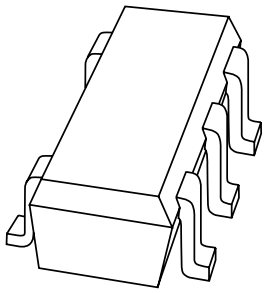
DATA SHEET



BZA800A-series
Quadruple ESD transient voltage suppressor

Preliminary specification

2000 Apr 18

Philips
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Quadruple ESD transient voltage suppressor

BZA800A-series

FEATURES

- ESD rating >8 kV, according to IEC1000-4-2
- SOT353 (SC-88A) surface mount package
- Common anode configuration

APPLICATIONS

- Computers and peripherals
- Audio and video equipment
- Communication systems
- Medical equipment.

DESCRIPTION

Monolithic transient voltage suppressor diode in a five lead SOT353 (SC-88A) package for 4-bit wide ESD transient suppression.

MARKING

TYPE NUMBER	MARKING CODE
BZA856A	Z1
BZA862A	Z2
BZA868A	Z3
BZA820A	Z4

PINNING

PIN	DESCRIPTION
1	cathode 1
2	common anode
3	cathode 2
4	cathode 3
5	cathode 4

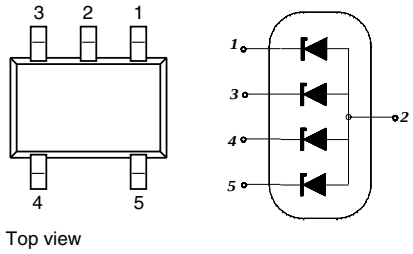


Fig.1 Simplified outline SOT353 (SC-88A)

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
Per diode					
I_Z	working current	T_a = 25 °C	–	note 1	mA
I_F	continuous forward current	T_a = 25 °C	–	200	mA
I_{FSM}	non-repetitive peak forward current	t_p = 1 ms; square pulse	–	3.75	A
P_{tot}	total power dissipation	T_a = 25 °C	–	335	mW
P_{ZSM}	non repetitive peak reverse power dissipation	square pulse; t_p = 1 ms; see Fig.3			
	BZA856A, BZA862A, BZA868A		–	24	W
	BZA820A		–	17	W
Tstg	storage temperature		–65	+150	°C
Tj	junction temperature		–	150	°C

Notes

1. DC working current limited by $P_{tot\ max}$.

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	all diodes loaded	370	K/W

ELECTRICAL CHARACTERISTICS

T_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MAX.	UNIT
V_F	forward voltage	I_F = 200 mA	1.3	V
I_R	reverse current			
	BZA856A	V_R = 3 V	2000	nA
	BZA862A	V_R = 4 V	700	nA
	BZA868A	V_R = 4.3 V	200	nA
	BZA820A	V_R = 15 V	100	nA

T_j = 25 °C unless otherwise specified

TYPE	WORKING VOLTAGE V_Z (V) at I_Z = 1 mA			DIFFERENTIAL RESISTANCE r_{dif} (Ω) at I_Z = 1 mA	TEMP. COEFF. S_Z (mV/K) at I_Z = 1 mA	DIODE CAP. C_d (pF) at f = 1 MHz; V_R = 0 V	NON-REPETITIVE PEAK REVERSE CURRENT I_{ZSM} (A) at t_p = 1 ms; T_{amb} = 25 °C
	MIN.	TYP.	MAX.	MAX.	TYP.	MAX.	MAX.
BZA856A	5.32	5.6	5.88	400	–0.2	240	3.2
BZA862A	5.89	6.2	6.51	300	1.8	200	2.9
BZA868A	6.46	6.8	7.14	200	3	180	2.6
BZA820A	19	20	21	125	16	50	0.6

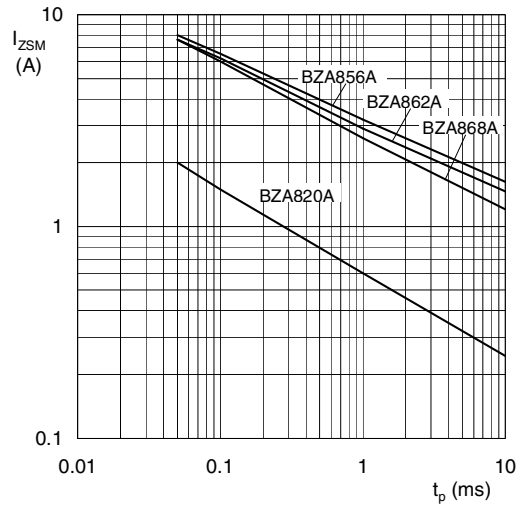
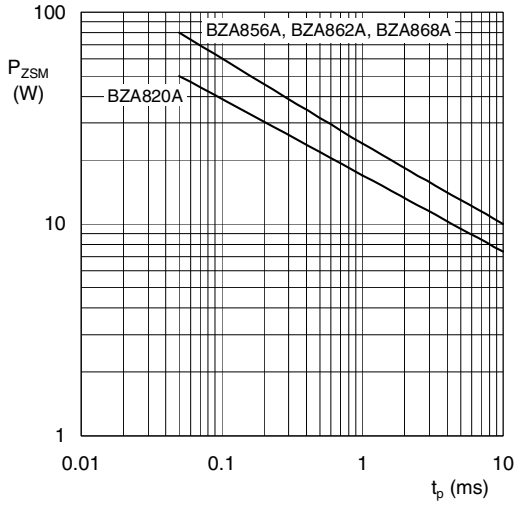
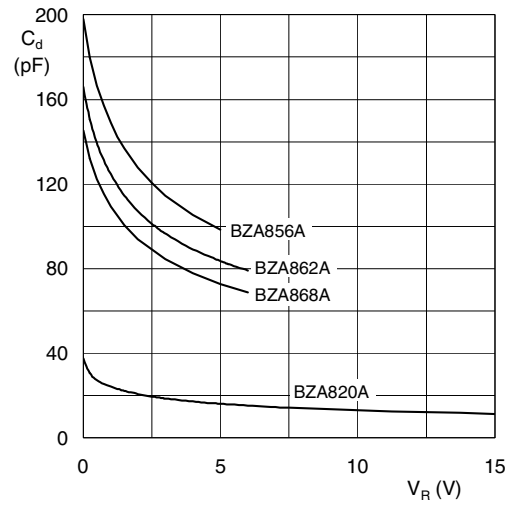


Fig.2 Maximum non-repetitive peak reverse current as a function of pulse time.



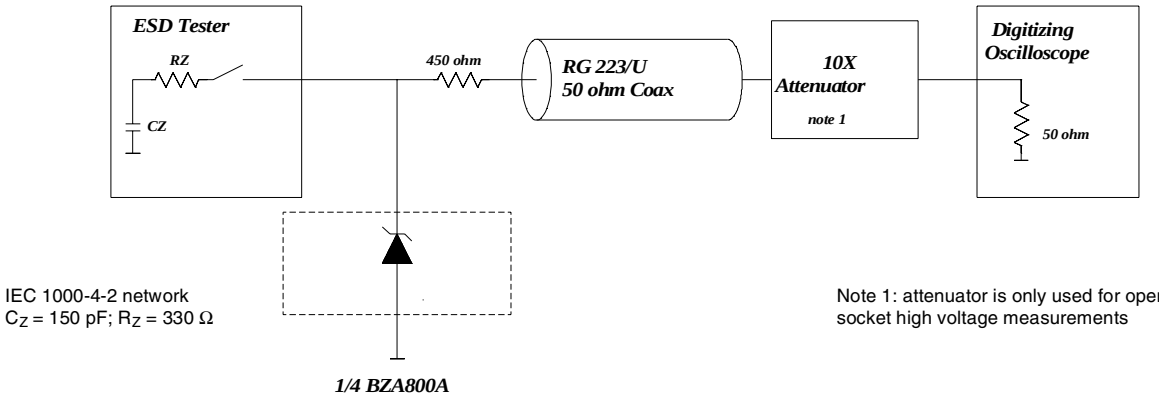
$P_{ZSM} = V_{ZSM} \times I_{ZSM}$.
V_{ZSM} is the non-repetitive peak reverse voltage at I_{ZSM}.

Fig.3 Maximum non-repetitive peak reverse power dissipation as a function of pulse duration (square pulse).



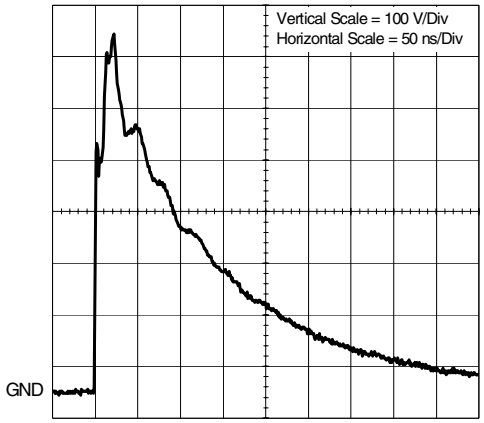
T_j = 25 °C; f = 1 MHz.

Fig.4 Diode capacitance as a function of reverse voltage; typical values.

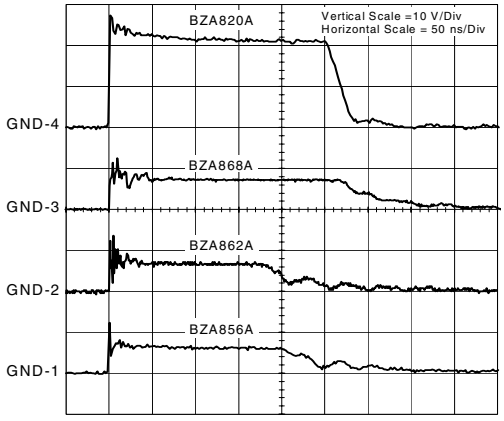


IEC 1000-4-2 network
C_Z = 150 pF; R_Z = 330 Ω

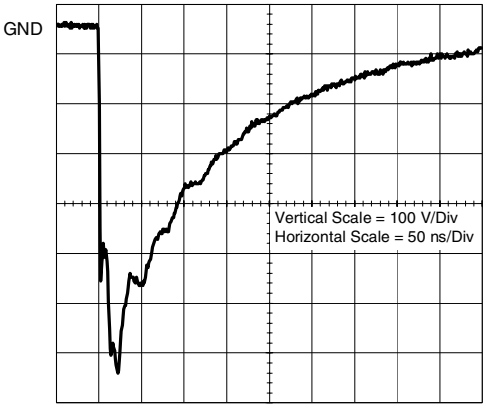
Note 1: attenuator is only used for open socket high voltage measurements



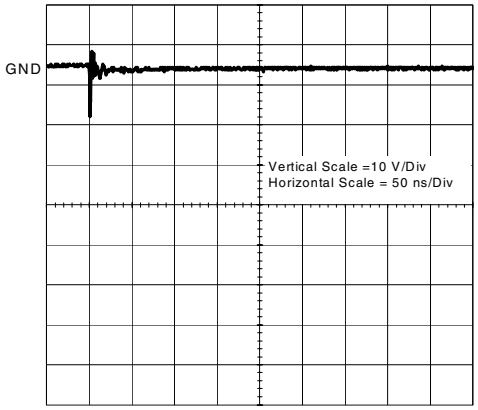
unclamped +1 kV ESD voltage waveform
(IEC 1000-4-2 network)



clamped +1 kV ESD voltage waveform
(IEC 1000-4-2 network)



unclamped −1 kV ESD voltage waveform
(IEC 1000-4-2 network)



clamped −1 kV ESD voltage waveform
(IEC 1000-4-2 network)

Fig.5 ESD clamping test set-up and waveforms.

APPLICATION INFORMATION

Typical common anode application

A quadruple transient suppressor in a SOT353 package makes it possible to protect four separate lines using only one package. Two simplified examples are shown in Figs 6 and 7.

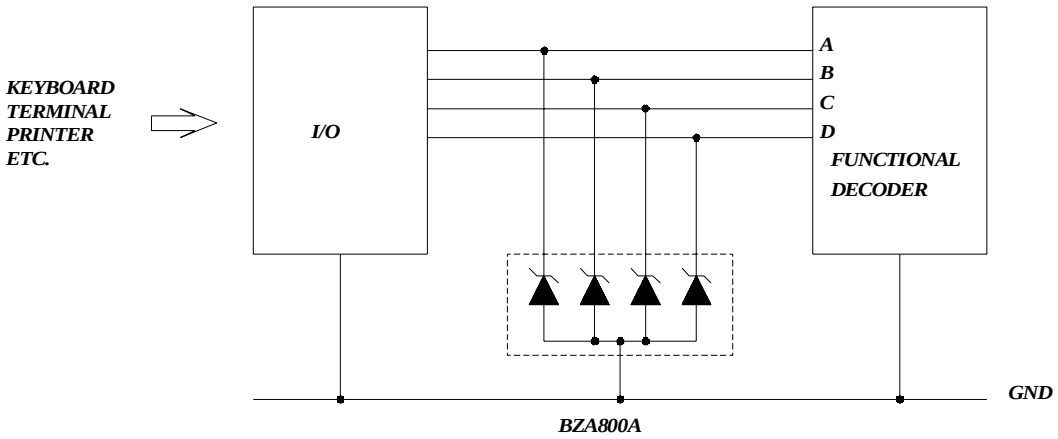


Fig.6 Computer interface protection.

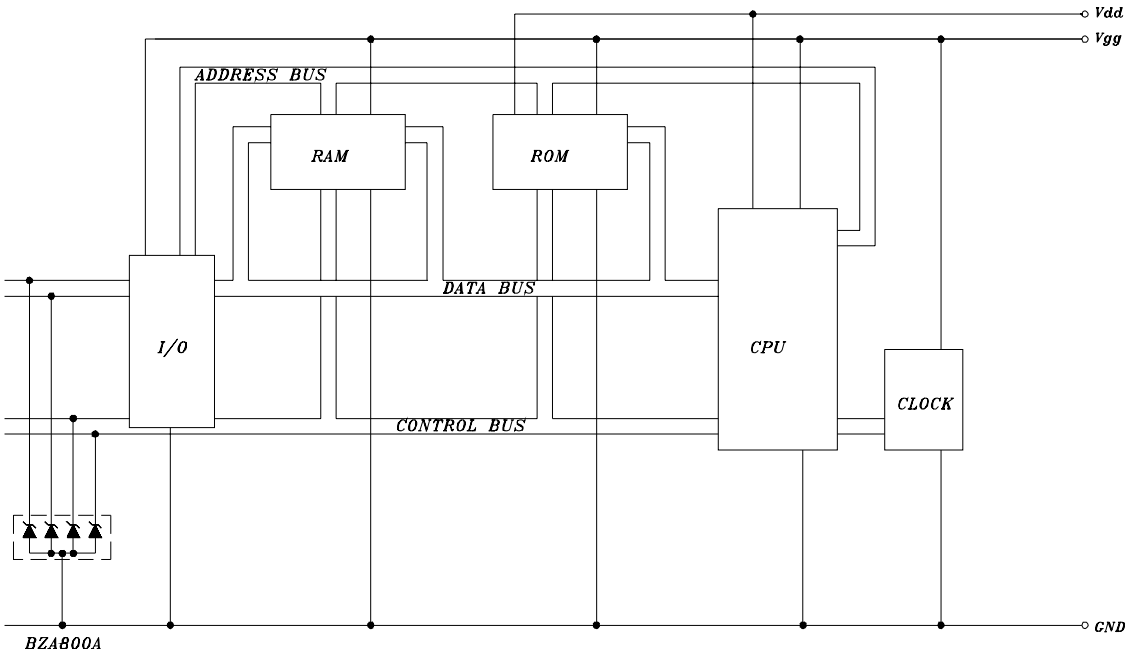


Fig.7 Microprocessor protection.

Device placement and printed-circuit board layout

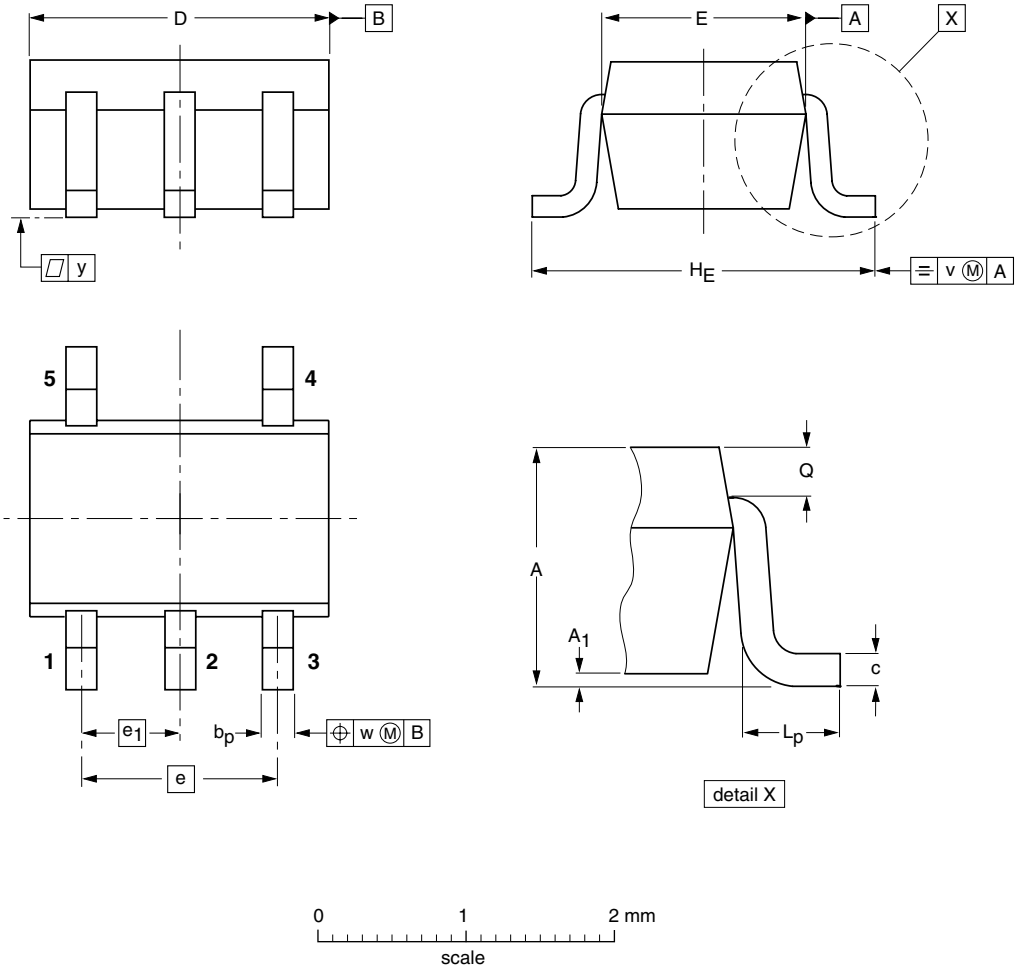
Circuit board layout is of extreme importance in the suppression of transients. The clamping voltage of the BZA800A is determined by the peak transient current and the rate of rise of that current (di/dt). Since parasitic inductances can further add to the clamping voltage (V = L di/dt) the series conductor lengths on the printed-circuit board should be kept to a minimum. This includes the lead length of the suppression element.

In addition to minimizing conductor length the following printed-circuit board layout guidelines are recommended:

1. Place the suppression element close to the input terminals or connectors.
2. Keep parallel signal paths to a minimum.
3. Avoid running protection conductors in parallel with unprotected conductors.
4. Minimize all printed-circuit board loop areas including power and ground loops.
5. Minimize the length of the transient return path to ground.
6. Avoid using shared transient return paths to a common ground point.

PACKAGE OUTLINE

Plastic surface mounted package; 5 leads **SOT353**



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max	b_p	c	D	E (2)	e	e_1	H_E	L_p	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			
SOT353			SC-88A			97-02-28

DATA SHEET STATUS

DATA SHEET STATUS	PRODUCT STATUS	DEFINITIONS [1]
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

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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,
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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

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Norway: Box 1, Manglerud 0612, OSLO,
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Poland: Al.Jerozolimskie 195 B, 02-222 WARSAW,
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Portugal: see Spain

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Tel. +65 350 2538, Fax. +65 251 6500

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

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Tel. +34 93 301 6312, Fax. +34 93 301 4107

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Tel. +41 1 488 2741 Fax. +41 1 488 3263

Taiwan: Philips Semiconductors, 6F, No. 96, Chien Kuo N. Rd., Sec. 1,
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Thailand: PHILIPS ELECTRONICS (THAILAND) Ltd.,
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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,
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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

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