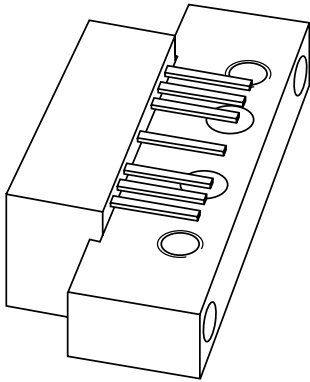


DATA SHEET



BGD804N CATV amplifier module

Product specification
Supersedes data of 1997 Oct 28

1999 Mar 26

CATV amplifier module

BGD804N

FEATURES

- Extremely flat gain response
- Excellent linearity
- Extremely low noise
- Silicon nitride passivation
- Excellent return loss properties
- Rugged construction
- Gold metallization ensures excellent reliability.

APPLICATIONS

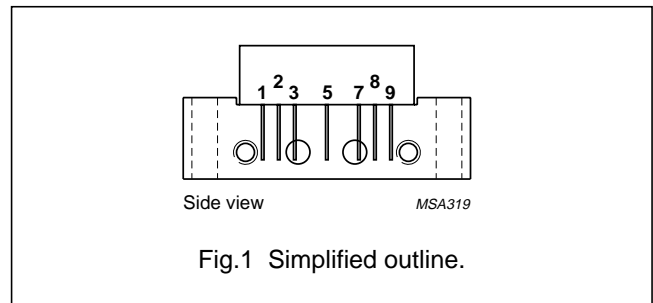
CATV systems operating in the 40 to 860 MHz frequency range.

DESCRIPTION

Hybrid amplifier module in a SOT115J package operating at a voltage supply of 24 V (DC).

PINNING - SOT115J

PIN	DESCRIPTION
1	input
2	common
3	common
5	+V _B
7	common
8	common
9	output



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
G _p	power gain	f = 50 MHz	19.5	20.5	dB
		f = 860 MHz	20	–	dB
I _{tot}	total current consumption (DC)	V _B = 24 V	–	410	mA

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V _B	supply voltage	–	25	V
V _i	RF input voltage	–	65	dBmV
T _{stg}	storage temperature	–40	+100	°C
T _{mb}	mounting base operating temperature	–20	+100	°C

CATV amplifier module

BGD804N

CHARACTERISTICS

Table 1 Bandwidth 40 to 860 MHz; $V_B = 24$ V; $T_{case} = 35$ °C; $Z_S = Z_L = 75$ Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	$f = 50$ MHz	19.5	20	20.5	dB
		$f = 860$ MHz	20	21	–	dB
SL	slope cable equivalent	$f = 40$ to 860 MHz	0.2	0.9	2	dB
FL	flatness of frequency response	$f = 40$ to 860 MHz	–	± 0.1	± 0.25	dB
S_{11}	input return losses	$f = 40$ to 80 MHz	20	29.5	–	dB
		$f = 80$ to 160 MHz	18.5	23.5	–	dB
		$f = 160$ to 320 MHz	17	20.5	–	dB
		$f = 320$ to 640 MHz	15.5	19.5	–	dB
		$f = 640$ to 860 MHz	14	17.5	–	dB
S_{22}	output return losses	$f = 40$ to 80 MHz	20	30	–	dB
		$f = 80$ to 160 MHz	18.5	31	–	dB
		$f = 160$ to 860 MHz	17	21	–	dB
S_{21}	phase response	$f = 50$ MHz	–45	–	+45	deg
CTB	composite triple beat	49 channels flat; $V_o = 47$ dBmV; measured at 859.25 MHz	–	–65	–62	dB
X_{mod}	cross modulation	49 channels flat; $V_o = 47$ dBmV; measured at 55.25 MHz	–	–64	–61	dB
CSO	composite second order distortion	49 channels flat; $V_o = 47$ dBmV; measured at 860.5 MHz	–	–66	–58	dB
d_2	second order distortion	note 1	–	–77.5	–67	dB
V_o	output voltage	$d_{im} = -60$ dB; note 2	61	63	–	dBmV
F	noise figure	$f = 50$ MHz	–	4.5	5	dB
		$f = 550$ MHz	–	–	5.5	dB
		$f = 650$ MHz	–	–	6.5	dB
		$f = 750$ MHz	–	–	7	dB
		$f = 860$ MHz	–	6.5	8	dB
I_{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

- $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
 $f_q = 805.25$ MHz; $V_q = 44$ dBmV;
measured at $f_p + f_q = 860.5$ MHz.
- Measured according to DIN45004B;
 $f_p = 851.25$ MHz; $V_p = V_o$;
 $f_q = 858.25$ MHz; $V_q = V_o - 6$ dB;
 $f_r = 860.25$ MHz; $V_r = V_o - 6$ dB;
measured at $f_p + f_q - f_r = 849.25$ MHz.
- The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

CATV amplifier module

BGD804N

Table 2 Bandwidth 40 to 860 MHz; $V_B = 24$ V; $T_{case} = 30$ °C; $Z_S = Z_L = 75$ Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G _p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 860 MHz	20	21	–	dB
SL	slope cable equivalent	f = 40 to 860 MHz	0.2	0.9	2	dB
FL	flatness of frequency response	f = 40 to 860 MHz	–	±0.1	±0.25	dB
S ₁₁	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	23.5	–	dB
		f = 160 to 320 MHz	17	20.5	–	dB
		f = 320 to 640 MHz	15.5	19.5	–	dB
		f = 640 to 860 MHz	14	17.5	–	dB
S ₂₂	output return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	31	–	dB
		f = 160 to 860 MHz	17	21	–	dB
S ₂₁	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	129 channels flat; V _o = 44 dBmV; measured at 859.25 MHz	–	–	–53	dB
X _{mod}	cross modulation	129 channels flat; V _o = 44 dBmV; measured at 55.25 MHz	–	–	–58	dB
CSO	composite second order distortion	129 channels flat; V _o = 44 dBmV; measured at 860.5 MHz	–	–	–54	dB
d ₂	second order distortion	note 1	–	–77.5	–67	dB
V _o	output voltage	d _{im} = –60 dB; note 2	61	63	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I _{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
 $f_q = 805.25$ MHz; $V_q = 44$ dBmV;
measured at $f_p + f_q = 860.5$ MHz.
2. Measured according to DIN45004B;
 $f_p = 851.25$ MHz; $V_p = V_o$;
 $f_q = 858.25$ MHz; $V_q = V_o - 6$ dB;
 $f_r = 860.25$ MHz; $V_r = V_o - 6$ dB;
measured at $f_p + f_q - f_r = 849.25$ MHz.
3. The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

CATV amplifier module

BGD804N

Table 3 Bandwidth 40 to 750 MHz; $V_B = 24$ V; $T_{case} = 30$ °C; $Z_S = Z_L = 75$ Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G _p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 750 MHz	20	–	–	dB
SL	slope cable equivalent	f = 40 to 750 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 750 MHz	–	–	±0.25	dB
S ₁₁	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	23.5	–	dB
		f = 160 to 320 MHz	17	20.5	–	dB
		f = 320 to 640 MHz	15.5	19.5	–	dB
		f = 640 to 750 MHz	14	17.5	–	dB
S ₂₂	output return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	31	–	dB
		f = 160 to 750 MHz	17	21	–	dB
S ₂₁	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	110 channels flat; V _o = 44 dBmV; measured at 745.25 MHz	–	–	–58	dB
X _{mod}	cross modulation	110 channels flat; V _o = 44 dBmV; measured at 55.25 MHz	–	–	–59	dB
CSO	composite second order distortion	110 channels flat; V _o = 44 dBmV; measured at 746.5 MHz	–	–	–58	dB
d ₂	second order distortion	note 1	–	–	–70	dB
V _o	output voltage	d _{im} = –60 dB; note 2	63	–	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I _{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

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.

CATV amplifier module

BGD804N

Table 4 Bandwidth 40 to 650 MHz; $V_B = 24$ V; $T_{case} = 30$ °C; $Z_S = Z_L = 75 \Omega$

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G_p	power gain	$f = 50$ MHz	19.5	20	20.5	dB
		$f = 650$ MHz	20	–	–	dB
SL	slope cable equivalent	$f = 40$ to 650 MHz	0.2	–	2	dB
FL	flatness of frequency response	$f = 40$ to 650 MHz	–	–	± 0.2	dB
S_{11}	input return losses	$f = 40$ to 80 MHz	20	29.5	–	dB
		$f = 80$ to 160 MHz	18.5	23.5	–	dB
		$f = 160$ to 320 MHz	17	20.5	–	dB
		$f = 320$ to 650 MHz	15	19.5	–	dB
S_{22}	output return losses	$f = 40$ to 80 MHz	20	30	–	dB
		$f = 80$ to 160 MHz	18.5	31	–	dB
		$f = 160$ to 650 MHz	17	21	–	dB
S_{21}	phase response	$f = 50$ MHz	–45	–	+45	deg
CTB	composite triple beat	94 channels flat; $V_o = 44$ dBmV; measured at 649.25 MHz	–	–	–60	dB
X_{mod}	cross modulation	94 channels flat; $V_o = 44$ dBmV; measured at 55.25 MHz	–	–	–60	dB
CSO	composite second order distortion	94 channels flat; $V_o = 44$ dBmV; measured at 650.5 MHz	–	–	–60	dB
d_2	second order distortion	note 1	–	–	–70	dB
V_o	output voltage	$d_{im} = -60$ dB; note 2	64	–	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I_{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

- $f_p = 55.25$ MHz; $V_p = 44$ dBmV;
 $f_q = 595.25$ MHz; $V_q = 44$ dBmV;
measured at $f_p + f_q = 650.5$ MHz.
- Measured according to DIN45004B;
 $f_p = 640.25$ MHz; $V_p = V_o$;
 $f_q = 647.25$ MHz; $V_q = V_o - 6$ dB;
 $f_r = 649.25$ MHz; $V_r = V_o - 6$ dB;
measured at $f_p + f_q - f_r = 638.25$ MHz.
- The module normally operates at $V_B = 24$ V, but is able to withstand supply transients up to 30 V.

CATV amplifier module

BGD804N

Table 5 Bandwidth 40 to 550 MHz; $V_B = 24$ V; $T_{case} = 30$ °C; $Z_S = Z_L = 75$ Ω

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
G _p	power gain	f = 50 MHz	19.5	20	20.5	dB
		f = 550 MHz	20	–	–	dB
SL	slope cable equivalent	f = 40 to 550 MHz	0.2	–	2	dB
FL	flatness of frequency response	f = 40 to 550 MHz	–	–	±0.2	dB
S ₁₁	input return losses	f = 40 to 80 MHz	20	29.5	–	dB
		f = 80 to 160 MHz	18.5	23.5	–	dB
		f = 160 to 320 MHz	17	20.5	–	dB
		f = 320 to 550 MHz	16	19.5	–	dB
S ₂₂	output return losses	f = 40 to 80 MHz	20	30	–	dB
		f = 80 to 160 MHz	18.5	31	–	dB
		f = 160 to 550 MHz	17	21	–	dB
S ₂₁	phase response	f = 50 MHz	–45	–	+45	deg
CTB	composite triple beat	77 channels flat; V _o = 44 dBmV; measured at 547.25 MHz	–	–	–64	dB
X _{mod}	cross modulation	77 channels flat; V _o = 44 dBmV; measured at 55.25 MHz	–	–	–62	dB
CSO	composite second order distortion	77 channels flat; V _o = 44 dBmV; measured at 548.5 MHz	–	–	–63	dB
d ₂	second order distortion	note 1	–	–	–72	dB
V _o	output voltage	d _{im} = –60 dB; note 2	65	–	–	dBmV
F	noise figure	see Table 1	–	–	–	dB
I _{tot}	total current consumption (DC)	note 3	–	395	410	mA

Notes

1. f_p = 55.25 MHz; V_p = 44 dBmV;
f_q = 493.25 MHz; V_q = 44 dBmV;
measured at f_p + f_q = 548.5 MHz.
2. Measured according to DIN45004B;
f_p = 540.25 MHz; V_p = V_o;
f_q = 547.25 MHz; V_q = V_o –6 dB;
f_r = 549.25 MHz; V_r = V_o –6 dB;
measured at f_p + f_q – f_r = 538.25 MHz.
3. The module normally operates at V_B = 24 V, but is able to withstand supply transients up to 30 V.

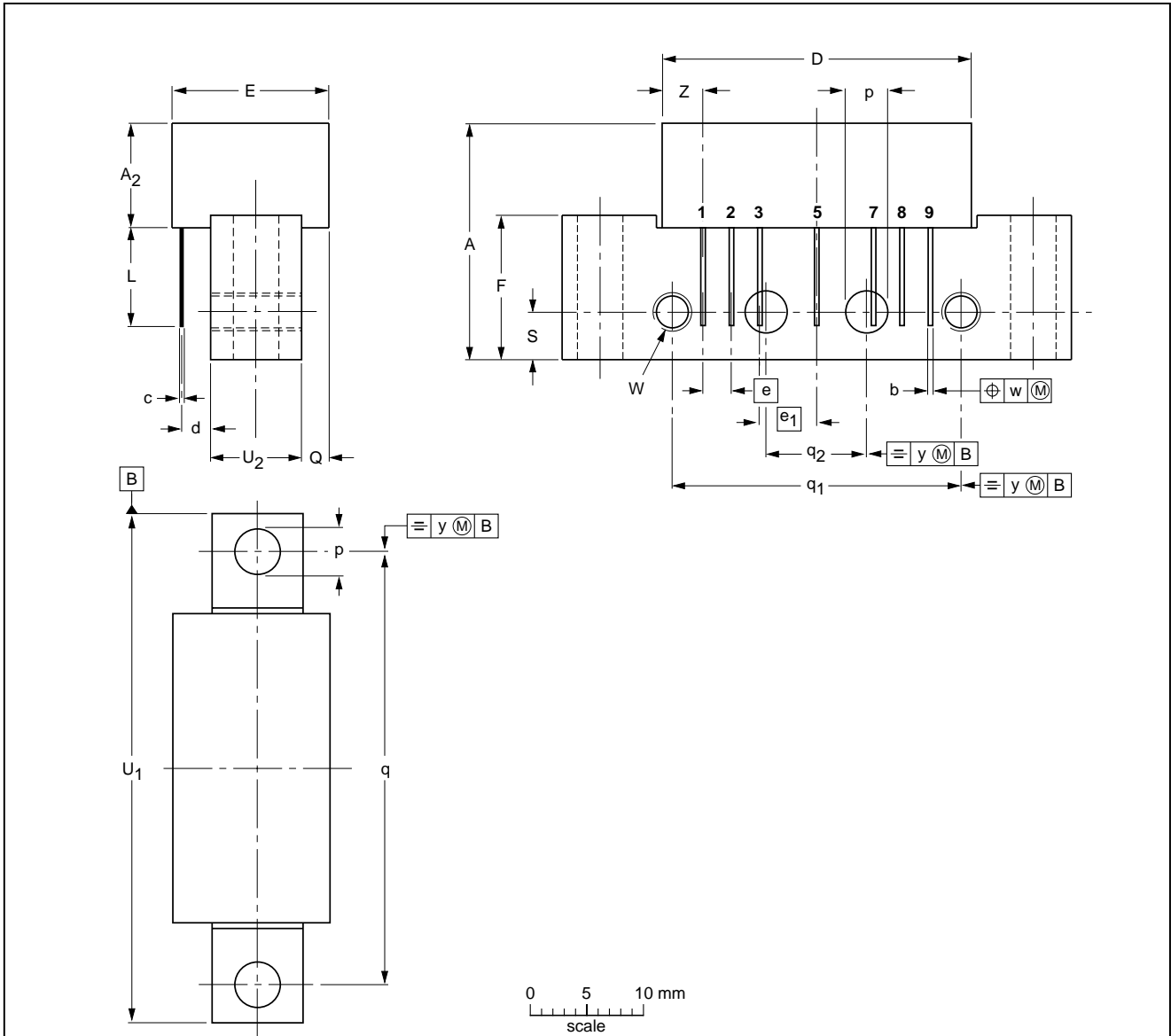
CATV amplifier module

BGD804N

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 max.	U ₂	W	w	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	8	6-32 UNC	0.25	0.1	3.8

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

CATV amplifier module

BGD804N

DEFINITIONS

Data Sheet Status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). 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	
Where application information is given, it is advisory and does not form part of the specification.	

LIFE SUPPORT APPLICATIONS

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 customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

CATV amplifier module

BGD804N

NOTES

CATV amplifier module

BGD804N

NOTES

Philips Semiconductors – a worldwide company

Argentina: see South America

Australia: 34 Waterloo Road, NORTH RYDE, NSW 2113,
Tel. +61 2 9805 4455, Fax. +61 2 9805 4466

Austria: Computerstr. 6, A-1101 WIEN, P.O. Box 213,
Tel. +43 1 60 101 1248, Fax. +43 1 60 101 1210

Belarus: Hotel Minsk Business Center, Bld. 3, r. 1211, Volodarski Str. 6,
220050 MINSK, Tel. +375 172 20 0733, Fax. +375 172 20 0773

Belgium: see The Netherlands

Brazil: see South America

Bulgaria: Philips Bulgaria Ltd., Energoproject, 15th floor,
51 James Bourchier Blvd., 1407 SOFIA,
Tel. +359 2 68 9211, Fax. +359 2 68 9102

Canada: PHILIPS SEMICONDUCTORS/COMPONENTS,
Tel. +1 800 234 7381, Fax. +1 800 943 0087

China/Hong Kong: 501 Hong Kong Industrial Technology Centre,
72 Tat Chee Avenue, Kowloon Tong, HONG KONG,
Tel. +852 2319 7888, Fax. +852 2319 7700

Colombia: see South America

Czech Republic: see Austria

Denmark: Sydhavnsgade 23, 1780 COPENHAGEN V,
Tel. +45 33 29 3333, Fax. +45 33 29 3905

Finland: Sinikalliontie 3, FIN-02630 ESPOO,
Tel. +358 9 615 800, Fax. +358 9 6158 0920

France: 51 Rue Carnot, BP317, 92156 SURESNES Cedex,
Tel. +33 1 4099 6161, Fax. +33 1 4099 6427

Germany: Hammerbrookstraße 69, D-20097 HAMBURG,
Tel. +49 40 2353 60, Fax. +49 40 2353 6300

Hungary: see Austria

India: Philips INDIA Ltd, Band Box Building, 2nd floor,
254-D, Dr. Annie Besant Road, Worli, MUMBAI 400 025,
Tel. +91 22 493 8541, Fax. +91 22 493 0966

Indonesia: PT Philips Development Corporation, Semiconductors Division,
Gedung Philips, Jl. Buncit Raya Kav.99-100, JAKARTA 12510,
Tel. +62 21 794 0040 ext. 2501, Fax. +62 21 794 0080

Ireland: Newstead, Clonskeagh, DUBLIN 14,
Tel. +353 1 7640 000, Fax. +353 1 7640 200

Israel: RAPAC Electronics, 7 Kehilat Saloniki St, PO Box 18053,
TEL AVIV 61180, Tel. +972 3 645 0444, Fax. +972 3 649 1007

Italy: PHILIPS SEMICONDUCTORS, Piazza IV Novembre 3,
20124 MILANO, Tel. +39 2 6752 2531, Fax. +39 2 6752 2557

Japan: Philips Bldg 13-37, Kohnan 2-chome, Minato-ku,
TOKYO 108-8507, Tel. +81 3 3740 5130, Fax. +81 3 3740 5077

Korea: Philips House, 260-199 Itaewon-dong, Yongsan-ku, SEOUL,
Tel. +82 2 709 1412, Fax. +82 2 709 1415

Malaysia: No. 76 Jalan Universiti, 46200 PETALING JAYA, SELANGOR,
Tel. +60 3 750 5214, Fax. +60 3 757 4880

Mexico: 5900 Gateway East, Suite 200, EL PASO, TEXAS 79905,
Tel. +9-5 800 234 7381, Fax +9-5 800 943 0087

Middle East: see Italy

Netherlands: Postbus 90050, 5600 PB EINDHOVEN, Bldg. VB,
Tel. +31 40 27 82785, Fax. +31 40 27 88399

New Zealand: 2 Wagener Place, C.P.O. Box 1041, AUCKLAND,
Tel. +64 9 849 4160, Fax. +64 9 849 7811

Norway: Box 1, Manglerud 0612, OSLO,
Tel. +47 22 74 8000, Fax. +47 22 74 8341

Pakistan: see Singapore

Philippines: Philips Semiconductors Philippines Inc.,
106 Valero St. Salcedo Village, P.O. Box 2108 MCC, MAKATI,
Metro MANILA, Tel. +63 2 816 6380, Fax. +63 2 817 3474

Poland: Ul. Lukiska 10, PL 04-123 WARSZAWA,
Tel. +48 22 612 2831, Fax. +48 22 612 2327

Portugal: see Spain

Romania: see Italy

Russia: Philips Russia, Ul. Usatcheva 35A, 119048 MOSCOW,
Tel. +7 095 755 6918, Fax. +7 095 755 6919

Singapore: Lorong 1, Toa Payoh, SINGAPORE 319762,
Tel. +65 350 2538, Fax. +65 251 6500

Slovakia: see Austria

Slovenia: see Italy

South Africa: S.A. PHILIPS Pty Ltd., 195-215 Main Road Martindale,
2092 JOHANNESBURG, P.O. Box 7430 Johannesburg 2000,
Tel. +27 11 470 5911, Fax. +27 11 470 5494

South America: Al. Vicente Pinzon, 173, 6th floor,
04547-130 SÃO PAULO, SP, Brazil,
Tel. +55 11 821 2333, Fax. +55 11 821 2382

Spain: Balmes 22, 08007 BARCELONA,
Tel. +34 93 301 6312, Fax. +34 93 301 4107

Sweden: Kottbygatan 7, Akalla, S-16485 STOCKHOLM,
Tel. +46 8 5985 2000, Fax. +46 8 5985 2745

Switzerland: Allmendstrasse 140, CH-8027 ZÜRICH,
Tel. +41 1 488 2741 Fax. +41 1 488 3263

Taiwan: Philips Semiconductors, 6F, No. 96, Chien Kuo N. Rd., Sec. 1,
TAIPEI, Taiwan Tel. +886 2 2134 2886, Fax. +886 2 2134 2874

Thailand: PHILIPS ELECTRONICS (THAILAND) Ltd.,
209/2 Sanpavuth-Bangna Road Prakanong, BANGKOK 10260,
Tel. +66 2 745 4090, Fax. +66 2 398 0793

Turkey: Talatpasa Cad. No. 5, 80640 GÜLTEPE/ISTANBUL,
Tel. +90 212 279 2770, Fax. +90 212 282 6707

Ukraine: PHILIPS UKRAINE, 4 Patrice Lumumba str., Building B, Floor 7,
252042 KIEV, Tel. +380 44 264 2776, Fax. +380 44 268 0461

United Kingdom: Philips Semiconductors Ltd., 276 Bath Road, Hayes,
MIDDLESEX UB3 5BX, Tel. +44 181 730 5000, Fax. +44 181 754 8421

United States: 811 East Arques Avenue, SUNNYVALE, CA 94088-3409,
Tel. +1 800 234 7381, Fax. +1 800 943 0087

Uruguay: see South America

Vietnam: see Singapore

Yugoslavia: PHILIPS, Trg N. Pasica 5/v, 11000 BEOGRAD,
Tel. +381 11 62 5344, Fax. +381 11 63 5777

For all other countries apply to: Philips Semiconductors,
International Marketing & Sales Communications, Building BE-p, P.O. Box 218,
5600 MD EINDHOVEN, The Netherlands, Fax. +31 40 27 24825

Internet: <http://www.semiconductors.philips.com>

© Philips Electronics N.V. 1999

SCA63

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.

Printed in The Netherlands

125008/00/02/pp12

Date of release: 1999 Mar 26

Document order number: 9397 750 05458

Let's make things better.

**Philips
Semiconductors**



PHILIPS