

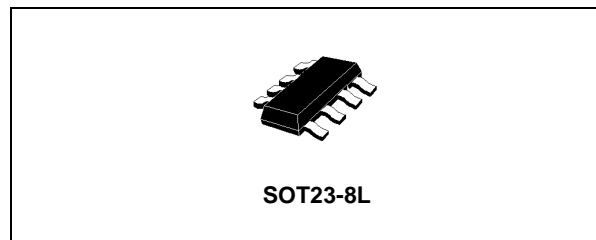
DUAL BUS BUFFER (3-STATE)

- HIGH SPEED: $t_{PD} = 3.8ns$ (TYP.) at $V_{CC} = 5V$
- LOW POWER DISSIPATION:
 $I_{CC} = 1\mu A$ (MAX.) at $T_A = 25^\circ C$
- HIGH NOISE IMMUNITY:
 $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (MIN.)
- POWER DOWN PROTECTION ON INPUTS AND OUTPUTS
- SYMMETRICAL OUTPUT IMPEDANCE:
 $|I_{OH}| = I_{OL} = 8mA$ (MIN) at $V_{CC} = 4.5V$
- BALANCED PROPAGATION DELAYS:
 $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE:
 $V_{CC}(OPR) = 2V$ to $5.5V$
- IMPROVED LATCH-UP IMMUNITY

DESCRIPTION

The 74V2G125 is an advanced high-speed CMOS DUAL BUS BUFFER fabricated with sub-micron silicon gate and double-layer metal wiring C²MOS technology.

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



ORDER CODES

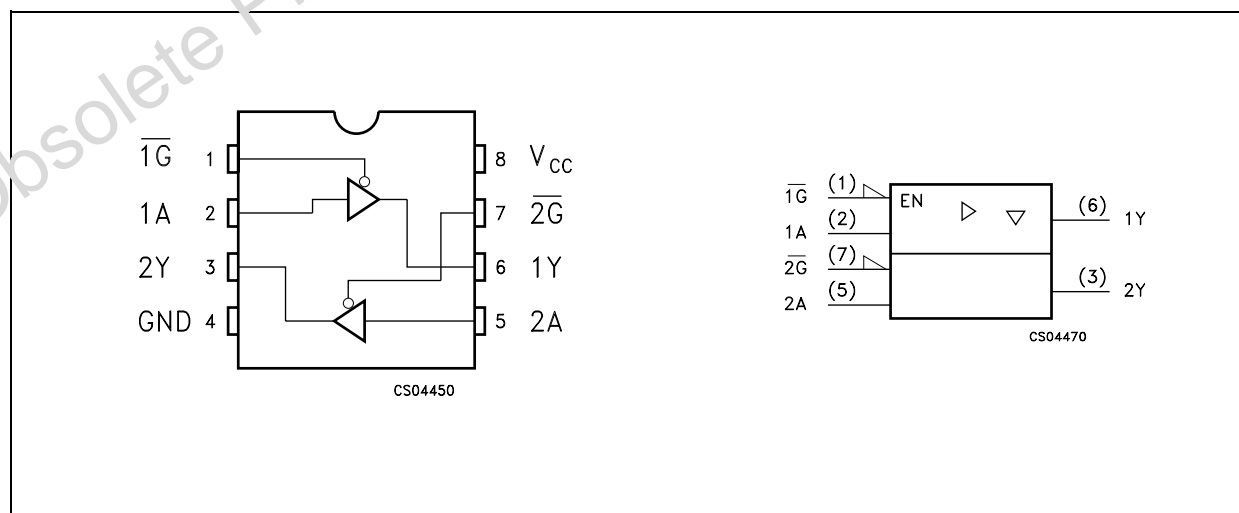
| PACKAGE | T & R |
|----------|-------------|
| SOT23-8L | 74V2G125STR |

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.

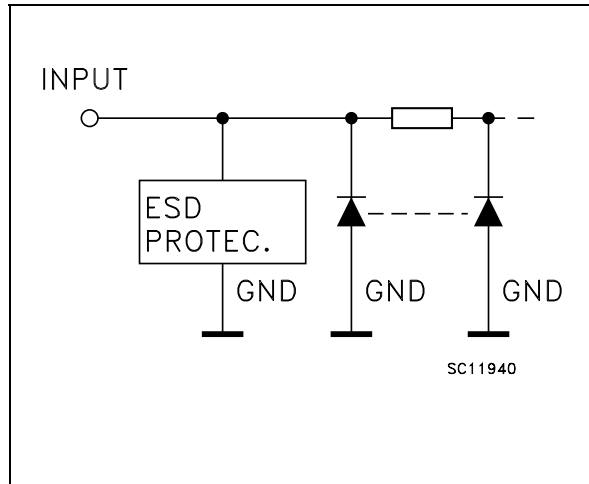
This device can be used to interface 5V to 3V systems and it is ideal for portable applications like personal digital assistant, camcorder and all battery-powered equipment.

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 No | 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 (see note 1) | -0.5 to +7.0 | V |
| V_O | DC Output Voltage (see note 2) | -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 | ± 25 | mA |
| I_{CC} or I_{GND} | DC V_{CC} or Ground Current | ± 50 | mA |
| T_{stg} | Storage Temperature | -65 to +150 | $^{\circ}C$ |
| T_L | Lead Temperature (10 sec) | 260 | $^{\circ}C$ |

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

1) $V_{CC}=0V$ or $n\overline{G}=V_{CC}$ (Output in High Impedance state)

2) High or Low State

RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Value | Unit |
|----------|--|---------------------|--------------|
| V_{CC} | Supply Voltage | 2 to 5.5 | V |
| V_I | Input Voltage | 0 to 5.5 | V |
| V_O | Output Voltage (see note 1) | 0 to 5.5 | V |
| V_O | Output Voltage (see note 2) | 0 to V_{CC} | V |
| T_{op} | Operating Temperature | -55 to 125 | $^{\circ}C$ |
| dt/dv | Input Rise and Fall Time (note 3) ($V_{CC} = 3.3 \pm 0.3V$) ($V_{CC} = 5.0 \pm 0.5V$) | 0 to 100 0 to 20 | ns/V ns/V |

1) $V_{CC}=0V$ or $n\overline{G}=V_{CC}$ (Output in High Impedance state)

2) High or Low State

3) V_{IN} from 30% to 70% of V_{CC}

DC SPECIFICATION

| Symbol | Parameter | Test Condition | | Value | | | | | | Unit | |
|------------------|---------------------------------------|------------------------|--|-----------------------|------|--------------------|--------------------|--------------------|--------------------|--------------------|------|
| | | V _{CC} (V) | | T _A = 25°C | | | -40 to 85°C | | -55 to 125°C | | |
| | | | | Min. | Typ. | Max. | Min. | Max. | Min. | | Max. |
| V _{IH} | High Level Input Voltage | 2.0 | | 1.5 | | | 1.5 | | 1.5 | | V |
| | | 3.0 to 5.5 | | 0.7V _{CC} | | | 0.7V _{CC} | | 0.7V _{CC} | | |
| V _{IL} | Low Level Input Voltage | 2.0 | | | | 0.5 | | 0.5 | | 0.5 | V |
| | | 3.0 to 5.5 | | | | 0.3V _{CC} | | 0.3V _{CC} | | 0.3V _{CC} | |
| V _{OH} | High Level Output Voltage | 2.0 | I _O =-50 μA | 1.9 | 2.0 | | 1.9 | | 1.9 | | V |
| | | 3.0 | I _O =-50 μA | 2.9 | 3.0 | | 2.9 | | 2.9 | | |
| | | 4.5 | I _O =-50 μA | 4.4 | 4.5 | | 4.4 | | 4.4 | | |
| | | 3.0 | I _O =-4 mA | 2.58 | | | 2.48 | | 2.4 | | |
| | | 4.5 | I _O =-8 mA | 3.94 | | | 3.8 | | 3.7 | | |
| V _{OL} | Low Level Output Voltage | 2.0 | I _O =50 μA | | 0.0 | 0.1 | | 0.1 | | 0.1 | V |
| | | 3.0 | I _O =50 μA | | 0.0 | 0.1 | | 0.1 | | 0.1 | |
| | | 4.5 | I _O =50 μA | | 0.0 | 0.1 | | 0.1 | | 0.1 | |
| | | 3.0 | I _O =4 mA | | | 0.36 | | 0.44 | | 0.55 | |
| | | 4.5 | I _O =8 mA | | | 0.36 | | 0.44 | | 0.55 | |
| I _{OZ} | High Impedance Output Leakage Current | 5.5 | V _I = V _{IH} or V _{IL} V _O = 5.5 or GND | | | ±0.25 | | ± 2.5 | | ± 5 | μA |
| I _I | Input Leakage Current | 0 to 5.5 | V _I = 5.5V or GND | | | ± 0.1 | | ± 1 | | ± 1 | μA |
| I _{CC} | Quiescent Supply Current | 5.5 | V _I = V _{CC} or GND | | | 1 | | 10 | | 20 | μA |
| I _{OPD} | Power down Output Leakage Current | 0 | V _O = 5.5 | | | 0.5 | | 5 | | 10 | μA |

AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 3\text{ns}$)

| Symbol | Parameter | Test Condition | | | Value | | | | | | Unit | |
|------------------------|------------------------|-----------------|---------------|-------------------------|--------------------------|------|------|-----------------------------|------|------------------------------|------|------|
| | | V_{CC} (V) | C_L (pF) | | $T_A = 25^\circ\text{C}$ | | | -40 to 85°C | | -55 to 125°C | | |
| | | | | | Min. | Typ. | Max. | Min. | Max. | Min. | | Max. |
| t_{PLH} t_{PHL} | Propagation Delay Time | 3.3(*) | 15 | | | 5.1 | 7.5 | 1.0 | 8.5 | 1.0 | 9.5 | ns |
| | | 3.3(**) | 50 | | | 5.6 | 8.0 | 1.0 | 9.5 | 1.0 | 10.5 | |
| | | 5.0(**) | 15 | | | 3.8 | 5.5 | 1.0 | 6.5 | 1.0 | 7.5 | |
| | | 5.0(**) | 50 | | | 4.3 | 6.5 | 1.0 | 7.5 | 1.0 | 8.5 | |
| t_{PLZ} t_{PHZ} | Output Disable Time | 3.3(*) | 15 | $R_L = 1\text{K}\Omega$ | | 5.4 | 8.0 | 1.0 | 9.0 | 1.0 | 10.0 | ns |
| | | 3.3(**) | 50 | $R_L = 1\text{K}\Omega$ | | 7.9 | 11.5 | 1.0 | 12.5 | 1.0 | 13.5 | |
| | | 5.0(**) | 15 | $R_L = 1\text{K}\Omega$ | | 3.6 | 5.0 | 1.0 | 6.0 | 1.0 | 7.0 | |
| | | 5.0(**) | 50 | $R_L = 1\text{K}\Omega$ | | 5.1 | 7.0 | 1.0 | 8.0 | 1.0 | 9.0 | |
| t_{PZL} t_{PZH} | Output Enable Time | 3.3(*) | 15 | $R_L = 1\text{K}\Omega$ | | 5.4 | 7.6 | 1.0 | 9.5 | 1.0 | 10.5 | ns |
| | | 3.3(**) | 50 | $R_L = 1\text{K}\Omega$ | | 5.9 | 8.5 | 1.0 | 10.0 | 1.0 | 11.0 | |
| | | 5.0(**) | 15 | $R_L = 1\text{K}\Omega$ | | 3.7 | 5.9 | 1.0 | 7.0 | 1.0 | 8.0 | |
| | | 5.0(**) | 50 | $R_L = 1\text{K}\Omega$ | | 4.1 | 6.5 | 1.0 | 7.5 | 1.0 | 8.5 | |

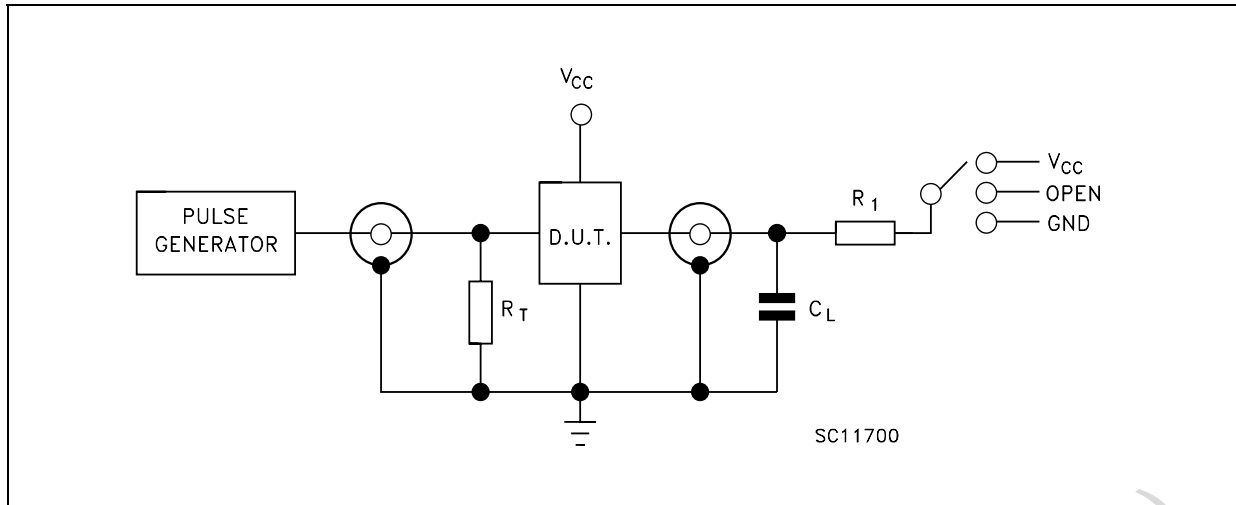
(*) Voltage range is $3.3\text{V} \pm 0.3\text{V}$ (**) Voltage range is $5.0\text{V} \pm 0.5\text{V}$

CAPACITIVE CHARACTERISTICS

| Symbol | Parameter | Test Condition | | | Value | | | | | | Unit | |
|-----------|--|----------------|--|--|--------------------------|------|------|-----------------------------|------|------------------------------|------|------|
| | | | | | $T_A = 25^\circ\text{C}$ | | | -40 to 85°C | | -55 to 125°C | | |
| | | | | | Min. | Typ. | Max. | Min. | Max. | Min. | | Max. |
| C_{IN} | Input Capacitance | | | | | 4 | 10 | | 10 | | 10 | pF |
| C_{OUT} | Output Capacitance | | | | | 6 | | | | | | pF |
| C_{PD} | Power Dissipation Capacitance (note 1) | | | | | 14 | | | | | | pF |

1) C_{PD} 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. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/2$

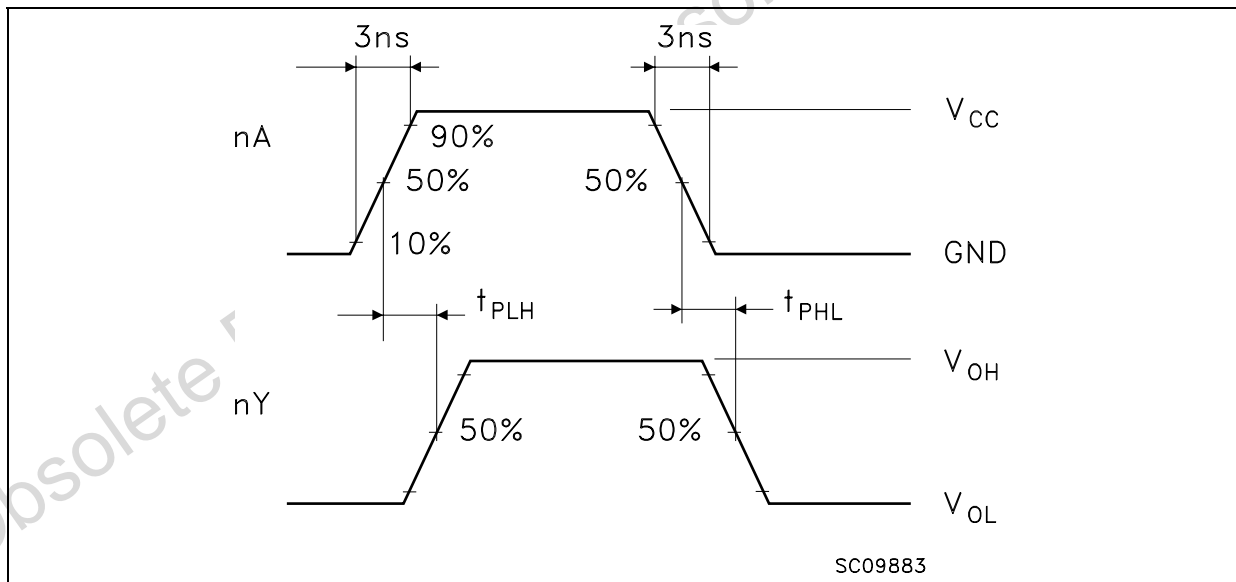
TEST CIRCUIT TEST CIRCUIT



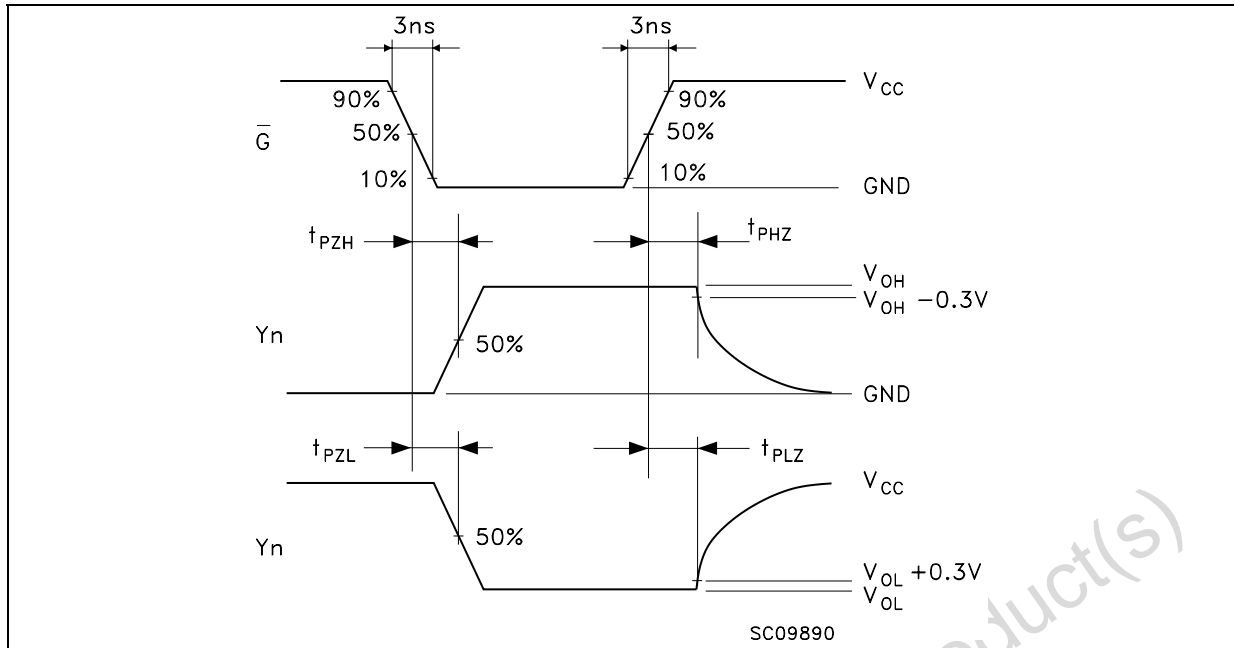
| TEST | SWITCH |
|-----------------------|----------|
| t_{PLH} , t_{PHL} | Open |
| t_{PZL} , t_{PLZ} | V_{CC} |
| t_{PZH} , t_{PHZ} | GND |

$C_L = 15/50\text{pF}$ or equivalent (includes jig and probe capacitance)
 $R_1 = 1\text{K}\Omega$ or equivalent
 $R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

WAVEFORM 1 : PROPAGATION DELAYS (f=1MHz; 50% duty cycle)

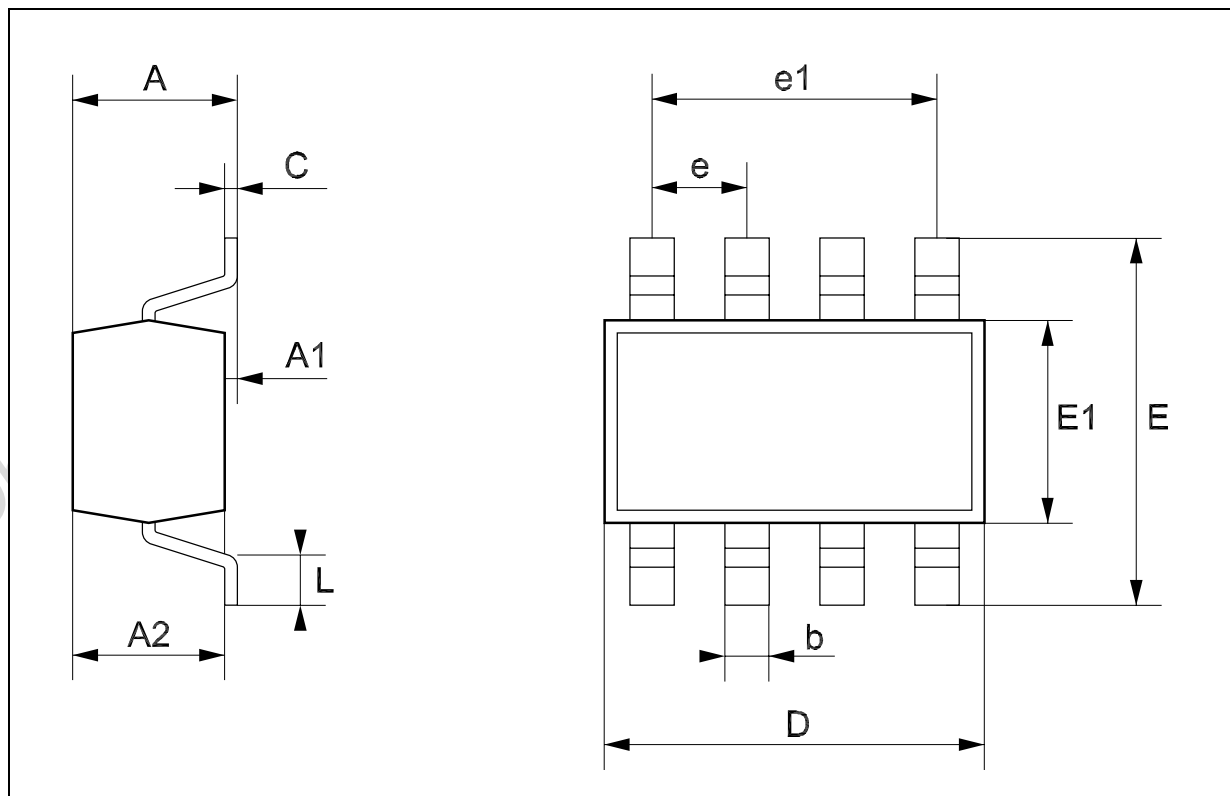


WAVEFORM 2: OUTPUT ENABLE AND DISABLE TIME (f=1MHz; 50% duty cycle)



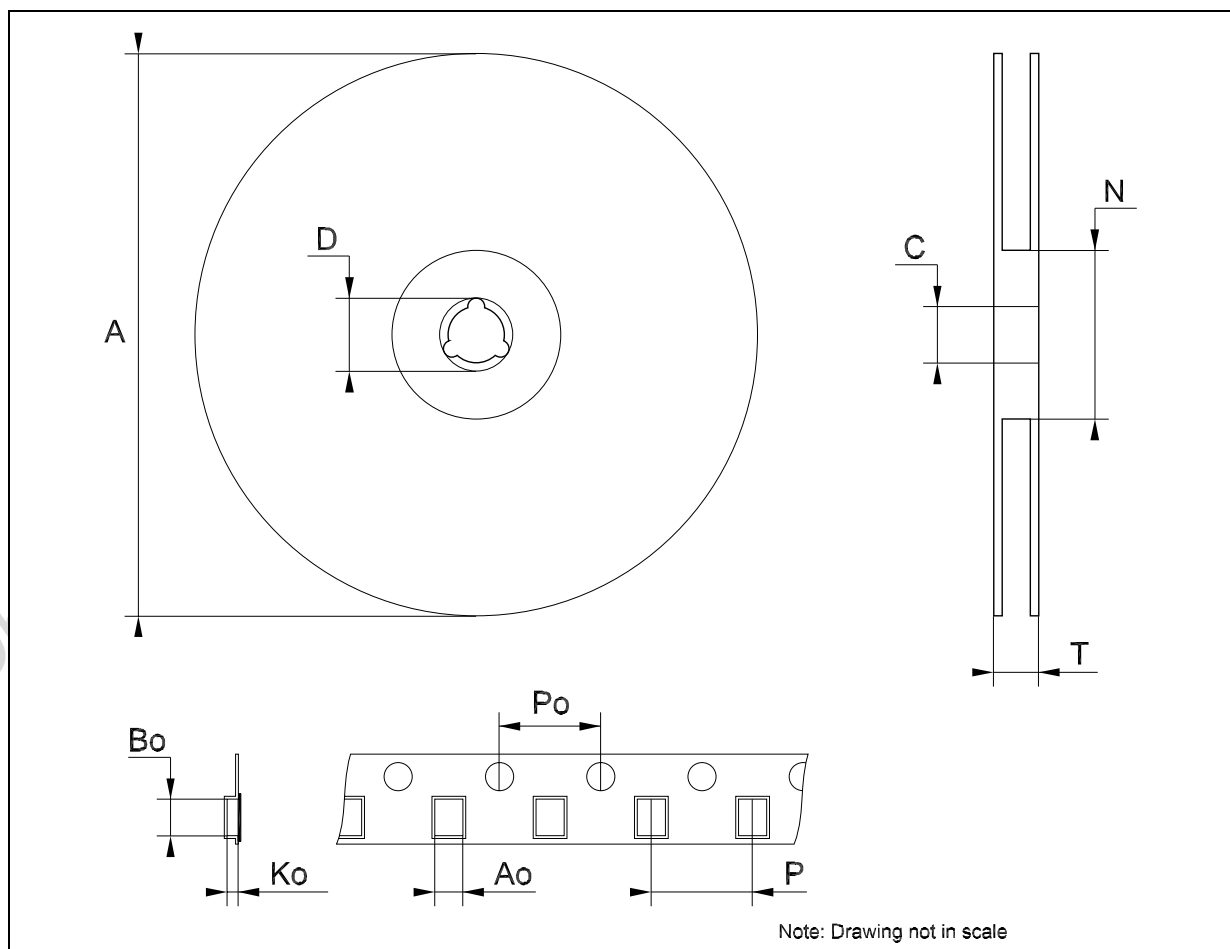
SOT23-8L MECHANICAL DATA

| 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 |



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