

# AN3336SB

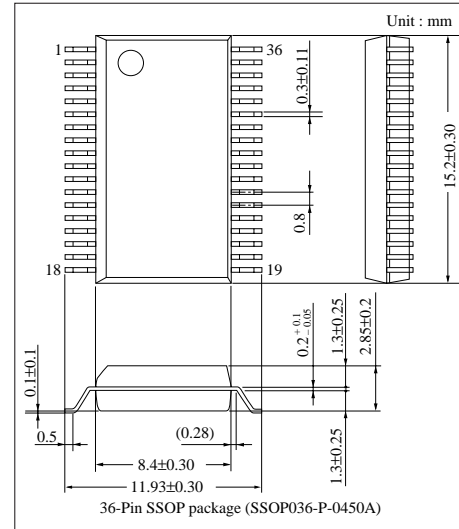
## 4-Head VCR Recording/Playback Amplifier IC

### ■ Overview

The AN3336SB is a recording/playback amplifier IC for 4-head VCR. It includes RF-AGC, automatic tracking I/O, and envelope comparing circuit.

### ■ Features

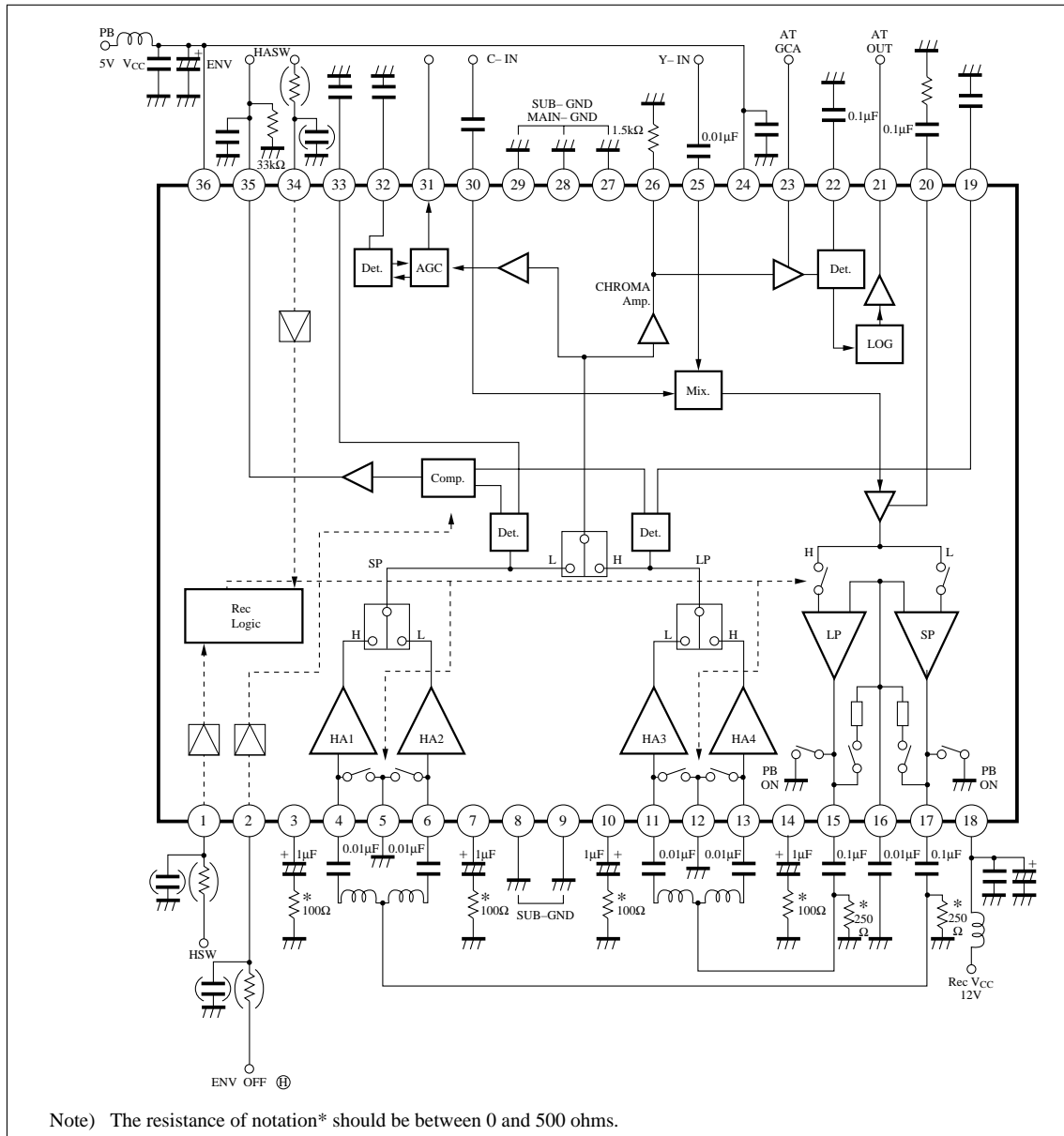
- Playback  $V_{CC} = 5.0V$ , recording  $V_{CC} = 12V$
- Built-in RF-AGC circuit
- Built-in automatic tracking I/O circuit
- Built-in envelope comparing circuit



### ■ Pin Descriptions

| Pin No. | Pin name                      | Pin No. | Pin name                                      |
|---------|-------------------------------|---------|---|
| 1       | Head switching                | 19      | Envelope detector capacitor for ch 3 and ch 4 |
| 2       | Envelope ON/OFF switching     | 20      | Peaking for recording                         |
| 3       | Ch 1 head amp. damping        | 21      | Automatic tracking output                     |
| 4       | Ch 1 head amp. input          | 22      | Automatic tracking detector capacitor         |
| 5       | Small-signal ground           | 23      | Automatic tracking control                    |
| 6       | Ch 2 head amp. input          | 24      | Automatic tracking $V_{CC}$                   |
| 7       | Ch 2 head amp. damping        | 25      | Rec. Y-input                                  |
| 8       | Sub-ground                    | 26      | Chroma output                                 |
| 9       | Sub-ground                    | 27      | Sub-ground                                    |
| 10      | Ch 3 head amp. damping        | 28      | Sub-ground                                    |
| 11      | Ch 3 head amp. input          | 29      | Sub-ground                                    |
| 12      | Small-signal ground           | 30      | Recording C-input                             |
| 13      | Ch 4 head amp. input          | 31      | AGC output                                    |
| 14      | Ch 4 head amp. damping        | 32      | AGC detector capacitor                        |
| 15      | Rec. current amp. (LP) output | 33      | Envelope detector capacitor for ch 1 and ch 2 |
| 16      | Rec. feedback                 | 34      | Head amp. switching                           |
| 17      | Rec. current amp. (SP) output | 35      | ENV output, recording bias                    |
| 18      | Rec. $V_{CC}$                 | 36      | Playback $V_{CC}$                             |

■ Block Diagram



■ Absolute Maximum Ratings

| Parameter  | Symbol              | Rating      | Unit |
|--|---------------------|-------------|------|
| Supply voltage (1)                               | PB V <sub>CC</sub>  | 6           | V    |
| Supply current (2)                               | Rec V <sub>CC</sub> | 13          | V    |
| Power dissipation <sup>Note 2)</sup>             | P <sub>D</sub>      | 440         | mW   |
| Operating ambient temperature <sup>Note 1)</sup> | T <sub>opr</sub>    | -20 to +70  | °C   |
| Storage temperature <sup>Note 1)</sup>           | T <sub>stg</sub>    | -55 to +125 | °C   |

Note 1) T<sub>a</sub>=25°C for except ambient temperature and storage temperatures.

Note 2) Allowable power dissipation of the package at T<sub>a</sub>=70°C.

### ■ Recommended Operating Range (Ta=25°C)

| Parameter                          | Symbol             | Range         |
|------------------------------------|--------------------|---------------|
| Operating supply voltage range (1) | PBV <sub>CC</sub>  | 4.5V to 5.5V  |
| Operating supply voltage range (2) | RecV <sub>CC</sub> | 8.5V to 12.5V |

### ■ Electrical Characteristics (Ta=25±2°C)

| Parameter                                  | Symbol                                 | Condition  | min   | typ   | max   | Unit              |
|--|--|--|-------|-------|-------|-------------------|
| PB circuit current                         | I <sub>36</sub>                        | PB V <sub>CC</sub> =5V                             | —     | —     | 56    | mA                |
| CH 1 gain                                  | G <sub>4-26</sub>                      | PB V <sub>CC</sub> =5V                             | 53    | —     | 61    | dB                |
| CH 2 gain                                  | G <sub>6-26</sub>                      | PB V <sub>CC</sub> =5V                             | 53    | —     | 61    | dB                |
| CH 3 gain                                  | G <sub>11-26</sub>                     | PB V <sub>CC</sub> =5V                             | 53    | —     | 61    | dB                |
| CH 4 gain                                  | G <sub>13-26</sub>                     | PB V <sub>CC</sub> =5V                             | 53    | —     | 61    | dB                |
| HSW change-over sensitivity                | S <sub>1</sub>                         | PB V <sub>CC</sub> =5V                             | —     | —     | 3.8   | V                 |
| HASW change-over sensitivity               | S <sub>34</sub>                        | PB V <sub>CC</sub> =5V                             | —     | —     | 3.8   | V                 |
| AGC output amplitude                       | V <sub>4-31</sub>                      | PB V <sub>CC</sub> =5V                             | 130   | —     | 270   | mV <sub>P-P</sub> |
| AGC control sensitivity                    | ΔV <sub>4-31</sub>                     | PB V <sub>CC</sub> =5V                             | —     | —     | 3.0   | dB                |
| HSW DC unbalance (I)                       | HSW <sub>26(I)</sub>                   | PB V <sub>CC</sub> =5V                             | —     | —     | 100   | mV <sub>P-P</sub> |
| HSW DC unbalance (II)                      | HSW <sub>26(II)</sub>                  | PB V <sub>CC</sub> =5V                             | —     | —     | 100   | mV <sub>P-P</sub> |
| HASW DC unbalance (I)                      | HASW <sub>26(I)</sub>                  | PB V <sub>CC</sub> =5V                             | —     | —     | 100   | mV <sub>P-P</sub> |
| HASW DC unbalance (II)                     | HASW <sub>26(II)</sub>                 | PB V <sub>CC</sub> =5V                             | —     | —     | 100   | mV <sub>P-P</sub> |
| Input conversion noise (1)                 | N <sub>4-26</sub> /G <sub>4-26</sub>   | PB V <sub>CC</sub> =5V                             | —     | —     | 1.0   | μVrms             |
| Input conversion noise (2)                 | N <sub>6-26</sub> /G <sub>6-26</sub>   | PB V <sub>CC</sub> =5V                             | —     | —     | 1.0   | μVrms             |
| Input conversion noise (3)                 | N <sub>11-26</sub> /G <sub>11-26</sub> | PB V <sub>CC</sub> =5V                             | —     | —     | 1.0   | μVrms             |
| Input conversion noise (4)                 | N <sub>13-26</sub> /G <sub>13-26</sub> | PB V <sub>CC</sub> =5V                             | —     | —     | 1.0   | μVrms             |
| Auto-tracking output at no-input           | V <sub>21min.</sub>                    | PB V <sub>CC</sub> =4.8V                           | —     | —     | 1.0   | V                 |
| Auto tracking max. output                  | V <sub>21max.</sub>                    | PB V <sub>CC</sub> =4.8V                           | 3.8   | —     | —     | V                 |
| ENV output amplitude                       | V <sub>35</sub>                        | PB V <sub>CC</sub> =5V                             | 3.5   | —     | —     | V <sub>P-P</sub>  |
| Rec. circuit current                       | I <sub>18</sub>                        | Rec V <sub>CC</sub> =12V                           | —     | —     | 48    | mA                |
| SP Y-Rec. current output                   | I <sub>17</sub>                        | Rec V <sub>CC</sub> =12V                           | 17    | —     | 32    | mA <sub>P-P</sub> |
| LP Y-Rec. current output ratio             | I <sub>15</sub> /I <sub>17</sub>       | Rec V <sub>CC</sub> =12V                           | -2.5  | —     | 2.5   | dB                |
| SP 8MHz f characteristics ratio            | I <sub>17H</sub> /I <sub>17</sub>      | Rec V <sub>CC</sub> =12V                           | -4    | —     | —     | dB                |
| LP 8MHz f characteristics ratio            | I <sub>15H</sub> /I <sub>15</sub>      | Rec V <sub>CC</sub> =12V                           | -4    | —     | —     | dB                |
| Rec. chroma output ratio                   | I <sub>17C</sub> /I <sub>17</sub>      | Rec V <sub>CC</sub> =12V                           | -15   | —     | -7    | dB                |
| PB circuit current                         | I <sub>36</sub>                        | PB V <sub>CC</sub> =5V                             | —     | (43)  | —     | mA                |
| CH 1 gain                                  | G <sub>4-26</sub>                      | PB V <sub>CC</sub> =5V                             | —     | (57)  | —     | dB                |
| CH 2 gain                                  | G <sub>6-26</sub>                      | PB V <sub>CC</sub> =5V                             | —     | (57)  | —     | dB                |
| CH 3 gain                                  | G <sub>11-26</sub>                     | PB V <sub>CC</sub> =5V                             | —     | (57)  | —     | dB                |
| CH 4 gain                                  | G <sub>13-26</sub>                     | PB V <sub>CC</sub> =5V                             | —     | (57)  | —     | dB                |
| AGC output amplitude                       | V <sub>4-31</sub>                      | PB V <sub>CC</sub> =5V                             | —     | (200) | —     | mV <sub>P-P</sub> |
| Rec circuit current                        | I <sub>18</sub>                        | Rec V <sub>CC</sub> =12V                           | —     | (33)  | —     | mA                |
| SP Y-Rec. current output                   | I <sub>17</sub>                        | Rec V <sub>CC</sub> =12V                           | —     | (12)  | —     | mA <sub>P-P</sub> |
| Rec. chroma output ratio                   | I <sub>17C</sub> /I <sub>17</sub>      | Rec V <sub>CC</sub> =12V                           | —     | (-12) | —     | dB                |
| Rec. current 2nd harmonics distortion      | D <sub>2f</sub>                        | Rec V <sub>CC</sub> =12V                           | —     | (-43) | —     | dB                |
| Cross-modulation relative level            | D <sub>M</sub>                         | Rec V <sub>CC</sub> =12V                           | —     | (-48) | —     | dB                |
| Auto tracking SP output voltage (1)        | V <sub>21SP1</sub>                     | PB V <sub>CC</sub> =4.8V, Vin=400mV <sub>P-P</sub> | (3.4) | —     | (3.9) | V                 |
| Auto tracking SP output voltage (2)        | V <sub>21SP2</sub>                     | PB V <sub>CC</sub> =4.8V, Vin=100mV <sub>P-P</sub> | (1.5) | —     | (2.5) | V                 |
| Auto tracking LP output voltage difference | V <sub>21LP</sub> -V <sub>21SP2</sub>  | PB V <sub>CC</sub> =4.8V                           | (0.1) | —     | (0.5) | V                 |

Note) The characteristics value in parentheses is not a guaranteed value, but reference one on design.

## ■ Functional Descriptions

### 1. Playback mode

- Pin36 (playback  $V_{CC}$ ) = 5V typ. (Pins15 and 17 are grounded internally)
- Pin18 (recording  $V_{CC}$ ) = open

#### (1) Selecting a head amplifier output channel

|    | Channel | Input pin | Head SW Pin1 | HASW Pin34 |
|----|---------|-----------|--------------|------------|
| SP | 1       | 4         | H            | L          |
|    | 2       | 6         | L            | L          |
| LP | 3       | 11        | L            | H          |
|    | 4       | 13        | H            | H          |

#### (2) Starting the envelope comparator

|                        |          |                        |
|------------------------|----------|------------------------|
| Env. ON/OFF SW<br>Pin2 | Open     | Low (special playback) |
| Env. comparator        | Inactive | Active                 |

#### (3) Automatic tracking interface

Pin24 (automatic tracking  $V_{CC}$ ) = 5V typ.

| HASW(Pin24) | Automatic tracking |
|-------------|--------------------|
| High        | LP                 |
| Low         | SP                 |

- When the SP mode of the automatic tracking interface switches to the LP mode, the gain of the amplifier increases 5.5dB.
- When the gain control voltage at Pin23 increases, the gain of the circuit increases.

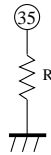
2. Recording mode

Pin18 (recording  $V_{CC}$ ) = 12V typ.

Pin36 (playback  $V_{CC}$ )  
Pin24 (automatic tracking  $V_{CC}$ ) } Opened or grounded

Pin35 : Recording internal bias current control

How to control :



- When the external resistance decreases, the internal circuit bias current ( $I_{total}$ ) increases.
- R should be 27 to 33k $\Omega$ .

○ HASW control at Pin34

| HASW Pin34 | SP output | LP output | Pin11,13 | Pin4,6 | Pin19 |
|------------|-----------|-----------|----------|--------|-------|
| H          | OFF       | active    | GND      | Diode  | Open  |
| L          | active    | OFF       | Diode    | GND    | GND   |

■ Reference

