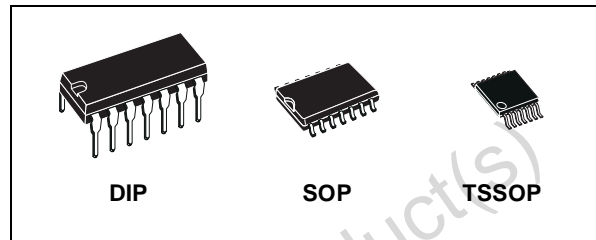




M74HCT132

QUAD 2-INPUT SCHMITT NAND GATE

- HIGH SPEED:
 $t_{PD} = 19\text{ns}$ (TYP.) at $V_{CC} = 4.5\text{V}$
- LOW POWER DISSIPATION:
 $I_{CC} = 1\mu\text{A}$ (MAX.) at $T_A = 25^\circ\text{C}$
- HIGH NOISE IMMUNITY :
 $V_H = 0.7\text{V}$ (TYP) at $V_{CC} = 4.5\text{V}$
- BALANCED PROPAGATION DELAYS:
 $t_{PLH} \cong t_{PHL}$
- SYMMETRICAL OUTPUT IMPEDANCE:
 $|I_{OH}| = I_{OL} = 4\text{mA}$ (MIN)
- PIN AND FUNCTION COMPATIBLE WITH
74 SERIES 132



ORDER CODES

| PACKAGE | TUBE | T & R |
|---------|--------------|-----------------|
| DIP | M74HCT132B1R | |
| SOP | M74HCT132M1R | M74HCT132RM13TR |
| TSSOP | | M74HCT132TTR |

DESCRIPTION

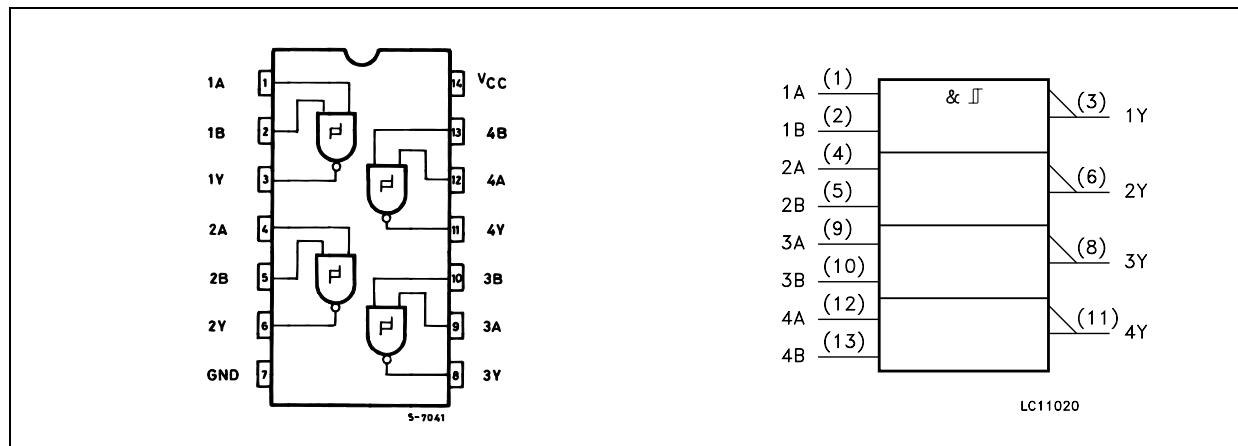
The M74HCT132 is an high speed CMOS QUAD 2-INPUT SCHMITT NAND GATE fabricated with silicon gate C²MOS technology.

Pin configuration and function are the same as those of the M74HCT00. The hysteresis characteristics (around 20% V_{CC}) of all inputs allow slowly changing input signals to be transformed into sharply defined jitter-free output signals.

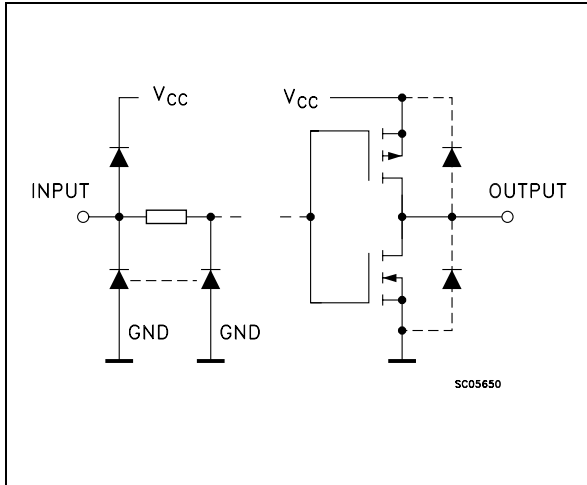
The M74HCT132 is designed to directly interface HSC²MOS systems with TTL and NMOS components.

All inputs are equipped with protection circuits against static discharge and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS



INPUT AND OUTPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

| PIN No | SYMBOL | NAME AND FUNCTION |
|--------------|-----------------|-------------------------|
| 1, 4, 9, 12 | 1A to 4A | Data Inputs |
| 2, 5, 10, 13 | 1B to 4B | Data Inputs |
| 3, 6, 8, 11 | 1Y to 4Y | Data Outputs |
| 7 | GND | Ground (0V) |
| 14 | V _{CC} | Positive Supply Voltage |

TRUTH TABLE

| A | B | Y |
|---|---|---|
| L | L | H |
| L | H | H |
| H | L | H |
| H | H | L |

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|-------------------------------------|--------------------------------------|-------------------------------|------|
| V _{CC} | Supply Voltage | -0.5 to +7 | V |
| V _I | DC Input Voltage | -0.5 to V _{CC} + 0.5 | 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 | ± 25 | mA |
| I _{CC} or I _{GND} | DC V _{CC} or Ground Current | ± 50 | mA |
| P _D | Power Dissipation | 500(*) | mW |
| T _{stg} | Storage Temperature | -65 to +150 | °C |
| T _L | Lead Temperature (10 sec) | 300 | °C |

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied
 (*) 500mW at 65 °C; derate to 300mW by 10mW/°C from 65°C to 85°C

RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Value | Unit |
|-----------------|-----------------------|----------------------|------|
| V _{CC} | Supply Voltage | 4.5 to 5.5 | V |
| V _I | Input Voltage | 0 to V _{CC} | V |
| V _O | Output Voltage | 0 to V _{CC} | V |
| T _{op} | Operating Temperature | -55 to 125 | °C |

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 _P | High Level Threshold Voltage | 4.5 | | 1.2 | 1.55 | 1.9 | 1.2 | 1.9 | 1.2 | 1.9 | V |
| | | 5.5 | | 1.4 | 1.75 | 2.1 | 1.4 | 2.1 | 1.4 | 2.1 | |
| V _N | Low Level Threshold Voltage | 4.5 | | 0.5 | 0.85 | 1.2 | 0.5 | 1.2 | 0.5 | 1.2 | V |
| | | 5.5 | | 0.6 | 1.1 | 1.4 | 0.6 | 1.4 | 0.6 | 1.4 | |
| V _H | Hysteresis Voltage | 4.5 | | 0.4 | 0.7 | 1.4 | 0.4 | 1.4 | 0.4 | 1.4 | V |
| | | 5.5 | | 0.4 | 0.7 | 1.5 | 0.4 | 1.5 | 0.4 | 1.5 | |
| V _{OH} | High Level Output Voltage | 4.5 | I _O =-20 μA | 4.4 | 4.5 | | 4.4 | | 4.4 | | V |
| | | | I _O =-4.0 mA | 4.18 | 4.31 | | 4.13 | | 4.10 | | |
| V _{OL} | Low Level Output Voltage | 4.5 | I _O =20 μA | | 0.0 | 0.1 | | 0.1 | | 0.1 | V |
| | | | I _O =4.0 mA | | 0.17 | 0.26 | | 0.33 | | 0.40 | |
| I _I | Input Leakage Current | 5.5 | V _I = V _{CC} 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 (C_L = 50 pF, Input t_r = t_f = 6ns)

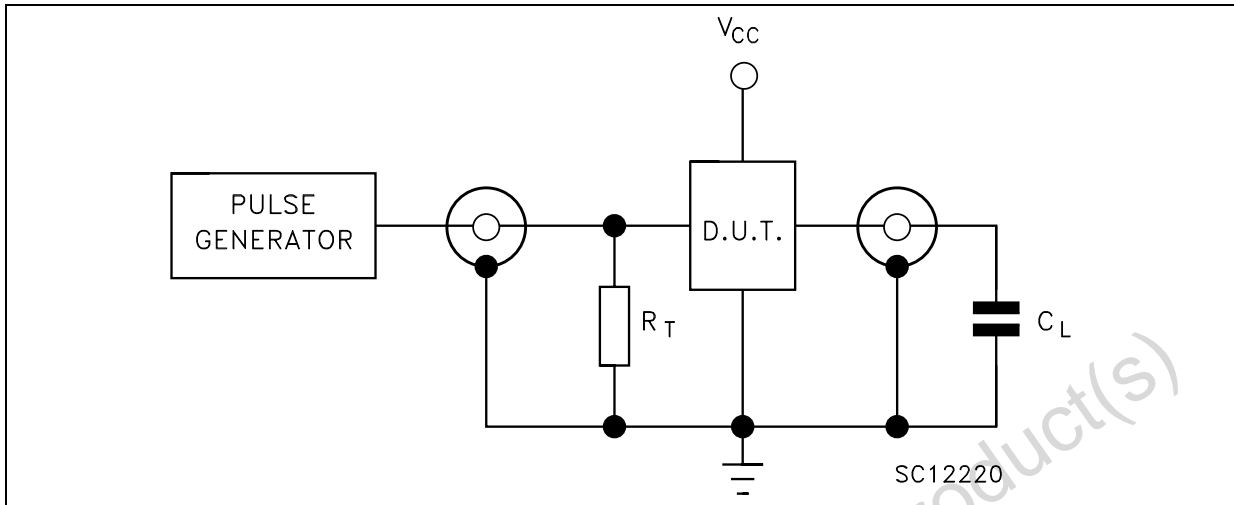
| Symbol | Parameter | Test Condition | | Value | | | | | | Unit | |
|-----------------------------------|------------------------|------------------------|--|-----------------------|------|------|-------------|------|--------------|------|------|
| | | V _{CC} (V) | | T _A = 25°C | | | -40 to 85°C | | -55 to 125°C | | |
| | | | | Min. | Typ. | Max. | Min. | Max. | Min. | | Max. |
| t _{TLH} t _{THL} | Output Transition Time | 4.5 | | | 8 | 15 | | 19 | | 22 | ns |
| t _{PLH} t _{PHL} | Propagation Delay Time | 4.5 | | | 19 | 30 | | 38 | | 45 | ns |

CAPACITIVE CHARACTERISTICS

| 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. |
| C _{IN} | Input Capacitance | | | | 5 | 10 | | 10 | | 10 | pF |
| C _{PD} | Power Dissipation Capacitance (note 1) | | | | 45 | | | | | | pF |

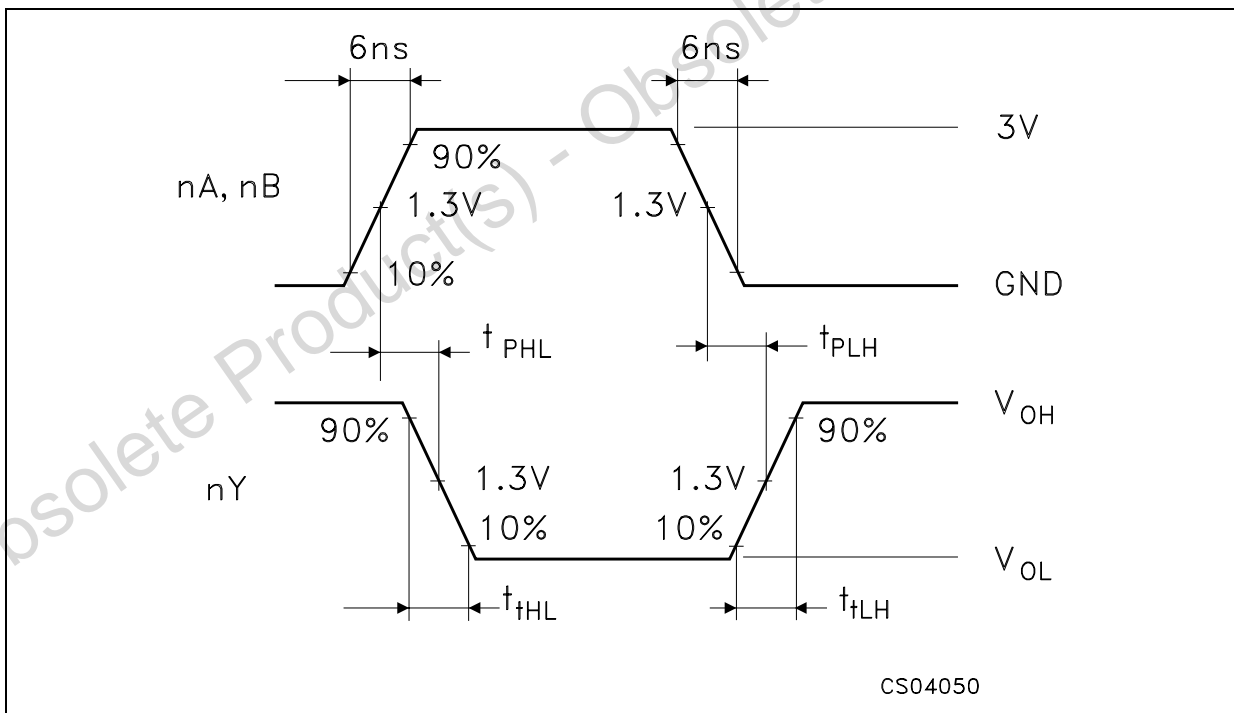
1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. I_{CC(oper)} = C_{PD} × V_{CC} × f_{IN} + I_{CC}

TEST CIRCUIT



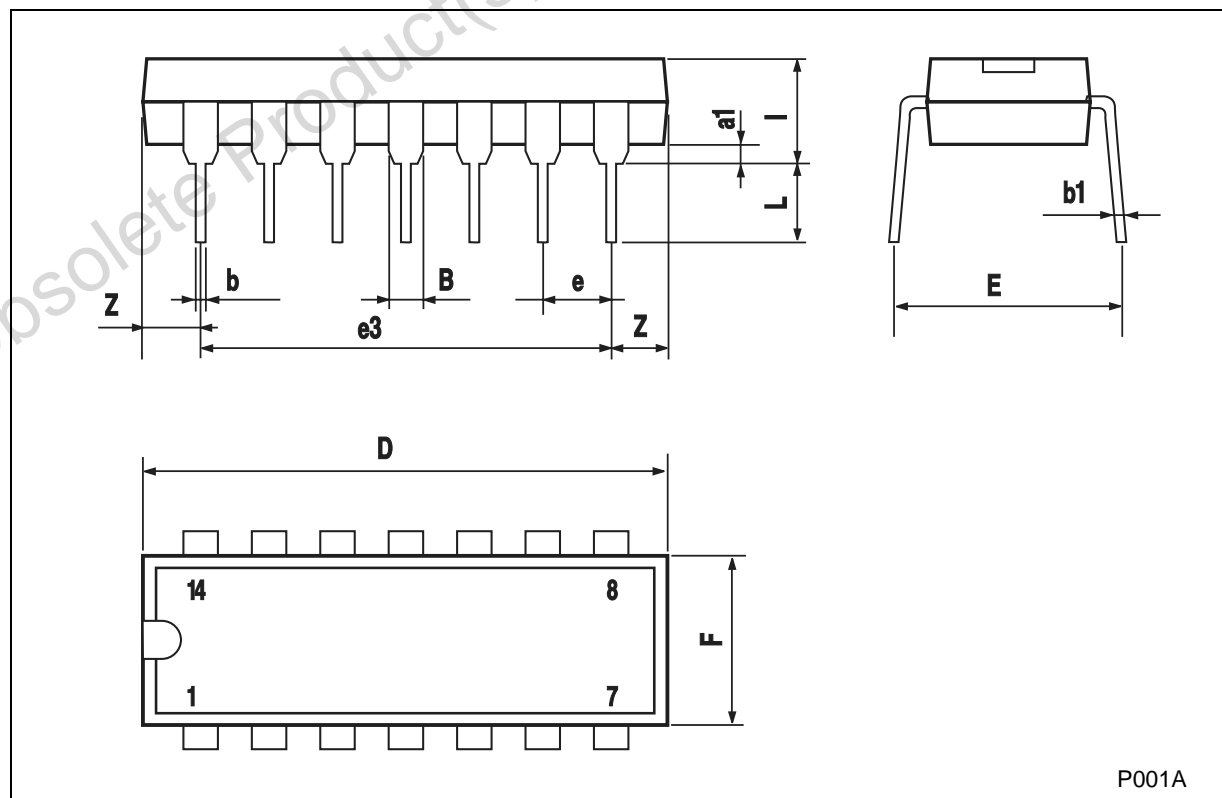
$C_L = 50\text{pF}$ or equivalent (includes jig and probe capacitance)
 $R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

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



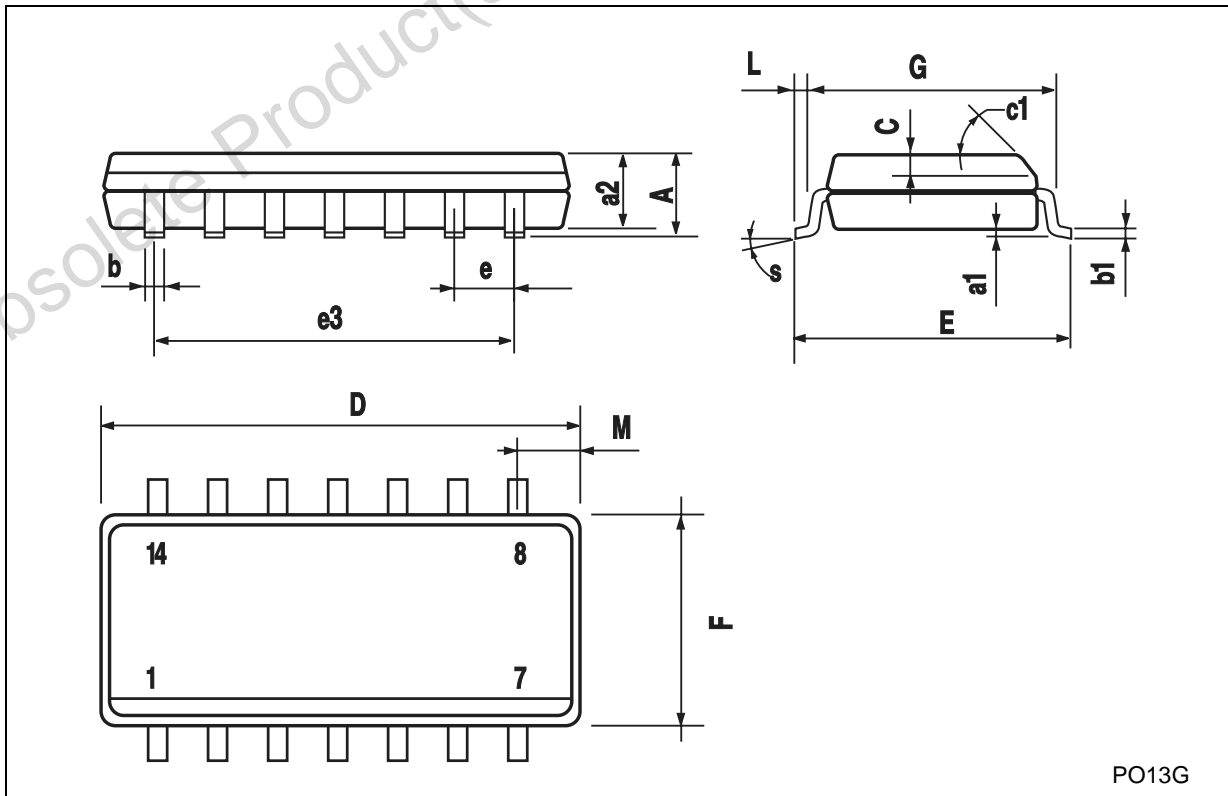
| | | | | | | |
|---------------------------------------|--|--|--|--|--|--|
| Plastic DIP-14 MECHANICAL DATA | | | | | | |
|---------------------------------------|--|--|--|--|--|--|

| DIM. | mm. | | | inch | | |
|------|------|-------|------|-------|-------|-------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| a1 | 0.51 | | | 0.020 | | |
| B | 1.39 | | 1.65 | 0.055 | | 0.065 |
| b | | 0.5 | | | 0.020 | |
| b1 | | 0.25 | | | 0.010 | |
| D | | | 20 | | | 0.787 |
| E | | 8.5 | | | 0.335 | |
| e | | 2.54 | | | 0.100 | |
| e3 | | 15.24 | | | 0.600 | |
| F | | | 7.1 | | | 0.280 |
| I | | | 5.1 | | | 0.201 |
| L | | 3.3 | | | 0.130 | |
| Z | 1.27 | | 2.54 | 0.050 | | 0.100 |



SO-14 MECHANICAL DATA

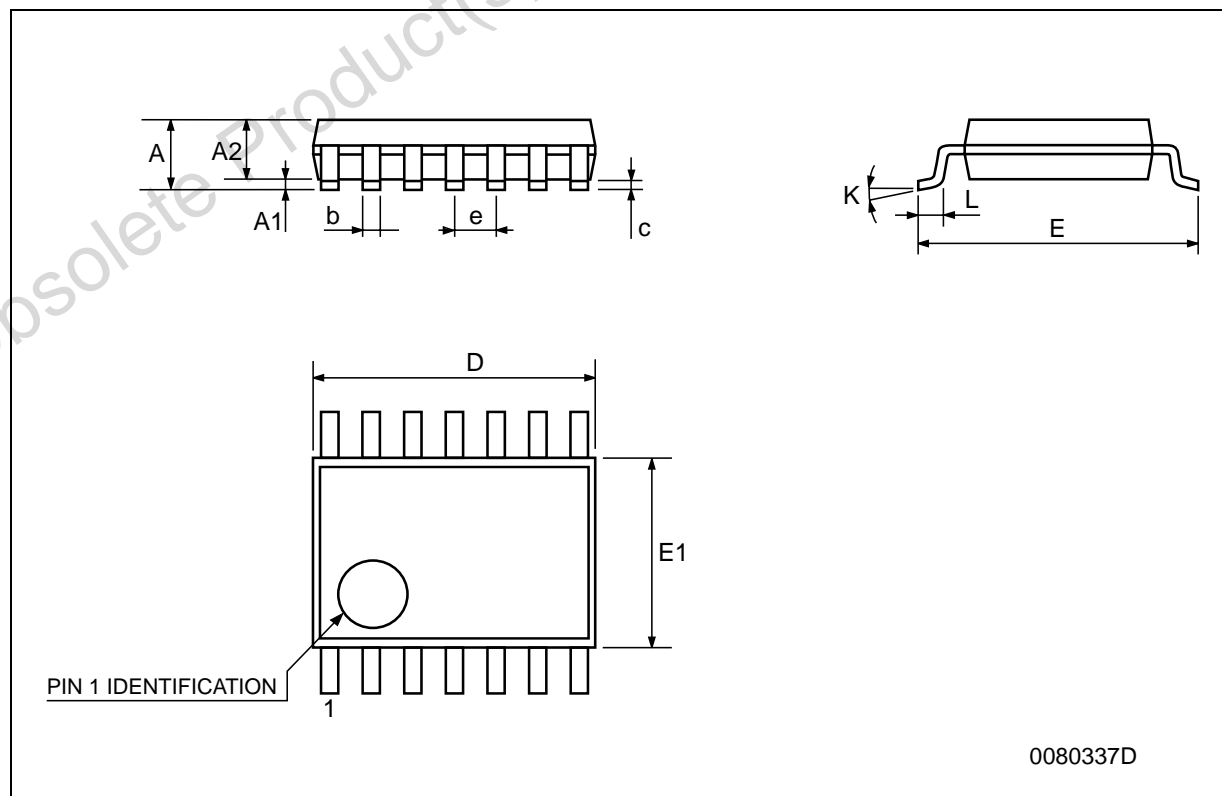
| DIM. | mm. | | | inch | | |
|------|------------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.75 | | | 0.068 |
| a1 | 0.1 | | 0.2 | 0.003 | | 0.007 |
| a2 | | | 1.65 | | | 0.064 |
| b | 0.35 | | 0.46 | 0.013 | | 0.018 |
| b1 | 0.19 | | 0.25 | 0.007 | | 0.010 |
| C | | 0.5 | | | 0.019 | |
| c1 | 45° (typ.) | | | | | |
| D | 8.55 | | 8.75 | 0.336 | | 0.344 |
| E | 5.8 | | 6.2 | 0.228 | | 0.244 |
| e | | 1.27 | | | 0.050 | |
| e3 | | 7.62 | | | 0.300 | |
| F | 3.8 | | 4.0 | 0.149 | | 0.157 |
| G | 4.6 | | 5.3 | 0.181 | | 0.208 |
| L | 0.5 | | 1.27 | 0.019 | | 0.050 |
| M | | | 0.68 | | | 0.026 |
| S | 8° (max.) | | | | | |



PO13G

TSSOP14 MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|------|------|----------|------|-------|------------|--------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.2 | | | 0.047 |
| A1 | 0.05 | | 0.15 | 0.002 | 0.004 | 0.006 |
| A2 | 0.8 | 1 | 1.05 | 0.031 | 0.039 | 0.041 |
| b | 0.19 | | 0.30 | 0.007 | | 0.012 |
| c | 0.09 | | 0.20 | 0.004 | | 0.0089 |
| D | 4.9 | 5 | 5.1 | 0.193 | 0.197 | 0.201 |
| E | 6.2 | 6.4 | 6.6 | 0.244 | 0.252 | 0.260 |
| E1 | 4.3 | 4.4 | 4.48 | 0.169 | 0.173 | 0.176 |
| e | | 0.65 BSC | | | 0.0256 BSC | |
| K | 0° | | 8° | 0° | | 8° |
| L | 0.45 | 0.60 | 0.75 | 0.018 | 0.024 | 0.030 |



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