M5218AL/P/FP

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

DESCRIPTION

The M5218 are semiconductor integrated circuits designed for a low noise preamplifier in audio equipment and a general-purpose operational amplifier in other electronic equipment. Two low noise operational amplifier circuits displaying internal phase-compensated high gain and low distortion are contained in an 8-pin SIP, DIP or FP for application over a wide rage as a general-purpose dual amplifier in general electronic equipment.

The devices have virtually the same characteristics as the 4557, 4558, 4559 and 741 operational amplifiers.

The units can also be used as a single power supply type and amplifier in portable equipment. It is also suitable as a headphone amplifier because of its high load current.

FEATURES

- High gain, low distortion ········· G_{VO}=110dB, THE=0.0015%(typ.)
- High slew rate, high f_T ········· SR=3.0V/μs, f_T=7MHz(typ.)
- Low noise(R_S=1kΩ)FLAT ········· V_{NI}=2μVrms(typ.)
  RIAA ········· V_{NI}=1μVrms(typ.)
- Operation with low supply voltage ········· $V_{CC}\geq$4V(±2V)
- High load current, high power dissipation ········· I_{LP}=±50mA, P_d=800mW(SIP)
  P_d=625mW(DIP), P_d=440mW(FP)

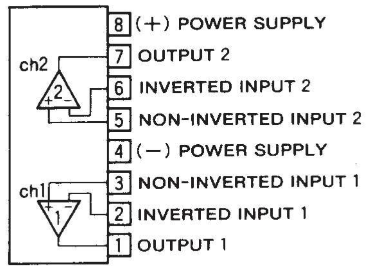
APPLICATION

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

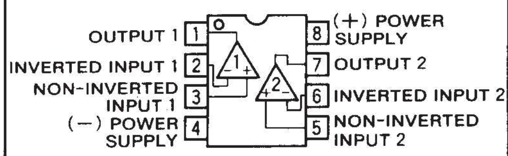
RECOMMENDED OPERATING CONDITINONS

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

PIN CONFIGURATION (TOP VIEW)

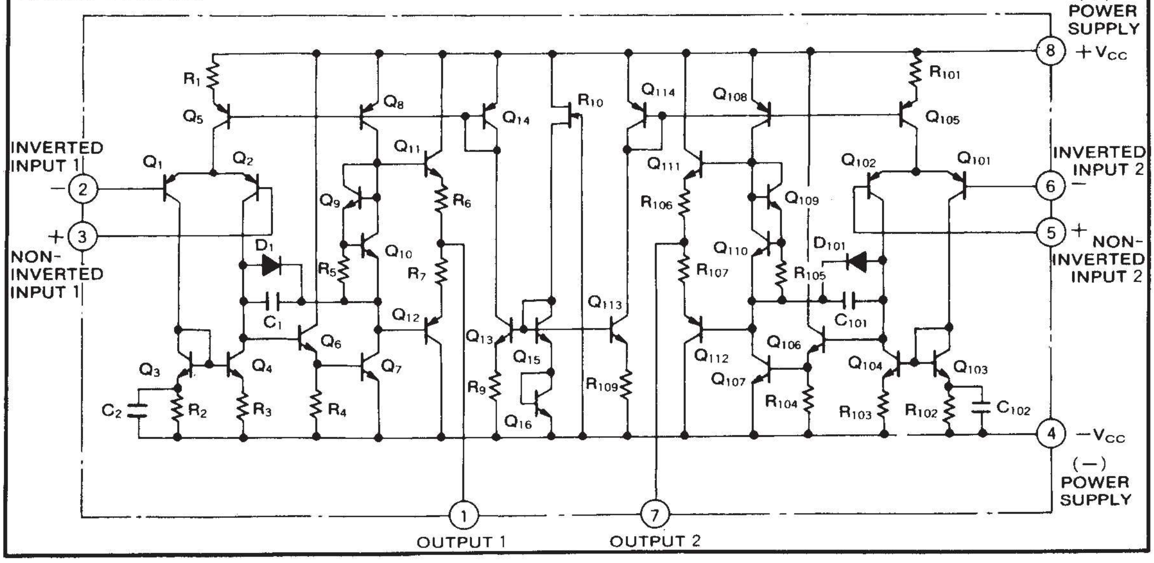


Outline 8P5 (AL)



Outline 8P4 (AP)
8P2S-A (AFP)

BLOCK DIAGRAM



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

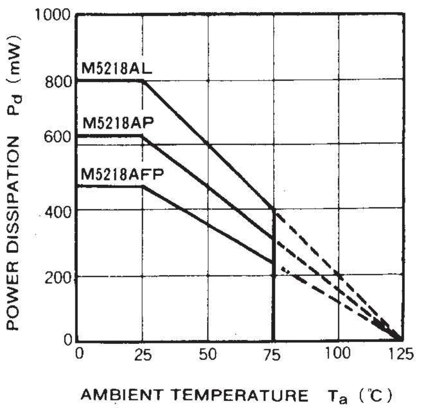
Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		±18	V
I_{LP}	Load current		±50	mA
V_{id}	Differential input voltage		±30	V
V_{ic}	Common input voltage		±15	V
P_d	Power dissipation		800(SIP)/625(DIP)/440(FP)	mW
K_θ	Thermal dirating	$T_a \geq 25$℃	8(SIP)/6.25(DIP)/4.4(FP)	mW/℃
T_{opr}	Ambient temperature		−20~+75	℃
T_{stg}	Storage temperature		−55~+125	℃

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

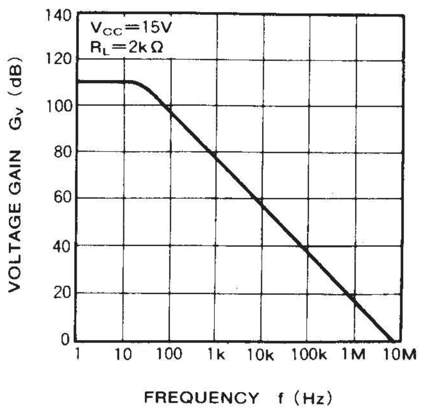
Symbol	Parameter	Test conditions	Limits Min.	Limits Typ.	Limits Max.	Unit
I_{CC}	Circuit current	V_{in}=0		3.0	6.0	mA
V_{IO}	Input offset voltage	$R_S \leq 10k\Omega$		0.5	6.0	mV
I_{IO}	Input offset current			5	200	nA
I_{IB}	Input bias current				500	nA
R_{in}	Input resistance		0.3	5		MΩ
G_{VO}	Open loop voltage gain	$R_L \geq 2k\Omega$, V_O=±10V	86	110		dB
V_{OM}	Maximum output voltage	$R_L \geq 10k\Omega$	±12	±14		V
		$R_L \geq 2k\Omega$	±10	±13		
V_{CM}	Common input voltage range		±12	±14		V
CMRR	Common mode rejection ratio	$R_S \leq 10k\Omega$	70	90		dB
SVRR	Sypply voltage	$R_S \leq 10k\Omega$		30	150	μV/V
P_d	Power dissipation			90	180	mW
SR	Slew rate	G_V=0dB, R_L=2kΩ		3.0		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

TERMAL DERATING (MAXIMUM RATING)



VOLTAGE GAIN VS. FREQUENCY RESPONSE



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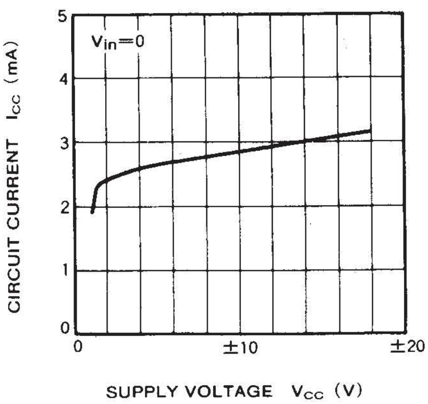
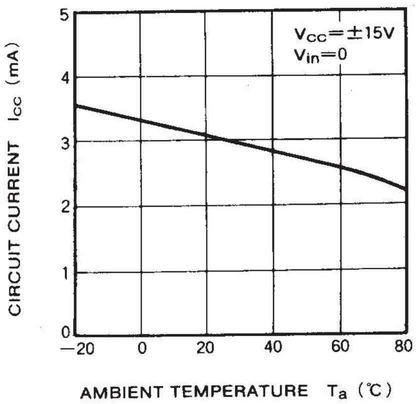
DUAL LOW-NOISE OPERATIONAL AMPLIFIERS (DUAL POWER SUPPLY TYPE)

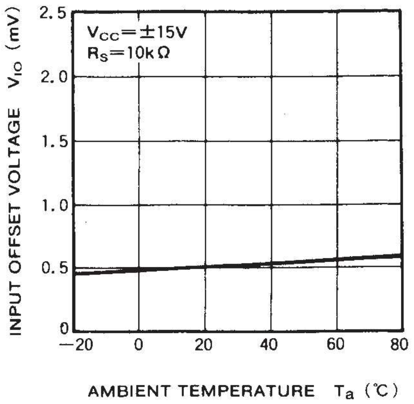
CIRCUIT CURRENT VS. SUPPLY VOLTAGE



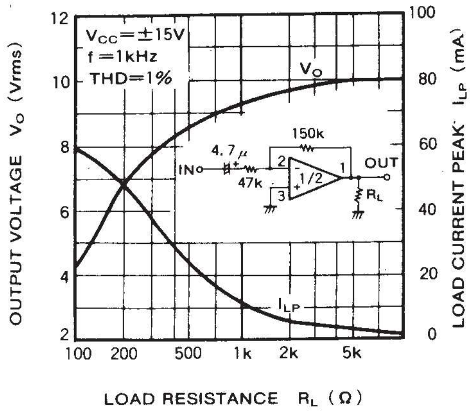
CIRCUIT CURRENT VS. AMBIENT TEMPERATURE



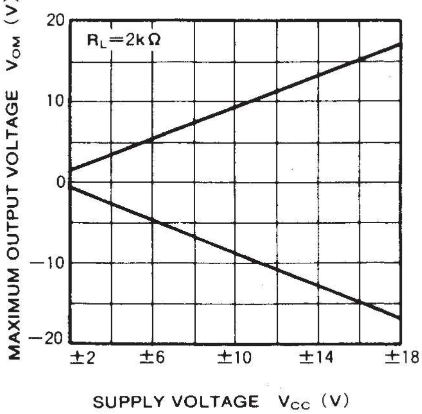
INPUT OFFSET VOLTAGE VS. AMBIENT TEMPERATURE



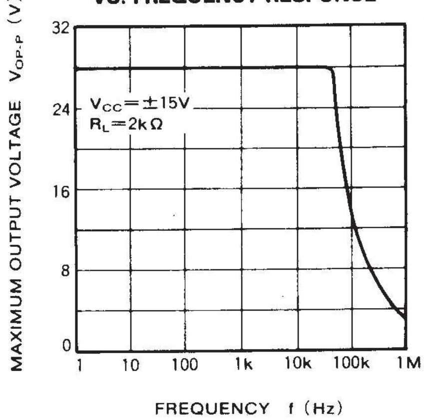
OUTPUT VOLTAGE / LOAD CURRENT PEAK VS. LOAD RESISTANCE



MAXIMUM OUTPUT VOLTAGE VS. SUPPLY VOLTAGE

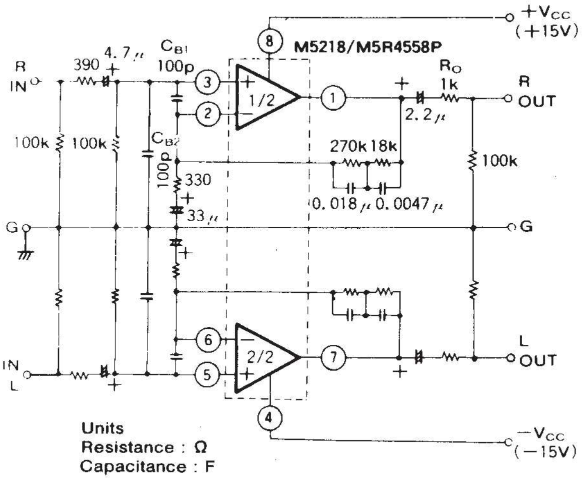


MAXIMUM OUTPUT VOLTAGE VS. FREQUENCY RESPONSE



APPLICATION EXAMPLES

(1) Stereo Equalizer amplifier circuit

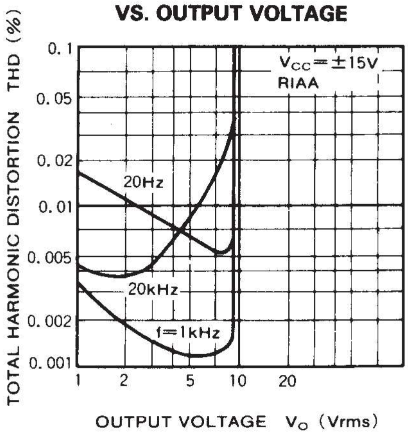


Left channel circuit constants are identical to those of right channel.
C_{B1}, C_{B2} : Capacitors for buzz prevention, use if required.
R_O : Resistor used to prevent parasitic oscillation for capacitive loads and current limiting with shorted and other abnormal load conditions.

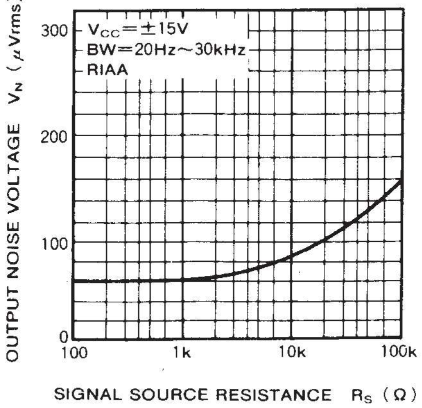
TYPICAL CHARACTERISTICS (V_{CC}=±15V, RIAA)

- G_V=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=3Vrms)

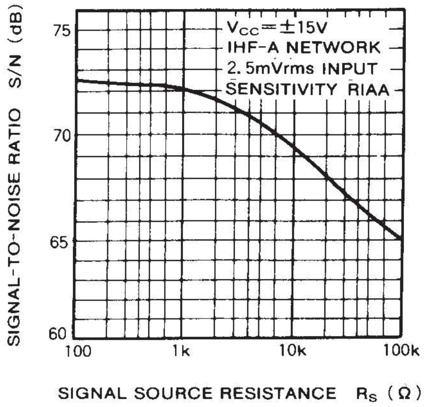
TOTAL HARMONIC DISTORTION VS. OUTPUT VOLTAGE



OUTPUT NOISE VOLTAGE VS. SIGNAL SOURCE RESISTANCE



SIGNAL-TO-NOISE RATIO VS. SIGNAL SOURCE RESISTANCE



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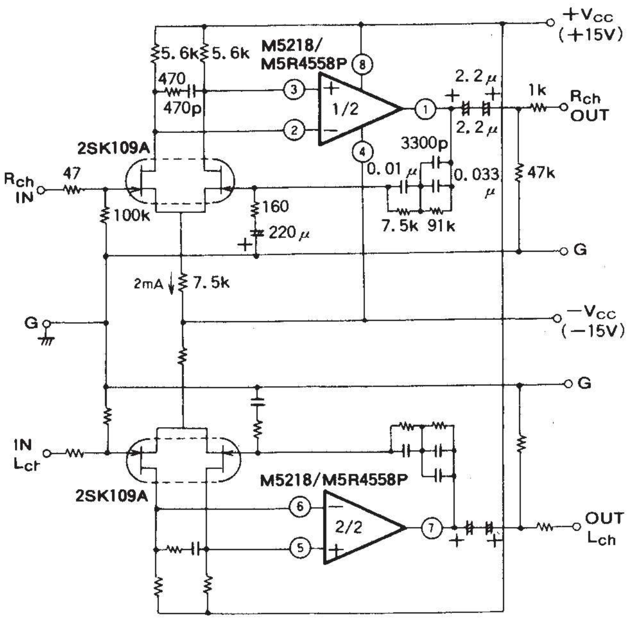
(2) High S / N stereo DC ICL equalizer



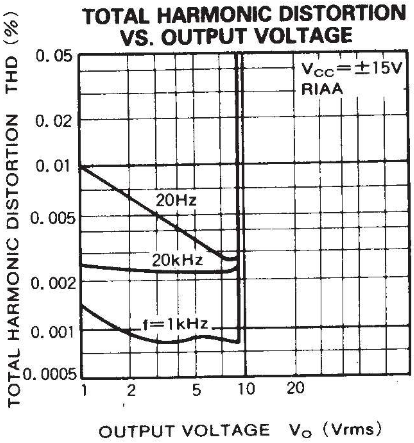
Units Resistance : Ω
Capacitance : F

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

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

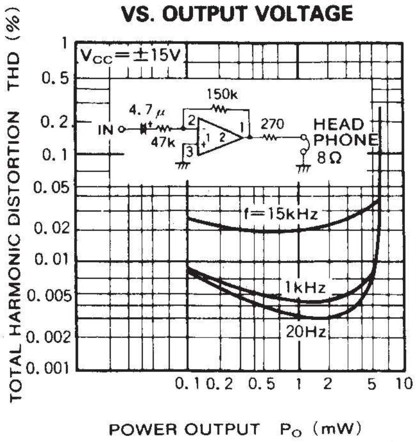
- Signal-to-noise=72.5dB (IHF-A network, shorted input, 2.5mVrms input sensitivity)
- V_{NI}=0.77μVrms(R_S=5.1kΩ, BW=5Hz~100kHz)
- G_V=35.6dB(f=1kHz)

TOTAL HARMONIC DISTORTION VS. OUTPUT VOLTAGE



(3) Headphone amplifier

TOTAL HARMONIC DISTORTION VS. OUTPUT VOLTAGE



(Output resistance R_O is made the parameter) POWER OUTPUT / POWER DISSIPATION VS. SUPPLY VOLTAGE