VHF power amplifier module — BGY143

FEATURES

- 12.5 V nominal supply voltage
- 13 W output power.

APPLICATIONS

- Mobile communication equipment operating directly from 12 V vehicle electrical systems.

DESCRIPTION

The BGY143 is a two-stage broadband RF amplifier module in a SOT132B package. The module consists of two NPN transistor dies together with lumped-element matching components.

PINNING - SOT132B

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

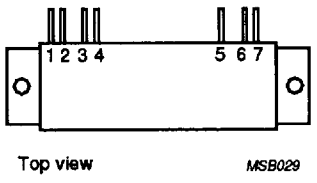


Fig.1 Simplified outline.

QUICK REFERENCE DATA

RF performance at T_h = 25 °C.

MODE OF OPERATION	f (MHz)	V_{S1}; V_{S2} (V)	P_D (mW)	P_L (W)	η (%)	Z_S; Z_L (Ω)
CW	146 to 174	12.5	150	≥13	typ. 48	50

WARNING

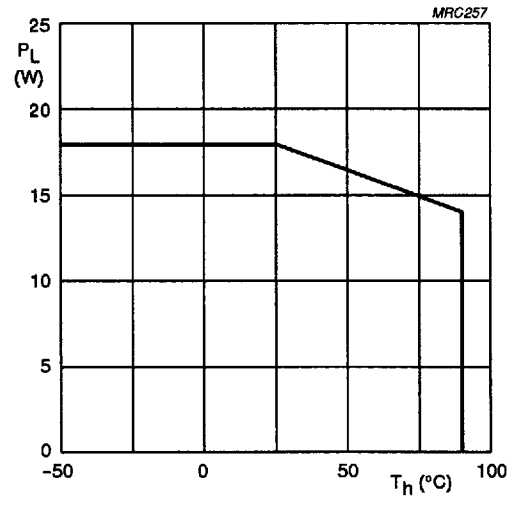
Product and environmental safety - toxic materials

This product contains beryllium oxide. The product is entirely safe provided that the BeO inserts are 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 voltage	–	25	V
V_o	RF output voltage	–	25	V
P_D	input drive power	–	300	mW
P_L	load power	–	18	W
T_{stg}	storage temperature	−40	+100	°C
T_h	heatsink operating temperature	−20	+90	°C



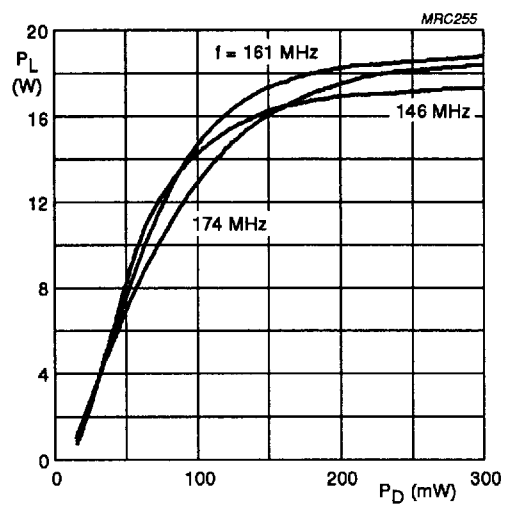
$V_{S1} = V_{S2} \leq 12.5$ V; VSWR = 1.

Fig.2 Load power derating curve.

CHARACTERISTICS

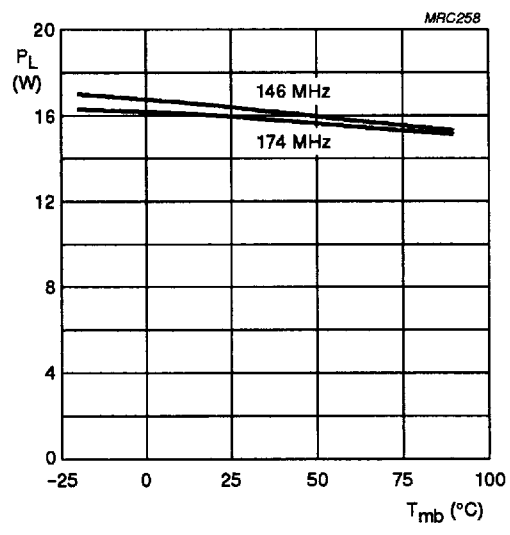
$Z_S = Z_L = 50\ \Omega$; $P_D = 150$ mW; $V_{S1} = V_{S2} = 12.5$ V; $T_h = 25$ °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f	frequency		146	–	174	MHz
I_{Q2}	leakage current	$V_{S1} = 0$; $P_D = 0$	–	–	10	mA
P_L	load power		13	–	–	W
η	efficiency	adjust P_D for $P_L = 13$ W	40	48	–	%
H_2	second harmonic	adjust P_D for $P_L = 13$ W	–	–34	–25	dBc
H_3	third harmonic	adjust P_D for $P_L = 13$ W	–	–34	–25	dBc
$VSWR_{in}$	input VSWR	adjust P_D for $P_L = 13$ W	–	1.5	3	
	stability	$V_{S1} = V_{S2} = 10.8$ to 15.6 V; $P_L = 1$ to 15 W; VSWR = 3 : 1	–	–	–60	dBc
	ruggedness	$P_D \leq 300$ mW; $V_{S1} = V_{S2} = 15.6$ V duration 5 s; $P_L < 18$ W; VSWR = 50 : 1	no degradation			



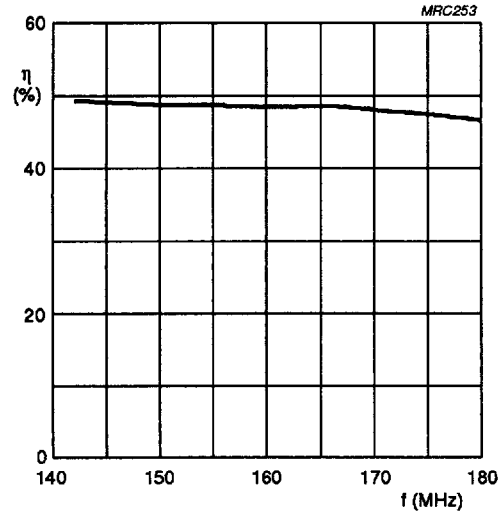
$V_{S1} = V_{S2} = 12.5$ V.

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



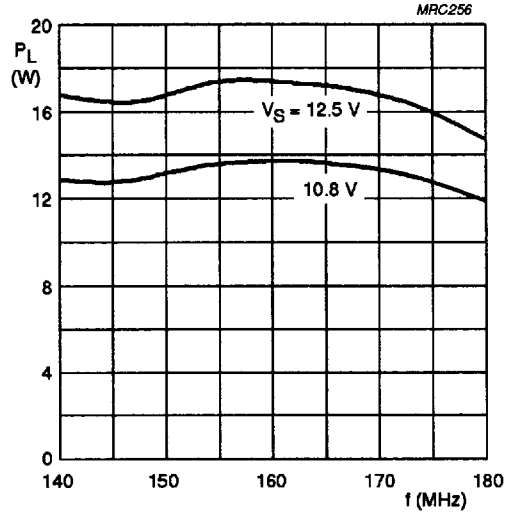
$P_D = 150$ mW; $V_{S1} = V_{S2} = 12.5$ V.

Fig.4 Load power as a function of mounting base temperature; typical values.



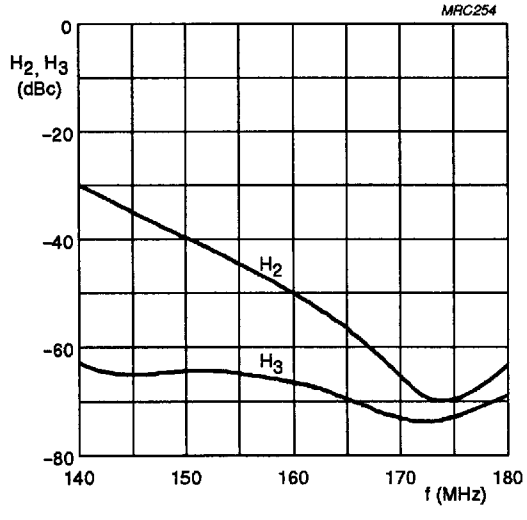
$V_{S1} = V_{S2} = 12.5$ V; $P_L = 13$ W.

Fig.5 Efficiency as a function of frequency; typical values.



$P_D = 150$ mW.

Fig.6 Load power as a function of frequency; typical values.



$V_{S1} = V_{S2} = 12.5$ V; $P_L = 13$ W.

Fig.7 Harmonics as functions of frequency; typical values.

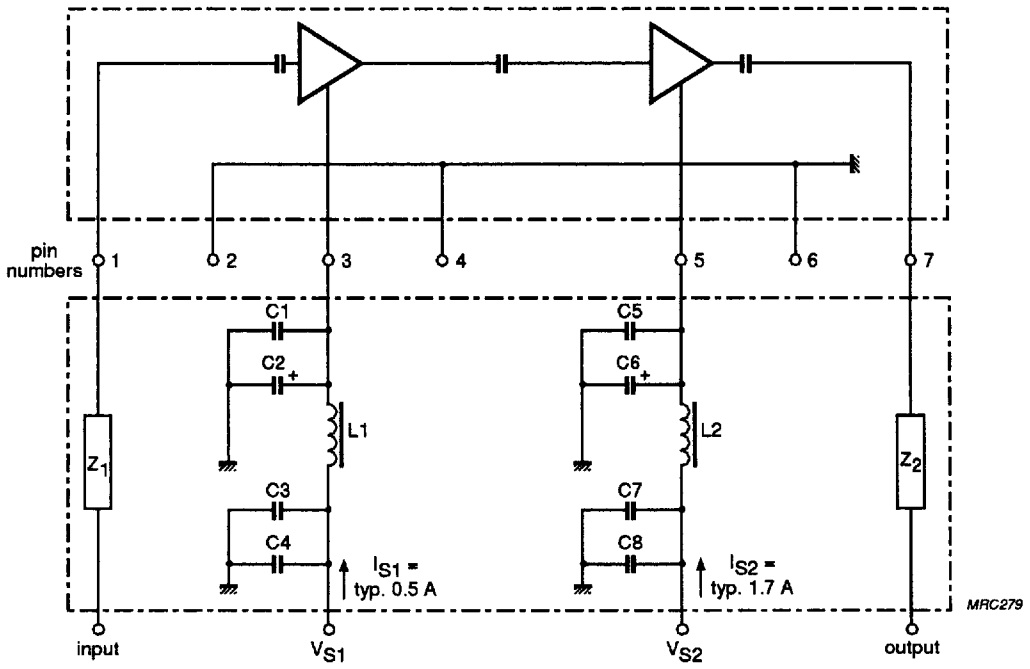
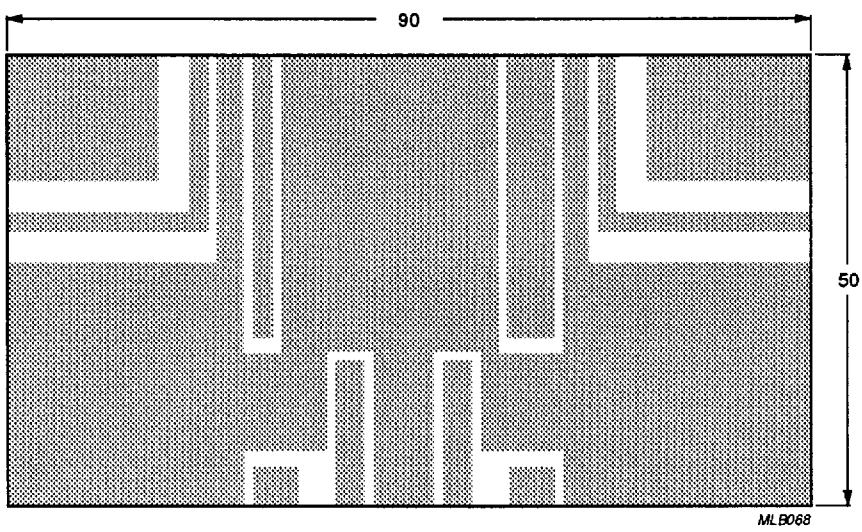


Fig.8 Test circuit.



Dimensions in mm.

Fig.9 Printed-circuit board layout.

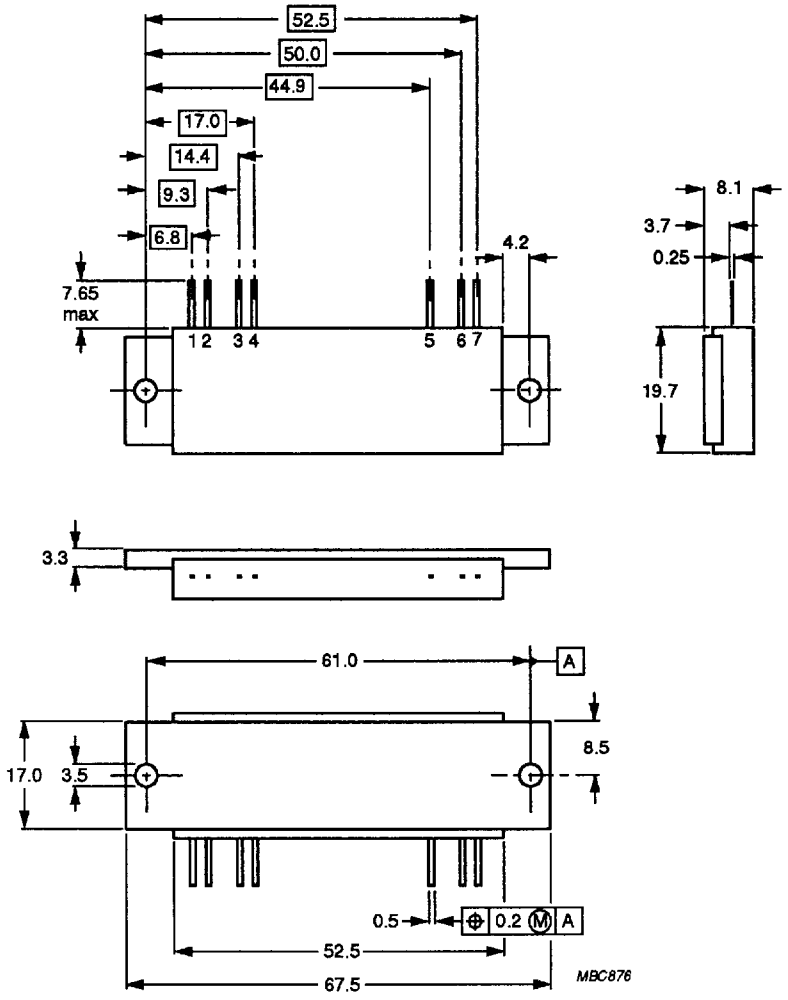
List of components used in test circuit (see Fig.8)

COMPONENT	DESCRIPTION	VALUE	CATALOGUE NO
C1, C5	multilayer chip capacitor	1 nF	4822 590 06614
C2, C6	tantalum capacitor	6.8 μF, 35 V	2022 001 00067
C3, C7	multilayer chip capacitor	10 nF	2222 852 47103
C4, C8	multilayer chip capacitor	100 nF	2222 852 47104
L1, L2	1 turn 0.5 mm copper wire on ferrite coil	1 μH	3122 108 20153
Z_1, Z_2	stripline; note 1	50 Ω	

Note

1. The striplines are on a double copper-clad printed-circuit board, with epoxy dielectric (ε_r = 4.7), thickness $^1/_{16}$ inch.

PACKAGE OUTLINE



Dimensions in mm.

Fig.10 SOT132B.