

UHF amplifier module

BGY201

FEATURES

- 12.5 V nominal supply voltage
- 14 W output power
- Easy control of output power by pulsed DC voltage.

APPLICATIONS

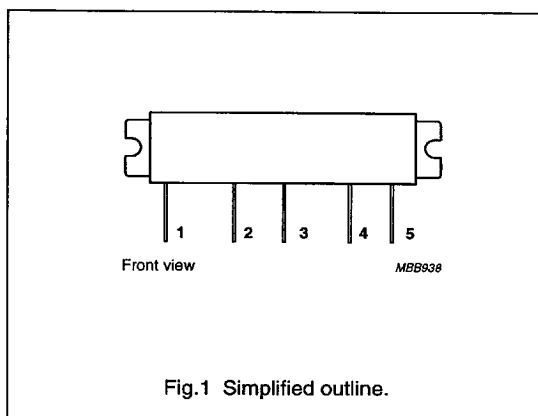
- Digital cellular radio systems with Time Division Multiple Axis (TDMA) operation (GSM systems) in the 890 to 915 MHz frequency range.

PINNING - SOT278A

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

DESCRIPTION

The BGY201 is a five-stage UHF amplifier module. It consists of five NPN silicon planar transistor chips mounted together with matching and bias circuit components on a metallized ceramic substrate.



QUICK REFERENCE DATA

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

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; $\delta = 1 : 8$	890 to 915	12.5	≤ 4	14	≥ 41.5	typ. 38	50

WARNING

Product and environmental safety - toxic materials

This product contains beryllium oxide. The product is entirely safe provided that the BeO slab is not damaged. All persons who handle, use or dispose of this product should be aware of its nature and of the necessary safety precautions. After use, dispose of as chemical or special waste according to the regulations applying at the location of the user. It must never be thrown out with the general or domestic waste.

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{S1}	DC supply voltage	$V_C = 4\text{ V}$	–	15.6	V
V_{S2}	DC supply voltage	$V_C = 4\text{ V}$	–	15.6	V
V_C	DC control voltage		–	5	V
P_D	input drive power		–	2	mW
P_L	load power		–	16	W
T_{stg}	storage temperature		–40	+100	°C
T_{mb}	operating mounting base temperature		–30	+90	°C

CHARACTERISTICS

$T_{mb} = 25\text{ °C}$; $Z_S = Z_L = 50\text{ }\Omega$; $P_D = 1\text{ mW}$; $V_C = 4\text{ V}$; $V_{S1} = V_{S2} = 12.5\text{ V}$; $f = 890\text{ to }915\text{ MHz}$; $\delta = 1 : 8$; $t_p = 575\text{ }\mu\text{s}$; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
P_L	load power		14	–	–	W
G_p	power gain	$P_L = 14\text{ W}$; note 1	41.5	–	–	dB
η	efficiency	$P_L = 14\text{ W}$; note 1	35	38	–	%
H_2	second harmonic	$P_L = 14\text{ W}$; note 1	–	–	–40	dBc
H_3	third harmonic	$P_L = 14\text{ W}$; note 1	–	–	–40	dBc
$VSWR_{in}$	input VSWR	$P_L = 14\text{ W}$; note 1	–	–	2 : 1	
I_C	control current	$P_L = 14\text{ W}$; note 1	–	–	1	mA
I_{Q2}	leakage current	$V_{S1} = V_C = 0$	–	–	1	mA
	isolation	$V_C < 0.5\text{ V}$	–	–	–36	dBm
	stability	$VSWR \leq 6 : 1$ through all phases; $P_L \leq 14\text{ W}$; $P_D = -3\text{ to }+3\text{ dBm}$; $V_{S1} = V_{S2} = 10\text{ to }15.6\text{ V}$; $V_C = 0\text{ to }4\text{ V}$	–	–	–60	dBc
t_r	rise time		–	–	1	μs
	AM-AM conversion	P_D with 1% AM; $P_L \leq 14\text{ W}$	–	–	3	
	control bandwidth	$P_L \leq 14\text{ W}$	1	–	–	MHz
	ruggedness	$VSWR \leq 10 : 1$ through all phases; $V_{S1} = V_{S2} = 15.6\text{ V}$; $P_L = 16\text{ W}$; note 1	no degradation			

Note

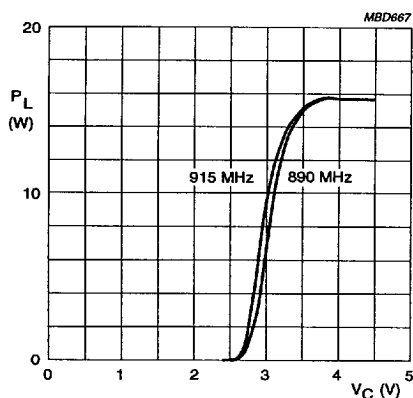
1. Adjust V_C for specified P_L .

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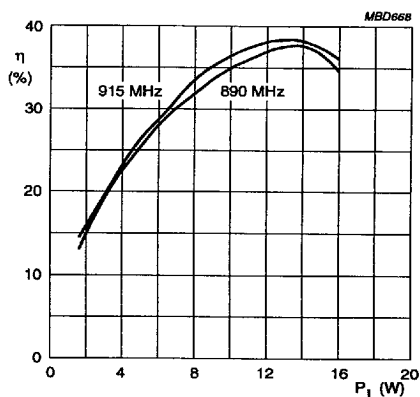
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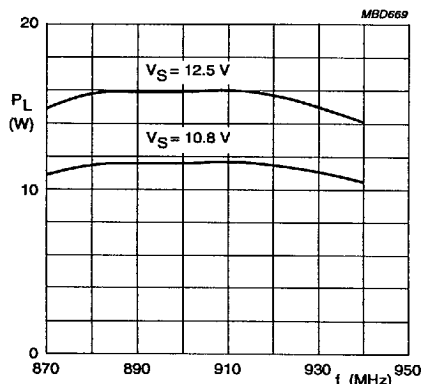
$Z_S = Z_L = 50 \Omega$; $V_{S1} = V_{S2} = 12.5 \text{ V}$; $T_{mb} = 25^\circ\text{C}$; $P_D = 1 \text{ mW}$;
 $\delta = 1 : 8$; $t_p = 575 \mu\text{s}$.

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



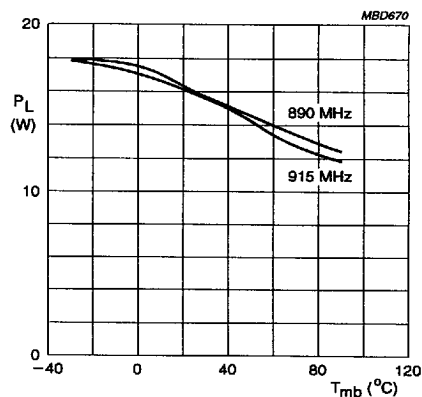
$Z_S = Z_L = 50 \Omega$; $V_{S1} = V_{S2} = 12.5 \text{ V}$; $T_{mb} = 25^\circ\text{C}$; $P_D = 1 \text{ mW}$;
 $\delta = 1 : 8$; $t_p = 575 \mu\text{s}$.

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



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

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



$Z_S = Z_L = 50 \Omega$; $V_C = 4 \text{ V}$; $V_{S1} = V_{S2} = 12.5 \text{ V}$; $P_D = 1 \text{ mW}$;
 $\delta = 1 : 8$; $t_p = 575 \mu\text{s}$.

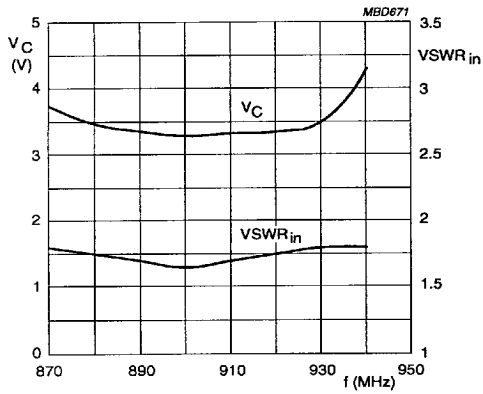
Fig.5 Load power as a function of mounting base
temperature; typical values.

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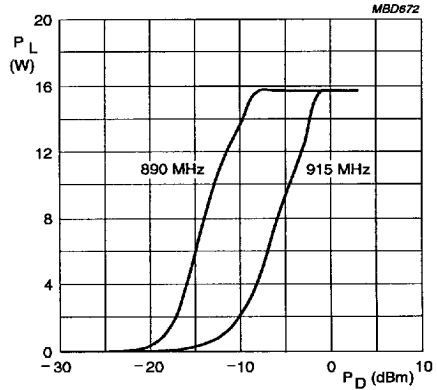
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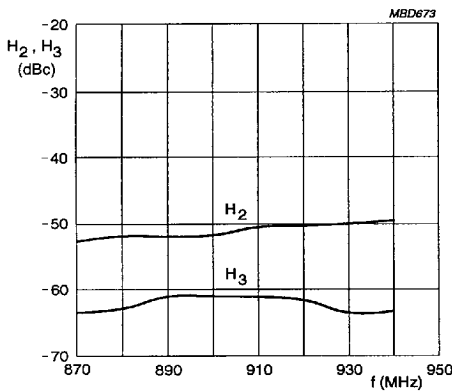
$Z_S = Z_L = 50 \Omega$; $V_{S1} = V_{S2} = 12.5 \text{ V}$; $T_{mb} = 25^\circ \text{C}$; $P_L = 14 \text{ W}$;
 $P_D = 1 \text{ mW}$; $\delta = 1:8$; $t_p = 575 \mu\text{s}$.

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



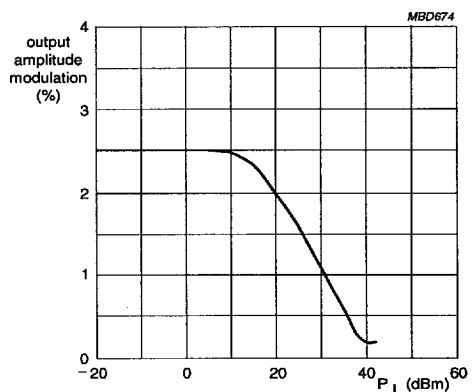
$Z_S = Z_L = 50 \Omega$; $V_C = 4 \text{ V}$; $V_{S1} = V_{S2} = 12.5 \text{ V}$; $T_{mb} = 25^\circ \text{C}$;
 $\delta = 1:8$; $t_p = 575 \mu\text{s}$.

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



$Z_S = Z_L = 50 \Omega$; $V_{S1} = V_{S2} = 12.5 \text{ V}$; $T_{mb} = 25^\circ \text{C}$; $P_L = 14 \text{ W}$;
 $P_D = 1 \text{ mW}$; $\delta = 1:8$; $t_p = 575 \mu\text{s}$.

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



$Z_S = Z_L = 50 \Omega$; $V_{S1} = V_{S2} = 12.5 \text{ V}$; $T_{mb} = 25^\circ \text{C}$; $f = 900 \text{ MHz}$;
input amplitude modulation = 1%; $\delta = 1:8$; $t_p = 575 \mu\text{s}$.

Fig.9 Output amplitude modulation as a function of load power; typical values.

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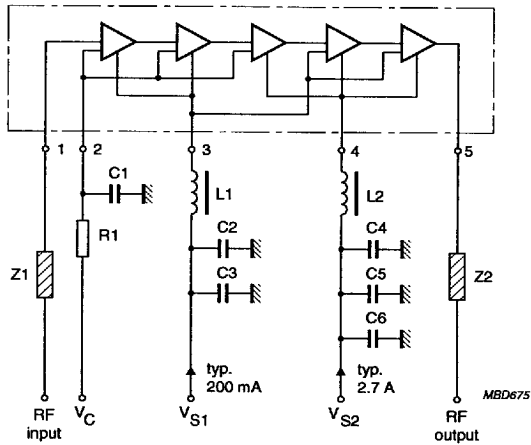


Fig.10 Test circuit.

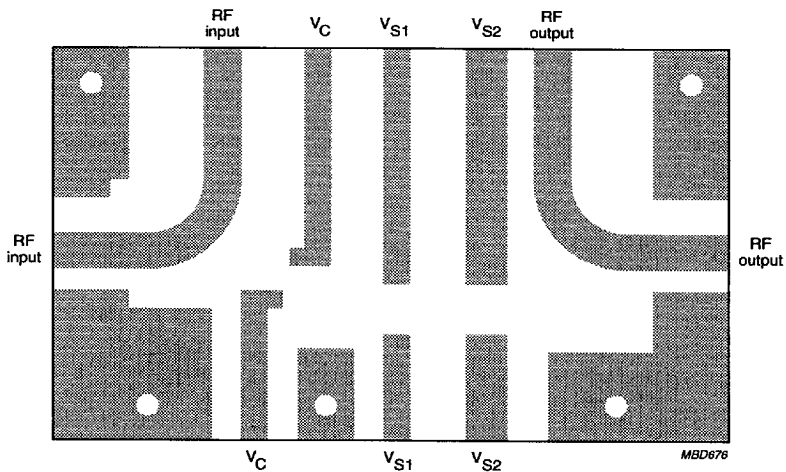


Fig.11 Printed-circuit board layout.

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List of components (see Fig.10)

COMPONENT	DESCRIPTION	VALUE	CATALOGUE NO.
C1	tantalum capacitor; note 1	560 pF	—
C2, C4	tantalum capacitor; note 1	2.2 μ F	—
C3, C5	electrolytic capacitor; note 1	22 μ F	—
C6	electrolytic capacitor; note 1	220 μ F	—
L1, L2	RF choke, 0.5 turn 0.8 mm copper wire on grade 3B core	1 μ H	4330 030 32221
Z1, Z2	stripline; note 2	—	—
R1	metal film resistor	100 Ω ; 0.4 W	—

Notes

1. The capacitors are for external supply decoupling and optimum pulse shape.
2. The striplines are on a double copper-clad printed-circuit board with PTFE fibreglass dielectric ($\epsilon_r = 2.2$); thickness $\frac{1}{16}$ inch.

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PACKAGE OUTLINE

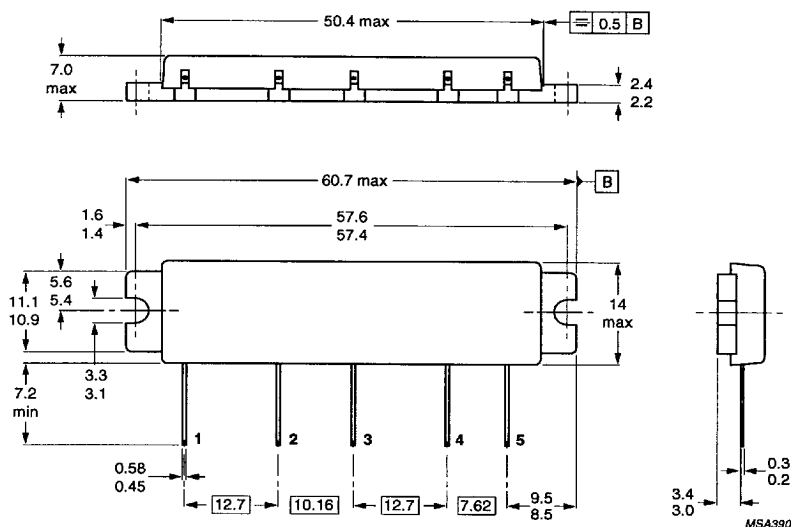


Fig.12 SOT278A.

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