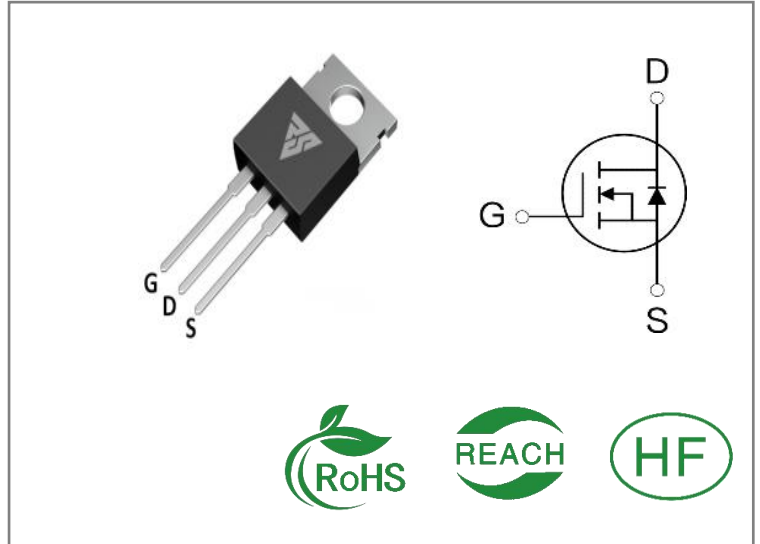


| ID | R _{Ds(ON)} (Typ) | VDSS |
|------|---------------------------|------|
| 190A | 3.2mΩ | 100V |


Applications:

- Load Switch
- PWM Applications
- Power Managment

Features:

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

Ordering Information

| Part Number | Package | Marking | Packing | Qty. |
|-------------|---------|------------|---------|--------|
| RS100N190T | TO-220 | RS100N190T | Tube | 50 PCS |

Absolute Maximun Ratings T_c= 25°C unless otherwise specified

| Symbol | Parameter | RS100N190T | Units |
|-------------|--|------------|-------|
| VDSS | Drain-to-Source Voltage | 100 | V |
| ID | Continuous Drain Current TC=25°C | 190 | A |
| ID | Continuous Drain Current TC=100°C | 130 | |
| IDM | Pulsed Drain Current | 680 | |
| PD | Power Dissipation | 310 | W |
| VGS | Gate- to- Source Voltage | ±20 | V |
| EAS | Single Pulse Avalanche Engergy L = 0.3mH, IS = 45A, RG = 25Ω, Tj = 25°C | 725 | 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 | RS100N190T | Units | Test Conditions |
|---------------|---------------------|------------|--------|---|
| R θ JC | Junction-to-Case | 0.40 | °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 | 45 | | 1 cubic foot chamber, free air. |

OFF Characteristics T_J= 25°C unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|--------|-------------------------------------|------|------|------|-------|------------------|
| BVDSS | Drain- to- source Breakdown Voltage | 100 | -- | -- | V | VGS=0V, ID=250μA |
| IDSS | Drain- to- Source Leakage Current | -- | -- | 1 | μA | VDS=80V, 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 T_J=25°C unless otherwise specified

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---------|--|------|------|------|-------|-------------------|
| RDS(on) | Static Drain- to- Source On-Resistance | -- | 3.2 | 3.8 | mΩ | VGS=10V, ID=20A |
| VGS(TH) | Gate Threshold Voltage | 2.0 | -- | 4.0 | V | VGS=VDS, ID=250μA |

Resistive Switching Characteristics Essentially independent of operating temperature

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|---------|----------------------|------|------|------|-------|--|
| td(ON) | Turn- on Delay Time | -- | 21 | -- | nS | VDS=50V RL=2.5Ω RG=3Ω VGS=10V |
| trise | Rise Time | -- | 35 | -- | | |
| td(OFF) | Turn- OFF Delay Time | -- | 50 | -- | | |
| tfall | Fall Time | -- | 30 | -- | | |

Dynamic Characteristics Essentially independent of operating temperature

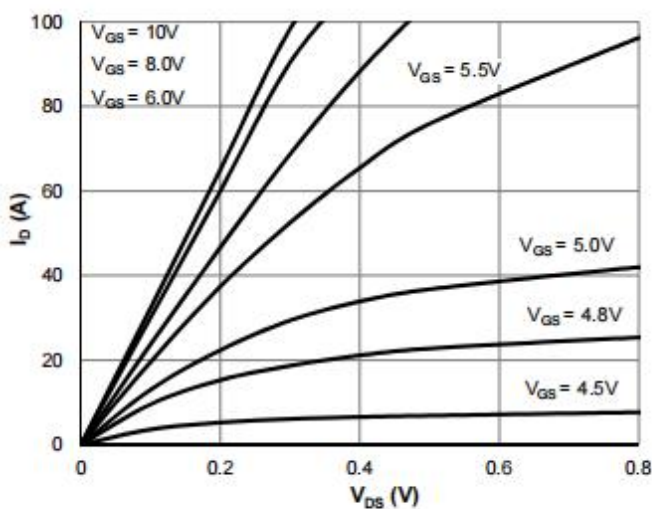
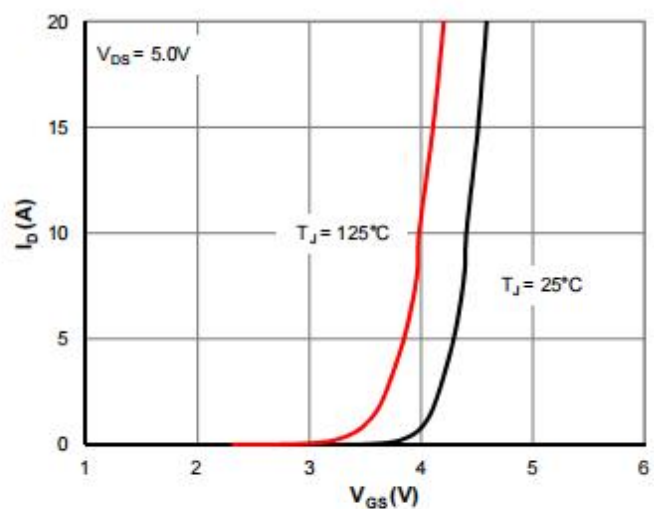
| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|--------|---------------------------------|------|------|------|-------|-------------------------------|
| Ciss | Input Capacitance | -- | 4790 | -- | pF | VGS= 0V VDS=50V f=1MHz |
| Coss | Output Capacitance | -- | 900 | -- | | |
| Crss | Reverse Transfer Capacitance | -- | 18 | -- | | |
| Qg | Total Gate Charge | -- | 83 | -- | nC | VDS= 50V ID=20A VGS=10V |
| Qgs | Gate- to- Source Charge | -- | 24 | -- | | |
| Qgd | Gate-to-Drain(" Miller") Charge | -- | 26 | -- | | |

Source- Drain Diode Characteristics

| Symbol | Parameter | Min. | Typ. | Max. | Units | Test Conditions |
|--------|---------------------------|------|------|------|-------|-----------------------------------|
| IS | Continuous Source Current | -- | -- | 190 | A | Integral pn- diode in MOSFET |
| ISM | Maximum Pulsed Current | -- | -- | 680 | A | |
| VSD | Diode Forward Voltage | -- | -- | 1.0 | V | IS=1A,VGS=0V |
| trr | Reverse Recovery Time | -- | 70 | -- | nS | VGS=0V IS=20A di/dt=100A/μs |
| Qrr | Reverse Recovery Charge | -- | 125 | -- | nC | |

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

Figure 1: Saturation Characteristics

Figure 2: Transfer Characteristics

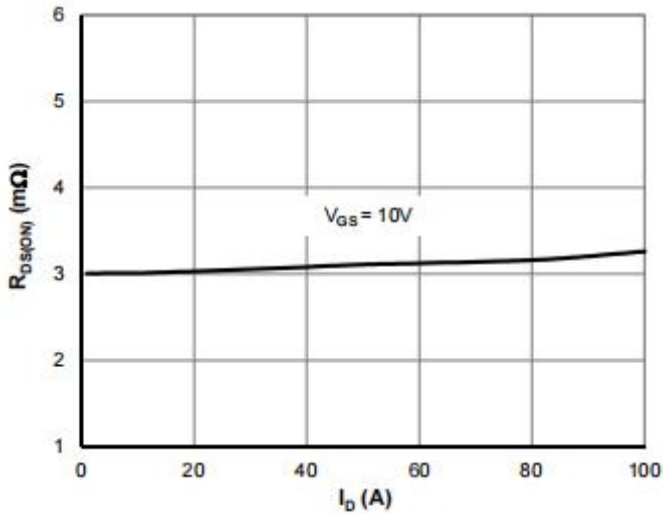


Figure 3: $R_{DS(ON)}$ vs. Drain Current

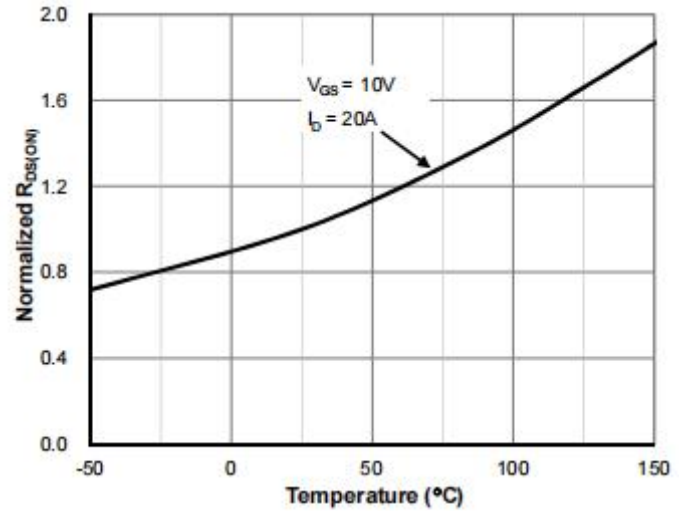


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

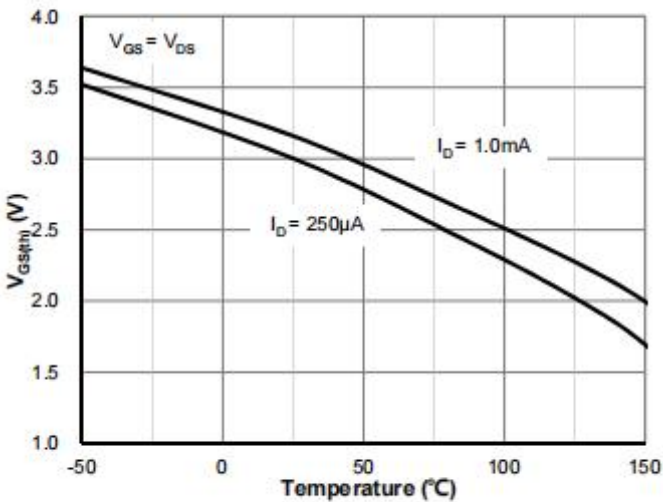


Figure 5: $V_{GS(th)}$ vs. Junction Temperature

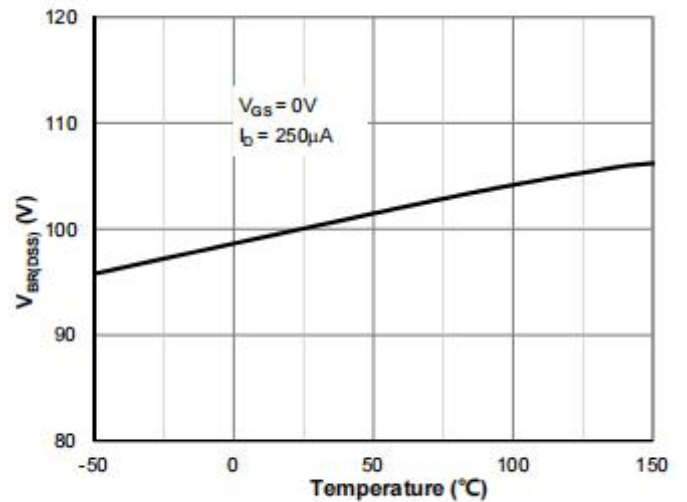


Figure 6: $V_{BR(DSS)}$ vs. Junction Temperature

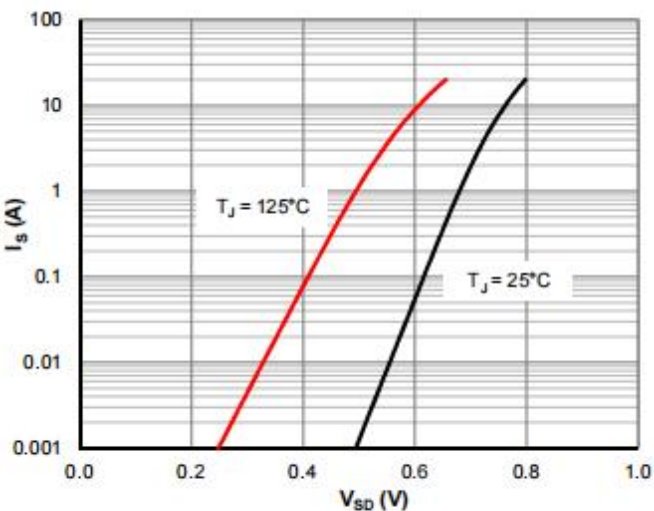


Figure 7: Body-Diode Characteristics

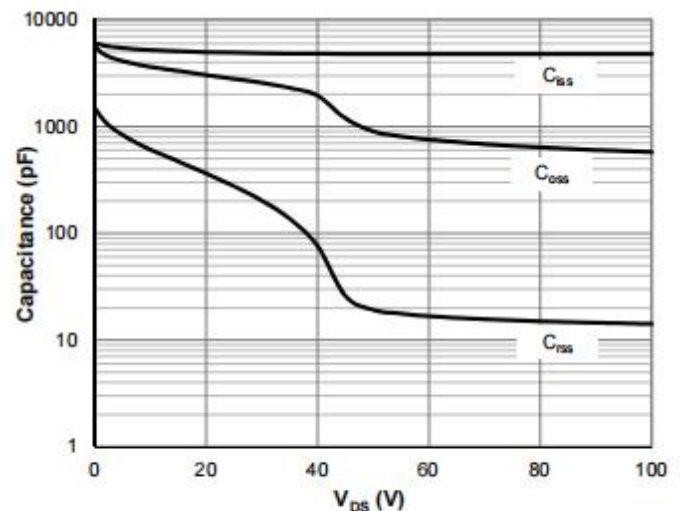


Figure 8: Capacitance Characteristics

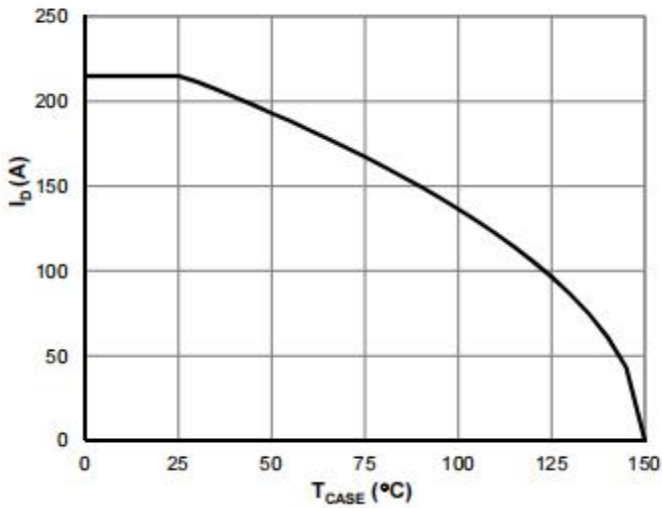


Figure 9: Current De-rating

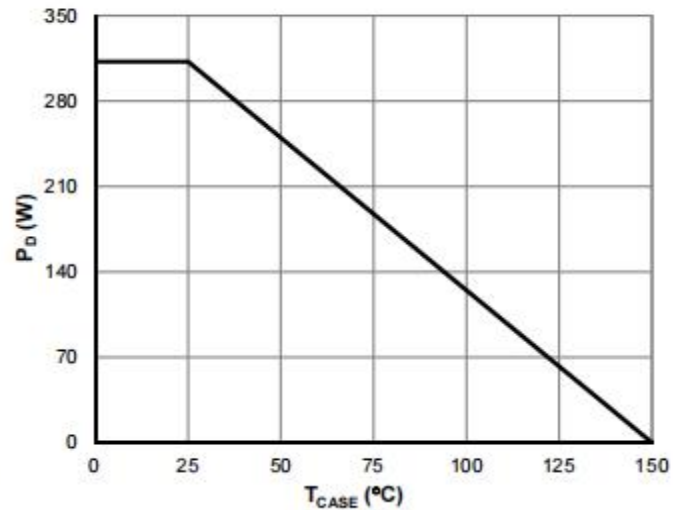


Figure 10: Power De-rating

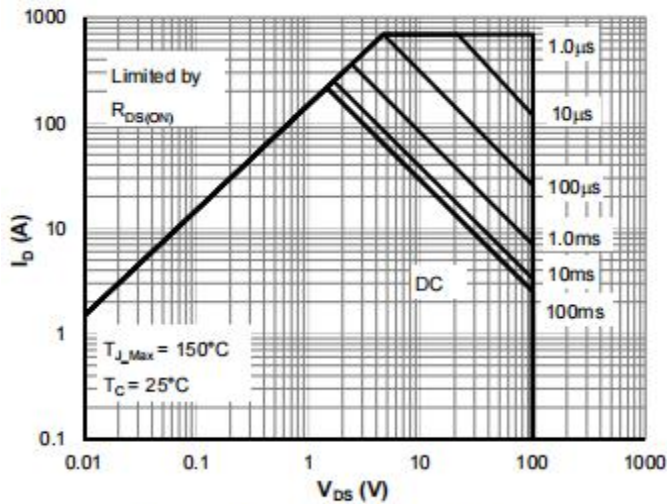


Figure 11: Maximum Safe Operating Area

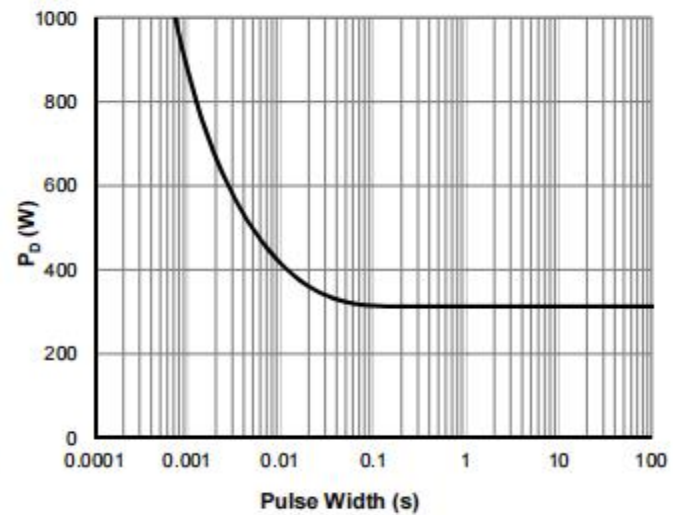


Figure 12: Single Pulse Power Rating, Junction-to-Case

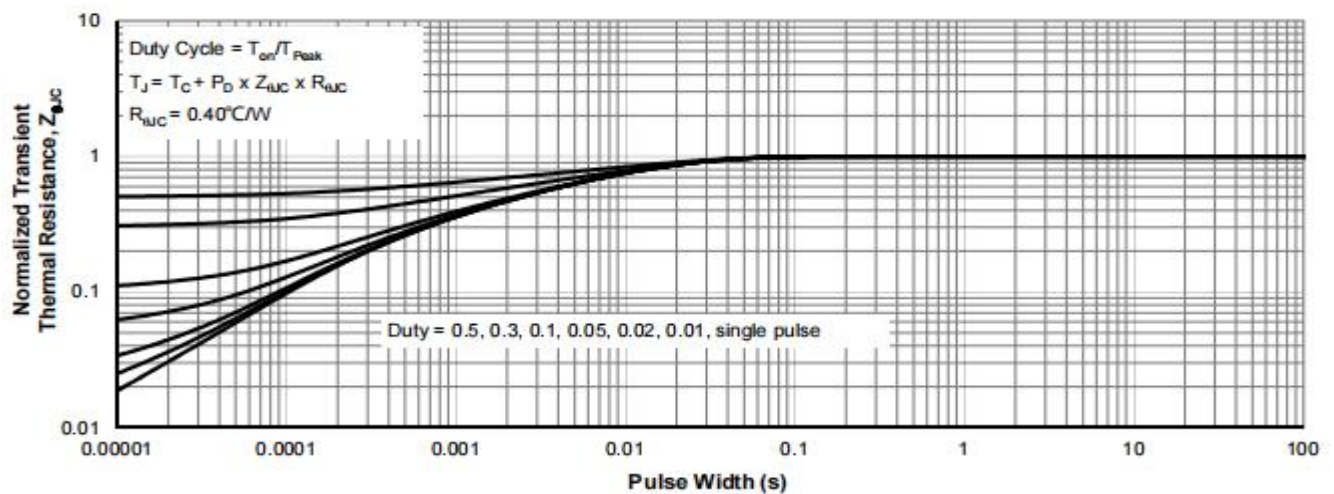


Figure 13: Normalized Maximum Transient Thermal Impedance

Test circuits and Waveforms

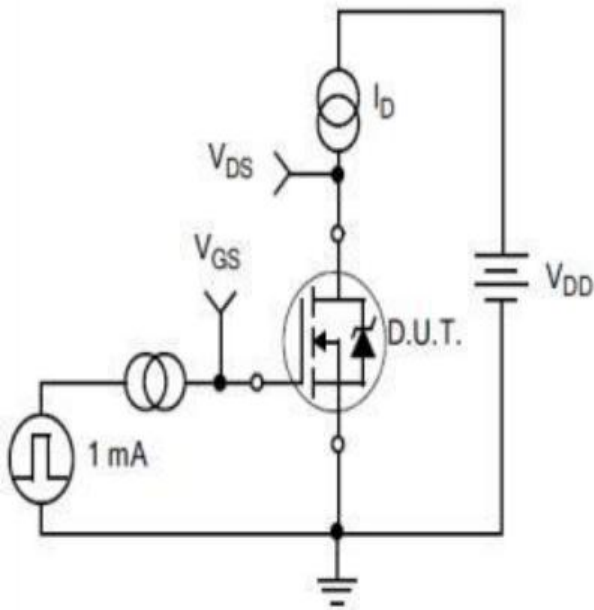


Figure A.
Gate Charge Test Circuit

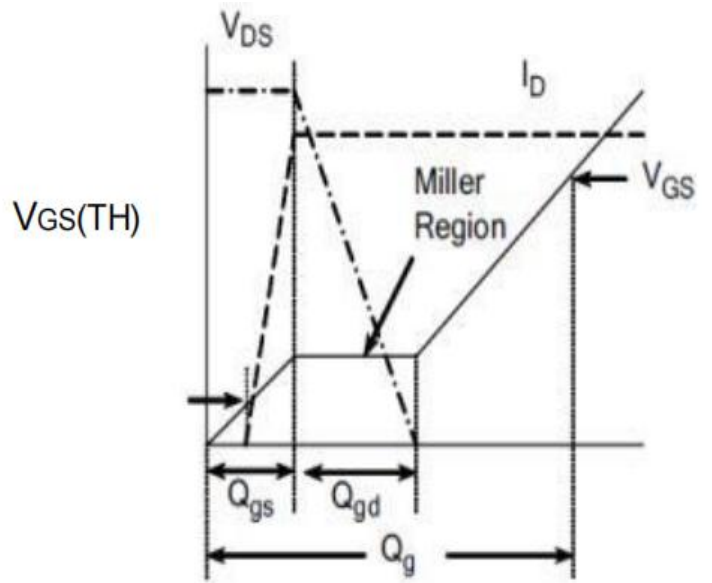


Figure B.
Gate Charge Waveform

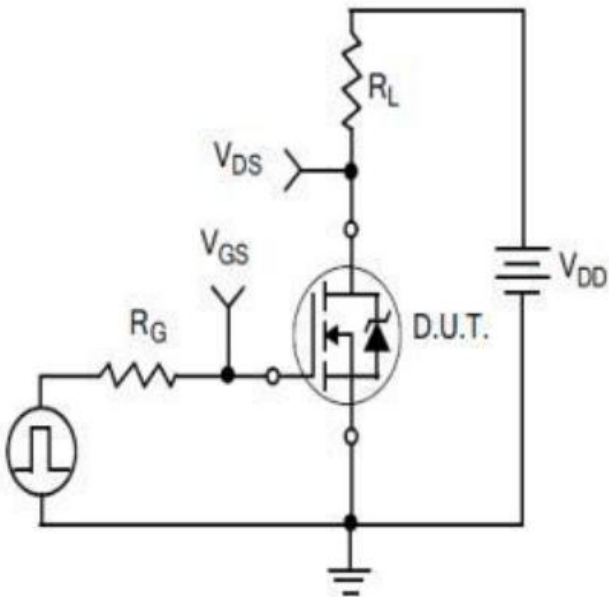


Figure C.
Resistive Switching Test Circuit

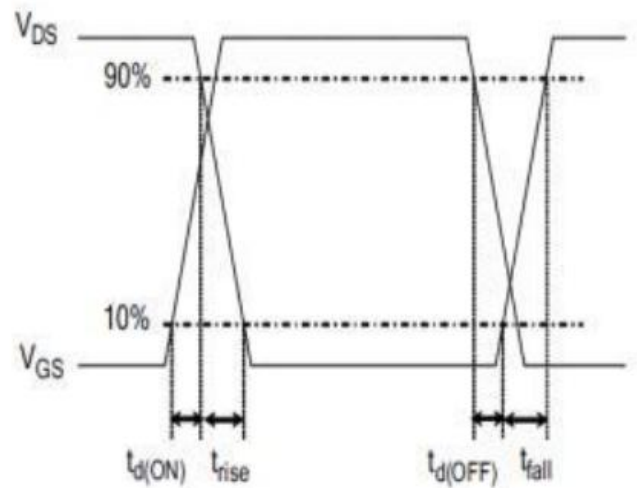


Figure D.
Resistive Switching Waveforms

Test circuits and Waveforms

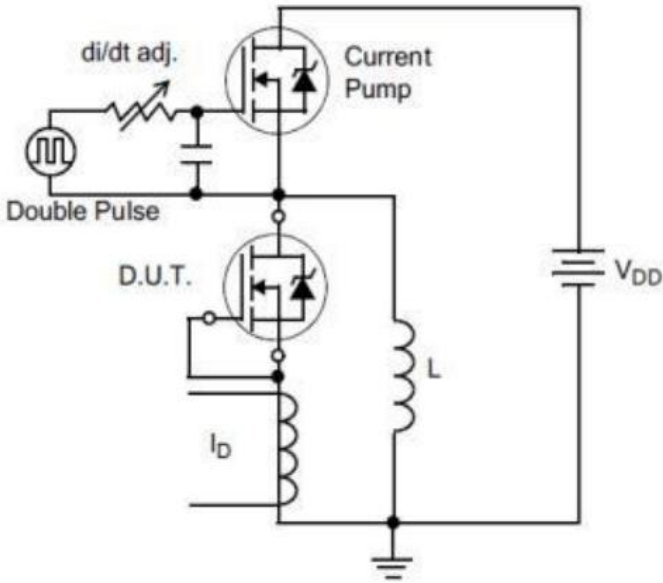


Figure E. Diode Reverse Recovery Test Circuit

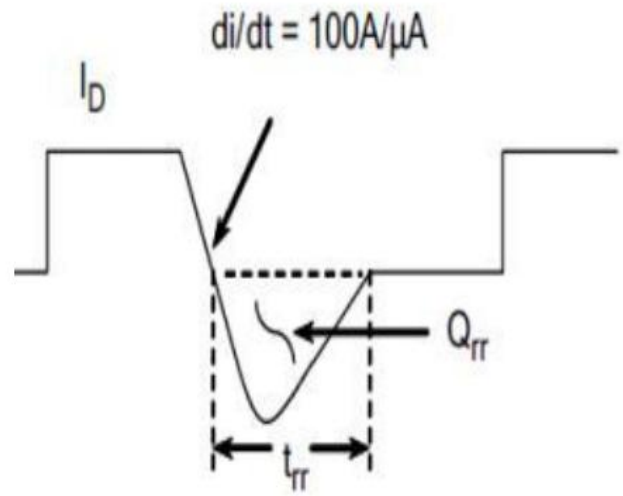


Figure F. Diode Reverse Recovery Waveform

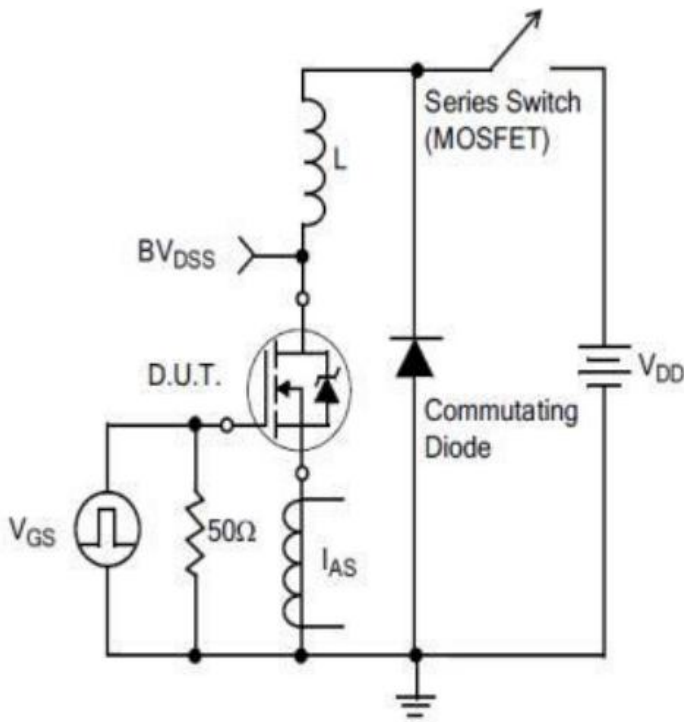
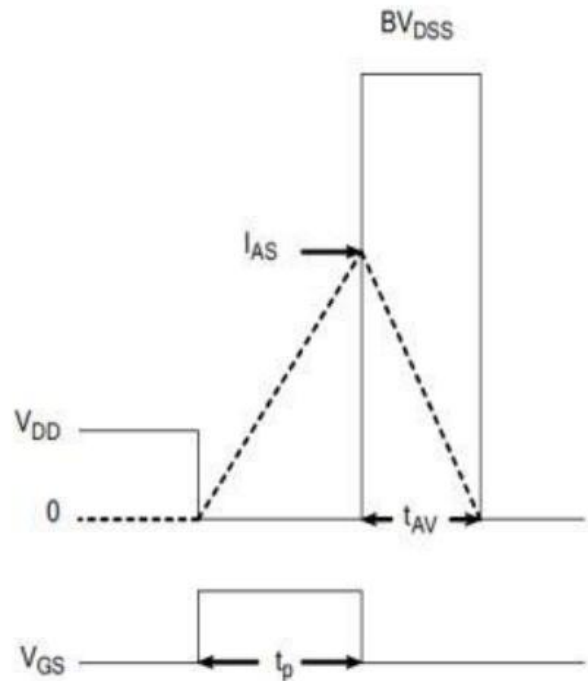


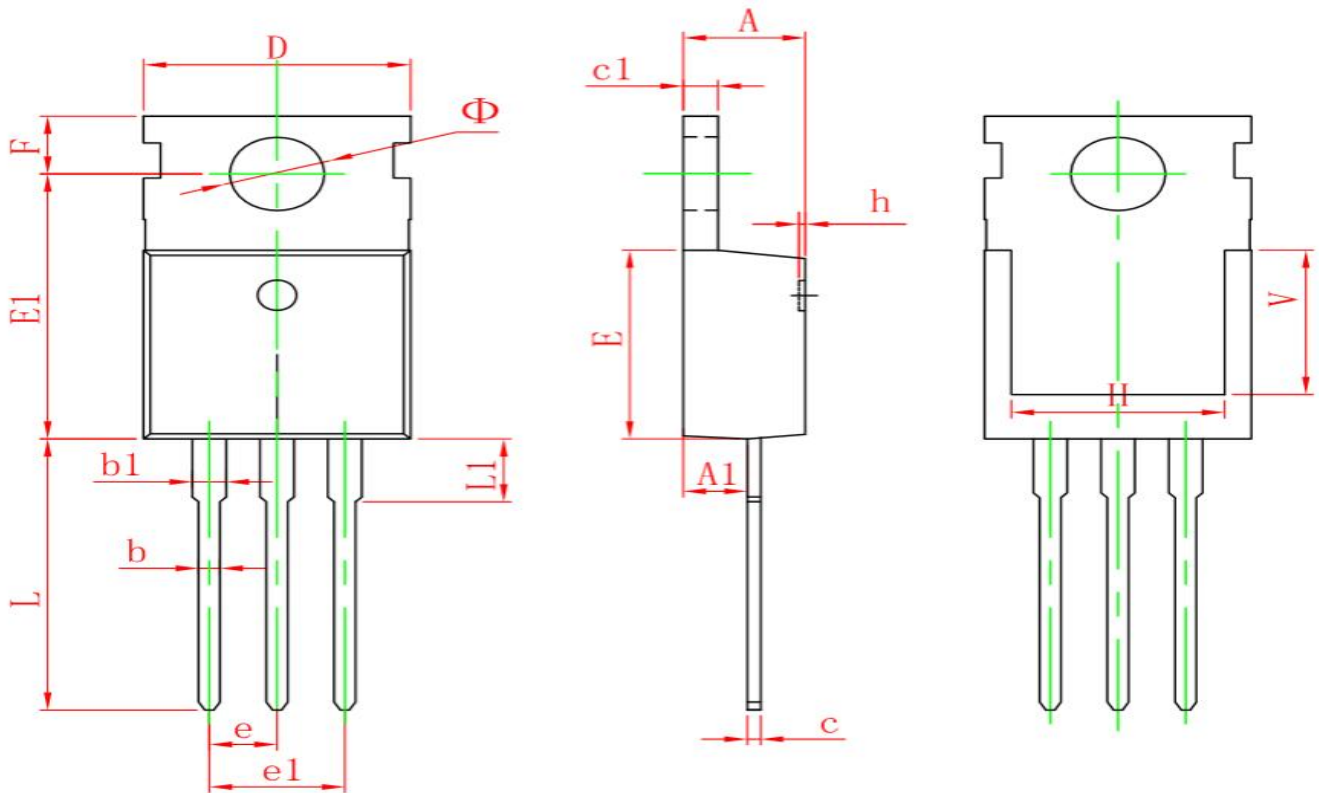
Figure G. Unclamped Inductive Switching Test Circuit



$$EAS = \frac{IAS^2 L}{2}$$

Figure H. Unclamped Inductive Switching Waveforms

Package outline drawing(TO-220 Unit: mm)



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 4.400 | 4.600 | 0.173 | 0.181 |
| A1 | 2.250 | 2.550 | 0.089 | 0.100 |
| b | 0.710 | 0.910 | 0.028 | 0.036 |
| b1 | 1.170 | 1.370 | 0.046 | 0.054 |
| c | 0.330 | 0.650 | 0.013 | 0.026 |
| c1 | 1.200 | 1.400 | 0.047 | 0.055 |
| D | 9.910 | 10.250 | 0.390 | 0.404 |
| E | 8.950 | 9.750 | 0.352 | 0.384 |
| E1 | 12.650 | 13.050 | 0.498 | 0.514 |
| e | 2.540 TYP. | | 0.100 TYP. | |
| e1 | 4.980 | 5.180 | 0.196 | 0.204 |
| F | 2.650 | 2.950 | 0.104 | 0.116 |
| H | 7.900 | 8.100 | 0.311 | 0.319 |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| L | 12.900 | 13.400 | 0.508 | 0.528 |
| L1 | 2.850 | 3.250 | 0.112 | 0.128 |
| V | 6.900 REF. | | 0.276 REF. | |
| Φ | 3.400 | 3.800 | 0.134 | 0.150 |

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