

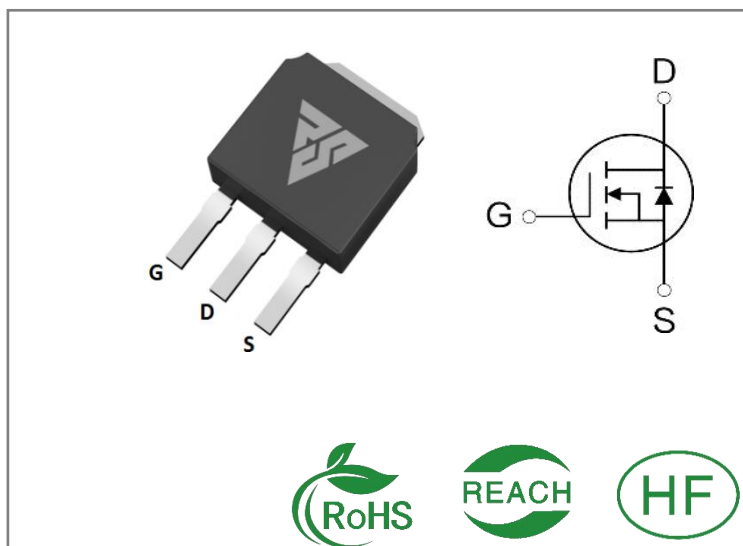
| ID | R _{DS(ON)} (Typ) | VDSS |
|----|---------------------------|------|
| 7A | 1.1Ω | 650V |

Applications:

- Switch Mode Power Supply(SMPS)
- Adapter & Charger
- AC-DC Switching Power Supply

Features:

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



Ordering Information

| Part Number | Package | Marking | Packing | Qty. |
|-------------|---------|----------|---------|--------|
| RS7N65MD | T0-251 | RS7N65MD | Tube | 80 PCS |

Absolute Maximum Ratings Tc= 25°C unless otherwise specified

| Symbol | Parameter | RS7N65MD | Units |
|-------------|--|------------|-------|
| VDSS | Drain-to-Source Voltage | 650 | V |
| ID | Continuous Drain Current TC=25°C | 7 | A |
| IDM | Pulsed Drain Current (Note*1) | 28 | |
| PD | Power Dissipation | 125 | W |
| VGS | Gate- to- Source Voltage | ±30 | V |
| EAS | Single Pulse Avalanche Engergy L = 10mH, VDD = 50V, RG = 25 Ω | 180 | mJ |
| TL TPKG | Maximum Temperature for Soldering | 300 260 | °C |
| | Leads at 0.063in(1.6mm)from Case for 10 seconds | | |
| | Package Body for 10 seconds | | |
| 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 | RS7N65MD | Units | Test Conditions |
|---------------|---------------------|----------|-------------------------------|---|
| R θ JC | Junction-to-Case | 0.98 | $^{\circ}\text{C} / \text{W}$ | Drain lead soldered to water cooled heatsink, PD adjusted for a peak junction temperature of + 150 $^{\circ}\text{C}$ |
| R θ JA | Junction-to-Ambient | 62.5 | | 1 cubic foot chamber, free air. |

OFF Characteristics $T_J = 25^{\circ}\text{C}$ unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|--------|-------------------------------------|------|------|------|---------------|--|
| BVDSS | Drain- to- source Breakdown Voltage | 650 | -- | -- | V | $V_{GS}=0\text{V}, I_D=250\mu\text{A}$ |
| IDSS | Drain- to- Source Leakage Current | -- | -- | 1 | μA | $V_{DS}=650\text{V}, V_{GS}=0\text{V}$ |
| IGSS | Gate- to- Source Forward Leakage | -- | -- | 100 | nA | $V_{GS}=30\text{V}, V_{DS}=0\text{V}$ |
| | Gate- to- Source Reverse Leakage | -- | -- | -100 | | $V_{GS}=-30\text{V}, V_{DS}=0\text{V}$ |

ON Characteristics $T_J = 25^{\circ}\text{C}$ unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---------|--|------|------|------|----------|--------------------------------------|
| RDS(on) | Static Drain- to- Source On-Resistance(Note*2) | -- | 1.1 | 1.35 | Ω | $V_{GS}=10\text{V}, I_D=3.5\text{A}$ |
| VGS(TH) | Gate Threshold Voltage | 3 | -- | 4 | V | $V_{GS}=V_{DS}, I_D=250\mu\text{A}$ |

Resistive Switching Characteristics Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---------|----------------------|------|------|------|-------|---|
| td(ON) | Turn- on Delay Time | -- | 9 | -- | nS | $V_{DS}=325\text{V}$ $I_D=7\text{A}$ $R_G=25\Omega$ |
| trise | Rise Time | -- | 125 | -- | | |
| td(OFF) | Turn- OFF Delay Time | -- | 55 | -- | | |
| tfall | Fall Time | -- | 20 | -- | | |

Dynamic Characteristics Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|--------|---------------------------------|------|------|------|-------|-------------------------------|
| Ciss | Input Capacitance | -- | 912 | -- | pF | VGS=0V VDS=25V f=1.0MHz |
| Coss | Output Capacitance | -- | 102 | -- | | |
| Crss | Reverse Transfer Capacitance | -- | 17 | -- | | |
| Qg | Total Gate Charge | -- | 29 | -- | nC | VDS=520V ID=7A VGS=10V |
| Qgs | Gate- to- Source Charge | -- | 4 | -- | | |
| Qgd | Gate-to-Drain(" Miller") Charge | -- | 14 | -- | | |

Source- Drain Diode Characteristics

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|--------|---------------------------|------|------|------|-------|-----------------------------------|
| IS | Continuous Source Current | -- | -- | 7 | A | Integral pn- diode in MOSFET |
| ISM | Maximum Pulsed Current | -- | -- | 28 | A | |
| VSD | Diode Forward Voltage | -- | -- | 1.4 | V | IS=3.5A,VGS=0V |
| trr | Reverse Recovery Time | -- | 280 | -- | nS | VGS=0V IS=7A,di/dt=100A /μs |
| Qrr | Reverse Recovery Charge | -- | 2.5 | -- | μC | |

Notes:

- * 1. Repetitive rating, pulse width limited by maximum junction temperature.
- * 2. Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

Typical Feature Curve

Figure 1. Output Characteristics ($T_J = 25^\circ\text{C}$)

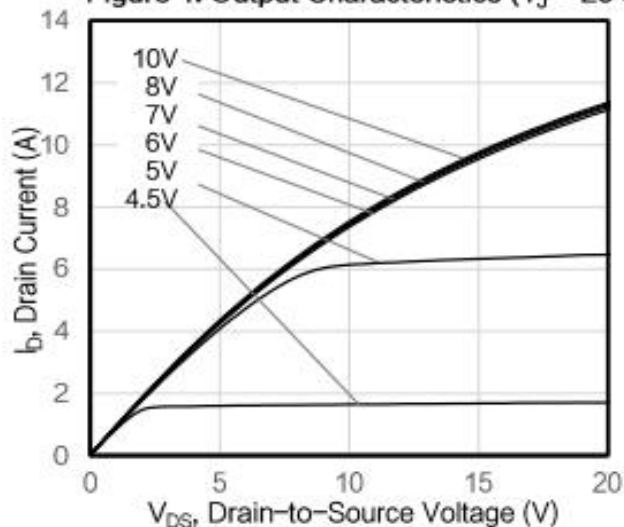


Figure 2. Body Diode Forward Voltage

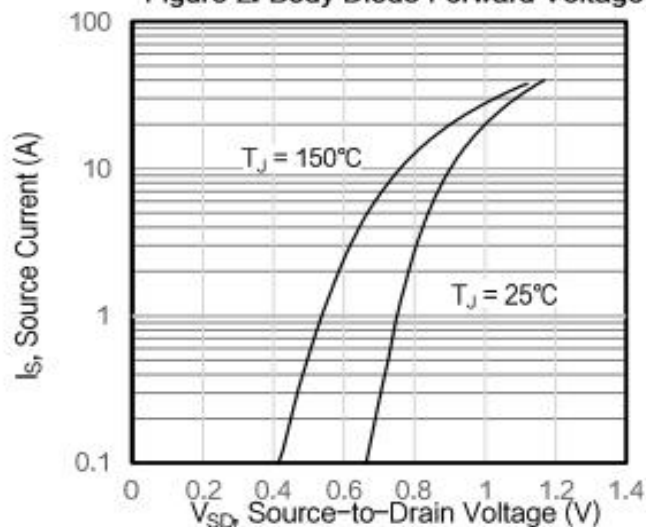


Figure 3. Drain Current vs. Temperature

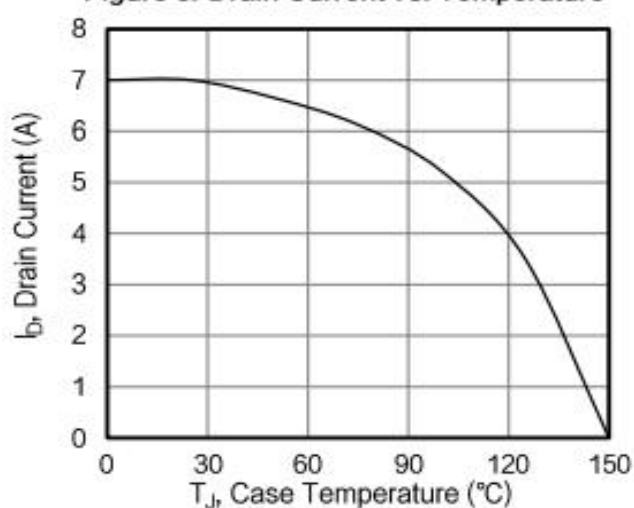


Figure 4. BV_{DSS} Variation vs. Temperature

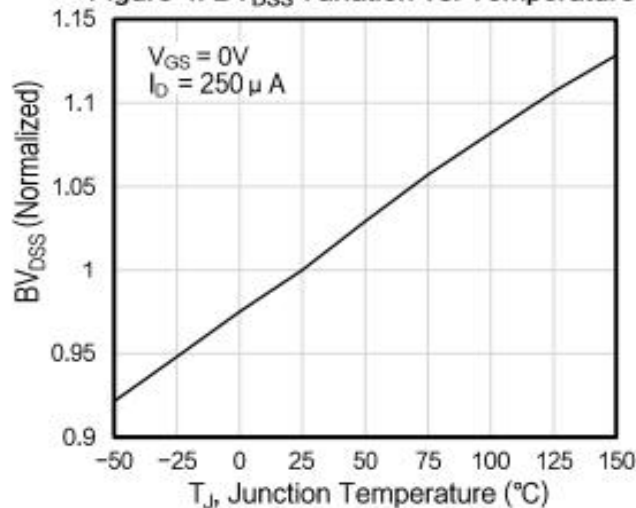


Figure 5. Transfer Characteristics

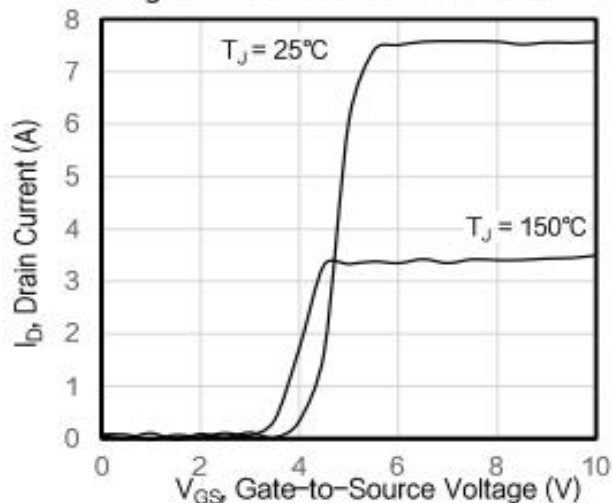


Figure 6. On-Resistance vs. Temperature

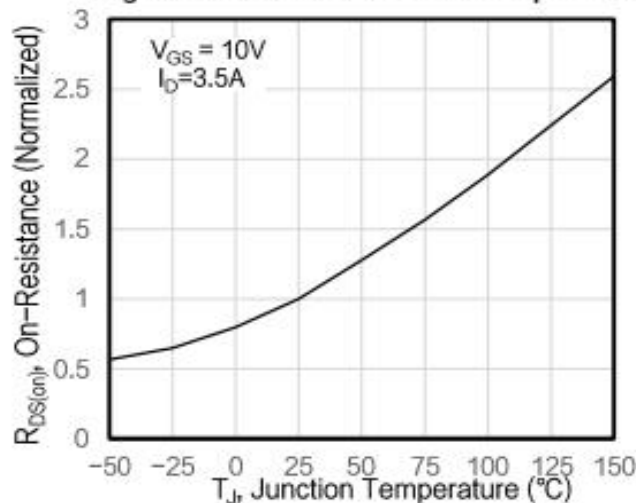


Figure 7. Capacitance

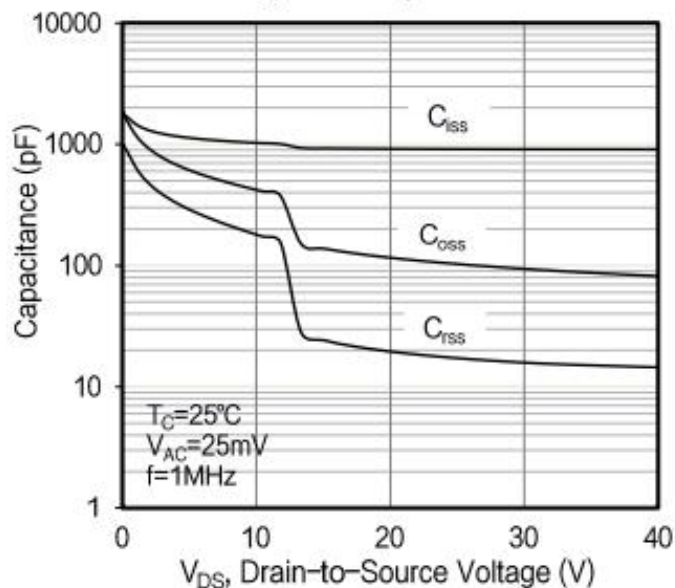


Figure 8. Gate Charge

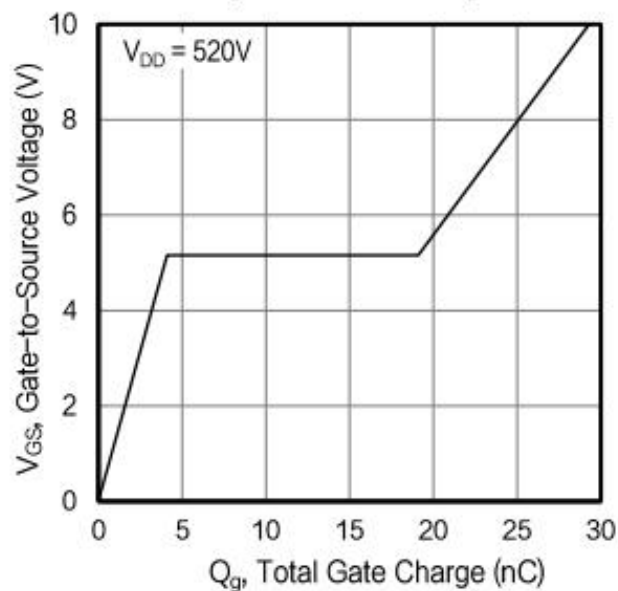


Figure 9. Transient Thermal Impedance

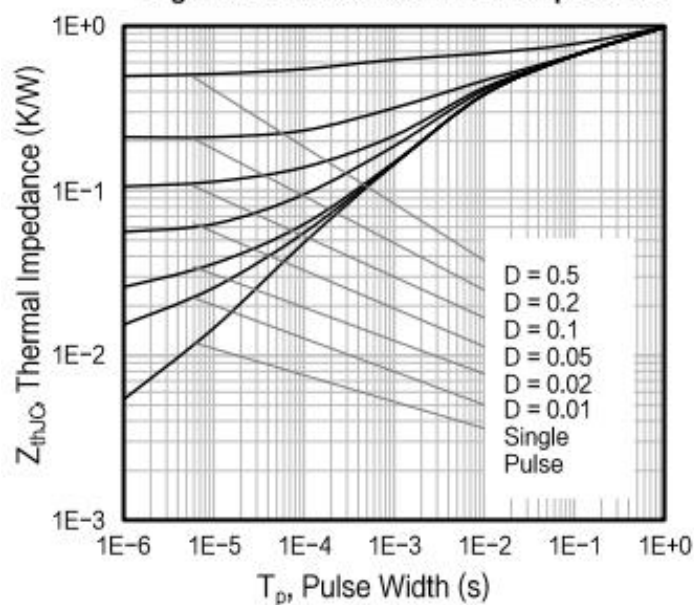
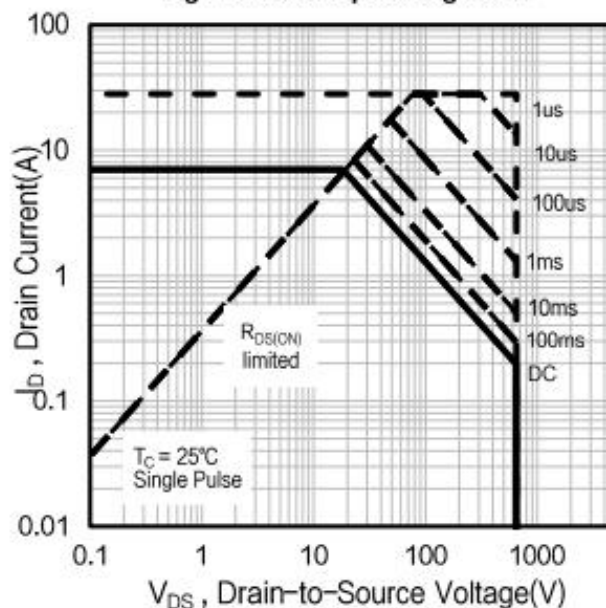


Fig. 10 Safe Operating Area



Test Circuits and Waveforms

Figure A: Gate Charge Test Circuit and Waveform

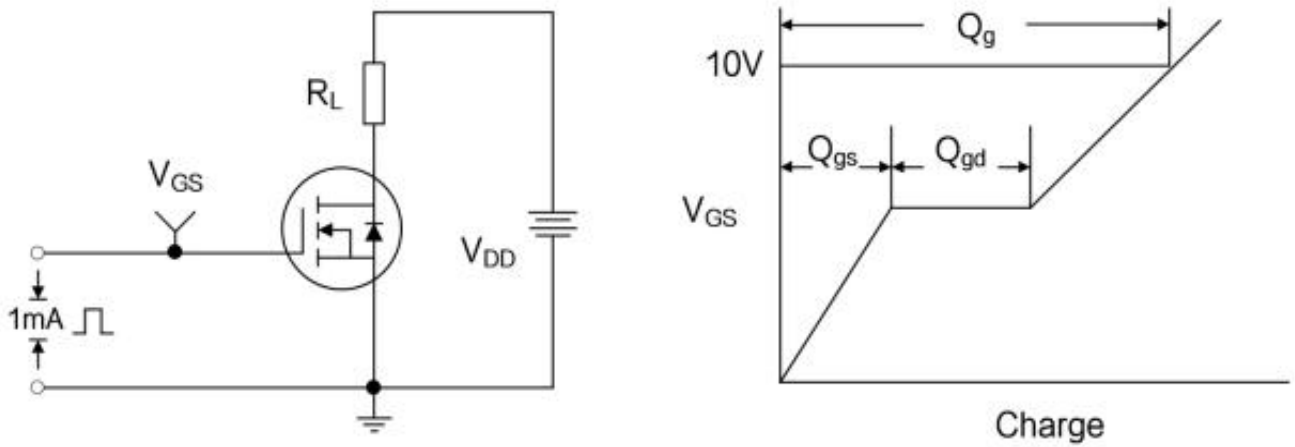


Figure B: Resistive Switching Test Circuit and Waveform

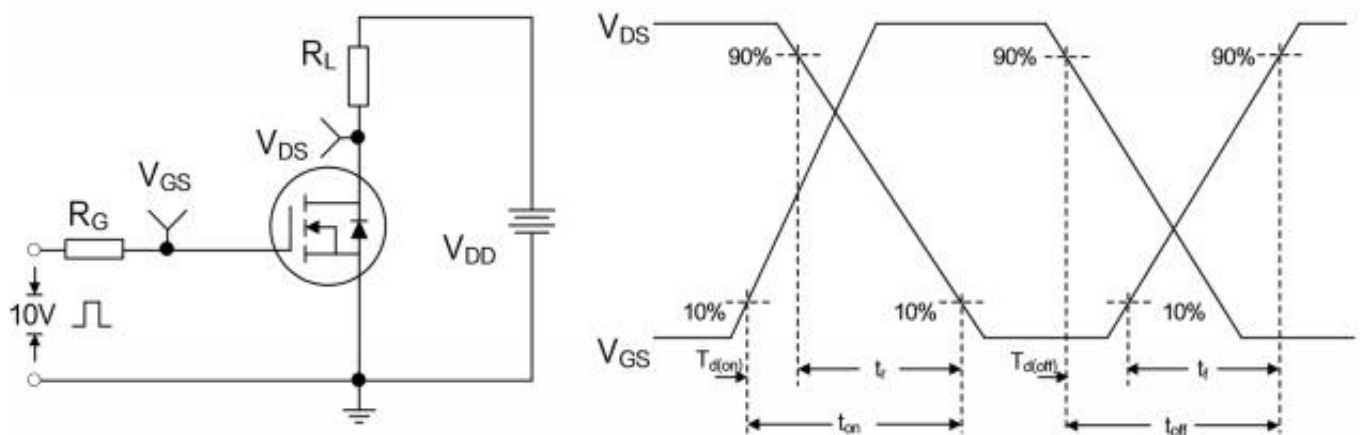
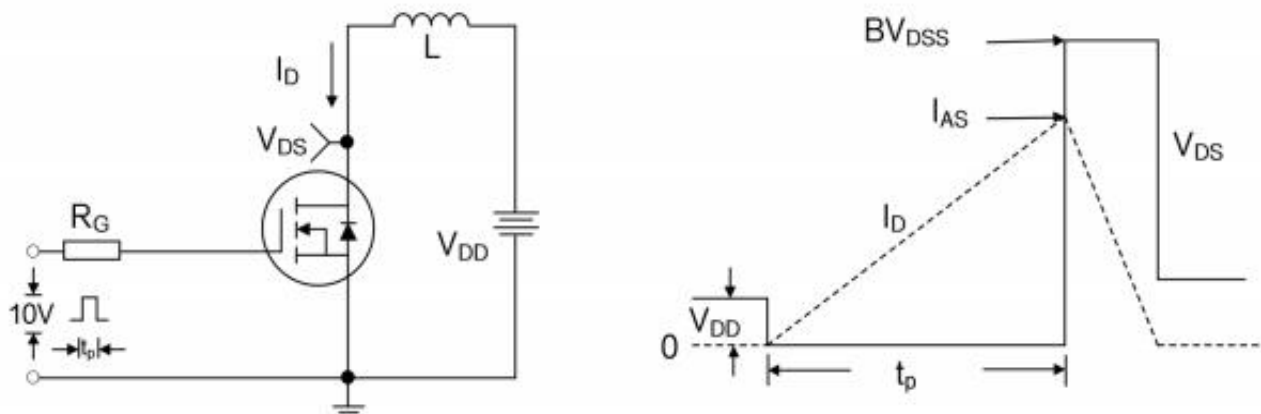
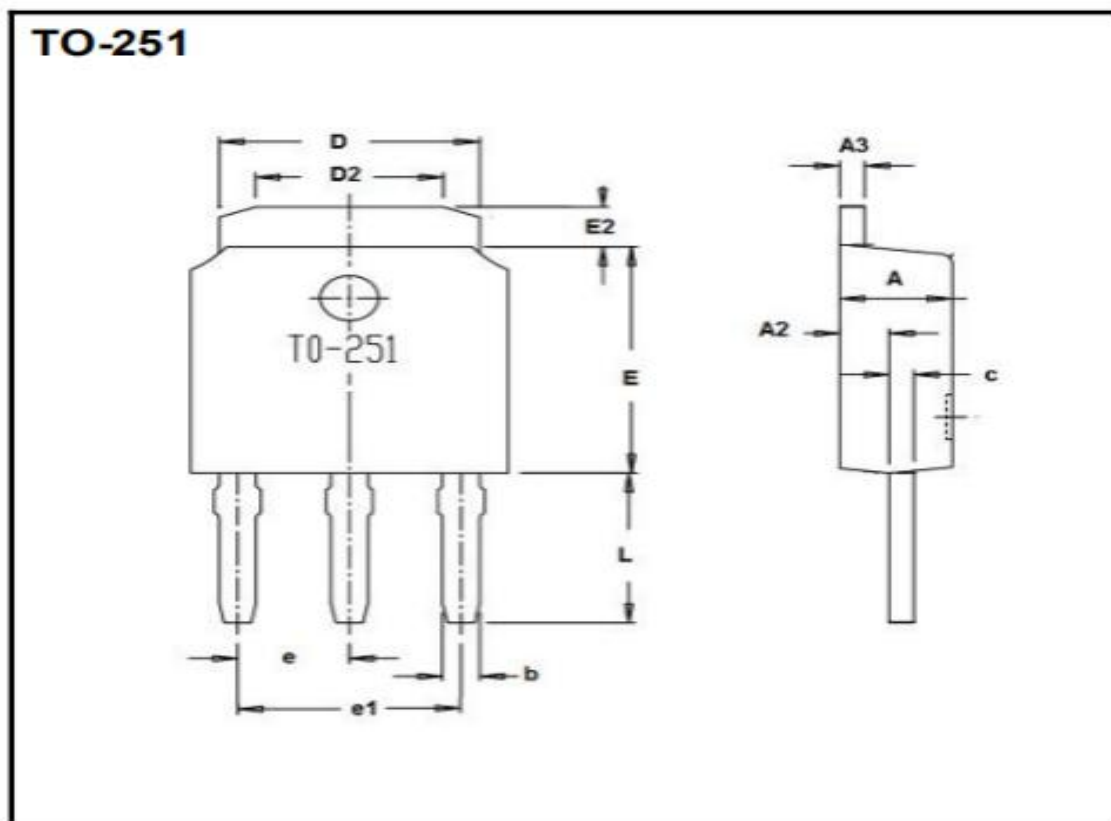


Figure C: Unclamped Inductive Switching Test Circuit and Waveform



Package outline drawing(TO-251 Unit: mm)



| Dim. | Min. | Max. |
|------------------------------|---------|------|
| A | 2.15 | 2.45 |
| A2 | 0.9 | 1.1 |
| A3 | Typ0.5 | |
| b | 0.74 | 0.86 |
| c | 0.9 | 1.1 |
| D | 5.33 | 5.53 |
| D2 | 3.65 | 4.05 |
| E | 6.0 | 6.2 |
| E2 | 0.91 | 1.36 |
| e | Typ2.29 | |
| e1 | Typ4.58 | |
| L | 3.7 | 4.3 |
| All Dimensions in millimeter | | |

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