74LVC1G332

Single 3-input OR gate Rev. 7 — 5 December 2016

Product data sheet

1. **General description**

The 74LVC1G332 provides one 3-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.

Features and benefits 2.

- 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)
 - JESD8B/JESD36 (2.7 V to 3.6 V)
- ESD protection:
 - ♦ HBM JESD22-A114F exceeds 2000 V
 - MM JESD22-A115-A exceeds 200 V
 - CDM JESD22-C101-C exceeds 1000 V
- \pm 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



3. Ordering information

Table 1. Ordering information

Type number	Package							
	Temperature range	Name	Description	Version				
74LVC1G332GW	–40 °C to +125 °C	SC-88	plastic surface-mounted package; 6 leads	SOT363				
74LVC1G332GV	–40 °C to +125 °C	SC-74	plastic surface-mounted package (TSOP6); 6 leads	SOT457				
74LVC1G332GM	-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				
74LVC1G332GF	-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				
74LVC1G332GN	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body $0.9 \times 1.0 \times 0.35$ mm	SOT1115				
74LVC1G332GS	-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				
74LVC1G332GX	-40 °C to +125 °C	X2SON6	plastic thermal extremely thin small outline package; no leads; 6 terminals; body 1 \times 0.8 \times 0.35 mm	SOT1255				

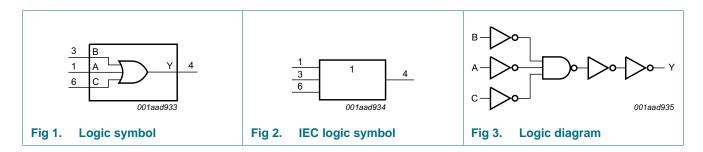
4. Marking

Table 2. Marking

Type number	Marking code ^[1]				
74LVC1G332GW	YG				
74LVC1G332GV	YG				
74LVC1G332GM	YG				
74LVC1G332GF	YG				
74LVC1G332GN	YG				
74LVC1G332GS	YG				
74LVC1G332GX	YG				

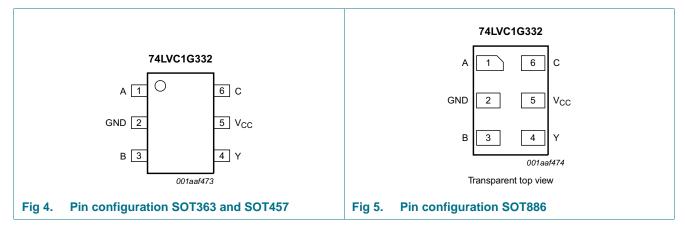
^[1] The pin 1 indicator is located on the lower left corner of the device, below the marking code.

5. Functional diagram



6. Pinning information

6.1 Pinning





6.2 Pin description

Table 3. Pin description

Symbol	Pin	Description
A	1	data input
GND	2	ground (0 V)
В	3	data input
Υ	4	data output
V _{CC}	5	supply voltage
С	6	data input

7. Functional description

Table 4. Function table[1]

Input	Output		
A	В	С	Υ
Н	X	X	Н
X	Н	X	Н
X	X	Н	Н
L	L	L	L

^[1] H = HIGH voltage level; L = LOW voltage level; X = don't care.

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][2]	-0.5	V _{CC} + 0.5	V
		Power-down mode	[1][2]	-0.5	+6.5	V
Io	output current	$V_O = 0 V \text{ to } V_{CC}$		-	±50	mA
I _{CC}	supply current			-	100	mA
I _{GND}	ground current			-100	-	mA
P _{tot}	total power dissipation	$T_{amb} = -40 ^{\circ}\text{C} \text{ to } +125 ^{\circ}\text{C}$	[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.

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
		V _{CC} = 0 V; Power-down mode	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

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

^[3] For SC-88 and SC-74A packages: above 87.5 °C the value of P_{tot} derates linearly with 4.0 mW/K. For X2SON6 and XSON6 packages: above 118 °C the value of P_{tot} derates linearly with 7.8 mW/K.

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[1]	Max	Min	Max	
V _{IH}	HIGH-level	V _{CC} = 1.65 V to 1.95 V	0.65V _{CC}	-	-	0.65V _{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	0.7V _{CC}	-	-	0.7V _{CC}	-	V
V _{IL}	LOW-level	V _{CC} = 1.65 V to 1.95 V	-	-	0.35V _{CC}	-	0.35V _{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	-	-	0.3V _{CC}	-	0.3V _{CC}	V
V _{ОН}	HIGH-level	$V_I = V_{IH}$ or V_{IL}						
	output voltage	$I_O = -100 \mu A;$ $V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}$	V _{CC} - 0.1	-	-	V _{CC} – 0.1	-	V
		$I_{O} = -4 \text{ mA}; V_{CC} = 1.65 \text{ V}$	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
√ _{OL}	LOW-level	$V_I = V_{IH}$ or V_{IL}						
	output voltage	$I_O = 100 \mu A;$ $V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}$	-	-	0.1	-	0.1	V
		$I_O = 4 \text{ mA}; V_{CC} = 1.65 \text{ V}$	-	-	0.45	-	0.70	V
		$I_O = 8 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.3	-	0.45	V
		$I_O = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	-	0.4	-	0.60	V
		I _O = 24 mA; V _{CC} = 3.0 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	V _{CC} = 0 V to 5.5 V; V _I = 5.5 V or GND	-	±0.1	±1	-	±1	μΑ
OFF	power-off leakage current	$V_{CC} = 0 \text{ V}; V_{I} \text{ or } V_{O} = 5.5 \text{ V}$	-	±0.1	±2	-	±2	μΑ
CC	supply current	$V_{CC} = 1.65 \text{ V to } 5.5 \text{ V};$ $V_{I} = V_{CC} \text{ or GND; } I_{O} = 0 \text{ A}$	-	0.1	4	-	4	μА
7l ^{CC}	additional supply current	per pin; $V_{CC} = 2.3 \text{ V to } 5.5 \text{ V};$ $V_I = V_{CC} - 0.6 \text{ V};$ $I_O = 0 \text{ A}$	-	5	500	-	500	μА
Cı	input capacitance	$V_{CC} = 3.3 \text{ V}; V_I = \text{GND to}$ V_{CC}	-	3	-	-	-	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 test circuit see Figure 9.

Symbol	Parameter	Conditions	–40 °C to +85 °C			-40 °C to	+125 °C	Unit	
			Min	Typ[1]	Max	Min	Max		
t _{pd}	propagation delay	A, B and C to Y; see Figure 8							
		V _{CC} = 1.65 V to 1.95 V	1.5	4.7	17.2	1.5	21.5	ns	
		V _{CC} = 2.3 V to 2.7 V	1.0	3.0	6.2	1.0	7.8	ns	
		V _{CC} = 2.7 V	1.0	3.0	6.0	1.0	7.5	ns	
		V _{CC} = 3.0 V to 3.6 V	1.0	2.6	4.8	1.0	6.2	ns	
		V _{CC} = 4.5 V to 5.5 V	1.0	1.9	3.5	1.0	4.4	ns	
C _{PD}	power dissipation capacitance	$V_I = GND \text{ to } V_{CC}; V_{CC} = 3.3 \text{ V}$	-	12	-	-	-	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 μW).

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

 f_i = input frequency in MHz;

f_o = output frequency in MHz;

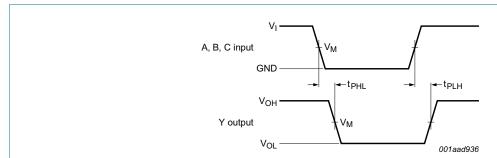
C_L = output load capacitance in pF;

 V_{CC} = supply voltage in V;

N = number of inputs switching;

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

12. AC waveforms



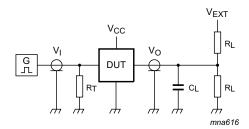
Measurement points are given in Table 9.

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

Fig 8. The input A, B and C to output Y propagation delays

Table 9. Measurement points

Supply voltage	Input	Output
V _{CC}	V _M	V _M
1.65 V to 1.95 V	0.5V _{CC}	0.5V _{CC}
2.3 V to 2.7 V	0.5V _{CC}	0.5V _{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	0.5V _{CC}	0.5V _{CC}



Test data is given in <u>Table 10</u>.

Definitions for test circuit:

R_L = Load resistance.

 C_L = Load capacitance including jig and probe capacitance.

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

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

Fig 9. Test circuit for measuring switching times

Table 10. Test data

Supply voltage	Input		Load	Load		
V _{CC}	Vı	$t_r = t_f$	CL	R _L	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

SOT363 Plastic surface-mounted package; 6 leads Α X = v (M) A ΗE ⊕ w M B е detail X scale **DIMENSIONS (mm are the original dimensions)** Α1 UNIT D Q Α С Ε ٧ e₁ H_{E} $L_{\mathbf{p}}$ w у max 0.25 0.10 0.25 0.30 1.35 1.15 2.2 2.0 0.45 1.1 2.2 0.65 0.1 0.8 0.20 1.8 0.15 0.15 REFERENCES **EUROPEAN** OUTLINE ISSUE DATE VERSION JEDEC **PROJECTION** IEC JEITA 04-11-08 SOT363 SC-88 \bigcirc 06-03-16

Fig 10. Package outline SOT363 (SC-88)

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Plastic surface-mounted package (TSOP6); 6 leads

SOT457

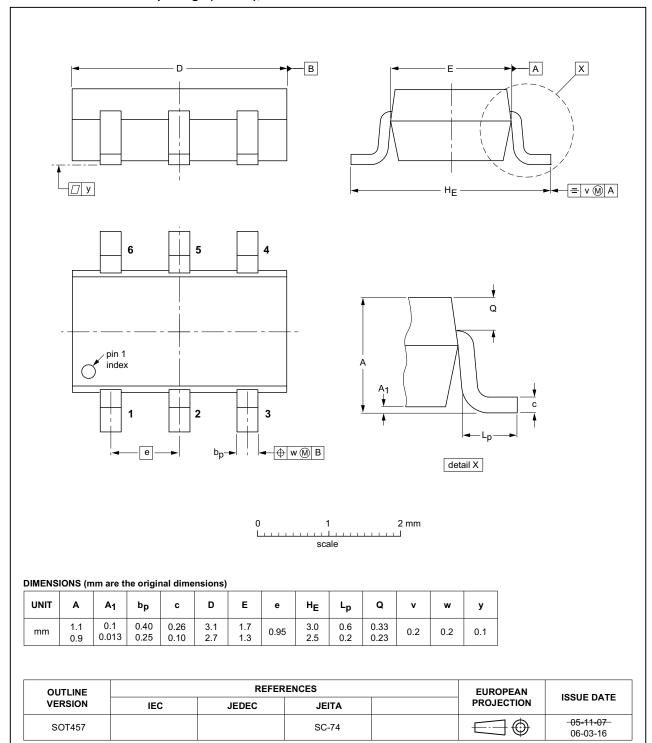


Fig 11. Package outline SOT457 (SC-74)

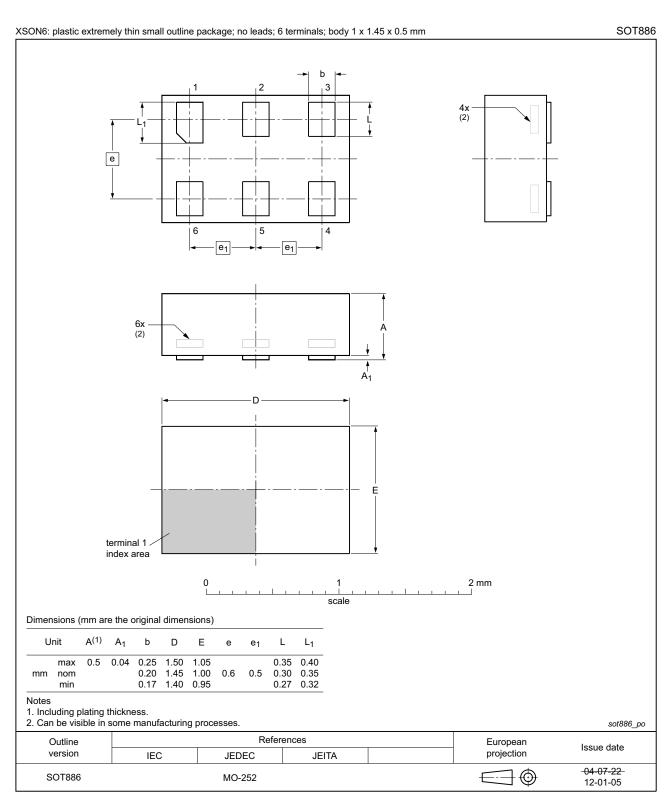


Fig 12. Package outline SOT886 (XSON6)

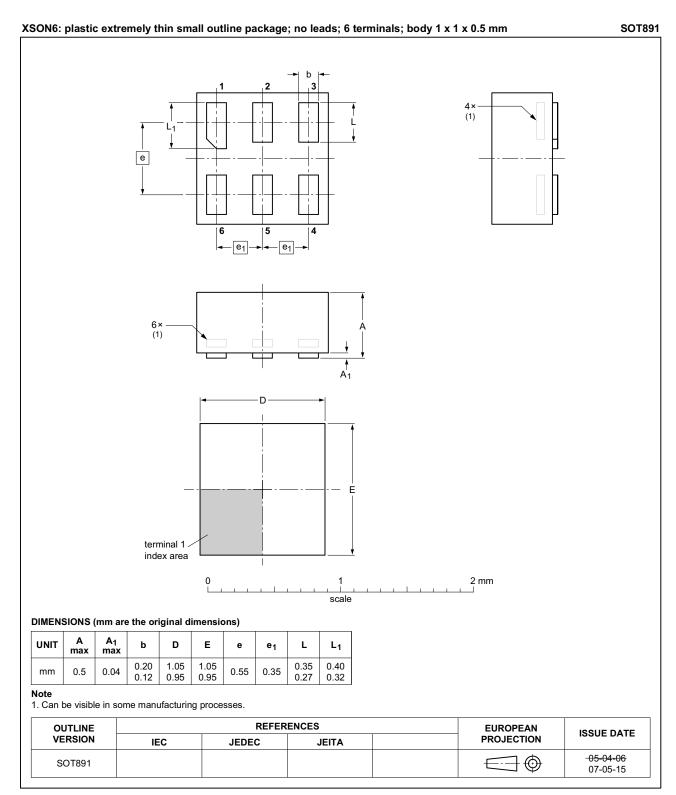


Fig 13. Package outline SOT891 (XSON6)

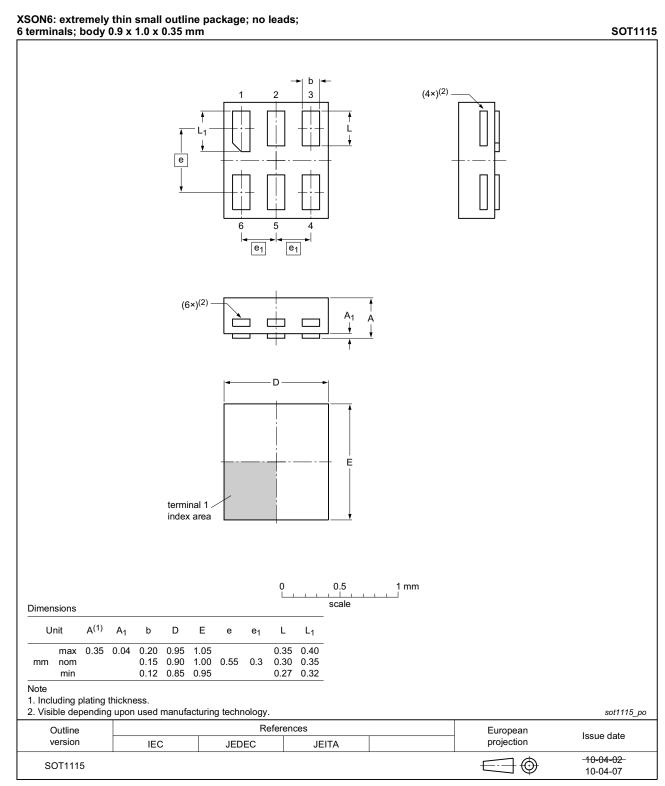


Fig 14. Package outline SOT1115 (XSON6)

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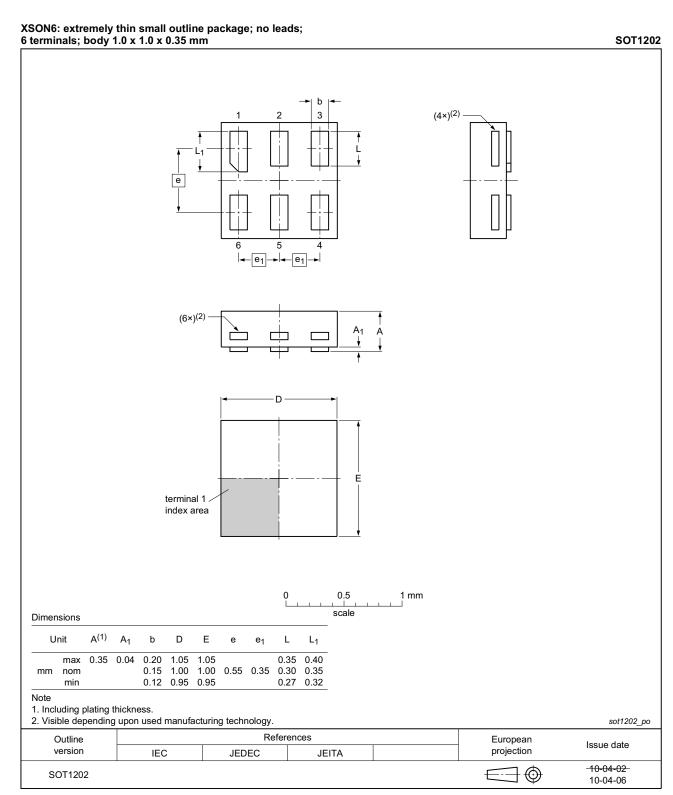


Fig 15. Package outline SOT1202 (XSON6)

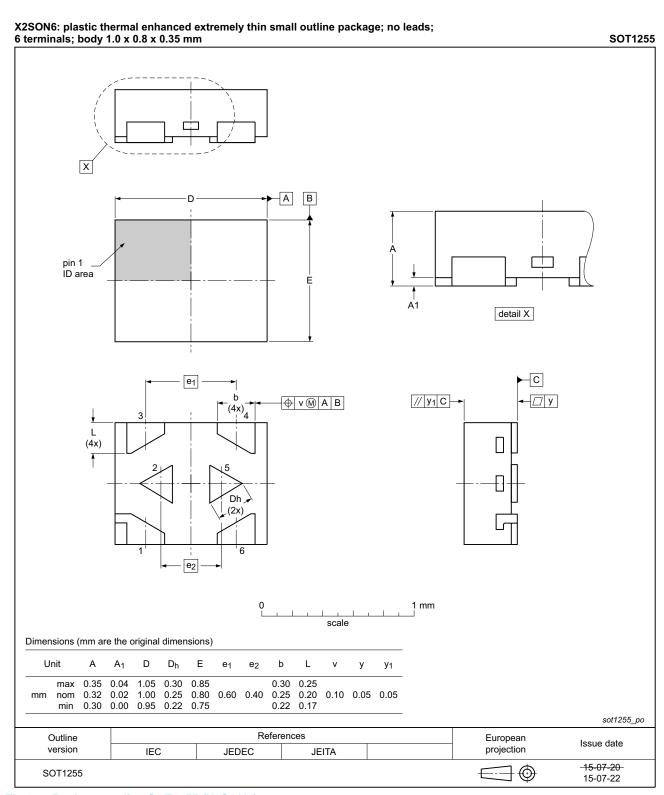


Fig 16. Package outline SOT1255 (X2SON6)

14. Abbreviations

Table 11. Abbreviations

Acronym	Description			
CDM	Charged Device Model			
CMOS	mplementary Metal Oxide Semiconductor			
DUT	evice Under Test			
ESD	ElectroStatic Discharge			
НВМ	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			
74LVC1G332 v.7	20161205	Product data sheet	-	74LVC1G332 v.6			
Modifications:	• <u>Table 7</u> : The	• <u>Table 7</u> : The maximum limits for leakage current and supply current have changed.					
74LVC1G332 v.6	20150917	Product data sheet	-	74LVC1G332 v.5			
Modifications:	 Added type 	Added type number 74LVC1G332GX (SOT1255/X2SON6).					
74LVC1G332 v.5	20140910	Product data sheet	-	74LVC1G332 v.4			
Modifications:	Package ou	ıtline drawing of SOT886 (Fi	gure 12) modified.				
74LVC1G332 v.4	20111206	Product data sheet	-	74LVC1G332 v.3			
74LVC1G332 v.3	20101026	Product data sheet	-	74LVC1G332 v.2			
74LVC1G332 v.2	20070719	Product data sheet	-	74LVC1G332 v.1			
74LVC1G332 v.1	20061011	Product data sheet	-	-			

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.

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Nexperia 74LVC1G332

Single 3-input OR gate

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18. Contents

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