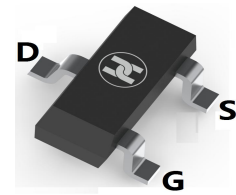
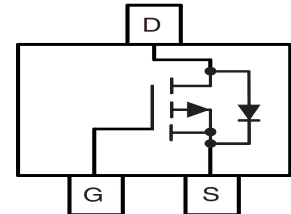


LOW VOLTAGE MOSFET (P-CHANNEL)
FEATURES

- $V_{DS}=-60V, R_{DS(ON)}\leq 345m\Omega @ V_{GS}=-10V, I_D=-1.6A$
- Low on-resistance
- For DC to DC converter and Load switch applications
- Surface Mount device


SOT-23

MECHANICAL DATA

- Case: SOT-23
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Weight: 0.008 grams (approximate)

MAXIMUM RATINGS ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|--|-----------------|-----------|--------------------|
| Drain-source voltage | V_{DS} | -60 | V |
| Gate-source voltage | V_{GS} | ± 20 | V |
| Continuous drain current | I_D | -1.6 | A |
| Pulsed Drain Current(10 μ s Pulse Width) | I_{DM} | -8 | A |
| Power dissipation | P_D | 1.7 | W |
| Thermal resistance from Junction to ambient | $R_{\theta JA}$ | 120 | $^\circ\text{C/W}$ |
| Junction temperature | T_J | 150 | $^\circ\text{C}$ |
| Storage temperature | T_{STG} | -55 ~+150 | $^\circ\text{C}$ |

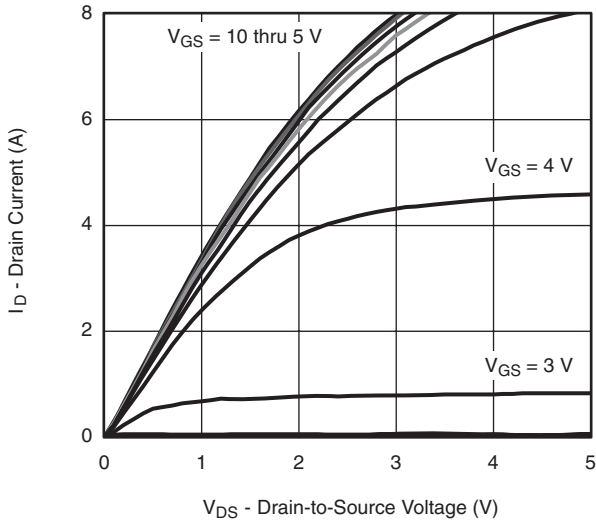
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise specified)

| Parameter | Symbol | Min | Typ | Max | Unit | Conditions |
|-------------------------------------|---------------|-----|------|-----------|------------|--|
| Drain-Source breakdown voltage | $V_{(BR)DSS}$ | -60 | | | V | $V_{GS}=0V, I_D=-250\mu A$ |
| Zero gate voltage drain current | I_{DSS} | | | -1 | μA | $V_{DS}=-60V, V_{GS}=0V$ |
| Gate-body leakage current | I_{GSS} | | | ± 100 | nA | $V_{DS}=0V, V_{GS}=\pm 20V$ |
| Gate-threshold voltage (note 1) | $V_{GS(th)}$ | -1 | | -3 | V | $V_{DS}=V_{GS}, I_D=-250\mu A$ |
| Drain-source on-resistance (note 1) | $R_{DS(ON)}$ | | 285 | 345 | m Ω | $V_{GS}=-10V, I_D=-1.25A$ |
| | | | 360 | 450 | m Ω | $V_{GS}=-4.5V, I_D=-1.0A$ |
| Forward transconductance (note 1) | g_{FS} | | 2.8 | | S | $V_{DS}=-10V, I_D=-1.0A$ |
| Gate resistance | R_g | | 7 | | Ω | $f=1MHz$ |
| Input capacitance | C_{iss} | | 210 | | pF | $V_{DS}=-30V, V_{GS}=0V, f=1MHz$ |
| Output capacitance | C_{oss} | | 28 | | pF | |
| Reverse transfer capacitance | C_{rss} | | 20 | | pF | |
| Turn-on delay time | $t_{d(on)}$ | | 40 | 60 | nS | $V_{DD}=-30V, I_D=-1A, V_{GEN}=-4.5V, R_g=1\Omega, R_L=30\Omega$ |
| Turn-on rise time | t_r | | 35 | 55 | nS | |
| Turn-off delay time | $t_{d(off)}$ | | 15 | 25 | nS | |
| Turn-off fall time | t_f | | 10 | 20 | nS | |
| Turn-on delay time | $t_{d(on)}$ | | 5 | 10 | nS | |
| Turn-on rise time | t_r | | 10 | 20 | nS | $V_{DD}=-30V, I_D=-1A, V_{GEN}=-10V, R_g=1\Omega, R_L=30\Omega$ |
| Turn-off delay time | $t_{d(off)}$ | | 15 | 25 | nS | |
| Turn-off fall time | t_f | | 10 | 20 | nS | |
| Total gate charge | Q_g | | 2.7 | 4.1 | nC | |
| Gate-source charge | Q_{gs} | | 0.8 | | nC | |
| Gate-drain charge | Q_{gd} | | 1.2 | | nC | $V_{DD}=-30V, V_{GS}=-4.5V, I_D=-1.25A$ |
| Diode forward voltage (note 1) | V_{SD} | | -0.8 | -1.2 | V | $I_S=-1.5A, V_{GS}=0V$ |
| Diode forward current | I_S | | | -1.4 | A | $T_C = 25^\circ\text{C}$ |
| Pulse diode forward current | I_{SM} | | | -8 | A | |
| Body diode reverse recovery time | t_{rr} | | 30 | 60 | nS | $I_F=-1.25A, dI/dt=100A/\mu s, T_J=25^\circ\text{C}$ |
| Body diode reverse recovery charge | Q_{rr} | | 33 | 60 | nC | |

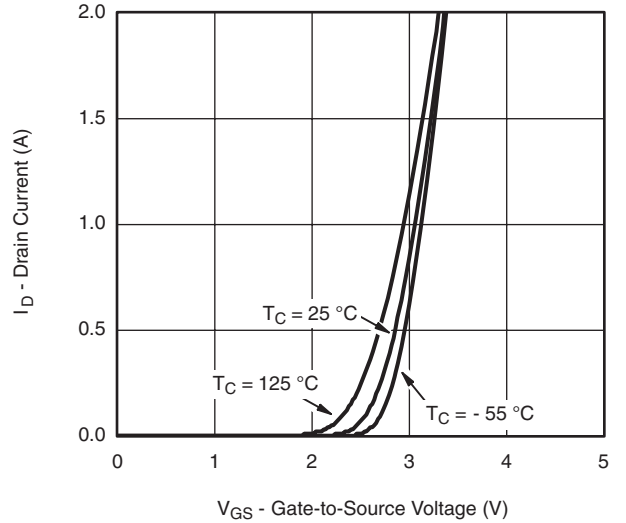
Note:1. Pulse test ; Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

LOW VOLTAGE MOSFET (P-CHANNEL)

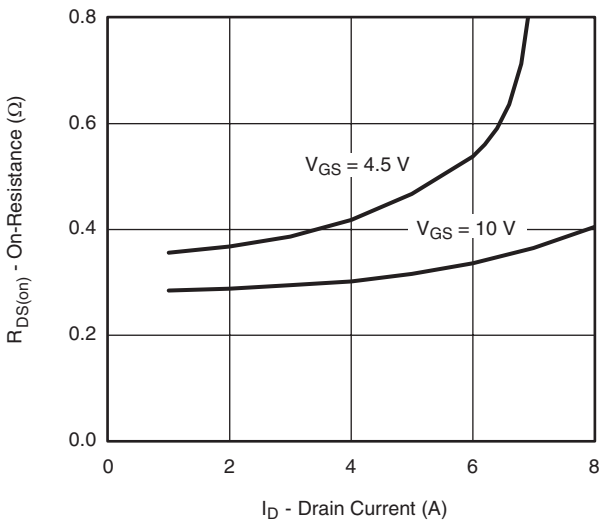
Typical Characteristics



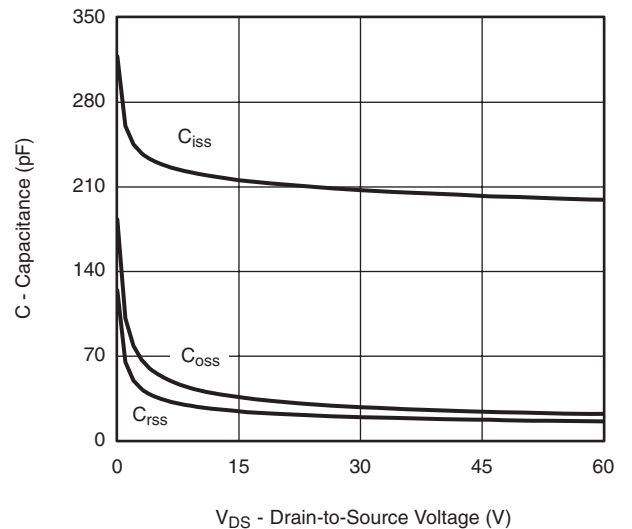
Output Characteristics



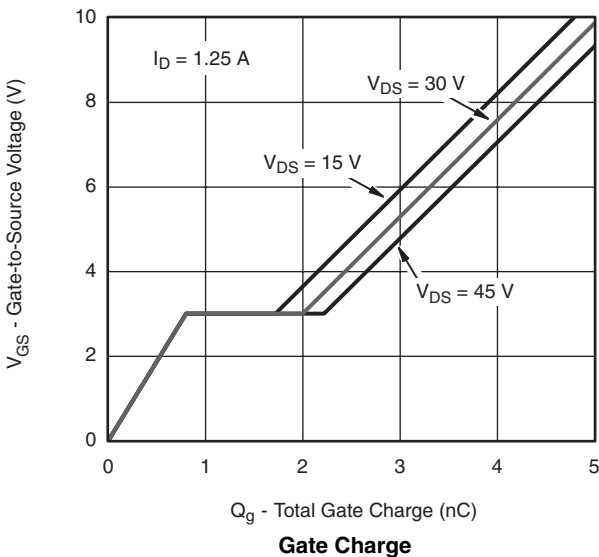
Transfer Characteristics



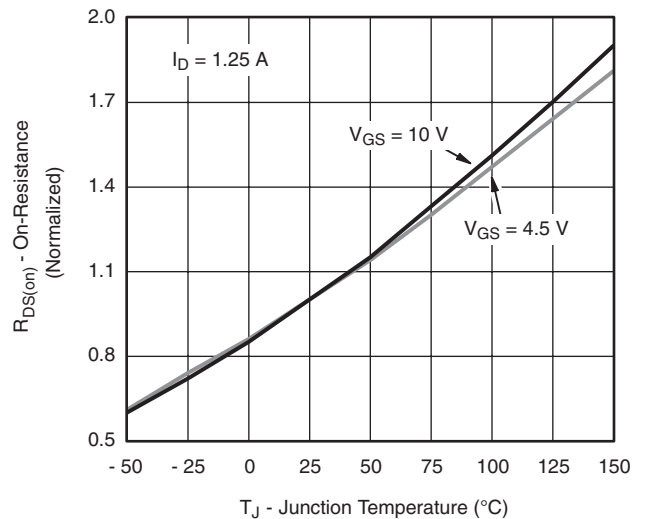
On-Resistance vs. Drain Current and Gate Voltage



Capacitance

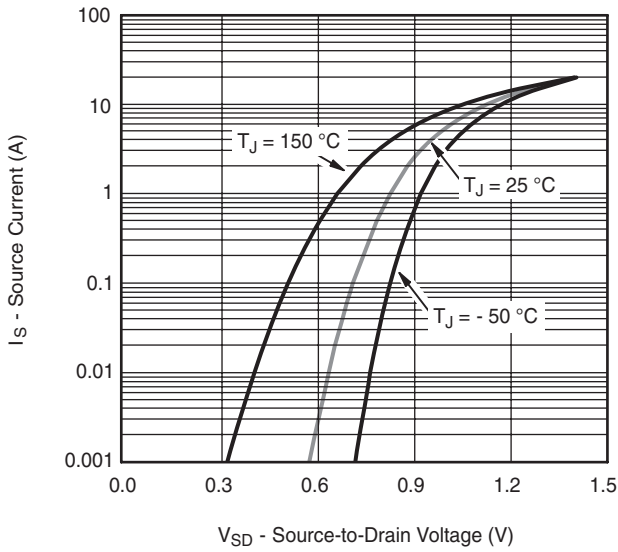


Gate Charge

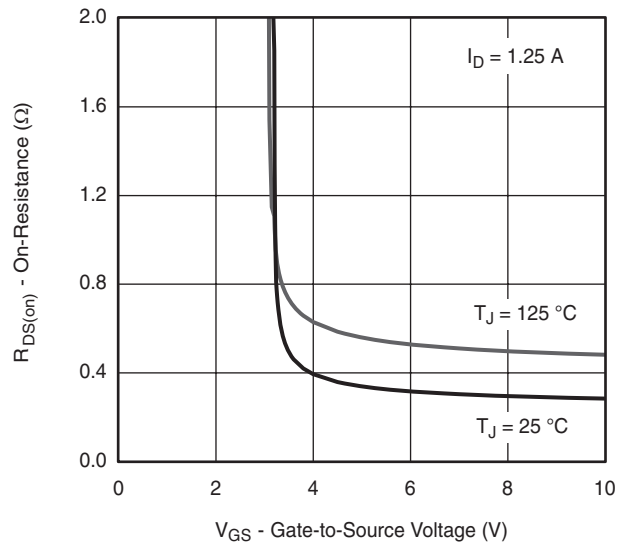


On-Resistance vs. Junction Temperature

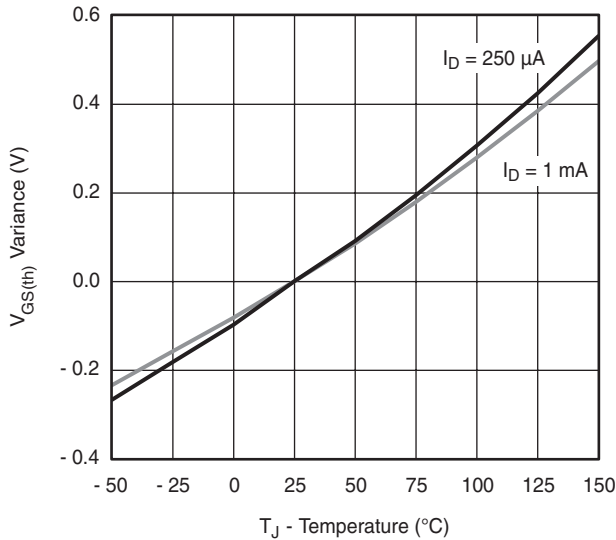
LOW VOLTAGE MOSFET (P-CHANNEL)



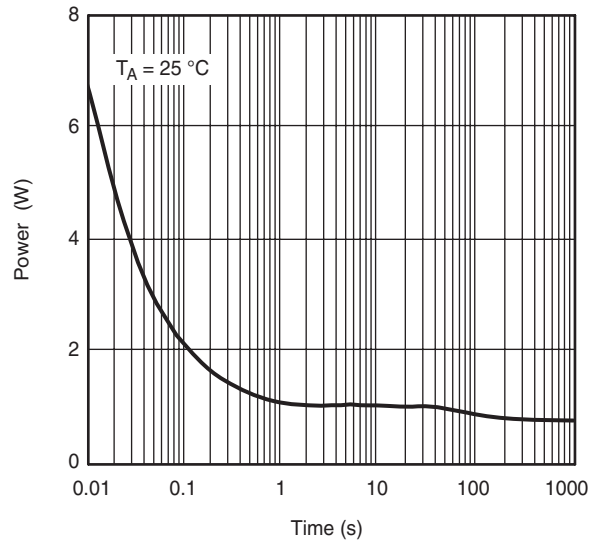
Source-Drain Diode Forward Voltage



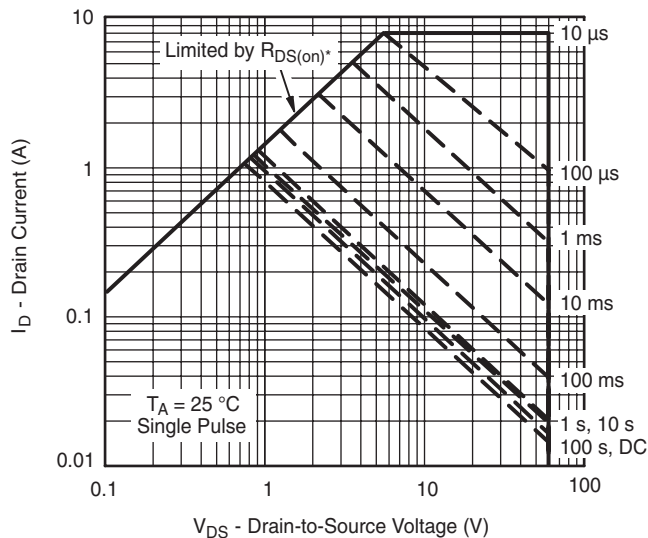
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage



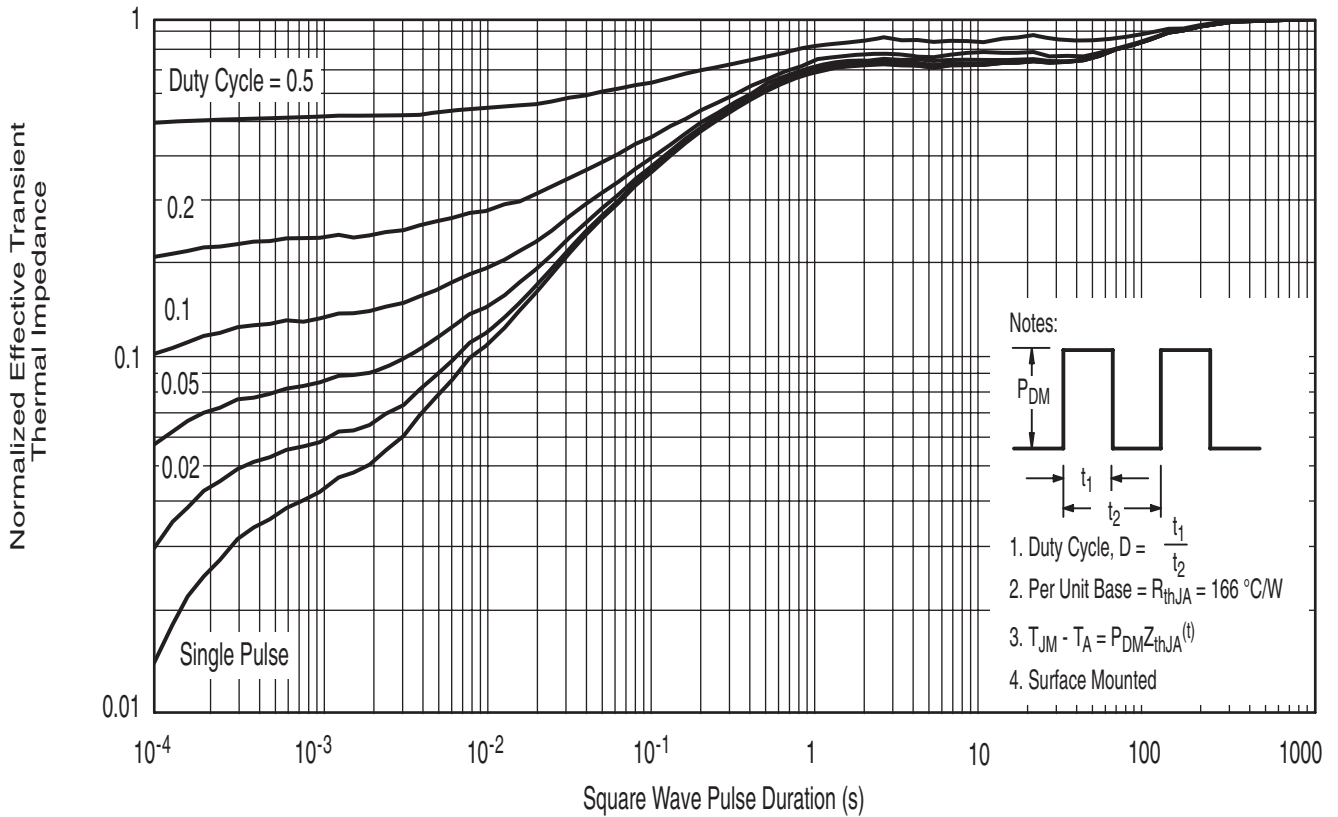
Single Pulse Power, Junction-to-Ambient



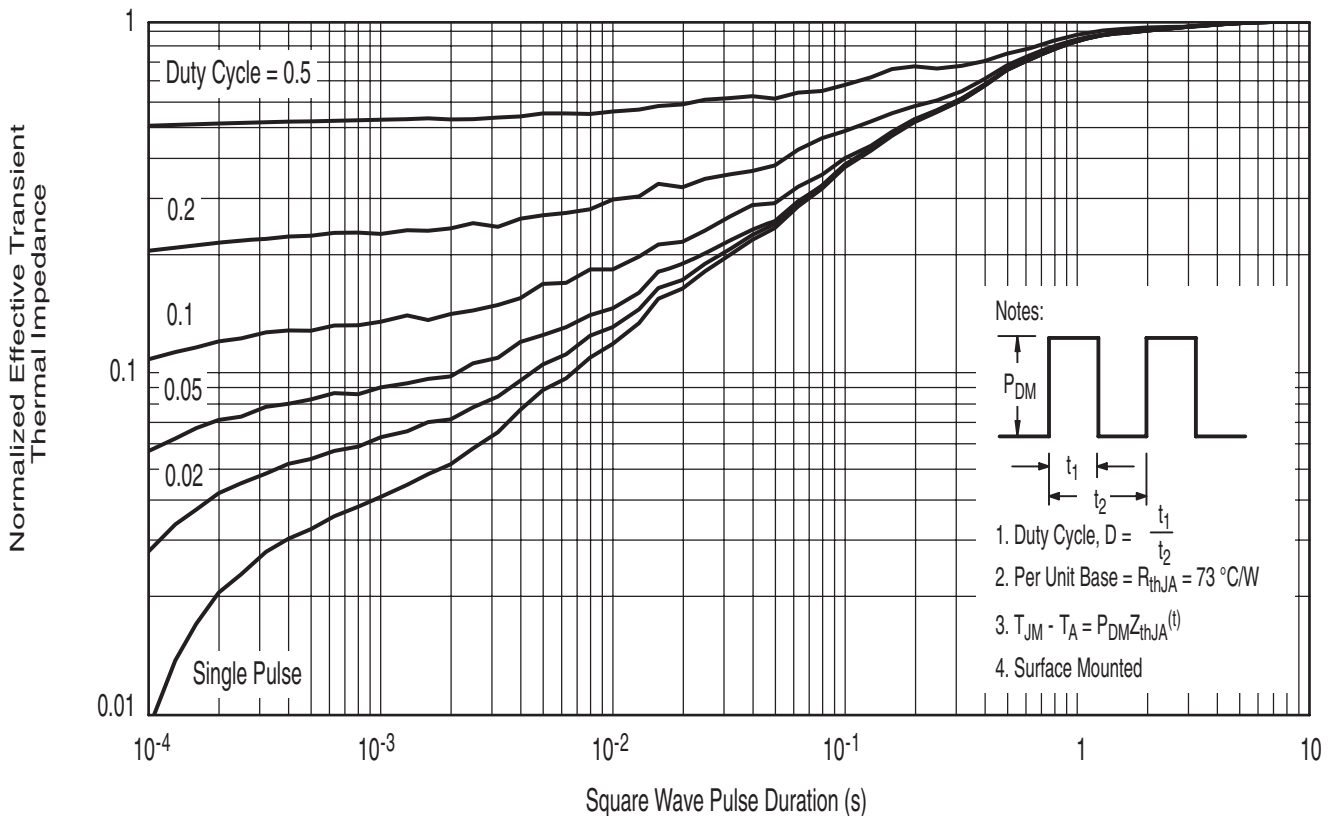
* $V_{GS} >$ minimum V_{GS} at which $R_{DS(on)}$ is specified

Safe Operating Area, Junction-to-Ambient

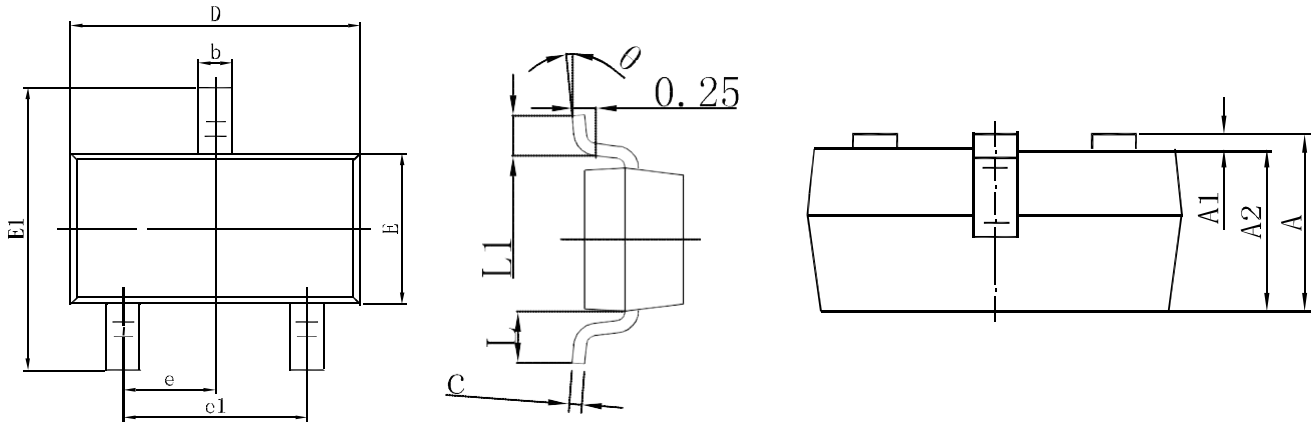
LOW VOLTAGE MOSFET (P-CHANNEL)



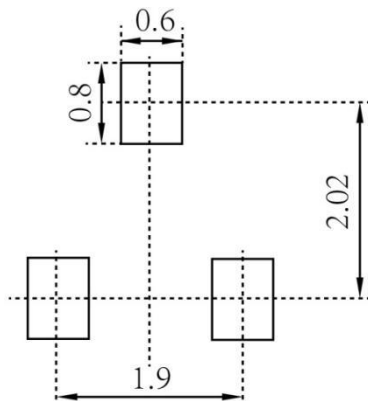
Normalized Thermal Transient Impedance, Junction-to-Ambient



Normalized Thermal Transient Impedance, Junction-to-Foot

LOW VOLTAGE MOSFET (P-CHANNEL)
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° |

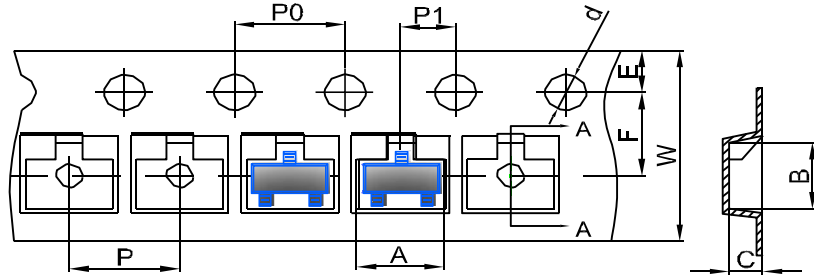
SOT-23 Suggested Pad Layout

Note:

1. Controlling dimension: in millimeters
2. General tolerance: $\pm 0.05\text{mm}$
3. The pad layout is for reference purposes only

LOW VOLTAGE MOSFET (P-CHANNEL)

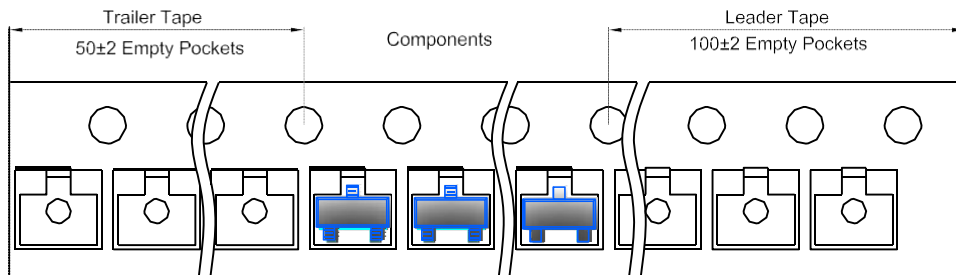
SOT-23 Tape and Reel

SOT-23 Embossed Carrier Tape

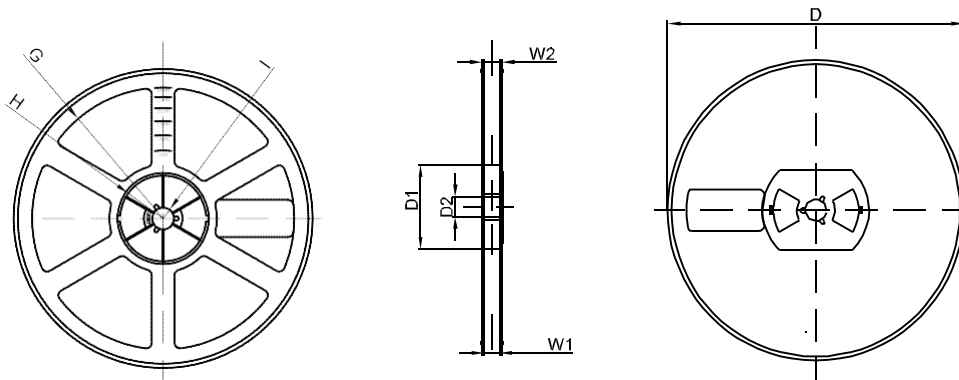


| DIMENSIONS ARE IN MILLIMETER | | | | | | | | | | |
|------------------------------|------|------|------|-------|------|------|------|------|------|------|
| TYPE | A | B | C | d | E | F | P0 | P | P1 | W |
| SOT-23 | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |
| TOLERANCE | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |

SOT-23 Tape Leader and Trailer



SOT-23 Reel



| DIMENSIONS ARE IN MILLIMETER | | | | | | | | |
|------------------------------|------|-------|-------|-----|--------|-------|------|-------|
| REEL OPTION | D | D1 | D2 | G | H | I | W1 | W2 |
| 7" DIA | Ø178 | 54.40 | 13.00 | R78 | R25.60 | R6.50 | 9.50 | 12.30 |
| TOLERANCE | ±2 | ±1 | ±1 | ±1 | ±1 | ±1 | ±1 | ±1 |