

**DISCRETE SEMICONDUCTORS**

# DATA SHEET

## **BGY43**

### VHF power amplifier module

Product specification

1996 Jun 06

Supersedes data of May 1991

File under Discrete Semiconductors, SC09

# VHF power amplifier module

# BGY43

### FEATURES

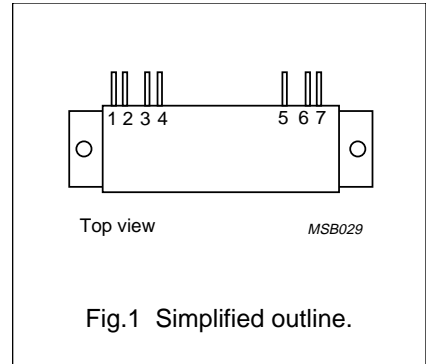
- Broadband VHF amplifier
- 13 W output power
- Direct operation from 12 V vehicle electrical systems

### APPLICATIONS

- Mobile communication equipment operating in the 148 to 174 MHz frequency range.

### PINNING - SOT132B

PIN	DESCRIPTION
1	RF input
2	ground
3	V <sub>S1</sub>
4	ground
5	V <sub>S2</sub>
6	ground
7	RF output
Flange	ground



### DESCRIPTION

The BGY43 is a two-stage amplifier module in a SOT132B package. The module consists of a two stage RF amplifier using NPN silicon planar transistor dies with lumped-element matching components, in a plastic stripline encapsulation. The negative supply is internally connected to the flange.

### QUICK REFERENCE DATA

RF performance at T<sub>h</sub> = 25 °C.

MODE OF OPERATION	f (MHz)	V <sub>S1</sub> ; V <sub>S2</sub> (V)	P <sub>D</sub> (mW)	P <sub>L</sub> (W)	Z <sub>S</sub> , Z <sub>L</sub> (Ω)
CW	148 to 174	12.5	≤150; typ 80	>13	50

### WARNING

#### Product and environmental safety - toxic materials

This product contains beryllium oxide. The product is entirely safe provided that the BeO disc 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.

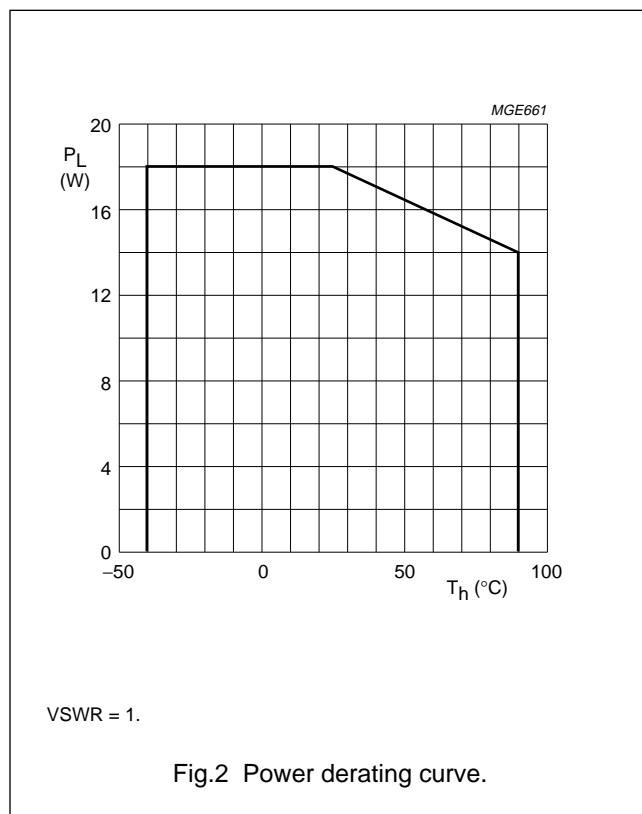
## VHF power amplifier module

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**LIMITING VALUES**

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
$V_{S1}$	DC supply voltage	–	16.5	V
$V_{S2}$	DC supply voltage	–	16.5	V
$V_i$	RF input terminal voltage	–	$\pm 25$	V
$V_o$	RF output terminal voltage	–	$\pm 25$	V
$P_D$	input drive power	–	300	mW
$P_L$	load power	–	18	W
$T_{stg}$	storage temperature	–40	+100	°C
$T_h$	operating heatsink temperature	–	90	°C



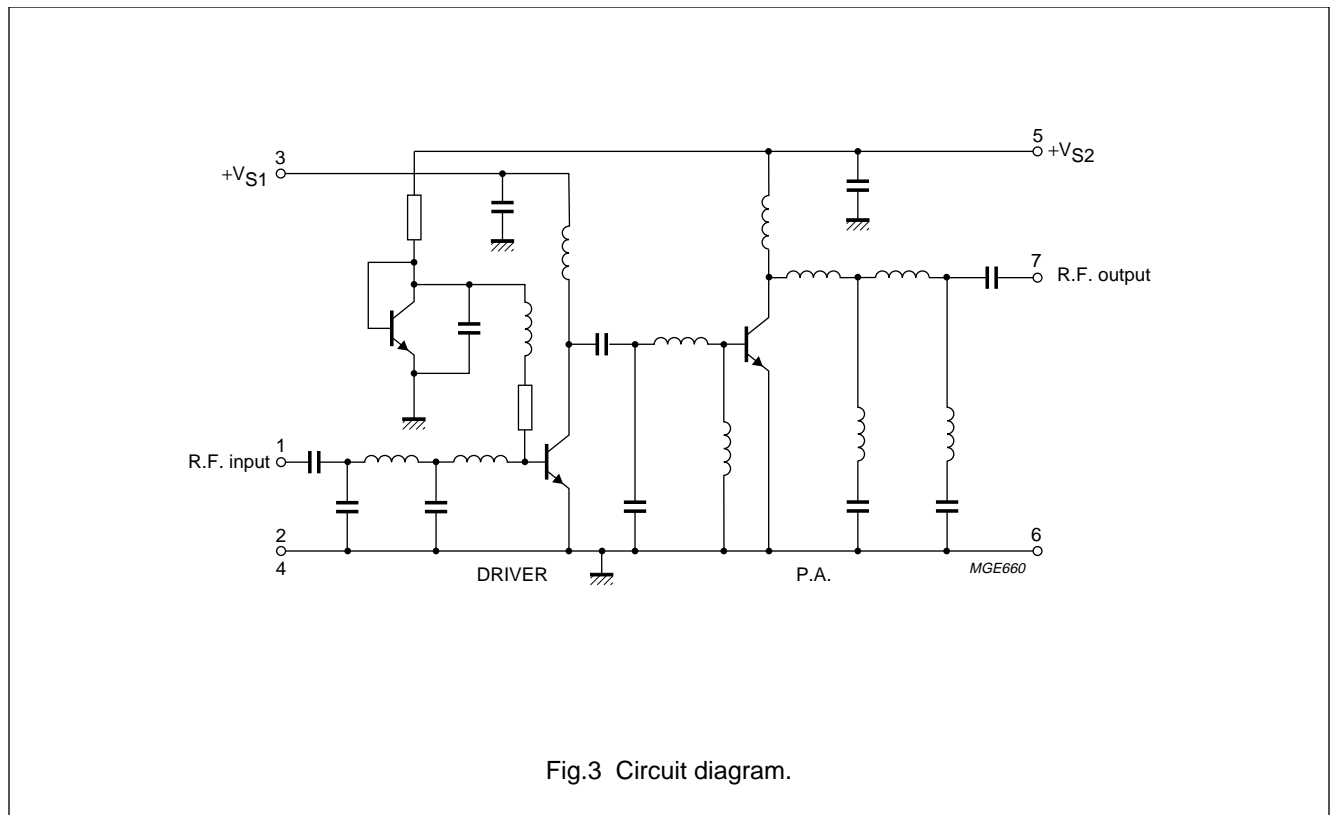
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### CHARACTERISTICS

$Z_S = Z_L = 50 \Omega$ ;  $V_{S1} = V_{S2} = 12.5 \text{ V}$ ;  $f = 148 \text{ to } 174 \text{ MHz}$ ;  $T_h = 25 \text{ }^\circ\text{C}$ ; unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{Q1}$	leakage current	$P_D = 0$	–	5	–	mA
$I_{Q2}$	leakage current	$P_D = 0$	–	15	–	mA
$P_D$	input drive power	$P_L = 13 \text{ W}$	–	80	150	mW
$\eta$	efficiency	$P_L = 13 \text{ W}$	40	48	–	%
$H_2$	second harmonic		–25	–34	–	dBc
$H_3$	third harmonic		–25	–34	–	dBc
$VSWR_{in}$	input VSWR	with respect to $50 \Omega$	–	1 : 1.5	–	



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### Stability

The module is stable with a load VSWR up to 3:1 (all phases) when operated within the following conditions:  
 $V_{S1} = V_{S2} = 10 \text{ V to } 16.5 \text{ V}$ ;  $P_D = 30 \text{ to } 300 \text{ mW}$ ;  
 $f = 148 \text{ to } 174 \text{ MHz}$ ;  $P_L \leq 18 \text{ W}$  (matched).

### Ruggedness

The module will withstand a load mismatch VSWR of 50:1 (all phases) for short period overload conditions, with drive power and DC supply voltages at maximum values, providing the combination does not result in the matched RF output power rating being exceeded.

### MOUNTING

To ensure good thermal transfer the module should be mounted on a heatsink with a flat surface with heat-conducting compound applied between module and heatsink. If an isolation washer is used, heatsink compound should be applied to both sides of the washer. Burrs and thickening of the holes in the heatsink should be removed and 3 mm bolts tightened to a torque of 0.5 Nm. The leads of the devices may be soldered directly into a circuit using a soldering iron with a maximum temperature of 245 °C for not more than 10 seconds at a distance of at least 1 mm from the plastic.

### APPLICATION INFORMATION

#### Power rating

In general, it is recommended that the output power from the module under nominal conditions should not exceed 16 W in order to provide an adequate safety margin under fault conditions.

#### Output power control

The module is not designed to be operated over a wide range of output power levels. The purpose of the output power control is to set the nominal output power level. The preferred method of output power control is by varying the drive power between 30 and 200 mW. The next option is by varying  $V_{S1}$  between 6 and 12.5 V.

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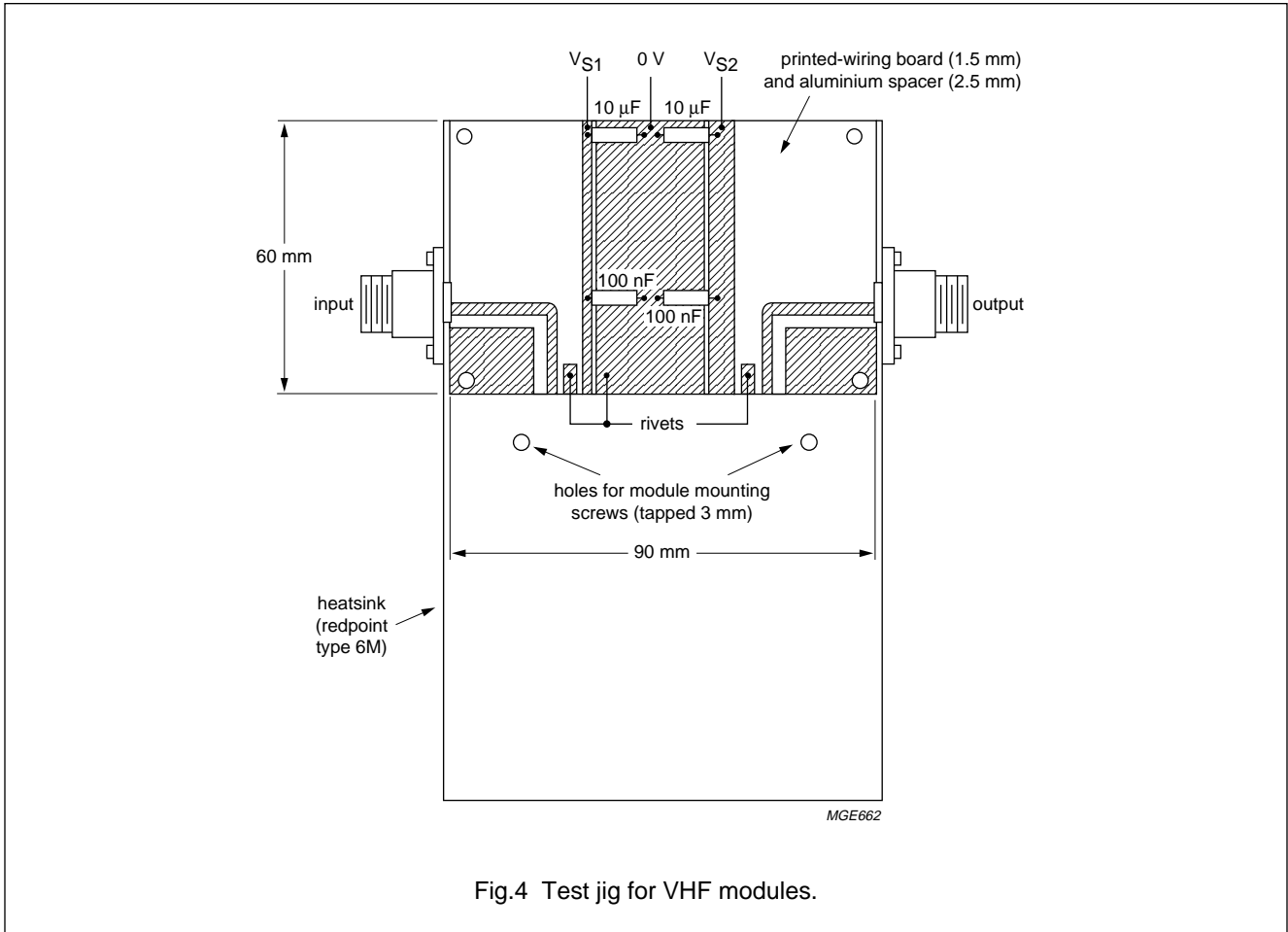


Fig.4 Test jig for VHF modules.

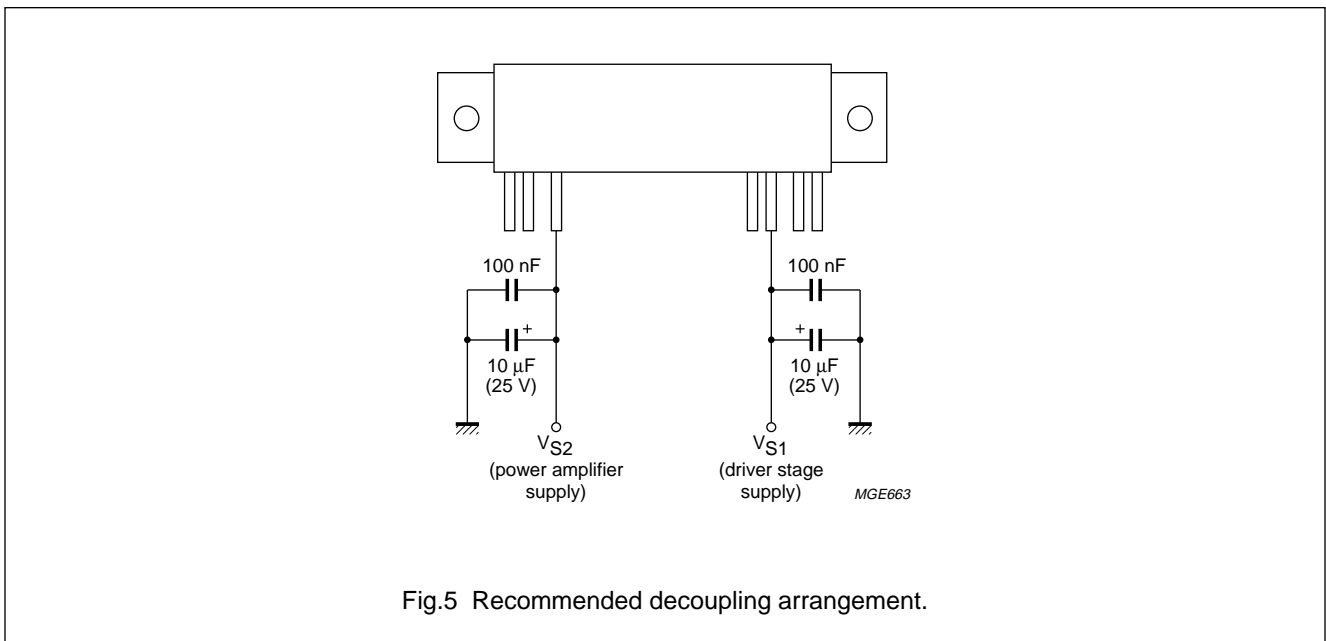
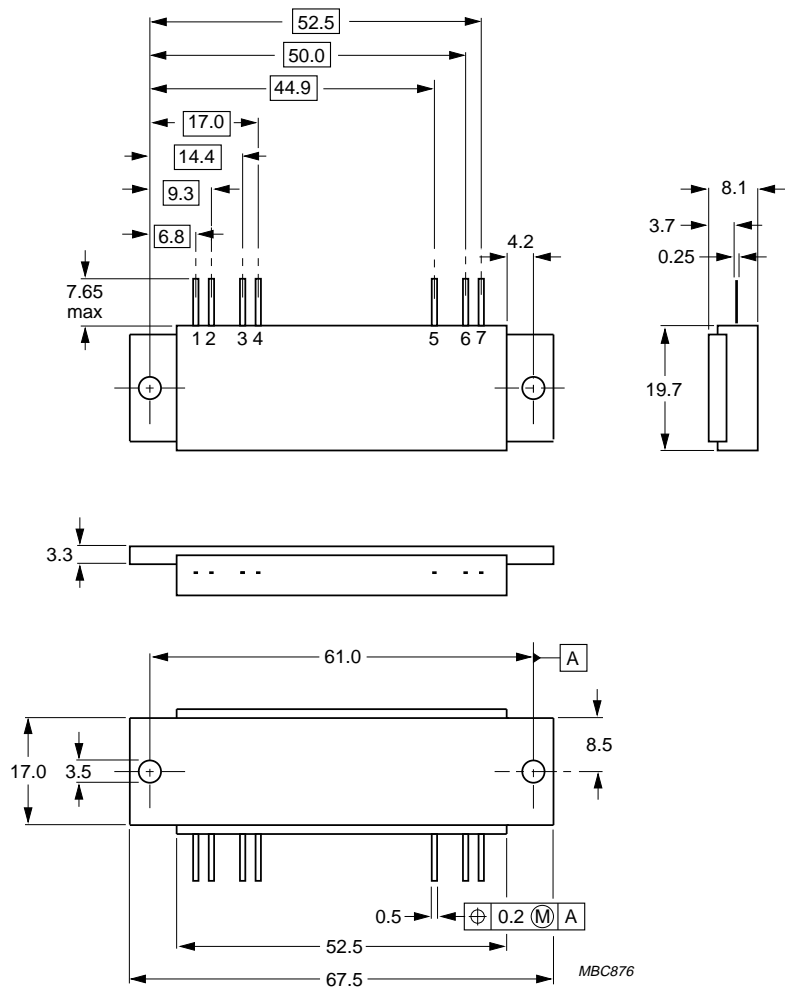


Fig.5 Recommended decoupling arrangement.

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## PACKAGE OUTLINE



Dimensions in mm.

Fig.6 SOT132B.

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**DEFINITIONS**

<b>Data sheet status</b>	
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.
Short-form specification	The data in this specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.
<b>Limiting values</b>	
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.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

**LIFE SUPPORT APPLICATIONS**

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