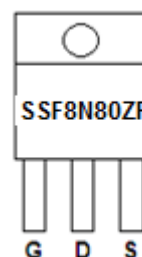


Main Product Characteristics:

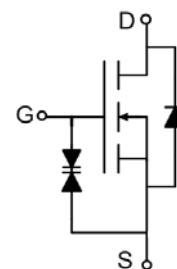
| | |
|--------------|---------------------|
| V_{DSS} | 800V |
| $R_{DS(on)}$ | 1.1 Ω (typ.) |
| I_D | 8A |



TO-220F



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
- ESD Rating(HBM) :4KV


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 | 8 | A |
| $I_D @ TC = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ ① | 5.1 | |
| I_{DM} | Pulsed Drain Current② | 32 | |
| $P_D @ TC = 25^\circ C$ | Power Dissipation③ | 45 | W |
| | Linear Derating Factor | 0.36 | W/°C |
| V_{DS} | Drain-Source Voltage | 800 | V |
| V_{GS} | Gate-to-Source Voltage | ± 20 | V |
| E_{AS} | Single Pulse Avalanche Energy @ L=25mH | 320 | mJ |
| I_{AS} | Avalanche Current @ L=25mH | 5 | A |
| $T_J \quad T_{STG}$ | Operating Junction and Storage Temperature Range | -55 to +150 | °C |

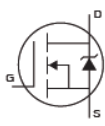
Thermal Resistance

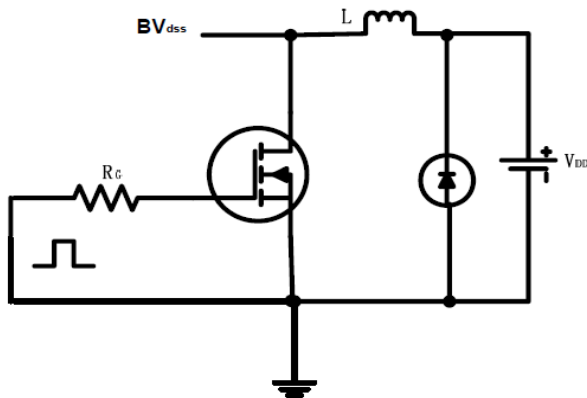
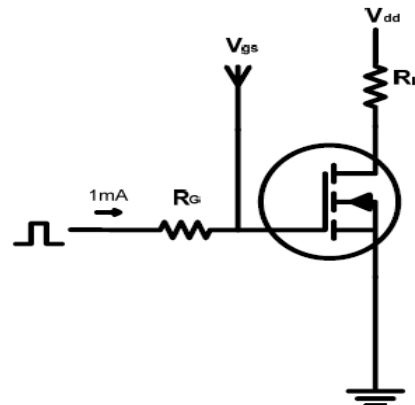
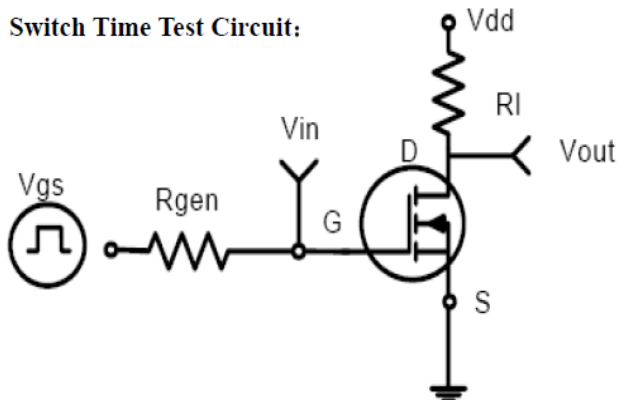
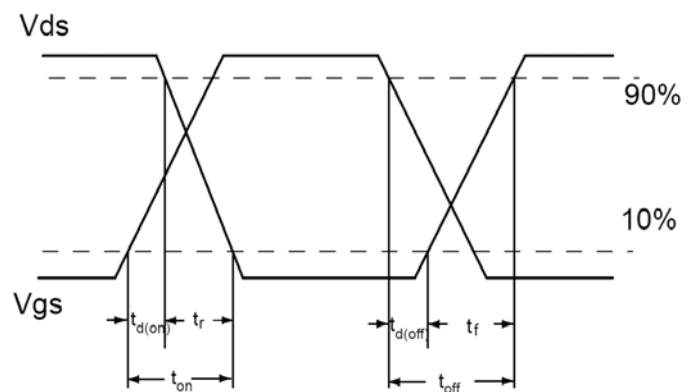
| Symbol | Characterizes | Typ. | Max. | Units |
|-----------------|---|------|------|-------|
| $R_{\theta JC}$ | Junction-to-case ^③ | — | 2.78 | °C/W |
| $R_{\theta JA}$ | Junction-to-ambient ($t \leq 10s$) ^④ | — | 100 | °C/W |

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

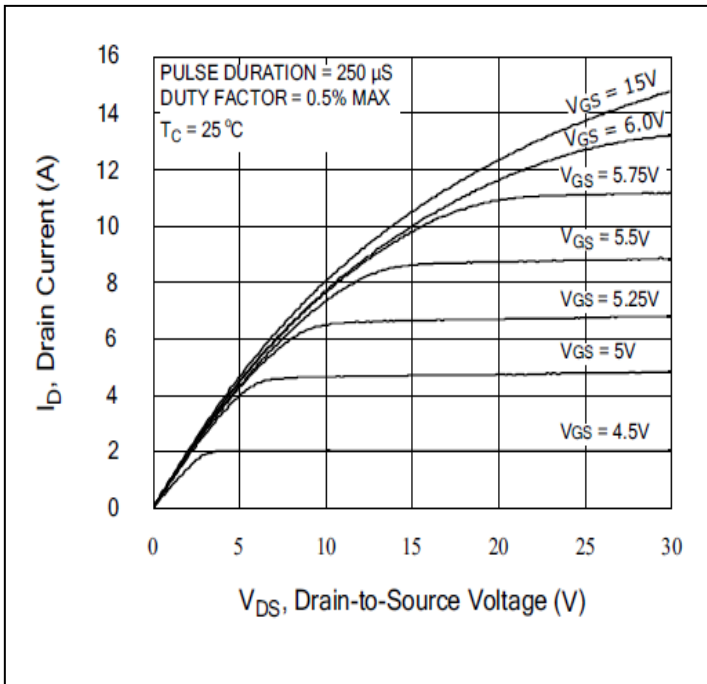
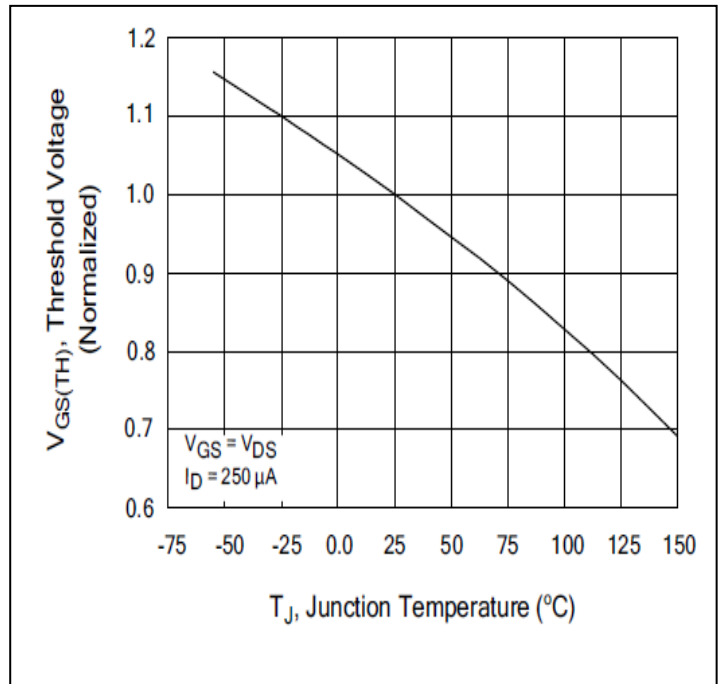
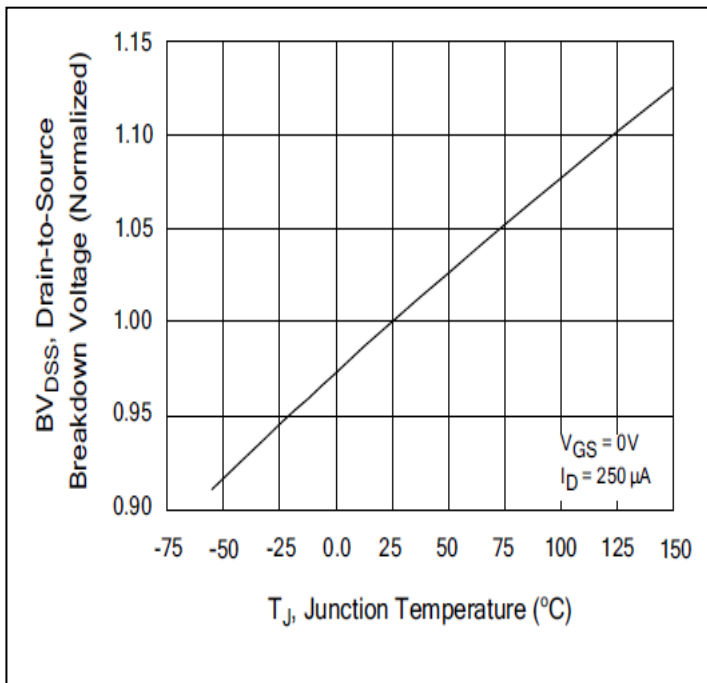
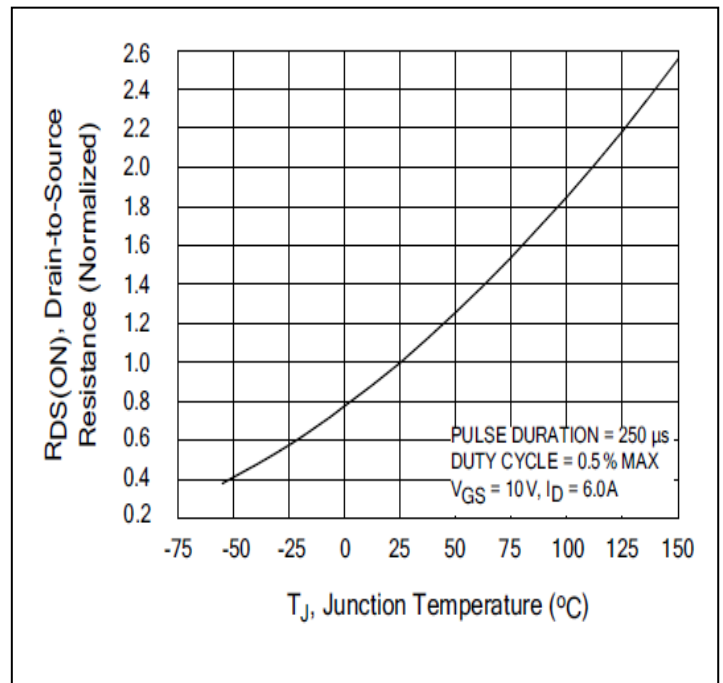
| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|---------------|--------------------------------------|------|------|------|----------|--|
| $V_{(BR)DSS}$ | Drain-to-Source breakdown voltage | 800 | — | — | V | $V_{GS} = 0V, I_D = 250\mu A$ |
| $R_{DS(on)}$ | Static Drain-to-Source on-resistance | — | 1.2 | 1.4 | Ω | $V_{GS}=10V, I_D = 4A$ |
| $V_{GS(th)}$ | Gate threshold voltage | 2 | — | 4 | V | $V_{DS} = V_{GS}, I_D = 250\mu A$ |
| I_{DSS} | Drain-to-Source leakage current | — | — | 1 | μA | $V_{DS} = 800V, V_{GS} = 0V$ $T_J = 125^\circ C$ |
| | | — | — | 50 | | |
| I_{GSS} | Gate-to-Source forward leakage | — | — | 10 | μA | $V_{GS} = 20V$ |
| | | — | — | -10 | | $V_{GS} = -20V$ |
| g_{fs} | Forward Transconductance | — | 16 | — | S | $V_{DS} > 2I_D \cdot R_{DS(on).max.}$ $I_D = 8A$ |
| Q_g | Total gate charge | — | 48 | — | nC | $I_D = 8A,$ $V_{DS} = 400V,$ $V_{GS} = 10V$ |
| Q_{GS} | Gate-to-Source charge | — | 8 | — | | |
| Q_{gd} | Gate-to-Drain("Miller") charge | — | 18 | — | | |
| $t_{d(on)}$ | Turn-on delay time | — | 25 | — | ns | $V_{GS} = 10V, V_{DS} = 400V,$ $R_{GEN} = 25\Omega$ $I_D = 8A$ |
| t_r | Rise time | — | 43 | — | | |
| $t_{d(off)}$ | Turn-Off delay time | — | 125 | — | | |
| t_f | Fall time | — | 62 | — | | |
| C_{iss} | Input capacitance | — | 2050 | — | pF | $V_{GS} = 0V$ |
| C_{oss} | Output capacitance | — | 150 | — | | $V_{DS} = 25V$ |
| C_{rss} | Reverse transfer capacitance | — | 20 | — | | $f = 1MHz$ |

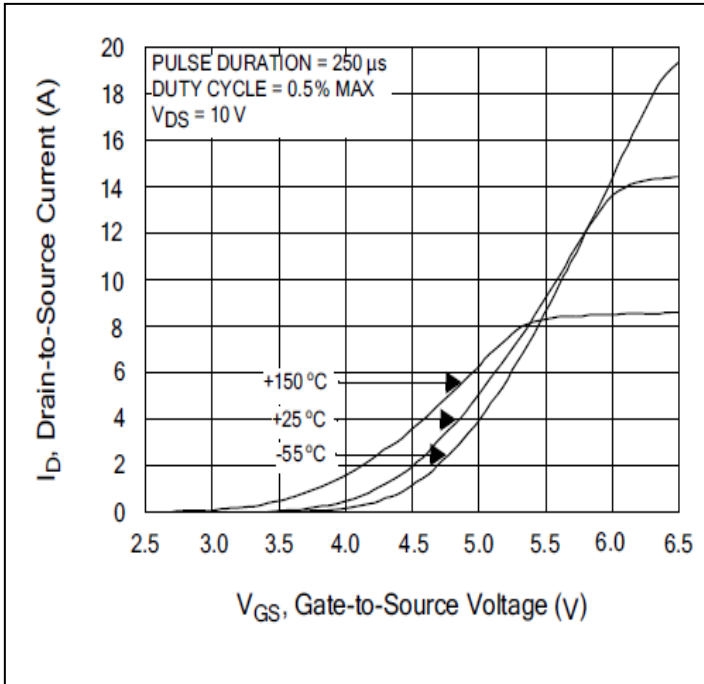
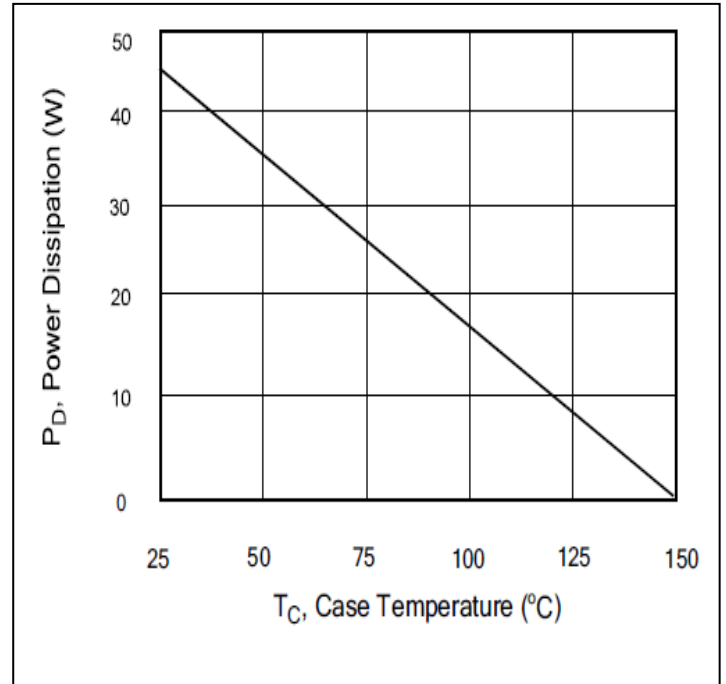
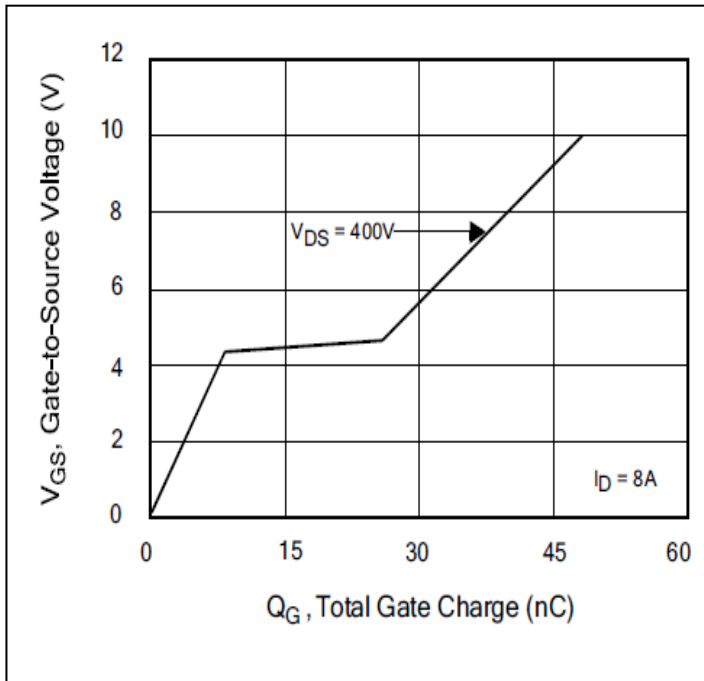
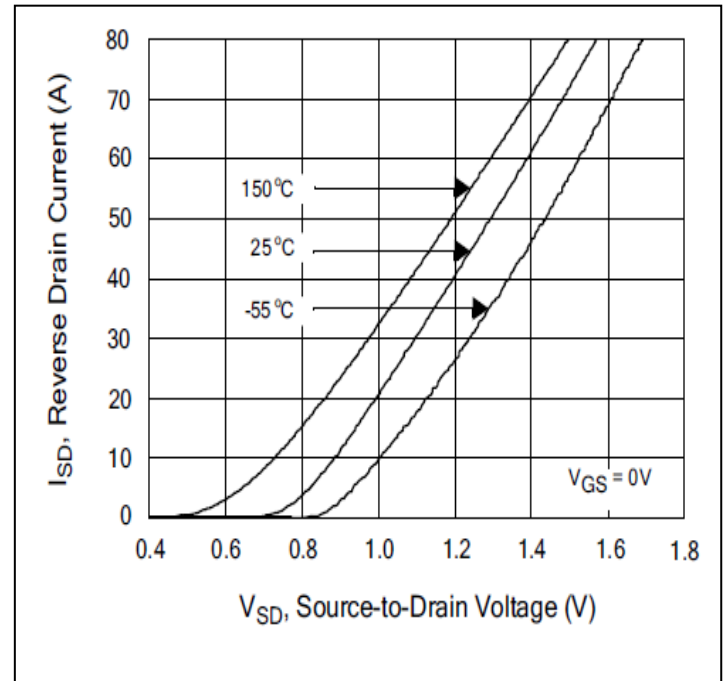
Source-Drain Ratings and Characteristics

| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|----------|---|------|------|------|-------|--|
| I_S | Continuous Source Current (Body Diode) | — | — | 8 | A | MOSFET symbol showing the integral reverse p-n junction diode.  |
| I_{SM} | Pulsed Source Current (Body Diode) | — | — | 32 | A | |
| V_{SD} | Diode Forward Voltage | — | — | 1.5 | V | $I_S = 9A, V_{GS} = 0V$ |
| t_{rr} | Reverse Recovery Time | — | 550 | — | ns | $T_J = 25^\circ C, I_F = 8A, di/dt = 100A/\mu s$ |
| Q_{rr} | Reverse Recovery Charge | — | 3600 | — | 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. Case Temperature

Figure 4: Normalized On-Resistance Vs. Case Temperature

Typical electrical and thermal characteristics

Figure 5: Typical Transfer Characteristics

Figure 6. Maximum Power Dissipation Vs. Case Temperature

Figure 7. Gate Charge Vs. Drain-to-Source Voltage

Figure 8: Typical Body Diode Transfer Characteristics

Typical electrical and thermal characteristics

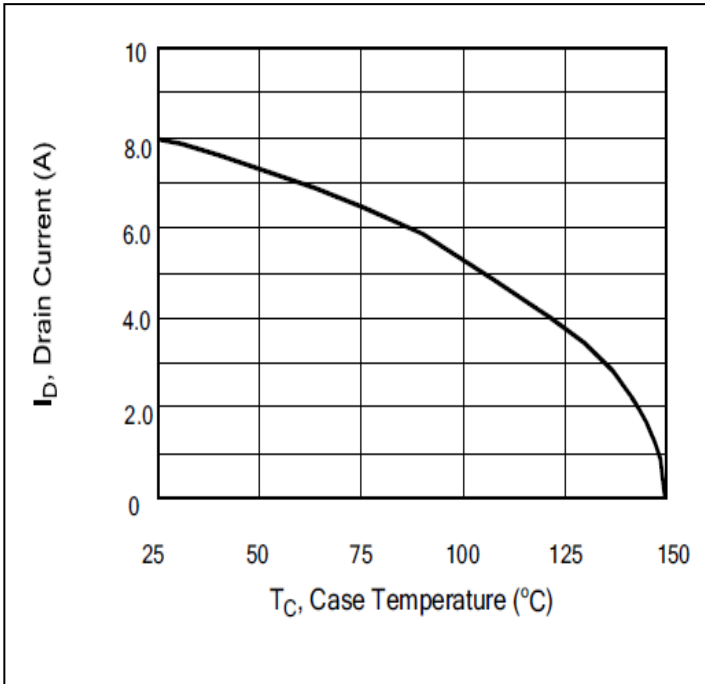


Figure 9. Maximum Drain Current Vs. Case Temperature

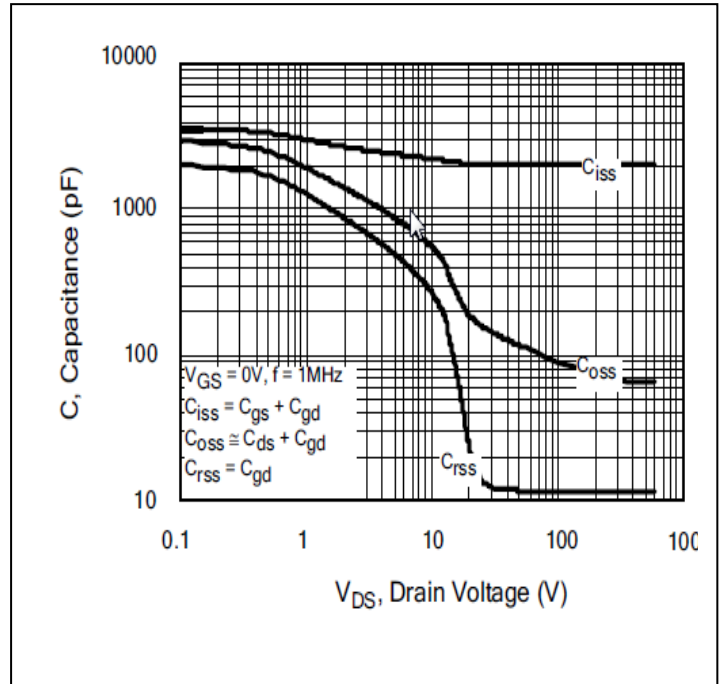


Figure 10. Typical Capacitance Vs. Drain-to-Source Voltage

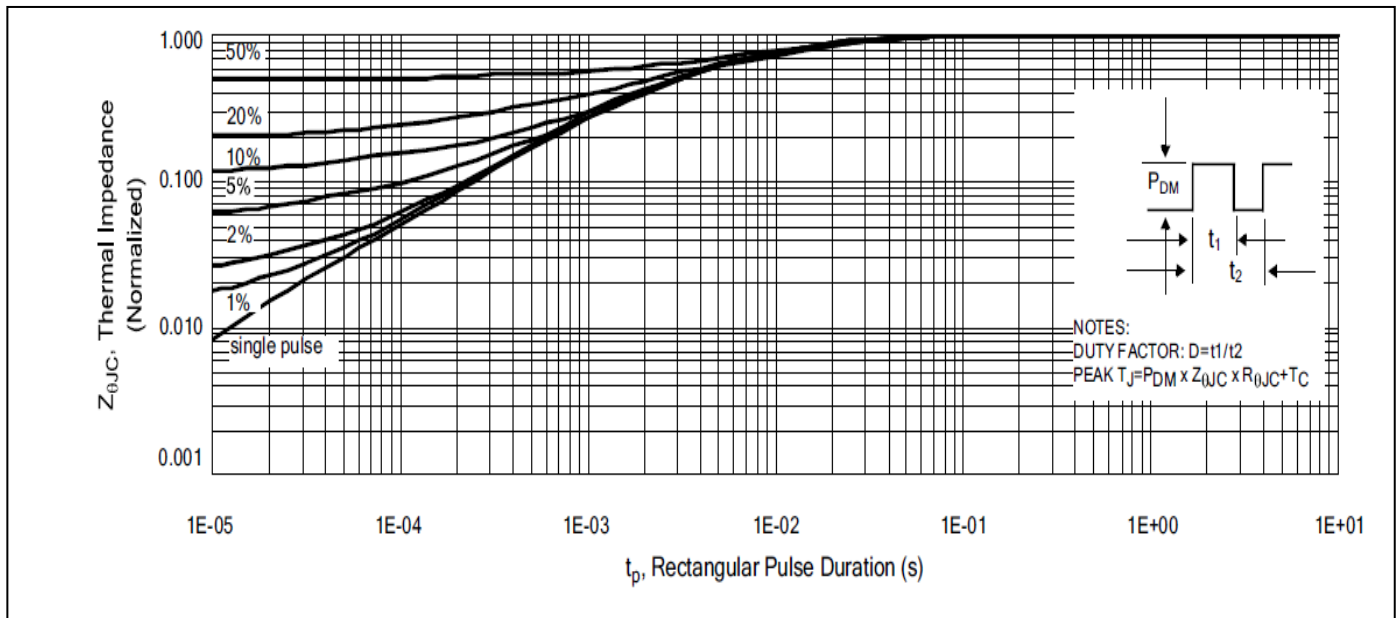
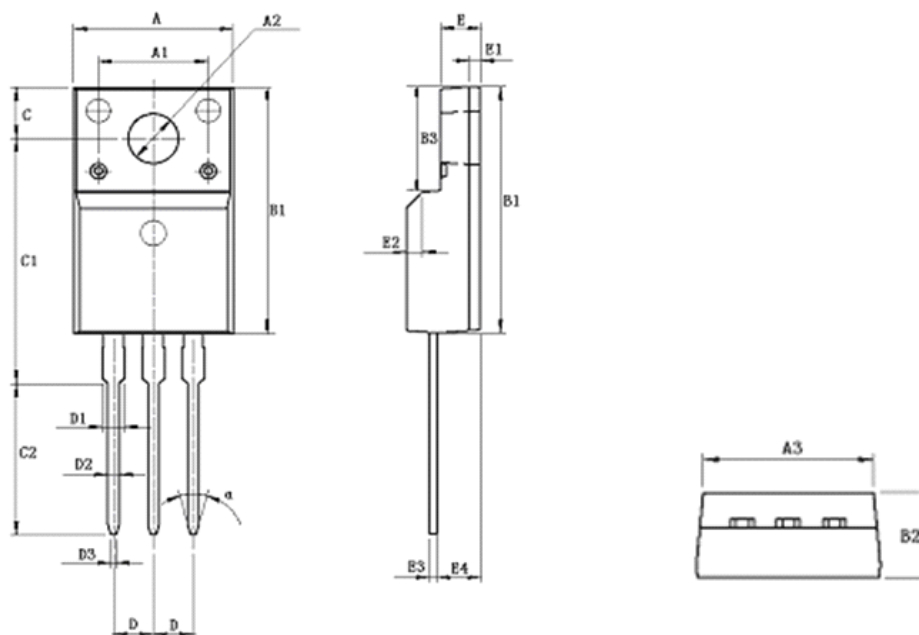


Figure 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Mechanical Data:
TO220F PACKAGE OUTLINE DIMENSION


| Symbol | Dimension In Millimeters | | | Dimension In Inches | | |
|----------|--------------------------|--------|--------|---------------------|-------|-------|
| | Min | Nom | Max | Min | Nom | Max |
| A | 9.960 | 10.160 | 10.360 | 0.392 | 0.400 | 0.408 |
| A1 | 7.000 | | | 0.276 | 0.000 | 0.000 |
| A2 | 3.080 | 3.180 | 3.280 | 0.121 | 0.125 | 0.129 |
| A3 | 9.260 | 9.460 | 9.660 | 0.365 | 0.372 | 0.380 |
| B1 | 15.670 | 15.870 | 16.070 | 0.617 | 0.625 | 0.633 |
| B2 | 4.500 | 4.700 | 4.900 | 0.177 | 0.185 | 0.193 |
| B3 | 6.480 | 6.680 | 6.880 | 0.255 | 0.263 | 0.271 |
| C | 3.200 | 3.300 | 3.400 | 0.126 | 0.130 | 0.134 |
| C1 | 15.600 | 15.800 | 16.000 | 0.614 | 0.622 | 0.630 |
| C2 | 9.550 | 9.750 | 9.950 | 0.376 | 0.384 | 0.392 |
| D | 2.54 (TYP) | | | 1.00 (TYP) | | |
| D1 | - | - | 1.470 | - | - | 0.058 |
| D2 | 0.700 | 0.800 | 0.900 | 0.028 | 0.031 | 0.035 |
| D3 | 0.250 | 0.350 | 0.450 | 0.010 | 0.014 | 0.018 |
| E | 2.340 | 2.540 | 2.740 | 0.092 | 0.100 | 0.108 |
| E1 | 0.700 | | | 0.028 | | |
| E2 | 1.0*45 ⁰ | | | 1.0*45 ⁰ | | |
| E3 | 0.450 | 0.500 | 0.600 | 0.018 | 0.020 | 0.024 |
| E4 | 2.560 | 2.760 | 2.960 | 0.101 | 0.109 | 0.117 |
| Θ | 30 ⁰ | | | 30 ⁰ | | |

Ordering and Marking Information
Device Marking: SSF8N80ZF

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} /VR | 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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