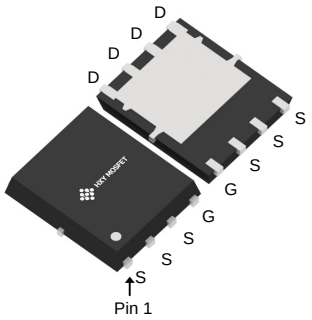
## General Description

The DMTH6005LPSW-13 use advanced SGT MOSFET technology to provide low RDS(ON), low gate charge, fast switching and excellent avalanche characteristics. This device is specially designed to get better ruggedness and suitable.

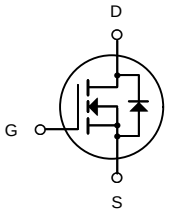



DFN5X6-8L

## General Features

$V_{DS}$ = 60V $I_D$ = 100A

$R_{DS(ON)}$ < 5mΩ @ $V_{GS}$=10V




N-Channel MOSFET

## Applications

Consumer electronic power supply Motor control

Synchronous-rectification Isolated DC

Synchronous-rectification applications

## Package Marking and Ordering Information

| Product ID | Pack | Brand | Qty(PCS) |
|---|---|---|---|
| DMTH6005LPSW-13 | DFN5X6-8L | HXY MOSFET | 5000 |

## Absolute Maximum Ratings ($T_C$ =25°C unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 60 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25°C | Continuous Drain Current, $V_{GS}$ @ 10V | 100 | A |
| $I_D$@$T_C$=100°C | Continuous Drain Current, $V_{GS}$ @ 10V | 64 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 385 | A |
| EAS | Single Pulse Avalanche Energy[3] | 80 | mJ |
| $P_D$@$T_C$=25°C | Total Power Dissipation[4] | 73.5 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | °C |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | °C |
| $R_{\theta JC}$ | Thermal Resistance from Junction-to-Ambient[3] | 1.7 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance Junction-Ambient [1] | 51 | °C/W |

## Electrical Characteristics ($T_J$ = 25°C, unless otherwise noted)

| Parameter | | Symbol | Test Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | | $V_{(BR)DSS}$ | $V_{GS}$ = 0V, $I_D$ = 250μA | 60 | - | - | V |
| Gate-body Leakage Current | | $I_{GSS}$ | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | - | - | ±100 | nA |
| Zero Gate Voltage Drain Current | $T_J$=25°C | $I_{DSS}$ | $V_{DS}$ = 60V, $V_{GS}$ = 0V | - | - | 1 | μA |
| | $T_J$=100°C | | | - | - | 100 | |
| Gate-Threshold Voltage | | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 2 | 2.9 | 4 | V |
| Drain-Source On-Resistance[4] | | $R_{DS(on)}$ | $V_{GS}$ = 10V, $I_D$ = 21A | - | 3.7 | 5 | mΩ |
| Forward Transconductance[4] | | $g_{fs}$ | $V_{DS}$ = 10V, $I_D$ = 21A | - | 89 | - | S |
| Input Capacitance | | $C_{iss}$ | $V_{DS}$ = 30V, $V_{GS}$ =0V, f =1MHz | - | 1673 | - | pF |
| Output Capacitance | | $C_{oss}$ | | - | 773 | - | |
| Reverse Transfer Capacitance | | $C_{rss}$ | | - | 46.8 | - | |
| Gate Resistance | | $R_g$ | f = 1MHz | - | 1.8 | - | Ω |
| Total Gate Charge | | $Q_g$ | $V_{GS}$ = 10V, $V_{DS}$ = 30V, $I_D$= 21A | - | 28.5 | - | nC |
| Gate-Source Charge | | $Q_{gs}$ | | - | 7.8 | - | |
| Gate-Drain Charge | | $Q_{gd}$ | | - | 8.4 | - | |
| Turn-On Delay Time | | $t_{d(on)}$ | $V_{GS}$ =10V, $V_{DD}$ = 30V, $R_G$ = 3Ω, $I_D$= 21A | - | 11.2 | - | ns |
| Rise Time | | $t_r$ | | - | 8.2 | - | |
| Turn-Off Delay Time | | $t_{d(off)}$ | | - | 19.6 | - | |
| Fall Time | | $t_f$ | | - | 6.2 | - | |
| Body Diode Reverse Recovery Time | | $t_{rr}$ | $I_F$=21A, dI/dt=100A/μs | - | 50 | - | ns |
| Body Diode Reverse Recovery Charge | | $Q_{rr}$ | | - | 20 | - | nC |
| Diode Forward Voltage[4] | | $V_{SD}$ | $I_S$ = 21A, $V_{GS}$ = 0V | - | - | 1.2 | V |
| Continuous Source Current | $T_C$=25°C | $I_S$ | - | - | - | 100 | A |

Notes:

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C
2. The EAS data shows Max. rating . The test condition is $V_{DD}$=25V,$V_{GS}$=10V,L=0.1mH，$I_{AS}$=40A.
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.
4. The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%.
5. This value is guaranteed by design hence it is not included in the production test.

## Typical Characteristics

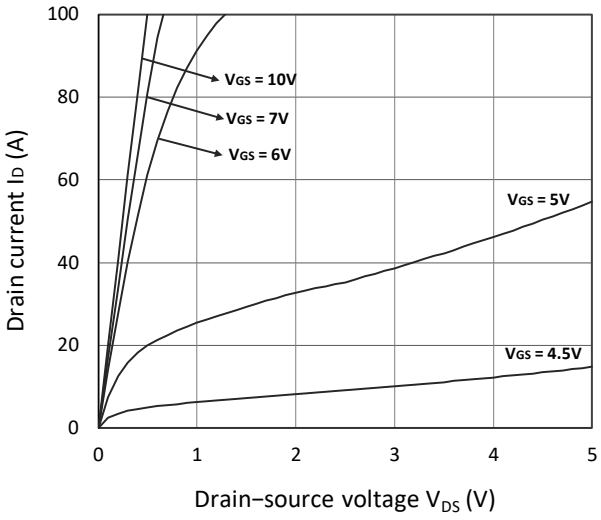



Figure 1. Output Characteristics

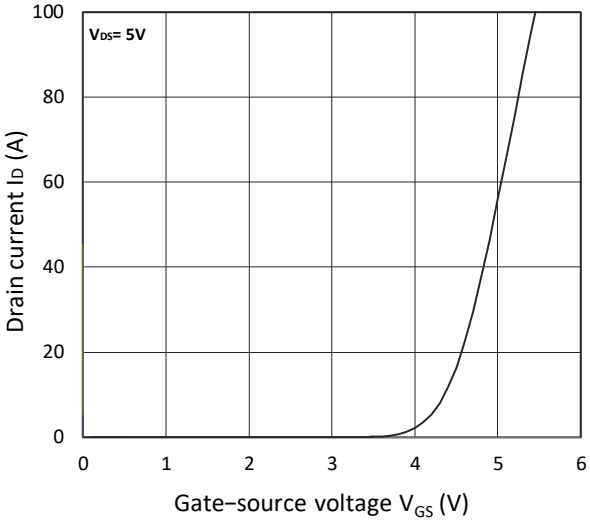



Figure 2. Transfer Characteristics

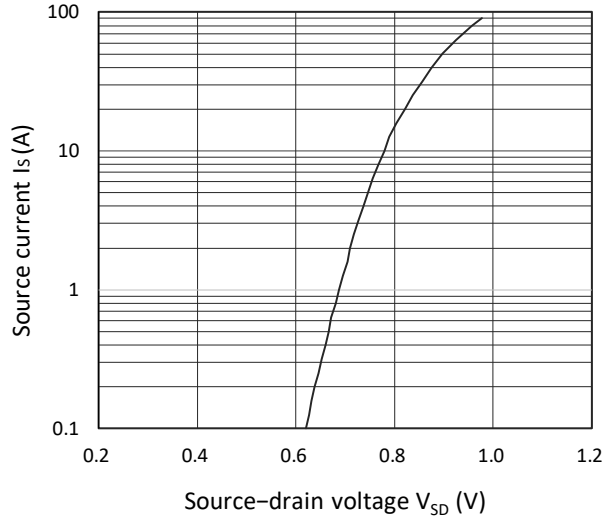



Figure 3. Forward Characteristics of Reverse

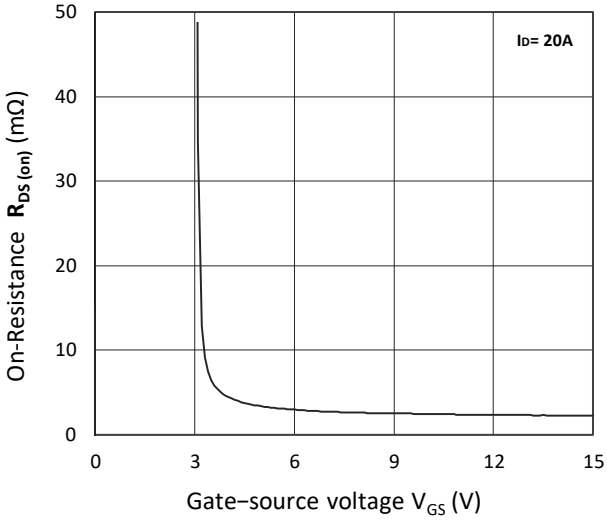



Figure 4. $R_{DS(ON)}$ vs. $V_{GS}$

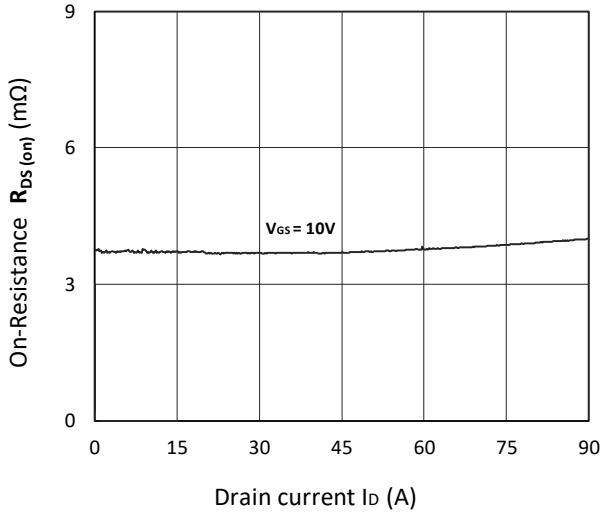



Figure 5. $R_{DS(ON)}$ vs. $I_D$

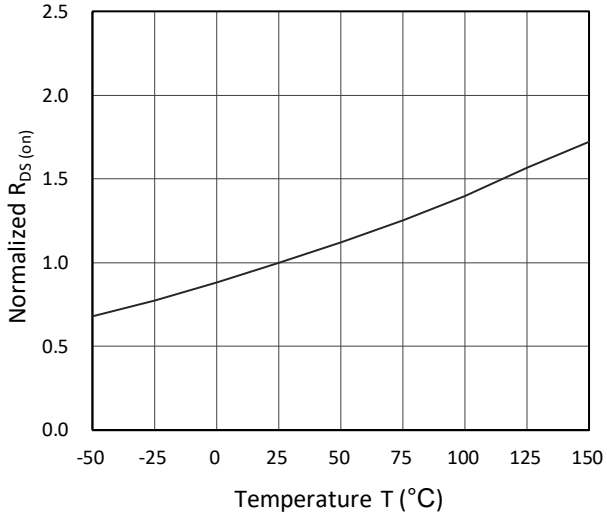



Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

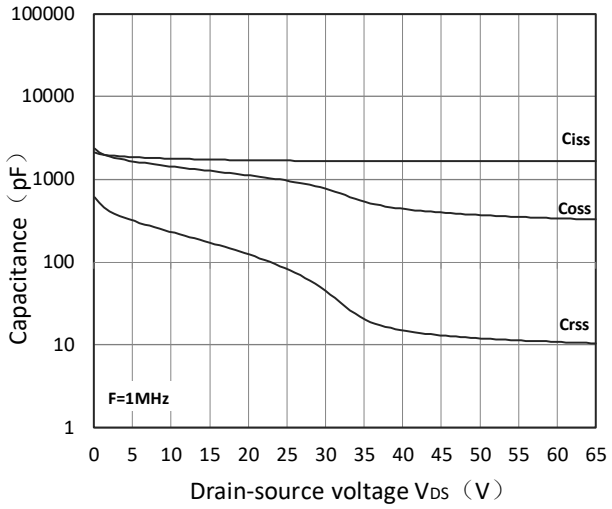



Figure 7. Capacitance Characteristics

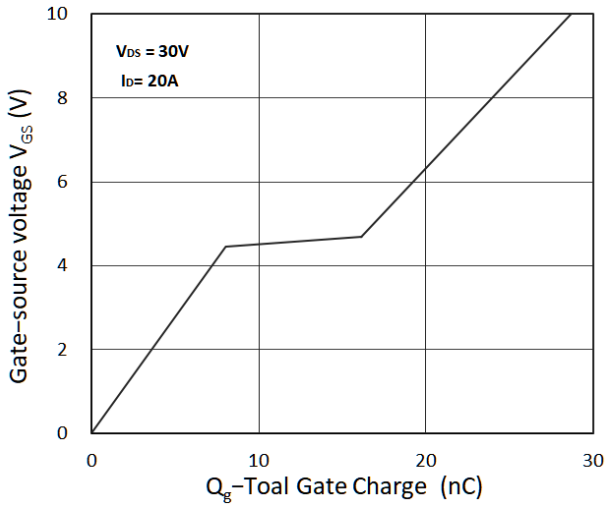



Figure 8. Gate Charge Characteristics

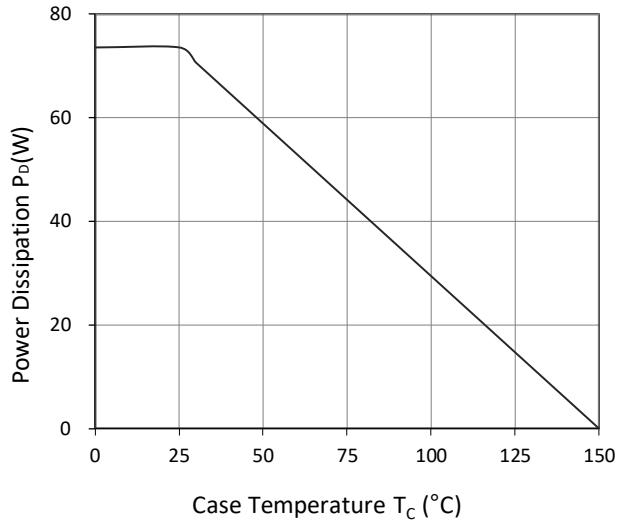



Figure 9. Power Dissipation

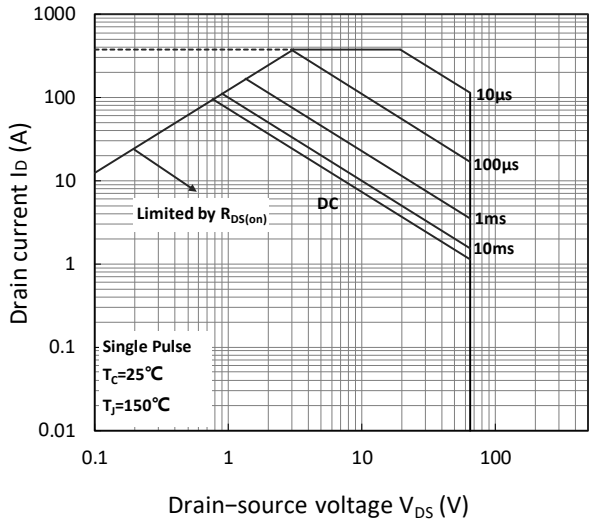



Figure10. Safe Operating Area

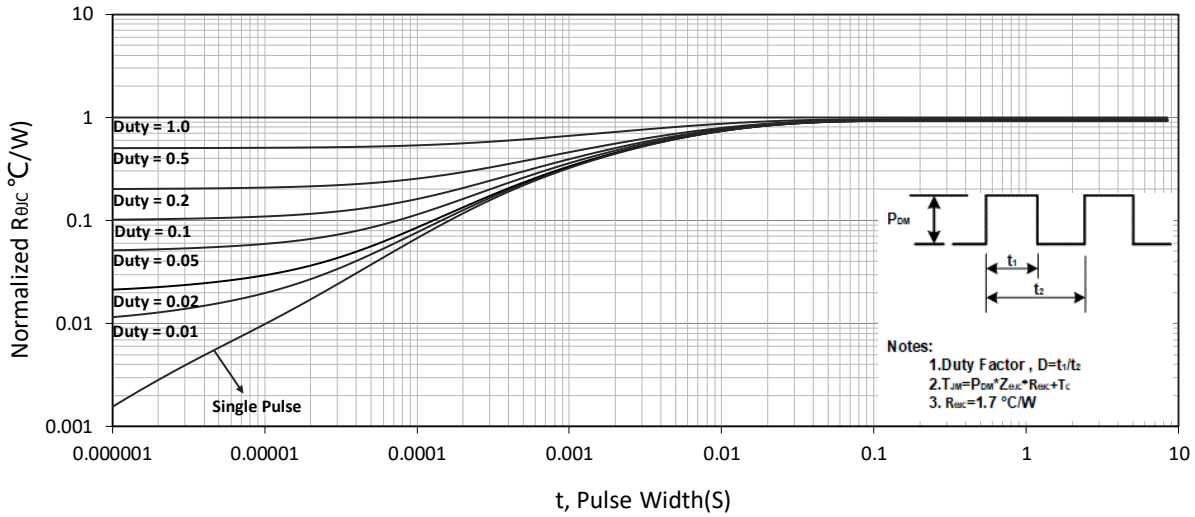



Figure 11. Normalized Maximum Transient Thermal Impedance

## Test Circuit

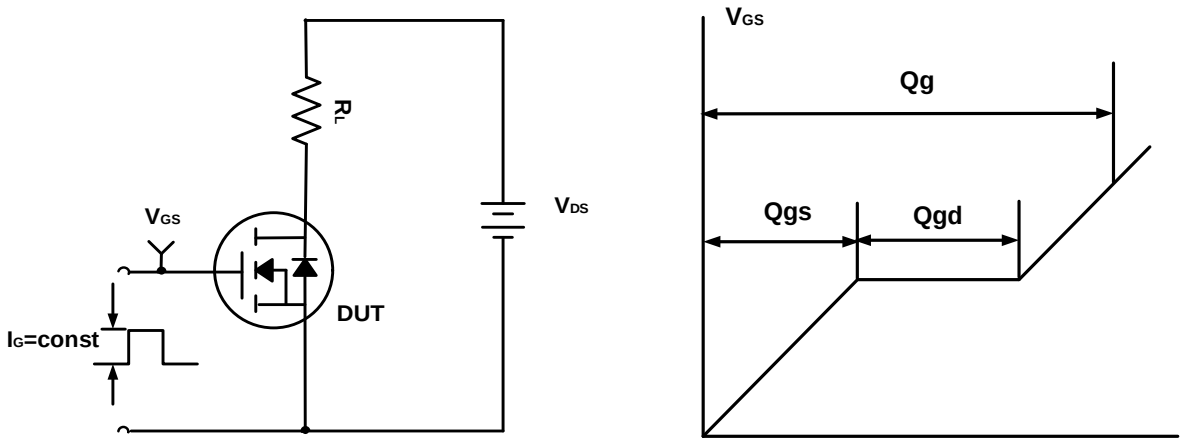



**Figure A. Gate Charge Test Circuit & Waveforms**

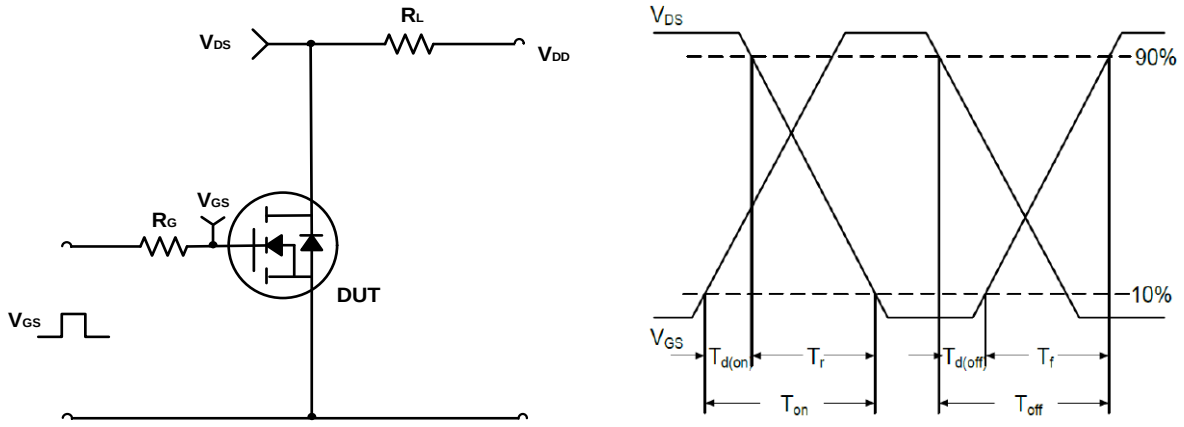



**Figure B. Switching Test Circuit & Waveforms**

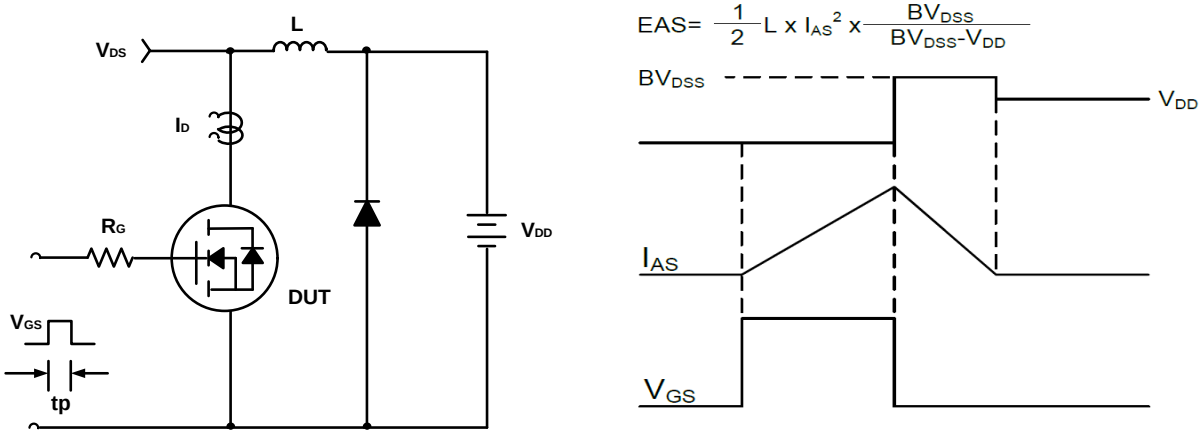
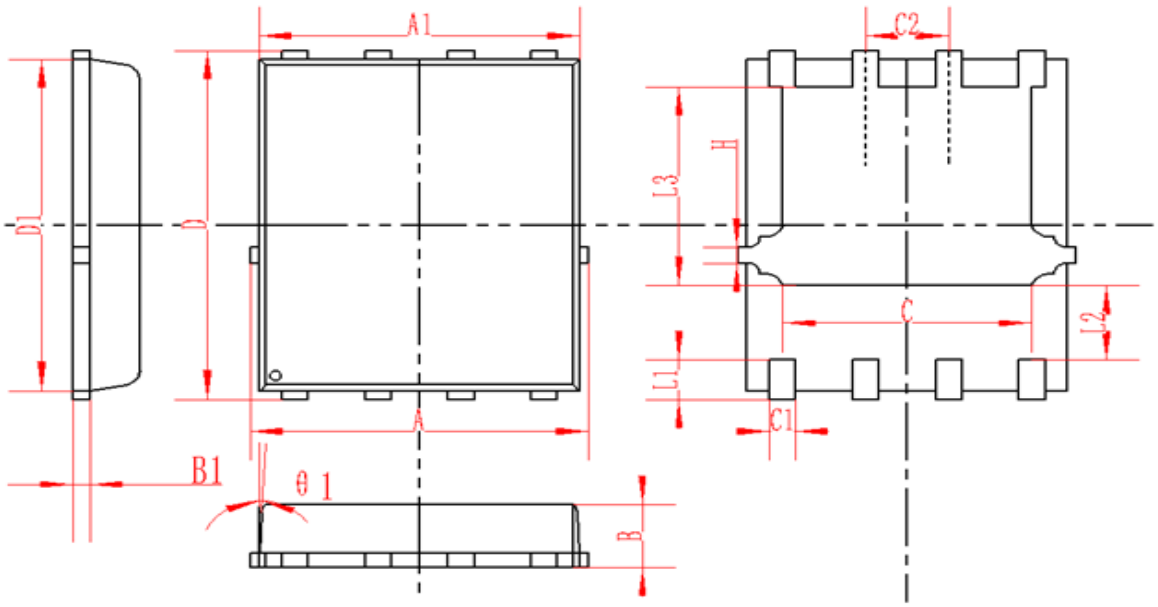



**Figure C. Unclamped Inductive Switching Circuit & Waveforms**

## DFN5X6-8L Package Information




| SYMBOL | MM | | | INCH | | |
|---|---|---|---|---|---|---|
| | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 4.95 | 5 | 5.05 | 0.195 | 0.197 | 0.199 |
| A1 | 4.82 | 4.9 | 4.98 | 0.190 | 0.193 | 0.196 |
| D | 5.98 | 6 | 6.02 | 0.235 | 0.236 | 0.237 |
| D1 | 5.67 | 5.75 | 5.83 | 0.223 | 0.226 | 0.230 |
| B | 0.9 | 0.95 | 1 | 0.035 | 0.037 | 0.039 |
| B1 | 0.254REF | | | 0.010REF | | |
| C | 3.95 | 4 | 4.05 | 0.156 | 0.157 | 0.159 |
| C1 | 0.35 | 0.4 | 0.45 | 0.014 | 0.016 | 0.018 |
| C2 | 1.27TYP | | | 0.5TYP | | |
| θ1 | 8° | 10° | 12° | 8° | 10° | 12° |
| L1 | 0.63 | 0.64 | 0.65 | 0.025 | 0.025 | 0.026 |
| L2 | 1.2 | 1.3 | 1.4 | 0.047 | 0.051 | 0.055 |
| L3 | 3.415 | 3.42 | 3.425 | 0.134 | 0.135 | 0.135 |
| H | 0.24 | 0.25 | 0.26 | 0.009 | 0.010 | 0.010 |

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## HXY MOSFET:

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