THOMSON SEMICONDUCTORS

TDB2022

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/µs 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".

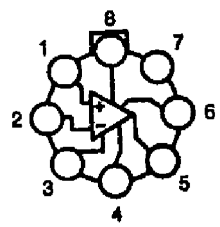
- Input offset voltage : 5 mV max.
- Input bias current : 3 µA max.
- Input offset current : 1 µA max.
- Gain-bandwidth product : 95 MHz minimum.
- Slew rate : 40 V/µs min.
- Output short circuit current limited for indefinite duration.

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		

Réf. 00300

THOMSON SEMICONDUCTORS
Sales headquarters
45, av. de l'Europe - 78140 VELIZY - FRANCE
Tel. : (3) 946 97 19 / Telex : 204780 F

THOMSON COMPONENTS

ELECTRICAL CHARACTERISTICS

$T_{amb} = +25°C$
$V_{CC}^{+} = +12$ V
$V_{CC}^{-} = -12$ V
(Unless otherwise specified)

Characteristic	Symbol	Value			Unit
		Min	Typ	Max	
Input offset voltage ($R_S = 2$ kΩ, $R_L = 100$ kΩ)	V_{IO}	–	2.8	5	mV
Input offset current ($R_S = 2$ kΩ, $R_L = 100$ kΩ)	I_{IO}	–	0.18	1	μA
Input bias current ($R_S = 1$ kΩ, $R_L = 100$ kΩ)	I_{IB}	–	1.6	3	μA
Differential mode voltage gain ($R_S = 100$ Ω, $R_L = 1$ kΩ, f = 10 kHz) - Fig. 7	A_{VD}	900	1500	–	V/mV
Supply voltage V_{CC}^{+} rejection ratio ($R_S = 2$ kΩ, $R_L = 100$ kΩ)	SVR^{+}	50	65	–	dB
Supply voltage V_{CC}^{-} rejection ratio ($R_S = 2$ kΩ, $R_L = 100$ kΩ)	SVR^{-}	80	92	–	dB
Supply currents ($R_S = 1$ kΩ, $R_L = 100$ kΩ)	I_{CC}^{+}, I_{CC}^{-}	–	8	10	mA
Temperature coefficient of input offset voltage ($R_S = 2$ kΩ, $R_L = 100$ kΩ)	αV_{IO}	–	3	20	μV/°C
Common-mode rejection ratio ($R_S = 2$ kΩ, $R_L = 100$ kΩ)	CMR	80	87	–	dB
Slew rate ($R_L = 1$ kΩ) $A_V = +2$ (Figs. 1, 2, 3) $A_V = +6$ (Figs. 5, 6)	S_{VO}	 – –	 50 60	 – –	V/μs
Output(5) current Sourcing current Sinking current	 $I_{05\ (source)}$ $I_{05\ (sink)}$	 – –	 10 3.5	 – –	mA
Output voltage swing ($A_V = +6$, f = 4.43 MHz, $R_L = 1$ kΩ) - Note 2 - Fig. 5	V_{OPP}	–	4	–	V
Output voltage swing Output 5 : $R_S = 1$ kΩ $R_L = 100$ kΩ Output 6 : $R_S = 1$ kΩ $R_L = 100$ kΩ	$V_{OPP(5)}$ $V_{OPP(6)}$		+3.2 −8.6 +1.0 −1.7		V
Output impedance ($R_S = 100$ Ω, f = 50 kHz) - Output 5	$Z_{O(5)}$	–	40	–	Ω
Differential input impedance ($R_S = 1$ kΩ, $R_L = 100$ kΩ)	$Z_{id(1)}$ $Z_{id(2)}$	– –	50 10	– –	kΩ
Input capacitance	C_I	–	5	–	pF
Transition frequency $R_S = 100$ Ω, $R_L = 1$ kΩ, f = 10 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/√Hz
Equivalent input noise current (Figs. 9, 10)	i_n	–	1.1	–	pA/√Hz

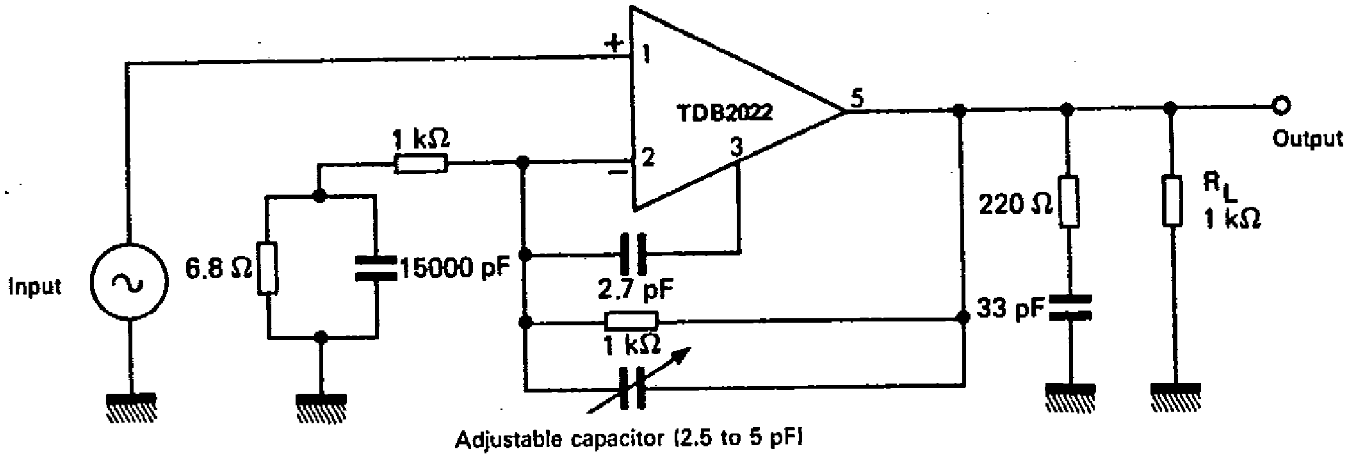
Note 1 : Output voltage swing V_{OPP} is maximum allowable output amplitude peak to peak. 2nd or 3rd harmonic ratio less than −40 dB.

TYPICAL APPLICATIONS

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

With bandwidth irregularity compensation

Application diagram
supplied by Télé Diffusion de France



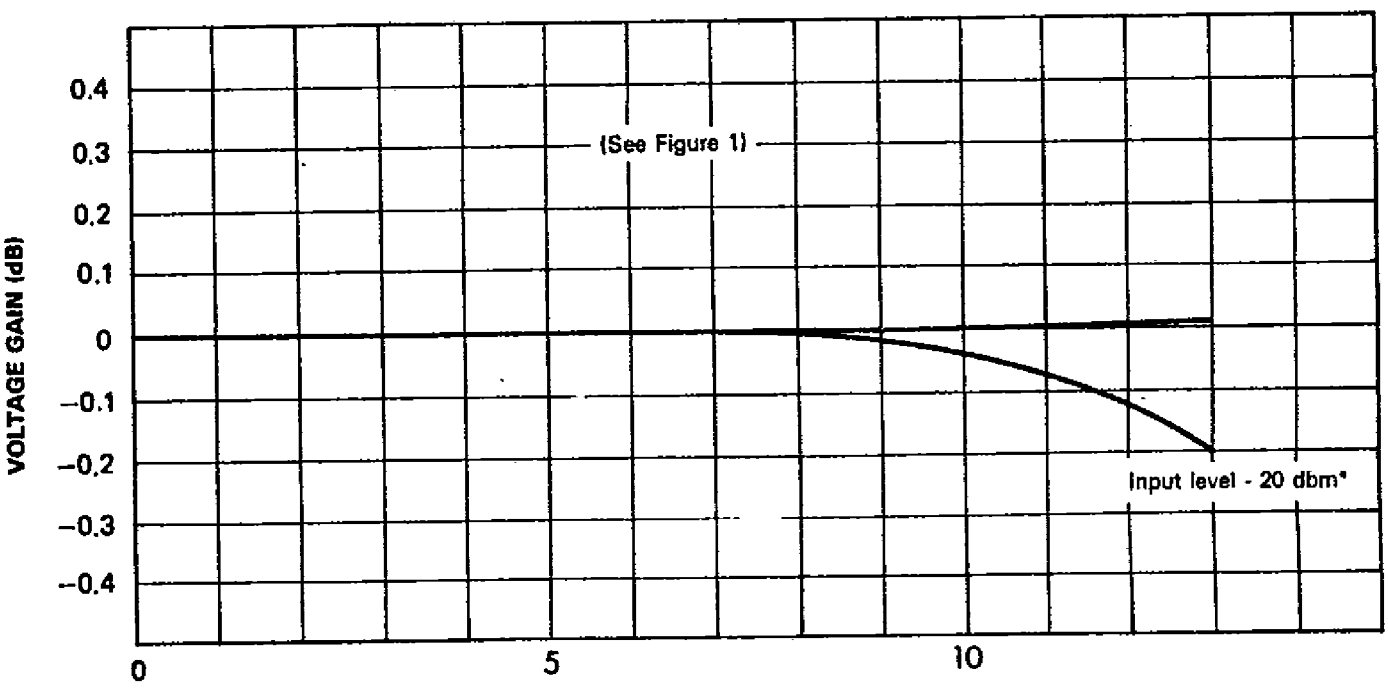
Input signal : −0.7 V to +0.7 V

Differential gain : 0.25% (0.02 dB)

Differential phase shift : 0.1 degree

Slew rate : 50 V/µs

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



* 0 dbm : 1 mW
with resistance of 50 Ω

FIGURE 3 : SLEW RATE

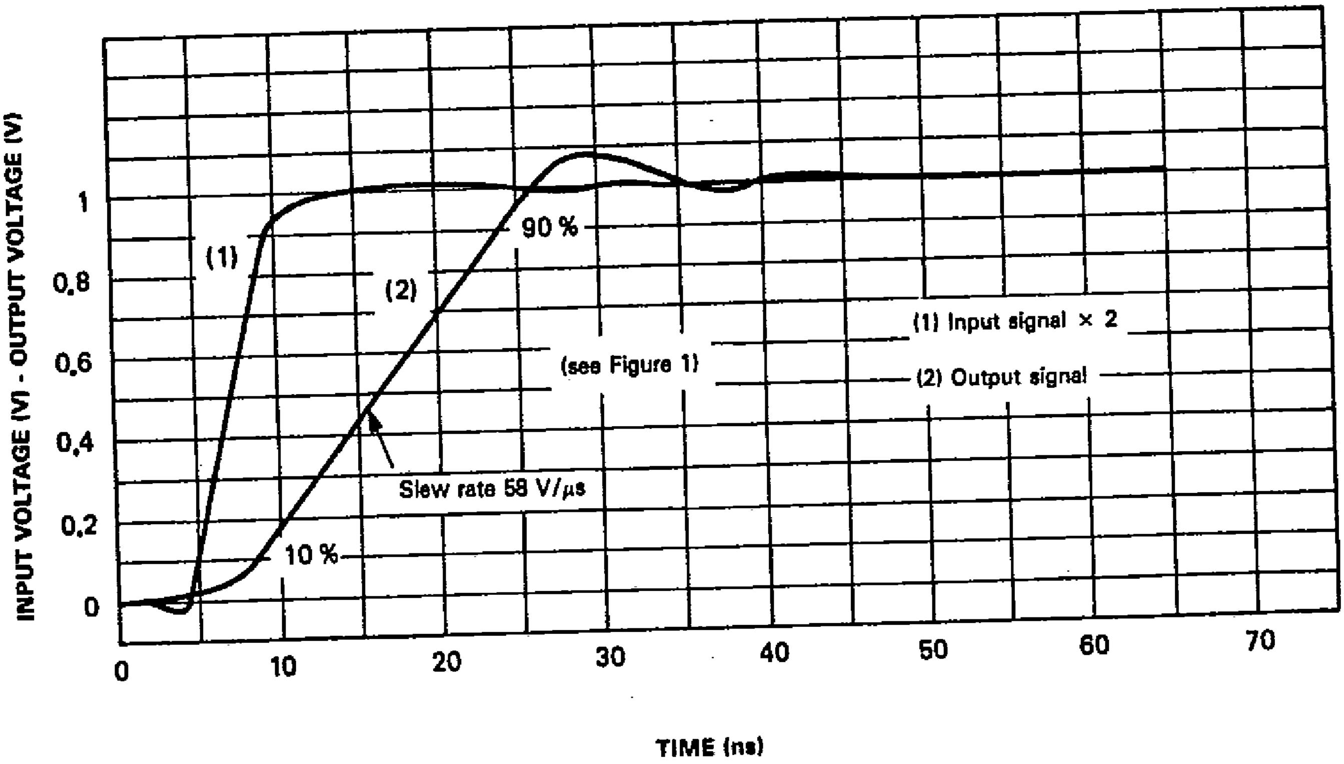
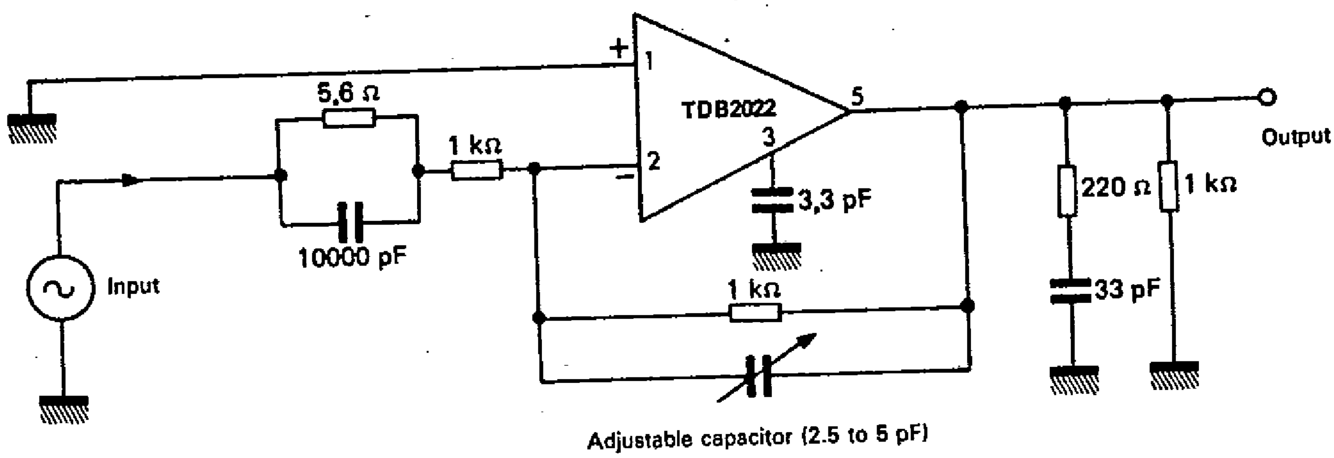


FIGURE 4 : INVERTING AMPLIFIER ($A_V = -1$)

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

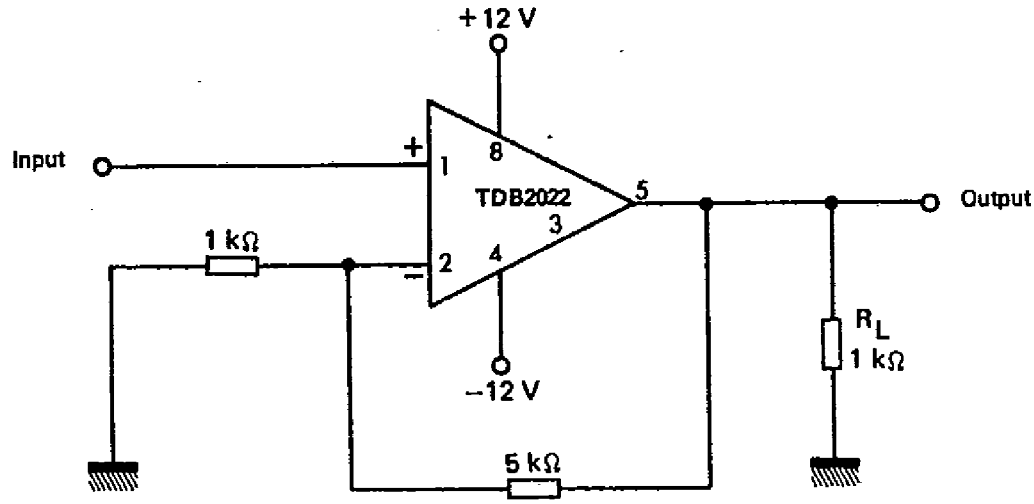


FIGURE 6 : MEASUREMENT OF SLEW RATE

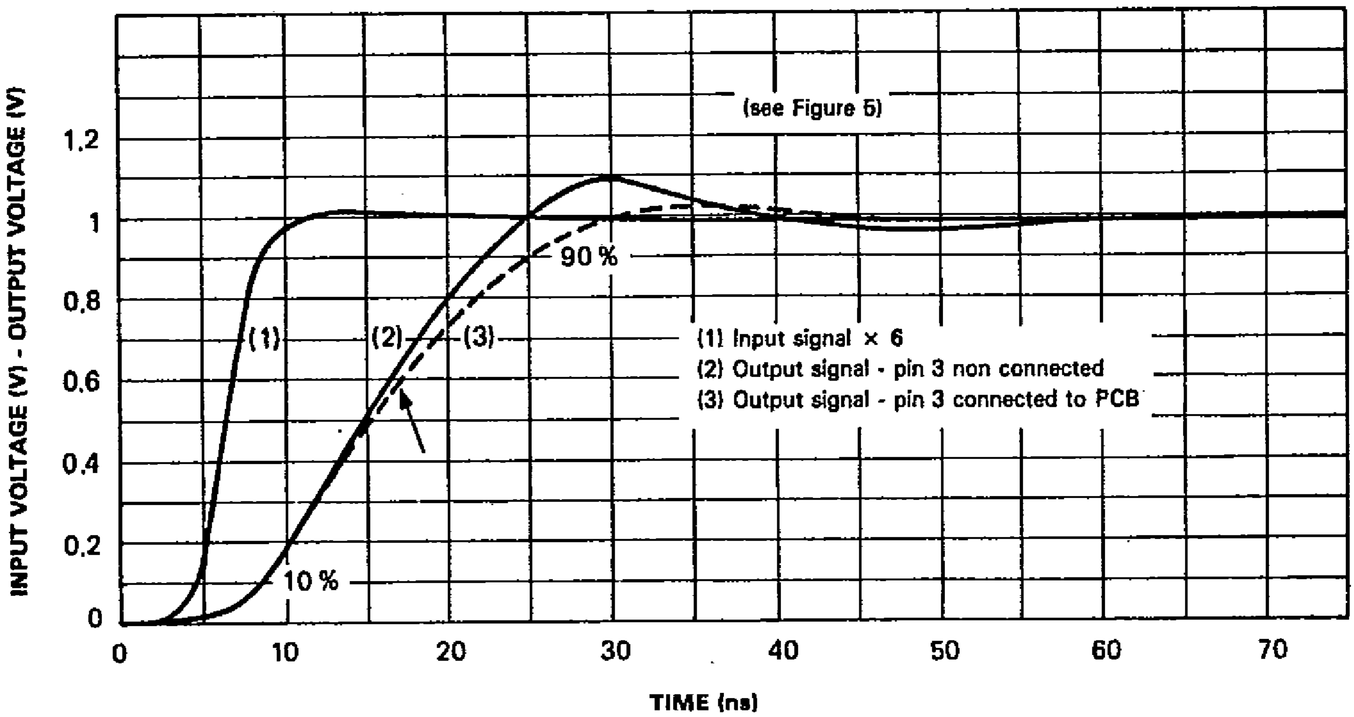


FIGURE 7 : INVERTING AMPLIFIER ($A_V = -10$)

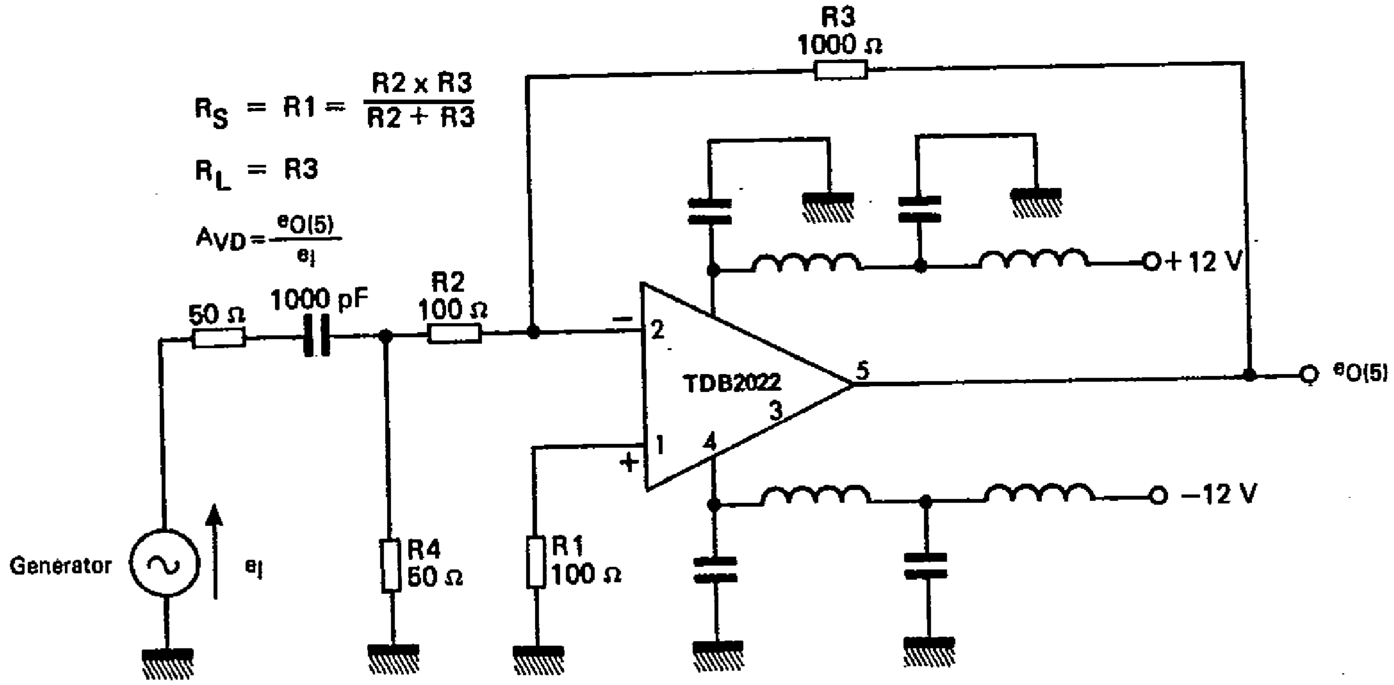


FIGURE 8 : GAIN VERSUS FREQUENCY - OPEN LOOP

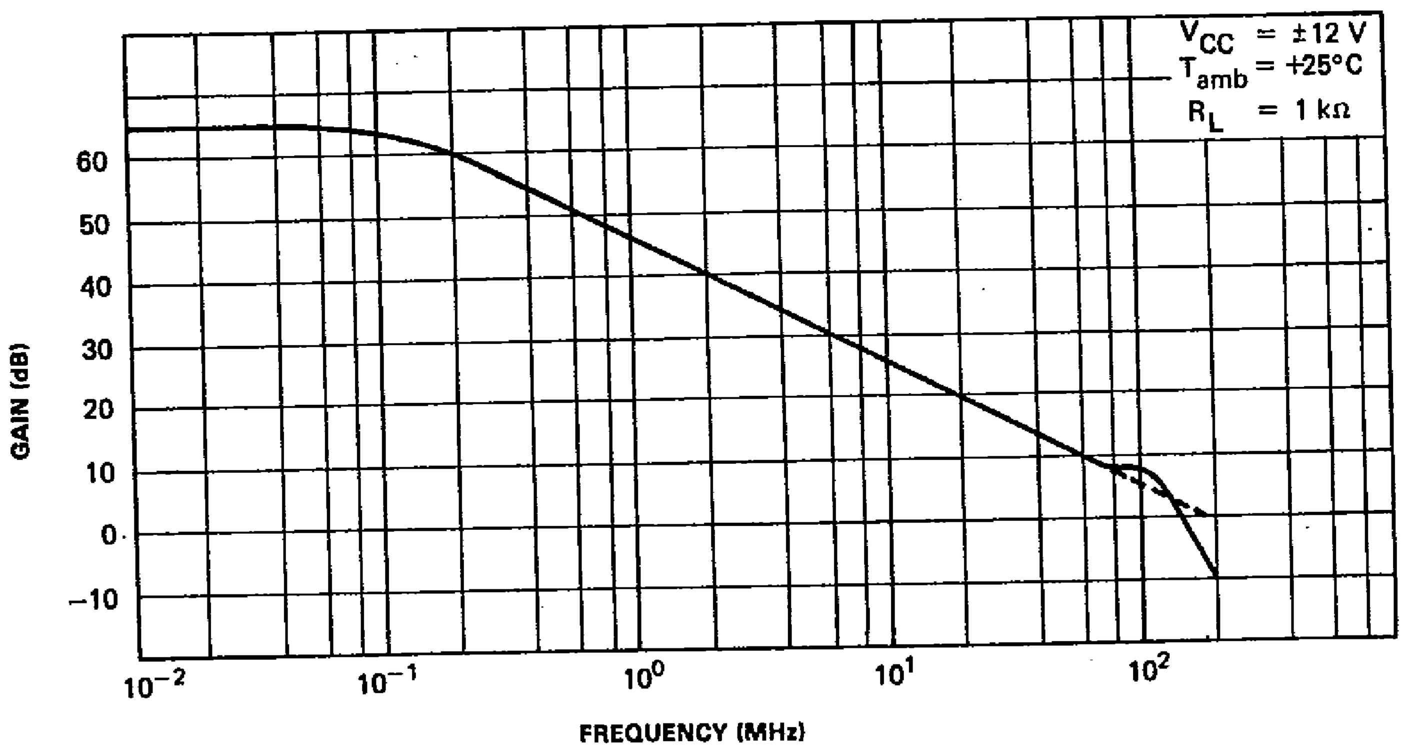


FIGURE 9 : NOISE FIGURE TEST CIRCUIT

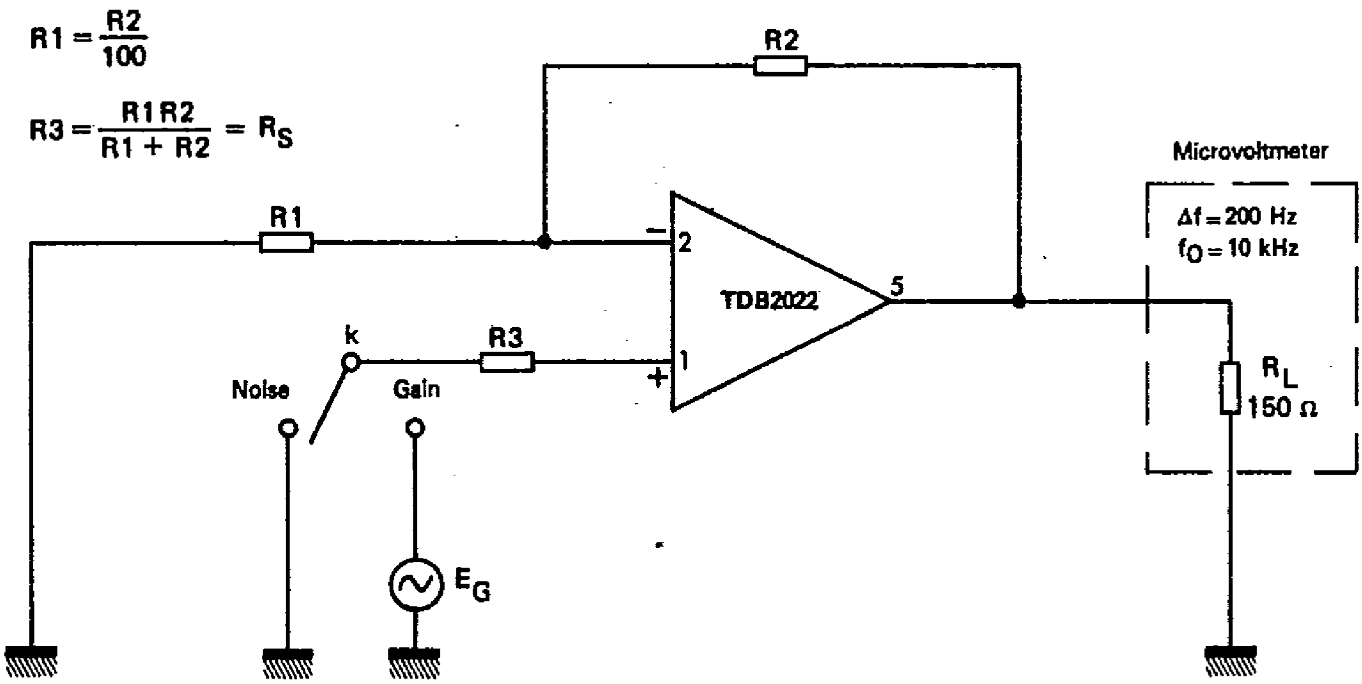
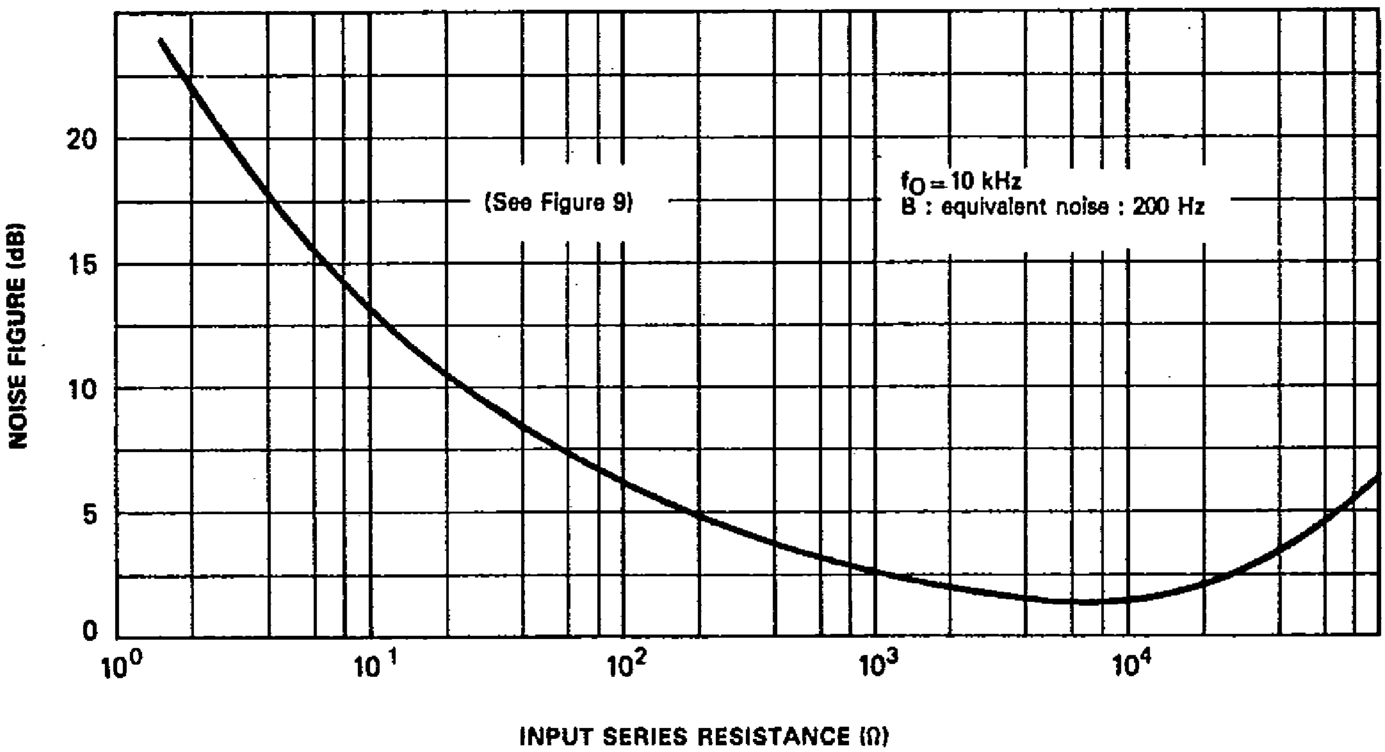
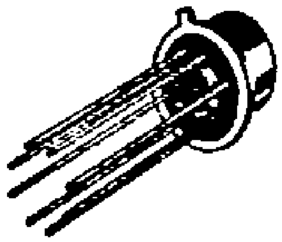


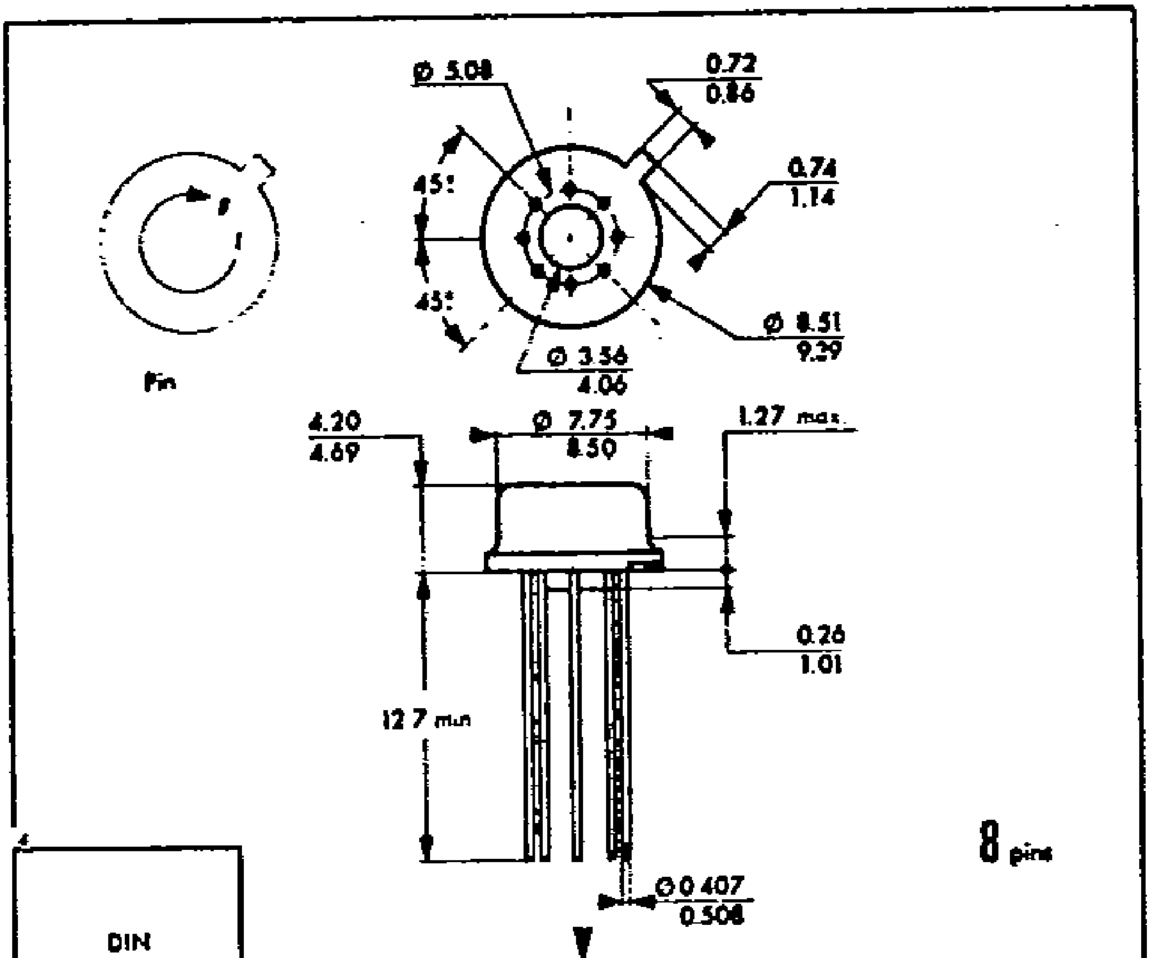
FIGURE 10 : NOISE FIGURE



CB-11
(TO-99)



CM SUFFIX
METAL CAN



DIN				
Case : C-23 Base : CEI	TO-99 D.A.T.A.	TO-99 JEDEC	F 101 SITELESC	CB-11 THOMSON SEMICONDUCTORS