

Main Product Characteristics

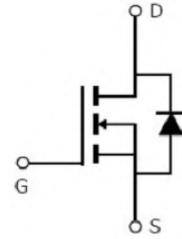
V_{DSS}	100V
$R_{DS(on)}$	4.6m Ω (typ.)
I_D	200A ①



TO-220



Marking and Pin Assignment



Schematic Diagram

Features and Benefits

- Advanced 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 SSF1006 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, $V_{GS} @ 10\text{V}$	200 ①	A
$I_D @ T_C = 100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10\text{V}$	130 ①	
I_{DM}	Pulsed Drain Current ②	800	
$P_D @ T_C = 25^\circ\text{C}$	Power Dissipation ③	326	W
	Linear Derating Factor	2.2	W/°C
V_{DS}	Drain-Source Voltage	100	V
V_{GS}	Gate-to-Source Voltage	± 20	V
E_{AS}	Single Pulse Avalanche Energy @ $L=0.3\text{mH}$	614	mJ
I_{AS}	Avalanche Current @ $L=0.3\text{mH}$	64	A
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to +175	°C

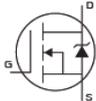
Thermal Resistance

Symbol	Characteristics	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ③	—	0.46	°C/W
$R_{\theta JA}$	Junction-to-Ambient ($t \leq 10s$) ④	—	62	°C/W
	Junction-to-Ambient (PCB mounted, steady-state) ④	—	40	°C/W

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

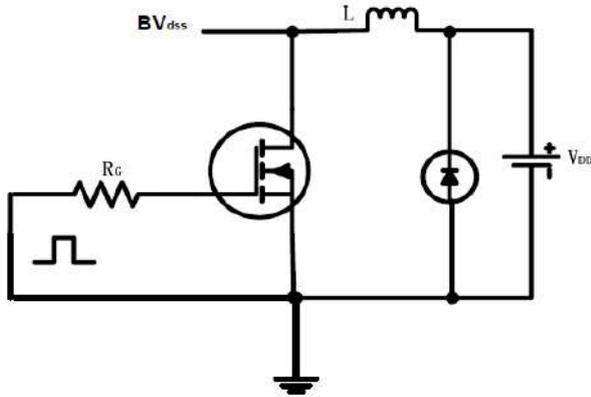
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	100	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source On-resistance	—	4.6	6	m Ω	$V_{GS}=10V, I_D = 30A$ $T_J = 125^\circ\text{C}$
		—	9.23	—		
$V_{GS(th)}$	Gate Threshold Voltage	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu A$ $T_J = 125^\circ\text{C}$
		—	2.22	—		
I_{DSS}	Drain-to-Source Leakage Current	—	—	1	μA	$V_{DS} = 100V, V_{GS} = 0V$ $T_J = 125^\circ\text{C}$
		—	—	50		
I_{GSS}	Gate-to-Source Forward Leakage	—	—	100	nA	$V_{GS} = 20V$ $V_{GS} = -20V$
		—	—	-100		
Q_g	Total Gate Charge	—	242	—	nC	$I_D = 30A,$ $V_{DS}=30V,$ $V_{GS} = 10V$
Q_{gs}	Gate-to-Source Charge	—	48	—		
Q_{gd}	Gate-to-Drain("Miller") Charge	—	79	—		
$t_{d(on)}$	Turn-on Delay Time	—	30	—	nS	$V_{GS}=10V, V_{DS} = 30V,$ $R_L=15\Omega,$ $R_{GEN}=2.5\Omega$ $I_D = 30A$
t_r	Rise Time	—	24	—		
$t_{d(off)}$	Turn-Off Delay Time	—	115	—		
t_f	Fall Time	—	43	—		
C_{iss}	Input Capacitance	—	9807	—	pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 500\text{KHz}$
C_{oss}	Output Capacitance	—	672	—		
C_{rss}	Reverse Transfer Capacitance	—	583	—		

Source-Drain Ratings and Characteristics

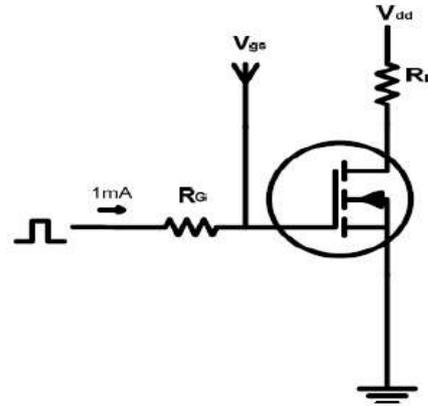
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	200	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	800	A	
V_{SD}	Diode Forward Voltage	—	0.88	1.3	V	$I_S=60A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	—	46	—	ns	$T_J = 25^\circ\text{C}, I_F = 75A, di/dt = 100A/\mu s$
Q_{rr}	Reverse Recovery Charge	—	88	—	nC	

Test Circuits and Waveforms

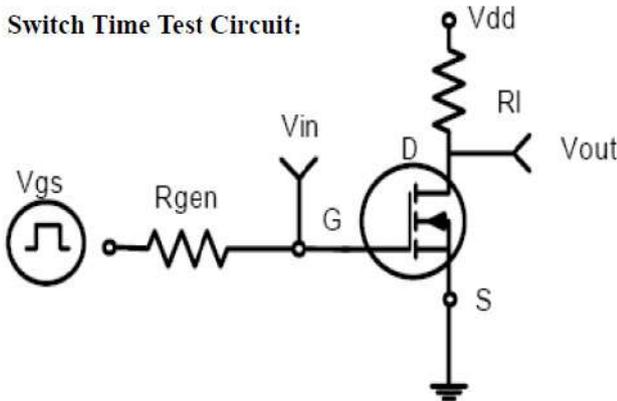
EAS test circuits:



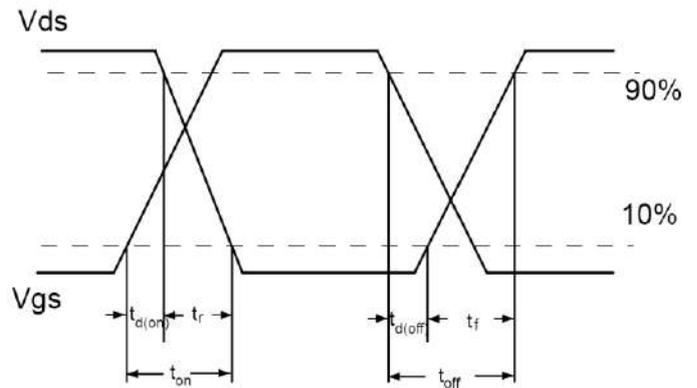
Gate charge test circuit:



Switch Time Test Circuit:



Switch Waveforms:



Notes:

- ① Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 75A.
- 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 in² FR-4 board with 2oz. Copper, in a still air environment with $T_A = 25^\circ\text{C}$

Typical Electrical and Thermal Characteristics

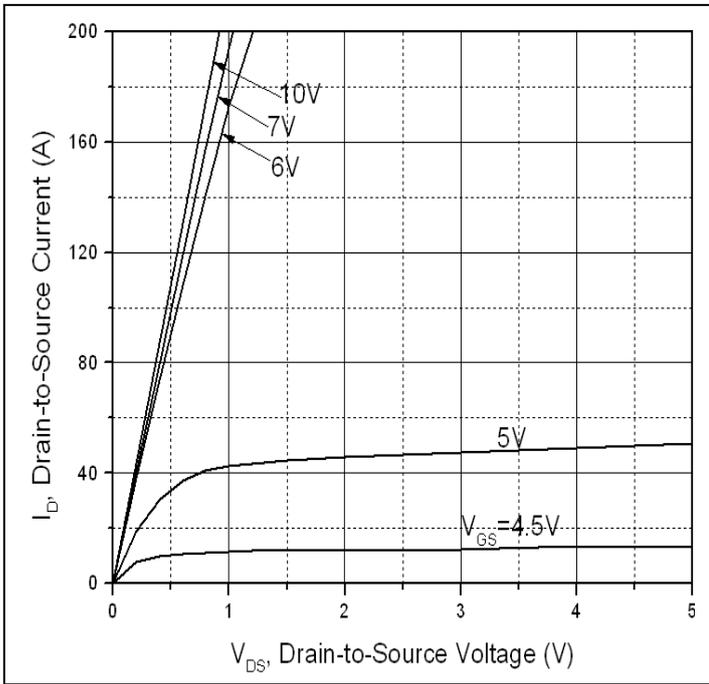


Figure 1. Typical Output Characteristics

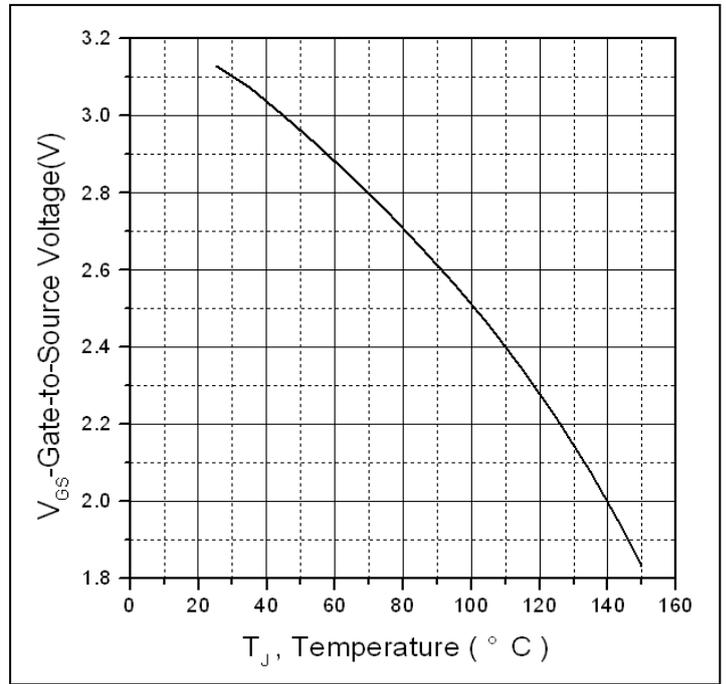


Figure 2. Gate to Source Cut-off Voltage

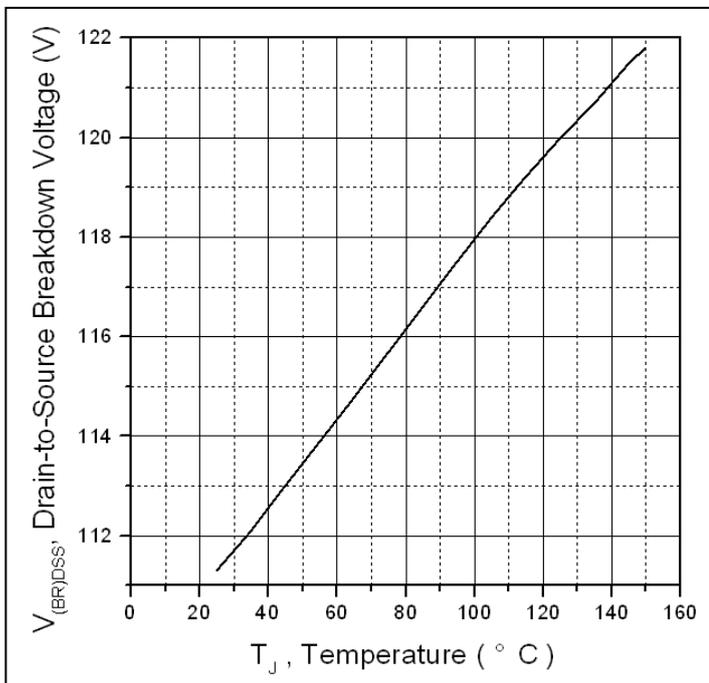


Figure 3. Drain-to-Source Breakdown Voltage vs. Temperature

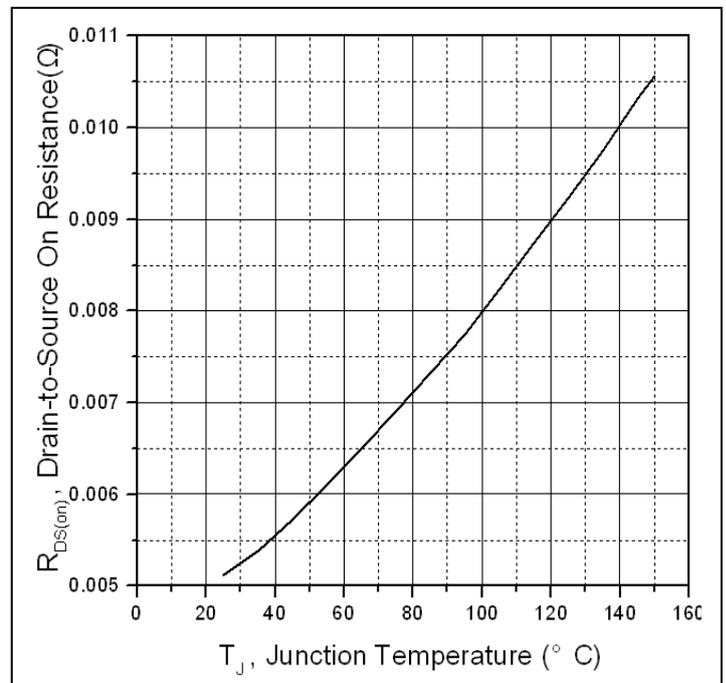


Figure 4. Normalized On-Resistance Vs. Case Temperature

Typical Electrical and Thermal Characteristics

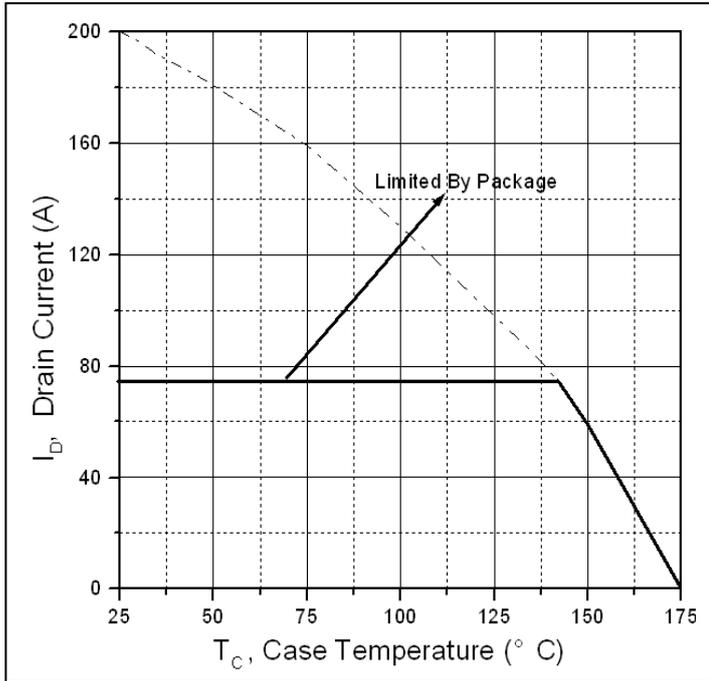


Figure 5. Maximum Drain Current Vs. Case Temperature

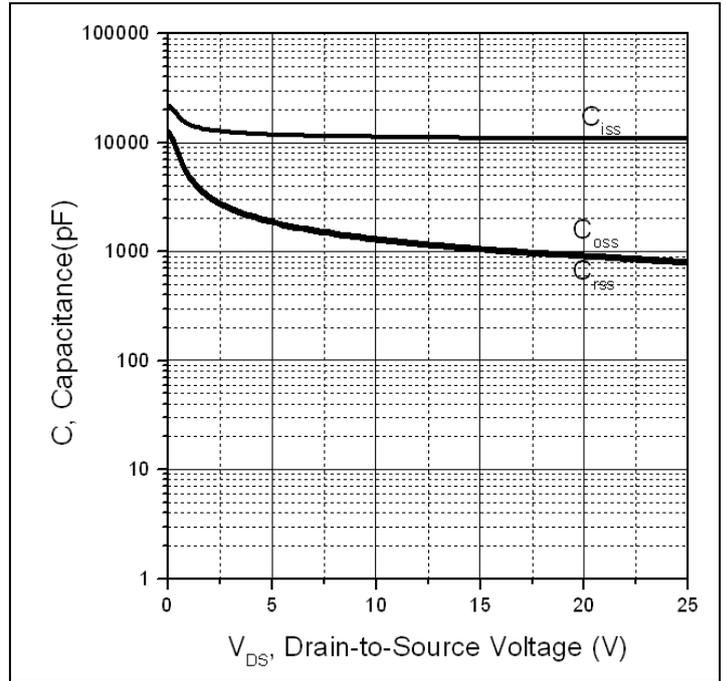


Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage

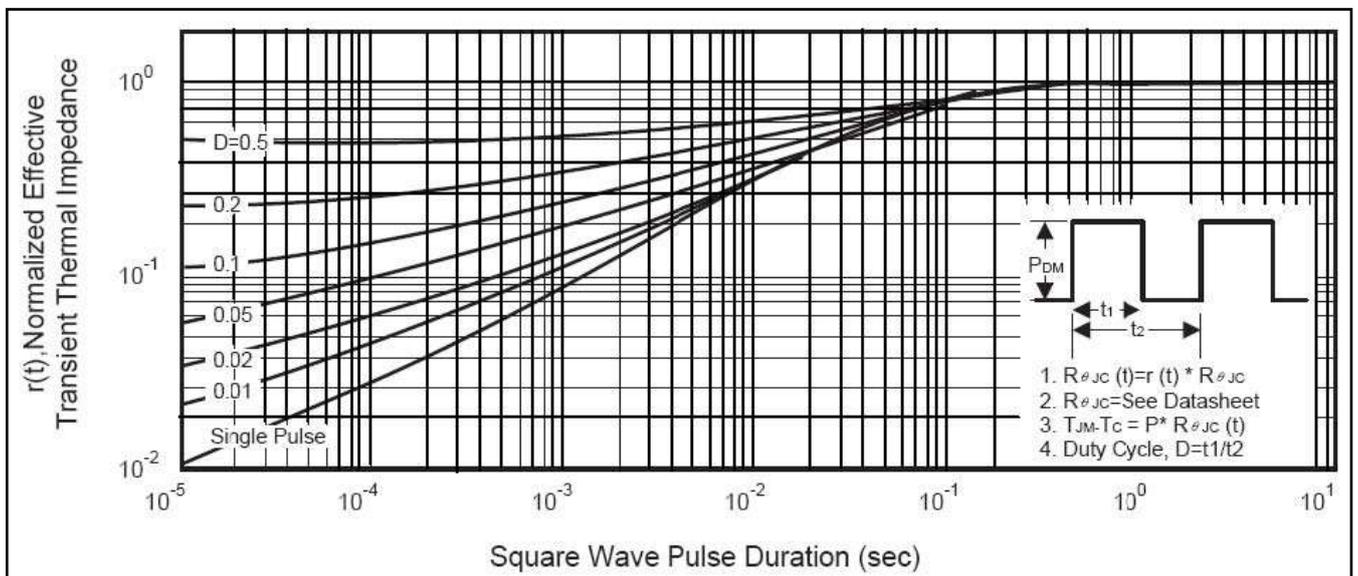
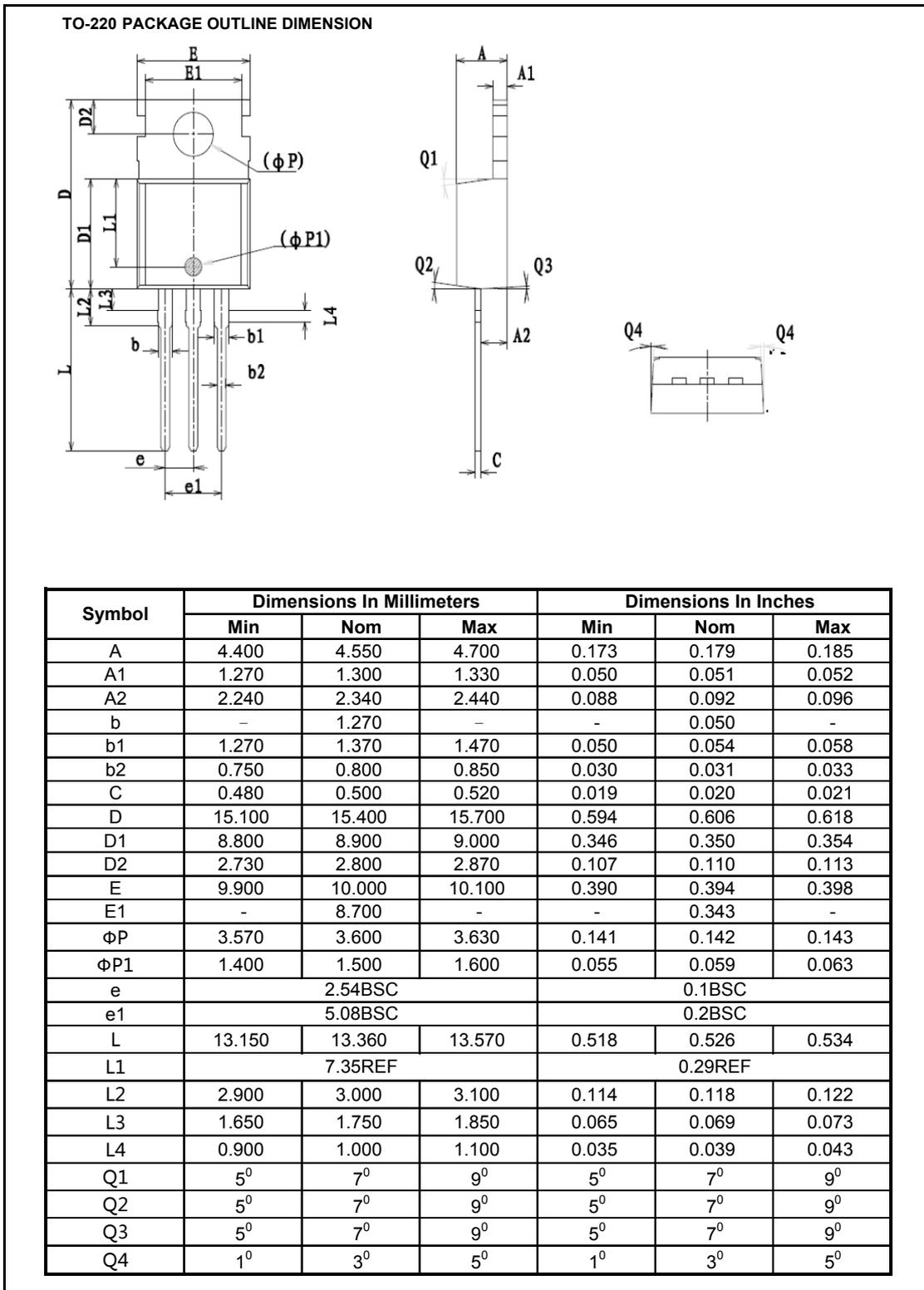


Figure 7. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Mechanical Data



Ordering and Marking Information

Device Marking: SSF1006

Package (Available)
 TO-220
 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
TO-220	50	20	1000	10	10000

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