## Description

### N-channel Enhancement Mode Power MOSFET

**Features**

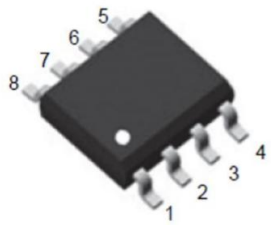
- 100V, 12A
  $R_{DS(ON)}$ Typ = 10mΩ @ $V_{GS}$ = 10V
  $R_{DS(ON)}$ Typ = 13mΩ @ $V_{GS}$ = 4.5V
- Advanced Split Gate Trench Technology
- Excellent $R_{DS(ON)}$ and Low Gate Charge
- Lead Free

**Applications**

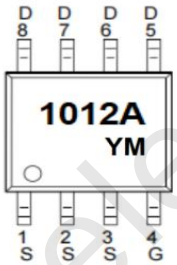
- Load Switch
- PWM Application
- Power Management

*100% UIS TESTED!*

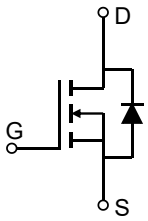
RoHS




SOP-8




Marking and Pin Assignment




Schematic Diagram

### Package Marking and Ordering Information

| Device Marking | Device | Outline | Package | Reel Size | Reel(pcs) | Per Carton (pcs) |
|---|---|---|---|---|---|---|
| 1012A | CRMPGL1012A | TAPING | SOP-8 | 13" | 4000 | 40000 |

### Absolute Maximum Ratings (@ $T_J$ = 25°C unless otherwise specified)

| Symbol | Parameter | | Value | Units |
|---|---|---|---|---|
| $V_{DS}$ | Drain-to-Source Voltage | | 100 | V |
| $V_{GS}$ | Gate-to-Source Voltage | | ±20 | V |
| $I_D$ | Continuous Drain Current | $T_A$ = 25°C | 12 | A |
| | | $T_A$ = 100°C | 7.5 | |
| $I_{DM}$ | Pulsed Drain Current (1) | | 48 | A |
| $E_{AS}$ | Single Pulsed Avalanche Energy (2) | | 72 | mJ |
| $P_D$ | Power Dissipation | $T_A$ = 25°C | 3.1 | W |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient (3) | | 40 | °C/W |
| $T_J$, $T_{STG}$ | Junction & Storage Temperature Range | | -55 to 150 | °C |

**Electrical Characteristics** ($T_J$ = 25°C unless otherwise specified)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Off Characteristics** | | | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | $I_D$ = 250μA, $V_{GS}$ = 0V | 100 | - | - | V |
| $I_{DSS}$ | Zero Gate Voltage Drain Current | $V_{DS}$ = 100V, $V_{GS}$ = 0V | - | - | 1.0 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | $V_{DS}$ = 0V, $V_{GS}$ = ±20V | - | - | ±100 | nA |
| **On Characteristics** | | | | | | |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA | 1.0 | 1.7 | 2.5 | V |
| $R_{DS(ON)}$ | Static Drain-Source ON-Resistance(4) | $V_{GS}$ = 10V, $I_D$ = 12A | - | 10.0 | 13.0 | mΩ |
| | | $V_{GS}$ = 4.5V, $I_D$ = 10A | - | 13.0 | 17.0 | mΩ |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0V, $V_{DS}$ = 25V, f = 1MHz | - | 1500 | - | pF |
| $C_{oss}$ | Output Capacitance | | - | 840 | - | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | - | 30 | - | pF |
| $Q_g$ | Total Gate Charge | $V_{GS}$ = 0 to 10V, $V_{DS}$ = 50V, $I_D$ = 12A | - | 35 | - | nC |
| $Q_{gs}$ | Gate Source Charge | | - | 4.5 | - | nC |
| $Q_{gd}$ | Gate Drain("Miller") Charge | | - | 8 | - | nC |
| | | | | | | |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On DelayTime | $V_{GS}$ = 10V, $V_{DD}$ = 50V, $I_D$= 12A, $R_{GEN}$ = 3Ω | - | 16 | - | ns |
| $t_r$ | Turn-On Rise Time | | - | 13 | - | ns |
| $t_{d(off)}$ | Turn-Off DelayTime | | - | 37 | - | ns |
| $t_f$ | Turn-Off Fall Time | | - | 17 | - | ns |
| **Drain-Source Diode Characteristics and Max Ratings** | | | | | | |
| $I_S$ | Maximum Continuous Drain to Source Diode Forward Current | | - | - | 12 | A |
| $I_{SM}$ | Maximum Pulsed Drain to Source Diode Forward Current | | - | - | 48 | A |
| $V_{SD}$ | Drain to Source Diode Forward Voltage | $V_{GS}$ = 0V, $I_S$ = 12A | - | - | 1.2 | V |

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

2. $E_{AS}$ condition: Starting $T_J$=25C, $V_{DD}$=30V, $V_G$=10V, $R_G$=25ohm, L=0.5mH, $I_{AS}$=17A

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

4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%.

## Typical Performance Characteristics

Figure 1: Output Characteristics

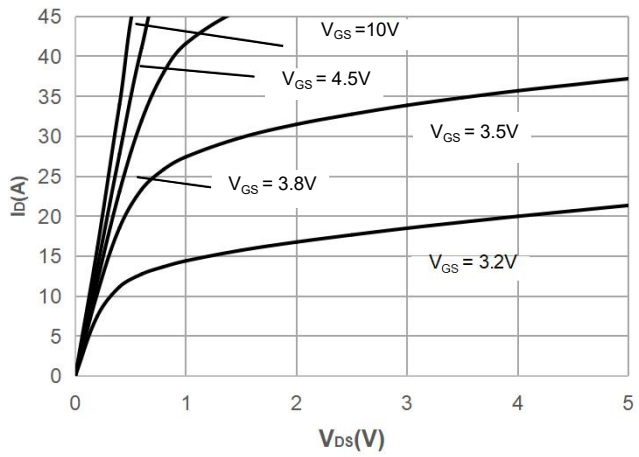



Figure 2: Typical Transfer Characteristics

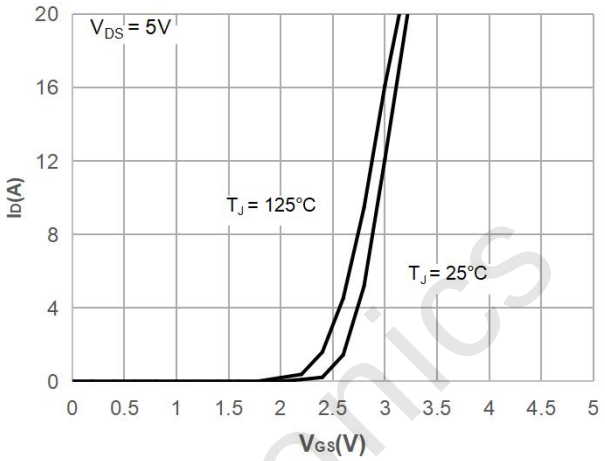



Figure 3: On-resistance vs. Drain Current

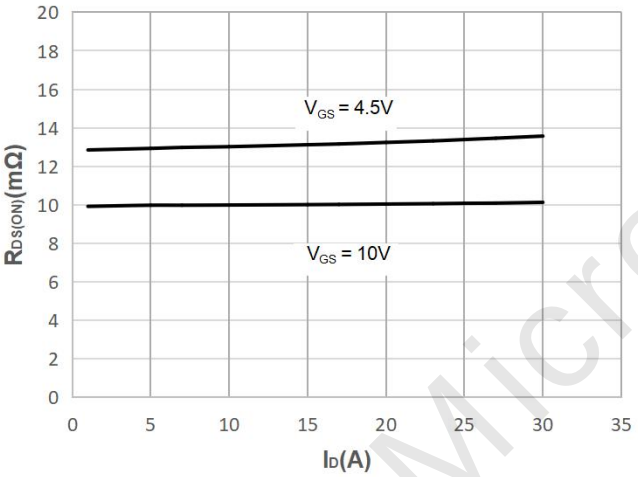



Figure 4: Body Diode Characteristics

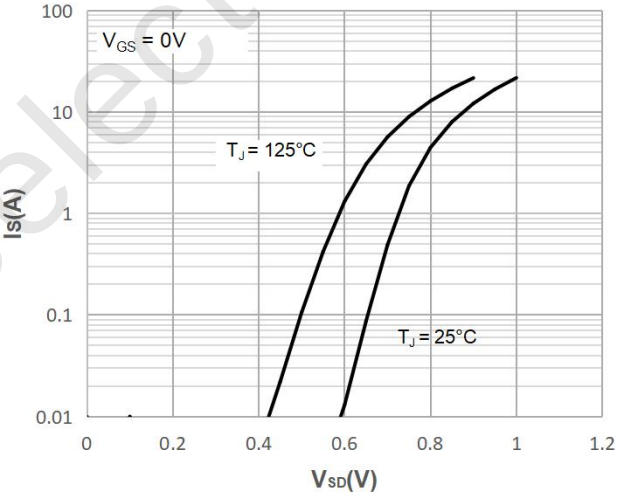



Figure 5: Gate Charge Characteristics

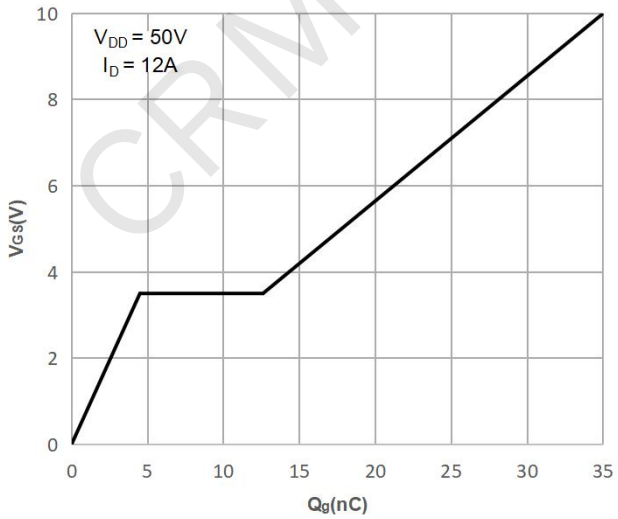
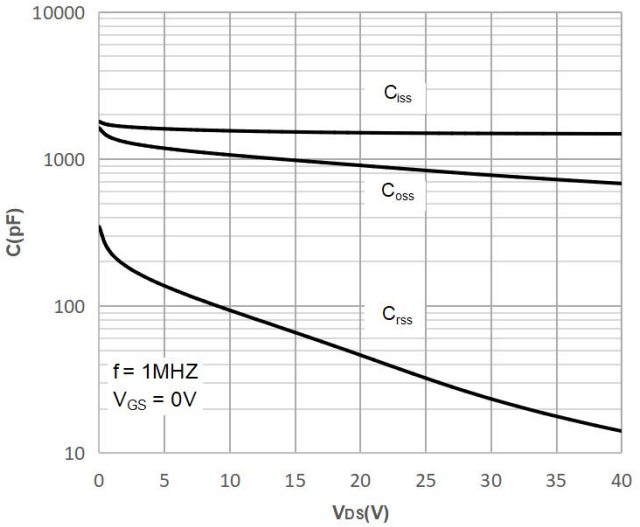



Figure 6: Capacitance Characteristics



## Typical Performance Characteristics

Figure 7: Normalized Breakdown voltage vs. Junction Temperature

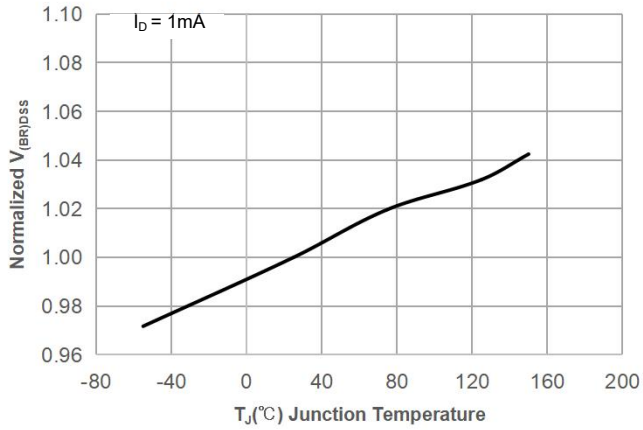



Figure 8: Normalized on Resistance vs. Junction Temperature

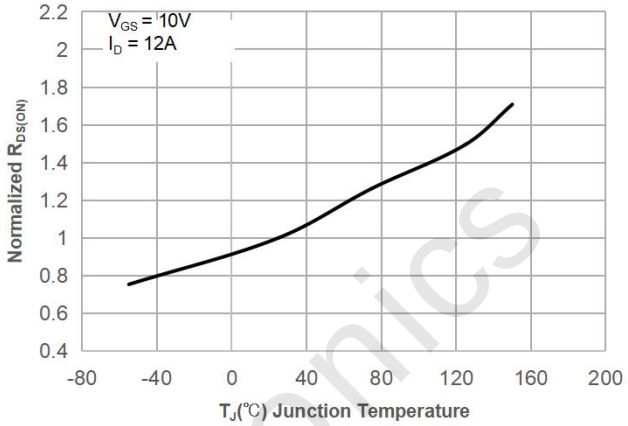



Figure 9: Maximum Safe Operating Area

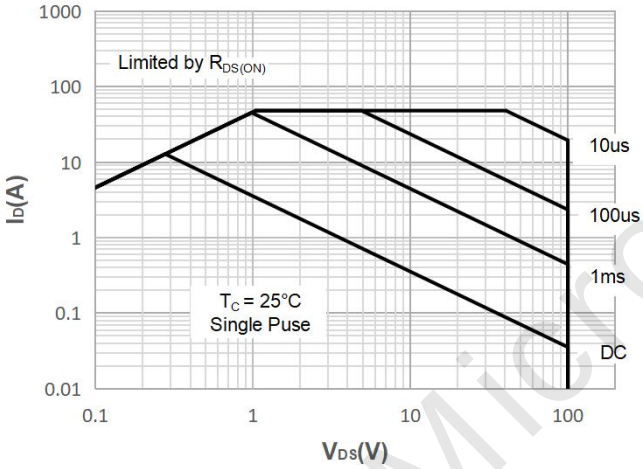



Figure 10: Maximum Continuous Drian Current vs. Case Temperature

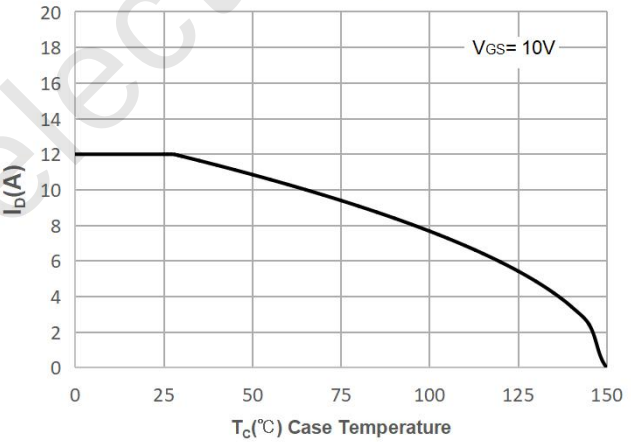



Figure 11: Normalized Maximum Transient Thermal Impedance

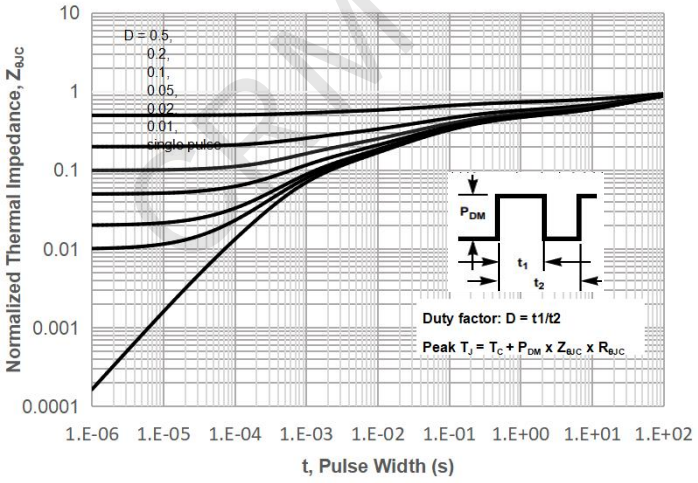
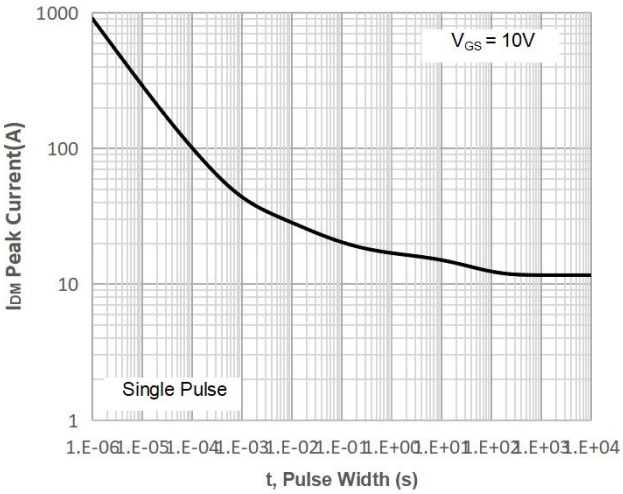



Figure 12: Peak Current Capacity



## Test Circuit

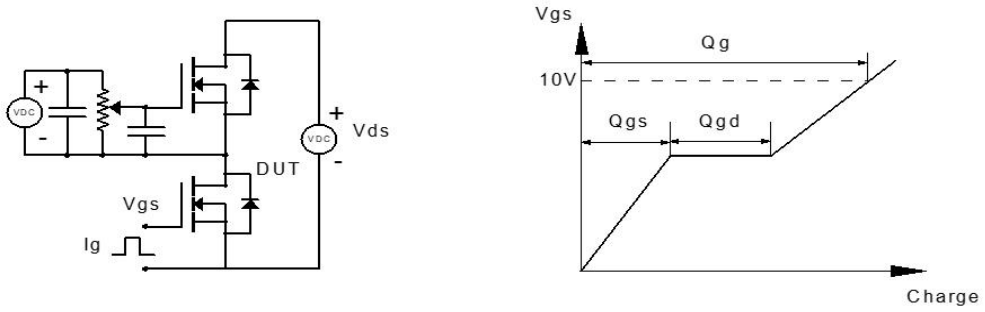



**Figure 1: Gate Charge Test Circuit & Waveform**

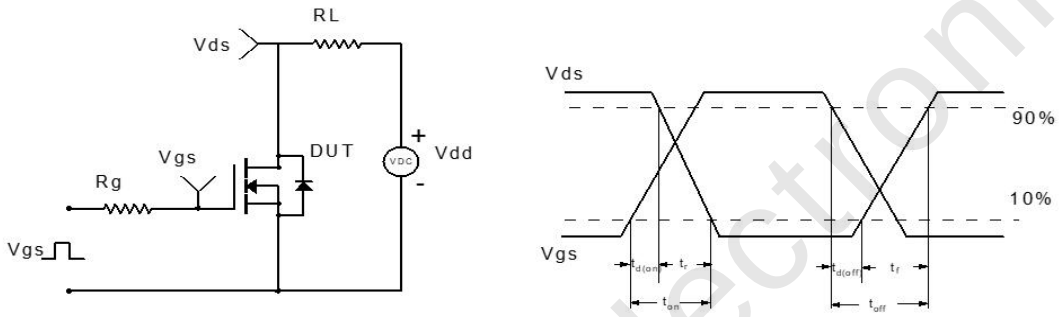



**Figure 2: Resistive Switching Test Circuit & Waveform**

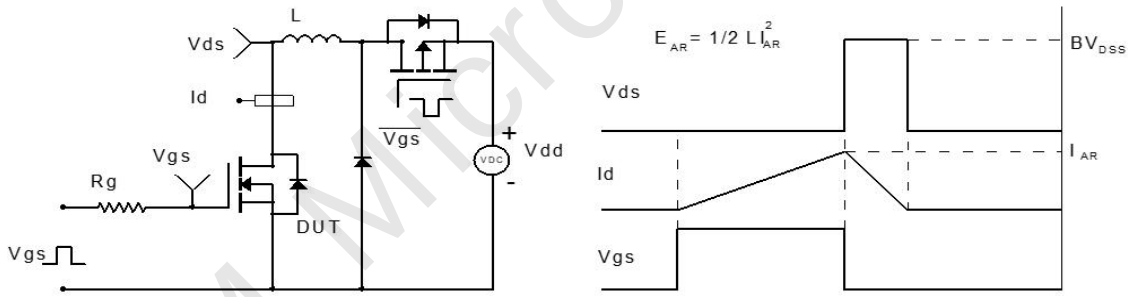



**Figure 3: Unclamped Inductive Switching Test Circuit& Waveform**

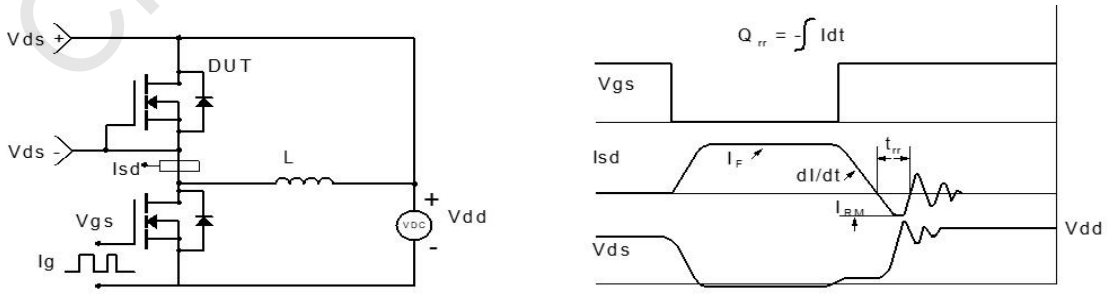
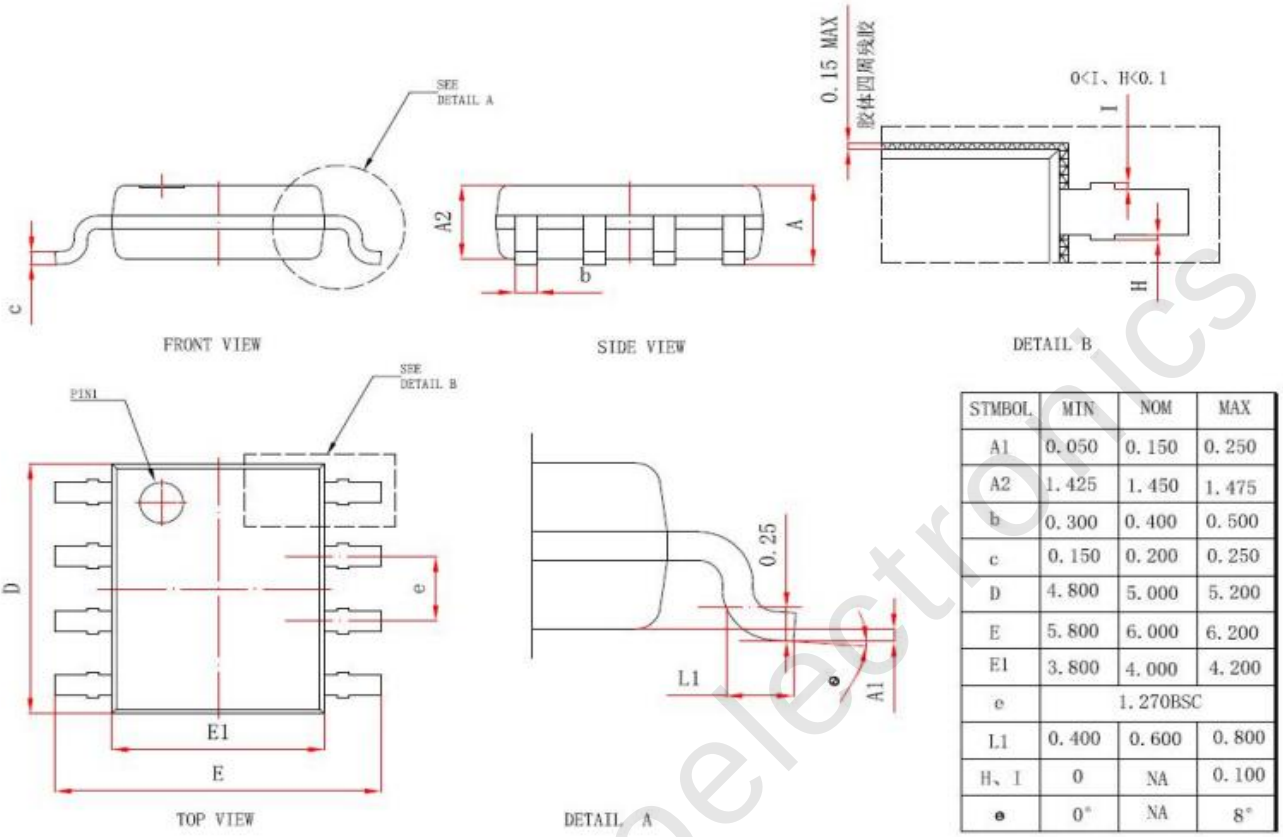



**Figure 4: Diode Recovery Test Circuit & Waveform**

## Package Mechanical Data(SOP-8)




| STMBOL | MIN | NOM | MAX |
|---|---|---|---|
| A1 | 0.050 | 0.150 | 0.250 |
| A2 | 1.425 | 1.450 | 1.475 |
| b | 0.300 | 0.400 | 0.500 |
| c | 0.150 | 0.200 | 0.250 |
| D | 4.800 | 5.000 | 5.200 |
| E | 5.800 | 6.000 | 6.200 |
| E1 | 3.800 | 4.000 | 4.200 |
| e | 1.270BSC | | |
| L1 | 0.400 | 0.600 | 0.800 |
| H、I | 0 | NA | 0.100 |
| θ | 0° | NA | 8° |