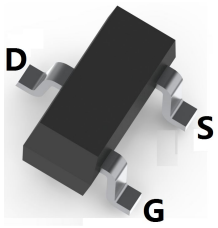
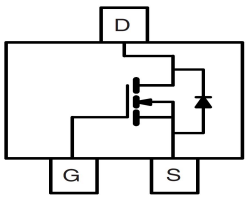
HKT Hottech Electronic

# IRLML0100

## LOW VOLTAGE MOSFET (N-CHANNEL)




SOT-23




### FEATURES

- Ultra low on-resistance:$V_{DS}$=100V,$R_{DS(ON)}$=235mΩ@$V_{GS}$=10 V,$I_D$=1.6A
- For Low power DC to DC converter application
- For Load switch application
- 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 | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 100 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±16 | |
| Continuous Drain Current @ $V_{GS}$=10V | TA=25℃ | $I_D$ | 1.6 | A |
| | TA=70℃ | | 1.3 | |
| Pulsed Drain Current | | $I_{DM}$ | 7 | |
| Power Dissipation | TA=25℃ | $P_D$ | 1.3 | W |
| | TA=70℃ | | 0.8 | |
| Thermal Resistance.Junction- to-Ambient (Note.1) | | $R_{thJA}$ | 100 | ℃/W |
| | | | 99 | |
| Linear Derating Factor | | | 0.01 | W/℃ |
| Junction Temperature | | $T_J$ | 150 | ℃ |
| Storage Temperature Range | | $T_{stg}$ | -55 to 150 | |

Note.1: Surface mounted on 1 in square Cu board

### Electric Characteristics @ $T_J$ = 25°C (unless otherwise specified)

| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{DSS}$ | $I_D$=250μA, $V_{GS}$=0V | 100 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=100V, $V_{GS}$=0V | | | 20 | μA |
| | | $V_{DS}$=100V, $V_{GS}$=0V, $T_J$=125℃ | | | 250 | |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±16V | | | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$ , $I_D$=250μA | 1 | | 2.5 | V |
| Static Drain-Source On-Resistance (Note.1) | $R_{DS(on)}$ | $V_{GS}$=4.5V, $I_D$=1.3A | | 190 | 235 | mΩ |
| | | $V_{GS}$=10V, $I_D$=1.6A | | 178 | 220 | |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=50V, $I_D$=1.6A | 5.7 | | | S |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=25V, f=1MHz | | 290 | | pF |
| Output Capacitance | $C_{oss}$ | | | 27 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 13 | | |
| Gate Resistance | $R_g$ | | | 1.3 | | Ω |
| Total Gate Charge | $Q_g$ | $V_{GS}$=4.5V, $V_{DS}$=50V, $I_D$=1.6A | | 2.5 | | nC |
| Gate Source Charge | $Q_{gs}$ | | | 0.5 | | |
| Gate Drain Charge | $Q_{gd}$ | | | 1.2 | | |
| Turn-On DelayTime | $t_{d(on)}$ | $V_{GS}$=4.5V, $V_{DS}$=50V, $I_D$=1A,$R_{GEN}$=6.8Ω | | 2.2 | | ns |
| Turn-On Rise Time | $t_r$ | | | 2.1 | | |
| Turn-Off DelayTime | $t_{d(off)}$ | | | 9 | | |
| Turn-Off Fall Time | $t_f$ | | | 3.6 | | |
| Body Diode Reverse Recovery Time | $t_{rr}$ | $V_R$=50V,$I_F$= 1.1A, dI/dt= 100A/μs , $T_J$ = 25℃ (Note.1) | | 20 | 30 | |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | | | 13 | 20 | nC |
| Maximum Body-Diode Continuous Current | $I_S$ | | | | 1.1 | A |
| Pulsed Source Current | $I_{SM}$ | (Note.2) | | | 7 | |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=1.1A,$V_{GS}$=0V,$T_J$ = 25℃ (Note.1) | | | 1.3 | V |

Note.1: Pulse width ≤ 400μs; duty cycle ≤ 2%.
Note.2:Repetitive rating; pulse width limited by max. junction temperature.

LOW VOLTAGE MOSFET (N-CHANNEL)

## Typical Characteristics

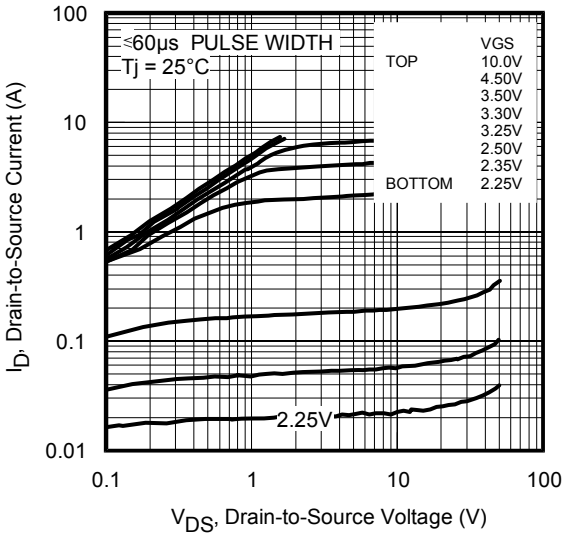



**Fig 1.** Typical Output Characteristics

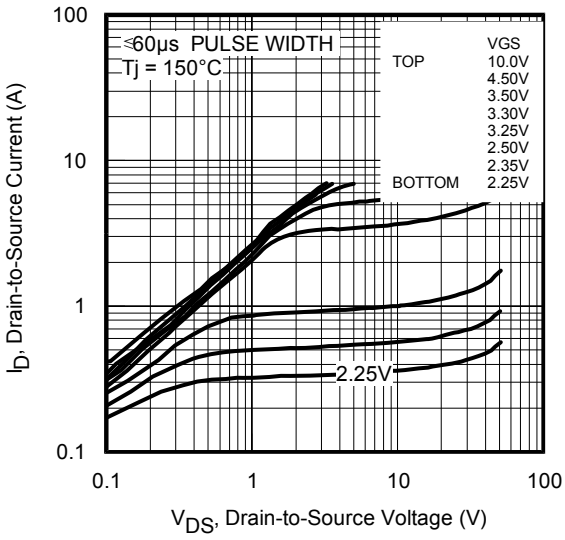



**Fig 2.** Typical Output Characteristics

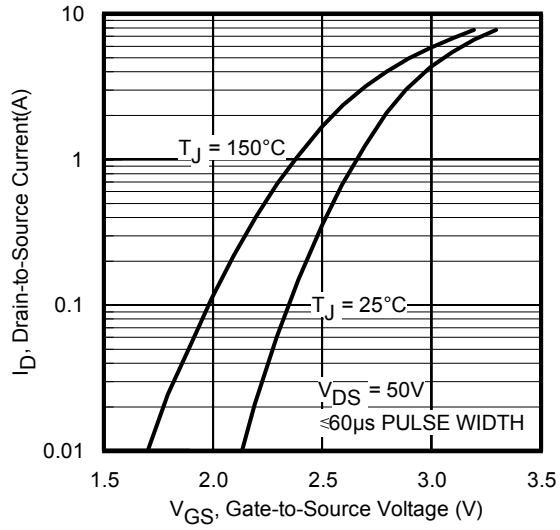



**Fig 3.** Typical Transfer Characteristics

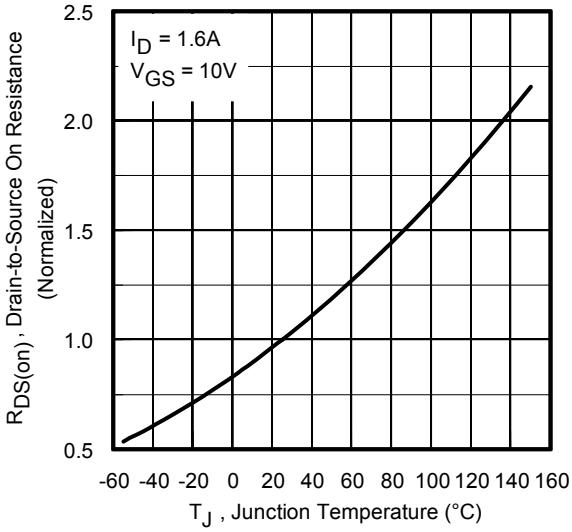



**Fig 4.** Normalized On-Resistance Vs. Temperature

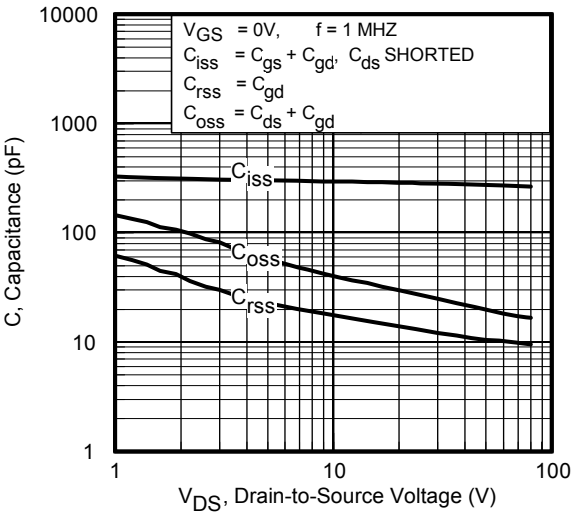



**Fig 5.** Typical Capacitance Vs. Drain-to-Source Voltage

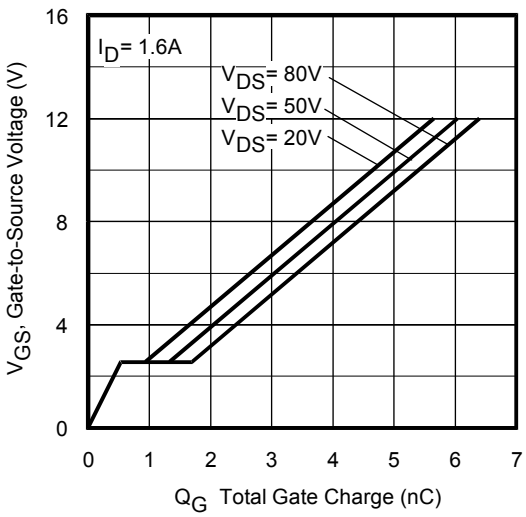



**Fig 6.** Typical Gate Charge Vs. Gate-to-Source Voltage

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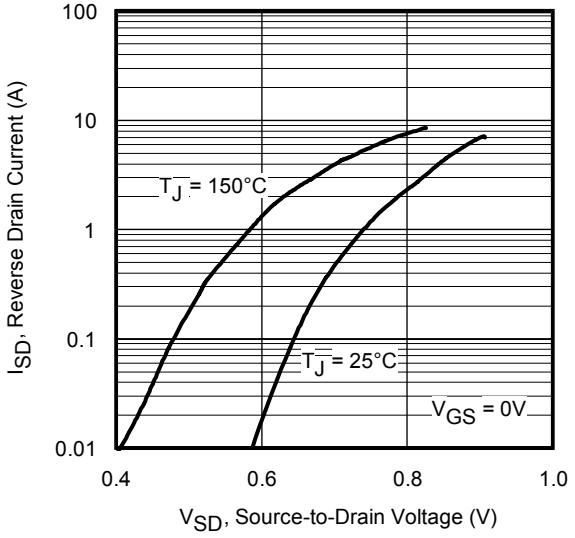



**Fig 7.** Typical Source-Drain Diode Forward Voltage

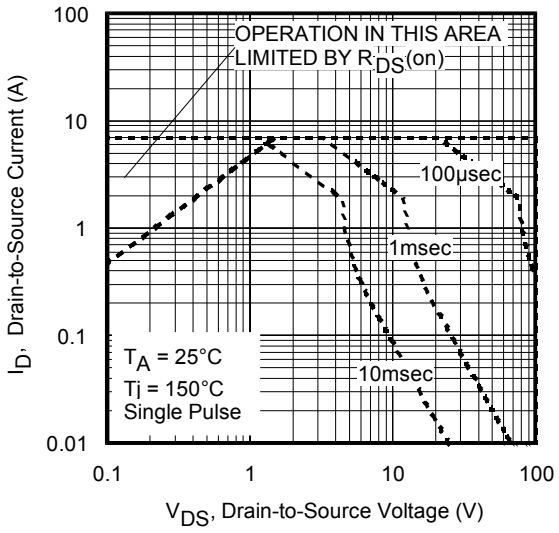



**Fig 8.** Maximum Safe Operating Area

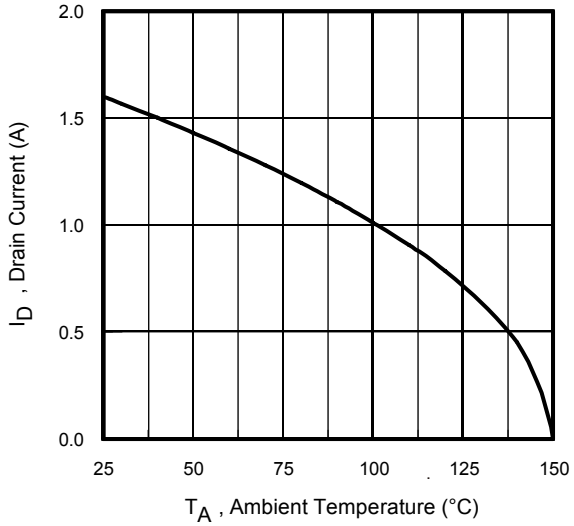



**Fig 9.** Maximum Drain Current Vs. Ambient Temperature

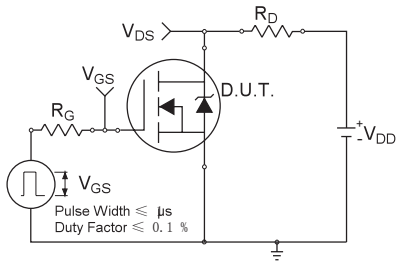



**Fig 10a.** Switching Time Test Circuit

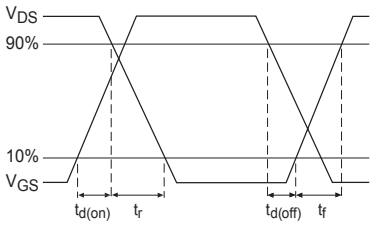



**Fig 10b.** Switching Time Waveforms

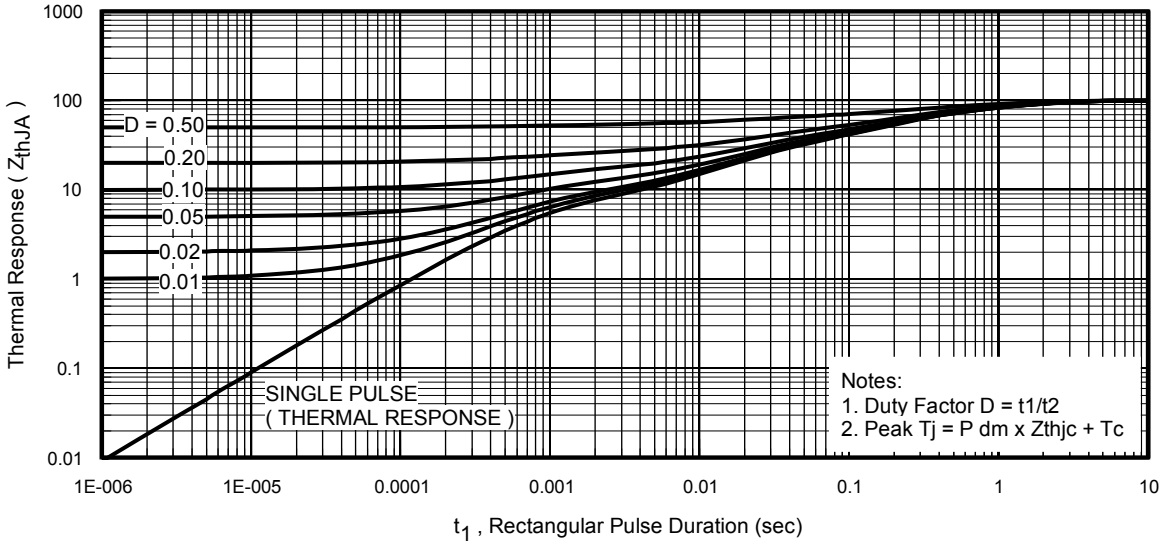



**Fig 11.** Typical Effective Transient Thermal Impedance, Junction-to-Ambient

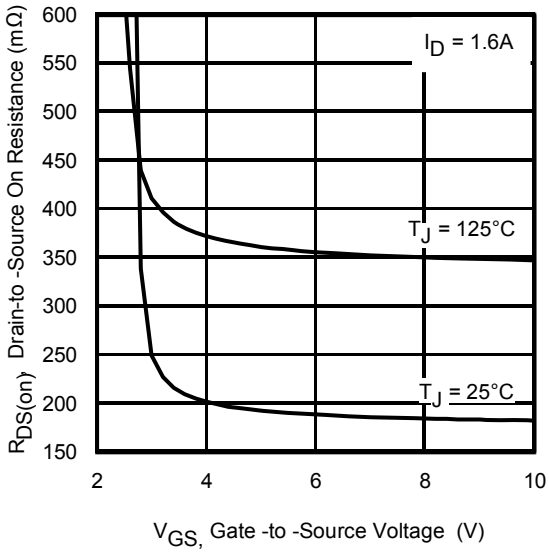



**Fig 12.** Typical On-Resistance Vs. Gate Voltage

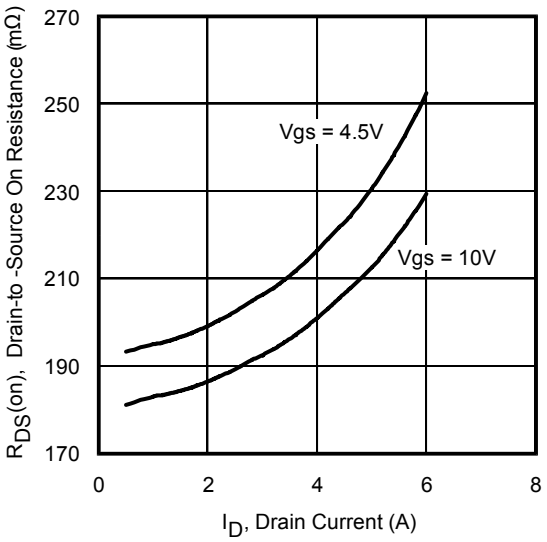



**Fig 13.** Typical On-Resistance Vs. Drain Current

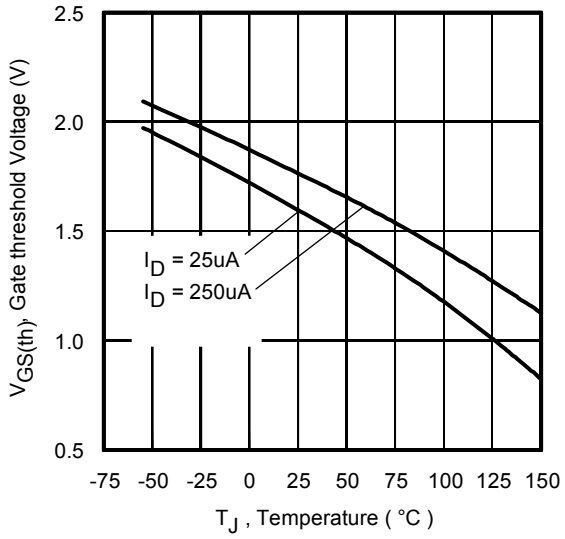



**Fig 14.** Typical Threshold Voltage Vs. Junction Temperature

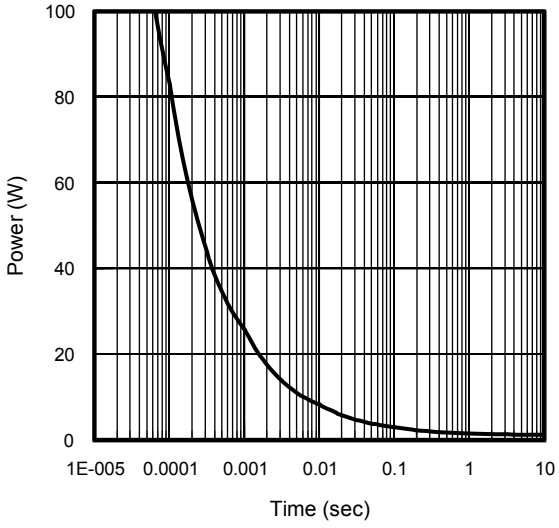



**Fig 15.** Typical Power Vs. Time

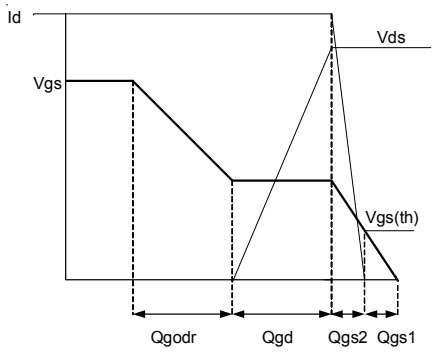



**Fig 16a.** Basic Gate Charge Waveform

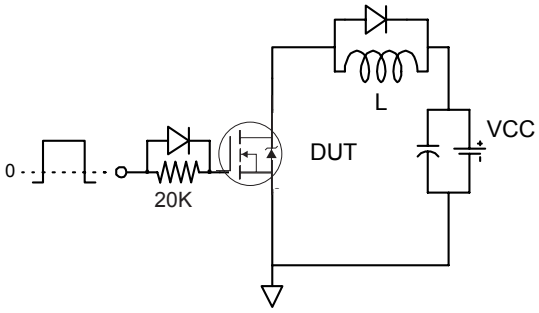
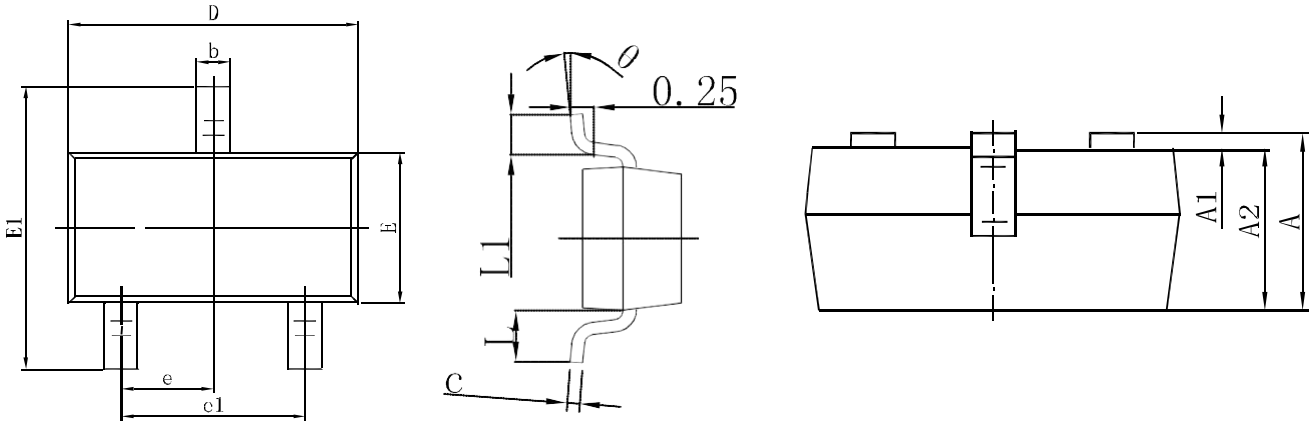


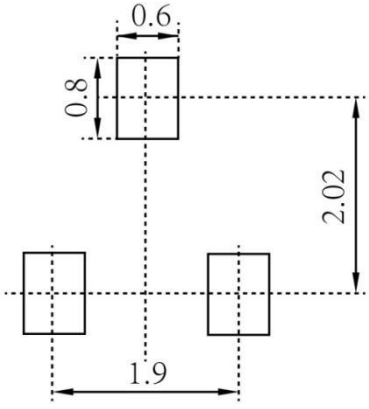

**Fig 16b.** Gate Charge Test Circuit

## 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:**

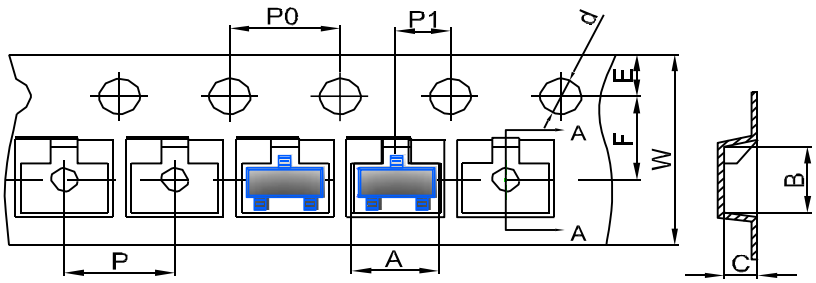
1.Controlling dimension: in millimeters

2.General tolerance: ±0.05mm

3.The pad layout is for reference purposes only

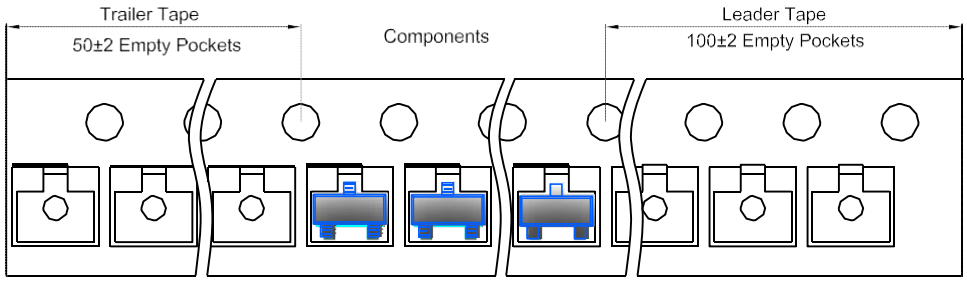
# SOT-23 Tape and Reel

## SOT-23 Embossed Carrier Tape

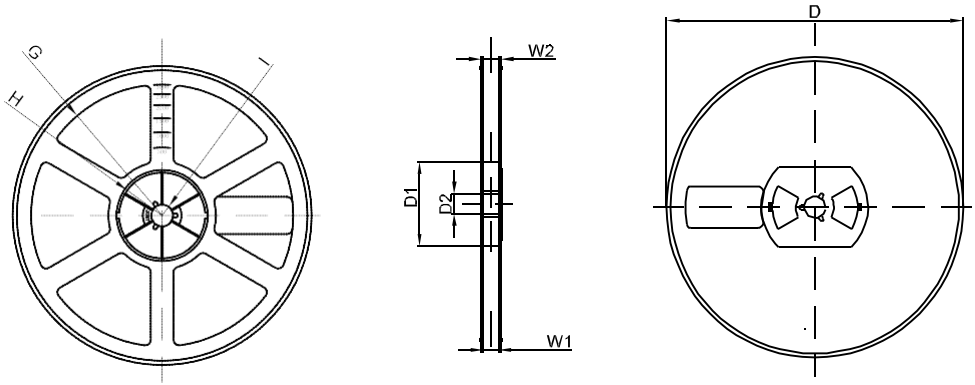



| | DIMENSIONS ARE IN MILLIMETER | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| TYPE | A | B | C | d | E | F | P0 | P | P1 | W |
| SOT-23 | 3.15 | 2.77 | 1.22 | Ø1.50 | 1.75 | 3.50 | 4.00 | 4.00 | 2.00 | 8.00 |
| TOLERANCE | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 | ±0.1 |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