

WIDEBAND SINGLE OPERATIONAL AMPLIFIER

The TDB2022-CM is a wideband monolithic operational amplifier. Its outstanding characteristics such as 150 MHz gain-bandwidth product and 50 V/ μ s slew rate make it particularly suitable for use as video frequency amplifier in TV signal processing applications.

The performances of the integrated video frequency amplifiers have been enhanced.

Operation from ± 15 V supplies.

3 dB noise figure.

Closed loop gain and phase irregularities with large input signals are minimized.

This circuit has been developed in co-operation with "Télé Diffusion de France".

- Input offset voltage : 5 mV max.
- Input bias current : 3 μ A max.
- Input offset current : 1 μ A max.
- Gain-bandwidth product : 95 MHz minimum.
- Slew rate : 40 V/ μ s min.
- Output short circuit current limited for indefinite duration.

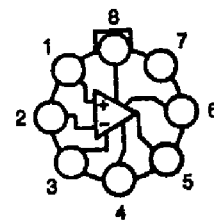
WIDEBAND SINGLE OPERATIONAL AMPLIFIER

CASE CB-11



CM SUFFIX
METAL CAN

PIN ASSIGNMENT (Top view)



- 1 - Non-inverting input
- 2 - Inverting input
- 3 - Frequency compensation
- 4 - V_{CC}
- 5 - Output
- 6 - Output
- 7 - NC
- 8 - V_{CC}

ORDERING INFORMATION

PART NUMBER	TEMPERATURE RANGE	PACKAGE
		CM
TDB2022	0°C to +70°C	•
Example : TDB2022CM		

ELECTRICAL CHARACTERISTICS $T_{amb} = +25^{\circ}\text{C}$ $V_{CC}^{+} = +12\text{ V}$ $V_{CC}^{-} = -12\text{ V}$

(Unless otherwise specified)

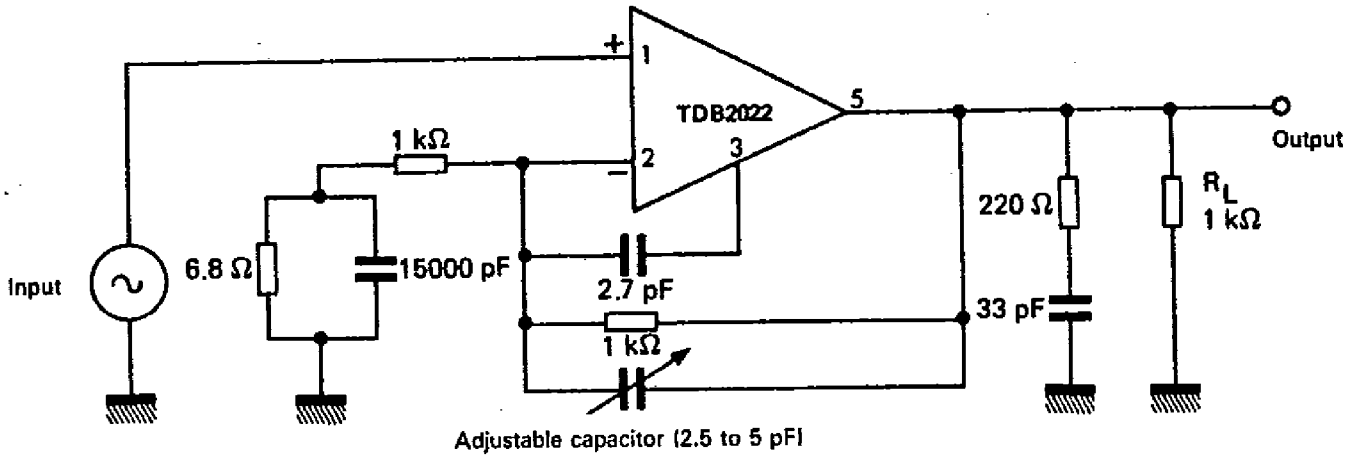
Characteristic	Symbol	Value			Unit
		Min	Typ	Max	
Input offset voltage ($R_S = 2\text{ k}\Omega$, $R_L = 100\text{ k}\Omega$)	V_{IO}	—	2.8	5	mV
Input offset current ($R_S = 2\text{ k}\Omega$, $R_L = 100\text{ k}\Omega$)	I_{IO}	—	0.18	1	μA
Input bias current ($R_S = 1\text{ k}\Omega$, $R_L = 100\text{ k}\Omega$)	I_{IB}	—	1.6	3	μA
Differential mode voltage gain ($R_S = 100\ \Omega$, $R_L = 1\text{ k}\Omega$, $f = 10\text{ kHz}$) - Fig. 7	A_{VD}	900	1500	—	V/mV
Supply voltage V_{CC}^{+} rejection ratio ($R_S = 2\text{ k}\Omega$, $R_L = 100\text{ k}\Omega$)	SVR^{+}	50	65	—	dB
Supply voltage V_{CC}^{-} rejection ratio ($R_S = 2\text{ k}\Omega$, $R_L = 100\text{ k}\Omega$)	SVR^{-}	80	92	—	dB
Supply currents ($R_S = 1\text{ k}\Omega$, $R_L = 100\text{ k}\Omega$)	I_{CC}^{+} , I_{CC}^{-}	—	8	10	mA
Temperature coefficient of input offset voltage ($R_S = 2\text{ k}\Omega$, $R_L = 100\text{ k}\Omega$)	αV_{IO}	—	3	20	$\mu\text{V}/^{\circ}\text{C}$
Common-mode rejection ratio ($R_S = 2\text{ k}\Omega$, $R_L = 100\text{ k}\Omega$)	CMR	80	87	—	dB
Slew rate ($R_L = 1\text{ k}\Omega$) $A_V = +2$ (Figs. 1, 2, 3) $A_V = +6$ (Figs. 5, 6)	SVO	—	50 60	—	V/ μs
Output(5) current Sourcing current Sinking current	I_{O5} (source) I_{O5} (sink)	—	10 3.5	—	mA
Output voltage swing ($A_V = +6$, $f = 4.43\text{ MHz}$, $R_L = 1\text{ k}\Omega$) - Note 2 - Fig. 5	V_{OPP}	—	4	—	V
Output voltage swing Output 5 : $R_S = 1\text{ k}\Omega$ $R_L = 100\text{ k}\Omega$ Output 6 : $R_S = 1\text{ k}\Omega$ $R_L = 100\text{ k}\Omega$	$V_{OPP(5)}$ $V_{OPP(6)}$		+3.2 -8.6 +1.0 -1.7		V
Output impedance ($R_S = 100\ \Omega$, $f = 50\text{ kHz}$) - Output 5	$Z_{O(5)}$	—	40	—	Ω
Differential input impedance ($R_S = 1\text{ k}\Omega$, $R_L = 100\text{ k}\Omega$)	$Z_{id(1)}$ $Z_{id(2)}$	—	50 10	—	k Ω
Input capacitance	C_I	—	5	—	pF
Transition frequency $R_S = 100\ \Omega$, $R_L = 1\text{ k}\Omega$, $f = 10\text{ MHz}$, inverting amplifier $A_V = -10$ - Figs. 7, 8.	f_T	95	150	—	MHz
Noise figure (Center frequency : 10 kHz)	F	—	1.5	3	dB
Equivalent input noise voltage (Bandwidth : 200 Hz)	v_n	—	3.3	—	nV/ $\sqrt{\text{Hz}}$
Equivalent input noise current (Figs. 9, 10)	i_n	—	1.1	—	pA/ $\sqrt{\text{Hz}}$

Note 1 : Output voltage swing V_{OPP} is maximum allowable output amplitude peak to peak. 2nd or 3rd harmonic ratio less than -40 dB.

FIGURE 1 : NON-INVERTING AMPLIFIER ($A_V = +2$)

With bandwidth irregularity compensation

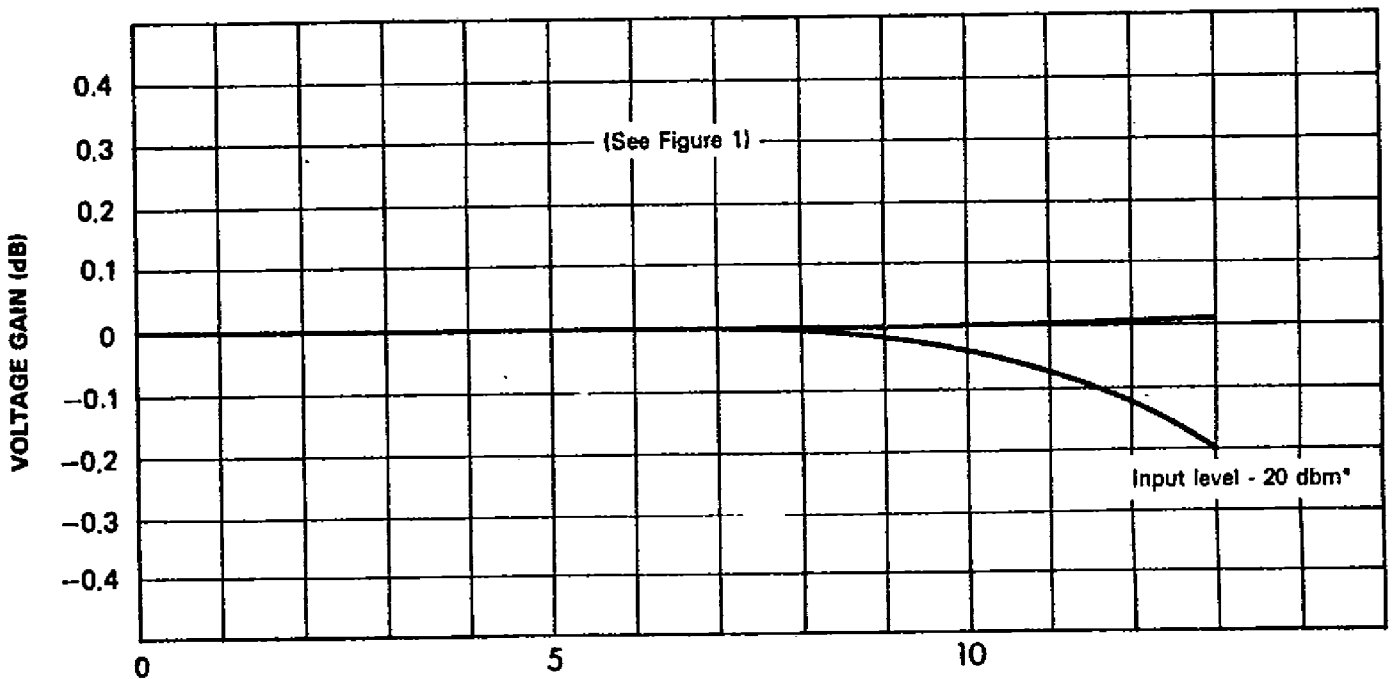
Application diagram
supplied by Télé Diffusion de France



Input signal : $-0.7\text{ V to }+0.7\text{ V}$
Differential gain : 0.25% (0.02 dB)

Differential phase shift : 0.1 degree
Slew rate : $50\text{ V}/\mu\text{s}$

FIGURE 2 : VOLTAGE GAIN VERSUS FREQUENCY OF NON-INVERTING AMPLIFIER ($A_V = +2$)



* 0 dbm : 1 mW
with resistance of 50 Ω

TYPICAL APPLICATIONS (continued)

FIGURE 3 : SLEW RATE

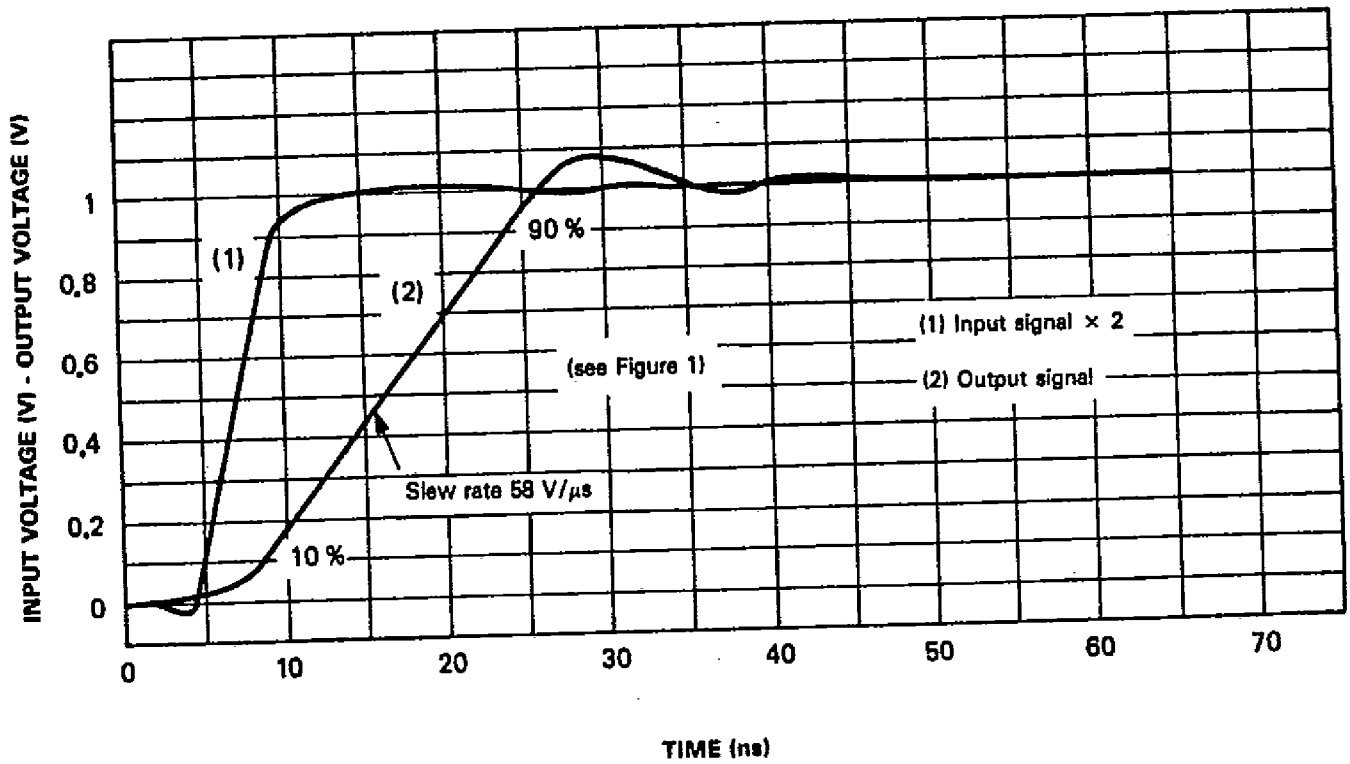
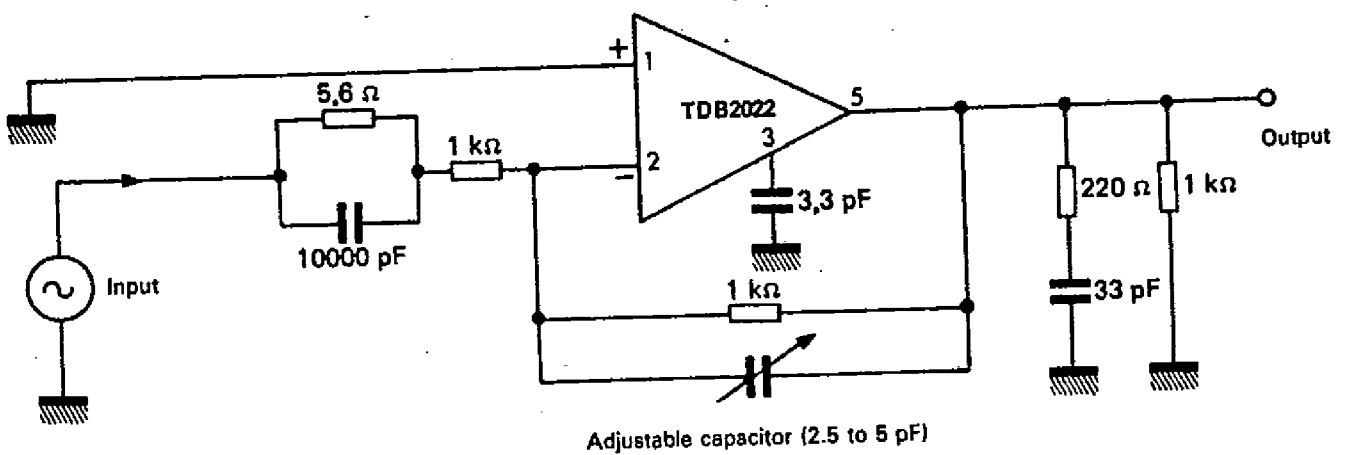


FIGURE 4 : INVERTING AMPLIFIER ($A_V = -1$)

With bandwidth irregularity compensation

Application diagram supplied by Télé Diffusion de France



Input signal : -0.7 V to +0.7 V
Differential gain : 0.25% (0.02 dB)

Differential phase shift : 0.1 degree
Slew rate : 40 V/μs

FIGURE 5 : NON-INVERTING AMPLIFIER ($A_V = +6$)

Without bandwidth compensation

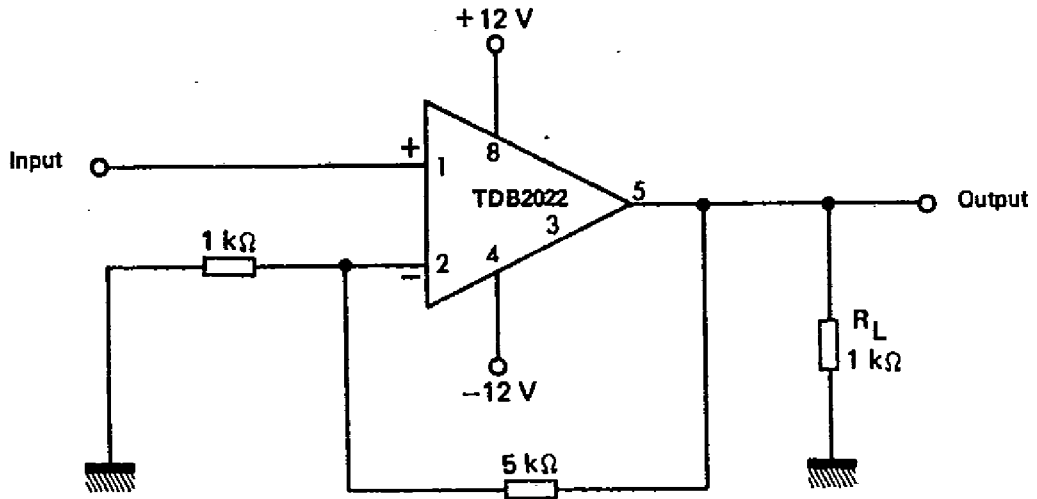


FIGURE 6 : MEASUREMENT OF SLEW RATE

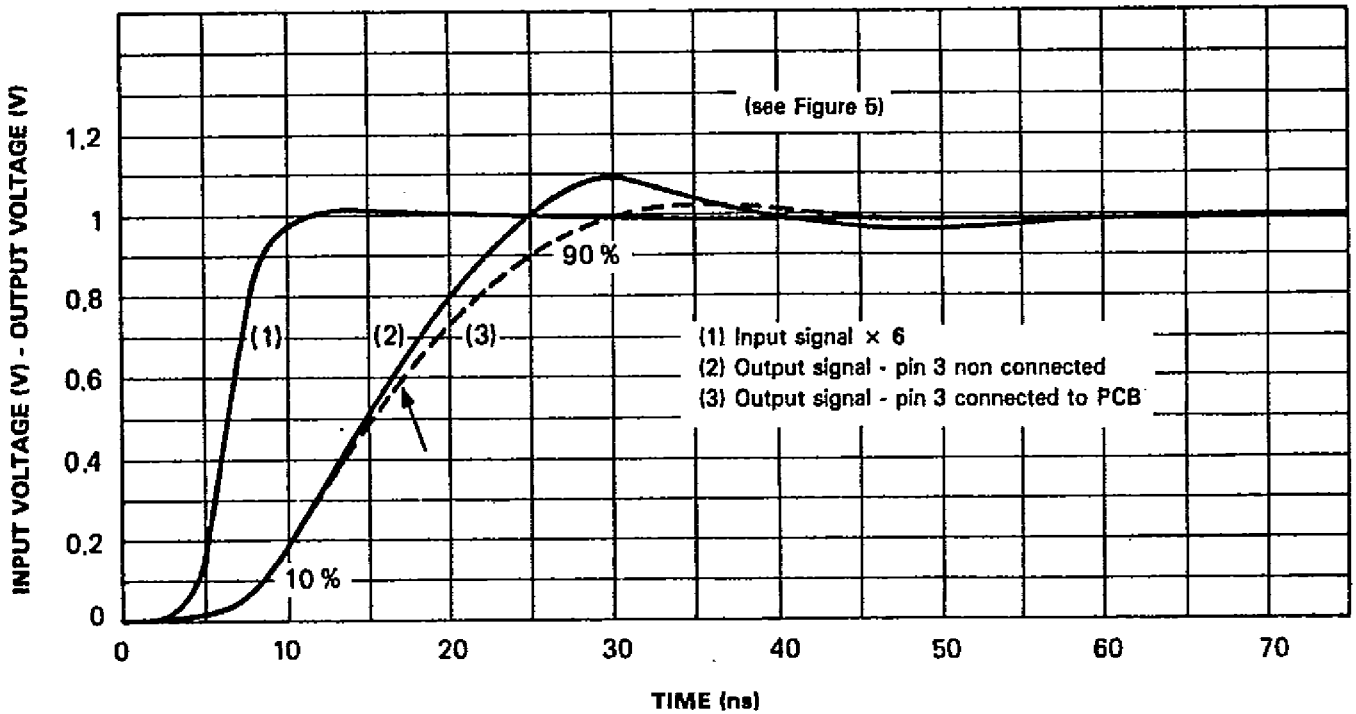


FIGURE 7 : INVERTING AMPLIFIER ($A_V = -10$)

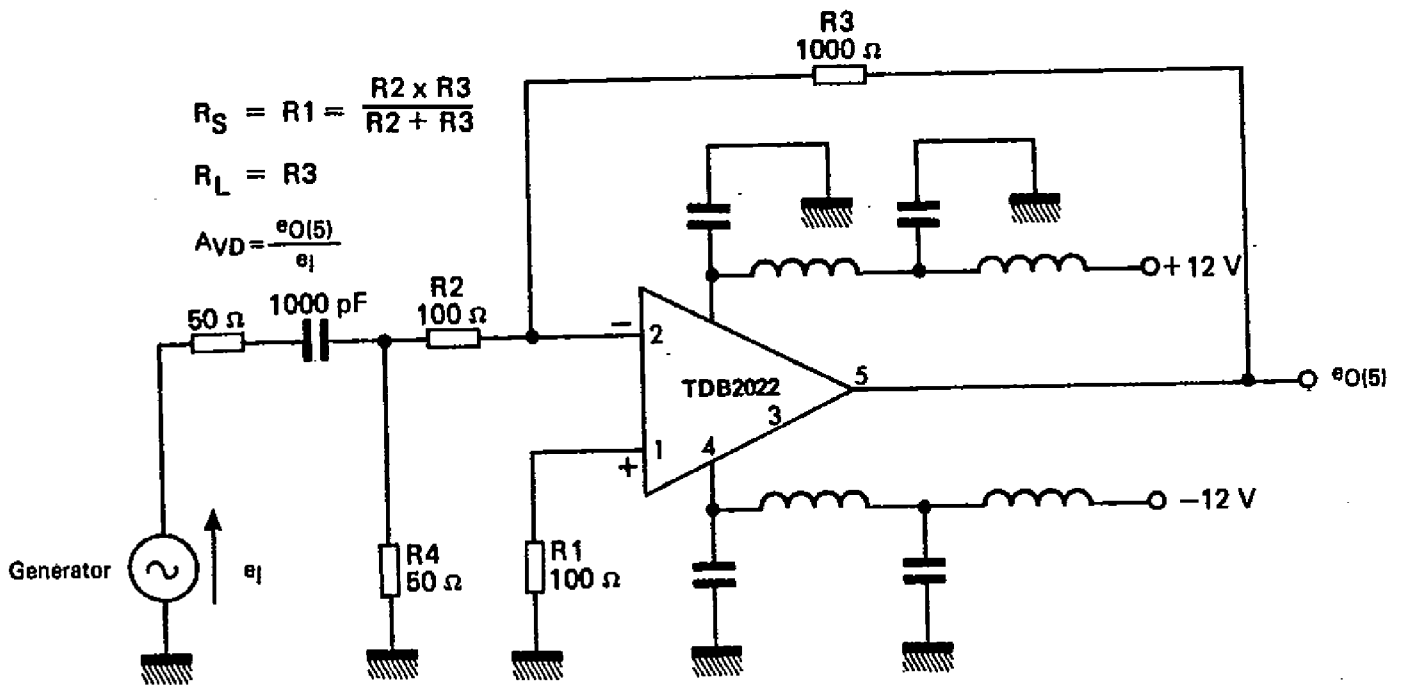


FIGURE 8 : GAIN VERSUS FREQUENCY - OPEN LOOP

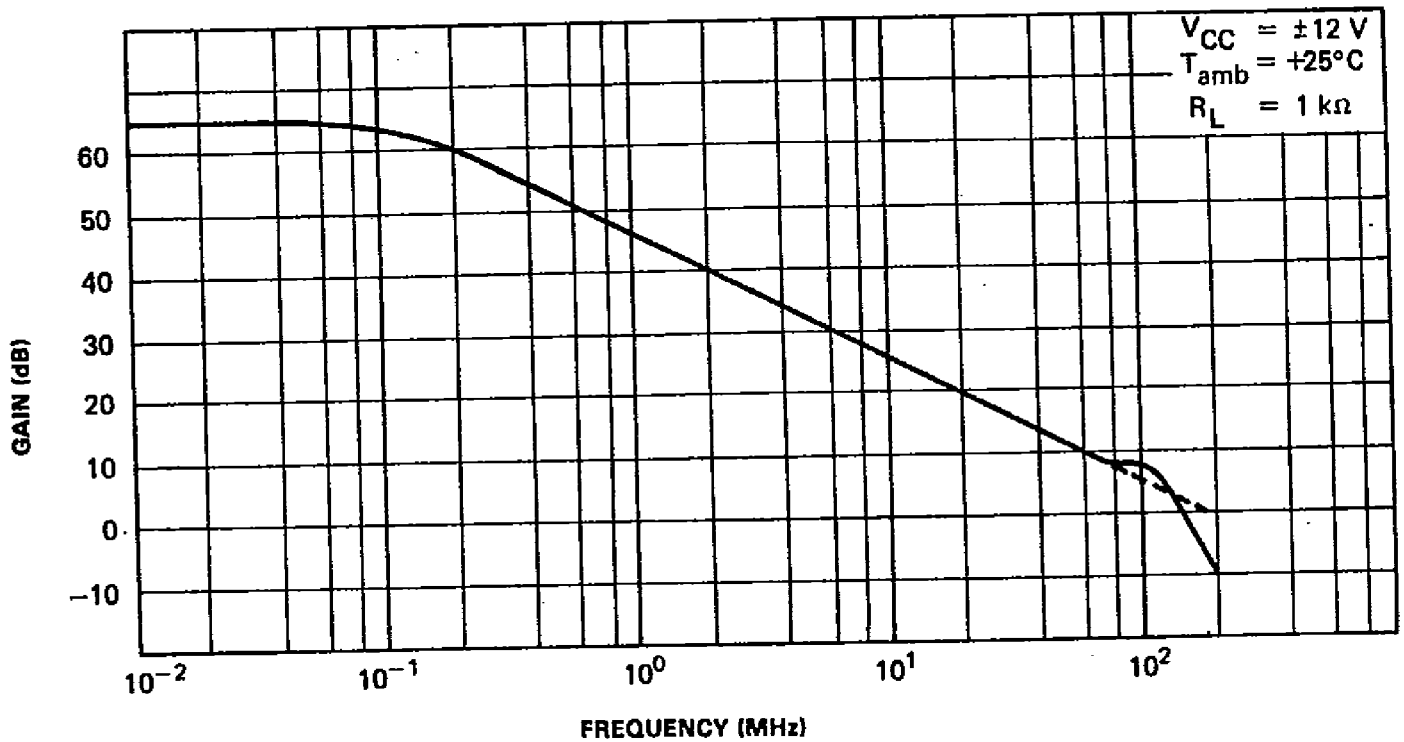


FIGURE 9 : NOISE FIGURE TEST CIRCUIT

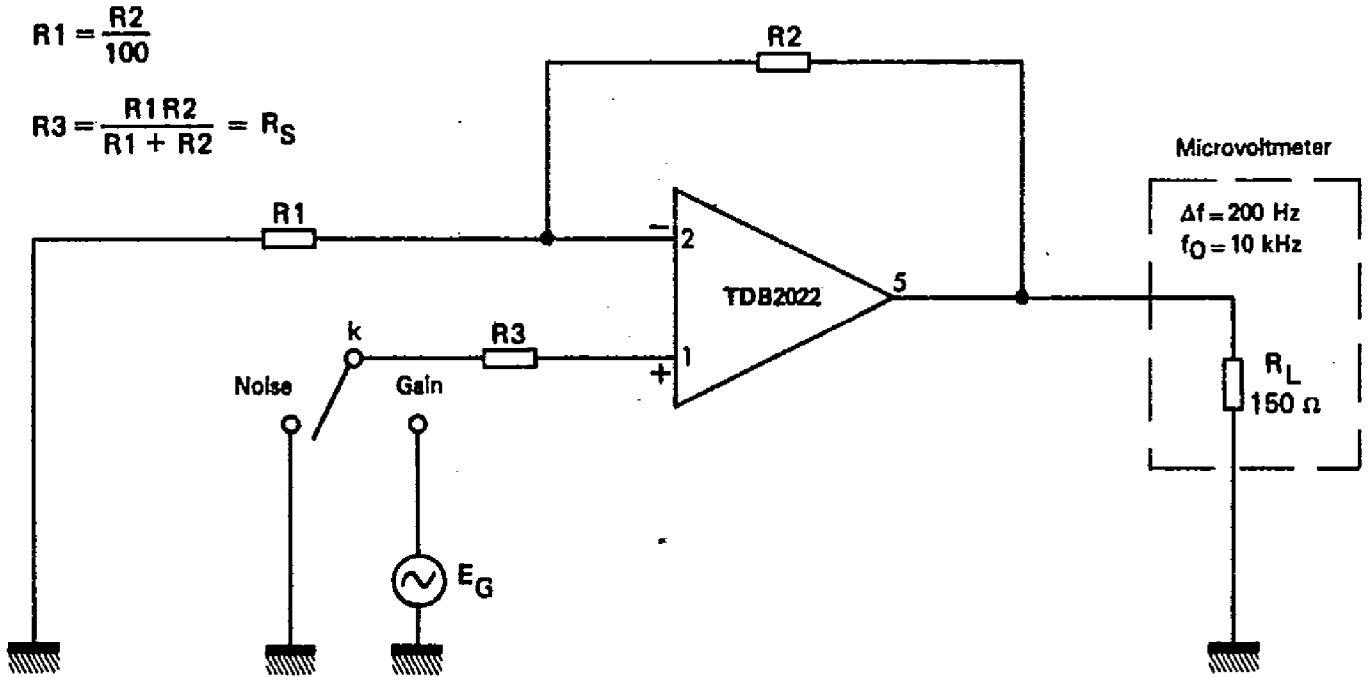
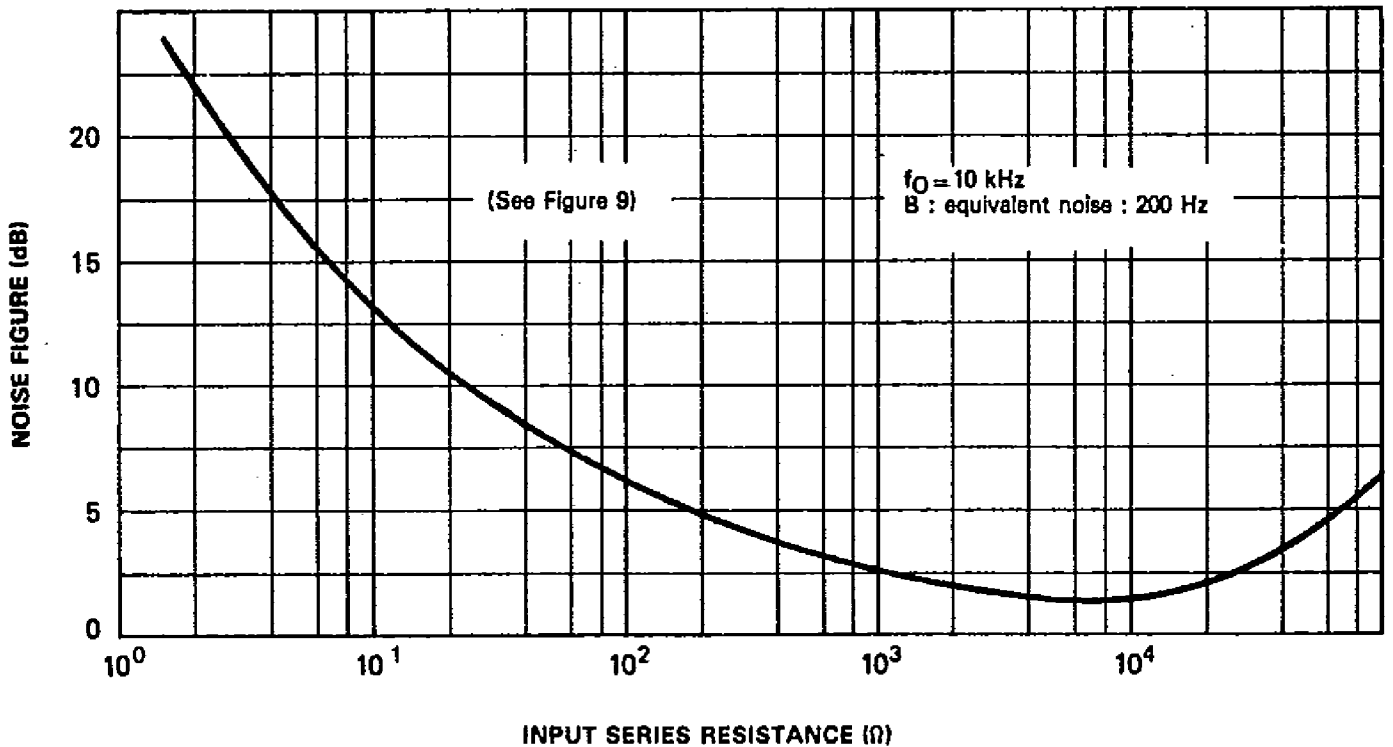
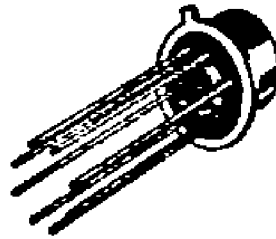


FIGURE 10 : NOISE FIGURE



CB-11 (TO-99)



CM SUFFIX METAL CAN

