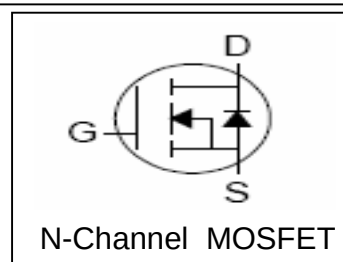
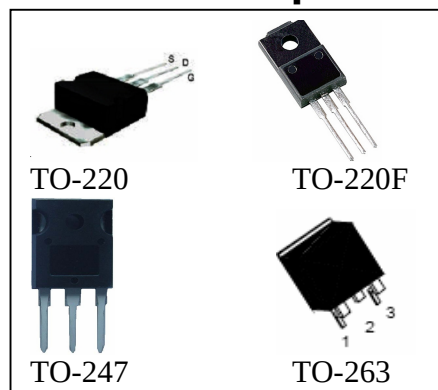


## Features

- 100V/75A  
 $R_{DS(ON)}=11m\Omega(Typ.) @ V_{GS}=10V$
- Ultra Low On-Resistance
- Extremely high dv/dt capability
- Fast Switching and Fully Avalanche Rated
- 100% avalanche tested

## Pin Description



## Applications

- High Speed Power Switching
- Uninterruptible Power Supply

## Absolute Maximum Ratings

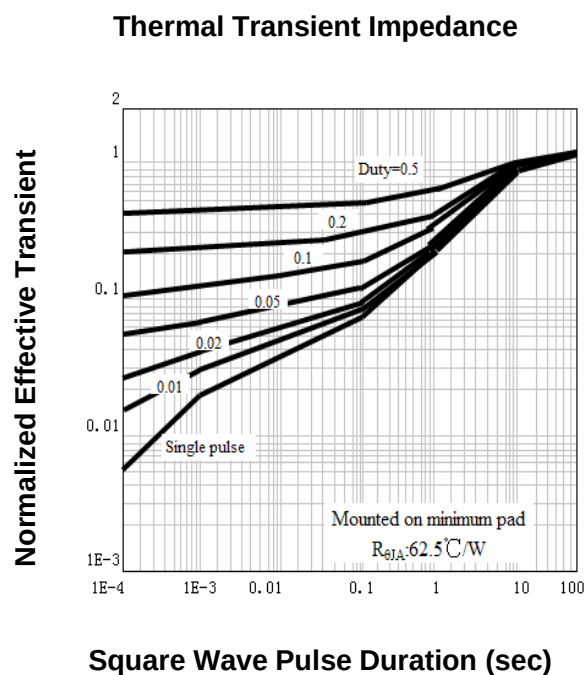
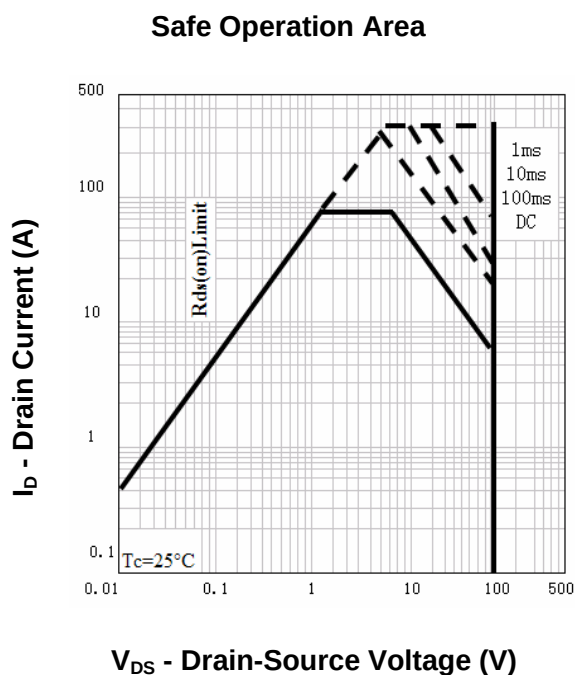
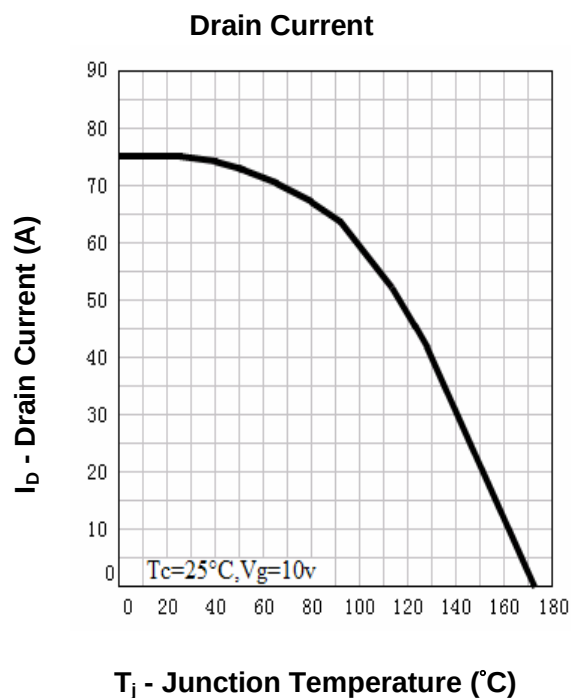
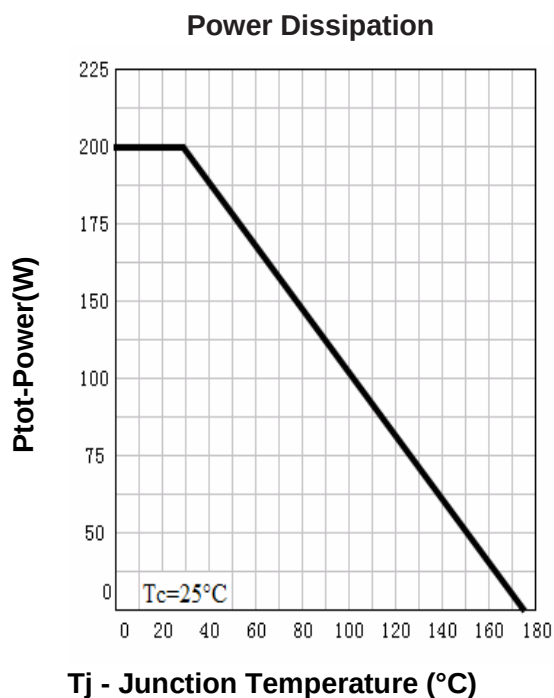
| Symbol                                                       | Parameter                              |                       | Rating          | Unit |
|--------------------------------------------------------------|----------------------------------------|-----------------------|-----------------|------|
| Common Ratings (T <sub>A</sub> =25°C Unless Otherwise Noted) |                                        |                       |                 |      |
| V <sub>DSS</sub>                                             | Drain-Source Voltage                   |                       | 100             | V    |
| V <sub>GSS</sub>                                             | Gate-Source Voltage                    |                       | ±25             |      |
| T <sub>J</sub>                                               | Maximum Junction Temperature           |                       | 175             | °C   |
| T <sub>STG</sub>                                             | Storage Temperature Range              |                       | -55 to 175      | °C   |
| I <sub>S</sub>                                               | Diode Continuous Forward Current       | T <sub>C</sub> =25°C  | 75 <sup>①</sup> | A    |
| Mounted on Large Heat Sink                                   |                                        |                       |                 |      |
| I <sub>DP</sub>                                              | 300μs Pulsed Drain Current Tested      | T <sub>C</sub> =25°C  | 300             | A    |
| I <sub>D</sub>                                               | Continue Drain Current                 | T <sub>C</sub> =25°C  | 75 <sup>①</sup> |      |
|                                                              |                                        | T <sub>C</sub> =100°C | 59              |      |
| P <sub>D</sub>                                               | Maximum Power Dissipation              | T <sub>C</sub> =25°C  | 200             | W    |
|                                                              |                                        | T <sub>C</sub> =100°C | 100             |      |
| R <sub>θJC</sub>                                             | Thermal Resistance -Junction to Case   |                       | 0.75            | °C/W |
| R <sub>θJA</sub>                                             | Thermal Resistance-Junction to Ambient |                       | 62.5            |      |
| Drain-Source Avalanche Ratings                               |                                        |                       |                 |      |
| E <sub>AS</sub> <sup>②</sup>                                 | Avalanche Energy ,Single Pulsed        |                       | 400             | mJ   |

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

| Symbol                                   | Parameter                        | Test Condition                                                                            | RU1H100 |      |      | Unit |
|------------------------------------------|----------------------------------|-------------------------------------------------------------------------------------------|---------|------|------|------|
|                                          |                                  |                                                                                           | Min.    | Typ. | Max. |      |
| Static Characteristics                   |                                  |                                                                                           |         |      |      |      |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA                                               | 100     |      |      | V    |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> = 100V, 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> =±25V, 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> =40A                                               |         | 11   | 14   | mΩ   |
| Diode Characteristics                    |                                  |                                                                                           |         |      |      |      |
| V <sub>SD</sub> <sup>③</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =40A, V <sub>GS</sub> =0V                                                 |         |      | 1.2  | V    |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>SD</sub> =40A, dI <sub>SD</sub> /dt=100A/μs                                        |         | 36   |      | ns   |
| q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                                           |         | 46   |      | nC   |
| Dynamic Characteristics <sup>④</sup>     |                                  |                                                                                           |         |      |      |      |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz                                          |         | 1.5  |      | Ω    |
| C <sub>iss</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V, V <sub>DS</sub> = 50V, Frequency=1.0MHz                              |         | 3450 |      | pF   |
| C <sub>oss</sub>                         | Output Capacitance               |                                                                                           |         | 265  |      |      |
| C <sub>rss</sub>                         | Reverse Transfer Capacitance     |                                                                                           |         | 148  |      |      |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time               | V <sub>DD</sub> =50V, I <sub>DS</sub> = 40A, V <sub>GEN</sub> = 10V, R <sub>G</sub> =5.6Ω |         | 19   |      | ns   |
| t <sub>r</sub>                           | Turn-on Rise Time                |                                                                                           |         | 86   |      |      |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time              |                                                                                           |         | 55   |      |      |
| t <sub>f</sub>                           | Turn-off Fall Time               |                                                                                           |         | 69   |      |      |
| Gate Charge Characteristics <sup>④</sup> |                                  |                                                                                           |         |      |      |      |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =80V, V <sub>GS</sub> = 10V, I <sub>DS</sub> =40A                         |         | 85   | 135  | nC   |
| Q <sub>gs</sub>                          | Gate-Source Charge               |                                                                                           |         | 20   |      |      |
| Q <sub>gd</sub>                          | Gate-Drain Charge                |                                                                                           |         | 35   |      |      |

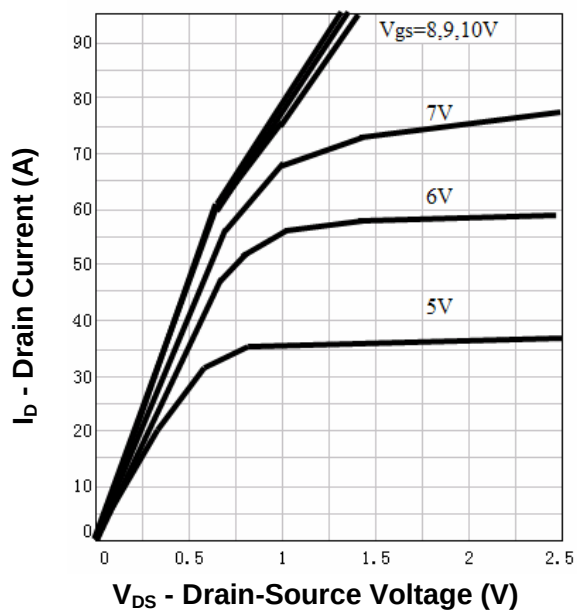
- Notes: ① Current limited by package.  
 ② Limited by  $T_{Jmax}$ ,  $I_{AS}=40A$ ,  $V_{DD}=48V$ ,  $R_G=47\Omega$ , Starting  $T_J=25^{\circ}\text{C}$   
 ③ Pulse test ; Pulse width $\leq 400\mu s$ , duty cycle $\leq 2\%$ .  
 ④ Guaranteed by design, not subject to production testing.

## Typical Characteristics

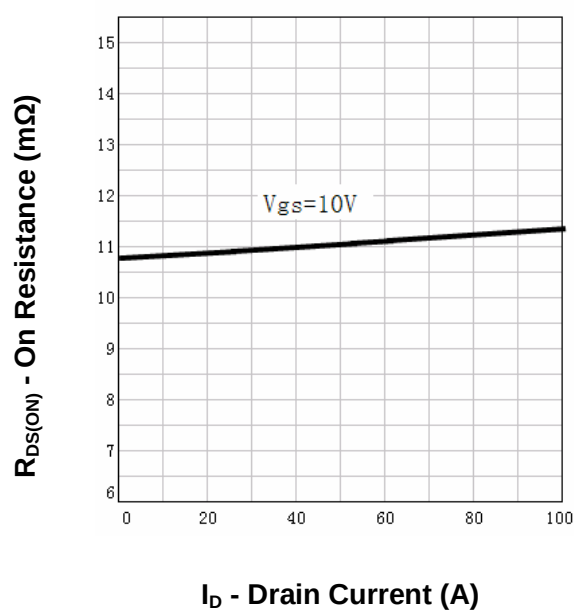


## Typical Characteristics

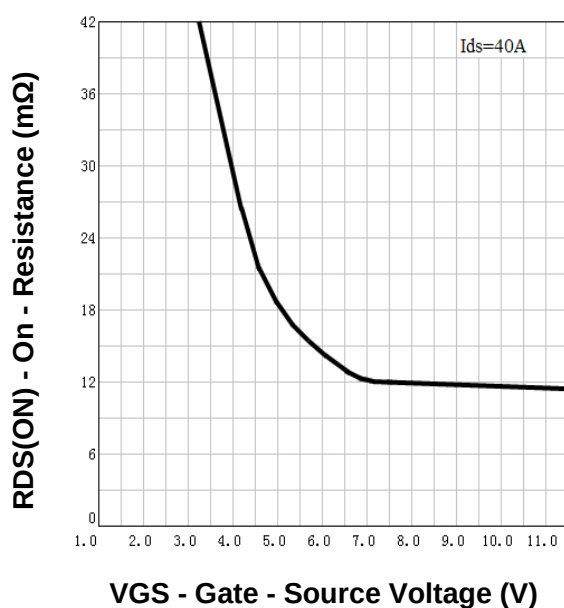
**Output Characteristics**



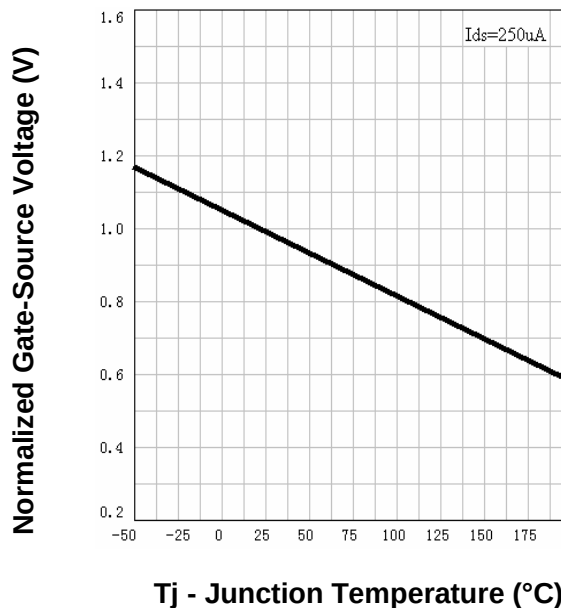
**Drain-Source On Resistance**



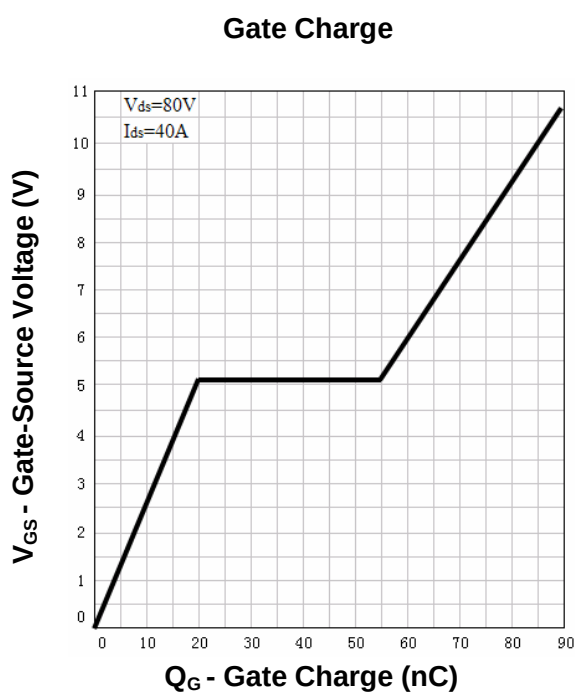
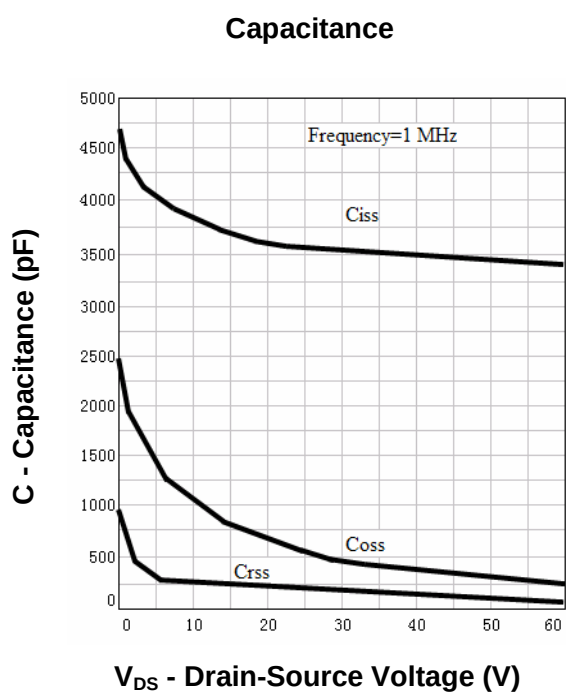
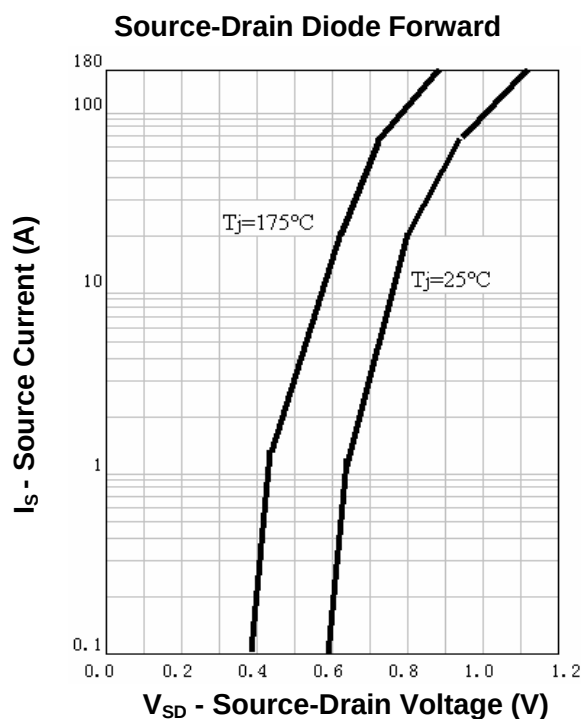
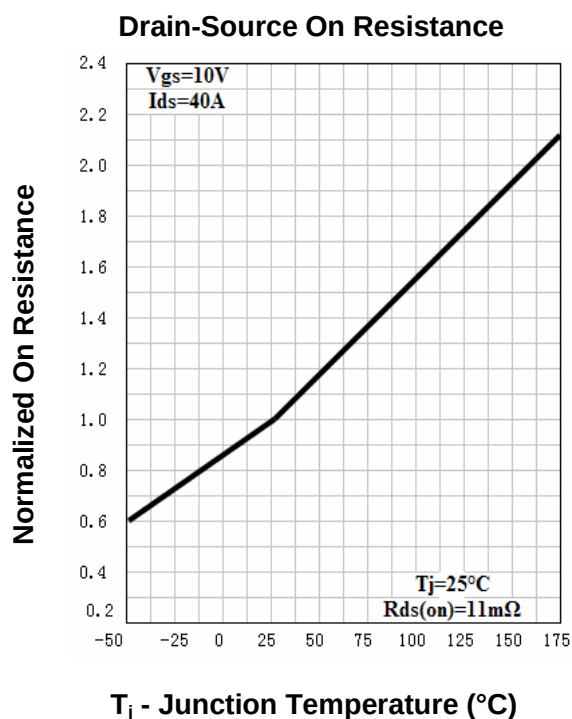
**Drain-Source On Resistance**



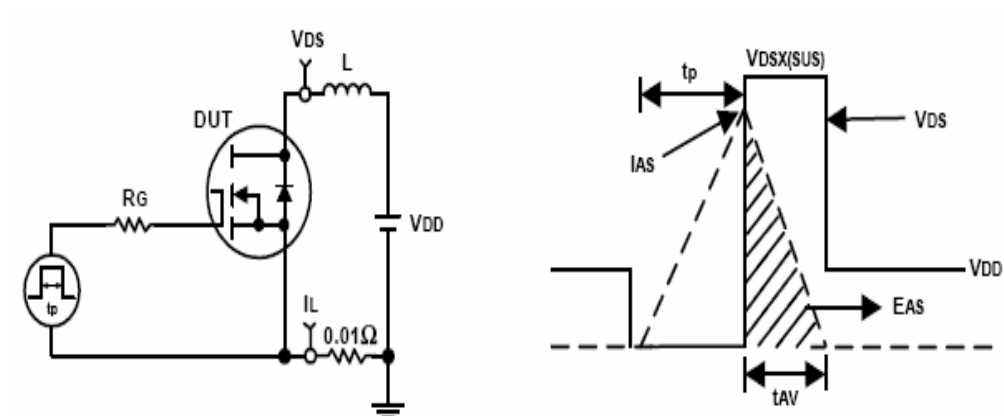
**Normalized Gate Threshold Voltage**



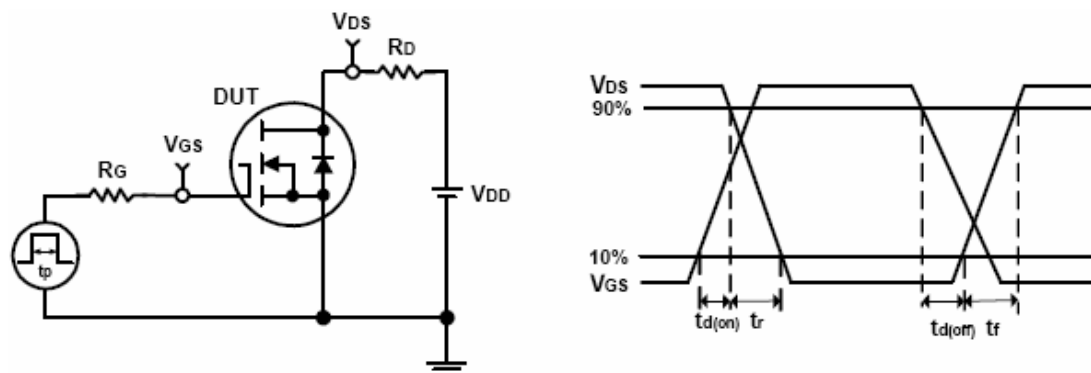
## Typical Characteristics



## Avalanche Test Circuit and Waveforms



## Switching Time Test Circuit and Waveforms



**Ordering and Marking Information****RU1H100****Package (Available)**

R : TO-220;    S: TO-263 ;    Q: TO-247

**Operating Temperature Range**

C : -55 to 175 °C

**Assembly Material**

G : Green & Lead Free Device

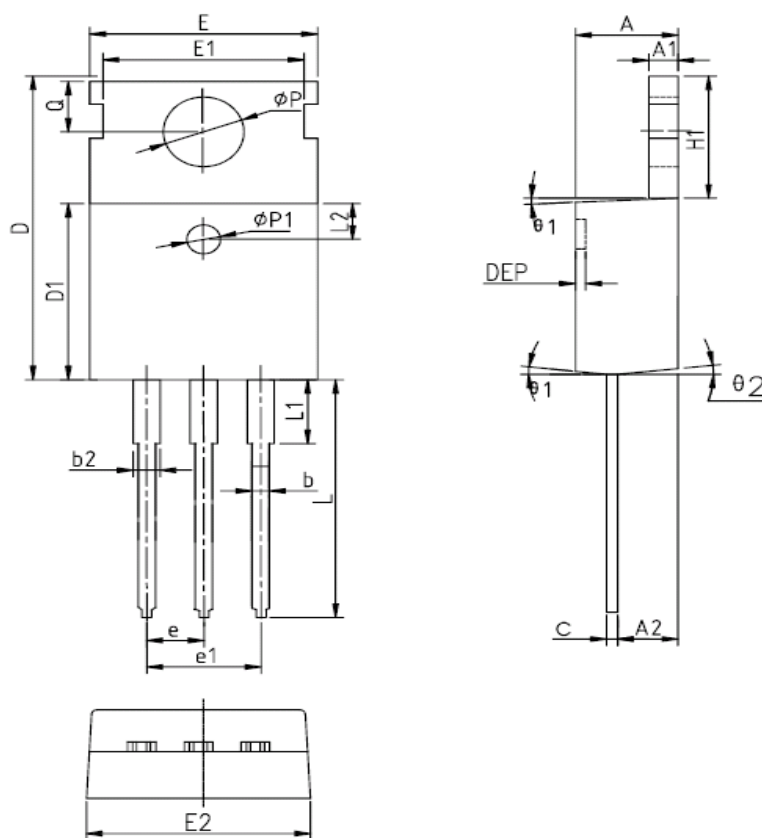
**Packaging**

T : TUBE

TR : Tape & Reel

## Package Information

### TO-220FB-3L

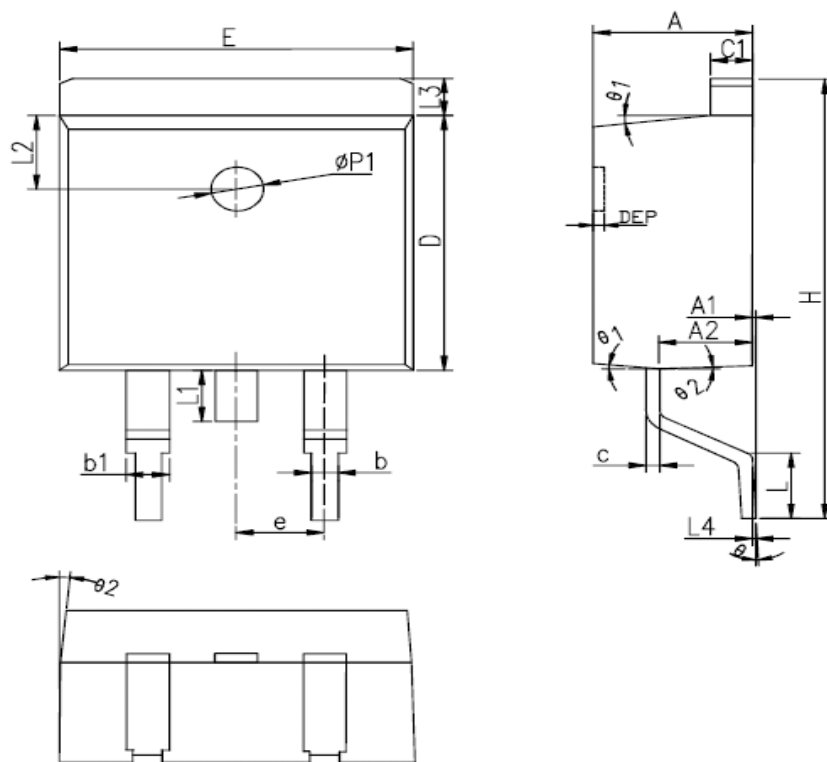


| SYMBOL | MM    |       |       | INCH  |       |       | SYMBOL     | MM       |      |       | INCH      |       |       |
|--------|-------|-------|-------|-------|-------|-------|------------|----------|------|-------|-----------|-------|-------|
|        | MIN   | NOM   | MAX   | MIN   | NOM   | MAX   |            | MIN      | NOM  | MAX   | MIN       | NOM   | MAX   |
| A      | 4.40  | 4.57  | 4.70  | 0.173 | 0.180 | 0.185 | $\phi p1$  | 1.40     | 1.50 | 1.60  | 0.055     | 0.059 | 0.063 |
| A1     | 1.27  | 1.30  | 1.33  | 0.050 | 0.051 | 0.052 | e          | 2.54BSC  |      |       | 0.1BSC    |       |       |
| A2     | 2.35  | 2.40  | 2.50  | 0.093 | 0.094 | 0.098 | e1         | 5.08BSC  |      |       | 0.2BSC    |       |       |
| b      | 0.77  | -     | 0.90  | 0.030 | -     | 0.035 | H1         | 6.40     | 6.50 | 6.60  | 0.252     | 0.256 | 0.260 |
| b2     | 1.23  | -     | 1.36  | 0.048 | -     | 0.054 | L          | 12.75    | -    | 13.17 | 0.502     | -     | 0.519 |
| C      | 0.48  | 0.50  | 0.52  | 0.019 | 0.020 | 0.021 | L1         | -        | -    | 3.95  | -         | -     | 0.156 |
| D      | 15.40 | 15.60 | 15.80 | 0.606 | 0.614 | 0.622 | L2         | 2.50REF. |      |       | 0.098REF. |       |       |
| D1     | 9.00  | 9.10  | 9.20  | 0.354 | 0.358 | 0.362 | $\phi p$   | 3.57     | 3.60 | 3.63  | 0.141     | 0.142 | 0.143 |
| DEP    | 0.05  | 0.10  | 0.20  | 0.002 | 0.004 | 0.008 | Q          | 2.73     | 2.80 | 2.87  | 0.107     | 0.110 | 0.113 |
| E      | 9.70  | 9.90  | 10.10 | 0.382 | 0.389 | 0.398 | $\theta_1$ | 5°       | 7°   | 9°    | 5°        | 7°    | 9°    |
| E1     | -     | 8.70  | -     | -     | 0.343 | -     | $\theta_2$ | 1°       | 3°   | 5°    | 1°        | 3°    | 5°    |
| E2     | 9.80  | 10.00 | 10.20 | 0.386 | 0.394 | 0.401 |            |          |      |       |           |       |       |

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



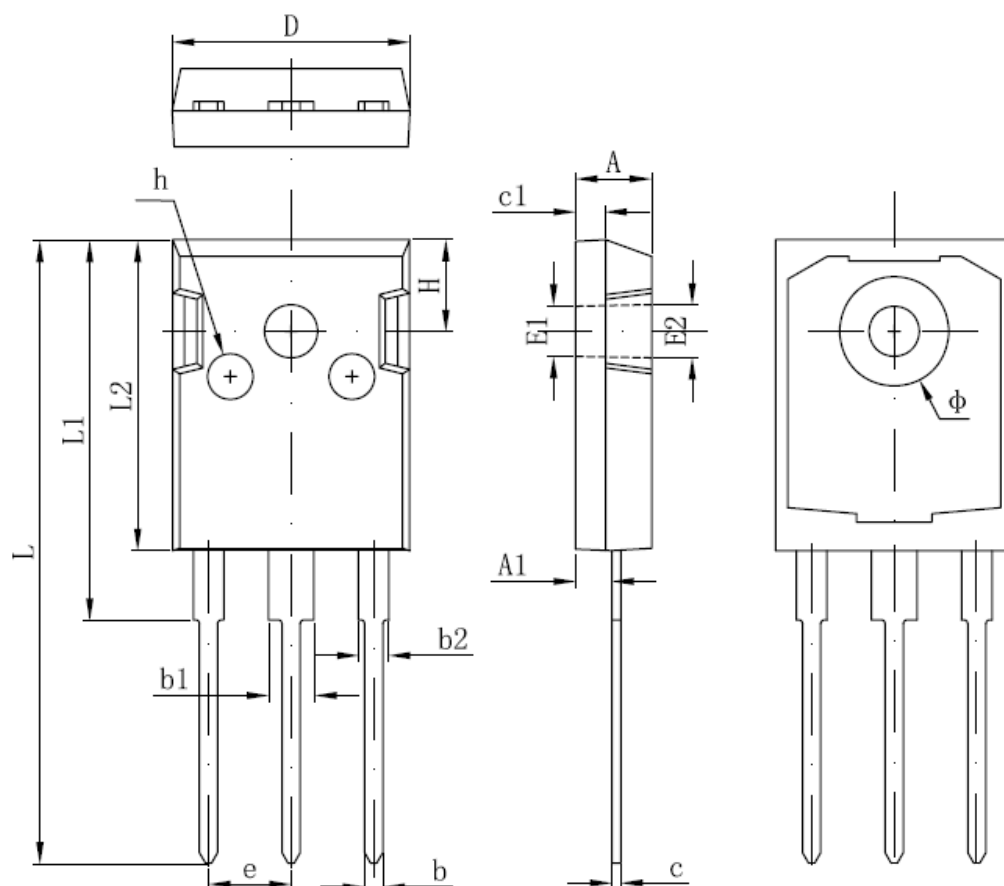
# TO-263-2L



| SYMBOL | MM      |       |       | INCH   |       |       | SYMBOL | MM       |      |      | INCH      |       |       |
|--------|---------|-------|-------|--------|-------|-------|--------|----------|------|------|-----------|-------|-------|
|        | MIN     | NOM   | MAX   | MIN    | NOM   | MAX   |        | MIN      | NOM  | MAX  | MIN       | NOM   | MAX   |
| A      | 4.40    | 4.57  | 4.70  | 0.173  | 0.180 | 0.185 | L      | 2.00     | 2.30 | 2.60 | 0.079     | 0.090 | 0.102 |
| A1     | 0       | 0.10  | 0.25  | 0      | 0.004 | 0.010 | L3     | 1.17     | 1.27 | 1.40 | 0.046     | 0.050 | 0.055 |
| A2     | 2.59    | 2.69  | 2.79  | 0.102  | 0.106 | 0.110 | L1     | -        | -    | 1.70 | -         | -     | 0.067 |
| b      | 0.77    | -     | 0.90  | 0.030  | -     | 0.035 | L4     | 0.25BSC  |      |      | 0.01BSC   |       |       |
| b1     | 1.23    | -     | 1.36  | 0.048  | -     | 0.052 | L2     | 2.50REF. |      |      | 0.098REF. |       |       |
| c      | 0.34    | -     | 0.47  | 0.013  | -     | 0.019 | θ      | 0°       | -    | 8°   | 0°        | -     | 8°    |
| C1     | 1.22    | -     | 1.32  | 0.048  | -     | 0.052 | θ 1    | 5°       | 7°   | 9°   | 5°        | 7°    | 9°    |
| D      | 8.60    | 8.70  | 8.80  | 0.338  | 0.343 | 0.346 | θ 2    | 1°       | 3°   | 5°   | 1°        | 3°    | 5°    |
| E      | 10.00   | 10.16 | 10.26 | 0.394  | 0.4   | 0.404 | DEP    | 0.05     | 0.10 | 0.20 | 0.002     | 0.004 | 0.008 |
| e      | 2.54BSC |       |       | 0.1BSC |       |       | Øp1    | 1.40     | 1.50 | 1.60 | 0.055     | 0.059 | 0.063 |
| H      | 14.70   | 15.10 | 15.50 | 0.579  | 0.594 | 0.610 |        |          |      |      |           |       |       |

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# TO-247



| SYMBOL | MM         |        | INCH       |       | SYMBOL | MM         |        | INCH       |       |
|--------|------------|--------|------------|-------|--------|------------|--------|------------|-------|
|        | MIN        | MAX    | MIN        | MAX   |        | MIN        | MAX    | MIN        | MAX   |
| A      | 4.850      | 5.150  | 0,191      | 0.200 | E2     | 3.600 REF  |        | 0.142 REF  |       |
| A1     | 2.200      | 2.600  | 0.087      | 0.102 | L      | 40.900     | 41.300 | 1.610      | 1.626 |
| B      | 1.000      | 1.400  | 0.039      | 0.055 | L1     | 24.800     | 25.100 | 0.976      | 0.988 |
| b1     | 2.800      | 3.200  | 0.110      | 0.126 | L2     | 20.300     | 20.600 | 0.799      | 0.811 |
| b2     | 1.800      | 2.200  | 0.071      | 0.087 | Φ      | 7.100      | 7.300  | 0.280      | 0.287 |
| c      | 0.500      | 0.700  | 0.020      | 0.028 | e      | 5.450 TYP  |        | 0.215 TYP  |       |
| c1     | 1.900      | 2.100  | 0.075      | 0.083 | H      | 5.980 REF. |        | 0.235 REF. |       |
| D      | 15.450     | 15.750 | 0.608      | 0.620 | h      | 0.000      | 0.300  | 0.000      | 0.012 |
| E1     | 3.500 REF. |        | 0.138 REF. |       |        |            |        |            |       |

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