BALANCED MIXER/MODULATOR/DEMODULATOR CIRCUIT

GENERAL DESCRIPTION

The TDA1571 is a monolithic integrated circuit which, due to the universal design, can be used in various applications such as:

- Mixer
- Modulator
- Chopper
- AM synchronous demodulator
- FM quadrature detector
- Differential amplifier

QUICK REFERENCE DATA

For application as a mixer in FM tuners; f_i = 98 MHz; f_{osc} = 108,7 MHz			
Supply voltage (pins 12 and 13)	V_P	typ.	15 V
Total supply current (from V_S)	I_S	typ.	6,5 mA
Input admittance			
at pins 2 and 7 for f = 98 MHz	y_{11}	typ.	3,8 + j5 mS
at pins 3 and 5 for f = 108,5 MHz	y_{11}	typ.	2,3 + j8 mS
Mixer gain	G_{mix}	typ.	19,5 dB
Mixer noise figure	F_{mix}	typ.	6,5 dB
I.F. suppression	α_{if}	typ.	40 dB
Oscillator suppression at the input	α_{osc}	typ.	46 dB
Supply voltage range (pins 12 and 13)	V_P		4 to 25 V
Operating ambient temperature range	T_{amb}		−30 to +80 °C

PACKAGE OUTLINE

16-lead DIL; plastic (SOT-38).

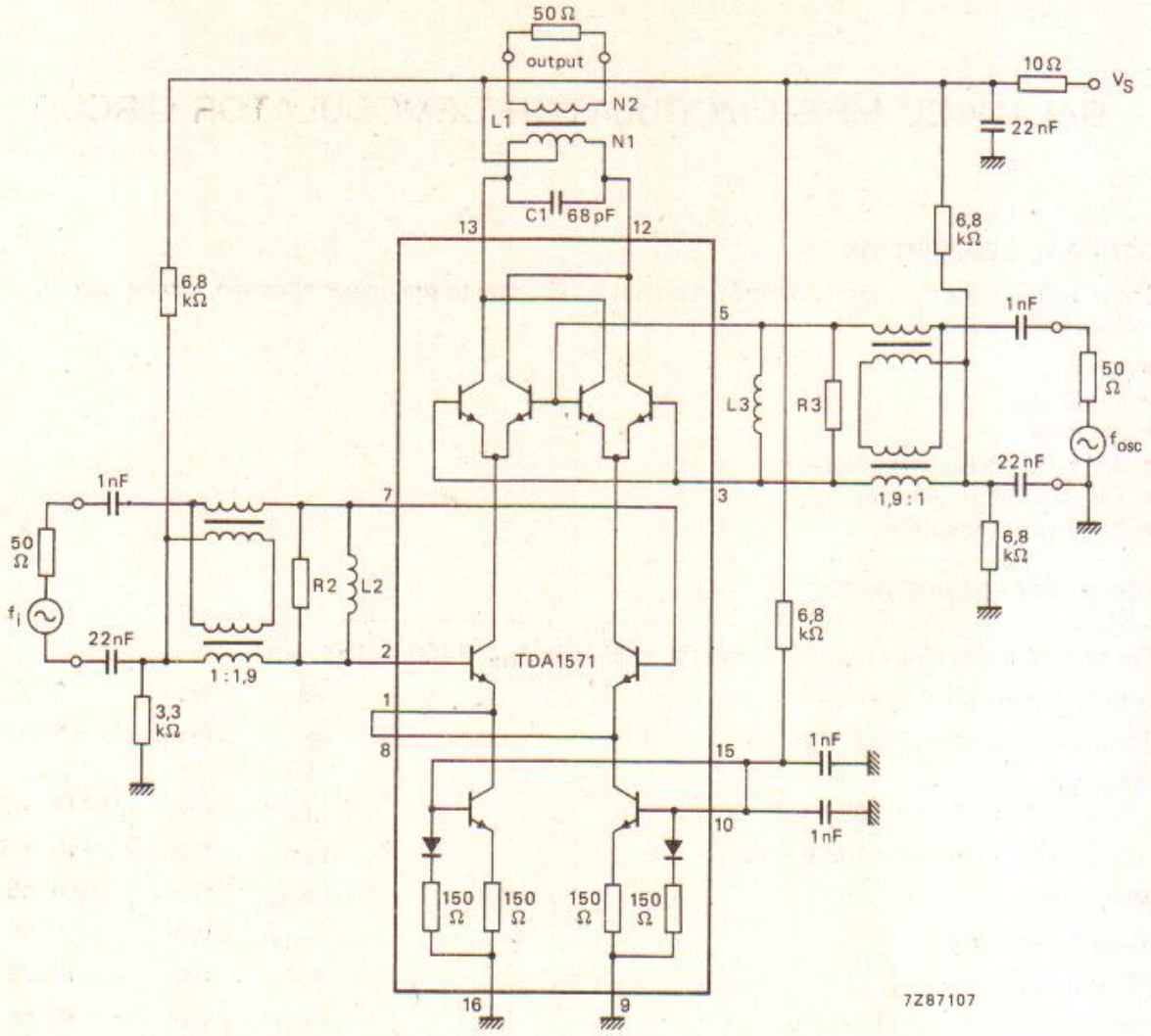

Fig. 1 Application circuit diagram of the TDA1571 used as FM mixer; also used as test circuit for the characteristics.

Data for coil L1: N1 = 2 x 7 turns CuL (0,18 mm) on coil former
N2 = 1 turn CuI (0,18 mm) on coil former
$Q_o = 78$

L2, R2, L3 and R3 are selected for minimum reflection
$r < 0{,}03$; R2 = R3 = 1 kΩ

N.B.: Unused pins should be grounded.

RATINGS

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

Supply voltages (pins 12 and 13)	$V_P = V_{12-9} = V_{13-16}$	max.	40 V
Voltage at pins 2 and 7	$V_{2-9} = V_{7-16}$	max.	18 V
Voltage at pins 3 and 5	$V_{3-2} = V_{5-7}$	max.	18 V
Voltage at pins 3 and 5	$V_{3-9} = V_{5-16}$	max.	23 V
Voltage at pins 12 and 13	$V_{12-3} = V_{13-5}$	max.	18 V
Voltage between pins 3 and 5	$\pm V_{3-5}$	max.	6 V
Voltage at pins 2 and 7	$-V_{2-1} = -V_{7-8}$	max.	6 V
Current on all pins	I_n	max.	10 mA
Total power dissipation	P_{tot}	max.	700 mW
Storage temperature range	T_{stg}	−55 to +150	°C
Operating ambient temperature range	T_{amb}	−30 to +80	°C

CHARACTERISTICS

f_i = 98 MHz; f_{osc} = 108,7 MHz with $R_S = R_L$ = 50 Ω; oscillator amplitude P_{osc} = −14 dBm; T_{amb} = 25 °C; measured in test circuit in Fig. 1; unless otherwise specified

parameter	symbol	min.	typ.	max.	unit
Supply voltage	V_S	–	15	–	V
Total supply current	I_S	–	6,5	–	mA
D.C. supply current output stage (pins 12 and 13)	I_P	–	2	–	mA
Input admittance					
at pins 2 and 7 for f = 98 MHz	y_{11}	–	3,8 + j5	–	mS
at pins 3 and 5 for f = 108,7 MHz	y_{11}	–	2,3 + j8	–	mS
Output admittance at pins 12 and 13 for f = 108,7 MHz	y_{22}	–	0,001 + j0,24	–	mS
Conversion transconductance of mixer	$\lvert y_{21} \rvert$	–	11	–	mS
Mixer gain	G_{mix}	–	19,5	–	dB
Mixer noise figure at R_S' = 200 Ω	F_{mix}	–	6,5	–	dB
I.F. suppression at an input signal amplitude P_i = −60 dBm	α_{if}	–	40	–	dB
Oscillator suppression					
at the input	$\alpha_{osc\ i}$	–	46	–	dB
at the i.f. output	$\alpha_{osc\ if}$	–	38	–	dB

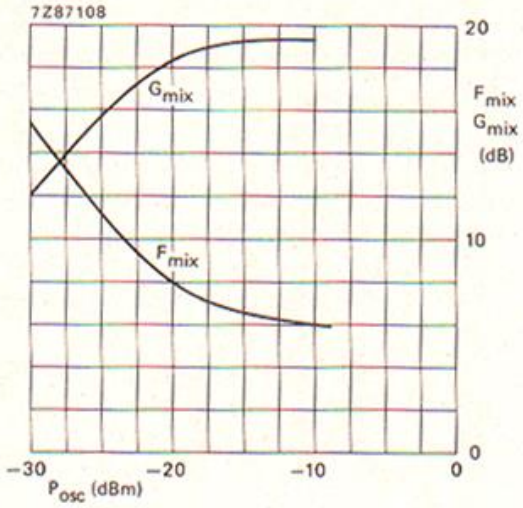

Fig. 2 Mixer gain (G_{mix}) and mixer noise figure (F_{mix}) at R_S' = 200 Ω as a function of the oscillator amplitude (P_{osc}).