DATA SHEET

BGY115A; BGY115B; BGY115C/P; BGY115D
UHF amplifier modules

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

1996 May 13

Philips Semiconductors

PHILIPS

UHF amplifier modules

BGY115A; BGY115B; BGY115C/P; BGY115D

FEATURES

- 6 V nominal supply voltage1996 May 13
- 1.2 W output power (BGY115A, BGY115B and BGY115D)
- 1.4 W output power (BGY115C/P)
- Easy control of output power by DC voltage
- SMD outline.

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 BGY115A, BGY115B, BGY115C/P and BGY115D are three-stage UHF amplifier modules. Each module consists of three NPN silicon planar transistor chips mounted together with matching and bias circuit components on a metallized ceramic substrate.

PINNING - SOT321A

PIN	DESCRIPTION
1	RF input
2	V_C
3	V_S
4	RF output
Flange	ground

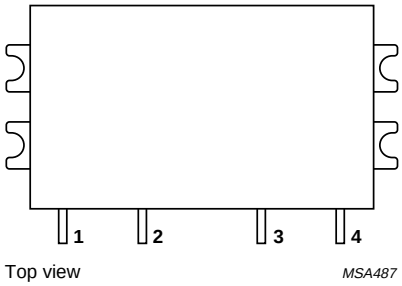


Fig.1 Simplified outline.

QUICK REFERENCE DATA

RF performance at T_{mb} = 25 °C.

TYPE NUMBER	MODE OF OPERATION	f (MHz)	V_S (V)	P_L (W)	G_p (dB)	η (%)	Z_S; Z_L (Ω)
BGY115A	CW	824 to 849	6	1.2	≥27.8	typ. 50	50
BGY115B	CW	872 to 905	6	1.2	≥27.8	typ. 50	50
BGY115C/P	CW	890 to 915	6	1.4	≥28.5	typ. 50	50
BGY115D	CW	902 to 928	6	1.2	≥27.8	typ. 50	50

LIMITING VALUES

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_S	DC supply voltage			
	BGY115A, BGY115B, BGY115D	–	8.5	V
	BGY115C/P	–	9	V
V_C	DC control voltage	–	4	V
P_D	input drive power	–	5	mW
P_L	load power			
	BGY115A, BGY115B, BGY115D	–	1.6	W
	BGY115C/P	–	1.8	W
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–30	+100	°C

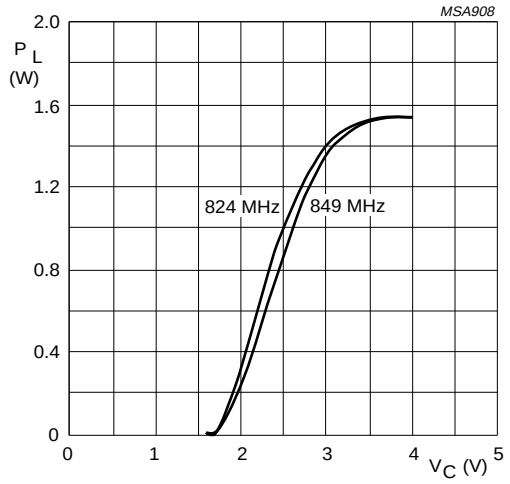
CHARACTERISTICS

$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $V_C \leq 3.5$ V; $T_{mb} = 25$ °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f	frequency					
	BGY115A		824	–	849	MHz
	BGY115B		872	–	905	MHz
	BGY115C/P		890	–	915	MHz
	BGY115D		902	–	928	MHz
I_Q	leakage current	$V_C = 0$; $P_D < -60$ dBm	–	–	100	μA
I_C	control current	note 1	–	–	500	μA
P_L	load power					
	BGY115A, BGY115B, BGY115D		1.2	–	–	W
	BGY115C/P		1.4	–	–	W
G_p	power gain	note 1				
	BGY115A, BGY115B, BGY115D		27.8	–	–	dB
	BGY115C/P		28.5	–	–	dB
η	efficiency	note 1	45	50	–	%
H_2	second harmonic	note 1	–	–	–40	dBc
H_3	third harmonic	note 1	–	–	–40	dBc
$VSWR_{in}$	input VSWR	note 1	–	–	3 : 1	
	stability	$P_D = 0$ to 6 dBm; $V_S = 4.8$ to 8.5 V; $V_C = 0$ to 3.5 V; VSWR ≤ 6 : 1 through all phases; note 2	–	–	–60	dBc
	isolation	$V_C = 0$	–	–	–40	dBm
P_n	noise power	bandwidth = 30 kHz; 45 MHz above f_0; note 1	–	–	–90	dBm
	ruggedness	note 3	no degradation			

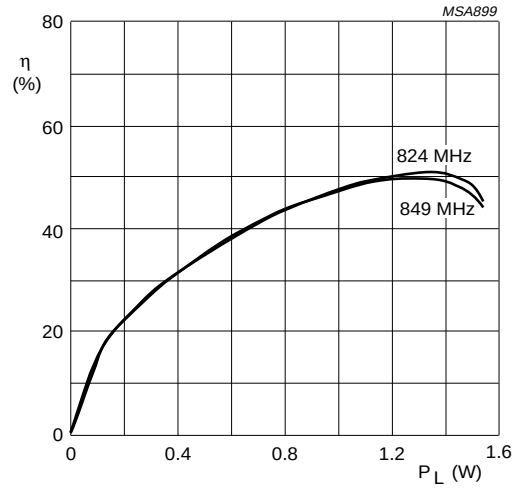
Notes

1. Adjust V_C for $P_L = 1.2$ W (BGY115A, BGY115B and BGY115D); $P_L = 1.4$ W (BGY115C/P).
2. Adjust V_C for $P_L \leq 1.2$ W (BGY115A, BGY115B and BGY115D); $P_L \leq 1.4$ W, $V_S = 4.8$ to 8 V (BGY115C/P).
3. Adjust V_C for $P_L = 1.6$ W; $V_S = 8.5$ V; VSWR ≤ 10 : 1; (BGY115A, BGY115B and BGY115D). Adjust V_C for $P_L = 1.6$ W; $V_S = 9$ V, VSWR ≤ 6 : 1 (BGY115C/P).



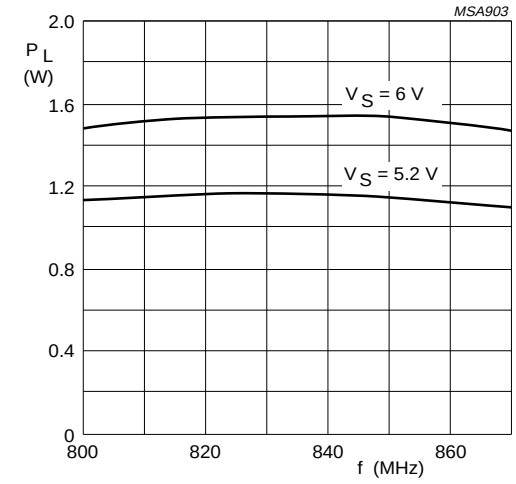
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.2 Load power as a function of control voltage; BGY115A, typical values.



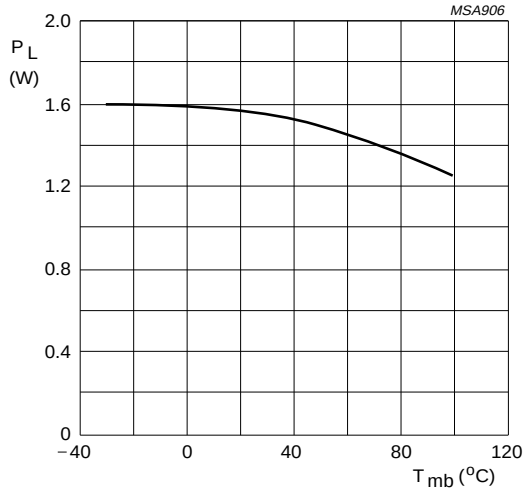
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.3 Efficiency as a function of load power; BGY115A, typical values.



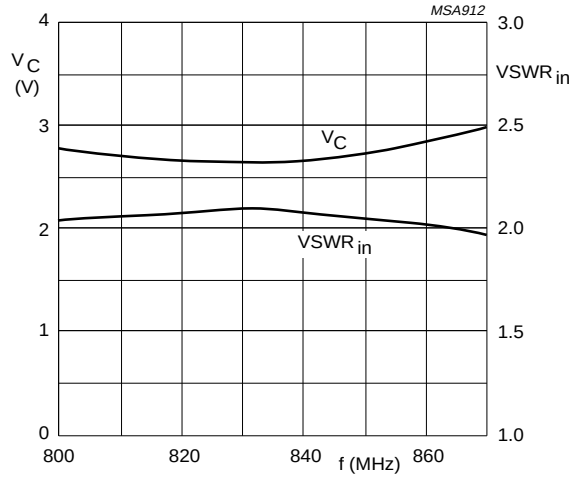
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_C = 3.5$ V; $T_{mb} = 25$ °C.

Fig.4 Load power as a function of frequency; BGY115A, typical values.



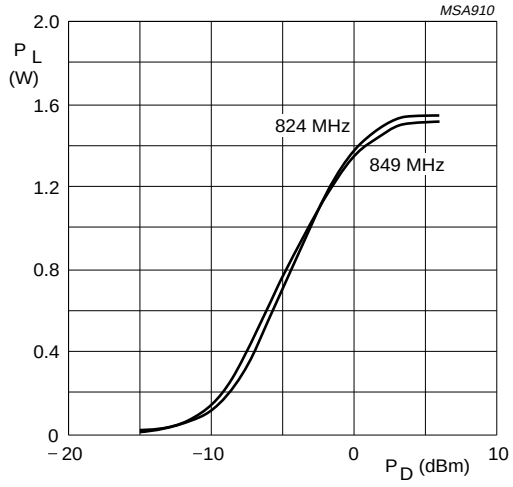
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $V_C = 3.5$ V; $T_{mb} = 25$ °C.

Fig.5 Load power as a function of mounting base temperature; BGY115A, typical values.



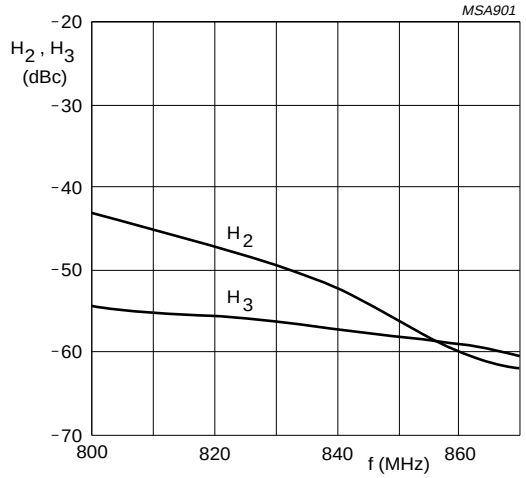
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $P_L = 1.2$ W; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.6 Control voltage and VSWR input as functions of frequency; BGY115A, typical values.



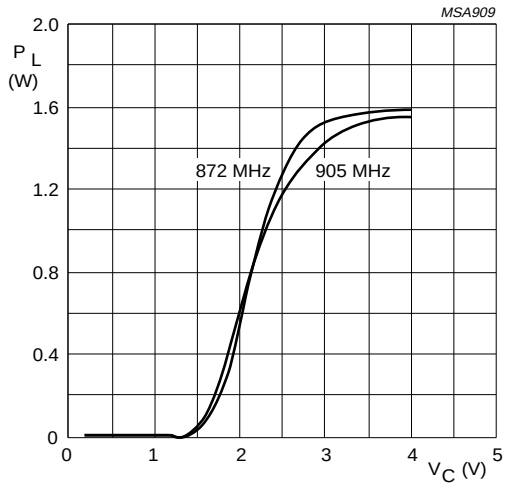
$Z_S = Z_L = 50\ \Omega$; $V_S = 6$ V; $V_C = 3.5$ V; $T_{mb} = 25$ °C.

Fig.7 Load power as a function of drive power; BGY115A, typical values.



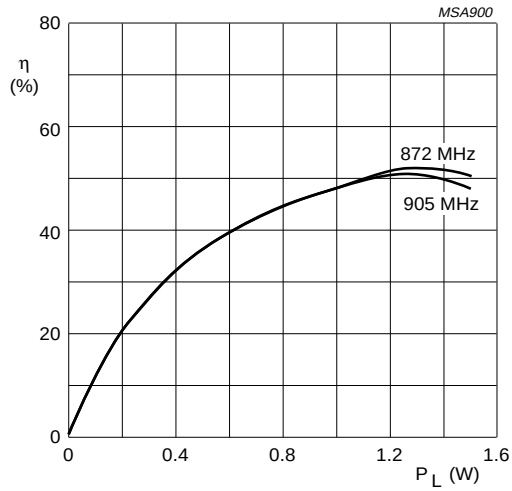
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $P_L = 1.2$ W; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.8 Harmonics as functions of frequency; BGY115A, typical values.



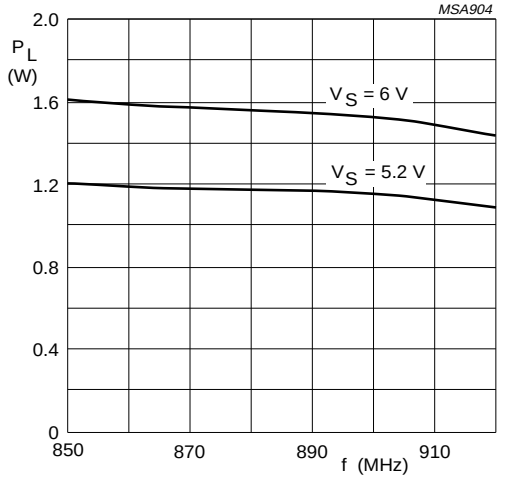
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.9 Load power as a function of control voltage; BGY115B, typical values.



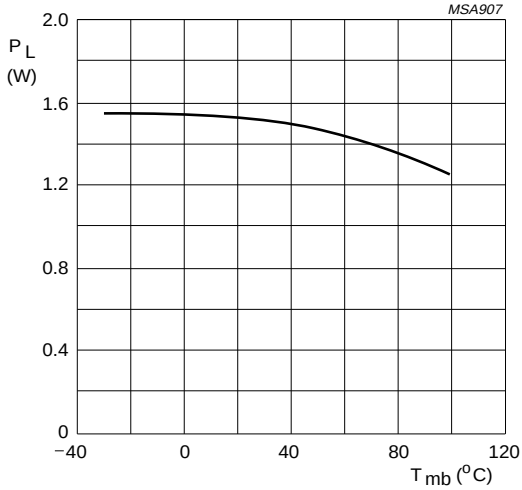
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.10 Efficiency as a function of load power; BGY115B, typical values.



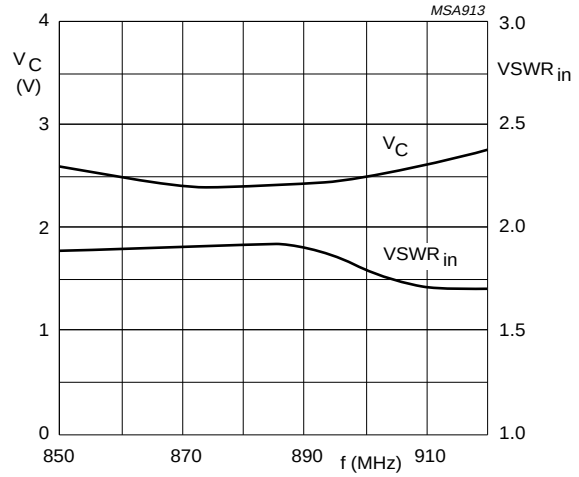
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_C = 3.5$ V; $T_{mb} = 25$ °C.

Fig.11 Load power as a function of frequency; BGY115B, typical values.



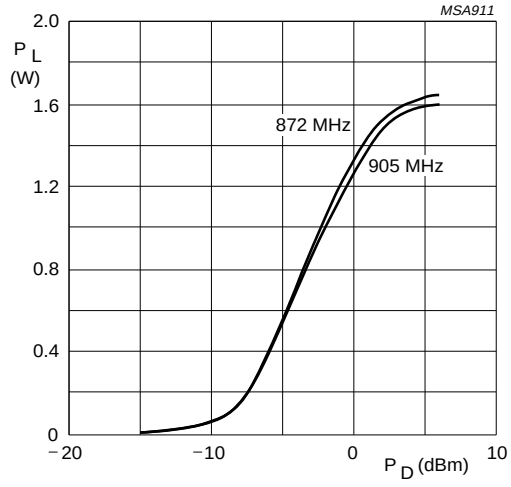
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $V_C = 3.5$ V; f = 890 MHz.

Fig.12 Load power as a function of mounting base temperature; BGY115B, typical values.



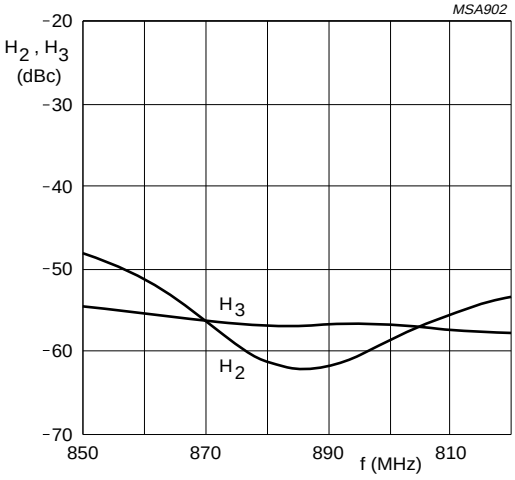
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $P_L = 1.2$ W; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.13 Control voltage and VSWR input as functions of frequency; BGY115B, typical values.



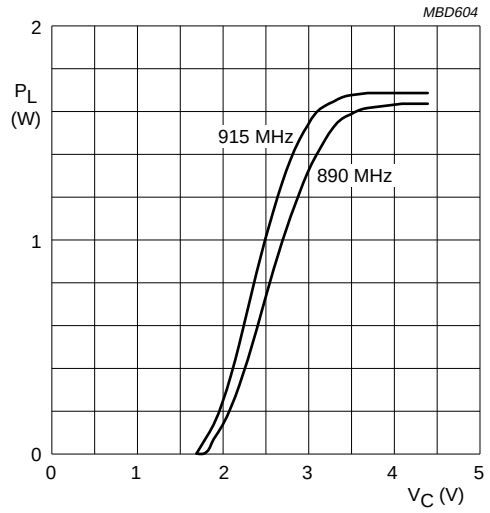
$Z_S = Z_L = 50\ \Omega$; $V_S = 6$ V; $V_C = 3.5$ V; $T_{mb} = 25$ °C.

Fig.14 Load power as a function of drive power; BGY115B, typical values.



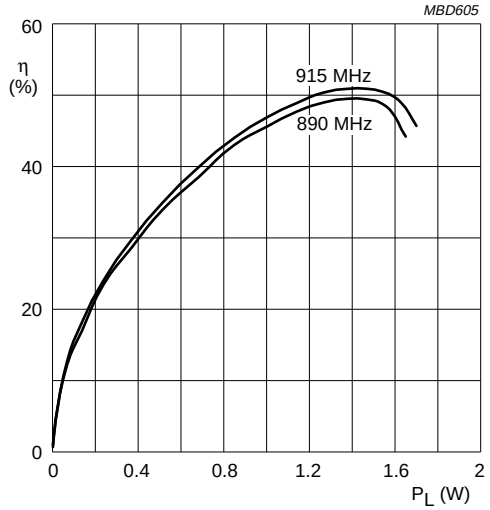
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $P_L = 1.2$ W; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.15 Harmonics as functions of frequency; BGY115B, typical values.



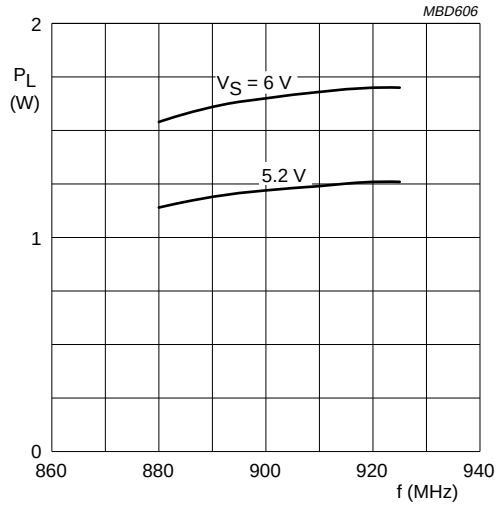
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.16 Load power as a function of control voltage; BGY115C/P, typical values.



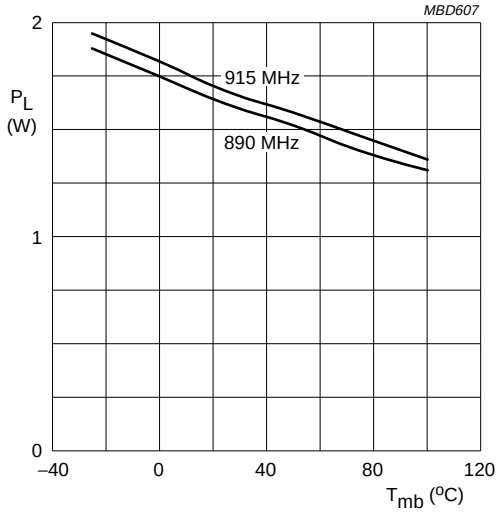
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.17 Efficiency as a function of load power; BGY115C/P, typical values.



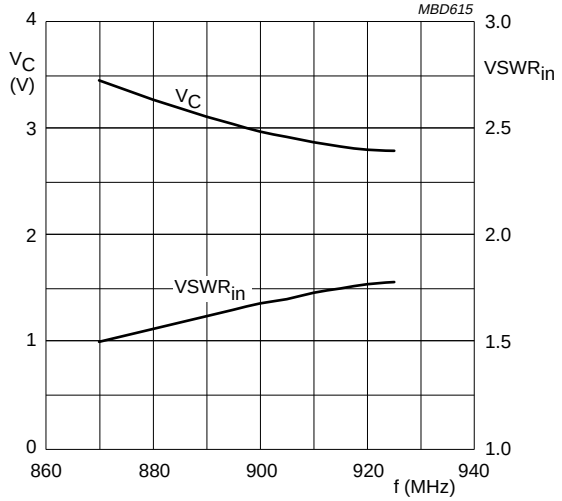
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_C = 3.5$ V; $T_{mb} = 25$ °C.

Fig.18 Load power as a function of frequency; BGY115C/P, typical values.



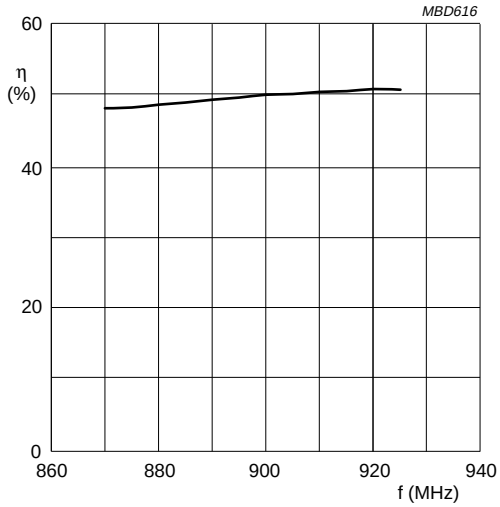
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $V_C = 3.5$ V.

Fig.19 Load power as a function of mounting base temperature; BGY115C/P, typical values.



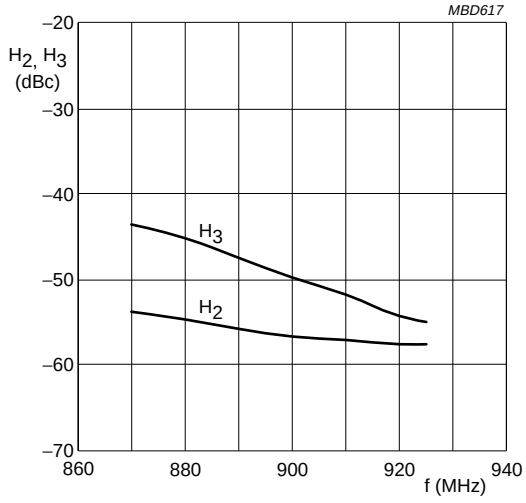
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $P_L = 1.4$ W; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.20 Control voltage and VSWR input as functions of frequency; BGY115C/P, typical values.



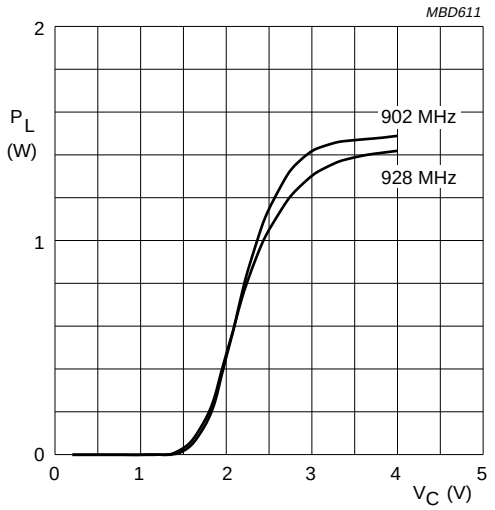
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $P_L = 1.4$ W; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.21 Efficiency as a function of frequency; BGY115C/P, typical values.



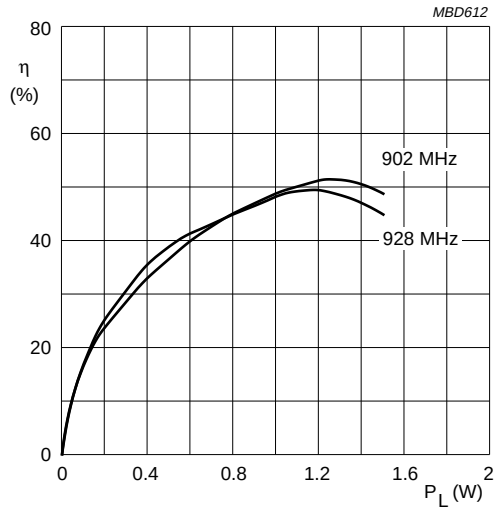
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $P_L = 1.4$ W; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.22 Harmonics as functions of frequency; BGY115C/P, typical values.



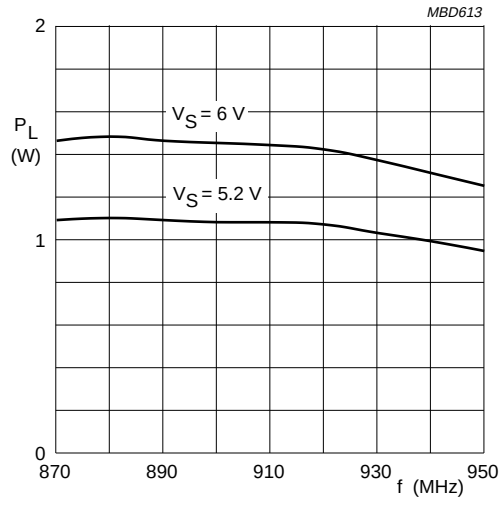
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.23 Load power as a function of control voltage; BGY115D, typical values.



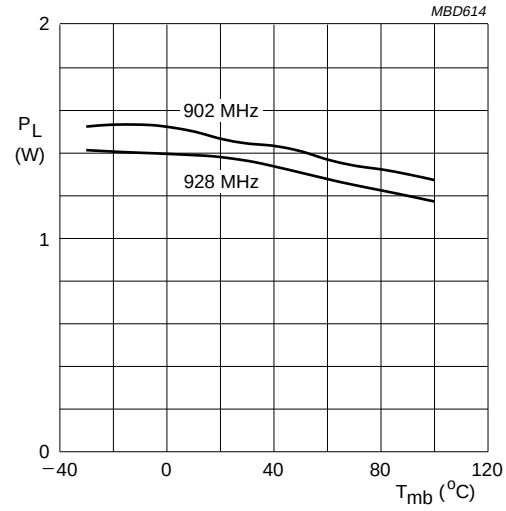
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.24 Efficiency as a function of load power; BGY115D, typical values.



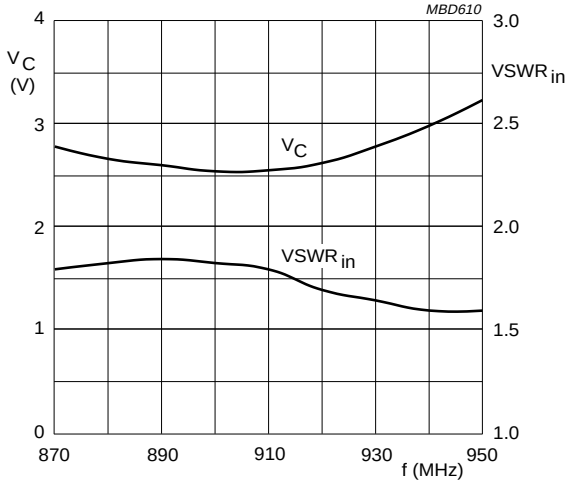
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_C = 3.5$ V; $T_{mb} = 25$ °C.

Fig.25 Load power as a function of frequency; BGY115D, typical values.



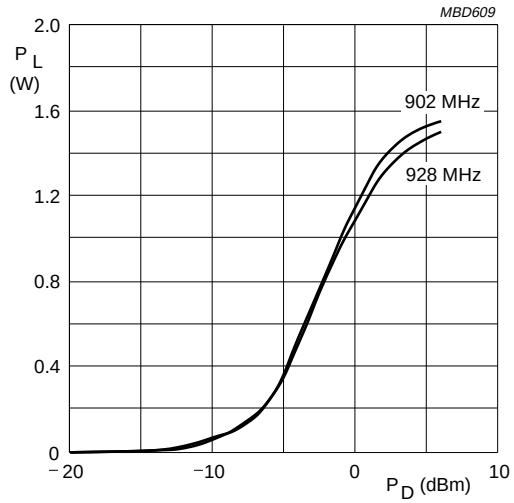
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 6$ V; $V_C = 3.5$ V.

Fig.26 Load power as a function of mounting base temperature; BGY115D, typical values.



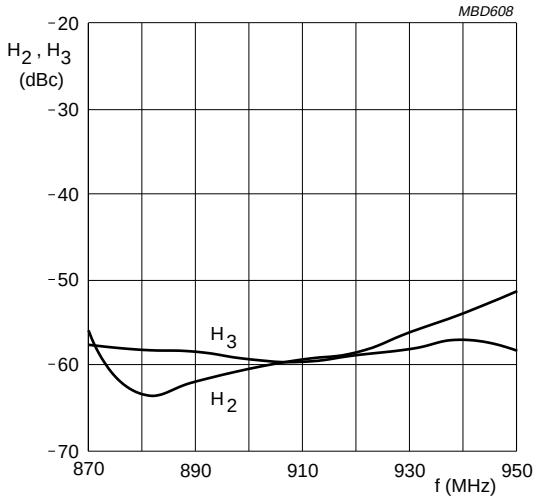
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $P_L = 1.2$ W; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.27 Control voltage and VSWR input as functions of frequency; BGY115D, typical values.



$Z_S = Z_L = 50\ \Omega$; $V_S = 6$ V; $V_C = 3.5$ V; $T_{mb} = 25$ °C.

Fig.28 Load power as a function of drive power; BGY115D, typical values.



$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $P_L = 1.2$ W; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.29 Harmonics as functions of frequency; BGY115D, typical values.

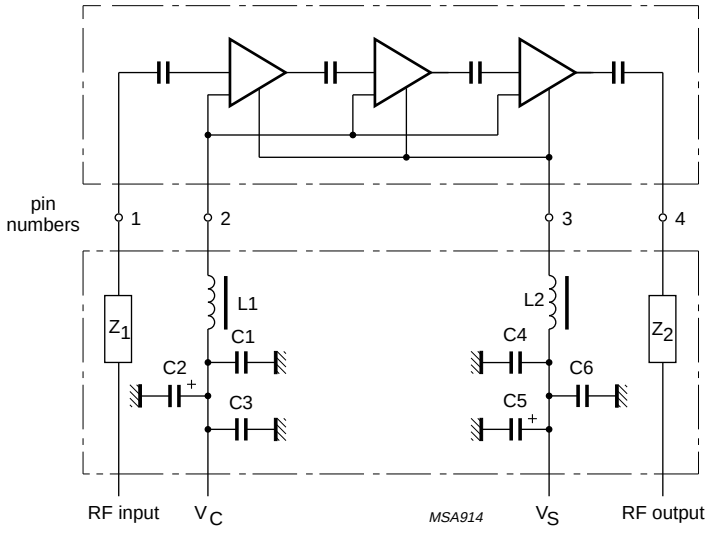
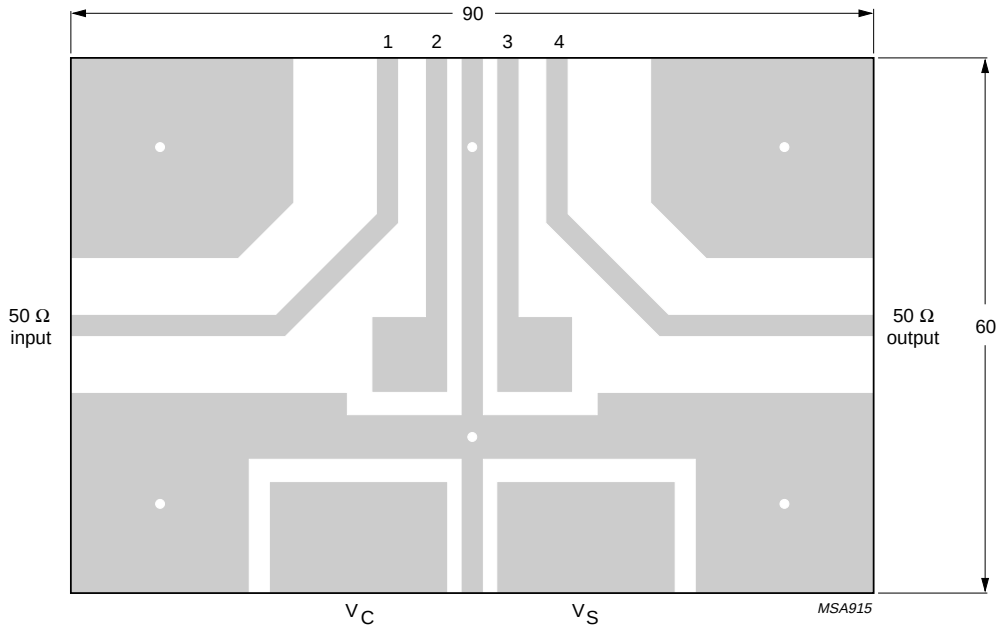


Fig.30 Test circuit.



Dimensions in mm.

Fig.31 Printed-circuit board layout.

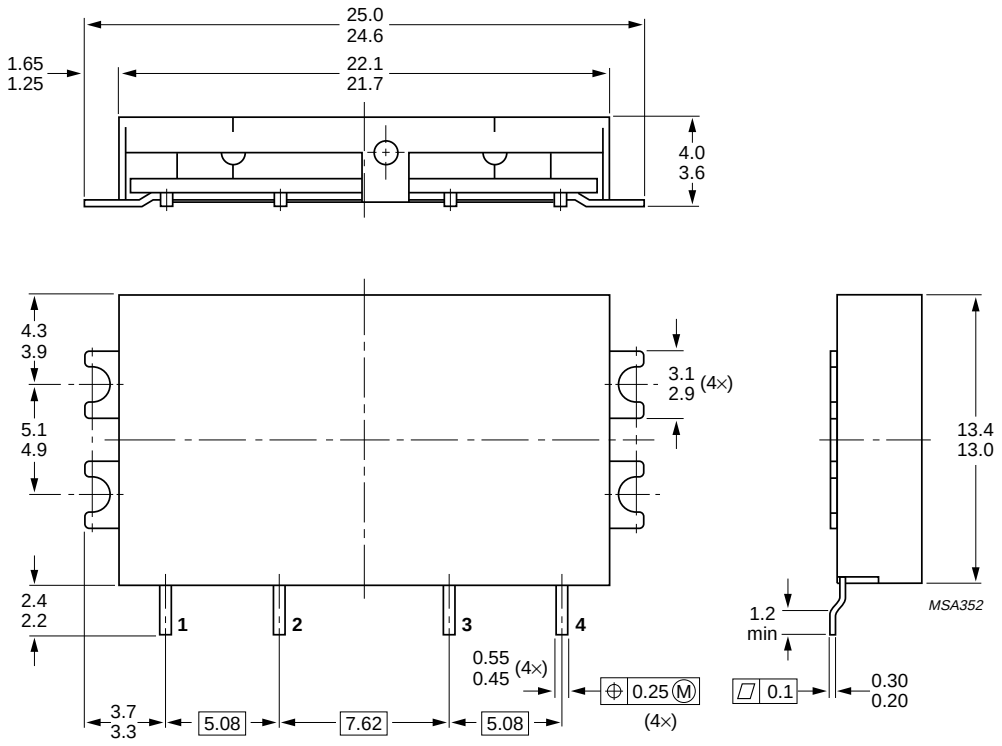
List of components (see Fig.30)

COMPONENT	DESCRIPTION	VALUE	CATALOGUE NO.
C1, C4	multilayer ceramic chip capacitor	100 nF	2222 852 47104
C2, C5	35 V tantalum capacitor	2.2 μF	–
C3, C6	multilayer ceramic chip capacitor	33 pF	2222 851 13339
L1, L2	Ferroxcube coil	5 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 PTFE fibre-glass dielectric ($\varepsilon_r = 2.2$); thickness $\frac{1}{32}$ inch.

PACKAGE OUTLINE



Dimensions in mm.

Fig.32 SOT321A.

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

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.