DATA SHEET

BGY116D; BGY116E
UHF amplifier modules

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

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Philips
Semiconductors

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FEATURES

- 12.5 V nominal supply voltage
- 6 W output power
- Easy control of output power by DC voltage.

APPLICATIONS

- Mobile Radio equipment operating in the 800 to 870 and 890 to 950 MHz frequency ranges.

DESCRIPTION

The BGY116D and BGY116E are five-stage UHF amplifier modules in a SOT278B package. Each module consists of 5 NPN silicon planar transistor dies mounted together with matching and bias circuit components on a metallized ceramic substrate.

PINNING - SOT278B

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

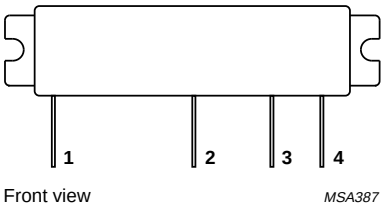


Fig.1 Simplified outline.

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)
BGY116D	CW	800 to 870	12.5	6	≥37.8	typ. 40	50
BGY116E	CW	890 to 950	12.5	6	≥37.8	typ. 40	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_S	DC supply voltage	–	16	V
V_C	DC control voltage	–	8	V
P_D	input drive power	–	10	mW
P_L	load power	–	10	W
T_{stg}	storage temperature	–40	+100	°C
T_{mb}	operating mounting base temperature	–30	+100	°C

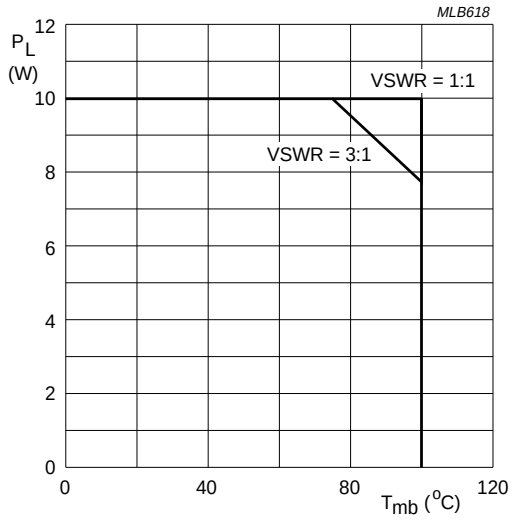
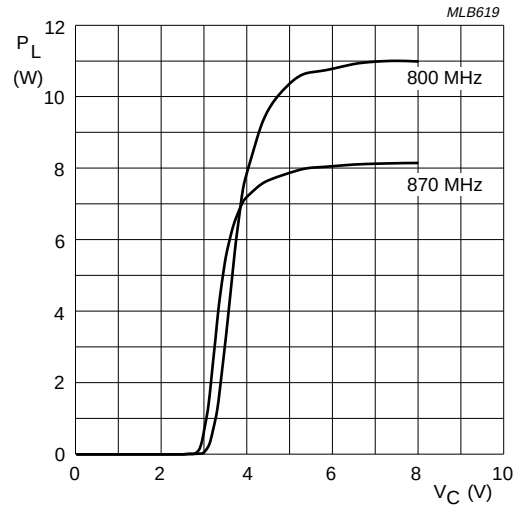


Fig.2 Power derating curve.

CHARACTERISTICS

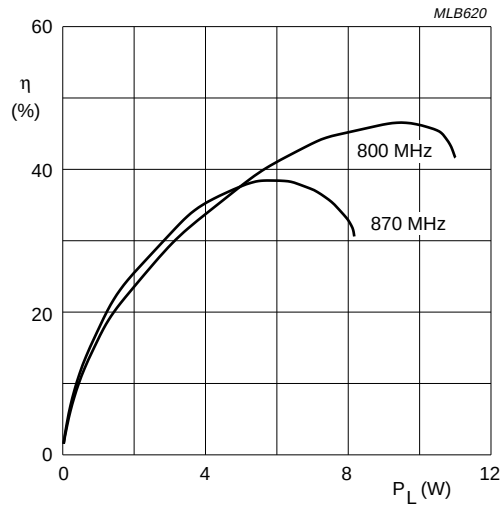
$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_S = 12.5$ V; $V_C \leq 6$ V; $T_{mb} = 25$ °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f	frequency					
	BGY116D		800	–	870	MHz
	BGY116E		890	–	950	MHz
I_Q	quiescent current	$V_C = 0$; $P_D = 0$	–	–	1	mA
I_C	control current		–	–	0.5	mA
P_L	load power		6	–	–	W
G_p	power gain	adjust V_C for $P_L = 6$ W	37.8	–	–	dB
η	efficiency	adjust V_C for $P_L = 6$ W	33	40	–	%
H_2	second harmonic	adjust V_C for $P_L = 6$ W	–	–	–35	dBc
H_3	third harmonic	adjust V_C for $P_L = 6$ W	–	–	–35	dBc
$VSWR_{in}$	input VSWR	adjust V_C for $P_L = 6$ W	–	–	3 : 1	
	isolation	$V_C = 0$	–	–50	–40	dBm
	stability	$P_D = -3$ to +3 dBm; $V_S = 10$ to 16 V; $V_C = 0$ to 6 V; adjust V_C for $P_L \leq 7$ W; VSWR ≤ 6 : 1	–	–	–60	dBc
	ruggedness	$V_S = 16$ V; adjust V_C for $P_L = 7$ W; VSWR ≤ 20 : 1	no degradation			



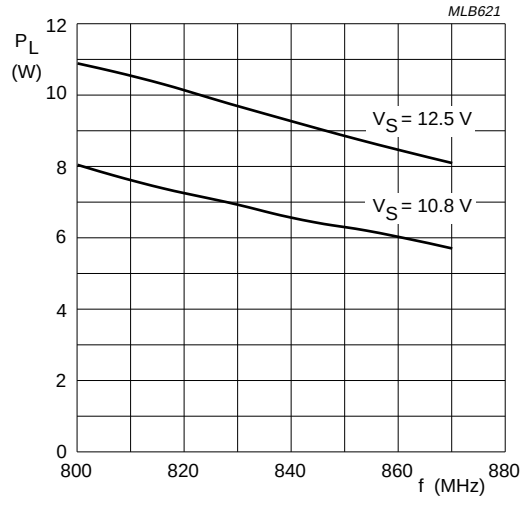
$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_S = 12.5$ V; $T_{mb} = 25\ ^{\circ}C$.

Fig.3 Load power as a function of control voltage; BGY116D; typical values.



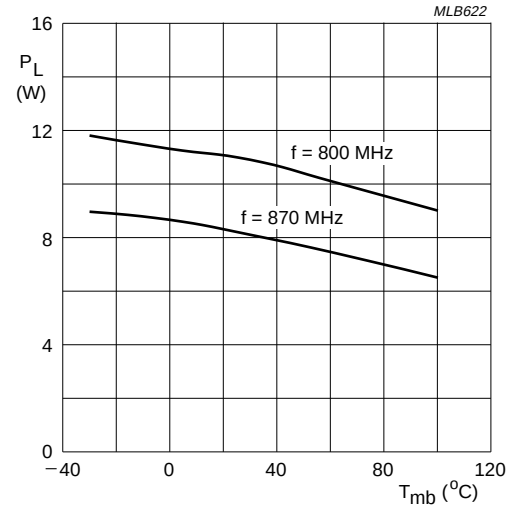
$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_S = 12.5$ V; $T_{mb} = 25\ ^{\circ}C$.

Fig.4 Efficiency as a function of load power; BGY116D; typical values.



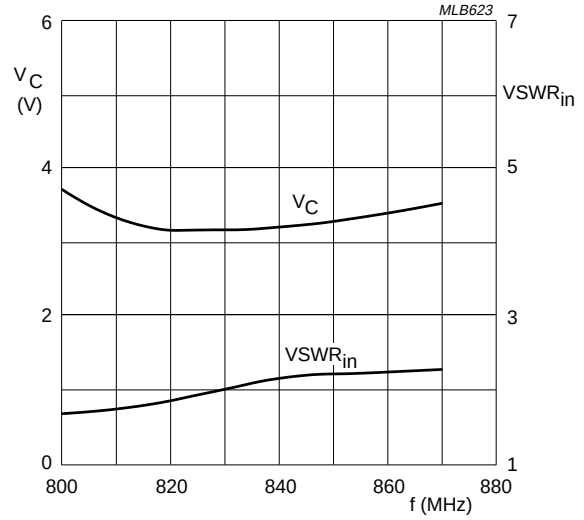
$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_C = 6$ V; $T_{mb} = 25\ ^{\circ}C$.

Fig.5 Load power as a function of frequency; BGY116D; typical values.



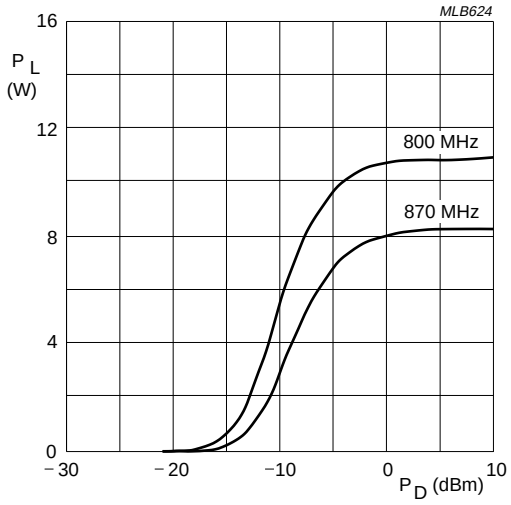
$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_S = 12.5$ V; $V_C = 6$ V.

Fig.6 Load power as a function of mounting base temperature; BGY116D; typical values.



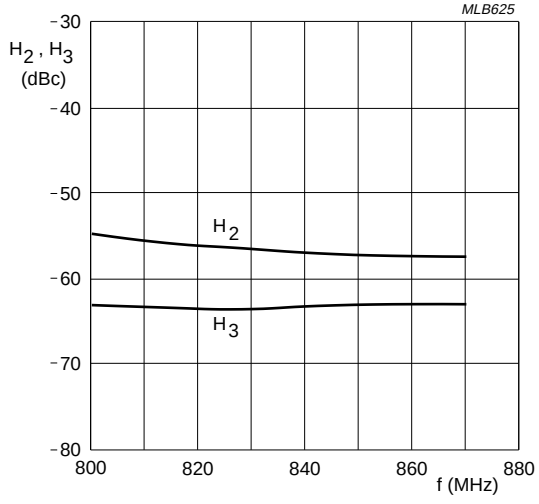
$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_S = 12.5$ V; $P_L = 6$ W; $T_{mb} = 25\ ^{\circ}C$.

Fig.7 Control voltage and input VSWR as functions of frequency; BGY116D; typical values.



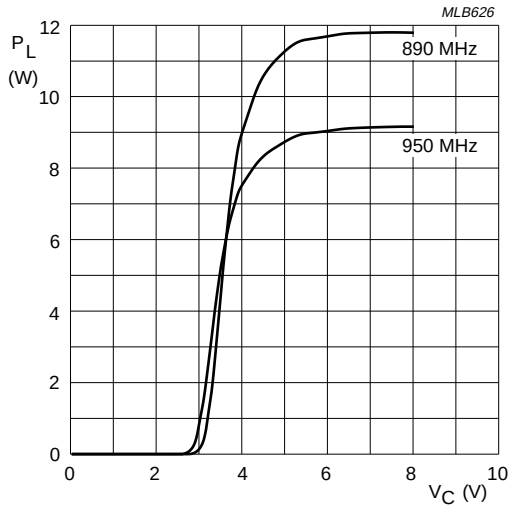
$Z_S = Z_L = 50\ \Omega$; $V_S = 12.5$ V; $V_C = 6$ V; $T_{mb} = 25\ ^{\circ}C$.

Fig.8 Load power as a function of drive power; BGY116D; typical values.



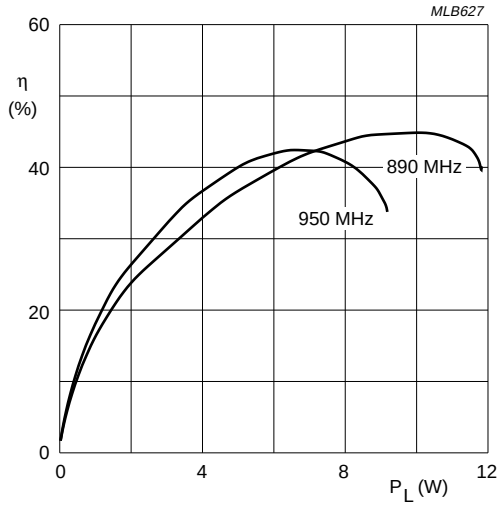
$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_S = 12.5$ V; $P_L = 6$ W; $T_{mb} = 25\ ^{\circ}C$.

Fig.9 Harmonics as function of frequency; BGY116D; typical values.



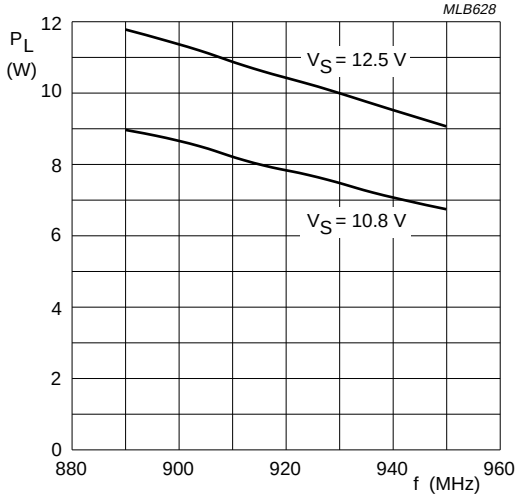
$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_S = 12.5$ V; $T_{mb} = 25\ ^{\circ}C$.

Fig.10 Load power as a function of control voltage; BGY116E; typical values.



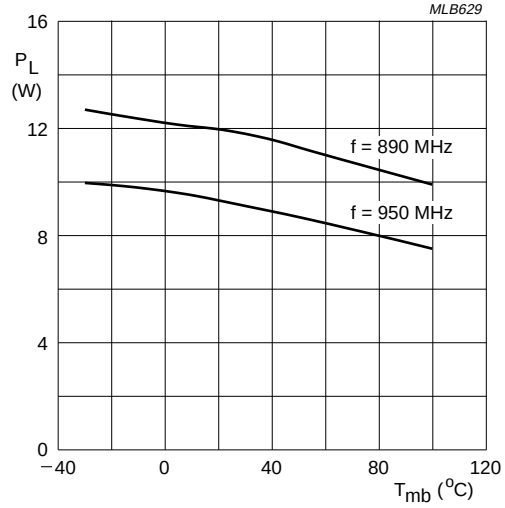
$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_S = 12.5$ V; $T_{mb} = 25\ ^{\circ}C$.

Fig.11 Efficiency as a function of load power; BGY116E; typical values.



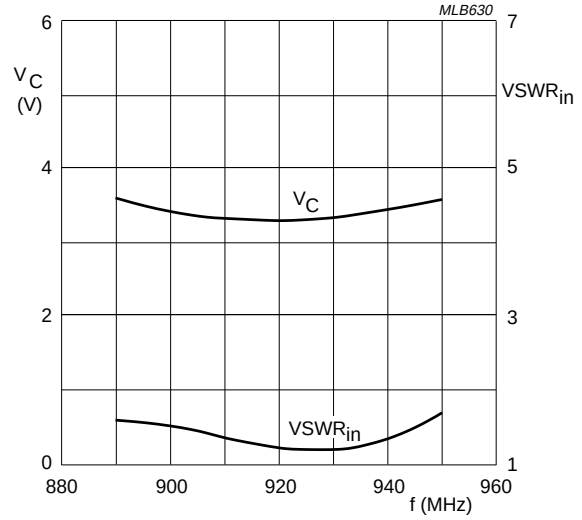
$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_C = 6$ V; $T_{mb} = 25\ ^{\circ}C$.

Fig.12 Load power as a function of frequency; BGY116E; typical values.



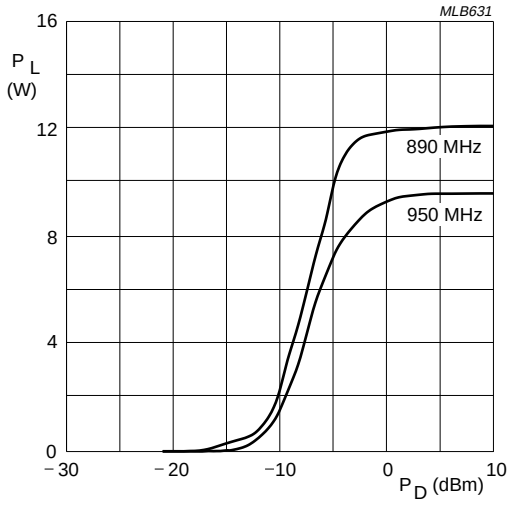
$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_S = 12.5$ V; $V_C = 6$ V.

Fig.13 Load power as a function of mounting base temperature; BGY116E; typical values.



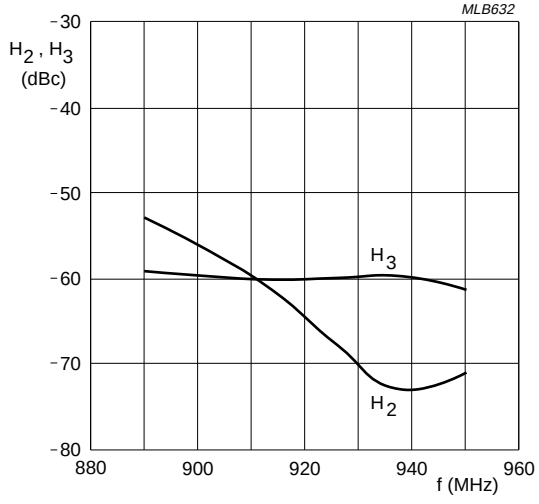
$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_S = 12.5$ V; $P_L = 6$ W; $T_{mb} = 25\ ^{\circ}C$.

Fig.14 Control voltage and input VSWR as functions of frequency; BGY116E; typical values.



$Z_S = Z_L = 50\ \Omega$; $V_S = 12.5$ V; $V_C = 6$ V; $T_{mb} = 25\ ^{\circ}C$.

Fig.15 Load power as a function of drive power; BGY116E; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_D = 0$ dBm; $V_S = 12.5$ V; $P_L = 6$ W; $T_{mb} = 25\ ^{\circ}C$.

Fig.16 Harmonics as function of frequency; BGY116E; typical values.

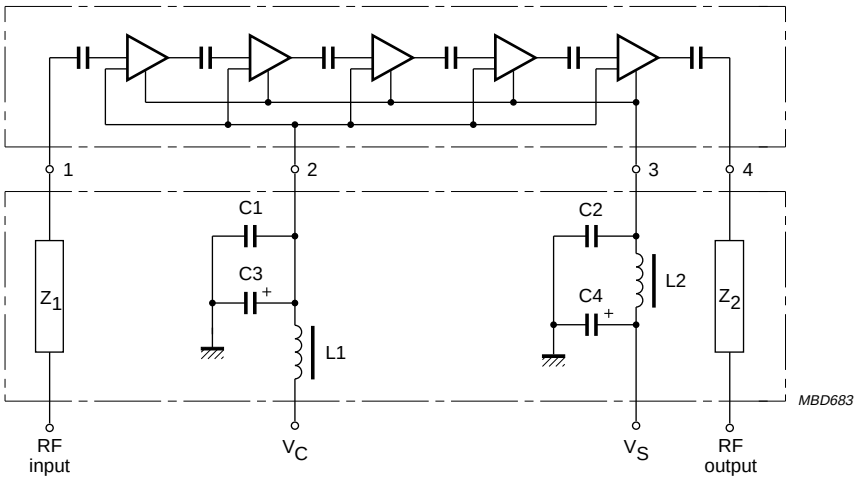
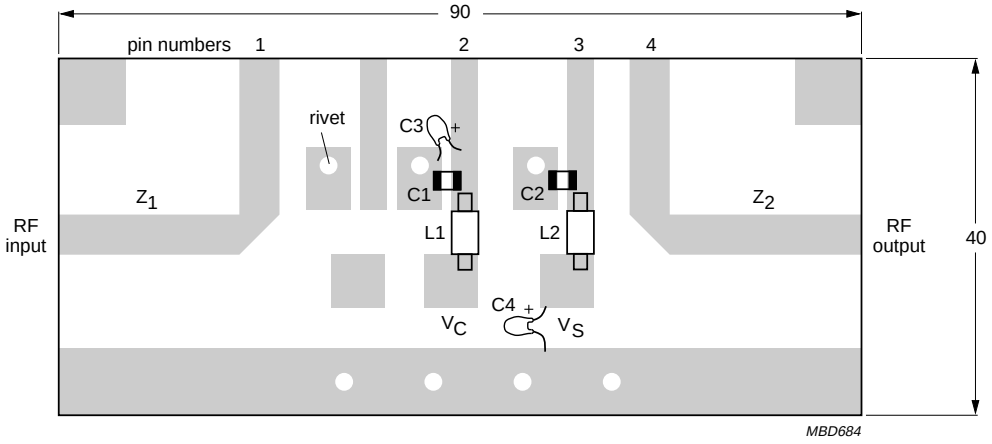


Fig.17 Test circuit.



Dimensions in mm.

Fig.18 Printed-circuit board component layout.

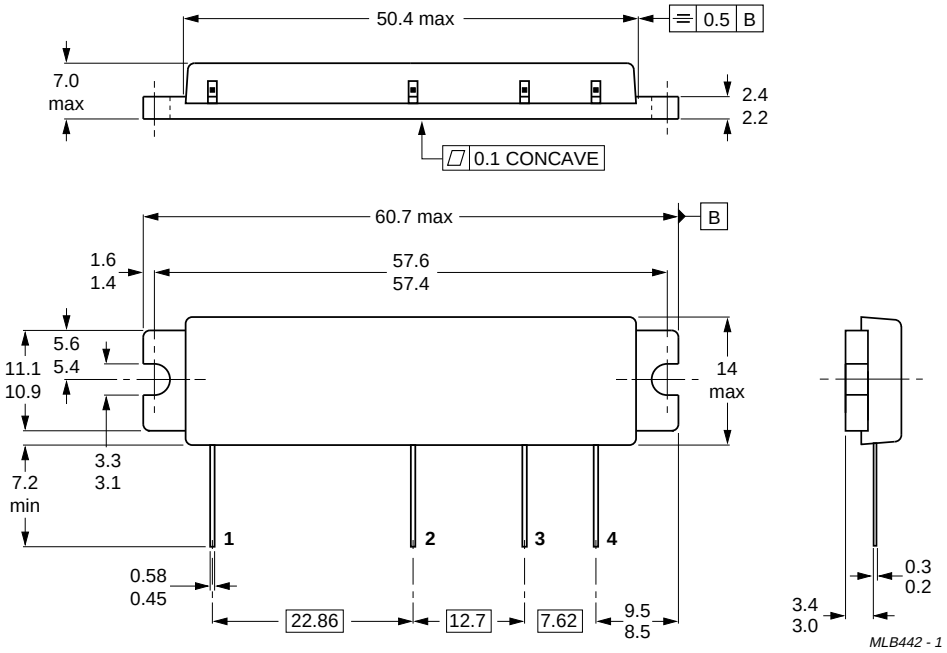
List of components (see Fig.17)

COMPONENT	DESCRIPTION	VALUE	DIMENSION	CATALOGUE NO.
C1, C2	multilayer ceramic chip capacitor	1 nF	–	–
C3, C4	tantalum capacitor	35 V; 4.7 μF	–	–
L1, L2	micro choke	1 μH	–	3122 108 20153
Z_1, Z_2	stripline; note 1	50 Ω	width 4.7 mm	–

Note

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

PACKAGE OUTLINE



Dimensions in mm.

Fig.19 SOT278B.

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.