DATA SHEET

BGY110D; BGY110E; BGY110F; BGY110G
UHF amplifier modules

Product specification
Supersedes data of May 1992
File under Discrete Semiconductors, SC09

1996 May 06

Philips Semiconductors

PHILIPS

UHF amplifier modules

BGY110D; BGY110E; BGY110F; BGY110G

FEATURES

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

APPLICATIONS

- Hand-held transmitting equipment operating in the 824 to 849 MHz, 872 to 905 MHz, 890 to 915 MHz and 902 to 928 MHz frequency ranges.

DESCRIPTION

The BGY110D, 110E, 110F and 110G are four-stage UHF amplifier modules in a SOT246 package. Each module consists of four NPN silicon planar transistor chips, mounted together with matching and bias circuit components on a metallized ceramic substrate.

PINNING - SOT246

PIN	DESCRIPTION
1	RF input/V_C
2	V_{S1}
3	V_{S2}
4	V_{S3}
5	RF output
Flange	ground

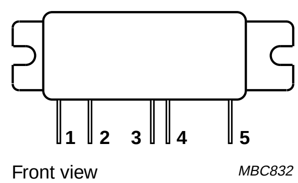

Fig.1 Simplified outline.

QUICK REFERENCE DATA

RF performance at T_{mb} = 25 °C.

TYPE NUMBER	MODE OF OPERATION	f (MHz)	V_S (V)	V_C (V)	P_L (W)	G_P (dB)	η (%)	Z_S; Z_L (Ω)
BGY110D	CW	824 to 849	7.2	4.5	1.7	≥32.3	≥39	50
BGY110E	CW	872 to 905	7.2	4.5	1.7	≥32.3	≥39	50
BGY110F	CW	890 to 915	7.2	4.5	1.7	≥32.3	≥39	50
BGY110G	CW	902 to 928	7.2	4.5	1.7	≥32.3	≥39	50

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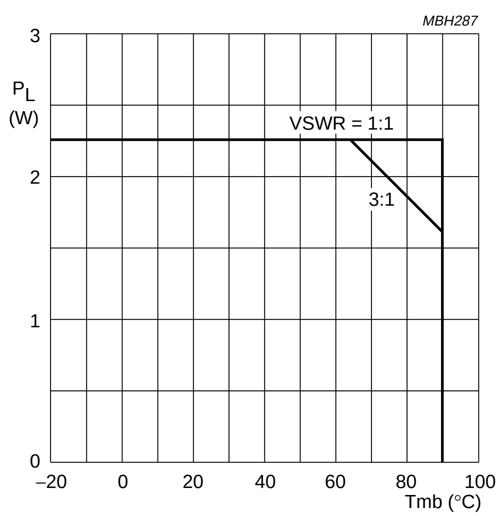
LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_{S1}	DC supply voltage	–	10	V
V_{S2}	DC supply voltage	–	10	V
V_{S3}	DC supply voltage	–	10	V
V_C	DC control voltage	–	4.5	V
$+V_o$	RF output terminal voltage	–	25	V
P_D	input drive power	–	3	mW
P_L	load power	–	2.25	W
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	mounting base temperature	–	90	°C



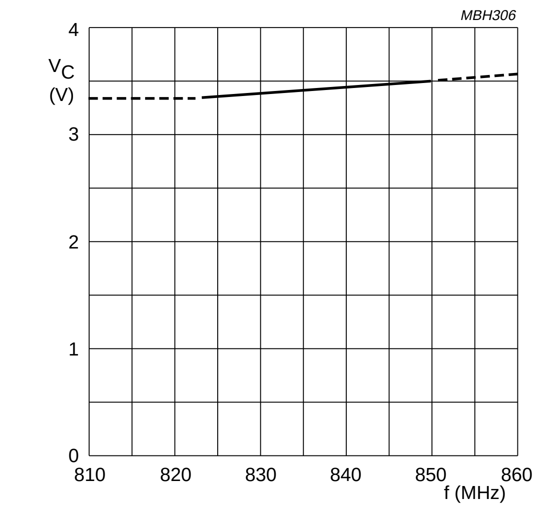
$V_{S1} = V_{S2} = V_{S3} = 9$ V max.

Fig.2 Power derating curve.

CHARACTERISTICS

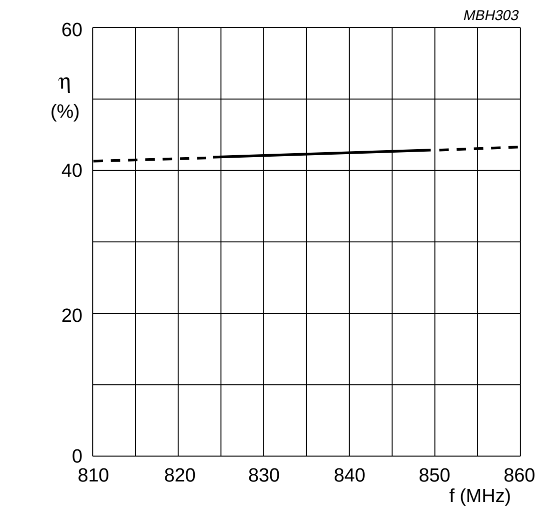
$Z_S = Z_L = 50\ \Omega$; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $V_C = 4.5$ V; $T_{mb} = 25$ °C; unless otherwise specified.4

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f	frequency					
	BGY110D		824	–	849	MHz
	BGY110E		872	–	905	MHz
	BGY110F		890	–	915	MHz
	BGY110G		902	–	928	MHz
I_{C2}	leakage current	$V_{S1} = V_C = 0$	–	–	100	μA
I_{C3}	leakage current	$V_{S1} = V_C = 0$	–	–	100	μA
P_L	load power	$P_D = 1$ mW	1.7	–	–	W
η	efficiency	$P_L = 1.7$ W	39	–	–	%
H_2	second harmonic	$P_L = 1.7$ W	–	–	–40	dB
H_3	third harmonic	$P_L = 1.7$ W	–	–	–45	dB
$VSWR_{in}$	input VSWR	$P_L = 1.7$ W	–	–	2:1	
ΔG_p	gain control	$V_C = 0$ to 4.5 V; $P_D = 1$ mW	30	–	–	dB
P_L	output switching power	$V_{S1} = V_C = 0$; $P_D = 1$ mW	–	–	–20	dBm
	stability	$P_D = 0.5$ to 2 mW; $V_{S1} = V_{S2} = V_{S3} = 6$ to 9 V; $V_C = 0$ to 4.5 V; $P_L \leq 2$ W; VSWR ≤ 6 : 1	–	–	–60	dBc
P_n	noise power	30 kHz bandwidth; $P_L = 1.7$ W; 45 MHz above f_o	–	–84	–80	dBm
	ruggedness	$P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 9$ V; $P_L \leq 1.8$ W; VSWR =10 : 1 through all phases;		no degradation		



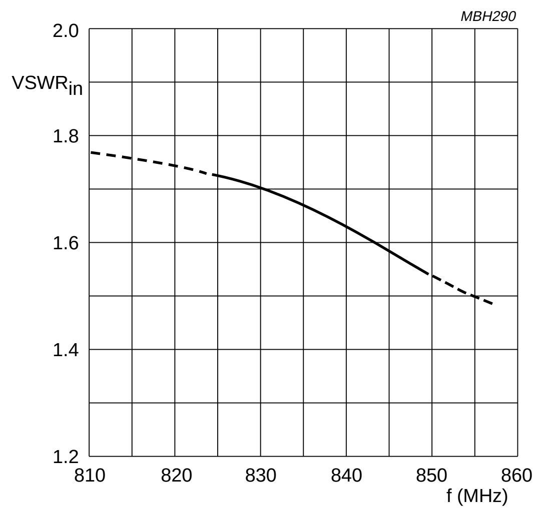
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25$ °C.

Fig.3 Control voltage as a function of frequency; BGY110D; typical values.



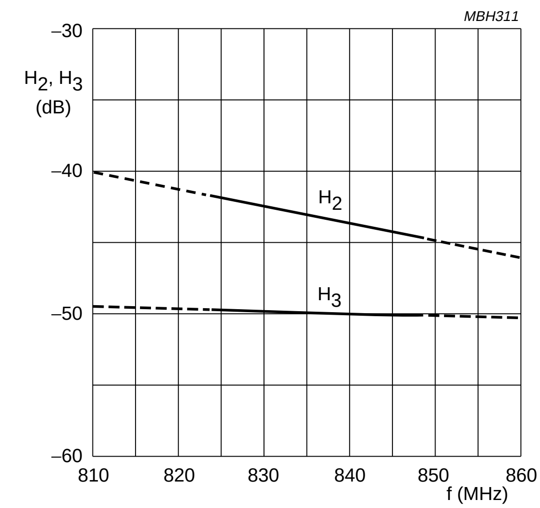
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25$ °C.

Fig.4 Efficiency as a function of frequency; BGY110D; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25$ °C.

Fig.5 Input VSWR as a function of frequency; BGY110D; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25$ °C.

Fig.6 Harmonics as a function of frequency; BGY110D; typical values.

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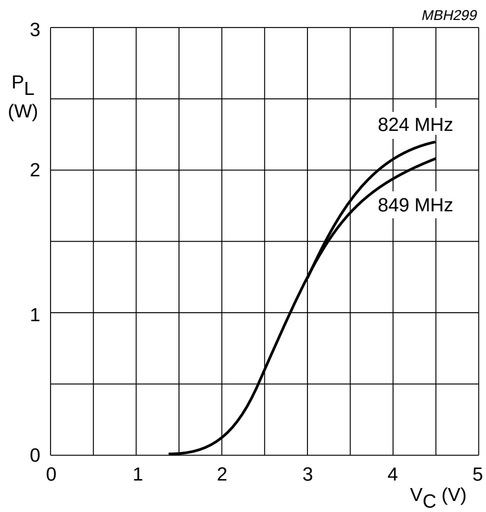
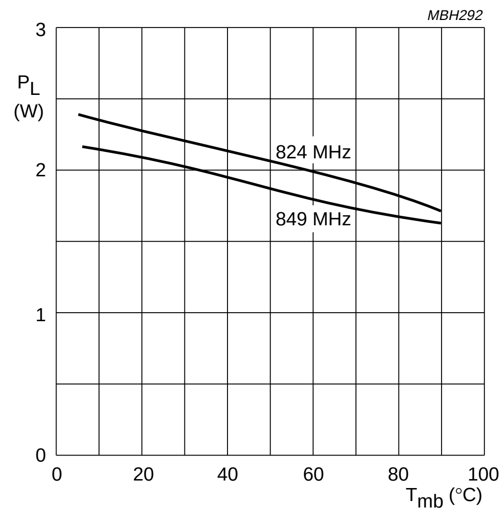


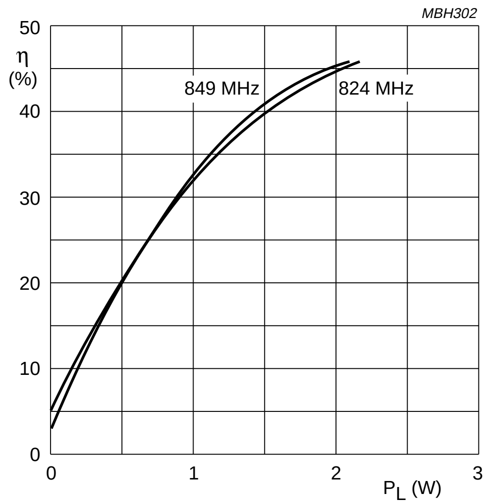
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $T_{mb} = 25$ °C.

Fig.7 Load power as a function of control voltage; BGY110D; typical values.



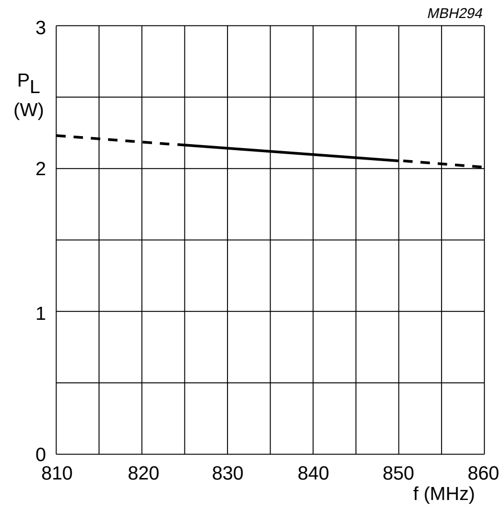
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $V_C = 4.5$ V.

Fig.8 Load power as a function of mounting base temperature; BGY110D; typical values.



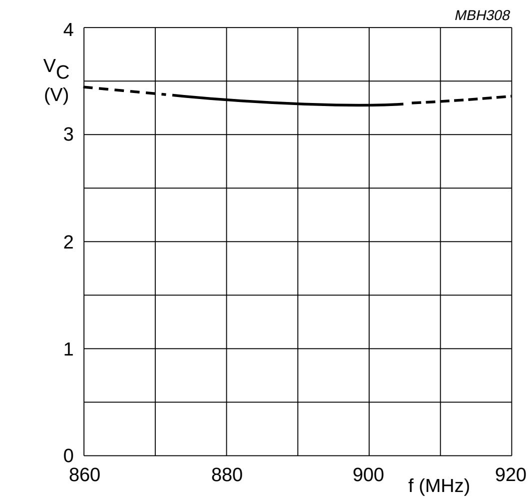
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $T_{mb} = 25$ °C.

Fig.9 Efficiency as a function of load power; BGY110D; typical values.



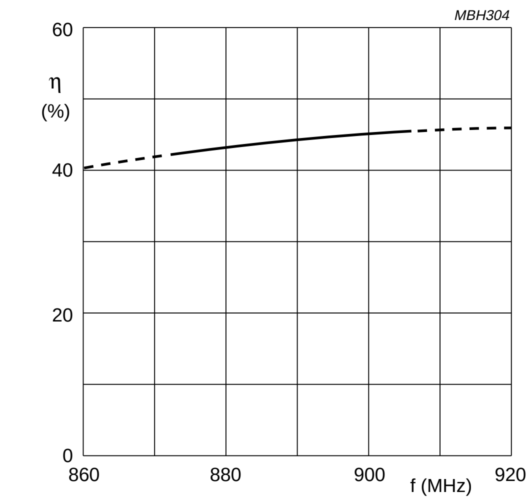
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $V_C = 4.5$ V; $T_{mb} = 25$ °C.

Fig.10 Load power as a function of frequency; BGY110D; typical values.



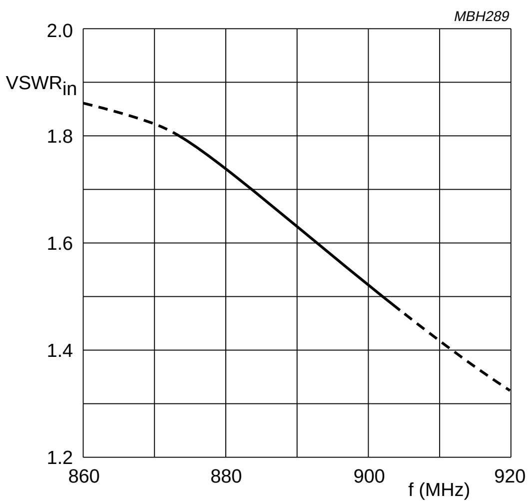
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25$ °C.

Fig.11 Control voltage as a function of frequency; BGY110E; typical values.



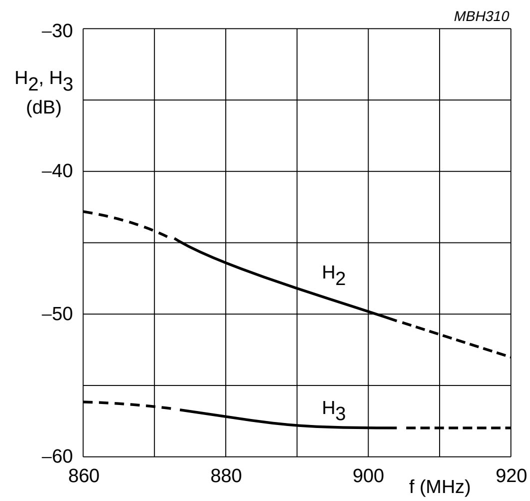
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25$ °C.

Fig.12 Efficiency as a function of frequency; BGY110E; typical values.



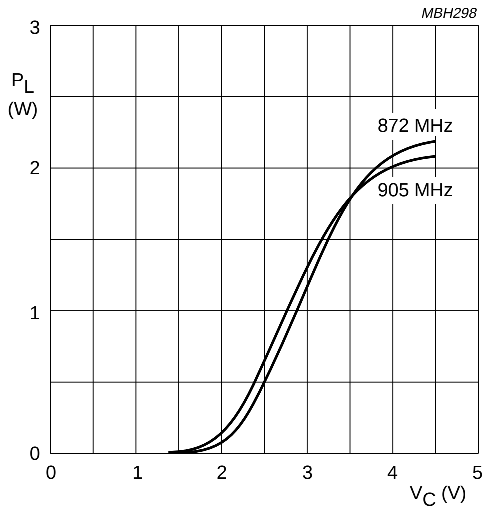
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25$ °C.

Fig.13 Input VSWR as a function of frequency; BGY110E; typical values.



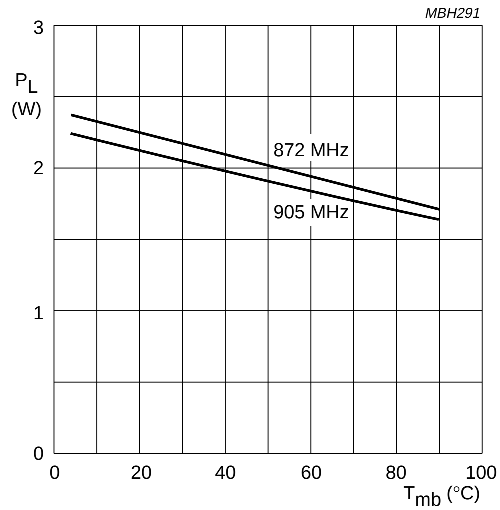
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25$ °C.

Fig.14 Harmonics as a function of frequency; BGY110E; typical values.



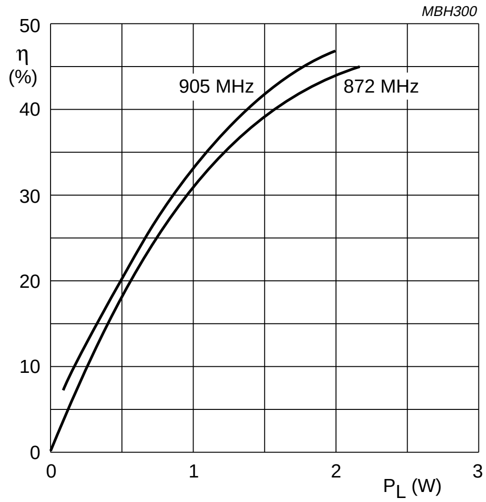
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $T_{mb} = 25$ °C.

Fig.15 Load power as a function of control voltage; BGY110E; typical values.



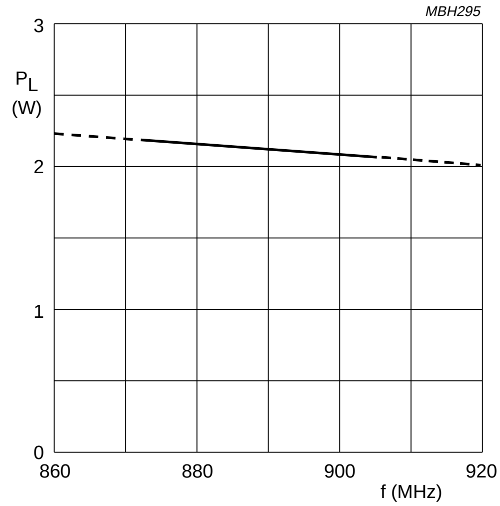
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $V_C = 4.5$ V.

Fig.16 Load power as a function of mounting base temperature; BGY110E; typical values.



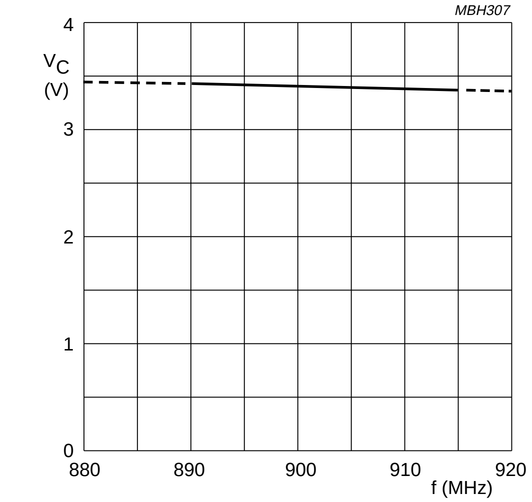
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $T_{mb} = 25$ °C.

Fig.17 Efficiency as a function of load power; BGY110E; typical values.



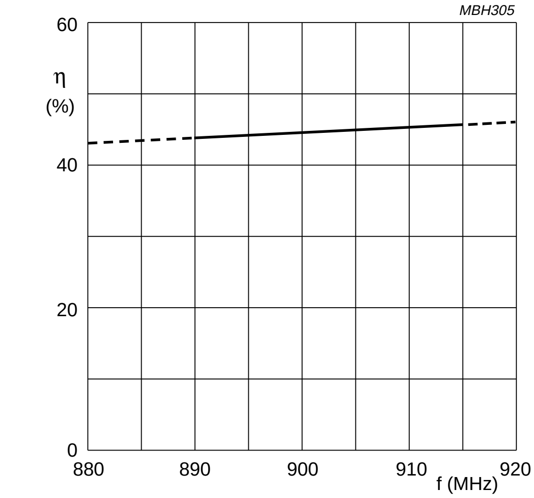
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $V_C = 4.5$ V; $T_{mb} = 25$ °C.

Fig.18 Load power as a function of frequency; BGY110E; typical values.



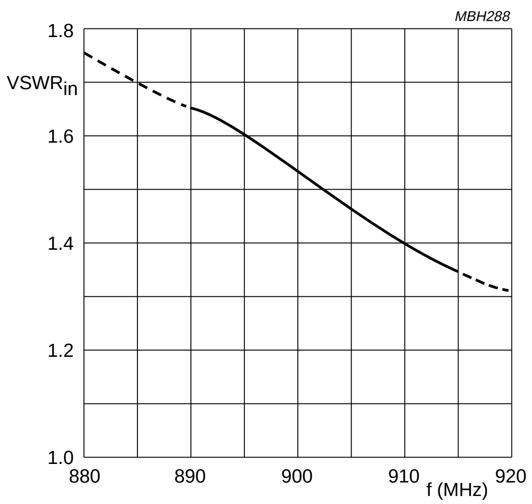
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25$ °C.

Fig.19 Control voltage as a function of frequency; BGY110F; typical values.



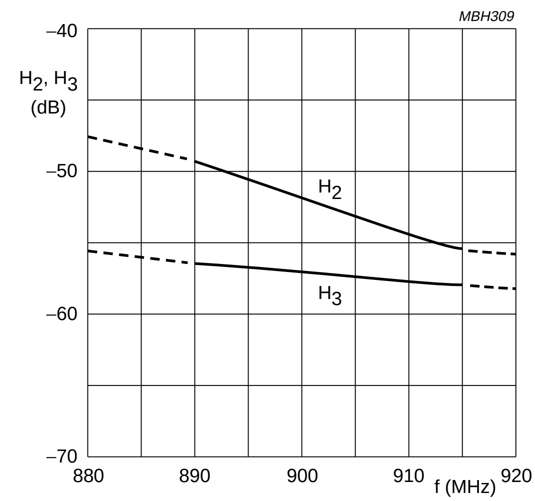
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25$ °C.

Fig.20 Efficiency as a function of frequency; BGY110F; typical values.



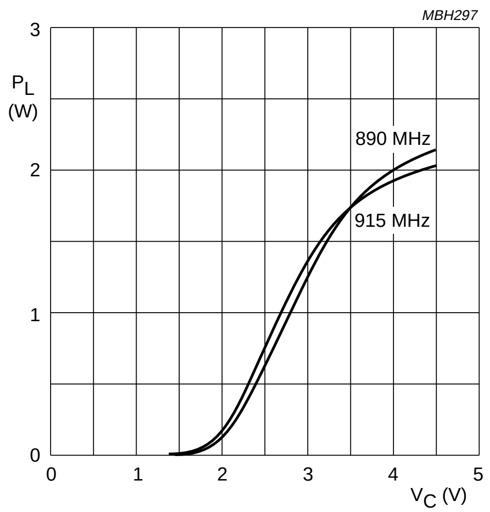
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25$ °C.

Fig.21 Input VSWR as a function of frequency; BGY110F; typical values.



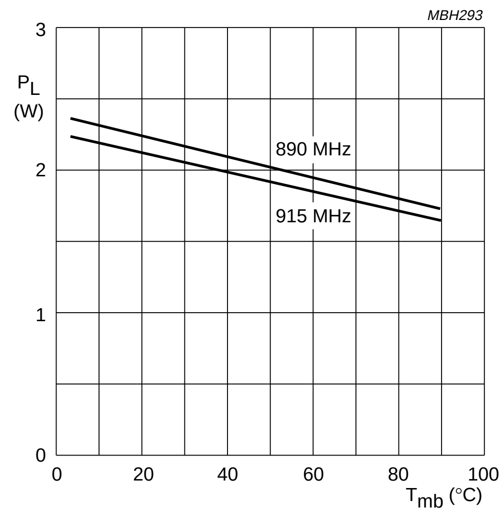
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25$ °C.

Fig.22 Harmonics as a function of frequency; BGY110F; typical values.



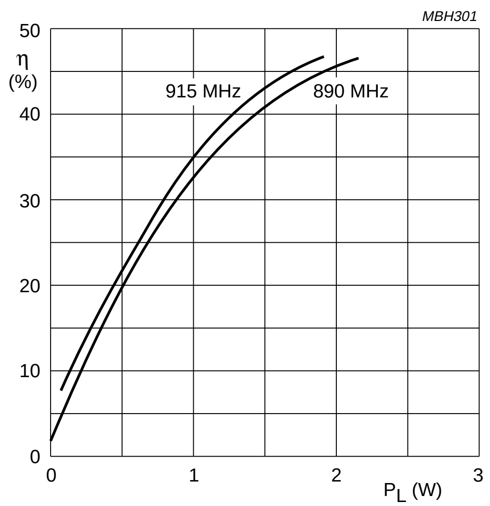
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $T_{mb} = 25$ °C.

Fig.23 Load power as a function of control voltage; BGY110F; typical values.



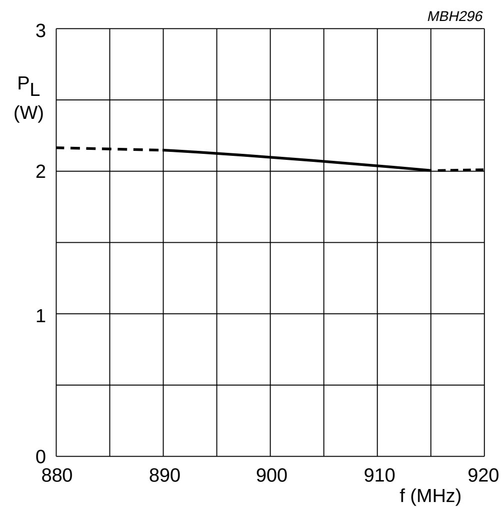
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $V_C = 4.5$ V.

Fig.24 Load power as a function of mounting base temperature; BGY110F; typical values.



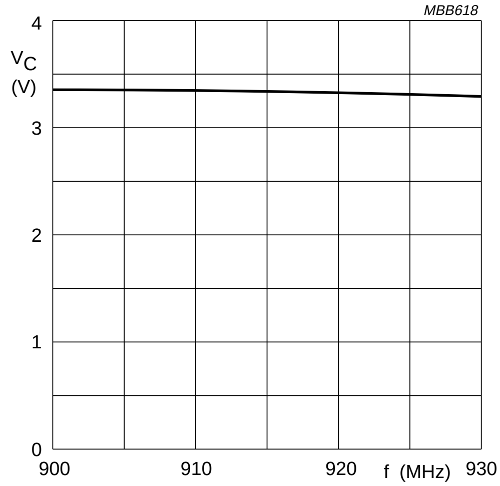
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $T_{mb} = 25$ °C.

Fig.25 Efficiency as a function of load power; BGY110F; typical values.



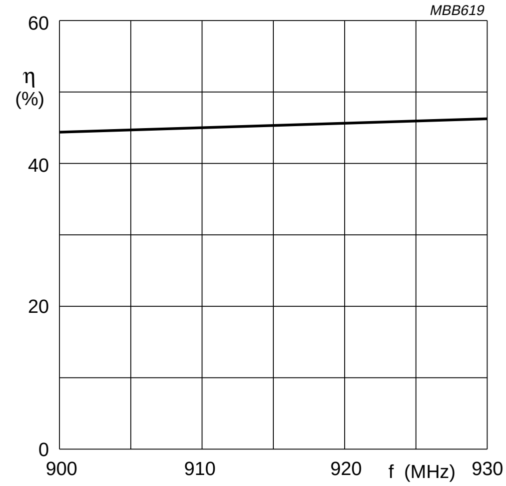
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $V_C = 4.5$ V; $T_{mb} = 25$ °C.

Fig.26 Load power as a function of frequency; BGY110F; typical values.



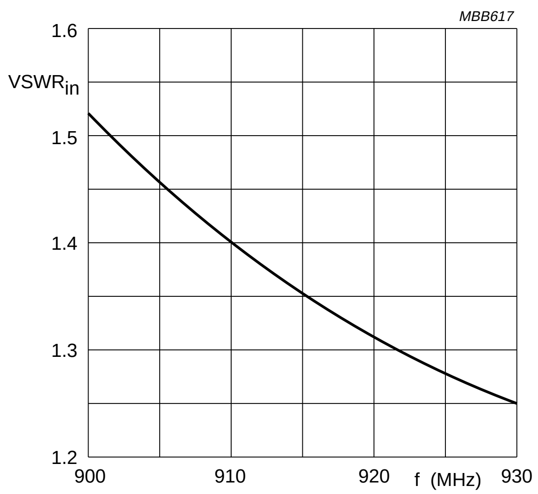
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25\ °C$.

Fig.27 Control voltage as a function of frequency; BGY110G; typical values.



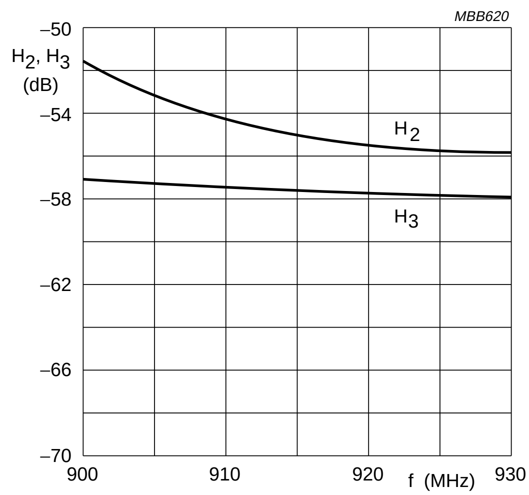
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25\ °C$.

Fig.28 Efficiency as a function of frequency; BGY110G; typical values.



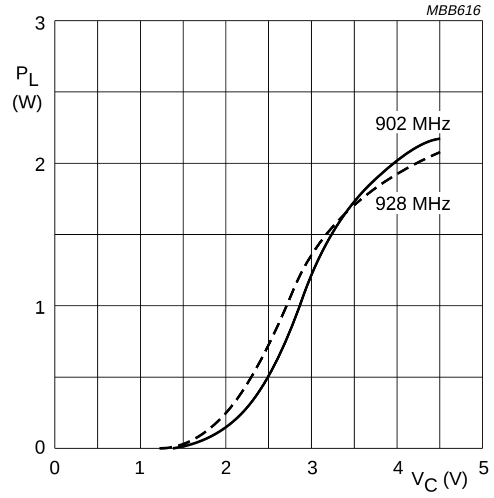
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25\ °C$.

Fig.29 Input VSWR as a function of frequency; BGY110G; typical values.



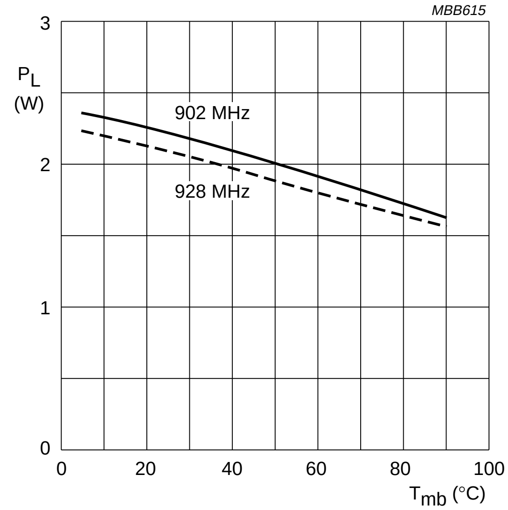
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $P_L = 1.7$ W; $T_{mb} = 25\ °C$.

Fig.30 Harmonics as a function of frequency; BGY110G; typical values.



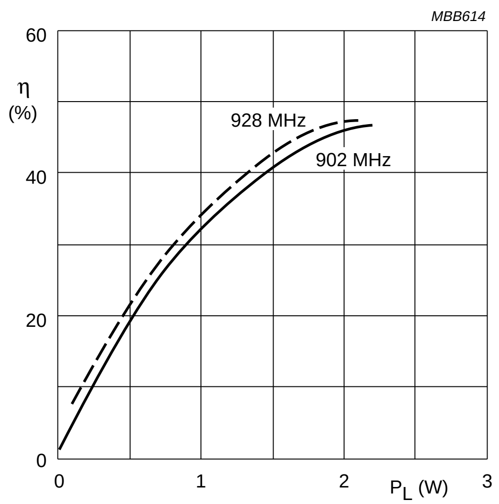
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $T_{mb} = 25$ °C.

Fig.31 Load power as a function of control voltage; BGY110G; typical values.



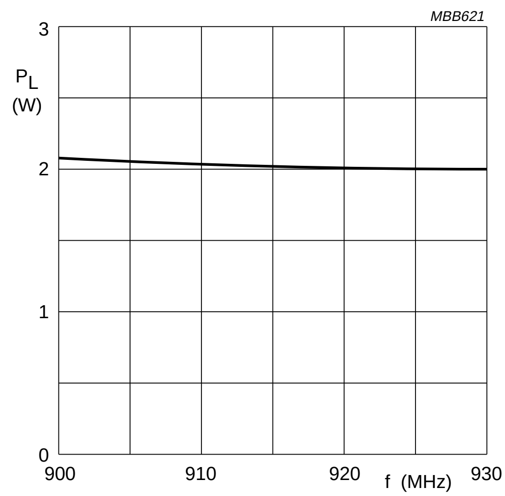
$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $V_C = 4.5$ V.

Fig.32 Load power as a function of mounting base temperature; BGY110G; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $T_{mb} = 25$ °C.

Fig.33 Efficiency as a function of load power; BGY110G; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_D = 1$ mW; $V_{S1} = V_{S2} = V_{S3} = 7.2$ V; $V_C = 4.5$ V; $T_{mb} = 25$ °C.

Fig.34 Load power as a function of frequency; BGY110G; typical values.

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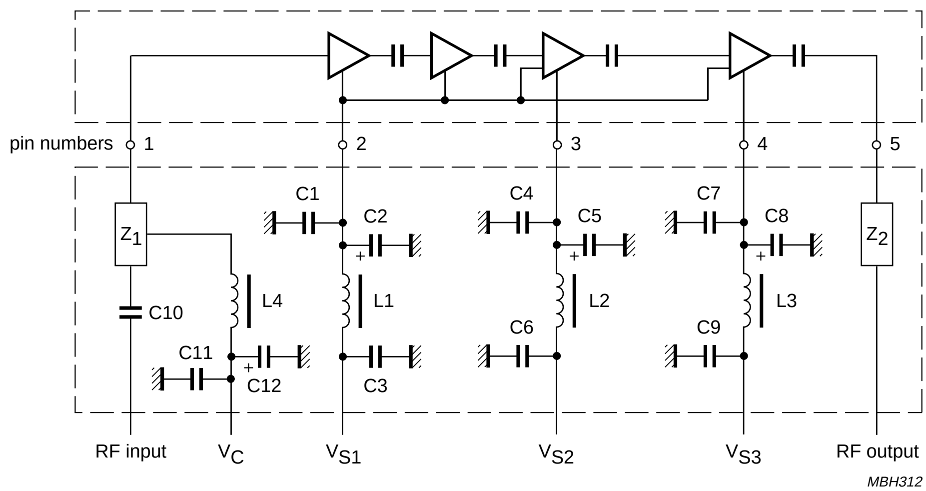


Fig.35 Test circuit.

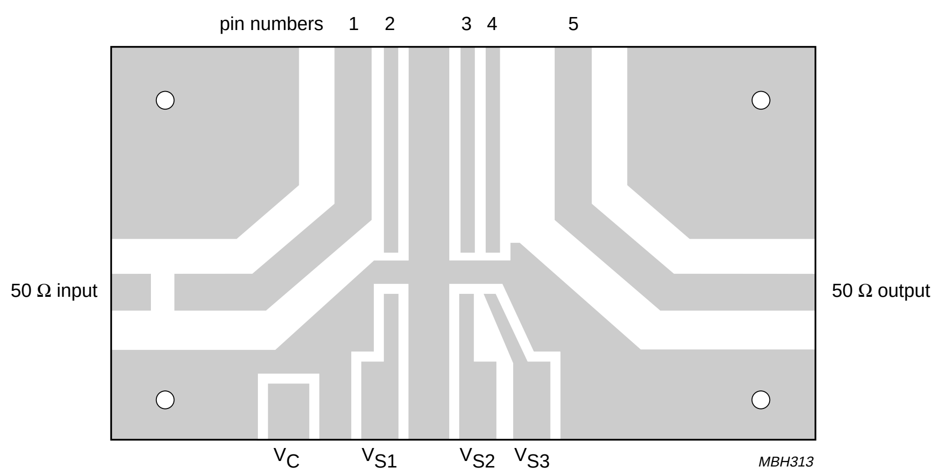


Fig.36 Printed circuit board test-fixture.

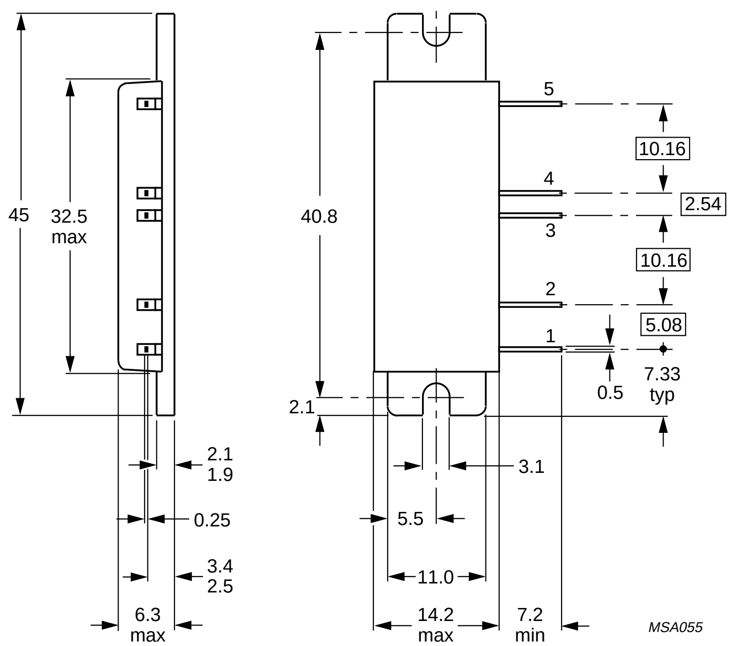
List of components (see Fig.35)

COMPONENT	DESCRIPTION	VALUE	DIMENSIONS	CATALOGUE NO.
C1, C4, C7	multilayer chip capacitor	100 nF		
C2, C5, C8	tantalum capacitor	2.2 μF		
C3, C6, C9	multilayer chip capacitor	33 pF		
C10, C11	multilayer chip capacitor	1 nF		
C12	tantalum capacitor	1 μF		
L1, L2, L3	RF choke, 1 turn copper wire on grade 3B core	22 μH	0.4 mm	4330 030 32221
L4	Ferroxcube coil	5 μH		3122 108 20153
Z_1, Z_2	stripline; note 1	50 Ω		

Note

1. The striplines are on double copper-clad printed circuit board with PTFE dielectric (ε_r = 2.2), thickness $^1/_{16}$ inch.

PACKAGE OUTLINE



Dimensions in mm.

Fig.37 SOT246.

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.
Short-form specification	The data in this specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.
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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