

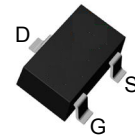
## Features

- 250V/0.3A,  
 $R_{DS(ON)} = 1000\text{m}\Omega(\text{typ.}) @ V_{GS} = 10\text{V}$   
 $R_{DS(ON)} = 1300\text{m}\Omega(\text{typ.}) @ V_{GS} = 4.5\text{V}$
- 100% UIS+Rg tested
- Reliable and Rugged
- Lead Free and Green Devices Available  
(RoHS Compliant)

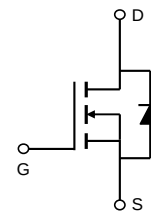
## Applications

- Power Management in TV Inverter.

## Pin Description



Top View of SOT-23



N-Channel MOSFET

## Absolute Maximum Ratings ( $T_A = 25^\circ\text{C}$ Unless Otherwise Noted)

| Symbol                                                                   | Parameter                                            | Rating                           | Unit               |
|--------------------------------------------------------------------------|------------------------------------------------------|----------------------------------|--------------------|
| <b>Common Ratings</b> ( $T_A = 25^\circ\text{C}$ Unless Otherwise Noted) |                                                      |                                  |                    |
| $V_{DS}$                                                                 | Drain-Source Voltage                                 | 250                              | V                  |
| $V_{GS}$                                                                 | Gate-Source Voltage                                  | $\pm 20$                         |                    |
| $T_J$                                                                    | Maximum Junction Temperature                         | 150                              | $^\circ\text{C}$   |
| $T_{STG}$                                                                | Storage Temperature Range                            | -55 to 150                       |                    |
| $I_S$                                                                    | Diode Continuous Forward Current                     | $T_A = 25^\circ\text{C}$<br>0.3  | A                  |
| $I_D$                                                                    | Continuous Drain Current                             | $T_A = 25^\circ\text{C}$<br>0.3  | A                  |
|                                                                          |                                                      | $T_A = 70^\circ\text{C}$<br>0.23 |                    |
| $I_{DM}^a$                                                               | Pulsed Drain Current                                 | $T_A = 25^\circ\text{C}$<br>0.9  | A                  |
| $P_D$                                                                    | Maximum Power Dissipation                            | $T_A = 25^\circ\text{C}$<br>3.5  | W                  |
|                                                                          |                                                      | $T_A = 70^\circ\text{C}$<br>2.2  |                    |
| $R_{\theta JA}^b$                                                        | Thermal Resistance-Junction to Ambient               | $t \leq 10\text{s}$<br>35        | $^\circ\text{C/W}$ |
|                                                                          |                                                      | Steady State<br>75               | $^\circ\text{C/W}$ |
| $I_{AS}^c$                                                               | Avalanche Current, Single pulse ( $L=0.5\text{mH}$ ) | 1                                | A                  |
| $E_{AS}^c$                                                               | Avalanche Energy, Single pulse ( $L=0.5\text{mH}$ )  | 0.25                             | mJ                 |

Note a: Pulse width is limited by maximum junction temperature.

b: Surface Mounted on  $1\text{in}^2$  pad area.

c: UIS tested and pulse width are limited by maximum junction temperature  $150^\circ\text{C}$  (initial temperature  $T_J = 25^\circ\text{C}$ ).

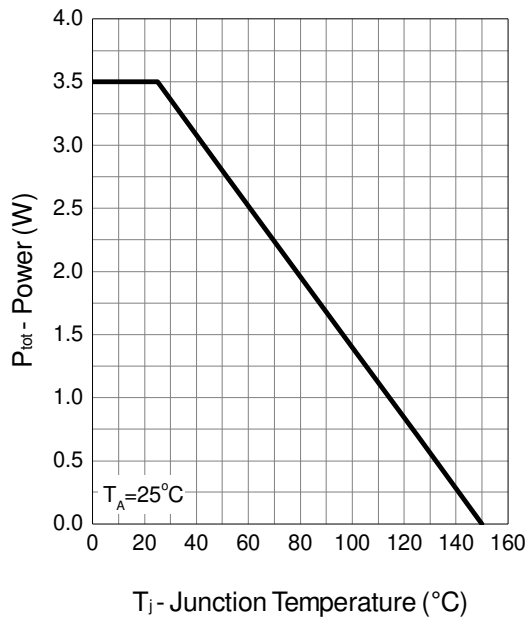
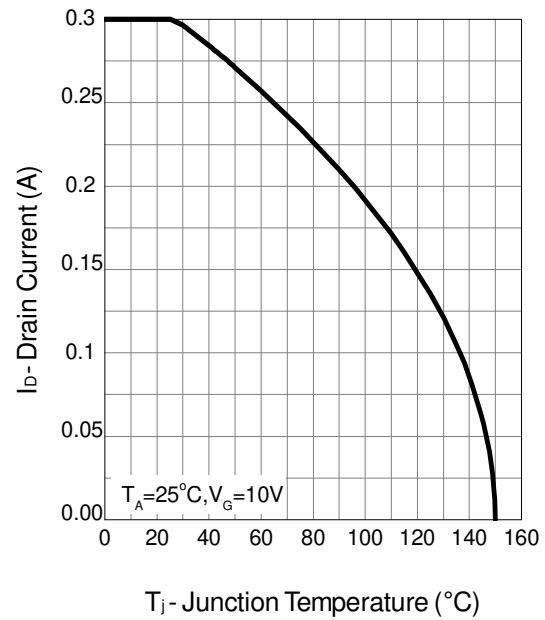
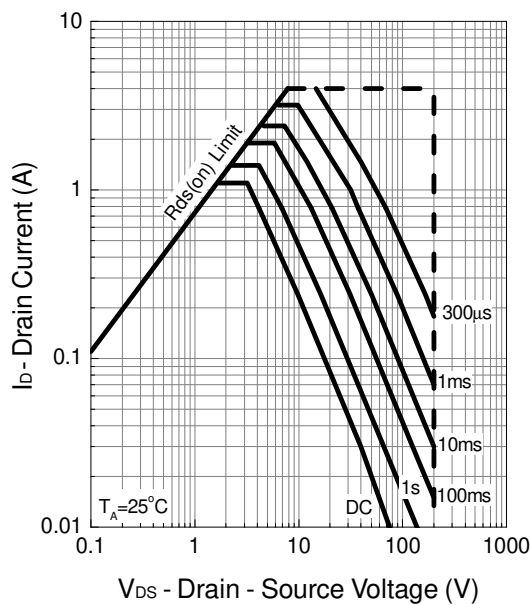
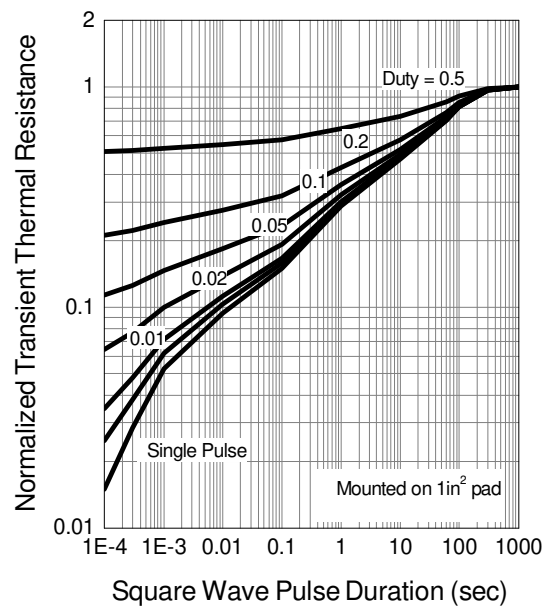
**Electrical Characteristics** ( $T_A = 25^\circ\text{C}$  Unless Otherwise Noted)

| Symbol                                   | Parameter                        | Test Conditions                                                                                                 | Min. | Typ.         | Max.         | Unit     |
|------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------------------------------|------|--------------|--------------|----------|
| Static Characteristics                   |                                  |                                                                                                                 |      |              |              |          |
| BV <sub>DSS</sub>                        | Drain-Source Breakdown Voltage   | V <sub>GS</sub> =0V, I <sub>DS</sub> =250μA                                                                     | 250  | -            | -            | V        |
| I <sub>DSS</sub>                         | Zero Gate Voltage Drain Current  | V <sub>DS</sub> =200V, V <sub>GS</sub> =0V<br>T <sub>J</sub> =85°C                                              | -    | -            | 1<br>30      | μA       |
| V <sub>GS(th)</sub>                      | Gate Threshold Voltage           | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =250μA                                                       | 0.8  | 1.4          | 1.8          | V        |
| I <sub>GSS</sub>                         | Gate Leakage Current             | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                                      | -    | -            | ±100         | nA       |
| R <sub>DS(ON)</sub> <sup>d</sup>         | Drain-Source On-state Resistance | V <sub>GS</sub> =10V, I <sub>DS</sub> =0.5A<br>V <sub>GS</sub> =4.5V, I <sub>DS</sub> =0.5A                     | -    | 1000<br>1300 | 1240<br>1600 | mΩ<br>mΩ |
| Diode Characteristics                    |                                  |                                                                                                                 |      |              |              |          |
| V <sub>SD</sub> <sup>d</sup>             | Diode Forward Voltage            | I <sub>SD</sub> =1A, V <sub>GS</sub> =0V                                                                        | -    | 0.8          | 1.3          | V        |
| t <sub>rr</sub>                          | Reverse Recovery Time            | I <sub>SD</sub> =1A, dI <sub>SD</sub> /dt=100A/μs                                                               | -    | 51           | -            | ns       |
| Q <sub>rr</sub>                          | Reverse Recovery Charge          |                                                                                                                 | -    | 54           | -            | nC       |
| Dynamic Characteristics <sup>e</sup>     |                                  |                                                                                                                 |      |              |              |          |
| R <sub>G</sub>                           | Gate Resistance                  | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, f=1MHz                                                                | -    | 3.7          | -            | Ω        |
| C <sub>iSS</sub>                         | Input Capacitance                | V <sub>GS</sub> =0V,<br>V <sub>DS</sub> =30V,<br>Frequency=1.0MHz                                               | -    | 57           | 85           | pF       |
| C <sub>oSS</sub>                         | Output Capacitance               |                                                                                                                 | -    | 7            | -            |          |
| C <sub>rSS</sub>                         | Reverse Transfer Capacitance     |                                                                                                                 | -    | 3            | -            |          |
| t <sub>d(ON)</sub>                       | Turn-on Delay Time               | V <sub>DD</sub> =30V, R <sub>L</sub> =30Ω,<br>I <sub>DS</sub> =1A, V <sub>GEN</sub> =10V,<br>R <sub>G</sub> =6Ω | -    | 8            | 15           | ns       |
| t <sub>r</sub>                           | Turn-on Rise Time                |                                                                                                                 | -    | 6            | 11           |          |
| t <sub>d(OFF)</sub>                      | Turn-off Delay Time              |                                                                                                                 | -    | 13           | 24           |          |
| t <sub>f</sub>                           | Turn-off Fall Time               |                                                                                                                 | -    | 8            | 15           |          |
| Gate Charge Characteristics <sup>e</sup> |                                  |                                                                                                                 |      |              |              |          |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =100V, V <sub>GS</sub> =4.5V,<br>I <sub>DS</sub> =1A                                            | -    | 2.5          | -            | nC       |
| Q <sub>g</sub>                           | Total Gate Charge                | V <sub>DS</sub> =100V, V <sub>GS</sub> =10V,<br>I <sub>DS</sub> =1A                                             | -    | 5.3          | 7.5          |          |
| Q <sub>gs</sub>                          | Gate-Source Charge               |                                                                                                                 | -    | 1.1          | -            |          |
| Q <sub>gd</sub>                          | Gate-Drain Charge                |                                                                                                                 | -    | 0.7          | -            |          |

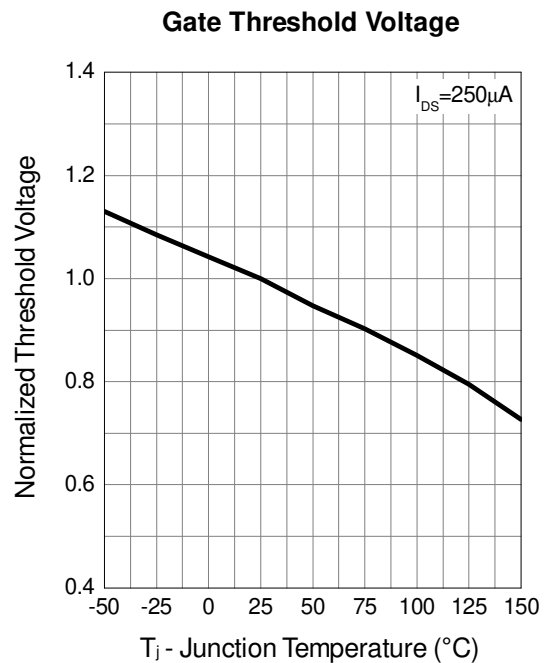
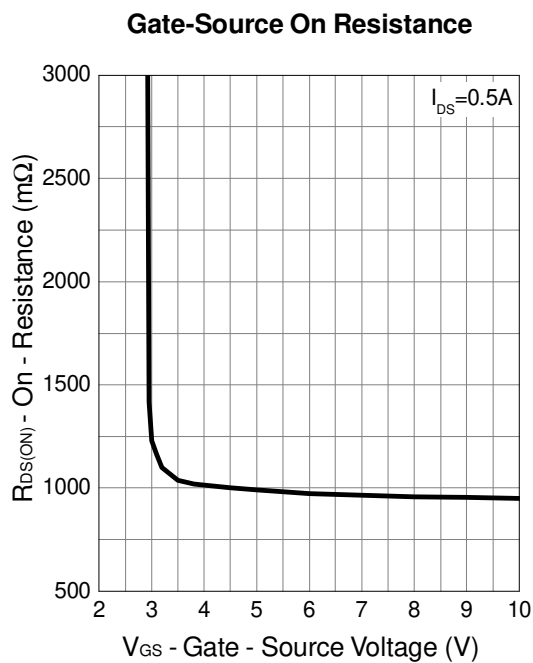
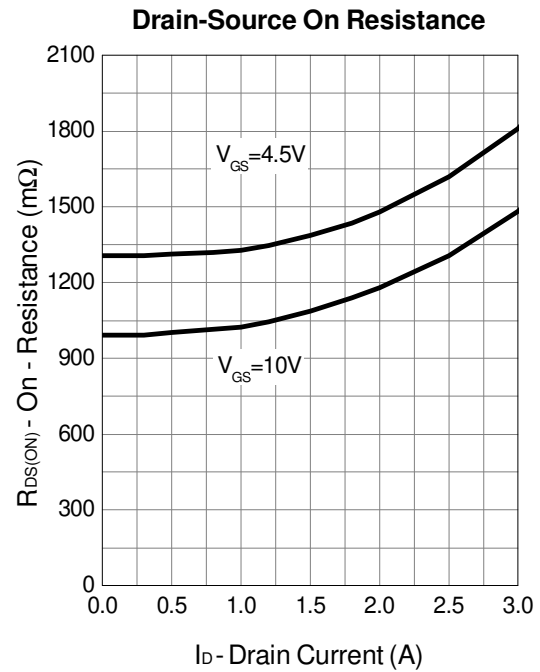
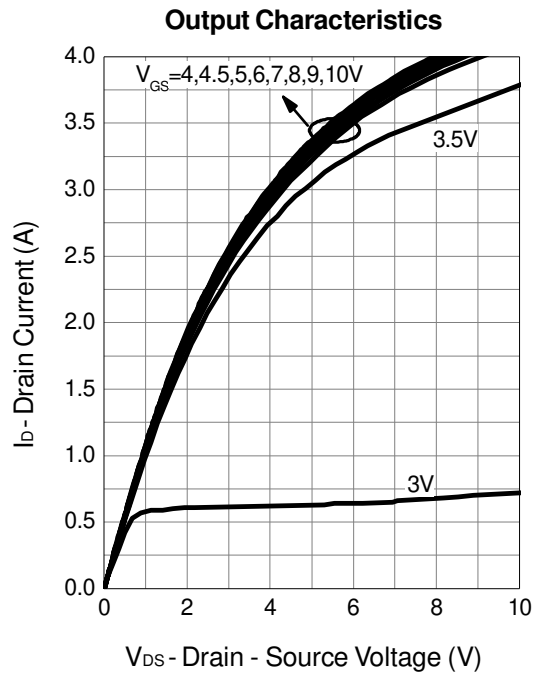
Note d: Pulse test; pulse width  $\leq 300 \mu s$ , duty cycle  $\leq 2\%$ .

e: Guaranteed by design, not subject to production testing.

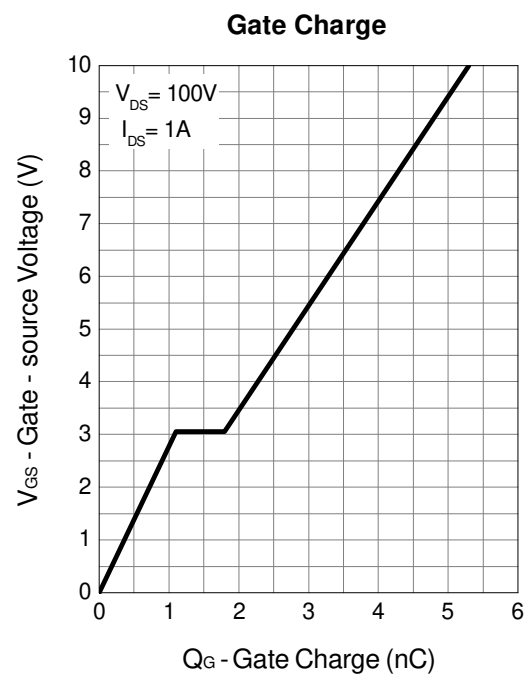
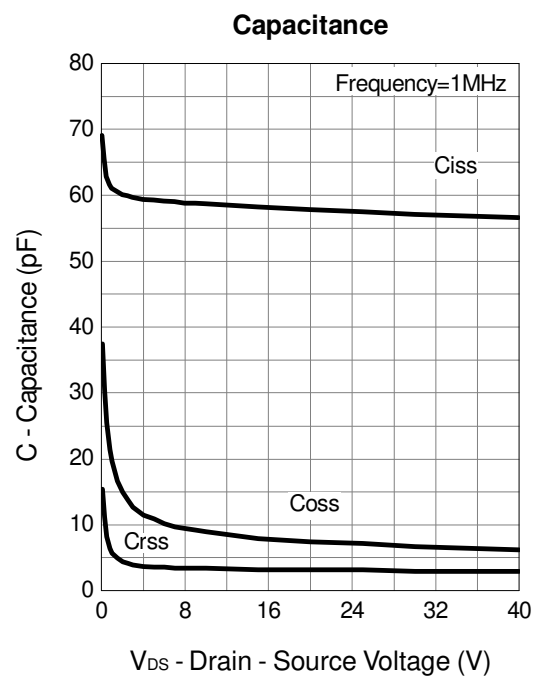
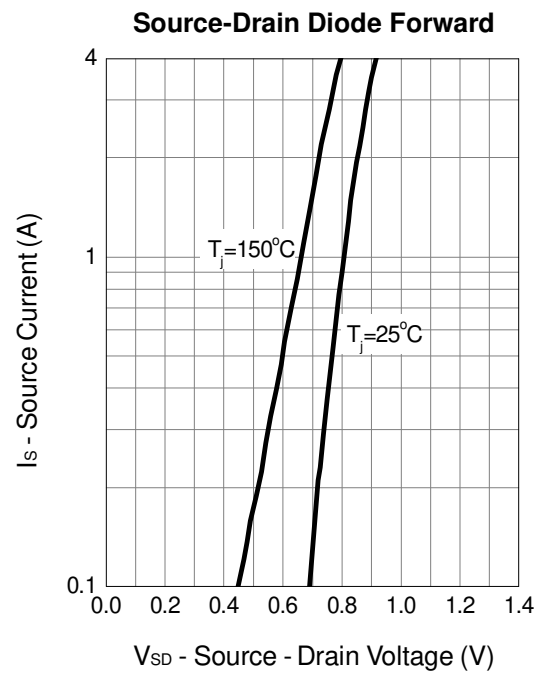
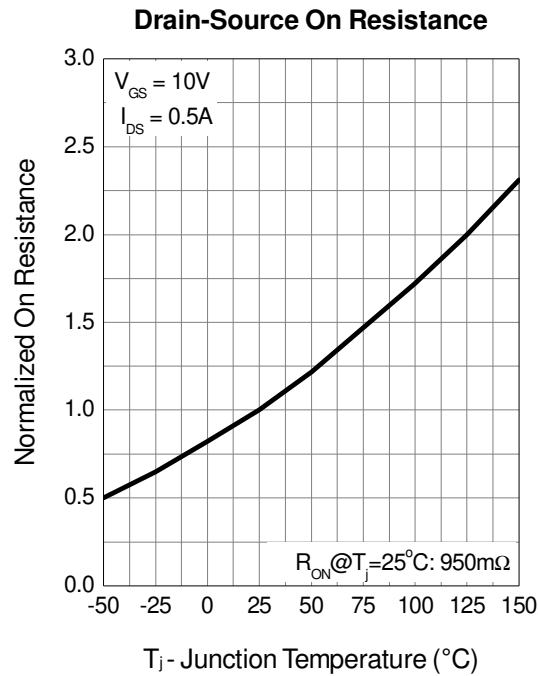
## Typical Operating Characteristics

**Power Dissipation**

**Drain Current**

**Safe Operation Area**

**Thermal Transient Impedance**


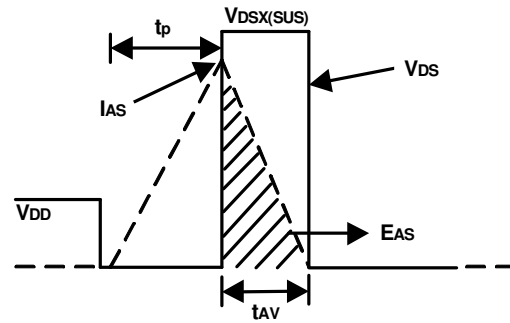
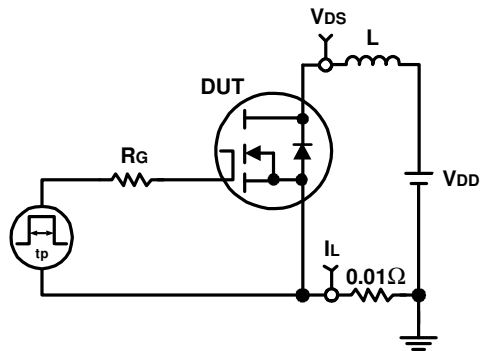
## Typical Operating Characteristics (Cont.)



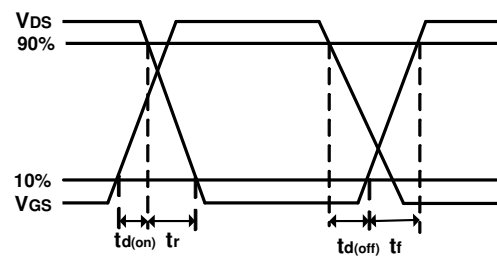
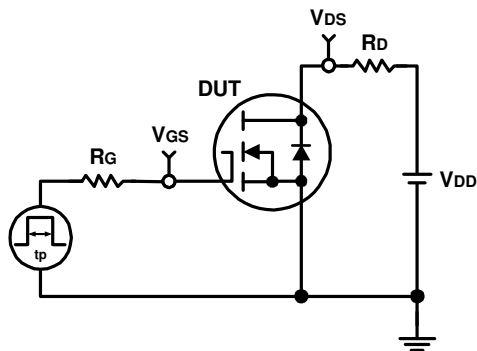
## Typical Operating Characteristics (Cont.)



## Avalanche Test Circuit and Waveforms

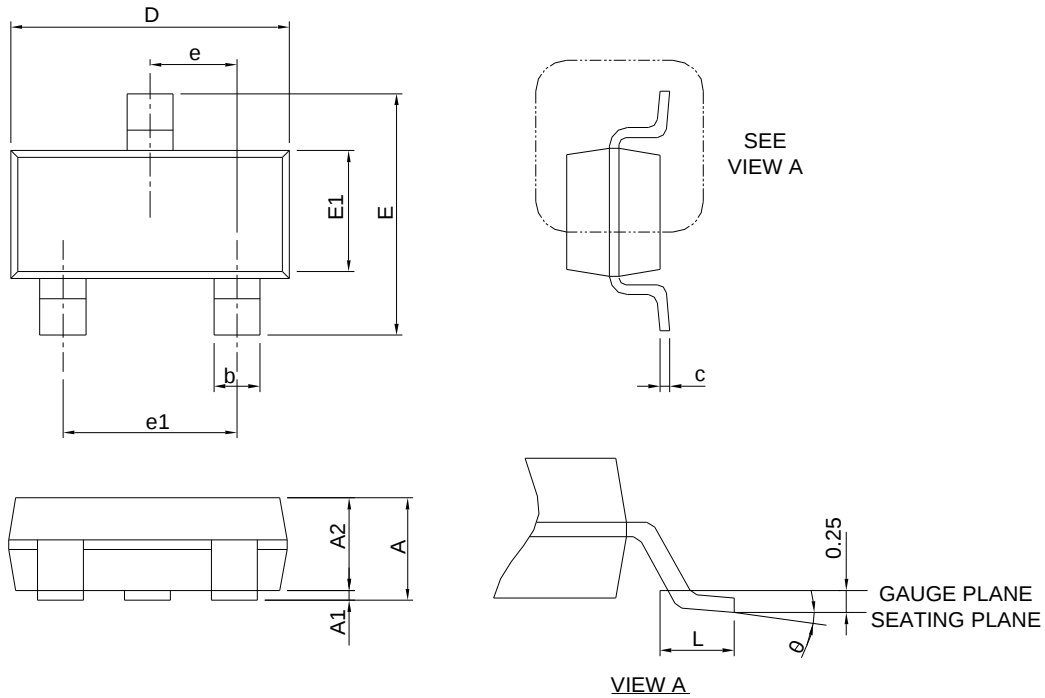


## Switching Time Test Circuit and Waveforms



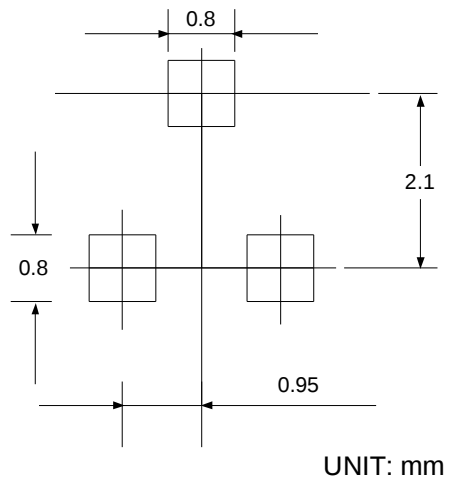
## Package Information

### SOT-23



| SYMBOL | SOT-23      |      |           |       |
|--------|-------------|------|-----------|-------|
|        | MILLIMETERS |      | INCHES    |       |
|        | MIN.        | MAX. | MIN.      | MAX.  |
| A      | -           | 1.20 | -         | 0.047 |
| A1     | 0.00        | 0.10 | 0.000     | 0.004 |
| A2     | 0.90        | 1.10 | 0.035     | 0.043 |
| b      | 0.30        | 0.50 | 0.012     | 0.020 |
| c      | 0.08        | 0.22 | 0.003     | 0.009 |
| D      | 2.70        | 3.10 | 0.106     | 0.122 |
| E      | 2.20        | 2.60 | 0.086     | 0.102 |
| E1     | 1.20        | 1.40 | 0.047     | 0.055 |
| e      | 0.95 BSC    |      | 0.037 BSC |       |
| e1     | 1.90 BSC    |      | 0.075 BSC |       |
| L      | 0.30        | 0.60 | 0.012     | 0.024 |
| θ      | 0 °         | 8 °  | 0 °       | 8 °   |

### RECOMMENDED LAND PATTERN



Note : Dimension D and E1 do not include mold flash, protrusions or gate burrs. Mold flash, protrusion or gate burrs shall not exceed 10 mil per side.