

# 74HC366; 74HCT366

Hex buffer/line driver; 3-state; inverting

Rev. 03 — 21 November 2006

Product data sheet

## 1. General description

The 74HC366; 74HCT366 is a high-speed Si-gate CMOS device and is pin compatible with Low-power Schottky TTL (LSTTL).

The 74HC366; 74HCT366 has six inverting buffer/line drivers with 3-state outputs. The 3-state outputs (nY) are controlled by the output enable inputs ( $\overline{OE1}$ ,  $\overline{OE2}$ ). A HIGH on  $\overline{OE_n}$  causes the outputs to assume a high-impedance OFF-state.

The 74HC366; 74HCT366 is functionally identical to:

- 74HC365; 74HCT365, but has inverted outputs

## 2. Features

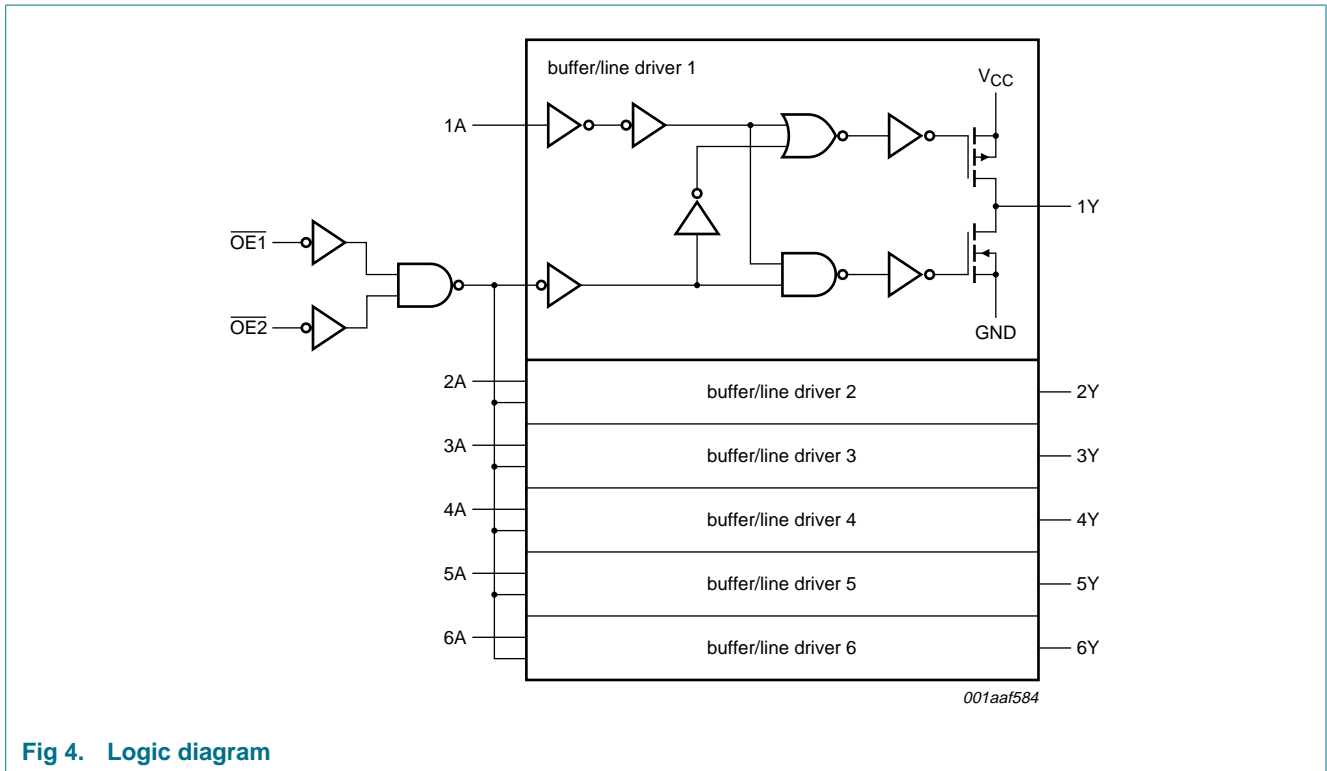
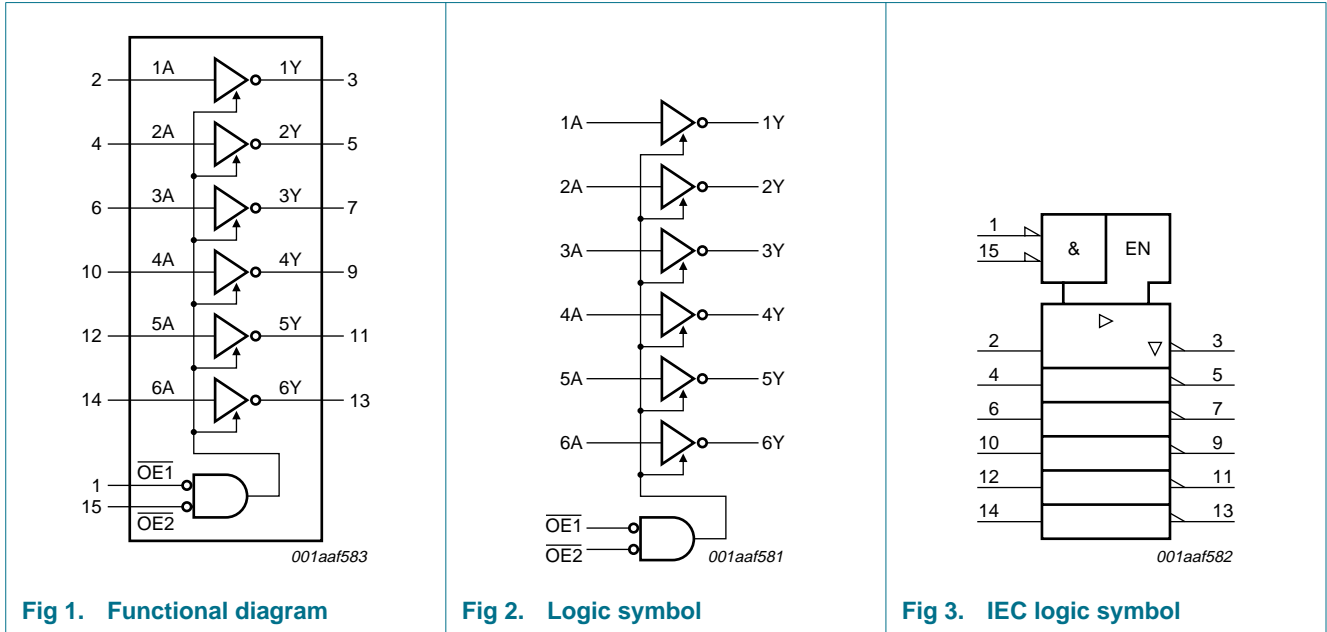
- Inverting outputs
- Complies with JEDEC standard no. 7A
- ESD protection:
  - ◆ HBM EIA/JESD22-A114-D exceeds 2000 V
  - ◆ MM EIA/JESD22-A115-A exceeds 200 V
- Specified from  $-40\text{ }^{\circ}\text{C}$  to  $+85\text{ }^{\circ}\text{C}$  and from  $-40\text{ }^{\circ}\text{C}$  to  $+125\text{ }^{\circ}\text{C}$

## 3. Ordering information

Table 1. Ordering information

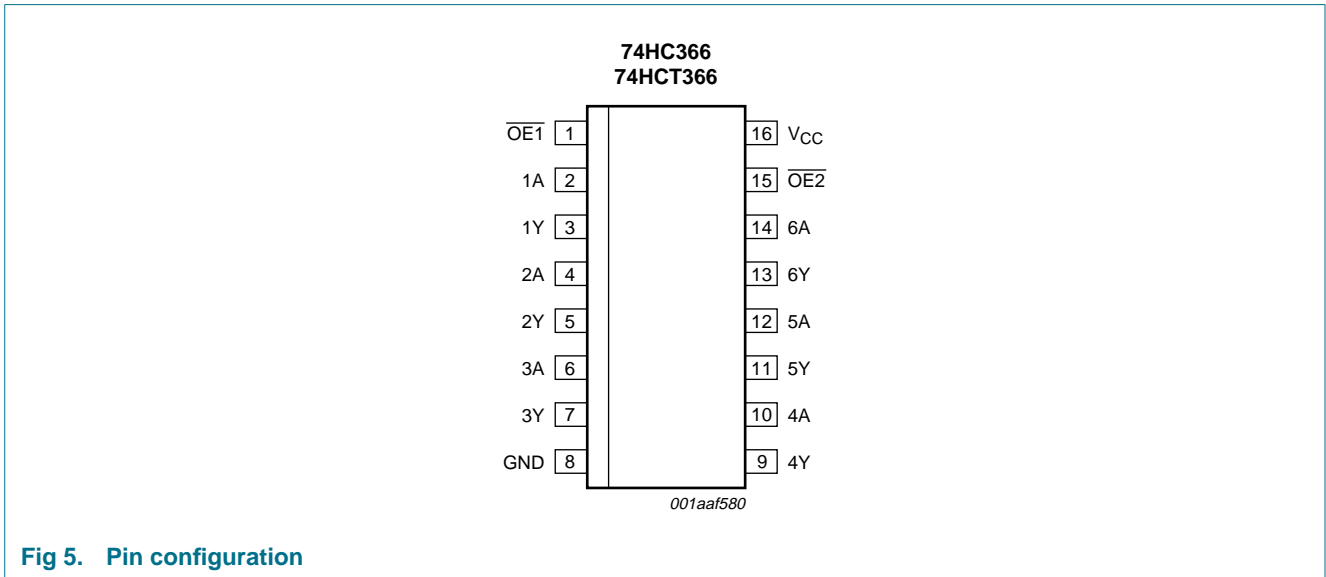
Type number	Package			Version
	Temperature range	Name	Description	
<b>74HC366</b>				
74HC366D	$-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$	SO16	plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1
74HC366N	$-40\text{ }^{\circ}\text{C}$ to $+125\text{ }^{\circ}\text{C}$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

## 4. Functional diagram



## 5. Pinning information

### 5.1 Pinning



### 5.2 Pin description

**Table 2. Pin description**

Symbol	Pin	Description
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
OE2	15	output enable input 2 (active LOW)
V <sub>CC</sub>	16	supply voltage

## 6. Functional description

Table 3. Function table<sup>[1]</sup>

Control		Input	Output
OE1	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 <sub>CC</sub>	supply voltage		-0.5	+7	V	
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < -0.5 V or V <sub>I</sub> > V <sub>CC</sub> + 0.5 V	-	±20	mA	
I <sub>OK</sub>	output clamping current	V <sub>O</sub> < -0.5 V or V <sub>O</sub> > V <sub>CC</sub> + 0.5 V	-	±20	mA	
I <sub>O</sub>	output current	V <sub>O</sub> = -0.5 V to (V <sub>CC</sub> + 0.5 V)	-	±35	mA	
I <sub>CC</sub>	supply current		-	70	mA	
I <sub>GND</sub>	ground current		-	-70	mA	
T <sub>stg</sub>	storage temperature		-65	+150	°C	
P <sub>tot</sub>	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 package: P<sub>tot</sub> derates linearly with 12 mW/K above 70 °C.  
 [2] For SO16 package: P<sub>tot</sub> derates linearly with 8 mW/K above 70 °C.  
 [3] For SSOP16 and TSSOP16 packages: P<sub>tot</sub> derates linearly with 5.5 mW/K above 60 °C.

## 8. Recommended operating conditions

Table 5. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>74HC366</b>						
V <sub>CC</sub>	supply voltage		2.0	5.0	6.0	V
V <sub>I</sub>	input voltage		0	-	V <sub>CC</sub>	V
V <sub>O</sub>	output voltage		0	-	V <sub>CC</sub>	V
T <sub>amb</sub>	ambient temperature		-40	+25	+125	°C

**Table 5. Recommended operating conditions ...continued**

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t <sub>r</sub>	rise time	inputs				
		V <sub>CC</sub> = 2.0 V	-	-	1000	ns
		V <sub>CC</sub> = 4.5 V	-	6.0	500	ns
		V <sub>CC</sub> = 6.0 V	-	-	400	ns
t <sub>f</sub>	fall time	inputs				
		V <sub>CC</sub> = 2.0 V	-	-	1000	ns
		V <sub>CC</sub> = 4.5 V	-	6.0	500	ns
		V <sub>CC</sub> = 6.0 V	-	-	400	ns
<b>74HCT366</b>						
V <sub>CC</sub>	supply voltage		4.5	5.0	5.5	V
V <sub>I</sub>	input voltage		0	-	V <sub>CC</sub>	V
V <sub>O</sub>	output voltage		0	-	V <sub>CC</sub>	V
T <sub>amb</sub>	ambient temperature		-40	+25	+125	°C
t <sub>r</sub>	rise time	inputs; V <sub>CC</sub> = 4.5 V	-	6.0	500	ns
t <sub>f</sub>	fall time	inputs; V <sub>CC</sub> = 4.5 V	-	6.0	500	ns

## 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
<b>T<sub>amb</sub> = 25 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 2.0 V	1.5	1.2	-	V
		V <sub>CC</sub> = 4.5 V	3.15	2.4	-	V
		V <sub>CC</sub> = 6.0 V	4.2	3.2	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 2.0 V	-	0.8	0.5	V
		V <sub>CC</sub> = 4.5 V	-	2.1	1.35	V
		V <sub>CC</sub> = 6.0 V	-	2.8	1.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	-	-	-	
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 2.0 V	1.9	2.0	-	V
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 4.5 V	4.4	4.5	-	V
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 6.0 V	5.9	6.0	-	V
		I <sub>O</sub> = -6.0 mA; V <sub>CC</sub> = 4.5 V	3.98	4.32	-	V
		I <sub>O</sub> = -7.8 mA; V <sub>CC</sub> = 6.0 V	5.48	5.81	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 2.0 V	-	0	0.1	V
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V	-	0	0.1	V
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 6.0 V	-	0	0.1	V
		I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V	-	0.15	0.26	V
		I <sub>O</sub> = 7.8 mA; V <sub>CC</sub> = 6.0 V	-	0.16	0.26	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 6.0 V	-	-	±0.1	μA

**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
$I_{OZ}$	OFF-state output current	$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = V_{CC}$ or GND; $V_{CC} = 6.0$ V	-	-	$\pm 0.5$	$\mu$ A
$I_{CC}$	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 6.0$ V	-	-	8.0	$\mu$ A
$C_I$	input capacitance		-	3.5	-	pF
<b><math>T_{amb} = -40</math> °C to <math>+85</math> °C</b>						
$V_{IH}$	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
		$I_O = -6.0$ mA; $V_{CC} = 4.5$ V	3.84	-	-	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
		$I_O = 6.0$ mA; $V_{CC} = 4.5$ V	-	-	0.33	V
$I_I$	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 6.0$ V;	-	-	$\pm 1.0$	$\mu$ A
		$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = V_{CC}$ or GND; $V_{CC} = 6.0$ V	-	-	$\pm 5.0$	$\mu$ A
		$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 6.0$ V	-	-	80	$\mu$ A
		$V_I = V_{CC}$ or GND; $V_{CC} = 6.0$ V;	-	-	$\pm 1.0$	$\mu$ A
		$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = V_{CC}$ or GND; $V_{CC} = 6.0$ V	-	-	$\pm 5.0$	$\mu$ A
<b><math>T_{amb} = -40</math> °C to <math>+125</math> °C</b>						
$V_{IH}$	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
		$I_O = -6.0$ mA; $V_{CC} = 4.5$ V	3.7	-	-	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
		$I_O = 6.0$ mA; $V_{CC} = 4.5$ V	-	-	0.33	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 <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>				
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 2.0 V	-	-	0.1	V
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V	-	-	0.1	V
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 6.0 V	-	-	0.1	V
		I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V	-	-	0.4	V
		I <sub>O</sub> = 7.8 mA; V <sub>CC</sub> = 6.0 V	-	-	0.4	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 6.0 V	-	-	±1.0	μA
I <sub>OZ</sub>	OFF-state output current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>O</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 6.0 V	-	-	±10.0	μA
I <sub>CC</sub>	supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 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
<b>T<sub>amb</sub> = 25 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	1.6	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	1.2	0.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V				
		I <sub>O</sub> = -20 μA	4.4	4.5	-	V
		I <sub>O</sub> = -6.0 mA	3.98	4.32	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V				
		I <sub>O</sub> = 20 μA	-	0	0.1	V
		I <sub>O</sub> = 6.0 mA	-	0.16	0.26	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V	-	-	±0.1	μA
I <sub>OZ</sub>	OFF-state output current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>O</sub> = V <sub>CC</sub> or GND per input pin; other inputs at GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	±0.5	μA
I <sub>CC</sub>	supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	8.0	μA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; other inputs at V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A				
		pins nA	-	100	360	μA
		pin $\overline{OE1}$	-	100	360	μA
		pin $\overline{OE2}$	-	90	320	μA
C <sub>I</sub>	input capacitance		-	3.5	-	pF
<b>T<sub>amb</sub> = -40 °C to +85 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V				
		I <sub>O</sub> = -20 μA	4.4	-	-	V
		I <sub>O</sub> = -6.0 mA	3.84	-	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V				
		I <sub>O</sub> = 20 μA	-	-	0.1	V
		I <sub>O</sub> = 6.0 mA	-	-	0.33	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V	-	-	±1.0	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 <sub>OZ</sub>	OFF-state output current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>O</sub> = V <sub>CC</sub> or GND per input pin; other inputs at GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V			±5.0	µA
I <sub>CC</sub>	supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	80	µA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; other inputs at V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A				
		pins nA	-	-	450	µA
		pin $\overline{OE1}$	-	-	450	µA
		pin $\overline{OE2}$	-	-	400	µA
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	-	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.8	V
V <sub>OH</sub>	HIGH-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V				
		I <sub>O</sub> = -20 µA	4.4	-	-	V
		I <sub>O</sub> = -6.0 mA	3.7	-	-	V
V <sub>OL</sub>	LOW-level output voltage	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>CC</sub> = 4.5 V				
		I <sub>O</sub> = 20 µA	-	-	0.1	V
		I <sub>O</sub> = 6.0 mA	-	-	0.4	V
I <sub>I</sub>	input leakage current	V <sub>I</sub> = V <sub>CC</sub> or GND; V <sub>CC</sub> = 5.5 V	-	-	±1.0	µA
I <sub>OZ</sub>	OFF-state output current	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub> ; V <sub>O</sub> = V <sub>CC</sub> or GND per input pin; other inputs at GND or V <sub>CC</sub> ; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	±10.0	µA
I <sub>CC</sub>	supply current	V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 5.5 V	-	-	160	µA
ΔI <sub>CC</sub>	additional supply current	V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; other inputs at V <sub>CC</sub> or GND; I <sub>O</sub> = 0 A				
		pins nA	-	-	490	µA
		pin $\overline{OE1}$	-	-	490	µA
		pin $\overline{OE2}$	-	-	441	µA

## 10. Dynamic characteristics

**Table 8. Dynamic characteristics 74HC366**

Voltages are referenced to GND (ground = 0 V); C<sub>L</sub> = 50 pF unless otherwise specified; see test circuit [Figure 8](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
<b>T<sub>amb</sub> = 25 °C</b>						
t <sub>pd</sub>	propagation delay	nA to nY; see <a href="#">Figure 6</a>	[1]			
		V <sub>CC</sub> = 2.0 V	-	33	100	ns
		V <sub>CC</sub> = 4.5 V	-	12	20	ns
		V <sub>CC</sub> = 5 V; C <sub>L</sub> = 15 pF	-	10	-	ns
		V <sub>CC</sub> = 6.0 V	-	10	17	ns
t <sub>en</sub>	enable time	$\overline{OE}n$ to nY; see <a href="#">Figure 7</a>	[2]			
		V <sub>CC</sub> = 2.0 V	-	44	150	ns
		V <sub>CC</sub> = 4.5 V	-	16	30	ns
		V <sub>CC</sub> = 6.0 V	-	13	26	ns



**Table 8. Dynamic characteristics 74HC366 ...continued**

*Voltages are referenced to GND (ground = 0 V); C<sub>L</sub> = 50 pF unless otherwise specified; see test circuit Figure 8.*

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
t <sub>dis</sub>	disable time	$\overline{OEn}$ to nY; see <a href="#">Figure 7</a>	[3]			
		V <sub>CC</sub> = 2.0 V	-	55	150	ns
		V <sub>CC</sub> = 4.5 V	-	20	30	ns
		V <sub>CC</sub> = 6.0 V	-	16	26	ns
t <sub>t</sub>	transition time	see <a href="#">Figure 6</a>	[4]			
		V <sub>CC</sub> = 2.0 V	-	14	60	ns
		V <sub>CC</sub> = 4.5 V	-	5	12	ns
		V <sub>CC</sub> = 6.0 V	-	4	10	ns
C <sub>PD</sub>	power dissipation capacitance	per buffer; V <sub>I</sub> = GND to V <sub>CC</sub>	[5]	-	30	pF
<b>T<sub>amb</sub> = -40 °C to +85 °C</b>						
t <sub>pd</sub>	propagation delay	nA to nY; see <a href="#">Figure 6</a>	[1]			
		V <sub>CC</sub> = 2.0 V	-	-	125	ns
		V <sub>CC</sub> = 4.5 V	-	-	25	ns
		V <sub>CC</sub> = 6.0 V	-	-	21	ns
t <sub>en</sub>	enable time	$\overline{OEn}$ to nY; see <a href="#">Figure 7</a>	[2]			
		V <sub>CC</sub> = 2.0 V	-	-	190	ns
		V <sub>CC</sub> = 4.5 V	-	-	38	ns
		V <sub>CC</sub> = 6.0 V	-	-	33	ns
t <sub>dis</sub>	disable time	$\overline{OEn}$ to nY; see <a href="#">Figure 7</a>	[3]			
		V <sub>CC</sub> = 2.0 V	-	-	190	ns
		V <sub>CC</sub> = 4.5 V	-	-	38	ns
		V <sub>CC</sub> = 6.0 V	-	-	33	ns
t <sub>t</sub>	transition time	see <a href="#">Figure 6</a>	[4]			
		V <sub>CC</sub> = 2.0 V	-	-	75	ns
		V <sub>CC</sub> = 4.5 V	-	-	15	ns
		V <sub>CC</sub> = 6.0 V	-	-	13	ns
<b>T<sub>amb</sub> = -40 °C to +125 °C</b>						
t <sub>pd</sub>	propagation delay	nA to nY; see <a href="#">Figure 6</a>	[1]			
		V <sub>CC</sub> = 2.0 V	-	-	150	ns
		V <sub>CC</sub> = 4.5 V	-	-	30	ns
		V <sub>CC</sub> = 6.0 V	-	-	26	ns
t <sub>en</sub>	enable time	$\overline{OEn}$ to nY; see <a href="#">Figure 7</a>	[2]			
		V <sub>CC</sub> = 2.0 V	-	-	225	ns
		V <sub>CC</sub> = 4.5 V	-	-	45	ns
		V <sub>CC</sub> = 6.0 V	-	-	38	ns
t <sub>dis</sub>	disable time	$\overline{OEn}$ to nY; see <a href="#">Figure 7</a>	[3]			
		V <sub>CC</sub> = 2.0 V	-	-	225	ns
		V <sub>CC</sub> = 4.5 V	-	-	45	ns
		V <sub>CC</sub> = 6.0 V	-	-	38	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
$t_t$	transition time	see <a href="#">Figure 6</a>	[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  $\mu$ W).  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$  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;  
 $\sum(C_L \times V_{CC}^2 \times f_o)$  = sum of outputs.

**Table 9. Dynamic characteristics 74HCT366**

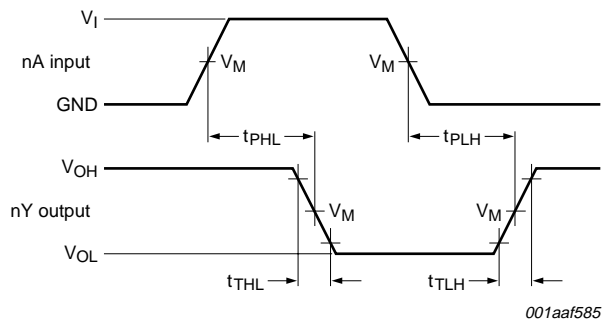
Voltages are referenced to GND (ground = 0 V);  $C_L = 50$  pF unless otherwise specified; see test circuit [Figure 8](#).

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
<b><math>T_{amb} = 25</math> °C</b>							
$t_{pd}$	propagation delay	nA to nY; see <a href="#">Figure 6</a>	[1]				
		$V_{CC} = 4.5$ V	-	13	24	ns	
		$V_{CC} = 5$ V; $C_L = 15$ pF	-	11	-	ns	
$t_{en}$	enable time	$\overline{OEN}$ to nY; $V_{CC} = 4.5$ V; see <a href="#">Figure 7</a>	[2]	-	16	35	ns
$t_{dis}$	disable time	$\overline{OEN}$ to nY; $V_{CC} = 4.5$ V; see <a href="#">Figure 7</a>	[3]	-	20	35	ns
$t_t$	transition time	$V_{CC} = 4.5$ V; see <a href="#">Figure 6</a>	[4]	-	5	12	ns
$C_{PD}$	power dissipation capacitance	per buffer; $V_I = GND$ to $(V_{CC} - 1.5)$ V	[5]	-	30	-	pF
<b><math>T_{amb} = -40</math> °C to <math>+85</math> °C</b>							
$t_{pd}$	propagation delay	nA to nY; $V_{CC} = 4.5$ V; see <a href="#">Figure 6</a>	[1]	-	-	30	ns
$t_{en}$	enable time	$\overline{OEN}$ to nY; $V_{CC} = 4.5$ V; see <a href="#">Figure 7</a>	[2]	-	-	44	ns
$t_{dis}$	disable time	$\overline{OEN}$ to nY; $V_{CC} = 4.5$ V; see <a href="#">Figure 7</a>	[3]	-	-	44	ns
$t_t$	transition time	$V_{CC} = 4.5$ V; see <a href="#">Figure 6</a>	[4]	-	-	15	ns
<b><math>T_{amb} = -40</math> °C to <math>+125</math> °C</b>							
$t_{pd}$	propagation delay	nA to nY; $V_{CC} = 4.5$ V; see <a href="#">Figure 6</a>	[1]	-	-	36	ns
$t_{en}$	enable time	$\overline{OEN}$ to nY; $V_{CC} = 4.5$ V; see <a href="#">Figure 7</a>	[2]	-	-	53	ns
$t_{dis}$	disable time	$\overline{OEN}$ to nY; $V_{CC} = 4.5$ V; see <a href="#">Figure 7</a>	[3]	-	-	53	ns
$t_t$	transition time	$V_{CC} = 4.5$ V; see <a href="#">Figure 6</a>	[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  $\mu W$ ).  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$  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;  
 $\sum(C_L \times V_{CC}^2 \times f_o)$  = sum of outputs.

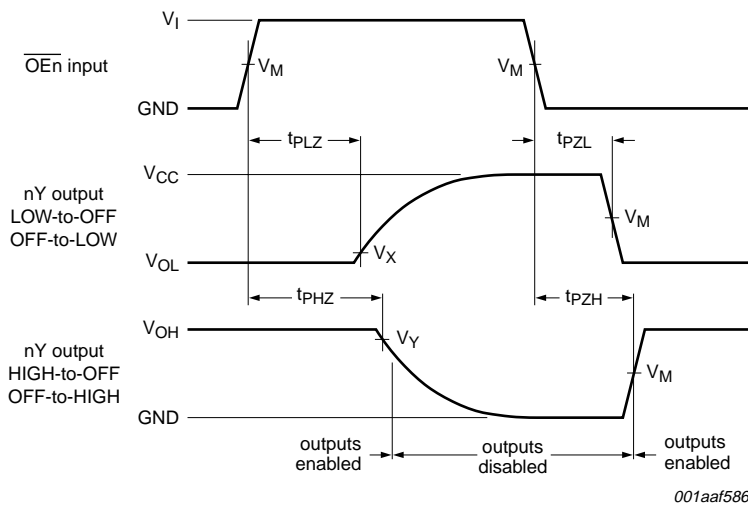
## 11. Waveforms



Measurement points are given in [Table 10](#).

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

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



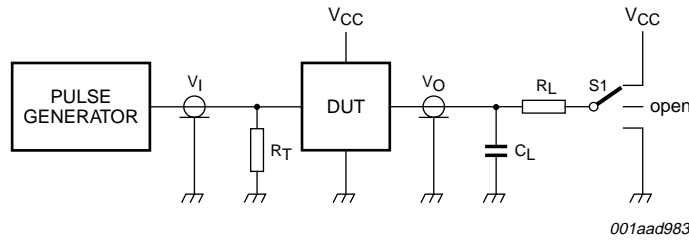
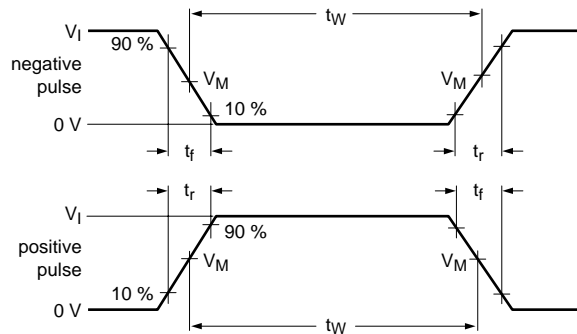
Measurement points are given in [Table 10](#).

$V_{OL}$  and  $V_{OH}$  are typical output voltage drop 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	$0.1 \times V_{CC}$	$0.9 \times V_{CC}$



001aad983

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 $\Omega$	open	GND	$V_{CC}$
74HCT366	3 V	6 ns	15 pF, 50 pF	1 k $\Omega$	open	GND	$V_{CC}$

12. Package outline

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

SOT109-1

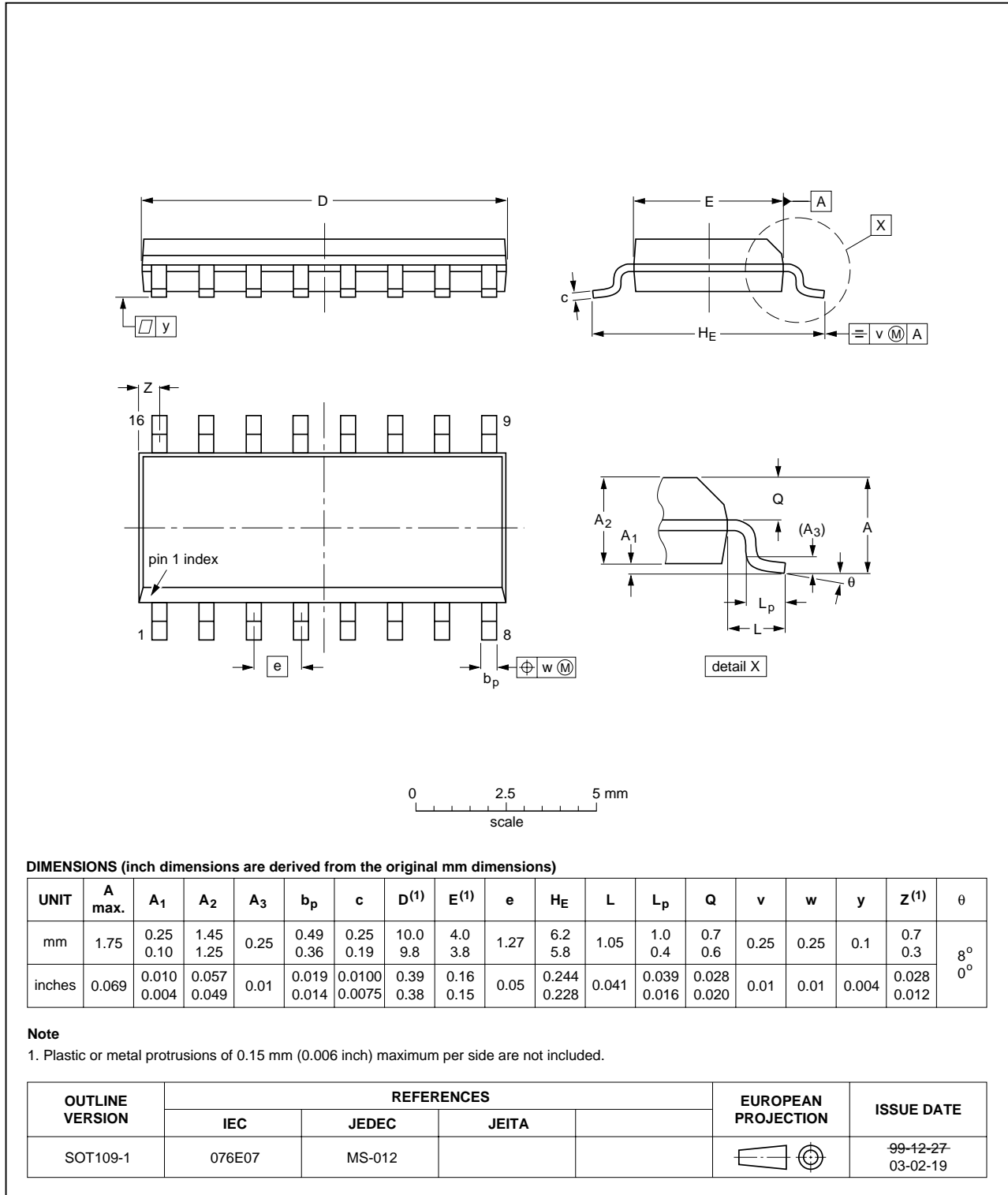


Fig 9. Package outline SOT109-1 (SO16)

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

SOT338-1

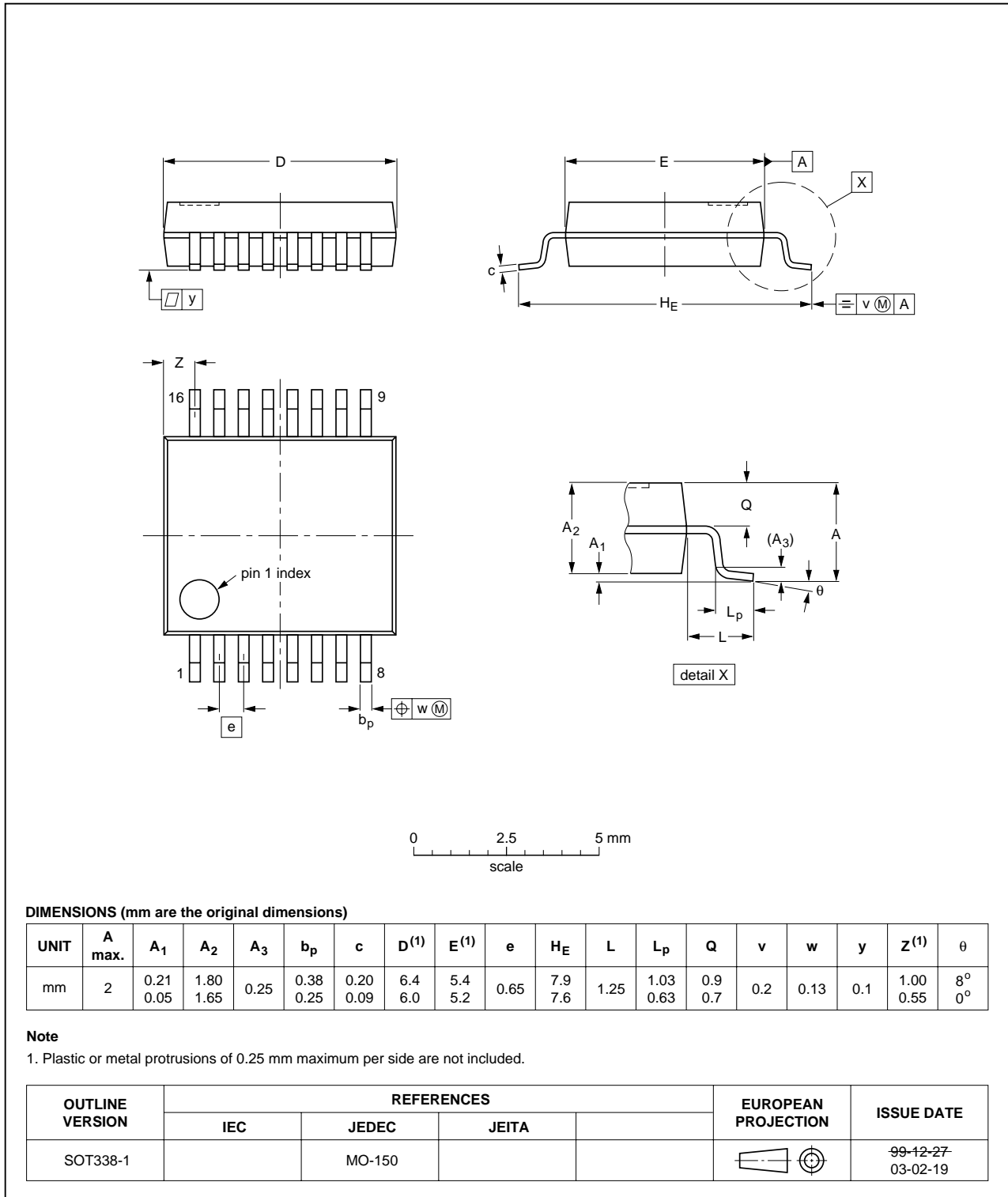


Fig 10. Package outline SOT338-1 (SSOP16)

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

SOT38-1

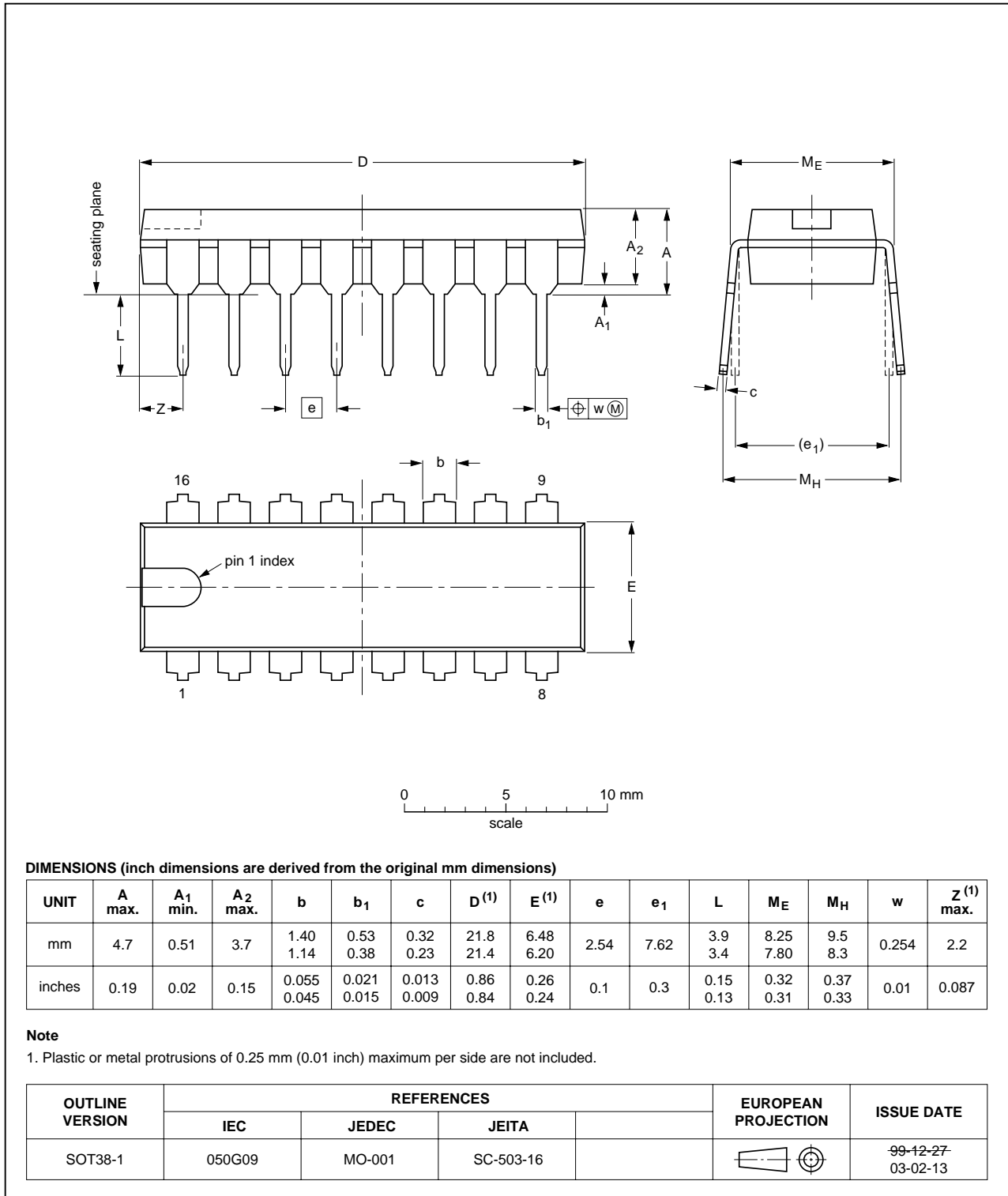


Fig 11. Package outline SOT38-1 (DIP16)

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

SOT403-1

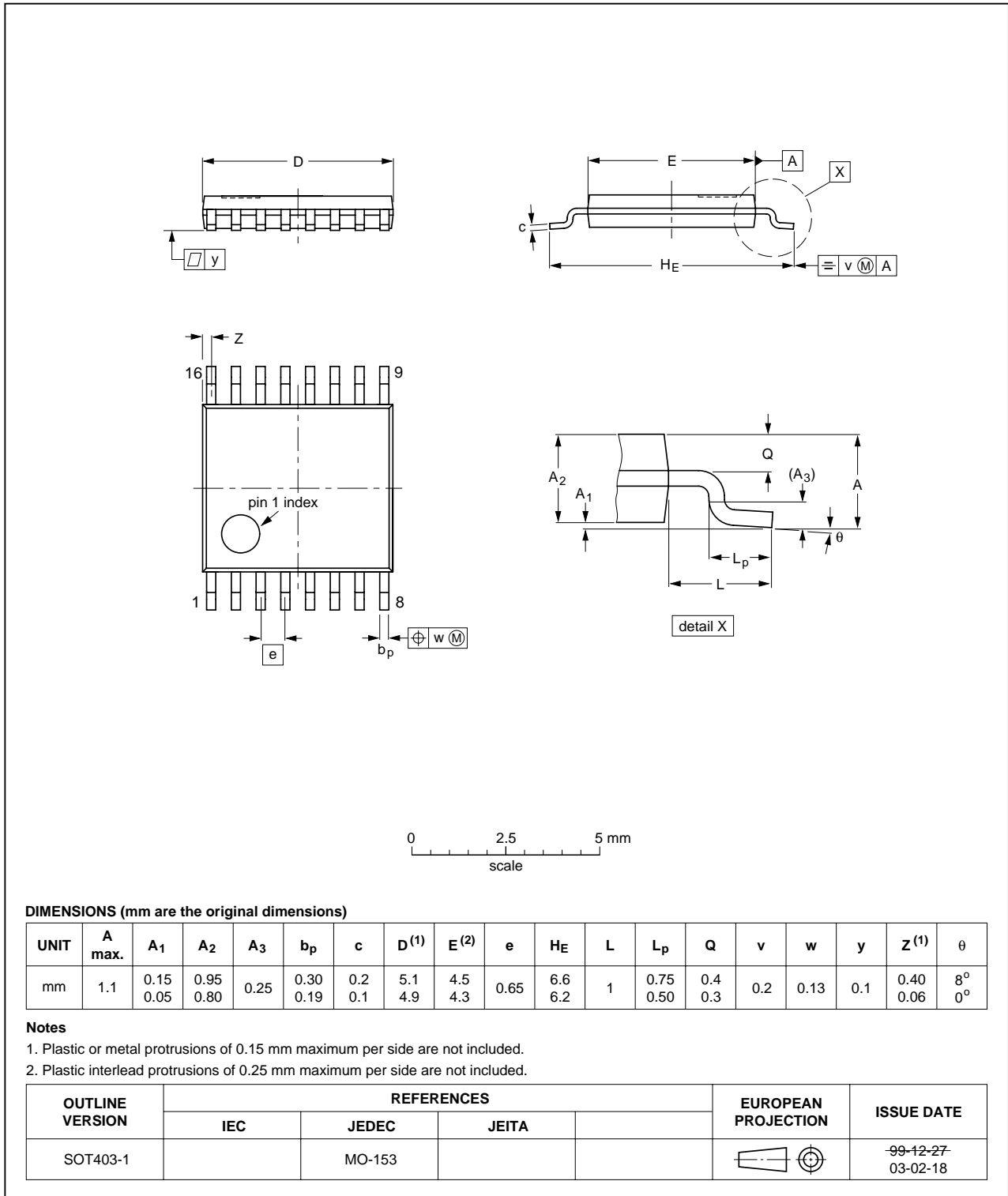


Fig 12. Package outline SOT403-1 (TSSOP16)



## 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_3	20061121	Product data sheet	-	74HC_HCT366_CNV_2
Modifications:		<ul style="list-style-type: none"><li>• The format of this data sheet has been redesigned to comply with the new identity guidelines of NXP Semiconductors</li><li>• Legal texts have been adapted to the new company name where appropriate</li><li>• Added family specification</li></ul>		
74HC_HCT366_CNV_2	19901201	Product specification	-	-

## 15. Legal information

### 15.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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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