

OPERATIONAL AMPLIFIER

The TCA520 is a silicon monolithic integrated circuit primarily intended for use in low power, low voltage applications and as comparator in digital systems.

Special features are:

- large supply voltage range : 2 to 20 V
- offset voltage adjustable to zero
- output TTL-compatible
- low power consumption : 5 mW at 5 V
- high slew rate (comparator) : 50 V/ μ s
- low input bias current : 30 nA

QUICK REFERENCE DATA

Supply voltage	V_P	nom.	5	V
Output sink current	I_{SINK}	typ.	12	mA
Input current	I_i	typ.	30	nA
Slew rate (comparator)	S	typ.	50	V/ μ s

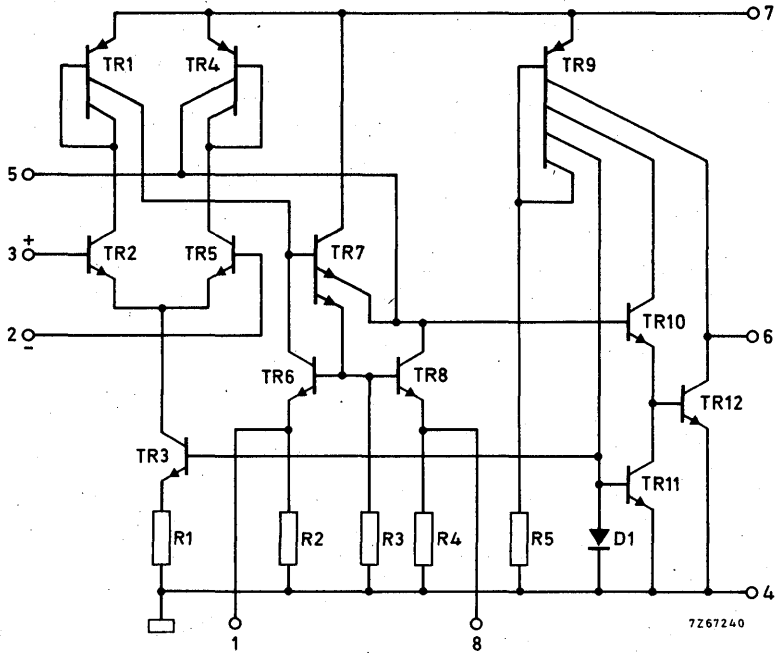
PACKAGE OUTLINES (see general section).

TCA520B : SOT-97 (plastic 8-lead dual in-line).

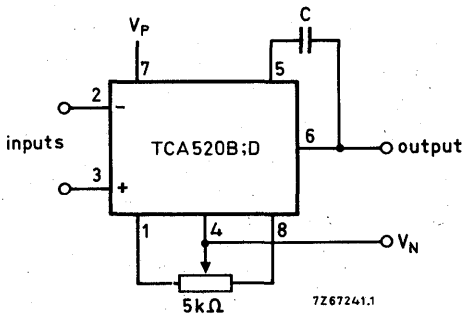
TCA520D : SOT-96A (plastic 8-lead flat pack).

**TCA520B
TCA520D**

CIRCUIT DIAGRAM



CONNECTION DIAGRAM AND PINNING



1. Balance
2. Inverting input
3. Non-inverting input
4. Negative supply (V_N)
5. Frequency compensation
6. Output
7. Positive supply (V_P)
8. Balance

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

Voltages

Positive supply voltage	V_P	max.	11 V
Negative supply voltage	$-V_N$	max.	11 V
Differential input voltage	$\pm V_{2-3}$	max.	6 V

Temperatures

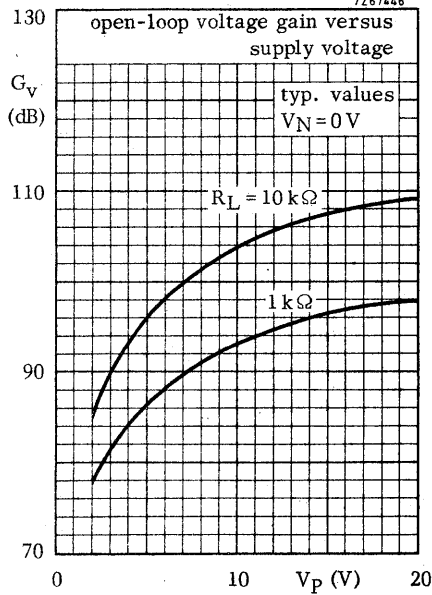
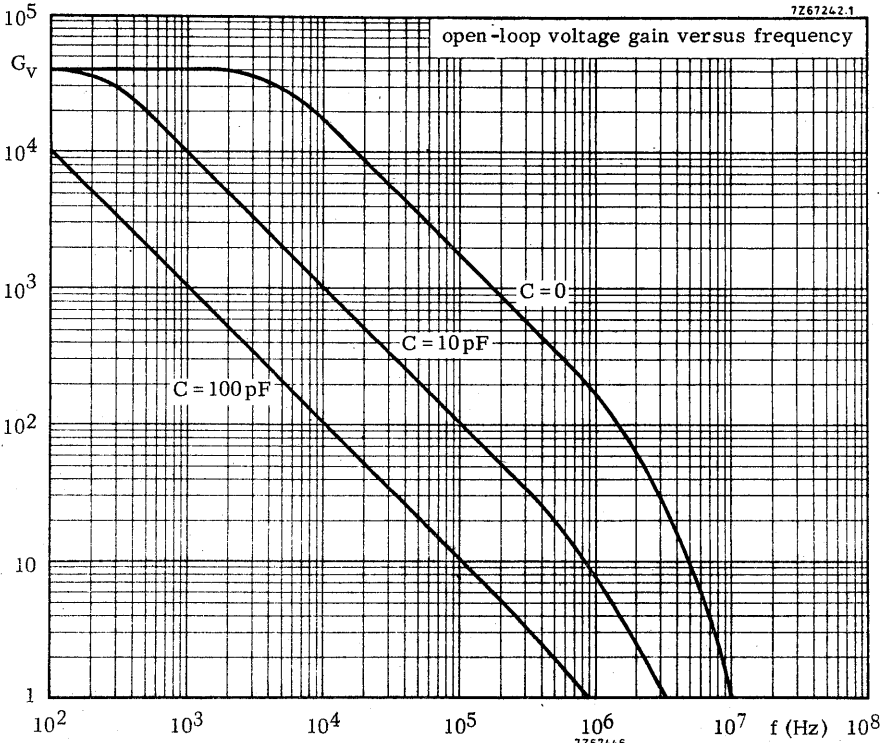
Operating ambient temperature	T_{amb}	-25 to +85 °C
Storage temperature	T_{stg}	-65 to +125 °C

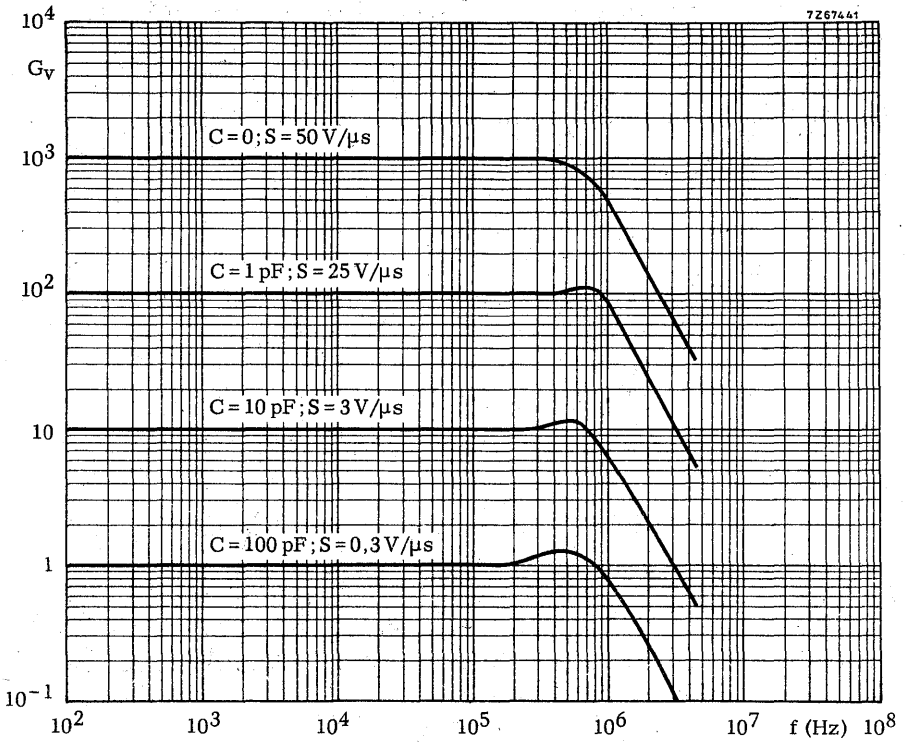
Maximum power dissipation in free air

package	mounting	max. power dissipation at $T_{amb} = 50\text{ °C}$ (mW)	derating factor for $T_{amb} > 50\text{ °C}$ (mW/°C)	thermal resistance $R_{th\ j-a}$ (°C/W)
SOT-97	on PC board	375	5	200
SOT-96A	on ceramic substrate (4 cm ²)	440	5, 8	170
SOT-96A	on PC board (4 cm ²)	300	4	250

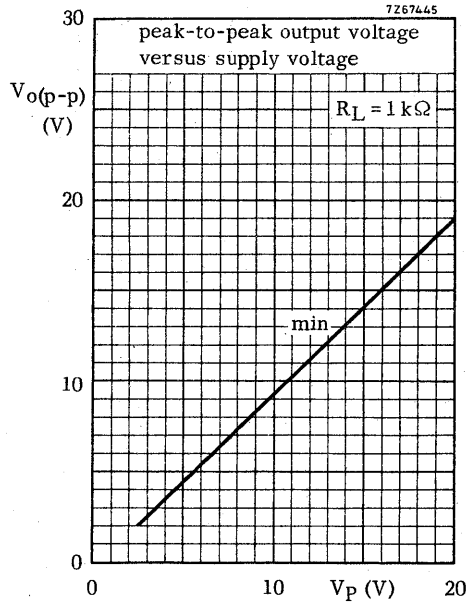
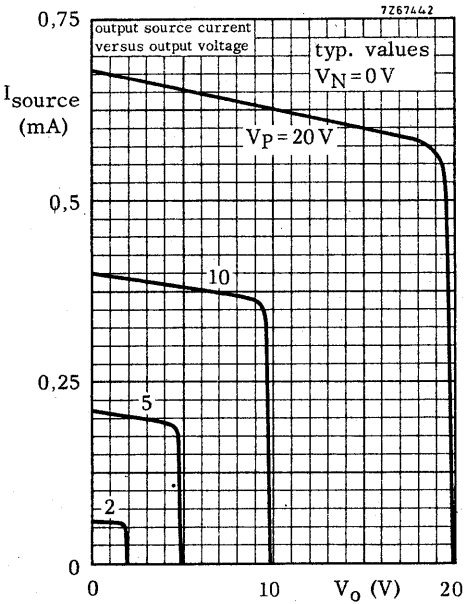
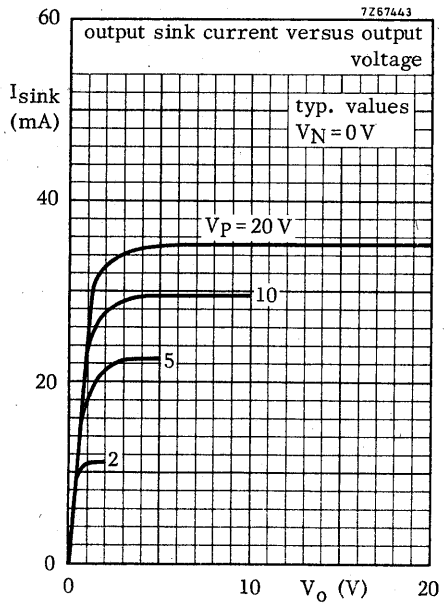
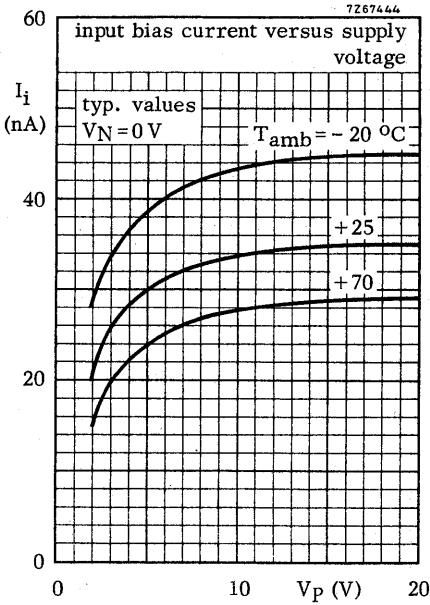
CHARACTERISTICS $V_P = 5\text{ V}$; $V_N = 0\text{ V}$; $T_{amb} = 25\text{ }^\circ\text{C}$; R_L connected between output (pin 6) and positive supply (pin 7)

Input offset voltage	V_{io}	typ. <	1 6	mV mV
Input offset voltage drift	ΔV_{io}	typ.	5	$\mu\text{V}/^\circ\text{C}$
Input bias current	I_i	typ. <	30 100	nA nA
Input offset current	I_{io}	typ. <	5 30	nA nA
Input voltage range	V_i	> >	$V_N + 0,9$ $V_P - 0,5$	V V
Common mode rejection ratio	CMRR	> typ.	70 100	dB dB
D. C. voltage gain at $R_L = 5\text{ k}\Omega$	G_v	> typ.	25 000 50 000	
A. C. voltage gain at $f = 1\text{ kHz}$; $C = 100\text{ pF}$	G_v	typ.	600 to 1800 1000	
Output voltage range at $R_L = 5\text{ k}\Omega$	V_o	> >	$V_N + 0,1$ $V_P - 0,1$	V V
Output sink current at $V_o = V_N + 0,4\text{ V}$	I_{sink}	> typ.	8 12	mA mA
Output source current at $V_o \leq V_P - 0,4\text{ V}$	I_{source}	> typ.	0,13 0,20	mA mA
Supply current at $I_o = 0$	$I_{P,N}$	typ. <	1 1,5	mA mA
Slew rate at $C = 100\text{ pF}$; $R_L = 1\text{ k}\Omega$ at $C = 0$; $R_L = 1\text{ k}\Omega$	S S	typ. typ.	0,3 50	V/ μs V/ μs
Input noise voltage at $f = 1\text{ kHz}$	V_n	typ.	15	nV/ $\sqrt{\text{Hz}}$
Input noise current at $f = 1\text{ kHz}$	I_n	typ.	0,2	pA/ $\sqrt{\text{Hz}}$

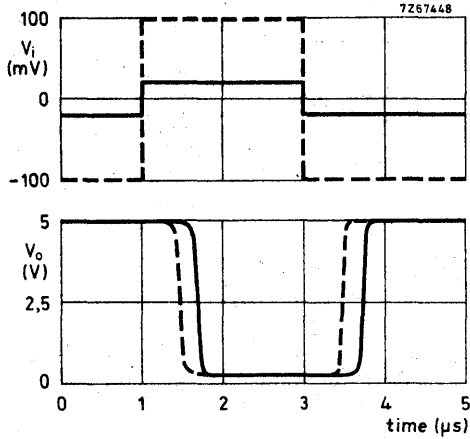
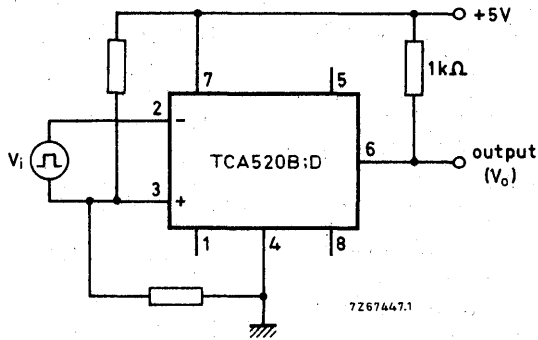




Frequency response and slew-rate for various closed-loop gains



TCA520B
TCA520D



The TCA520B;D used as a comparator; pulse delays when the circuit is 20 or 100 mV overdriven.

