

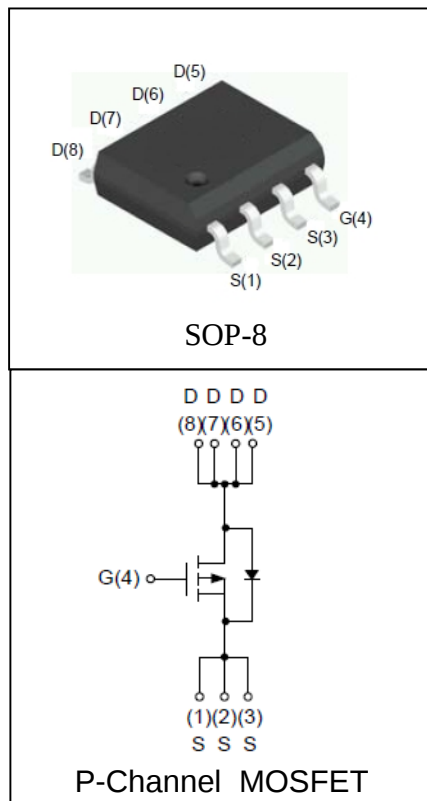
## Features

- -30V/-5.5A,  
 $R_{DS(ON)} = 38m\Omega$  (Typ.) @  $V_{GS} = -10V$   
 $R_{DS(ON)} = 55m\Omega$  (Typ.) @  $V_{GS} = -4.5V$
- Super High Dense Cell Design
- Reliable and Rugged
- Lead Free and Green Available

## Applications

- Power Management.

## Pin Description



## Absolute Maximum Ratings

| Symbol                                                       | Parameter                              |                      | Rating           | Unit |
|--------------------------------------------------------------|----------------------------------------|----------------------|------------------|------|
| Common Ratings (T <sub>A</sub> =25°C Unless Otherwise Noted) |                                        |                      |                  |      |
| V <sub>DSS</sub>                                             | Drain-Source Voltage                   |                      | -30              | V    |
| V <sub>GSS</sub>                                             | Gate-Source Voltage                    |                      | ±20              |      |
| T <sub>J</sub>                                               | Maximum Junction Temperature           |                      | 150              | °C   |
| T <sub>STG</sub>                                             | Storage Temperature Range              |                      | -55 to 150       | °C   |
| I <sub>S</sub>                                               | Diode Continuous Forward Current       | T <sub>A</sub> =25°C | -3.1             | A    |
| Mounted on Large Heat Sink                                   |                                        |                      |                  |      |
| I <sub>DP</sub>                                              | 300μs Pulse Drain Current Tested       | T <sub>A</sub> =25°C | -22 <sup>①</sup> | A    |
| I <sub>D</sub>                                               | Continuous Drain Current               | T <sub>A</sub> =25°C | -5.5             | A    |
|                                                              |                                        | T <sub>A</sub> =70°C | -4.5             |      |
| P <sub>D</sub>                                               | Maximum Power Dissipation              | T <sub>A</sub> =25°C | 2.5              | W    |
|                                                              |                                        | T <sub>A</sub> =70°C | 1.6              |      |
| R <sub>θJA</sub> <sup>②</sup>                                | Thermal Resistance-Junction to Ambient |                      | 50               | °C/W |

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

| Symbol                                   | Parameter                        | Test Condition                                                                                                        | RU30P5H |      |      | Unit |
|------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------------|---------|------|------|------|
|                                          |                                  |                                                                                                                       | Min.    | Typ. | Max. |      |
| Static Characteristics                   |                                  |                                                                                                                       |         |      |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =-250μA                                                                          | -30     |      |      | V    |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =-30V, V <sub>GS</sub> =0V                                                                            |         |      | -1   | μA   |
|                                          |                                  | T <sub>J</sub> =85°C                                                                                                  |         |      | -30  |      |
| V <sub>GS(th)</sub>                      | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250μA                                                            | -1      | -1.8 | -2.5 | V    |
| I <sub>GSS</sub>                         | Gate Leakage Current             | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                                            |         |      | ±100 | nA   |
| R <sub>DS(ON)</sub> <sup>③</sup>         | Drain-Source On-state Resistance | V <sub>GS</sub> =-10V, I <sub>DS</sub> =-5.2A                                                                         |         | 38   | 45   | mΩ   |
|                                          |                                  | V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-2A                                                                          |         | 55   | 75   | mΩ   |
| Diode Characteristics                    |                                  |                                                                                                                       |         |      |      |      |
| V <sub>SD</sub> <sup>③</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =-2A, V <sub>GS</sub> =0V                                                                             |         |      | -1   | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>SD</sub> =-5.5A, dI <sub>SD</sub> /dt=100A/μs                                                                  |         | 12   |      | ns   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                                                                       |         | 7    |      | nC   |
| Dynamic Characteristics <sup>④</sup>     |                                  |                                                                                                                       |         |      |      |      |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz                                                                      |         | 1.1  |      | Ω    |
| C <sub>iss</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V,<br>V <sub>DS</sub> =-15V,<br>Frequency=1.0MHz                                                    |         | 550  |      | pF   |
| C <sub>oss</sub>                         | Output Capacitance               |                                                                                                                       |         | 90   |      |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance     |                                                                                                                       |         | 50   |      |      |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time               | V <sub>DD</sub> =-15V, R <sub>L</sub> =2.7Ω,<br>I <sub>DS</sub> =-5.5A, V <sub>GEN</sub> =-10V,<br>R <sub>G</sub> =6Ω |         | 8    |      | ns   |
| t <sub>r</sub>                           | Turn-on Rise Time                |                                                                                                                       |         | 10   |      |      |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time              |                                                                                                                       |         | 28   |      |      |
| t <sub>f</sub>                           | Turn-off Fall Time               |                                                                                                                       |         | 10   |      |      |
| Gate Charge Characteristics <sup>④</sup> |                                  |                                                                                                                       |         |      |      |      |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =-24V, V <sub>GS</sub> =-10V,<br>I <sub>DS</sub> =-5.5A                                               |         | 11   | 14   | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge               |                                                                                                                       |         | 2    |      |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge                |                                                                                                                       |         | 3    |      |      |

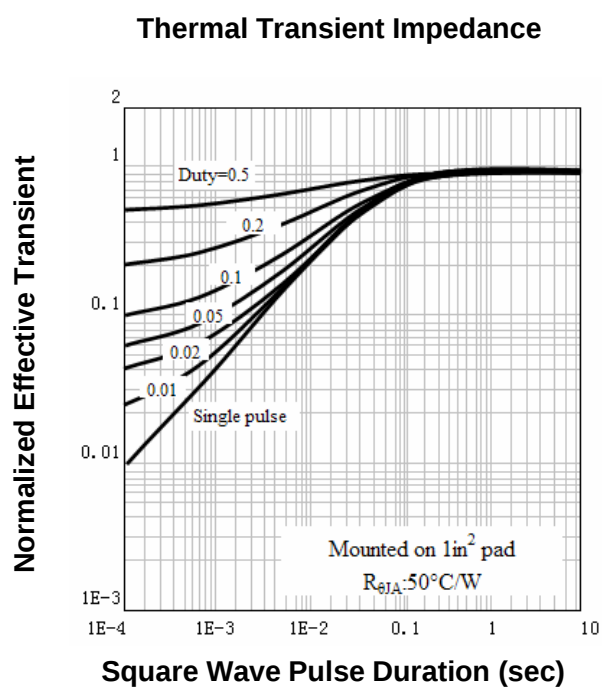
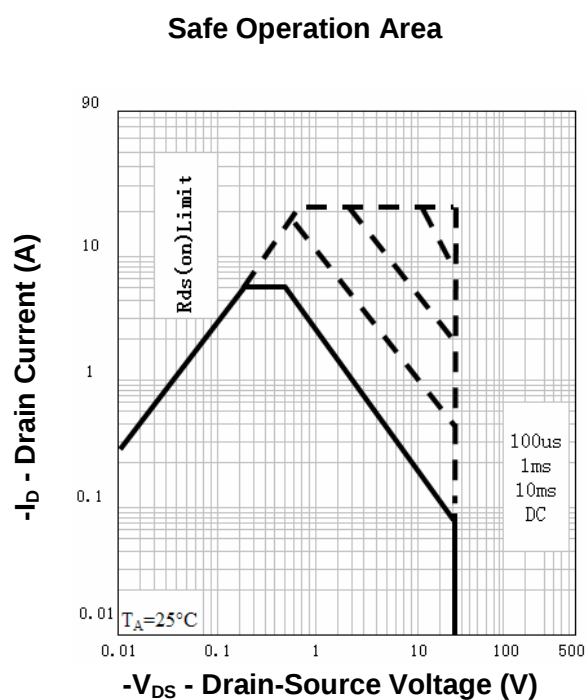
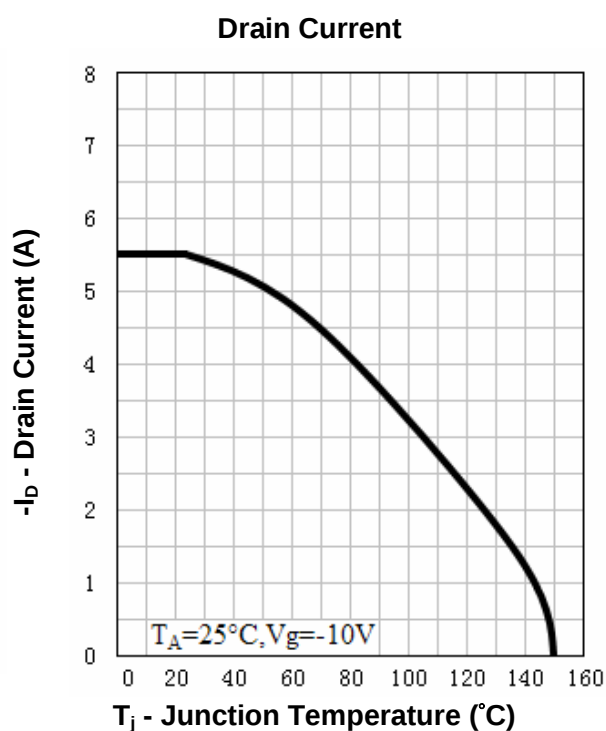
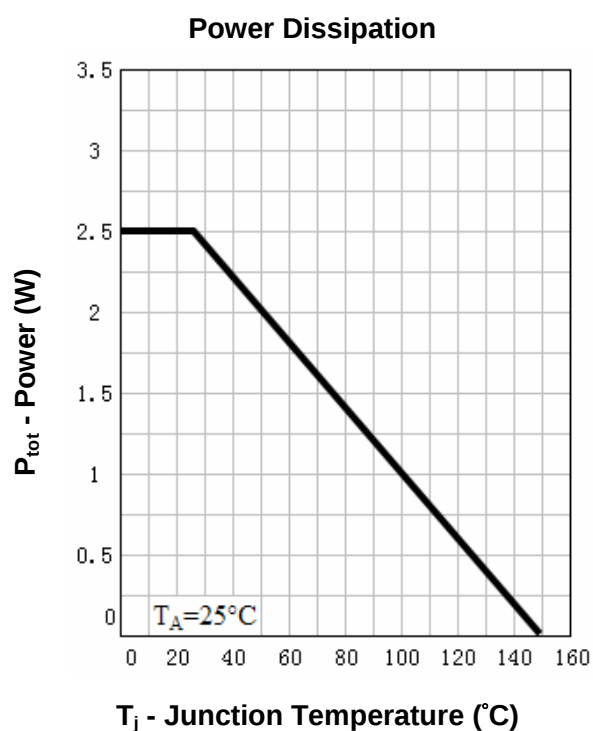
Notes: ① Pulse width limited by safe operating area.

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  $\leq 2\%$ .

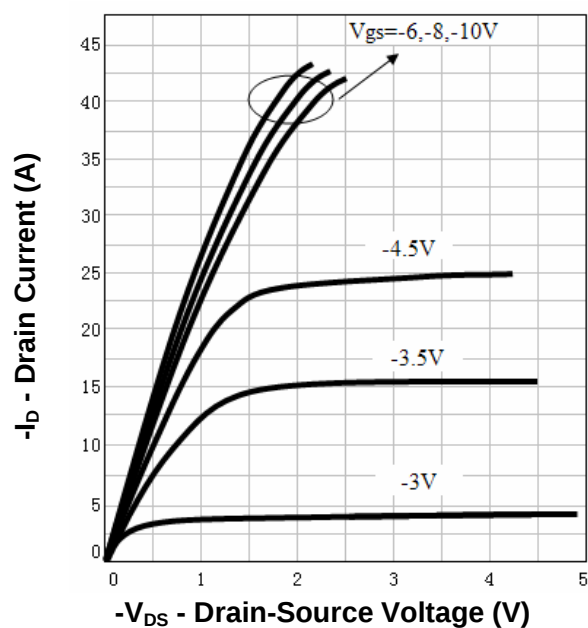
④ Guaranteed by design, not subject to production testing.

## Typical Characteristics

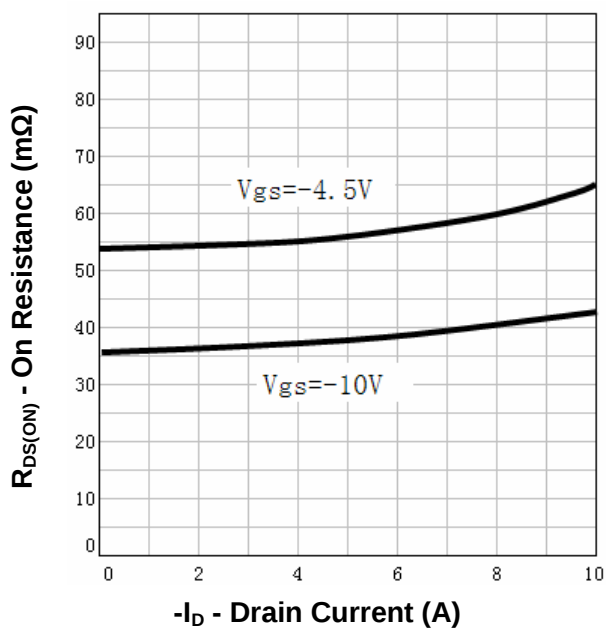


## Typical Characteristics

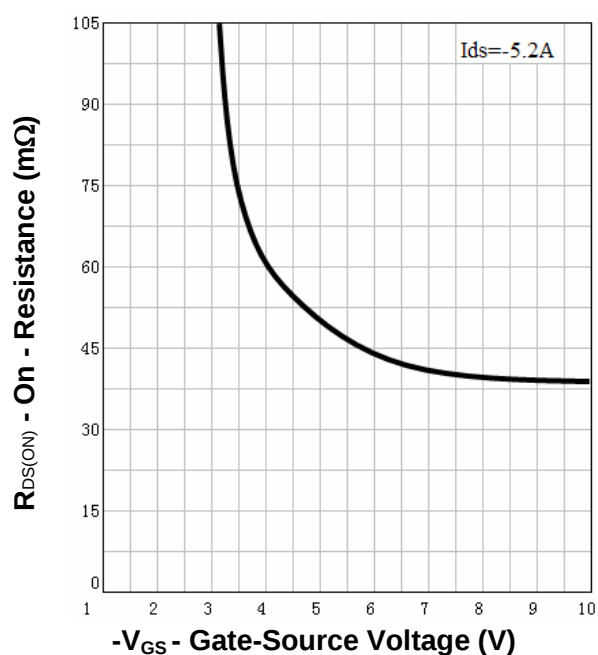
Output Characteristics



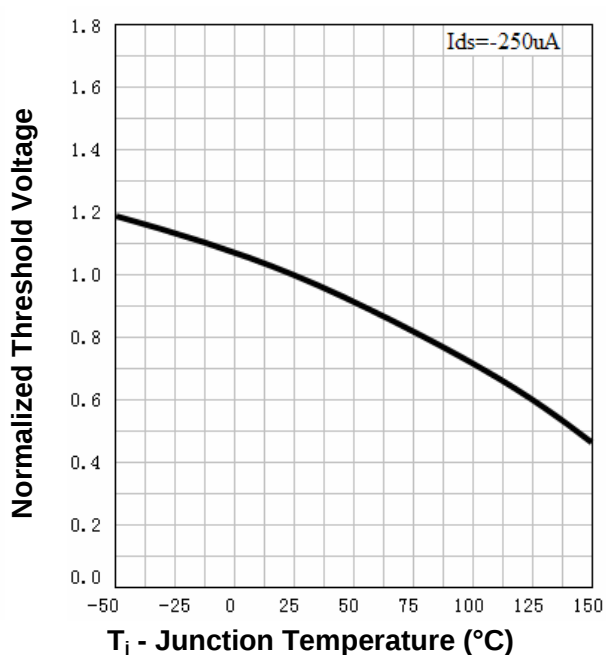
Drain-Source On Resistance



Drain-Source On Resistance

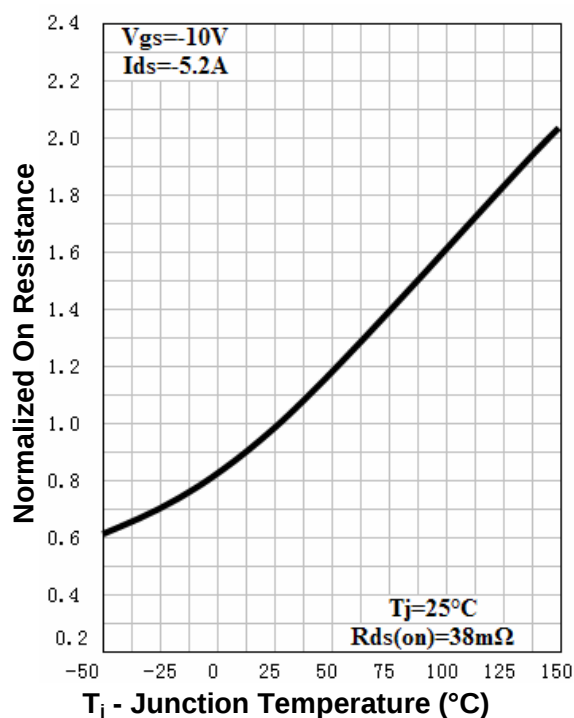


Gate Threshold Voltage

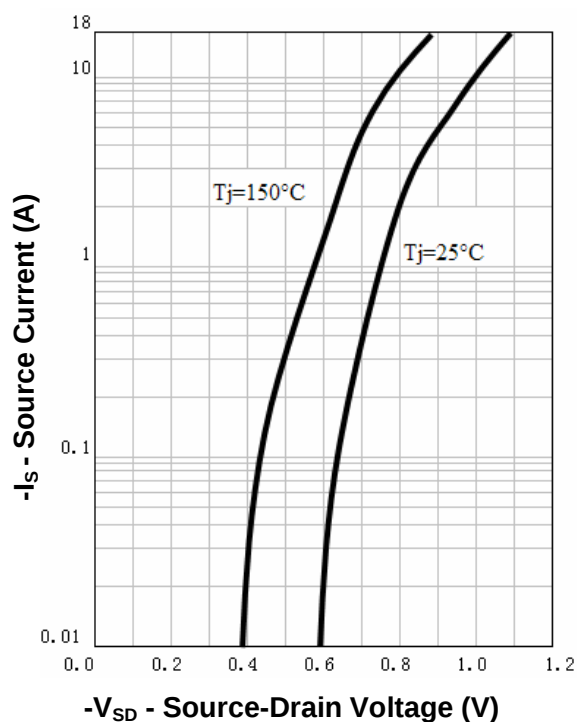


## Typical Characteristics

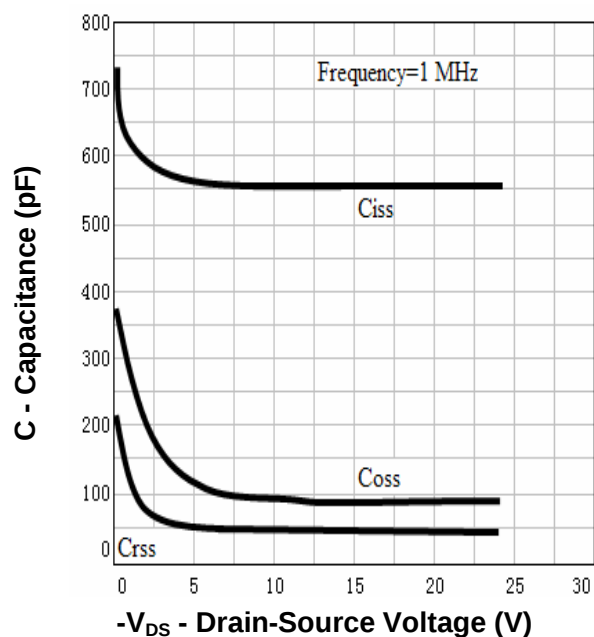
**Drain-Source On Resistance**



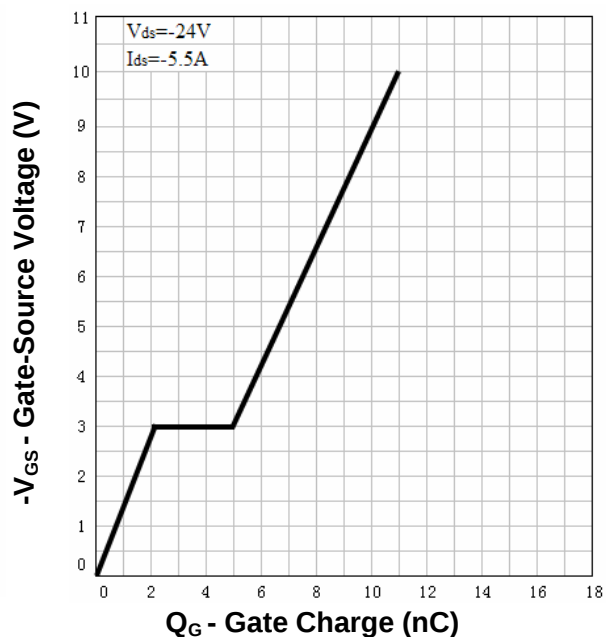
**Source-Drain Diode Forward**



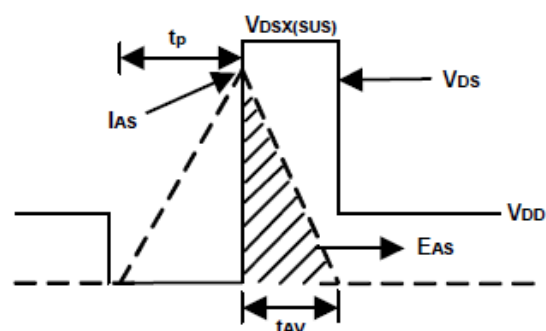
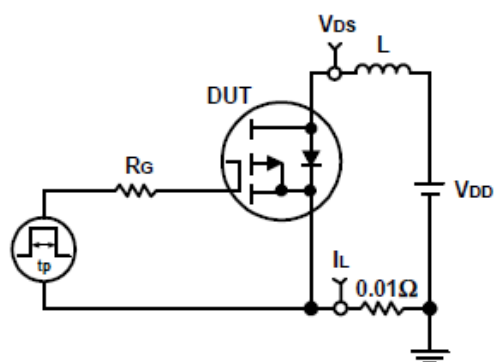
**Capacitance**



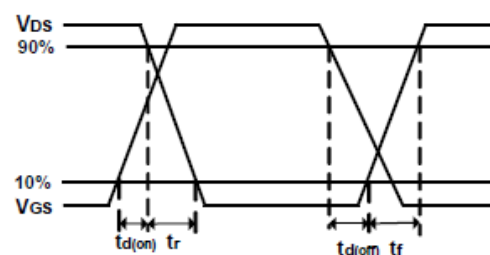
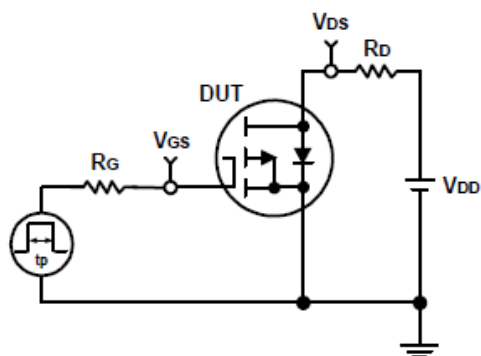
**Gate Charge**



## Avalanche Test Circuit and Waveforms



## Switching Time Test Circuit and Waveforms



**Ordering and Marking Information****RU30P5****Package (Available)**

H : SOP-8

**Operating Temperature Range**

C : -55 to 150 °C

**Assembly Material**

G : Green &amp; Lead Free

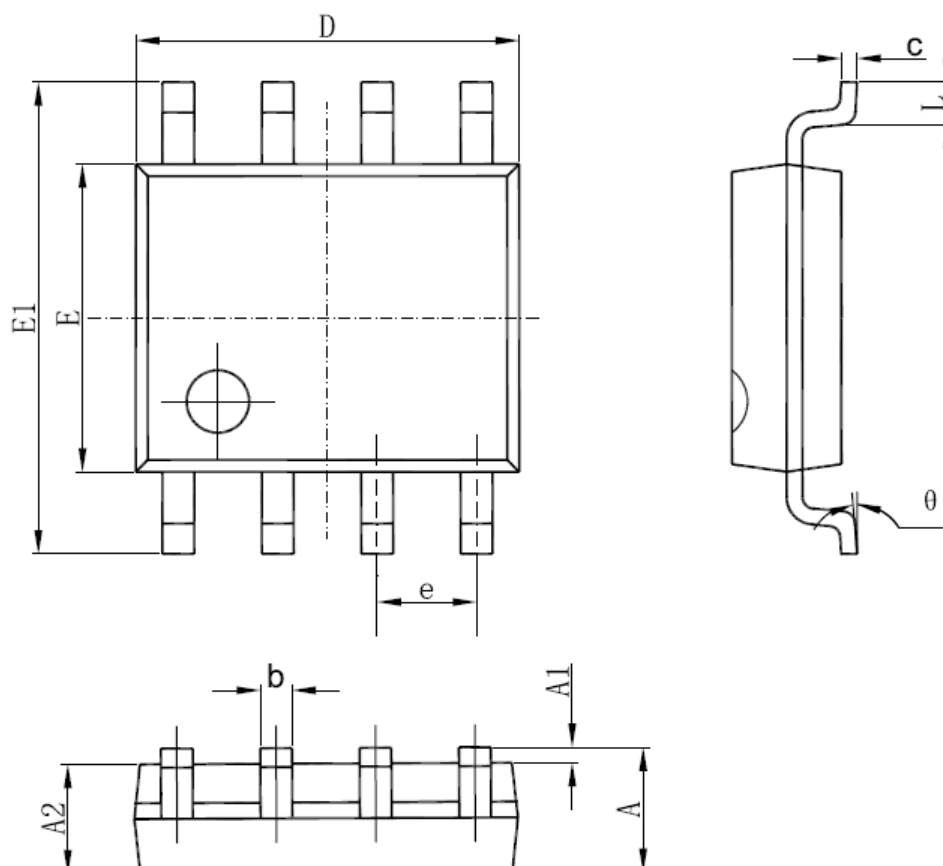
**Packaging**

T : TUBE

TR : Tape &amp; 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

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