

Features

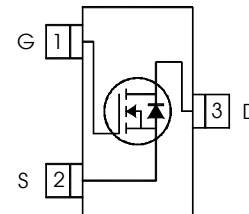
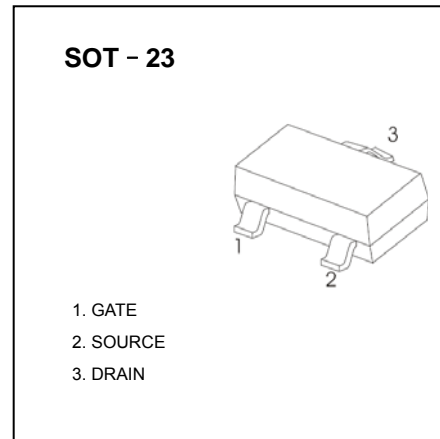
- $V_{DS(V)} = 30V$
- $R_{DS(ON)} < 100m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 154m\Omega$ ($V_{GS} = 4.5V$)

Application(s)

- Load/ System Switch

Benefits

- Multi-vendor compatibility
- Easier manufacturing RoHS
- Environmentally friendly
- Increased reliability



Absolute Maximum Ratings

| Symbol | Parameter | Max. | Units |
|--------------------------|--|--------------|-------|
| V_{DS} | Drain-Source Voltage | 30 | V |
| $I_D @ T_A = 25^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 2.7 | A |
| $I_D @ T_A = 70^\circ C$ | Continuous Drain Current, $V_{GS} @ 10V$ | 2.2 | |
| I_{DM} | Pulsed Drain Current | 11 | |
| $P_D @ T_A = 25^\circ C$ | Maximum Power Dissipation | 1.3 | W |
| $P_D @ T_A = 70^\circ C$ | Maximum Power Dissipation | 0.8 | |
| | Linear Derating Factor | 0.01 | W/°C |
| V_{GS} | Gate-to-Source Voltage | ± 20 | V |
| T_J, T_{STG} | Junction and Storage Temperature Range | -55 to + 150 | °C |

Thermal Resistance

| Symbol | Parameter | Typ. | Max. | Units |
|-----------------|--|------|------|-------|
| $R_{\theta JA}$ | Junction-to-Ambient ^③ | — | 100 | °C/W |
| $R_{\theta JA}$ | Junction-to-Ambient (t<10s) ^④ | — | 99 | |

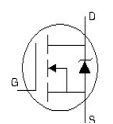
Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width $\leq 400\mu s$; duty cycle $\leq 2\%$.
- ③ Surface mounted on 1 in square Cu board

Electric Characteristics @ $T_J = 25^\circ\text{C}$ (unless otherwise specified)

| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|---------------------------------|--------------------------------------|------|------|------|-------|--|
| $V_{(BR)DSS}$ | Drain-to-Source Breakdown Voltage | 30 | — | — | V | $V_{GS} = 0V, I_D = 250\mu A$ |
| $\Delta V_{(BR)DSS}/\Delta T_J$ | Breakdown Voltage Temp. Coefficient | — | 0.03 | — | V/°C | Reference to $25^\circ\text{C}, I_D = 1\text{mA}$ |
| $R_{DS(on)}$ | Static Drain-to-Source On-Resistance | — | 80 | 100 | mΩ | $V_{GS} = 10V, I_D = 2.7A$ ② |
| | | — | 123 | 154 | | $V_{GS} = 4.5V, I_D = 2.2A$ ② |
| $V_{GS(th)}$ | Gate Threshold Voltage | 1.3 | 1.7 | 2.3 | V | $V_{DS} = V_{GS}, I_D = 25\mu A$ |
| I_{DSS} | Drain-to-Source Leakage Current | — | — | 1 | μA | $V_{DS} = 24V, V_{GS} = 0V$ |
| | | — | — | 150 | | $V_{DS} = 24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$ |
| I_{GSS} | Gate-to-Source Forward Leakage | — | — | 100 | nA | $V_{GS} = 20V$ |
| | Gate-to-Source Reverse Leakage | — | — | -100 | | $V_{GS} = -20V$ |
| R_G | Internal Gate Resistance | — | 7.6 | — | Ω | |
| g_{fs} | Forward Transconductance | 2.6 | — | — | S | $V_{DS} = 10V, I_D = 2.7A$ |
| Q_g | Total Gate Charge | — | 1.0 | — | nC | $I_D = 2.7A$ |
| Q_{gs} | Gate-to-Source Charge | — | 0.34 | — | | $V_{DS} = 15V$ |
| Q_{gd} | Gate-to-Drain ("Miller") Charge | — | 0.34 | — | | $V_{GS} = 4.5V$ ② |
| $t_{d(on)}$ | Turn-On Delay Time | — | 4.1 | — | ns | $V_{DD} = 15V$ ② |
| t_r | Rise Time | — | 3.3 | — | | $I_D = 1.0A$ |
| $t_{d(off)}$ | Turn-Off Delay Time | — | 4.5 | — | | $R_G = 6.8\Omega$ |
| t_f | Fall Time | — | 2.9 | — | | $V_{GS} = 4.5V$ |
| C_{iss} | Input Capacitance | — | 110 | — | pF | $V_{GS} = 0V$ |
| C_{oss} | Output Capacitance | — | 29 | — | | $V_{DS} = 15V$ |
| C_{rss} | Reverse Transfer Capacitance | — | 12 | — | | $f = 1.0\text{MHz}$ |

Source - Drain Ratings and Characteristics

| Symbol | Parameter | Min. | Typ. | Max. | Units | Conditions |
|----------|---|------|------|------|-------|--|
| I_S | Continuous Source Current (Body Diode) | — | — | 1.6 | A | MOSFET symbol showing the integral reverse p-n junction diode.  |
| I_{SM} | Pulsed Source Current (Body Diode) ① | — | — | 11 | | |
| V_{SD} | Diode Forward Voltage | — | — | 1.0 | V | $T_J = 25^\circ\text{C}, I_S = 2.7A, V_{GS} = 0V$ ② |
| t_{rr} | Reverse Recovery Time | — | 9.0 | 14 | ns | $T_J = 25^\circ\text{C}, V_R = 15V, I_F = 2.7A$ |
| Q_{rr} | Reverse Recovery Charge | — | 0.3 | 0.4 | nC | $di/dt = 100A/\mu s$ ② |

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

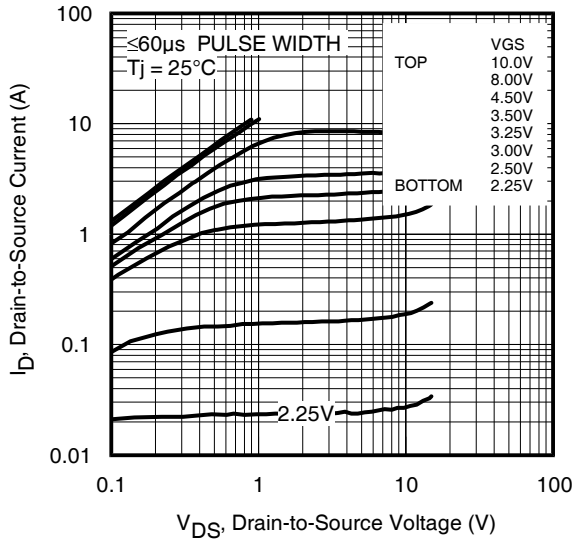


Fig 1. Typical Output Characteristics

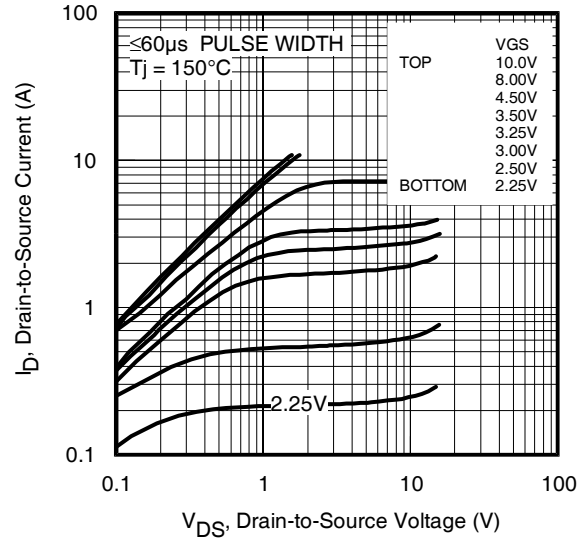


Fig 2. Typical Output Characteristics

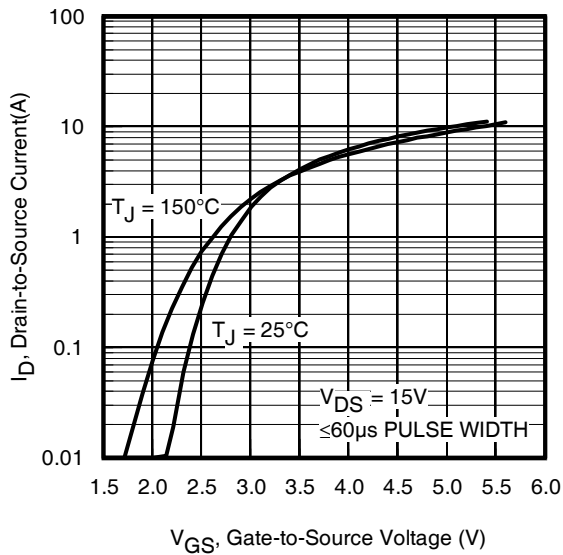


Fig 3. Typical Transfer Characteristics

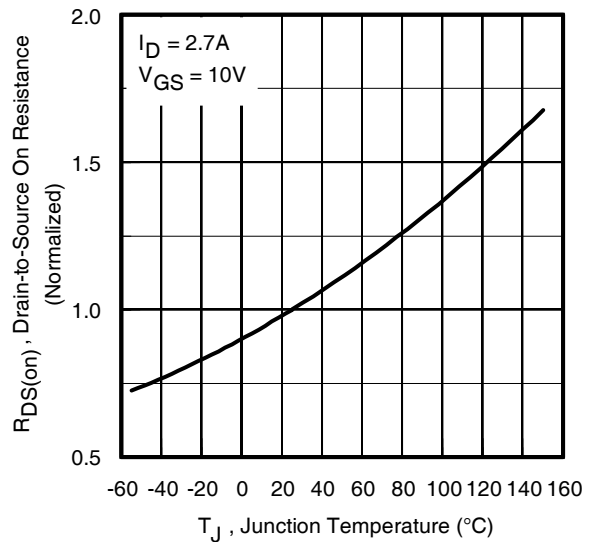


Fig 4. Normalized On-Resistance Vs. Temperature

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

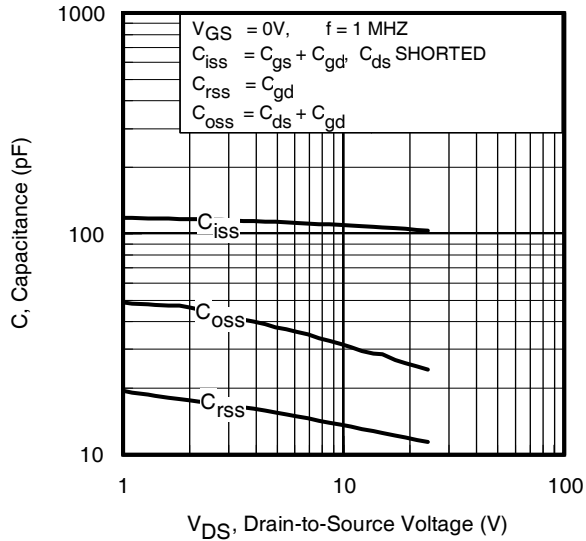


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

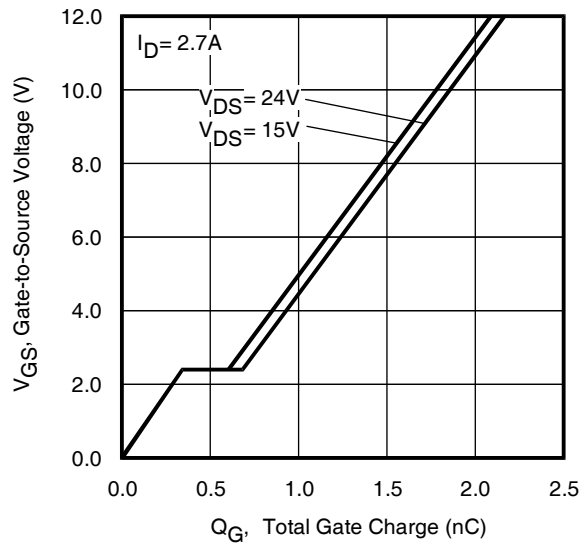


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

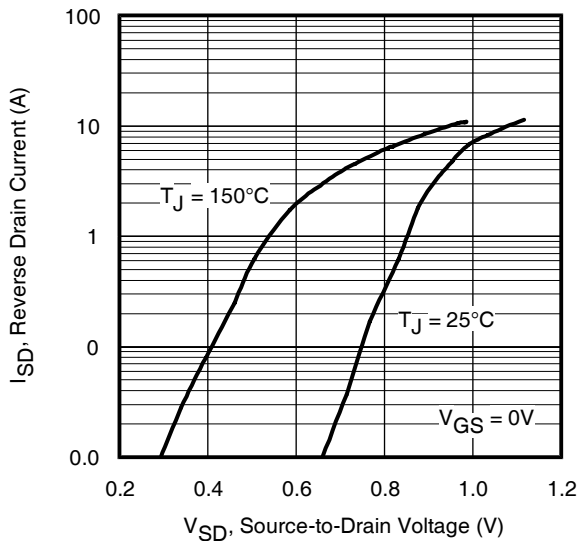


Fig 7. Typical Source-Drain Diode Forward Voltage

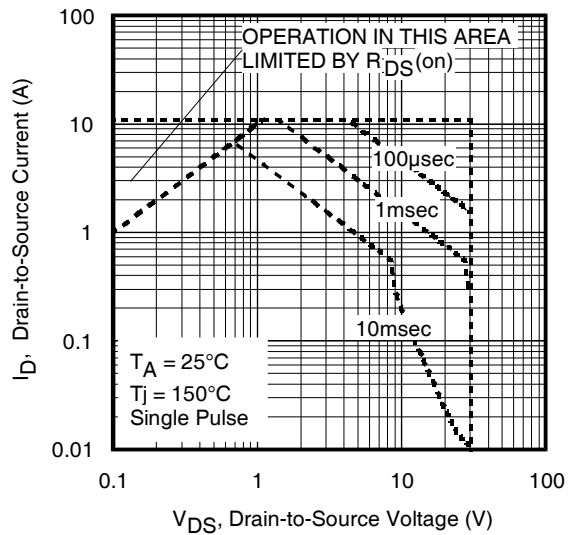


Fig 8. Maximum Safe Operating Area

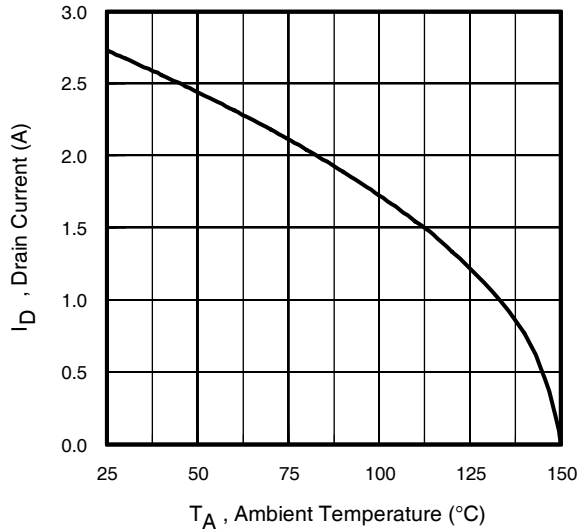


Fig 9. Maximum Drain Current Vs. Ambient Temperature

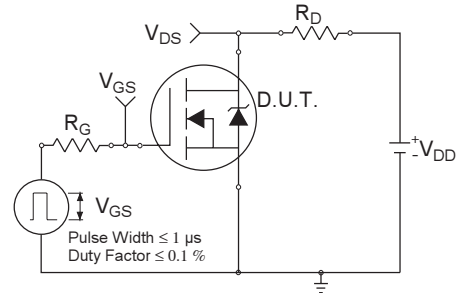


Fig 10a. Switching Time Test Circuit

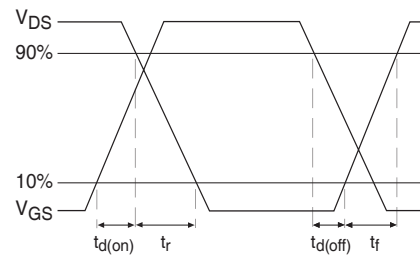


Fig 10b. Switching Time Waveforms

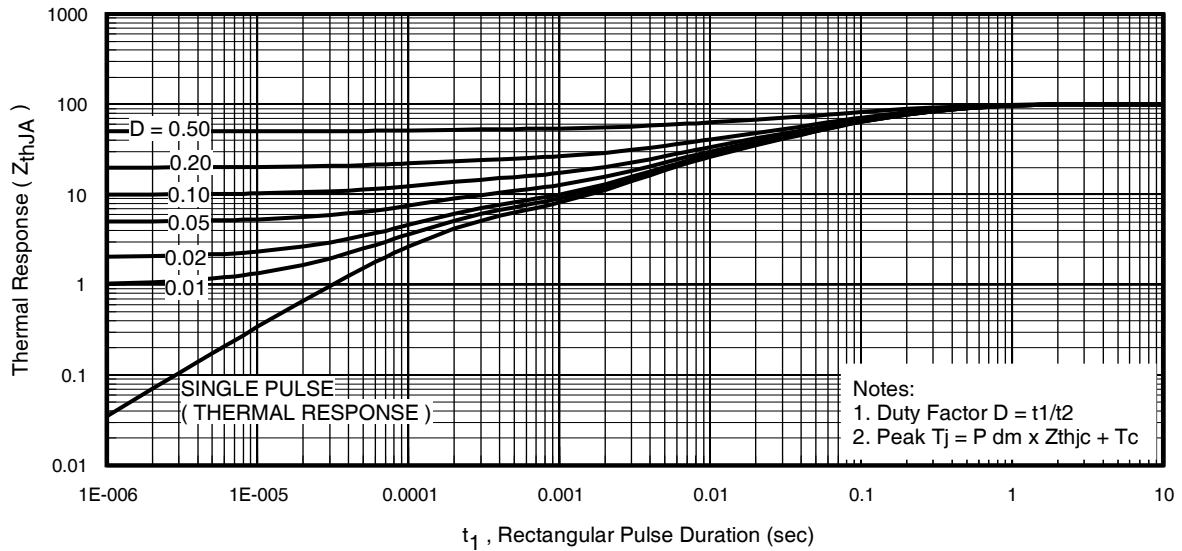


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

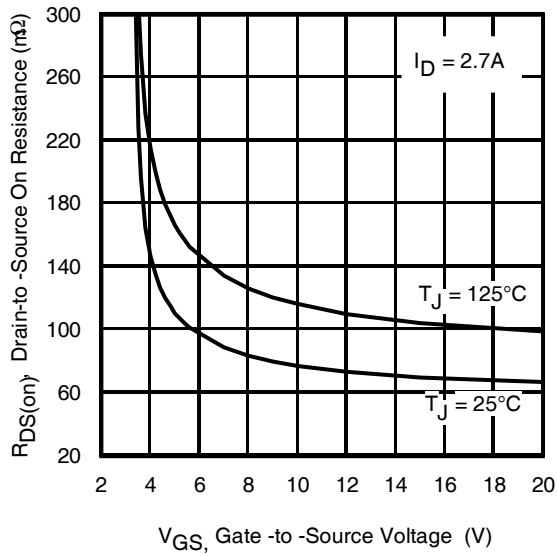


Fig 12. Typical On-Resistance Vs. Gate Voltage

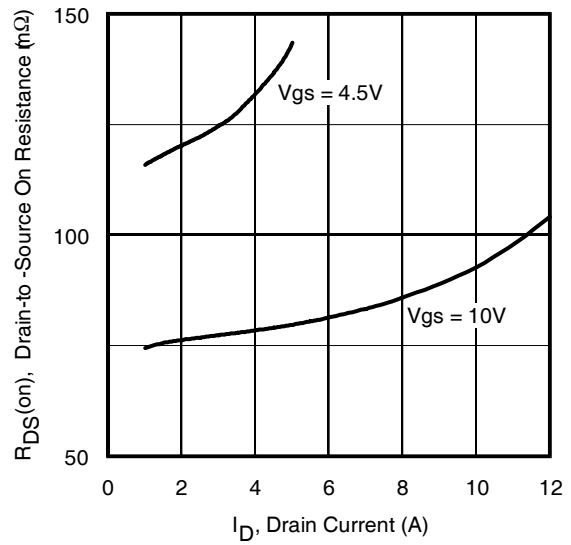


Fig 13. Typical On-Resistance Vs. Drain Current

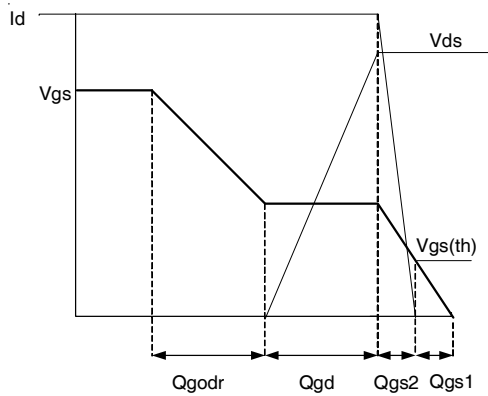


Fig 14a. Basic Gate Charge Waveform

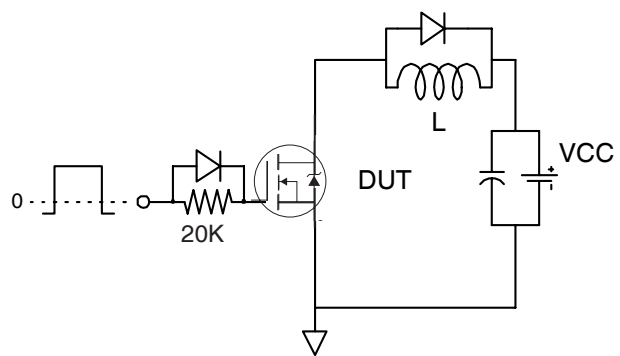


Fig 14b. Gate Charge Test Circuit

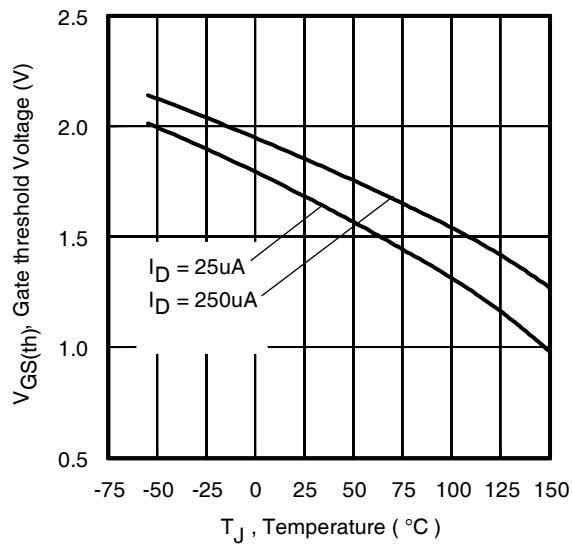


Fig 15. Typical Threshold Voltage Vs. Junction Temperature

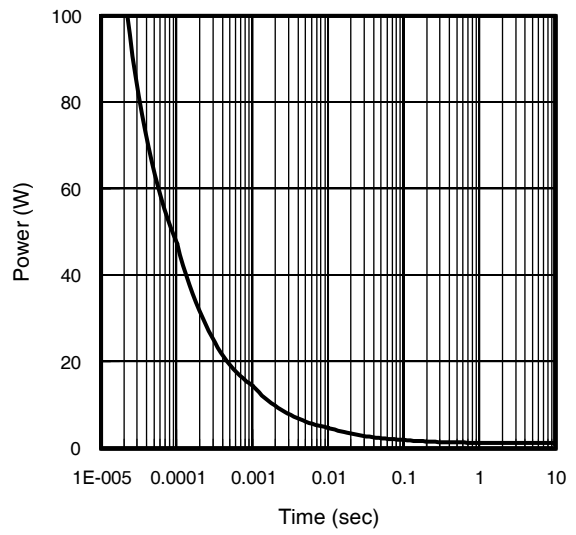
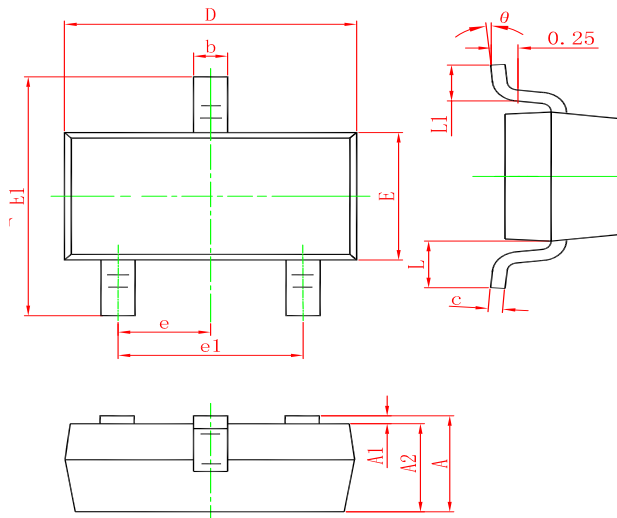


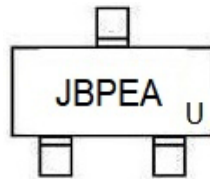
Fig 16. Typical Power Vs. Time

SOT-23 PACKAGE OUTLINE DIMENSIONS



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|-------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP. | | 0.037 TYP. | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF. | | 0.022 REF. | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

Marking



Ordering information

| Order code | Package | Baseqty | Deliverymode |
|-----------------|---------|---------|---------------|
| UMW IRLML2030TR | SOT-23 | 3000 | Tape and reel |