Ordering number: EN 405D

Monolithic Linear IC

SANYO No.405D

# LA3210

## EQUALIZER AMPLIFIER WITH ALC

### Features

- Low Noise Use.
- Wide automatic level control range.
- Good reduced voltage characteristics.

### Maximum Ratings at Ta=25°C

| | | | unit |
|---|---|---|---|
| Maximum Supply Voltage | $V_{CC}max$ | 15 | V |
| Allowable Power Dissipation | $P_dmax$ | 200 | mW |
| Current Dissipation in Amplifier | $I_{CC}max$ | 3.0 | mA |
| Allowable Current in ALC Transistor | $I_6max$ | 3.5 | mA |
| Operating Temperature | **Topr** | -20 to +80 | °C |
| Storage Temperature | $T_{stg}$ | -40 to +125 | °C |

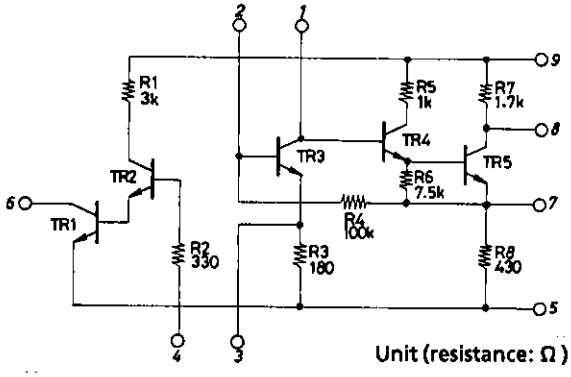
### Operating Conditions at Ta=25°C

| | | | unit |
|---|---|---|---|
| Recommended Supply Voltage | $V_{CC}$ | 5 | V |
| Recommended Load Resistance | $R_L$ | 5.1k | ohm |

### Operating Characteristics at Ta=25°C, $V_{CC}$=5V, $R_L$=5.1kohms, Rg=600ohms, f=1kHz, See specified Test Circuit.

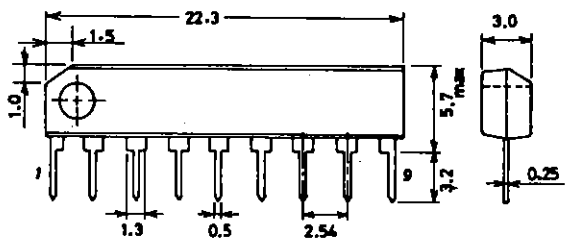
| | | | min | typ | max | unit |
|---|---|---|---|---|---|---|
| Current Dissipation | $I_{CC}$ | $v_i$=0, ALC off | | 1.4 | 2.0 | mA |
| Voltage Gain | $V_{GO}$ | Open loop | 66 | 69 | | dB |
| | VG | Closed loop | 33 | 35 | 37 | dB |
| Output Voltage | $V_O$ | THD=1% | 0.7 | 1.0 | | V |
| Total Harmonic Distortion | THD | $V_O$=0.2V | | 0.1 | | % |
| Input Resistance | ri | | 60 | 100 | | kohm |
| Equivalent Input Noise Voltage | $V_{NI}$ | Rg=2.2kohms, NAB | | 1 | 2 | uV |
| ALC Transistor Saturation Voltage | $V_{sat}$ | | | 75 | 100 | mV |

### Equivalent Circuit




Unit (resistance: Ω)

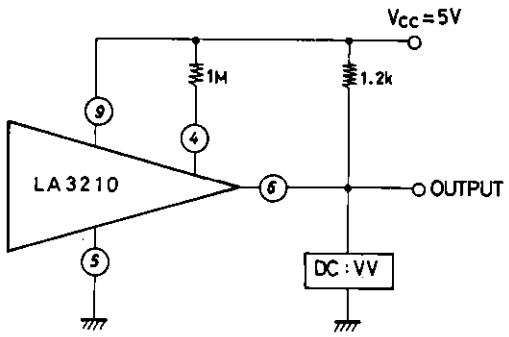
### Package Dimensions (unit: mm) 3017B



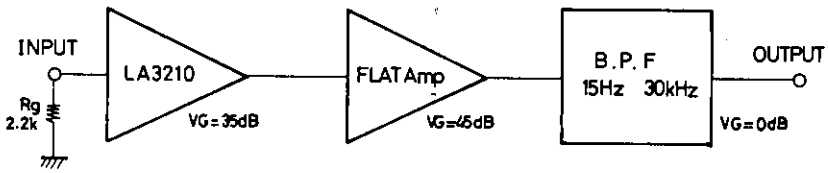

SANYO:SIP9

## Test Circuit

·ALC saturation voltage

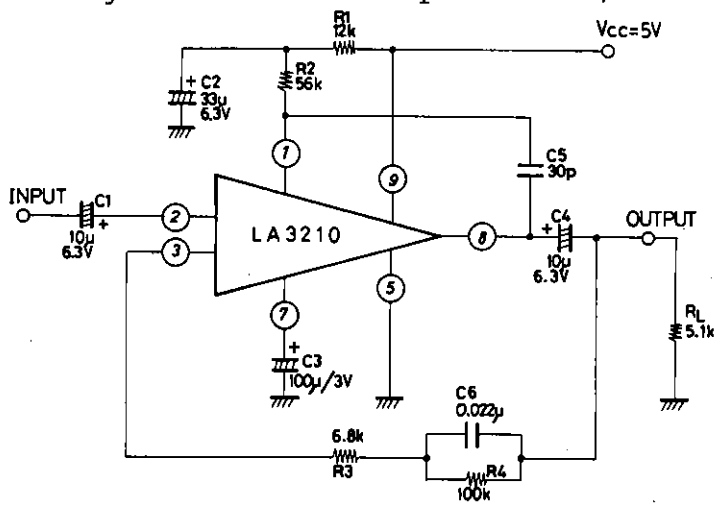



·Noise voltage



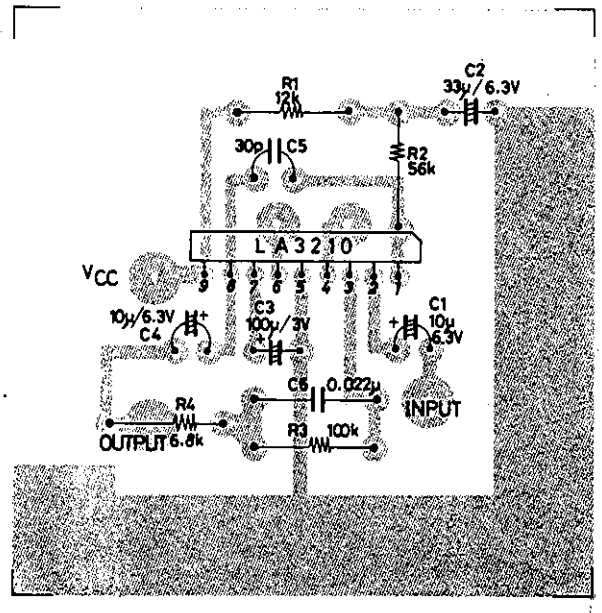

Unit (resistance: Ω)

## ■ 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 (10uF)
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 2.2uF 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 (33uF)
Used to bypass the power source ripple.
Decreasing the capacitance value makes the starting time shorter. We recommend using a capacitor of 33uF.

C3: Bypass capacitor (100uF)
Used to AC-short the emitter resistance and prevent AC components from being fed back to the input

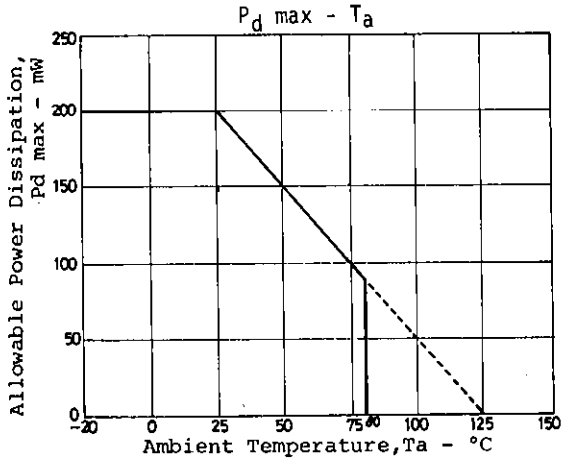
C4: Output capacitor (10uF)
Used to block DC components and pass AC components only
The C4 is calculated using $C4=1/2\pi f_L.R_L$ ($f_L$: low cutoff frequency, $R_L$: load resistance).

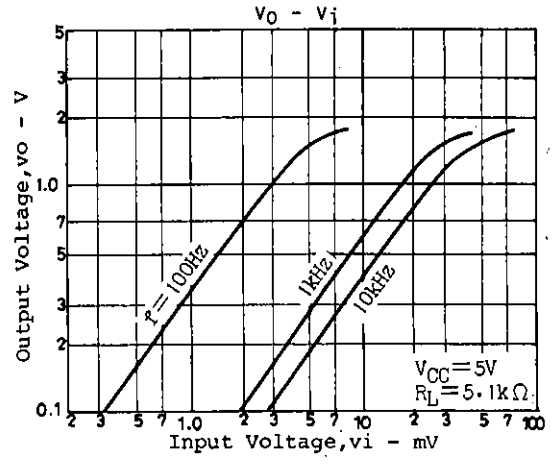
C5: Phase compensation capacitor (30pF)
Used to prevent high-frequency oscillation caused by phase shift when a deep feedback is provided. It should be noted that the high frequency response depends on the capacitance value of C5.

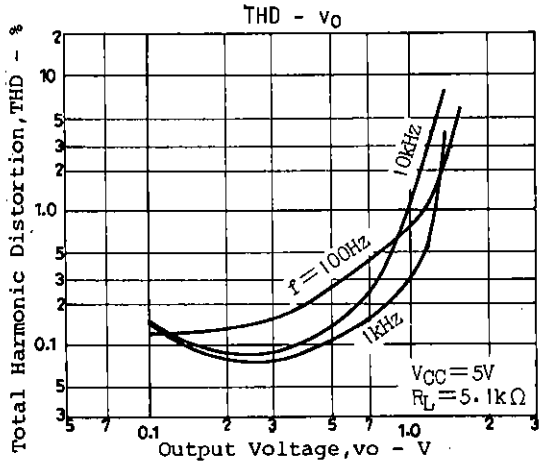
R1: Decoupling resistor used to bypass the power source ripple through C2.

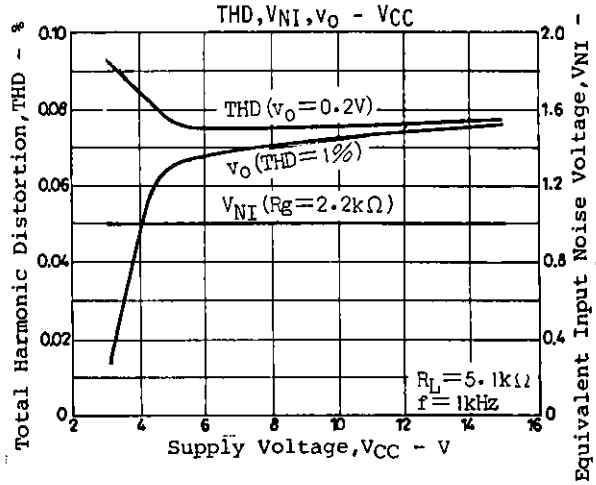
R2: Collector resistor of the first stage transistor of IC. Taken as load resistance in terms of AC.

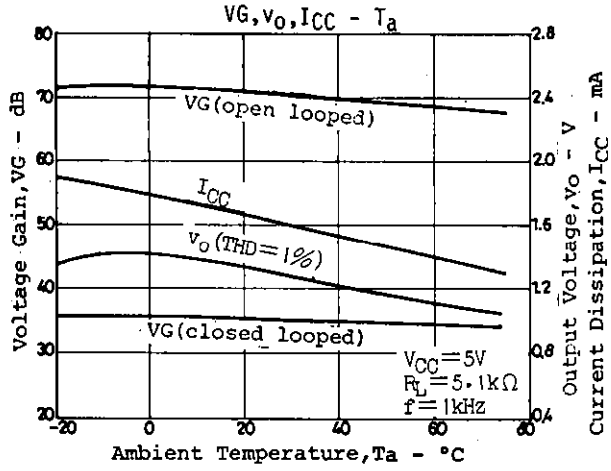
C6,R3,R4: Equalizer parts on which the closed-loop voltage gain depends. NAB 4.75 cm/s is provided.

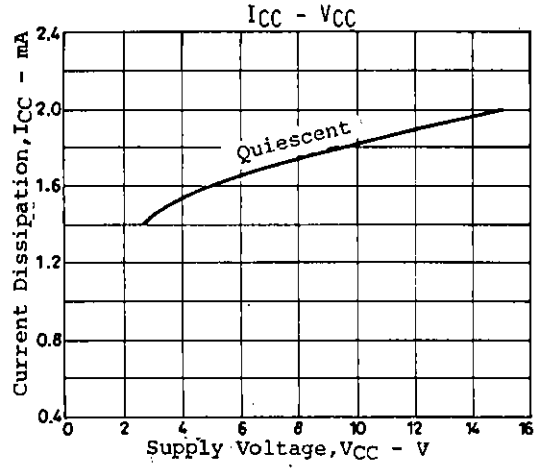


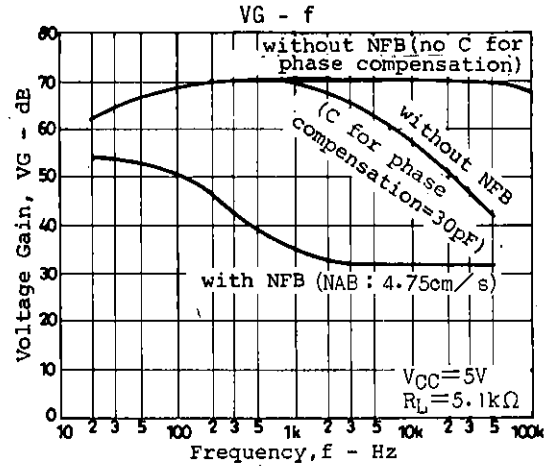



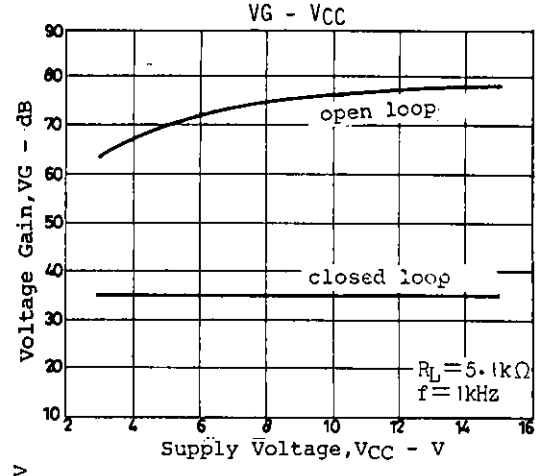



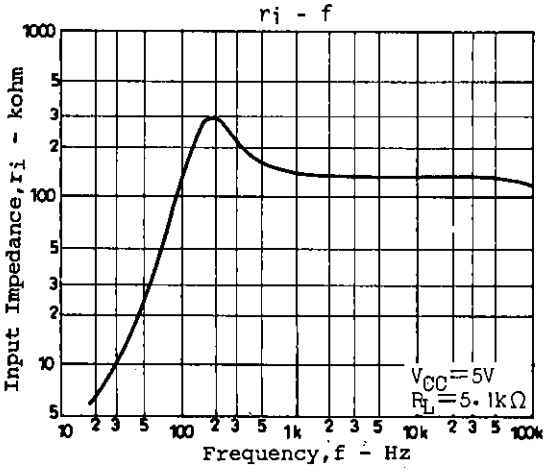



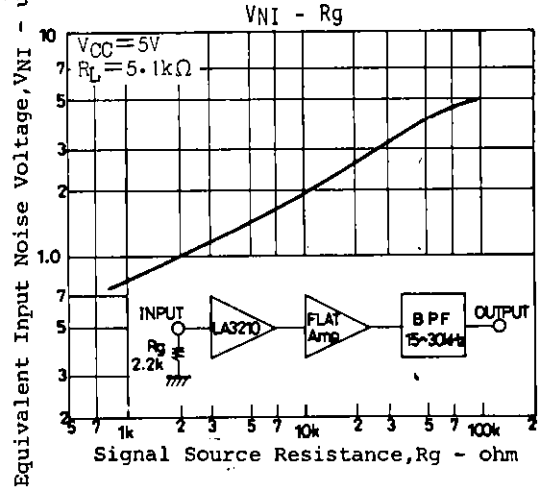



## Proper Cares in Using IC

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 exceeded.
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.