

DUAL AF PREAMPLIFIER

DESCRIPTION

The M51522AL is a semiconductor integrated circuit designed for use in car stereo and car component systems. The circuits include a dual channel preamplifier, with both amplifiers featuring high gain and low noise and distortion.

A recently developed fabrication technique has been employed in this device resulting in extremely low noise output overall, and reducing 1/f noise in particular.

FEATURES

- Low noise (extremely low 1/f noise) $N_o = 0.18\text{mVrms (typ)}$
- High open-loop voltage gain 83dB (typ)
- Low distortion $0.04\% \text{ (typ)}$
- Good channel separation.
- SEPP circuit used for high immunity to fluctuations in the load.
- Built-in charging circuit for fast rise time at power ON.

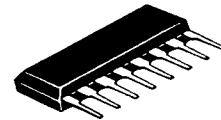
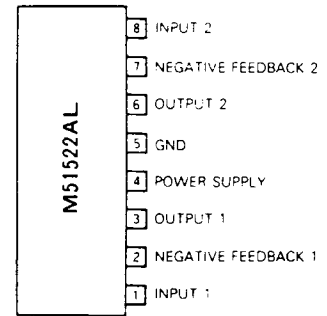
APPLICATIONS

Car stereos, car modular component stereo systems, radio cassette recorders, stereo sets, etc.

RECOMMENDED OPERATING CONDITIONS

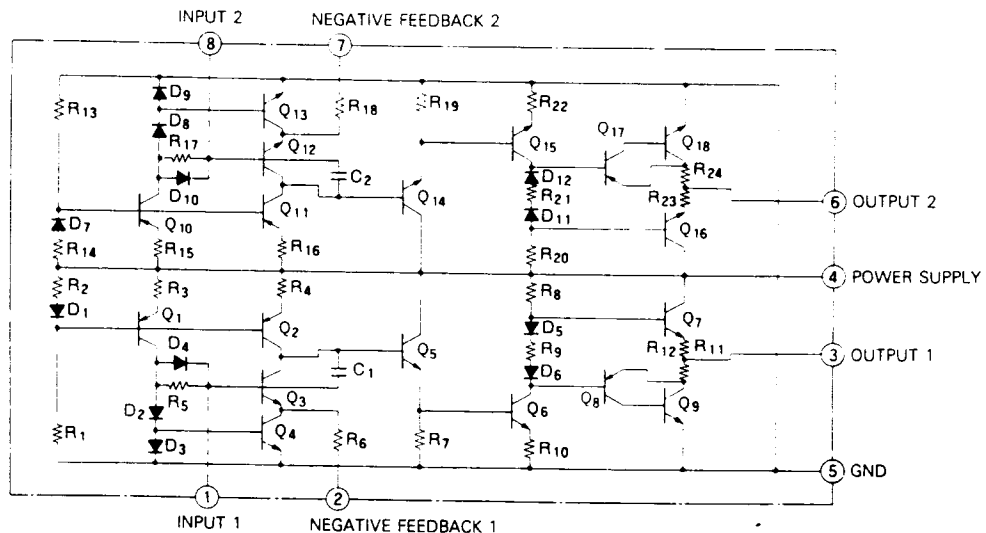
Supply voltage range $6 \sim 16\text{V}$
 Rated supply voltage 13.2V

PIN CONFIGURATION (TOP VIEW)



8-pin molded plastic SIL

EQUIVALENT CIRCUIT



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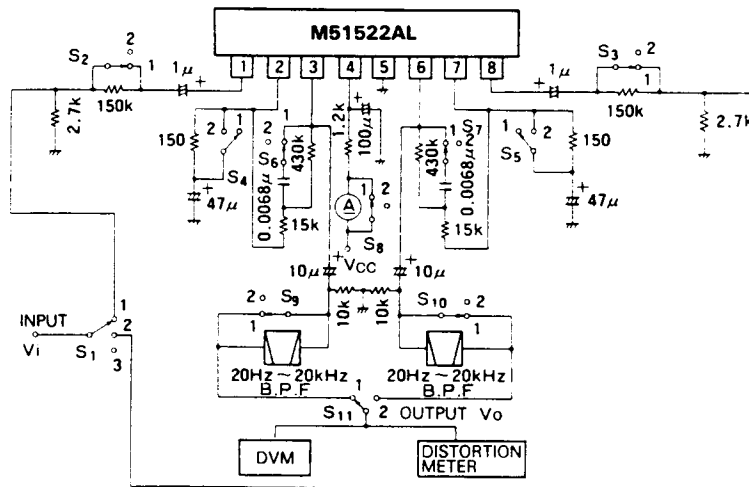
ABSOLUTE MAXIMUM RATINGS (T_a = 25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
V _{CC}	Supply voltage		18	V
I _{CC}	Circuit Current		36	mA
P _d	Power dissipation		650	mW
K _θ	Thermal derating	T _a ≥ 25°C	6.5	mW/°C
T _{opr}	Operating temperature		-20 ~ +75	°C
T _{stg}	Storage temperature		-40 ~ +125	°C

ELECTRICAL CHARACTERISTICS (T_a = 25°C, V_{CC} = 13.2V unless otherwise noted)

Symbol	Parameter	Test conditions		Limits			Unit	
		V _{CC} (V)	f(kHz)	Min	Typ	Max		
I _{CCO}	Quiescent circuit current	13.2			4	7	mA	
G _{VO}	Open-loop voltage gain	13.2	1	V _O = 0.77V _{rms}	70	83	dB	
THD	Total harmonic distortion	13.2	1	V _O = 0.77V _{rms}	0.04	0.2	%	
G _{VC}	Closed-loop voltage gain	13.2	1	V _O = 0.77V _{rms}	43	45	47	dB
Z _{in}	Input impedance	13.2	1	V _O = 0.77V _{rms}	50	150	kΩ	
V _{om}	Maximum output voltage	13.2	1	THD = 1%	1.0	1.6	V _{rms}	
N _O	Output noise voltage	13.2		R _g = 2.7kΩ, B _w = 20Hz ~ 20kHz	0.18	0.36	mV _{rms}	

TEST CIRCUIT



UNIT: RESISTANCE: Ω
CAPACITANCE: F

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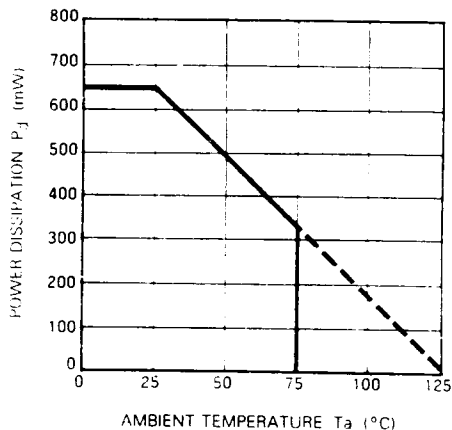
TEST METHODS

Symbol	S ₁	S ₂	S ₃	S ₄	S ₅	S ₆	S ₇	S ₈	S ₉	S ₁₀	S ₁₁	Method
I _{CC0}	3	1	1	1	1	1	1	2	1	1	1	Measure with ammeter.
G _{V01}	1	1	1	2	1	2	1	1	1	1	1	f = 1kHz, V _O = 0.77Vrms At f = 1kHz, V _O = 0.77Vrms, calculate using G _{V0} = 20 log V _O /V _i
G _{V02}	2	1	1	1	2	1	2	1	1	1	2	f = 1kHz, V _O = 0.77Vrms At f = 1kHz, V _O = 0.77Vrms, measure with distortion meter
THD ₁	1	1	1	1	1	1	1	1	1	1	1	f = 1kHz, THD = 1% ₀
THD ₂	2	1	1	1	1	1	1	1	1	1	2	Measure with DVM at f = 1kHz, THD = 1% ₀
G _{Vc1}	1	1	1	1	1	1	1	1	1	1	1	f = 1kHz, V _O = 0.77Vrms At f = 1kHz, V _O = 0.77Vrms, calculate using G _{Vc} = 20 log V _O /V _i
G _{Vc2}	2	1	1	1	1	1	1	1	1	1	2	f = 1kHz, V _O = 0.77Vrms Consider output as V _{O1} when S ₂ is 1, V _{O1} when S ₂ is 2. Consider output as V _{O2} when S ₃ is 1, V _{O1} when S ₃ is 2. Z _{in1} = 150V _{O1} / (V _{O1} - V _{O1}) kΩ Z _{in2} = 150V _{O2} / (V _{O2} - V _{O2}) kΩ
Z _{in1}	1	1→2	1	1	1	1	1	1	1	1	1	f = 1kHz, THD = 1% ₀
Z _{in2}	2	1	1→2	1	1	1	1	1	1	1	2	Measure with DVM at f = 1kHz, THD = 1% ₀
V _{Om1}	1	1	1	1	1	1	1	1	1	1	1	R _g = 2.7kΩ Bw = 20Hz ~ 20kHz
V _{Om2}	2	1	1	1	1	1	1	1	1	1	2	Measure with DVM at f = 1kHz, THD = 1% ₀
N _{O1}	3	1	1	1	1	1	1	1	2	1	1	R _g = 2.7kΩ Bw = 20Hz ~ 20kHz
N _{O2}	3	1	1	1	1	1	1	1	1	2	2	Measure with DVM at f = 1kHz, THD = 1% ₀

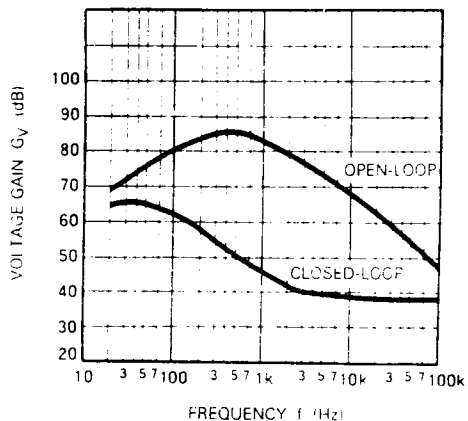
*1 Pin 3 output *2 Pin 6 output

TYPICAL CHARACTERISTICS (T_a = 25°C, V_{CC} = 13.2V unless otherwise noted)

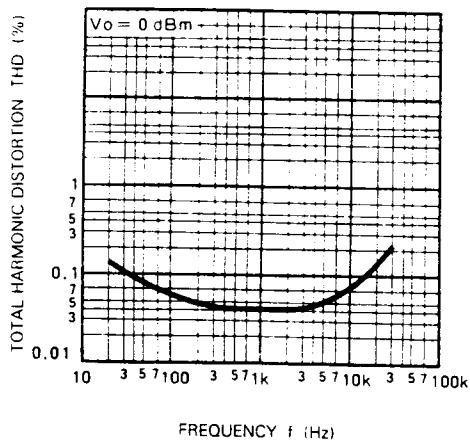
THERMAL DERATING (MAXIMUM RATING)



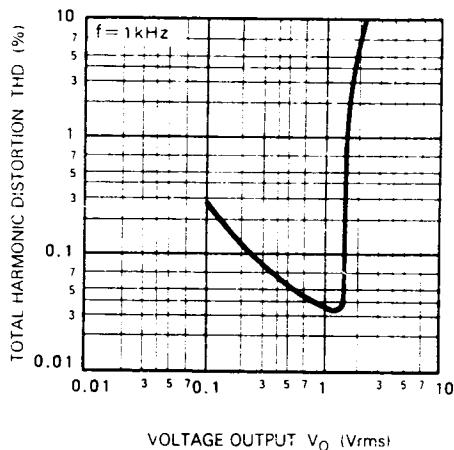
VOLTAGE GAIN VS FREQUENCY RESPONSE



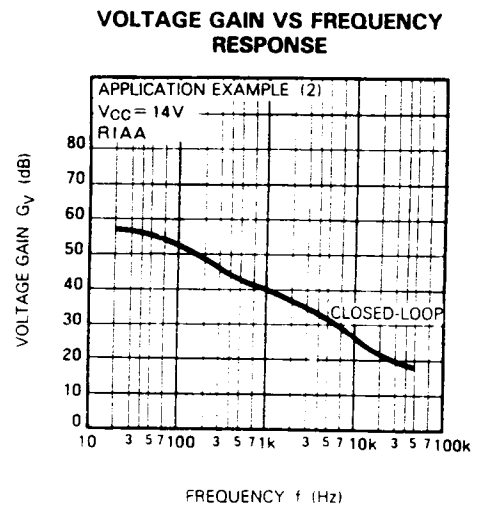
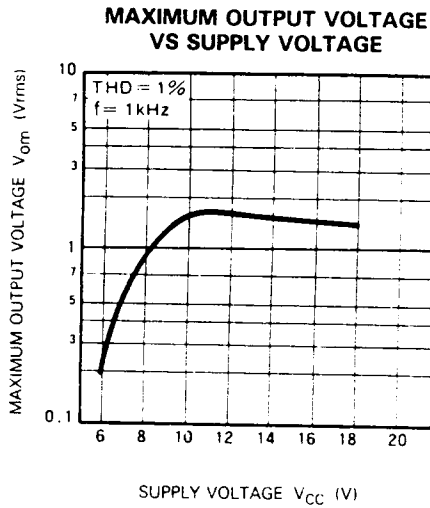
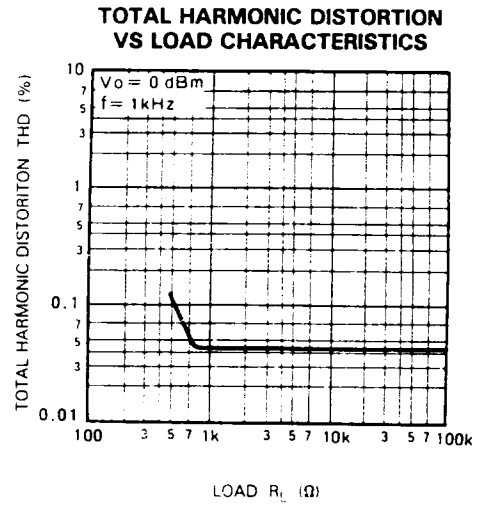
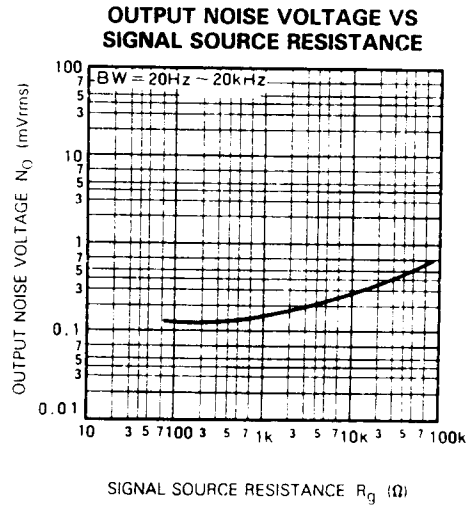
TOTAL HARMONIC DISTORTION VS FREQUENCY RESPONSE



TOTAL HARMONIC DISTORTION VS VOLTAGE OUTPUT

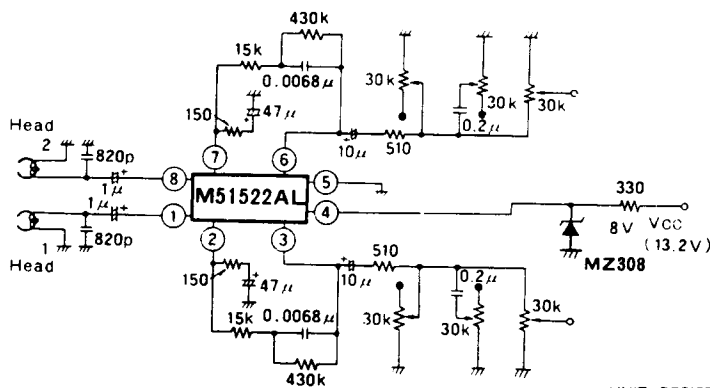


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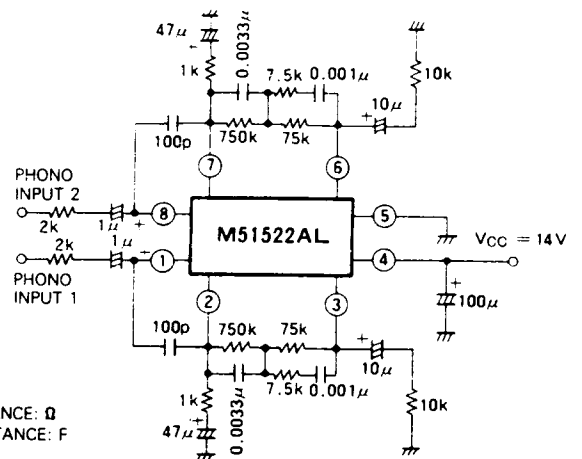


APPLICATION EXAMPLES

(1) Car stereo (tape playback unit)



(2) Stereo preamplifier (E; RIAA)



UNIT: RESISTANCE: Ω
CAPACITANCE: F