

# VHF Power Amplifier Module

## **BGY33**

Broadband VHF Amplifier

# DATASHEET

OEM – Philips

Source: Philips Data Handbook SC09

RF Power Modules and Transistors for Mobile Phones 1996

**VHF power amplifier modules**

**BGY32; BGY33;  
BGY35; BGY36**

**FEATURES**

- Broadband VHF amplifiers
- 18 W output power
- Direct operation from 12 V vehicle electrical systems.

**APPLICATIONS**

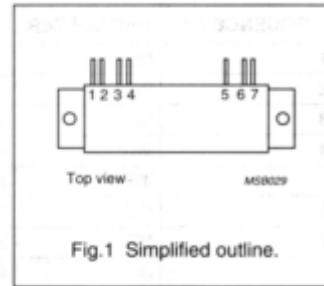
- Mobile communication equipment.

**DESCRIPTION**

The BGY32, BGY33; BGY35 and BGY36 are two stage amplifier modules in a SOT132B package. Each module comprises two NPN silicon planar transistor dies together with lumped-element matching components.

**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



**QUICK REFERENCE DATA**

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

TYPE	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)
BGY32	CW	68 to 88	12.5	100	>18; typ. 23	50
BGY33	CW	80 to 108	12.5	100	>18; typ. 22	50
BGY35	CW	132 to 156	12.5	150	>18; typ. 22	50
BGY36	CW	148 to 174	12.5	150	>18; typ. 21	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.

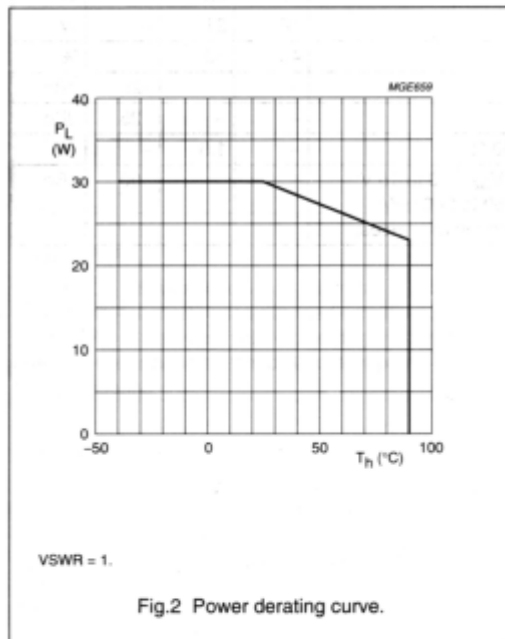
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**LIMITING VALUES**

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

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
$V_{S1}$	DC supply voltage	-	15	V
$V_{S2}$	DC supply voltage	-	15	V
$V_i$	RF input terminal voltage	-	$\pm 25$	V
$V_o$	RF output terminal voltage	-	$\pm 25$	V
$P_D$	input drive power	-	200	mW
	BGY32; BGY33 BGY35; BGY36	-	300	mW
$P_L$	load power	-	30	W
$T_{stg}$	storage temperature	-40	+100	$^{\circ}\text{C}$
$T_h$	operating heatsink temperature	-	90	$^{\circ}\text{C}$



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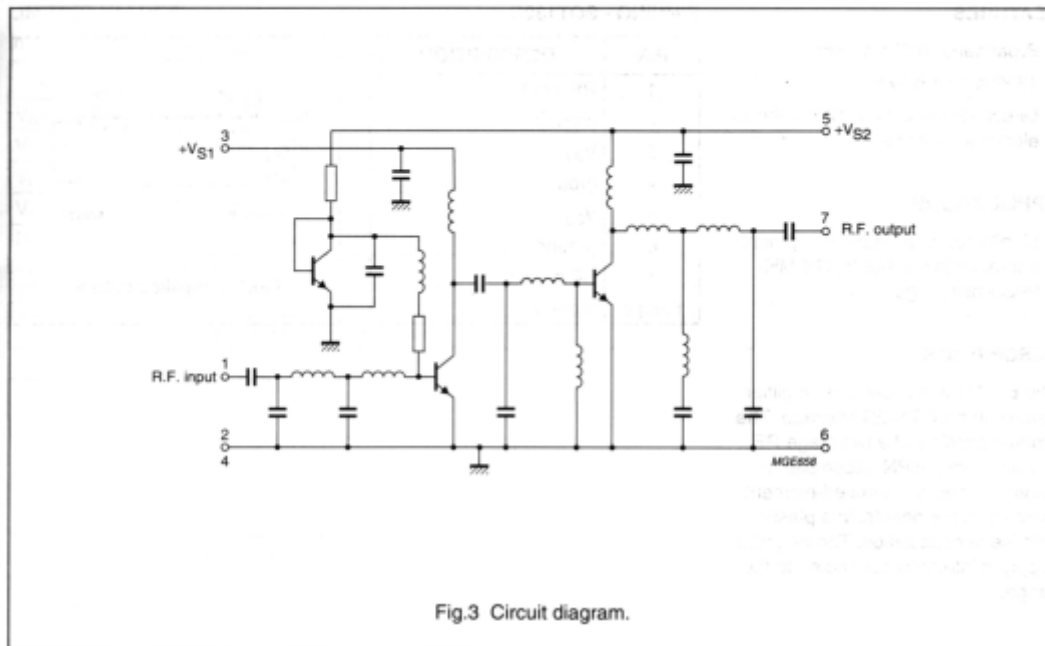
## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f	frequency					
	BGY32		68	–	88	MHz
	BGY33		80	–	108	MHz
	BGY35		132	–	156	MHz
	BGY36		148	–	174	MHz
$I_{O1}$	leakage current	$P_D = 0$	–	6	–	mA
$I_{O2}$	leakage current	$P_D = 0$	–	13	–	mA
$P_L$	load power					
	BGY32	$P_D = 100 \text{ mW}$	18	23	–	W
	BGY33	$P_D = 100 \text{ mW}$	18	22	–	W
	BGY35	$P_D = 150 \text{ mW}$	18	22	–	W
	BGY36	$P_D = 150 \text{ mW}$	18	21	–	W
$\eta$	efficiency		40	50	–	%
$H_2$	second harmonic		–	–	–25	dBc
$H_3$	third harmonic		–	–	–25	dBc
$VSWR_{in}$	input VSWR	with respect to $50 \Omega$	–	1.5	–	
	stability	$V_{S1} = 6 \text{ to } 15 \text{ V}$ ; $V_{S2} = 10 \text{ to } 15 \text{ V}$ ; $V_{S1} \leq V_{S2}$ ; $P_D = 50 \text{ to } 200 \text{ mW}$ ; $VSWR \leq 3 : 1$ through all phases;	–	–	–60	dBc

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**Ruggedness**

The module will withstand a load mismatch VSWR of 50:1 (all phases) for short period overload conditions, with  $P_D$ ,  $V_{S1}$  and  $V_{S2}$  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 maximum 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****Supply**

An electrolytic capacitor of 10  $\mu$ F, 25 V, in parallel with a polyester capacitor of 100 nF to earth, is recommended as a decoupling arrangement for each power supply pin.

**Power rating**

In general it is recommended that the output power from the module under nominal conditions should not exceed 23 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 large 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 50 and 200 mW. The next option is by varying  $V_{S1}$  between 6 and 12.5 V.