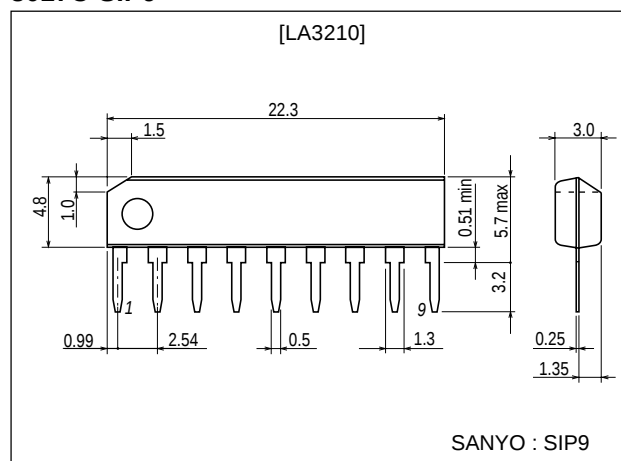


**LA3210****Equalizer Amplifier with ALC****Features**

- Low noise use.
- Wide automatic level control range.
- Good reduced voltage characteristics.

Package Dimensions

unit:mm

3017C-SIP9**Specifications****Absolute Maximum Ratings** at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Maximum Supply Voltage	V_{CC} max		15	V
Allowable Power Dissipation	P_d max		200	mW
Current Dissipation in Amplifier	I_{CC} max		3.0	mA
Allowable Current in ALC Transistor	I_6 max		3.5	mA
Operating Temperature	T_{opr}		-20 to $+80$	$^\circ\text{C}$
Storage Temperature	T_{stg}		-40 to $+125$	$^\circ\text{C}$

Operating Conditions at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Recommended Supply Voltage	V_{CC}		5	V
Recommended Load Resistance	R_L		5.1k	Ω

- Any and all SANYO products described or contained herein do not have specifications that can handle applications that require extremely high levels of reliability, such as life-support systems, aircraft's control systems, or other applications whose failure can be reasonably expected to result in serious physical and/or material damage. Consult with your SANYO representative nearest you before using any SANYO products described or contained herein in such applications.
- SANYO assumes no responsibility for equipment failures that result from using products at values that exceed, even momentarily, rated values (such as maximum ratings, operating condition ranges, or other parameters) listed in products specifications of any and all SANYO products described or contained herein.

SANYO Electric Co.,Ltd. Semiconductor Company

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

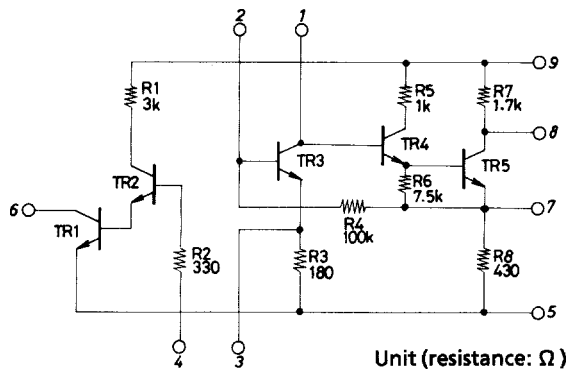
10700TH (KT)/31093TS/O137KI/4015KI/OD03KI, TS No.405-1/6

LA3210

Operating Characteristics at $T_a = 25^\circ\text{C}$, $V_{CC}=5\text{V}$, $R_L=5.1\text{k}\Omega$, $R_g=600\Omega$, $f=1\text{kHz}$, See specified Test Circuit.

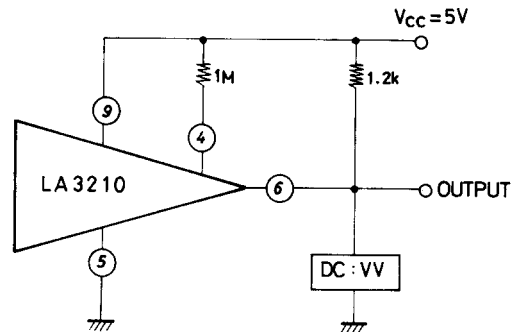
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Current Dissipation	I_{CC}	$V_i=0$, ALC off		1.4	2.0	mA
Voltage Gain	V_{GO}	Open loop	66	69		dB
	V_G	Closed loop	33	35	37	dB
Output Voltage	V_O	THD=1%	0.7	1.0		V
Total Harmonic Distortion	THD	$V_O=0.2\text{V}$		0.1		%
Input Resistance	r_i		60	100		$\text{k}\Omega$
Equivalent Input Noise Voltage	V_{NI}	$R_g=2.2\text{k}\Omega$, NAB		1	2	μV
ALT Transistor Saturation Voltage	V_{sat}			75	100	mV

Equivalent Circuit

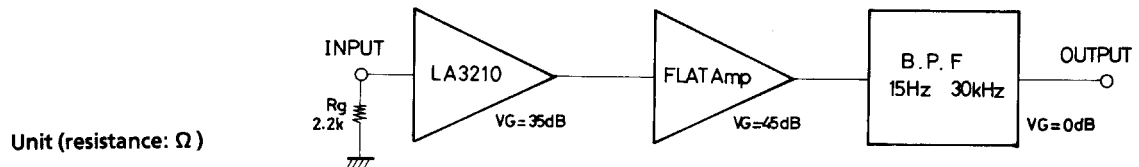


Test Circuit

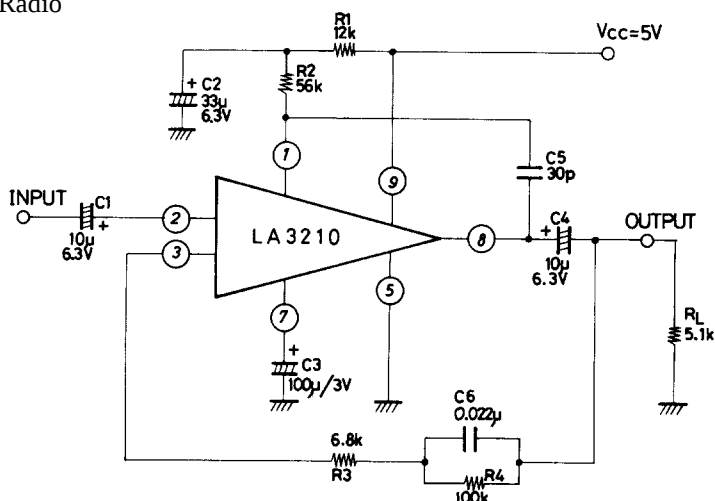
- ALC saturation voltage



- Noise Voltage

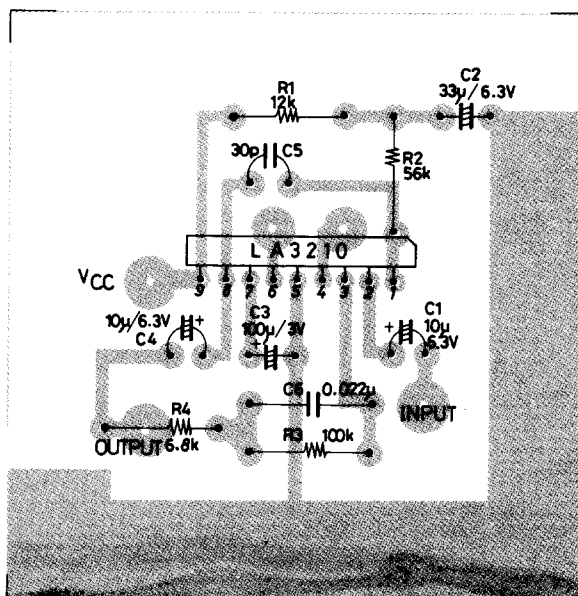


Sample Application Circuit : Equalizer Amplifier with Automatic Level Control designed for Cassette Tape Recorder, Radio



Unit (resistance: Ω , capacitance: F)

Sample Printed Circuit Pattern
(Cu-foiled side, 60 x 60mm²)



Unit (resistance: Ω , capacitance: F)

Description of External Parts

C1 : Input coupling capacitor (10µF)

DC current blocking capacitor used to prevent the DC current applied to the base from mixing in the AC signal source.

The C1 is calculated using $C1 = 1/2\pi f_T z_i$ (z_i : input resistance, f_T : low cutoff frequency). If the capacitance value is too decreased, your set is subjected to inductive hum. We recommend using a capacitor of 2.2µF or greater. We also recommend using 6.3WV or greater because the chemical capacitor becomes less leaky as the withstand voltage gets higher.

C2 : Decoupling capacitor (33µF)

Used to bypass the power source ripple.

Decreasing the capacitance value makes the starting time shorter. We recommend using a capacitor of 33µF.

C3 : Bypass capacitor (100µF)

Used to AC-Short the emitter resistance and prevent AC components from being fed back to the input.

C4 : Output capacitor (10µF)

Used to block DC components and pass AC Components only.

The C4 is calculated using $C4 = 1/1\pi f_L \cdot R_L$ (f_L : low cutoff frequency, R_L : load resistance).

C5 : Phase compensation capacitor (30pF)

Used to prevent high-frequency oscillation caused by phase shift when a deep feedback is provided. It should be noted that the high frequency response depends on the capacitance value of C5.

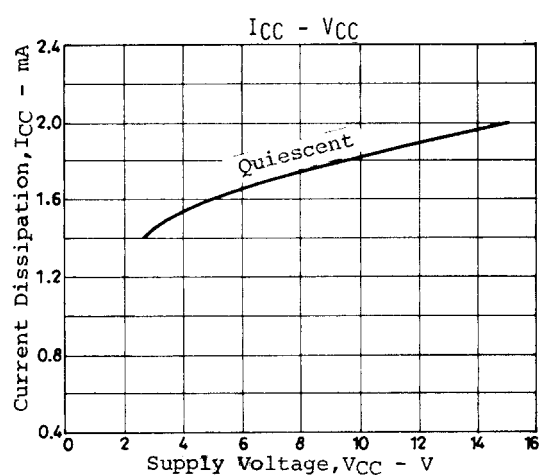
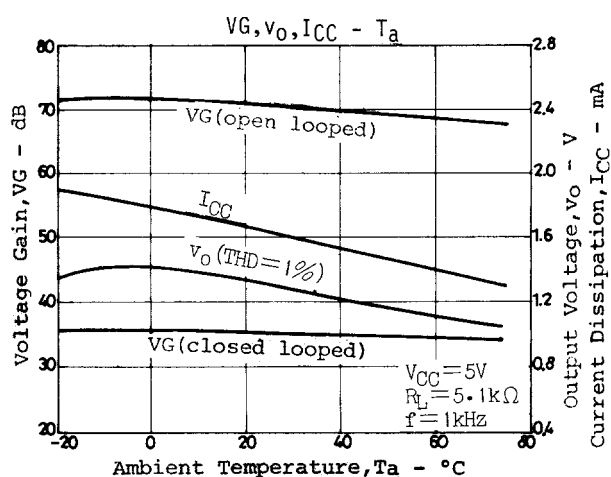
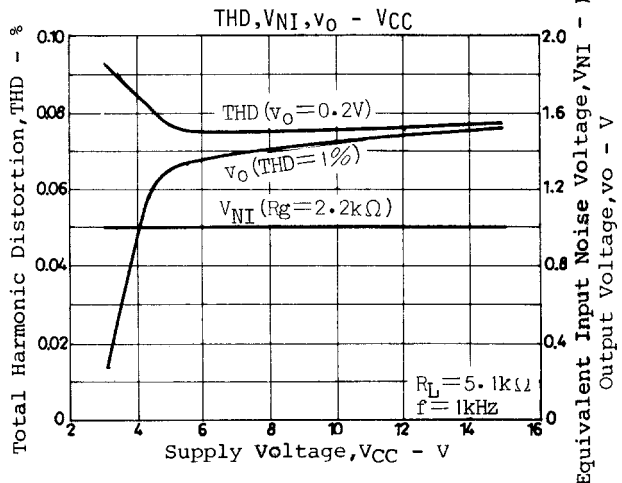
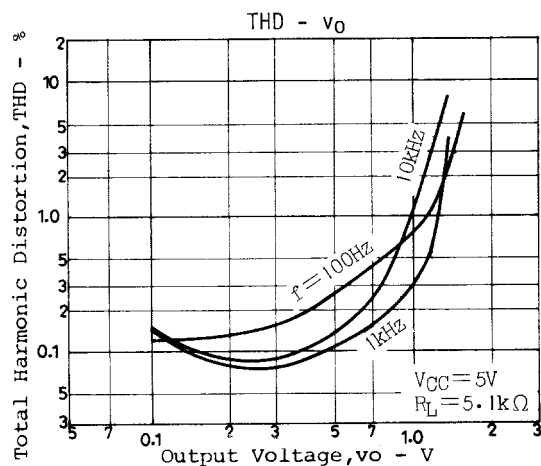
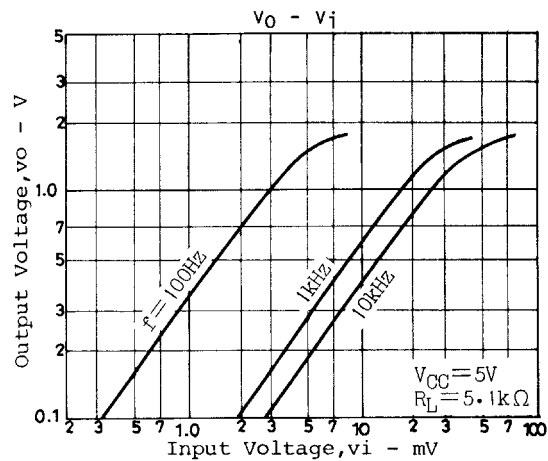
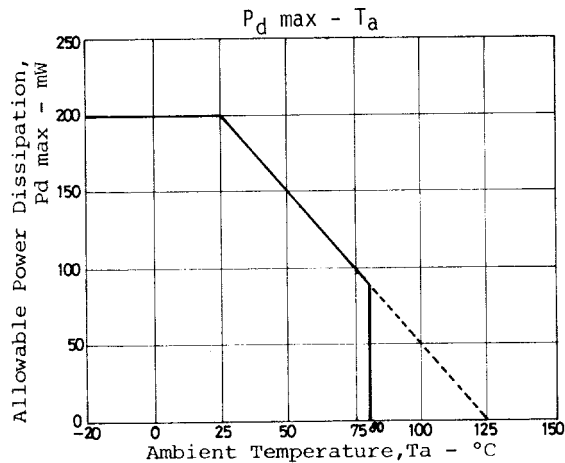
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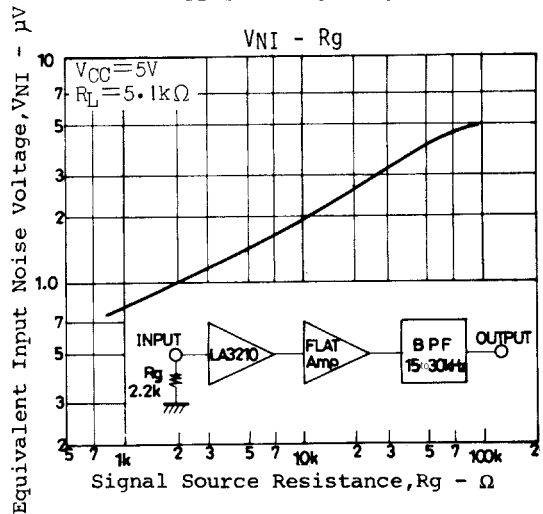
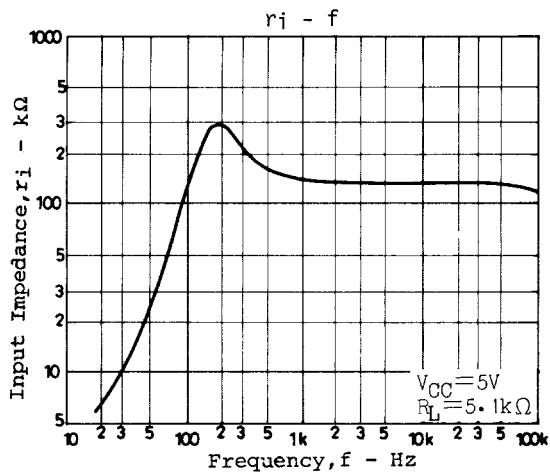
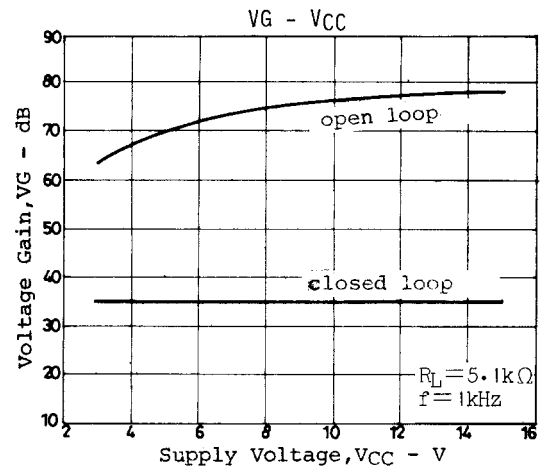
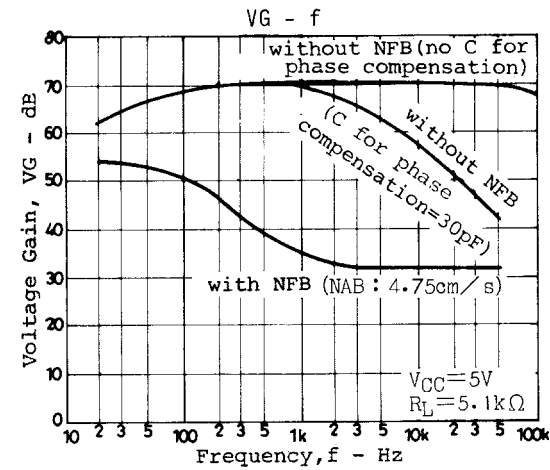
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R1 : Decoupling resistor used to bypass the power source ripple through C2.

R2 : Collector resistor of the first stage transistor of IC. Taken as load resistance in terms of AC.

C6, R3, R4 : Equalizer parts on which the closed-loop voltage gain depends. NAB 4.75cm/s is provided.





Proper Cares in Using IC

1. If the IC is used in the vicinity of the maximum rating, even a slight variation in conditions may cause the maximum rating to be exceeded, thereby leading to a breakdown. Allow an ample margin of variation for supply voltage, etc. and use the IC in the range where the maximum rating is not exceed.
2. Pin-to-pin short
If the supply voltage is applied when the space between pins is shorted, a breakdown or deterioration may occur. When installing the IC on the board or applying the supply voltage, make sure that the space between pins is not shorted with solder, etc.

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