

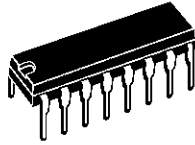
QUAD 2 CHANNEL MULTIPLEXER

- HIGH SPEED: $t_{PD} = 4 \text{ ns}$ (TYP.) at $V_{CC} = 5V$
- LOW POWER DISSIPATION:
 $I_{CC} = 8 \mu A$ (MAX.) at $T_A = 25^\circ C$
- HIGH NOISE IMMUNITY:
 $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (MIN.)
- 50Ω TRANSMISSION LINE DRIVING CAPABILITY
- SYMMETRICAL OUTPUT IMPEDANCE:
 $|I_{OH}| = I_{OL} = 24 \text{ mA}$ (MIN)
- BALANCED PROPAGATION DELAYS:
 $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE:
 V_{CC} (OPR) = 2V to 6V
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 157
- IMPROVED LATCH-UP IMMUNITY

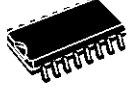
DESCRIPTION

The AC157 is an high-speed CMOS QUAD 2-CHANNEL MULTIPLEXER fabricated with sub-micron silicon gate and double-layer metal wiring C²MOS technology. It is ideal for low power applications maintaining high speed operation similar to equivalent Bipolar Schottky TTL.

PRELIMINARY DATA



B
(Plastic Package)



M
(Micro Package)

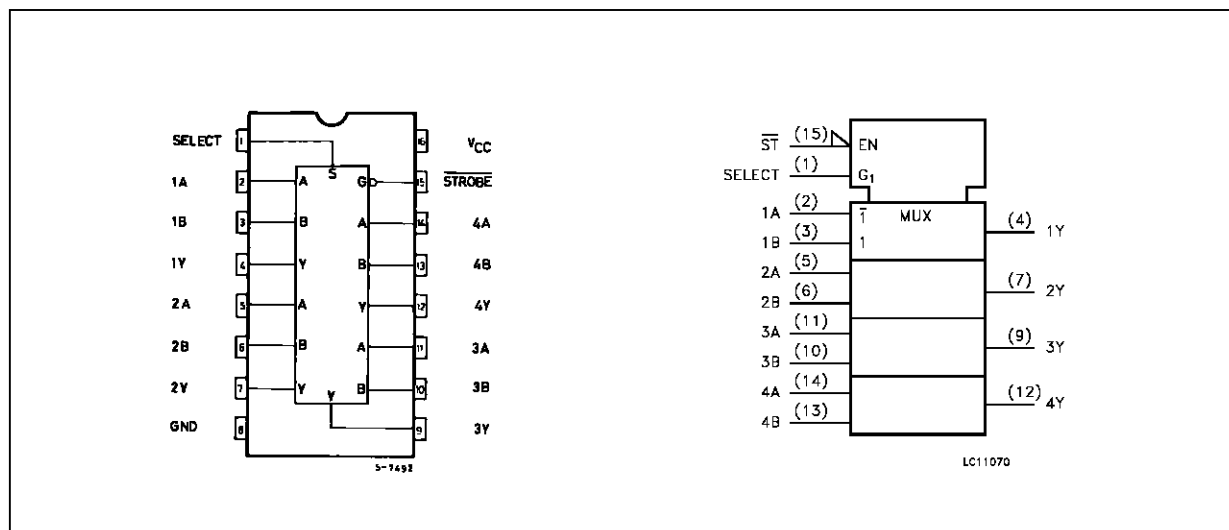
ORDER CODES :

| | |
|----------|----------|
| 74AC157B | 74AC157M |
|----------|----------|

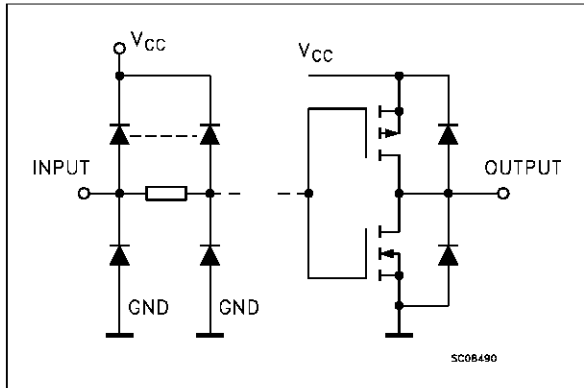
It consists of four 2-input digital multiplexers with common select and strobe inputs. It is a non-inverting multiplexer. When the STROBE input is held high selection of data is inhibit and all the outputs become low. The SELECT decoding determines whether the A or B inputs get routed to their corresponding Y outputs.

All inputs and outputs are equipped with protection circuits against static discharge, giving them 2KV ESD immunity and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS



INPUT AND OUTPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

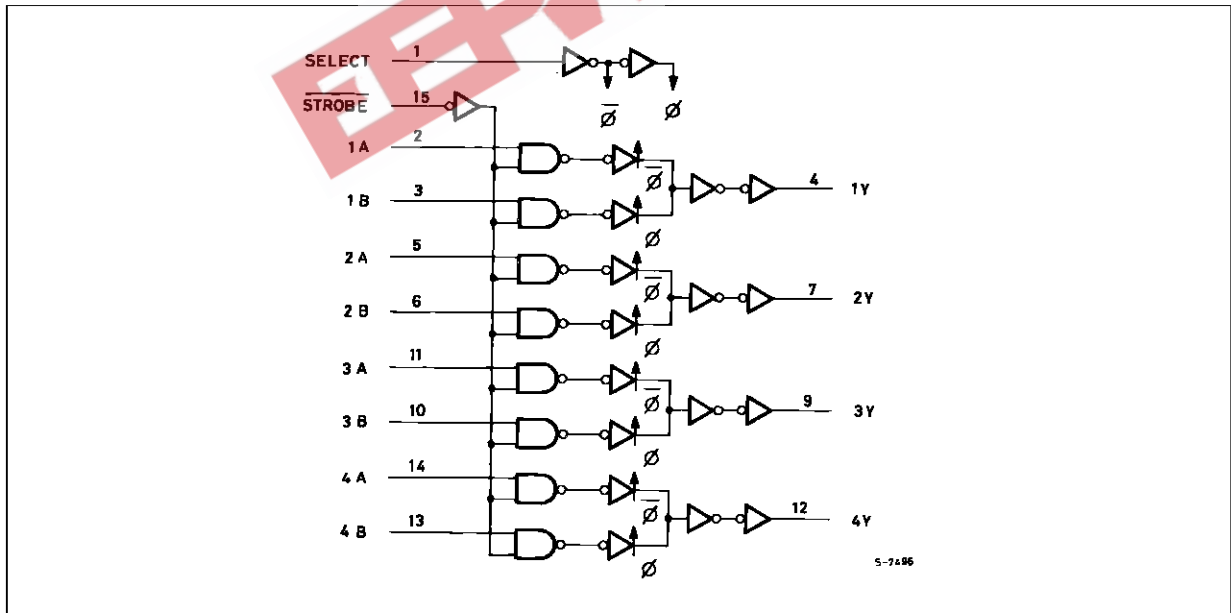
| PIN No | SYMBOL | NAME AND FUNCTION |
|--------------|----------------------------|---------------------------|
| 1 | SELECT | Common Data Select Input |
| 2, 5, 11, 14 | 1A to 4A | Data Inputs From Source A |
| 3, 6, 10, 13 | 1B to 4B | Data Inputs From Source B |
| 4, 7, 9, 12 | 1Y to 4Y | Multiplexer Outputs |
| 15 | $\overline{\text{STROBE}}$ | Strobe Input |
| 8 | GND | Ground (0V) |
| 16 | V _{cc} | Positive Supply Voltage |

TRUTH TABLE

| $\overline{\text{STROBE}}$ | INPUT | | | OUTPUT |
|----------------------------|--------|---|---|--------|
| | SELECT | A | B | Y |
| H | X | X | X | L |
| L | L | L | X | L |
| L | L | H | X | H |
| L | H | X | L | L |
| L | H | X | H | H |

X: "H" or "L"

LOGIC DIAGRAM



ABSOLUTE MAXIMUM RATING

| 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 | ± 50 | mA |
| I _{CC} or I _{GND} | DC V _{CC} or Ground Current | ± 200 | mA |
| 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 condition is not implied.

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: | -40 to +85 | °C |
| dV/dt | Input Rise and Fall Time V _{CC} = 3.0, 4.5 or 5.5 V(note 1) | 8 | ns/V |

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

DC SPECIFICATIONS

| Symbol | Parameter | Test Conditions | | Value | | | | | Unit |
|------------------|---------------------------------------|------------------------|--|-------------------------|------|-------|--------------|------|------|
| | | V _{CC} (V) | | T _A = 25 °C | | | -40 to 85 °C | | |
| | | | | Min. | Typ. | Max. | Min. | Max. | |
| V _{IH} | High Level Input Voltage | 3.0 | V _O = 0.1 V or V _{CC} - 0.1 V | 2.1 | 1.5 | | 2.1 | | V |
| | | 4.5 | | 3.15 | 2.25 | | 3.15 | | |
| | | 5.5 | | 3.85 | 2.75 | | 3.85 | | |
| V _{IL} | Low Level Input Voltage | 3.0 | V _O = 0.1 V or V _{CC} - 0.1 V | | 1.5 | 0.9 | | 0.9 | V |
| | | 4.5 | | | 2.25 | 1.35 | | 1.35 | |
| | | 5.5 | | | 2.75 | 1.65 | | 1.65 | |
| V _{OH} | High Level Output Voltage | 3.0 | V _I ^(*) = V _{IH} or V _{IL} | I _O = -50 μA | 2.9 | 2.99 | | 2.9 | V |
| | | 4.5 | | I _O = -50 μA | 4.4 | 4.49 | | 4.4 | |
| | | 5.5 | | I _O = -50 μA | 5.4 | 5.49 | | 5.4 | |
| | | 3.0 | | I _O = -12 mA | 2.56 | | | 2.46 | |
| | | 4.5 | | I _O = -24 mA | 3.86 | | | 3.76 | |
| | | 5.5 | | I _O = -24 mA | 4.86 | | | 4.76 | |
| V _{OL} | Low Level Output Voltage | 3.0 | V _I ^(*) = V _{IH} or V _{IL} | I _O = 50 μA | | 0.002 | 0.1 | 0.1 | V |
| | | 4.5 | | I _O = 50 μA | | 0.001 | 0.1 | 0.1 | |
| | | 5.5 | | I _O = 50 μA | | 0.001 | 0.1 | 0.1 | |
| | | 3.0 | | I _O = 12 mA | | 0.36 | | 0.44 | |
| | | 4.5 | | I _O = 24 mA | | 0.36 | | 0.44 | |
| | | 5.5 | | I _O = 24 mA | | 0.36 | | 0.44 | |
| I _I | Input Leakage Current | 5.5 | V _I = V _{CC} or GND | | | ±0.1 | | ±1 | μA |
| I _{CC} | Quiescent Supply Current | 5.5 | V _I = V _{CC} or GND | | | 8 | | 80 | μA |
| I _{OLD} | Dynamic Output Current (note 1, 2) | 5.5 | V _{OLD} = 1.65 V max | | | | | 75 | mA |
| I _{OHD} | | | V _{OHD} = 3.85 V min | | | | | -75 | mA |

1) Maximum test duration 2ms, one output loaded at time

2) Incident wave switching is guaranteed on transmission lines with impedances as low as 50 Ω.

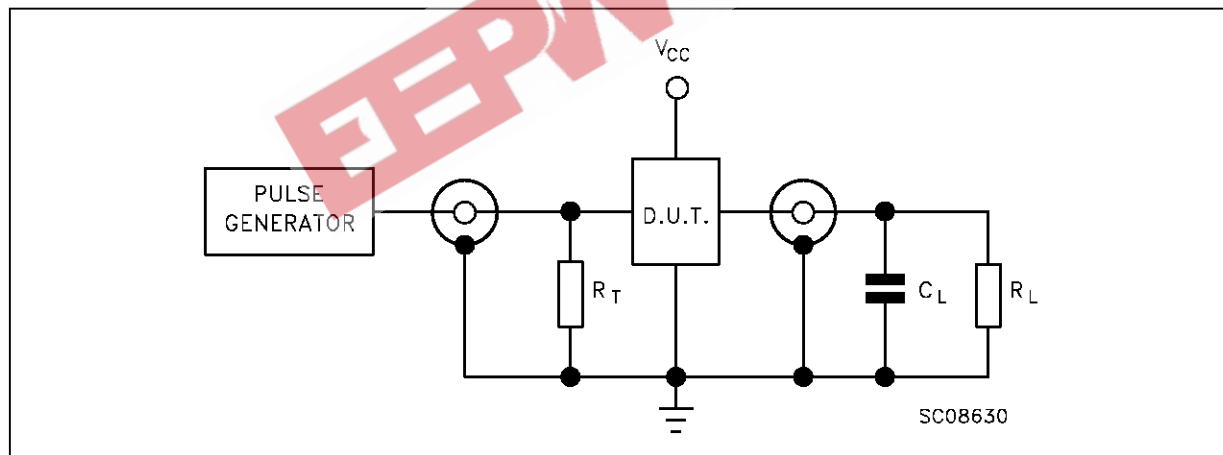
AC ELECTRICAL CHARACTERISTICS ($C_L = 50 \text{ pF}$, $R_L = 500 \Omega$, Input $t_r = t_f = 3 \text{ ns}$)

| Symbol | Parameter | Test Condition | | Value | | | | | Unit | |
|--------------------------------------|---------------------------------------|---|--|------------------------|------------------------|-------------|------------|--------------|------|------|
| | | | | V _{CC} (V) | T _A = 25 °C | | | -40 to 85 °C | | |
| | | | | | Min. | Typ. | Max. | Min. | | Max. |
| t _{PLH} t _{PHL} | Propagation Delay Time SELECT to Y | 3.3 ^(*) 5.0 ^(**) | | 1.5 1.5 | 6.5 5.0 | 11.0 8.5 | 1.5 1.5 | 12.0 9.5 | ns | |
| t _{PLH} t _{PHL} | Propagation Delay Time STROBE to Y | 3.3 ^(*) 5.0 ^(**) | | 1.5 1.5 | 6.5 5.5 | 11.0 9.0 | 1.5 1.5 | 12.0 10.0 | ns | |
| t _{PLH} t _{PHL} | Propagation Delay Time A, B to Y | 3.3 ^(*) 5.0 ^(**) | | 1.5 1.5 | 5.0 4.0 | 8.0 6.5 | 1.5 1.5 | 9.0 7.0 | ns | |

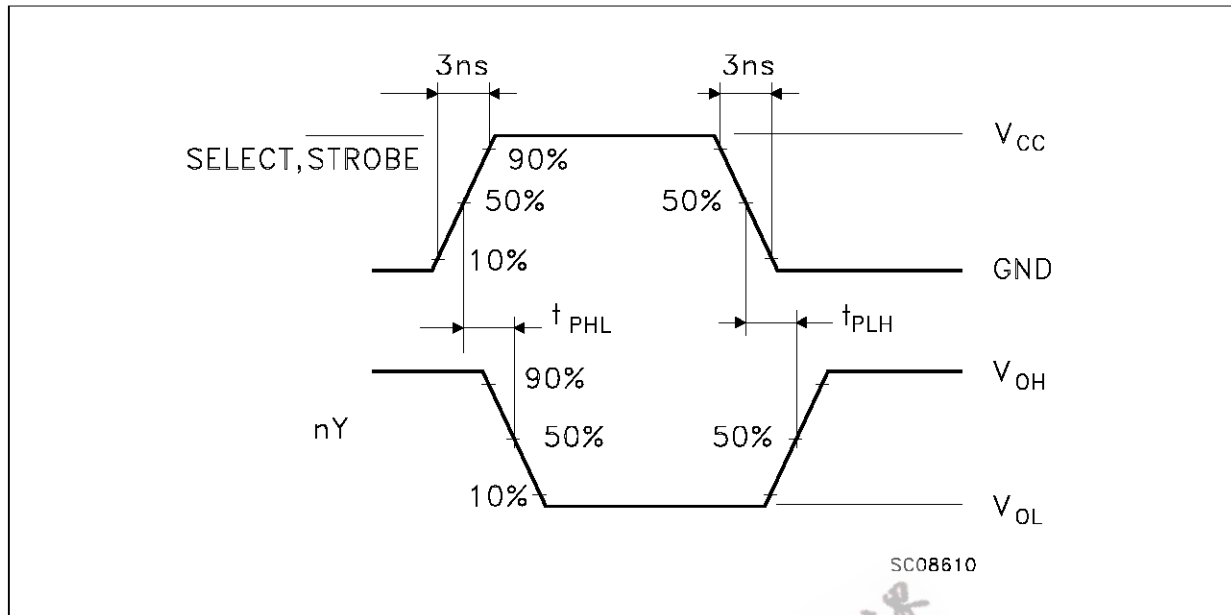
(*) Voltage range is $3.3\text{V} \pm 0.3\text{V}$ (**) Voltage range is $5\text{V} \pm 0.5\text{V}$ **CAPACITIVE CHARACTERISTICS**

| Symbol | Parameter | Test Conditions | | Value | | | | | Unit | |
|-----------------|---|-----------------|--|------------------------|------------------------|------|------|--------------|------|------|
| | | | | V _{CC} (V) | T _A = 25 °C | | | -40 to 85 °C | | |
| | | | | | Min. | Typ. | Max. | Min. | | Max. |
| C _{IN} | Input Capacitance | 5.0 | | | 4 | | | | pF | |
| C _{PD} | Power Dissipation Capacitance (note 1) | 5.0 | | | TBD | | | | pF | |

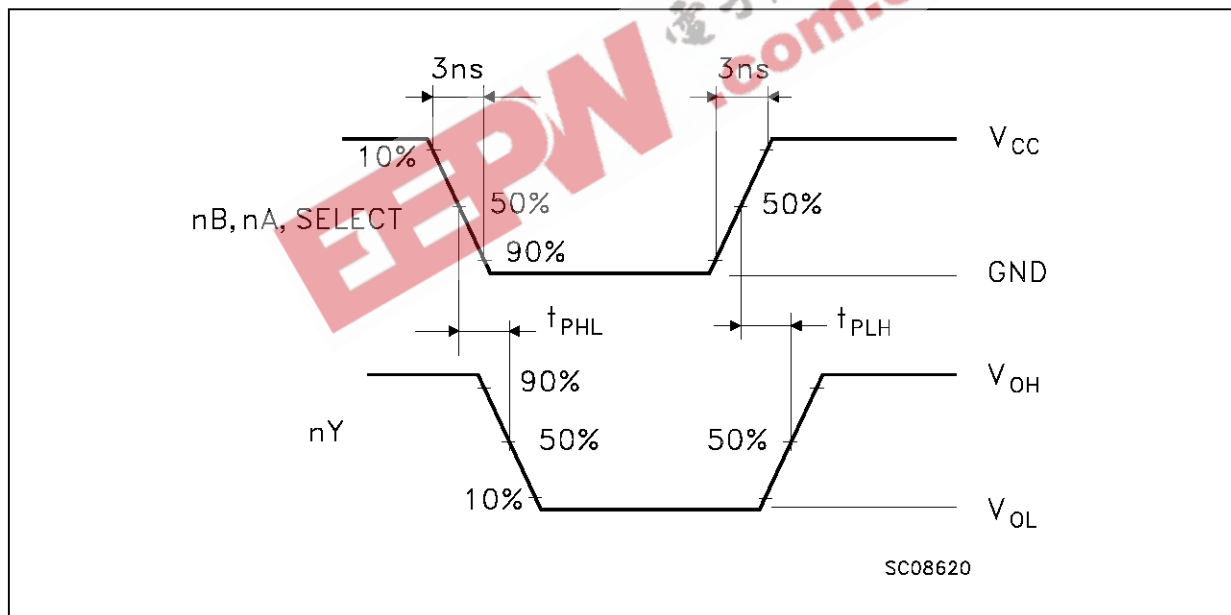
1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC(oper)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC0}$ (per circuit)

TEST CIRCUIT

WAVEFORM 1: PROPAGATION DELAYS FOR INVERTING CONDITIONS

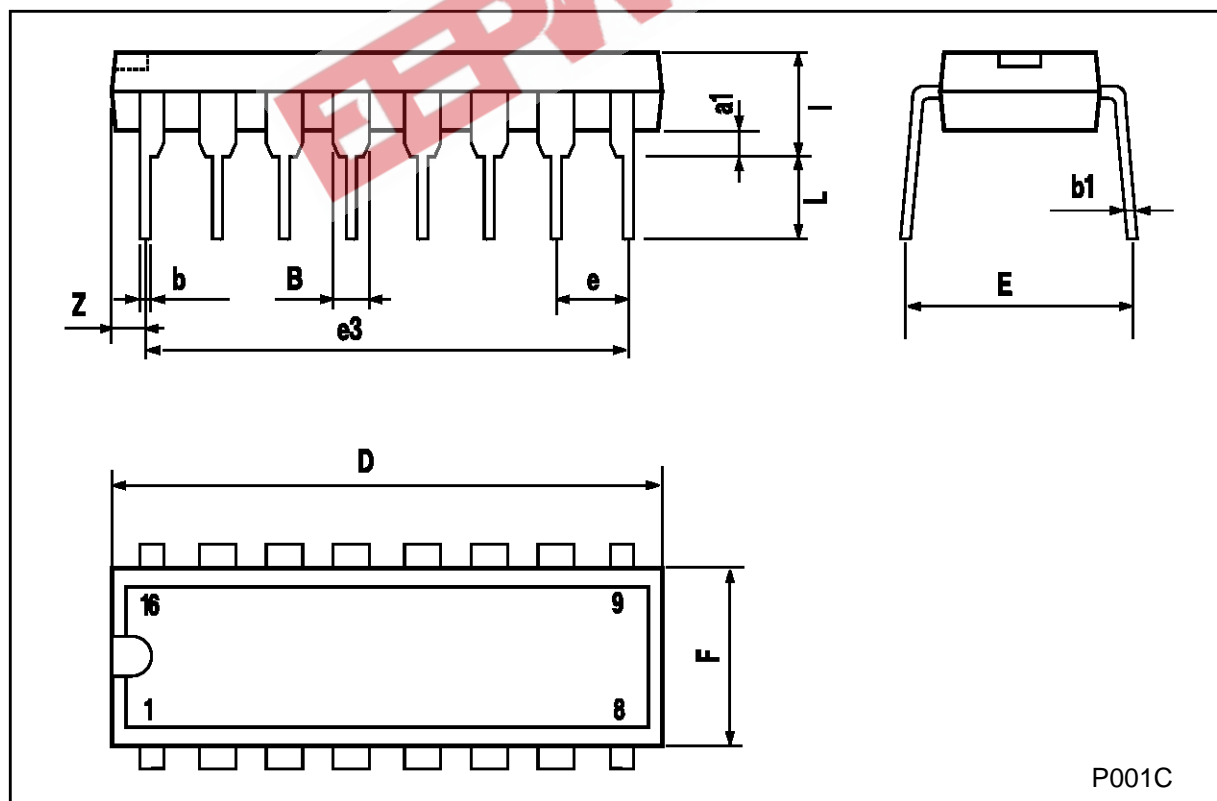


WAVEFORM 2: PROPAGATION DELAYS FOR NON-INVERTING CONDITIONS



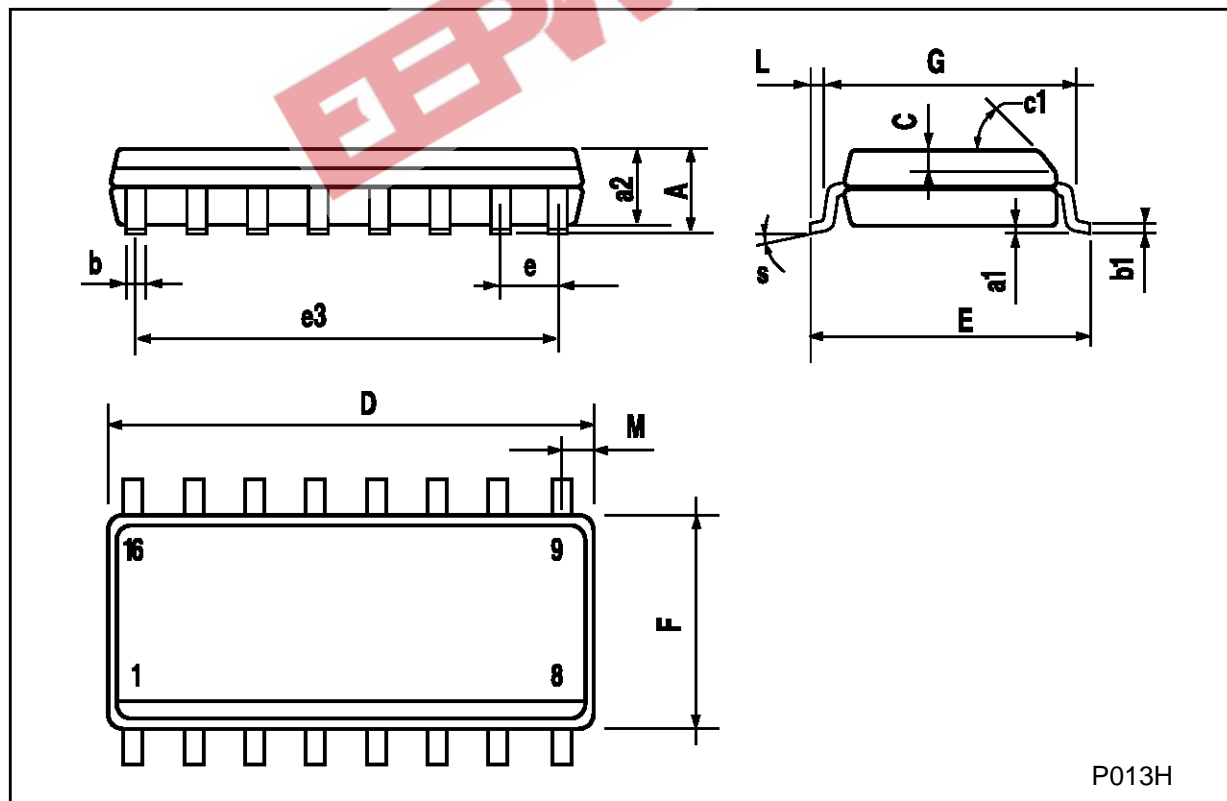
Plastic DIP-16 (0.25) MECHANICAL DATA

| 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 |



SO-16 MECHANICAL DATA

| DIM. | mm | | | inch | | |
|------|-----------|------|------|-------|-------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | | | 1.75 | | | 0.068 |
| a1 | 0.1 | | 0.2 | 0.004 | | 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.) | | | | | |



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