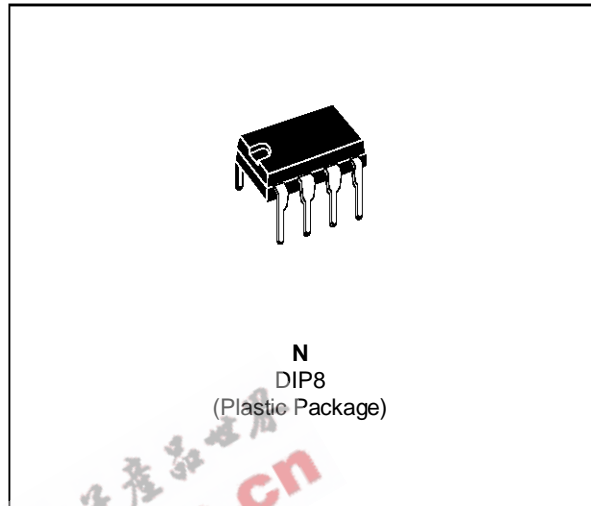


**STEREO AMPLIFIER**

- WIDE SUPPLY VOLTAGE RANGE (3 to 36V)
- SINGLE OR SPLIT SUPPLY OPERATION
- VERY LOW CURRENT CONSUMPTION (0.8mA)
- VERY LOW DISTORTION
- NO POP-NOISE



**DESCRIPTION**

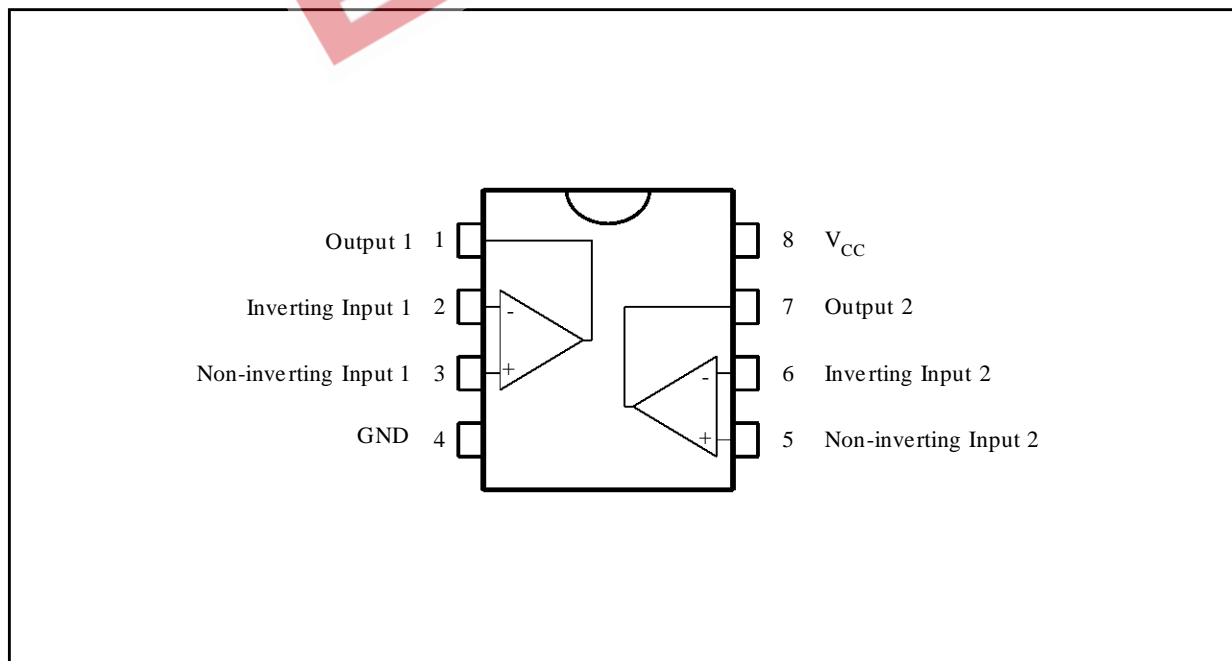
The TDA2320A is a stereo class A preamplifier intended for application in portable cassette players and high quality audio systems.

The TDA2320A is a monolithic integrated circuit in a 8 lead plastic dip.

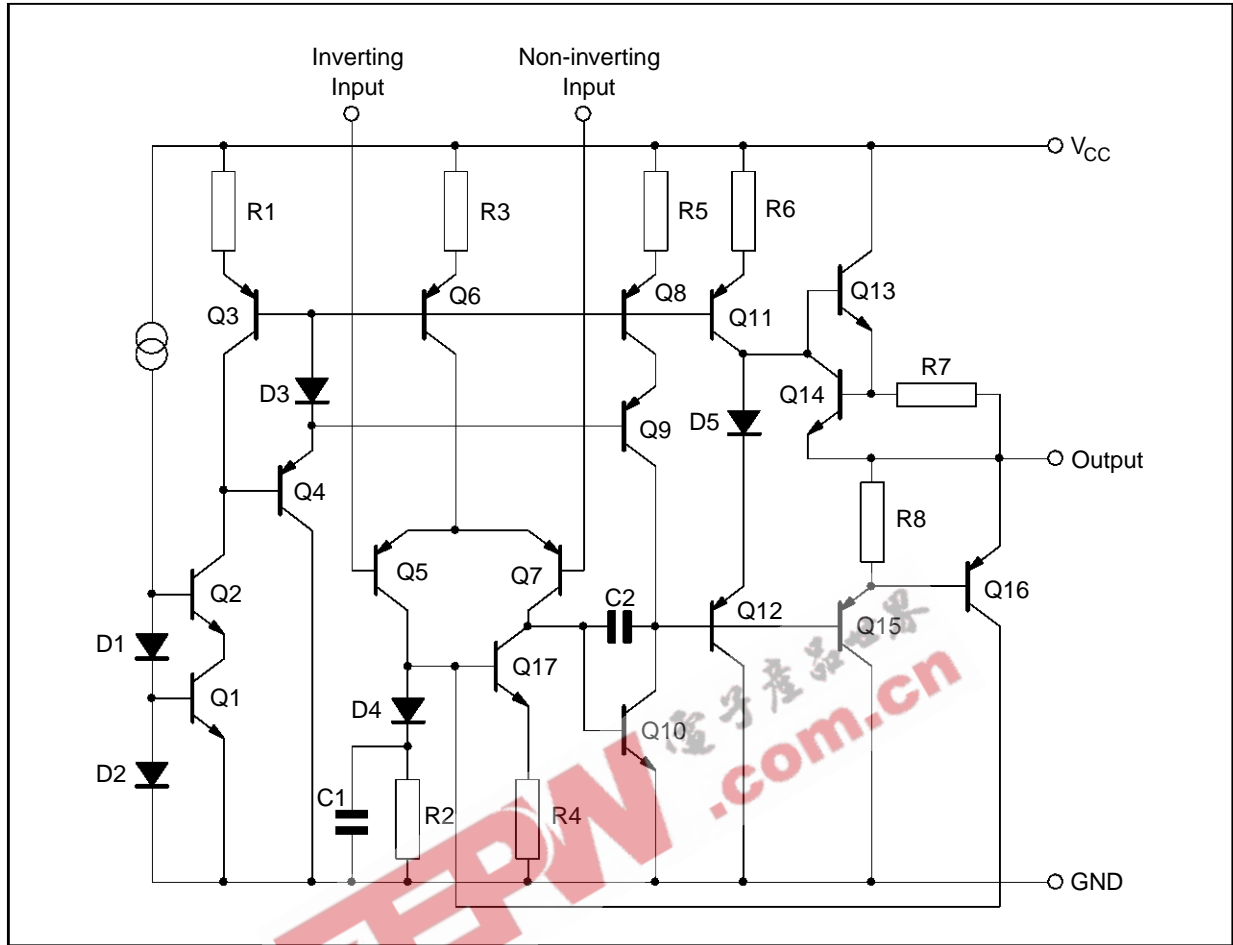
**ORDER CODES**

Part Number	Temperature Range	Package
		N
TDA2320A	-40°C, +105°C	•

**PIN CONNECTIONS (top view)**



SCHMATIC DIAGRAM (1/2 TDA2320A)



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	36	V
P <sub>tot</sub>	Total Power Dissipation at T <sub>amb</sub> = 70°C	400	mW
T <sub>stg</sub> , T <sub>j</sub>	Storage and Junction Temperature	-40 to 150	°C

**ELECTRICAL CHARACTERISTICS**

$V_{CC} = 15V$ ,  $T_{amb} = 25^{\circ}C$  (unless otherwise specified) (refer to the test circuits)

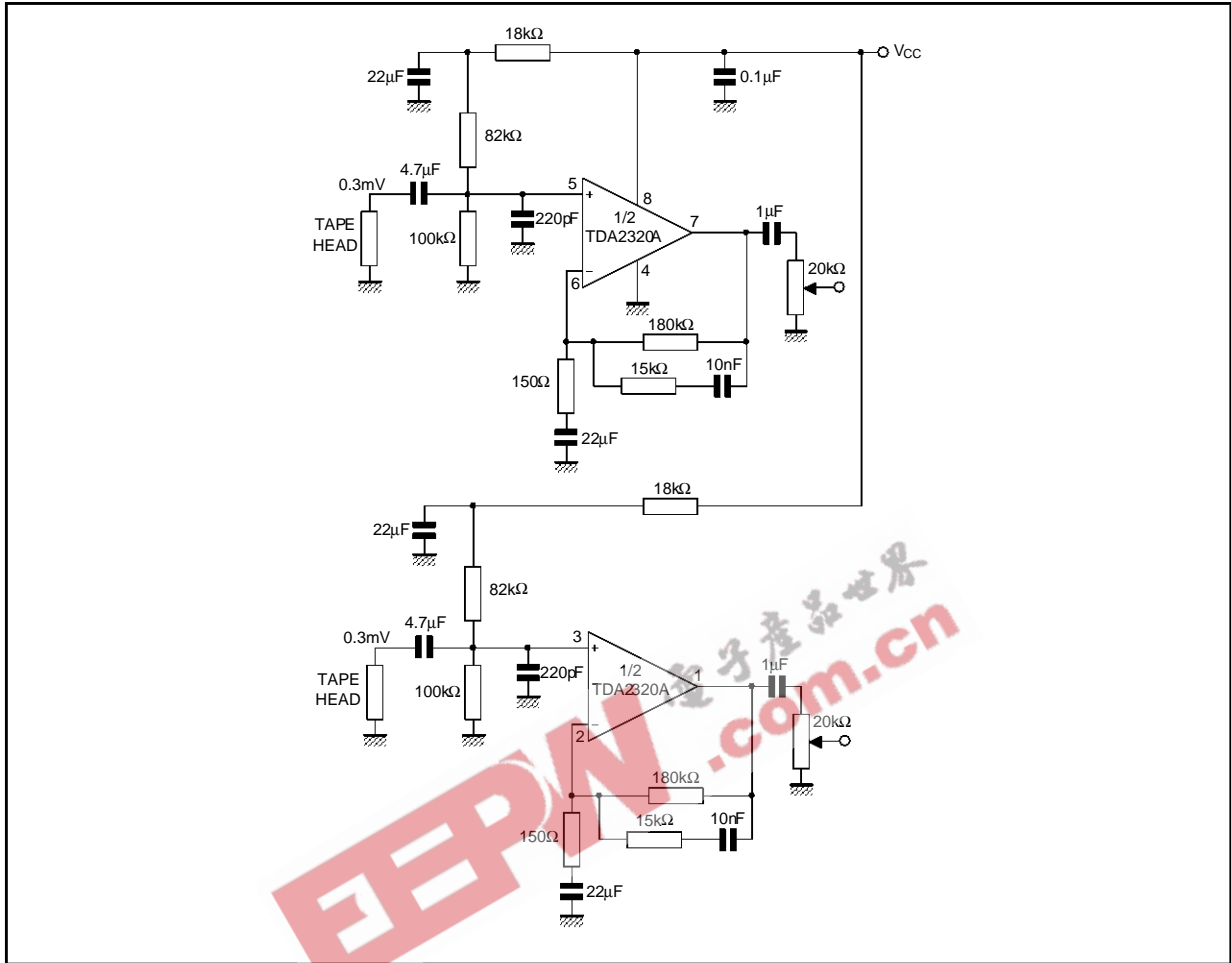
Symbol	Parameter	Min.	Typ.	Max.	Unit
$V_{CC}$	Supply Voltage (*)	3		36	V
$I_{CC}$	Supply Current (*)		0.8	2	mA
$I_{ib}$	Input Bias Current		150	500	nA
$V_{io}$	Input Offset Voltage $R_s \leq 10k\Omega$		1	5	mV
$I_{io}$	Input Offset Current		10	50	nA
$A_{vd}$	Open Loop Voltage Gain $V_{CC} = 15V$ $V_{CC} = 4.5V$ f = 333Hz f = 1kHz f = 10kHz f = 1kHz		80 70 50 70		dB
$V_{OPP}$	Output Voltage Swing (f = 1kHz, $R_L = 600\Omega$ ) (*) $V_{CC} = 15V$ $V_{CC} = 4.5V$		13 2.5		V
GBP	Gain-bandwidth Product f = 20kHz	1.5	2.5		MHz
FBP	Power Bandwidth (*) $V_o = 5V_{PP}$ , THD = 1%	40	70		kHz
SR	Slew Rate (*)	1	1.6		V/ $\mu$ s
THD	Distortion ( $V_o = 2V$ , $A_v = 20dB$ ) (*) f = 1kHz f = 10kHz		0.03 0.08		%
$e_n$	Equivalent Input Noise Voltage (**) Curve A B = 22Hz to 22kHz f = 1kHz $R_s = 50\Omega$ $R_s = 600\Omega$ $R_s = 5k\Omega$ $R_s = 50\Omega$ $R_s = 600\Omega$ $R_s = 5k\Omega$ $R_s = 600\Omega$		1 1.1 1.5 1.3 1.5 2 9	1.4	$\mu$ V      nV $\sqrt{Hz}$
$V_{O1}/V_{O2}$	Channel Separation (**) f = 1kHz		100		dB
SVR	Supply Voltage Rejection Ratio(**) f = 100Hz		80		dB

(\*) Test circuit of figure 1

(\*\*) Test circuit of figure 2

TYPICAL APPLICATION

STEREO PREAMPLIFIER FOR CASSETTE PLAYERS



TEST CIRCUITS

Figure 1

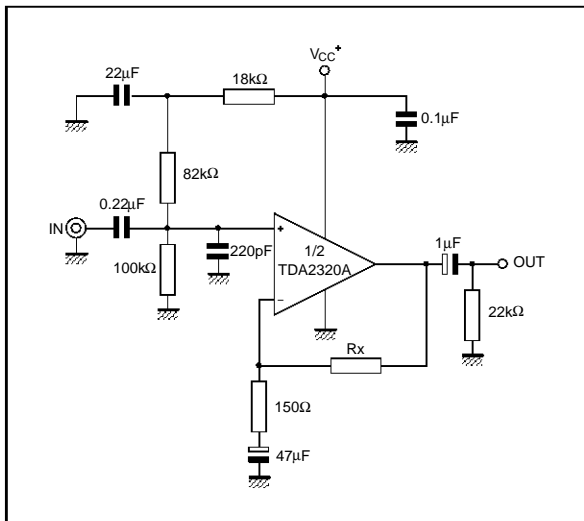


Figure 2

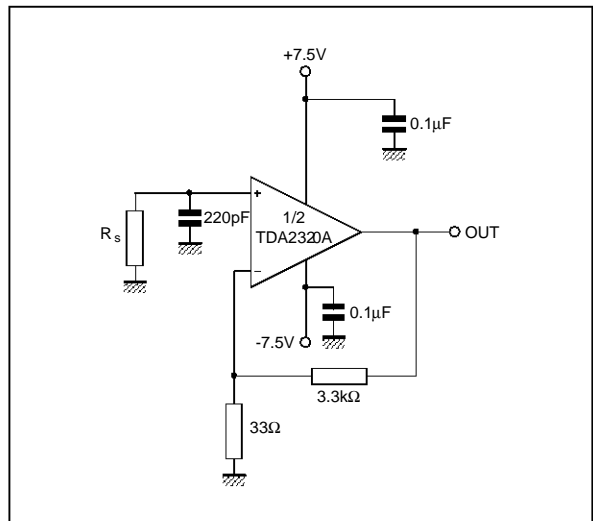


Figure 3 : Supply Current versus Supply Voltage

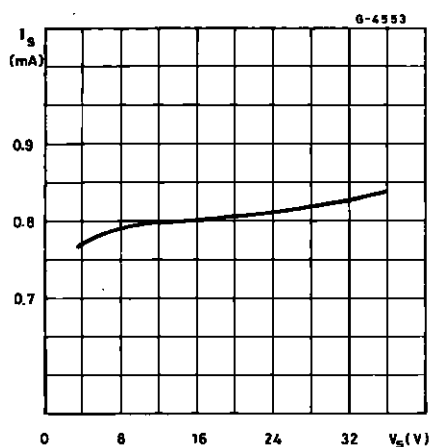


Figure 4 : Supply Current versus Ambient Temperature

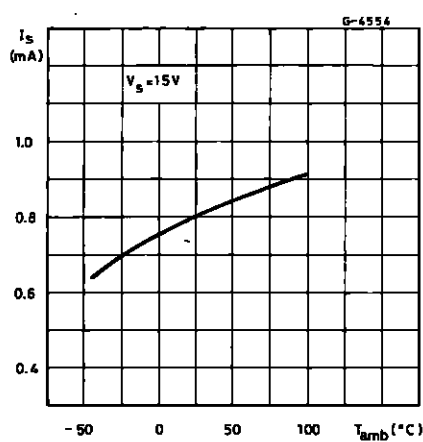


Figure 5 : Output Voltage Swing versus Load Resistance

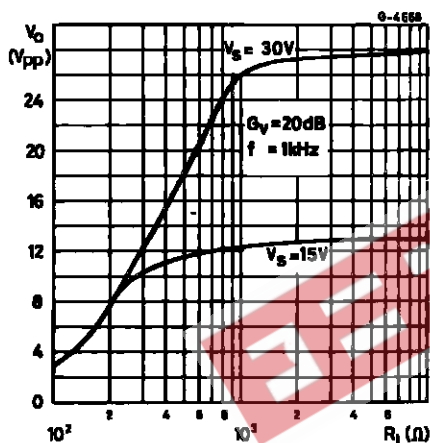


Figure 6 : Power Bandwidth

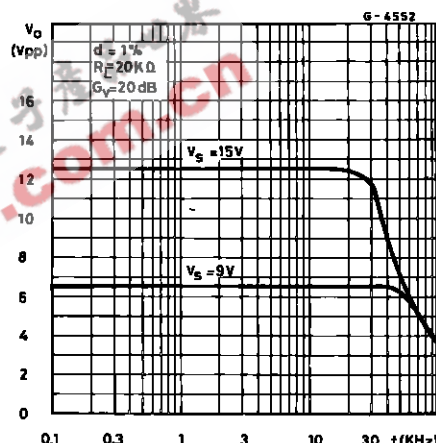


Figure 7 : Total Harmonic Distortion versus Output Voltage

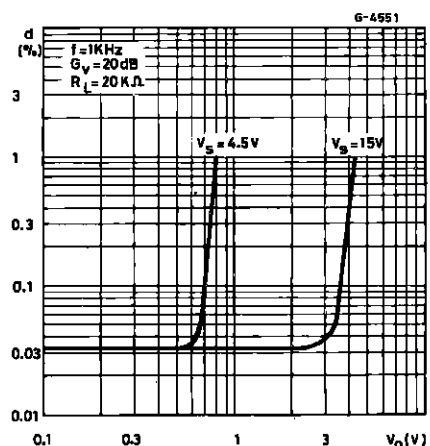


Figure 8 : Total Input Noise versus Source Resistance

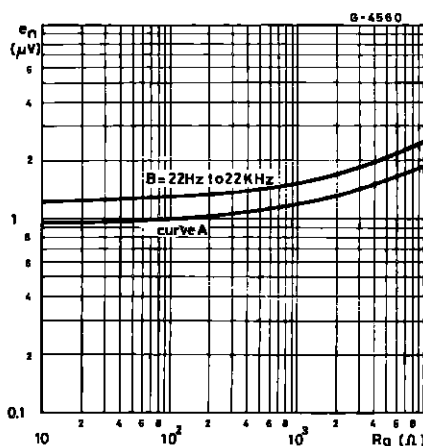


Figure 9 : Noise Density versus Frequency

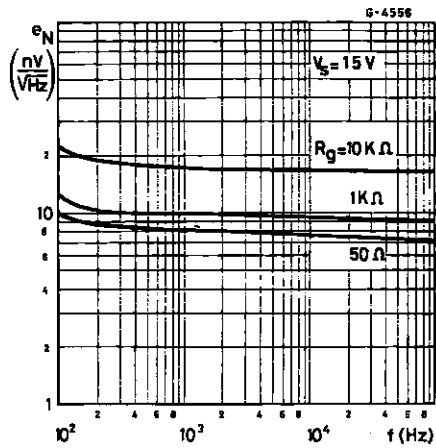


Figure 10 :RIAA Preamplifier Response

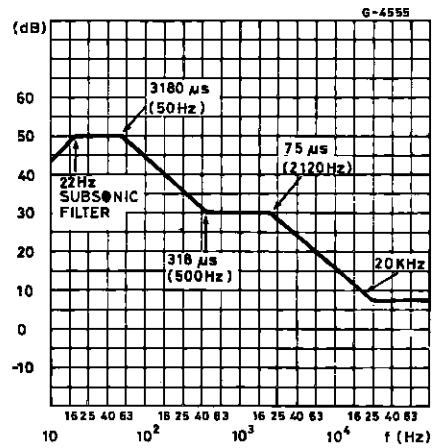
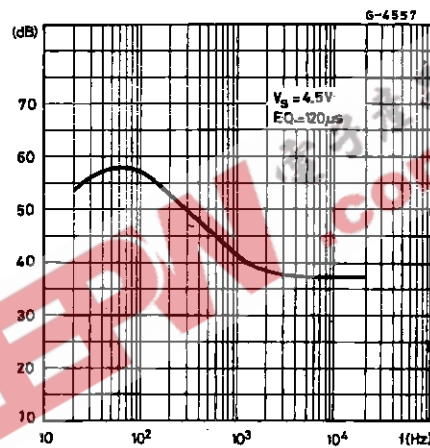


Figure 11 :Tape Preamplifier Frequency



APPLICATION INFORMATION

Figure 12 :Stereo RIAA Preamplifier

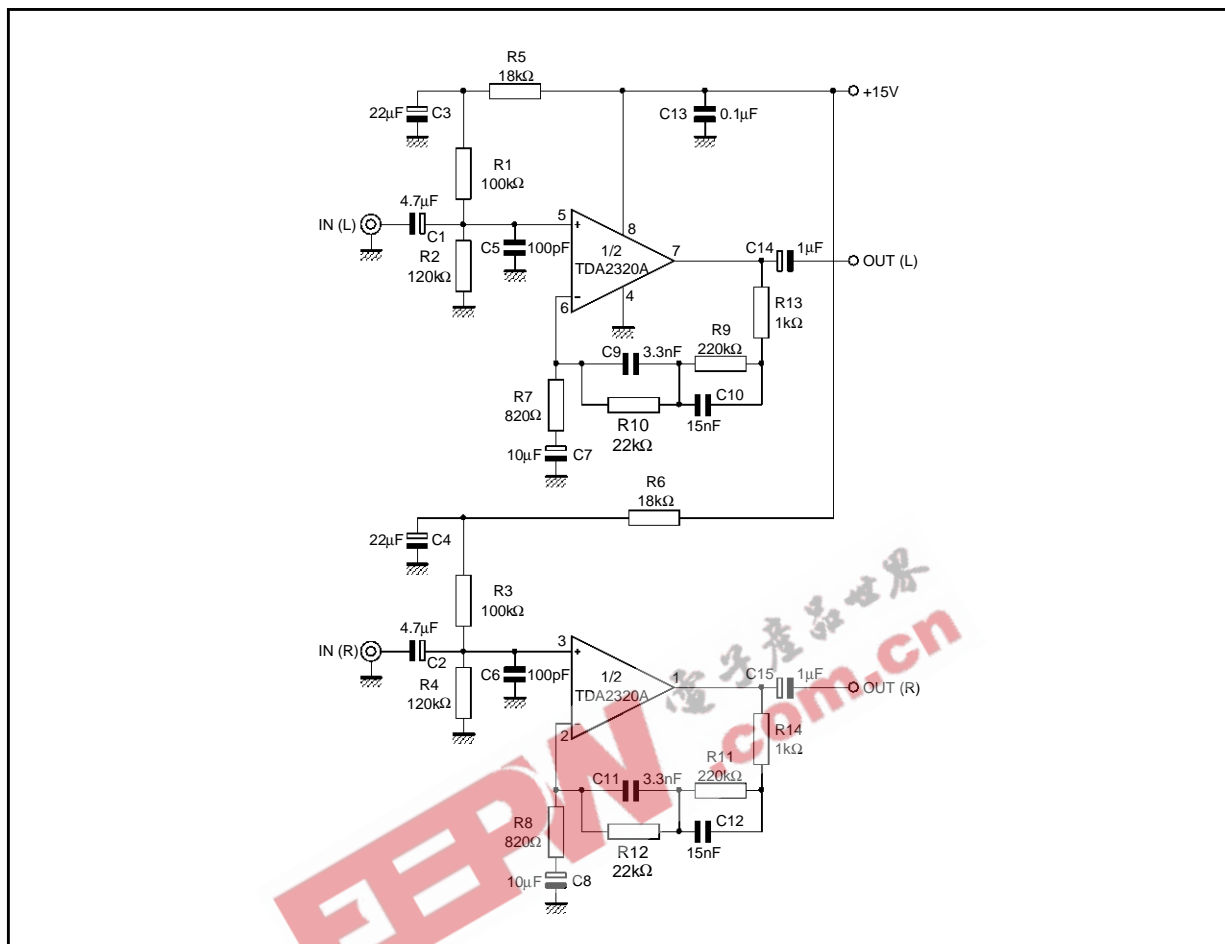
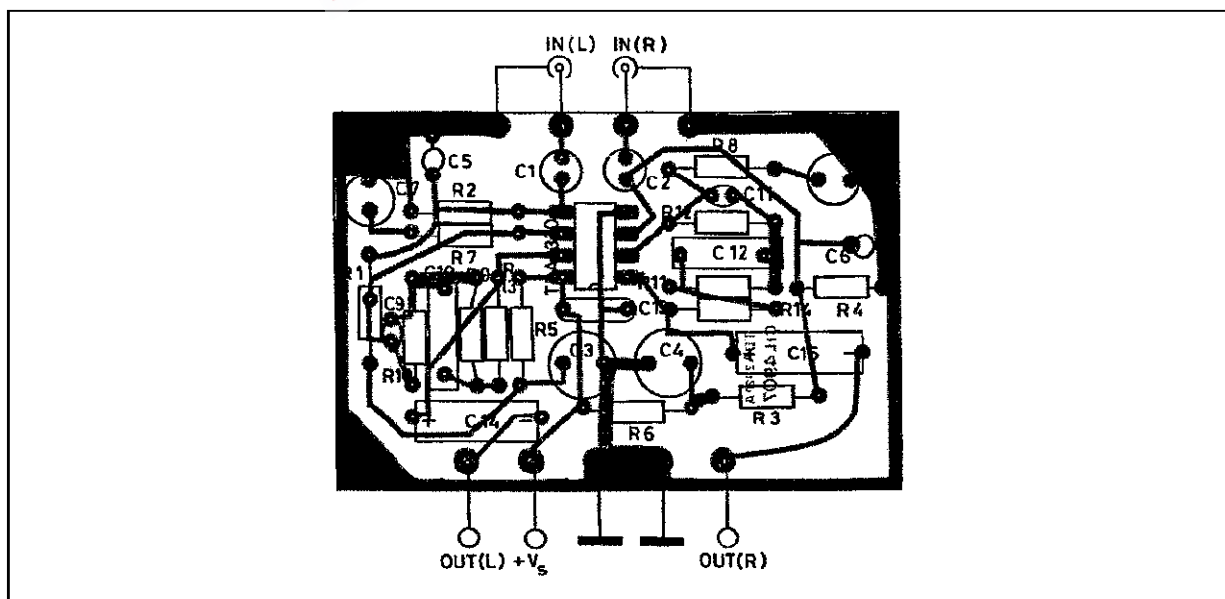
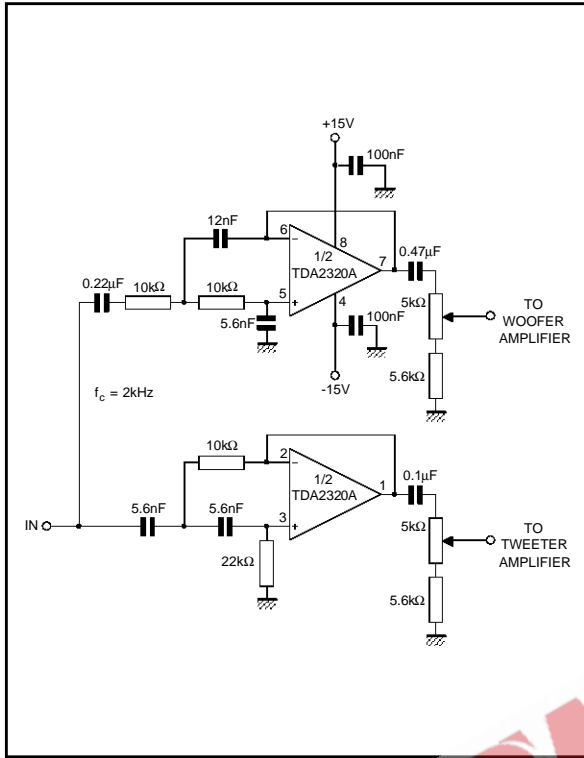


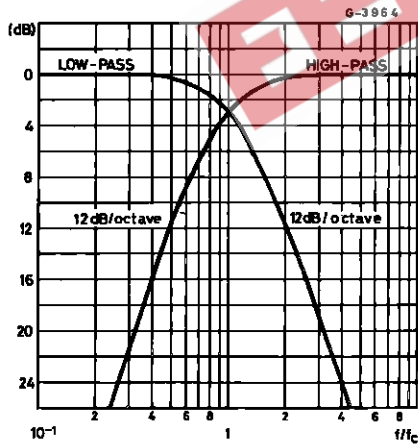
Figure 13 :P.C. Board and Components layout of the Circuit of figure 12



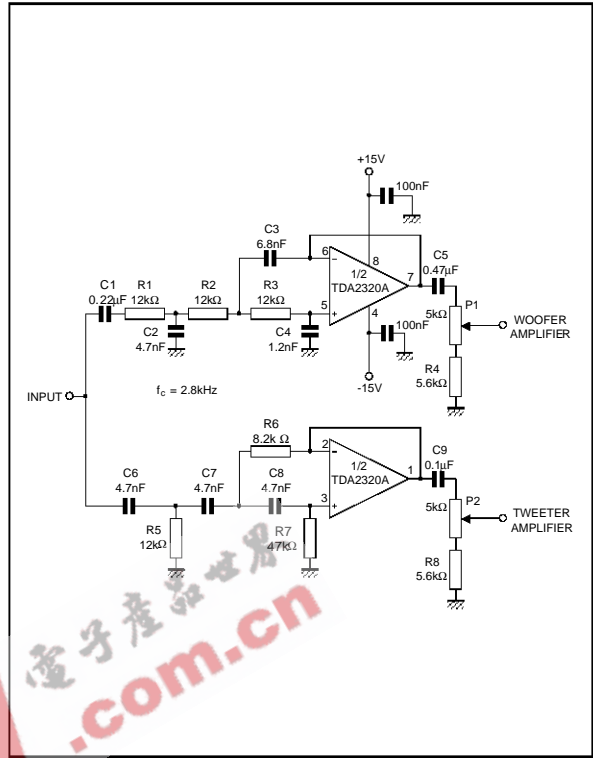
**Figure 14** : Second Order 2kHz Butterworth Crossover Filter for Hi-Fi Active Boxes



**Figure 16** : Frequency Response (circuit of figure 14)



**Figure 15** : Third Order 2.8kHz Bessel Crossover Filter for Hi-Fi Active Boxes



**Figure 17** : Frequency Response (circuit of figure 15)

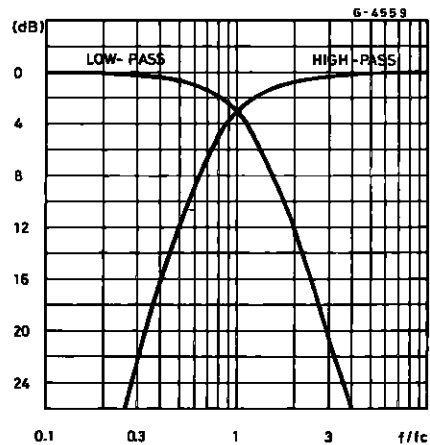




Figure 18 : 200Hz to 2kHz Active Bandpass Filter for Midrange Speakers

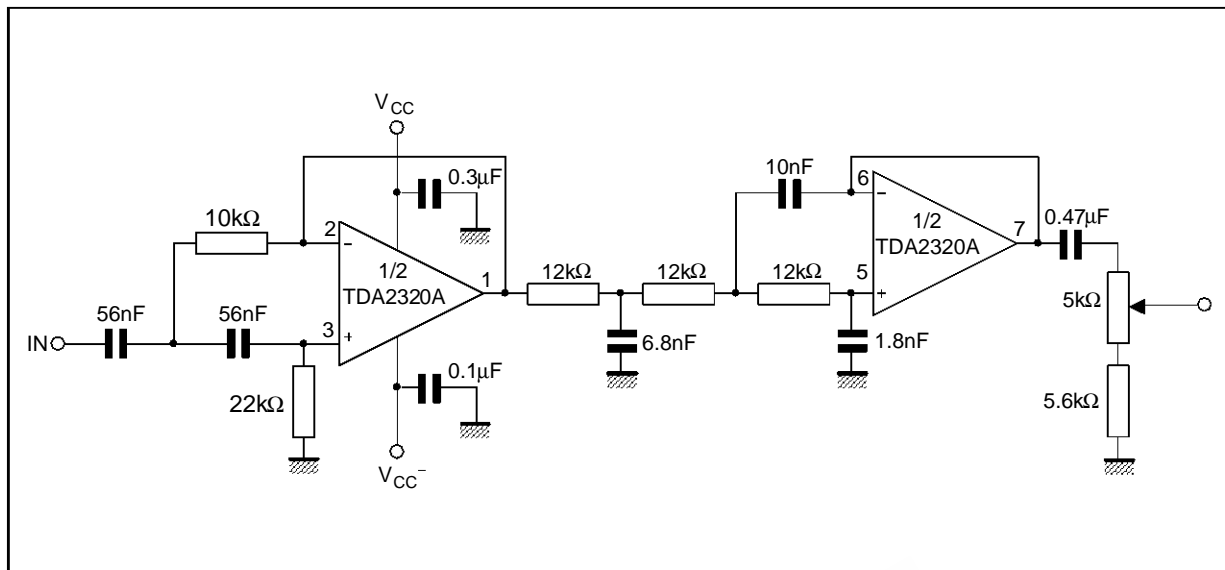


Figure 19 : Subsonic Filter

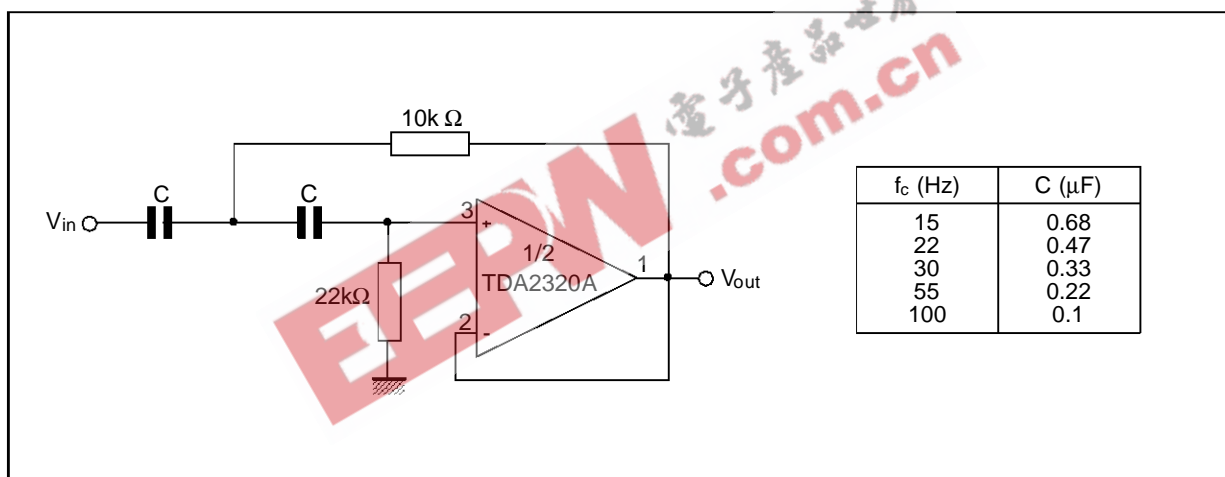


Figure 20 : High-cut Filter

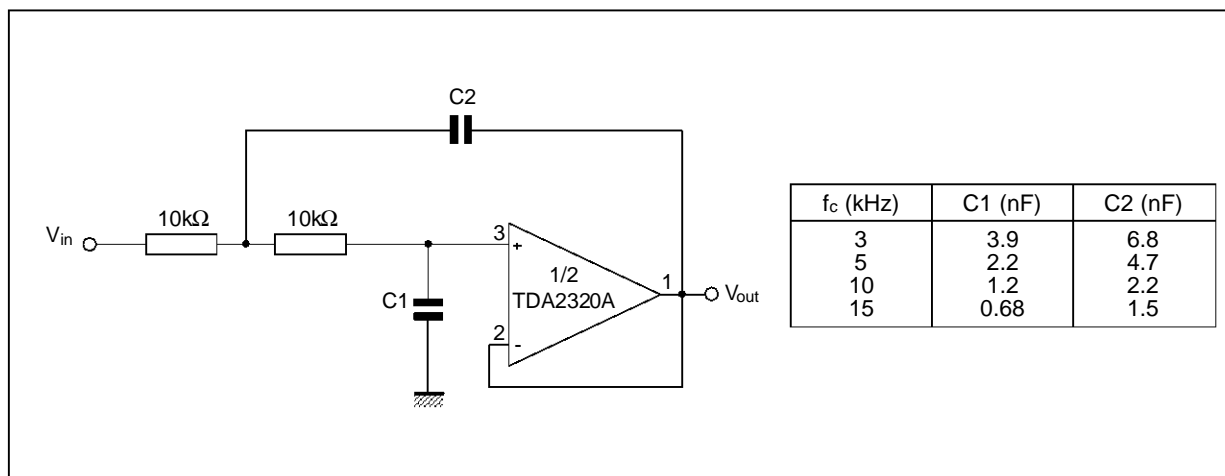
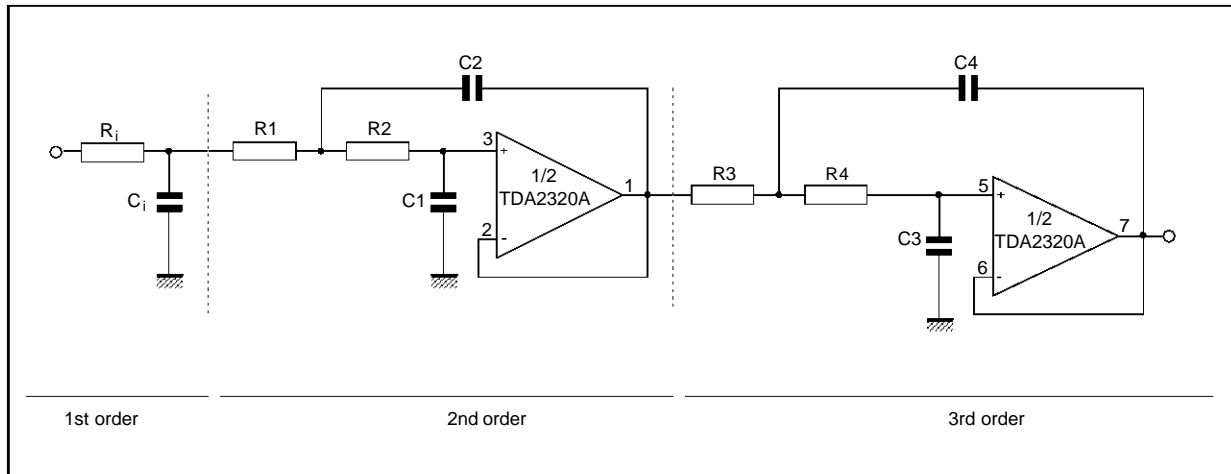


Figure 21 :Fifth Order 3.4kHz Low-pass Butterworth Filter



For  $f_c = 3.4\text{kHz}$  and  $R_i = R_1 = R_2 = R_3 = R_4 = 10\text{k}\Omega$ , we obtain :

$$C_1 = 1.354 \cdot \frac{1}{R} \cdot \frac{1}{2\pi f_c} = 6.33\text{nF}$$

$$C_3 = 0.309 \cdot \frac{1}{R} \cdot \frac{1}{2\pi f_c} = 1.45\text{nF}$$

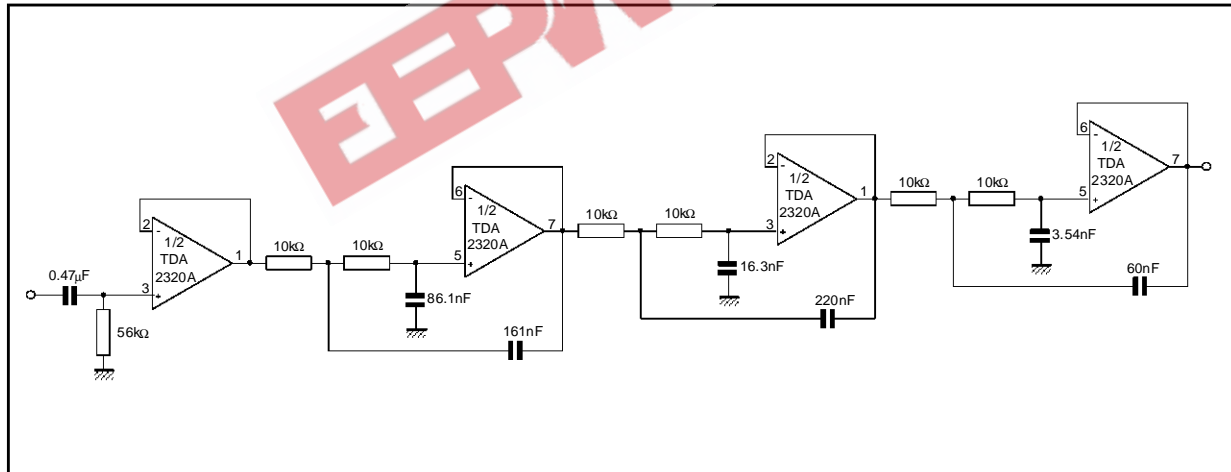
$$C_2 = 0.421 \cdot \frac{1}{R} \cdot \frac{1}{2\pi f_c} = 1.97\text{nF}$$

$$C_4 = 3.325 \cdot \frac{1}{R} \cdot \frac{1}{2\pi f_c} = 15.14\text{nF}$$

$$C_2 = 1.753 \cdot \frac{1}{R} \cdot \frac{1}{2\pi f_c} = 8.20\text{nF}$$

The attenuation of the filter is 30dB at 6.8kHz and better than 60dB at 15kHz.

Figure 22 :Sixth-pole 355Hz Low-pass Filter (Chebychev type)



This is a 6-pole Chebychev type with  $\pm 0.25\text{dB}$  ripple in the passband. A decoupling stage is used to avoid the influence of the input impedance of the filter's characteristics.

The attenuation is about 55dB at 710Hz and reaches 80dB at 1065Hz. The in band attenuation is limited in practice to the  $\pm 0.25\text{dB}$  ripple and does not exceed  $1/2\text{dB}$  at  $0.9f_c$ .

Figure 23 : Three Band Tone Control

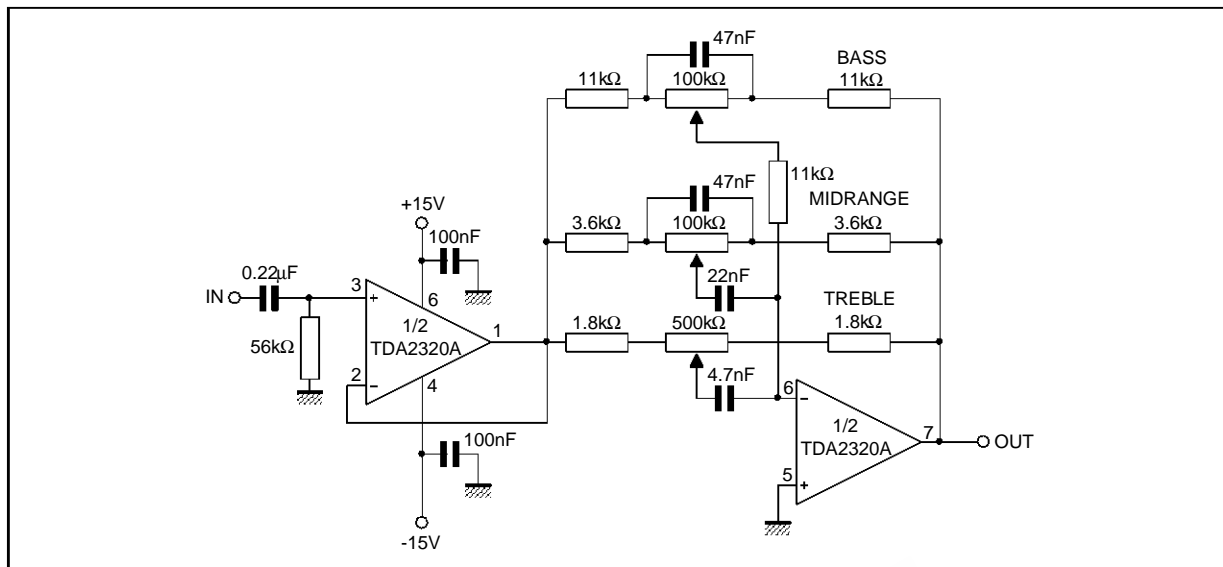
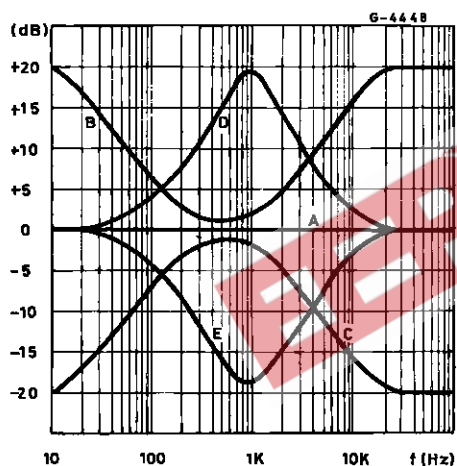


Figure 24 :Frequency Response of the Circuit of figure 23



A : all controls flat

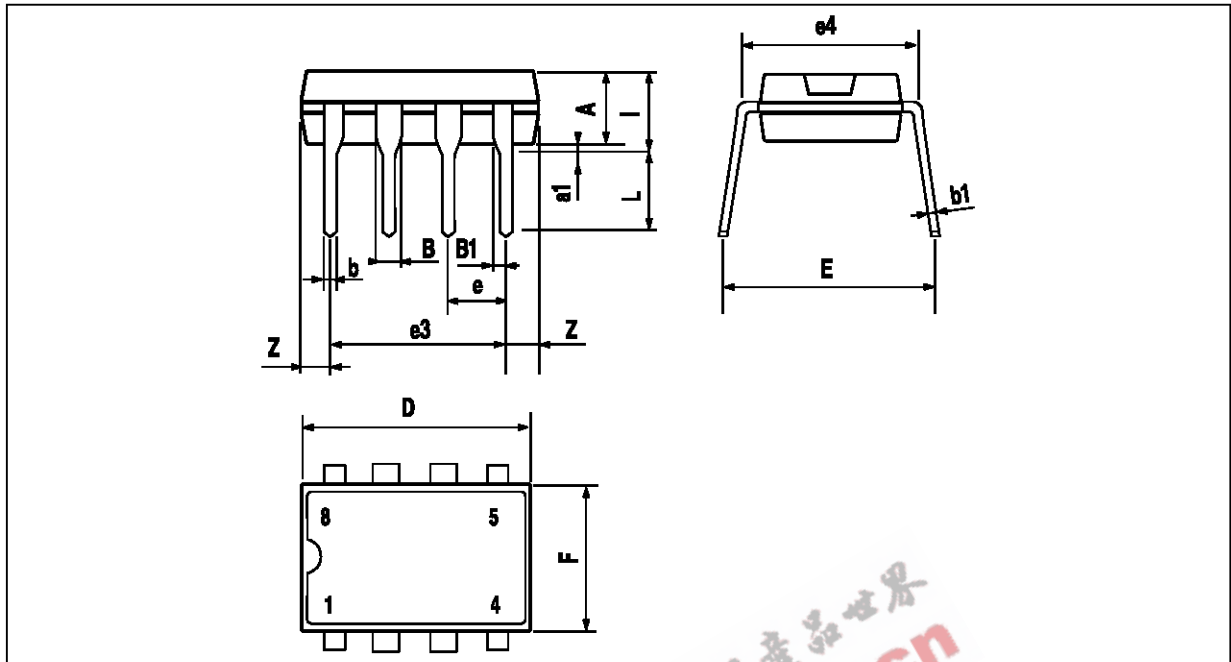
B : bass & treble boost, mid flat

C : bass & treble cut, mid flat

D : mid boost, bass & treble flat

E : mid cut, bass treble flat

**PACKAGE MECHANICAL DATA**  
8 PINS -PLASTIC DIP



PM-DIP8.EPS

Dimensions	Millimeters			Inches		
	Min.	Typ.	Max.	Min.	Typ.	Max.
A		3.32			0.131	
a1	0.51			0.020		
B	1.15		1.65	0.045		0.065
b	0.356		0.55	0.014		0.022
b1	0.204		0.304	0.008		0.012
D			10.92			0.430
E	7.95		9.75	0.313		0.384
e		2.54			0.100	
e3		7.62			0.300	
e4		7.62			0.300	
F			6.6			0.260
i			5.08			0.200
L	3.18		3.81	0.125		0.150
Z			1.52			0.060

DIP8.TBL

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