

Dual preamplifier with ALC detector circuit

BA3314F

The BA3314F is a dual preamplifier IC with built-in ALC detector circuit, designed for audio applications. It comes in a compact 14-pin SOP package, and has two record/playback preamplifiers, and an ALC detector circuit. The preamplifier 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.

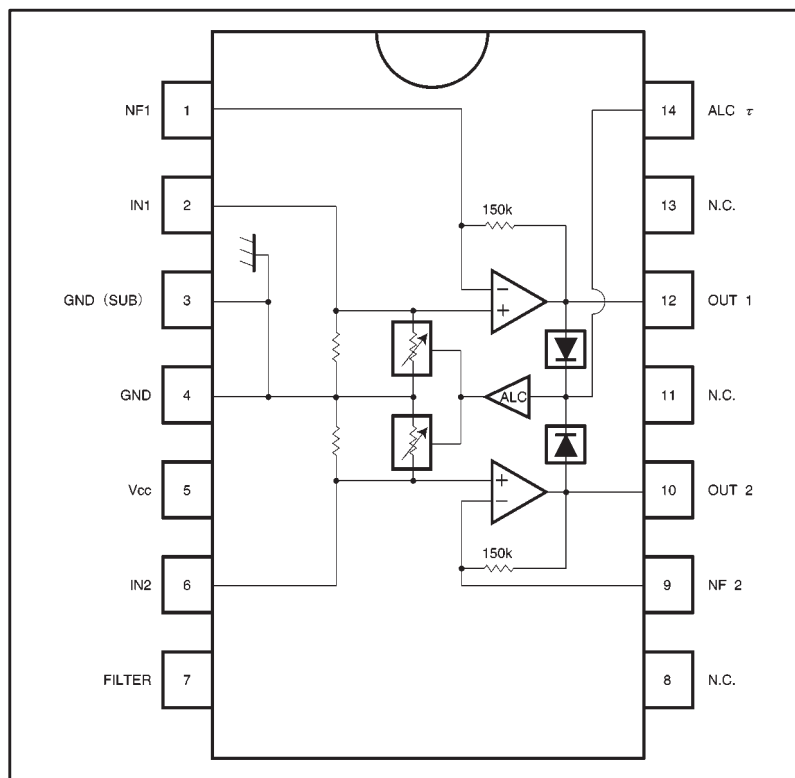
● Applications

Audio equipment

● 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 | V _{CC} | 14 | V |
| Power dissipation | P _d | 450* | mW |
| Operating temperature | T _{opr} | -25~+75 | °C |
| Storage temperature | T _{stg} | -55~+125 | °C |

* Reduced by 4.5mW 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 | V _{CC} | 5.0 | — | 12.0 | V |

● Electrical characteristics (unless otherwise noted, Ta = 25°C, V_{CC} = 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.

⊙ Not designed for radiation resistance.

● Measurement circuit

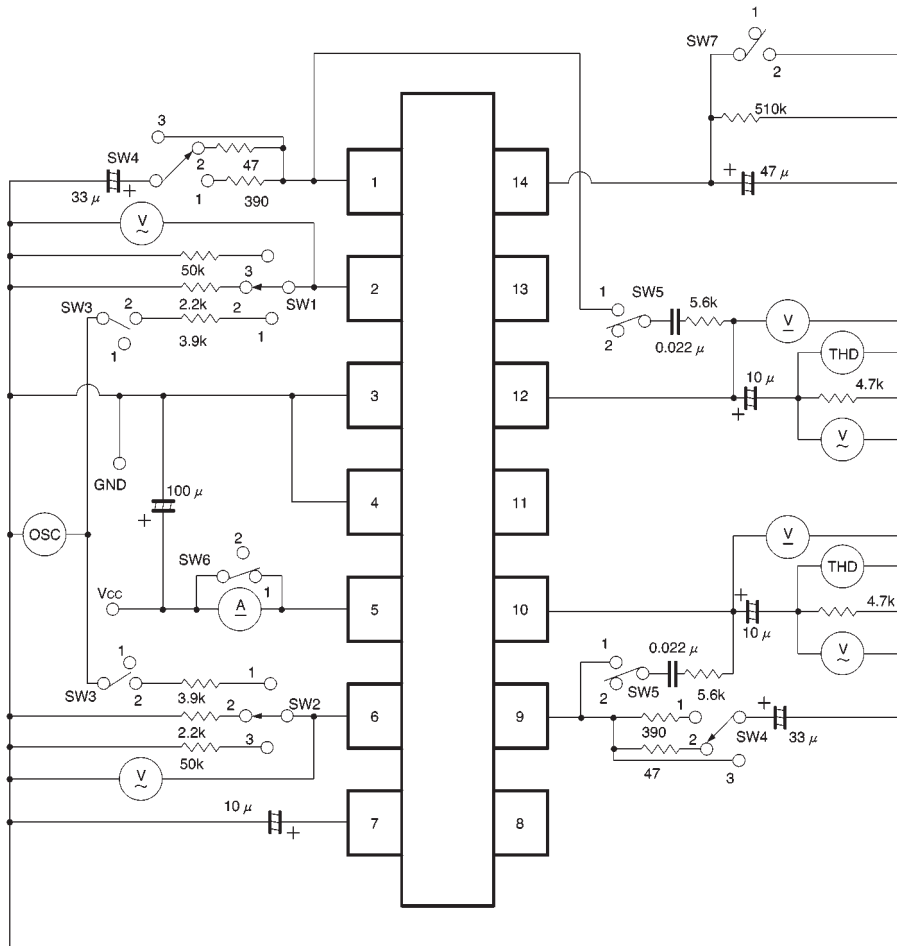


Fig. 1

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

● Operation notes

Changing the input resistor R_g , and the ALC time constant influences the ALC transient characteristics. In particular, if R_g is less than 3.9kΩ or the time constant capacitor is less than 47µF, the ALC may operate excessively. Do not use smaller values than those recommended for these components.

● Application example

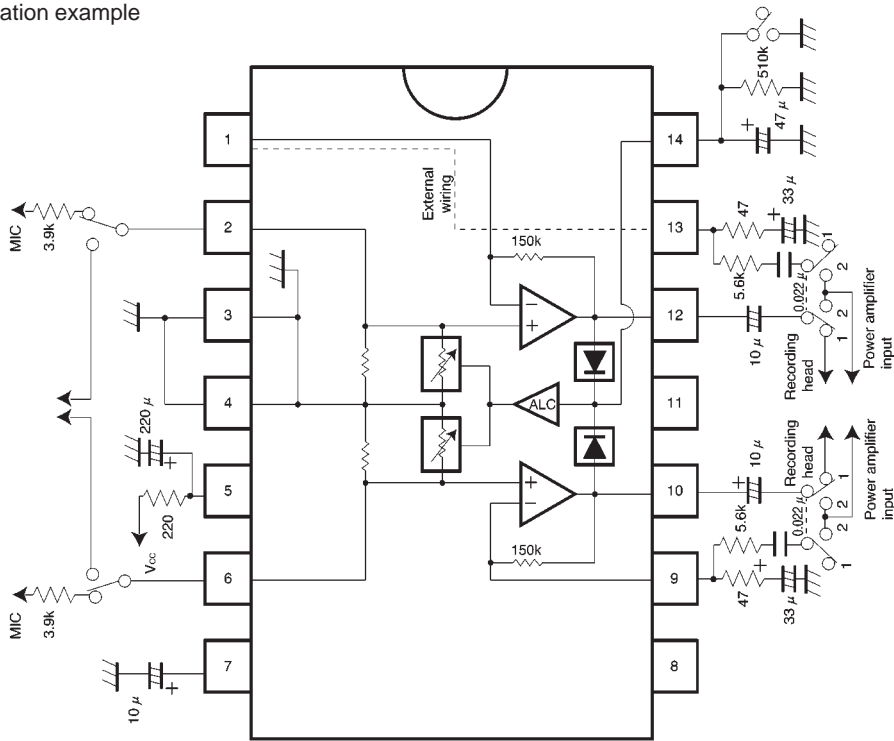


Fig. 2

SW

- 1: recording
- 2: playback

Units

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

● Electrical characteristics curve

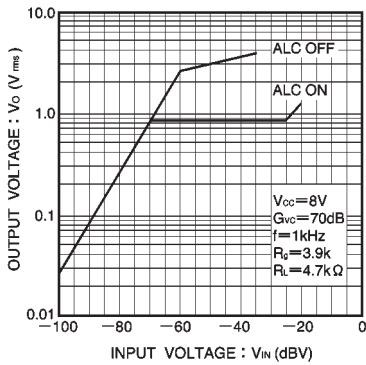
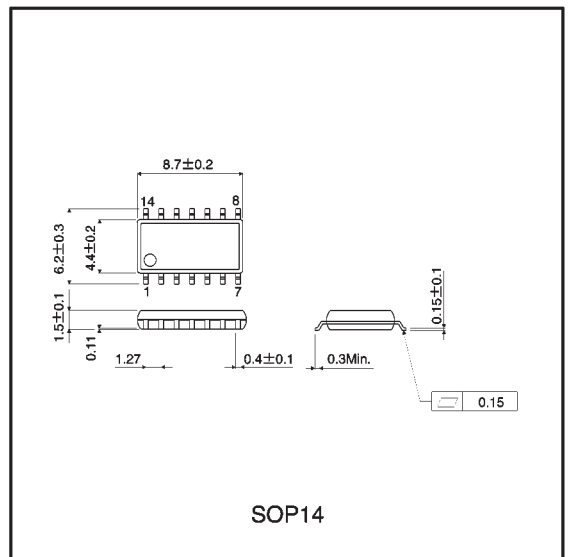


Fig. 3 Input voltage vs. output voltage

● External dimensions (Units: mm)



SOP14