UHF amplifier module BGY200

FEATURES

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

APPLICATIONS

- Digital cellular radio systems (GSM systems) operating in the 890 to 915 MHz frequency range.

PINNING - SOT350

PIN	DESCRIPTION
1	RF input
2	V_C
3	V_{S1}
4	V_{S2}
5	RF output
mounting base	ground

DESCRIPTION

The BGY200 is a four-stage UHF amplifier module. It consists of four NPN silicon planar transistor chips mounted together with matching and bias circuit components on a metallized ceramic substrate.

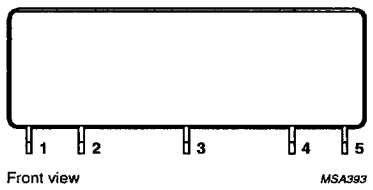


Fig.1 Simplified outline.

QUICK REFERENCE DATA

RF performance at T_{mb} = 25 °C.

MODE OF OPERATION	f (MHz)	V_{S1}; V_{S2} (V)	V_C (V)	P_L (W)	G_p (dB)	η (%)	Z_S; Z_L (Ω)
pulsed; δ = 1 : 8	890 to 915	7.2	4	≥3.5	≥35.5	typ. 43	50

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{S1}	DC supply voltage	$V_C \leq 4$ V	–	10	V
V_{S2}	DC supply voltage	$V_C \leq 4$ V	–	10	V
V_C	DC control voltage		–	4.5	V
P_D	input drive power		–	2	mW
P_L	load power		–	4	W
T_{stg}	storage temperature		–40	+100	°C
T_c	case temperature		–30	+100	°C

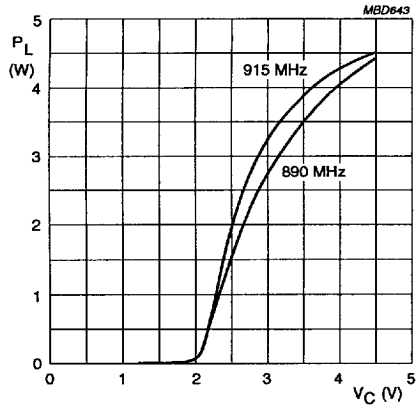
CHARACTERISTICS

$T_{mb} = 25$ °C; $Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_C = 4$ V; $V_{S1} = V_{S2} = 7.2$ V; $f = 890$ to 915 MHz; $\delta = 1 : 8$; $t_p = 575\ \mu$s; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
P_L	load power		3.5	–	–	W
P_L	load power	$V_{S1} = V_{S2} = 6.2$ V	2.5	–	–	W
G_p	power gain	$P_L = 3.5$ W; note 1	35.5	–	–	dB
η	efficiency	$P_L = 3.5$ W; note 1	40	43	–	%
H_2	second harmonic	$P_L = 3.5$ W; note 1	–	–	–40	dBc
H_3	third harmonic	$P_L = 3.5$ W; note 1	–	–	–40	dBc
$VSWR_{in}$	input VSWR	$P_L = 3.5$ W; note 1	–	–	2 : 1	
I_C	control current		–	–	0.5	mA
$I_{Q1} + I_{Q2}$	total leakage current	$V_C < 0.5$ V	–	–	200	µA
	isolation	$V_C < 0.5$ V	–	–	–36	dBm
	stability	VSWR ≤ 6 : 1 through all phases; $P_L \leq 3.5$ W; $P_D = 0.7$ to 2 mW; $V_{S1} = V_{S2} = 6$ to 9 V; $V_C = 0$ to 4 V	–	–	–60	dBc
	control bandwidth		1	–	–	MHz
P_n	noise power	$P_L \leq 3.5$ W; notes 1 and 2; bandwidth = 30 kHz; 20 MHz above transmitter band	–	–80	–	dBm
	ruggedness	VSWR ≤ 10 : 1 through all phases; $V_{S1} = V_{S2} = 9$ V; $P_L = 4$ W; note 1	no degradation			

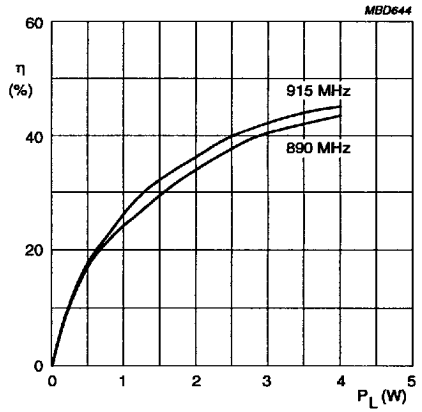
Notes

1. Adjust V_C for specified P_L.
2. Measured under CW conditions.



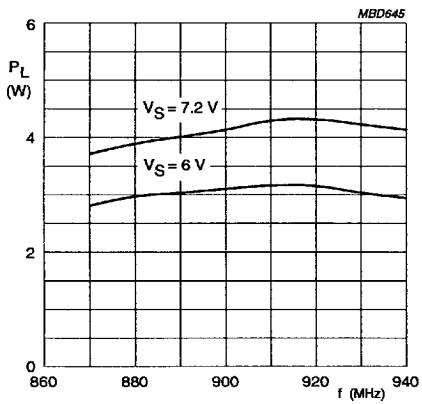
$Z_S = Z_L = 50\ \Omega$; $V_{S1} = V_{S2} = 7.2$ V; $T_{mb} = 25\ ^\circ C$; $P_D = 1$ mW.
$\delta = 1 : 8$; $t_p = 575\ \mu s$.

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



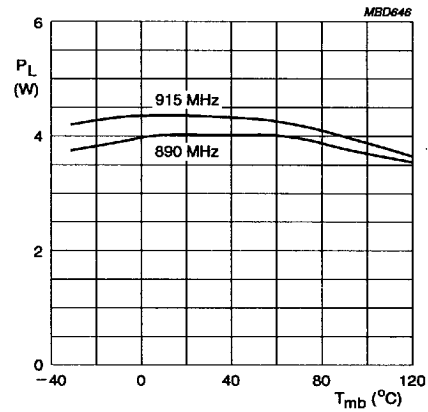
$Z_S = Z_L = 50\ \Omega$; $V_{S1} = V_{S2} = 7.2$ V; $T_{mb} = 25\ ^\circ C$; $P_D = 1$ mW.
$\delta = 1 : 8$; $t_p = 575\ \mu s$.

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



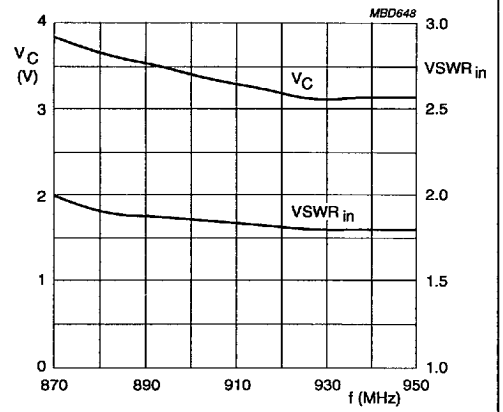
$Z_S = Z_L = 50\ \Omega$; $V_C = 4$ V; $T_{mb} = 25\ ^\circ C$; $P_D = 1$ mW;
$\delta = 1 : 8$; $t_p = 575\ \mu s$.

Fig.4 Load power as a function of frequency; typical values.



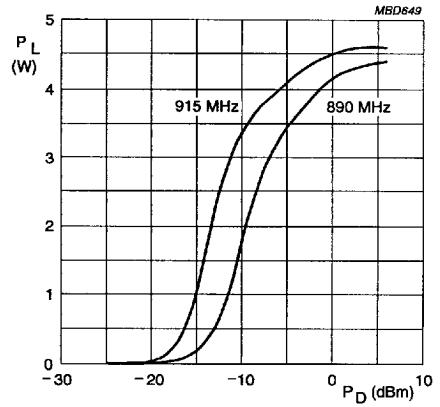
$Z_S = Z_L = 50\ \Omega$; $V_C = 4$ V; $V_{S1} = V_{S2} = 7.2$ V; $P_D = 1$ mW.
$\delta = 1 : 8$; $t_p = 575\ \mu s$.

Fig.5 Load power as a function of mounting base temperature; typical values.



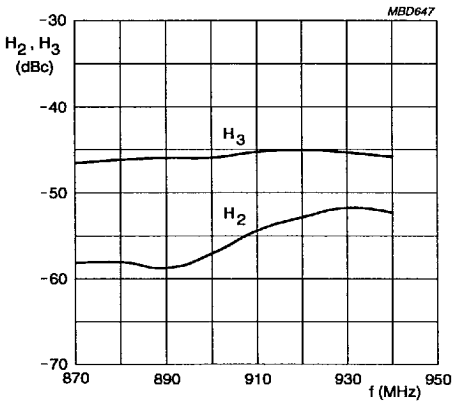
$Z_S = Z_L = 50\ \Omega$; $V_{S1} = V_{S2} = 7.2$ V; $T_{mb} = 25$ °C; $P_L = 3.5$ W; $P_D = 1$ mW; $\delta = 1:8$; $t_p = 575\ \mu s$.

Fig.6 Control voltage and VSWR input as functions of frequency; typical values.



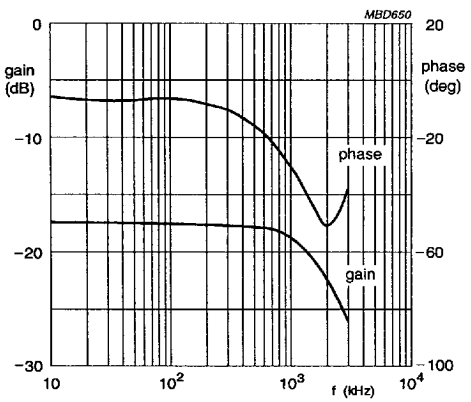
$Z_S = Z_L = 50\ \Omega$; $V_C = 4$ V; $V_{S1} = V_{S2} = 7.2$ V; $T_{mb} = 25$ °C; $\delta = 1:8$; $t_p = 575\ \mu s$.

Fig.7 Load power as a function of drive power; typical values.



$Z_S = Z_L = 50\ \Omega$; $V_{S1} = V_{S2} = 7.2$ V; $T_{mb} = 25$ °C; $P_L = 3.5$ W; $P_D = 1$ mW. $\delta = 1:8$; $t_p = 575\ \mu s$.

Fig.8 Harmonics as functions of frequency; typical values.



$Z_S = Z_L = 50\ \Omega$; $V_{S1} = V_{S2} = 7.2$ V; $T_{mb} = 25$ °C; $P_L = 35$ dBm; $P_D = 1$ mW; $\delta = 1:8$; $t_p = 575\ \mu s$.

Fig.9 Control bandwidth in terms of gain and phase-shift as functions of frequency; typical values.

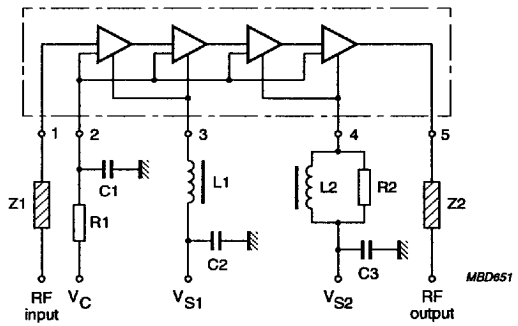


Fig.10 Test circuit.

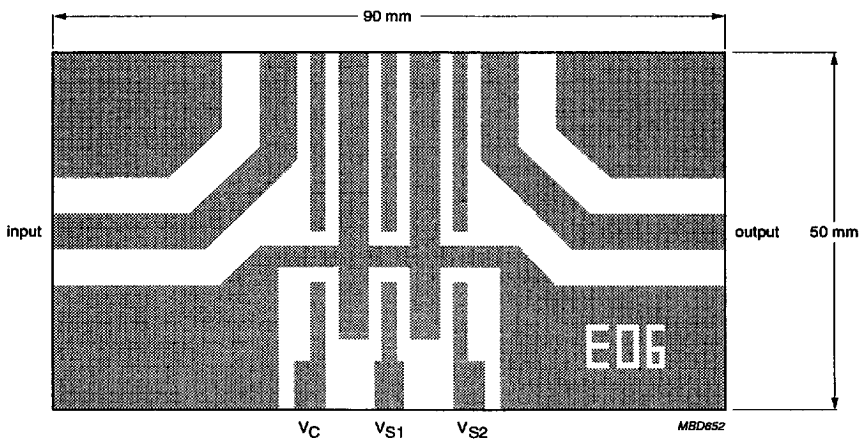


Fig.11 Printed-circuit board layout.

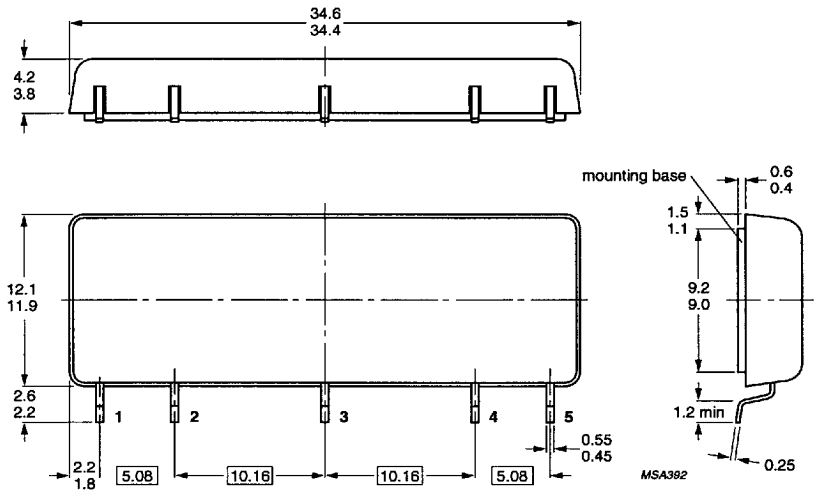
List of components (see Fig.10)

COMPONENT	DESCRIPTION	VALUE	CATALOGUE NO.
C1	multilayer ceramic chip capacitor	470 pF	2222 861 12471
C2	tantalum capacitor	2.2 μF	–
C3	electrolytic capacitor	68 μF	–
L1, L2	1 turn 0.4 mm copper wire on grade 3B core	0.9 μH	4330 030 32221
Z1, Z2	stripline; note 1	50 Ω	–
R1	metal film resistor	78 Ω; 0.4 W	–
R2	metal film resistor	5 Ω; 0.4 W	–

Note

1. The striplines are on a double copper-clad printed-circuit board with PTFE fibre-glass dielectric ($\varepsilon_r = 2.2$); thickness $^1/_{16}$ inch.

PACKAGE OUTLINE



Dimensions in mm.

Fig.12 SOT350.