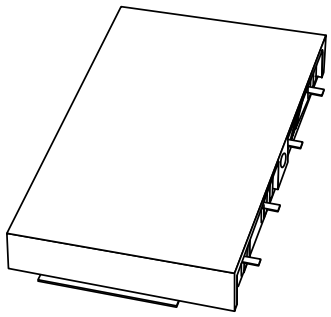
DATA SHEET



BGY148A; BGY148B
HF amplifier modules

Product specification
Supersedes data of 1997 Jul 14

1998 May 13

Philips
Semiconductors

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HF amplifier modules BGY148A; BGY148B

FEATURES

- Single 6 V nominal supply voltage
- 3 W output power
- Easy control of output power by DC voltage
- Silicon bipolar technology
- Standby current less than 100 μA.

APPLICATIONS

- Portable communication equipment operating in the 400 to 440 MHz and 430 to 488 MHz frequency ranges respectively.

DESCRIPTION

The BGY148A and BGY148B are three-stage UHF amplifier modules in a SOT421A package. Each module consists of three NPN silicon planar transistor dies mounted together with matching and bias circuit components on a metallized ceramic substrate. The modules produce an output power of 3 W into a load of 50 Ω with an RF drive power of 10 mW.

PINNING - SOT421A

PIN	DESCRIPTION
1	RF input
2	V_C
3	V_S
4	RF output
Flange	ground

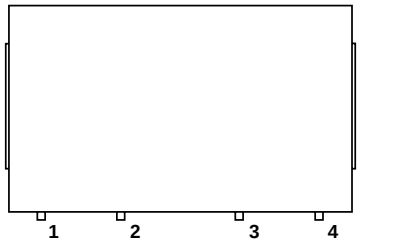


Fig.1 Simplified outline (SOT421A).

QUICK REFERENCE DATA

RF performance at T_{mb} = 25 °C.

TYPE	MODE OF OPERATION	f (MHz)	V_S (V)	P_L (W)	G_p (dB)	η (%)	Z_S; Z_L (Ω)
BGY148A	CW	400 to 440	6	≥3	≥24.8	typ. 53	50
BGY148B	CW	430 to 488	6	≥3	≥24.8	typ. 53	50

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_S	DC supply voltage	–	8.5	V
V_C	DC control voltage	–	4	V
P_D	input drive power	–	20	mW
P_L	load power	–	3.5	W
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting-base temperature; note1	–30	+100	°C

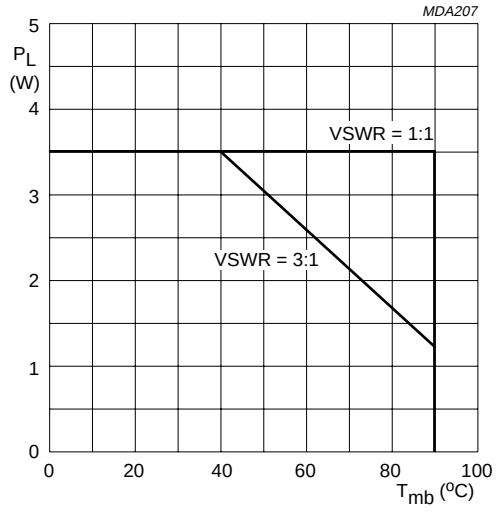
Note

1. In order to control the mounting-base temperature, proper heatsinking of the underside of the device is required. It is therefore advisable that the device is mounted on a printed-circuit board with metallized through holes.

CHARACTERISTICS

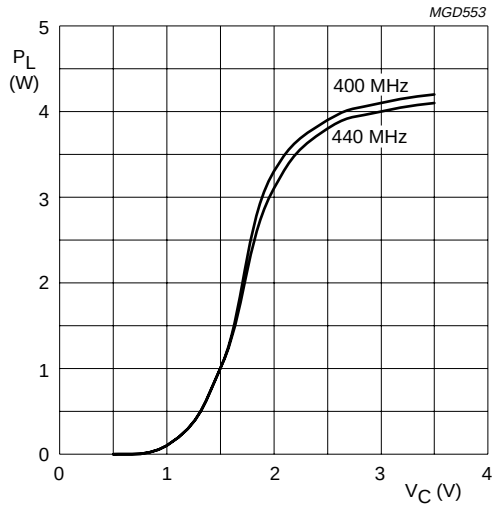
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $V_C \leq 3.5$ V; $T_{mb} = 25$ °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f	frequency range					
	BGY148A		400	–	440	MHz
	BGY148B		430	–	488	MHz
I_Q	total quiescent current	$V_C = 0$; $P_D = 0$	–	–	100	μA
I_C	control current	adjust V_C for $P_L = 3$ W	–	–	500	μA
P_L	load power		3	–	–	W
G_p	power gain	adjust V_C for $P_L = 3$ W	24.8	–	–	dB
η	efficiency	adjust V_C for $P_L = 3$ W	46	53	–	%
H_2	second harmonic	adjust V_C for $P_L = 3$ W	–	–	–38	dBc
H_3	third harmonic	adjust V_C for $P_L = 3$ W	–	–	–38	dBc
$VSWR_{in}$	input VSWR	adjust V_C for $P_L = 3$ W	–	–	3 : 1	
	control range	$V_C = 0$ to 3.5 V	10	–	–	dB
	stability	$P_D = 5$ to 20 mW; $V_S = 5$ to 8.5 V; $P_L \leq 3.5$ W; VSWR ≤ 4 : 1 through all phases	–	–	–60	dBc
	ruggedness	$V_S = 8.5$ V; adjust V_C for $P_L = 3.5$ W; VSWR ≤ 4 : 1 through all phases	no degradation			



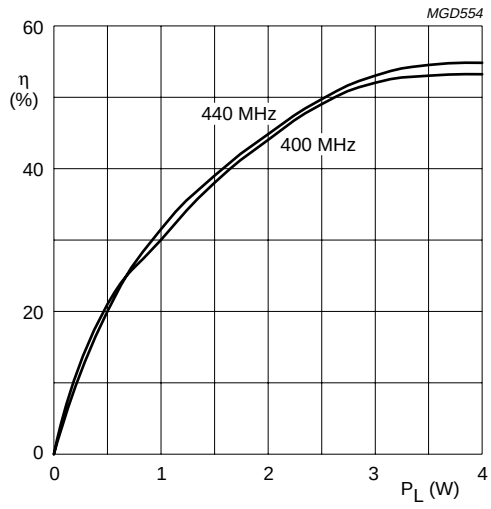
$V_S = 8.5$ V.

Fig.2 Load power derating curves.



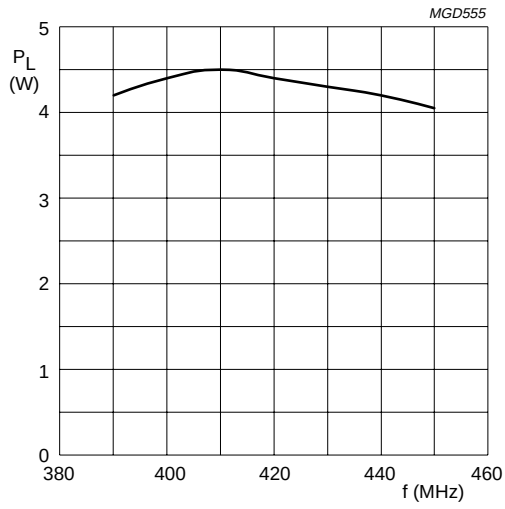
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.3 Load power as a function of control voltage; BGY148A; typical values.



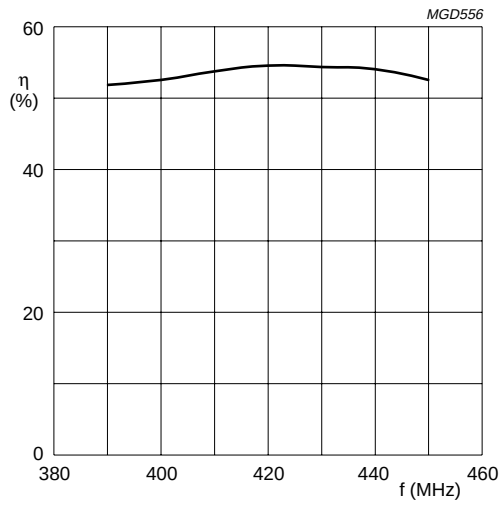
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.4 Efficiency as a function of load power; BGY148A; typical values.



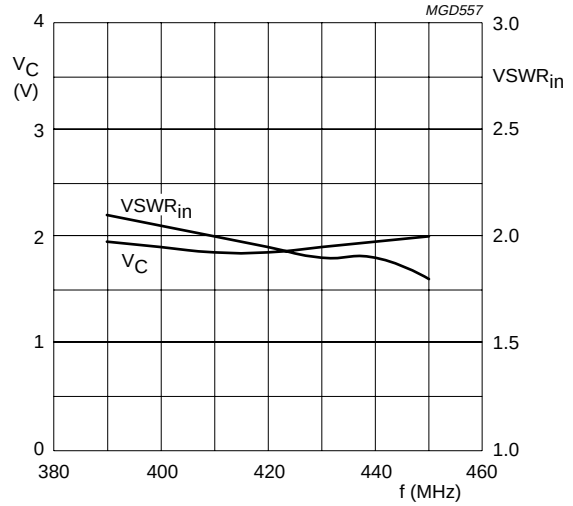
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $V_C = 3.5$ V; $T_{mb} = 25$ °C.

Fig.5 Load power as a function of frequency; BGY148A; typical values.



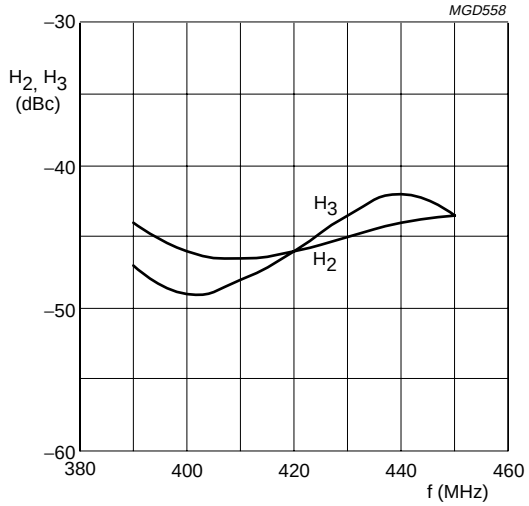
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $P_L = 3$ W; $T_{mb} = 25$ °C.

Fig.6 Efficiency as a function of frequency; BGY148A; typical values.



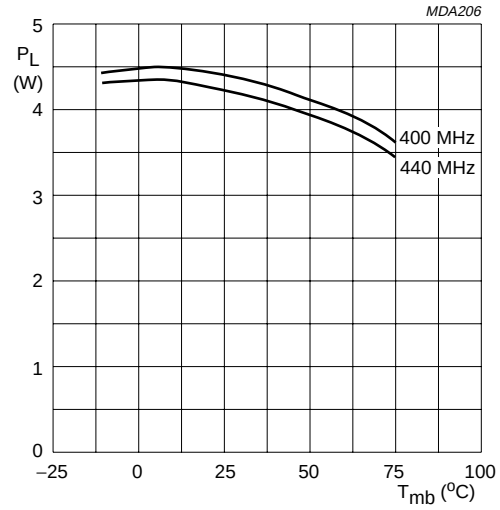
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $P_L = 3$ W; $T_{mb} = 25$ °C.

Fig.7 Control voltage and input VSWR as functions of frequency; BGY148A; typical values.



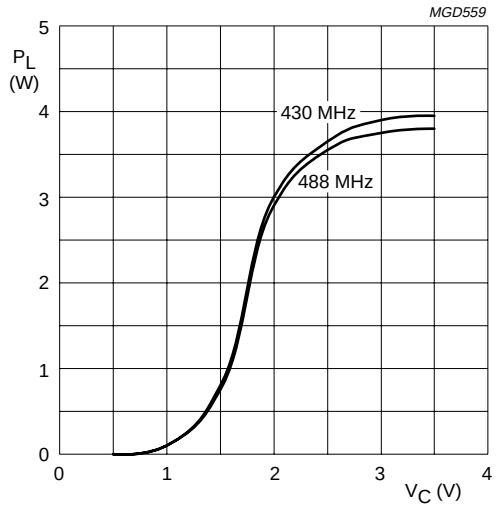
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $P_L = 3$ W; $T_{mb} = 25$ °C.

Fig.8 Harmonics as a function of frequency; BGY148A; typical values.



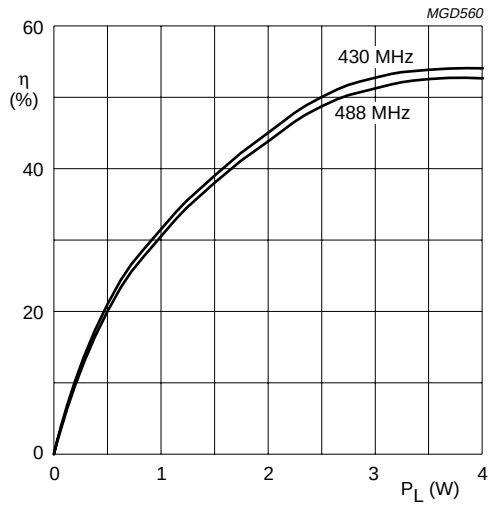
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $T_{mb} = 25$ °C.

Fig.9 Load power as a function of mounting base temperature; BGY148A; typical values.



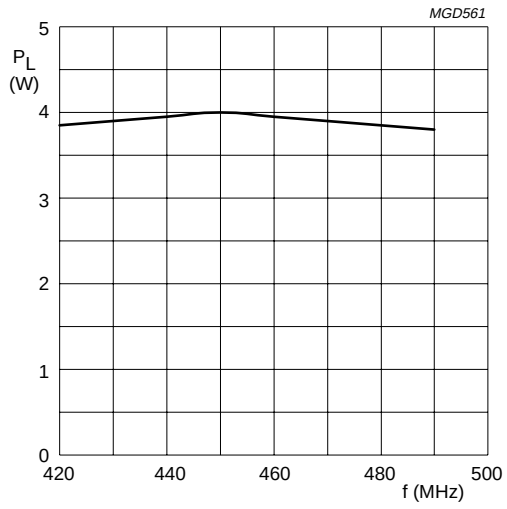
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.10 Load power as a function of control voltage; BGY148B; typical values.



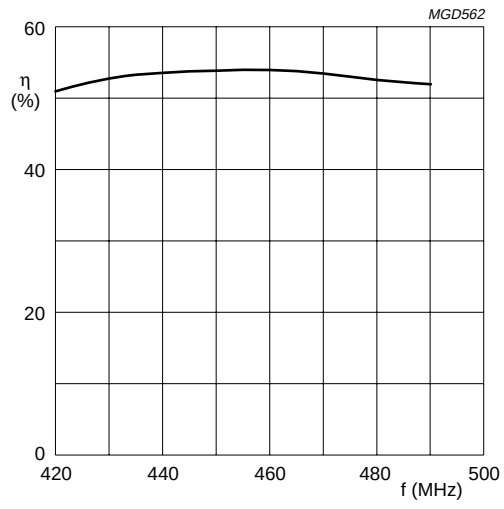
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.11 Efficiency as a function of load power; BGY148B; typical values.



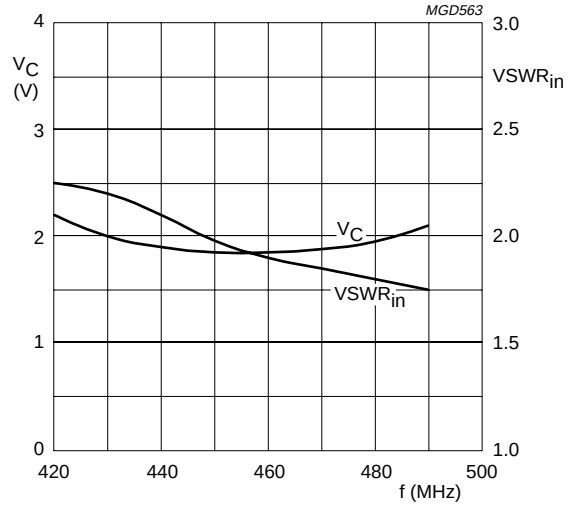
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $V_C = 3.5$ V; $T_{mb} = 25$ °C.

Fig.12 Load power as a function of frequency; BGY148B; typical values.



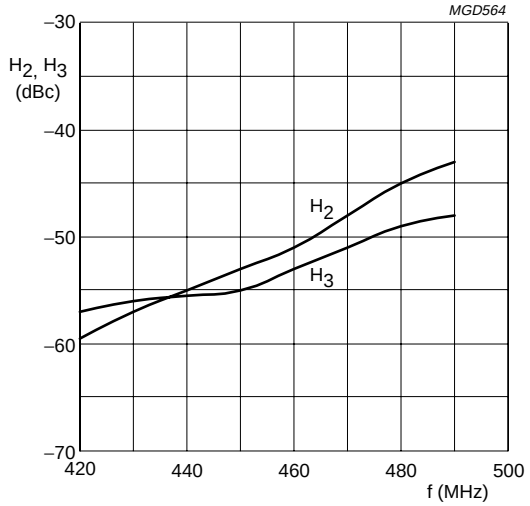
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $P_L = 3$ W; $T_{mb} = 25$ °C.

Fig.13 Efficiency as a function of frequency; BGY148B; typical values.



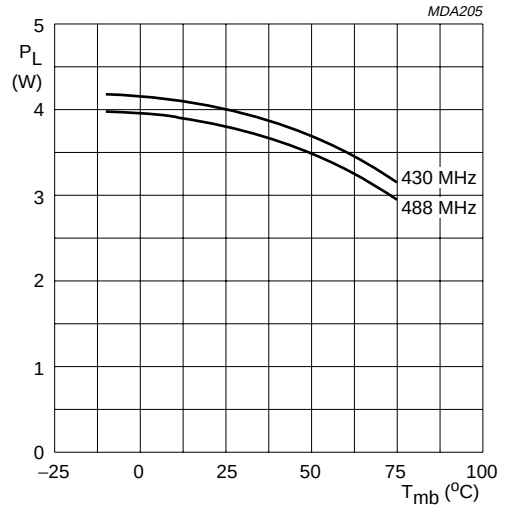
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $P_L = 3$ W; $T_{mb} = 25$ °C.

Fig.14 Control voltage and input VSWR as functions of frequency; BGY148B; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $P_L = 3$ W; $T_{mb} = 25$ °C.

Fig.15 Harmonics as a function of frequency; BGY148B; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $T_{mb} = 25$ °C.

Fig.16 Load power as a function of mounting base temperature; BGY148B; typical values.

SOLDERING

The indicated temperatures are those at the solder interfaces.

Advised solder types are types with a liquidus less than or equal to 210 °C.

Solder dots or solder prints must be large enough to wet the contact areas.

Soldering can be carried out using a conveyor oven, a hot air oven, an infrared oven or a combination of these ovens. A double reflow process is permitted.

Hand soldering must be avoided because the soldering iron tip can exceed the maximum permitted temperature of 250 °C and damage the module.

The maximum allowed temperature is 250 °C for 5 seconds.

The maximum ramp-up is 10 °C per second.

The maximum cool-down is 5 °C per second.

Cleaning

The following fluids may be used for cleaning:

- Alcohol
- Bio-Act (Terpene Hydrocarbon)
- Acetone.

Ultrasonic cleaning should not be used since this can cause serious damage to the product.

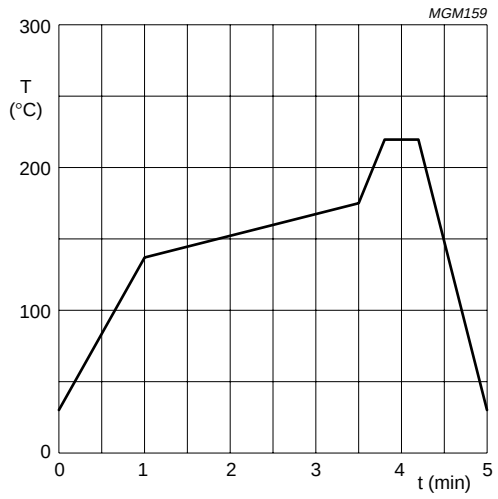
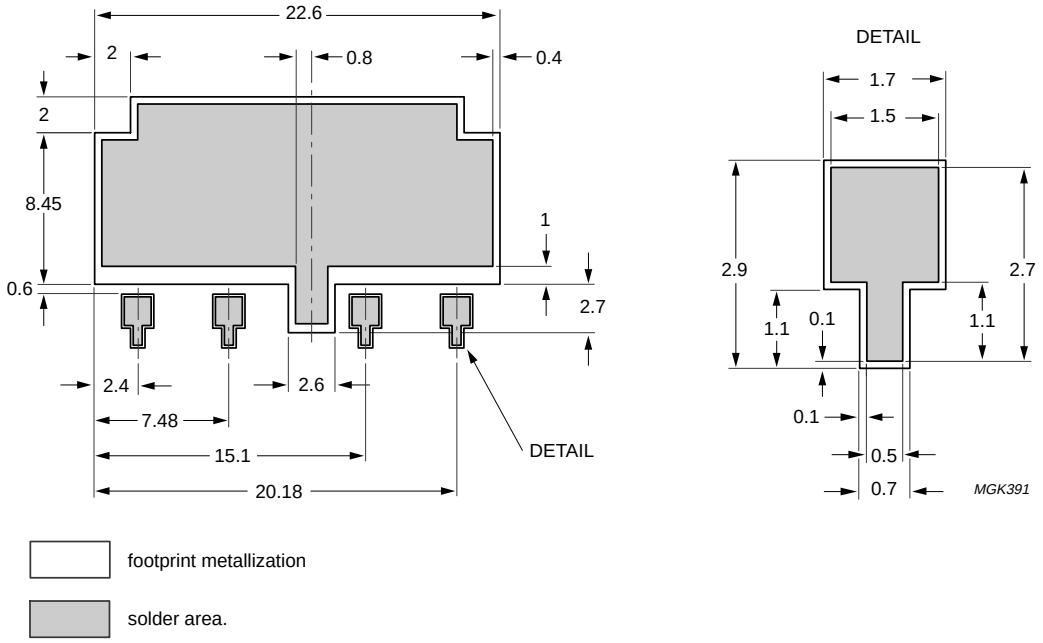
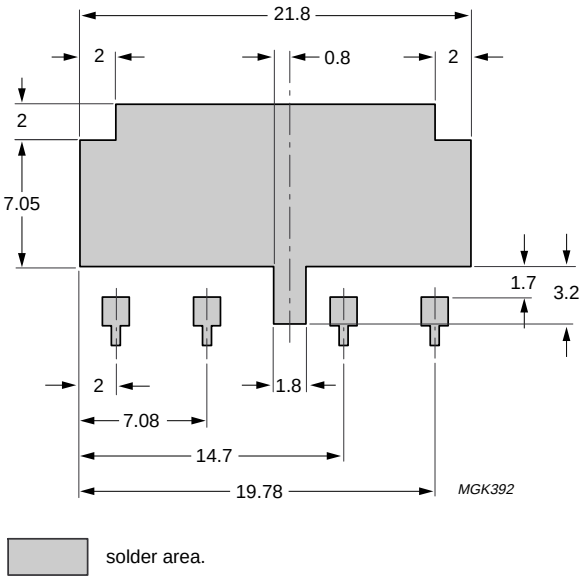


Fig.17 Recommended reflow temperature profile.



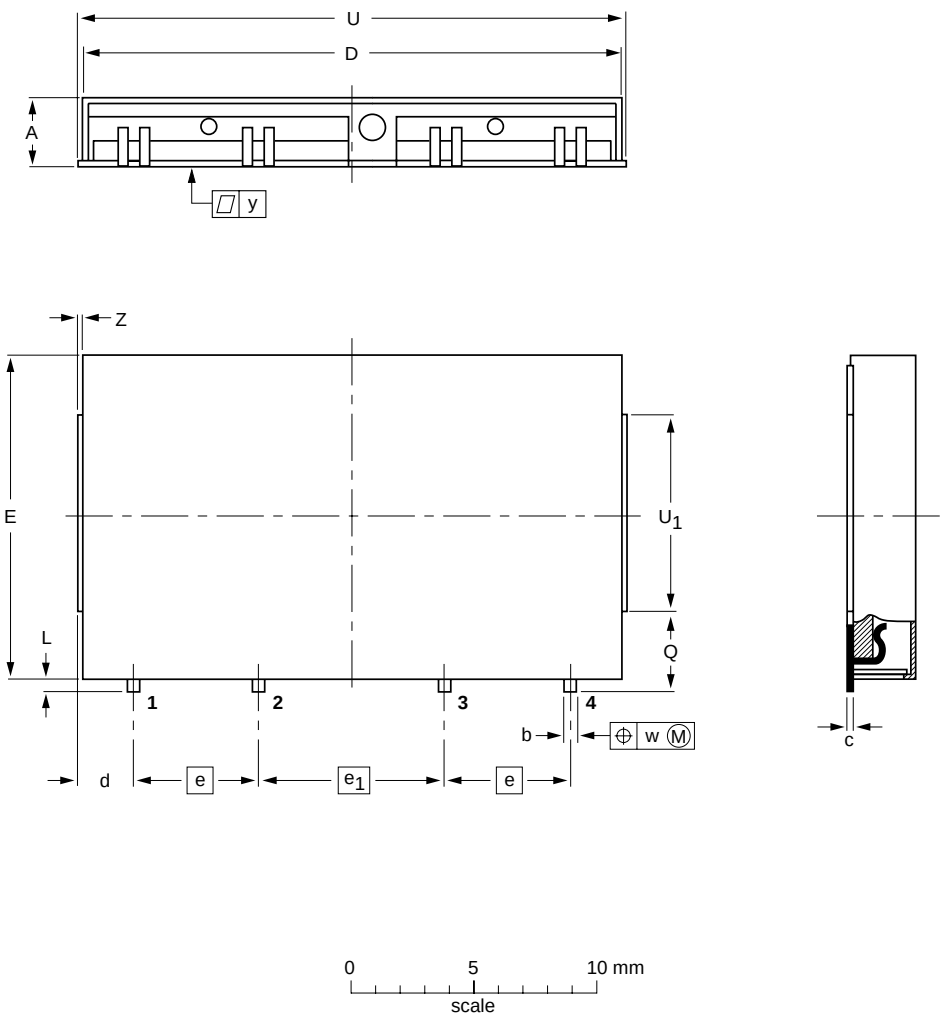


Dimensions in mm.

Fig.18 SOT421A footprint.

PACKAGE OUTLINE

Ceramic single-ended flat package; 4 in-line leads **SOT421A**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	c	D	d	E	e	e_1	L	Q	U	U_1	w	y	Z
mm	3.0 2.6	0.56 0.46	0.30 0.20	22.1 21.7	2.4 2.0	13.4 13.0	5.08	7.62	0.7 0.3	3.4 3.0	22.4 22.0	8.2 7.8	0.25	0.15	0.25 0.05

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT421A						97-06-20

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.	

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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. +43 160 1010,
Fax. +43 160 101 1210

Belarus: Hotel Minsk Business Center, Bld. 3, r. 1211, Volodarski Str. 6,
220050 MINSK, Tel. +375 172 200 733, Fax. +375 172 200 773

Belgium: see The Netherlands

Brazil: see South America

Bulgaria: Philips Bulgaria Ltd., Energoproject, 15th floor,
51 James Bourchier Blvd., 1407 SOFIA,
Tel. +359 2 689 211, Fax. +359 2 689 102

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

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: Prags Boulevard 80, PB 1919, DK-2300 COPENHAGEN S,
Tel. +45 32 88 2636, Fax. +45 31 57 0044

Finland: Sinikalliontie 3, FIN-02630 ESPOO,
Tel. +358 9 615800, Fax. +358 9 61580920

France: 51 Rue Carnot, BP317, 92156 SURESNES Cedex,
Tel. +33 1 40 99 6161, Fax. +33 1 40 99 6427

Germany: Hammerbrookstraße 69, D-20097 HAMBURG,
Tel. +49 40 23 53 60, Fax. +49 40 23 536 300

Greece: No. 15, 25th March Street, GR 17778 TAVROS/ATHENS,
Tel. +30 1 4894 339/239, Fax. +30 1 4814 240

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

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 2865, 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

Uruguay: see South America

Vietnam: see Singapore

Yugoslavia: PHILIPS, Trg N. Pasica 5/v, 11000 BEOGRAD,
Tel. +381 11 625 344, Fax.+381 11 635 777

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

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