

Description

The GT55N06 uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gate charge. It can be used in a wide variety of applications.

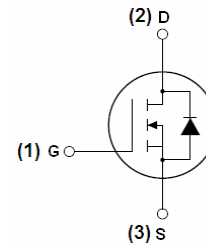
General Features

| VDSS | RDS(ON) @10V (typ) | RDS(ON) @4.5V (typ) | ID |
|------|-----------------------|------------------------|-----|
| 60V | 6.8mΩ | 9.5 mΩ | 53A |

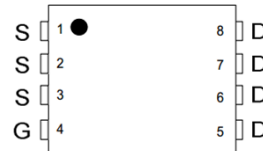
- High density cell design for ultra low Rdson
- Fully characterized avalanche voltage and current
- Good stability and uniformity with high E_{AS}
- Excellent package for good heat dissipation
- Special process technology for high ESD capability
- RoHS Compliant

Application

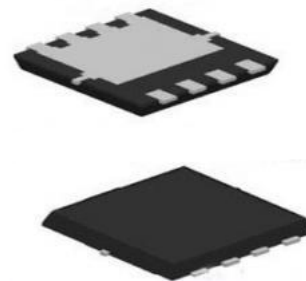
Synchronous Rectification in DC/DC and AC/DC Converters
Industrial and Motor Drive applications



Schematic diagram



Marking and pin assignment



DFN 5x6-8L

Ordering Information

| Part Number | Marking | Case | Packaging |
|-------------|---------|-----------|--------------|
| GT55N06 | GT55N06 | DFN5X6-8L | 2500pcs/Reel |

Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise noted

| Parameter | Symbol | Maximum | Units |
|--|----------------|---------------------------|------------------|
| Drain-Source Voltage | V_{DS} | 60 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Continuous Drain Current ^G | I_D | $T_A = 25^\circ\text{C}$ | 53 |
| | | $T_A = 100^\circ\text{C}$ | 34 |
| Pulsed Drain Current ^C | I_{DM} | 110 | A |
| Avalanche energy $L=0.5\text{mH}$ ^C | E_{AS} | 195 | mJ |
| Power Dissipation ^A | P_{DSM} | $T_A = 25^\circ\text{C}$ | 70 |
| | | $T_A = 70^\circ\text{C}$ | 28 |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55 to 150 | $^\circ\text{C}$ |

Thermal Characteristics

| Parameter | Symbol | Maximum | Units |
|--|-----------------|---------|--------------------|
| Maximum Junction-to-Ambient ^A | $R_{\theta JA}$ | 14 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Ambient ^{A D} | | 17 | |
| Maximum Junction-to-Ambient ^{A D} | Steady-State | 40 | $^\circ\text{C/W}$ |
| Maximum Junction-to-Case | Steady-State | 1.3 | $^\circ\text{C/W}$ |
| | | 1.8 | |

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Units |
|-----------------------------|--|---|-----|------------|-------------|-------|
| STATIC PARAMETERS | | | | | | |
| BV _{DSS} | Drain-Source Breakdown Voltage | I _D =250μA, V _{GS} =0V | 60 | 65 | | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =60V, V _{GS} =0V T _J =55°C | | | 1 5 | μA |
| I _{GSS} | Gate-Body leakage current | V _{DS} =0V, V _{GS} =±20V | | | ±100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =250μA | 1.1 | 1.7 | 2.5 | V |
| R _{DS(on)} | Static Drain-Source On-Resistance | V _{GS} =10V, I _D =20A V _{GS} =4.5V, I _D =20A | | 6.8 9.5 | 8.2 12.0 | mΩ |
| g _{FS} | Diode Forward Voltage | V _{DS} =5V, I _D =20A | 30 | | | S |
| V _{SD} | Diode Forward Voltage | I _S =20A, V _{GS} =0V | | 0.85 | 0.99 | V |
| I _S | Maximum Body-Diode Continuous Current ^G | | | | 53 | A |
| DYNAMIC PARAMETERS | | | | | | |
| C _{iss} | Input Capacitance | V _{GS} =0V, V _{DS} =30V, f=1MHz | | 1988 | | pF |
| C _{oss} | Output Capacitance | | | 470 | | pF |
| C _{rss} | Reverse Transfer Capacitance | | | 14 | | pF |
| R _g | Gate resistance | V _{GS} =0V, V _{DS} =0V, f=1MHz | | 1.6 | | Ω |
| SWITCHING PARAMETERS | | | | | | |
| Q _{g(10V)} | Total Gate Charge | V _{GS} =10V, V _{DS} =30V, I _D =20A | | 31 | | nC |
| Q _{g(4.5V)} | Total Gate Charge | | | 16 | | nC |
| Q _{gs} | Gate Source Charge | | | 6 | | nC |
| Q _{gd} | Gate Drain Charge | | | 5 | | nC |
| t _{D(on)} | Turn-on Delay Time | V _{GS} =10V, V _{DS} =15V, R _L =2.5Ω, R _{GEN} =3Ω | | 10.5 | | ns |
| t _r | Turn-on Rise Time | | | 4.5 | | ns |
| t _{D(off)} | Turn-off Delay Time | | | 29.5 | | ns |
| t _f | Turn-off Fall Time | | | 8 | | ns |
| t _{rr} | Body Diode Reverse Recovery Time | I _F =20A, di/dt=500A/μs | | 17 | | ns |
| Q _{rr} | Body Diode Reverse Recovery charge | I _F =20A, di/dt=500A/μs | | 58 | | nC |

A. The value of R_{θJA} is measured with the device mounted on 1in2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25° C. The Power dissipation P_{D(SM)} is based on R_{θJA} ≤ 10s and the maximum allowed junction temperature of 150° C. The value in any given application depends on the user's specific board design.

B. The power dissipation P_D is based on T_{J(MAX)}=150° C, using junction-to-case thermal resistance, and is more useful in setting the upper dissipation limit for cases where additional heatsinking is used.

C. Single pulse width limited by junction temperature T_{J(MAX)}=150° C.

D. The R_{θJA} is the sum of the thermal impedance from junction to case R_{θJC} and case to ambient.

E. The static characteristics in Figures 1 to 6 are obtained using <300μs pulses, duty cycle 0.5% max.

F. These curves are based on the junction-to-case thermal impedance which is measured with the device mounted to a large heatsink, assuming a maximum junction temperature of T_{J(MAX)}=150° C. The SOA curve provides a single pulse rating.

G. The maximum current rating is package limited.

Typical Performance Characteristics

Fig 1: Output Characteristics

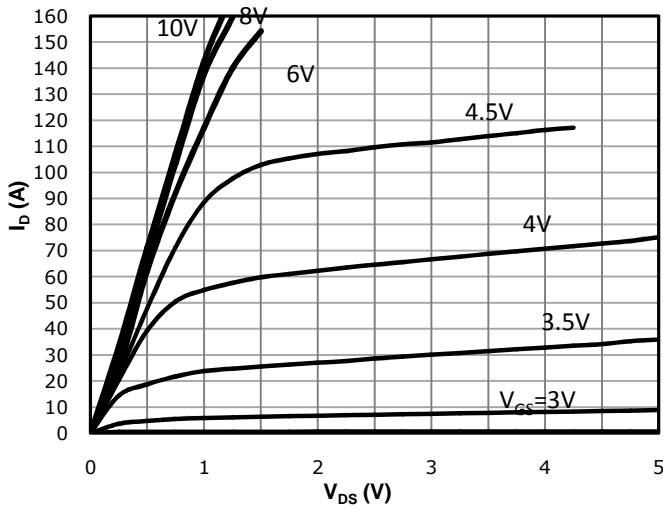


Fig 2: Transfer Characteristics

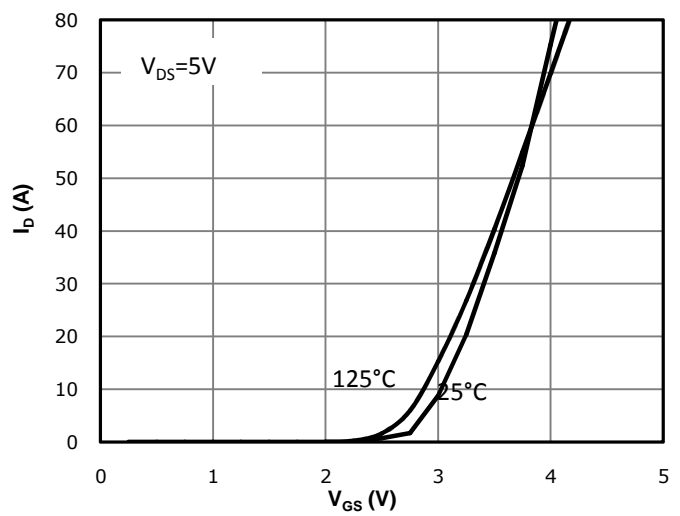


Fig 3: $R_{DS(on)}$ vs Drain Current and Gate Voltage

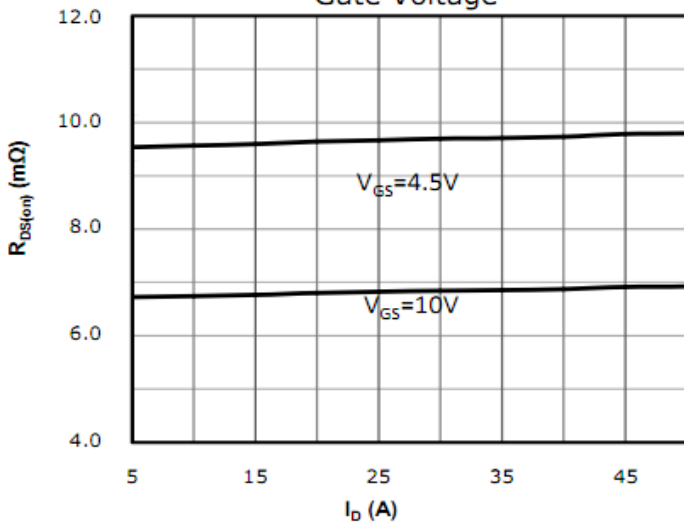


Fig 4: $R_{DS(on)}$ vs Gate Voltage

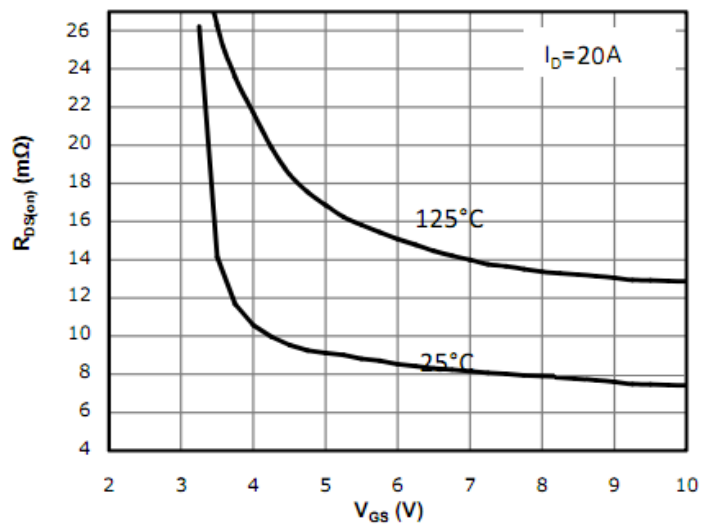


Fig 5: $R_{DS(on)}$ vs. Temperature

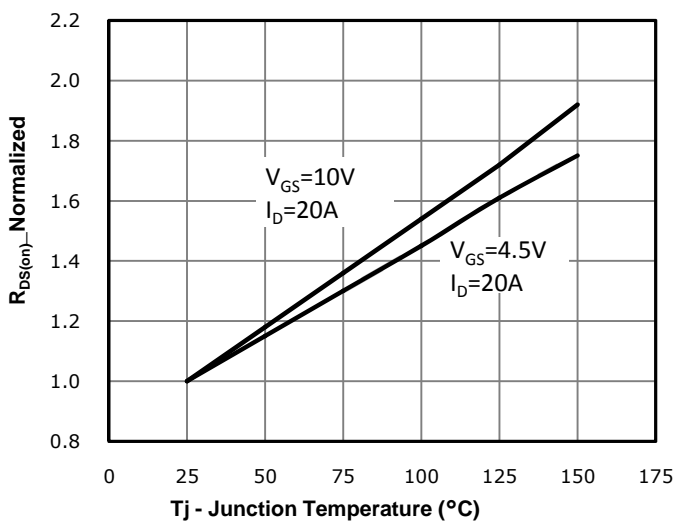


Fig 6: Capacitance Characteristics

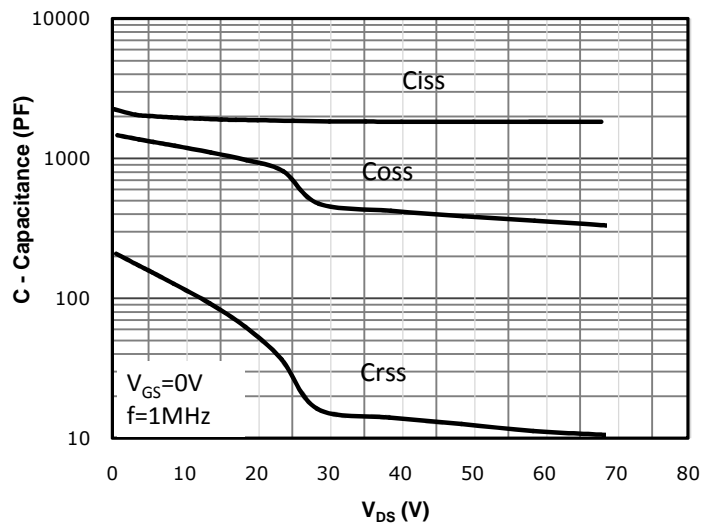


Fig 7: Gate Charge Characteristics

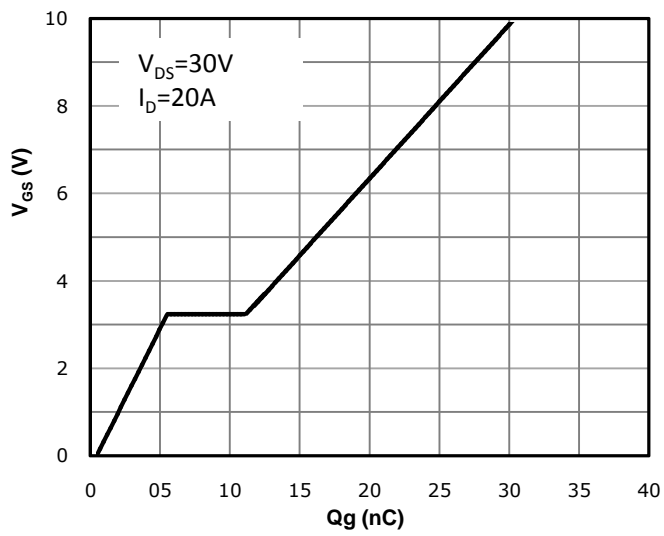


Fig 8: Body-diode Forward Characteristics

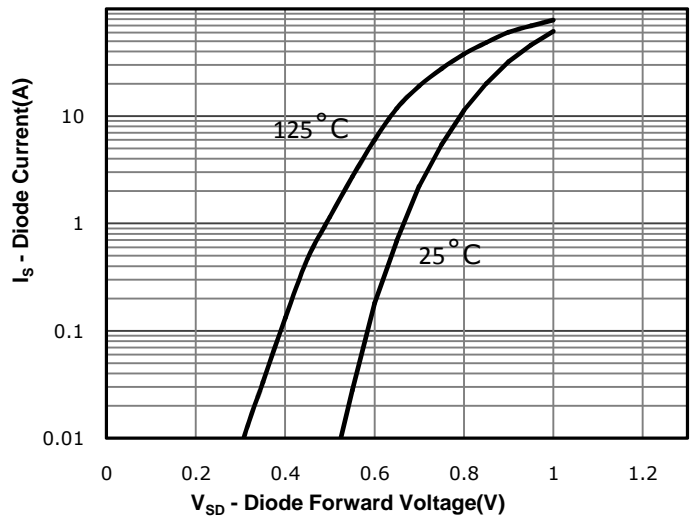


Fig 9: Power Dissipation

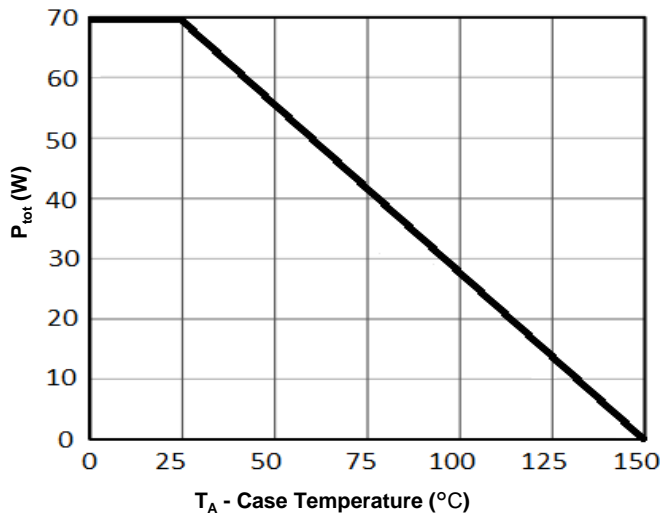


Fig 10: Drain Current Derating

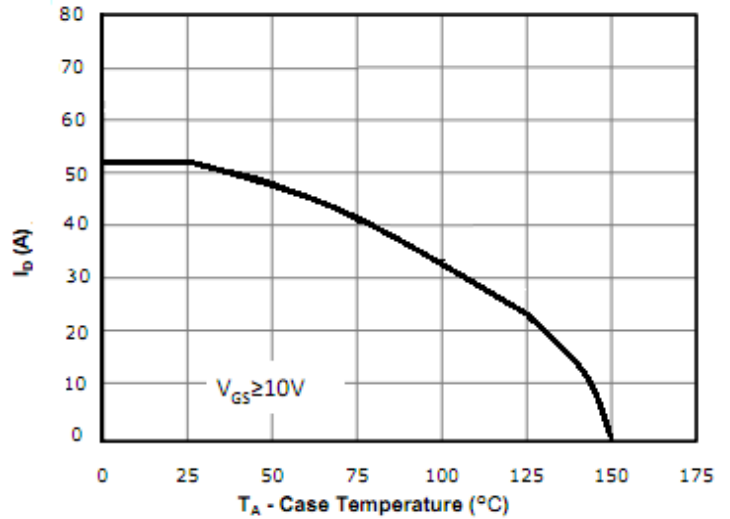


Figure A: Gate Charge Test Circuit & Waveforms

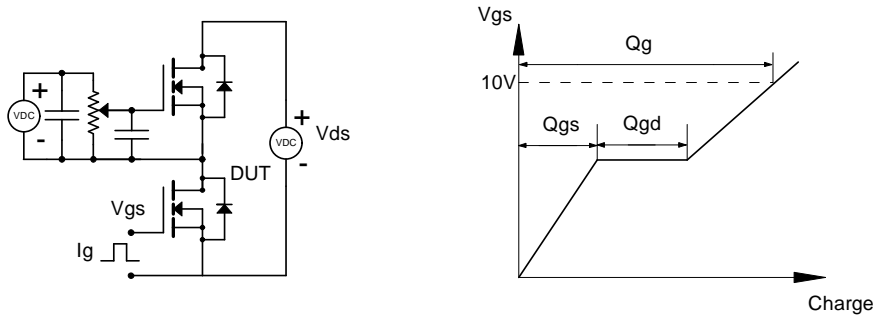


Figure B: Resistive Switching Test Circuit & Waveforms

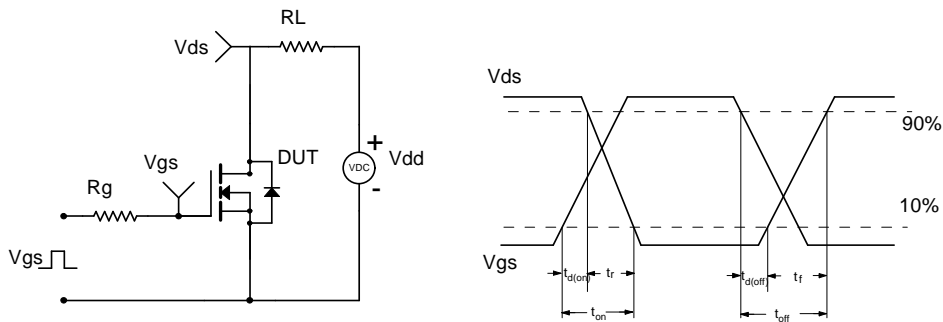


Figure C: Unclamped Inductive Switching (UIS) Test

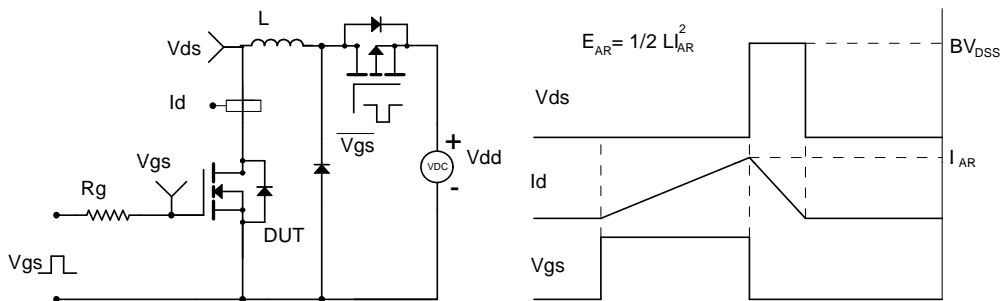
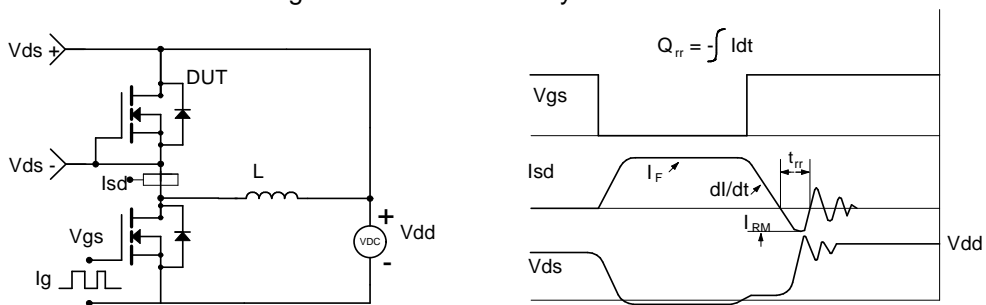
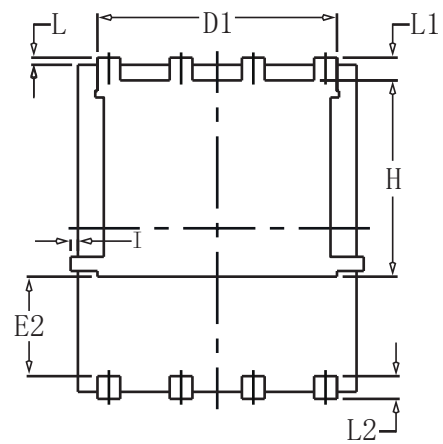
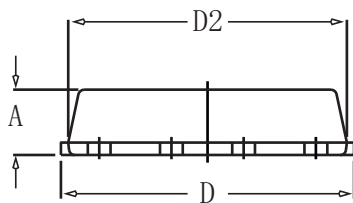
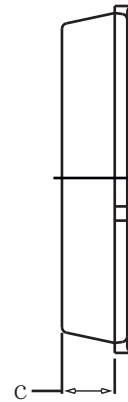
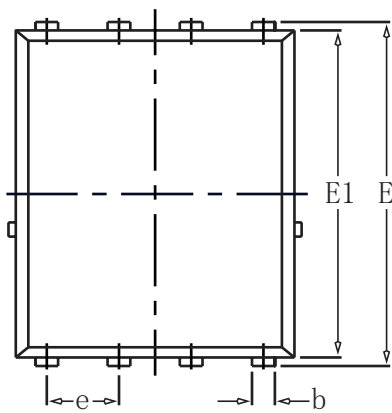


Figure D: Diode Recovery Test Circuit & Waveforms



DFN5X6-8L Package information



| SYMBOL | COMMON | | | |
|--------|----------|-------|----------|--------|
| | MM | | INCH | |
| | MIN | MAX | MIN | MAX |
| A | 1.03 | 1.17 | 0.0406 | 0.0461 |
| b | 0.34 | 0.48 | 0.0134 | 0.0189 |
| c | 0.824 | 0.970 | 0.0324 | 0.0382 |
| D | 4.80 | 5.40 | 0.1890 | 0.2126 |
| D1 | 4.11 | 4.31 | 0.1618 | 0.1697 |
| D2 | 4.80 | 5.00 | 0.1890 | 0.1969 |
| E | 5.59 | 6.15 | 0.2343 | 0.2421 |
| E1 | 5.65 | 5.85 | 0.2224 | 0.2303 |
| E2 | 1.60 | - | 0.0630 | - |
| e | 1.27 BSC | | 0.05 BSC | |
| L | 0.05 | 0.25 | 0.0020 | 0.0098 |
| L1 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| L2 | 0.38 | 0.50 | 0.0150 | 0.0197 |
| H | 3.30 | 3.50 | 0.1299 | 0.1378 |
| I | - | 0.18 | - | 0.0070 |