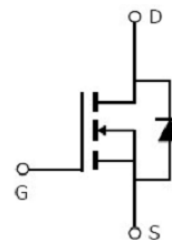


Main Product Characteristics:

V_{DSS}	600V
$R_{DS(on)}$	0.69ohm(typ.)
I_D	10A


TO220F

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
- 150°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
$I_D @ TC = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ①	10	A
$I_D @ TC = 100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$ ①	6	
I_{DM}	Pulsed Drain Current②	40	
$P_D @ TC = 25^\circ C$	Power Dissipation③	156	W
	Linear Derating Factor	1.2	W/°C
V_{DS}	Drain-Source Voltage	600	V
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy @ L=14.2mH	700	mJ
I_{AS}	Avalanche Current @ L=14.2mH	10	A
$T_J \quad T_{STG}$	Operating Junction and Storage Temperature Range	-55 to + 150	°C

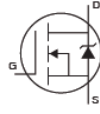
Thermal Resistance

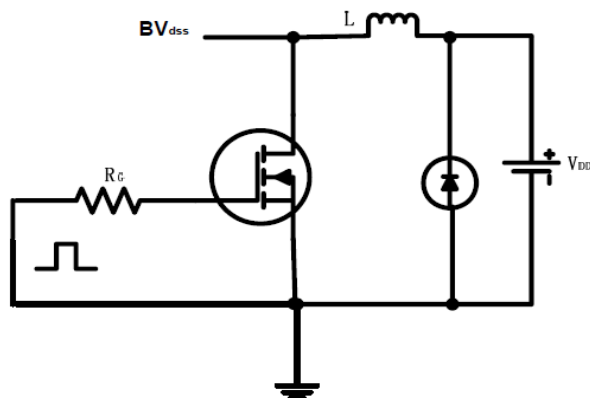
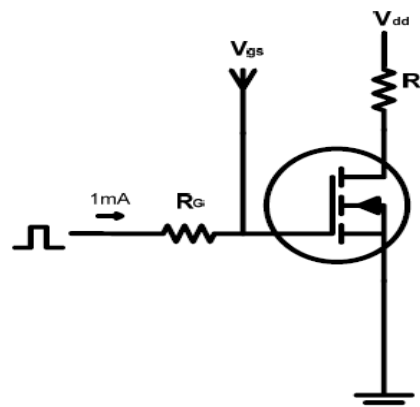
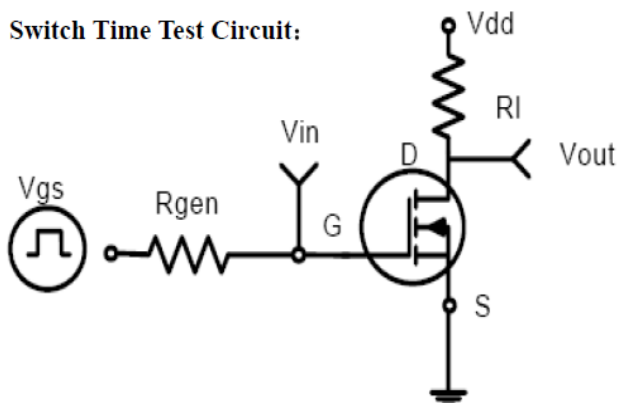
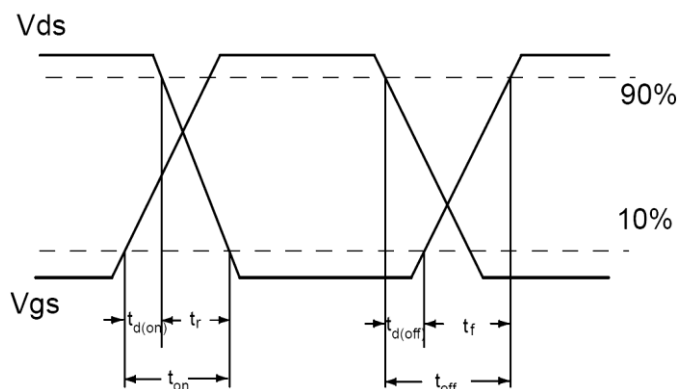
Symbol	Characterizes	Typ.	Max.	Units
R _{θJC}	Junction-to-case ^③	—	0.8	°C/W
R _{θJA}	Junction-to-ambient (t ≤ 10s) ^④	—	62	°C/W
	Junction-to-Ambient (PCB mounted, steady-state) ^④	—	40	°C/W

Electrical Characterizes @T_A=25°C unless otherwise specified

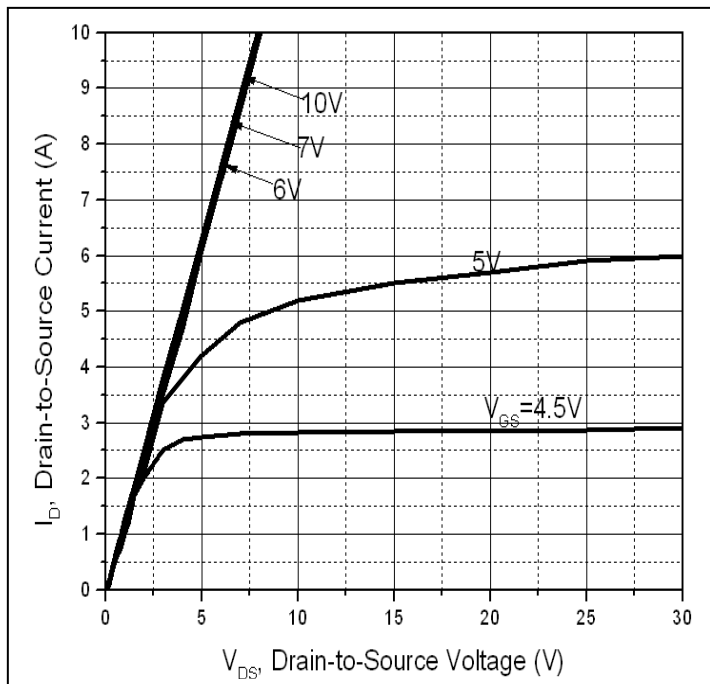
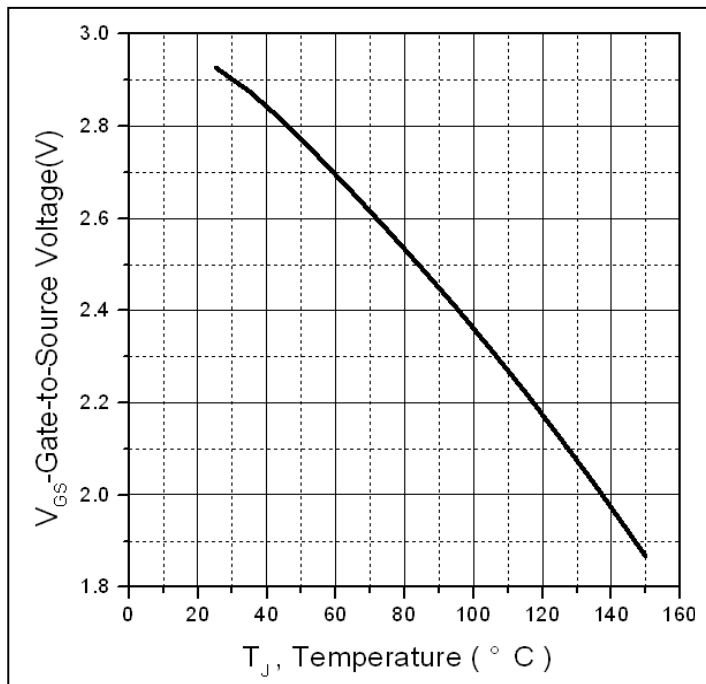
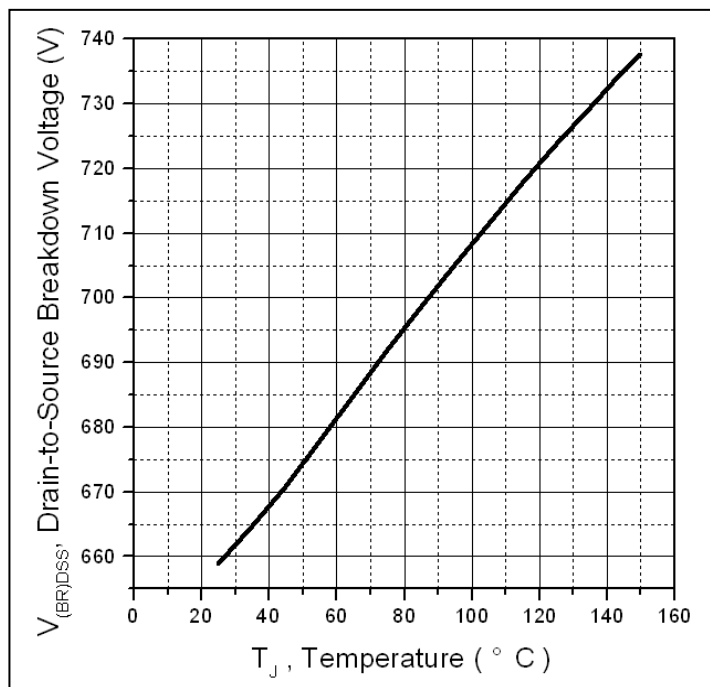
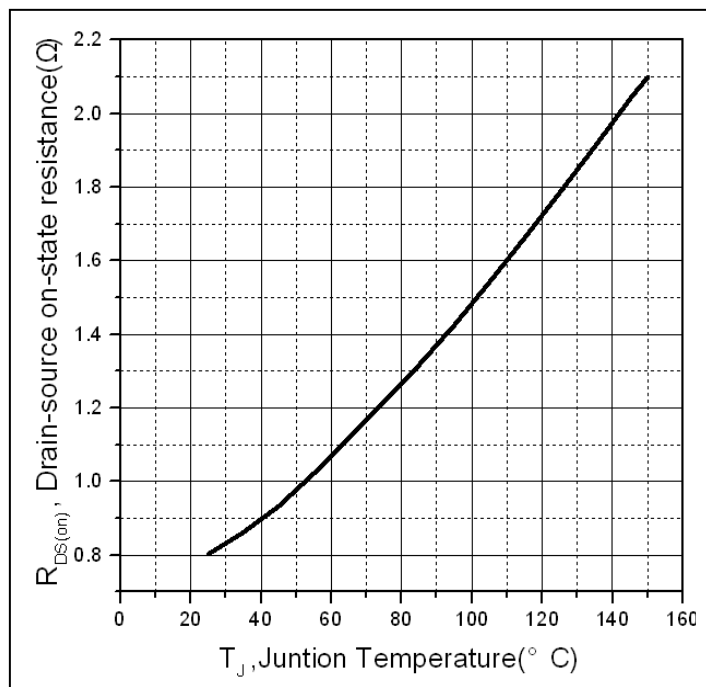
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
V _{(BR)DSS}	Drain-to-Source breakdown voltage	600	—	—	V	V _{GS} = 0V, I _D = 250μA
R _{DS(on)}	Static Drain-to-Source on-resistance	—	0.69	0.8	Ω	V _{GS} =10V, I _D = 5A T _J = 125°C
		—	1.54	—		
V _{GS(th)}	Gate threshold voltage	2	—	4	V	V _{DS} = V _{GS} , I _D = 250μA T _J = 125°C
		—	2.1	—		
I _{DSS}	Drain-to-Source leakage current	—	—	1	μA	V _{DS} = 600V, V _{GS} = 0V T _J = 125°C
		—	—	50		
I _{GSS}	Gate-to-Source forward leakage	—	—	100	nA	V _{GS} = 30V V _{GS} = -30V
		—	—	-100		
Q _g	Total gate charge	—	42.1	—	nC	I _D = 10A, V _{DS} =480V, V _{GS} = 10V
Q _{gs}	Gate-to-Source charge	—	8.2	—		
Q _{gd}	Gate-to-Drain("Miller") charge	—	16.2	—		
t _{d(on)}	Turn-on delay time	—	20.9	—	ns	V _{GS} =10V, V _{DS} =330V, R _L =33Ω, R _{GEN} =25Ω I _D =10A
t _r	Rise time	—	36.4	—		
t _{d(off)}	Turn-Off delay time	—	119.9	—		
t _f	Fall time	—	52.2	—		
C _{iss}	Input capacitance	—	1515	—	pF	V _{GS} = 0V V _{DS} = 25V f = 1MHz
C _{oss}	Output capacitance	—	137	—		
C _{rss}	Reverse transfer capacitance	—	9	—		

Source-Drain Ratings and Characteristics

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I _S	Continuous Source Current (Body Diode)	—	—	10	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I _{SM}	Pulsed Source Current (Body Diode)	—	—	40	A	
V _{SD}	Diode Forward Voltage	—	0.90	1.3	V	I _S =10A, V _{GS} =0V
t _{rr}	Reverse Recovery Time	—	866	—	ns	T _J = 25°C, I _F = 10A,
Q _{rr}	Reverse Recovery Charge	—	5163	—	nC	di/dt = 100A/μs

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.
- 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 $T_A = 25^\circ C$

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

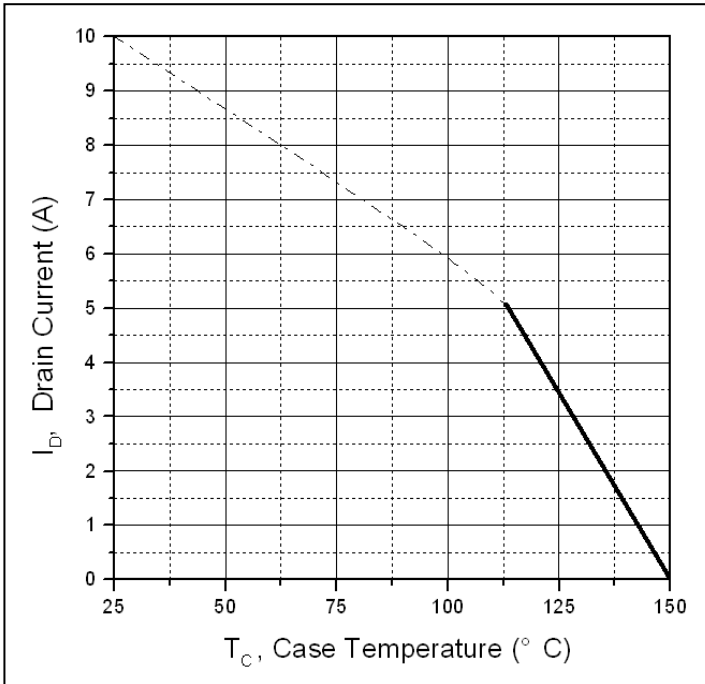


Figure 5. Maximum Drain Current Vs. Case Temperature

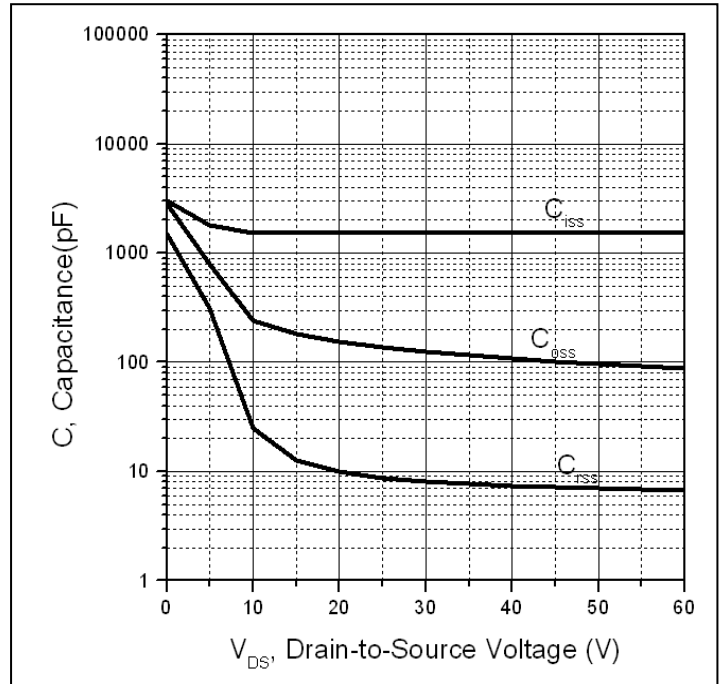


Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage

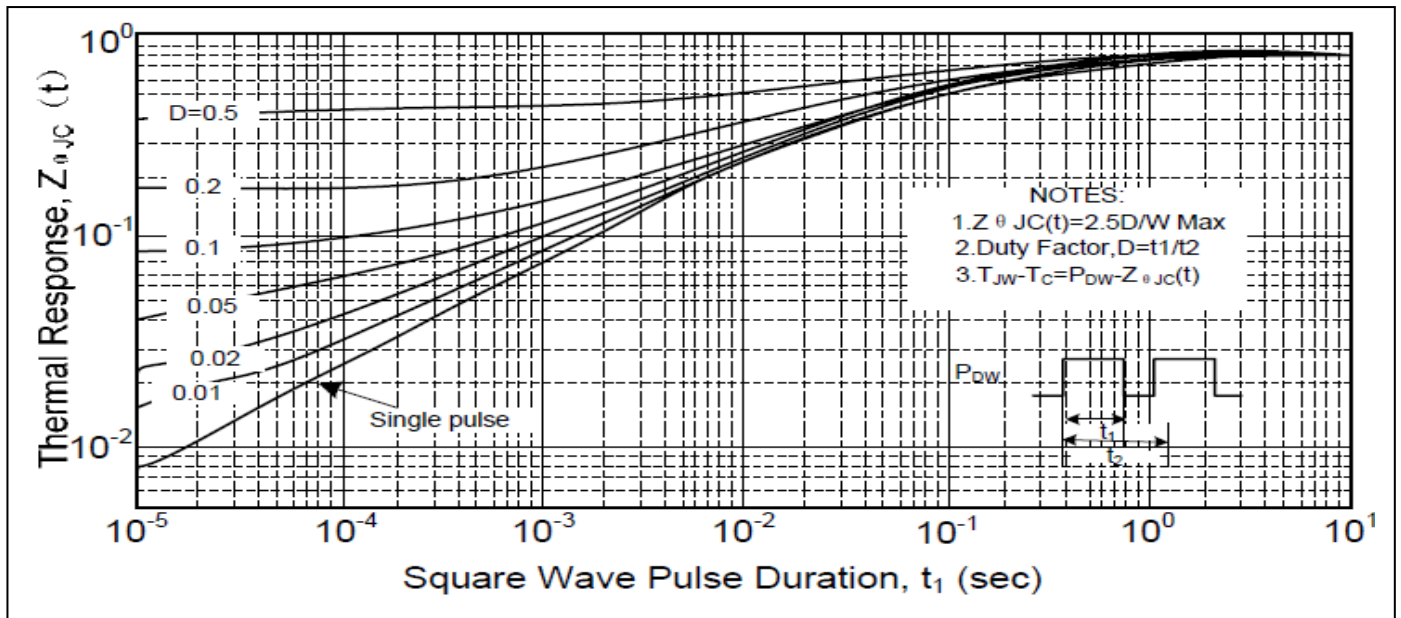
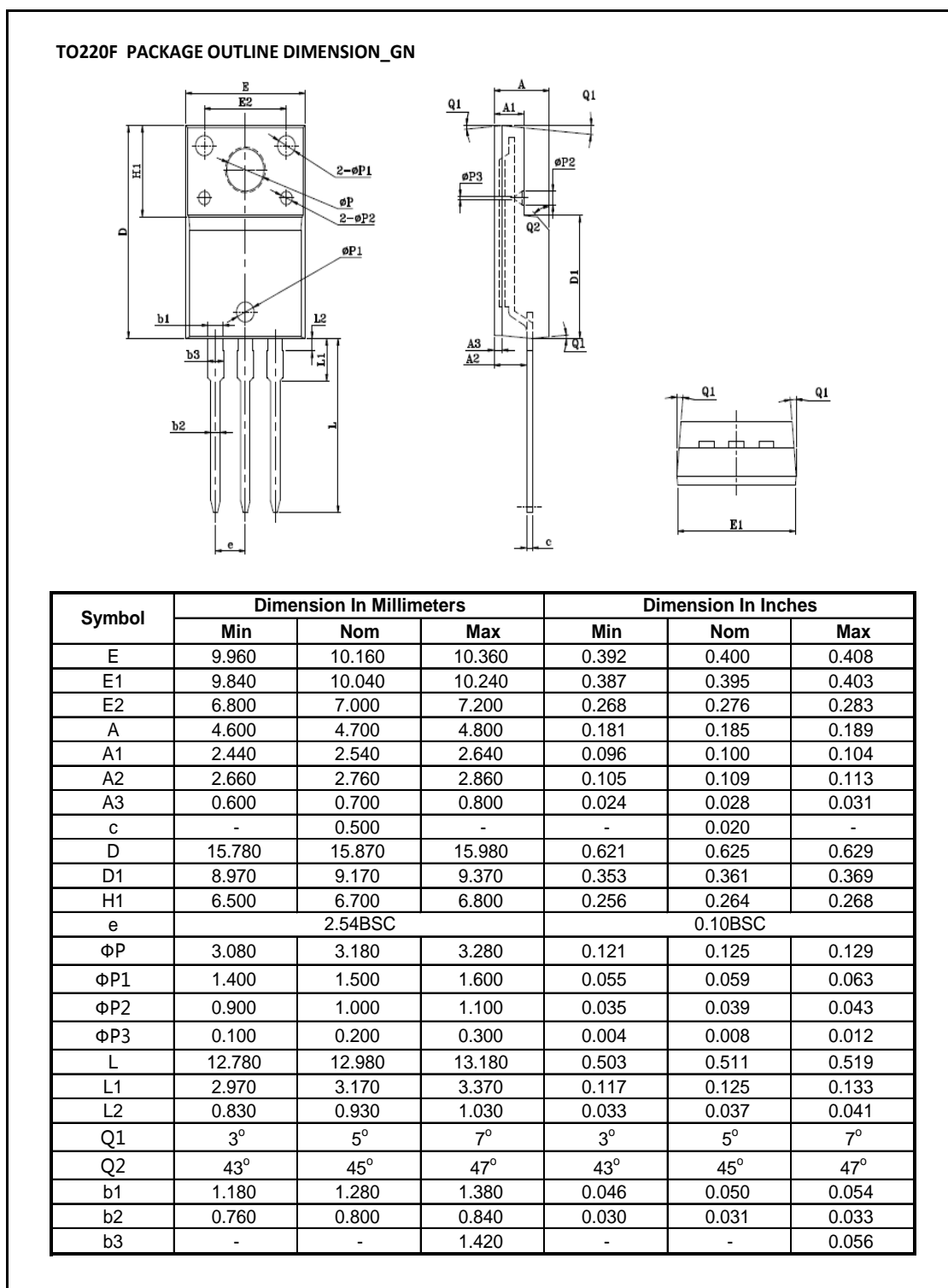


Figure 7. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Mechanical Data:


Ordering and Marking Information
Device Marking: SSF10N60F

Package (Available)
TO220F
Operating Temperature Range
C : -55 to 150 °C

Devices per Unit

Package Type	Units/Tube	Tubes/Inner Box	Units/Inner Box	Inner Boxes/ Carton Box	Units/ Carton Box
TO220F	50	20	1000	6	6000

Reliability Test Program

Test Item	Conditions	Duration	Sample Size
High Temperature Reverse Bias(HTRB)	T _j =125°C to 150°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°C @ 100% of Max V _{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices

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