

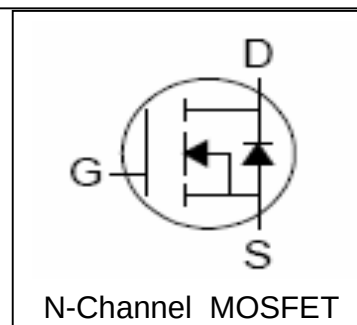
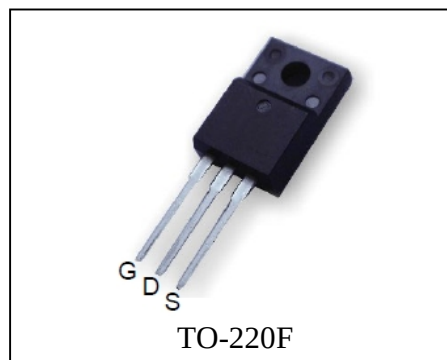
## Features

- 500V/8A,  
 $R_{DS(ON)} = 0.7\Omega$  (Typ.) @  $V_{GS} = 10V$
- Gate charge minimized
- Low  $C_{rss}$  (Typ. 26pF)
- Extremely high dv/dt capability
- 100% avalanche tested
- Lead Free and Green Available

## Applications

- High efficiency switch mode power supplies
- Lighting

## Pin Description



## Absolute Maximum Ratings

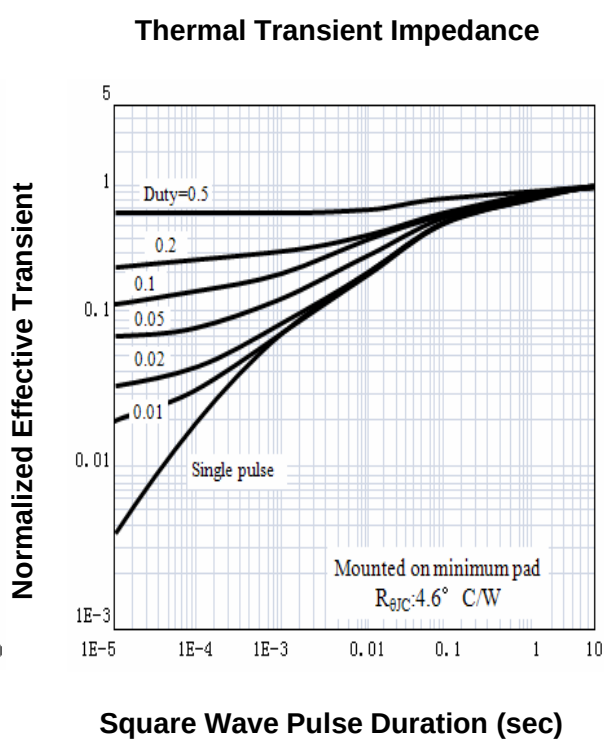
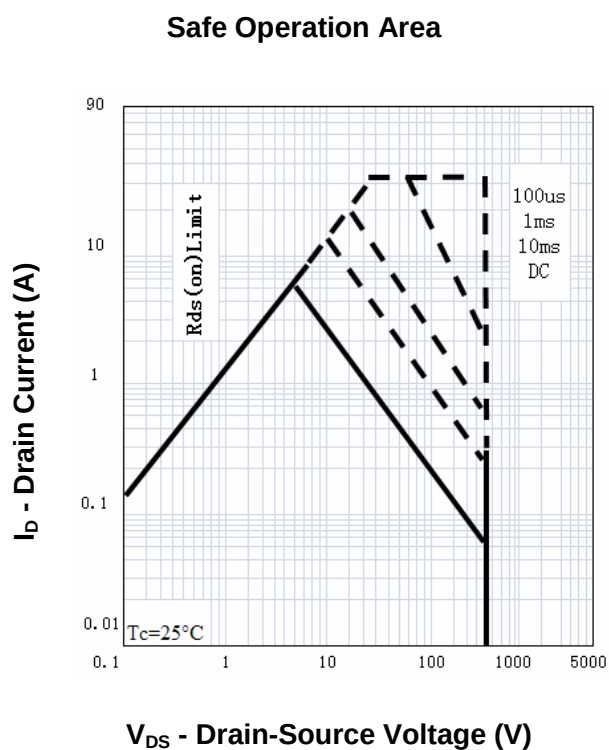
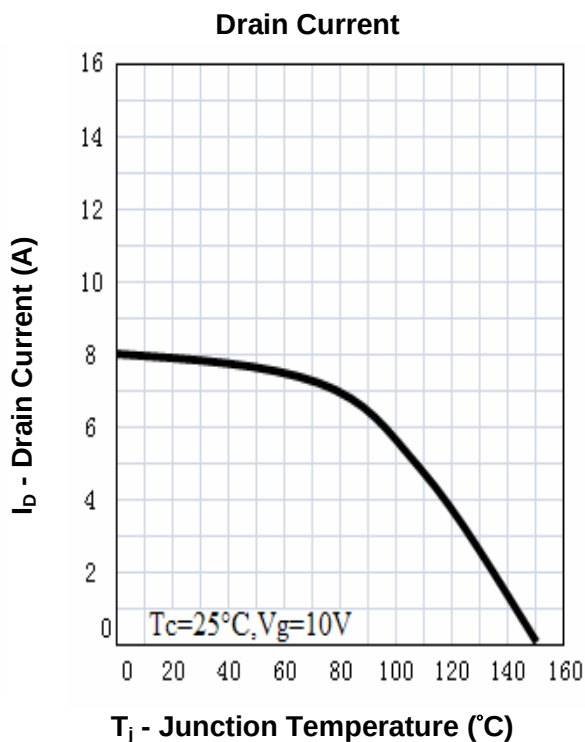
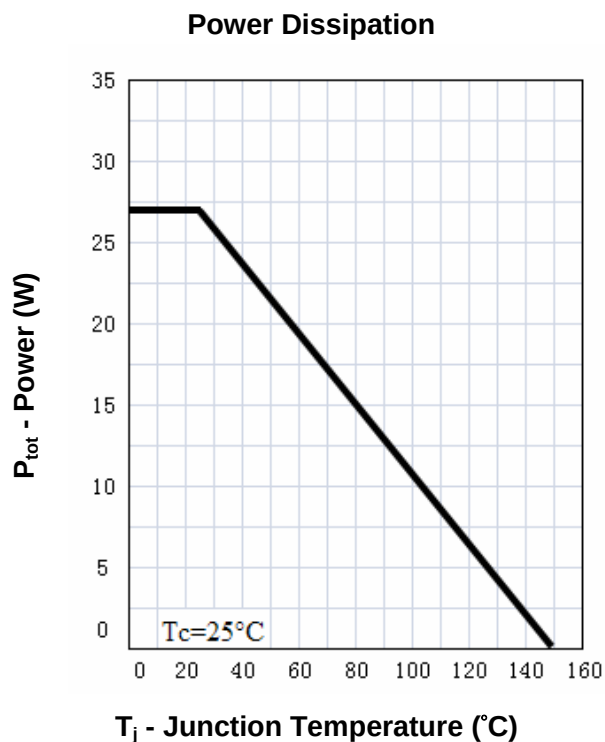
| Symbol                                                       | Parameter                           |                       | Rating           | Unit |
|--------------------------------------------------------------|-------------------------------------|-----------------------|------------------|------|
| Common Ratings (T <sub>C</sub> =25°C Unless Otherwise Noted) |                                     |                       |                  |      |
| V <sub>DSS</sub>                                             | Drain-Source Voltage                |                       | 500              | V    |
| V <sub>GSS</sub>                                             | Gate-Source Voltage                 |                       | ±30              |      |
| 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>C</sub> =25°C  | 8                | A    |
| Mounted on Large Heat Sink                                   |                                     |                       |                  |      |
| I <sub>DP</sub>                                              | 300μs Pulse Drain Current Tested    | T <sub>C</sub> =25°C  | 32 <sup>①</sup>  | A    |
| I <sub>D</sub>                                               | Continuous Drain Current            | T <sub>C</sub> =25°C  | 8 <sup>①</sup>   | A    |
|                                                              |                                     | T <sub>C</sub> =100°C | 5.6 <sup>①</sup> |      |
| P <sub>D</sub>                                               | Maximum Power Dissipation           | T <sub>C</sub> =25°C  | 27               | W    |
|                                                              |                                     | T <sub>C</sub> =100°C | 11               |      |
| R <sub>θJC</sub>                                             | Thermal Resistance-Junction to Case |                       | 4.6              | °C/W |
| Drain-Source Avalanche Ratings                               |                                     |                       |                  |      |
| E <sub>AS</sub> <sup>②</sup>                                 | Avalanche Energy, Single Pulsed     |                       | 100              | mJ   |

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

| Symbol                                   | Parameter                        | Test Condition                                                                                                     | RU5H8P |      |      | Unit |
|------------------------------------------|----------------------------------|--------------------------------------------------------------------------------------------------------------------|--------|------|------|------|
|                                          |                                  |                                                                                                                    | Min.   | Typ. | Max. |      |
| Static Characteristics                   |                                  |                                                                                                                    |        |      |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA                                                                        | 500    |      |      | V    |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> = 500V, 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                                                          | 2      | 3    | 4    | V    |
| I <sub>GSS</sub>                         | Gate Leakage Current             | V <sub>GS</sub> =±30V, 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> =4A                                                                         |        | 0.7  | 0.85 | Ω    |
| Diode Characteristics                    |                                  |                                                                                                                    |        |      |      |      |
| V <sub>SD</sub> <sup>③</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =8A, V <sub>GS</sub> =0V                                                                           |        |      | 1.2  | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>SD</sub> =8A, dI <sub>SD</sub> /dt=100A/μs                                                                  |        | 310  |      | ns   |
| Q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                                                                    |        | 2.3  |      | μC   |
| Dynamic Characteristics <sup>④</sup>     |                                  |                                                                                                                    |        |      |      |      |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz                                                                   |        | 10   |      | Ω    |
| C <sub>iss</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V,<br>V <sub>DS</sub> = 250V,<br>Frequency=1.0MHz                                                |        | 1110 |      | pF   |
| C <sub>oss</sub>                         | Output Capacitance               |                                                                                                                    |        | 195  |      |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance     |                                                                                                                    |        | 26   |      |      |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time               | V <sub>DD</sub> =250V, R <sub>L</sub> =32Ω,<br>I <sub>DS</sub> =8A, V <sub>GEN</sub> = 10V,<br>R <sub>G</sub> =25Ω |        | 30   |      | ns   |
| t <sub>r</sub>                           | Turn-on Rise Time                |                                                                                                                    |        | 50   |      |      |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time              |                                                                                                                    |        | 120  |      |      |
| t <sub>f</sub>                           | Turn-off Fall Time               |                                                                                                                    |        | 50   |      |      |
| Gate Charge Characteristics <sup>④</sup> |                                  |                                                                                                                    |        |      |      |      |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =400V, V <sub>GS</sub> = 10V,<br>I <sub>DS</sub> =8A                                               |        | 25   |      | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge               |                                                                                                                    |        | 4    |      |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge                |                                                                                                                    |        | 10   |      |      |

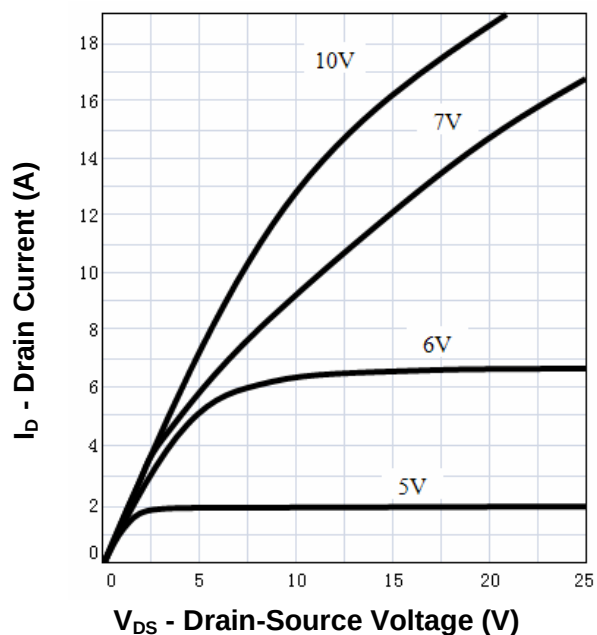
- Notes: ① Current limited by maximum junction temperature.  
 ② Limited by  $T_{Jmax}$ ,  $I_{AS}=14A$ ,  $V_{DD}=100V$ ,  $R_G=50\Omega$ , Starting  $T_J=25^{\circ}\text{C}$ .  
 ③ Pulse test; Pulse width $\leq 300\mu s$ , duty cycle $\leq 2\%$ .  
 ④ Guaranteed by design, not subject to production testing.

## Typical Characteristics

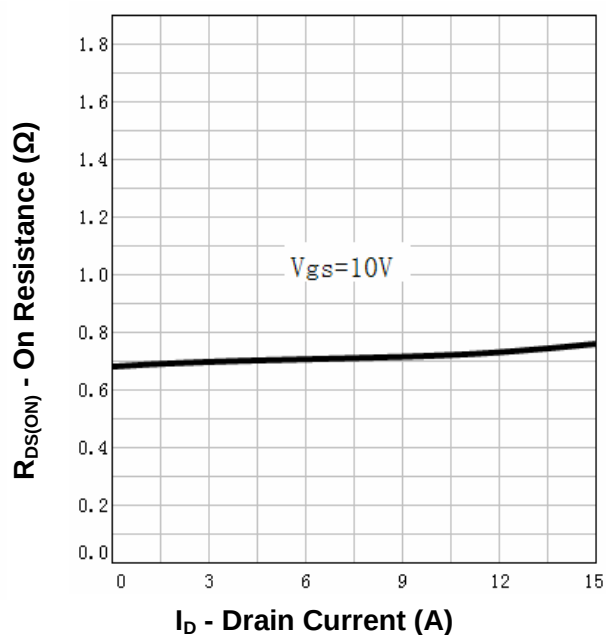


## Typical Characteristics

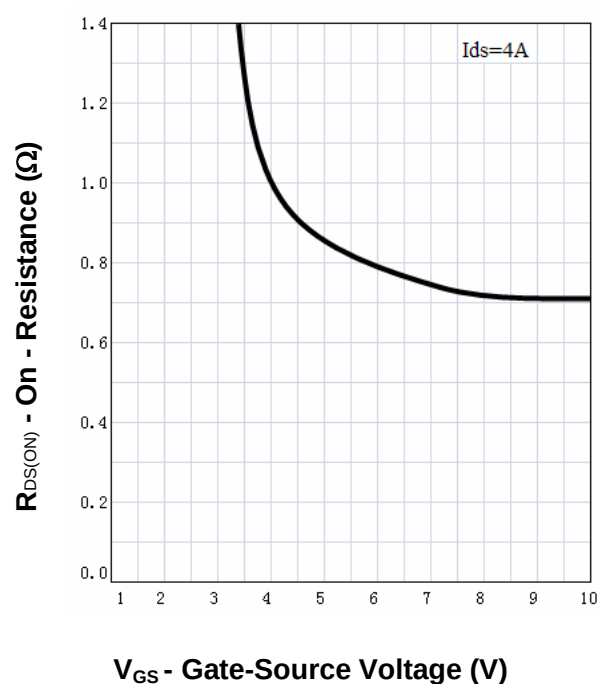
Output Characteristics



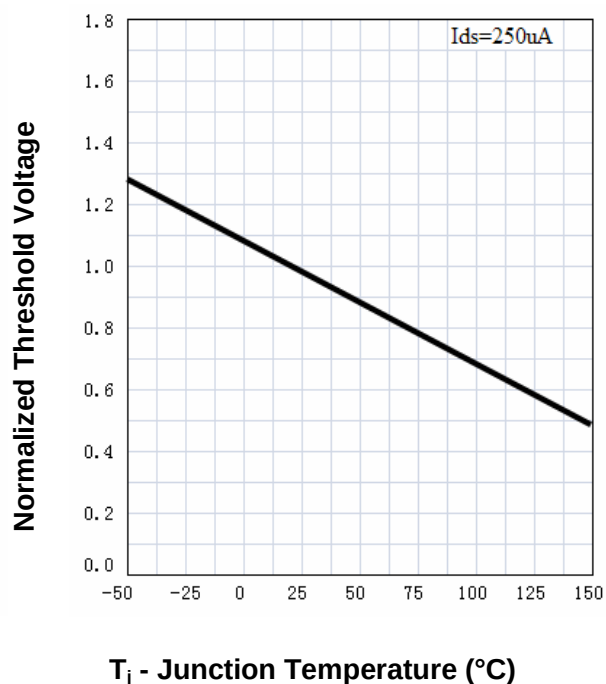
Drain-Source On Resistance



Drain-Source On Resistance

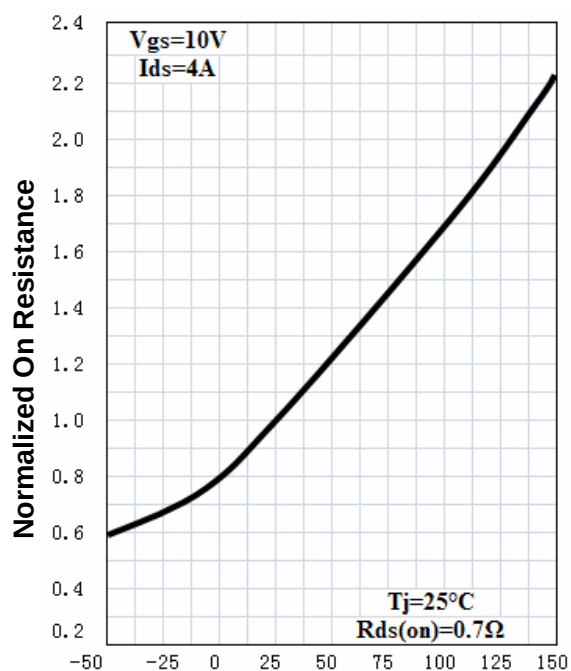


Gate Threshold Voltage



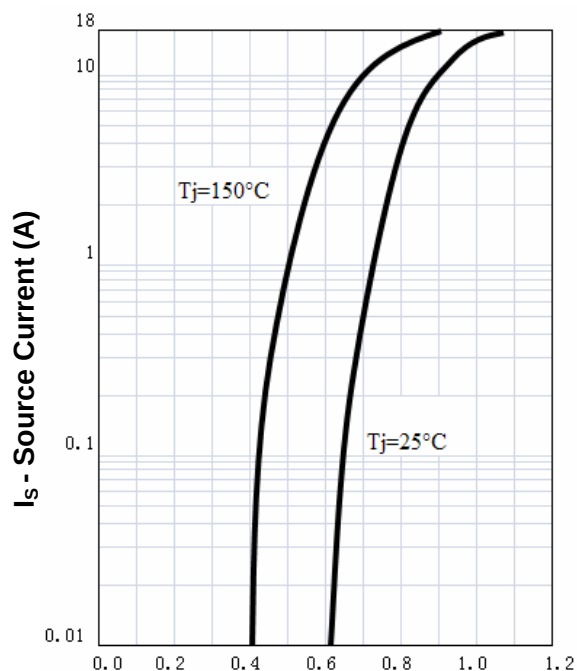
## Typical Characteristics

**Drain-Source On Resistance**



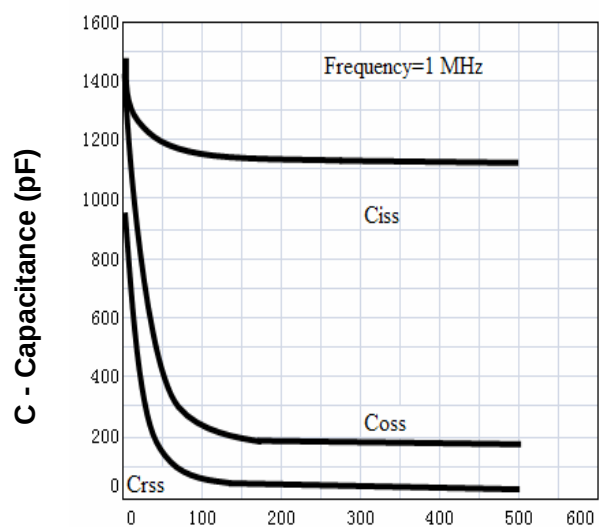
$T_j$  - Junction Temperature ( $^{\circ}\text{C}$ )

**Source-Drain Diode Forward**



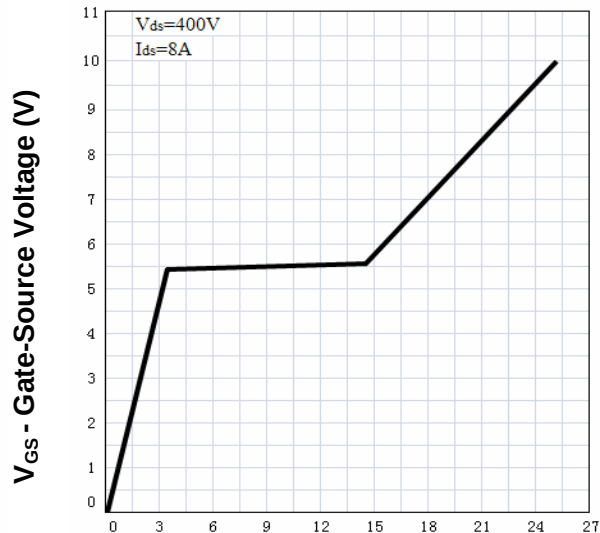
$V_{SD}$  - Source-Drain Voltage (V)

**Capacitance**



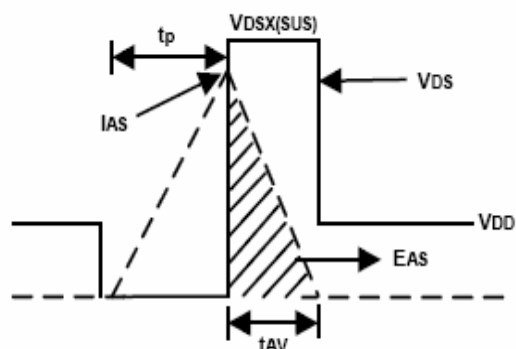
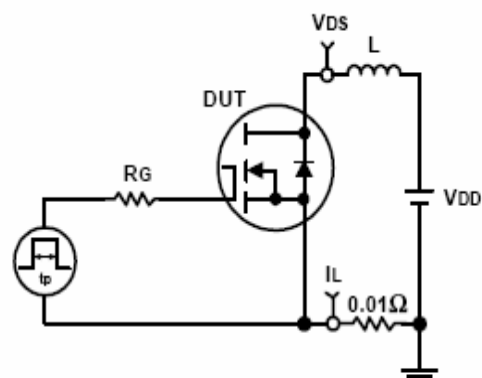
$V_{DS}$  - Drain-Source Voltage (V)

**Gate Charge**

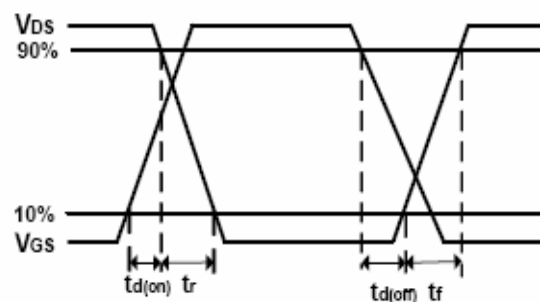
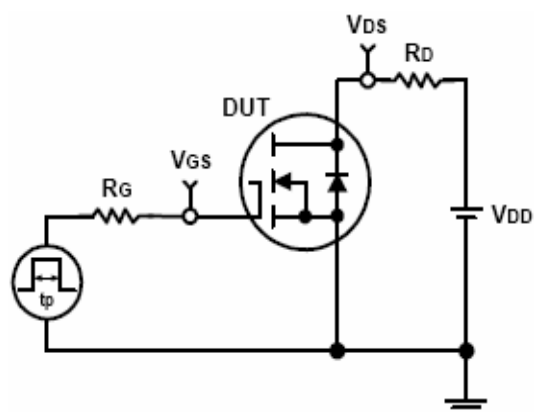


$Q_G$  - Gate Charge (nC)

## Avalanche Test Circuit and Waveforms



## Switching Time Test Circuit and Waveforms

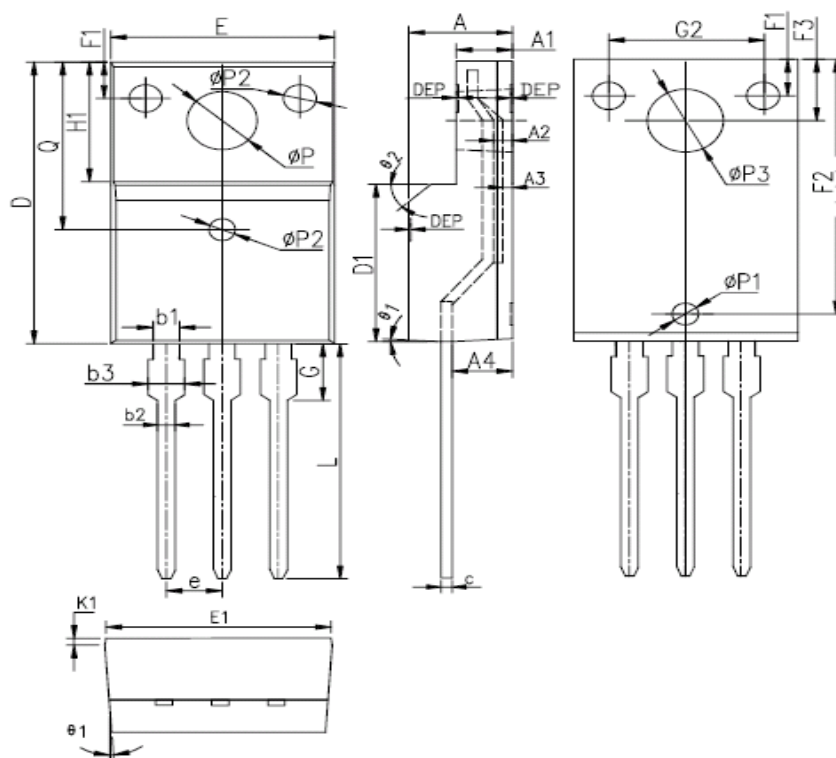


**Ordering and Marking Information**

| Device | Marking | Package | Packaging | Quantity | Reel Size | Tape width |
|--------|---------|---------|-----------|----------|-----------|------------|
| RU5H8P | RU5H8P  | TO-220F | Tube      | 50       | -         | -          |

# Package Information

## TO-220F-3L



| SYMBOL | MM      |       |       | INCH   |       |       | SYMBOL | MM    |       |       | INCH  |       |       |
|--------|---------|-------|-------|--------|-------|-------|--------|-------|-------|-------|-------|-------|-------|
|        | MIN     | NOM   | MAX   | MIN    | NOM   | MAX   |        | MIN   | NOM   | MAX   | MIN   | NOM   | MAX   |
| E      | 9.96    | 10.16 | 10.36 | 0.392  | 0.400 | 0.408 | Øp3    | -     | 3.450 | -     | -     | 0.136 | -     |
| A      | 4.50    | 4.70  | 4.90  | 0.177  | 0.185 | 0.193 | θ 1    | 5°    | 7°    | 9°    | 5°    | 7°    | 9°    |
| A1     | 2.34    | 2.54  | 2.74  | 0.092  | 0.100 | 0.108 | θ 2    | -     | 45°   | -     | -     | 45°   | -     |
| A2     | 0.95    | 1.05  | 1.15  | 0.037  | 0.041 | 0.045 | DEP    | 0.05  | 0.10  | 0.15  | 0.002 | 0.004 | 0.006 |
| A3     | 0.42    | 0.52  | 0.62  | 0.017  | 0.020 | 0.024 | F1     | 1.90  | 2.00  | 2.10  | 0.075 | 0.079 | 0.083 |
| A4     | 2.65    | 2.75  | 2.85  | 0.104  | 0.108 | 0.112 | F2     | 13.61 | 13.81 | 14.01 | 0.536 | 0.544 | 0.552 |
| c      | -       | 0.50  | -     | -      | 0.020 | -     | F3     | 3.20  | 3.30  | 3.40  | 0.126 | 0.130 | 0.134 |
| D      | 15.67   | 15.87 | 16.07 | 0.617  | 0.625 | 0.633 | G      | 3.25  | 3.45  | 3.65  | 0.128 | 0.136 | 0.144 |
| Q      | 8.80    | 9.00  | 9.20  | 0.346  | 0.354 | 0.362 | G1     | 5.90  | 6.00  | 6.10  | 0.232 | 0.236 | 0.240 |
| H1     | 6.48    | 6.68  | 6.88  | 0.255  | 0.263 | 0.271 | G2     | 6.90  | 7.00  | 7.10  | 0.272 | 0.276 | 0.280 |
| e      | 2.54BSC |       |       | 0.1BSC |       |       | b1     | 1.17  | 1.20  | 1.24  | 0.046 | 0.047 | 0.048 |
| Øp     | -       | 3.183 | -     | -      | 0.125 | -     | b2     | 0.77  | 0.8   | 0.85  | 0.030 | 0.031 | 0.033 |
| L      | 12.78   | 12.98 | 13.18 | 0.503  | 0.511 | 0.519 | b3     | 1.10  | 1.30  | 1.50  | 0.043 | 0.051 | 0.059 |
| D1     | 8.99    | 9.19  | 9.39  | 0.354  | 0.362 | 0.370 | E1     | 9.8   | 10.00 | 10.20 | 0.386 | 0.394 | 0.412 |
| Øp1    | 1.40    | 1.50  | 1.60  | 0.055  | 0.059 | 0.063 | K1     | 0.75  | 0.8   | 0.85  | 0.030 | 0.031 | 0.033 |
| Øp2    | 1.15    | 1.20  | 1.25  | 0.045  | 0.047 | 0.049 |        |       |       |       |       |       |       |

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