
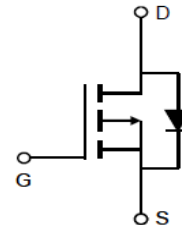
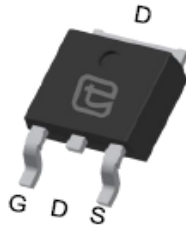


**30V P-Channel Trench MOSFET(Preliminary)**

| | | | | | | | | | |
|--|---|----------|------|--------------------------|------|----------------------------------|-----------------|-----------------------------------|----------------|
| <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>-30V</td> </tr> <tr> <td>I_D (at $V_{GS}=10V$)</td> <td>-90A</td> </tr> <tr> <td>$R_{DS(ON)}$ (at $V_{GS}=-10V$)</td> <td>< 7.5mΩ</td> </tr> <tr> <td>$R_{DS(ON)}$ (at $V_{GS}=-4.5V$)</td> <td>< 12mΩ</td> </tr> </table> <p>100% UIS Tested</p>  | V_{DS} | -30V | I_D (at $V_{GS}=10V$) | -90A | $R_{DS(ON)}$ (at $V_{GS}=-10V$) | < 7.5m Ω | $R_{DS(ON)}$ (at $V_{GS}=-4.5V$) | < 12m Ω |
| V_{DS} | -30V | | | | | | | | |
| I_D (at $V_{GS}=10V$) | -90A | | | | | | | | |
| $R_{DS(ON)}$ (at $V_{GS}=-10V$) | < 7.5m Ω | | | | | | | | |
| $R_{DS(ON)}$ (at $V_{GS}=-4.5V$) | < 12m Ω | | | | | | | | |

TO-252



| Part Number | Package Type | Form | Marking |
|-------------|--------------|-----------|---------|
| TTD90P03AT | TO-252 | Tape&Reel | 90P03AT |

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

| Parameter | Symbol | Maximum | Units |
|---|----------------|---------------------------|------------------|
| Drain-Source Voltage | V_{DS} | - 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ^B | I_D | $T_C = 25^\circ\text{C}$ | -46 |
| | | $T_C = 100^\circ\text{C}$ | -46 |
| Pulsed Drain Current ^A | I_{DM} | -270 | A |
| Avalanche Current ^A | I_{AS} | -30 | A |
| Single Pulse Avalanche Energy $L = 0.3\text{mH}$ ^A | E_{AS} | 135 | mJ |
| Power Dissipation ^C | P_D | $T_C = 25^\circ\text{C}$ | 79 |
| | | $T_C = 100^\circ\text{C}$ | 39.5 |
| 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 | $R_{\theta JC}$ | 1.9 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient | $R_{\theta JA}$ | 100 | |



| 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 | $I_D = -250\mu\text{A}, V_{GS} = 0\text{V}$ | -30 | | | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$ | $T_J = 25^\circ\text{C}$ | | -1 | μA |
| | | | $T_J = 100^\circ\text{C}$ | | -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 | $V_{DS} = V_{GS}, I_D = -250\mu\text{A}$ | -1 | -1.7 | -2.4 | V |
| $R_{DS(on)}$ | Static Drain-Source On-Resistance | $V_{GS} = -10\text{V}, I_D = -20\text{A}$ | | 6.3 | 7.5 | $\text{m}\Omega$ |
| | | $V_{GS} = -4.5\text{V}, I_D = -20\text{A}$ | | 10 | 12 | $\text{m}\Omega$ |
| g_{FS} | Forward Transconductance | $V_{DS} = -5\text{V}, I_D = -20\text{A}$ | | 30 | | S |
| V_{SD} | Diode Forward Voltage | $I_S = -15\text{A}, V_{GS} = 0\text{V}$ | | | -1 | V |
| I_S | Maximum Body-Diode Continuous Current ^B | | | | -46 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C_{iss} | Input Capacitance | $V_{GS} = 0\text{V}, V_{DS} = -15\text{V}, f = 1\text{MHz}$ | | 4942 | | pF |
| C_{oss} | Output Capacitance | | | 473 | | |
| C_{rss} | Reverse Transfer Capacitance | | | 461 | | |
| SWITCHING PARAMETERS | | | | | | |
| $Q_g(10\text{V})$ | Total Gate Charge | $V_{GS} = -10\text{V}, V_{DS} = -15\text{V}, I_D = -20\text{A}$ | | 82 | | nC |
| Q_{gs} | Gate Source Charge | | | 14 | | |
| Q_{gd} | Gate Drain Charge | | | 16 | | |
| $t_{D(on)}$ | Turn-On Delay Time | $V_{GS} = -10\text{V}, V_{DS} = -15\text{V}, I_D = -20\text{A}, R_G = 2.5\Omega$ | | 182 | | ns |
| t_r | Turn-On Rise Time | | | 262 | | |
| $T_{D(off)}$ | Turn-Off Delay Time | | | 1.3 | | |
| t_f | Turn-Off Fall Time | | | 9.8 | | |
| t_{rr} | Body Diode Reverse Recovery Time | $I_F = -15\text{A}, di/dt = 100\text{A}/\mu\text{s}$ | | 34 | | ns |
| Q_{rr} | Body Diode Reverse Recovery Charge | | | 79 | | 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 Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

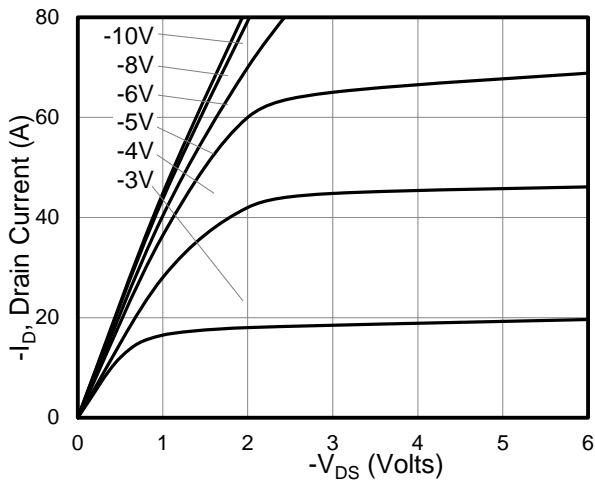


Figure 1: On-Region Characteristics

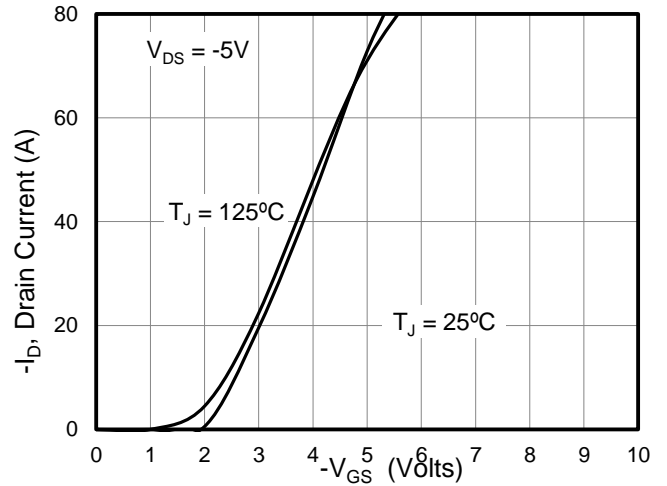


Figure 2: Transfer Characteristics

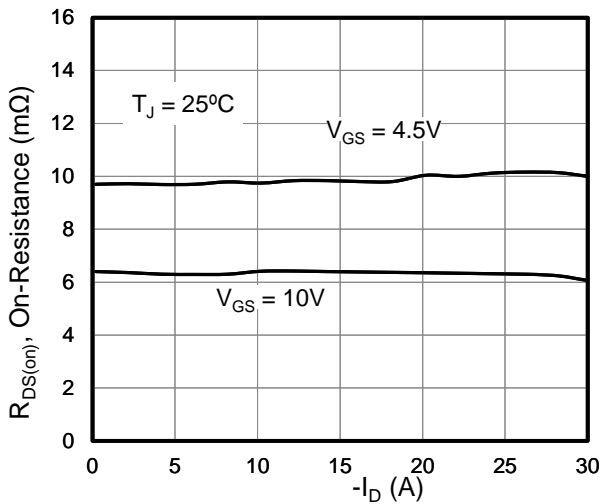


Figure 3: On-Resistance vs. Drain Current

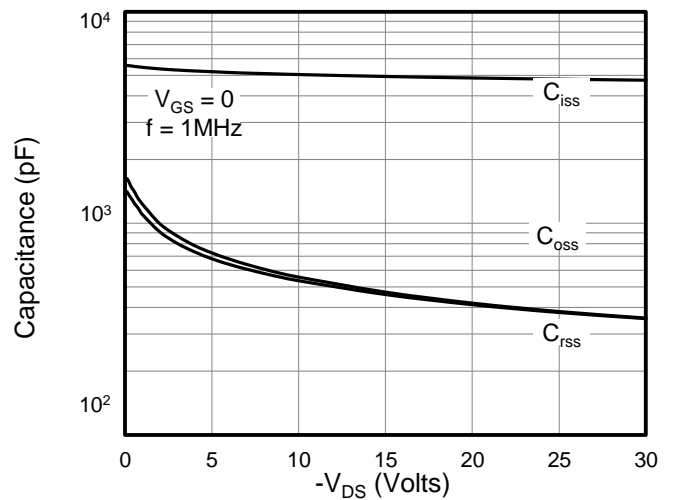


Figure 4: Capacitance Characteristics

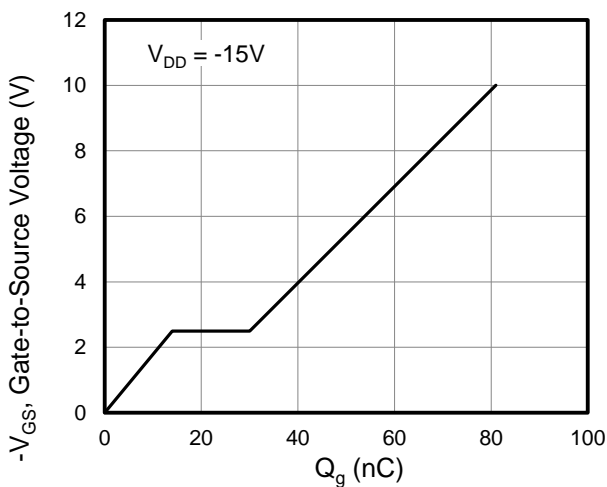


Figure 5: Gate Charge Characteristics

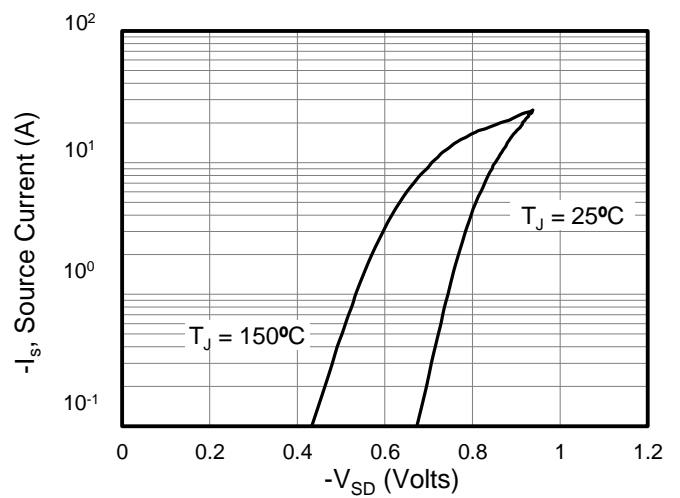


Figure 6: Body Diode Forward Voltage



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

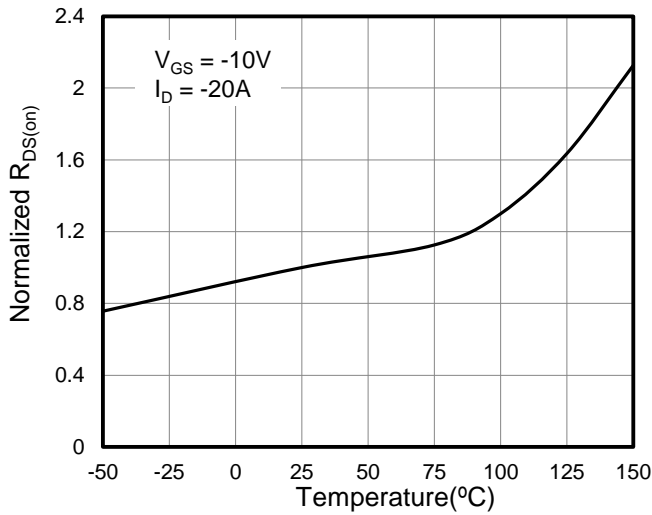


Figure 7: On-Resistance vs. Junction Temperature

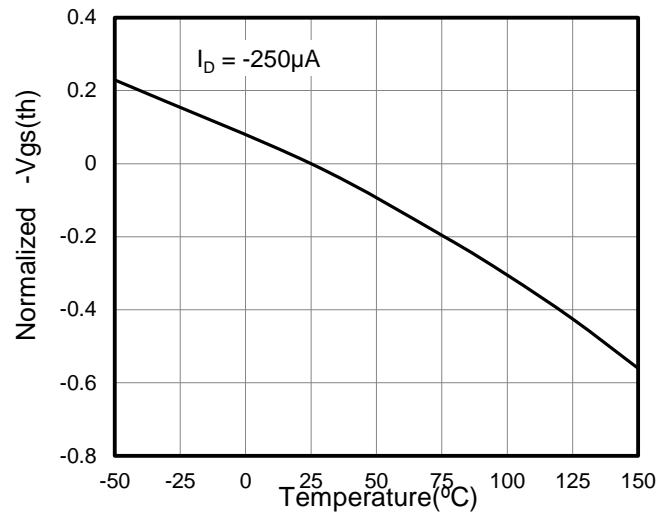


Figure 8: $V_{gs(th)}$ vs. Junction Temperature

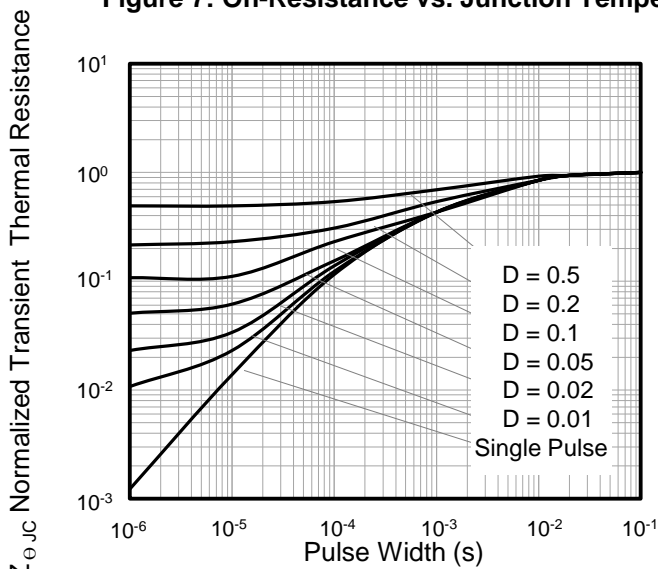


Figure 11: Normalized Transient Thermal Resistance

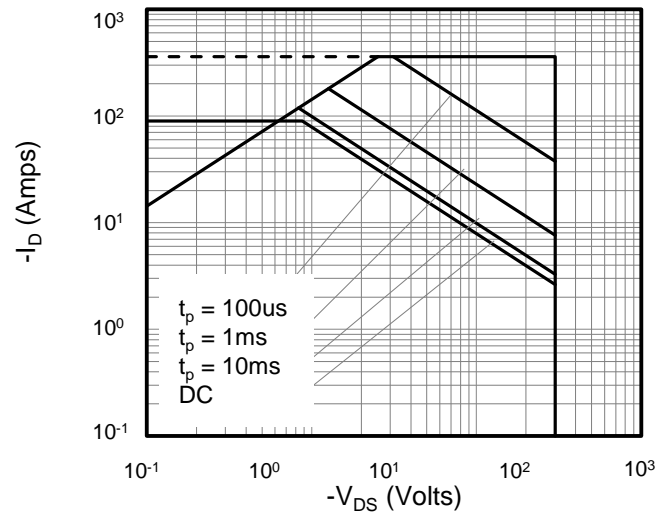


Figure 12: Safe Operating Area



Figure A: Gate Charge Test Circuit and Waveform

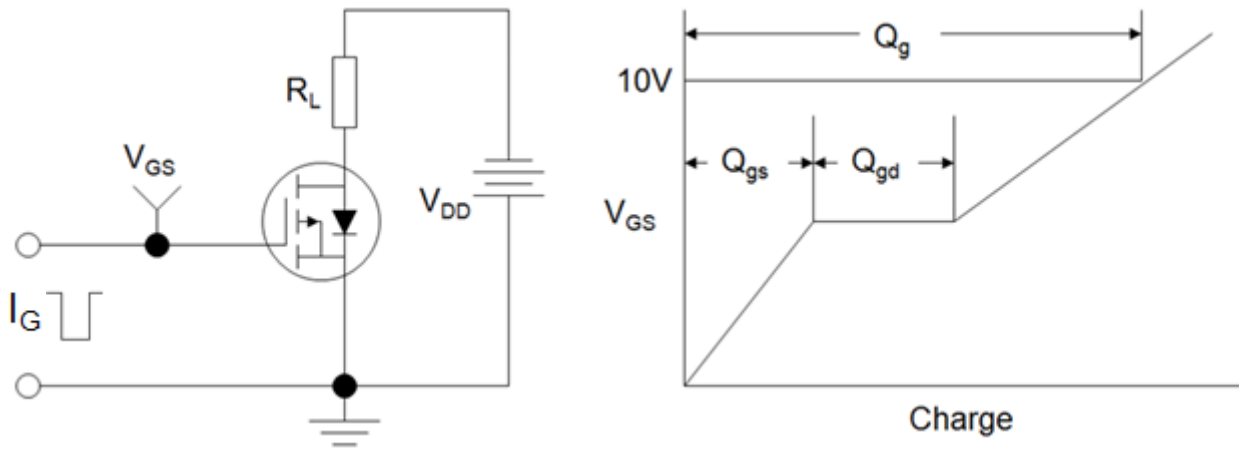


Figure B: Resistive Switching Test Circuit and Waveform

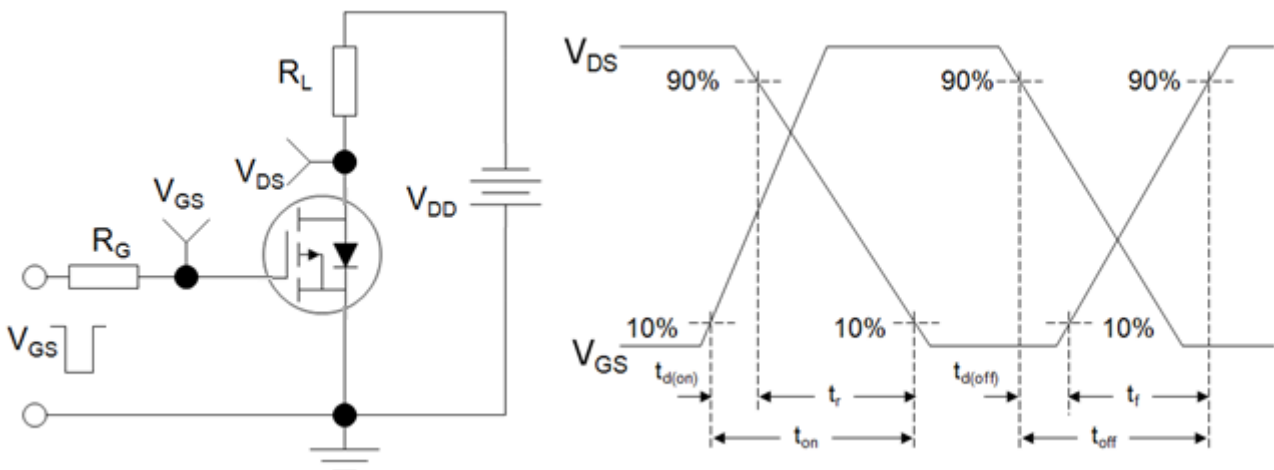
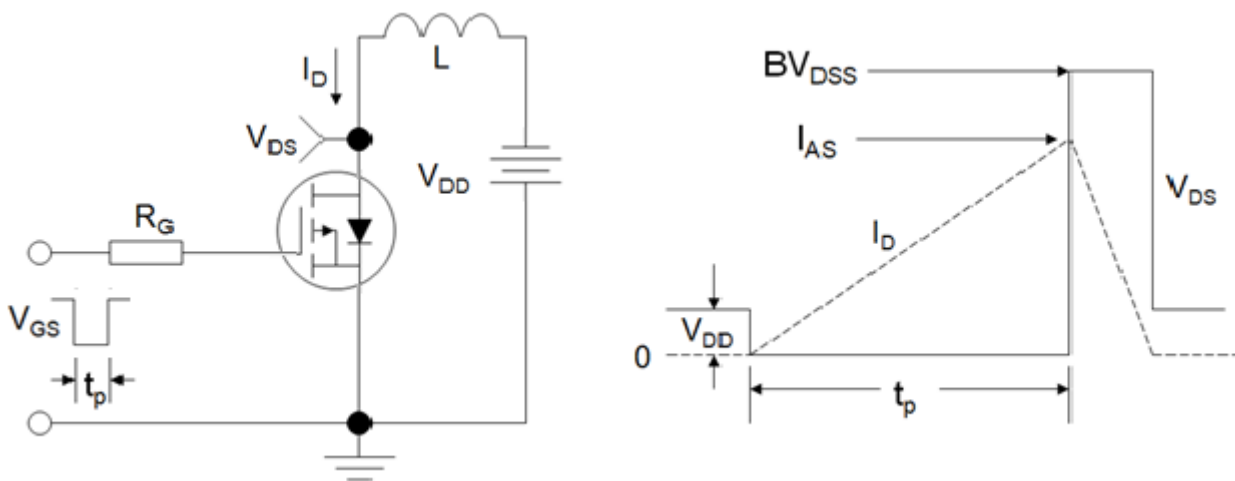
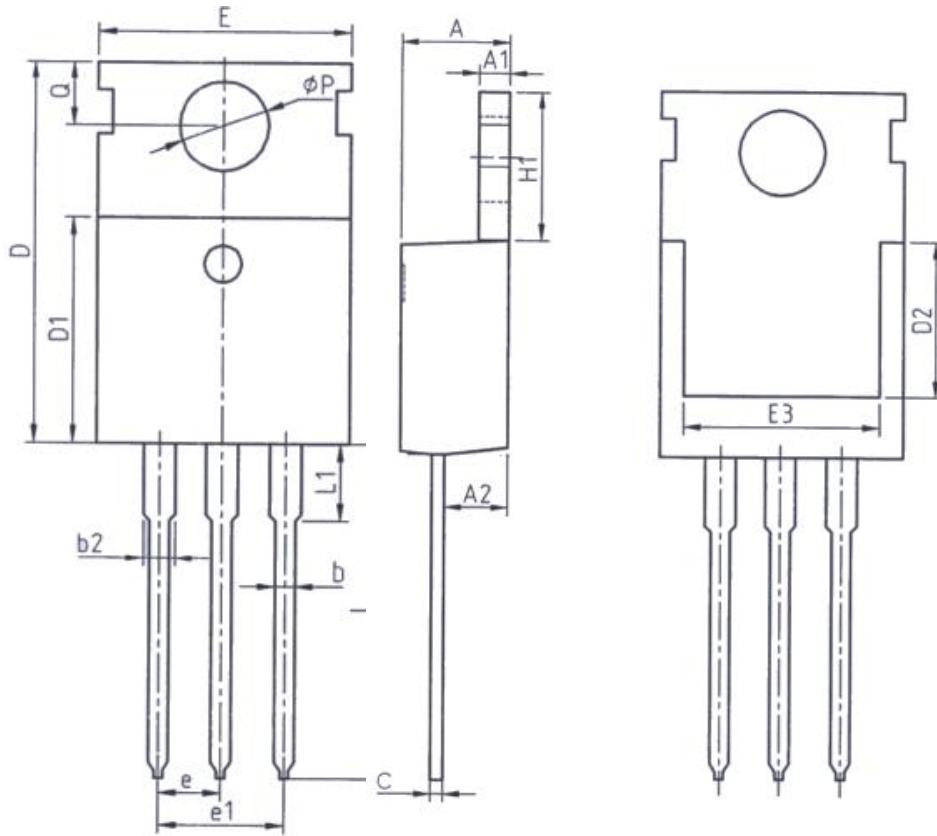


Figure C: Unclamped Inductive Switching Test Circuit and Waveform





TO-220(华天)



| Unit: mm | | |
|----------|-------|-------|
| Symbol | Min. | Max. |
| A | 4.37 | 4.77 |
| A1 | 1.25 | 1.45 |
| A2 | 2.20 | 2.60 |
| b | 0.70 | 0.95 |
| b2 | 1.17 | 1.47 |
| c | 0.40 | 0.65 |
| D | 15.10 | 16.10 |
| D1 | 8.80 | 9.40 |
| D2 | 5.50 | - |

| Unit: mm | | |
|----------|---------|-------|
| Symbol | Min. | Max. |
| E | 9.70 | 10.30 |
| E3 | 7.00 | - |
| e | 2.54BSC | |
| e1 | 5.08BSC | |
| H1 | 6.25 | 6.85 |
| L | 12.75 | 13.80 |
| L1 | - | 3.40 |
| P | 3.40 | 3.80 |
| Q | 2.60 | 3.00 |



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