

# SECAM chroma signal processor for VHS VCRs

## BA7207AS / BA7207AK

The BA7207AS and BA7207AK are LSI components that incorporate the contain circuitry required for SECAM chroma signal processing. The ICs have both recording and playback systems and each includes a bell filter, a band-pass filter, a limiter amplifier, a multiply-by-four circuit, a divide-by-four circuit, and a sync-gate circuit.

### ●Applications

SECAM and VHS format video cassette recorders and camcorders

### ●Features

- 1) All filters required for SECAM chroma signal processing are provided.
- 2) Built-in chroma killer circuit.
- 3) Built-in switch circuit for selecting PAL chroma or SECAM chroma for the PB / REC system output.

### ●Absolute maximum ratings (Ta = 25°C)

| Parameter             |          | Symbol          | Limits          | Unit |
|-----------------------|----------|-----------------|-----------------|------|
| Power supply voltage  |          | V <sub>CC</sub> | 7               | V    |
| Power dissipation     | BA7207AS | Pd              | 1400 (SDIP32)*1 | mW   |
|                       | BA7207AK |                 | 850 (QFP44)*2   |      |
| Operating temperature | BA7207AS | Topr            | – 25 ~ + 75     | °C   |
|                       | BA7207AK |                 | – 25 ~ + 65     |      |
| Storage temperature   |          | Tstg            | – 55 ~ + 125    | °C   |

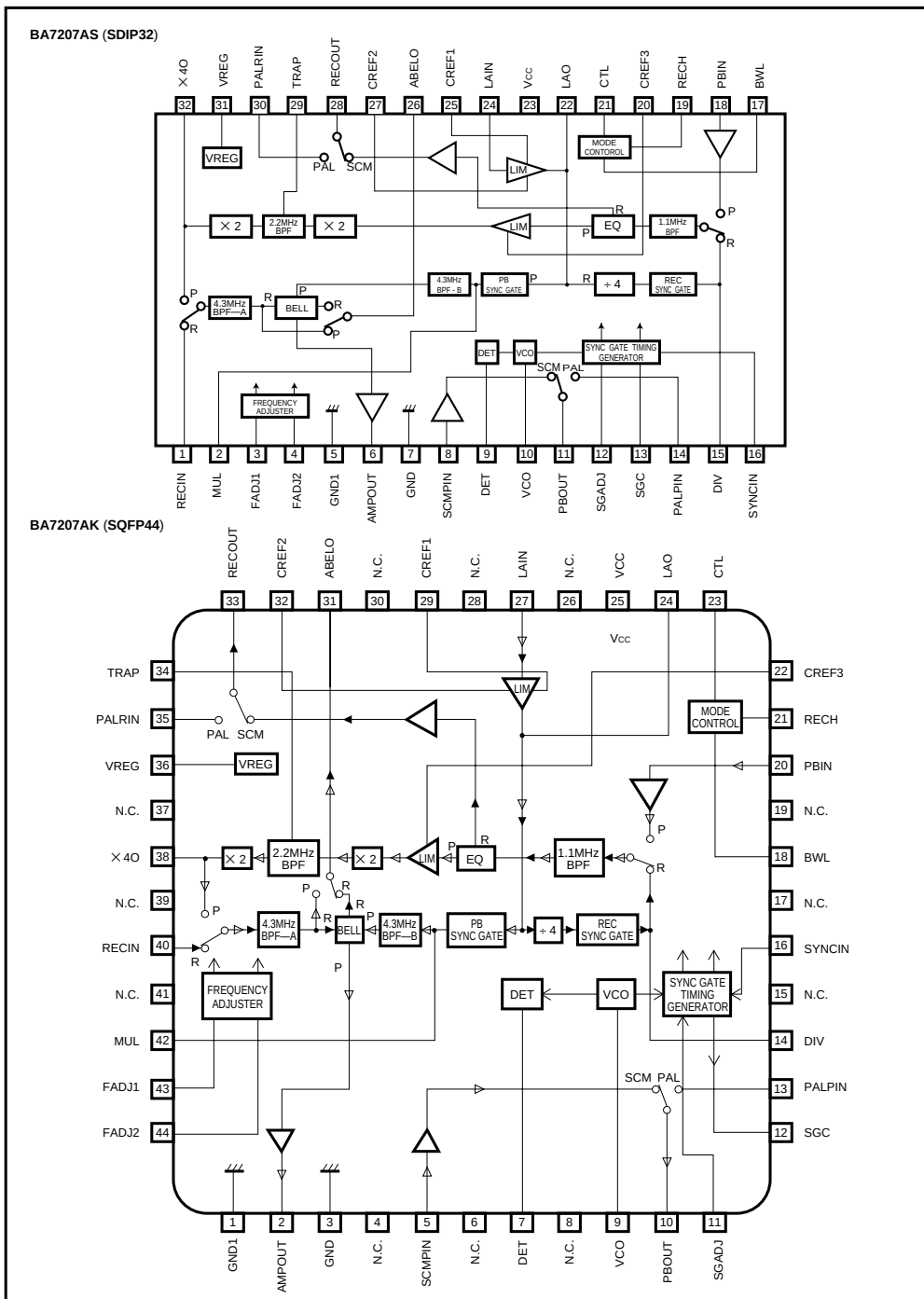
\*1 Reduced by 14mW for each increase in Ta of 1°C over 25°C.

\*2 When mounted on a 70mm × 70mm, t = 1.6mm glass epoxy board, reduced by 8.5W for each increase in Ta of 1°C over 25°C.

### ●Recommended operating conditions (Ta = 25°C)

| Parameter                      | Symbol          | Min. | Typ. | Max. | Unit |
|--------------------------------|-----------------|------|------|------|------|
| Operating power supply voltage | V <sub>CC</sub> | 4.5  | 5.0  | 5.5  | V    |

## ● Block diagram



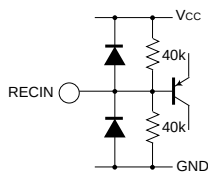
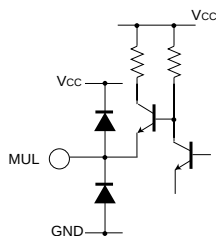
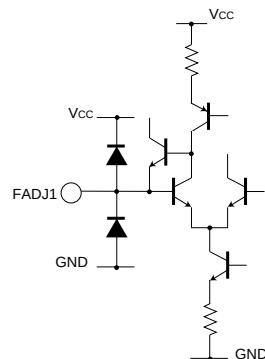
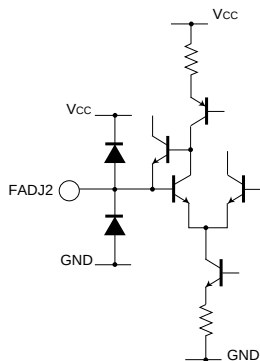
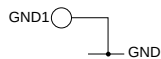
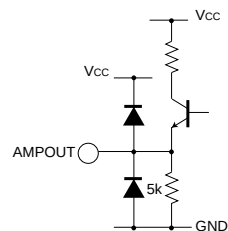
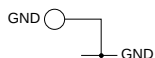
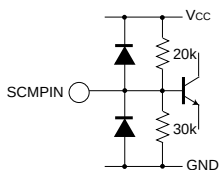
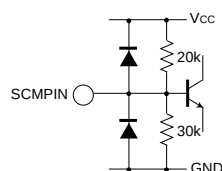
## ● Pin descriptions

| Pin No. | Pin name | Function                                                                                                                                                                                    |
|---------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 (40)  | RECIN    | Recording system input.<br>Input the REC system chroma signal.                                                                                                                              |
| 2 (42)  | MUL      | PB sync gate output.<br>Test pin. Outputs the chroma signal after it is multiplied by four and passed through the sync gate. Normally connected to V <sub>CC</sub> to prevent interference. |
| 3 (43)  | FADJ1    | Filter fo adjustment pin 1.<br>Used to adjust fo for the equalizer, 1.1MHz BPF and 2.2MHz BPF. Connect a resistor and variable resistor from this pin to GND.                               |
| 4 (44)  | FADJ2    | Filter fo adjustment pin 2.<br>Used to adjust fo for the bell filter, 4.3MHz BPF-A and 4.3MHz BPF-B. Connect a resistor and variable resistor from this pin to GND.                         |
| 5 (1)   | GND1     | Ground.                                                                                                                                                                                     |
| 6 (2)   | AMPOUT   | PB system preamplifier output.<br>Connect to GND via a variable resistor to adjust the level, and input to pin 8.                                                                           |
| 7 (3)   | GND      | Ground.                                                                                                                                                                                     |
| 8 (5)   | SCMPIN   | PB system output amplifier input.<br>Input the level-adjusted PB system SECAM chroma signal.                                                                                                |
| 9 (7)   | DET      | Phase comparator output.<br>Connect to GND via a RC LPF to obtain the error voltage.                                                                                                        |
| 10 (9)  | VCO      | VCO oscillator frequency control pin.<br>The error voltage is input via a resistor. Connected to GND via free-running frequency setting resistor.                                           |
| 11 (10) | PBOUT    | PB system output.<br>Outputs the PB system chroma signal.                                                                                                                                   |
| 12 (11) | SGADJ    | Fine adjustment for the sync gate phase.<br>The voltage from a resistor divider is used for fine adjustment of the gate phase of the sync gate. Normally open.                              |
| 13 (12) | SGC      | Sync gate timing output.<br>Test pin. Outputs the REC sync gate timing. Normally open.                                                                                                      |
| 14 (13) | PALPIN   | PAL PB system input.<br>Input chroma signal for the PAL PB system.                                                                                                                          |
| 15 (14) | DIV      | Divide-by-four divider output.<br>Test pin. Outputs the chroma signal after it has been divided by four. Normally connected to V <sub>CC</sub> to prevent interference.                     |
| 16      | SYNCIN   | Delayed sync signal input.<br>Input the synchronously-separated composite                                                                                                                   |

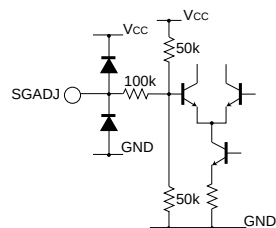
| Pin No. | Pin name        | Function                                                                                                                                                                      |
|---------|-----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 17 (18) | BWL             | Chroma killer mode setting . "L" sets the IC in chroma killer mode.                                                                                                           |
| 18 (20) | PBIN            | PB system input .<br>Input chroma signal for the PB system.                                                                                                                   |
| 19 (21) | RECH            | REC / PB mode switch.<br>Set to open or "H" for REC mode, "L" for PB mode.                                                                                                    |
| 20 (22) | CREF3           | Bias terminal for the limiter amplifier before $\times 2$ .<br>Connect to GND via a capacitor.                                                                                |
| 21 (23) | CTL             | SECAM / PAL output switch.<br>Selects the signal output for the REC / PB terminal. Set to open or "H" for SECAM output mode, "L" for PAL mode.                                |
| 22 (24) | LAO             | Limiter amplifier output.<br>Test pin. Outputs the amplitude-limited chroma signal. Normally connected to V <sub>CC</sub> to prevent interference.                            |
| 23 (25) | V <sub>CC</sub> | Power supply.                                                                                                                                                                 |
| 24 (27) | LAIN            | Limiter amplifier input.<br>Input the de-emphasised chroma signal.                                                                                                            |
| 25 (29) | CREF1           | Limiter amplifier bias pin 1.<br>Connect to GND via a capacitor.                                                                                                              |
| 26 (31) | ABELO           | REC BELL output. When in REC mode, de-emphasised chroma signal is output via REC BELL. When in PB mode, the PB system chroma signal is output after being multiplied by four. |
| 27 (32) | CREF2           | Limiter amplifier bias pin 2.<br>Connect to GND via a capacitor.                                                                                                              |
| 28 (33) | RECOUT          | REC system output.<br>REC system chroma signal output.                                                                                                                        |
| 29 (34) | TRAP            | TRAP connection.<br>Connect TRAP that rejects spurious signal component after $\times 2$ multiplication.                                                                      |
| 30 (35) | PALRIN          | PAL REC system input.<br>PAL REC system chroma signal input.                                                                                                                  |
| 31 (36) | VREG            | Regulated voltage output.<br>Output for the regulated 2.5V reference voltage used for internal biasing. Connect to GND via a bypass capacitor.                                |
| 32 (38) | $\times 40$     | $\times 4$ multiply output.<br>Test pin. Outputs the chroma signal after it is multiplied by four. Normally connected to V <sub>CC</sub> to prevent interference.             |

BA7207AK pin numbers are given in brackets.

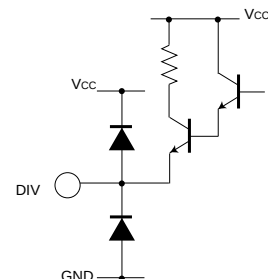
## ● Input / output circuits

1pin  
(40pin)2pin  
(42pin)3pin  
(43pin)4pin  
(44pin)5pin  
(1pin)6pin  
(2pin)7pin  
(3pin)8pin  
(5pin)9pin  
(7pin)

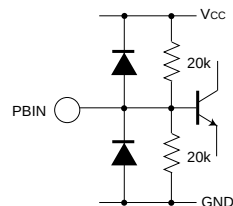
12pin  
(11pin)



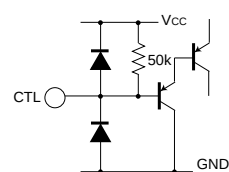
15pin  
(14pin)

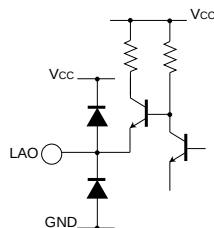
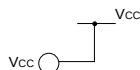
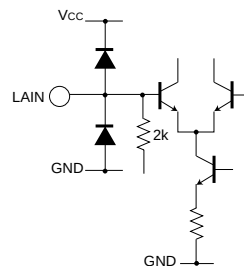
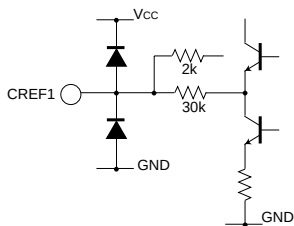
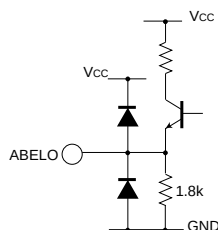
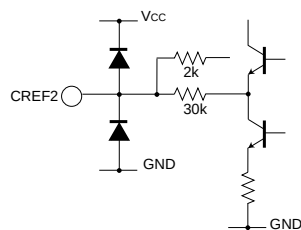
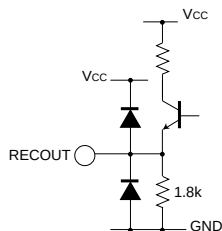
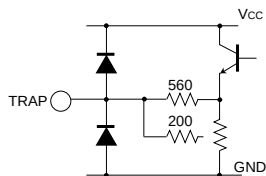
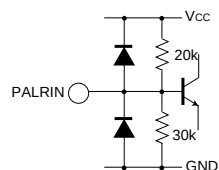
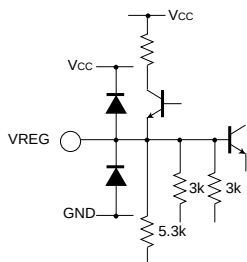
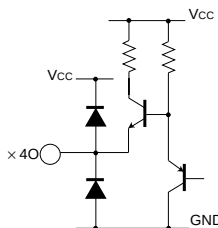


18pin  
(20pin)



21pin  
(23pin)



22pin  
(24pin)23pin  
(25pin)24pin  
(27pin)25pin  
(29pin)26pin  
(31pin)27pin  
(32pin)28pin  
(33pin)29pin  
(34pin)30pin  
(35pin)31pin  
(36pin)32pin  
(38pin)

Pin numbers in parentheses are for the BA7207AK.

●Electrical characteristics (unless otherwise noted, Ta = 25°C, V<sub>CC</sub> = 5.0V)

| Parameter                                | Symbol            | Min.  | Typ.   | Max.  | Unit              | Conditions                                            | Measurement circuit |
|------------------------------------------|-------------------|-------|--------|-------|-------------------|-------------------------------------------------------|---------------------|
| [Total device]                           |                   |       |        |       |                   |                                                       |                     |
| REC mode supply current                  | I <sub>REC</sub>  | 39.2  | 56.0   | 72.8  | mA                | REC mode                                              | Fig.1               |
| PB mode supply current                   | I <sub>PB</sub>   | 46.9  | 67.0   | 87.1  | mA                | PB mode                                               | Fig.1               |
| Regulator voltage                        | V <sub>REG</sub>  | 2.38  | 2.53   | 2.68  | V                 |                                                       | Fig.1               |
| [Sync-gate block]                        |                   |       |        |       |                   |                                                       |                     |
| VCO free-running frequency               | f <sub>osc</sub>  | 13.8  | 15.625 | 17.4  | kHz               |                                                       | Fig.1               |
| Capture range "H"                        | CR <sub>H</sub>   | 1.8   | —      | —     | kHz               | Delayed sync input                                    | Fig.1               |
| Capture range "L"                        | CR <sub>L</sub>   | —     | —      | – 1.8 | kHz               | Delayed sync input                                    | Fig.1               |
| Lock range "H"                           | LR <sub>H</sub>   | 2.2   | —      | —     | kHz               | Delayed sync input                                    | Fig.1               |
| Lock range "L"                           | LR <sub>L</sub>   | —     | —      | – 2.2 | kHz               | Delayed sync input                                    | Fig.1               |
| [REC system]                             |                   |       |        |       |                   |                                                       |                     |
| RECOUT output amplitude                  | V <sub>REC</sub>  | 187.5 | 250.0  | 312.5 | mV <sub>P-P</sub> | Cyan level (cyan frequency)                           | Fig.1               |
| Unwanted spectrum rejection              |                   |       |        |       |                   |                                                       |                     |
| 4MHz component                           | HD <sub>R4</sub>  | —     | —      | – 25  | dB                | V <sub>i</sub> = 170mV <sub>P-P</sub> , 4.286MHz      | Fig.1               |
| 3MHz component                           | HD <sub>R3</sub>  | —     | —      | – 25  | dB                | V <sub>i</sub> = 170mV <sub>P-P</sub> , 4.286MHz      | Fig.1               |
| 2MHz component                           | HD <sub>R2</sub>  | —     | —      | – 25  | dB                | V <sub>i</sub> = 170mV <sub>P-P</sub> , 4.286MHz      | Fig.1               |
| Output switch voltage gain               | G <sub>RS</sub>   | – 1   | 0      | 1     | dB                | V <sub>30</sub> = 0.3V <sub>P-P</sub> , 627kHz        | Fig.1               |
| Output switch frequency characteristic   | f <sub>RS</sub>   | – 1   | 0      | 1     | dB                | V <sub>30</sub> = 0.3V <sub>P-P</sub> , 5MHz / 100kHz | Fig.1               |
| Output switch crosstalk 1                | CT <sub>R1</sub>  | —     | – 60   | —     | dB                | V <sub>18</sub> = 25mV <sub>P-P</sub> , 1.0715MHz     | Fig.1               |
| Output switch crosstalk 2                | CT <sub>R2</sub>  | —     | – 60   | —     | dB                | V <sub>30</sub> = 0.3V <sub>P-P</sub> , 627kHz        | Fig.1               |
| [PB system]                              |                   |       |        |       |                   |                                                       |                     |
| PB output amplitude                      | V <sub>PB</sub>   | 202.5 | 270.0  | 337.5 | mV <sub>P-P</sub> | Cyan level (cyan frequency)                           | Fig.1               |
| Unwanted spectrum rejection              |                   |       |        |       |                   |                                                       |                     |
| 3MHz component                           | HD <sub>P3</sub>  | —     | —      | – 35  | dB                | V <sub>18</sub> = 25mV <sub>P-P</sub> , 1.0715MHz     | Fig.1               |
| 2MHz component                           | HD <sub>P2</sub>  | —     | —      | – 35  | dB                | V <sub>18</sub> = 25mV <sub>P-P</sub> , 1.0715MHz     | Fig.1               |
| 1MHz component                           | HD <sub>P1</sub>  | —     | —      | – 35  | dB                | V <sub>18</sub> = 25mV <sub>P-P</sub> , 1.0715MHz     | Fig.1               |
| Output switch voltage gain 1             | G <sub>P1</sub>   | 5     | 6      | 7     | dB                | V <sub>8</sub> = 0.3V <sub>P-P</sub> , 4.3MHz         | Fig.1               |
| Output switch frequency characteristic 1 | f <sub>P1</sub>   | – 1   | 0      | 1     | dB                | V <sub>8</sub> = 0.3V <sub>P-P</sub> , 5MHz / 100kHz  | Fig.1               |
| Output switch crosstalk 1                | CT <sub>P1</sub>  | —     | – 60   | —     | dB                | V <sub>8</sub> = 0.3V <sub>P-P</sub> , 4.3MHz         | Fig.1               |
| Output switch voltage gain 2             | G <sub>P2</sub>   | – 1   | 0      | 1     | dB                | V <sub>14</sub> = 0.3V <sub>P-P</sub> , 4.43MHz       | Fig.1               |
| Output switch frequency characteristic 2 | f <sub>P2</sub>   | – 1   | 0      | 1     | dB                | V <sub>14</sub> = 0.3V <sub>P-P</sub> , 5MHz / 100kHz | Fig.1               |
| Output switch crosstalk 2                | CT <sub>P2</sub>  | —     | – 60   | —     | dB                | V <sub>14</sub> = 0.3V <sub>P-P</sub> , 4.43MHz       | Fig.1               |
| RECIN crosstalk                          | CT <sub>RIN</sub> | —     | – 40   | – 30  | dB                | V <sub>i</sub> = 0.5V <sub>P-P</sub> , 4.286MHz       | Fig.1               |
| [Control system]                         |                   |       |        |       |                   |                                                       |                     |
| High level voltage                       | V <sub>H</sub>    | 2.5   | —      | —     | V                 | Pins 14, 17, 19, 21 and 30 (Pins 13,18,21,23 and 35)* | Fig.1               |
| Low level voltage                        | V <sub>L</sub>    | —     | —      | 1.5   | V                 | Pins 14, 17, 19, 21 and 30 (Pins 13,18,21,23 and 35)* | Fig.1               |

\* BA7207AK pin numbers are given in brackets.

| Parameter                                  | Symbol           | Min.   | Typ.   | Max.   | Unit | Conditions                                        | Measurement circuit |
|--------------------------------------------|------------------|--------|--------|--------|------|---------------------------------------------------|---------------------|
| [Filter block]                             |                  |        |        |        |      |                                                   |                     |
| (1.1MHz BPF characteristic)                |                  |        |        |        |      |                                                   |                     |
| 1.1MHz voltage gain                        | G <sub>F11</sub> | − 2.8  | 0.7    | 4.2    | dB   | V <sub>18</sub> = 25mV <sub>P-P</sub> , 1.0715MHz | Fig.1               |
| 0.5MHz voltage gain                        | G <sub>F12</sub> | − 6.5  | − 3.0  | 0.5    | dB   | V <sub>18</sub> = 25mV <sub>P-P</sub> , 0.5MHz    | Fig.1               |
| 3.2MHz voltage gain                        | G <sub>F13</sub> | —      | − 35.0 | − 26.0 | dB   | V <sub>18</sub> = 25mV <sub>P-P</sub> , 3.2145MHz | Fig.1               |
| (4.3MHz BPF - A characteristic)            |                  |        |        |        |      |                                                   |                     |
| 4.3MHz voltage gain                        | G <sub>F31</sub> | − 11.3 | − 7.8  | − 4.3  | dB   | V <sub>1</sub> = 500mV <sub>P-P</sub> , 4.286MHz  | Fig.1               |
| 3.2MHz voltage gain                        | G <sub>F32</sub> | − 16.1 | − 12.6 | − 9.1  | dB   | V <sub>1</sub> = 500mV <sub>P-P</sub> , 3.2MHz    | Fig.1               |
| 5.5MHz voltage gain                        | G <sub>F33</sub> | − 14.0 | − 10.5 | − 7.0  | dB   | V <sub>1</sub> = 500mV <sub>P-P</sub> , 5.5MHz    | Fig.1               |
| (REC BELL + 4.3MHz BPF - A characteristic) |                  |        |        |        |      |                                                   |                     |
| 4.3MHz voltage gain                        | G <sub>RB1</sub> | − 0.7  | 2.8    | 6.3    | dB   | V <sub>1</sub> = 170mV <sub>P-P</sub> , 4.286MHz  | Fig.1               |
| 4.1MHz voltage gain                        | G <sub>RB2</sub> | − 7.0  | − 3.5  | 0      | dB   | V <sub>1</sub> = 170mV <sub>P-P</sub> , 4.1MHz    | Fig.1               |
| 4.5MHz voltage gain                        | G <sub>RB3</sub> | − 7.2  | − 3.7  | − 0.2  | dB   | V <sub>1</sub> = 170mV <sub>P-P</sub> , 4.5MHz    | Fig.1               |
| (PB BELL + 4.3MHz BPF - A characteristic)  |                  |        |        |        |      |                                                   |                     |
| 4.3MHz voltage gain                        | G <sub>PB1</sub> | − 20.9 | − 17.4 | − 13.9 | dB   | V <sub>1</sub> = 800mV <sub>P-P</sub> , 4.286MHz  | Fig.1               |
| 4.1MHz voltage gain                        | G <sub>PB2</sub> | − 16.2 | − 12.7 | − 9.2  | dB   | V <sub>1</sub> = 800mV <sub>P-P</sub> , 4.1MHz    | Fig.1               |
| 4.5MHz voltage gain                        | G <sub>PB3</sub> | − 15.3 | − 11.8 | − 8.3  | dB   | V <sub>1</sub> = 800mV <sub>P-P</sub> , 4.5MHz    | Fig.1               |
| (REC EQ + 1.1MHz BPF characteristic)       |                  |        |        |        |      |                                                   |                     |
| 1.1MHz voltage gain                        | G <sub>RE1</sub> | − 4.0  | − 0.5  | 3.0    | dB   | V <sub>18</sub> = 95mV <sub>P-P</sub> , 1.0715MHz | Fig.1               |
| 1.0MHz voltage gain                        | G <sub>RE2</sub> | 4.1    | 7.6    | 11.1   | dB   | V <sub>18</sub> = 95mV <sub>P-P</sub> , 1.0MHz    | Fig.1               |
| 1.2MHz voltage gain                        | G <sub>RE3</sub> | 6.7    | 10.2   | 13.7   | dB   | V <sub>18</sub> = 95mV <sub>P-P</sub> , 1.2MHz    | Fig.1               |
| (PB EQ + 1.1MHz BPF characteristic)        |                  |        |        |        |      |                                                   |                     |
| 1.1MHz voltage gain                        | G <sub>PE1</sub> | 2.5    | 6.0    | 9.5    | dB   | V <sub>18</sub> = 25mV <sub>P-P</sub> , 1.0715MHz | Fig.1               |
| 1.0MHz voltage gain                        | G <sub>PE2</sub> | − 5.1  | − 1.6  | 1.9    | dB   | V <sub>18</sub> = 25mV <sub>P-P</sub> , 1.0MHz    | Fig.1               |
| 1.2MHz voltage gain                        | G <sub>PE3</sub> | − 8.9  | − 5.4  | − 1.9  | dB   | V <sub>18</sub> = 25mV <sub>P-P</sub> , 1.2MHz    | Fig.1               |

●Guaranteed design parameters (unless otherwise noted, T<sub>a</sub> = 25°C, V<sub>CC</sub> = 5.0V, delayed sync input)

| Parameter               | Symbol          | Min. | Typ. | Max. | Unit | Conditions                      |
|-------------------------|-----------------|------|------|------|------|---------------------------------|
| REC sync-gate phase     | T <sub>DR</sub> | 1.3  | 2.4  | 3.5  | μs   | DIV (pin 14 / pin 15), REC mode |
| PB sync-gate phase      | T <sub>DP</sub> | 0.5  | 1.6  | 2.7  | μs   | MUL (pin 2 / pin 42), PB mode   |
| REC sync-gate amplitude | T <sub>WR</sub> | 4.9  | 5.2  | 5.5  | μs   | DIV (pin 15 / pin 14), REC mode |
| PB sync-gate amplitude  | T <sub>WP</sub> | 6.1  | 6.4  | 6.7  | μs   | MUL (pin 2 / pin 42), PB mode   |

The pin numbers in brackets are for the BA7207AS and the BA7207AK respectively.

## ●Reference design data

(unless otherwise noted, Ta = 25°C, Vcc = 5.0V, fo (REC BELL) = 4.286MHz, fo (PB EQ) = 1.0715MHz)

| Parameter                | Symbol | Min. | Typ.   | Max. | Unit | Conditions                             |
|--------------------------|--------|------|--------|------|------|----------------------------------------|
| 〈1.1MHzBPF〉              |        |      |        |      |      |                                        |
| 1.1MHz gain              | GF11   | —    | 1.0    | —    | dB   | VIN = 0.3VP-P, 1.0715MHz               |
| 0.5MHz suppression ratio | GF12   | —    | − 4.0  | —    | dB   | VIN = 0.3VP-P, 0.5MHz                  |
| 3.2MHz suppression ratio | GF13   | —    | − 30.0 | —    | dB   | VIN = 0.3VP-P, 3.2145MHz               |
| Groupe delay time        | DF1    | 370  | 420    | 470  | nS   | VIN = 0.3VP-P, 1.0715MHz               |
| 〈2.2MHzBPF〉              |        |      |        |      |      |                                        |
| 2.2MHz gain              | GF21   | —    | − 6.0  | —    | dB   | VIN = 0.3VP-P, 2.143MHz                |
| 1.1MHz suppression ratio | GF22   | —    | − 25.0 | —    | dB   | VIN = 0.3VP-P, 1.0715MHz               |
| 3.2MHz suppression ratio | GF23   | —    | − 25.0 | —    | dB   | VIN = 0.3VP-P, 3.2145MHz               |
| Groupe delay time        | DF2    | 180  | 230    | 280  | ns   | VIN = 0.3VP-P, 2.143MHz                |
| 〈4.3MHz BPF - A〉         |        |      |        |      |      |                                        |
| 4.3MHz gain              | GF31   | —    | 7.0    | —    | dB   | VIN = 0.1VP-P, 4.286MHz                |
| 3.2MHz suppression ratio | GF32   | —    | − 3.0  | —    | dB   | VIN = 0.1VP-P, 3.2MHz                  |
| 5.5MHz suppression ratio | GF33   | —    | − 3.0  | —    | dB   | VIN = 0.1VP-P, 5.5MHz                  |
| Groupe delay time        | DF3    | 160  | 210    | 260  | nS   | VIN = 0.1VP-P, 4.286MHz                |
| 〈4.3MHz BPF - B〉         |        |      |        |      |      |                                        |
| 4.3MHz gain              | GF41   | —    | 9.0    | —    | dB   | VIN = 0.1VP-P, 4.286MHz                |
| 3.5MHz suppression ratio | GF42   | —    | − 3.0  | —    | dB   | VIN = 0.1VP-P, 3.5MHz                  |
| 5.2MHz suppression ratio | GF43   | —    | − 3.0  | —    | dB   | VIN = 0.1VP-P, 5.2MHz                  |
| Groupe delay time        | DF4    | 250  | 300    | 350  | nS   | VIN = 0.1VP-P, 4.286MHz                |
| 〈REC BELL〉               |        |      |        |      |      |                                        |
| 4.3MHz gain              | GRB1   | —    | 19.5   | —    | dB   | VIN = 0.3VP-P, 4.286MHz                |
| 4.1MHz suppression ratio | GRB2   | —    | − 5.0  | —    | dB   | VIN = 0.3VP-P, 4.1MHz                  |
| 4.5MHz suppression ratio | GRB3   | —    | − 5.5  | —    | dB   | VIN = 0.3VP-P, 4.5MHz                  |
| 〈PB BELL〉                |        |      |        |      |      |                                        |
| 4.3MHz gain              | GPB1   | —    | − 19.5 | —    | dB   | VIN = 0.3VP-P, 4.286MHz                |
| 4.1MHz gain              | GPB2   | —    | 5.0    | —    | dB   | VIN = 0.3VP-P, 4.1MHz                  |
| 4.5MHz gain              | GPB3   | —    | 5.5    | —    | dB   | VIN = 0.3VP-P, 4.5MHz                  |
| Center frequency ratio   | dfOB   | − 1  | 0      | 1    | %    | dfOB = (fo (PB) − fo (REC)) / fo (REC) |
| 〈PB EQ〉                  |        |      |        |      |      |                                        |
| 1.1MHz gain              | GRE1   | —    | 19.5   | —    | dB   | VIN = 0.3VP-P, 1.0715MHz               |
| 1.0MHz suppression ratio | GRE2   | —    | − 8.0  | —    | dB   | VIN = 0.3VP-P, 1.0MHz                  |
| 1.2MHz suppression ratio | GRE3   | —    | − 11.0 | —    | dB   | VIN = 0.3VP-P, 1.2MHz                  |
| 〈REC EQ〉                 |        |      |        |      |      |                                        |
| 1.1MHz gain              | GPE1   | —    | − 19.5 | —    | dB   | VIN = 0.3VP-P, 1.0715MHz               |
| 1.0MHz gain              | GPE2   | —    | 8.0    | —    | dB   | VIN = 0.3VP-P, 1.0MHz                  |
| 1.2MHz gain              | GPE3   | —    | 11.0   | —    | dB   | VIN = 0.3VP-P, 1.2MHz                  |
| Center frequency ratio   | dfOE   | − 1  | 0      | 1    | %    | dfOE = (fo (REC) − fo (PB)) / fo (PB)  |



BA7207AK (QFP44)

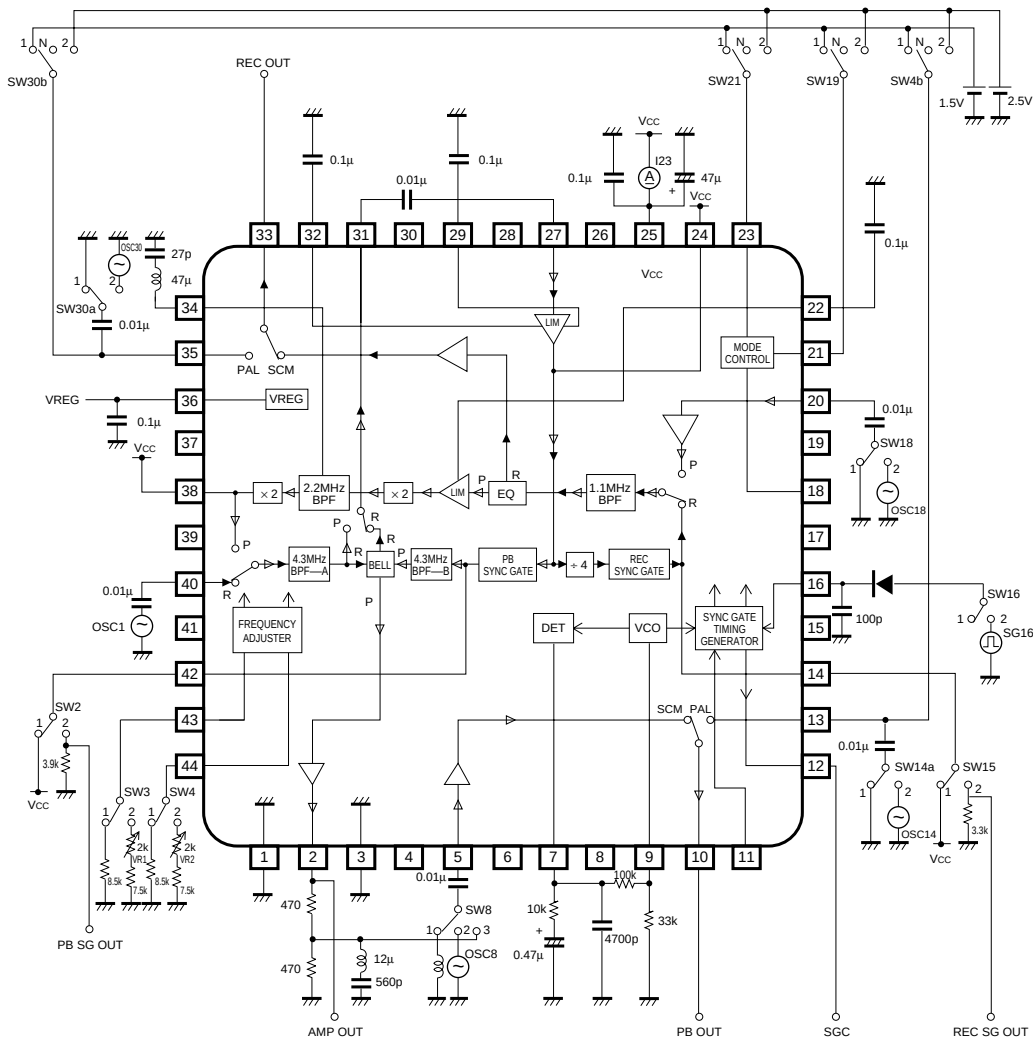


Fig. 2

### ● Circuit operation

#### (1) Recording system (REC)

The input to REC IN is passed through the 4.3MHz BPF-A to remove unwanted frequency components, and is flattened by REC BELL which has an anti-bell characteristic. The flattened signal is wave-shaped by the limiter amplifier, and processed by the divide-by-four and sync gate circuits. Finally, unwanted frequency components are removed by the 1.1MHz BPF and the REC EQ prepares the signal for recording playback and the signal is output on REC OUT. Refer to Fig. 3.

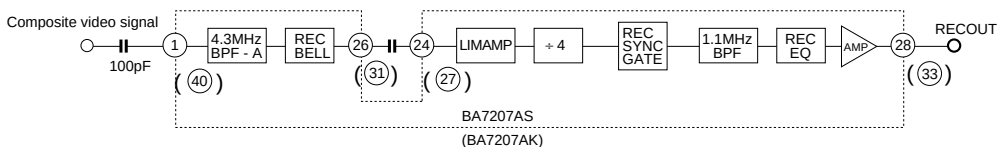


Fig. 3

#### (2) Playback system (PB)

The input to PB IN is passed through the 1.1MHz BPF to remove unwanted frequency components, and is flattened by the PB EQ circuit. The amplitude of the flattened signal is fixed by the 1st-stage limiter amplifier, and the frequency is multiplied by four by the multiplier circuit. Unwanted frequency components generated by the multiplier circuit are removed by the 2.2MHz BPF and 4.3MHz BPF-A. The signal is wave-shaped by the limiter amplifier, and has gate applied to it by the sync gate circuit then is passed through the 4.3MHz BPF-B to remove unwanted frequency components. The PB BELL circuit restores the original bell characteristic and the signal is output on PB OUT. Refer to Fig. 4.

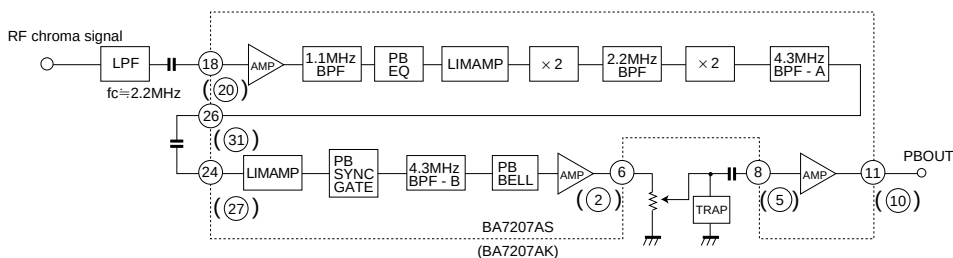


Fig. 4

#### (3) Sync gate timing circuit

REC and PB SYNC gate operation is as follows. The gate closes in synchronous with the SYNC IN input pulse during the synchronous signal pulse (SYNC) horizontal scan interval (64μs period). During vertical retrace (32μs period), the input pulse period becomes shorter than the horizontal scan interval. This is detected by the built-in vertical synchronous detector circuit which closes the gate. Refer to Fig. 5.

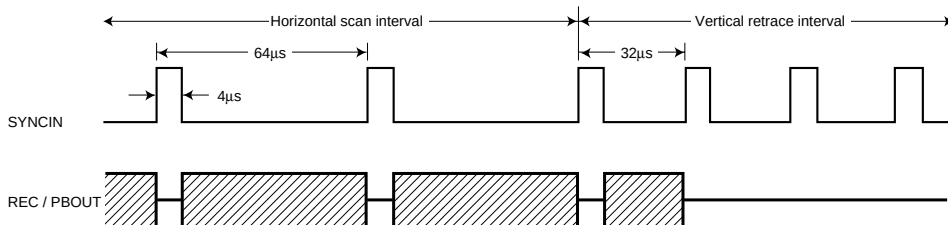
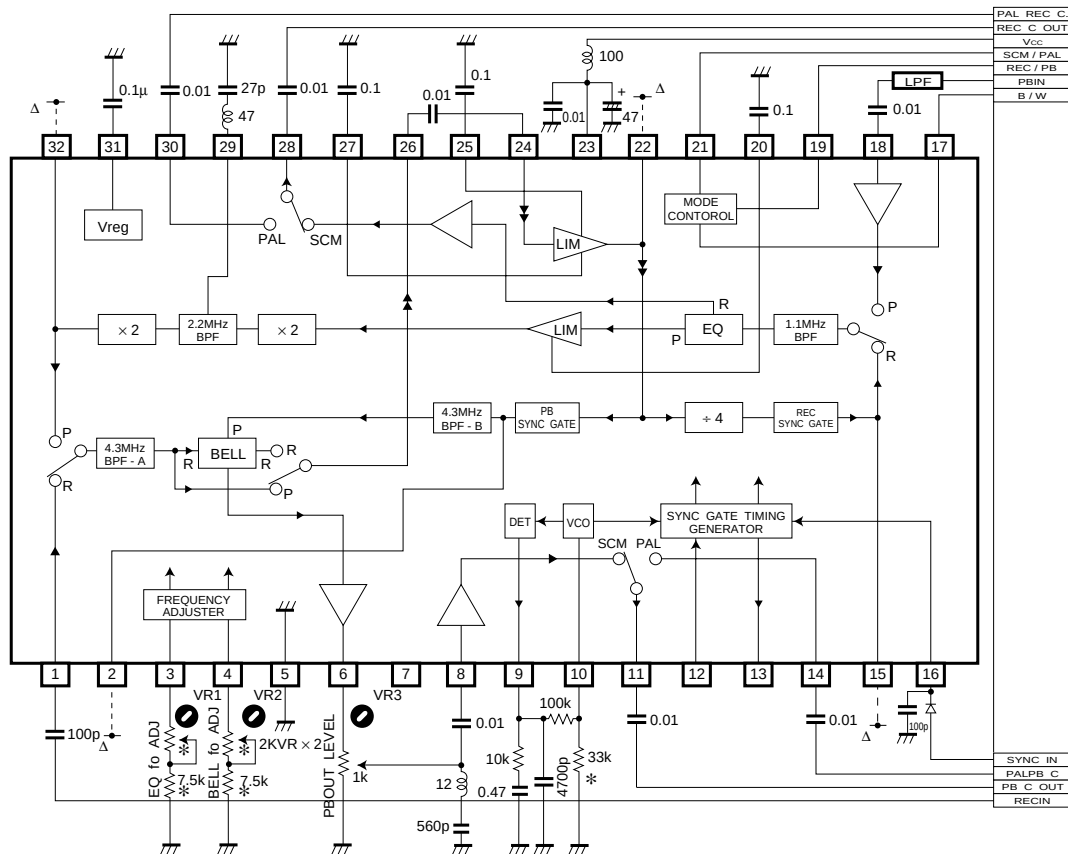


Fig. 5

## ● Application examples

## BA7207AS (SDIP32)



\* To cancel the temperature characteristic of the ID, the resistors marked with asterisks should be of the metal film, and have a temperature coefficient  $\pm 100\text{ppm} / ^\circ\text{C}$ .

Δ: Test pin. Connect to  $V_{CC}$  if unused.

The 100pF capacitor connected to pin 16 is intended to reduce temperature disper of the gate phase. It should have a static capacitance tolerance of  $\pm 10\%$  or Ic and a temperature coefficient of  $\pm 30\text{ppm} / ^\circ\text{C}$  ( $-55^\circ\text{C}$  to  $+125^\circ\text{C}$ ) A (CG).

Fig. 6

[illegible]

Δ: Test pin. Connect to V<sub>CC</sub> if unused.

The 100pF capacitor connected to pin 16 is intended to reduce temperature disper of the gate phase.It should have a static capacitance tolerance of  $\pm 10\%$  or 1c and a temperature coefficient of  $\pm 30\text{ppm} / ^\circ\text{C}$  ( $-55^\circ\text{C}$  to  $+125^\circ\text{C}$ ) A (CG).

- Control pin logic

|                         | Pin                  | Low           | High (Open) |
|-------------------------|----------------------|---------------|-------------|
| REC / PB setting switch | RECH (19pin / 21pin) | PB            | REC         |
| Output select switch    | CTL (21pin / 23pin)  | PAL           | SECAM       |
| Chroma killer switch    | BWL (17pin / 18pin)  | Chroma killer | NORMAL      |

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### ● Operation notes

#### (1) Equalizer fo adjustment

Set to PB mode and input a  $25\text{mV}_{\text{P-P}}$ ,  $1.0715\text{MHz}$  sine wave to PBIN. Adjust the variable resistor connected between FADJ1 and GND to maximize the REC OUT output. This adjustment also adjusts the  $1.1\text{MHz}$  and  $2.2\text{MHz}$  band-pass filters. The value of the variable resistor must be at least  $2\text{k}\Omega$ . If it is less than this, adjustment may not be possible.

#### (2) Bell filter fo adjustment

Set to REC mode and input a  $170\text{mV}_{\text{P-P}}$ ,  $4.286\text{MHz}$  sine wave to RECIN. Adjust the variable resistor connected between FADJ2 and GND to maximize the AMP OUT output. This adjustment also adjusts the  $4.3\text{MHz}$  and  $4.3\text{MHz}$  A and B band-pass filters. The value of the variable resistor must be at least  $2\text{k}\Omega$ . If it is less than this, adjustment may not be possible.

#### (3) Test pins

The MUL, DIV, LAO and 4XO pins are test terminals. By connecting these pins to GND via a  $3.6\text{k}\Omega$  resistor, it is possible to monitor there waveforms. When unused, connect these pins to  $V_{\text{CC}}$  to prevent interference.

#### (4) REC / PB input levels

The frequency characteristics of the built-in filters can change. For this reason use the following input signal levels:

RECIN:  $540\text{mV}_{\text{P-P}} + / - 6\text{dB}$  (cyan level)

PBIN:  $75\text{mV}_{\text{P-P}} + / - 6\text{dB}$  (cyan level)

#### (5) Capacitor connected to VREG

Use a ceramic with a static capacitance of  $0.1\mu\text{F}$ . The filter may not operate correctly with other capacitance values.

#### (6) PBIN input

If there is a chroma component imposed on the FM brightness signal, use a low-pass filter (with an  $f_c$  of about  $2.2\text{MHz}$ ) to remove the FM brightness signal component, and ensure that only the chroma component is input to PBIN.

#### (7) RECIN input

In the case of composite video input, connect a  $100\text{pF}$  capacitor to ensure that only the chroma component is input to RECIN.

#### (8) Sync-gate phase adjustment

Perform fine adjustment of the sync-gate phase by applying a voltage to the SGADJ terminal, or using a resistor divider connected between  $V_{\text{CC}}$  and GND. The adjustment sensitivity is shown in Fig. 6.

SGADJ pin voltage when open:  $V_{\text{SGADJ}} = 2.5\text{V}$   
Input impedance  $Z = 125\text{k}\Omega$

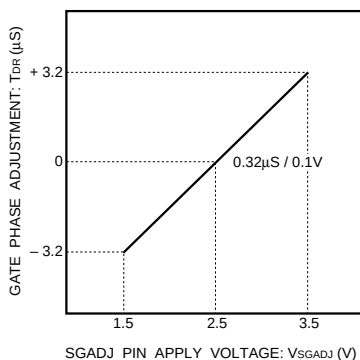


Fig. 8 Sync-gate phase

● Electrical characteristic curves

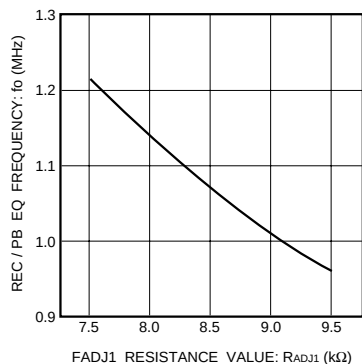


Fig. 9 REC / PB EQ fo frequency adjustment range

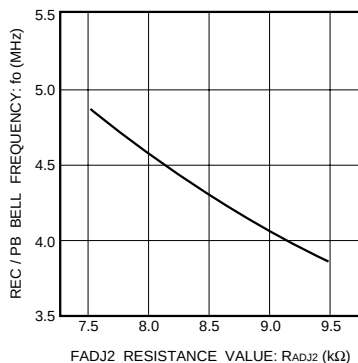


Fig. 10 REC / PB BELL fo frequency adjustment range

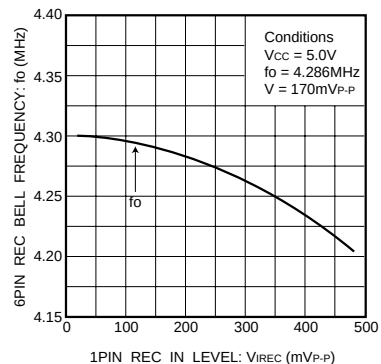


Fig. 11 REC / BELL fo frequency variation

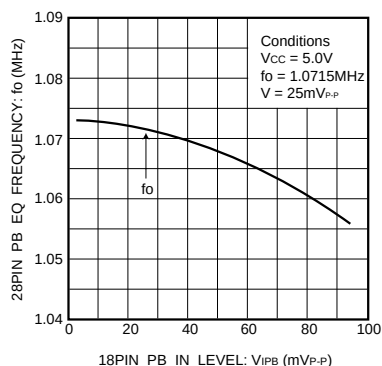


Fig. 12 PB EQ fo frequency variation characteristics

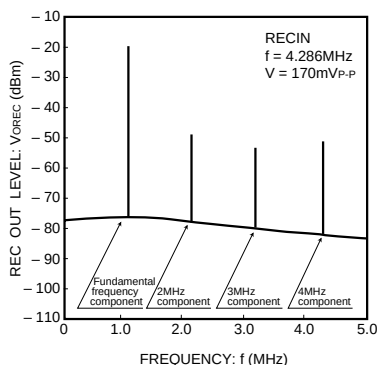


Fig. 13 REC OUT spurious characteristics

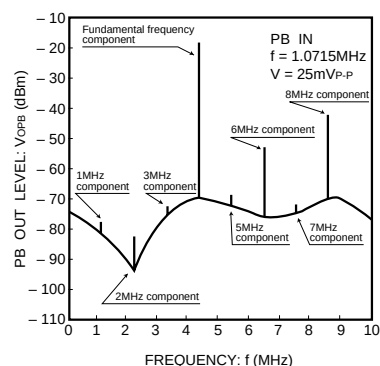
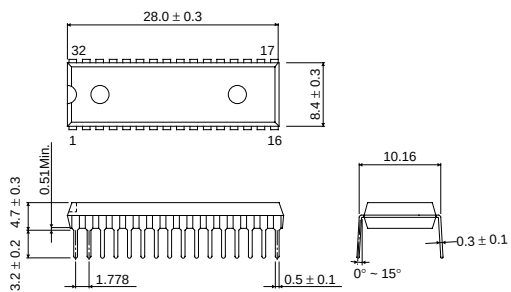


Fig. 14 PB OUT spurious characteristics

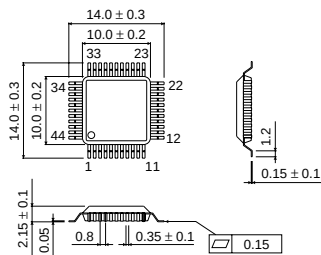
## ● External dimensions (Units: mm)

BA7207AS



SDIP32

BA7207AK



QFP44