

80V N-Ch Power MOSFET

Feature

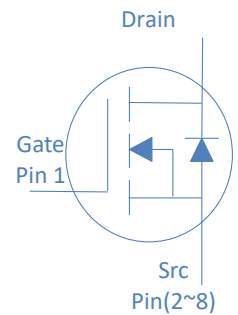
- ◇ High Speed Power Switching
- ◇ Enhanced Body diode dv/dt capability
- ◇ Enhanced Avalanche Ruggedness
- ◇ 100% UIS Tested, 100% Rg Tested
- ◇ Lead Free, Halogen Free

| | | |
|-------------------------|-----|------------|
| V_{DS} | 80 | V |
| $R_{DS(on),typ}$ | 1.6 | m Ω |
| I_D (Silicon Limited) | 294 | A |
| I_D (Package Limited) | 240 | A |

Application

- ◇ Synchronous Rectification in SMPS
- ◇ Hard Switching and High Speed Circuit
- ◇ DC/DC in Telecoms and Industrial

| Part Number | Package | Marking |
|-------------|---------|-----------|
| HGT019N08A | TOLL | GT019N08A |



Absolute Maximum Ratings at $T_j=25^\circ\text{C}$ (unless otherwise specified)

| Parameter | Symbol | Conditions | Value | Unit |
|---|----------------|--|------------|------------------|
| Continuous Drain Current(Silicon limited) | I_D | $T_C=25^\circ\text{C}$ | 294 | A |
| | | $T_C=100^\circ\text{C}$ | 208 | |
| | | $T_C=25^\circ\text{C}$ | 240 | |
| Continuous Drain Current(Package limited) | | | 240 | |
| Drain to Source Voltage | V_{DS} | - | 80 | V |
| Gate to Source Voltage | V_{GS} | - | ± 20 | V |
| Pulsed Drain Current | I_{DM} | - | 900 | A |
| Avalanche Energy, Single Pulse | E_{AS} | $L=0.1\text{mH}, T_C=25^\circ\text{C}$ | 180 | mJ |
| Power Dissipation | P_D | $T_C=25^\circ\text{C}$ | 319 | W |
| Operating and Storage Temperature | T_J, T_{stg} | - | -55 to 175 | $^\circ\text{C}$ |

Absolute Maximum Ratings

| Parameter | Symbol | Max | Unit |
|-------------------------------------|-----------------|------|---------------------------|
| Thermal Resistance Junction-Ambient | $R_{\theta JA}$ | 60 | $^\circ\text{C}/\text{W}$ |
| Thermal Resistance Junction-Case | $R_{\theta JC}$ | 0.47 | $^\circ\text{C}/\text{W}$ |

Electrical Characteristics at $T_j=25^\circ\text{C}$ (unless otherwise specified)
Static Characteristics

| Parameter | Symbol | Conditions | Value | | | Unit |
|-----------------------------------|---------------|--|-------|------|-----------|-----------|
| | | | min | typ | max | |
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 80 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$ | 2.0 | 2.7 | 4.0 | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{GS}=0V, V_{DS}=80V, T_j=25^\circ\text{C}$ | - | - | 1 | μA |
| | | $V_{GS}=0V, V_{DS}=80V, T_j=100^\circ\text{C}$ | - | - | 100 | |
| Gate to Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| Drain to Source on Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=20A$ | - | 1.6 | 1.9 | $m\Omega$ |
| Transconductance | g_{fs} | $V_{DS}=5V, I_D=20A$ | - | 79 | - | S |
| Gate Resistance | R_G | $V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$ | - | 0.59 | - | Ω |

Dynamic Characteristics

| | | | | | | |
|-------------------------------|--------------|--|---|------|---|----|
| Input Capacitance | C_{iss} | $V_{GS}=0V, V_{DS}=40V, f=1\text{MHz}$ | - | 8628 | - | pF |
| Output Capacitance | C_{oss} | | - | 1396 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 34 | - | |
| Total Gate Charge | $Q_g(10V)$ | $V_{DD}=40V, I_D=20A, V_{GS}=10V$ | - | 135 | - | nC |
| Gate to Source Charge | Q_{gs} | | - | 28 | - | |
| Gate to Drain (Miller) Charge | Q_{gd} | | - | 36 | - | |
| Turn on Delay Time | $t_{d(on)}$ | $V_{DD}=40V, I_D=20A, V_{GS}=10V, R_G=10\Omega,$ | - | 30 | - | ns |
| Rise time | t_r | | - | 28 | - | |
| Turn off Delay Time | $t_{d(off)}$ | | - | 70 | - | |
| Fall Time | t_f | | - | 32 | - | |

Reverse Diode Characteristics

| | | | | | | |
|-------------------------|----------|--|---|-----|-----|----|
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_F=20A$ | - | 0.9 | 1.2 | V |
| Reverse Recovery Time | t_{rr} | $V_R=40V, I_F=20A, dI_F/dt=100A/\mu s$ | - | 72 | - | ns |
| Reverse Recovery Charge | Q_{rr} | | - | 108 | - | nC |

Fig 1. Typical Output Characteristics

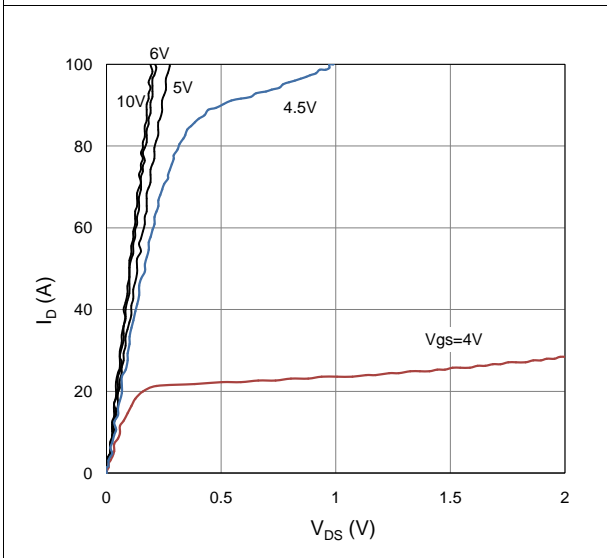


Figure 2. On-Resistance vs. Gate-Source Voltage

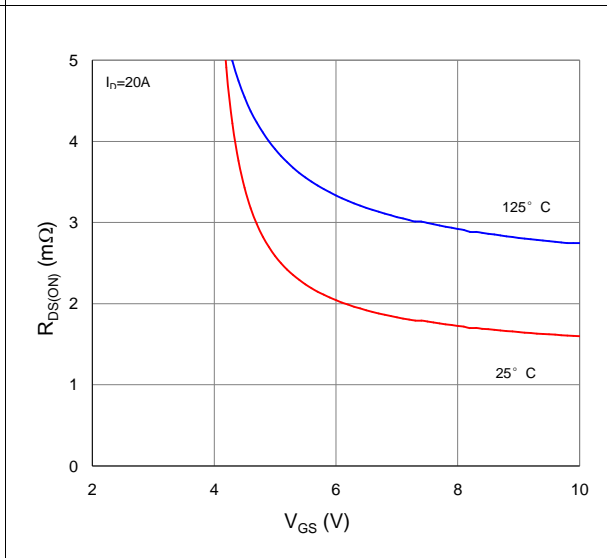


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

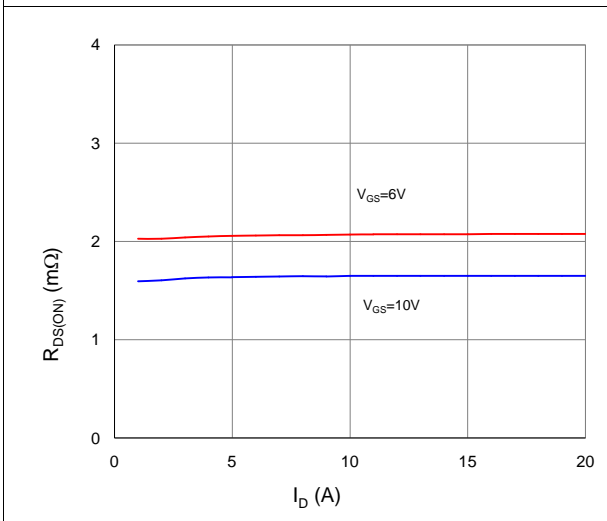


Figure 4. Normalized On-Resistance vs. Junction Temperature

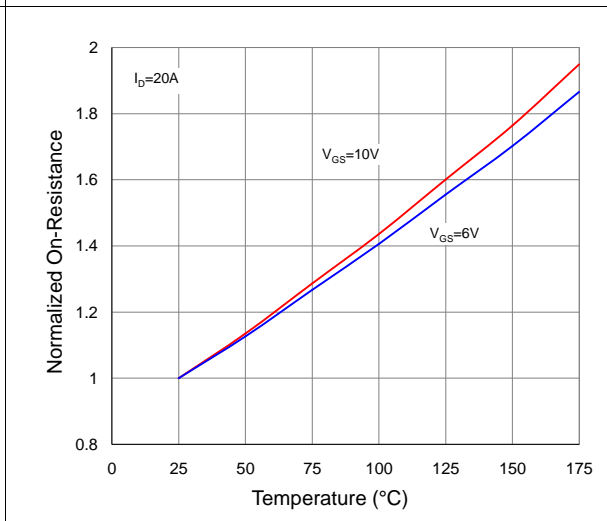


Figure 5. Typical Transfer Characteristics

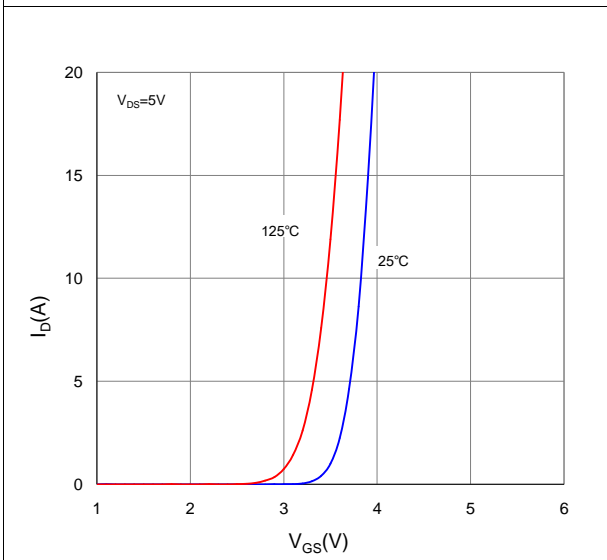


Figure 6. Typical Source-Drain Diode Forward Voltage

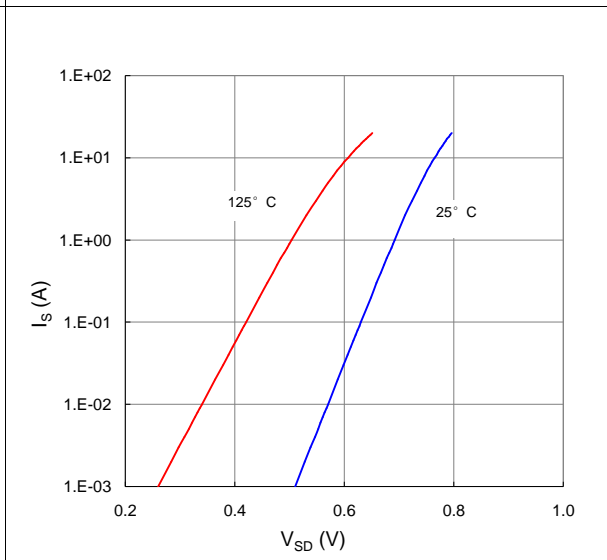


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

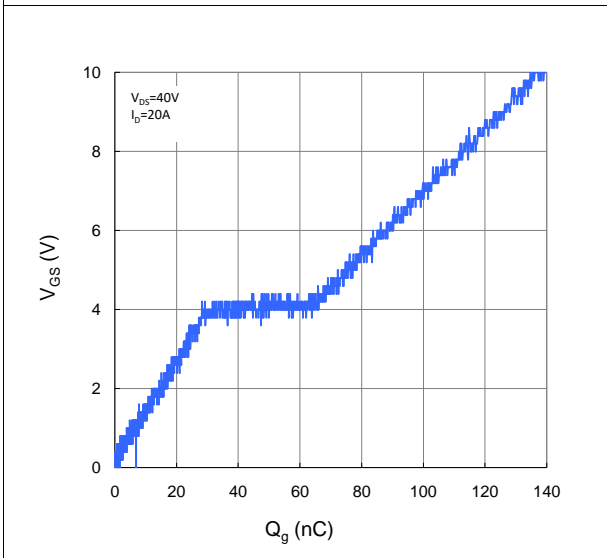


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

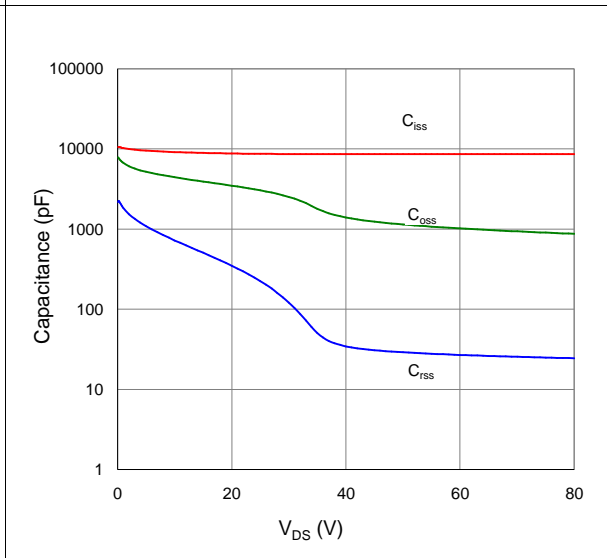


Figure 9. Maximum Safe Operating Area

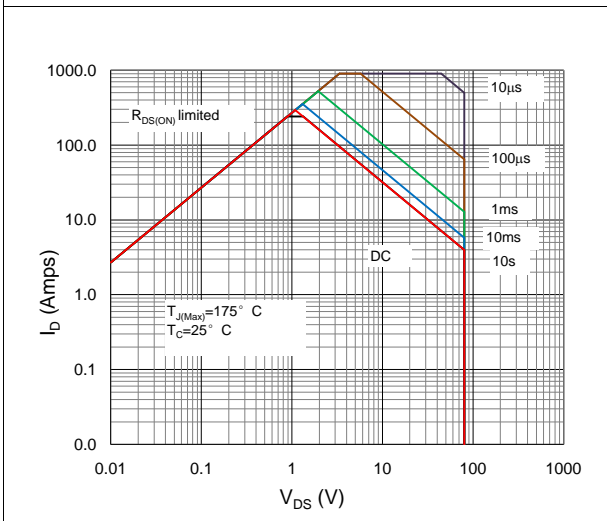


Figure 10. Maximum Drain Current vs. Case Temperature

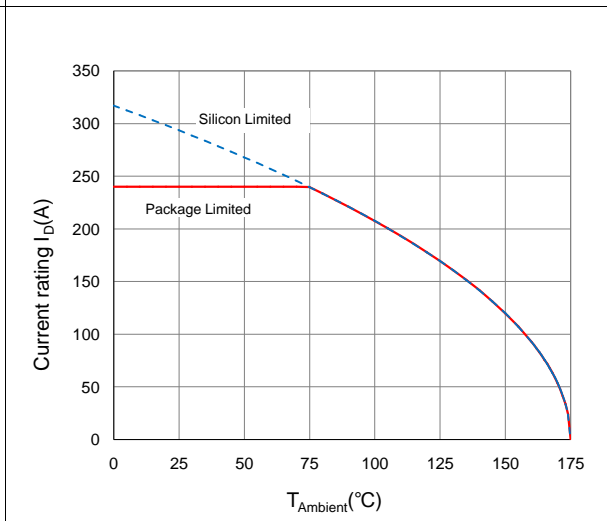
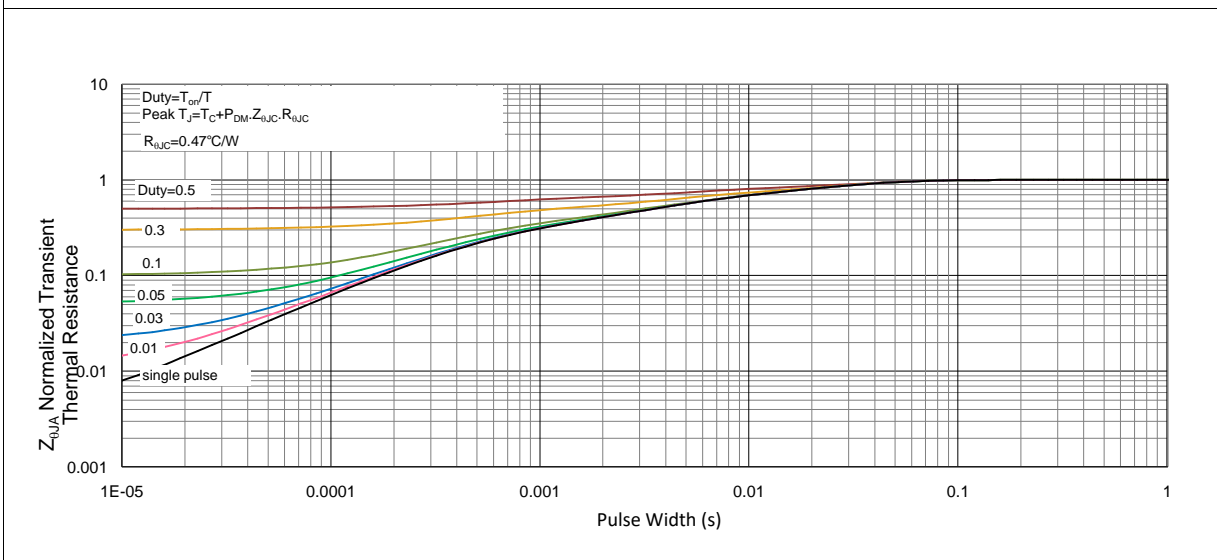
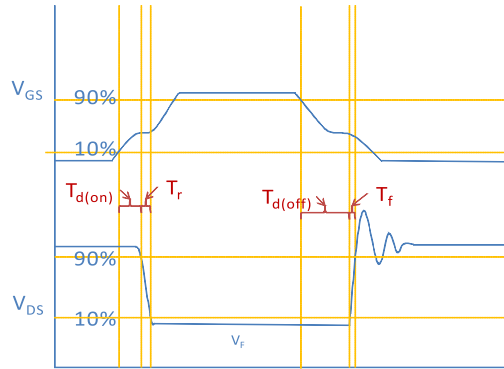
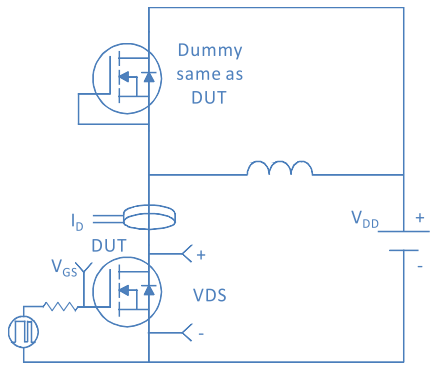


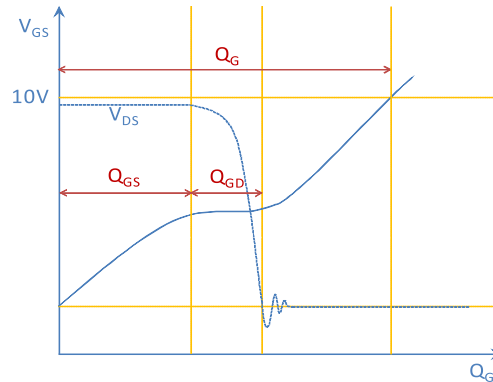
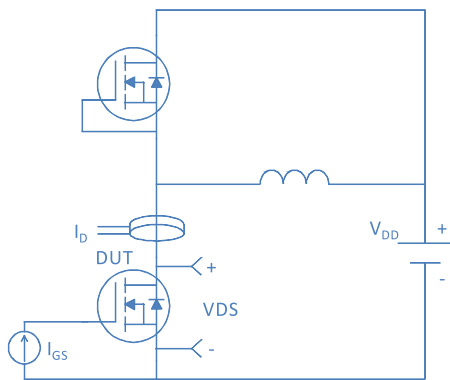
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



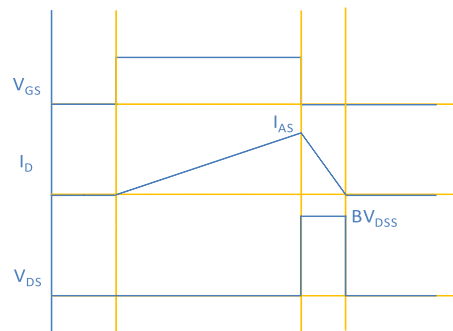
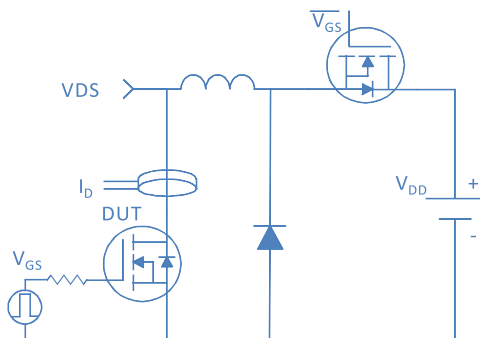
Inductive switching Test



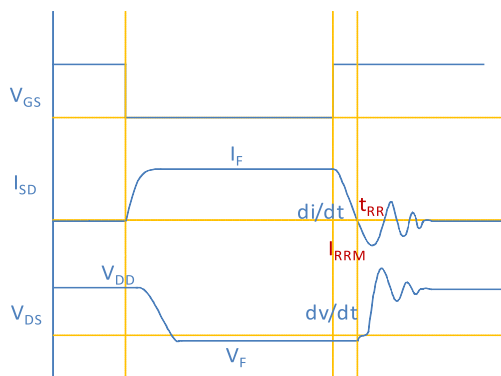
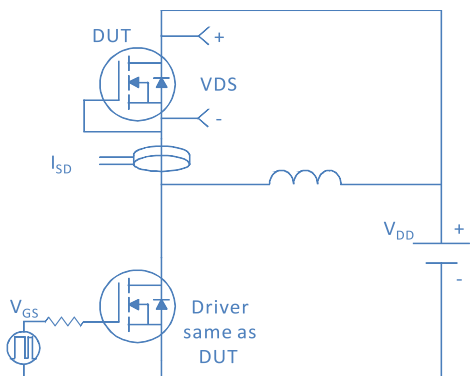
Gate Charge Test



Uclamped Inductive Switching (UIS) Test

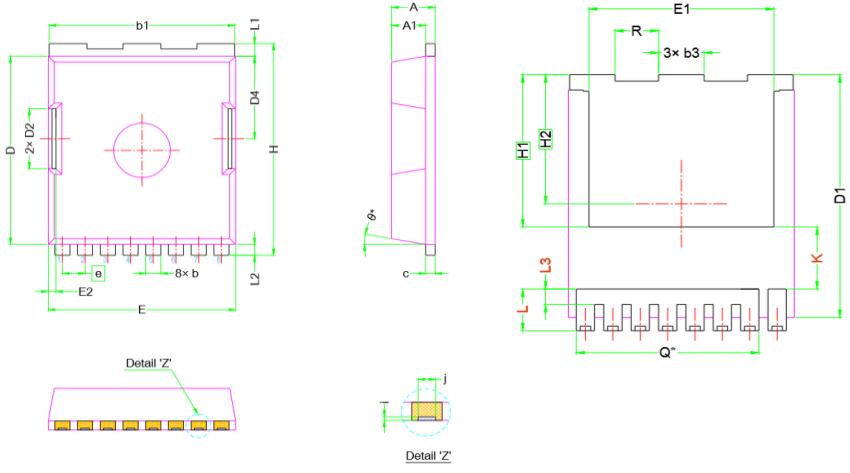


Diode Recovery Test



Package Outline

TOLL, 8 leads



| SYMBOL | DIMENSIONS | | |
|--------|------------|-------|-------|
| | MIN. | NOM. | MAX. |
| A | 2.20 | 2.30 | 2.40 |
| A1 | 1.70 | 1.80 | 1.90 |
| b | 0.70 | 0.80 | 0.90 |
| b1 | 9.70 | 9.80 | 9.90 |
| b3 | 1.90 | 2.00 | 2.10 |
| c | 0.40 | 0.50 | 0.60 |
| D | 10.28 | 10.38 | 10.48 |
| D1 | 10.98 | 11.08 | 11.18 |
| D2 | 3.20 | 3.30 | 3.40 |
| D4 | 4.45 | 4.55 | 4.65 |
| E | 9.80 | 9.90 | 10.00 |
| E1 | 8.00 | 8.10 | 8.20 |
| E2 | 0.30 | 0.40 | 0.50 |
| e | 1.20 BSC | | |
| H | 11.58 | 11.68 | 11.78 |
| H1 | 6.95 BSC | | |
| H2 | 5.89 BSC | | |
| i | 0.10 REF. | | |
| j | 0.46 REF. | | |
| K | 2.80 REF. | | |
| L | 1.60 | 1.90 | 2.10 |
| L1 | 0.60 | 0.70 | 0.80 |
| L2 | 0.50 | 0.60 | 0.70 |
| L3 | 0.60 | 0.70 | 0.80 |
| N | 8 | | |
| Q | 6.80 REF. | | |
| R | 1.80 | 1.90 | 2.00 |
| θ | 10° REF. | | |