# 150V N-Ch Power MOSFET

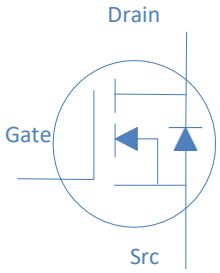
## Features:

◇ High Speed Power Switching
◇ Enhanced Body diode dv/dt capability
◇ Enhanced Avalanche Ruggedness
◇ 100% UIS Tested, 100% Rg Tested
◇ Lead Free, Halogen Free

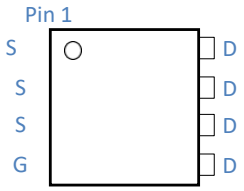
DFN5x6

## Application：

◇ Synchronous Rectification in SMPS
◇ Hard Switching and High Speed Circuit
◇ DC/DC in Telecoms and Inductrial




| | | | |
|---|---|---|---|
| $V_{DS}$ | | 150 | V |
| $R_{DS(on),typ}$ | $V_{GS}$=10V | 7.5 | mΩ |
| $R_{DS(on),typ}$ | $V_{GS}$=4.5V | 8.8 | mΩ |
| $I_D$ (Sillicon Limited) | | 87 | A |
| $I_D$ (Package Limited) | | 60 | A |




| Part Number | Package | Marking |
|---|---|---|
| KGN088N15SL | DFN5*6 | GN088N15SL |

**Absolute Maximum Ratings at $T_j$=25℃ (unless otherwise specified)**

| Parameter | Symbol | Conditions | Value | Unit |
|---|---|---|---|---|
| Continuous Drain Current (Silicon Limited) | $I_D$ | $T_C$=25℃ | 87 | A |
| | | $T_C$=100℃ | 55 | |
| Continuous Drain Current (Package Limited | | $T_C$=25℃ | 60 | |
| Drain to Source Voltage | $V_{DS}$ | - | 150 | V |
| Gate to Source Voltage | $V_{GS}$ | - | ±20 | V |
| Pulsed Drain Current | $I_{DM}$ | - | 350 | A |
| Avalanche Energy, Single Pulse | $E_{AS}$ | L=0.4mH, $T_C$=25℃ | 320 | mJ |
| Power Dissipation | $P_D$ | $T_C$=25℃ | 139 | W |
| Operating and Storage Temperature | $T_J$, $T_{stg}$ | - | -55 to150 | ℃ |

**Absolute Maximum Ratings**

| Parameter | Symbol | Max | Unit |
|---|---|---|---|
| Thermal Resistance Junction-Ambient | $R_{\theta JA}$ | 55 | ℃/W |
| Thermal Resistance Junction-Case | $R_{\theta JC}$ | 0.9 | ℃/W |

## Electrical Characteristics at $T_j$=25℃ (unless otherwise specified)

### Static Characteristics

| Parameter | Symbol | Conditions | Value | | | Unit |
|---|---|---|---|---|---|---|
| | | | min | typ | max | |
| Drain to Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS}$=0V, $I_D$=250μA | 150 | - | - | V |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{GS}$=$V_{DS}$, $I_D$=250μA | 1 | 2 | 3 | |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{GS}$=0V, $V_{DS}$=150V, $T_j$=25℃ | - | - | 1 | μA |
| | | $V_{GS}$=0V, $V_{DS}$=150V, $T_j$=100℃ | - | - | 100 | |
| Gate to Source Leakage Current | $I_{GSS}$ | $V_{GS}$=±20V, $V_{DS}$=0V | - | - | ±100 | nA |
| Drain to Source on Resistance | $R_{DS(on)}$ | $V_{GS}$=10V, $I_D$=20A | - | 7.5 | 8.8 | mΩ |
| Drain to Source on Resistance | $R_{DS(on)}$ | $V_{GS}$=4.5V, $I_D$=20A | - | 8.8 | 11 | mΩ |
| Transconductance | $g_{fs}$ | $V_{DS}$=5V, $I_D$=20A | - | 85 | - | S |
| Gate Resistance | $R_G$ | $V_{GS}$=0V, $V_{DS}$ Open, f=1MHz | - | 0.95 | - | Ω |

### Dynamic Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=75V, f=1MHz | - | 4758 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 325 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 10.0 | - | |
| Total Gate Charge | $Q_g$(10V) | $V_{DD}$=75V, $I_D$=20A, $V_{GS}$=10V | - | 62 | - | nC |
| | | | - | 28 | - | |
| Gate to Source Charge | $Q_{gs}$ | | - | 14 | - | |
| Gate to Drain (Miller) Charge | $Q_{gd}$ | | - | 6 | - | |
| Turn on Delay Time | $t_{d(on)}$ | $V_{DD}$=75V, $I_D$=20A, $V_{GS}$=10V, $R_G$=10Ω, | - | 21 | - | ns |
| Rise time | $t_r$ | | - | 10 | - | |
| Turn off Delay Time | $t_{d(off)}$ | | - | 32 | - | |
| Fall Time | $t_f$ | | - | 12 | - | |

### Reverse Diode Characteristics

| | | | | | | |
|---|---|---|---|---|---|---|
| Diode Forward Voltage | $V_{SD}$ | $V_{GS}$=0V, $I_F$=20A | - | 0.9 | 1.2 | V |
| Reverse Recovery Time | $t_{rr}$ | $V_R$=75V, $I_F$=20A, $dI_F/dt$=100A/μs | - | 70 | - | ns |
| Reverse Recovery Charge | $Q_{rr}$ | | - | 150 | - | nC |

Fig 1. Typical Output Characteristics

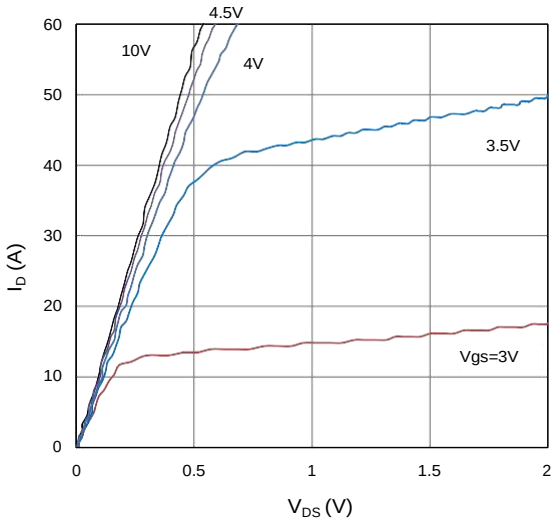



Figure 2. On-Resistance vs. Gate-Source Voltage

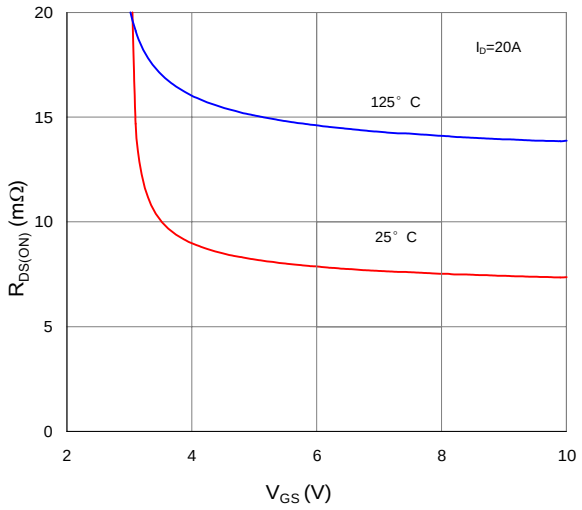



Figure 3. On-Resistance vs. Drain Current and Gate Voltage

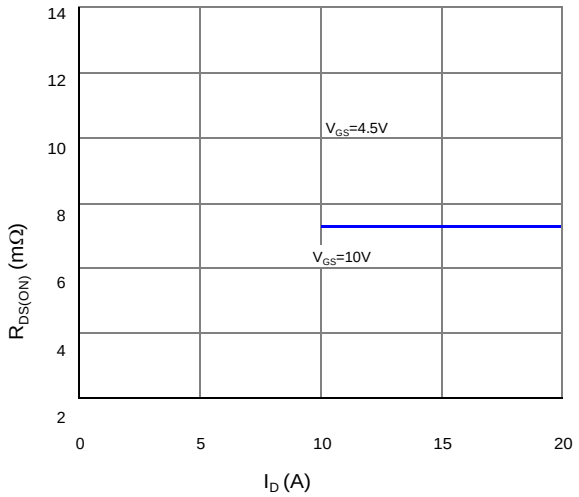



Figure 4. Normalized On-Resistance vs. Junction Temperature

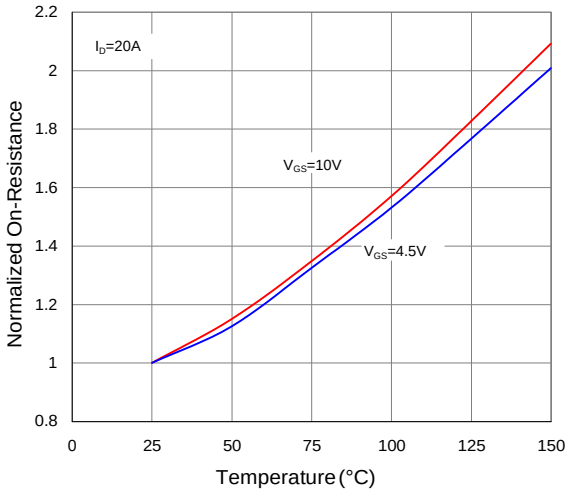



Figure 5. Typical Transfer Characteristics

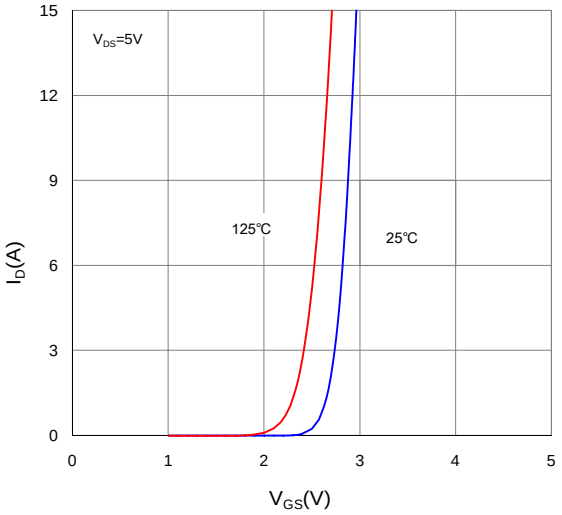



Figure 6. Typical Source-Drain Diode Forward Voltage

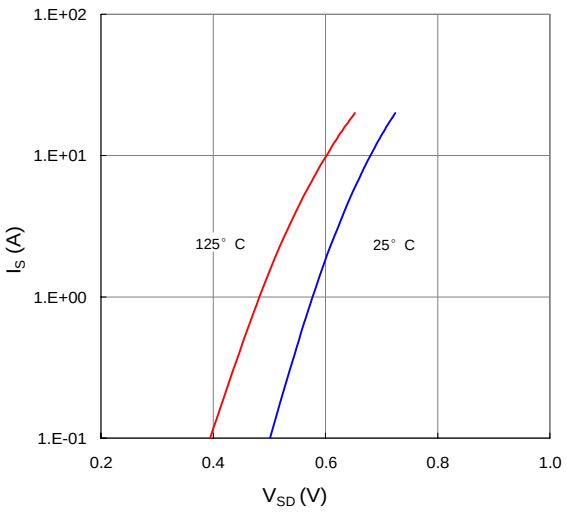


Figure 7. Typical Gate-Charge vs. Gate-to-Source Voltage

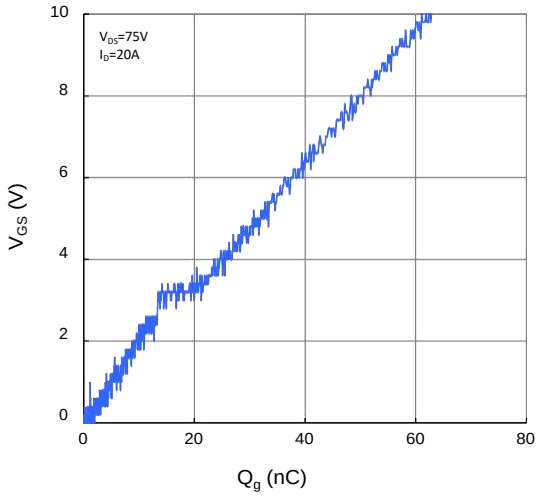



Figure 8. Typical Capacitance vs. Drain-to-Source Voltage

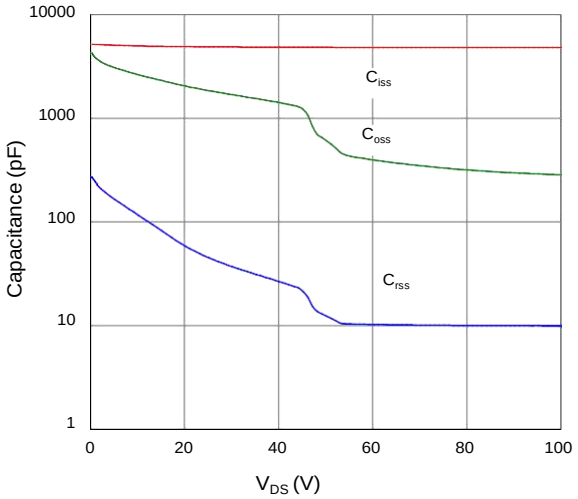



Figure 9. Maximum Safe Operating Area

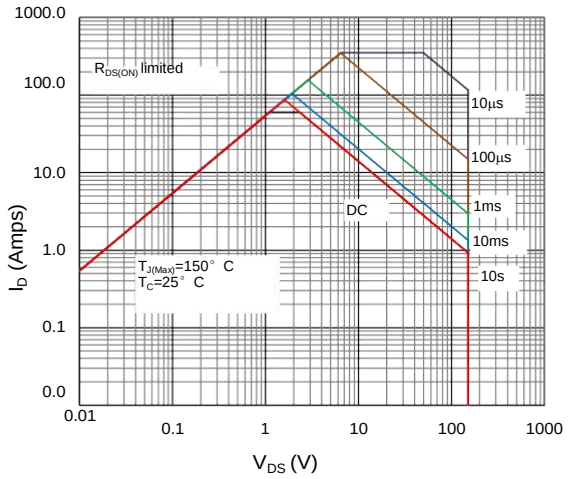



Figure 10. Maximun Drain Current vs. Case Temperature

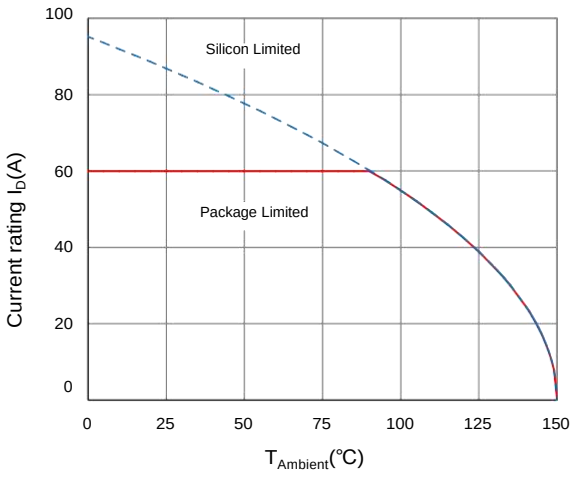
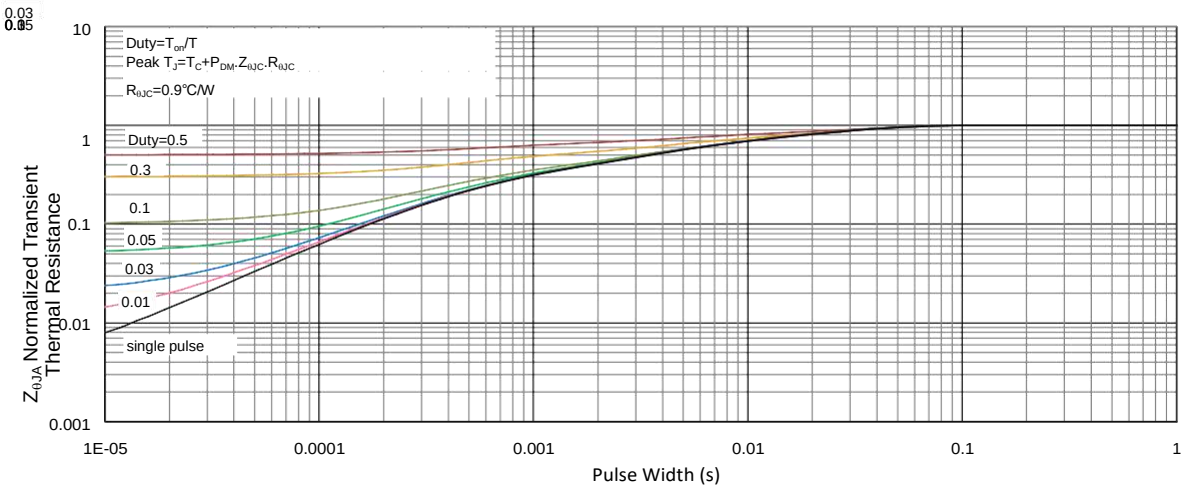
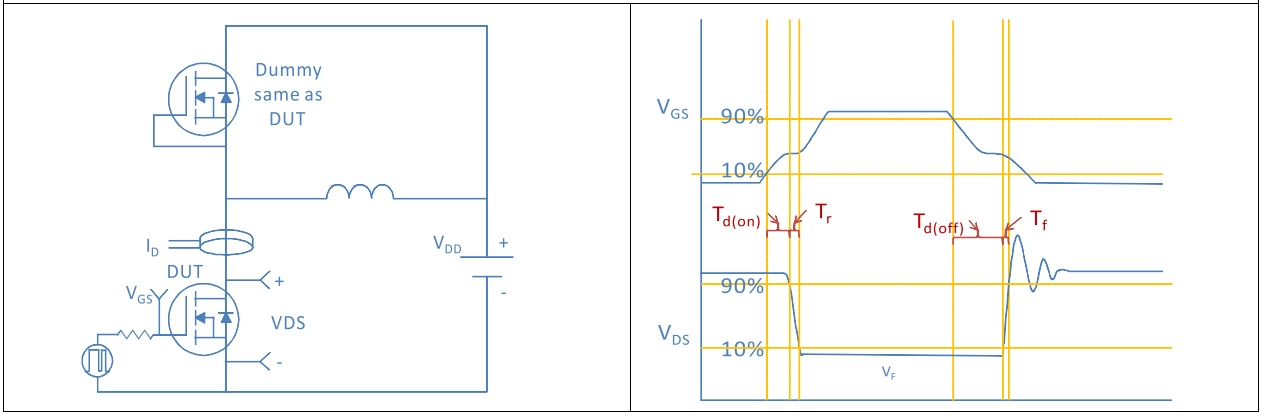


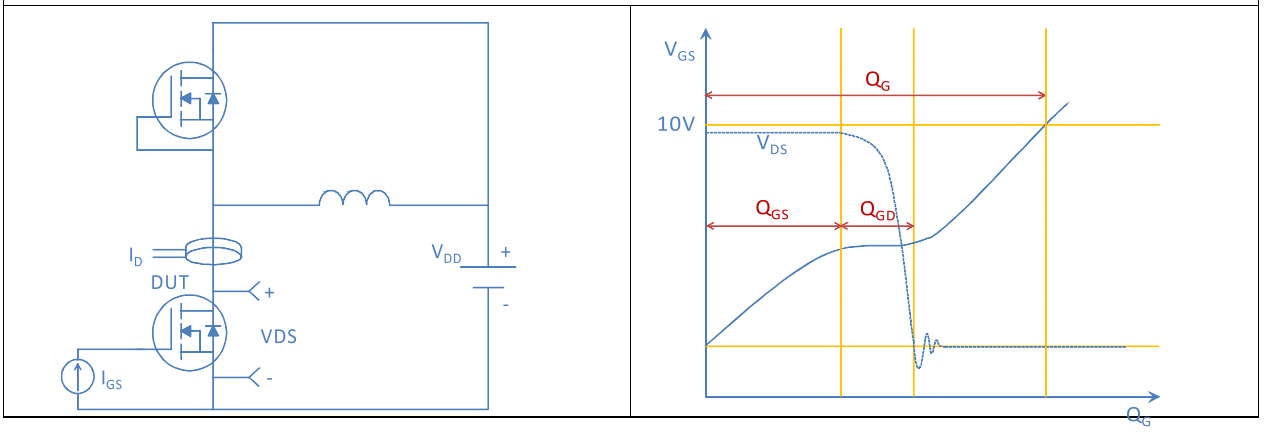

Figure 11. Normalized Maximum Transient Thermal Impedance, Junction-to-Ambient



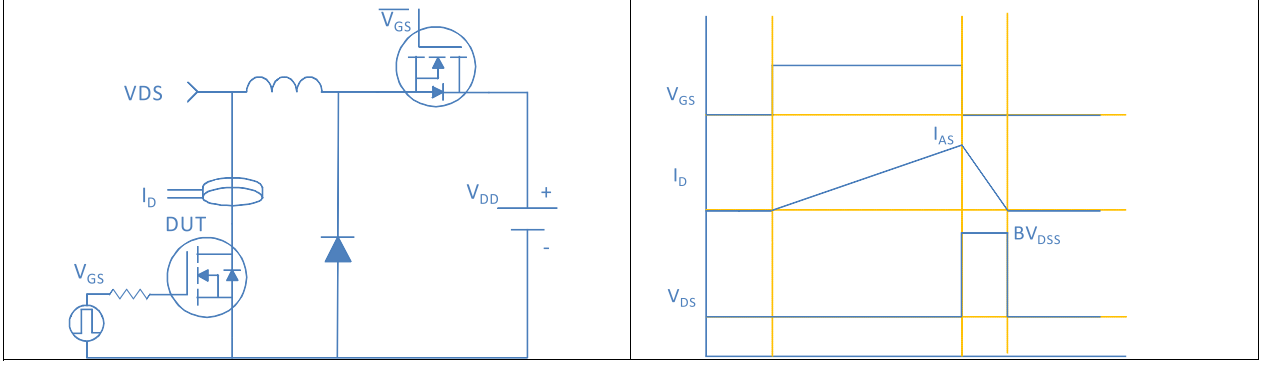
## Inductive switching Test



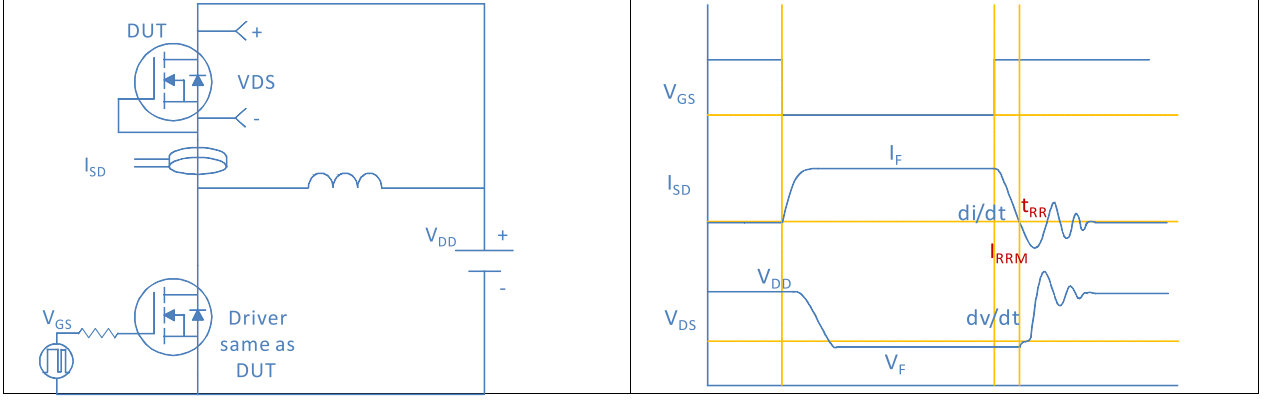

## Gate Charge Test



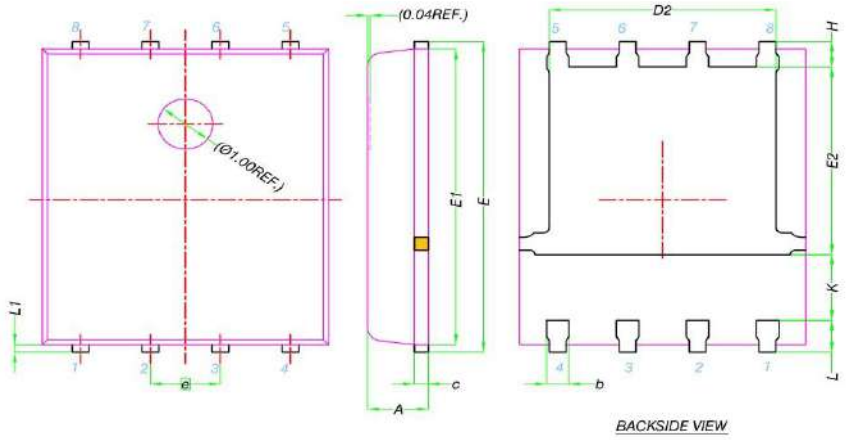

## Uclamped Inductive Switching (UIS) Test




## Diode Recovery Test



Package Outline **DFN5x6_P, 8 Leads**




| DIM. | MILLIMETERS | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 1.00 | 1.10 | 1.20 |
| A1 | 0 | --- | 0.05 |
| b | 0.33 | 0.40 | 0.50 |
| c | 0.20 | 0.25 | 0.30 |
| D1 | 5.00 | 5.20 | 5.40 |
| D2 | 3.80 | 4.10 | 4.25 |
| E | 6.00 | 6.15 | 6.30 |
| E1 | 5.76 | 5.86 | 5.96 |
| E2 | 3.52 | 3.72 | 3.92 |
| e | 1.27 BSC | | |
| H | 0.40 | 0.50 | 0.60 |
| K | 1.10 | --- | --- |
| L | 0.50 | 0.60 | 0.70 |
| L1 | 0.08 | 0.15 | 0.22 |
| α | 0° | --- | 12° |