

Main Product Characteristics

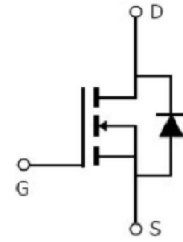
V_{DSS}	55V
$R_{DS(on)}$	4.5mohm(typ.)
I_D	110A



TO-220



Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced trench MOSFET process technology
- Special designed for PWM, load switching and general purpose applications
- Ultra low on-resistance with low gate charge
- Fast switching and reverse body recovery
- 175°C operating temperature
- Lead free product



Description

It utilizes the latest trench processing techniques to achieve the high cell density and reduces the on-resistance with high repetitive avalanche rating. These features combine to make this design an extremely efficient and reliable device for use in power switching application and a wide variety of other applications.

Absolute Max Rating

Symbol	Parameter	Max.	Units
$I_D @ TC = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ①	110	A
$I_D @ TC = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ①	80	
I_{DM}	Pulsed Drain Current②	440	
$P_D @ TC = 25^\circ C$	Power Dissipation③	205	W
	Linear Derating Factor	2.0	W/°C
V_{DS}	Drain-Source Voltage	55	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ $L=0.3mH$ ②	375	mJ
I_{AR}	Avalanche Current @ $L=0.3mH$ ②	50	A
$T_J \quad T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +175	°C

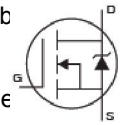
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ^③	—	0.73	$^{\circ}C/W$
$R_{\theta JA}$	Junction-to-ambient ($t \leq 10s$) ^④	—	62	$^{\circ}C/W$
	Junction-to-Ambient (PCB mounted, steady-state) ^④	—	40	$^{\circ}C/W$

Electrical Characteristics @ $T_A=25^{\circ}C$ unless otherwise specified

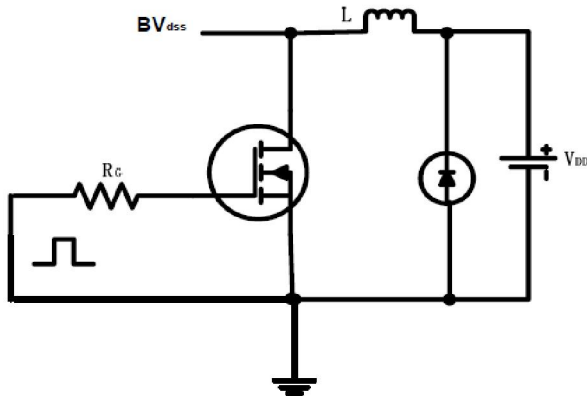
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	55	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	4.5	5.5	m Ω	$V_{GS}=10V, I_D = 68A$
		—	7	—		$T_J = 125^{\circ}C$
$V_{GS(th)}$	Gate threshold voltage	2.5	—	3.5	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
		—	2.4	—		$T_J = 125^{\circ}C$
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	$V_{DS} = 55V, V_{GS} = 0V$
		—	—	50		$T_J = 125^{\circ}C$
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 20V$
		-100	—	—		$V_{GS} = -20V$
Q_g	Total gate charge	—	124.7	—	nC	$I_D = 30A,$ $V_{DS}=30V,$ $V_{GS} = 10V$
Q_{gs}	Gate-to-Source charge	—	24.46	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	48.68	—		
$t_{d(on)}$	Turn-on delay time	—	19.62	—	ns	$V_{GS}=10V, V_{DS}=30V,$ $R_L=15\Omega,$ $R_{GEN}=2.55\Omega$
t_r	Rise time	—	18.82	—		
$t_{d(off)}$	Turn-Off delay time	—	69.76	—		
t_f	Fall time	—	30.12	—		
C_{iss}	Input capacitance	—	5607	—	pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 600KHz$
C_{oss}	Output capacitance	—	463	—		
C_{rss}	Reverse transfer capacitance	—	454	—		

Source-Drain Ratings and Characteristics

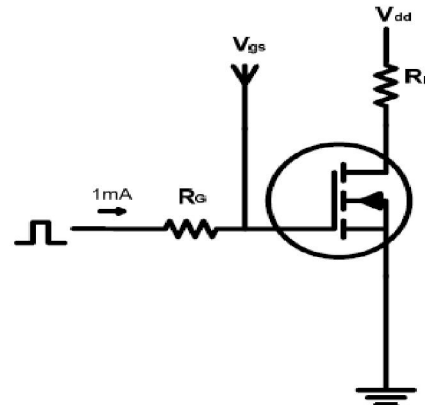
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	110	A	MOSFET symb showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	440	A	
V_{SD}	Diode Forward Voltage	—	0.94	1.3	V	$I_S=68A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	—	37	—	ns	$T_J = 25^{\circ}C, I_F = 68A, di/dt = 100A/\mu s$
Q_{rr}	Reverse Recovery Charge	—	60	—	nC	

Test Circuits and Waveforms

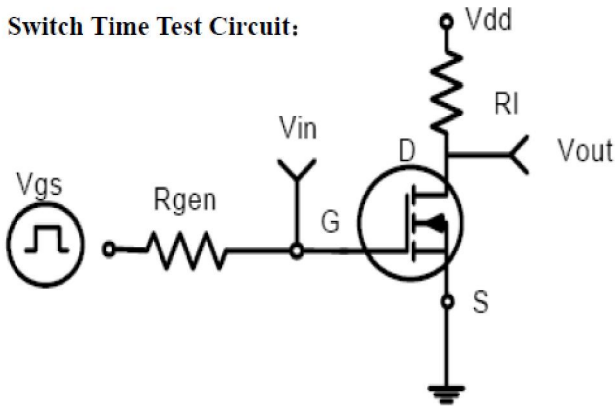
EAS test circuits:



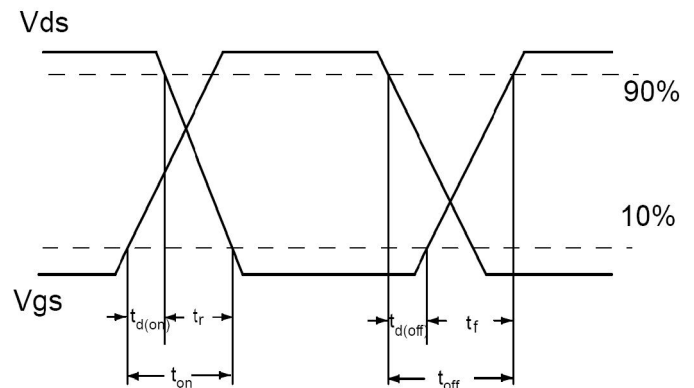
Gate charge test circuit:



Switch Time Test Circuit:



Waveforms:



Notes:

- ① The maximum current rating is limited by bond-wires.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation PD is based on max. junction temperature, using junction-to-case thermal resistance.
- ④ The value of $R_{\theta JA}$ is measured with the device mounted on 1in 2 FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$
- ⑤ These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)} = 175^\circ\text{C}$.
- ⑥ The maximum current rating is limited by bond-wires.

Typical Electrical and Thermal Characteristics

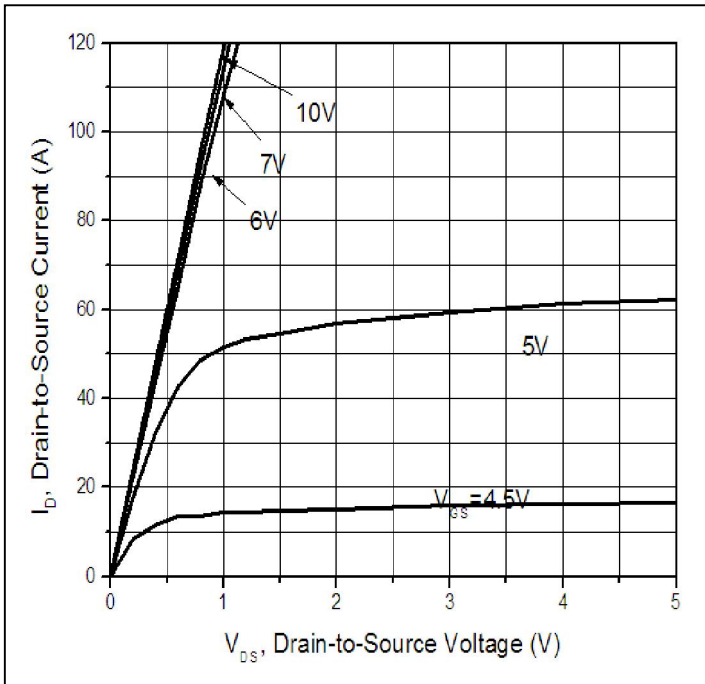


Figure 1: Typical Output Characteristics

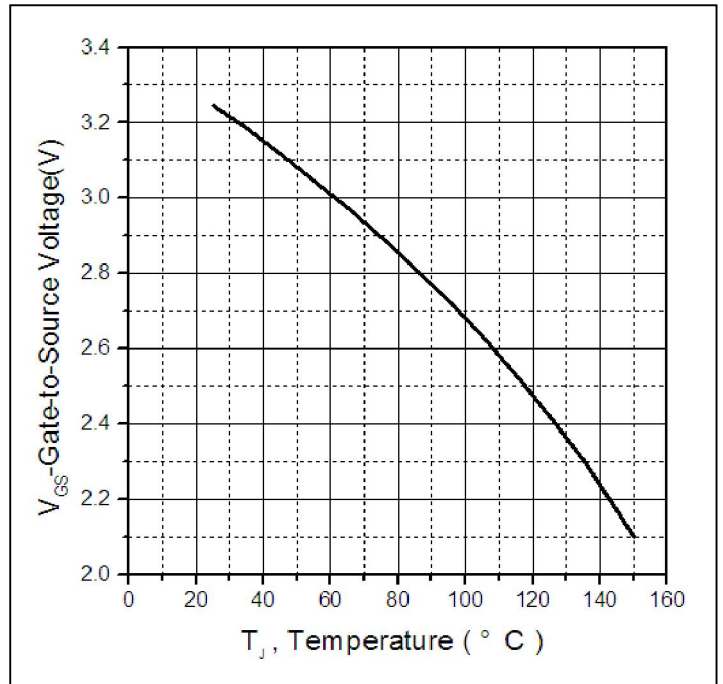


Figure 2. Gate to source cut-off voltage

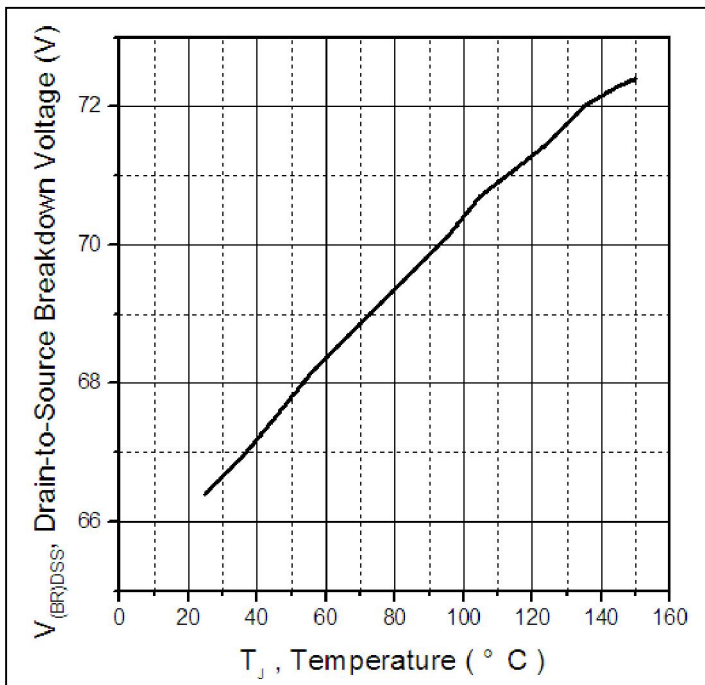


Figure 3. Drain-to-Source Breakdown Voltage vs. Temperature

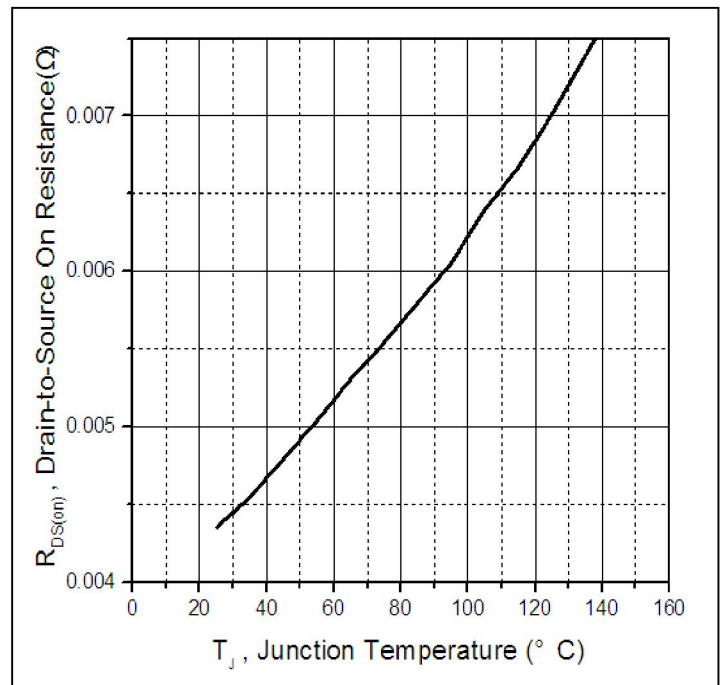


Figure 4: Normalized On-Resistance Vs. Case Temperature

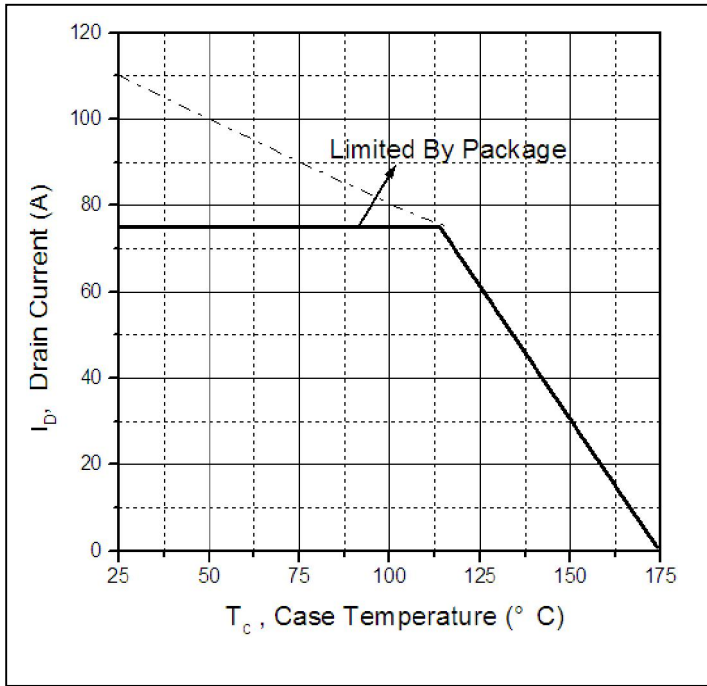


Figure 5. Maximum Drain Current Vs. Case Temperature

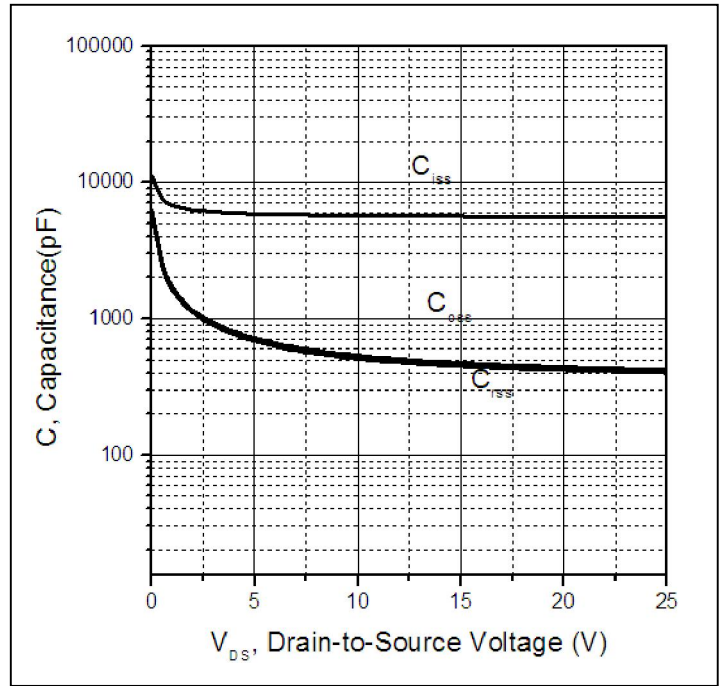


Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage

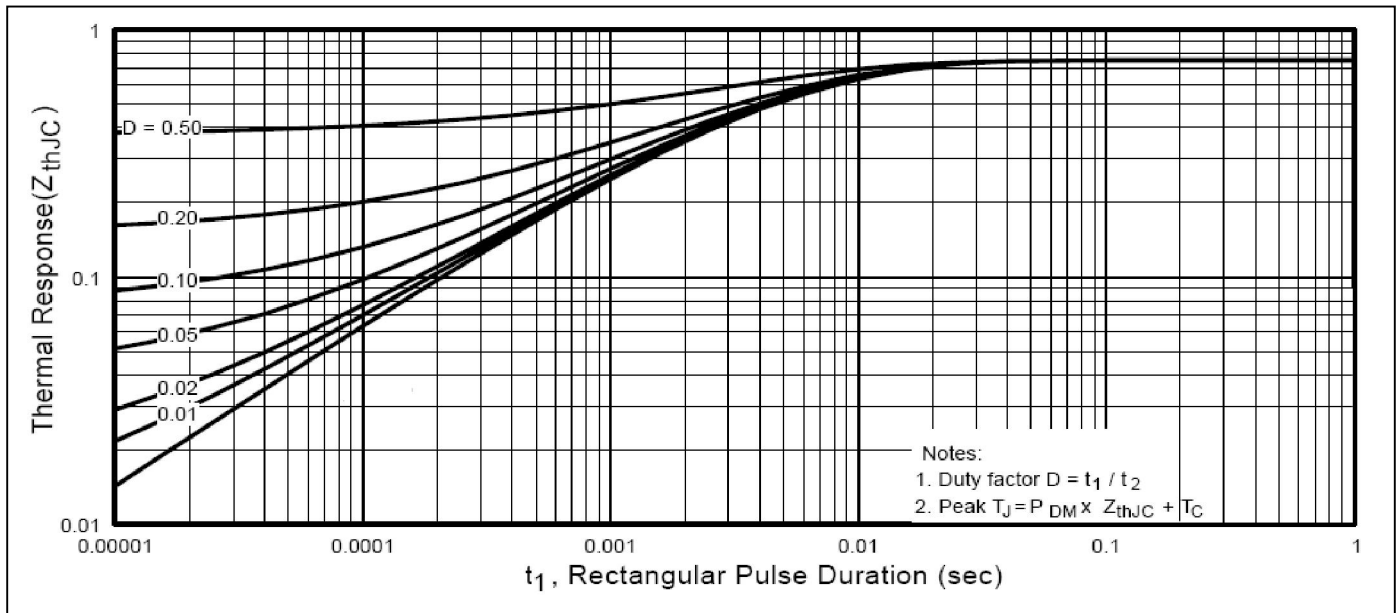
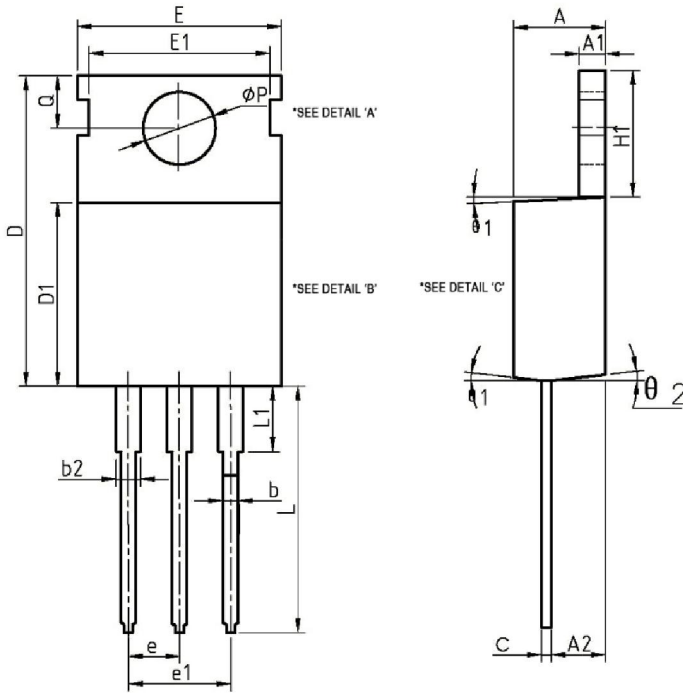


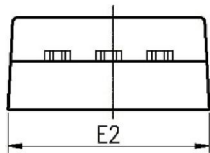
Figure 7. Maximum Effective Transient Thermal Impedance, Junction-to-Case

TO-220 Mechanical Data

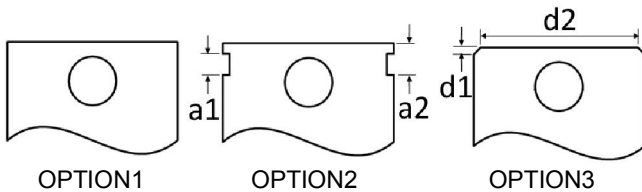
COMMON DIMENSIONS



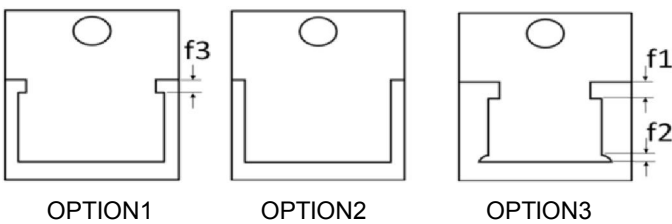
SYMBOL	MM		
	MIN	NOM	MAX
A	4.3	4.57	4.7
A1	1.2	-	1.4
A2	2.2	2.4	2.9
b	0.77	-	0.9
b2	1.23	-	1.36
c	0.4	-	0.7
D	15.25	15.6	15.8
D1	8.59	9.1	9.4
E	9.66	10	10.4
E1	-	8.7	-
E2	9.66	10	10.4
e	2.54BSC		
e1	5.08BSC		
H1	6.2	6.5	6.7
L	12.6	-	14.27
L1	-	-	3.95
phi P	3.5	3.6	3.9
Q	2.65	2.8	2.95
theta 1	1°	3°	5°
theta 2	1°	3°	5°
a1	-	1.8	-
a2	-	3.0	-
d1	-	2.0	-
d2	-	7.6	-
f1	-	1.4	-
f2	-	1.5	-
f3	-	1.0	-
g1	-	2.8	-



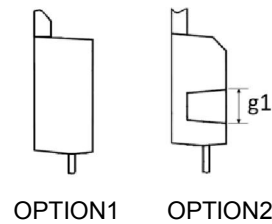
DETAIL 'A'



DETAIL 'B' (BACK VIEW)



DETAIL 'C'





Ordering and Marking Information

Device Marking: SSF5508

Package (Available)
TO220
Operating Temperature Range
C : -55 to 175 °C

Devices per Unit

Package Type	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/Carton Box	Units/Carton Box
TO220	50	20	1000	6	6000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	$T_j=125^{\circ}\text{C}$ to 175°C @ 80% of Max $V_{DSS}/V_{CES}/V_R$	168 hours 500 hours 1000 hours	3 lots x 77 devices
High Temperature Gate Bias(HTGB)	$T_j=150^{\circ}\text{C}$ or 175°C @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices