Triple inverter
Rev. 10 — 6 July 2012

Product data sheet

#### 1. **General description**

The 74LVC3GU04 provides three inverters. Each inverter is a single stage with unbuffered output.

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.

#### **Features and benefits** 2.

- Wide supply voltage range from 1.65 V to 5.5 V
- 5 V tolerant input/output for interfacing with 5 V logic
- High noise immunity
- ESD protection:
  - ◆ HBM JESD22-A114F exceeds 2000 V
  - MM JESD22-A115-A exceeds 200 V
- ±24 mA output drive at V<sub>CC</sub> = 3.0 V
- CMOS low power consumption
- Latch-up performance exceeds 250 mA
- Multiple package options
- Specified from -40 °C to +85 °C and from -40 °C to +125 °C.

#### **Ordering information** 3.

Table 1. **Ordering information** 

Type number	Package							
	Temperature range	Name	Description	Version				
74LVC3GU04DP	–40 °C to +125 °C	TSSOP8	plastic thin shrink small outline package; 8 leads; body width 3 mm; lead length 0.5 mm	SOT505-2				
74LVC3GU04DC	–40 °C to +125 °C	VSSOP8	plastic very thin shrink small outline package; 8 leads; body width 2.3 mm	SOT765-1				
74LVC3GU04GT	–40 °C to +125 °C	XSON8	plastic extremely thin small outline package; no leads; 8 terminals; body 1 $\times$ 1.95 $\times$ 0.5 mm	SOT833-1				
74LVC3GU04GF	–40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 $\times$ 1 $\times$ 0.5 mm	SOT1089				
74LVC3GU04GD	–40 °C to +125 °C	XSON8U	plastic extremely thin small outline package; no leads; 8 terminals; UTLP based; body $3 \times 2 \times 0.5$ mm	SOT996-2				



 Table 1.
 Ordering information ...continued

Type number	Package							
	Temperature range	Name	Description	Version				
74LVC3GU04GM	–40 °C to +125 °C	XQFN8	plastic, extremely thin quad flat package; no leads; 8 terminals; body 1.6 $\times$ 1.6 $\times$ 0.5 mm	SOT902-2				
74LVC3GU04GN	–40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.2 $\times$ 1.0 $\times$ 0.35 mm	SOT1116				
74LVC3GU04GS	–40 °C to +125 °C	XSON8	extremely thin small outline package; no leads; 8 terminals; body 1.35 $\times$ 1.0 $\times$ 0.35 mm	SOT1203				

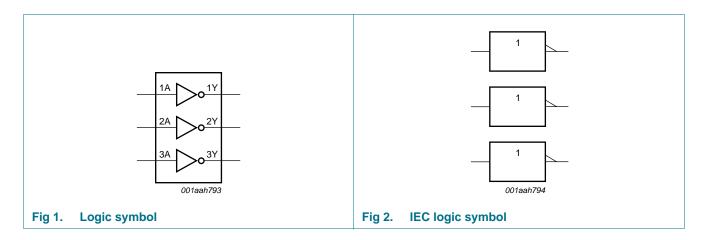
# 4. Marking

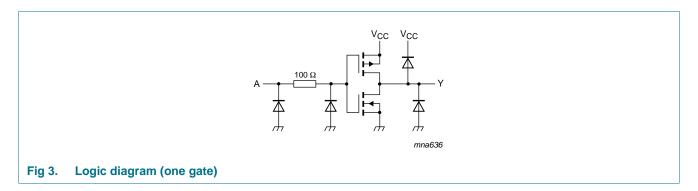
Table 2. Marking codes

Type number	Marking code[1]
74LVC3GU04DP	VU04
74LVC3GU04DC	VU4
74LVC3GU04GT	VU4
74LVC3GU04GF	YD
74LVC3GU04GD	VU4
74LVC3GU04GM	VU4
74LVC3GU04GN	YD
74LVC3GU04GS	YD

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

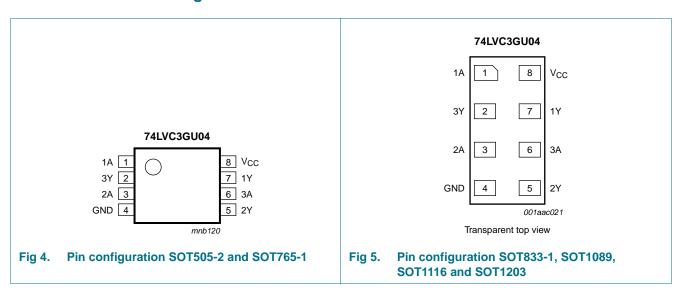
# 5. Functional diagram

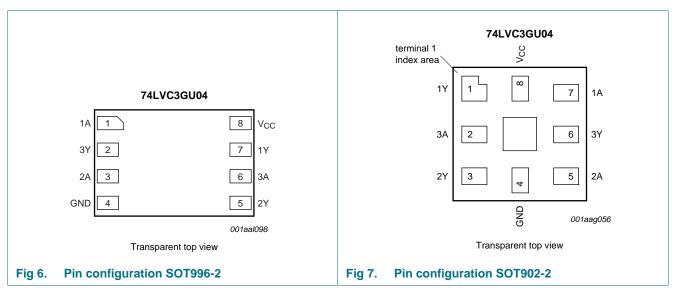




# 6. Pinning information

### 6.1 Pinning





74LVC3GU04

All information provided in this document is subject to legal disclaimers.

### 6.2 Pin description

Table 3. Pin description

Symbol	Pin	Description		
	SOT505-2, SOT765-1, SOT833-1, SOT1089, SOT996-2, SOT1116 and SOT1203	SOT902-2		
1A, 2A, 3A	1, 3, 6	7, 5, 2	data input	
GND	4	4	ground (0 V)	
1Y, 2Y, 3Y	7, 5, 2	1, 3, 6	data output	
$V_{CC}$	8	8	supply voltage	

# 7. Functional description

Table 4. Function table [1]

Input nA	Output nY
L	Н
Н	L

<sup>[1]</sup> 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 <sub>CC</sub>	supply voltage		-0.5	+6.5	V
VI	input voltage		[1] -0.5	+6.5	V
$V_{O}$	output voltage	Active mode	[ <u>1</u> ] -0.5	$V_{CC} + 0.5$	V
I <sub>IK</sub>	input clamping current	V <sub>I</sub> < 0 V	-50	-	mA
I <sub>OK</sub>	output clamping current	$V_O > V_{CC}$ or $V_O < 0 V$	-	±50	mA
Io	output current	$V_O = 0 V \text{ to } V_{CC}$	-	±50	mA
I <sub>CC</sub>	supply current		-	100	mA
$I_{GND}$	ground current		-100	-	mA
P <sub>tot</sub>	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

<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 packages: above 55 °C the value of P<sub>tot</sub> derates linearly with 2.5 mW/K.
For VSSOP8 packages: above 110 °C the value of P<sub>tot</sub> derates linearly with 8.0 mW/K.
For XSON8, XSON8U and XQFN8 packages: above 118 °C the value of P<sub>tot</sub> derates linearly with 7.8 mW/K.

# 9. Recommended operating conditions

Table 6. Operating conditions

Symbol	Parameter	Conditions	Min	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 <sub>CC</sub> = 0 V	0	5.5	V
T <sub>amb</sub>	ambient temperature		-40	+125	°C
$\Delta t/\Delta V$	input transition rise and fall rate	$V_{CC} = 1.65 \text{ V to } 2.7 \text{ V}$	-	20	ns/V
		$V_{CC} = 2.7 \text{ V to } 5.5 \text{ V}$	-	10	ns/V

# 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 <sub>CC</sub> = 1.65 V to 5.5 V	$0.75 \times V_{CC}$	-	-	V
$V_{IL}$	LOW-level input voltage	V <sub>CC</sub> = 1.65 V to 5.5 V	-	-	$0.25 \times V_{CC}$	V
V <sub>OH</sub>	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = -100 \mu A;$ $V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}$	V <sub>CC</sub> - 0.1	-	-	V
		$I_{O} = -4 \text{ mA}; V_{CC} = 1.65 \text{ V}$	1.2	-	-	V
		$I_{O} = -8 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.9	-	-	V
		$I_O = -12$ mA; $V_{CC} = 2.7$ V	2.2	-	-	V
		$I_O = -24$ mA; $V_{CC} = 3.0$ V	2.3	-	-	V
		$I_O = -32$ mA; $V_{CC} = 4.5$ V	3.8	-	-	V
$V_{OL}$	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = 100 \mu A;$ $V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}$	-	-	0.1	V
		$I_O = 4 \text{ mA}; V_{CC} = 1.65 \text{ V}$	-	-	0.45	V
		$I_O = 8 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.3	V
		$I_0 = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	-	0.4	V
		$I_O = 24 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.55	V
		$I_O = 32 \text{ mA}; V_{CC} = 4.5 \text{ V}$	-	-	0.55	V
l <sub>l</sub>	input leakage current	$V_{I} = 5.5 \text{ V or GND};$ $V_{CC} = 0 \text{ V to } 5.5 \text{ V}$	-	±0.1	±5	μΑ
l <sub>cc</sub>	supply current	$V_I = 5.5 \text{ V or GND};$ $V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}; I_O = 0 \text{ A}$	-	0.1	10	μА
C <sub>I</sub>	input capacitance		-	5	-	pF

 Table 7.
 Static characteristics ...continued

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

Symbol	Parameter	Conditions	Min	Typ[1]	Max	Unit
T <sub>amb</sub> = -40	°C to +125 °C					
V <sub>IH</sub>	HIGH-level input voltage	V <sub>CC</sub> = 1.65 V to 5.5 V	$0.8 \times V_{CC}$	-	-	V
$V_{IL}$	LOW-level input voltage	V <sub>CC</sub> = 1.65 V to 5.5 V	-	-	$0.2 \times V_{CC}$	V
V <sub>OH</sub>	HIGH-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = -100 \mu A;$ $V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}$	V <sub>CC</sub> - 0.1	-	-	V
		$I_{O} = -4 \text{ mA}; V_{CC} = 1.65 \text{ V}$	0.95	-	-	V
		$I_{O} = -8 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.7	-	-	V
		$I_{O} = -12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	1.9	-	-	V
		$I_O = -24$ mA; $V_{CC} = 3.0$ V	2.0	-	-	V
		$I_O = -32$ mA; $V_{CC} = 4.5$ V	3.4	-	-	V
V <sub>OL</sub>	LOW-level output voltage	$V_I = V_{IH}$ or $V_{IL}$				
		$I_O = 100 \mu A;$ $V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}$	-	-	0.1	V
		$I_O = 4 \text{ mA}; V_{CC} = 1.65 \text{ V}$	-	-	0.70	V
		$I_{O} = 8 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.45	V
		$I_O = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	-	0.60	V
		$I_O = 24 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.80	V
		$I_O = 32 \text{ mA}; V_{CC} = 4.5 \text{ V}$	-	-	0.80	V
I	input leakage current	$V_1 = 5.5 \text{ V or GND};$ $V_{CC} = 0 \text{ V to } 5.5 \text{ V}$	-	-	±20	μА
СС	supply current	$V_I = 5.5 \text{ V or GND};$ $V_{CC} = 1.65 \text{ V to } 5.5 \text{ V}; I_O = 0 \text{ A}$	-	-	40	μА

<sup>[1]</sup> All typical values are measured at  $T_{amb}$  = 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			–40 °C to +85 °C			-40 °C	-40 °C to +125 °C	
				Min	Typ[1]	Max	Min	Max	
t <sub>pd</sub>	propagation delay	nA to nY; see Figure 8	[2]						
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$		0.5	2.3	5.0	0.5	6.3	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$		0.3	1.8	4.0	0.3	4.0	ns
		V <sub>CC</sub> = 2.7 V		0.3	2.6	4.5	0.3	5.6	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$		0.3	2.3	3.7	0.3	4.5	ns
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}$		0.3	1.7	3.0	0.3	3.8	ns

 Table 8.
 Dynamic characteristics ...continued

Voltages are referenced to GND (ground = 0 V). For test circuit see Figure 9.

Symbol	Symbol Parameter Conditions -		-40 °C to +85 °C			–40 °C to +125 °C		Unit	
				Min	Typ[1]	Max	Min	Max	
$C_{PD}$	power dissipation capacitance	$V_I = GND \text{ to } V_{CC}; V_{CC} = 3.3 \text{ V}$	[3]	-	7	-	-	-	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  $\mu W$ ).

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

 $f_i$  = input frequency in MHz;

f<sub>o</sub> = output frequency in MHz;

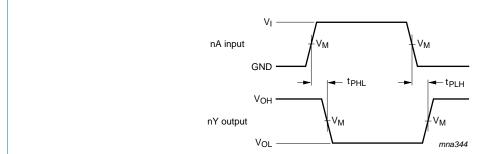
C<sub>L</sub> = output load capacitance in pF;

 $V_{CC}$  = supply voltage in V;

N = number of inputs switching;

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

## 12. Waveforms



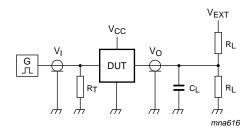
Measurement points are given in Table 9.

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

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

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	$0.5 \times V_{CC}$	0.5 × V <sub>CC</sub>
2.3 V to 2.7 V	$0.5 \times V_{CC}$	0.5 × V <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	$0.5 \times V_{CC}$	0.5 × V <sub>CC</sub>



Test data is given in Table 10.

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  $Z_0$  of the pulse generator.

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

Fig 9. Test circuit for measuring switching times

Table 10. Test data

Supply voltage	Input		Load		V <sub>EXT</sub>
V <sub>CC</sub>	VI	$t_r = t_f$	CL	$R_L$	t <sub>PLH</sub> , t <sub>PHL</sub>
1.65 V to 1.95 V	V <sub>CC</sub>	$\leq$ 2.0 ns	30 pF	1 kΩ	open
2.3 V to 2.7 V	$V_{CC}$	$\leq$ 2.0 ns	30 pF	$500~\Omega$	open
2.7 V	2.7 V	$\leq$ 2.5 ns	50 pF	$500~\Omega$	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

### 13. Additional characteristics

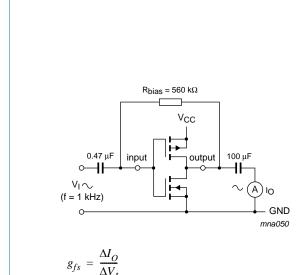
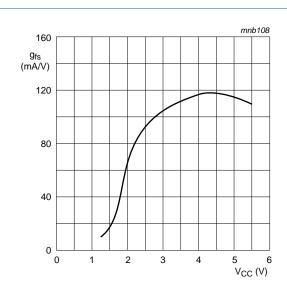


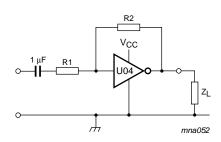
Fig 10. Test set-up for measuring forward transconductance



 $T_{amb} = 25 \, ^{\circ}C.$ 

Fig 11. Typical forward transconductance as a function of supply voltage

# 14. Application information



 $Z_L > 10 \text{ k}\Omega$ 

 $R1 \geq 3 \; k\Omega$ 

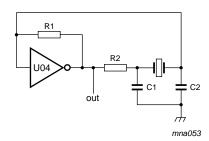
 $R2 \leq 1~M\Omega$ 

Open loop gain: Gol = 20

$$\mbox{Voltage gain: } G_v = -\frac{G_{ol}}{l + \frac{Rl}{R2}(l + G_{ol})} \label{eq:gain:gain}$$

$$\begin{split} V_{o(p\text{-}p)} &= V_{CC} - 1.5 \text{ V centered at } 0.5 \times V_{CC} \\ \text{Unity gain bandwidth product is 5 MHz.} \end{split}$$

Fig 12. Linear amplifier application



C1 = 47 pF

C2 = 22 pF

R1 = 1 M $\Omega$  to 10 M $\Omega$ 

R2 optimum value depends on the frequency and required stability against changes in  $V_{CC}$  or average minimum  $I_{CC}$  ( $I_{CC}$  = 2 mA at  $V_{CC}$  = 3.3 V and f = 10 MHz).

Fig 13. Crystal oscillator application

Remark: All values given are typical values unless otherwise specified.

74LVC3GU04

All information provided in this document is subject to legal disclaimers.

# 15. Package outline

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

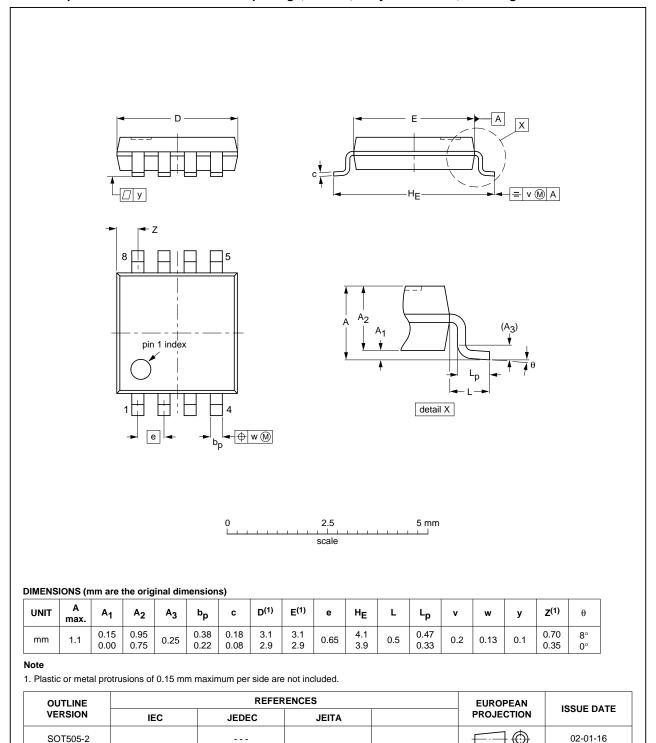
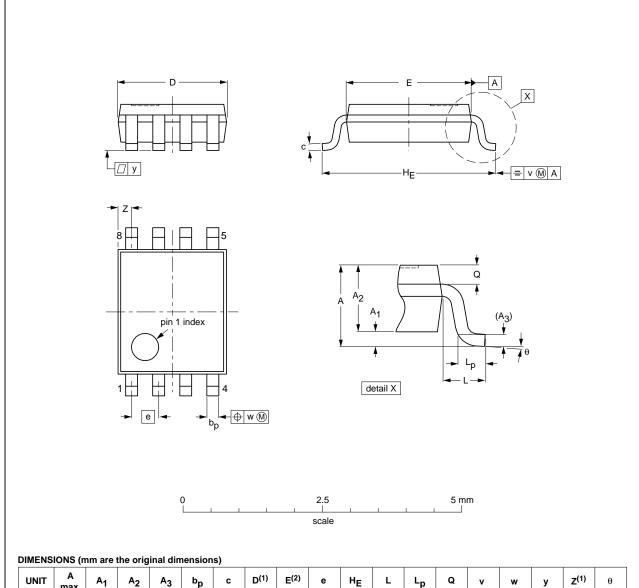


Fig 14. Package outline SOT505-2 (TSSOP8)

All information provided in this document is subject to legal disclaimers.

#### 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	Q	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 15. Package outline SOT765-1 (VSSOP8)

74LVC3GU04

All information provided in this document is subject to legal disclaimers.

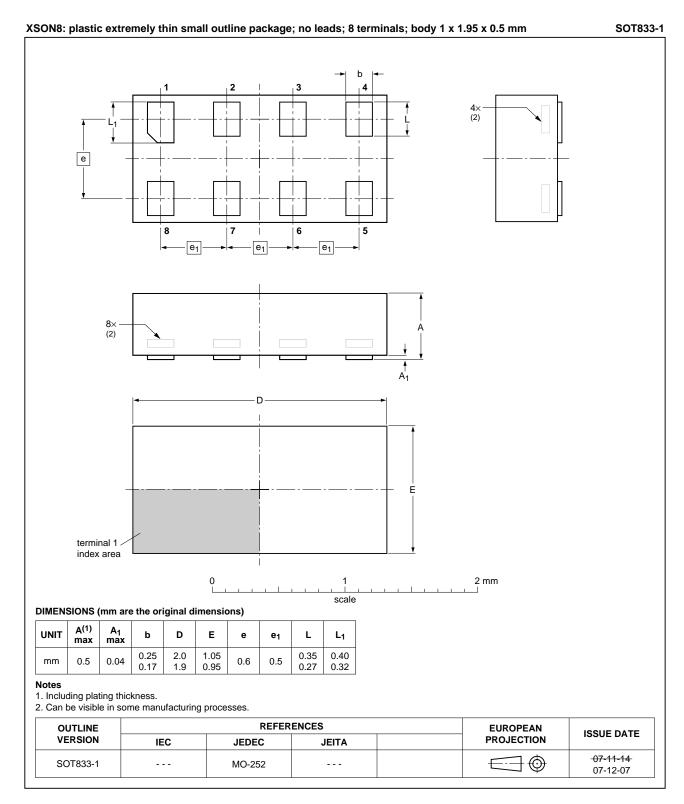


Fig 16. Package outline SOT833-1 (XSON8)

74LVC3GU04 All information provided in this document is subject to legal disclaimers.

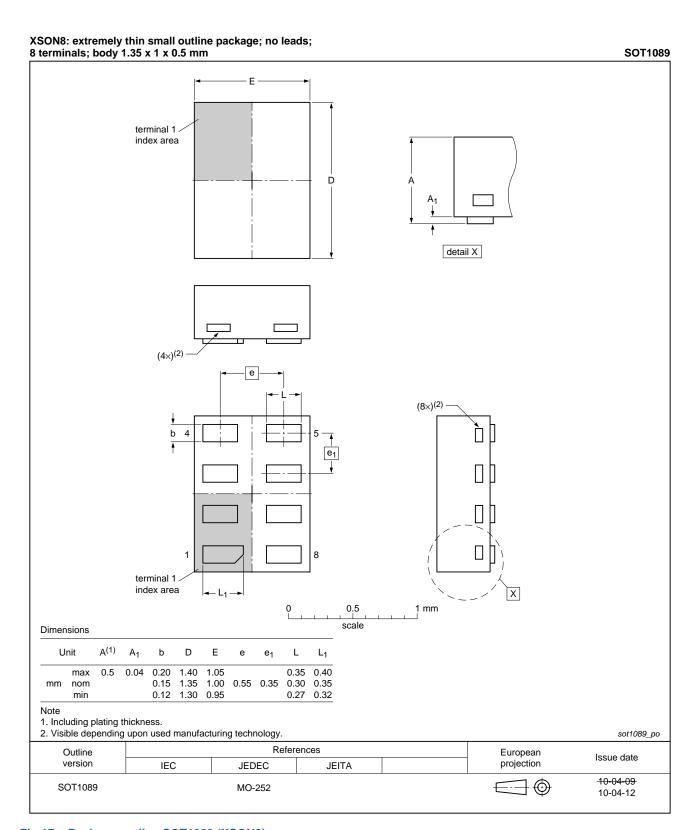


Fig 17. Package outline SOT1089 (XSON8)

74LVC3GU04 All information provided in this document is subject to legal disclaimers.

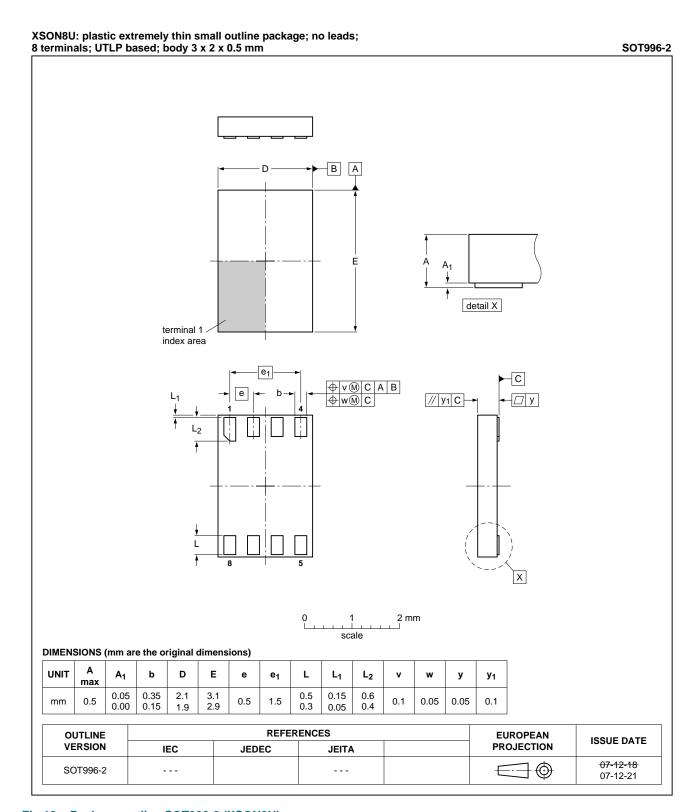


Fig 18. Package outline SOT996-2 (XSON8U)

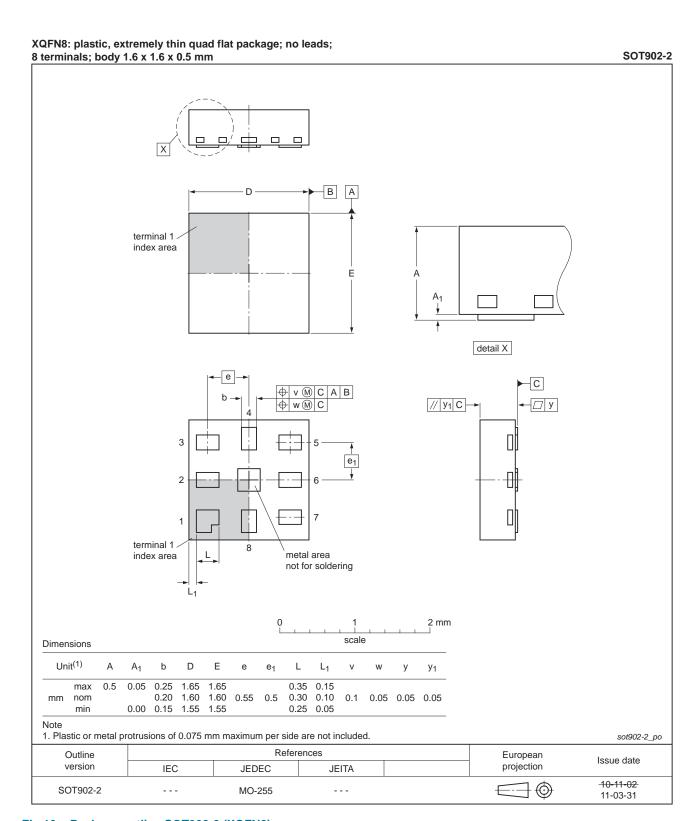


Fig 19. Package outline SOT902-2 (XQFN8)

All information provided in this document is subject to legal disclaimers.

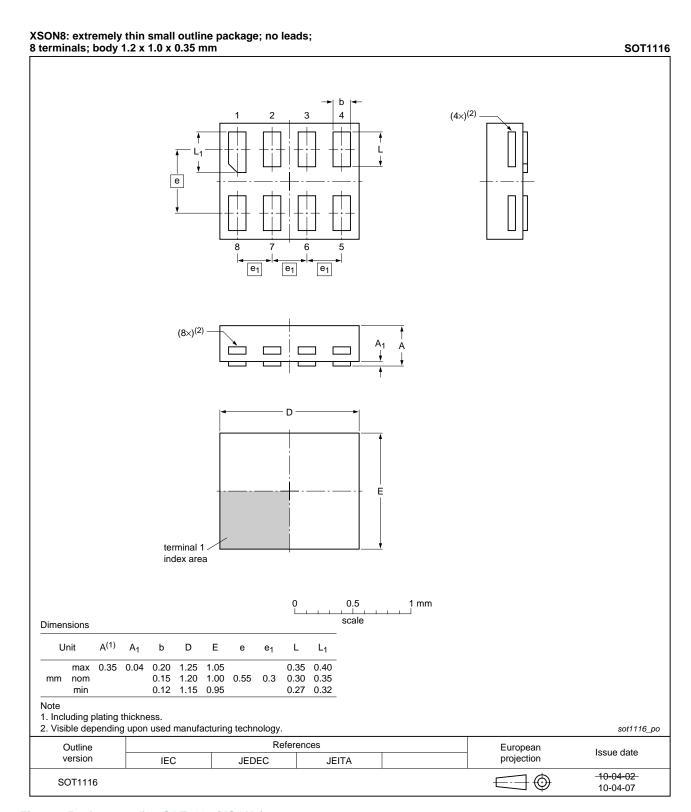


Fig 20. Package outline SOT1116 (XSON8)

All information provided in this document is subject to legal disclaimers.

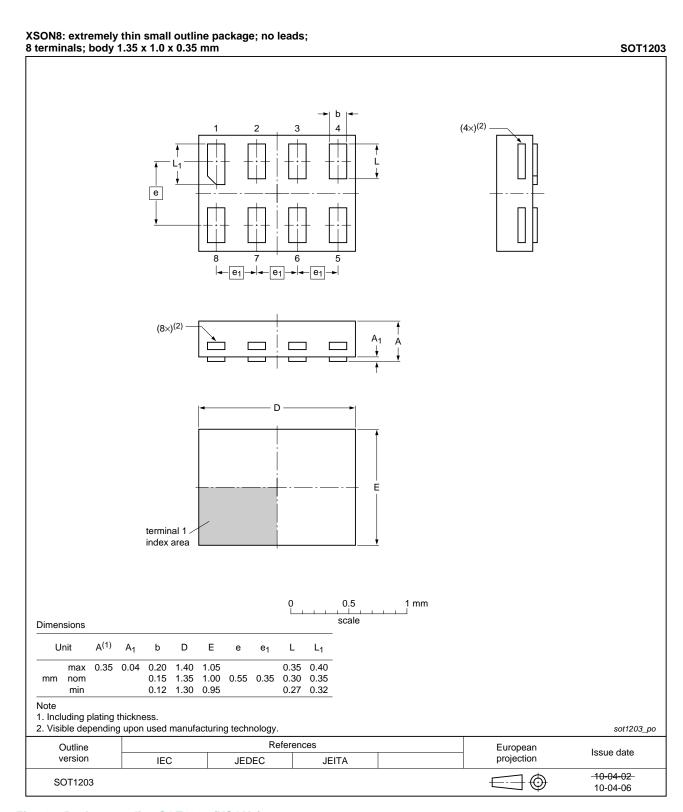


Fig 21. Package outline SOT1203 (XSON8)

All information provided in this document is subject to legal disclaimers.

# 16. Abbreviations

#### Table 11. Abbreviations

Acronym	Description
DUT	Device Under Test
ESD	ElectroStatic Discharge
HBM	Human Body Model
MM	Machine Model

# 17. Revision history

### Table 12. Revision history

	_			
Document ID	Release date	Data sheet status	Change notice	Supersedes
74LVC3GU04 v.10	20120706	Product data sheet	-	74LVC3GU04 v.9
Modifications:	<ul> <li>For type nu</li> </ul>	mber 74LVC3GU04GM the	SOT code has changed	d to SOT902-2.
74LVC3GU04 v.9	20111123	Product data sheet	-	74LVC3GU04 v.8
Modifications:	<ul> <li>Legal pages</li> </ul>	s updated.		
74LVC3GU04 v.8	20101110	Product data sheet	-	74LVC3GU04 v.7
74LVC3GU04 v.7	20091111	Product data sheet	-	74LVC3GU04 v.6
74LVC3GU04 v.6	20080304	Product data sheet	-	74LVC3GU04 v.5
74LVC3GU04 v.5	20071005	Product data sheet	-	74LVC3GU04 v.4
74LVC3GU04 v.4	20070315	Product data sheet	-	74LVC3GU04 v.3
74LVC3GU04 v.3	20050201	Product data sheet	-	74LVC3GU04 v.2
74LVC3GU04 v.2	20041027	Product data sheet	-	74LVC3GU04 v.1
74LVC3GU04 v.1	20040512	Product data sheet	-	-

# 18. Legal information

#### 18.1 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 <a href="http://www.nxp.com">http://www.nxp.com</a>.

#### 18.2 Definitions

Draft — The document is a draft version only. The content is still under internal review and subject to formal approval, which may result in modifications or additions. NXP Semiconductors does not give any representations or warranties as to the accuracy or completeness of information included herein and shall have no liability for the consequences of use of such information.

Short data sheet — A short data sheet is an extract from a full data sheet with the same product type number(s) and title. A short data sheet is intended for quick reference only and should not be relied upon to contain detailed and full information. For detailed and full information see the relevant full data sheet, which is available on request via the local NXP Semiconductors sales office. In case of any inconsistency or conflict with the short data sheet, the full data sheet shall prevail.

**Product specification** — The information and data provided in a Product data sheet shall define the specification of the product as agreed between NXP Semiconductors and its customer, unless NXP Semiconductors and customer have explicitly agreed otherwise in writing. In no event however, shall an agreement be valid in which the NXP Semiconductors product is deemed to offer functions and qualities beyond those described in the Product data sheet.

#### 18.3 Disclaimers

Limited warranty and liability — Information in this document is believed to be accurate and reliable. However, NXP Semiconductors does not give any representations or warranties, expressed or implied, as to the accuracy or completeness of such information and shall have no liability for the consequences of use of such information. NXP Semiconductors takes no responsibility for the content in this document if provided by an information source outside of NXP Semiconductors.

In no event shall NXP Semiconductors be liable for any indirect, incidental, punitive, special or consequential damages (including - without limitation - lost profits, lost savings, business interruption, costs related to the removal or replacement of any products or rework charges) whether or not such damages are based on tort (including negligence), warranty, breach of contract or any other legal theory.

Notwithstanding any damages that customer might incur for any reason whatsoever, NXP Semiconductors' aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the *Terms and conditions of commercial sale* of NXP Semiconductors.

Right to make changes — NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Suitability for use — NXP Semiconductors products are not designed, authorized or warranted to be suitable for use in life support, life-critical or safety-critical systems or equipment, nor in applications where failure or malfunction of an NXP Semiconductors product can reasonably be expected to result in personal injury, death or severe property or environmental damage. NXP Semiconductors and its suppliers accept no liability for inclusion and/or use of NXP Semiconductors products in such equipment or applications and therefore such inclusion and/or use is at the customer's own risk

**Applications** — Applications that are described herein for any of these products are for illustrative purposes only. NXP Semiconductors makes no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Customers are responsible for the design and operation of their applications and products using NXP Semiconductors products, and NXP Semiconductors accepts no liability for any assistance with applications or customer product design. It is customer's sole responsibility to determine whether the NXP Semiconductors product is suitable and fit for the customer's applications and products planned, as well as for the planned application and use of customer's third party customer(s). Customers should provide appropriate design and operating safeguards to minimize the risks associated with their applications and products.

NXP Semiconductors does not accept any liability related to any default, damage, costs or problem which is based on any weakness or default in the customer's applications or products, or the application or use by customer's third party customer(s). Customer is responsible for doing all necessary testing for the customer's applications and products using NXP Semiconductors products in order to avoid a default of the applications and the products or of the application or use by customer's third party customer(s). NXP does not accept any liability in this respect.

Limiting values — Stress above one or more limiting values (as defined in the Absolute Maximum Ratings System of IEC 60134) will cause permanent damage to the device. Limiting values are stress ratings only and (proper) operation of the device at these or any other conditions above those given in the Recommended operating conditions section (if present) or the Characteristics sections of this document is not warranted. Constant or repeated exposure to limiting values will permanently and irreversibly affect the quality and reliability of the device.

Terms and conditions of commercial sale — NXP Semiconductors products are sold subject to the general terms and conditions of commercial sale, as published at <a href="http://www.nxp.com/profile/terms">http://www.nxp.com/profile/terms</a>, unless otherwise agreed in a valid written individual agreement. In case an individual agreement is concluded only the terms and conditions of the respective agreement shall apply. NXP Semiconductors hereby expressly objects to applying the customer's general terms and conditions with regard to the purchase of NXP Semiconductors products by customer.

**No offer to sell or license** — Nothing in this document may be interpreted or construed as an offer to sell products that is open for acceptance or the grant, conveyance or implication of any license under any copyrights, patents or other industrial or intellectual property rights.

74LVC3GU04

All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2012. All rights reserved.

19 of 21

**Export control** — This document as well as the item(s) described herein may be subject to export control regulations. Export might require a prior authorization from competent authorities.

Non-automotive qualified products — Unless this data sheet expressly states that this specific NXP Semiconductors product is automotive qualified, the product is not suitable for automotive use. It is neither qualified nor tested in accordance with automotive testing or application requirements. NXP Semiconductors accepts no liability for inclusion and/or use of non-automotive qualified products in automotive equipment or applications.

In the event that customer uses the product for design-in and use in automotive applications to automotive specifications and standards, customer (a) shall use the product without NXP Semiconductors' warranty of the product for such automotive applications, use and specifications, and (b) whenever customer uses the product for automotive applications beyond

NXP Semiconductors' specifications such use shall be solely at customer's own risk, and (c) customer fully indemnifies NXP Semiconductors for any liability, damages or failed product claims resulting from customer design and use of the product for automotive applications beyond NXP Semiconductors' standard warranty and NXP Semiconductors' product specifications.

**Translations** — A non-English (translated) version of a document is for reference only. The English version shall prevail in case of any discrepancy between the translated and English versions.

#### 18.4 Trademarks

Notice: All referenced brands, product names, service names and trademarks are the property of their respective owners.

#### 19. Contact information

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

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

# 20. Contents

1	General description
2	Features and benefits
3	Ordering information 1
4	Marking 2
5	Functional diagram 2
6	Pinning information 3
6.1	Pinning
6.2	Pin description 4
7	Functional description 4
8	Limiting values 4
9	Recommended operating conditions 5
10	Static characteristics 5
11	Dynamic characteristics 6
12	Waveforms
13	Additional characteristics 9
14	Application information 9
15	Package outline
16	Abbreviations
17	Revision history
18	Legal information
18.1	Data sheet status
18.2	Definitions
18.3	Disclaimers
18.4	Trademarks20
19	Contact information
20	Contents

Please be aware that important notices concerning this document and the product(s) described herein, have been included in section 'Legal information'.