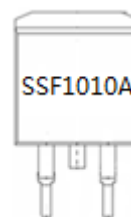
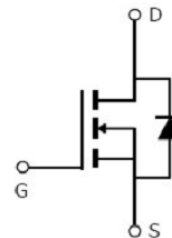


Main Product Characteristics:

| | |
|--------------|---------------|
| V_{DSS} | 100V |
| $R_{DS(on)}$ | 9.5mohm(typ.) |
| I_D | 100A |


D2PAK

**Marking and pin
Assignment**

Schematic diagram
Features and Benefits:

- Advanced trench 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 trench 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 | 100 | A |
| $I_D @ TC = 100^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ ① | 70 | |
| I_{DM} | Pulsed Drain Current② | 400 | |
| $P_D @ TC = 25^\circ C$ | Power Dissipation③ | 205 | W |
| | Linear Derating Factor | 1.3 | W/°C |
| V_{DS} | Drain-Source Voltage | 100 | V |
| V_{GS} | Gate-to-Source Voltage | ± 20 | V |
| E_{AS} | Single Pulse Avalanche Energy @ L=1.28mH | 576 | mJ |
| I_{AS} | Avalanche Current @ L=1.28mH | 30 | A |
| T_J T_{STG} | Operating Junction and Storage Temperature Range | -55 to + 175 | °C |

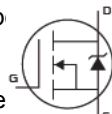
Thermal Resistance

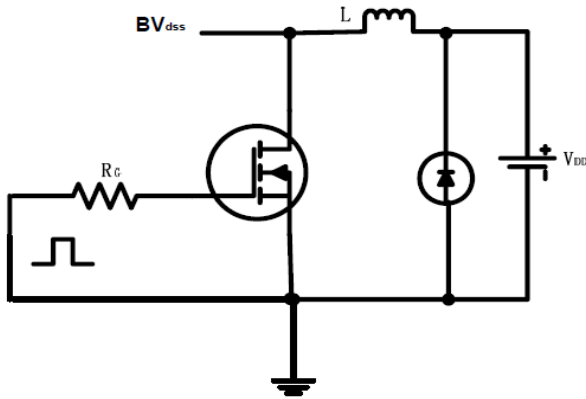
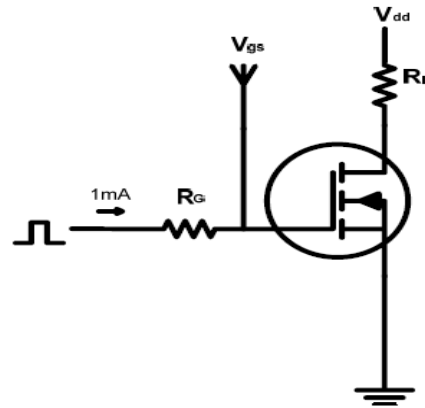
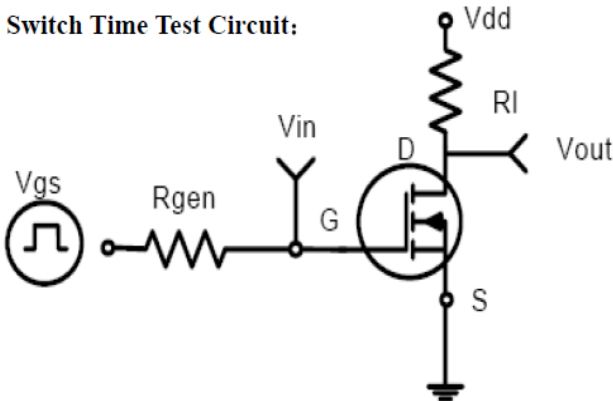
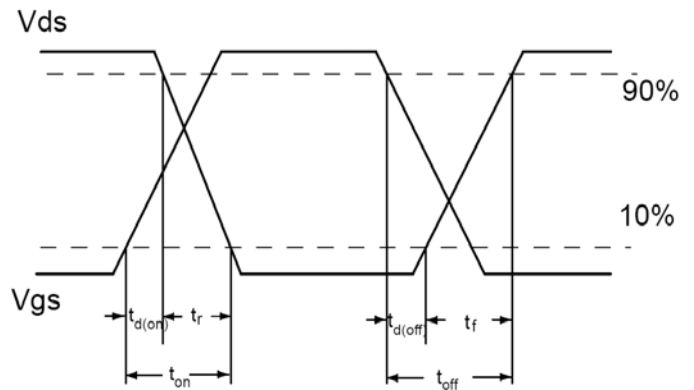
| Symbol | Characterizes | Typ. | Max. | Units |
|------------------|--|------|------|-------|
| R _{θJC} | Junction-to-case ^③ | — | 0.73 | °C /W |
| R _{θJA} | Junction-to-ambient (t ≤ 10s) ^④ | — | 62 | °C /W |
| | Junction-to-Ambient (PCB mounted, steady-state) ^④ | — | 40 | °C /W |

Electrical Characterizes @T_A=25°C unless otherwise specified

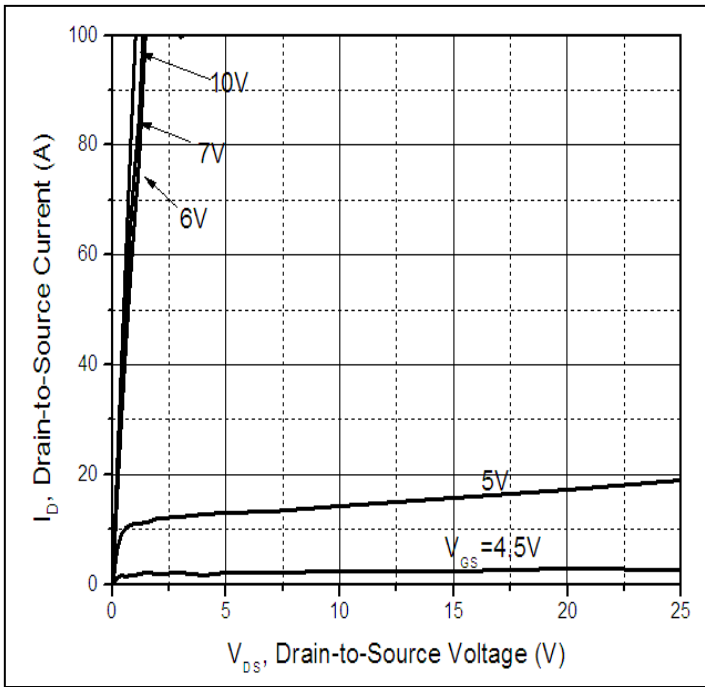
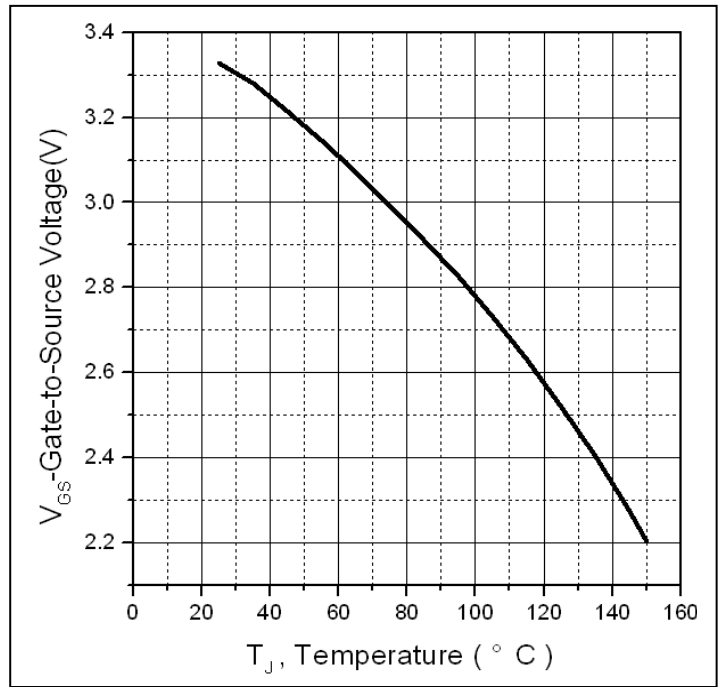
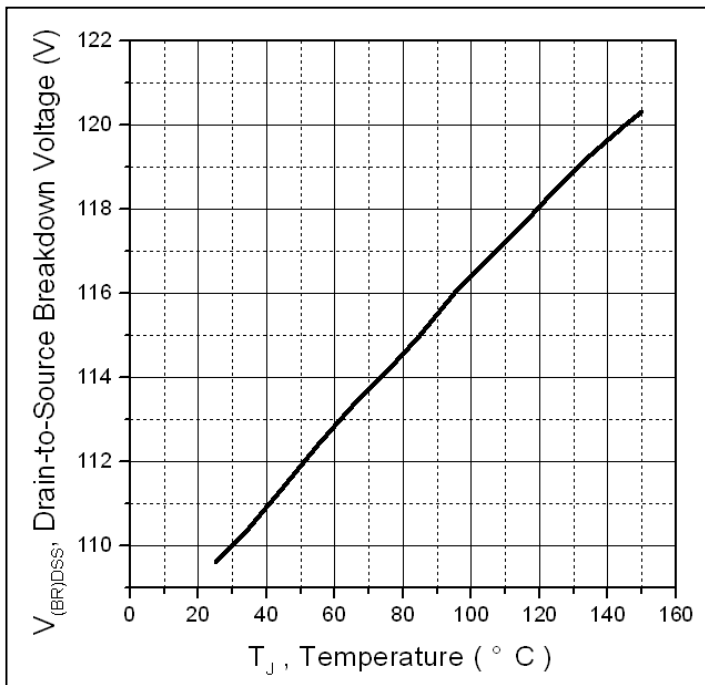
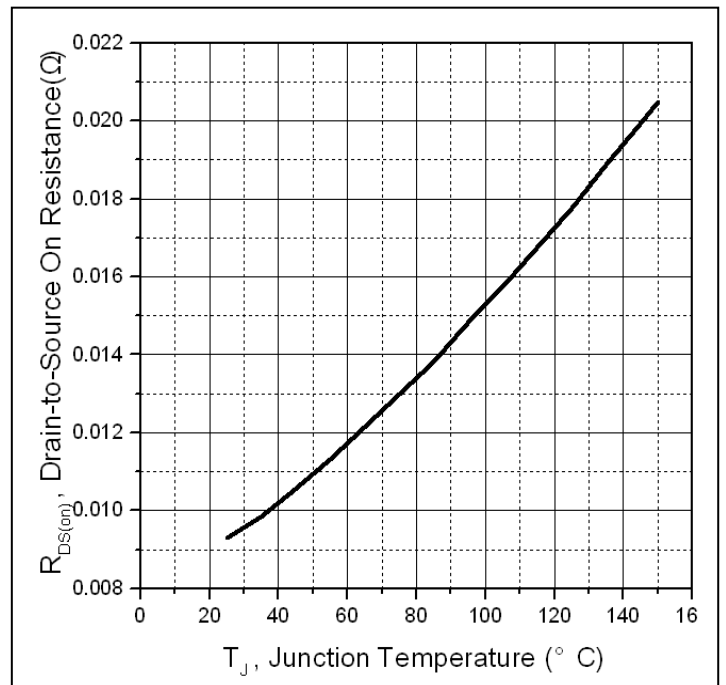
| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|----------------------|--------------------------------------|------|------|------|-------|---|
| V _{(BR)DSS} | Drain-to-Source breakdown voltage | 100 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| R _{DS(on)} | Static Drain-to-Source on-resistance | — | 9.5 | 10 | mΩ | V _{GS} =10V, I _D = 30A T _J = 125°C |
| | | — | 17.8 | — | | |
| V _{GS(th)} | Gate threshold voltage | 2 | — | 4 | V | V _{DS} = V _{GS} , I _D = 250μA T _J = 125°C |
| | | — | 2.52 | — | | |
| I _{DSS} | Drain-to-Source leakage current | — | — | 1 | μA | V _{DS} = 100V, V _{GS} = 0V T _J = 125°C |
| | | — | — | 50 | | |
| I _{GSS} | Gate-to-Source forward leakage | — | — | 100 | nA | V _{GS} = 20V |
| | | -100 | — | — | | V _{GS} = -20V |
| Q _g | Total gate charge | — | 120 | — | nC | I _D = 30A, V _{DS} =30V, V _{GS} = 10V |
| Q _{gs} | Gate-to-Source charge | — | 24 | — | | |
| Q _{gd} | Gate-to-Drain("Miller") charge | — | 45 | — | | |
| t _{d(on)} | Turn-on delay time | — | 39 | — | ns | V _{GS} =10V, V _{DS} =30V, R _L =15Ω, R _{GEN} =2.5Ω I _D =2A |
| t _r | Rise time | — | 67 | — | | |
| t _{d(off)} | Turn-Off delay time | — | 221 | — | | |
| t _f | Fall time | — | 79 | — | | |
| C _{iss} | Input capacitance | — | 5688 | — | pF | V _{GS} = 0V V _{DS} = 25V f = 1MHz |
| C _{oss} | Output capacitance | — | 312 | — | | |
| C _{rss} | Reverse transfer capacitance | — | 287 | — | | |

Source-Drain Ratings and Characteristics

| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|-----------------|---|------|------|------|-------|--|
| I _S | Continuous Source Current (Body Diode) | — | — | 100 | A | MOSFET symb showing the integral reverse p-n junction diode.  |
| I _{SM} | Pulsed Source Current (Body Diode) | — | — | 400 | A | |
| V _{SD} | Diode Forward Voltage | — | 0.85 | 1.3 | V | I _S =60A, V _{GS} =0V |
| t _{rr} | Reverse Recovery Time | — | 51 | — | ns | T _J = 25°C, I _F = 75A, di/dt = |
| Q _{rr} | Reverse Recovery Charge | — | 135 | — | nC | 100A/μs |

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 $T_A = 25^\circ\text{C}$
- 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 $T_{J(\text{MAX})} = 175^\circ\text{C}$.
- ⑥ The maximum current rating is limited by bond-wires.

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

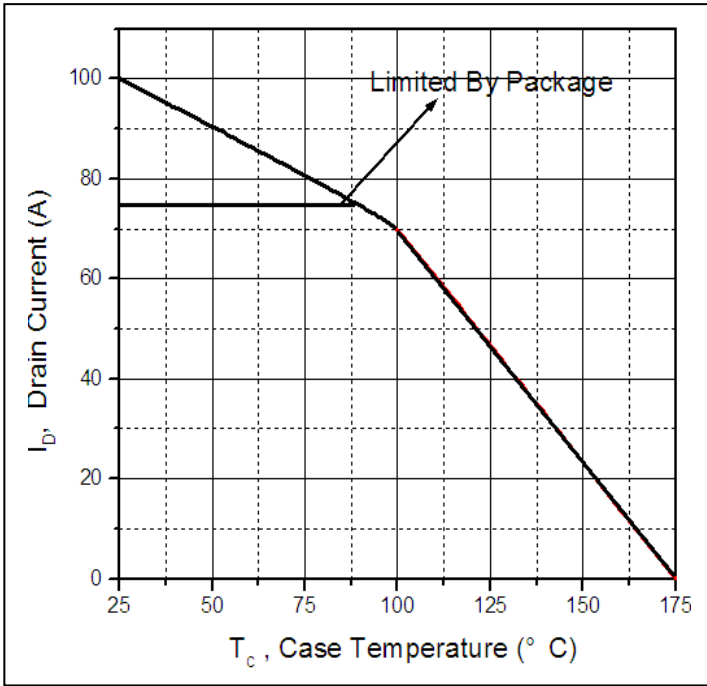


Figure 5. Maximum Drain Current Vs. Case Temperature

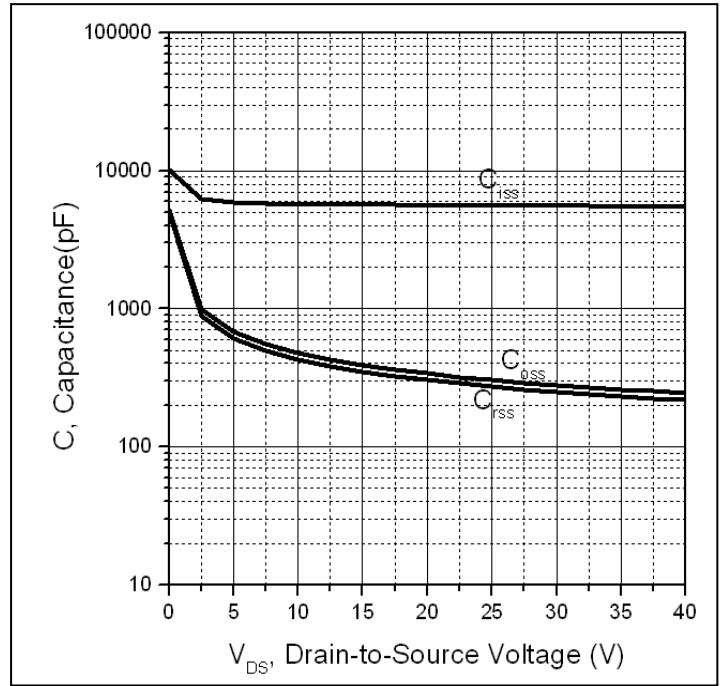


Figure 6. Typical Capacitance Vs. Drain-to-Source Voltage

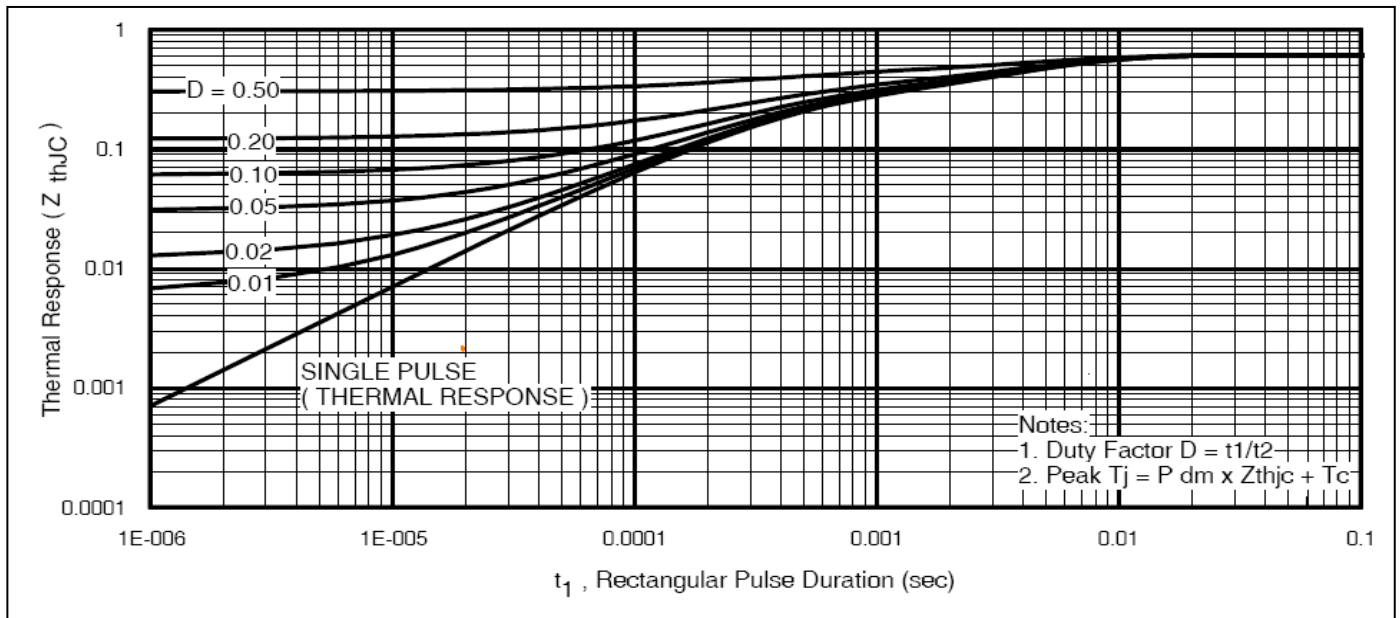
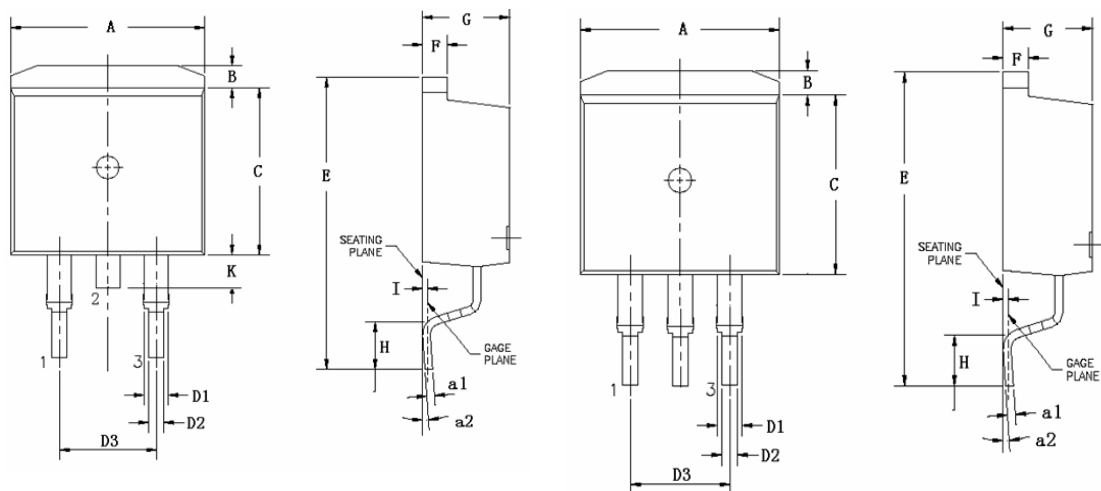


Figure 7. Maximum Effective Transient Thermal Impedance, Junction-to-Case

Mechanical Data:
D2PAK PACKAGE OUTLINE DIMENSION


| Symbol | Dimension In Millimeters | | Dimension In Inches | |
|--------|--------------------------|--------|---------------------|-------|
| | Min | Max | Min | Max |
| A | 9.660 | 10.280 | 0.380 | 0.405 |
| B | 1.020 | 1.320 | 0.040 | 0.052 |
| C | 8.590 | 9.400 | 0.338 | 0.370 |
| D1 | 1.140 | 1.400 | 0.045 | 0.055 |
| D2 | 0.700 | 0.950 | 0.028 | 0.037 |
| D3 | 5.080 (TYP) | | 0.200 (TYP) | |
| E | 15.090 | 15.390 | 0.594 | 0.606 |
| F | 1.150 | 1.400 | 0.045 | 0.055 |
| G | 4.300 | 4.700 | 0.169 | 0.185 |
| H | 2.290 | 2.790 | 0.090 | 0.110 |
| I | 0.250 (TYP) | | 0.010 (TYP) | |
| K | 1.300 | 1.600 | 0.051 | 0.063 |
| a1 | 0.450 | 0.650 | 0.018 | 0.026 |
| a2 | 0° | 8° | 1° | 8° |

Ordering and Marking Information
Device Marking: SSF1010A

Package (Available)
D2PAK(TO263)
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 |
|--------------|------------|-----------------|-----------------|------------------------|------------------|
| D2PAK | 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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Sales@silikron.com

Technical Support:

Technical@silikron.com

Suzhou Silikron Semiconductor Corp.

11A, 428 Xinglong Street, Suzhou Industrial Park, P.R.China

TEL: (86-512) 62560688

FAX: (86-512) 65160705

E-mail: Sales@silikron.com