

Dual preamplifier with ALC detector circuit

BA3313L

The BA3313L is a dual preamplifier IC with built-in ALC detector circuit, designed for use in stereo radio cassette recorders. It comes in a compact 12-pin ZIP package, and has two record/playback preamplifiers, and an ALC detector circuit. The preamplifiers can be directly coupled to the tape head without coupling capacitors to prevent tape head magnetization and "pop" noise generation.

With the built-in ALC detector circuit, an ALC circuit with large dynamic range can be constructed with addition of just an external time constant circuit.

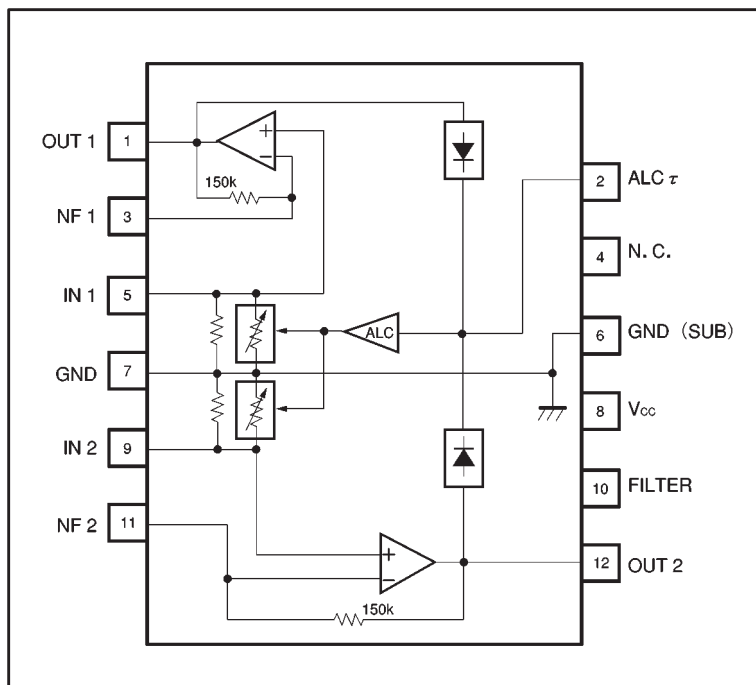
●Applications

Stereo radio cassette recorders

●Features

- 1) Input bias circuit does not require coupling capacitors.
- 2) Built-in ALC circuit with external time constant circuit.
- 3) Wide operating power supply voltage range.
- 4) High gain.
- 5) Low noise.

●Block diagram



● Absolute maximum ratings (Ta = 25°C)

| Parameter | Symbol | Limits | Unit |
|-----------------------|--------|----------|------|
| Power supply voltage | Vcc | 14 | V |
| Power dissipation | Pd | 400* | mW |
| Operating temperature | Topr | -25~+75 | °C |
| Storage temperature | Tstg | -55~+125 | °C |

* Reduced by 4.0mW for each increase in Ta of 1°C over 25°C

● Recommended operating conditions (Ta = 25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|----------------------|--------|------|------|------|------|
| Power supply voltage | Vcc | 5.0 | 8.0 | 12.0 | V |

● Electrical characteristics (unless otherwise noted, Ta = 25°C, Vcc = 8V and f = 1kHz)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|--------------------------------|------------------|------|------|------|-------------------|---|
| Quiescent current | I _Q | 1.5 | 3.0 | 6.0 | mA | |
| Open loop voltage gain | G _{VO} | 70 | 85 | — | dB | V _O = 1V _{rms} |
| Closed loop voltage gain | G _{VC} | 49 | 52 | 55 | dB | V _O = 0.3V _{rms} |
| Total harmonic distortion | THD 1 | — | 0.3 | 1.0 | % | V _O = 0.3V _{rms} |
| Maximum output voltage | V _{OM} | 1.5 | 2.0 | — | V _{rms} | THD = 1% |
| Input conversion-noise voltage | V _{NIN} | — | 1.0 | 1.8 | μV _{rms} | R _g = 2.2kΩ, DIN AUDIO 45dB at 1kHz NAB |
| Input resistance | R _{IN} | 35 | 51 | 71 | kΩ | |
| Channel separation | CS | 40 | 55 | — | dB | R _g = 2.2kΩ |
| ALC range * | ALC | 40 | 53 | — | dB | |
| ALC balance | ALB | — | 0 | 3.0 | dB | V _{IN} = -45dBV |
| ALC distortion | THD 2 | — | 0.3 | 1.0 | % | V _{IN} = -45dBV |
| ALC output voltage | V _{ALC} | 700 | 850 | 1000 | mV _{rms} | V _{IN} = -45dBV |

* The range for which the ALC begins to operate is the output voltage + 3dB with respect to the output voltage.

● Measurement circuit

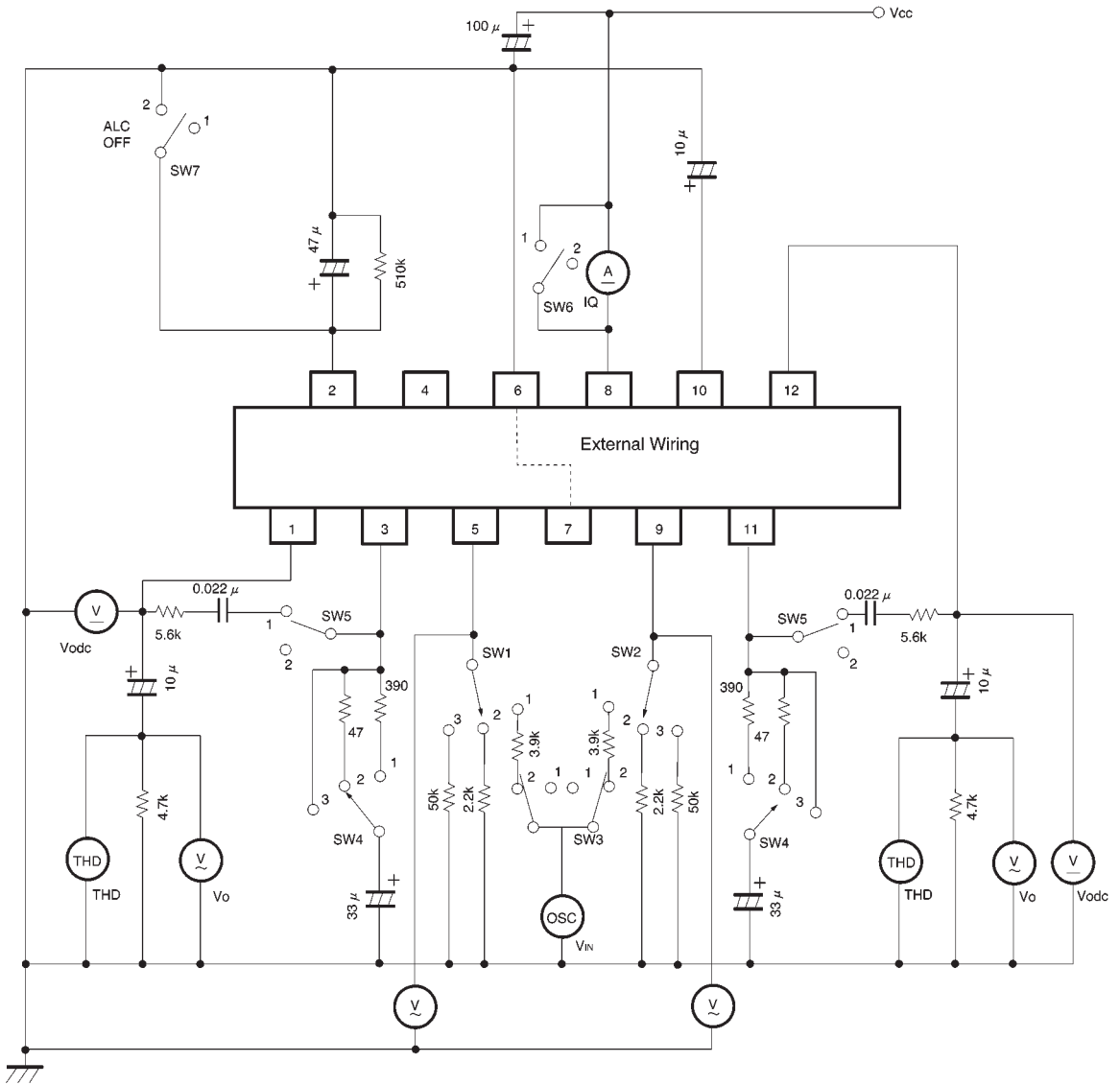


Fig. 1

Units

- Resistance : Ω (±1%)
- Film capacitors : F (±1%)
- Electrolytic capacitors : F (±5%)

●Application example

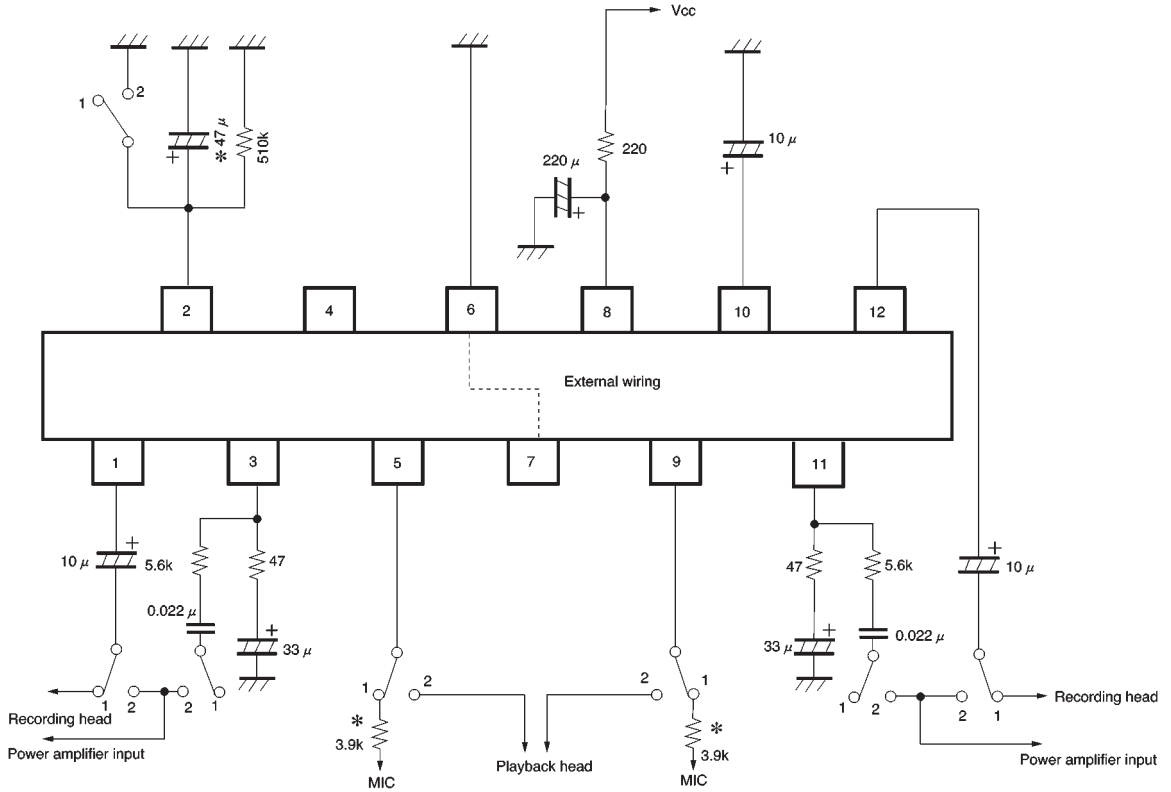


Fig. 2

SW

- 1: Recording
- 2: Playback

Units

- Resistance : Ω (±5%)
- Film capacitors : F (±10%)
- Electrolytic capacitors : F (±20%)

●Operation notes (the resistor marked with an asterisk)
 Changing the input resistor R_g , and the ALC time constant influences the ALC transient characteristics. In particular, if R_g is less than $3.9k\Omega$ or the time constant capacitor is less than $47\mu F$, the ALC may operate excessively. Do not use smaller values than those recommended for these components.

●Electrical characteristics curve

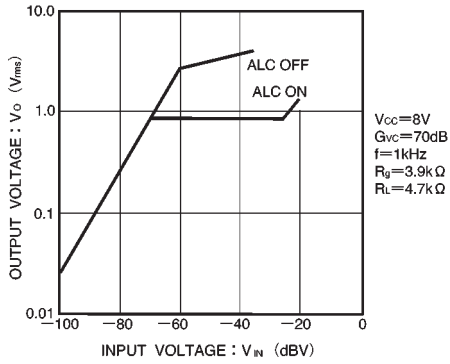
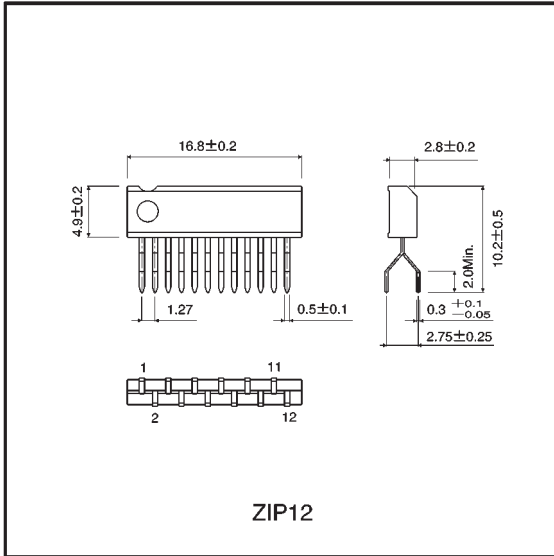


Fig. 3 Input voltage vs. output voltage

●External dimensions (Units: mm)



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Datasheets for electronics components.