74LVC1G126

Bus buffer/line driver; 3-state

Rev. 15 — 3 May 2021

Product data sheet

1. General description

The 74LVC1G126 is a single buffer/line driver with 3-state output. Inputs can be driven from either 3.3 V or 5 V devices. This feature allows the use of these devices as translators in mixed 3.3 V and 5 V environments. Schmitt-trigger action at all inputs makes the circuit tolerant of slower input rise and fall times. This device is fully specified for partial power down applications using I_{OFF} . The I_{OFF} circuitry disables the output, preventing the potentially damaging backflow current through the device when it is powered down.

2. Features and benefits

- Wide supply voltage range from 1.65 V to 5.5 V
- Overvoltage tolerant inputs to 5.5 V
- · High noise immunity
- · CMOS low power dissipation
- I_{OFF} circuitry provides partial Power-down mode operation
- ±24 mA output drive (V_{CC} = 3.0 V)
- Latch-up performance exceeds 250 mA
- · Direct interface with TTL levels
- Complies with JEDEC standard:
 - JESD8-7 (1.65 V to 1.95 V)
 - JESD8-5 (2.3 V to 2.7 V)
 - JESD8C (2.7 V to 3.6 V)
 - JESD36 (4.5 V to 5.5 V)
- · ESD protection:
 - HBM JESD22-A114F exceeds 2000 V
 - MM JESD22-A115-A exceeds 200 V
- Multiple package options
- Specified from -40 °C to +85 °C and -40 °C to +125 °C



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3. Ordering information

Table 1. Ordering information

Type number	Package							
	Temperature range	Name	Description	Version				
74LVC1G126GW	-40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1				
74LVC1G126GV	-40 °C to +125 °C	SC-74A	plastic surface-mounted package; 5 leads	SOT753				
74LVC1G126GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 × 1.45 × 0.5 mm	SOT886				
74LVC1G126GN	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 0.9 × 1.0 × 0.35 mm	SOT1115				
74LVC1G126GS	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 × 1.0 × 0.35 mm	SOT1202				
74LVC1G126GX	-40 °C to +125 °C	X2SON5	plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 × 0.8 × 0.32 mm	SOT1226-3				

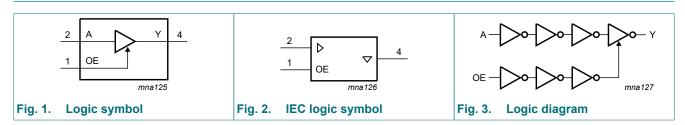
4. Marking

Table 2. Marking codes

Table 2. Marking codes						
Type number	Marking[1]					
74LVC1G126GW	VN					
74LVC1G126GV	V26					
74LVC1G126GM	VN					
74LVC1G126GN	VN					
74LVC1G126GS	VN					
74LVC1G126GX	VN					

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

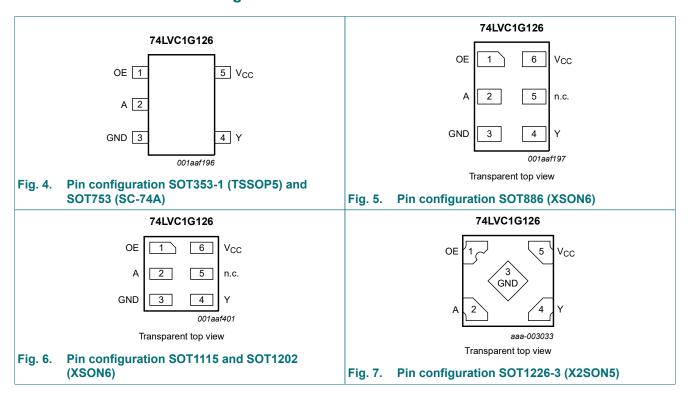
5. Functional diagram



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6. Pinning information

6.1. Pinning



6.2. Pin description

Table 3. Pin description

Symbol	Pin	Pin			
	TSSOP5, SC-74A and X2SON5	XSON6			
OE	1	1	output enable input		
A	2	2	data input		
GND	3	3	ground (0 V)		
Υ	4	4	data output		
n.c.	-	5	not connected		
V_{CC}	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 OE		Output
OE	A	Υ
Н	L	L
Н	Н	Н
L	X	Z

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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	+6.5	V
I _{IK}	input clamping current	V _I < 0 V	-50	-	mA
VI	input voltage	[1]	-0.5	+6.5	V
I _{OK}	output clamping current	$V_O > V_{CC}$ or $V_O < 0 V$	-	±50	mA
Vo	output voltage	Active mode [1]	-0.5	V _{CC} + 0.5	V
		Power-down mode; V _{CC} = 0 V [1]	-0.5	+6.5	V
Io	output current	$V_O = 0 \text{ V to } V_{CC}$	-	±50	mA
I _{CC}	supply current		-	100	mA
I _{GND}	ground current		-100	-	mA
P _{tot}	total power dissipation	$T_{amb} = -40 ^{\circ}\text{C} \text{ to } +125 ^{\circ}\text{C}$ [2]	-	250	mW
T _{stg}	storage temperature		-65	+150	°C

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

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

For SOT886 (XSON6) package: P_{tot} derates linearly with 3.3 mW/K above 74 °C.

For SOT1115 (XSON6) package: P_{tot} derates linearly with 3.2 mW/K above 71 °C.

For SOT1202 (XSON6) package: P_{tot} derates linearly with 3.3 mW/K above 74 °C.

For SOT1226-3 (X2SON5) package: Ptot derates linearly with 3.0 mW/K above 67 °C.

9. Recommended operating conditions

Table 6. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V _{CC}	supply voltage		1.65	-	5.5	V
VI	input voltage		0	-	5.5	V
Vo	output voltage	Active mode	0	-	V _{CC}	V
		Power-down mode; V _{CC} = 0 V	0	-	5.5	V
T _{amb}	ambient temperature		-40	-	+125	°C
Δt/ΔV	input transition rise and fall rate	V _{CC} = 1.65 V to 2.7 V	-	-	20	ns/V
		V _{CC} = 2.7 V to 5.5 V	-	-	10	ns/V

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

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10. Static characteristics

Table 7. Static characteristics

At recommended operating conditions; voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
T _{amb} = -	40 °C to +85 °C				·	
V _{IH}	HIGH-level input voltage	V _{CC} = 1.65 V to 1.95 V	0.65 × V _{CC}	-	-	V
		V _{CC} = 2.3 V to 2.7 V	1.7	-	-	V
		V _{CC} = 2.7 V to 3.6 V	2.0	-	-	V
		V _{CC} = 4.5 V to 5.5 V	0.7 × V _{CC}	-	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 1.65 V to 1.95 V	-	-	0.35 × V _{CC}	V
		V _{CC} = 2.3 V to 2.7 V	-	-	0.7	V
		V _{CC} = 2.7 V to 3.6 V	-	-	0.8	V
		V _{CC} = 4.5 V to 5.5 V	-	-	0.3 × V _{CC}	V
V _{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		V_{CC} = 1.65 V to 5.5 V; I_{O} = 100 μ A	-	-	0.1	V
		V _{CC} = 1.65 V; I _O = 4 mA	-	-	0.45	V
		V _{CC} = 2.3 V; I _O = 8 mA	-	-	0.3	V
		V _{CC} = 2.7 V; I _O = 12 mA	-	-	0.4	V
		V _{CC} = 3.0 V; I _O = 24 mA	-	-	0.55	V
		V _{CC} = 4.5 V; I _O = 32 mA	-	-	0.55	V
V _{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		V_{CC} = 1.65 V to 5.5 V; I_{O} = -100 μ A	V _{CC} - 0.1	-	-	V
		V _{CC} = 1.65 V; I _O = -4 mA	1.2	-	-	V
		V _{CC} = 2.3 V; I _O = -8 mA	1.9	-	-	V
		V _{CC} = 2.7 V; I _O = -12 mA	2.2	-	-	V
		V _{CC} = 3.0 V; I _O = -24 mA	2.3	-	-	V
		V _{CC} = 4.5 V; I _O = -32 mA	3.8	-	-	V
l _l	input leakage current	V _{CC} = 0 V to 5.5 V; V _I = 5.5 V or GND	-	±0.1	±1	μΑ
l _{OZ}	OFF-state output current	$V_{CC} = 3.6 \text{ V}; V_I = V_{IH} \text{ or } V_{IL};$ $V_O = 5.5 \text{ V or GND}$	-	±0.1	±2	μΑ
I _{OFF}	power-off leakage current	V _{CC} = 0 V; V _I or V _O = 5.5 V	-	±0.1	±2	μΑ
I _{CC}	supply current	V _I = 5.5 V or GND; V _{CC} = 1.65 V to 5.5 V; I _O = 0 A	-	0.1	4	μΑ
ΔI _{CC}	additional supply current	per pin; V _{CC} = 2.3 V to 5.5 V; V _I = V _{CC} - 0.6 V; I _O = 0 A	-	5	500	μΑ
Cı	input capacitance		-	5	-	pF

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Symbol	Parameter	Conditions	Min	Typ [1]	Max	Unit
T _{amb} = -4	40 °C to +125 °C				-	
V _{IH}	HIGH-level input voltage	V _{CC} = 1.65 V to 1.95 V	0.65 × V _{CC}	-	-	V
		V _{CC} = 2.3 V to 2.7 V	1.7	-	-	V
		V _{CC} = 2.7 V to 3.6 V	2.0	-	-	V
		V _{CC} = 4.5 V to 5.5 V	0.7 × V _{CC}	-	-	V
V _{IL}	LOW-level input voltage	V _{CC} = 1.65 V to 1.95 V	-	-	0.35 × V _{CC}	V
		V _{CC} = 2.3 V to 2.7 V	-	-	0.7	V
		V _{CC} = 2.7 V to 3.6 V	-	-	0.8	V
		V _{CC} = 4.5 V to 5.5 V	-	-	0.3 × V _{CC}	V
V _{OL}	LOW-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		V _{CC} = 1.65 V to 5.5 V; I _O = 100 μA	-	-	0.1	V
		V _{CC} = 1.65 V; I _O = 4 mA	-	-	0.70	V
		V _{CC} = 2.3 V; I _O = 8 mA	-	-	0.45	V
		V _{CC} = 2.7 V; I _O = 12 mA	-	-	0.60	V
		V _{CC} = 3.0 V; I _O = 24 mA	-	-	0.80	V
		V _{CC} = 4.5 V; I _O = 32 mA	-	-	0.80	V
V _{OH}	HIGH-level output voltage	$V_I = V_{IH}$ or V_{IL}				
		V_{CC} = 1.65 V to 5.5 V; I_{O} = -100 μ A	V _{CC} - 0.1	-	-	V
		V _{CC} = 1.65 V; I _O = -4 mA	0.95	-	-	V
		V _{CC} = 2.3 V; I _O = -8 mA	1.7	-	-	V
		V _{CC} = 2.7 V; I _O = -12 mA	1.9	-	-	V
		V _{CC} = 3.0 V; I _O = -24 mA	2.0	-	-	V
		V _{CC} = 4.5 V; I _O = -32 mA	3.4	-	-	V
l _l	input leakage current	V _{CC} = 0 V to 5.5 V; V _I = 5.5 V or GND	-	-	±1	μΑ
l _{OZ}	OFF-state output current	$V_{CC} = 3.6 \text{ V}; V_I = V_{IH} \text{ or } V_{IL};$ $V_O = 5.5 \text{ V or GND}$	-	-	±2	μA
I _{OFF}	power-off leakage current	V _{CC} = 0 V; V _I or V _O = 5.5 V	-	-	±2	μA
I _{CC}	supply current	V _I = 5.5 V or GND; V _{CC} = 1.65 V to 5.5 V; I _O = 0 A	-	-	4	μΑ
ΔI _{CC}	additional supply current	per pin; V _{CC} = 2.3 V to 5.5 V; V _I = V _{CC} - 0.6 V; I _O = 0 A	-	-	500	μΑ

^[1] All typical values are measured at V_{CC} = 3.3 V and T_{amb} = 25 °C.

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11. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V). For test circuit see Fig. 10.

Symbol	Parameter	Conditions		-40 °C to +85 °C			-40 °C to +125 °C		
				Typ [1]	Max	Min	Max		
t _{pd}	propagation delay	A to Y; see Fig. 8							
		V _{CC} = 1.65 V to 1.95 V	1.0	3	8.0	1.0	10.5	ns	
		V _{CC} = 2.3 V to 2.7 V	0.5	2.1	5.5	0.5	7	ns	
		V _{CC} = 2.7 V	0.5	2.3	5.5	0.5	7	ns	
		V _{CC} = 3.0 V to 3.6 V	0.5	2.0	4.5	0.5	6	ns	
		V _{CC} = 4.5 V to 5.5 V	0.5	1.7	4.0	0.5	5.5	ns	
t _{en}	enable time	OE to Y; see Fig. 9							
		V _{CC} = 1.65 V to 1.95 V	1.0	3.2	9.4	1.0	12	ns	
		V _{CC} = 2.3 V to 2.7 V	0.5	2.2	6.6	0.5	8.5	ns	
		V _{CC} = 2.7 V	0.5	2.4	6.6	0.5	8.5	ns	
		V _{CC} = 3.0 V to 3.6 V	0.5	2.1	5.3	0.5	7	ns	
		V _{CC} = 4.5 V to 5.5 V	0.5	1.6	5.0	0.5	6.5	ns	
t _{dis}	disable time	OE to Y; see Fig. 9							
		V _{CC} = 1.65 V to 1.95 V	1.0	4.3	9.2	1.0	12	ns	
		V _{CC} = 2.3 V to 2.7 V	0.5	2.7	5.5	0.5	7	ns	
		V _{CC} = 2.7 V	0.5	3.4	5.5	0.5	7	ns	
		V _{CC} = 3.0 V to 3.6 V	0.5	3.0	5.5	0.5	7	ns	
		V _{CC} = 4.5 V to 5.5 V	0.5	2.2	4.2	0.5	5.5	ns	
C _{PD}	power dissipation	per buffer; V_I = GND to V_{CC} [5	1						
	capacitance	output enabled	-	25	-	-	-	pF	
		output disabled	-	6	-	-	-	pF	

^[1] Typical values are measured at T_{amb} = 25 °C and V_{CC} = 1.8 V, 2.5 V, 2.7 V, 3.3 V and 5.0 V respectively.

 $P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \sum (C_L \times V_{CC}^2 \times f_o)$ 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 V;

N = number of inputs switching;

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

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^[2] t_{pd} is the same as t_{PLH} and t_{PHL}

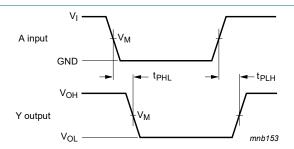
^[3] t_{en} is the same as t_{PZH} and t_{PZL}

^[4] t_{dis} is the same as t_{PLZ} and t_{PHZ}

^[5] C_{PD} is used to determine the dynamic power dissipation (P_D in μ W).

Bus buffer/line driver; 3-state

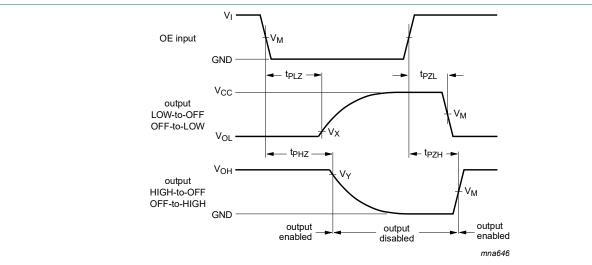
11.1. Waveforms and test circuit



Measurement points are given in Table 9.

V_{OL} and V_{OH} are typical output voltage levels that occur with the output load.

Fig. 8. Input A to output Y propagation delay times



Measurement points are given in <u>Table 9</u>.

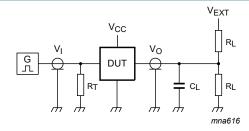
 $\ensuremath{V_{\text{OL}}}$ and $\ensuremath{V_{\text{OH}}}$ are typical output voltage levels that occur with the output load.

Fig. 9. 3-state enable and disable times

Table 9. Measurement points

Supply voltage	Input	Output	Output				
V _{CC}	V _M	V _M	V _X	V _Y			
1.65 V to 1.95 V	0.5V _{CC}	0.5V _{CC}	V _{OL} + 0.15 V	V _{OH} - 0.15 V			
2.3 V to 2.7 V	0.5V _{CC}	0.5V _{CC}	V _{OL} + 0.15 V	V _{OH} - 0.15 V			
2.7 V	1.5 V	1.5 V	V _{OL} + 0.3 V	V _{OH} - 0.3 V			
3.0 V to 3.6 V	1.5 V	1.5 V	V _{OL} + 0.3 V	V _{OH} - 0.3 V			
4.5 V to 5.5 V	0.5V _{CC}	0.5V _{CC}	V _{OL} + 0.3 V	V _{OH} - 0.3 V			

Bus buffer/line driver; 3-state



Test data is given in Table 10.

Definitions for test circuit:

 R_L = Load resistance.

 $\ensuremath{C_L}$ = Load capacitance including jig and probe capacitance.

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

 V_{EXT} = External voltage for measuring switching times.

Fig. 10. Test circuit for measuring switching times

Table 10. Test data

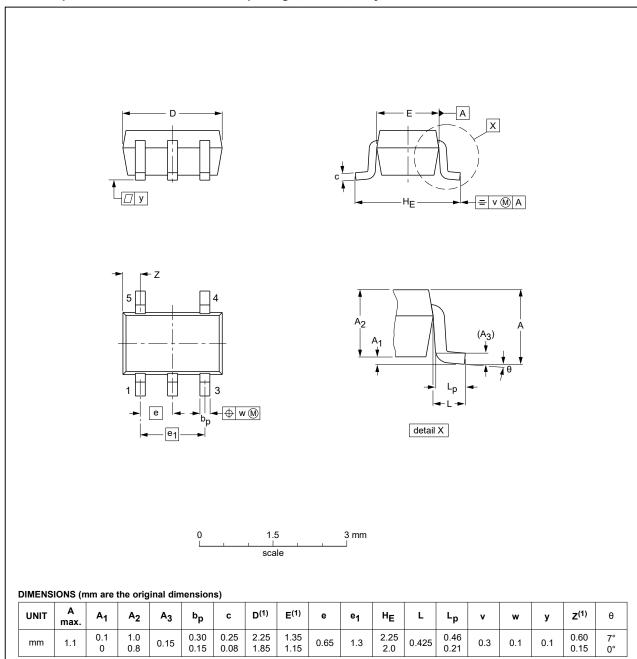
Supply voltage Input		Load	Load		V _{EXT}		
V _{CC}	VI	t _r , t _f	CL	R _L	t _{PLH} , t _{PHL}	t _{PZH} , t _{PHZ}	t _{PZL} , t _{PLZ}
1.65 V to 1.95 V	V _{CC}	≤ 2.0 ns	30 pF	1 kΩ	open	GND	2V _{CC}
2.3 V to 2.7 V	V _{CC}	≤ 2.0 ns	30 pF	500 Ω	open	GND	2V _{CC}
2.7 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	GND	6 V
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open	GND	6 V
4.5 V to 5.5 V	V _{CC}	≤ 2.5 ns	50 pF	500 Ω	open	GND	2V _{CC}

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12. Package outline

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

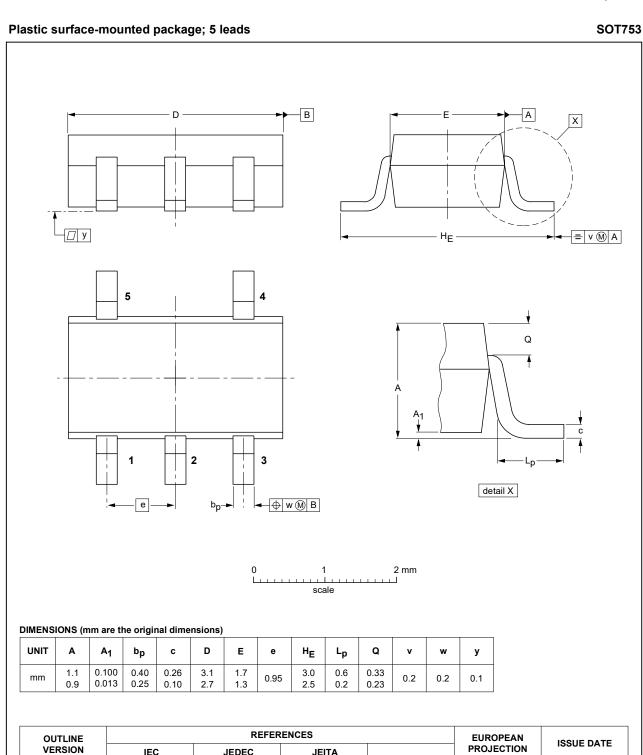
SOT353-1



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

OUTLINE		REFERENCES			EUROPEAN	ISSUE DATE
VERSION	IEC	JEDEC	JEDEC JEITA PROJECTION		ISSUE DATE	
SOT353-1		MO-203	SC-88A			-00-09-01 03-02-19

Fig. 11. Package outline SOT353-1 (TSSOP5)



 VERSION
 IEC
 JEDEC
 JEITA
 PROJECTION
 ISSUE DATE

 SOT753
 SC-74A
 ©2-04-16-06-03-16

Fig. 12. Package outline SOT753 (SC-74A)

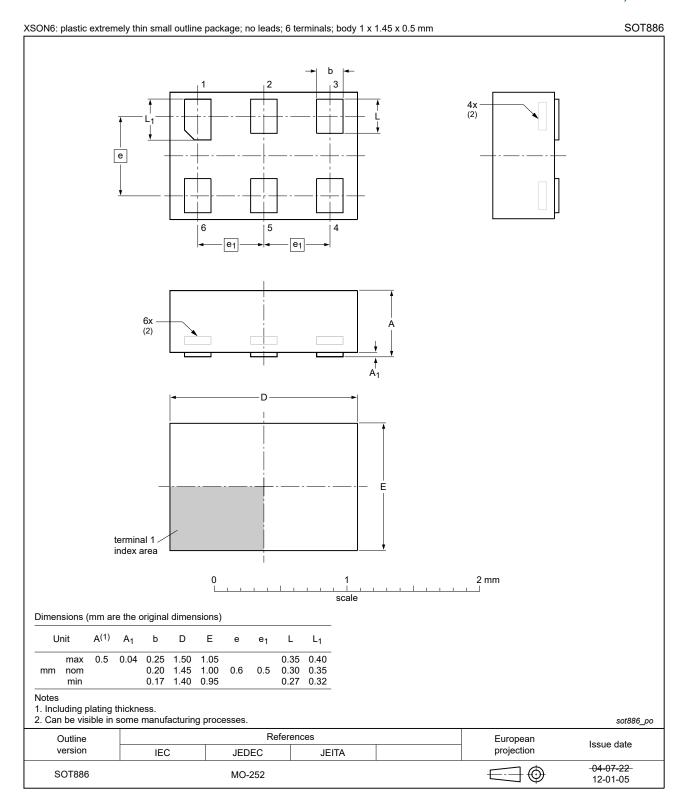


Fig. 13. Package outline SOT886 (XSON6)

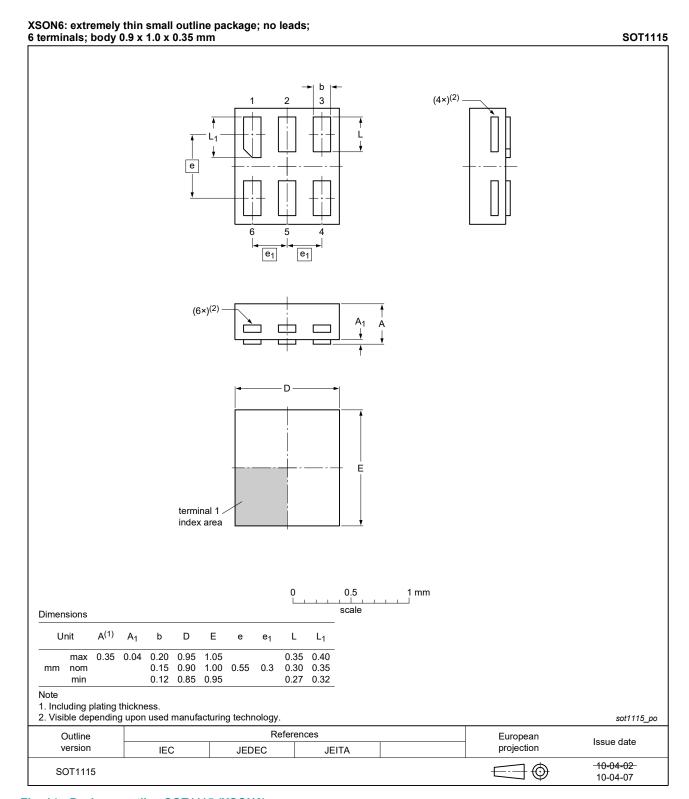


Fig. 14. Package outline SOT1115 (XSON6)

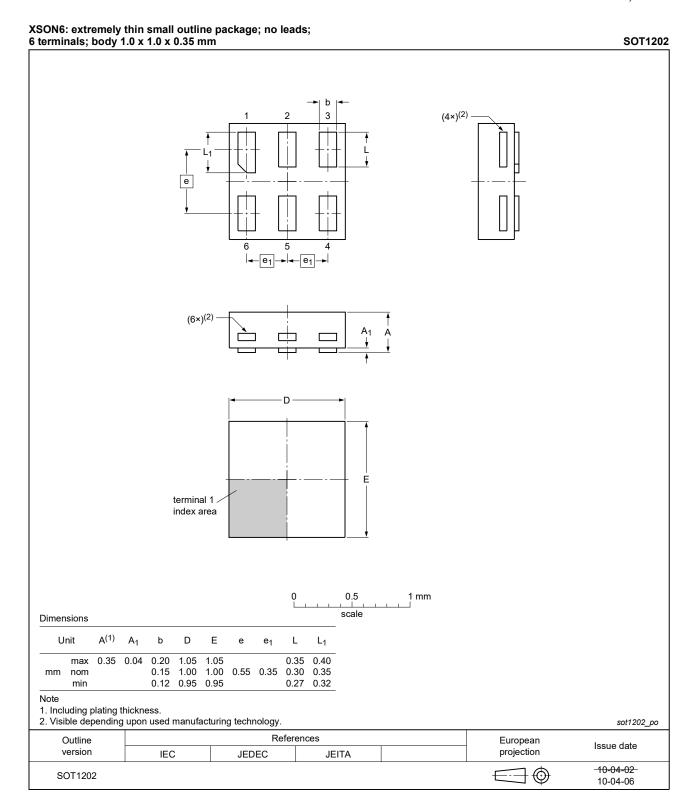


Fig. 15. Package outline SOT1202 (XSON6)

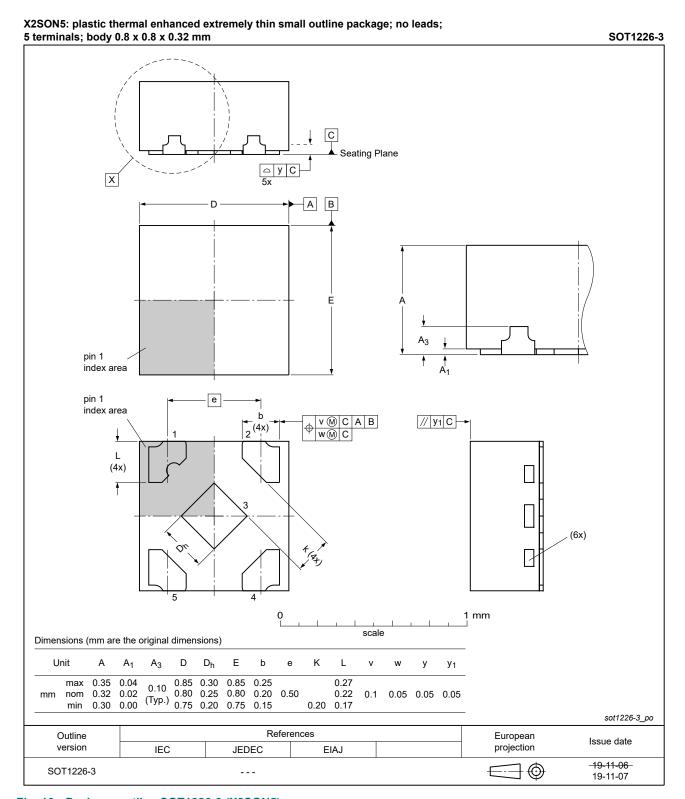


Fig. 16. Package outline SOT1226-3 (X2SON5)

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13. Abbreviations

Table 11. Abbreviations

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

14. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes		
74LVC1G126 v.15	20210503	Product data sheet	-	74LVC1G126 v.14		
Modifications:	Type numb	 Type number 74LVC1G126GF (SOT891/XSON6) removed. 				
74LVC1G126 v.14	20190315	Product data sheet	-	74LVC1G126 v.13		
Modifications:	guidelines o	 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. 				
74LVC1G126 v.13	20161202	Product data sheet	-	74LVC1G126 v.12		
Modifications:	• <u>Table 7</u> : Th	<u>Table 7</u> : The maximum limits for leakage current and supply current have changed.				
74LVC1G126 v.12	20120702	Product data sheet	-	74LVC1G126 v.11		
Modifications:		 Added type number 74LVC1G126GX (SOT1226) Package outline drawing of SOT886 (Fig. 13) modified. 				
74LVC1G126 v.11	20111208	Product data sheet	-	74LVC1G126 v.10		
Modifications:	Legal page	Legal pages updated.				
74LVC1G126 v.10	20101229	Product data sheet	-	74LVC1G126 v.9		
74LVC1G126 v.9	20100825	Product data sheet	-	74LVC1G126 v.8		
74LVC1G126 v.8	20090409	Product data sheet	-	74LVC1G126 v.7		
74LVC1G126 v.7	20070830	Product data sheet	-	74LVC1G126 v.6		
74LVC1G126 v.6	20061009	Product data sheet	-	74LVC1G126 v.5		
74LVC1G126 v.5	20040921	Product specification	-	74LVC1G126 v.4		
74LVC1G126 v.4	20021002	Product specification	-	74LVC1G126 v.3		
74LVC1G126 v.3	20020528	Product specification	-	74LVC1G126 v.2		
74LVC1G126 v.2	20010406	Preliminary specification	-	74LVC1G126 v.1		
74LVC1G126 v.1	20001222	Preliminary specification	-	-		

Product data sheet

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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 https://www.nexperia.com.

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Bus buffer/line driver; 3-state

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