

M51134P/FP

SUB-HARMONIZER FOR BASS EMPHASIS

DESCRIPTION

The M51134 is an IC developed for audio-visual applications to emphasize heavy bass. The IC is used to produce sound effects at the stage before power amplifier. The M51134 offers capability of converting desired frequency into its half by setting a constant of external filter. The built-in VCA is also capable of level setting controlled by an external source.

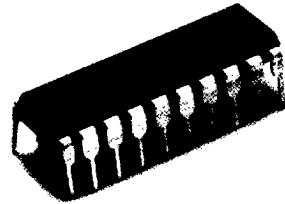
The IC is also suitable for 3-D systems.

FEATURES

- Input sensitivity variable by input sensitivity adjust pin
- Built-in 5V regulator for single power supply
- Envelope detector facilitates level setting matching input level
- Capability of controlling VCA from external source facilitates level settings at will
- Maximum input voltage.....3Vrms
- Low noise.....-92dBv
- Built-in OP-amp for low pass filter
- Built-in voltage control amplifier (VCA)
- Built-in Flip-Flop circuit for 1/2 frequency divider

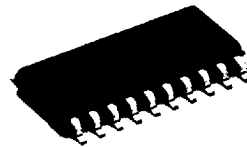
RECOMMENDED OPERATING CONDITIONS

Supply voltage range $V_{cc1} = 7$ to 15V, $V_{cc2} = 4.5$ to 5.5V
 Rated supply voltage..... $V_{cc1} = 12V$, $V_{cc2} = 5V$



Outline 20P4(P)

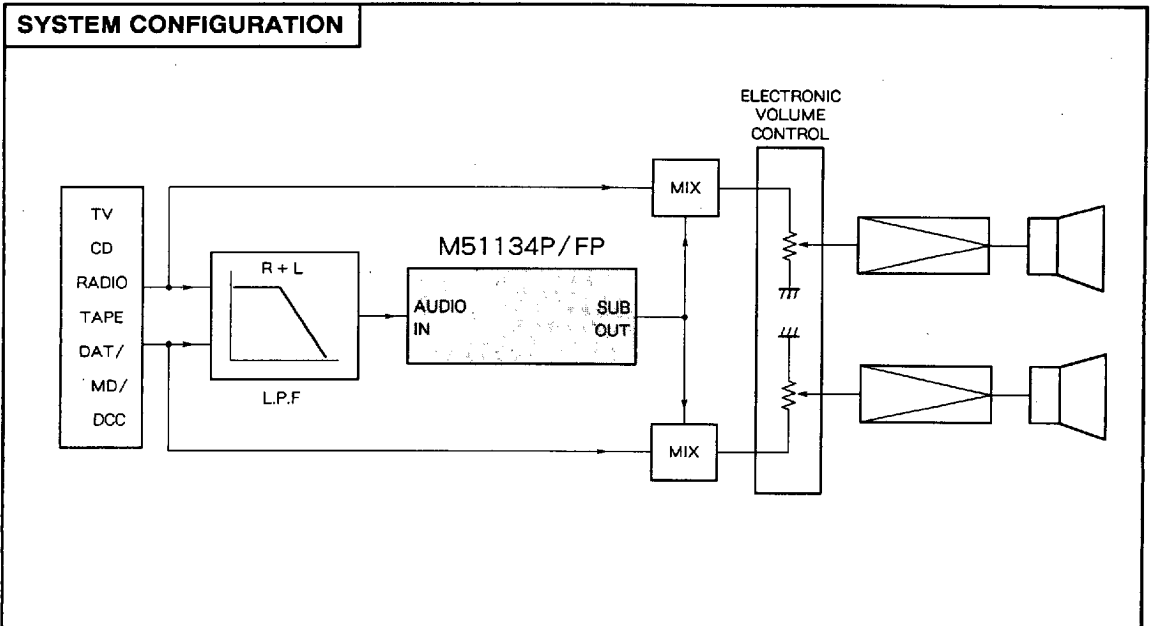
2.54mm pitch 300mil DIP
 (6.3mm × 24.0mm × 3.3mm)



Outline 20P2N-A(FP)

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

SYSTEM CONFIGURATION



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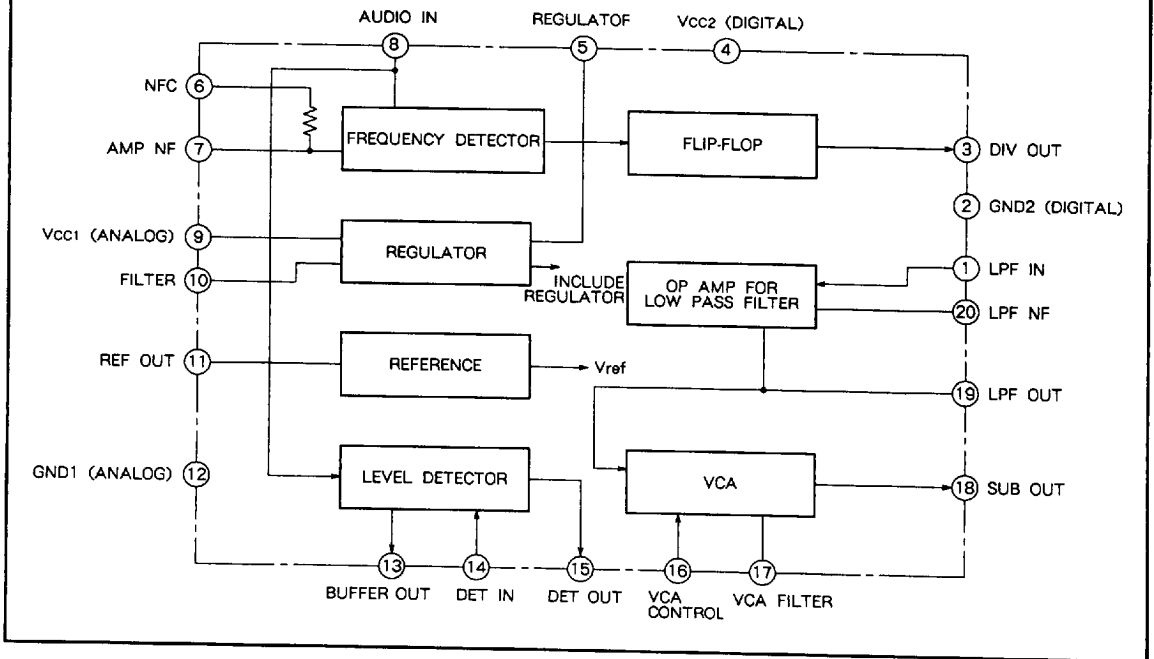
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PIN CONFIGURATION (TOP VIEW)

LPF IN	1	20	LPF NF
GND2 (DIGITAL)	2	19	LPF OUT
DIV OUT	3	18	SUB OUT
Vcc2 (DIGITAL)	4	17	VCA FILTER
REGULATOR	5	16	VCA CONTROL
NFC	6	15	DET OUT
AMP NF	7	14	DET IN
AUDIO IN	8	13	BUFFER OUT
Vcc1 (ANALOG)	9	12	GND1 (ANALOG)
FILTER	10	11	REFERENCE OUT

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

IC INTERNAL BLOCK DIAGRAM



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

Symbol	Parameter	Ratings	Unit
Vcc1	Supply voltage (analog)	+ 16	V
Vcc2	Supply voltage (digital)	+ 5.5	V
Pa	Power dissipation	800(P)/500(FP)	mW
Ke	Thermal derating	8.0(P)/5.0(FP)	mW/°C
Topr	Operating temperature	-20 to +75	°C
Tstg	Storage temperature	-40 to +125	°C

ELECTRICAL CHARACTERISTICS (Ta = 25°C, Vcc1 = 12V, Vcc2 = 5V, f = 100Hz, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
Icc1	Quiescent circuit current	Quiescence	—	12	22	mA
Icc2	Quiescent circuit current	Quiescence	—	0.95	2.5	mA
Vimn	Minimum detect input voltage		—	-55	-40	dBV
Vore	Response output voltage range		35	47	—	dB
THD	Total harmonic distortion	Vi = -10dBV	—	1.3	2.5	%
Trsp	Response time		—	2.5	3.5	mS
Vimax	Maximum input voltage	THD = 2.0%	+4	+10	—	dBV
Vomax	Maximum output voltage	THD = 2.0%	1.8	2.5	—	Vrms
No	Output noise voltage	DIN AUDIO	—	-93	-83	dBV

TEST METHOD

Symbol	SW1	SW2	SW3	SW4	Conditions
Icc1	1	2	1	2	Measure circuit current at pin⑨ for quiescent state.
Icc2	2	1	1	2	Measure circuit current at pin④ for quiescent state.
Vimn	2	2	2	2	Measure minimum input voltage at pin③ output.
Vore	2	2	2	2	Measure difference in output voltage at Vomax and Vimin.
THD	2	2	2	2	Measure distortion with f = 100Hz, Vi = -10dBV
Trsp	2	2	2	2	Measure delay time between input signal and output signal.
Vimax	2	2	2	2	Measure output voltage with THD = 2%
Vomax	2	2	2	2	Measure input voltage with THD = 2%
No	2	2	2	1	DIN AUDIO

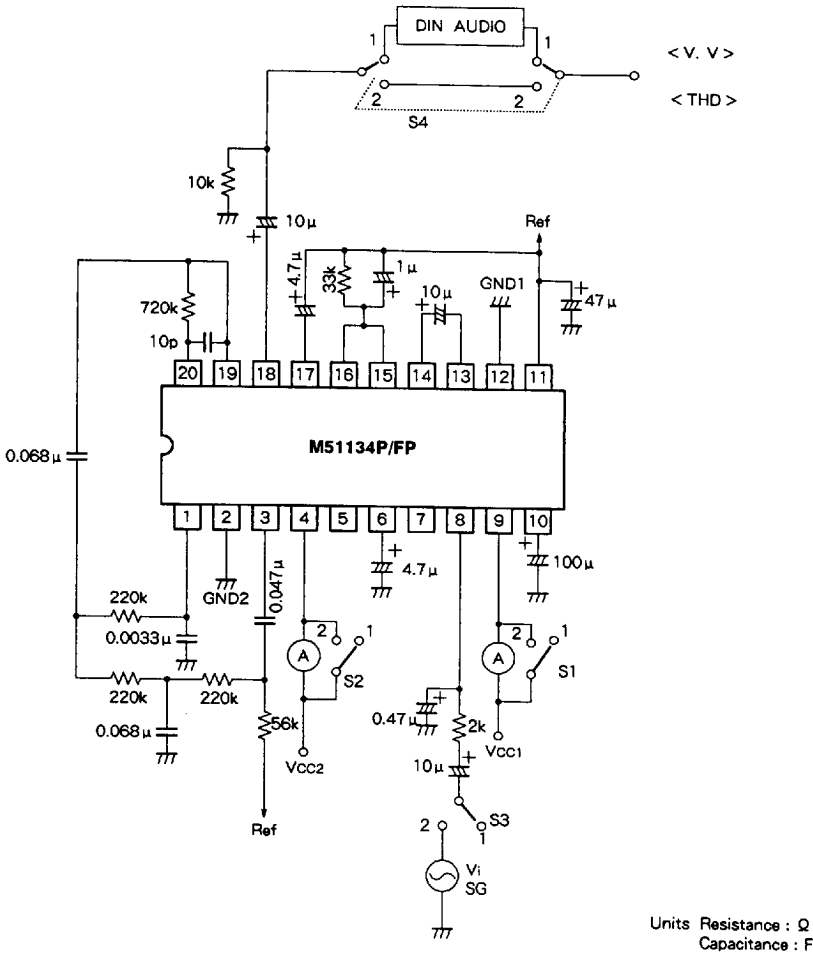
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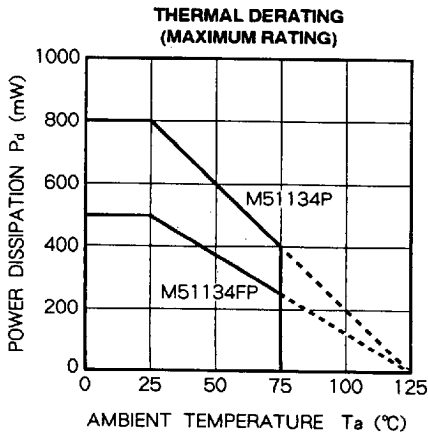
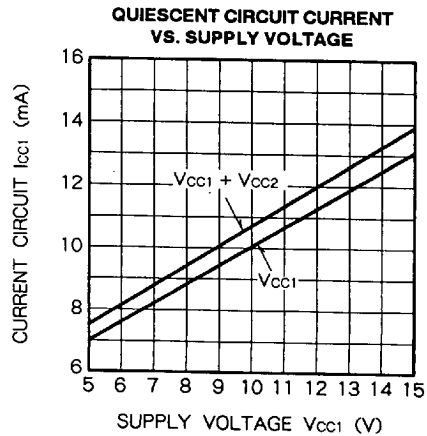
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TEST CIRCUIT



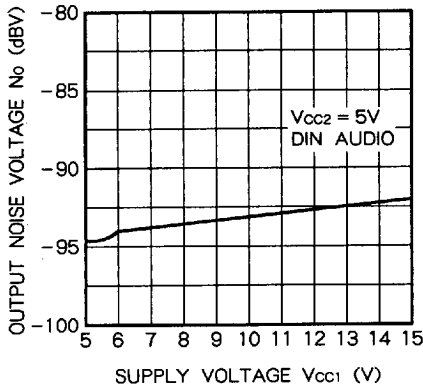
TYPICAL CHARACTERISTICS



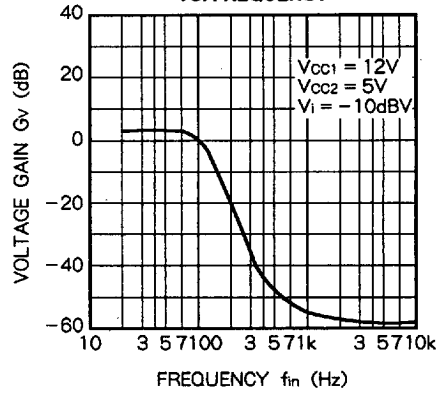
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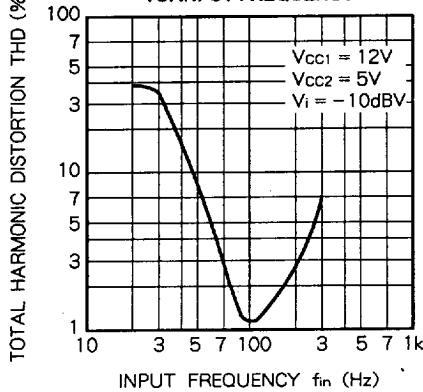
OUTPUT NOISE VOLTAGE
VS. SUPPLY VOLTAGE



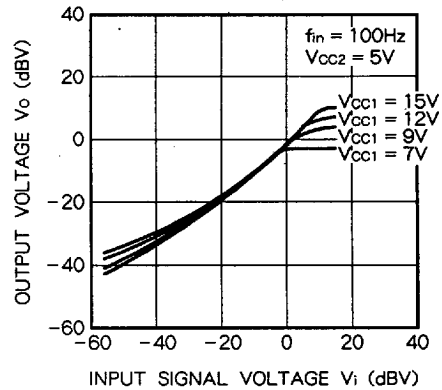
VOLTAGE GAIN
VS. FREQUENCY



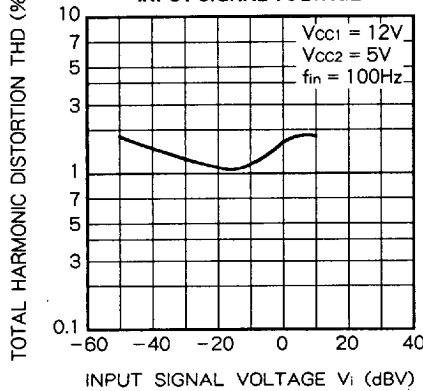
TOTAL HARMONIC DISTORTION
VS. INPUT FREQUENCY



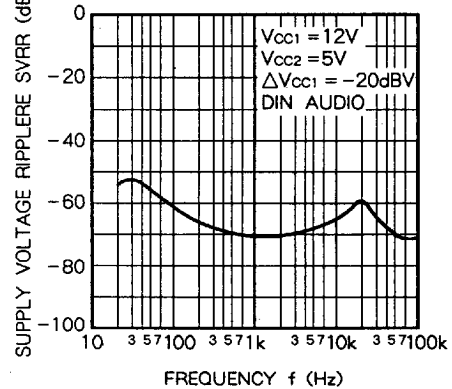
OUTPUT VOLTAGE VS.
INPUT SIGNAL VOLTAGE



TOTAL HARMONIC DISTORTION VS.
INPUT SIGNAL VOLTAGE



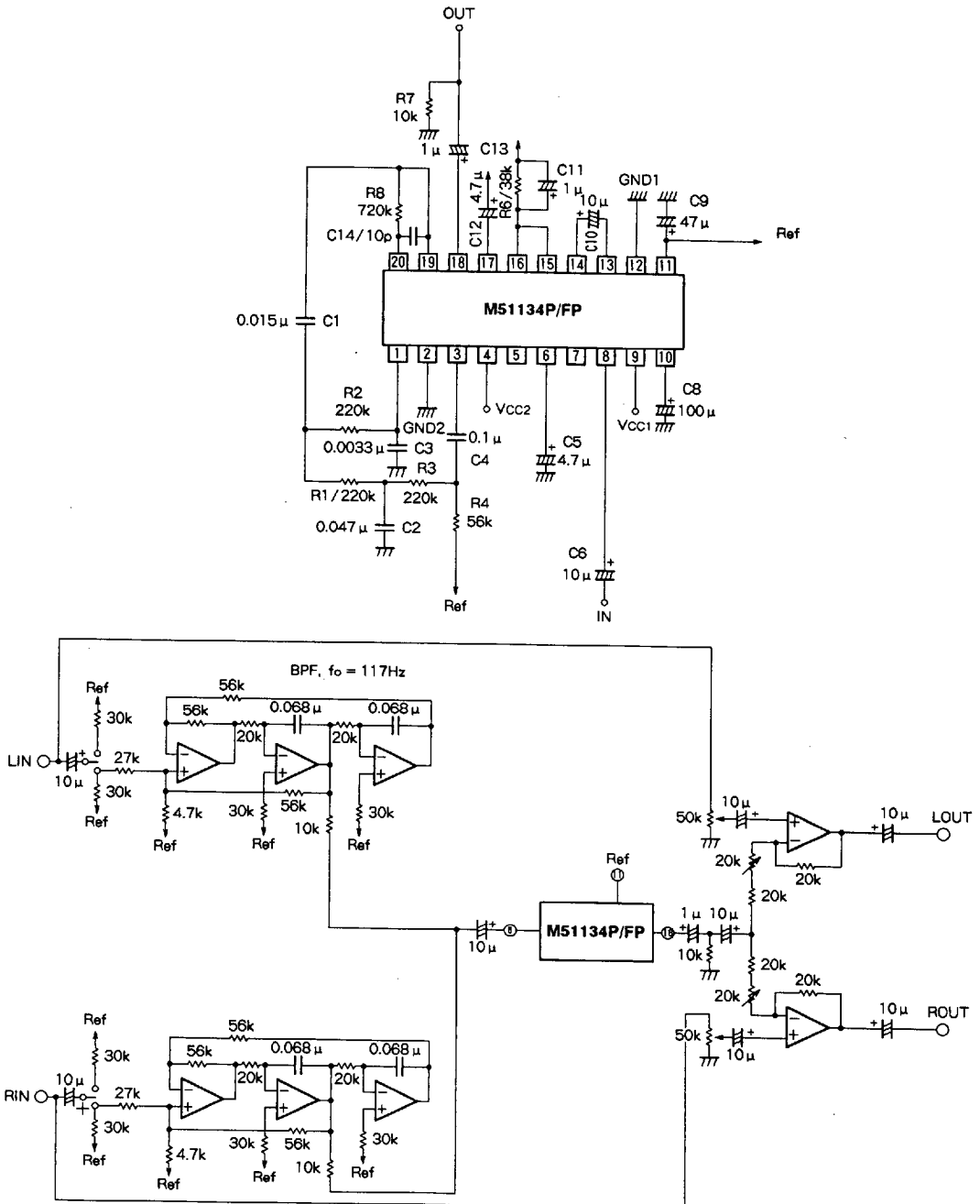
SUPPLY VOLTAGE REGULATIN RATIO
VS. FREQUENCY



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APPLICATION EXAMPLE



Units Resistance : Ω
Capacitance : F

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