DATA SHEET

74LVT32
3.3 V Quad 2-input OR gate

Product data
Supersedes data of 1996 Aug 28

2002 Sep 06

Philips
Semiconductors

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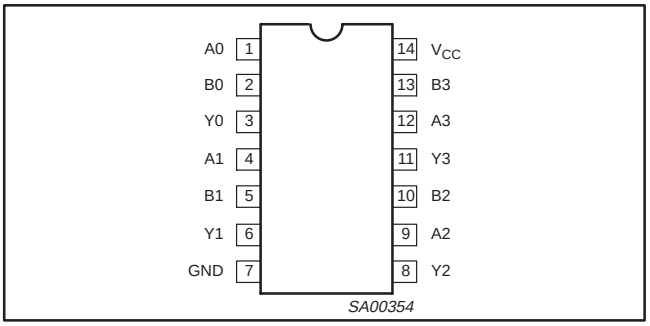
3.3 V Quad 2-input OR gate 74LVT32

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS T_{amb} = 25 °C; GND = 0 V	TYPICAL	UNIT
t_{PLH} t_{PHL}	Propagation delay An, Bn to Yn	C_L = 50 pF; V_{CC} = 3.3 V	2.6 3.2	ns
C_{IN}	Input capacitance	V_I = 0 V or 3.0 V	3	pF
I_{CCL}	Total supply current	Outputs Low; V_{CC} = 3.6 V	1	mA

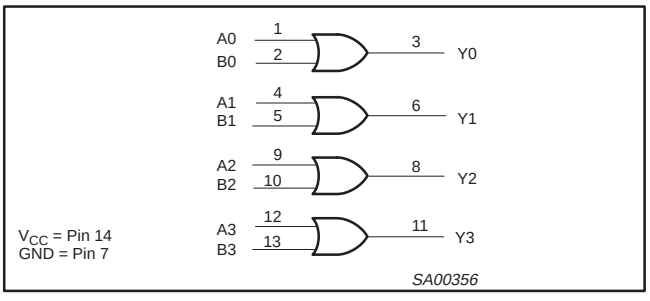
PIN CONFIGURATION



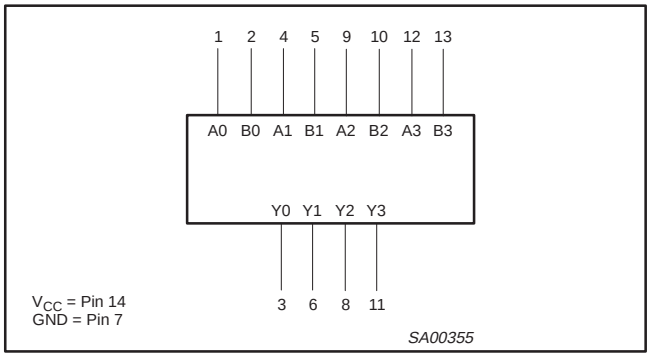
PIN DESCRIPTION

PIN NUMBER	SYMBOL	NAME AND FUNCTION
1, 2, 4, 5, 9, 10, 12, 13	An, Bn	Data inputs
3, 6, 8, 11	Yn	Data outputs
7	GND	Ground (0 V)
14	V_{CC}	Positive supply voltage

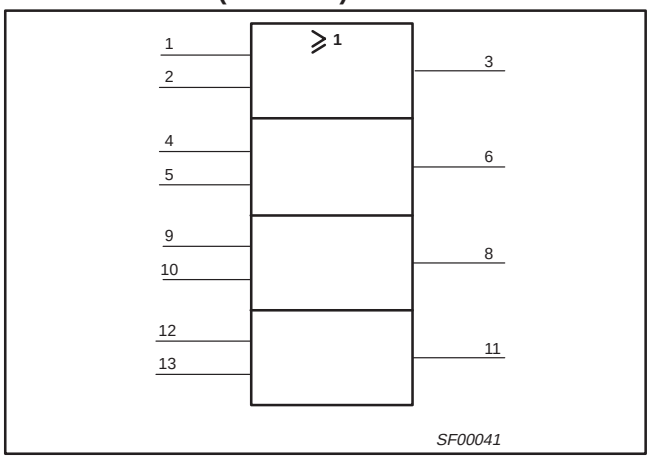
LOGIC DIAGRAM



LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



FUNCTION TABLE

INPUTS		OUTPUT
Dna	Dnb	Qn
L	L	L
L	H	H
H	L	H
H	H	H

NOTES:
H = High voltage level
L = Low voltage level

ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	OUTSIDE NORTH AMERICA	NORTH AMERICA	DWG NUMBER
14-Pin Plastic SO	–40 °C to +85 °C	74LVT32D	74LVT32D	SOT108-1
14-Pin Plastic SSOP	–40 °C to +85 °C	74LVT32DB	74LVT32DB	SOT337-1
14-Pin Plastic TSSOP	–40 °C to +85 °C	74LVT32PW	74LVT32PWDH	SOT402-1

ABSOLUTE MAXIMUM RATINGS[1, 2]

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
V_{CC}	DC supply voltage		–0.5 to +4.6	V
I_{IK}	DC input diode current	$V_I < 0$	–50	mA
V_I	DC input voltage[3]		–0.5 to +7.0	V
I_{OK}	DC output diode current	$V_O < 0$	–50	mA
V_{OUT}	DC output voltage[3]	Output in Off or High state	–0.5 to +7.0	V
I_{OUT}	DC output current	Output in High state	–32	mA
		Output in Low state	64	
T_{stg}	Storage temperature range		–65 to 150	°C

NOTES:
1. Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
2. The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability. The maximum junction temperature of this integrated circuit should not exceed 150°C.
3. The input and output negative voltage ratings may be exceeded if the input and output clamp current ratings are observed.

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS		UNIT
		MIN	MAX	
V_{CC}	DC supply voltage	2.7	3.6	V
V_I	Input voltage	0	5.5	V
V_{IH}	High-level input voltage	2.0		V
V_{IL}	Low-level Input voltage		0.8	V
I_{OH}	High-level output current		–20	mA
I_{OL}	Low-level output current		32	mA
$\Delta t/\Delta v$	Input transition rise or fall rate; Outputs enabled		10	ns/V
T_{amb}	Operating free-air temperature range	–40	+85	°C

DC ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Temp = -40°C to +85°C			
			MIN	TYP[1]	MAX	
V_{IK}	Input clamp voltage	V_{CC} = 2.7 V; I_{IK} = –18 mA			–1.2	V
V_{OH}	High-level output voltage	V_{CC} = 2.7 to 3.6 V; I_{OH} = –100 µA	V_{CC}–0.2			V
		V_{CC} = 2.7 V; I_{OH} = –6 mA	2.4			
		V_{CC} = 3.0 V; I_{OH} = –20 mA	2.0			
V_{OL}	Low-level output voltage	V_{CC} = 2.7 V; I_{OL} = 100 µA			0.2	V
		V_{CC} = 2.7 V; I_{OL} = 24 mA			0.5	
		V_{CC} = 3.0 V; I_{OL} = 32 mA			0.5	
I_I	Input leakage current	V_{CC} = 0 or 3.6 V; V_I = 5.5 V			10	µA
		V_{CC} = 3.6 V; V_I = V_{CC} or GND			±1	
I_{OFF}	Output off current	V_{CC} = 0 V; V_I or V_O = 0 to 4.5 V			±100	µA
I_{CCH}	Quiescent supply current	V_{CC} = 3.6 V; Outputs High, V_I = GND or V_{CC}, I_O = 0			0.02	mA
I_{CCL}		V_{CC} = 3.6 V; Outputs Low, V_I = GND or V_{CC}, I_O = 0		1	2	
ΔI_{CC}	Additional supply current per input pin[2]	V_{CC} = 3 V to 3.6 V; One input at V_{CC}–0.6 V, Other inputs at V_{CC} or GND			0.2	µA
C_I	Input capacitance	V_I = 3 V or 0		3		pF

NOTES:
1. All typical values are at V_{CC} = 3.3 V and T_{amb} = 25 °C.
2. This is the increase in supply current for each input at the specificed voltage level other than V_{CC} or GND.

AC CHARACTERISTICS

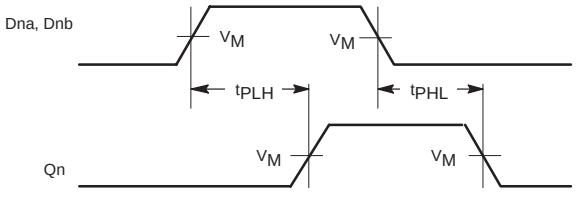
GND = 0 V; $t_R = t_F$ = 2.5 ns; C_L = 50 pF, R_L = 500 Ω; T_{amb} = –40 °C to +85 °C.

SYMBOL	PARAMETER	WAVEFORM	LIMITS				UNIT
			V_{CC} = 3.3 V ± 0.3 V			V_{CC} = 2.7 V	
			MIN	TYP[1]	MAX	MAX	
t_{PLH} t_{PHL}	Propagation delay An, Bn to Yn	1	1.0 1.0	2.6 3.2	3.8 4.6	4.5 4.9	ns

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

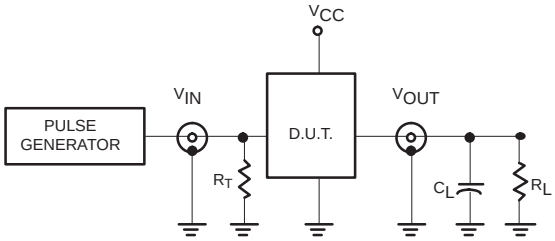
AC WAVEFORMS

V_M = 1.5 V, V_{IN} = GND to 2.7 V

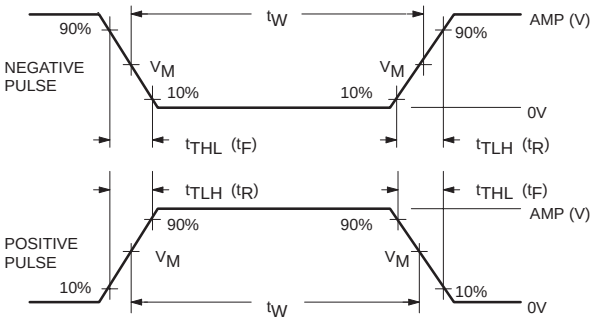


Waveform 1. Propagation delay for inverting outputs

TEST CIRCUIT AND WAVEFORMS



Test Circuit for Outputs



V_M = 1.5V
Input Pulse Definition

DEFINITIONS

R_L = Load resistor; see AC CHARACTERISTICS for value.

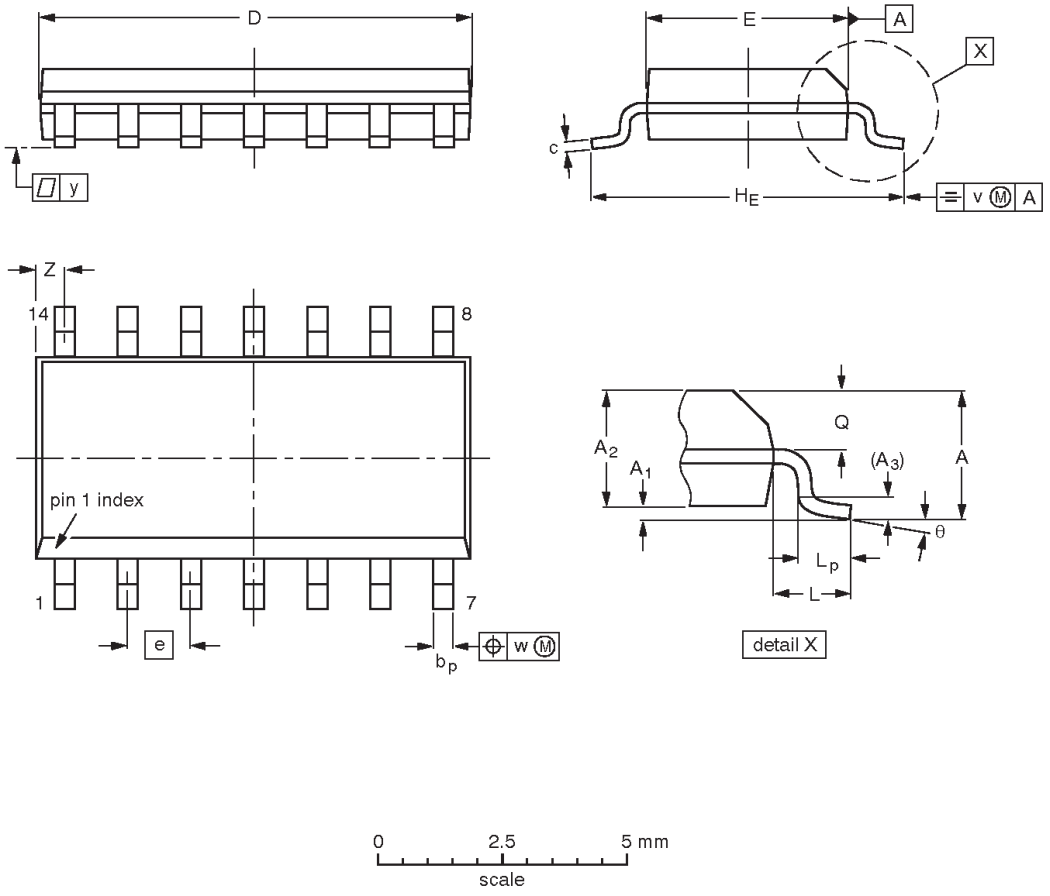
C_L = Load capacitance includes jig and probe capacitance; see AC CHARACTERISTICS for value.

R_T = Termination resistance should be equal to Z_{OUT} of pulse generators.

FAMILY	INPUT PULSE REQUIREMENTS				
	Amplitude	Rep. Rate	t_W	t_R	t_F
74LVT	2.7V	≤10MHz	500ns	≤2.5ns	≤2.5ns

SV00022

SO14: plastic small outline package; 14 leads; body width 3.9 mm **SOT108-1**



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

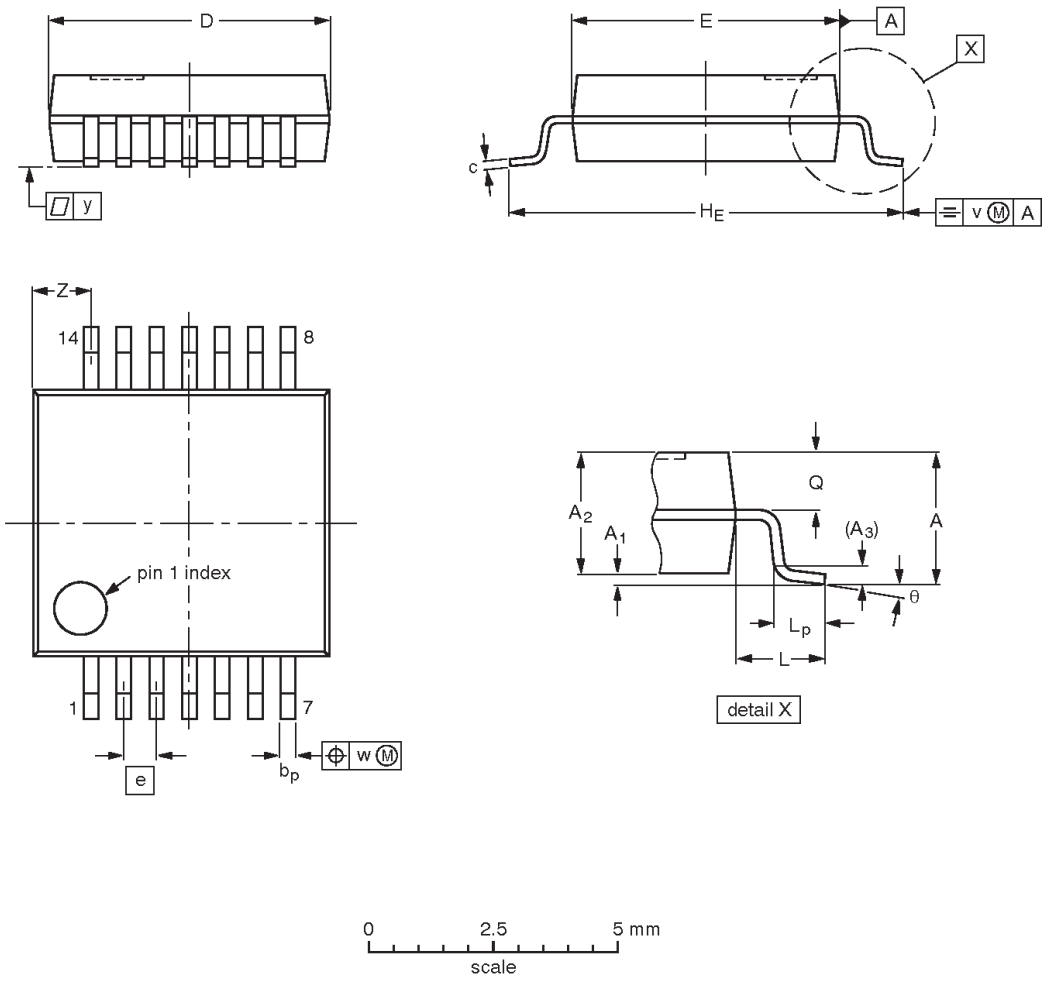
UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(1)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	8.75 8.55	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8^o 0^o
inches	0.069	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.35 0.34	0.16 0.15	0.050	0.244 0.228	0.041	0.039 0.016	0.028 0.024	0.01	0.01	0.004	0.028 0.012	

Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT108-1	076E06	MS-012				~~97-05-22~~ 99-12-27

SSOP14: plastic shrink small outline package; 14 leads; body width 5.3 mm **SOT337-1**



DIMENSIONS (mm are the original dimensions)

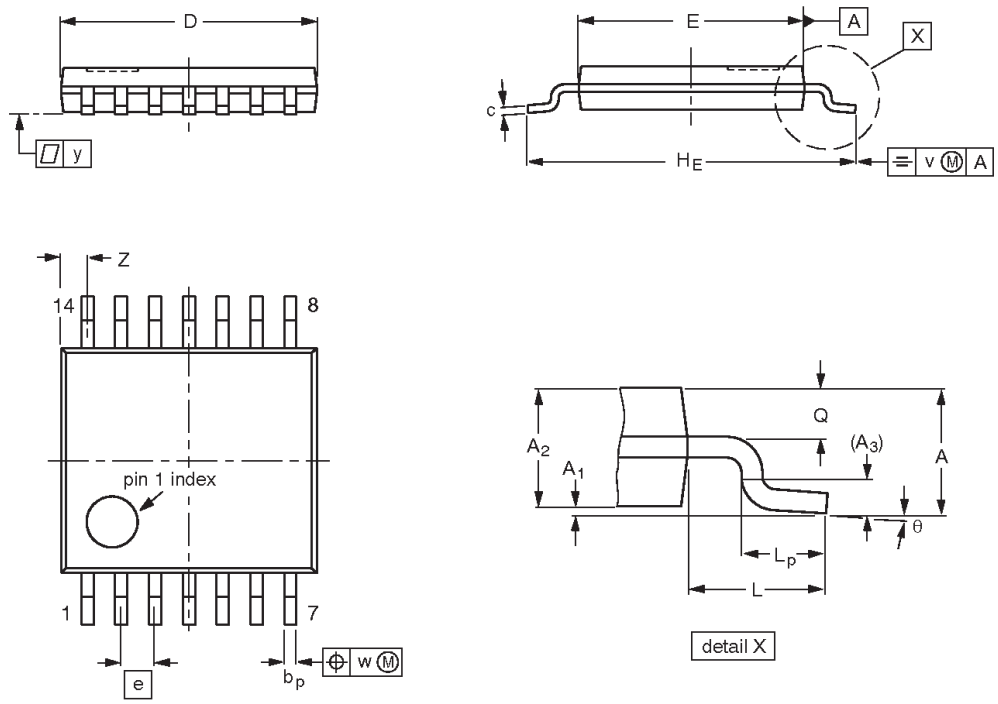
UNIT	A max.	A_1	A_2	A_3	b_p	c	$D^{(1)}$	$E^{(1)}$	e	H_E	L	L_p	Q	v	w	y	$Z^{(1)}$	θ
mm	2.0	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	6.4 6.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	1.4 0.9	8^o 0^o

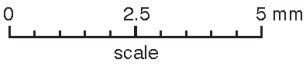
Note

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

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT337-1		MO-150				~~96-01-18~~ 99-12-27

TSSOP14: plastic thin shrink small outline package; 14 leads; body width 4.4 mm SOT402-1





DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A_1	A_2	A_3	b_p	c	D (1)	E (2)	e	H_E	L	L_p	Q	v	w	y	Z (1)	θ
mm	1.10	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	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.72 0.38	8^o 0^o

Notes

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 VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT402-1		MO-153				~~95-04-04~~ 99-12-27

REVISION HISTORY

Rev	Date	Description
_2	2002 Sep 06	Product data (9397 750 10298); supersedes Product specification 74LVT32 of 1996 Aug 28. Modifications: There are no changes to any data. Document re-issued to improve quality of package outline drawings display only.
–	1996 Aug 28	Product specification; initial version. Engineering Change Notice: 853-1873 17244 (date: 1996 Aug 28).

Data sheet status

Data sheet status [1]	Product status [2]	Definitions
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Changes will be communicated according to the Customer Product/Process Change Notification (CPCN) procedure SNW-SQ-650A.

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL http://www.semiconductors.philips.com.

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Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

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For sales offices addresses send e-mail to:
sales.addresses@www.semiconductors.philips.com.

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