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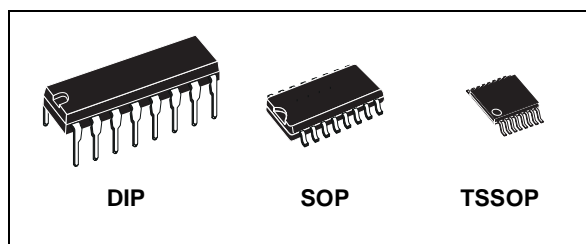
sales@integrated-circuit.com



M74HC155

DUAL 2 TO 4 LINE DECODER 3 TO 8 LINE DECODER

- HIGH SPEED:
 $t_{PD} = 13ns$ (TYP.) at $V_{CC} = 6V$
- LOW POWER DISSIPATION:
 $I_{CC} = 4\mu A$ (MAX.) at $T_A = 25^\circ C$
- HIGH NOISE IMMUNITY:
 $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (MIN.)
- SYMMETRICAL OUTPUT IMPEDANCE:
 $|I_{OH}| = I_{OL} = 4mA$ (MIN)
- BALANCED PROPAGATION DELAYS:
 $t_{PLH} \approx t_{PHL}$
- WIDE OPERATING VOLTAGE RANGE:
 V_{CC} (OPR) = 2V to 6V
- PIN AND FUNCTION COMPATIBLE WITH
 74 SERIES 155



ORDER CODES

| PACKAGE | TUBE | 1 & R |
|---------|-------------|----------------|
| DIP | M74HC155B1R | |
| SOP | M74HC155M1R | M74HC155RM13TR |
| TSSOP | | M74HC155TTR |

DESCRIPTION

The M74HC155 is an high speed CMOS QUAD 2-INPUT NAND GATE fabricated with silicon gate C²MOS technology.

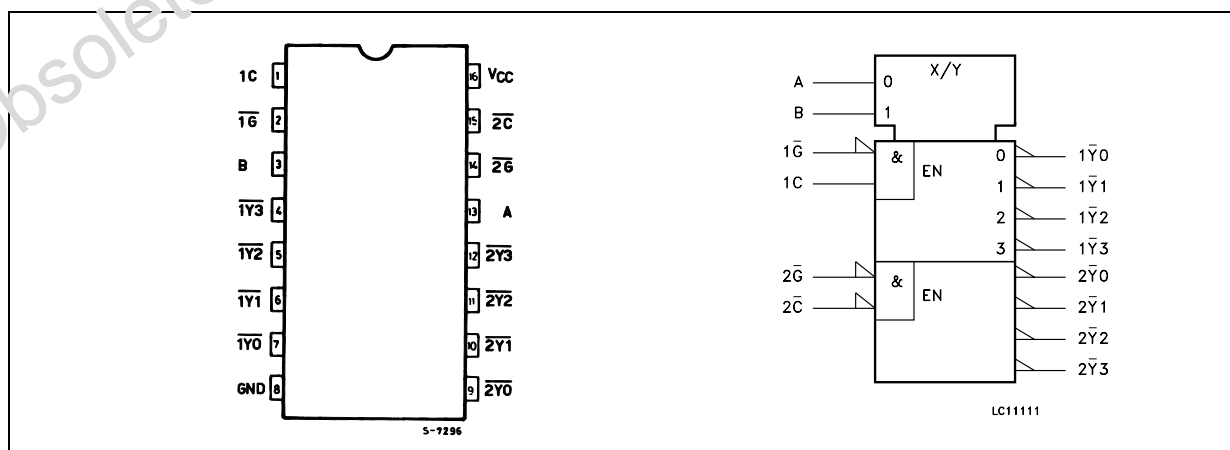
It features dual 1 to 4 line demultiplexers with individual strobe inputs (1G and 2G), individual data inputs (1C and 2C) and common binary address inputs (A and B).

When both decoders are enabled by the strobes, the inverted output of 1C data and non-inverted output of 2C data will be brought to the select

output pins of each sections. A 1 to 8 line demultiplexer can also easily be built up by providing a data signal to both 1C and 2C inputs; the output order from the msb is 1Y3, 1Y2, 1Y1, 1Y0, 2Y3, 2Y2, 2Y1, 2Y0. This device can be used as a 2 to 4 line decoder or a 3 to 8 line decoder when 1C is held high and 2C is held low.

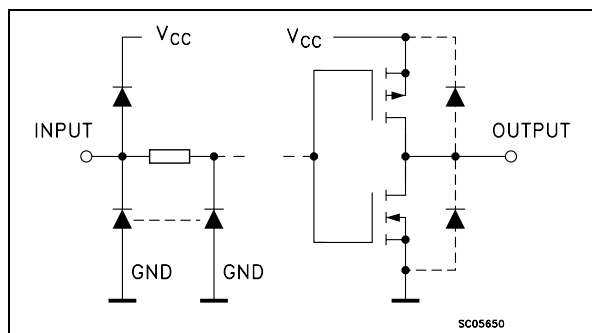
All inputs are equipped with protection circuits against static discharge and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS



M74HC155

INPUT AND OUTPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

| PIN No | SYMBOL | NAME AND FUNCTION |
|---------------|-----------------|-------------------------|
| 1, 15 | 1C to 2C | Data Inputs |
| 2, 14 | 1G, 2G | Strobe Inputs |
| 3, 13 | B, A | Common Data Inputs |
| 7, 6, 5, 4 | 1Y0 to 1Y3 | Outputs |
| 9, 10, 11, 12 | 2Y0 to 2Y3 | Outputs |
| 8 | GND | Ground (0V) |
| 16 | V _{CC} | Positive Supply Voltage |

TRUTH TABLE

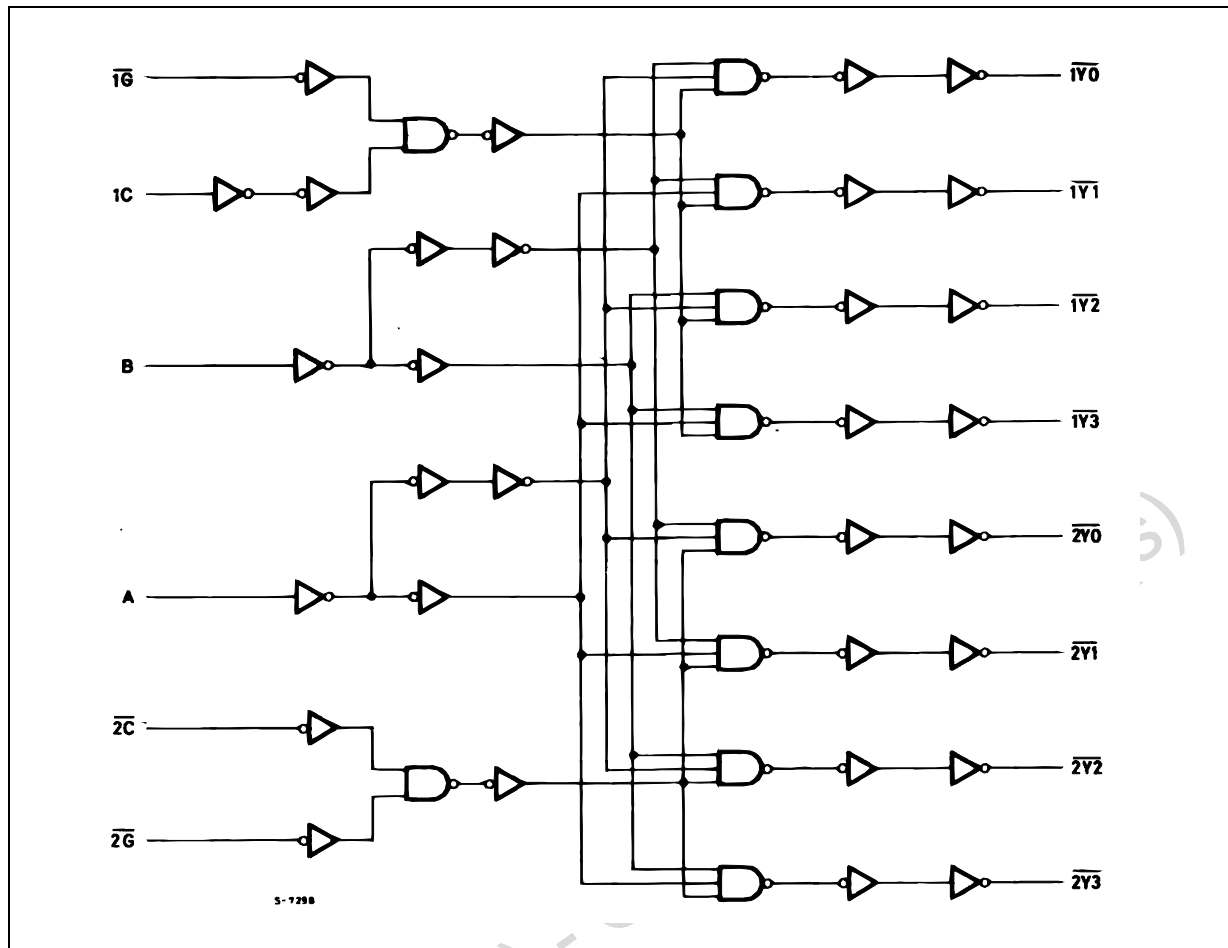
| INPUTS | | | | OUTPUTS | | | |
|--------|---|----|----|---------|-----|-----|-----|
| B | A | 1G | 1C | 1Y0 | 1Y1 | 1Y2 | 1Y3 |
| X | X | H | X | H | H | H | H |
| L | L | L | H | L | H | H | H |
| L | H | L | H | H | L | H | H |
| H | L | L | H | H | H | L | H |
| H | H | L | H | H | H | H | L |
| X | X | X | L | H | H | H | H |

TRUTH TABLE

| INPUTS | | | | OUTPUTS | | | |
|--------|---|----|----|---------|-----|-----|-----|
| B | A | 2G | 2C | 2Y0 | 2Y1 | 2Y2 | 2Y3 |
| X | X | H | X | H | H | H | H |
| L | L | L | L | L | H | H | H |
| L | H | L | L | H | L | H | H |
| H | L | L | L | H | H | L | H |
| H | H | L | L | H | H | H | L |
| X | X | X | H | H | H | H | H |

M74HC155

LOGIC DIAGRAM



This logic diagram has not be used to estimate propagation delays

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 | $^{\circ}C$ |
| T_L | Lead Temperature (10 sec) | 300 | $^{\circ}C$ |

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 $^{\circ}C$; derate to 300mW by 10mW/ $^{\circ}C$ from 65 $^{\circ}C$ to 85 $^{\circ}C$

M74HC155
RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Value | Unit | |
|------------|--------------------------|-----------------|-----------|----|
| V_{CC} | Supply Voltage | 2 to 6 | 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 | |
| t_r, t_f | Input Rise and Fall Time | $V_{CC} = 2.0V$ | 0 to 1000 | ns |
| | | $V_{CC} = 4.5V$ | 0 to 500 | ns |
| | | $V_{CC} = 6.0V$ | 0 to 400 | ns |

DC SPECIFICATIONS

| Symbol | Parameter | Test Condition | | Value | | | | | | Unit | |
|----------|---------------------------|-----------------|-----------------------|--------------------|------|-----------|-----------------------|---------|------------------------|---------|---------|
| | | V_{CC} (V) | | $T_A = 25^\circ C$ | | | -40 to $85^\circ C$ | | -55 to $125^\circ C$ | | |
| | | | | Min. | Typ. | Max. | Min. | Max. | Min. | | Max. |
| V_{IH} | High Level Input Voltage | 2.0 | | 1.5 | | | 1.5 | | 1.5 | | V |
| | | 4.5 | | 3.15 | | | 3.15 | | 3.15 | | |
| | | 6.0 | | 4.2 | | | 4.2 | | 4.2 | | |
| V_{IL} | Low Level Input Voltage | 2.0 | | | | 0.5 | | 0.5 | | 0.5 | V |
| | | 4.5 | | | | 1.35 | | 1.35 | | 1.35 | |
| | | 6.0 | | | | 1.8 | | 1.8 | | 1.8 | |
| V_{OH} | High Level Output Voltage | 2.0 | $I_O = -20 \mu A$ | 1.9 | 2.0 | | 1.9 | | 1.9 | | V |
| | | 4.5 | $I_O = -20 \mu A$ | 4.4 | 4.5 | | 4.4 | | 4.4 | | |
| | | 6.0 | $I_O = -20 \mu A$ | 5.9 | 6.0 | | 5.9 | | 5.9 | | |
| | | 4.5 | $I_O = -4.0 mA$ | 4.18 | 4.31 | | 4.13 | | 4.10 | | |
| | | 6.0 | $I_O = -5.2 mA$ | 5.68 | 5.8 | | 5.63 | | 5.60 | | |
| V_{OL} | Low Level Output Voltage | 2.0 | $I_O = 20 \mu A$ | | 0.0 | 0.1 | | 0.1 | | 0.1 | V |
| | | 4.5 | $I_O = 20 \mu A$ | | 0.0 | 0.1 | | 0.1 | | 0.1 | |
| | | 6.0 | $I_O = 20 \mu A$ | | 0.0 | 0.1 | | 0.1 | | 0.1 | |
| | | 4.5 | $I_O = 4.0 mA$ | | 0.17 | 0.26 | | 0.33 | | 0.40 | |
| | | 6.0 | $I_O = 5.2 mA$ | | 0.18 | 0.26 | | 0.33 | | 0.40 | |
| I_I | Input Leakage Current | 6.0 | $V_I = V_{CC}$ or GND | | | ± 0.1 | | ± 1 | | ± 1 | μA |
| I_{CC} | Quiescent Supply Current | 6.0 | $V_I = V_{CC}$ or GND | | | 4 | | 40 | | 80 | μA |

AC ELECTRICAL CHARACTERISTICS ($C_L = 50 pF$, Input $t_r = t_f = 6ns$)

| Symbol | Parameter | Test Condition | | Value | | | | | | Unit | |
|-------------------|------------------------|-----------------|--|--------------------|------|------|-----------------------|------|------------------------|------|------|
| | | V_{CC} (V) | | $T_A = 25^\circ C$ | | | -40 to $85^\circ C$ | | -55 to $125^\circ C$ | | |
| | | | | Min. | Typ. | Max. | Min. | Max. | Min. | | Max. |
| $t_{TLH} t_{THL}$ | Output Transition Time | 2.0 | | | 30 | 75 | | 95 | | 110 | ns |
| | | 4.5 | | | 8 | 15 | | 19 | | 22 | |
| | | 6.0 | | | 7 | 13 | | 16 | | 19 | |
| $t_{PLH} t_{PHL}$ | Propagation Delay Time | 2.0 | | | 45 | 130 | | 165 | | 195 | ns |
| | | 4.5 | | | 15 | 26 | | 33 | | 39 | |
| | | 6.0 | | | 13 | 22 | | 28 | | 33 | |

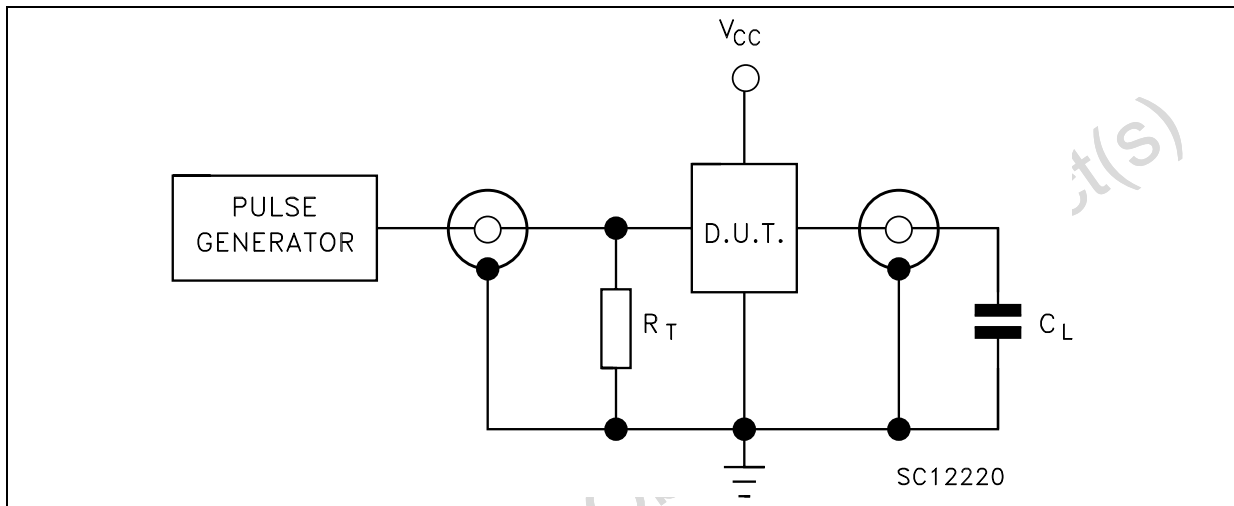
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CAPACITIVE CHARACTERISTICS

| 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 | 5.0 | | | 5 | 10 | | 10 | | 10 | pF |
| C _{PD} | Power Dissipation Capacitance (note 1) | 5.0 | | | 53 | | | | | | pF |

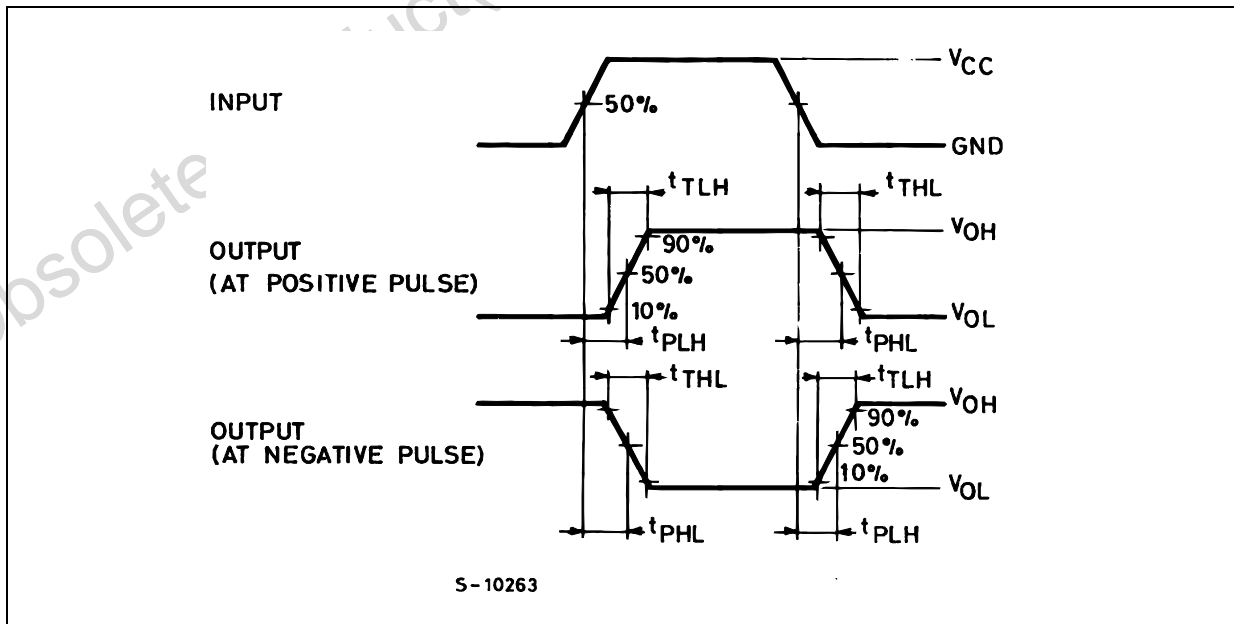
1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. I_{CC(oper)} = C_{PD} × V_{CC} × f_{IN} + I_{CC}

TEST CIRCUIT



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

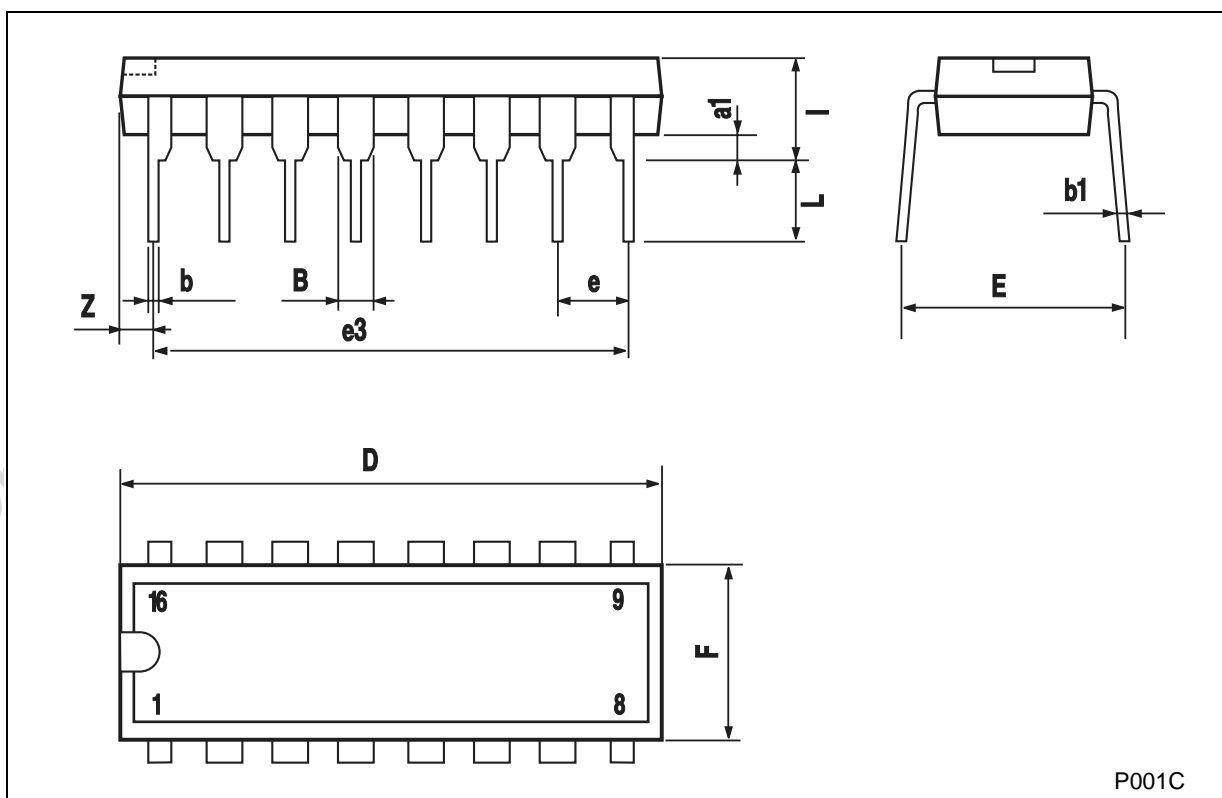
WAVEFORM : PROPAGATION DELAY TIME (f=1MHz; 50% duty cycle)



M74HC155

Plastic DIP-16 (0.25) MECHANICAL DATA

| DIM. | mm. | | | inch | | |
|------|------|-------|------|-------|-------|-------|
| | MIN. | TYP | MAX. | MIN. | TYP. | MAX. |
| a1 | 0.51 | | | 0.020 | | |
| B | 0.77 | | 1.65 | 0.030 | | 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 | | 17.78 | | | 0.700 | |
| F | | | 7.1 | | | 0.280 |
| l | | | 5.1 | | | 0.201 |
| L | | 3.3 | | | 0.130 | |
| Z | | | 1.27 | | | 0.050 |

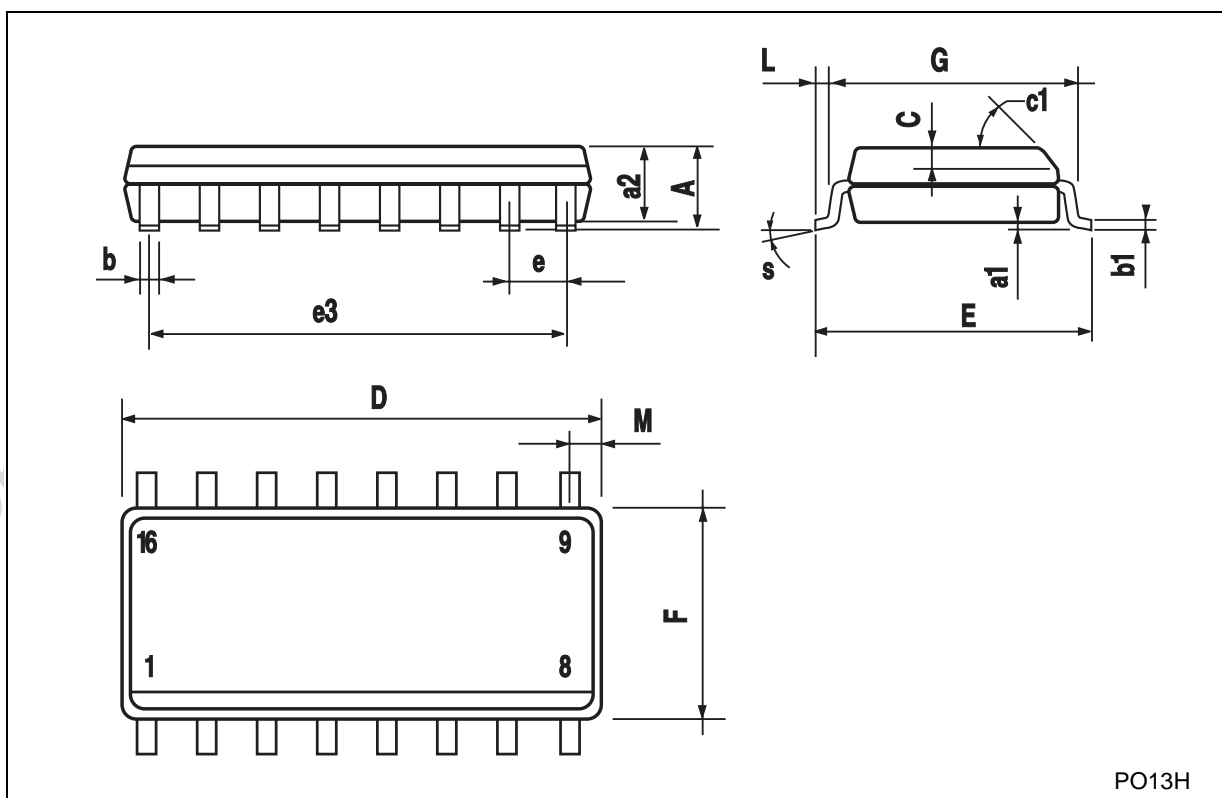


P001C

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SO-16 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 | 9.8 | | 10 | 0.385 | | 0.393 |
| E | 5.8 | | 6.2 | 0.228 | | 0.244 |
| e | | 1.27 | | | 0.050 | |
| e3 | | 8.89 | | | 0.350 | |
| 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 | | | 0.62 | | | 0.024 |
| S | 8° (max.) | | | | | |

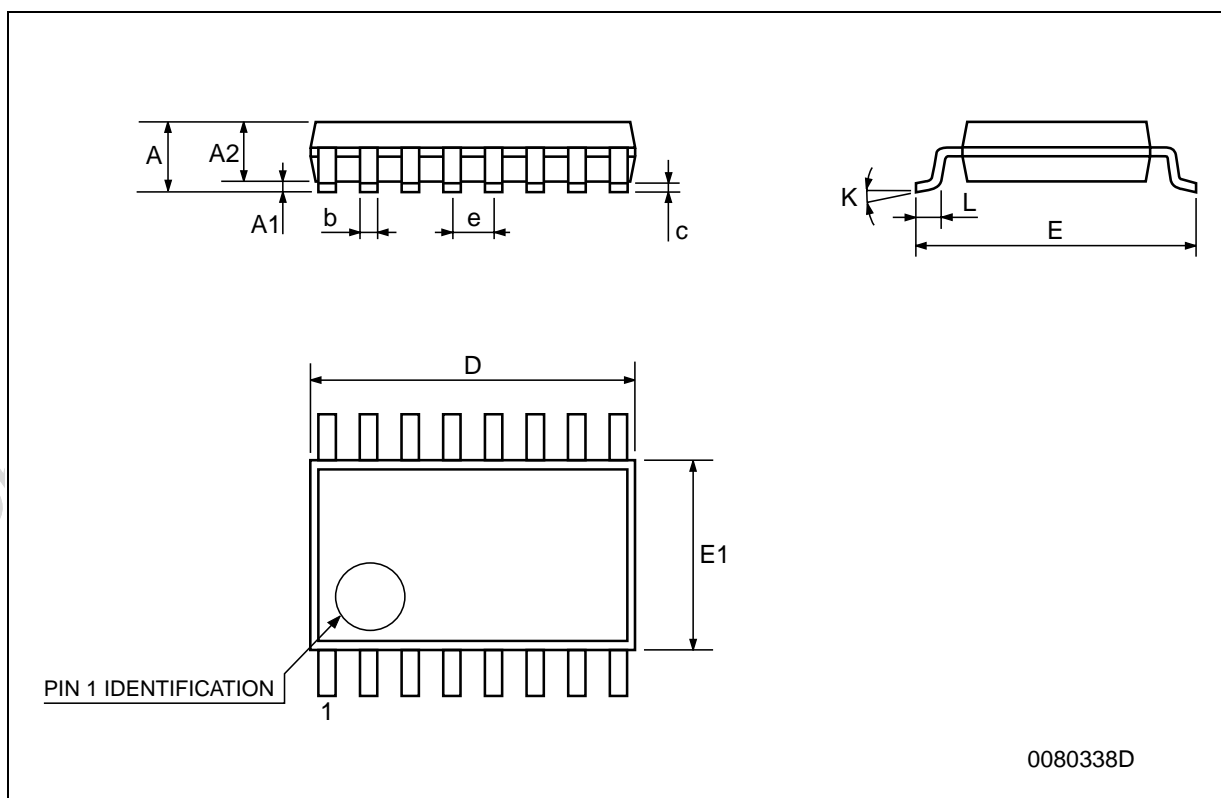


PO13H

M74HC155

TSSOP16 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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