M5243BFP

3-element 2-ch Graphic Equalizer IC

REJ03F0082-0100Z
Rev.1.0
Sep.22.2003

Description

This 2-ch, 3-element graphic equalizer IC is ideal for Hi-Fi audio devices, and features three transistor-type resonance circuits and an output operating amp that handles two channels built into it. It is designed for use in radio cassette players, car stereos, portable stereos and other devices.

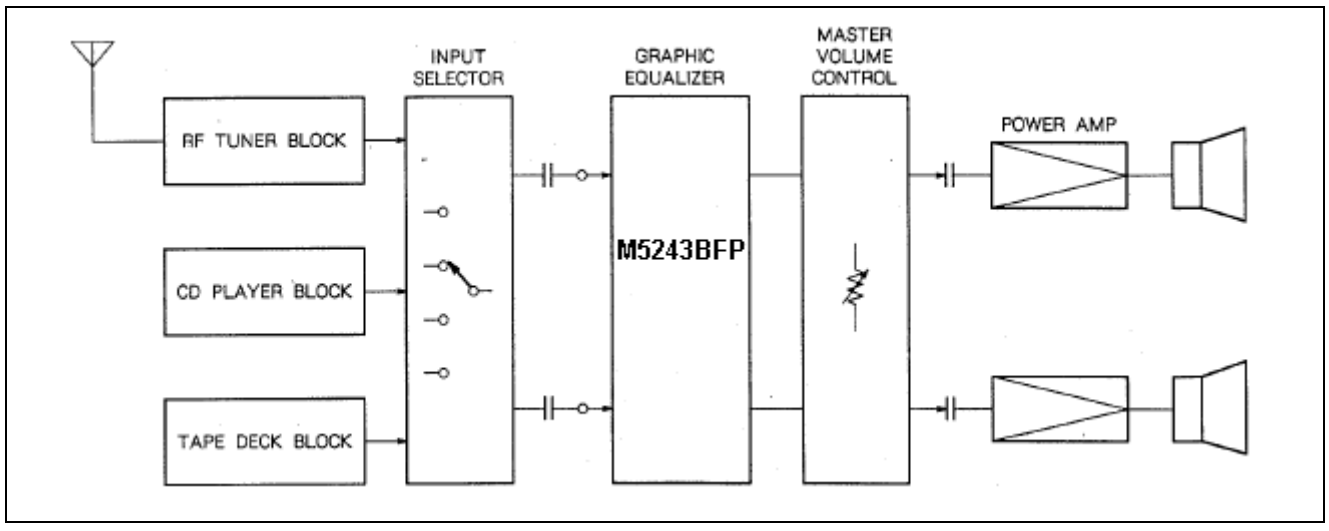
Features

- Two-channel (stereo) processing is possible with single IC.
- An internal reference voltage circuit eliminates the need for a large-volume capacitor and makes it possible to use fewer components.
- The Gv can be varied using an external resistor.
- Low noise ..... V_{NO} FLAT = 4 μV_{rms} (standard)
- Low distortion ..... THD = 0.004% (standard)
  (@f = 1 kHz, FLAT)

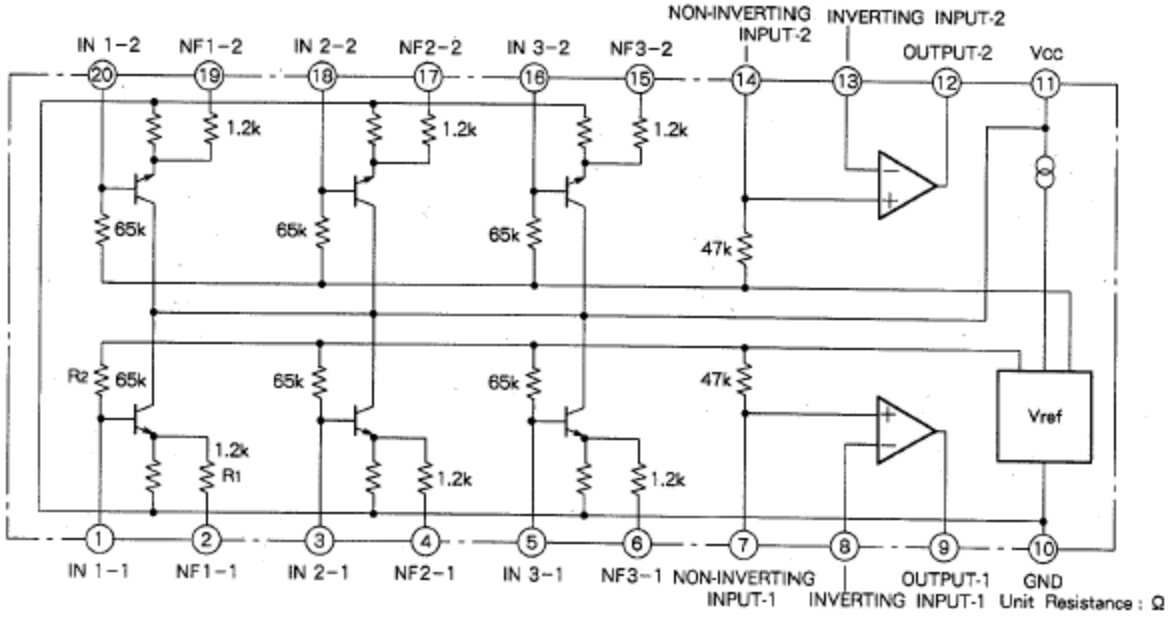
Recommended Operating Conditions

Rated power dissipation : 550 mW (FP)

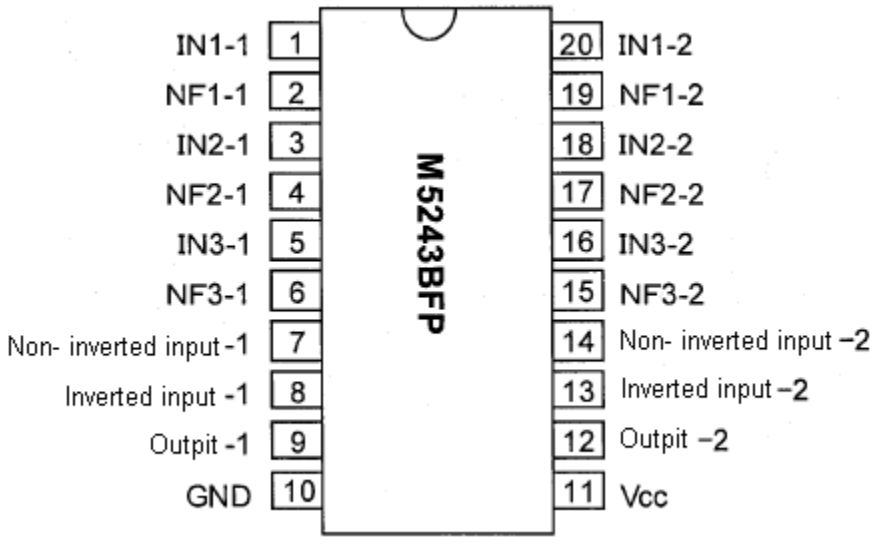
System Configuration



Block Diagram



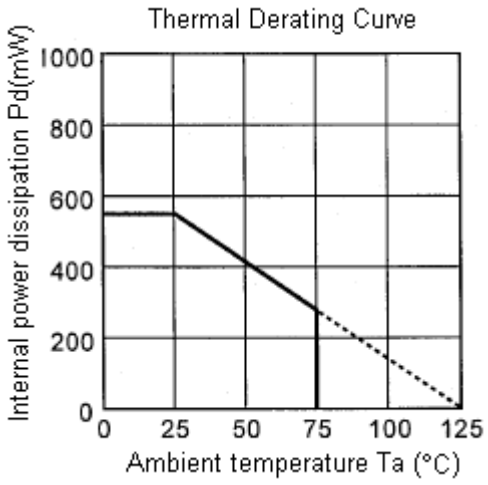
Pin Configuration



Absolute Maximum Ratings

(Unless otherwise noted, Ta = 25°C)

Symbol	Item	Conditions	Rated values	Unit
Vcc	Power supply voltage		16	V
I_{LP}	Current load		30	mA
P_d	Internal power dissipation		550	mW
T_{opr}	Ambient operating temperature		-20 to +75	°C
T_{stg}	Storage temperature		-55 to +125	°C

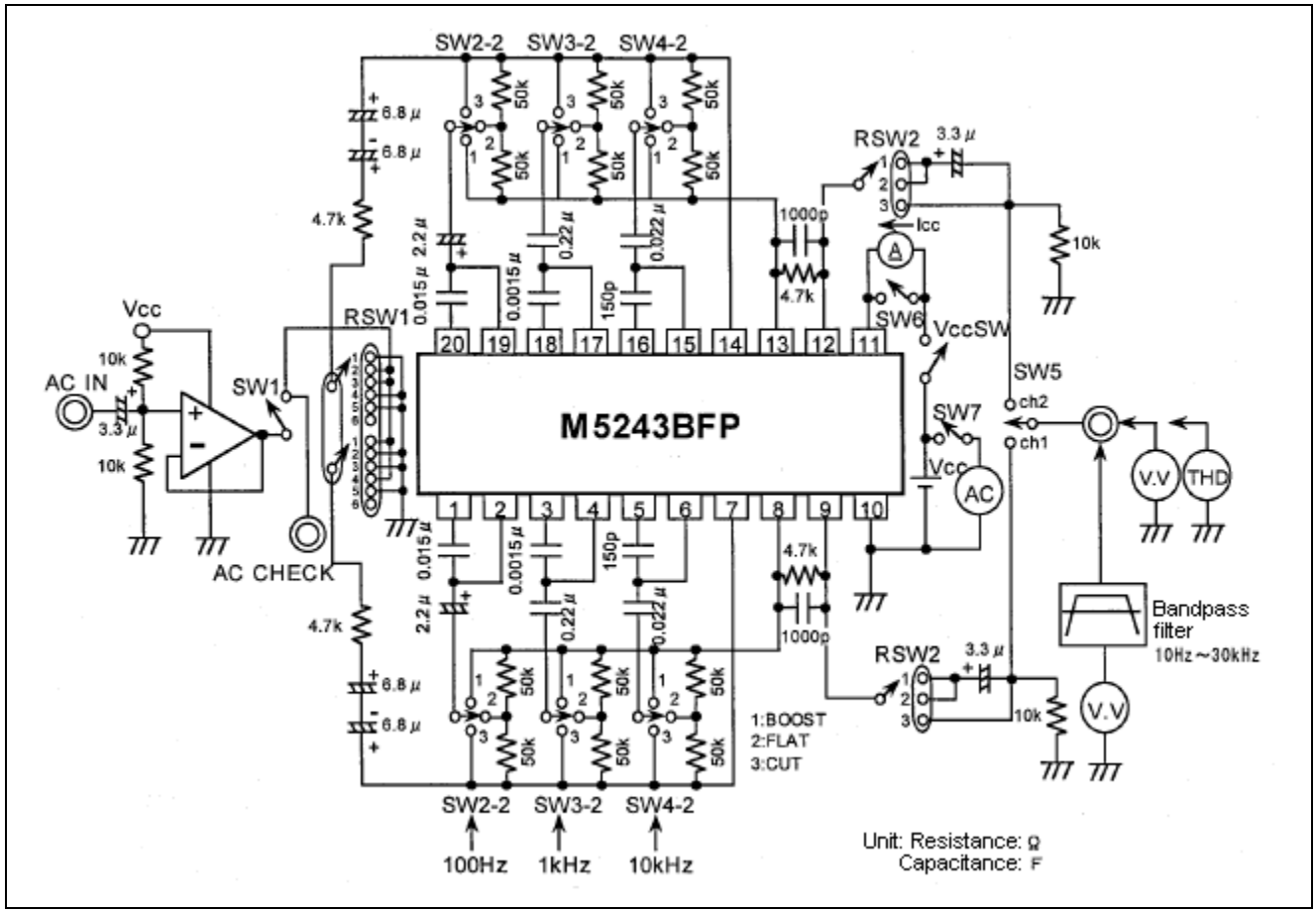


Electrical Characteristics

(Unless otherwise noted, Ta = 25°C)

Symbol	Item		Measurement conditions	f (Hz)	Limits			Unit
					Min.	Typ.	Max.	
Icc	Circuit current			—	9.0	12.5	16.0	mA
Gv (FLAT)	Voltage gain	Flat	V1 = –10dBm	1k	–2.0	–0.5	1.0	dB
Gv (BOOST)		Boost	V1 = –10dBm Vi = 0 dBm Rg = 4.7k	100	10.0	12.0	14.0	
				1k	10.0	12.0	14.0	
				10k	10.0	12.0	14.0	
Gv (CUT)		Cut		100	–14.0	–12.0	–10.0	
				1k	–14.0	–12.0	–10.0	
				10k	–10.0	–12.0	–10.0	
THD	Total harmonic distortion		Vi = 1Vms All FLAT	1k	—	0.003	0.1	%
V_{OM}	Maximum out put voltage		THD = 0.1% All FLAT	1k	1.5	1.9	—	Vrms
C.C	Channel separation		V1 = –10 dBm All FLAT	1k	60	75	—	dB
H.R	Hum rejection		V1 = –10 dBm All FLAT	120	55	65	—	dB
V_{NO}	Output noise voltage		All FLAT BW: 10 Hz to 30 kHz	—	—	3.5	15	µVrms
V_M	Midpoint potential			—	3.5	4.5	5.5	V

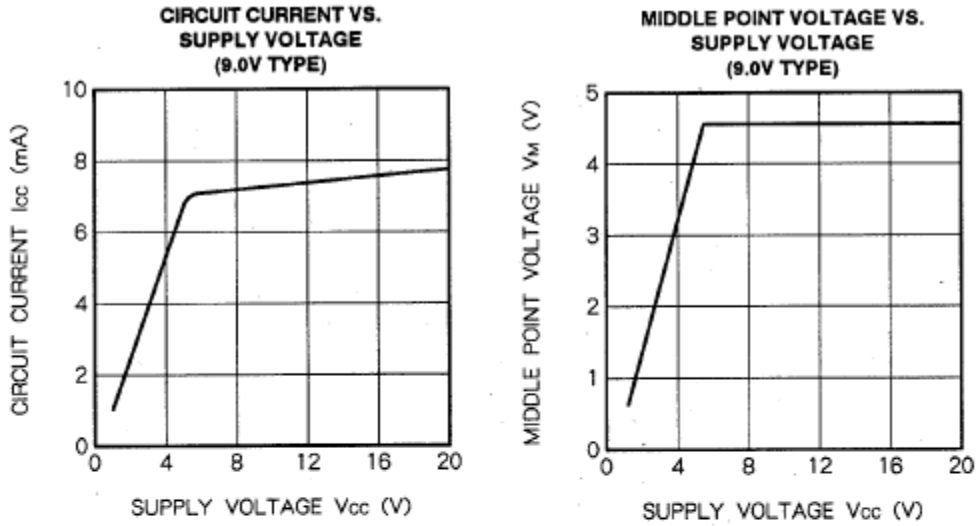
Test Circuit

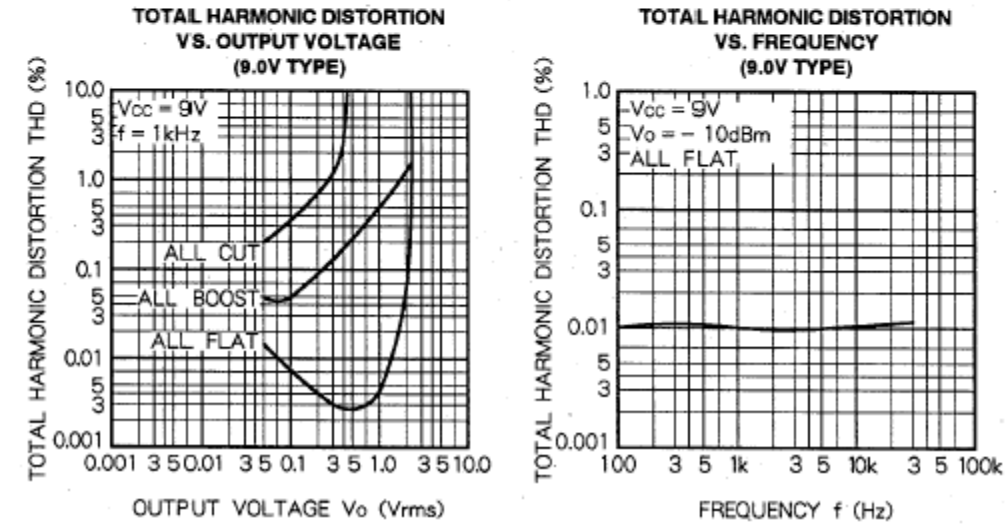


Switch matrices

Item				RSW 1	RSW 2	SW 1	SW 2	SW 3-1	SW 4-1	SW 2-2	SW 3-2	SW 4-2	SW 5	SW 6	SW 7	Remarks
Circuit current Icc				–	1or 2	–	–	–	–	–	–	–	–	OFF	OFF	
Voltage gain	Gv (FLAT)	ch1		1	1	ON	2	2	2	–	–	–	ch1	ON	OFF	
		ch2		2	2	ON	–	–	–	2	2	2	ch2	ON	OFF	
	Gv (BOOST)	ch 1	100 Hz	1	1	ON	1	2	2	–	–	–	ch1	ON	OFF	
			1 Hz	1	1	ON	2	1	2	–	–	–	ch1	ON	OFF	
			10 Hz	1	1	ON	2	2	1	–	–	–	ch1	ON	OFF	
		ch 2	100 Hz	2	2	ON	–	–	–	1	2	2	ch2	ON	OFF	
			1 Hz	2	2	ON	–	–	–	2	1	2	ch2	ON	OFF	
			10 Hz	2	2	ON	–	–	–	2	2	1	ch2	ON	OFF	
	Gv (CUT)	ch 1	100 Hz	1	1	ON	3	2	2	–	–	–	ch1	ON	OFF	
			1 Hz	1	1	ON	2	3	2	–	–	–	ch1	ON	OFF	
			10 Hz	1	1	ON	2	2	3	–	–	–	ch1	ON	OFF	
		ch 2	100 Hz	2	2	ON	–	–	–	3	2	2	ch2	ON	OFF	
			1 Hz	2	2	ON	–	–	–	2	3	2	ch2	ON	OFF	
			10 Hz	2	2	ON	–	–	–	2	2	3	ch2	ON	OFF	
Maximum output voltage V_{OM}			ch1	1	1	ON	2	2	2	–	–	–	ch1	ON	OFF	
			ch2	2	2	ON	–	–	–	2	2	2	ch2	ON	OFF	
Total harmonic distortion THD (FLAT)			ch1	1	1	ON	2	2	2	–	–	–	ch1	ON	OFF	BOOST: Set SW2-SW4 to 1.CUT: SW4 to 3.
			ch2	2	2	ON	–	–	–	2	2	2	ch2	ON	OFF	
Output noise voltage V_{NO} (FLAT)			ch1	5	1	OFF	2	2	2	–	–	–	ch1	ON	OFF	
			ch2	5	2	OFF	–	–	–	2	2	2	ch2	ON	OFF	
Channel separation CS			ch1	3	1	ON	2	2	2	–	–	–	ch1	ON	OFF	
			ch2	4	2	ON	–	–		2	2	2	ch2	ON	OFF	
Hum rejection HR			ch1	5	1	OFF	2	2	2	–	–	–	ch1	ON	ON	
			ch2	5	2	OFF	–	–	–	2	2	2	ch2	ON	ON	
Midpoint potential V_M			ch1	6	3	OFF	–	–	–	–	–	–	ch1	ON	OFF	
			ch2	6	3	OFF	–	–	–	–	–	–	ch2	ON	OFF	

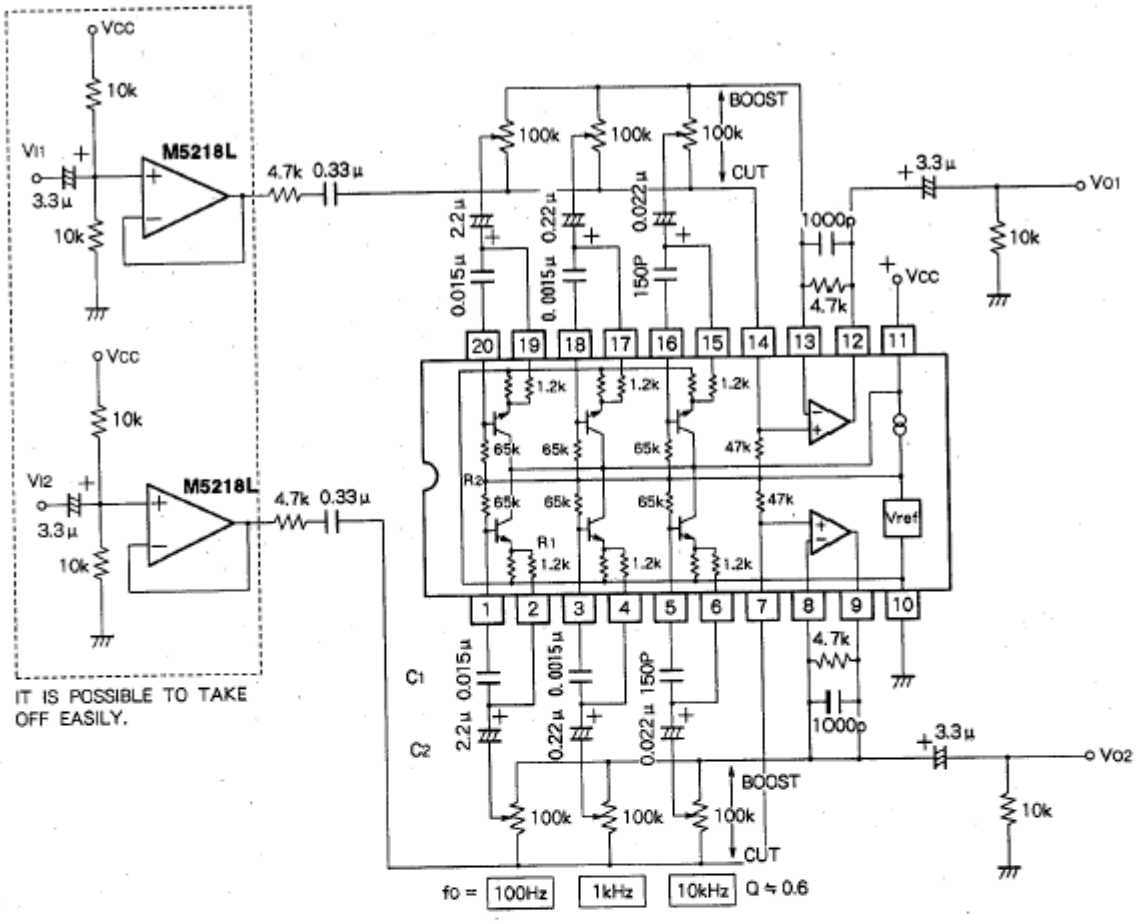
Typical Characteristics

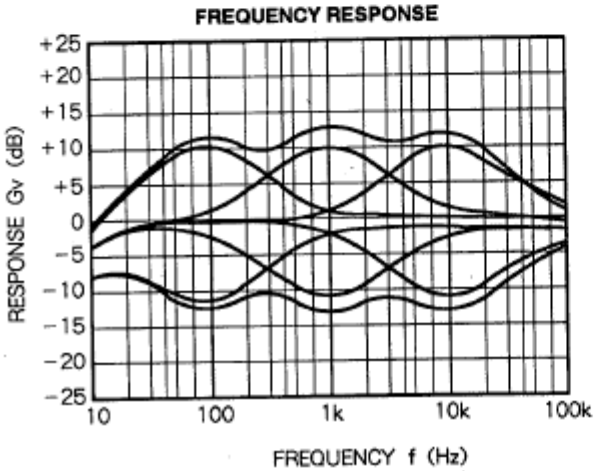




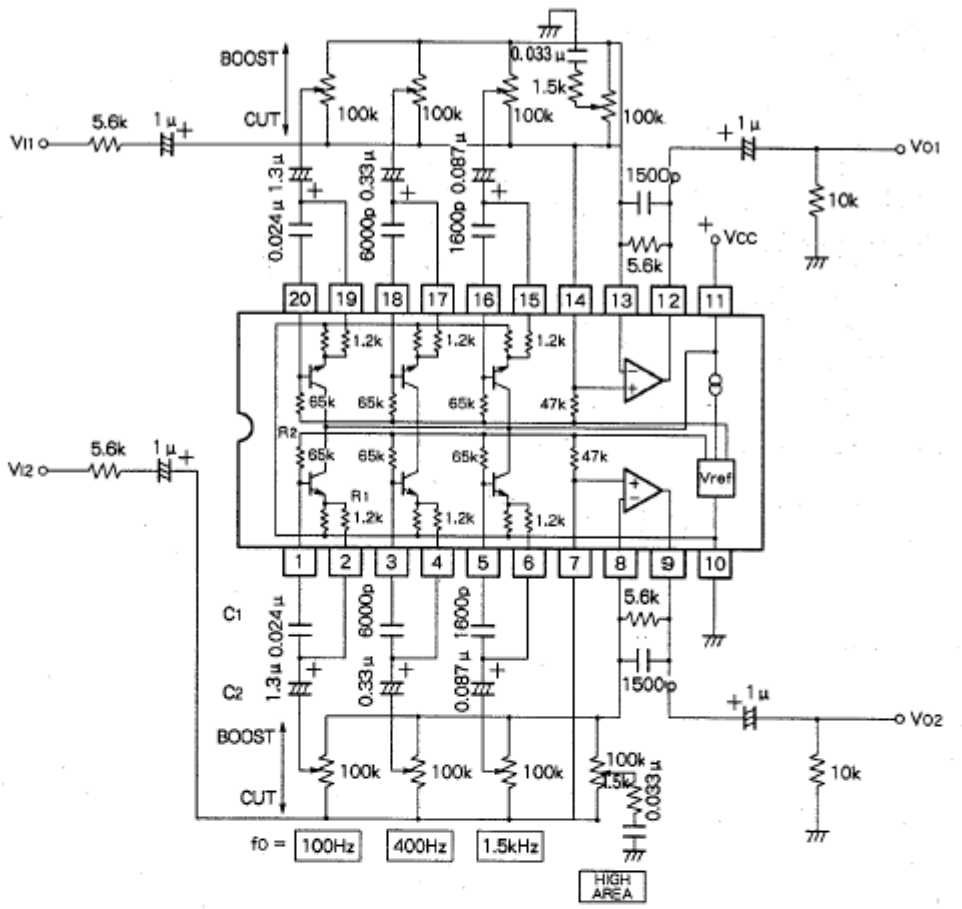
Application Example

1. 3-Element graphic equalizer (Dual channel)





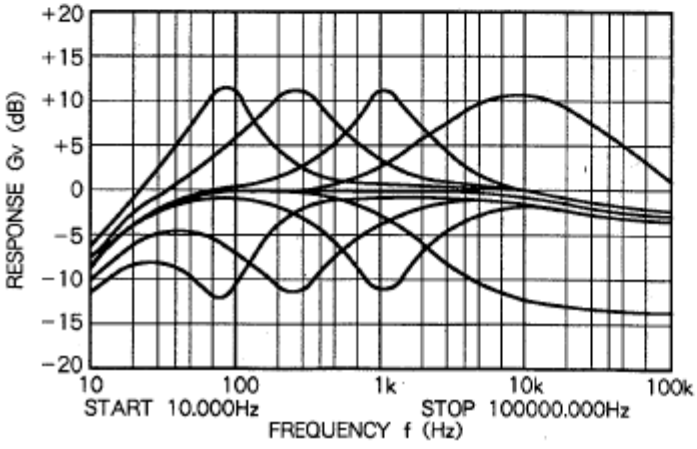
2. Simplicity 4-element graphic equalizer (Dual channel)



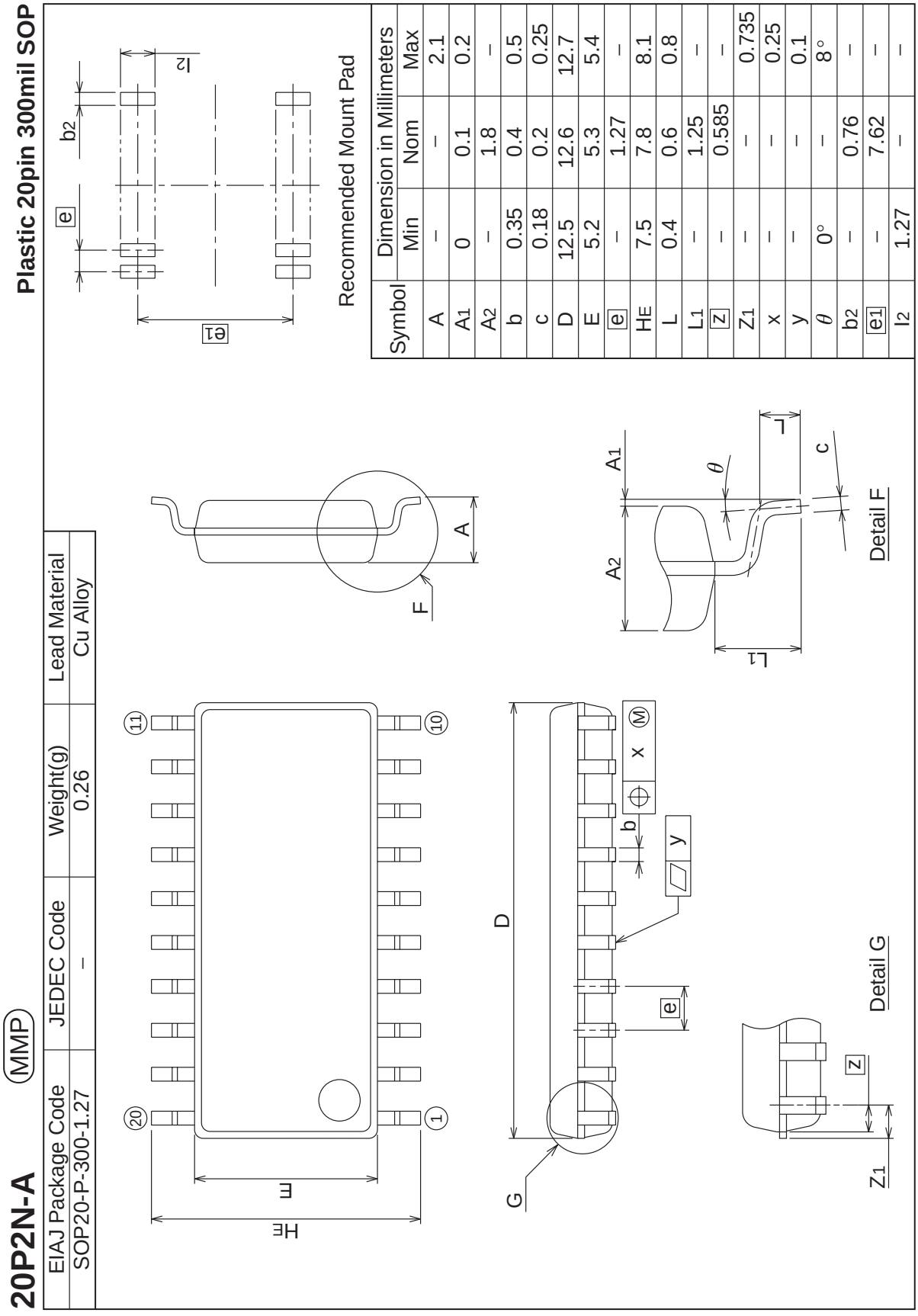
RESONANCE FREQUENCY $f_O = 1/2\pi \sqrt{C_1 \cdot C_2 \cdot R_1 \cdot R_2}$ (Hz) $Q = \sqrt{C_1 \cdot R_2 / C_2 \cdot R_1} \fallingdotseq 1.0$

Units Resistance : Ω
Capacitance : F

FREQUENCY RESPONSE



Package Dimensions



Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	–	–	2.1
A_1	0	0.1	0.2
A_2	–	1.8	–
b	0.35	0.4	0.5
c	0.18	0.2	0.25
D	12.5	12.6	12.7
E	5.2	5.3	5.4
e	–	1.27	–
H_E	7.5	7.8	8.1
L	0.4	0.6	0.8
L_1	–	1.25	–
z	–	0.585	–
Z_1	–	–	0.735
x	–	–	0.25
y	–	–	0.1
θ	0°	–	8°
b_2	–	0.76	–
e_1	–	7.62	–
l_2	1.27	–	–

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