



## DESCRIPTION

AM4403 is available in a SOP8 package.

## FEATURES

- -20V/-12.2A,  
 $R_{DS(ON)} = 14m\Omega(\text{max.}) @ V_{GS} = -4.5V$   
 $R_{DS(ON)} = 20m\Omega(\text{max.}) @ V_{GS} = -2.5V$   
 $R_{DS(ON)} = 32m\Omega(\text{max.}) @ V_{GS} = -1.8V$
- Reliable and Rugged
- Available in a SOP8 package.

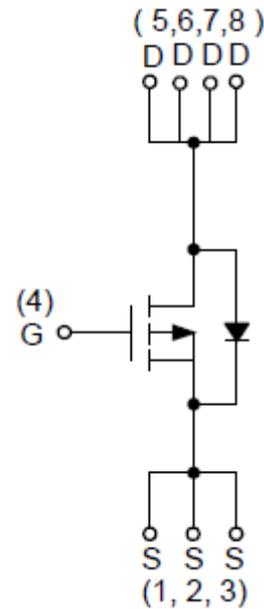
## ORDERING INFORMATION

| Package Type  | Part Number                               |            |
|---|---|------------|
| SOP8  | M8  | AM4403M8R  |
|   |   | AM4403M8VR |
| Note  | V: Halogen free Package<br>R: Tape & Reel |            |
| AiT provides all RoHS products<br>Suffix " V " means Halogen free Package |   |            |

## APPLICATION

- Power Management in Notebook Computer, Portable Equipment and Battery Powered Systems.

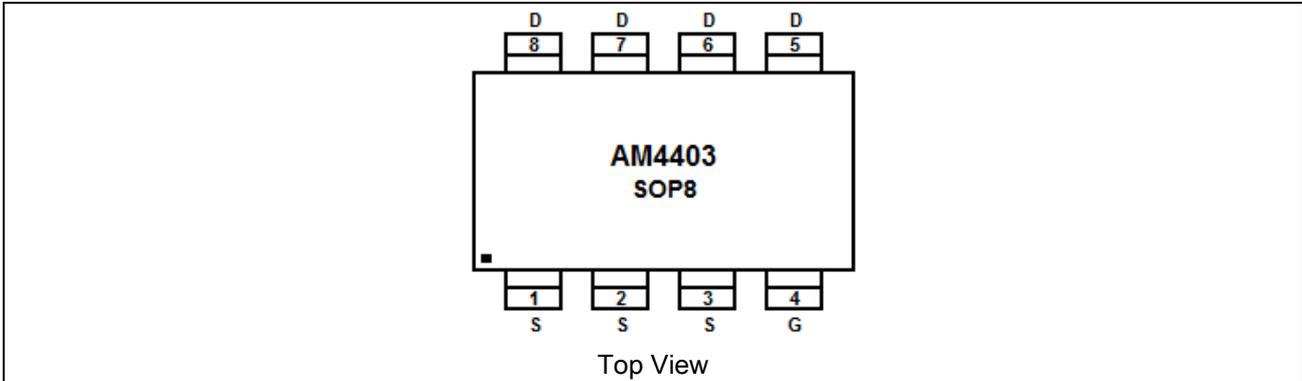
## PIN DESCRIPTION



P-Channel MOSFET



## PIN DESCRIPTION



| Pin # | Symbol | Function |
|-------|--------|----------|
| 1     | S      | Source   |
| 2     | S      | Source   |
| 3     | S      | Source   |
| 4     | G      | Gate     |
| 5     | D      | Drain    |
| 6     | D      | Drain    |
| 7     | D      | Drain    |
| 8     | D      | Drain    |



## ABSOLUTE MAXIMUM RATINGS

T<sub>A</sub> = 25°C, unless otherwise noted

|   |                      |             |
|---|----------------------|-------------|
| V <sub>DSS</sub> , Drain-Source Voltage   |                      | -20V        |
| V <sub>GSS</sub> , Gate-Source Voltage  |                      | ±12V        |
| I <sub>D</sub> <sup>NOTE1</sup> , Continuous Drain Current(V <sub>GS</sub> =-4.5V)    | T <sub>A</sub> =25°C | -12.2A      |
|   | T <sub>A</sub> =70°C | -9.8A       |
| I <sub>DM</sub> <sup>NOTE1</sup> , 300µs Pulsed Drain Current(V <sub>GS</sub> =-4.5V) |                      | -48.8A      |
| I <sub>S</sub> <sup>NOTE1</sup> , Diode Continuous Forward Current                    |                      | -3A         |
| I <sub>AS</sub> <sup>NOTE2</sup> , Avalanche Current, Single pulse (L=0.1mH)          |                      | -28A        |
| E <sub>AS</sub> <sup>NOTE2</sup> , Avalanche Energy, Single pulse (L=0.1mH)           |                      | 39mJ        |
| T <sub>J</sub> , Maximum Junction Temperature   |                      | 150°C       |
| T <sub>STG</sub> , Storage Temperature Range  |                      | -55°C~150°C |
| P <sub>D</sub> <sup>NOTE1</sup> , Maximum Power Dissipation                           | T <sub>A</sub> =25°C | 3.1W        |
|   | T <sub>A</sub> =70°C | 2W          |
| R <sub>θJA</sub> <sup>NOTE1,3</sup> , Thermal Resistance-Junction to Ambient          | t ≤ 10s              | 40°C/W      |
|   | Steady state         | 75°C/W      |
| R <sub>θJL</sub> , Thermal Resistance-Junction to Lead                                | Steady state         | 24°C/W      |

Stress beyond above listed "Absolute Maximum Ratings" may lead permanent damage to the device. These are stress ratings only and operations of the device at these or any other conditions beyond those indicated in the operational sections of the specifications are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

NOTE1: Surface Mounted on 1in<sup>2</sup> pad area, t ≤ 10sec.

NOTE2: UIS tested and pulse width limited by maximum junction temperature 150°C (initial temperature T<sub>J</sub>=25°C).

NOTE3: Maximum under Steady State conditions is 75 °C/W.



## ELECTRICAL CHARACTERISTICS

T<sub>A</sub> = 25°C, unless otherwise noted

| Parameter                                | Symbol                       | Conditions  | Min  | Typ. | Max  | Units |
|--|------------------------------|---|------|------|------|-------|
| <b>Static Characteristics</b>            |                              |   |      |      |      |       |
| Drain-Source Breakdown Voltage           | BV <sub>DSS</sub>            | V <sub>GS</sub> =0V, I <sub>DS</sub> =-250μA  | -20  | -    | -    | V     |
| Zero Gate Voltage Drain Current          | I <sub>DSS</sub>             | V <sub>DS</sub> =-16V, V <sub>GS</sub> =0V  | -    | -    | -1   | μA    |
|  |                              | T <sub>J</sub> =85°C  | -    | -    | -30  |       |
| Gate Threshold Voltage                   | V <sub>GS(th)</sub>          | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>DS</sub> =-250μA  | -0.4 | -    | -1   | V     |
| Gate Leakage Current                     | I <sub>GSS</sub>             | V <sub>GS</sub> =±12V, V <sub>DS</sub> =0V  | -    | -    | ±100 | nA    |
| Drain-Source On-state Resistance         | R <sub>DS(ON)</sub><br>NOTE4 | V <sub>GS</sub> =-4.5V, I <sub>DS</sub> =-12.2A   | -    | 11   | 14   | mΩ    |
|  |                              | V <sub>GS</sub> =-2.5V, I <sub>DS</sub> =-7.7A  | -    | 15   | 20   |       |
|  |                              | V <sub>GS</sub> =-1.8V, I <sub>DS</sub> =-3A  | -    | 22   | 32   |       |
| <b>Diode Characteristics</b>             |                              |   |      |      |      |       |
| Diode Forward Voltage                    | V <sub>SD</sub> NOTE4        | I <sub>SD</sub> =-1A, V <sub>GS</sub> =0V   | -    | -0.7 | -1   | V     |
| Reverse Recovery Time                    | t <sub>rr</sub> NOTE5        | I <sub>SD</sub> =-12.2A,<br>di <sub>SD</sub> /dt=100A/μs  | -    | 18   | -    | ns    |
| Reverse Recovery Charge                  | Q <sub>rr</sub> NOTE5        |   | -    | 9    | -    | nC    |
| <b>Dynamic Characteristics</b> NOTE5     |                              |   |      |      |      |       |
| Gate Resistance                          | R <sub>G</sub>               | V <sub>GS</sub> =0V, V <sub>DS</sub> =0V, F=1MHz  | -    | 3    | -    | Ω     |
| Input Capacitance                        | C <sub>ISS</sub>             | V <sub>GS</sub> =0V,<br>V <sub>DS</sub> =-10V,<br>Frequency=1.0MHz  | -    | 1790 | -    | pF    |
| Output Capacitance                       | C <sub>OSS</sub>             |   | -    | 388  | -    |       |
| Reverse Transfer Capacitance             | C <sub>RSS</sub>             |   | -    | 310  | -    |       |
| Turn-on Delay Time                       | t <sub>D(ON)</sub>           | V <sub>DD</sub> =-10V, R <sub>L</sub> =10Ω<br>I <sub>DS</sub> =-1A, V <sub>GEN</sub> =-10V,<br>R <sub>G</sub> =6Ω | -    | 10   | -    | ns    |
| Turn-on Rise Time                        | t <sub>R</sub>               |   | -    | 14   | -    |       |
| Turn-off Delay Time                      | t <sub>D(OFF)</sub>          |   | -    | 80   | -    |       |
| Turn-off Fall Time                       | t <sub>F</sub>               |   | -    | 65   | -    |       |
| <b>Gate Charge Characteristics</b> NOTE3 |                              |   |      |      |      |       |
| Total Gate Charge                        | Q <sub>G</sub>               | V <sub>DS</sub> =-10V, V <sub>GS</sub> =-4.5V,<br>I <sub>DS</sub> =-12.2A   | -    | 22   | -    | nC    |
| Gate-Source Charge                       | Q <sub>GS</sub>              |   | -    | 1.2  | -    |       |
| Gate-Drain Charge                        | Q <sub>GD</sub>              |   | -    | 10.5 | -    |       |

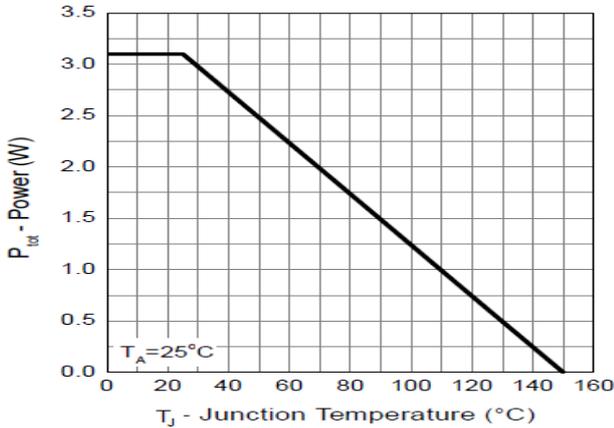
NOTE4: Pulse test; pulse width ≤ 300μs, duty cycle ≤ 2%.

NOTE5: Guaranteed by design, not subject to production testing.

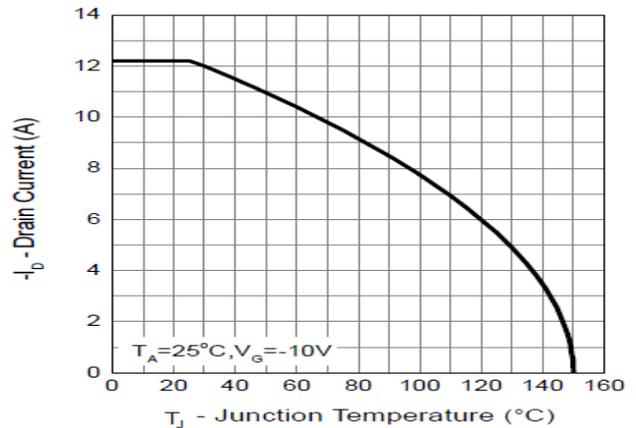


## TYPICAL CHARACTERISTICS

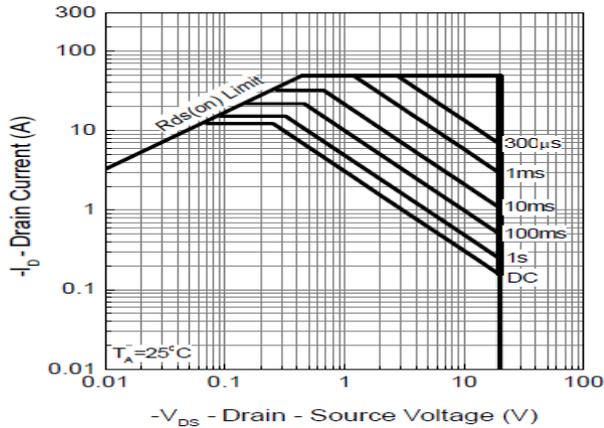
### 1. Power Dissipation



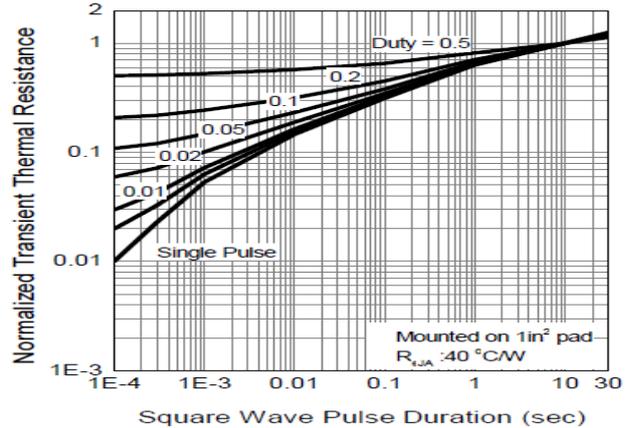
### 2. Drain Current



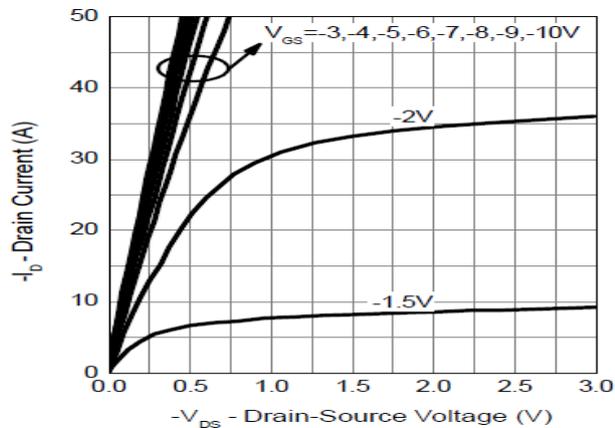
### 3. Safe Operation Area



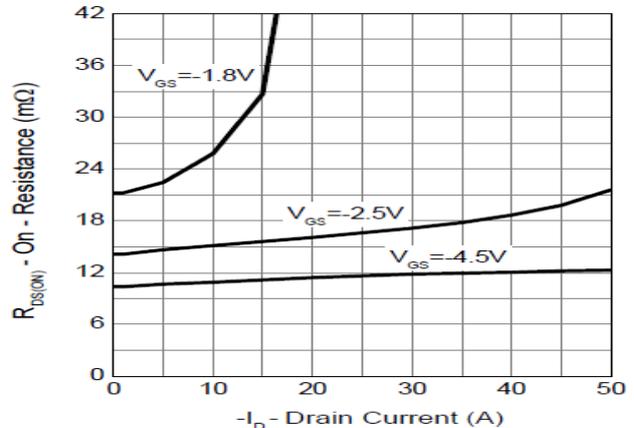
### 4. Thermal Transient Impedance



### 5. Output Characteristics

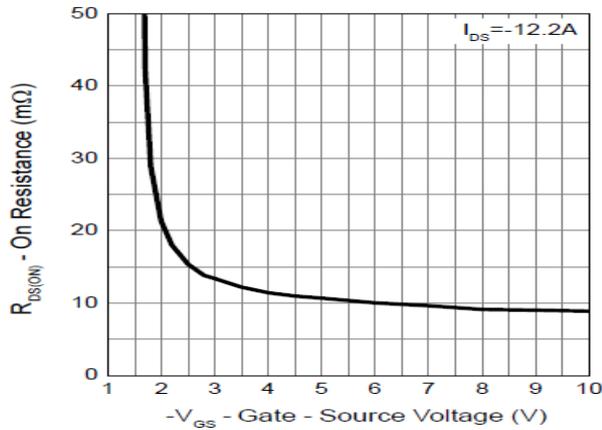


### 6. Drain-Source On Resistance

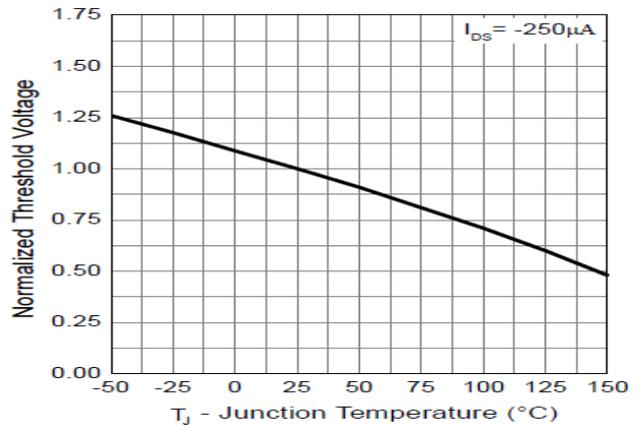




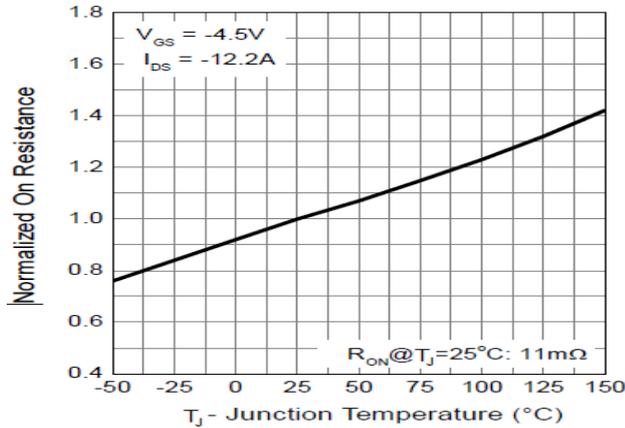
7. Gate-Source On Resistance



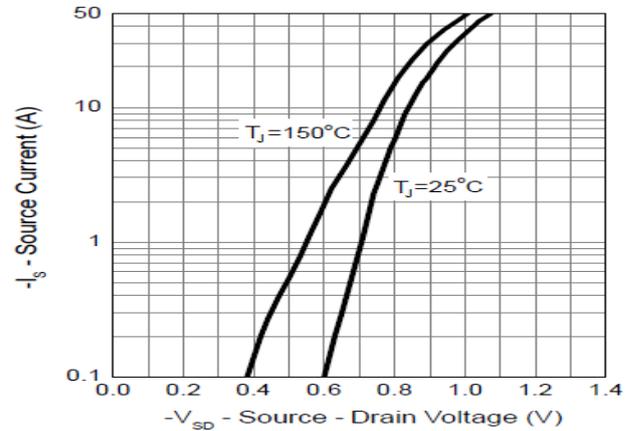
8. Gate Threshold Voltage



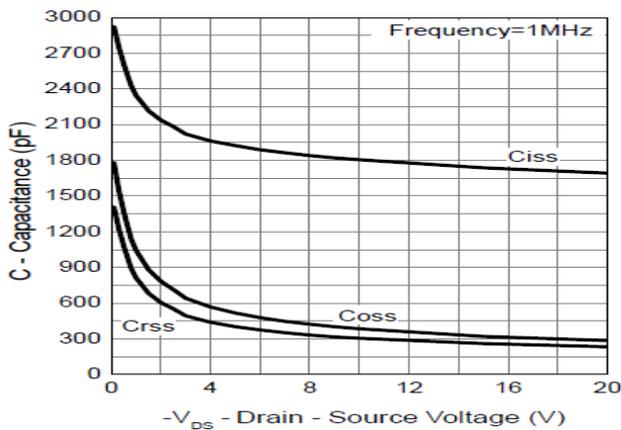
9. Drain-Source On Resistance



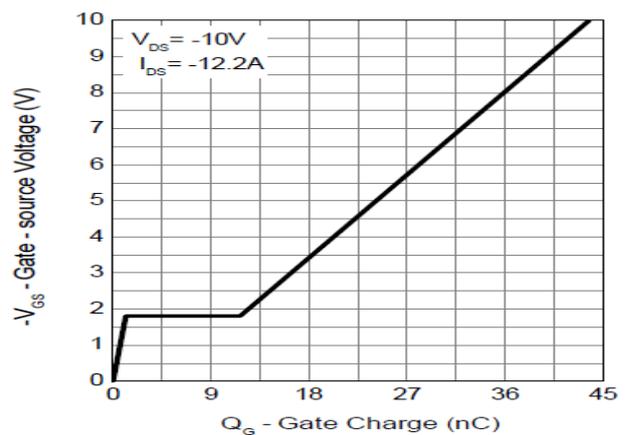
10. Source-Drain Diode Forward



11. Capacitance



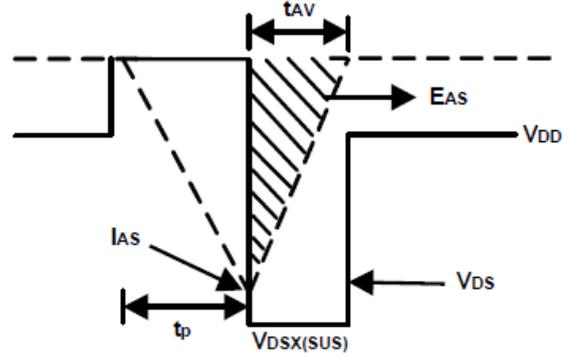
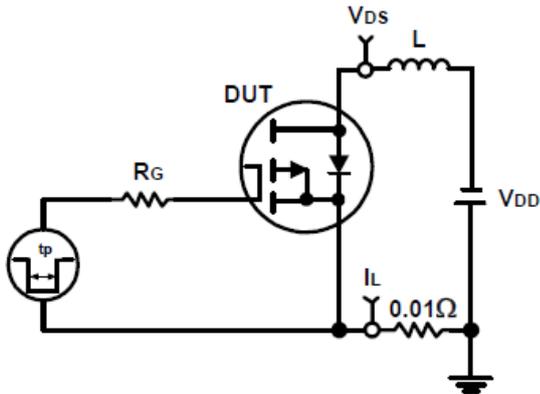
12. Gate Charge



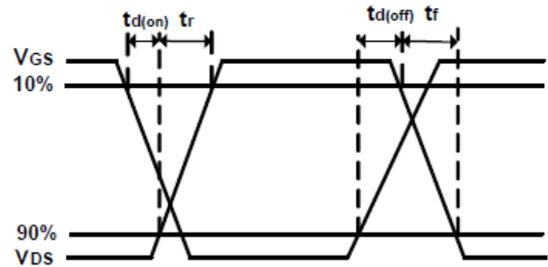
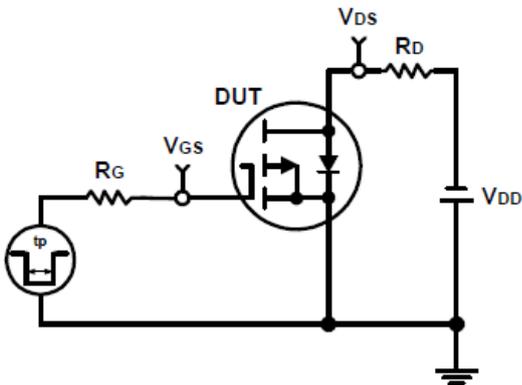


## DETAILED INFORMATION

### Avalanche Test Circuit and Waveforms



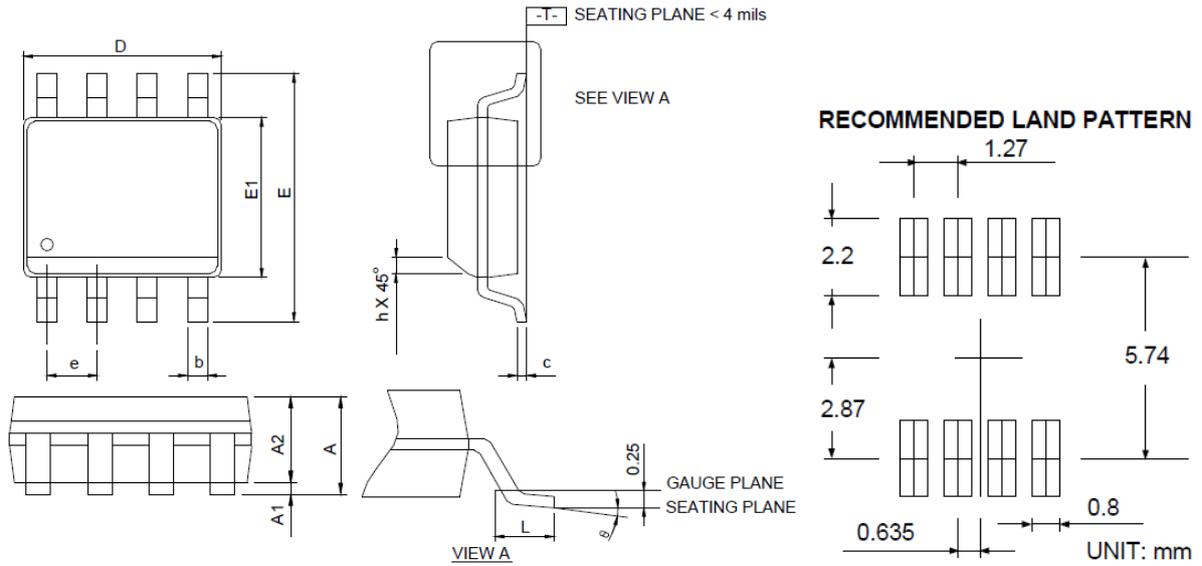
### Switching Time Test Circuit and Waveforms





**PACKAGE INFORMATION**

Dimension in SOP8 (Unit: mm)



| Symbol   | Min        | Max   |
|----------|------------|-------|
| A        | -          | 1.750 |
| A1       | 0.100      | 0.250 |
| A2       | 1.250      | -     |
| b        | 0.310      | 0.510 |
| c        | 0.170      | 0.250 |
| D        | 4.800      | 5.000 |
| E        | 5.800      | 6.200 |
| E1       | 3.800      | 4.000 |
| e        | 1.270(BSC) |       |
| h        | 0.250      | 0.500 |
| L        | 0.400      | 1.270 |
| $\theta$ | 0°         | 8°    |



## IMPORTANT NOTICE

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