DATA SHEET

BGY201
UHF amplifier module

Product specification
Supersedes data of June 1994
File under Discrete Semiconductors, SC09

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Philips
Semiconductors

PHILIPS

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 Access (TDMA) operation (GSM systems) in the 890 to 915 MHz frequency range.

DESCRIPTION

The BGY201 is a five-stage UHF amplifier module in a SOT278A package. It consists of five NPN silicon planar transistor dies mounted together with matching and bias circuit components on a metallized ceramic substrate.

PINNING - SOT278A

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

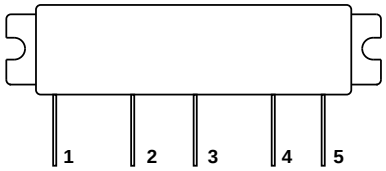


Fig.1 Simplified outline.

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; $\delta = 1 : 8$	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.

LIMITING VALUES

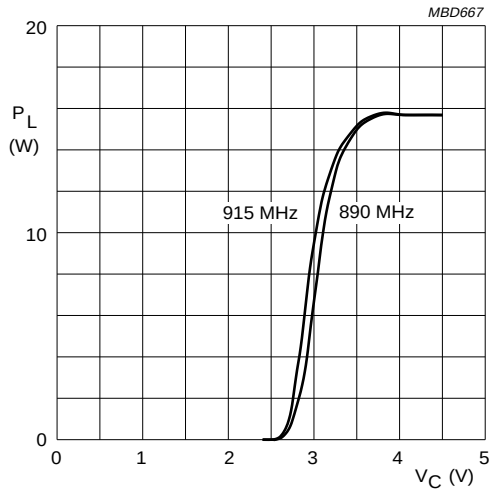
In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{S1}	DC supply voltage	V_C = 4 V	–	15.6	V
V_{S2}	DC supply voltage	V_C = 4 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 range		–40	+100	°C
T_{mb}	operating mounting base temperature		–30	+90	°C

CHARACTERISTICS

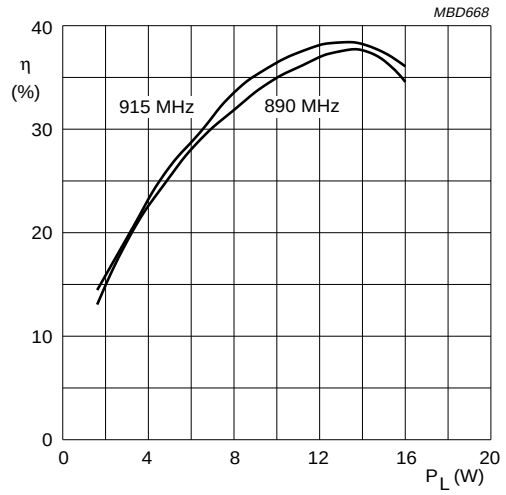
$Z_S = Z_L$ = 50 Ω; P_D = 1 mW; $V_{S1} = V_{S2}$ = 12.5 V; $V_C \leq$ 4 V; f = 890 to 915 MHz; T_{mb} = 25 °C; δ = 1 : 8; t_p = 575 µs; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{Q2}	leakage current	$V_{S1} = V_C = 0$	–	–	1	mA
I_C	control current	adjust V_C for P_L = 14 W	–	–	1	mA
P_L	load power		14	–	–	W
G_p	power gain	adjust V_C for P_L = 14 W	41.5	–	–	dB
η	efficiency	adjust V_C for P_L = 14 W	33	38	–	%
H_2	second harmonic	adjust V_C for P_L = 14 W	–	–	–40	dBc
H_3	third harmonic	adjust V_C for P_L = 14 W	–	–	–40	dBc
$VSWR_{in}$	input VSWR	adjust V_C for P_L = 14 W	–	–	2 : 1	
	stability	P_D = –3 to +3 dBm; $V_{S1} = V_{S2}$ = 10 to 15.6 V; V_C = 0 to 4 V; $P_L \leq$ 14 W; VSWR ≤ 6 : 1 through all phases	–	–	–55	dBc
	isolation	V_C < 0.5 V	–	–	–36	dBm
	control bandwidth	$P_L \leq$ 14 W	1	–	–	MHz
	AM-AM conversion	P_D with 1% AM; $P_L \leq$ 14 W	–	–	3	
t_r	rise time		–	–	1	µs
	ruggedness	$V_{S1} = V_{S2}$ = 15.6 V; adjust V_C for P_L = 16 W VSWR ≤ 10 : 1 through all phases	no degradation			



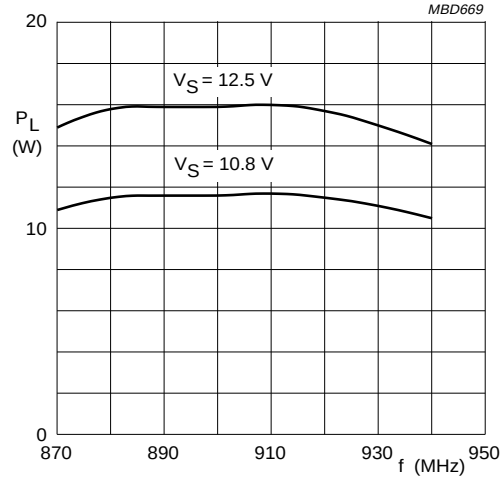
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = 12.5$ V; $T_{mb} = 25\ ^{o}C$; $\delta = 1 : 8$; $t_p = 575\ \mu s$.

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



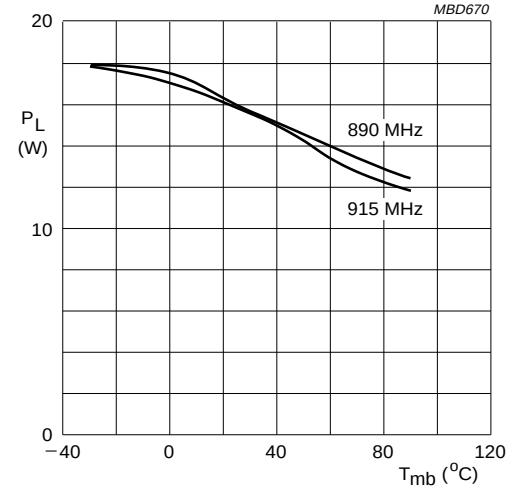
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = 12.5$ V; $T_{mb} = 25\ ^{o}C$; $\delta = 1 : 8$; $t_p = 575\ \mu s$.

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



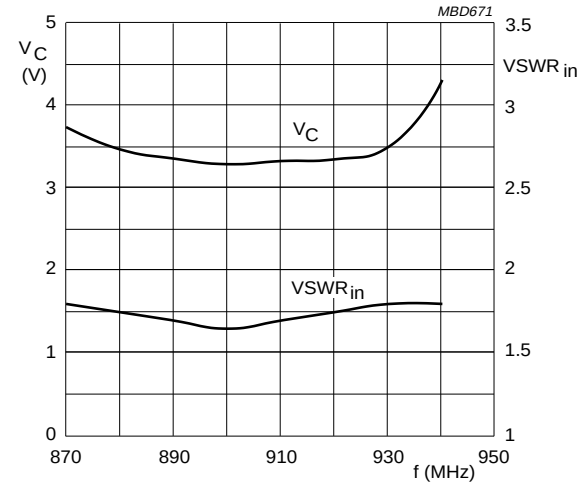
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_C = 4$ V; $T_{mb} = 25\ ^{o}C$; $\delta = 1 : 8$; $t_p = 575\ \mu s$.

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



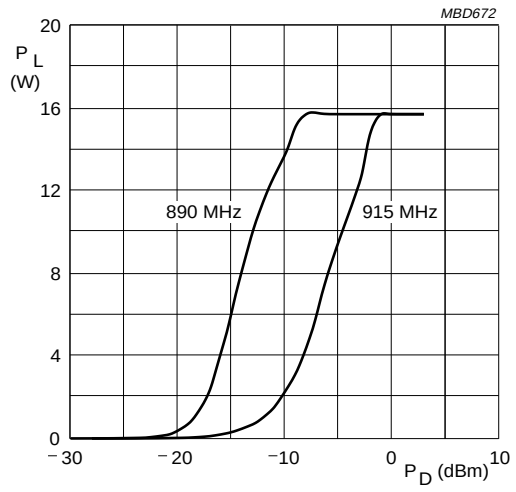
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = 12.5$ V; $V_C = 4$ V; $\delta = 1 : 8$; $t_p = 575\ \mu s$.

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



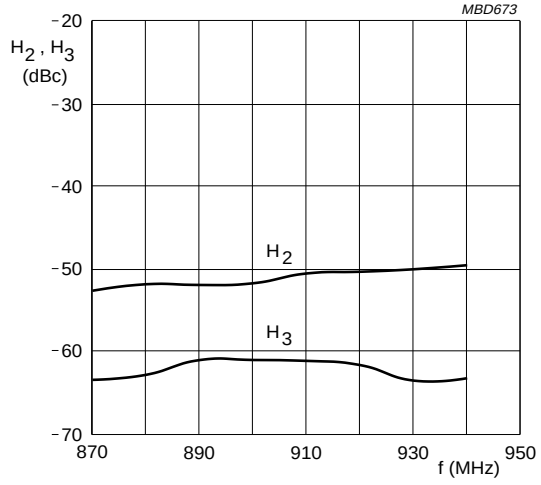
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = 12.5$ V; $P_L = 14$ W; $T_{mb} = 25\ °C$; $\delta = 1 : 8$; $t_p = 575\ \mu s$.

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



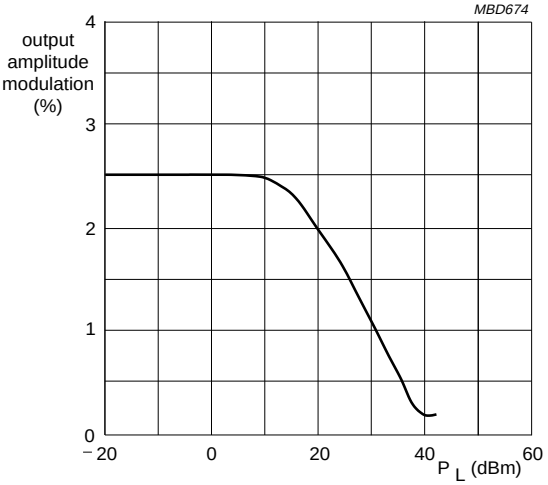
$Z_S = Z_L = 50\ \Omega$; $V_{S1} = V_{S2} = 12.5$ V; $V_C = 4$ V; $T_{mb} = 25\ °C$; $\delta = 1 : 8$; $t_p = 575\ \mu s$.

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



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

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



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

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

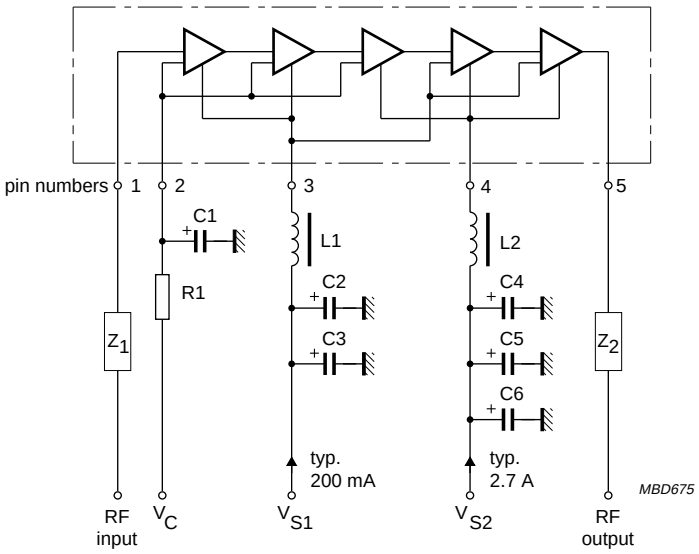


Fig.10 Test circuit.

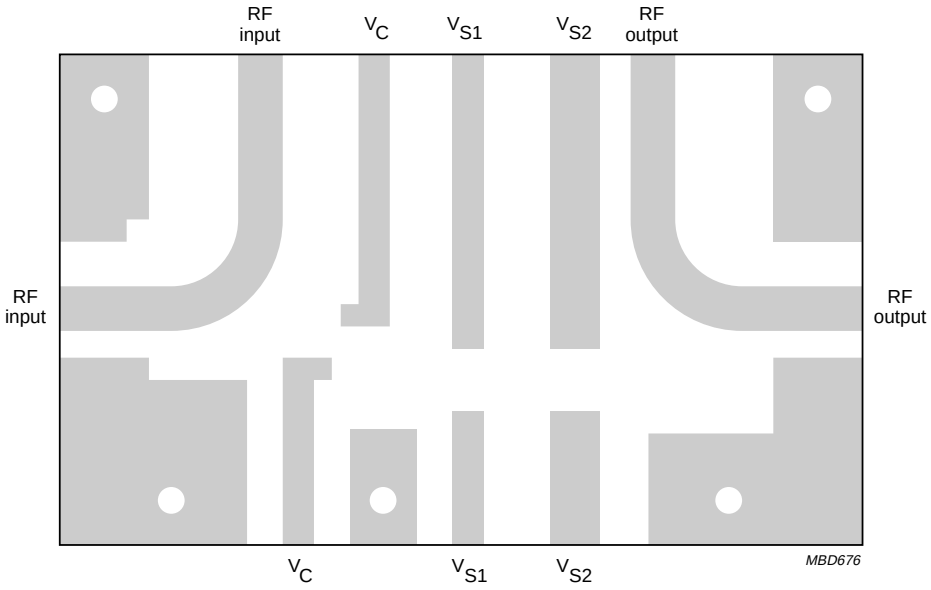


Fig.11 Printed-circuit board layout.

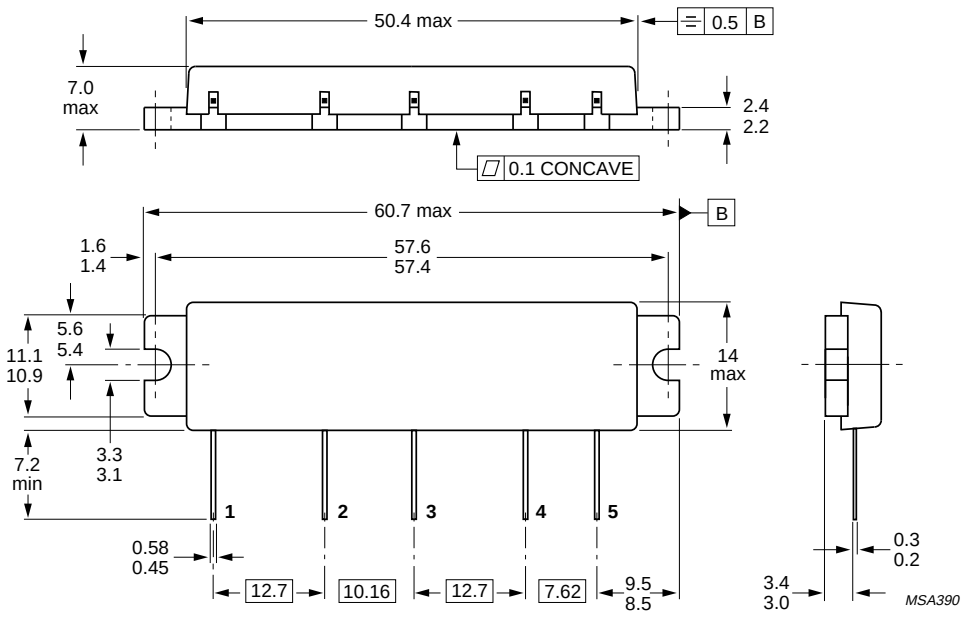
List of components (see Fig.10)

COMPONENT	DESCRIPTION	VALUE	CATALOGUE NO.
C1	tantalum capacitor; note 1	560 pF	–
C2, C4	tantalum capacitor; note 1	2.2 μF	–
C3, C5	electrolytic capacitor; note 1	22 μF	–
C6	electrolytic capacitor; note 1	220 μF	–
L1, L2	RF choke, 0.5 turn 0.8 mm copper wire on grade 3B core	1 μH	4330 030 32221
Z_1, Z_2	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 ($\varepsilon = 2.2$); thickness $^1/_{16}$ inch.

PACKAGE OUTLINE



Dimensions in mm.

Fig.12 SOT278A.

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.	

LIFE SUPPORT APPLICATIONS

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