HYBRID INTEGRATED CIRCUIT VHF/UHF WIDE-BAND AMPLIFIER

Three-stage wide-band amplifier in hybrid integrated circuit technique on a thin-film substrate, intended for use in mast-head booster-amplifiers, as an amplifier in MATV and CATV systems, and as general-purpose amplifier for v.h.f. and u.h.f. applications.

QUICK REFERENCE DATA

Frequency range	f		40 to 860	MHz
Source and load (characteristic) impedance	$R_s = R_\ell = Z_o$	=	75	Ω
Transducer gain	$G_{tr} = \lvert s_{fl}\rvert^2$	typ.	28	dB
Flatness of frequency response	$\pm\Delta\lvert s_{fl}\rvert^2$	typ.	1	dB
Output voltage at −60 dB intermodulation distortion (DIN 45004, 3-tone)				
VHF	$V_{o(rms)}$	typ.	113	dBμV
UHF	$V_{o(rms)}$	typ.	112	dBμV
Noise figure	F	typ.	7	dB
D.C. supply voltage	V_B	=	12	V ± 10%
Operating ambient temperature	T_{amb}		−20 to +70	°C

ENCAPSULATION 9-pin, in-line, resin-coated body, see MECHANICAL DATA (Fig.2)

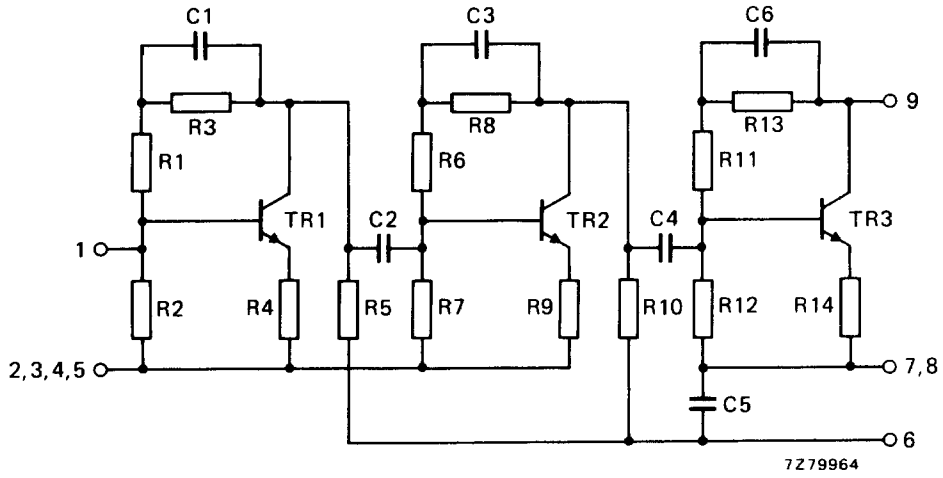


Fig. 1 Circuit diagram.

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 8	P_{I1M}, P_{I8M}	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_ℓ	=	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.	100 mA
Transducer gain	$G_{tr} = \lvert s_f \rvert^2$	typ.	28 dB 26 to 31 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.	2,3 *
output	$VSWR_{(o)}$	typ.	1,9 *
Back attenuation			
f = 100 MHz	$\lvert s_r \rvert^2$	typ.	45 dB
f = 860 MHz	$\lvert s_r \rvert^2$	typ.	35 dB
Output voltage at −60 dB intermodulation distortion (DIN 45004, par. 6,3; 3-tone)			
VHF	$V_{o(rms)}$	>	111 dBμV
		typ.	113 dBμV
UHF	$V_{o(rms)}$	>	110 dBμV
		typ.	112 dBμV
Noise figure	F	typ.	7 dB

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

* Highest value, for a sample, occurring 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_ℓ	=	75 Ω

MECHANICAL DATA

Dimensions in mm

The device is resin coated.

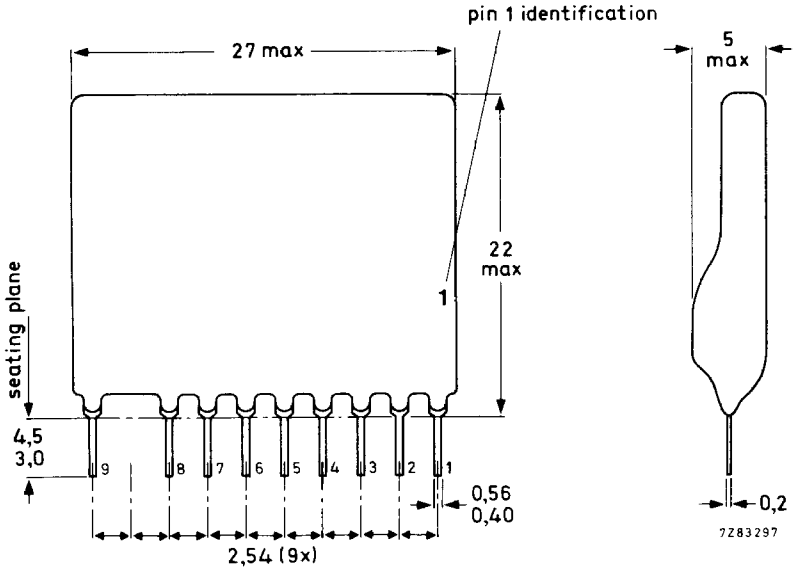


Fig. 2 Encapsulation.

Terminal connections

1	= input
2, 3, 4, 5 and 7, 8	= common
6	= supply (+)
9	= output/supply (+)

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

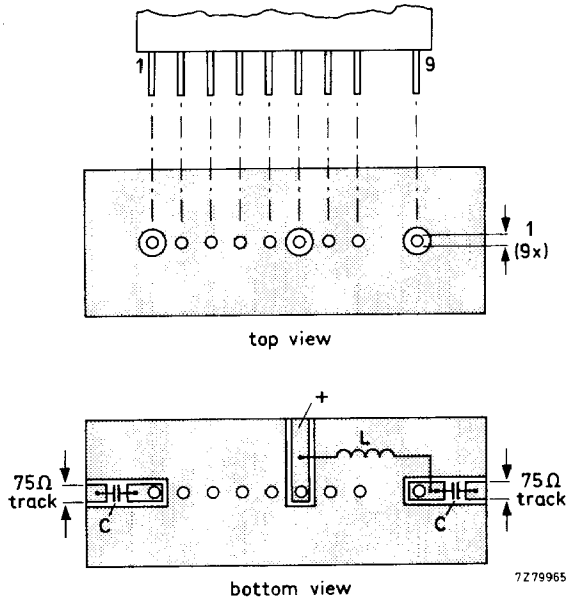
260 °C is the maximum permissible temperature of the solder; it must not be in contact with the joint for more than 5 seconds. The total contact time of successive solder waves must not exceed 5 seconds. The device may be mounted against the printed-circuit board, but the temperature of the device must 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.



L > 5 μH; e.g. catalogue no. 3122 108 20150 or 27 turns enamelled Cu wire (0,3 mm) wound on a ferrite core (material 4B1; catalogue no. 3122 104 91110) with a diameter of 1,6 mm.
C > 220 pF ceramic capacitor.

Fig. 3 Printed-circuit board holes and tracks.

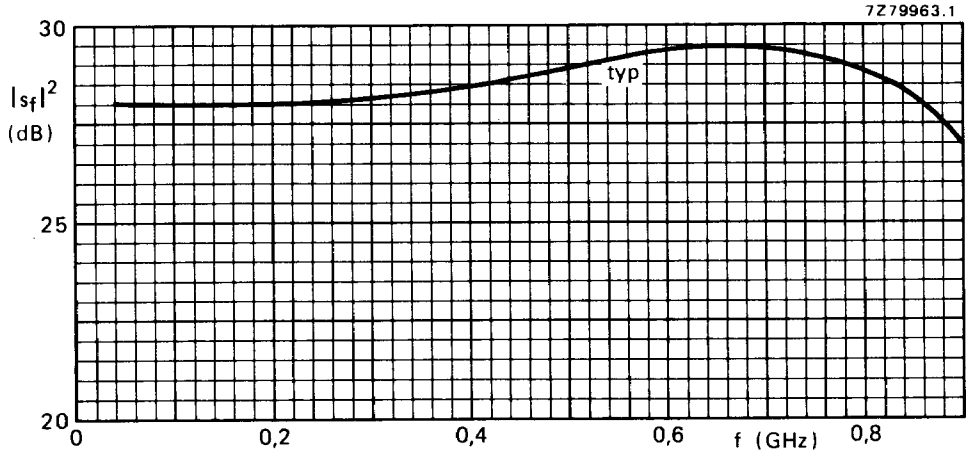


Fig. 4 Transducer gain as a function of frequency; Z_o = 75 Ω.

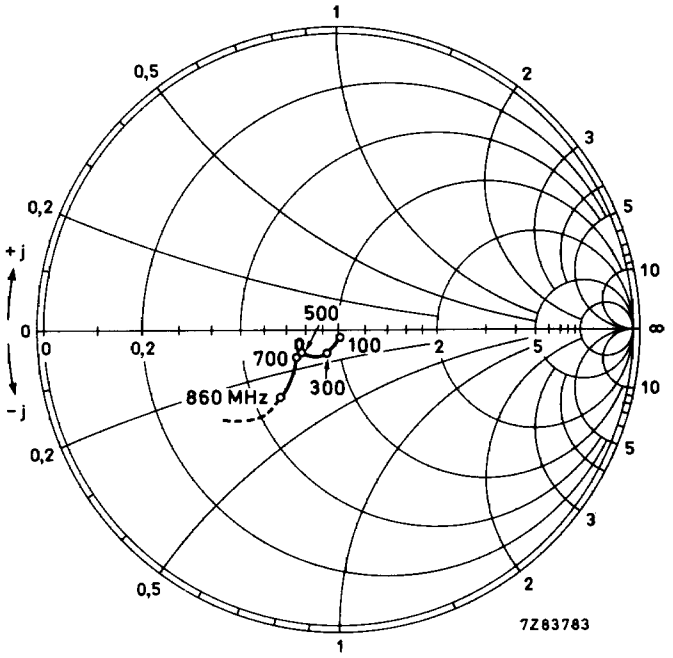


Fig. 5 Input impedance derived from input reflection coefficient s_i, co-ordinates in ohm x 75; typical values.

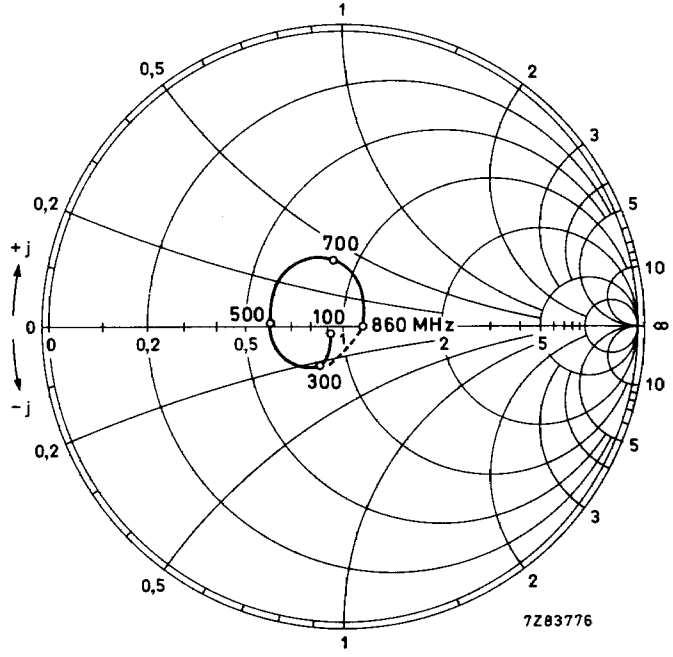


Fig. 6 Output impedance derived from output reflection coefficient s_O, co-ordinates in ohm x 75; typical values.

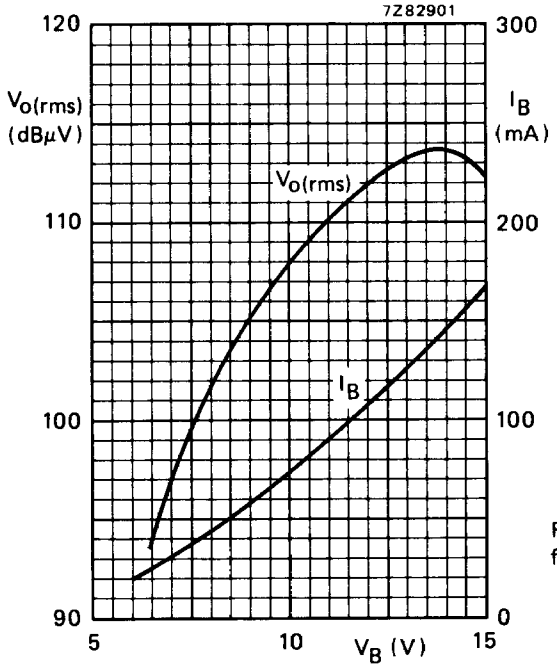


Fig. 7 Output voltage and supply current as a function of the supply voltage; typical values.

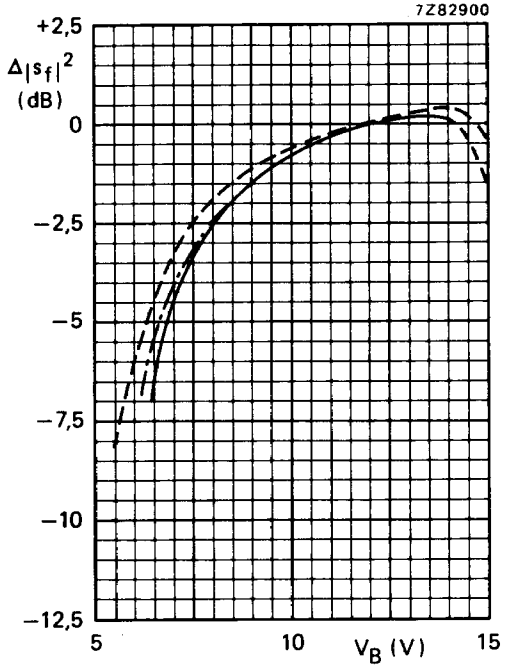


Fig. 8 Variation of transducer gain with supply voltage; reference 0 dB at 12 V;
——— f = 500 MHz;
– – – – f = 100 MHz;
—·—·— f = 860 MHz;
typical values.