DATA SHEET

BGY122A; BGY122B
UHF amplifier modules

Preliminary specification
File under Discrete Semiconductors, SC09

1996 Apr 26

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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 SOT388A package. Each module consists of three NPN silicon planar transistor chips 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 - SOT388A

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

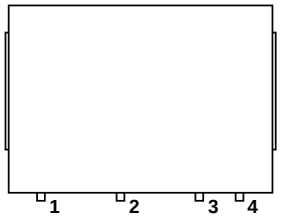


Fig.1 Simplified outline.

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

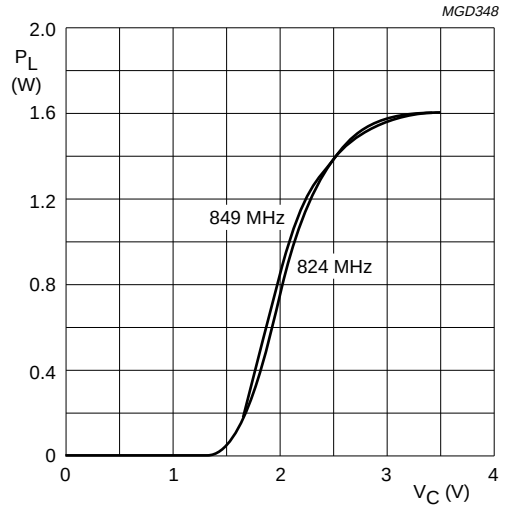
In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
V_S	DC supply voltage	–	7	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 range	–40	+100	°C
T_{mb}	operating mounting base temperature	–30	+100	°C

CHARACTERISTICS

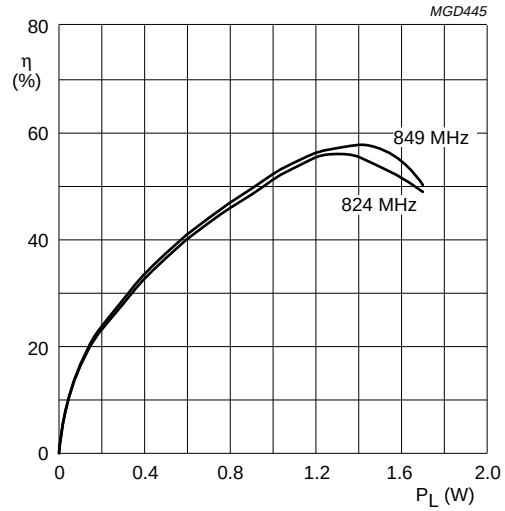
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $V_C \leq 3$ V; $T_{mb} = 25$ °C; unless otherwise specified.

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			



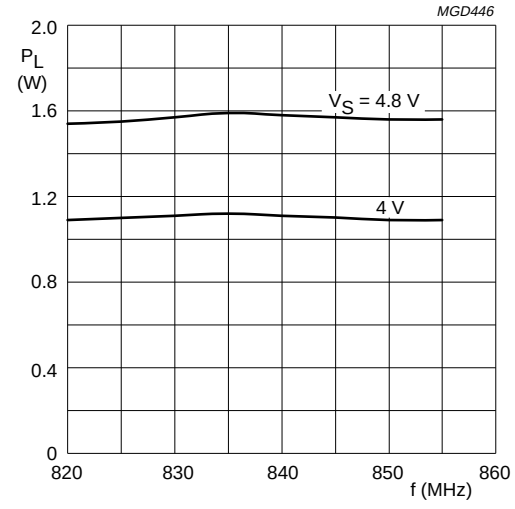
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $T_{mb} = 25$ °C.

Fig.2 Load power as a function of control voltage; BGY122A; typical values.



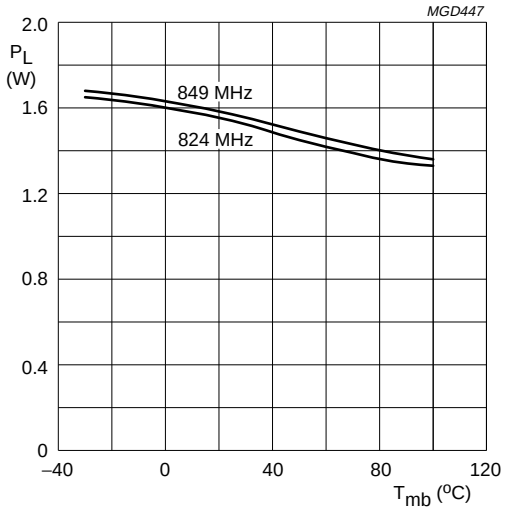
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $T_{mb} = 25$ °C.

Fig.3 Efficiency as a function of load power; BGY122A; typical values.



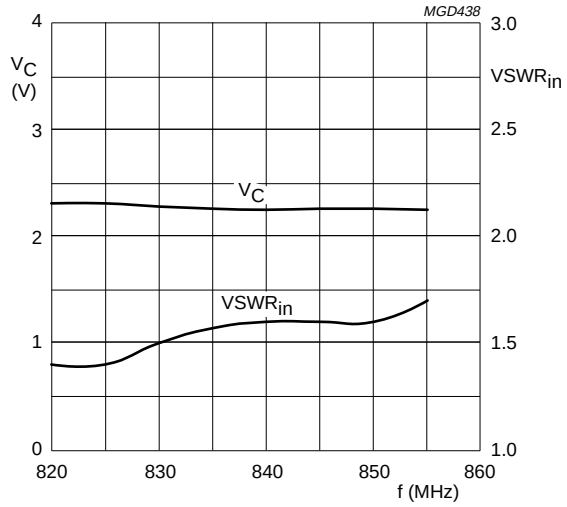
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_C = 3$ V; $T_{mb} = 25$ °C.

Fig.4 Load power as a function of frequency; BGY122A; typical values.



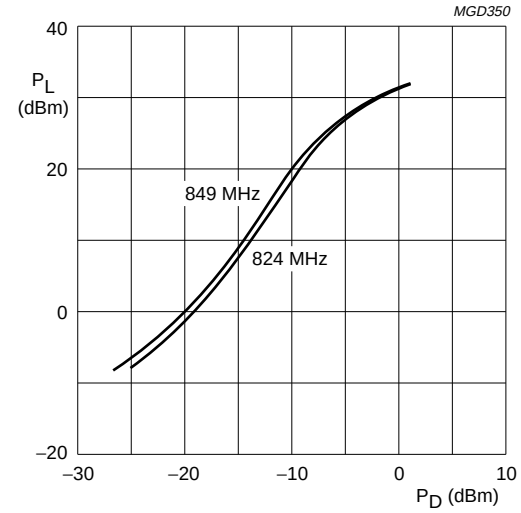
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $V_C = 3$ V.

Fig.5 Load power as a function of mounting base temperature; BGY122A; typical values.



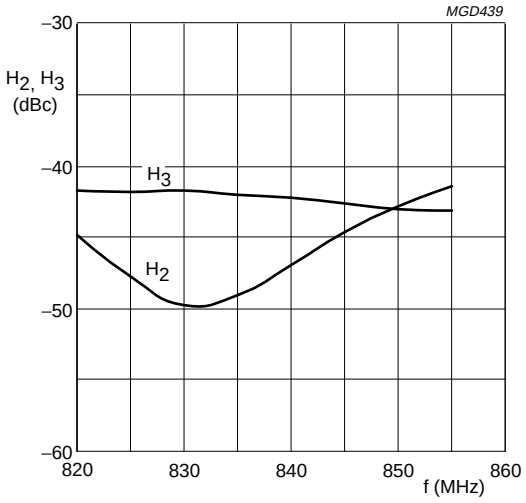
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $P_L = 1.2$ W; $T_{mb} = 25$ °C.

Fig.6 Control voltage and input VSWR as functions of frequency; BGY122A; typical values.



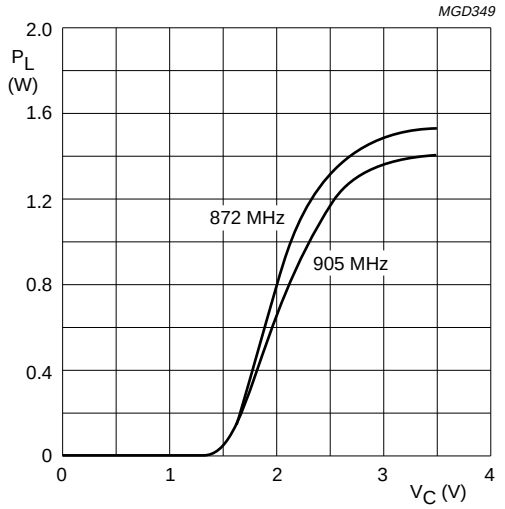
$Z_S = Z_L = 50\ \Omega$; $V_S = 4.8$ V; $V_C = 3$ V; $T_{mb} = 25$ °C.

Fig.7 Load power as a function of drive power; BGY122A; typical values.



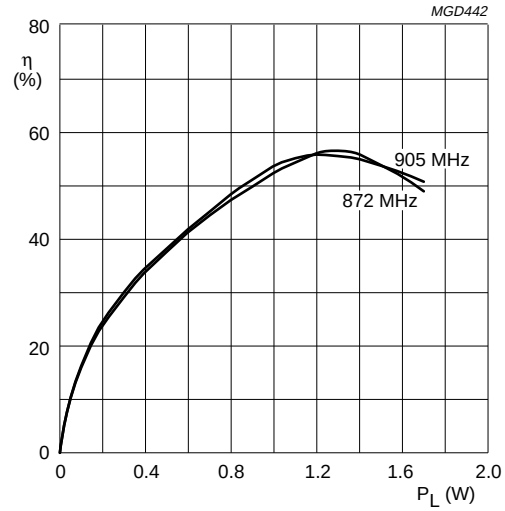
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $P_L = 1.2$ W; $T_{mb} = 25$ °C.

Fig.8 Harmonics as a function of frequency; BGY122A; typical values.



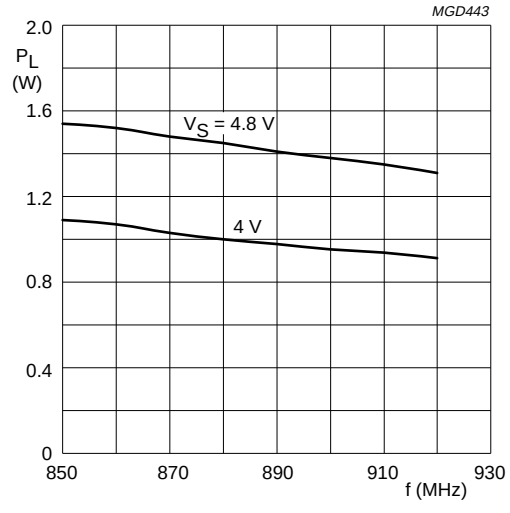
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $T_{mb} = 25$ °C.

Fig.9 Load power as a function of control voltage; BGY122B; typical values.



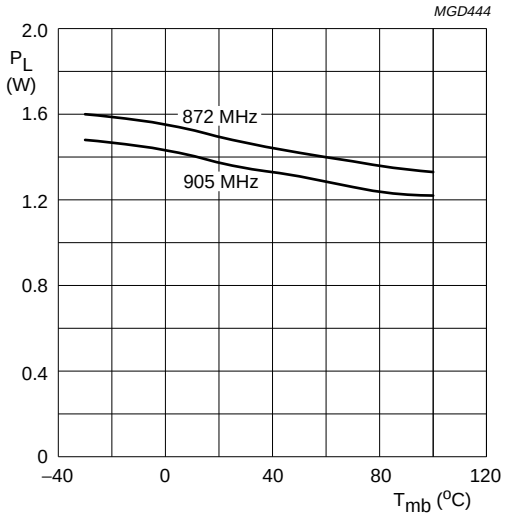
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $T_{mb} = 25$ °C.

Fig.10 Efficiency as a function of load power; BGY122B; typical values.



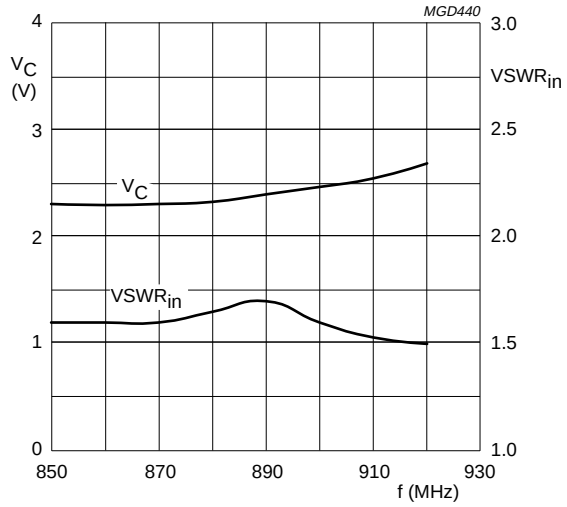
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_C = 3$ V; $T_{mb} = 25$ °C.

Fig.11 Load power as a function of frequency; BGY122B; typical values.



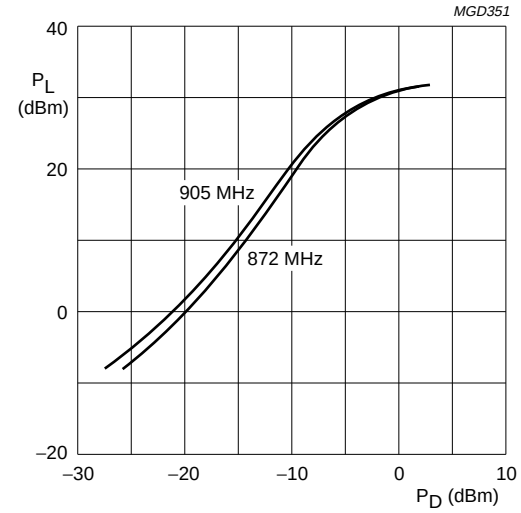
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $V_C = 3$ V.

Fig.12 Load power as a function of mounting base temperature; BGY122B; typical values.



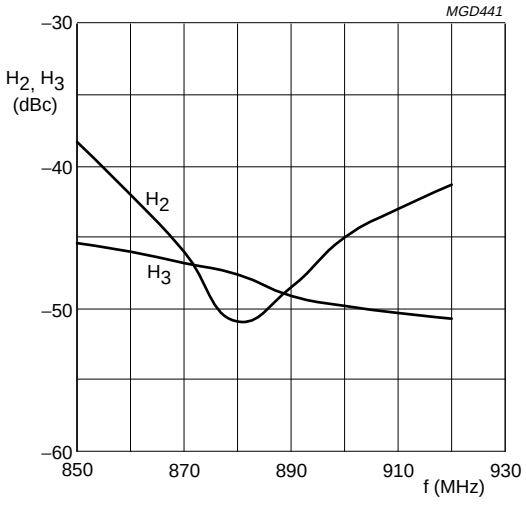
$Z_S = Z_L = 50\ \Omega$; $P_D = 2$ mW; $V_S = 4.8$ V; $P_L = 1.2$ W; $T_{mb} = 25$ °C.

Fig.13 Control voltage and input VSWR as functions of frequency; 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 Harmonics as a function of frequency; BGY122B; typical values.

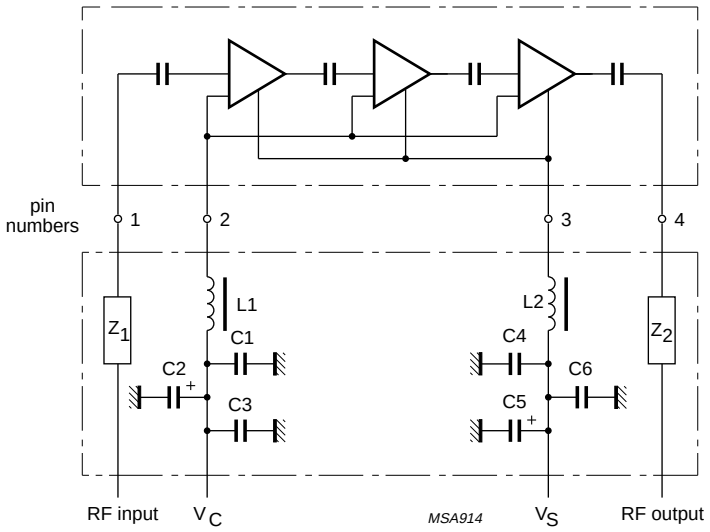
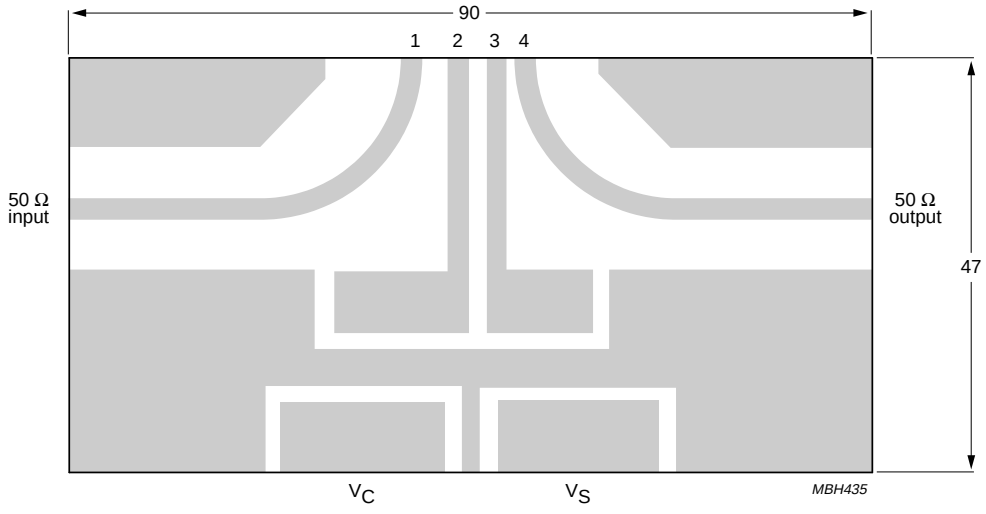


Fig.16 Test circuit.



Dimensions in mm.

Fig.17 Printed-circuit board test-fixture.

List of components (See Figs 16 **and** 17**)**

COMPONENT	DESCRIPTION	VALUE	CATALOGUE NO.
C1, C4	multilayer ceramic chip capacitor	100 nF	2222 852 47104
C2, C5	tantalum capacitor	35 V; 2.2 μF	–
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 PCB 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.

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.18):

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).

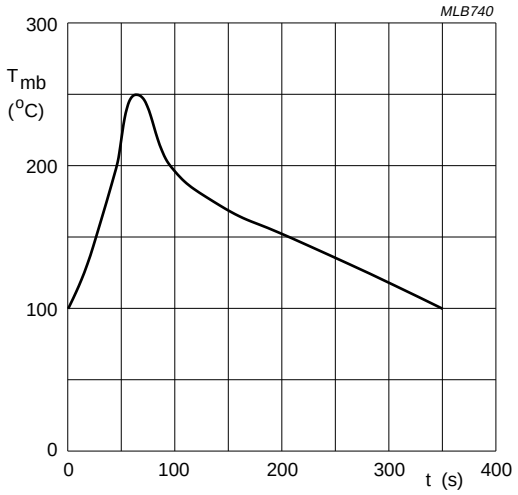


Fig.18 Maximum allowable temperature profile.

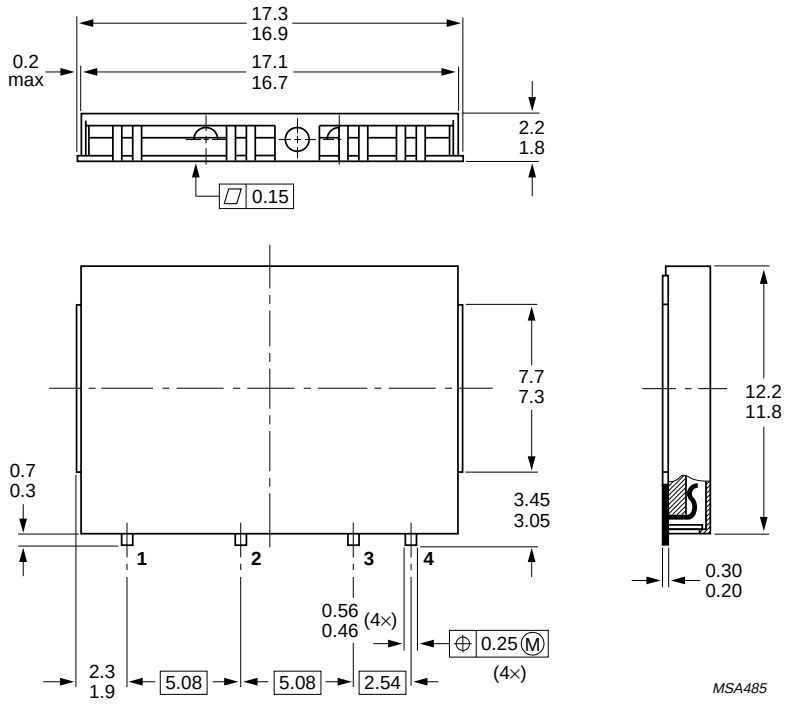
Cleaning

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.19 SOT388A.

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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