# HYBRID INTEGRATED CIRCUIT VHF/UHF WIDE-BAND AMPLIFIER

One-stage wide-band amplifier in hybrid integrated circuit technique on a thin-film substrate, intended for aerial amplifiers in car radios, caravans or RATV and MATV applications.

## QUICK REFERENCE DATA

| | | | |
|---|---|---|---|
| D.C. supply voltage | $V_B$ | = | 12 V ± 10% |
| Frequency range | f | | 40 to 860 MHz |
| Source and load (characteristic) impedance | $R_s = R_\ell = Z_o$ | = | 75 Ω |
| Transducer gain | $G_{tr} = \lvert s_f \rvert^2$ | typ. | 12 dB |
| Flatness of frequency response | $\pm \Delta \lvert s_f \rvert^2$ | typ. | 1 dB |
| Output voltage at −60 dB intermodulation distortion (DIN 45004, 3-tone) | $V_{o(rms)}$ | typ. | 99 dBμV |
| Noise figure | F | typ. | 5,5 dB |
| Operating ambient temperature | $T_{amb}$ | | −20 to + 70 °C |

**ENCAPSULATION** 5-pin, in-line, resin-coated body, see MECHANICAL DATA (Fig. 2)

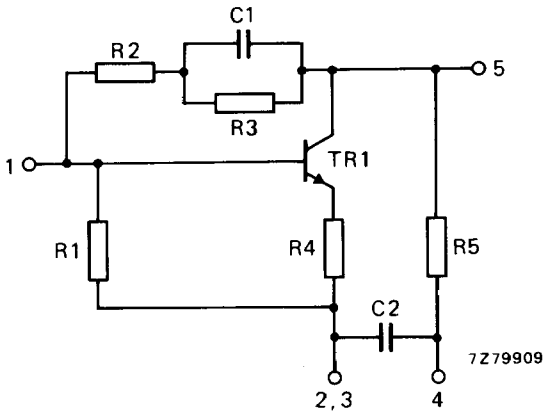


Fig. 1 Circuit diagram.

## RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

| | | | | |
|---|---|---|---|---|
| Operating ambient temperature | $T_{amb}$ | | −20 to +70 | °C |
| Storage temperature | $T_{stg}$ | | −40 to +125 | °C |
| D.C. supply voltage | $V_B$ | max. | 15 | V |
| Peak incident powers on pins 1 and 5 | $P_{I1M}, P_{I5M}$ | max. | 100 | mW |

## CHARACTERISTICS

**Measuring conditions**

| | | | | |
|---|---|---|---|---|
| Ambient temperature | $T_{amb}$ | = | 25 | °C |
| D.C. supply voltage | $V_B$ | = | 12 | V |
| Source impedance and load impedance | $R_s, R_\ell$ | = | 75 | Ω |
| Characteristic impedance of h.f. connections | $Z_o$ | = | 75 | Ω |
| Frequency range | f | = | 40 to 860 | MHz |

**Performance**

| | | | | |
|---|---|---|---|---|
| Supply current | $I_B$ | typ. | 11,5 | mA |
| Transducer gain | $G_{tr} = \lvert s_f \rvert^2$ | typ. | 12 | dB |
| Flatness of frequency response | $\pm \Delta \lvert s_f \rvert^2$ | typ. | 1 | dB |
| Individual maximum v.s.w.r. | | | | |
| input | $VSWR_{(i)}$ | typ. | 2,0 | * |
| output | $VSWR_{(o)}$ | typ. | 1,4 | * |
| Back attenuation | | | | |
| f = 100 MHz | $\lvert s_r \rvert^2$ | typ. | 22 | dB |
| f = 860 MHz | $\lvert s_r \rvert^2$ | typ. | 19 | dB |
| Output voltage at −60 dB intermodulation distortion (DIN 45004, par. 6.3: 3-tone) | $V_{o(rms)}$ | typ. | 99 | dBμV |
| Noise figure | F | typ. | 5,5 | dB |

s-parameters: $s_f = s_{21}$ $s_i = s_{11}$ $s_r = s_{12}$ $s_o = s_{22}$

* Highest value, for a sample, occuring in the frequency range.

## OPERATING CONDITIONS

| | | | |
|---|---|---|---|
| Ambient temperature range | $T_{amb}$ | | −20 to + 70 °C |
| D.C. supply voltage | $V_B$ | = | 12 V ±10% |
| Frequency range | f | | 40 to 860 MHz |
| Source impedance and load impedance | $R_s, R_\ell$ | = | 75 Ω |

## MECHANICAL DATA

Dimensions in mm

The device is resin coated.

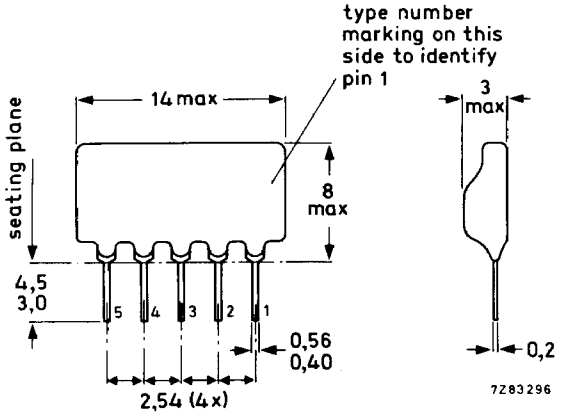


Fig. 2 Encapsulation.

### Terminal connections

1 = input
2,3 = common
4 = supply (+)
5 = output

### Soldering recommendations

*Hand soldering*

Maximum contact time for a soldering-iron temperature of 260 °C up to the seating plane is 5 s.

*Dip or wave soldering*

260 °C is the maximum permissible temperature of the solder; it must not be in contact with the joint for more than 5 seconds. The total contact time of successive solder waves must not exceed 5 seconds. The device may be mounted against the printed-circuit board, but the temperature of the device must not exceed 125 °C. If the printed-circuit board has been pre-heated, forced cooling may be necessary immediately after soldering to keep the temperature below the allowable limit.

**Mounting recommendations**

The module should preferably be mounted on double-sided printed-circuit board, see the example shown below.

Input and output should be connected to 75 Ω tracks.

The connections to the 'common' pins should be as close to the seating plane as possible.

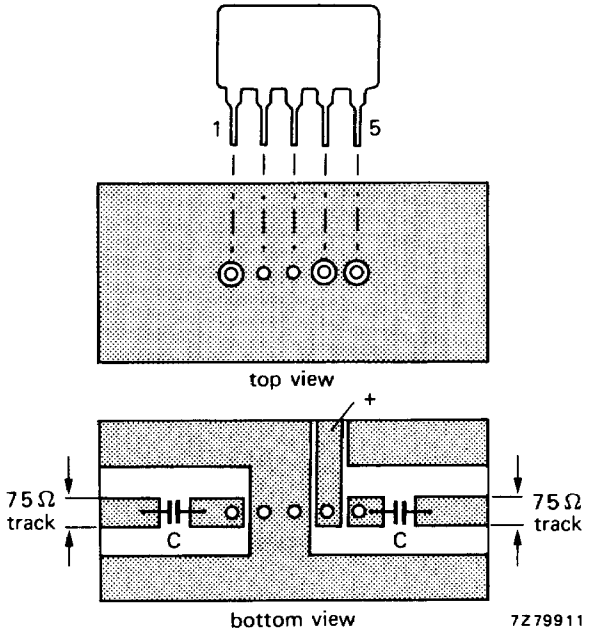


Fig. 3 Printed-circuit board holes and tracks.
C > 220 pF ceramic capacitor.

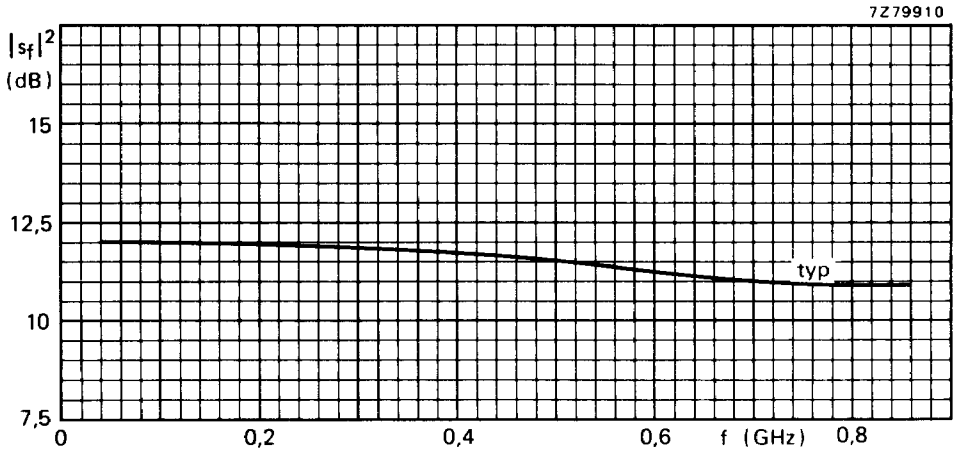


Fig. 4 Transducer gain as a function of frequency; $Z_o$ = 75 Ω.

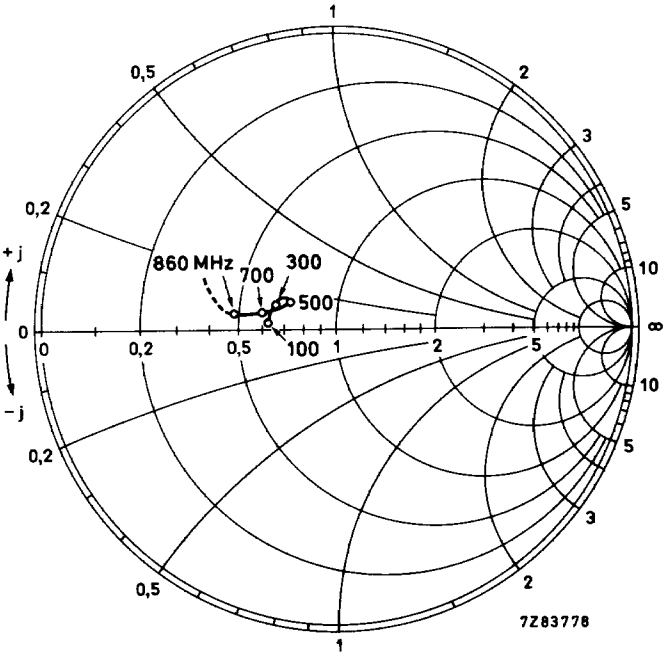


Fig. 5 Input impedance derived from input reflection coefficient $s_i$, co-ordinates in ohm x 75; typical values.

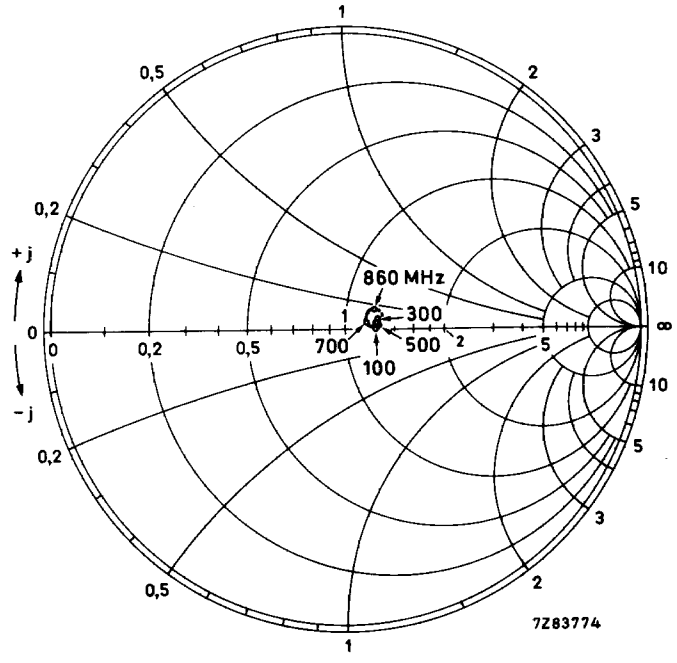


Fig. 6 Output impedance derived from output reflection coefficient $s_o$, co-ordinates in ohm x 75; typical values.

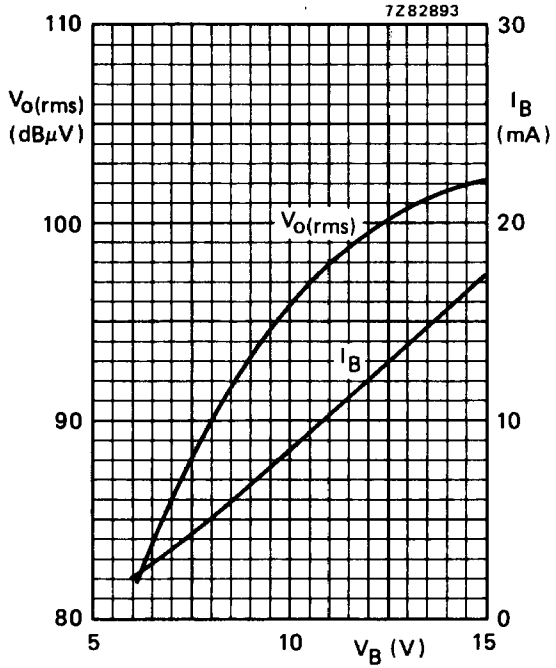


Fig. 7 Output voltage and supply current as a function of the supply voltage; typical values.

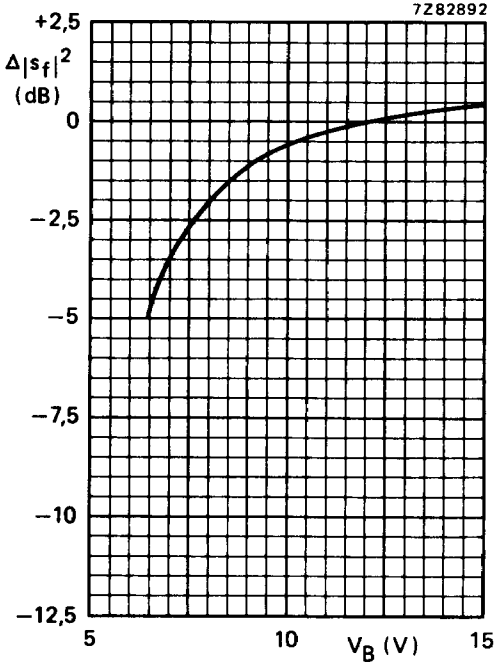


Fig. 8 Variation of transducer gain with supply voltage; reference 0 dB at 12 V; f = 100 to 860 MHz; typical values.