M51522AL

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 = 0.18mVrms (typ)
- High open-loop voltage gain ..... 83dB (typ)
- Low distortion ..... 0.04% (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.

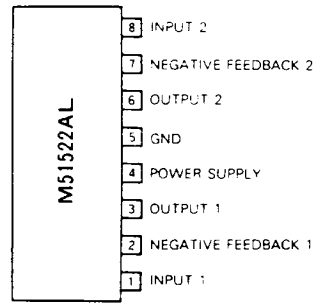
APPLICATIONS

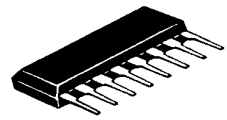
Car stereos, car modular component stereo systems, radio cassette recorders, stereo sets, etc.

RECOMMENDED OPERATING CONDITIONS

Supply voltage range ..... 6 ~ 16V
Rated supply voltage 13.2V

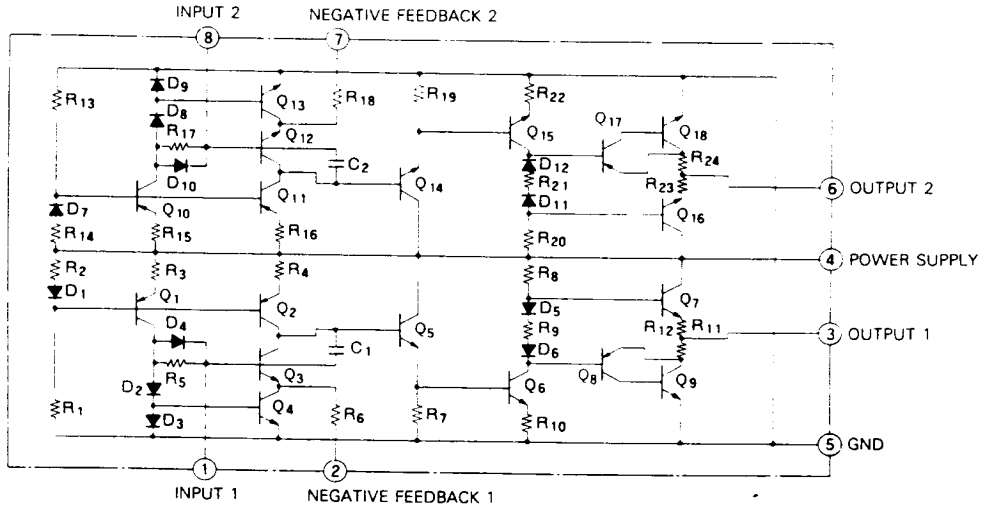
PIN CONFIGURATION (TOP VIEW)





8-pin molded plastic SIL

EQUIVALENT CIRCUIT



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DUAL AF PREAMPLIFIER

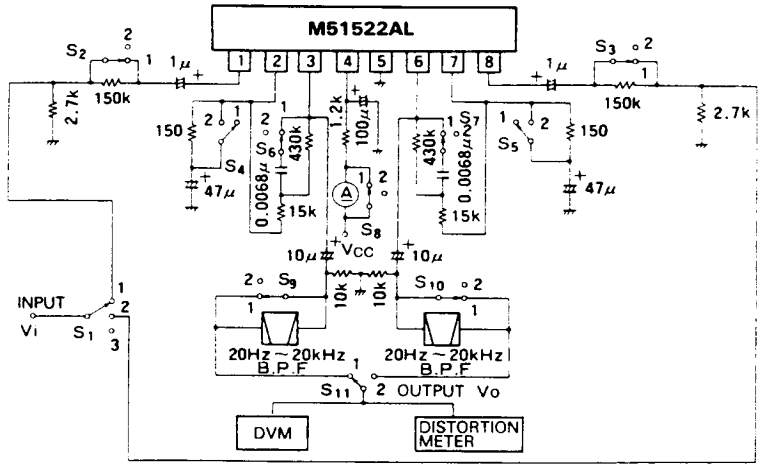
ABSOLUTE MAXIMUM RATINGS (Ta = 25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Limits	Unit
V_{CC}	Supply voltage		18	V
I_{CC}	Circuit Current		36	mA
Pd	Power dissipation		650	mW
K_θ	Thermal derating	Ta ≧ 25°C	6.5	mW/°C
Topr	Operating temperature		−20 ~ +75	°C
Tstg	Storage temperature		−40 ~ +125	°C

ELECTRICAL CHARACTERISTICS (Ta = 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=0.77Vrms	70	83		dB
THD	Total harmonic distortion	13.2	1	V_O=0.77Vrms		0.04	0.2	%
G_{VC}	Closed-loop voltage gain	13.2	1	V_O=0.77Vrms	43	45	47	dB
Zin	Input impedance	13.2	1	V_O=0.77Vrms	50	150		kΩ
Vom	Maximum output voltage	13.2	1	THD=1%	1.0	1.6		Vrms
No	Output noise voltage	13.2		Rg=2.7kΩ, Bw=20Hz ~ 20kHz		0.18	0.36	mVrms

TEST CIRCUIT



UNIT: RESISTANCE: Ω
CAPACITANCE: F

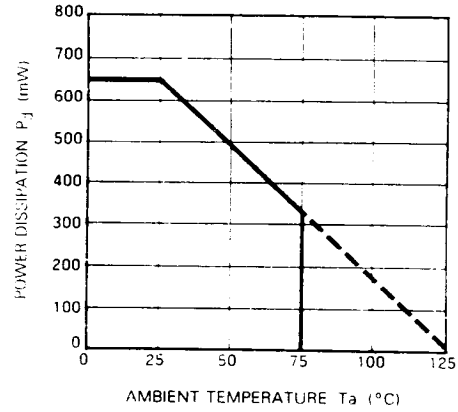
TEST METHODS

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_{CCO}	3	1	1	1	1	1	1	2	1	1	1	Measure with ammeter.
G_{VO1}	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_{VO} = 20 log V_O/V_I
G_{VO2}	2	1	1	1	2	1	2	1	1	1	2	
THD_1	1	1	1	1	1	1	1	1	1	1	1	f = 1kHz, V_O = 0.77Vrms
THD_2	2	1	1	1	1	1	1	1	1	1	2	At f = 1kHz, V_O = 0.77Vrms, measure with distortion meter
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	
Z_{in1}	1	1→2	1	1	1	1	1	1	1	1	1	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_{O2}' when S_3 is 2 Z_{in1} = 150V_{O1}' / (V_{O1} − V_{O1}') kΩ, Z_{in2} = 150V_{O2}' / (V_{O2} − V_{O2}') kΩ
Z_{in2}	2	1	1→2	1	1	1	1	1	1	1	2	
V_{om1}	1	1	1	1	1	1	1	1	1	1	1	f = 1kHz, THD = 1%①
V_{om2}	2	1	1	1	1	1	1	1	1	1	2	Measure with DVM at f = 1kHz, THD = 1%
N_{O1}	3	1	1	1	1	1	1	1	2	1	1	Rg = 2.7kΩ Bw = 20Hz ~ 20kHz
N_{O2}	3	1	1	1	1	1	1	1	1	2	2	Measure with DVM at Rg = 2.7kΩ, Bw = 20Hz ~ 20kHz.

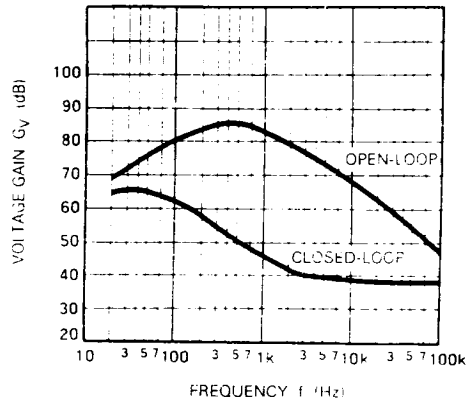
•1 Pin 3 output •2 Pin 6 output

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

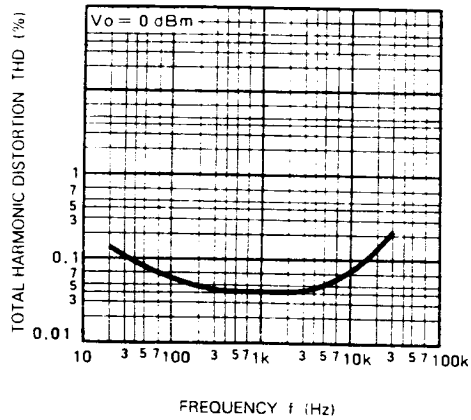
THERMAL DERATING (MAXIMUM RATING)



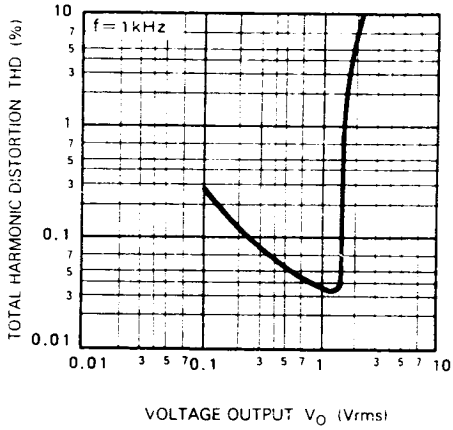
VOLTAGE GAIN VS FREQUENCY RESPONSE



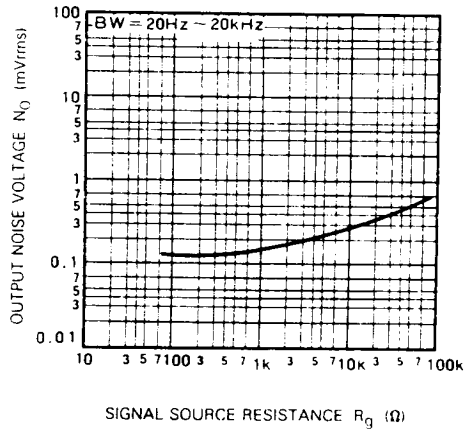
TOTAL HARMONIC DISTORTION VS FREQUENCY RESPONSE



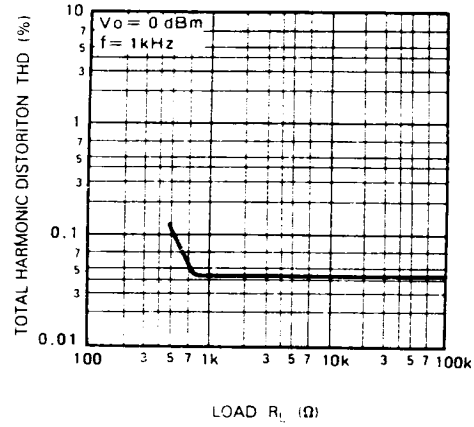
TOTAL HARMONIC DISTORTION VS VOLTAGE OUTPUT



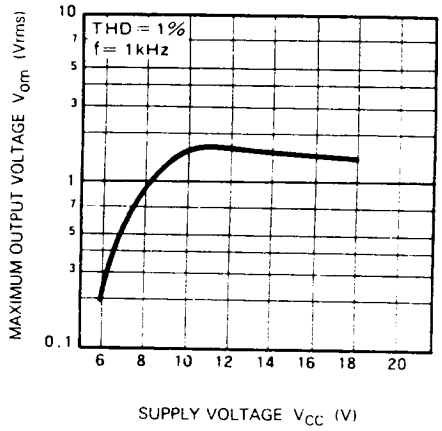
OUTPUT NOISE VOLTAGE VS SIGNAL SOURCE RESISTANCE



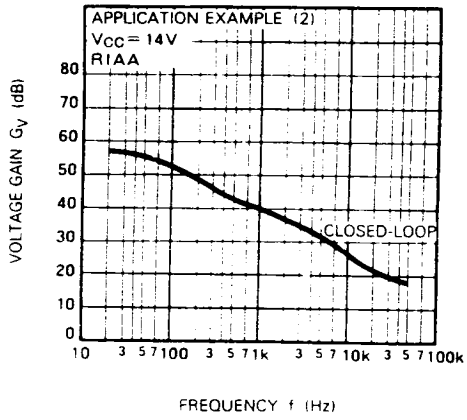
TOTAL HARMONIC DISTORTION VS LOAD CHARACTERISTICS



MAXIMUM OUTPUT VOLTAGE VS SUPPLY VOLTAGE

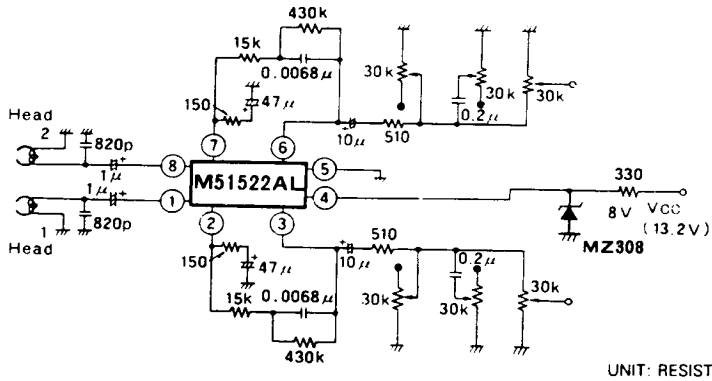


VOLTAGE GAIN VS FREQUENCY RESPONSE

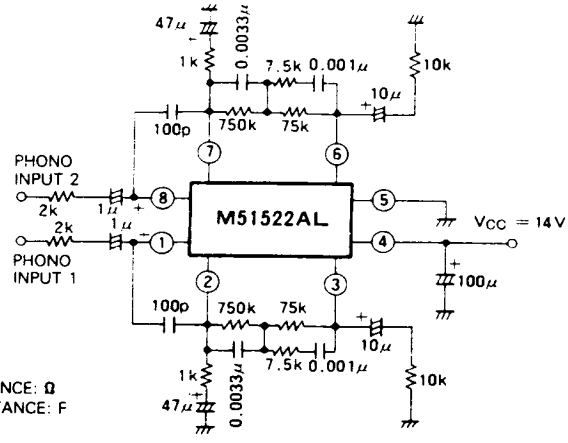


APPLICATION EXAMPLES

(1) Car stereo (tape playback unit)



(2) Stereo preamplifier (E; RIAA)



UNIT: RESISTANCE: Ω
CAPACITANCE: F