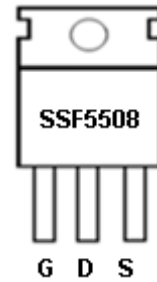


### Main Product Characteristics

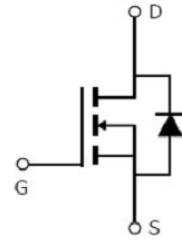
$V_{DS}$	55V
$R_{DS(on)}$	4.5m $\Omega$ (typ.)
$I_D$	110A



TO-220



Marking and Pin Assignment



Schematic Diagram

### Features and Benefits

- Advanced trench MOSFET process technology
- Ideal 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



### Description

The SSF5508 utilizes the latest processing techniques to achieve high cell density, low on-resistance and high repetitive avalanche rating. These features make this device extremely efficient and reliable device for use in power switching applications and a wide variety of other applications.

### Absolute Max Ratings

Symbol	Parameter	Max.	Units
$I_D @ T_C = 25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}^{(1)}$	110	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}^{(1)}$	80	
$I_{DM}$	Pulsed Drain Current <sup>(2)</sup>	440	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation <sup>(3)</sup>	205	W
	Linear Derating Factor	2.0	W/ $^\circ\text{C}$
$V_{DS}$	Drain-Source Voltage	55	V
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$E_{AS}$	Single Pulse Avalanche Energy @ $L=0.3\text{mH}^{(2)}$	375	mJ
$I_{AR}$	Avalanche Current @ $L=0.3\text{mH}^{(2)}$	50	A
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 to +175	$^\circ\text{C}$

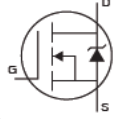
### Thermal Resistance

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

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

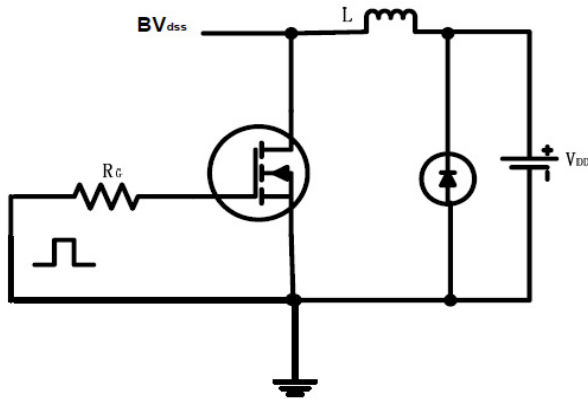
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	55	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source On-resistance	—	4.5	5.5	m $\Omega$	$V_{GS}=10V, I_D = 68A$
		—	7	—		$T_J = 125^\circ\text{C}$
$V_{GS(th)}$	Gate Threshold Voltage	2.5	—	3.5	V	$V_{DS} = V_{GS}, I_D = 250\mu A$
		—	2.4	—		$T_J = 125^\circ\text{C}$
$I_{DSS}$	Drain-to-Source Leakage Current	—	—	1	$\mu A$	$V_{DS} = 55V, V_{GS} = 0V$
		—	—	50		$T_J = 125^\circ\text{C}$
$I_{GSS}$	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	$V_{GS} = 0V$
$C_{oss}$	Output Capacitance	—	463	—		$V_{DS} = 25V$
$C_{rss}$	Reverse Transfer Capacitance	—	454	—		$f = 600\text{KHz}$

### Source-Drain Ratings and Characteristics

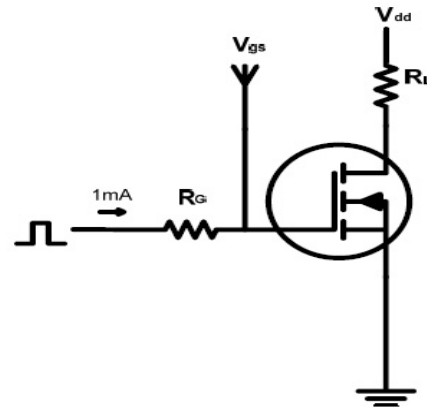
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$I_S$	Continuous Source Current (Body Diode)	—	—	110	A	MOSFET symbol showing the integral reverse p-n junction diode. 
$I_{SM}$	Pulsed Source Current (Body Diode)	—	—	440	A	
$V_{SD}$	Diode Forward Voltage	—	0.94	1.3	V	$I_S=68A, V_{GS}=0V$
$t_{rr}$	Reverse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

## Test Circuits and Waveforms

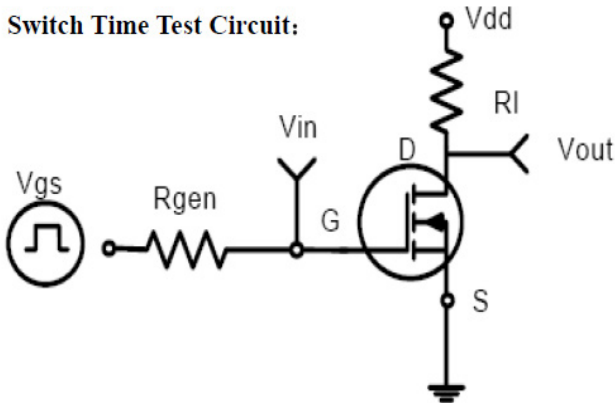
EAS test circuits:



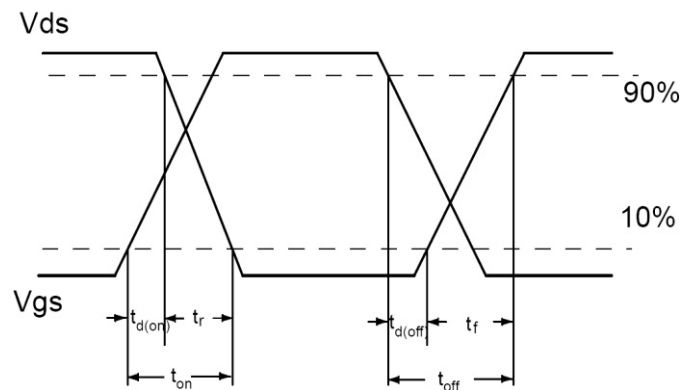
Gate charge test circuit:



Switch Time Test Circuit:



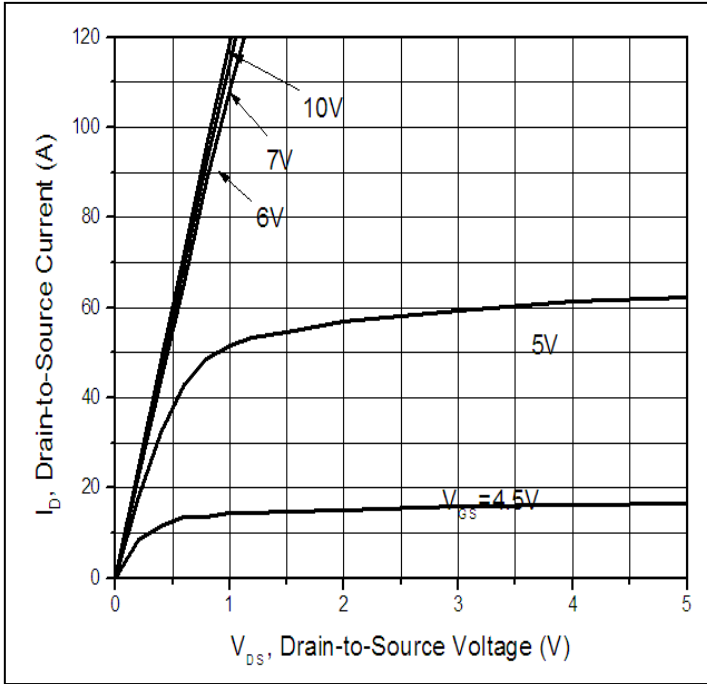
Switching Waveforms:



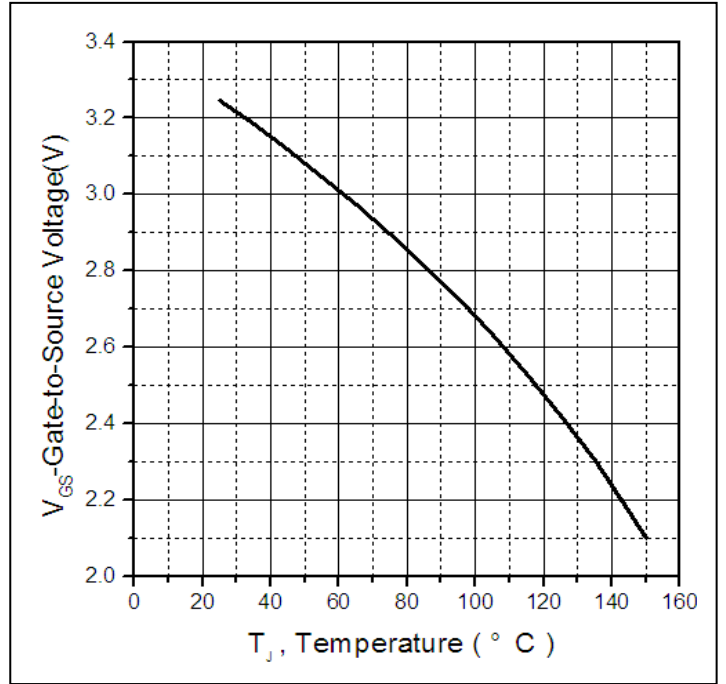
### Notes:

- ① The maximum current rating is limited by bond-wires.
- ② Repetitive rating; pulse width limited by max. junction temperature.
- ③ The power dissipation  $P_D$  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  $1\text{in}^2$  FR-4 board with 2oz. Copper, in a still air environment with  $T_A = 25^\circ\text{C}$

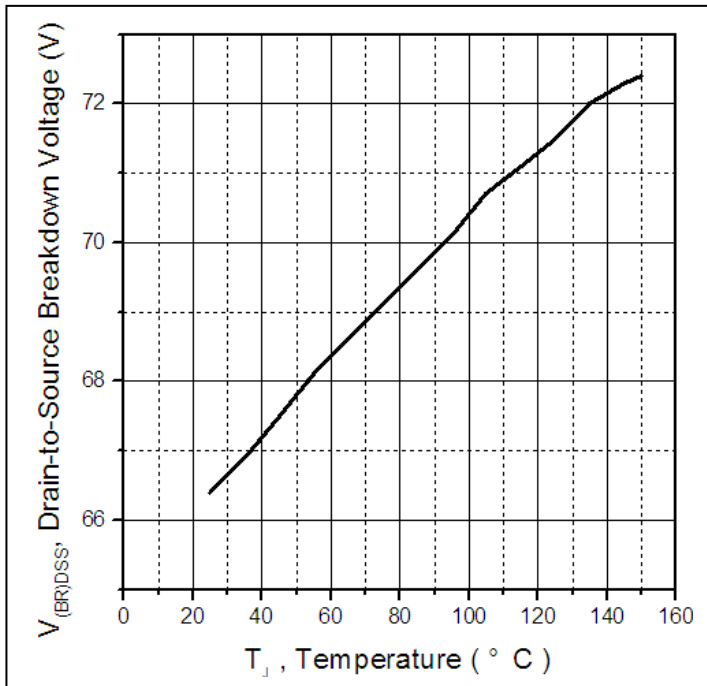
**Typical Electrical and Thermal Characteristics**



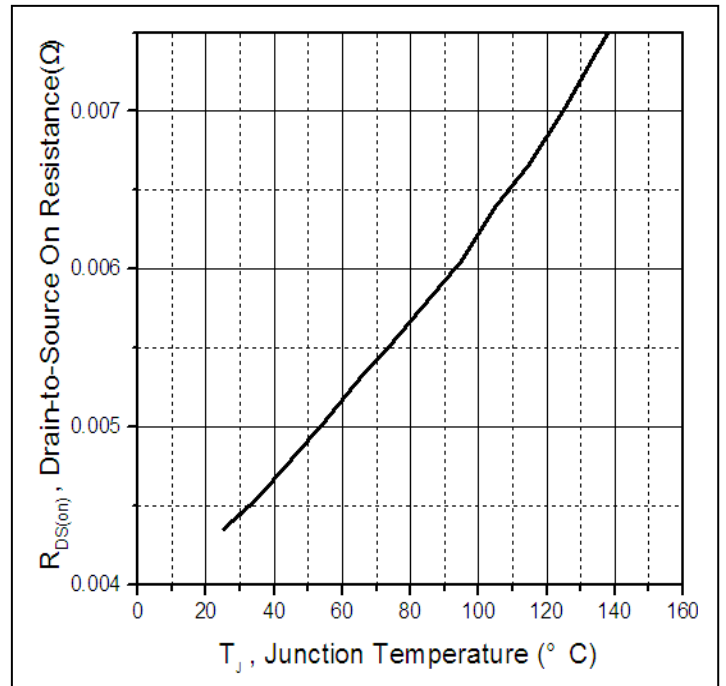
**Figure 1. Typical Output Characteristics**



**Figure 2. Gate to Source Cut-off Voltage**

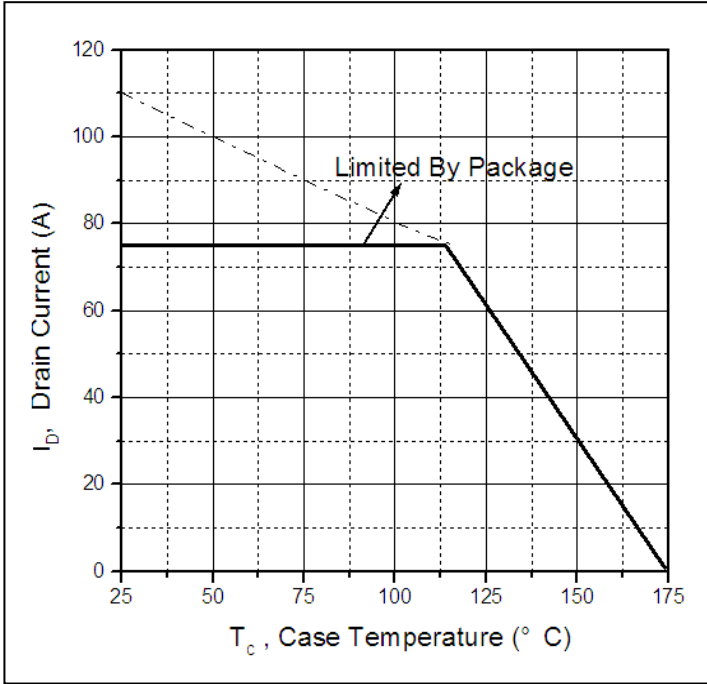


**Figure 3. Drain-to-Source Breakdown Voltage vs. Temperature**

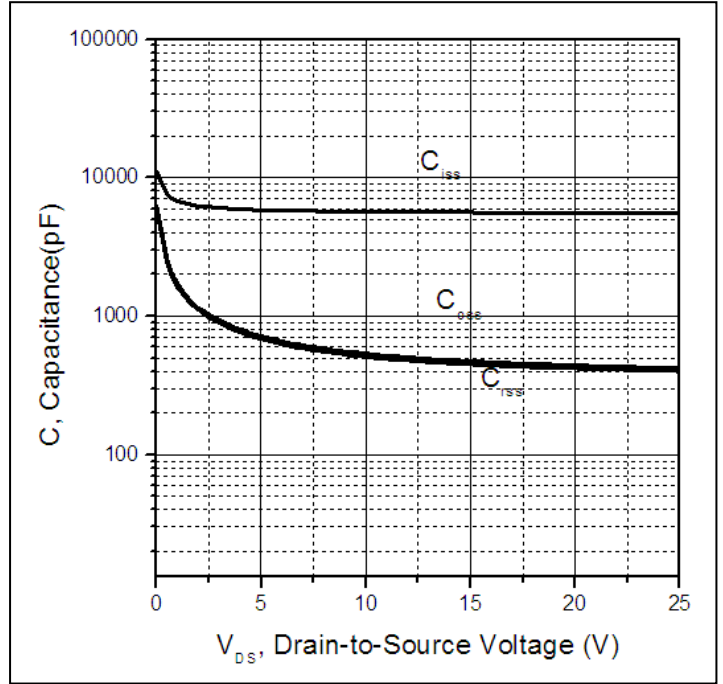


**Figure 4. Normalized On-Resistance Vs. Case Temperature**

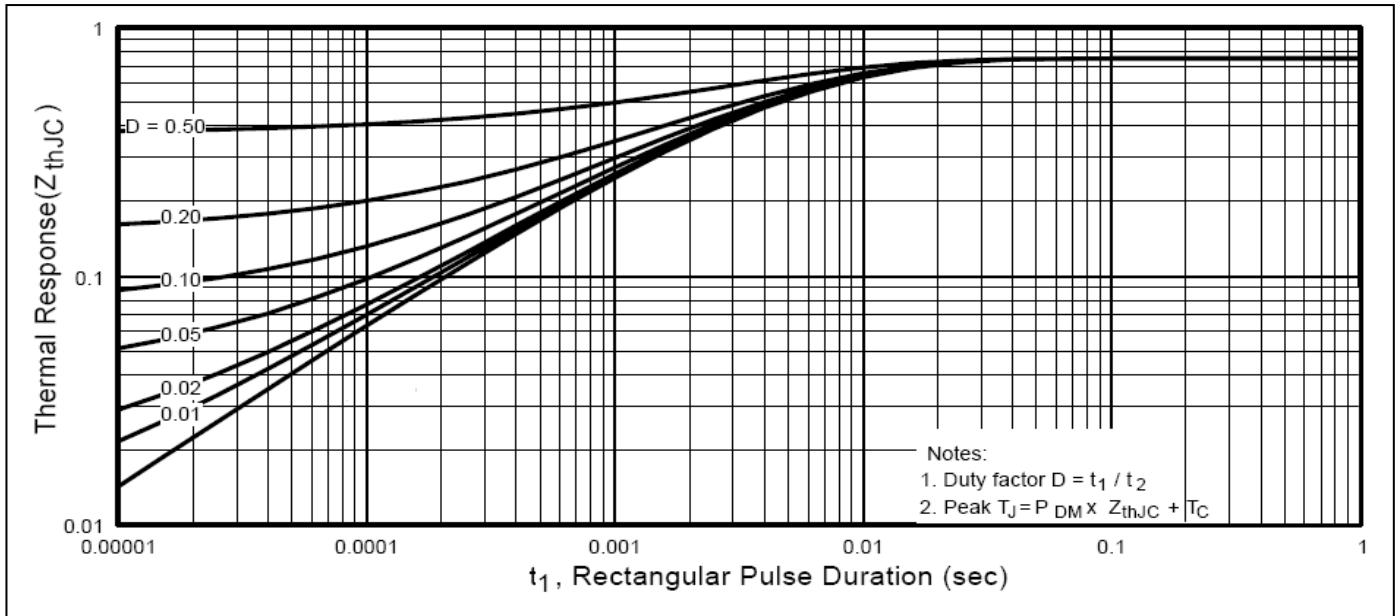
**Typical Electrical and Thermal Characteristics**



**Figure 5. Maximum Drain Current Vs. Case Temperature**



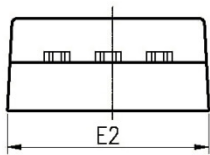
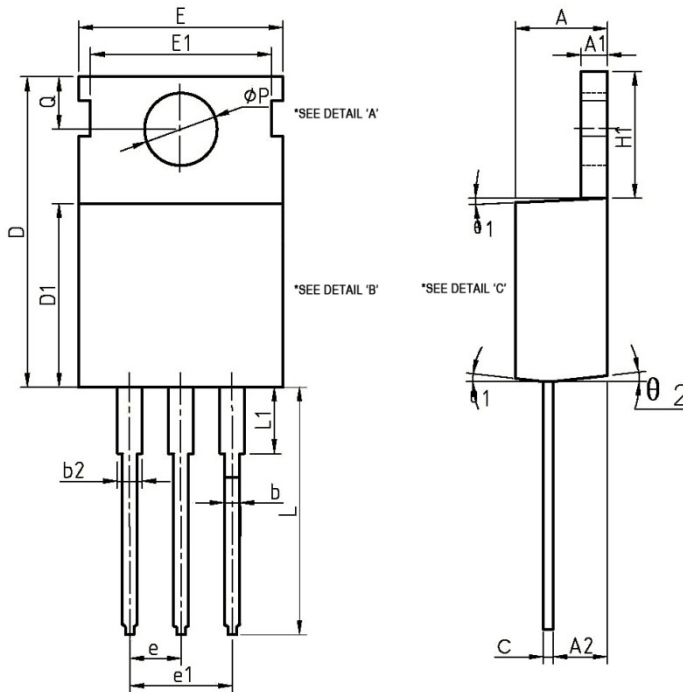
**Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage**



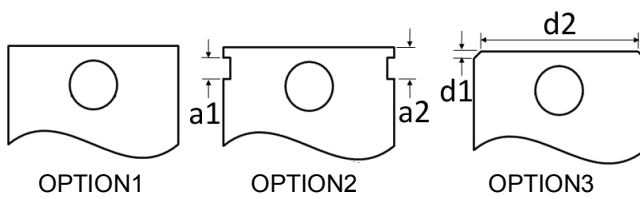
**Figure 7. Maximum Effective Transient Thermal Impedance, Junction-to-Case**

**TO-220 Mechanical Data**

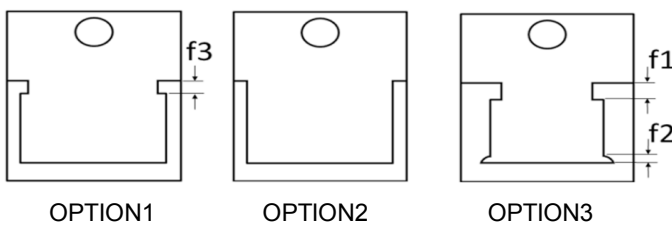
COMMON DIMENSIONS



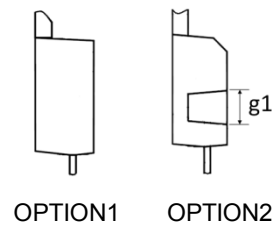
DETAIL 'A'



DETAIL 'B' (BACK VIEW)



DETAIL 'C'



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	-

**Ordering and Marking Information****Device Marking: SSF5508****Package (Available)****TO-220****Operating Temperature Range****C : -55 to 175 °C****Devices per Unit**

<b>Package Type</b>	<b>Units/Tube</b>	<b>Tubes/Inner Box</b>	<b>Units/Inner Box</b>	<b>Inner Boxes/Carton Box</b>	<b>Units/Carton Box</b>
TO-220	50	20	1000	10	10000

**Reliability Test Program**

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