VHF amplifier modules BGY132; BGY133

FEATURES

- Broadband VHF amplifiers
- 18 W output power
- Operate directly from 12 V vehicle electrical systems
- Output power control over a 10 dB range by drive power.

DESCRIPTION

The BGY132 and BGY133 are two stage amplifier modules. Each module comprises two NPN silicon planar transistor chips together with lumped-element matching components.

APPLICATIONS

- Mobile communication equipment.

PINNING - SOT132B

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

Fig.1 Simplified outline.

QUICK REFERENCE DATA

RF performance at T_{mb} = 25 °C.

TYPE NUMBER	MODE OF OPERATION	f (MHz)	V_{S1}; V_{S2} (V)	P_L (W)	G_p (dB)	η (%)	Z_S; Z_L (Ω)
BGY132	CW	68 to 88	12.5	≥18	≥22.6	typ. 45	50
BGY133	CW	80 to 108	12.5	≥18	≥22.6	typ. 45	50

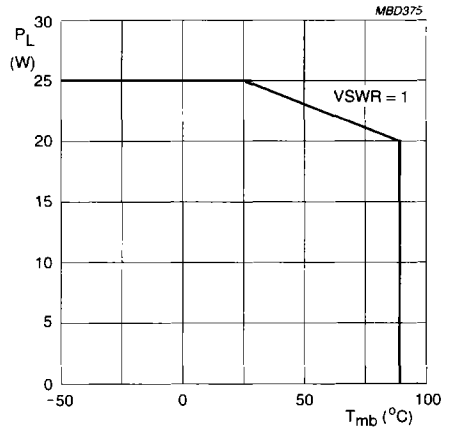
WARNING

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	MIN.	MAX.	UNIT
V_{S1}	DC supply voltage	–	15.6	V
V_{S2}	DC supply voltage	–	15.6	V
V_i	RF input terminal voltage	–	25	V
V_o	RF output terminal voltage	–	25	V
P_D	input drive power	–	200	mW
P_L	load power	–	25	W
T_{stg}	storage temperature	−40	+100	°C
T_{mb}	operating mounting base temperature	−20	+90	°C



$V_{S1} = V_{S2} = 12.5$ V.

Fig.2 Power derating curve.

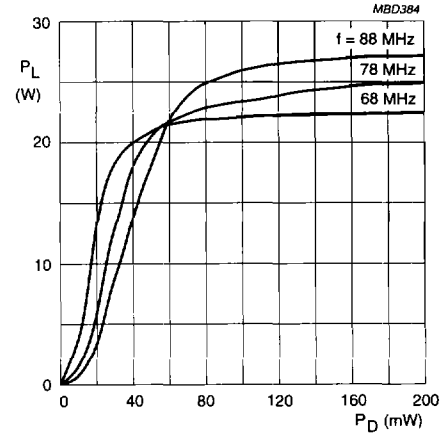
CHARACTERISTICS

T_{mb} = 25 °C; $Z_S = Z_L$ = 50 Ω; P_D = 100 mW; $V_{S1} = V_{S2}$ = 12.5 V; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f	frequency					
	BGY132		68	–	88	MHz
	BGY133		80	–	108	MHz
I_{Q2}	leakage current	V_{S1} = 0; P_D = 0	–	–	10	mA
P_L	load power		18	–	–	W
G_p	power gain	P_L = 18 W; note 1	22.6	–	–	dB
η	efficiency	P_L = 18 W; note 1	38	45	–	%
H_2	second harmonic	P_L = 18 W; note 1	–	–	−25	dBc
H_3	third harmonic	P_L = 18 W; note 1	–	–	−25	dBc
$VSWR_{in}$	input VSWR	P_L = 18 W; note 1	–	1.5 : 1	3 : 1	
	stability	VSWR ≤ 3 : 1; P_L = 2 to 20 W; $V_{S1} = V_{S2}$ = 10.8 to 15.6 V; note 1	–	–	−60	dBc
	ruggedness	VSWR = 50 : 1; $V_{S1} = V_{S2}$ = 15.6 V; P_L < 25 W during 1 minute; note 1	no degradation			

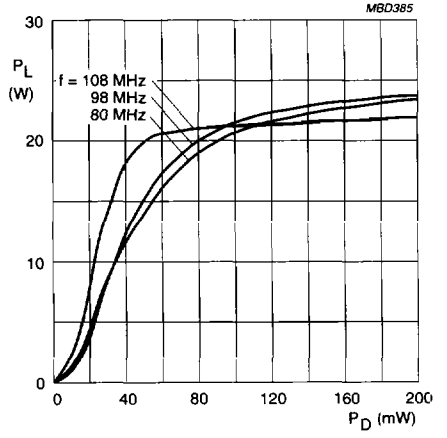
Note

1. Adjust P_D for specified P_L.



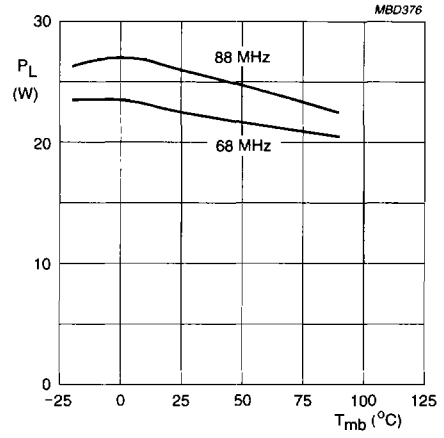
$Z_S = Z_L$ = 50 Ω.
$V_{S1} = V_{S2}$ = 12.5 V.
T_{mb} = 25 °C.

Fig.3 Load power as a function of drive power; BGY132; typical values.



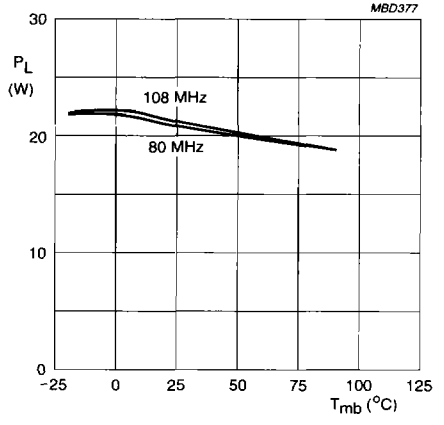
$Z_S = Z_L$ = 50 Ω.
$V_{S1} = V_{S2}$ = 12.5 V.
T_{mb} = 25 °C.

Fig.4 Load power as a function of drive power; BGY133; typical values.



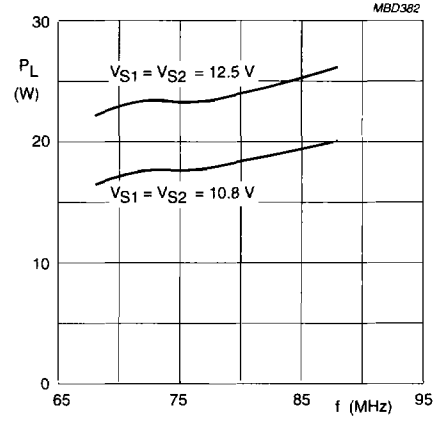
$Z_S = Z_L = 50\ \Omega$.
$P_D = 100$ mW.
$V_{S1} = V_{S2} = 12.5$ V.

Fig.5 Load power as a function of mounting base temperature; BGY132; typical values.



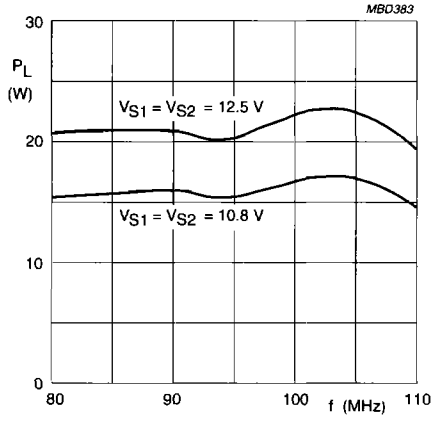
$Z_S = Z_L = 50\ \Omega$.
$P_D = 100$ mW.
$V_{S1} = V_{S2} = 12.5$ V.

Fig.6 Load power as a function of mounting base temperature; BGY133; typical values.



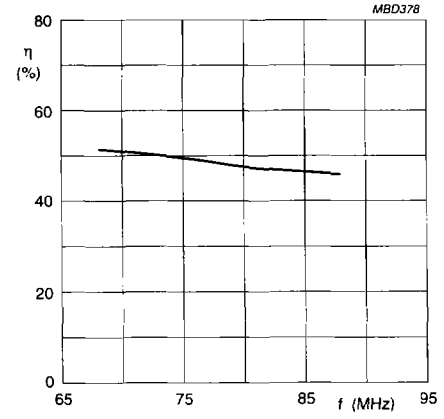
$Z_S = Z_L = 50\ \Omega$.
$P_D = 100$ mW.
$T_{mb} = 25$ °C.

Fig.7 Load power as a function of frequency; BGY132; typical values.



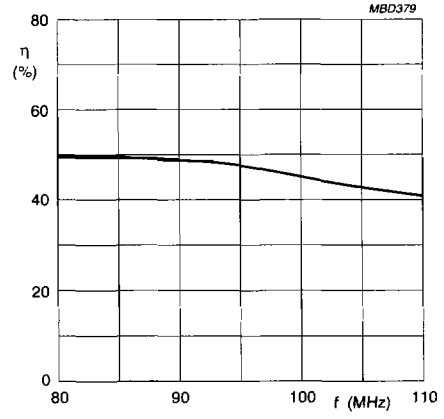
$Z_S = Z_L = 50\ \Omega$.
$P_D = 100$ mW.
$T_{mb} = 25$ °C.

Fig.8 Load power as a function of frequency; BGY133; typical values.



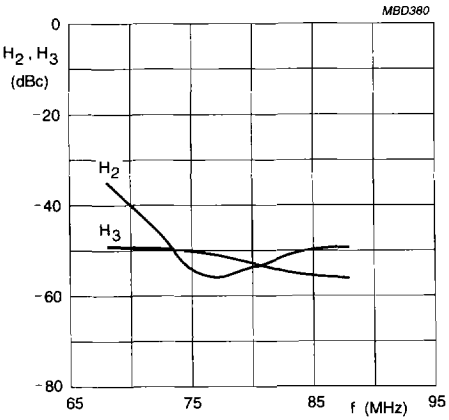
$Z_S = Z_L = 50\ \Omega$.
$P_D = 100$ mW.
$V_{S1} = V_{S2} = 12.5$ V.
$T_{mb} = 25\ ^\circ$C.
$P_L = 18$ W.

Fig.9 Efficiency as a function of frequency; BGY132; typical values.



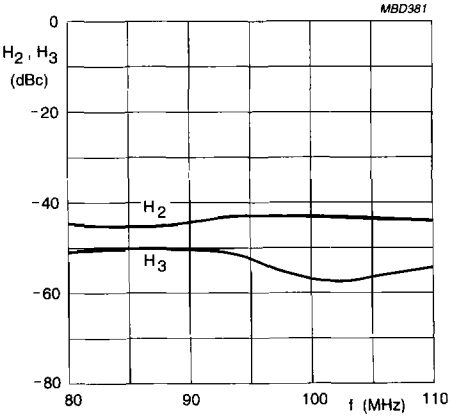
$Z_S = Z_L = 50\ \Omega$.
$P_D = 100$ mW.
$V_{S1} = V_{S2} = 12.5$ V.
$T_{mb} = 25\ ^\circ$C.
$P_L = 18$ W.

Fig.10 Efficiency as a function of frequency; BGY133; typical values.



$Z_S = Z_L = 50\ \Omega$.
$P_D = 100$ mW.
$V_{S1} = V_{S2} = 12.5$ V.
$T_{mb} = 25\ ^\circ$C.
$P_L = 18$ W.

Fig.11 Harmonics as functions of frequency; BGY132; typical values.



$Z_S = Z_L = 50\ \Omega$.
$P_D = 100$ mW.
$V_{S1} = V_{S2} = 12.5$ V.
$T_{mb} = 25\ ^\circ$C.
$P_L = 18$ W.

Fig.12 Harmonics as functions of frequency; BGY133; typical values.

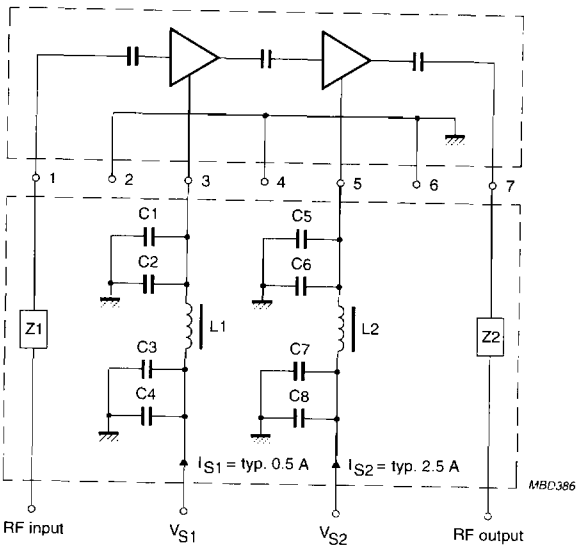


Fig.13 Test circuit.

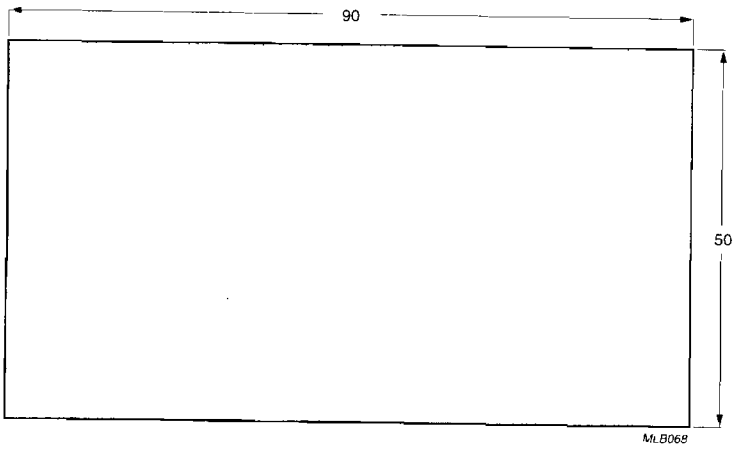


Fig.14 Printed-circuit board layout.

List of components (see Fig.13)

COMPONENT	DESCRIPTION	VALUE	CATALOGUE NO.
C1, C5	multilayer ceramic chip capacitor	1 nF	4822 590 06614
C2, C6	tantalum capacitor	6.8 μF; 35 V	2022 001 00067
C3, C7	multilayer ceramic chip capacitor	10 nF	2222 852 47103
C4, C8	multilayer ceramic chip capacitor	100 nF	2222 852 47104
L1, L2	1 turn 0.5 mm Cu wire on ferrite coil	1 μH	3122 108 20153
Z1, Z2	stripline; note 1	50 Ω	

Note

1. The striplines are on a double copper-clad printed-circuit board with epoxy dielectric ($\varepsilon_r = 4.7$); thickness $1/16$ inch.