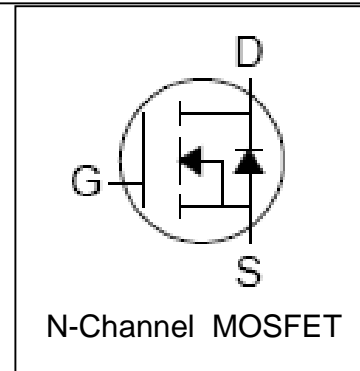
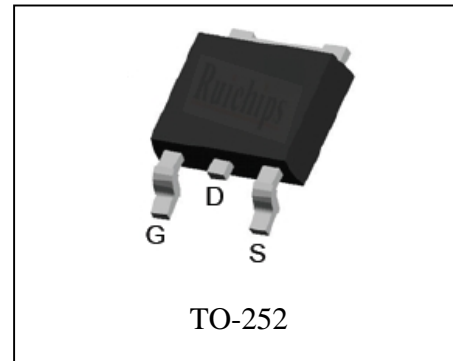


### Features

- 60V/80A,  
 $R_{DS(ON)} = 7m$  (Typ.) @  $V_{GS} = 10V$
- Super High Dense Cell Design
- 100% avalanche tested
- Lead Free and Green Devices Available  
 (RoHS Compliant)

### Pin Description



### Applications

- SMPS
- High Speed Power Switching

### Absolute Maximum Ratings

| Symbol   | Parameter                                   | Rating                                 | Unit         |
|--|---|--|--------------|
| <b>Common Ratings</b> ( $T_A = 25^\circ C$ Unless Otherwise Noted) |   |  |              |
| $V_{DSS}$  | Drain-Source Voltage                        | 60                                     | V            |
| $V_{GSS}$  | Gate-Source Voltage                         | $\pm 25$                               |              |
| $T_J$  | Maximum Junction Temperature                | 175                                    | $^\circ C$   |
| $T_{STG}$  | Storage Temperature Range                   | -55 to 175                             | $^\circ C$   |
| $I_S$  | Diode Continuous Forward Current            | $T_C = 25^\circ C$<br>80 <sup>②</sup>  | A            |
| <b>Mounted on Large Heat Sink</b>                                  |   |  |              |
| $I_{DP}$   | 300 $\mu s$ Pulse Drain Current Tested      | $T_C = 25^\circ C$<br>310 <sup>①</sup> | A            |
| $I_D$  | Continuous Drain Current ( $V_{GS} = 10V$ ) | $T_C = 25^\circ C$<br>80 <sup>②</sup>  | A            |
|  |   | $T_C = 100^\circ C$<br>65              |              |
| $P_D$  | Maximum Power Dissipation                   | $T_C = 25^\circ C$<br>125              | W            |
|  |   | $T_C = 100^\circ C$<br>63              | W            |
| $R_{\theta JC}$  | Thermal Resistance-Junction to Case         | 1.2                                    | $^\circ C/W$ |
| <b>Drain-Source Avalanche Ratings</b>                              |   |  |              |
| $E_{AS}$ <sup>③</sup>  | Avalanche Energy, Single Pulsed             | 225                                    | mJ           |

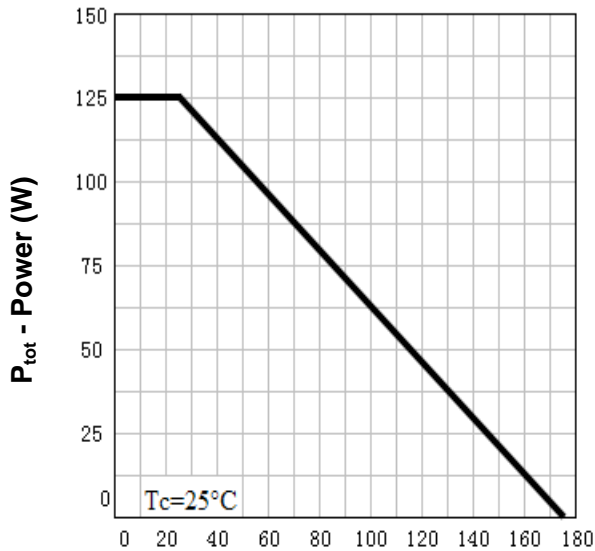
**Electrical Characteristics** ( $T_A=25^\circ\text{C}$  Unless Otherwise Noted)

| Symbol  | Parameter                        | Test Condition   | RU6080L |      |           | Unit       |
|---|----------------------------------|--|---------|------|-----------|------------|
|   |                                  |  | Min.    | Typ. | Max.      |            |
| <b>Static Characteristics</b>                     |                                  |  |         |      |           |            |
| $BV_{DSS}$  | Drain-Source Breakdown Voltage   | $V_{GS}=0V, I_{DS}=250\mu A$   | 60      |      |           | V          |
| $I_{DSS}$   | Zero Gate Voltage Drain Current  | $V_{DS}=60V, V_{GS}=0V$<br>$T_J=85^\circ\text{C}$                            |         |      | 1         | $\mu A$    |
|   |                                  |  |         |      | 10        |            |
| $V_{GS(th)}$                                      | Gate Threshold Voltage           | $V_{DS}=V_{GS}, I_{DS}=250\mu A$   | 2       | 3    | 4         | V          |
| $I_{GSS}$   | Gate Leakage Current             | $V_{GS}=\pm 25V, V_{DS}=0V$  |         |      | $\pm 100$ | nA         |
| $R_{DS(ON)}^{(4)}$                                | Drain-Source On-state Resistance | $V_{GS}=10V, I_{DS}=30A$   |         | 7    | 8.5       | m $\Omega$ |
| <b>Diode Characteristics</b>                      |                                  |  |         |      |           |            |
| $V_{SD}^{(4)}$                                    | Diode Forward Voltage            | $I_{SD}=30A, V_{GS}=0V$  |         | 0.8  | 1.2       | V          |
| $t_{rr}$  | Reverse Recovery Time            | $I_{SD}=30A, di_{SD}/dt=100A/\mu s$  |         | 38   |           | ns         |
| $Q_{rr}$  | Reverse Recovery Charge          |  |         | 45   |           | nC         |
| <b>Dynamic Characteristics</b> <sup>(5)</sup>     |                                  |  |         |      |           |            |
| $R_G$   | Gate Resistance                  | $V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$  |         | 2.0  |           | $\Omega$   |
| $C_{iss}$   | Input Capacitance                | $V_{GS}=0V,$<br>$V_{DS}=30V,$<br>Frequency=1.0MHz                            |         | 2840 |           | pF         |
| $C_{oss}$   | Output Capacitance               |  |         | 300  |           |            |
| $C_{riss}$  | Reverse Transfer Capacitance     |  |         | 140  |           |            |
| $t_{d(ON)}$                                       | Turn-on Delay Time               |  |         | 14   |           |            |
| $t_r$   | Turn-on Rise Time                | $V_{DD}=30V, R_L=30\Omega,$<br>$I_{DS}=30A, V_{GEN}=10V,$<br>$R_G=4.7\Omega$ |         | 45   |           |            |
| $t_{d(OFF)}$                                      | Turn-off Delay Time              |  |         | 54   |           |            |
| $t_f$   | Turn-off Fall Time               |  |         | 32   |           |            |
| <b>Gate Charge Characteristics</b> <sup>(5)</sup> |                                  |  |         |      |           |            |
| $Q_g$   | Total Gate Charge                | $V_{DS}=48V, V_{GS}=10V,$<br>$I_{DS}=30A$                                    |         | 55   | 72        | nC         |
| $Q_{gs}$  | Gate-Source Charge               |  |         | 11   |           |            |
| $Q_{gd}$  | Gate-Drain Charge                |  |         | 13   |           |            |

- Notes:
- ① Pulse width limited by safe operating area.
  - ② Calculated continuous current based on maximum allowable junction temperature. Package limitation current is 60A.
  - ③ Limited by  $T_{Jmax}, I_{AS}=30A, V_{DD}=48V, R_G=50\Omega$ , Starting  $T_J=25^\circ\text{C}$ .
  - ④ Pulse test; Pulse width  $\leq 300\mu s$ , duty cycle  $\leq 2\%$ .
  - ⑤ Guaranteed by design, not subject to production testing.

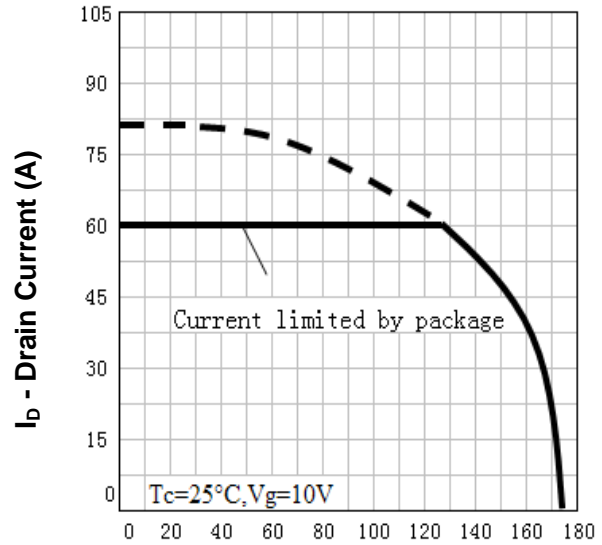
**Typical Characteristics**

**Power Dissipation**



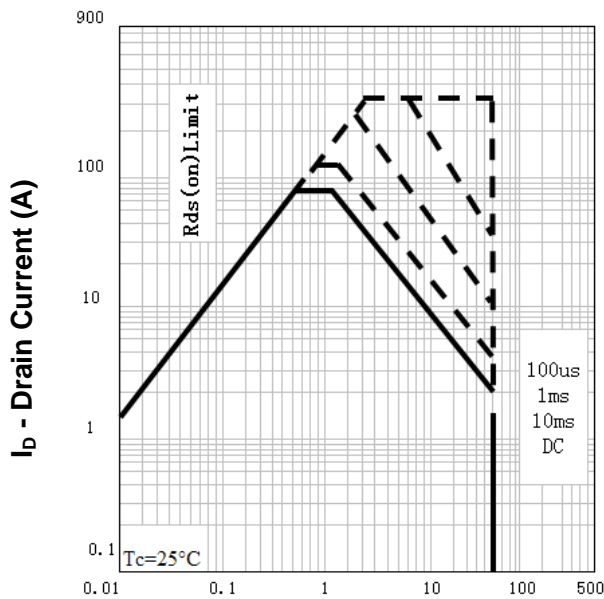
**T<sub>j</sub> - Junction Temperature (°C)**

**Drain Current**



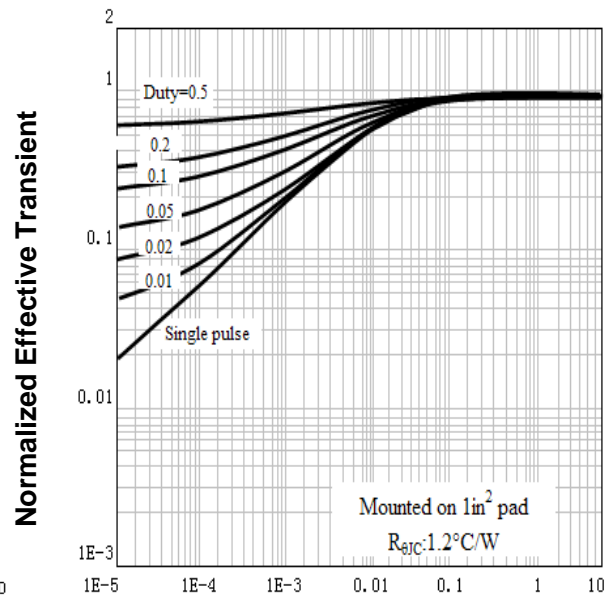
**T<sub>j</sub> - Junction Temperature (°C)**

**Safe Operation Area**



**V<sub>DS</sub> - Drain-Source Voltage (V)**

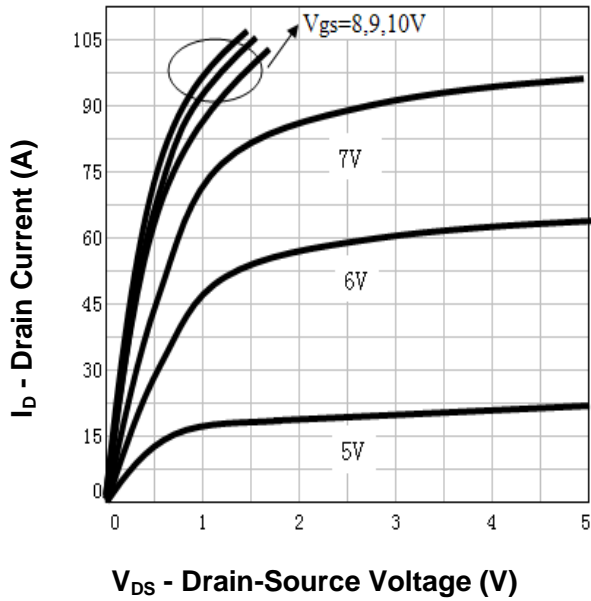
**Thermal Transient Impedance**



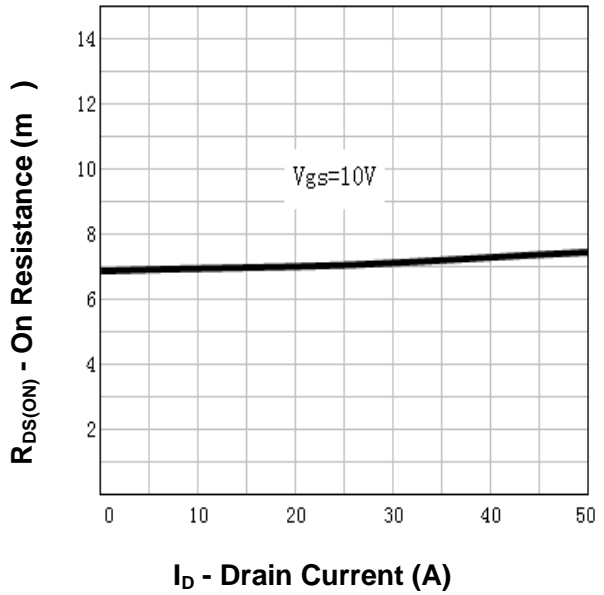
**Square Wave Pulse Duration (sec)**

**Typical Characteristics**

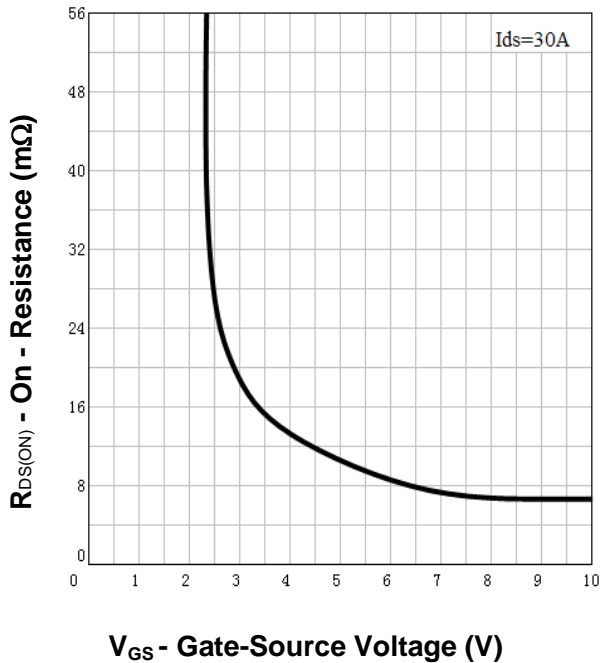
**Output Characteristics**



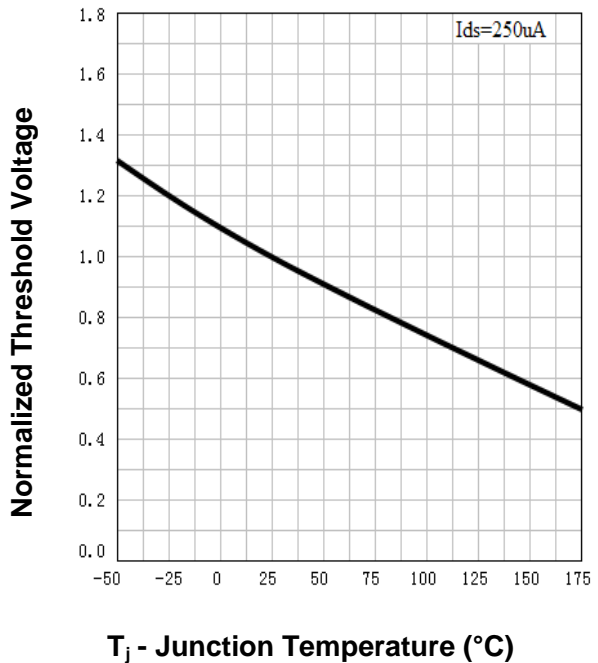
**Drain-Source On Resistance**



**Drain-Source On Resistance**

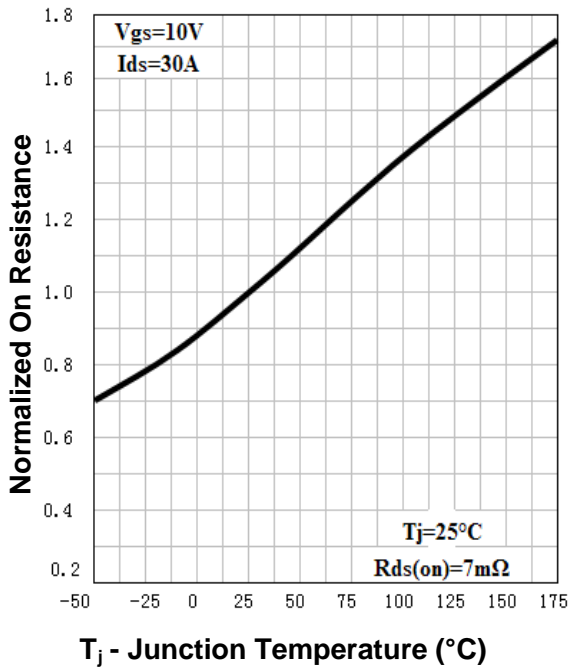


**Gate Threshold Voltage**

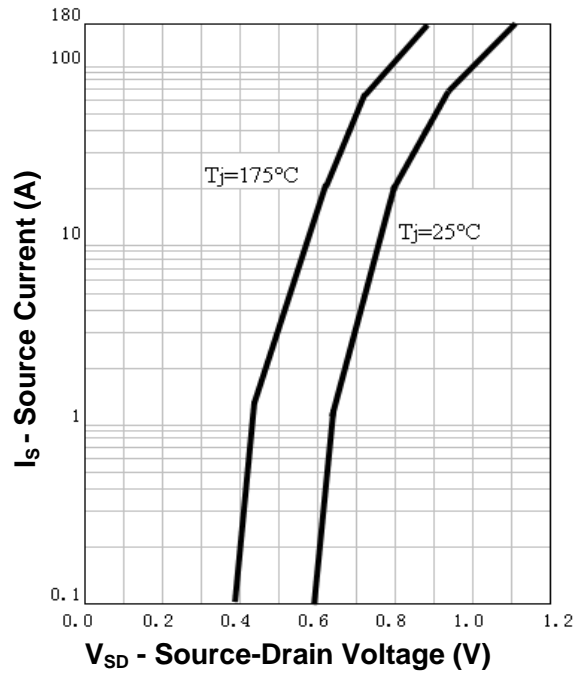


**Typical Characteristics**

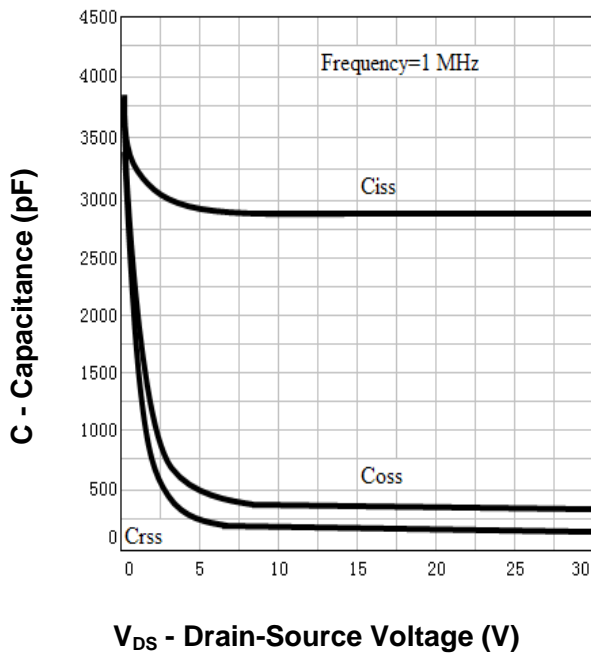
**Drain-Source On Resistance**



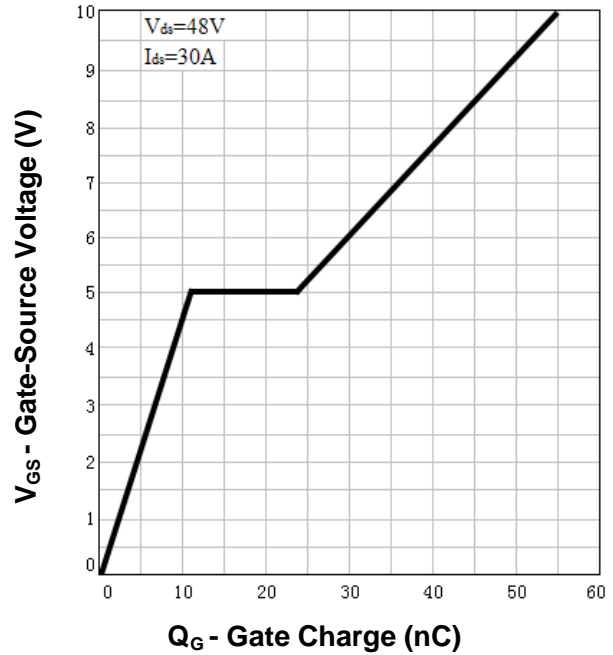
**Source-Drain Diode Forward**



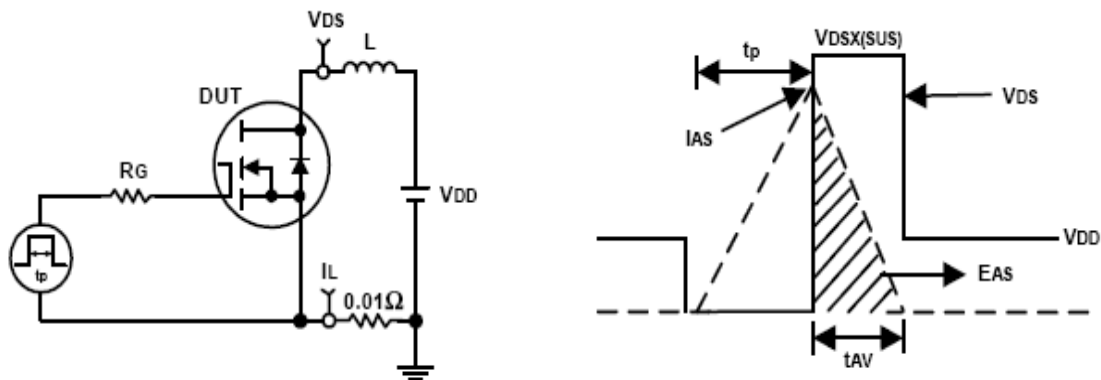
**Capacitance**



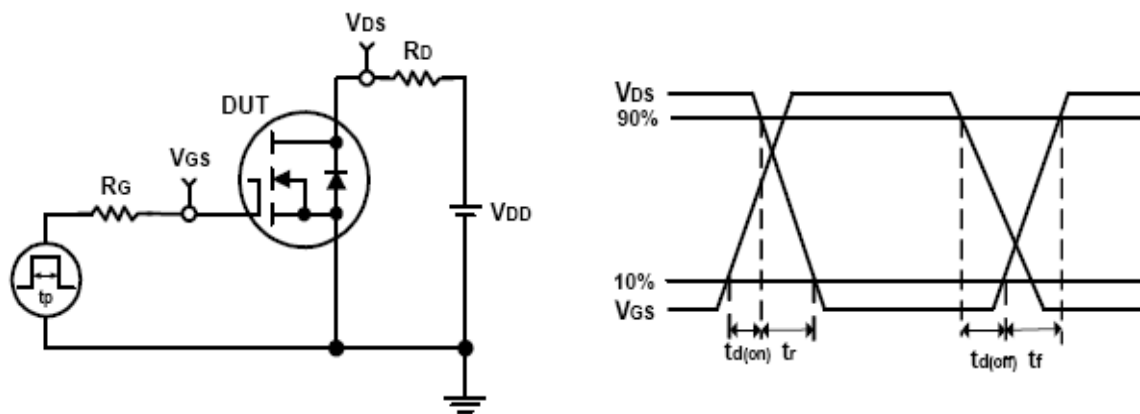
**Gate Charge**



### Avalanche Test Circuit and Waveforms



### Switching Time Test Circuit and Waveforms

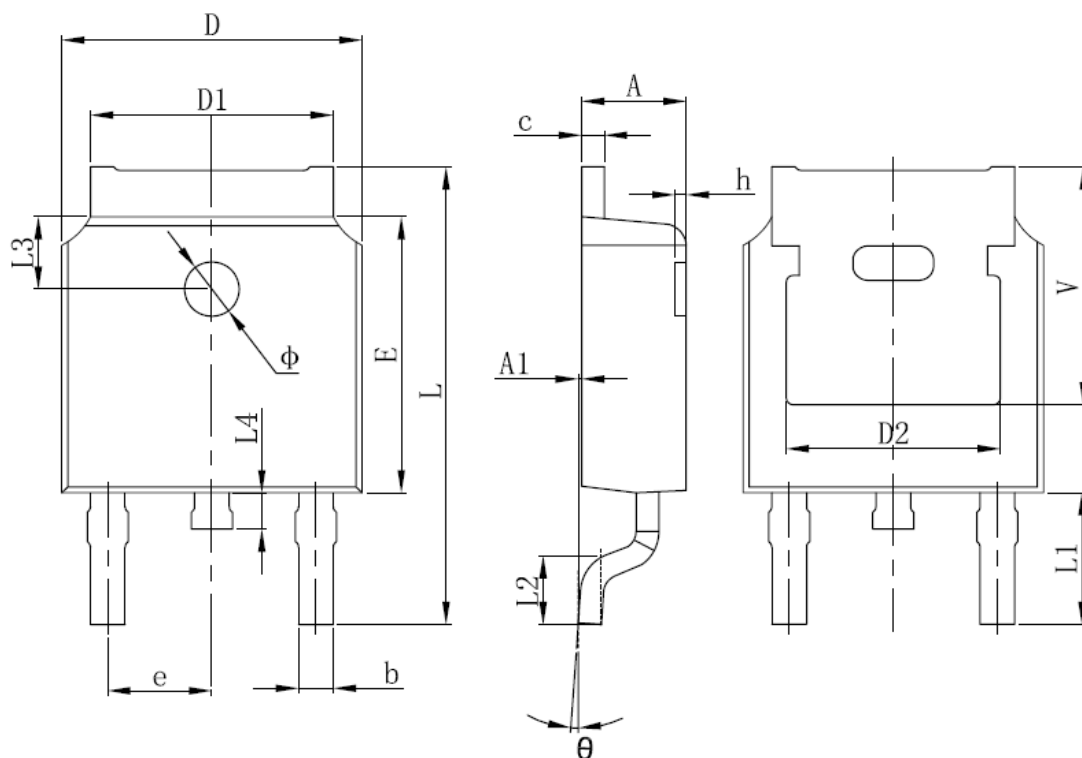


**Ordering and Marking Information**

| <b>Device</b> | <b>Marking</b> | <b>Package</b> | <b>Packaging</b> | <b>Quantity</b> | <b>Reel Size</b> | <b>Tape width</b> |
|---------------|----------------|----------------|------------------|-----------------|------------------|-------------------|
| RU6080L       | RU6080L        | TO-252         | Tape&Reel        | 2500            | 13''             | 16mm              |

**Package Information**

**TO252-2L**



| SYMBOL | MM         |       | INCH       |       | SYMBOL | MM         |        | INCH       |       |
|--------|------------|-------|------------|-------|--------|------------|--------|------------|-------|
|        | MIN        | MAX   | MIN        | MAX   |        | MIN        | MAX    | MIN        | MAX   |
| A      | 2.200      | 2.400 | 0.087      | 0.094 | L      | 9.800      | 10.400 | 0.386      | 0.409 |
| A1     | 0.000      | 0.127 | 0.000      | 0.005 | L1     | 2.900 REF. |        | 0.114 REF. |       |
| b      | 0.660      | 0.860 | 0.026      | 0.034 | L2     | 1.400      | 1.700  | 0.055      | 0.067 |
| C      | 0.460      | 0.580 | 0.018      | 0.023 | L3     | 1.600 REF. |        | 0.063 REF. |       |
| D      | 6.500      | 6.700 | 0.256      | 0.264 | L4     | 0.600      | 1.000  | 0.024      | 0.039 |
| D1     | 5.100      | 5.460 | 0.201      | 0.215 | Φ      | 1.100      | 1.300  | 0.043      | 0.051 |
| D2     | 4.830 REF. |       | 0.190 REF. |       | θ      | 0°         | 8°     | 0°         | 8°    |
| E      | 6.000      | 6.200 | 0.236      | 0.244 | h      | 0.000      | 0.300  | 0.000      | 0.012 |
| e      | 2.186      | 2.386 | 0.086      | 0.094 | V      | 5.350 REF. |        | 0.211 REF. |       |

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



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**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

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