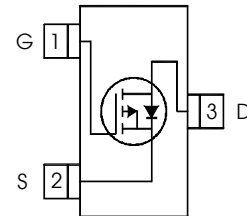
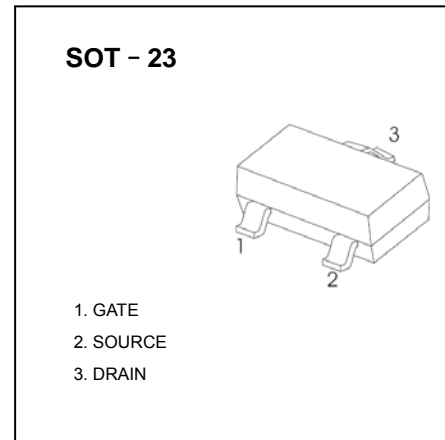


Features

- Generation VTechnology
- UltraLowOn-Resistance
- P-ChannelMOSFET
- Low Profile(<1.1mm)
- Available in Tape and Reel
- Fast Switching
- Lead-Free
- RoHS CompliantHalogen-Free



Absolute Maximum Ratings

| | Parameter | Max. | Units |
|--------------------------------|--|--------------|-------|
| $I_D @ T_A = 25^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ -10\text{V}$ | -0.76 | A |
| $I_D @ T_A = 70^\circ\text{C}$ | Continuous Drain Current, $V_{GS} @ -10\text{V}$ | -0.61 | |
| I_{DM} | Pulsed Drain Current ① | -4.8 | |
| $P_D @ T_A = 25^\circ\text{C}$ | Power Dissipation | 540 | mW |
| | Linear Derating Factor | 4.3 | mW/°C |
| V_{GS} | Gate-to-Source Voltage | ± 20 | V |
| dv/dt | Peak Diode Recovery dv/dt ② | -5.0 | V/ns |
| T_J, T_{STG} | Junction and Storage Temperature Range | -55 to + 150 | °C |

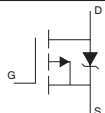
Thermal Resistance

| | Parameter | Typ. | Max. | Units |
|-----------------|-------------------------------|------|------|-------|
| $R_{\theta JA}$ | Maximum Junction-to-Ambient ④ | — | 230 | °C/W |

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

| | 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 | — | -0.029 | — | V/°C | Reference to 25°C , $I_D = -1\text{mA}$ |
| $R_{DS(ON)}$ | Static Drain-to-Source On-Resistance | — | — | 600 | mΩ | $V_{GS} = -10V, I_D = -0.60A$ ③ |
| | | — | — | 1000 | | $V_{GS} = -4.5V, I_D = -0.30A$ ③ |
| $V_{GS(th)}$ | Gate Threshold Voltage | -1.0 | — | — | V | $V_{DS} = V_{GS}, I_D = -250\mu A$ |
| g_{fs} | Forward Transconductance | 0.44 | — | — | S | $V_{DS} = -10V, I_D = -0.30A$ |
| I_{DSS} | Drain-to-Source Leakage Current | — | — | -1.0 | μA | $V_{DS} = -24V, V_{GS} = 0V$ |
| | | — | — | -25 | | $V_{DS} = -24V, V_{GS} = 0V, T_J = 125^\circ\text{C}$ |
| I_{GSS} | Gate-to-Source Forward Leakage | — | — | -100 | nA | $V_{GS} = -20V$ |
| | Gate-to-Source Reverse Leakage | — | — | 100 | | $V_{GS} = 20V$ |
| Q_g | Total Gate Charge | — | 3.4 | 5.1 | nC | $I_D = -0.60A$ |
| Q_{gs} | Gate-to-Source Charge | — | 0.52 | 0.78 | | $V_{DS} = -24V$ |
| Q_{gd} | Gate-to-Drain ("Miller") Charge | — | 1.1 | 1.7 | | $V_{GS} = -10V$, See Fig. 6 and 9 ③ |
| $t_{d(on)}$ | Turn-On Delay Time | — | 10 | — | ns | $V_{DD} = -15V$ |
| t_r | Rise Time | — | 8.2 | — | | $I_D = -0.60A$ |
| $t_{d(off)}$ | Turn-Off Delay Time | — | 23 | — | | $R_G = 6.2\Omega$ |
| t_f | Fall Time | — | 16 | — | | $R_D = 25\Omega$, See Fig. 10 ③ |
| C_{iss} | Input Capacitance | — | 75 | — | pF | $V_{GS} = 0V$ |
| C_{oss} | Output Capacitance | — | 37 | — | | $V_{DS} = -25V$ |
| C_{riss} | Reverse Transfer Capacitance | — | 18 | — | | $f = 1.0\text{MHz}$, See Fig. 5 |

Source-Drain Ratings and Characteristics

| | Parameter | Min. | Typ. | Max. | Units | Conditions |
|----------|--|------|------|-------|-------|--|
| I_S | Continuous Source Current (Body Diode) | — | — | -0.54 | A | MOSFET symbol showing the integral reverse p-n junction diode.  |
| I_{SM} | Pulsed Source Current (Body Diode) ① | — | — | -4.8 | | |
| V_{SD} | Diode Forward Voltage | — | — | -1.2 | V | $T_J = 25^\circ\text{C}, I_S = -0.60A, V_{GS} = 0V$ ③ |
| t_{rr} | Reverse Recovery Time | — | 26 | 39 | ns | $T_J = 25^\circ\text{C}, I_F = -0.60A$ |
| Q_{rr} | Reverse Recovery Charge | — | 20 | 30 | nC | $di/dt = 100A/\mu s$ ③ |

Notes:

- ① Repetitive rating; pulse width limited by max. junction temperature. (See fig. 11)
- ② $I_{SD} \leq -0.60A, di/dt \leq 110A/\mu s, V_{DD} \leq V_{(BR)DSS}, T_J \leq 150^\circ\text{C}$
- ③ Pulse width $\leq 300\mu s$; duty cycle $\leq 2\%$.
- ④ Surface mounted on FR-4 board, $t \leq 5\text{sec}$.

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

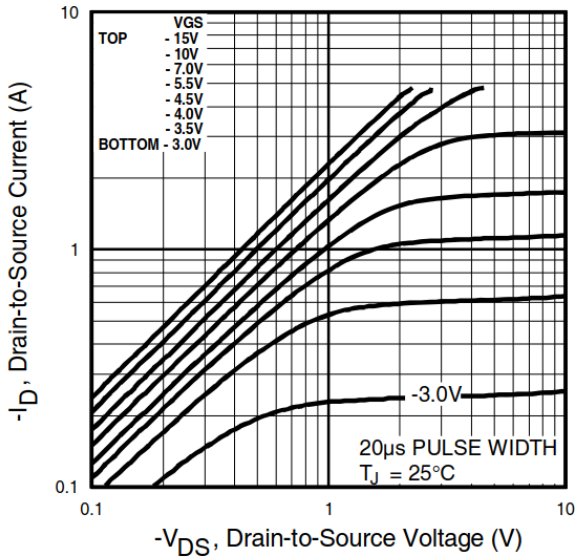


Fig 1. Typical Output Characteristics

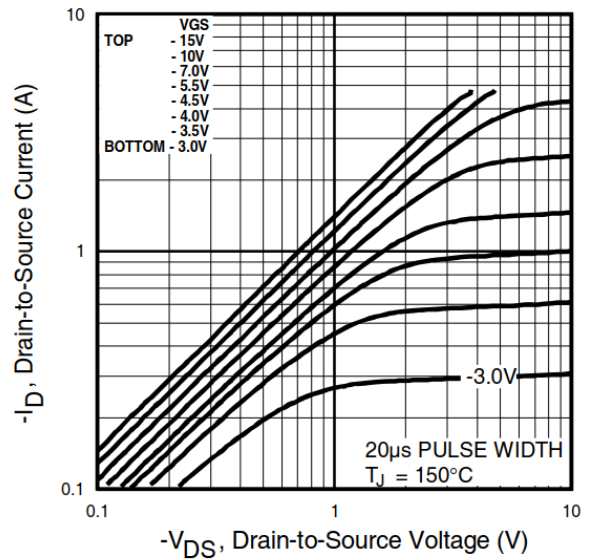


Fig 2. Typical Output Characteristics

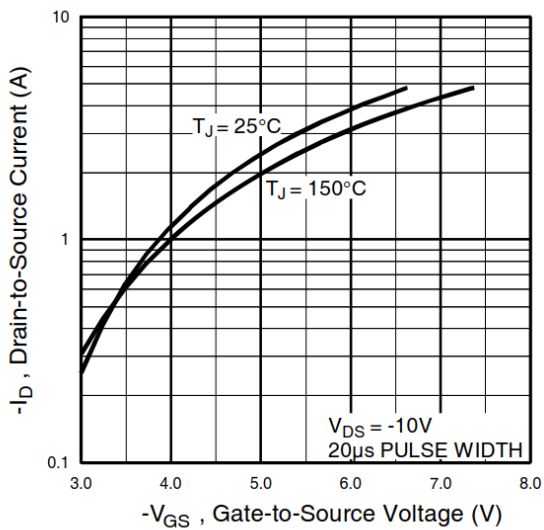


Fig 3. Typical Transfer Characteristics

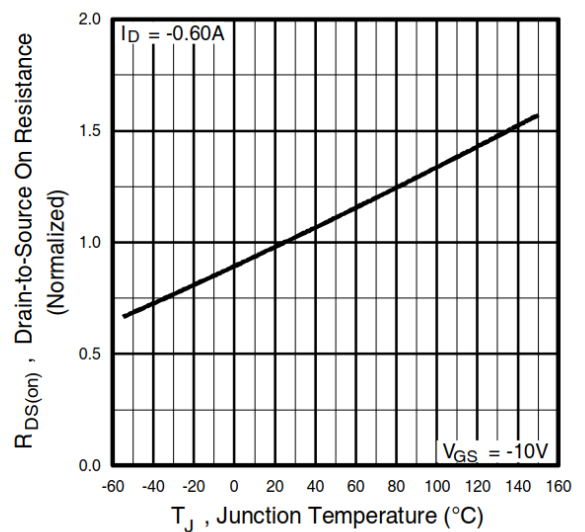


Fig 4. Normalized On-Resistance Vs. Temperature

TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)

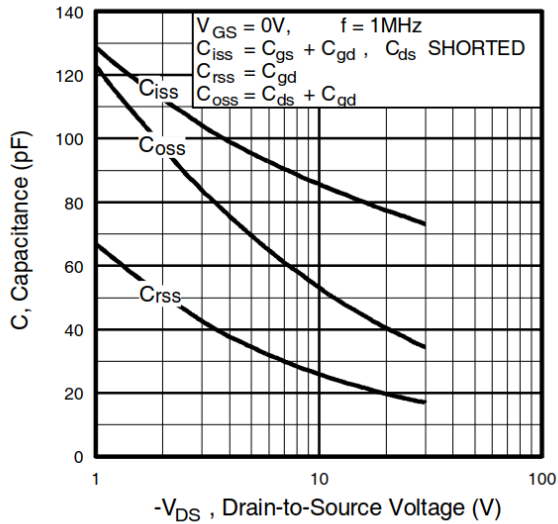


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

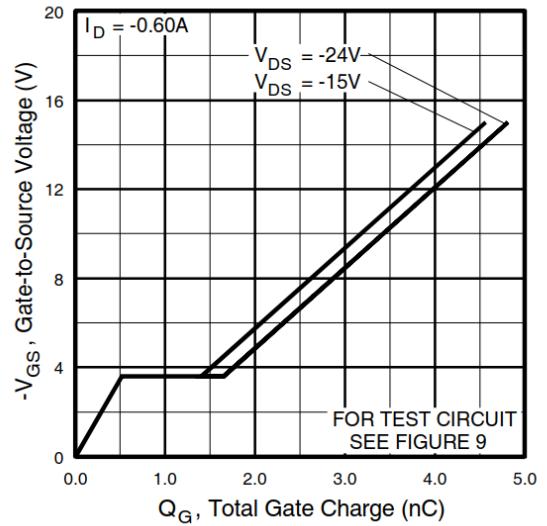


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

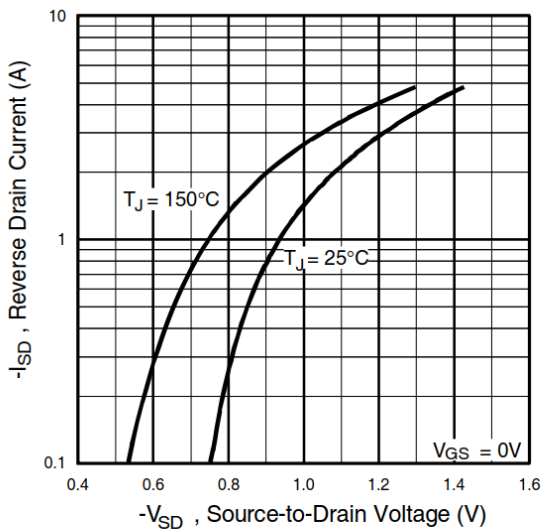


Fig 7. Typical Source-Drain Diode Forward Voltage

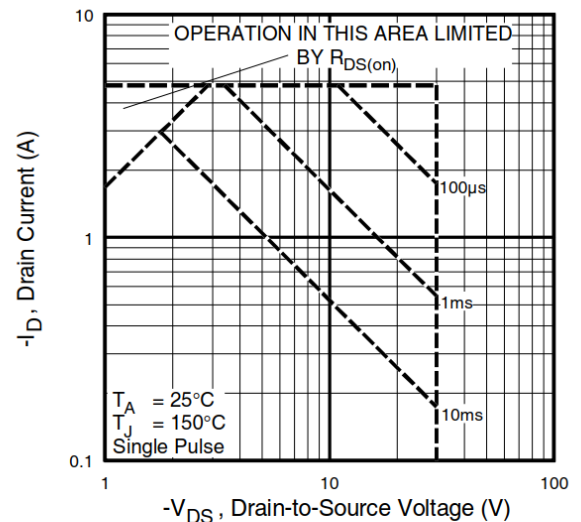


Fig 8. Maximum Safe Operating Area

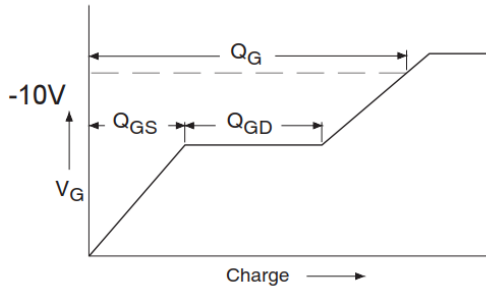


Fig 9a. Basic Gate Charge Waveform

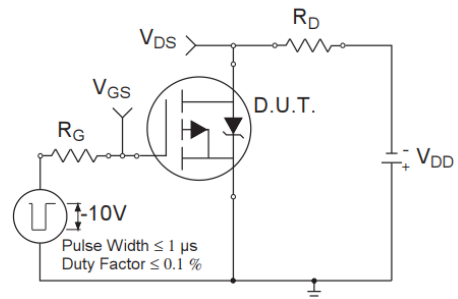


Fig 10a. Switching Time Test Circuit

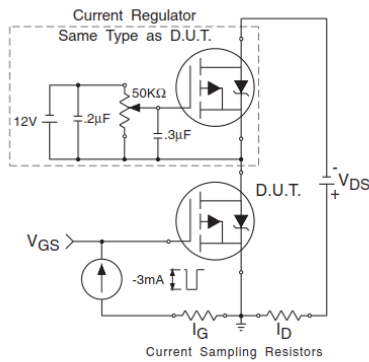


Fig 9b. Gate Charge Test Circuit

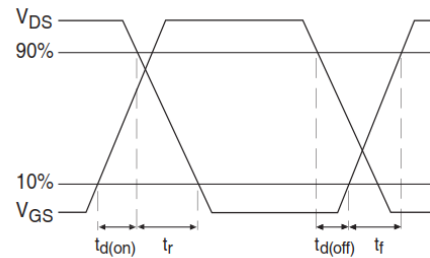


Fig 10b. Switching Time Waveforms

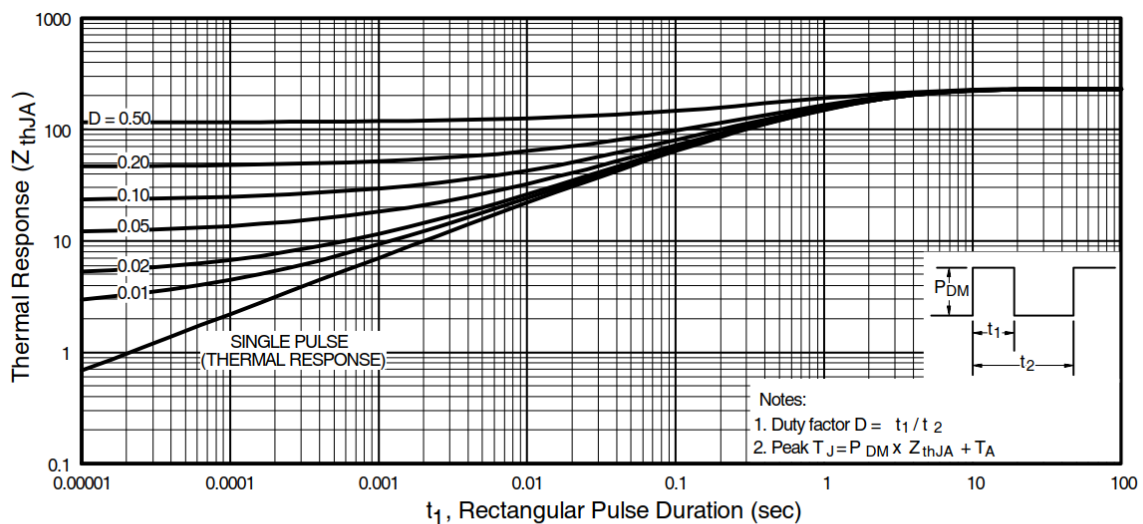
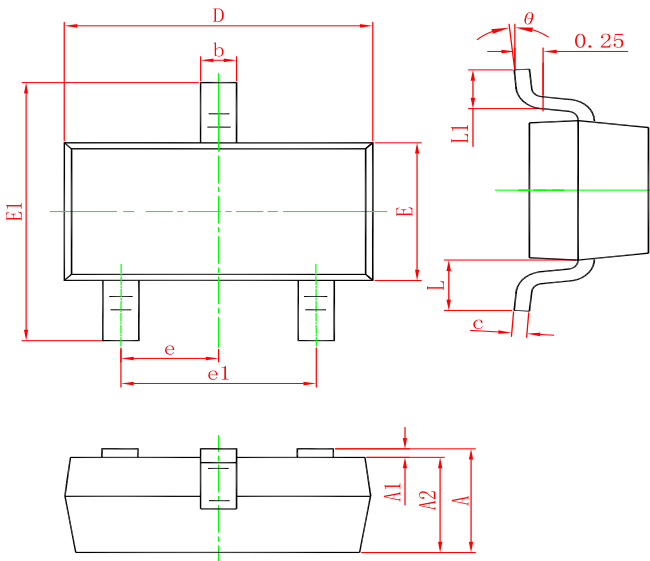


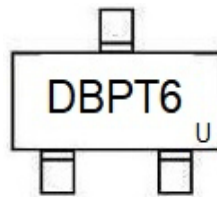
Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

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 IRLML5103TR | SOT-23 | 3000 | Tape and reel |