

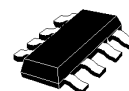
## DUAL BUS BUFFER (3-STATE)

- HIGH SPEED:  $t_{PD} = 3.8ns$  (TYP.) at  $V_{CC} = 5V$
- LOW POWER DISSIPATION:  
 $I_{CC} = 1\mu A$  (MAX.) at  $T_A = 25^\circ C$
- COMPATIBLE WITH TTL OUTPUTS:  
 $V_{IH} = 2V$  (MIN),  $V_{IL} = 0.8V$  (MAX)
- POWER DOWN PROTECTION ON INPUTS AND OUTPUTS
- SYMMETRICAL OUTPUT IMPEDANCE:  
 $|I_{OH}| = I_{OL} = 8mA$  (MIN)
- BALANCED PROPAGATION DELAYS:  
 $t_{PLH} \approx t_{PHL}$
- OPERATING VOLTAGE RANGE:  
 $V_{CC(OPR)} = 4.5V$  to  $5.5V$
- IMPROVED LATCH-UP IMMUNITY

### DESCRIPTION

The 74V2T125 is an advanced high-speed CMOS DUAL BUS BUFFER fabricated with sub-micron silicon gate and double-layer metal wiring C<sup>2</sup>MOS technology.

3-STATE control input  $\overline{nG}$  has to be set HIGH to place the output into the high impedance state.



SOT23-8L

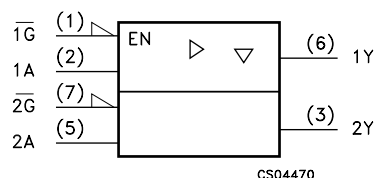
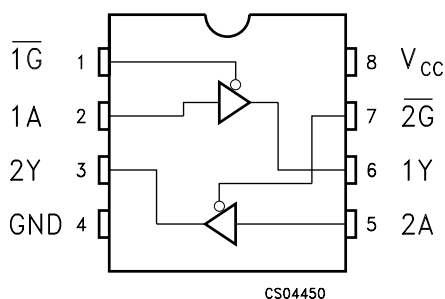
### ORDER CODES

| PACKAGE  | T & R       |
|----------|-------------|
| SOT23-8L | 74V2T125STR |

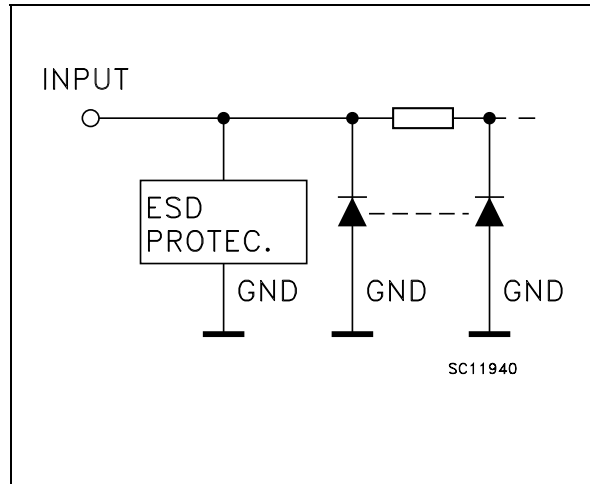
Power down protection is provided on all inputs and outputs and 0 to 7V can be accepted on inputs with no regard to the supply voltage. This device can be used to interface 3V to 5V systems and it is ideal for portable applications like personal digital assistant, camcorder and all battery-powered equipment.

All inputs and outputs are equipped with protection circuits against static discharge, giving them ESD immunity and transient excess voltage.

### PIN CONNECTION AND IEC LOGIC SYMBOLS



## INPUT EQUIVALENT CIRCUIT



## PIN DESCRIPTION

| PIN N° | SYMBOL                 | NAME AND FUNCTION       |
|--------|------------------------|-------------------------|
| 1, 7   | $\overline{1G}$ , $2G$ | Output Enable Inputs    |
| 2, 5   | $1A$ , $2A$            | Data Inputs             |
| 3, 6   | $2Y$ , $1Y$            | Data Outputs            |
| 4      | GND                    | Ground (0V)             |
| 8      | $V_{CC}$               | Positive Supply Voltage |

## TRUTH TABLE

| A | $\overline{G}$ | Y |
|---|----------------|---|
| X | H              | Z |
| L | L              | L |
| H | L              | H |

X: "H" or "L"

Z: High Impedance

## ABSOLUTE MAXIMUM RATINGS

| Symbol                | Parameter                     | Value                  | Unit |
|-----------------------|-------------------------------|------------------------|------|
| $V_{CC}$              | Supply Voltage                | -0.5 to +7.0           | V    |
| $V_I$                 | DC Input Voltage              | -0.5 to +7.0           | V    |
| $V_O$                 | DC Output Voltage             | -0.5 to $V_{CC} + 0.5$ | V    |
| $I_{IK}$              | DC Input Diode Current        | - 20                   | mA   |
| $I_{OK}$              | DC Output Diode Current       | - 20                   | mA   |
| $I_O$                 | DC Output Current             | $\pm 25$               | mA   |
| $I_{CC}$ or $I_{GND}$ | DC $V_{CC}$ or Ground Current | $\pm 50$               | mA   |
| $T_{stg}$             | Storage Temperature           | -65 to +150            | °C   |
| $T_L$                 | Lead Temperature (10 sec)     | 260                    | °C   |

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

## RECOMMENDED OPERATING CONDITIONS

| Symbol   | Parameter                                                     | Value         | Unit |
|----------|---------------------------------------------------------------|---------------|------|
| $V_{CC}$ | Supply Voltage                                                | 4.5 to 5.5    | V    |
| $V_I$    | Input Voltage                                                 | 0 to 5.5      | V    |
| $V_O$    | Output Voltage                                                | 0 to $V_{CC}$ | V    |
| $T_{op}$ | Operating Temperature                                         | -55 to 125    | °C   |
| dt/dv    | Input Rise and Fall Time (note 1) ( $V_{CC} = 5.0 \pm 0.5V$ ) | 0 to 20       | ns/V |

1)  $V_{IN}$  from 0.8V to 2V

## DC SPECIFICATION

| Symbol            | Parameter                             | Test Condition         |                                                                                    | Value                 |      |       |             |       |              | Unit |      |
|-------------------|---------------------------------------|------------------------|------------------------------------------------------------------------------------|-----------------------|------|-------|-------------|-------|--------------|------|------|
|                   |                                       | V <sub>CC</sub><br>(V) |                                                                                    | T <sub>A</sub> = 25°C |      |       | -40 to 85°C |       | -55 to 125°C |      |      |
|                   |                                       |                        |                                                                                    | Min.                  | Typ. | Max.  | Min.        | Max.  | Min.         |      | Max. |
| V <sub>IH</sub>   | High Level Input Voltage              | 4.5 to 5.5             |                                                                                    | 0.8                   |      |       | 0.8         |       | 0.8          |      | V    |
| V <sub>IL</sub>   | Low Level Input Voltage               | 4.5 to 5.5             |                                                                                    |                       |      | 2.0   |             | 2.0   |              | 2.0  | V    |
| V <sub>OH</sub>   | High Level Output Voltage             | 4.5                    | I <sub>O</sub> = -50 μA                                                            | 4.4                   | 4.5  |       | 4.4         |       | 4.4          |      | V    |
|                   |                                       | 4.5                    | I <sub>O</sub> = -8 mA                                                             | 3.94                  |      |       | 3.8         |       | 3.7          |      |      |
| V <sub>OL</sub>   | Low Level Output Voltage              | 4.5                    | I <sub>O</sub> = 50 μA                                                             |                       | 0.0  | 0.1   |             | 0.1   |              | 0.1  | V    |
|                   |                                       | 4.5                    | I <sub>O</sub> = 8 mA                                                              |                       |      | 0.36  |             | 0.44  |              | 0.55 |      |
| I <sub>OZ</sub>   | High Impedance Output Leakage Current | 5.5                    | V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub><br>V <sub>O</sub> = 5.5 or GND |                       |      | ±0.25 |             | ± 2.5 |              | ± 5  | μA   |
| I <sub>I</sub>    | Input Leakage Current                 | 0 to 5.5               | V <sub>I</sub> = 5.5V or GND                                                       |                       |      | ± 0.1 |             | ± 1   |              | ± 1  | μA   |
| I <sub>OPD</sub>  | Power down Output Leakage Current     | 0                      | V <sub>O</sub> = 5.5                                                               |                       |      | 0.5   |             | 5     |              | 10   | μA   |
| I <sub>CC</sub>   | Quiescent Supply Current              | 5.5                    | V <sub>I</sub> = V <sub>CC</sub> or GND                                            |                       |      | 1     |             | 10    |              | 20   | μA   |
| Δ I <sub>CC</sub> | Additional Worst Case Supply Current  | 5.5                    | One Input at 3.4V,<br>other input at V <sub>CC</sub><br>or GND                     |                       |      | 1.35  |             | 1.5   |              | 1.5  | mA   |

AC ELECTRICAL CHARACTERISTICS (Input t<sub>r</sub> = t<sub>f</sub> = 3ns)

| Symbol                               | Parameter              | Test Condition         |                        |                       | Value                 |      |      |             |      |              |      | Unit |
|--------------------------------------|------------------------|------------------------|------------------------|-----------------------|-----------------------|------|------|-------------|------|--------------|------|------|
|                                      |                        | V <sub>CC</sub><br>(V) | C <sub>L</sub><br>(pF) |                       | T <sub>A</sub> = 25°C |      |      | -40 to 85°C |      | -55 to 125°C |      |      |
|                                      |                        |                        |                        |                       | Min.                  | Typ. | Max. | Min.        | Max. | Min.         | Max. |      |
| t <sub>PLH</sub><br>t <sub>PHL</sub> | Propagation Delay Time | 5.0 <sup>(*)</sup>     | 15                     |                       |                       | 3.8  | 5.5  | 1.0         | 6.5  | 1.0          | 7.5  | ns   |
|                                      |                        | 5.0 <sup>(*)</sup>     | 50                     |                       |                       | 4.3  | 6.5  | 1.0         | 7.5  | 1.0          | 8.5  |      |
| t <sub>PLZ</sub><br>t <sub>PHZ</sub> | Output Disable Time    | 5.0 <sup>(*)</sup>     | 15                     | R <sub>L</sub> = 1 KΩ |                       | 3.6  | 5.0  | 1.0         | 6.0  | 1.0          | 7.0  |      |
|                                      |                        | 5.0 <sup>(*)</sup>     | 50                     | R <sub>L</sub> = 1 KΩ |                       | 5.1  | 7.0  | 1.0         | 8.0  | 1.0          | 9.0  |      |
| t <sub>PZL</sub><br>t <sub>PZH</sub> | Output Enable Time     | 5.0 <sup>(*)</sup>     | 15                     | R <sub>L</sub> = 1 KΩ |                       | 3.7  | 5.9  | 1.0         | 7.0  | 1.0          | 8.0  |      |
|                                      |                        | 5.0 <sup>(*)</sup>     | 50                     | R <sub>L</sub> = 1 KΩ |                       | 4.1  | 6.5  | 1.0         | 7.5  | 1.0          | 8.5  |      |

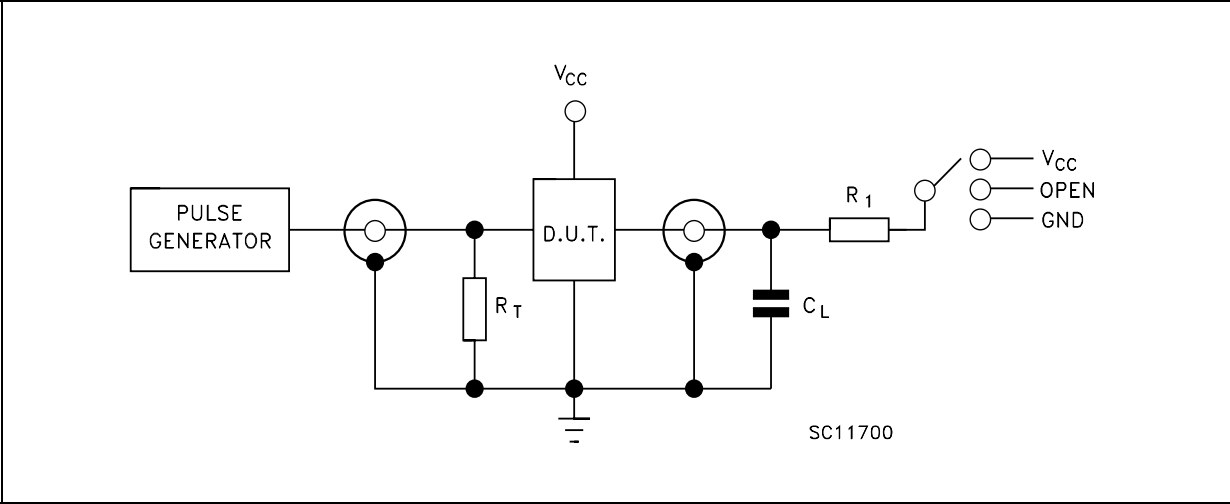
(\*) Voltage range is 5.0V ± 0.5V

CAPACITIVE CHARACTERISTICS

| Symbol           | Parameter                              | Test Condition | Value                 |      |      |             |      |              |      | Unit |
|------------------|----------------------------------------|----------------|-----------------------|------|------|-------------|------|--------------|------|------|
|                  |                                        |                | T <sub>A</sub> = 25°C |      |      | -40 to 85°C |      | -55 to 125°C |      |      |
|                  |                                        |                | Min.                  | Typ. | Max. | Min.        | Max. | Min.         | Max. |      |
| C <sub>IN</sub>  | Input Capacitance                      |                |                       | 4    | 10   |             | 10   |              | 10   | pF   |
| C <sub>OUT</sub> | Output Capacitance                     |                |                       | 6    |      |             |      |              |      | pF   |
| C <sub>PD</sub>  | Power Dissipation Capacitance (note 1) |                |                       | 14   |      |             |      |              |      | pF   |

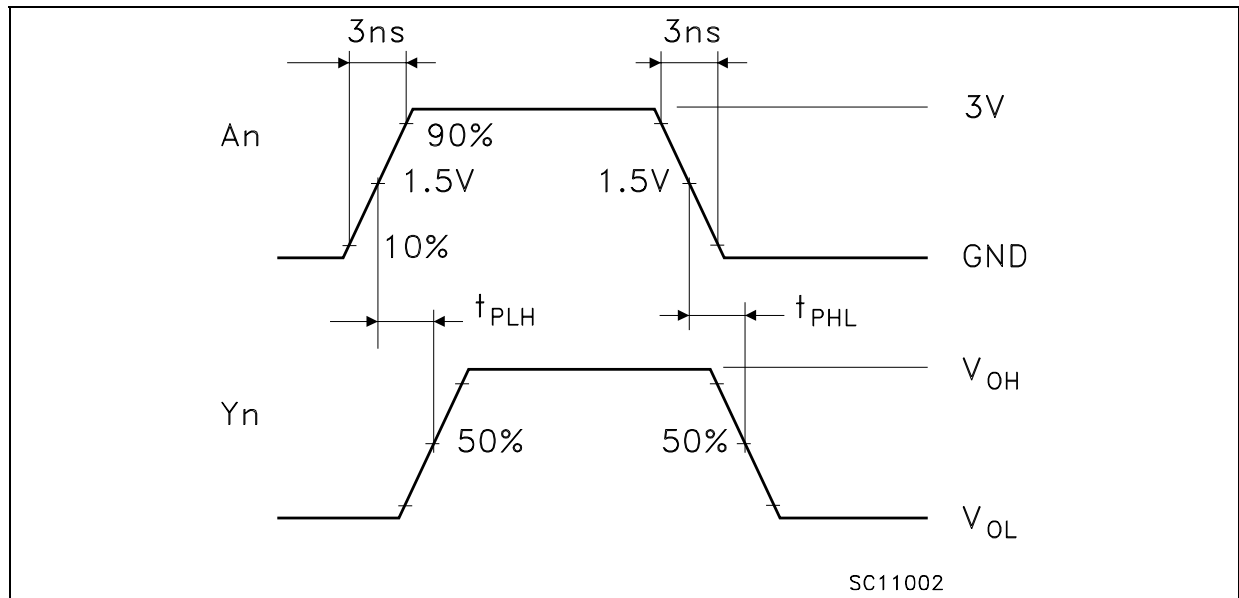
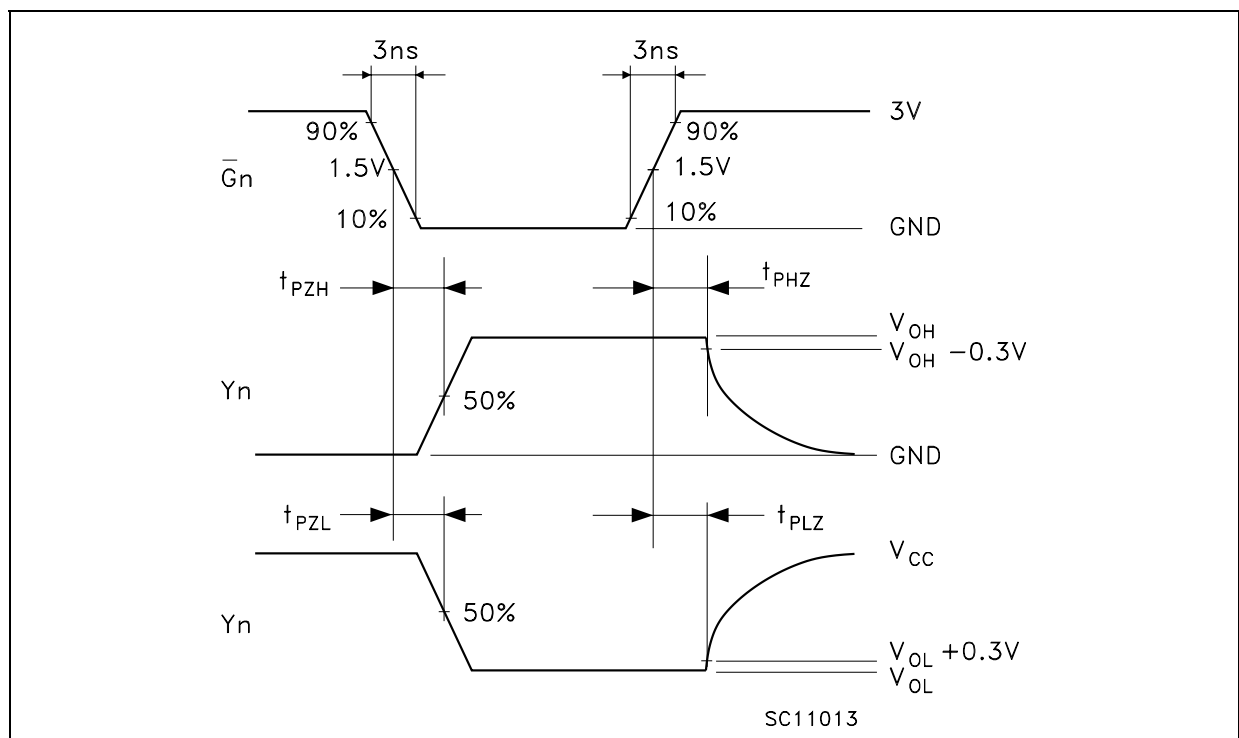
1) C<sub>PD</sub> is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average current can be obtained by the following equation.  $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/2$

TEST CIRCUIT TEST CIRCUIT



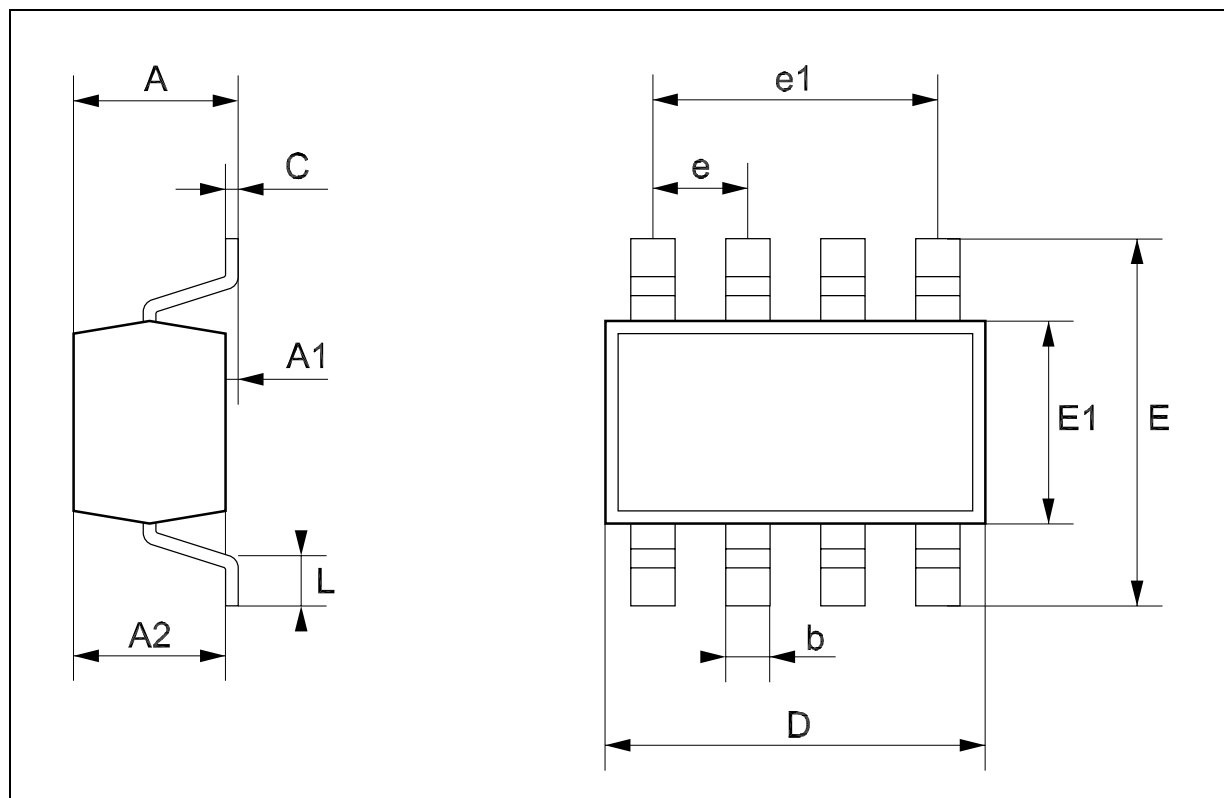
| TEST                                | SWITCH          |
|-------------------------------------|-----------------|
| t <sub>PLH</sub> , t <sub>PHL</sub> | Open            |
| t <sub>PZL</sub> , t <sub>PLZ</sub> | V <sub>CC</sub> |
| t <sub>PZH</sub> , t <sub>PHZ</sub> | GND             |

C<sub>L</sub> = 15/50pF or equivalent (includes jig and probe capacitance)  
R<sub>1</sub> = 1KΩ or equivalent  
R<sub>T</sub> = Z<sub>OUT</sub> of pulse generator (typically 50Ω)

**WAVEFORM 1 : PROPAGATION DELAYS** ( $f=1\text{MHz}$ ; 50% duty cycle)**WAVEFORM 2: OUTPUT ENABLE AND DISABLE TIME** ( $f=1\text{MHz}$ ; 50% duty cycle)

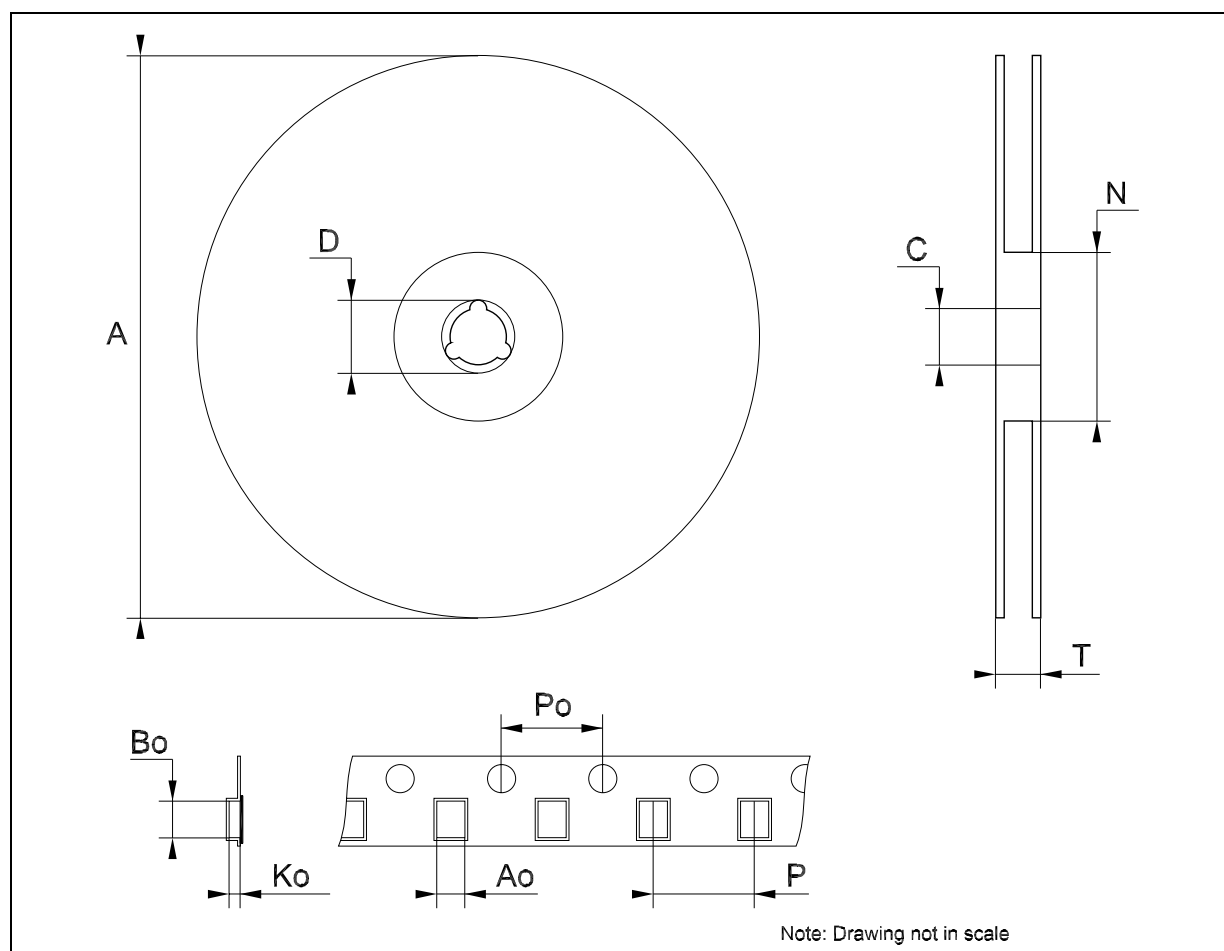
## SOT23-8L MECHANICAL DATA

| DIM. | mm.  |      |      | mils  |      |       |
|------|------|------|------|-------|------|-------|
|      | MIN. | TYP  | MAX. | MIN.  | TYP. | MAX.  |
| A    | 0.90 |      | 1.45 | 35.4  |      | 57.1  |
| A1   | 0.00 |      | 0.15 | 0.0   |      | 5.9   |
| A2   | 0.90 |      | 1.30 | 35.4  |      | 51.2  |
| b    | 0.22 |      | 0.38 | 8.6   |      | 14.9  |
| C    | 0.09 |      | 0.20 | 3.5   |      | 7.8   |
| D    | 2.80 |      | 3.00 | 110.2 |      | 118.1 |
| E    | 2.60 |      | 3.00 | 102.3 |      | 118.1 |
| E1   | 1.50 |      | 1.75 | 59.0  |      | 68.8  |
| e    | 0    | .65  |      |       | 25.6 |       |
| e1   |      | 1.95 |      |       | 76.7 |       |
| L    | 0.35 |      | 0.55 | 13.7  |      | 21.6  |



### Tape & Reel SOT23-xL MECHANICAL DATA

| DIM. | mm.  |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP  | MAX. | MIN.  | TYP.  | MAX.  |
| A    |      |      | 180  |       |       | 7.086 |
| C    | 12.8 | 13.0 | 13.2 | 0.504 | 0.512 | 0.519 |
| D    | 20.2 |      |      | 0.795 |       |       |
| N    | 60   |      |      | 2.362 |       |       |
| T    |      |      | 14.4 |       |       | 0.567 |
| Ao   | 3.13 | 3.23 | 3.33 | 0.123 | 0.127 | 0.131 |
| Bo   | 3.07 | 3.17 | 3.27 | 0.120 | 0.124 | 0.128 |
| Ko   | 1.27 | 1.37 | 1.47 | 0.050 | 0.054 | 0.058 |
| Po   | 3.9  | 4.0  | 4.1  | 0.153 | 0.157 | 0.161 |
| P    | 3.9  | 4.0  | 4.1  | 0.153 | 0.157 | 0.161 |



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

© The ST logo is a registered trademark of STMicroelectronics

© 2003 STMicroelectronics - Printed in Italy - All Rights Reserved  
STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco  
Singapore - Spain - Sweden - Switzerland - United Kingdom - United States.

© <http://www.st.com>