DATA SHEET

BGY148A; BGY148B
UHF amplifier modules

Preliminary specification
File under Discrete Semiconductors, SC09

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Philips
Semiconductors

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FEATURES

- Single 6 V nominal supply voltage
- 3 W output power
- Easy control of output power by DC voltage
- Silicon bipolar technology
- Standby current less than 100 μA.

APPLICATIONS

- Portable communication equipment operating in the 400 to 440 MHz and 430 to 488 MHz frequency ranges respectively.

DESCRIPTION

The BGY148A and BGY148B are three-stage UHF amplifier modules in a SOT421A package. Each module consists of three NPN silicon planar transistor dies mounted together with matching and bias circuit components on a metallized ceramic substrate. The modules produce an output power of 3 W into a load of 50 Ω with an RF power of 10 mW.

PINNING - SOT421A

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

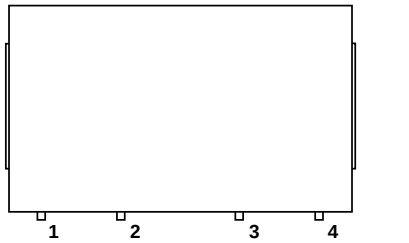


Fig.1 Simplified outline.

QUICK REFERENCE DATA

RF performance at T_{mb} = 25 °C.

TYPE	MODE OF OPERATION	f (MHz)	V_S (V)	P_L (W)	G_p (dB)	η (%)	Z_S; Z_L (Ω)
BGY148A	CW	400 to 440	6	≥3	≥24.8	typ. 53	50
BGY148B	CW	430 to 488	6	≥3	≥24.8	typ. 53	50

LIMITING VALUES

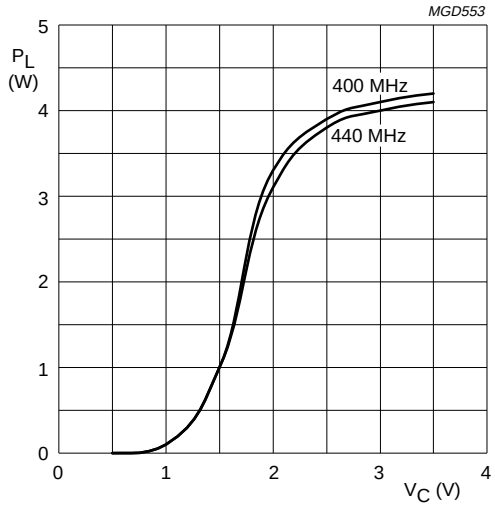
In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_S	DC supply voltage	–	8.5	V
V_C	DC control voltage	–	4	V
P_D	input drive power	–	20	mW
P_L	load power	–	3.5	W
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting-base temperature	–30	+100	°C

CHARACTERISTICS

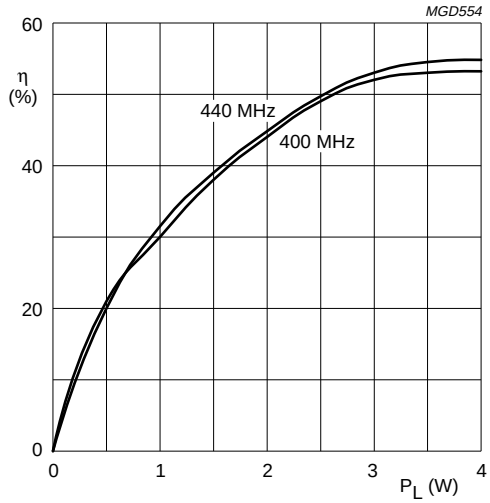
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $V_C \leq 3.5$ V; $T_{mb} = 25$ °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f	frequency range					
	BGY148A		400	–	440	MHz
	BGY148B		430	–	488	MHz
I_Q	total quiescent current	$V_C = 0$; $P_D = 0$	–	–	100	μA
I_C	control current	adjust V_C for $P_L = 3$ W	–	–	500	μA
P_L	load power		3	–	–	W
G_p	power gain	adjust V_C for $P_L = 3$ W	24.8	–	–	dB
η	efficiency	adjust V_C for $P_L = 3$ W	46	53	–	%
H_2	second harmonic	adjust V_C for $P_L = 3$ W	–	–	–38	dBc
H_3	third harmonic	adjust V_C for $P_L = 3$ W	–	–	–38	dBc
$VSWR_{in}$	input VSWR	adjust V_C for $P_L = 3$ W	–	–	3 : 1	
	control range	$V_C = 0$ to 3.5 V	10	–	–	dB
	stability	$P_D = 5$ to 20 mW; $V_S = 5$ to 8.5 V; $P_L \leq 3.5$ W; VSWR ≤ 4 : 1 through all phases	–	–	–60	dBc
	ruggedness	$V_S = 8.5$ V; adjust V_C for $P_L = 3.5$ W; VSWR ≤ 4 : 1 through all phases	no degradation			



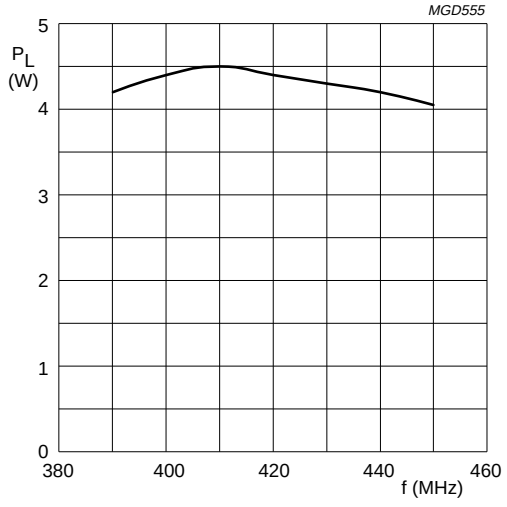
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.2 Load power as a function of control voltage; BGY148A; typical values.



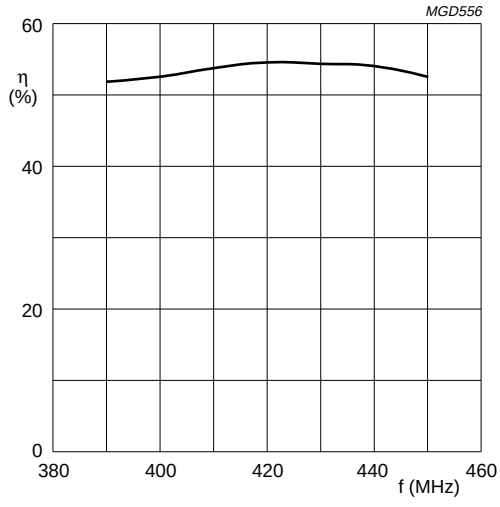
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.3 Efficiency as a function of load power; BGY148A; typical values.



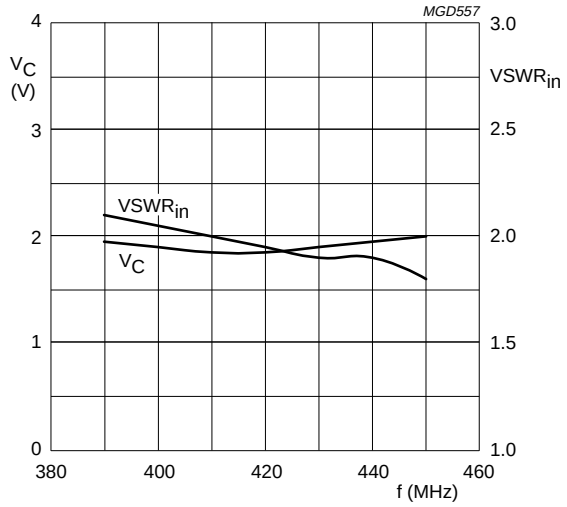
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $V_C = 3.5$ V; $T_{mb} = 25$ °C.

Fig.4 Load power as a function of frequency; BGY148A; typical values.



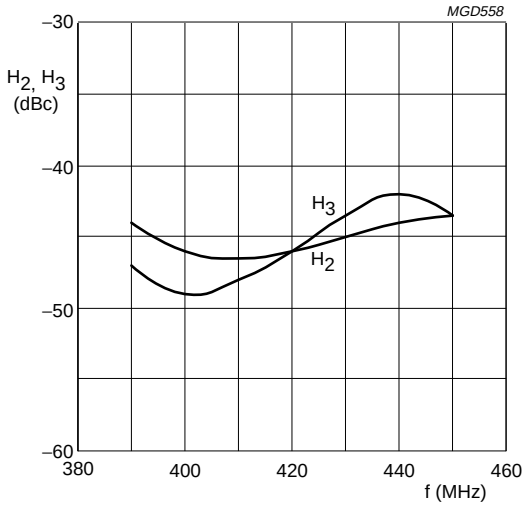
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $P_L = 3$ W; $T_{mb} = 25$ °C.

Fig.5 Efficiency as a function of frequency; BGY148A; typical values.



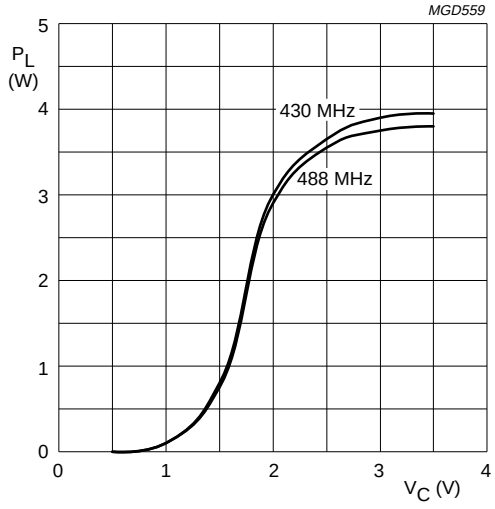
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $P_L = 3$ W; $T_{mb} = 25$ °C.

Fig.6 Control voltage and input VSWR as functions of frequency; BGY148A; typical values.



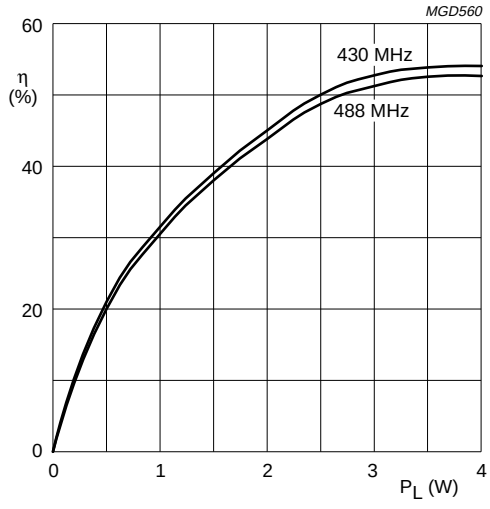
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $P_L = 3$ W; $T_{mb} = 25$ °C.

Fig.7 Harmonics as a function of frequency; BGY148A; typical values.



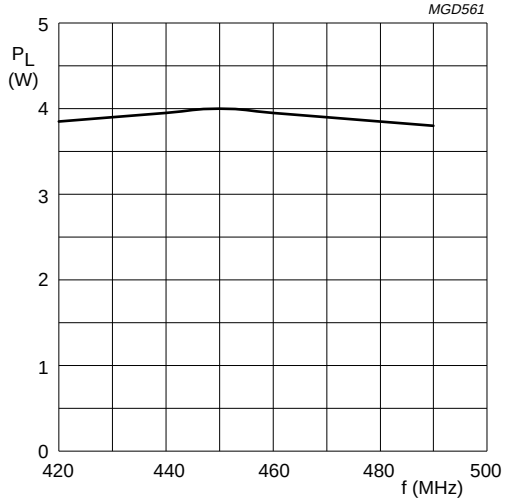
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.8 Load power as a function of control voltage; BGY148B; typical values.



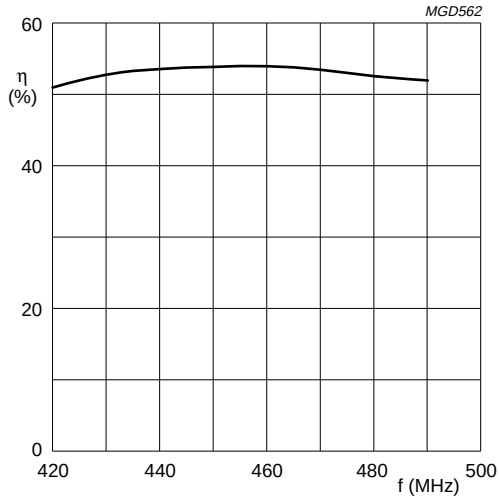
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $T_{mb} = 25$ °C.

Fig.9 Efficiency as a function of load power; BGY148B; typical values.



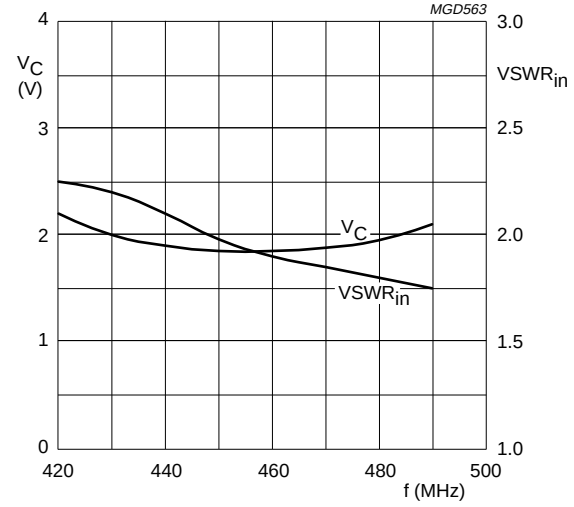
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $V_C = 3.5$ V; $T_{mb} = 25$ °C.

Fig.10 Load power as a function of frequency; BGY148B; typical values.



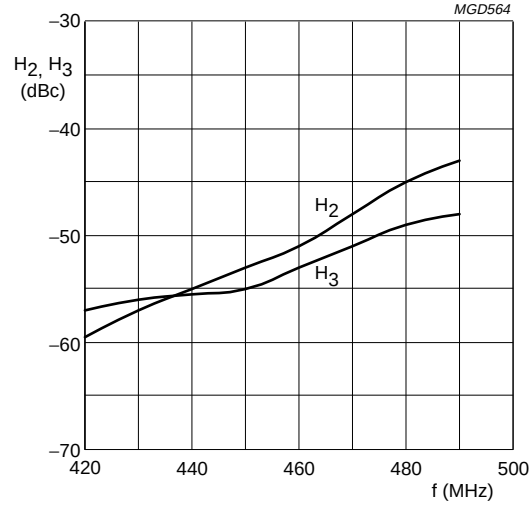
$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $P_L = 3$ W; $T_{mb} = 25$ °C.

Fig.11 Efficiency as a function of frequency; BGY148B; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_D = 10$ mW; $V_S = 6$ V; $P_L = 3$ W; $T_{mb} = 25$ °C.

Fig.12 Control voltage and input VSWR as functions of frequency; BGY148B; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $P_L = 3$ W; $T_{mb} = 25$ °C.

Fig.13 Harmonics as a function of frequency; BGY148B; typical values.

SOLDERING

The indicated temperatures are those at the solder interfaces.

Advised solder types are types with a liquidus less than or equal to 210 °C.

Solder dots or solder prints must be large enough to wet the contact areas.

Footprints for soldering should cover the module contact area +0.1 mm on all sides.

Soldering can be carried out using a conveyor oven, a hot air oven, an infrared oven or a combination of these ovens.

Hand soldering must be avoided because the soldering iron tip can exceed the maximum permitted temperature of 250 °C and damage the module.

The maximum temperature profile and soldering time is indicated as follows (see Fig.14):

t = 350 s at 100 °C

t = 300 s at 125 °C

t = 200 s at 150 °C

t = 100 s at 175 °C

t = 50 s at 200 °C

t = 5 s at 250 °C (maximum temperature).

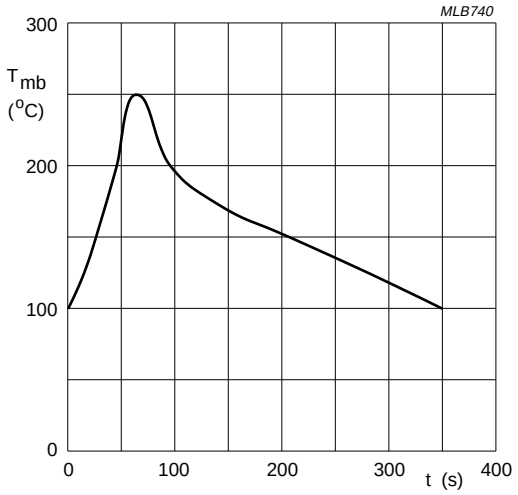


Fig.14 Maximum allowable temperature profile.

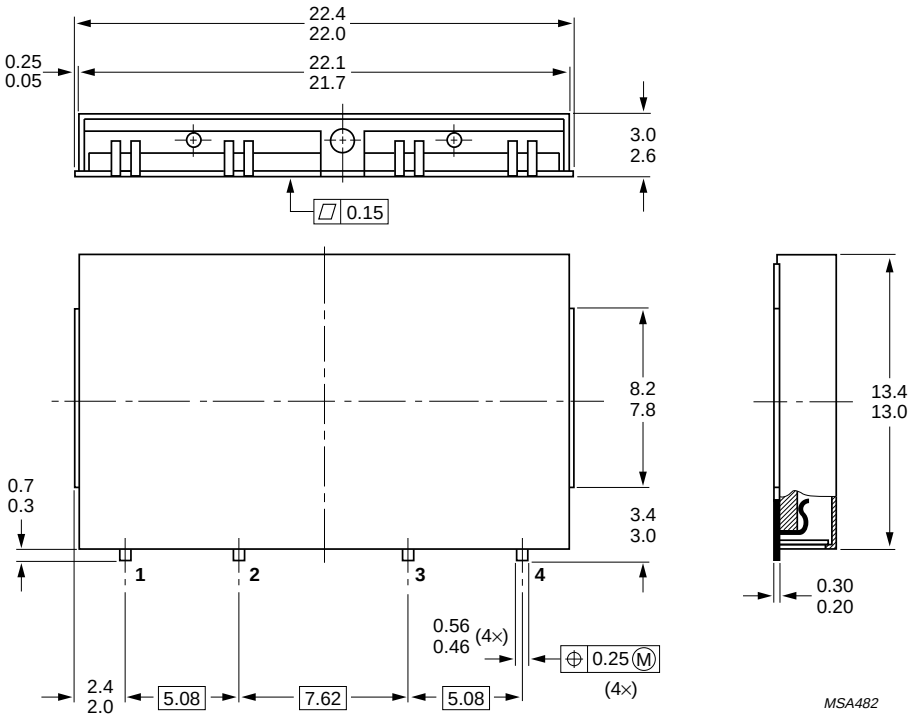
Cleaning

The following fluids may be used for cleaning:

- Alcohol
- Bio-Act (Terpene Hydrocarbon)
- Triclean B/S
- Acetone.

Ultrasonic cleaning should not be used since this can cause serious damage to the product.

PACKAGE OUTLINE



Dimensions in mm.

Fig.15 SOT421A.

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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