

# DATA SHEET



## **BGA2022** MMIC mixer

Product specification  
Supersedes data of 2000 Jun 06

2000 Dec 04

**MMIC mixer**

**BGA2022**

**FEATURES**

- Large frequency range:
  - Cellular band (900 MHz)
  - PCS band (1900 MHz)
  - WLAN band (2.4 GHz)
- High isolation
- High linearity
- High conversion gain.

**APPLICATIONS**

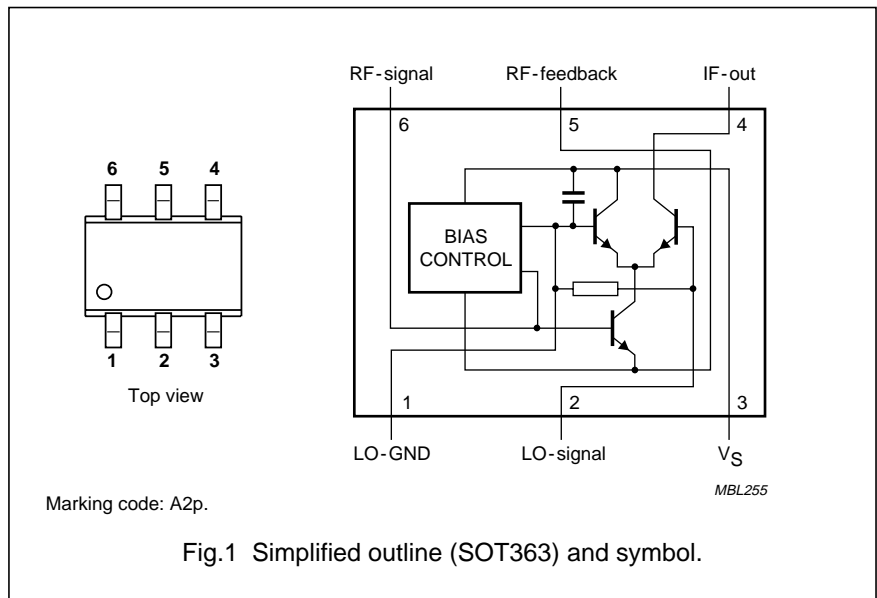
Receiver side of wireless systems that require high conversion gain and high linearity at low supply current, such as CDMA.

**DESCRIPTION**

Silicon double poly MMIC mixer in a 6-lead SOT363 plastic package.

**PINNING**

PIN	DESCRIPTION
1	LO - GND
2	LO - signal
3	V <sub>S</sub>
4	IF - out
5	RF - feedback
6	RF - signal



**QUICK REFERENCE DATA**

V<sub>S</sub> = 2.8 V; I<sub>S</sub> = 6 mA; P<sub>LO</sub> = 0 dBm; f<sub>RF</sub> = 1800 MHz; f<sub>LO</sub> = 2080 MHz; f<sub>IF</sub> = 280 MHz.

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNIT
G <sub>conv</sub>	conversion gain	4	6	8	dB
NF	noise figure (DSB)	–	12	–	dB
IP <sub>3</sub>	output third order intercept point	–	7	–	dBm

**CAUTION**

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.

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**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_S$	supply voltage		–	4	V
$I_S$	supply current		–	10	mA
$P_{LO}$	oscillator power	note 1	–	10	dBm
$P_{RF}$	RF power	note 1	–	10	dBm
$P_{tot}$	total power dissipation	$T_s \leq 100\text{ °C}$ ; note 2	–	40	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C

**Notes**

- LO and RF signals always AC coupled; 50  $\Omega$  source; no external DC voltage supplied to pins 1, 2 and 6.
- $T_s$  is the temperature at the soldering point of the ground tab.

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	VALUE	UNIT
$R_{th\ j-s}$	thermal resistance from junction to solder point	375	K/W

**CHARACTERISTICS**

$V_S = 2.8\text{ V}$ ;  $I_S = 6\text{ mA}$ ;  $T_j = 25\text{ °C}$ ; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_S$	supply current	$V_S = 2.8\text{ V}$	4	6	8	mA
$G_{conv(p)}$	power conversion gain 880 MHz 1800 MHz 1950 MHz 2450 MHz	$P_{RF} = -25\text{ dBm}$ ; $P_{LO} = 0\text{ dBm}$	– 4 – –	5 6 5 6	– 8 – –	dB dB dB dB
NF	noise figure 880 MHz 1800 MHz 1950 MHz 2450 MHz	DSB	– – – –	9 12 9 9	– – – –	dB dB dB dB
$IP_3$	intercept point third order input 880 MHz 1800 MHz 1950 MHz 2450 MHz	output referred	– – – –	4 7 7 10	– – – –	dBm dBm dBm dBm
$VSWR_{LO}$	return losses at LO port	$P_{LO} = 0\text{ dBm}$ ; $f = 0\text{ to }3\text{ GHz}$	–	–	2:1	

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APPLICATION INFORMATION

See application note number AN00059.

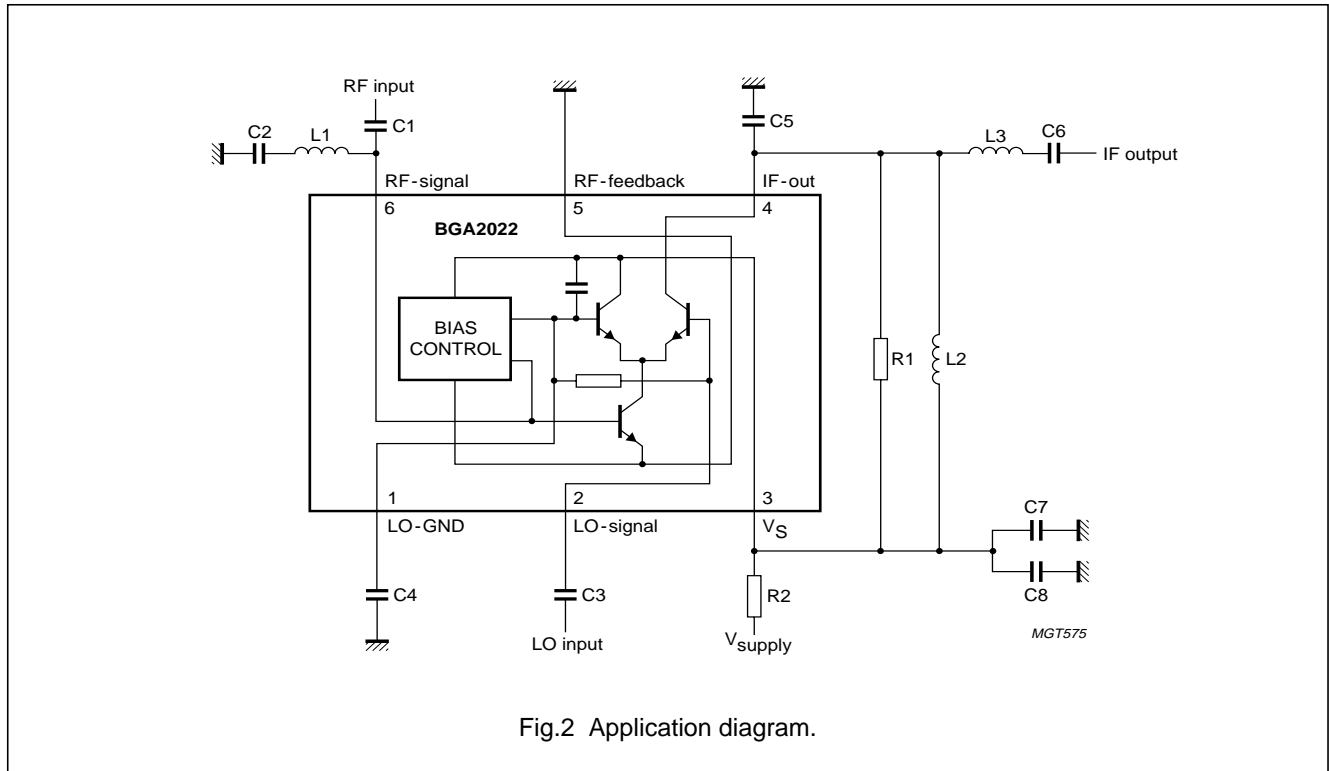


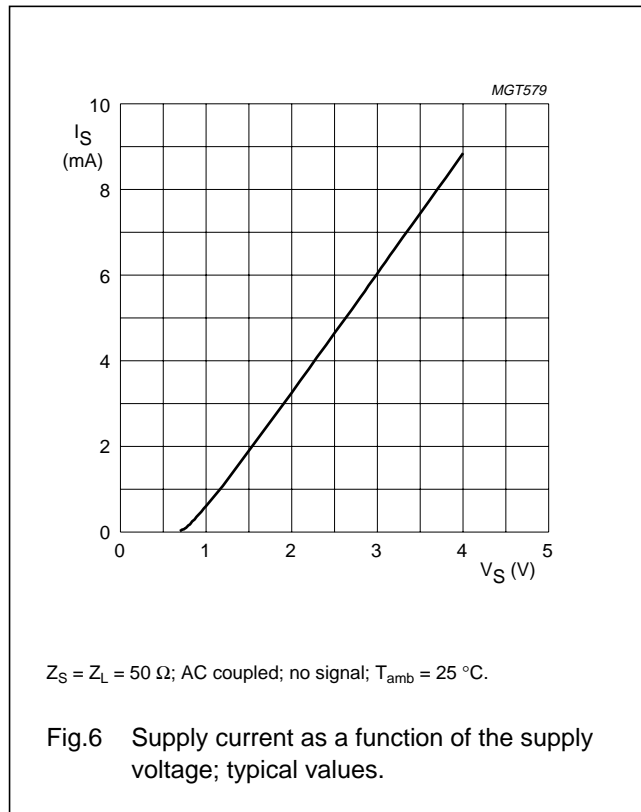
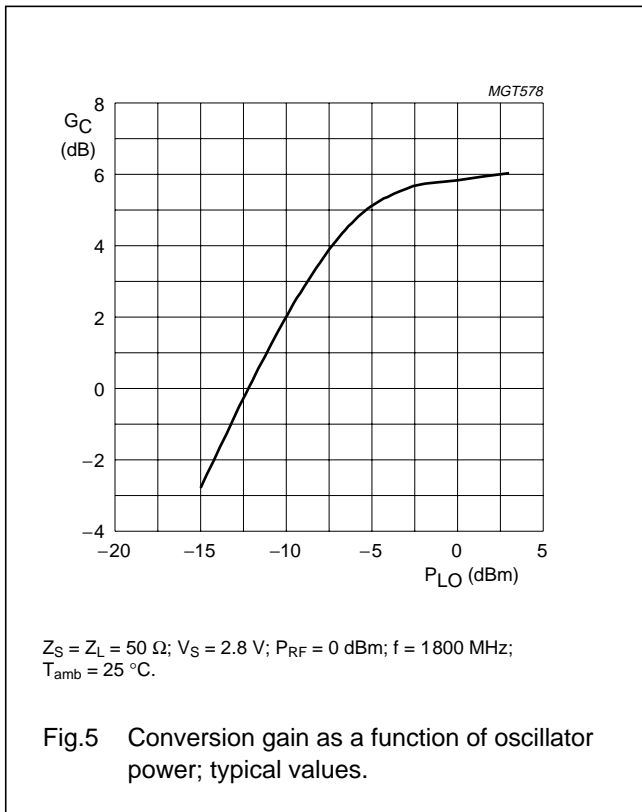
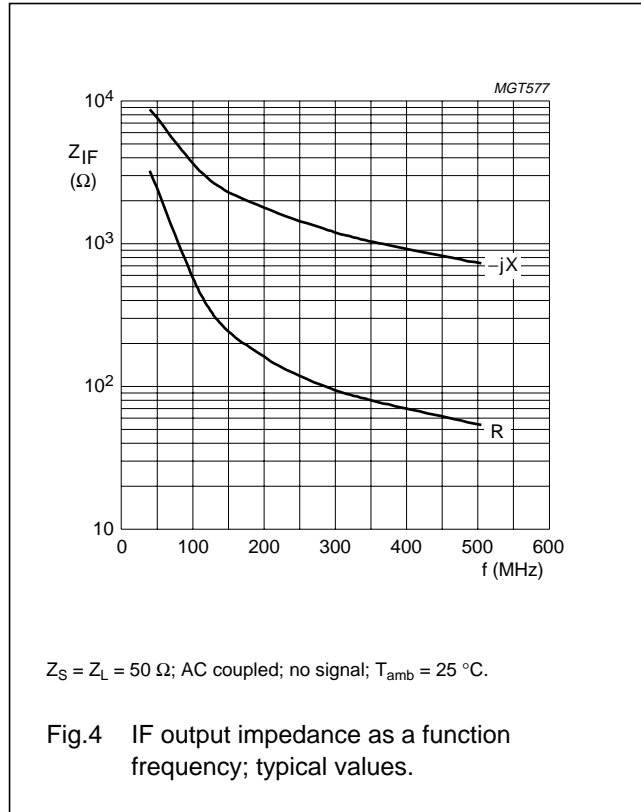
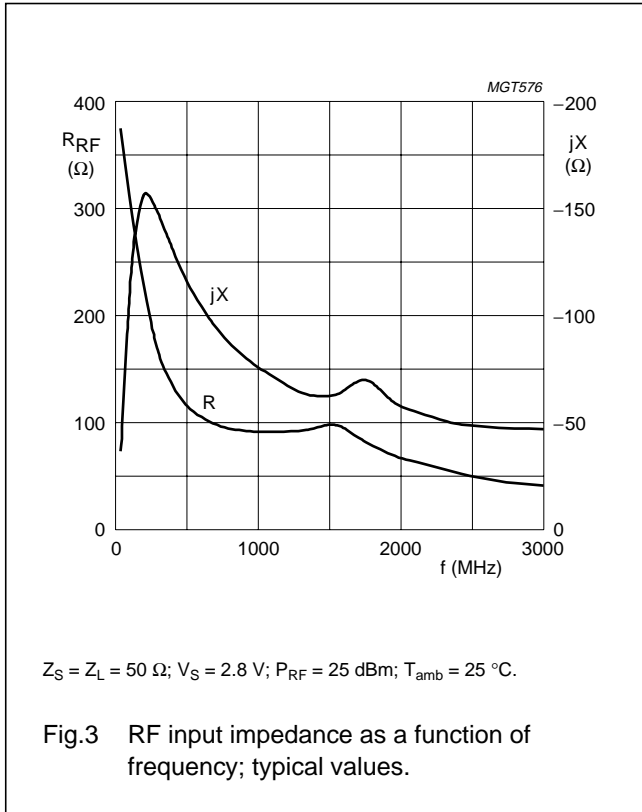
Fig.2 Application diagram.

List of components (see Fig.2)

COMPONENT	APPLICATION BOARD			
	880 MHz (IF = 80 MHz)	1800 MHz (IF = 280 MHz)	1950 MHz (IF = 80 MHz)	2450 MHz (IF = 280 MHz)
R1	1.2 kΩ	2.7 kΩ	2.2 kΩ	3.3 kΩ
R2	22 Ω	22 Ω	22 Ω	18 Ω
C1	12 pF	1.2 pF	1.5 pF	1.0 pF
C2	390 pF	5.6 pF	1.5 nF	82 pF
C3, C4	39 pF	6.8 pF	6.8 pF	2.7 pF
C5	27 pF	2 pF	15 pF	2.2 pF
C6	100 pF	100 pF	10 pF	100 pF
C7	22 nF	22 nF	22 nF	22 nF
C8	56 pF	8.2 pF	10 pF	6.8 pF
L1	10 nH	2.7 nH	2.7 nH	1.8 nH
L2	220 nH	110 nH	150 nH	220 nH
L3	470 nH	120 nH	–	120 nH

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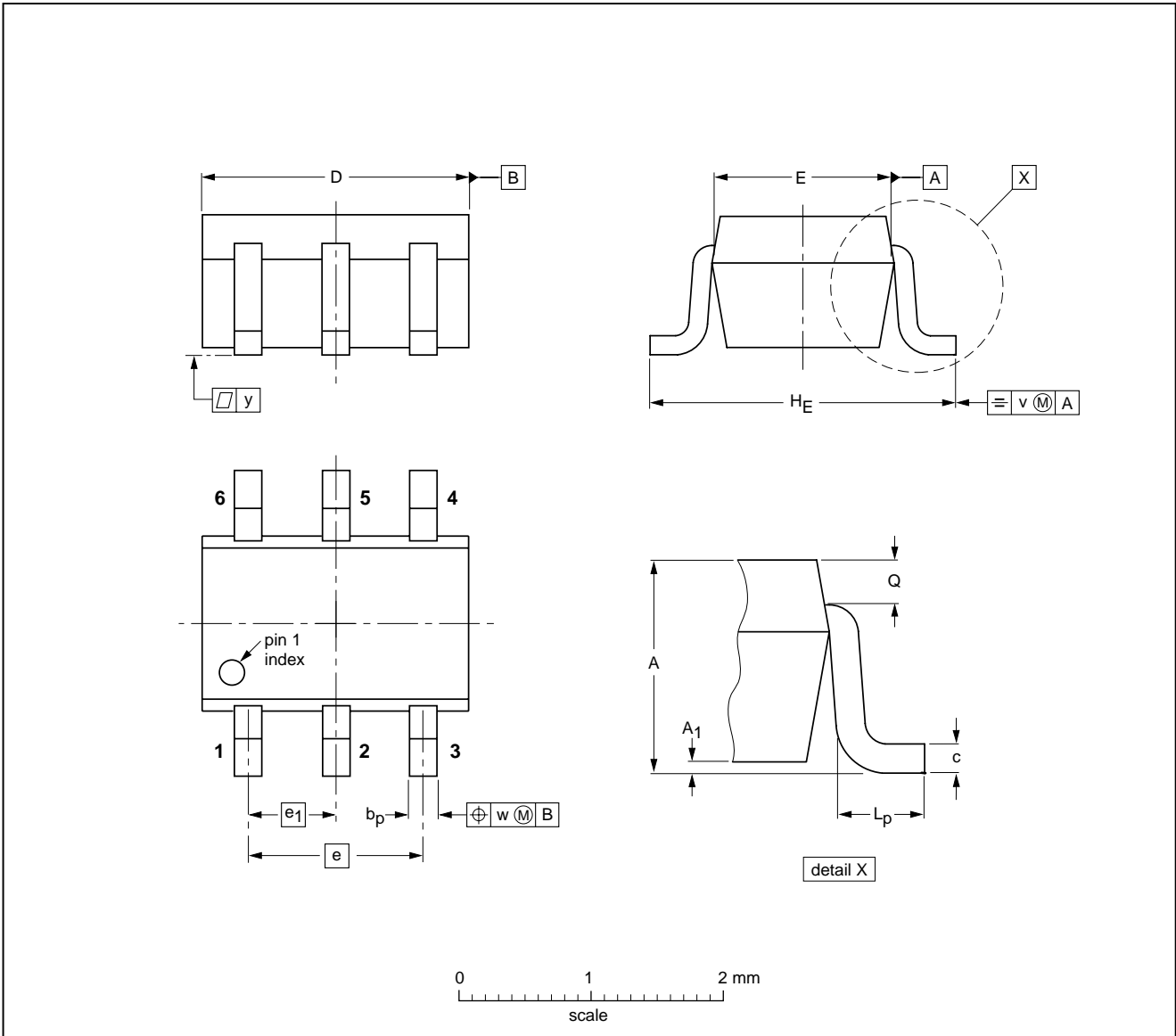
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PACKAGE OUTLINE

Plastic surface mounted package; 6 leads

SOT363



DIMENSIONS (mm are the original dimensions)

UNIT	A	A <sub>1</sub> max	b <sub>p</sub>	c	D	E	e	e <sub>1</sub>	H <sub>E</sub>	L <sub>p</sub>	Q	v	w	y
mm	1.1 0.8	0.1	0.30 0.20	0.25 0.10	2.2 1.8	1.35 1.15	1.3	0.65	2.2 2.0	0.45 0.15	0.25 0.15	0.2	0.2	0.1

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT363			SC-88			97-02-28

## MMIC mixer

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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.
Product specification	Production	This data sheet contains final specifications. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.

## Note

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

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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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# 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

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**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,  
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**Switzerland:** Allmendstrasse 140, CH-8027 ZÜRICH,  
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**Taiwan:** Philips Semiconductors, 5F, No. 96, Chien Kuo N. Rd., Sec. 1,  
TAIPEI, Taiwan Tel. +886 2 2134 2451, Fax. +886 2 2134 2874

**Thailand:** PHILIPS ELECTRONICS (THAILAND) Ltd.,  
60/14 MOO 11, Bangna Trad Road KM. 3, Bagna, BANGKOK 10260,  
Tel. +66 2 361 7910, Fax. +66 2 398 3447

**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

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**Yugoslavia:** PHILIPS, Trg N. Pasica 5/v, 11000 BEOGRAD,  
Tel. +381 11 3341 299, Fax.+381 11 3342 553

**For all other countries apply to:** Philips Semiconductors,  
Marketing Communications, Building BE-p, P.O. Box 218, 5600 MD EINDHOVEN,  
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