# 74AHC2G126; 74AHCT2G126

Dual buffer/line driver; 3-state

Rev. 7 — 6 May 2013

**Product data sheet** 

### 1. General description

The 74AHC2G126 and 74AHCT2G126 are high-speed Si-gate CMOS devices. They provide a dual non-inverting buffer/line driver with 3-state output. The 3-state output is controlled by the output enable input (nOE). A LOW at nOE causes the output to assume a high-impedance OFF-state.

The AHC device has CMOS input switching levels and supply voltage range 2 V to 5.5 V.

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

### 2. Features and benefits

- Symmetrical output impedance
- High noise immunity
- Low power dissipation
- Balanced propagation delays
- Multiple package options
- ESD protection:
  - ◆ HBM JESD22-A114E: exceeds 2000 V
  - ♦ MM JESD22-A115-A: exceeds 200 V
  - ◆ CDM JESD22-C101C: exceeds 1000 V
- Specified from -40 °C to +125 °C

## 3. Ordering information

Table 1. Ordering information

Type number	Package										
	Temperature range Name		Description	Version							
74AHC2G126DP	–40 °C to +125 °C	TSSOP8	plastic thin shrink small outline package; 8 leads;	SOT505-2							
74AHCT2G126DP			body width 3 mm; lead length 0.5 mm								
74AHC2G126DC	–40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package;	SOT765-1							
74AHCT2G126DC			8 leads; body width 2.3 mm								
74AHC2G126GD	–40 °C to +125 °C	XSON8	plastic extremely thin small outline package; no	SOT996-2							
74AHCT2G126GD	_		leads; 8 terminals; body 3 × 2 × 0.5 mm								



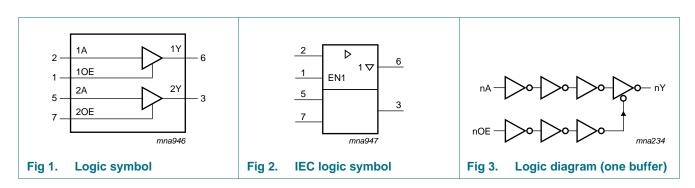
### 4. Marking

Table 2. Marking codes

Type number	Marking[1]
74AHC2G126DP	A26
74AHCT2G126DP	C26
74AHC2G126DC	A26
74AHCT2G126DC	C26
74AHC2G126GD	A26
74AHCT2G126GD	C26

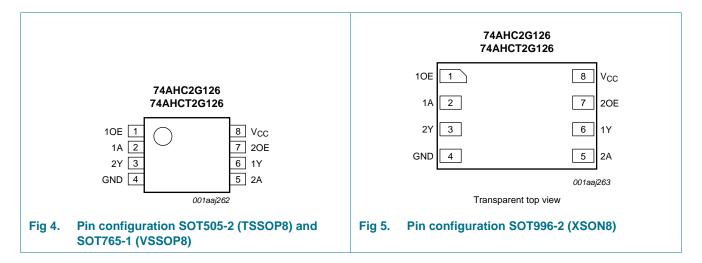
<sup>[1]</sup> The pin 1 indicator is located on the lower left corner of the device, below the marking code.

### 5. Functional diagram



## 6. Pinning information

### 6.1 Pinning



### 6.2 Pin description

Table 3. Pin description

Symbol	Pin	Description
10E, 20E	1, 7	output enable input (active HIGH)
1A, 2A	2, 5	data input
GND	4	ground (0 V)
1Y, 2Y	6, 3	data output
V <sub>CC</sub>	8	supply voltage

## 7. Functional description

Table 4. Function table[1]

Control	Input	Output
nOE	nA	nY
Н	L	L
Н	Н	Н
L	X	Z

<sup>[1]</sup> H = HIGH voltage level; L = LOW voltage level; X = don't care; Z = high-impedance OFF-state.

## 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
VI	input voltage		-0.5	+7.0	V
I <sub>IK</sub>	input clamping current	$V_1 < -0.5 V$	<u>[1]</u> –20	-	mA
I <sub>OK</sub>	output clamping current	$V_O$ < $-0.5$ V or $V_O$ > $V_{CC}$ + $0.5$ V	<u>[1]</u> _	±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		<b>-75</b>	-	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.

<sup>[2]</sup> For TSSOP8 package: above 55 °C the value of P<sub>tot</sub> derates linearly with 2.5 mW/K. For VSSOP8 package: above 110 °C the value of P<sub>tot</sub> derates linearly with 8 mW/K. For XSON8 package: above 118 °C the value of P<sub>tot</sub> derates linearly with 7.8 mW/K.

## 9. Recommended operating conditions

Table 6. Recommended operating conditions

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

Symbol	Parameter	Conditions	74AHC2G126			74AHCT2G126			Unit
			Min	Тур	Max	Min	Тур	Max	
$V_{CC}$	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	-	$V_{CC}$	0	-	$V_{CC}$	V
T <sub>amb</sub>	ambient temperature		-40	+25	+125	-40	+25	+125	°C
$\Delta t/\Delta V$	input transition rise	$V_{CC}$ = 3.3 V $\pm$ 0.3 V	-	-	100	-	-	-	ns/V
;	and fall rate	$V_{CC}$ = 5.0 V $\pm$ 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	to +85 °C	-40 °C to +125 °C		Unit
			Min	Тур	Max	Min	Max	Min	Max	Ī
74AHC2	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
$V_{OH}$	HIGH-level	$V_I = V_{IH}$ or $V_{IL}$								
	output voltage	$I_{O} = -50 \mu A; V_{CC} = 2.0 V$	1.9	2.0	-	1.9	-	1.9	-	V
		$I_O = -50 \mu A; V_{CC} = 3.0 V$	2.9	3.0	-	2.9	-	2.9	-	V
		$I_O = -50 \mu A; V_{CC} = 4.5 V$	4.4	4.5	-	4.4	-	4.4	-	V
		$I_{O} = -4.0 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.58	-	-	2.48	-	2.40	-	V
		$I_{O} = -8.0 \text{ mA}; V_{CC} = 4.5 \text{ V}$	3.94	-	-	3.8	-	3.70	-	V
$V_{OL}$	LOW-level	$V_I = V_{IH}$ or $V_{IL}$								
	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
l <sub>OZ</sub>	OFF-state output current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5 \text{ V}$	-	-	0.25	-	2.5	-	10	μΑ
I <sub>I</sub>	input leakage current	$V_I = 5.5 \text{ V or GND};$ $V_{CC} = 0 \text{ V to } 5.5 \text{ V}$	-	-	0.1	-	1.0	-	2.0	μΑ
I <sub>CC</sub>	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5 \text{ V}$	-	-	1.0	-	10	-	40	μΑ

**Table 7. Static characteristics** ...continued Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions		25 °C		-40 °C	to +85 °C	-40 °C 1	to +125 °C	Unit
			Min	Тур	Max	Min	Max	Min	Max	
Cı	input capacitance		-	1.5	10	-	10	-	10	pF
74AHCT	2G126									
$V_{IH}$	HIGH-level input voltage	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	2.0	-	-	2.0	-	2.0	-	V
$V_{IL}$	LOW-level input voltage	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	-	-	8.0	-	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	$I_{O} = -50 \mu A$	4.4	4.5	-	4.4	-	4.4	-	V
		$I_{O} = -8.0 \text{ mA}$	3.94	-	-	3.8	-	3.70	-	V
V <sub>OL</sub>	LOW-level	$V_I = V_{IH}$ or $V_{IL}$ ; $V_{CC} = 4.5 \text{ V}$								
	output voltage	I <sub>O</sub> = 50 μA	-	0	0.1	-	0.1	-	0.1	V
		$I_0 = 8.0 \text{ mA}$	-	-	0.36	-	0.44	-	0.55	V
I <sub>OZ</sub>	OFF-state output current	$V_I = V_{CC}$ or GND; $V_{CC} = 5.5 \text{ V}$	-	-	0.25	-	2.5	-	10	μΑ
I <sub>I</sub>	input leakage current	$V_I = 5.5 \text{ V or GND};$ $V_{CC} = 0 \text{ V to } 5.5 \text{ V}$	-	-	0.1	-	1.0	-	2.0	μΑ
I <sub>CC</sub>	supply current	$V_I = V_{CC}$ or GND; $I_O = 0$ A; $V_{CC} = 5.5 \text{ V}$	-	-	1.0	-	10	-	40	μΑ
$\Delta I_{CC}$	additional supply current	per input pin; $V_I = 3.4 \text{ V}$ ; other inputs at $V_{CC}$ or GND; $I_O = 0 \text{ A}$ ; $V_{CC} = 5.5 \text{ V}$	-	-	1.35	-	1.5	-	1.5	mA
Cı	input capacitance		-	1.5	10	-	10	-	10	pF

## 11. Dynamic characteristics

Table 8. Dynamic characteristics GND = 0 V; for test circuit see <u>Figure 8</u>.

Symbol	Parameter	Conditions			25 °C			-40 °C to +85 °C		-40 °C to +125 °C	
				Min	Тур	Max	Min	Max	Min	Max	
74AHC2G126											•
Pu	propagation delay	nA to nY; see Figure 6	<u>[1]</u>								
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	[2]								
		$C_L = 15 pF$		-	4.7	8.0	1.0	9.5	1.0	11.5	ns
		$C_L = 50 pF$		-	6.6	11.5	1.0	13.0	1.0	14.5	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	[3]								
		$C_L = 15 pF$		-	3.4	5.5	1.0	6.5	1.0	7.0	ns
		$C_L = 50 pF$		-	4.8	7.5	1.0	8.5	1.0	9.5	ns

**Table 8. Dynamic characteristics** ...continued GND = 0 V; for test circuit see <u>Figure 8</u>.

Symbol	Parameter	Conditions			25 °C		-40 °C	to +85 °C	-40 °C t	o +125 °C	Unit
				Min	Тур	Max	Min	Max	Min	Max	
t <sub>en</sub>	enable time	nOE to nY; see Figure 7	<u>[1]</u>			•		'	'	'	
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	[2]								
		C <sub>L</sub> = 15 pF		-	5.0	8.0	1.0	9.5	1.0	11.5	ns
		$C_L = 50 pF$		-	6.9	11.5	1.0	13.0	1.0	14.5	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	[3]								
		C <sub>L</sub> = 15 pF		-	3.6	5.1	1.0	6.0	1.0	6.5	ns
		$C_L = 50 pF$		-	4.9	7.5	1.0	9.0	1.0	9.5	ns
t <sub>dis</sub>	disable time	nOE to nY; see Figure 7	<u>[1]</u>								
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	[2]								
	C <sub>L</sub> = 15 pF		-	6.0	9.7	1.0	11.5	1.0	12.5	ns	
		$C_L = 50 pF$		-	8.3	13.2	1.0	15.0	1.0	16.5	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	[3]								
		C <sub>L</sub> = 15 pF		-	4.1	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	11.0	ns
C <sub>PD</sub>	power dissipation capacitance	per buffer; $C_L = 50 \text{ pF}$ ; $f_i = 1 \text{ MHz}$ ; $V_I = \text{GND to } V_{CC}$	[4]	-	10	-	-	-	-	-	pF
74AHCT	2G126										
t <sub>pd</sub>	propagation	nA to nY; see Figure 6	<u>[1]</u>								
	delay	$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	[3]								
		C <sub>L</sub> = 15 pF		-	3.4	5.5	1.0	6.5	1.0	7.0	ns
		$C_L = 50 pF$		-	4.8	7.5	1.0	8.5	1.0	9.5	ns
t <sub>en</sub>	enable time	nOE to nY; see Figure 7	<u>[1]</u>								
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	[3]								
		C <sub>L</sub> = 15 pF		-	3.9	5.1	1.0	6.0	1.0	6.5	ns
		C <sub>L</sub> = 50 pF		-	5.1	7.5	1.0	9.0	1.0	9.5	ns
t <sub>dis</sub>	disable time	nOE to nY; see Figure 7	<u>[1]</u>								
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$	[3]								
		C <sub>L</sub> = 15 pF		-	4.5	6.8	1.0	8.0	1.0	8.5	ns
					6.1	8.8					

 Table 8.
 Dynamic characteristics ...continued

GND = 0 V; for test circuit see Figure 8.

Symbol	Parameter	Conditions		25 °C		-40 °C to +85 °C		-40 °C to +125 °C		Unit	
			N	Vin	Тур	Max	Min	Max	Min	Max	
$C_{PD}$		per buffer; $C_L = 50 \text{ pF}$ ; $f_i = 1 \text{ MHz}$ ; $V_I = \text{GND to V}_{CC}$	1	-	10	-	-	-	-	-	pF

[1]  $t_{pd}$  is the same as  $t_{PLH}$  and  $t_{PHL}$ .

 $t_{\text{en}}$  is the same as  $t_{\text{PZL}}$  and  $t_{\text{PZH}}.$ 

 $t_{\text{dis}}$  is the same as  $t_{\text{PLZ}}$  and  $t_{\text{PHZ}}.$ 

- [2] Typical values are measured at  $V_{CC} = 3.3 \text{ V}$ .
- [3] Typical values are measured at  $V_{CC} = 5.0 \text{ V}$ .
- [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:

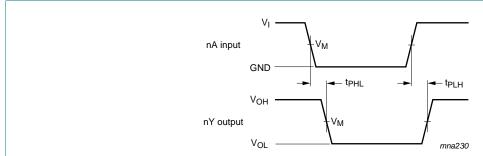
 $f_i$  = input frequency in MHz;

fo = output frequency in MHz;

C<sub>L</sub> = output load capacitance in pF;

 $V_{CC}$  = supply voltage in Volts.

### 12. Waveforms



Measurement points are given in Table 9.

Logic levels: V<sub>OL</sub> and V<sub>OH</sub> are typical output voltage levels that occur with the output load.

Fig 6. Input (nA) to output (nY) propagation delays

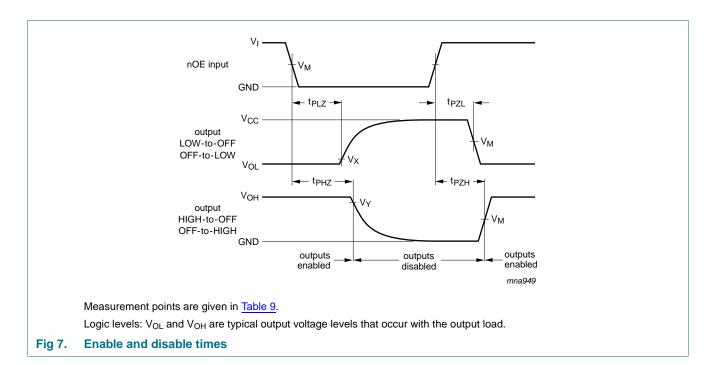
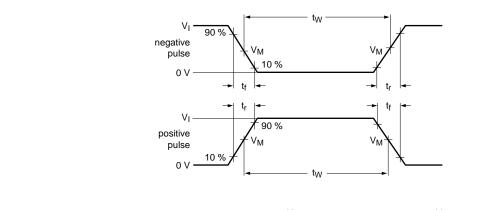
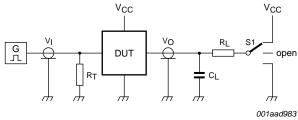


Table 9. Measurement points

Туре	Input	Output							
	V <sub>M</sub>	V <sub>M</sub>	V <sub>X</sub>	V <sub>Y</sub>					
74AHC2G126	0.5V <sub>CC</sub>	0.5V <sub>CC</sub>	V <sub>OL</sub> + 0.3 V	V <sub>OH</sub> – 0.3 V					
74AHCT2G126	1.5 V	0.5V <sub>CC</sub>	V <sub>OL</sub> + 0.3 V	V <sub>OH</sub> – 0.3 V					

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Test data is given in Table 10.

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<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			
	VI	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 <sub>PZL</sub> , t <sub>PLZ</sub>	
74AHC2G126	$V_{CC}$	$\leq$ 3 ns	15 pF, 50 pF	1 kΩ	open	GND	V <sub>CC</sub>	
74AHCT2G126	3 V	$\leq$ 3 ns	15 pF, 50 pF	1 k $\Omega$	open	GND	V <sub>CC</sub>	

## 13. Package outline

TSSOP8: plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm SOT505-2

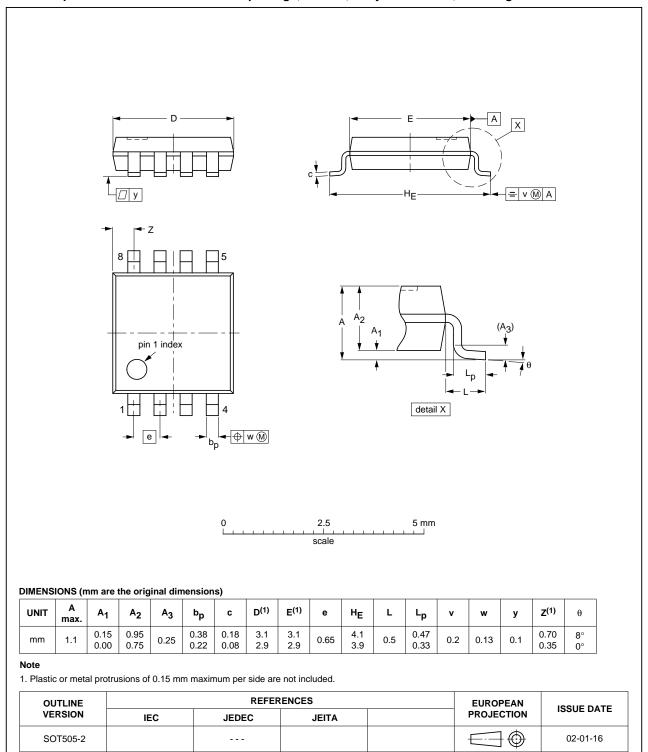


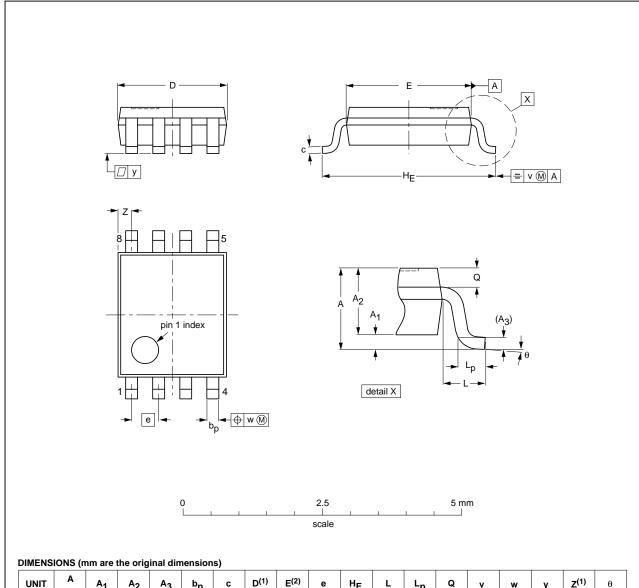
Fig 9. Package outline SOT505-2 (TSSOP8)

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### VSSOP8: plastic very thin shrink small outline package; 8 leads; body width 2.3 mm

SOT765-1



UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	А3	bp	С	D <sup>(1)</sup>	E <sup>(2)</sup>	е	HE	L	Lp	ď	٧	w	у	Z <sup>(1)</sup>	θ
mm	1	0.15 0.00	0.85 0.60	0.12	0.27 0.17	0.23 0.08	2.1 1.9	2.4 2.2	0.5	3.2 3.0	0.4	0.40 0.15	0.21 0.19	0.2	0.13	0.1	0.4 0.1	8° 0°

#### Notes

- Plastic or metal protrusions of 0.15 mm maximum per side are not included.
- 2. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE	
SOT765-1		MO-187				02-06-07	

Fig 10. Package outline SOT765-1 (VSSOP8)

74AHC\_AHCT2G126

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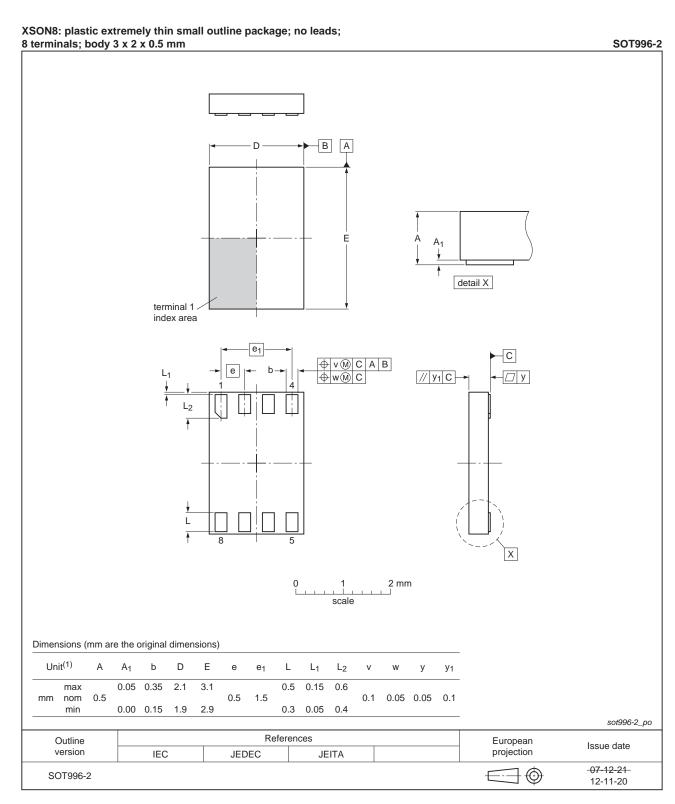


Fig 11. Package outline SOT996-2 (XSON8)

74AHC\_AHCT2G126

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## 14. 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

## 15. Revision history

### Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes
74AHC_AHCT2G126 v.7	20130506	Product data sheet	-	74AHC_AHCT2G126 v.6
Modifications:	<ul> <li>For type nui XSON8.</li> </ul>	mber 74AHC2G126GD ar	nd 74AHCT2G126GI	O XSON8U has changed to
74AHC_AHCT2G126 v.6	20111108	Product data sheet	-	74AHC_AHCT2G126 v.5
Modifications:	<ul> <li>Legal pages</li> </ul>	updated.		
74AHC_AHCT2G126 v.5	20110324	Product data sheet	-	74AHC_AHCT2G126 v.4
74AHC_AHCT2G126 v.4	20090427	Product data sheet	-	74AHC_AHCT2G126 v.3
74AHC_AHCT2G126 v.3	20090115	Product data sheet	-	74AHC_AHCT2G126 v.2
74AHC_AHCT2G126 v.2	20040921	Product data sheet	-	74AHC_AHCT2G126 v.1
74AHC_AHCT2G126 v.1	20040113	Product specification	-	-

### 16. Legal information

#### 16.1 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.

- [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.nexperia.com.

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### 17. Contact information

For more information, please visit: http://www.nexperia.com

For sales office addresses, please send an email to: salesaddresses@nexperia.com

# 74AHC2G126; 74AHCT2G126

Dual buffer/line driver; 3-state

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