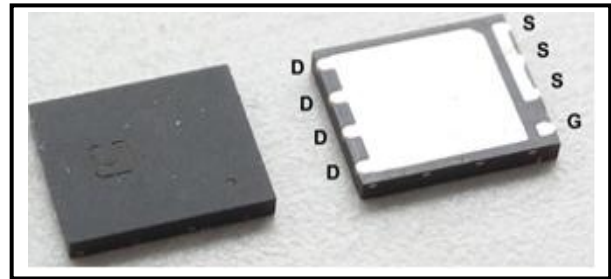




30V N-Channel Trench MOSFET

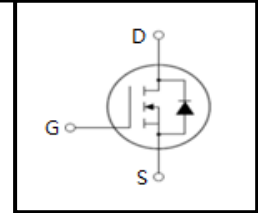
FEATURES

- Trench Power MOSFET Technology
- Low $R_{DS(ON)}$
- Low Gate Charge
- Optimized For Fast-switching Applications



APPLICATIONS

- Synchronous Rectification in DC/DC and AC/DC Converters
- Isolated DC/DC Converters in Telecom and Industrial



| Device Marking and Package Information | | |
|--|---------|----------|
| Device | Package | Marking |
| TTG160N03GT | DFN5×6 | 160N03GT |

| Absolute Maximum Ratings $T_C = 25^\circ\text{C}$, unless otherwise noted | | | |
|--|----------------|----------|------------------|
| Parameter | Symbol | Value | Unit |
| Drain-Source Voltage ($V_{GS} = 0\text{V}$) | V_{DSS} | 30 | V |
| Continuous Drain Current | I_D | 160 | A |
| Pulsed Drain Current (note1) | I_{DM} | 640 | A |
| Gate-Source Voltage | V_{GSS} | ± 12 | V |
| Single Pulse Avalanche Energy (note2) | E_{AS} | 277 | mJ |
| Avalanche Current | I_{As} | 43 | A |
| Power Dissipation ($T_C = 25^\circ\text{C}$) | P_D | 119 | W |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55~+150 | $^\circ\text{C}$ |

| Thermal Resistance | | | |
|---|------------|-------|------|
| Parameter | Symbol | Value | Unit |
| Thermal Resistance, Junction-to-Case | R_{thJC} | 1.05 | K/W |
| Thermal Resistance, Junction-to-Ambient | R_{thJA} | 60 | |



| Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted | | | | | | |
|--|---------------|--|-------|------|-----------|------------------|
| Parameter | Symbol | Test Conditions | Value | | | Unit |
| | | | Min. | Typ. | Max. | |
| Static | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu\text{A}$ | 30 | -- | -- | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 30V, V_{GS} = 0V, T_J = 25^\circ\text{C}$ | -- | -- | 1 | μA |
| | | $V_{DS} = 30V, V_{GS} = 0V, T_J = 125^\circ\text{C}$ | -- | -- | 100 | |
| Gate-Source Leakage | I_{GSS} | $V_{GS} = \pm 12V$ | -- | -- | ± 100 | nA |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ | 1 | 1.7 | 2.4 | V |
| Drain-Source On-Resistance (Note3) | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 20A$ | -- | 1.6 | 2.1 | $\text{m}\Omega$ |
| | | $V_{GS} = 4.5V, I_D = 20A$ | -- | 2.1 | 3.0 | $\text{m}\Omega$ |
| Forward Transconductance (Note3) | g_{fs} | $V_{DS} = 10V, I_D = 20A$ | -- | 42.6 | -- | S |
| Dynamic | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0V,$ $V_{DS} = 25V,$ $f = 1.0\text{MHz}$ | -- | 9300 | -- | pF |
| Output Capacitance | C_{oss} | | -- | 904 | -- | |
| Reverse Transfer Capacitance | C_{rss} | | -- | 813 | -- | |
| Total Gate Charge | Q_g | $V_{DD} = 15V, I_D = 30A,$ $V_{GS} = 10V$ | -- | 160 | -- | nC |
| Gate-Source Charge | Q_{gs} | | -- | 18 | -- | |
| Gate-Drain Charge | Q_{gd} | | -- | 34 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD} = 20V, I_D = 30A,$ $R_G = 3\Omega$ | -- | 27 | -- | ns |
| Turn-on Rise Time | t_r | | -- | 25 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 90 | -- | |
| Turn-off Fall Time | t_f | | -- | 40 | -- | |
| Drain-Source Body Diode Characteristics | | | | | | |
| Continuous Body Diode Current | I_S | $T_C = 25^\circ\text{C}$ | -- | -- | 160 | A |
| Pulsed Diode Forward Current | I_{SM} | | -- | -- | 640 | |
| Body Diode Voltage | V_{SD} | $T_J = 25^\circ\text{C}, I_{SD} = 30A, V_{GS} = 0V$ | -- | -- | 1.2 | V |
| Reverse Recovery Time | t_{rr} | $I_F = 30A,$ $di_F/dt = 100A/\mu\text{s}$ | -- | 43 | -- | ns |
| Reverse Recovery Charge | Q_{rr} | | -- | 40 | -- | nC |

Notes

1. Repetitive Rating: Pulse Width limited by maximum junction temperature
2. $V_{DD} = 30V, R_G = 25\Omega$, Starting $T_J = 25^\circ\text{C}$
3. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 1\%$



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

Figure 1. Output Characteristics

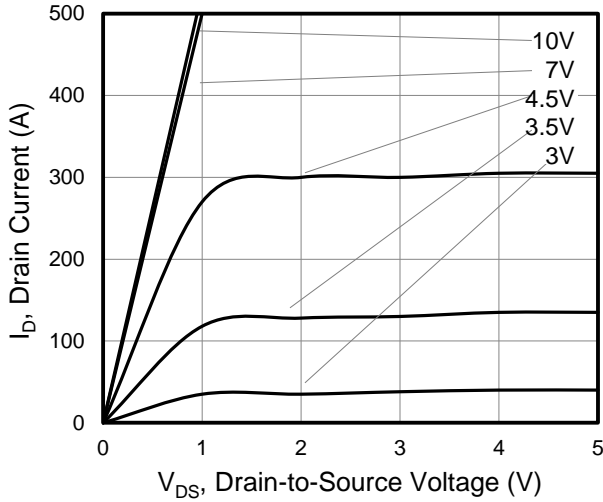


Figure 2. Transfer Characteristics

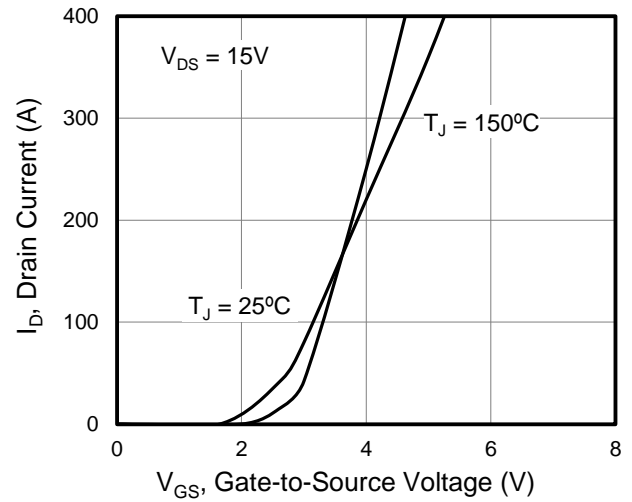


Figure 3. On-Resistance vs. Drain Current

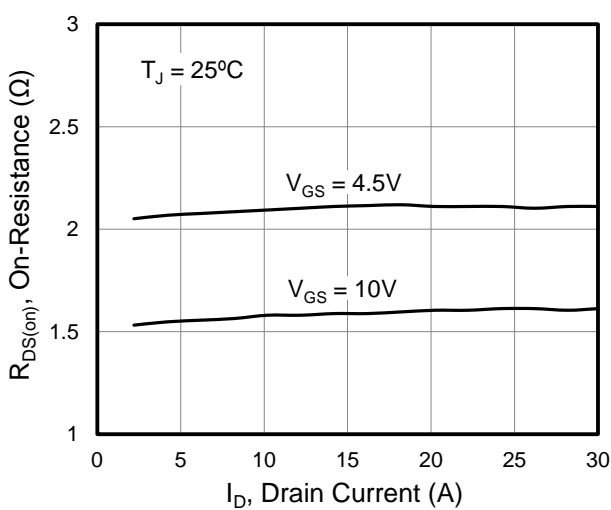


Figure 4. Capacitance

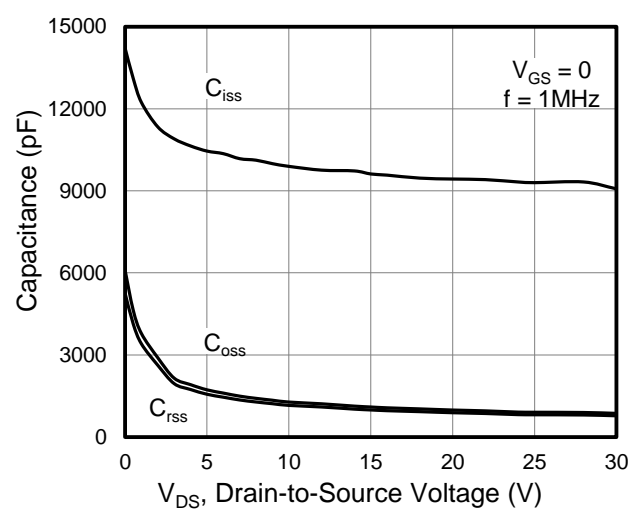


Figure 5. Gate Charge

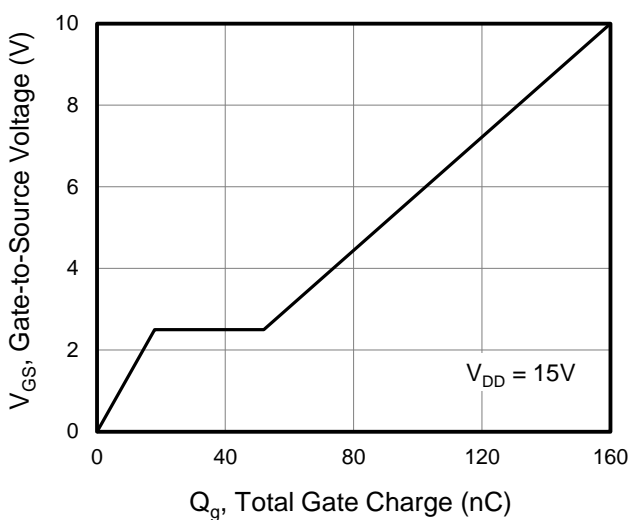
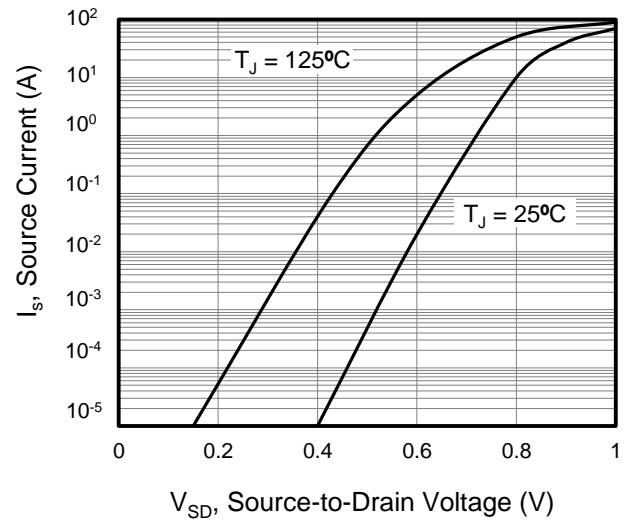


Figure 6. Body Diode Forward Voltage





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

Figure 7. On-Resistance vs. Junction Temperature

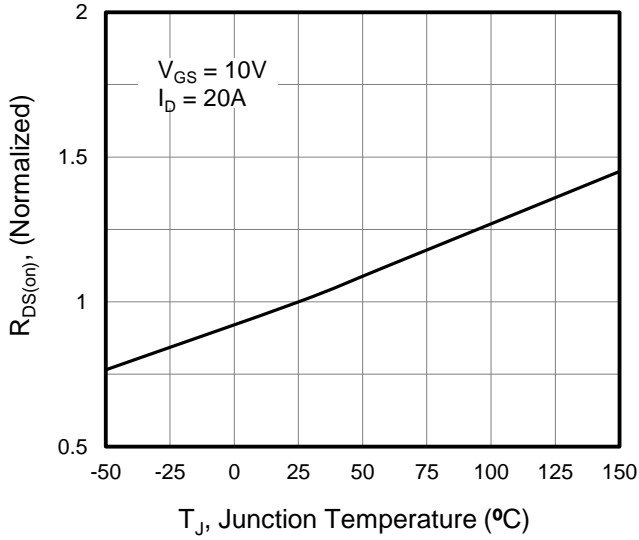


Figure 8. Threshold Voltage vs. Junction Temperature

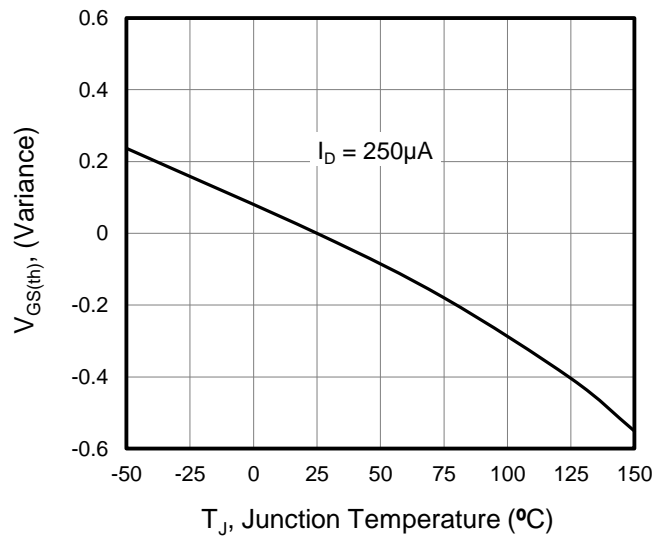


Figure 9. Transient Thermal Impedance

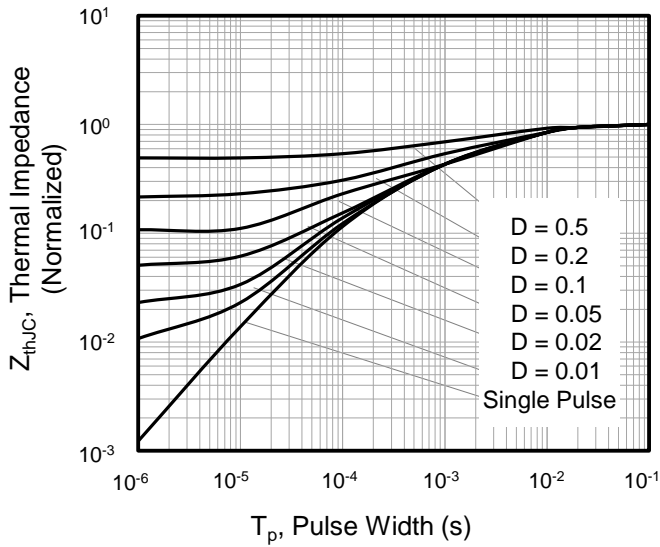


Figure 10. Safe Operating Area

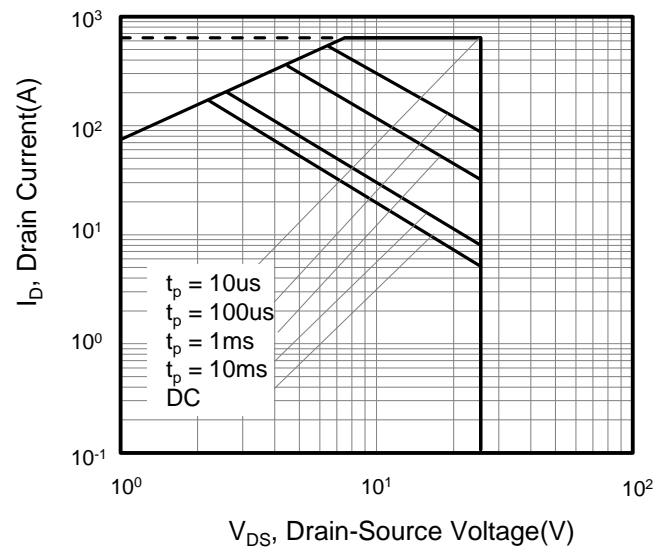




Figure A: Gate Charge Test Circuit and Waveform

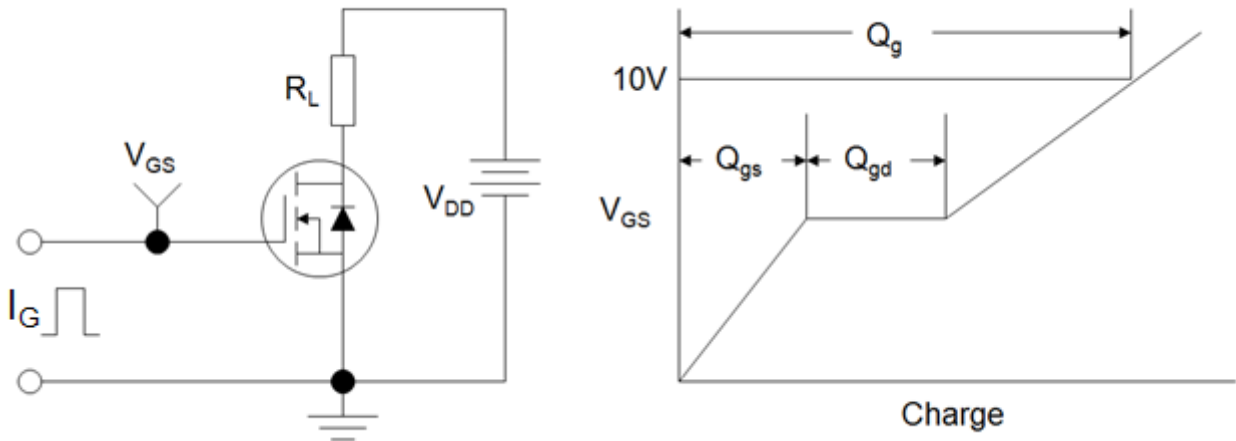


Figure B: Resistive Switching Test Circuit and Waveform

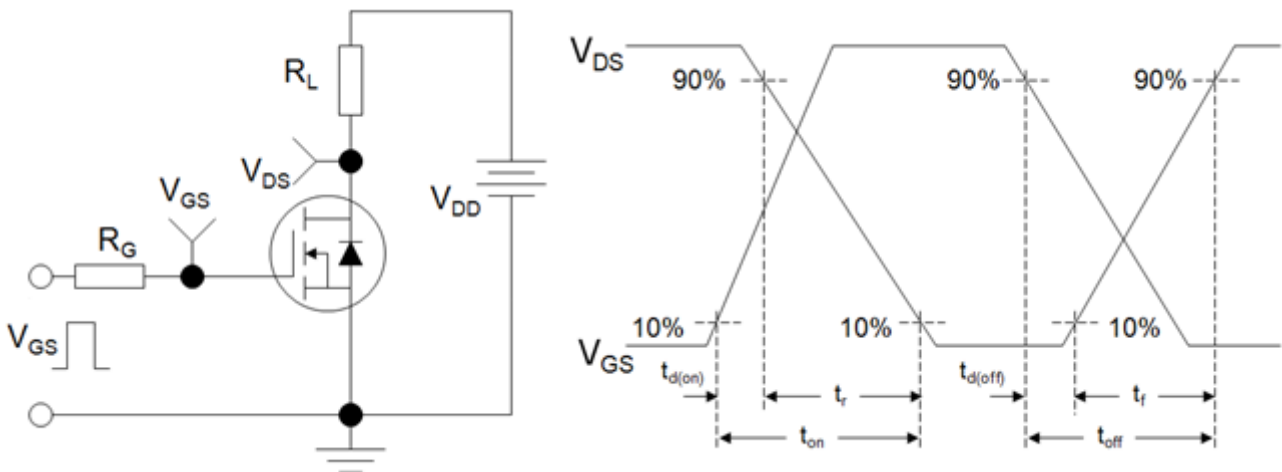
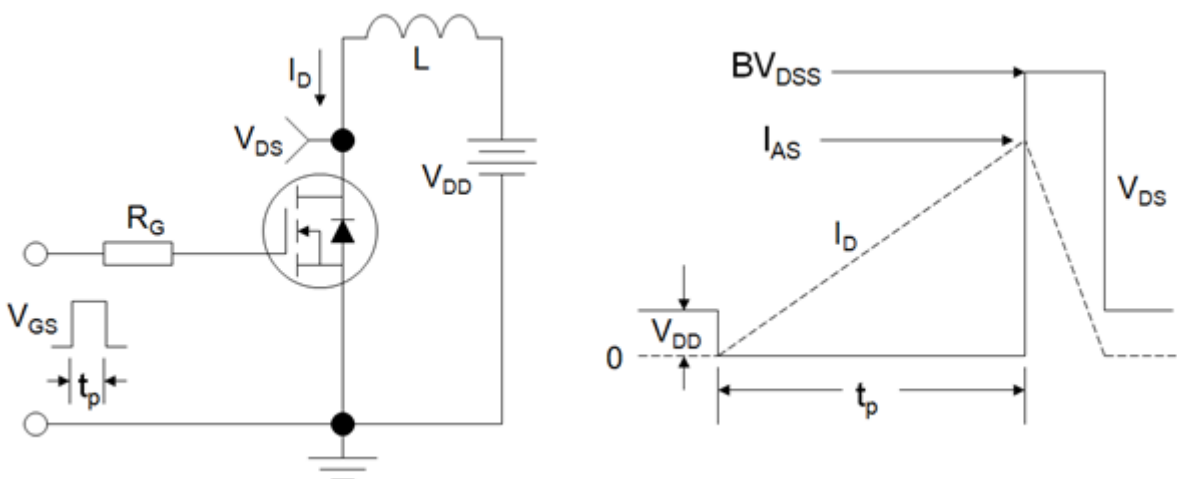
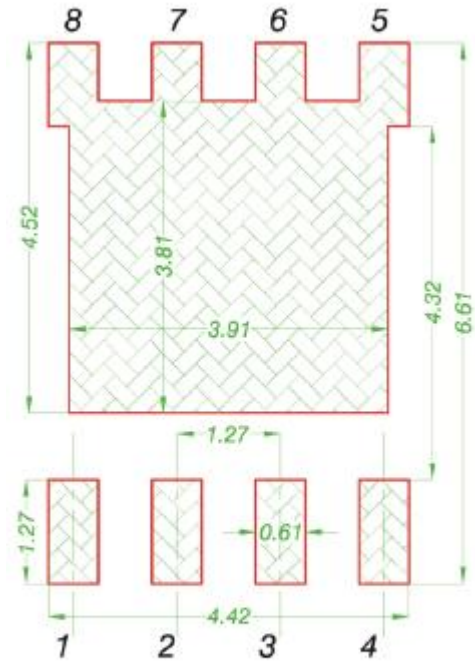
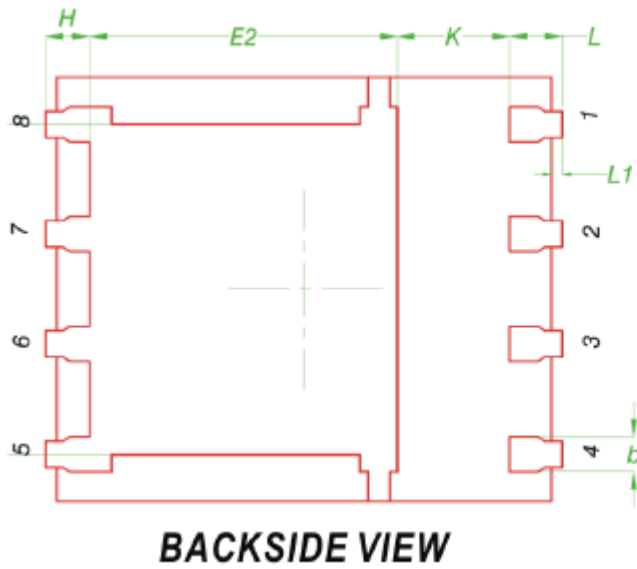


Figure C: Unclamped Inductive Switching Test Circuit and Waveform

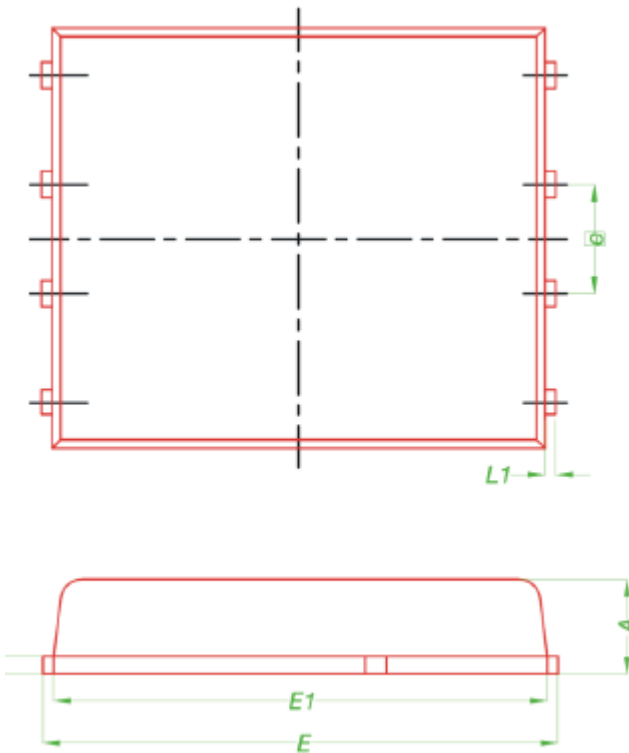




DFN5×6



**LAND PATTERN
(ONLY FOR REFERENCE)**



| DIM. | MILLIMETERS | | |
|----------|-------------|------|------|
| | MIN. | NOM. | MAX. |
| A | 0.90 | 1.00 | 1.10 |
| b | 0.33 | 0.41 | 0.51 |
| C | 0.20 | 0.25 | 0.30 |
| D1 | 4.80 | 4.90 | 5.00 |
| D2 | 3.61 | 3.81 | 3.96 |
| E | 5.90 | 6.00 | 6.10 |
| E1 | 5.70 | 5.75 | 5.80 |
| E2 | 3.38 | 3.58 | 3.78 |
| e | 1.27 BSC | | |
| H | 0.41 | 0.51 | 0.61 |
| K | 1.10 | - | - |
| L | 0.51 | 0.61 | 0.71 |
| L1 | 0.06 | 0.13 | 0.20 |
| α | 0° | - | 12° |



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