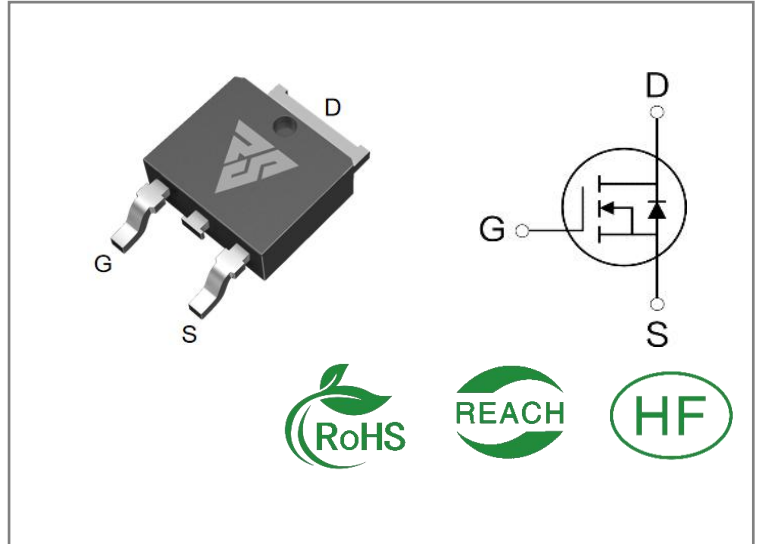


| ID | R _{DS(ON)} (Typ) | VDSS |
|-----|---------------------------|------|
| 60A | 6.2mΩ | 30V |


Applications:

- Load Switch
- PWM Applications
- Power Management

Features:

- Fast switching speed
- 100% avalanche tested
- Improved dv/dt capability

Ordering Information

| Part Number | Package | Marking | Packing | Qty. |
|-------------|---------|----------|-----------|----------|
| RS30N60D | T0-252 | RS30N60D | Tape&reel | 2500 PCS |

Absolute Maximum Ratings Tc= 25°C unless otherwise specified

| Symbol | Parameter | RS30N60D | Units |
|-------------|--|------------|-------|
| VDSS | Drain-to-Source Voltage | 30 | V |
| ID | Continuous Drain Current TC=25°C | 60 | A |
| ID | Continuous Drain Current TC=100°C | 35 | |
| IDM | Pulsed Drain Current (Note*1) | 140 | |
| PD | Power Dissipation | 60 | W |
| VGS | Gate- to- Source Voltage | ±20 | V |
| EAS | Single Pulse Avalanche Energy L = 1mH, VDD = 15V, RG = 25 Ω, TC=25°C | 70 | mJ |
| TL TPKG | Maximum Temperature for Soldering | 300 | °C |
| | Leads at 0.063in(1.6mm)from Case for 10 seconds Package Body for 10 seconds | 260 | |
| TJ and TSTG | Operating Junction and Storage Temperature Range | -55 to 150 | |

* Drain Current Limited by Maximum Junction Temperature

Caution: Stresses greater than those listed in the " Absolute Maximum Ratings" Table may cause permanent damage to the device.

Thermal Resistance

| Symbol | Parameter | RS30N60D | Units | Test Conditions |
|---------------|---------------------|----------|--------|---|
| R θ JC | Junction-to-Case | 2.5 | °C / W | Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 150 °C |
| R θ JA | Junction-to-Ambient | 60 | | 1 cubic foot chamber, free air. |

OFF Characteristics TJ= 25°C unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|--------|-------------------------------------|------|------|------|---------|------------------------|
| BVDSS | Drain- to- source Breakdown Voltage | 30 | -- | -- | V | VGS=0V, ID=250 μ A |
| IDSS | Drain- to- Source Leakage Current | -- | -- | 1 | μ A | VDS=30V, VGS=0V |
| IGSS | Gate- to- Source Forward Leakage | -- | -- | 100 | nA | VGS=20V, VDS=0V |
| | Gate- to- Source Reverse Leakage | -- | -- | -100 | | VGS=-20V, VDS=0V |

ON Characteristics TJ=25°C unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---------|--|------|------|------|------------|-------------------------|
| RDS(on) | Static Drain- to- Source On-Resistance(Note*2) | -- | 6.2 | 7.5 | m Ω | VGS=10V, ID=25A |
| | | -- | 11.5 | 15 | m Ω | VGS=4.5V, ID=20A |
| VGS(TH) | Gate Threshold Voltage | 1.0 | 1.6 | 3.0 | V | VGS=VDS, ID=250 μ A |

Resistive Switching Characteristics Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---------|----------------------|------|------|------|-------|--------------------------------------|
| td(ON) | Turn- on Delay Time | -- | 10 | -- | nS | VDS=15V ID=20A RG=1.8 Ω |
| trise | Rise Time | -- | 8 | -- | | |
| td(OFF) | Turn- OFF Delay Time | -- | 30 | -- | | |
| tfall | Fall Time | -- | 5 | -- | | |

Dynamic Characteristics Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|--------|---------------------------------|------|------|------|-------|-------------------------------|
| Ciss | Input Capacitance | -- | 2000 | -- | pF | VGS=0V VDS=15V f=1.0MHz |
| Coss | Output Capacitance | -- | 280 | -- | | |
| Crss | Reverse Transfer Capacitance | -- | 160 | -- | | |
| Qg | Total Gate Charge | -- | 23 | -- | nC | VDS=10V ID=25A VGS=10V |
| Qgs | Gate- to- Source Charge | -- | 7 | -- | | |
| Qgd | Gate-to-Drain(" Miller") Charge | -- | 4.5 | -- | | |

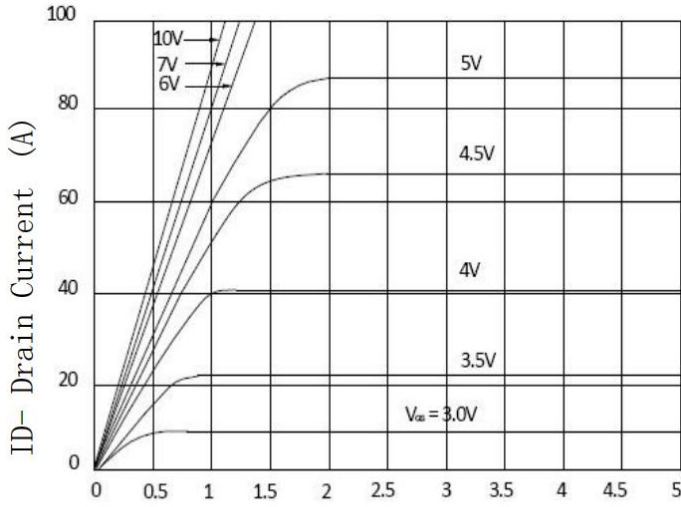
Source- Drain Diode Characteristics

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|--------|---------------------------|------|------|------|-------|-----------------------------------|
| IS | Continuous Source Current | -- | -- | 60 | A | Integral pn- diode in MOSFET |
| ISM | Maximum Pulsed Current | -- | -- | 250 | A | |
| VSD | Diode Forward Voltage | -- | -- | 1.2 | V | IS=8A,VGS=0V |
| trr | Reverse Recovery Time | -- | 22 | -- | nS | VGS=0V IS=16A di/dt=100A/μs |
| Qrr | Reverse Recovery Charge | -- | 12 | -- | μC | |

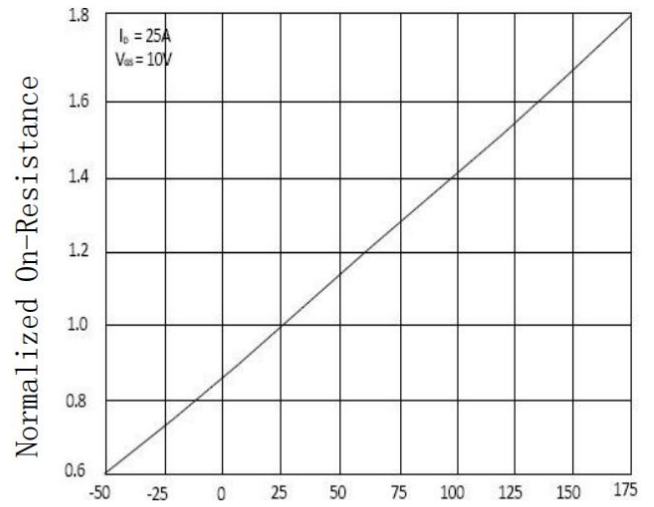
Notes:

- * 1. Repetitive rating, pulse width limited by maximum junction temperature.
- * 2. Pulse Test: Pulse width $\leq 300\mu\text{s}$, Duty Cycle $\leq 1\%$

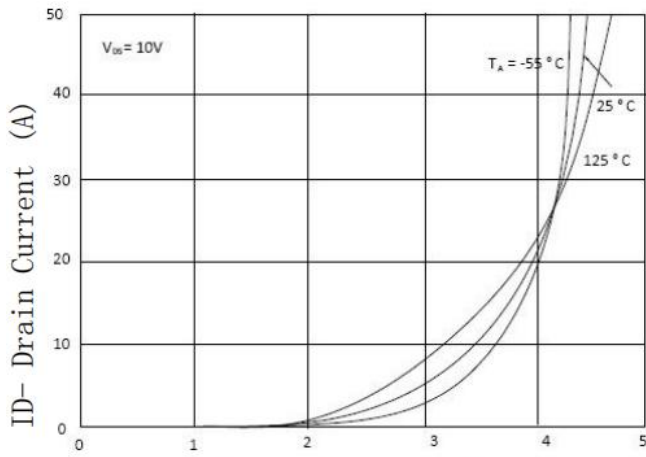
Typical Feature Curve



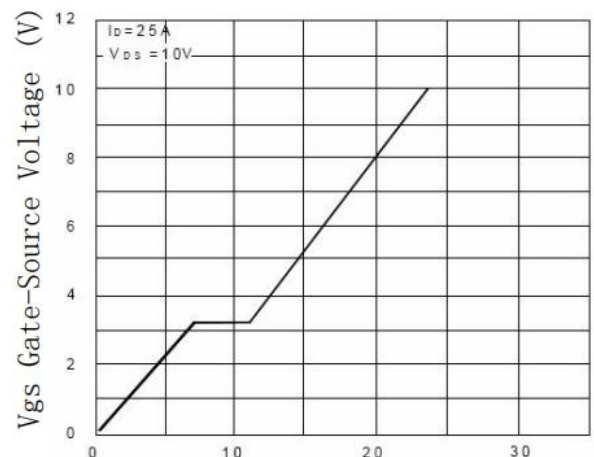
Vds Drain-Source Voltage (V)
Figure 1 Output Characteristics



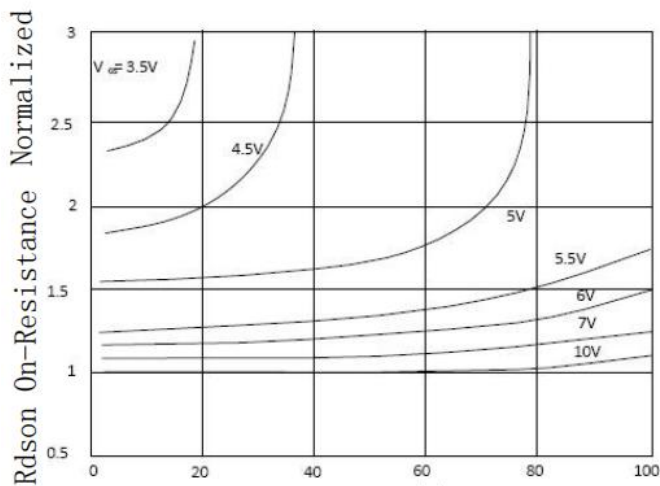
TJ-Junction Temperature (°C)
Figure 4 Rdson-Junction Temperature



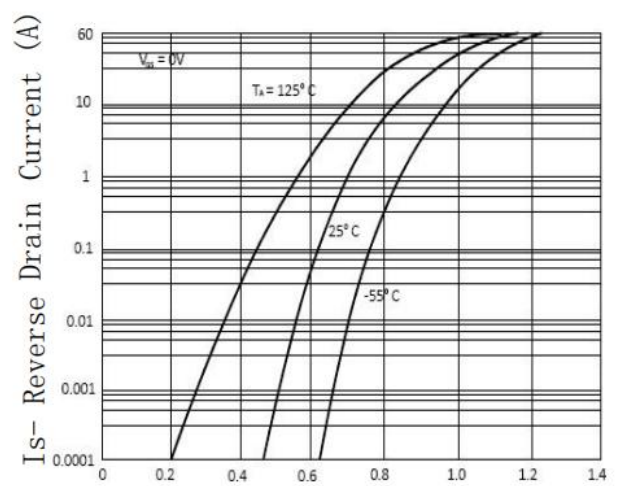
Vgs Gate-Source Voltage (V)
Figure 2 Transfer Characteristics



Qg Gate Charge (nC)
Figure 5 Gate Charge



ID- Drain Current (A)
Figure 3 Rdson- Drain Current



Vsd Source-Drain Voltage (V)
Figure 6 Source- Drain Diode Forward

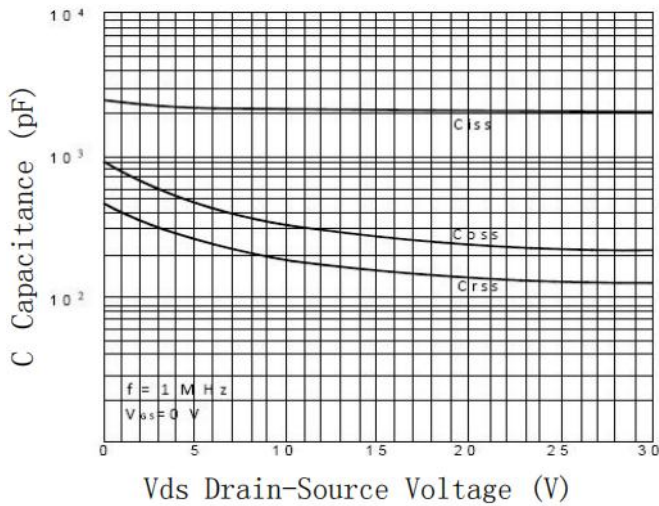


Figure 7 Capacitance vs Vds

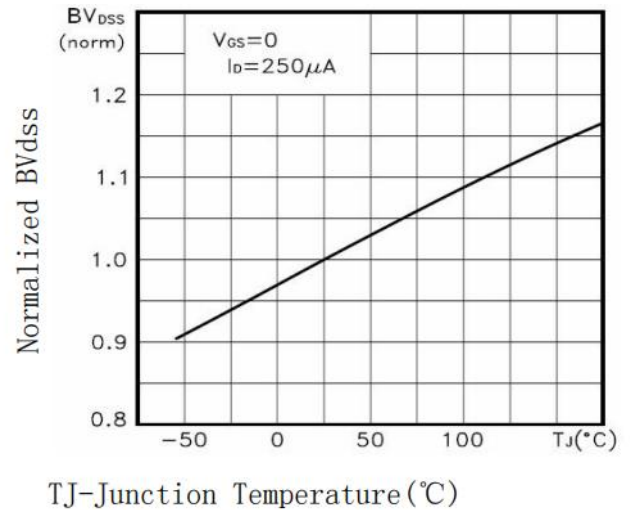


Figure 9 BVdss vs Junction Temperature

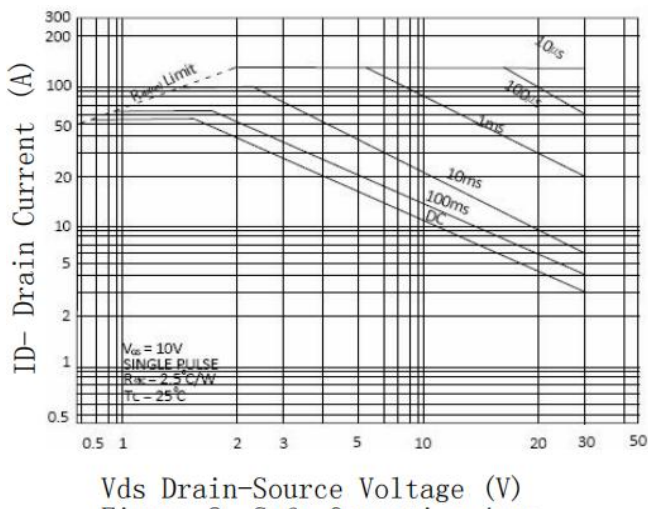


Figure 8 Safe Operation Area

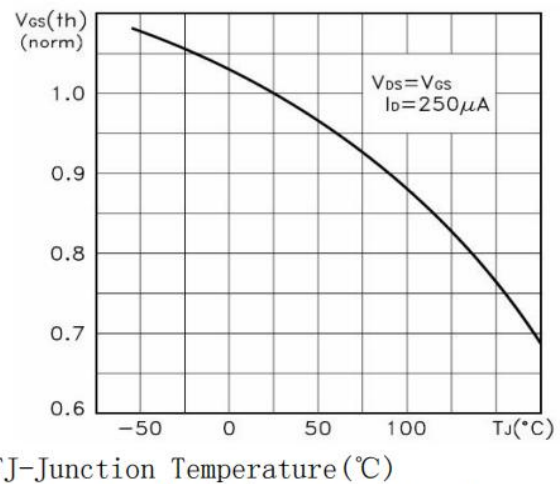


Figure 10 VGS(th) vs Junction Temperature

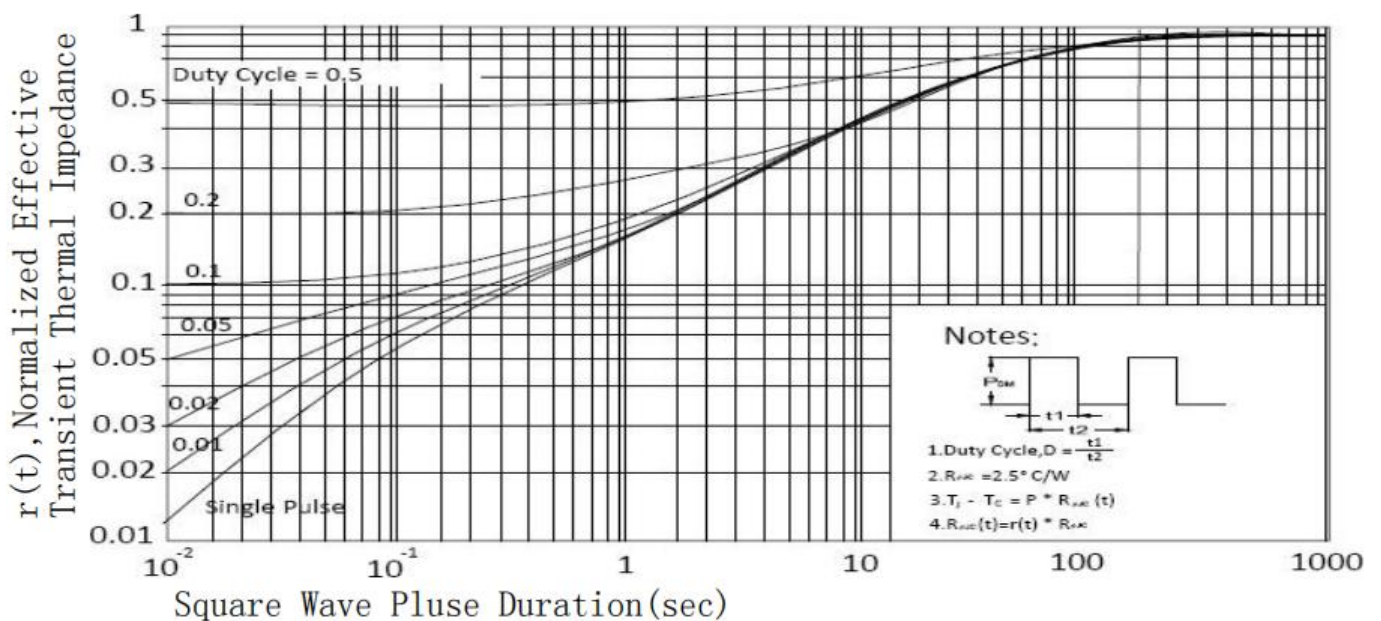


Figure 11 Normalized Maximum Transient Thermal Impedance

Test Circuits and Waveforms

Figure A: Gate Charge Test Circuit and Waveform

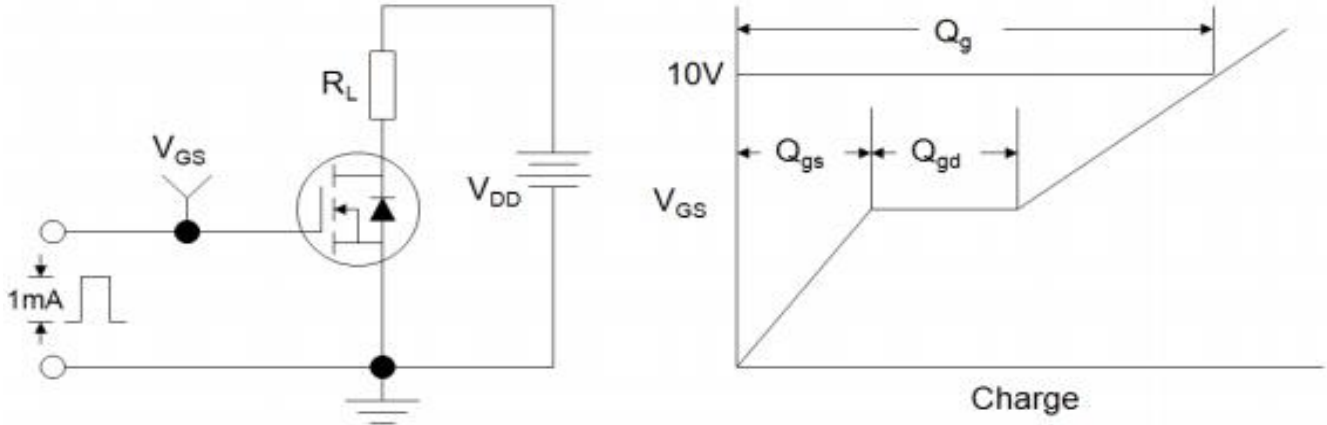


Figure B: Resistive Switching Test Circuit and Waveform

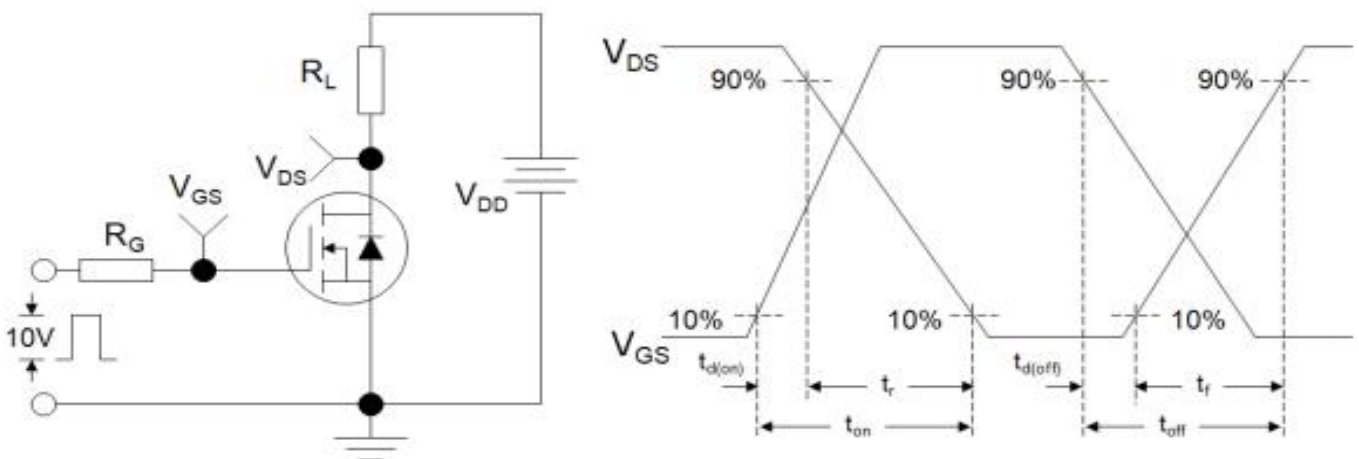
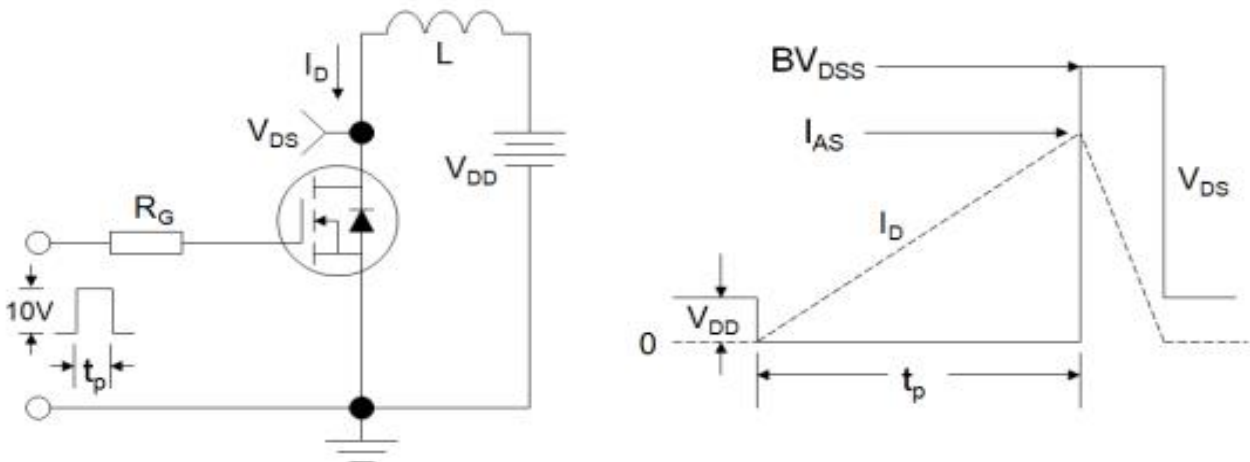
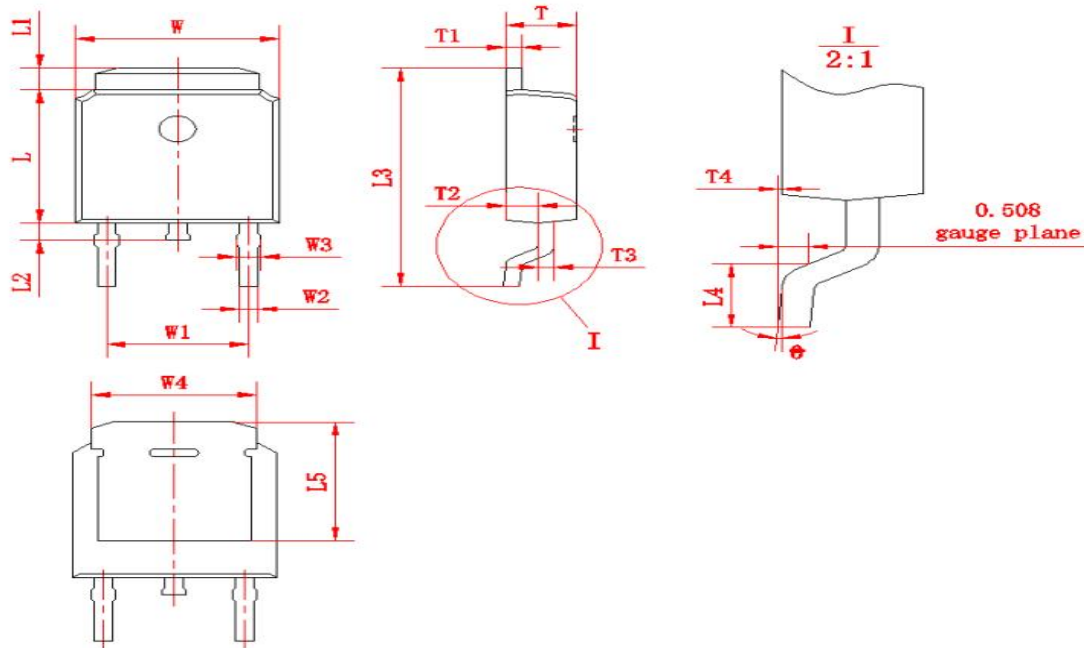


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Package outline drawing(TO-252 Unit: mm)



| 符号 | 尺寸 | | 符号 | 尺寸 | | 符号 | 尺寸 | |
|----|---------|------|----|--------|-------|----|------|------|
| | Min | Max | | Min | Max | | Min | Max |
| W | 6.50 | 6.70 | L1 | 0.80 | 1.20 | T1 | 0.48 | 0.58 |
| W1 | (4.572) | | L2 | 0.60 | 1.00 | T2 | 0.95 | 1.15 |
| W2 | 0.6 | 0.8 | L3 | 9.70 | 10.30 | T3 | 0.48 | 0.58 |
| W3 | 0.68 | 0.88 | L4 | 1.30 | 1.70 | T4 | 0.00 | 0.12 |
| W4 | (5.3) | | L5 | (5.20) | | 0 | 0 | 8 |
| L | 6.00 | 6.20 | T | 2.20 | 2.40 | | | |

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