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}\geqq$4V($\pm$2V)
- High load current, high power dissipation
  ..... I_{LP}=$\pm$50mA, P_d=800mW(SIP)
  P_d=625mW(DIP), P_d=440mW(FP)

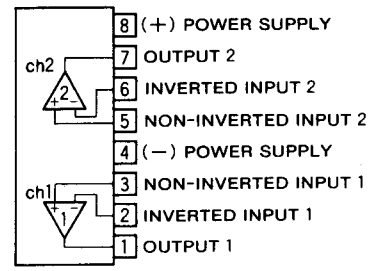
APPLICATION

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

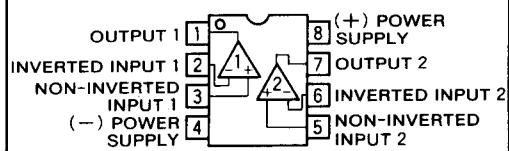
RECOMMENDED OPERATING CONDITINONS

Supply voltage range ..... $\pm$2~$\pm$16V
Rated supply voltage ..... $\pm$15V

PIN CONFIGURATION (TOP VIEW)

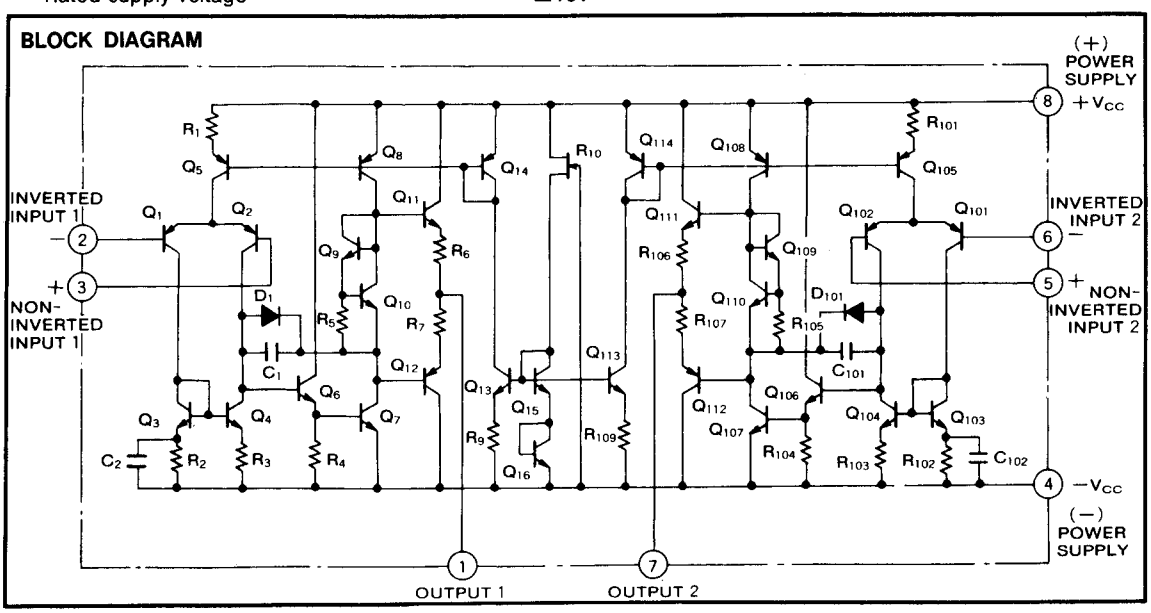


Outline 8P5 (AL)



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

BLOCK DIAGRAM



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

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

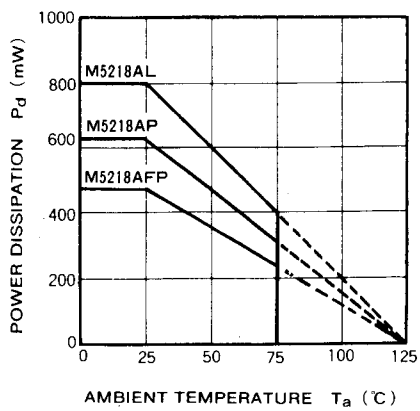
Symbol	Parameter	Conditions	Ratings	Unit
V_{CC}	Supply voltage		±18	V
I_{LP}	Load current		±50	mA
V_{id}	Differential input voltage		±30	V
V_{ic}	Common input voltage		±15	V
P_d	Power dissipation		800(SIP)/625(DIP)/440(FP)	mW
K_θ	Thermal dirating	$T_a \geqq 25$℃	8(SIP)/6.25(DIP)/4.4(FP)	mW/℃
T_{opr}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

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

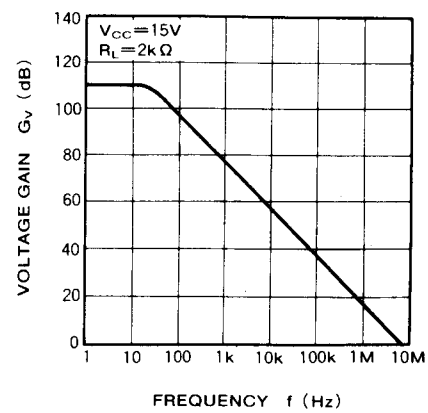
Symbol	Parameter	Test conditions	Limits			Unit
			Min.	Typ.	Max.	
I_{CC}	Circuit current	V_{in}=0		3.0	6.0	mA
V_{IO}	Input offset voltage	$R_S \leqq 10k\Omega$		0.5	6.0	mV
I_{IO}	Input offset current			5	200	nA
I_{IB}	Input bias current				500	nA
R_{in}	Input resistance		0.3	5		MΩ
G_{VO}	Open loop voltage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



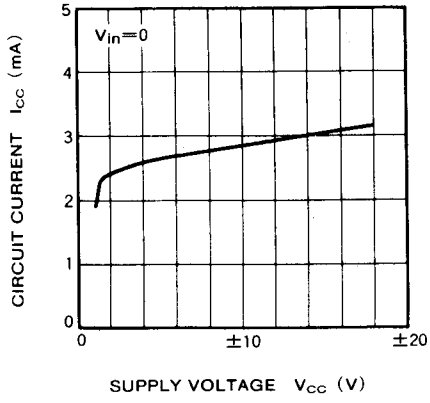
VOLTAGE GAIN VS. FREQUENCY RESPONSE



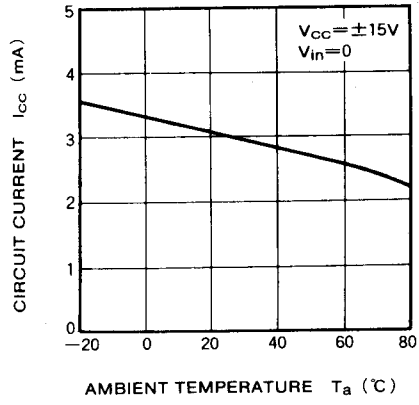
MITSUBISHI ELECTRIC

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

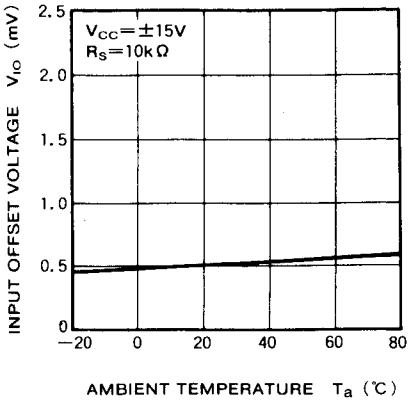
CIRCUIT CURRENT VS. SUPPLY VOLTAGE



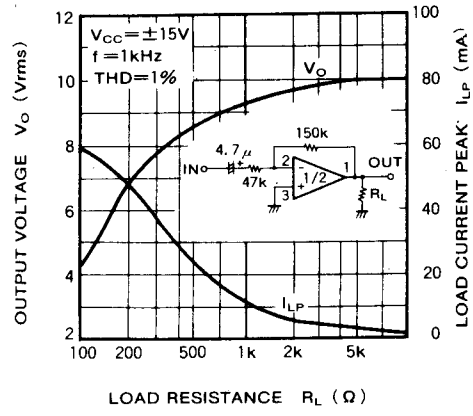
CIRCUIT CURRENT VS. AMBIENT TEMPERATURE



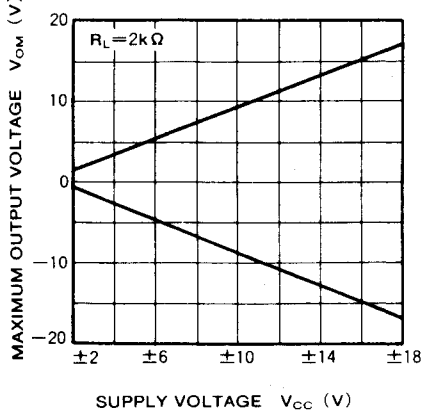
INPUT OFFSET VOLTAGE VS. AMBIENT TEMPERATURE



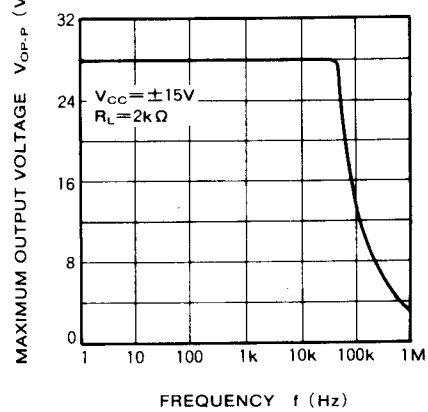
OUTPUT VOI TAGE / LOAD CURRENT PEAK VS. LOAD RESISTANCE



MAXIMUM OUTPUT VOLTAGE VS. SUPPLY VOLTAGE



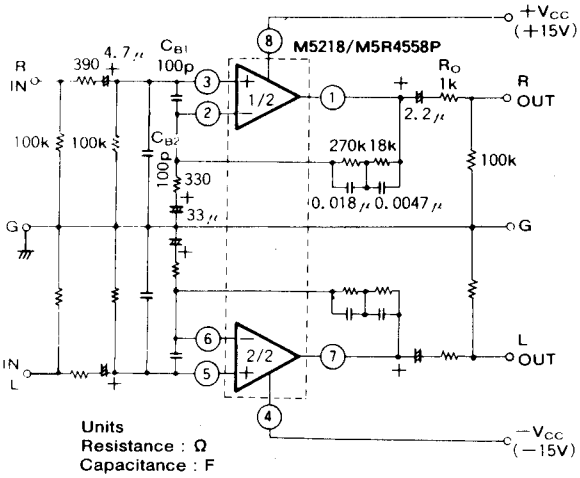
MAXIMUM OUTPUT VOLTAGE VS. FREQUENCY RESPONSE



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

APPLICATION EXAMPLES

(1) Stereo Equalizer amplifier circuit

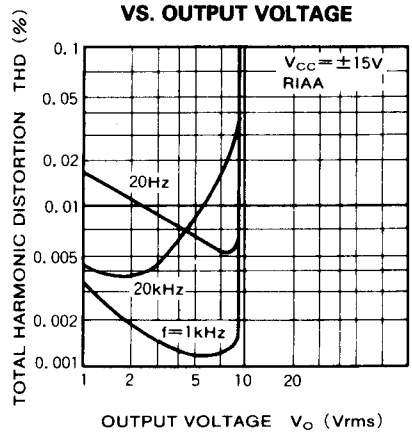


Left channel circuit constants are identical to those of right channel.
C_{B1}, C_{B2} : Capacitors for buzz prevention, use if required.
R_O : Resistor used to prevent parasitic oscillation for capacitive loads and current limiting with shorted and other abnormal load conditions.

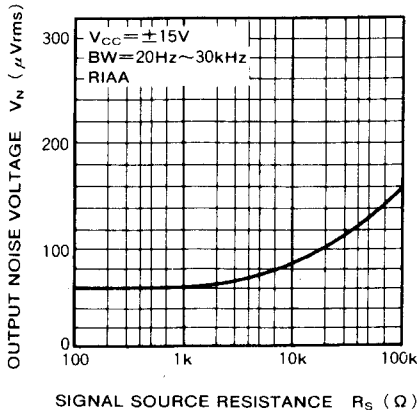
TYPICAL CHARACTERISTICS (V_{CC}=±15V, RIAA)

- 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)

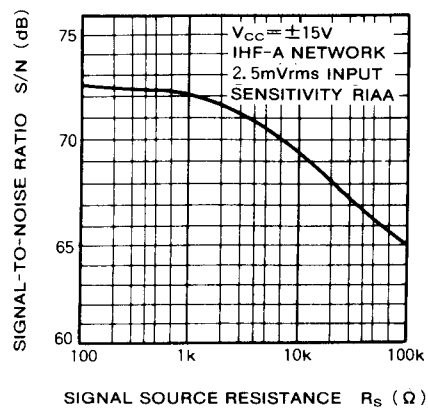
TOTAL HARMONIC DISTORTION VS. OUTPUT VOLTAGE



OUTPUT NOISE VOLTAGE VS. SIGNAL SOURCE RESISTANCE



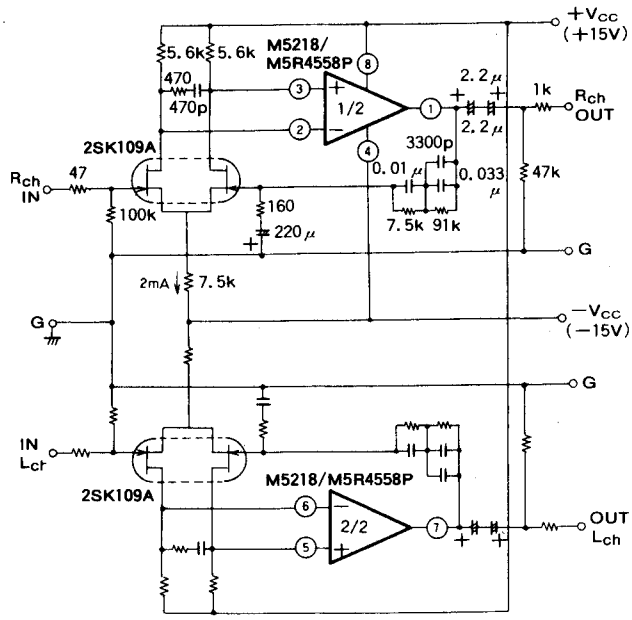
SIGNAL-TO-NOISE RATIO VS. SIGNAL SOURCE RESISTANCE



MITSUBISHI ELECTRIC

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

(2) High S / N stereo DC ICL equalizer

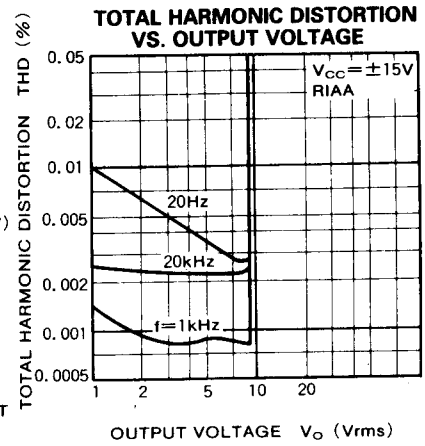


Left channel circuit constants are identical to those of right channel.

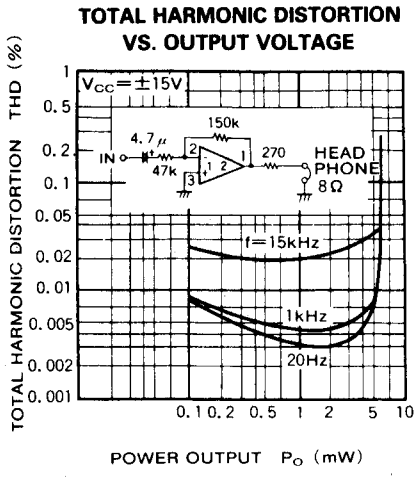
Units Resistance : Ω
Capacitance : F

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

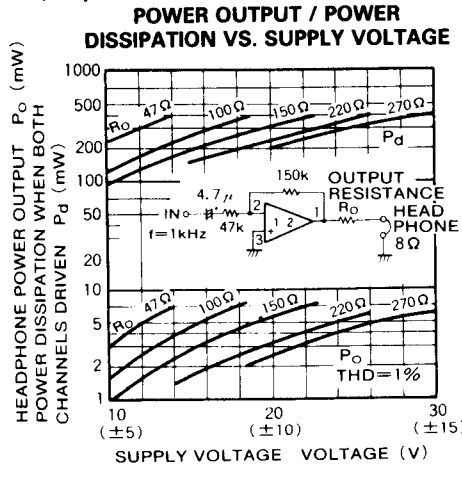
- Signal-to-noise=72.5dB (IHF-A network, shorted input, 2.5mVrms input sensitivity)
- V_{NI}=0.77μVrms(R_S=5.1kΩ, BW=5Hz~100kHz)
- G_V=35.6dB(f=1kHz)



(3) Headphone amplifier



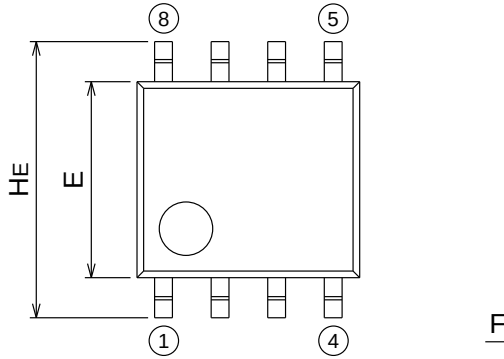
(Output resistance R_O is made the parameter)

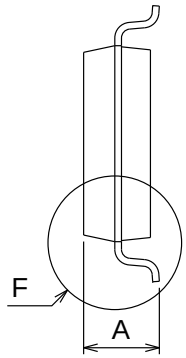


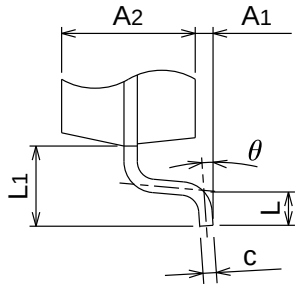
8P2S-A

Plastic 8pin 225mil SOP

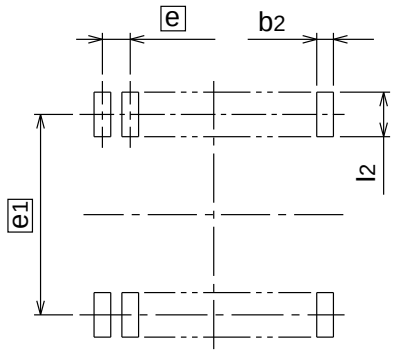
EIAJ Package Code	JEDEC Code	Weight(g)	Lead Material
SOP8-P-225-1.27	–	0.07	Cu Alloy







Detail F



Recommended Mount Pad

Symbol	Dimension in Millimeters		
	Min	Nom	Max
A	–	–	1.9
A1	0.05	–	–
A2	–	1.5	–
b	0.35	0.4	0.5
c	0.13	0.15	0.2
D	4.8	5.0	5.2
E	4.2	4.4	4.6
e	–	1.27	–
HE	5.9	6.2	6.5
L	0.2	0.4	0.6
L1	–	0.9	–
y	–	–	0.1
θ	0°	–	10°
b2	–	0.76	–
e1	–	5.72	–
l2	1.27	–	–