

M51525P,FP,GP

AUTO REVERSE PREAMPLIFIER WITH MUSIC SENSOR

DESCRIPTION

The M51525 is a preamplifier IC developed for car audio systems.

The IC, in addition to 2 channels of high-gain, low-noise preamplifiers, has a lead-in detection function suiting to auto reverse function and is capable of processing analog signals transmitted from the cassette deck.

Its applications cover home-use audio systems and portable radio CD/cassette players, as well as car audio systems.

FEATURES

- Frequency characteristics adjust pin for mixing amplifier.
- Built-in electronic switch for forward/reverse selection offers capability of switching 2 channels with a single switch.
- Built-in electronic switch for equalizer selection makes it possible to switch 2 channels with a single switch.
- Use of reference voltage of bias circuit eliminates the need for input coupling capacitor.
- 2 channels of high-gain, low-noise preamplifiers built-in.
- Internal direct connection between each preamplifier output and high-gain mixing amplifier, without using coupling capacitor.
- Built-in filter circuits for prevention of malfunctioning caused by tape pop up noise at music blank.
- Built-in reset circuit to reset music selection at power up.
- Capable of setting timing for music blank by means of external CR combination.



Outline 24P4D(P)

2.54mm pitch 300mil DIP
(6.3mm × 29.2mm × 3.3mm)



Outline 24P2N-B(FP)

1.27mm pitch 300mil SOP
(5.3mm × 15.02mm × 1.8mm)

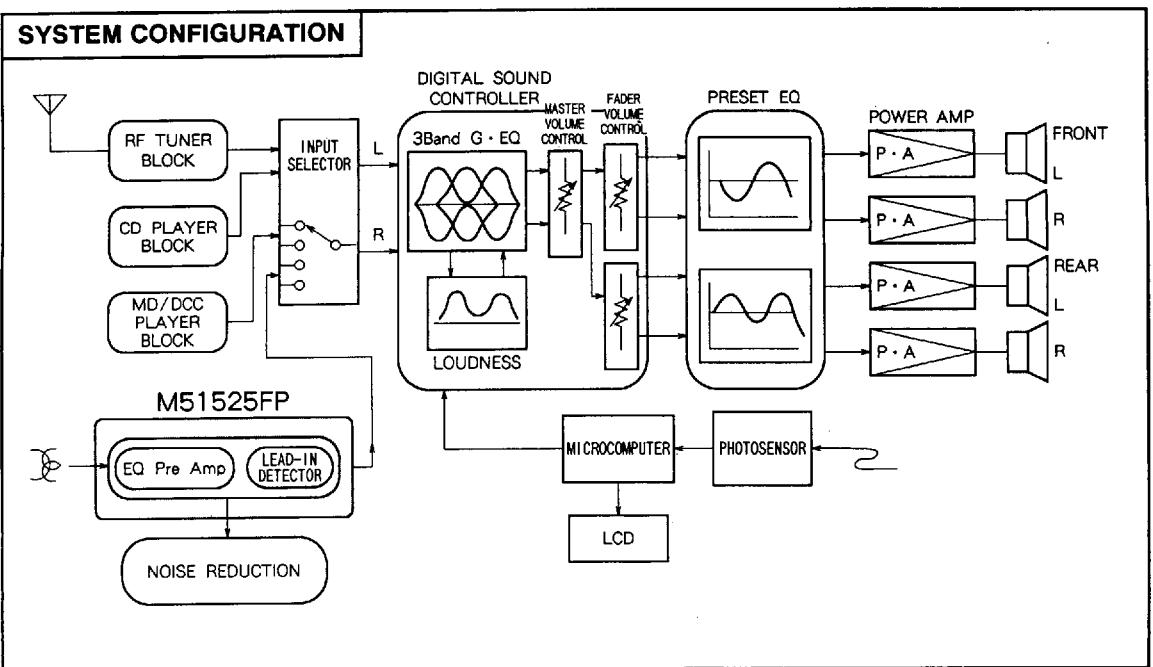


Outline 24P2Q-A(GP)

0.8mm pitch 300mil SSOP
(5.3mm × 10.1mm × 1.8mm)

RECOMMENDED OPERATING CONDITIONS

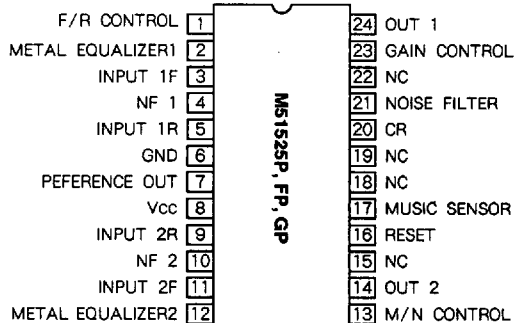
Supply voltage range.....Vcc = 6~15V
Rated supply voltage.....Vcc = 8V



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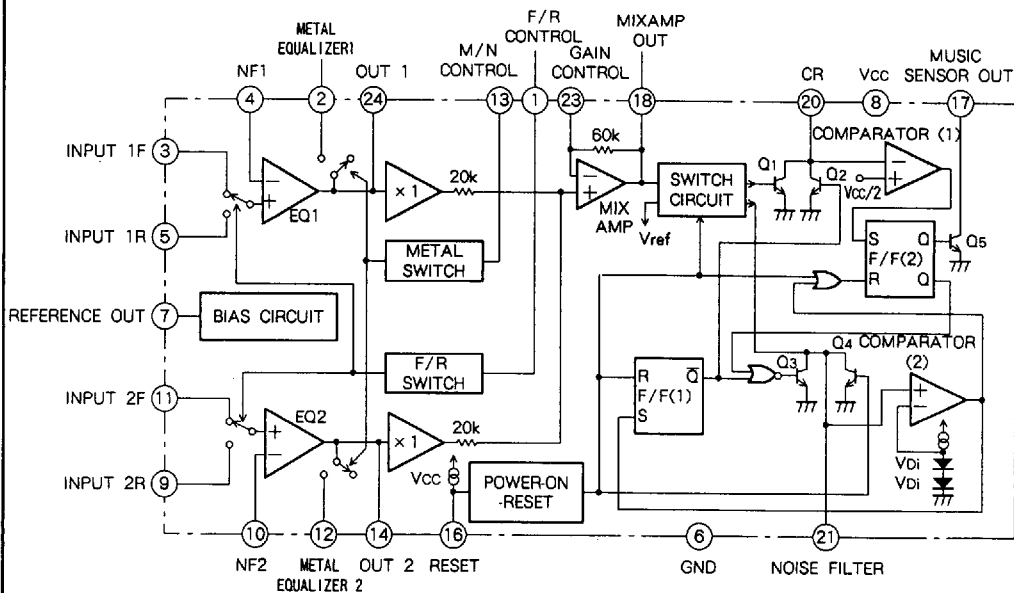
PIN CONFIGURATION



Outline 24P4D(P)
24P2N-B(FP)
24P2Q-A(GP)

NC : NO CONNECTION

IC INTERNAL BLOCK DIAGRAM



Unit Resistance : Ω

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ABSOLUTE MAXIMUM RATINGS ($T_a = 25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
V _{cc}	Supply voltage		16	V
I _{cc}	Circuit current		40	mA
P _d	Power dissipation	(M51525P)	1000	mW
		(M51525FP)	500	
		(M51525GP)	540	
K _θ	Thermal derating	(M51525P)	10	mW/°C
		(M51525FP)	5	
		(M51525GP)	5.4	
T _{opr}	Operating temperature		-20~+75	°C
T _{stg}	Storage temperature		-40~+125	°C

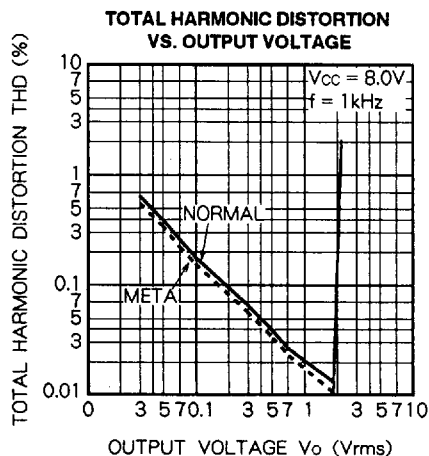
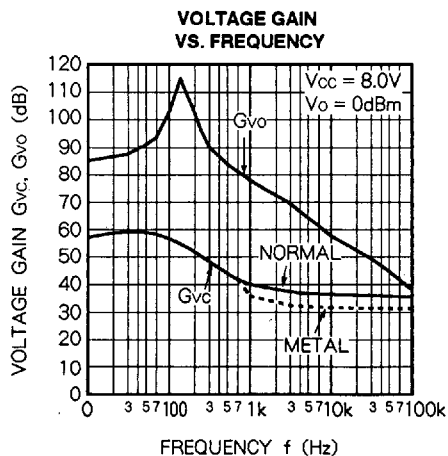
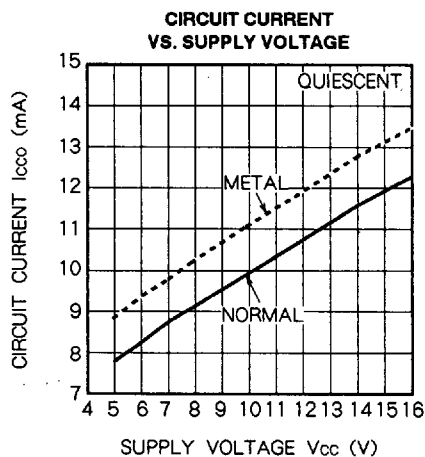
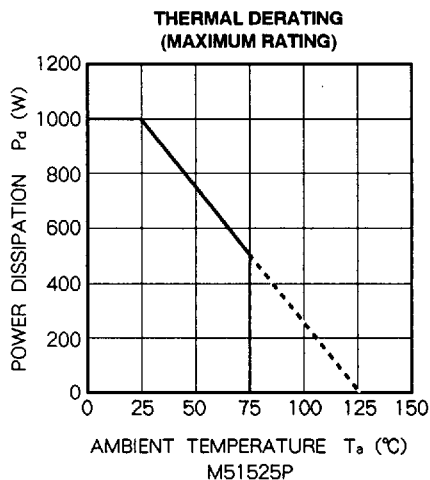
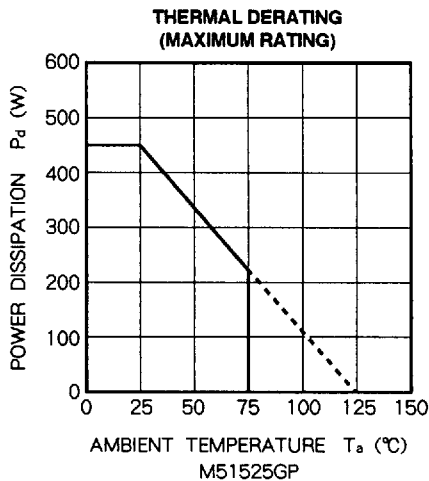
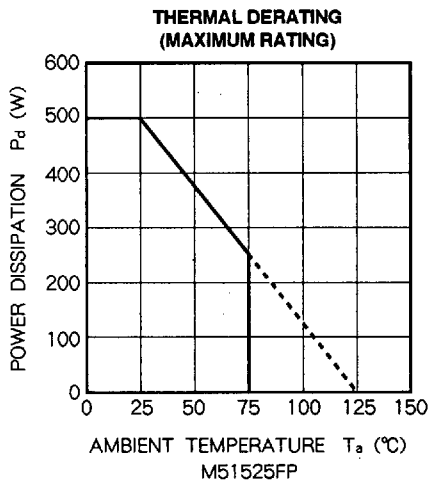
ELECTRICAL CHARACTERISTICS ($f = 1\text{kHz}$, $R_g = 620\Omega$, $V_{cc} = 8\text{V}$, Normal equalizer, $T_a = 25^\circ\text{C}$, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I _{cc}	Circuit current	Quiescent circuit current	-	9	14	mA
G _{vo}	Open loop gain	$C_E = 220\mu\text{F}$	68	80	-	dB
G _{vc}	Close loop gain		38.5	40.5	42.5	dB
THD	Total harmonic distortion	$V_o = 0.5V_{rms}$	-	0.06	0.2	%
V _{omax}	Maximum output voltage	THD = 1%	1.5	2.0	-	V _{rms}
N _o	Output noise voltage	BW = 20Hz~20kHz	-	85	160	μV_{rms}
S _{ep}	Separation	$V_o = 0\text{dBm}$, BW = 20Hz~20kHz	45	63	-	dB
CT	Crosstalk	$V_o = 0\text{dBm}$, BW = 20Hz~20kHz	60	78	-	dB
I _{in20}	CR circuit input current		-	-0.1	-0.6	μA
V _{oL}	Music sensor output voltage L		-	0.15	0.4	V
V _{th20}	Comparator (1) threshold voltage		3.5	4.0	4.5	V
I ₁₆	Reset charging current		-3	-9	-30	μA
V ₁₆	Reset completion voltage		1.0	1.4	1.7	V
V _{th16}	Reset threshold voltage		0.8	1.2	1.7	V
I ₂₁	Noise filter charging current		-30	-60	-110	μA
V _{th21}	Comparator (2) threshold voltage		1.1	1.5	1.7	V
R ₁	Input impedance (pin①)	$V_1 = 1\text{V}$	70	100	150	k Ω
R ₁₃	Input impedance (pin⑬)	$V_{13} = 1\text{V}$	70	100	150	k Ω

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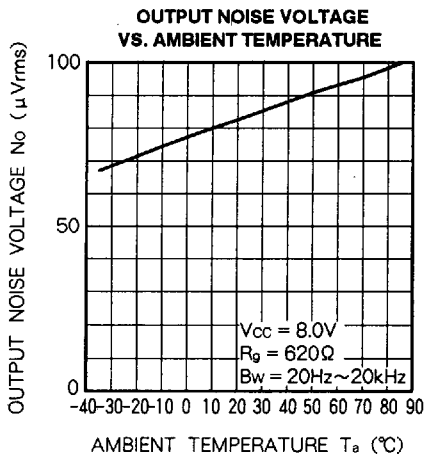
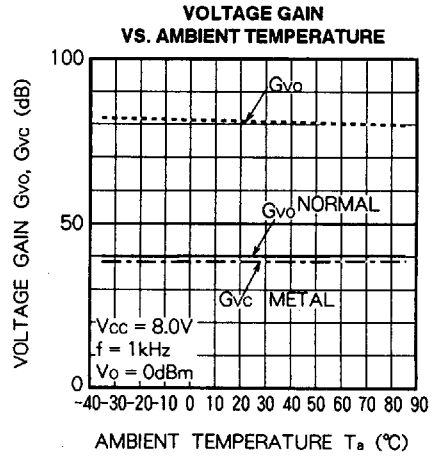
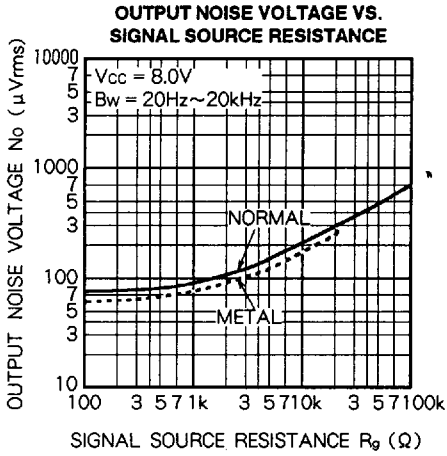
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TYPICAL CHARACTERISTICS



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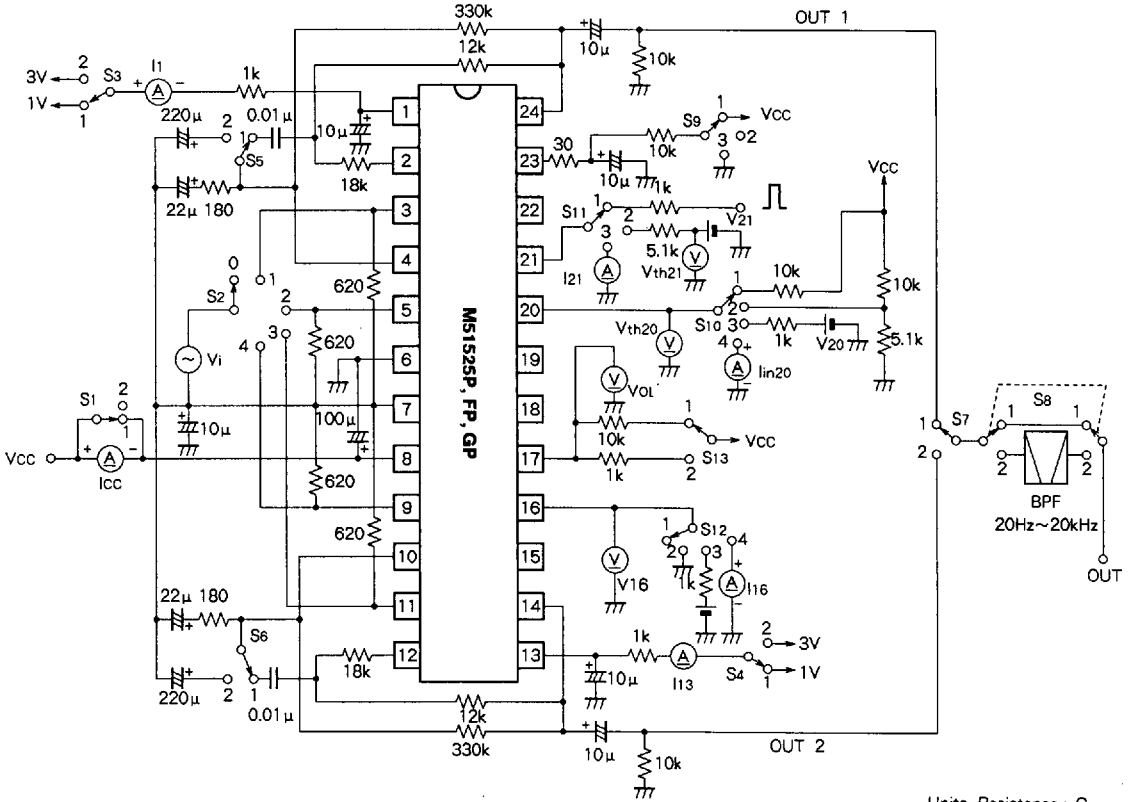
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AUTO REVERSE PREAMPLIFIER WITH MUSIC SENSOR

TEST CIRCUIT



Units Resistance : Ω
Capacitance : F

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TEST CONDITIONS

Parameter	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	Methods
I _{cc}	2	0	1	1	1	1	1	1	2	1	1	1	1	Read value on ammeter
G _{vo}	1	1/2 3/4	1	2	1	2	1	1	1	2	1	1	2	G _{vo} = 20 log(V _o /V _i)
G _{vc}	1	1/3	1	1	1	1	1	2	1	2	1	1	2	G _{vc} = 20 log(V _o /V _i)
THD	1	1/3	1	1	1	1	1	2	1	2	1	1	2	Read value on distortion meter at V _o = 0.5V _{rms}
V _{omax}	1	1/3	1	1	1	1	1	2	1	2	1	1	2	Measure output voltage at THD = 1%
N _o	1	0	1	2	1	1	1	1	2	2	1	1	2	BW = 20Hz~20kHz
Sep	1	1/3	1	1	1	1	1	1,2	2	2	1	1	2	Measure output voltage when another output voltage is 0dBm. BW = 20Hz~20kHz, Sep = V _o (dB)
CT	1	1/2 3/4	1,2	1,2	1	1	1	1	2	2	1	1	2	Measure crosstalk between forward and reverse V _i = 0dBm, BW = 20Hz~20kHz
I _{in20}	1	0	1	1	1	1	1	1	2	4	1	1	2	Measure current of pin⑫ after preset pulse enters to pin⑫
V _{oL}	1	0	1	1	1	1	1	1	2	4	1	1	2	Measure voltage of pin⑫ after preset pulse enters to pin⑫
V _{th20}	1	0	1	1	1	1	1	1	2	3	1	1	1	Measure voltage of pin⑫ when V ₁ increases from 1V and output of pin⑫ changes to High from Low after preset pulse enters to pin⑫
I ₁₆	1	0	1	1	1	1	1	1	2	1	1	4	1	Measure current with pin⑯
V ₁₆	1	0	1	1	1	1	1	1	2	1	1	1	1	Measure voltage with pin⑯
V _{th16}	1	0	1	1	1	1	1	1	2	1	1	3	1	Measure voltage of pin⑯ when V ₁₉ decreases from 2V and output of pin⑫ changes to Low from High, after preset pulse enters to pin
I ₂₁	1	0	1	1	1	1	1	1	3	2	3	*	1	Measure current of pin⑳ after S12 changes to 1→2→1
V _{th21}	1	0	1	1	1	1	1	1	2	2	2	*	1	Measure supply voltage of pin⑳ when V ₂ increases from 0.5V and voltage of pin⑫ changes to High (2.7V) from Low, after S12 changes to 1→2→1
R ₁	1	0	1	1	1	1	1	1	2	1	1	1	1	Measure current I ₁ at pin① R ₁ = 1/I ₁ (kΩ)
R ₁₃	1	0	1	1	1	1	1	1	2	1	1	1	1	Measure current I ₁₃ at pin⑬ R ₁₃ = 1/I ₁₃ (kΩ)