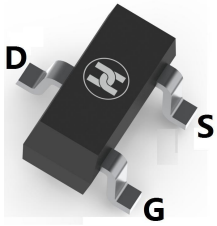
MOSFET (N-CHANNEL)



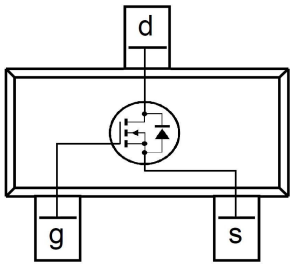

SOT-23

## FEATURES

- Fast switching
- Ultra Low On-Resistance
- Surface Mount device

## MECHANICAL DATA

- Case: SOT-23
- Case Material: Molded Plastic. UL flammability
- Classification Rating: 94V-0
- Weight: 0.008 grams (approximate)




## MAXIMUM RATINGS ($T_A$ = 25°C unless otherwise noted)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | 20 | V |
| Gate-source voltage | $V_{GS}$ | ±12 | V |
| Continuous drain current | $I_D$ | 4.2 | A |
| Pulsed drain current (Note 1) | $I_{DM}$ | 33 | A |
| Power dissipation | $P_D$ | 1.25 | W |
| Thermal resistance from Junction to ambient | $R_{\theta JA}$ | 100 | °C/W |
| Junction temperature | $T_J$ | 150 | °C |
| Storage temperature | $T_{STG}$ | -55 ~+150 | °C |

## ELECTRICAL CHARACTERISTICS ($T_A$ = 25°C unless otherwise specified)

| Parameter | Symbol | Min | Typ | Max | Unit | Conditions |
|---|---|---|---|---|---|---|
| Drain-Source breakdown voltage | $V_{(BR)DSS}$ | 20 | | | V | $V_{GS}$=0V, $I_D$=250μA |
| Zero gate voltage drain current | $I_{DSS}$ | | | 1 | uA | $V_{DS}$=16V, $V_{GS}$=0V |
| Gate-body leakage current | $I_{GSS}$ | | | ±100 | nA | $V_{DS}$=0V, $V_{GS}$=±12V |
| Gate-threshold voltage (note 1) | $V_{GS(th)}$ | 0.6 | | 1.2 | V | $V_{DS}$=$V_{GS}$, $I_D$=250μA |
| Drain-source on-resistance (note 1) | $R_{DS(ON)}$ | | 35 | 45 | mΩ | $V_{GS}$=4.5V, $I_D$=4.2A |
| | | | 50 | 80 | mΩ | $V_{GS}$=2.5V, $I_D$=3.6A |
| Forward transconductance (note 1) | $g_{FS}$ | | 2.8 | | S | $V_{DS}$=10V, $I_D$=4.0A |
| Diode forward voltage (note 1) | $V_{SD}$ | | | 1.2 | V | $I_S$=1.3A, $V_{GS}$=0V,Tj=25°C |
| Diode forward current | $I_S$ | | | 1.3 | A | |
| Input capacitance | $C_{iss}$ | | 740 | | pF | $V_{DS}$=15V, $V_{GS}$=0V, f=1MHz |
| Output capacitance | $C_{oss}$ | | 90 | | pF | |
| Reverse transfer capacitance | $C_{rss}$ | | 66 | | pF | |
| Turn-on delay time | $t_{d(on)}$ | | 7.5 | | nS | $V_{DD}$=10V,$I_D$=1A, $R_{GEN}$=6Ω,$R_L$=10Ω |
| Turn-on rise time | $t_r$ | | 10 | | nS | |
| Turn-off delay time | $t_{d(off)}$ | | 54 | | nS | |
| Turn-off fall time | $t_f$ | | 26 | | nS | |
| Total gate charge | $Q_g$ | | 8 | 12 | nC | $V_{DS}$=10V,$V_{GS}$=5V,$I_D$=4A |
| Gate-source charge | $Q_{gs}$ | | 1.8 | 2.7 | nC | |
| Gate-drain charge | $Q_{gd}$ | | 1.7 | 2.6 | nC | |

Note:1. Pulse test ; Pulse width ≤300μs, Duty cycle ≤ 2% .

MOSFET (N-CHANNEL)

## Typical Characteristics

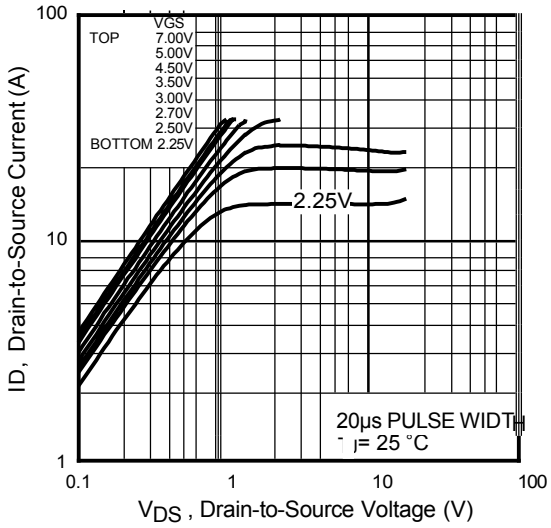



**Fig 1.** Typical Output Characteristics

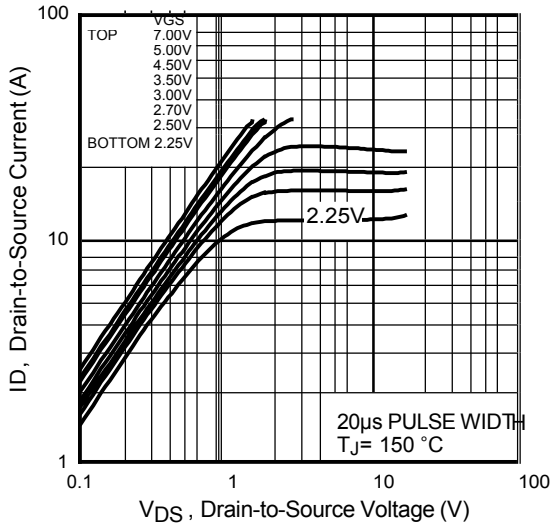



**Fig 2.** Typical Output Characteristics

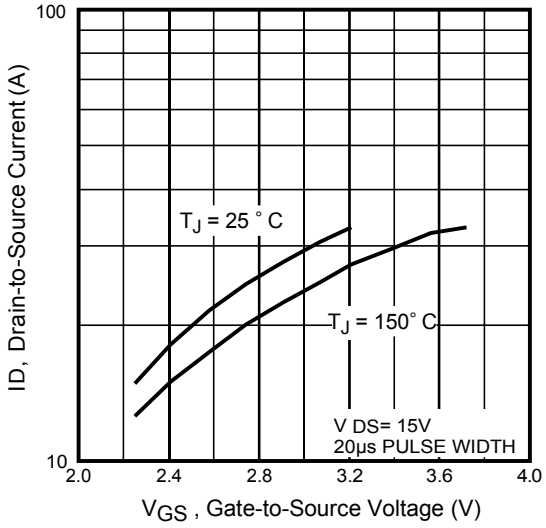



**Fig 3.** Typical Transfer Characteristics

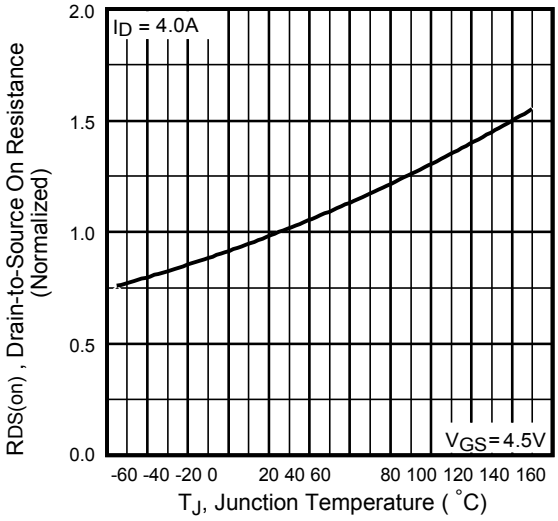



**Fig 4.** Normalized On-Resistance Vs. Temperature

MOSFET (N-CHANNEL)

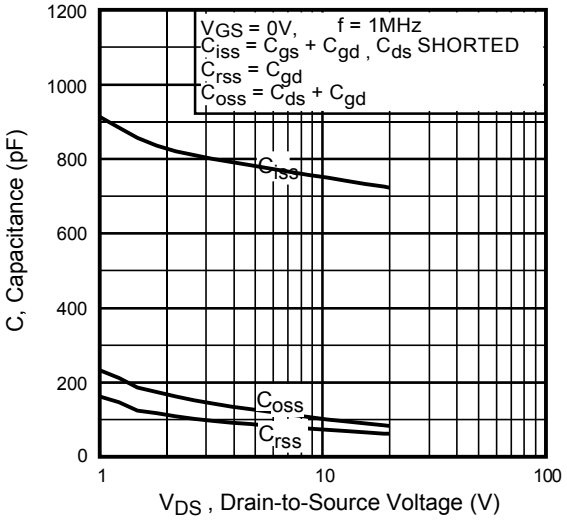



**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage

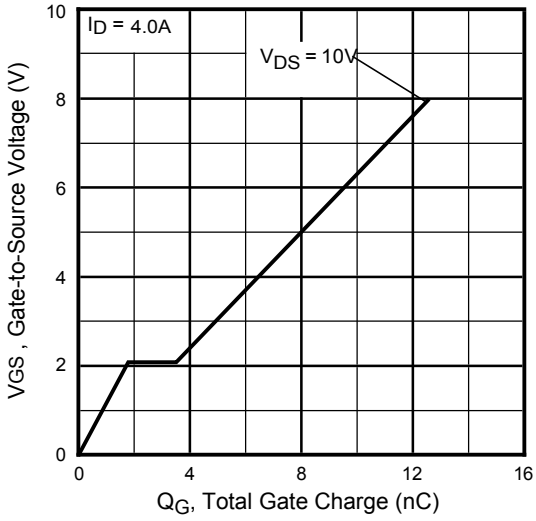



**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage

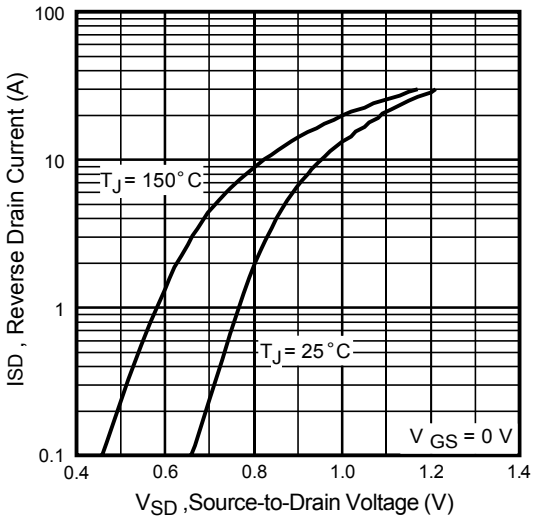



**Fig 7.** Typical Source-Drain Diode Forward Voltage

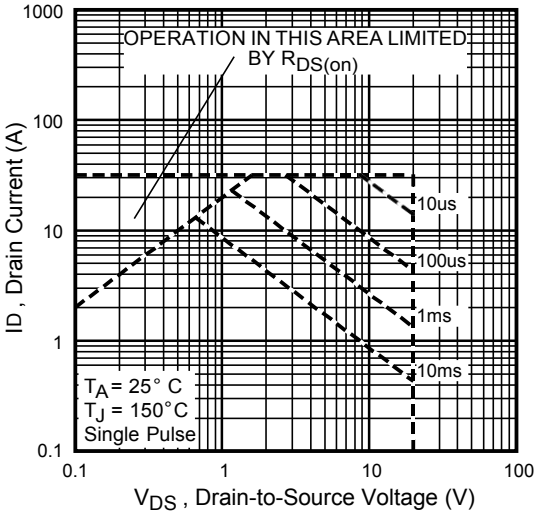



**Fig 8.** Maximum Safe Operating Area

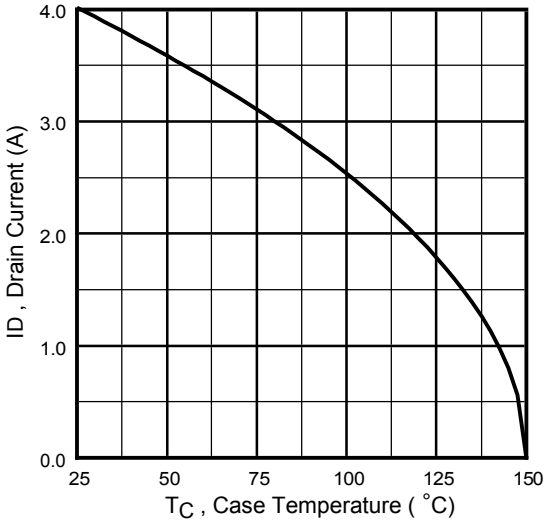



**Fig 9.** Maximum Drain Current Vs. Case Temperature

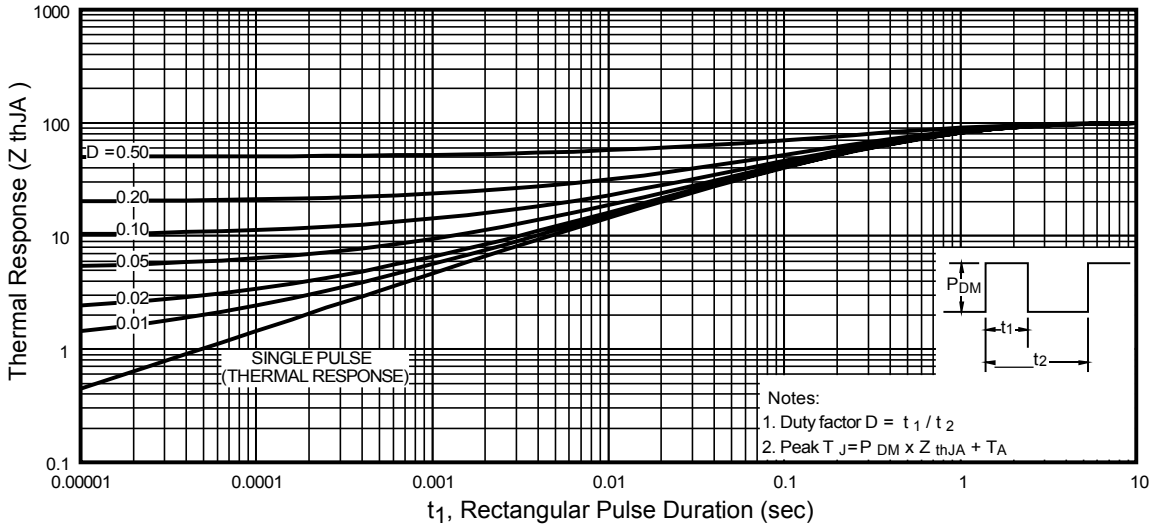
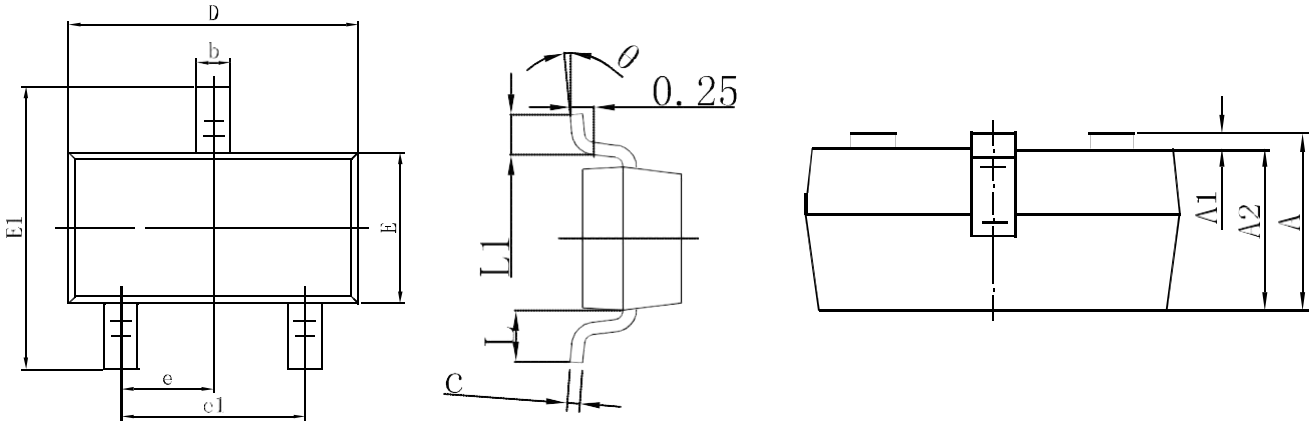



**Fig 10.** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

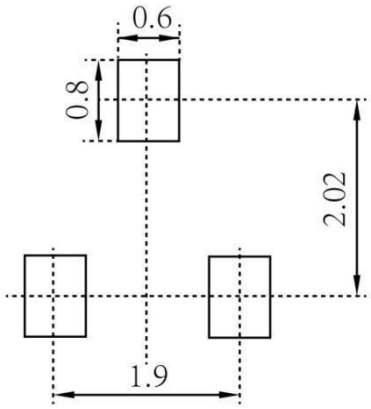
MOSFET (N-CHANNEL)

## 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



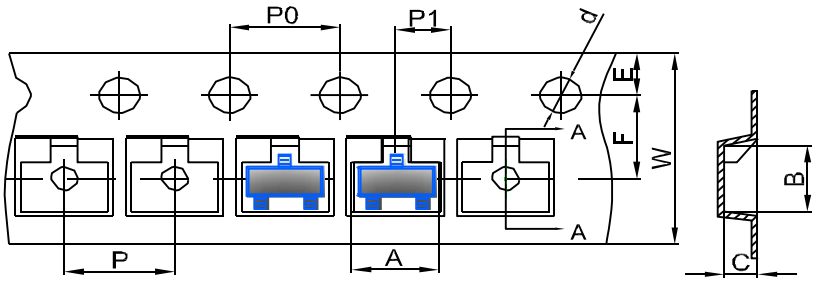

**Note:**

1. Controlling dimension: in millimeters
2. General tolerance: ±0.05mm
3. The pad layout is for reference purposes only

MOSFET (N-CHANNEL)

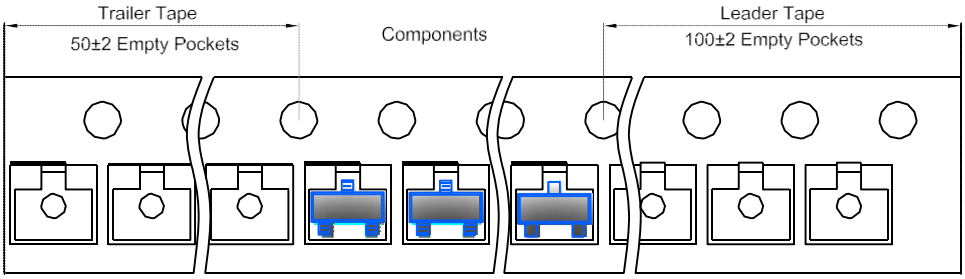
# SOT-23 Tape and Reel

## SOT-23 Embossed Carrier Tape

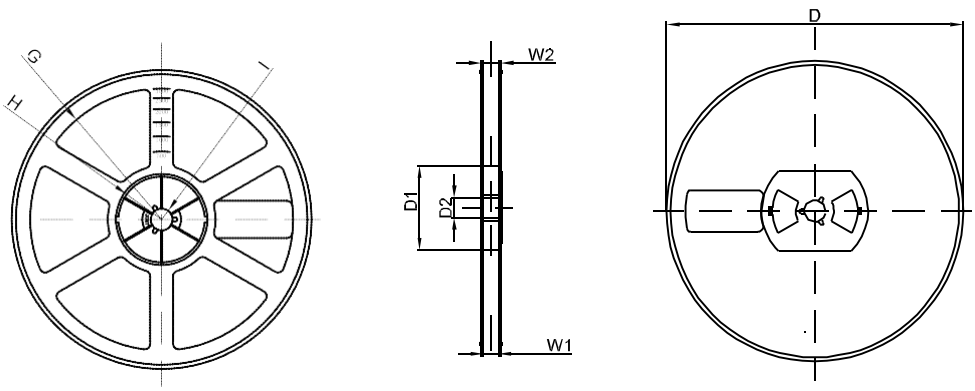



| | DIMENSIONS ARE IN MILLIMETER | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TYPE | A | B | C | d | E | F | P0 | P | P1 | W |
| SOT-23 | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |
| TOLERANCE | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |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