

1. General description

The 74LVC1G32 provides one 2-input OR function.

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 applications.

Schmitt trigger action at all inputs makes the circuit tolerant of slower input rise and fall time.

This device is fully specified for partial power-down applications using I_{OFF} . The I_{OFF} circuitry disables the output, preventing the 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
- High noise immunity
- Complies with JEDEC standard:
 - JESD8-7 (1.65 V to 1.95 V)
 - JESD8-5 (2.3 V to 2.7 V)
 - ◆ JESD8-B/JESD36 (2.7 V to 3.6 V)
- ESD protection:
 - HBM JESD22-A114F exceeds 2000 V
 - MM JESD22-A115-A exceeds 200 V
- ± 24 mA output drive (V_{CC} = 3.0 V)
- CMOS low power consumption
- Latch-up performance exceeds 250 mA
- Direct interface with TTL levels
- Inputs accept voltages up to 5 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	Package						
	Temperature range	Name	Description	Version				
74LVC1G32GW	–40 °C to +125 °C	TSSOP5	plastic thin shrink small outline package; 5 leads; body width 1.25 mm	SOT353-1				
74LVC1G32GV	–40 °C to +125 °C	SC-74A	plastic surface-mounted package; 5 leads	SOT753				
74LVC1G32GM	–40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 \times 1.45 \times 0.5 mm	SOT886				
74LVC1G32GF	–40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 \times 1 \times 0.5 mm	SOT891				
74LVC1G32GN	–40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body $0.9\times1.0\times0.35$ mm	SOT1115				
74LVC1G32GS	–40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body $1.0 \times 1.0 \times 0.35$ mm	SOT1202				
74LVC1G32GX	–40 °C to +125 °C	X2SON5	X2SON5: plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body $0.8 \times 0.8 \times 0.35$ mm	SOT1226				

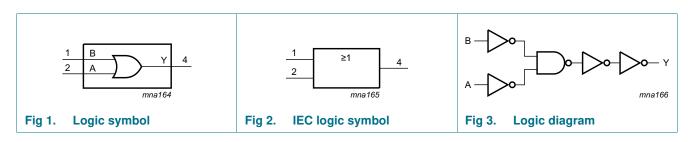
4. Marking

Table 2.Marking

Type number	Marking code ^[1]
74LVC1G32GW	VG
74LVC1G32GV	V32
74LVC1G32GM	VG
74LVC1G32GF	VG
74LVC1G32GN	VG
74LVC1G32GS	VG
74LVC1G32GX	VG

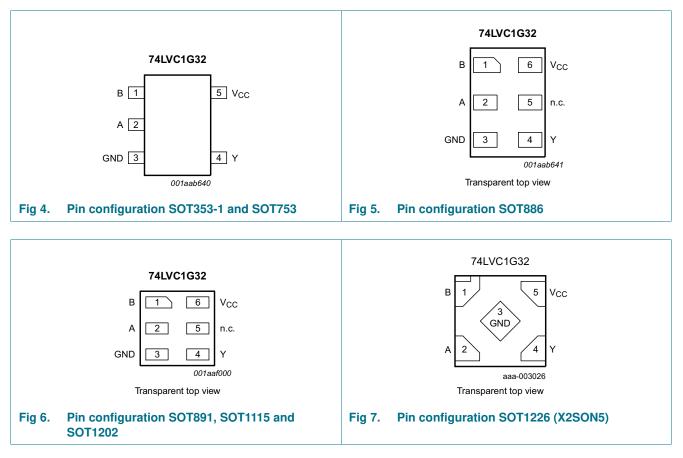
[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

5. Functional diagram



6. Pinning information

6.1 Pinning



6.2 Pin description

Table 3. Pin description	n		
Symbol	Pin		Description
	TSSOP5 and X2SON5	XSON6	
В	1	1	data input
A	2	2	data input
GND	3	3	ground (0 V)
Y	4	4	data output
n.c.	-	5	not connected
V _{CC}	5	6	supply voltage

7. Functional description

Table 4.Function table

Input	Output	
Α	В	Y
L	L	L
L	Н	Н
Н	L	Н
Н	Н	Н

[1] H = HIGH voltage level; L = LOW voltage level

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	$V_{\rm O}$ > $V_{\rm CC}$ or $V_{\rm O}$ < 0 V		-	±50	mA
Vo	output voltage	Active mode	<u>[1][2]</u>	-0.5	$V_{CC} + 0.5$	V
		Power-down mode	<u>[1][2]</u>	-0.5	+6.5	V
I _O	output current	$V_{O} = 0 V$ to V_{CC}		-	±50	mA
I _{CC}	supply current			-	100	mA
I _{GND}	ground current			-100	-	mA
P _{tot}	total power dissipation	$T_{amb} = -40 \text{ °C to } +125 \text{ °C}$	[3]	-	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.

[2] When $V_{CC} = 0 V$ (Power-down mode), the output voltage can be 5.5 V in normal operation.

[3] For TSSOP5 and SC-74A packages: above 87.5 °C the value of P_{tot} derates linearly with 4.0 mW/K. For XSON6 and X2SON5 packages: above 118 °C the value of P_{tot} derates linearly with 7.8 mW/K.

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9. 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
		V _{CC} = 0 V; Power-down mode	0	-	5.5	V
T _{amb}	ambient temperature		-40	-	+125	°C
$\Delta t / \Delta V$	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

Table 6. Recommended operating conditions

10. Static characteristics

Table 7. Static characteristics

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

Symbol	Parameter	Conditions	-40	–40 °C to +85 °C			–40 °C to +125 °C		
			Min	Typ <mark>[1]</mark>	Max	Min	Max	-	
VIH	HIGH-level	V _{CC} = 1.65 V to 1.95 V	$0.65 \times V_{CC}$	-	-	$0.65 \times V_{CC}$	-	V	
	input voltage	V _{CC} = 2.3 V to 2.7 V	1.7	-	-	1.7	-	V	
		V _{CC} = 2.7 V to 3.6 V	2.0	-	-	2.0	-	V	
		V _{CC} = 4.5 V to 5.5 V	$0.7 \times V_{CC}$	-	-	$0.7\times V_{CC}$	-	V	
VIL	LOW-level	V _{CC} = 1.65 V to 1.95 V	-	-	$0.35 \times V_{CC}$	-	$0.35 \times V_{CC}$	V	
	input voltage	V _{CC} = 2.3 V to 2.7 V	-	-	0.7	-	0.7	V	
		V _{CC} = 2.7 V to 3.6 V	-	-	0.8	-	0.8	V	
		V _{CC} = 4.5 V to 5.5 V	-	-	$0.3 \times V_{CC}$	-	$0.3 imes V_{CC}$	V	
V _{OH}	HIGH-level	$V_{I} = V_{IH} \text{ or } V_{IL}$							
output voltage	•	$I_{O} = -100 \ \mu A;$ $V_{CC} = 1.65 \ V \ to \ 5.5 \ V$	V _{CC} - 0.1	-	-	V _{CC} - 0.1	-	V	
		I _O = -4 mA; V _{CC} = 1.65 V	1.2	-	-	0.95	-	V	
		$I_{O} = -8 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.9	-	-	1.7	-	V	
		$I_{O} = -12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	2.2	-	-	1.9	-	V	
		$I_{O} = -24 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.3	-	-	2.0	-	V	
		$I_{O} = -32 \text{ mA}; V_{CC} = 4.5 \text{ V}$	3.8	-	-	3.4	-	V	
V _{OL}	LOW-level	$V_{I} = V_{IH} \text{ or } V_{IL}$							
	output voltage	I _O = 100 μA; V _{CC} = 1.65 V to 5.5 V	-	-	0.10	-	0.10	V	
		I _O = 4 mA; V _{CC} = 1.65 V	-	-	0.45	-	0.70	V	
		I _O = 8 mA; V _{CC} = 2.3 V	-	-	0.30	-	0.45	V	
		$I_0 = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	-	0.40	-	0.60	V	
		$I_{O} = 24 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.55	-	0.80	V	
		$I_{O} = 32 \text{ mA}; V_{CC} = 4.5 \text{ V}$	-	-	0.55	-	0.80	V	
lı	input leakage current	$\label{eq:VI} \begin{array}{l} V_{I} = 5.5 \ V \ \text{or GND}; \\ V_{CC} = 0 \ V \ \text{to} \ 5.5 \ V \end{array}$	-	±0.1	±1	-	±1	μA	

74LVC1G32 Product data sheet

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Table 7. Static charac	cteristics continued
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At recommended operating conditions. Voltages are referenced to GND (ground = 0 V).

Symbol	Parameter	Conditions	-40	–40 °C to +85 °C			o +125 ℃	Unit
			Min	Typ <mark>[1]</mark>	Max	Min	Max	
I _{OFF}	power-off leakage current	$V_{CC} = 0 \text{ V}; \text{ V}_{I} \text{ or } \text{ V}_{O} = 5.5 \text{ V}$	-	±0.1	±2	-	±2	μΑ
I _{CC}	supply current	$V_{I} = 5.5 V \text{ or GND}; I_{O} = 0 \text{ A};$ $V_{CC} = 1.65 V \text{ to } 5.5 V$	-	0.1	4	-	4	μA
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	-	500	μA
Cı	input capacitance	V_{CC} = 3.3 V; V_I = GND to V_{CC}	-	5	-	-	-	pF

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

11. Dynamic characteristics

Table 8. Dynamic characteristics

Voltages are referenced to GND (ground = 0 V); for load circuit see Figure 9.

Symbol P	Parameter	Conditions	–40 °C to +85 °C			–40 °C to	o +125 °C	Unit
			Min	Typ <mark>[1]</mark>	Max	Min	Max	
t _{pd}	propagation delay	A, B to Y; see Figure 8						
		V _{CC} = 1.65 V to 1.95 V	1.0	3.1	8.0	1.0	10.5	ns
		$V_{CC} = 2.3 \text{ V} \text{ to } 2.7 \text{ V}$	0.5	2.1	5.5	0.5	7.0	ns
		V _{CC} = 2.7 V	0.5	2.5	5.5	0.5	7.0	ns
		$V_{CC} = 3.0 \text{ V} \text{ to } 3.6 \text{ V}$	0.5	2.1	4.5	0.5	6.0	ns
		$V_{CC} = 4.5 \text{ V} \text{ to } 5.5 \text{ V}$	0.5	1.7	4.0	0.5	5.5	ns
C _{PD}	power dissipation capacitance	$V_I = GND$ to V_{CC} ; $V_{CC} = 3.3 V$ [3]	-	16	-	-	-	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.

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

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

 $P_{D} = (C_{PD} \times V_{CC}^{2} \times f_{i} \times N) + (C_{L} \times V_{CC}^{2} \times f_{o}) \text{ where:}$

 V_{CC} = supply voltage in V,

 f_i = input frequency in MHz,

N = number of inputs switching,

 C_L = output load capacitance in pF,

 $f_o = output$ frequency in MHz.

12. AC waveforms

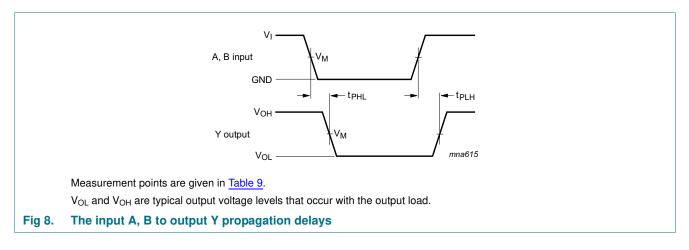


Table 9.Measurement points

Supply voltage	Input	Output
V _{cc}	V _M	V _M
1.65 V to 1.95 V	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
2.3 V to 2.7 V	$0.5 imes V_{CC}$	$0.5 \times V_{CC}$
2.7 V	1.5 V	1.5 V
3.0 V to 3.6 V	1.5 V	1.5 V
4.5 V to 5.5 V	$0.5 imes V_{CC}$	$0.5 imes V_{CC}$

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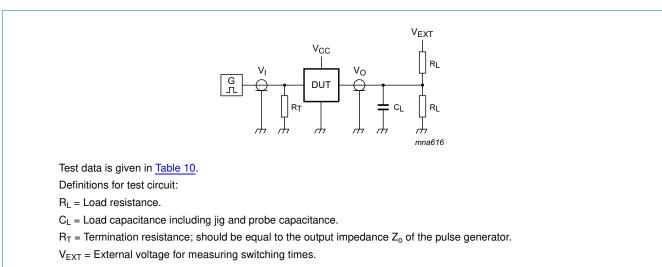


Fig 9. Test circuit for measuring switching times

Table 10. Test data

Supply voltage	ly voltage Input Load		Load		V _{EXT}
V _{cc}	VI	$t_r = t_f$	CL	RL	t _{PLH} , t _{PHL}
1.65 V to 1.95 V	V _{CC}	≤ 2.0 ns	30 pF	1 kΩ	open
2.3 V to 2.7 V	V _{CC}	≤ 2.0 ns	30 pF	500 Ω	open
2.7 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω	open
4.5 V to 5.5 V	V _{CC}	≤ 2.5 ns	50 pF	500 Ω	open

13. Package outline

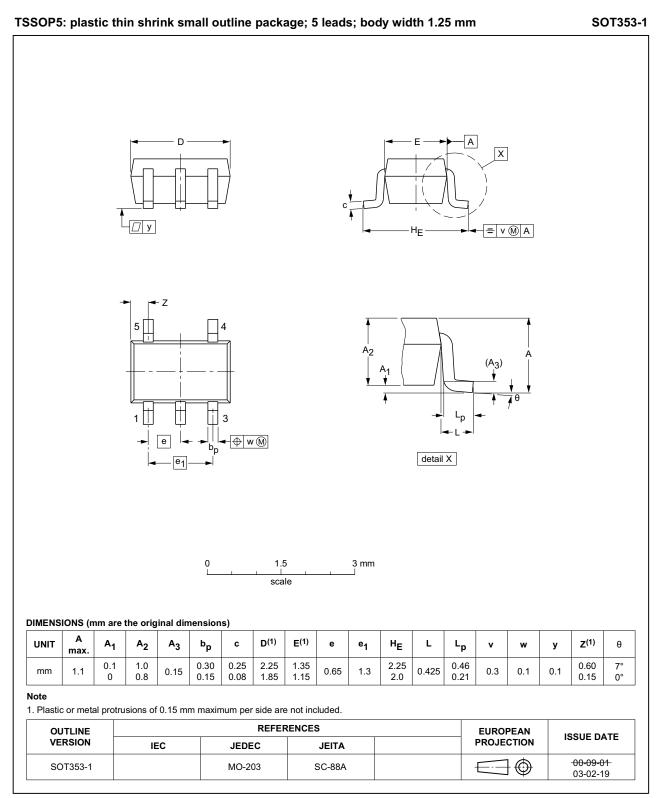
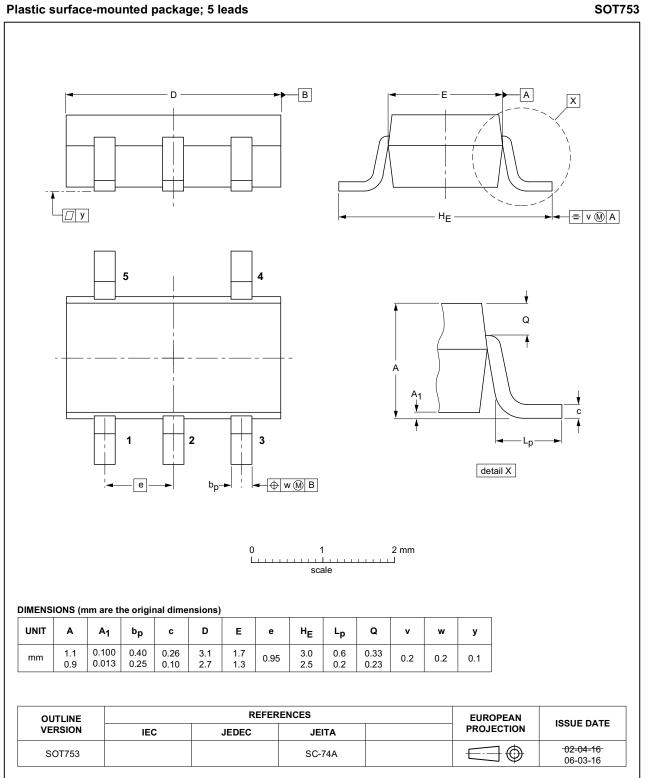


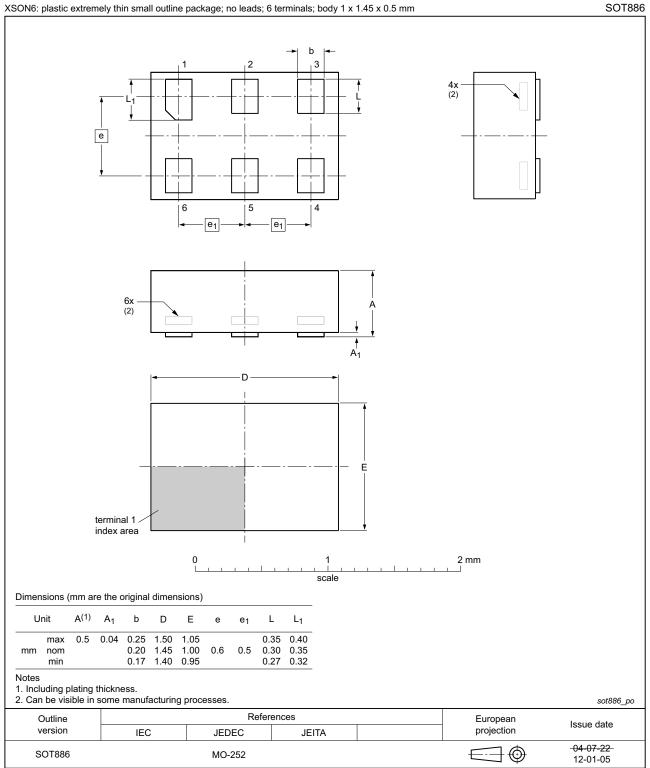
Fig 10. Package outline SOT353-1 (TSSOP5)

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Plastic surface-mounted package; 5 leads

Fig 11. Package outline SOT753 (SC-74A)



XSON6: plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm

Fig 12. Package outline SOT886 (XSON6)

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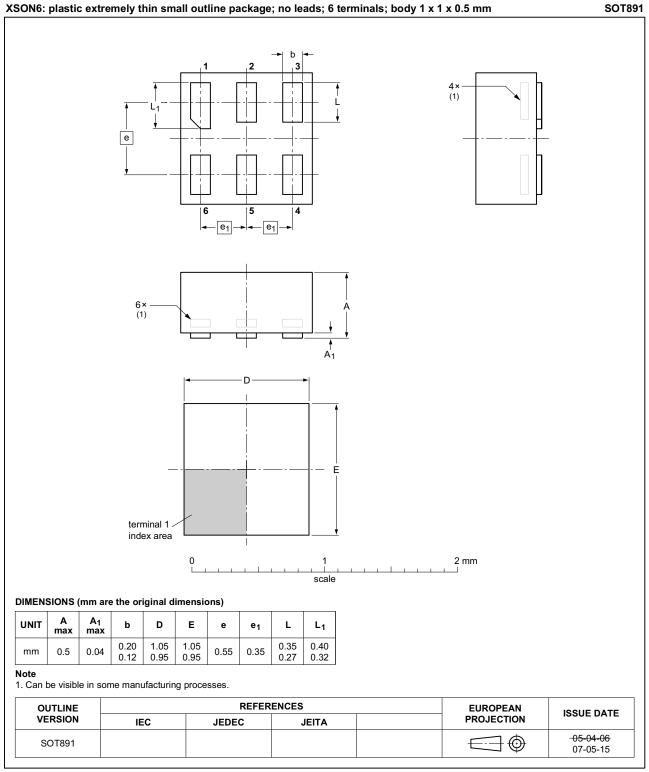
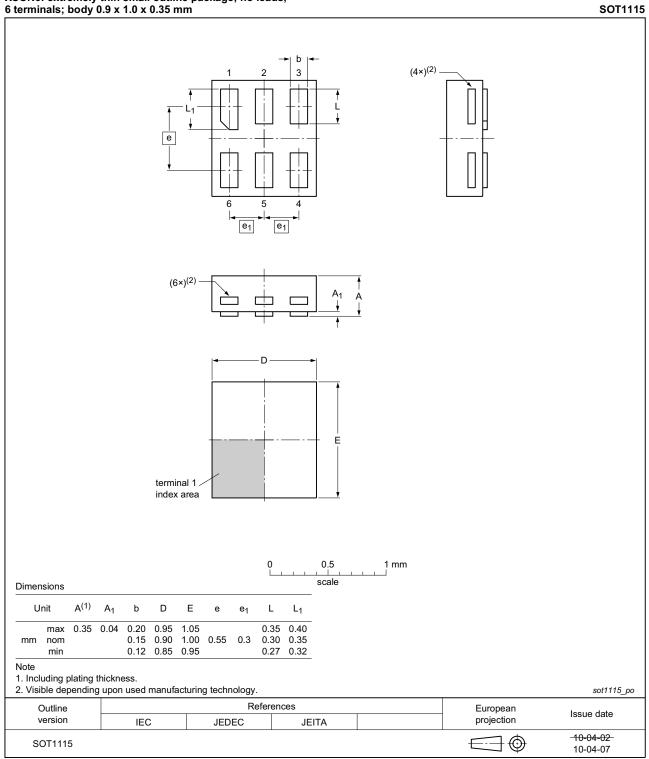


Fig 13. Package outline SOT891 (XSON6)

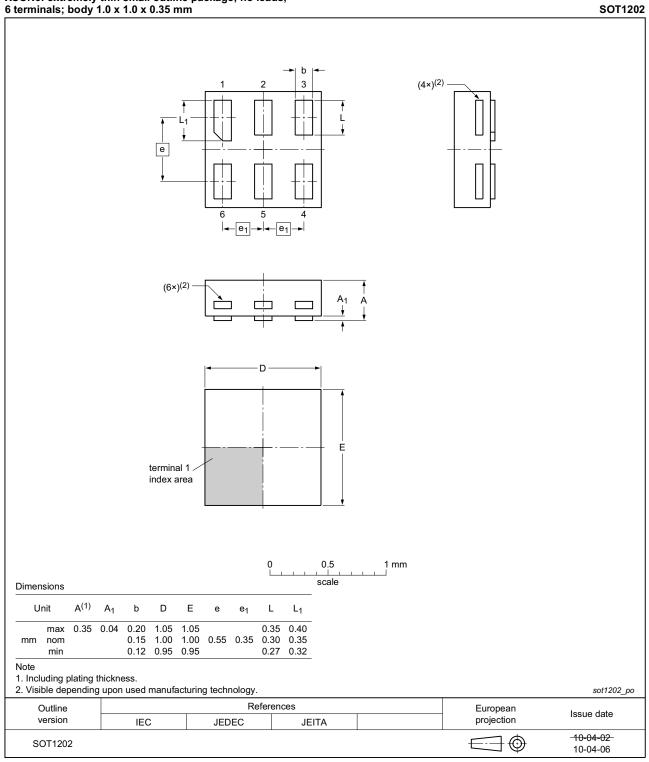
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XSON6: extremely thin small outline package; no leads; 6 terminals; body 0.9 x 1.0 x 0.35 mm

Fig 14. Package outline SOT1115 (XSON6)

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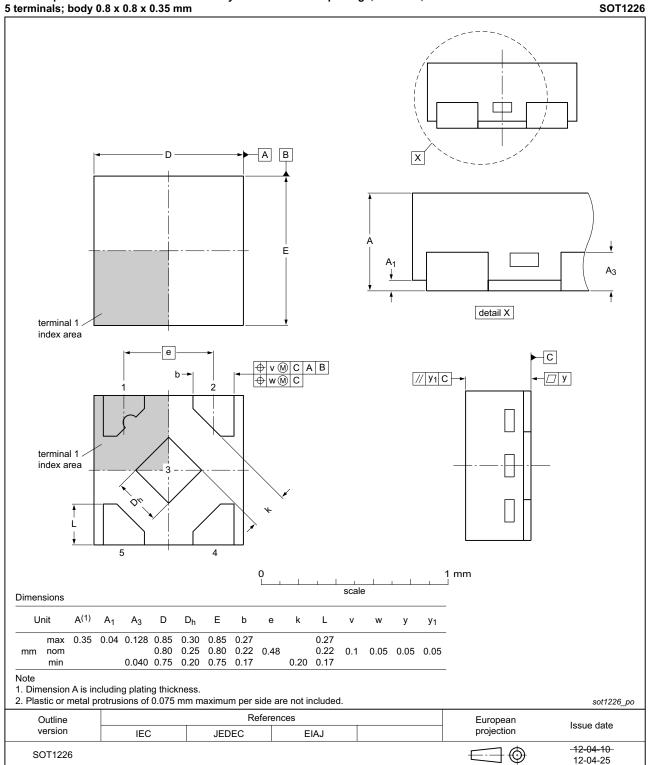


XSON6: extremely thin small outline package; no leads; 6 terminals; body 1.0 x 1.0 x 0.35 mm

Fig 15. Package outline SOT1202 (XSON6)

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X2SON5: plastic thermal enhanced extremely thin small outline package; no leads; 5 terminals; body 0.8 x 0.8 x 0.35 mm

Fig 16. Package outline SOT1226 (X2SON5)

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14. Abbreviations

Table 11. 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	

15. Revision history

Table 12. Revision history

Document ID	Release date	Data sheet status	Change notice	Supersedes		
74LVC1G32 v.11	20161202	Product data sheet	-	74LVC1G32 v.10		
Modifications:	• <u>Table 7</u> : The maximum limits for leakage current and supply current have changed.					
74LVC1G32 v.10	20120904	Product data sheet	-	74LVC1G32 v.9		
Modifications:	 Package ou 	Package outline drawing of SOT1226 (Figure 16) modified.				
74LVC1G32 v.9	20120412	Product data sheet	-	74LVC1G32 v.8		
Modifications:	Added type number 74LVC1G32GX (SOT1226)					
	 Package ou 	tline drawing of SOT886 (Fig	gure 12) modified.			
74LVC1G32 v.8	20111206	Product data sheet	-	74LVC1G32 v.7		
Modifications:	 Legal pages 	Legal pages updated.				
74LVC1G32 v.7	20101020	Product data sheet	-	74LVC1G32 v.6		
74LVC1G32 v.6	20070802	Product data sheet	-	74LVC1G32 v.5		
74LVC1G32 v.5	20060619	Product data sheet	-	74LVC1G32 v.4		
74LVC1G32 v.4	20040915	Product specification	-	74LVC1G32 v.3		
74LVC1G32 v.3	20021115	Product specification	-	74LVC1G32 v.2		
74LVC1G32 v.2	20020521	Product specification	-	74LVC1G32 v.1		
74LVC1G32 v.1	20001121	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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