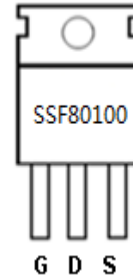
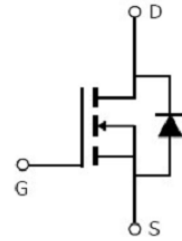


Main Product Characteristics:

| | |
|--------------|--------------------|
| V_{DSS} | 75V |
| $R_{DS(on)}$ | 8m Ω (typ.) |
| I_D | 80A ① |


TO220

Marking and pin Assignment

Schematic diagram
Features and Benefits:

- Advanced MOSFET process technology
- Special designed for motor control, PWM, load switching etc.
- Ultra low on-resistance with low gate charge
- Excellent Qgd/Qgs rating
- 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, motor control and a wide variety of other applications.

Absolute max Rating:

| Symbol | Parameter | Max. | Units |
|--------------------------|--|--------------|-------|
| $I_D @ TC = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 80 ① | A |
| $I_D @ TC = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 70 ① | |
| I_{DM} | Pulsed Drain Current ② | 320 | |
| $P_D @ TC = 25^\circ C$ | Power Dissipation ③ | 200 | W |
| | Linear Derating Factor | 2.0 | W/°C |
| V_{DS} | Drain-Source Voltage | 75 | V |
| V_{GS} | Gate-to-Source Voltage | ± 20 | V |
| E_{AS} | Single Pulse Avalanche Energy @ L=0.3mH | 375 | mJ |
| I_{AS} | Avalanche Current @ L=0.3mH | 50 | A |
| $T_J T_{STG}$ | Operating Junction and Storage Temperature Range | -55 to + 175 | °C |

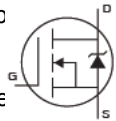
Thermal Resistance

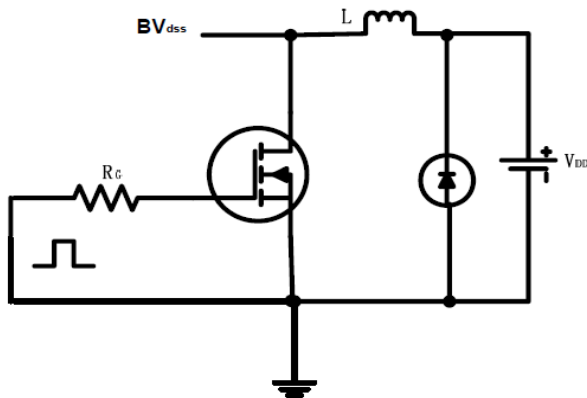
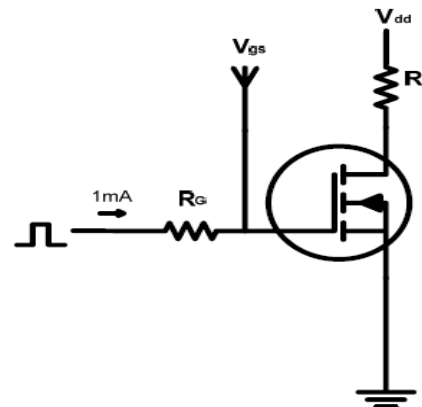
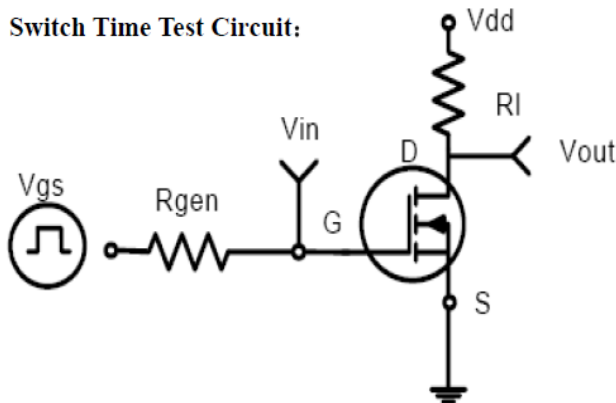
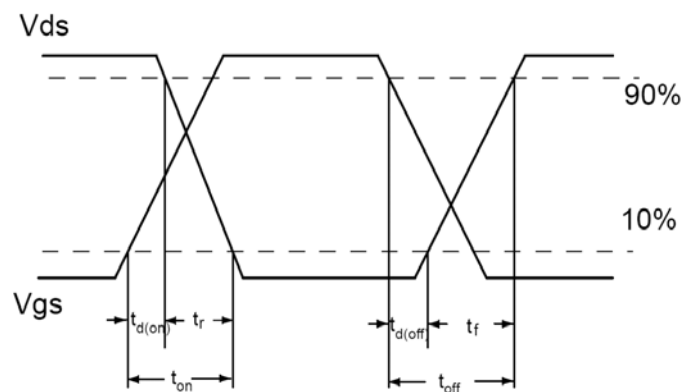
| Symbol | Characterizes | Typ. | Max. | Units |
|------------------|---|------|------|-------|
| R _{θJC} | Junction-to-case ③ | — | 0.75 | °C/W |
| R _{θJA} | Junction-to-ambient (t ≤ 10s) ④ | — | 62 | °C/W |
| | Junction-to-Ambient (PCB mounted, steady-state) ④ | — | 40 | °C/W |

Electrical Characterizes @T_A=25°C unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|----------------------|--------------------------------------|------|------|------|-------|---|
| V _{(BR)DSS} | Drain-to-Source breakdown voltage | 75 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| R _{DS(on)} | Static Drain-to-Source on-resistance | — | 8 | 10 | mΩ | V _{GS} =10V, I _D = 30A T _J = 125°C |
| | | — | 14.9 | — | | |
| V _{GS(th)} | Gate threshold voltage | 2 | — | 4 | V | V _{DS} = V _{GS} , I _D = 250μA T _J = 125°C |
| | | — | 2.11 | — | | |
| I _{DSS} | Drain-to-Source leakage current | — | — | 1 | μA | V _{DS} = 75V, V _{GS} = 0V T _J = 125°C |
| | | — | — | 50 | | |
| I _{GSS} | Gate-to-Source forward leakage | — | — | 100 | nA | V _{GS} = 20V V _{GS} = -20V |
| | | — | — | -100 | | |
| Q _g | Total gate charge | — | 73 | — | nC | I _D = 30A, V _{DS} =30V, V _{GS} = 10V |
| Q _{gs} | Gate-to-Source charge | — | 29 | — | | |
| Q _{gd} | Gate-to-Drain("Miller") charge | — | 23 | — | | |
| t _{d(on)} | Turn-on delay time | — | 19 | — | ns | V _{GS} =10V, V _{DS} =30V, R _L =15Ω, R _{GEN} =2.5Ω |
| t _r | Rise time | — | 18 | — | | |
| t _{d(off)} | Turn-Off delay time | — | 56 | — | | |
| t _f | Fall time | — | 24 | — | | |
| C _{iss} | Input capacitance | — | 4308 | — | pF | V _{GS} = 0V V _{DS} = 25V f = 1MHz |
| C _{oss} | Output capacitance | — | 328 | — | | |
| C _{rss} | Reverse transfer capacitance | — | 118 | — | | |

Source-Drain Ratings and Characteristics

| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|-----------------|---|------|------|------|-------|---|
| I _S | Continuous Source Current (Body Diode) | — | — | 80 ① | A | MOSFET symb showing the integral reverse p-n junction diode.  |
| I _{SM} | Pulsed Source Current (Body Diode) | — | — | 320 | A | |
| V _{SD} | Diode Forward Voltage | — | 0.88 | 1.3 | V | I _S =30A, V _{GS} =0V |
| t _{rr} | Reverse Recovery Time | — | 36 | — | ns | T _J = 25°C, I _F = 75A, di/dt = |
| Q _{rr} | Reverse Recovery Charge | — | 50 | — | nC | 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. 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 $T_A = 25^\circ\text{C}$
- ⑤ These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of $T_{J(MAX)} = 175^\circ\text{C}$.

Typical electrical and thermal characteristics

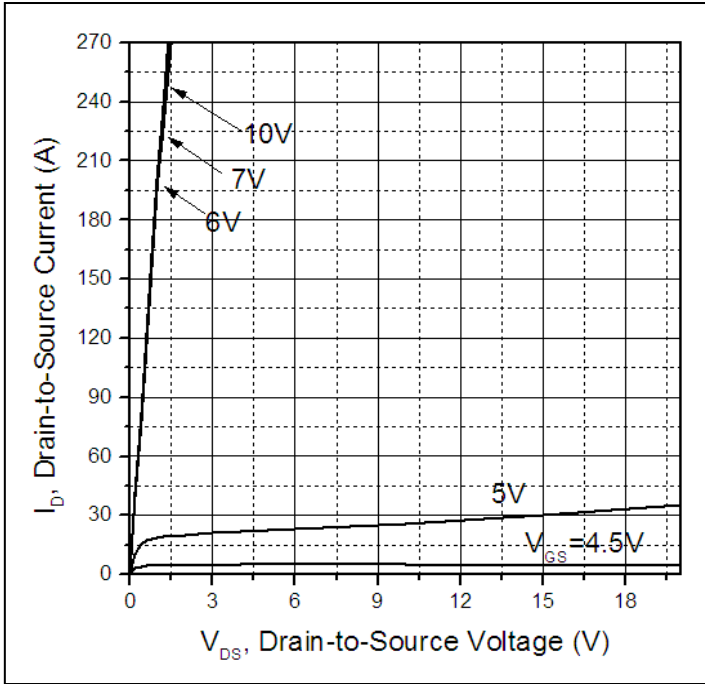


Figure 1: Typical Output Characteristics

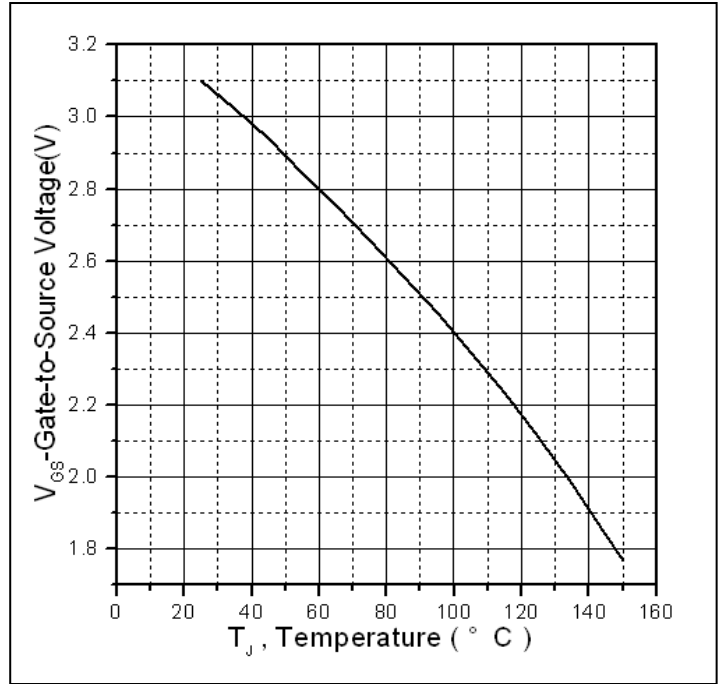


Figure 2. Gate to source cut-off voltage

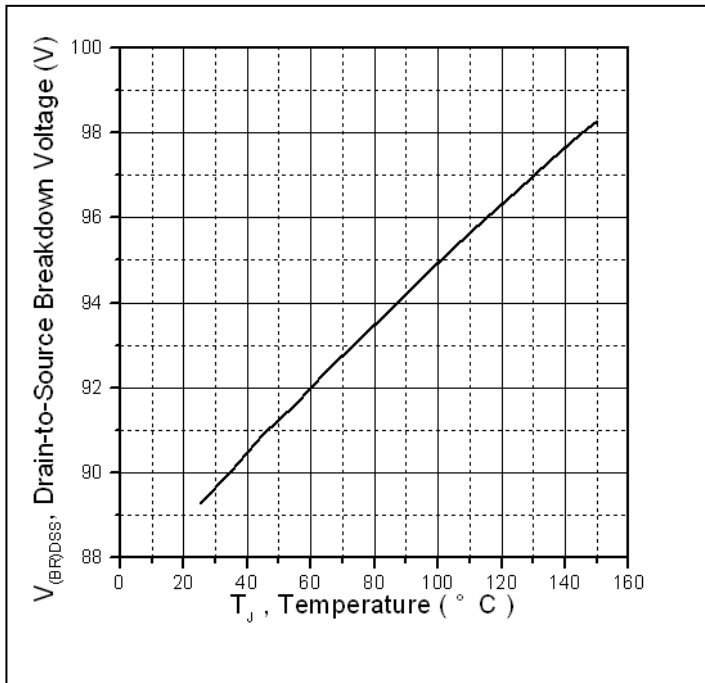


Figure 3. Drain-to-Source Breakdown Voltage vs. Temperature

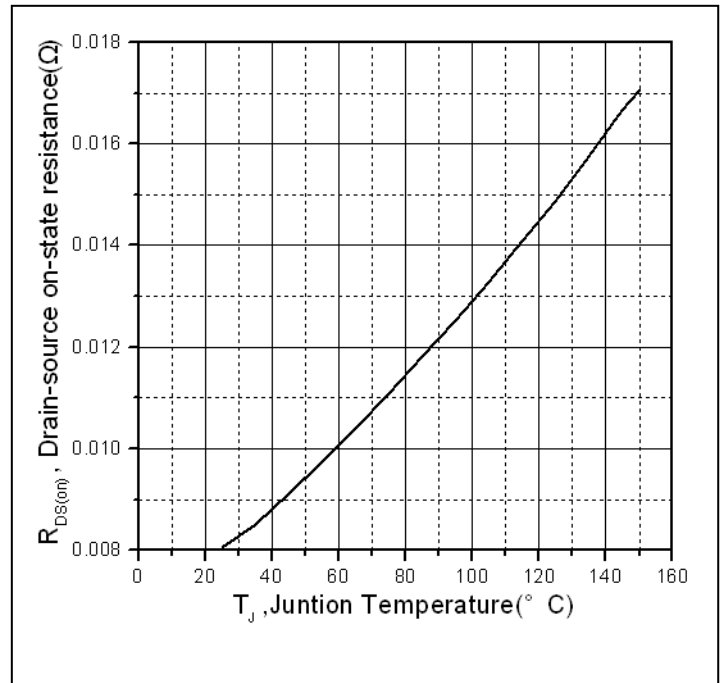


Figure 4: Normalized On-Resistance Vs. Case Temperature

Typical electrical and thermal characteristics

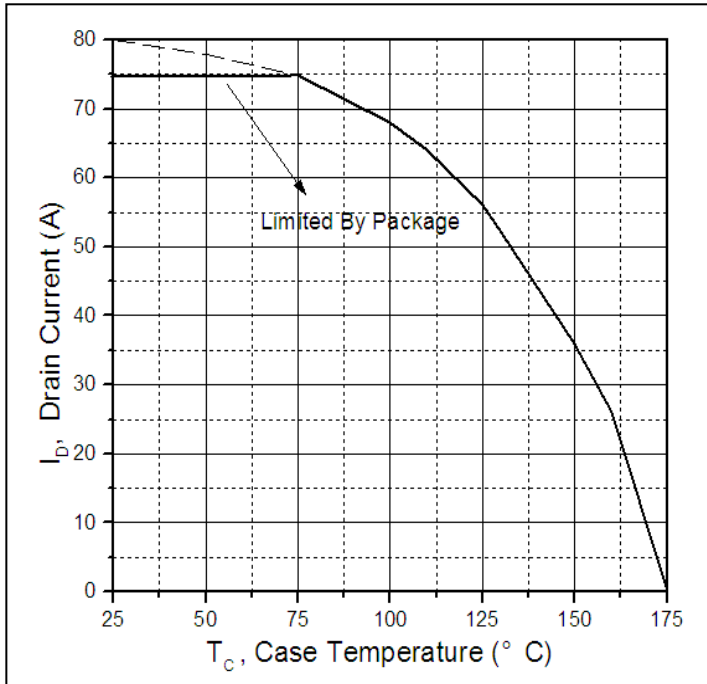


Figure 5. Maximum Drain Current Vs. Case Temperature

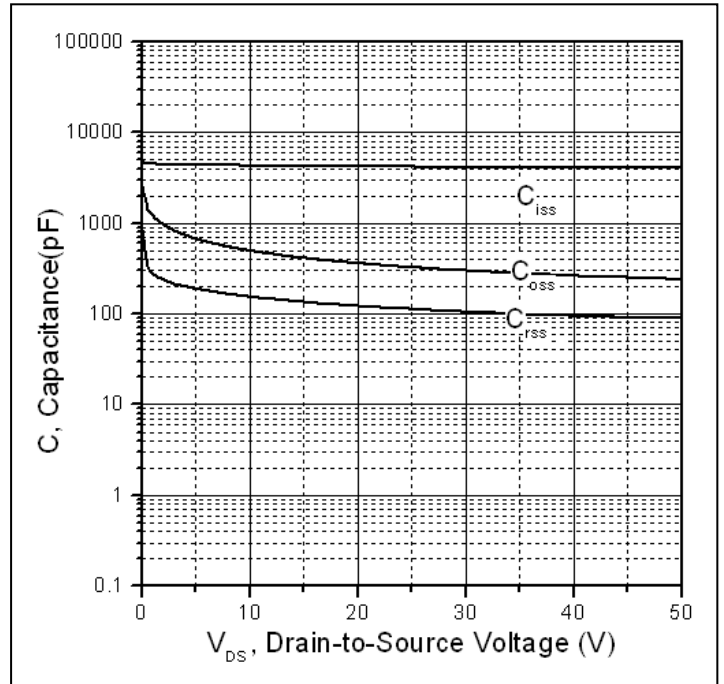


Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage

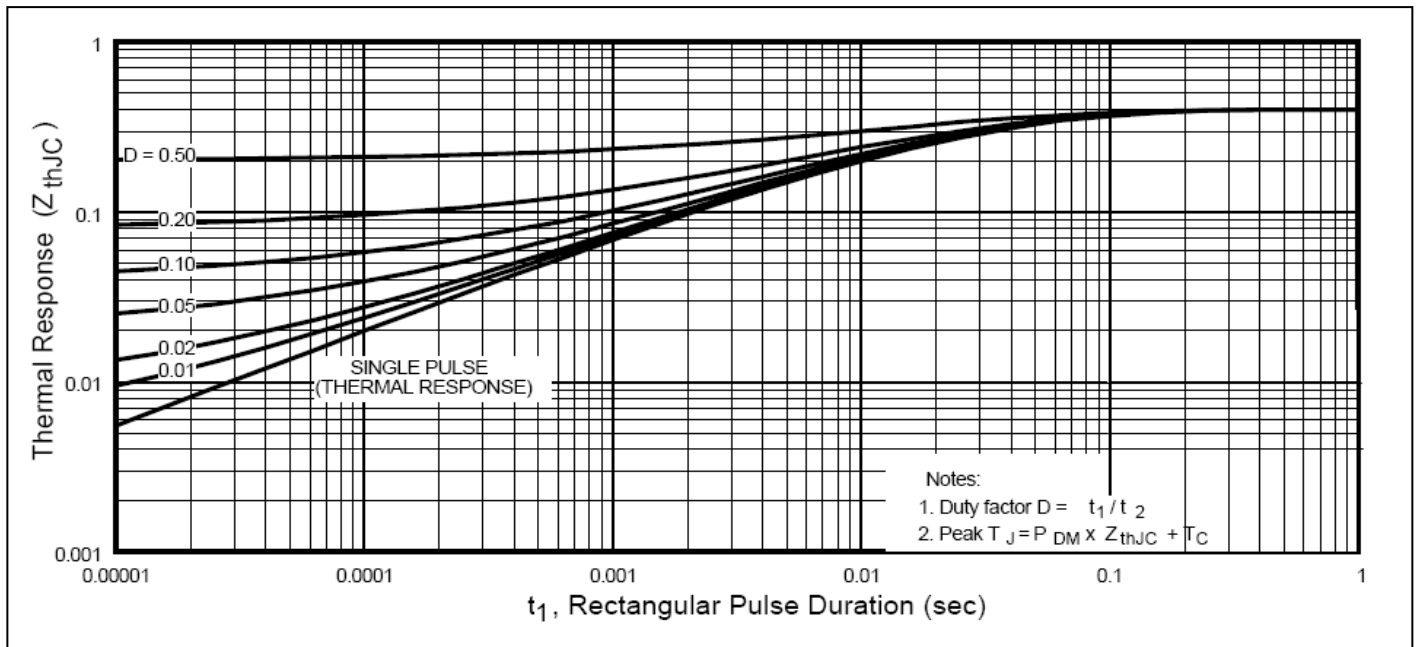
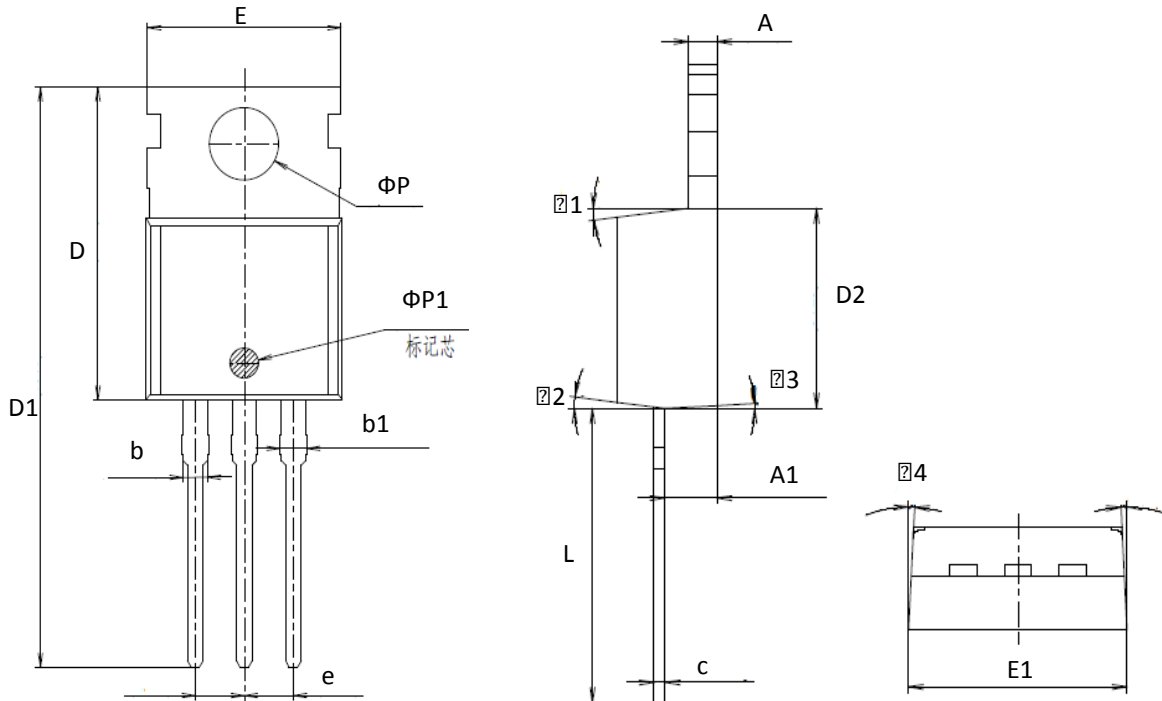


Figure 7. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Mechanical Data:
TO220 PACKAGE OUTLINE DIMENSION_GN


| Symbol | Dimension In Millimeters | | | Dimension In Inches | | |
|--------|--------------------------|--------|--------|---------------------|-------|-------|
| | Min | Nom | Max | Min | Nom | Max |
| A | - | 1.300 | - | - | 0.051 | - |
| A1 | 2.200 | 2.400 | 2.600 | 0.087 | 0.094 | 0.102 |
| b | - | 1.270 | - | - | 0.050 | - |
| b1 | 1.270 | 1.370 | 1.470 | 0.050 | 0.054 | 0.058 |
| c | - | 0.500 | - | - | 0.020 | - |
| D | - | 15.600 | - | - | 0.614 | - |
| D1 | - | 28.700 | - | - | 1.130 | - |
| D2 | - | 9.150 | - | - | 0.360 | - |
| E | 9.900 | 10.000 | 10.100 | 0.390 | 0.394 | 0.398 |
| E1 | - | 10.160 | - | - | 0.400 | - |
| ΦP | - | 3.600 | - | - | 0.142 | - |
| ΦP1 | | 1.500 | | | 0.059 | |
| e | 2.54BSC | | | 0.1BSC | | |
| L | 12.900 | 13.100 | 13.300 | 0.508 | 0.516 | 0.524 |
| Θ1 | - | 7° | - | - | 7° | - |
| Θ2 | - | 7° | - | - | 7° | - |
| Θ3 | - | 3° | - | 5° | 7° | 9° |
| Θ4 | - | 3° | - | 1° | 3° | 5° |

Ordering and Marking Information
Device Marking: SSF80100

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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