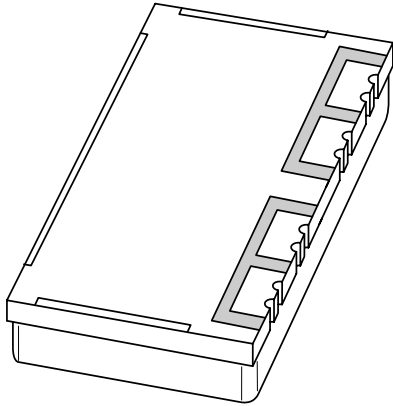


# DATA SHEET



## **BGY212A** UHF amplifier module

Preliminary specification

1999 Aug 23

# UHF amplifier module

# BGY212A

### FEATURES

- 3.5 V nominal supply voltage
- 2 W output power
- Easy output power control by DC voltage.

### APPLICATIONS

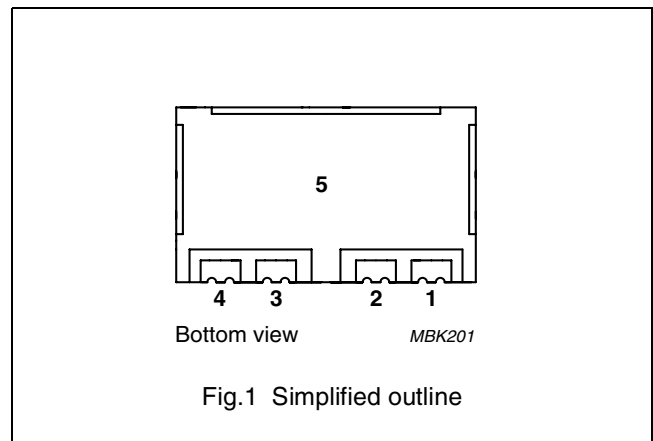
- Digital cellular radio systems with Time Division Multiple Access (TDMA) operation (GSM systems) in the 1710 to 1785 MHz frequency range.

### DESCRIPTION

The BGY212A is a three-stage UHF amplifier module in a SOT482C leadless package with a plastic cover. The module consists of one NPN silicon planar transistor die and one bipolar monolithic integrated circuit mounted together with matching and bias circuit components on a metallized ceramic substrate.

### PINNING - SOT482C

PIN	DESCRIPTION
1	RF input
2	V <sub>C</sub>
3	V <sub>S</sub>
4	RF output
5	ground



### QUICK REFERENCE DATA

RF performance at T<sub>mb</sub> = 25 °C.

MODE OF OPERATION	f (MHz)	V <sub>S</sub> (V)	V <sub>C</sub> (V)	P <sub>L</sub> (dBm)	G <sub>p</sub> (dB)	η (%)	Z <sub>S</sub> , Z <sub>L</sub> (Ω)
Pulsed; δ = 1 : 8	1710 to 1785	3.5	≤2.2	typ. 33	typ. 33	typ. 40	50

### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>S</sub>	DC supply voltage	V <sub>C</sub> < 0.2 V; P <sub>D</sub> = 0 mW	–	7	V
		V <sub>C</sub> ≥ 0.2 V	–	4.1	V
V <sub>C</sub>	DC control voltage		–	2.7	V
P <sub>D</sub>	input drive power		–	10	dBm
P <sub>L</sub>	load power		–	34.1	dBm
T <sub>stg</sub>	storage temperature		–40	+100	°C
T <sub>mb</sub>	operating mounting base temperature		–30	+100	°C

### 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.

## UHF amplifier module

## BGY212A

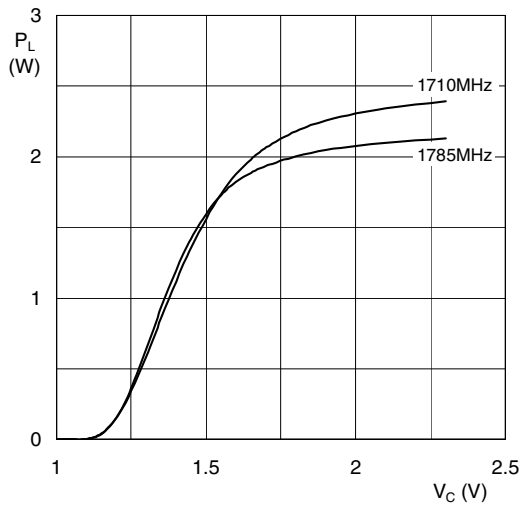
## CHARACTERISTICS

$Z_S = Z_L = 50 \Omega$ ;  $P_D = 0$  dBm;  $V_S = 3.5$  V;  $V_C \leq 2.2$  V;  $f = 1710$  to  $1785$  MHz;  $T_{mb} = 25$  °C;  $\delta = 1 : 8$ ;  $t_p = 575$   $\mu$ s unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_Q$	leakage current	$V_C = 0.2$ V	–	–	10	$\mu$ A
		$V_C = 0.2$ V; $V_S = 7$ V	–	5	20	mA
$I_{CM}$	peak control current	adjust $V_C$ for $P_L = 32$ dBm	–	–	3	mA
$P_L$	load power	$V_C = 2.2$ V; $V_S = 3.5$ V	–	33.2	–	dBm
		$V_C = 2.2$ V; $V_S = 3.2$ V	32	32.3	–	dBm
		$V_C = 2.2$ V; $V_S = 3.2$ V; $T_{mb} = 85$ °C	31	31.8	–	dBm
$G_p$	power gain	$P_L = 32$ dBm	–	32	–	dB
$\eta$	efficiency	$P_L = 32$ dBm	–	40	–	%
$H_2$	second harmonic	$P_L = 32$ dBm	–	–	–35	dBc
$H_3$	third harmonic	$P_L = 32$ dBm	–	–	–40	dBc
$VSWR_{in}$	input VSWR	$P_L = 2$ to $32$ dBm	–	–	3 : 1	
	stability	$V_S = 3.2$ to $4.1$ V; $P_D = -3$ to $3$ dBm; $V_C = 0$ to $2.2$ V; $P_L \leq 33$ dBm; $VSWR \leq 8 : 1$ through all phases	–	–	–60	dBc
	isolation	$V_C = 0.2$ V; $P_D = 3$ dBm	–	–36	–33	dBm
	control bandwidth		tbd	–	–	MHz
$P_n$	noise power	$P_L = 2$ to $32$ dBm; bandwidth = $100$ kHz; $20$ MHz above transmission band	–	–73	–71	dBm
	AM/AM conversion	$P_D$ with $3\%$ AM; $f = 100$ kHz; $P_L = 2$ to $32$ dBm	–	5	8	%
	AM/PM conversion	$P_D = -0.5$ to $0.5$ dBm; $P_L = 2$ to $32$ dBm	–	–	tbd	deg/dB
	control slope	$P_L = -8$ to $+2$ dBm	–	tbd	–	dB / V
		$P_L = 2$ to $32$ dBm	–	tbd	–	dB / V
	$T_X / R_X$ conversion	$P_L = 32$ dBm; $f = 1785$ MHz $P_L (1805$ MHz) / $P_D (1765$ MHz)	–	28	30	dB
$t_r$	carrier rise time	$P_L = 2$ to $32$ dBm; time to settle within $-0.5$ dB of final $P_L$	–	1.5	2	$\mu$ s
$t_f$	carrier fall time	$P_L = 2$ to $32$ dBm; time to fall below $-33$ dBm	–	1.5	2	$\mu$ s
	ruggedness	$V_S = 4.1$ V; adjust $V_C$ for $P_L = 33$ dBm; $VSWR \leq 8 : 1$ through all phases	no degradation			

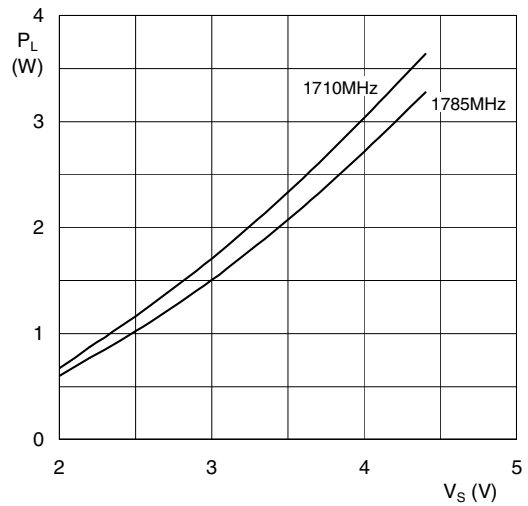
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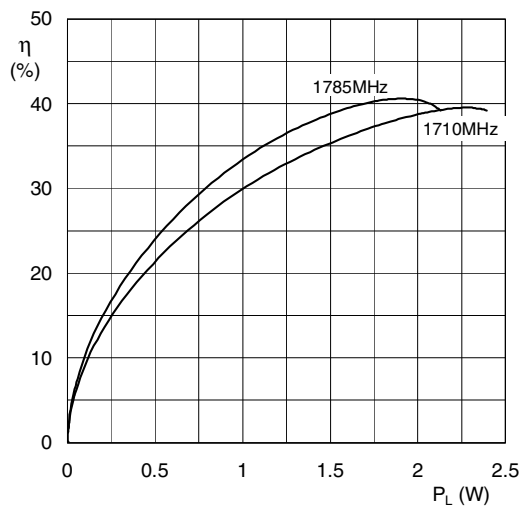
$Z_S = Z_L = 50 \Omega$ ;  $V_S = 3.5 \text{ V}$ ;  $P_D = 0 \text{ dBm}$ ;  
 $T_{mb} = 25 \text{ }^\circ\text{C}$ ;  $\delta = 1 : 8$ ;  $t_p = 575 \mu\text{s}$ .

Fig.2 Load power as a function of control voltage; typical values.



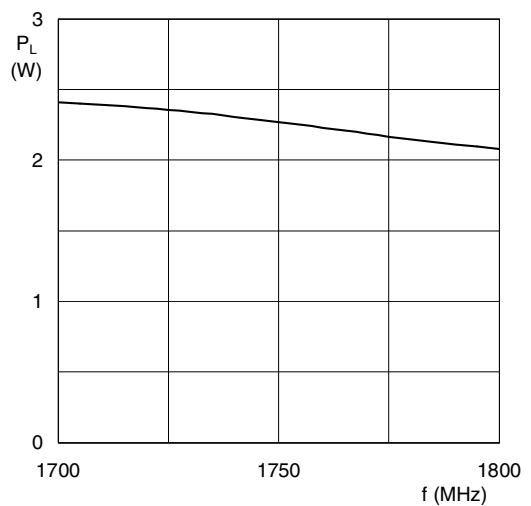
$Z_S = Z_L = 50 \Omega$ ;  $V_C = 2.2 \text{ V}$ ;  $P_D = 0 \text{ dBm}$ ;  
 $T_{mb} = 25 \text{ }^\circ\text{C}$ ;  $\delta = 1 : 8$ ;  $t_p = 575 \mu\text{s}$ .

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



$Z_S = Z_L = 50 \Omega$ ;  $V_S = 3.5 \text{ V}$ ;  $P_D = 0 \text{ dBm}$ ;  
 $T_{mb} = 25 \text{ }^\circ\text{C}$ ;  $\delta = 1 : 8$ ;  $t_p = 575 \mu\text{s}$ .

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

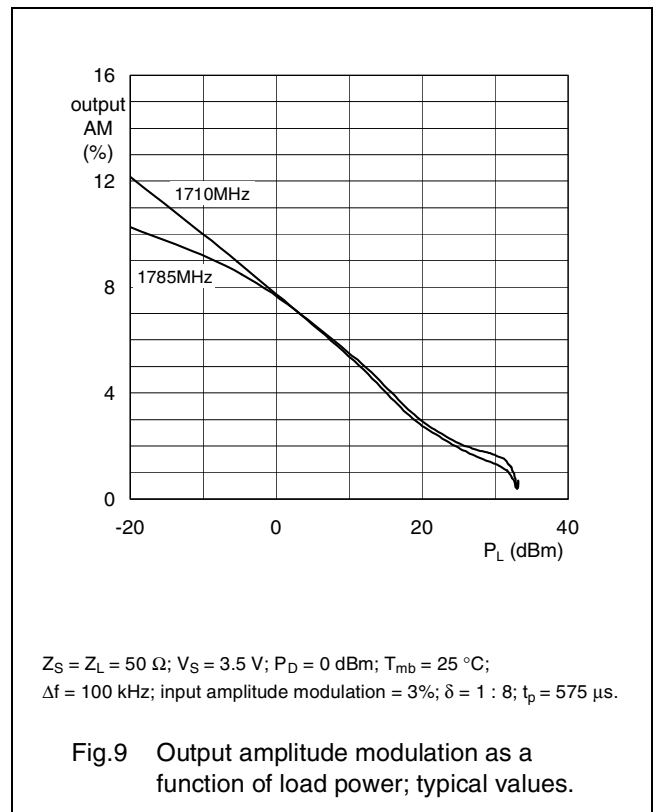
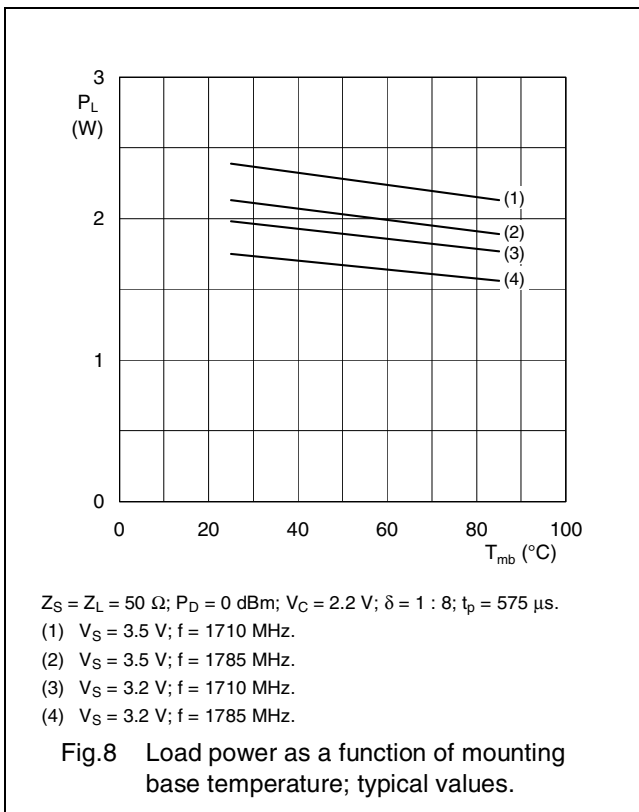
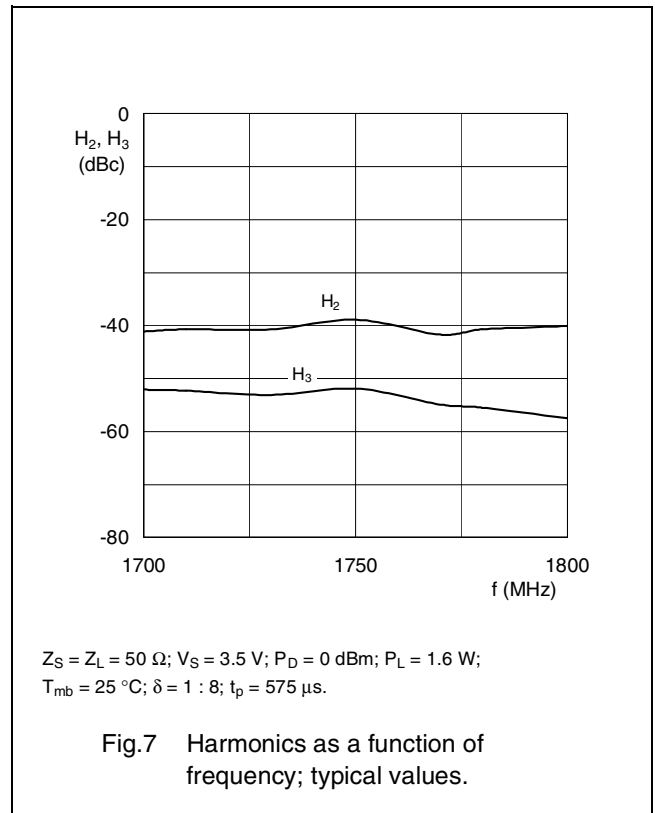
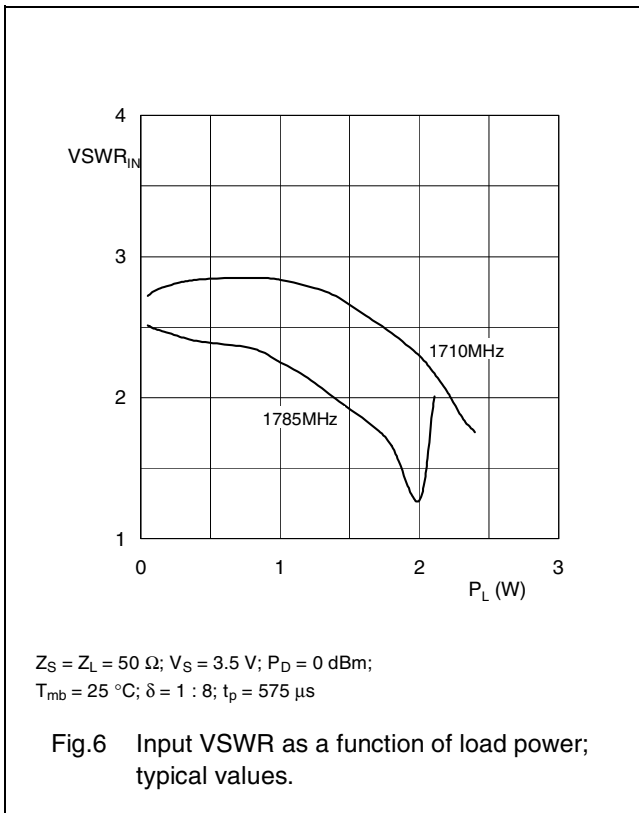


$Z_S = Z_L = 50 \Omega$ ;  $V_S = 3.5 \text{ V}$ ;  $P_D = 0 \text{ dBm}$ ;  $V_C = 2.2 \text{ V}$ ;  
 $T_{mb} = 25 \text{ }^\circ\text{C}$ ;  $\delta = 1 : 8$ ;  $t_p = 575 \mu\text{s}$ .

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

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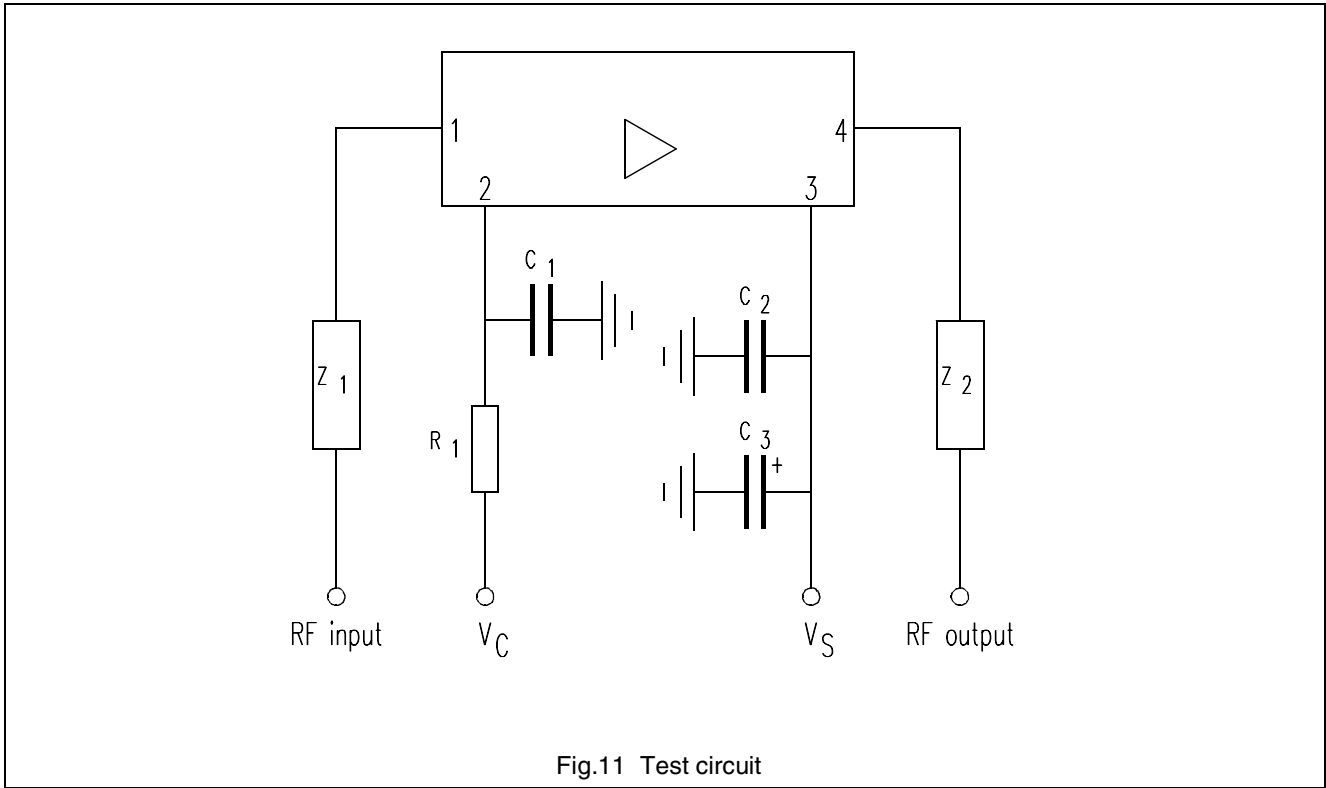


Fig.11 Test circuit

List of components (See Fig 10)

COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE NO.
C1	multilayer ceramic chip capacitor	680 pF		2222 851 11681
C2	multilayer ceramic chip capacitor	100 nF		2222 910 16549
C3	electrolytic capacitor	47 $\mu$ F; 40 V		2222 030 37479
Z <sub>1</sub> , Z <sub>2</sub>	stripline; note 1	50 $\Omega$	width 2.3 mm	–
R1	metal film resistor	100 $\Omega$ ; 0.6 W		2322 156 11001

Note

1. The striplines are on a double copper-clad printed-circuit board with PTFE fibreglass dielectric ( $\epsilon_r = 2.2$ ); thickness  $1/32$  inch.

## UHF amplifier module

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**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 is not recommended because the soldering iron tip can exceed the maximum permitted temperature of 250 °C and damage the module. In case handsoldering is needed, recommendations can be found in RNR-45-98-A-0485.

The maximum allowed temperature is 250 °C for a maximum of 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.

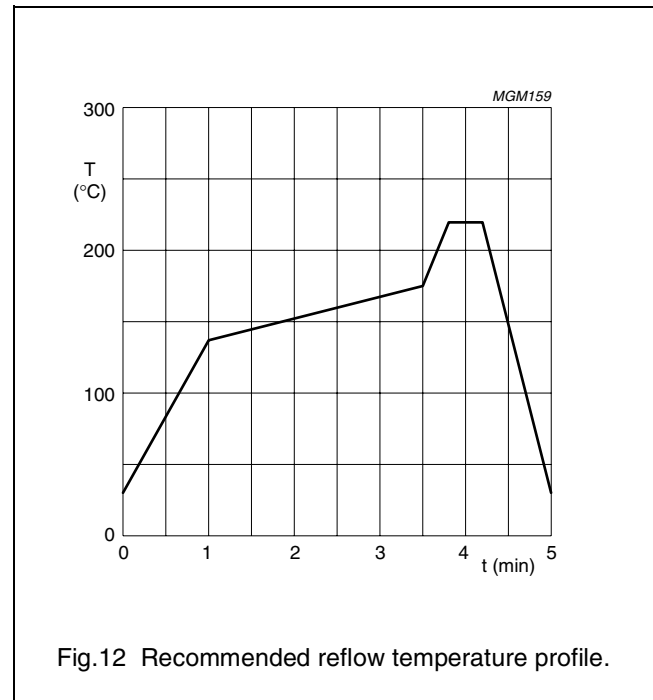
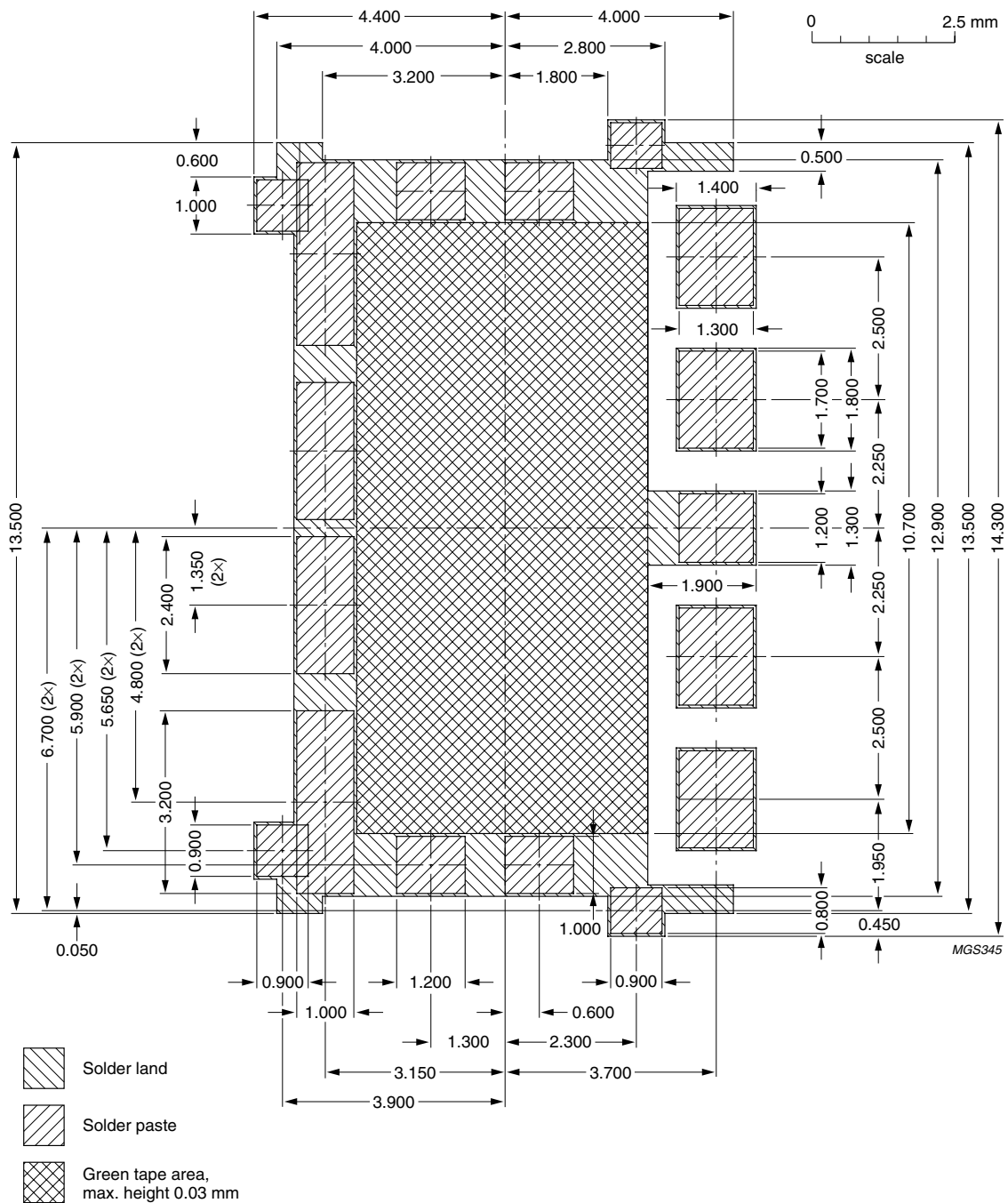


Fig.12 Recommended reflow temperature profile.

UHF amplifier module

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Dimensions in mm.

Fig.13 Footprint SOT482C.



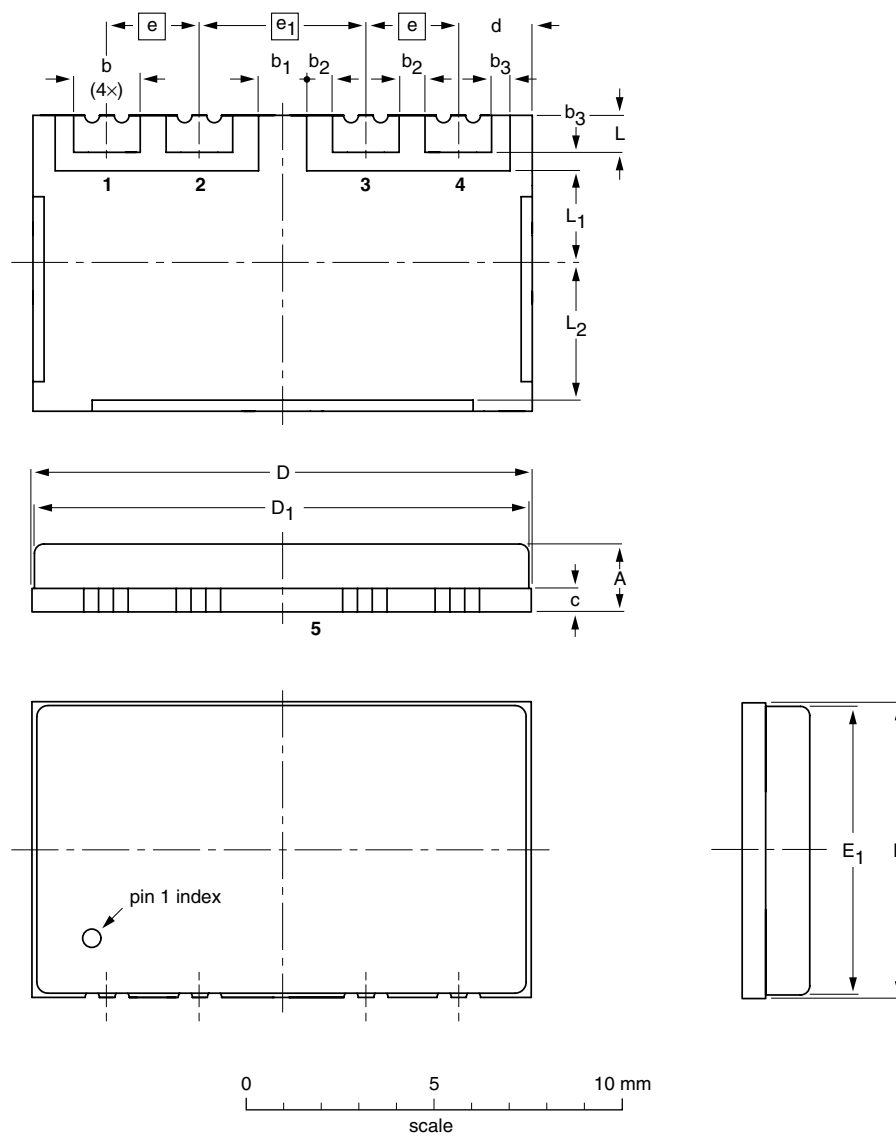
UHF amplifier module

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PACKAGE OUTLINE

Leadless surface mounted package; plastic cap; 4 terminations

SOT482C



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b <sub>1</sub>	b <sub>2</sub>	b <sub>3</sub>	c	D	D <sub>1</sub>	d	E	E <sub>1</sub>	e	e <sub>1</sub>	L	L <sub>1</sub>	L <sub>2</sub>
mm	1.90 1.59	1.9 1.7	1.4 1.2	0.8 0.6	0.6 0.4	0.70 0.57	13.7 13.3	13.35 13.05	2.0	8.2 7.8	7.85 7.55	2.6 2.4	4.6 4.4	1.15 0.85	2.65 2.35	3.85 3.55

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT482C						99-05-18 99-08-16

## UHF amplifier module

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**DEFINITIONS**

<b>Data Sheet Status</b>	
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.
<b>Limiting values</b>	
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.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

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**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

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Tel. +359 2 68 9211, Fax. +359 2 68 9102

**Canada:** PHILIPS SEMICONDUCTORS/COMPONENTS,  
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**China/Hong Kong:** 501 Hong Kong Industrial Technology Centre,  
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Tel. +852 2319 7888, Fax. +852 2319 7700

**Colombia:** see South America

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**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,  
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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

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**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

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Tel. +31 40 27 82785, Fax. +31 40 27 88399

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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.,  
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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

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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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TAIPEI, Taiwan Tel. +886 2 2134 2886, Fax. +886 2 2134 2874

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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,  
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

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**Yugoslavia:** PHILIPS, Trg N. Pasica 5/v, 11000 BEOGRAD,  
Tel. +381 11 62 5344, Fax. +381 11 63 5777

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