



# SPN4972

## N-Channel Enhancement Mode MOSFET

### DESCRIPTION

The SPN4972 is the Dual N-Channel logic enhancement mode power field effect transistors are produced using high cell density , DMOS trench technology.

This high density process is especially tailored to minimize on-state resistance.

These devices are particularly suited for low voltage application , notebook computer power management and other battery powered circuits where high-side switching .

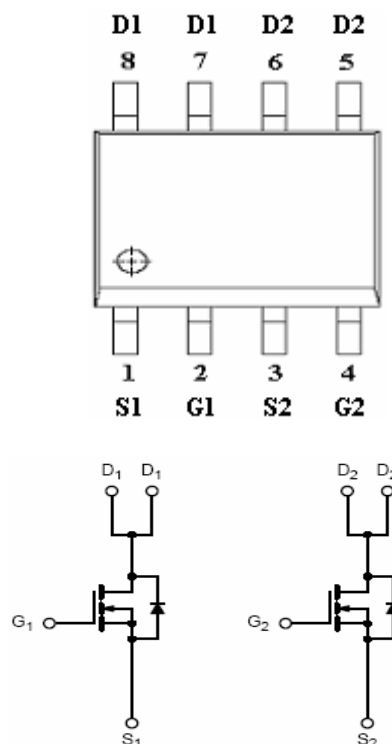
### FEATURES

- ◆ 30V/8.5A,  $R_{DS(ON)} = 14m\Omega @ V_{GS} = 10V$
- ◆ 30V/7.8A,  $R_{DS(ON)} = 18m\Omega @ V_{GS} = 4.5V$
- ◆ Super high density cell design for extremely low  $R_{DS(ON)}$
- ◆ Exceptional on-resistance and maximum DC current capability
- ◆ SOP – 8P package design

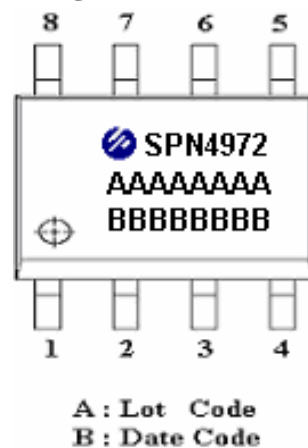
### APPLICATIONS

- Power Management in Note book
- Portable Equipment
- Battery Powered System
- DC/DC Converter
- Load Switch
- DSC
- LCD Display inverter

### PIN CONFIGURATION(SOP – 8P)



### PART MARKING





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### PIN DESCRIPTION

| Pin | Symbol | Description |
|-----|--------|-------------|
| 1   | S1     | Source 1    |
| 2   | G1     | Gate 1      |
| 3   | S2     | Source 2    |
| 4   | G2     | Gate 2      |
| 5   | D2     | Drain 2     |
| 6   | D2     | Drain 2     |
| 7   | D1     | Drain 1     |
| 8   | D1     | Drain 1     |

### ORDERING INFORMATION

| Part Number | Package | Part Marking |
|-------------|---------|--------------|
| SPN4972S8RG | SOP- 8P | SPN4972      |
| SPN4972S8TG | SOP- 8P | SPN4972      |

※ SPN4972S8RG : 13" Tape Reel ; Pb – Free

※ SPN4972S8TG : Tube ; Pb – Free

※

### ABSOLUTE MAXIMUM RATINGS

(TA=25°C Unless otherwise noted)

| Parameter                                       | Symbol           | Typical | Unit |
|-------------------------------------------------|------------------|---------|------|
| Drain-Source Voltage                            | V <sub>DSS</sub> | 30      | V    |
| Gate –Source Voltage                            | V <sub>GSS</sub> | ±20     | V    |
| Continuous Drain Current(T <sub>J</sub> =150°C) | I <sub>D</sub>   | 8.5     | A    |
|                                                 |                  | 7.5     |      |
| Pulsed Drain Current                            | I <sub>DM</sub>  | 20      | A    |
| Continuous Source Current(Diode Conduction)     | I <sub>S</sub>   | 2.3     | A    |
| Power Dissipation                               | P <sub>D</sub>   | 2.5     | W    |
|                                                 |                  | 1.6     |      |
| Operating Junction Temperature                  | T <sub>J</sub>   | -55/150 | °C   |
| Storage Temperature Range                       | T <sub>STG</sub> | -55/150 | °C   |
| Thermal Resistance-Junction to Ambient          | R <sub>θJA</sub> | 80      | °C/W |



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### ELECTRICAL CHARACTERISTICS

(T<sub>A</sub>=25°C Unless otherwise noted)

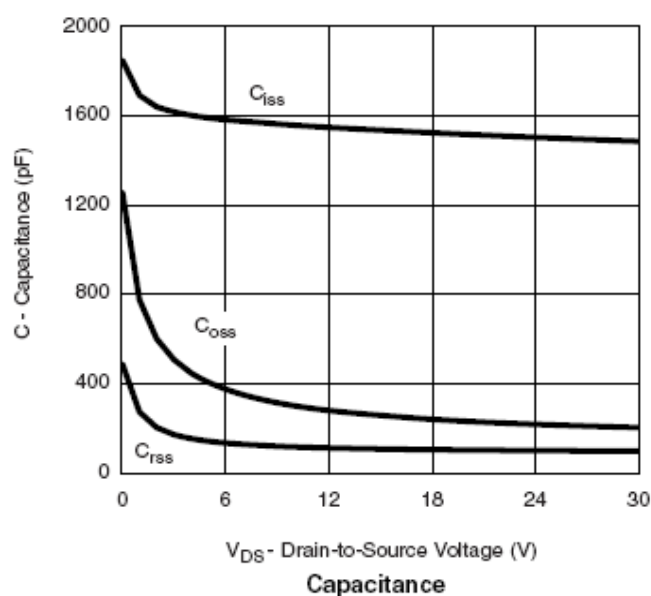
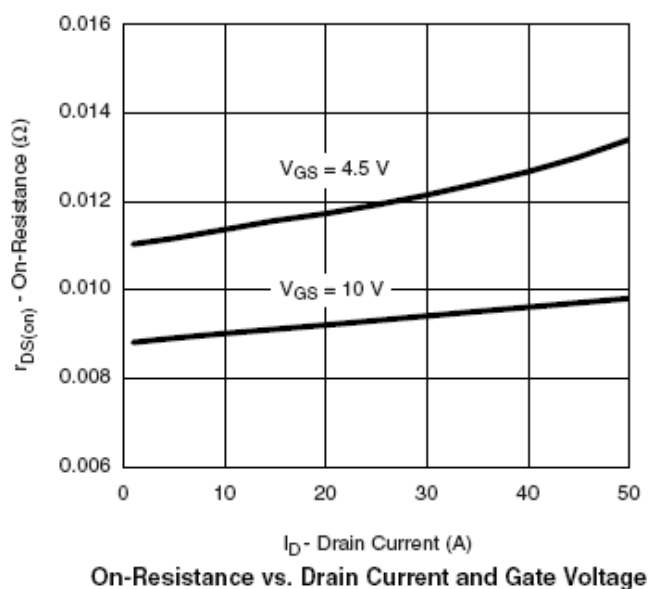
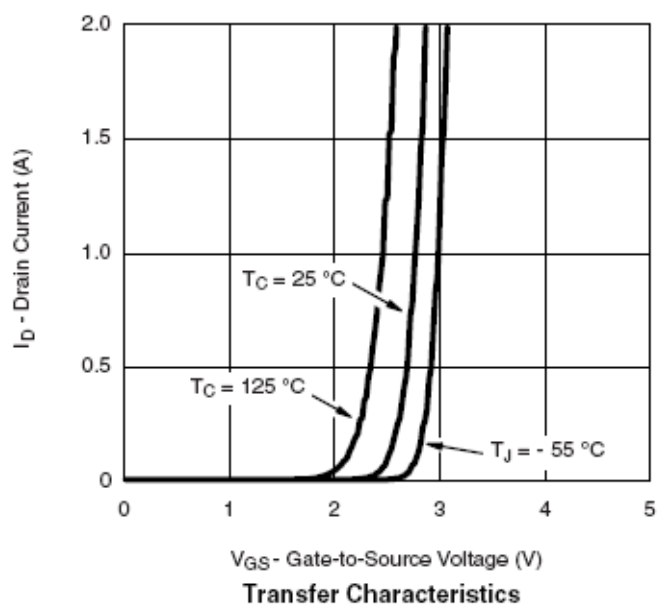
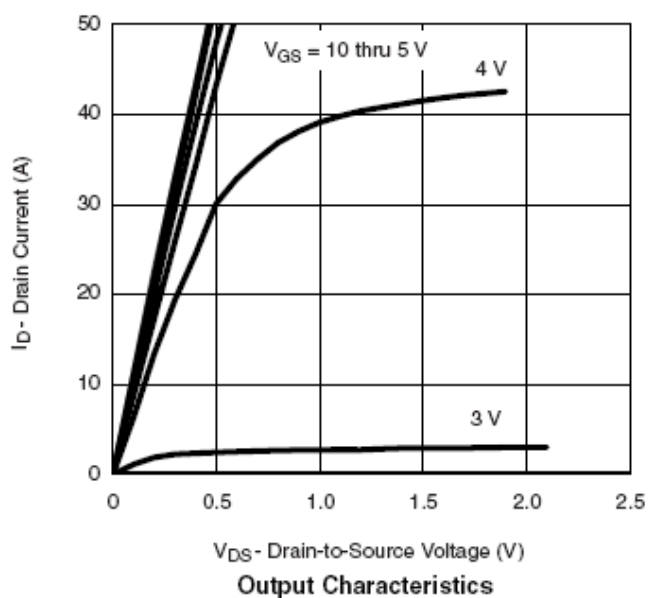
| Parameter                       | Symbol               | Conditions                                                                                                     | Min. | Typ   | Max.  | Unit |
|---------------------------------|----------------------|----------------------------------------------------------------------------------------------------------------|------|-------|-------|------|
| <b>Static</b>                   |                      |                                                                                                                |      |       |       |      |
| Drain-Source Breakdown Voltage  | V <sub>(BR)DSS</sub> | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                                                                     | 30   |       |       | V    |
| Gate Threshold Voltage          | V <sub>GS(th)</sub>  | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA                                                       | 1.0  |       | 3.0   |      |
| Gate Leakage Current            | I <sub>GSS</sub>     | V <sub>DS</sub> =0V, V <sub>GS</sub> =±20V                                                                     |      |       | ±100  | nA   |
| Zero Gate Voltage Drain Current | I <sub>DSS</sub>     | V <sub>DS</sub> =24V, V <sub>GS</sub> =0V                                                                      |      |       | 1     | uA   |
|                                 |                      | V <sub>DS</sub> =24V, V <sub>GS</sub> =0V<br>T <sub>J</sub> =85°C                                              |      |       | 5     |      |
| On-State Drain Current          | I <sub>D(on)</sub>   | V <sub>DS</sub> ≥5V, V <sub>GS</sub> =10V                                                                      | 25   |       |       | A    |
| Drain-Source On-Resistance      | R <sub>DS(on)</sub>  | V <sub>GS</sub> =10V, I <sub>D</sub> =8.5A                                                                     |      | 0.012 | 0.014 | Ω    |
|                                 |                      | V <sub>GS</sub> =4.5V, I <sub>D</sub> =7.8A                                                                    |      | 0.015 | 0.018 |      |
| Forward Transconductance        | g <sub>fs</sub>      | V <sub>DS</sub> =15V, I <sub>D</sub> =6.2A                                                                     |      | 13    |       | S    |
| Diode Forward Voltage           | V <sub>SD</sub>      | I <sub>S</sub> =2.3A, V <sub>GS</sub> =0V                                                                      |      | 0.8   | 1.2   | V    |
| <b>Dynamic</b>                  |                      |                                                                                                                |      |       |       |      |
| Total Gate Charge               | Q <sub>g</sub>       | V <sub>DS</sub> =15V, V <sub>GS</sub> =10V<br>I <sub>D</sub> =2A                                               |      | 16    | 24    | nC   |
| Gate-Source Charge              | Q <sub>gs</sub>      |                                                                                                                |      | 4.2   |       |      |
| Gate-Drain Charge               | Q <sub>gd</sub>      |                                                                                                                |      | 2.5   |       |      |
| Input Capacitance               | C <sub>iss</sub>     | V <sub>DS</sub> =15V, V <sub>GS</sub> =0V<br>f=1MHz                                                            |      | 1350  |       | pF   |
| Output Capacitance              | C <sub>oss</sub>     |                                                                                                                |      | 258   |       |      |
| Reverse Transfer Capacitance    | C <sub>rss</sub>     |                                                                                                                |      | 150   |       |      |
| Turn-On Time                    | t <sub>d(on)</sub>   | V <sub>DD</sub> =15V, R <sub>L</sub> =15Ω<br>I <sub>D</sub> =5.0A, V <sub>GEN</sub> =10V<br>R <sub>G</sub> =1Ω |      | 15    | 20    | nS   |
|                                 | t <sub>r</sub>       |                                                                                                                |      | 6     | 16    |      |
| Turn-Off Time                   | t <sub>d(off)</sub>  |                                                                                                                |      | 20    | 40    |      |
|                                 | t <sub>f</sub>       |                                                                                                                |      | 12    | 20    |      |



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### TYPICAL CHARACTERISTICS

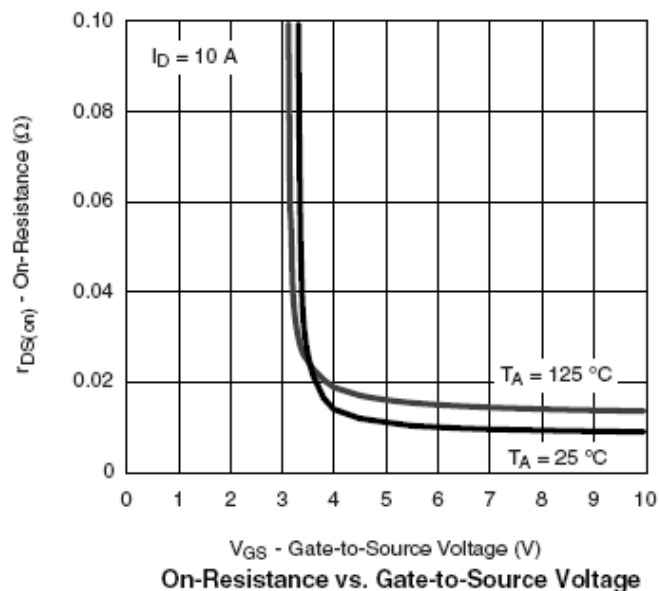
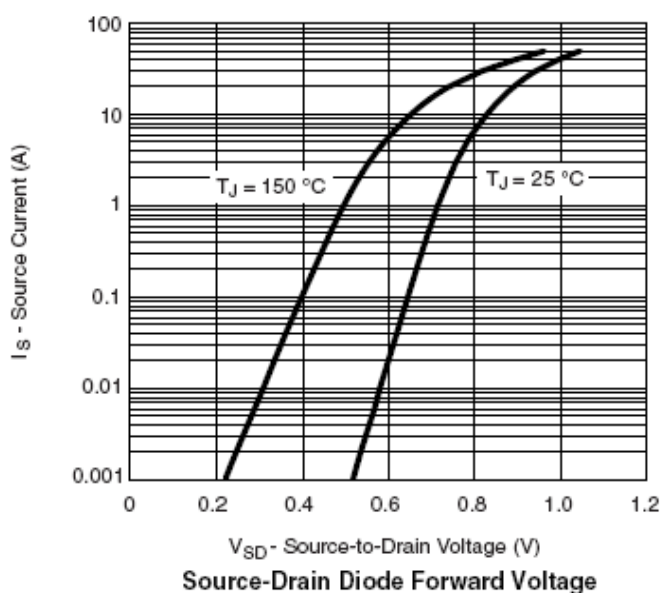
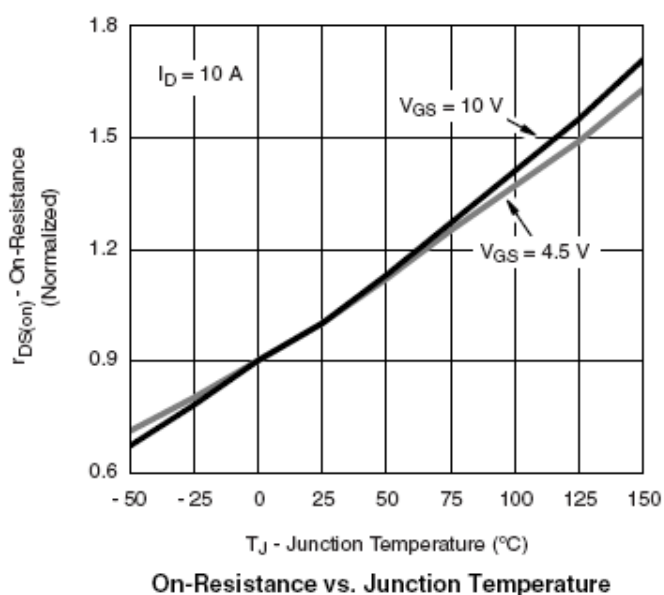
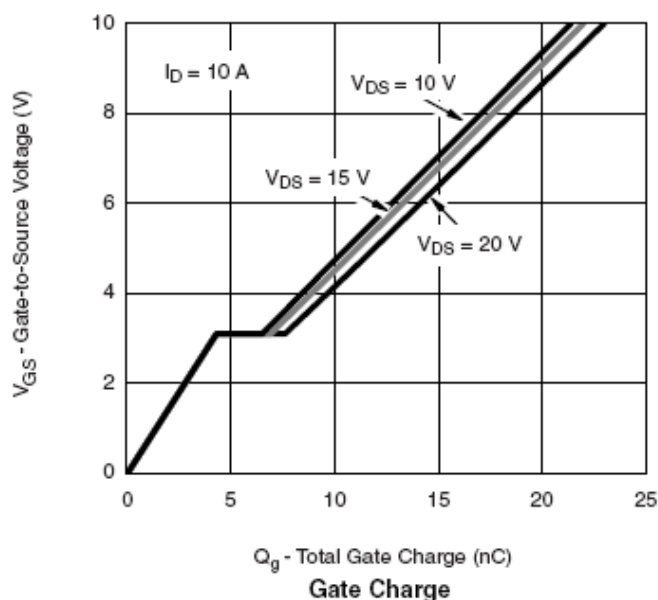




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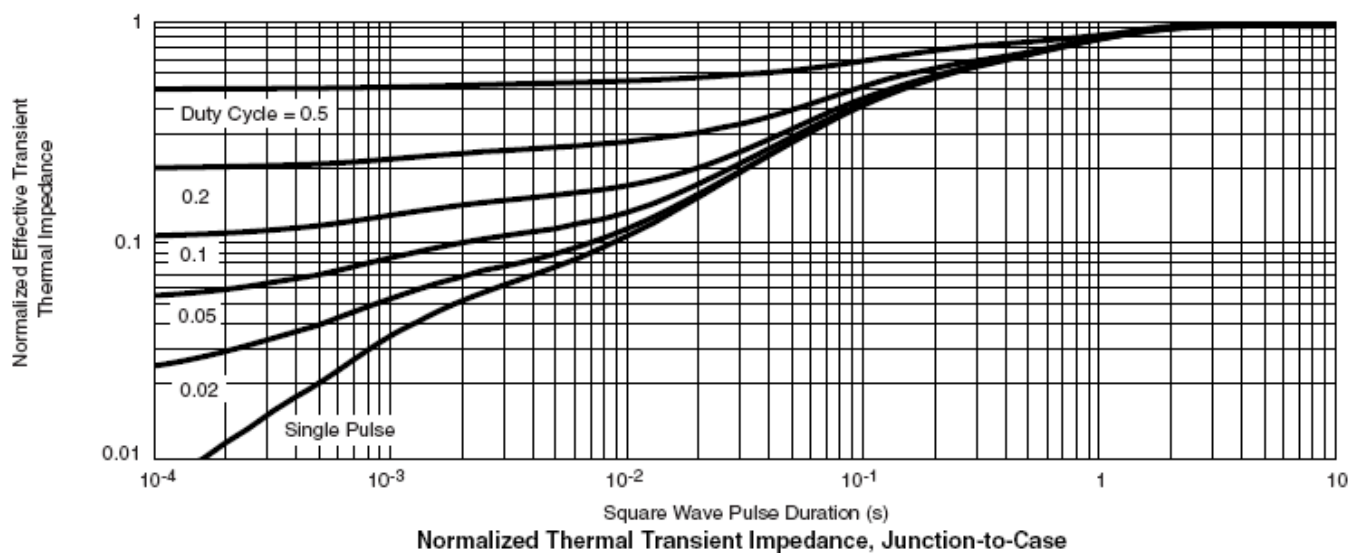
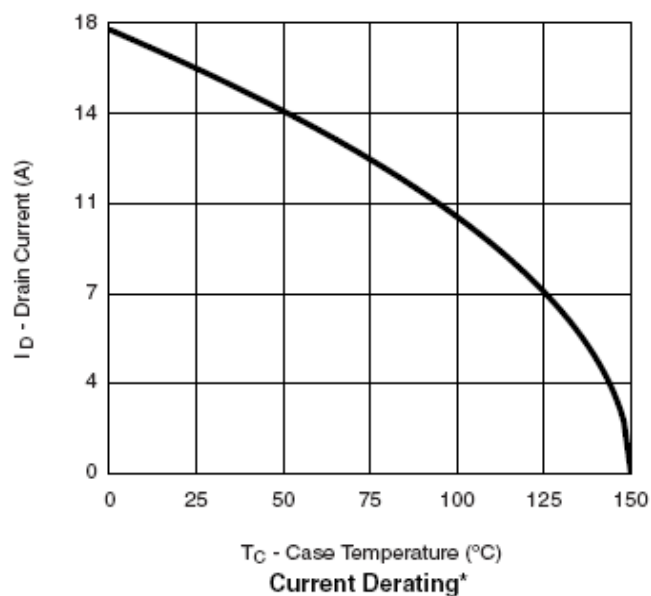
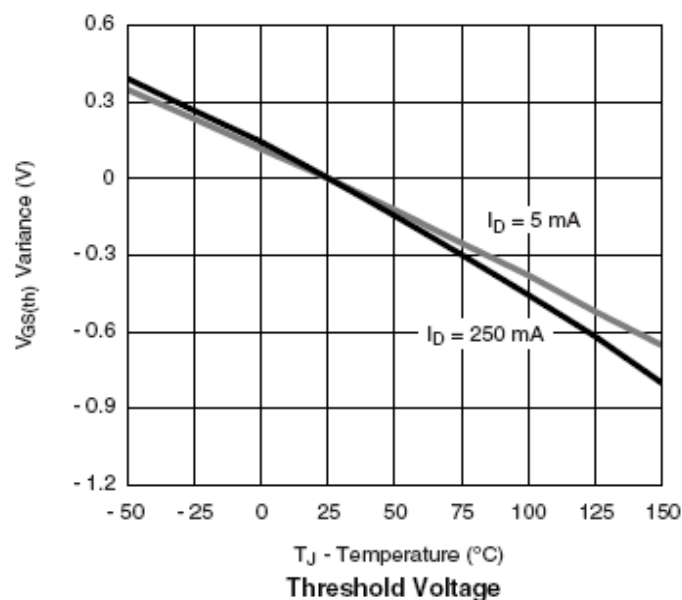




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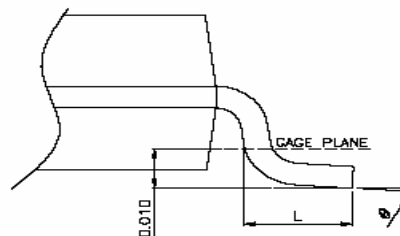
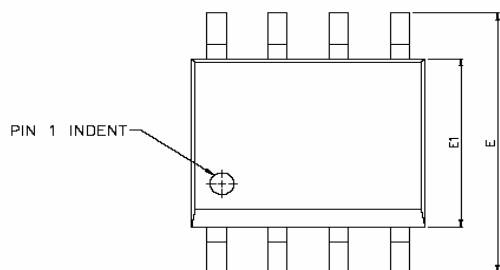




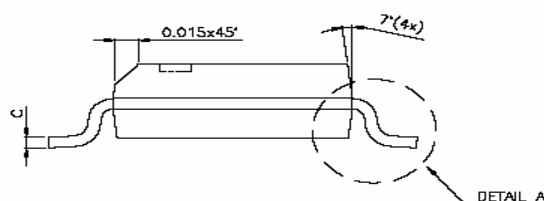
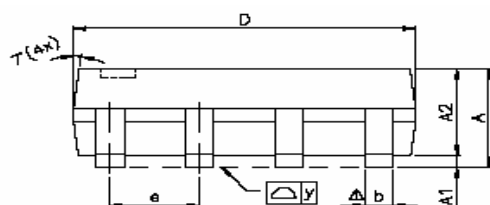
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### SOP- 8 PACKAGE OUTLINE



DETAIL A



| SYMBOLS    | DIMENSIONS IN MILLIMETERS |      |       | DIMENSIONS IN INCHES |       |        |
|------------|---------------------------|------|-------|----------------------|-------|--------|
|            | MIN                       | NOM  | MAX   | MIN                  | NOM   | MAX    |
| A          | 1.47                      | 1.60 | 1.73  | 0.058                | 0.063 | 0.068  |
| A1         | 0.10                      | —    | 0.25  | 0.004                | —     | 0.010  |
| A2         | —                         | 1.45 | —     | —                    | 0.057 | —      |
| b          | 0.33                      | 0.41 | 0.51  | 0.013                | 0.016 | 0.020  |
| C          | 0.19                      | 0.20 | 0.25  | 0.0075               | 0.008 | 0.0098 |
| D          | 4.80                      | 4.85 | 4.95  | 0.189                | 0.191 | 0.195  |
| E          | 5.80                      | 6.00 | 6.20  | 0.228                | 0.236 | 0.244  |
| E1         | 3.80                      | 3.90 | 4.00  | 0.150                | 0.154 | 0.157  |
| e          | —                         | 1.27 | —     | —                    | 0.050 | —      |
| L          | 0.38                      | 0.71 | 1.27  | 0.015                | 0.028 | 0.050  |
| $\Delta y$ | —                         | —    | 0.076 | —                    | —     | 0.003  |
| $\theta$   | 0°                        | —    | 8°    | 0°                   | —     | 8°     |



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