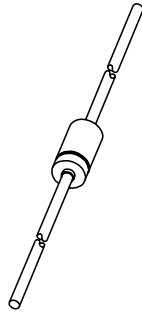


DATA SHEET



KTY84-1 series **Silicon temperature sensors**

Product specification
Supersedes data of 1998 Apr 09

2000 Aug 25

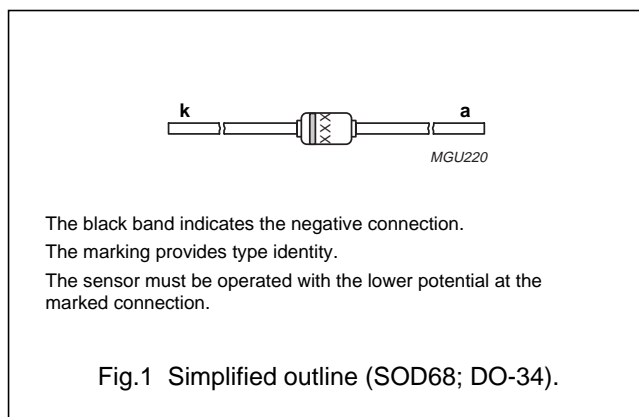
Silicon temperature sensors

KTY84-1 series

DESCRIPTION

The temperature sensors in the KTY84-1 series have a positive temperature coefficient of resistance and are suitable for use in measurement and control systems over a temperature range of -40 to +300 °C. The sensors are encapsulated in the SOD68 (DO-34) package. The leads are nickel plated.

Tolerances of 0.5% or other special selections are available on request.



MARKING

TYPE NUMBER	MARKING CODE
KTY84-130	KTY84L
KTY84-150	KTY84M
KTY84-151	KTY84O
KTY84-152	KTY84P

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
R ₁₀₀	sensor resistance	T _{amb} = 100 °C; I _{cont} = 2 mA			
	KTY84-130		970	1030	Ω
	KTY84-150		950	1050	Ω
	KTY84-151		950	1000	Ω
	KTY84-152		1000	1050	Ω
T _{amb}	ambient operating temperature		-40	+300	°C

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I _{cont}	continuous sensor current	in free air; T _{amb} = 25 °C; note 1	-	10	mA
		in free air; T _{amb} = 300 °C	-	2	mA
T _{amb}	ambient operating temperature		-40	+300	°C
T _{stg}	storage temperature		-55	+300	°C

Note

- For temperatures greater than 200 °C, a sensor current of I_{cont} = 2 mA must be used.

Silicon temperature sensors

KTY84-1 series

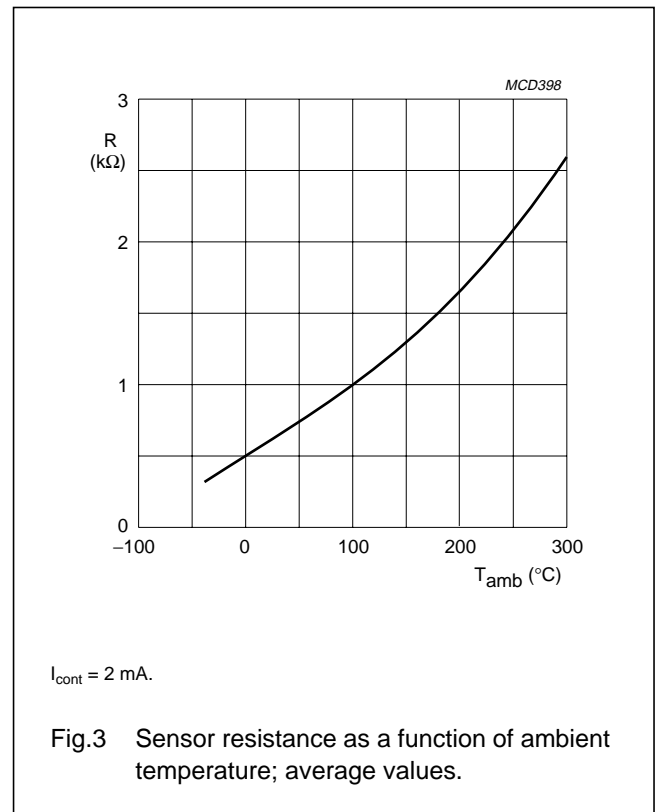
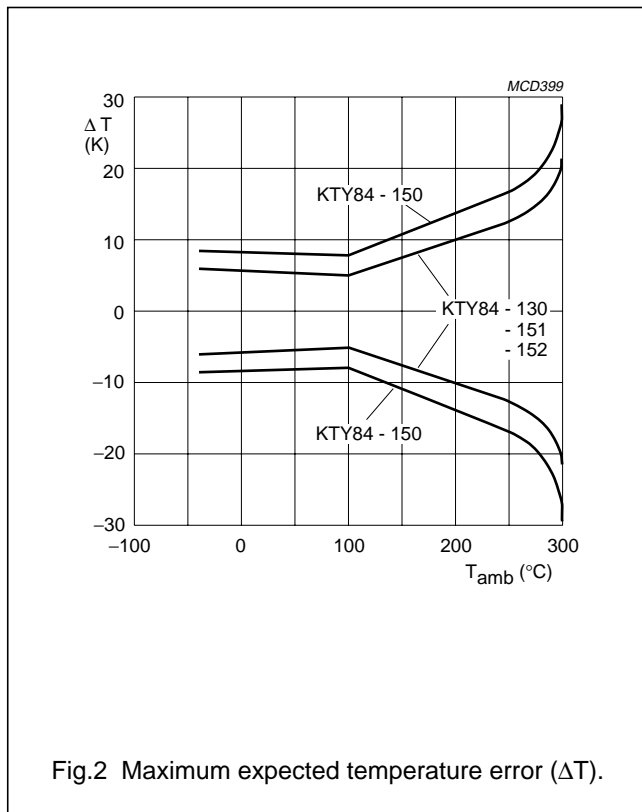
CHARACTERISTICS

$T_{amb} = 100\text{ }^{\circ}\text{C}$, in liquid, unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
R_{100}	sensor resistance	$I_{cont} = 2\text{ mA}$				
	KTY84-130		970	–	1030	Ω
	KTY84-150		950	–	1050	Ω
	KTY84-151		950	–	1000	Ω
	KTY84-152	1000	–	1050	Ω	
TC	temperature coefficient		–	0.61	–	%/K
R_{250}/R_{100}	resistance ratio	$T_{amb} = 250\text{ }^{\circ}\text{C}$ and $100\text{ }^{\circ}\text{C}$	2.111	2.166	2.221	
R_{25}/R_{100}	resistance ratio	$T_{amb} = 25\text{ }^{\circ}\text{C}$ and $100\text{ }^{\circ}\text{C}$	0.595	0.603	0.611	
τ	thermal time constant; note 1	in still air	–	20	–	s
		in still liquid; note 2	–	1	–	s
		in flowing liquid; note 2	–	0.5	–	s
	rated temperature range		–40	–	+300	$^{\circ}\text{C}$

Notes

- The thermal time constant is the time taken for the sensor to reach 63.2% of the total temperature difference. For example, if a sensor with a temperature of $25\text{ }^{\circ}\text{C}$ is moved to an environment with an ambient temperature of $100\text{ }^{\circ}\text{C}$, the time for the sensor to reach a temperature of $72.4\text{ }^{\circ}\text{C}$ is the thermal time constant.
- Inert liquid, e.g. FC43 manufactured by the 3M company.



Silicon temperature sensors

KTY84-1 series

Table 1 Ambient temperature, corresponding resistance, temperature coefficient and maximum expected temperature error for KTY84-130 and KTY84-150 $I_{\text{cont}} = 2 \text{ mA}$.

AMBIENT TEMPERATURE		TEMP. COEFF. (%/K)	KTY84-130				KTY84-150				
(°C)	(°F)		RESISTANCE (Ω)			TEMP. ERROR (K)	RESISTANCE (Ω)			TEMP. ERROR (K)	
			MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		
-40	-40	0.84	340	359	379	±6.48	332	359	386	±8.85	
-30	-22	0.83	370	391	411	±6.36	362	391	419	±8.76	
-20	-4	0.82	403	424	446	±6.26	394	424	455	±8.7	
-10	14	0.80	437	460	483	±6.16	428	460	492	±8.65	
0	32	0.79	474	498	522	±6.07	464	498	532	±8.61	
10	50	0.77	514	538	563	±5.98	503	538	574	±8.58	
20	68	0.75	555	581	607	±5.89	544	581	618	±8.55	
25	77	0.74	577	603	629	±5.84	565	603	641	±8.54	
30	86	0.73	599	626	652	±5.79	587	626	665	±8.53	
40	104	0.71	645	672	700	±5.69	632	672	713	±8.5	
50	122	0.70	694	722	750	±5.59	679	722	764	±8.46	
60	140	0.68	744	773	801	±5.47	729	773	817	±8.42	
70	158	0.66	797	826	855	±5.34	781	826	872	±8.37	
80	176	0.64	852	882	912	±5.21	835	882	929	±8.31	
90	194	0.63	910	940	970	±5.06	891	940	989	±8.25	
100	212	0.61	970	1000	1030	±4.9	950	1000	1050	±8.17	
110	230	0.60	1029	1062	1096	±5.31	1007	1062	1117	±8.66	
120	248	0.58	1089	1127	1164	±5.73	1067	1127	1187	±9.17	
130	266	0.57	1152	1194	1235	±6.17	1128	1194	1259	±9.69	
140	284	0.55	1216	1262	1309	±6.63	1191	1262	1334	±10.24	
150	302	0.54	1282	1334	1385	±7.1	1256	1334	1412	±10.8	
160	320	0.53	1350	1407	1463	±7.59	1322	1407	1492	±11.37	
170	338	0.52	1420	1482	1544	±8.1	1391	1482	1574	±11.96	
180	356	0.51	1492	1560	1628	±8.62	1461	1560	1659	±12.58	
190	374	0.49	1566	1640	1714	±9.15	1533	1640	1747	±13.2	
200	392	0.48	1641	1722	1803	±9.71	1607	1722	1837	±13.85	
210	410	0.47	1719	1807	1894	±10.28	1683	1807	1931	±14.51	
220	428	0.46	1798	1893	1988	±10.87	1760	1893	2026	±15.19	
230	446	0.45	1879	1982	2085	±11.47	1839	1982	2125	±15.88	
240	464	0.44	1962	2073	2184	±12.09	1920	2073	2226	±16.59	
250	482	0.44	2046	2166	2286	±12.73	2003	2166	2329	±17.32	
260	500	0.42	2132	2261	2390	±13.44	2087	2261	2436	±18.15	
270	518	0.41	2219	2357	2496	±14.44	2172	2357	2543	±19.36	
280	536	0.38	2304	2452	2600	±15.94	2255	2452	2650	±21.21	
290	554	0.34	2384	2542	2700	±18.26	2333	2542	2751	±24.14	
300	572	0.29	2456	2624	2791	±22.12	2404	2624	2844	±29.05	

Silicon temperature sensors

KTY84-1 series

Table 2 Ambient temperature, corresponding resistance, temperature coefficient and maximum expected temperature error for KTY84-151 and KTY84-152 $I_{\text{cont}} = 2 \text{ mA}$.

AMBIENT TEMPERATURE		TEMP. COEFF. (%/K)	KTY84-151				KTY84-152				
(°C)	(°F)		RESISTANCE (Ω)			TEMP. ERROR (K)	RESISTANCE (Ω)			TEMP. ERROR (K)	
			MIN.	TYP.	MAX.		MIN.	TYP.	MAX.		
-40	-40	0.84	332	350	368	±5.97	350	368	386	±5.82	
-30	-22	0.83	362	381	399	±5.84	381	400	419	±5.69	
-20	-4	0.82	394	414	433	±5.72	415	435	455	±5.57	
-10	14	0.80	428	449	469	±5.62	451	472	492	±5.46	
0	32	0.79	464	486	507	±5.51	489	511	532	±5.35	
10	50	0.77	503	525	547	±5.41	530	552	574	±5.25	
20	68	0.75	544	566	589	±5.31	573	595	618	±5.14	
25	77	0.74	565	588	611	±5.25	595	618	641	±5.08	
30	86	0.73	587	610	633	±5.2	618	641	665	±5.03	
40	104	0.71	632	656	679	±5.08	665	689	713	±4.91	
50	122	0.70	679	704	728	±4.96	715	740	764	±4.78	
60	140	0.68	729	754	778	±4.83	767	792	817	±4.64	
70	158	0.66	781	806	831	±4.68	822	847	872	±4.5	
80	176	0.64	835	860	885	±4.53	879	904	929	±4.34	
90	194	0.63	891	916	942	±4.37	938	963	989	±4.17	
100	212	0.61	950	975	1000	±4.19	1000	1025	1050	±3.99	
110	230	0.60	1007	1036	1064	±4.58	1060	1089	1117	±4.37	
120	248	0.58	1067	1099	1131	±4.99	1123	1155	1187	±4.77	
130	266	0.57	1128	1164	1199	±5.41	1187	1223	1259	±5.19	
140	284	0.55	1191	1231	1271	±5.84	1254	1294	1334	±5.62	
150	302	0.54	1256	1300	1345	±6.3	1322	1367	1412	±6.07	
160	320	0.53	1322	1372	1421	±6.77	1392	1442	1492	±6.53	
170	338	0.52	1391	1445	1500	±7.25	1464	1519	1574	±7.01	
180	356	0.51	1461	1521	1581	±7.75	1538	1599	1659	±7.51	
190	374	0.49	1533	1599	1664	±8.27	1614	1681	1747	±8.02	
200	392	0.48	1607	1679	1751	±8.81	1692	1765	1837	±8.55	
210	410	0.47	1683	1761	1839	±9.36	1772	1852	1931	±9.09	
220	428	0.46	1760	1846	1931	±9.93	1854	1940	2026	±9.66	
230	446	0.45	1839	1932	2024	±10.51	1937	2031	2125	±10.23	
240	464	0.44	1920	2021	2121	±11.11	2022	2125	2226	±10.83	
250	482	0.44	2003	2112	2220	±11.73	2110	2220	2329	±11.44	
260	500	0.42	2087	2205	2321	±12.42	2198	2318	2436	±12.12	
270	518	0.41	2172	2298	2424	±13.37	2288	2416	2543	±13.06	
280	536	0.38	2257	2391	2525	±14.79	2376	2513	2650	±14.46	
290	554	0.34	2335	2479	2622	±16.98	2459	2606	2751	±16.61	
300	572	0.29	2406	2558	2710	±20.61	2533	2689	2844	±20.18	

Silicon temperature sensors

KTY84-1 series

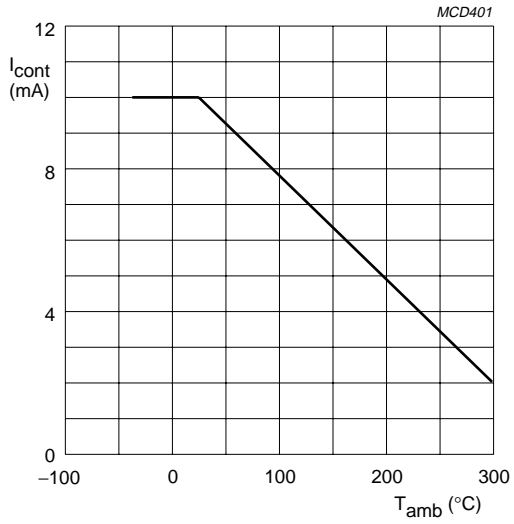
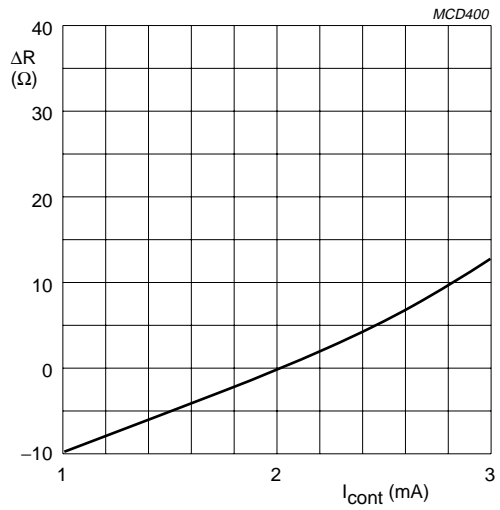


Fig.4 Maximum operating current for safe operation.



$T_{amb} = 100$ °C.

Fig.5 Deviation of sensor resistance as a function of operating current in still liquid.

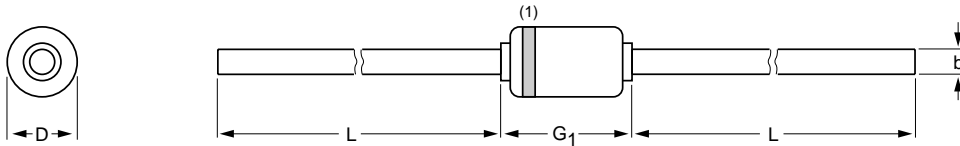
Silicon temperature sensors

KTY84-1 series

PACKAGE OUTLINE

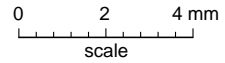
Hermetically sealed glass package; axial leaded; 2 leads

SOD68



DIMENSIONS (mm are the original dimensions)

UNIT	b max.	D max.	G ₁ max.	L min.
mm	0.55	1.6	3.04	25.4



Note

1. The marking band indicates the cathode.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOD68		DO-34				97-06-09

Silicon temperature sensors

KTY84-1 series

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

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

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.

DISCLAIMERS

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 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, without notice, in the products, including circuits, standard cells, and/or software, described or contained herein in order to improve design and/or performance. Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no licence 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.

Silicon temperature sensors

KTY84-1 series

NOTES

Silicon temperature sensors

KTY84-1 series

NOTES

Silicon temperature sensors

KTY84-1 series

NOTES

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, 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

Vietnam: see Singapore

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,
The Netherlands, Fax. +31 40 27 24825

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

© Philips Electronics N.V. 2000

SCA 70

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

613520/04/pp12

Date of release: 2000 Aug 25

Document order number: 9397 750 07229

Let's make things better.

Philips
Semiconductors



PHILIPS