SAMWIN SW P 3205

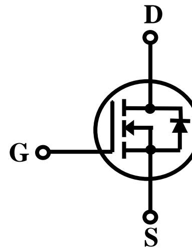
Features

- N-Channel MOSFET
- BV_{DSS} (Minimum) : 55 V
- $R_{DS(ON)}$ (Maximum) : 8.0 mohm
- I_D : 110 A
- Qg (Typical) : 146 nc
- P_D (@TC=25 ℃) : 200 W

General Description

This power MOSFET is produced with advanced VDMOS 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. It is mainly suitable for half bridge or full bridge resonant topology like a electronic ballast, and also low power switching mode power appliances.

TO-220
SW P 3205



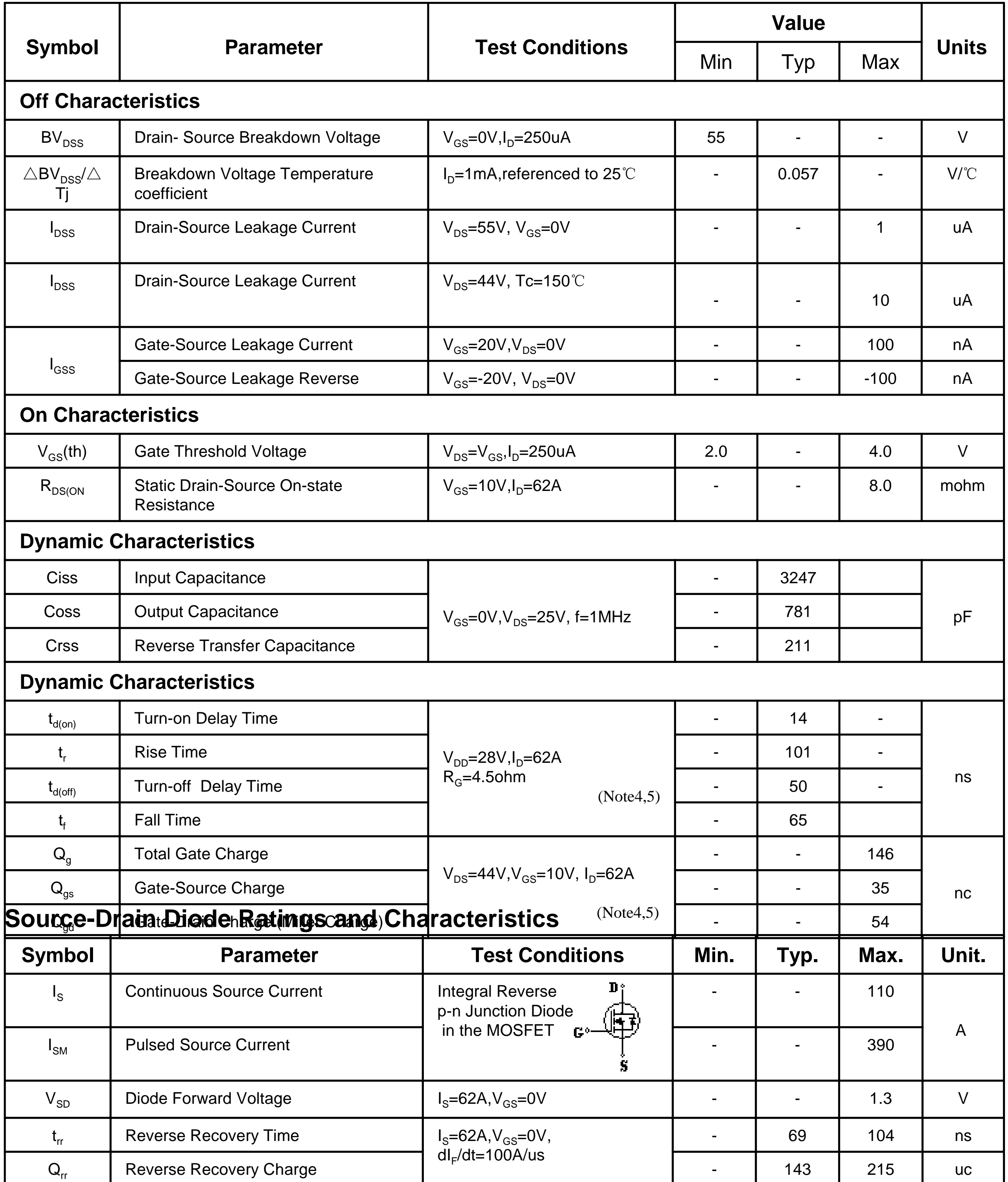
Absolute Maximum Ratings

Symbol	Parameter	Value	Units
V_{DSS}	Drain to Source Voltage	60	V
I_D	Continuous Drain Current (@Tc=25℃)	110	A
	Continuous Drain Current (@Tc=100℃)	80	A
I_{DM}	Drain Current Pulsed (Note 1)	390	A
V_{GS}	Gate to Source Voltage	±20	V
E_{AS}	Single Pulsed Avalanche Energy (Note 2)	480	mJ
E_{AR}	Repetitive Avalanche Energy (Note 1)	20	mJ
dv/dt	Peak Diode Recovery dv/dt (Note 3)	5.0	V/ns
P_D	Total Power Dissipation (@Tc=25℃)	200	W
	Derating Factor above 25℃	1.3	W/℃
T_{STG},T_J	Operating junction temperature &Storage temperature	-55 ~ +175	℃
T_L	Maximum Lead Temperature for soldering purpose, 1/8 from Case for 5 seconds.		℃

Thermal Characteristics

Symbol	Parameter	Value			Units
		Min	Typ	Max	
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	-	-	0.75	℃/ W
$R_{\theta CS}$	Thermal Resistance, Case-to-Sink	-	0.50	-	℃/ W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	-	-	62.0	℃/ W

Electrical Characteristics (Tc=25℃ unless otherwise noted)



Symbol	Parameter	Test Conditions	Value Min	Value Typ	Value Max	Units
Off Characteristics						
BV_{DSS}	Drain- Source Breakdown Voltage	V_{GS}=0V,I_D=250uA	55	-	-	V
$\triangle BV_{DSS}/\triangle Tj$	Breakdown Voltage Temperature coefficient	I_D=1mA,referenced to 25℃	-	0.057	-	V/℃
I_{DSS}	Drain-Source Leakage Current	V_{DS}=55V, V_{GS}=0V	-	-	1	uA
I_{DSS}	Drain-Source Leakage Current	V_{DS}=44V, Tc=150℃	-	-	10	uA
I_{GSS}	Gate-Source Leakage Current	V_{GS}=20V,V_{DS}=0V	-	-	100	nA
	Gate-Source Leakage Reverse	V_{GS}=-20V, 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
$R_{DS(ON}$	Static Drain-Source On-state Resistance	V_{GS}=10V,I_D=62A	-	-	8.0	mohm
Dynamic Characteristics						
Ciss	Input Capacitance	V_{GS}=0V,V_{DS}=25V, f=1MHz	-	3247		pF
Coss	Output Capacitance		-	781		
Crss	Reverse Transfer Capacitance		-	211		
Dynamic Characteristics						
$t_{d(on)}$	Turn-on Delay Time	V_{DD}=28V,I_D=62A R_G=4.5ohm (Note4,5)	-	14	-	ns
t_r	Rise Time		-	101	-	
$t_{d(off)}$	Turn-off Delay Time		-	50	-	
t_f	Fall Time		-	65		
Q_g	Total Gate Charge	V_{DS}=44V,V_{GS}=10V, I_D=62A (Note4,5)	-	-	146	nc
Q_{gs}	Gate-Source Charge		-	-	35	
Q_{gd}	Gate-Drain Charge (Miller Charge)		-	-	54	

Source-Drain Diode Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit.
I_S	Continuous Source Current	Integral Reverse p-n Junction Diode in the MOSFET (D, G, S)	-	-	110	A
I_{SM}	Pulsed Source Current		-	-	390	
V_{SD}	Diode Forward Voltage	I_S=62A,V_{GS}=0V	-	-	1.3	V
t_{rr}	Reverse Recovery Time	I_S=62A,V_{GS}=0V, dI_F/dt=100A/us	-	69	104	ns
Q_{rr}	Reverse Recovery Charge		-	143	215	uc

※**NOTES**

1. Repeativity rating: pulse width limited by junction temperature
2. L=138uH,I_{AS}=62A,V_{DD}=25V,RG=25ohm, Starting TJ=25℃
3. I_{SD}≤62A,di/dt≤207A/us,V_{DD}≤BV_{DSS}, Starting TJ=175℃
4. Pulse Test: Pulse Width≤400us,Duty Cycle≤2%
5. Essentially independent of operating temperature.

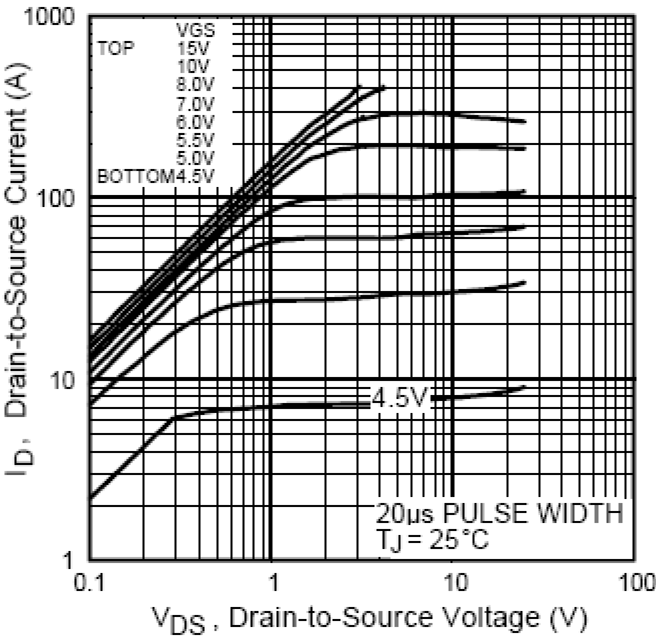


Fig 1. Typical Output Characteristics

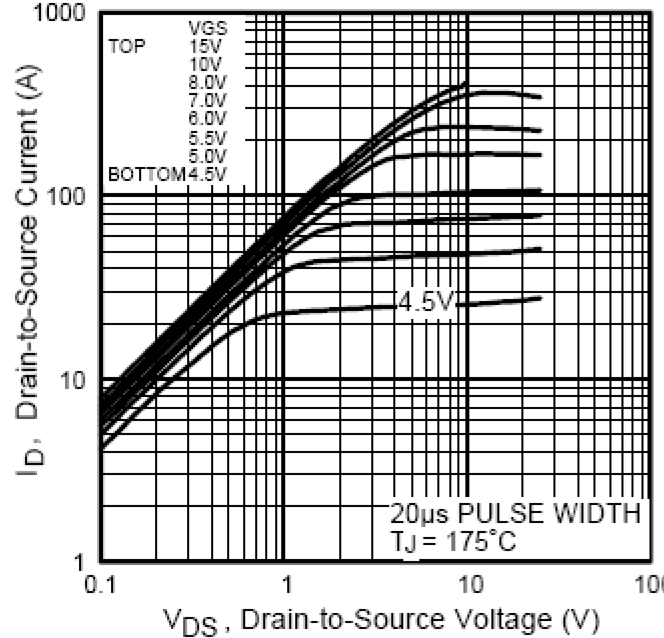


Fig 2. Typical Output Characteristics

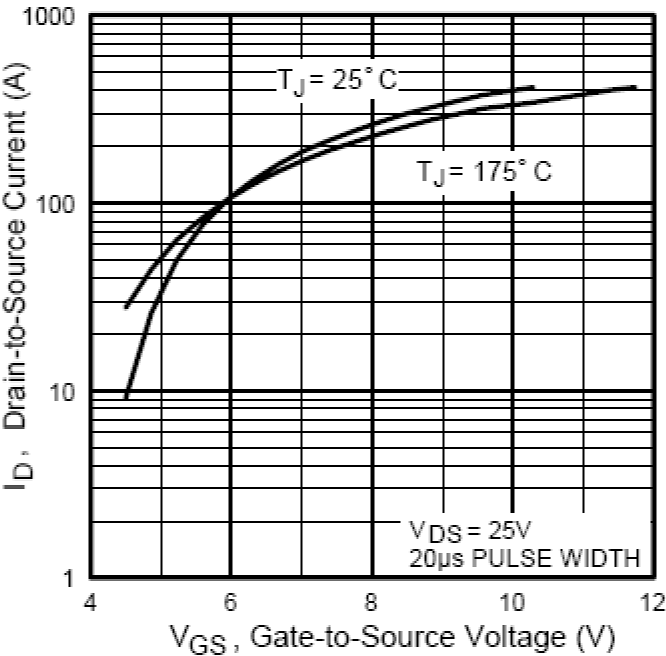


Fig 3. Typical Transfer Characteristics

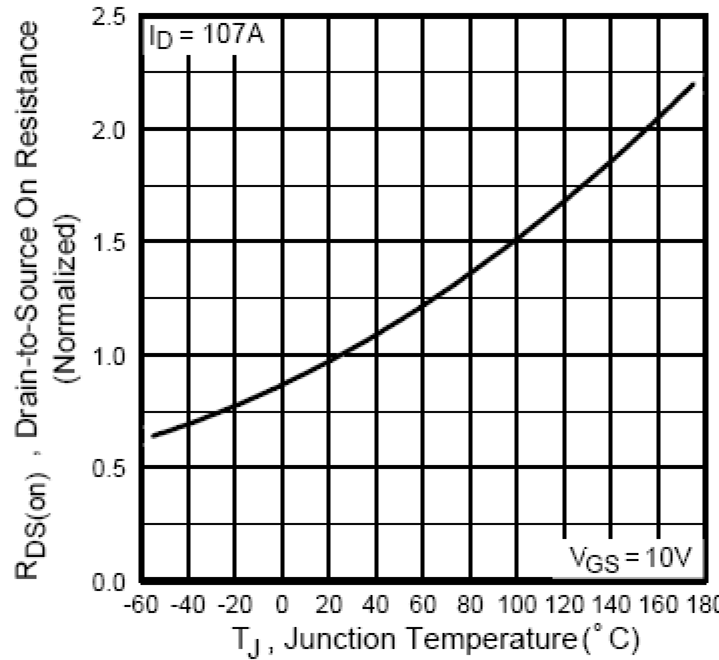


Fig 4. Normalized On-Resistance Vs. Temperature

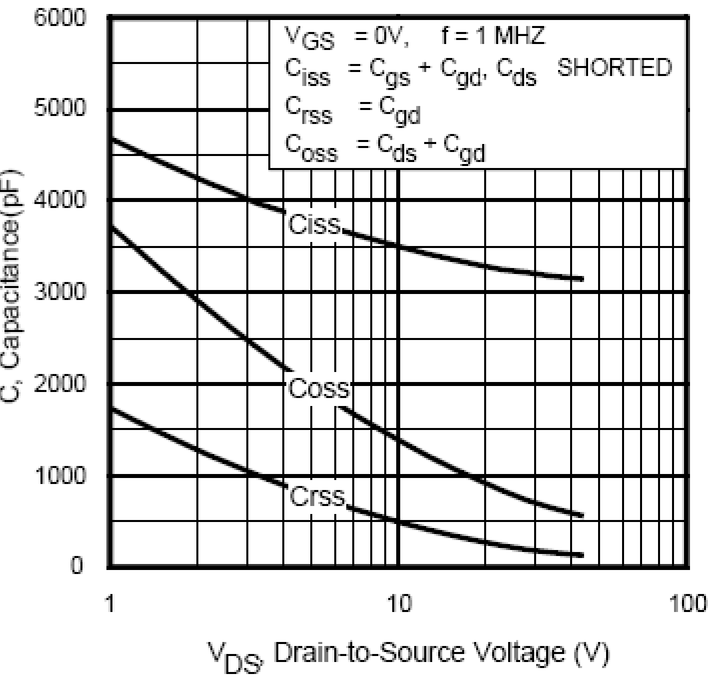


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

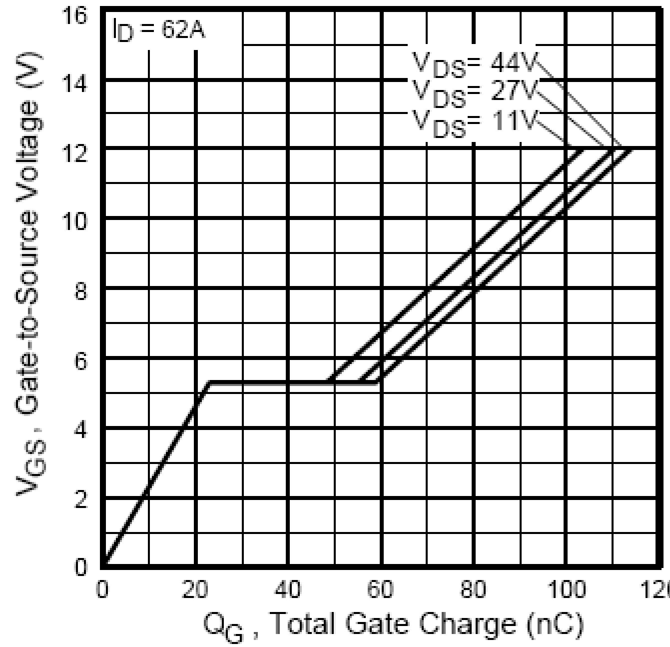
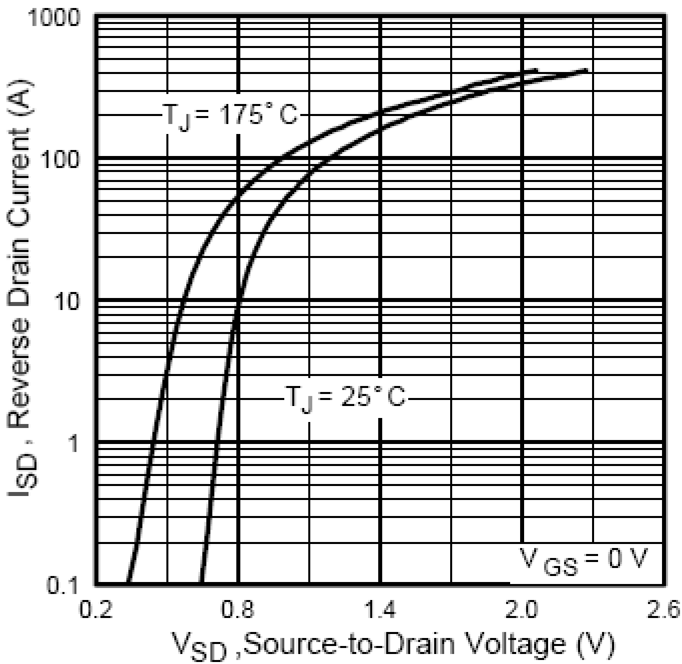
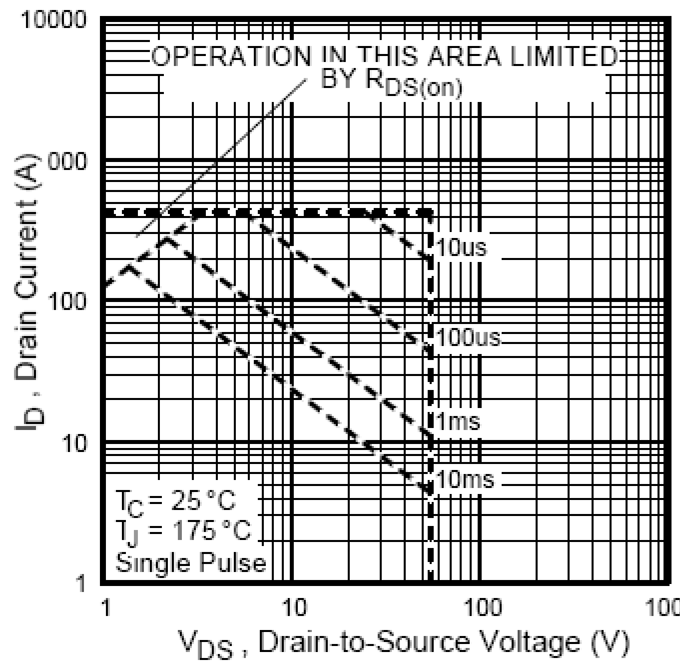
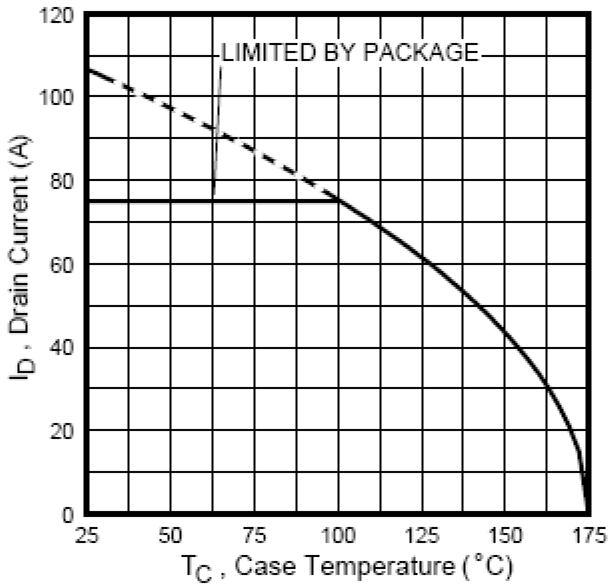


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage







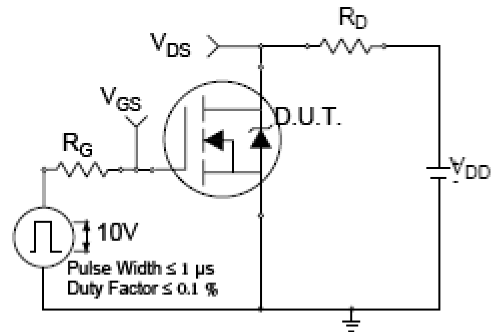


Fig 10a. Switching Time Test Circuit

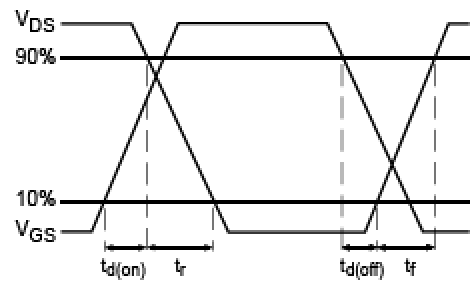


Fig 9. Maximum Drain Current Vs. Case Temperature

Fig 10b. Switching Time Waveforms

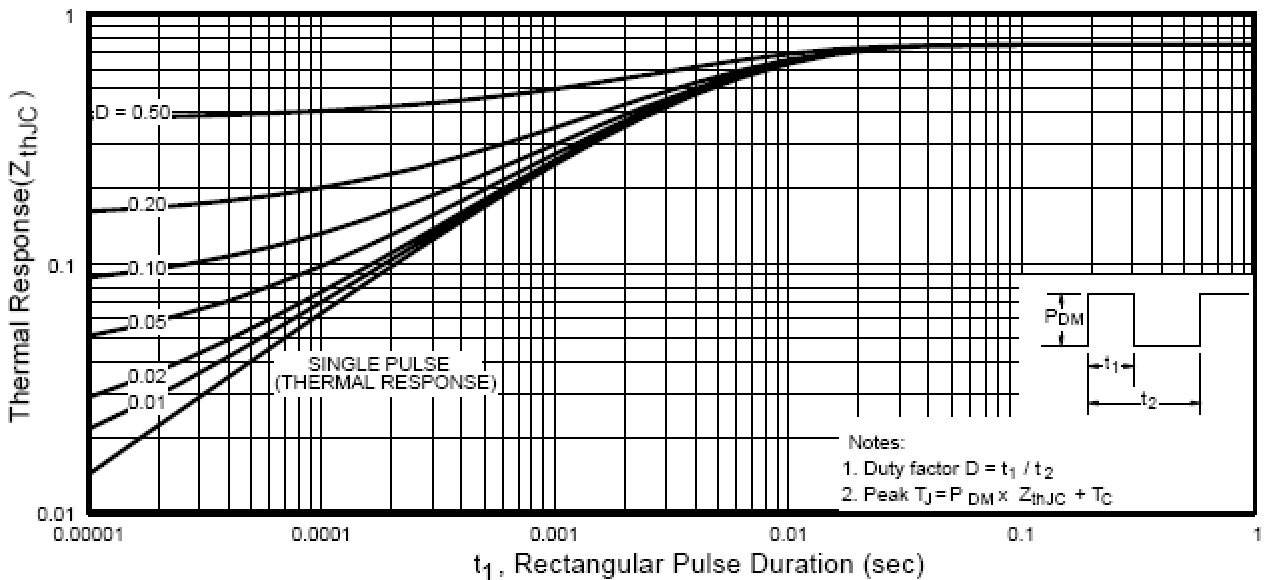


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

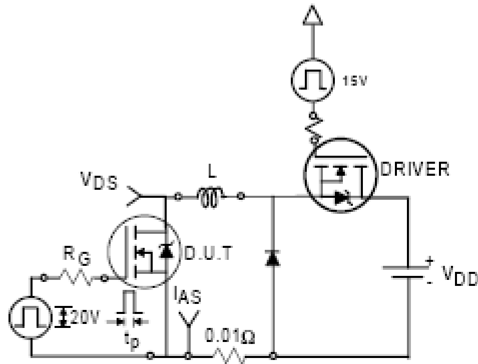


Fig 12a. Unclamped Inductive Test Circuit

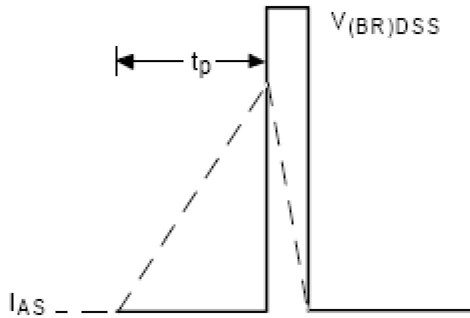


Fig 12b. Unclamped Inductive Waveforms

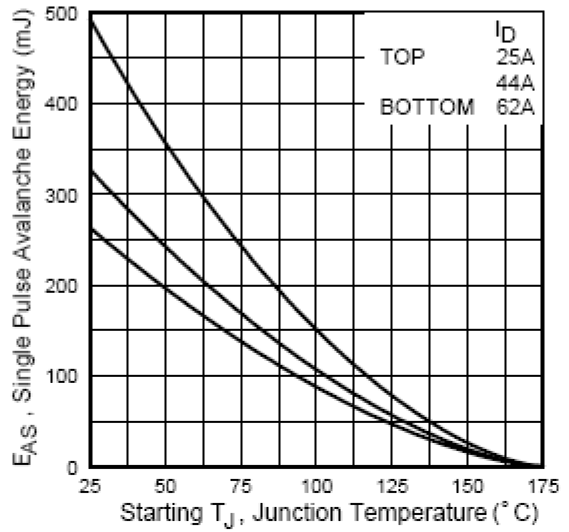


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

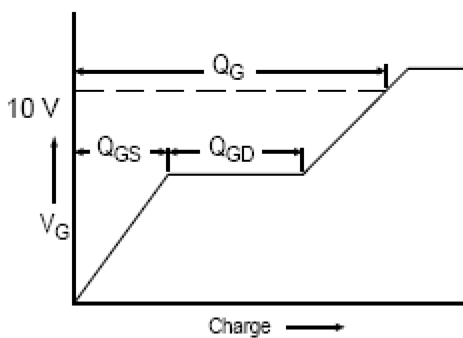


Fig 13a. Basic Gate Charge Waveform

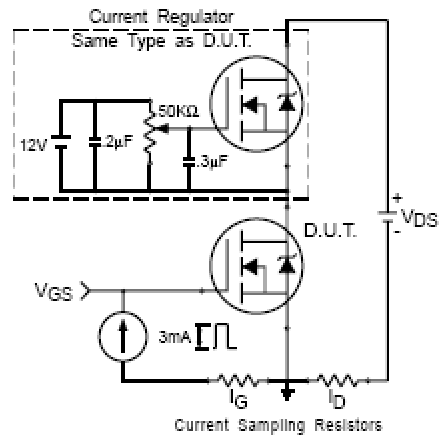
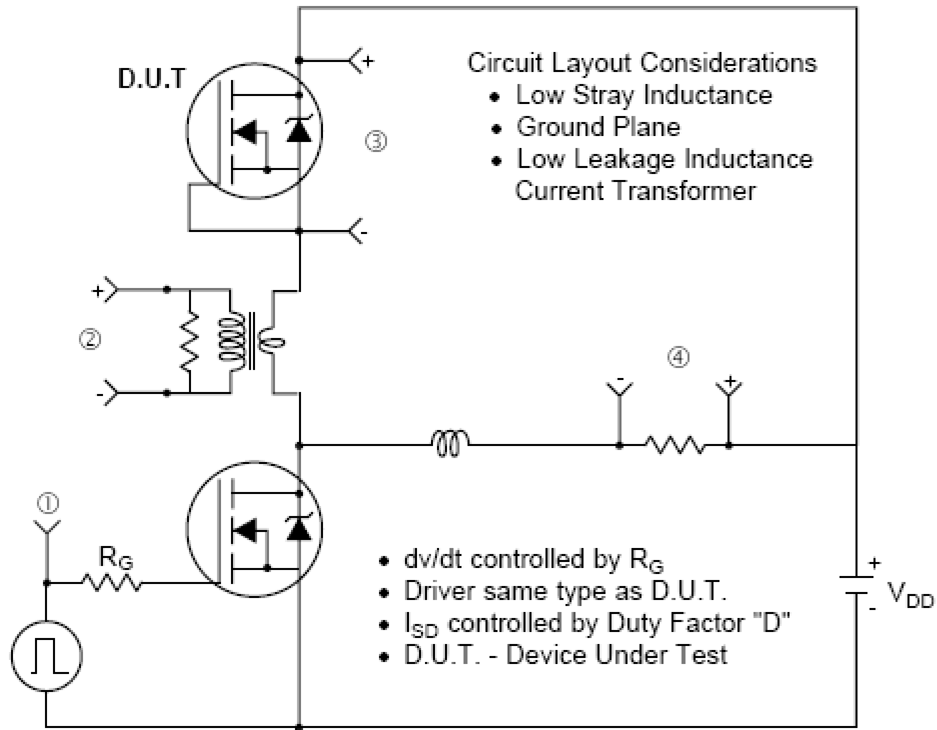
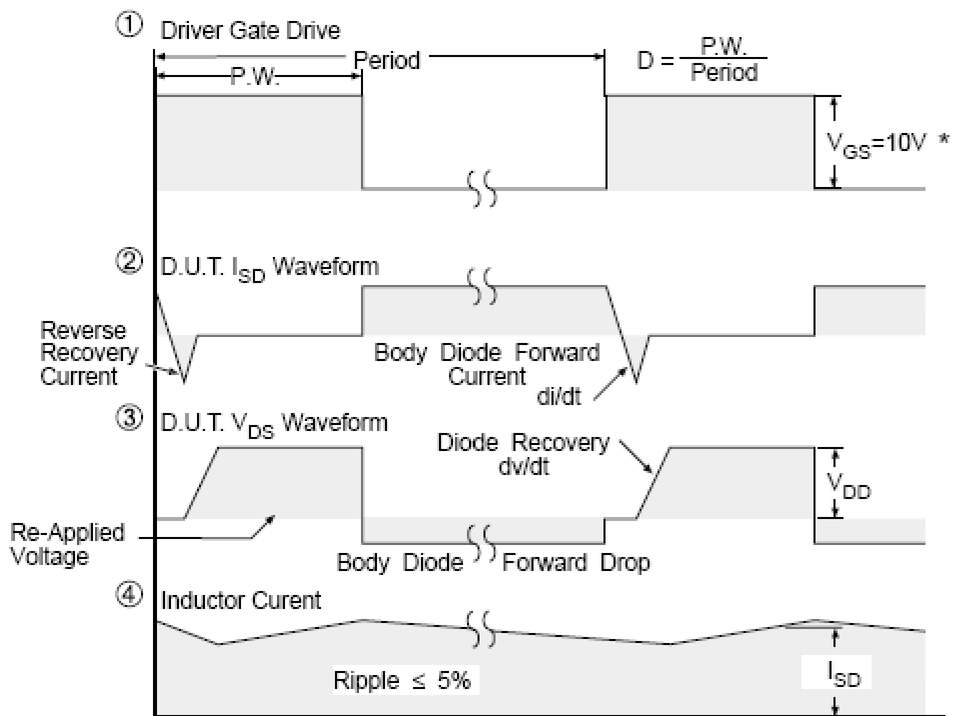


Fig 13b. Gate Charge Test Circuit

Peak Diode Recovery dv/dt Test Circuit





* V_{GS} = 5V for Logic Level Devices