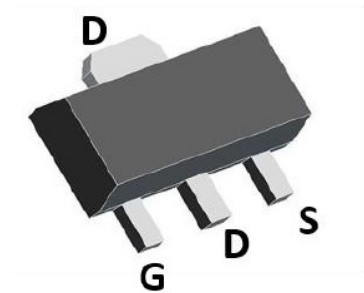
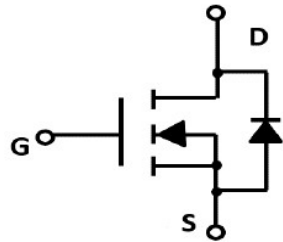
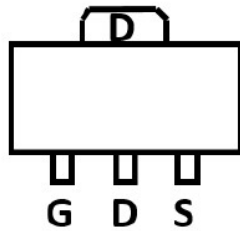


## N-Channel Enhancement Mode Field Effect Transistor



**SOT-89**



### Product Summary

- $V_{DS}$  60V
- $I_D$  3.0A
- $R_{DS(ON)}$  (at  $V_{GS}=10V$ ) < 100mohm
- $R_{DS(ON)}$  (at  $V_{GS}=4.5V$ ) < 120mohm
- 100%  $\nabla V_{DS}$  Tested

### General Description

- Trench Power MV MOSFET technology
- Excellent package for heat dissipation
- High density cell design for low  $R_{DS(ON)}$

### Applications

- DC-DC Converters
- Power management functions

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

| Parameter                                           |                        | Symbol          | Limit    | Unit                      |
|-----------------------------------------------------|------------------------|-----------------|----------|---------------------------|
| Drain-source Voltage                                |                        | $V_{DS}$        | 60       | V                         |
| Gate-source Voltage                                 |                        | $V_{GS}$        | $\pm 20$ | V                         |
| Drain Current                                       | $T_A=25^\circ\text{C}$ | $I_D$           | 3        | A                         |
|                                                     | $T_A=70^\circ\text{C}$ |                 | 2.4      |                           |
| Pulsed Drain Current <sup>A</sup>                   |                        | $I_{DM}$        | 12       | A                         |
| Total Power Dissipation                             | $T_A=25^\circ\text{C}$ | $P_D$           | 0.69     | W                         |
|                                                     | $T_A=70^\circ\text{C}$ |                 | 0.44     |                           |
| Thermal Resistance Junction-to-Ambient <sup>B</sup> |                        | $R_{\theta JA}$ | 180      | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature Range              |                        | $T_J, T_{STG}$  | -55~+150 | $^\circ\text{C}$          |

### ■ Ordering Information (Example)

| PREFERRED P/N | PACKING CODE | Marking | MINIMUM PACKAGE(pcs) | INNER BOX QUANTITY(pcs) | OUTER CARTON QUANTITY(pcs) | DELIVERY MODE |
|---------------|--------------|---------|----------------------|-------------------------|----------------------------|---------------|
| YJH03N06A     | F1           | 6003A   | 1000                 | 10000                   | 40000                      | 7" reel       |



# YJH03N06A

## ■ Electrical Characteristics (T<sub>J</sub>=25℃ unless otherwise noted)

| Parameter                         | Symbol              | Conditions                                                                              | Min | Typ   | Max  | Units |
|-----------------------------------|---------------------|-----------------------------------------------------------------------------------------|-----|-------|------|-------|
| Static Parameter                  |                     |                                                                                         |     |       |      |       |
| Drain-Source Breakdown Voltage    | BV <sub>DSS</sub>   | V <sub>GS</sub> =0V, I <sub>D</sub> =250μA                                              | 60  |       |      | V     |
| Zero Gate Voltage Drain Current   | I <sub>DSS</sub>    | V <sub>DS</sub> =60V, V <sub>GS</sub> =0V                                               |     |       | 1    | μA    |
| Gate-Body Leakage Current         | I <sub>GSS1</sub>   | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                              |     |       | ±100 | nA    |
|                                   | I <sub>GSS2</sub>   | V <sub>GS</sub> =±10V, V <sub>DS</sub> =0V                                              |     |       | ±50  |       |
| Gate Threshold Voltage            | V <sub>GS(th)</sub> | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> =250μA                               | 1.0 | 1.3   | 2.0  | V     |
| Static Drain-Source On-Resistance | R <sub>DS(ON)</sub> | V <sub>GS</sub> =10V, I <sub>D</sub> =3A                                                |     | 86    | 100  | mΩ    |
|                                   |                     | V <sub>GS</sub> =4.5V, I <sub>D</sub> =2A                                               |     | 92    | 120  |       |
| Diode Forward Voltage             | V <sub>SD</sub>     | I <sub>S</sub> =3A, V <sub>GS</sub> =0V                                                 |     |       | 1.2  | V     |
| Dynamic Parameters                |                     |                                                                                         |     |       |      |       |
| Input Capacitance                 | C <sub>iss</sub>    | V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHZ                                       |     | 409   |      | pF    |
| Output Capacitance                | C <sub>oss</sub>    |                                                                                         |     | 50    |      |       |
| Reverse Transfer Capacitance      | C <sub>rss</sub>    |                                                                                         |     | 41    |      |       |
| Switching Parameters              |                     |                                                                                         |     |       |      |       |
| Total Gate Charge                 | Q <sub>g</sub>      | V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, I <sub>D</sub> =3A                          |     | 10.27 |      | nC    |
| Gate-Source Charge                | Q <sub>gs</sub>     |                                                                                         |     | 1.65  |      |       |
| Gate-Drain Charge                 | Q <sub>gd</sub>     |                                                                                         |     | 2.11  |      |       |
| Reverse Recovery Chrage           | Q <sub>rr</sub>     | I <sub>F</sub> =3A, di/dt=100A/us                                                       |     | 6.99  |      | ns    |
| Reverse Recovery Time             | t <sub>rr</sub>     |                                                                                         |     | 32.6  |      |       |
| Turn-on Delay Time                | t <sub>D(on)</sub>  | V <sub>GS</sub> =10V, V <sub>DS</sub> =30V, R <sub>L</sub> =20Ω<br>R <sub>GEN</sub> =3Ω |     | 3.6   |      |       |
| Turn-on Rise Time                 | t <sub>r</sub>      |                                                                                         |     | 17.6  |      |       |
| Turn-off Delay Time               | t <sub>D(off)</sub> |                                                                                         |     | 13    |      |       |
| Turn-off fall Time                | t <sub>f</sub>      |                                                                                         |     | 23    |      |       |

A. Pulse Test: Pulse Width≤300us,Duty cycle ≤2%.

B. R<sub>θJA</sub> is the sum of the junction-to-case and case-to-ambient thermal resistance, where the case thermal reference is defined as the solder mounting surface of the drain pins. R<sub>θJC</sub> is guaranteed by design, while R<sub>θJA</sub> is determined by the board design. The maximum rating presented here is based on mounting on a 1 in 2 pad of 2oz copper.

## ■ Typical Performance Characteristics

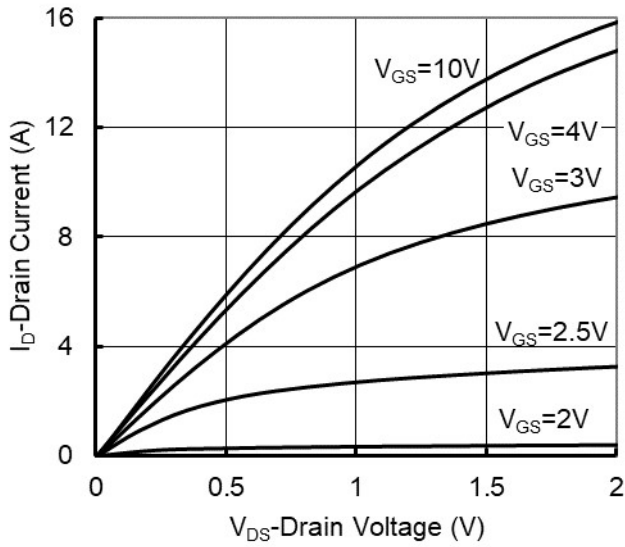


Figure1. Output Characteristics

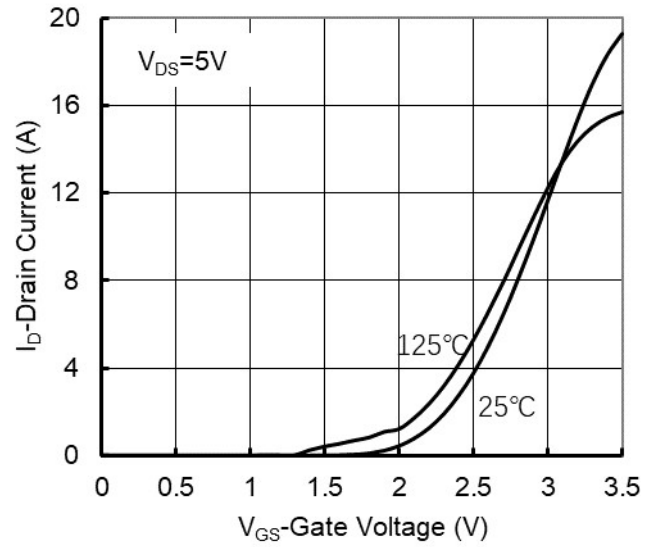


Figure2. Transfer Characteristics

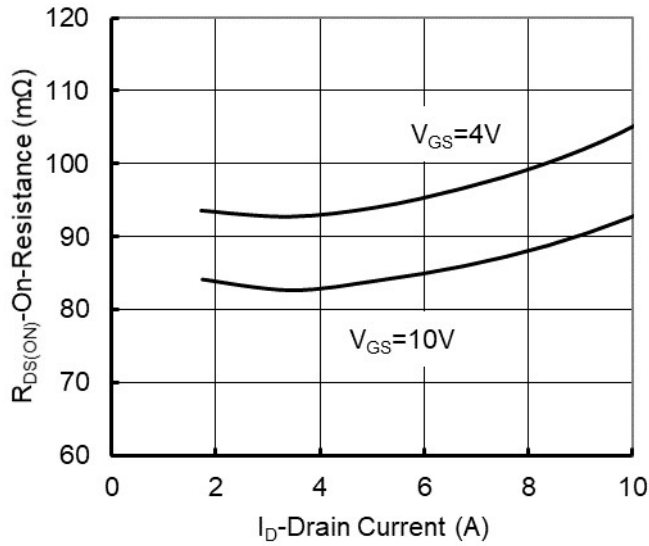


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

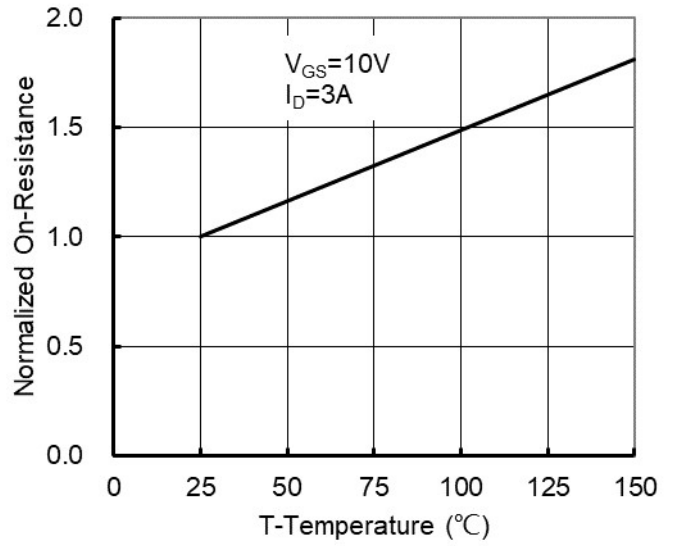


Figure 4: On-Resistance vs. Junction Temperature

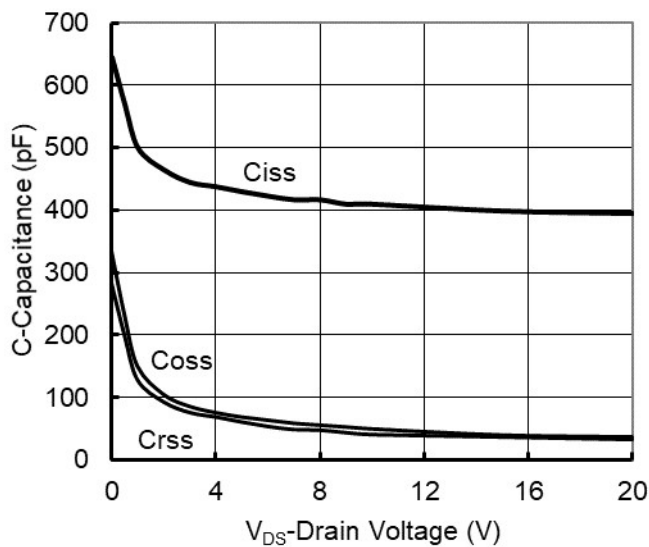


Figure5. Capacitance Characteristics

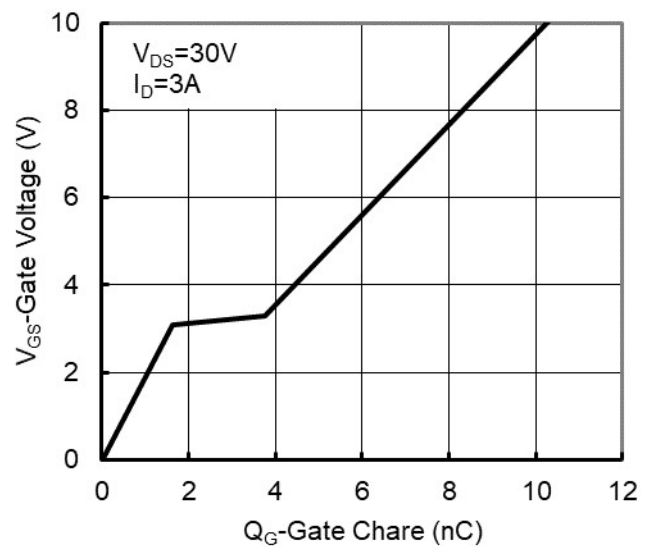


Figure6. Gate Charge

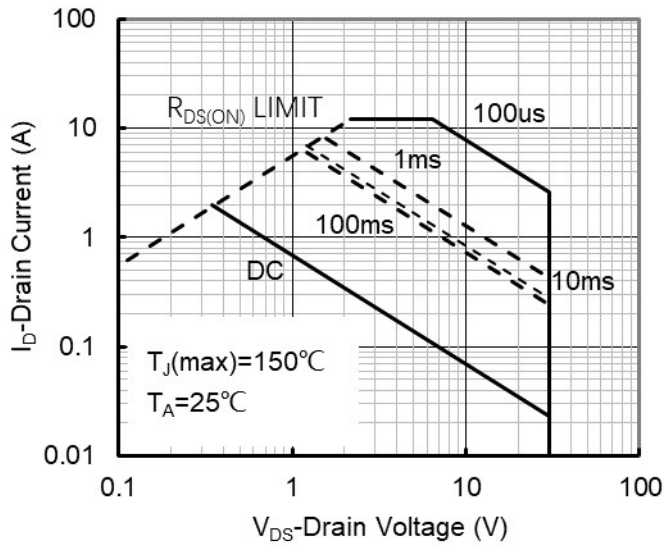


Figure7. Safe Operation Area

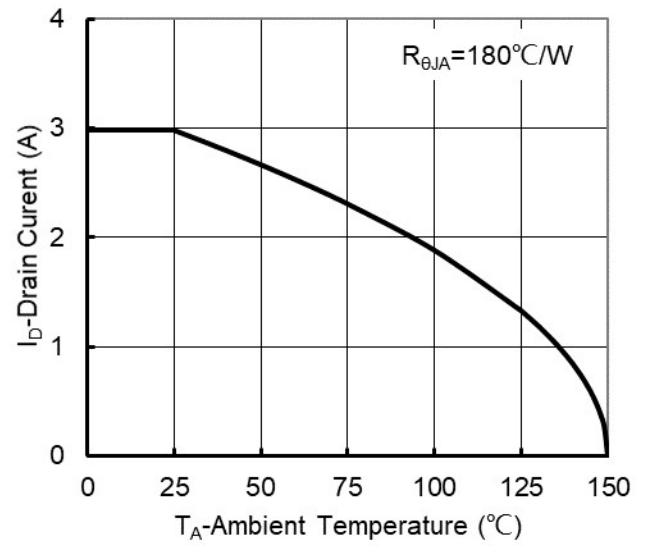


Figure8. Maximum Continuous Drain Current vs Ambient Temperature

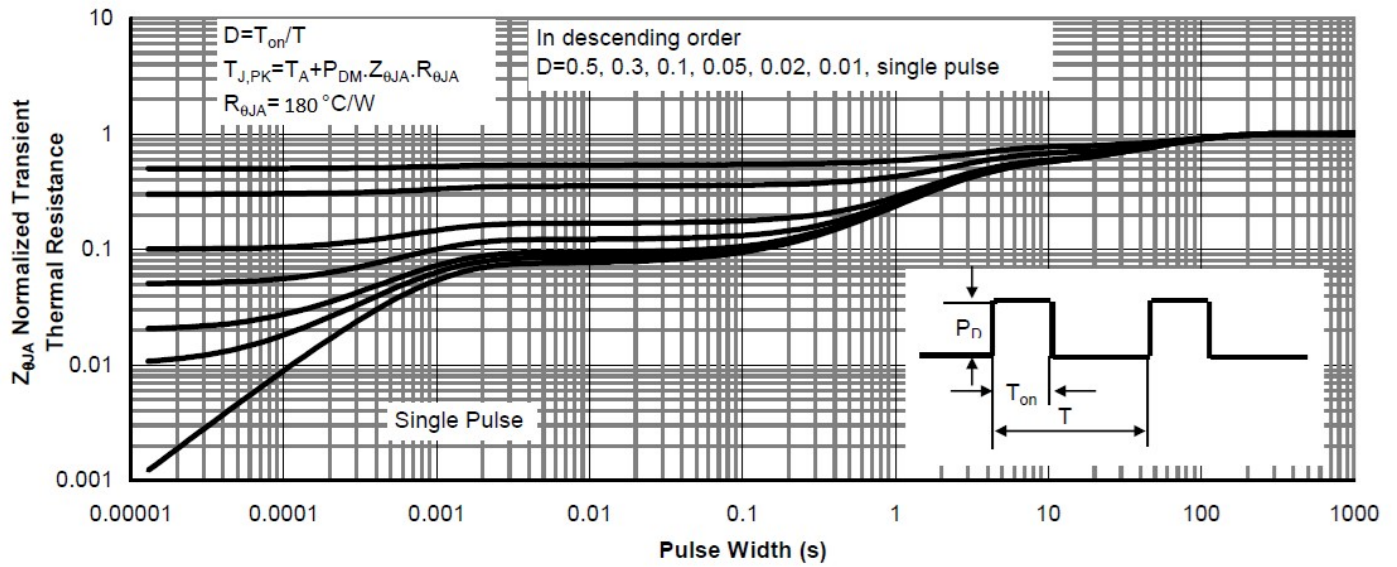
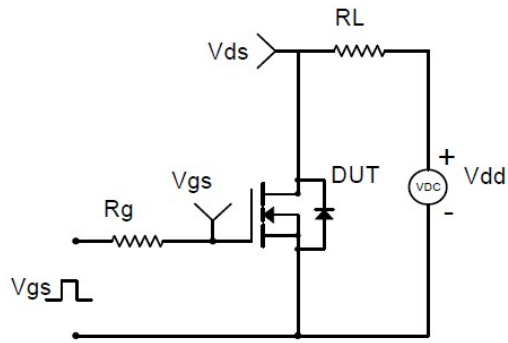
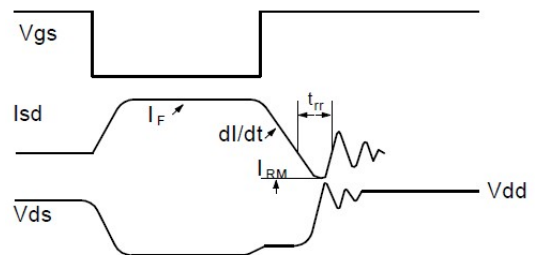
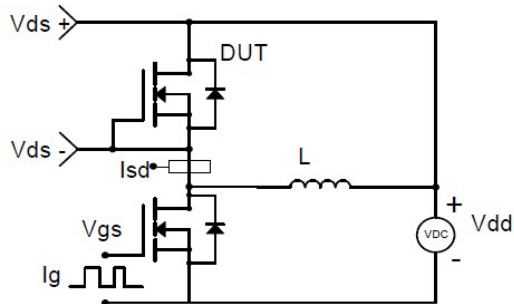


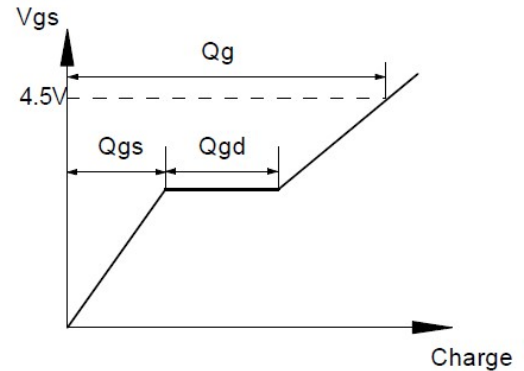
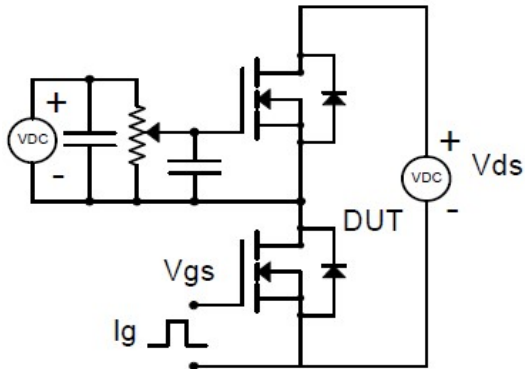
Figure9. Normalized Maximum Transient Thermal Impedance



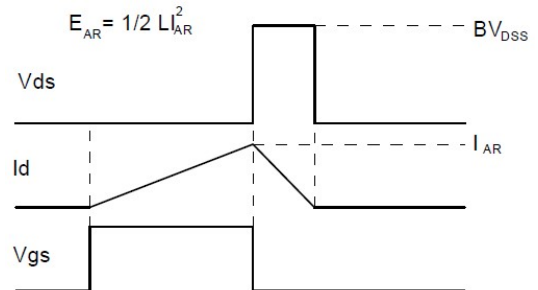
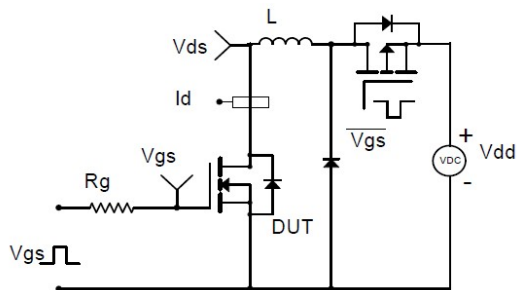
**Resistive Switching Test Circuit & Waveforms**



**Diode Recovery Test Circuit & Waveforms**



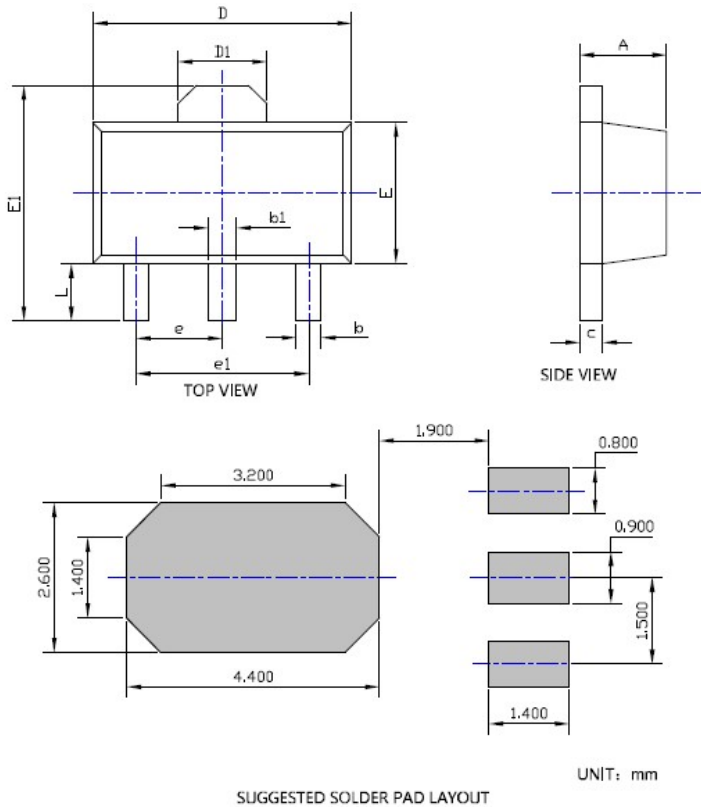
**Gate Charge Test Circuit & Waveform**



**Unclamped Inductive Switching (UIS) Test Circuit & Waveforms**



## ■ SOT-89 Package Information



| SYMBOL | DIMENSIONS |       |       |            |       |       |
|--------|------------|-------|-------|------------|-------|-------|
|        | INCHES     |       |       | Millimeter |       |       |
|        | MIN.       | NOM.  | MAX.  | MIN.       | NOM.  | MAX.  |
| A      | 0,055      | 0,059 | 0,063 | 1,400      | 1,500 | 1,600 |
| b      | 0,014      | ---   | 0,020 | 0,350      | ---   | 0,520 |
| b1     | 0,016      | ---   | 0,023 | 0,400      | ---   | 0,580 |
| c      | 0,014      | ---   | 0,017 | 0,350      | ---   | 0,440 |
| D      | 0,173      | 0,177 | 0,181 | 4,400      | 4,500 | 4,600 |
| D1     | 0,061REF   |       |       | 1,550REF   |       |       |
| E      | 0,093      | 0,096 | 0,100 | 2,350      | 2,450 | 2,550 |
| E1     | 0,155      | ---   | 0,167 | 3,940      | ---   | 4,250 |
| e      | 0,059TYP   |       |       | 1,500TYP   |       |       |
| e1     | 0,118TYP   |       |       | 3,000TYP   |       |       |
| L      | 0,035      | 0,039 | 0,043 | 0,900      | 1,000 | 1,100 |

### NOTE:

- 1.PACKAGE BODY SIZES EXCLUDE MOLD FLASH AND GATE BURRS,
- 2.TOLERANCE 0.1mm UNLESS OTHERWISE SPECIFIED.
- 3.THE PAD LAYOUT IS FOR REFERENCE PURPOSES ONLY.



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