

74HC366; 74HCT366

Hex buffer/line driver; 3-state; inverting

Rev. 4 — 4 September 2012

Product data sheet

1. General description

The 74HC366; 74HCT366 is a hex inverter/line driver with 3-state outputs controlled by the output enable inputs ($\overline{OE}1$). A HIGH on $\overline{OE}n$ causes the outputs to assume a high impedance OFF-state. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of V_{CC} .

The 74HC366; 74HCT366 is functionally identical to:

- 74HC365; 74HCT365, but has inverted outputs

2. Features and benefits

- Inverting outputs
- Input levels:
 - ◆ For 74HC366: CMOS level
 - ◆ For 74HCT366: TTL level
- Complies with JEDEC standard no. 7A
- ESD protection:
 - ◆ HBM EIA/JESD22-A114-F exceeds 2000 V
 - ◆ MM EIA/JESD22-A115-A exceeds 200 V
- Specified from $-40\text{ }^{\circ}\text{C}$ to $+85\text{ }^{\circ}\text{C}$ and from $-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$
- Multiple package options

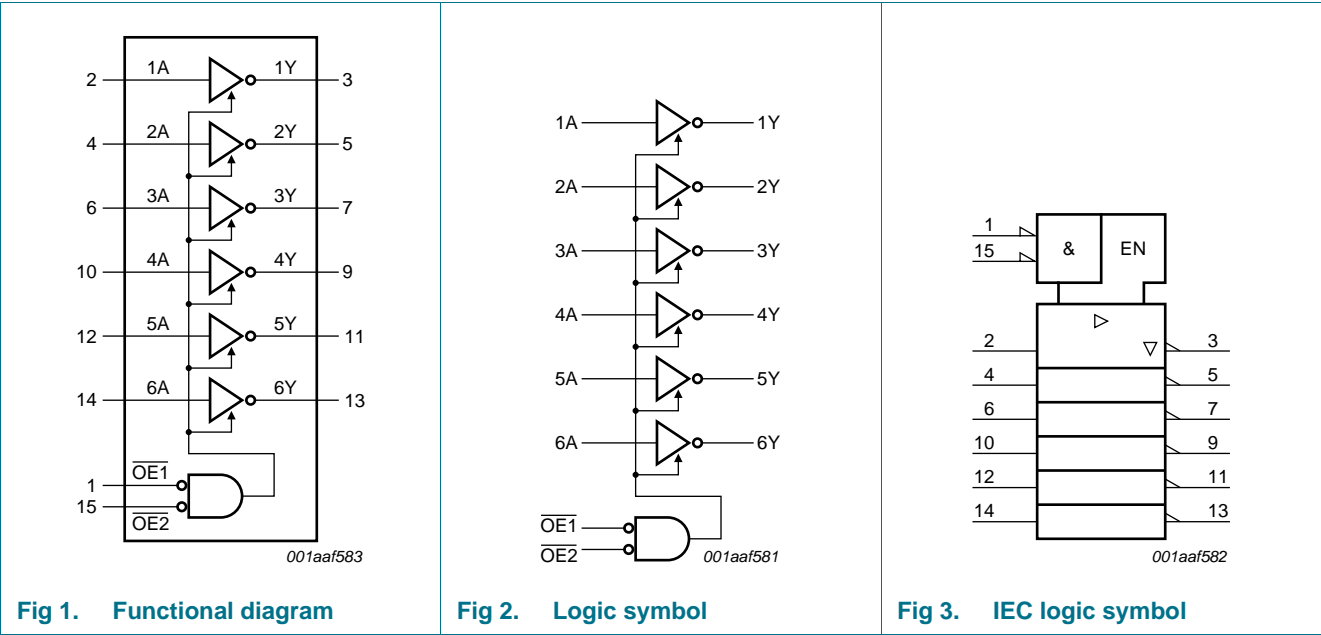


3. Ordering information

Table 1. Ordering information

| Type number | Package | | | |
|-----------------|-------------------|---------|--|----------|
| | Temperature range | Name | Description | Version |
| 74HC366 | | | | |
| 74HC366D | −40 °C to +125 °C | SO16 | plastic small outline package; 16 leads; body width 3.9 mm | SOT109-1 |
| 74HC366N | −40 °C to +125 °C | DIP16 | plastic dual in-line package; 16 leads (300 mil); long body | SOT38-1 |
| 74HC366PW | −40 °C to +125 °C | TSSOP16 | plastic thin shrink small outline package; 16 leads; body width 4.4 mm | SOT403-1 |
| 74HCT366 | | | | |
| 74HCT366D | −40 °C to +125 °C | SO16 | plastic small outline package; 16 leads; body width 3.9 mm | SOT109-1 |
| 74HCT366DB | −40 °C to +125 °C | SSOP16 | plastic shrink small outline package; 16 leads; body width 5.3 mm | SOT338-1 |
| 74HCT366N | −40 °C to +125 °C | DIP16 | plastic dual in-line package; 16 leads (300 mil); long body | SOT38-1 |
| 74HCT366PW | −40 °C to +125 °C | TSSOP16 | plastic thin shrink small outline package; 16 leads; body width 4.4 mm | SOT403-1 |

4. Functional diagram



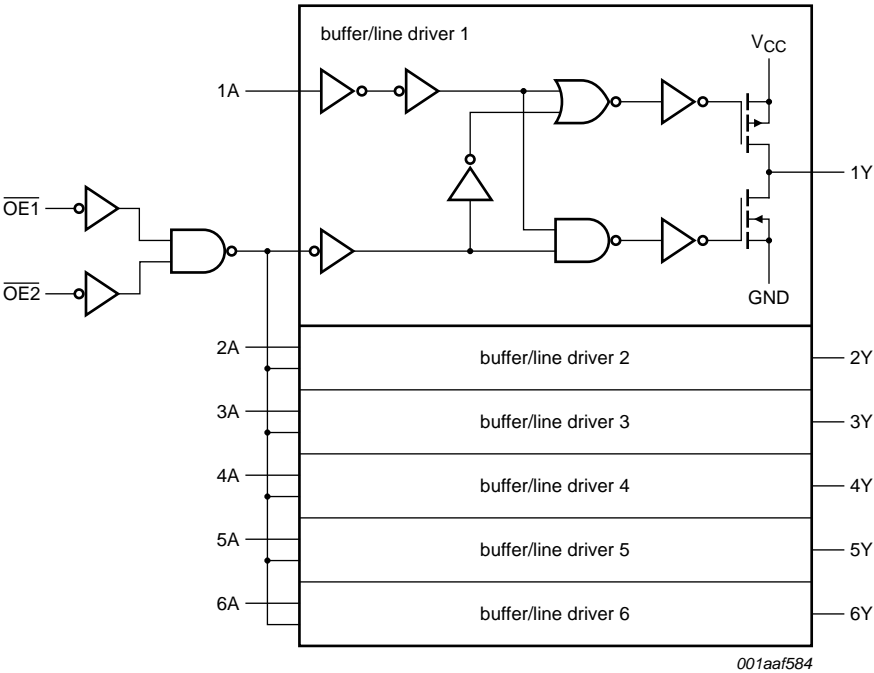


Fig 4. Logic diagram

5. Pinning information

5.1 Pinning

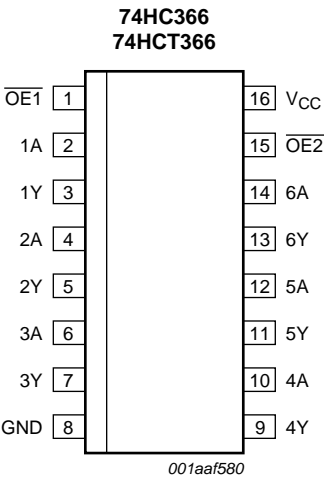


Fig 5. Pin configuration

5.2 Pin description

Table 2. Pin description

| Symbol | Pin | Description |
|-------------------------|-----|------------------------------------|
| $\overline{\text{OE1}}$ | 1 | output enable input 1 (active LOW) |
| 1A | 2 | data input 1 |
| 1Y | 3 | data output 1 |
| 2A | 4 | data input 2 |
| 2Y | 5 | data output 2 |
| 3A | 6 | data input 3 |
| 3Y | 7 | data output 3 |
| GND | 8 | ground (0 V) |
| 4Y | 9 | data output 4 |
| 4A | 10 | data input 4 |
| 5Y | 11 | data output 5 |
| 5A | 12 | data input 5 |
| 6Y | 13 | data output 6 |
| 6A | 14 | data input 6 |
| $\overline{\text{OE2}}$ | 15 | output enable input 2 (active LOW) |
| V _{CC} | 16 | supply voltage |

6. Functional description

Table 3. Function table^[1]

| Control | | Input | Output |
|-------------------------|-------------------------|-------|--------|
| $\overline{\text{OE1}}$ | $\overline{\text{OE2}}$ | nA | nY |
| L | L | L | H |
| L | L | H | L |
| X | H | X | Z |
| H | X | X | Z |

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

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 | $V_O = -0.5\text{ V}$ to $(V_{CC} + 0.5\text{ V})$ | - | ± 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 | DIP16 package | [1] - | 750 | mW |
| | | SO16 package | [2] - | 500 | mW |
| | | SSOP16 package | [3] - | 500 | mW |
| | | TSSOP16 package | [3] - | 500 | mW |

[1] For DIP16 packages: P_{tot} derates linearly with 12 mW/K above 70 °C.

[2] For SO16 packages: P_{tot} derates linearly with 8 mW/K above 70 °C.

[3] For SSOP16 and TSSOP16 packages: P_{tot} derates linearly with 5.5 mW/K above 60 °C.

8. Recommended operating conditions

Table 5. Recommended operating conditions

Voltages are referenced to GND (ground = 0 V)

| Symbol | Parameter | Conditions | 74HC366 | | | 74HCT366 | | | 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 74HC366

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 = -6.0 mA; V _{CC} = 4.5 V | 3.98 | 4.32 | - | V |
| | | I _O = -7.8 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 = 6.0 mA; V _{CC} = 4.5 V | - | 0.15 | 0.26 | V |
| | | I _O = 7.8 mA; V _{CC} = 6.0 V | - | 0.16 | 0.26 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 6.0 V | - | - | ±0.1 | µA |
| I _{OZ} | OFF-state output current | V _I = V _{IH} or V _{IL} ; V _O = V _{CC} or GND; V _{CC} = 6.0 V | - | - | ±0.5 | µA |
| I _{CC} | 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 = -6.0 mA; V _{CC} = 4.5 V | 3.84 | - | - | V |
| | | I _O = -7.8 mA; V _{CC} = 6.0 V | 5.34 | - | - | V |

Table 6. Static characteristics 74HC366 ...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 µA; V _{CC} = 2.0 V | - | - | 0.1 | V |
| | | I _O = 20 µA; V _{CC} = 4.5 V | - | - | 0.1 | V |
| | | I _O = 20 µA; V _{CC} = 6.0 V | - | - | 0.1 | V |
| | | I _O = 6.0 mA; V _{CC} = 4.5 V | - | - | 0.33 | V |
| | | I _O = 7.8 mA; V _{CC} = 6.0 V | - | - | 0.33 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 6.0 V; | - | - | ±1.0 | µA |
| I _{OZ} | OFF-state output current | V _I = V _{IH} or V _{IL} ; V _O = V _{CC} or GND; V _{CC} = 6.0 V | - | - | ±5.0 | µA |
| I _{CC} | 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 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 = -6.0 mA; V _{CC} = 4.5 V | 3.7 | - | - | V |
| | | I _O = -7.8 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 µA; V _{CC} = 2.0 V | - | - | 0.1 | V |
| | | I _O = 20 µA; V _{CC} = 4.5 V | - | - | 0.1 | V |
| | | I _O = 20 µA; V _{CC} = 6.0 V | - | - | 0.1 | V |
| | | I _O = 6.0 mA; V _{CC} = 4.5 V | - | - | 0.4 | V |
| | | I _O = 7.8 mA; V _{CC} = 6.0 V | - | - | 0.4 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 6.0 V | - | - | ±1.0 | µA |
| I _{OZ} | OFF-state output current | V _I = V _{IH} or V _{IL} ; V _O = V _{CC} or GND; V _{CC} = 6.0 V | - | - | ±10.0 | µA |
| I _{CC} | supply current | V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 6.0 V | - | - | 160 | µA |

Table 7. Static characteristics 74HCT366

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} = 4.5 V to 5.5 V | 2.0 | 1.6 | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 4.5 V to 5.5 V | - | 1.2 | 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 | - | V |
| | | I _O = -6.0 mA | 3.98 | 4.32 | - | V |

Table 7. Static characteristics 74HCT366 ...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} ; V _{CC} = 4.5 V | | | | |
| | | I _O = 20 μA | - | 0 | 0.1 | V |
| | | I _O = 6.0 mA | - | 0.16 | 0.26 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 5.5 V | - | - | ±0.1 | μA |
| I _{OZ} | OFF-state output current | V _I = V _{IH} or V _{IL} ; V _O = V _{CC} or GND per input pin; other inputs at GND or V _{CC} ; I _O = 0 A; V _{CC} = 5.5 V | - | - | ±0.5 | μA |
| I _{CC} | supply current | V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 5.5 V | - | - | 8.0 | μA |
| ΔI _{CC} | additional supply current | V _I = V _{CC} – 2.1 V; other inputs at V _{CC} or GND; I _O = 0 A | | | | |
| | | pins nA | - | 100 | 360 | μA |
| | | pin $\overline{OE1}$ | - | 100 | 360 | μA |
| | | pin $\overline{OE2}$ | - | 90 | 320 | μA |
| C _I | input capacitance | | - | 3.5 | - | pF |
| T _{amb} = –40 °C to +85 °C | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 4.5 V to 5.5 V | 2.0 | - | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 4.5 V to 5.5 V | - | - | 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 | - | - | V |
| | | I _O = –6.0 mA | 3.84 | - | - | V |
| V _{OL} | LOW-level output voltage | V _I = V _{IH} or V _{IL} ; V _{CC} = 4.5 V | | | | |
| | | I _O = 20 μA | - | - | 0.1 | V |
| | | I _O = 6.0 mA | - | - | 0.33 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 5.5 V | - | - | ±1.0 | μA |
| I _{OZ} | OFF-state output current | V _I = V _{IH} or V _{IL} ; V _O = V _{CC} or GND per input pin; other inputs at GND or V _{CC} ; I _O = 0 A; V _{CC} = 5.5 V | | | ±5.0 | μA |
| I _{CC} | supply current | V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 5.5 V | - | - | 80 | μA |
| ΔI _{CC} | additional supply current | V _I = V _{CC} – 2.1 V; other inputs at V _{CC} or GND; I _O = 0 A | | | | |
| | | pins nA | - | - | 450 | μA |
| | | pin $\overline{OE1}$ | - | - | 450 | μA |
| | | pin $\overline{OE2}$ | - | - | 400 | μA |
| T _{amb} = –40 °C to +125 °C | | | | | | |
| V _{IH} | HIGH-level input voltage | V _{CC} = 4.5 V to 5.5 V | 2.0 | - | - | V |
| V _{IL} | LOW-level input voltage | V _{CC} = 4.5 V to 5.5 V | - | - | 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 | - | - | V |
| | | I _O = –6.0 mA | 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 | - | - | 0.1 | V |
| | | I _O = 6.0 mA | - | - | 0.4 | V |
| I _I | input leakage current | V _I = V _{CC} or GND; V _{CC} = 5.5 V | - | - | ±1.0 | μA |
| I _{OZ} | OFF-state output current | V _I = V _{IH} or V _{IL} ; V _O = V _{CC} or GND per input pin; other inputs at GND or V _{CC} ; I _O = 0 A; V _{CC} = 5.5 V | - | - | ±10.0 | μA |

Table 7. Static characteristics 74HCT366 ...continued

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

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|-----------------|---------------------------|--|-----|-----|-----|---------|
| I_{CC} | supply current | $V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5$ V | - | - | 160 | μ A |
| ΔI_{CC} | additional supply current | $V_I = V_{CC} - 2.1$ V; other inputs at V_{CC} or GND; $I_O = 0$ A | | | | |
| | | pins nA | - | - | 490 | μ A |
| | | pin $\overline{OE}1$ | - | - | 490 | μ A |
| | | pin $\overline{OE}2$ | - | - | 441 | μ A |

10. Dynamic characteristics

Table 8. Dynamic characteristics 74HC366Voltages are referenced to GND (ground = 0 V); $C_L = 50$ pF unless otherwise specified; see test circuit [Figure 8](#).

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|---|-------------------------------|--|-----|-----|-----|------|
| $T_{amb} = 25$ °C | | | | | | |
| t_{pd} | propagation delay | nA to nY; see Figure 6 | [1] | | | |
| | | $V_{CC} = 2.0$ V | - | 33 | 100 | ns |
| | | $V_{CC} = 4.5$ V | - | 12 | 20 | ns |
| | | $V_{CC} = 5$ V; $C_L = 15$ pF | - | 10 | - | ns |
| | | $V_{CC} = 6.0$ V | - | 10 | 17 | ns |
| t_{en} | enable time | $\overline{OE}n$ to nY; see Figure 7 | [2] | | | |
| | | $V_{CC} = 2.0$ V | - | 44 | 150 | ns |
| | | $V_{CC} = 4.5$ V | - | 16 | 30 | ns |
| | | $V_{CC} = 6.0$ V | - | 13 | 26 | ns |
| t_{dis} | disable time | $\overline{OE}n$ to nY; see Figure 7 | [3] | | | |
| | | $V_{CC} = 2.0$ V | - | 55 | 150 | ns |
| | | $V_{CC} = 4.5$ V | - | 20 | 30 | ns |
| | | $V_{CC} = 6.0$ V | - | 16 | 26 | ns |
| t_t | transition time | see Figure 6 | [4] | | | |
| | | $V_{CC} = 2.0$ V | - | 14 | 60 | ns |
| | | $V_{CC} = 4.5$ V | - | 5 | 12 | ns |
| | | $V_{CC} = 6.0$ V | - | 4 | 10 | ns |
| C_{PD} | power dissipation capacitance | per buffer; $V_I =$ GND to V_{CC} | [5] | 30 | - | pF |
| $T_{amb} = -40$ °C to $+85$ °C | | | | | | |
| t_{pd} | propagation delay | nA to nY; see Figure 6 | [1] | | | |
| | | $V_{CC} = 2.0$ V | - | - | 125 | ns |
| | | $V_{CC} = 4.5$ V | - | - | 25 | ns |
| | | $V_{CC} = 6.0$ V | - | - | 21 | ns |
| t_{en} | enable time | $\overline{OE}n$ to nY; see Figure 7 | [2] | | | |
| | | $V_{CC} = 2.0$ V | - | - | 190 | ns |
| | | $V_{CC} = 4.5$ V | - | - | 38 | ns |
| | | $V_{CC} = 6.0$ V | - | - | 33 | ns |

Table 8. Dynamic characteristics 74HC366 ...continued

Voltages are referenced to GND (ground = 0 V); $C_L = 50$ pF unless otherwise specified; see test circuit [Figure 8](#).

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit |
|--------------------------------------|-------------------|--|-----|-----|-----|------|
| t _{dis} | disable time | \overline{OEn} to nY; see Figure 7 [3] | | | | |
| | | V _{CC} = 2.0 V | - | - | 190 | ns |
| | | V _{CC} = 4.5 V | - | - | 38 | ns |
| | | V _{CC} = 6.0 V | - | - | 33 | ns |
| t _t | transition time | see Figure 6 [4] | | | | |
| | | V _{CC} = 2.0 V | - | - | 75 | ns |
| | | V _{CC} = 4.5 V | - | - | 15 | ns |
| | | V _{CC} = 6.0 V | - | - | 13 | ns |
| T _{amb} = -40 °C to +125 °C | | | | | | |
| t _{pd} | propagation delay | nA to nY; see Figure 6 [1] | | | | |
| | | V _{CC} = 2.0 V | - | - | 150 | ns |
| | | V _{CC} = 4.5 V | - | - | 30 | ns |
| | | V _{CC} = 6.0 V | - | - | 26 | ns |
| t _{en} | enable time | \overline{OEn} to nY; see Figure 7 [2] | | | | |
| | | V _{CC} = 2.0 V | - | - | 225 | ns |
| | | V _{CC} = 4.5 V | - | - | 45 | ns |
| | | V _{CC} = 6.0 V | - | - | 38 | ns |
| t _{dis} | disable time | \overline{OEn} to nY; see Figure 7 [3] | | | | |
| | | V _{CC} = 2.0 V | - | - | 225 | ns |
| | | V _{CC} = 4.5 V | - | - | 45 | ns |
| | | V _{CC} = 6.0 V | - | - | 38 | ns |
| t _t | transition time | see Figure 6 [4] | | | | |
| | | V _{CC} = 2.0 V | - | - | 90 | ns |
| | | V _{CC} = 4.5 V | - | - | 18 | ns |
| | | V _{CC} = 6.0 V | - | - | 15 | ns |

[1] t_{pd} is the same as t_{PHL} and t_{PLH} .

[2] t_{en} is the same as t_{PZH} and t_{PZL} .

[3] t_{dis} is the same as t_{PHZ} and t_{PLZ} .

[4] t_t is the same as t_{THL} and t_{TLH} .

[5] C_{PD} is used to determine the dynamic power dissipation (P_D in μ W).

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

Table 9. Dynamic characteristics 74HCT366

Voltages are referenced to GND (ground = 0 V); $C_L = 50$ pF unless otherwise specified; see test circuit [Figure 8](#).

| Symbol | Parameter | Conditions | Min | Typ | Max | Unit | |
|--------------------------------------|-------------------------------|--|-----|-----|-----|------|----|
| T _{amb} = 25 °C | | | | | | | |
| t _{pd} | propagation delay | nA to nY; see Figure 6 | [1] | | | | |
| | | V _{CC} = 4.5 V | - | 13 | 24 | ns | |
| | | V _{CC} = 5 V; C _L = 15 pF | - | 11 | - | ns | |
| t _{en} | enable time | $\overline{\text{OEn}}$ to nY; V _{CC} = 4.5 V; see Figure 7 | [2] | - | 16 | 35 | ns |
| t _{dis} | disable time | $\overline{\text{OEn}}$ to nY; V _{CC} = 4.5 V; see Figure 7 | [3] | - | 20 | 35 | ns |
| t _t | transition time | V _{CC} = 4.5 V; see Figure 6 | [4] | - | 5 | 12 | ns |
| C _{PD} | power dissipation capacitance | per buffer; V _I = GND to (V _{CC} – 1.5 V) | [5] | - | 30 | - | pF |
| T _{amb} = –40 °C to +85 °C | | | | | | | |
| t _{pd} | propagation delay | nA to nY; V _{CC} = 4.5 V; see Figure 6 | [1] | - | - | 30 | ns |
| t _{en} | enable time | $\overline{\text{OEn}}$ to nY; V _{CC} = 4.5 V; see Figure 7 | [2] | - | - | 44 | ns |
| t _{dis} | disable time | $\overline{\text{OEn}}$ to nY; V _{CC} = 4.5 V; see Figure 7 | [3] | - | - | 44 | ns |
| t _t | transition time | V _{CC} = 4.5 V; see Figure 6 | [4] | - | - | 15 | ns |
| T _{amb} = –40 °C to +125 °C | | | | | | | |
| t _{pd} | propagation delay | nA to nY; V _{CC} = 4.5 V; see Figure 6 | [1] | - | - | 36 | ns |
| t _{en} | enable time | $\overline{\text{OEn}}$ to nY; V _{CC} = 4.5 V; see Figure 7 | [2] | - | - | 53 | ns |
| t _{dis} | disable time | $\overline{\text{OEn}}$ to nY; V _{CC} = 4.5 V; see Figure 7 | [3] | - | - | 53 | ns |
| t _t | transition time | V _{CC} = 4.5 V; see Figure 6 | [4] | - | - | 18 | ns |

[1] t_{pd} is the same as t_{PHL} and t_{PLH} .

[2] t_{en} is the same as t_{PZH} and t_{PZL} .

[3] t_{dis} is the same as t_{PHZ} and t_{PLZ} .

[4] t_t is the same as t_{THL} and t_{TLH} .

[5] 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;

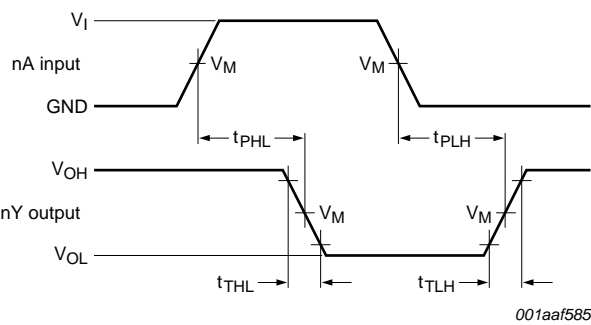
C_L = output load capacitance in pF;

V_{CC} = supply voltage in V;

N = number of inputs switching;

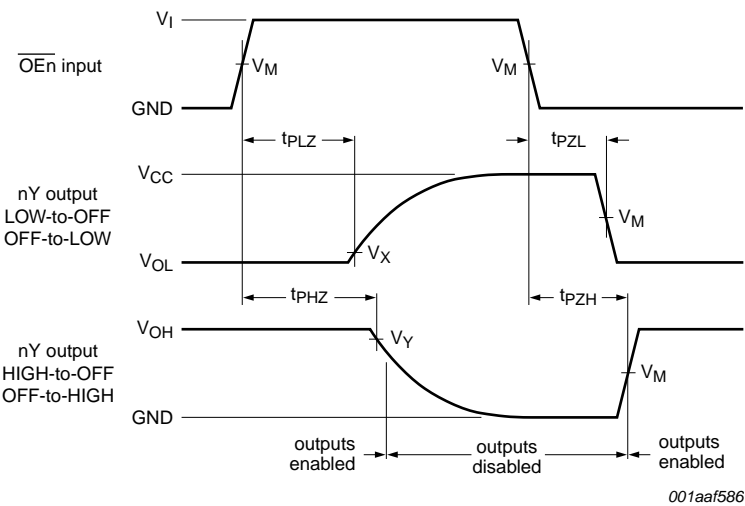
$\Sigma(C_L \times V_{CC}^2 \times f_o)$ = sum of outputs.

11. Waveforms



Measurement points are given in [Table 10](#).
 V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Fig 6. Propagation delay data input (nA) to output (nY) and output transition time

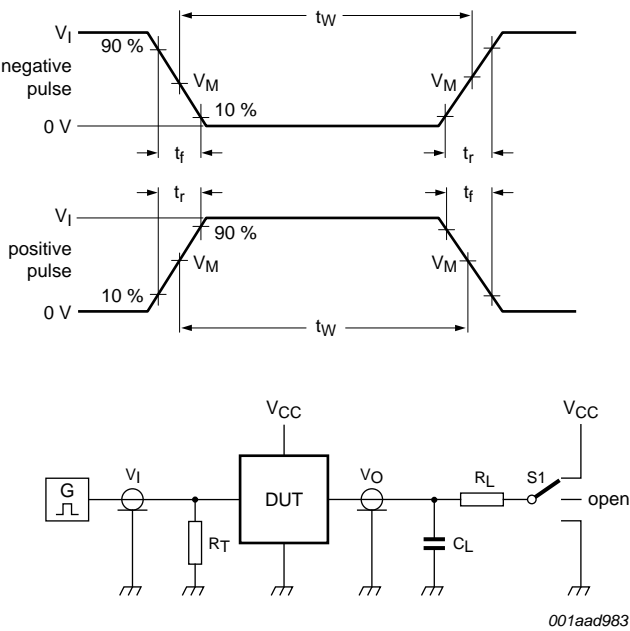


Measurement points are given in [Table 10](#).
 V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Fig 7. 3-state enable and disable times

Table 10. Measurement points

| Type | Input | Output | | |
|----------|-------------|-------------|---------------------|---------------------|
| | V_M | V_M | V_X | V_Y |
| 74HC366 | $0.5V_{CC}$ | $0.5V_{CC}$ | $0.1 \times V_{CC}$ | $0.9 \times V_{CC}$ |
| 74HCT366 | 1.3 V | 1.3 V | $0.1 \times V_{CC}$ | $0.9 \times V_{CC}$ |



Test data is given in [Table 11](#).
Definitions 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
 R_L = Load resistor
 $S1$ = Test selection switch

Fig 8. Load circuitry for measuring switching times

Table 11. 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} |
| 74HC366 | V_{CC} | 6 ns | 15 pF, 50 pF | 1 k Ω | open | GND | V_{CC} |
| 74HCT366 | 3 V | 6 ns | 15 pF, 50 pF | 1 k Ω | open | GND | V_{CC} |

12. Package outline

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

SOT109-1

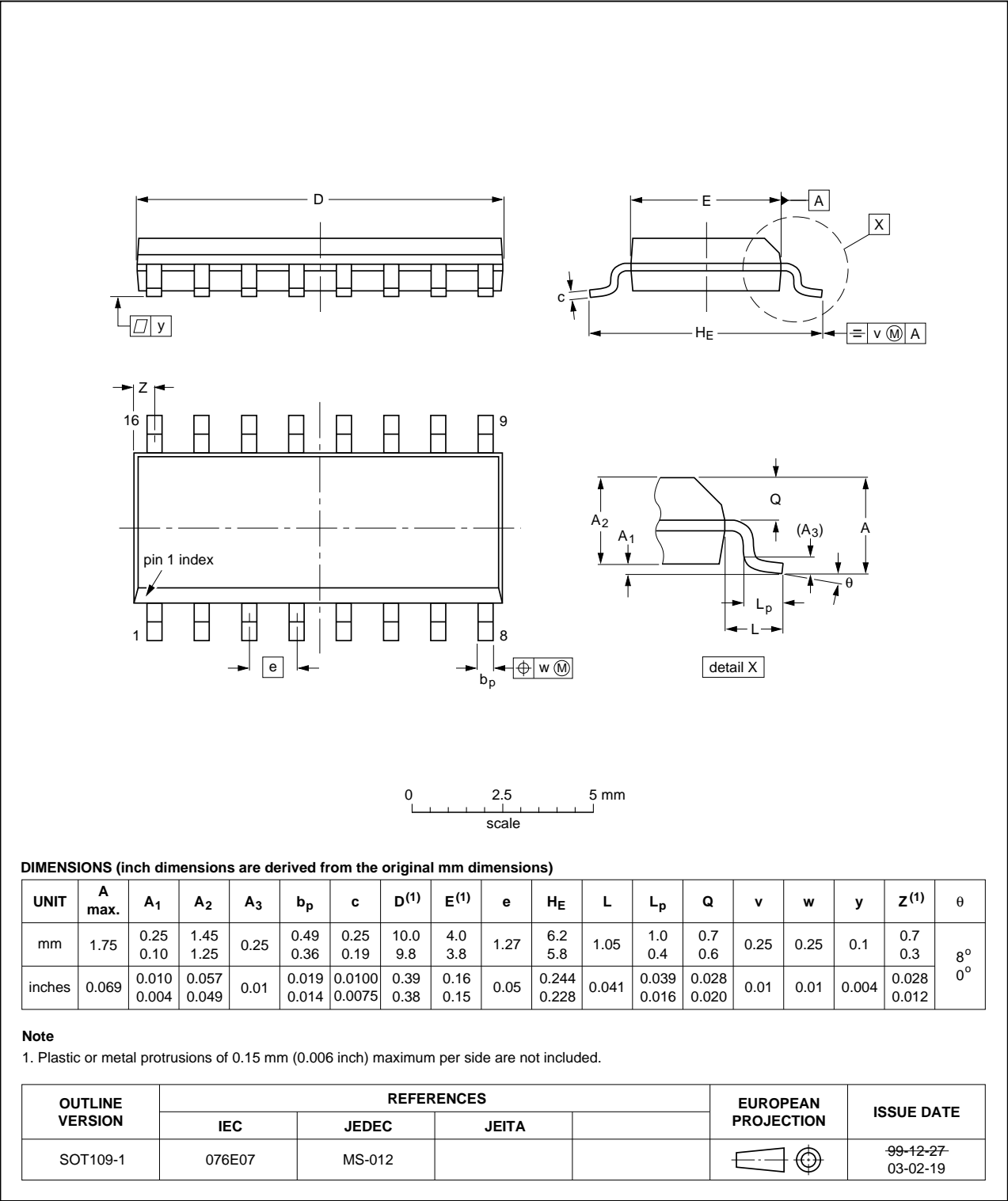


Fig 9. Package outline SOT109-1 (SO16)

SSOP16: plastic shrink small outline package; 16 leads; body width 5.3 mm

SOT338-1

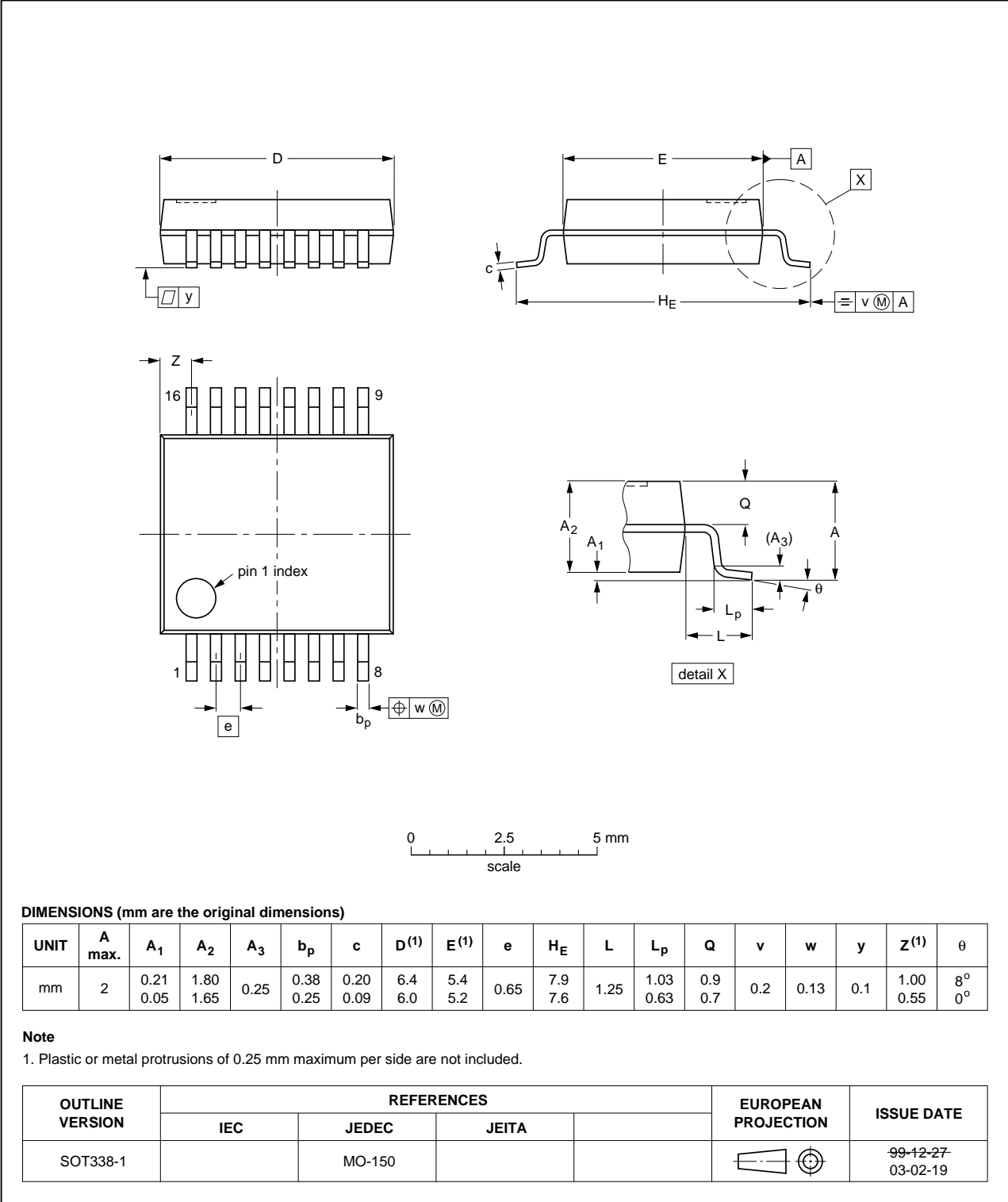


Fig 10. Package outline SOT338-1 (SSOP16)

DIP16: plastic dual in-line package; 16 leads (300 mil); long body

SOT38-1

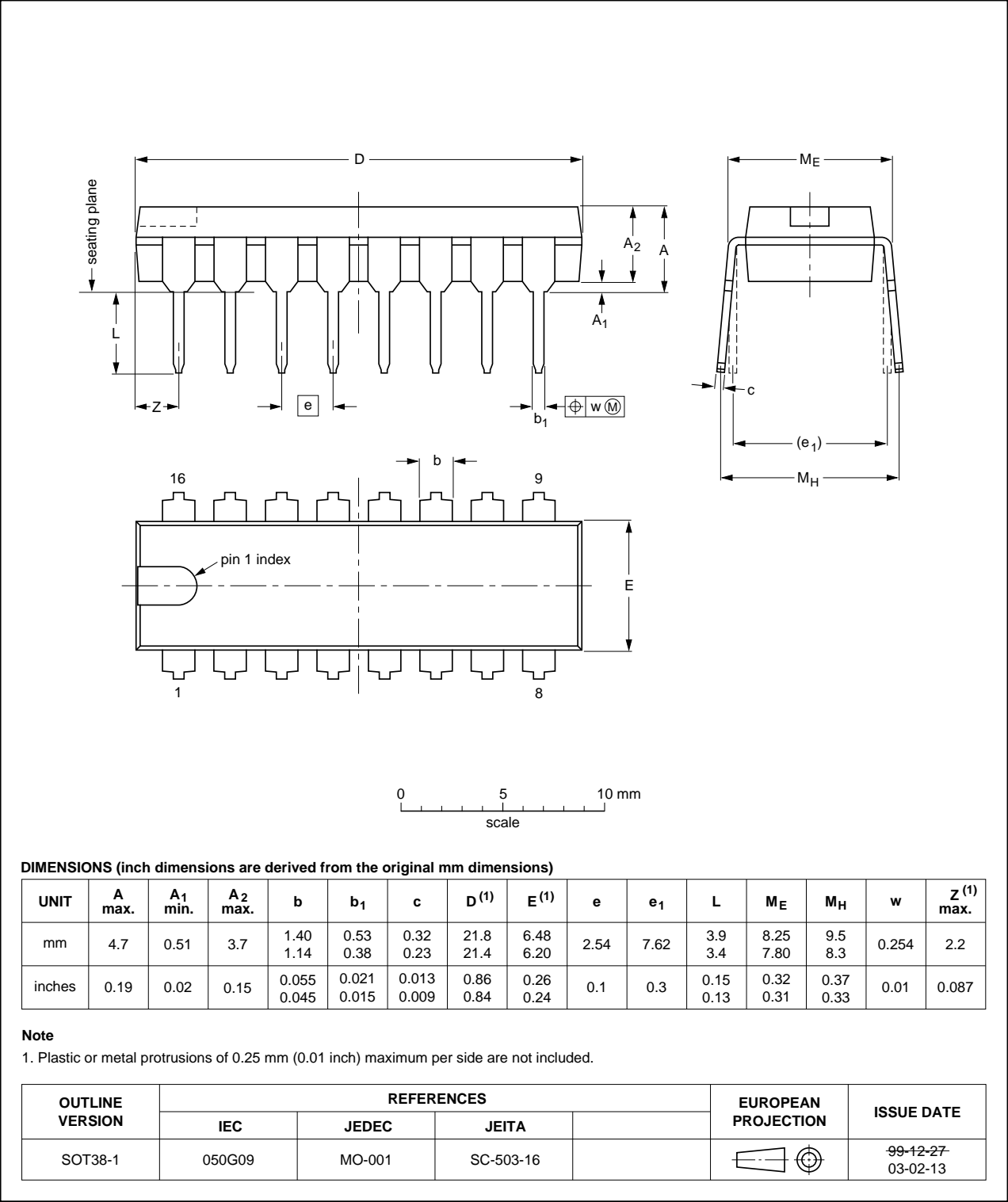


Fig 11. Package outline SOT38-1 (DIP16)

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

SOT403-1

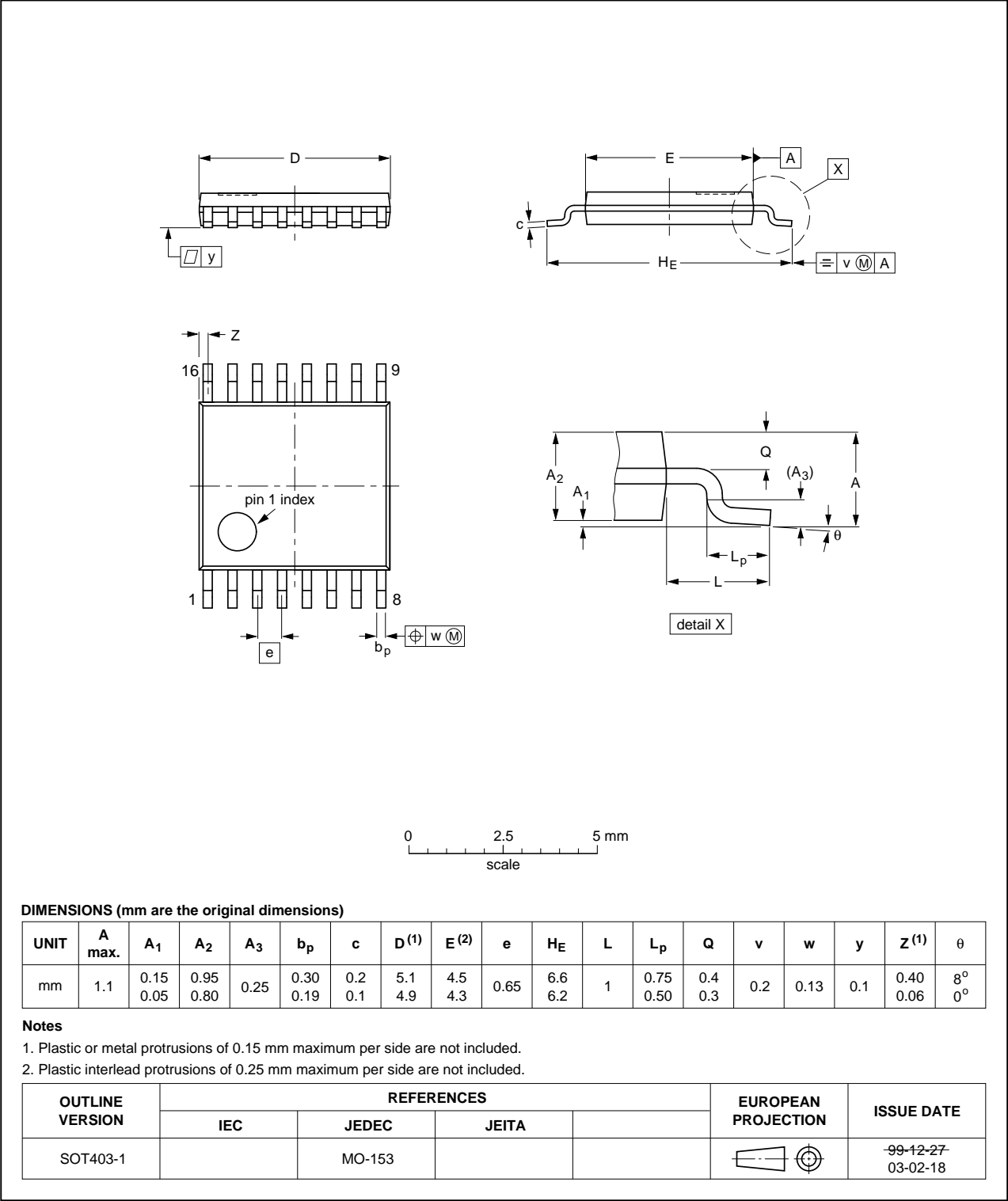


Fig 12. Package outline SOT403-1 (TSSOP16)

13. Abbreviations

Table 12. Abbreviations

| Acronym | Description |
|---------|--|
| CMOS | Complementary Metal Oxide Semiconductor |
| DUT | Device Under Test |
| ESD | ElectroStatic Discharge |
| HBM | Human Body Model |
| LSTTL | Low-power Schottky Transistor-Transistor Logic |
| MM | Machine Model |

14. Revision history

Table 13. Revision history

| Document ID | Release date | Data sheet status | Change notice | Supersedes |
|---------------------|------------------------|-----------------------|---------------|---------------------|
| 74HC_HCT366 v.4 | 20120904 | Product data sheet | - | 74HC_HCT366 v.3 |
| Modifications: | • Legal pages updated. | | | |
| 74HC_HCT366 v.3 | 20061121 | Product data sheet | - | 74HC_HCT366_CNV v.2 |
| 74HC_HCT366_CNV v.2 | 19901201 | Product specification | - | - |

15. Legal information

15.1 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. |

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

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

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