M5219

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

DESCRIPTION

The M5219L and M5219P are dual power supply type of semiconductor integrated circuit designed for preamplifiers in stereo equipment and tape decks. Two low-noise, high-voltage preamplifier circuits displaying internal phase-compensated high gain and low distortion are contained in a 8-pin (SIL/DIL) package, making the device ideal for use as an equalizer amplifier or tone control amplifier in stereo equipment and tape decks.

The device can also be used as a single power supply type and employed with low supply voltages, making it suitable as a general-purpose amplifier in stereo radio-cassette tape recorders and other portable equipment.

FEATURES

- Low noise (Rg = 2.2kΩ, RIAA) ····· V_{NI} = 0.9μVrms (typ.)
  S/N = 77dB (typ.) (shorted input, IHF-A network RIAA, PHONO = 2.5mVrms)
- High voltage ····· V_{CC} = ±25V (50V)
- High maximum allowable PHONO input voltage
  ····· V_i=230mVrms(typ.)(V_{CC}=±22.5V, f=1kHz)
- High gain, low distortion G_{VO} = 110dB, THD = 0.001% (typ.)
- High slew rate ····· SR = 6.5V/μs (typ.)
- High load current, high power dissipation
  ····· I_{LP} = ±50mA, P_d = 800mW (SIL)
  625mW (DIL)

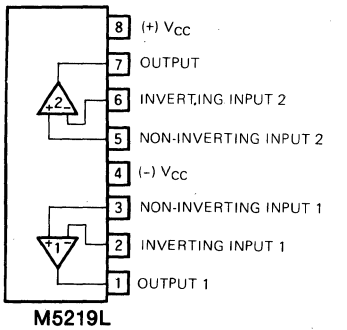
APPLICATION

General-purpose amplifier in stereo equipment, tape decks, stereo radio-cassette tape recorders and other general electronic equipment.

RECOMMENDED OPERATING CONDITIONS

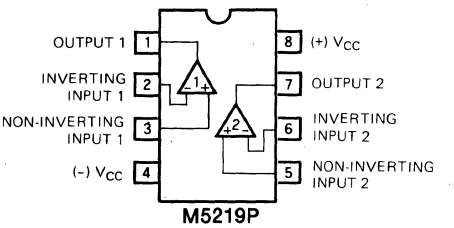
Supply voltage range ····· ±2 ~ ±22.5V
Rated supply voltage ····· ±22.5V

PIN CONFIGURATION (TOP VIEW)

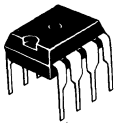


M5219L
Outline 8P5

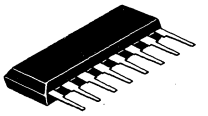
PIN CONFIGURATION (TOP VIEW)



M5219P
Outline 8P4

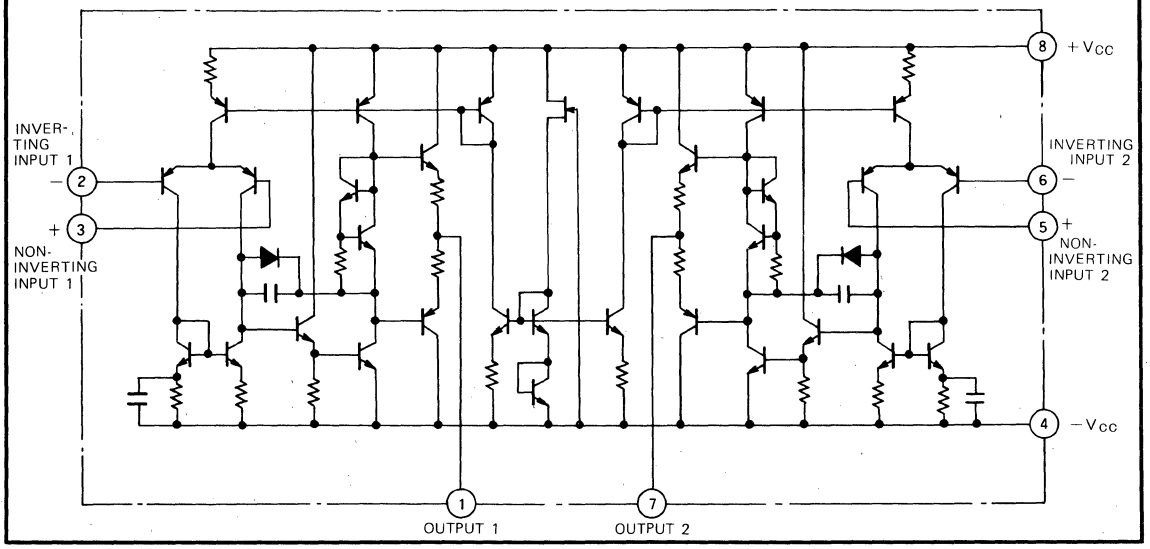


8-pin plastic DIL package



8-pin plastic SIL package

EQUIVALENT CIRCUIT



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

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

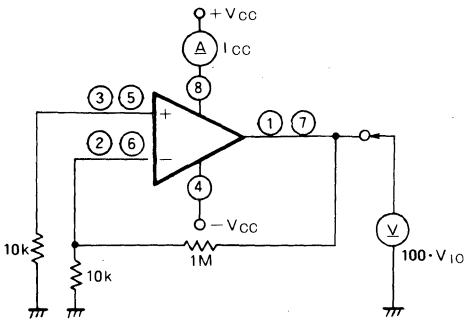
Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		±25(50)	V
I_{LP}	Load current		±50	mA
Vid	Differential input voltage		±30	V
Vic	Common input voltage		±22.5V	V
Pd	Power dissipation		800 (SIL) 625 (DIL)	mW
K_θ	Thermal derating	$T_a \geqq 25$℃	8 (SIL) 6.25 (DIL)	mW/℃
Topr	Operating temperature		−20 ~ +75	℃
Tstg	Storage temperature		−55 ~ +125	℃

ELECTRICAL CHARACTERISTICS (T_a=25℃, V_{CC}=±22.5V)

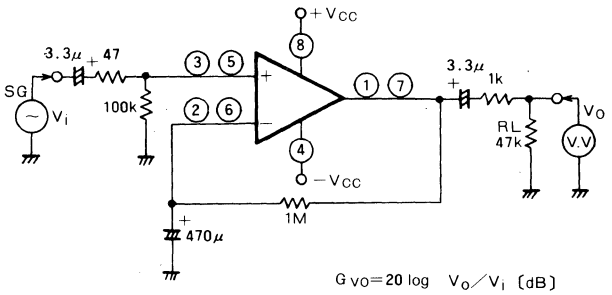
Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
I_{CC}	Circuit current	Vin = 0		3.5	7.0	mA
V_{IO}	Input offset voltage	$R_S \leqq 10k\Omega$		0.5	6.0	mV
I_{IB}	Input bias current			0.3		μA
G_{VO}	Open loop voltage gain	f=100Hz, R_L=47kΩ, C_{NF}=470μF	90	110		dB
V_{OM}	Maximum output voltage	f=1kHz, THD=0.1%, R_L=47kΩ, RIAA	12.5	14.0		μVrms
THD	Total harmonic distortion	f=1kHz, V_O=5Vrms, R_L=47kΩ, RIAA		0.001	0.03	%
V_{NI}	Input-referred noise voltage	Rg=2.2kΩ, BW=10Hz~30kHz, RIAA		0.9	1.8	μVrms
S/N	Signal-to-noise ratio	Shorted input (Rg=47Ω), IHF-A network, PHONO=2.5mVrms, RIAA		77		dB

TEST CIRCUITS

(a) I_{CC}, V_{IO}

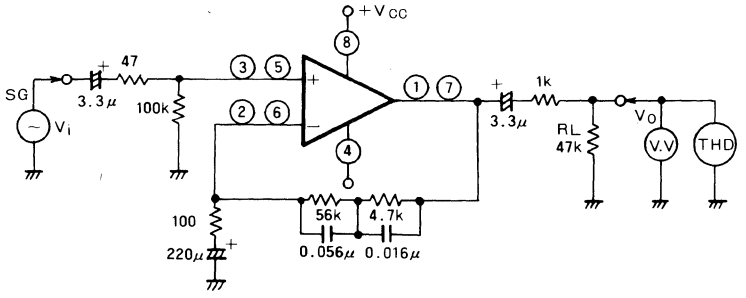


(b) G_{VO}



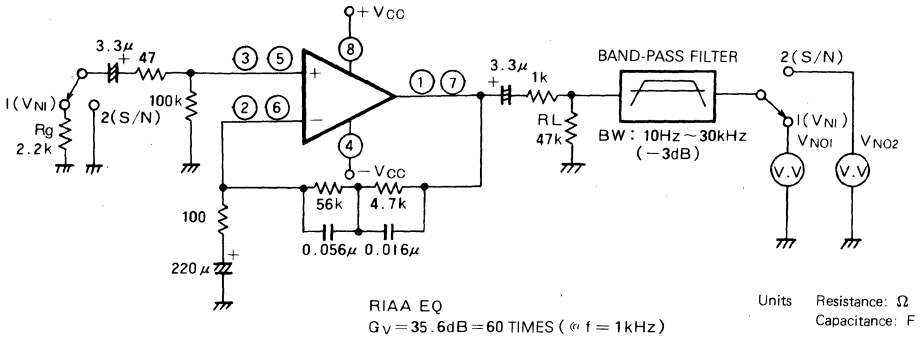
G_{VO}=20 log V_O/V_i (dB)

(c) V_{OM}, THD



Units Resistance: Ω
Capacitance: F

(d) V_{NI}, S/N

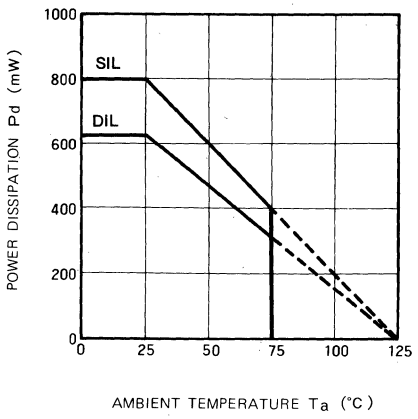


1. $V_{NI}=V_{NO1}/60$ (μVrms)
2. $S/N=20\log\{2.5\text{mVrms}/(V_{NO2}/60)\}$ (dB)

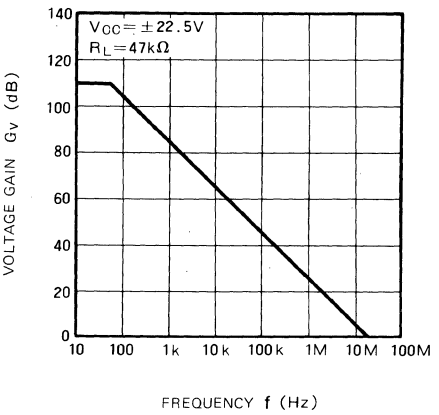
* An AC voltmeter VV with a built-in IHF-A network filter should be used for measuring the S/N ratio.

TYPICAL CHARACTERISTICS

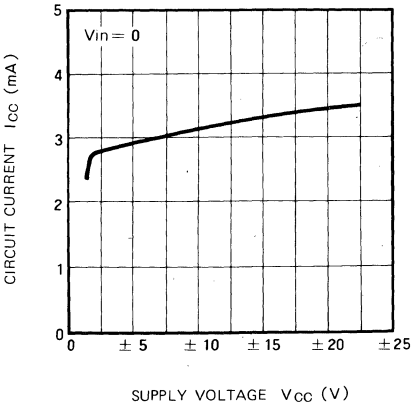
THERMAL DERATING (MAXIMUM RATING)



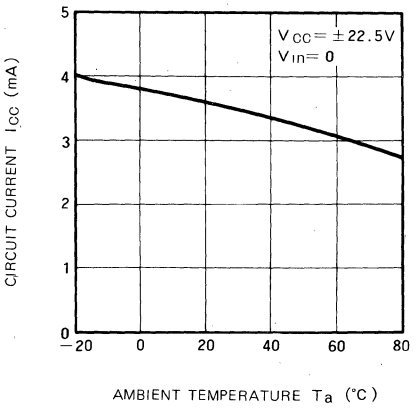
VOLTAGE GAIN VS FREQUENCY



CIRCUIT CURRENT VS SUPPLY VOLTAGE



CIRCUIT CURRENT VS AMBIENT TEMPERATURE



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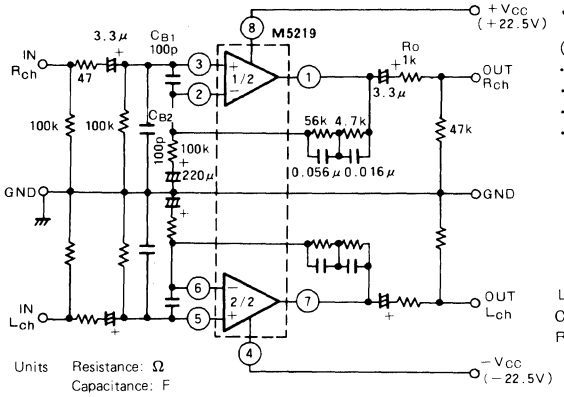
APPLICATION EXAMPLES

(1) Stereo equalizer amplifier circuit



TYPICAL CHARACTERISTICS

(V_{CC} = ±22.5V, RIAA)

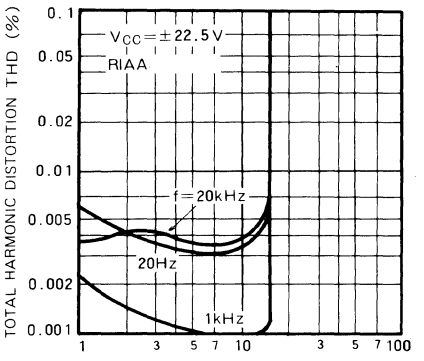
- G_V = 35.6dB (f = 1kHz)
- V_{NI} = 0.9μVrms (R_g = 2.2kΩ, BW = 10Hz ~ 30kHz)
- S/N = 77dB (IHF-A network, shorted input, 2.5mVrms input sensitivity)
- THD = 0.001% (f = 1kHz, V_O = 5 Vrms)

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

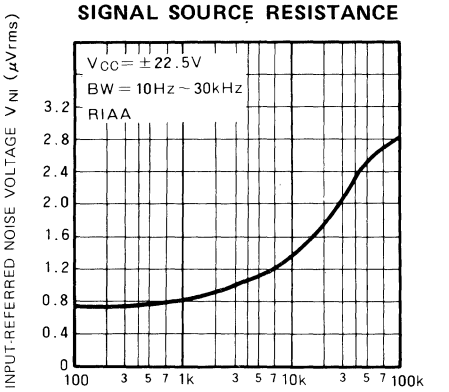
C_{B1}, C_{B2} : Capacitors for buzz prevention; use if required.

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

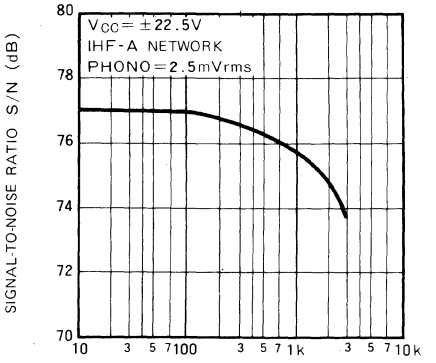
TOTAL HARMONIC DISTORTION VS OUTPUT VOLTAGE



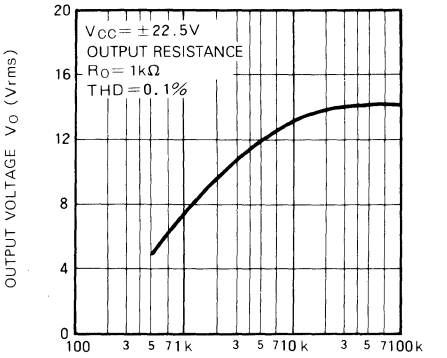
OUTPUT NOISE VOLTAGE VS SIGNAL SOURCE RESISTANCE



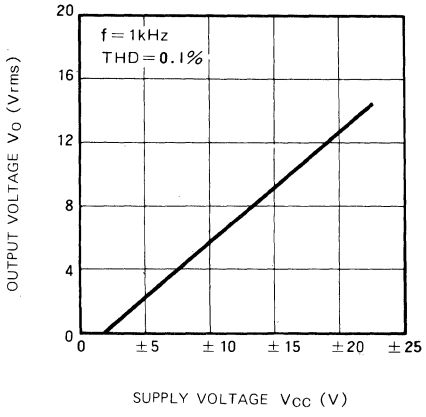
SIGNAL-TO-NOISE RATIO VS SIGNAL SOURCE RESISTANCE



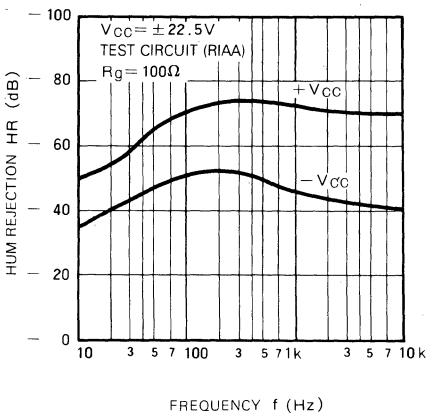
OUTPUT VOLTAGE VS LOAD RESISTANCE



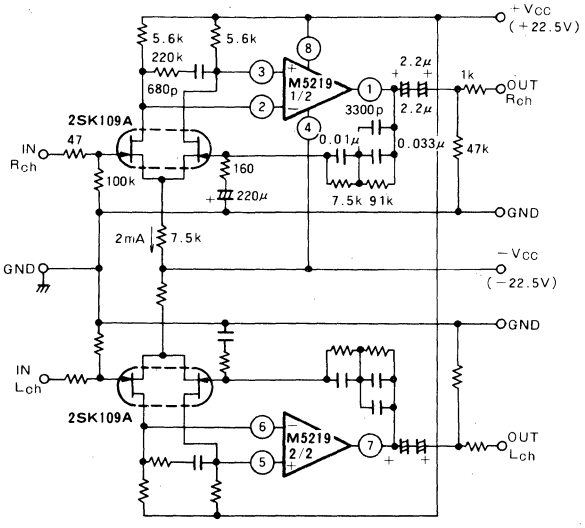
OUTPUT VOLTAGE VS SUPPLY VOLTAGE



HUM REJECTION VS FREQUENCY



(2) High S/N stereo DC ICL equalizer amplifier circuit



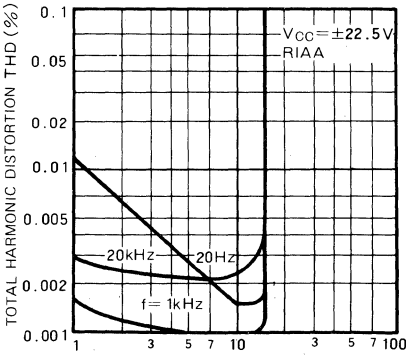
Left channel circuit constants are identical to those of right channel.

Units Resistance: Ω
Capacitance: F

TYPICAL CHARACTERISTICS (Vcc = ±22.5V, RIAA)

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

TOTAL HARMONIC DISTORTION VS OUTPUT VOLTAGE



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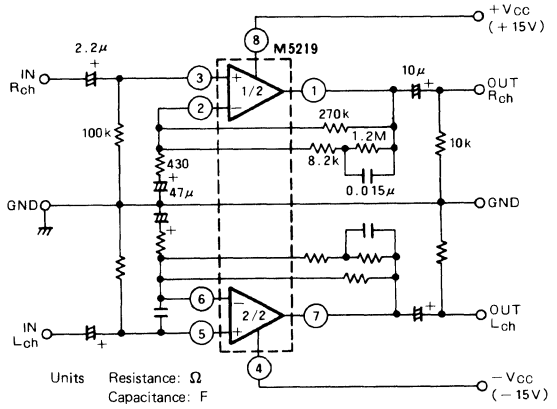
(3) Tape deck equalizer amplifier circuit

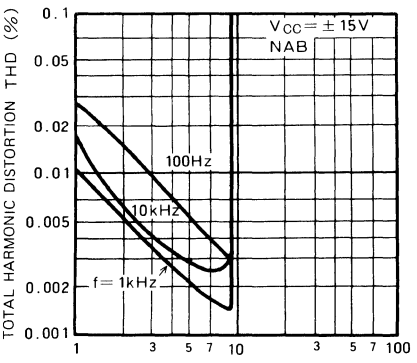


Left channel circuit constants are identical to those of right channel.

TYPICAL CHARACTERISTICS (V_{CC} = ±15V, NAB)

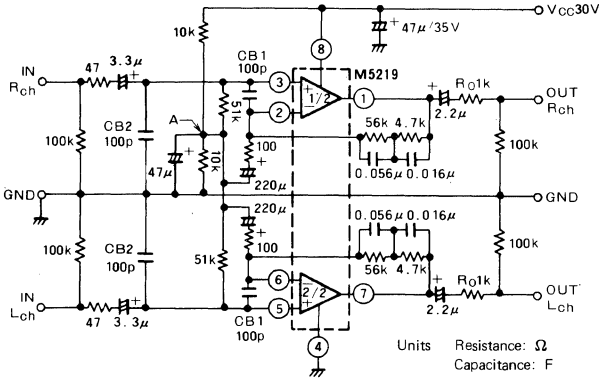
- G_V = 29.9dB (f = 1kHz)
- V_{NI} = 1.4μVrms (R_g = 2.2kΩ, BW = 20Hz ~ 15kHz)
  (−117dBv)

TOTAL HARMONIC DISTORTION VS OUTPUT VOLTAGE



(4) Typical single power supply application

PHONO EQUALIZER AMPLIFIER (RIAA)



→ Point A is the V_{CC}/2point in DC terms (virtual ground) when the device is used as a single power supply type.

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} = +30V RIAA)

- G_V = 35.6dB (f = 1kHz)
- V_{NI} = 0.9μVrms (R_g = 2.2kΩ, BW = 10Hz ~ 30kHz)
- S/N = 77dB (IHF-A network, shorted input, 2.5mVrms input sensitivity)

TOTAL HARMONIC DISTORTION VS OUTPUT VOLTAGE