

BGY885A

860 MHz, 18.5 dB push-pull amplifier

Rev. 06 — 22 March 2005

Product data sheet

1. Product profile

1.1 General description

Hybrid amplifier module for CATV systems operating over a frequency range of 40 MHz to 860 MHz with a supply voltage of 24 V (DC).

CAUTION



This device is sensitive to ElectroStatic Discharge (ESD). Therefore care should be taken during transport and handling.

1.2 Features

- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Rugged construction
- Gold metallization ensures excellent reliability

1.3 Quick reference data

Table 1: Quick reference data

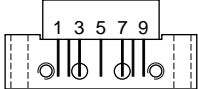
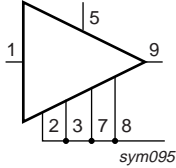
Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$f = 50$ MHz	18	18.5	19	dB
		$f = 860$ MHz	18.5	19.5	-	dB
I_{tot}	total current consumption (DC)	$V_B = 24$ V	[1] -	225	240	mA

[1] The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

PHILIPS

2. Pinning information

Table 2: Pinning

Pin	Description	Simplified outline	Symbol
1	input		
2	common		
3	common		
5	+V _B		
7	common		
8	common		
9	output		

3. Ordering information

Table 3: Ordering information

Type number	Package		
	Name	Description	Version
BGY885A	-	rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 × 6-32 UNC and 2 extra horizontal mounting holes; 7 gold-plated in-line leads	SOT115J

4. Limiting values

Table 4: Limiting values

In accordance with the Absolute Maximum Rating System (IEC 60134).

Symbol	Parameter	Conditions	Min	Max	Unit
V _i	RF input voltage		-	65	dBmV
T _{stg}	storage temperature		-40	+100	°C
T _{mb}	mounting base temperature		-20	+100	°C

5. Characteristics

Table 5: Characteristics

Bandwidth 40 MHz to 860 MHz; $V_B = 24\text{ V}$; $T_{mb} = 30\text{ °C}$; $Z_S = Z_L = 75\ \Omega$; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$f = 50\text{ MHz}$	18	18.5	19	dB
		$f = 860\text{ MHz}$	18.5	19.5	-	dB
SL	slope cable equivalent	$f = 40\text{ MHz to }860\text{ MHz}$	0	0.8	2	dB
FL	flatness of frequency response	$f = 40\text{ MHz to }860\text{ MHz}$	-	± 0.2	± 0.3	dB
S_{11}	input return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	31	-	dB
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	30	-	dB
		$f = 160\text{ MHz to }320\text{ MHz}$	17	27.5	-	dB
		$f = 320\text{ MHz to }640\text{ MHz}$	15.5	25	-	dB
		$f = 640\text{ MHz to }860\text{ MHz}$	14	20.5	-	dB
S_{22}	output return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	29	-	dB
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	27.5	-	dB
		$f = 160\text{ MHz to }320\text{ MHz}$	17	24	-	dB
		$f = 320\text{ MHz to }640\text{ MHz}$	15.5	21	-	dB
		$f = 640\text{ MHz to }860\text{ MHz}$	14	21	-	dB
ϕ_{s21}	phase response	$f = 50\text{ MHz}$	-45	-	+45	deg
CTB	composite triple beat	49 channels flat; $V_o = 44\text{ dBmV}$; measured at 859.25 MHz	-	-65	-61	dB
X_{mod}	cross modulation	49 channels flat; $V_o = 44\text{ dBmV}$; measured at 55.25 MHz	-	-65	-61	dB
CSO	composite second order distortion	49 channels flat; $V_o = 44\text{ dBmV}$; measured at 860.5 MHz	-	-67	-61	dB
d_2	second order distortion		[1] -	-78	-70	dB
V_o	output voltage	$d_{im} = -60\text{ dB}$	[2] 58	60	-	dBmV
F	noise figure	$f = 50\text{ MHz}$	-	4.5	5	dB
		$f = 450\text{ MHz}$	-	-	5.5	dB
		$f = 550\text{ MHz}$	-	-	5.5	dB
		$f = 600\text{ MHz}$	-	-	6	dB
		$f = 650\text{ MHz}$	-	-	6	dB
		$f = 750\text{ MHz}$	-	-	7	dB
		$f = 860\text{ MHz}$	-	6	8	dB
I_{tot}	total current consumption (DC)		[3] -	225	240	mA

[1] $f_p = 55.25\text{ MHz}$; $V_p = 44\text{ dBmV}$; $f_q = 805.25\text{ MHz}$; $V_q = 44\text{ dBmV}$; measured at $f_p + f_q = 860.5\text{ MHz}$.

[2] Measured according to DIN45004B: $f_p = 851.25\text{ MHz}$; $V_p = V_o$; $f_q = 858.25\text{ MHz}$; $V_q = V_o - 6\text{ dB}$; $f_r = 860.25\text{ MHz}$; $V_r = V_o - 6\text{ dB}$; measured at $f_p + f_q - f_r = 849.25\text{ MHz}$.

[3] The module normally operates at $V_B = 24\text{ V}$, but is able to withstand supply transients up to 30 V.

Table 6: CharacteristicsBandwidth 40 MHz to 750 MHz; $V_B = 24$ V; $T_{mb} = 30$ °C; $Z_S = Z_L = 75$ Ω; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
G_p	power gain	$f = 50$ MHz	18	18.5	19	dB	
		$f = 750$ MHz	18.5	-	-	dB	
SL	slope cable equivalent	$f = 40$ MHz to 750 MHz	0	-	1.5	dB	
FL	flatness of frequency response	$f = 40$ MHz to 750 MHz	-	-	±0.3	dB	
S_{11}	input return losses	$f = 40$ MHz to 80 MHz	20	31	-	dB	
		$f = 80$ MHz to 160 MHz	18.5	30	-	dB	
		$f = 160$ MHz to 320 MHz	17	27.5	-	dB	
		$f = 320$ MHz to 640 MHz	15.5	25	-	dB	
		$f = 640$ MHz to 750 MHz	14	20.5	-	dB	
S_{22}	output return losses	$f = 40$ MHz to 80 MHz	20	29	-	dB	
		$f = 80$ MHz to 160 MHz	18.5	27.5	-	dB	
		$f = 160$ MHz to 320 MHz	17	24	-	dB	
		$f = 320$ MHz to 640 MHz	15.5	21	-	dB	
		$f = 640$ MHz to 750 MHz	14	21	-	dB	
φ_{s21}	phase response	$f = 50$ MHz	-45	-	+45	deg	
CTB	composite triple beat	110 channels flat; $V_o = 44$ dBmV; measured at 745.25 MHz	-	-55	-53	dB	
X_{mod}	cross modulation	110 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	-	-58	-57	dB	
CSO	composite second order distortion	110 channels flat; $V_o = 44$ dBmV; measured at 746.5 MHz	-	-65	-53	dB	
d_2	second order distortion		[1]	-	-	-65	dB
V_o	output voltage	$d_{im} = -60$ dB	[2]	59	-	-	dBmV
F	noise figure	see Table 5	-	-	-	dB	
I_{tot}	total current consumption (DC)		[3]	-	225	240	mA

[1] $f_p = 55.25$ MHz; $V_p = 44$ dBmV; $f_q = 691.25$ MHz; $V_q = 44$ dBmV; measured at $f_p + f_q = 746.5$ MHz.[2] Measured according to DIN45004B: $f_p = 740.25$ MHz; $V_p = V_o$; $f_q = 747.25$ MHz; $V_q = V_o - 6$ dB; $f_r = 749.25$ MHz; $V_r = V_o - 6$ dB; measured at $f_p + f_q - f_r = 738.25$ MHz.[3] The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.**Table 7: Characteristics**Bandwidth 40 MHz to 600 MHz; $V_B = 24$ V; $T_{mb} = 30$ °C; $Z_S = Z_L = 75$ Ω; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G_p	power gain	$f = 50$ MHz	18	18.5	19	dB
		$f = 600$ MHz	18.5	-	-	dB
SL	slope cable equivalent	$f = 40$ MHz to 600 MHz	0	-	1.5	dB
FL	flatness of frequency response	$f = 40$ MHz to 600 MHz	-	-	±0.3	dB
S_{11}	input return losses	$f = 40$ MHz to 80 MHz	20	31	-	dB
		$f = 80$ MHz to 160 MHz	18.5	30	-	dB
		$f = 160$ MHz to 320 MHz	17	27.5	-	dB
		$f = 320$ MHz to 600 MHz	16	25	-	dB

Table 7: Characteristics ...continued

Bandwidth 40 MHz to 600 MHz; $V_B = 24\text{ V}$; $T_{mb} = 30\text{ °C}$; $Z_S = Z_L = 75\ \Omega$; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
S ₂₂	output return losses	f = 40 MHz to 80 MHz	20	29	-	dB	
		f = 80 MHz to 160 MHz	18.5	27.5	-	dB	
		f = 160 MHz to 320 MHz	17	24	-	dB	
		f = 320 MHz to 600 MHz	16	21	-	dB	
φ _{S21}	phase response	f = 50 MHz	-45	-	+45	deg	
CTB	composite triple beat	85 channels flat; V _o = 44 dBmV; measured at 595.25 MHz	-	-60	-57	dB	
X _{mod}	cross modulation	85 channels flat; V _o = 44 dBmV; measured at 55.25 MHz	-	-60.5	-59	dB	
CSO	composite second order distortion	85 channels flat; V _o = 44 dBmV; measured at 596.5 MHz	-	-64.5	-58	dB	
d ₂	second order distortion		[1]	-	-79	-70	dB
V _o	output voltage	d _{im} = -60 dB	[2]	61	64.5	-	dBmV
F	noise figure	see Table 5	-	-	-	dB	
I _{tot}	total current consumption (DC)		[3]	-	225	240	mA

[1] f_p = 55.25 MHz; V_p = 44 dBmV; f_q = 541.25 MHz; V_q = 44 dBmV; measured at f_p + f_q = 596.5 MHz.

[2] Measured according to DIN45004B: f_p = 590.25 MHz; V_p = V_o; f_q = 597.25 MHz; V_q = V_o - 6 dB; f_r = 599.25 MHz; V_r = V_o - 6 dB; measured at f_p + f_q - f_r = 588.25 MHz.

[3] The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

Table 8: Characteristics

Bandwidth 40 MHz to 550 MHz; $V_B = 24\text{ V}$; $T_{mb} = 30\text{ °C}$; $Z_S = Z_L = 75\ \Omega$; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
G _p	power gain	f = 50 MHz	18	18.5	19	dB
		f = 550 MHz	18.5	-	-	dB
SL	slope cable equivalent	f = 40 MHz to 550 MHz	0	-	1.5	dB
FL	flatness of frequency response	f = 40 MHz to 550 MHz	-	-	±0.3	dB
S ₁₁	input return losses	f = 40 MHz to 80 MHz	20	31	-	dB
		f = 80 MHz to 160 MHz	18.5	30	-	dB
		f = 160 MHz to 320 MHz	17	27.5	-	dB
		f = 320 MHz to 550 MHz	16	25	-	dB
S ₂₂	output return losses	f = 40 MHz to 80 MHz	20	29	-	dB
		f = 80 MHz to 160 MHz	18.5	27.5	-	dB
		f = 160 MHz to 320 MHz	17	24	-	dB
		f = 320 MHz to 550 MHz	16	21	-	dB
φ _{S21}	phase response	f = 50 MHz	-45	-	+45	deg
CTB	composite triple beat	77 channels flat; V _o = 44 dBmV; measured at 547.25 MHz	-	-61	-60	dB
X _{mod}	cross modulation	77 channels flat; V _o = 44 dBmV; measured at 55.25 MHz	-	-61	-60	dB
CSO	composite second order distortion	77 channels flat; V _o = 44 dBmV; measured at 548.5 MHz	-	-69	-60	dB

Table 8: Characteristics ...continued

Bandwidth 40 MHz to 550 MHz; $V_B = 24\text{ V}$; $T_{mb} = 30\text{ }^\circ\text{C}$; $Z_S = Z_L = 75\ \Omega$; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
d_2	second order distortion		[1]	-	-72	dB	
V_o	output voltage	$d_{im} = -60\text{ dB}$	[2]	62	-	dBmV	
F	noise figure	see Table 5	-	-	-	dB	
I_{tot}	total current consumption (DC)		[3]	-	225	240	mA

[1] $f_p = 55.25\text{ MHz}$; $V_p = 44\text{ dBmV}$; $f_q = 493.25\text{ MHz}$; $V_q = 44\text{ dBmV}$; measured at $f_p + f_q = 548.5\text{ MHz}$.

[2] Measured according to DIN45004B: $f_p = 540.25\text{ MHz}$; $V_p = V_o$; $f_q = 547.25\text{ MHz}$; $V_q = V_o - 6\text{ dB}$; $f_r = 549.25\text{ MHz}$; $V_r = V_o - 6\text{ dB}$; measured at $f_p + f_q - f_r = 538.25\text{ MHz}$.

[3] The module normally operates at $V_B = 24\text{ V}$, but is able to withstand supply transients up to 30 V.

Table 9: Characteristics

Bandwidth 40 MHz to 450 MHz; $V_B = 24\text{ V}$; $T_{mb} = 30\text{ }^\circ\text{C}$; $Z_S = Z_L = 75\ \Omega$; unless otherwise specified.

Symbol	Parameter	Conditions	Min	Typ	Max	Unit	
G_p	power gain	$f = 50\text{ MHz}$	18	18.5	19	dB	
		$f = 450\text{ MHz}$	18.5	-	-	dB	
SL	slope cable equivalent	$f = 40\text{ MHz to }450\text{ MHz}$	0	-	1.5	dB	
FL	flatness of frequency response	$f = 40\text{ MHz to }450\text{ MHz}$	-	-	± 0.3	dB	
s_{11}	input return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	31	-	dB	
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	30	-	dB	
		$f = 160\text{ MHz to }320\text{ MHz}$	17	27.5	-	dB	
		$f = 320\text{ MHz to }450\text{ MHz}$	16	25	-	dB	
s_{22}	output return losses	$f = 40\text{ MHz to }80\text{ MHz}$	20	29	-	dB	
		$f = 80\text{ MHz to }160\text{ MHz}$	18.5	27.5	-	dB	
		$f = 160\text{ MHz to }320\text{ MHz}$	17	24	-	dB	
		$f = 320\text{ MHz to }450\text{ MHz}$	16	21	-	dB	
ϕ_{s21}	phase response	$f = 50\text{ MHz}$	-45	-	+45	deg	
CTB	composite triple beat	60 channels flat; $V_o = 46\text{ dBmV}$; measured at 445.25 MHz	-	-	-61	dB	
X_{mod}	cross modulation	60 channels flat; $V_o = 46\text{ dBmV}$; measured at 55.25 MHz	-	-	-60	dB	
CSO	composite second order distortion	60 channels flat; $V_o = 46\text{ dBmV}$; measured at 446.5 MHz	-	-	-61	dB	
d_2	second order distortion		[1]	-	-75	dB	
V_o	output voltage	$d_{im} = -60\text{ dB}$	[2]	64	-	dBmV	
F	noise figure	see Table 5	-	-	-	dB	
I_{tot}	total current consumption (DC)		[3]	-	225	240	mA

[1] $f_p = 55.25\text{ MHz}$; $V_p = 46\text{ dBmV}$; $f_q = 391.25\text{ MHz}$; $V_q = 46\text{ dBmV}$; measured at $f_p + f_q = 446.5\text{ MHz}$.

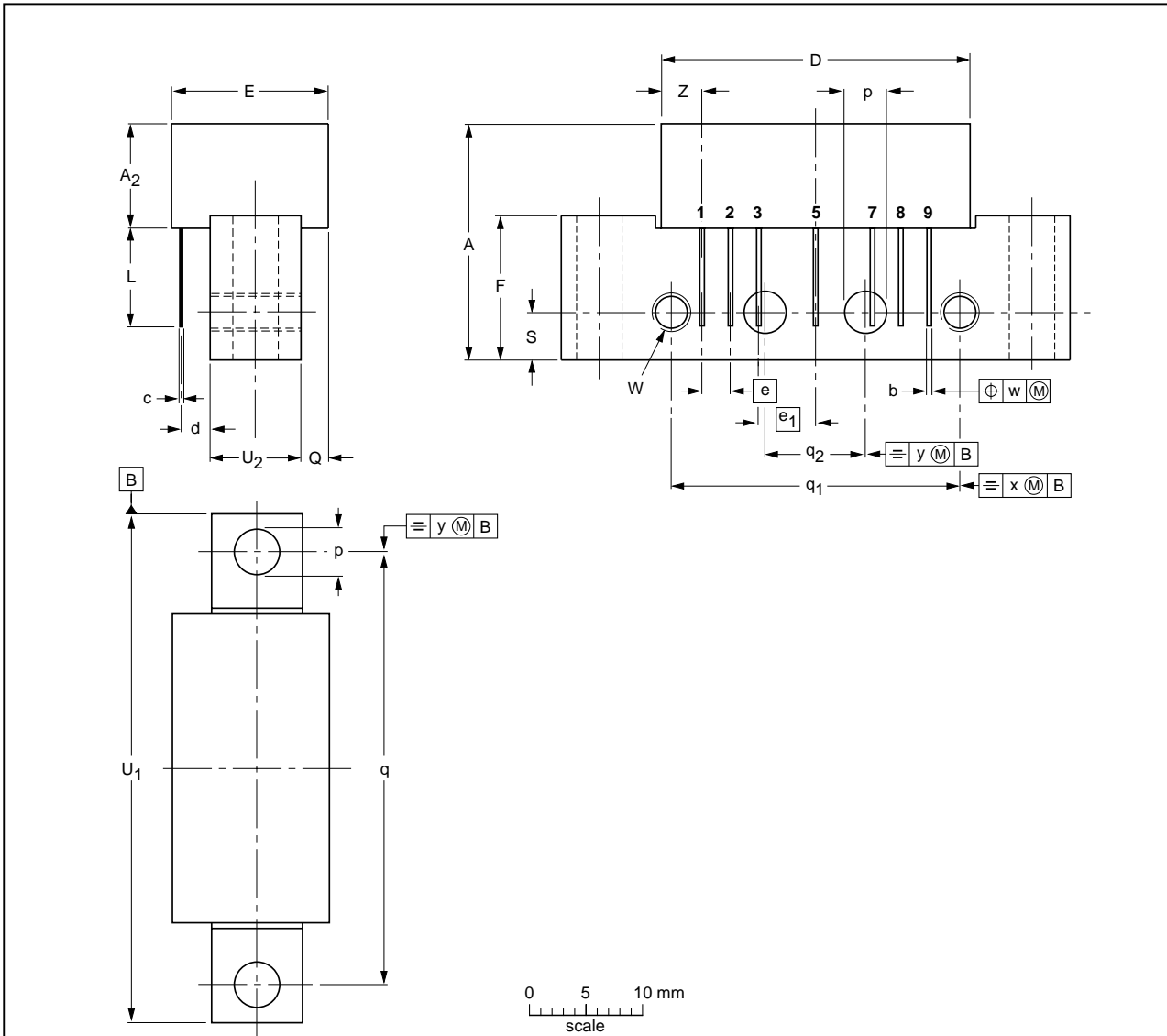
[2] Measured according to DIN45004B: $f_p = 440.25\text{ MHz}$; $V_p = V_o$; $f_q = 447.25\text{ MHz}$; $V_q = V_o - 6\text{ dB}$; $f_r = 449.25\text{ MHz}$; $V_r = V_o - 6\text{ dB}$; measured at $f_p + f_q - f_r = 438.25\text{ MHz}$.

[3] The module normally operates at $V_B = 24\text{ V}$, but is able to withstand supply transients up to 30 V.

6. Package outline

Rectangular single-ended package; aluminium flange; 2 vertical mounting holes; 2 x 6-32 UNC and 2 extra horizontal mounting holes; 7 gold-plated in-line leads

SOT115J



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A ₂ max.	b	c	D max.	d max.	E max.	e	e ₁	F	L min.	p	Q max.	q	q ₁	q ₂	S	U ₁	U ₂	W	w	x	y	Z max.
mm	20.8	9.1	0.51 0.38	0.25	27.2	2.54	13.75	2.54	5.08	12.7	8.8	4.15 3.85	2.4	38.1	25.4	10.2	4.2	44.75 44.25	8.2 7.8	6-32 UNC	0.25	0.7	0.1	3.8

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	JEITA			
SOT115J						99-02-06 04-02-04

Fig 1. Package outline SOT115J

7. Revision history

Table 10: Revision history

Document ID	Release date	Data sheet status	Change notice	Doc. number	Supersedes
BGY885A_6	20050322	Product data sheet	-	9397 750 14434	BGY885A_5
Modifications:	<ul style="list-style-type: none">The format of this data sheet has been redesigned to comply with the new representation and information standard of Philips Semiconductors				
BGY885A_5	20011022	Product specification	-	9397 750 08818	BGY885A_4
BGY885A_4	19990330	Product specification	-	9397 750 05444	BGY885A_3
BGY885A_3	19970407	Product specification	-	9397 750 02093	BGY885A_2
BGY885A_2	199502	Product specification	-	n.a.	n.a.

8. Data sheet status

Level	Data sheet status ^[1]	Product status ^[2] ^[3]	Definition
I	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.
II	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.
III	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. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[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>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

9. 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.

10. 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 in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). 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.

11. Contact information

For additional information, please visit: <http://www.semiconductors.philips.com>

For sales office addresses, send an email to: sales.addresses@www.semiconductors.philips.com

12. Contents

1	Product profile	1
1.1	General description	1
1.2	Features	1
1.3	Quick reference data	1
2	Pinning information	2
3	Ordering information	2
4	Limiting values	2
5	Characteristics	3
6	Package outline	7
7	Revision history	8
8	Data sheet status	9
9	Definitions	9
10	Disclaimers	9
11	Contact information	9



© Koninklijke Philips Electronics N.V. 2005

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Date of release: 22 March 2005
Document number: 9397 750 14434

Published in The Netherlands