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# 74HC1G126; 74HCT1G126

Bus buffer/line driver; 3-state

Rev. 04 — 20 July 2007

Product data sheet

## 1. General description

The 74HC1G126 and 74HCT1G126 are high-speed, Si-gate CMOS devices. They provide one non-inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input pin (OE). A LOW at pin OE causes the output to assume a high-impedance OFF-state.

The HC device has CMOS input switching levels and supply voltage range 2 V to 6 V.

The HCT device has TTL input switching levels and supply voltage range 4.5 V to 5.5 V.

The bus driver output currents are equal to those of the 74HC126 and 74HCT126.

## 2. Features

- Symmetrical output impedance
- High noise immunity
- Low power dissipation
- Balanced propagation delays
- SOT353-1 and SOT753 package options

## 3. Ordering information

Table 1. Ordering information

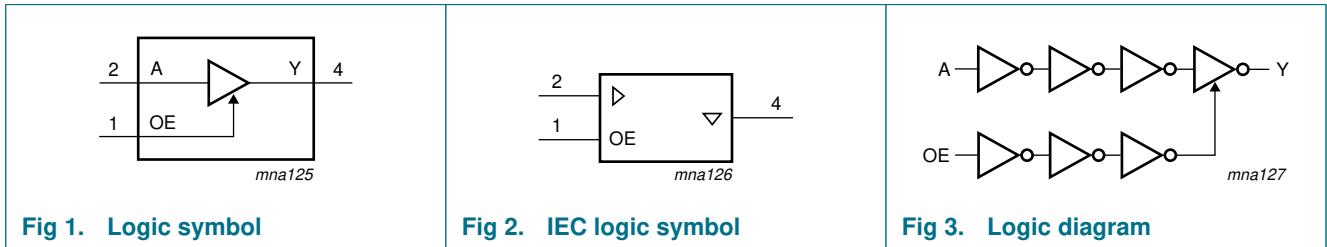
Type number	Package			
	Temperature range	Name	Description	Version
74HC1G126GW 74HCT1G126GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74HC1G126GV 74HCT1G126GV	-40 °C to +125 °C	SC-74A	plastic surface-mounted package; 5 leads	SOT753

## 4. Marking

Table 2. Marking codes

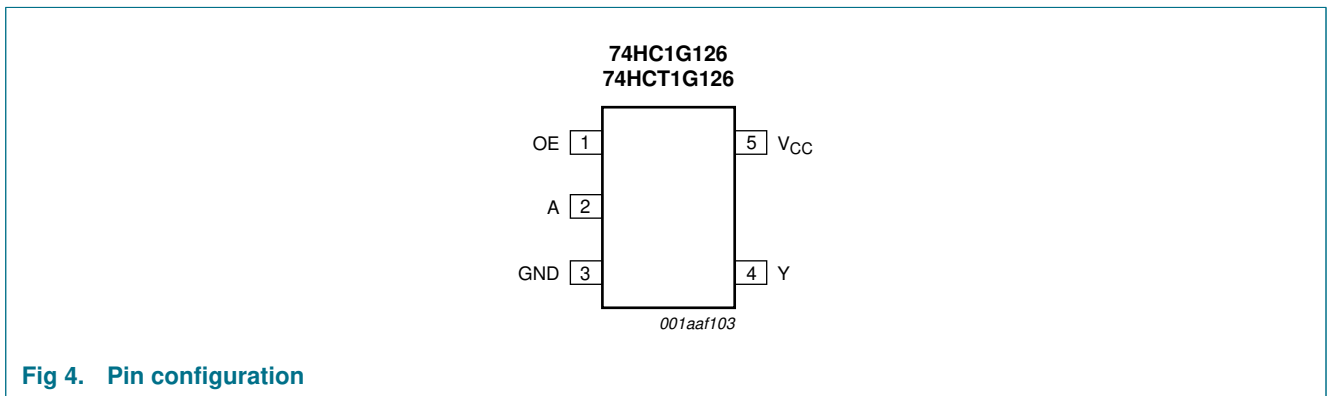
Type number	Marking
74HC1G126GW	HN
74HCT1G126GW	TN
74HC1G126GV	H26
74HCT1G126GV	T26

## 5. Functional diagram



## 6. Pinning information

### 6.1 Pinning



### 6.2 Pin description

Table 3. Pin description

Symbol	Pin	Description
OE	1	output enable input
A	2	data input
GND	3	ground (0 V)
Y	4	data output
V <sub>CC</sub>	5	supply voltage

## 7. Functional description

Table 4. Function table

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

Inputs		Output
OE	A	Y
H	L	L
H	H	H
L	X	Z

## 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). [\[1\]](#)

Symbol	Parameter	Conditions	Min	Max	Unit
$V_{CC}$	supply voltage		-0.5	+7.0	V
$I_{IK}$	input clamping current	$V_I < -0.5\text{ V}$ or $V_I > V_{CC} + 0.5\text{ V}$	-	$\pm 20$	mA
$I_{OK}$	output clamping current	$V_O < -0.5\text{ V}$ or $V_O > V_{CC} + 0.5\text{ V}$	-	$\pm 20$	mA
$I_O$	output current	$-0.5\text{ V} < V_O < V_{CC} + 0.5\text{ V}$	-	$\pm 35.0$	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	$T_{amb} = -40\text{ °C to }+125\text{ °C}$	<a href="#">[2]</a> -	200	mW

[1] The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

[2] Above 55 °C the value of  $P_{tot}$  derates linearly with 2.5 mW/K.

## 9. Recommended operating conditions

**Table 6. Recommended operating conditions**

Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	74HC1G126			74HCT1G126			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
		$V_{CC} = 4.5\text{ V}$	-	-	139	-	-	139	ns/V
		$V_{CC} = 6.0\text{ V}$	-	-	83	-	-	-	ns/V

## 10. Static characteristics

**Table 7. Static characteristics**

Voltages are referenced to GND (ground = 0 V). All typical values are measured at  $T_{amb} = 25\text{ °C}$ .

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	
<b>For type 74HC1G126</b>								
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 2.0\text{ V}$	1.5	1.2	-	1.5	-	V
		$V_{CC} = 4.5\text{ V}$	3.15	2.4	-	3.15	-	V
		$V_{CC} = 6.0\text{ V}$	4.2	3.2	-	4.2	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 2.0\text{ V}$	-	0.8	0.5	-	0.5	V
		$V_{CC} = 4.5\text{ V}$	-	2.1	1.35	-	1.35	V
		$V_{CC} = 6.0\text{ V}$	-	2.8	1.8	-	1.8	V

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

Voltages are referenced to GND (ground = 0 V). All typical values are measured at  $T_{amb} = 25\text{ }^{\circ}\text{C}$ .

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	
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	-	1.9	-	V
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 4.5 V	4.4	4.5	-	4.4	-	V
		I <sub>O</sub> = -20 μA; V <sub>CC</sub> = 6.0 V	5.9	6.0	-	5.9	-	V
		I <sub>O</sub> = -6.0 mA; V <sub>CC</sub> = 4.5 V	3.84	4.32	-	3.7	-	V
		I <sub>O</sub> = -7.8 mA; V <sub>CC</sub> = 6.0 V	5.34	5.81	-	5.2	-	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	-	0.1	V
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 4.5 V	-	0	0.1	-	0.1	V
		I <sub>O</sub> = 20 μA; V <sub>CC</sub> = 6.0 V	-	0	0.1	-	0.1	V
		I <sub>O</sub> = 6.0 mA; V <sub>CC</sub> = 4.5 V	-	0.15	0.33	-	0.4	V
		I <sub>O</sub> = 7.8 mA; V <sub>CC</sub> = 6.0 V	-	0.16	0.33	-	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	-	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	-	-	5	-	10	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	-	-	10	-	20	μA
C <sub>I</sub>	input capacitance		-	1.5	-	-	-	pF
<b>For type 74HCT1G126</b>								
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	1.6	-	2.0	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	1.2	0.8	-	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	-	4.4	-	V
		I <sub>O</sub> = -6.0 mA	3.84	4.32	-	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	0.1	-	0.1	V
		I <sub>O</sub> = 6.0 mA	-	0.16	0.33	-	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	-	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> = 5.5 V	-	-	5	-	10	
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	-	-	10	-	20	μA
ΔI <sub>CC</sub>	additional supply current	per input; V <sub>CC</sub> = 4.5 V to 5.5 V; V <sub>I</sub> = V <sub>CC</sub> - 2.1 V; I <sub>O</sub> = 0 A	-	-	500	-	850	μA
C <sub>I</sub>	input capacitance		-	1.5	-	-	-	pF

## 11. Dynamic characteristics

**Table 8. Dynamic characteristics**

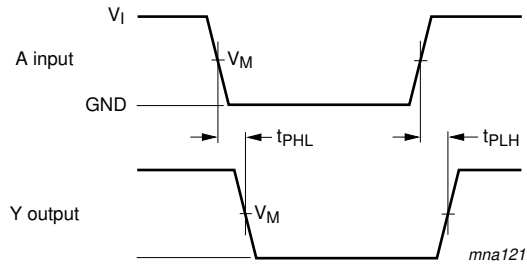
$GND = 0\text{ V}$ ;  $t_r = t_f \leq 6.0\text{ ns}$ ;  $C_L = 50\text{ pF}$  unless otherwise specified. All typical values are measured at  $T_{amb} = 25\text{ }^\circ\text{C}$ . For test circuit see [Figure 7](#)

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit	
			Min	Typ	Max	Min	Max		
<b>For type 74HC1G126</b>									
$t_{pd}$	propagation delay	A to Y; see <a href="#">Figure 5</a>	<a href="#">[1]</a>						
		$V_{CC} = 2.0\text{ V}$	-	24	125	-	150	ns	
		$V_{CC} = 4.5\text{ V}$	-	10	25	-	30	ns	
		$V_{CC} = 5.0\text{ V}$ ; $C_L = 15\text{ pF}$	-	9	-	-	-	ns	
		$V_{CC} = 6.0\text{ V}$	-	9	21	-	26	ns	
$t_{en}$	enable time	OE to Y; see <a href="#">Figure 6</a>	<a href="#">[1]</a>						
		$V_{CC} = 2.0\text{ V}$	-	24	155	-	190	ns	
		$V_{CC} = 4.5\text{ V}$	-	10	31	-	38	ns	
		$V_{CC} = 6.0\text{ V}$	-	8	26	-	32	ns	
$t_{dis}$	disable time	OE to Y; see <a href="#">Figure 6</a>	<a href="#">[1]</a>						
		$V_{CC} = 2.0\text{ V}$	-	16	155	-	190	ns	
		$V_{CC} = 4.5\text{ V}$	-	12	31	-	38	ns	
		$V_{CC} = 6.0\text{ V}$	-	11	26	-	32	ns	
$C_{PD}$	power dissipation capacitance	$V_I = GND$ to $V_{CC}$	<a href="#">[2]</a>	-	30	-	-	-	pF
<b>For type 74HCT1G126</b>									
$t_{pd}$	propagation delay	A to Y; see <a href="#">Figure 5</a>	<a href="#">[1]</a>						
		$V_{CC} = 4.5\text{ V}$	-	11	30	-	36	ns	
		$V_{CC} = 5.0\text{ V}$ ; $C_L = 15\text{ pF}$	-	10	-	-	-	ns	
$t_{en}$	enable time	OE to Y; see <a href="#">Figure 6</a> ; $V_{CC} = 4.5\text{ V}$	<a href="#">[1]</a>	-	10	35	-	42	ns
$t_{dis}$	disable time	OE to Y; see <a href="#">Figure 6</a> ; $V_{CC} = 4.5\text{ V}$	<a href="#">[1]</a>	-	12	31	-	38	ns
$C_{PD}$	power dissipation capacitance	$V_I = GND$ to $V_{CC} - 1.5\text{ V}$	<a href="#">[2]</a>	-	27	-	-	-	pF

- [1]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ .  
 $t_{en}$  is the same as  $t_{PZL}$  and  $t_{PZH}$ .  
 $t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ .

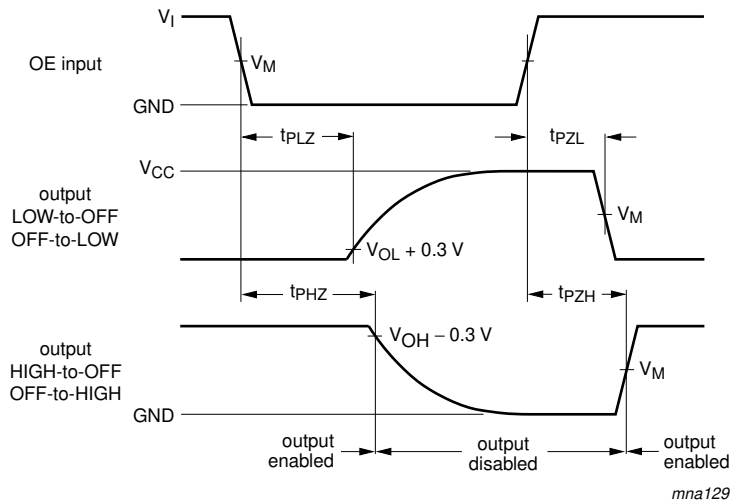
- [2]  $C_{PD}$  is used to determine the dynamic power dissipation  $P_D$  ( $\mu\text{W}$ ).  
 $P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o)$  where:  
 $f_i$  = input frequency in MHz  
 $f_o$  = output frequency in MHz  
 $C_L$  = output load capacitance in pF  
 $V_{CC}$  = supply voltage in Volts  
 $\sum (C_L \times V_{CC}^2 \times f_o)$  = sum of outputs

12. Waveforms



Measurement points are given in [Table 9](#).

Fig 5. The input (A) to output (Y) propagation delays



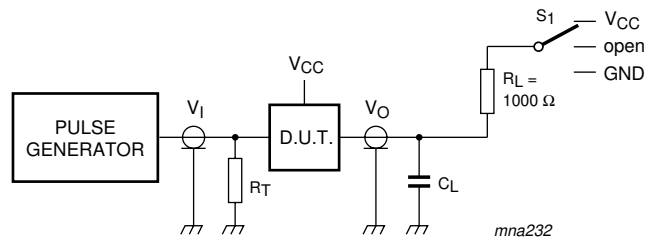
Measurement points are given in [Table 9](#).

Fig 6. The 3-state enable and disable times

Table 9. Measurement points

Type	Input		Output
	$V_M$	$V_I$	$V_M$
74HC1G126	$0.5 \times V_{CC}$	GND to $V_{CC}$	$0.5 \times V_{CC}$
74HCT1G126	1.3 V	GND to 3.0 V	1.3 V





Test data is given in [Table 8](#). Definitions for test circuit:

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

$C_L$  = Load capacitance including jig and probe capacitance

$R_L$  = Load resistance

For  $t_{PLH}$ ,  $t_{PHL}$ ,  $S_1$  = open

For  $t_{PLZ}$ ,  $t_{PZL}$ ,  $S_1$  =  $V_{CC}$

For  $t_{PHZ}$ ,  $t_{PZH}$ ,  $S_1$  = GND

**Fig 7. Load circuitry for switching times**

13. Package outline

TSSOP5: plastic thin shrink small outline package; 5 leads; body width 1.25 mm

SOT353-1

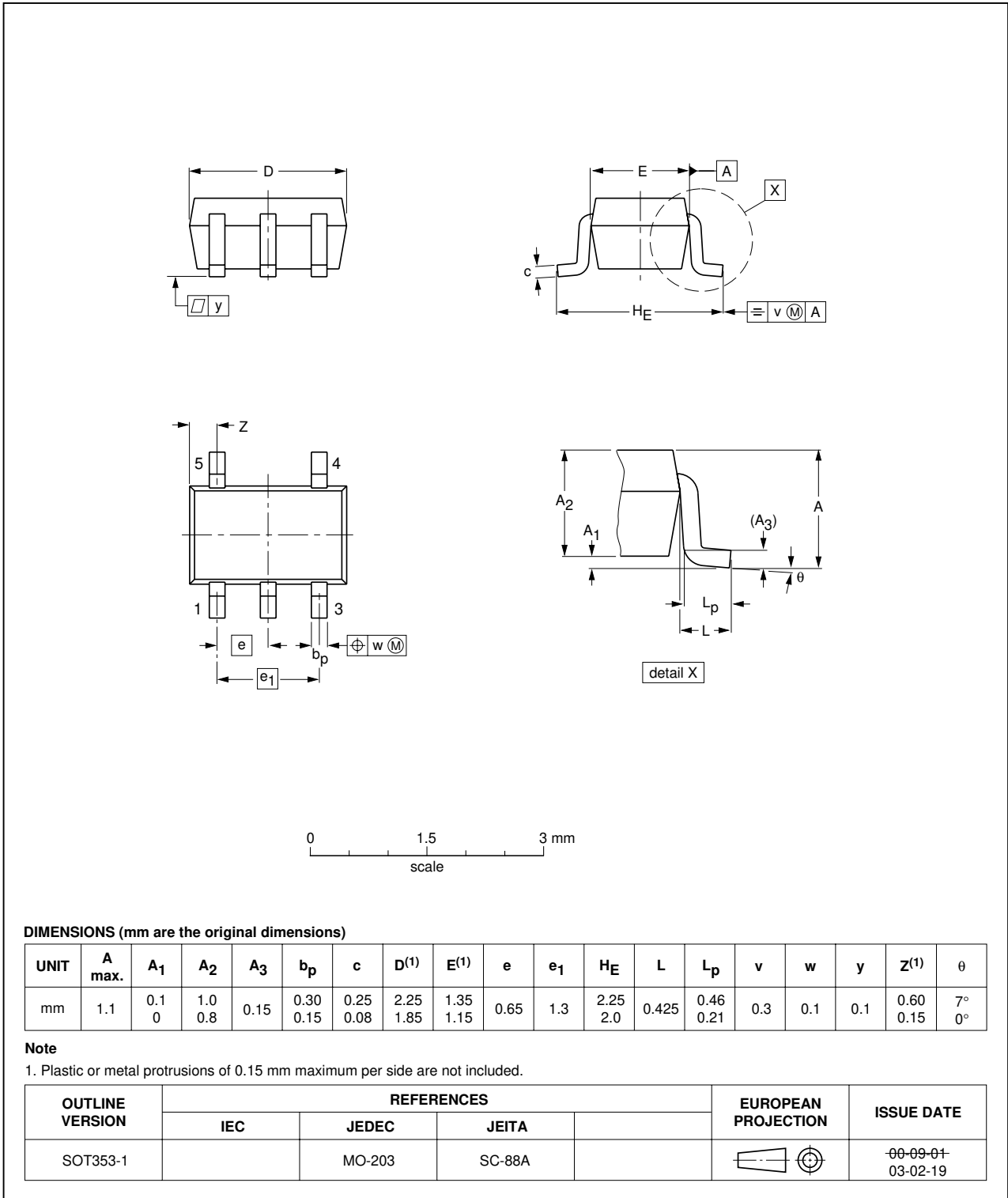


Fig 8. Package outline SOT353-1 (TSSOP5)

Plastic surface-mounted package; 5 leads

SOT753

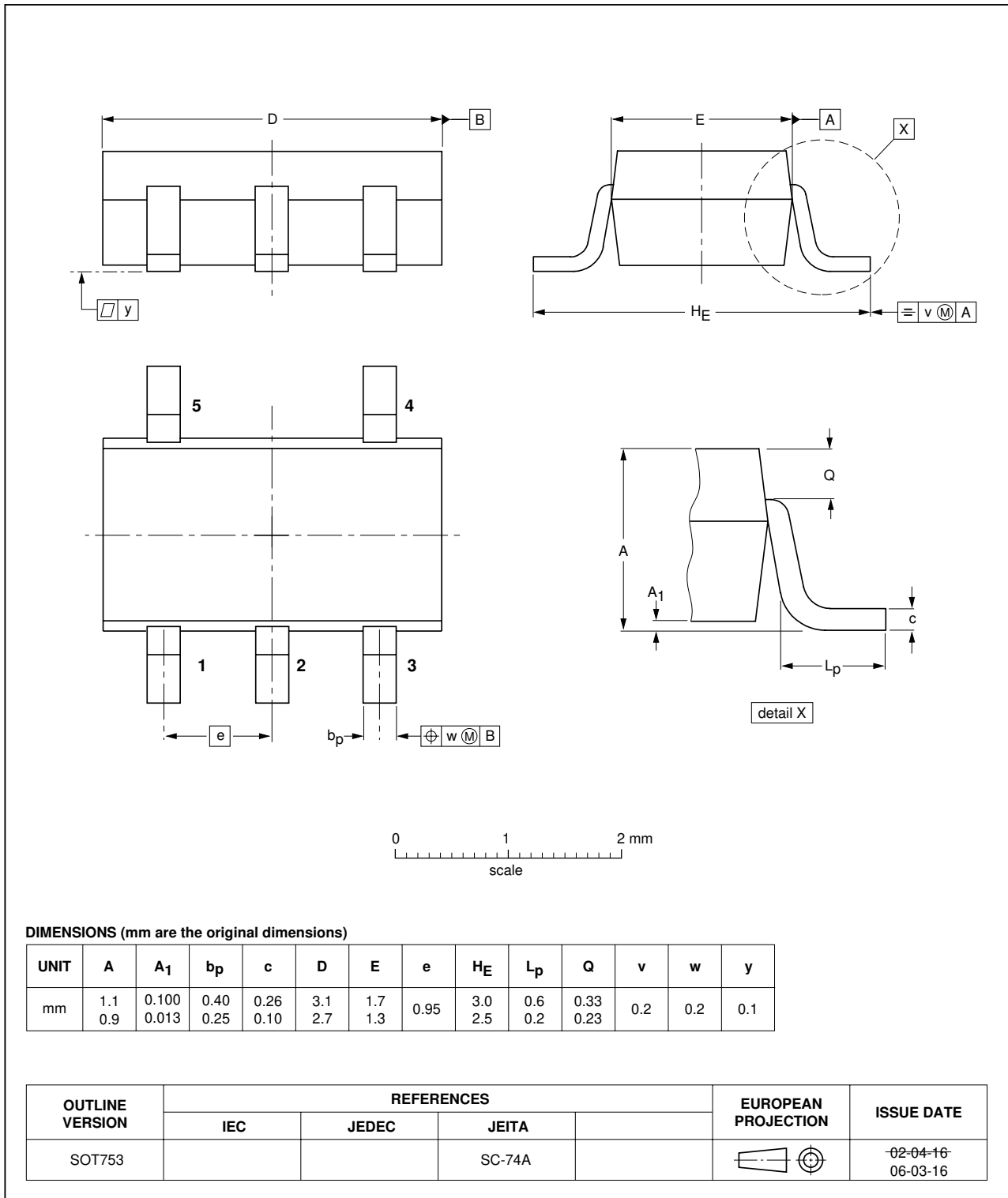


Fig 9. Package outline SOT753 (SC-74A)

## 14. Abbreviations

Table 10. Abbreviations

Acronym	Description
DUT	Device Under Test
TTL	Transistor-Transistor Logic

## 15. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74HC_HCT1G126_4	20070720	Product data sheet	-	74HC_HCT1G126_3
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>Package SOT353 changed to SOT353-1 in <a href="#">Table 1</a> and <a href="#">Figure 8</a>.</li><li>Quick Reference Data and Soldering sections removed.</li><li><a href="#">Section 2 "Features"</a> updated.</li></ul>		
74HC_HCT1G126_3	20020515	Product specification	-	74HC_HCT1G126_2
74HC_HCT1G126_2	20010406	Product specification	-	74HC_HCT1G126
74HC_HCT1G126	19970924	Preliminary specification	-	-

## 16. Legal information

### 16.1 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".

[3] The product status of device(s) described in this document may have changed since this document was published and may differ in case of multiple devices. The latest product status information is available on the Internet at URL <http://www.nxp.com>.

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## 18. Contents

<b>1</b>	<b>General description</b> .....	<b>1</b>
<b>2</b>	<b>Features</b> .....	<b>1</b>
<b>3</b>	<b>Ordering information</b> .....	<b>1</b>
<b>4</b>	<b>Marking</b> .....	<b>1</b>
<b>5</b>	<b>Functional diagram</b> .....	<b>2</b>
<b>6</b>	<b>Pinning information</b> .....	<b>2</b>
6.1	Pinning .....	2
6.2	Pin description .....	2
<b>7</b>	<b>Functional description</b> .....	<b>2</b>
<b>8</b>	<b>Limiting values</b> .....	<b>3</b>
<b>9</b>	<b>Recommended operating conditions</b> .....	<b>3</b>
<b>10</b>	<b>Static characteristics</b> .....	<b>3</b>
<b>11</b>	<b>Dynamic characteristics</b> .....	<b>5</b>
<b>12</b>	<b>Waveforms</b> .....	<b>6</b>
<b>13</b>	<b>Package outline</b> .....	<b>8</b>
<b>14</b>	<b>Abbreviations</b> .....	<b>10</b>
<b>15</b>	<b>Revision history</b> .....	<b>10</b>
<b>16</b>	<b>Legal information</b> .....	<b>11</b>
16.1	Data sheet status .....	11
16.2	Definitions .....	11
16.3	Disclaimers .....	11
16.4	Trademarks .....	11
<b>17</b>	<b>Contact information</b> .....	<b>11</b>
<b>18</b>	<b>Contents</b> .....	<b>12</b>

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For sales office addresses, please send an email to: [salesaddresses@nxp.com](mailto:salesaddresses@nxp.com)

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