# 74HC158

## Quad 2-input multiplexer; inverting

**Rev. 03 — 12 November 2004** **Product data sheet**

## 1. General description

The 74HC is a high-speed Si-gate CMOS device and is pin compatible with low power Schottky TTL (LSTTL). The 74HC158 is specified in compliance with JEDEC standard no. 7A.

The 74HC158 is a quad 2-input multiplexer which select 4 bits of data from two sources and are controlled by a common data select input (S). The four outputs present the selected data in the inverted form. The enable input ($\overline{E}$) is active LOW.

When $\overline{E}$ is HIGH, all the outputs ($1\overline{Y}$ to $4\overline{Y}$) are forced HIGH regardless of all other input conditions.

Moving the data from two groups of registers to four common output buses is a common use of the 74HC158. The state of S determines the particular register from which the data comes. It can also be used as a function generator.

The device is useful for implementing highly irregular logic by generating any four of the 16 different functions of two variables with one variable common.

The 74HC158 is the logic implementation of a 4-pole, 2-position switch, where the position of the switch is determined by the logic levels applied to S.

The logic equations for the output are:

$1\overline{Y} = \overline{E}.(1I1.S + 1I0.\overline{S})$

$2\overline{Y} = \overline{E}.(2I1.S + 2I0.\overline{S})$

$3\overline{Y} = \overline{E}.(3I1.S + 3I0.\overline{S})$

$4\overline{Y} = \overline{E}.(4I1.S + 4I0.\overline{S})$

The 74HC158 is identical to the 74HC157 but has inverting outputs.

## 2. Features

- Low-power dissipation
- Inverting data path
- Complies with JEDEC standard no. 7A
- ESD protection:
  - HBM EIA/JESD22-A114-B exceeds 2000 V
  - MM EIA/JESD22-A115-A exceeds 200 V.
- Multiple package options
- Specified from –40 °C to +80 °C and from –40 °C to +125 °C.

PHILIPS

# 3. Quick reference data

**Table 1: Quick reference data**

*GND = 0 V; $T_{amb}$ = 25 °C; $t_r = t_f$ = 6 ns.*

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| $t_{PHL}$, $t_{PLH}$ | propagation delay | $C_L$ = 15 pF; $V_{CC}$ = 5 V | | | | | |
| | nI0, nI1 to n$\overline{Y}$ | | | - | 12 | - | ns |
| | $\overline{E}$ to n$\overline{Y}$ | | | - | 14 | - | ns |
| | S to n$\overline{Y}$ | | | - | 14 | - | ns |
| $C_I$ | input capacitance | | | - | 3.5 | - | pF |
| $C_{PD}$ | power dissipation capacitance per multiplexer | $V_I$ = GND to $V_{CC}$ | [1] | - | 40 | - | pF |

[1] $C_{PD}$ is used to determine the dynamic power dissipation ($P_D$ in μW).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$ where:

$f_i$ = input frequency in MHz;

$f_o$ = output frequency in MHz;

$C_L$ = output load capacitance in pF;

$V_{CC}$ = supply voltage in V;

N = number of inputs switching;

$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

# 4. Ordering information

**Table 2: Ordering information**

| Type number | Package | | | |
|---|---|---|---|---|
| | Temperature range | Name | Description | Version |
| 74HC158N | –40 °C to +125 °C | DIP16 | plastic dual in-line package; 16 leads (300 mil) | SOT38-4 |
| 74HC158D | –40 °C to +125 °C | SO16 | plastic small outline package; 16 leads; body width 3.9 mm | SOT109-1 |

## 5. Functional diagram

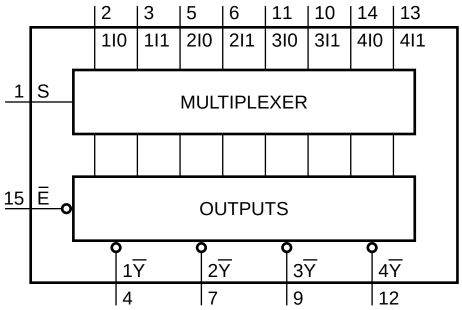



Fig 1. Functional diagram

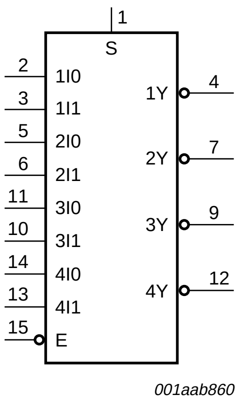



Fig 2. Logic symbol

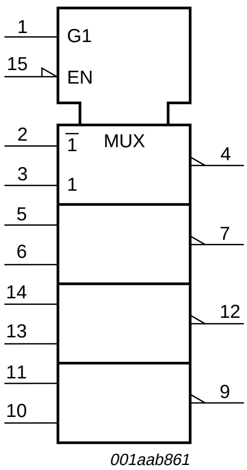



Fig 3. IEC logic symbol

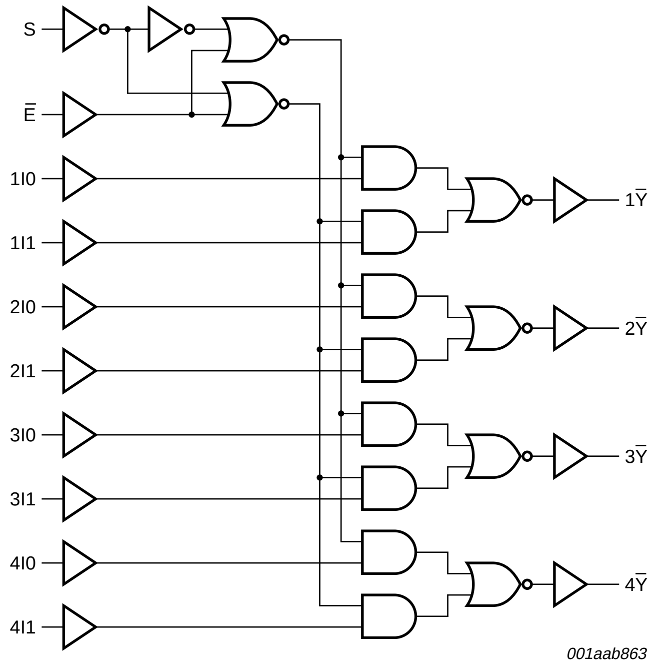



Fig 4. Logic diagram

# 6. Pinning information

## 6.1 Pinning

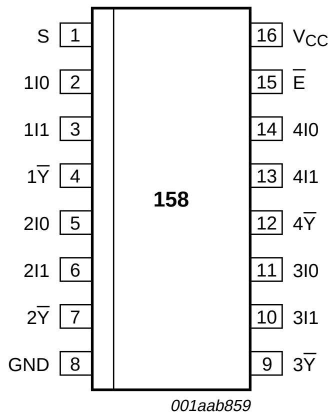



Fig 5. Pin configuration

### 6.2 Pin description

Table 3: Pin description

| Symbol | Pin | Description |
|---|---|---|
| S | 1 | common data select input |
| 1I0 | 2 | data input 1 from source 0 |
| 1I1 | 3 | data input 1 from source 1 |
| $1\overline{Y}$ | 4 | multiplexer output 1 |
| 2I0 | 5 | data input 2 from source 0 |
| 2I1 | 6 | data input 2 from source 1 |
| $2\overline{Y}$ | 7 | multiplexer output 2 |
| GND | 8 | ground (0 V) |
| $3\overline{Y}$ | 9 | multiplexer output 3 |
| 3I1 | 10 | data input 3 from source 1 |
| 3I0 | 11 | data input 3 from source 0 |
| $4\overline{Y}$ | 12 | multiplexer output 4 |
| 4I1 | 13 | data input 4 from source 1 |
| 4I0 | 14 | data input 4 from source 0 |
| $\overline{E}$ | 15 | enable input (active LOW) |
| $V_{CC}$ | 16 | positive supply voltage |

## 7. Functional description

### 7.1 Function table

Table 4: Function [1]

| Control | | Input | | Output |
|---|---|---|---|---|
| $\overline{E}$ | S | nI0 | nI1 | $n\overline{Y}$ |
| H | X | X | X | H |
| L | L | L | X | H |
| | | H | X | L |
| | H | X | L | H |
| | | X | H | L |

[1] H = HIGH voltage level;
L = LOW voltage level;
X = don't care.

# 8. Limiting values

**Table 5: Limiting values**

*In accordance with the Absolute Maximum Rating System (IEC 60134). Voltages are referenced to GND (ground = 0 V).*

| Symbol | Parameter | Conditions | | Min | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | | | –0.5 | +7 | V |
| $I_{IK}$ | input diode current | $V_I < -0.5$ V or $V_I > V_{CC} + 0.5$ V | | - | ±20 | mA |
| $I_{OK}$ | output diode current | $V_O < -0.5$ V or $V_O > V_{CC} + 0.5$ V | | - | ±20 | mA |
| $I_O$ | output source or sink current | $V_O = -0.5$ V to $V_{CC} + 0.5$ V | | - | ±25 | mA |
| $I_{CC}$, $I_{GND}$ | $V_{CC}$ or GND current | | | - | ±50 | mA |
| $T_{stg}$ | storage temperature | | | –65 | +150 | °C |
| $P_{tot}$ | power dissipation | | | | | |
| | DIP16 package | | [1] | - | 750 | mW |
| | SO16 package | | [2] | - | 500 | mW |

[1] Above 70 °C: $P_{tot}$ derates linearly with 12 mW/K.

[2] Above 70 °C: $P_{tot}$ derates linearly with 8 mW/K.

# 9. Recommended operating conditions

**Table 6: Recommended operating conditions**

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{CC}$ | supply voltage | | 2.0 | 5.0 | 6.0 | V |
| $V_I$ | input voltage | | 0 | - | $V_{CC}$ | V |
| $V_O$ | output voltage | | 0 | - | $V_{CC}$ | V |
| $t_r$, $t_f$ | input rise and fall times | $V_{CC} = 2.0$ V | - | - | 1000 | ns |
| | | $V_{CC} = 4.5$ V | - | 6.0 | 500 | ns |
| | | $V_{CC} = 6.0$ V | - | - | 400 | ns |
| $T_{amb}$ | ambient temperature | | –40 | - | +125 | °C |

## 10. Static characteristics

**Table 7: Static characteristics**

*At recommended operating conditions; voltages are referenced to GND (ground = 0 V).*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **$T_{amb}$ = 25 °C** | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$ = 2.0 V | 1.5 | 1.2 | - | V |
| | | $V_{CC}$ = 4.5 V | 3.15 | 2.4 | - | V |
| | | $V_{CC}$ = 6.0 V | 4.2 | 3.2 | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$ = 2.0 V | - | 0.8 | 0.5 | V |
| | | $V_{CC}$ = 4.5 V | - | 2.1 | 1.35 | V |
| | | $V_{CC}$ = 6.0 V | - | 2.8 | 1.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O$ = −20 μA; $V_{CC}$ = 2.0 V | 1.9 | 2.0 | - | V |
| | | $I_O$ = −20 μA; $V_{CC}$ = 4.5 V | 4.4 | 4.5 | - | V |
| | | $I_O$ = −20 μA; $V_{CC}$ = 6.0 V | 5.9 | 6.0 | - | V |
| | | $I_O$ = −4 mA; $V_{CC}$ = 4.5 V | 3.98 | 4.32 | - | V |
| | | $I_O$ = −5.2 mA; $V_{CC}$ = 6.0 V | 5.48 | 5.81 | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O$ = 20 μA; $V_{CC}$ = 2.0 V | - | 0 | 0.1 | V |
| | | $I_O$ = 20 μA; $V_{CC}$ = 4.5 V | - | 0 | 0.1 | V |
| | | $I_O$ = 20 μA; $V_{CC}$ = 6.0 V | - | 0 | 0.1 | V |
| | | $I_O$ = 4 mA; $V_{CC}$ = 4.5 V | - | 0.15 | 0.26 | V |
| | | $I_O$ = 5.2 mA; $V_{CC}$ = 6.0 V | - | 0.16 | 0.26 | V |
| $I_{LI}$ | input leakage current | $V_I$ = $V_{CC}$ or GND; $V_{CC}$ = 6.0 V | - | - | ±0.1 | μA |
| $I_{CC}$ | quiescent supply current | $V_I$ = $V_{CC}$ or GND; $I_O$ = 0 A; $V_{CC}$ = 6.0 V | - | - | 8.0 | μA |
| $C_I$ | input capacitance | | - | 3.5 | - | pF |
| **$T_{amb}$ = −40 °C to +85 °C** | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC}$ = 2.0 V | 1.5 | - | - | V |
| | | $V_{CC}$ = 4.5 V | 3.15 | - | - | V |
| | | $V_{CC}$ = 6.0 V | 4.2 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC}$ = 2.0 V | - | - | 0.5 | V |
| | | $V_{CC}$ = 4.5 V | - | - | 1.35 | V |
| | | $V_{CC}$ = 6.0 V | - | - | 1.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I$ = $V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O$ = −20 μA; $V_{CC}$ = 2.0 V | 1.9 | - | - | V |
| | | $I_O$ = −20 μA; $V_{CC}$ = 4.5 V | 4.4 | - | - | V |
| | | $I_O$ = −20 μA; $V_{CC}$ = 6.0 V | 5.9 | - | - | V |
| | | $I_O$ = −4 mA; $V_{CC}$ = 4.5 V | 3.84 | - | - | V |
| | | $I_O$ = −5.2 mA; $V_{CC}$ = 6.0 V | 5.34 | - | - | V |

**Table 7: Static characteristics** *...continued*

*At recommended operating conditions; voltages are referenced to GND (ground = 0 V).*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| $V_{OL}$ | LOW-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O = 20\ \mu A$; $V_{CC} = 2.0\ V$ | - | - | 0.1 | V |
| | | $I_O = 20\ \mu A$; $V_{CC} = 4.5\ V$ | - | - | 0.1 | V |
| | | $I_O = 20\ \mu A$; $V_{CC} = 6.0\ V$ | - | - | 0.1 | V |
| | | $I_O = 4\ mA$; $V_{CC} = 4.5\ V$ | - | - | 0.33 | V |
| | | $I_O = 5.2\ mA$; $V_{CC} = 6.0\ V$ | - | - | 0.33 | V |
| $I_{LI}$ | input leakage current | $V_I = V_{CC}$ or GND; $V_{CC} = 6.0\ V$ | - | - | ±1.0 | μA |
| $I_{CC}$ | quiescent supply current | $V_I = V_{CC}$ or GND; $I_O = 0\ A$; $V_{CC} = 6.0\ V$ | - | - | 80 | μA |
| **$T_{amb}$ = −40 °C to +125 °C** | | | | | | |
| $V_{IH}$ | HIGH-level input voltage | $V_{CC} = 2.0\ V$ | 1.5 | - | - | V |
| | | $V_{CC} = 4.5\ V$ | 3.15 | - | - | V |
| | | $V_{CC} = 6.0\ V$ | 4.2 | - | - | V |
| $V_{IL}$ | LOW-level input voltage | $V_{CC} = 2.0\ V$ | - | - | 0.5 | V |
| | | $V_{CC} = 4.5\ V$ | - | - | 1.35 | V |
| | | $V_{CC} = 6.0\ V$ | - | - | 1.8 | V |
| $V_{OH}$ | HIGH-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O = -20\ \mu A$; $V_{CC} = 2.0\ V$ | 1.9 | - | - | V |
| | | $I_O = -20\ \mu A$; $V_{CC} = 4.5\ V$ | 4.4 | - | - | V |
| | | $I_O = -20\ \mu A$; $V_{CC} = 6.0\ V$ | 5.9 | - | - | V |
| | | $I_O = -4\ mA$; $V_{CC} = 4.5\ V$ | 3.7 | - | - | V |
| | | $I_O = -5.2\ mA$; $V_{CC} = 6.0\ V$ | 5.2 | - | - | V |
| $V_{OL}$ | LOW-level output voltage | $V_I = V_{IH}$ or $V_{IL}$ | | | | |
| | | $I_O = 20\ \mu A$; $V_{CC} = 2.0\ V$ | - | - | 0.1 | V |
| | | $I_O = 20\ \mu A$; $V_{CC} = 4.5\ V$ | - | - | 0.1 | V |
| | | $I_O = 20\ \mu A$; $V_{CC} = 6.0\ V$ | - | - | 0.1 | V |
| | | $I_O = 4\ mA$; $V_{CC} = 4.5\ V$ | - | - | 0.4 | V |
| | | $I_O = 5.2\ mA$; $V_{CC} = 6.0\ V$ | - | - | 0.4 | V |
| $I_{LI}$ | input leakage current | $V_I = V_{CC}$ or GND; $V_{CC} = 6.0\ V$ | - | - | ±1.0 | μA |
| $I_{CC}$ | quiescent supply current | $V_I = V_{CC}$ or GND; $I_O = 0\ A$; $V_{CC} = 6.0\ V$ | - | - | 160 | μA |

## 11. Dynamic characteristics

**Table 8: Dynamic characteristics**

*GND = 0 V; $t_r$ = $t_f$ = 6 ns; $C_L$ = 50 pF; see Figure 8.*

| Symbol | Parameter | Conditions | | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|---|
| **$T_{amb}$ = 25 °C** | | | | | | | |
| $t_{PHL}$, $t_{PLH}$ | propagation delay nI0, nI1 to $n\overline{Y}$ | see Figure 6 | | | | | |
| | | $V_{CC}$ = 2.0 V | | - | 41 | 125 | ns |
| | | $V_{CC}$ = 4.5 V | | - | 15 | 25 | ns |
| | | $V_{CC}$ = 6.0 V | | - | 12 | 21 | ns |
| | | $V_{CC}$ = 5.0 V; $C_L$ = 15 pF | | - | 12 | - | ns |
| | propagation delay $\overline{E}$ to $n\overline{Y}$ | see Figure 7 | | | | | |
| | | $V_{CC}$ = 2.0 V | | - | 47 | 145 | ns |
| | | $V_{CC}$ = 4.5 V | | - | 17 | 29 | ns |
| | | $V_{CC}$ = 6.0 V | | - | 14 | 25 | ns |
| | | $V_{CC}$ = 5.0 V; $C_L$ = 15 pF | | - | 14 | - | ns |
| | propagation delay S to $n\overline{Y}$ | see Figure 6 | | | | | |
| | | $V_{CC}$ = 2.0 V | | - | 47 | 145 | ns |
| | | $V_{CC}$ = 4.5 V | | - | 17 | 29 | ns |
| | | $V_{CC}$ = 6.0 V | | - | 14 | 25 | ns |
| | | $V_{CC}$ = 5.0 V; $C_L$ = 15 pF | | - | 14 | - | ns |
| $t_{THL}$, $t_{TLH}$ | output transition time | see Figure 6 and 7 | | | | | |
| | | $V_{CC}$ = 2.0 V | | - | 19 | 75 | ns |
| | | $V_{CC}$ = 4.5 V | | - | 7 | 15 | ns |
| | | $V_{CC}$ = 6.0 V | | - | 6 | 13 | ns |
| $C_{PD}$ | power dissipation capacitance per multiplexer | $V_I$ = GND to $V_{CC}$ | [1] | - | 40 | - | pF |
| **$T_{amb}$ = −40 °C to +85 °C** | | | | | | | |
| $t_{PHL}$, $t_{PLH}$ | propagation delay nI0, nI1 to $n\overline{Y}$ | see Figure 6 | | | | | |
| | | $V_{CC}$ = 2.0 V | | - | - | 155 | ns |
| | | $V_{CC}$ = 4.5 V | | - | - | 31 | ns |
| | | $V_{CC}$ = 6.0 V | | - | - | 26 | ns |
| | propagation delay $\overline{E}$ to $n\overline{Y}$ | see Figure 7 | | | | | |
| | | $V_{CC}$ = 2.0 V | | - | - | 180 | ns |
| | | $V_{CC}$ = 4.5 V | | - | - | 36 | ns |
| | | $V_{CC}$ = 6.0 V | | - | - | 31 | ns |
| | propagation delay S to $n\overline{Y}$ | see Figure 6 | | | | | |
| | | $V_{CC}$ = 2.0 V | | - | - | 180 | ns |
| | | $V_{CC}$ = 4.5 V | | - | - | 36 | ns |
| | | $V_{CC}$ = 6.0 V | | - | - | 31 | ns |
| $t_{THL}$, $t_{TLH}$ | output transition time | see Figure 6 and 7 | | | | | |
| | | $V_{CC}$ = 2.0 V | | - | - | 95 | ns |
| | | $V_{CC}$ = 4.5 V | | - | - | 19 | ns |
| | | $V_{CC}$ = 6.0 V | | - | - | 16 | ns |

**Table 8: Dynamic characteristics** *...continued*

*GND = 0 V; $t_r = t_f$ = 6 ns; $C_L$ = 50 pF; see Figure 8.*

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| **$T_{amb}$ = −40 °C to +125 °C** | | | | | | |
| $t_{PHL}$, $t_{PLH}$ | propagation delay nI0, nI1 to $n\overline{Y}$ | see Figure 6 | | | | |
| | | $V_{CC}$ = 2.0 V | - | - | 190 | ns |
| | | $V_{CC}$ = 4.5 V | - | - | 38 | ns |
| | | $V_{CC}$ = 6.0 V | - | - | 32 | ns |
| | propagation delay $\overline{E}$ to $n\overline{Y}$ | see Figure 7 | | | | |
| | | $V_{CC}$ = 2.0 V | - | - | 220 | ns |
| | | $V_{CC}$ = 4.5 V | - | - | 44 | ns |
| | | $V_{CC}$ = 6.0 V | - | - | 38 | ns |
| | propagation delay S to $n\overline{Y}$ | see Figure 6 | | | | |
| | | $V_{CC}$ = 2.0 V | - | - | 220 | ns |
| | | $V_{CC}$ = 4.5 V | - | - | 44 | ns |
| | | $V_{CC}$ = 6.0 V | - | - | 38 | ns |
| $t_{THL}$, $t_{TLH}$ | output transition time | see Figure 6 and 7 | | | | |
| | | $V_{CC}$ = 2.0 V | - | - | 110 | ns |
| | | $V_{CC}$ = 4.5 V | - | - | 22 | ns |
| | | $V_{CC}$ = 6.0 V | - | - | 19 | ns |

[1] $C_{PD}$ is used to determine the dynamic power dissipation ($P_D$ in µW).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$ where:

$f_i$ = input frequency in MHz;

$f_o$ = output frequency in MHz;

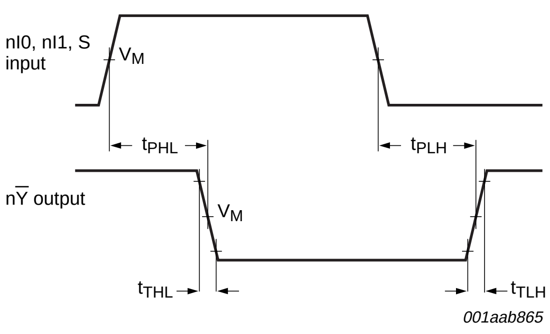
$C_L$ = output load capacitance in pF;

$V_{CC}$ = supply voltage in V;

N = number of inputs switching;

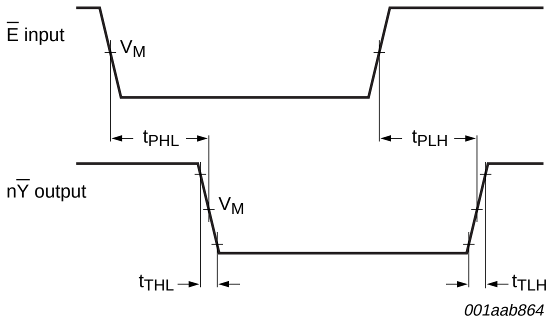
$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

## 12. Waveforms



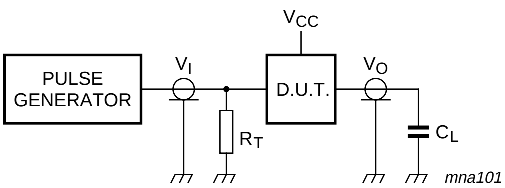

$V_M = 0.5 \times V_I$.

**Fig 6. Waveforms showing the data input (nI0, nI1) to output ($n\overline{Y}$) propagation delays and the output transition times**




$V_M = 0.5 \times V_I$.

**Fig 7. Waveforms showing the enable input ($\overline{E}$) to output ($n\overline{Y}$) propagation delays and the output transition times**




Test data is given in Table 9.

Definitions for test circuit:

$R_T$ = Termination resistance should be equal to output impedance $Z_o$ of the pulse generator.

$C_L$ = Load capacitance including jig and probe capacitance.

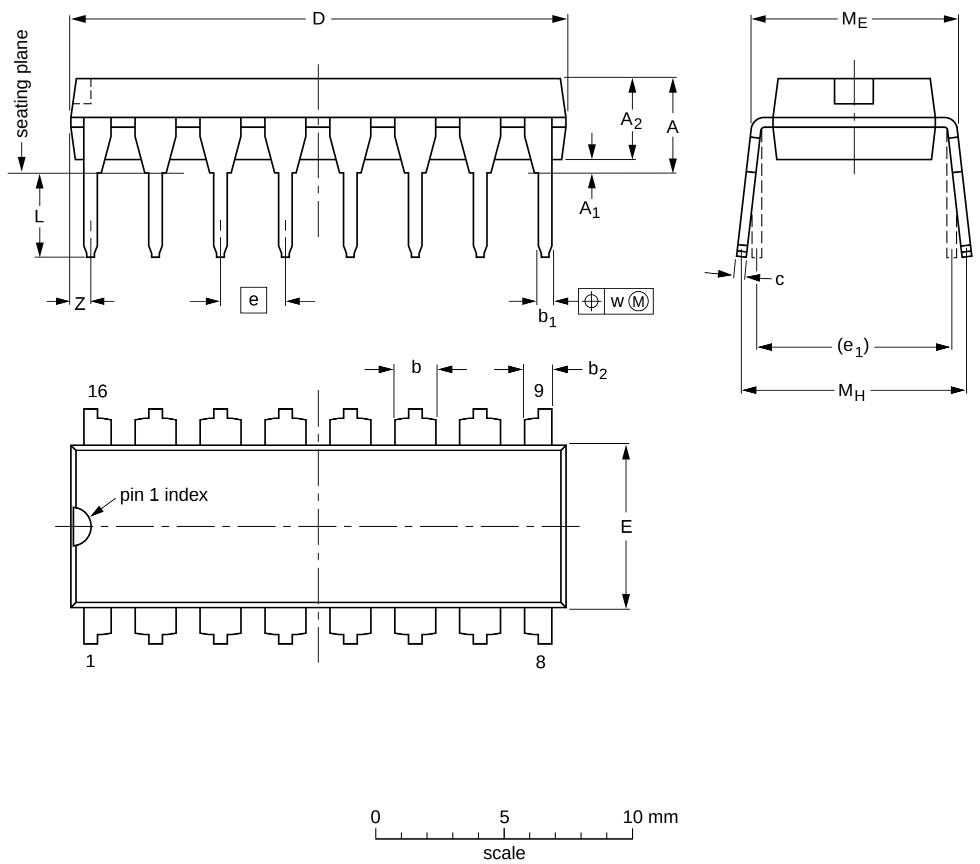
**Fig 8. Load circuitry for switching times**

**Table 9: Test data**

| Supply | Input | | Load |
|---|---|---|---|
| $V_{CC}$ | $V_I$ | $t_r$, $t_f$ | $C_L$ |
| 2.0 V | $V_{CC}$ | 6 ns | 50 pF |
| 4.5 V | $V_{CC}$ | 6 ns | 50 pF |
| 6.0 V | $V_{CC}$ | 6 ns | 50 pF |
| 5.0 V | $V_{CC}$ | 6 ns | 15 pF |

## 13. Package outline

**DIP16: plastic dual in-line package; 16 leads (300 mil)** **SOT38-4**




**DIMENSIONS (inch dimensions are derived from the original mm dimensions)**

| UNIT | A max. | $A_1$ min. | $A_2$ max. | b | $b_1$ | $b_2$ | c | D (1) | E (1) | e | $e_1$ | L | $M_E$ | $M_H$ | w | Z (1) max. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 4.2 | 0.51 | 3.2 | 1.73<br>1.30 | 0.53<br>0.38 | 1.25<br>0.85 | 0.36<br>0.23 | 19.50<br>18.55 | 6.48<br>6.20 | 2.54 | 7.62 | 3.60<br>3.05 | 8.25<br>7.80 | 10.0<br>8.3 | 0.254 | 0.76 |
| inches | 0.17 | 0.02 | 0.13 | 0.068<br>0.051 | 0.021<br>0.015 | 0.049<br>0.033 | 0.014<br>0.009 | 0.77<br>0.73 | 0.26<br>0.24 | 0.1 | 0.3 | 0.14<br>0.12 | 0.32<br>0.31 | 0.39<br>0.33 | 0.01 | 0.03 |

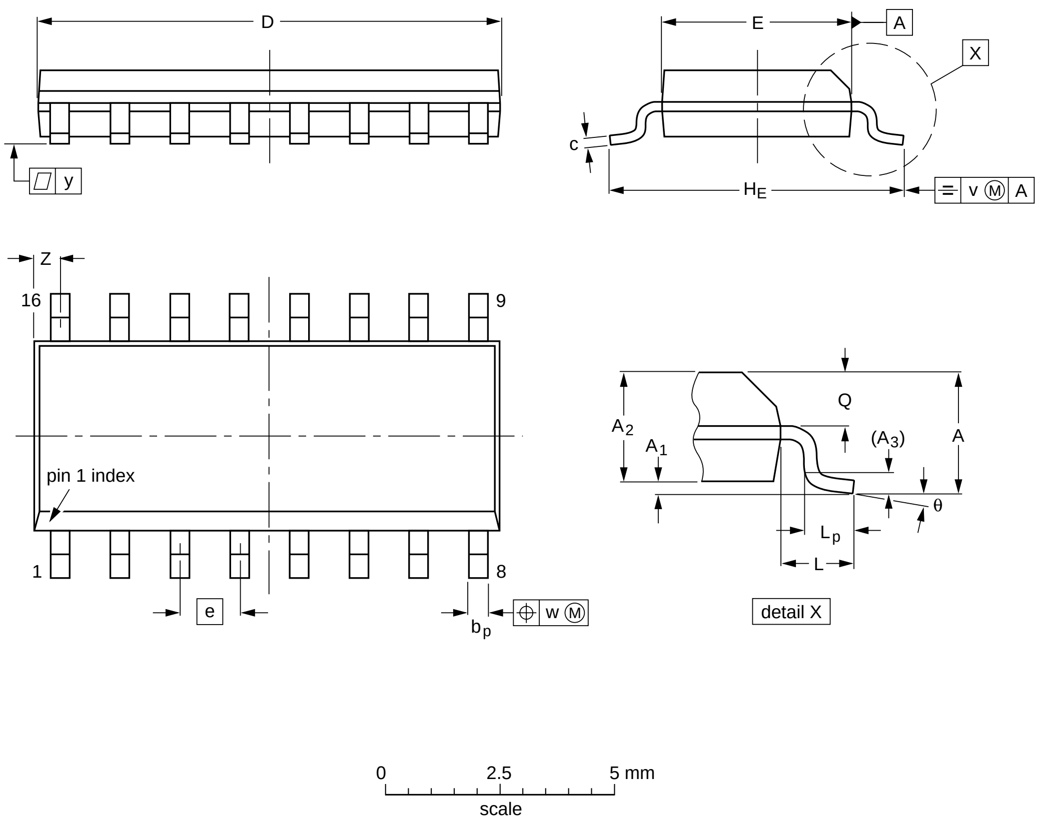
**Note**

1. Plastic or metal protrusions of 0.25 mm (0.01 inch) maximum per side are not included.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT38-4 | | | | | | ~~95-01-14~~<br>03-02-13 |

**Fig 9. Package outline SOT38-4 (DIP16)**

**SO16: plastic small outline package; 16 leads; body width 3.9 mm** **SOT109-1**




**DIMENSIONS (inch dimensions are derived from the original mm dimensions)**

| UNIT | A max. | $A_1$ | $A_2$ | $A_3$ | $b_p$ | c | $D^{(1)}$ | $E^{(1)}$ | e | $H_E$ | L | $L_p$ | Q | v | w | y | $Z^{(1)}$ | θ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| mm | 1.75 | 0.25<br>0.10 | 1.45<br>1.25 | 0.25 | 0.49<br>0.36 | 0.25<br>0.19 | 10.0<br>9.8 | 4.0<br>3.8 | 1.27 | 6.2<br>5.8 | 1.05 | 1.0<br>0.4 | 0.7<br>0.6 | 0.25 | 0.25 | 0.1 | 0.7<br>0.3 | $8^o$<br>$0^o$ |
| inches | 0.069 | 0.010<br>0.004 | 0.057<br>0.049 | 0.01 | 0.019<br>0.014 | 0.0100<br>0.0075 | 0.39<br>0.38 | 0.16<br>0.15 | 0.05 | 0.244<br>0.228 | 0.041 | 0.039<br>0.016 | 0.028<br>0.020 | 0.01 | 0.01 | 0.004 | 0.028<br>0.012 | |

**Note**

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

| OUTLINE VERSION | REFERENCES | | | | EUROPEAN PROJECTION | ISSUE DATE |
|---|---|---|---|---|---|---|
| | IEC | JEDEC | JEITA | | | |
| SOT109-1 | 076E07 | MS-012 | | | | ~~99-12-27~~<br>03-02-19 |

**Fig 10. Package outline SOT109-1 (SO16)**

## 14. Revision history

**Table 10: Revision history**

| Document ID | Release date | Data sheet status | Change notice | Doc. number | Supersedes |
|---|---|---|---|---|---|
| 74HC158_3 | 20041112 | Product data sheet | - | 9397 750 13805 | 74HC_HCT158_CNV_2 |
| Modifications: | • The format of this data sheet has been redesigned to comply with the current presentation and information standard of Philips Semiconductors.<br>• Removed type number 74HCT158.<br>• Inserted family specification. | | | | |
| 74HC_HCT158_CNV_2 | 19970827 | Product specification | - | - | 74HC_HCT158_1 |
| 74HC_HCT158_1 | 19901201 | Product specification | - | - | - |

## 15. Data sheet status

| Level | Data sheet status [1] | Product status [2] [3] | Definition |
|---|---|---|---|
| I | Objective data | Development | This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice. |
| II | Preliminary data | Qualification | This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product. |
| III | Product data | Production | This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). |

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

## 16. Definitions

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

**Application information** — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

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## 18. Contact information

For additional information, please visit: **http://www.semiconductors.philips.com**

For sales office addresses, send an email to: **sales.addresses@www.semiconductors.philips.com**

## 19. Contents





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