DATA SHEET

74ALVCHS162830

18-bit to 36-bit address driver with bus hold (3-State)

Product data

2001 Sep 07

File under Integrated Circuits — ICL03

Philips Semiconductors

PHILIPS

18-bit to 36-bit address driver with bus hold (3-State) 74ALVCHS162830

FEATURES

- Output ports have equivalent 26 Ω series resistors, so no external resistors are required
- Diodes on inputs clamp overshoot
- ESD classification testing is done to JEDEC Standard JESD22. Protection exceeds 2000 V HBM per method A114.
- Latch-up testing is done to JEDEC Standard JESD78, which exceeds 100 mA.
- Bus hold on data inputs eliminates the need for external pullup/pulldown resistors
- Packaged in thin very small-outline package (TVSOP) — 0.4 mm pitch
- Optimized for use with PCK953 in SDRAM module applications
- Balanced ±12 mA output drive
- Low noise, low skew

DESCRIPTION

The ALVCHS162830 address driver is designed for 2.3 V to 3.6 V V_{CC} operation.

Diodes to V_{CC} have been added on the inputs to clamp overshoot.

The bus hold feature retains the inputs' last state whenever the input bus goes to high impedance. This prevents floating inputs and eliminates the need for pull up or pull down resistors.

The outputs, which are designed to sink up to 12 mA, include equivalent 26 Ω series resistors to reduce overshoot and undershoot.

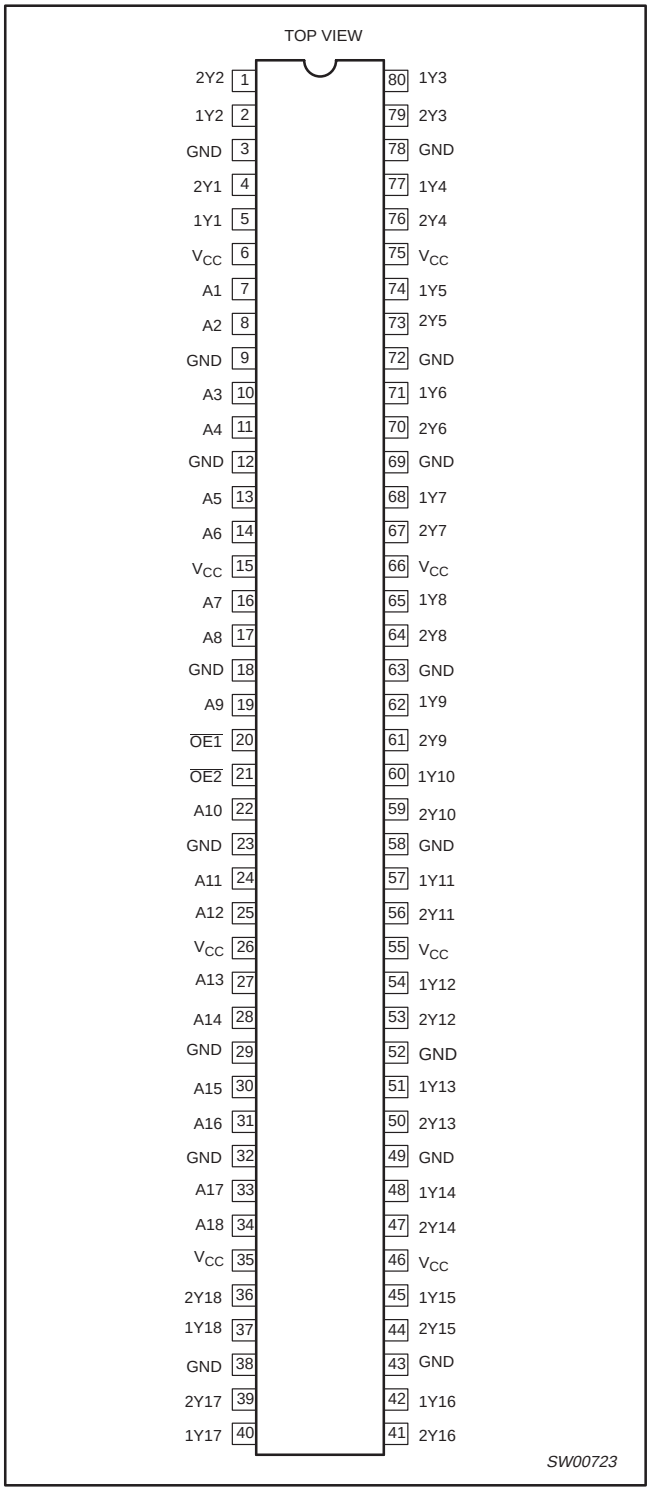
To ensure the high-impedance state during power up or power down, the output-enable ($\overline{OE}$) input should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

The 74ALVCHS162830 is characterized for operation from –40 to +85 °C.

FUNCTION TABLE

Inputs			Outputs	
$\overline{OE1}$	$\overline{OE2}$	A	1Yn	2Yn
L	H	H	H	Z
L	H	L	L	Z
H	L	H	Z	H
H	L	L	Z	L
L	L	H	H	H
L	L	L	L	L
H	H	X	Z	Z

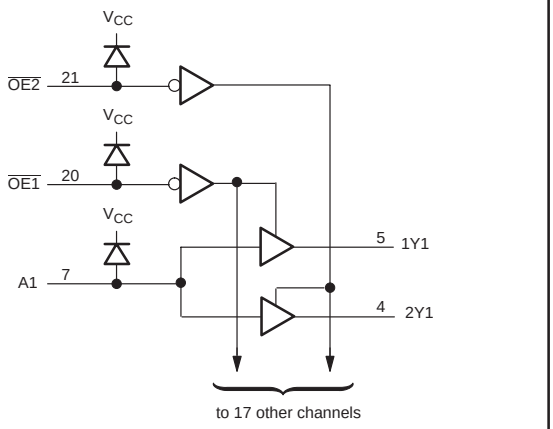
PIN CONFIGURATION



ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	ORDER CODE	DWG NUMBER
80-pin plastic thin very small outline (TVSOP)	–40 to +85 °C	74ALVCHS162830DGB	SOT647-1

LOGIC DIAGRAM (POSITIVE LOGIC)



PIN DESCRIPTION

PIN(S)	SYMBOL	FUNCTION
6, 15, 26, 35, 46, 55, 66, 75	V_{CC}	Supply voltage
7, 8, 10, 11, 13, 14, 16, 17, 19, 22, 24, 25, 27, 28, 30, 31, 33, 34	An	Inputs
1, 2, 4, 5, 36, 37, 39, 40, 41, 42, 44, 45, 47, 48, 50, 51, 53, 54, 56, 57, 59, 60, 61, 62, 64, 65, 67, 68, 70, 71, 73, 74, 76, 77, 79, 80	1Yn, 2Yn	Outputs
20, 21	$\overline{OE1}$, $\overline{OE2}$	Output enable
3, 9, 12, 18, 23, 29, 32, 38, 43, 49, 52, 58, 63, 69, 72, 78	GND	Ground

ABSOLUTE MAXIMUM RATINGS

Over recommended operating free-air temperature range (unless otherwise noted).[1]

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
V_{CC}	Supply voltage range		–0.5 to +4.6	V
V_I	Input voltage range	See Note 2	–0.5 to +4.6	V
V_O	Output voltage range	See Notes 2 and 3	–0.5 to V_{CC} +0.5	V
I_{IK}	Input clamp current	$V_I < 0$	–50	mA
I_{OK}	Output clamp current	$V_O < 0$	–50	mA
I_O	Continuous output current		±50	mA
I_{CC}, I_{GND}	Continuous current through each V_{CC} or GND		±100	mA
Θ_{JA}	Package thermal impedance	See Note 4	106	°C/W
T_{stg}	Storage temperature range		–65 to +150	°C

NOTES:

1. Stresses beyond those listed under ”absolute maximum ratings” 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 input negative-voltage and output voltage ratings may be exceeded if the input and output current ratings are observed.
3. This value is limited to 4.6 V maximum.
4. The package thermal impedance is calculated in accordance with JESD 51.

RECOMMENDED OPERATING CONDITIONS

All unused control inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

SYMBOL	PARAMETER	CONDITIONS	LIMITS		UNIT
			MIN	MAX	
V_{CC}	Supply voltage		2.3	3.6	V
V_{IH}	High-level input voltage	V_{CC} = 2.3 V to 2.7 V	1.7		V
		V_{CC} = 2.7 V to 3.6 V	2		
V_{IL}	Low-level input voltage	V_{CC} = 2.3 V to 2.7 V		0.7	V
		V_{CC} = 2.7 V to 3.6 V		0.8	
V_I	Input voltage		0	V_{CC}	V
V_O	Output voltage		0	V_{CC}	V
I_{OH}	High-level output current	V_{CC} = 2.3 V		–6	mA
		V_{CC} = 2.7 V		–8	
		V_{CC} = 3 V		–12	
I_{OL}	Low-level output current	V_{CC} = 2.3 V		6	mA
		V_{CC} = 2.7 V		8	
		V_{CC} = 3 V		12	
$\Delta t/\Delta v$	Input transition rise or fall rate			10	ns/V
T_{amb}	Operating free-air temperature		–40	+85	°C

ELECTRICAL CHARACTERISTICS

Over recommended operating free-air temperature range (unless otherwise noted).

SYMBOL	PARAMETER	TEST CONDITIONS		V_{CC}	LIMITS			UNIT
					MIN	TYP[1]	MAX	
V_{IK}		I_I = –18 mA		2.3 V			–1.2	V
		I_I = 18 mA		2.3 V			V_{CC}+1.2	
V_{OH}		I_{OH} = –100 μA		2.3 V to 3.6 V	V_{CC}–0.2			V
		I_{OH} = –4 mA, V_{IH} = 1.7 V		2.3 V	1.9			
		I_{OH} = –6 mA	V_{IH} = 1.7 V	2.3 V	1.7			
			V_{IH} = 2 V	3 V	2.4			
		I_{OH} = –8 mA, V_{IH} = 2 V		2.7 V	2			
		I_{OH} = –12 mA, V_{IH} = 2 V		3 V	2			
V_{OL}		I_{OL} = 100 μA		2.3 V to 3.6 V			0.2	V
		I_{OL} = 4 mA, V_{IL} = 0.7 V		2.3 V			0.4	
		I_{OL} = 6 mA	V_{IL} = 0.7 V	2.3 V			0.55	
			V_{IL} = 0.8 V	3 V			0.55	
		I_{OL} = 8 mA, V_{IL} = 0.8 V		2.7 V			0.6	
		I_{OL} = 12 mA, V_{IL} = 0.8 V		3 V			0.8	
I_I		V_I = V_{CC} or GND		3.6 V			±5	μA
$I_{I(hold)}$		V_I = 0.7 V		2.3 V	45			μA
		V_I = 1.7 V		2.3 V	–45			
		V_I = 0.8 V		3 V	75			
		V_I = 2 V		3 V	–75			
		V_I = 0 to 3.6 V[2]		3.6 V			±500	
I_{OZ}		V_O = V_{CC} or GND		3.6 V			±10	μA
I_{CC}		V_I = V_{CC} or GND, I_O = 0		3.6 V			40	μA
ΔI_{CC}		One input at V_{CC} – 0.6 V, Other inputs at V_{CC} or GND		3 V to 3.6 V			750	μA
C_i	Control inputs	V_I = V_{CC} or GND		3.3 V		3.5		pF
	Data inputs					7.64		
C_o	Outputs	V_O = V_{CC} or GND		3.3 V		3.12		pF

NOTES:

1. All typical values are at V_{CC} = 3.3 V, T_{amb} = 25°C.
2. This is the bus-hold maximum dynamic current. It is the minimum overdrive current required to switch the input from one state to another.

SWITCHING CHARACTERISTICS

Over recommended operating free-air temperature range (unless otherwise noted) (see Figures 1 and 2).

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 2.5 V ± 0.2 V		V_{CC} = 2.7 V		V_{CC} = 3.3 V ± 0.3 V		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A	Y	1.2	3.8		4	1.7	3.5	ns
t_{en}	$\overline{OE}$	Y	1	5.7		5.7	1	4.8	ns
t_{dis}	$\overline{OE}$	Y	1	4.9		5.4	1.7	5.2	ns
$t_{sk(o)}$[1]	Output skew	–	–	–	–	–	–	500	ps

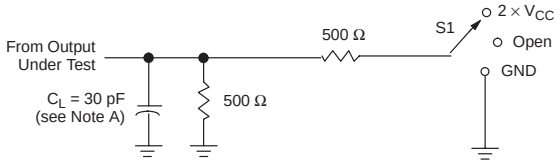
NOTE:

1. Output skew between any 2 outputs of same part switching in the same direction.

OPERATING CHARACTERISTICS, T_{amb} = 25°C

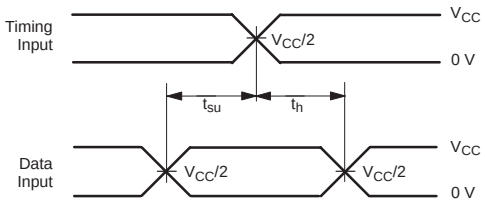
SYMBOL	PARAMETER		TEST CONDITIONS	V_{CC} = 2.5 V ± 0.2 V	V_{CC} = 3.3 V ± 0.3 V	UNIT
				TYP	TYP	
C_{pd}	Power dissipation capacitance per driver	All outputs enabled	C_L = 0, f = 10 MHz	49	53	pF
		All outputs disabled		6	7.5	

PARAMETER MEASUREMENT INFORMATION
V_{CC} = 2.5 V ± 0.2 V

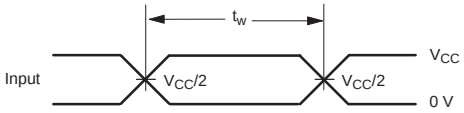


Load Circuit

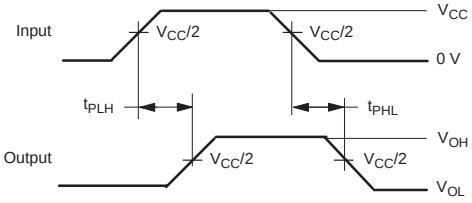
TEST	S_1
t_{pd}	Open
t_{PLZ}/t_{PZL}	2 × V_{CC}
t_{PHZ}/t_{PZH}	GND



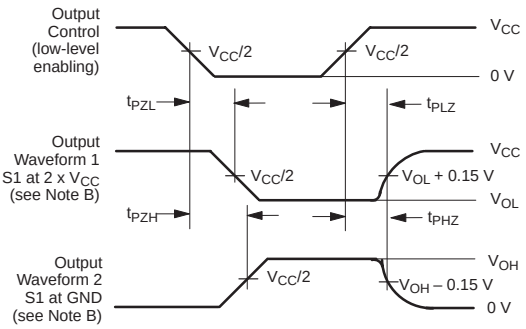
Voltage Waveforms
Setup and Hold Times



Voltage Waveforms
Pulse Duration



Voltage Waveforms
Propagation Delay Times



Voltage Waveforms
Enable and Disable Times

SV01849

NOTES:

A. C_L includes probe and jig capacitance.

B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.

C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2 ns, t_f ≤ 2 ns.

D. The outputs are measured one at a time with one transition per measurement.

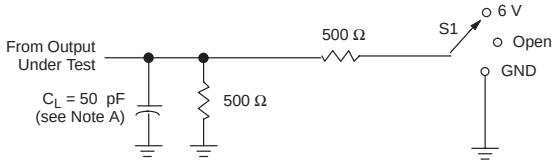
E. t_{PLZ} and t_{PHZ} are the same as t_{dis}.

F. t_{PZL} and t_{PZH} are the same as t_{en}.

G. t_{PLH} and t_{PHL} are the same as t_{pd}.

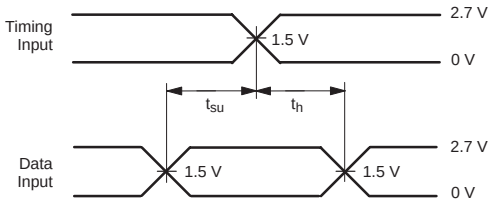
Figure 1. Load circuit and voltage waveforms

PARAMETER MEASUREMENT INFORMATION
V_{CC} = 2.7 V and 3.3 V ± 0.3 V

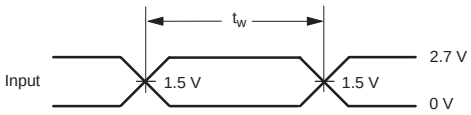


Load Circuit

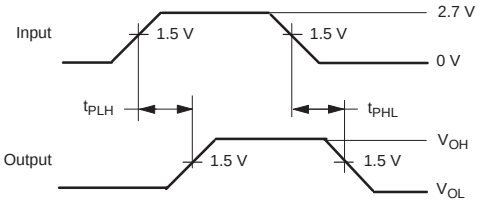
TEST	S_1
t_{pd}	Open
t_{PLZ}/t_{PZL}	6 V
t_{PHZ}/t_{PZH}	GND



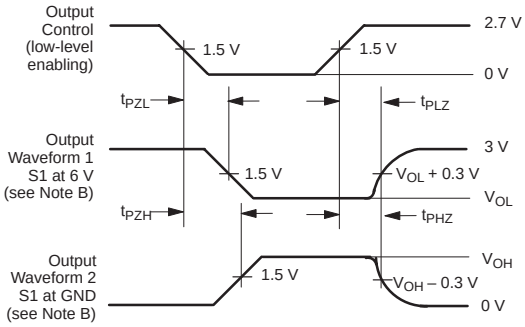
Voltage Waveforms
Setup and Hold Times



Voltage Waveforms
Pulse Duration



Voltage Waveforms
Propagation Delay Times



Voltage Waveforms
Enable and Disable Times

SV01850

NOTES:

A. C_L includes probe and jig capacitance.

B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.

C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns.

D. The outputs are measured one at a time with one transition per measurement.

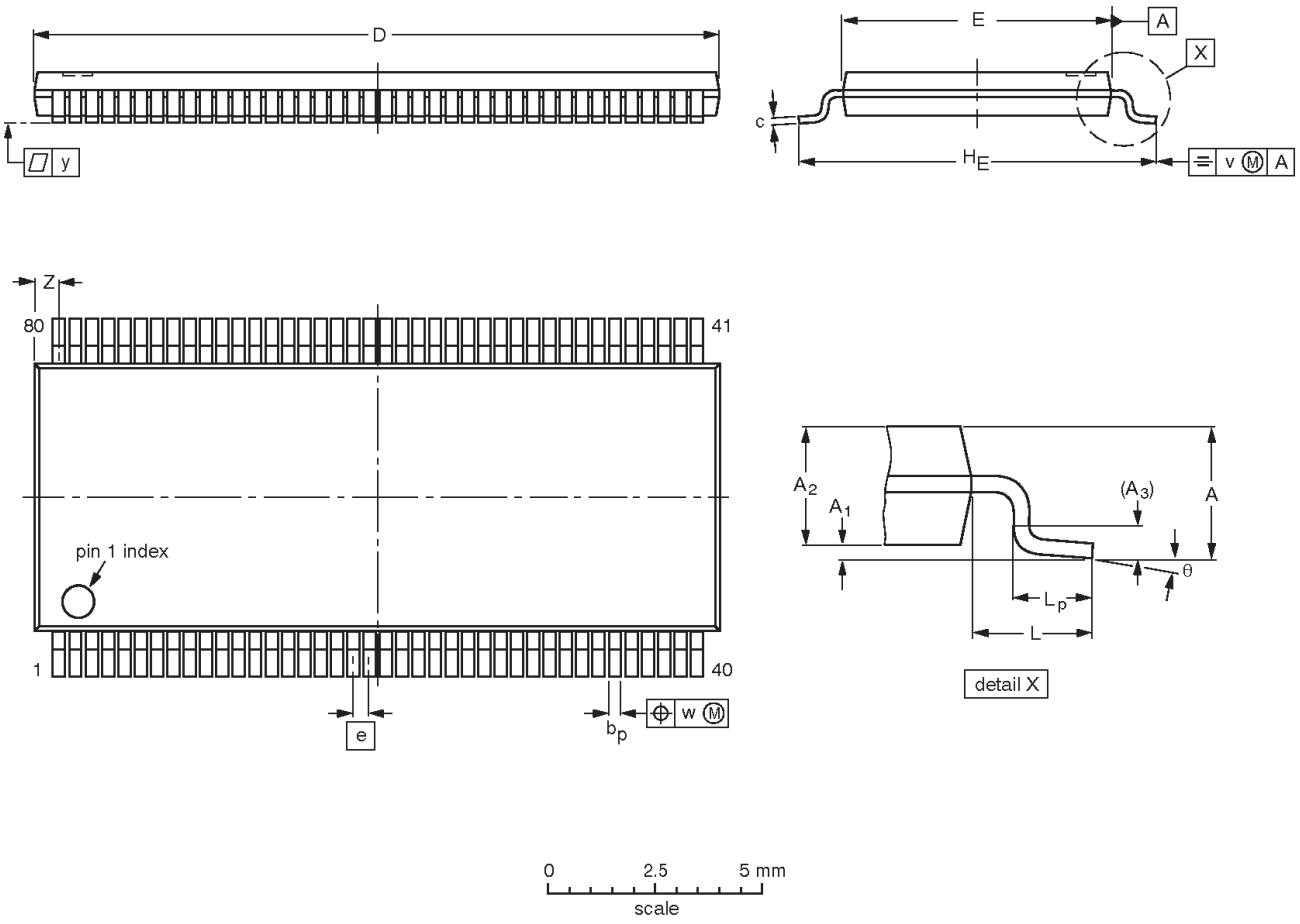
E. t_{PLZ} and t_{PHZ} are the same as t_{dis}.

F. t_{PZL} and t_{PZH} are the same as t_{en}.

G. t_{PLH} and t_{PHL} are the same as t_{pd}.

Figure 2. Load circuit and voltage waveforms

TSSOP80: plastic thin shrink small outline package; 80 leads; body width 6.1 mm SOT647-1



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	v	w	y	Z	θ
mm	1.2	0.15 0.05	1.05 0.85	0.25	0.23 0.13	0.2 0.1	17.1 16.9	6.2 6.0	0.4	8.3 7.9	1.0	0.75 0.45	0.2	0.07	0.08	0.84 0.57	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				
SOT647-1		MO-153					00-08-21

18-bit to 36-bit address driver with bus hold (3-State)

74ALVCHS162830

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.

Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

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.

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

Disclaimers

Life support — These products are not designed for use in life support appliances, devices or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance. Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

Contact information

For additional information please visit
http://www.semiconductors.philips.com. Fax: **+31 40 27 24825**

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

© Koninklijke Philips Electronics N.V. 2001
All rights reserved. Printed in U.S.A.

Date of release: 09-01

Document order number: 9397 750 09111

Let's make things better.

Philips Semiconductors

PHILIPS