

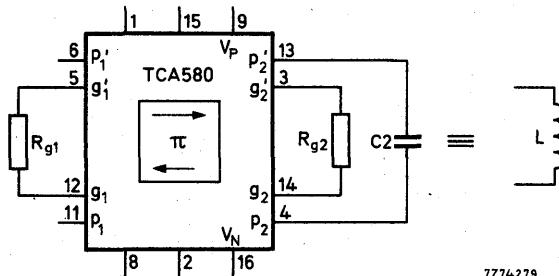
INTEGRATED GYRATOR CIRCUIT

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

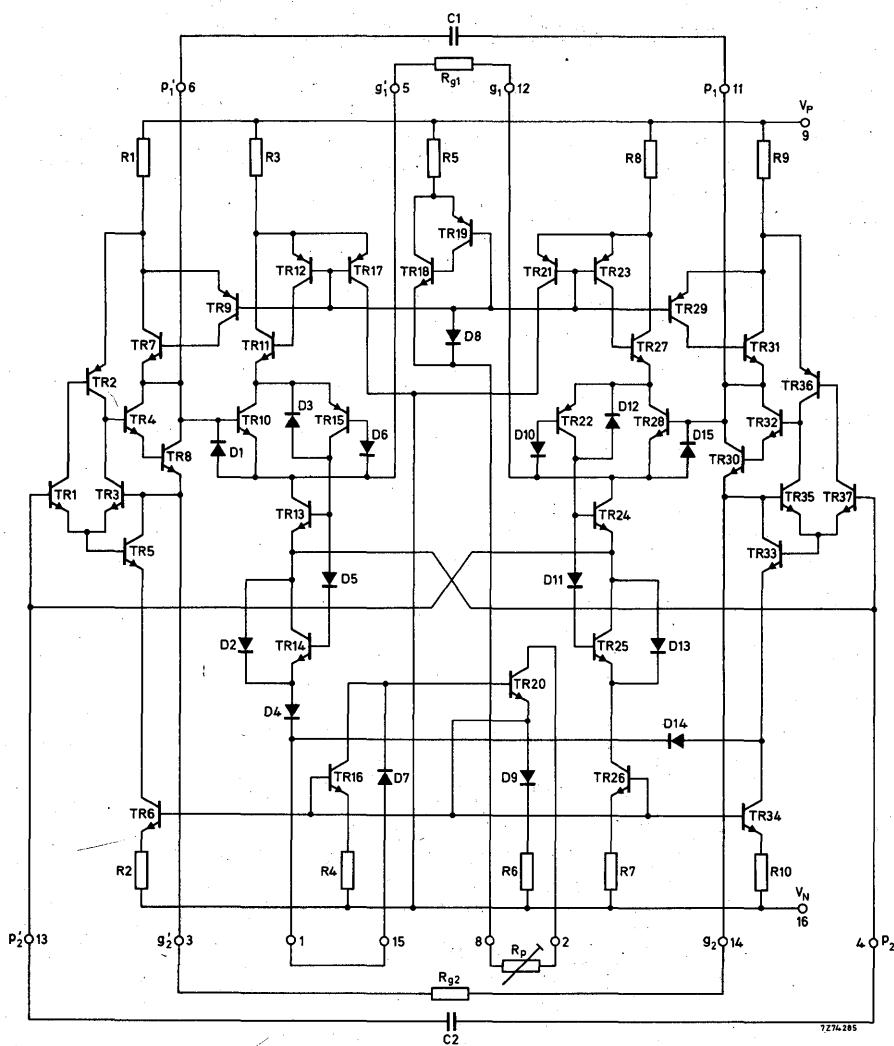
Supply voltages	V_P	typ.	4, 4	V
	V_N	typ.	7, 6	V
Supply current	I_P	typ.	0, 8	mA
Frequency range	f	d. c. to 10	kHz	
Quality factor at $f = 200\text{ Hz}$	Q	500 to 5000		
Efficiency	η	typ.	1, 4	%
Operating ambient temperature	T_{amb}	-20 to +70	$^{\circ}\text{C}$	

BASIC CIRCUIT

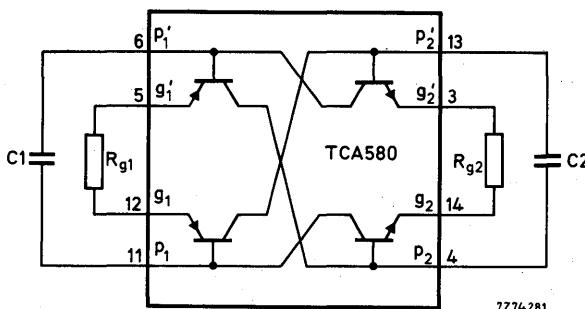


PACKAGE OUTLINE plastic 16-lead dual in-line (see general section).

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

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

ΔL \approx $\pm 0,2$ %

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)

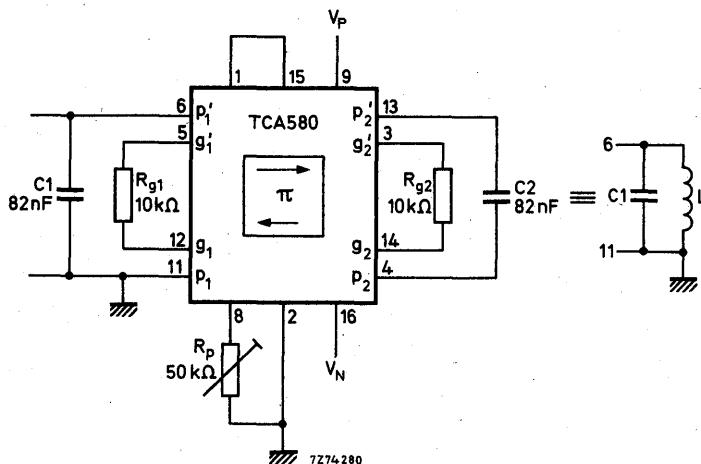
V_{om} < 1,6 V

Input offset voltage

V_{io} < 25 mV

Input offset current

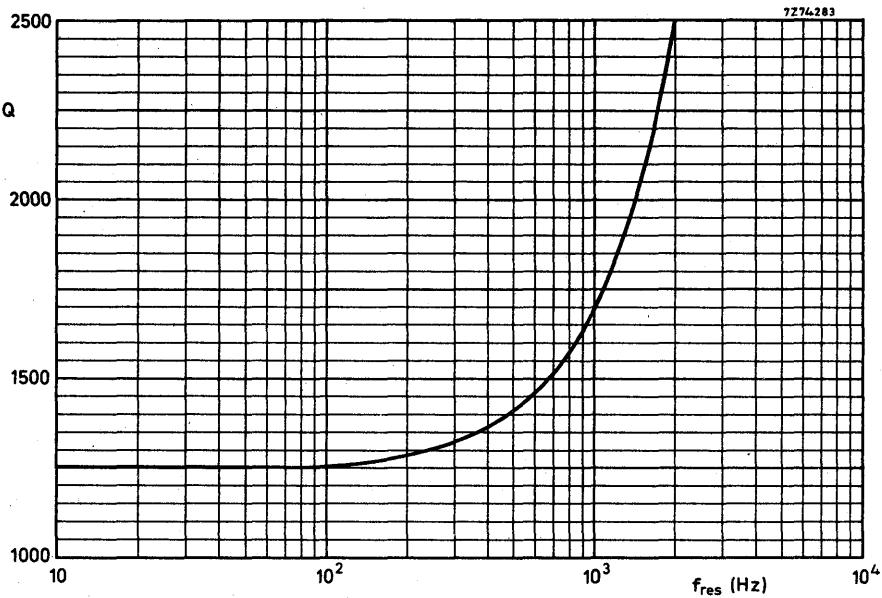
I_{io} < 9 μA



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

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

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



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

TCA580

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

