

# M5289P/FP

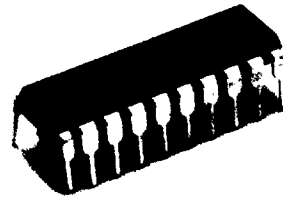
## Hi-Fi 7-ELEMENT GRAPHIC EQUALIZER IC

### DESCRIPTION

The M5289 is a 7-element graphic equalizer IC best suited to Hi-Fi audio systems. It has a built-in 7-element of transistor-based resonance circuits and an output OP amp. The IC can be used in compact sets of high-density assemblies, modules, and hybrid ICs. Its applications cover Hi-Fi stereo sets, portable radio cassette tape players, car audio systems, music centers, and electronic instruments.

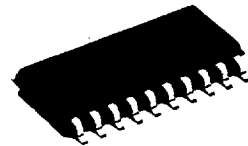
### FEATURES

- Low distortion  
 ..... THD = 0.001 % (M5289P), 0.003 % (M5289FP) (typ)  
 (@ f = 1kHz, Flat)
- Low noise .....  $V_{no}$  Flat =  $3.5 \mu V_{rms}$  (typ)  
 High pressure proof ( $V_{cc} = \pm 15V$ )
- Dynamic range is large .....  $V_{om} = 9.2V_{rms}$  (M5289P),  
 $2.0V_{rms}$  (M5289FP) (typ)
- Capable of being driven by single power supply single  
 power (use GND pin ⑨ for  $V_{cc}/2$  pin)
- Variable  $G_v$  by external resistance



Outline 20P4(P)

2.54mm pitch 300mil DIP  
 (6.3mm × 24.0mm × 3.3mm)



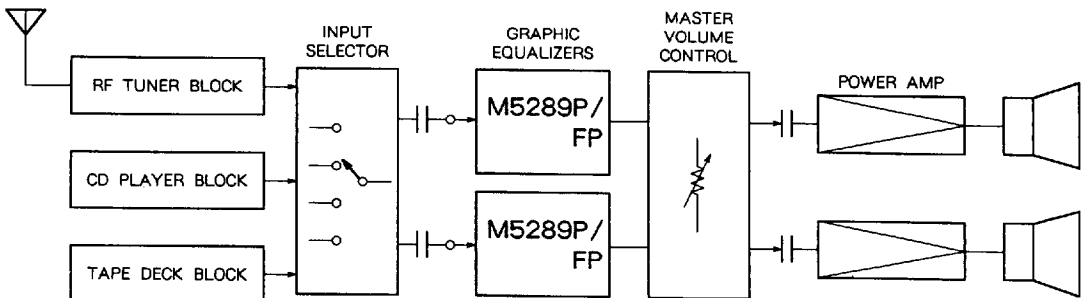
Outline 20P2N-A(FP)

1.27mm pitch 300mil SOP  
 (5.3mm × 12.6mm × 1.8mm)

### RECOMMENDED OPERATING CONDITIONS

- Supply voltage range .....  $V_{cc}, V_{EE} = \pm 2$  to  $\pm 15V$  (4 to 30V)
- Rated supply voltage .....  $V_{cc}, V_{EE} = \pm 15V$
- Rated power dissipation ..... 1000mW(P)  
 550mW(FP)

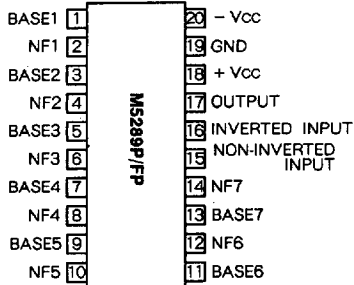
### SYSTEM CONFIGURATION



# M5289P/FP

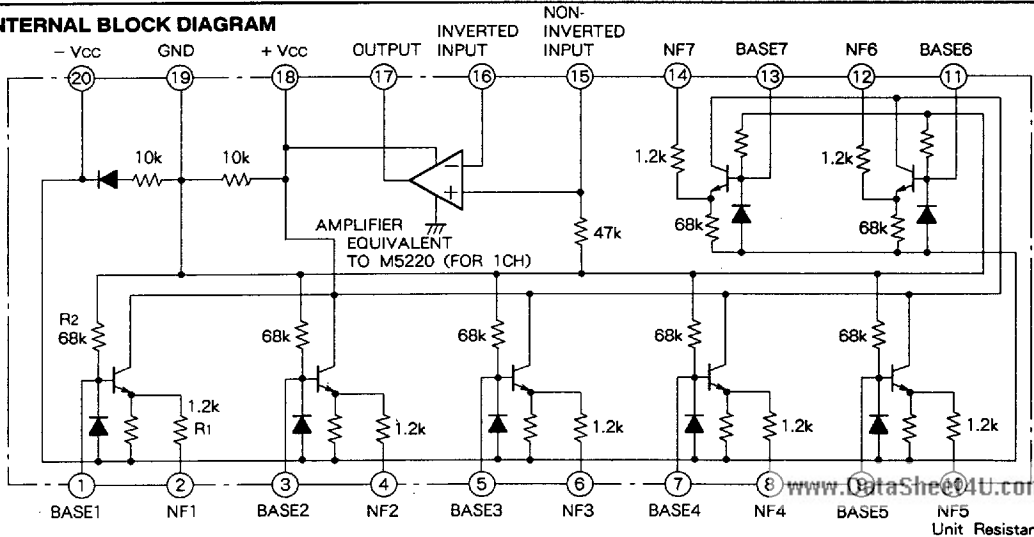
## HI-FI 7-ELEMENT GRAPHIC EQUALIZER IC

### PIN CONFIGURATION (TOP VIEW)



Outline 20P4(P)  
20P2N-A(FP)

### IC INTERNAL BLOCK DIAGRAM



# M5289P/FP

## HI-FI 7-ELEMENT GRAPHIC EQUALIZER IC

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

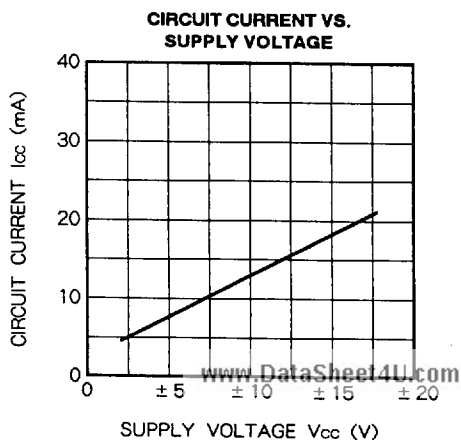
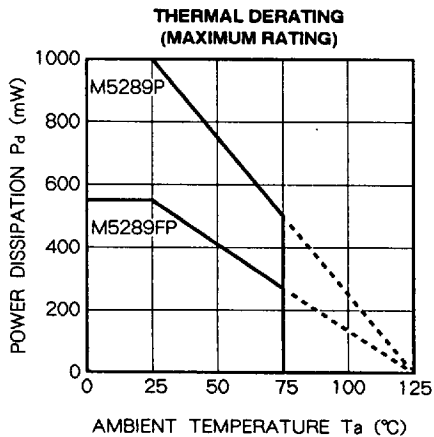
Symbol	Parameter	Ratings	Unit
Vcc	Supply voltage	36 (± 18)	V
ILP	Load current	50	mA
Pd	Power dissipation	1000(P)/550(FP)	mW
Topr	Operating temperature	- 20 to + 75	°C
Tstg	Storage temperature	- 55 to + 125	°C

### ELECTRICAL CHARACTERISTICS (Ta = 25°C, Vcc = ± 15V (M5289P), + 9V (M5289FP), unless otherwise noted)

Symbol	Parameter	Test conditions		f = (Hz)	Limits			Unit
					Min	Typ	Max	
Icc	Circuit current	Vin = 0	Vcc = + 9V Vcc = ± 15V	-	4.4 11.3	6.8 17.8	10.5 24.5	mA
Gv (FLAT)	Voltage gain	Flat	Vin = - 10dBm Vo (FLAT) = 0dB	1k	- 3.0	- 0.5	+ 1.8	dB
Gv (BOOST)				Boost	61.7	7.5	10.5	13.1
		156			7.5	10.5	13.1	
		412			7.5	10.5	13.1	
		1.08k			7.5	10.5	13.1	
		2.29k			7.5	10.5	13.1	
		6.17k			7.5	10.5	13.1	
Gv (CUT)		Cut		15.6k	7.5	10.5	13.1	dB
				61.7	- 13.1	- 10.5	- 7.5	
				156	- 13.1	- 10.5	- 7.5	
				412	- 13.1	- 10.5	- 7.5	
				1.08k	- 13.1	- 10.5	- 7.5	
				2.29k	- 13.1	- 10.5	- 7.5	
Vom		Maximum output voltage		THD = 1%	M5289P M5289FP	1k	6.7	9.2
	1.2		2.2				-	
THD	Total harmonic distortion	Vo = 1Vrms	M5289P M5289FP	1k	-	0.001	0.05	%
					-	0.003	0.1	
Vno	Output noise voltage	Input short BM : 10Hz to 30kHz flat		-	3.5	13.0	μ Vrms	

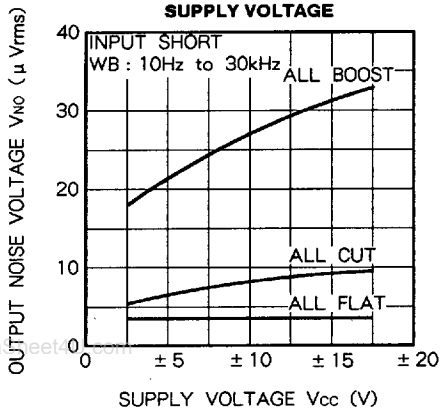
\* Single power source Vcc = + 9V is standard for M5289FP because the power dissipation is limited to 550mW.

### TYPICAL CHARACTERISTICS

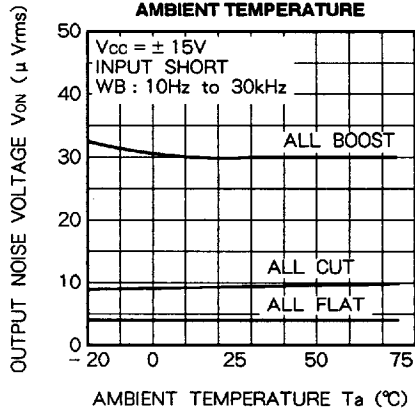


HI-FI 7-ELEMENT GRAPHIC EQUALIZER IC

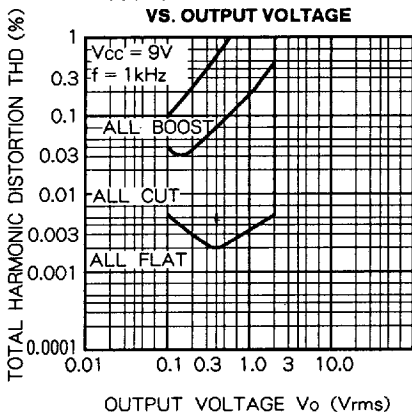
OUTPUT NOISE VOLTAGE VS. SUPPLY VOLTAGE



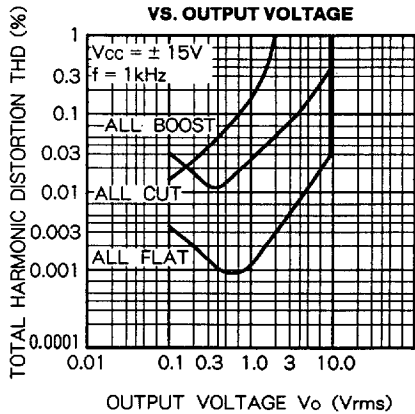
OUTPUT NOISE VOLTAGE VS. AMBIENT TEMPERATURE



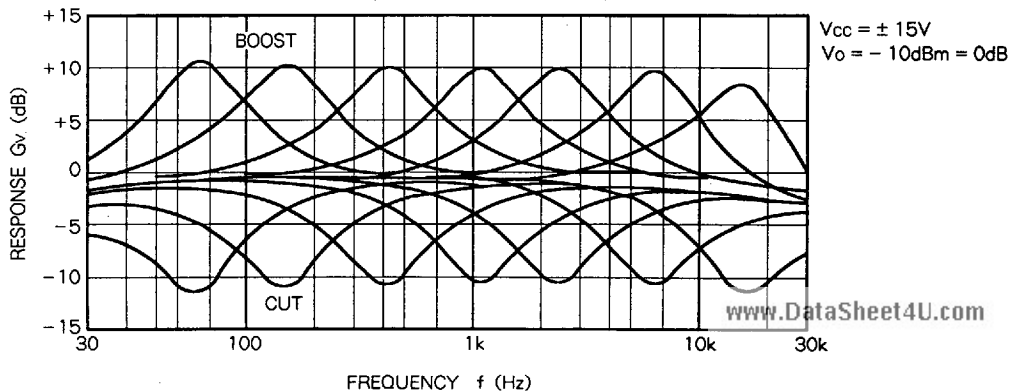
TOTAL HARMONIC DISTORTION VS. OUTPUT VOLTAGE



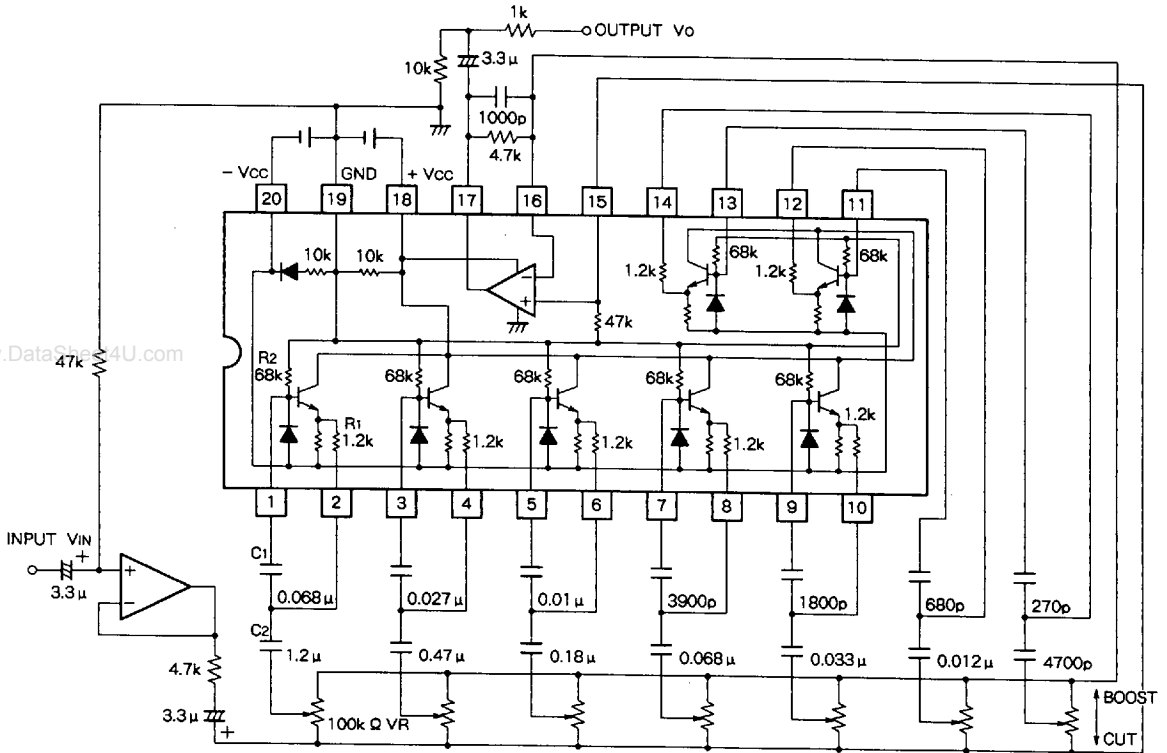
TOTAL HARMONIC DISTORTION VS. OUTPUT VOLTAGE



FREQUENCY CHARACTERISTIC



APPLICATION EXAMPLE



fo =	61.7Hz	156Hz	412Hz	1.08kHz	2.29kHz	6.17kHz	15.6kHz
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$$f_o = \frac{1}{2 \pi \sqrt{C_1 \cdot C_2 \cdot R_1 \cdot R_2}} \text{ (Hz)}$$

Units Resistance : Ω  
Capacitance : F

1. M5289FP

Maximum rating of power dissipation  $P_d$  for M5289FP is 550mW. We recommend that you take notice of thermal deration well for your application.