

# 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 as 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

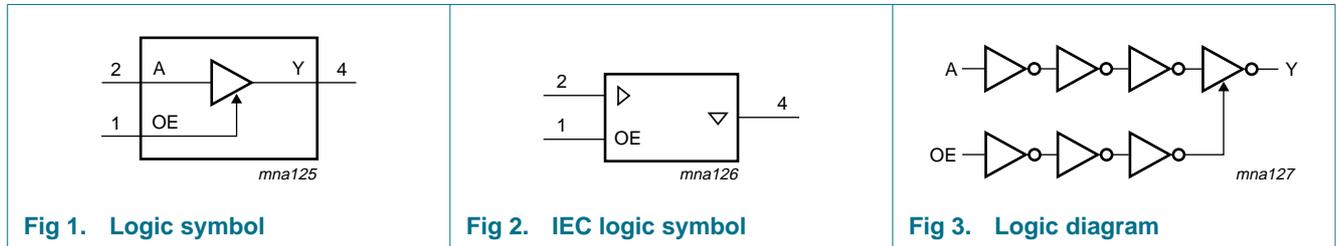
Type number	Package			
	Temperature range	Name	Description	Version
74HC1G126GW 74HCT1G126GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74HC1G126GV 74HCT1G126GV	-40 °C to +125 °C	SC-74A	plastic surface-mounted package; 5 leads	SOT753

## 4. Marking

Table 2. Marking codes

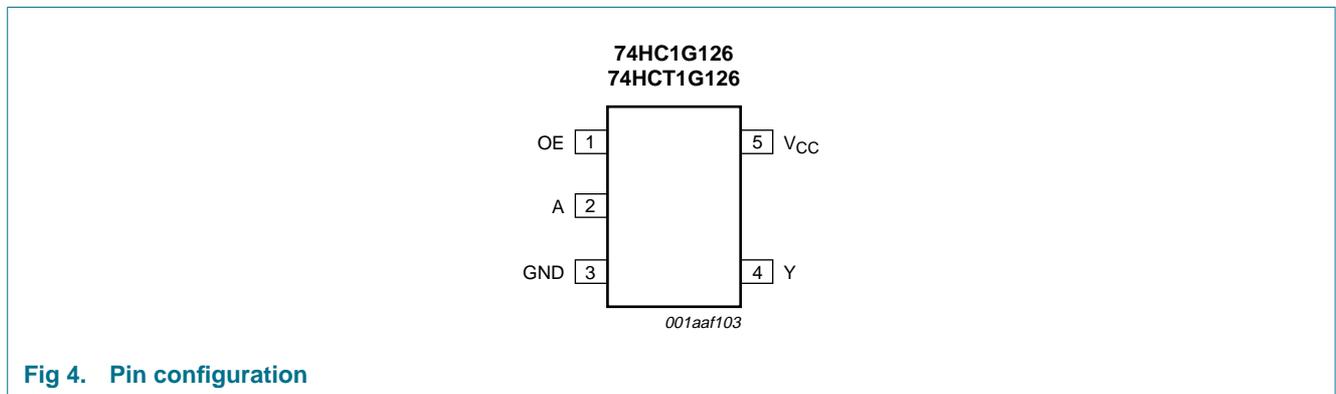
Type number	Marking
74HC1G126GW	HN
74HCT1G126GW	TN
74HC1G126GV	H26
74HCT1G126GV	T26

## 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	
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$						
		$I_O = -20\text{ }\mu\text{A}$ ; $V_{CC} = 2.0\text{ V}$	1.9	2.0	-	1.9	-	V
		$I_O = -20\text{ }\mu\text{A}$ ; $V_{CC} = 4.5\text{ V}$	4.4	4.5	-	4.4	-	V
		$I_O = -20\text{ }\mu\text{A}$ ; $V_{CC} = 6.0\text{ V}$	5.9	6.0	-	5.9	-	V
		$I_O = -6.0\text{ mA}$ ; $V_{CC} = 4.5\text{ V}$	3.84	4.32	-	3.7	-	V
		$I_O = -7.8\text{ mA}$ ; $V_{CC} = 6.0\text{ V}$	5.34	5.81	-	5.2	-	V
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$						
		$I_O = 20\text{ }\mu\text{A}$ ; $V_{CC} = 2.0\text{ V}$	-	0	0.1	-	0.1	V
		$I_O = 20\text{ }\mu\text{A}$ ; $V_{CC} = 4.5\text{ V}$	-	0	0.1	-	0.1	V
		$I_O = 20\text{ }\mu\text{A}$ ; $V_{CC} = 6.0\text{ V}$	-	0	0.1	-	0.1	V
		$I_O = 6.0\text{ mA}$ ; $V_{CC} = 4.5\text{ V}$	-	0.15	0.33	-	0.4	V
		$I_O = 7.8\text{ mA}$ ; $V_{CC} = 6.0\text{ V}$	-	0.16	0.33	-	0.4	V
$I_I$	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 6.0\text{ V}$	-	-	1.0	-	1.0	$\mu\text{A}$
$I_{OZ}$	OFF-state output current	$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = V_{CC}$ or GND; $V_{CC} = 6.0\text{ V}$	-	-	5	-	10	$\mu\text{A}$
$I_{CC}$	supply current	$V_I = V_{CC}$ or GND; $I_O = 0\text{ A}$ ; $V_{CC} = 6.0\text{ V}$	-	-	10	-	20	$\mu\text{A}$
$C_I$	input capacitance		-	1.5	-	-	-	pF
<b>For type 74HCT1G126</b>								
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 4.5\text{ V}$ to $5.5\text{ V}$	2.0	1.6	-	2.0	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 4.5\text{ V}$ to $5.5\text{ V}$	-	1.2	0.8	-	0.8	V
$V_{OH}$	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5\text{ V}$						
		$I_O = -20\text{ }\mu\text{A}$	4.4	4.5	-	4.4	-	V
		$I_O = -6.0\text{ mA}$	3.84	4.32	-	3.7	-	V
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5\text{ V}$						
		$I_O = 20\text{ }\mu\text{A}$	-	0	0.1	-	0.1	V
		$I_O = 6.0\text{ mA}$	-	0.16	0.33	-	0.4	V
$I_I$	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5\text{ V}$	-	-	1.0	-	1.0	$\mu\text{A}$
$I_{OZ}$	OFF-state output current	$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = V_{CC}$ or GND; $V_{CC} = 5.5\text{ V}$	-	-	5	-	10	
$I_{CC}$	supply current	$V_I = V_{CC}$ or GND; $I_O = 0\text{ A}$ ; $V_{CC} = 5.5\text{ V}$	-	-	10	-	20	$\mu\text{A}$
$\Delta I_{CC}$	additional supply current	per input; $V_{CC} = 4.5\text{ V}$ to $5.5\text{ V}$ ; $V_I = V_{CC} - 2.1\text{ V}$ ; $I_O = 0\text{ A}$	-	-	500	-	850	$\mu\text{A}$
$C_I$	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  $T_{amb} = 25\text{ °C}$ . 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

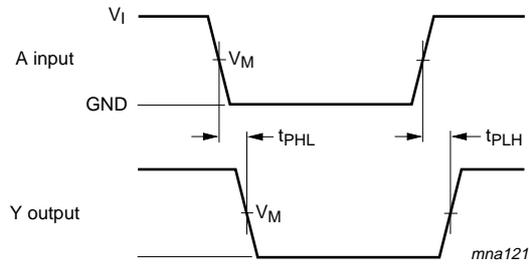
$f_o$  = output frequency in MHz

$C_L$  = output load capacitance in pF

$V_{CC}$  = supply voltage in Volts

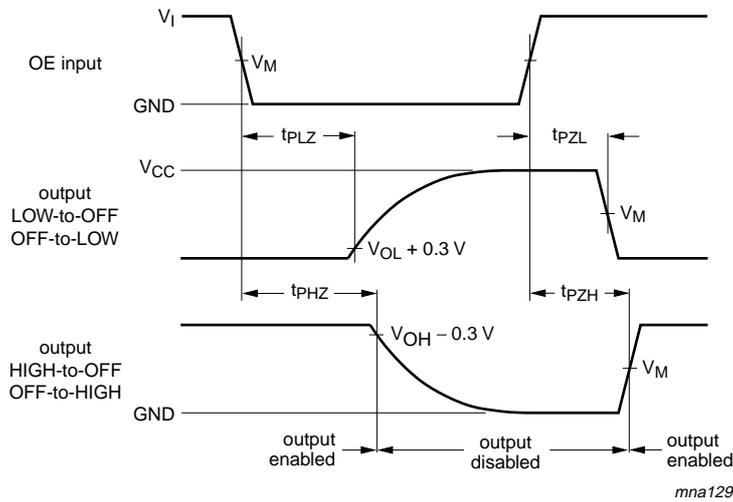
$\sum (C_L \times V_{CC}^2 \times f_o)$  = sum of outputs

12. Waveforms



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

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

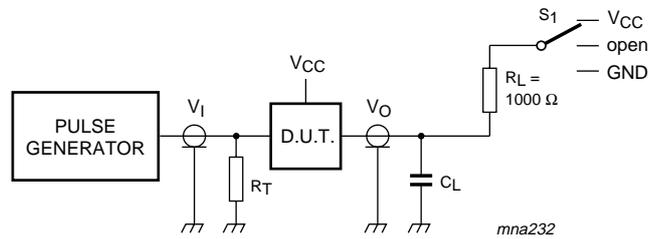


Measurement points are given in [Table 9](#).

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

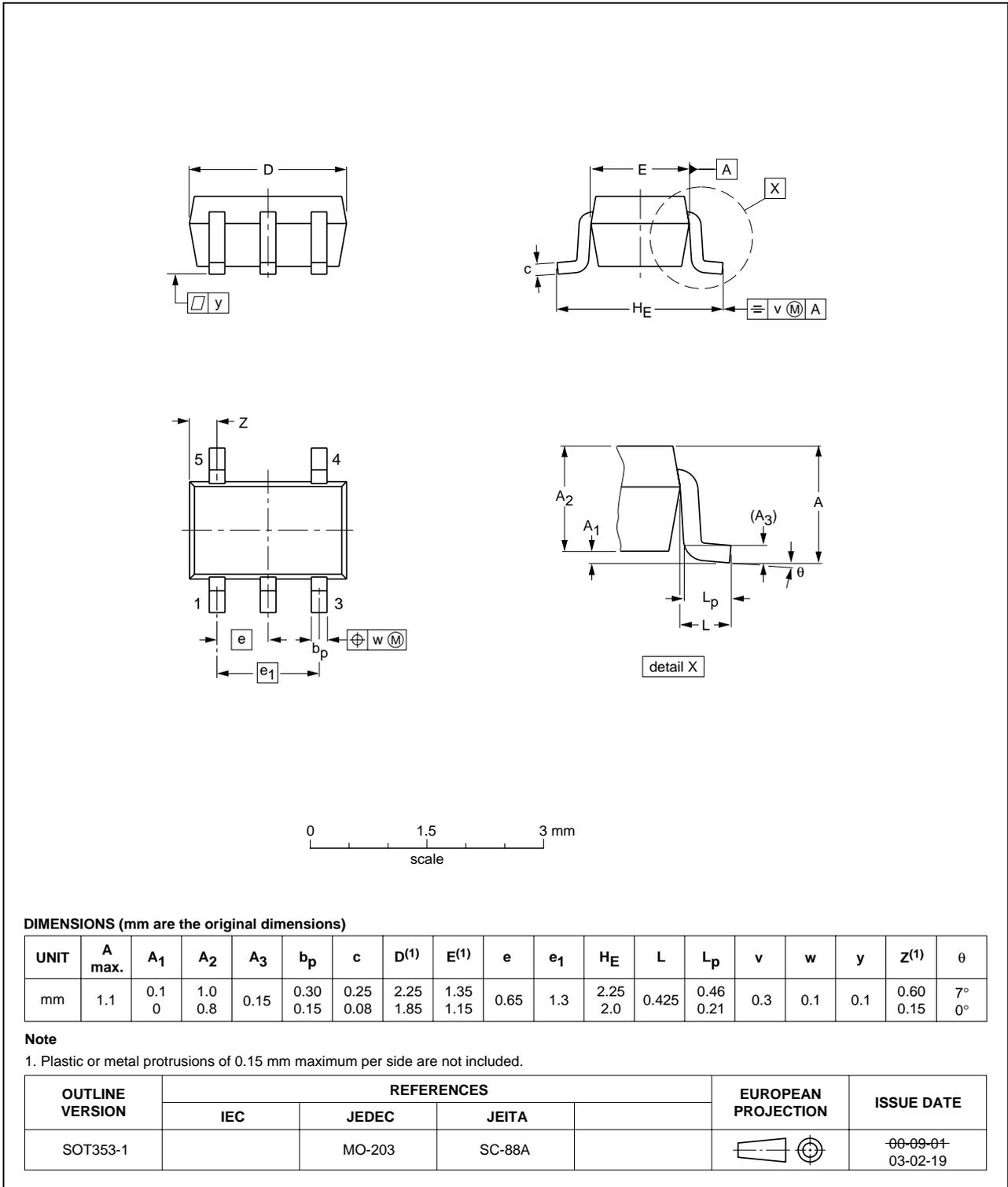


Fig 8. Package outline SOT353-1 (TSSOP5)

Plastic surface-mounted package; 5 leads

SOT753

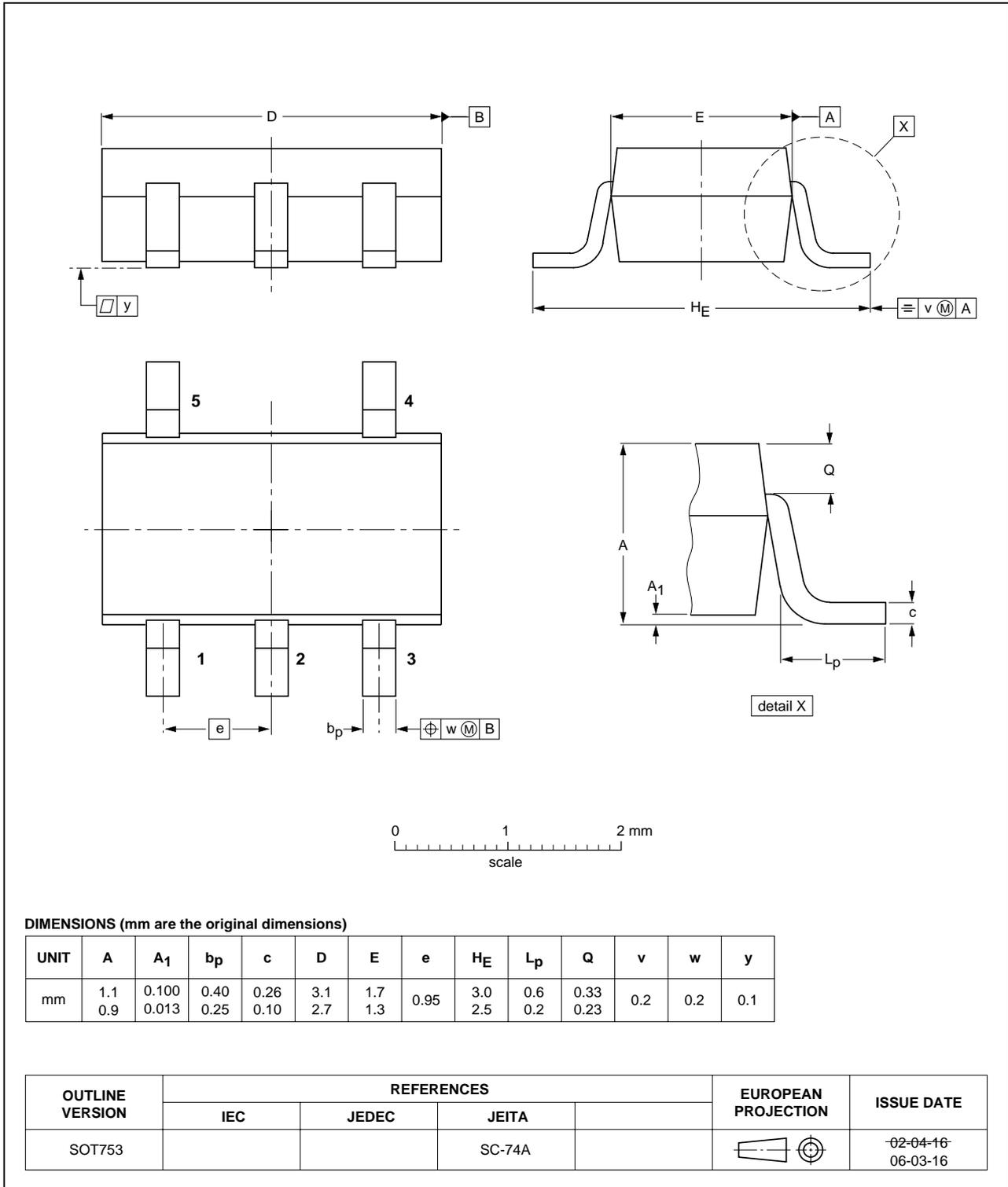


Fig 9. Package outline SOT753 (SC-74A)

## 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".

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