

74HC367; 74HCT367

Hex buffer/line driver; 3-state

Rev. 5 — 19 March 2024

Product data sheet

1. General description

The 74HC367; 74HCT367 is a hex buffer/line driver with 3-state outputs controlled by the output enable inputs ($n\overline{OE}$). A HIGH on $n\overline{OE}$ causes the outputs to assume a high impedance OFF-state. Inputs include clamp diodes. It enables the use of current limiting resistors to interface inputs to voltages in excess of V_{CC} .

2. Features and benefits

- Wide supply voltage range from 2.0 V to 6.0 V
- CMOS low power dissipation
- High noise immunity
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level B
- Complies with JEDEC standards:
 - JESD8C (2.7 V to 3.6 V)
 - JESD7A (2.0 V to 6.0 V)
- 3-state outputs
- Input levels:
 - For 74HC367: CMOS level
 - For 74HCT367: TTL level
- ESD protection:
 - HBM: ANSI/ESDA/JEDEC JS-001 class 2 exceeds 2000 V
 - CDM: ANSI/ESDA/JEDEC JS-002 class C3 exceeds 1000 V
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

3. Ordering information

Table 1. Ordering information

| Type number | Package | | | |
|----------------------------|-------------------|---------|--|--------------------------|
| | Temperature range | Name | Description | Version |
| 74HC367D | -40 °C to +125 °C | SO16 | plastic small outline package; 16 leads; body width 3.9 mm | SOT109-1 |
| 74HCT367D | | | | |
| 74HC367PW | -40 °C to +125 °C | TSSOP16 | plastic thin shrink small outline package; 16 leads; body width 4.4 mm | SOT403-1 |
| 74HCT367PW | | | | |

4. Functional diagram

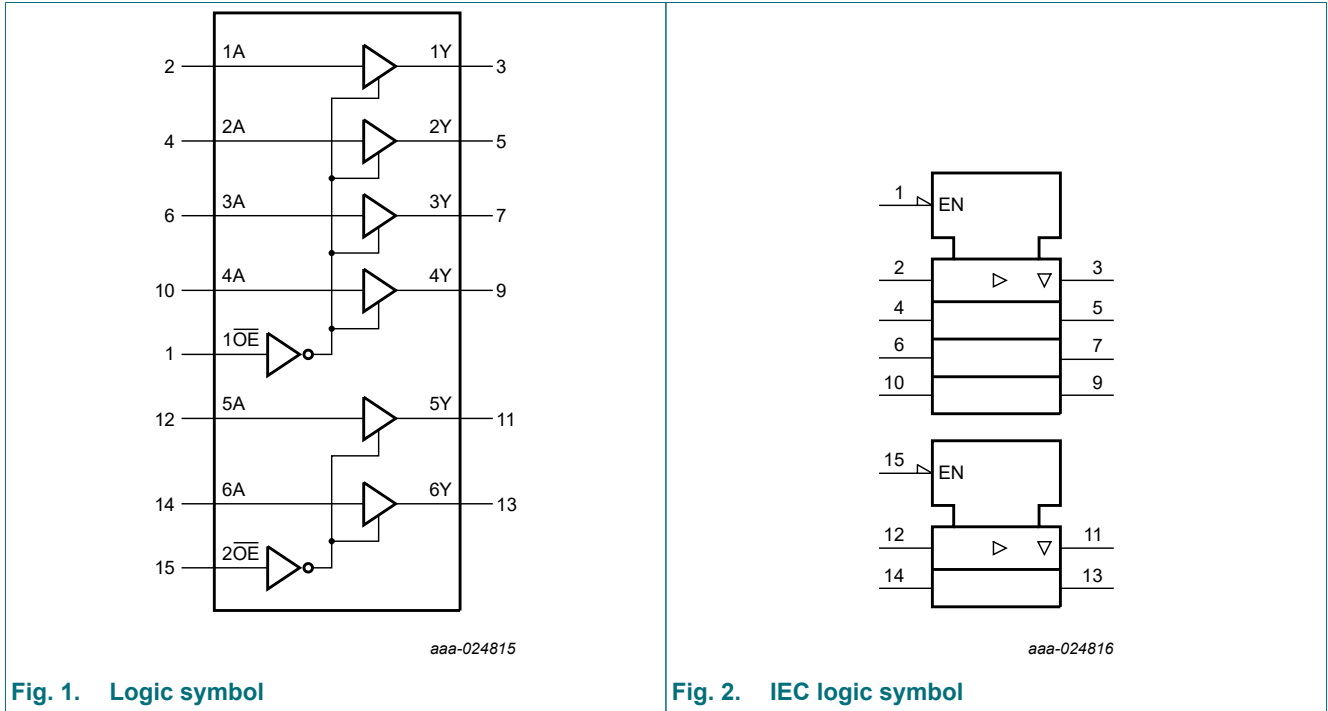


Fig. 1. Logic symbol

Fig. 2. IEC logic symbol

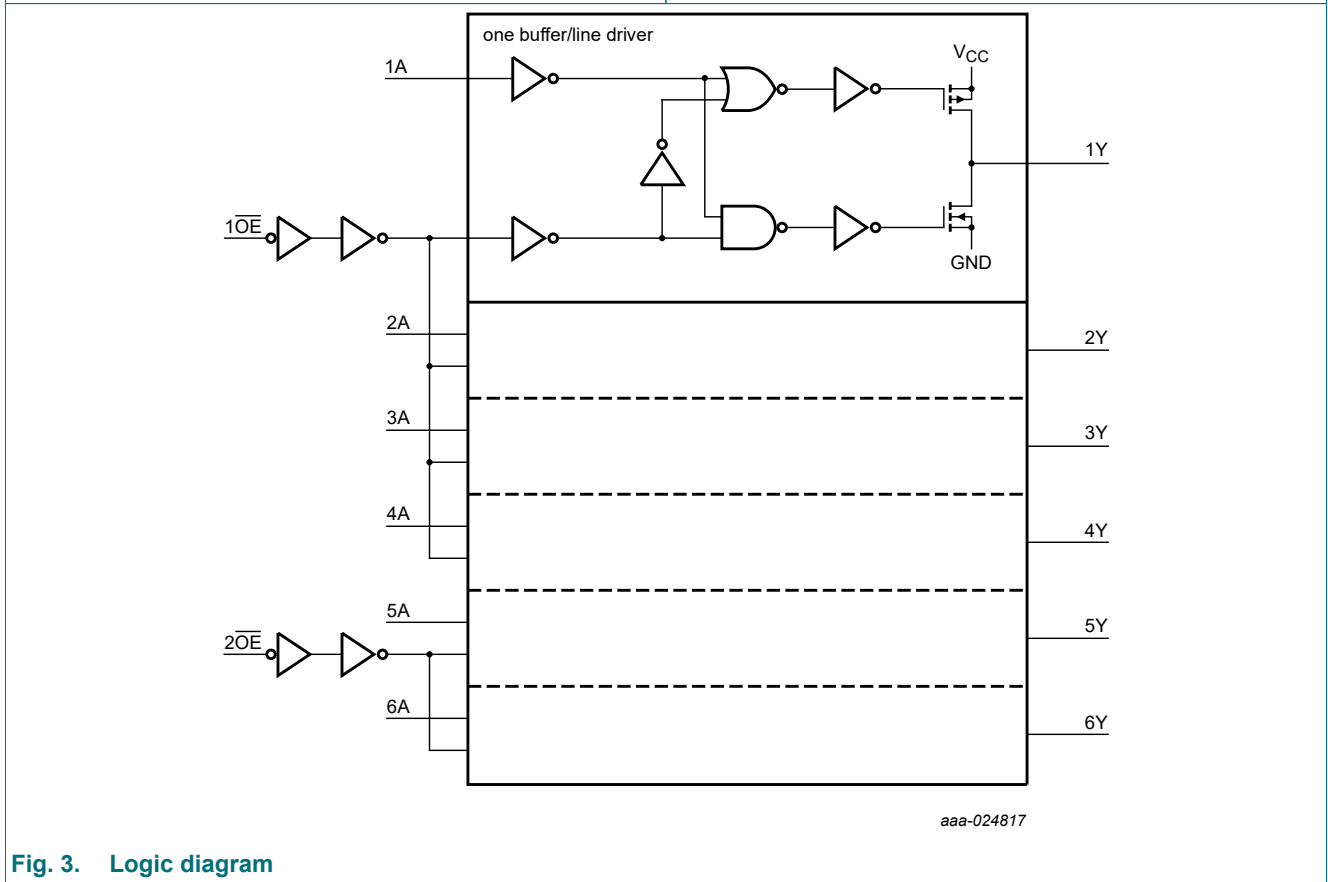
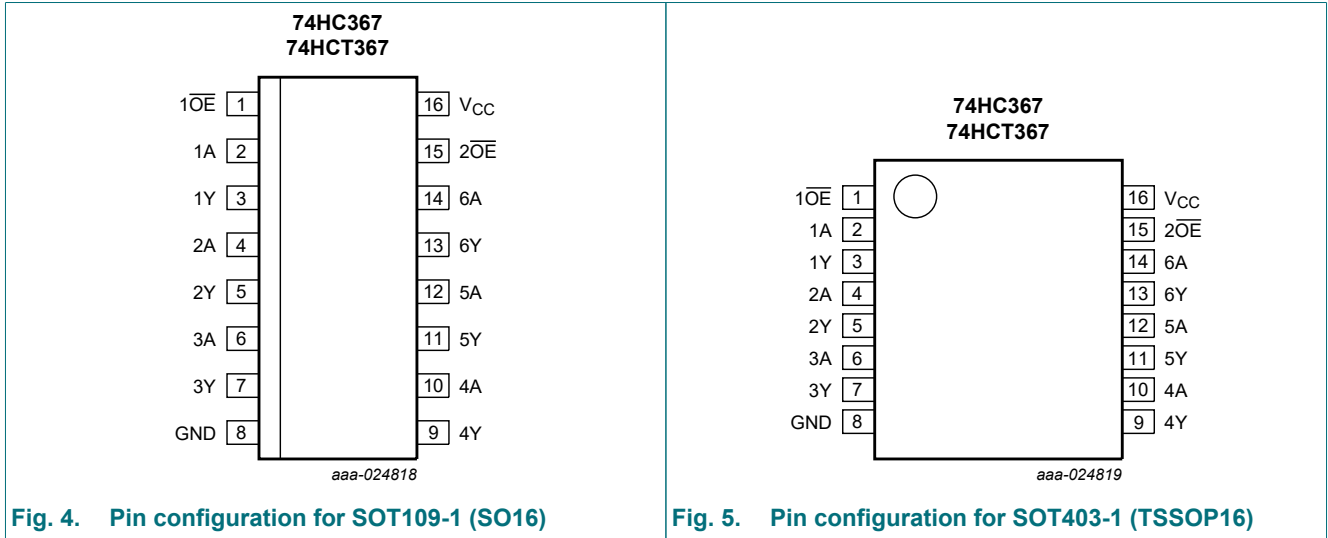


Fig. 3. Logic diagram

5. Pinning information

5.1. Pinning



5.2. Pin description

Table 2. Pin description

| Symbol | Pin | Description |
|------------------------|---------------------|----------------------------------|
| 1OE, 2OE | 1, 15 | output enable input (active LOW) |
| 1A, 2A, 3A, 4A, 5A, 6A | 2, 4, 6, 10, 12, 14 | data input |
| 1Y, 2Y, 3Y, 4Y, 5Y, 6Y | 3, 5, 7, 9, 11, 13 | bus output |
| GND | 8 | ground (0 V) |
| V _{CC} | 16 | supply voltage |

6. Functional description

Table 3. Function table

H = HIGH voltage level; L = LOW voltage level; X = don't care; Z = high-impedance OFF-state.

| Input | | Output |
|-------|----|--------|
| nOE | nA | nY |
| L | L | L |
| L | H | H |
| H | X | Z |

7. Limiting values

Table 4. 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 clamping current | $V_I < -0.5\text{ V}$ or $V_I > V_{CC} + 0.5\text{ V}$ | - | ± 20 | mA |
| I_{OK} | output clamping current | $V_O < -0.5\text{ V}$ or $V_O > V_{CC} + 0.5\text{ V}$ | - | ± 20 | mA |
| I_O | output current | $-0.5\text{ V} < V_O < V_{CC} + 0.5\text{ V}$ | - | ± 35 | mA |
| I_{CC} | supply current | | - | 70 | mA |
| I_{GND} | ground current | | -70 | - | mA |
| T_{stg} | storage temperature | | -65 | +150 | °C |
| P_{tot} | total power dissipation | [1] | - | 500 | mW |

- [1] For SOT109-1 (SO16) package: P_{tot} derates linearly with 12.4 mW/K above 110 °C.
For SOT403-1 (TSSOP16) package: P_{tot} derates linearly with 8.5 mW/K above 91 °C.

8. Recommended operating conditions

Table 5. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V)

| Symbol | Parameter | Conditions | 74HC367 | | | 74HCT367 | | | Unit |
|---------------------|-------------------------------------|-------------------------|---------|------|----------|----------|------|----------|------|
| | | | Min | Typ | Max | Min | Typ | Max | |
| V_{CC} | supply voltage | | 2.0 | 5.0 | 6.0 | 4.5 | 5.0 | 5.5 | V |
| V_I | input voltage | | 0 | - | V_{CC} | 0 | - | V_{CC} | V |
| V_O | output voltage | | 0 | - | V_{CC} | 0 | - | V_{CC} | V |
| T_{amb} | ambient temperature | | -40 | +25 | +125 | -40 | +25 | +125 | °C |
| $\Delta t/\Delta V$ | input transition rise and fall rate | $V_{CC} = 2.0\text{ V}$ | - | - | 625 | - | - | - | ns/V |
| | | $V_{CC} = 4.5\text{ V}$ | - | 1.67 | 139 | - | 1.67 | 139 | ns/V |
| | | $V_{CC} = 6.0\text{ V}$ | - | - | 83 | - | - | - | ns/V |

9. Static characteristics

Table 6. Static characteristics

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

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|-----------------|--|--|-------|------|------|------------------|------|-------------------|------|------|
| | | | Min | Typ | Max | Min | Max | Min | Max | |
| 74HC367 | | | | | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 2.0 V | 1.5 | 1.2 | - | 1.5 | - | 1.5 | - | V |
| | | V _{CC} = 4.5 V | 3.15 | 2.4 | - | 3.15 | - | 3.15 | - | V |
| | | V _{CC} = 6.0 V | 4.2 | 3.2 | - | 4.2 | - | 4.2 | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 2.0 V | - | 0.8 | 0.5 | - | 0.5 | - | 0.5 | V |
| | | V _{CC} = 4.5 V | - | 2.1 | 1.35 | - | 1.35 | - | 1.35 | V |
| | | V _{CC} = 6.0 V | - | 2.8 | 1.8 | - | 1.8 | - | 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 | - | 1.9 | - | 1.9 | - | V |
| | | I _O = -20 μA; V _{CC} = 4.5 V | 4.4 | 4.5 | - | 4.4 | - | 4.4 | - | V |
| | | I _O = -20 μA; V _{CC} = 6.0 V | 5.9 | 6.0 | - | 5.9 | - | 5.9 | - | V |
| | | I _O = -6.0 mA; V _{CC} = 4.5 V | 3.98 | 4.32 | - | 3.84 | - | 3.7 | - | 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 | - | 0.1 | - | 0.1 | V |
| | | I _O = 20 μA; V _{CC} = 4.5 V | - | 0 | 0.1 | - | 0.1 | - | 0.1 | V |
| | | I _O = 20 μA; V _{CC} = 6.0 V | - | 0 | 0.1 | - | 0.1 | - | 0.1 | V |
| | | I _O = 6.0 mA; V _{CC} = 4.5 V | - | 0.15 | 0.26 | - | 0.33 | - | 0.4 | V |
| I _O | I _O = 7.8 mA; V _{CC} = 6.0 V | | - | 0.16 | 0.26 | - | 0.33 | - | 0.4 | V |
| | | | | | | | | | | |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 6.0 V | - | - | ±0.1 | - | ±1.0 | - | ±1.0 | μA |
| I _{OZ} | OFF-state output current | V _I = V _{IH} or V _{IL} ; V _{CC} = 6.0 V; V _O = V _{CC} or GND | - | - | ±0.5 | - | ±5.0 | - | ±10 | μA |
| I _{CC} | supply current | V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 6.0 V | - | - | 8.0 | - | 80 | - | 160 | μA |
| C _I | input capacitance | | - | 3.5 | - | - | - | - | - | pF |

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|------------------|---------------------------|---|-------|------|------|------------------|------|-------------------|------|------|
| | | | Min | Typ | Max | Min | Max | Min | Max | |
| 74HCT367 | | | | | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 4.5 V to 5.5 V | 2.0 | 1.6 | - | 2.0 | - | 2.0 | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 4.5 V to 5.5 V | - | 1.2 | 0.8 | - | 0.8 | - | 0.8 | V |
| V _{OH} | HIGH-level output voltage | V _I = V _{IH} or V _{IL} ; V _{CC} = 4.5 V | | | | | | | | |
| | | I _O = -20 µA | 4.4 | 4.5 | - | 4.4 | - | 4.4 | - | V |
| | | I _O = -6 mA | 3.98 | 4.32 | - | 3.84 | - | 3.7 | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} ; V _{CC} = 4.5 V | | | | | | | | |
| | | I _O = 20 µA | - | 0 | 0.1 | - | 0.1 | - | 0.1 | V |
| | | I _O = 6.0 mA | - | 0.16 | 0.26 | - | 0.33 | - | 0.4 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 5.5 V | - | - | ±0.1 | - | ±1.0 | - | ±1.0 | µA |
| I _{OZ} | OFF-state output current | V _I = V _{IH} or V _{IL} ; V _{CC} = 5.5 V; V _O = V _{CC} or GND | - | - | ±0.5 | - | ±5.0 | - | ±10 | µA |
| I _{CC} | supply current | V _I = V _{CC} or GND; V _{CC} = 5.5 V; I _O = 0 A | - | - | 8.0 | - | 80 | - | 160 | µA |
| ΔI _{CC} | additional supply current | per input pin; V _I = V _{CC} - 2.1 V; other inputs at V _{CC} or GND; V _{CC} = 4.5 V to 5.5 V; I _O = 0 A | | | | | | | | |
| | | 1 $\overline{\text{OE}}$, nA inputs | - | 100 | 360 | - | 450 | - | 490 | µA |
| | | 2 $\overline{\text{OE}}$ input | - | 90 | 324 | - | 405 | - | 441 | µA |
| C _I | input capacitance | | - | 3.5 | - | - | - | - | - | pF |

10. Dynamic characteristics

Table 7. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); $C_L = 50$ pF unless otherwise specified; for test circuit, see Fig. 8.

| Symbol | Parameter | Conditions | 25 °C | | | -40 °C to +85 °C | | -40 °C to +125 °C | | Unit |
|-----------------|-------------------------------|---|-------|-----|-----|------------------|-----|-------------------|-----|------|
| | | | Min | Typ | Max | Min | Max | Min | Max | |
| 74HC367 | | | | | | | | | | |
| t_{pd} | propagation delay | nA to nY; see Fig. 6 [1] | | | | | | | | |
| | | $V_{CC} = 2.0$ V | - | 28 | 95 | - | 120 | - | 145 | ns |
| | | $V_{CC} = 4.5$ V | - | 10 | 19 | - | 24 | - | 29 | ns |
| | | $V_{CC} = 5.0$ V; $C_L = 15$ pF | - | 8 | - | - | - | - | - | ns |
| | | $V_{CC} = 6.0$ V | - | 8 | 16 | - | 20 | - | 25 | ns |
| t_{en} | enable time | nOE to nY; see Fig. 7 [1] | | | | | | | | |
| | | $V_{CC} = 2.0$ V | - | 44 | 150 | - | 190 | - | 225 | ns |
| | | $V_{CC} = 4.5$ V | - | 16 | 30 | - | 38 | - | 45 | ns |
| | | $V_{CC} = 6.0$ V | - | 13 | 26 | - | 33 | - | 38 | ns |
| t_{dis} | disable time | nOE to nY; see Fig. 7 [1] | | | | | | | | |
| | | $V_{CC} = 2.0$ V | - | 55 | 150 | - | 190 | - | 225 | ns |
| | | $V_{CC} = 4.5$ V | - | 20 | 30 | - | 38 | - | 45 | ns |
| | | $V_{CC} = 6.0$ V | - | 16 | 26 | - | 33 | - | 38 | ns |
| t_t | transition time | see Fig. 6 [1] | | | | | | | | |
| | | $V_{CC} = 2.0$ V | - | 14 | 60 | - | 75 | - | 90 | ns |
| | | $V_{CC} = 4.5$ V | - | 5 | 12 | - | 15 | - | 18 | ns |
| | | $V_{CC} = 6.0$ V | - | 4 | 10 | - | 13 | - | 15 | ns |
| C_{PD} | power dissipation capacitance | per buffer; $V_I = \text{GND to } V_{CC}$ [2] | - | 30 | - | - | - | - | - | pF |
| 74HCT367 | | | | | | | | | | |
| t_{pd} | propagation delay | nA to nY; see Fig. 6 [1] | | | | | | | | |
| | | $V_{CC} = 4.5$ V | - | 14 | 25 | - | 31 | - | 38 | ns |
| | | $V_{CC} = 5.0$ V; $C_L = 15$ pF | - | 11 | - | - | - | - | - | ns |
| t_{en} | enable time | nOE to nY; $V_{CC} = 4.5$ V; see Fig. 7 [1] | - | 16 | 35 | - | 44 | - | 53 | ns |
| t_{dis} | disable time | nOE to nY; $V_{CC} = 4.5$ V; see Fig. 7 [1] | - | 21 | 35 | - | 44 | - | 53 | ns |
| t_t | transition time | $V_{CC} = 4.5$ V; see Fig. 6 [1] | - | 5 | 12 | - | 15 | - | 18 | ns |
| C_{PD} | power dissipation capacitance | per buffer; $V_I = \text{GND to } V_{CC} - 1.5$ V [2] | - | 32 | - | - | - | - | - | pF |

[1] t_{pd} is the same as t_{PHL} and t_{PLH} ; t_{en} is the same as t_{PZH} and t_{PZL} ; t_{dis} is the same as t_{PHZ} and t_{PLZ} ; t_t is the same as t_{THL} and t_{TLH} .

[2] C_{PD} is used to determine the dynamic power dissipation (P_D in μW):

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

f_i = input frequency in MHz;

f_o = output frequency in MHz;

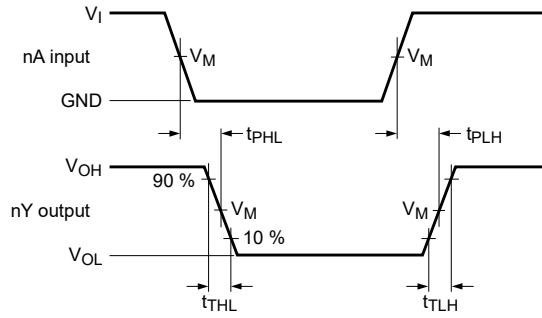
C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

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

10.1. Waveforms and test circuit

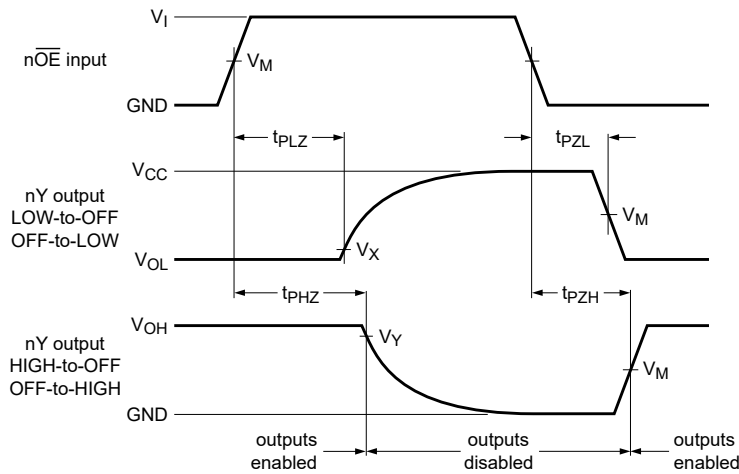


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Measurement points are given in [Table 8](#).

V_{OL} and V_{OH} are typical voltage output levels that occur with the output load.

Fig. 6. Input (nA) to output (nY) propagation delays and output transition times



aaa-024821

Measurement points are given in [Table 8](#).

V_{OL} and V_{OH} are typical voltage output levels that occur with the output load.

Fig. 7. 3-state enable and disable times

Table 8. Measurement points

| Type | Input | Output | | |
|----------|---------------------|---------------------|---------------------|---------------------|
| | V_M | V_M | V_X | V_Y |
| 74HC367 | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $0.1 \times V_{CC}$ | $0.9 \times V_{CC}$ |
| 74HCT367 | 1.3 V | 1.3 V | $0.1 \times V_{CC}$ | $0.9 \times V_{CC}$ |

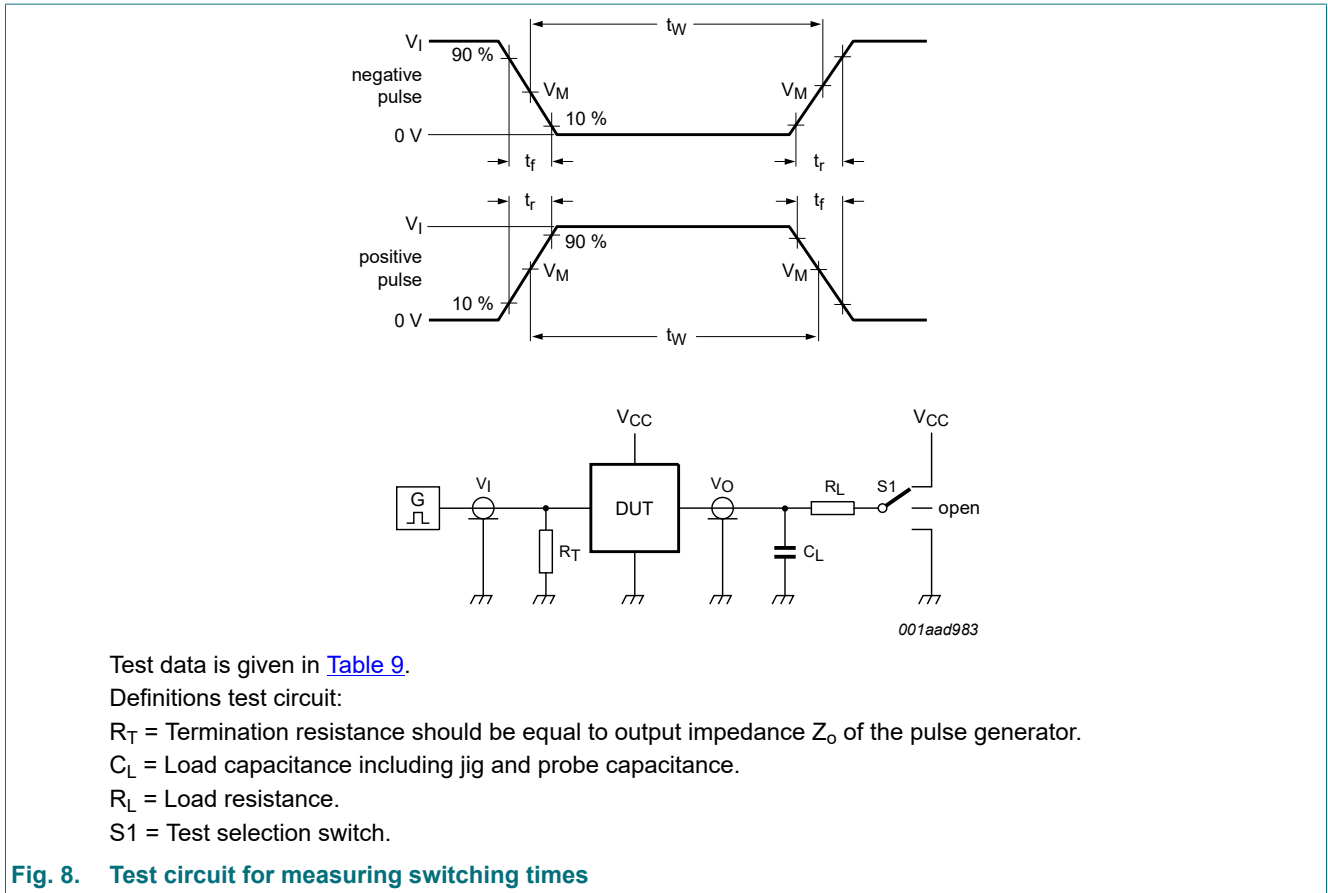


Fig. 8. Test circuit for measuring switching times

Table 9. Test data

| Type | Input | | Load | | S1 position | | |
|----------|----------|------------|--------------|--------------|--------------------|--------------------|--------------------|
| | V_I | t_r, t_f | C_L | R_L | t_{PHL}, t_{PLH} | t_{PZH}, t_{PHZ} | t_{PZL}, t_{PLZ} |
| 74HC367 | V_{CC} | 6 ns | 15 pF, 50 pF | 1 k Ω | open | GND | V_{CC} |
| 74HCT367 | 3 V | 6 ns | 15 pF, 50 pF | 1 k Ω | open | GND | V_{CC} |

11. Package outline

SO16: plastic small outline package; 16 leads; body width 3.9 mm

SOT109-1

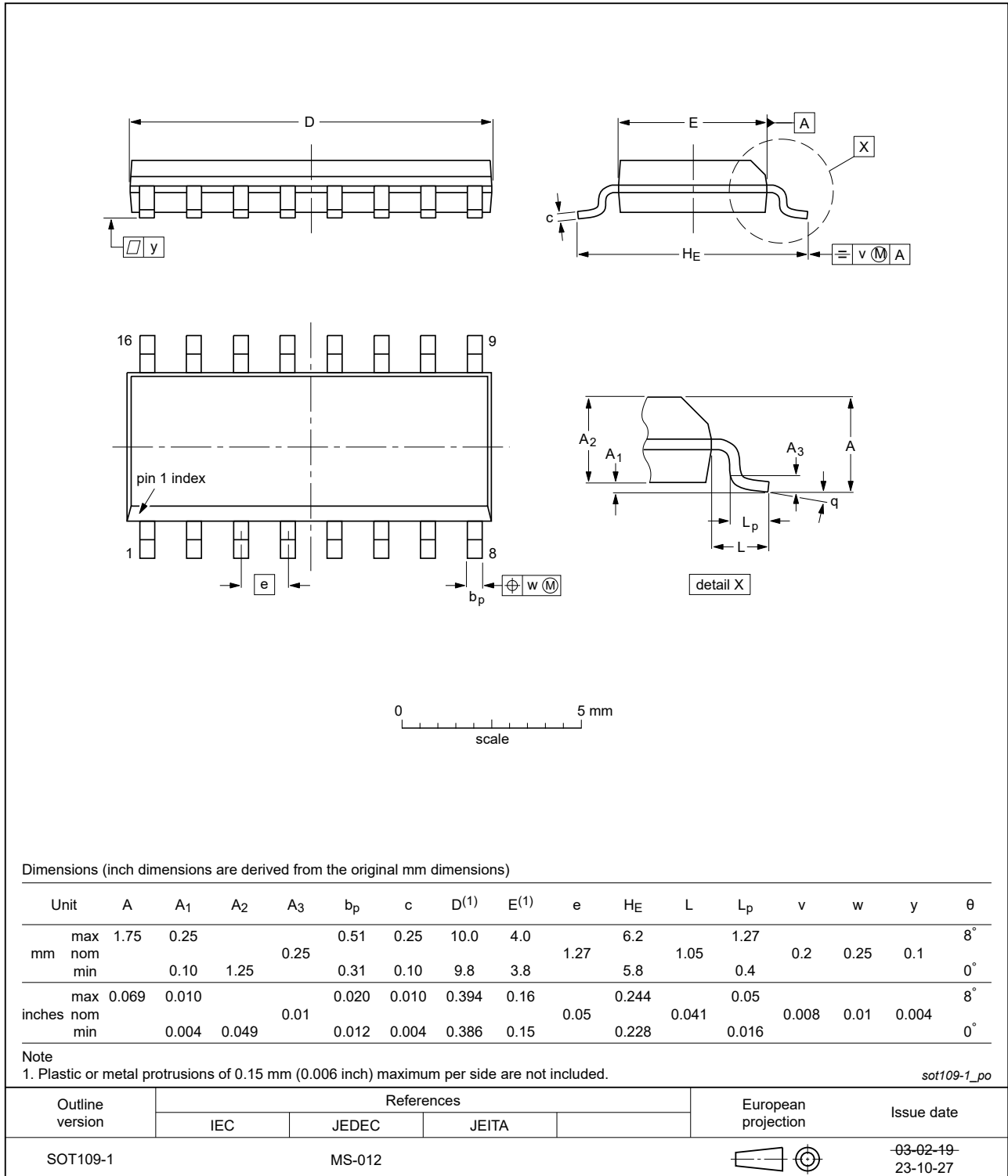


Fig. 9. Package outline SOT109-1 (SO16)

TSSOP16: plastic thin shrink small outline package; 16 leads; body width 4.4 mm

SOT403-1

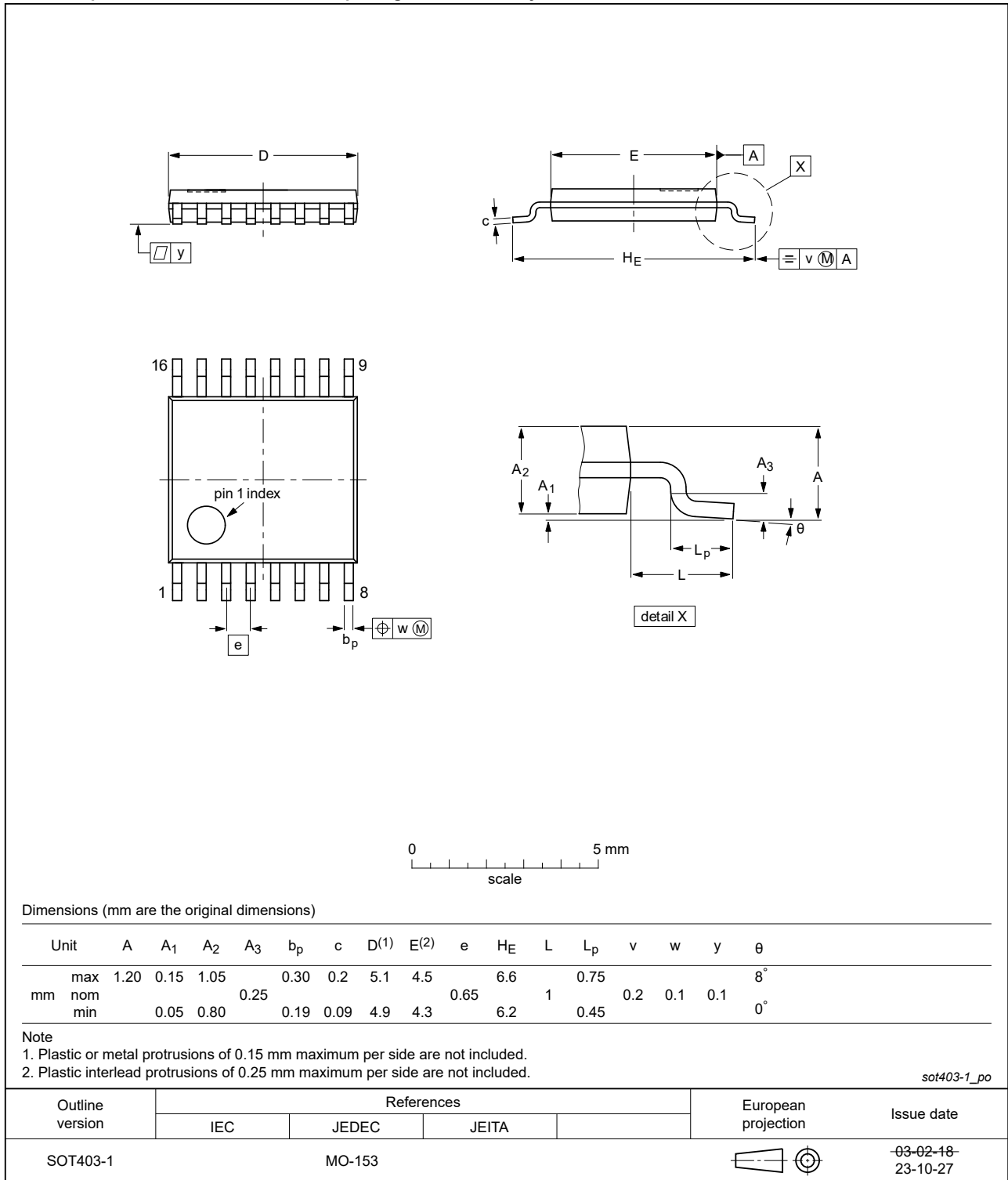


Fig. 10. Package outline SOT403-1 (TSSOP16)

12. Abbreviations

Table 10. Abbreviations

| Acronym | Description |
|---------|---|
| CDM | Charged Device Model |
| CMOS | Complementary Metal Oxide Semiconductor |
| DUT | Device Under Test |
| ESD | ElectroStatic Discharge |
| HBM | Human Body Model |
| TTL | Transistor-Transistor Logic |

13. Revision history

Table 11. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------------|---|-----------------------|---------------|---------------------|
| 74HC_HCT367 v.5 | 20240319 | Product data sheet | - | 74HC_HCT367 v.4 |
| Modifications: | <ul style="list-style-type: none"> • Fig. 9, Fig. 10: Aligned SO and TSSOP package outline drawings to JEDEC MS-012 and MO-153. • Section 2: ESD specification updated according to the latest JEDEC standard. | | | |
| 74HC_HCT367 v.4 | 20210224 | Product data sheet | - | 74HC_HCT367 v.3 |
| Modifications: | <ul style="list-style-type: none"> • The format of this data sheet has been redesigned to comply with the identity guidelines of Nexperia. • Legal texts have been adapted to the new company name where appropriate. • Section 2 updated. • Section 7: Derating values for P_{tot} total power dissipation updated. • Type numbers 74HC367DB and 74HCT367DB (SOT338-1 / SSOP16) removed. | | | |
| 74HC_HCT367 v.3 | 20161017 | Product data sheet | - | 74HC_HCT367_CNV v.2 |
| Modifications: | <ul style="list-style-type: none"> • The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors. • Legal texts have been adapted to the new company name where appropriate. • Type numbers 74HC367N and 74HCT367N removed. | | | |
| 74HC_HCT367_CNV v.2 | 19901201 | Product specification | - | - |

14. Legal information

Data sheet status

| Document status [1][2] | Product status [3] | Definition |
|--------------------------------|--------------------|---|
| Objective [short] data sheet | Development | This document contains data from the objective specification for product development. |
| Preliminary [short] data sheet | Qualification | This document contains data from the preliminary specification. |
| Product [short] data sheet | Production | This document contains the product specification. |

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- [2] The term 'short data sheet' is explained in section "Definitions".
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