
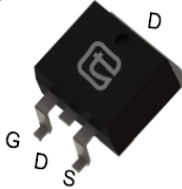


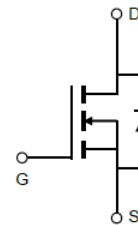
**85V N-Channel Trench MOSFET(Preliminary)**

| | | | | | | | |
|--|--|----------|-----|--------------------------|-----|---------------------------------|-----------------|
| <p>General Description</p> <ul style="list-style-type: none"> ● Trench Power technology ● Low $R_{DS(ON)}$ ● Low Gate Charge ● Optimized for fast-switching applications <p>Applications</p> <ul style="list-style-type: none"> ● Synchronous Rectification in DC/DC and AC/DC Converters ● Isolated DC/DC Converters in Telecom and Industrial | <p>Product Summary</p> <table> <tr> <td>V_{DS}</td> <td>85V</td> </tr> <tr> <td>I_D (at $V_{GS}=10V$)</td> <td>85A</td> </tr> <tr> <td>$R_{DS(ON)}$ (at $V_{GS}=10V$)</td> <td>< 8.8mΩ</td> </tr> </table> <p>100% UIS Tested</p>  | V_{DS} | 85V | I_D (at $V_{GS}=10V$) | 85A | $R_{DS(ON)}$ (at $V_{GS}=10V$) | < 8.8m Ω |
| V_{DS} | 85V | | | | | | |
| I_D (at $V_{GS}=10V$) | 85A | | | | | | |
| $R_{DS(ON)}$ (at $V_{GS}=10V$) | < 8.8m Ω | | | | | | |

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TO-220



| Part Number | Package Type | Form | Marking |
|-------------|--------------|-----------|------------|
| TTB85N08AA | TO-263 | Tape&Reel | TTB85N08AA |
| TTP85N08AA | TO-220 | Tube | TTP85N08AA |

Absolute Maximum Ratings ($T_A = 25^\circ\text{C}$ unless otherwise noted)

| Parameter | Symbol | Maximum | Units |
|---|----------------|---------------------------|------------------|
| Drain-Source Voltage | V_{DS} | 85 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ^B | I_D | $T_C = 25^\circ\text{C}$ | 85 |
| | | $T_C = 100^\circ\text{C}$ | 62 |
| Pulsed Drain Current ^A | I_{DM} | 340 | A |
| Avalanche Current ^A | I_{AS} | 44 | A |
| Single Pulse Avalanche Energy $L = 0.3\text{mH}$ ^A | E_{AS} | 290 | mJ |
| Power Dissipation ^C | P_D | $T_C = 25^\circ\text{C}$ | 157 |
| | | $T_C = 100^\circ\text{C}$ | 78 |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 175 | $^\circ\text{C}$ |

Thermal Characteristics

| Parameter | Symbol | Maximum | Units |
|-----------------------------|-----------------|---------|--------------------|
| Maximum Junction-to-Case | $R_{\theta JC}$ | 0.95 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient | | | |



| Electrical Characteristics($T_J = 25^\circ\text{C}$ unless otherwise noted) | | | | | | |
|--|--|---|---------------------------|------|-----------|------------------|
| Symbol | Parameter | Conditions | Value | | | Units |
| | | | Min | Typ | Max | |
| STATIC PARAMETERS | | | | | | |
| BV_{DSS} | Drain-Source Breakdown Voltage | $I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$ | 85 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 85\text{V}, V_{GS} = 0\text{V}$ | $T_J = 25^\circ\text{C}$ | | 1 | μA |
| | | | $T_J = 125^\circ\text{C}$ | | 100 | |
| I_{GSS} | Gate-Body Leakage Current | $V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$ | | | ± 100 | nA |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ | 2 | 3 | 4 | V |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance | $V_{GS} = 10\text{V}, I_D = 30\text{A}$ | | 8 | 8.8 | $\text{m}\Omega$ |
| g_{FS} | Forward Transconductance | $V_{DS} = 5\text{V}, I_D = 20\text{A}$ | | 30 | | S |
| V_{SD} | Diode Forward Voltage | $I_S = 30\text{A}, V_{GS} = 0\text{V}$ | | | 1 | V |
| I_S | Maximum Body-Diode Continuous Current ^B | | | | 85 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C_{iss} | Input Capacitance | $V_{GS} = 0\text{V}, V_{DS} = 40\text{V}, f = 1\text{MHz}$ | | 5585 | | pF |
| C_{oss} | Output Capacitance | | | 248 | | |
| C_{rss} | Reverse Transfer Capacitance | | | 219 | | |
| R_g | Gate Resistance | $f = 1\text{MHz}$ | | 1.6 | | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Q_g | Total Gate Charge | $V_{GS} = 10\text{V}, V_{DS} = 40\text{V}, I_D = 20\text{A}$ | | 92 | | nC |
| Q_{gs} | Gate Source Charge | | | 27 | | |
| Q_{gd} | Gate Drain Charge | | | 21 | | |
| $t_{D(on)}$ | Turn-On Delay Time | $V_{GS} = 10\text{V}, V_{DS} = 40\text{V}, I_D = 20\text{A}, R_G = 2.5\Omega$ | | 24 | | ns |
| t_r | Turn-On Rise Time | | | 19 | | |
| $T_{D(off)}$ | Turn-Off Delay Time | | | 70 | | |
| t_f | Turn-Off Fall Time | | | 30 | | |
| t_{rr} | Body Diode Reverse Recovery Time | $I_F = 20\text{A}, di/dt = 100\text{A}/\mu\text{s}$ | | 37 | | ns |
| Q_{rr} | Body Diode Reverse Recovery Charge | | | 58 | | nC |

A. Single pulse width limited by maximum junction temperature.

B. The maximum current rating is package limited.

C. The power dissipation P_D is based on $T_{J(MAX)} = 175^\circ\text{C}$, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

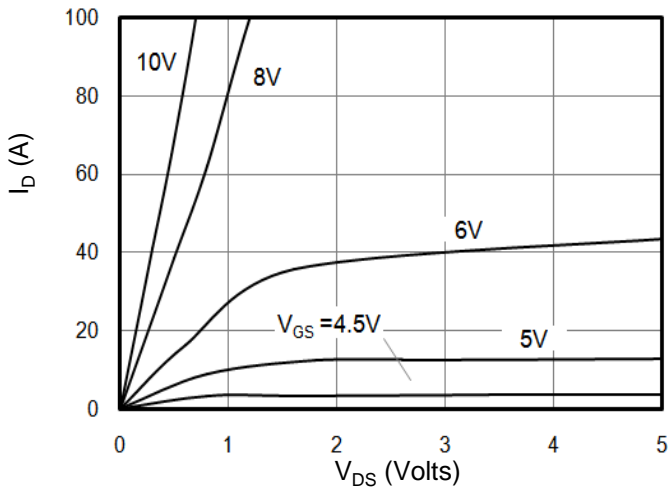


Figure 1: On-Region Characteristics

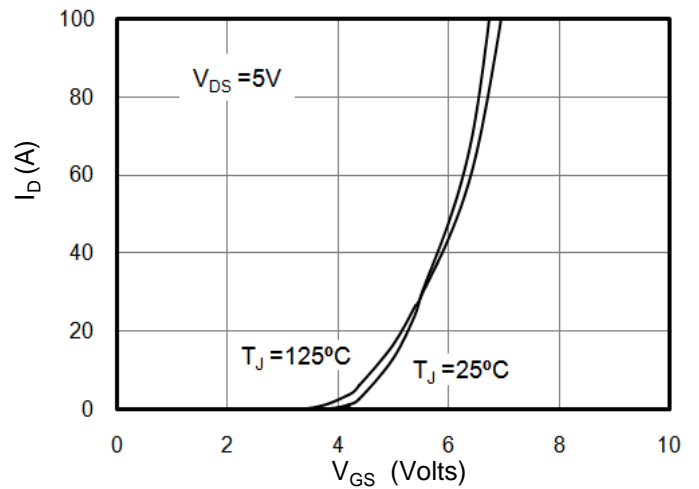


Figure 2: Transfer Characteristics

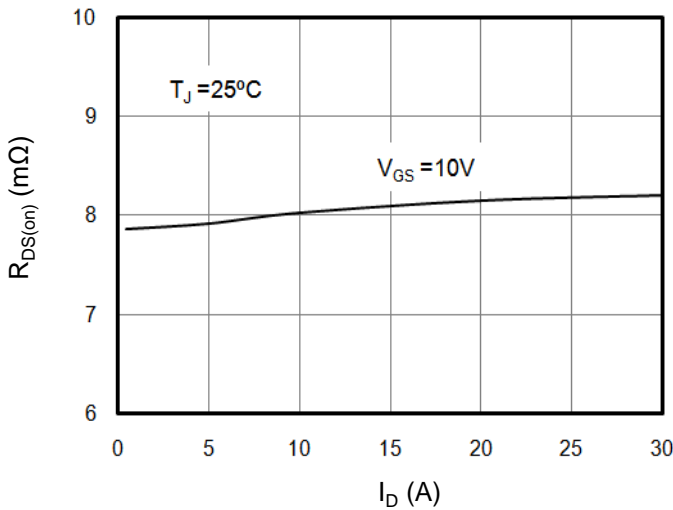


Figure 3: On-Resistance vs. Drain Current

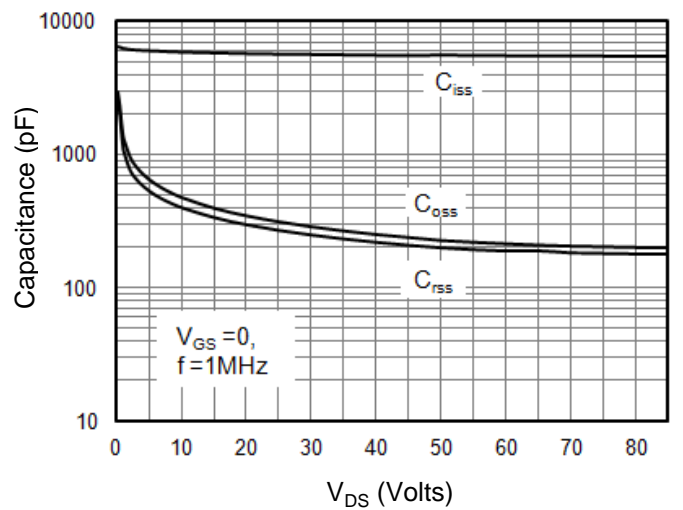


Figure 4: Capacitance Characteristics

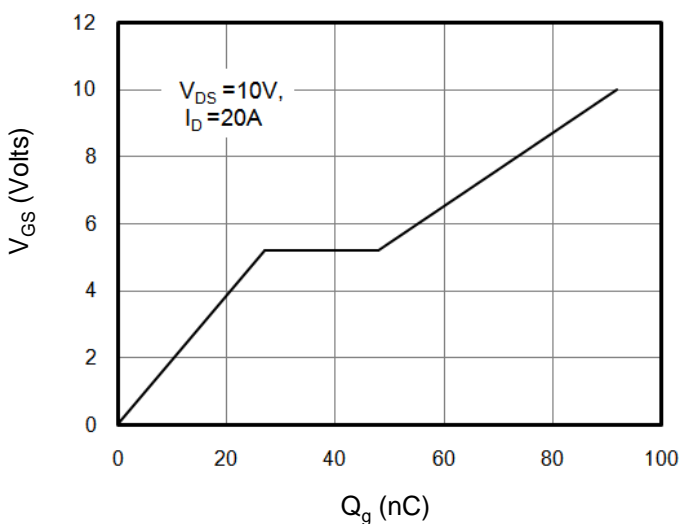


Figure 5: Gate Charge Characteristics

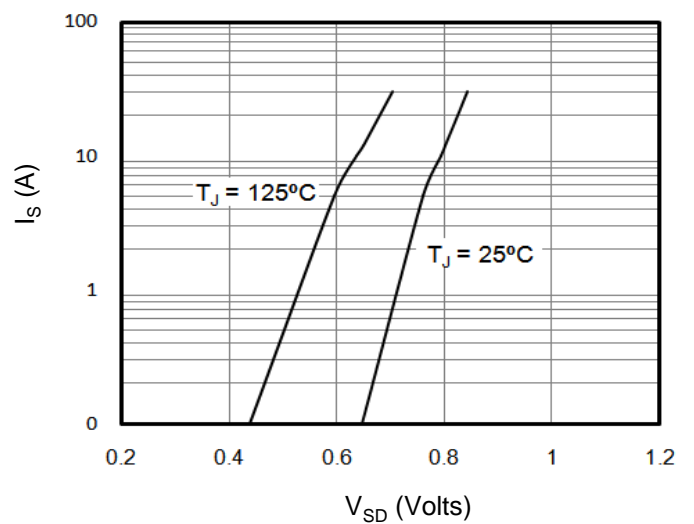


Figure 6: Body Diode Forward Voltage



TYPICAL ELECTRICAL AND THERMAL CHARACTERISTICS

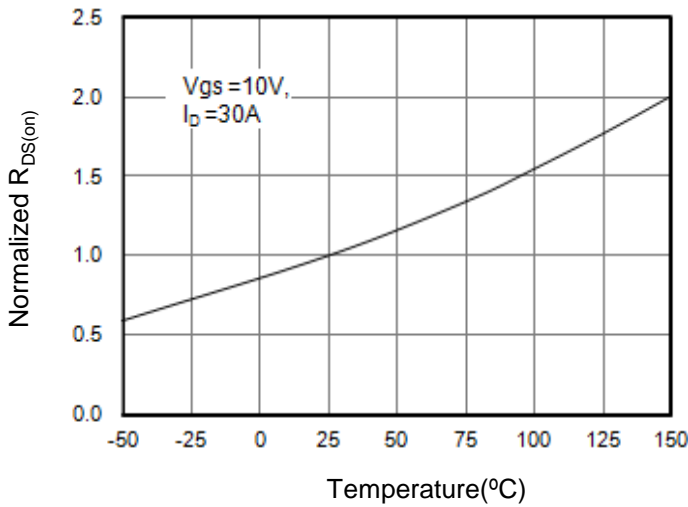


Figure 7: On-Resistance vs. Junction Temperature

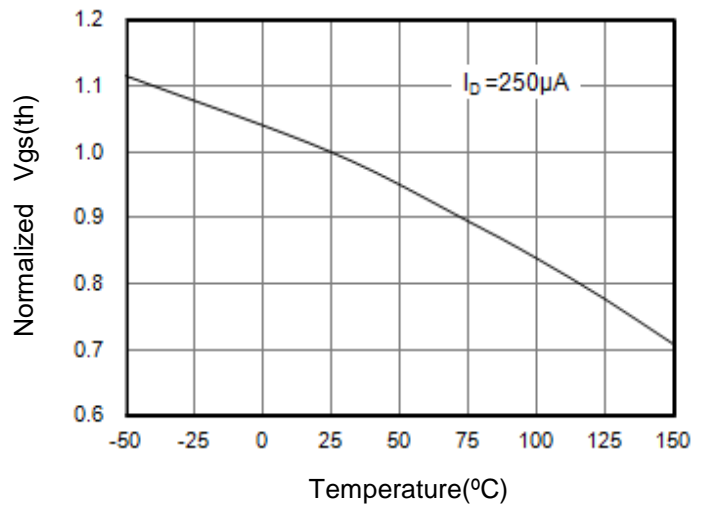


Figure 8: Vgs(th) vs. Junction Temperature

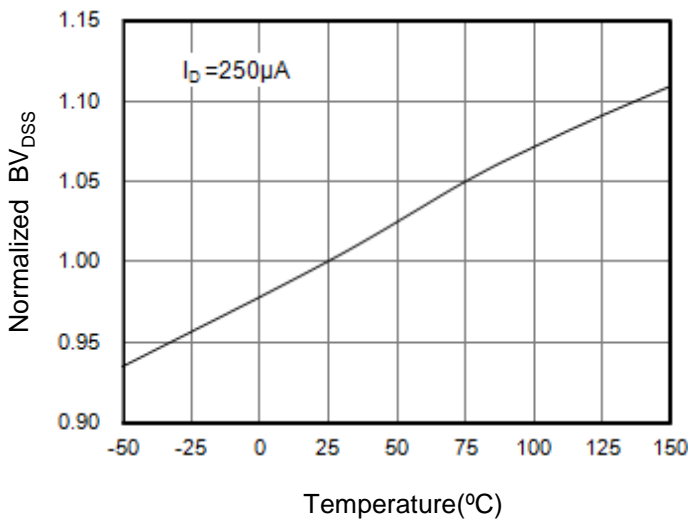


Figure 9: BV_{DSS} vs. Junction Temperature

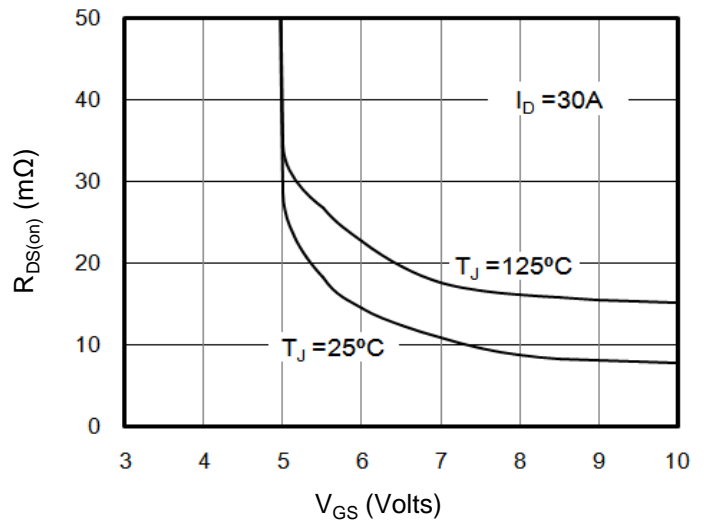


Figure 10: On-Resistance vs. Gate-Source Voltage

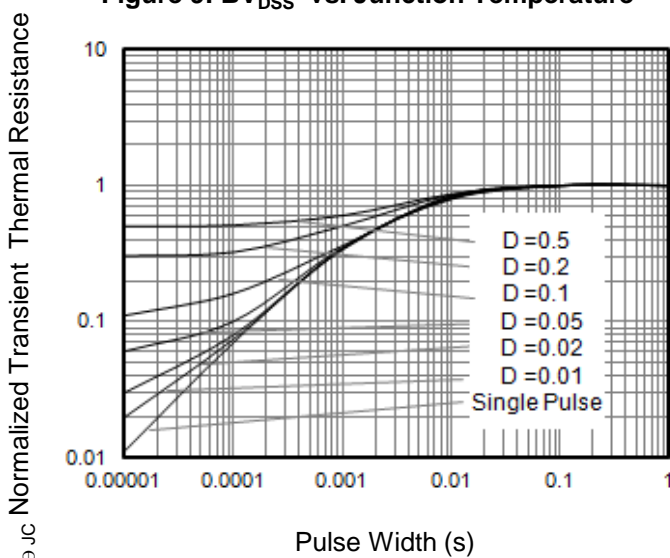


Figure 11: Normalized Transient Thermal Resistance

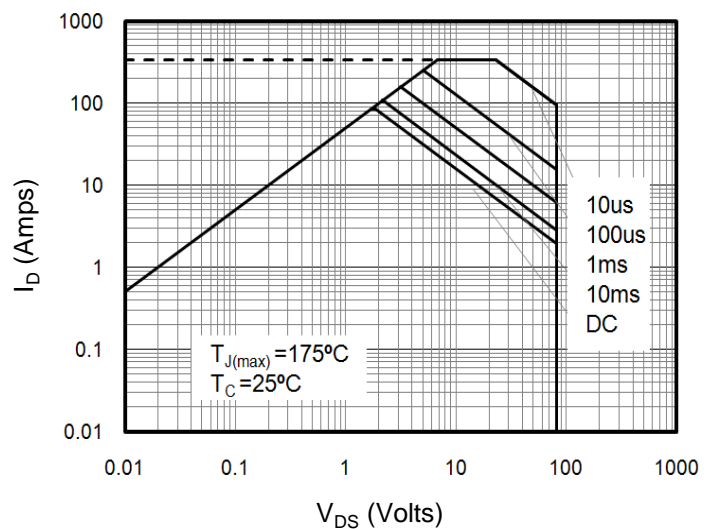


Figure 12: Safe Operating Area



Figure A: Gate Charge Test Circuit and Waveforms

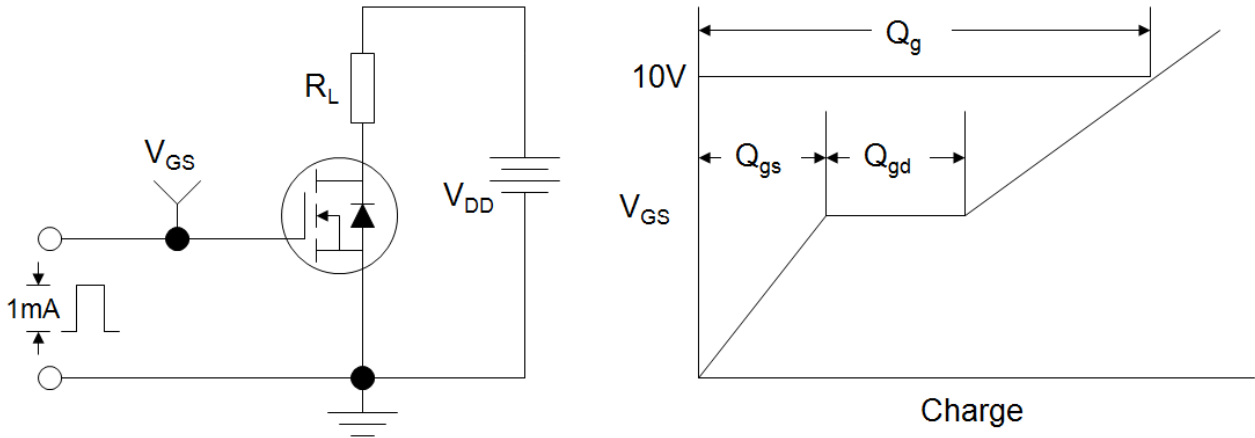


Figure B: Resistive Switching Test Circuit and Waveforms

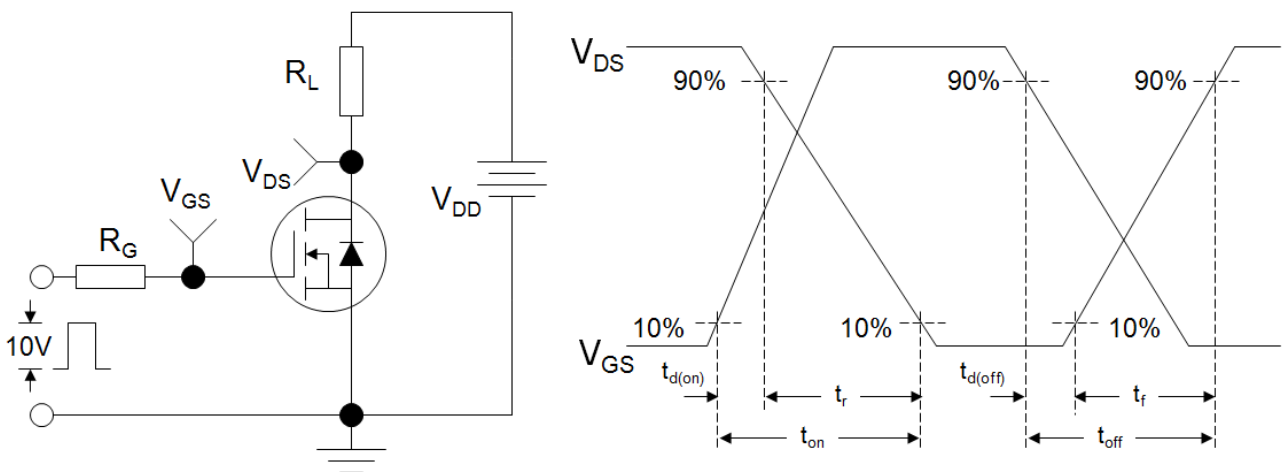
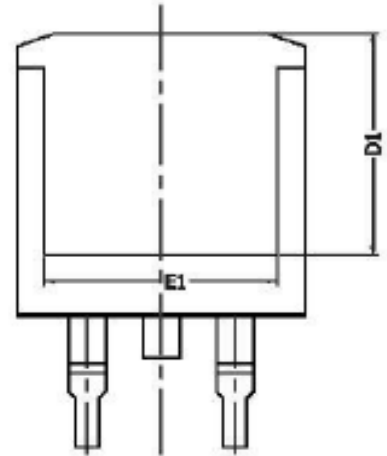
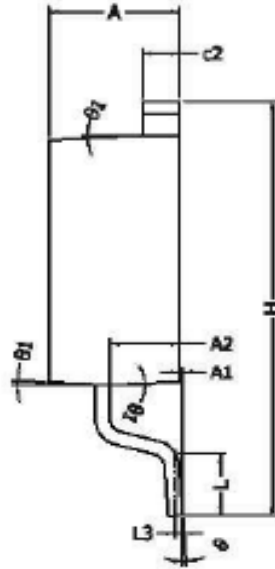
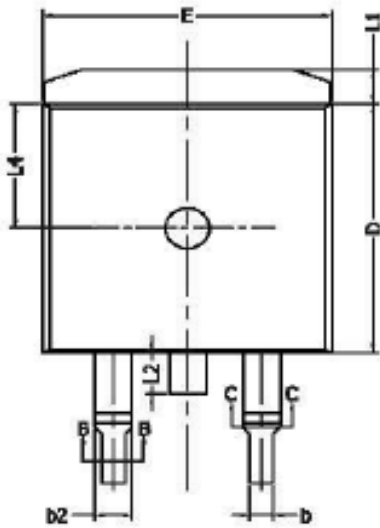


Figure C: Unclamped Inductive Switching (UIS) Test Circuit and Waveforms





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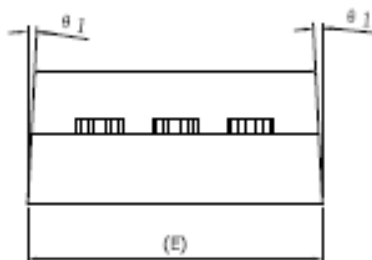
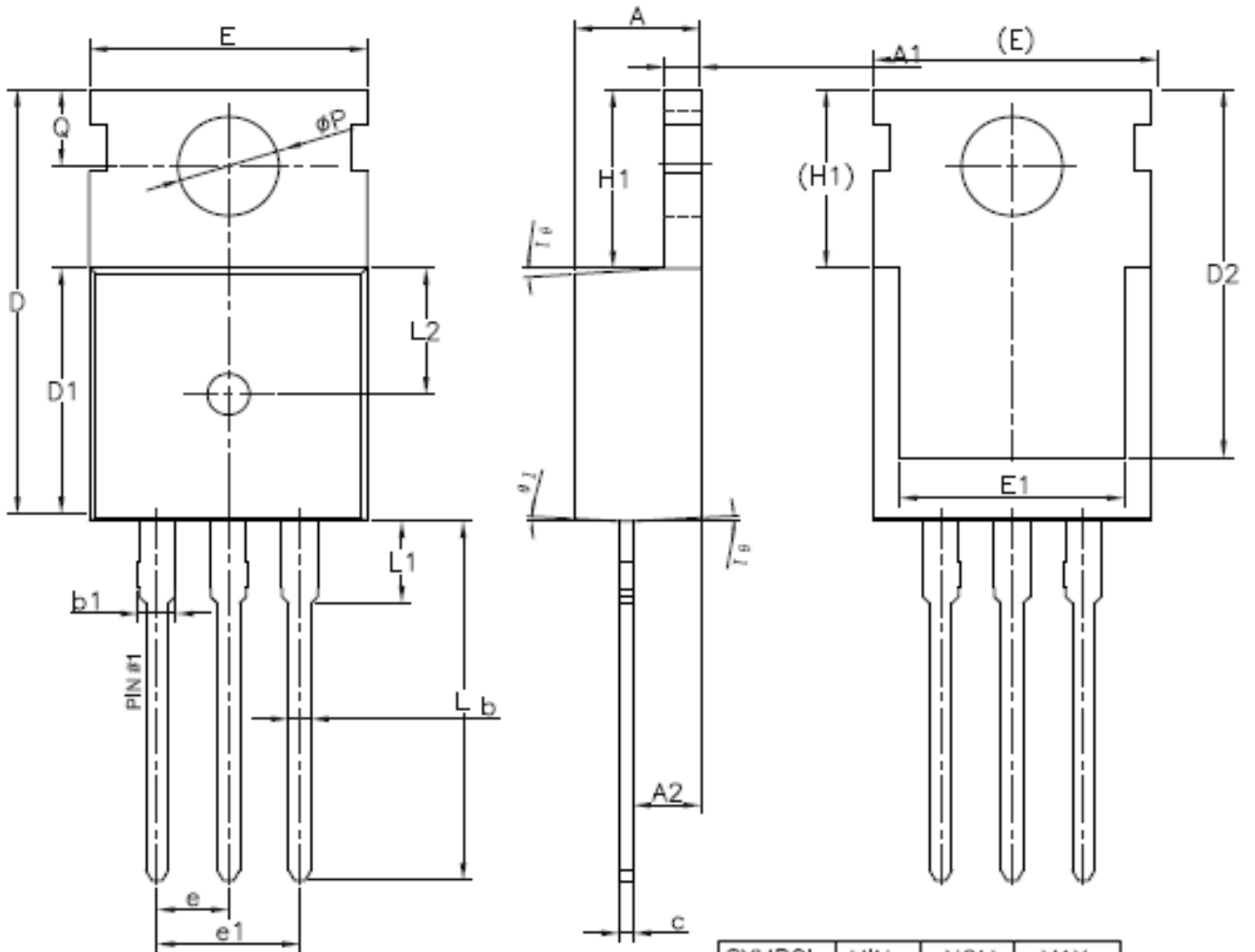
COMMON DIMENSIONS
(UNITS OF MEASURE -MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|--------|----------|-------|-------|
| A | 4.40 | 4.50 | 4.60 |
| A1 | 0 | 0.10 | 0.25 |
| A2 | 2.20 | 2.40 | 2.60 |
| b | 0.76 | --- | 0.89 |
| b1 | 0.75 | 0.80 | 0.85 |
| b2 | 1.23 | --- | 1.37 |
| b3 | 1.22 | 1.27 | 1.32 |
| c | 0.47 | --- | 0.60 |
| c1 | 0.46 | 0.51 | 0.56 |
| c2 | 1.25 | 1.30 | 1.35 |
| D | 9.10 | 9.20 | 9.30 |
| D1 | 8.00 | --- | --- |
| E | 9.80 | 9.90 | 10.00 |
| E1 | 7.80 | --- | --- |
| e | 2.54 BSC | | |
| H | 14.90 | 15.30 | 15.70 |
| L | 2.00 | 2.30 | 2.60 |
| L1 | 1.17 | 1.27 | 1.40 |
| L2 | --- | --- | 1.75 |
| L3 | 0.25BSC | | |
| L4 | 4.60 REF | | |
| theta | 0° | --- | 8° |
| theta1 | 1° | 3° | 5° |





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| SYMBOL | MIN | NOM | MAX |
|------------|---------|-------|-------|
| A | 4.40 | 4.50 | 4.60 |
| A1 | 1.27 | 1.30 | 1.33 |
| A2 | 2.30 | 2.40 | 2.50 |
| b | 0.70 | - | 0.90 |
| b1 | 1.27 | - | 1.40 |
| c | 0.45 | 0.50 | 0.60 |
| D | 15.30 | 15.70 | 16.10 |
| D1 | 9.10 | 9.20 | 9.30 |
| D2 | 13.10 | - | 13.70 |
| E | 9.70 | 9.90 | 10.20 |
| E1 | 7.80 | 8.00 | 8.20 |
| e | 2.54BSC | | |
| e1 | 5.08BSC | | |
| H1 | 6.30 | 6.50 | 6.70 |
| L | 12.78 | 13.08 | 13.38 |
| L1 | - | - | 3.50 |
| L2 | 4.60REF | | |
| ϕP | 3.55 | 3.60 | 3.65 |
| Q | 2.73 | - | 2.87 |
| θ_1 | 1° | 3° | 5° |



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