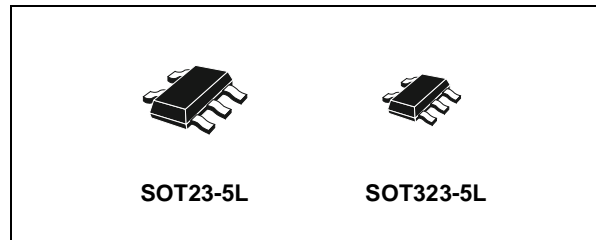


SINGLE EXCLUSIVE OR GATE

- HIGH SPEED: $t_{PD} = 4.8\text{ns}$ (TYP.) at $V_{CC} = 5\text{V}$
- LOW POWER DISSIPATION:
 $I_{CC} = 1\mu\text{A}$ (MAX.) at $T_A=25^\circ\text{C}$
- HIGH NOISE IMMUNITY:
 $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (MIN.)
- POWER DOWN PROTECTION ON INPUTS
- SYMMETRICAL OUTPUT IMPEDANCE:
 $|I_{OH}| = I_{OL} = 8\text{mA}$ (MIN) at $V_{CC} = 4.5\text{V}$
- BALANCED PROPAGATION DELAYS:
 $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE:
 $V_{CC}(\text{OPR}) = 2\text{V}$ to 5.5V
- IMPROVED LATCH-UP IMMUNITY

DESCRIPTION

The 74V1G86 is an advanced high-speed CMOS SINGLE EXCLUSIVE OR GATE fabricated with sub-micron silicon gate and double-layer metal wiring C²MOS technology.

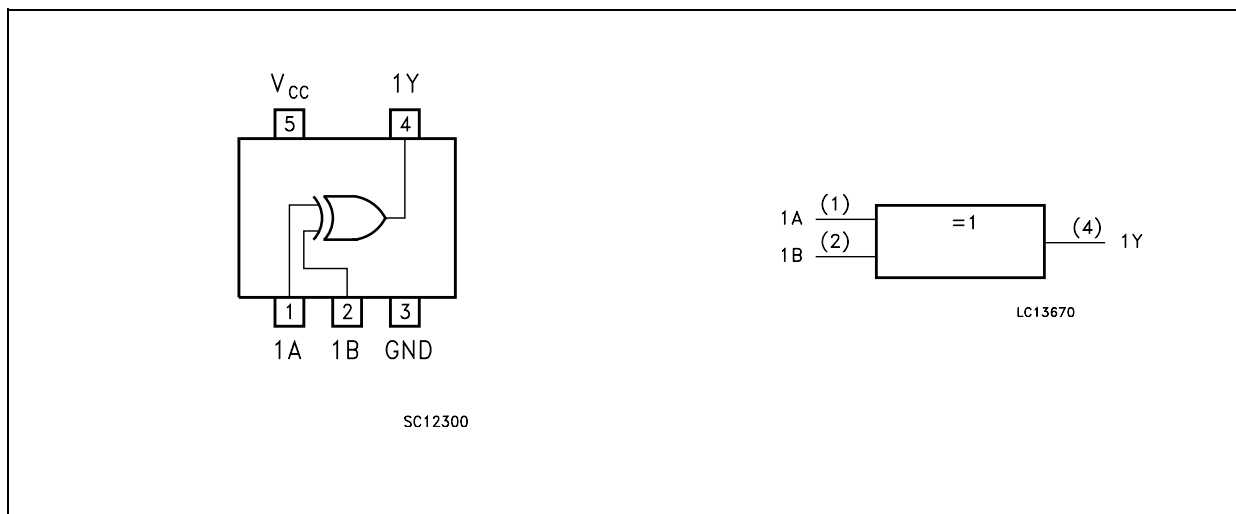


ORDER CODES

| PACKAGE | T & R |
|-----------|------------|
| SOT23-5L | 74V1G86STR |
| SOT323-5L | 74V1G86CTR |

Power down protection is provided on all inputs 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.

PIN CONNECTION AND IEC LOGIC SYMBOLS



DC SPECIFICATIONS

| 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 _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 |

AC ELECTRICAL CHARACTERISTICS (Input t_r = t_f = 3ns)

| Symbol | Parameter | Test Condition | | Value | | | | | | Unit | |
|-----------------------------------|------------------------|------------------------|------------------------|-----------------------|------|------|-------------|------|--------------|------|------|
| | | V _{CC} (V) | C _L (pF) | T _A = 25°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 | | 6.6 | 9.5 | 1.0 | 11.0 | 1.0 | 12.5 | ns |
| | | 3.3(*) | 50 | | 7.3 | 10.5 | 1.0 | 12.0 | 1.0 | 13.5 | |
| | | 5.0(**) | 15 | | 4.8 | 6.8 | 1.0 | 8.0 | 1.0 | 9.0 | |
| | | 5.0(**) | 50 | | 5.3 | 7.5 | 1.0 | 9.0 | 1.0 | 10.0 | |

(*) Voltage range is 3.3V ± 0.3V

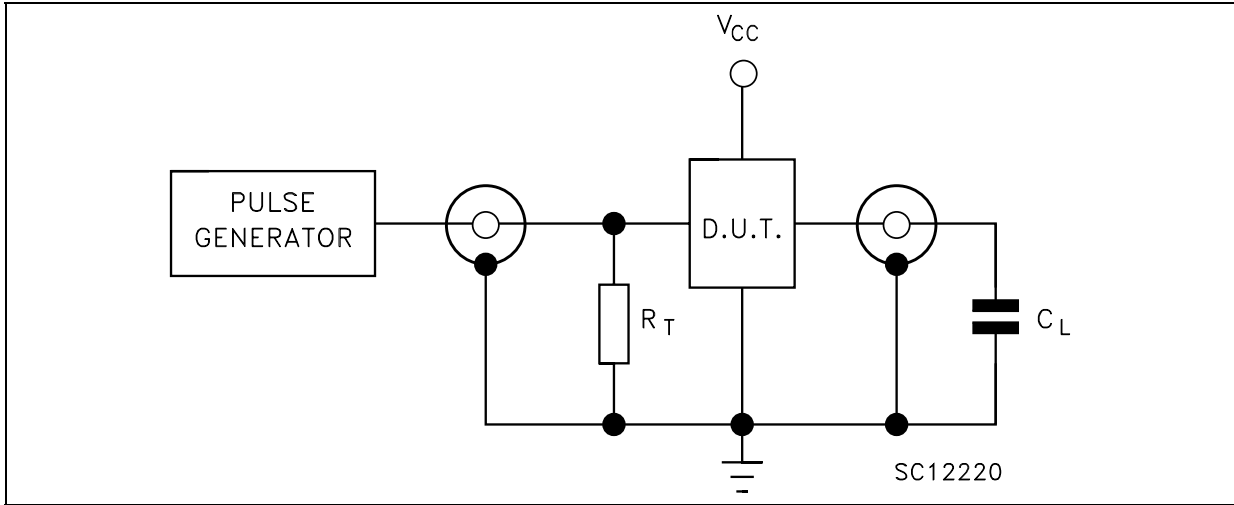
(**) Voltage range is 5.0V ± 0.5V

CAPACITIVE CHARACTERISTICS

| Symbol | Parameter | Test Condition | | Value | | | | | | Unit | |
|-----------------|--|----------------|--|-----------------------|------|------|-------------|------|--------------|------|------|
| | | | | T _A = 25°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 _{PD} | Power Dissipation Capacitance (note 1) | | | 12 | | | | | | pF | |

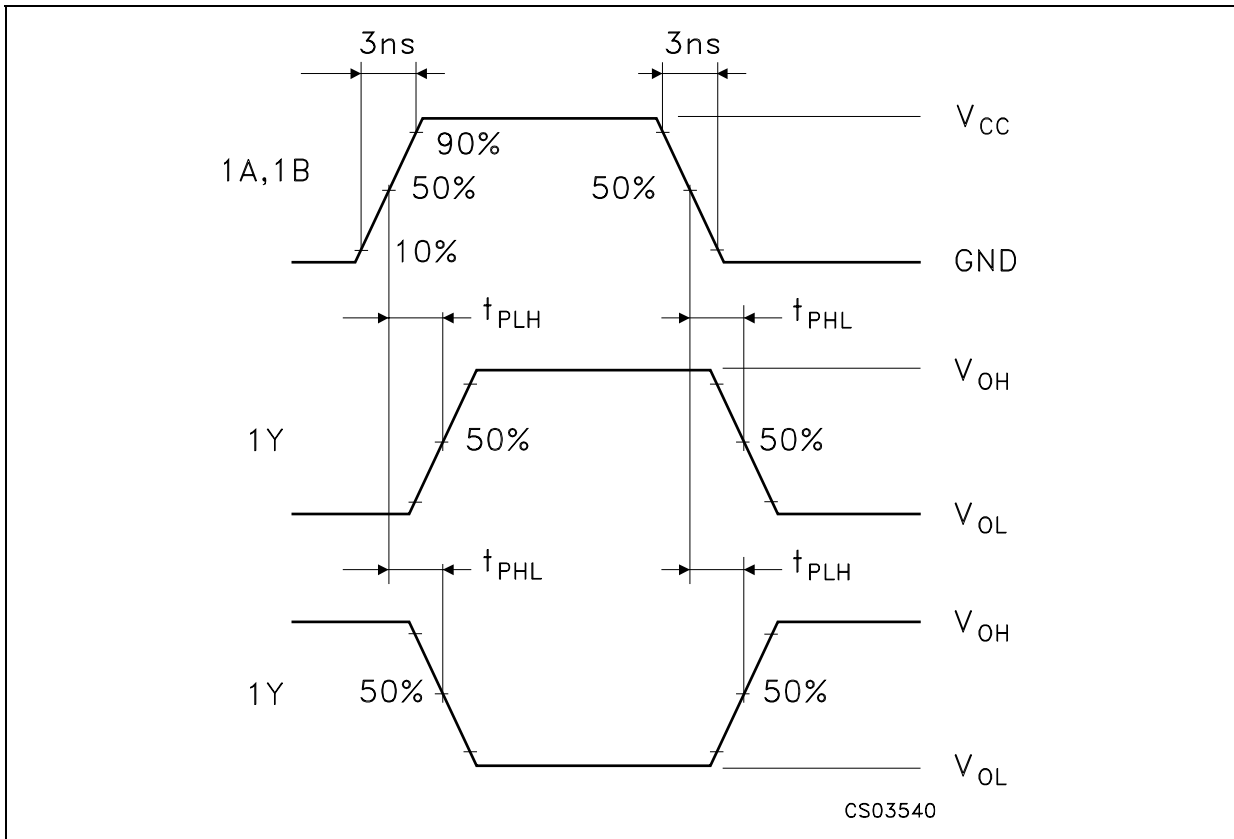
1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. I_{CC(opr)} = C_{PD} × V_{CC} × f_{IN} + I_{CC}

TEST CIRCUIT



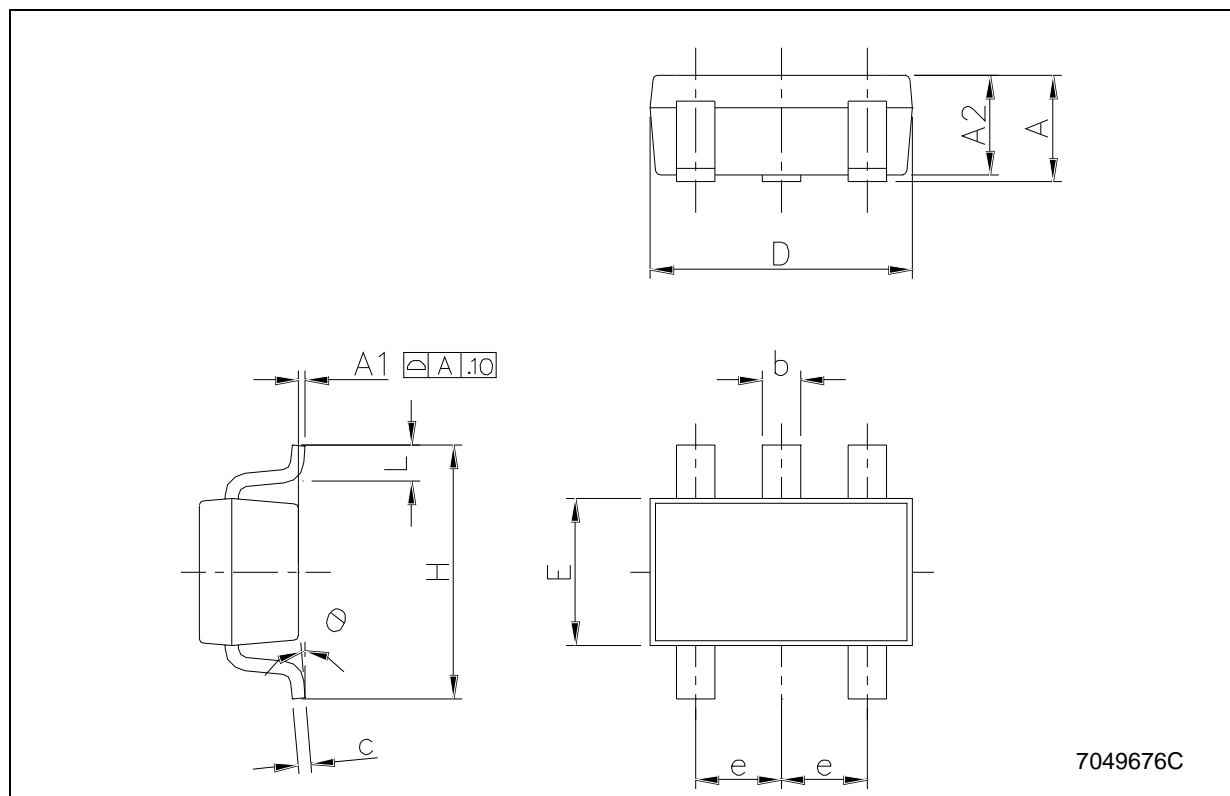
$C_L = 15/50\text{pF}$ or equivalent (includes jig and probe capacitance)
 $R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

WAVEFORM: PROPAGATION DELAY ($f=1\text{MHz}$; 50% duty cycle)



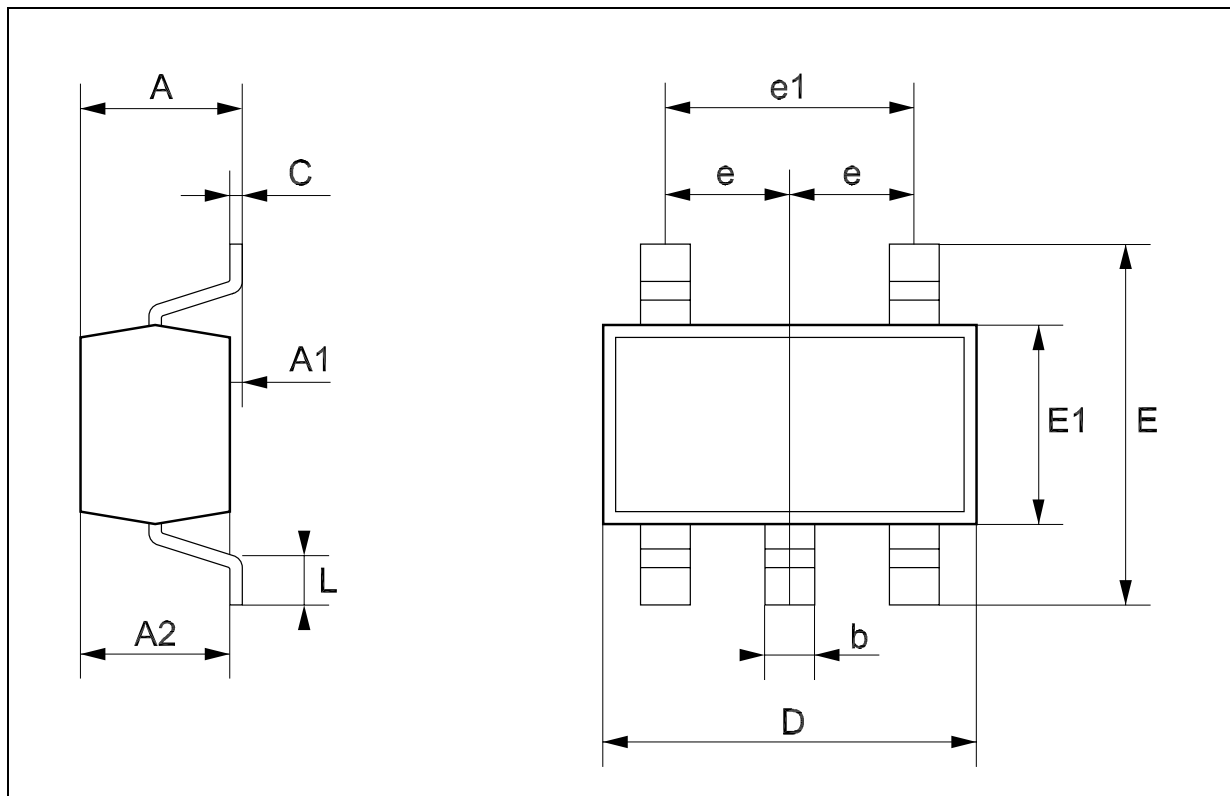
SOT23-5L MECHANICAL DATA

| DIM. | mm. | | | mils | | |
|------|------|------|------|-------|------|-------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | 0.90 | | 1.45 | 35.4 | | 57.1 |
| A1 | 0.00 | | 0.10 | 0.0 | | 3.9 |
| A2 | 0.90 | | 1.30 | 35.4 | | 51.2 |
| b | 0.35 | | 0.50 | 13.7 | | 19.7 |
| C | 0.09 | | 0.20 | 3.5 | | 7.8 |
| D | 2.80 | | 3.00 | 110.2 | | 118.1 |
| E | 1.50 | | 1.75 | 59.0 | | 68.8 |
| e | | 0.95 | | | 37.4 | |
| H | 2.60 | | 3.00 | 102.3 | | 118.1 |
| L | 0.10 | | 0.60 | 3.9 | | 23.6 |



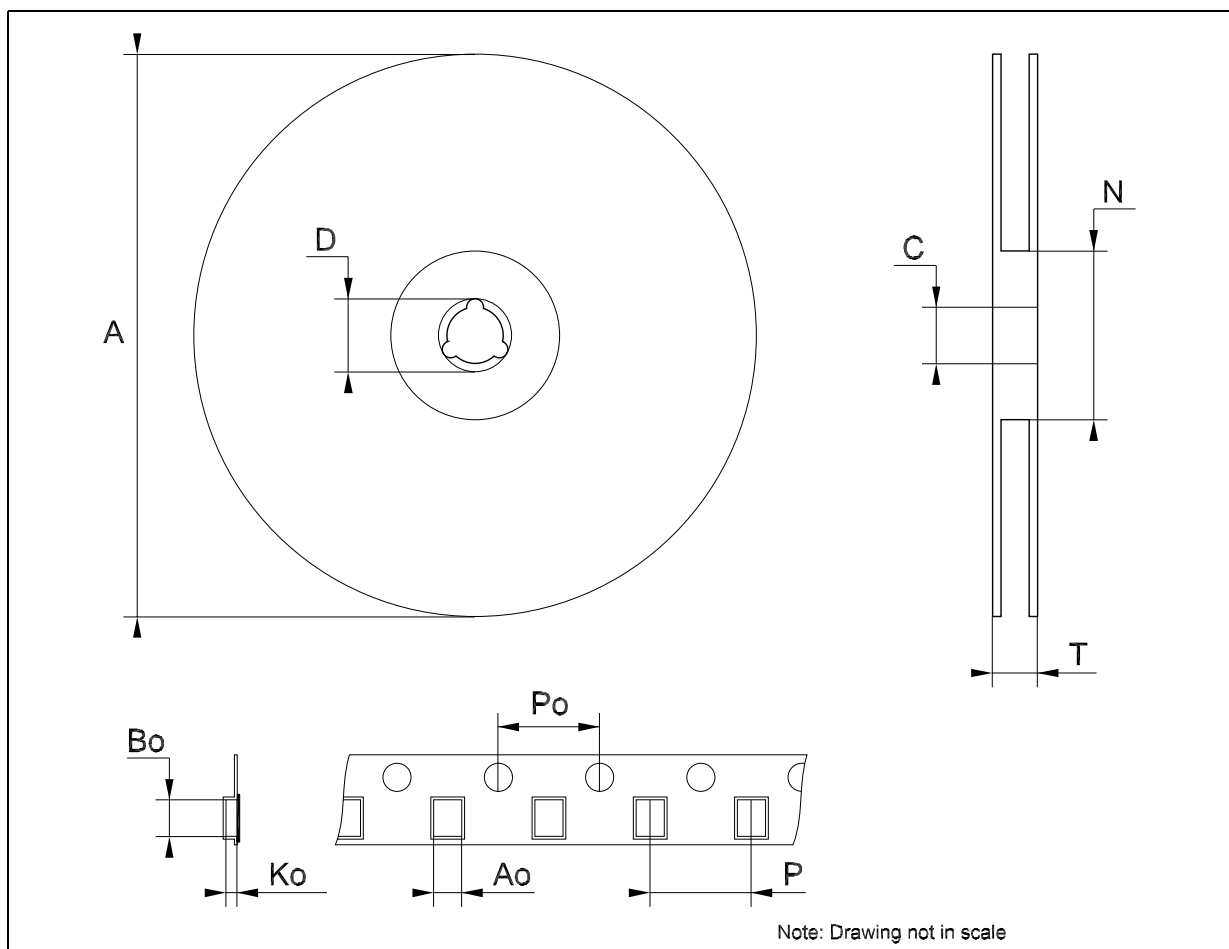
SOT323-5L MECHANICAL DATA

| DIM. | mm. | | | mils | | |
|------|------|------|------|------|------|------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | 0.80 | | 1.10 | 31.5 | | 43.3 |
| A1 | 0.00 | | 0.10 | 0.0 | | 3.9 |
| A2 | 0.80 | | 1.00 | 31.5 | | 39.4 |
| b | 0.15 | | 0.30 | 5.9 | | 11.8 |
| C | 0.10 | | 0.18 | 3.9 | | 7.1 |
| D | 1.80 | | 2.20 | 70.9 | | 86.6 |
| E | 1.80 | | 2.40 | 70.9 | | 94.5 |
| E1 | 1.15 | | 1.35 | 45.3 | | 53.1 |
| e | | 0.65 | | | 25.6 | |
| e1 | | 1.3 | | | 51.2 | |
| L | 0.10 | | 0.30 | 3.9 | | 11.8 |



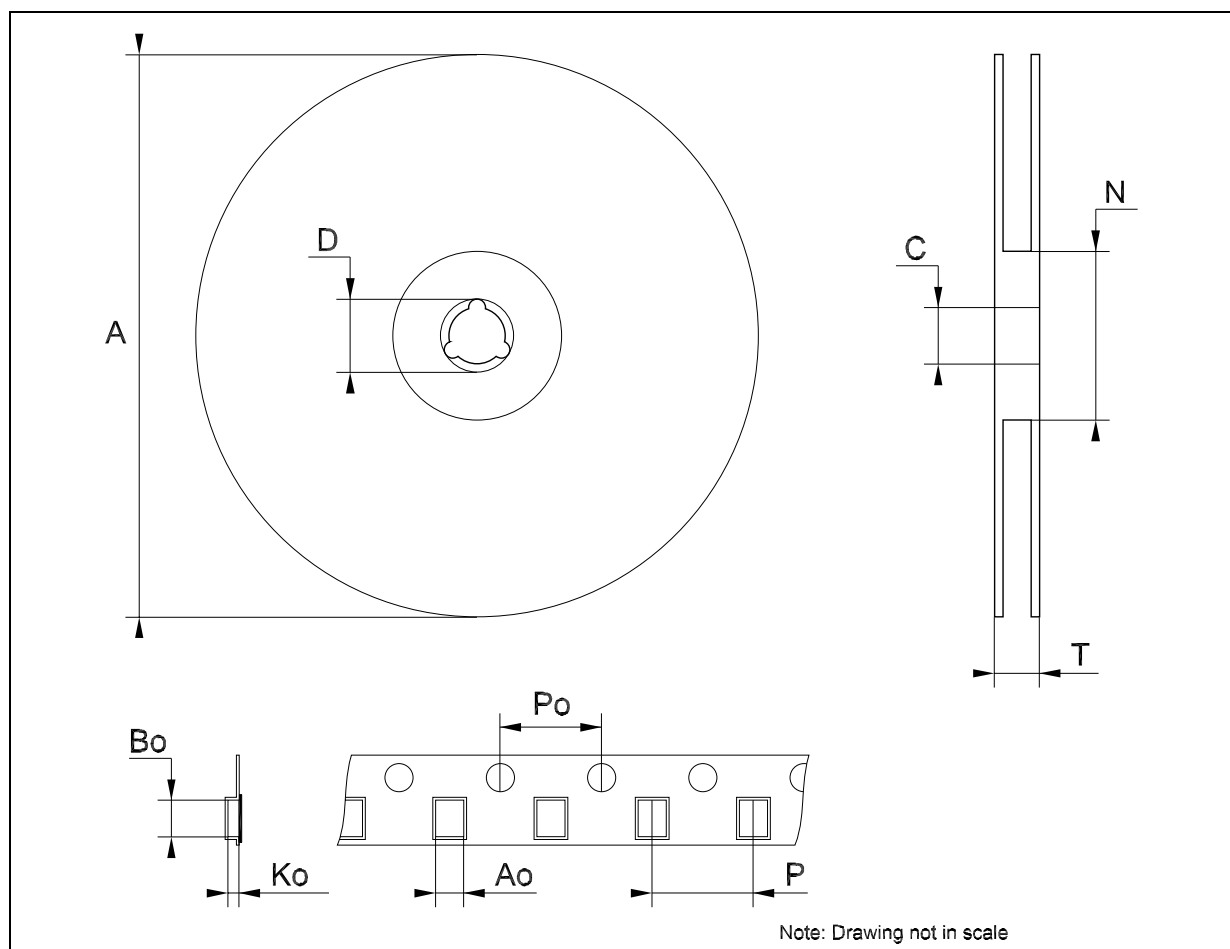
Tape & Reel SOT23-xL MECHANICAL DATA

| 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 |



Tape & Reel SOT323-xL MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|------|------|------|------|-------|-------|-------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| A | 175 | 180 | 185 | 6.889 | 7.086 | 7.283 |
| C | 12.8 | 13 | 13.2 | 0.504 | 0.512 | 0.519 |
| D | 20.2 | | | 0.795 | | |
| N | 59.5 | 60 | 60.5 | | 2.362 | |
| T | | | 14.4 | | | 0.567 |
| Ao | | 2.25 | | | 0.088 | |
| Bo | | 2.7 | | | 0.106 | |
| Ko | | 1.2 | | | 0.047 | |
| Po | 3.9 | 4 | 4.1 | 0.153 | 0.157 | 0.161 |
| P | 3.8 | 4 | 4.2 | 0.149 | 0.157 | 0.165 |



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