# 74AHC1G126; 74AHCT1G126

Bus buffer/line driver; 3-state

Rev. 9 — 18 May 2021 Product data sheet

# 1. General description

The 74AHC1G126; 74AHCT1G126 is a single buffer/line driver with 3-state output. Inputs are overvoltage tolerant. This feature allows the use of these devices as translators in mixed voltage environments.

### 2. Features and benefits

- Symmetrical output impedance
- Balanced propagation delays
- Wide supply voltage range from 2.0 to 5.5 V
- Overvoltage tolerant inputs to 5.5 V
- · High noise immunity
- CMOS low power dissipation
- · Latch-up performance exceeds 100 mA per JESD 78 Class II Level A
- Input levels:
  - For 74AHC1G126: CMOS level
  - For 74AHCT1G126: TTL level
- ESD protection:
  - HBM JESD22-A114F: exceeds 2000 V
  - MM JESD22-A115-A: exceeds 200 V
  - CDM JESD22-C101E: exceeds 1000 V
- Multiple package options
- Specified from -40 °C to +125 °C

# 3. Ordering information

#### **Table 1. Ordering information**

Type number	Package									
	Temperature range	Name	Description	Version						
74AHC1G126GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads;	SOT353-1						
74AHCT1G126GW			body width 1.25 mm							
74AHC1G126GV	-40 °C to +125 °C	SC-74A	plastic surface-mounted package; 5 leads	SOT753						
74AHCT1G126GV										
74AHC1G126GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package;	SOT886						
74AHCT1G126GM			no leads; 6 terminals; body 1 × 1.45 × 0.5 mm							



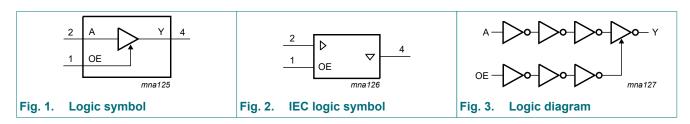
# 4. Marking

#### Table 2. Marking codes

Type number	Marking [1]
74AHC1G126GW	AN
74AHCT1G126GW	CN
74AHC1G126GV	A26
74AHCT1G126GV	C26
74AHC1G126GM	AN
74AHCT1G126GM	CN

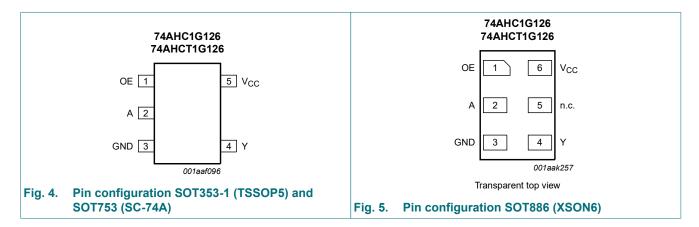
<sup>[1]</sup> The pin 1 indicator is located on the lower left corner of the device, below the marking code.

# 5. Functional diagram



# 6. Pinning information

### 6.1. Pinning



### 6.2. Pin description

Table 3. Pin description

Symbol	Pin	Pin				
	SOT353-1 and SOT753	SOT886				
OE	1	1	output enable input			
A	2	2	data input A			
GND	3	3	ground (0 V)			
Υ	4	4	data output Y			
n.c.	-	5	not connected			
V <sub>CC</sub>	5	6	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

Input	nput					
OE	A	Υ				
Н	L	L				
Н	Н	Н				
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 <sub>CC</sub>	supply voltage		-0.5	+7.0	V
VI	input voltage		-0.5	+7.0	V
I <sub>IK</sub>	input clamping current	$V_1 < -0.5 \text{ V}$ [1]	-20	-	mA
I <sub>OK</sub>	output clamping current	$V_O < -0.5 \text{ V or } V_O > V_{CC} + 0.5 \text{ V}$ [1]	-	±20	mA
Io	output current	$-0.5 \text{ V} < \text{V}_{\text{O}} < \text{V}_{\text{CC}} + 0.5 \text{ V}$	-	±25	mA
I <sub>CC</sub>	supply current		-	75	mA
I <sub>GND</sub>	ground current		-75	-	mA
T <sub>stg</sub>	storage temperature		-65	+150	°C
P <sub>tot</sub>	total power dissipation	$T_{amb} = -40  ^{\circ}\text{C} \text{ to } +125  ^{\circ}\text{C}$ [2]	-	250	mW

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

For SOT886 (XSON6) package: Ptot derates linearly with 3.3 mW/K above 74 °C.

<sup>[2]</sup> For SOT353-1 (TSSOP5) package: P<sub>tot</sub> derates linearly with 3.3 mW/K above 74 °C. For SOT753 (SC-74A) package: P<sub>tot</sub> 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	74	AHC1G1	26	74	Unit		
			Min	Тур	Max	Min	Тур	Max	
V <sub>CC</sub>	supply voltage		2.0	5.0	5.5	4.5	5.0	5.5	V
VI	input voltage		0	-	5.5	0	-	5.5	V
Vo	output voltage		0	-	V <sub>CC</sub>	0	-	V <sub>CC</sub>	V
T <sub>amb</sub>	ambient temperature		-40	+25	+125	-40	+25	+125	°C
Δt/ΔV	input transition rise and	$V_{CC} = 3.3 \text{ V} \pm 0.3 \text{ V}$	-	-	100	-	-	-	ns/V
	fall rate	V <sub>CC</sub> = 5.0 V ± 0.5 V	-	-	20	-	-	20	ns/V

# 10. Static characteristics

### **Table 7. Static characteristics**

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

Symbol	Parameter	Conditions		25 °C		-40 °C 1	to +85 °C	-40 °C t	o +125 °C	Unit
			Min	Тур	Max	Min	Max	Min	Max	
74AHC1	G126		'		'					
$V_{IH}$	HIGH-level	V <sub>CC</sub> = 2.0 V	1.5	-	-	1.5	-	1.5	-	V
	input voltage	V <sub>CC</sub> = 3.0 V	2.1	-	-	2.1	-	2.1	-	V
		V <sub>CC</sub> = 5.5 V	3.85	-	-	3.85	-	3.85	-	V
$V_{IL}$	LOW-level	V <sub>CC</sub> = 2.0 V	-	-	0.5	-	0.5	-	0.5	V
	input voltage	V <sub>CC</sub> = 3.0 V	-	-	0.9	-	0.9	-	0.9	V
		V <sub>CC</sub> = 5.5 V	-	-	1.65	-	1.65	-	1.65	V
V <sub>OH</sub>	HIGH-level	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>								
	output voltage	$I_{O}$ = -50 $\mu$ A; $V_{CC}$ = 2.0 $V$	1.9	2.0	-	1.9	-	1.9	-	V
		I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 3.0 V	2.9	3.0	-	2.9	-	2.9	-	V
		I <sub>O</sub> = -50 μA; V <sub>CC</sub> = 4.5 V	4.4	4.5	-	4.4	-	4.4	-	V
		$I_{O}$ = -4.0 mA; $V_{CC}$ = 3.0 V	2.58	-	-	2.48	-	2.40	-	V
		$I_{O}$ = -8.0 mA; $V_{CC}$ = 4.5 V	3.94	-	-	3.8	-	3.70	-	V
$V_{OL}$	LOW-level	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>								
	output voltage	$I_{O} = 50 \mu A; V_{CC} = 2.0 V$	-	0	0.1	-	0.1	-	0.1	V
		$I_O = 50 \mu A; V_{CC} = 3.0 V$	-	0	0.1	-	0.1	-	0.1	V
		$I_O = 50 \mu A; V_{CC} = 4.5 V$	-	0	0.1	-	0.1	-	0.1	V
		$I_O = 4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.36	-	0.44	-	0.55	V
		$I_O = 8.0 \text{ mA}; V_{CC} = 4.5 \text{ V}$	-	-	0.36	-	0.44	-	0.55	V
I <sub>OZ</sub>	OFF-state output current	$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = V_{CC}$ or GND; $V_{CC} = 5.5 \text{ V}$	-	-	±0.25	-	±2.5	-	±10	μA
l <sub>l</sub>	input leakage current	V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 0 V to 5.5 V	-	-	0.1	-	1.0	-	2.0	μΑ

Symbol	Parameter	Conditions		25 °C		-40 °C 1	to +85 °C	-40 °C t	o +125 °C	Unit
			Min	Тур	Max	Min	Max	Min	Max	
I <sub>CC</sub>	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5 \text{ V}$	-	-	2.0	-	20	-	40	μΑ
Cı	input capacitance		-	3	10	-	10	-	10	pF
74AHCT	1G126				_					
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	2.0	-	-	2.0	-	2.0	-	V
V <sub>IL</sub>	LOW-level input voltage	V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.8	-	0.8	-	0.8	V
V <sub>OH</sub>	HIGH-level	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5 \text{ V}$								
	output voltage	I <sub>O</sub> = -50 μA	4.4	4.5	-	4.4	-	4.4	-	V
		I <sub>O</sub> = -8.0 mA	3.94	-	-	3.8	-	3.70	-	V
$V_{OL}$	LOW-level	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5 V$								
	output voltage	I <sub>O</sub> = 50 μA	-	0	0.1	-	0.1	-	0.1	V
		I <sub>O</sub> = 8.0 mA	-	-	0.36	-	0.44	-	0.55	V
l <sub>OZ</sub>	OFF-state output current	$V_I = V_{IH}$ or $V_{IL}$ ; $V_O = V_{CC}$ or GND; $V_{CC} = 5.5 \text{ V}$	-	-	±0.25	-	±2.5	-	±10	μA
I <sub>I</sub>	input leakage current	V <sub>I</sub> = 5.5 V or GND; V <sub>CC</sub> = 0 V to 5.5 V	-	-	0.1	-	1.0	-	2.0	μA
I <sub>CC</sub>	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5 \text{ V}$	-	-	2.0	-	20	-	40	μA
ΔI <sub>CC</sub>	additional supply current	per input pin; $V_I = V_{CC} - 2.1 \text{ V};$ other inputs at $V_{CC}$ or GND; $I_O = 0 \text{ A}; V_{CC} = 4.5 \text{ V} \text{ to } 5.5 \text{ V}$	-	-	1.35	-	1.5	-	1.5	mA
Cı	input capacitance		-	3	10	-	10	-	10	pF

# 11. Dynamic characteristics

#### **Table 8. Dynamic characteristics**

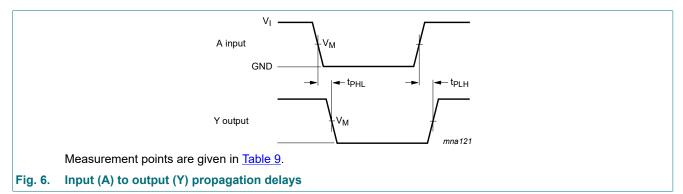
GND = 0 V; For test circuit see Fig. 8.

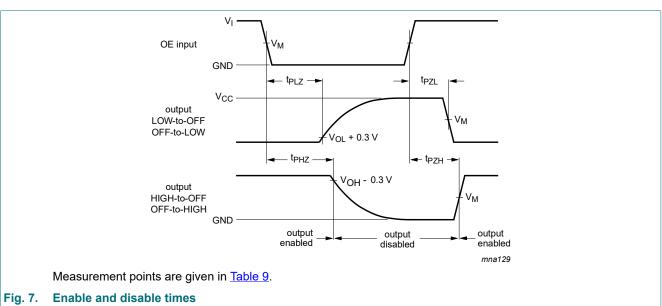
Symbol	Parameter	Conditions			25 °C		-40 °C	to +85 °C	-40 °C to +125 °C		Unit
				Min	Тур	Max	Min	Max	Min	Max	
74AHC1	G126						1			ı	
t <sub>pd</sub>	propagation	A to Y; see Fig. 6	[1]								
	delay	V <sub>CC</sub> = 3.0 V to 3.6 V	[2]								
		C <sub>L</sub> = 15 pF		-	4.4	8.0	1.0	9.5	1.0	10.0	ns
		C <sub>L</sub> = 50 pF		-	6.3	11.5	1.0	13.0	1.0	14.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	[3]								
		C <sub>L</sub> = 15 pF		-	3.4	5.5	1.0	6.5	1.0	7.0	ns
		C <sub>L</sub> = 50 pF		-	4.7	7.5	1.0	8.5	1.0	9.5	ns
t <sub>en</sub>	enable time	OE to Y; see Fig. 7	[1]								
		V <sub>CC</sub> = 3.0 V to 3.6 V	[2]								
		C <sub>L</sub> = 15 pF		-	4.9	8.0	1.0	9.5	1.0	10.0	ns
		C <sub>L</sub> = 50 pF		-	7.0	11.5	1.0	13.0	1.0	14.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	[3]								
		C <sub>L</sub> = 15 pF		-	3.6	5.6	1.0	6.3	1.0	7.0	ns
		C <sub>L</sub> = 50 pF		-	5.4	8.0	1.0	9.0	1.0	9.5	ns
t <sub>dis</sub>	disable time	OE to Y; see Fig. 7	[1]								
		V <sub>CC</sub> = 3.0 V to 3.6 V	[2]								
		C <sub>L</sub> = 15 pF		-	6.3	9.7	1.0	11.5	1.0	12.5	ns
		C <sub>L</sub> = 50 pF		-	9.0	13.2	1.0	15.0	1.0	16.5	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	[3]								
		C <sub>L</sub> = 15 pF		-	4.3	6.8	1.0	8.0	1.0	8.5	ns
		C <sub>L</sub> = 50 pF		-	6.1	8.8	1.0	10.0	1.0	11.0	ns
C <sub>PD</sub>	power dissipation capacitance	per buffer; $C_L = 50 \text{ pF}$ ; f = 1  MHz; $V_I = \text{GND to } V_{CC}$	[4]	-	9	-	-	-	-	-	pF

Symbol	Parameter	Conditions			25 °C		-40 °C	to +85 °C	-40 °C to +125 °C		Unit
				Min	Тур	Max	Min	Max	Min	Max	
74AHCT	1G126										<u>'</u>
t <sub>pd</sub>	propagation	A to Y; see Fig. 6	[1]								
	delay	V <sub>CC</sub> = 4.5 V to 5.5 V	[3]								
		C <sub>L</sub> = 15 pF		-	3.4	5.5	1.0	6.5	1.0	7.0	ns
		C <sub>L</sub> = 50 pF		-	4.7	7.5	1.0	8.5	1.0	9.5	ns
t <sub>en</sub> en	enable time	OE to Y; see Fig. 7	[1]								
		V <sub>CC</sub> = 4.5 V to 5.5 V	[3]								
		C <sub>L</sub> = 15 pF		-	3.4	5.6	1.0	6.3	1.0	6.5	ns
		C <sub>L</sub> = 50 pF		-	4.8	8.0	1.0	9.0	1.0	9.0	ns
t <sub>dis</sub>	disable time	OE to Y; see Fig. 7	[1]								
		V <sub>CC</sub> = 4.5 V to 5.5 V	[3]								
		C <sub>L</sub> = 15 pF		-	4.0	6.8	1.0	8.0	1.0	8.5	ns
		C <sub>L</sub> = 50 pF		-	5.7	8.8	1.0	10.0	1.0	11.5	ns
C <sub>PD</sub>	power dissipation capacitance	per buffer; $C_L = 50 \text{ pF}$ ; f = 1  MHz; $V_I = \text{GND to } V_{CC}$	[4]	-	11	-	-	-	-	-	pF

- [1]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ .
  - $t_{\text{en}}$  is the same as  $t_{\text{PZL}}$  and  $t_{\text{PZH}}.$
- $t_{dis}$  is the same as  $t_{PLZ}$  and  $t_{PHZ}$ . Typical values are measured at  $V_{CC}$  = 3.3 V.
- [3] Typical values are measured at  $V_{CC}$  = 5.0 V. [4]  $C_{PD}$  is used to determine the dynamic power dissipation  $P_D$  ( $\mu$ W).
  - $P_D = C_{PD} \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o)$  where:
  - f<sub>i</sub> = input frequency in MHz;
  - f<sub>o</sub> = output frequency in MHz;
  - C<sub>L</sub> = output load capacitance in pF;
  - V<sub>CC</sub> = supply voltage in Volts.

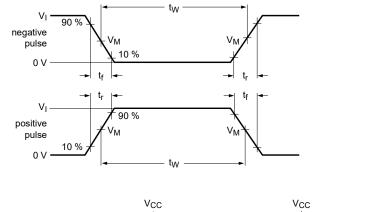
### 11.1. Waveforms and test circuit

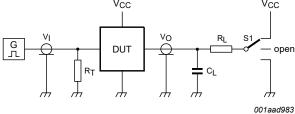




**Table 9. Measurement points** 

Туре	Input	Output	
	V <sub>M</sub>	V <sub>I</sub>	V <sub>M</sub>
74AHC1G126	0.5 × V <sub>CC</sub>	GND to V <sub>CC</sub>	0.5 × V <sub>CC</sub>
74AHCT1G126	1.5 V	GND to 3.0 V	0.5 × V <sub>CC</sub>





Test data is given in Table 10.

Definitions test circuit:

 $R_T$  = Termination resistance should be equal to output impedance  $Z_0$  of the pulse generator.

 $C_L$  = Load capacitance including jig and probe capacitance.

R<sub>L</sub> = Load resistance.

S1 = Test selection switch.

### Fig. 8. Test circuit for measuring switching times

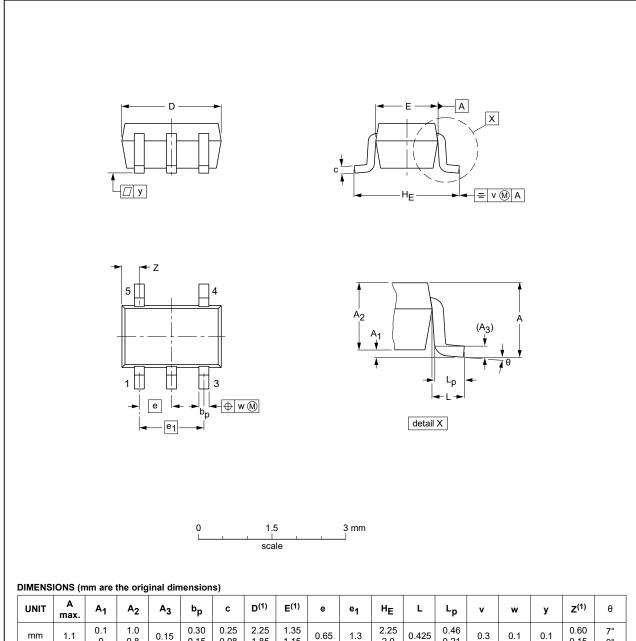
Table 10. Test data

Туре	Input		Load		S1 position		
	V <sub>I</sub>	t <sub>r</sub> , t <sub>f</sub>	CL	$R_L$	t <sub>PHL</sub> , t <sub>PLH</sub>	t <sub>PZH</sub> , t <sub>PHZ</sub>	$t_{PZL}, t_{PLZ}$
74AHC1G126	V <sub>CC</sub>	≤ 3 ns	15 pF, 50 pF	1 kΩ	open	GND	V <sub>CC</sub>
74AHCT1G126	3 V	≤ 3 ns	15 pF, 50 pF	1 kΩ	open	GND	V <sub>CC</sub>

# 12. Package outline

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

SOT353-1



UI	NIT	A max.	A <sub>1</sub>	A <sub>2</sub>	А3	bp	С	D <sup>(1)</sup>	E <sup>(1)</sup>	е	e <sub>1</sub>	HE	L	Lp	v	w	у	Z <sup>(1)</sup>	θ
n	nm	1.1	0.1 0	1.0 0.8	0.15	0.30 0.15	0.25 0.08	2.25 1.85	1.35 1.15	0.65	1.3	2.25 2.0	0.425	0.46 0.21	0.3	0.1	0.1	0.60 0.15	7° 0°

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE	
SOT353-1		MO-203	SC-88A			<del>-00-09-01</del> 03-02-19	

Fig. 9. Package outline SOT353-1 (TSSOP5)

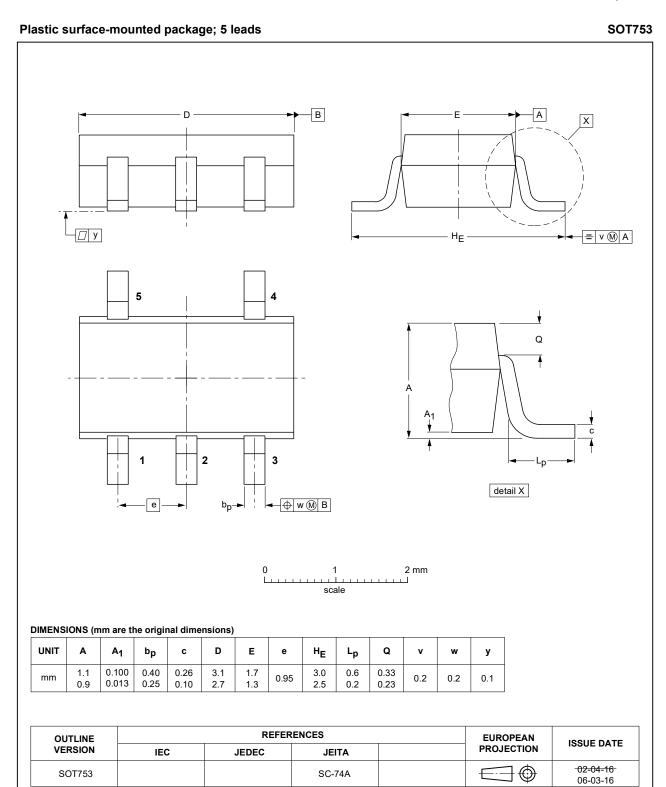


Fig. 10. Package outline SOT753 (SC-74A)

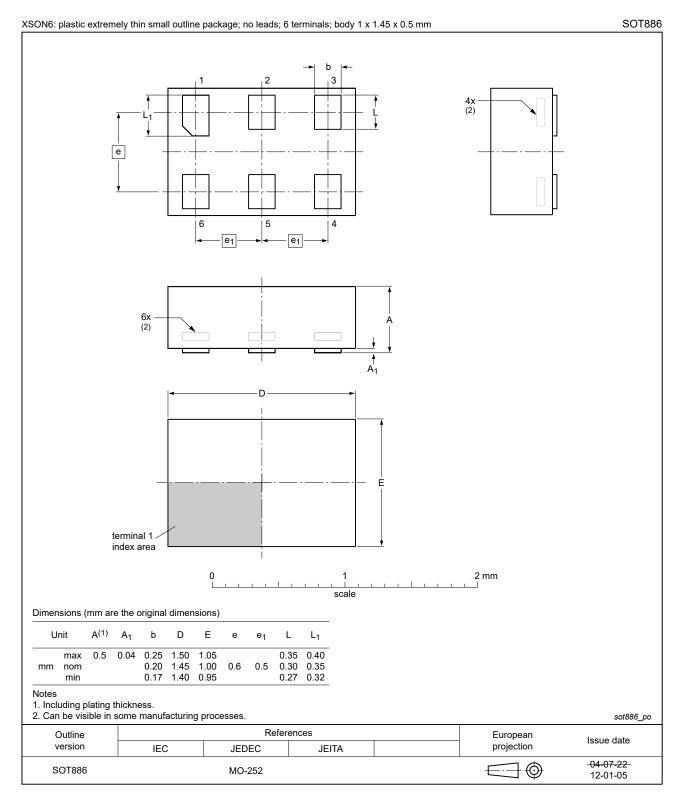


Fig. 11. Package outline SOT886 (XSON6)

# 13. Abbreviations

#### **Table 11. Abbreviations**

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

# 14. Revision history

### **Table 12. Revision history**

Table 12. Revision history	I		<b>a</b>	
Document ID	Release date	Data sheet status	Change notice	Supersedes
74AHC_AHCT1G126 v.9	20210518	Product data sheet	-	74AHC_AHCT1G126 v.8
Modifications:	guidelines o Legal texts I Type numbe Section 1 ar	nave been adapted to the r	new company nan 4AHCT1G126GF	ne where appropriate. (SOT891 / XSON6) removed.
74AHC_AHCT1G126 v.8	20120823	Product data sheet	-	74AHC_AHCT1G126 v.7
Modifications:	Package ou	tline drawing of SOT886 (	ig. 11) modified.	
74AHC_AHCT1G126 v.7	20090617	Product data sheet	-	74AHC_AHCT1G126 v.6
74AHC_AHCT1G126 v.6	20070525	Product data sheet	-	74AHC_AHCT1G126 v.5
74AHC_AHCT1G126 v.5	20070514	Product data sheet	-	74AHC_AHCT1G126 v.4
74AHC_AHCT1G126 v.4	20020606	Product specification	-	74AHC_AHCT1G126 v.3
74AHC_AHCT1G126 v.3	20020215	Product specification	-	74AHC_AHCT1G126 v.2
74AHC_AHCT1G126 v.2	20010406	Product specification	-	74AHC1G_AHCT1G126 v.1
74AHC1G_AHCT1G126 v.1	19990920	Product 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.
Product [short] data sheet	Production	This document contains the product specification.

- Please consult the most recently issued document before initiating or completing a design.
- [2] The term 'short data sheet' is explained in section "Definitions".
- 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 <a href="https://www.nexperia.com">https://www.nexperia.com</a>.

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