

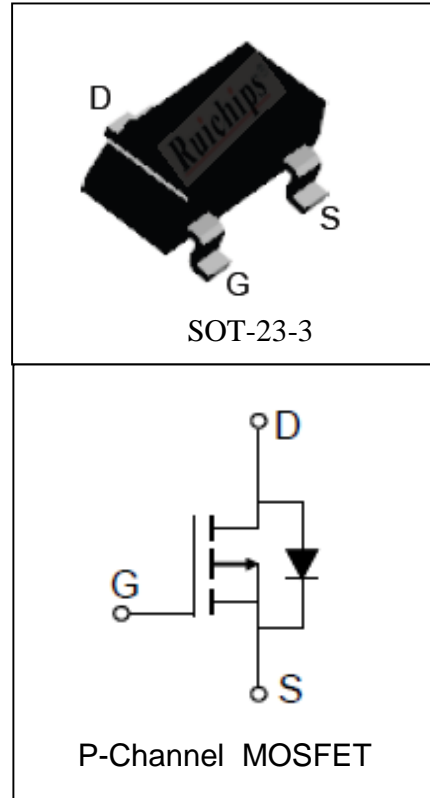
Features

- -20V/-4A,
 $R_{DS(ON)} = 40m\Omega$ (Typ.) @ $V_{GS} = -4.5V$
 $R_{DS(ON)} = 55m\Omega$ (Typ.) @ $V_{GS} = -2.5V$
- Low $R_{DS(ON)}$
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free and Green Available

Applications

- Power Management
- Load Switch

Pin Description



Absolute Maximum Ratings

| Symbol | Parameter | Rating | Unit |
|--|---|--|--------------|
| Common Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted) | | | |
| V_{DSS} | Drain-Source Voltage | -20 | V |
| V_{GSS} | Gate-Source Voltage | ± 12 | |
| T_J | Maximum Junction Temperature | 150 | $^\circ C$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| I_S | Diode Continuous Forward Current | $T_A = 25^\circ C$ -1.5 | A |
| Mounted on Large Heat Sink | | | |
| I_{DP} | 300 μs Pulse Drain Current Tested | $T_A = 25^\circ C$ -16 ^① | A |
| I_D | Continuous Drain Current ($V_{GS} = -4.5V$) | $T_A = 25^\circ C$ | A |
| | | $T_A = 70^\circ C$ | |
| P_D | Maximum Power Dissipation | $T_A = 25^\circ C$ | W |
| | | $T_A = 70^\circ C$ | |
| $R_{\theta JA}$ ^② | Thermal Resistance-Junction to Ambient | 100 | $^\circ C/W$ |

Electrical Characteristics ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol | Parameter | Test Condition | RU20P4C | | | Unit |
|---|----------------------------------|--|---------|------|-----------|-----------|
| | | | Min. | Typ. | Max. | |
| Static Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_{DS}=-250\mu A$ | -20 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=-20V, V_{GS}=0V$ | | | -1 | μA |
| | | $T_J=85^\circ C$ | | | -30 | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_{DS}=-250\mu A$ | -0.4 | -0.7 | -1.1 | V |
| I_{GSS} | Gate Leakage Current | $V_{GS}=\pm 10V, V_{DS}=0V$ | | | ± 100 | nA |
| $R_{DS(ON)}^{(3)}$ | Drain-Source On-state Resistance | $V_{GS}=-4.5V, I_{DS}=-4A$ | | 40 | 60 | $m\Omega$ |
| | | $V_{GS}=-2.5V, I_{DS}=-3A$ | | 55 | 100 | $m\Omega$ |
| Diode Characteristics | | | | | | |
| $V_{SD}^{(3)}$ | Diode Forward Voltage | $I_{SD}=-1A, V_{GS}=0V$ | | | -1 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD}=-4A, di_{SD}/dt=100A/\mu s$ | | 15 | | ns |
| Q_{rr} | Reverse Recovery Charge | | | 8 | | nC |
| Dynamic Characteristics ⁽⁴⁾ | | | | | | |
| R_G | Gate Resistance | $V_{GS}=0V, V_{DS}=0V, F=1MHz$ | | 7.5 | | Ω |
| C_{iss} | Input Capacitance | $V_{GS}=0V,$ $V_{DS}=-10V,$ Frequency=1.0MHz | | 585 | | pF |
| C_{oss} | Output Capacitance | | | 95 | | |
| C_{rss} | Reverse Transfer Capacitance | | | 50 | | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}=-10V, R_L=2.5\Omega,$ $I_{DS}=-4A, V_{GEN}=-4.5V,$ $R_G=6\Omega$ | | 8 | | ns |
| t_r | Turn-on Rise Time | | | 11 | | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | | 30 | | |
| t_f | Turn-off Fall Time | | | 10 | | |
| Gate Charge Characteristics ⁽⁴⁾ | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=-16V, V_{GS}=-4.5V,$ $I_{DS}=-4A$ | | 9 | 13 | nC |
| Q_{gs} | Gate-Source Charge | | | 1.8 | | |
| Q_{gd} | Gate-Drain Charge | | | 2.9 | | |

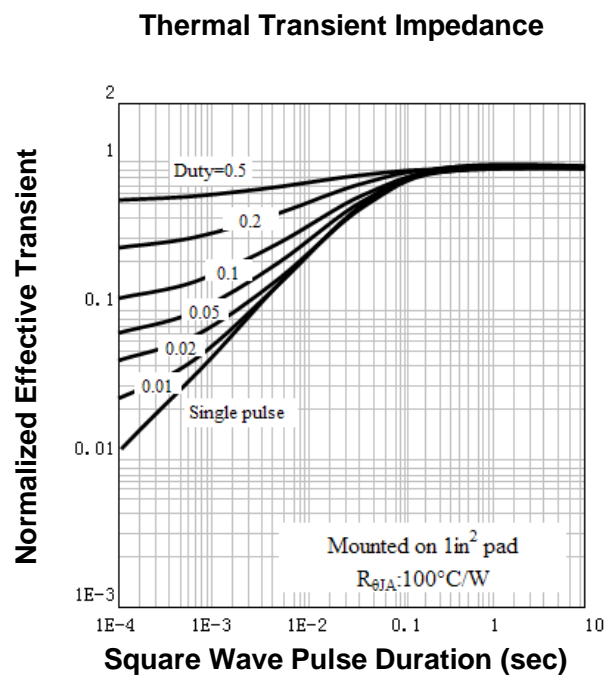
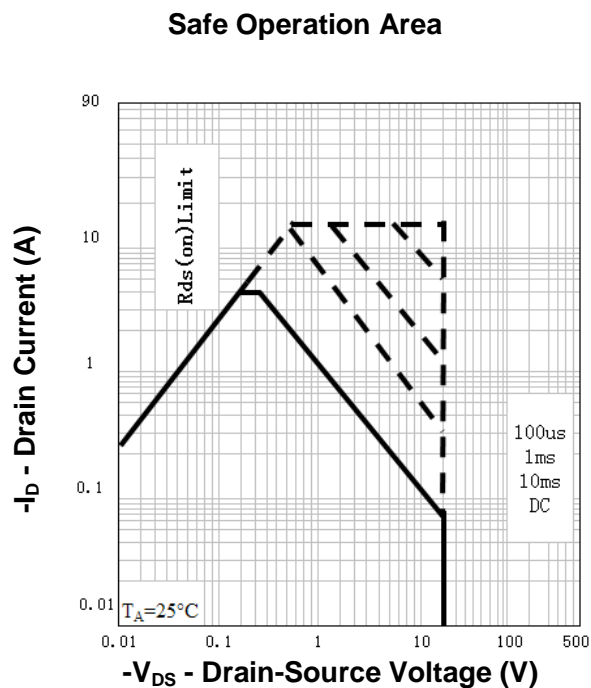
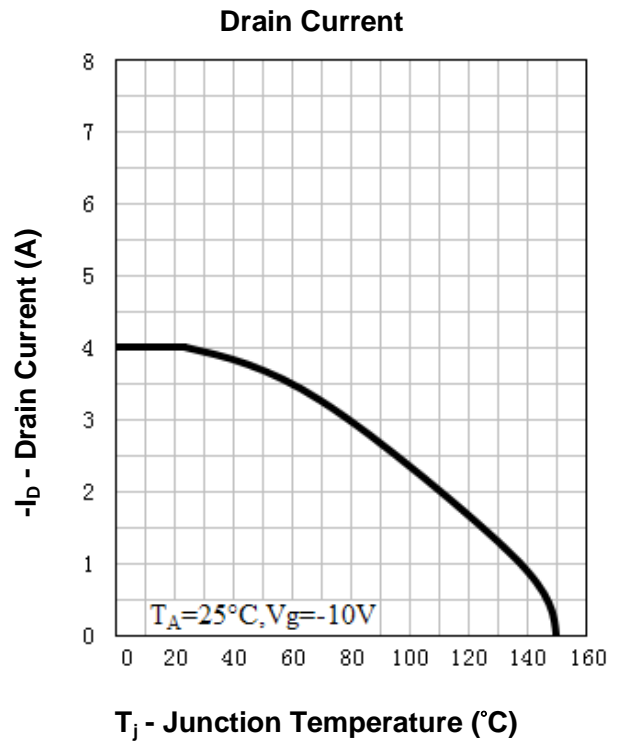
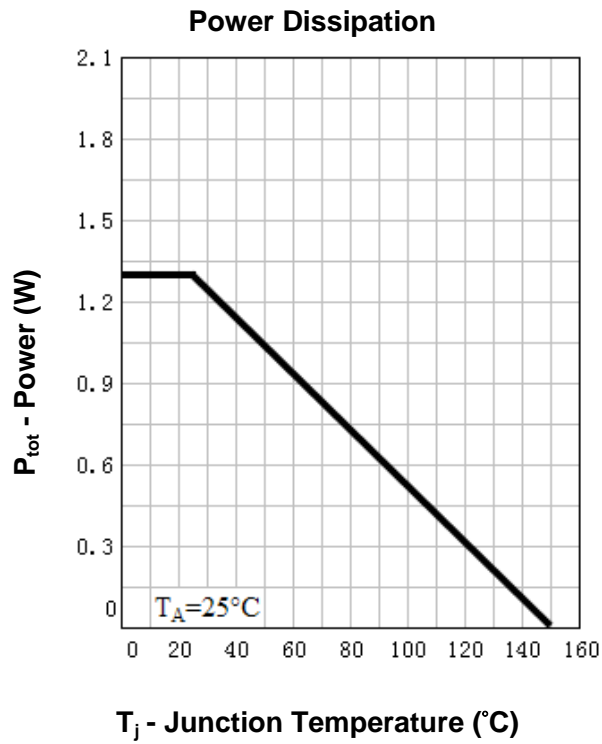
Notes: ① Pulse width limited by safe operating area.

② When mounted on 1 inch square copper board, $t \leq 10\text{sec}$. The value in any given application depends on the user's specific board design.

③ Pulse test ; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.

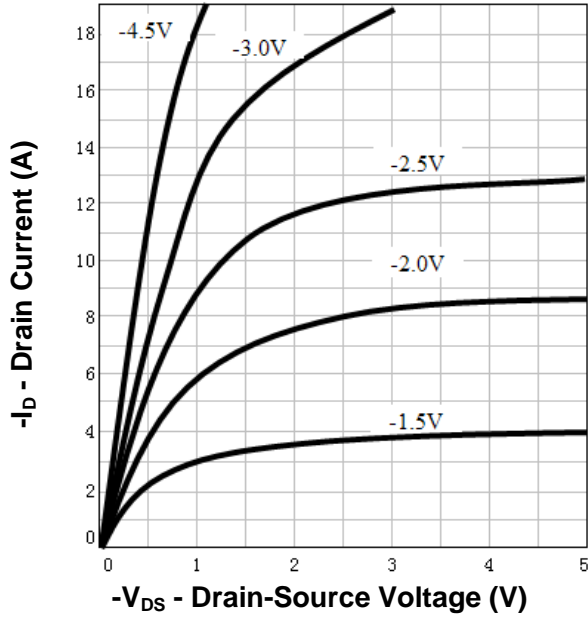
④ Guaranteed by design, not subject to production testing.

Typical Characteristics

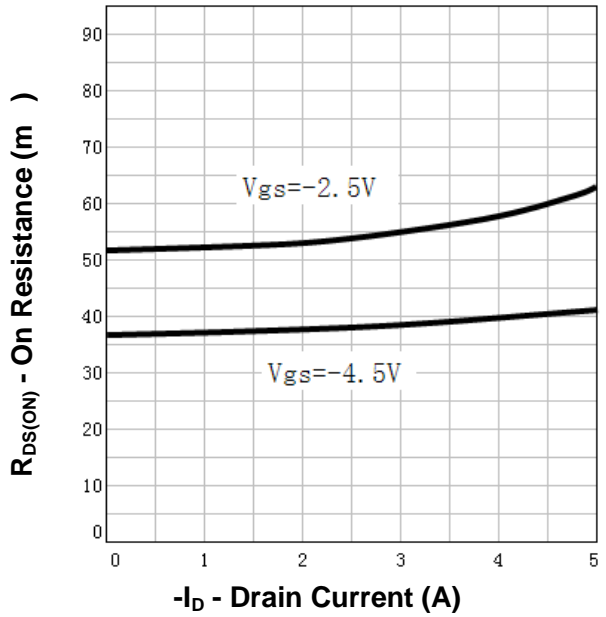


Typical Characteristics

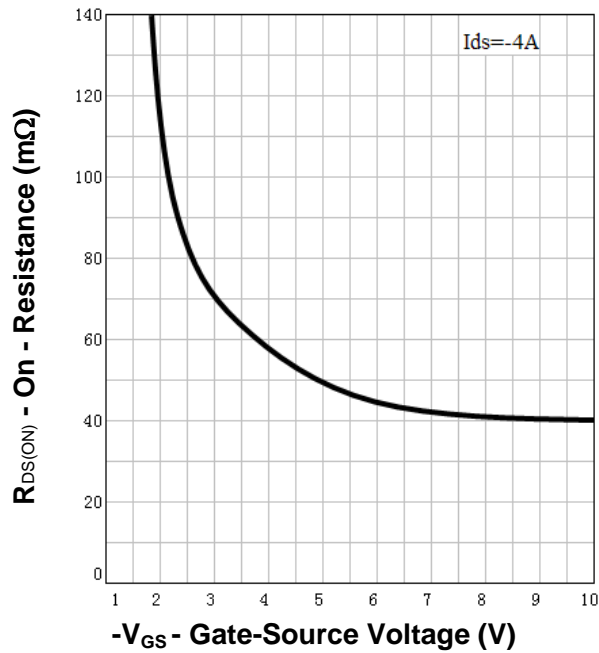
Output Characteristics



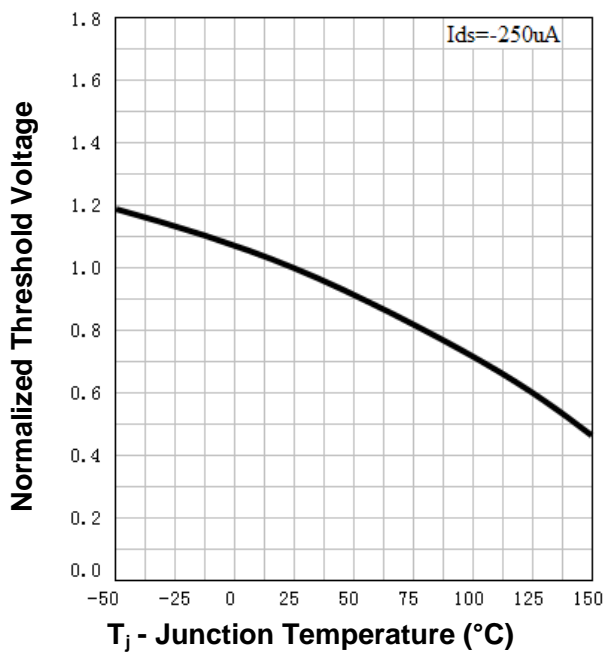
Drain-Source On Resistance



Drain-Source On Resistance

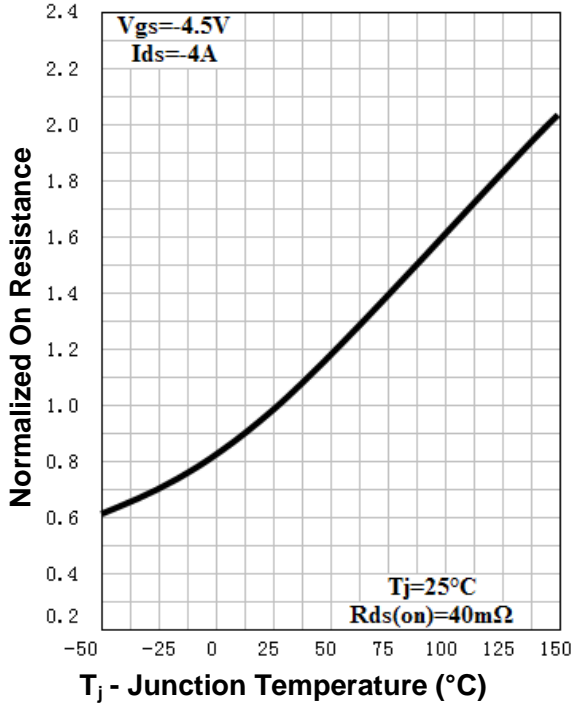


Gate Threshold Voltage

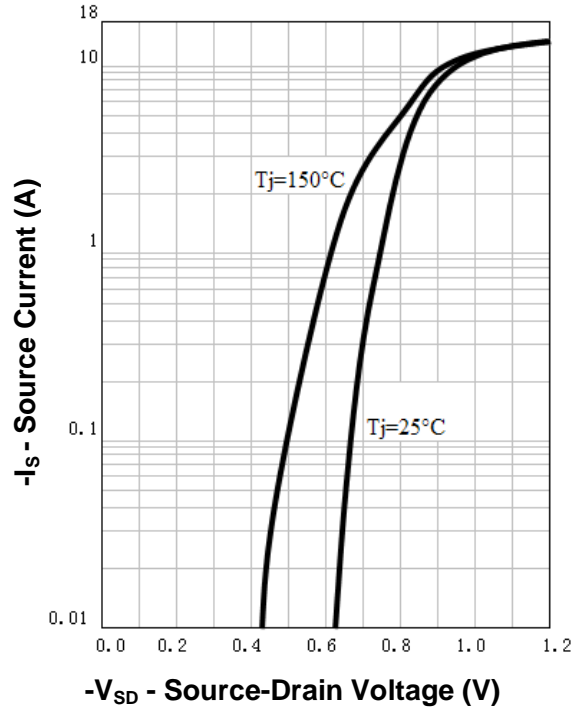


Typical Characteristics

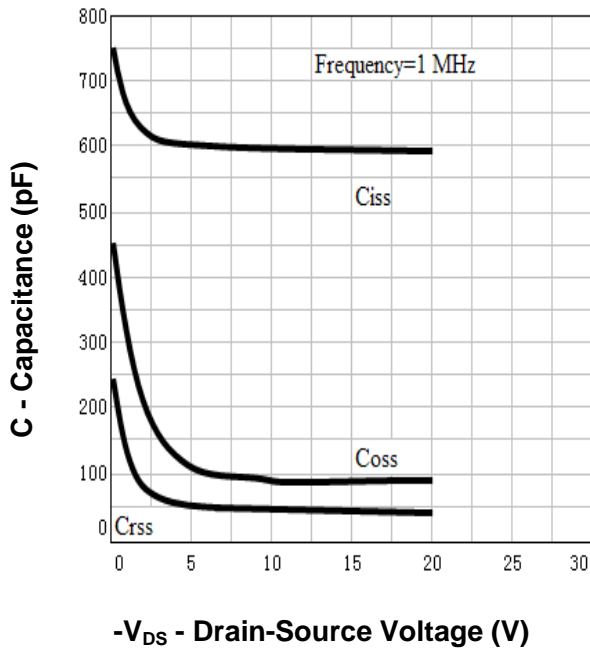
Drain-Source On Resistance



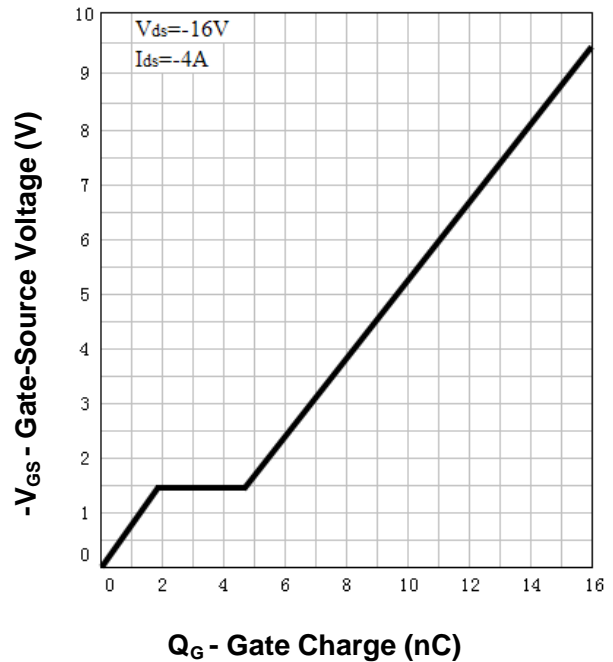
Source-Drain Diode Forward



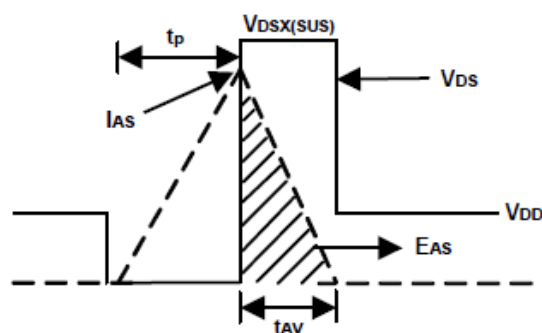
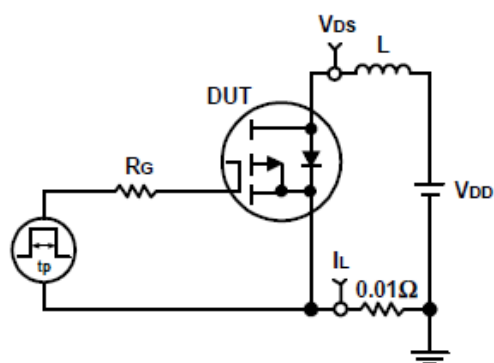
Capacitance



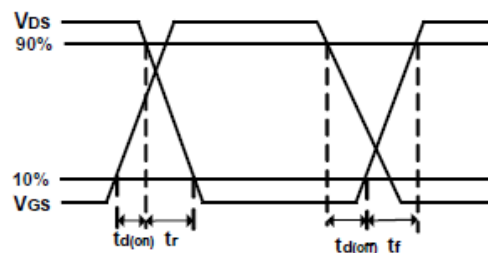
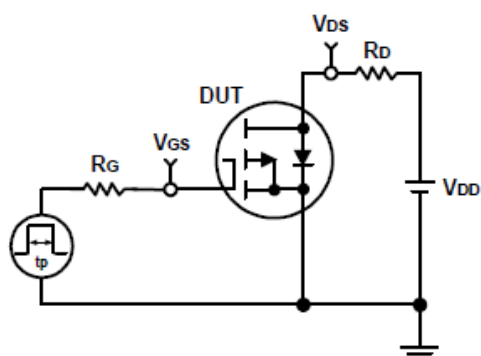
Gate Charge



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Ordering and Marking Information

| Device | Marking ^① | Package | Packaging | Quantity | Reel Size | Tape width |
|---------|----------------------|----------|-----------|----------|-----------|------------|
| RU20P4C | 2XYWW | SOT-23-3 | Tape&Reel | 3000 | 7'' | 8mm |

① The following characters could be different and means:

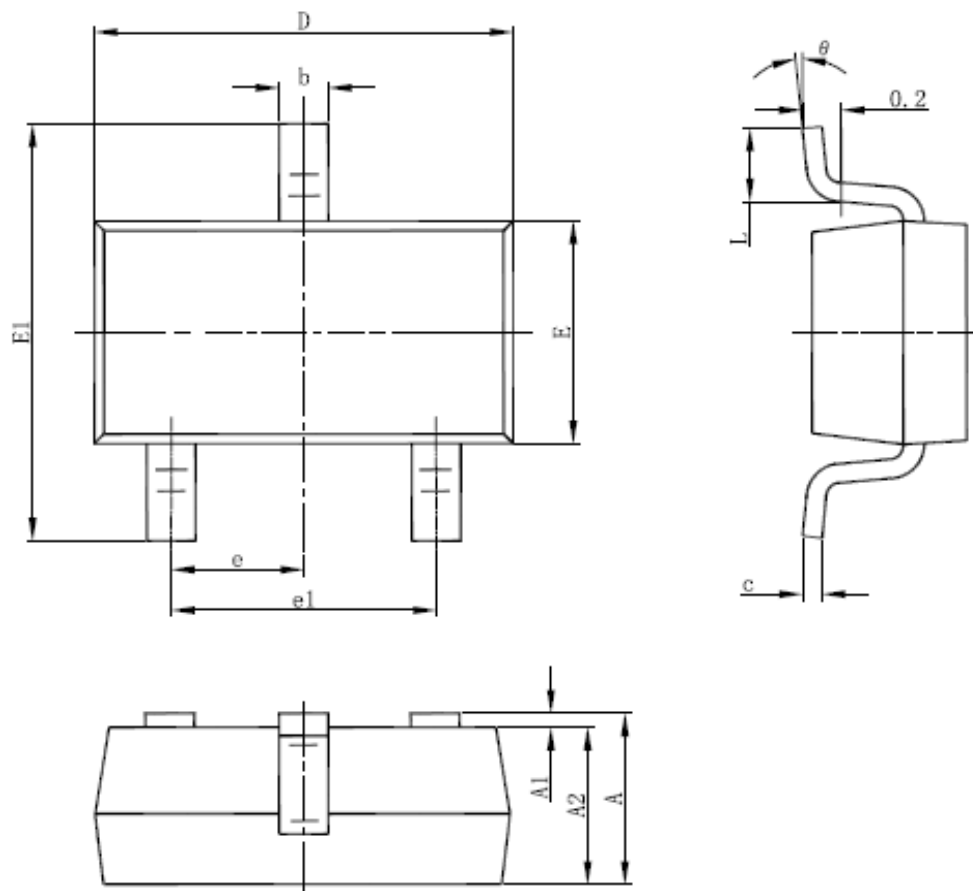
X =Assembly site code

Y =Year

WW =Work Week

Package Information

SOT-23-3



| SYMBOL | MM | | INCH | | SYMBOL | MM | | INCH | |
|--------|--------|-------|-------|-------|----------|------------|-------|------------|-------|
| | MIN | MAX | MIN | MAX | | MIN | MAX | MIN | MAX |
| A | 1.050 | 1.250 | 0.041 | 0.049 | E | 1.500 | 1.700 | 0.059 | 0.067 |
| A1 | 0.0000 | 0.100 | 0.000 | 0.004 | E1 | 2.650 | 2.950 | 0.104 | 0.116 |
| A2 | 1.050 | 1.150 | 0.041 | 0.045 | e | 0.950(BSC) | | 0.037(BSC) | |
| b | 0.300 | 0.500 | 0.012 | 0.020 | e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| c | 0.100 | 0.200 | 0.004 | 0.008 | L | 0.300 | 0.600 | 0.012 | 0.024 |
| D | 2.820 | 3.020 | 0.111 | 0.119 | θ | 0° | 8° | 0° | 8° |

ALL DIMENSIONS REFER TO JEDEC STANDARD
DO NOT INCLUDE MOLD FLASH OR PROTRUSIONS

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