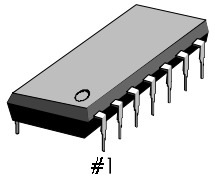
INTRODUCTION

The S1A2224A01 is a monolithic integrated circuit consisting of a dual equalizer amplifier with ALC, and it is suitable for stereo radio cassette-tape players.

14–DIP–300



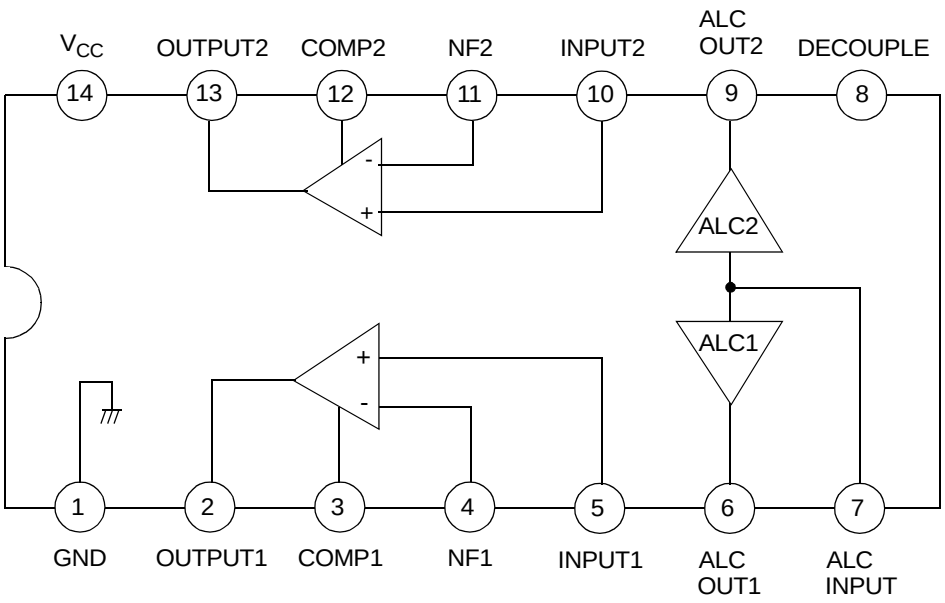
FEATURES

- Dual equalizer amplifier with a built-in ALC circuit
- Recording amp available because of high gain characteristics (Variable monitor possible)
- Good channel separation (sep = 50dB Typ)
- Quick stabilization after power on
- Capable of direct meter driving and ALC transistor
- Good ALC response balance between channels
- Wide operating supply voltage range: Vcc = 4V — 13V

ORDERING INFORMATION

Device	Package	Operating Temperature
S1A2224A01-D0B0	14–DIP–300	–20°C — +70°C

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS (Ta =25°C)

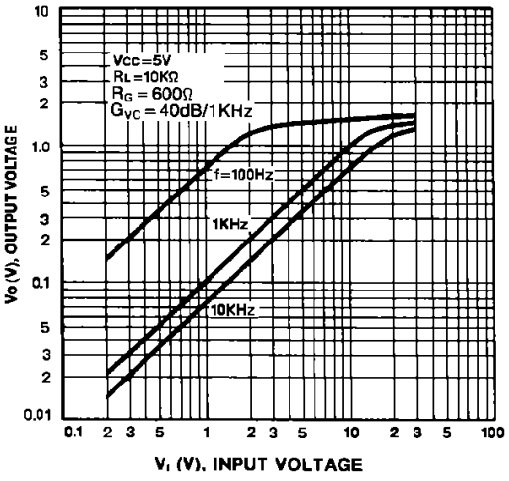
Characteristic	Symbol	Value	Unit
Supply Voltage	V_{CC}	14	V
Power Dissipation	P_D	600	mW
Operating Temperature	T_{OPR}	–20 — +70	°C
Storage Temperature	T_{STG}	–40 — +125	°C
ALC TR Maximum Current	–	3.5	mA

ELECTRICAL CHARACTERISTICS

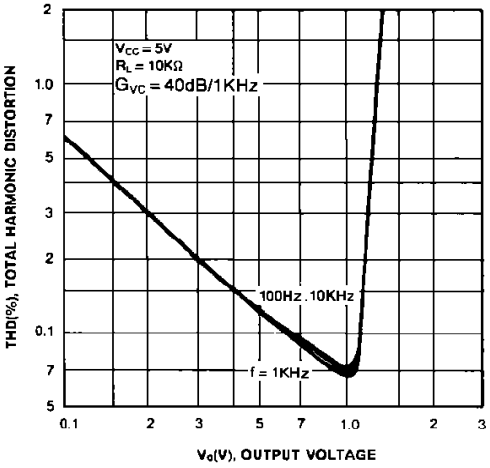
(Ta = 25°C, Vcc = 5V, R_L = 10kΩ, f = 1kHz: play, R_L = 680Ω: Recording)

Characteristic	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Quiescent Circuit Current	I_{CCQ}	V_I = 0	–	4.5	10	mA
Open Loop Voltage Gain	G_{VO}	–	–	85	–	dB
Closed Loop Voltage Gain	G_{VC1}	Play	–	40	–	dB
	G_{VC2}	Record	–	58	–	dB
Output Voltage	V_O	THD =1%, Play	0.9	1.2	–	V
Total Harmonic Distortion	THD	V_O = 0.5V, Play	–	0.1	1.0	%
Input Resistance	R_I	–	21	30	–	kΩ
Equivalent Input Noise Voltage	V_{NI}	BW (–3dB) = 20Hz – 20kHz	–	1.0	2.0	μV
Cross Talk	CT	R_G = 2.2kΩ	40	50	–	dB
ALC Range	V_{ALC}	V_I = –60dBm, Record	35	45	–	dB
ALC Balance	CB_{ALC}	V_I = –20dBm, Record	–	0	2.0	dB
ALC Distortion	THD_{ALC}	V_I = –20dBm, Record	–	0.5	2.0	%

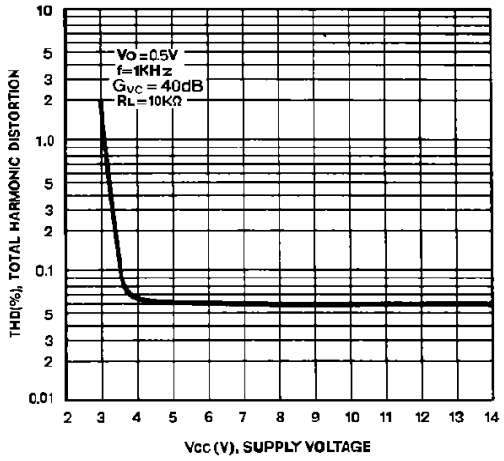
OUTPUT VOLTAGE-INPUT VOLTAGE



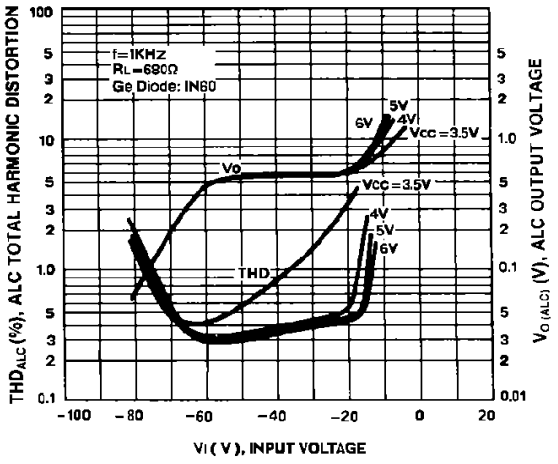
TOTAL HARMONIC DISTORTION-OUTPUT VOLTAGE



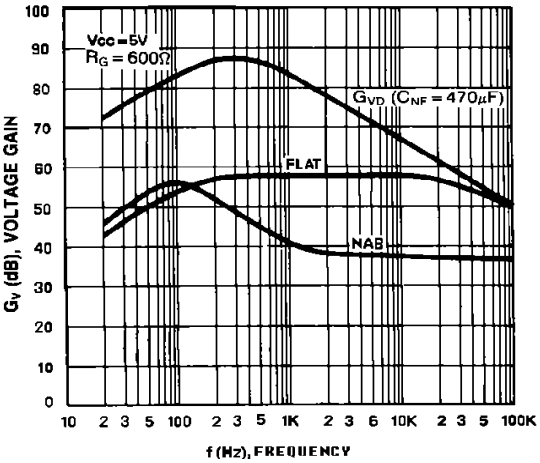
TOTAL HARMONIC DISTORTION-SUPPLY VOLTAGE



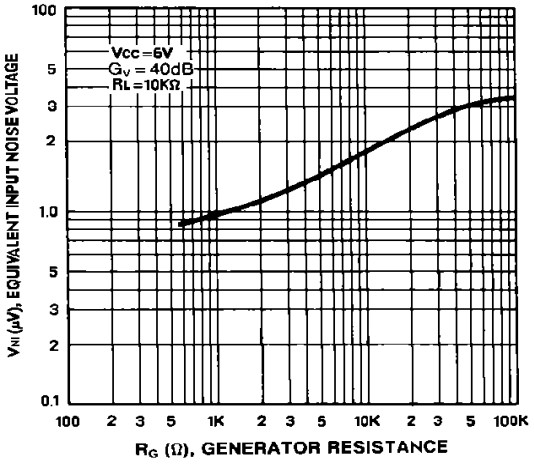
ALC OUTPUT VOLTAGE
ALC TOTAL HARMONIC DISTORTION — INPUT VOLTAGE



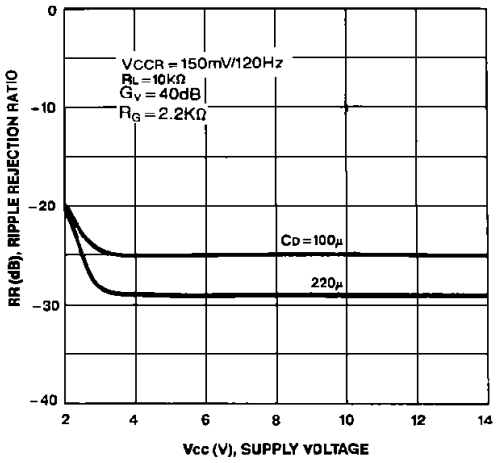
VOLTAGE GAIN-FREQUENCY



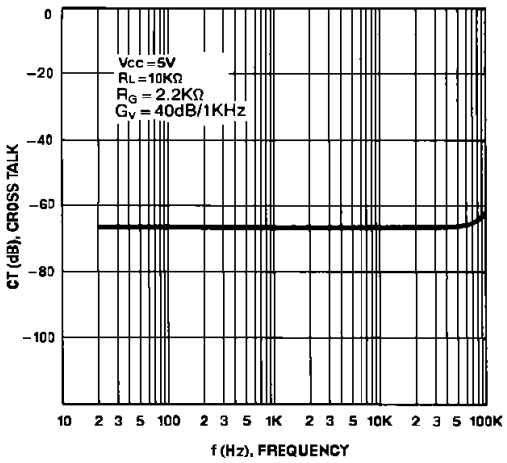
EQUIVALENT INPUT NOISE VOLTAGE -GENERATOR RESISTANCE



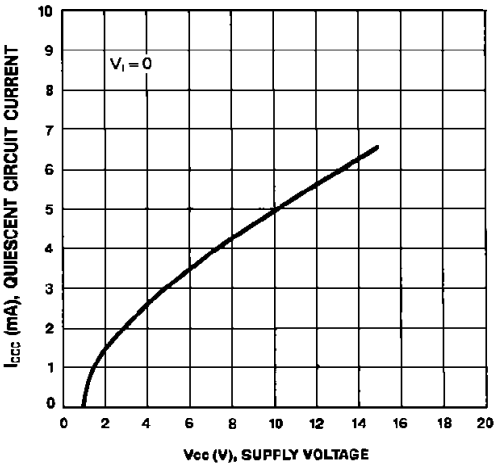
RIPPLE REJECTION RATIO-SUPPLY VOLTAGE



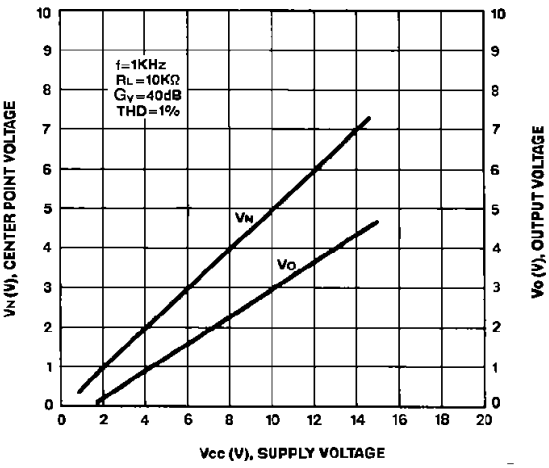
CROSS TALK-FREQUENCY



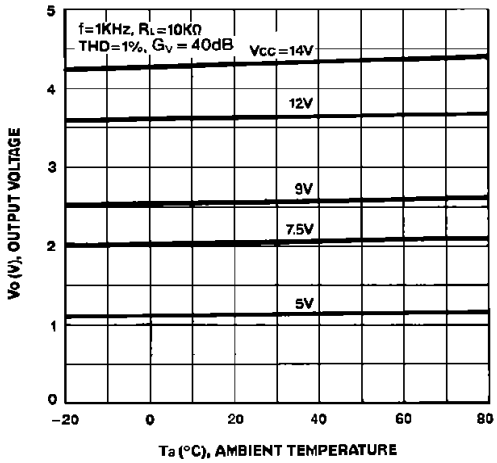
QUIESCENT CIRCUIT CURRENT-SUPPLY VOLTAGE



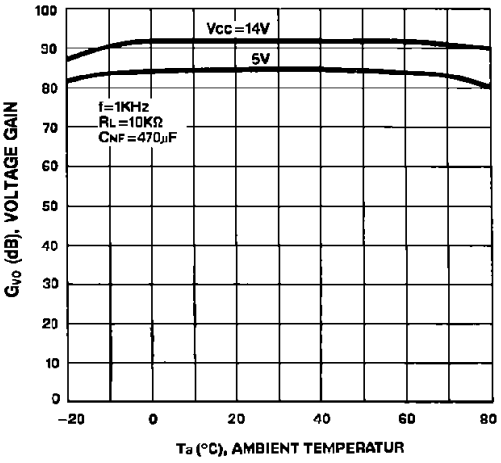
CENTER POINT VOLTAGE, OUTPUT VOLTAGE -SUPPLY VOLTAGE



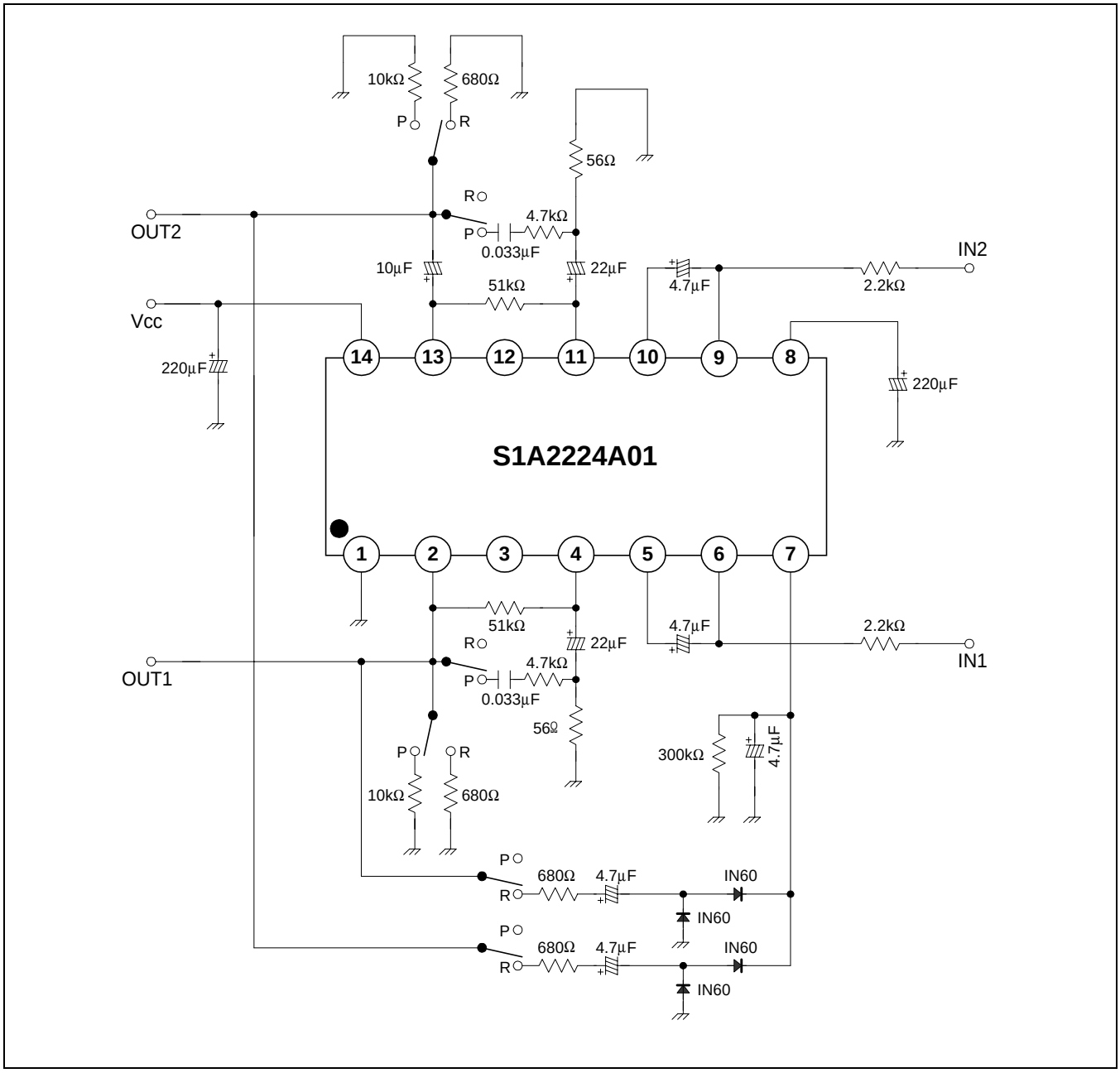
OUTPUT VOLTAGE-AMBIENT TEMPERATURE



VOLTAGE GAIN-AMBIENT TEMPERATURE

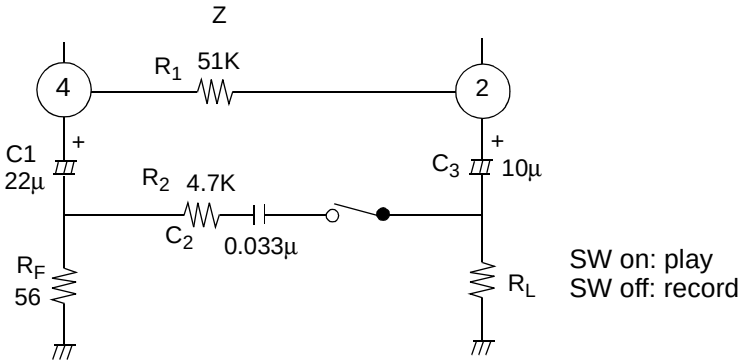


TEST CIRCUIT



APPLICATION INFORMATION

Closed Loop Voltage Gain



A. Playback amplifier

$$Gv = 20 \log \frac{Z}{R_F} \text{ (dB) at f =1 kHz, } G_V = 42 \text{ dB (Typ) } Z = R_1 // (R_2 + \frac{1}{2\pi f \bullet C_2})$$

B. Recording amplifier

$$Gv = 20 \log \frac{R1}{R_F} \text{ (dB) at f =1 kHz, } G_V = 58 \text{ dB (Typ)}$$

ALC Circuit

The ALC circuit consists of TR_1, TR_2 and some external components. The output level of the amplifier is recti-fied by external circuits. Since this DC level is applied to the ALC input terminal (Pin 7), the impedance between the collector and emitter of TR1 can change its value. Therefore, the pre-amplifier input level can be controlled.