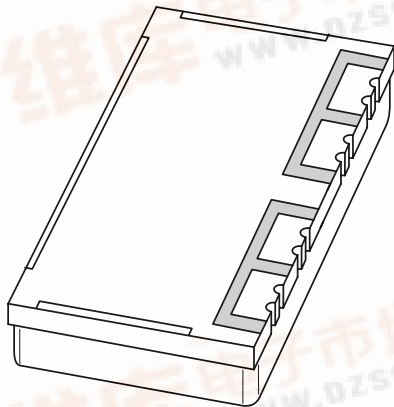


DISCRETE SEMICONDUCTORS

DATA SHEET



BGY241 UHF amplifier module

Product specification
Supersedes data of 1999 May 01

1999 Sep 09

UHF amplifier module

BGY241

FEATURES

- 3.5 V nominal supply voltage
- 35 dBm 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 880 to 915 MHz frequency range.

DESCRIPTION

The BGY241 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_C
3	V_S
4	RF output
5	ground

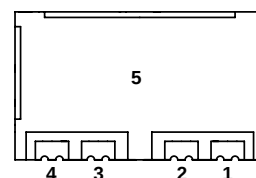


Fig.1 Simplified outline.

QUICK REFERENCE DATA

RF performance at $T_{mb} = 25^\circ\text{C}$.

MODE OF OPERATION	f (MHz)	V_S (V)	V_C (V)	P_L (dBm)	G_p (dB)	η (%)	$Z_S; Z_L$ (Ω)
Pulsed; $\delta = 1 : 8$	880 to 915	3.5	≤ 2.2	35.2	≥ 35.2	typ. 43	50

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_S	DC supply voltage	$V_C = 0; P_D = 0 \text{ mW}$	–	7	V
		$V_C \geq 0.2 \text{ V}$	–	5.5	V
V_C	DC control voltage		–	2.7	V
P_D	input drive power		–	10	dBm
P_L	load power		–	36	dBm
T_{stg}	storage temperature		–40	+100	$^\circ\text{C}$
T_{mb}	operating mounting base temperature		–30	+100	$^\circ\text{C}$

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

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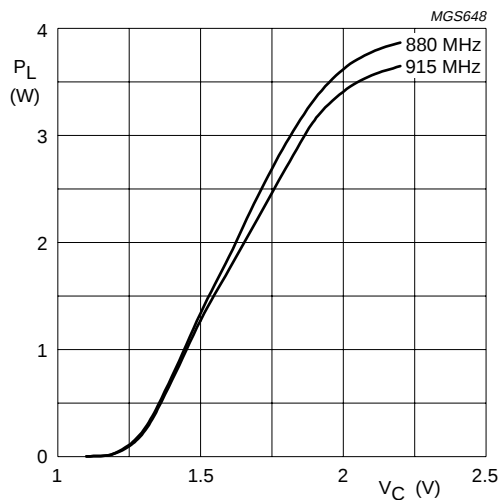
CHARACTERISTICS

$Z_S = Z_L = 50\ \Omega$; $P_D = 0\ \text{dBm}$; $V_S = 3.5\ \text{V}$; $V_C \leq 2.2\ \text{V}$; $f = 880\ \text{to}\ 915\ \text{MHz}$; $T_{mb} = 25\ ^\circ\text{C}$; $\delta = 1 : 8$; $t_p = 575\ \mu\text{s}$; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_Q	leakage current	$V_C = 0.2\ \text{V}$; $P_D = 0\ \text{mW}$	–	–	10	μA
		$V_S = 7\ \text{V}$; $V_C = 0$; $P_D = 0\ \text{mW}$	–	6	20	mA
I_{CM}	peak control current	$P_L = 35.2\ \text{dBm}$	–	–	3	mA
P_L	load power	$V_C = 2.2\ \text{V}$	35.2	35.5	–	dBm
		$V_S = 3\ \text{V}$; $V_C = 2.2\ \text{V}$; $T_{mb} = -20\ \text{to}\ +85\ ^\circ\text{C}$	33.6	–	–	dBm
G_p	power gain	$P_L = 35.2\ \text{dBm}$	–	35.2	–	dB
η	efficiency	$P_L = 34\ \text{dBm}$	35	42	–	%
H_2	second harmonic	$P_L = 35.2\ \text{dBm}$	–	–50	–38	dBc
H_3	third harmonic	$P_L = 35.2\ \text{dBm}$	–	–53	–40	dBc
$VSWR_{in}$	input VSWR	$P_L = 5\ \text{to}\ 35\ \text{dBm}$	–	–	3 : 1	
	stability	$V_S = 3\ \text{to}\ 5\ \text{V}$; $P_D = -3\ \text{to}\ +3\ \text{dBm}$; $V_C = 0\ \text{to}\ 2.2\ \text{V}$; $P_L \leq 35.2\ \text{dBm}$; $VSWR \leq 6 : 1$ through all phases	–	–	–60	dBc
	isolation	$V_C = 0.5\ \text{V}$; $P_D = 3\ \text{dBm}$	–	–43	–37	dBm
	control bandwidth		1.5	–	–	MHz
	control slope	$P_L = -5\ \text{to}\ +5\ \text{dBm}$	–	240	–	dB/V
P_n	noise power	$P_L = 5\ \text{to}\ 35.2\ \text{dBm}$; bandwidth = 100 kHz; 20 MHz above transmitter band	–	–76	–75	dBm
	AM/AM conversion	$P_D = 3\% \text{ AM}$; $f = 100\ \text{kHz}$; $P_L = 5\ \text{to}\ 35.2\ \text{dBm}$	–	12	14	%
	AM/PM conversion	$P_D = -0.5\ \text{to}\ +0.5\ \text{dBm}$; $P_L = 5\ \text{to}\ 35.2\ \text{dBm}$	–	–	2	deg
	T_X/R_X conversion	$P_L = 35.2\ \text{dBm}$; $f = 915\ \text{MHz}$; $P_L (925\ \text{MHz})/P_D (905\ \text{MHz})$	–	25	30	dB
t_r	carrier rise time	$P_L = 6\ \text{to}\ 34\ \text{dBm}$; time to settle within –0.5 dB of final P_L	–	1.5	2	μs
t_f	carrier fall time	$P_L = 6\ \text{to}\ 34\ \text{dBm}$; time to settle within –0.5 dB of final P_L	–	1.5	2	μs
	ruggedness	$V_S = 5\ \text{V}$; $P_L = 34.8\ \text{dBm}$; $VSWR \leq 12 : 1$ through all phases	no degradation			
		$V_S = 4.5\ \text{V}$; $V_C = 2.3\ \text{V}$; $VSWR \leq 5 : 1$ through all phases	no degradation			

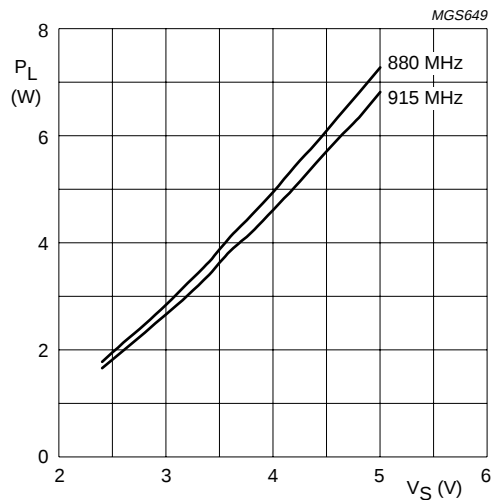
UHF amplifier module

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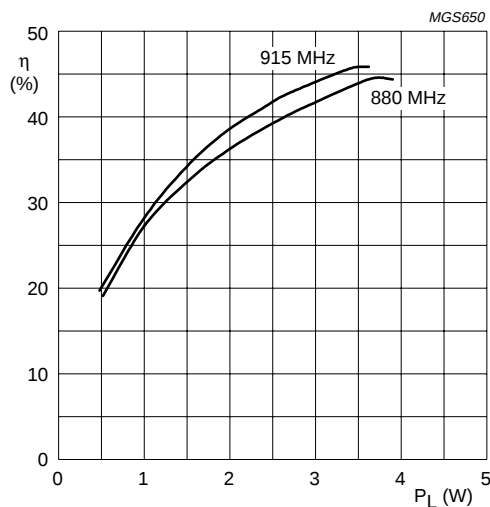
$Z_S = Z_L = 50\ \Omega$; $V_S = 3.5\text{ V}$; $P_D = 1\text{ mW}$;
 $T_{mb} = 25\text{ }^\circ\text{C}$; $\delta = 1 : 8$; $t_p = 575\ \mu\text{s}$.

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



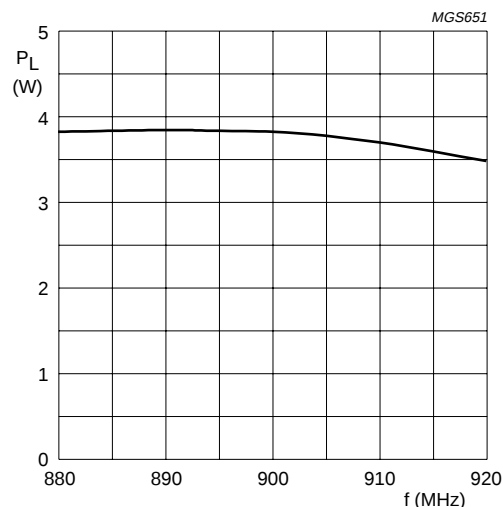
$Z_S = Z_L = 50\ \Omega$; $V_C = 2.2\text{ V}$; $P_D = 1\text{ mW}$;
 $T_{mb} = 25\text{ }^\circ\text{C}$; $\delta = 1 : 8$; $t_p = 575\ \mu\text{s}$.

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



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

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

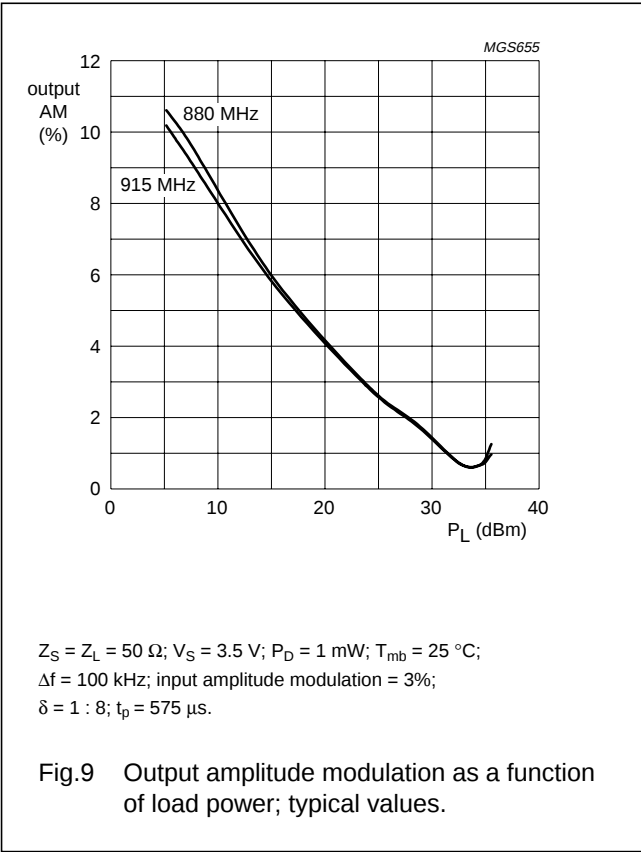
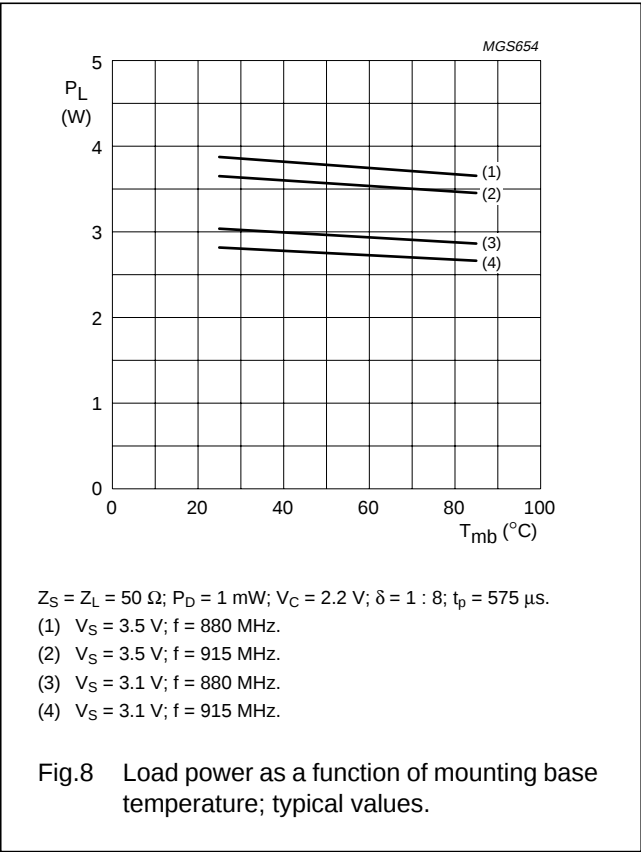
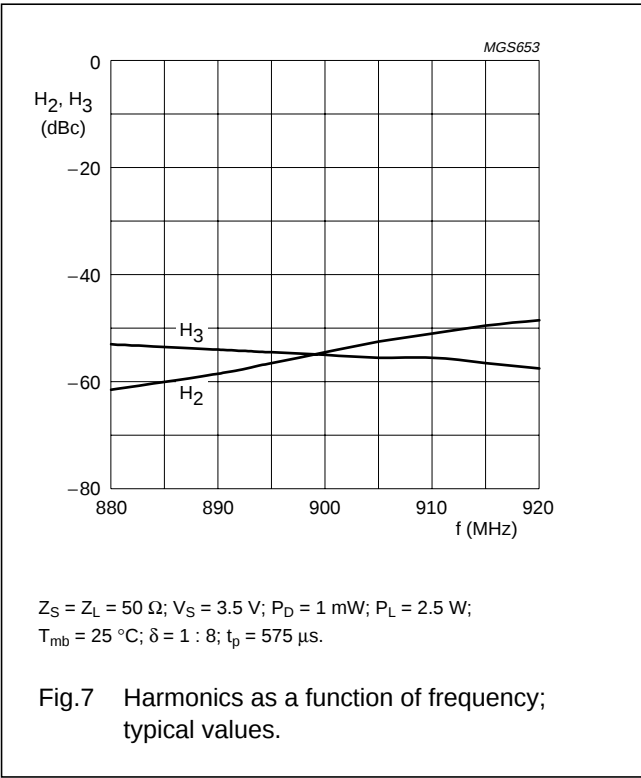
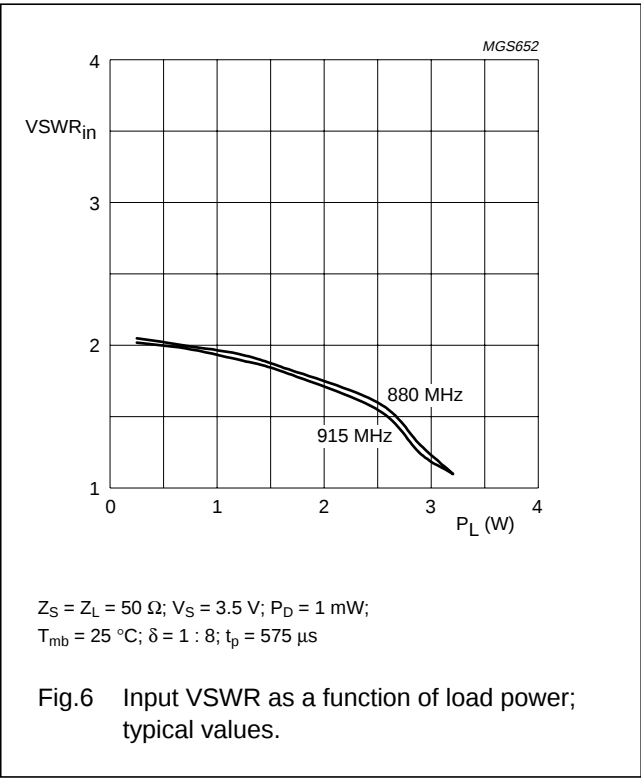


$Z_S = Z_L = 50\ \Omega$; $V_S = 3.5\text{ V}$; $P_D = 1\text{ mW}$; $V_C = 2.2\text{ V}$;
 $T_{mb} = 25\text{ }^\circ\text{C}$; $\delta = 1 : 8$; $t_p = 575\ \mu\text{s}$.

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

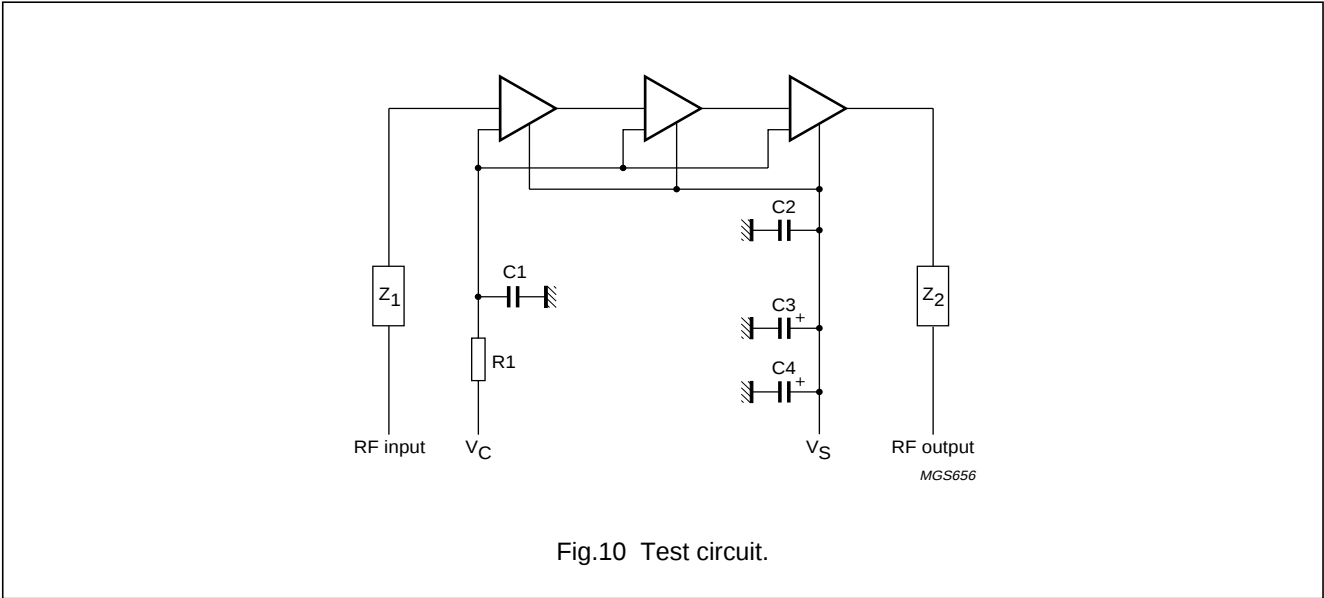
UHF amplifier module

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List of components (see Fig.10)

COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE NO.
C1,C2	multilayer ceramic chip capacitor	680 pF		2222 851 11681
C3	tantalum capacitor	2.2 μ F; 35 V		–
C4	electrolytic capacitor	47 μ F; 40 V		2222 030 37479
Z1,Z2	stripline; note 1	50 Ω	width 2.33 mm	–
R1	metal film resistor	100 Ω ; 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 $\frac{1}{32}$ inch.

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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 hand soldering 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.

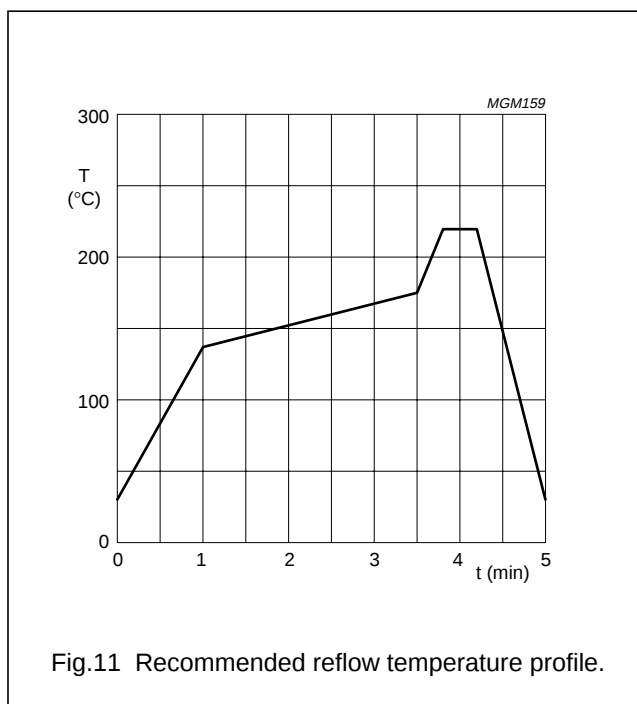
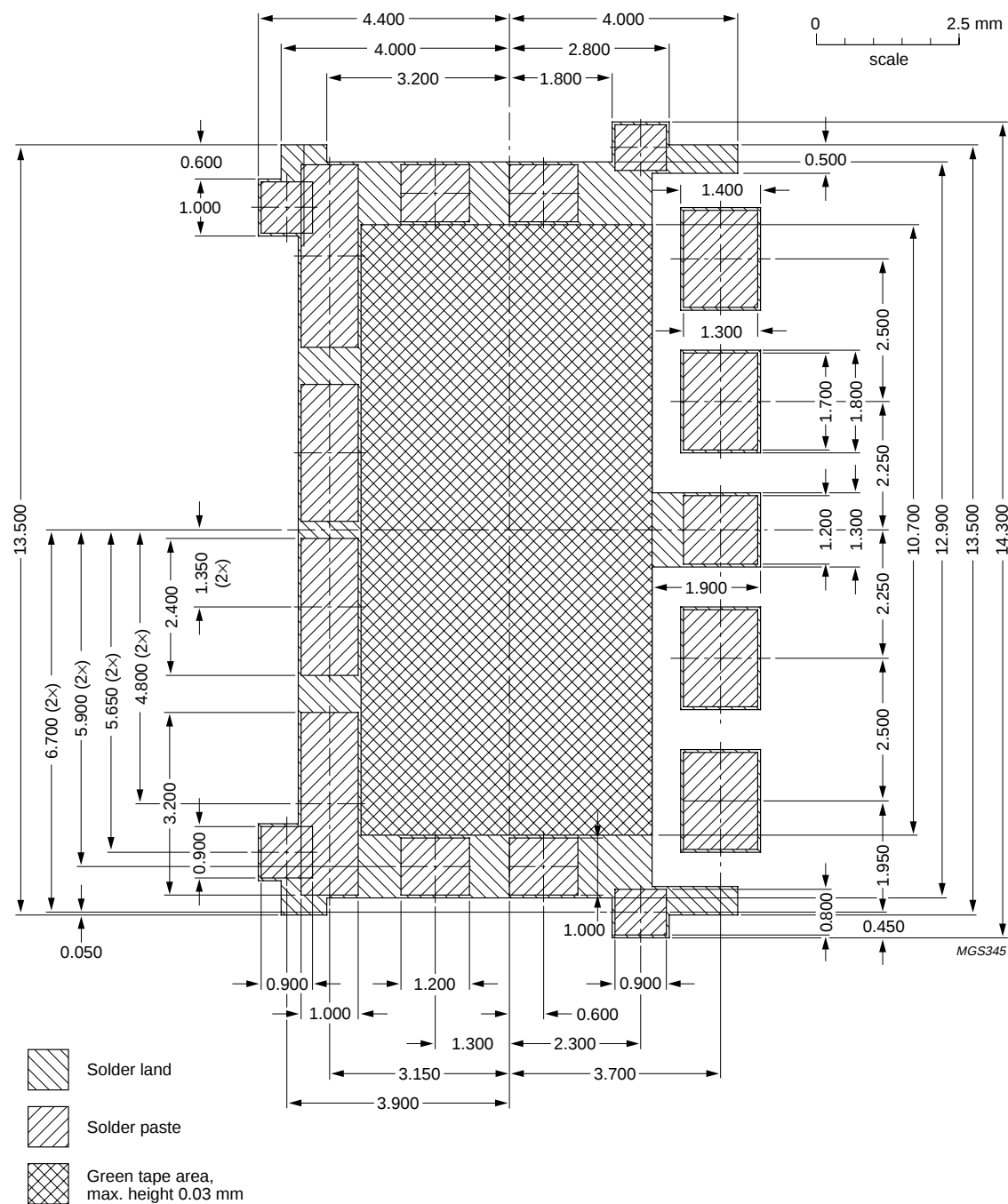


Fig.11 Recommended reflow temperature profile.

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Dimensions in mm.

Fig.12 Footprint SOT482C.

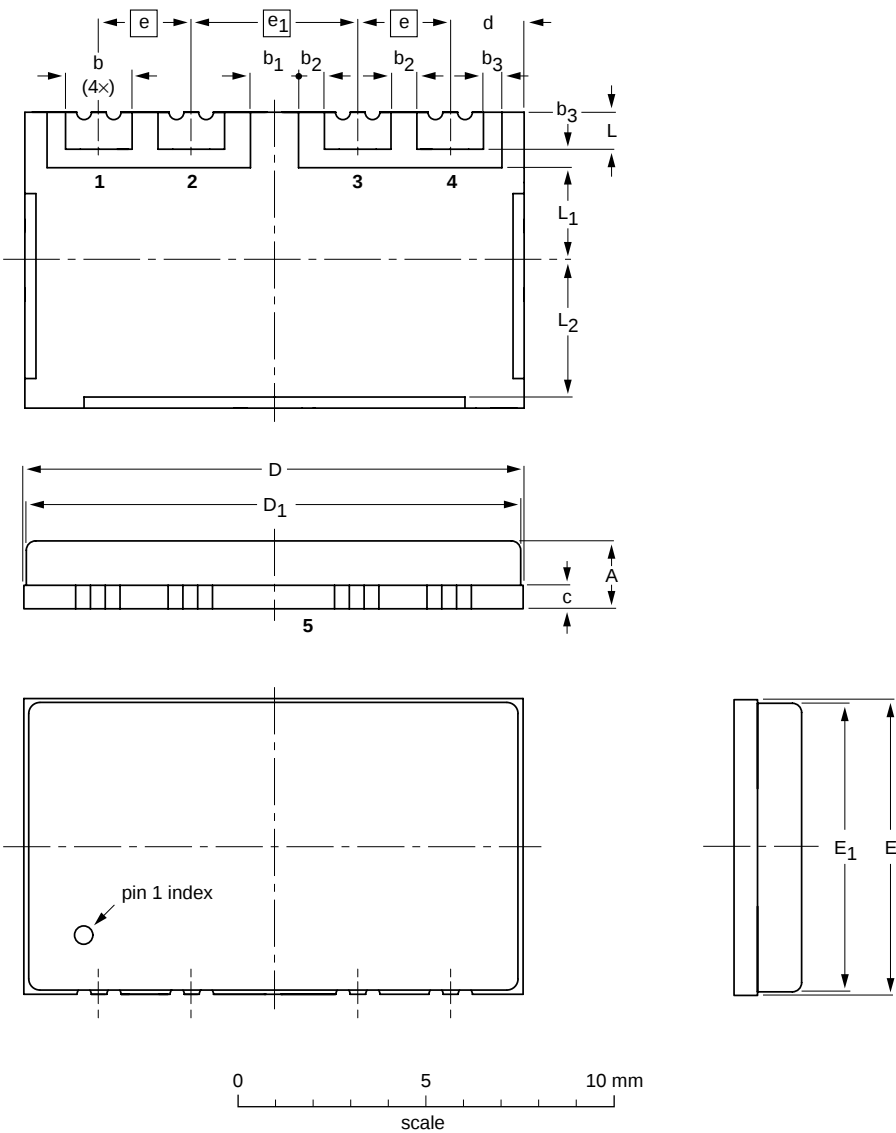
UHF amplifier module

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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 ₁	b ₂	b ₃	c	D	D ₁	d	E	E ₁	e	e ₁	L	L ₁	L ₂
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

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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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 customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

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