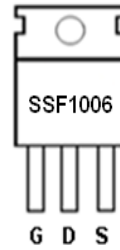
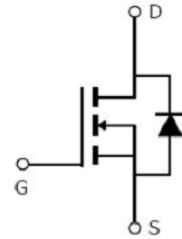


Main Product Characteristics:

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


TO220

**Marking and pin
Assignment**

Schematic diagram
Features and Benefits:

- Advanced 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


Description:

It utilizes the latest 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°C	Continuous Drain Current, V_{GS} @ 10V	200 ①	A
I_D @ TC = 100°C	Continuous Drain Current, V_{GS} @ 10V	130 ①	
I_{DM}	Pulsed Drain Current ②	800	
P_D @TC = 25°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=0.3mH	614	mJ
I_{AS}	Avalanche Current @ L=0.3mH	64	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +175	°C

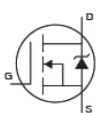
Thermal Resistance

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

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

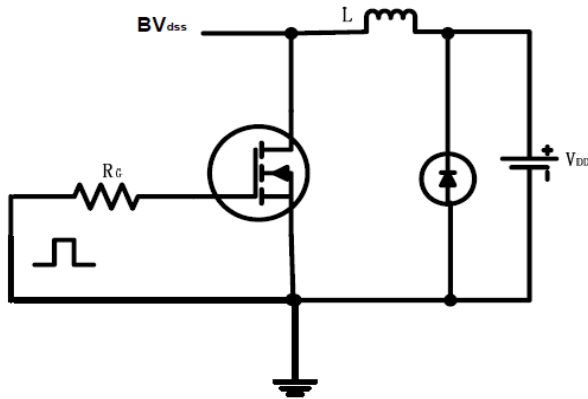
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	100	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	4.6	6	m Ω	$V_{GS}=10\text{V}, I_D = 30\text{A}$
		—	9.23	—		$T_J = 125^{\circ}\text{C}$
$V_{GS(th)}$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

Source-Drain Ratings and Characteristics

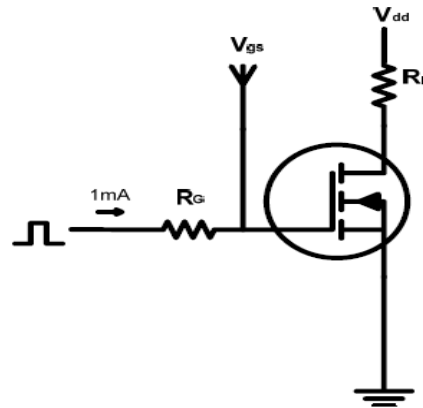
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	200	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	800	A	
V_{SD}	Diode Forward Voltage	—	0.88	1.3	V	$I_S=60\text{A}, V_{GS}=0\text{V}$
t_{rr}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

Test circuits and Waveforms

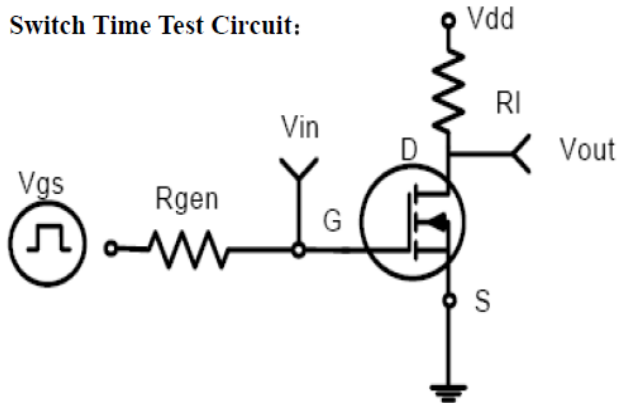
EAS test circuits:



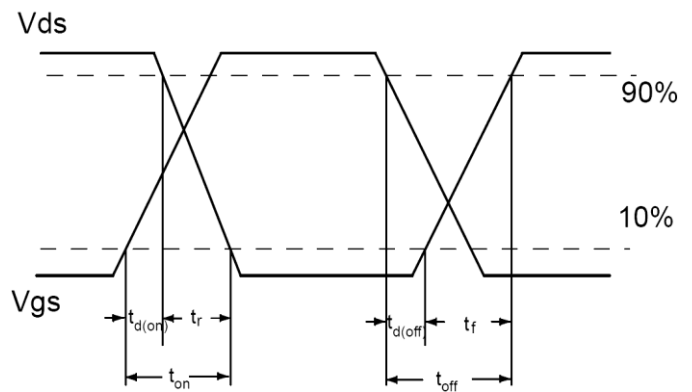
Gate charge test circuit:



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 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 1 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

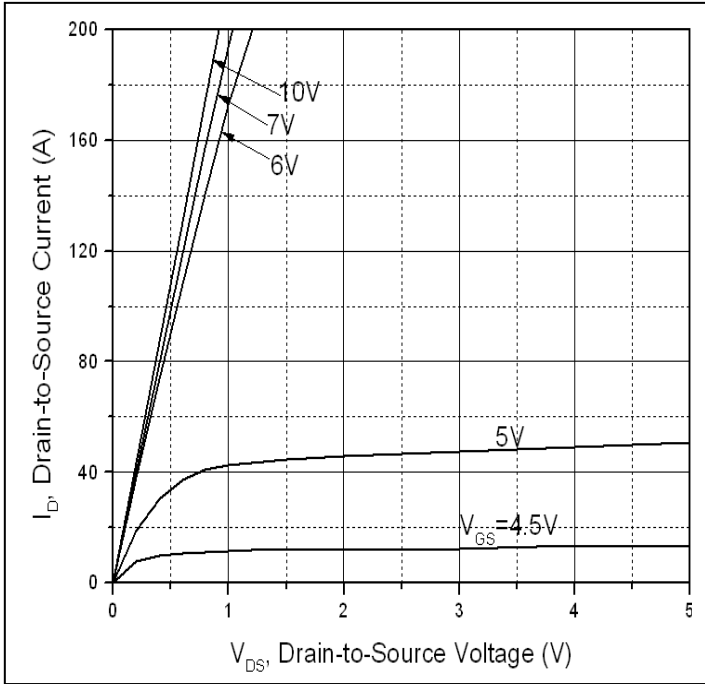


Figure 1: Typical Output Characteristics

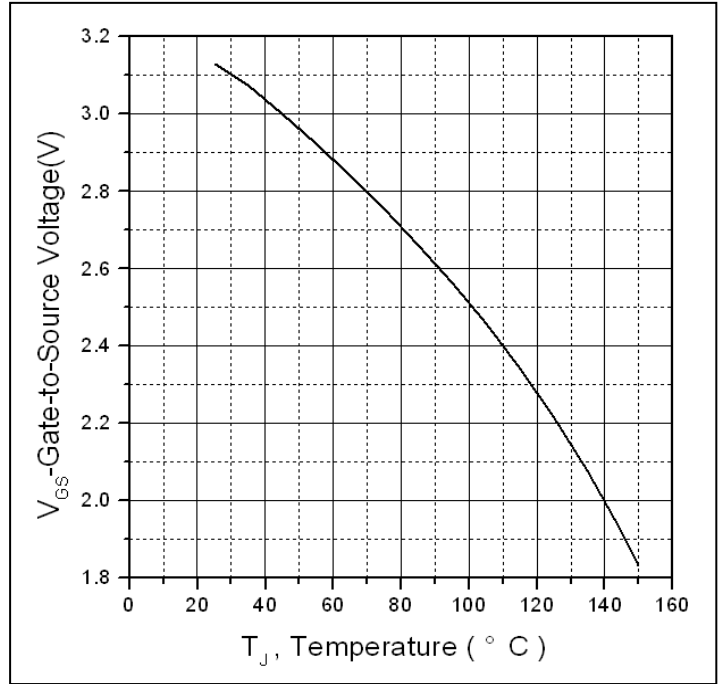


Figure 2. Gate to source cut-off voltage

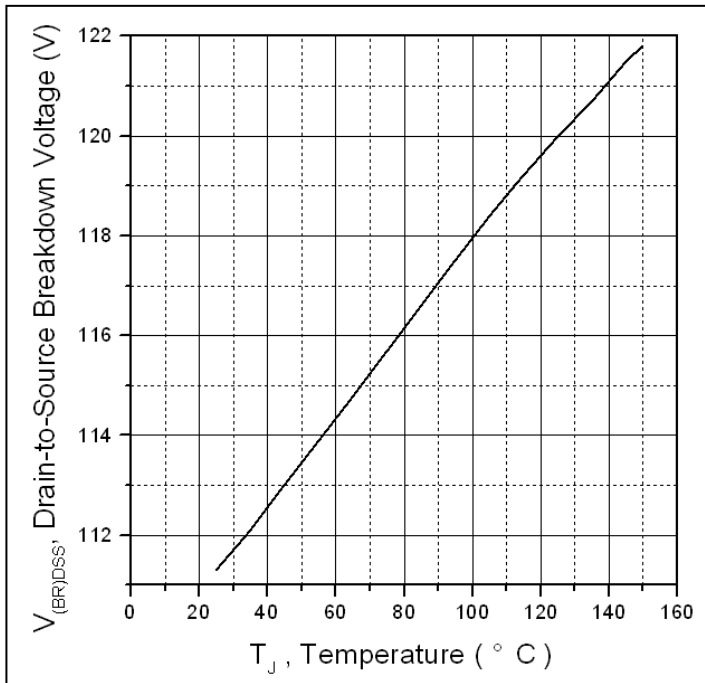


Figure 3. Drain-to-Source Breakdown Voltage vs. Temperature

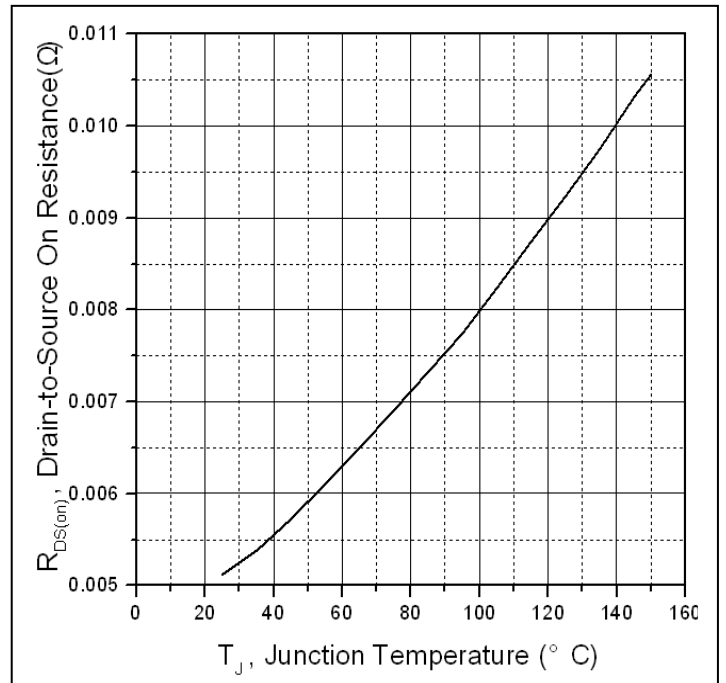


Figure 4: Normalized On-Resistance Vs. Case Temperature

Typical electrical and thermal characteristics

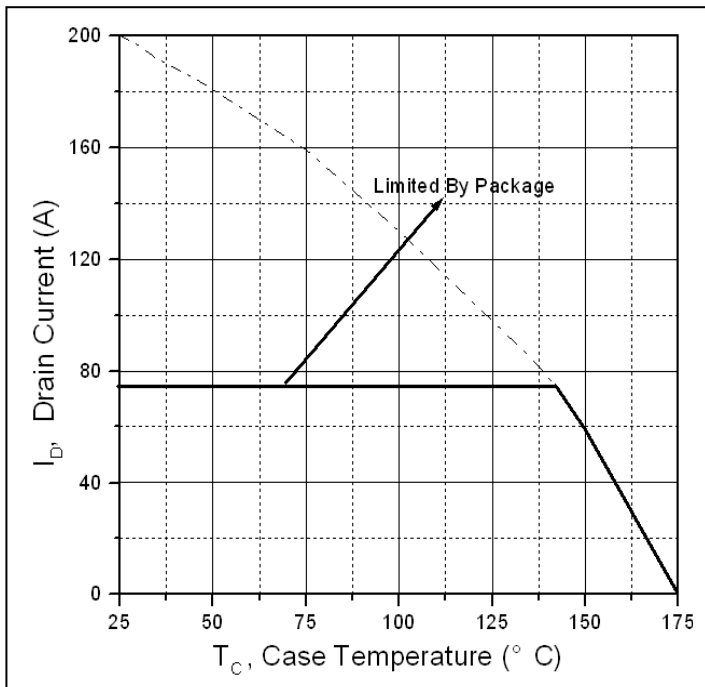


Figure 5. Maximum Drain Current Vs. Case Temperature

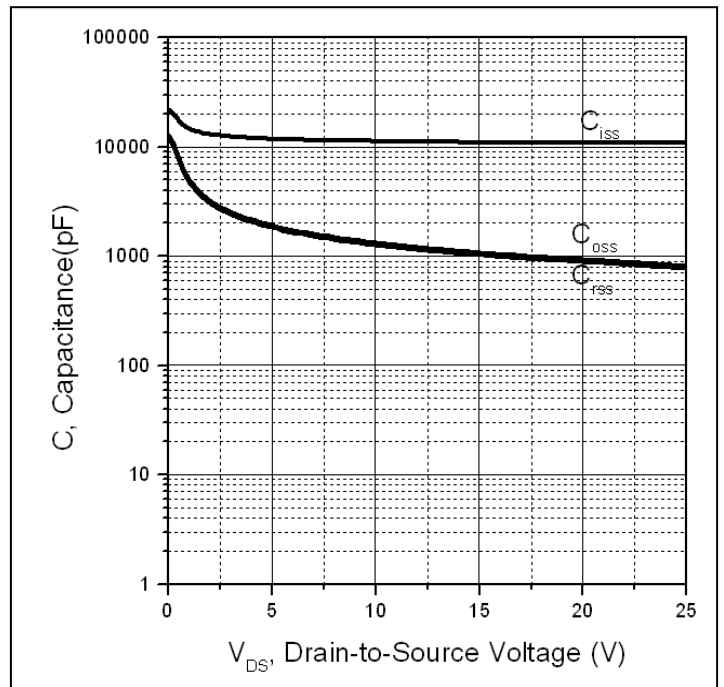


Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage

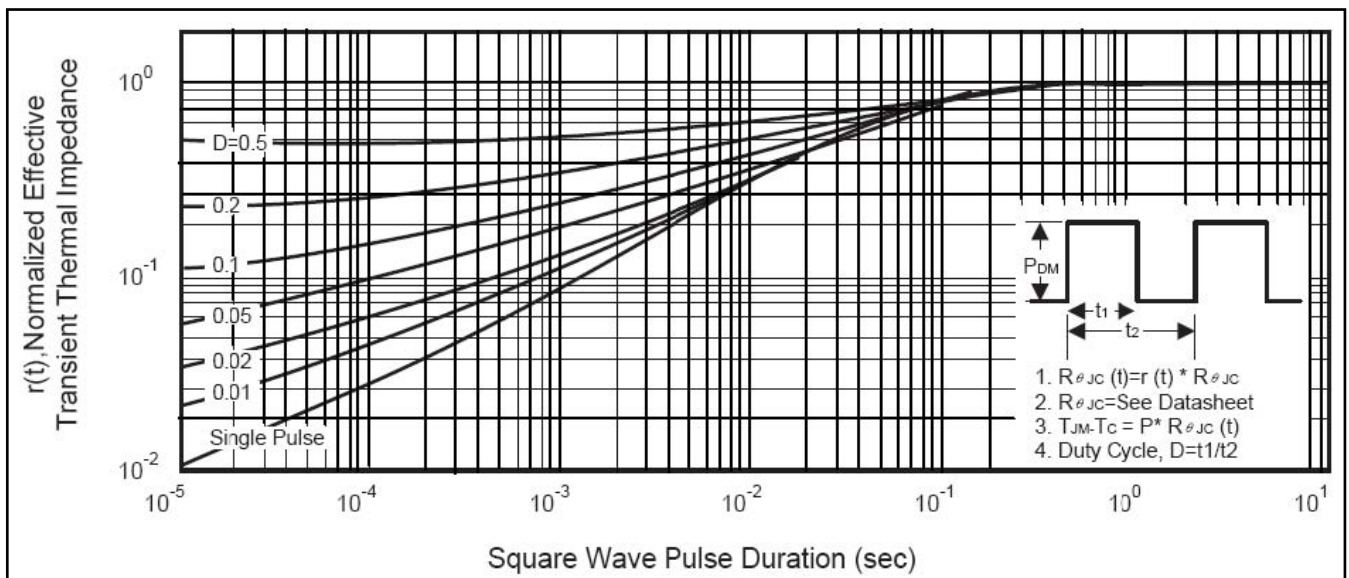
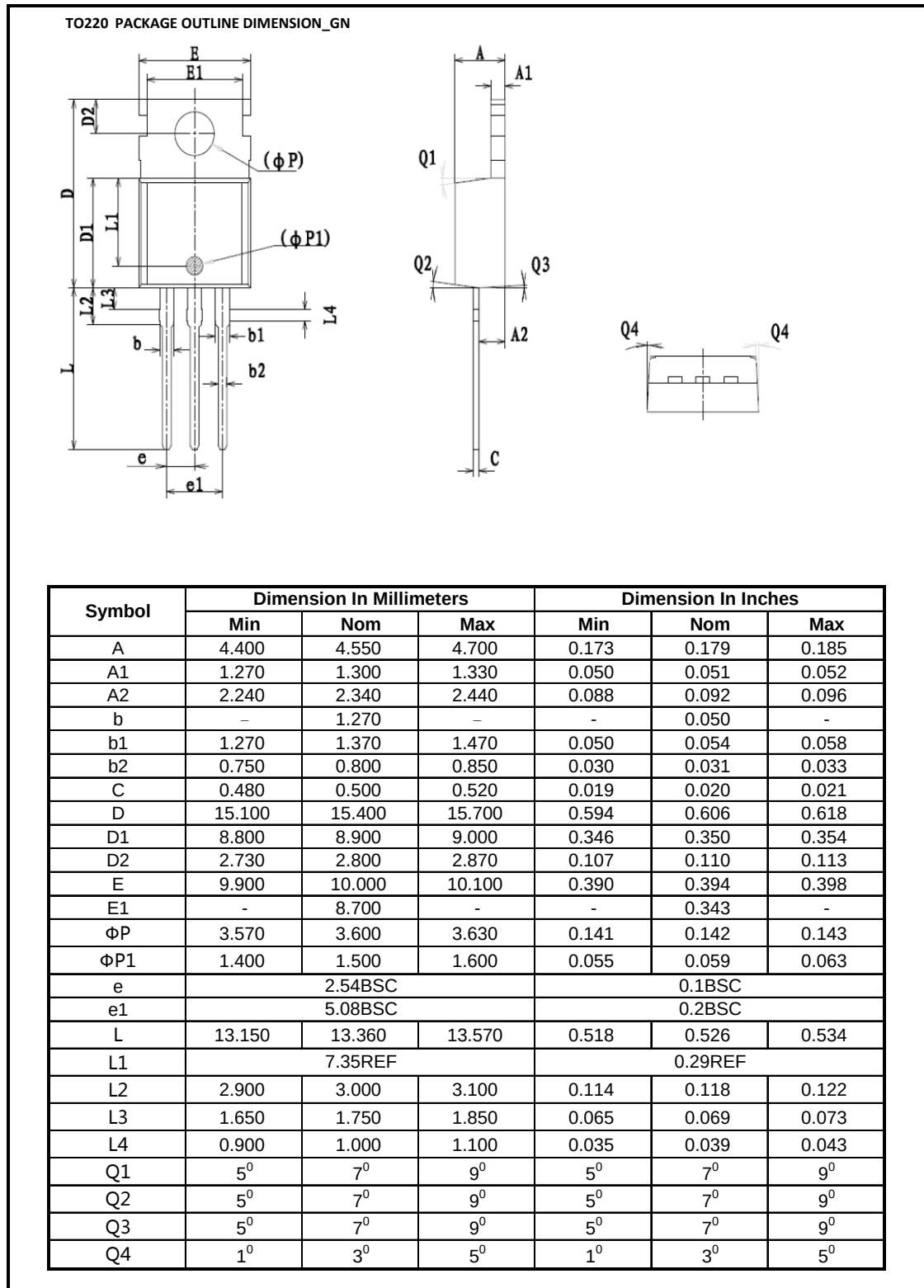


Figure7. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Mechanical Data:


Ordering and Marking Information**Device Marking: SSF1006**

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

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