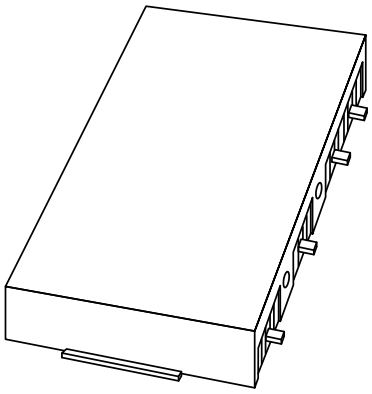
DATA SHEET



BGY122A; BGY122B
UHF amplifier modules

Product specification
Supersedes data of 1997 Dec 01

1998 May 11

Philips
Semiconductors

PHILIPS

UHF amplifier modules BGY122A; BGY122B

FEATURES

- Single 4.8 V nominal supply voltage
- 1.2 W output power
- Easy control of output power by DC voltage
- Very high efficiency (typ. 55%)
- Silicon bipolar technology
- Standby current less than 100 μA.

APPLICATIONS

- Hand-held transmitting equipment operating in the 824 to 849 MHz and 872 to 905 MHz frequency ranges.

DESCRIPTION

The BGY122A and BGY122B are three-stage UHF amplifier modules in a SOT388B 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 1.2 W into a load of 50 Ω with an RF drive power of 2 mW.

PINNING - SOT388B

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

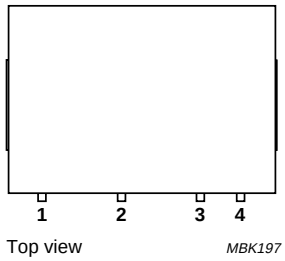


Fig.1 Simplified outline.

QUICK REFERENCE DATA

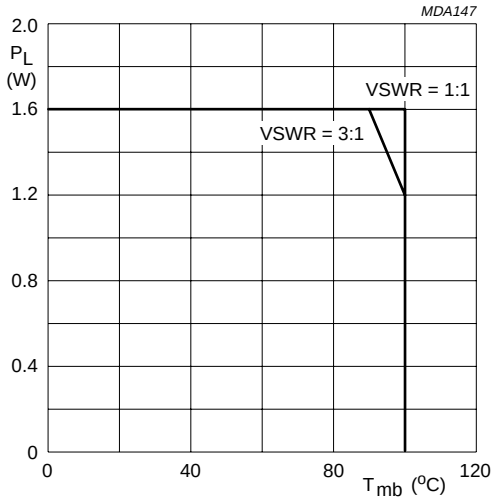
RF performance at T_{mb} = 25 °C.

TYPE	MODE OF OPERATION	f (MHz)	V_S (V)	P_L (W)	G_p (dB)	η (%)	Z_S; Z_L (Ω)
BGY122A	CW	824 to 849	4.8	1.2	≥27.8	typ. 55	50
BGY122B	CW	872 to 905	4.8	1.2	≥27.8	typ. 55	50

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_S	DC supply voltage	V_C = 0; P_D = 0	–	10	V
V_C	DC control voltage		–	3.5	V
P_D	input drive power		–	5	mW
P_L	load power		–	1.6	W
T_{stg}	storage temperature		–40	+100	°C
T_{mb}	operating mounting base temperature		–30	+100	°C



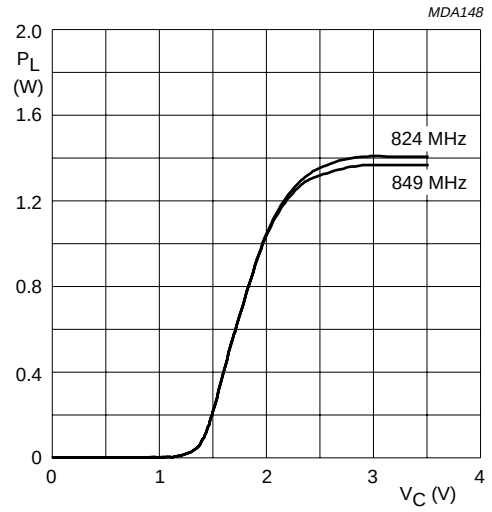
V_S = 6.5 V.

Fig.2 Load power derating curve.

CHARACTERISTICS

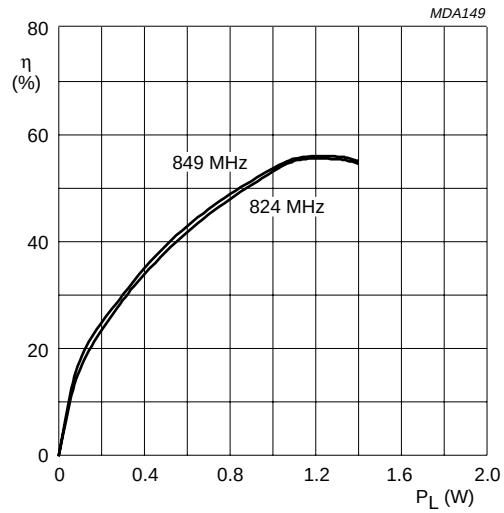
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $V_C \leq 3$ V; $T_{mb} = 25$ °C; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f	frequency					
	BGY122A		824	–	849	MHz
	BGY122B		872	–	905	MHz
I_Q	total quiescent current	$V_C = 0$; $P_D < -60$ dBm	–	–	100	μA
I_C	control current	adjust V_C for $P_L = 1.2$ W	–	–	500	μA
P_L	load power	$V_C = 3$ V	1.2	–	–	W
G_p	power gain	adjust V_C for $P_L = 1.2$ W	27.8	–	–	dB
η	efficiency	adjust V_C for $P_L = 1.2$ W	50	55	–	%
H_2	second harmonic	adjust V_C for $P_L = 1.2$ W	–	–	–36	dBc
H_3	third harmonic	adjust V_C for $P_L = 1.2$ W	–	–	–36	dBc
$VSWR_{in}$	input VSWR	adjust V_C for $P_L = 1.2$ W	–	–	3 : 1	
	stability	$P_D = 0$ to +6 dBm; $V_S = 4$ to 6.5 V; $V_C = 0$ to 3 V; $P_L \leq 1.2$ W; VSWR ≤ 6 : 1 through all phases	–	–	–60	dBc
	isolation	$V_C = 0$	–	–40	–	dBm
P_n	noise power	adjust V_C for $P_L = 1.2$ W; bandwidth = 30 kHz; $f_n = f_o + 45$ MHz	–	–	–90	dBm
	ruggedness	$V_S = 6.5$ V; adjust V_C for $P_L = 1.4$ W; VSWR ≤ 10 : 1 through all phases	no degradation			



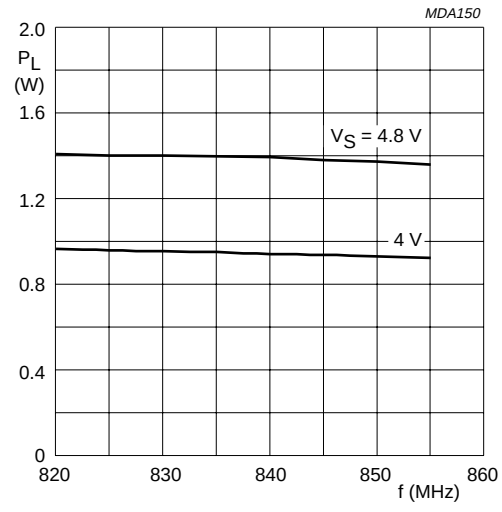
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $T_{mb} = 25$ °C.

Fig.3 Load power as a function of control voltage; BGY122A; typical values.



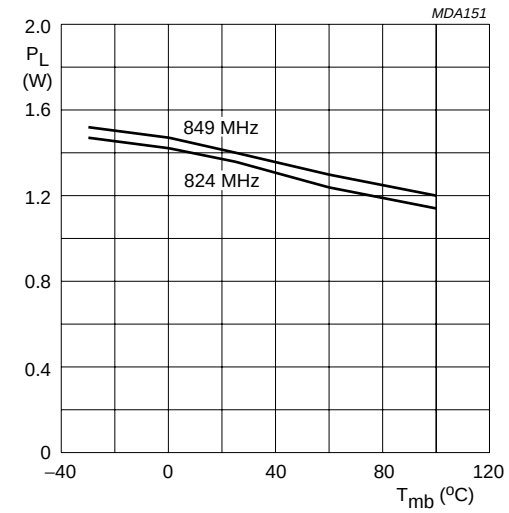
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $T_{mb} = 25$ °C.

Fig.4 Efficiency as a function of load power; BGY122A; typical values.



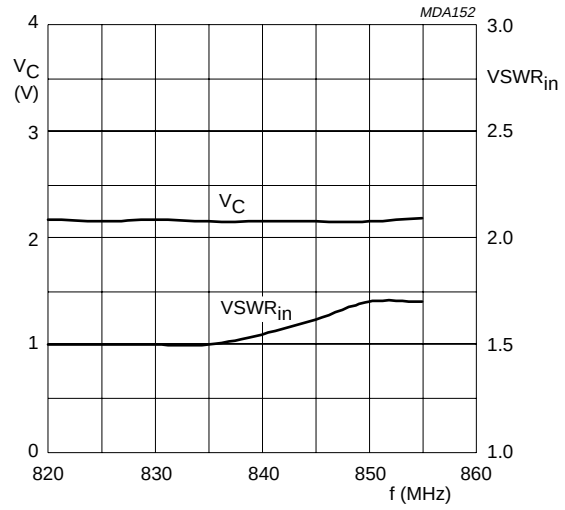
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_C = 3$ V; $T_{mb} = 25$ °C.

Fig.5 Load power as a function of frequency; BGY122A; typical values.



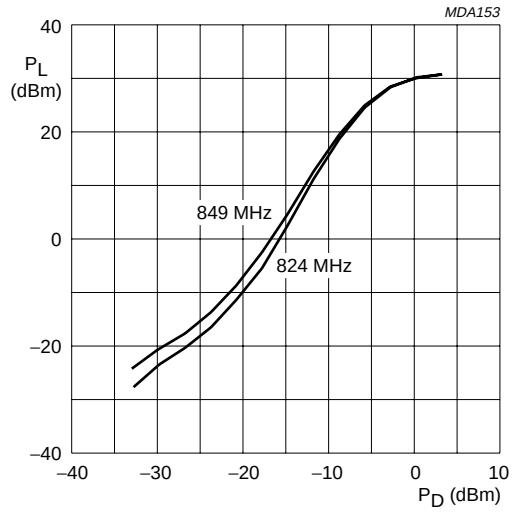
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $V_C = 3$ V.

Fig.6 Load power as a function of mounting base temperature; BGY122A; typical values.



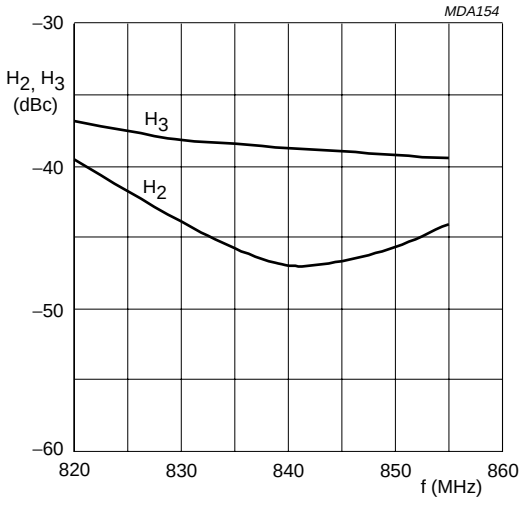
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $P_L = 1.2$ W; $T_{mb} = 25$ °C.

Fig.7 Control voltage and input VSWR as functions of frequency; BGY122A; typical values.



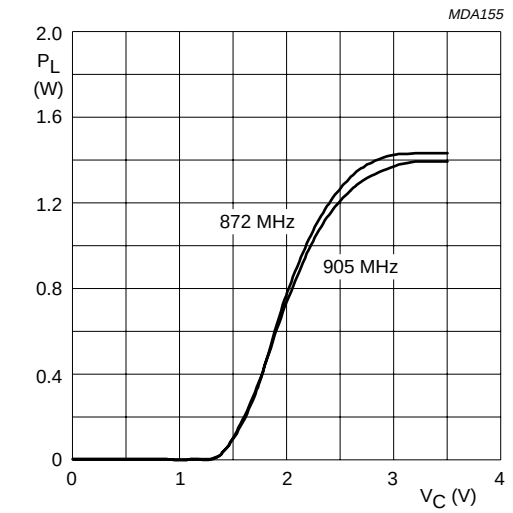
$Z_S = Z_L = 50\ \Omega$; $V_S = 4.8$ V; $V_C = 3$ V; $T_{mb} = 25$ °C.

Fig.8 Load power as a function of drive power; BGY122A; typical values.



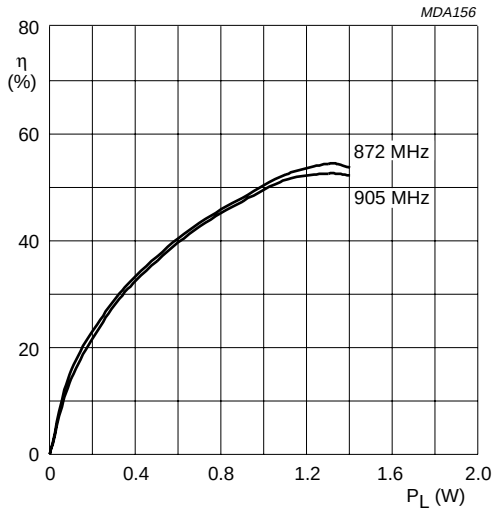
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $P_L = 1.2$ W; $T_{mb} = 25$ °C.

Fig.9 Harmonics as a function of frequency; BGY122A; typical values.



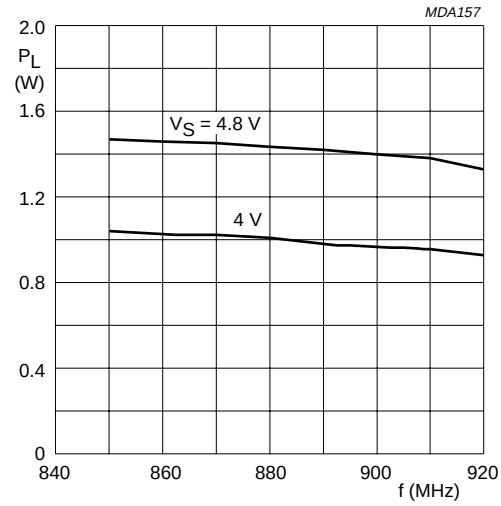
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $T_{mb} = 25$ °C.

Fig.10 Load power as a function of control voltage; BGY122B; typical values.



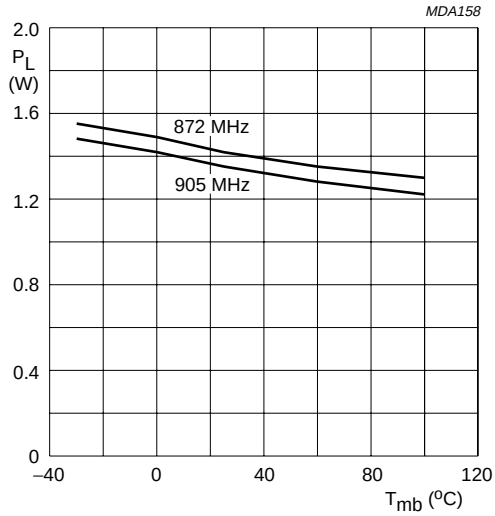
$Z_S = Z_L = 50\ \Omega$; P_D =2 mW; V_S = 4.8 V; T_{mb} = 25 °C.

Fig.11 Efficiency as a function of load power; BGY122B; typical values.



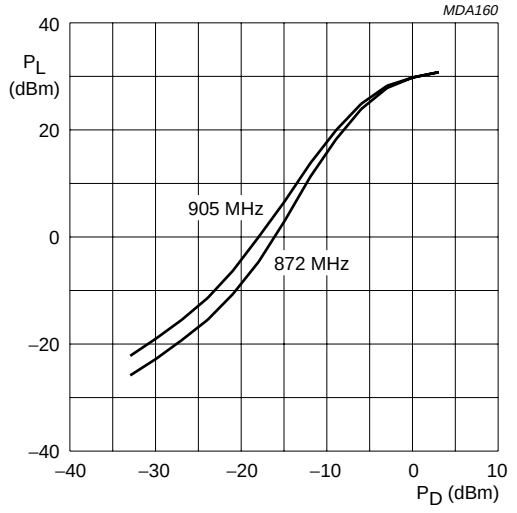
$Z_S = Z_L = 50\ \Omega$; P_D = 2 mW; V_C = 3 V; T_{mb} = 25 °C.

Fig.12 Load power as a function of frequency; BGY122B; typical values.



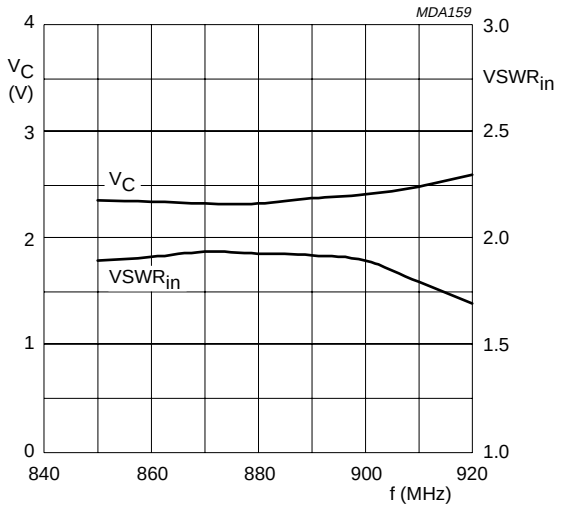
$Z_S = Z_L = 50\ \Omega$; P_D = 2 mW; V_S = 4.8 V; V_C = 3 V.

Fig.13 Load power as a function of mounting base temperature; BGY122B; typical values.



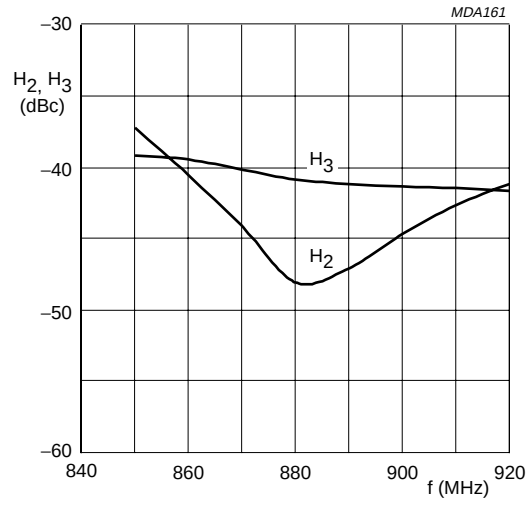
$Z_S = Z_L = 50\ \Omega$; V_S = 4.8 V; V_C = 3 V; T_{mb} = 25 °C.

Fig.14 Load power as a function of drive power; BGY122B; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $P_L = 1.2$ W; $T_{mb} = 25$ °C.

Fig.15 Control voltage and input VSWR as functions of frequency; BGY122B; typical values.



$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $P_L = 1.2$ W; $T_{mb} = 25$ °C.

Fig.16 Harmonics as a function of frequency; BGY122B; typical values.

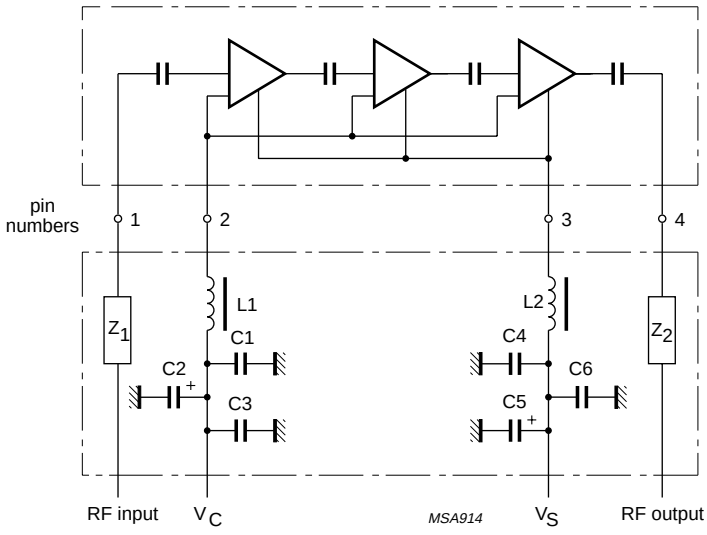
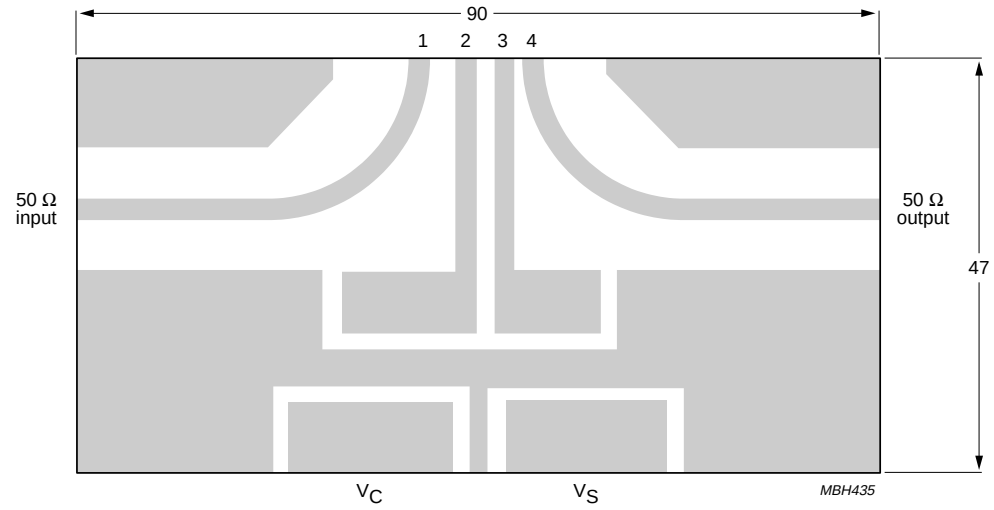


Fig.17 Test circuit.



Dimensions in mm.

Fig.18 Printed-circuit board test-fixture.

List of components (See Figs 17 and 18)

COMPONENT	DESCRIPTION	VALUE	CATALOGUE NO.
C1, C4	multilayer ceramic chip capacitor	100 nF	2222 852 47104
C2, C5	tantalum capacitor	2.2 µF; 35 V	–
C3, C6	multilayer ceramic chip capacitor	33 pF	2222 851 13339
L1, L2	Grade 4S2 Ferroxcube chip bead	–	4330 030 36300
Z_1, Z_2	stripline; note 1	50 Ω	–

Note

1. The striplines are on a double copper-clad printed-circuit board with PTFE fibreglass dielectric (ε_r = 2.2); thickness $^1/_{32}$ inch.

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.

Soldering can be carried out using a conveyor oven, a hot air oven, an infrared oven or a combination of these ovens. A double reflow process is permitted.

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 allowed temperature is 250 °C for a maximum of 5 seconds.

The maximum ramp-up is 10 °C per second.

The maximum cool-down is 5 °C per second.

Cleaning

The following fluids may be used for cleaning:

- Alcohol
- Bio-Act (Terpene Hydrocarbon)
- Acetone.

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

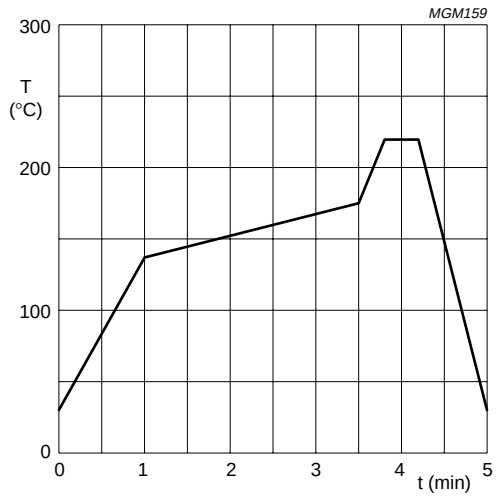
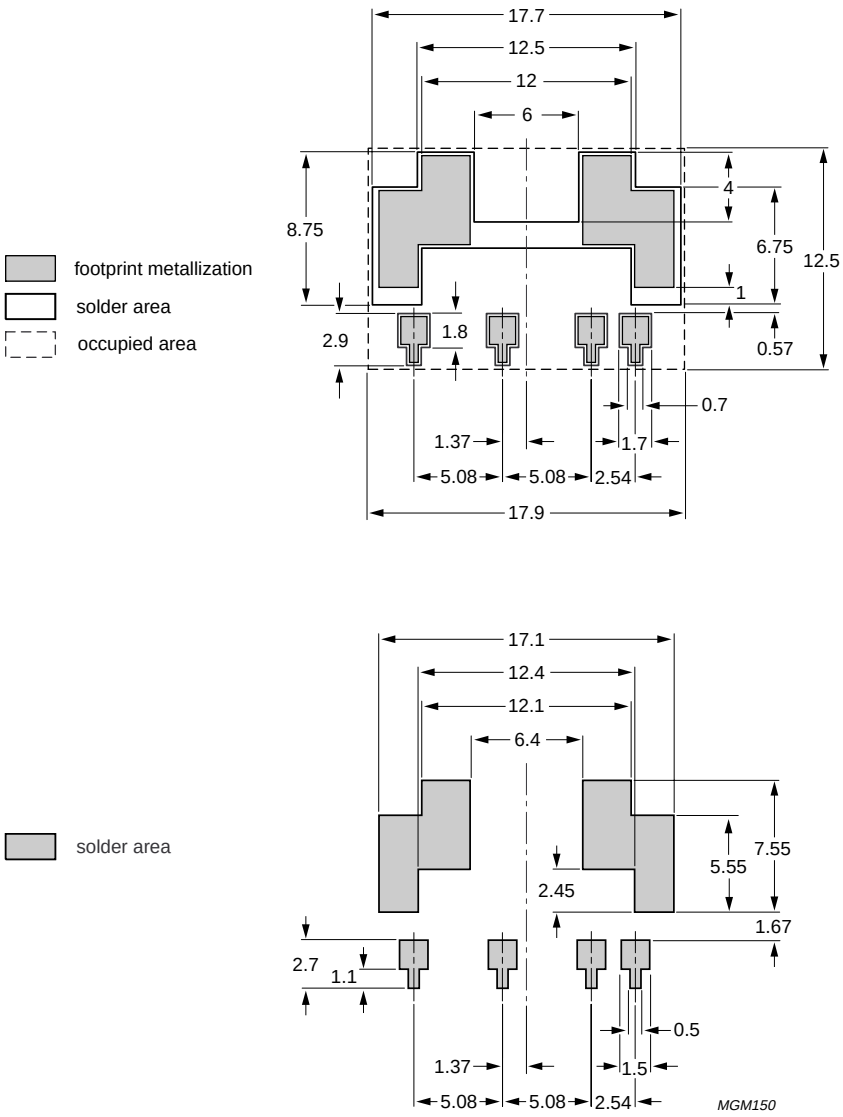


Fig.19 Recommended reflow temperature profile.

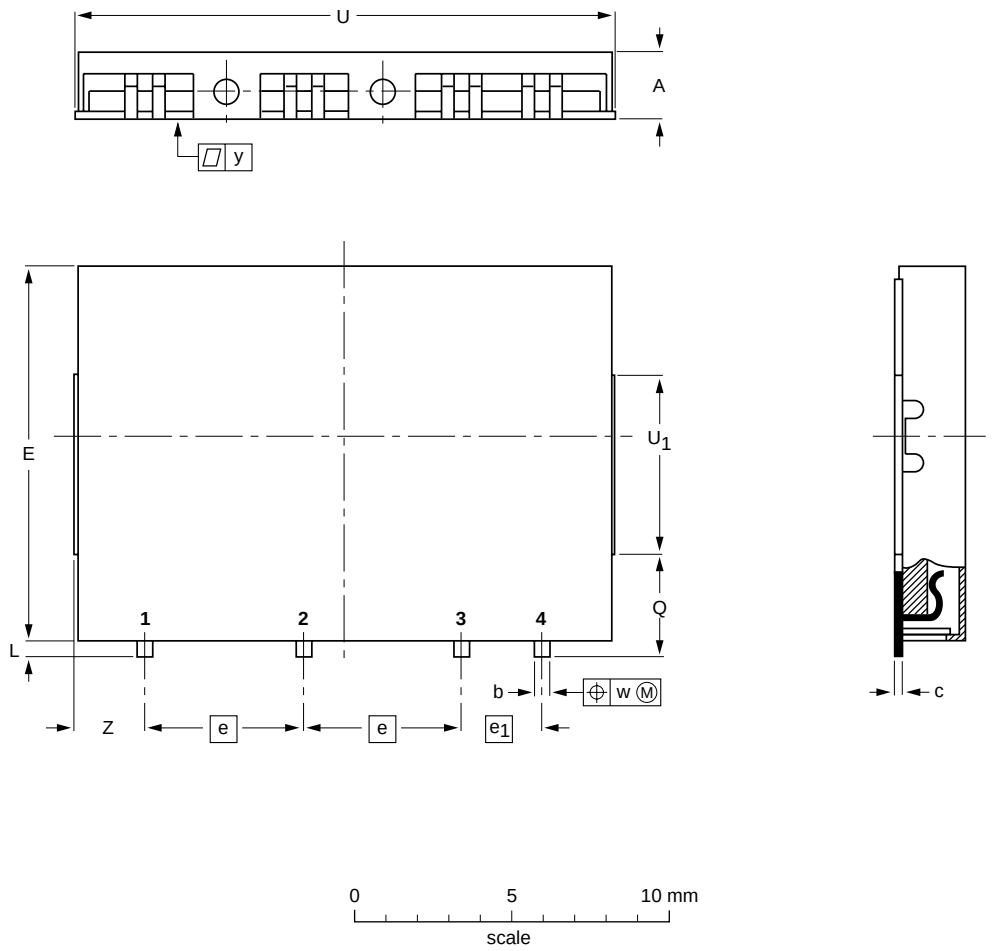


Dimensions in mm.

Fig.20 Footprint SOT388B.

PACKAGE OUTLINE

Rectangular single-ended surface-mount package; metal cap; 4 in-line leads **SOT388B**



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	c	e	e_1	E	L	Q	U	U_1	w	y	Z
mm	2.2 1.8	0.56 0.46	0.30 0.20	5.08	2.54	12.2 11.8	0.7 0.3	3.4 3.0	17.3 16.9	6.0 5.6	0.25	0.15	2.3 1.9

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT388B						97-11-19

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.	

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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.

NOTES

NOTES

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