductance	V_{DS} = 30 V, I_D = 4.5A		7		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1479		pF
C_{oss}	Output capacitance			126		
C_{rss}	Reverse transfer capacitance			22.4		
$t_{d(on)}$	Turn on delay time	V_{DS}=250V, I_D=9A, R_G=25Ω V_{GS}=10V (note 4,5)		19		ns
t_r	Rising time			41		
$t_{d(off)}$	Turn off delay time			74		
t_f	Fall time			37		
Q_g	Total gate charge	V_{DS}=400V, V_{GS}=10V, I_D=9A (note 4,5)		31		nC
Q_{gs}	Gate-source charge			7		
Q_{gd}	Gate-drain charge			13		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			9	A
I_{SM}	Pulsed source current				36	A
V_{SD}	Diode forward voltage drop.	I_S=9A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=9A, V_{GS}=0V, dI_F/dt=100A/us		319		ns
Q_{rr}	Reverse recovery charge			3.48		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 11.4mH, I_{AS} = 9A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 9A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%.
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

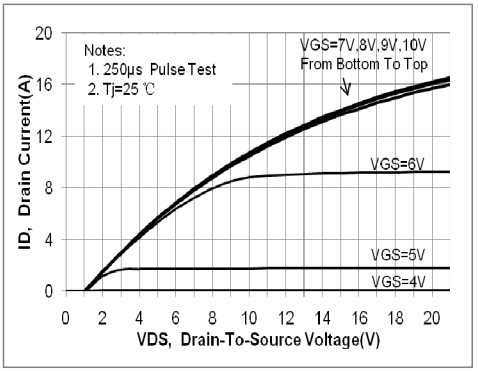


Fig. 2. On-resistance variation vs. drain current and gate voltage

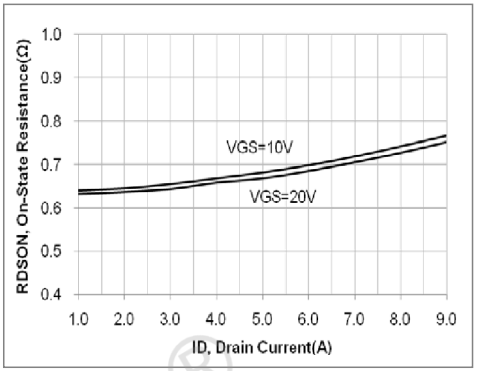


Fig. 3. Gate charge characteristics

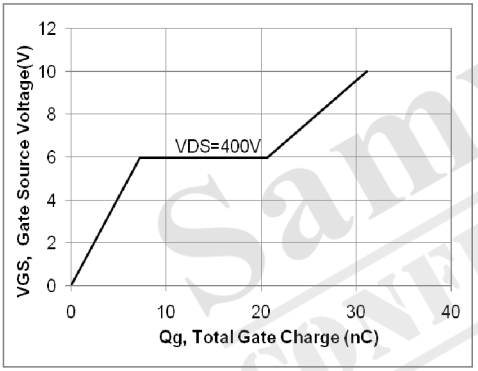


Fig. 4. On state current vs. diode forward voltage

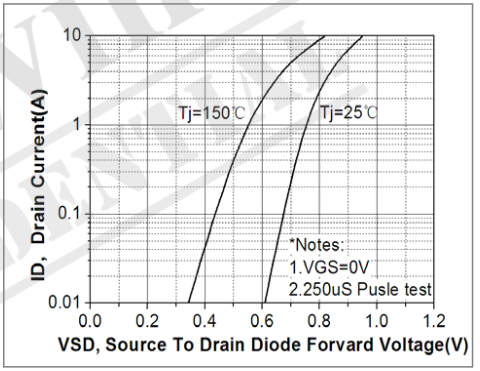


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

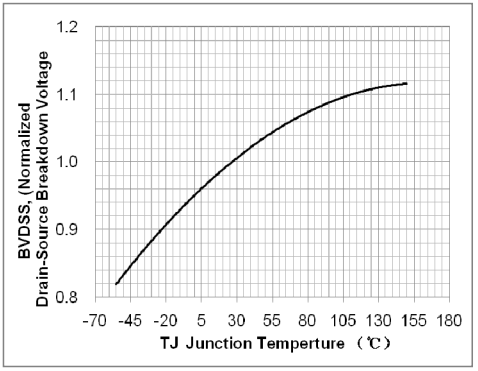


Fig. 6. On resistance variation vs. junction temperature

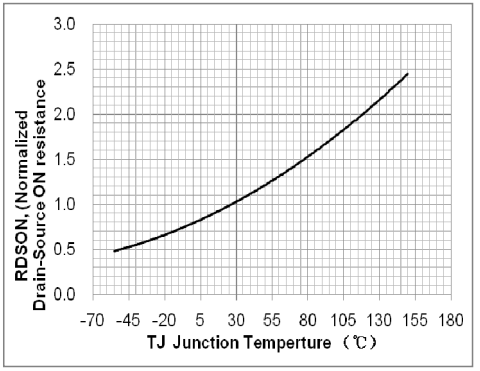


Fig. 7. Maximum safe operating area(TO-220F)

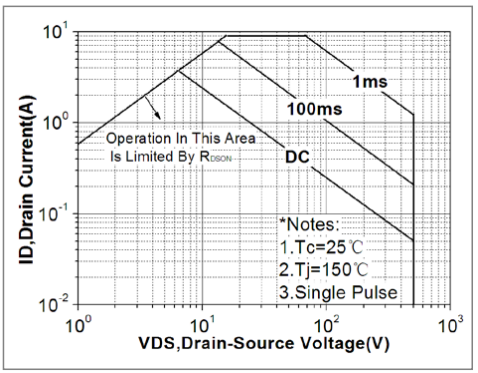


Fig. 8. Transient thermal response curve(TO-220F)

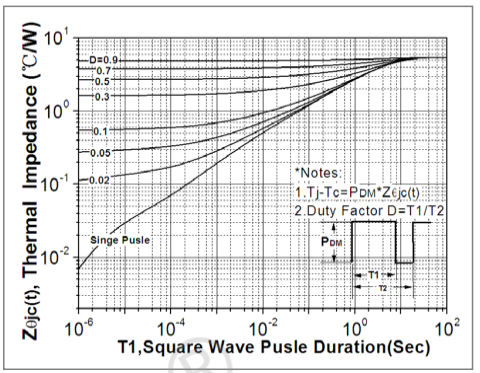


Fig. 9. Maximum safe operating area(TO-220)

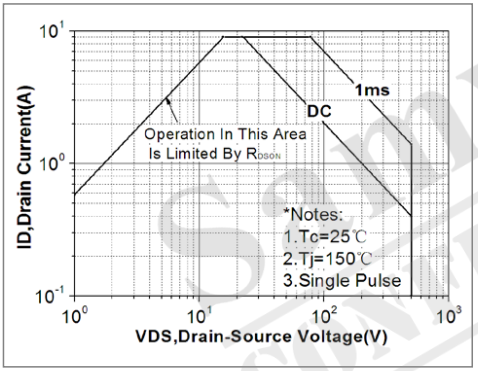


Fig. 10. Transient thermal response curve(TO-220)

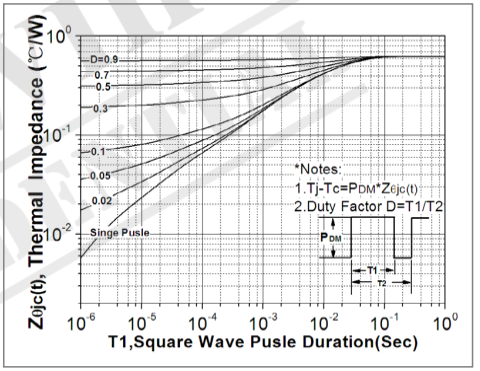


Fig. 11. Capacitance Characteristics

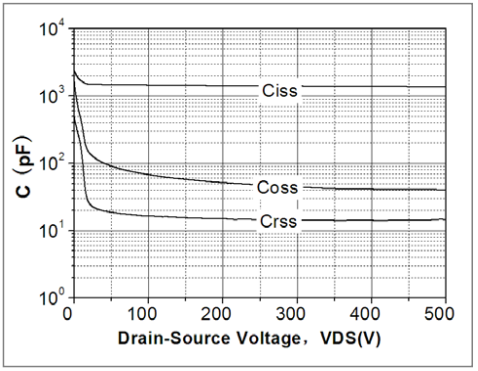


Fig. 12. Gate charge test circuit & waveform

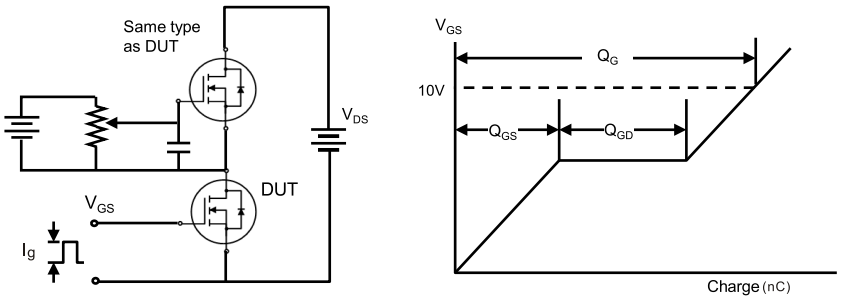


Fig. 13. Switching time test circuit & waveform

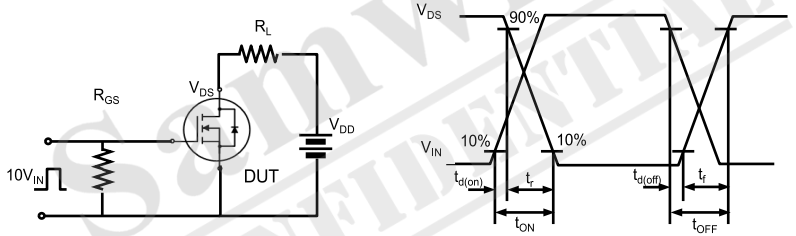


Fig. 14. Unclamped Inductive switching test circuit & waveform

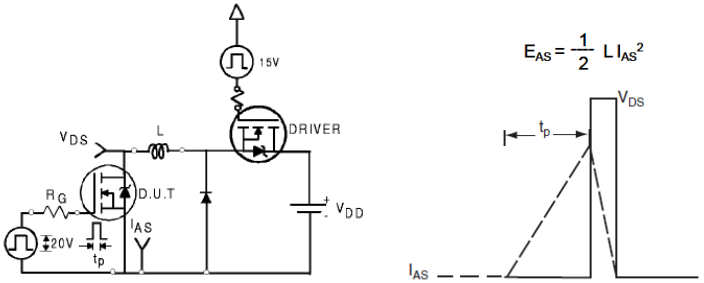
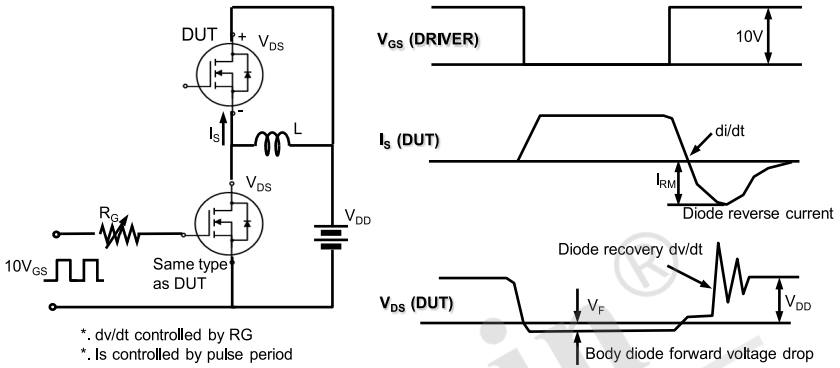


Fig. 15. Peak diode recovery dv/dt test circuit & waveform



N-channel Enhanced mode TO-3P MOSFET

Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 1.0 Ω)@V_{GS}=10V
- Low Gate Charge (Typical 74nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: LED,UPS

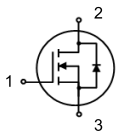
TO-3P

1. Gate 2. Drain 3. Source

BV_{DSS} : 900V

I_D : 9.0A

$R_{DS(ON)}$: 1.0Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable power MOSFET to have better characteristics, such as fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW W9N90	SW9N90	TO-3P	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		900	V
I_D	Continuous drain current (@T_C=25°C)		9.0*	A
	Continuous drain current (@T_C=100°C)		5.6*	A
I_{DM}	Drain current pulsed	(note 1)	36	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	1093	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	80	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	4.5	V/ns
P_D	Total power dissipation (@T_C=25°C)		417	W
	Derating factor above 25°C		3.3	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	0.3	°C/W
R_{thja}	Thermal resistance, Junction to ambient	50	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	900			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		1.09		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=900V, V_{GS}=0V			10	uA
		V_{DS}=720V, T_C=125°C			100	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	3.0		5.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 4.5A		1.0	1.45	Ω
G_{fs}	Forward transconductance	V_{DS} = 40 V, I_D = 4.5 A		6		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		2370		pF
C_{oss}	Output capacitance			192		
C_{rss}	Reverse transfer capacitance			41		
$t_{d(on)}$	Turn on delay time	V_{DS}=450V, I_D=9A, R_G=25Ω V_{GS}=10V (note 4,5)		41		ns
t_r	Rising time			62		
$t_{d(off)}$	Turn off delay time			210		
t_f	Fall time			58		
Q_g	Total gate charge	V_{DS}=720V, V_{GS}=10V, I_D=9A (note 4,5)		74		nC
Q_{gs}	Gate-source charge			13		
Q_{gd}	Gate-drain charge			39		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			9	A
I_{SM}	Pulsed source current				36	A
V_{SD}	Diode forward voltage drop.	I_S=9A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=9A, V_{GS}=0V, dI_F/dt=100A/us		480		ns
Q_{rr}	Reverse recovery charge			5.6		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 27mH, I_{AS} = 9A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 9A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

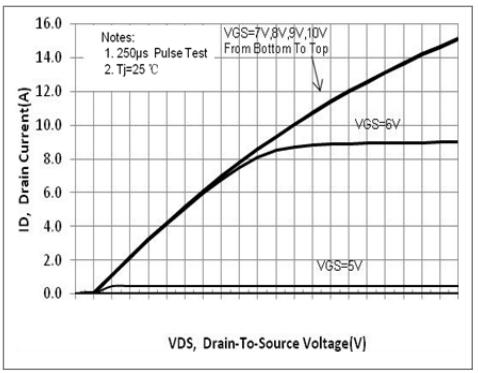


Fig. 2. On-resistance variation vs. drain current and gate voltage

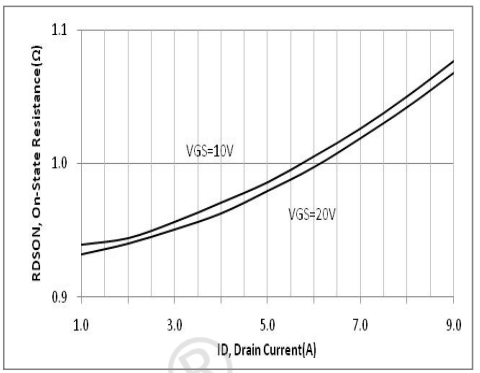


Fig. 3. Gate charge characteristics

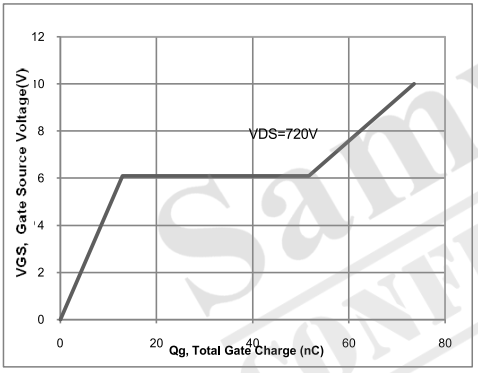


Fig. 4. On state current vs. diode forward voltage

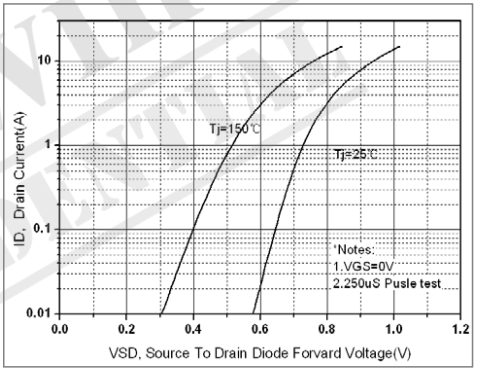


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

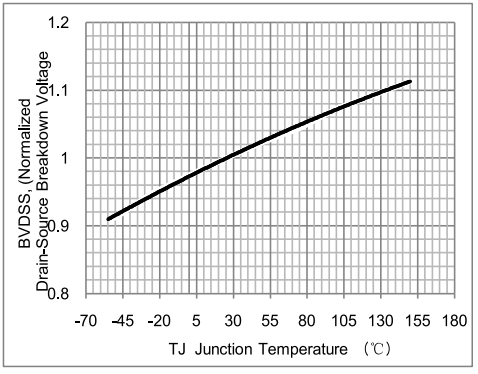


Fig. 6. On resistance variation vs. junction temperature

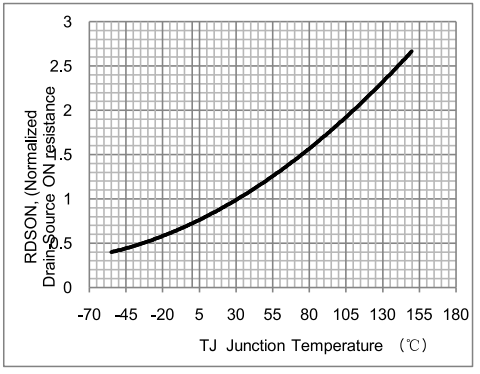


Fig. 7. Maximum safe operating area

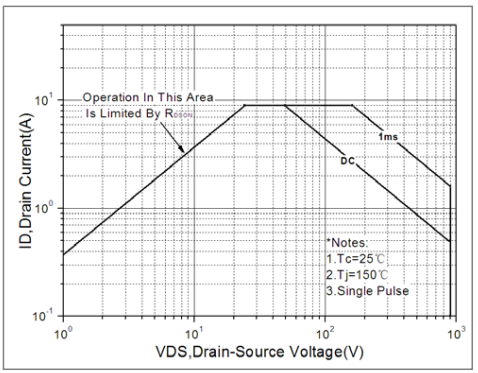


Fig. 8. Transient thermal response curve

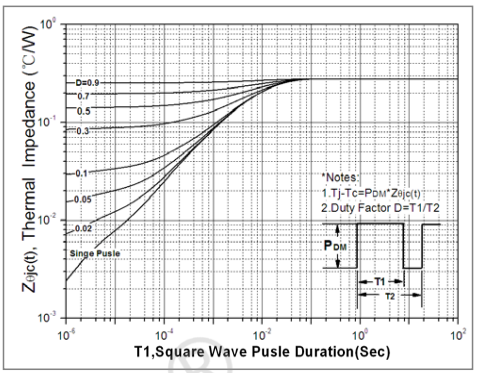


Fig. 9. Capacitance Characteristics

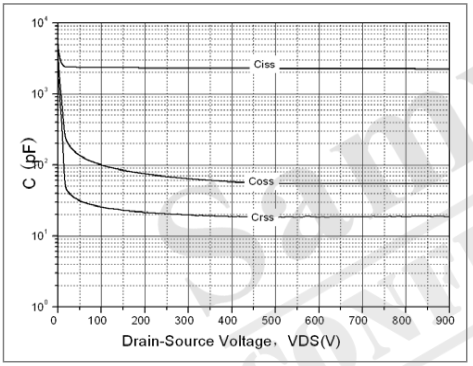
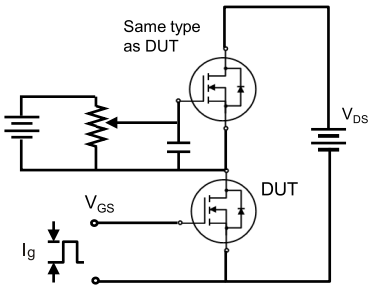


Fig. 10. Gate charge test circuit & waveform



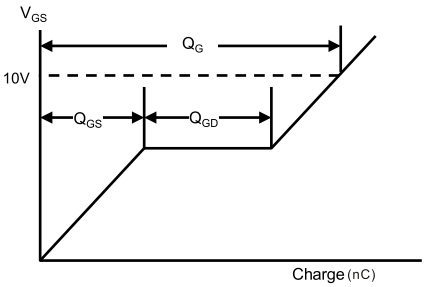


Fig. 11. Switching time test circuit & waveform

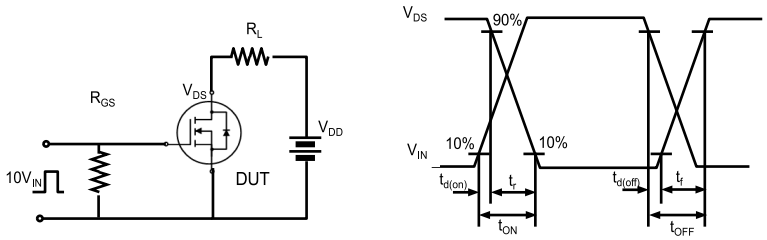


Fig. 12. Unclamped Inductive switching test circuit & waveform

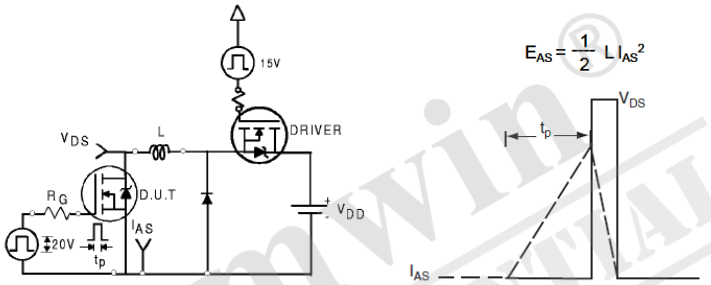
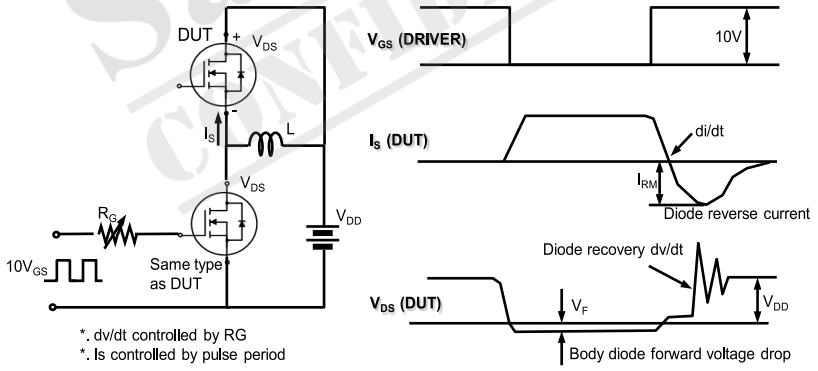


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



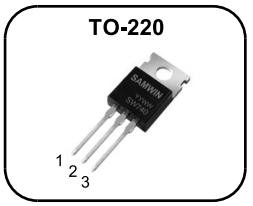
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220 MOSFET

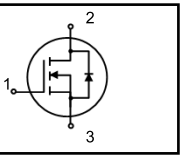
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.49Ω)@V_{GS}=10V
- Low Gate Charge (Typ 32nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application:DC-DC,LED



1. Gate 2. Drain 3. Source

BV_{DSS} : 400V
I_D : 10A
$R_{DS(ON)}$: 0.49Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW P 740	SW740	TO-220	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		400	V
I_D	Continuous drain current (@T_C=25°C)		10*	A
	Continuous drain current (@T_C=100°C)		6.2*	A
I_{DM}	Drain current pulsed	(note 1)	40	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	668	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	55	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	3.8	V/ns
P_D	Total power dissipation (@T_C=25°C)		250	W
	Derating factor above 25°C		2	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	0.5	°C/W
R_{thja}	Thermal resistance, Junction to ambient	65	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	400			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.38		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=400V, V_{GS}=0V			1	uA
		V_{DS}=320V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.0		4.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D=5.0A		0.49	0.55	Ω
G_{fs}	Forward transconductance	V_{DS} = 40V, I_D=5.0 A		5.5		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1150		pF
C_{oss}	Output capacitance			125		
C_{rss}	Reverse transfer capacitance			25		
$t_{d(on)}$	Turn on delay time	V_{DS}=200V, I_D=10A, R_G=25Ω V_{GS}=10V (note 4,5)		15		ns
t_r	Rising time			36		
$t_{d(off)}$	Turn off delay time			92		
t_f	Fall time			38		
Q_g	Total gate charge	V_{DS}=320V, V_{GS}=10V, I_D=10A (note 4,5)		32		nC
Q_{gs}	Gate-source charge			6.5		
Q_{gd}	Gate-drain charge			13		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			10	A
I_{SM}	Pulsed source current				40	A
V_{SD}	Diode forward voltage drop.	I_S=10A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=10A, V_{GS}=0V, dI_F/dt=100A/us		285		ns
Q_{rr}	Reverse recovery charge			2.96		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 13.3mH, I_{AS} = 10A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 10A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

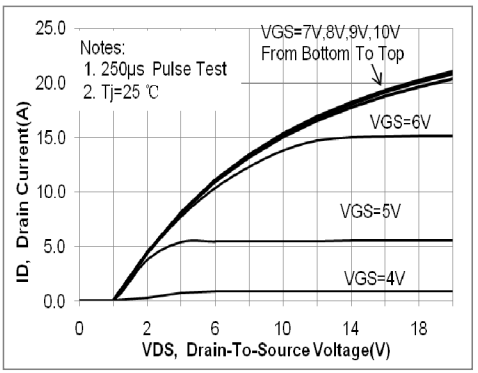


Fig. 2. On-resistance variation vs. drain current and gate voltage

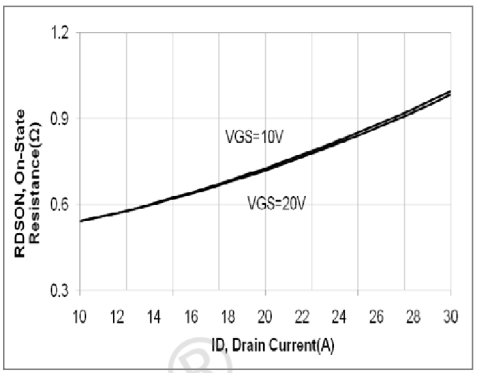


Fig. 3. Gate charge characteristics

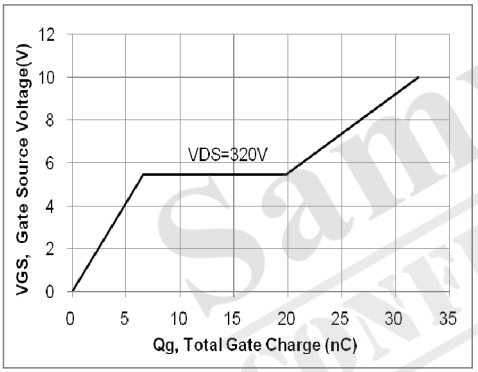


Fig. 4. On state current vs. diode forward voltage

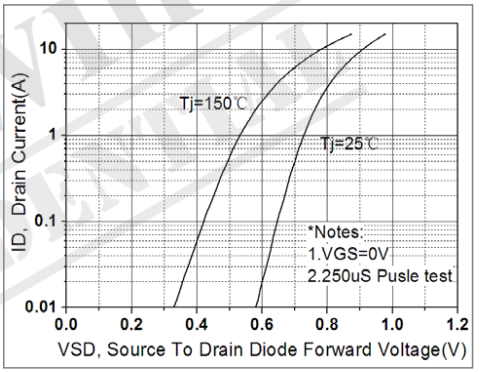


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

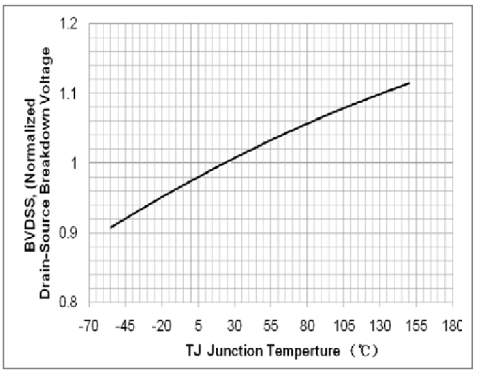


Fig. 6. On resistance variation vs. junction temperature

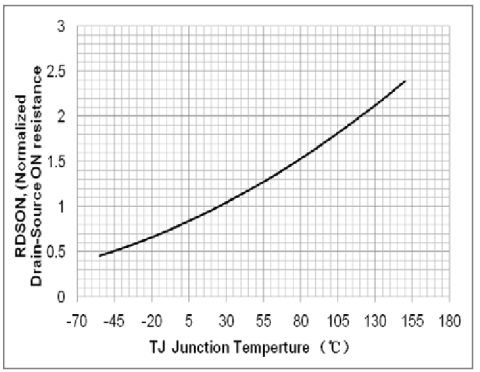


Fig. 7. Maximum safe operating area

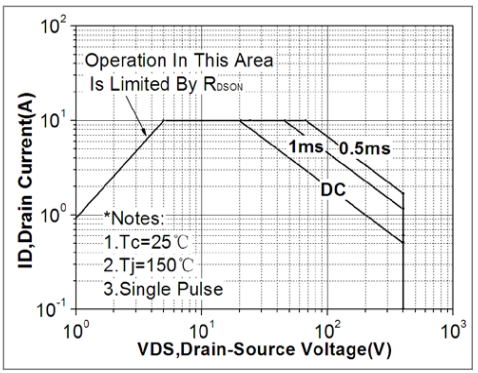


Fig. 8. Transient thermal response curve

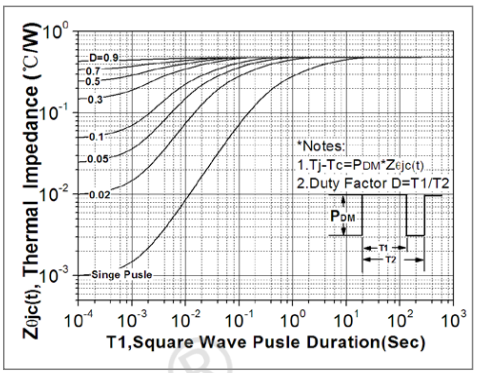


Fig. 9. Capacitance Characteristics

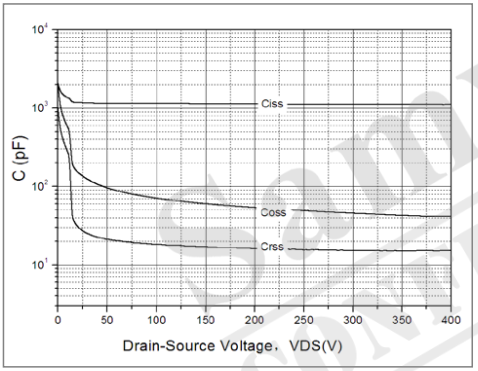
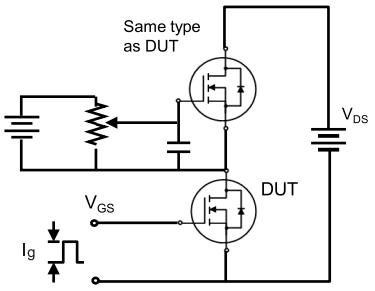


Fig. 10. Gate charge test circuit & waveform



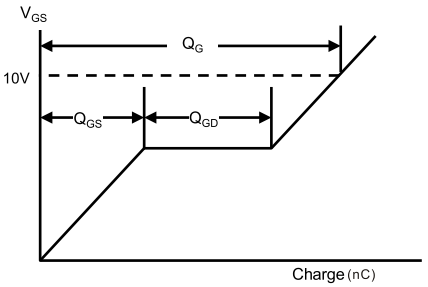


Fig. 11. Switching time test circuit & waveform

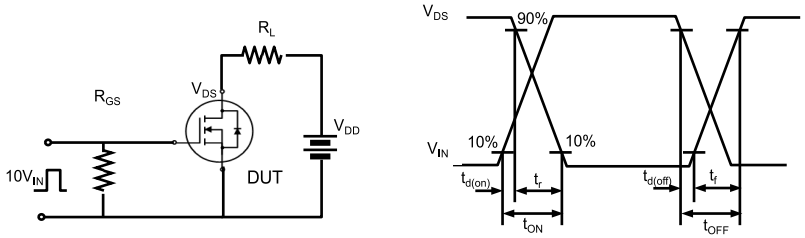


Fig. 12. Unclamped Inductive switching test circuit & waveform

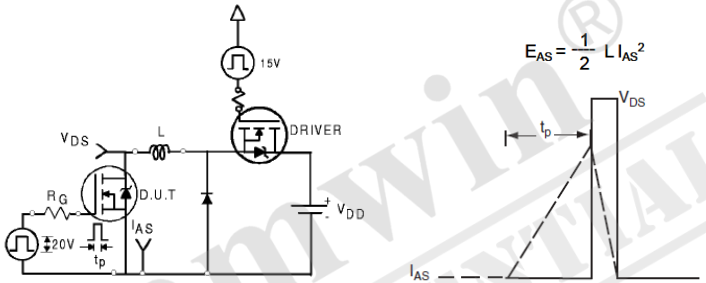
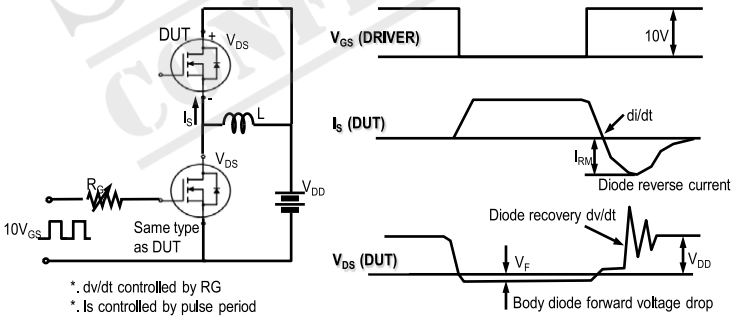


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



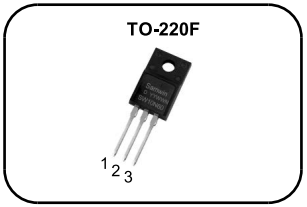
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F MOSFET

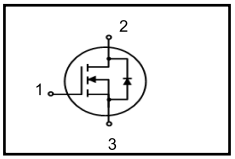
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.9Ω)@V_{GS}=10V
- Low Gate Charge (Typ 35nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: UPS、Inverter、TV-POWER



1. Gate 2. Drain 3. Source

BV_{DSS} : 600V
I_D : 10A
$R_{DS(ON)}$: 0.9Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 10N60D	SW10N60D	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		600	V
I_D	Continuous drain current (@T_C=25°C)		10	A
	Continuous drain current (@T_C=100°C)		6.3	A
I_{DM}	Drain current pulsed	(note 1)	40	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	427	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	43	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		41.8	W
	Derating factor above 25°C		0.33	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum Lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	2.99	°C/W
R_{thja}	Thermal resistance, Junction to ambient	47.21	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	600			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.51		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=600V, V_{GS}=0V			1	uA
		V_{DS}=480V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 5A		0.9	1.1	Ω
G_{fs}	Forward transconductance	V_{DS} = 30 V, I_D = 5 A		7.3		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1120		pF
C_{oss}	Output capacitance			122		
C_{rss}	Reverse transfer capacitance			22		
$t_{d(on)}$	Turn on delay time	V_{DS}=300V, I_D=10A, R_G=25Ω V_{GS}=10V (note 4,5)		16		ns
t_r	Rising time			38		
$t_{d(off)}$	Turn off delay time			75		
t_f	Fall time			41		
Q_g	Total gate charge	V_{DS}=480V, V_{GS}=10V, I_D=10A (note 4,5)		35		nC
Q_{gs}	Gate-source charge			6		
Q_{gd}	Gate-drain charge			17		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			10	A
I_{SM}	Pulsed source current				40	A
V_{SD}	Diode forward voltage drop.	I_S=10A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=10A, V_{GS}=0V, dI_F/dt=100A/us		511		ns
Q_{rr}	Reverse recovery charge			12		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 8.5mH, I_{AS} = 10A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 10A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

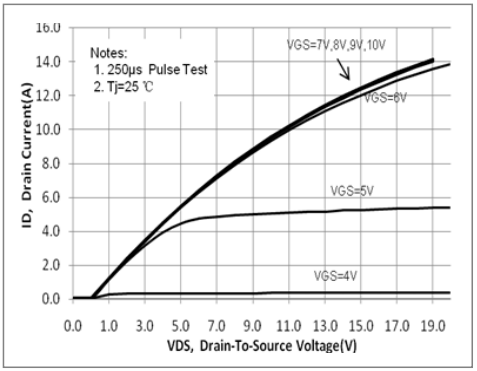


Fig. 2. On-resistance variation vs. drain current and gate voltage

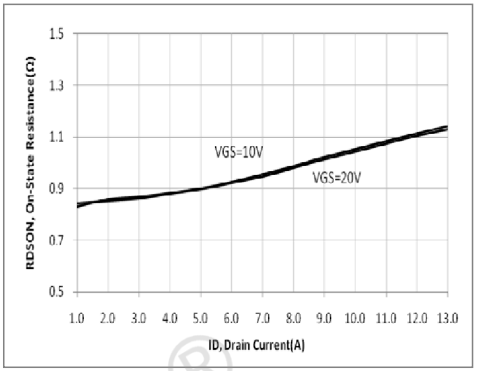


Fig. 3. Gate charge characteristics

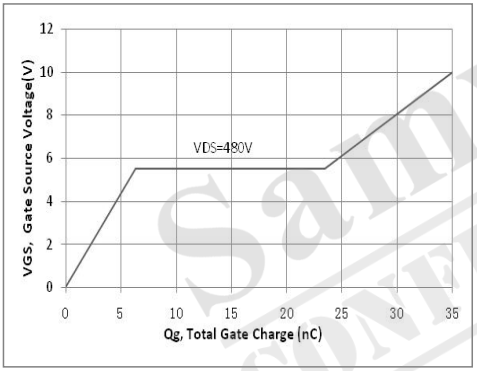


Fig. 4. On state current vs. diode forward voltage

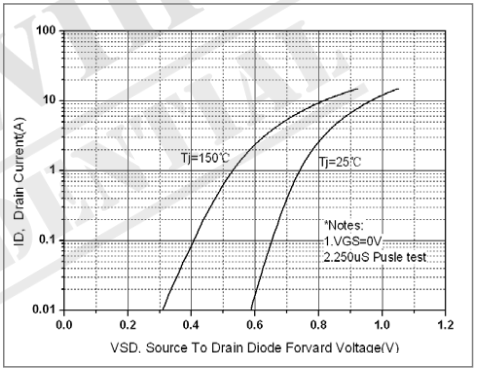


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

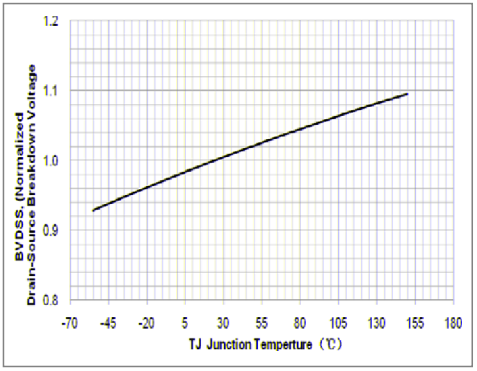


Fig. 6. On resistance variation vs. junction temperature

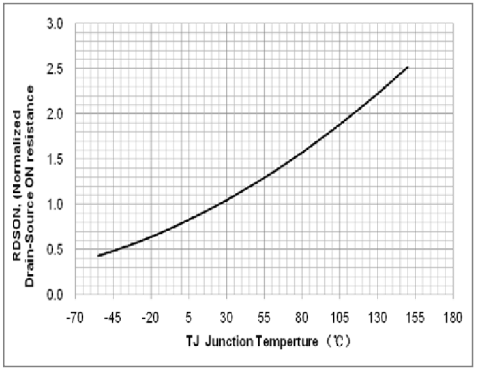


Fig. 7. Maximum safe operating area

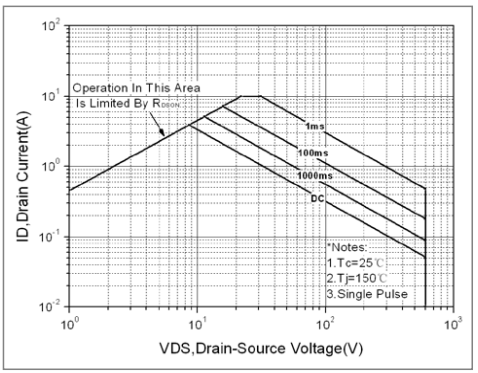


Fig. 8. Transient thermal response curve

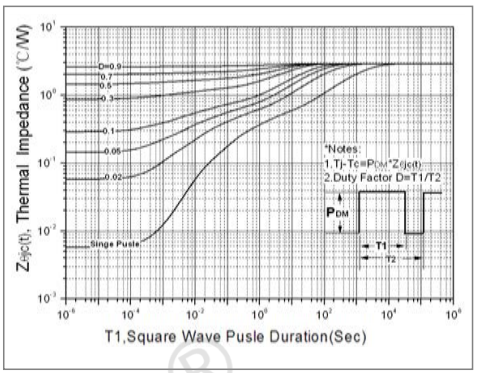


Fig. 9. Capacitance Characteristics

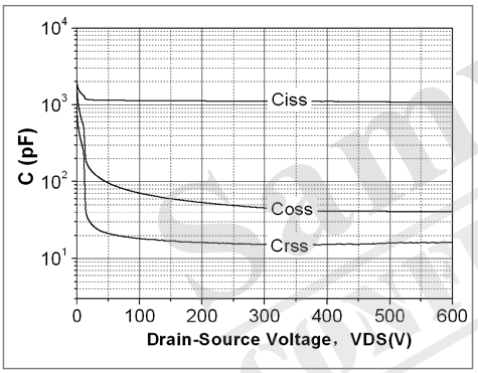
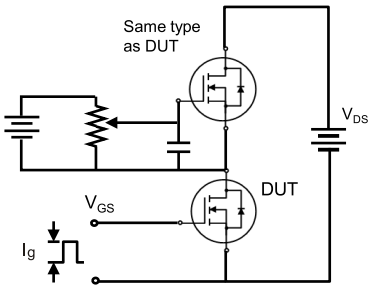


Fig. 10. Gate charge test circuit & waveform



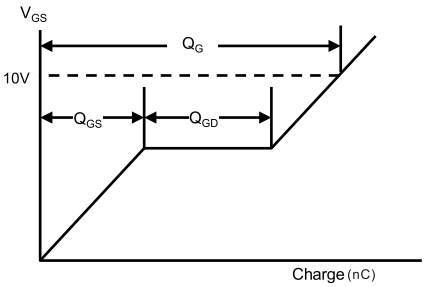


Fig. 11. Switching time test circuit & waveform

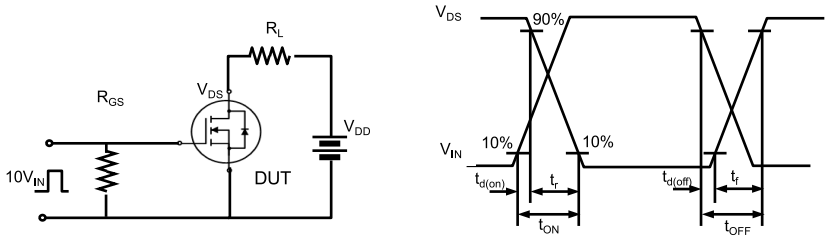


Fig. 12. Unclamped Inductive switching test circuit & waveform

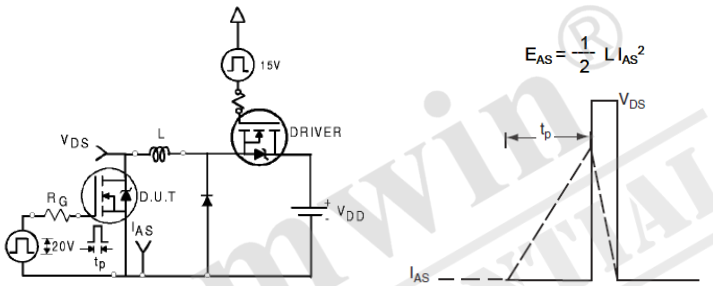
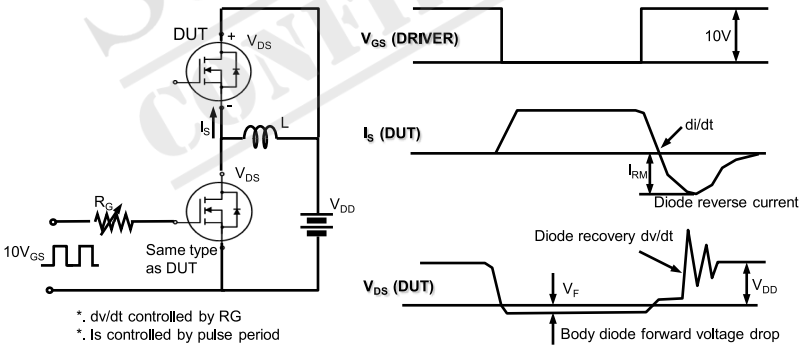


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



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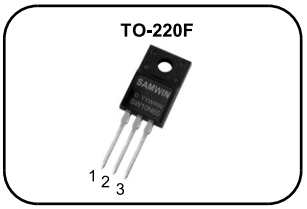
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F MOSFET

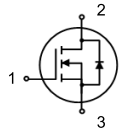
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.9Ω)@V_{GS}=10V
- Low Gate Charge (Typ 35nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: UPS,Inverter,PC-POWER



1. Gate 2. Drain 3. Source

BV_{DSS} : 650V
I_D : 10A
$R_{DS(ON)}$: 0.9Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 10N65D	SW10N65D	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to Source Voltage		650	V
I_D	Continuous drain current (@T_C=25°C)		10	A
	Continuous drain current (@T_C=100°C)		6.3	A
I_{DM}	Drain current pulsed	(note 1)	40	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	427	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	43	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		41.8	W
	Derating factor above 25°C		0.33	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	2.99	°C/W
R_{thja}	Thermal resistance, Junction to ambient	47.21	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	650			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.51		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=650V, V_{GS}=0V			1	uA
		V_{DS}=520V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 5A		0.9	1.1	Ω
Gfs	Forward transconductance	VDS = 30 V, ID = 5 A		7.3		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1120		pF
C_{oss}	Output capacitance			122		
C_{rss}	Reverse transfer capacitance			22		
$t_{d(on)}$	Turn on delay time	V_{DS}=325V, I_D=10A, R_G=25Ω V_{GS}=10V (note 4,5)		17		ns
t_r	Rising time			43		
$t_{d(off)}$	Turn off delay time			88		
t_f	Fall time			46		
Q_g	Total gate charge	V_{DS}=520V, V_{GS}=10V, I_D=10A (note 4,5)		35		nC
Q_{gs}	Gate-source charge			6		
Q_{gd}	Gate-drain charge			17		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			10	A
I_{SM}	Pulsed source current				40	A
V_{SD}	Diode forward voltage drop.	I_S=10A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=10A, V_{GS}=0V, dI_F/dt=100A/us		511		ns
Q_{rr}	Reverse recovery charge			12		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 8.5mH, I_{AS} = 10A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 10A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

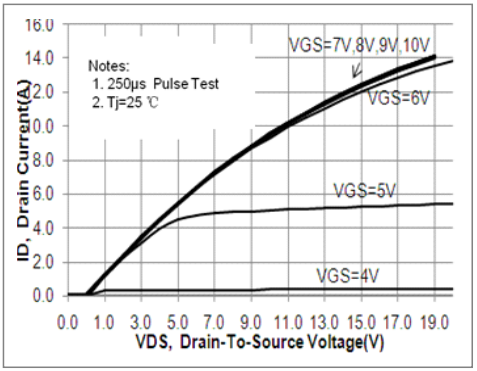


Fig. 2. On-resistance variation vs. drain current and gate voltage

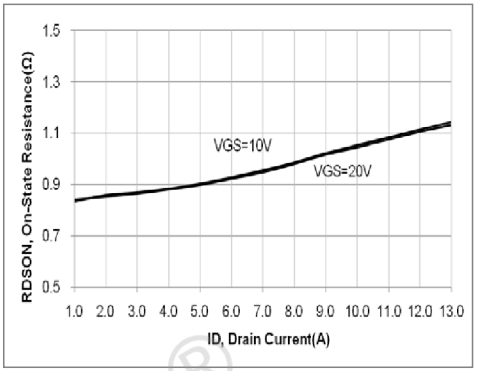


Fig. 3. Gate charge characteristics

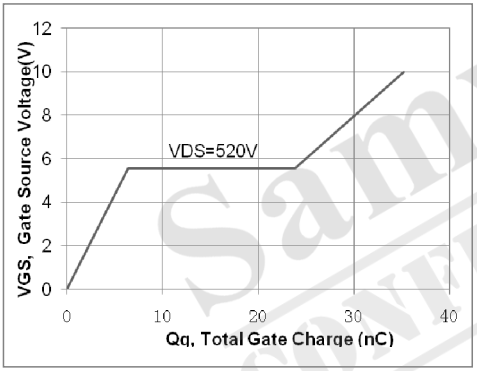


Fig. 4. On state current vs. diode forward voltage

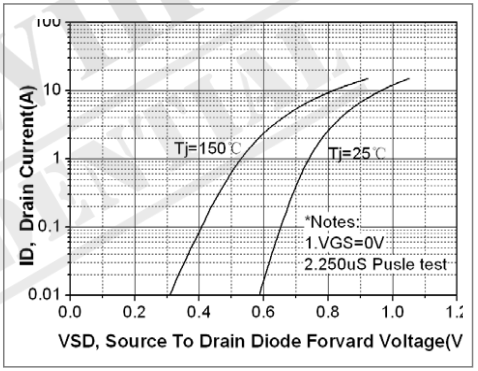


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

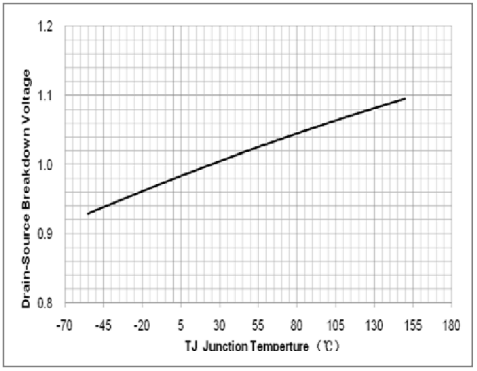


Fig. 6. On resistance variation vs. junction temperature

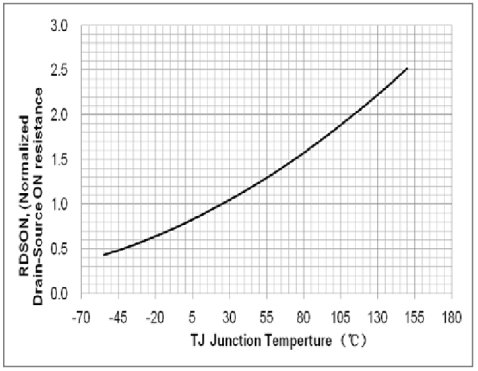


Fig. 7. Maximum safe operating area

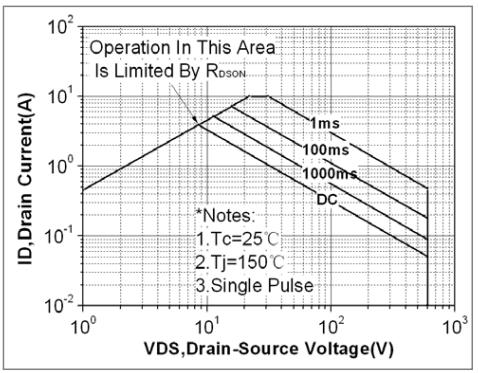


Fig. 8. Transient thermal response curve

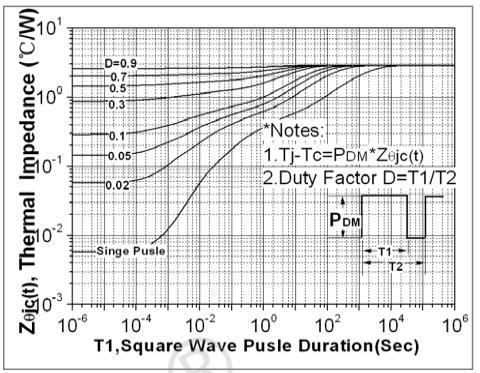


Fig. 9. Capacitance Characteristics

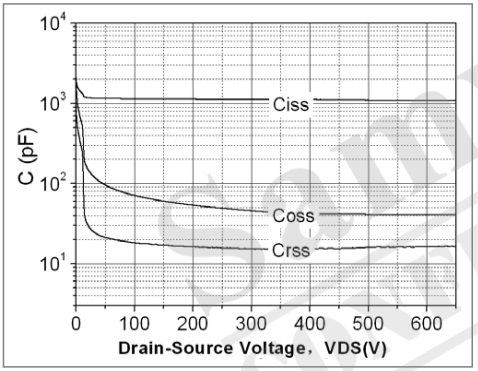
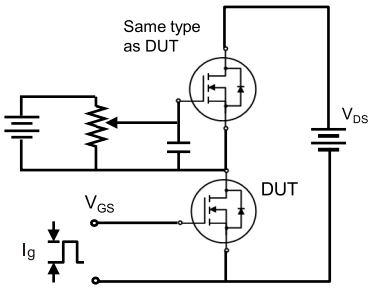


Fig. 10. Gate charge test circuit & waveform



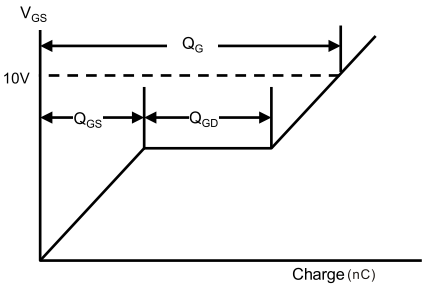


Fig. 11. Switching time test circuit & waveform

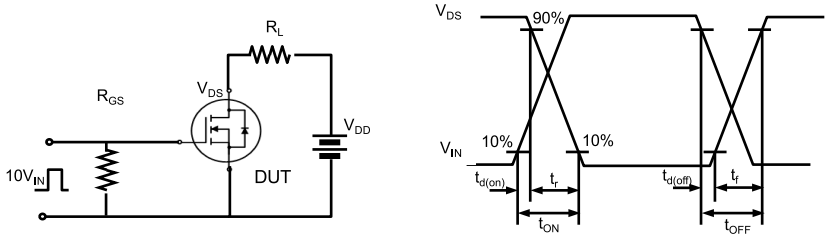


Fig. 12. Unclamped Inductive switching test circuit & waveform

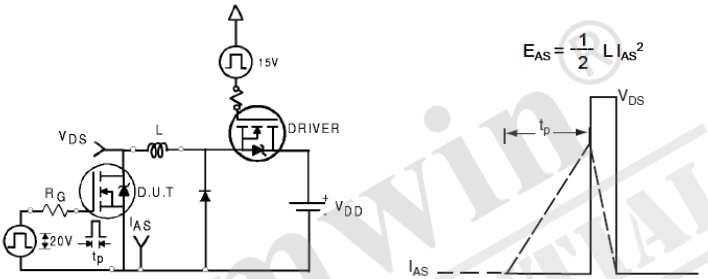
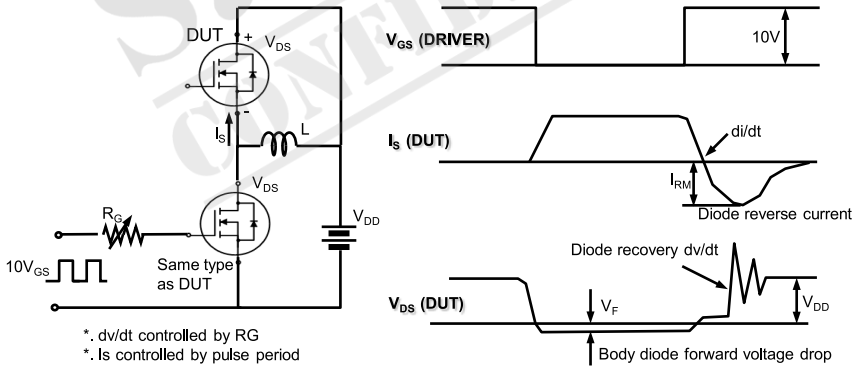


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



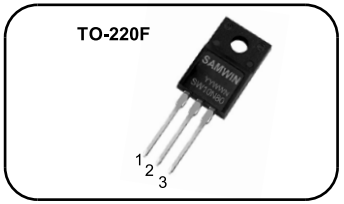
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F MOSFET

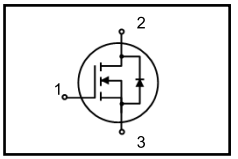
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.8Ω)@V_{GS}=10V
- Low Gate Charge (Typ 66nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: LED, UPS



1. Gate 2. Drain 3. Source

BV_{DSS} : 800V
I_D : 10A
$R_{DS(ON)}$: 0.8Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 10N80	SW10N80	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		800	V
I_D	Continuous drain current (@T_C=25°C)		10.0*	A
	Continuous drain current (@T_C=100°C)		6.3*	A
I_{DM}	Drain current pulsed	(note 1)	40	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	1673	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	236	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		37.1	W
	Derating factor above 25°C		0.3	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	3.37	°C/W
R_{thja}	Thermal resistance, Junction to ambient	47.3	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	800			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.83		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=800V, V_{GS}=0V			1	uA
		V_{DS}=640V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	3.0		5.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 5.0A		0.8	1.1	Ω
G_{fs}	Forward transconductance	V_{DS}= 20 V, I_D = 5 .0A		13		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		2143		pF
C_{oss}	Output capacitance			198		
C_{rss}	Reverse transfer capacitance			10		
$t_{d(on)}$	Turn on delay time	V_{DS}=400V, I_D=10A, R_G=25Ω V_{GS}=10V (note 4,5)		30		ns
t_r	Rising time			46		
$t_{d(off)}$	Turn off delay time			140		
t_f	Fall time			47		
Q_g	Total gate charge	V_{DS}=640V, V_{GS}=10V, I_D=10A (note 4,5)		66		nC
Q_{gs}	Gate-source charge			12		
Q_{gd}	Gate-drain charge			34		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			10	A
I_{SM}	Pulsed source current				40	A
V_{SD}	Diode forward voltage drop.	I_S=10A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=10A, V_{GS}=0V, dI_F/dt=100A/us		470		ns
Q_{rr}	Reverse recovery charge			7.3		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 33.46mH, I_{AS} = 10A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 10.0A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

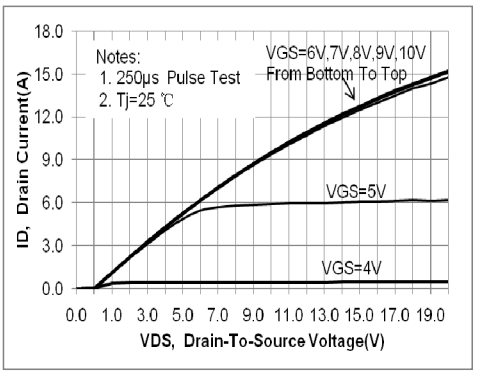


Fig. 2. On-resistance variation vs. drain current and gate voltage

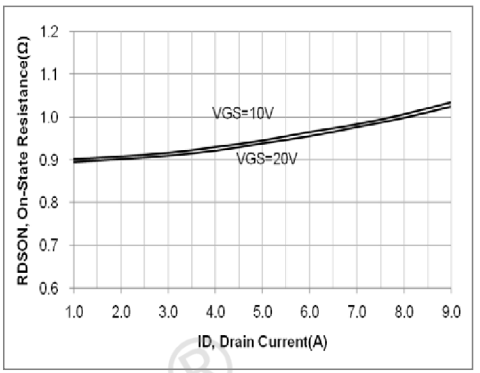


Fig. 3. Gate charge characteristics

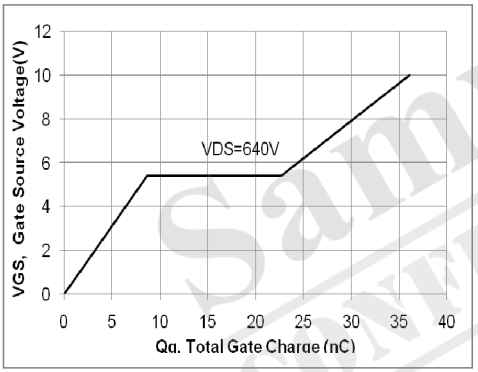


Fig. 4. On state current vs. diode forward voltage

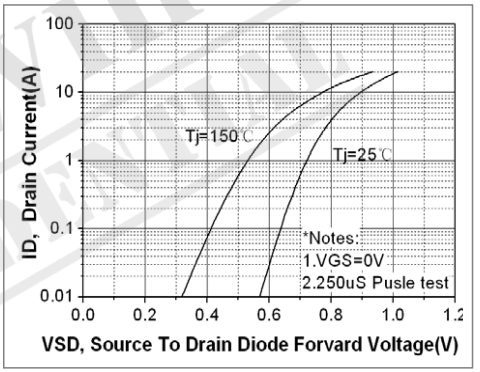


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

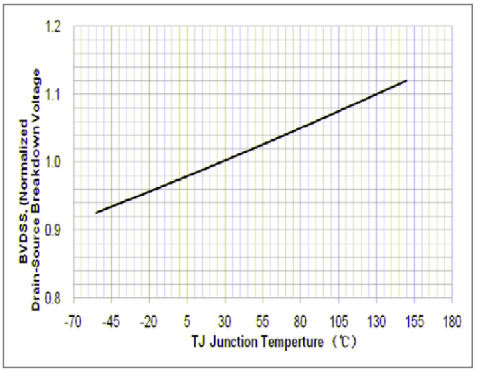


Fig. 6. On resistance variation vs. junction temperature

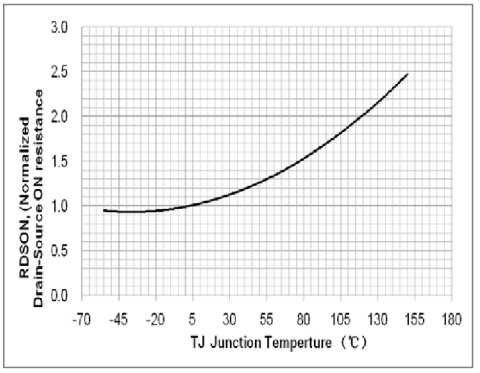


Fig. 7. Maximum safe operating area

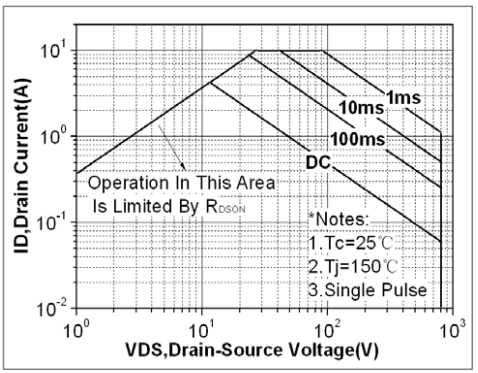


Fig. 8. Transient thermal response curve

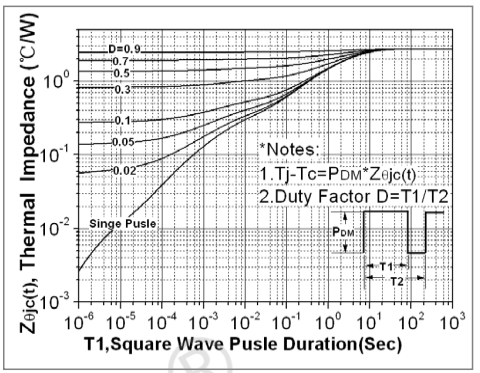


Fig. 9. Capacitance Characteristics

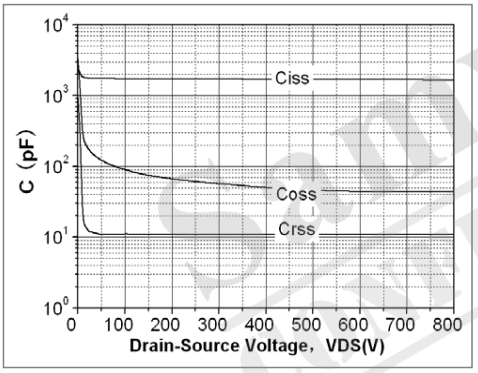
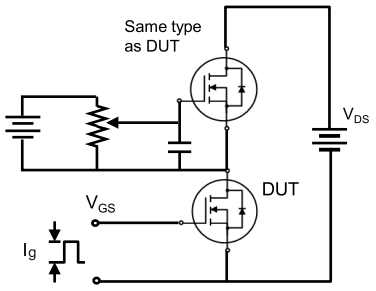


Fig. 10. Gate charge test circuit & waveform



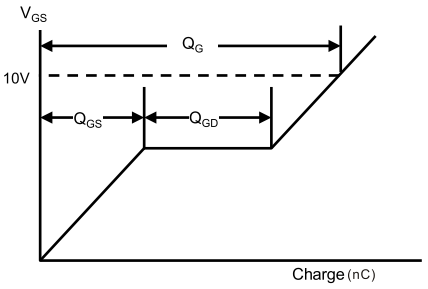


Fig. 10. Switching time test circuit & waveform

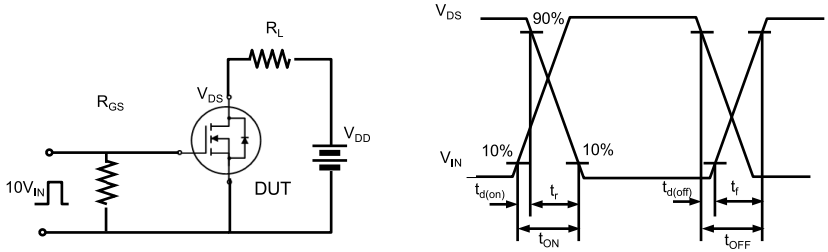


Fig. 11. Unclamped Inductive switching test circuit & waveform

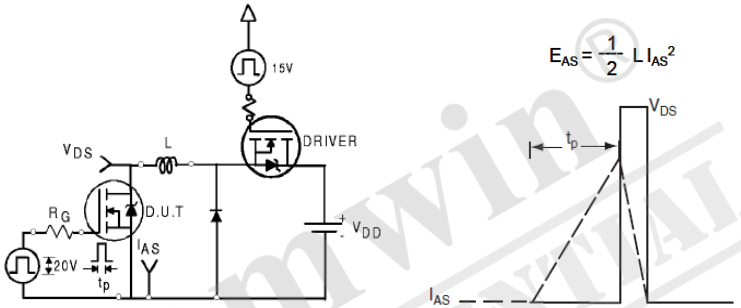
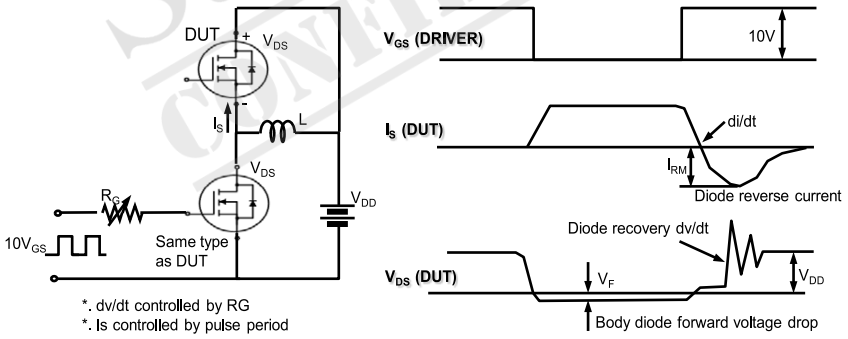


Fig. 12. Peak diode recovery dv/dt test circuit & waveform



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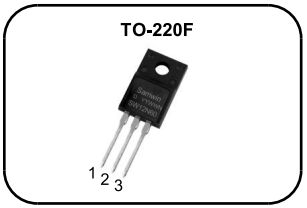
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F MOSFET

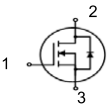
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.7Ω)@V_{GS}=10V
- Low Gate Charge (Typ 48nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: UPS, Inverter, PC-POWER



1. Gate 2. Drain 3. Source

BV_{DSS} : 600V
I_D : 12A
$R_{DS(ON)}$: 0.7Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 12N60D	SW12N60D	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		600	V
I_D	Continuous drain current (@T_C=25°C)		12*	A
	Continuous drain current (@T_C=100°C)		7.6*	A
I_{DM}	Drain current pulsed	(note 1)	48	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	605	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	60	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		32.3	W
	Derating factor above 25°C		0.26	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	3.87	°C/W
R_{thja}	Thermal resistance, Junction to ambient	47.5	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	600			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.49		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=600V, V_{GS}=0V			1	uA
		V_{DS}=480V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 6A		0.7	0.8	Ω
G_{fs}	Forward transconductance	V_{DS} = 30 V, I_D = 6 A		11		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1456		pF
C_{oss}	Output capacitance			157		
C_{rss}	Reverse transfer capacitance			25		
$t_{d(on)}$	Turn on delay time	V_{DS}=300V, I_D=12A, R_G=25Ω V_{GS}=10V (note 4,5)		17		ns
t_r	Rising time			42		
$t_{d(off)}$	Turn off delay time			120		
t_f	Fall time			55		
Q_g	Total gate charge	V_{DS}=480V, V_{GS}=10V, I_D=12A (note 4,5)		48		nC
Q_{gs}	Gate-source charge			8		
Q_{gd}	Gate-drain charge			24		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			12	A
I_{SM}	Pulsed source current				48	A
V_{SD}	Diode forward voltage drop.	I_S=12A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=12A, V_{GS}=0V, dI_F/dt=100A/us		1724		ns
Q_{rr}	Reverse recovery charge			32		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 8.4mH, I_{AS} = 12A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 12A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

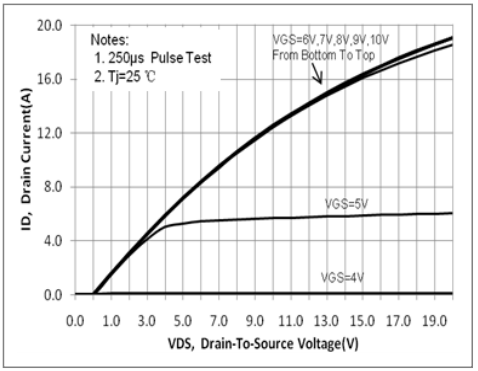


Fig. 2. On-resistance variation vs. drain current and gate voltage

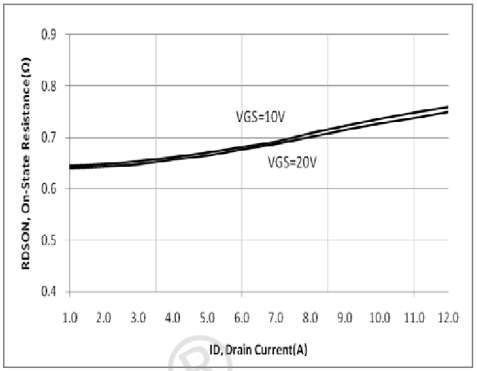


Fig. 3. Gate charge characteristics

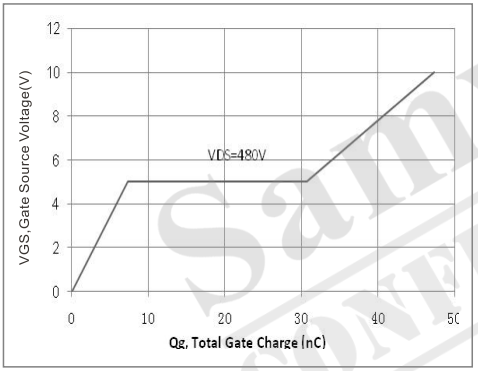


Fig. 4. On state current vs. diode forward voltage

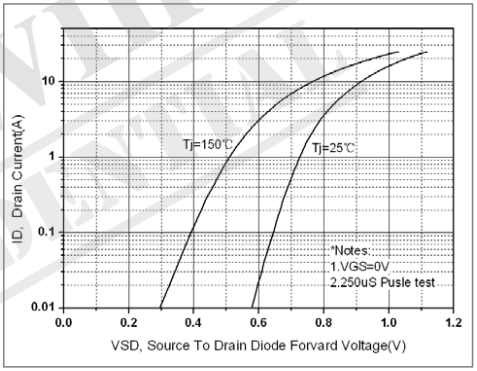


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

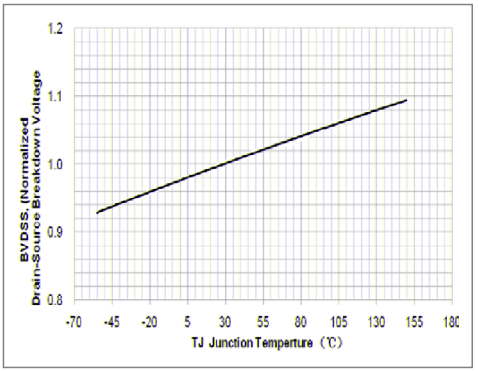


Fig. 6. On resistance variation vs. junction temperature

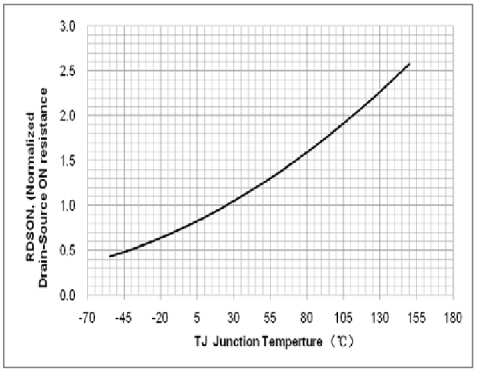


Fig. 7. Maximum safe operating area

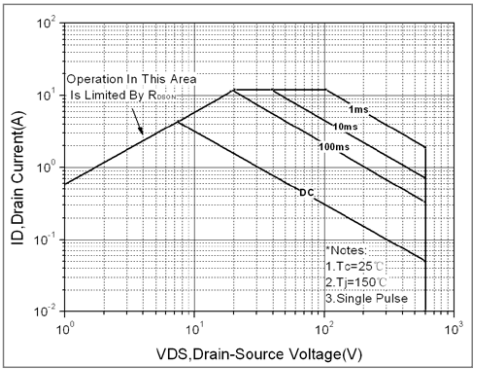


Fig. 8. Transient thermal response curve

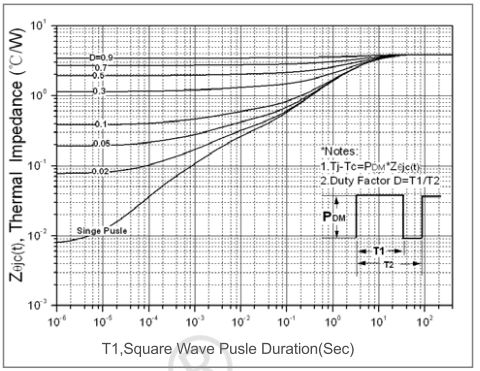


Fig. 9. Capacitance Characteristics

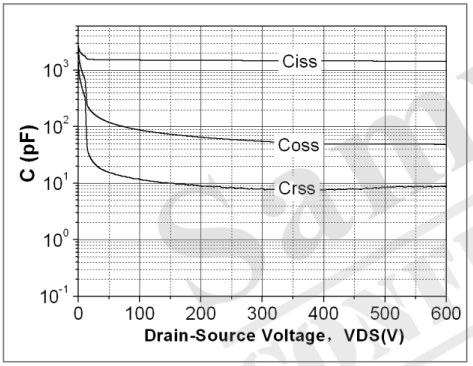
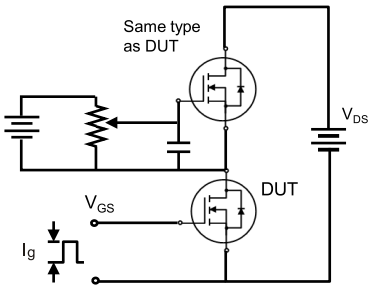


Fig. 10. Gate charge test circuit & waveform



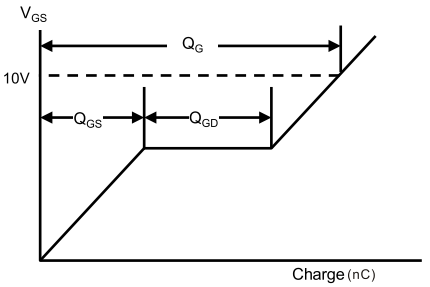


Fig. 11. Switching time test circuit & waveform

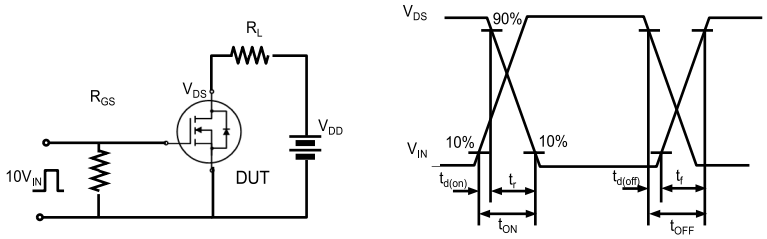


Fig. 12. Unclamped Inductive switching test circuit & waveform

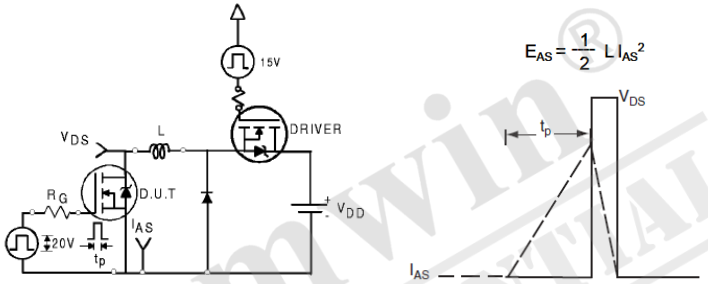
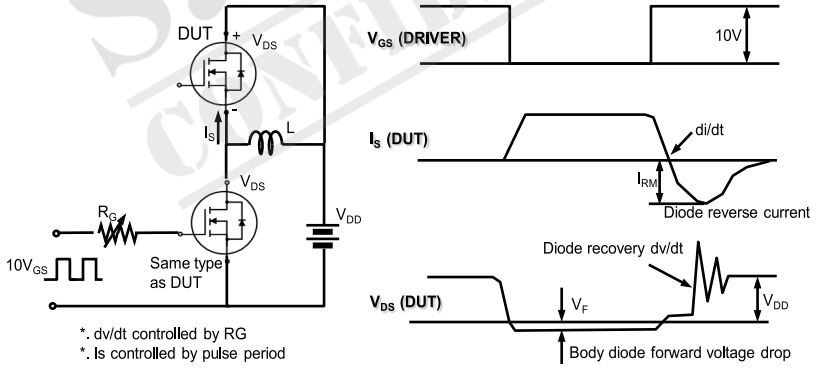


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



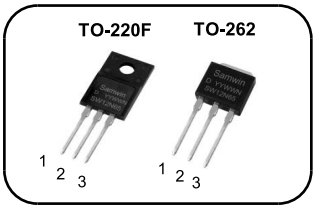
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F/TO-262 MOSFET

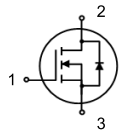
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.7Ω)@V_{GS}=10V
- Low Gate Charge (Typ 45nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: UPS,Inverter,PC-POWER



1. Gate 2. Drain 3. Source

BV_{DSS} : 650V
I_D : 12A
$R_{DS(ON)}$: 0.7Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 12N65D	SW12N65D	TO-220F	TUBE
2	SW U 12N65D	SW12N65D	TO-262	TUBE

Absolute maximum ratings

Symbol	Parameter		Value		Unit
			TO-220F	TO-262	
V_{DSS}	Drain to source voltage		650		V
I_D	Continuous drain current (@T_C=25°C)		12 *		A
	Continuous drain current (@T_C=100°C)		7.6*		A
I_{DM}	Drain current pulsed	(note 1)	48		A
V_{GS}	Gate to source voltage		±30		V
E_{AS}	Single pulsed avalanche energy	(note 2)	605		mJ
E_{AR}	Repetitive avalanche energy	(note 1)	121		mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5		V/ns
P_D	Total power dissipation (@T_C=25°C)		45.2	186.6	W
	Derating factor above 25°C		0.36	1.49	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150		°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300		°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value		Unit
		TO-220F	TO-262	
R_{thjc}	Thermal resistance, Junction to case	2.76	0.67	°C/W
R_{thja}	Thermal resistance, Junction to ambient	47.5	66.6	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	650			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.49		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=650V, V_{GS}=0V			1	uA
		V_{DS}=520V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 6A		0.7	0.8	Ω
Gfs	Forward transconductance	VDS = 30 V, ID = 6 A		10.5		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1456		pF
C_{oss}	Output capacitance			157		
C_{rss}	Reverse transfer capacitance			25		
$t_{d(on)}$	Turn on delay time	V_{DS}=325V, I_D=12A, R_G=25Ω V_{GS}=10V (note 4,5)		24		ns
t_r	Rising time			51		
$t_{d(off)}$	Turn off delay time			131		
t_f	Fall time			56		
Q_g	Total gate charge	V_{DS}=520V, V_{GS}=10V, I_D=12A (note 4,5)		45		nC
Q_{gs}	Gate-source charge			8		
Q_{gd}	Gate-drain charge			22		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			12	A
I_{SM}	Pulsed source current				48	A
V_{SD}	Diode forward voltage drop.	I_S=12A, V_{GS}=0V			1.4	V
t_r	Reverse recovery time	I_S=12A, V_{GS}=0V, dI_F/dt=100A/us		1724		ns
Q_{rr}	Reverse recovery charge			32		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L =8.4mH, I_{AS} = 12A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 12A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

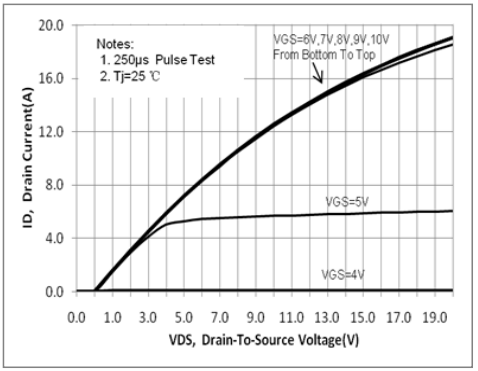


Fig. 2. On-resistance variation vs. drain current and gate voltage

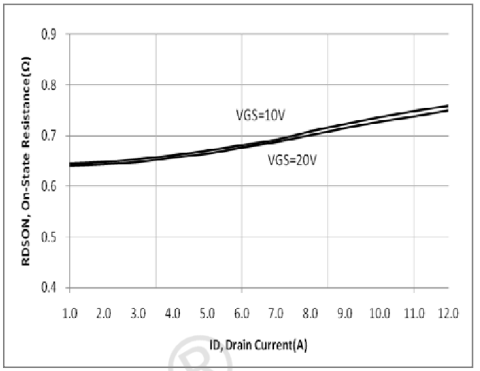


Fig. 3. Gate charge characteristics

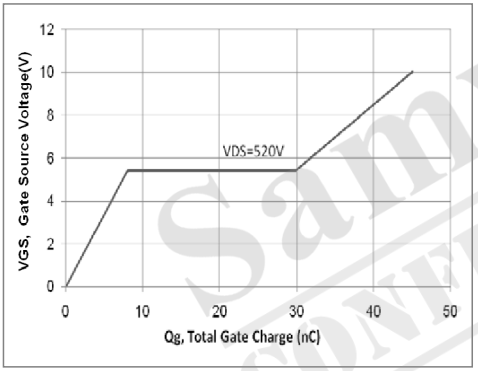


Fig. 4. On state current vs. diode forward voltage

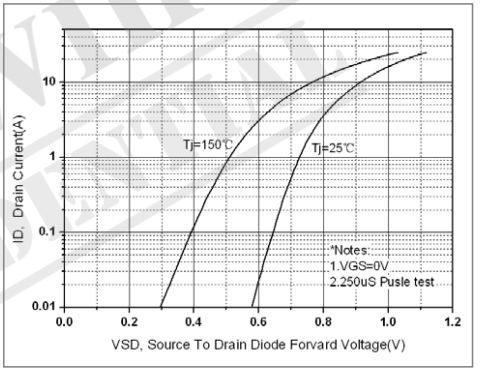


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

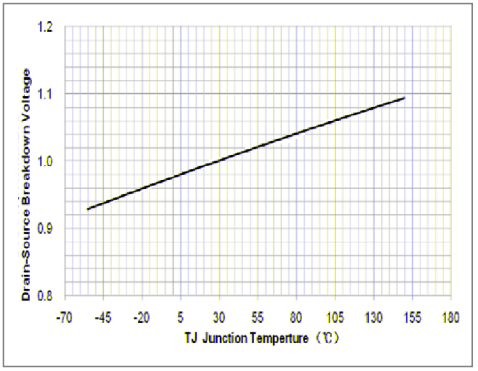


Fig. 6. On resistance variation vs. junction temperature

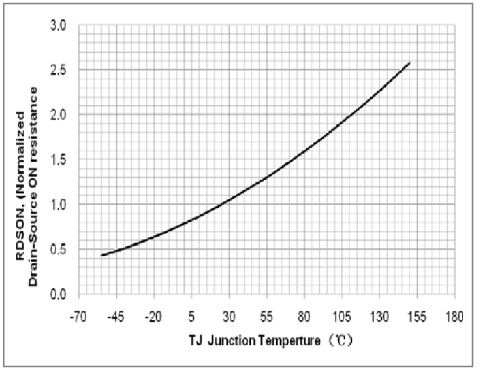


Fig. 7. Maximum safe operating area（TO-220F）

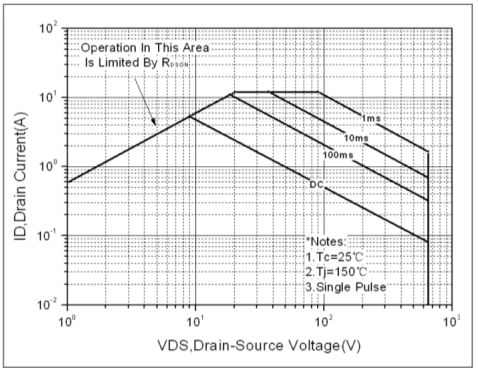


Fig. 8. Transient thermal response curve（TO-220F）

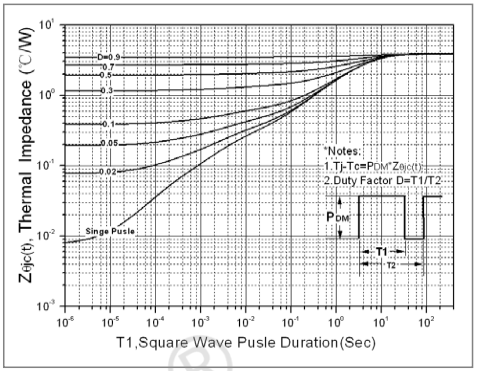


Fig. 9. Maximum safe operating area（TO-262）

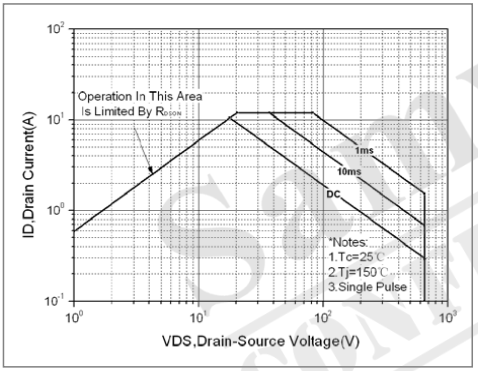


Fig. 10. Transient thermal response curve（TO-262）

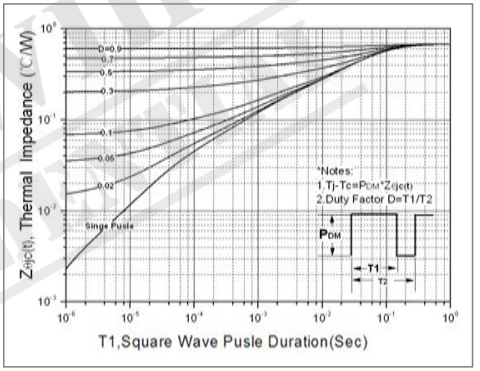


Fig. 11. Capacitance Characteristics

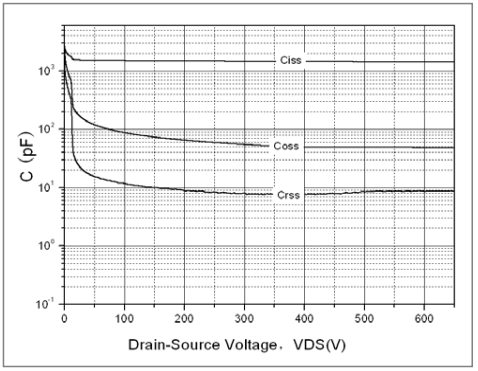


Fig. 12. Gate charge test circuit & waveform

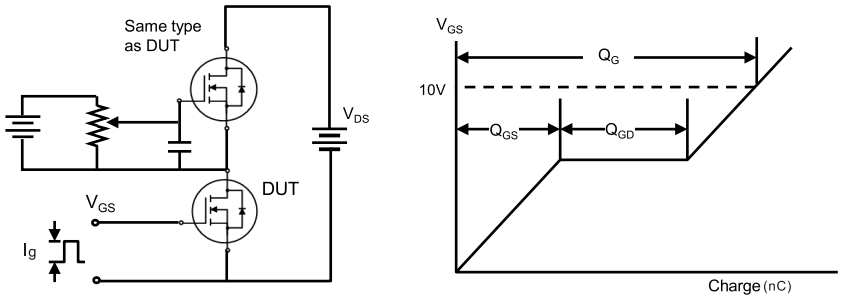


Fig. 13. Switching time test circuit & waveform

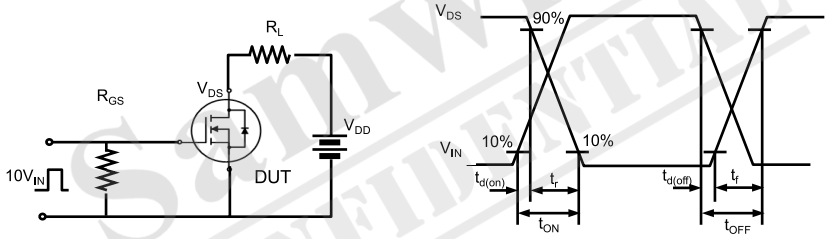


Fig. 14. Unclamped Inductive switching test circuit & waveform

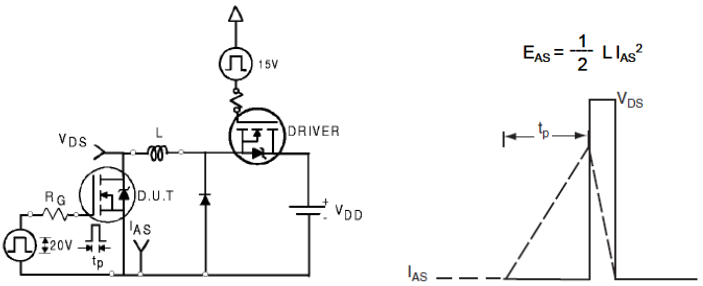
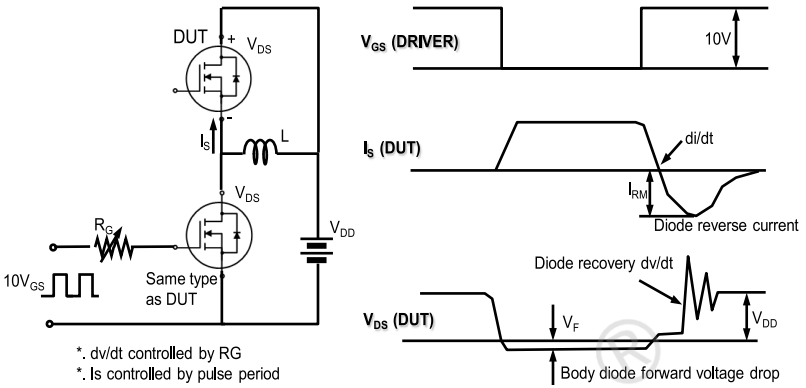


Fig. 15. Peak diode recovery dv/dt test circuit & waveform



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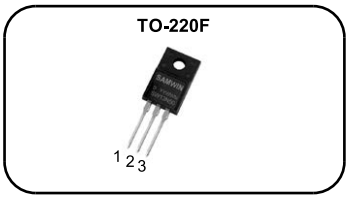
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F MOSFET

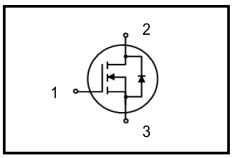
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.46Ω)@V_{GS}=10V
- Low Gate Charge (Typ 47nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: Charge, Adaptor, LED



1. Gate 2. Drain 3. Source

BV_{DSS} : 500V
I_D : 13A
$R_{DS(ON)}$: 0.46Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 13N50D	SW13N50D	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		500	V
I_D	Continuous drain current (@T_C=25°C)		13*	A
	Continuous drain current (@T_C=100°C)		8.2*	A
I_{DM}	Drain current pulsed	(note 1)	52	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	408	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	95	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		43	W
	Derating factor above 25°C		0.34	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	2.9	°C/W
R_{thja}	Thermal resistance, Junction to ambient	55	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	500			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.51		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=500V, V_{GS}=0V			1	uA
		V_{DS}=400V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.5		4.5	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D=6.5A		0.46	0.52	Ω
G_{fs}	Forward transconductance	V_{DS}=30V, I_D=6.5A		11		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		1886		pF
C_{oss}	Output capacitance			189		
C_{rss}	Reverse transfer capacitance			30		
$t_{d(on)}$	Turn on delay time	V_{DS}=250V, I_D=13A, R_G=25Ω, V_{GS}=10V (note 4,5)		23		ns
t_r	Rising time			54		
$t_{d(off)}$	Turn off delay time			112		
t_f	Fall time			51		
Q_g	Total gate charge	V_{DS}=400V, V_{GS}=10V, I_D=13A (note 4,5)		47		nC
Q_{gs}	Gate-source charge			10		
Q_{gd}	Gate-drain charge			20		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			13	A
I_{SM}	Pulsed source current				52	A
V_{SD}	Diode forward voltage drop.	I_S=13A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=13A, V_{GS}=0V, dI_F/dt=100A/us		360		ns
Q_{rr}	Reverse recovery charge			5.1		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 9.8mH, I_{AS} = 13.0A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 13.0A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

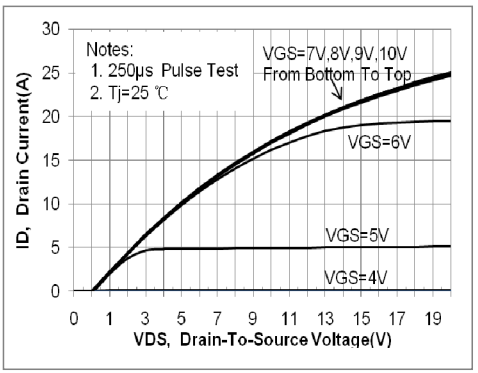


Fig. 2. On-resistance variation vs. drain current and gate voltage

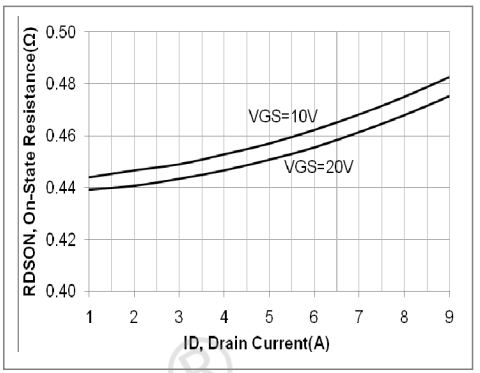


Fig. 3. Gate charge characteristics

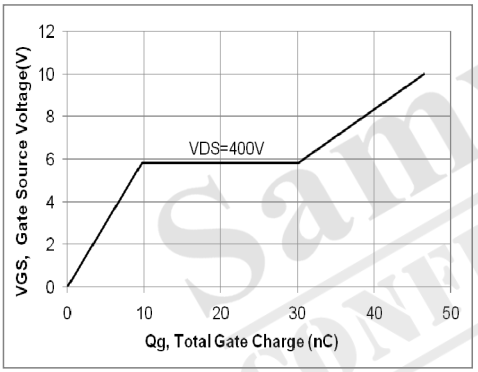


Fig. 4. On state current vs. diode forward voltage

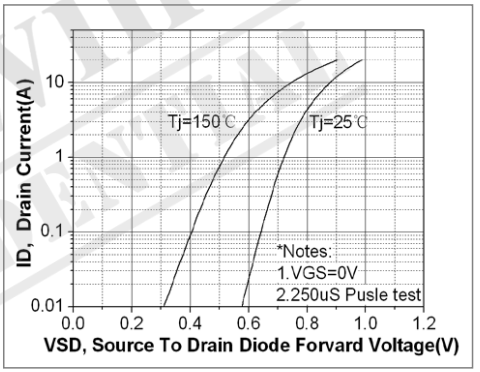


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

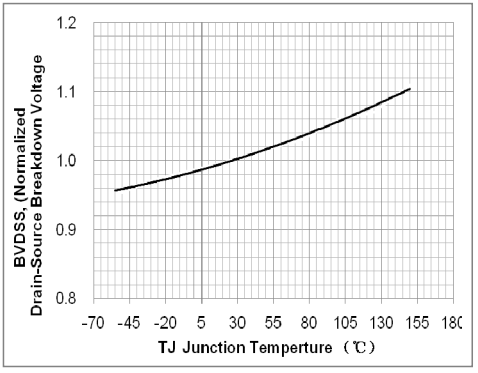


Fig. 6. On resistance variation vs. junction temperature

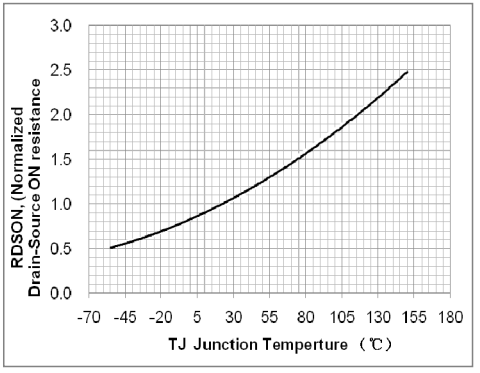


Fig. 7. Maximum safe operating area

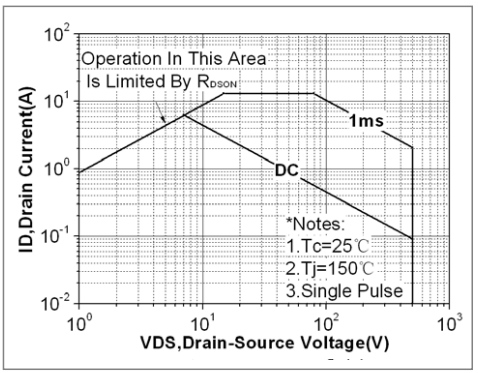


Fig. 8. Capacitance Characteristics

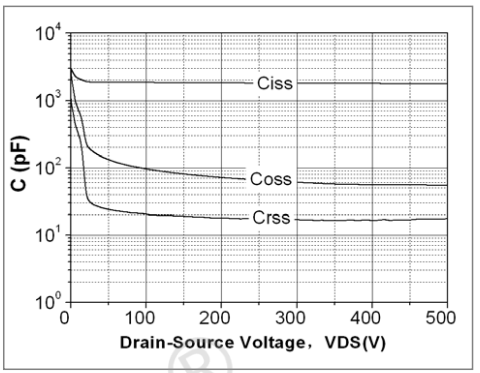


Fig. 9. Transient thermal response curve

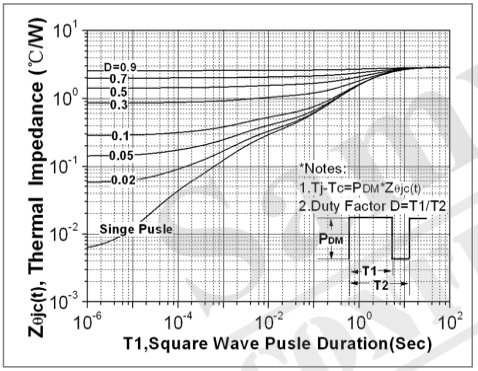


Fig. 10. Gate charge test circuit & waveform

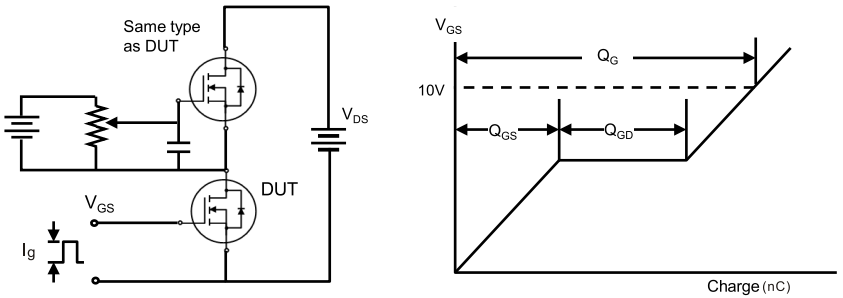


Fig. 11. Switching time test circuit & waveform

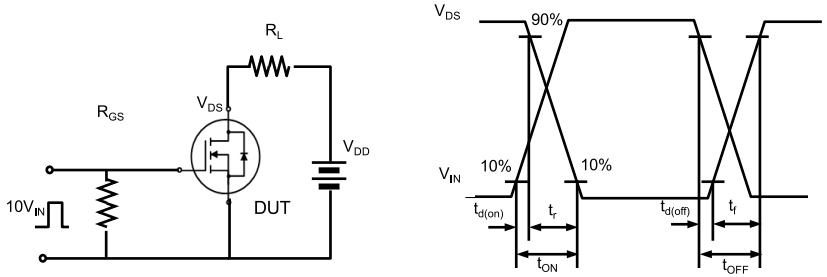


Fig. 12. Unclamped Inductive switching test circuit & waveform

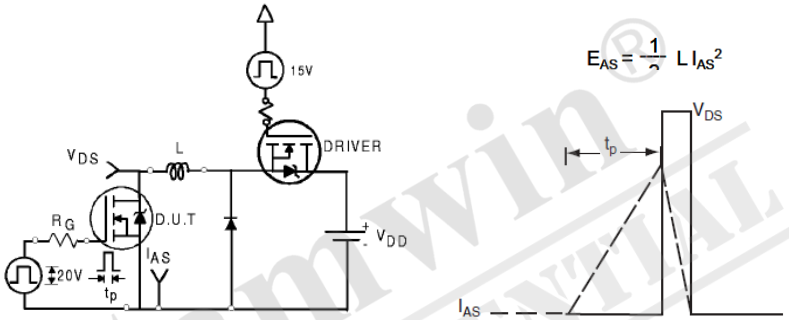
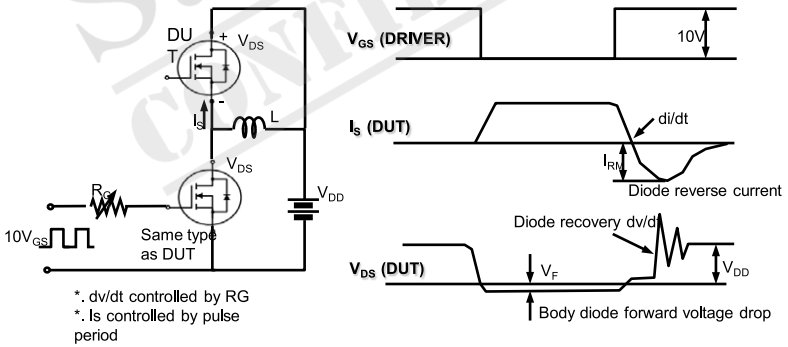


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



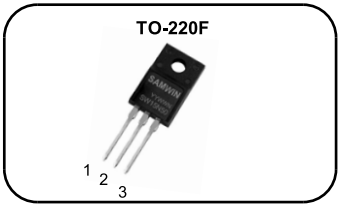
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-220F MOSFET

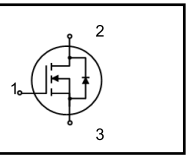
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.26Ω)@V_{GS}=10V
- Low Gate Charge (Typ 66nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: DC-DC,LED,PC



1. Gate 2. Drain 3. Source

BV_{DSS} : 500V
I_D : 15A
$R_{DS(ON)}$: 0.26Ω



LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW F 15N50	SW15N50	TO-220F	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		500	V
I_D	Continuous drain current (@T_C=25°C)		15.0*	A
	Continuous drain current (@T_C=100°C)		9.5*	A
I_{DM}	Drain current pulsed	(note 1)	60	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	1811	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	266	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	5	V/ns
P_D	Total power dissipation (@T_C=25°C)		34.6	W
	Derating factor above 25°C		0.28	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	3.62	°C/W
R_{thja}	Thermal resistance, Junction to ambient	43.5	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	500			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.57		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=500V, V_{GS}=0V			1	uA
		V_{DS}=400V, T_C=125°C			50	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	2.0		4.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D =7.5A		0.26	0.32	Ω
G_{fs}	Forward transconductance	V_{DS} = 20 V, I_D =7.5A		19.5		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		2650		pF
C_{oss}	Output capacitance			290		
C_{rss}	Reverse transfer capacitance			30		
$t_{d(on)}$	Turn on delay time	V_{DS}=250V, I_D=15A, R_G=25Ω V_{GS}=10V (note 4,5)		30		ns
t_r	Rising time			47		
$t_{d(off)}$	Turn off delay time			144		
t_f	Fall time			45		
Q_g	Total gate charge	V_{DS}=400V, V_{GS}=10V, I_D=15A (note 4,5)		66		nC
Q_{gs}	Gate-source charge			14		
Q_{gd}	Gate-drain charge			29		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			15	A
I_{SM}	Pulsed source current				60	A
V_{SD}	Diode forward voltage drop.	I_S=15A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=15A, V_{GS}=0V, dI_F/dt=100A/us		363		ns
Q_{rr}	Reverse recovery charge			5.5		uC

※. Notes
1. Repeatitive rating : pulse width limited by junction temperature.
2. L = 16.1 mH, I_{AS} = 15A, V_{DD} = 50V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 15A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

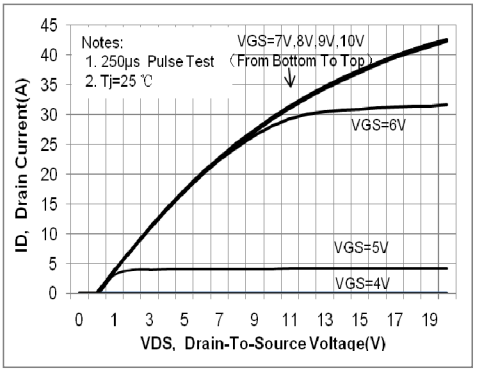


Fig. 2. On-resistance variation vs. drain current and gate voltage

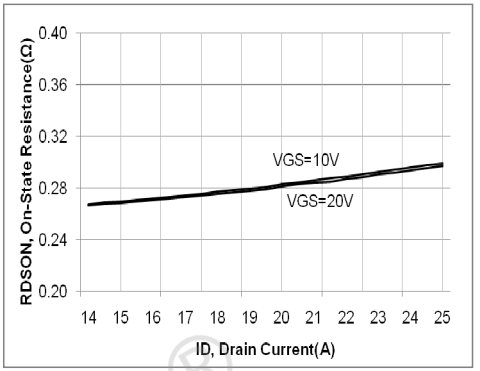


Fig. 3. Gate charge characteristics

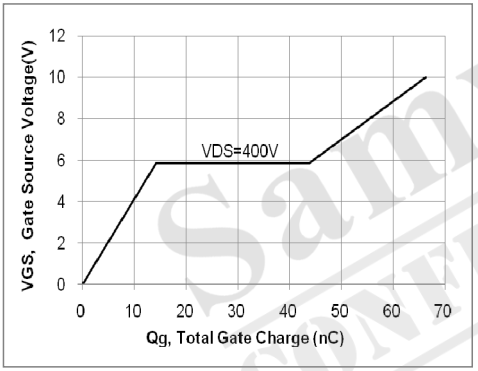


Fig. 4. On state current vs. diode forward voltage

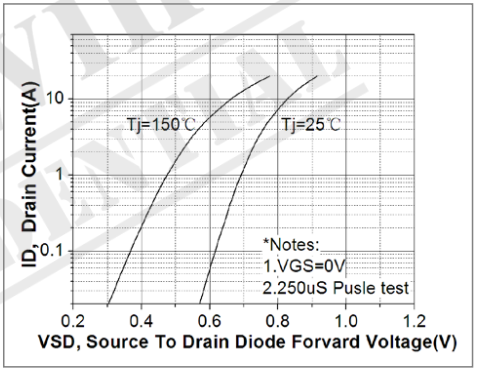


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

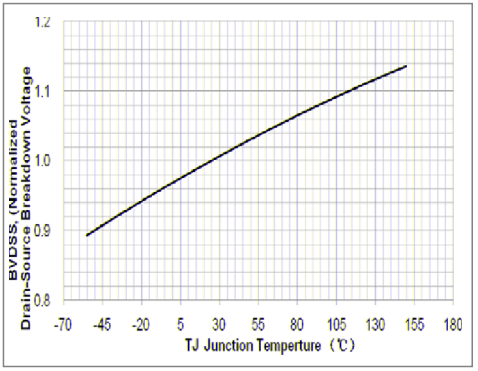


Fig. 6. On resistance variation vs. junction temperature

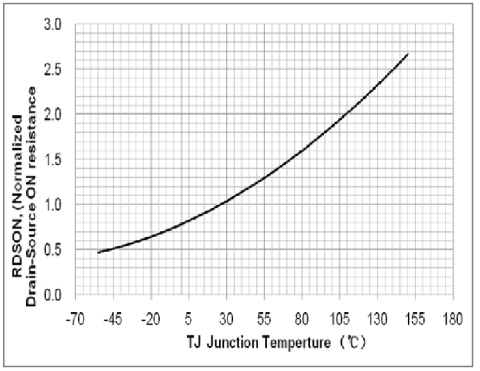


Fig. 7. Maximum safe operating area（TO-220F）

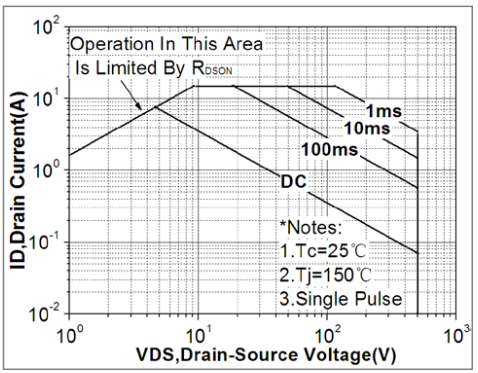


Fig. 8. Transient thermal response curve

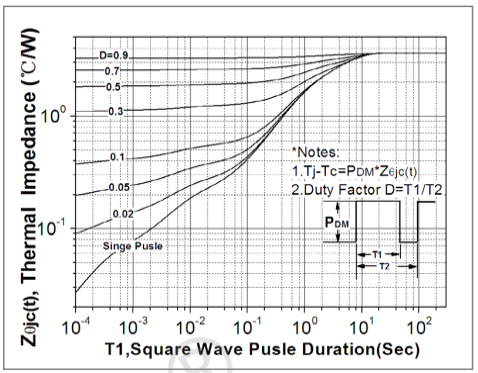


Fig. 9. Capacitance Characteristics

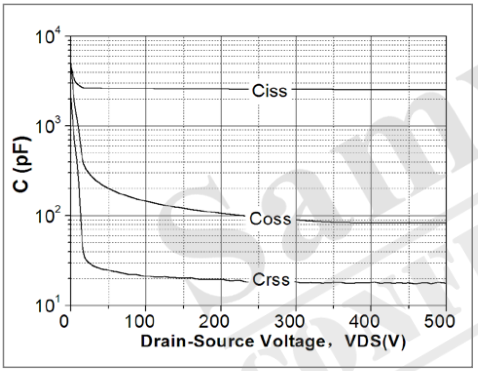
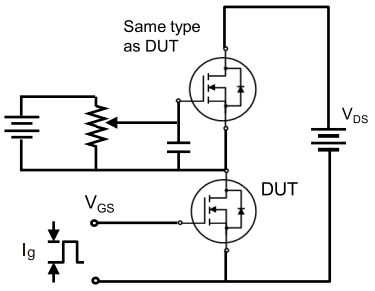


Fig. 10. Gate charge test circuit & waveform



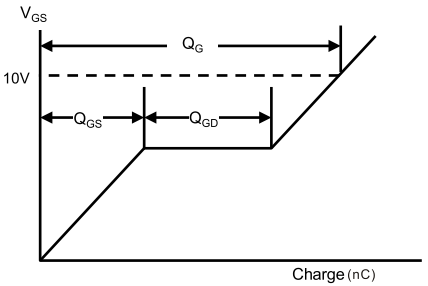


Fig. 11. Switching time test circuit & waveform

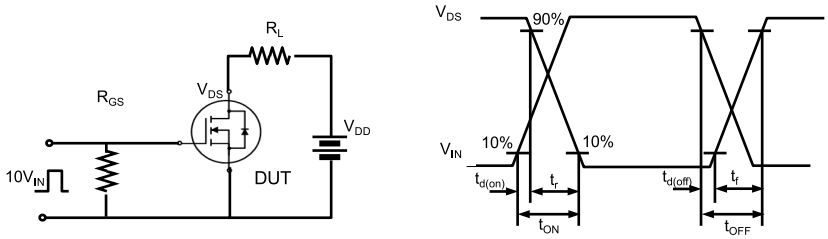


Fig. 12. Unclamped Inductive switching test circuit & waveform

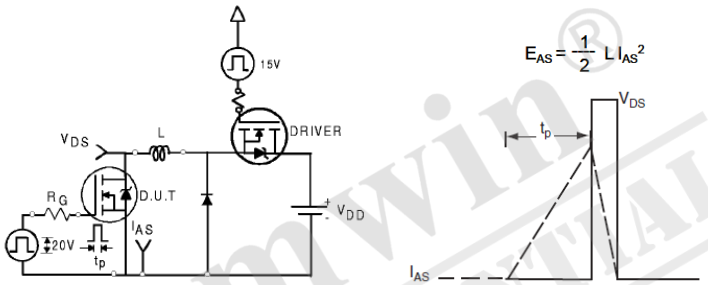
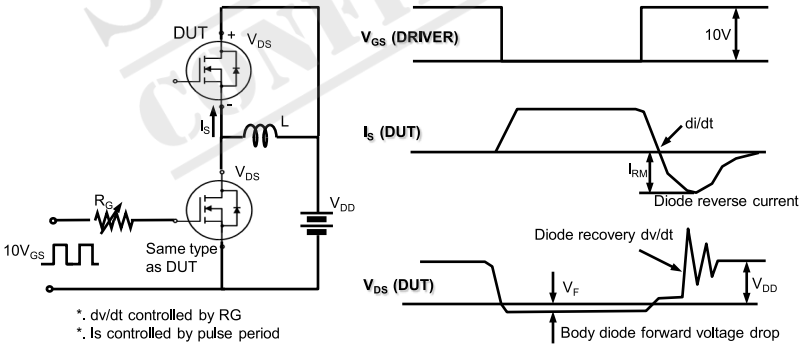


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



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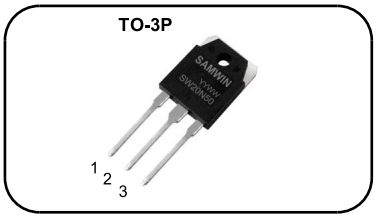
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-3P MOSFET

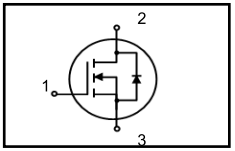
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.22Ω)@V_{GS}=10V
- Low Gate Charge (Typ 90nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: DC-DC,LED,PC



1. Gate 2. Drain 3. Source

BV_{DSS} : 500V
I_D : 20A
$R_{DS(ON)}$: 0.22Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW W 20N50	SW20N50	TO-3P	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		500	V
I_D	Continuous drain current (@T_C=25°C)		20*	A
	Continuous drain current (@T_C=100°C)		14*	A
I_{DM}	Drain current pulsed	(note 1)	80	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	1416	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	86	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	4.5	V/ns
P_D	Total power dissipation (@T_C=25°C)		480	W
	Derating factor above 25°C		3.85	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 150	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	0.26	°C/W
R_{thja}	Thermal resistance, Junction to ambient	50	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	500			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.49		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=500V, V_{GS}=0V			10	uA
		V_{DS}=400V, T_C=125°C			100	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	3.0		5.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 10A		0.22	0.27	Ω
G_{fs}	Forward transconductance	V_{DS} = 40V, I_D=10 A		5.5		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		3520		pF
C_{oss}	Output capacitance			745		
C_{rss}	Reverse transfer capacitance			30		
$t_{d(on)}$	Turn on delay time	V_{DS}=250V, I_D=20A, R_G=25Ω V_{GS}=10V (note 4,5)		40		ns
t_r	Rising time			58		
$t_{d(off)}$	Turn off delay time			390		
t_f	Fall time			190		
Q_g	Total gate charge	V_{DS}=400V, V_{GS}=10V, I_D=20A (note 4,5)		90		nC
Q_{gs}	Gate-source charge			16		
Q_{gd}	Gate-drain charge			37		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			20	A
I_{SM}	Pulsed source current				80	A
V_{SD}	Diode forward voltage drop.	I_S=20A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=20A, V_{GS}=0V, dI_F/dt=100A/us.		250		ns
Q_{rr}	Reverse recovery charge			2.1		uC

※. Notes
1. Repetitive rating : pulse width limited by junction temperature.
2. L = 7mH, I_{AS} = 20A, V_{DD} = 25V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 20A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

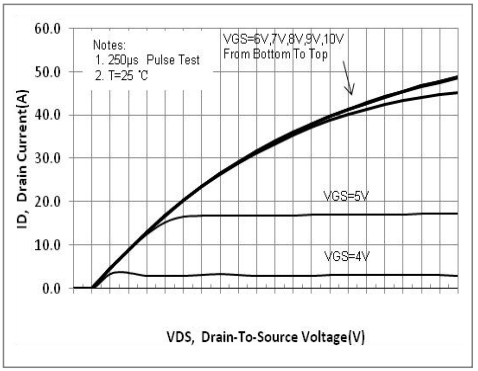


Fig. 2. On-resistance variation vs. drain current and gate voltage

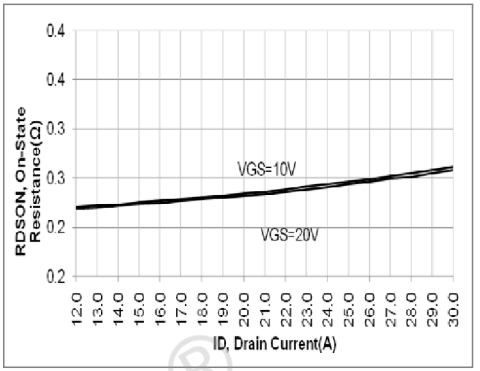


Fig. 3. Gate charge characteristics

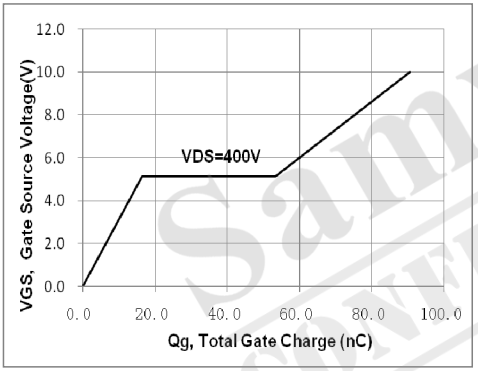


Fig. 4. On state current vs. diode forward voltage

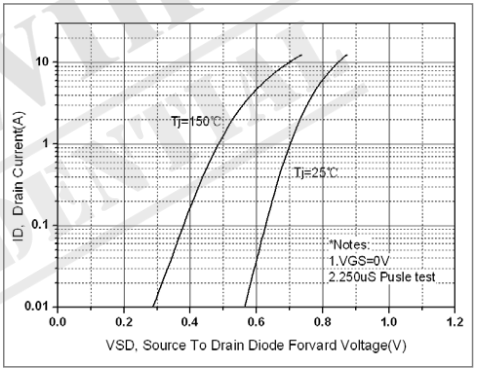


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

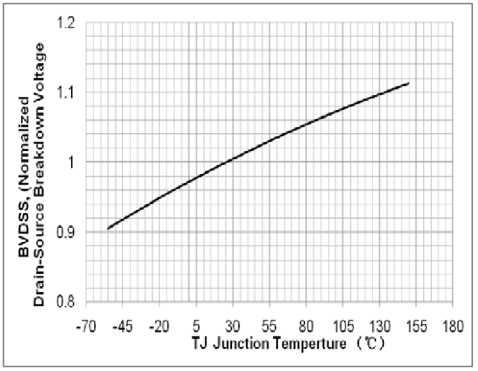


Fig. 6. On resistance variation vs. junction temperature

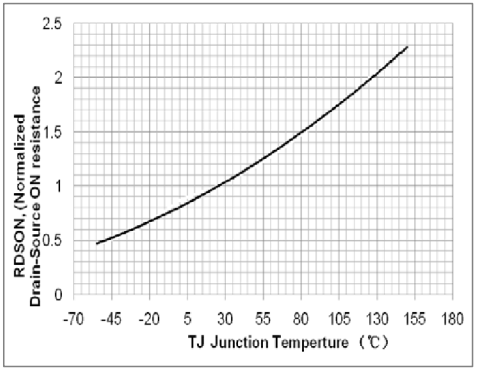


Fig. 7. Maximum safe operating area

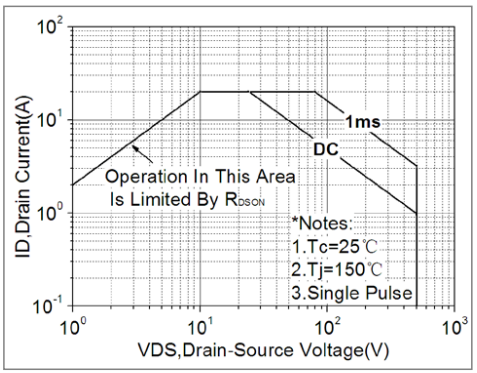


Fig. 8. Transient thermal response curve

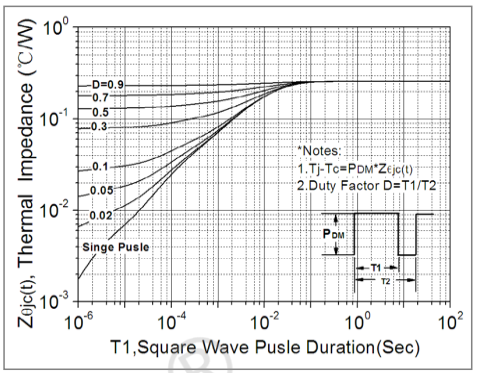


Fig. 9. Capacitance Characteristics

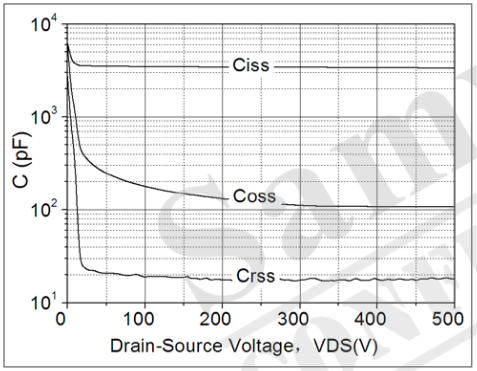
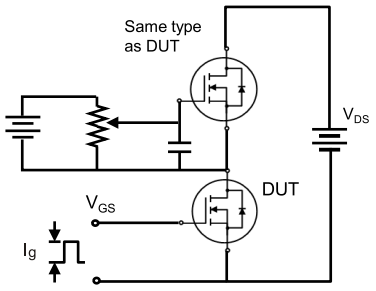


Fig. 10. Gate charge test circuit & waveform



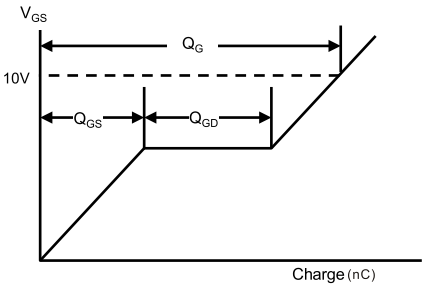


Fig. 11. Switching time test circuit & waveform

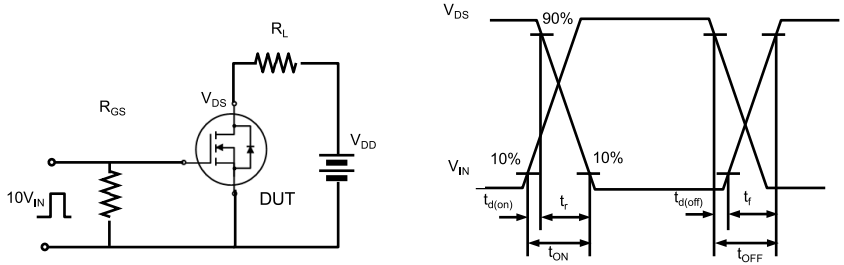


Fig. 12. Unclamped Inductive switching test circuit & waveform

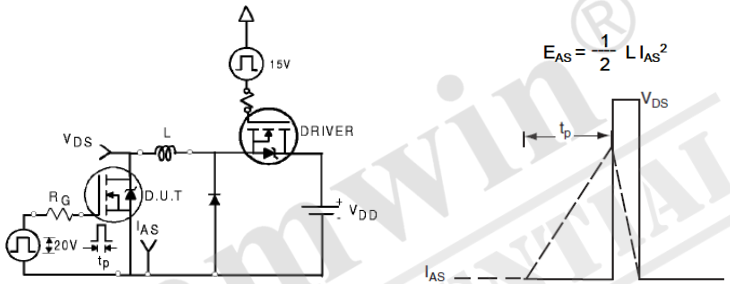
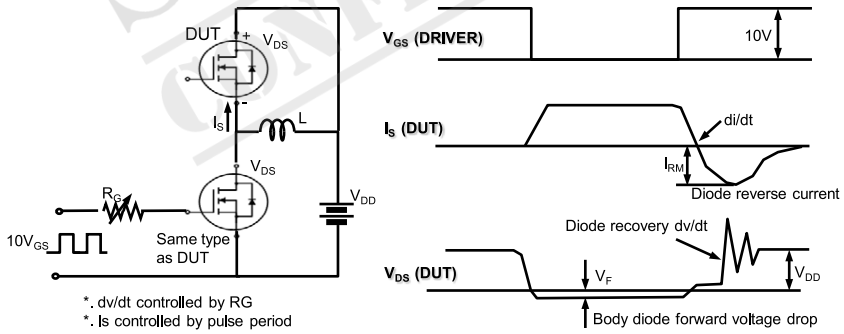


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



*. dv/dt controlled by RG
*. Is controlled by pulse period

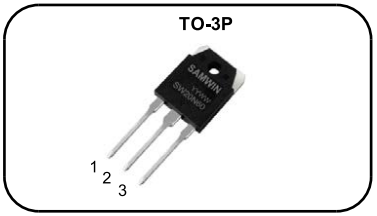
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Enhanced mode TO-3P MOSFET

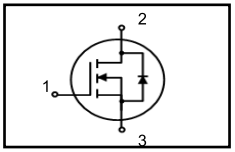
Features

- High ruggedness
- Low $R_{DS(ON)}$ (Typ 0.27Ω)@V_{GS}=10V
- Low Gate Charge (Typ 97nC)
- Improved dv/dt Capability
- 100% Avalanche Tested
- Application: UPS,Inverter,PC-POWER



1. Gate 2. Drain 3. Source

BV_{DSS} : 600V
I_D : 20A
$R_{DS(ON)}$: 0.27Ω



Pb LEAD-FREE RoHS

General Description

This power MOSFET is produced with advanced technology of SAMWIN.
This technology enable the power MOSFET to have better characteristics, including fast switching time, low on resistance, low gate charge and especially excellent avalanche characteristics.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW W 20N60	SW20N60	TO-3P	TUBE

Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain to source voltage		600	V
I_D	Continuous drain current (@T_C=25°C)		20*	A
	Continuous drain current (@T_C=100°C)		14*	A
I_{DM}	Drain current pulsed	(note 1)	80	A
V_{GS}	Gate to source voltage		±30	V
E_{AS}	Single pulsed avalanche energy	(note 2)	456	mJ
E_{AR}	Repetitive avalanche energy	(note 1)	40	mJ
dv/dt	Peak diode recovery dv/dt	(note 3)	4.5	V/ns
P_D	Total power dissipation (@T_C=25°C)		367	W
	Derating factor above 25°C		2.9	W/°C
T_{STG}, T_J	Operating junction temperature & storage temperature		-55 ~ + 175	°C
T_L	Maximum lead temperature for soldering purpose, 1/8 from case for 5 seconds.		300	°C

*. Drain current is limited by junction temperature.

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thjc}	Thermal resistance, Junction to case	0.35	°C/W
R_{thja}	Thermal resistance, Junction to ambient	50	°C/W

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=0V, I_D=250uA	600			V
ΔBV_{DSS} / ΔT_J	Breakdown voltage temperature coefficient	I_D=250uA, referenced to 25°C		0.54		V/°C
I_{DSS}	Drain to source leakage current	V_{DS}=600V, V_{GS}=0V			10	uA
		V_{DS}=480V, T_C=125°C			100	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=30V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-30V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(TH)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D=250uA	3.0		5.0	V
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=10V, I_D = 10A		0.27	0.3	Ω
G_{fs}	Forward Transconductance	V_{DS} = 40 V, I_D = 10 A		5.2		S
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		4010		pF
C_{oss}	Output capacitance			350		
C_{rss}	Reverse transfer capacitance			40		
$t_{d(on)}$	Turn on delay time	V_{DS}=300V, I_D=20A, R_G=25Ω V_{GS}=10V (note 4,5)		52		ns
t_r	Rising time			87		
$t_{d(off)}$	Turn off delay time			273		
t_f	Fall time			95		
Q_g	Total gate charge	V_{DS}=480V, V_{GS}=10V, I_D=20A (note 4,5)		97		nC
Q_{gs}	Gate-source charge			20		
Q_{gd}	Gate-drain charge			42		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_S	Continuous source current	Integral reverse p-n Junction diode in the MOSFET			20	A
I_{SM}	Pulsed source current				80	A
V_{SD}	Diode forward voltage drop.	I_S=20A, V_{GS}=0V			1.4	V
t_{rr}	Reverse recovery time	I_S=20A, V_{GS}=0V, dI_F/dt=100A/us.		484		ns
Q_{rr}	Reverse recovery charge			9.1		uC

※. Notes
1. Repetitive rating : pulse width limited by junction temperature.
2. L = 2.3mH, I_{AS} = 20A, V_{DD} = 25V, R_G=25Ω, Starting T_J = 25°C
3. I_{SD} ≤ 20A, di/dt = 100A/us, V_{DD} ≤ BV_{DSS}, Staring T_J =25°C
4. Pulse Test : Pulse Width ≤ 300us, duty cycle ≤ 2%
5. Essentially independent of operating temperature.

Fig. 1. On-state characteristics

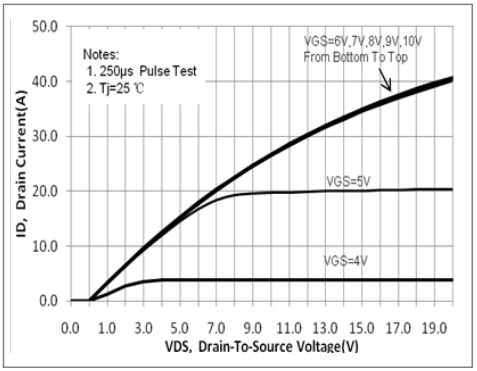


Fig. 2. On-resistance variation vs. drain current and gate voltage

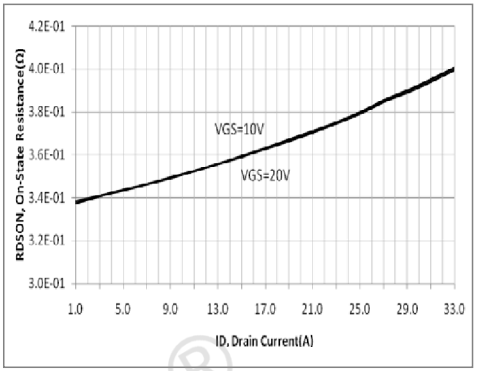


Fig. 3. Gate charge characteristics

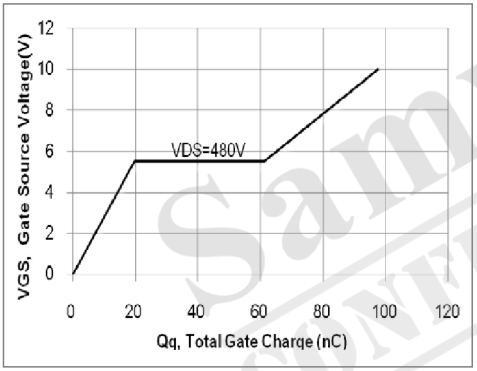


Fig. 4. On state current vs. diode forward voltage

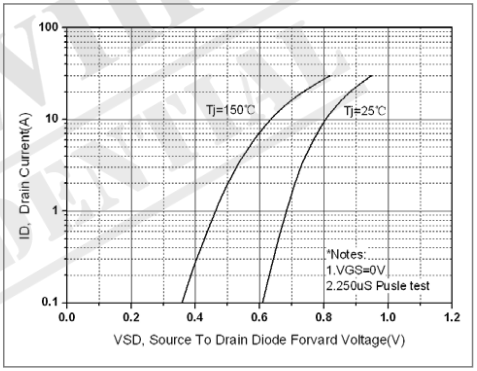


Fig 5. Breakdown Voltage Variation vs. Junction Temperature

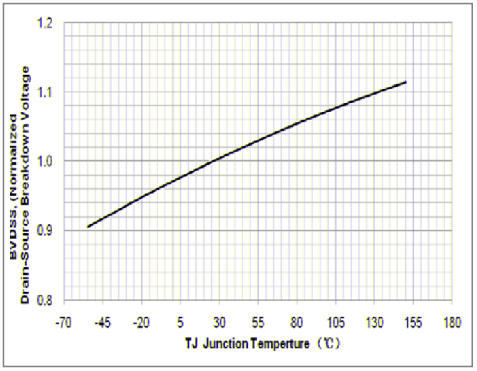


Fig. 6. On resistance variation vs. junction temperature

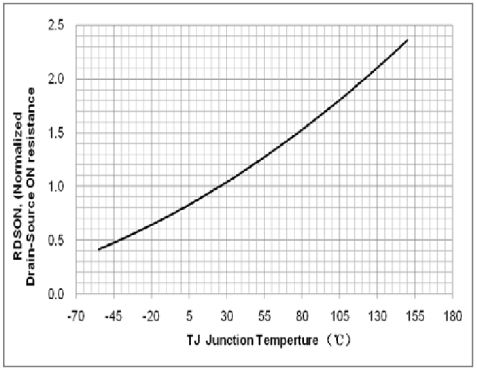


Fig. 7. Maximum safe operating area

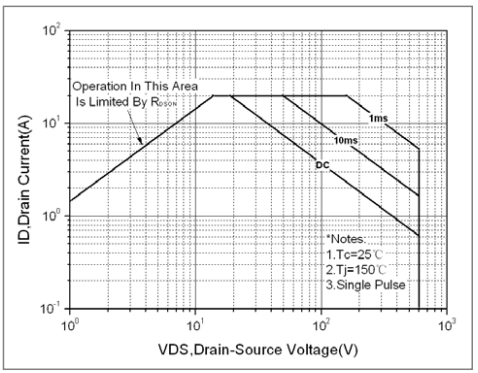


Fig. 8. Transient thermal response curve

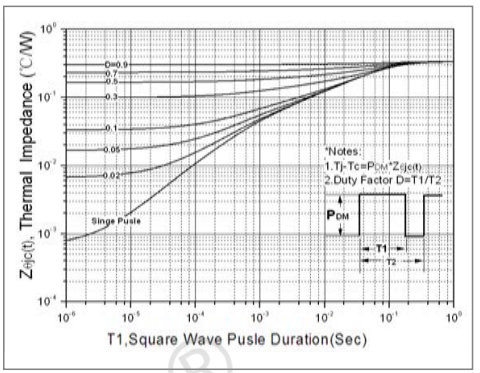


Fig. 9. Capacitance Characteristics

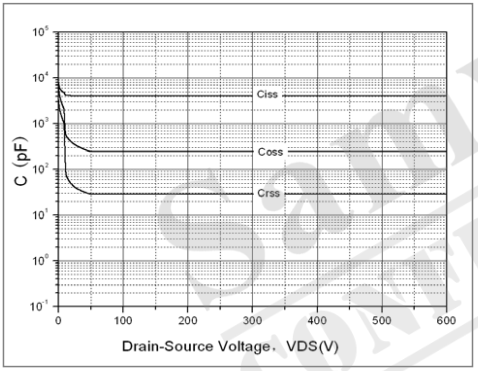
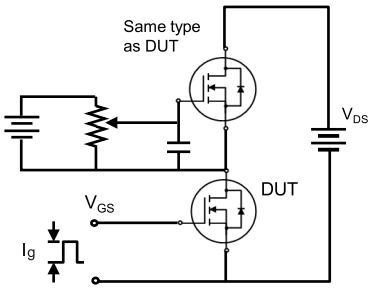


Fig. 10. Gate charge test circuit & waveform



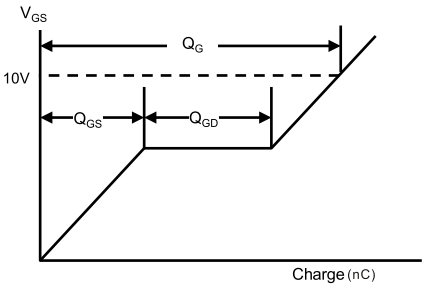


Fig. 11. Switching time test circuit & waveform

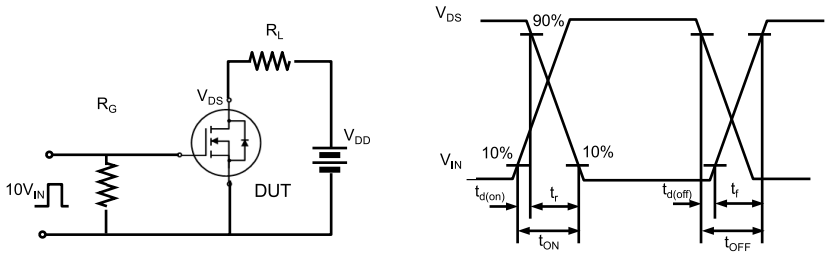


Fig. 12. Unclamped Inductive switching test circuit & waveform

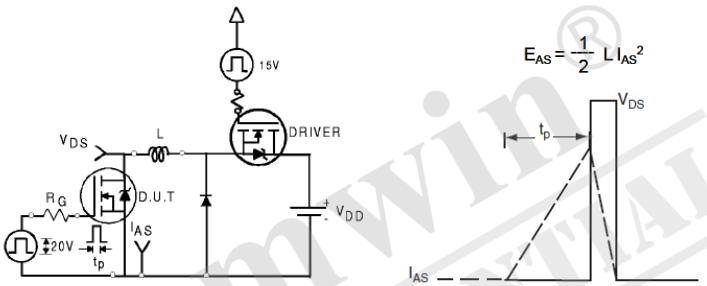
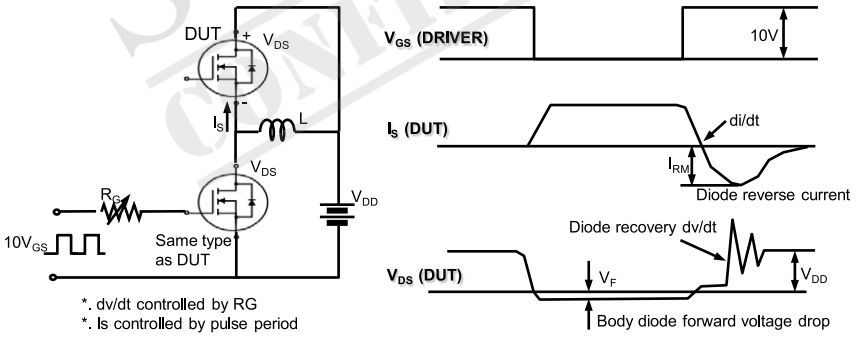


Fig. 13. Peak diode recovery dv/dt test circuit & waveform



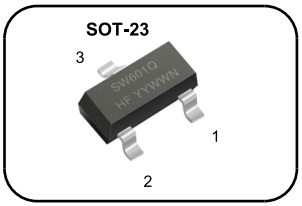
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

N-channel Depletion mode SOT 23 MOSFET

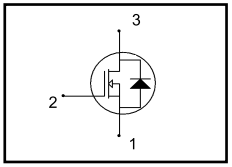
Features

- Low $R_{DS(ON)}$ (Typ 330Ω)@V_{GS}=0V,ID=3mA
- High Switching Speed
- Application:LED,Charger



1. Source 2. Gate 3. Drain

BV_{DSS} : 600V
I_D : 0.185A
$R_{DS(ON)}$: 330Ω



LEAD-FREE RoHS

General Description

The SW601Q is an N-channel power MOSFET using SAMWIN's Advanced technology to provide the customers with high switching speed.

Order Codes

Item	Sales Type	Marking	Package	Packaging
1	SW E 601Q	SW601Q	SOT-23	REEL

Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DSS}	Drain to source voltage (Note 2)	600	V
V_{DGX}	Drain to gate voltage (Note 2)	600	V
I_D	Continuous drain current (@T_C=25°C)	0.185	A
I_{DM}	Drain current pulsed	0.740	A
V_{GSS}	Gate to source voltage	±20	V
P_D	Total power dissipation (@T_C=25°C)	0.5	W
T_J	Junction temperature	+ 150	°C
T_{STG},	Storage temperature	-55 ~ + 150	°C

Thermal characteristics

Symbol	Parameter	Value	Unit
R_{thja}	Thermal resistance, Junction to ambient	250	°C/W

Notes: 1. Absolute maximum ratings are those valuesbeyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.
2. TJ=+25°C~+150°C

Electrical characteristic (T_C = 25°C unless otherwise specified)

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
Off characteristics						
BV_{DSS}	Drain to source breakdown voltage	V_{GS}=-5V, I_D=250uA	600			V
$I_{D(OFF)}$	Drain to source leakage current	V_{DS}=600V, V_{GS}=-5V			0.1	uA
I_{GSS}	Gate to source leakage current, forward	V_{GS}=20V, V_{DS}=0V			100	nA
	Gate to source leakage current, reverse	V_{GS}=-20V, V_{DS}=0V			-100	nA
On characteristics						
$V_{GS(OFF)}$	Gate to Source Cut Off Voltage	V_{DS}=3V, I_D=8uA	-2.7		-1.5	V
I_{DSS}	Drain to source leakage current	V_{DS}=25V, V_{GS}=0V	7			mA
$R_{DS(ON)}$	Drain to source on state resistance	V_{GS}=0V, I_D = 3mA		330	700	Ω
Dynamic characteristics						
C_{iss}	Input capacitance	V_{GS}=0V, V_{DS}=25V, f=1MHz		15		pF
C_{oss}	Output capacitance			145		
C_{rss}	Reverse transfer capacitance			4		
$t_{d(on)}$	Turn on delay time	V_{GS}=-5~5V, V_{DD}=30V, I_D=5mA, V_{GS}=10V R_G=20Ω		40		ns
t_r	Rising time			20		
$t_{d(off)}$	Turn off delay time			45		
t_f	Fall time			280		
Q_g	Total gate charge	V_{GS}=-5~5V, V_{DD}=30V, I_D=5mA		1300		nC
Q_{gs}	Gate-source charge			300		
Q_{gd}	Gate-drain charge			45		

Source to drain diode ratings characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
V_{SD}	Diode forward voltage drop.	I_{SD}=3mA, V_{GS}=-10V			1.4	V

Notes: 1. Repetitive rating, pulse width limited by maximum junction temperature.
2. Pulse width≤380μs; duty cycle≤2%.

Fig. 1. On-state characteristics

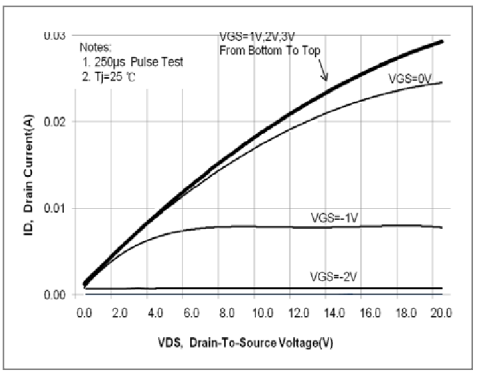


Fig. 2. transfer characteristics

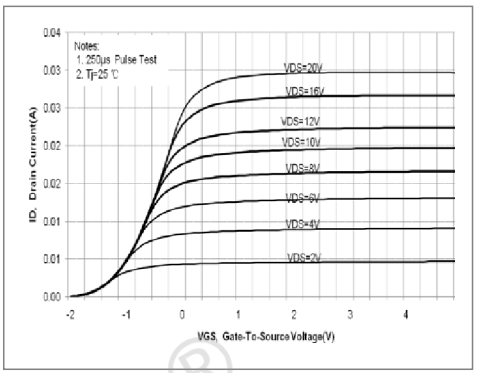


Fig 3. Breakdown Voltage Variation vs. Junction Temperature

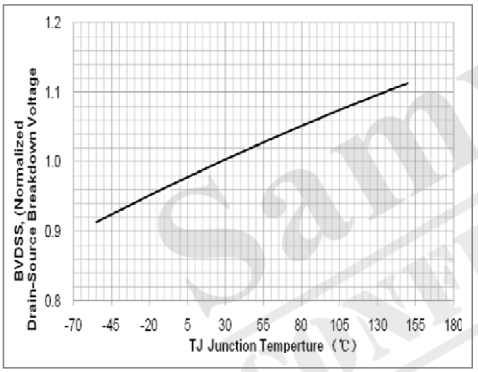


Fig. 4. On resistance variation vs. junction temperature

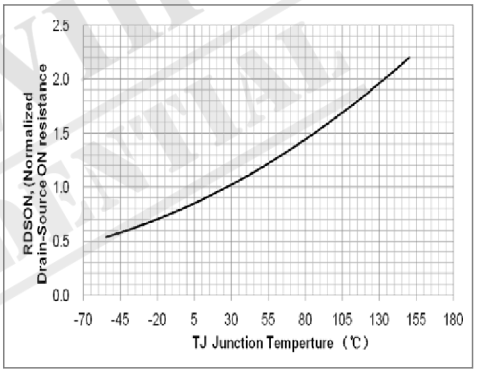
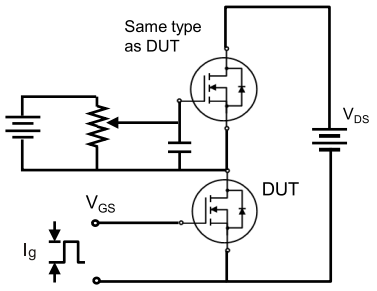


Fig. 5. Gate charge test circuit & waveform



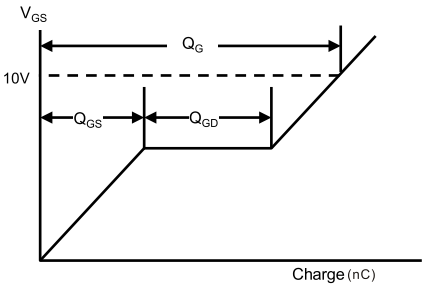


Fig. 6. Switching time test circuit & waveform

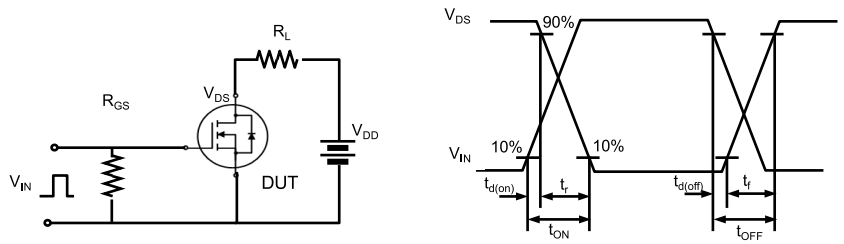
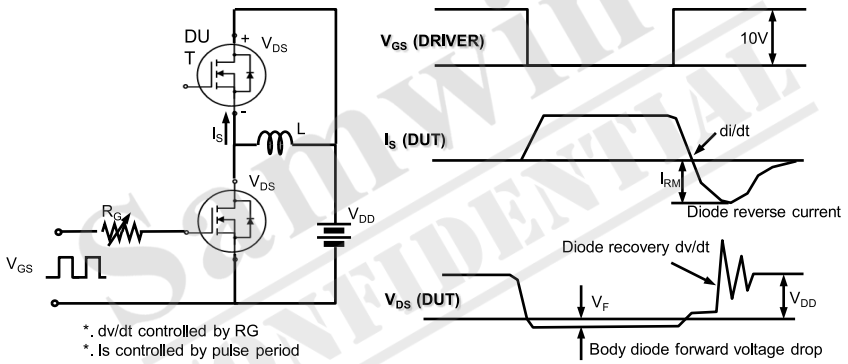


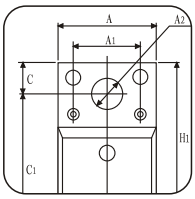
Fig. 7. Peak diode recovery dv/dt test circuit & waveform

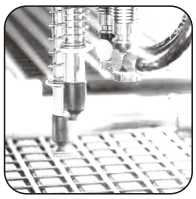


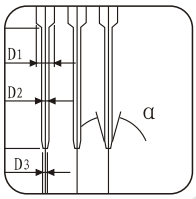
DISCLAIMER

* All the data&curve in this document was tested in XI'AN SEMIPOWER TESTING & APPLICATION CENTER.
* This product has passed the PCT,TC,HTRB,HTGB,HAST,PC and Solderdunk reliability testing.
* Qualification standards can also be found on the Web site (http://www.semipower.com.cn)
* Suggestions for improvement are appreciated, Please send your suggestions to samwin@samwinsemi.com

Samwin® 产品封装

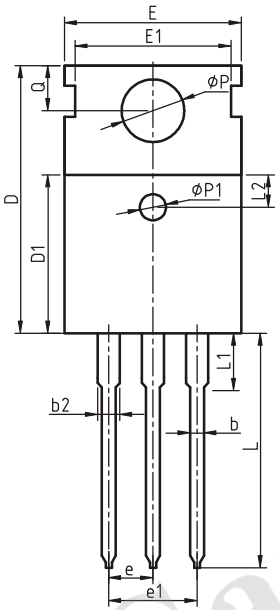


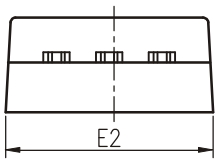


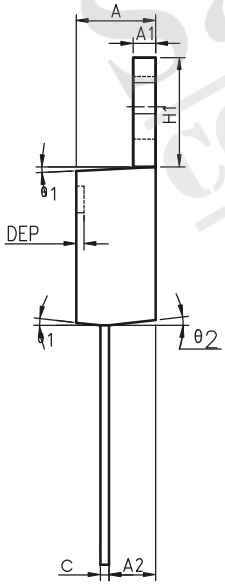


PACKAGING

TO-220



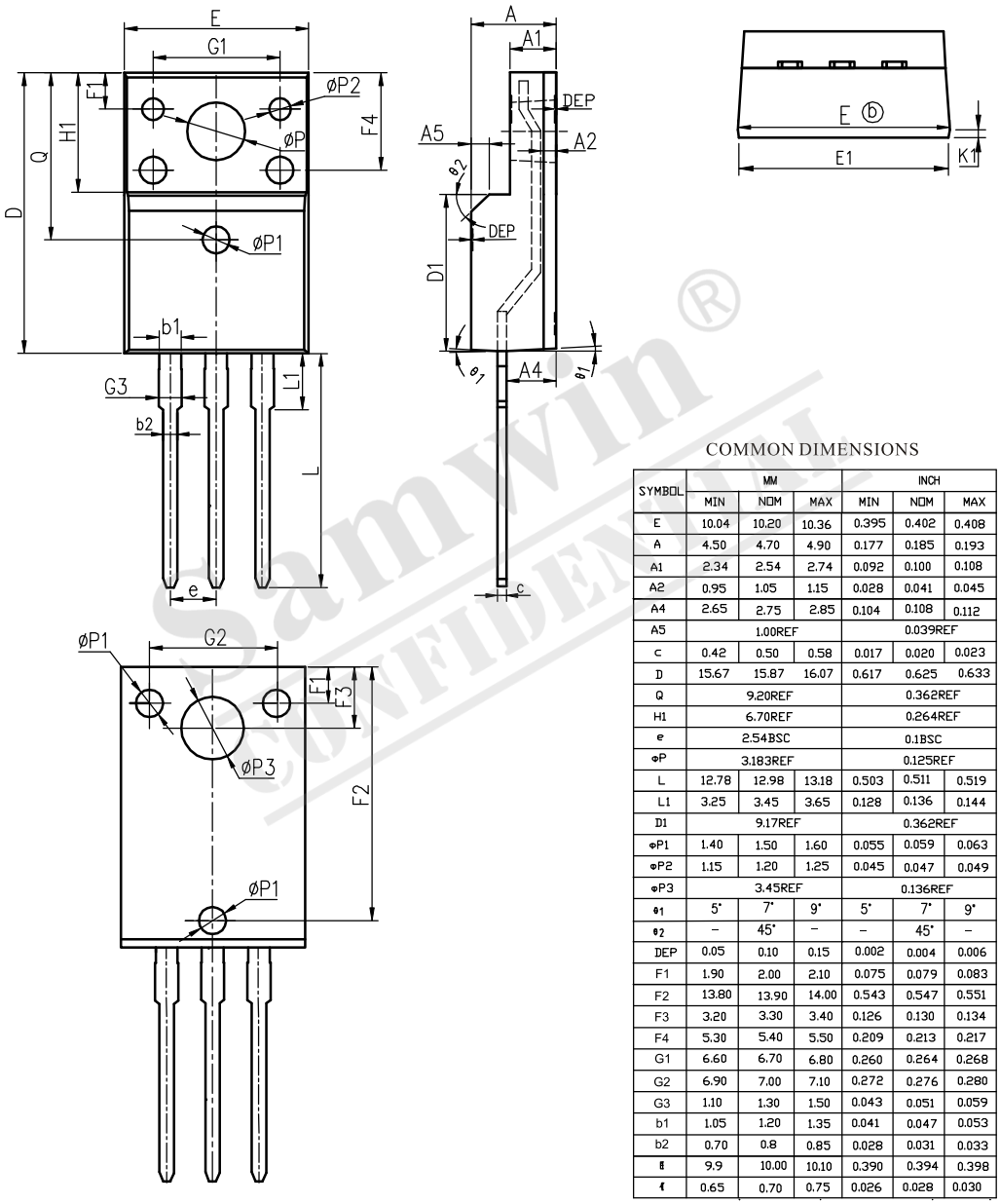




COMMON DIMENSIONS

SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.40	4.57	4.70	0.173	0.180	0.185
A1	1.27	1.30	1.37	0.050	0.051	0.054
A2	2.35	2.40	2.50	0.091	0.094	0.098
b	0.77	0.80	0.90	0.030	0.031	0.035
b2	1.17	1.27	1.36	0.046	0.050	0.054
c	0.48	0.50	0.56	0.019	0.020	0.022
D	15.40	15.60	15.80	0.606	0.614	0.622
D1	9.00	9.10	9.20	0.354	0.358	0.362
DEP	0.05	0.10	0.20	0.002	0.004	0.008
E	9.80	10.00	10.20	0.386	0.394	0.402
E1	–	8.70	–	–	0.343	–
E2	9.80	10.00	10.20	0.386	0.394	0.401
ΦP1	1.40	1.50	1.60	0.055	0.059	0.063
e	2.54BSC			0.1BSC		
e1	5.08BSC			0.2BSC		
H1	6.40	6.50	6.60	0.252	0.256	0.260
L	12.75	13.50	13.65	0.502	0.531	0.537
L1	–	3.10	3.30	–	0.122	0.130
L2	2.50REF			0.098REF		
ΦP	3.50	3.60	3.63	0.137	0.142	0.143
Q	2.73	2.80	2.87	0.107	0.110	0.116
θ1	5°	7°	9°	5°	7°	9°
θ2	1°	3°	5°	1°	3°	5°
θ3	1°	3°	5°	1°	3°	5°

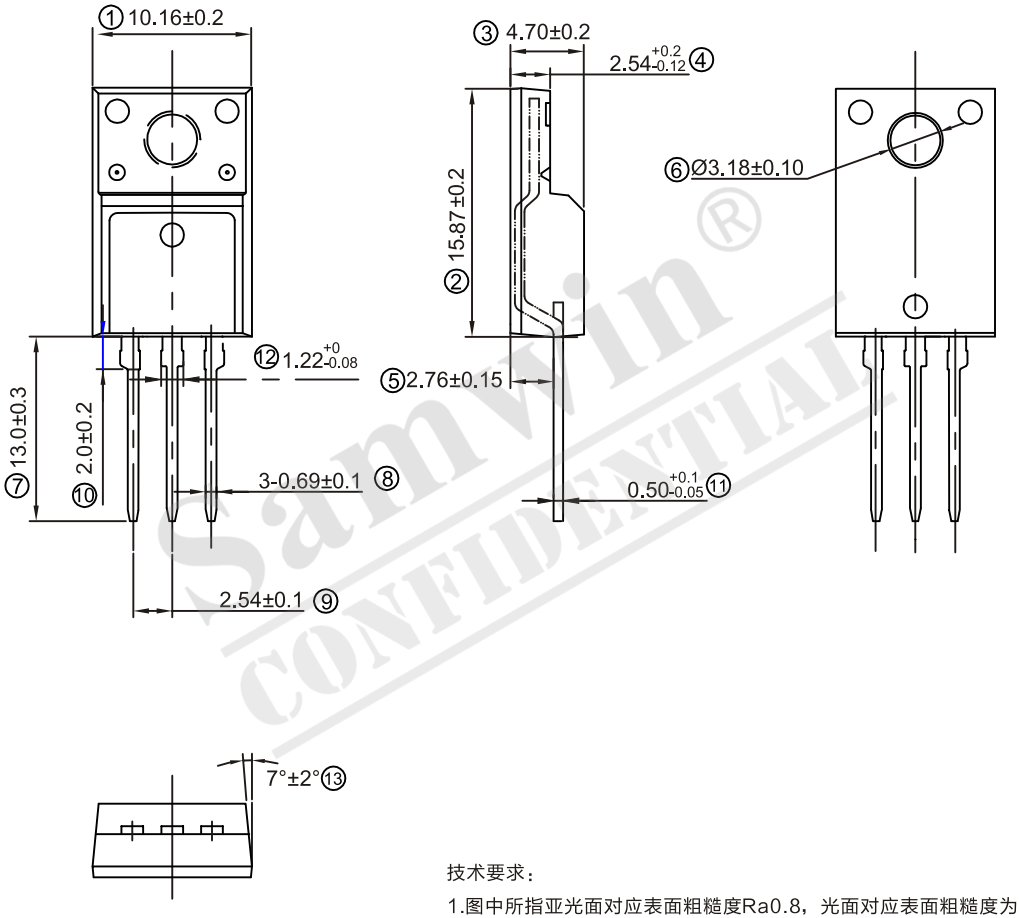
TO-220F



COMMON DIMENSIONS

SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
E	10.04	10.20	10.36	0.395	0.402	0.408
A	4.50	4.70	4.90	0.177	0.185	0.193
A1	2.34	2.54	2.74	0.092	0.100	0.108
A2	0.95	1.05	1.15	0.028	0.041	0.045
A4	2.65	2.75	2.85	0.104	0.108	0.112
A5		1.00REF			0.039REF	
c	0.42	0.50	0.58	0.017	0.020	0.023
D	15.67	15.87	16.07	0.617	0.625	0.633
Q		9.20REF			0.362REF	
H1		6.70REF			0.264REF	
e		2.54BSC			0.1BSC	
ΦP		3.183REF			0.125REF	
L	12.78	12.98	13.18	0.503	0.511	0.519
L1	3.25	3.45	3.65	0.128	0.136	0.144
D1		9.17REF			0.362REF	
ΦP1	1.40	1.50	1.60	0.055	0.059	0.063
ΦP2	1.15	1.20	1.25	0.045	0.047	0.049
ΦP3		3.45REF			0.136REF	
θ1	5°	7°	9°	5°	7°	9°
θ2	–	45°	–	–	45°	–
DEP	0.05	0.10	0.15	0.002	0.004	0.006
F1	1.90	2.00	2.10	0.075	0.079	0.083
F2	13.80	13.90	14.00	0.543	0.547	0.551
F3	3.20	3.30	3.40	0.126	0.130	0.134
F4	5.30	5.40	5.50	0.209	0.213	0.217
G1	6.60	6.70	6.80	0.260	0.264	0.268
G2	6.90	7.00	7.10	0.272	0.276	0.280
G3	1.10	1.30	1.50	0.043	0.051	0.059
b1	1.05	1.20	1.35	0.041	0.047	0.053
b2	0.70	0.8	0.85	0.028	0.031	0.033
E1	9.9	10.00	10.10	0.390	0.394	0.398
e	0.65	0.70	0.75	0.026	0.028	0.030

TO-220FT



技术要求：

1.图中所指亚光面对应表面粗糙度Ra0.8，光面对应表面粗糙度为Ra0.2

2.上、下塑封体错位≤0.1；塑封体中心与引线框架中心错位≤0.1

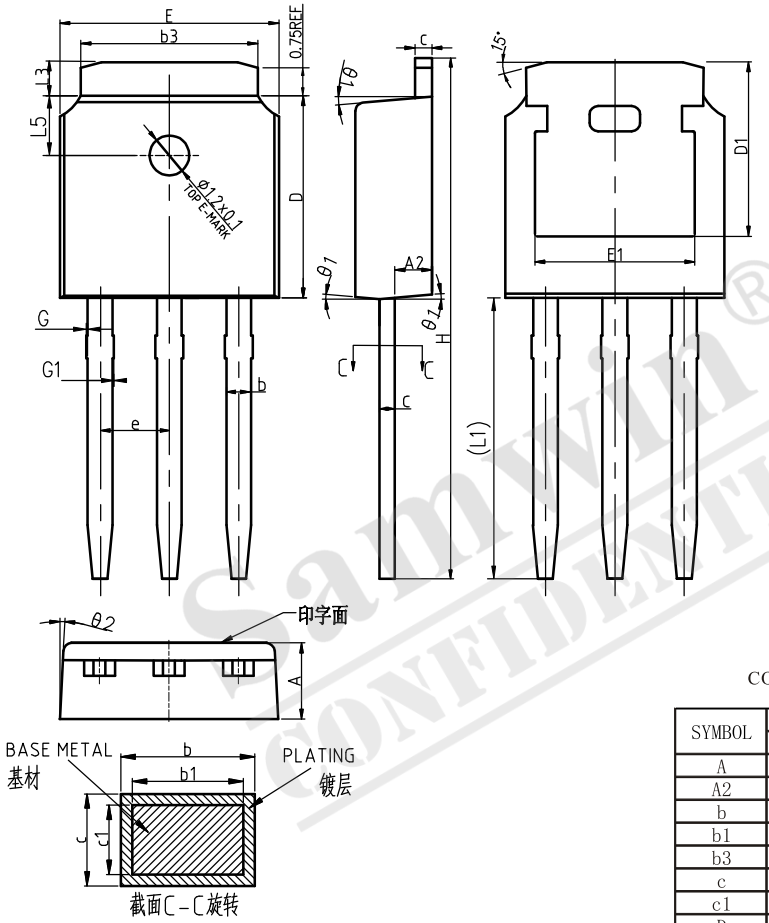
3.塑封体外形未注棱边R0.2

4.顶针孔不允许凸出塑封体表面

5.标注单位mm

6.树脂体不准有缺损，缩孔，裂纹、气泡等有害缺陷

TO-251

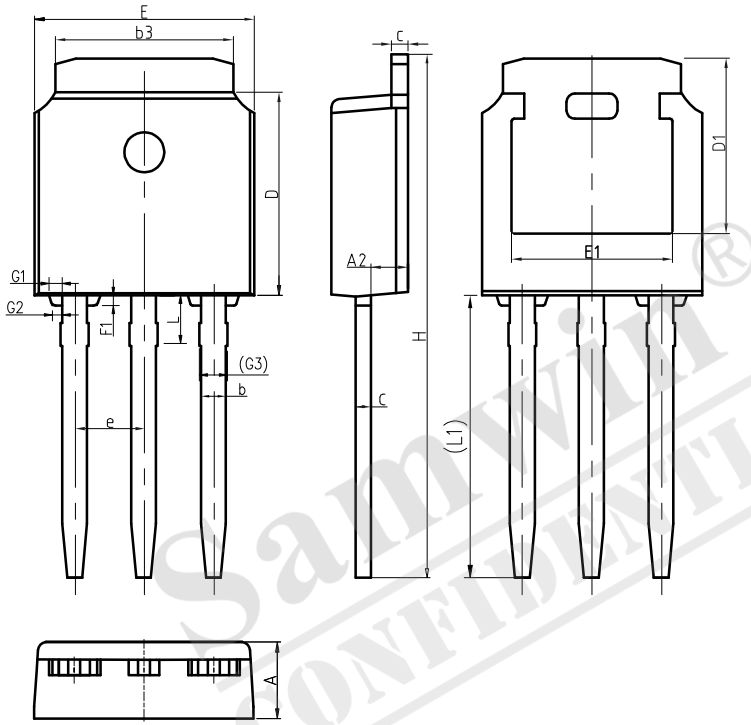


COMMON DIMENSIONS

SYMBOL	MM		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A2	0.97	1.07	1.17
b	0.72	0.78	0.85
b1	0.71	0.76	0.81
b3	5.23	5.33	5.46
c	0.47	0.53	0.58
c1	0.46	0.51	0.56
D	6.00	6.10	6.20
D1		5.30REF	
E	6.50	6.60	6.70
E1	4.70	4.83	4.92
e		2.286BSC	
H	16.10	16.40	16.60
L1	9.20	9.40	9.60
L3	0.90	1.02	1.25
L5	1.70	1.80	1.90
1	5!	7!	9!
2	5!	7!	9!

Notes
All Dimensions refer to jedec standard To-251 AA,
Do not include mold flash or protrusions.

TO-251N

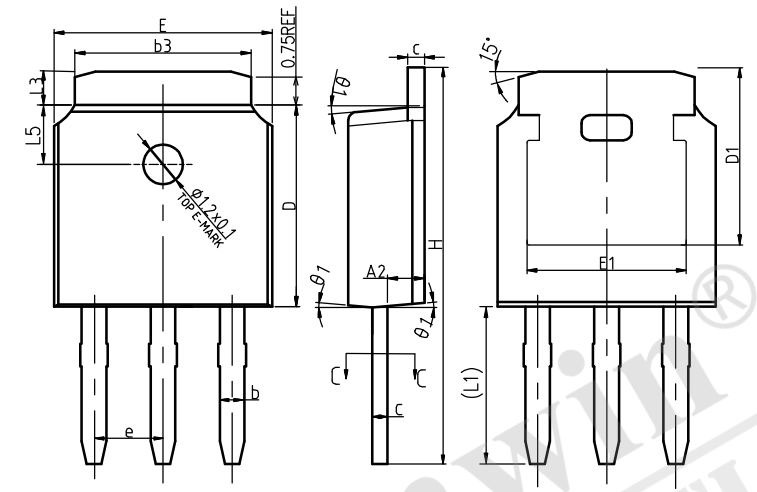


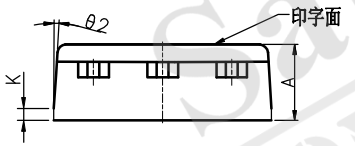
COMMON DIMENSIONS

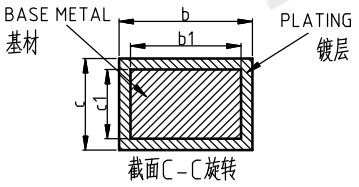
SYMBOL	MM		
	MIN	NOM	MAX
A	2.20	2.30	2.4
A2	0.97	1.07	1.17
b	0.58	0.68	0.80
b3	5.20	5.33	5.50
c	0.43	0.53	0.63
D	5.98	6.10	6.22
D1	5.30REF		
E	6.40	6.60	6.80
E1	4.63	–	–
e	2.286BSC		
F1	0.23	0.30	0.37
G1	0.33	0.40	0.47
G2	0.23	0.30	0.37
G3	0.60	0.74	0.88
H	16.22	16.52	16.82
L	1.15	1.35	1.55
L1	9.15	9.40	9.65

Notes
All Dimensions refer to jedec standard To-251 AA,
Do not include mold flash or protrusions.

TO-251S



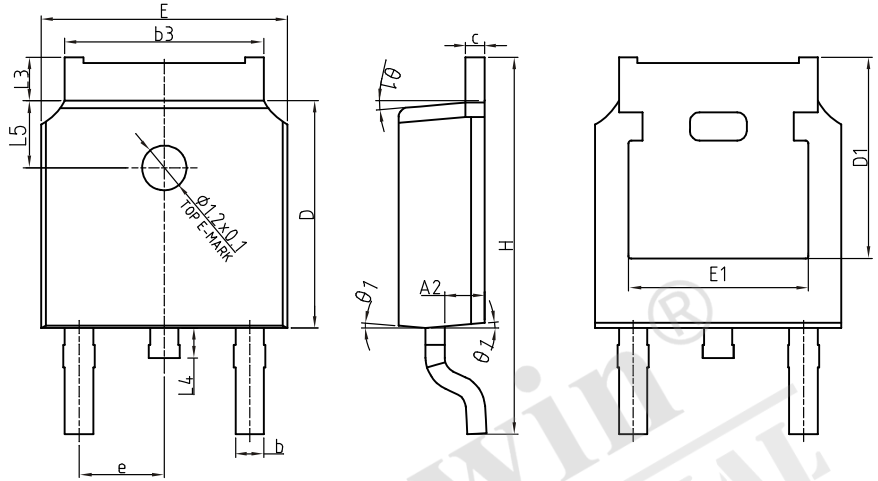


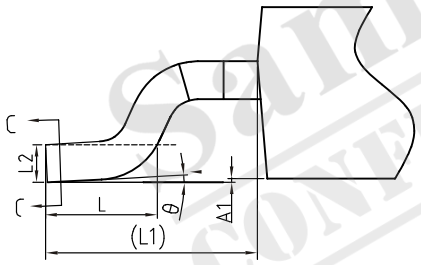


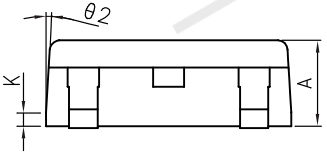
COMMON DIMENSIONS

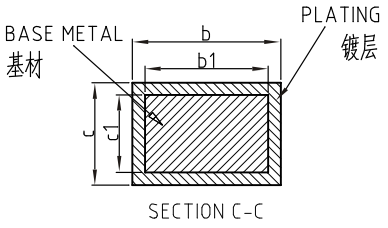
SYMBOL	MM		
	MIN	NOM	MAX
A	2.20	2.30	2.40
A2	0.97	1.07	1.17
b	0.68	0.78	0.90
b1	0.66	0.76	0.88
b3	5.20	5.33	5.50
c	0.43	0.53	0.63
c1	0.41	0.51	0.61
D	5.98	6.10	6.22
D1		5.30REF	
E	6.40	6.60	6.80
E1	4.63	–	–
e		2.286BSC	
H	10.00	11.22	11.44
L1	3.90	4.10	4.30
L3	0.88	1.02	1.28
L5	1.65	1.80	1.95
θ1	5°	7°	9°
θ2	5°	7°	9°
K		0.40REF	

TO-252







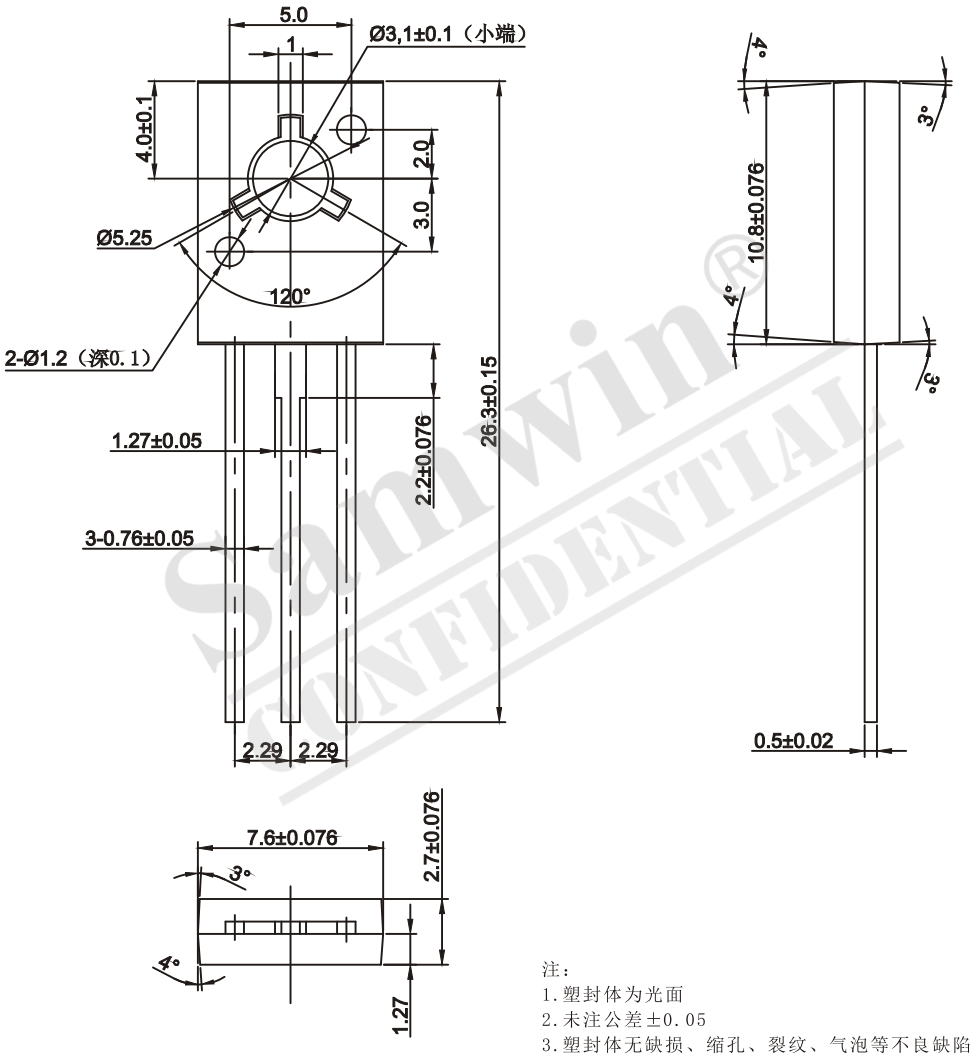


COMMON DIMENSIONS

BOL SYM	mm		
	MIN	NOM	MAX
A	2.20	2.30	2.38
A1	0.00	–	0.10
A2	0.97	1.07	1.17
b	0.72	0.78	0.85
b1	0.71	0.76	0.81
b3	5.23	5.33	5.46
c	0.47	0.53	0.58
c1	0.46	0.51	0.56
D	6.00	6.10	6.20
D1		5.30REF	
E	6.50	6.60	6.70
E1	4.70	4.83	4.92
e		2.286 BSC	
H	9.90	10.10	10.30
L	1.40	1.50	1.70
L1		2.90REF	
L2		0.51BSC	
L3	0.90	–	1.25
L4	0.60	0.80	1.00
L5	1.70	1.80	1.90
		–	
K		0.40REF	

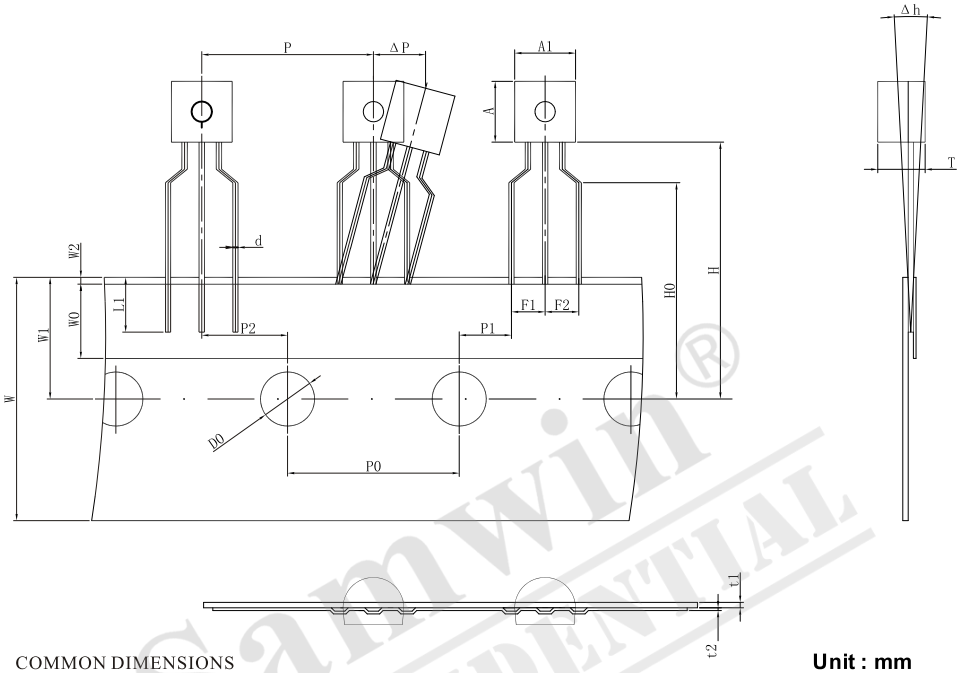
Notes
All Dimensions refer to jedec standard TO-252 AA,
Do not include mold flash or protrusions.

TO-126



注：
1.塑封体为光面
2.未注公差±0.05
3.塑封体无缺损、缩孔、裂纹、气泡等不良缺陷

TO-92

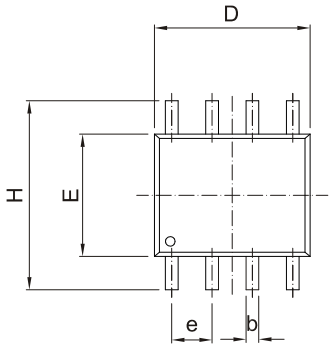


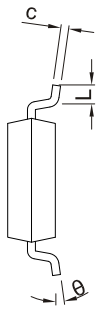
COMMON DIMENSIONS

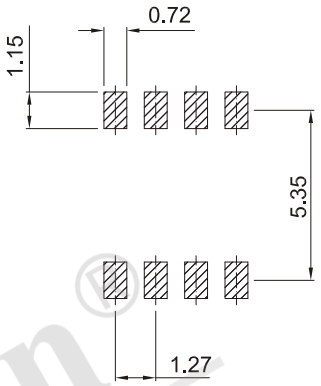
Unit : mm

Item	Symbol	Value & Tolerance
Body width	A1	4.5 ± 0.2
Body height	A	4.5 ± 0.2
Body thickness	T	3.5 ± 0.2
Lead wire diameter	d	0.46 ± 0.05
Pitch of component	P	12.7 ± 0.3
Feed hole pitch	P0	12.7 ± 0.2
Hole center to component center	P2	6.35 ± 0.3
Lead to lead distance	F1,F2	2.5 ± 0.3
Component alignment, F-R	△h	0 ± 1.0
Type width	W	18.0 + 1.0, - 0.5
Hole down tape width	W0	6.0 ± 0.5
Hole position	W1	9.0 ± 0.5
Hole down tape position	W2	1.0 MAX.
Height of component from tape center	H	19.0 ± 1.0
Lead wire clinch height	H0	16.0 ± 0.5
Lead wire(tape portion)	L1	2.5 MIN.
Feed hole diameter	D0	4.0 ± 0.2
Taped Lead Thickness	t1	0.4 ± 0.05
Carrier Tape Thickness	t2	0.2 ± 0.05
Position of hole	P1	3.85 ± 0.3
Component alignment	△P	0 ± 1.0

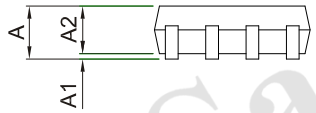
SOP−8







Recommended Land Pattern



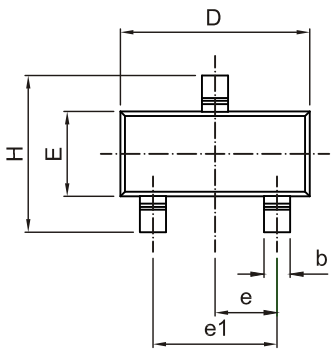
COMMON DIMENSIONS

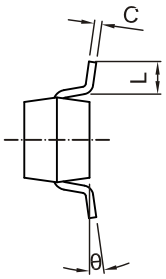
Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	—	1.75	—	0.069
A1	0.00	0.26	0.000	0.010
A2	1.30	1.70	0.051	0.067
b	0.30	0.55	0.012	0.022
C	0.15	0.35	0.006	0.014
D	4.80	5.00	0.189	0.197
E	3.80	4.00	0.150	0.157
e	1.27 TYP		0.050 TYP	
H	5.70	6.30	0.224	0.248
L	0.45	0.85	0.018	0.033
θ	0°	8°	0°	8°

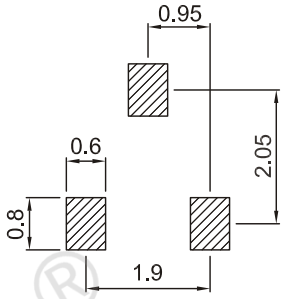
1.Refer to JEDEC NO.MS012 AA

2.Coplanarity: 0.10mm max

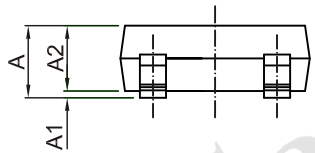
SOT−23−3







Recommended Land Pattern

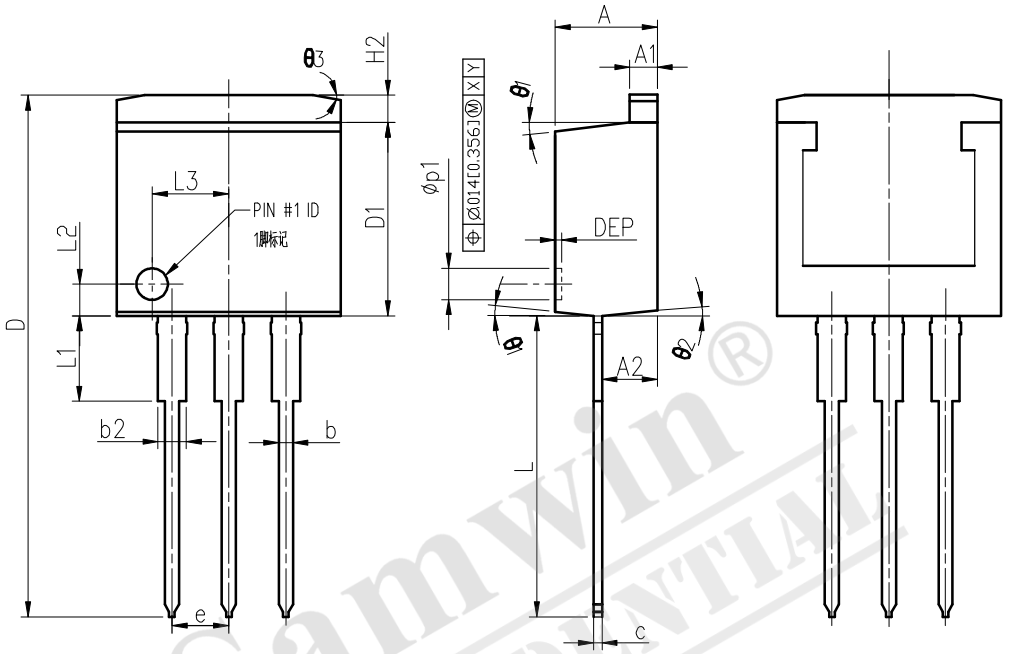


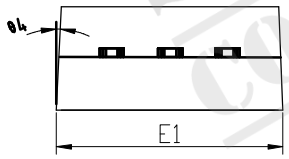
Symbol	Dimensions in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	0.90	1.15	0.035	0.045
A1	0.00	0.10	0.000	0.004
A2	0.90	1.05	0.035	0.041
b	0.30	0.55	0.012	0.022
C	0.08	0.15	0.003	0.006
D	2.80	3.00	0.110	0.118
E	1.20	1.40	0.047	0.055
e	0.95 TYP		0.037 TYP	
e1	1.80	2.00	0.071	0.079
H	2.25	2.55	0.089	0.100
L	0.30	0.50	0.012	0.020
θ	0°	8°	0°	8°

1.Refer to JEDEC NO.MS012 AA

2.Coplanarity: 0.10mm max

TO-262



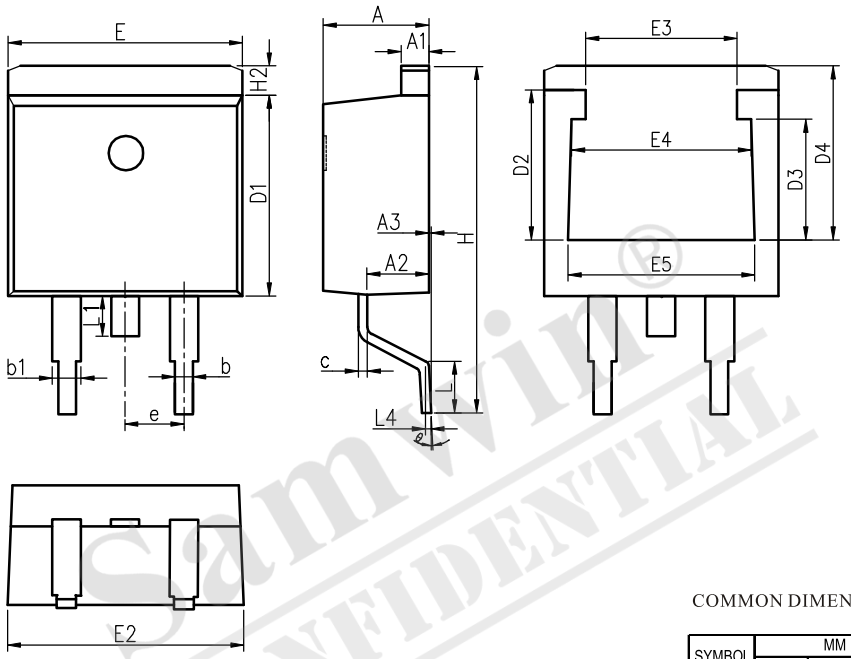


Notes:
All Dimensions do not include mold flash or protrusions.

COMMON DIMENSIONS

SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.45	4.57	4.70	0.175	0.180	0.185
A1	1.22	1.27	1.32	0.048	0.050	0.052
A2	2.29	2.67	2.92	0.090	0.105	0.115
b	0.71	0.813	0.97	0.028	0.032	0.038
b2	1.22	1.270	1.40	0.048	0.050	0.055
c	0.38	0.381	0.76	0.015	0.015	0.030
D	23.20	23.61	24.02	0.913	0.930	0.946
D1	8.38	8.70	8.89	0.330	0.343	0.350
E1	10.03	10.16	10.54	0.395	0.400	0.415
e		2.54 BSC			0.100 BSC	
H2	-	-	1.31	-	-	0.052
L	13.34	13.73	14.10	0.525	0.541	0.555
L1	3.30	3.56	4.06	0.130	0.140	0.160
L2		1.49 REF			0.059 REF	
L3		3.40 REF			0.134 REF	
ΦP1	1.07	1.20	1.32	0.042	0.047	0.052
θ1	-	7°	-	-	7°	-
θ2	-	3°	-	-	3°	-
θ3	-	-	12°	-	-	12°
θ4	-	-	3°	-	-	3°
DEP	0.10	0.18	0.25	0.004	0.007	0.010

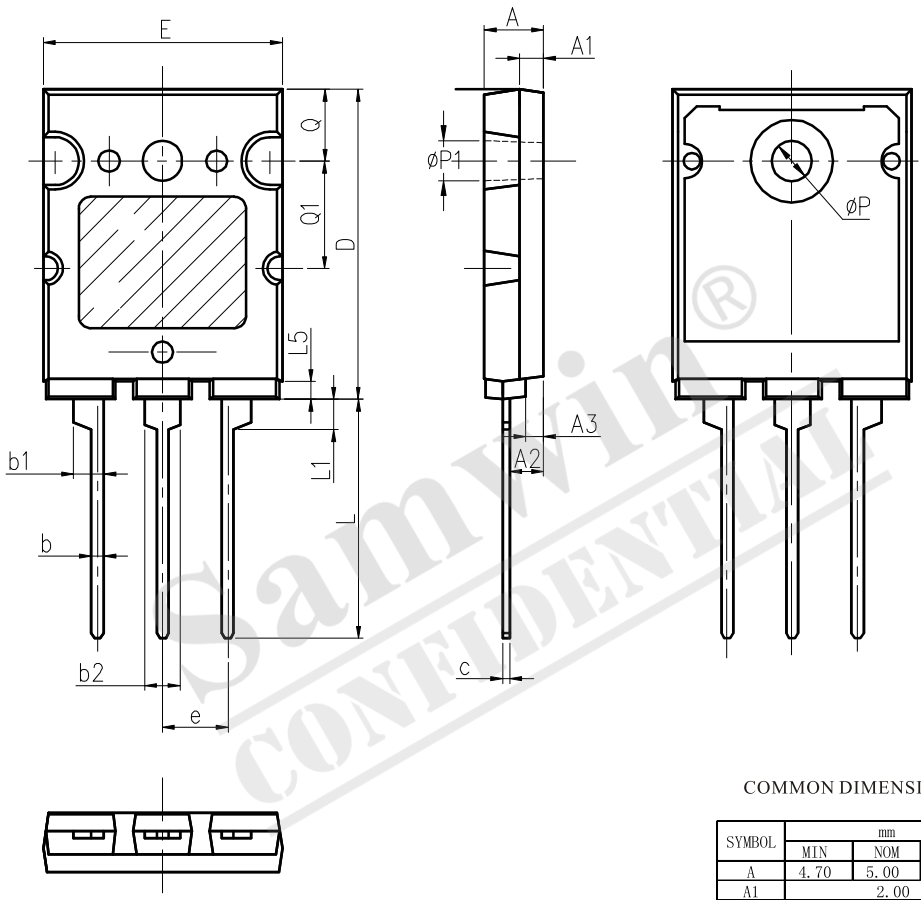
TO-263-2L



COMMON DIMENSIONS

SYMBOL	MM		
	MIN	NOM	MAX
A	4.27	4.57	4.87
A1	1.22	1.27	1.42
A2	2.39	2.69	2.99
A3	0.00	0.13	0.20
b	0.70	0.81	1.01
b1	1.17	1.27	1.50
c	0.30	0.38	0.53
D1	8.40	8.70	9.00
D2	5.33	6.33	6.63
D3	4.54	5.54	5.84
D4	6.60	7.60	8.00
E	9.88	10.16	10.50
E2	9.80	10.10	10.40
E3	4.94	5.94	6.24
E4	6.67	7.67	7.97
E5	7.06	8.06	8.36
e		2.54 BSC	
H	14.70	15.10	15.50
H2	1.00	1.27	1.50
L	2.00	2.30	2.60
L1	1.35	1.55	1.75
L4		0.25 BSC	
θ	0°	5°	9°

TO-264

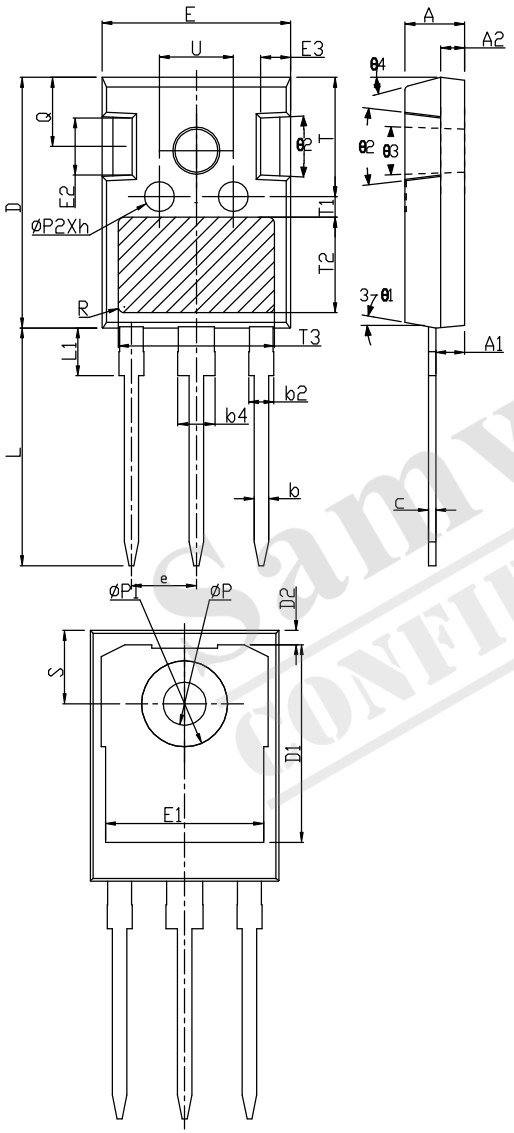


COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.70	5.00	5.30
A1		2.00 REF	
A2	2.50	2.80	3.10
A3		1.50 REF	
b	0.90	1.00	1.25
b1	2.30	2.50	2.75
b2	2.80	3.00	3.30
c	0.50	0.60	0.85
D	25.50	26.00	26.50
E	19.50	20.00	20.50
e		5.45 TYP	
L	19.50	20.00	20.50
L1	2.30	2.50	2.70
L5		1.35 REF	
P	2.95	3.20	3.45
P1	3.15	3.40	3.65
Q	5.75	6.00	6.25
Q1	8.70	9.00	9.30

Notes
All Dimensions refer to jedec standard TO-264,
Do not include mold flash or protrusions.

TO-247B

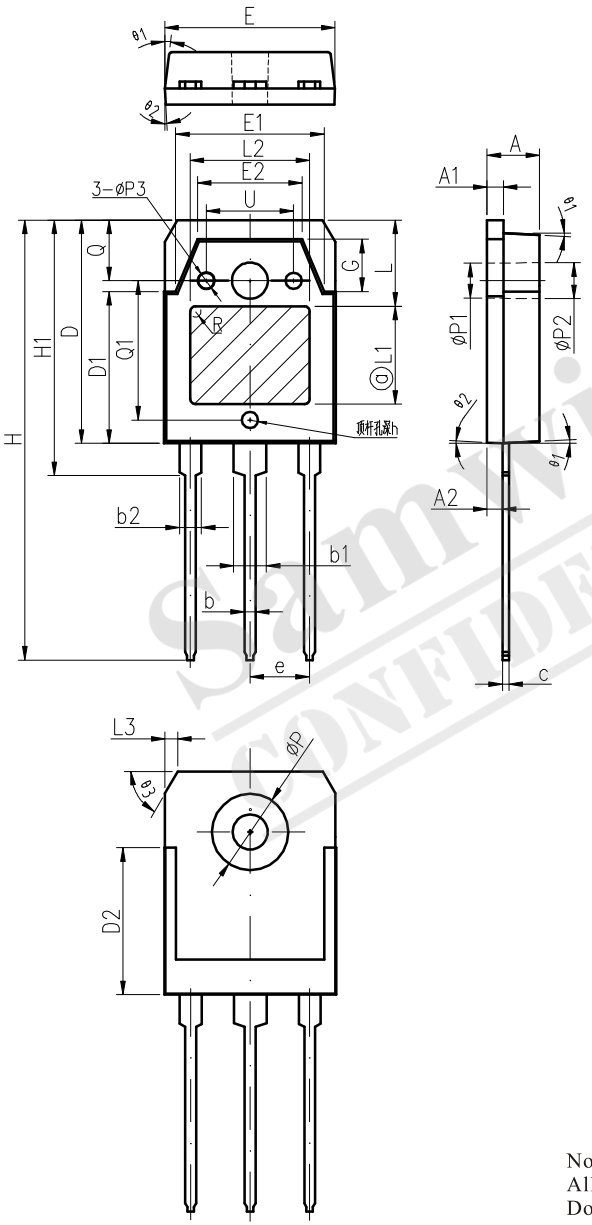


Notes
All Dimensions refer to jedec standard TO-247 AD,
Do not include mold flash or protrusions.

COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.75	5.00	5.25
A1	2.16	2.41	2.66
A2	1.85	2.00	2.15
b	1.11	1.21	1.35
b2	1.90	2.01	2.25
b4	2.90	3.01	3.25
c	0.51	0.61	0.75
D	20.60	21.00	21.40
D1	16.15	16.55	16.95
D2	1.00	1.20	1.40
E	15.50	15.80	16.10
E1	13.00	13.30	13.60
E2	4.70	5.00	5.30
E3	2.25	2.50	2.75
e	5.44BSC		
h	0.00	0.10	0.25
L	19.52	19.92	20.32
L1	–	–	4.30
P	3.35	3.60	3.85
P1	–	–	7.30
P2	2.25	2.50	2.75
Q	5.50	5.80	6.10
S	6.15BSC		
R	0.50REF		
T	9.70	–	10.30
T1	1.65REF		
T2	8.00REF		
T3	12.80REF		
U	5.90	–	6.50
θ1	4°	7°	10°
θ2	2°	5°	8°
θ3	1°	–	2°
θ4	10°	15°	20°

TO-3P

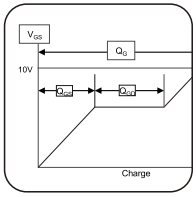


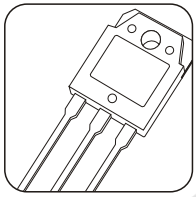
COMMON DIMENSIONS

SYMBOL	mm		
	MIN	NOM	MAX
A	4.60	4.80	5.00
A1	1.40	1.50	1.60
A2	1.33	1.38	1.43
b	0.80	1.00	1.20
b1	2.80	3.00	3.20
b2	1.80	2.00	2.20
c	0.50	0.60	0.70
D	19.75	19.90	20.05
D1	13.70	13.90	14.10
D2	12.90 REF		
E	15.40	15.60	15.80
E1	13.40	13.60	13.80
E2	9.40	9.60	9.80
e	5.45 TYP		
G	4.60	4.80	5.00
H	40.30	40.50	40.70
H1	23.20	23.40	23.60
h	0.05	0.10	0.15
L	7.40 TYP		
L1	9.00 TYP		
L2	11.00 TYP		
L3	1.00 REF		
P	6.90	7.00	7.10
P1	3.20 REF		
P2	3.50 REF		
P3	1.40	1.50	1.60
R	0.50 REF		
Q	5.00 REF		
Q1	12.56	12.76	12.96
U	7.8	8	8.2
θ1	5°	7°	9°
θ2	1°	3°	5°
θ3	60° REF		

Notes
All Dimensions refer to jedec standard TO-3P,
Do not include mold flash or protrusions.

Samwin® 产品选型指南





PRODUCT SELECTION GUIDE

Samwin® MOSFET 选型指南（低压部分 .01.）：

Part Number	Package	Product status	Channel Type	PD [max] (W)	ID [max] (A)	BVDSS [min] (V)	RDSon [max] @ VGS = 10 V (Ohm)	VGSth [min] (V)	VGSth [max] (V)	Qgd[Typ] (nC)	Qg [Typ] (nC)	Ciss [max] (pF)	Coss [max] (pF)
SW5003	TO-220	Preliminary	N	–	50	30	0.011	1	3	4.5	23	2000	280
SW75N03	TO-220	Production	N	75	75	30	0.007	1	3	27	48	3298	1400
SW100N03	TO-220	Production	N	113	100	30	0.0053	1	3	195	69	9500	800
SW100N03	TO-251	Production	N	96	100	30	0.0053	1	3	195	69	9500	800
SW100N03	TO-252	Production	N	83	100	30	0.0053	1	3	195	69	9500	800
SW100N03	TO-263	Production	N	96	100	30	0.0053	1	3	195	69	9500	800
SW120N03	TO-220	Preliminary	N	–	120	30	0.004	1	3	10	48	3550	1350
SW210N03	TO-220	Preliminary	N	–	210	30	0.0025	2	4	98	250	11000	1300
SW120N04M	TO-220	Production	N	138.7	120	40	0.005	1	3	13	57	2945	462
SW180N04B	TO-220	Production	N	336	180	40	0.004	2	4	74	147	6400	1380
SW190N04A	TO-220	Production	N	224	190	40	0.0045	2	4	60	112	4606	1066
SW190N04	TO-220	Preliminary	N	–	190	40	0.0035	2	4	64	163	6500	916
SW200N04	TO-220	Preliminary	N	–	200	40	0.004	2	4	56	170	9000	880
SW210N04	TO-220	Production	N	388.5	210	40	0.0045	2	4	93	256	11450	895
SW210N04A	TO-220	Production	N	497	210	40	0.0036	2	4	82	184	7275	1351
SW210N04M	TO-220	Production	N	295.5	210	40	0.002	2	4	45	153	7950	1190
SW210N04	TO-220	Preliminary	N	–	210	40	0.0032	2	4	98	250	11000	1300
SW230N04B	TO-220	Production	N	288.7	230	40	0.004	2	4	96	190	7830	1790
SW4955	TO-220	Preliminary	N	–	49	55	0.015	2	4	16	50	2350	237
SW3205	TO-220	Production	N	250	110	55	0.012	2	4	25	65	4250	1650
SW110N55	TO-220	Preliminary	N	–	110	55	0.006	2	4	49	125	4900	470
SW120N55	TO-220	Preliminary	N	–	120	55	0.0055	2	4	49	125	4900	470
SW2N7002	SOT-23	Production	N	0.35	0.3	60	2	1	2.5		1.7	36	18
SW6016	SOP-8	Production	N	2.3	8	60	0.012	1.2	2.5	22	69	2667	235
SW15N06	TO-220	Production	N	72.8	15	60	0.09	2	4	9	14	346	196
SW15N06L	TO-252	Production	N	72.7	15	60	0.065	1	2.5	14	1.5	312	192
SW30N06	TO-220	Production	N	250	30	60	0.036	2	4	15	25	760	280
SW30N06	TO-251	Production	N	186	30	60	0.036	2	4	15	25	760	280
SW30N06	TO-252	Production	N	104	30	60	0.036	2	4	15	25	760	280
SW30N06U	TO-251	Production	N	103.5	30	60	0.04	2	4	13	27	1000	280
SW50N06	TO-220	Production	N	215	50	60	0.023	2	4	11	31	1220	550
SW50N06	TO-220F	Production	N	42	50	60	0.023	2	4	11	31	1220	550
SW50N06A	TO-251	Production	N	108	50	60	0.023	2	4	11	31	1220	550
SW50N06A	TO-252	Production	N	108	50	60	0.023	2	4	11	31	1220	550
SW50N06A	TO-220	Production	N	215	50	60	0.023	2	4	11	31	1220	550
SW50N06A	TO-220F	Production	N	42	50	60	0.023	2	4	11	31	1220	550
SW50N06D	TO-220	Production	N	95	50	60	0.013	2	4	17	31	1500	244
SW50N06U	TO-251	Production	N	195.3	50	60	0.023	2	4	15	32.5	1220	550
SW50N06U	TO-252	Production	N	195.3	50	60	0.023	2	4	15	32.5	1220	550
SW50N06C	TO-220	Production	N	165	50	60	0.023	2	4	20	40	1330	364
SW50N06C	TO-220F	Production	N	38.7	50	60	0.023	2	4	20	40	1330	364

Samwin® MOSFET 选型指南（低压部分 .02.）：

Part Number	Package	Product status	Channel Type	PD [max] (W)	ID [max] (A)	BVDSS [min] (V)	RDSon [max] @ VGS = 10 V (Ohm)	VGSth [min] (V)	VGSth [max] (V)	Qgd[Typ] (nC)	Qg [Typ] (nC)	Ciss [max] (pF)	Coss [max] (pF)
SW50N06T	TO-252	Production	N	87.4	50	60	0.0168	2	4	19	41	2178	195
SW50N06T	TO-220	Production	N	114.7	50	60	0.0168	2	4	19	41	2178	195
SW60N06T	TO-220	Production	N	141	60	60	0.008	2	4	35	77	3960	335
SW60N06V	TO-251S	Production	N	85.8	60	60	0.012	1	2	14	31	1170	237
SW60N06V	TO-252	Production	N	84	60	60	0.012	1	2	14	31	1170	237
SW60N06V	TO-220	Production	N	113.6	60	60	0.012	1	2	14	31	1170	237
SW75N06	TO-220	Preliminary	N	–	75	60	0.0115	2	4	16	50	2350	237
SW7506	TO-220	Preliminary	N	–	75	60	0.0115	2	4	16	50	2350	237
SW100N06	TO-220	Preliminary	N	–	100	60	0.0065	2	4	28	85	4800	440
SW3205N	TO-220	Production	N	170	110	60	0.0105	2	4	33	66	2919	554
SW150N06A	TO-220	Production	N	251.8	150	60	0.006	2	4	62	115	4652	813
SW180N06A	TO-220	Production	N	321.1	180	60	0.005	2	4	69	133	5929	1002
SW210N06	TO-220	Preliminary	N	–	210	60	0.004	2	4	98	250	11000	1120
SW75N07	TO-220	Preliminary	N	–	75	70	0.012	2	4	16	50	2350	237
SW80N07	TO-220	Production	N	150	80	70	0.0082	2	4	33	78	3940	341
SW80N07	TO-220	Preliminary	N	–	80	70	0.008	2	4	24	94	3400	310
SW90N71	TO-220	Preliminary	N	–	90	71	0.0068	2	4	28	85	4800	440
SW75N75	TO-220	Production	N	312	75	75	0.008	2	4	47	126	1260	135
SW75N75A	TO-220	Production	N	142.2	75	75	0.00918	2	4	47	99	4780	390
SW78N75	TO-220	Preliminary	N	–	78	75	0.0085	2	4	24	94	3400	290
SW80N75	TO-220	Preliminary	N	–	80	75	0.008	2	4	30	100	4400	340
SW80N75D	TO-263	Preliminary	N	–	80	75	0.008	2	4	30	100	4400	340
SW80N75T	TO-247	Preliminary	N	–	80	75	0.008	2	4	30	100	4400	340
SW80N75	TO-220	Preliminary	N	–	80	75	0.008	2	4	30	100	4400	340
SW110N75	TO-220	Preliminary	N	–	110	75	0.009	2	4	18	114	4700	440
SW140N75	TO-220	Preliminary	N	–	140	75	0.0055	2	4	40	120	7650	540
SW180N75A	TO-220	Production	N	484.5	180	75	0.0045	2	4	86	178	7527	1075
SW210N75	TO-220	Production	N	357.4	210	75	0.0042	2	4	122	268	11385	902
SW210N75	TO-220	Preliminary	N	–	210	75	0.004	2	4	98	250	11000	914
SW210N75T	TO-247	Preliminary	N	–	210	75	0.004	2	4	98	250	11000	914
SW260N75T	TO-247	Preliminary	N	–	260	75	0.003	2	4	55	160	15700	2410
SW350N75T	TO-247	Preliminary	N	–	350	75	0.0025	2	4	105	380	19000	1650
SW75N08	TO-220	Production	N	227	75	80	0.011	2	4	29	74	4700	480
SW80N08A	TO-220	Production	N	185.6	80	80	0.0092	2	4	42	82	3540	447
SW80N08B	TO-220	Production	N	173.6	80	80	0.0085	2	4	29	72	6620	496
SW98N08	TO-220	Preliminary	N	–	98	80	0.008	2	4	49	125	4900	410
SW105N08D	TO-263	Preliminary	N	–	105	80	0.008	2	4	49	152	4900	410
SW110N08	TO-220	Preliminary	N	–	105	80	0.008	2	4	49	152	4900	410
SW110N08A	TO-220	Production	N	266.3	110	80	0.0072	2	4	52	107	4588	618
SW120N08	TO-220	Preliminary	N	–	120	80	0.006	2	4	64	163	6500	520
SW150N08A	TO-220	Production	N	328	150	80	0.0051	2	4	73	143	5783	838

Samwin® MOSFET 选型指南（低压部分 .03.）：

Part Number	Package	Product status	Channel Type	PD [max] (W)	ID [max] (A)	BVDSS [min] (V)	RDSon [max] @ VGS = 10 V (Ohm)	VGSth [min] (V)	VGSth [max] (V)	Qgd[Typ] (nC)	Qg [Typ] (nC)	Ciss [max] (pF)	Coss [max] (pF)
SW150N85	TO-220	Preliminary	N	–	150	85	0.0048	2	4	60	200	8800	680
SW150N85T	**TO-247**	**Preliminary**	**N**	**–**	**150**	**85**	**0.0048**	**2**	**4**	**60**	**200**	**8800**	**680**
SW210N85	TO-220	Preliminary	N	–	210	85	0.005	2	4	98	250	11000	914
SW210N85T	**TO-247**	**Preliminary**	**N**	**–**	**210**	**85**	**0.005**	**2**	**4**	**98**	**250**	**11000**	**914**
SW2N10	SOT-23	Production	N		2	100	0.24	1	3	3.2	13	550	50
SW3N10	TO-252	Production	N	44	3	100	0.107	1.5	2.5	5	21	1050	65
SW1710	TO-220	Preliminary	N	–	17	100	0.07	2	4	9.4	31	1350	240
SW19N10	TO-220	Production	N	208	19	100	0.12	2	4	6.5	15	780	215
SW19N10	TO-252	Production	N	118	19	100	0.12	2	4	6.5	15	780	215
SW19N10A	TO-252	Production	N	99.6	19	100	0.102	2	4	11	25	1050	185
SW2810D	TO-263	Preliminary	N	–	28	100	0.018	2	4	25	95	3700	630
SW50N10	TO-220	Production	N	165	50	100	0.017	2	4	32	82	4030	243
SW3710	TO-220	Production	N	195	57	100	0.023	2	4	38	85	4250	1650
SW5710	**TO-220**	**Preliminary**	**N**	**–**	**57**	**100**	**0.016**	**2**	**4**	**25**	**95**	**4400**	**320**
SW5710A	TO-220	Preliminary	N	–	57	100	0.017	2	4	24	94	3400	260
SW5710T	**TO-247**	**Preliminary**	**N**	**–**	**57**	**100**	**0.016**	**2**	**4**	**25**	**95**	**4400**	**320**
SW5910	TO-220	Preliminary	N	–	59	100	0.015	2	4	25	95	4900	400
SW7010	**TO-220**	**Preliminary**	**N**	**–**	**70**	**100**	**0.014**	**2**	**4**	**25**	**95**	**4900**	**400**
SW100N10	TO-220	Production	N	209.1	100	100	0.011	2	4	43	109	16700	548
SW100N10A	TO-220	Production	N	390	100	100	0.0074	2	4	56	127	5732	679
SW100N10B	TO-220	Production	N	318	100	100	0.0105	2	4	47	106	4571	509
SW100N10	**TO-220**	**Preliminary**	**N**	**–**	**100**	**100**	**0.013**	**2**	**4**	**28**	**85**	**4800**	**340**
SW110N10	TO-220	Preliminary	N	–	110	100	0.009	2	4	64	163	6500	380
SW140N10	**TO-220**	**Preliminary**	**N**	**–**	**140**	**100**	**0.0068**	**2**	**4**	**35**	**120**	**105000**	**914**
SW140N10D	TO-263	Preliminary	N	–	140	100	0.0068	2	4	35	120	105000	914
SW140N10T	**TO-247**	**Preliminary**	**N**	**–**	**140**	**100**	**0.0068**	**2**	**4**	**35**	**120**	**105000**	**914**
SW150N10A	TO-220	Production	N	464	150	100	0.0056	2	4	75	160	7201	805
SW210N10T	TO-247	Preliminary	N	–	210	100	0.0043	2	4	118	377	16500	1061
SW290N10T	TO-247	Preliminary	N	–	290	100	0.0035	2	4	184	586	21000	1652
SW4015D	TO-263	Preliminary	N	–	40	150	0.045	2.5	4.5	31.5	105	4200	203
SW5015	TO-220	Preliminary	N	–	50	150	0.023	2.5	4.5	64	163	3250	670
SW7915	TO-220	Preliminary	N	–	79	150	0.019	2	4	98	250	11000	463
SW8315T	TO-247	Preliminary	N	–	83	150	0.019	2	4	98	250	11000	463
SW100N15	TO-220	Preliminary	N	–	100	150	0.012	2	4	128	326	13000	640
SW110N15T	TO-247	Preliminary	N	–	110	150	0.013	2	4	118	377	16500	1344
SW150N15T	TO-247	Preliminary	N	–	150	150	0.008	2	4	184	586	21000	1446

Samwin® MOSFET 选型指南（中高压部分 .01.）：

Part Number	Package	Product status	Channel Type	PD [max] (W)	ID [max] (A)	BVDSS [min] (V)	RDSon [max] @ VGS = 10 V (Ohm)	VGSth [min] (V)	VGSth [max] (V)	Qgd[Typ] (nC)	Qg [Typ] (nC)	Ciss [max] (pF)	Coss [max] (pF)
SW630	TO-252	Production	N	48	10	200	0.4	2	4	13	21	770	120
SW630	TO-220F	Production	N	70	10	200	0.4	2	4	13	21	770	120
SW630	TO-220	Production	N	120	10	200	0.4	2	4	13	21	770	120
SW630A	TO-220	Production	N	132	10	200	0.4	2	4	13	22	420	100
SW630A	TO-252	Production	N	148	10	200	0.4	2	4	13	22	420	100
SW640U	TO-220	Production	N	178.2	18	200	0.18	2	4	12	25	907	280
SW640	TO-220	Production	N	240	18	200	0.18	2	4	30	35	1750	240
SW640	TO-3P	Production	N	245	18	200	0.18	2	4	30	48	1750	240
SW1820	TO-220	Preliminary	N	–	18	200	0.08	2	4	17	60	4200	163
SW1820D	TO-263	Preliminary	N	–	18	200	0.08	2	4	17	60	4200	163
SW1820F	TO-220F	Preliminary	N	–	18	200	0.08	2	4	17	60	4200	163
SW2420D	TO-263	Preliminary	N	–	24	200	0.08	1	2	17	60	4200	163
SW4020	TO-220	Preliminary	N	–	40	200	0.041	2	4	64	163	6500	290
SW4020F	TO-220F	Preliminary	N	–	40	200	0.041	2	4	64	163	6500	290
SW634	TO-220F	Production	N	38	9	250	0.45	2	4	13	26	1220	130
SW634	TO-220	Production	N	133	9	250	0.45	2	4	13	26	1220	130
SW634	TO-252	Production	N	143.9	9	250	0.45	2	4	13	26	787	116
SW5N30D	TO-251	Production	N	83	5	300	0.9	2.5	4.5	7	12	475	71
SW2N40D	TO-92	Production	N	1.1	2	400	3.5	2.5	4.5	3.5	7	176	30
SW730	TO-220	Production	N	192	6.5	400	1	2	4	17	33	750	215
SW740U	TO-220	Production	N	226	10	400	0.55	2	4	18	38	1150	170
SW740	TO-220	Production	N	250	10	400	0.55	2	4	13	32	1800	200
SW830D1	TO-220F	Production	N	18.7	5	500	1.54	2.5	4.5	8	17	519	76
SW830D1	TO-251	Production	N	101.9	5	500	1.54	2.5	4.5	8	17	519	76
SW830D1	TO-252	Production	N	113.4	5	500	1.54	2.5	4.5	8	17	519	76
SW830D1	TO-220	Production	N	123.6	5	500	1.54	2.5	4.5	8	17	519	76
SW830	TO-220F	Production	N	39	5.5	500	1.5	2	4	14	30	1100	115
SW830A	TO-220F	Production	N	39	5.5	500	1.5	2	4	14	30	1100	115
SW830	TO-220	Production	N	135	5.5	500	1.5	2	4	14	30	1100	115
SW830A	TO-220	Production	N	135	5.5	500	1.5	2	4	14	30	1100	115
SW830D	TO-252	Production	N	200	5.5	500	1.5	2	4	3	17	570	75
SW830C	TO-251	Production	N	215	5.5	500	1.5	2	4	9	19.5	1100	115
SW830C	TO-252	Production	N	215	5.5	500	1.5	2	4	9	19.5	1100	115
SW840	TO-220F	Production	N	21	8.5	500	0.9	2	4	22	47	1450	210
SW840	TO-220	Production	N	195	8.5	500	0.9	2	4	22	47	1450	210
SW840A	TO-220	Production	N	195	8.5	500	0.85	2	4	22	47	1450	210
SW9N50D	TO-220F	Production	N	23.3	9	500	0.8	2.5	4.5	13	31	1479	126
SW9N50D	TO-220	Production	N	200	9	500	0.8	2.5	4.5	13	31	1479	126
SW13N50B	TO-220F	Production	N	67.5	13	500	0.52	2	4	9	29	1500	200
SW13N50	TO-220F	Production	N	184	13	500	0.48	2	4	9	27	1600	200
SW15N50	TO-220F	Production	N	34.6	15	500	0.32	2	4	29	66	2610	283

Samwin® MOSFET 选型指南（中高压部分 .02.）：

Part Number	Package	Product status	Channel Type	PD [max] (W)	ID [max] (A)	BVDSS [min] (V)	RDSon [max] @ VGS = 10 V (Ohm)	VGSth [min] (V)	VGSth [max] (V)	Qgd[Typ] (nC)	Qg [Typ] (nC)	Ciss [max] (pF)	Coss [max] (pF)
SW15N50A	TO-220F	Production	N	51.2	15	500	0.315	2	4	30	72	2900	267
SW20N50	TO-3P	Production	N	215	20	500	0.27	3	5	37	90	3600	500
SW20N50U	TO-3P	Production	N	386	20	500	0.27	2	4	41	103	4157	374
SW1N55D	TO-251	Production	N	77.1	1	550	6.5	2.5	4.5	3.5	7	182	30
SW601Q	SOT-23	Production	N	0.5	0.185	600	700	-2.7	-1.5	45	1300	15	145
SW1N60L	TO-92	Production	N	1	0.3	600	23	3	4.5	3.5	4.5	60	12
SW1N60A	TO-92	Production	N	4.3	0.5	600	15	3	4.5	3.6	6	150	25
SW1N60C	TO-92	Production	N	3.13	0.8	600	9	2	4	1.9	5.6	150	25
SW1N60E	TO-92	Production	N	3.58	1	600	8	2	4	1	3.7	270	60
SW1N60D	TO-92	Production	N	4.2	1	600	8.5	2.5	4.5	3.7	6.8	150	28
SW1N60	TO-126	Production	N	30	1	600	12	2	4	2.4	7	150	25
SW1N60	TO-251	Production	N	30	1	600	12	2	4	2.4	7	150	25
SW1N60	TO-252	Production	N	30	1	600	12	2	4	2.4	7	150	25
SW1N60C	TO-251	Production	N	50	1	600	9	2	4	1.9	5.6	150	25
SW1N60C	TO-252	Production	N	50	1	600	9	2	4	1.9	5.6	150	25
SW1N60DC	TO-252	Production	N	52	1	600	8.5	2.5	4.5	4.7	6.3	160	32
SW1N60D	TO-251	Production	N	65.9	1	600	8.5	2.5	4.5	3.7	6.8	150	28
SW1N60E	TO-251	Production	N	103	1	600	8	2	4	1	3.7	270	60
SW2N60D	TO-220F	Production	N	17.45	2	600	4.5	2.5	4.5	4	9	306	43
SW2N60B	TO-220F	Production	N	18.5	2	600	4.5	2	4	5.5	7.5	520	50
SW2N60B	TO-126	Production	N	20	2	600	4.5	2	4	5.5	7.5	520	50
SW2N60A1	TO-220F	Production	N	23	2	600	5	2	4	4	10	330	40
SW2N6O	TO-220F	Production	N	28	2	600	5	2	4	7.5	15	520	50
SW2N60	TO-220F	Production	N	28	2	600	5	2	4	7.5	15	520	50
SW2N60	TO-251	Production	N	40	2	600	5	2	4	7.5	15	520	50
SW2N60	TO-252	Production	N	40	2	600	5	2	4	7.5	15	520	50
SW2N60B	TO-251	Production	N	69	2	600	4.5	2	4	5.5	7.5	520	50
SW2N60B	TO-252	Production	N	69	2	600	4.5	2	4	5.5	7.5	520	50
SW2N60DC	TO-251	Production	N	77.6	2	600	4.5	2.5	4.5	4	9.5	305	45
SW2N60DC	TO-252	Production	N	78.1	2	600	4.5	2.5	4.5	4	9.5	305	45
SW2N60D	TO-252	Production	N	85.5	2	600	4.5	2.5	4.5	4	9	306	43
SW2N60D	TO-251	Production	N	88.7	2	600	4.5	2.5	4.5	4	9	306	43
SW2N60	TO-220	Production	N	108	2	600	5	2	4	7.5	15	520	50
SW2N60A1	TO-251	Production	N	122	2	600	5	2	4	4	10	330	40
SW4N60B	TO-220F	Production	N	19.1	4	600	2.5	2	4	4	11	463	63
SW4N60D	TO-220F	Production	N	23.5	4	600	2.2	2.5	4.5	9	18	522	57
SW4N60A	TO-220F	Production	N	33	4	600	2.2	2	4	17	30	740	83
SW4N60	TO-220F	Production	N	33	4	600	2.2	2	4	17	30	740	83
SW226N	TO-251	Production	N	60	4	600	2.3	2	4	13.8	30	740	90
SW 226N	TO-252	Production	N	60	4	600	2.3	2	4	13.8	30	740	90
SW4N60B	TO-251	Production	N	140	4	600	2.5	2	4	4	11	463	63

Samwin® MOSFET 选型指南（中高压部分 .03.）：

Part Number	Package	Product status	Channel Type	PD [max] (W)	ID [max] (A)	BVDSS [min] (V)	RDSon [max] @ VGS = 10 V (Ohm)	VGSth [min] (V)	VGSth [max] (V)	Qgd[Typ] (nC)	Qg [Typ] (nC)	Ciss [max] (pF)	Coss [max] (pF)
SW 4N60D	TO-252	Production	N	141	4	600	2.2	2.5	4.5	9	18	522	57
SW 4N60B	TO-252	Production	N	144.5	4	600	2.5	2	4	4	11	463	63
SW 4N60D	TO-251N	Production	N	152.6	4	600	2.2	2.5	4.5	9	18	522	57
SW 4N60A	TO-220	Production	N	198	4	600	2.2	2	4	17	30	740	83
SW 4N60	TO-220	Production	N	198	4	600	2.2	2	4	17	30	740	83
SW 226NV	TO-251	Production	N	270	4	600	2.5	2	4	14	27	740	90
SW 226NV	TO-252	Production	N	270	4	600	2.5	2	4	14	27	740	90
SW 4N60V	TO-251	Production	N	312.5	4	600	2.5	2	4	13.7	27	740	83
SW 4N60V	TO-252	Production	N	312.5	4	600	2.5	2	4	13.7	27	740	83
SW 5N60D	TO-220F	Production	N	19.5	5	600	2.45	2.5	4.5	8.6	17	555	70
SW 5N60	TO-220F	Production	N	24	5	600	2.2	2	4	10	22	630	65
SW 6N60	TO-251	Production	N	24	6	600	1.5	2	4	12.4	29	700	95
SW 6N60	TO-252	Production	N	24	6	600	1.5	2	4	12.4	29	700	95
SW 6N60D	TO-220F	Production	N	24	6	600	1.7	2.5	4.5	12	23	794	94
SW 6N60	TO-220F	Production	N	50	6	600	1.5	2	4	12.4	29	700	95
SW 6N65	TO-252	Production	N	162	6	600	1.4	2	4	11	26	1004	87
SW6N60D	TO-252	Production	N	205	6	600	1.7	2.5	4.5	12	23	794	94
SW7N60D	TO-220F	Production	N	23.76	7	600	1.2	2.5	4.5	15	30	1000	115
SW7N60R	TO-220	Production	N	23.8	7	600	1.25	2	4	6	19	943	110
SW7N60R	TO-220F	Production	N	23.8	7	600	1.25	2	4	6	19	943	110
SW7N60H	TO-220F	Production	N	28.6	7	600	1.32	2	4	12	28	1073	87
SW7N60	TO-220F	Production	N	68.5	7	600	1.3	2	4	13	32	1260	135
SW7N60	TO-220	Production	N	147	7	600	1.3	2	4	13	32	1260	135
SW8N60	TO-220F	Production	N	53	7.5	600	1.3	2	4	12	28	1255	135
SW 8N60	TO-220	Production	N	147	7.5	600	1.3	2	4	12	28	1255	135
SW8N60B	TO-220F	Production	N	21.8	8	600	1.25	2	4	7	19	930	120
SW 10N60D	TO-220F	Production	N	41.8	10	600	1.1	2.5	4.5	17	35	1120	122
SW 10N60	TO-220F	Production	N	50	10	600	0.9	2	4	15.5	40	2530	205
SW 10N60	TO-220	Production	N	156	10	600	0.9	2	4	15.5	40	2530	205
SW 11N60	TO-220F	Production	N	48	11	600	0.8	2	4	18	50	2080	177
SW 12N60D	TO-220F	Production	N	32.3	12	600	0.8	2.5	5	24	48	1456	157
SW 12N60	TO-220F	Production	N	52	12	600	0.7	2	4	11	31	2530	205
SW 12N60	TO-220	Production	N	250	12	600	0.7	2	4	11	31	2530	205
SW 20N60	TO-3P	Production	N	265	20	600	0.3	3	5	42	97	3600	500
SW 20N60U	TO-3P	Production	N	367.7	20	600	0.45	2	4	47	108	4082	350
SW 22N60U	TO-3P	Production	N	520	22	600	0.35	2	5	48	124	5028	373
SW2N65B	TO-220F	Production	N	16.7	2	650	5.6	2	4	4.6	7.7	260	40
SW2N65	TO-220F	Production	N	19.2	2	650	5.5	2	4	4.4	7.8	260	40
SW 2N65	TO-220	Production	N	62.5	2	650	5.5	2	4	4.4	7.8	260	40
SW4N65B	TO-220F	Production	N	15.8	4	650	2.7	2	4	6	11	740	90
SW4N65D	TO-220F	Production	N	23.3	4	650	2.6	2.5	4.5	9	18	531	60

Samwin® MOSFET 选型指南（中高压部分 .04.）：

Part Number	Package	Product status	Channel Type	PD [max] (W)	ID [max] (A)	BVDSS [min] (V)	RDSon [max] @ VGS = 10 V (Ohm)	VGSth [min] (V)	VGSth [max] (V)	Qgd[Typ] (nC)	Qg [Typ] (nC)	Ciss [max] (pF)	Coss [max] (pF)
SW4N65	TO-220F	Production	N	43	4	650	2.6	2	4	7	17	740	90
SW4N65	TO-251	Production	N	54	4	650	2.6	2	4	7	17	740	90
SW4N65	TO-252	Production	N	54	4	650	2.6	2	4	7	17	740	90
SW4N65U	TO-220F	Production	N	54.6	4	650	2.6	2	4	8	17	560	65
SW4N65	TO-220	Production	N	100	4	650	2.6	2	4	7	17	740	90
SW4N65D	TO-252	Production	N	144.4	4	650	2.6	2.5	4.5	9	18	531	60
SW4N65D	TO-251N	Production	N	157.1	4	650	2.6	2.5	4.5	9	18	531	60
SW4N65D	TO-251S	Production	N	157.1	4	650	2.6	2.5	4.5	9	18	531	60
SW4N65U	TO-251N	Production	N	250.1	4	650	2.6	2	4	8	17	560	65
SW7N65D	TO-220F	Production	N	27.9	7	650	1.4	2.5	4.5	15	30	950	108
SW7N65	TO-220F	Production	N	45	7	650	1.32	2	4	13	32	1500	145
SW7N65B	TO-220F	Production	N	65.17	7	650	1.4	2	4	7	19	850	110
SW7N65	TO-220	Production	N	147	7	650	1.32	2	4	13	32	1500	145
SW7N65D	TO-251	Production	N	173.6	7	650	1.4	2.5	4.5	15	30	950	108
SW7N65D	TO-252	Production	N	255.1	7	650	1.4	2.5	4.5	15	30	950	108
SW8N65B	TO-220F	Production	N	24.9	8	650	1.5	2	4	6	19	959	115
SW8N65A1	TO-220F	Production	N	31	8	650	1.42	2	4	12	31	1210	110
SW10N65D	TO-220F	Production	N	41.8	10	650	1.1	2.5	4.5	17	35	1120	122
SW10N65B	TO-220F	Production	N	43	10	650	1.2	2	4	6.5	23	1200	130
SW10N65	TO-220	Production	N	156	10	650	1.1	2	4	14.5	40	2530	205
SW10N65	TO-220F	Production	N	38*	10	650	1.1	2	4	14.5	40	2530	205
SW12N65D	TO-220F	Production	N	45.2	12	650	0.8	2.5	4.5	22	45	1456	157
SW12N65B	TO-220F	Production	N	54	12	650	0.85	2	4	9	28	1450	160
SW12N65A1	TO-220F	Production	N	58	12	650	0.8	2	4	20	43	2100	170
SW12N65	TO-220	Production	N	165	12	650	0.8	2	4	21	53	2530	205
SW12N65D	TO-262	Production	N	186.6	12	650	0.8	2.5	4.5	22	45	1456	157
SW12N65A1	TO-263	Production	N	208	12	650	0.8	2	4	20	43	2100	170
SW12N65A1	TO-220	Production	N	215	12	650	0.8	2	4	20	43	2100	170
SW12N65	TO-220F	Production	N	65	12	650	0.8	2	4	21	53	2530	205
SW1N70A	TO-92	Production	N	3	0.5	700	15	3	4.5	2.4	7	150	25
SW1N70C	TO-92	Production	N	3.64	0.8	700	16	2.3	4.5	3.5	15	100	30
SW2N70D	TO-251N	Production	N	76	2	700	6.2	2.5	4.5	5.5	11	360	42
SW2N70	TO-251	Production	N	120	2	700	7	2	4	6.5	11	530	50
SW2N70	TO-252	Production	N	120	2	700	7	2	4	6.5	11	530	50
SW4N70B	TO-220F	Production	N	24.1	4	700	2.8	2	4	4	12	595	55
SW4N70D	TO-251	Production	N	145	4	700	2.7	2.5	4.5	9	20	790	72
SW4N70B	TO-251	Production	N	147.1	4	700	2.8	2	4	4	12	595	55
SW6N70DA	TO-220F	Production	N	21.9	6	700	1.9	2.5	4.5	11	26	1040	88
SW6N70D	TO-220F	Production	N	30.3	6	700	1.7	2	4	7	20	995	93
SW6N70P	TO-251	Production	N	137.5	6	700	1.7	2	4	7	20	995	93
SW6N70P	TO-252	Production	N	192.3	6	700	1.7	2	4	7	20	995	93

Samwin® MOSFET 选型指南（中高压部分 .05.）：

Part Number	Package	Product status	Channel Type	PD [max] (W)	ID [max] (A)	BVDSS [min] (V)	RDSon [max] @ VGS = 10 V (Ohm)	VGSth [min] (V)	VGSth [max] (V)	Qgd[Typ] (nC)	Qg [Typ] (nC)	Ciss [max] (pF)	Coss [max] (pF)
SW6N70DA	TO-252	Production	N	195.3	6	700	1.9	2.5	4.5	11	26	1040	88
SW 6N70DA	TO-251S	Production	N	219	6	700	1.9	2.5	4.5	11	26	1040	88
SW6N70A	TO-251	Production	N	222	6	700	1.8	2	4	10	24	936	86
SW 7N70	TO-262	Production	N	147	7	700	1.35	2	4	15	35	1500	145
SW8N70A	TO-220F	Production	N	39.8	8	700	1.2	2.1	4	8	25	1660	134
SW 8N70	TO-220F	Production	N	50	8	700	1.6	2	4	18	35	1130	100
SW1N80A	TO-92	Production	N	4.1	1	800	16	3	5	3.1	6	150	25
SW 3N80C	TO-220F	Production	N	18.4	3	800	4.9	2	4	8	12.5	700	70
SW3N80	TO-220F	Production	N	35	3	800	4.5	3	5	7	13	700	70
SW 3N80	TO-220	Production	N	106	3	800	4.5	3	5	7	13	700	70
SW3N80C	TO-251	Production	N	147	3	800	4.9	2	4	8	12.5	700	70
SW 3N80C	TO-252	Production	N	147	3	800	4.9	2	4	8	12.5	700	70
SW 4N80B	TO-220F	Production	N	41.65	4	800	4	2	4	6	14	520	65
SW 4N80B	TO-251N	Production	N	252.1	4	800	4	2	4	6	14	520	65
SW 5N80B	TO-220F	Production	N	22.3	5	800	2.68	2	4	7.5	18	743	85
SW 5N80	TO-220F	Production	N	45	5	800	2.4	3	5	15.7	33	1450	200
SW5N80B	TO-251	Production	N	173.6	5	800	2.68	2	4	7.5	18	743	85
SW 7N80B	TO-220F	Production	N	48	7	800	1.59	2	4	10	25	1150	117
SW 7N80U	TO-220F	Production	N	65	7	800	1.9	3	5	21	43	1400	130
SW 7N80U	TO-262	Production	N	290.7	7	800	1.9	3	5	21	43	1400	130
SW10N80	TO-220F	Production	N	37.1	10	800	1.1	3	5	34	66	2143	198
SW10N80B	TO-220F	Production	N	46.3	10	800	1.15	2	4	14	36	1760	168
SW 6N90	TO-262	Production	N	231	6	900	2.3	3	5	19	40	1400	120
SW 7N90	TO-220F	Production	N	32	7	900	1.8	3	5	20	40	1880	185
SW 7N90	TO-3P	Production	N	390	7	900	1.8	3	5	23	50	1880	185
SW 8N90	TO-220F	Production	N	69	8	900	1.5	2	4	27	57	2100	160
SW 9N90	TO-3P	Production	N	219	9	900	1.45	3	5	39	74	2700	260
SW4N100U	TO-220F	Production	N	35	4	1000	3.5	3	5	16.5	33	1100	122

Samwin® 超结MOSFET 选型指南 01：

Part Number	Package	Product status	Channel Type	ID [max] (A)	BVDSS [min] (V)	RDSon [max] @ VGS = 10 V (Ohm)	VGSth [min] (V)	VGSth [max] (V)	Qgd[Typ] (nC)	Qg [Typ] (nC)	Ciss [max] (pF)	Coss [max] (pF)
SW 4N60K	TO-251	Production	N	4	600	1.15	3	5	6.5	13	382	290
SW 4N60K	TO-252	Production	N	4	600	1.15	3	5	6.5	13	382	290
SW 4N60K	TO-220F	Production	N	4	600	1.15	3	5	6.5	13	382	290
SW 4N65K	TO-251	Production	N	4	650	1.25	3	5	6.5	13	382	290
SW 4N65K	TO-252	Production	N	4	650	1.25	3	5	6.5	13	382	290
SW 4N65K	TO-220F	Production	N	4	650	1.25	3	5	6.5	13	382	290
SW 4N70K	TO-251	Production	N	4	700	1.3	3	5	7	13	410	325
SW 6N65K	TO-251	Production	N	6	650	0.9	3	5	9	17	863	380
SW 6N65K	TO-252	Production	N	6	650	0.9	3	5	9	17	863	380
SW 6N65K	TO-220F	Production	N	6	650	0.9	3	5	9	17	863	380
SW 6N70K	TO-251	Production	N	6	700	1.3	3	5	7	13	388	303
SW 6N70K	TO-252	Production	N	6	700	1.3	3	5	7	13	388	303
SW 6N70K	TO-220F	Production	N	6	700	1.3	3	5	7	13	388	303
SW 7N60K	TO-251	Production	N	7	700	0.6	2.5	5	11	21	561	414
SW 7N60K	TO-220F	Production	N	7	700	0.6	2.5	5	11	21	561	414
SW 7N65K	TO-251	Production	N	7	650	0.6	2.5	5	10	21	723	528
SW 7N65K	TO-252	Production	N	7	650	0.6	2.5	5	10	21	723	528
SW 7N65K	TO-220	Production	N	7	650	0.6	2.5	5	10	21	723	528
SW 7N65K	TO-220F	Production	N	7	650	0.6	2.5	5	10	21	723	528
SW 7N70K	TO-251	Production	N	7	700	0.9	3	5	9	17	863	380
SW 7N70K	TO-252	Production	N	7	700	0.9	3	5	9	17	863	380
SW 7N70K	TO-220	Production	N	7	700	0.9	3	5	9	17	863	380
SW 7N70K	TO-220F	Production	N	7	700	0.9	3	5	9	17	863	380
SW 10N60K	TO-220F	Production	N	10	600	0.37	2	5	10	29	1020	120
SW 10N65K	TO-251N	Production	N	10	650	0.4	2	5	14	29	1020	730
SW 10N65K	TO-220	Production	N	10	650	0.4	2	5	14	29	1020	730
SW 10N65K	TO-220F	Production	N	10	650	0.4	2	5	14	29	1020	730
SW 16N65K	TO-220	Production	N	16	650	0.25	2	5	19	43	1510	1080
SW 16N65K	TO-220F	Production	N	16	650	0.25	2	5	19	43	1510	1080
SW 20N65K	TO-220	Production	N	20	650	0.19	2	5	26	60	2170	1470
SW 20N65K	TO-220F	Production	N	20	650	0.19	2	5	26	60	2170	1470
SW 22N65K	TO-220	Preliminary	N	22	650	0.15	2	5	33	76	2750	1860
SW 25N65K	TO-220	Preliminary	N	25	650	0.125	2	5	39	91	3300	2230
SW 38N65K	TO-247	Production	N	38	650	0.1	2	5	44	96	3660	2460
SW 43N65K	TO-247	Preliminary	N	43	650	0.08	2	5	50	137	5150	3490
SW 47N65K	TO-247	Production	N	47	650	0.072	2	5	56	152	5700	3990
500V SJ												
SW 4N50K	TO-251	Preliminary	N	4	500	0.85	2	5	5	12	360	271
SW 4N50K	TO-252	Preliminary	N	4	500	0.85	2	5	5	12	360	271
SW 4N50K	TO-220F	Preliminary	N	4	500	0.85	2	5	5	12	360	271
SW 5N50K	TO-251	Preliminary	N	5	500	0.6	2	5	6	14	505	375
SW 5N50K	TO-252	Preliminary	N	5	500	0.6	2	5	6	14	505	375
SW 5N50K	TO-220F	Preliminary	N	5	500	0.6	2	5	6	14	505	375
SW 7N50K	TO-251	Preliminary	N	7	500	0.42	2	5	9	19	650	475

Samwin® 超结MOSFET 选型指南 02：

Part Number	Package	Product status	Channel Type	ID [max] (A)	BVDSS [min] (V)	RDSon [max] @ VGS = 10 V (Ohm)	VGSth [min] (V)	VGSth [max] (V)	Qgd[Typ] (nC)	Qg [Typ] (nC)	Ciss [max] (pF)	Coss [max] (pF)
SW 7N50K	TO-252	Preliminary	N	7	500	0.42	2	5	9	19	650	475
SW 7N50K	TO-220F	Preliminary	N	7	500	0.42	2	5	9	19	650	475
SW 10N50K	TO-251	Preliminary	N	10	500	0.26	2	5	13	26	920	660
SW 10N50K	TO-252	Preliminary	N	10	500	0.26	2	5	13	26	920	660
SW 10N50K	TO-220F	Preliminary	N	10	500	0.26	2	5	13	26	920	660
SW 16N50K	TO-220	Preliminary	N	16	500	0.18	2	5	17	37	1360	945
SW 16N50K	TO-220F	Preliminary	N	16	500	0.18	2	5	17	37	1360	945
SW 20N50K	TO-220	Preliminary	N	20	500	0.12	2	5	23	55	1950	1323
SW 20N50K	TO-220F	Preliminary	N	20	500	0.12	2	5	23	55	1950	1323
SW 38N50K	TO-247	Preliminary	N	38	500	0.07	2	5	40	89	4640	3140
SW 47N50K	TO-247	Preliminary	N	47	500	0.046	2	5	50	137	5140	3600
800V SJ												
SW 4N80K	TO-251	Preliminary	N	4	800	2.1	2	5	6	14	432	325
SW 4N80K	TO-252	Preliminary	N	4	800	2.1	2	5	6	14	432	325
SW 4N80K	TO-220F	Preliminary	N	4	800	2.1	2	5	6	14	432	325
SW 5N80K	TO-251	Preliminary	N	5	800	1.5	2	5	7	17	606	450
SW 5N80K	TO-252	Preliminary	N	5	800	1.5	2	5	7	17	606	450
SW 5N80K	TO-220F	Preliminary	N	5	800	1.5	2	5	7	17	606	450
SW 7N80K	TO-251	Preliminary	N	7	800	1.05	2	5	11	23	780	570
SW 7N80K	TO-252	Preliminary	N	7	800	1.05	2	5	11	23	780	570
SW 7N80K	TO-220F	Preliminary	N	7	800	1.05	2	5	11	23	780	570
SW 10N80K	TO-251	Preliminary	N	10	800	0.68	2	5	16	31	1104	792
SW 10N80K	TO-252	Preliminary	N	10	800	0.68	2	5	16	31	1104	792
SW 10N80K	TO-220F	Preliminary	N	10	800	0.68	2	5	16	31	1104	792
SW 16N80K	TO-220	Preliminary	N	16	800	0.45	2	5	20	44	1632	1134
SW 16N80K	TO-220F	Preliminary	N	16	800	0.45	2	5	20	44	1632	1134
SW 20N80K	TO-220	Preliminary	N	20	800	0.31	2	5	28	66	2340	1588
SW 20N80K	TO-220F	Preliminary	N	20	800	0.31	2	5	28	66	2340	1588
SW 38N80K	TO-247	Preliminary	N	38	800	0.175	2	5	48	107	5568	3768
SW 47N80K	TO-247	Preliminary	N	47	800	0.115	2	5	60	164	6168	4320
900V SJ												
SW 4N90K	TO-220	Preliminary	N	4	900	1.2	2	5	12	28	710	35
SW 4N90K	TO-220F	Preliminary	N	4	900	1.2	2	5	12	28	710	35
SW 5N90K	TO-220	Preliminary	N	5	900	1	2	5	15	34	850	42
SW 5N90K	TO-220F	Preliminary	N	5	900	1	2	5	15	34	850	42
SW 6N90K	TO-220	Preliminary	N	6	900	0.8	2	5	18	42	1100	52
SW 6N90K	TO-220F	Preliminary	N	6	900	0.8	2	5	18	42	1100	52
SW 8N90K	TO-220	Preliminary	N	8	900	0.5	2	5	29	68	1700	83
SW 8N90K	TO-220F	Preliminary	N	8	900	0.5	2	5	29	68	1700	83
SW 10N90K	TO-220	Preliminary	N	10	900	0.34	2	5	41	94	2400	120
SW 10N90K	TO-220F	Preliminary	N	10	900	0.34	2	5	41	94	2400	120

附录一： 桥式整流管(Bridge diode).01

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)		
MB1F	0.8	100	30	1.1	0.8	5	100	MBF	MB1F
MB2F	0.8	200	30	1.1	0.8	5	200	MBF	MB2F
MB4F	0.8	400	30	1.1	0.8	5	400	MBF	MB4F
MB6F	0.8	600	30	1.1	0.8	5	600	MBF	MB6F
MB8F	0.8	800	30	1.1	0.8	5	800	MBF	MB8F
MB10F	0.8	1000	30	1.1	0.8	5	1000	MBF	MB10F
TB1S	0.8	100	30	1.1	0.8	5	100	ABS/LBF	TB1S
TB2S	0.8	200	30	1.1	0.8	5	200	ABS/LBF	TB2S
TB4S	0.8	400	30	1.1	0.8	5	400	ABS/LBF	TB4S
TB6S	0.8	600	30	1.1	0.8	5	600	ABS/LBF	TB6S
TB8S	0.8	800	30	1.1	0.8	5	800	ABS/LBF	TB8S
TB10S	0.8	1000	30	1.1	0.8	5	1000	ABS/LBF	TB10S
MB1S	0.8	100	30	1.1	0.8	5	100	MBS	MB1S
MB2S	0.8	200	30	1.1	0.8	5	200	MBS	MB2S
MB4S	0.8	400	30	1.1	0.8	5	400	MBS	MB4S
MB6S	0.8	600	30	1.1	0.8	5	600	MBS	MB6S
MB8S	0.8	800	30	1.1	0.8	5	800	MBS	MB8S
MB10S	0.8	1000	30	1.1	0.8	5	1000	MBS	MB10S
TB1F	0.8	100	30	1.1	0.8	5	100	ABF	TB1F
TB2F	0.8	200	30	1.1	0.8	5	200	ABF	TB2F
TB4F	0.8	400	30	1.1	0.8	5	400	ABF	TB4F
TB6F	0.8	600	30	1.1	0.8	5	600	ABF	TB6F
TB8F	0.8	800	30	1.1	0.8	5	800	ABF	TB8F
TB10F	0.8	1000	30	1.1	0.8	5	1000	ABF	TB10F
MB1F-05	0.5	100	20	1.1	0.5	5	100	MBF	05M1
MB2F-05	0.5	200	20	1.1	0.5	5	200	MBF	05M2
MB4F-05	0.5	400	20	1.1	0.5	5	400	MBF	05M4
MB6F-05	0.5	600	20	1.1	0.5	5	600	MBF	05M6
MB8F-05	0.5	800	20	1.1	0.5	5	800	MBF	05M8
MB10F-05	0.5	1000	20	1.1	0.5	5	1000	MBF	05M10
TB1S-05	0.5	100	20	1	0.5	5	100	ABS/LBF	05T10
TB2S-05	0.5	200	20	1	0.5	5	200	ABS/LBF	05T2
TB4S-05	0.5	400	20	1	0.5	5	400	ABS/LBF	05T4
TB6S-05	0.5	600	20	1	0.5	5	600	ABS/LBF	05T6
TB8S-05	0.5	800	20	1	0.5	5	800	ABS/LBF	05T8
TB10S-05	0.5	1000	20	1	0.5	5	1000	ABS/LBF	05T10
MB1S-05	0.5	100	20	1.1	0.5	5	100	MBS	05S1
MB2S-05	0.5	200	20	1.1	0.5	5	200	MBS	05S2
MB4S-05	0.5	400	20	1.1	0.5	5	400	MBS	05S4
MB6S-05	0.5	600	20	1.1	0.5	5	600	MBS	05S6
MB8S-05	0.5	800	20	1.1	0.5	5	800	MBS	05S8

附录一： 桥式整流管(Bridge diode).02

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)		
MB10S-05	0.5	1000	20	1.1	0.5	5	1000	MBS	05S10
TB1F-05	0.5	100	20	1	0.5	3	100	ABF	05F1
TB2F-05	0.5	200	20	1	0.5	3	200	ABF	05F2
TB4F-05	0.5	400	20	1	0.5	3	400	ABF	05F4
TB6F-05	0.5	600	20	1	0.5	3	600	ABF	05F6
TB8F-05	0.5	800	20	1	0.5	3	800	ABF	05F8
TB10F-05	0.5	1000	20	1	0.5	3	1000	ABF	05F10
MB1F-10	1	100	35	1.1	1	5	100	MBF	10M1
MB2F-10	1	200	35	1.1	1	5	200	MBF	10M2
MB4F-10	1	400	35	1.1	1	5	400	MBF	10M4
MB6F-10	1	600	35	1.1	1	5	600	MBF	10M6
MB8F-10	1	800	35	1.1	1	5	800	MBF	10M8
MB10F-10	1	1000	35	1.1	1	5	1000	MBF	10M10
TB1S-10	1	100	35	1.1	1	5	100	ABS/LBF	10T1
TB2S-10	1	200	35	1.1	1	5	200	ABS/LBF	10T2
TB4S-10	1	400	35	1.1	1	5	400	ABS/LBF	10T4
TB6S-10	1	600	35	1.1	1	5	600	ABS/LBF	10T6
TB8S-10	1	800	35	1.1	1	5	800	ABS/LBF	10T8
TB10S-10	1	1000	35	1.1	1	5	1000	ABS/LBF	10T10
MB1S-10	1	100	35	1.1	1	5	100	MBS	10S1
MB2S-10	1	200	35	1.1	1	5	200	MBS	10S2
MB4S-10	1	400	35	1.1	1	5	400	MBS	10S4
MB6S-10	1	600	35	1.1	1	5	600	MBS	10S6
MB8S-10	1	800	35	1.1	1	5	800	MBS	10S8
MB10S-10	1	1000	35	1.1	1	5	1000	MBS	10S10
TB1F-10	1	100	35	1.1	1	5	100	ABF	10F1
TB2F-10	1	200	35	1.1	1	5	200	ABF	10F2
TB4F-10	1	400	35	1.1	1	5	400	ABF	10F4
TB6F-10	1	600	35	1.1	1	5	600	ABF	10F6
TB8F-10	1	800	35	1.1	1	5	800	ABF	10F8
TB10F-10	1	1000	35	1.1	1	5	1000	ABF	10F10
MB1F-12	1.2	100	40	1.1	1.2	5	100	MBF	12M1
MB2F-12	1.2	200	40	1.1	1.2	5	200	MBF	12M2
MB4F-12	1.2	400	40	1.1	1.2	5	400	MBF	12M4
MB6F-12	1.2	600	40	1.1	1.2	5	600	MBF	12M6
MB8F-12	1.2	800	40	1.1	1.2	5	800	MBF	12M8
MB10F-12	1.2	1000	40	1.1	1.2	5	1000	MBF	12M10
TB1S-12	1.2	100	40	1.1	1.2	5	100	ABS/LBF	12T1
TB2S-12	1.2	200	40	1.1	1.2	5	200	ABS/LBF	12T2
TB4S-12	1.2	400	40	1.1	1.2	5	400	ABS/LBF	12T4
TB6S-12	1.2	600	40	1.1	1.2	5	600	ABS/LBF	12T6

附录一： 桥式整流管(Bridge diode).03

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)		
TB8S-12	1.2	800	40	1.1	1.2	5	800	ABS/LBF	12T8
TB10S-12	1.2	1000	40	1.1	1.2	5	1000	ABS/LBF	12T10
MB1S-12	1.2	100	40	1.1	1.2	5	100	MBS	12S1
MB2S-12	1.2	200	40	1.1	1.2	5	200	MBS	12S2
MB4S-12	1.2	400	40	1.1	1.2	5	400	MBS	12S4
MB6S-12	1.2	600	40	1.1	1.2	5	600	MBS	12S6
MB8S-12	1.2	800	40	1.1	1.2	5	800	MBS	12S8
MB10S12	1.2	1000	40	1.1	1.2	5	1000	MBS	12S10
TB1F-12	1.2	100	40	1.1	1	5	100	ABF	12F1
TB2F-12	1.2	200	40	1.1	1	5	200	ABF	12F2
TB4F-12	1.2	400	40	1.1	1	5	400	ABF	12F4
TB6F-12	1.2	600	40	1.1	1	5	600	ABF	12F6
TB8F-12	1.2	800	40	1.1	1	5	800	ABF	12F8
TB10F-12	1.2	1000	40	1.1	1	5	1000	ABF	12F10
MB1F-15	1.5	100	50	1.1	1.5	5	100	MBF	15M1
MB2F-15	1.5	200	50	1.1	1.5	5	200	MBF	15M2
MB4F-15	1.5	400	50	1.1	1.5	5	400	MBF	15M4
MB6F-15	1.5	600	50	1.1	1.5	5	600	MBF	15M6
MB8F-15	1.5	800	50	1.1	1.5	5	800	MBF	15M8
MB10F-15	1.5	1000	50	1.1	1.5	5	1000	MBF	15M10
TB1S-15	1.5	100	50	1.1	1.5	5	100	ABS/LBF	15T1
TB2S-15	1.5	200	50	1.1	1.5	5	200	ABS/LBF	15T2
TB4S-15	1.5	400	50	1.1	1.5	5	400	ABS/LBF	15T4
TB6S-15	1.5	600	50	1.1	1.5	5	600	ABS/LBF	15T6
TB8S-15	1.5	800	50	1.1	1.5	5	800	ABS/LBF	15T8
TB10S-15	1.5	1000	50	1.1	1.5	5	1000	ABS/LBF	15T10
MB1S-15	1.5	100	50	1.1	1.5	5	100	MBS	15S1
MB2S-15	1.5	200	50	1.1	1.5	5	200	MBS	15S2
MB4S-15	1.5	400	50	1.1	1.5	5	400	MBS	15S4
MB6S-15	1.5	600	50	1.1	1.5	5	600	MBS	15S6
MB8S-15	1.5	800	50	1.1	1.5	5	800	MBS	15S8
MB10S15	1.5	1000	50	1.1	1.5	5	1000	MBS	15S10
TB1F-15	1.5	100	50	1.1	1.5	5	100	ABF	15F1
TB2F-15	1.5	200	50	1.1	1.5	5	200	ABF	15F2
TB4F-15	1.5	400	50	1.1	1.5	5	400	ABF	15F4
TB6F-15	1.5	600	50	1.1	1.5	5	600	ABF	15F6
TB8F-15	1.5	800	50	1.1	1.5	5	800	ABF	15F8
TB10F-15	1.5	1000	50	1.1	1.5	5	1000	ABF	15F10

附录二： 快恢复整流桥(Fast recovery bridge).01

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		T_{rr}	Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)	(ns)		
FTB1F-10	1	100	35	1.3	1	5	100	500	ABF	F10F1
FTB2F-10	1	200	35	1.3	1	5	200	500	ABF	F10F2
FTB4F-10	1	400	35	1.3	1	5	400	500	ABF	F10F4
FTB6F-10	1	600	35	1.3	1	5	600	500	ABF	F10F6
FTB8F-10	1	800	35	1.3	1	5	800	500	ABF	F10F8
FTB10F-10	1	1000	35	1.3	1	5	1000	500	ABF	F10F10
FTB1F-15	1.5	100	50	1.3	1.5	5	100	500	ABF	F15F1
FTB2F-15	1.5	200	50	1.3	1.5	5	200	500	ABF	F15F2
FTB4F-15	1.5	400	50	1.3	1.5	5	400	500	ABF	F15F4
FTB6F-15	1.5	600	50	1.3	1.5	5	600	500	ABF	F15F6
FTB8F-15	1.5	800	50	1.3	1.5	5	800	500	ABF	F15F8
FTB10F-15	1.5	1000	50	1.3	1.5	5	1000	500	ABF	F15F10
FTB1S-10	1	100	35	1.3	1	5	100	500	ABS	F10T1
FTB2S-10	1	200	35	1.3	1	5	200	500	ABS	F10T2
FTB4S-10	1	400	35	1.3	1	5	400	500	ABS	F10T4
FTB6S-10	1	600	35	1.3	1	5	600	500	ABS	F10T6
FTB8S-10	1	800	35	1.3	1	5	800	500	ABS	F10T8
FTB10S-10	1	1000	35	1.3	1	5	1000	500	ABS	F10T10
FTB1S-15	1.5	100	50	1.3	1.5	5	100	500	ABS	F15T1
FTB2S-15	1.5	200	50	1.3	1.5	5	200	500	ABS	F15T2
FTB4S-15	1.5	400	50	1.3	1.5	5	400	500	ABS	F15T4
FTB6S-15	1.5	600	50	1.3	1.5	5	600	500	ABS	F15T6
FTB8S-15	1.5	800	50	1.3	1.5	5	800	500	ABS	F15T8
FTB10S-15	1.5	1000	50	1.3	1.5	5	1000	500	ABS	F15T10
FTBL1F-10	1	100	35	1.1	1	5	100	500	ABF	F10FL1
FTBL2F-10	1	200	35	1.1	1	5	200	500	ABF	F10FL2
FTBL4F-10	1	400	35	1.1	1	5	400	500	ABF	F10FL4
FTBL6F-10	1	600	35	1.1	1	5	600	500	ABF	F10FL6
FTBL8F-10	1	800	35	1.1	1	5	800	500	ABF	F10FL8
FTBL10F-10	1	1000	35	1.1	1	5	1000	500	ABF	F10FL10
FTBL1F-15	1.5	100	50	1.1	1.5	5	100	500	ABF	F15FL01
FTBL2F-15	1.5	200	50	1.1	1.5	5	200	500	ABF	F15FL02
FTBL4F-15	1.5	400	50	1.1	1.5	5	400	500	ABF	F15FL04
FTBL6F-15	1.5	600	50	1.1	1.5	5	600	500	ABF	F15FL06
FTBL8F-15	1.5	800	50	1.1	1.5	5	800	500	ABF	F15FL08
FTBL10F-15	1.5	1000	50	1.1	1.5	5	1000	500	ABF	F15FL10
FTB1S-15	1.5	100	50	1.3	1.5	5	100	500	ABS	F15T01
FTB2S-15	1.5	200	50	1.3	1.5	5	200	500	ABS	F15T02
FTB4S-15	1.5	400	50	1.3	1.5	5	400	500	ABS	F15T04
FTB6S-15	1.5	600	50	1.3	1.5	5	600	500	ABS	F15T06
FTB8S-15	1.5	800	50	1.3	1.5	5	800	500	ABS	F15T08

附录二： 快恢复整流桥(Fast recovery bridge).02

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		T_{rr}	Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)	(ns)		
FTB10S-15	1.5	1000	50	1.3	1.5	5	1000	500	ABS	F15T10
FMB1F	0.8	100	30	1.3	0.8	5	100	500	MBF	FMB1F
FMB2F	0.8	200	30	1.3	0.8	5	200	500	MBF	FMB2F
FMB4F	0.8	400	30	1.3	0.8	5	400	500	MBF	FMB4F
FMB6F	0.8	600	30	1.3	0.8	5	600	500	MBF	FMB6F
FMB8F	0.8	800	30	1.3	0.8	5	800	500	MBF	FMB8F
FMB10F	0.8	1000	30	1.3	0.8	5	1000	500	MBF	FMB10F
FMB1F-05	0.5	100	20	1.3	0.5	5	100	500	MBF	F05F1
FMB2F-05	0.5	200	20	1.3	0.5	5	200	500	MBF	F05F2
FMB4F-05	0.5	400	20	1.3	0.5	5	400	500	MBF	F05F4
FMB6F-05	0.5	600	20	1.3	0.5	5	600	500	MBF	F05F6
FMB8F-05	0.5	800	20	1.3	0.5	5	800	500	MBF	F05F8
FMB10F-05	0.5	1000	20	1.3	0.5	5	1000	500	MBF	F05F10
FMB1F-10	1	100	35	1.3	1	5	100	500	MBF	F10M01
FMB2F-10	1	200	35	1.3	1	5	200	500	MBF	F10M02
FMB4F-10	1	400	35	1.3	1	5	400	500	MBF	F10M04
FMB6F-10	1	600	35	1.3	1	5	600	500	MBF	F10M06
FMB8F-10	1	800	35	1.3	1	5	800	500	MBF	F10M08
FMB10F-10	1	1000	35	1.3	1	5	1000	500	MBF	F10M10
FMB1F-12	1.2	100	40	1.3	1.2	5	100	500	MBF	F12F1
FMB2F-12	1.2	200	40	1.3	1.2	5	200	500	MBF	F12F2
FMB4F-12	1.2	400	40	1.3	1.2	5	400	500	MBF	F12F4
FMB6F-12	1.2	600	40	1.3	1.2	5	600	500	MBF	F12F6
FMB8F-12	1.2	800	40	1.3	1.2	5	800	500	MBF	F12F8
FMB10F-12	1.2	1000	40	1.3	1.2	5	1000	500	MBF	F12F10
FMB1F-15	1.5	100	50	1.3	1.5	5	100	500	MBF	F15M01
FMB2F-15	1.5	200	50	1.3	1.5	5	200	500	MBF	F15M02
FMB4F-15	1.5	400	50	1.3	1.5	5	400	500	MBF	F15M04
FMB6F-15	1.5	600	50	1.3	1.5	5	600	500	MBF	F15M06
FMB8F-15	1.5	800	50	1.3	1.5	5	800	500	MBF	F15M08
FMB10F-15	1.5	1000	50	1.3	1.5	5	1000	500	MBF	F15M10
FMB1S-08	0.8	100	30	1.1	0.8	5	100	500	MBS	FMB1S
FMB2S-08	0.8	200	30	1.1	0.8	5	200	500	MBS	FMB2S
FMB4S-08	0.8	400	30	1.1	0.8	5	400	500	MBS	FMB4S
FMB6S-08	0.8	600	30	1.1	0.8	5	600	500	MBS	FMB6S
FMB8S-08	0.8	800	30	1.1	0.8	5	800	500	MBS	FMB8S
FMB10S-08	0.8	1000	30	1.1	0.8	5	1000	500	MBS	FMB10S
FMB1S-05	0.5	100	20	1.1	0.5	5	100	500	MBS	F05S1
FMB2S-05	0.5	200	20	1.1	0.5	5	200	500	MBS	F05S2
FMB4S-05	0.5	400	20	1.1	0.5	5	400	500	MBS	F05S4
FMB6S-05	0.5	600	20	1.1	0.5	5	600	500	MBS	F05S6

附录二： 快恢复整流桥(Fast recovery bridge).03

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		T_{rr}	Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)	(ns)		
FMB8S-05	0.5	800	20	1.1	0.5	5	800	500	MBS	F05S8
FMB10S-05	0.5	1000	20	1.1	0.5	5	1000	500	MBS	F05S10
FMB1S-10	1	100	35	1.3	1	5	100	500	MBS	U10S1
FMB2S-10	1	200	35	1.3	1	5	200	500	MBS	U10S2
FMB4S-10	1	400	35	1.3	1	5	400	500	MBS	U10S4
FMB6S-10	1	600	35	1.3	1	5	600	500	MBS	U10S6
FMB8S-10	1	800	35	1.3	1	5	800	500	MBS	U10S8
FMB10S-10	1	1000	35	1.3	1	5	1000	500	MBS	U10S10
FMB1S-12	1.2	100	40	1.1	1.2	5	100	500	MBS	F12S1
FMB2S-12	1.2	200	40	1.1	1.2	5	200	500	MBS	F12S2
FMB4S-12	1.2	400	40	1.1	1.2	5	400	500	MBS	F12S4
FMB6S-12	1.2	600	40	1.1	1.2	5	600	500	MBS	F12S6
FMB8S-12	1.2	800	40	1.1	1.2	5	800	500	MBS	F12S8
FMB10S-12	1.2	1000	40	1.1	1.2	5	1000	500	MBS	F12S10
FMB1S-15	1.5	100	50	1.1	1.5	5	100	500	MBS	F15S1
FMB2S-15	1.5	200	50	1.1	1.5	5	200	500	MBS	F15S2
FMB4S-15	1.5	400	50	1.1	1.5	5	400	500	MBS	F15S4
FMB6S-15	1.5	600	50	1.1	1.5	5	600	500	MBS	F15S6
FMB8S-15	1.5	800	50	1.1	1.5	5	800	500	MBS	F15S8
FMB10S-15	1.5	1000	50	1.1	1.5	5	1000	500	MBS	F15S10

附录三： 高效整流桥(High efficient rectifier bridge).01

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		T_{rr}	Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)	(ns)		
UTB1F-10	1	100	35	1	1	5	100	50	ABF	U10F01
UTB2F-10	1	200	35	1	1	5	200	50	ABF	U10F02
UTB4F-10	1	400	35	1.3	1	5	400	50	ABF	U10F04
UTB6F-10	1	600	35	1.5	1	5	600	75	ABF	U10F06
UTB8F-10	1	800	35	1.5	1	5	800	75	ABF	U10F08
UTB10F-10	1	1000	35	1.5	1	5	1000	75	ABF	U10F10
UTB1F-15	1.5	100	50	1	1	5	100	50	ABF	U15T1
UTB2F-15	1.5	200	50	1	1	5	200	50	ABF	U15T2
UTB4F-15	1.5	400	50	1.4	1	5	400	50	ABF	U15T4
UTB6F-15	1.5	600	50	1.6	1	5	600	75	ABF	U15T6
UTB8F-15	1.5	800	50	1.6	1	5	800	75	ABF	U15T8
UTB10F-15	1.5	1000	50	1.6	1	5	1000	75	ABF	U15T10
UTB1S-10	1	100	35	1	1	5	100	50	ABS	U10T01
UTB2S-10	1	200	35	1	1	5	200	50	ABS	U10T02
UTB4S-10	1	400	35	1.3	1	5	400	50	ABS	U10T04
UTB6S-10	1	600	35	1.5	1	5	600	75	ABS	U10T06
UTB8S-10	1	800	35	1.5	1	5	800	75	ABS	U10T08
UTB10S-10	1	1000	35	1.5	1	5	1000	75	ABS	U10T10
UTB1S-15	1.5	100	50	1	1	5	100	50	ABS	U15T1
UTB2S-15	1.5	200	50	1	1	5	200	50	ABS	U15T2
UTB4S-15	1.5	400	50	1.4	1	5	400	50	ABS	U15T4
UTB6S-15	1.5	600	50	1.6	1	5	600	75	ABS	U15T6
UTB8S-15	1.5	800	50	1.6	1	5	800	75	ABS	U15T8
UTB10S-15	1.5	1000	50	1.6	1	5	1000	75	ABS	U15T10
UMB1F-10	1	100	35	1	1	5	100	50	MBF	U10F1
UMB2F-10	1	200	35	1	1	5	200	50	MBF	U10F2
UMB4F-10	1	400	35	1.3	1	5	400	50	MBF	U10F4
UMB6F-10	1	600	35	1.5	1	5	600	75	MBF	U10F6
UMB8F-10	1	800	35	1.5	1	5	800	75	MBF	U10F8
UMB10F-10	1	1000	35	1.5	1	5	1000	75	MBF	U10F10
UMB1F-15	1.5	100	50	1	1.5	5	100	50	MBF	U15F1
UMB2F-15	1.5	200	50	1	1.5	5	200	50	MBF	U15F2
UMB4F-15	1.5	400	50	1.4	1.5	5	400	50	MBF	U15F4
UMB6F-15	1.5	600	50	1.6	1.5	5	600	75	MBF	U15F6
UMB8F-15	1.5	800	50	1.6	1.5	5	800	75	MBF	U15F8
UMB10F-15	1.5	1000	50	1.6	1.5	5	1000	75	MBF	U15F10
UMB1S-10	1	100	35	1	1	5	100	50	MBS	U10S1
UMB2S-10	1	200	35	1	1	5	200	50	MBS	U10S2
UMB4S-10	1	400	35	1.3	1	5	400	50	MBS	U10S4
UMB6S-10	1	600	35	1.5	1	5	600	75	MBS	U10S6

附录三： 高效整流桥(High efficient rectifier bridge).02

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		T_{rr}	Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)	(ns)		
UMB8S-10	1	800	35	1.5	1	5	800	75	MBS	U10S8
UMB10S-10	1	1000	35	1.5	1	5	1000	75	MBS	U10S10
UMB1S-15	1.5	100	50	1	1.5	5	100	50	MBS	U15S1
UMB2S-15	1.5	200	50	1	1.5	5	200	50	MBS	U15S2
UMB4S-15	1.5	400	50	1.4	1.5	5	400	50	MBS	U15S4
UMB6S-15	1.5	600	50	1.6	1.5	5	600	75	MBS	U15S6
UMB8S-15	1.5	800	50	1.6	1.5	5	800	75	MBS	U15S8
UMB10S-15	1.5	1000	50	1.6	1.5	5	1000	75	MBS	U15S10

附录四： 肖特基桥(Schottky bridge).01

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(μA)	V_R(V)		
TB14F	1	40	40	0.55	1	300	40	ABF	TB14F
TB16F	1	60	40	0.7	1	300	60	ABF	TB16F
TB18F	1	80	30	0.85	1	200	80	ABF	TB18F
TB110F	1	100	30	0.85	1	200	100	ABF	TB110F
TB120F	1	200	30	0.85	1	100	200	ABF	TB120F
TB24F	2	40	50	0.55	2	500	40	ABF	TB24F
TB26F	2	60	50	0.7	2	500	60	ABF	TB26F
TB28F	2	80	40	0.85	2	500	80	ABF	TB28F
TB210F	2	100	40	0.85	2	300	100	ABF	TB210F
TB220F	2	200	40	0.85	2	300	200	ABF	TB220F
TB34F	3	40	80	0.55	3	500	40	ABF	TB34F
TB36F	3	60	80	0.7	3	300	60	ABF	TB36F
TB38F	3	80	70	0.85	3	300	80	ABF	TB38F
TB310F	3	100	70	0.85	3	300	100	ABF	TB310F
TB320F	3	200	70	0.95	3	300	200	ABF	TB320F
TB14S	1	40	40	0.55	1	300	40	ABS	TB14S
TB16S	1	60	40	0.7	1	300	60	ABS	TB16S
TB18S	1	80	30	0.85	1	200	80	ABS	TB18S
TB110S	1	100	30	0.85	1	200	100	ABS	TB110S
TB120S	1	200	30	0.85	1	100	200	ABS	TB120S
TB24S	2	40	50	0.55	2	500	40	ABS	TB24S
TB26S	2	60	50	0.7	2	500	60	ABS	TB26S
TB28S	2	80	40	0.85	2	500	80	ABS	TB28S
TB210S	2	100	40	0.85	2	300	100	ABS	TB210S
TB220S	2	200	40	0.85	2	300	200	ABS	TB220S
TB34S	3	40	80	0.55	3	500	40	ABS	TB34S
TB36S	3	60	80	0.7	3	300	60	ABS	TB36S
TB38S	3	80	70	0.85	3	300	80	ABS	TB38S
TB310S	3	100	70	0.85	3	300	100	ABS	TB310S
TB320S	3	200	70	0.95	3	300	200	ABS	TB320S
MB14F	1	40	40	0.5	1	300	40	MBF	MB14F
MB16F	1	60	40	0.7	1	300	60	MBF	MB16F
MB18F	1	80	40	0.7	1	300	80	MBF	MB18F
MB110F	1	100	30	0.85	1	200	100	MBF	MB110F
MB115F	1	150	30	0.9	1	100	150	MBF	MB115F
MB120F	1	200	30	0.9	1	100	200	MBF	MB120F
MB24F	2	40	50	0.55	2	500	40	MBF	MB24F
MB26F	2	60	50	0.7	2	500	60	MBF	MB26F
MB28F	2	80	40	0.85	2	500	80	MBF	MB28F
MB210F	2	100	40	0.85	2	300	100	MBF	MB210F

附录四： 肖特基桥(Schottky bridge).02

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(μA)	V_R(V)		
MB220F	2	200	40	0.85	2	300	200	MBF	MB220F
MB34F	3	40	80	0.55	3	500	40	MBF	MB34F
MB36F	3	60	80	0.7	3	300	60	MBF	MB36F
MB38F	3	80	70	0.85	3	300	80	MBF	MB38F
MB310F	3	100	70	0.85	3	300	100	MBF	MB310F
MB320F	3	200	70	0.95	3	300	200	MBF	MB320F
MB14S	1	40	40	0.5	1	300	40	MBS	MB14S
MB16S	1	60	40	0.7	1	300	60	MBS	MB16S
MB18S	1	80	40	0.7	1	300	80	MBS	MB18S
MB110S	1	100	30	0.85	1	200	100	MBS	MB110S
MB115S	1	150	30	0.9	1	100	150	MBS	MB115S
MB120S	1	200	30	0.9	1	100	200	MBS	MB120S
MB24S	2	40	50	0.55	2	500	40	MBS	MB24S
MB26S	2	60	50	0.7	2	500	60	MBS	MB26S
MB28S	2	80	40	0.85	2	500	80	MBS	MB28S
MB210S	2	100	40	0.85	2	300	100	MBS	MB210S
MB220S	2	200	40	0.85	2	300	200	MBS	MB220S
MB34S	3	40	80	0.55	3	500	40	MBS	MB34S
MB36S	3	60	80	0.7	3	300	60	MBS	MB36S
MB38S	3	80	70	0.85	3	300	80	MBS	MB38S
MB310S	3	100	70	0.85	3	300	100	MBS	MB310S
MB320S	3	200	70	0.95	3	300	200	MBS	MB320S

附录五： 普通整流二极管(General rectifier diode).01

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)		
1N4001W	1	50	30	1.1	1	5	50	SOD-123FL	A1
1N4002W	1	100	30	1.1	1	5	100	SOD-123FL	A2
1N4003W	1	200	30	1.1	1	5	200	SOD-123FL	A3
1N4004W	1	400	30	1.1	1	5	400	SOD-123FL	A4
1N4005W	1	600	30	1.1	1	5	600	SOD-123FL	A5
1N4006W	1	800	30	1.1	1	5	800	SOD-123FL	A6
1N4007W	1	1000	30	1.1	1	5	1000	SOD-123FL	A7
GS1010FL	1	1000	30	1.1	1	5	1000	SOD-123FL	A7
S12AW	1.2	50	40	1	1.2	5	50	SOD-123FL	S12A
S12BW	1.2	100	40	1	1.2	5	100	SOD-123FL	S12B
S12DW	1.2	200	40	1	1.2	5	200	SOD-123FL	S12D
S12GW	1.2	400	40	1	1.2	5	400	SOD-123FL	S12G
S12JW	1.2	600	40	1	1.2	5	600	SOD-123FL	S12J
S12KW	1.2	800	40	1	1.2	5	800	SOD-123FL	S12K
S12MW	1.2	1000	40	1	1.2	5	1000	SOD-123FL	S12M
S15AW	1.5	50	50	1	1.5	5	50	SOD-123FL	S15A
S15BW	1.5	100	50	1	1.5	5	100	SOD-123FL	S15B
S15DW	1.5	200	50	1	1.5	5	200	SOD-123FL	S15D
S15GW	1.5	400	50	1	1.5	5	400	SOD-123FL	S15G
S15JW	1.5	600	50	1	1.5	5	600	SOD-123FL	S15J
S15KW	1.5	800	50	1	1.5	5	800	SOD-123FL	S15K
S15MW	1.5	1000	50	1	1.5	5	1000	SOD-123FL	S15M
S2AW	2	50	60	1.1	2	5	50	SOD-123FL	2A1
S2BW	2	100	60	1.1	2	5	100	SOD-123FL	2A2
S2DW	2	200	60	1.1	2	5	200	SOD-123FL	2A3
S2GW	2	400	60	1.1	2	5	400	SOD-123FL	2A4
S2JW	2	600	60	1.1	2	5	600	SOD-123FL	2A5
S2KW	2	800	60	1.1	2	5	800	SOD-123FL	2A6
S2MW	2	1000	60	1.1	2	5	1000	SOD-123FL	2A7
S1AF	1	50	30	1.1	1	5	50	SMAF	S1A
S1BF	1	100	30	1.1	1	5	100	SMAF	S1B
S1DF	1	200	30	1.1	1	5	200	SMAF	S1D
S1GF	1	400	30	1.1	1	5	400	SMAF	S1G
S1JF	1	600	30	1.1	1	5	600	SMAF	S1J
S1KF	1	800	30	1.1	1	5	800	SMAF	S1K
S1MF	1	1000	30	1.1	1	5	1000	SMAF	S1M
S2AF	2	50	50	1.1	2	5	50	SMAF	S2A
S2BF	2	100	50	1.1	2	5	100	SMAF	S2B
S2DF	2	200	50	1.1	2	5	200	SMAF	S2D
S2GF	2	400	50	1.1	2	5	400	SMAF	S2G
S2JF	2	600	50	1.1	2	5	600	SMAF	S2J
S2KF	2	800	50	1.1	2	5	800	SMAF	S2K

附录五： 普通整流二极管(General rectifier diode).02

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)		
S2MF	2	1000	50	1.1	2	5	1000	SMAF	S2M
S2AF-6	2	50	60	1.1	2	5	50	SMAF	S2A
S2BF-6	2	100	60	1.1	2	5	100	SMAF	S2B
S2DF-6	2	200	60	1.1	2	5	200	SMAF	S2D
S2GF-6	2	400	60	1.1	2	5	400	SMAF	S2G
S2JF-6	2	600	60	1.1	2	5	600	SMAF	S2J
S2KF-6	2	800	60	1.1	2	5	800	SMAF	S2K
S2MF-6	2	1000	60	1.1	2	5	1000	SMAF	S2M
S3AF	3	50	100	1.2	3	5	50	SMAF	S3A
S3BF	3	100	100	1.2	3	5	100	SMAF	S3B
S3DF	3	200	100	1.2	3	5	200	SMAF	S3D
S3GF	3	400	100	1.2	3	5	400	SMAF	S3G
S3JF	3	600	100	1.2	3	5	600	SMAF	S3J
S3KF	3	800	100	1.2	3	5	800	SMAF	S3K
S3MF	3	1000	100	1.2	3	5	1000	SMAF	S3M
M1	1	50	30	1.1	1	5	50	SMAF	M1
M2	1	100	30	1.1	1	5	100	SMAF	M2
M3	1	200	30	1.1	1	5	200	SMAF	M3
M4	1	400	30	1.1	1	5	400	SMAF	M4
M5	1	600	30	1.1	1	5	600	SMAF	M5
M6	1	800	30	1.1	1	5	800	SMAF	M6
M7	1	1000	30	1.1	1	5	1000	SMAF	M7
S1ABF	1	50	30	1.1	1	5	50	SMBF	S1AB
S1BBF	1	100	30	1.1	1	5	100	SMBF	S1BB
S1DBF	1	200	30	1.1	1	5	200	SMBF	S1DB
S1GBF	1	400	30	1.1	1	5	400	SMBF	S1GB
S1JBF	1	600	30	1.1	1	5	600	SMBF	S1JB
S1KBF	1	800	30	1.1	1	5	800	SMBF	S1KB
S1MBF	1	1000	30	1.1	1	5	1000	SMBF	S1MB
S2ABF	2	50	60	1.1	2	5	50	SMBF	S2AB
S2BBF	2	100	60	1.1	2	5	100	SMBF	S2BB
S2DBF	2	200	60	1.1	2	5	200	SMBF	S2DB
S2GBF	2	400	60	1.1	2	5	400	SMBF	S2GB
S2JBF	2	600	60	1.1	2	5	600	SMBF	S2JB
S2KBF	2	800	60	1.1	2	5	800	SMBF	S2KB
S2MBF	2	1000	60	1.1	2	5	1000	SMBF	S2MB
S3ABF	3	50	100	1.1	3	5	50	SMBF	S3AB
S3BBF	3	100	100	1.1	3	5	100	SMBF	S3BB
S3DBF	3	200	100	1.1	3	5	200	SMBF	S3DB
S3GBF	3	400	100	1.1	3	5	400	SMBF	S3GB
S3JBF	3	600	100	1.1	3	5	600	SMBF	S3JB
S3KBF	3	800	100	1.1	3	5	800	SMBF	S3KB
S3MBF	3	1000	100	1.1	3	5	1000	SMBF	S3MB

附录六： 快恢复二极管(Fast recovery diode).01

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		T_{rr}	Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)	(ns)		
FR101W	1	50	30	1.3	1	5	50	150	SOD-123FL	F1
FR102W	1	100	30	1.3	1	5	100	150	SOD-123FL	F2
FR103W	1	200	30	1.3	1	5	200	150	SOD-123FL	F3
FR104W	1	400	30	1.3	1	5	400	150	SOD-123FL	F4
FR105W	1	600	30	1.3	1	5	600	250	SOD-123FL	F5
FR106W	1	800	30	1.3	1	5	800	500	SOD-123FL	F6
FR107W	1	1000	30	1.3	1	5	1000	500	SOD-123FL	F7
RS12AW	1.2	50	40	1.3	1.2	5	50	150	SOD-123FL	RS1AW
RS12BW	1.2	100	40	1.3	1.2	5	100	150	SOD-123FL	RS1BW
RS12DW	1.2	200	40	1.3	1.2	5	200	150	SOD-123FL	RS1DW
RS12GW	1.2	400	40	1.3	1.2	5	400	150	SOD-123FL	RS1GW
RS12JW	1.2	600	40	1.3	1.2	5	600	250	SOD-123FL	RS1JW
RS12KW	1.2	800	40	1.3	1.2	5	800	500	SOD-123FL	RS1KW
RS12MW	1.2	1000	40	1.3	1.2	5	1000	500	SOD-123FL	RS1MW
RSL12KW	1.2	800	40	1	1.2	5	800	300	SOD-123FL	RL12K
RS2AW	2	50	50	1.3	2	5	50	150	SOD-123FL	RS2A
RS2BW	2	100	50	1.3	2	5	100	150	SOD-123FL	RS2B
RS2DW	2	200	50	1.3	2	5	200	150	SOD-123FL	RS2D
RS2GW	2	400	50	1.3	2	5	400	150	SOD-123FL	RS2G
RS2JW	2	600	50	1.3	2	5	600	250	SOD-123FL	RS2J
RS2KW	2	800	50	1.3	2	5	800	500	SOD-123FL	RS2K
RS2MW	2	1000	50	1.3	2	5	1000	500	SOD-123FL	RS2M
RS1AF	1	50	30	1.3	1	5	50	150	SMAF	RS1A
RS1BF	1	100	30	1.3	1	5	100	150	SMAF	RS1B
RS1DF	1	200	30	1.3	1	5	200	150	SMAF	RS1D
RS1GF	1	400	30	1.3	1	5	400	150	SMAF	RS1G
RS1JF	1	600	30	1.3	1	5	600	250	SMAF	RS1J
RS1KF	1	800	30	1.3	1	5	800	500	SMAF	RS1K
RS1MF	1	1000	30	1.3	1	5	1000	500	SMAF	RS1M
RS2AF	2	50	50	1.3	2	5	50	150	SMAF	RS2A
RS2BF	2	100	50	1.3	2	5	100	150	SMAF	RS2B
RS2DF	2	200	50	1.3	2	5	200	150	SMAF	RS2D
RS2GF	2	400	50	1.3	2	5	400	150	SMAF	RS2G
RS2JF	2	600	50	1.3	2	5	600	250	SMAF	RS2J
RS2KF	2	800	50	1.3	2	5	800	500	SMAF	RS2K
RS2MF	2	1000	50	1.3	2	5	1000	500	SMAF	RS2M
RS3AF	3	50	100	1.3	2	5	50	150	SMAF	RS3A
RS3BF	3	100	100	1.3	2	5	100	150	SMAF	RS3B
RS3DF	3	200	100	1.3	2	5	200	150	SMAF	RS3D
RS3GF	3	400	100	1.3	2	5	400	150	SMAF	RS3G
RS3JF	3	600	100	1.3	2	5	600	250	SMAF	RS3J
RS3KF	3	800	100	1.3	2	5	800	500	SMAF	RS3K

附录六： 快恢复二极管(Fast recovery diode).02

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		T_{rr}	Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)	(ns)		
RS3MF	3	1000	100	1.3	2	5	1000	500	SMAF	RS3M
RS1ABF	1	50	30	1.3	1	5	50	150	SMBF	R1AB
RS1BBF	1	100	30	1.3	1	5	100	150	SMBF	R1BB
RS1DBF	1	200	30	1.3	1	5	200	150	SMBF	R1DB
RS1GBF	1	400	30	1.3	1	5	400	150	SMBF	R1GB
RS1JBF	1	600	30	1.3	1	5	600	250	SMBF	R1JB
RS1KBF	1	800	30	1.3	1	5	800	500	SMBF	R1KB
RS1MBF	1	1000	30	1.3	1	5	1000	500	SMBF	R1MB
RS2ABF	2	50	50	1.3	2	5	50	150	SMBF	R2AB
RS2BBF	2	100	50	1.3	2	5	100	150	SMBF	R2BB
RS2DBF	2	200	50	1.3	2	5	200	150	SMBF	R2DB
RS2GBF	2	400	50	1.3	2	5	400	150	SMBF	R2GB
RS2JBF	2	600	50	1.3	2	5	600	250	SMBF	R2JB
RS2KBF	2	800	50	1.3	2	5	800	500	SMBF	R2KB
RS2MBF	2	1000	50	1.3	2	5	1000	500	SMBF	R2MB
RS3ABF	3	50	100	1.3	2	5	50	150	SMBF	R3AB
RS3BBF	3	100	100	1.3	2	5	100	150	SMBF	R3BB
RS3DBF	3	200	100	1.3	2	5	200	150	SMBF	R3DB
RS3GBF	3	400	100	1.3	2	5	400	150	SMBF	R3GB
RS3JBF	3	600	100	1.3	2	5	600	250	SMBF	R3JB
RS3KBF	3	800	100	1.3	2	5	800	500	SMBF	R3KB
RS3MBF	3	1000	100	1.3	2	5	1000	500	SMBF	R3MB

附录七： 高效整流二极管(High efficient rectifier diode).01

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		T_{rr}	Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)	(ns)		
US1AW	1	50	30	1	1	5	50	50	SOD-123FL	US1A
US1BW	1	100	30	1	1	5	100	50	SOD-123FL	US1B
US1DW	1	200	30	1	1	5	200	50	SOD-123FL	US1D
US1GW	1	400	30	1.4	1	5	400	50	SOD-123FL	US1G
US1JW	1	600	30	1.7	1	5	600	75	SOD-123FL	US1J
US1KW	1	800	30	1.7	1	5	800	75	SOD-123FL	US1K
US1MW	1	1000	30	1.7	1	5	1000	75	SOD-123FL	US1M
US2AW	2	50	50	1	2	5	50	50	SOD-123FL	US2A
US2BW	2	100	50	1	2	5	100	50	SOD-123FL	US2B
US2DW	2	200	50	1	2	5	200	50	SOD-123FL	US2D
US2GW	2	400	50	1.4	2	5	400	50	SOD-123FL	US2G
US2JW	2	600	50	1.7	2	5	600	75	SOD-123FL	US2J
US2KW	2	800	50	1.7	2	5	800	75	SOD-123FL	US2K
US2MW	2	1000	50	1.7	2	5	1000	75	SOD-123FL	US2M
US1AF	1	50	30	1	1	5	50	50	SMAF	US1A
US1BF	1	100	30	1	1	5	100	50	SMAF	US1B
US1DF	1	200	30	1	1	5	200	50	SMAF	US1D
US1GF	1	400	30	1.4	1	5	400	50	SMAF	US1G
US1JF	1	600	30	1.7	1	5	600	75	SMAF	US1J
US1KF	1	800	30	1.7	1	5	800	75	SMAF	US1K
US1MF	1	1000	30	1.7	1	5	1000	75	SMAF	US1M
US2AF	2	50	50	1	2	5	50	50	SMAF	US2A
US2BF	2	100	50	1	2	5	100	50	SMAF	US2B
US2DF	2	200	50	1	2	5	200	50	SMAF	US2D
US2GF	2	400	50	1.4	2	5	400	50	SMAF	US2G
US2JF	2	600	50	1.7	2	5	600	75	SMAF	US2J
US2KF	2	800	50	1.7	2	5	800	75	SMAF	US2K
US2MF	2	1000	50	1.7	2	5	1000	75	SMAF	US2M
US3AF	3	50	100	1	3	5	50	50	SMAF	US2A
US3BF	3	100	100	1	3	5	100	50	SMAF	US2B
US3DF	3	200	100	1	3	5	200	50	SMAF	US2D
US3GF	3	400	100	1.4	3	5	400	50	SMAF	US2G
US3JF	3	600	100	1.7	3	5	600	75	SMAF	US2J
US3KF	3	800	100	1.7	3	5	800	75	SMAF	US2K
US3MF	3	1000	100	1.7	3	5	1000	75	SMAF	US2M
US1ABF	1	50	30	1	1	5	50	50	SMBF	U1AB
US1BBF	1	100	30	1	1	5	100	50	SMBF	U1BB
US1DBF	1	200	30	1	1	5	200	50	SMBF	U1DB
US1GBF	1	400	30	1.4	1	5	400	50	SMBF	U1GB
US1JBF	1	600	30	1.7	1	5	600	75	SMBF	U1JB
US1KBF	1	800	30	1.7	1	5	800	75	SMBF	U1KB
US1MBF	1	1000	30	1.7	1	5	1000	75	SMBF	U1MB

附录七： 高效整流二极管(High efficient rectifier diodes).02

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		T_{rr}	Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)	(ns)		
US2ABF	2	50	50	1	2	5	50	50	SMBF	U2AB
US2BBF	2	100	50	1	2	5	100	50	SMBF	U2BB
US2DBF	2	200	50	1	2	5	200	50	SMBF	U2DB
US2GBF	2	400	50	1.4	2	5	400	50	SMBF	U2GB
US2JBF	2	600	50	1.7	2	5	600	75	SMBF	U2JB
US2KBF	2	800	50	1.7	2	5	800	75	SMBF	U2KB
US2MBF	2	1000	50	1.7	2	5	1000	75	SMBF	U2MB
US3ABF	3	50	100	1	3	5	50	50	SMBF	U2AB
US3BBF	3	100	100	1	3	5	100	50	SMBF	U2BB
US3DBF	3	200	100	1	3	5	200	50	SMBF	U2DB
US3GBF	3	400	100	1.4	3	5	400	50	SMBF	U2GB
US3JBF	3	600	100	1.7	3	5	600	75	SMBF	U2JB
US3KBF	3	800	100	1.7	3	5	800	75	SMBF	U2KB
US3MBF	3	1000	100	1.7	3	5	1000	75	SMBF	U2MB
MUR460BF	4	6	125	1.3	4	10	600	50	SMBF	U460B

附录八： 超快恢复二极管(Ultrafast recovery diode).01

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		T_{rr}	Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)	(ns)		
ES1AW	1	50	25	1	1	5	50	35	SOD-123FL	ESL
ES1BW	1	100	25	1	1	5	100	35	SOD-123FL	ESL
ES1DW	1	200	25	1	1	5	200	35	SOD-123FL	ESL
ES1EW	1	300	25	1.25	1	5	300	35	SOD-123FL	ESM
ES1GW	1	400	25	1.25	1	5	400	35	SOD-123FL	ESM
ES1JW	1	600	25	1.7	1	5	600	35	SOD-123FL	ESH
ES2AW	2	50	50	1	2	5	50	35	SOD-123FL	E2L
ES2BW	2	100	50	1	2	5	100	35	SOD-123FL	E2L
ES2DW	2	200	50	1	2	5	200	35	SOD-123FL	E2L
ES2EW	2	300	50	1.25	2	5	300	35	SOD-123FL	E2M
ES2GW	2	400	50	1.25	2	5	400	35	SOD-123FL	E2M
ES2JW	2	600	50	1.7	2	5	600	35	SOD-123FL	E2H
ES1AF	1	50	30	1	1	5	50	35	SMAF	ES1A
ES1BF	1	100	30	1	1	5	100	35	SMAF	ES1B
ES1DF	1	200	30	1	1	5	200	35	SMAF	ES1D
ES1EF	1	300	30	1.25	1	5	300	35	SMAF	ES1E
ES1GF	1	400	30	1.25	1	5	400	35	SMAF	ES1G
ES1JF	1	600	30	1.7	1	5	600	35	SMAF	ES1J
ES2AF	2	50	50	1	2	5	50	35	SMAF	ES2A
ES2BF	2	100	50	1	2	5	100	35	SMAF	ES2B
ES2DF	2	200	50	1	2	5	200	35	SMAF	ES2D
ES2EF	2	300	50	1.25	2	5	300	35	SMAF	ES2E
ES2GF	2	400	50	1.25	2	5	400	35	SMAF	ES2G
ES2JF	2	600	50	1.7	2	5	600	35	SMAF	ES2J
ES3AF	3	50	100	1	3	5	50	35	SMAF	ES3A
ES3BF	3	100	100	1	3	5	100	35	SMAF	ES3B
ES3DF	3	200	100	1	3	5	200	35	SMAF	ES3D
ES3EF	3	300	100	1.25	3	5	300	35	SMAF	ES3E
ES3GF	3	400	100	1.25	3	5	400	35	SMAF	ES3G
ES3JF	3	600	100	1.7	3	5	600	35	SMAF	ES3J
ES1ABF	1	50	35	1	1	5	50	35	SMBF	E1AB
ES1BBF	1	100	35	1	1	5	100	35	SMBF	E1BB
ES1DBF	1	200	35	1	1	5	200	35	SMBF	E1DB
ES1EBF	1	300	35	1.25	1	5	300	35	SMBF	E1EB
ES1GBF	1	400	35	1.25	1	5	400	35	SMBF	E1GB
ES1JBF	1	600	35	1.65	1	5	600	35	SMBF	E1JB
ES2ABF	2	50	50	1	2	5	50	35	SMBF	E2AB
ES2BBF	2	100	50	1	2	5	100	35	SMBF	E2BB
ES2DBF	2	200	50	1	2	5	200	35	SMBF	E2DB
ES2EBF	2	300	50	1.25	2	5	300	35	SMBF	E2EB
ES2GBF	2	400	50	1.25	2	5	400	35	SMBF	E2GB
ES2JBF	2	600	50	1.65	2	5	600	35	SMBF	E2JB

附录八： 超快恢复二极管(Ultrafast recovery diode).02

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		T_{rr}	Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(uA)	V_R(V)	(ns)		
ES3ABF	3	50	100	1	3	5	50	35	SMBF	E3AB
ES3BBF	3	100	100	1	3	5	100	35	SMBF	E3BB
ES3DBF	3	200	100	1	3	5	200	35	SMBF	E3DB
ES3EBF	3	300	100	1.25	3	5	300	35	SMBF	E3EB
ES3GBF	3	400	100	1.25	3	5	400	35	SMBF	E3GB
ES3JBF	3	600	100	1.65	3	5	600	35	SMBF	E3JB

附录九： 肖特基二极管(Schottky diode).01

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(mA)	$V_{R(V)}$		
DS12W	1	20	40	0.55	1	0.3	20	SOD-123FL	S12
DS14W	1	40	40	0.55	1	0.3	40	SOD-123FL	S14
DS16W	1	60	40	0.70	1	0.3	60	SOD-123FL	S16
DS18W	1	80	40	0.70	1	0.3	80	SOD-123FL	S18
DS110W	1	100	30	0.85	1	0.2	100	SOD-123FL	S110
DS112W	1	120	30	0.85	1	0.2	120	SOD-123FL	S112
DS115W	1	150	30	0.90	1	0.1	150	SOD-123FL	S115
DS120W	1	200	30	0.90	1	0.1	200	SOD-123FL	S120
DS22W	2	20	50	0.55	2	0.5	20	SOD-123FL	S22
DS24W	2	40	50	0.55	2	0.5	40	SOD-123FL	S24
DS26W	2	60	50	0.70	2	0.5	60	SOD-123FL	S26
DS28W	2	80	50	0.70	2	0.3	80	SOD-123FL	S28
DS210W	2	100	40	0.85	2	0.3	100	SOD-123FL	S210
DS212W	2	120	40	0.85	2	0.3	120	SOD-123FL	S212
DS215W	2	150	40	0.95	2	0.3	150	SOD-123FL	S215
DS220W	2	200	40	0.95	2	0.3	200	SOD-123FL	S220
DS32W	3	20	80	0.55	3	0.5	20	SOD-123FL	S32
DS34W	3	40	80	0.55	3	0.5	40	SOD-123FL	S34
DS36W	3	60	80	0.70	3	0.3	60	SOD-123FL	S36
DS38W	3	80	80	0.70	3	0.3	80	SOD-123FL	S38
DS310W	3	100	70	0.85	3	0.3	100	SOD-123FL	S310
DS312W	3	120	70	0.85	3	0.3	120	SOD-123FL	S312
DS315W	3	150	70	0.95	3	0.3	150	SOD-123FL	S315
DS320W	3	200	70	0.95	3	0.3	200	SOD-123FL	S320
1N5817W	1	20	25	0.45	1	0.3	20	SOD-123FL	12A
1N5818W	1	30	25	0.55	1	0.2	30	SOD-123FL	13A
1N5819W	1	40	25	0.60	1	0.1	40	SOD-123FL	14A
DSL12W	1	20	40	0.45	1	0.3	20	SOD-123FL	SL12
DSL14W	1	40	40	0.45	1	0.2	40	SOD-123FL	SL14
DSL16W	1	60	40	0.50	1	0.2	60	SOD-123FL	SL16
SS12F	1	20	40	0.55	1	0.3	20	SMAF	SS12
SS14F	1	40	40	0.55	1	0.3	40	SMAF	SS14
SS16F	1	60	40	0.70	1	0.3	60	SMAF	SS16
SS18F	1	80	40	0.70	1	0.3	80	SMAF	SS18
SS110F	1	100	30	0.85	1	0.2	100	SMAF	SS110
SS112F	1	120	30	0.85	1	0.2	120	SMAF	SS112
SS115F	1	150	30	0.90	1	0.1	150	SMAF	SS115
SS120F	1	200	30	0.90	1	0.1	200	SMAF	SS120
SS22F	2	20	50	0.55	2	0.5	20	SMAF	SS22
SS24F	2	40	50	0.55	2	0.5	40	SMAF	SS24
SS26F	2	60	50	0.70	2	0.5	60	SMAF	SS26
SS28F	2	80	50	0.70	2	0.5	80	SMAF	SS28

附录九： 肖特基二极管(Schottky diode).02

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(mA)	$V_{R(V)}$		
SS210F	2	100	40	0.85	2	0.3	100	SMAF	SS210
SS212F	2	120	40	0.85	2	0.3	120	SMAF	SS212
SS215F	2	150	40	0.95	2	0.3	150	SMAF	SS215
SS220F	2	200	40	0.95	2	0.3	200	SMAF	SS220
SS32F	3	20	80	0.55	3	0.5	20	SMAF	SS32
SS34F	3	40	80	0.55	3	0.5	40	SMAF	SS34
SS36F	3	60	80	0.70	3	0.3	60	SMAF	SS36
SS38F	3	80	80	0.70	3	0.3	80	SMAF	SS38
SS310F	3	100	70	0.85	3	0.3	100	SMAF	SS310
SS312F	3	120	70	0.85	3	0.3	120	SMAF	SS312
SS315F	3	150	70	0.95	3	0.3	150	SMAF	SS315
SS320F	3	200	70	0.95	3	0.3	200	SMAF	SS320
SS52F	5	20	150	0.45	5	1	20	SMAF	SS52
SS54F	5	40	150	0.55	5	1	40	SMAF	SS54
SS56F	5	60	150	0.70	5	1	60	SMAF	SS56
SS58F	5	80	150	0.70	5	1	80	SMAF	SS58
SS510F	5	100	150	0.85	5	1	100	SMAF	SS510
SS512F	5	120	150	0.85	5	1	120	SMAF	SS512
SS515F	5	150	150	0.85	5	1	150	SMAF	SS515
SS520F	5	200	150	0.85	5	1	200	SMAF	SS520
SSL12F	1	20	40	0.45	1	0.3	20	SMAF	SSL12
SSL14F	1	40	40	0.45	1	0.2	40	SMAF	SSL14
SSL16F	1	60	40	0.50	1	0.2	60	SMAF	SSL16
SSL24F	2	40	50	0.45	2	0.5	40	SMAF	SSL24
SSL26F	2	60	40	0.52	2	0.3	60	SMAF	SSL26
SSL34F	3	40	80	0.45	3	0.3	40	SMAF	SSL34
SSL54F	5	40	150	0.45	5	1	40	SMAF	SSL54
SSL56F	5	60	150	0.55	5	1	60	SMAF	SSL56
SS32BF	3	20	80	0.55	3	0.5	20	SMBF	S32B
SS34BF	3	40	80	0.55	3	0.5	40	SMBF	S34B
SS36BF	3	60	80	0.70	3	0.3	60	SMBF	S36B
SS38BF	3	80	80	0.70	3	0.3	80	SMBF	S38B
SS310BF	3	100	70	0.85	3	0.3	100	SMBF	S310B
SS312BF	3	120	70	0.85	3	0.3	120	SMBF	S312B
SS315BF	3	150	70	0.95	3	0.3	150	SMBF	S315B
SS320BF	3	200	70	0.95	3	0.3	200	SMBF	S320B
SS52BF	5	20	150	0.45	5	1	20	SMBF	S52B
SS54BF	5	40	150	0.55	5	1	40	SMBF	S54B
SS56BF	5	60	150	0.70	5	1	60	SMBF	S56B
SS58BF	5	80	150	0.70	5	1	80	SMBF	S58B
SS510BF	5	100	150	0.85	5	1	100	SMBF	S510B
SS512BF	5	120	150	0.85	5	1	120	SMBF	S512B

附录九： 肖特基二极管(Schottky diode).03

Type	I_o	V_{RRM}	I_{FSM}	V_F		I_R		Package Outline	Marking code
	(A)	(V)	(A)	(V)	I_F	(mA)	$V_{R(V)}$		
SS515BF	5	150	150	0.85	5	1	150	SMBF	S515B
SS520BF	5	200	150	0.85	5	1	200	SMBF	S520B
SSL54BF	5	40	160	0.45	5	1	40	SMBF	SL54B
MBR10A100CT	10	100	150	0.85	10	5	100	TO-220	MBR10A100CT
MBR20A100CT	20	100	150	0.79	20	5	100	TO-220	MBR20A100CT
MBR20L150CT	20	150	200	0.65	20	5	150	TO-220	MBR20L150CT
MBR20L200CT	20	200	200	0.72	20	5	200	TO-220	MBR20L200CT
MBR20A200CT	20	300	150	0.88	20	5	200	TO-220	MBR20A200CT

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