

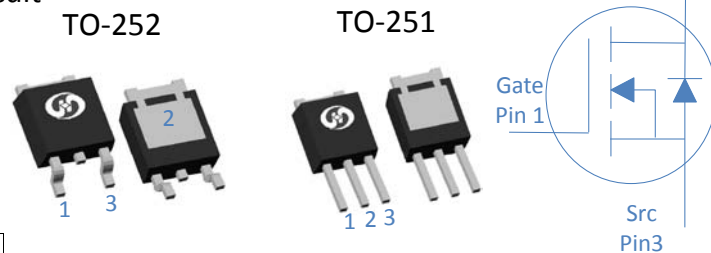
100V N-Ch Power MOSFET
Feature

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

| | | | |
|------------------|---------------|------|------------|
| V_{DS} | | 100 | V |
| $R_{DS(on),typ}$ | $V_{GS}=10V$ | 15.5 | m Ω |
| $R_{DS(on),typ}$ | $V_{GS}=4.5V$ | 20.0 | m Ω |
| I_D | | 45 | A |

Application

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



| Part Number | Package | Marking |
|-------------|---------|------------|
| HGI200N10SL | TO-251 | GI200N10SL |
| HGD200N10SL | TO-252 | GD200N10SL |

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 | $T_C=25^\circ\text{C}$ | 45 | A |
| | | $T_C=100^\circ\text{C}$ | 32 | |
| Drain to Source Voltage | V_{DS} | - | 100 | V |
| Gate to Source Voltage | V_{GS} | - | ± 20 | V |
| Pulsed Drain Current | I_{DM} | - | 200 | A |
| Avalanche Energy, Single Pulse | E_{AS} | $L=0.4\text{mH}, T_C=25^\circ\text{C}$ | 45 | mJ |
| Power Dissipation | P_D | $T_C=25^\circ\text{C}$ | 75 | 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 | $R_{\theta JA}$ | 65 | $^\circ\text{C/W}$ |
| Thermal Resistance Junction-Case | $R_{\theta JC}$ | 2 | $^\circ\text{C/W}$ |

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 | $V_{(BR)DSS}$ | $V_{GS}=0V, I_D=250\mu A$ | 100 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}=V_{DS}, I_D=250\mu A$ | 1.4 | 2.0 | 2.4 | |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{GS}=0V, V_{DS}=100V, T_J=25^{\circ}\text{C}$ | - | - | 1 | μA |
| | | $V_{GS}=0V, V_{DS}=100V, T_J=100^{\circ}\text{C}$ | - | - | 100 | |
| Gate to Source Leakage Current | I_{GSS} | $V_{GS}=\pm 20V, V_{DS}=0V$ | - | - | ± 100 | nA |
| Drain to Source on Resistance | $R_{DS(on)}$ | $V_{GS}=10V, I_D=20A$ | - | 15.5 | 20 | m Ω |
| | | $V_{GS}=4.5V, I_D=10A$ | - | 20 | 26 | |
| Transconductance | g_{fs} | $V_{DS}=5V, I_D=10A$ | - | 33 | - | S |
| Gate Resistance | R_G | $V_{GS}=0V, V_{DS}$ Open, $f=1\text{MHz}$ | - | 1.5 | - | Ω |

Dynamic Characteristics

| | | | | | | |
|-------------------------------|--------------|---|---|------|---|----|
| Input Capacitance | C_{iss} | $V_{GS}=0V, V_{DS}=50V, f=1\text{MHz}$ | - | 1350 | - | pF |
| Output Capacitance | C_{oss} | | - | 104 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 7 | - | |
| Total Gate Charge | $Q_g(10V)$ | $V_{DD}=50V, I_D=10A, V_{GS}=10V$ | - | 19.9 | - | nC |
| Total Gate Charge | $Q_g(4.5V)$ | | - | 8.5 | - | |
| Gate to Source Charge | Q_{gs} | | - | 4.8 | - | |
| Gate to Drain (Miller) Charge | Q_{gd} | | - | 3.0 | - | |
| Turn on Delay Time | $t_{d(on)}$ | $V_{DD}=50V, I_D=10A, V_{GS}=10V,$ $R_G=10\Omega,$ | - | 8 | - | ns |
| Rise time | t_r | | - | 3 | - | |
| Turn off Delay Time | $t_{d(off)}$ | | - | 18 | - | |
| Fall Time | t_f | | - | 3 | - | |

Reverse Diode Characteristics

| | | | | | | |
|-------------------------|----------|--|---|-----|-----|----|
| Diode Forward Voltage | V_{SD} | $V_{GS}=0V, I_F=10A$ | - | 0.9 | 1.2 | V |
| Reverse Recovery Time | t_{rr} | $V_R=50V, I_F=10A, di_F/dt=500A/\mu s$ | - | 23 | - | ns |
| Reverse Recovery Charge | Q_{rr} | | - | 98 | - | nC |

Fig 1. Typical Output Characteristics

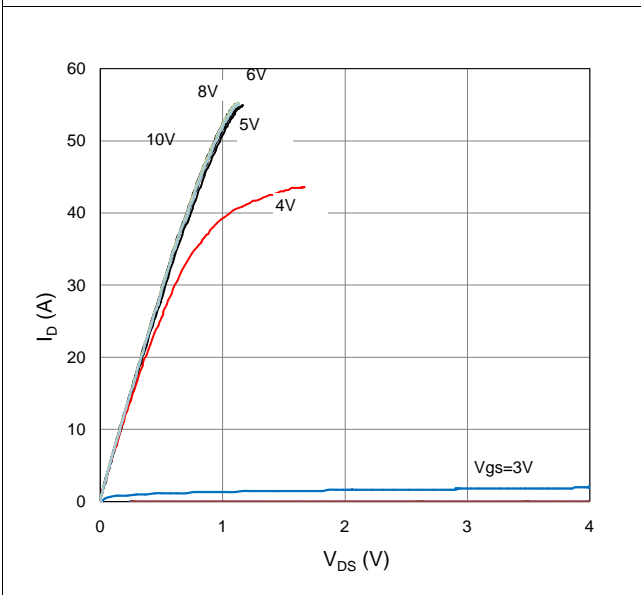


Figure 2. On-Resistance vs. Gate-Source Voltage

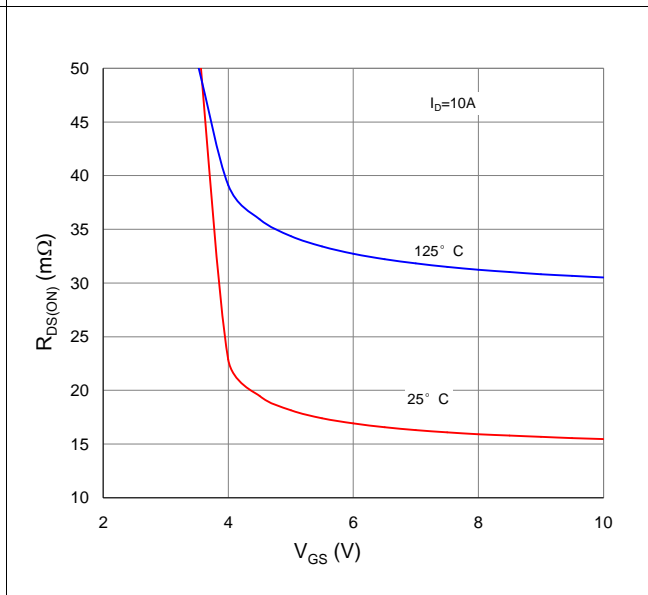


Figure 3. On-Resistance vs. Drain Current and Gate Voltage

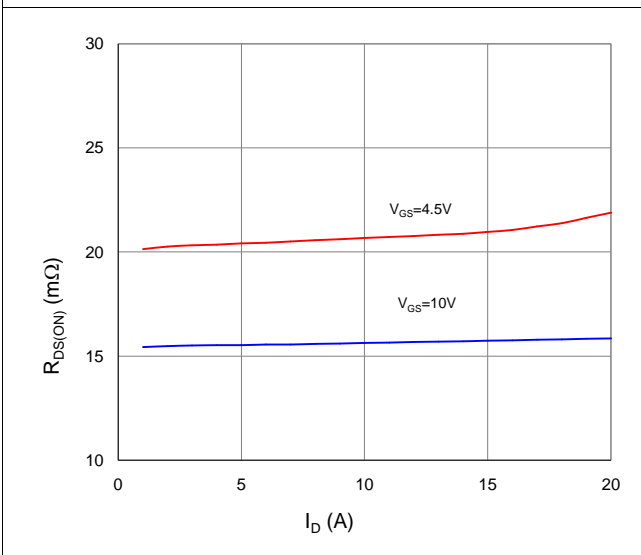


Figure 4. Normalized On-Resistance vs. Junction Temperature

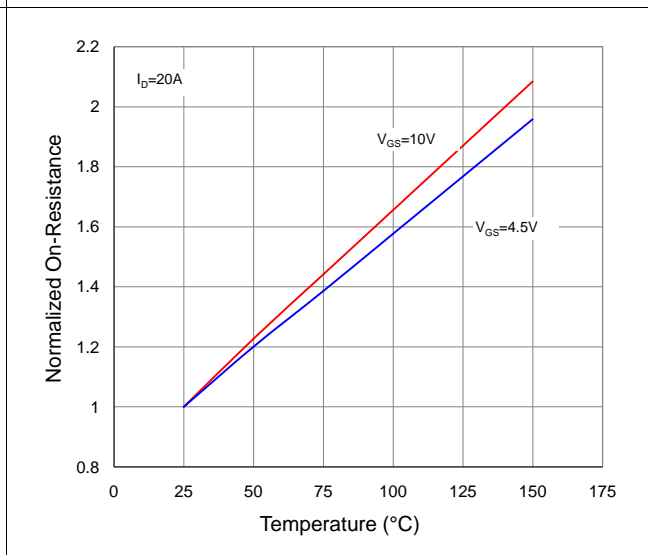


Figure 5. Typical Transfer Characteristics

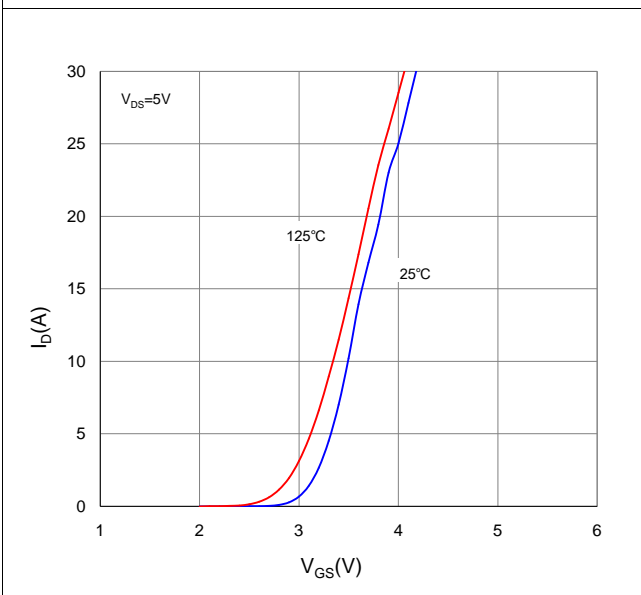


Figure 6. Typical Source-Drain Diode Forward Voltage

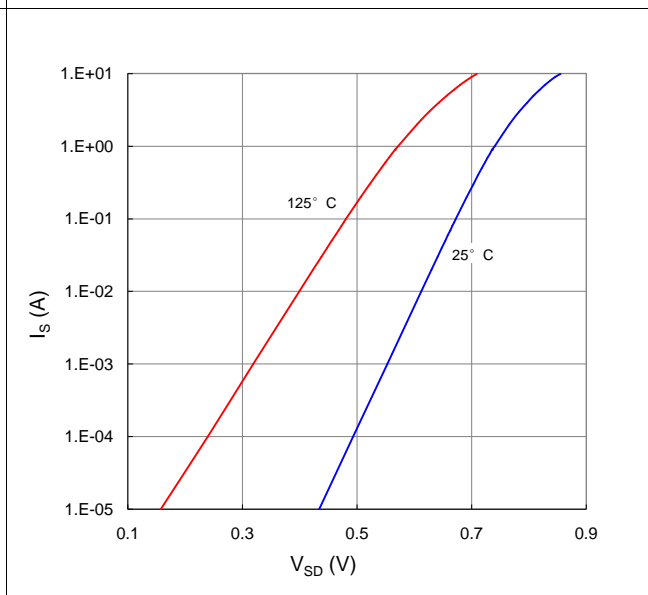


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

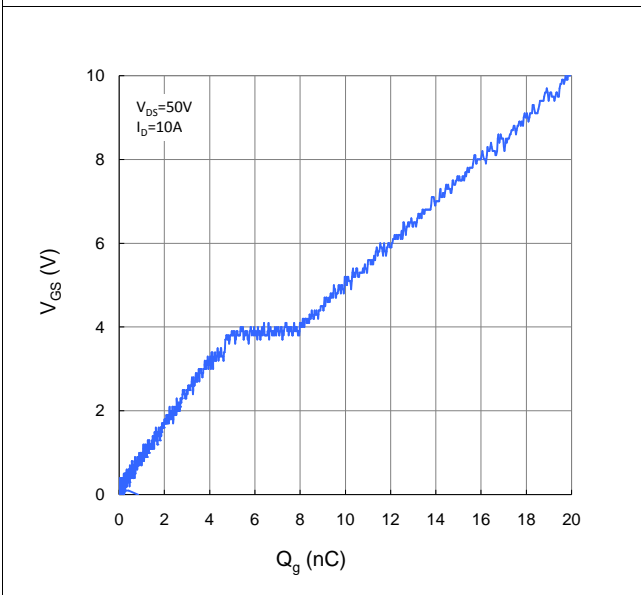


Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

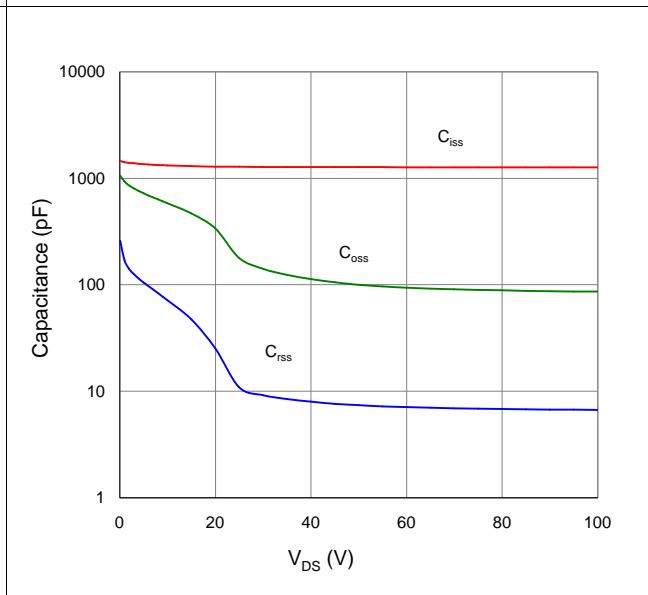


Figure 9. Maximum Safe Operating Area

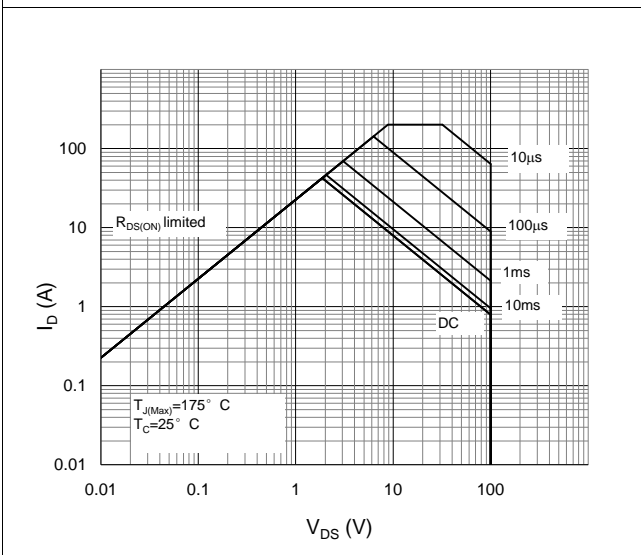


Figure 10. Maximum Drain Current vs. Case Temperature

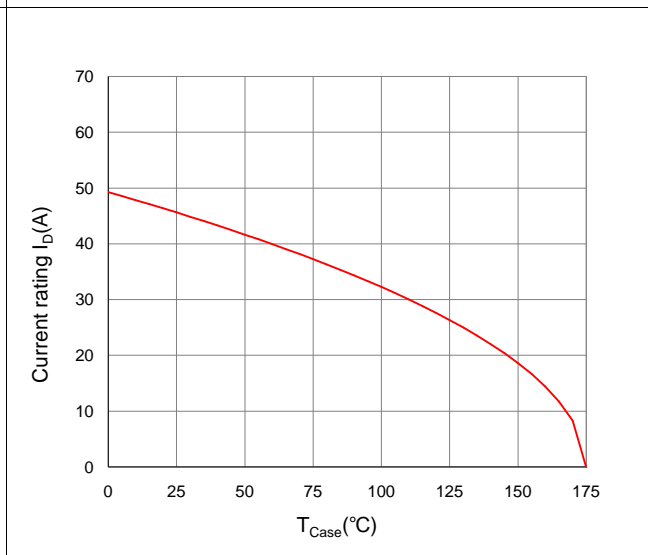
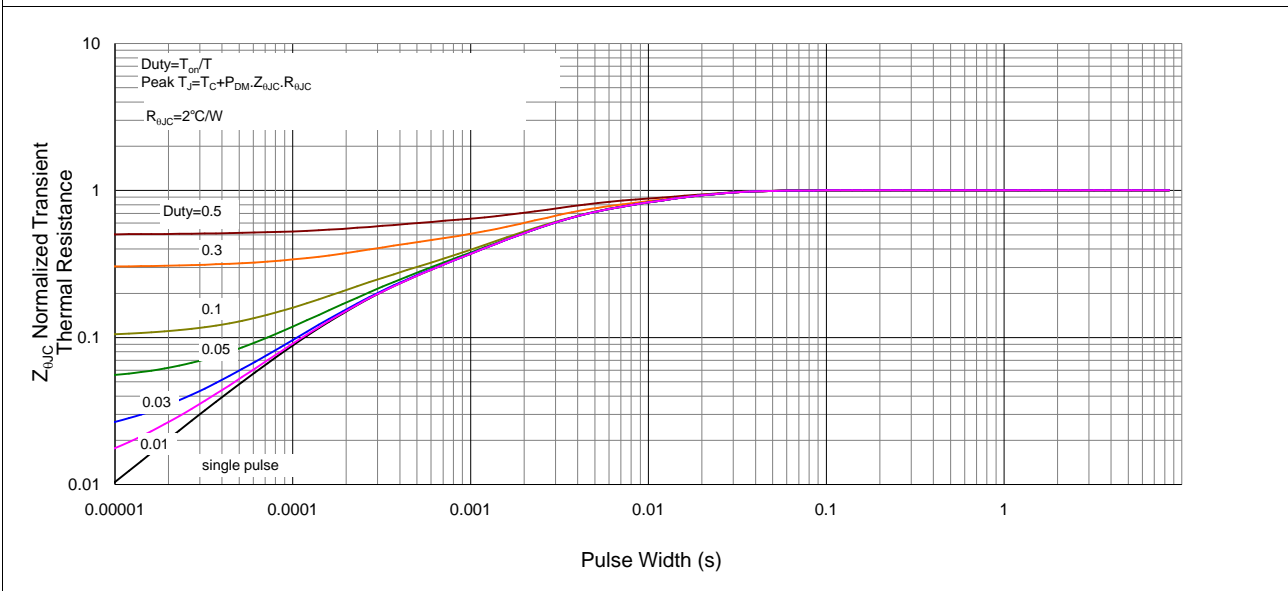
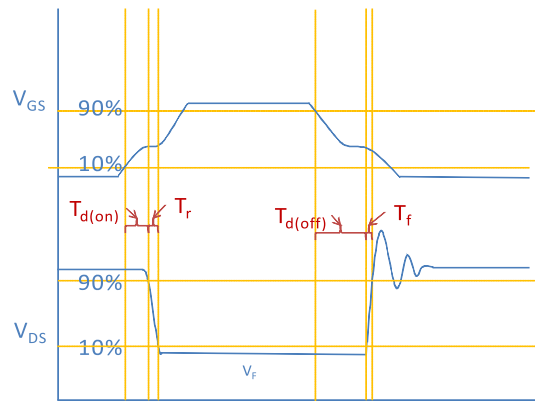


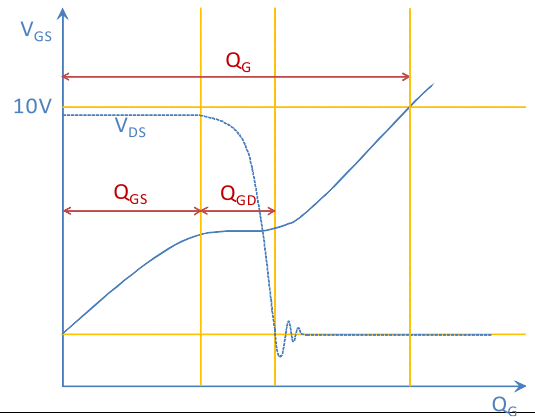
Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Case



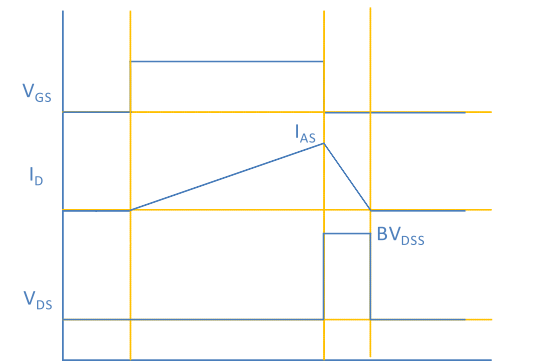
Inductive switching Test



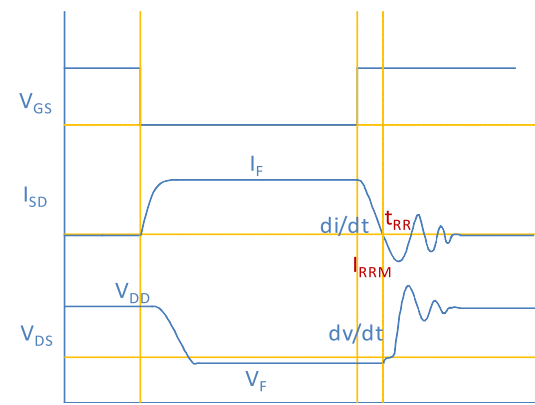
Gate Charge Test



Uclamped Inductive Switching (UIS) Test

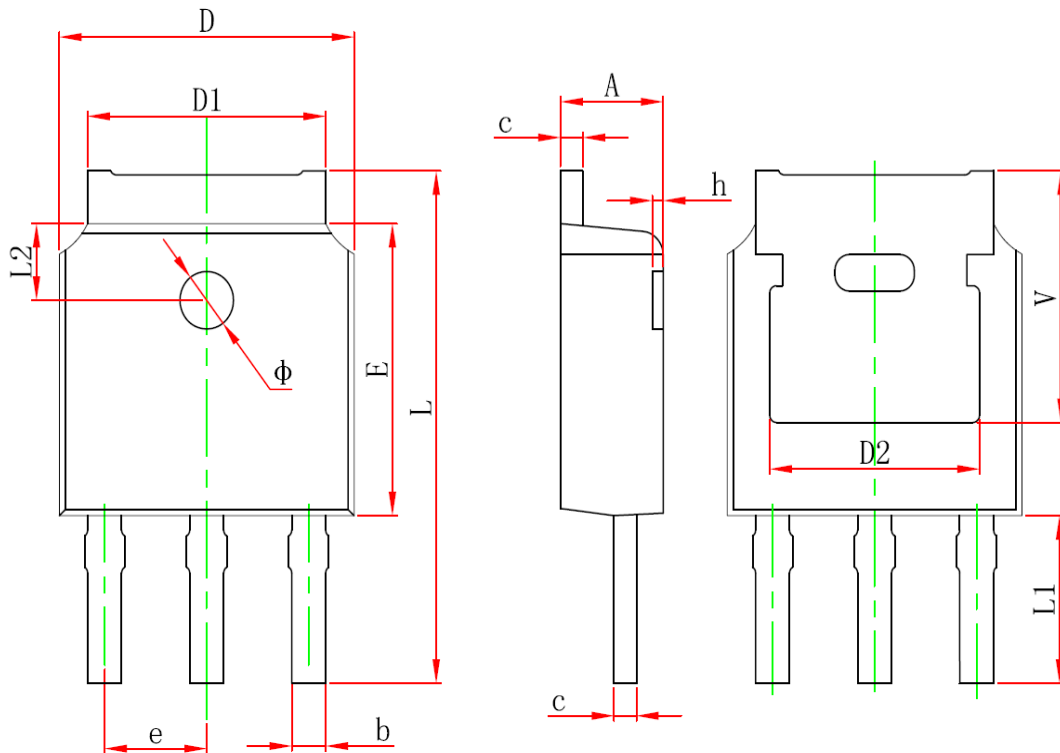


Diode Recovery Test

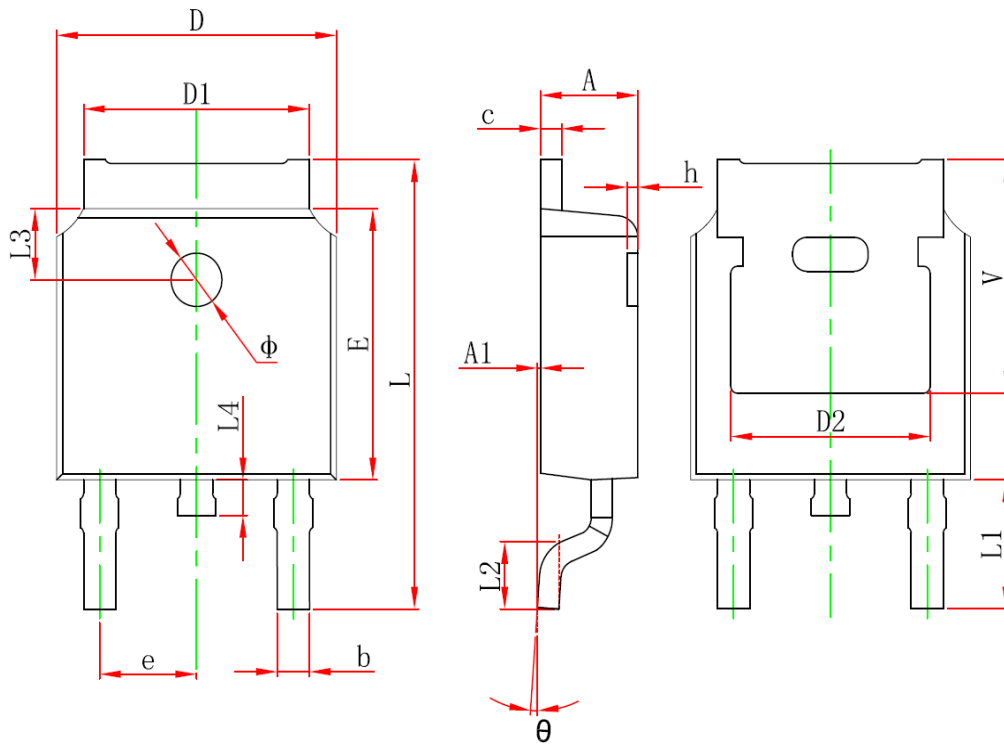


Package Outline

TO-251, 3 leads



| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| b | 0.660 | 0.860 | 0.026 | 0.034 |
| c | 0.460 | 0.580 | 0.018 | 0.023 |
| D | 6.500 | 6.700 | 0.256 | 0.264 |
| D1 | 5.100 | 5.460 | 0.201 | 0.215 |
| D2 | 4.830 REF. | | 0.190 REF. | |
| E | 6.000 | 6.200 | 0.236 | 0.244 |
| e | 2.186 | 2.386 | 0.086 | 0.094 |
| L | 10.400 | 11.000 | 0.409 | 0.433 |
| L1 | 3.500 REF. | | 0.138 REF. | |
| L2 | 1.600 REF. | | 0.063 REF. | |
| ϕ | 1.100 | 1.300 | 0.043 | 0.051 |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| V | 5.350 REF. | | 0.211 REF. | |

Package Outline
TO-252, 2 leads


| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|--------|---------------------------|--------|----------------------|-------|
| | Min. | Max. | Min. | Max. |
| A | 2.200 | 2.400 | 0.087 | 0.094 |
| A1 | 0.000 | 0.127 | 0.000 | 0.005 |
| b | 0.660 | 0.860 | 0.026 | 0.034 |
| c | 0.460 | 0.580 | 0.018 | 0.023 |
| D | 6.500 | 6.700 | 0.256 | 0.264 |
| D1 | 5.100 | 5.460 | 0.201 | 0.215 |
| D2 | 4.830 REF. | | 0.190 REF. | |
| E | 6.000 | 6.200 | 0.236 | 0.244 |
| e | 2.186 | 2.386 | 0.086 | 0.094 |
| L | 9.800 | 10.400 | 0.386 | 0.409 |
| L1 | 2.900 REF. | | 0.114 REF. | |
| L2 | 1.400 | 1.700 | 0.055 | 0.067 |
| L3 | 1.600 REF. | | 0.063 REF. | |
| L4 | 0.600 | 1.000 | 0.024 | 0.039 |
| Φ | 1.100 | 1.300 | 0.043 | 0.051 |
| θ | 0° | 8° | 0° | 8° |
| h | 0.000 | 0.300 | 0.000 | 0.012 |
| V | 5.350 REF. | | 0.211 REF. | |