

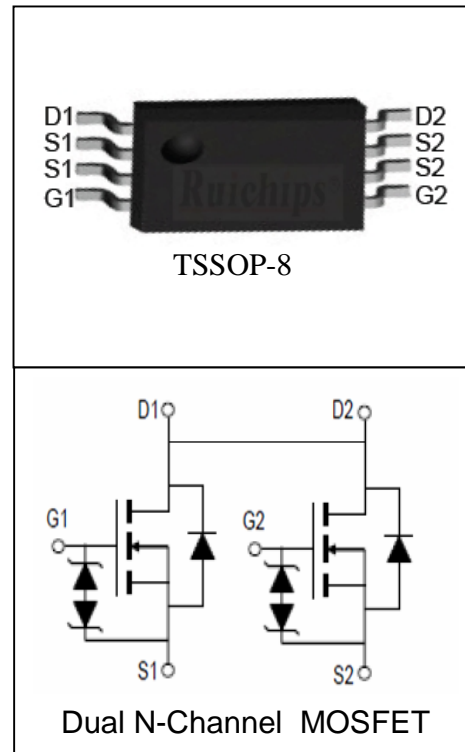
Features

- 20V/7A,
 $R_{DS(ON)} = 12m\Omega$ (Typ.) @ $V_{GS} = 4.5V$
 $R_{DS(ON)} = 18m\Omega$ (Typ.) @ $V_{GS} = 2.5V$
- Super High Dense Cell Design
- Reliable and Rugged
- ESD Protected
- Lead Free and Green Available

Applications

- PWM Applications

Pin Description



Absolute Maximum Ratings

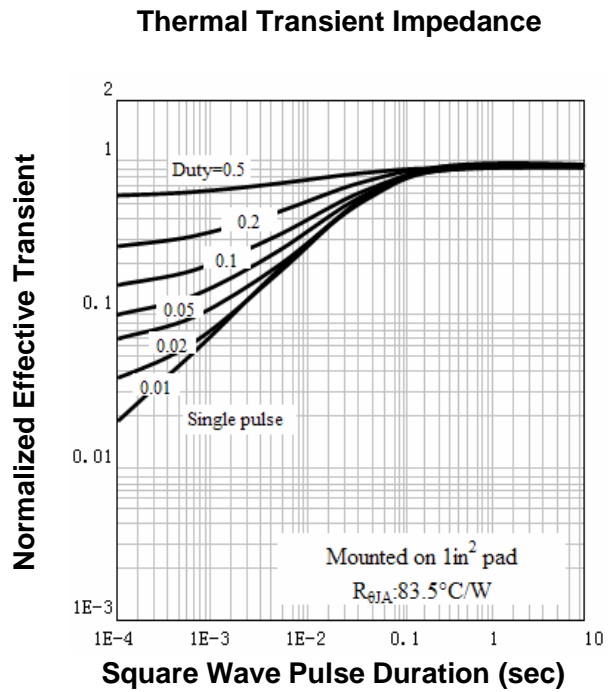
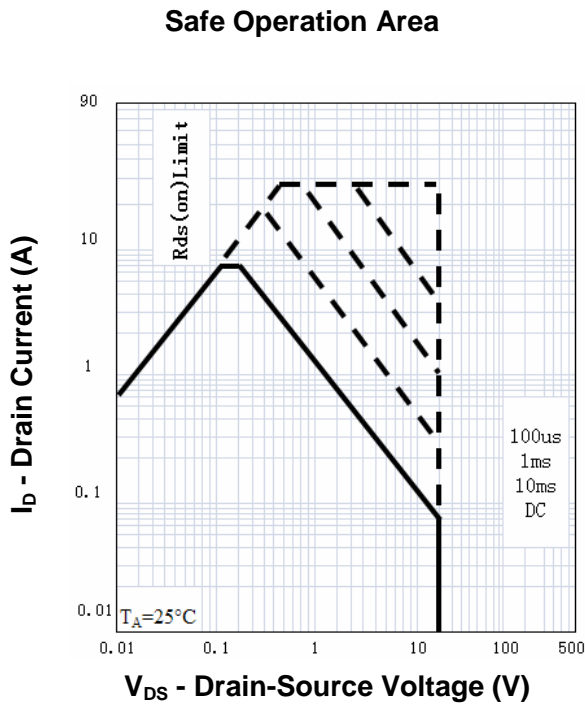
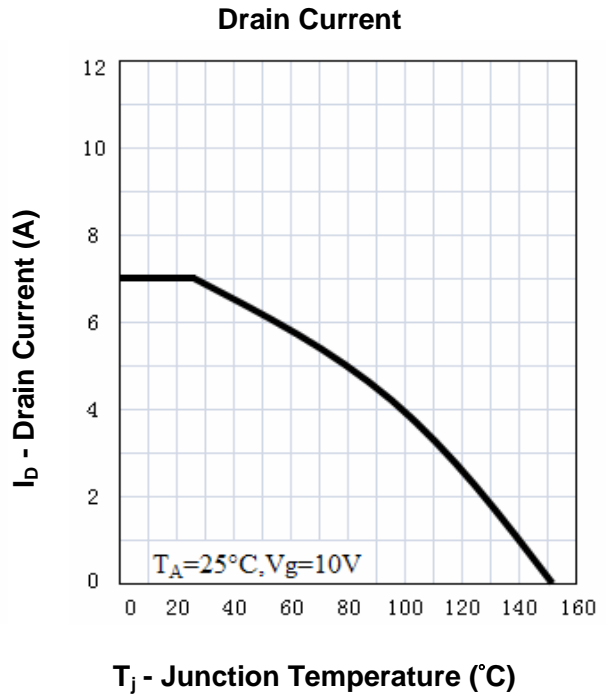
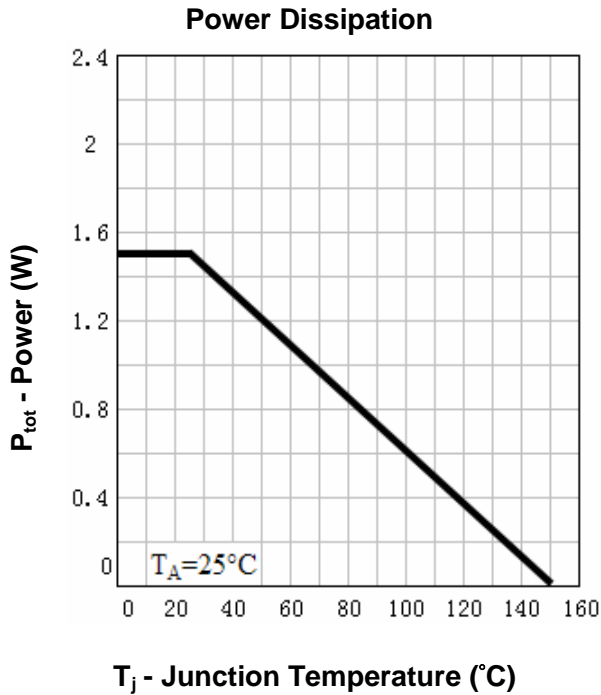
| Symbol | Parameter | Rating | Unit |
|--|--|---------------------------------------|--------------|
| Common Ratings ($T_A = 25^\circ C$ Unless Otherwise Noted) | | | |
| V_{DSS} | Drain-Source Voltage | 20 | V |
| V_{GSS} | Gate-Source Voltage | ± 8 | |
| T_J | Maximum Junction Temperature | 150 | $^\circ C$ |
| T_{STG} | Storage Temperature Range | -55 to 150 | $^\circ C$ |
| I_S | Diode Continuous Forward Current | $T_A = 25^\circ C$ 2 | A |
| Mounted on Large Heat Sink | | | |
| I_{DP} | 300 μs Pulse Drain Current Tested | $T_A = 25^\circ C$ 28 ^① | A |
| I_D | Continuous Drain Current ($V_{GS} = 4.5V$) | $T_A = 25^\circ C$ 7 | A |
| | | $T_A = 70^\circ C$ 5.5 | |
| P_D | Maximum Power Dissipation | $T_A = 25^\circ C$ 1.5 | W |
| | | $T_A = 70^\circ C$ 0.96 | |
| $R_{\theta JA}$ ^② | Thermal Resistance-Junction to Ambient | 83.5 | $^\circ C/W$ |

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

| Symbol | Parameter | Test Condition | RU20T7G | | | 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 | $V_{DS}=V_{GS}, I_{DS}=250\mu A$ | 0.5 | 0.7 | 1.0 | V |
| I_{GSS} | Gate Leakage Current | $V_{GS}=\pm 8V, V_{DS}=0V$ | | | ± 10 | μA |
| $R_{DS(ON)}^{(3)}$ | Drain-Source On-state Resistance | $V_{GS}=4.5V, I_{DS}=7A$ | | 12 | 16 | $m\Omega$ |
| | | $V_{GS}=2.5V, I_{DS}=5.5A$ | | 18 | 25 | $m\Omega$ |
| Diode Characteristics | | | | | | |
| $V_{SD}^{(3)}$ | Diode Forward Voltage | $I_{SD}=1A, V_{GS}=0V$ | | | 1 | V |
| t_{rr} | Reverse Recovery Time | $I_{SD}=1A, dI_{SD}/dt=100A/\mu s$ | | 18 | | ns |
| Q_{rr} | Reverse Recovery Charge | | | 8 | | nC |
| Dynamic Characteristics ⁽⁴⁾ | | | | | | |
| R_G | Gate Resistance | $V_{GS}=0V, V_{DS}=0V, F=1MHz$ | | 1.5 | | Ω |
| C_{iss} | Input Capacitance | $V_{GS}=0V, V_{DS}=10V, \text{Frequency}=1.0MHz$ | | 1155 | | pF |
| C_{oss} | Output Capacitance | | | 180 | | |
| C_{rss} | Reverse Transfer Capacitance | | | 140 | | |
| $t_{d(ON)}$ | Turn-on Delay Time | $V_{DD}=10V, R_L=1.4\Omega, I_{DS}=7A, V_{GEN}=4.5V, R_G=3\Omega$ | | 6 | | ns |
| t_r | Turn-on Rise Time | | | 12 | | |
| $t_{d(OFF)}$ | Turn-off Delay Time | | | 50 | | |
| t_f | Turn-off Fall Time | | | 14 | | |
| Gate Charge Characteristics ⁽⁴⁾ | | | | | | |
| Q_g | Total Gate Charge | $V_{DS}=16V, V_{GS}=4.5V, I_{DS}=7A$ | | 13 | | nC |
| Q_{gs} | Gate-Source Charge | | | 1 | | |
| Q_{gd} | Gate-Drain Charge | | | 3.5 | | |

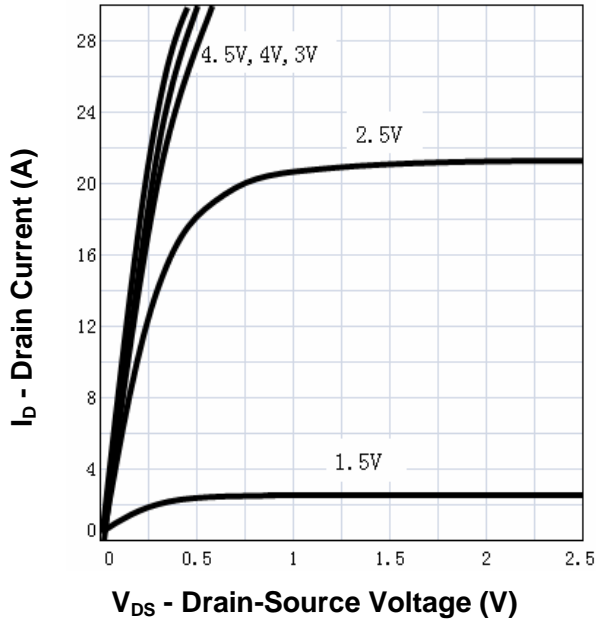
- Notes: ① Pulse width limited by safe operating area.
 ② When mounted on 1 inch square copper board, $t \leq 10\text{sec}$.
 ③ Pulse test ; Pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$.
 ④ Guaranteed by design, not subject to production testing.

Typical Characteristics

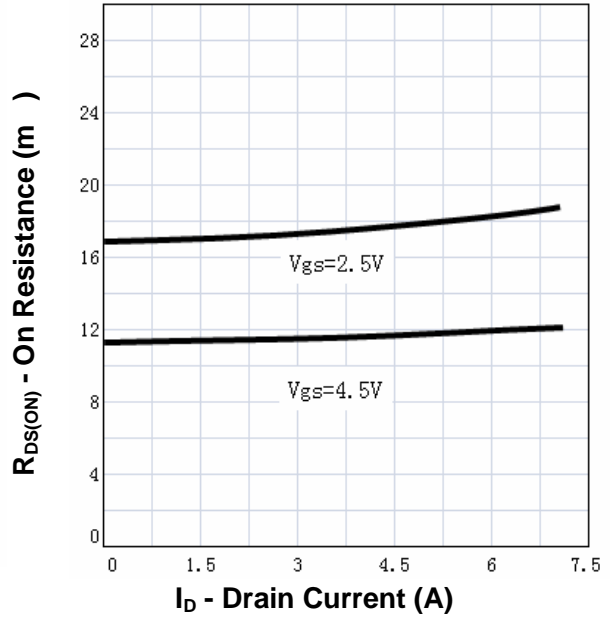


Typical Characteristics

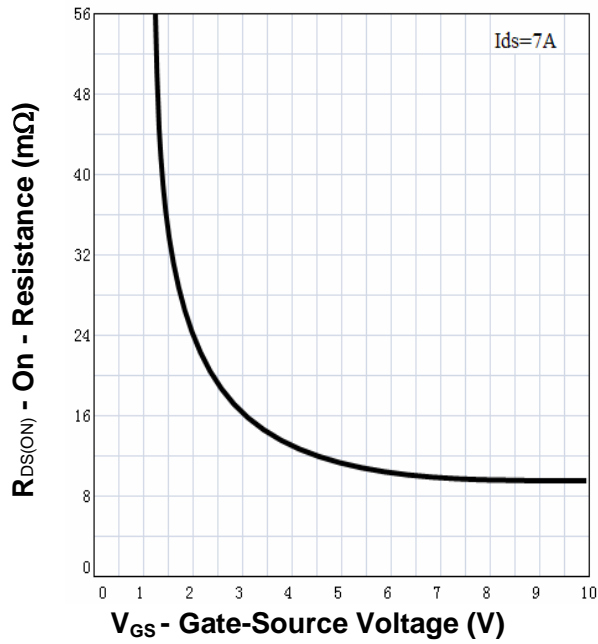
Output Characteristics



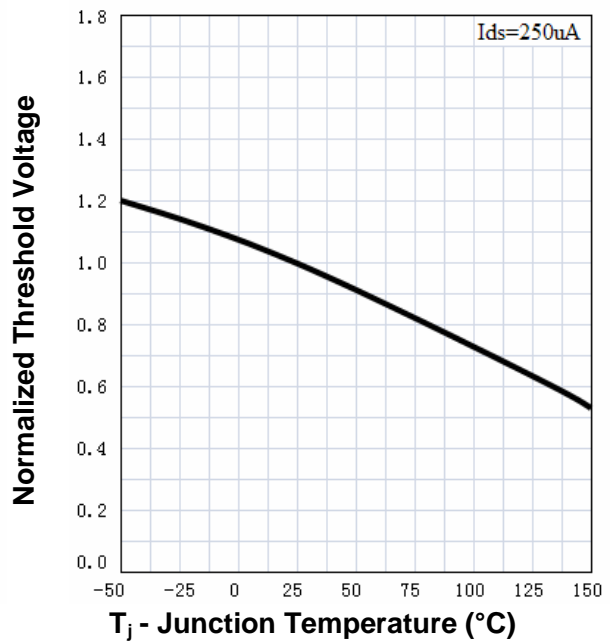
Drain-Source On Resistance



Drain-Source On Resistance

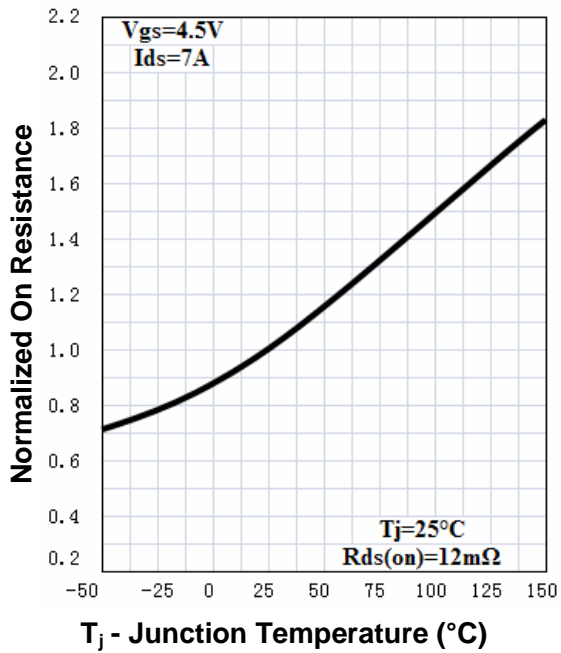


Gate Threshold Voltage

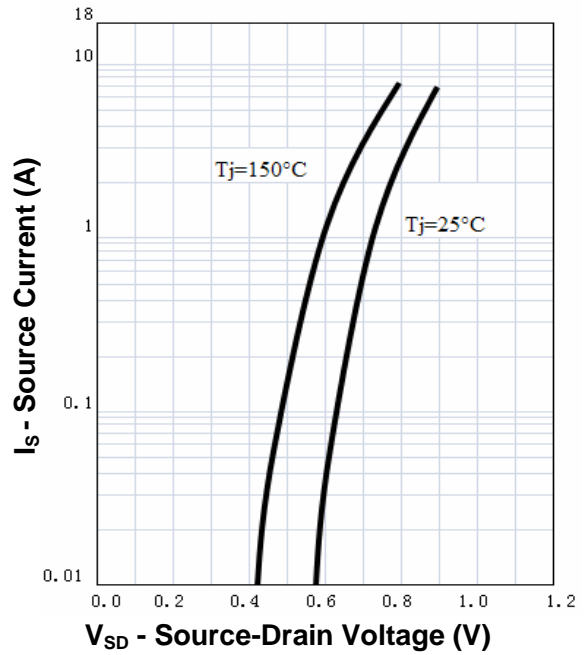


Typical Characteristics

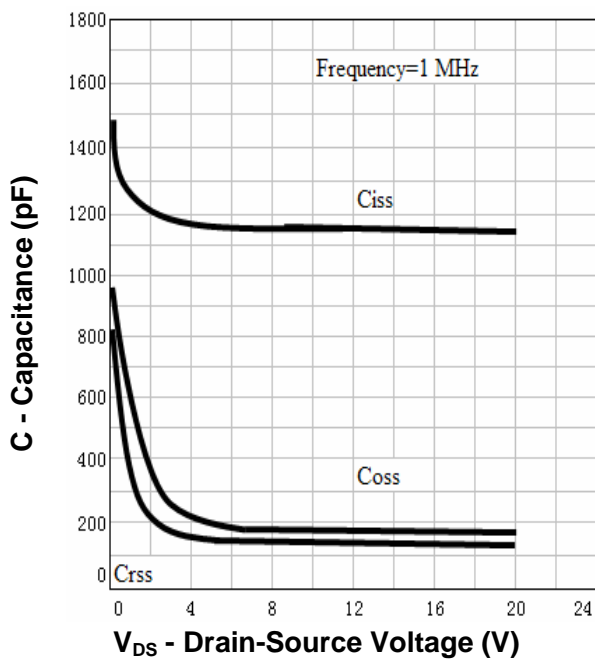
Drain-Source On Resistance



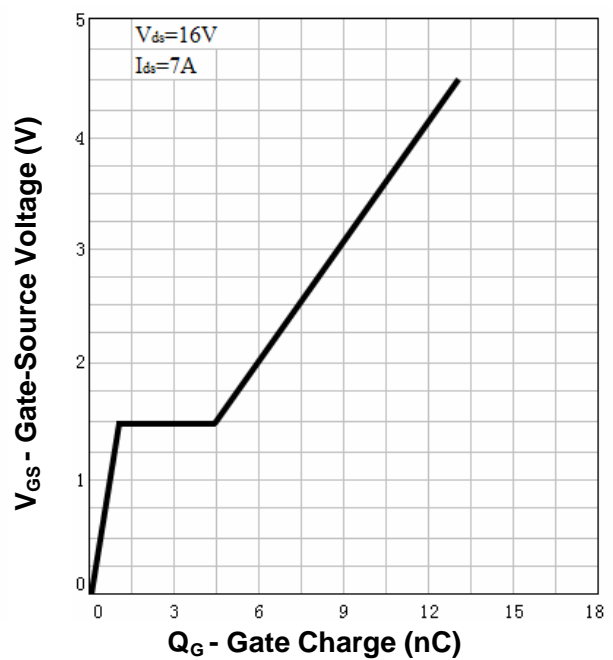
Source-Drain Diode Forward



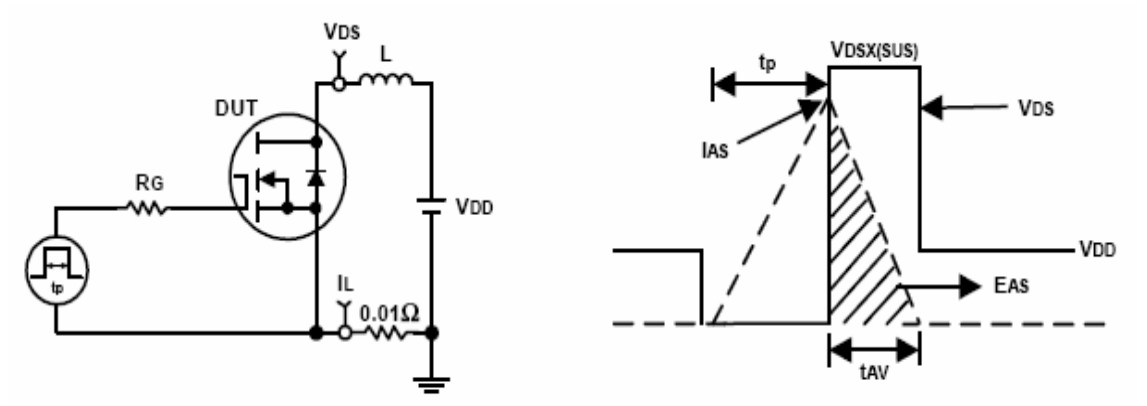
Capacitance



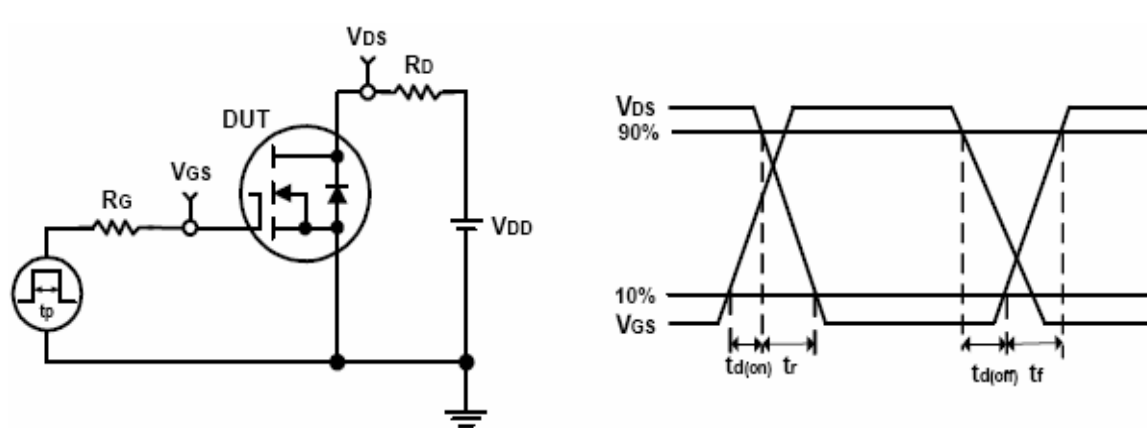
Gate Charge



Avalanche Test Circuit and Waveforms



Switching Time Test Circuit and Waveforms

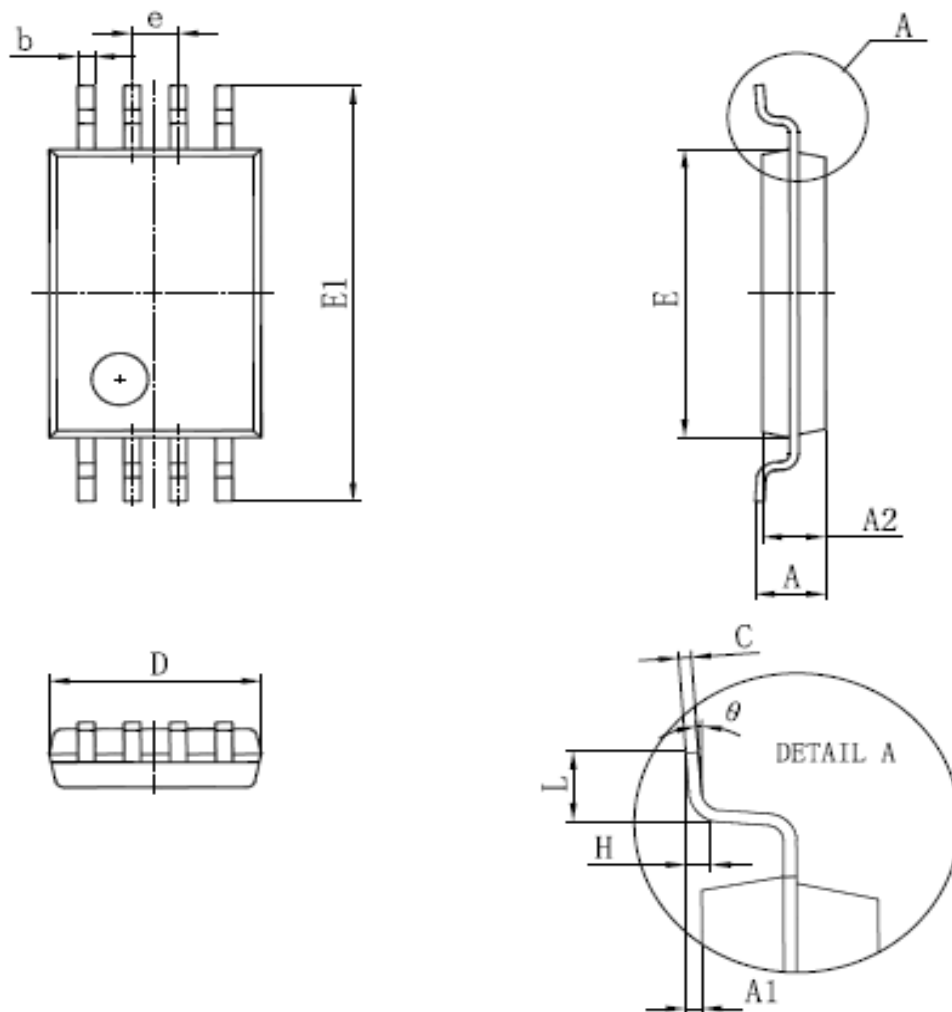


Ordering and Marking Information

| Device | Marking | Package | Packaging | Quantity | Reel Size | Tape width |
|---------------|----------------|----------------|------------------|-----------------|------------------|-------------------|
| RU20T7G | RU20T7G | TSSOP8 | Tape&Reel | 3000 | 13'' | 12mm |

Package Information

TSSOP-8



| SYMBOL | MM | | INCH | | SYMBOL | MM | | INCH | |
|--------|-------|-------|-------|-------|--------|------------|-------|-------------|-------|
| | MIN | MAX | MIN | MAX | | MIN | MAX | MIN | MAX |
| D | 2.900 | 3.100 | 0.114 | 0.122 | A2 | 0.800 | 1.050 | 0.031 | 0.041 |
| E | 4.300 | 4.500 | 0.169 | 0.177 | A1 | 0.050 | 0.150 | 0.002 | 0.006 |
| b | 0.190 | 0.300 | 0.007 | 0.012 | e | 0.65 (BSC) | | 0.026 (BSC) | |
| c | 0.090 | 0.200 | 0.004 | 0.008 | L | 0.500 | 0.700 | 0.020 | 0.028 |
| E1 | 6.250 | 6.550 | 0.246 | 0.258 | H | 0.25(TYP) | | 0.01(TYP) | |
| A | | 1.200 | | 0.047 | θ | 0° | 8° | 0° | 8° |

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