

74HC1G126; 74HCT1G126

Bus buffer/line driver; 3-state

Rev. 5 — 17 January 2022

Product data sheet

1. General description

The 74HC1G126; 74HCT1G126 is a single buffer/line driver with 3-state output. Inputs include clamp diodes. This 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
- Symmetrical output impedance
- High noise immunity
- Latch-up performance exceeds 100 mA per JESD 78 Class II Level B
- Balanced propagation delays
- Input levels:
 - For 74HC1G126: CMOS level
 - For 74HCT1G126: TTL level
- Complies with JEDEC standards:
 - JESD8C (2.7 V to 3.6 V)
 - JESD7A (2.0 V to 6.0 V)
- ESD protection:
 - HBM/JESD22-A114-A exceeds 2000 V
 - MM/JESD22-A115-A exceeds 200 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
74HC1G126GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1
74HCT1G126GW				
74HC1G126GV	-40 °C to +125 °C	SC-74A	plastic surface-mounted package; 5 leads	SOT753
74HCT1G126GV				

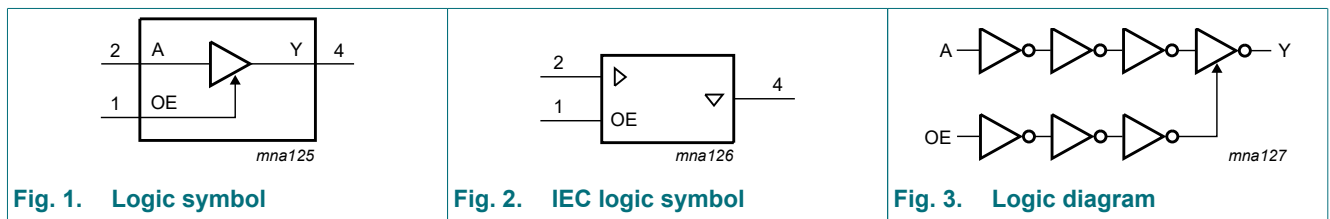
4. Marking

Table 2. Marking codes

Type number	Marking [1]
74HC1G126GW	HN
74HCT1G126GW	TN
74HC1G126GV	H26
74HCT1G126GV	T26

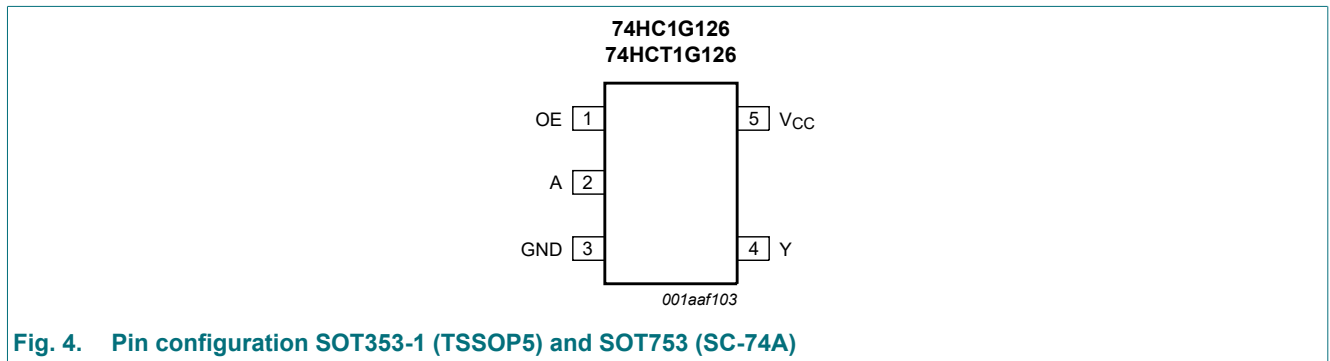
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

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 _{CC}	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).

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 $V_I > V_{CC} + 0.5\text{ V}$	-	± 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	$-0.5\text{ V} < V_O < V_{CC} + 0.5\text{ V}$ [1]	-	± 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 $+125\text{ °C}$ [2]	-	250	mW

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

[2] For SOT353-1 (TSSOP5) package: P_{tot} derates linearly with 3.3 mW/K above 74 °C.

For SOT753 (SC-74A) package: P_{tot} derates linearly with 3.8 mW/K above 85 °C.

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	
74HC1G126								
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
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
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_{O1}	input leakage current	$V_I = V_{CC}$ or GND; $V_{CC} = 6.0\text{ V}$	-	-	1.0	-	1.0	μA
		$V_I = V_{OH}$ or V_{OL} ; $V_O = V_{CC}$ or GND; $V_{CC} = 6.0\text{ V}$	-	-	5	-	10	μA
I_{CC}	supply current	$V_I = V_{CC}$ or GND; $I_O = 0\text{ A}$; $V_{CC} = 6.0\text{ V}$	-	-	10	-	20	μA
C_I	input capacitance		-	1.5	-	-	-	pF

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	
74HCT1G126								
V _{IH}	HIGH-level input voltage	V _{CC} = 4.5 V to 5.5 V	2.0	1.6	-	2.0	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 4.5 V to 5.5 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 V						
		I _O = -20 µA	4.4	4.5	-	4.4	-	V
		I _O = -6.0 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 V						
		I _O = 20 µA	-	0	0.1	-	0.1	V
		I _O = 6.0 mA	-	0.16	0.33	-	0.4	V
I _I	input leakage current	V _I = V _{CC} or GND; V _{CC} = 5.5 V	-	-	1.0	-	1.0	µA
I _{OZ}	OFF-state output current	V _I = V _{IH} or V _{IL} ; V _O = V _{CC} or GND; V _{CC} = 5.5 V	-	-	5	-	10	
I _{CC}	supply current	V _I = V _{CC} or GND; I _O = 0 A; V _{CC} = 5.5 V	-	-	10	-	20	µA
ΔI _{CC}	additional supply current	per input; V _{CC} = 4.5 V to 5.5 V; V _I = V _{CC} - 2.1 V; I _O = 0 A	-	-	500	-	850	µA
C _I	input capacitance		-	1.5	-	-	-	pF

11. Dynamic characteristics

Table 8. Dynamic characteristics

GND = 0 V; t_r = t_f ≤ 6.0 ns; C_L = 50 pF unless otherwise specified. All typical values are measured at T_{amb} = 25 °C. For test circuit see Fig. 7.

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	
74HC1G126								
t _{pd}	propagation delay	A to Y; see Fig. 5 [1]						
		V _{CC} = 2.0 V	-	24	125	-	150	ns
		V _{CC} = 4.5 V	-	10	25	-	30	ns
		V _{CC} = 5.0 V; C _L = 15 pF	-	9	-	-	-	ns
		V _{CC} = 6.0 V	-	9	21	-	26	ns
t _{en}	enable time	OE to Y; see Fig. 6 [1]						
		V _{CC} = 2.0 V	-	24	155	-	190	ns
		V _{CC} = 4.5 V	-	10	31	-	38	ns
		V _{CC} = 6.0 V	-	8	26	-	32	ns
t _{dis}	disable time	OE to Y; see Fig. 6 [1]						
		V _{CC} = 2.0 V	-	16	155	-	190	ns
		V _{CC} = 4.5 V	-	12	31	-	38	ns
		V _{CC} = 6.0 V	-	11	26	-	32	ns
C _{PD}	power dissipation capacitance	V _I = GND to V _{CC} [2]	-	30	-	-	-	pF

Symbol	Parameter	Conditions	-40 °C to +85 °C			-40 °C to +125 °C		Unit
			Min	Typ	Max	Min	Max	
74HCT1G126								
t _{pd}	propagation delay	A to Y; see Fig. 5 [1]						
		V _{CC} = 4.5 V	-	11	30	-	36	ns
		V _{CC} = 5.0 V; C _L = 15 pF	-	10	-	-	-	ns
t _{en}	enable time	OE to Y; see Fig. 6; V _{CC} = 4.5 V [1]	-	10	35	-	42	ns
t _{dis}	disable time	OE to Y; see Fig. 6; V _{CC} = 4.5 V [1]	-	12	31	-	38	ns
C _{PD}	power dissipation capacitance	V _I = GND to V _{CC} - 1.5 V [2]	-	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 (μW).

$$P_D = C_{PD} \times V_{CC}^2 \times f_i + \dot{a} (C_L \times V_{CC}^2 \times f_o)$$
 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
 $\dot{a} (C_L \times V_{CC}^2 \times f_o)$ = sum of outputs

11.1. Waveforms and test circuit

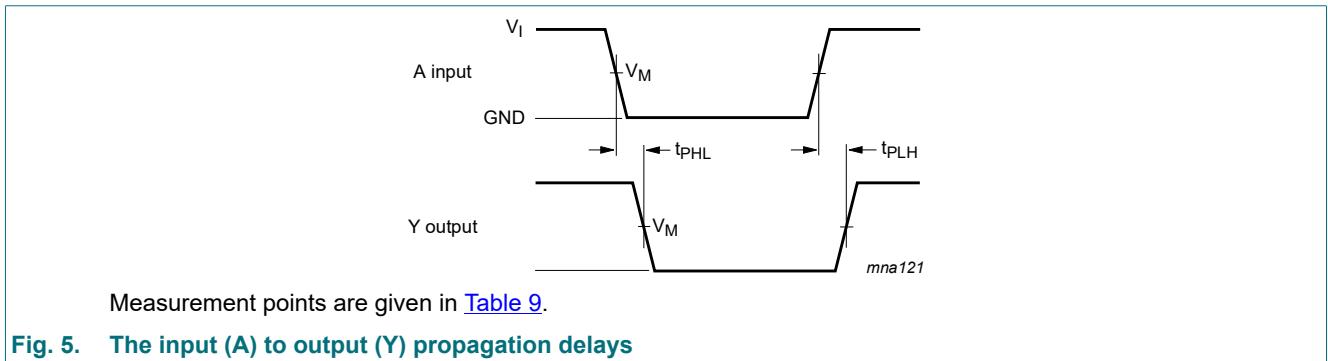


Fig. 5. The input (A) to output (Y) propagation delays

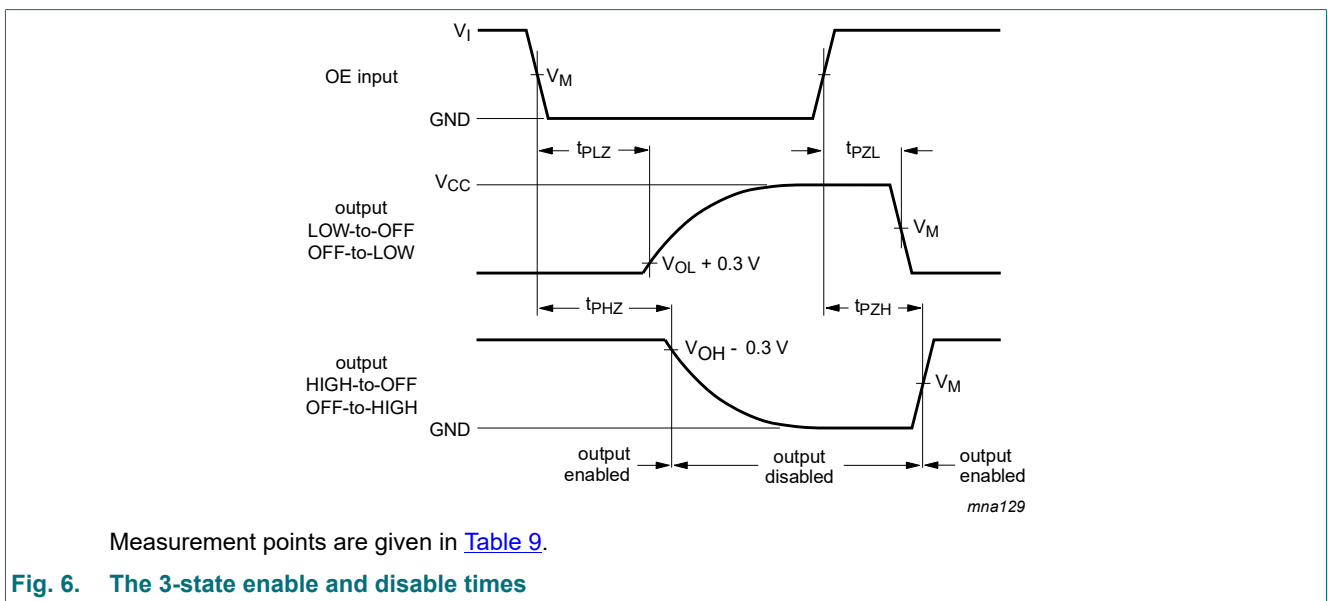
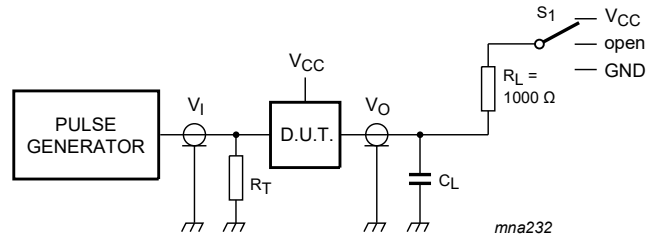


Fig. 6. The 3-state enable and disable times

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. test circuit for measuring switching times

12. Package outline

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

SOT353-1

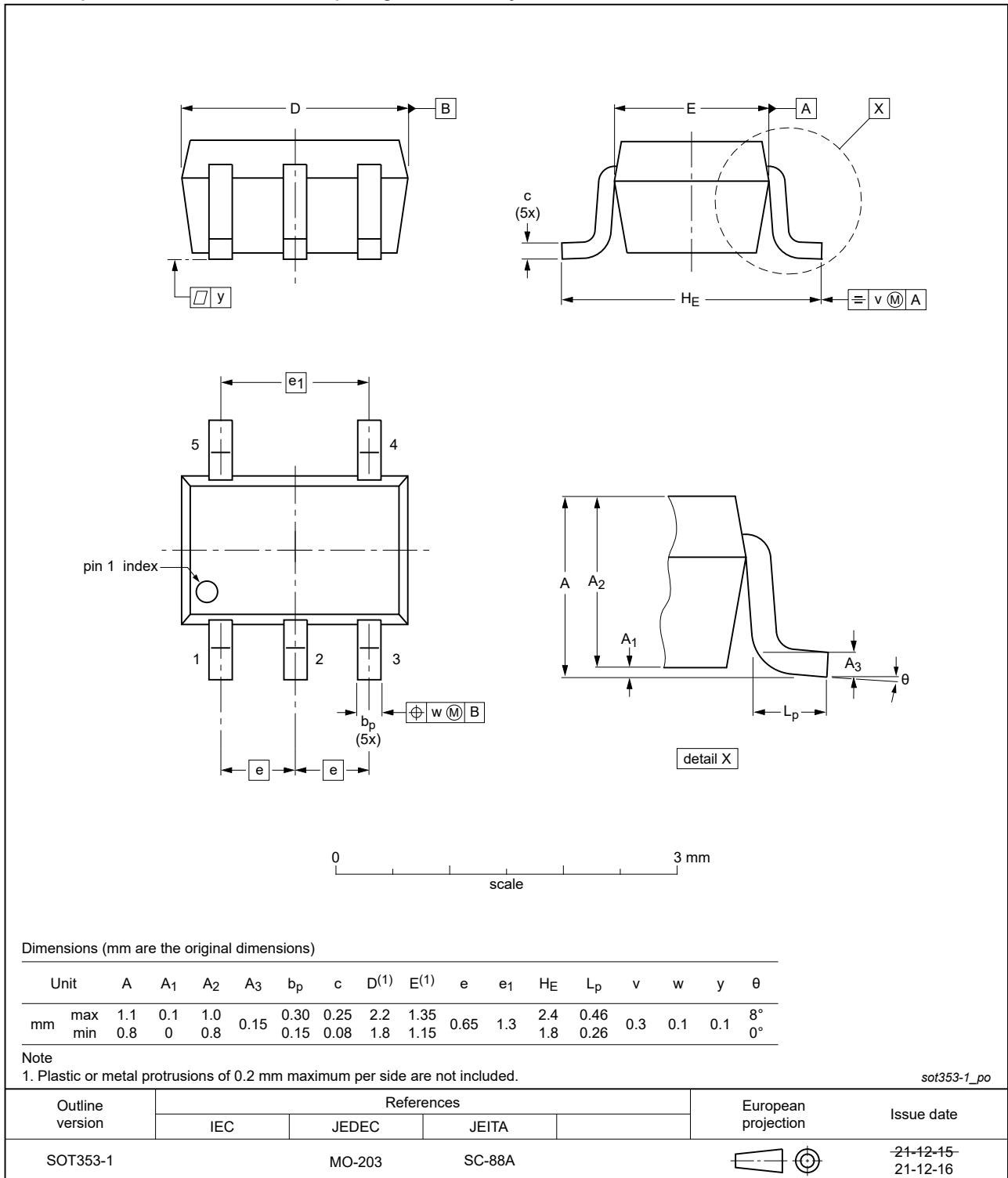


Fig. 8. Package outline SOT353-1 (TSSOP5)

Plastic surface-mounted package; 5 leads

SOT753

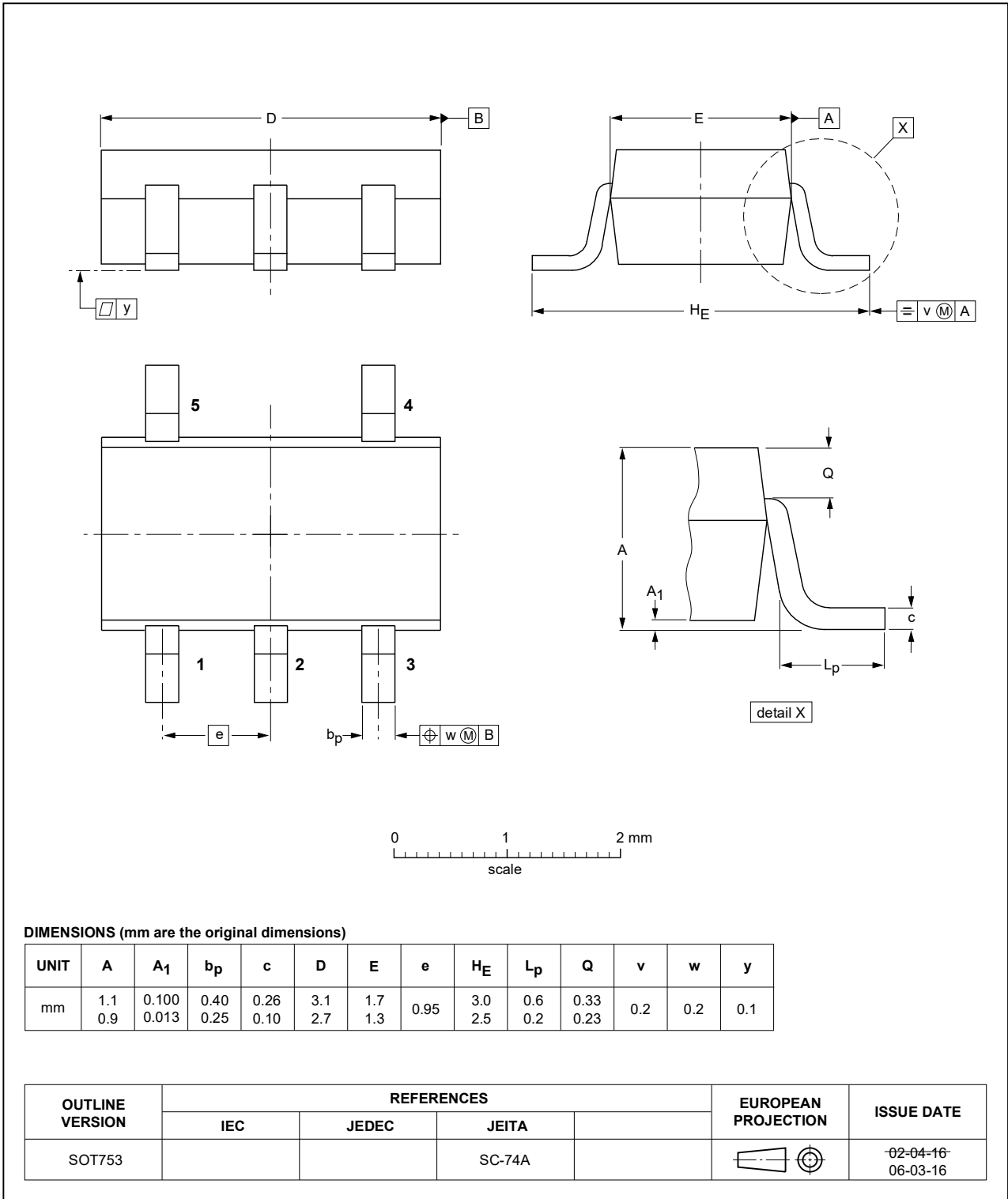


Fig. 9. Package outline SOT753 (SC-74A)

13. Abbreviations

Table 10. Abbreviations

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

14. Revision history

Table 11. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74HC_HCT1G126v.5	20220117	Product data sheet	-	74HC_HCT1G126v.4
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 1 and Section 2 updated. Fig. 8: Package outline drawing for SOT353-1 (TSSOP5) has changed. Table 5: Derating values for P_{tot} total power dissipation updated. 			
74HC_HCT1G126v.4	20070720	Product data sheet	-	74HC_HCT1G126v.3
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. Package SOT353 changed to SOT353-1 in Table 1 and Fig. 8. Quick Reference Data and Soldering sections removed. Section 2 updated. 			
74HC_HCT1G126v.3	20020515	Product specification	-	74HC_HCT1G126v.2
74HC_HCT1G126v.2	20010406	Product specification	-	74HC_HCT1G126
74HC_HCT1G126	19970924	Preliminary specification	-	-

15. 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.
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