

M5243AP/FP

3-ELEMENT (SIMPLE 4-ELEMENT) DUAL CHANNEL GRAPHIC EQUALIZER IC

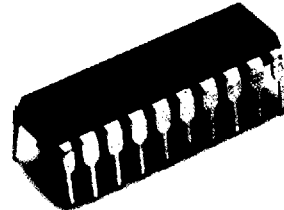
DESCRIPTION

The M5243 is a dual channel 3-element graphic equalizer IC best suited to Hi-Fi audio systems. Each channel incorporates 3-elements of transistor-based resonance circuits and an output OP amp.

Applications cover radio cassette tape recorders, car stereo sets, and portable stereo systems.

FEATURES

- It is possible to stereo (dual-channel) with single IC
- Large capacitor take off by reference voltage circuit self-contained
- Variable G_v by external resistance
- Low noise..... $V_{No\ FLAT} = 4\ \mu V_{rms}(typ)$
- Low distortion ratio..... $THD = 0.004\ \%(typ)$
(@ $f = 1kHz, Flat$)



Outline 20P4(AP)
2.54mm pitch 300mil DIP
(6.3mm x 24.0mm x 3.3mm)

Type(marking)	Recommended supply voltage	Type(marking)	Recommended supply voltage
M5243P06	4.0 to 6.0V	M5243FP06	4.0 to 6.0V
M5243P75	5.0 to 7.5V	M5243FP75	5.0 to 7.5V
M5243P09	6.0 to 9.0V	M5243FP09	6.0 to 9.0V
M5243P12	8.0 to 12.0V	M5243FP12	8.0 to 12.0V

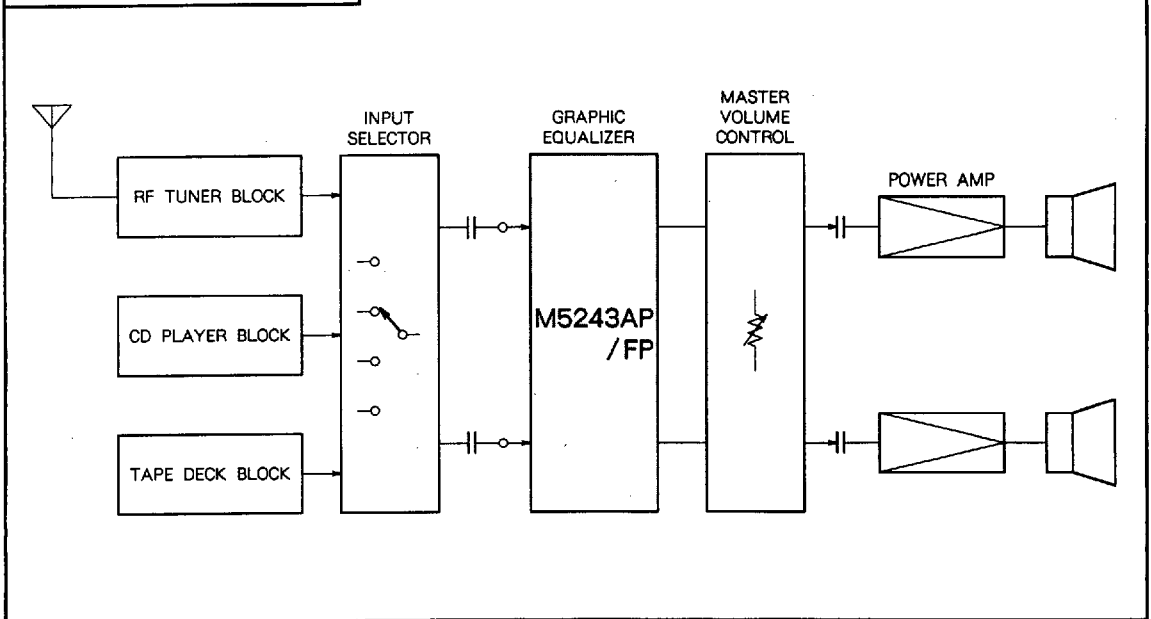


Outline 20P2N-A(AFP)
1.27mm pitch 300mil SOP
(5.3mm x 12.6mm x 1.8mm)

RECOMMENDED OPERATING CONDITIONS

Rated dissipation voltage.....1000mW(AP)
550mW(AFP)

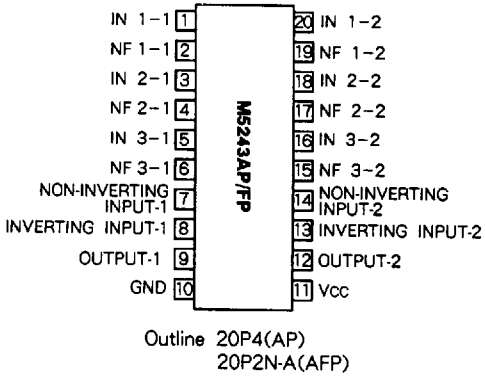
SYSTEM CONFIGURATION



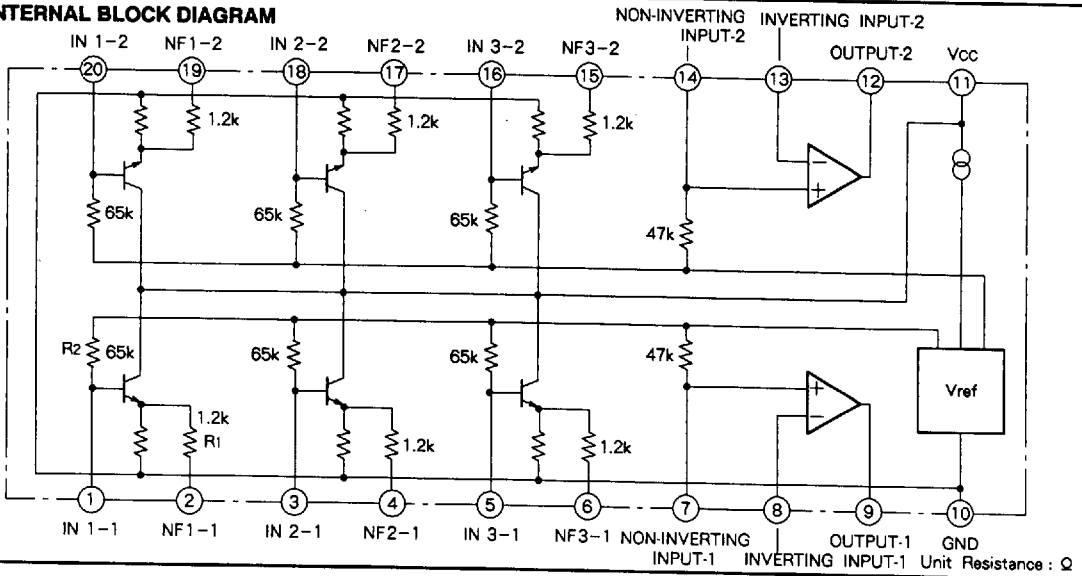
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PIN CONFIGURATION (TOP VIEW)



IC INTERNAL BLOCK DIAGRAM



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ABSOLUTE MAXIMUM RATINGS (Ta = 25°C, unless otherwise noted)

Symbol	Parameter	Ratings	Unit
Vcc	Supply voltage	20	V
ILP	Load current	30	mA
Pd	Power dissipation	AFP : 550/AP : 1	mW/W
Topr	Operating temperature	- 20 to + 75	°C
Tstg	Storage temperature	- 55 to + 125	°C

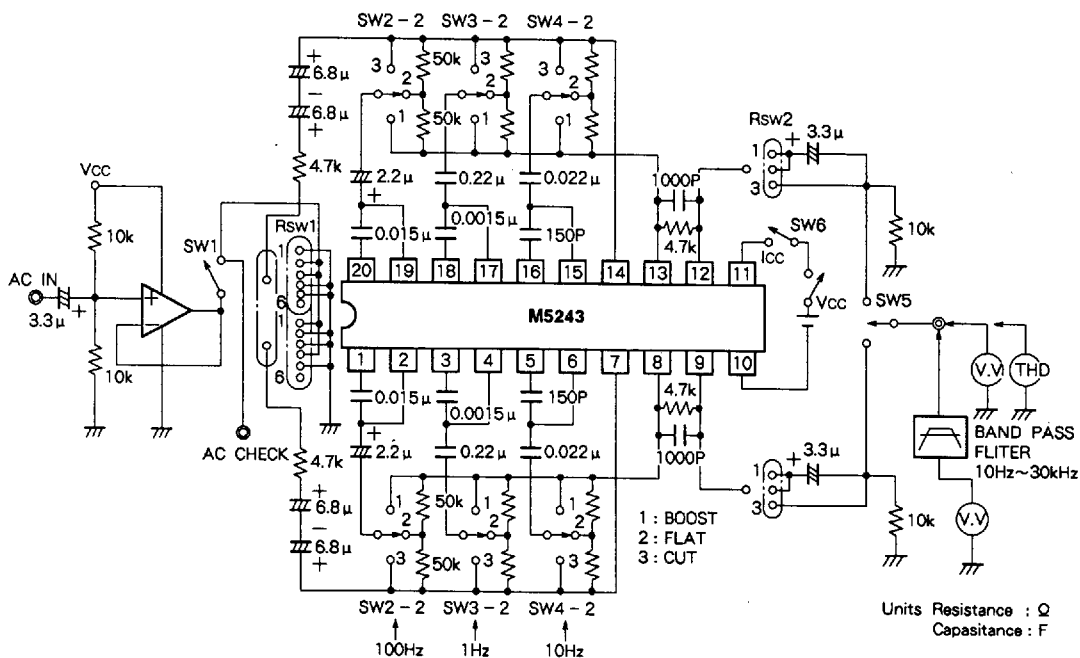
ELECTRICAL CHARACTERISTICS (Ta = 25°C)

Symbol	Parameter		Test conditions	Limits				Unit	
				f(Hz)	Min	Typ	Max		
Icc	Circuit current			-	5.0	7.5	12.0	mA	
Gv (FLAT)	Voltage gain	Flat	Vi = - 10dBm, Rg = 4.7k Ω	1k	- 2.0	- 0.5	1.0	dB	
Gv(BOOST)		Boost		100	8.0	10.0	12.0		
				1k	8.0	10.0	12.0		
Gv (CUT)		Cut		10k	8.8	10.0	12.0		
				100	- 13.0	- 11.0	- 9.0		
1k		- 13.0		- 11.0	- 9.0				
10k	- 13.0	- 11.0	- 9.0						
THD	Total harmonic distortion		Vi = 1Vrms, All flat	1k	-	0.004	0.1	%	
Vom	Maximum output voltage		THD = 0.1 %, All flat	1k	M5243X06		0.5	1.0	Vrms
					M5243X75		1.0	1.5	
					M5243X09		1.5	1.9	
					M5243X12		2.0	2.9	
CS	Channel separation		Vi = - 10dBm, All flat	1k	60	75	-	dB	
RR	Ripple rejection		Vi = - 10dBm, All flat	120	55	65	-	dB	
VNO	Output noise voltage		All flat BW : 10Hz to 30kHz	-	-	4	15	μVrms	
Vm	Middle point voltage			-	M5243X06		2.1	3.0	V
					M5243X75		2.7	3.75	
					M5243X09		3.5	4.5	
					M5243X12		5.0	6.0	

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STANDARD TEST CIRCUIT



SWITCH MATRIX

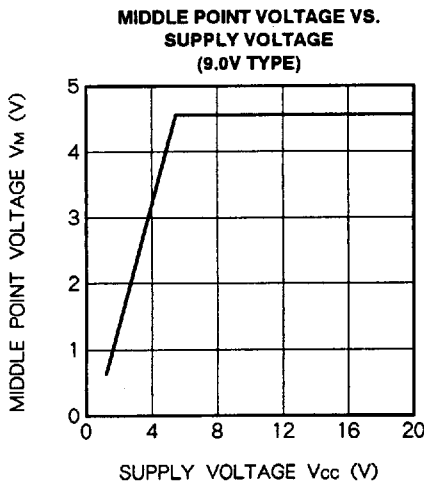
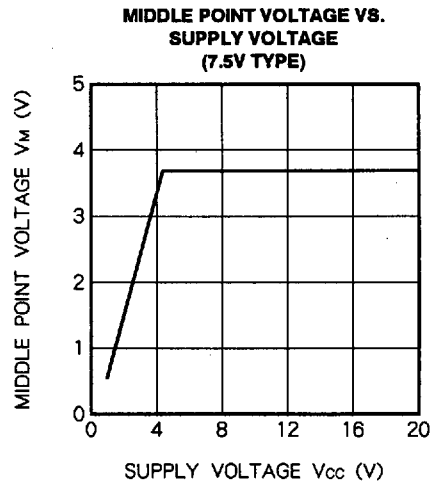
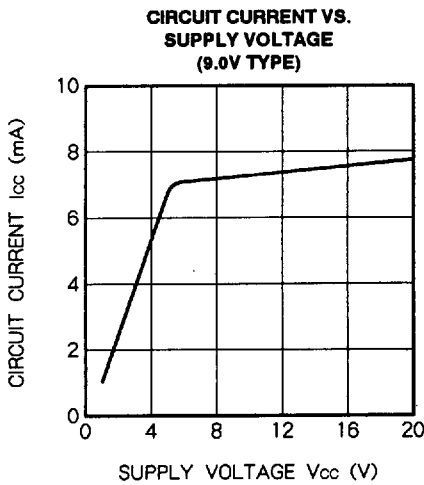
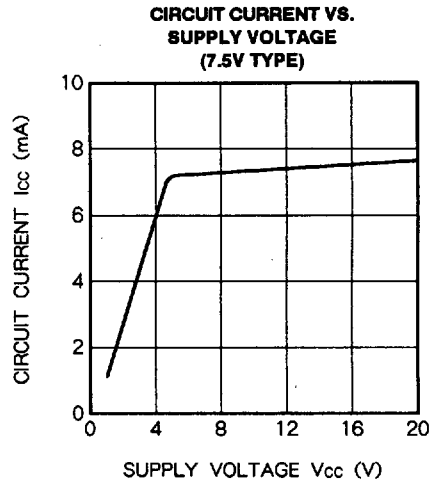
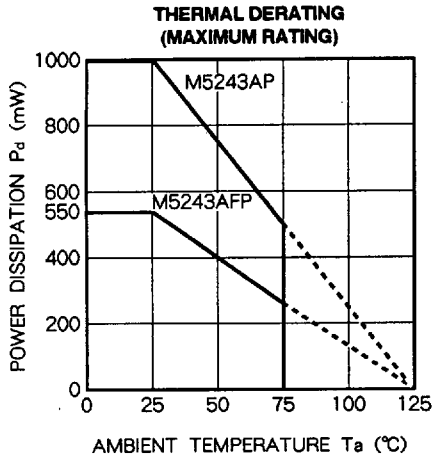
Parameter		Vcc	Rsw1	Rsw2	SW1	SW2-1	SW3-1	SW4-1	SW2-2	SW3-2	SW4-2	SW5	SW6	Remarks	
Circuit current		I _{cc}	ON	-	ch1 or 2	-	-	-	-	-	-	-	OFF		
Voltage gain	Gv(FLAT)	ch1	ON	ch1	ch1	ON	2	2	2	-	-	-	ch1	ON	
		ch2	ON	ch2	ch2	ON	-	-	-	2	2	2	ch2	ON	
	Gv(BOOST)	ch1	100Hz	ON	ch1	ch1	ON	1	2	2	-	-	-	ch1	ON
			1kHz	ON	ch1	ch1	ON	2	1	2	-	-	-	ch1	ON
			10kHz	ON	ch1	ch1	ON	2	2	1	-	-	-	ch1	ON
		ch2	100Hz	ON	ch2	ch2	ON	-	-	-	1	2	2	ch2	ON
			1kHz	ON	ch2	ch2	ON	-	-	-	2	1	2	ch2	ON
			10kHz	ON	ch2	ch2	ON	-	-	-	2	2	1	ch2	ON
	Gv(CUT)	ch1	100Hz	ON	ch1	ch1	ON	3	2	2	-	-	-	ch1	ON
			1kHz	ON	ch1	ch1	ON	2	3	2	-	-	-	ch1	ON
			10kHz	ON	ch1	ch1	ON	2	2	3	-	-	-	ch1	ON
		ch2	100Hz	ON	ch2	ch2	ON	-	-	-	3	2	2	ch2	ON
1kHz			ON	ch2	ch2	ON	-	-	-	2	3	2	ch2	ON	
10kHz			ON	ch2	ch2	ON	-	-	-	2	2	3	ch2	ON	
Maximum output voltage		V _{OM}	ON	ch1	ch1	ON	2	2	2	-	-	-	ch1	ON	
Total harmonic distortion		THD (FLAT)	ON	ch1	ch1	ON	-	-	-	2	2	2	ch2	ON	
Output noise voltage		V _{NO} (FLAT)	ON	V _{no}	ch1	OFF	2	2	2	-	-	-	ch1	ON	
Channel separation		CS	ON	ch1	ch1	ON	2	2	2	-	-	-	ch1	ON	
Ripple rejection		RR	ON	HR	ch1	OFF	2	2	2	-	-	-	ch1	ON	
Middle point voltage		V _M	ON	V _M	V _M	OFF	-	-	-	-	-	-	ch1	ON	
			ON	V _M	V _M	OFF	-	-	-	-	-	-	ch2	ON	

BOOST : SW2 to 4①
CUT : SW 2 to 4③

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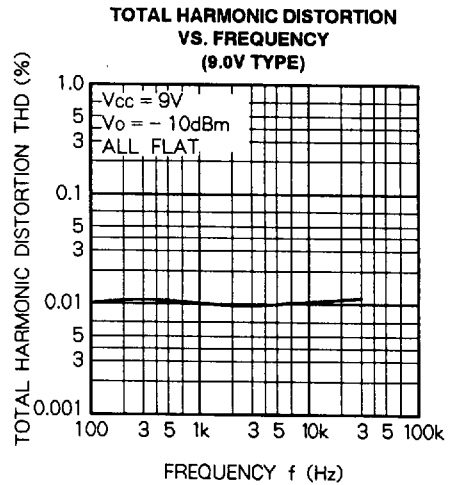
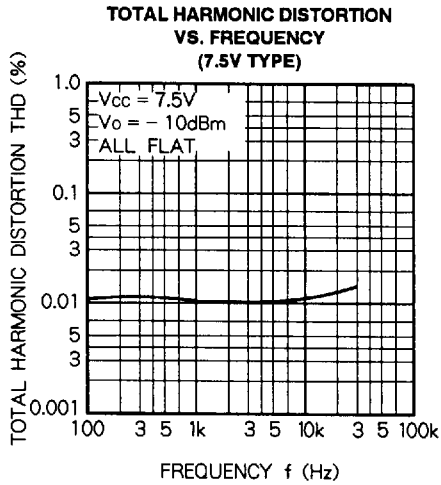
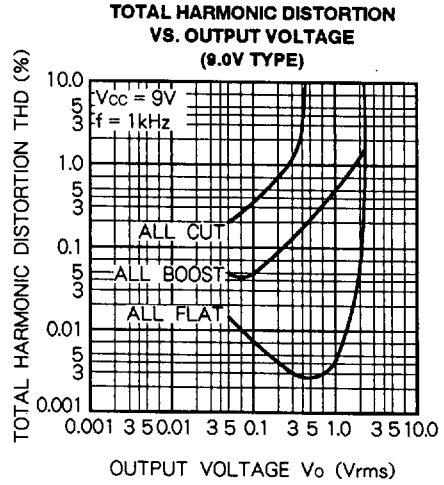
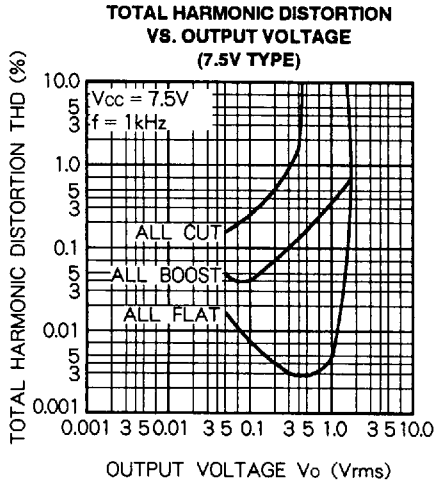
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TYPICAL CHARACTERISTICS



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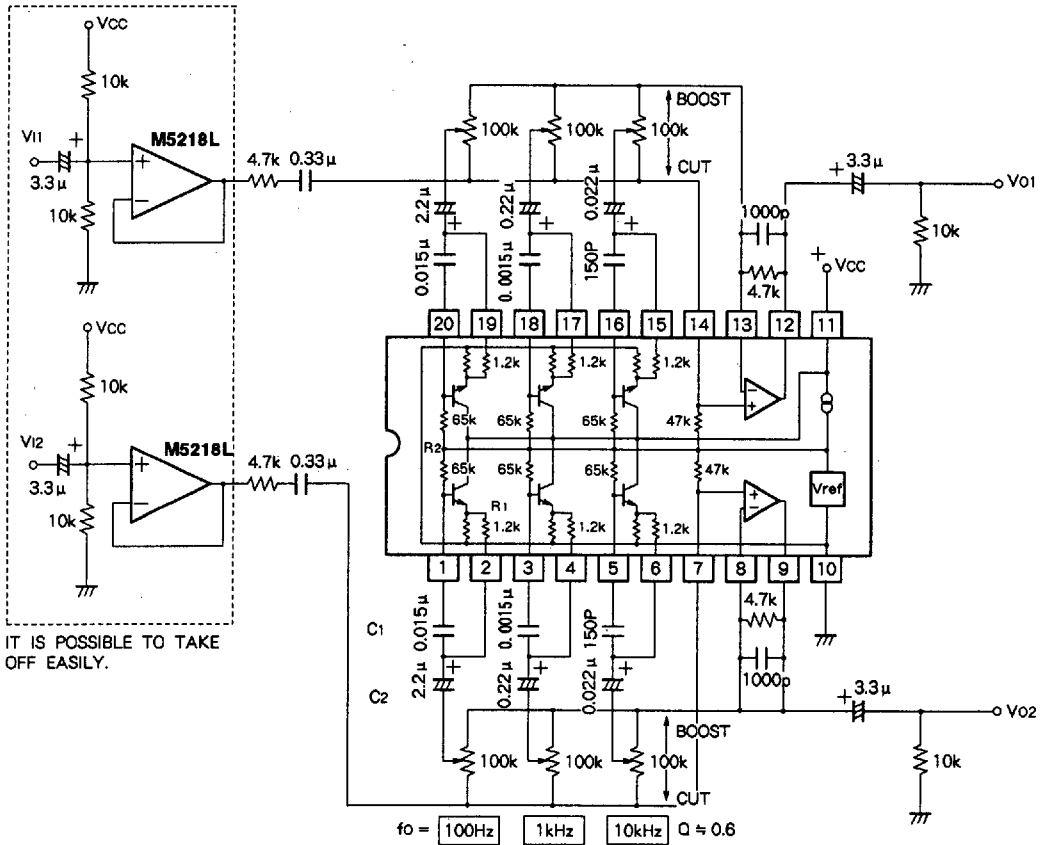
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APPLICATION EXAMPLE - 1

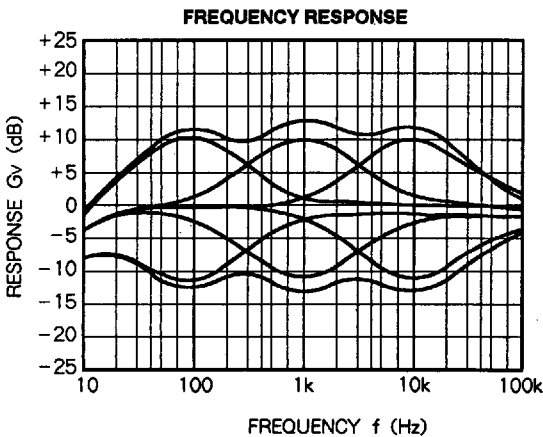
3-Element graphic equalizer (Dual channel)



IT IS POSSIBLE TO TAKE OFF EASILY.

$$\text{RESONANCE FREQUENCY } f_0 = 1/2 \pi \sqrt{C_1 \cdot C_2 \cdot R_1 \cdot R_2} \text{ (Hz)} \quad Q = \sqrt{C_1 \cdot R_2 / C_2 \cdot R_1}$$

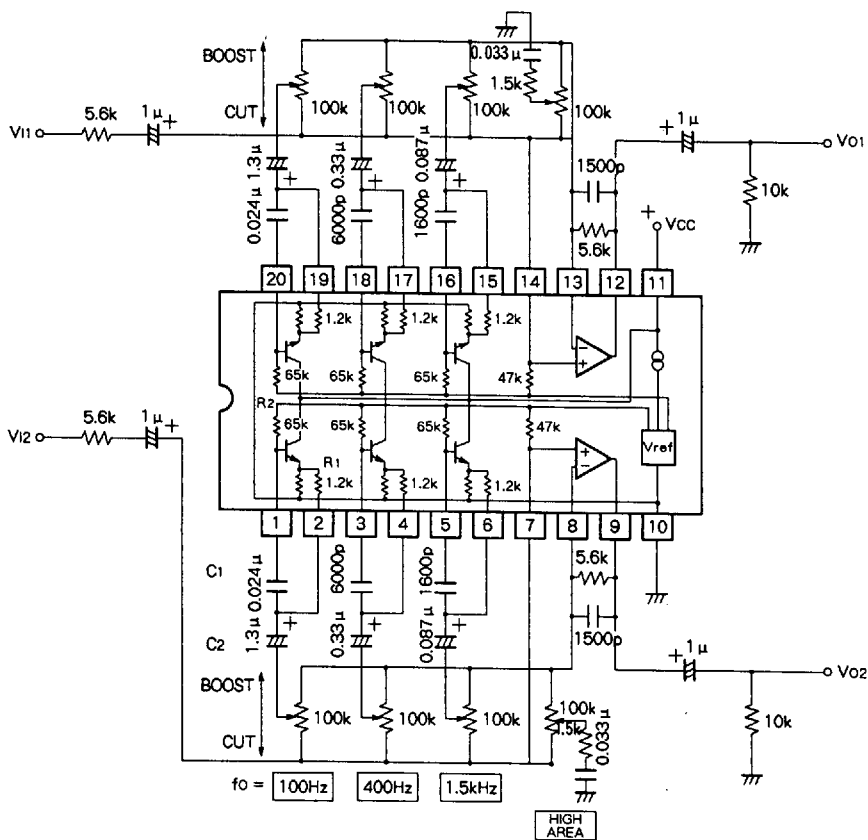
Units Resistance : Ω
Capacitance : F



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APPLICATION EXAMPLE - 2

Simplicity 4-element graphic equalizer (Dual channel)



$$f_0 = \frac{1}{2\pi} \sqrt{C_1 \cdot C_2 \cdot R_1 \cdot R_2} \text{ (Hz)}$$

$$Q = \sqrt{C_1 \cdot R_2 / C_2 \cdot R_1} \approx 1.0$$

Units Resistance : Ω
Capacitance : F

