

Features

- -40V/-4.5A,
 $R_{DS(ON)} = 60m\Omega$ (Typ.) @ $V_{GS} = -10V$
 $R_{DS(ON)} = 80m\Omega$ (Typ.) @ $V_{GS} = -4.5V$
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free and Green Available

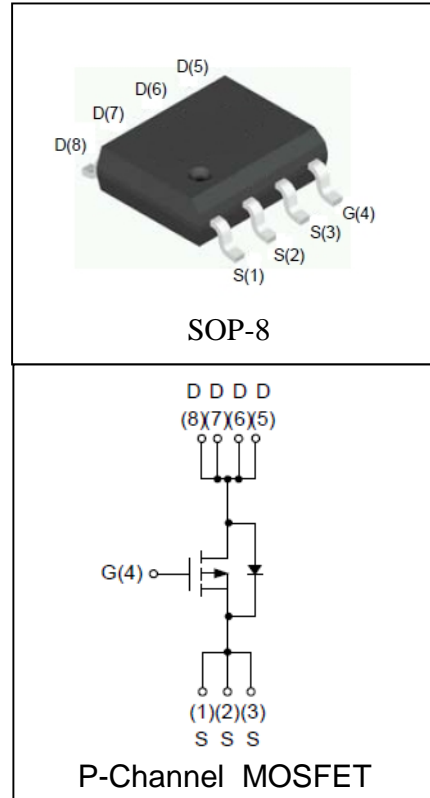
Applications

- Load Switches.

Absolute Maximum Ratings

| Symbol | Parameter | Rating | Unit |
|--|--|--|--------------|
| Common Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted) | | | |
| V_{DSS} | Drain-Source Voltage | -40 | V |
| V_{GSS} | Gate-Source Voltage | ± 20 | |
| T_J | Maximum Junction Temperature | 150 | $^\circ C$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| I_S | Diode Continuous Forward Current | $T_A = 25^\circ C$ -3 | A |
| Mounted on Large Heat Sink | | | |
| I_{DP} | 300 μs Pulse Drain Current Tested | $T_A = 25^\circ C$ -18 ^① | A |
| I_D | Continuous Drain Current | $T_A = 25^\circ C$ -4.5 | A |
| | | $T_A = 70^\circ C$ -3.6 | |
| P_D | Maximum Power Dissipation | $T_A = 25^\circ C$ 2.5 | W |
| | | $T_A = 70^\circ C$ 1.6 | |
| $R_{\theta JA}$ ^② | Thermal Resistance-Junction to Ambient | 50 | $^\circ C/W$ |

Pin Description

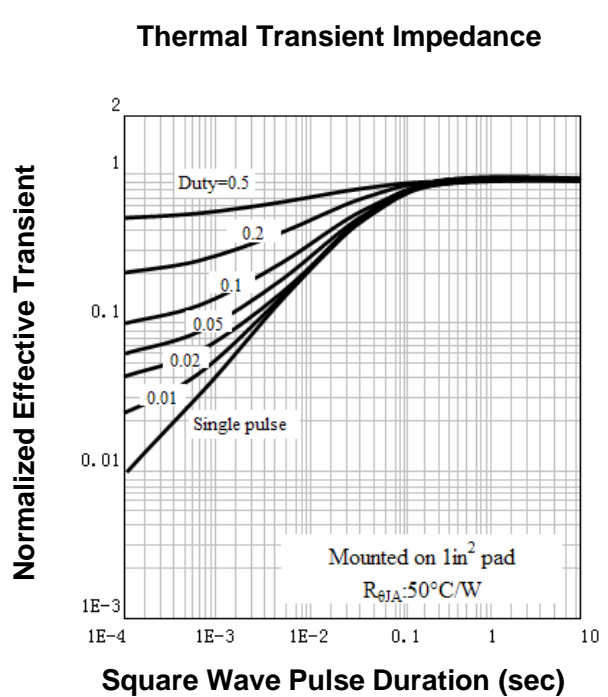
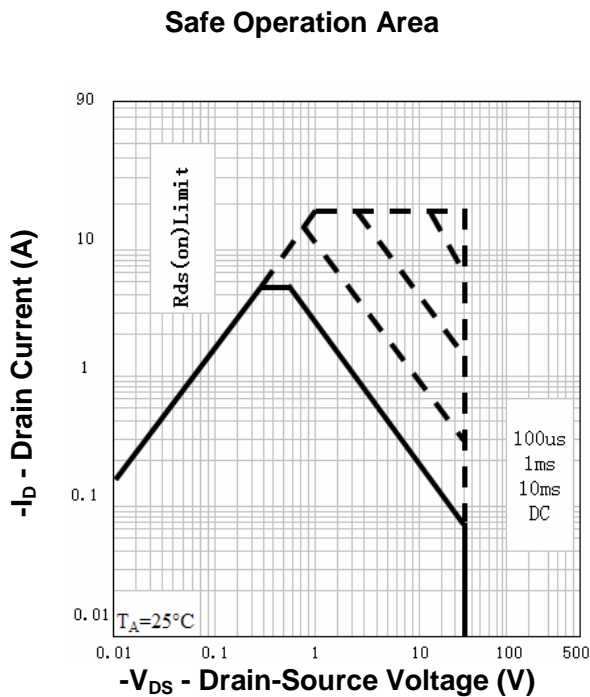
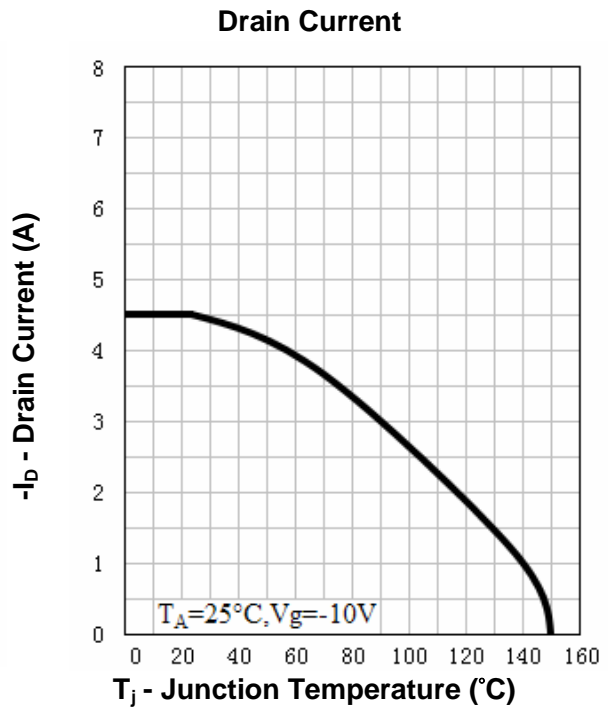
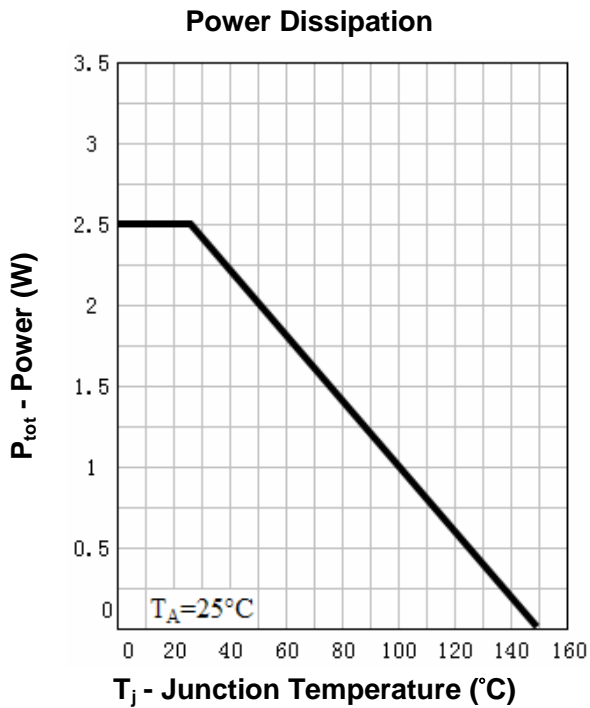


Electrical Characteristics ($T_A=25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol | Parameter | Test Condition | RU40P4H | | | Unit |
|---|----------------------------------|---|---------|------|-----------|-----------|
| | | | Min. | Typ. | Max. | |
| Static Characteristics | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_{DS}=-250\mu A$ | -40 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=-40V, V_{GS}=0V$ $T_J=85^\circ\text{C}$ | | | -1 | μA |
| | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_{DS}=-250\mu A$ | -1 | -1.8 | -2.5 | V |
| I_{GSS} | Gate Leakage Current | $V_{GS}=\pm 20V, V_{DS}=0V$ | | | ± 100 | nA |
| $R_{DS(ON)}^{(3)}$ | Drain-Source On-state Resistance | $V_{GS}=-10V, I_{DS}=-4.2A$ | | 60 | 70 | $m\Omega$ |
| | | $V_{GS}=-4.5V, I_{DS}=-2A$ | | 80 | 105 | $m\Omega$ |
| Diode Characteristics | | | | | | |
| $V_{SD}^{(3)}$ | Diode Forward Voltage | $I_{SD}=-2A, V_{GS}=0V$ | | | -1 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD}=-4.5A, dI_{SD}/dt=100A/\mu s$ | | 13 | | ns |
| Q_{rr} | Reverse Recovery Charge | | | 8 | | nC |
| Dynamic Characteristics ⁽⁴⁾ | | | | | | |
| R_G | Gate Resistance | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$ | | 1.2 | | Ω |
| C_{iss} | Input Capacitance | $V_{GS}=0V,$ $V_{DS}=-20V,$ Frequency=1.0MHz | | 560 | | pF |
| C_{oss} | Output Capacitance | | | 95 | | |
| C_{rss} | Reverse Transfer Capacitance | | | 55 | | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}=-20V, R_L=4.4\Omega,$ $I_{DS}=-4.5A, V_{GEN}=-10V,$ $R_G=6\Omega$ | | 8 | | ns |
| t_r | Turn-on Rise Time | | | 11 | | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | | 27 | | |
| t_f | Turn-off Fall Time | | | 12 | | |
| Gate Charge Characteristics ⁽⁴⁾ | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=-32V, V_{GS}=-10V,$ $I_{DS}=-4.5A$ | | 14 | 18 | nC |
| Q_{gs} | Gate-Source Charge | | | 3 | | |
| Q_{gd} | Gate-Drain Charge | | | 4 | | |

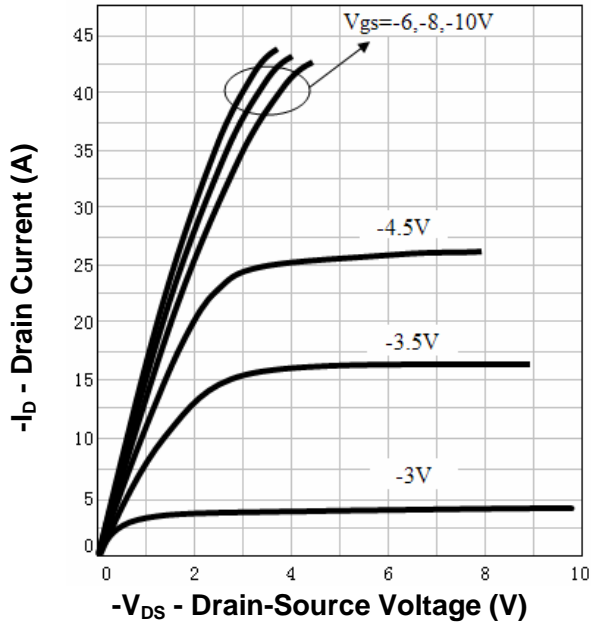
- Notes: ① Pulse width limited by safe operating area.
 ② When mounted on 1 inch square copper board, $t \leq 10\text{sec}$. The value in any given application depends on the user's specific board design.
 ③ Pulse test ; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 ④ Guaranteed by design, not subject to production testing.

Typical Characteristics

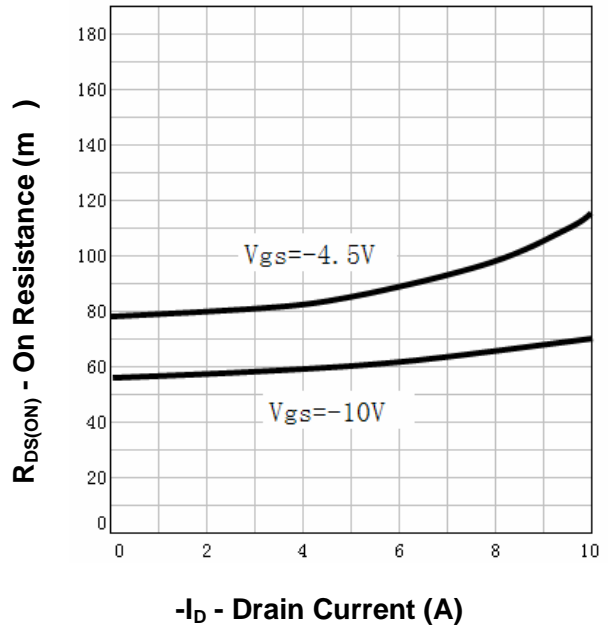


Typical Characteristics

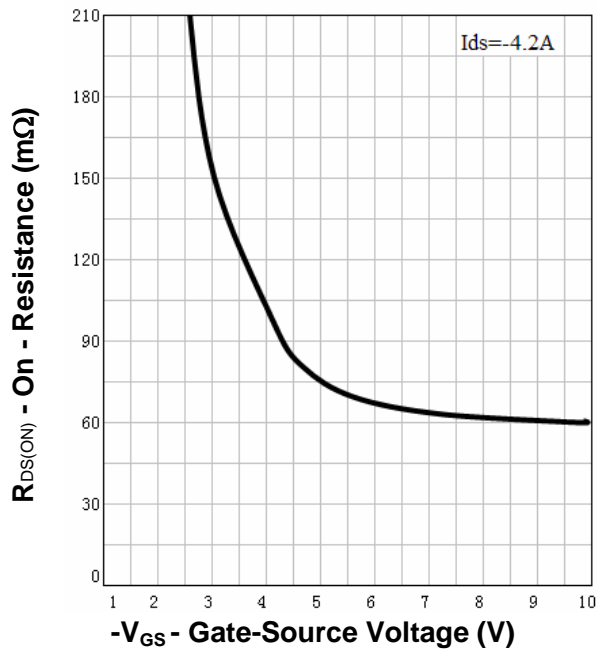
Output Characteristics



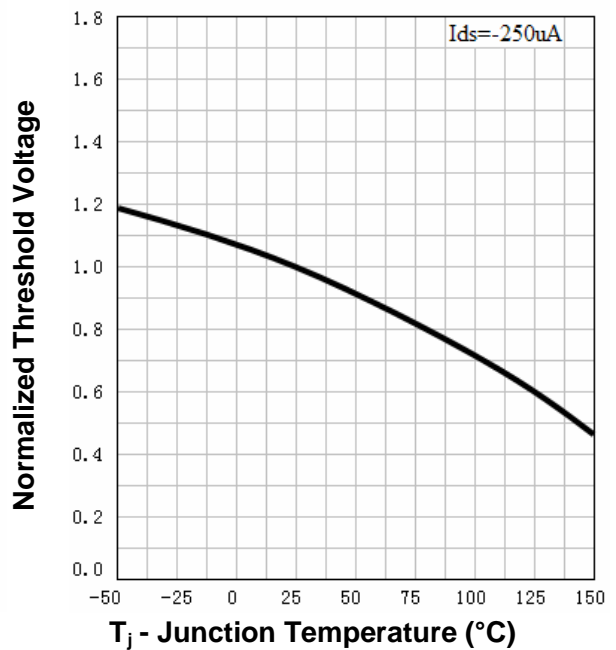
Drain-Source On Resistance



Drain-Source On Resistance

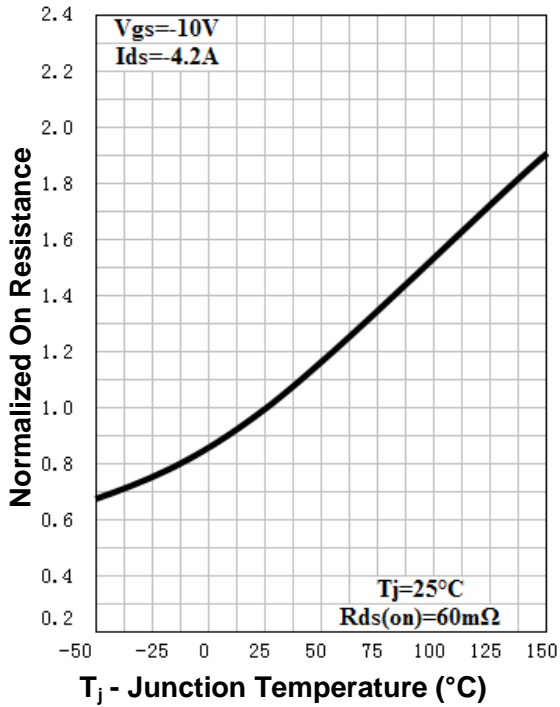


Gate Threshold Voltage

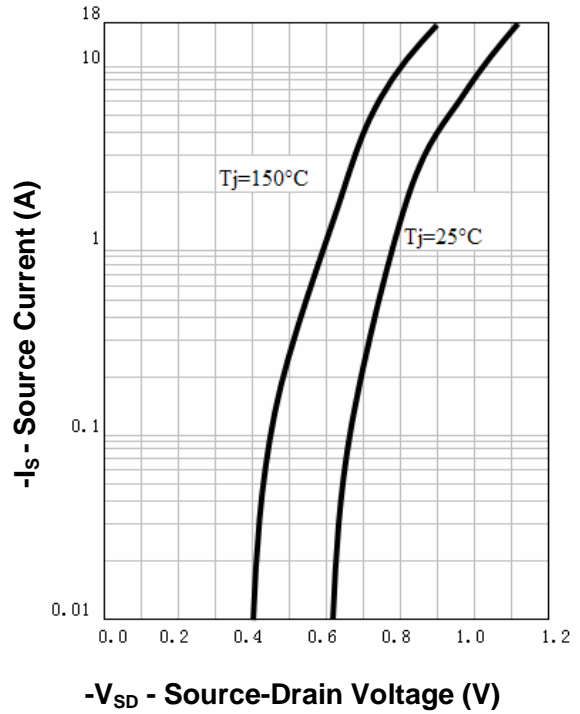


Typical Characteristics

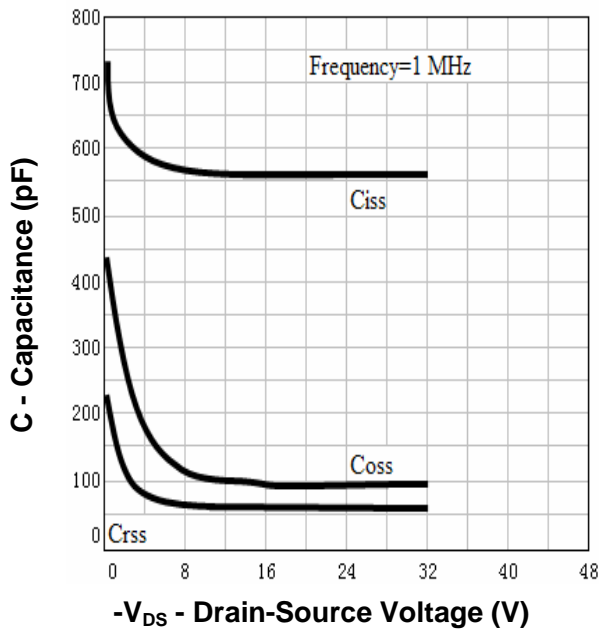
Drain-Source On Resistance



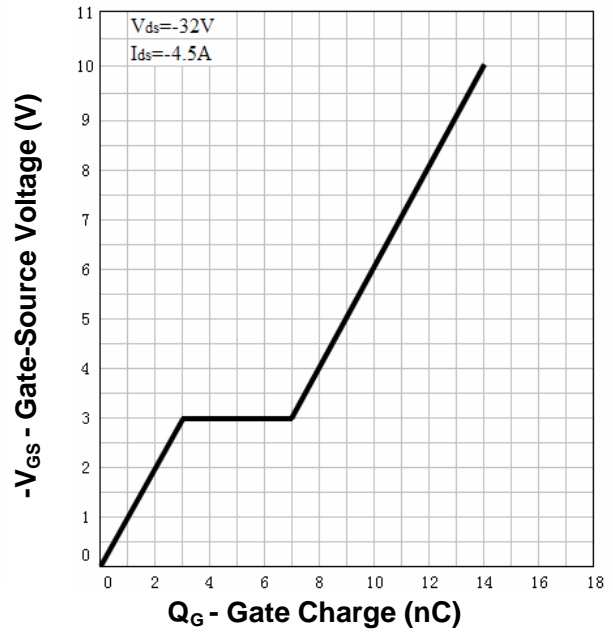
Source-Drain Diode Forward



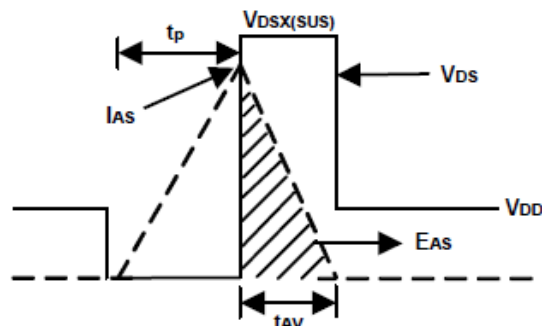
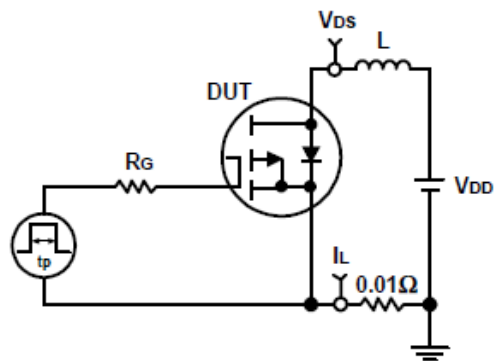
Capacitance



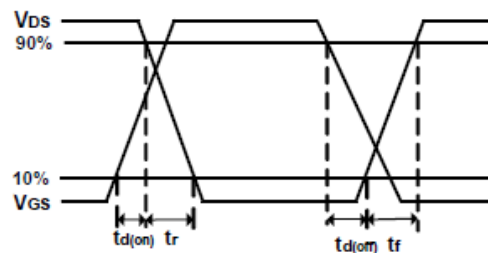
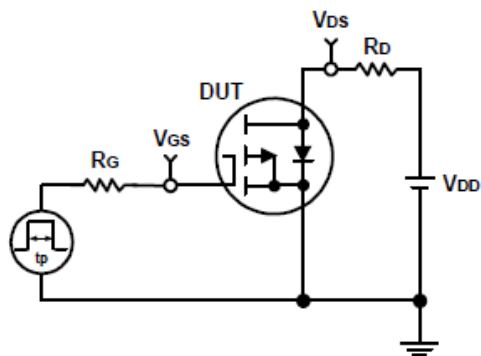
Gate Charge



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms



Ordering and Marking Information**RU40P4****Package (Available)**

H : SOP-8

Operating Temperature Range

C : -55 to 150 °C

Assembly Material

G : Green & Lead Free

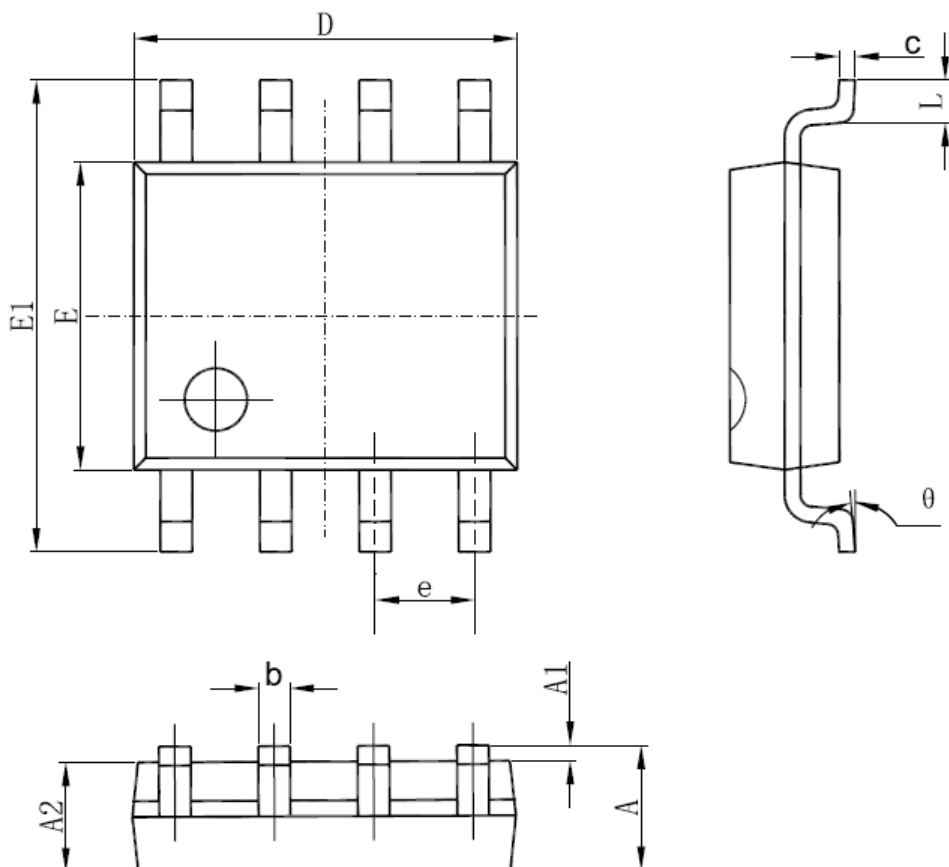
Packaging

T : TUBE

TR : Tape & Reel

Package Information

SOP-8



| SYMBOL | MM | | INCH | | SYMBOL | MM | | INCH | |
|--------|-------|-------|-------|-------|--------|-------------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX | | MIN | MAX | MIN | MAX |
| A | 1.350 | 1.750 | 0.053 | 0.069 | E | 3.800 | 4.000 | 0.150 | 0.157 |
| A1 | 0.100 | 0.250 | 0.004 | 0.010 | E1 | 5.800 | 6.200 | 0.228 | 0.244 |
| A2 | 1.350 | 1.550 | 0.053 | 0.061 | e | 1.270 (BSC) | | 0.050 (BSC) | |
| b | 0.330 | 0.510 | 0.013 | 0.020 | L | 0.400 | 1.270 | 0.016 | 0.050 |
| c | 0.170 | 0.250 | 0.006 | 0.010 | θ | 0° | 8° | 0° | 8° |
| D | 4.700 | 5.100 | 0.185 | 0.200 | | | | | |

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

Customer Service

Worldwide Sales and Service:

Sales@ruichips.com

Technical Support:

Technical@ruichips.com

Investor Relations Contacts:

Investor@ruichips.com

Marcom Contact:

Marcom@ruichips.com

Editorial Contact:

Editorial@ruichips.com

HR Contact:

HR@ruichips.com

Legal Contact:

Legal@ruichips.com

Shen Zhen RUICHIPS Semiconductor CO., LTD

Room 501, the 5floor An Tong Industrial Building,
NO.207 Mei Hua Road Fu Tian Area Shen Zhen City, CHINA

TEL: (86-755) 8311-5334

FAX: (86-755) 8311-4278

E-mail: Sales-SZ@ruichips.com