# 74LVC2G34

# **Dual buffer gate**

Rev. 10 — 23 February 2018

**Product data sheet** 

## 1 General description

The 74LVC2G34 provides two buffers.

Inputs can be driven from either 3.3 V or 5 V devices. These features allow the use of these devices in a mixed 3.3 V and 5 V environment.

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
- 5 V tolerant inputs for interfacing with 5 V logic
- 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 2 000 V
  - MM JESD22-A115-A exceeds 200 V
- ±24 mA output drive (V<sub>CC</sub> = 3.0 V)
- CMOS low power consumption
- Latch-up performance exceeds 250 mA
- · Direct interface with TTL levels
- 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				
74LVC2G34GW	-40 °C to +125 °C	SC-88	plastic surface-mounted package; 6 leads	SOT363				
74LVC2G34GV	-40 °C to +125 °C	TSOP6	plastic surface-mounted package (TSOP6); 6 leads	SOT457				
74LVC2G34GM	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1.45 x 0.5 mm	SOT886				
74LVC2G34GF	-40 °C to +125 °C	XSON6	plastic extremely thin small outline package; no leads; 6 terminals; body 1 x 1 x 0.5 mm	SOT891				
74LVC2G34GN	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 0.9 x 1.0 x 0.35 mm	SOT1115				
74LVC2G34GS	-40 °C to +125 °C	XSON6	extremely thin small outline package; no leads; 6 terminals; body 1.0 x 1.0 x 0.35 mm	SOT1202				
74LVC2G34GX	-40 °C to +125 °C	X2SON6	plastic thermal extremely thin small outline package; no leads; 6 terminals; body 1 x 0.8 x 0.35 mm	SOT1255				

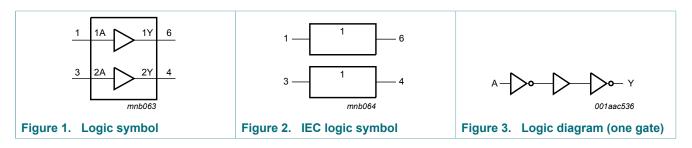
## 4 Marking

Table 2. Marking

Marking code <sup>[1]</sup> YA
<b>V</b> Δ
IA .
Y34
YA
Y Y

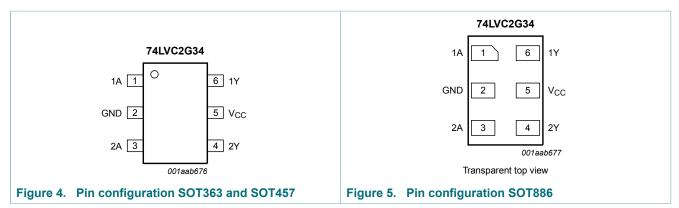
<sup>[1]</sup> The pin 1 indicator is located on the lower left corner of the device, below the marking code.

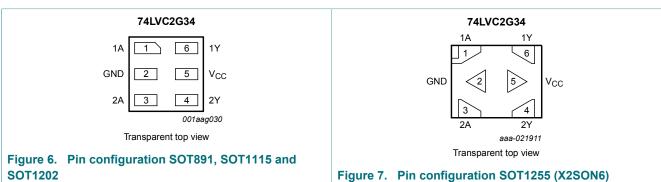
# 5 Functional diagram



# 6 Pinning information

## 6.1 Pinning





## 6.2 Pin description

#### Table 3. Pin description

Symbol	Pin	Description
1A	1	data input
GND	2	ground (0 V)
2A	3	data input
2Y	4	data output
V <sub>CC</sub>	5	supply voltage
1Y	6	data output

# **Functional description**

#### Table 4. Function table

 $H = HIGH \ voltage \ level; \ L = LOW \ voltage \ level.$ 

Input	Output
nA	nY
L	L
Н	Н

# **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	+6.5	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0 V	-50	-	mA
VI	input voltage	[1]	-0.5	+6.5	V
I <sub>OK</sub>	output clamping current	V <sub>O</sub> > V <sub>CC</sub> or V <sub>O</sub> < 0 V	-	±50	mA
V <sub>O</sub>	output voltage	Active mode [1] [2]	-0.5	V <sub>CC</sub> + 0.5	V
		Power-down mode [1] [2]	-0.5	+6.5	V
Io	output current	V <sub>O</sub> = 0 V to V <sub>CC</sub>	-	±50	mA
I <sub>CC</sub>	supply current		-	100	mA
I <sub>GND</sub>	ground current		-100	-	mA
P <sub>tot</sub>	total power dissipation	$T_{amb} = -40  ^{\circ}\text{C} \text{ to } +125  ^{\circ}\text{C}$ [3]	-	250	mW
T <sub>stg</sub>	storage temperature		-65	+150	°C

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

# **Recommended operating conditions**

Table 6. Recommended operating conditions

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

74LVC2G34

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

<sup>[2]</sup> When  $V_{CC}$  = 0 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  $^{\circ}\text{C}$  the value of P  $_{\text{tot}}$  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 <sup>[1]</sup>	Max	Min	Max	
V <sub>IH</sub>	HIGH-level input	V <sub>CC</sub> = 1.65 V to 1.95 V	0.65V <sub>CC</sub>	-	-	0.65V <sub>CC</sub>	-	٧
	voltage	V <sub>CC</sub> = 2.3 V to 2.7 V	1.7	-	-	1.7	-	V
		V <sub>CC</sub> = 2.7 V to 3.6 V	2.0	-	-	2.0	-	V
		V <sub>CC</sub> = 4.5 V to 5.5 V	0.7V <sub>CC</sub>	-	-	0.7V <sub>CC</sub>	-	٧
V <sub>IL</sub>	LOW-level input	V <sub>CC</sub> = 1.65 V to 1.95 V	-	-	0.35V <sub>CC</sub>	-	0.35V <sub>CC</sub>	V
	voltage	V <sub>CC</sub> = 2.3 V to 2.7 V	-	-	0.7	-	0.7	٧
		V <sub>CC</sub> = 2.7 V to 3.6 V	-	-	0.8	-	0.8	V
		V <sub>CC</sub> = 4.5 V to 5.5 V	-	-	0.3V <sub>CC</sub>	-	0.3V <sub>CC</sub>	٧
V <sub>OH</sub>	HIGH-level	$V_I = V_{IH}$ or $V_{IL}$						
	output voltage	I <sub>O</sub> = -100 μA; V <sub>CC</sub> = 1.65 V to 5.5 V	V <sub>CC</sub> - 0.1	-	-	V <sub>CC</sub> - 0.1	-	V
		I <sub>O</sub> = -4 mA; V <sub>CC</sub> = 1.65 V	1.2	-	-	0.95	-	٧
		$I_{O}$ = -8 mA; $V_{CC}$ = 2.3 V	1.9	-	-	1.7	-	V
		$I_{O}$ = -12 mA; $V_{CC}$ = 2.7 V	2.2	-	-	1.9	-	V
		$I_{O}$ = -24 mA; $V_{CC}$ = 3.0 V	2.3	-	-	2.0	-	V
		$I_{O}$ = -32 mA; $V_{CC}$ = 4.5 V	3.8	-	-	3.4	-	V
V <sub>OL</sub>	LOW-level output	$V_I = V_{IH}$ or $V_{IL}$						
	voltage	I <sub>O</sub> = 100 μA; V <sub>CC</sub> = 1.65 V to 5.5 V	-	-	0.10	-	0.10	V
		I <sub>O</sub> = 4 mA; V <sub>CC</sub> = 1.65 V	-	-	0.45	-	0.70	V
		I <sub>O</sub> = 8 mA; V <sub>CC</sub> = 2.3 V	-	-	0.30	-	0.45	V
		$I_O = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	-	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
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	-	±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
СС	supply current	V <sub>I</sub> = 5.5 V or GND; I <sub>O</sub> = 0 A; V <sub>CC</sub> = 1.65 V to 5.5 V	-	0.1	4	-	4	μA
ΔI <sub>CC</sub>	additional supply current	per pin; V <sub>CC</sub> = 2.3 V to 5.5 V; V <sub>I</sub> = V <sub>CC</sub> - 0.6 V; I <sub>O</sub> = 0 A	-	5	500	-	500	μA
Cı	input capacitance	$V_{CC}$ = 3.3 V; $V_{I}$ = GND to $V_{CC}$	-	2.5	-	-	-	pF

<sup>[1]</sup> All typical values are measured at  $V_{CC}$  = 3.3 V and  $T_{amb}$  = 25  $^{\circ}C.$ 

# 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	S°C	-40 °C to	+125 °C	Unit
			Min	Typ <sup>[1]</sup>	Max	Min	Max	
t <sub>pd</sub>	propagation delay	nA to nY; see Figure 8 [2]						
		V <sub>CC</sub> = 1.65 V to 1.95 V	1.0	3.8	8.6	1.0	10.8	ns
		V <sub>CC</sub> = 2.3 V to 2.7 V	0.5	2.4	4.4	0.5	5.5	ns
		V <sub>CC</sub> = 2.7 V	0.5	2.5	5.0	0.5	6.3	ns
		V <sub>CC</sub> = 3.0 V to 3.6 V	0.5	2.2	4.1	0.5	5.1	ns
		V <sub>CC</sub> = 4.5 V to 5.5 V	0.5	1.9	3.2	0.5	4.0	ns
C <sub>PD</sub>	power dissipation capacitance	$V_I$ = GND to $V_{CC}$ ; $V_{CC}$ = 3.3 $V$ [3]	-	20	-	-	-	pF

<sup>[1]</sup> 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  $t_{Pl}$  H and  $t_{Dell}$  .

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

 $f_i$  = input frequency in MHz;

 $f_o$  = output frequency in MHz;

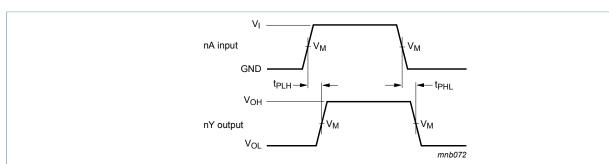
C<sub>L</sub> = output load capacitance in pF;

V<sub>CC</sub> = supply voltage in V;

N = number of inputs switching;

 $\sum (C_L \times V_{CC}^2 \times f_0) = \text{sum of outputs.}$ 

## 11.1 Waveform and test circuit



Measurement points are given in Table 9.

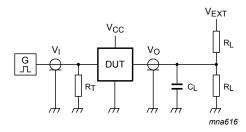
Logic levels: V<sub>OL</sub> and V<sub>OH</sub> are typical output voltage levels that occur with the output load.

Figure 8. The data input (nA) to output (nY) propagation delays

 <sup>[2]</sup> t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.
 [3] C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).

Table 9. Measurement points

Supply voltage	Input	Output
V <sub>CC</sub>	V <sub>M</sub>	V <sub>M</sub>
1.65 V to 1.95 V	0.5V <sub>CC</sub>	0.5V <sub>CC</sub>
2.3 V to 2.7 V	0.5V <sub>CC</sub>	0.5V <sub>CC</sub>
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 <sub>CC</sub>	0.5V <sub>CC</sub>



Test data is given in Table 10.

Definitions for test circuit:

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

 $C_L$  = 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.

Figure 9. Test circuit for measuring switching times

Table 10. Test data

Supply voltage	upply voltage Input		Load	Load	
V <sub>CC</sub>	V <sub>I</sub>	t <sub>r</sub> = t <sub>f</sub>	CL	R <sub>L</sub>	t <sub>PLH</sub> , t <sub>PHL</sub>
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 <sub>CC</sub>	≤ 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 <sub>CC</sub>	≤ 2.5 ns	50 pF	500 Ω	open

# 12 Package outline

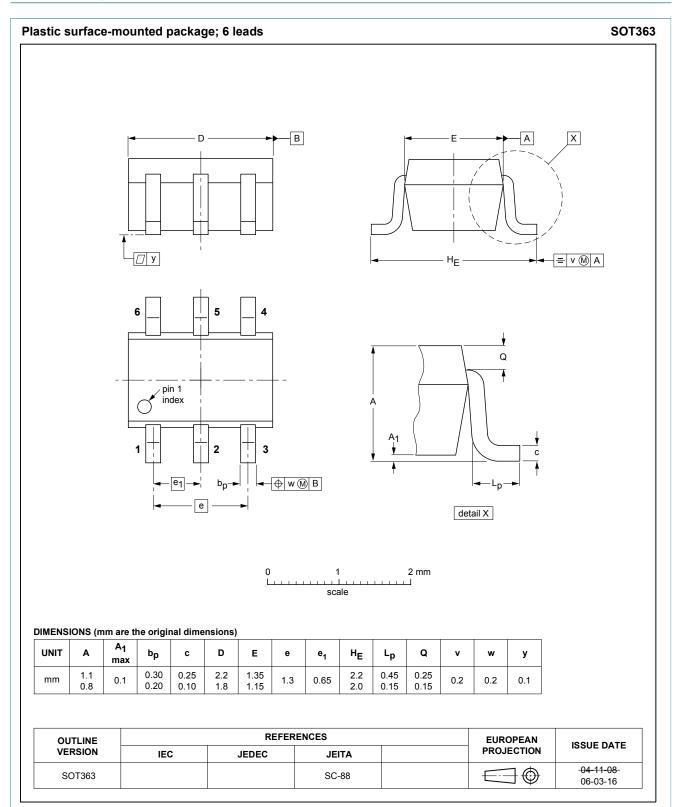


Figure 10. Package outline SOT363 (SC-88)

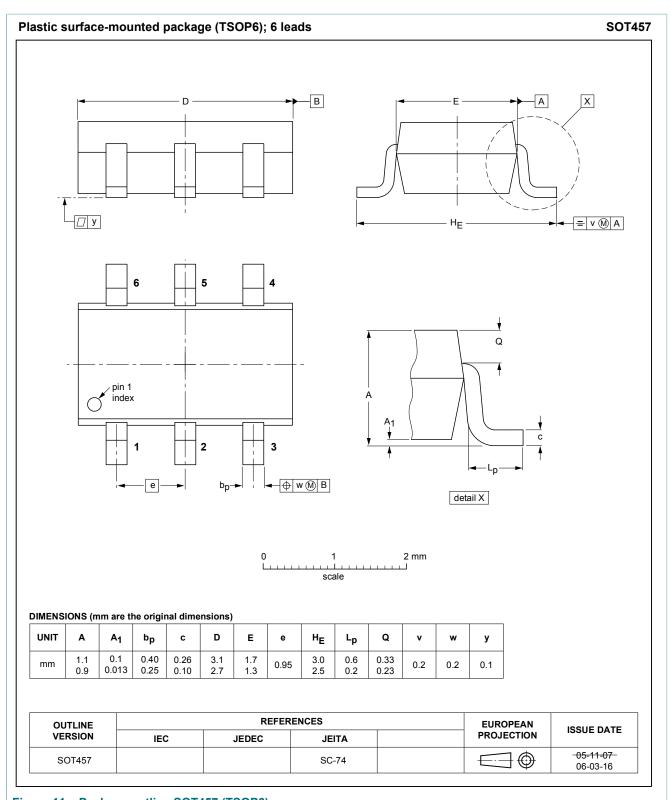
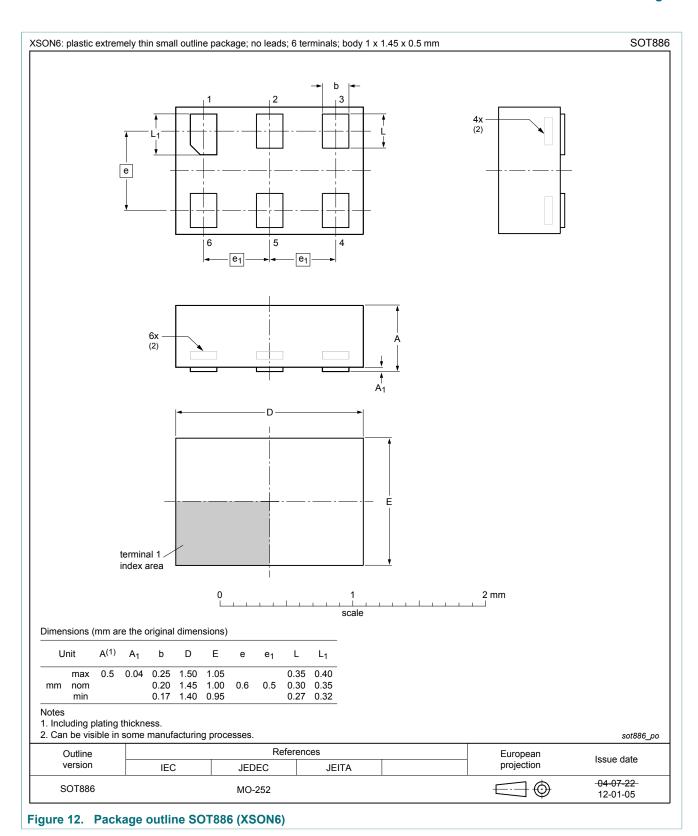
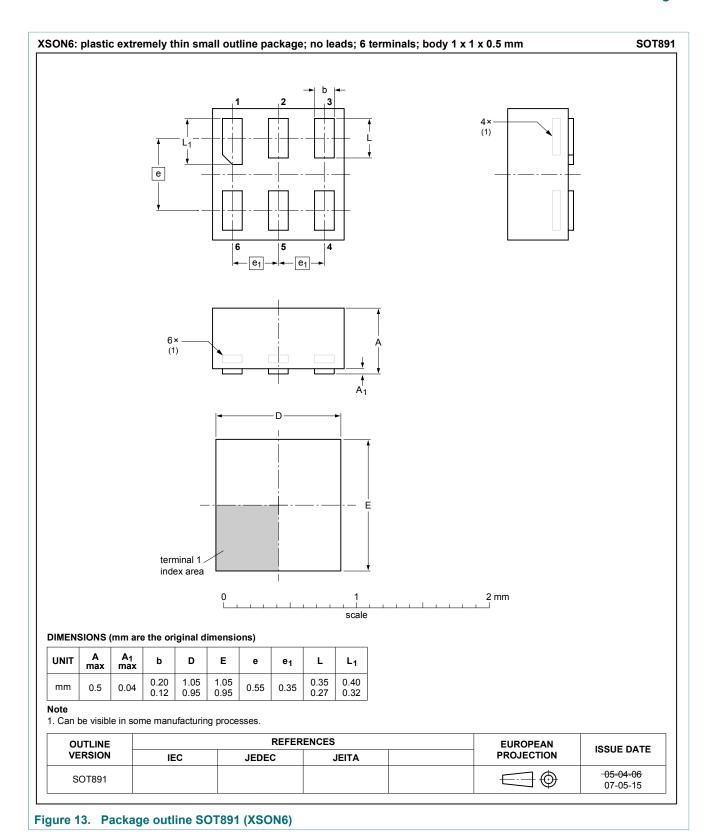
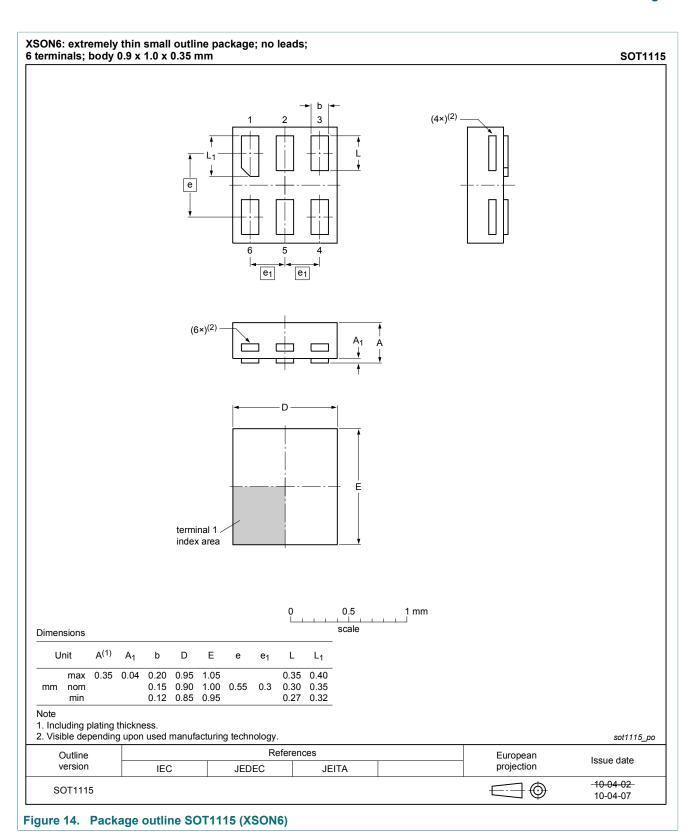


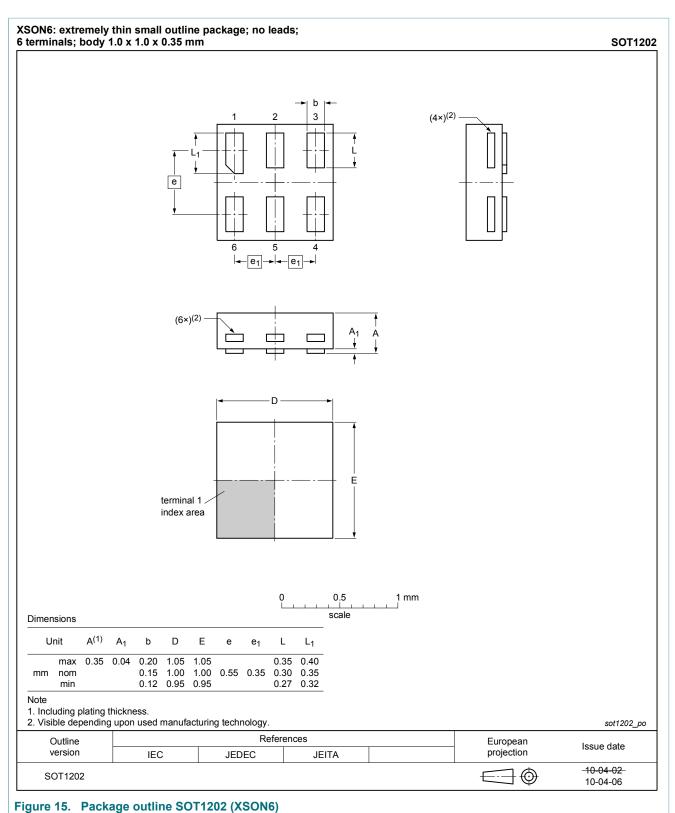
Figure 11. Package outline SOT457 (TSOP6)



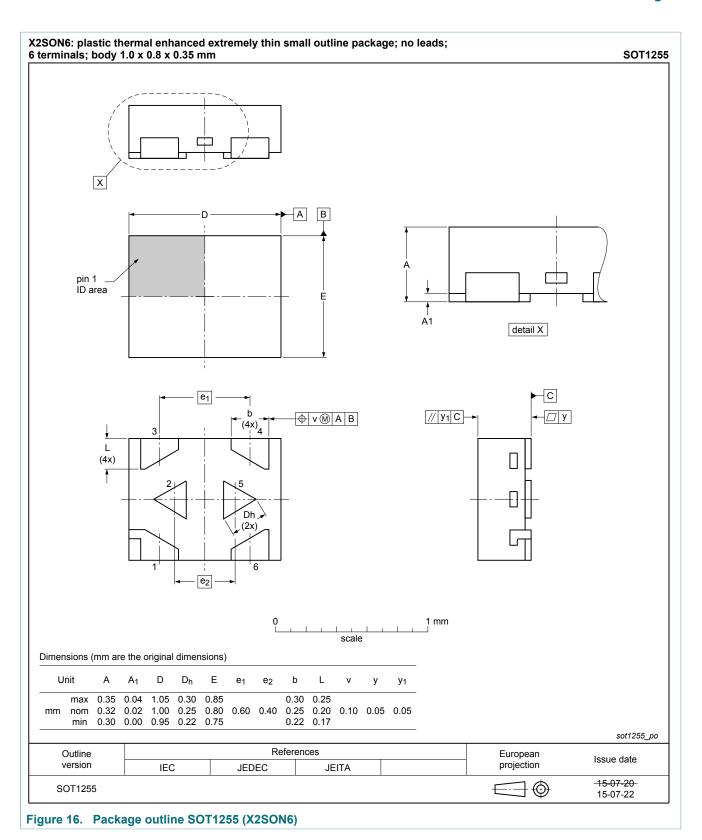


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# 13 Abbreviations

#### **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
74LVC2G34 v.10	20180223	Product data sheet	-	74LVC2G34 v.9
Modifications:	Nexperia.	is data sheet has been redesignee been adapted to the new con		, ,
74LVC2G34 v.9	20161215	Product data sheet	-	74LVC2G34 v.8
Modifications:	Table 7: The ma	aximum limits for leakage curre	ent and supply current ha	ive changed.
74LVC2G34 v.8	20160210	Product data sheet	-	74LVC2G34 v.7
Modifications:	Added type num	nber 74LVC2G34GX (SOT125	5/X2SON6).	
74LVC2G34 v.7	20120704	Product data sheet	-	74LVC2G34 v.6
Modifications:	<ul> <li>Package outline</li> </ul>	drawing of SOT886 (Figure 1	2) modified.	
74LVC2G34 v.6	20111129	Product data sheet	-	74LVC2G34 v.5
Modifications:	<ul> <li>Legal pages upo</li> </ul>	dated.		
74LVC2G34 v.5	20100902	Product data sheet	-	74LVC2G34 v.4
74LVC2G34 v.4	20070720	Product data sheet	-	74LVC2G34 v.3
74LVC2G34 v.3	20070321	Product data sheet	-	74LVC2G34 v.2
74LVC2G34 v.2	20040910	Product specification	-	74LVC2G34 v.1
74LVC2G34 v.1	20030725	Product specification	-	-

## 15 Legal information

#### 15.1 Data sheet status

Document status <sup>[1][2]</sup>	Product status <sup>[3]</sup>	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.
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