M5218/M5R4558P

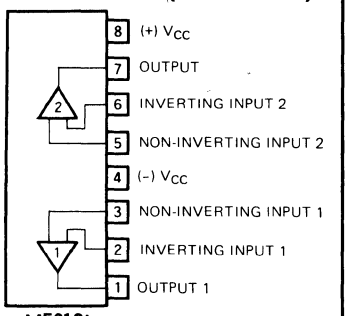
DUAL LOW-NOISE OPERATIONAL AMPLIFIERS (DUAL POWER SUPPLY TYPE)

DESCRIPTION

The M5218/M5R4558P is a monolithic integrated circuit designed for a lownoise preamplifier in audio equipment and a general-purpose operational amplifier in other electronic equipment. Two lownoise operational amplifier circuits displaying internal phasecompensated high gain and low distortion are contained in a 8-pin (SIL, DIL) package for application over a wide range as a general-purpose dual amplifier in general electronic equipment.

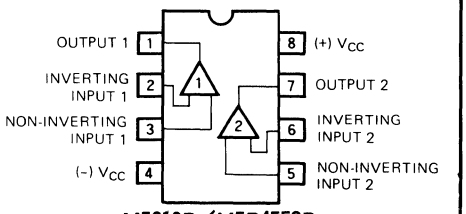
The device has virtually the same characteristics as the 4557, 4558, 4559 and 741 operational amplifiers. The unit can also be used as a single power supply type and employed with low supply voltages, making it ideal as a general-purpose amplifier in portable equipment. It is also suitable as a headphone amplifier because of its high load current.

PIN CONFIGURATION (TOP VIEW)



M5218L
Outline 8P5

PIN CONFIGURATION (TOP VIEW)



M5218P/M5R4558P
Outline 8P4

FEATURES

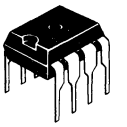
- High gain, low distortion ..... G_{VO} = 110dB, THD = 0.0015% (typ.)
- High slew rate, high f_T ..... SR = 2.2V/μs, f_T = 7MHz (typ.)
- Low noise (R_g = 1kΩ) FLAT ..... V_{NI} = 2μVrms (typ.)
  RIAA ..... V_{NI} = 1μVrms (typ.)
- Operation with low supply voltage ..... ≧4V (±2V)
- High load current, high power dissipation ..... I_{LP} = ±50mA, P_d = 800mW (SIL), 625mW (DIL)

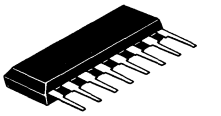
APPLICATION

General-purpose amplifier in stereo equipment, tape decks and radio stereo cassette recorders; active filters, servo amplifiers, operational circuits in other general electronic equipment.

RECOMMENDED OPERATING CONDITIONS

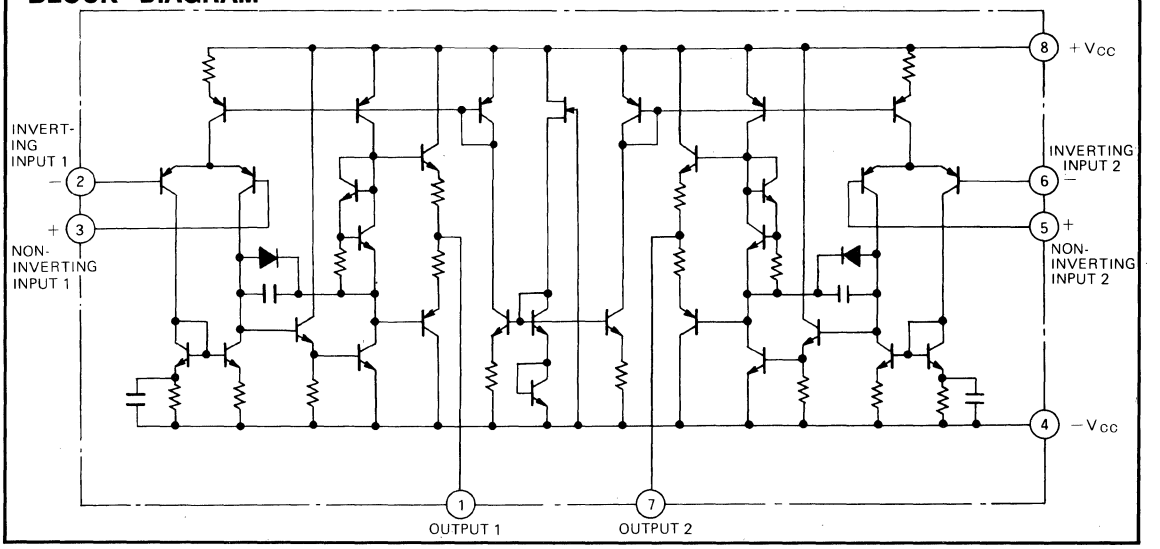
Supply voltage range ..... ±2~±16V
Rated supply voltage ..... ±15V





8-pin plastic DIL package 8-pin plastic SIL package

BLOCK DIAGRAM



M5218/M5R4558P

DUAL LOW-NOISE OPERATIONAL AMPLIFIERS (DUAL POWER SUPPLY TYPE)

ABSOLUTE MAXIMUM RATINGS (T_a=25℃, unless otherwise noted)

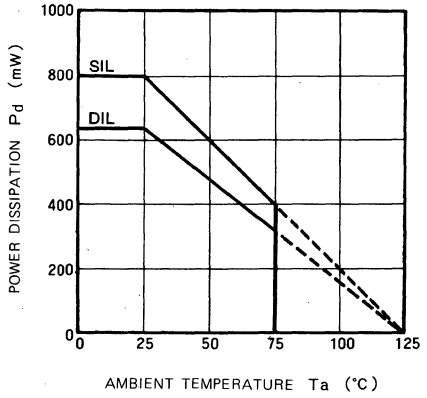
Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		±18	V
I_{LP}	Load current		±50	mA
V_{id}	Differential input voltage		±30	V
V_{ic}	Common input voltage		±15	V
P_d	Power dissipation		800(SIL)	mW
			625(DIL)	
K_θ	Thermal derating	T_a≧25℃	8(SIL)	mW/℃
			6.25(DIL)	
T_{opr}	Operation temperature		−20～+75	℃
T_{stg}	Storage temperature		−55～+125	℃

ELECTRICAL CHARACTERISTICS (T_a=25℃, V_{CC}=±15V)

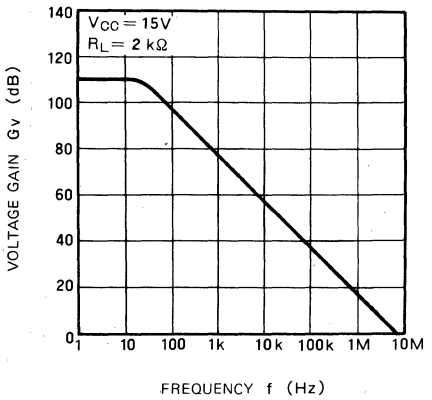
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{CC}	Circuit current	Vin=0		3.0	6.0	mA
V_{IO}	Input offset voltage	R_S≦10kΩ		0.5	6.0	mV
I_{IO}	Input offset current			5	200	nA
I_{IB}	Input bias current				500	nA
R_{in}	Input resistance		0.3	5		MΩ
G_{VO}	Open loop voltage gain	R_L≧2kΩ, V_O=±10V	86	110		dB
V_{OM}	Maximum output voltage	R_L≧10kΩ	±12	±14		V
		R_L≧2kΩ	±10	±13		V
V_{CM}	Common input voltage range		±12	±14		V
CMRR	Common mode rejection ratio	R_S≦10kΩ	70	90		dB
SVRR	Supply voltage rejection ratio	R_S≦10kΩ		30	150	μV/V
P_d	Power dissipation			90	180	mW
SR	Slew rate	G_V=0dB, R_L=2kΩ		2.2		V/μs
f_T	Gain bandwidth product			7		MHz
V_{NI}	Input-referred noise voltage	R_S=1kΩ, BW : 10Hz～30kHz		2.0		μVrms

TYPICAL CHARACTERISTICS

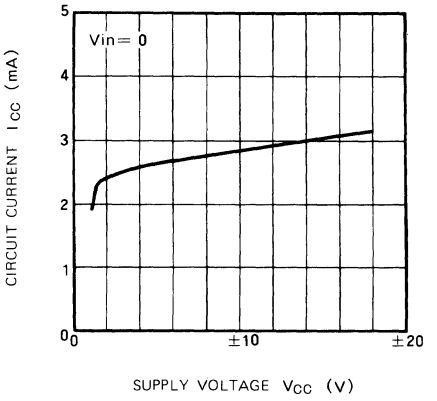
THERMAL DERATING (MAXIMUM RATING)



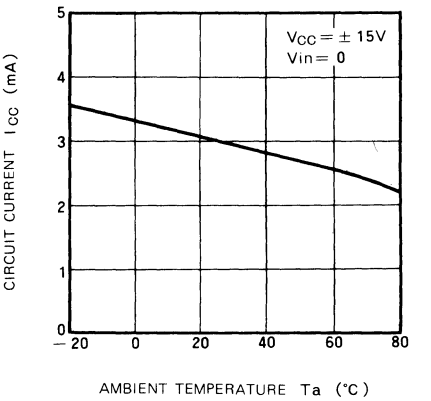
VOLTAGE GAIN VS FREQUENCY RESPONSE



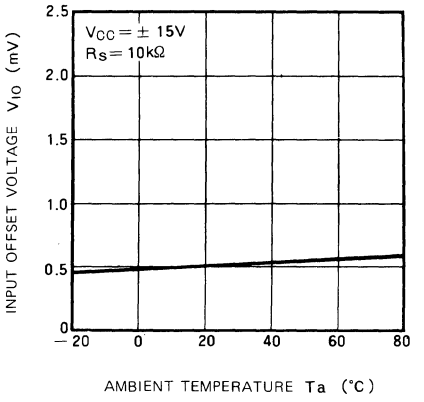
CIRCUIT CURRENT VS SUPPLY VOLTAGE



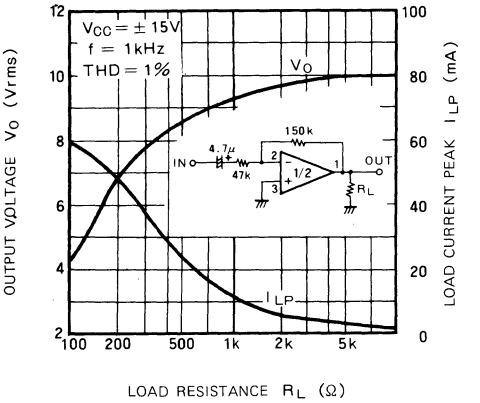
CIRCUIT CURRENT VS AMBIENT TEMPERATURE



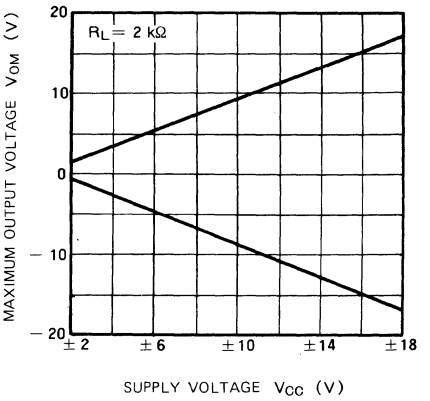
INPUT OFFSET VOLTAGE VS AMBIENT TEMPERATURE



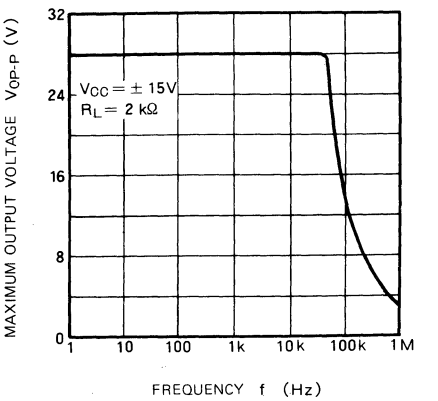
OUTPUT VOLTAGE/LOAD CURRENT PEAK VS LOAD RESISTANCE



MAXIMUM OUTPUT VOLTAGE VS SUPPLY VOLTAGE



MAXIMUM OUTPUT VOLTAGE VS FREQUENCY RESPONSE



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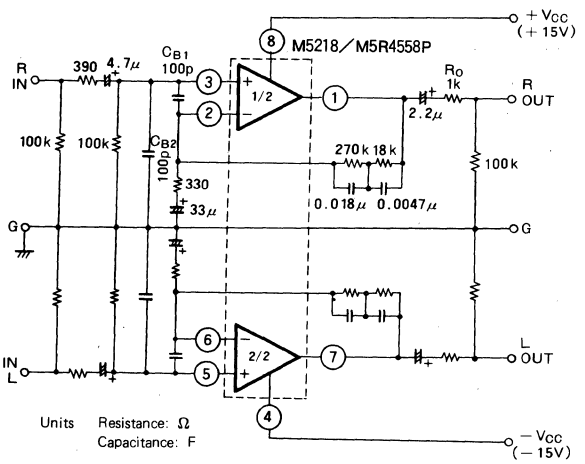
APPLICATION EXAMPLES

(1) Stereo equalizer amplifier circuit



Left channel circuit constants are identical to those of right channel

C_{B1}, C_{B2} : Capacitors for buzz prevention, use if required.

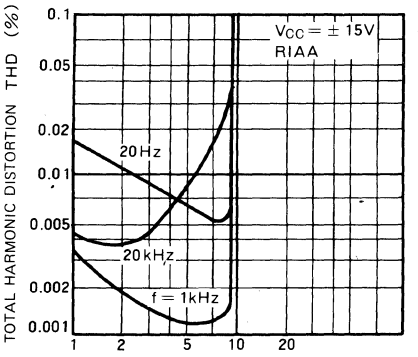
R_O: Resistor used to prevent parasitic oscillation for capacitive loads and current limiting with shorted and other abnormal load conditions.

TYPICAL CHARACTERISTICS

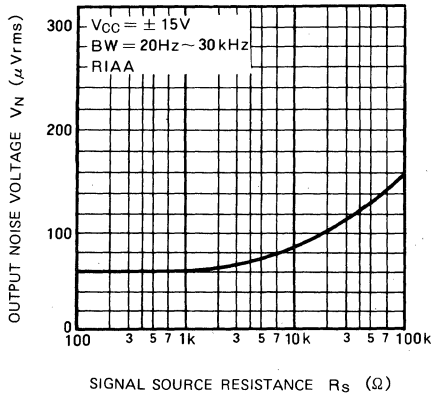
(V_{CC} = ± 15V, RIAA)

- Gv = 35.6dB (f = 1kHz)
- V_{NI} = 1μVrms (R_S = 1kΩ , BW = 20Hz ~ 30kHz)
- Signal-to-noise = 72.5dB (IHF-A network, shorted input, 2.5mVrms input sensitivity)
- THD = 0.0015% (f = 1kHz, V_O = 3 Vrms)

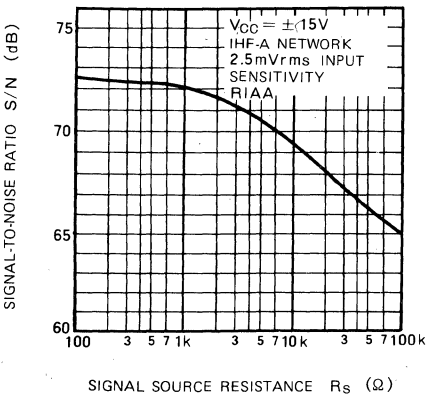
TOTAL HARMONIC DISTORTION VS OUTPUT VOLTAGE



OUTPUT NOISE VOLTAGE VS SIGNAL SOURCE RESISTANCE

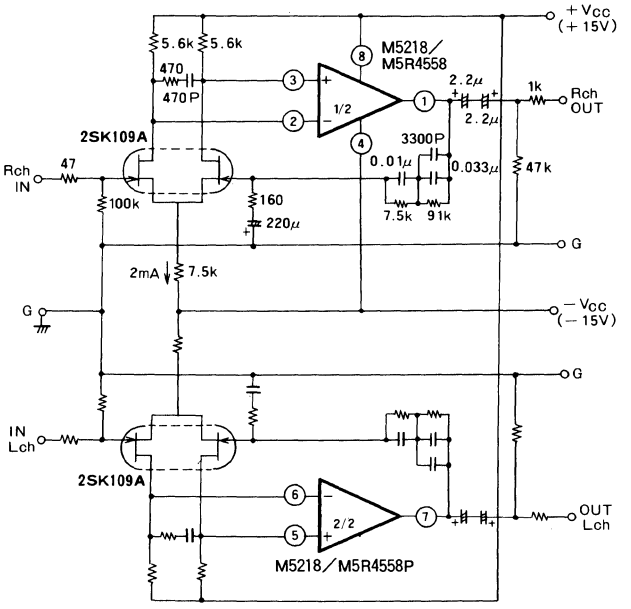


SIGNAL-TO-NOISE RATIO VS SIGNAL SOURCE RESISTANCE



MITSUBISHI ELECTRIC

(2) High S/N stereo DC ICL equalizer



Left channel circuit constants are identical to those of right channel.

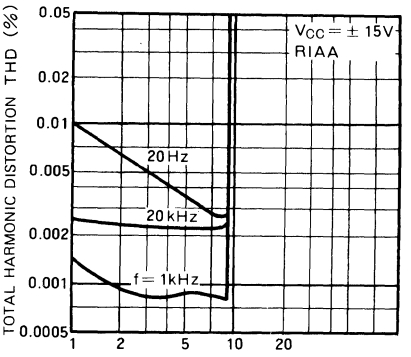
Units Resistance: Ω
Capacitance: F

TYPICAL CHARACTERISTICS

(V_{CC} = ± 15V, RIAA)

- Signal-to-noise = 85 dB (IHF-A network, shorted input, 2.5mVrms input sensitivity)
- V_{NI} = 0.77μVrms (R_S = 5.1kΩ, BW = 5 Hz ~ 100kHz)
- Gv = 35.6dB (f = 1kHz)

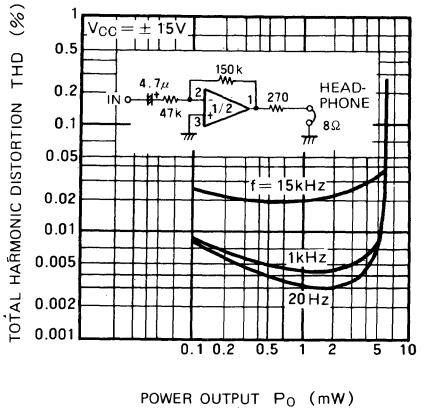
TOTAL HARMONIC DISTORTION VS OUTPUT VOLTAGE



(3) Headphone amplifier

(Output resistance Ro is made the parameter)

TOTAL HARMONIC DISTORTION VS OUTPUT VOLTAGE



POWER OUTPUT/POWER DISSIPATION VS SUPPLY VOLTAGE