

M51523AL

DUAL ELECTRONIC VOLUME

DESCRIPTION

The M51523AL is an electronic volume control IC of dual channel configuration. The IC varies attenuation of the right and left channels and the balance between them. The M51523AL also has a built-in temperature-compensated reference voltage supply operating on a DC voltage, making the device useful as a control voltage source.

FEATURES

- High attenuation 92dB (typ)
(f = 1kHz, $V_i = 150\text{mV}$, IHF-A network)
- Low distortion ratio 0.015% (typ)
(f = 1kHz, $V_i = 150\text{mV}$, at maximum volume)
- Low noise 3.6 μVrms (typ)
(IHF-A network at minimum volume)
- Built-in stabilized power supply circuit makes device strong to fluctuations in supply voltage.
- Good temperature characteristics.
- Built-in balance circuit

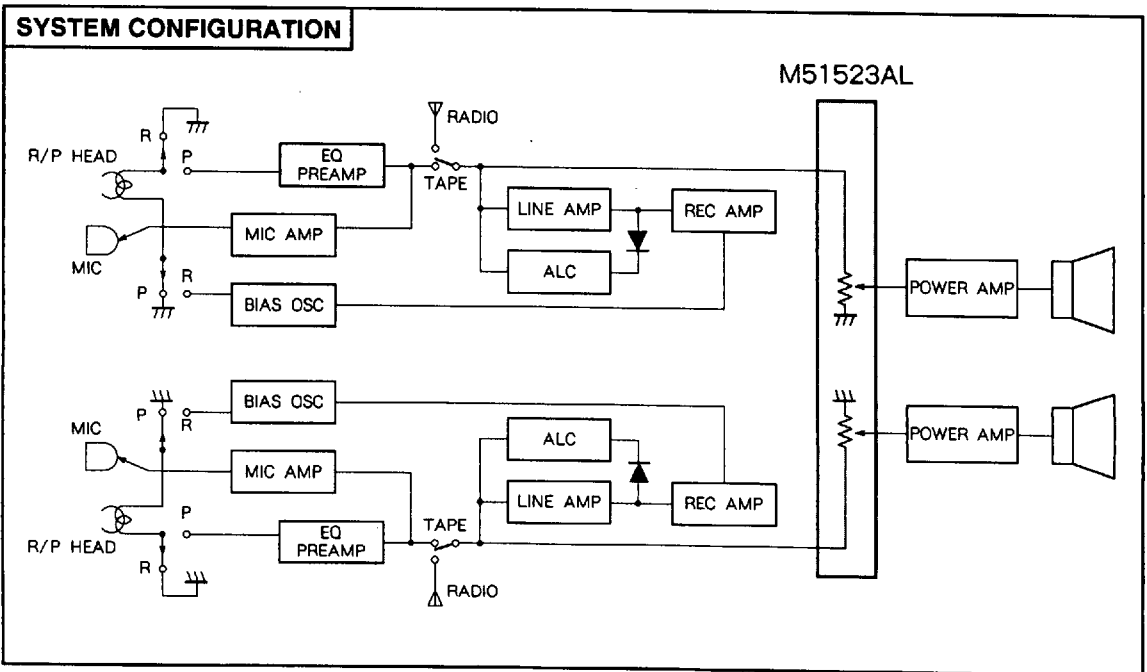


Outline 14P5A

1.27mm pitch 325mil ZIP
(2.8mm × 19.0mm × 6.3mm)

RECOMMENDED OPERATING CONDITIONS

Supply voltage range $V_{CC} = 8$ to 16V
Rated supply voltage 12V

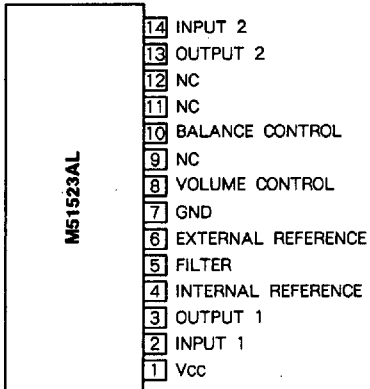


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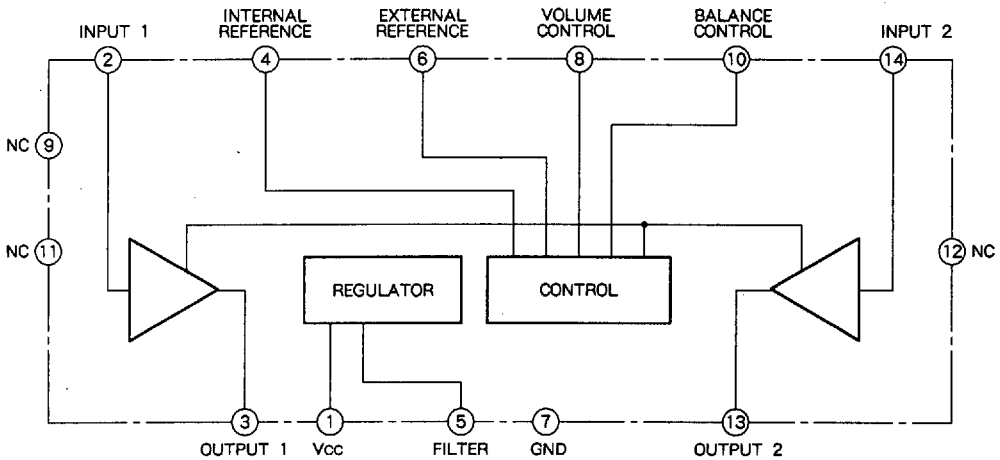
PIN CONFIGURATION (TOP VIEW)



Outline 14P5A

NC : NO CONNECTION

IC INTERNAL BLOCK DIAGRAM



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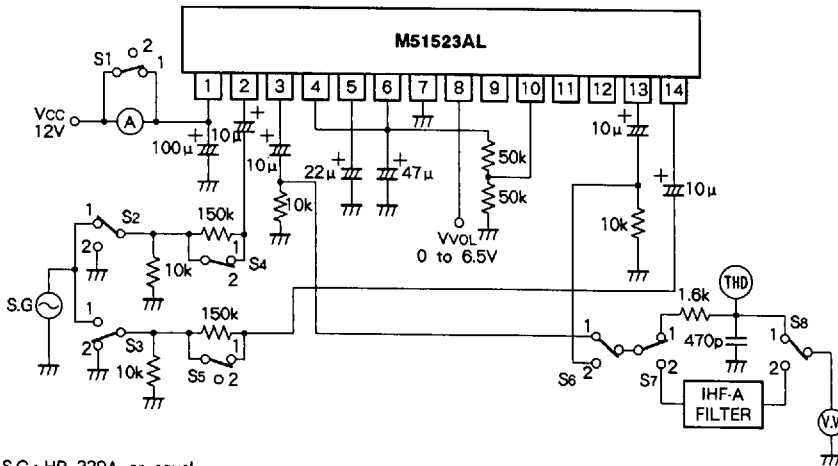
ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C, unless otherwise noted)

Symbol	Parameter	Conditions	Ratings	Unit
Vcc	Supply voltage	Quiescent	18	V
Icc	Circuit current		30	mA
Ps	Power dissipation		550	mW
Kθ	Thermal derating	Ta ≥ 25 °C	5.5	mW/°C
Topr	Operating temperature		-20 to +75	°C
Tstg	Storage temperature		-40 to +125	°C

ELECTRICAL CHARACTERISTICS (Ta = 25 °C, Vcc = 12V, f = 1kHz, unless otherwise noted)

Symbol	Parameter	Test conditions	Limits			Unit
			Min	Typ	Max	
Icco	Quiescent circuit current	VVOL = 0V, Vi = 0	7	12	20	mA
ATT	Attenuation level	VVOL = 0V, Vi = 150mVrms IHF-A network	83	92	-	dB
C.B	Channel balance	VVOL = 2.8V, Vi = 1Vrms	-3	0	3	dB
THD	Total harmonic distortion	VVOL = 6.5V, Vi = 150mVrms	-	0.015	0.1	%
Ri	Input resistance	VVOL = 6.5V, Vi = 1Vrms	50	150	-	k Ω
Vi(max)	Maximum input voltage	THD = 1%	1.0	1.5	-	Vrms
No	Output noise voltage	Vi = 0, IHF-A network	-	3.6	10	μ Vrms
No(r)	Residual output noise voltage	Vi = 150mVrms, IHF-A network	-	3.6	10	μ Vrms

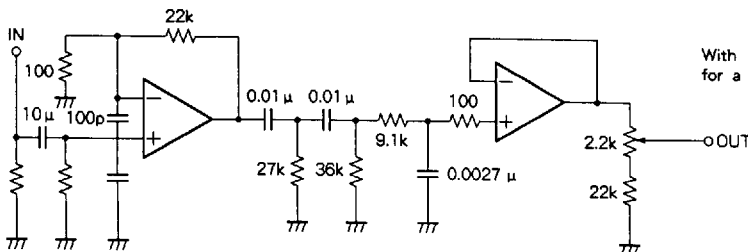
TEST CIRCUIT



- Note 1. S.G: HP 339A or equal
 THD: HP 339A or equal
 V.V: Kikusui Model 1635 or equal
 2. A low noise power supply (VCC,VEE) should be used (< 2μV).

Units Resistance : Ω
 Capacitance : F

- When the specified IHF-A filter is not used, see the following circuit for correct modifications. Note that output is increased by a factor of 100X.



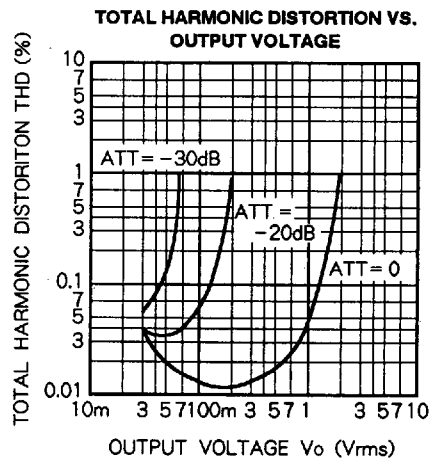
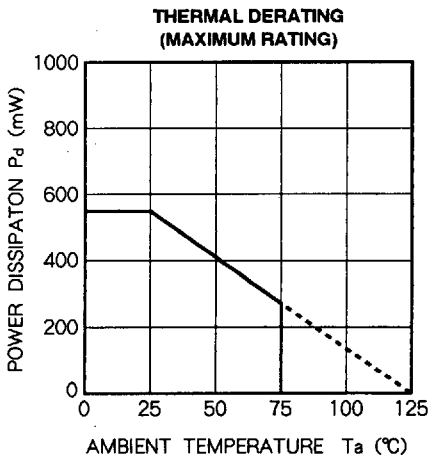
With 1kHz at input, adjust for a gain at output of 40dB.

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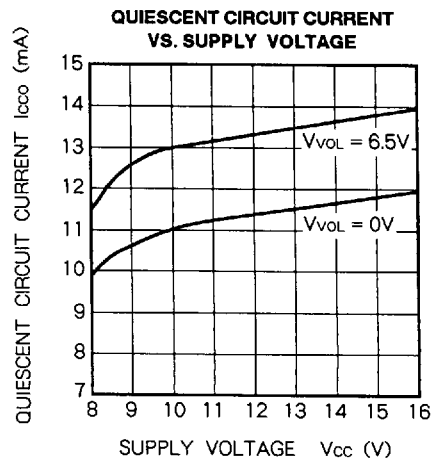
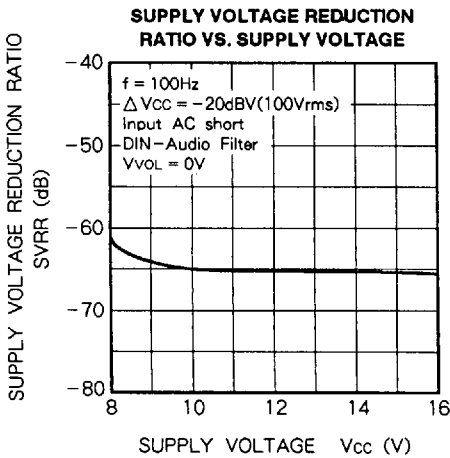
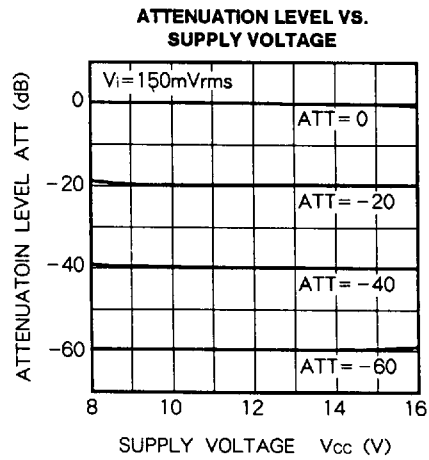
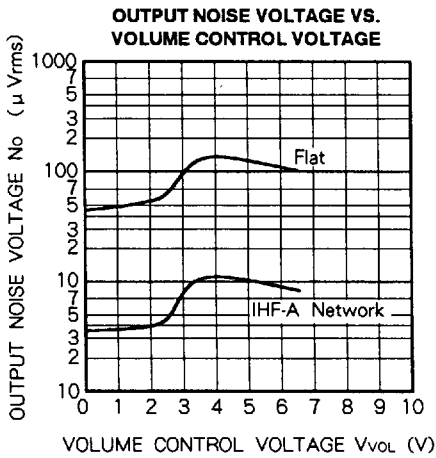
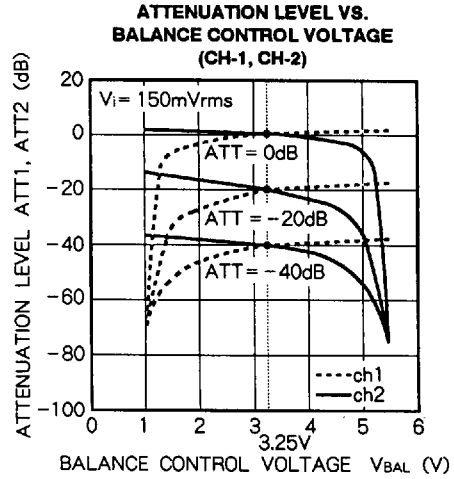
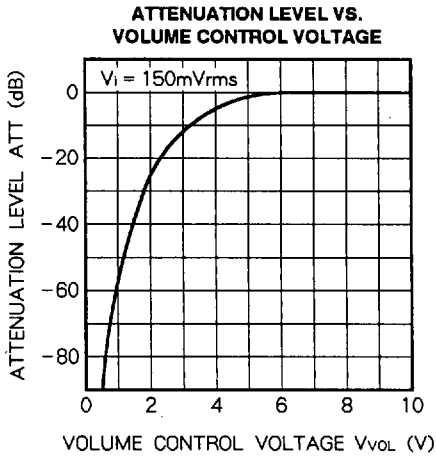
TEST METHODS (Ta = 25°C, Vcc = 12V, f = 1kHz, unless otherwise noted)

Symbol	Switch condition								Method
	S1	S2	S3	S4	S5	S6	S7	S8	
Icco	2	2	2	1	1	-	1	1	Measure with ammeter.
ATT	1	1	1	1	1	1 2	1	1	Varying Vvol from 0 to 6.5V, calculate using ATT = 20 log(Vo/Vi)(dB)
C.B	1	1	1	1	1	1 2	1	1	Channel balance at 2.8V volume level
THD	1	1	1	1	1	1 2	1	1	At f = 1kHz, Vo = 1Vrms, and maximum volume, measure with distortion meter.
Ri	1	1	1	1→2 1	1 1→2	1 2	1	1	Measure output when S4 = 1 as Vo1, when S4 = 2 as Vo2 calculate using Ri = 150/(Vo1/Vo2 - 1)(kΩ)
Vi(max)	1	1	1	1	1	1 2	1	1	At f = 1kHz, the input voltage when the output distortion rates 1% at maximum volume.
No	1	2	2	1	1	1 2	2	2	Minimum volume level, Ro = 10kΩ, IHFA filter
No(r)	1	1	1	1	1	1 2	2	2	Minimum volume level, Ro = 10kΩ, IHFA filter

TYPICAL CHARACTERISTICS



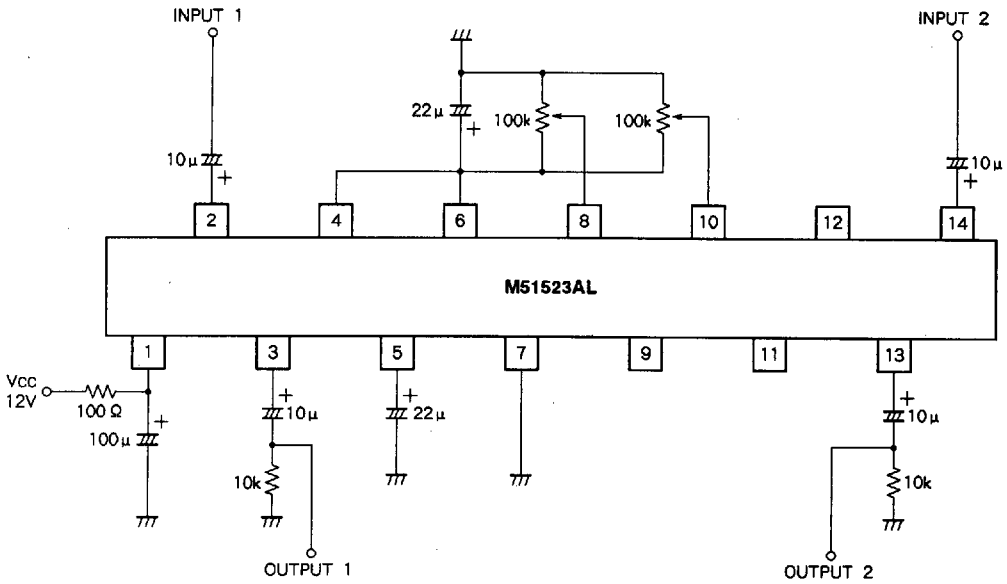
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APPLICATION EXAMPLE



Units Resistance : Ω
Capacitance : F