

4-channel video-signal PRE/REC amplifier

BA7274S

The BA7274S PRE/REC amplifier has been designed for use in video cassette recorders. It is compatible with four-head decks, and has four head amplifiers, a chroma output amplifier, and FM output amplifier (with AGC circuit), an envelope detector, a fixed-current drive recording amplifier, a channel switch circuit, and record/playback switch integrated only one monolithic IC.

● Applications

VCRs

● Features

- 1) Suitable for 4-head decks.
- 2) Integration of the head-section signal processing circuits (REC and head amplifiers, AGC, and envelope detector) only one IC allows compact deck designs.
- 3) The head amplifier has low input capacitance and low noise ($V_{NIN}=0.4 \mu V_{rms}$), and both the playback and recording systems have a wide frequency range.
- 4) The REX amplifier employs a fixed-output current system to minimize change in the recording current due to load fluctuation. The maximum recording current output is a large $30mA_{P-P}$.
- 5) Built-in channel and record/playback switches (switched to PB V_{CC} and REC V_{CC}).
- 6) Peaking amplifier pin provided for external setting of peak value.
- 7) Compact SDIP 32 pin package.
- 8) Auto-tracking compatible.

● Absolute maximum ratings ($T_a=25^\circ C$)

| Parameter | Symbol | Limits | Unit |
|-----------------------|-----------|------------------|------------|
| Power supply voltage | V_{CC} | 7 (PRE) 13 (REC) | V |
| Power dissipation | P_d | 1370* | mW |
| Operating temperature | T_{opr} | -20~70 | $^\circ C$ |
| Storage temperature | T_{stg} | -55~150 | $^\circ C$ |

* Reduced by 11.0mW for each increase in T_a of $1^\circ C$ over $25^\circ C$.

● Recommended operating conditions ($T_a=25^\circ C$)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|--------------------------------------|-------------|------|------|------|------|------------|
| Operating supply voltage (playback) | $V_{CC(P)}$ | 4.5 | 5.0 | 5.5 | V | 25pin |
| Operating supply voltage (recording) | $V_{CC(R)}$ | 11.5 | 12 | 12.5 | V | 21pin |

* The PRE and REC V_{CC} are used for mode switching. If the PRE and REC V_{CC} voltages are applied together, the amplifier systems and head switch will go on simultaneously causing a large current to flow. This must be avoided, so do not make pins 21 and 25 "H" (0.5V or more) together.

●Electrical characteristics (Unless otherwise specified Ta=25°C)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|--|---------------------------|------|------|------|-------------------|--|
| (Playback system) V _{CC} = 5V | | | | | | |
| Quiescent current | I _{CC-P} | 23 | 34 | 44 | mA | — |
| Voltage gain (CH1 to CH4) | G _{VP} | 49 | 57 | 62 | dB | V _{IN} =0.3mV _{P-P} , 100kHz |
| Maximum chroma output level | V _{OMC} | 1.3 | 1.5 | — | V _{P-P} | |
| AGC output amplitude level | V _{AGC} | 130 | 180 | 220 | mV _{P-P} | |
| AGC control sensitivity | ΔV _{AGC} | -1.0 | 1.0 | 3.0 | dB | V _{IN} =0.15~0.6mV _{P-P} , 4MHz |
| AGC frequency char. (CH1 to CH4) | G _{f1~4} | -2.0 | 2.0 | 4.0 | dB | V _{IN} =0.3mV _{P-P} , 10MHz / 1MHz |
| Crosstalk | CT | — | -40 | -33 | dB | 4MHz |
| Input conversion noise (CH1 to CH4) | V _{N1~4} | — | 0.4 | 1.2 | μV _{rms} | |
| Head switch threshold voltage | V _{TH3} | 2.0 | 2.5 | 3.0 | V | Hi : CH1, 4 Lo : CH2, 3 |
| Head amplifier switch threshold voltage | V _{TH4} | 2.0 | 2.5 | 3.0 | V | Hi : CH3 or 4 Lo : 1 or 2 |
| ENVELOPE comparison output amplitude | V ₂₄ | 4.3 | — | — | V | Hi : CH1 or 2 > CH3 or 4 Lo : CH3 or 4 > CH1 or 2 |
| COMP (ENVE) switch threshold | V _{THP2} | 0.3 | 1.3 | 1.8 | V | Hi : STOP Lo : ENVE OUT |
| ENVE detector output level SP | V _{ENV-S1} | 1.3 | 1.6 | 2.1 | V | CHROMA OUT=0.0V _{P-P} |
| ENVE detector output level SP | V _{ENV-S2} | 2.6 | 2.9 | 3.3 | V | CHROMA OUT=0.5V _{P-P} , 4MHz |
| ENVE detector output level EP | V _{ENV-E1} | 1.3 | 1.6 | 1.9 | V | CHROMA OUT=0.0V _{P-P} |
| ENVE detector output level EP | V _{ENV-E2} | 3.4 | 3.7 | 4.1 | V | CHROMA OUT=0.5V _{P-P} , 4MHz |
| PRE switch on resistance | R _{16, 18} | — | 5 | 10 | Ω | |
| (Recording system) V _{CC} = 12V | | | | | | |
| Quiescent current | I _{CC-R} | 30 | 47 | 65 | mA | |
| Maximum output current | I _L | 30 | — | — | mA _{P-P} | |
| Recording current secondary distortion | D _L | — | -35 | -31 | dB | I _L =30mA _{P-P} , 4MHz |
| Recording current load characteristics | ΔI _L | — | 1 | 3 | mA | I _L =30mA, 4MHz, 8.2~15 μH |
| Recording current frequency char. | G _I | -5 | -3 | 1.5 | dB | I _L =10mA, 8MHz / 100kHz |
| EP/SP switching threshold voltage | V _{THR 2} | 0.8 | 1.3 | 1.8 | V | Hi : EP Lo : SP |
| REC switch ON resistance | R _{5, 7, 10, 12} | — | 10 | 15 | Ω | |

●Electrical characteristic curves

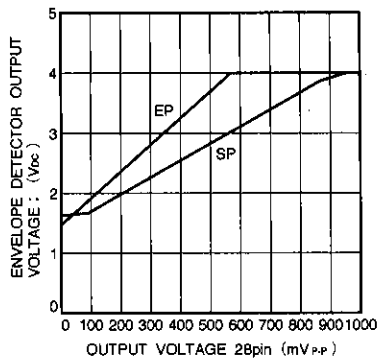
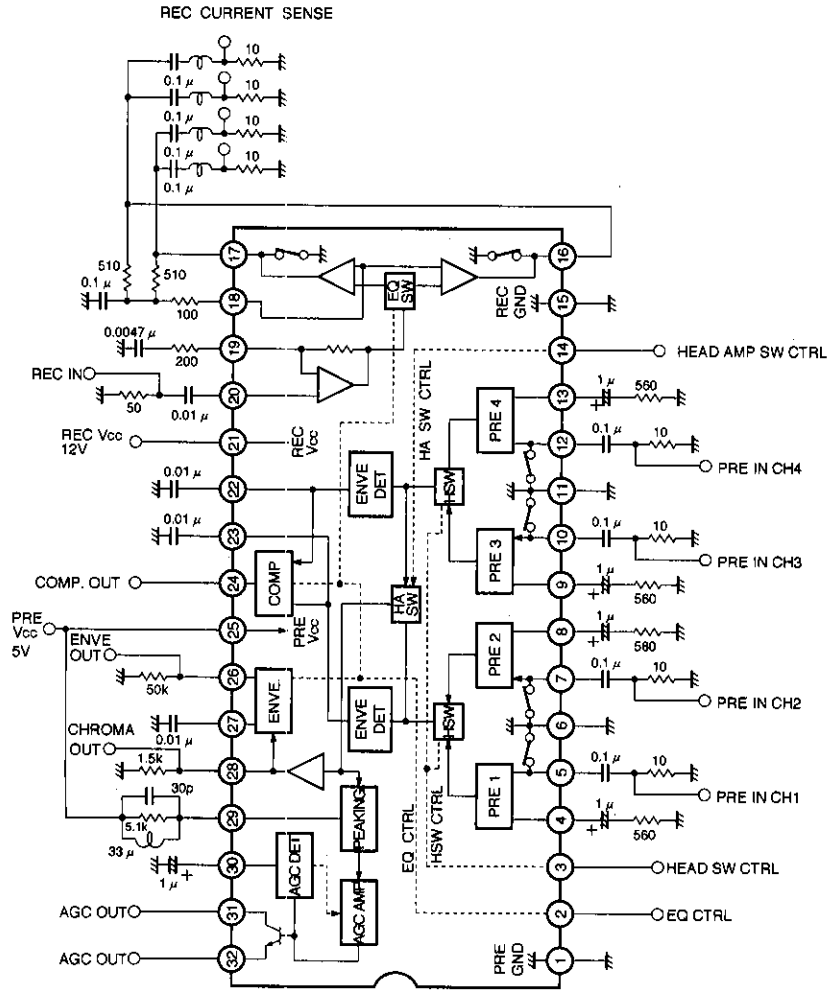


Fig. 1 Playback signal envelope detector characteristics

● Measurement circuit



Unit: R [Ω]
 C [F]
 L [H]

Fig.2

●Control pin logic

(1)Playback head switching

| H. AMP SW 14pin | HEAD SW 3pin | Selected head |
|-----------------|--------------|----------------------------|
| L | H | CH1 (PRE AMP pin 5 input) |
| | L | CH2 (PRE AMP pin 7 input) |
| H | L | CH3 (PRE AMP pin 10 input) |
| | H | CH4 (PRE AMP pin 12 input) |

(2)EP/SP switching envelope comparator ON/OFF switch (pin 2)

| REC V _{cc} 21pin | PRE V _{cc} 25pin | EP / SP 2pin | Mode |
|---------------------------|---------------------------|--------------|---|
| H (REC) | L | H | EP (REC AMP pin 16 output) |
| | | L | SP (REC AMP pin 17 output) |
| L | H (PB) | H | ENVE. detector output pin 26 EP mode ENVE. comparator output pin 24 stopped "H" |
| | | L | ENVE. detector output pin 26 SP mode ENVE. comparator output pin 24 operating, see (3) |

(3)Envelope comparator output (pin 24)

| COMP. OUT 24pin | Conditions |
|-----------------|---------------------------------------|
| H | CH1 or CH2 output > CH3 or CH4 output |
| L | CH1 or CH2 output < CH3 or CH4 output |

Note: The correspondence between channels and amplifiers is as follows:

| CH | CH1 | CH2 | CH3 | CH4 |
|---------|-----------|-----------|-----------|-----------|
| PRE AMP | PRE AMP 1 | PRE AMP 2 | PRE AMP 3 | PRE AMP 4 |

●Block diagram and application example

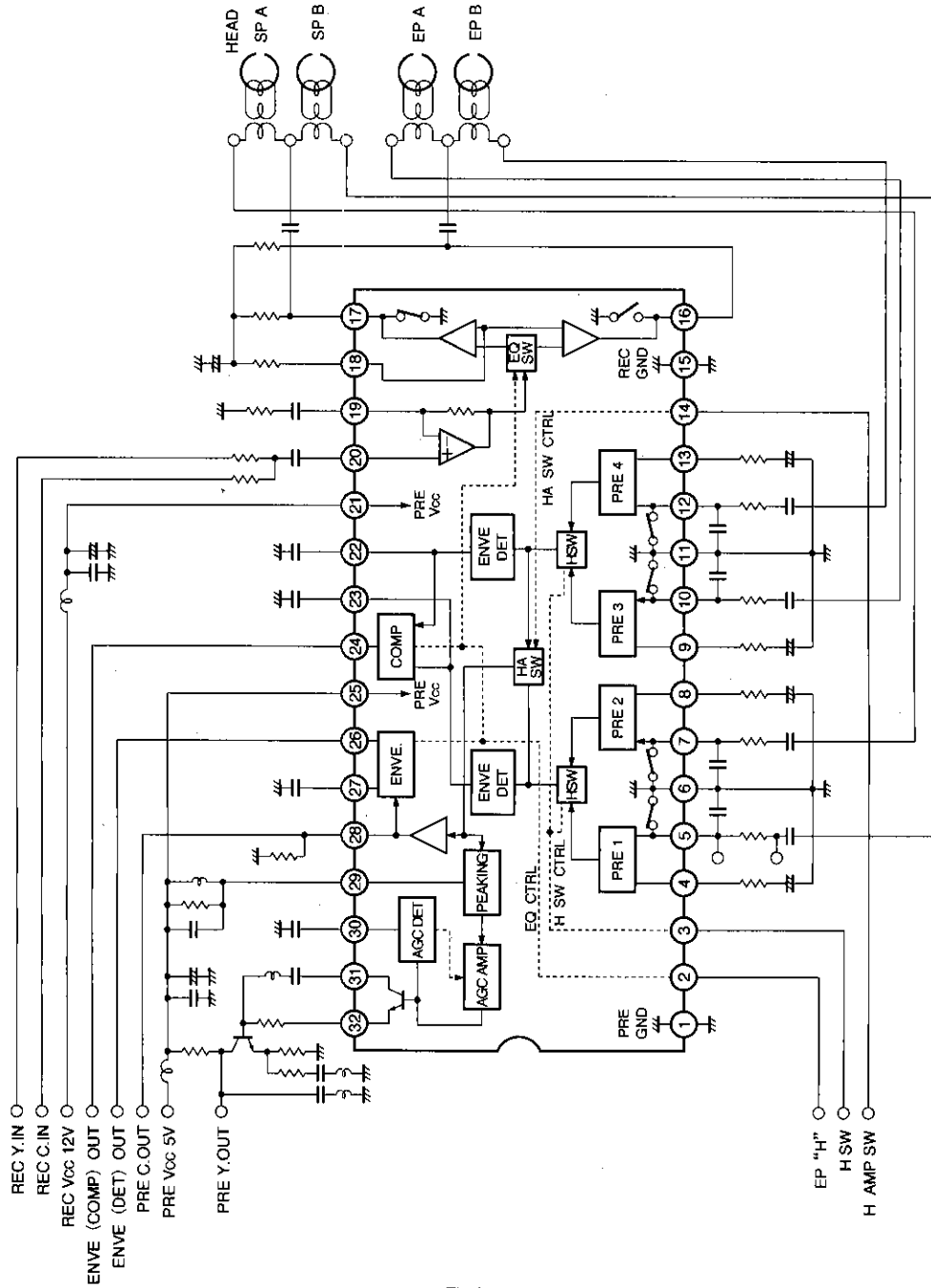
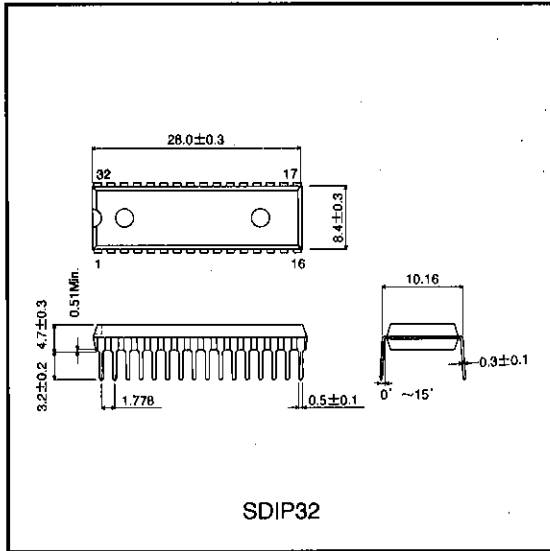


Fig.3

●External dimensions (Units: mm)



VCR components

