

## VHF amplifier modules

## BGY132; BGY133

### FEATURES

- Broadband VHF amplifiers
- 18 W output power
- Operate directly from 12 V vehicle electrical systems
- Output power control over a 10 dB range by drive power.

### APPLICATIONS

- Mobile communication equipment.

### 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 BGY132 and BGY133 are two stage amplifier modules. Each module comprises two NPN silicon planar transistor chips together with lumped-element matching components.

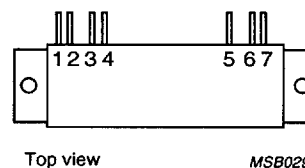


Fig.1 Simplified outline.

### QUICK REFERENCE DATA

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

| TYPE NUMBER | MODE OF OPERATION | f (MHz)   | V <sub>S1</sub> ; V <sub>S2</sub> (V) | P <sub>L</sub> (W) | G <sub>p</sub> (dB) | η (%)   | Z <sub>S</sub> ; Z <sub>L</sub> (Ω) |
|-------------|-------------------|-----------|---------------------------------------|--------------------|---------------------|---------|-------------------------------------|
| BGY132      | CW                | 68 to 88  | 12.5                                  | ≥18                | ≥22.6               | typ. 45 | 50                                  |
| BGY133      | CW                | 80 to 108 | 12.5                                  | ≥18                | ≥22.6               | typ. 45 | 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.

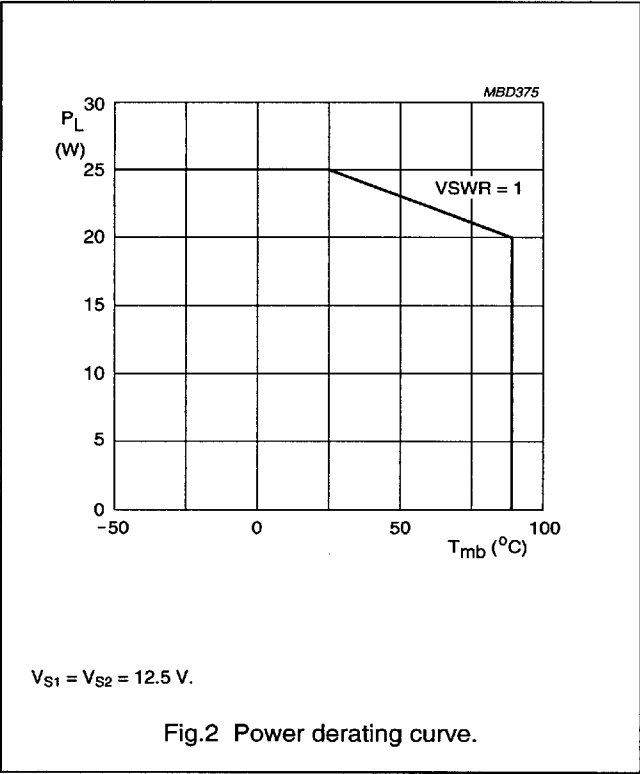
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**LIMITING VALUES**

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

| SYMBOL           | PARAMETER                           | MIN. | MAX. | UNIT |
|------------------|-------------------------------------|------|------|------|
| V <sub>S1</sub>  | DC supply voltage                   | —    | 15.6 | V    |
| V <sub>S2</sub>  | DC supply voltage                   | —    | 15.6 | V    |
| V <sub>i</sub>   | RF input terminal voltage           | —    | 25   | V    |
| V <sub>o</sub>   | RF output terminal voltage          | —    | 25   | V    |
| P <sub>D</sub>   | input drive power                   | —    | 200  | mW   |
| P <sub>L</sub>   | load power                          | —    | 25   | W    |
| T <sub>stg</sub> | storage temperature                 | −40  | +100 | °C   |
| T <sub>mb</sub>  | operating mounting base temperature | −20  | +90  | °C   |



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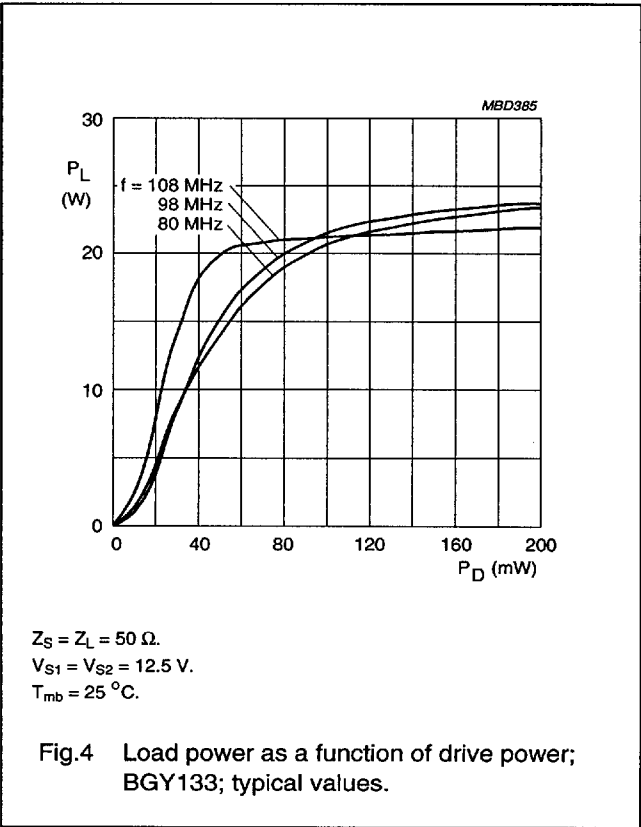
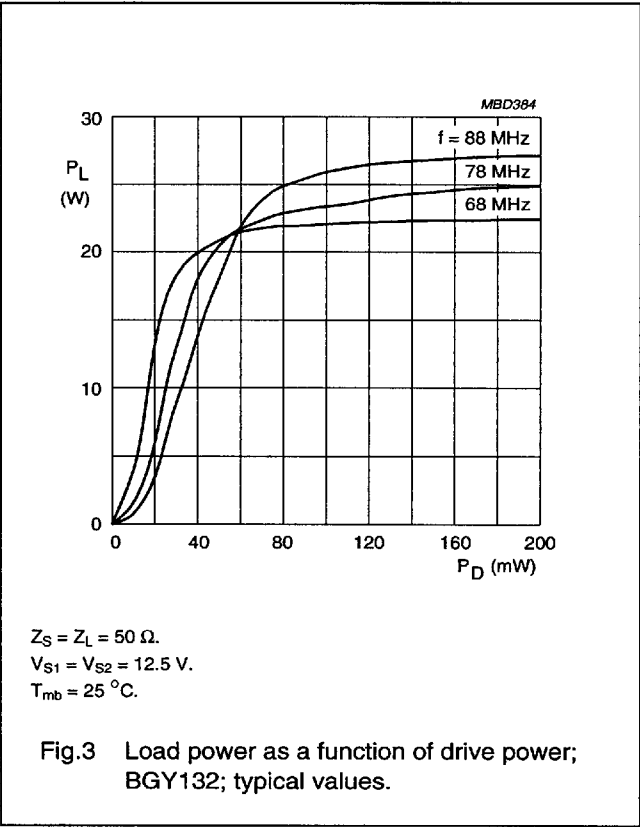
CHARACTERISTICS

$T_{mb} = 25\text{ }^{\circ}\text{C}$ ;  $Z_S = Z_L = 50\text{ }\Omega$ ;  $P_D = 100\text{ mW}$ ;  $V_{S1} = V_{S2} = 12.5\text{ V}$ ; unless otherwise specified.

| SYMBOL      | PARAMETER       | CONDITIONS                                                                                                         | MIN.           | TYP.    | MAX.  | UNIT |
|-------------|-----------------|--------------------------------------------------------------------------------------------------------------------|----------------|---------|-------|------|
| f           | frequency       |                                                                                                                    |                |         |       |      |
|             | BGY132          |                                                                                                                    | 68             | —       | 88    | MHz  |
|             | BGY133          |                                                                                                                    | 80             | —       | 108   | MHz  |
| $I_{O2}$    | leakage current | $V_{S1} = 0$ ; $P_D = 0$                                                                                           | —              | —       | 10    | mA   |
| $P_L$       | load power      |                                                                                                                    | 18             | —       | —     | W    |
| $G_p$       | power gain      | $P_L = 18\text{ W}$ ; note 1                                                                                       | 22.6           | —       | —     | dB   |
| $\eta$      | efficiency      | $P_L = 18\text{ W}$ ; note 1                                                                                       | 38             | 45      | —     | %    |
| $H_2$       | second harmonic | $P_L = 18\text{ W}$ ; note 1                                                                                       | —              | —       | −25   | dBc  |
| $H_3$       | third harmonic  | $P_L = 18\text{ W}$ ; note 1                                                                                       | —              | —       | −25   | dBc  |
| $VSWR_{in}$ | input VSWR      | $P_L = 18\text{ W}$ ; note 1                                                                                       | —              | 1.5 : 1 | 3 : 1 |      |
|             | stability       | $VSWR \leq 3 : 1$ ; $P_L = 2\text{ to }20\text{ W}$ ;<br>$V_{S1} = V_{S2} = 10.8\text{ to }15.6\text{ V}$ ; note 1 | —              | —       | −60   | dBc  |
|             | ruggedness      | $VSWR = 50 : 1$ ; $V_{S1} = V_{S2} = 15.6\text{ V}$ ;<br>$P_L < 25\text{ W}$ during 1 minute; note 1               | no degradation |         |       |      |

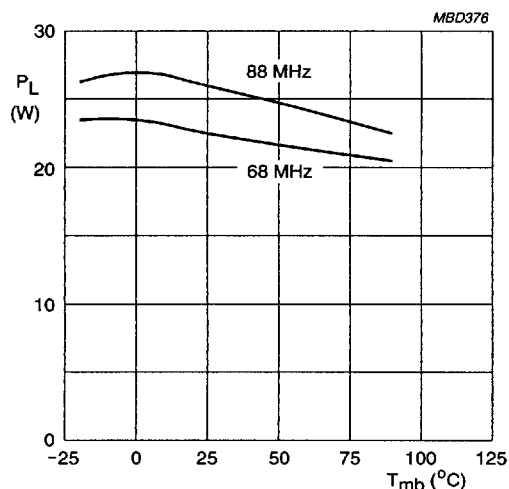
Note

1. Adjust  $P_D$  for specified  $P_L$ .



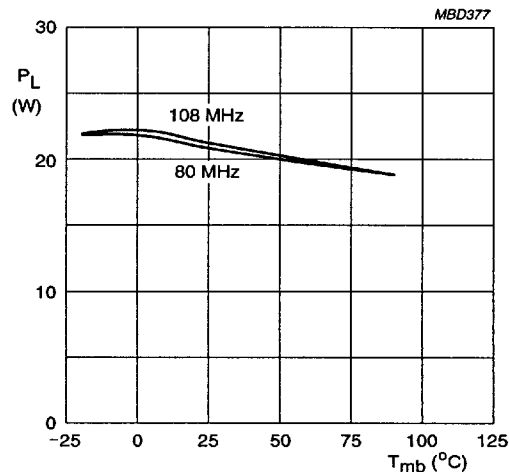
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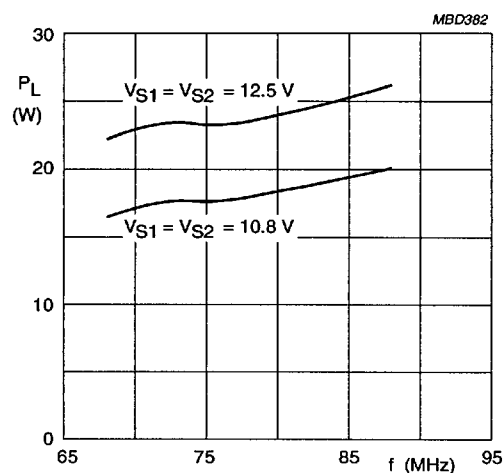
$Z_S = Z_L = 50 \Omega$ .  
 $P_D = 100 \text{ mW}$ .  
 $V_{S1} = V_{S2} = 12.5 \text{ V}$ .

Fig.5 Load power as a function of mounting base temperature; BGY132; typical values.



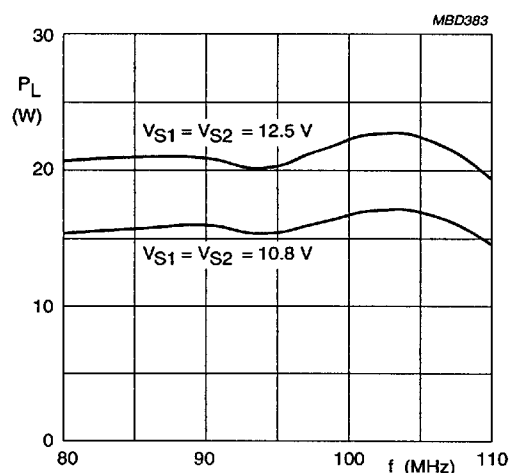
$Z_S = Z_L = 50 \Omega$ .  
 $P_D = 100 \text{ mW}$ .  
 $V_{S1} = V_{S2} = 12.5 \text{ V}$ .

Fig.6 Load power as a function of mounting base temperature; BGY133; typical values.



$Z_S = Z_L = 50 \Omega$ .  
 $P_D = 100 \text{ mW}$ .  
 $T_{mb} = 25^\circ\text{C}$ .

Fig.7 Load power as a function of frequency; BGY132; typical values.

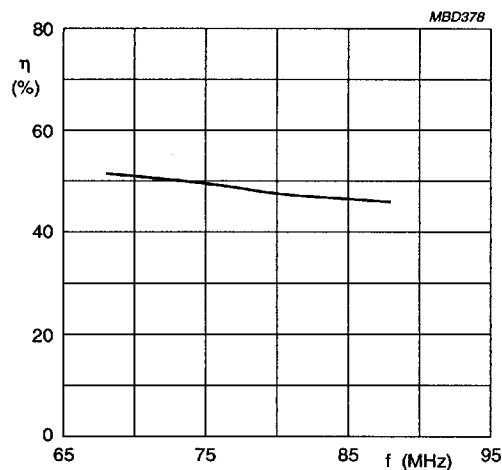


$Z_S = Z_L = 50 \Omega$ .  
 $P_D = 100 \text{ mW}$ .  
 $T_{mb} = 25^\circ\text{C}$ .

Fig.8 Load power as a function of frequency; BGY133; typical values.

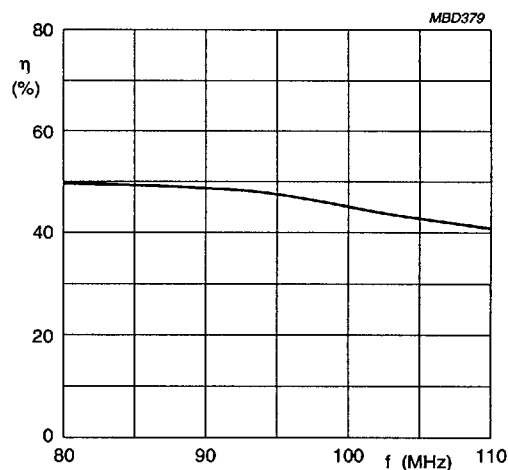
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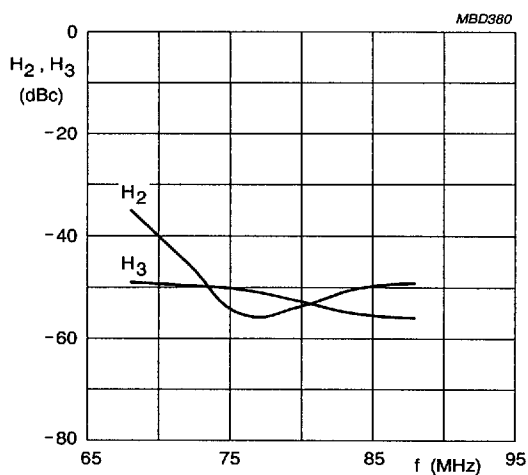
$Z_S = Z_L = 50 \Omega$ .  
 $P_D = 100 \text{ mW}$ .  
 $V_{S1} = V_{S2} = 12.5 \text{ V}$ .  
 $T_{mb} = 25^\circ \text{C}$ .  
 $P_L = 18 \text{ W}$ .

Fig. 9 Efficiency as a function of frequency; BGY132; typical values.



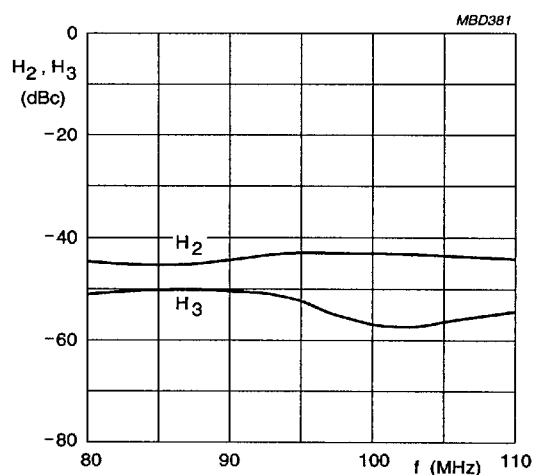
$Z_S = Z_L = 50 \Omega$ .  
 $P_D = 100 \text{ mW}$ .  
 $V_{S1} = V_{S2} = 12.5 \text{ V}$ .  
 $T_{mb} = 25^\circ \text{C}$ .  
 $P_L = 18 \text{ W}$ .

Fig. 10 Efficiency as a function of frequency; BGY133; typical values.



$Z_S = Z_L = 50 \Omega$ .  
 $P_D = 100 \text{ mW}$ .  
 $V_{S1} = V_{S2} = 12.5 \text{ V}$ .  
 $T_{mb} = 25^\circ \text{C}$ .  
 $P_L = 18 \text{ W}$ .

Fig. 11 Harmonics as functions of frequency; BGY132; typical values.



$Z_S = Z_L = 50 \Omega$ .  
 $P_D = 100 \text{ mW}$ .  
 $V_{S1} = V_{S2} = 12.5 \text{ V}$ .  
 $T_{mb} = 25^\circ \text{C}$ .  
 $P_L = 18 \text{ W}$ .

Fig. 12 Harmonics as functions of frequency; BGY133; typical values.

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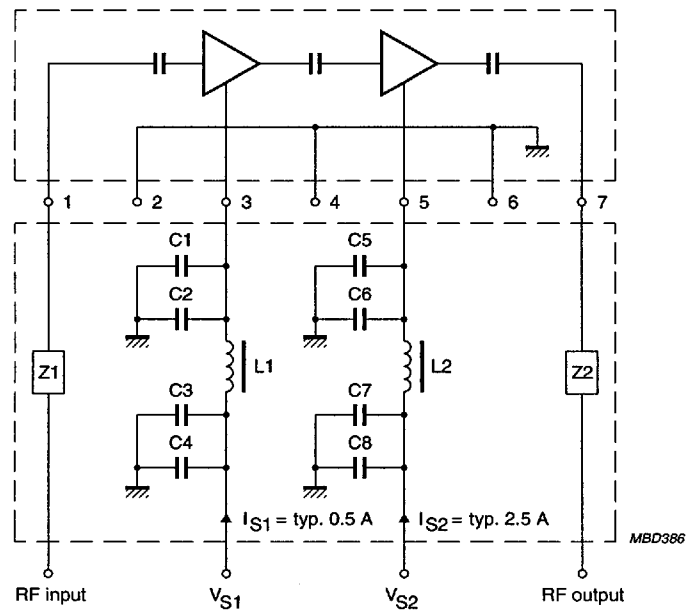


Fig.13 Test circuit.

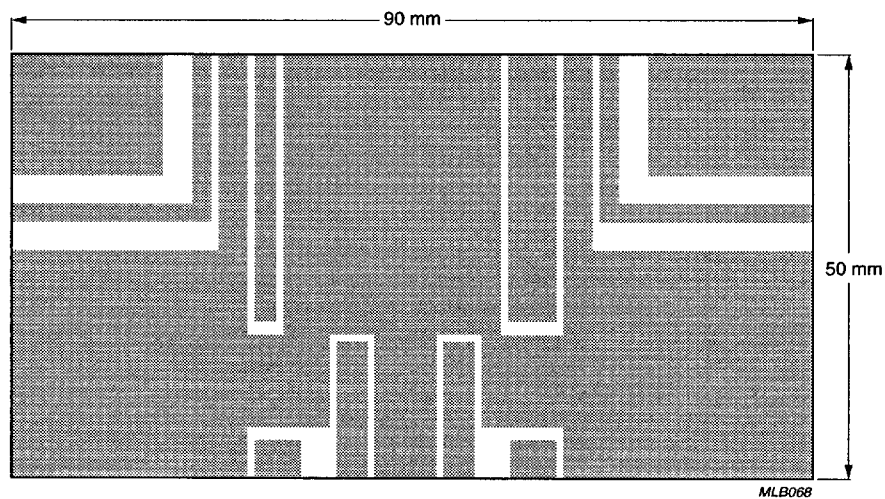


Fig.14 Printed-circuit board layout.

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## List of components (see Fig.13)

| COMPONENT | DESCRIPTION                           | VALUE             | CATALOGUE NO.  |
|-----------|---------------------------------------|-------------------|----------------|
| C1, C5    | multilayer ceramic chip capacitor     | 1 nF              | 4822 590 06614 |
| C2, C6    | tantalum capacitor                    | 6.8 $\mu$ F; 35 V | 2022 001 00067 |
| C3, C7    | multilayer ceramic chip capacitor     | 10 nF             | 2222 852 47103 |
| C4, C8    | multilayer ceramic chip capacitor     | 100 nF            | 2222 852 47104 |
| L1, L2    | 1 turn 0.5 mm Cu wire on ferrite coil | 1 $\mu$ H         | 3122 108 20153 |
| Z1, Z2    | stripline; note 1                     | 50 $\Omega$       |                |

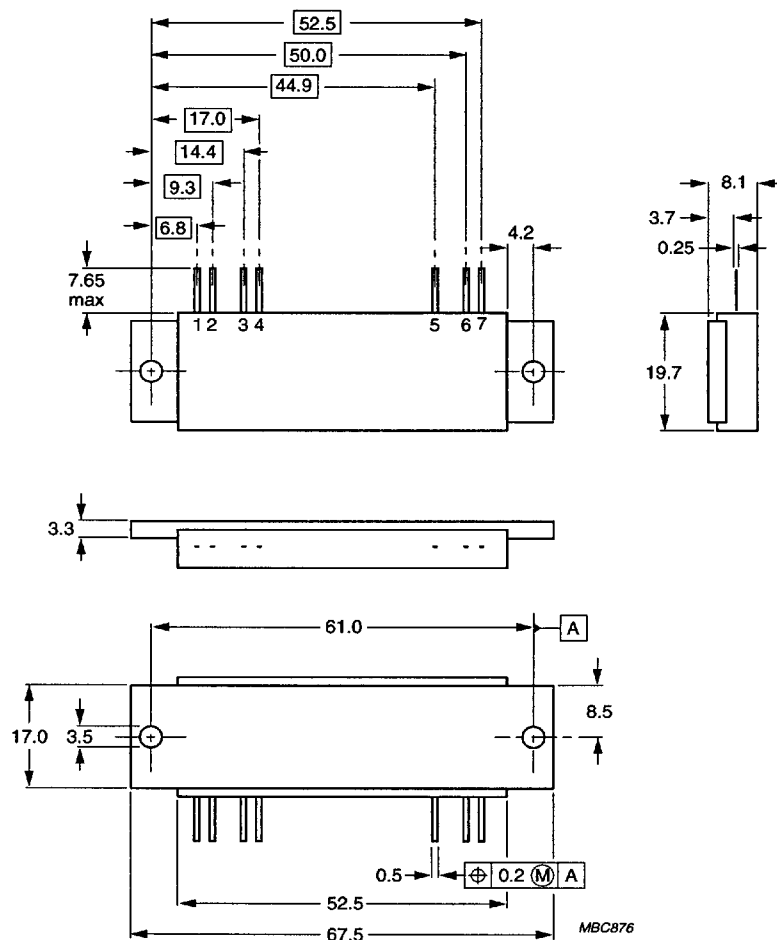
## Note

1. The striplines are on a double copper-clad printed-circuit board with epoxy dielectric ( $\epsilon_r = 4.7$ ); thickness  $\frac{1}{16}$  inch.

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## PACKAGE OUTLINE



Dimensions in mm.

Fig.15 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.                                |
| <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.                                                                                                                                                                                                                                                                                                                                                       |                                                                                       |

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