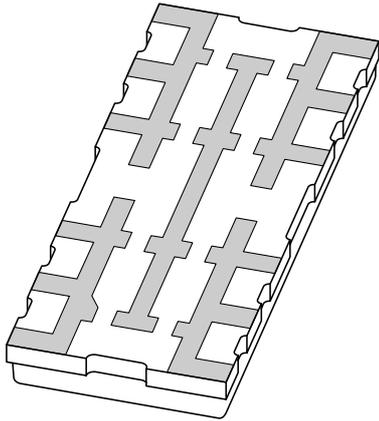


# DATA SHEET



## **BGY282**

dual band UHF amplifier module  
for GSM900 and GSM1800

Preliminary specification

2001 Dec 04

## dual band UHF amplifier module for GSM900 and GSM1800 BGY282

**FEATURES**

- Dual band GSM amplifier
- 3.5 V nominal supply voltage
- 33 dBm output power for GSM1800
- 35 dBm output power for GSM900
- Easy output power control by DC voltage
- Internal input and output matching
- Easy band selection by DC voltage
- Suited for GPRS class 12 (duty cycle 4 : 8).

**APPLICATIONS**

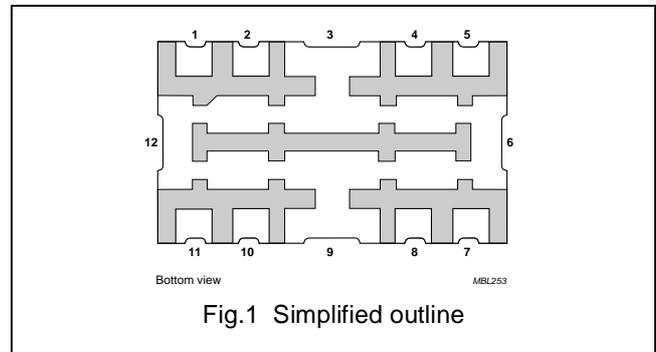
- Digital cellular radio systems with Time Division Multiple Access (TDMA) operation (GSM systems) in two frequency bands: 880 to 915 MHz and 1710 to 1785 MHz.

**DESCRIPTION**

The BGY282 is a power amplifier module in a SOT632A surface mounted ceramic package with a plastic cap. The module consists of two separated line-ups, one for GSM900 and one for GSM1800 with internal power control, input and output matching.

**PINNING - SOT632A**

PIN	DESCRIPTION
1	RF input 1 (GSM900)
2	V <sub>APC</sub>
3, 6, 9, 12	Ground
4	V <sub>S1</sub> (GSM900)
5	RF output 1 (GSM900)
7	RF output 2 (GSM1800)
8	V <sub>S2</sub> (GSM1800)
10	V <sub>band</sub>
11	RF input 2 (GSM1800)



**QUICK REFERENCE DATA**

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

MODE OF OPERATION	f (MHz)	V <sub>S</sub> (V)	V <sub>APC</sub> (V)	P <sub>L</sub> (dBm)	η (%)	Z <sub>S</sub> , Z <sub>L</sub> (Ω)
Pulsed; δ = 1 : 8	880 to 915	3.5	≤2.2	typ. 35	50	50
	1710 to 1785	3.5	≤2.2	typ. 33	45	50

## dual band UHF amplifier module for GSM900 and GSM1800

BGY282

**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>S1</sub> , V <sub>S2</sub>	DC supply voltage	V <sub>APC</sub> = 0; RF <sub>IN</sub> = off	–	7	V
		V <sub>APC</sub> > 0.5 V; RF <sub>IN</sub> = on	–	5.5	V
V <sub>APC</sub>	DC control voltage		–	3	V
P <sub>D1</sub> , P <sub>D2</sub>	input drive power		–	10	dBm
P <sub>L1</sub>	load power 1 (GSM900)		–	36	dBm
P <sub>L1</sub>	load power 1 (GSM900)	δ = 4 : 8; VSWR <sub>out</sub> > 2 : 1	–	35	dBm
P <sub>L2</sub>	load power 2 (GSM1800)		–	35	dBm
P <sub>L2</sub>	load power 2 (GSM1800)	δ = 4 : 8; VSWR <sub>out</sub> > 2 : 1	–	34	dBm
P <sub>S1</sub>	total power from supply during pulse (GSM900)	δ = 4 : 8	–	7.5	W
P <sub>S2</sub>	total power from supply during pulse (GSM1800)	δ = 4 : 8	–	4.5	W
T <sub>stg</sub>	storage temperature		–40	+100	°C
T <sub>mb</sub>	operating mounting base temperature		–30	+90	°C

Note: P<sub>L</sub> is forward power, measured in a coupler.

## dual band UHF amplifier module for GSM900 and GSM1800

BGY282

**CHARACTERISTICS**

$Z_S = Z_L = 50 \Omega$ ;  $P_{D1,2} = 0$  dBm;  $V_{S1} = V_{S2} = 3.5$  V;  $V_{APC} \leq 2.2$  V;  $T_{mb} = 25$  °C;  $t_p = 575$   $\mu$ s;  $\delta = 1 : 8$ ;  
 $f = 880$  to  $915$  MHz (GSM900);  $f = 1710$  to  $1785$  MHz (GSM1800); measured on demoboard of fig 7; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{band}$	band switch voltage	GSM1800 selected	0	–	0.7	V
		GSM900 selected	1.7	–	5.5	V
$I_{band}$	band switch current		–	–	30	$\mu$ A
$I_L$	leakage current	$V_{APC} = 0.2$ V; $P_{D1,2} = 0$ mW	–	–	10	$\mu$ A
$I_{CM1}, I_{CM2}$	peak control current		–	–	2	mA
$P_{D1}$	input drive power (GSM900)		–3	–	4	dBm
$P_{D2}$	input drive power (GSM1800)		–3	2	5	dBm
$P_{L1}$	load power GSM900	$V_{APC} = 2.2$ V	34.7	35	–	dBm
		$V_{APC} = 2.2$ V; $V_{S1} = 3.1$ V	34.2	34.5	–	dBm
$P_{L2}$	load power GSM1800	$V_{APC} = 2.2$ V	32.3	33	–	dBm
		$V_{APC} = 2.2$ V; $V_{S1} = 3.1$ V	31.7	32.3	–	dBm
$\eta_1$	efficiency GSM900	$V_{APC} = 2$ V	43	50	–	%
$\eta_2$	efficiency GSM1800	$V_{APC} = 2$ V	38	45	–	%
$H_2, H_3$	harmonics GSM900	$P_{L1} = 34.7$ dBm	–	–	–38	dBc
	harmonics GSM1800	$P_{L2} = 32.3$ dBm	–	–	–35	dBc
$VSWR_{in}$	input VSWR of active device	$V_{S1,2} = 3.1$ to $4.4$ V; $P_{D1,2} = 0$ dBm; $P_{L1} = 5$ to $34.7$ dBm; $P_{L2} = 0$ to $32.3$ dBm	–	–	3 : 1	
	input VSWR of inactive device	$V_{S1,2} = 3.1$ to $5.15$ V; $V_{APC} \leq 0.5$ V	–	–	8 : 1	
	stability	$V_{S1,2} = 3$ to $5$ V; $P_{D1} = 0$ to $3$ dBm; $P_{D2} = 0$ to $5$ dBm; $P_{L1} = <35$ dBm; $P_{L2} = <33$ dBm; $VSWR = 6 : 1$ through all phases	–	–	–60	dBc
		$V_{S1,2} = 3.1$ to $4.2$ V; $P_{D1} = 0$ to $3$ dBm; $P_{D2} = 0$ to $5$ dBm; $P_{L1} = <34$ dBm; $P_{L2} = <32$ dBm; $VSWR = 6 : 1$ through all phases; $\delta = 4 : 8$	–	–	–60	dBc
	isolation	$V_{APC} = 0.5$ V; $P_{D1} = 3$ dBm; $P_{D2} = 5$ dBm	–	–	–36	dBm
	second harmonic isolation from GSM900 into GSM1800	$P_{L1} = 34.7$ dBm	–	–	–20	dBm
	maximum control slope	$-5$ dBm < $P_{L1,2}$ < $P_{Lmax}$	120	–	200	dB/V
$t_r$	carrier rise time	$P_{L1} = 5$ to $34$ dBm; $P_{L2} = 0$ to $32$ dBm; time to settle within $-0.5$ dB of final $P_L$	–	1.5	2	$\mu$ s
$t_f$	carrier fall time	$P_{L1} = 5$ to $34$ dBm; $P_{L2} = 0$ to $32$ dBm; time to settle within $-0.5$ dB of final $P_L$	–	1.5	2	$\mu$ s

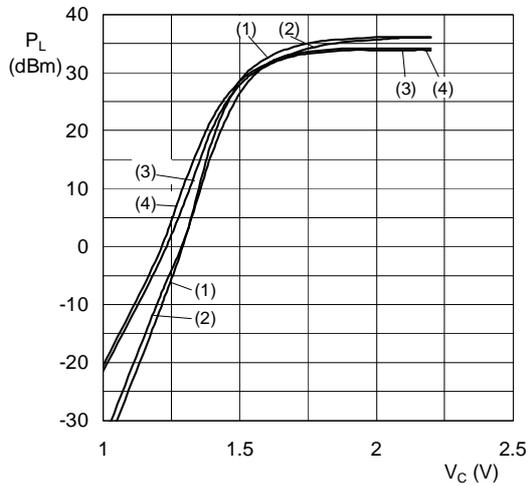
## dual band UHF amplifier module for GSM900 and GSM1800

## BGY282

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
P <sub>n</sub>	noise power GSM900	P <sub>L1</sub> ≤ 34 dBm; bandwidth = 100 kHz; f = 925 MHz	–	–	–71	dBm
		P <sub>L1</sub> ≤ 34 dBm; bandwidth = 100 kHz; f = 935 MHz	–	–	–80	dBm
	noise power GSM1800	P <sub>L2</sub> ≤ 32 dBm; bandwidth = 100 kHz; f = 1805 MHz	–	–	–76	dBm
	AM/PM conversion	P <sub>D1,2</sub> = –0.5 to 0.5 dBm; P <sub>L1</sub> = 5 to 34 dBm; P <sub>L2</sub> = 0 to 32 dBm; P <sub>L1,2</sub> = constant during measurement	–	–	6	deg/dB
	AM/AM conversion	P <sub>D1,2</sub> = 4 %; f = 100 kHz; P <sub>L1</sub> = 5 to 34.7 dBm; P <sub>L2</sub> = 0 to 32.3 dBm	–	–	30	%
CG	conversion gain GSM900	P <sub>D1</sub> = 0 dBm @ 915 MHz; P <sub>L1</sub> = 34 dBm; P <sub>i1</sub> = –50 dBm @ 905 MHz; CG = P <sub>925</sub> – P <sub>i1</sub>	–	25	–	dB
CG	conversion gain GSM1800	P <sub>D2</sub> = 0 dBm @ 1785 MHz; P <sub>L2</sub> = 32 dBm; P <sub>i2</sub> = –50 dBm @ 1765 MHz; CG = P <sub>1805</sub> – P <sub>i2</sub>	–	25	–	dB
	3 dB control bandwidth GSM900, GSM1800	P <sub>L1</sub> = 5 to 34 dBm; P <sub>L2</sub> = 0 to 32 dBm	0.5	–	–	MHz
	power drop 4 slot burst GSM900, GSM1800	V <sub>APC</sub> = 2.2 V; difference P <sub>L</sub> with δ = 1 : 8 and δ = 4 : 8	–	–	0.4	dB
	ruggedness	V <sub>S1,2</sub> = 5 V; P <sub>D1</sub> = 0 to 3 dBm; P <sub>D2</sub> = 0 to 5 dBm; P <sub>L1</sub> = <35 dBm; P <sub>L2</sub> = <33 dBm; VSWR ≤ 6 : 1 through all phases	no degradation			
V <sub>S1,2</sub> = 4.2 V; P <sub>D1</sub> = 0 to 3 dBm; P <sub>D2</sub> = 0 to 5 dBm; P <sub>L1</sub> = <35 dBm; P <sub>L2</sub> = <33 dBm; VSWR ≤ 10 : 1 through all phases		no degradation				
V <sub>S1,2</sub> = 4.2 V; P <sub>D1</sub> = 0 to 3 dBm; P <sub>D2</sub> = 0 to 5 dBm P <sub>L1</sub> = <34 dBm; P <sub>L2</sub> = <32 dBm; VSWR ≤ 6 : 1 through all phases; δ = 4 : 8		no degradation				

dual band UHF amplifier module for GSM900 and GSM1800

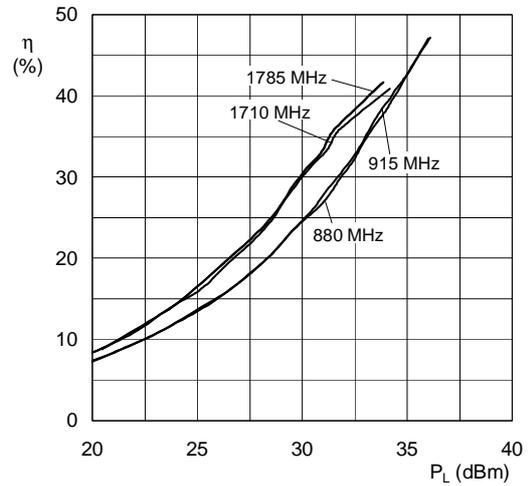
BGY282



(1) = 880 MHz                      (3) = 1710 MHz  
 (2) = 915 MHz                    (4) = 1785 MHz

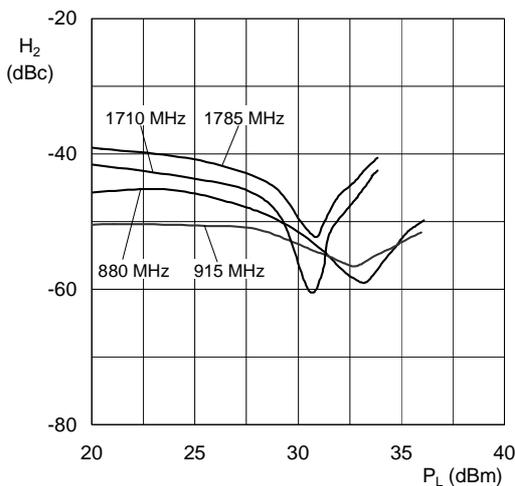
$Z_S = Z_L = 50 \Omega$ ;  $V_S = 3.5 \text{ V}$ ;  $P_D = 0 \text{ dBm}$ ;  
 $T_{mb} = 25 \text{ }^\circ\text{C}$ ;  $\delta = 1 : 8$ ;  $t_p = 575 \mu\text{s}$ .

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



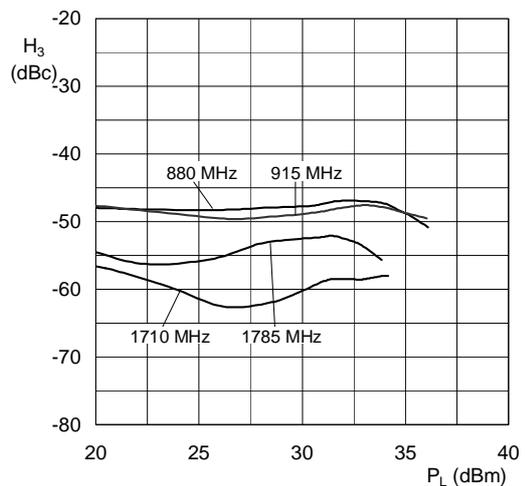
$Z_S = Z_L = 50 \Omega$ ;  $V_S = 3.5 \text{ V}$ ;  $P_D = 0 \text{ dBm}$ ;  
 $T_{mb} = 25 \text{ }^\circ\text{C}$ ;  $\delta = 1 : 8$ ;  $t_p = 575 \mu\text{s}$ .

Fig.3 Efficiency as a function of load power; typical values.



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

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



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

Fig.5 Third harmonic as a function of load power; typical values.

dual band UHF amplifier module for  
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APPLICATION INFORMATION

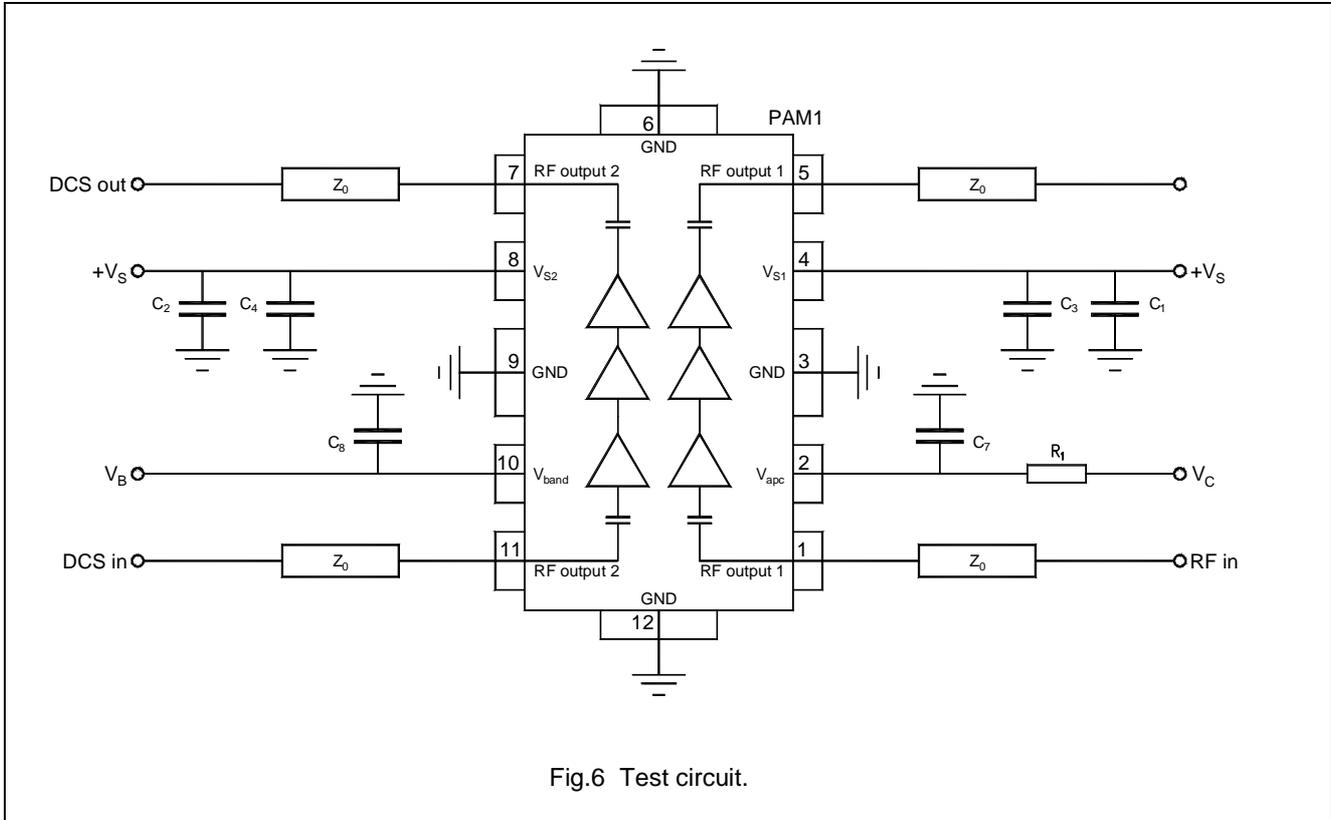


Fig.6 Test circuit.

List of components

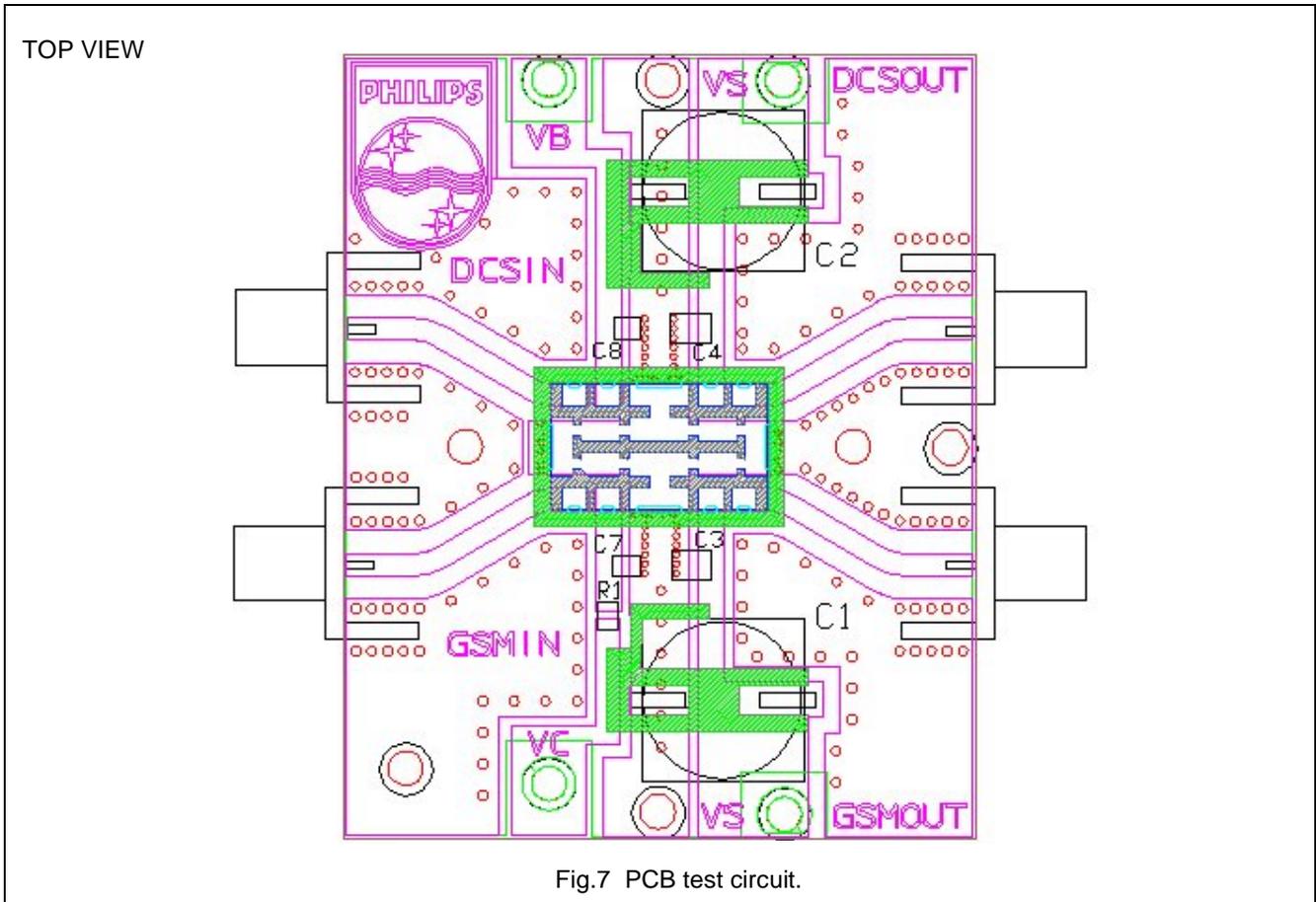
QUANTITY	LOCATION	VALUE / TYPE	DESCRIPTION	REMARK	SUPPLIER
1			PCB		Roland Haefele
1	PAM1	BGY282	Power amplifier module		
4			Jack assembly end launch SMA connector	Type no. 142-0701-881	Johnson Components
1	C1	100 μF / 35 V	Electrol. capacitor	Type no. ECEV1VA101P	Matsushita
1	C2	100 μF / 35 V	Electrol. capacitor	Type no. ECEV1VA101P	Matsushita
1	C3	100 nF	0805 size SMD capacitor		
1	C4	100 nF	0805 size SMD capacitor		
1	C7	680 pF	0603 size SMD capacitor		
1	C8	100 pF	0603 size SMD capacitor		
1	R1	100 Ohms / 0.1 W	0805 size SMD resistor		
4	Z0	50 Ω	stripline; note 1	width 1.4 mm	

Note

1. The striplines are on a double etched printed circuit board ( $\epsilon_r = 4.6$ ); thickness 0.8 mm

dual band UHF amplifier module for  
GSM900 and GSM1800

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**SOLDERING**

The indicated temperatures are those at the solder interfaces.

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

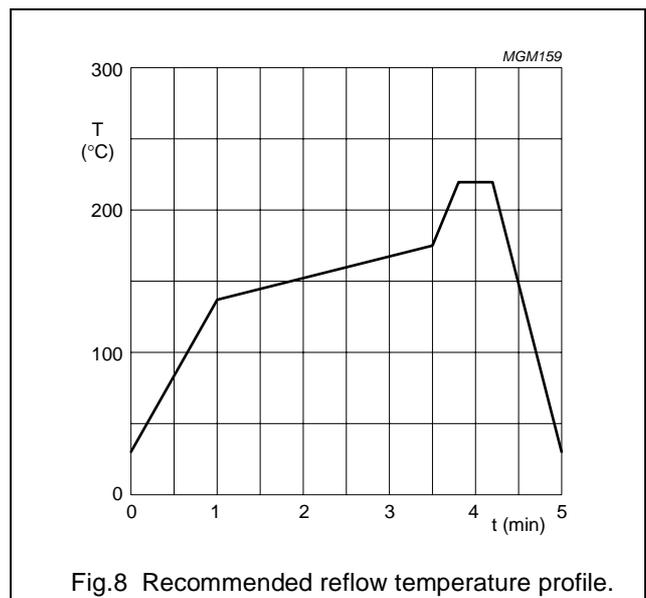
Soldering can be carried out using a conveyor oven, a hot air oven, an infrared oven or a combination of these ovens. A double reflow process can be used.

Hand soldering is not recommended because of the nature of the contacts.

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

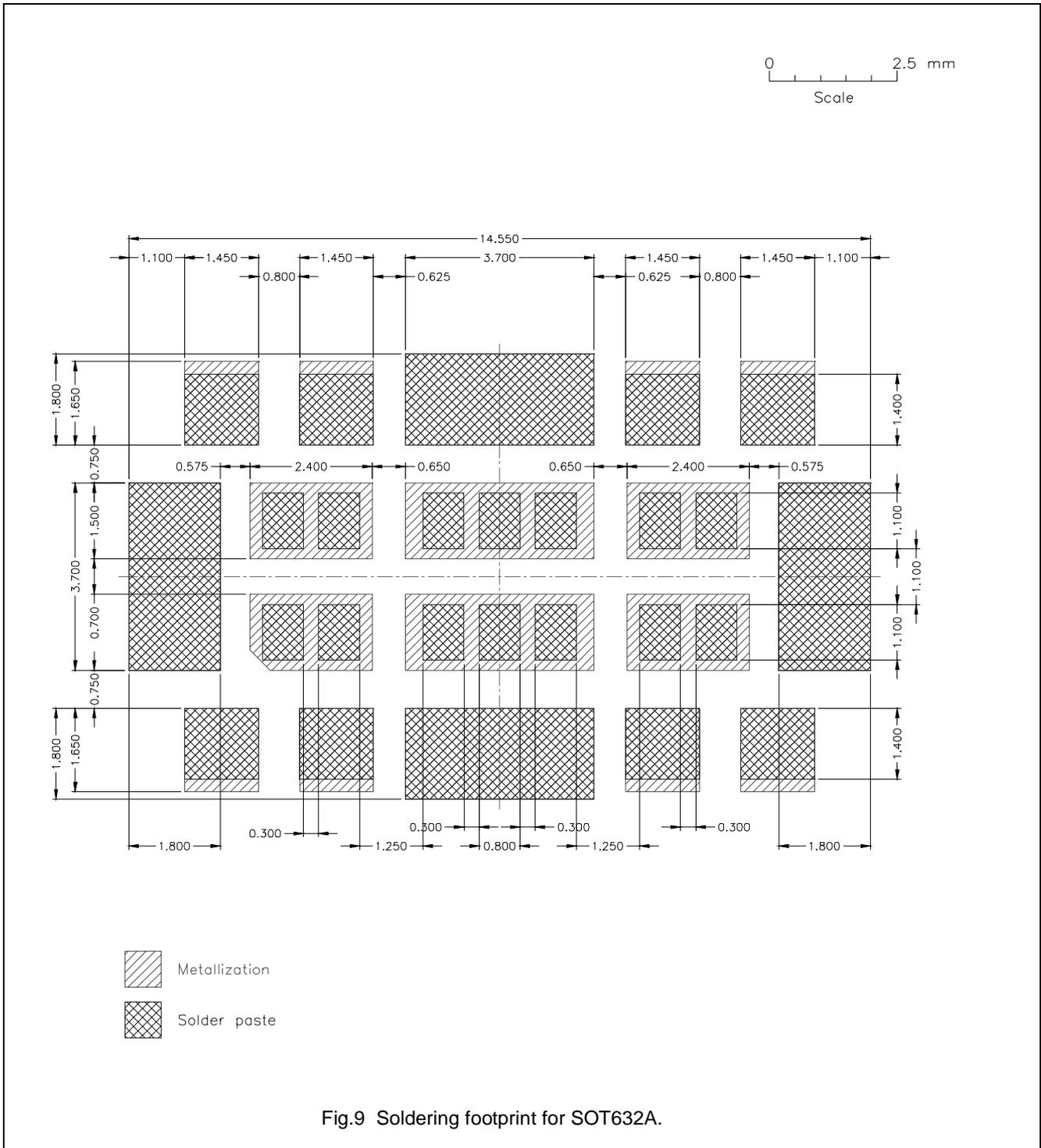
The maximum ramp-up is 10 °C per second.

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



dual band UHF amplifier module for GSM900 and GSM1800

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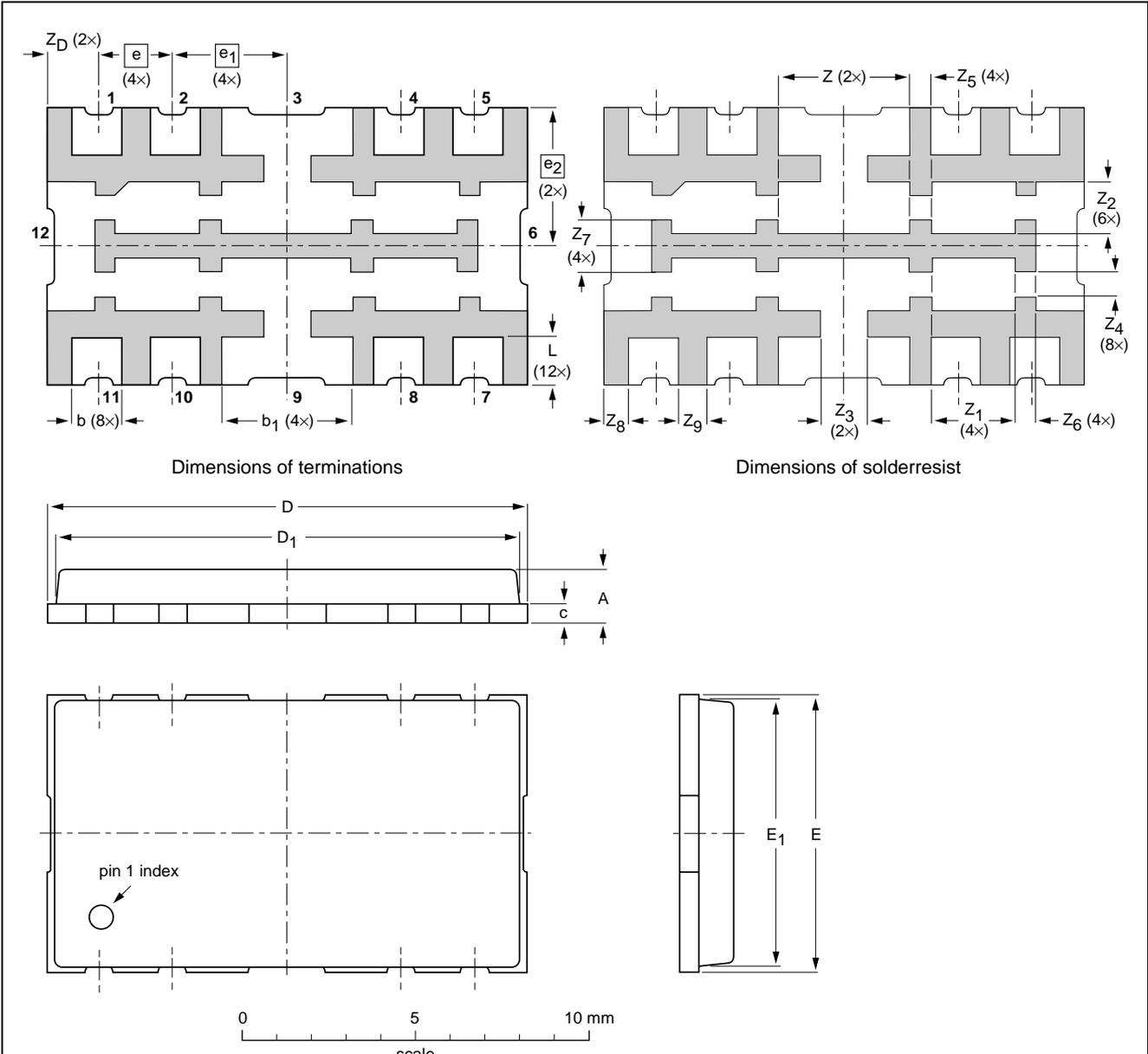
dual band UHF amplifier module for GSM900 and GSM1800

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PACKAGE OUTLINE

Leadless surface mounted package; plastic cap; 12 terminations

SOT632A



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b <sub>1</sub>	c	D	D <sub>1</sub>	E	E <sub>1</sub>	e	e <sub>1</sub>	e <sub>2</sub>	L	Z	Z <sub>D</sub>	Z <sub>1</sub>	Z <sub>2</sub>	Z <sub>3</sub>	Z <sub>4</sub>	Z <sub>5</sub>	Z <sub>6</sub>	Z <sub>7</sub>	Z <sub>8</sub>	Z <sub>9</sub>
mm	1.8 1.4	1.5 1.4	3.75 3.65	0.61 0.49	14.05 13.45	13.35 13.05	8.3 7.7	7.85 7.55	2.1	3.275	4.0	1.45 1.35	3.75 3.65	1.55 1.45	2.45 2.35	1.55 1.45	1.35 1.25	0.75 0.65	0.7 0.6	0.625 0.525	1.55 1.45	0.75 0.65	0.85 0.75

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT632A						01-09-26 01-11-20

## dual band UHF amplifier module for GSM900 and GSM1800

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## DATA SHEET STATUS

DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)</sup>	DEFINITIONS
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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