

## Description

### JMT N-channel Enhancement Mode Power MOSFET

#### Features

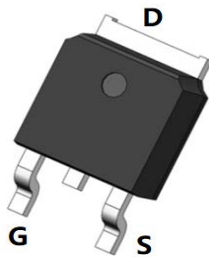
- 30V, 70A  
 $R_{DS(ON)} < 6.0m\Omega @ V_{GS} = 10V$   
 $R_{DS(ON)} < 9.5m\Omega @ V_{GS} = 4.5V$
- Advanced Trench Technology
- Excellent  $R_{DS(ON)}$  and Low Gate Charge
- Lead Free

#### Applications

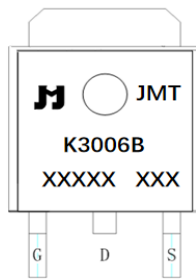
- Load Switch
- PWM Application
- Power Management



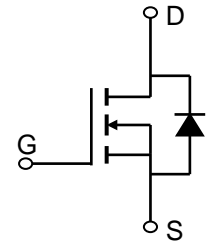
*100% UIS TESTED!*  
*100% ΔVds TESTED!*



TO-252-3L(DPAK) Top View



Marking and Pin Assignment



Schematic Diagram

## Package Marking and Ordering Information

| Device Marking | Device    | Outline | Package   | Reel Size | Reel(pcs) | Per Carton (pcs) |
|----------------|-----------|---------|-----------|-----------|-----------|------------------|
| JMTK3006B      | JMTK3006B | TAPING  | TO-252-3L | 13"       | 2500      | 25000            |

## Absolute Maximum Ratings (@ $T_C = 25^\circ\text{C}$ unless otherwise specified)

| Symbol          | Parameter  | Value                       | Units |
|-----------------|--|-----------------------------|-------|
| $V_{DS}$        | Drain-to-Source Voltage                                | 30                          | V     |
| $V_{GS}$        | Gate-to-Source Voltage                                 | ±20                         | V     |
| $I_D$           | Continuous Drain Current                               | $T_C = 25^\circ\text{C}$    | 70    |
|                 |  | $T_C = 100^\circ\text{C}$   | 45    |
| $I_{DM}$        | Pulsed Drain Current <sup>(1)</sup>                    | 280                         | A     |
| $E_{AS}$        | Single Pulsed Avalanche Energy <sup>(2)</sup>          | 81                          | mJ    |
| $P_D$           | Power Dissipation                                      | $T_C = 25^\circ\text{C}$ 50 | W     |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient <sup>(3)</sup> | 31                          | °C/W  |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case                   | 2.5                         |       |
| $T_J, T_{STG}$  | Junction & Storage Temperature Range                   | -55 to 150                  | °C    |



## Electrical Characteristics (T<sub>J</sub> = 25°C unless otherwise specified)

| Symbol  | Parameter  | Conditions  | Min. | Typ. | Max. | Unit |
|---|--|---|------|------|------|------|
| <b>Off Characteristics</b>                                |  |   |      |      |      |      |
| V <sub>(BR)DSS</sub>                                      | Drain-Source Breakdown Voltage                           | I <sub>D</sub> = 250μA, V <sub>GS</sub> = 0V  | 30   | -    | -    | V    |
| I <sub>DSS</sub>  | Zero Gate Voltage Drain Current                          | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V   | -    | -    | 1.0  | μA   |
| I <sub>GSS</sub>  | Gate-Body Leakage Current                                | V <sub>DS</sub> = 0V, V <sub>GS</sub> = ±20V  | -    | -    | ±100 | nA   |
| <b>On Characteristics</b>                                 |  |   |      |      |      |      |
| V <sub>GS(th)</sub>                                       | Gate Threshold Voltage                                   | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                  | 1.0  | 1.6  | 2.5  | V    |
| R <sub>DS(ON)</sub>                                       | Static Drain-Source ON-Resistance <sup>(4)</sup>         | V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A   | -    | 4.6  | 6.0  | mΩ   |
|   |  | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 20A  | -    | 7.3  | 9.5  | mΩ   |
| <b>Dynamic Characteristics</b>                            |  |   |      |      |      |      |
| C <sub>iss</sub>  | Input Capacitance  | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 15V,<br>f = 1MHz                                    | -    | 1788 | -    | pF   |
| C <sub>oss</sub>  | Output Capacitance                                       |   | -    | 225  | -    | pF   |
| C <sub>rss</sub>  | Reverse Transfer Capacitance                             |   | -    | 180  | -    | pF   |
| Q <sub>g</sub>  | Total Gate Charge  | V <sub>GS</sub> = 0 to 10V<br>V <sub>DS</sub> = 15V, I <sub>D</sub> = 30A                   | -    | 34   | -    | nC   |
| Q <sub>gs</sub>   | Gate Source Charge                                       |   | -    | 6.5  | -    | nC   |
| Q <sub>gd</sub>   | Gate Drain("Miller") Charge                              |   | -    | 7.5  | -    | nC   |
| <b>Switching Characteristics</b>                          |  |   |      |      |      |      |
| t <sub>d(on)</sub>  | Turn-On DelayTime  | V <sub>GS</sub> = 10V, V <sub>DD</sub> = 15V<br>I <sub>D</sub> = 30A, R <sub>GEN</sub> = 3Ω | -    | 7    | -    | ns   |
| t <sub>r</sub>  | Turn-On Rise Time  |   | -    | 14   | -    | ns   |
| t <sub>d(off)</sub>                                       | Turn-Off DelayTime                                       |   | -    | 34   | -    | ns   |
| t <sub>f</sub>  | Turn-Off Fall Time                                       |   | -    | 11   | -    | ns   |
| <b>Drain-Source Diode Characteristics and Max Ratings</b> |  |   |      |      |      |      |
| I <sub>S</sub>  | Maximum Continuous Drain to Source Diode Forward Current |   | -    | -    | 70   | A    |
| I <sub>SM</sub>   | Maximum Pulsed Drain to Source Diode Forward Current     |   | -    | -    | 280  | A    |
| V <sub>SD</sub>   | Drain to Source Diode Forward Voltage                    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 30A  | -    | -    | 1.2  | V    |
| t <sub>rr</sub>   | Body Diode Reverse Recovery Time                         | I <sub>F</sub> = 20A, di/dt = 100A/us   | -    | 10   | -    | ns   |
| Q <sub>rr</sub>   | Body Diode Reverse Recovery Charge                       |   | -    | 1.7  | -    | nC   |

- Notes:
1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.
  2. E<sub>AS</sub> condition: Starting T<sub>J</sub>=25C, V<sub>DD</sub>=15V, V<sub>G</sub>=10V, R<sub>G</sub>=25ohm, L=0.5mH, I<sub>AS</sub>=18A
  3. R<sub>θJA</sub> is measured with the device mounted on a 1inch<sup>2</sup> pad of 2oz copper FR4 PCB
  4. Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 0.5%.

## Typical Performance Characteristics

Figure 1: Output Characteristics

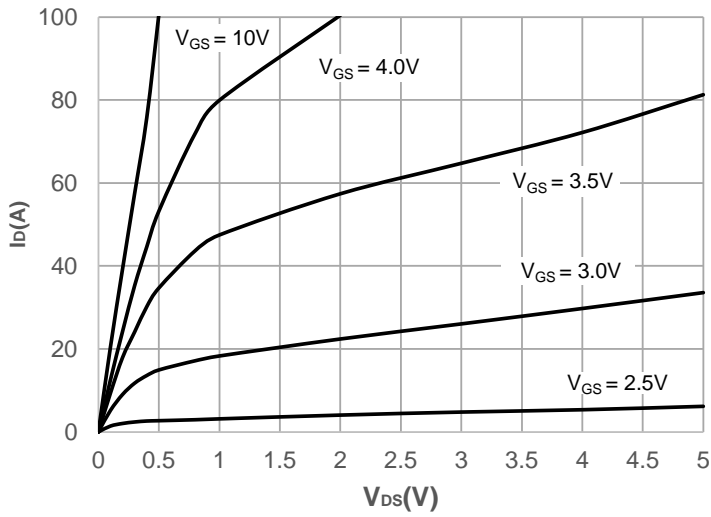


Figure 2: Typical Transfer Characteristics

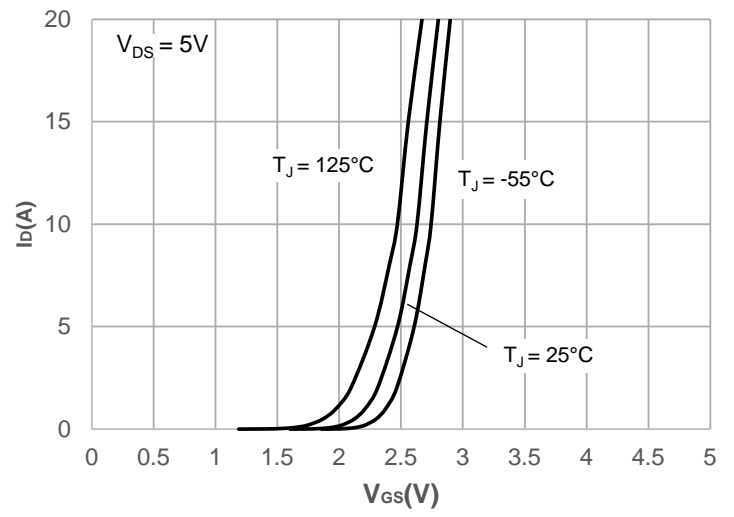


Figure 3: On-resistance vs. Drain Current

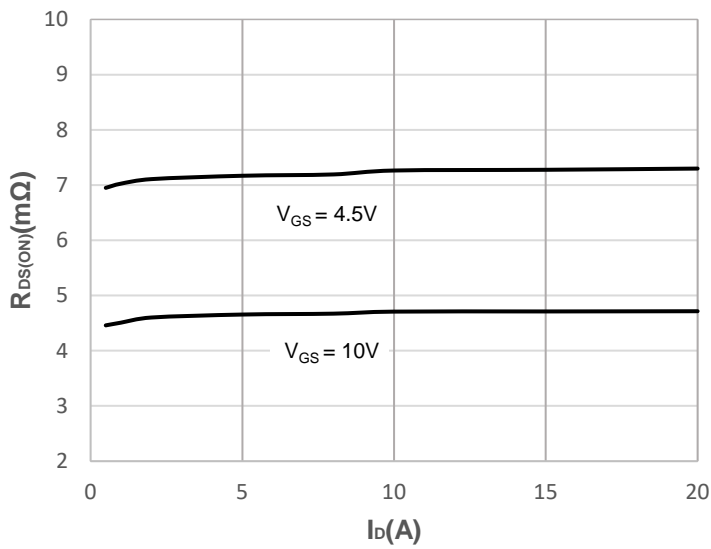


Figure 4: Body Diode Characteristics

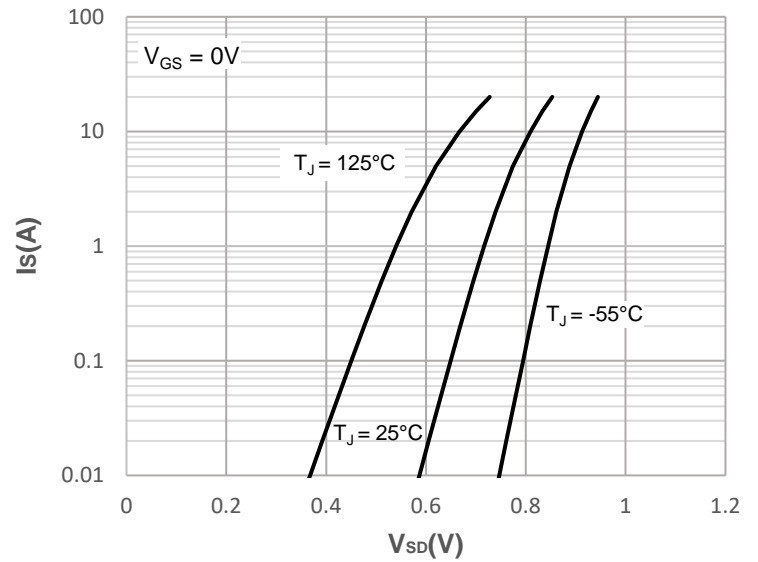


Figure 5: Gate Charge Characteristics

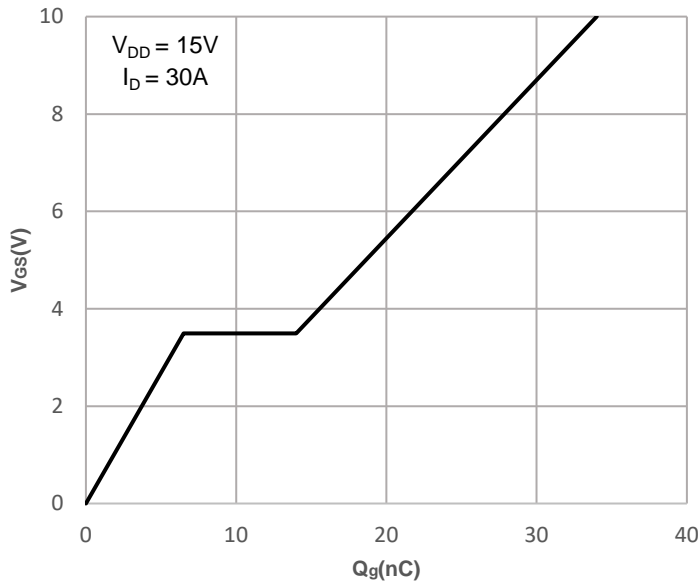
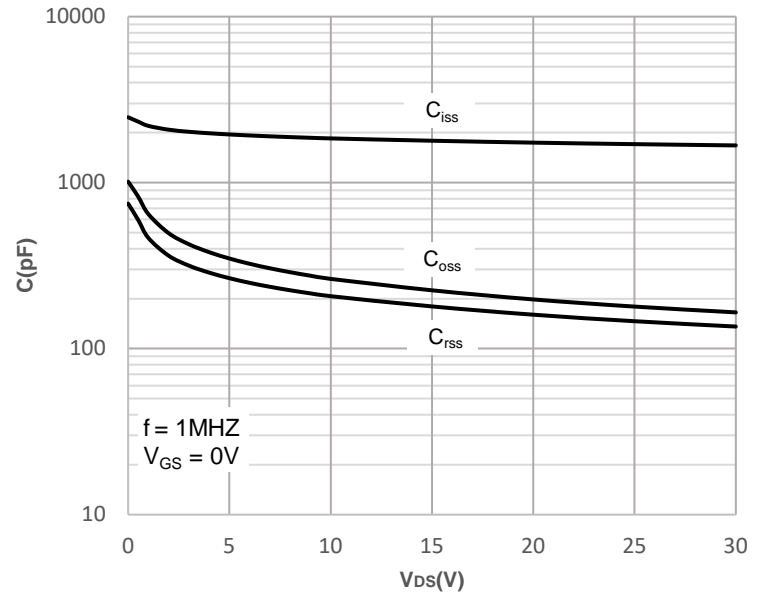


Figure 6: Capacitance Characteristics



## Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

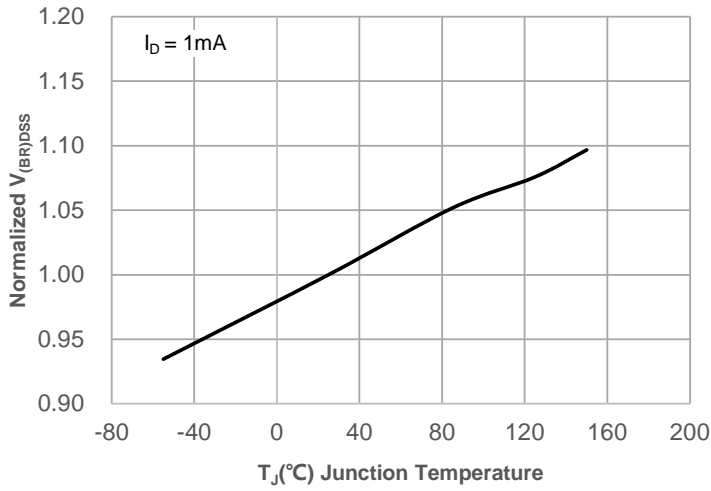


Figure 8: Normalized on Resistance vs. Junction Temperature

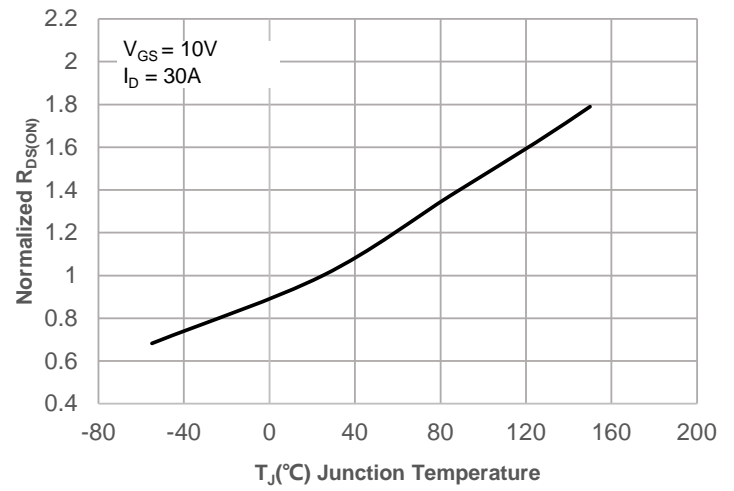


Figure 9: Maximum Safe Operating Area

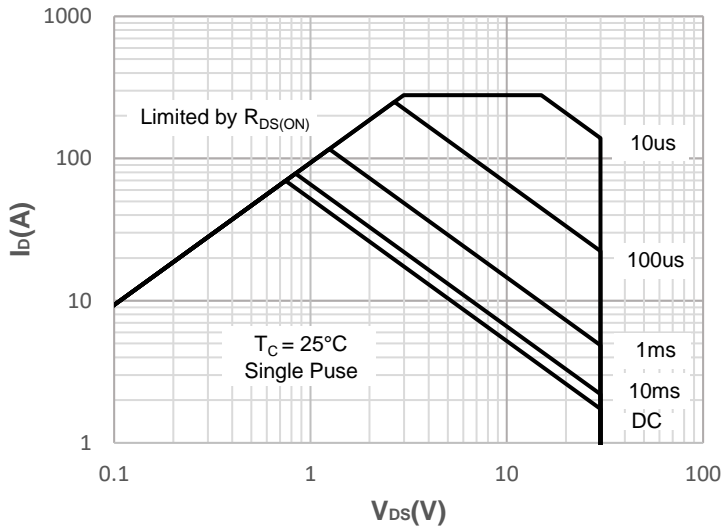


Figure 10: Maximum Continuous Driant Current vs. Case Temperature

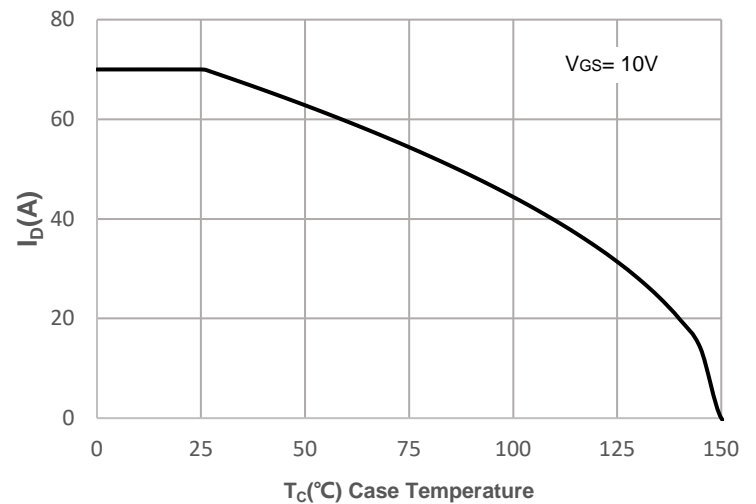


Figure 11: Normalized Maximum Transient Thermal Impedance

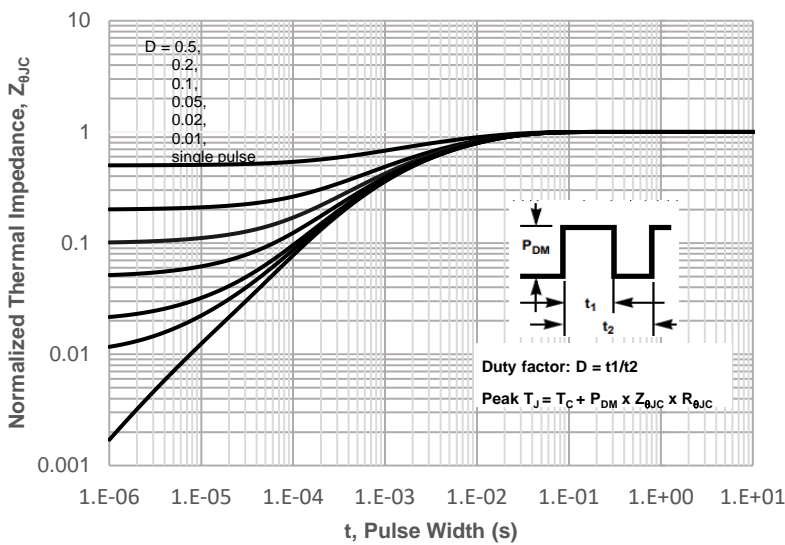
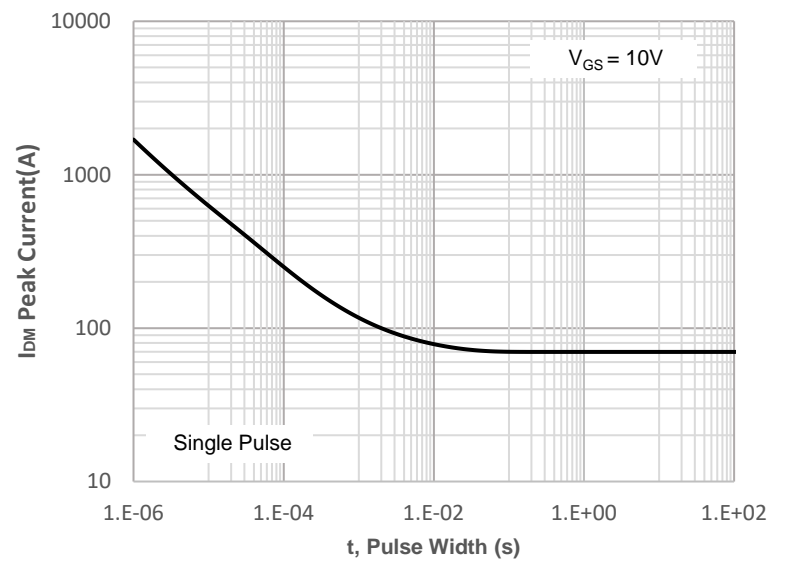


Figure 12: Peak Current Capacity



## Test Circuit

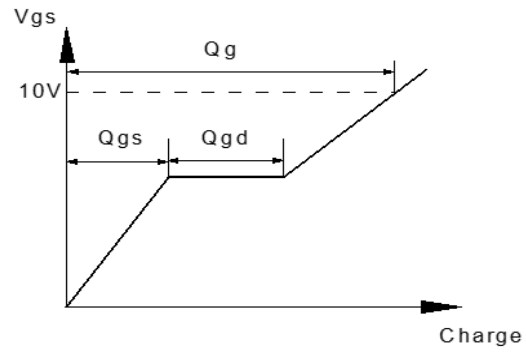
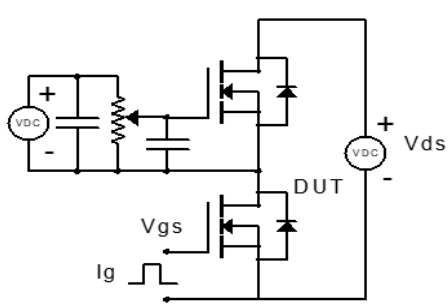


Figure 1: Gate Charge Test Circuit & Waveform

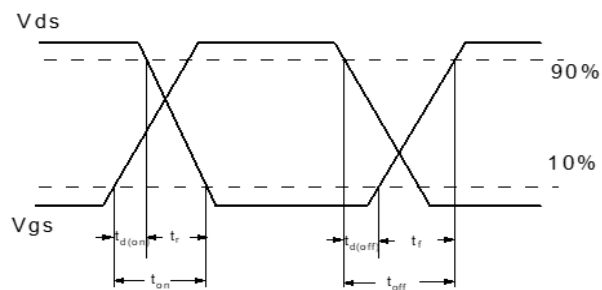
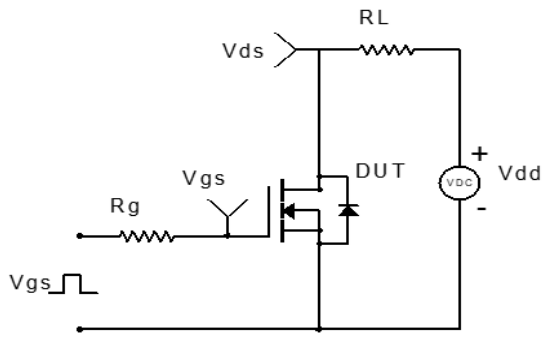


Figure 2: Resistive Switching Test Circuit & Waveform

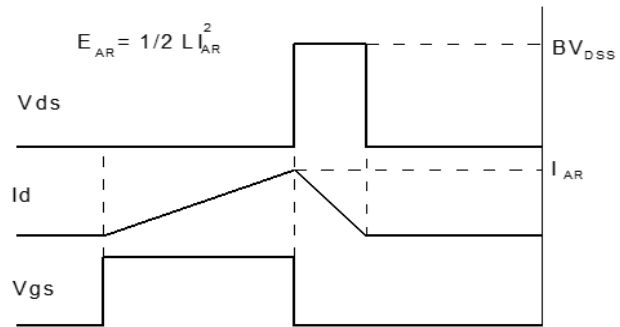
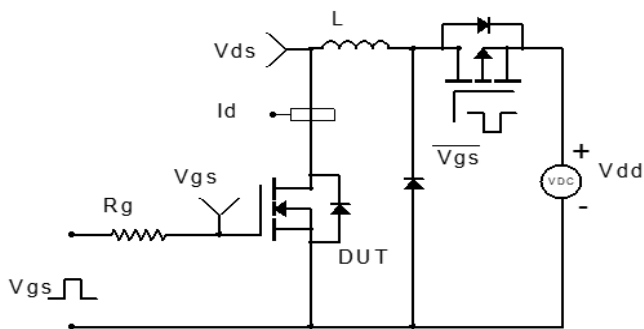


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

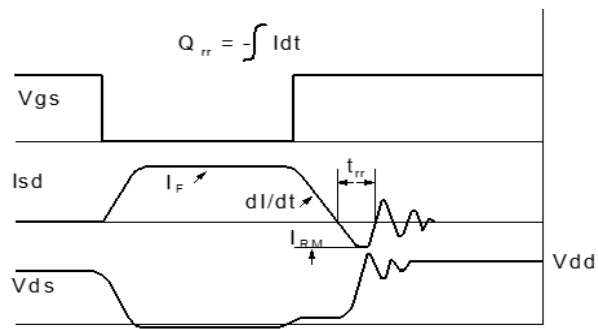
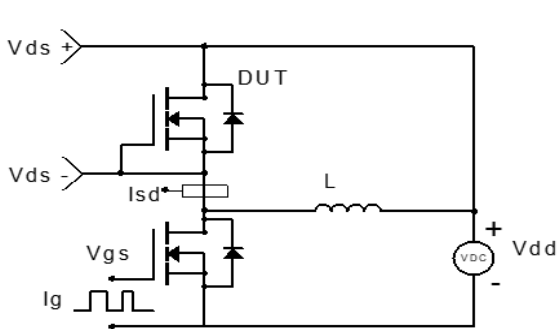
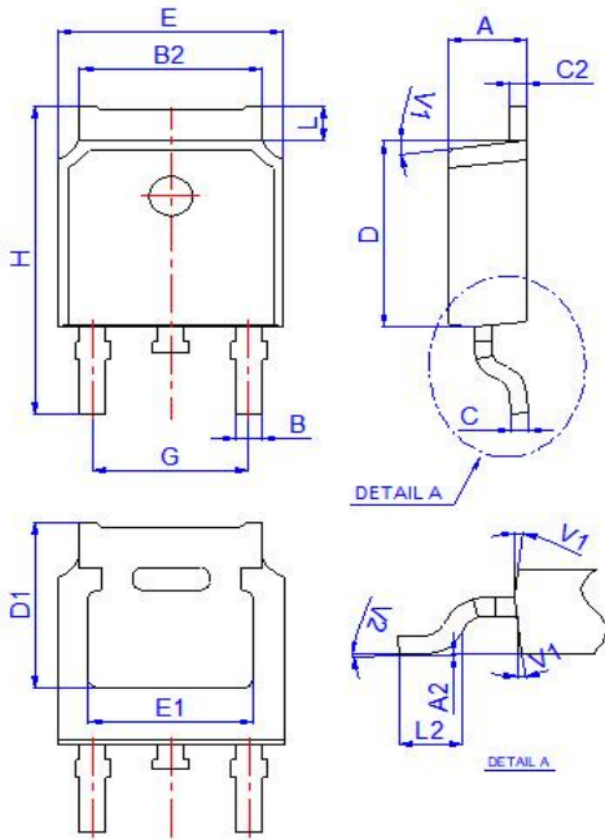


Figure 4: Diode Recovery Test Circuit & Waveform

## Package Mechanical Data(TO-252-3L)



| Ref. | Dimensions  |      |       |          |      |       |
|------|-------------|------|-------|----------|------|-------|
|      | Millimeters |      |       | Inches   |      |       |
|      | Min.        | Typ. | Max.  | Min.     | Typ. | Max.  |
| A    | 2.10        |      | 2.50  | 0.083    |      | 0.098 |
| A2   | 0           |      | 0.10  | 0        |      | 0.004 |
| B    | 0.66        |      | 0.86  | 0.026    |      | 0.034 |
| B2   | 5.18        |      | 5.48  | 0.202    |      | 0.216 |
| C    | 0.40        |      | 0.60  | 0.016    |      | 0.024 |
| C2   | 0.44        |      | 0.58  | 0.017    |      | 0.023 |
| D    | 5.90        |      | 6.30  | 0.232    |      | 0.248 |
| D1   | 5.30REF     |      |       | 0.209REF |      |       |
| E    | 6.40        |      | 6.80  | 0.252    |      | 0.268 |
| E1   | 4.63        |      |       | 0.182    |      |       |
| G    | 4.47        |      | 4.67  | 0.176    |      | 0.184 |
| H    | 9.50        |      | 10.70 | 0.374    |      | 0.421 |
| L    | 1.09        |      | 1.21  | 0.043    |      | 0.048 |
| L2   | 1.35        |      | 1.65  | 0.053    |      | 0.065 |
| V1   |             | 7°   |       |          | 7°   |       |
| V2   | 0°          |      | 6°    | 0°       |      | 6°    |

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