

Product Summary

Features

- Excellent $R_{DS(ON)}$ and Low Gate Charge
- 100% UIS Tested
- 100% ΔV_{DS} Tested
- Halogen-free; RoHS-compliant

| Parameters | Value | Unit |
|----------------------------------|-------|------|
| V_{DSS} | 30 | V |
| $V_{GS(th)}_{Typ}$ | 1.6 | V |
| $I_D(@V_{GS}=10V)$ | 158 | A |
| $R_{DS(ON)}_{Typ}(@V_{GS}=10V)$ | 1.8 | mΩ |
| $R_{DS(ON)}_{Typ}(@V_{GS}=4.5V)$ | 2.5 | mΩ |

Applications

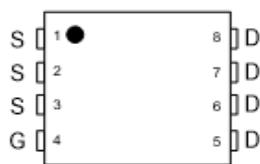
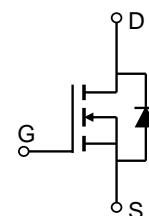
- Load Switch
- PWM Application
- Power Management



Top View



Bottom View


PDFN5X6-8L
Pin Assignment

Schematic Diagram

Ordering Information

| Device | Marking | MSL | Form | Package | Reel(pcs) | Per Carton (pcs) |
|---------------|---------|-----|-----------|------------|-----------|------------------|
| JMSL0303TG-13 | SL0303T | 1 | Tape&Reel | PDFN5x6-8L | 5000 | 50000 |

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

| Symbol | Parameter | Value | Unit |
|----------------|---|----------------|------|
| V_{DS} | Drain-to-Source Voltage | 30 | V |
| V_{GS} | Gate-to-Source Voltage | ± 20 | V |
| I_D | Continuous Drain Current | 158 | A |
| | | 100 | |
| I_{DM} | Pulsed Drain Current ⁽¹⁾ | Refer to Fig.4 | A |
| E_{AS} | Single Pulsed Avalanche Energy ⁽²⁾ | 165 | mJ |
| P_D | Power Dissipation | 89 | W |
| | | 36 | |
| T_J, T_{STG} | Junction & Storage Temperature Range | -55 to 150 | °C |

Thermal Characteristics

| Symbol | Parameter | Max | Unit |
|-----------------|--|-----|------|
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient ⁽³⁾ | 44 | °C/W |
| $R_{\theta JC}$ | Thermal Resistance, Junction to Case | 1.4 | |

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

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|-----------------------------------|--|--|------|------|-----------|------------------|
| Off Characteristics | | | | | | |
| $V_{(\text{BR})\text{DSS}}$ | Drain-Source Breakdown Voltage | $I_D = 250\mu\text{A}, V_{GS} = 0\text{V}$ | 30 | - | - | V |
| I_{DSS} | Zero Gate Voltage Drain Current | $V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$ | - | - | 1.0 | μA |
| I_{GSS} | Gate-Body Leakage Current | $V_{DS} = 0\text{V}, V_{GS} = \pm 20\text{V}$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| $V_{GS(\text{th})}$ | Gate Threshold Voltage | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ | 1.1 | 1.6 | 2.1 | V |
| $R_{\text{DS(ON)}}$ | Static Drain-Source ON-Resistance ⁽⁴⁾ | $V_{GS} = 10\text{V}, I_D = 20\text{A}$ | - | 1.8 | 2.3 | $\text{m}\Omega$ |
| | | $V_{GS} = 4.5, I_D = 15\text{A}$ | - | 2.5 | 3.3 | $\text{m}\Omega$ |
| Dynamic Characteristics | | | | | | |
| R_g | Gate Resistance | $f = 1\text{MHz}$ | - | 1.0 | - | Ω |
| C_{iss} | Input Capacitance | $V_{GS} = 0\text{V}, V_{DS} = 15\text{V}, f = 1\text{MHz}$ | 1704 | 2386 | 3102 | pF |
| C_{oss} | Output Capacitance | | 1599 | 2238 | 2909 | pF |
| C_{rss} | Reverse Transfer Capacitance | | 73 | 102 | 133 | pF |
| Q_g | Total Gate Charge | $V_{GS} = 0 \text{ to } 10\text{V}$ $V_{DS} = 15\text{V}, I_D = 15\text{A}$ | 26 | 36 | 47 | nC |
| Q_{gs} | Gate Source Charge | | - | 6.9 | - | nC |
| Q_{gd} | Gate Drain("Miller") Charge | | - | 6.3 | - | nC |
| Switching Characteristics | | | | | | |
| $t_{d(on)}$ | Turn-On DelayTime | $V_{GS} = 10\text{V}, V_{DD} = 15\text{V}$ $I_D = 15\text{A}, R_{\text{GEN}} = 3\Omega$ | - | 18 | - | ns |
| t_r | Turn-On Rise Time | | - | 31 | - | ns |
| $t_{d(off)}$ | Turn-Off DelayTime | | - | 25 | - | ns |
| t_f | Turn-Off Fall Time | | - | 13 | - | ns |
| Body Diode Characteristics | | | | | | |
| I_S | Maximum Continuous Body Diode Forward Current | - | - | 158 | A | |
| I_{SM} | Maximum Pulsed Body Diode Forward Current | - | - | 634 | A | |
| V_{SD} | Body Diode Forward Voltage | $V_{GS} = 0\text{V}, I_S = 20\text{A}$ | - | 1.2 | V | |
| trr | Body Diode Reverse Recovery Time | $I_F = 15\text{A}, di/dt = 100\text{A/us}$ | 37 | 52 | 68 | ns |
| Qrr | Body Diode Reverse Recovery Charge | | - | 52 | - | nC |

Notes:

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature.

2. E_{AS} condition: Starting $T_J=25^\circ\text{C}$, $V_{DD}=15\text{V}$, $V_{GS}=10\text{V}$, $R_G=25\text{ohm}$, $L=3\text{mH}$, $I_{AS}=10.5\text{A}$, $V_{DD}=0\text{V}$ during time in avalanche.

3. $R_{\theta JA}$ is measured with the device mounted on a 1inch² pad of 2oz copper FR4 PCB.

4. Pulse Test: Pulse Width $\leq 300\mu\text{s}$, Duty Cycle $\leq 0.5\%$.



Typical Performance Characteristics

Figure 1: Power De-rating

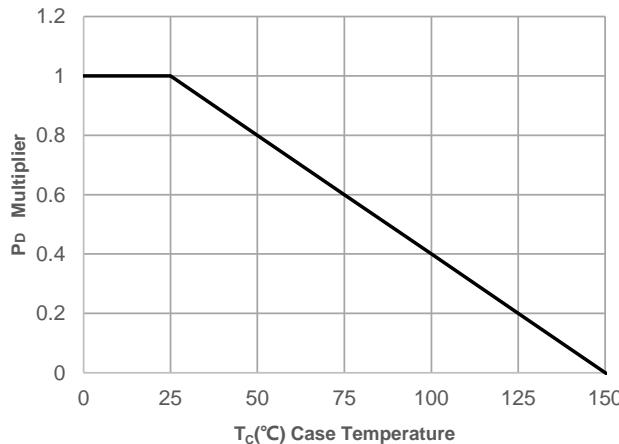


Figure 2: Current De-rating

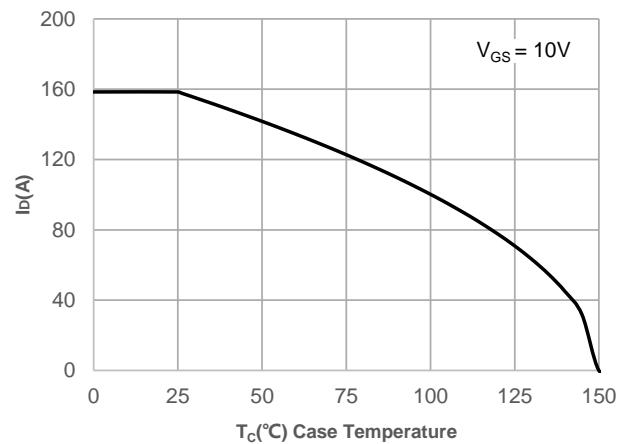


Figure 3: Normalized Maximum Transient Thermal Impedance

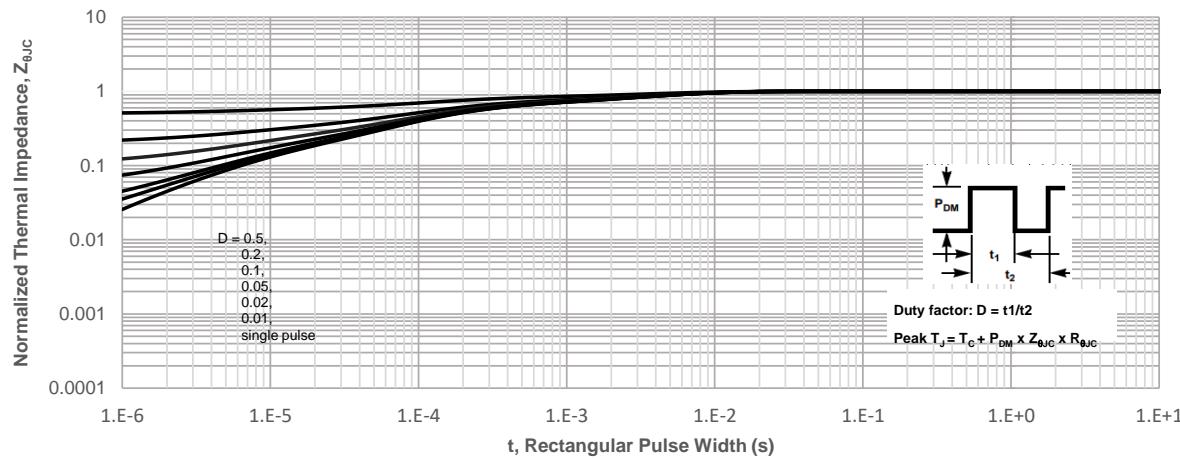
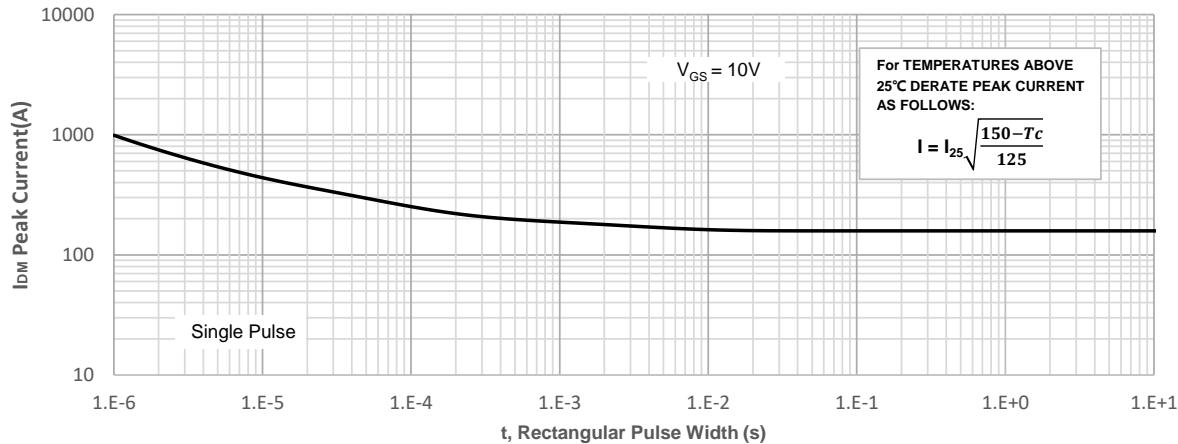


Figure 4: Peak Current Capacity



Typical Performance Characteristics

Figure 5: Output Characteristics

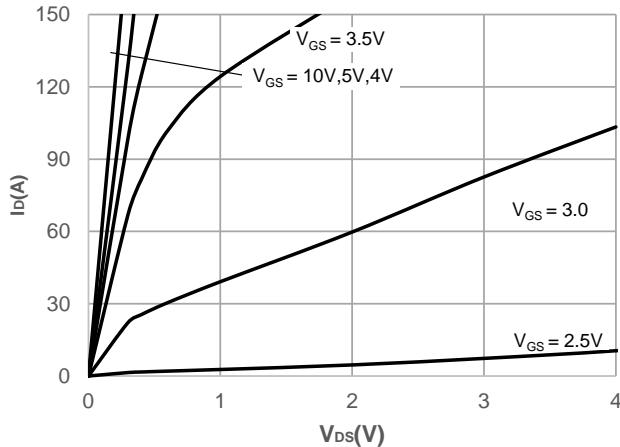


Figure 6: Typical Transfer Characteristics

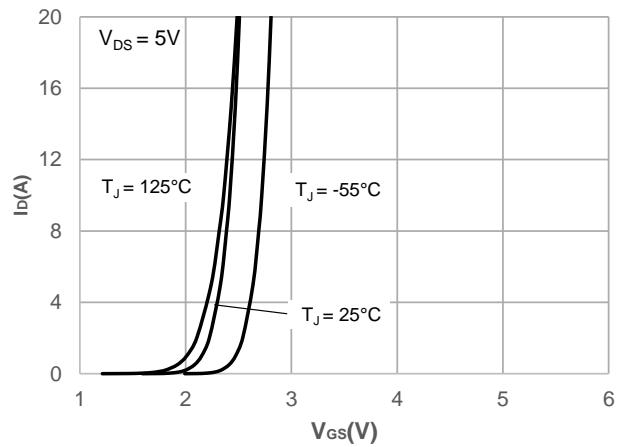


Figure 7: On-resistance vs. Drain Current

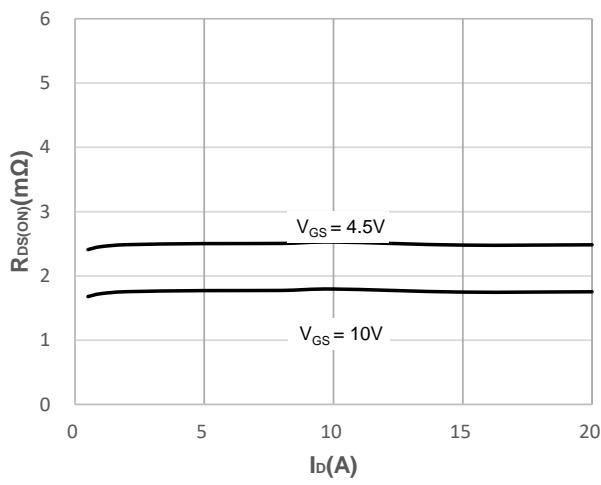


Figure 8: Body Diode Characteristics

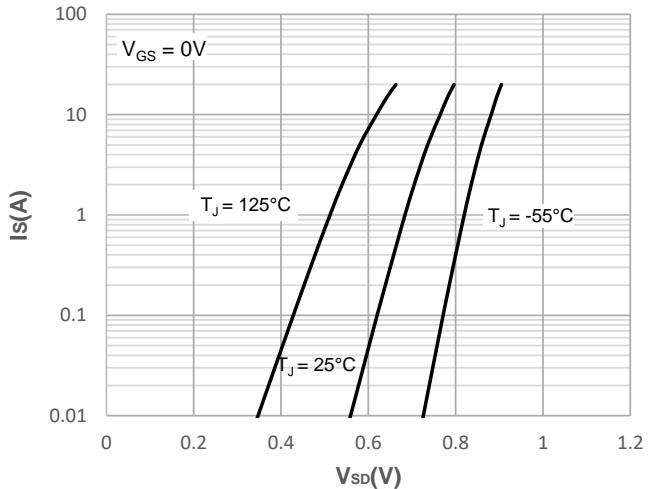


Figure 9: Gate Charge Characteristics

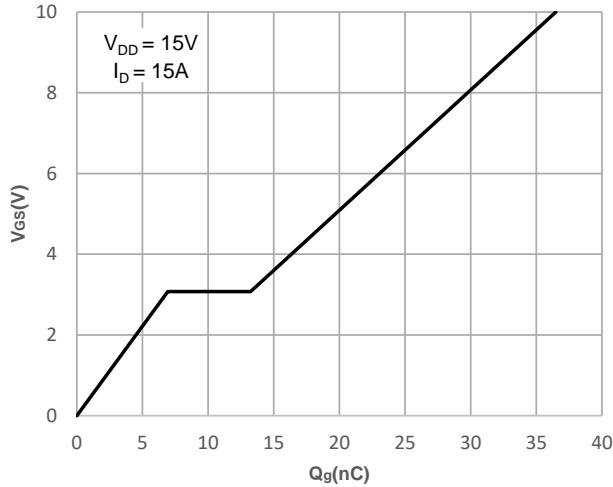
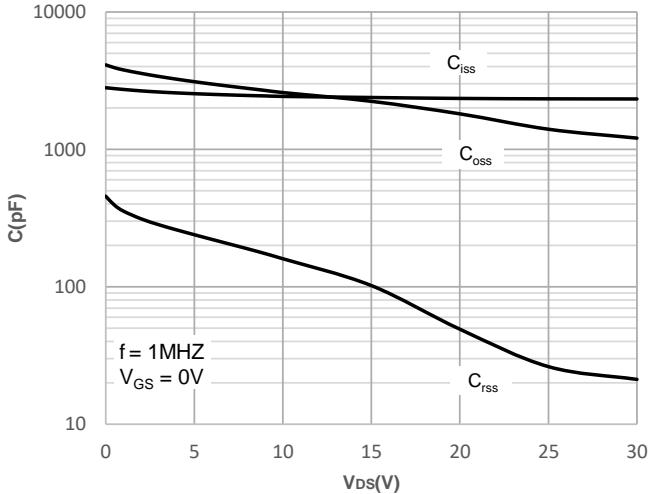


Figure 10: Capacitance Characteristics



Typical Performance Characteristics

Figure 11: Normalized Breakdown voltage vs. Junction Temperature

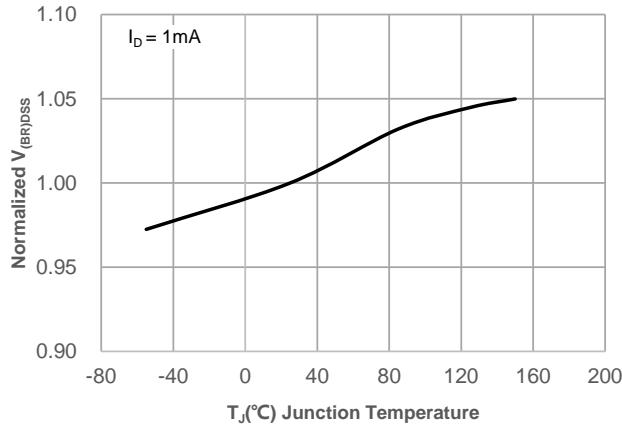


Figure 12: Normalized on Resistance vs. Junction Temperature

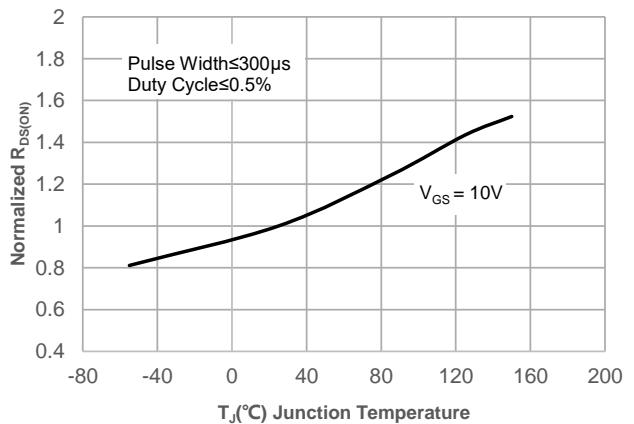


Figure 13: Normalized Threshold Voltage vs. Junction Temperature

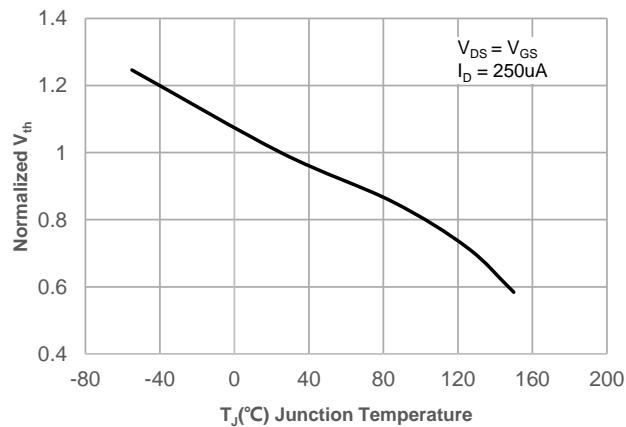


Figure 14: $R_{DS(ON)}$ vs. V_{GS}

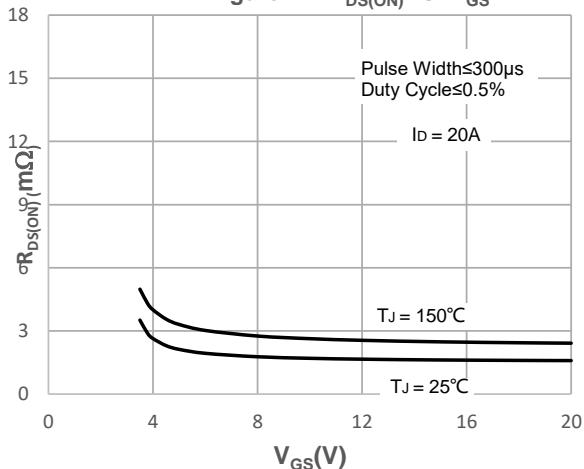
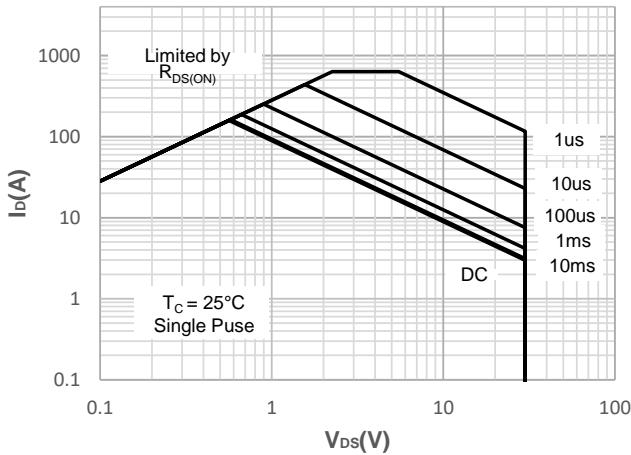


Figure 15: Maximum Safe Operating Area



Test Circuit

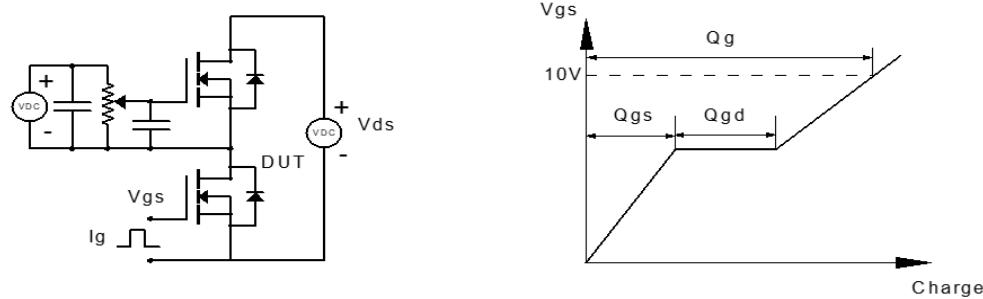


Figure 1: Gate Charge Test Circuit & Waveform

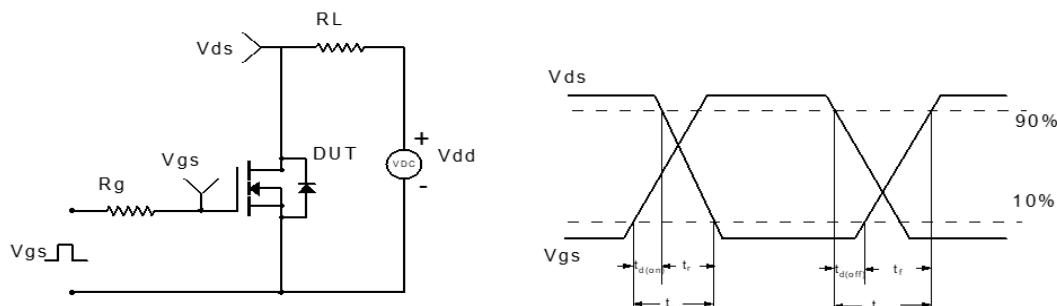


Figure 2: Resistive Switching Test Circuit & Waveform

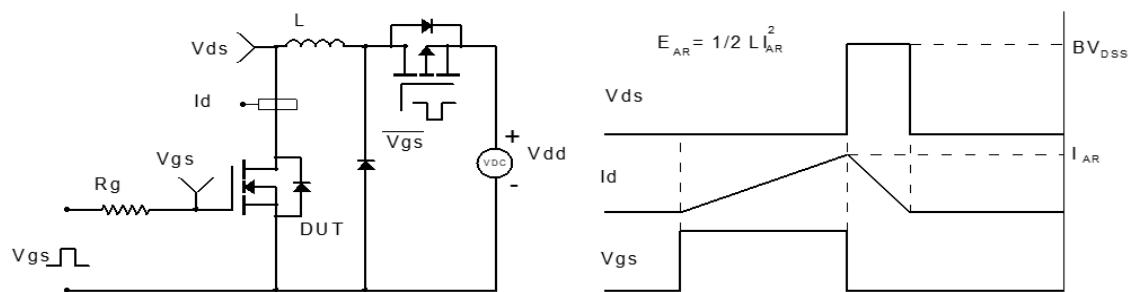


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

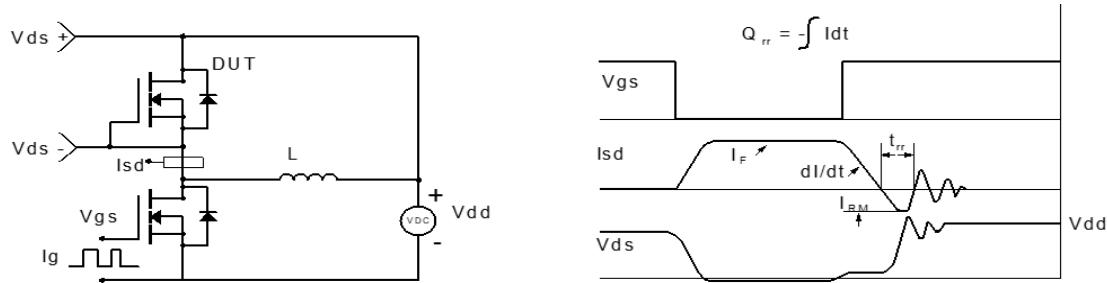
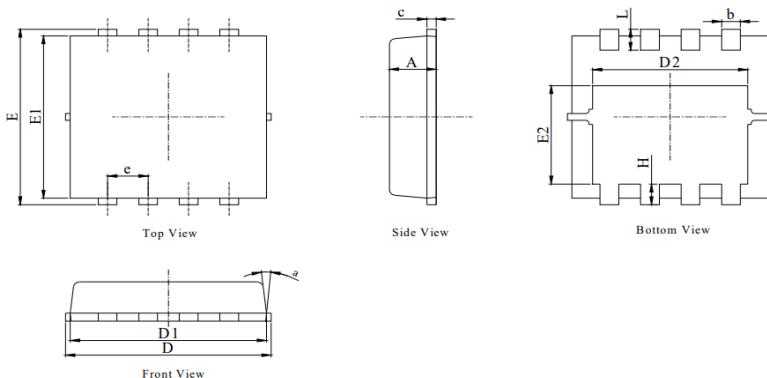


Figure 4: Diode Recovery Test Circuit & Waveform

Package Mechanical Data(PDFN5X6-8L)

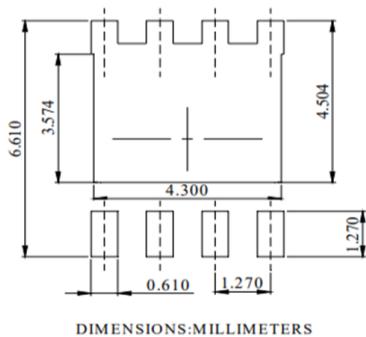
Package Outline



NOTES:
 1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M-1994.
 2. ALL DIMENSIONS IN MILLIMETER (ANGLE IN DEGREE).
 3. DIMENSIONS D1 AND E1 DO NOT INCLUDE MOLD FLASH PROTRUSIONS OR GATE BURRS.

| DIM. | MILLIMETER | | |
|------|------------|----------|------|
| | MIN. | NOM. | MAX. |
| A | 0.9 | 1 | 1.15 |
| b | 0.31 | 0.41 | 0.51 |
| C | 0.24 | 0.32 | 0.4 |
| D | 5 | 5.2 | 5.4 |
| D1 | 4.95 | 5.05 | 5.15 |
| D2 | 4 | 4.1 | 4.2 |
| E | 6.05 | 6.15 | 6.25 |
| E1 | 5.5 | 5.6 | 5.7 |
| E2 | 3.42 | 3.53 | 3.63 |
| e | | 1.27BSC | |
| H | 0.6 | 0.7 | 0.8 |
| L | 0.5 | 0.7 | 0.8 |
| K | | 1.23 REF | |
| 0 | | | 10 |

Recommended Soldering Footprint



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