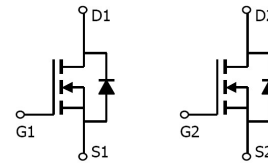


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Features

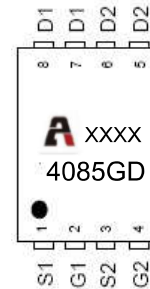
- 40V,50A
 $R_{DS(ON)} < 8.5m\Omega @ V_{GS} = 10V$
 $R_{DS(ON)} < 15m\Omega @ V_{GS} = 4.5V$
- Lead free and Green Device Available
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead free product is acquiredcc



Schematic Diagram

Application

- Load Switch
- PWM Application
- Power management



Marking and pin assignment

Package Marking and Ordering Information

| Device Marking | Device | Device Package | Reel Size | Tape width | Quantity (PCS) |
|----------------|----------|----------------|-----------|------------|----------------|
| 4085GD | AP4085GD | PDFN5*6-8L | 13 inch | - | 5000 |

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

| Symbol | Parameter | Max. | Units |
|-----------------|---|---------------------------|---------------------------|
| V_{DSS} | Drain-Source Voltage | 40 | V |
| V_{GSS} | Gate-Source Voltage | ± 20 | V |
| I_D | Continuous Drain Current | $T_C = 25^\circ\text{C}$ | 50 |
| | | $T_C = 100^\circ\text{C}$ | 33 |
| I_{DM} | Pulsed Drain Current ^{note1} | 125 | A |
| E_{AS} | Single Pulsed Avalanche Energy ^{note2} | 48 | mJ |
| P_D | Power Dissipation | $T_C = 25^\circ\text{C}$ | 27.8 |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 3.2 | $^\circ\text{C}/\text{W}$ |
| T_J, T_{STG} | Operating and Storage Temperature Range | -55 to +150 | $^\circ\text{C}$ |

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

| Symbol | Parameter | Test Condition | Min. | Typ. | Max. | Units |
|---|---|--|------|------|-----------|------------|
| Off Characteristic | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}=0V, I_D=250\mu A$ | 40 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS}=40V, V_{GS}=0V,$ | - | - | 1.0 | μA |
| I_{GSS} | Gate to Body Leakage Current | $V_{DS}=0V, V_{GS}=\pm 20V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}=V_{GS}, I_D=250\mu A$ | 1.0 | 1.5 | 2.5 | V |
| $R_{DS(on)}$ | Static Drain-Source on-Resistance <small>note3</small> | $V_{GS}=10V, I_D=12A$ | - | 6.9 | 8.5 | m Ω |
| | | $V_{GS}=4.5V, I_D=10A$ | - | 10.5 | 15 | |
| Dynamic Characteristics | | | | | | |
| C_{iss} | Input Capacitance | $V_{DS}=15V, V_{GS}=0V,$ $f=1.0\text{MHz}$ | - | 690 | - | pF |
| C_{oss} | Output Capacitance | | - | 195 | - | pF |
| C_{rss} | Reverse Transfer Capacitance | | - | 38 | - | pF |
| Q_g | Total Gate Charge | $V_{DS}=20V, I_D=12A,$ $V_{GS}=4.5V$ | - | 5.8 | - | nC |
| Q_{gs} | Gate-Source Charge | | - | 3 | - | nC |
| Q_{gd} | Gate-Drain("Miller") Charge | | - | 1.2 | - | nC |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | $V_{DD}=15V, I_D=1A,$ $R_L=1\Omega, R_{GEN}=3\Omega,$ $V_{GS}=10V$ | - | 14.3 | - | ns |
| t_r | Turn-on Rise Time | | - | 5.6 | - | ns |
| $t_{d(off)}$ | Turn-off Delay Time | | - | 20 | - | ns |
| t_f | Turn-off Fall Time | | - | 11 | - | ns |
| Drain-Source Diode Characteristics and Maximum Ratings | | | | | | |
| I_S | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 30 | A |
| I_{SM} | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 125 | A |
| V_{SD} | Drain to Source Diode Forward Voltage | $V_{GS}=0V, I_S=10A$ | - | - | 1.2 | V |

- Notes: 1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
 2. EAS condition: $T_J=25^{\circ}\text{C}$, $V_{DD}=25V$, $R_G=25\Omega$, $L=0.1\text{mH}$, $I_{AS}=31A$
 3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 0.5\%$

Typical Characteristics

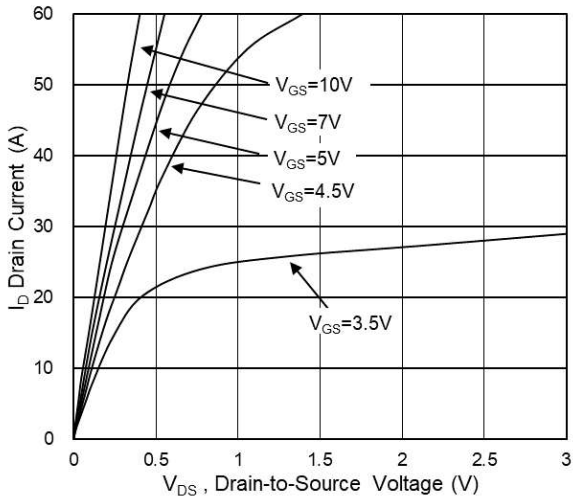


Fig.1 Typical Output Characteristics

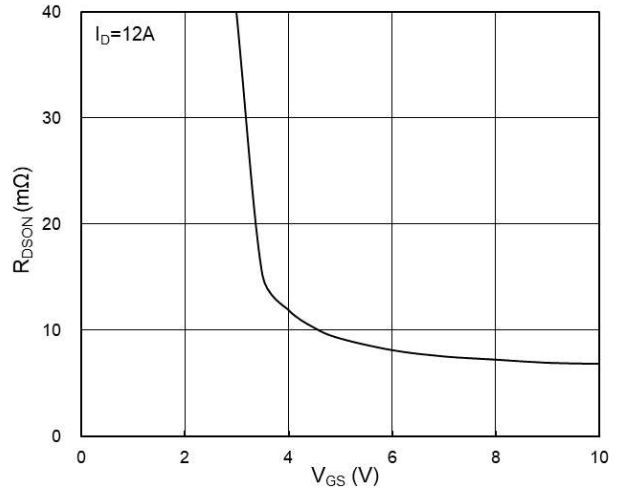


Fig.2 On-Resistance vs G-S Voltage

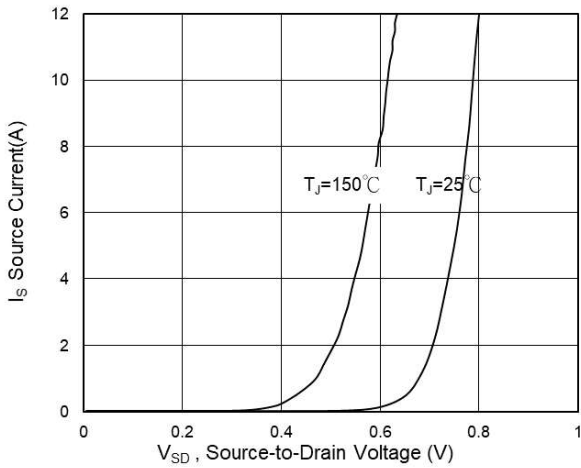


Fig.3 Source Drain Forward Characteristics

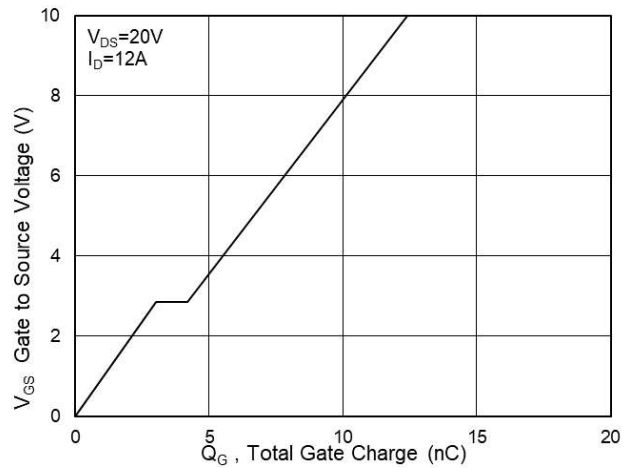


Fig.4 Gate-Charge Characteristics

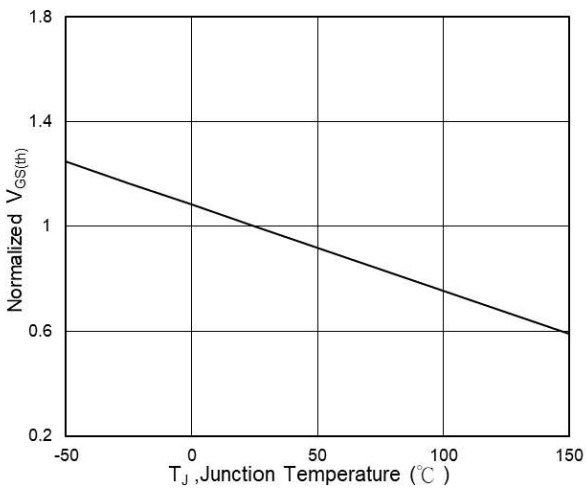


Fig.5 Normalized $V_{GS(th)}$ vs T_J

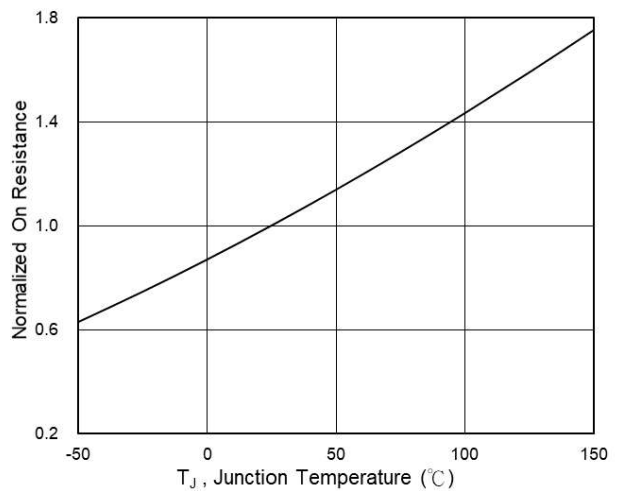


Fig.6 Normalized $R_{DS(on)}$ vs T_J

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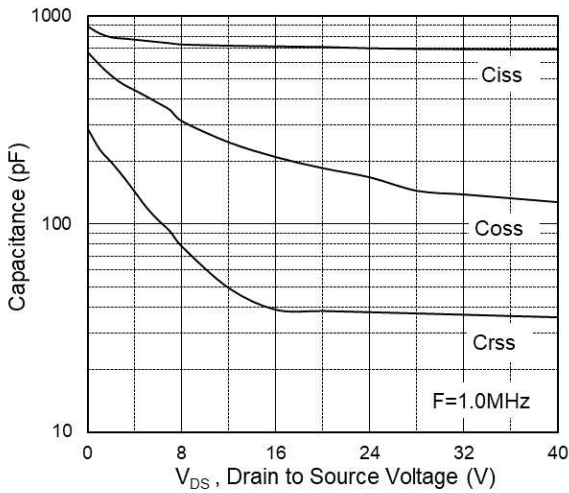


Fig.7 Capacitance

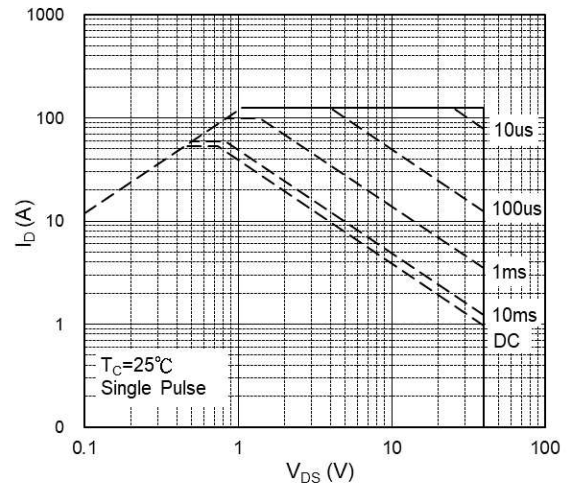


Fig.8 Safe Operating Area

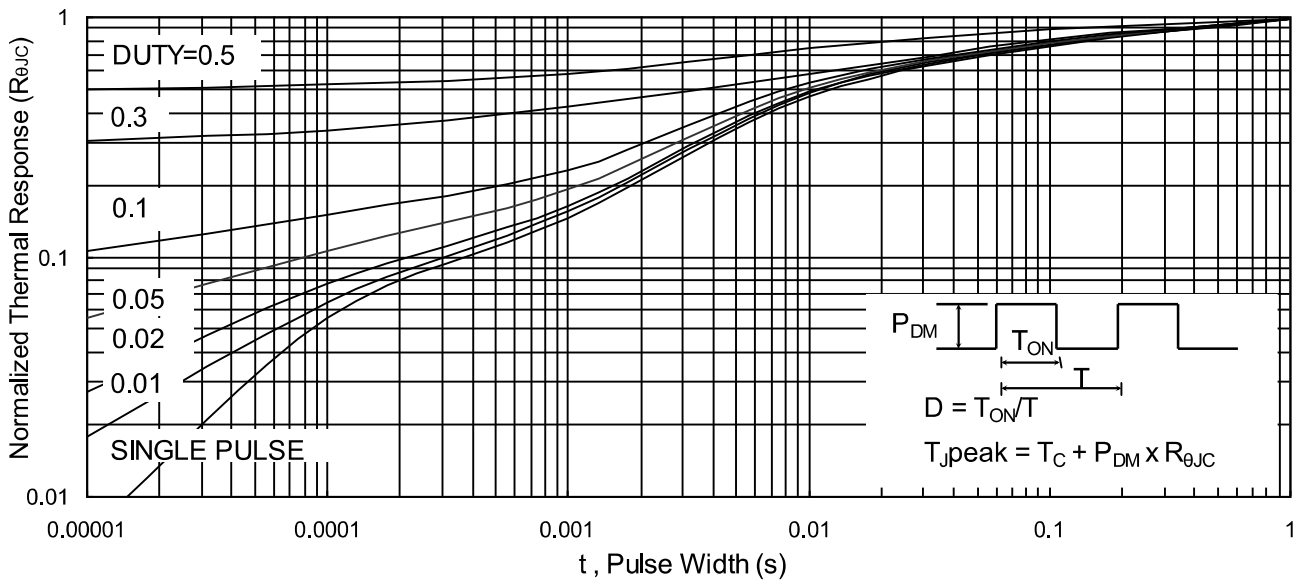


Fig.9 Normalized Maximum Transient Thermal Impedance

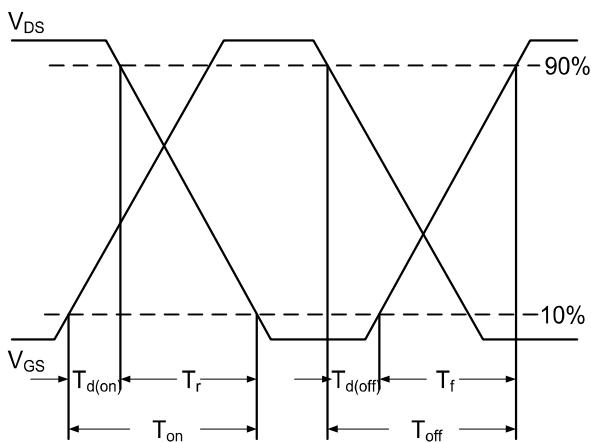


Fig.10 Switching Time Waveform

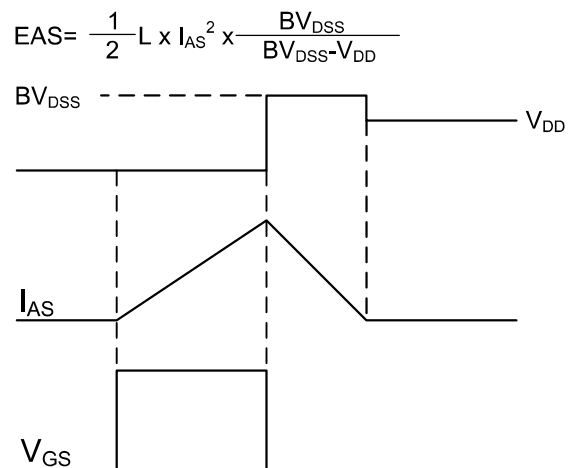


Fig.11 Unclamped Inductive Waveform

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Test Circuit

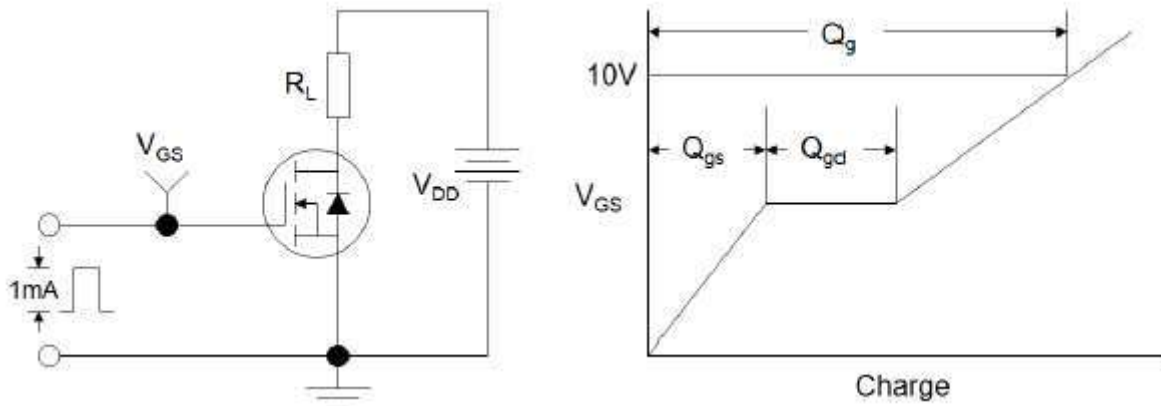


Figure 1: Gate Charge Test Circuit & Waveform

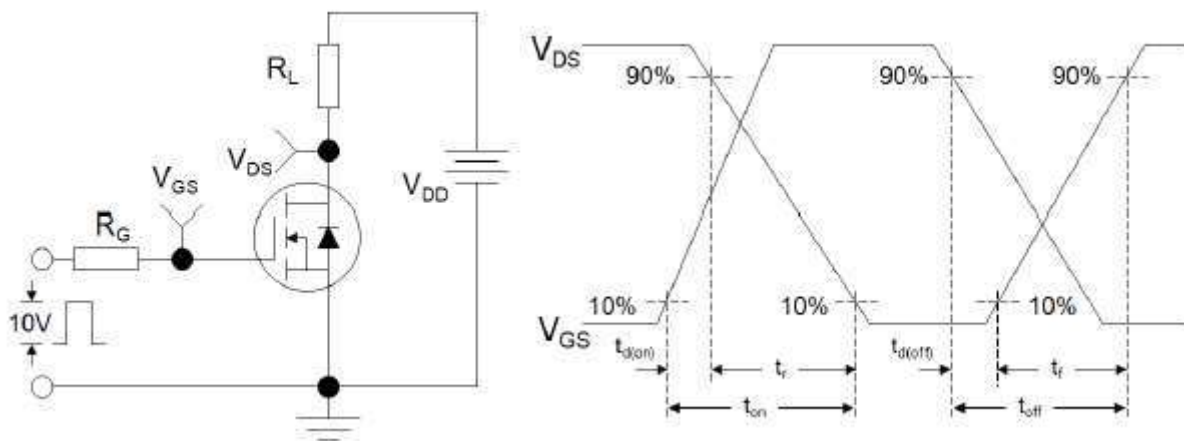


Figure 2: Resistive Switching Test Circuit & Waveforms

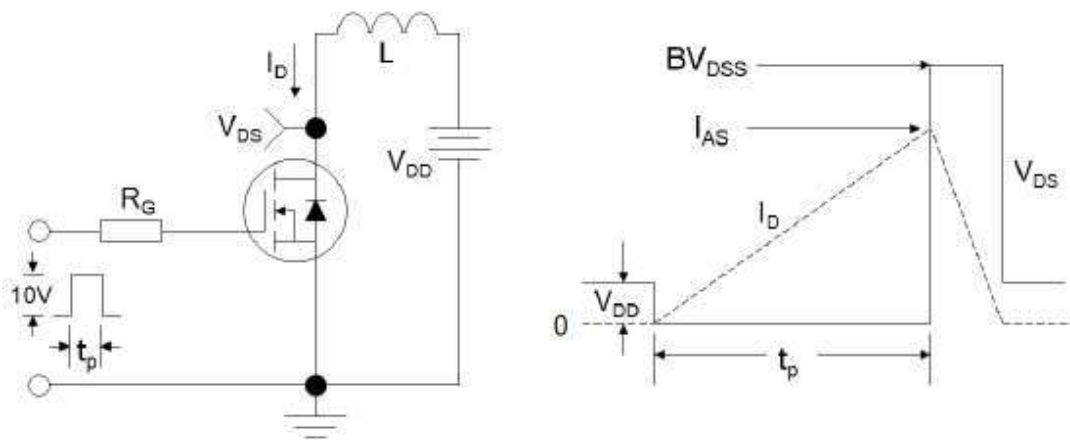
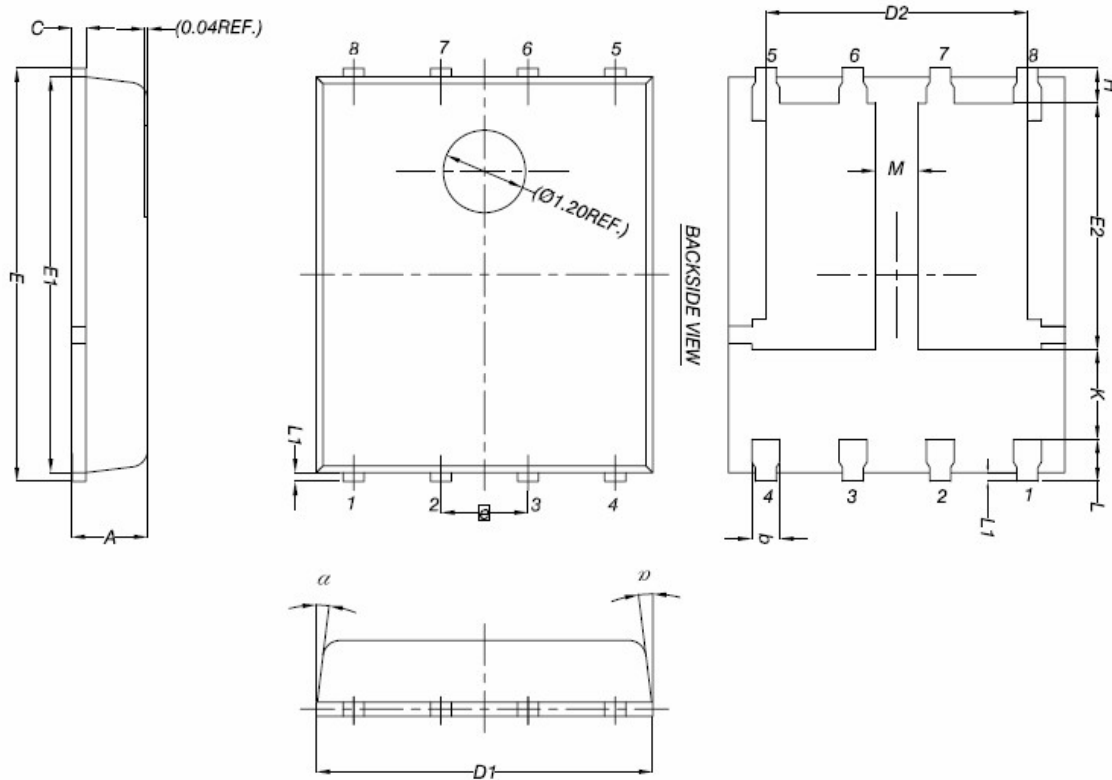


Figure 3: Unclamped Inductive Switching Test Circuit & Waveforms

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PDFN5X6-8L Package Information



| 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 |
| M | 0.50 | - | - |
| α | 0° | - | 12° |

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