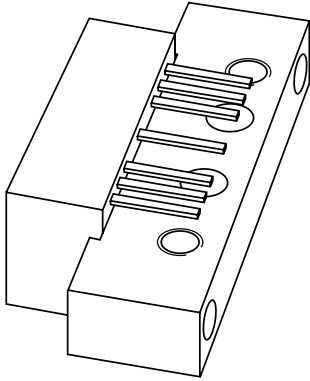


# DATA SHEET



## **BGD816L** CATV amplifier module

Objective specification

2000 Apr 12

# CATV amplifier module

# BGD816L

### FEATURES

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

### APPLICATIONS

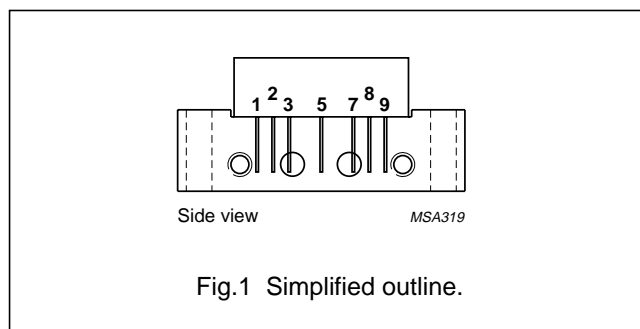
- CATV systems operating in the 40 to 870 MHz frequency range.

### DESCRIPTION

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

### PINNING - SOT115J

| PIN     | DESCRIPTION     |
|---------|-----------------|
| 1       | input           |
| 2 and 3 | common          |
| 5       | +V <sub>B</sub> |
| 7 and 8 | common          |
| 9       | output          |



### QUICK REFERENCE DATA

| SYMBOL           | PARAMETER                      | CONDITIONS            | MIN. | MAX. | UNIT |
|------------------|--------------------------------|-----------------------|------|------|------|
| G <sub>p</sub>   | power gain                     | f = 45 MHz            | 21.2 | 21.8 | dB   |
|                  |                                | f = 870 MHz           | 22   | 23   | dB   |
| I <sub>tot</sub> | total current consumption (DC) | V <sub>B</sub> = 24 V | 345  | 375  | mA   |

### LIMITING VALUES

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

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>B</sub>   | supply voltage                      | –    | 30   | V    |
| V <sub>i</sub>   | RF input voltage                    | –    | 70   | dBmV |
| T <sub>stg</sub> | storage temperature                 | –40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | –20  | +100 | °C   |

## CATV amplifier module

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**CHARACTERISTICS**Bandwidth 40 to 870 MHz;  $V_B = 24$  V;  $T_{mb} = 35$  °C;  $Z_S = Z_L = 75 \Omega$ 

| SYMBOL           | PARAMETER              | CONDITIONS   | MIN. | TYP. | MAX.  | UNIT |
|------------------|------------------------|--|------|------|-------|------|
| G <sub>p</sub>   | power gain             | f = 45 MHz   | 21.2 | –    | 21.8  | dB   |
|                  |                        | f = 870 MHz  | 22   | –    | 23    | dB   |
| SL               | slope straight line    | f = 45 to 870 MHz; note 1  | 0.5  | 1    | 1.5   | dB   |
| FL               | flatness straight line | f = 45 to 100 MHz  | –    | –    | ±0.35 | dB   |
|                  |                        | f = 100 to 800 MHz   | –    | –    | ±0.5  | dB   |
|                  |                        | f = 800 to 870 MHz   | –    | –    | ±0.15 | dB   |
| S <sub>11</sub>  | input return losses    | f = 45 to 80 MHz   | 21   | –    | –     | dB   |
|                  |                        | f = 80 to 160 MHz  | 20   | –    | –     | dB   |
|                  |                        | f = 160 to 320 MHz   | 19   | –    | –     | dB   |
|                  |                        | f = 320 to 550 MHz   | 18   | –    | –     | dB   |
|                  |                        | f = 550 to 650 MHz   | 17   | –    | –     | dB   |
|                  |                        | f = 650 to 750 MHz   | 16   | –    | –     | dB   |
|                  |                        | f = 750 to 870 MHz   | 15   | –    | –     | dB   |
|                  |                        | f = 870 to 914 MHz   | 14   | –    | –     | dB   |
| S <sub>22</sub>  | output return losses   | f = 45 to 80 MHz   | 21   | –    | –     | dB   |
|                  |                        | f = 80 to 160 MHz  | 20   | –    | –     | dB   |
|                  |                        | f = 160 to 320 MHz   | 19   | –    | –     | dB   |
|                  |                        | f = 320 to 550 MHz   | 18   | –    | –     | dB   |
|                  |                        | f = 550 to 650 MHz   | 17   | –    | –     | dB   |
|                  |                        | f = 650 to 750 MHz   | 16   | –    | –     | dB   |
|                  |                        | f = 750 to 870 MHz   | 15   | –    | –     | dB   |
|                  |                        | f = 870 to 914 MHz   | 14   | –    | –     | dB   |
| S <sub>21</sub>  | phase response         | f = 50 MHz   | –45  | –    | +45   | deg  |
| CTB              | composite triple beat  | 79 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 547.25 MHz               | –    | –    | –64   | dB   |
|                  |                        | 112 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 745.25 MHz              | –    | –    | –58   | dB   |
|                  |                        | 132 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 859.25 MHz              | –    | –    | –54   | dB   |
|                  |                        | 112 chs; f <sub>m</sub> = tbd MHz; V <sub>o</sub> = 48.2 dBmV at 745 MHz; note 2 | –    | –    | –57   | dB   |
|                  |                        | 79 chs; f <sub>m</sub> = tbd MHz; V <sub>o</sub> = 45.3 dBmV at 547 MHz; note 3  | –    | –    | –65   | dB   |
| X <sub>mod</sub> | cross modulation       | 79 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 55.25 MHz                | –    | –    | –63   | dB   |
|                  |                        | 112 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 55.25 MHz               | –    | –    | –59   | dB   |
|                  |                        | 132 chs flat; V <sub>o</sub> = 44 dBmV; f <sub>m</sub> = 55.25 MHz               | –    | –    | –58   | dB   |
|                  |                        | 112 chs; f <sub>m</sub> = tbd MHz; V <sub>o</sub> = 48.2 dBmV at 745 MHz; note 2 | –    | –    | –54.5 | dB   |
|                  |                        | 79 chs; f <sub>m</sub> = tbd MHz; V <sub>o</sub> = 45.3 dBmV at 547 MHz; note 3  | –    | –    | –63.5 | dB   |

## CATV amplifier module

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| SYMBOL    | PARAMETER                         | CONDITIONS   | MIN. | TYP. | MAX. | UNIT |
|-----------|-----------------------------------|--|------|------|------|------|
| CSO       | composite second order distortion | 79 chs flat; $V_o = 44$ dBmV; $f_m = 548.5$ MHz                | –    | –    | –64  | dB   |
|           |                                   | 112 chs flat; $V_o = 44$ dBmV; $f_m = 746.5$ MHz               | –    | –    | –58  | dB   |
|           |                                   | 132 chs flat; $V_o = 44$ dBmV; $f_m = 860.5$ MHz               | –    | –    | –56  | dB   |
|           |                                   | 112 chs; $f_m =$ tbd MHz; $V_o = 48.2$ dBmV at 745 MHz; note 2 | –    | –    | –57  | dB   |
|           |                                   | 79 chs; $f_m =$ tbd MHz; $V_o = 45.3$ dBmV at 547 MHz; note 3  | –    | –    | –64  | dB   |
| $d_2$     | second order distortion           | note 4   | –    | –    | –74  | dB   |
| $V_o$     | output voltage                    | $d_{im} = -60$ dB; note 5                                      | 64.5 | –    | –    | dBmV |
|           |                                   | CTB compression = 1 dB; 132 chs flat; $f =$ tbd MHz            | tbd  | –    | –    | dBmV |
|           |                                   | CSO compression = 1 dB; 132 chs flat; $f =$ tbd MHz            | tbd  | –    | –    | dBmV |
| F         | noise figure                      | $f = 50$ MHz   | –    | –    | 5.5  | dB   |
|           |                                   | $f = 550$ MHz  | –    | –    | 5.5  | dB   |
|           |                                   | $f = 750$ MHz  | –    | –    | 6.5  | dB   |
|           |                                   | $f = 870$ MHz  | –    | –    | 7.5  | dB   |
| $I_{tot}$ | total current consumption (DC)    | note 6   | 345  | 360  | 375  | mA   |

**Notes**

- Slope straight line is defined as gain at 870 MHz against gain at 45 MHz.
- Tilt = 10.2 dB (55 to 745 MHz).
- Tilt = 7.3 dB (55 to 547 MHz).
- $f_p = 55.25$  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 35 V.

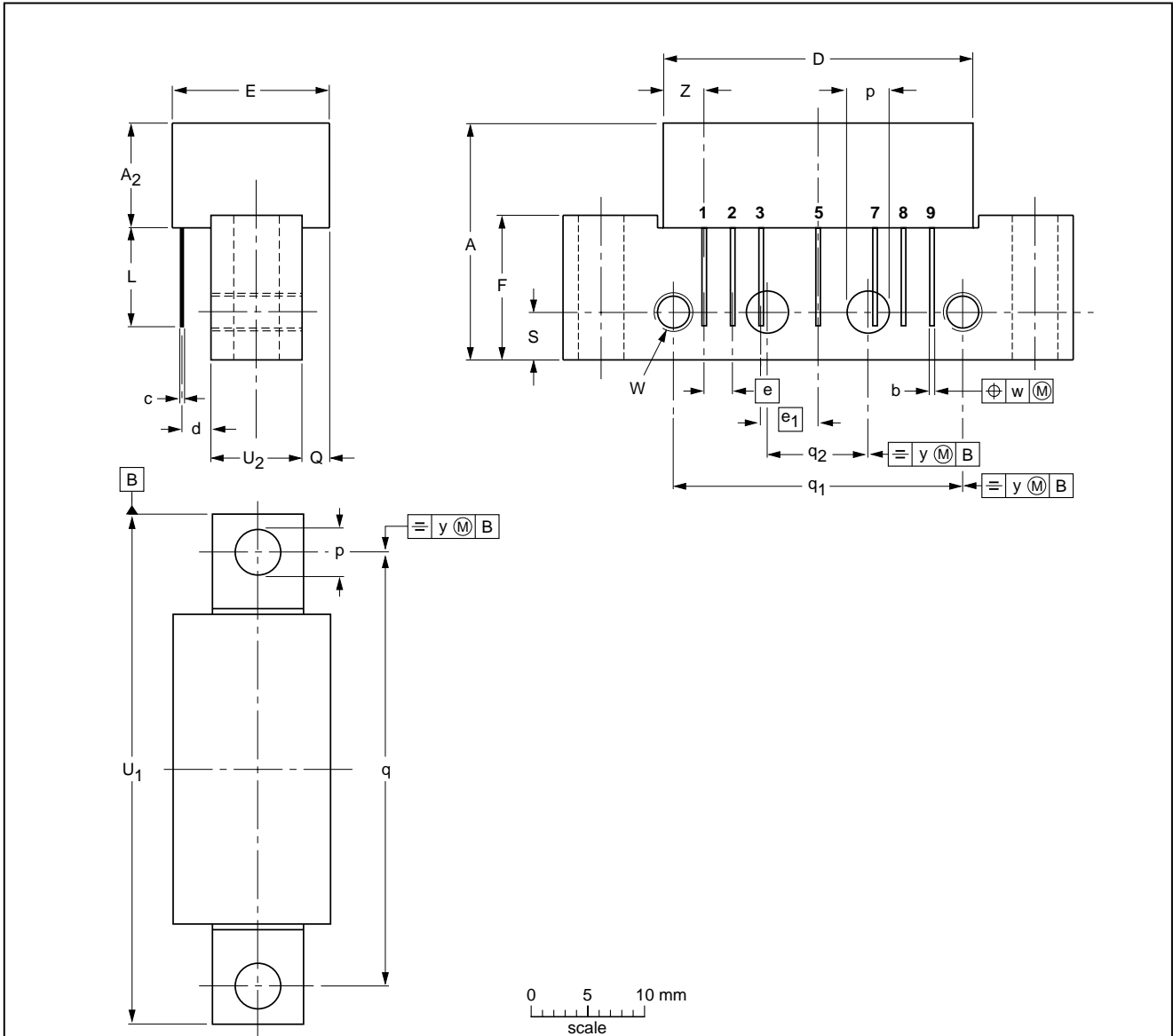
CATV amplifier module

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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 <sub>2</sub> max. | b            | c    | D max. | d max. | E max. | e    | e <sub>1</sub> | F    | L min. | p            | Q max. | q    | q <sub>1</sub> | q <sub>2</sub> | S   | U <sub>1</sub> max. | U <sub>2</sub> | W           | w    | y   | Z max. |
|------|--------|---------------------|--------------|------|--------|--------|--------|------|----------------|------|--------|--------------|--------|------|----------------|----------------|-----|---------------------|----------------|-------------|------|-----|--------|
| mm   | 20.8   | 9.1                 | 0.51<br>0.38 | 0.25 | 27.2   | 2.54   | 13.75  | 2.54 | 5.08           | 12.7 | 8.8    | 4.15<br>3.85 | 2.4    | 38.1 | 25.4           | 10.2           | 4.2 | 44.75               | 8              | 6-32<br>UNC | 0.25 | 0.1 | 3.8    |

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

## CATV amplifier module

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## DATA SHEET STATUS

| DATA SHEET STATUS         | PRODUCT STATUS | DEFINITIONS <sup>(1)</sup>   |
|---------------------------|----------------|--|
| Objective specification   | Development    | This data sheet contains the design target or goal specifications for product development. Specification may change in any manner without notice.  |
| Preliminary specification | Qualification  | This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product. |
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## Note

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

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**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.

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This product is supplied in anti-static packing to prevent damage caused by electrostatic discharge during transport and handling. For further information, refer to Philips specs.: SNW-EQ-608, SNW-FQ-302A and SNW-FQ-302B.

CATV amplifier module

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# Philips Semiconductors – a worldwide company

**Argentina:** see South America

**Australia:** 3 Figtree Drive, HOMEBUSH, NSW 2140,  
Tel. +61 2 9704 8141, Fax. +61 2 9704 8139

**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, Via Casati, 23 - 20052 MONZA (MI),  
Tel. +39 039 203 6838, Fax +39 039 203 6800

**Japan:** Philips Bldg 13-37, Kohnan 2-chome, Minato-ku,  
TOKYO 108-8507, Tel. +81 3 3740 5130, Fax. +81 3 3740 5057

**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:** Al.Jerozolimskie 195 B, 02-222 WARSAW,  
Tel. +48 22 5710 000, Fax. +48 22 5710 001

**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 58088 Newville 2114,  
Tel. +27 11 471 5401, Fax. +27 11 471 5398

**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:** Yukari Dudullu, Org. San. Blg., 2.Cad. Nr. 28 81260 Umraniye,  
ISTANBUL, Tel. +90 216 522 1500, Fax. +90 216 522 1813

**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. +44 208 730 5000, Fax. +44 208 754 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 3341 299, Fax.+381 11 3342 553

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International Marketing & Sales Communications, Building BE-p, P.O. Box 218,  
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