

# M5226P/FP

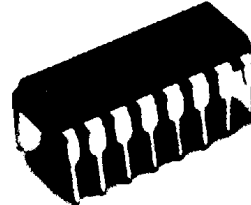
## 5-ELEMENT GRAPHIC EQUALIZER IC

### DESCRIPTION

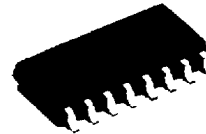
The M5226 is a 5-element graphic equalizer IC best suited to audio systems. It has a built-in 5-element resonance circuits with transistor system and an output OP amp. The IC can be used in hybrid ICs and compact sets of high-density assemblies. Its applications include radio cassette tape players, car audio systems, and music centers.

### FEATURES

- The number of part can be reduced drastically for compact size.
- Graphic equalizer can be easily composed
- Low distortion ..... THD = 0.02% (typ)  
@ Flat input short
- Low noise .....  $V_{NO} = 5\mu V_{rms}$  (typ)  
@  $f = 1kHz$ , Flat
- Large allowable input voltage .....  $V_i = 2.3V_{rms}$  (typ)  
@  $V_{cc} = 9V$ ,  $f = 1kHz$ , Flat



Outline 16P4(P)  
2.54mm pitch 300mil DIP  
(6.3mm x 19.0mm x 3.3mm)

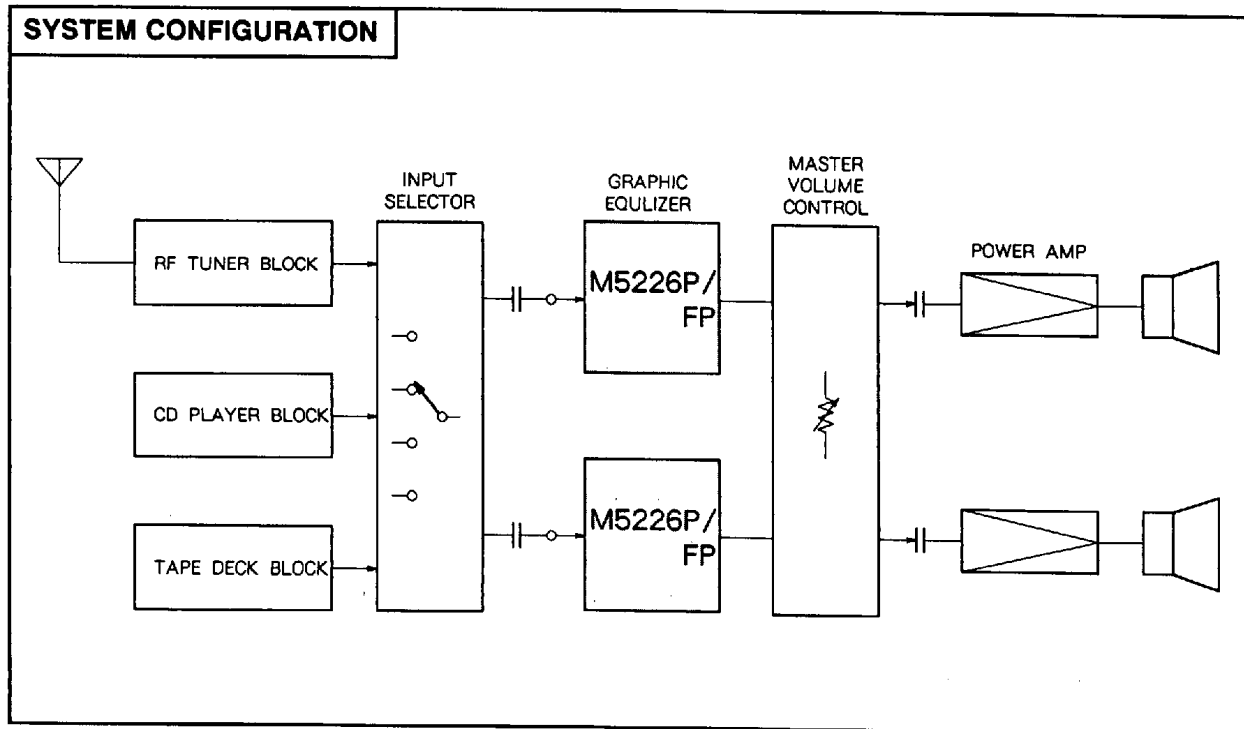


Outline 16P2S-A(FP)  
1.27mm pitch 225mil SOP  
(4.4mm x 10.0mm x 1.5mm)

### RECOMMENDED OPERATING CONDITIONS

- Supply voltage range .....  $V_{cc} = 4$  to  $20V$
- Rated supply voltage .....  $V_{cc} = 20V$
- Rated power dissipation .....  $700mW$  (P)  
 $550mW$ (FP)

### SYSTEM CONFIGURATION

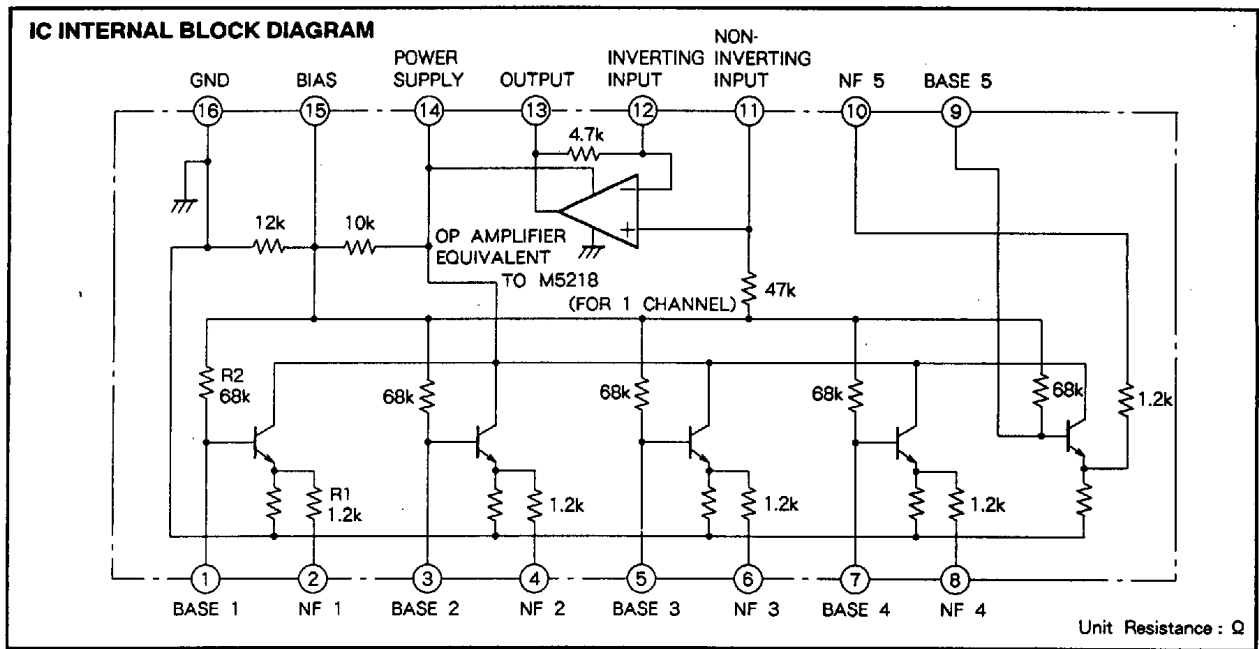
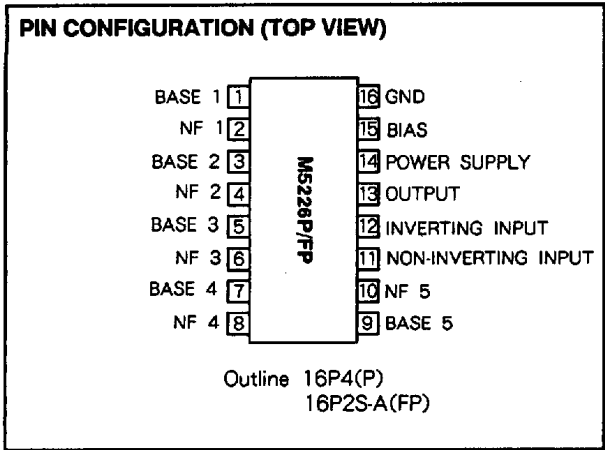


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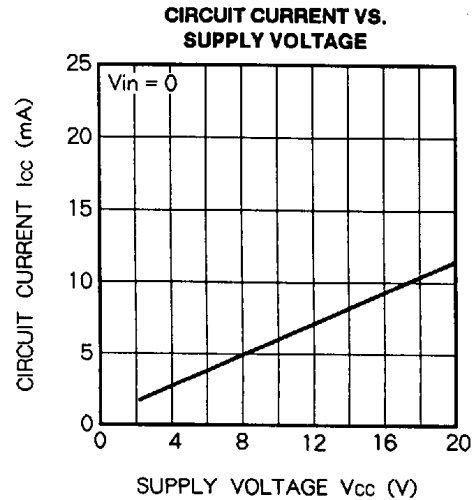
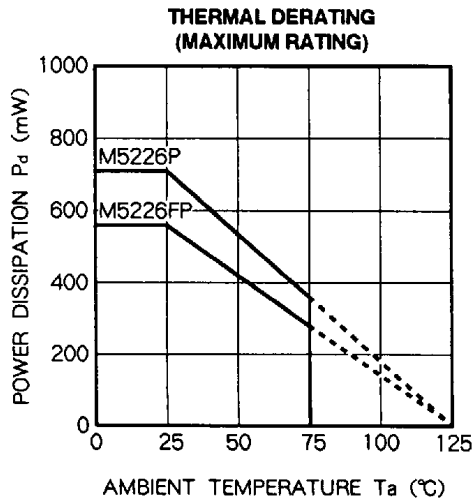
**ABSOLUTE MAXIMUM RATINGS** (Ta = 25°C, unless otherwise noted)

Symbol	Parameter	Ratings	Unit
Vcc	Supply voltage	20	V
ILP	Load current	30	mA
Pd	Power dissipation	550(FP)/1000(DIP)	mW
Topr	Operating temperature	- 20 to + 75	°C
Tstg	Storage temperature	- 55 to + 125	°C

**ELECTRICAL CHARACTERISTICS** (Ta = 25°C, Vcc = 9V)

Symbol	Parameter	f (Hz)	Test conditions	Limits			Unit
				Min	Typ	Max	
Icc	Circuit current	-	Vin = 0	3.0	5.2	8.0	mA
GV(FLAT)	Flat	1k	Vin = - 10dBm	- 3.8	- 0.8	+ 2.2	dB
GV(BOOST)	Boost	108	Vin = - 10dBm	7.2	9.7	11.2	dB
		343		7.2	9.7	11.2	
		1.08k		7.2	9.7	11.2	
		3.43k		7.2	9.7	11.2	
		10.8k		7.2	9.7	11.2	
GV(CUT)	Cut	108	Vin = - 10dBm	- 12.8	- 11.3	- 8.8	dB
		343		- 12.8	- 11.3	- 8.8	
		1.08k		- 12.8	- 11.3	- 8.8	
		3.43k		- 12.8	- 11.3	- 8.8	
		10.8k		- 12.8	- 11.3	- 8.8	
THD	Total harmonic distortion	1k	Vin = 1Vrms	-	0.02	0.1	%
Vno	Output noise voltage	Input short BW : 10Hz to 30kHz (3dB) flat		-	5.0	20	µVrms

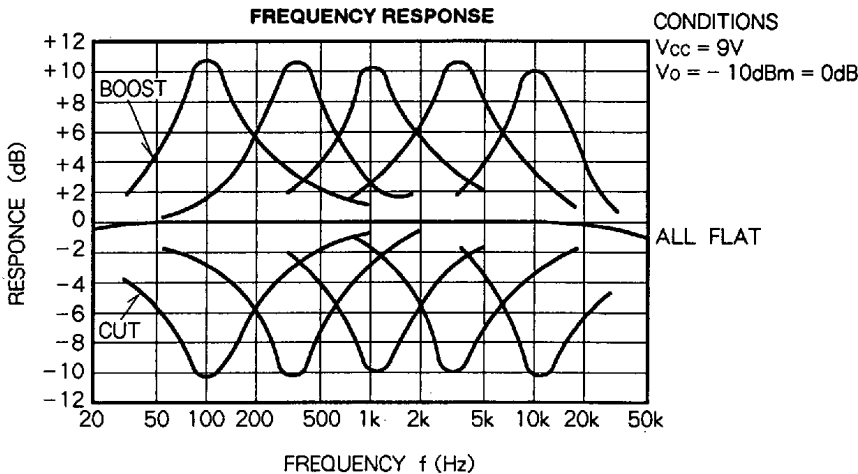
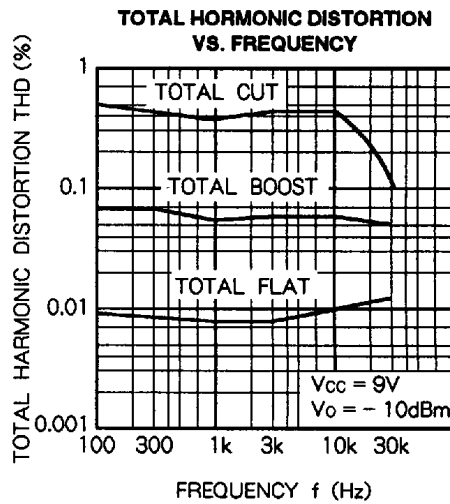
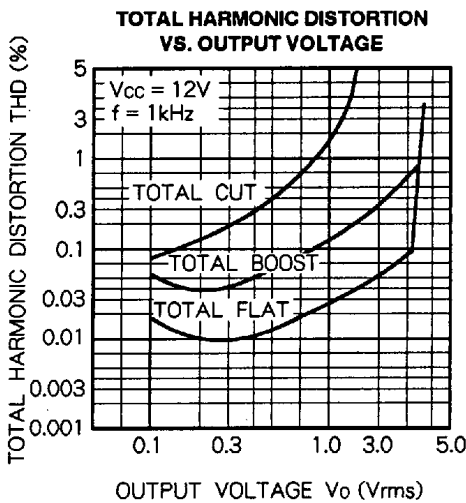
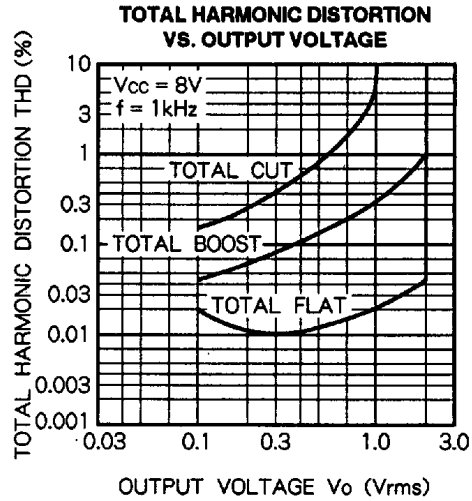
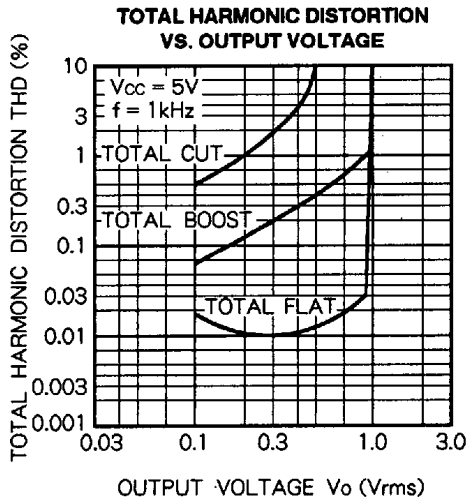
**TYPICAL CHARACTERISTICS**

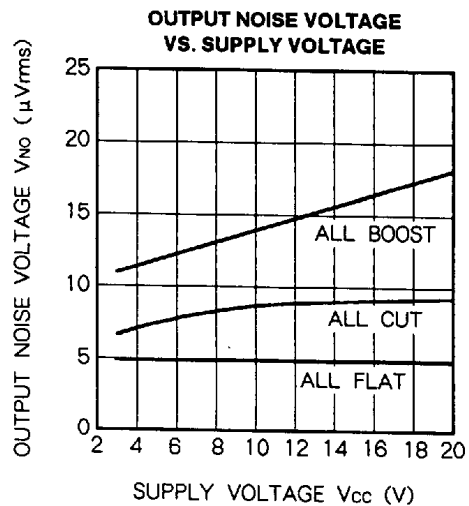
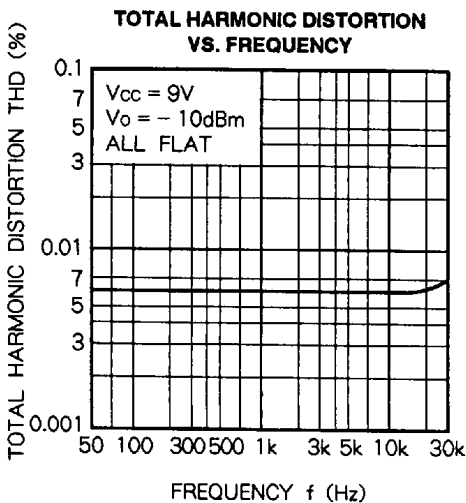
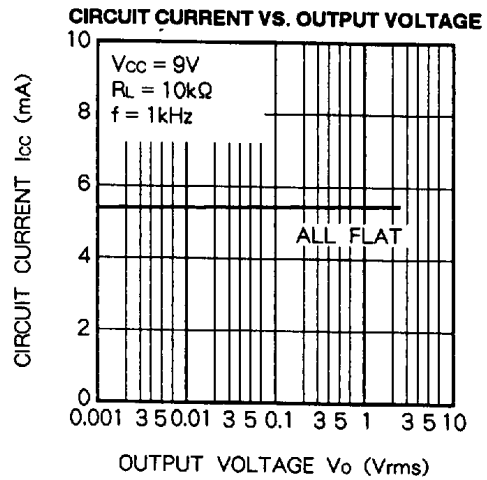
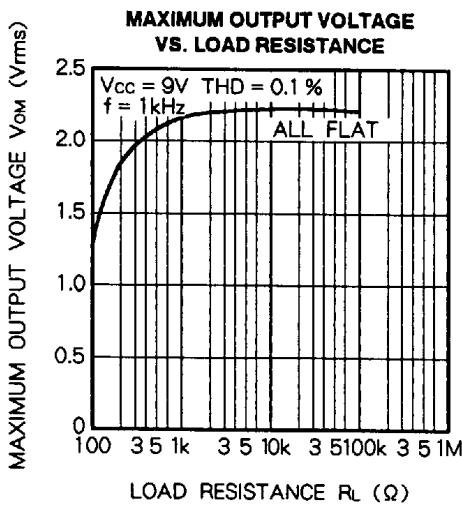
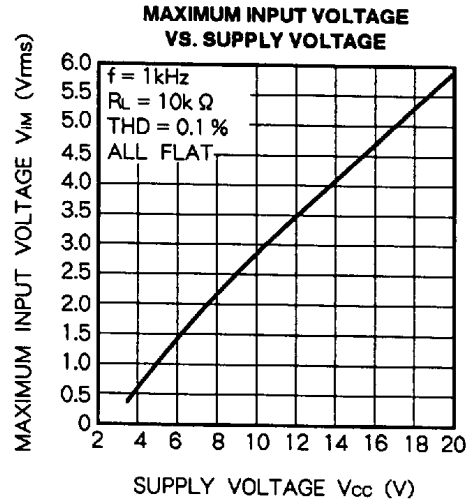
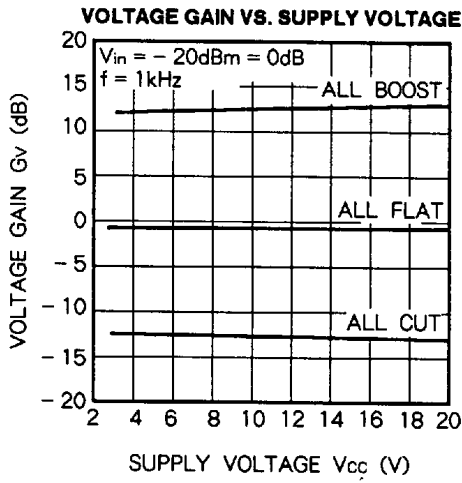


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5-ELEMENT GRAPHIC EQUALIZER IC

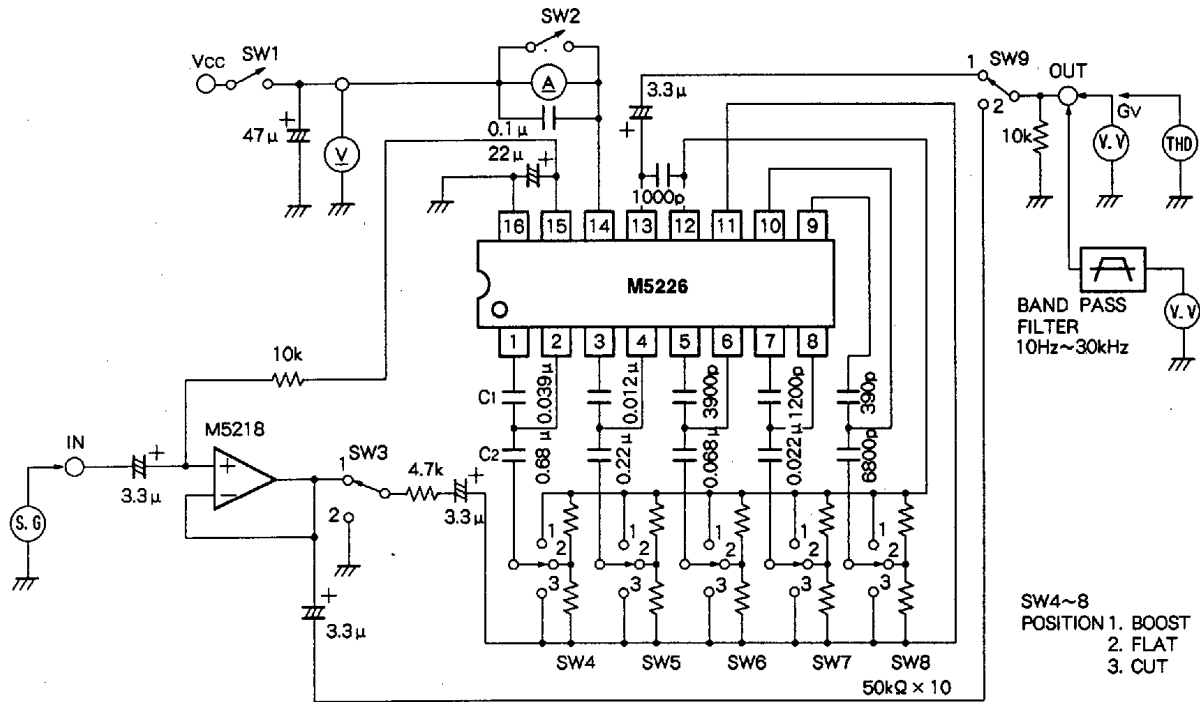




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## 5-ELEMENT GRAPHIC EQUALIZER IC

**TEST CIRCUIT** (Circuit current  $I_{cc}$ , Voltage gain  $G_v$ , Total harmonic distortion THD, Output noise voltage  $V_{No}$ )



### TEST CIRCUIT SWITCH MATRIX

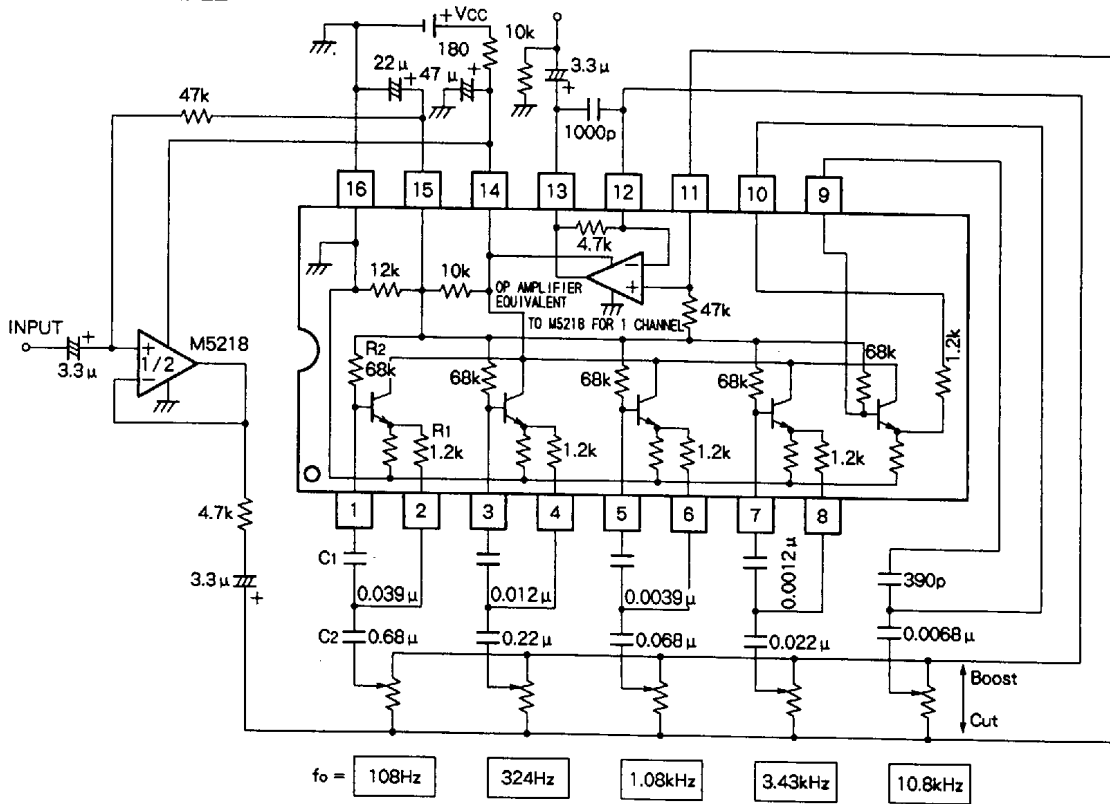
Test item	SW2	SW3	SW4	SW5	SW6	SW7	SW8	SW9
$I_{cc}$	OFF	1	○	○	○	○	○	1
$G_v$ (FLAT)	ON	1	2	2	2	2	2	1
$G_v$ (BOOST)	$f = 108\text{Hz}$	ON	1	1	2	2	2	1
	$f = 343\text{Hz}$	ON	1	2	1	2	2	1
	$f = 1.08\text{kHz}$	ON	1	2	2	1	2	1
	$f = 3.43\text{kHz}$	ON	1	2	2	2	1	1
	$f = 10.8\text{kHz}$	ON	1	2	2	2	2	1
$G_v$ (CUT)	$f = 108\text{Hz}$	ON	1	3	2	2	2	1
	$f = 343\text{Hz}$	ON	1	2	3	2	2	1
	$f = 1.08\text{kHz}$	ON	1	2	2	3	2	1
	$f = 3.43\text{kHz}$	ON	1	2	2	2	3	1
THD	ON	1	2	2	2	2	2	1
$V_{No}$ (ALLFLAT)	ON	2	2	2	2	2	2	1

Note: The mark "○" applies to both 1 and 2

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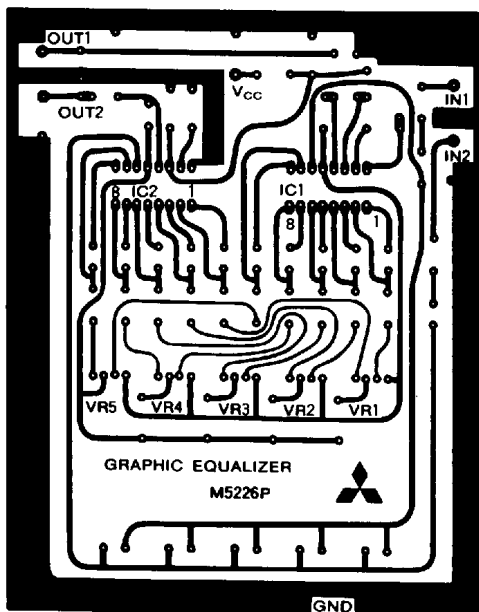
APPLICATION EXAMPLE



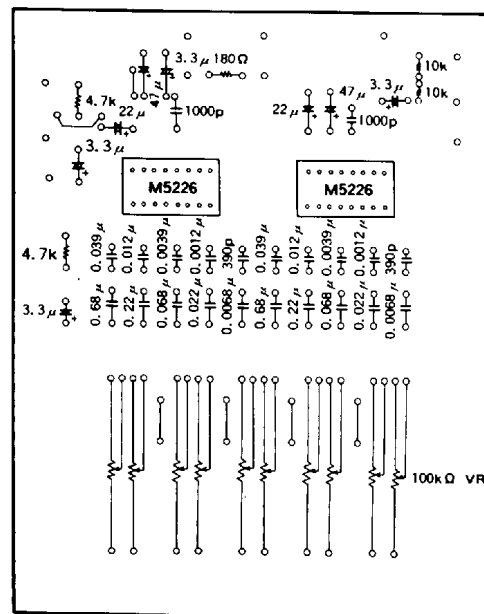
RESONANCE FREQUENCY  $f_o = \frac{1}{2\pi \sqrt{C1 \cdot C2 \cdot R1 \cdot R2}}$  (Hz) Units Resistance :  $\Omega$  Capacitance : F

PRINTED CIRCUIT BOARD FOR CIRCUIT TESTING (TYPICAL APPLICATION EXAMPLE)

PC BOARD PARTS-PLACEMENT DIAGRAM (COPPER FOIL SIDE)



PC BOARD PARTS-PRACEMENT-DIAGRAM (PARTS SIDE)



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APPLICATION EXAMPLE (7-ELEMENT)

