

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from, Europe, America and south Asia, supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts, Customers Priority, Honest Operation, and Considerate Service", our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip, ALPS, ROHM, Xilinx, Pulse, ON, Everlight and Freescale. Main products comprise IC, Modules, Potentiometer, IC Socket, Relay, Connector. Our parts cover such applications as commercial, industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China









Important notice

Dear Customer,

On 7 February 2017 the former NXP Standard Product business became a new company with the tradename **Nexperia**. Nexperia is an industry leading supplier of Discrete, Logic and PowerMOS semiconductors with its focus on the automotive, industrial, computing, consumer and wearable application markets

In data sheets and application notes which still contain NXP or Philips Semiconductors references, use the references to Nexperia, as shown below.

Instead of http://www.nxp.com, http://www.nxp.com, http://www.nexperia.com, http://www.nexperia.com)

Instead of sales.addresses@www.nxp.com or sales.addresses@www.semiconductors.philips.com, use salesaddresses@nexperia.com (email)

Replace the copyright notice at the bottom of each page or elsewhere in the document, depending on the version, as shown below:

- © NXP N.V. (year). All rights reserved or © Koninklijke Philips Electronics N.V. (year). All rights reserved

Should be replaced with:

- © Nexperia B.V. (year). All rights reserved.

If you have any questions related to the data sheet, please contact our nearest sales office via e-mail or telephone (details via **salesaddresses@nexperia.com**). Thank you for your cooperation and understanding,

Kind regards,

Team Nexperia

74LVC157A

Quad 2-input multiplexer Rev. 7 — 25 November 2011

Product data sheet

General description 1.

The 74LVC157A is a quad 2-input multiplexer which select four bits of data from two sources under the control of a common select input (S). The four outputs present the selected data in the true (non-inverted) form. The enable input (E) is active LOW. When pin E is HIGH, all of the outputs (1Y to 4Y) are forced LOW regardless of all the other input conditions. Moving the data from two groups of registers to four common output buses is a common use of the 74LVC157A. The state of the common data select input (S) determines the particular register from which the data comes. It can also be used as function generator.

It is useful for implementing highly irregular logic by generating any 4 of the 16 different functions of two variables with one variable common.

The device is the logic implementation of a 4-pole, 2-position switch, where the position of the switch is determined by the logic levels applied to pin S.

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.

2. Features and benefits

- 5 V tolerant inputs for interfacing with 5 V logic
- Wide supply voltage range from 1.2 V to 3.6 V
- CMOS low power consumption
- Direct interface with TTL levels
- Complies with JEDEC standard:
 - ◆ JESD8-7A (1.65 V to 1.95 V)
 - ◆ JESD8-5A (2.3 V to 2.7 V)
 - ◆ JESD8-C/JESD36 (2.7 V to 3.6 V)
- ESD protection:
 - ◆ HBM JESD22-A114F exceeds 2000 V
 - MM JESD22-A115-B exceeds 200 V
 - CDM JESD22-C101E exceeds 1000 V
- Specified from -40 °C to +85 °C and -40 °C to +125 °C

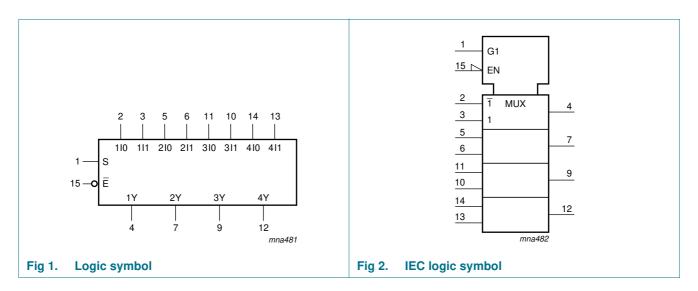


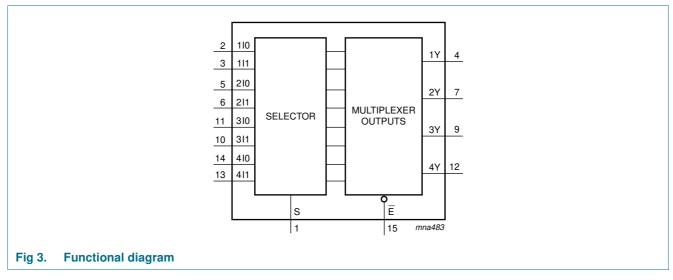
3. Ordering information

Table 1. Ordering information

Type number	Package			
	Temperature range	Name	Description	Version
74LVC157AD	–40 °C to +125 °C	SO16	plastic small outline package; 16 leads; body width 3.9 mm	SOT109-1
74LVC157ADB	–40 °C to +125 °C	SSOP16	plastic shrink small outline package; 16 leads; body width 5.3 mm	SOT338-1
74LVC157APW	–40 °C to +125 °C	TSSOP16	plastic thin shrink small outline package; 16 leads; body width 4.4 mm	SOT403-1
74LVC157ABQ	–40 °C to +125 °C	DHVQFN16	plastic dual In-line compatible thermal enhanced very thin quad flat package; no leads; 16 terminals; body 2.5 \times 3.5 \times 0.85 mm	SOT763-1

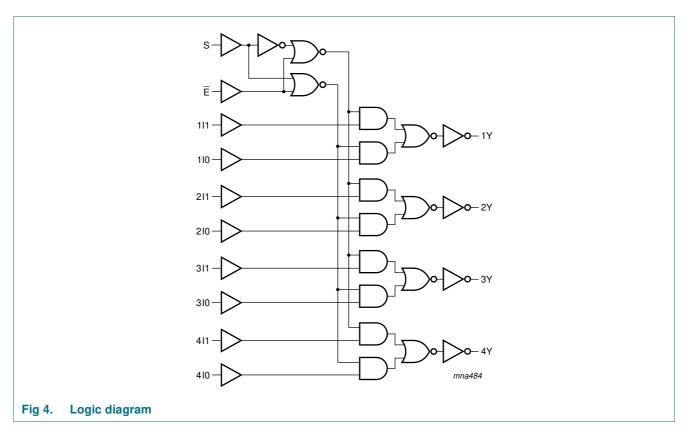
4. Functional diagram





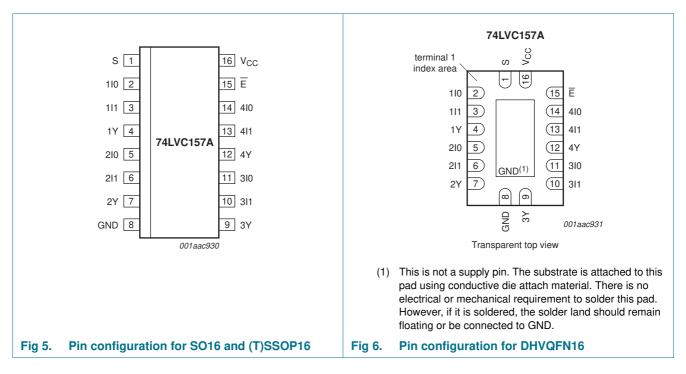
NXP Semiconductors 74LVC157A

Quad 2-input multiplexer



5. Pinning information

5.1 Pinning



5.2 Pin description

Table 2. Pin description

Symbol	Pin	Description
S	1	common data select input
110	2	data input from source 0
111	3	data input from source 1
1Y	4	multiplexer output
210	5	data input from source 0
211	6	data input from source 1
2Y	7	multiplexer output
GND	8	ground (0 V)
3Y	9	multiplexer output
311	10	data input from source 1
310	11	data input from source 0
4Y	12	multiplexer output
411	13	data input from source 1
410	14	data input from source 0
Ē	15	enable input (active LOW)
V _{CC}	16	supply voltage
-		

6. Functional description

Table 3. Function table[1]

Input				Output
E	S	nI0	nl1	nY
Н	X	X	X	L
L	L	L	X	L
L	L	Н	X	Н
L	Н	X	L	L
L	Н	Χ	Н	Н

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

7. Limiting values

Table 4. 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	-50	-	mA
VI	input voltage		<u>[1]</u> –0.5	+6.5	V
l _{OK}	output clamping current	$V_O > V_{CC}$ or $V_O < 0$	-	±50	mA
Vo	output voltage		<u>[2]</u> –0.5	$V_{CC} + 0.5$	V
I _O	output current	$V_O = 0 V \text{ to } V_{CC}$	-	±50	mA
I _{CC}	supply current		-	100	mA
I _{GND}	ground current		-100	-	mA
T _{stg}	storage temperature		- 65	+150	°C
P _{tot}	total power dissipation	$T_{amb} = -40 ^{\circ}\text{C} \text{ to } +125 ^{\circ}\text{C}$	[3] _	500	mW

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

8. Recommended operating conditions

Table 5. Recommended operating conditions

Symbol	Parameter	Conditions	Min	Тур	Max	Unit
V_{CC}	supply voltage		1.65	-	3.6	V
		functional	1.2	-	-	V
V_{I}	input voltage		0	-	5.5	V
Vo	output voltage		0	-	V_{CC}	V
T _{amb}	ambient temperature		-40	-	+125	°C
$\Delta t/\Delta V$	input transition rise and fall	$V_{CC} = 1.65 \text{ V to } 2.7 \text{ V}$	0	-	20	ns/V
	rate	$V_{CC} = 2.7 \text{ V to } 3.6 \text{ V}$	0	-	10	ns/V

^[2] The output voltage ratings may be exceeded if the output current ratings are observed.

^[3] For SO16 packages: above 70 °C the value of P_D derates linearly with 8 mW/K. For (T)SSOP16 packages: above 60 °C the value of P_D derates linearly with 5.5 mW/K. For DHVQFN16 packages: above 60 °C the value of P_D derates linearly with 4.5 mW/K.

9. Static characteristics

Table 6. Static characteristics

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

		Conditions	-40 °C to +85 °C		JJ 0	-40 °C to	J + 123 O	Unit	
			Min	Typ[1]	Max	Min	Max		
V_{IH}	HIGH-level	V _{CC} = 1.2 V	1.08	-	-	1.08	-	٧	
	input voltage	V _{CC} = 1.65 V to 1.95 V	$0.65 \times V_{CC}$	-	-	$0.65 \times V_{CC}$	-	V	
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	1.7	-	-	1.7	-	V	
		V _{CC} = 2.7 V to 3.6 V	2.0	-	-	2.0	-	V	
V _{IL}	LOW-level	V _{CC} = 1.2 V	-	-	0.12	-	0.12	V	
	input voltage	V _{CC} = 1.65 V to 1.95 V	-	-	$0.35 \times V_{CC}$	-	$0.35 \times V_{CC}$	V	
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$	-	-	0.7	-	0.7	V	
		V _{CC} = 2.7 V to 3.6 V	-	-	0.8	-	0.8	V	
V_{OH}	HIGH-level	$V_I = V_{IH}$ or V_{IL}							
	output voltage	$I_O = -100 \mu A;$ $V_{CC} = 1.65 V \text{ to } 3.6 V$	V _{CC} - 0.2	-	-	$V_{CC}-0.3$	-	V	
		$I_O = -4 \text{ mA}; V_{CC} = 1.65 \text{ V}$	1.2	-	-	1.05	-	V	
		$I_{O} = -8 \text{ mA}; V_{CC} = 2.3 \text{ V}$	1.8	-	-	1.65	-	V	
		$I_{O} = -12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	2.2	-	-	2.05	-	V	
		$I_{O} = -18 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.4	-	-	2.25	-	V	
		$I_{O} = -24 \text{ mA}; V_{CC} = 3.0 \text{ V}$	2.2	-	-	2.0	-	V	
V_{OL}	LOW-level	$V_I = V_{IH}$ or V_{IL}							
	output voltage	$I_O = 100 \mu A;$ $V_{CC} = 1.65 \text{ V to } 3.6 \text{ V}$	-	-	0.2	-	0.3	V	
		$I_O = 4 \text{ mA}; V_{CC} = 1.65 \text{ V}$	-	-	0.45	-	0.65	V	
		$I_O = 8 \text{ mA}; V_{CC} = 2.3 \text{ V}$	-	-	0.6	-	0.8	V	
		$I_O = 12 \text{ mA}; V_{CC} = 2.7 \text{ V}$	-	-	0.4	-	0.6	V	
		$I_O = 24 \text{ mA}; V_{CC} = 3.0 \text{ V}$	-	-	0.55	-	0.8	V	
lı	input leakage current	$V_{CC} = 3.6 \text{ V}; V_I = 5.5 \text{ V or GND}$	-	±0.1	±5	-	±20	μΑ	
I _{CC}	supply current	V_{CC} = 3.6 V; V_{I} = V_{CC} or GND; I_{O} = 0 A	-	0.1	10	-	40	μА	
Δl _{CC}	additional supply current	per input pin; V_{CC} = 2.7 V to 3.6 V; V_I = V_{CC} - 0.6 V; I_O = 0 A	-	5	500	-	5000	μА	
C _I	input capacitance	$V_{CC} = 0 \text{ V to } 3.6 \text{ V};$ $V_{I} = \text{GND to } V_{CC}$	-	5.0	-	-	-	pF	

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

10. Dynamic characteristics

Table 7. Dynamic characteristics

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

Symbol	Parameter	Conditions		-40	°C to +8	5 °C	-40 °C to	+125 °C	Unit
				Min	Typ[1]	Max	Min	Max	
t _{pd}	propagation delay	nI0, nI1 to nY; see Figure 8	[2]						
		V _{CC} = 1.2 V		-	16	-	-	-	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$		1.0	4.8	10.2	1.0	11.8	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$		1.5	2.8	5.8	1.5	6.7	ns
		$V_{CC} = 2.7 \text{ V}$		1.0	2.9	5.9	1.0	7.5	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$		1.0	2.5	5.2	1.0	6.5	ns
		E to nY; see Figure 7	[2]						
		V _{CC} = 1.2 V		-	17	-	-	-	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$		0.5	4.8	12.8	0.5	14.7	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$		1.5	2.8	7.2	1.5	8.3	ns
		$V_{CC} = 2.7 \text{ V}$		1.0	2.9	7.8	1.0	10.0	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$		1.0	2.6	6.5	1.0	8.5	ns
		S to nY; see Figure 8	[2]						
		$V_{CC} = 1.2 \text{ V}$		-	16	-	-	-	ns
		$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$		1.0	5.1	12.4	1.0	14.3	ns
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$		1.5	3.0	7.0	1.5	8.1	ns
		$V_{CC} = 2.7 \text{ V}$		1.0	3.1	7.3	1.0	9.5	ns
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$		1.0	2.7	6.3	1.0	8.0	ns
$t_{sk(o)}$	output skew time	$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$	[3]	-	-	1.0	-	1.5	ns
C_{PD}	power dissipation	per input; $V_I = GND$ to V_{CC}	[4]						
	capacitance	$V_{CC} = 1.65 \text{ V to } 1.95 \text{ V}$		-	9.4	-	-	-	pF
		$V_{CC} = 2.3 \text{ V to } 2.7 \text{ V}$		-	12.8	-	-	-	pF
		$V_{CC} = 3.0 \text{ V to } 3.6 \text{ V}$		-	15.9	-	-	-	pF

^[1] Typical values are measured at T_{amb} = 25 °C and V_{CC} = 1.2 V, 1.8 V, 2.5 V, 2.7 V, and 3.3 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

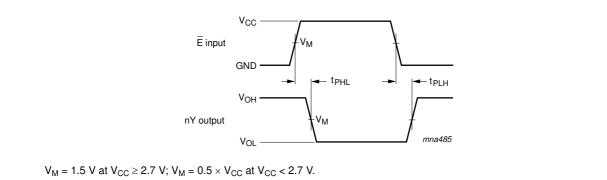
 $\sum (C_L \times V_{CC}^2 \times f_o) = \text{sum of outputs}$

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

^[3] Skew between any two outputs of the same package switching in the same direction. This parameter is guaranteed by design.

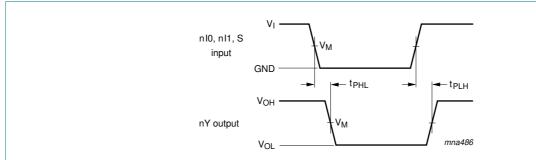
^[4] C_{PD} is used to determine the dynamic power dissipation (P_D in μW).

11. Waveforms



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

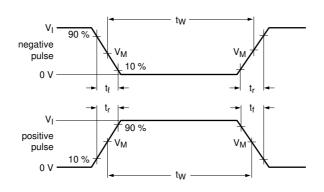
Fig 7. Enable input (\overline{E}) to output (nY) propagation delays

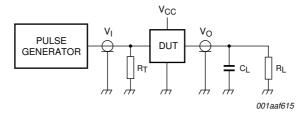


 V_M = 1.5 V at $V_{CC} \geq$ 2.7 V; V_M = 0.5 \times V_{CC} at V_{CC} < 2.7 V.

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

Fig 8. Data inputs (nl0, nl1) and common data select input (S) to output (nY) propagation delays





Test data is given in Table 8. 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 output impedance Z_0 of the pulse generator.

Fig 9. Test circuit for measuring switching times

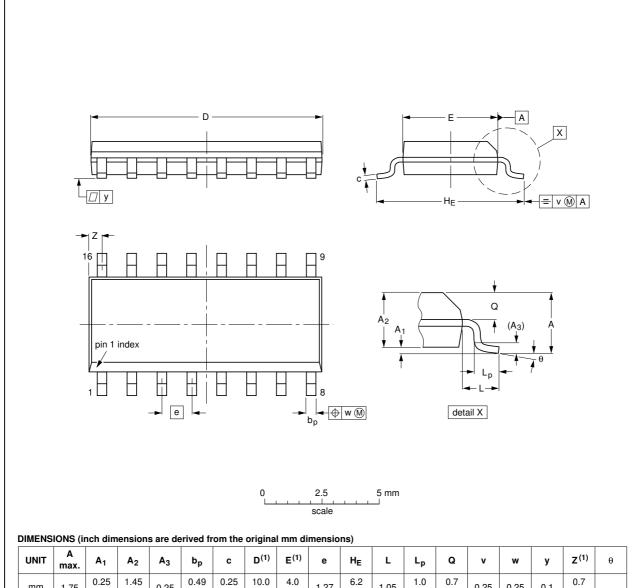
Table 8. Test data

Supply voltage	Input		Load	
	VI	t _r , t _f	CL	R _L
1.2 V	V _{CC}	≤ 2 ns	30 pF	1 kΩ
1.65 V to 1.95 V	V _{CC}	≤ 2 ns	30 pF	1 kΩ
2.3 V to 2.7 V	V _{CC}	≤ 2 ns	30 pF	500 Ω
2.7 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω
3.0 V to 3.6 V	2.7 V	≤ 2.5 ns	50 pF	500 Ω

12. Package outline

SO16: plastic small outline package; 16 leads; body width 3.9 mm

SOT109-1



UNIT	A max.	A ₁	A ₂	A ₃	bp	С	D ⁽¹⁾	E ⁽¹⁾	е	HE	٦	Lp	Q	v	w	у	Z ⁽¹⁾	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	10.0 9.8	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8°
inches	0.069	0.010 0.004	0.057 0.049	0.01		0.0100 0.0075	0.39 0.38	0.16 0.15	0.05	0.244 0.228	0.041	0.039 0.016		0.01	0.01	0.004	0.028 0.012	0°

Note

1. Plastic or metal protrusions of 0.15 mm (0.006 inch) maximum per side are not included.

15154	DDO IECTION	. ISSUE DATE
JEITA	PROJECTION	
		99-12-27 03-02-19

Fig 10. Package outline SOT109-1 (SO16)

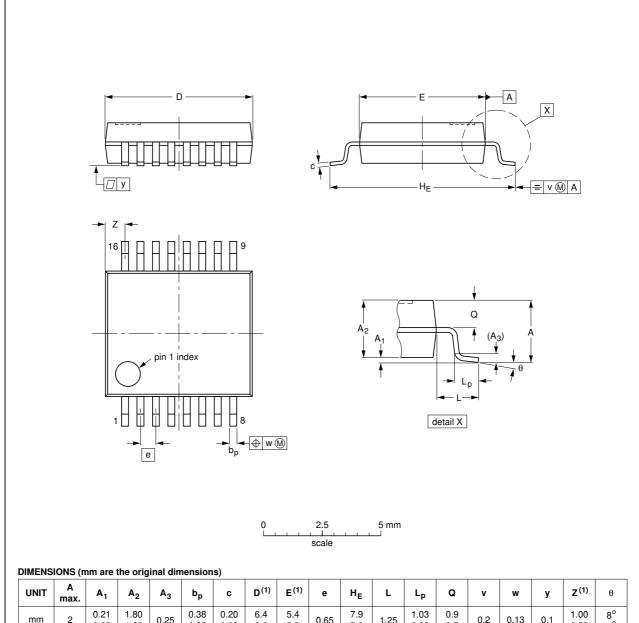
74LVC157A

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

© NXP B.V. 2011. All rights reserved.

SSOP16: plastic shrink small outline package; 16 leads; body width 5.3 mm

SOT338-1



							-,												
ι	JNIT	A max.	A ₁	A ₂	A ₃	b _p	С	D ⁽¹⁾	E ⁽¹⁾	е	HE	L	Lp	Q	v	w	у	Z ⁽¹⁾	θ
	mm	2	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	6.4 6.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	1.00 0.55	8° 0°

Note

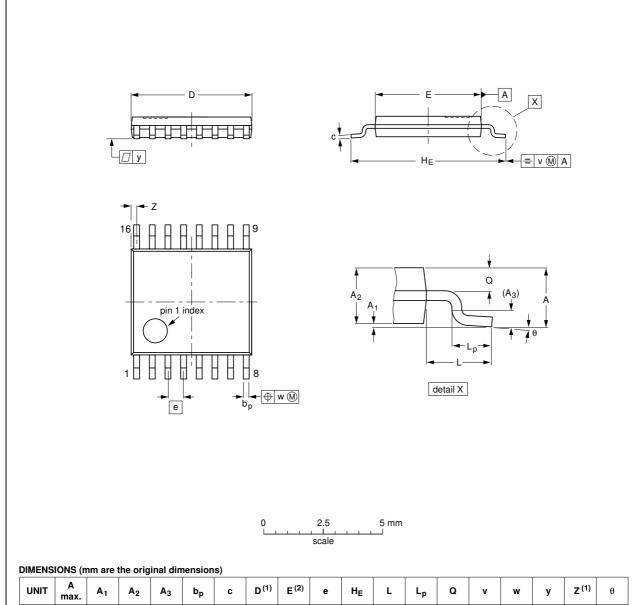
1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE	
SOT338-1		MO-150				99-12-27 03-02-19	
							•

Fig 11. Package outline SOT338-1 (SSOP16)

TSSOP16: plastic thin shrink small outline package; 16 leads; body width 4.4 mm

SOT403-1



							-,												
ι	JNIT	A max.	A ₁	A ₂	A ₃	bp	С	D ⁽¹⁾	E ⁽²⁾	е	HE	L	Lp	Q	v	w	у	Z (1)	θ
	mm	1.1	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	5.1 4.9	4.5 4.3	0.65	6.6 6.2	1	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.40 0.06	8° 0°

- 1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
- 2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

OUTLINE		REFER	EUROPEAN	ISSUE DATE			
VERSION	IEC	JEDEC	JEITA		PROJECTION	ISSUE DATE	
SOT403-1		MO-153				-99-12-27 03-02-18	

Fig 12. Package outline SOT403-1 (TSSOP16)

DHVQFN16: plastic dual in-line compatible thermal enhanced very thin quad flat package; no leads; 16 terminals; body 2.5 x 3.5 x 0.85 mm SOT763-1

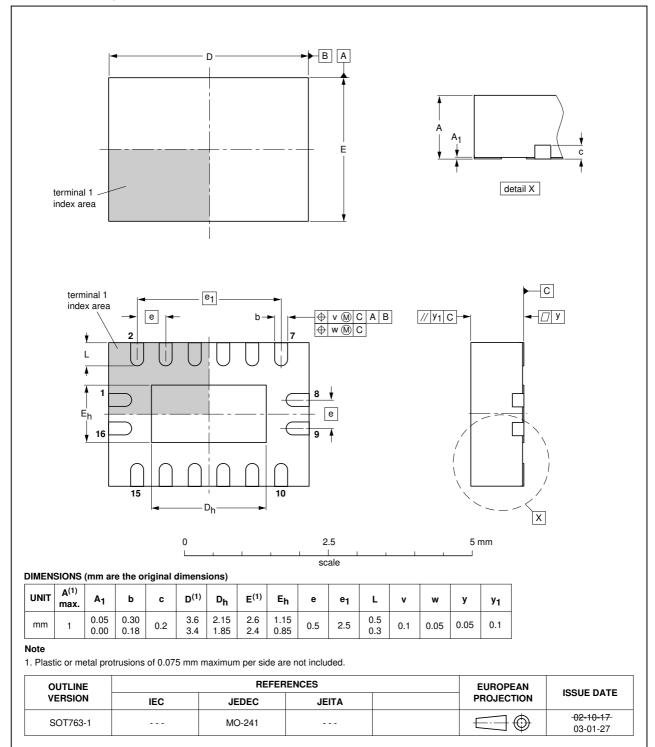


Fig 13. Package outline SOT763-1 (DHVQFN16)

74LVC157A All information provided in this document is subject to legal disclaimers.

© NXP B.V. 2011. All rights reserved.

13. Abbreviations

Table 9. Abbreviations

Acronym	Description
CDM	Charged Device Model
DUT	Device Under Test
ESD	ElectroStatic Discharge
НВМ	Human Body Model
MM	Machine Model
TTL	Transistor-Transistor Logic

14. Revision history

Table 10. Revision history

	•							
Document ID	Release date	Data sheet status	Change notice	Supersedes				
74LVC157A v.7	20111125	Product data sheet	-	74LVC157A v.6				
Modifications:	• <u>Table 7</u> : maxin	num values for lower voltage	ranges changed (erra	ata).				
74LVC157A v.6	20111027	Product data sheet	-	74LVC157A v.5				
Modifications:	 The format of this document has been redesigned to comply with the new identity guidelines of NXP Semiconductors. 							
	 Legal texts have been adapted to the new company name where appropriate. 							
	• Table 4, Table	5, Table 6, Table 7, and Tab	le 8: values added for	lower voltage ranges.				
74LVC157A v.5	031202	Product specification	-	74LVC157A v.4				
74LVC157A v.4	030617	Product specification	-	74LVC157A v.3				
74LVC157A v.3	020315	Product specification	-	74LVC157A v.2				
74LVC157A v.2	980729	Product specification	-	-				

15. Legal information

15.1 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.nxp.com.

15.2 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.

15.3 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.

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 accepts 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 http://www.nxp.com/profile/terms, 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.

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.

15.4 Trademarks

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

16. Contact information

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

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



17. Contents

1	General description 1
2	Features and benefits
3	Ordering information 2
4	Functional diagram 2
5	Pinning information 3
5.1	Pinning
5.2	Pin description 4
6	Functional description 4
7	Limiting values 5
8	Recommended operating conditions 5
9	Static characteristics 6
10	Dynamic characteristics
11	Waveforms
12	Package outline
13	Abbreviations14
14	Revision history 14
15	Legal information
15.1	Data sheet status
15.2	Definitions
15.3	Disclaimers
15.4	Trademarks16
16	Contact information 16
17	Contents

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