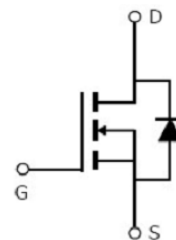


Main Product Characteristics:

V_{DSS}	600V
$R_{DS(on)}$	3.6ohm(typ.)
I_D	2A


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°C	Continuous Drain Current, V_{GS} @ 10V ^①	2	A
I_D @ TC = 100°C	Continuous Drain Current, V_{GS} @ 10V ^①	1.3	
I_{DM}	Pulsed Drain Current ^②	8	
P_D @TC = 25°C	Power Dissipation ^③	23	W
	Linear Derating Factor	0.18	W/°C
V_{DS}	Drain-Source Voltage	600	V
V_{GS}	Gate-to-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy @ L=55mH	110	mJ
I_{AS}	Avalanche Current @ L=55mH	2	A
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to +150	°C

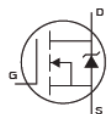
Thermal Resistance

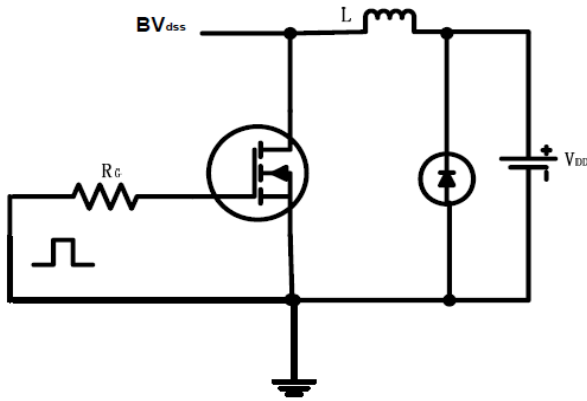
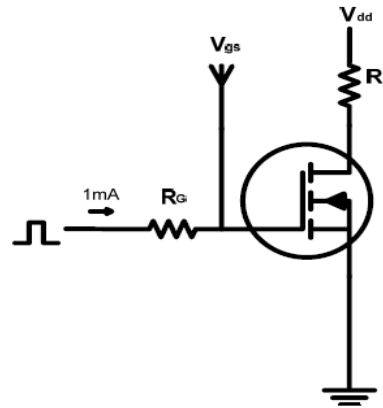
Symbol	Characterizes	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-case ^③	—	5.5	°C/W
$R_{\theta JA}$	Junction-to-ambient ($t \leq 10s$) ^④	—	62	°C/W
	Junction-to-Ambient (PCB mounted, steady-state) ^④	—	40	°C/W

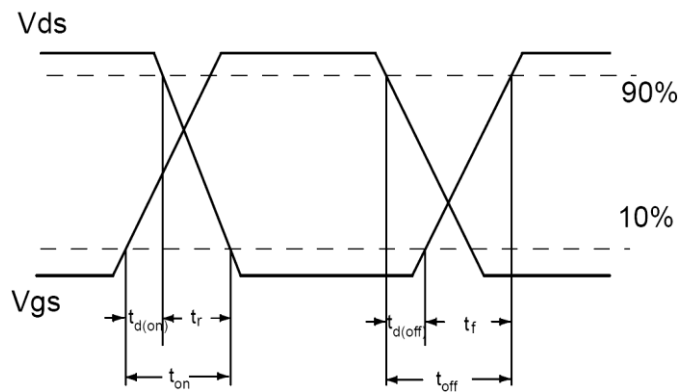
Electrical Characterizes @ $T_A=25^\circ\text{C}$ unless otherwise specified

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source breakdown voltage	600	—	—	V	$V_{GS} = 0V, I_D = 250\mu A$
$R_{DS(on)}$	Static Drain-to-Source on-resistance	—	3.6	4	Ω	$V_{GS}=10V, I_D = 1A$ $T_J = 125^\circ\text{C}$
		—	8.01	—		
$V_{GS(th)}$	Gate threshold voltage	2	—	4	V	$V_{DS} = V_{GS}, I_D = 250\mu A$ $T_J = 125^\circ\text{C}$
		—	2.17	—		
I_{DSS}	Drain-to-Source leakage current	—	—	1	μA	$V_{DS} = 600V, V_{GS} = 0V$ $T_J = 125^\circ\text{C}$
		—	—	50		
I_{GSS}	Gate-to-Source forward leakage	—	—	100	nA	$V_{GS} = 30V$ $V_{GS} = -30V$
		—	—	-100		
Q_g	Total gate charge	—	11.5	—	nC	$I_D = 2A,$ $V_{DS}=480V,$ $V_{GS} = 10V$
Q_{gs}	Gate-to-Source charge	—	2.7	—		
Q_{gd}	Gate-to-Drain("Miller") charge	—	4.5	—		
$t_{d(on)}$	Turn-on delay time	—	9.4	—	ns	$V_{GS}=10V, V_{DS}=300V,$ $R_L=150\Omega,$ $R_{GEN}=25\Omega$ $I_D=2A$
t_r	Rise time	—	7.4	—		
$t_{d(off)}$	Turn-Off delay time	—	25.4	—		
t_f	Fall time	—	20.8	—		
C_{iss}	Input capacitance	—	323	—	pF	$V_{GS} = 0V$ $V_{DS} = 25V$ $f = 1MHz$
C_{oss}	Output capacitance	—	40	—		
C_{rss}	Reverse transfer capacitance	—	5	—		

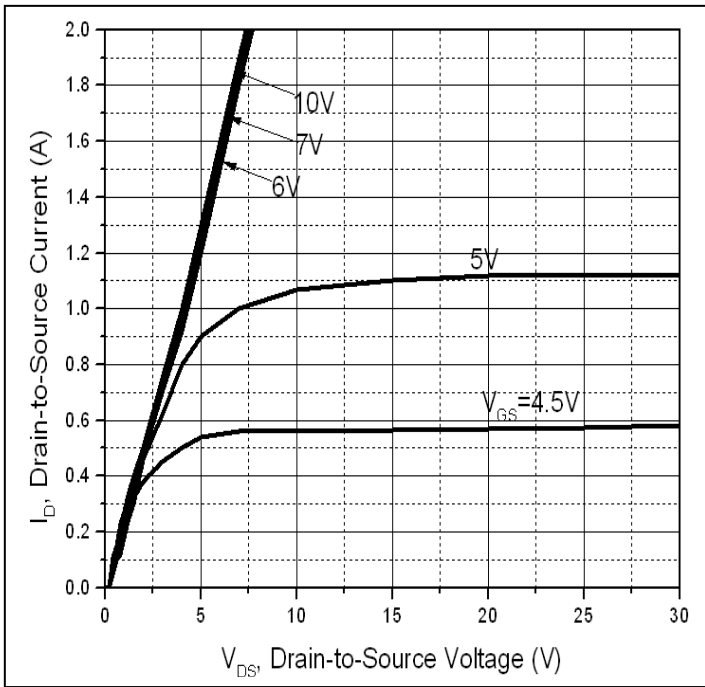
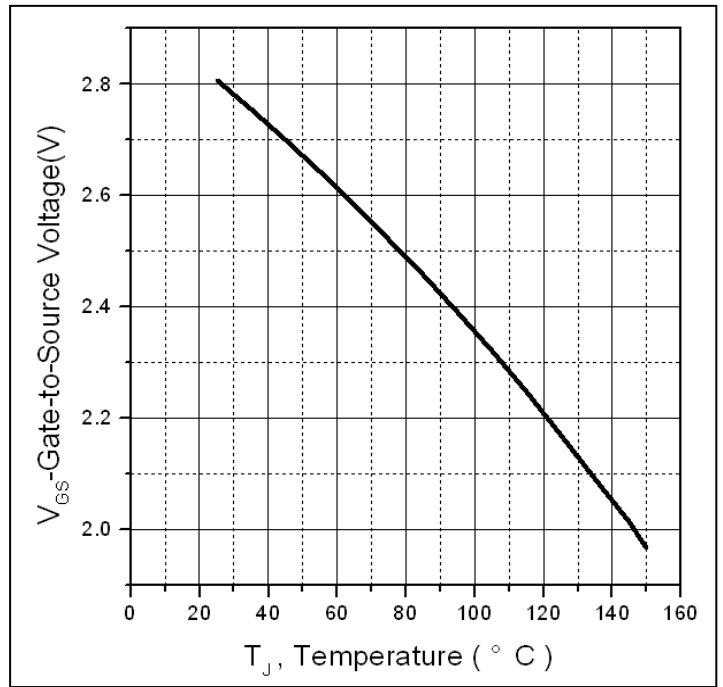
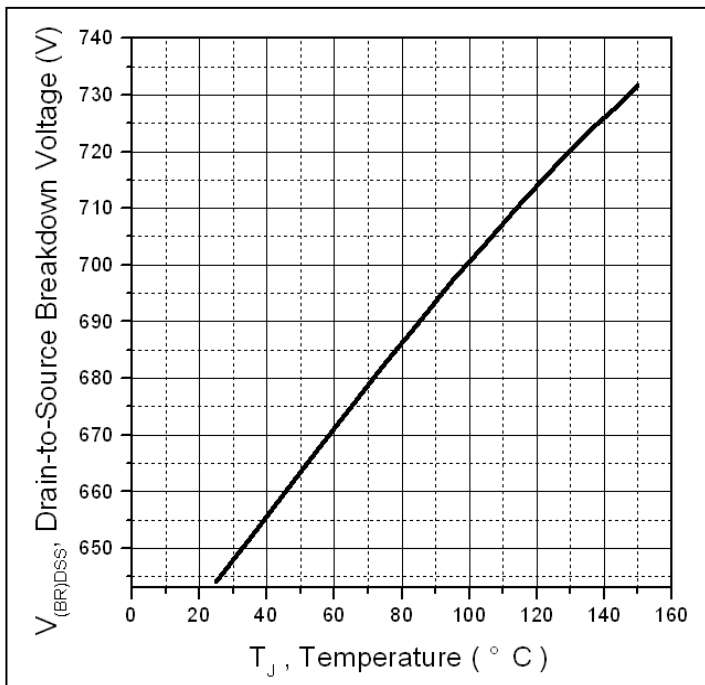
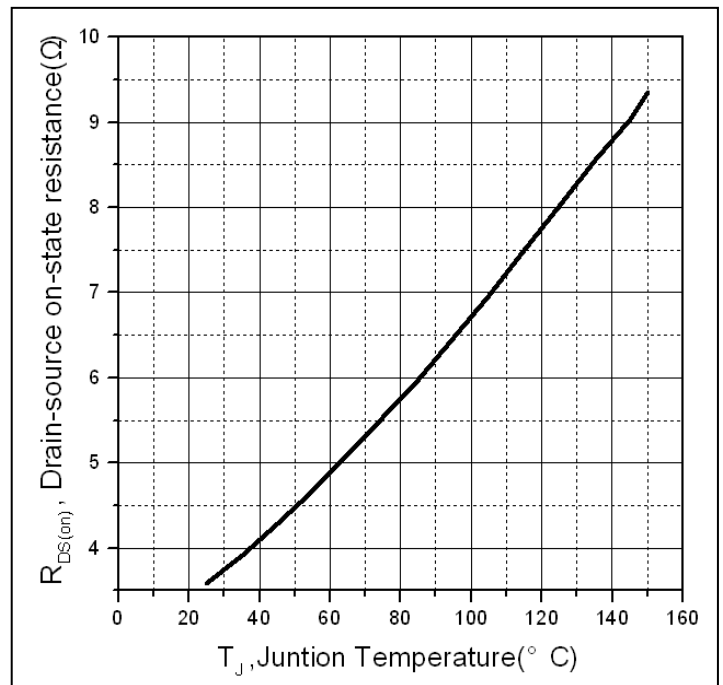
Source-Drain Ratings and Characteristics

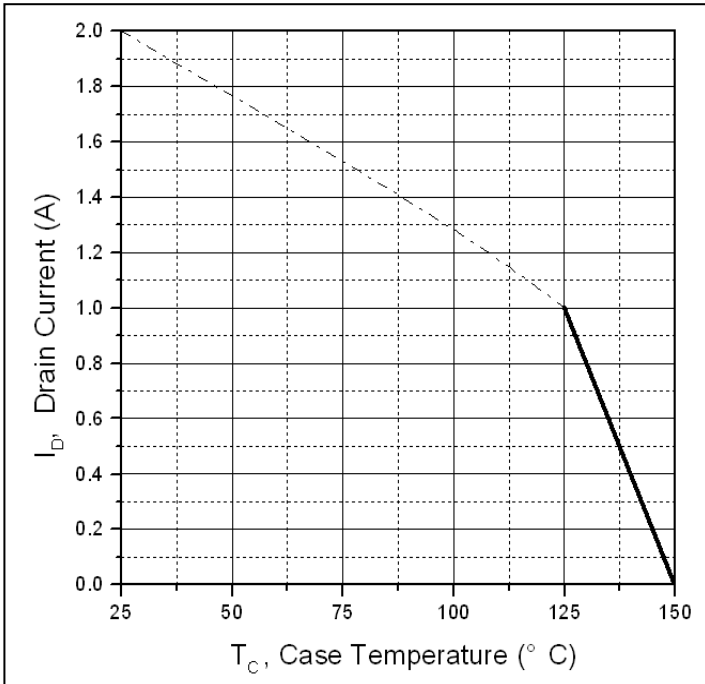
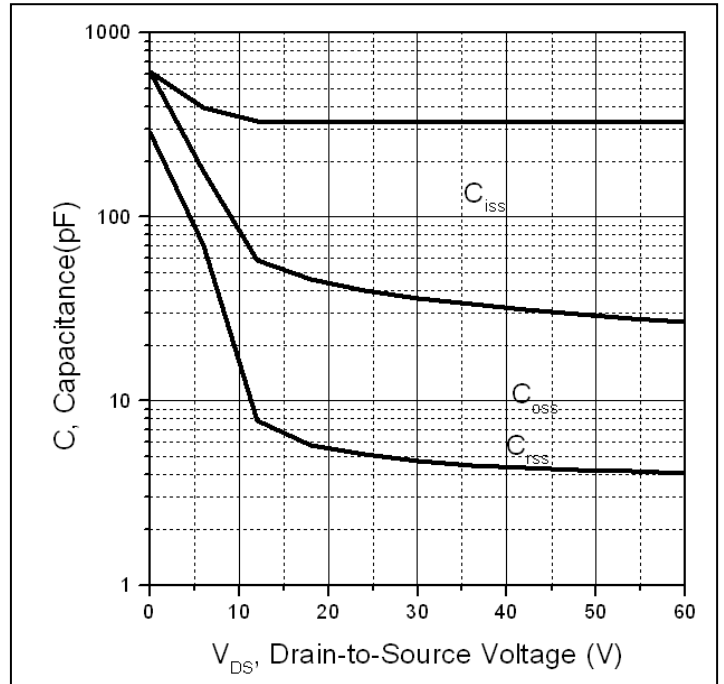
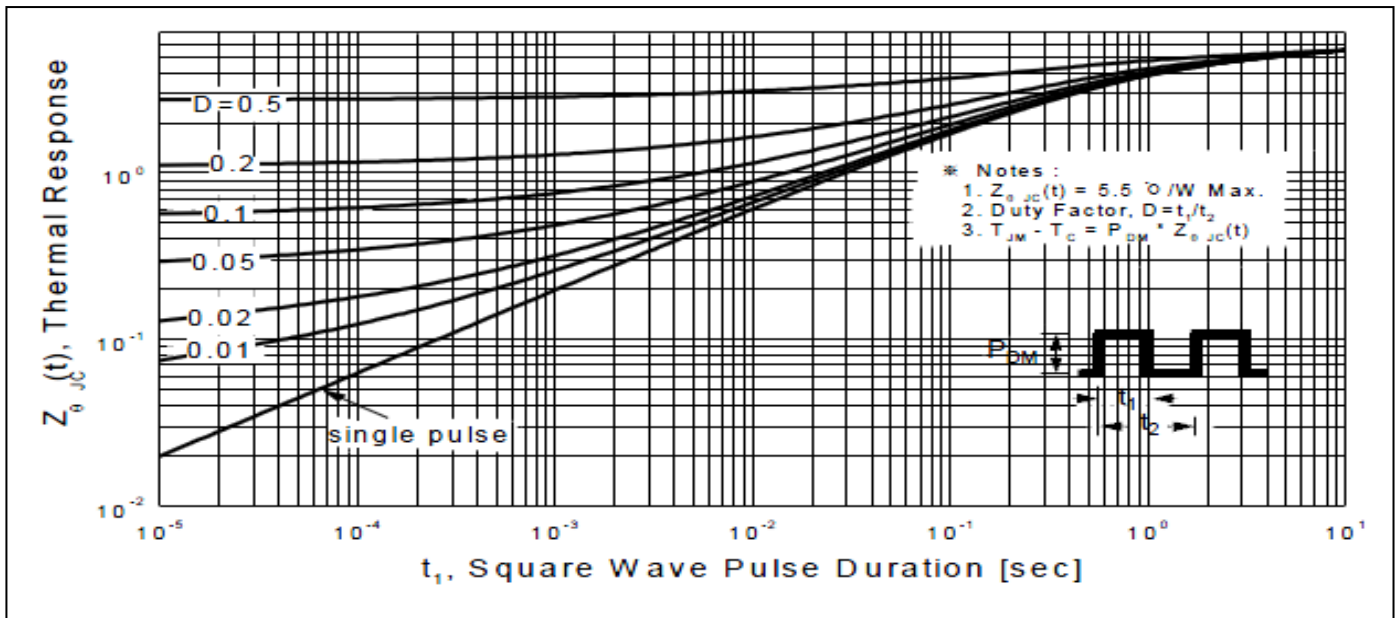
Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	2	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode)	—	—	8	A	
V_{SD}	Diode Forward Voltage	—	0.86	1.3	V	$I_S=2A, V_{GS}=0V$
t_{rr}	Reverse Recovery Time	—	259.3	—	ns	$T_J = 25^\circ\text{C}, I_F = 2A, di/dt = 100A/\mu s$
Q_{rr}	Reverse Recovery Charge	—	1419	—	nC	

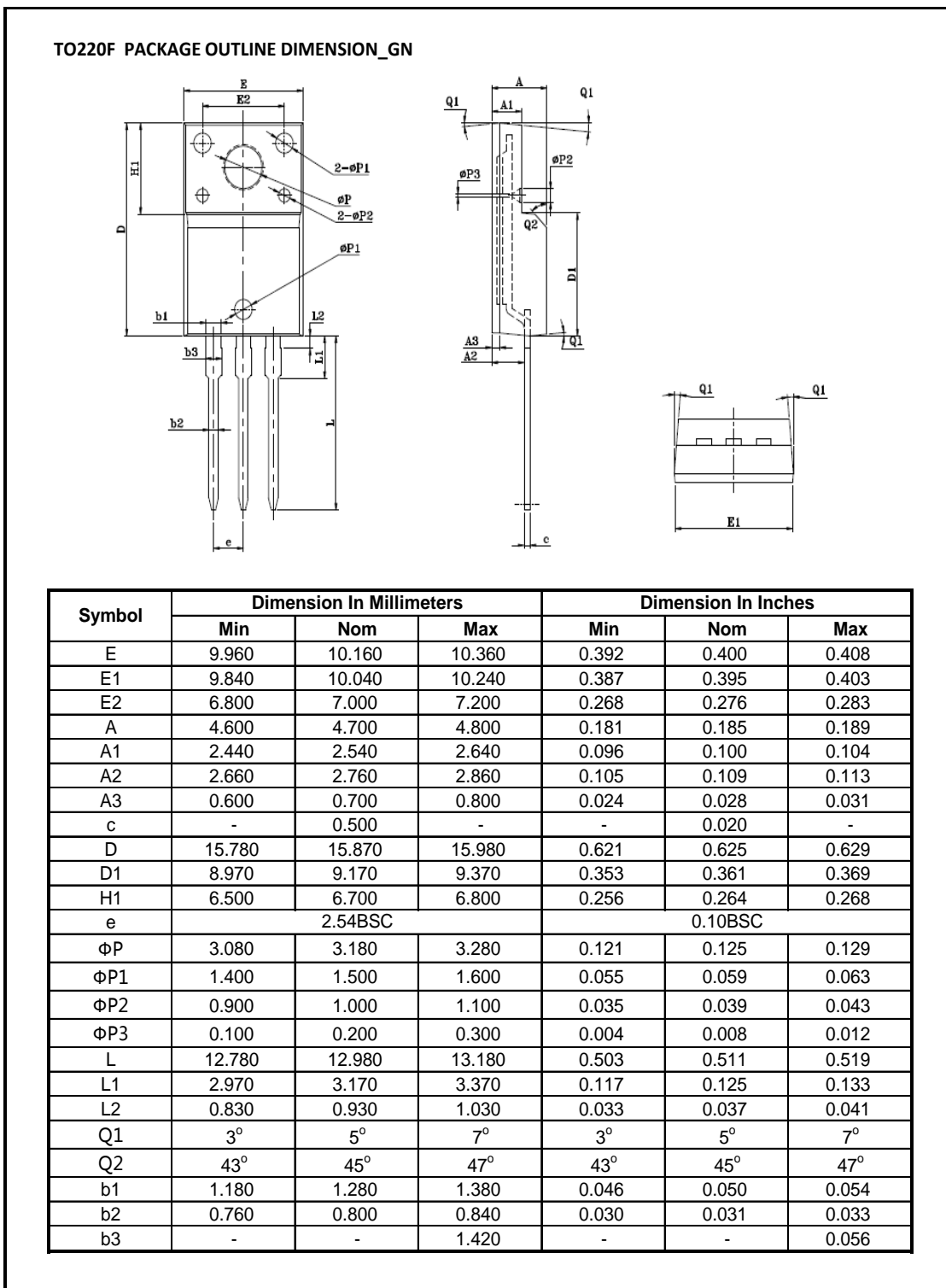
Test circuits and Waveforms
EAS test circuits:

Gate charge test circuit:

Switch Time Test Circuit:

Switch 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 $T_A = 25^\circ C$

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: SSF2N60F

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)	$T_j=125^{\circ}\text{C}$ 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)	$T_j=150^{\circ}\text{C}$ @ 100% of Max V_{GSS}	168 hours 500 hours 1000 hours	3 lots x 77 devices

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