

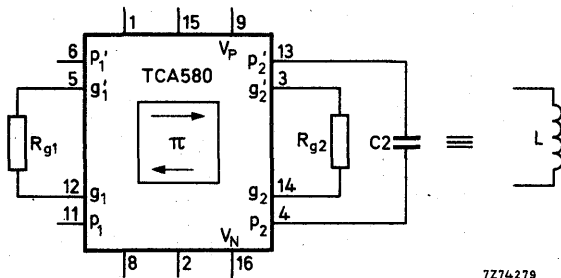
INTEGRATED GYRATOR CIRCUIT

The TCA580 is a monolithic integrated gyrator circuit with floating inputs. It is intended mainly to replace the coils in telephony low-pass filters. The simulated inductance consists of the IC, two resistors R_{g1} and R_{g2} and a capacitor $C2$. With this configuration, inductances of up to $1 \text{ MH} \pm 2\%$ can be achieved.

QUICK REFERENCE DATA

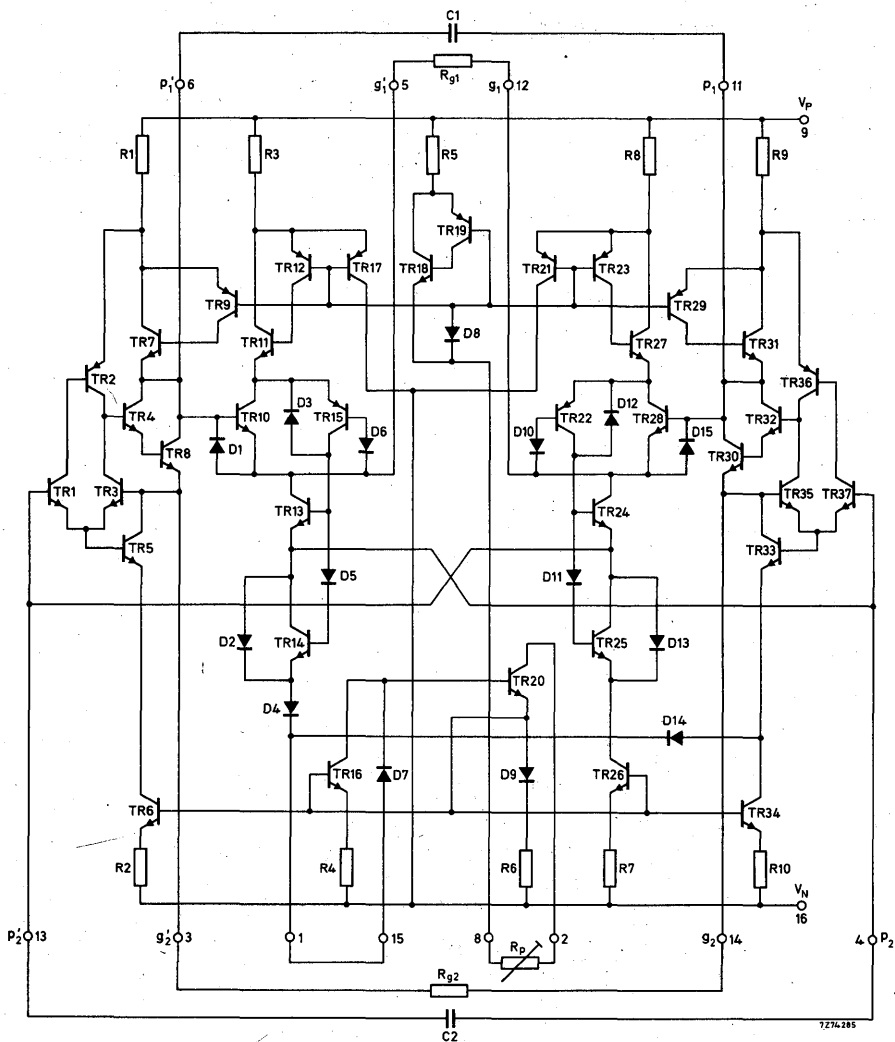
Supply voltages	V_P	typ.	4,4	V
	V_N	typ.	7,6	V
Supply current	I_P	typ.	0,8	mA
Frequency range	f		d. c. to 10	kHz
Quality factor at $f = 200 \text{ Hz}$	Q		500 to 5000	
Efficiency	η	typ.	1,4	%
Operating ambient temperature	T_{amb}		-20 to +70	$^{\circ}\text{C}$

BASIC CIRCUIT

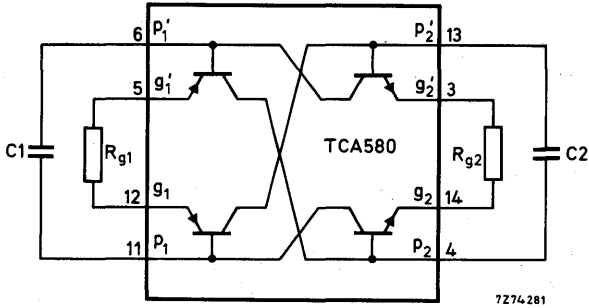


PACKAGE OUTLINE plastic 16-lead dual in-line (see general section).

CIRCUIT DIAGRAM



SIMPLIFIED CIRCUIT DIAGRAM



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

Voltages

Supply voltages	V_p to V_N	max.	14	V
Common mode input voltage	$\pm V_{IC}$	max.	14	V
Differential input voltage	$\pm V_{ID}$	max.	14	V

Temperatures

Storage temperature	T_{stg}	-55 to +125	°C
Operating ambient temperature	T_{amb}	-20 to +70	°C

TCA580

CHARACTERISTICS at $V_P = 4,4 \text{ V}$; $V_N = 7,6 \text{ V}$; $T_{\text{amb}} = 25 \text{ }^\circ\text{C}$

Supply current (adjust with $R_P = 50 \text{ k}\Omega$)

I_P typ. 0,8 mA

Efficiency: $\frac{\text{signal power}}{\text{supply power}}$

η typ. 1,4 %

Tolerance of inductance

$\Delta L \approx \pm 0,2 \text{ %}$

Quality factor at $f = 200 \text{ Hz}$;

$R_{g1} = R_{g2} = 10 \text{ k}\Omega$; pin 11 earthed

Q 500 to 5000

Output voltage (peak value)

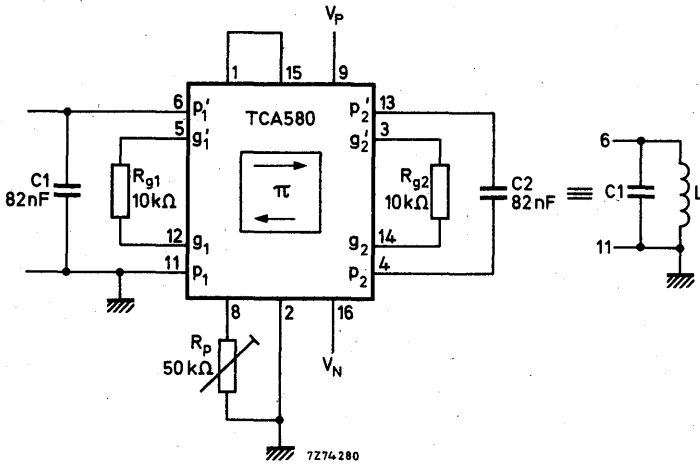
$V_{om} < 1,6 \text{ V}$

Input offset voltage

$V_{io} < 25 \text{ mV}$

Input offset current

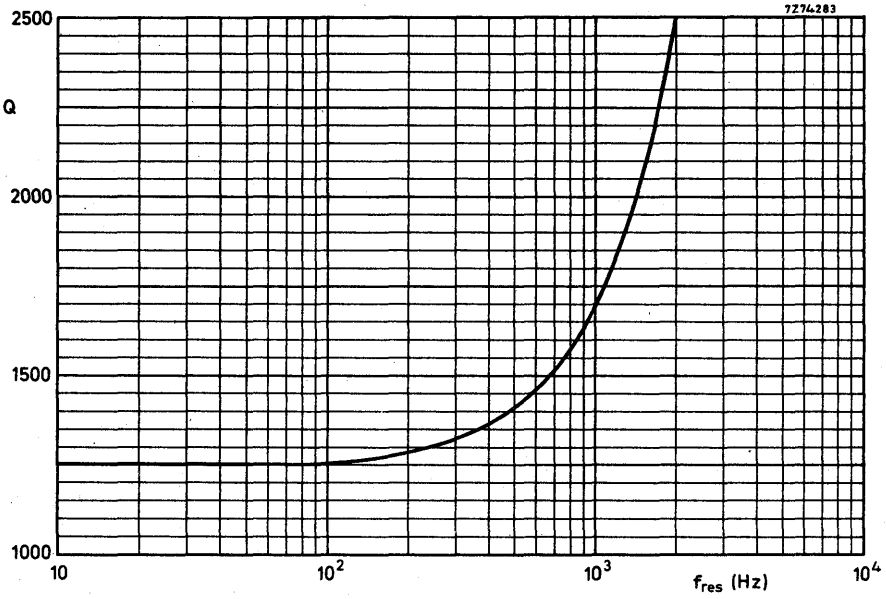
$I_{io} < 9 \text{ }\mu\text{A}$



The values for L and f_{res} in the circuit above are:

$$L = R_{g1} R_{g2} C_2 = 8,2 \text{ H}$$

$$f_{res} = \frac{1}{2\pi \sqrt{R_{g1} R_{g2} C_1 C_2}} = 194 \text{ Hz}$$



Quality factor as a function of frequency at pin 11 connected to earth.

Circuit and response of a low-pass filter with three TCA580 gyrators.

