

# Video signal switcher

## BA7606/BA7606F/BA7606FS

The BA7606, BA7606F and BA7606FS are switching ICs developed for use in video cameras. Each contains three two-channel analog multiplexers. They feature a large dynamic range, and wide operating frequency range, and the switches have pedestal clamp inputs which are ideal for switching RGB and video signals.

### ●Applications

Video cassette recorders and televisions

### ●Features

- |                                         |                                                            |
|-----------------------------------------|------------------------------------------------------------|
| 1) Three 2-input / 1-output switches.   | 5) Excellent frequency characteristics (10MHz, -1dB Typ.). |
| 2) 5V power supply.                     | 6) Wide dynamic range (2.6V <sub>P-P</sub> Typ.).          |
| 3) Pedestal clamp inputs                | 7) Fast switching speed (50ns Typ.).                       |
| 4) Low power consumption (62.5mW Typ.). |                                                            |

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

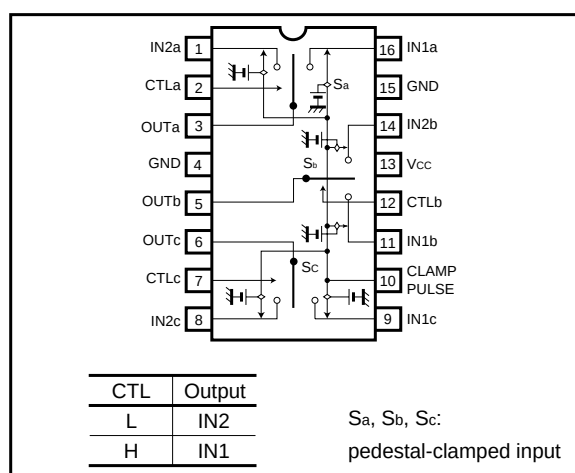
| Parameter             | Symbol           | Limits        | Unit |
|-----------------------|------------------|---------------|------|
| Power supply voltage  | V <sub>CC</sub>  | 9             | V    |
| Power dissipation     | BA7606           | 500*1         | mW   |
|                       | BA7606F          | 500*2         |      |
|                       | BA7606FS         | 650*3         |      |
| Operating temperature | T <sub>opr</sub> | - 40 to + 85  | °C   |
| Storage temperature   | T <sub>stg</sub> | - 55 to + 125 | °C   |

\*1 Reduced by 5.0mW for each increase in Ta of 1°C over 25°C.(BA7606)

\*2 Reduced by 5.0mW for each increase in Ta of 1°C over 25°C.(BA7606F)

\*3 Reduced by 6.5mW for each increase in Ta of 1°C over 25°C.(BA7606FS)

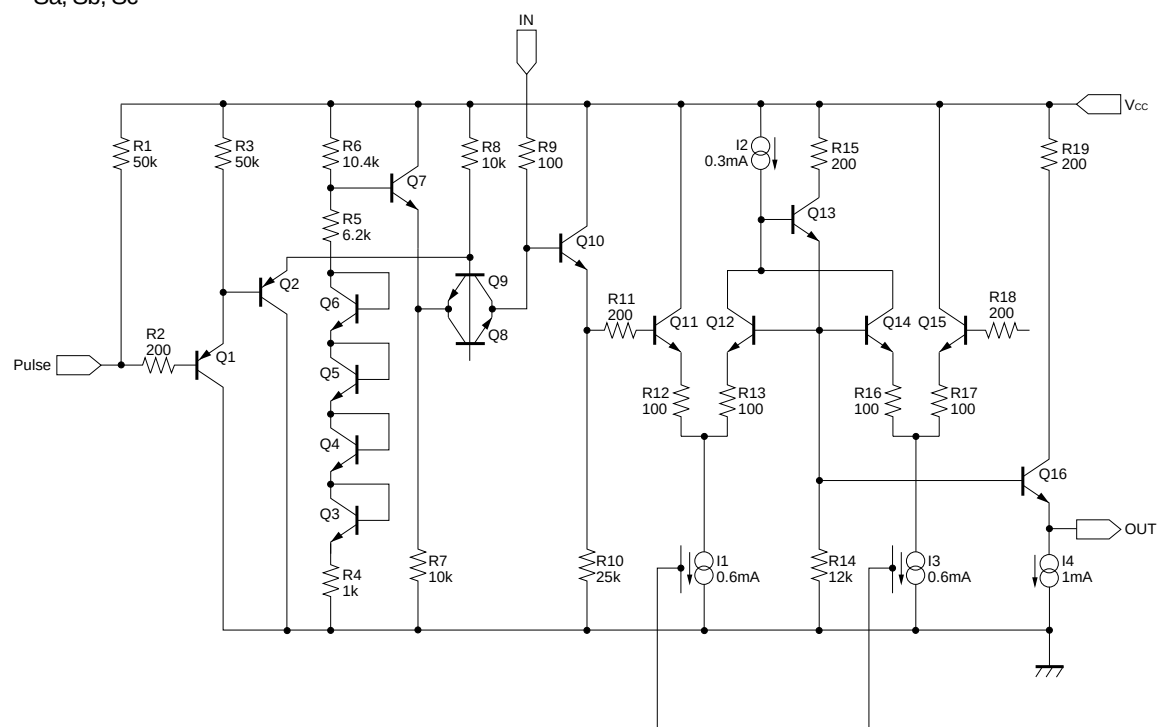
### ●Block diagram



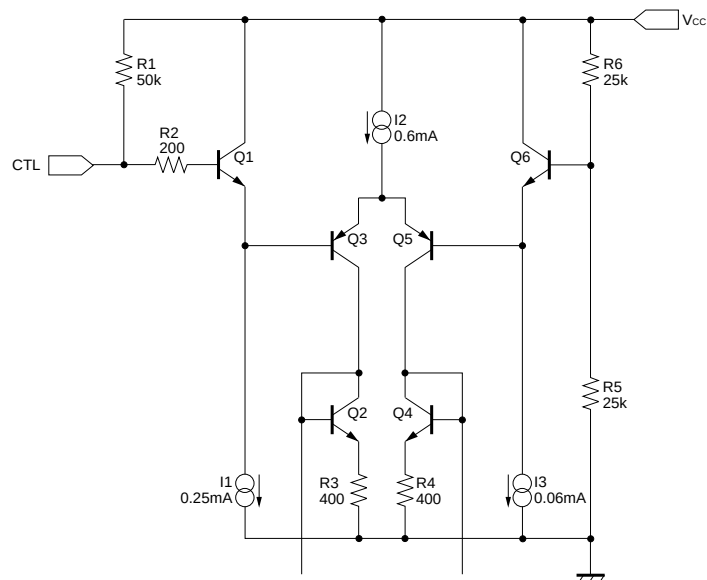
## Multimedia ICs

## ●Equivalent circuits

Sa, Sb, Sc



CTL



## Multimedia ICs

●Electrical characteristics (unless otherwise noted, Ta=25°C, V<sub>CC</sub>=5V)

| Parameter                 | Symbol           | Min. | Typ. | Max. | Unit             | Conditions                                        |
|---------------------------|------------------|------|------|------|------------------|---------------------------------------------------|
| Operating voltage         | V <sub>CC</sub>  | 4.5  | 5.0  | 5.5  | V                | —                                                 |
| Supply current            | I <sub>CC</sub>  | —    | 15.0 | 23.0 | mA               | —                                                 |
| Maximum output level U    | V <sub>omU</sub> | 1.40 | 1.65 | —    | V <sub>P-P</sub> | Note 1                                            |
| Maximum output level D    | V <sub>omD</sub> | 0.80 | 0.95 | —    | V <sub>P-P</sub> | Note 2                                            |
| Voltage gain              | G <sub>V</sub>   | −0.9 | 0    | 0.5  | dB               | f = 1MHz, V <sub>IN</sub> = 1V <sub>P-P</sub>     |
| Interchannel crosstalk    | C <sub>T</sub>   | —    | − 65 | —    | dB               | f = 4.43MHz, V <sub>IN</sub> = 1V <sub>P-P</sub>  |
| Frequency characteristics | G <sub>f</sub>   | − 3  | − 1  | 1    | dB               | 10MHz / 1MHz, V <sub>IN</sub> = 1V <sub>P-P</sub> |
| CTL pin switch level      | V <sub>TH</sub>  | 2.0  | 2.5  | 3.0  | V                | —                                                 |
| Clamp input level         | V <sub>ct</sub>  | 0.75 | —    | 2.2  | V                | —                                                 |

\* Refer to the measurement circuit given in Fig. 1.

Note 1: Positive-side dynamic range from the clamp level

Note 2: Negative-side dynamic range from the clamp level

## ●Reference data

## Pin DC voltage (reference values)

Units: Vdc

| Pin No. | DC voltage | Pin No. | DC voltage |
|---------|------------|---------|------------|
| 1       | 2.96       | 9       | 2.96       |
| 2       | 4.91       | 10      | 4.97       |
| 3       | 1.54       | 11      | 2.96       |
| 4       | 0          | 12      | 4.91       |
| 5       | 1.54       | 13      | 5.00       |
| 6       | 1.54       | 14      | 2.96       |
| 7       | 4.91       | 15      | 0          |
| 8       | 2.96       | 16      | 2.96       |

## Electrical characteristics

| Parameter                    | Min. | Typ. | Max. | Unit |
|------------------------------|------|------|------|------|
| Pedestal clamp level         | 1.20 | 1.54 | 1.95 | Vdc  |
| Input impedance (with clamp) | —    | 1.7M | —    | Ω    |
| Output impedance*            | —    | 30   | —    | Ω    |

The input coupling capacitor values should be 0.1μF to 1μF.

Use a clamp pulse of at least 1μS (BA7606).

\* The pin 6 output impedance of the BA7606 is 130Ω

## ●Measurement circuit

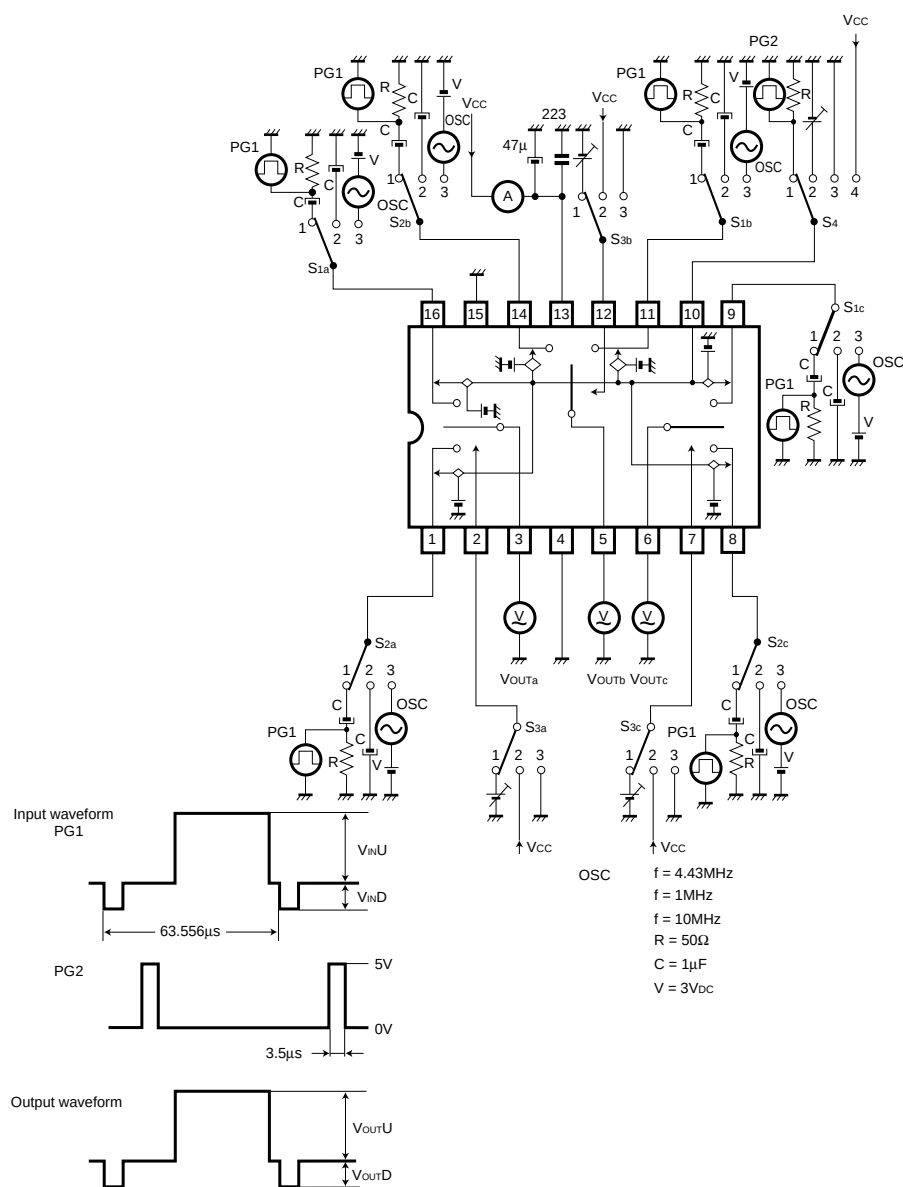


Fig.1

## Multimedia ICs

## ●Measurement conditions

| Parameter                     |       | Symbol          | Switch settings |     |     |     |     |     |     |     |     |     | Measurement method                                                            |
|-------------------------------|-------|-----------------|-----------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------------------------------------------------------------------------------|
|                               |       |                 | S1a             | S2a | S3a | S1b | S2b | S3b | S1c | S2c | S3c | S4c |                                                                               |
| Current dissipation           |       | I <sub>CC</sub> | 2               | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 4   | Ammeter                                                                       |
| Maximum output level (U or D) | IN1a  | V <sub>om</sub> | 1               | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 1   | Note 1                                                                        |
|                               | IN2a  | V <sub>om</sub> | 2               | 1   | 3   | 2   | 2   | 2   | 2   | 2   | 2   | 1   |                                                                               |
|                               | IN1b  | V <sub>om</sub> | 2               | 2   | 2   | 1   | 2   | 2   | 2   | 2   | 2   | 1   |                                                                               |
|                               | IN2b  | V <sub>om</sub> | 2               | 2   | 2   | 2   | 1   | 3   | 2   | 2   | 2   | 1   |                                                                               |
|                               | IN1c  | V <sub>om</sub> | 2               | 2   | 2   | 2   | 2   | 2   | 1   | 2   | 2   | 1   |                                                                               |
|                               | IN2c  | V <sub>om</sub> | 2               | 2   | 2   | 2   | 2   | 2   | 2   | 1   | 3   | 1   |                                                                               |
| Voltage gain                  | IN1a  | G <sub>v</sub>  | 3               | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 3   | OSC<br>f = 1MHz<br>V <sub>IN</sub> = 1V <sub>P-P</sub><br>Note 2              |
|                               | IN2a  | G <sub>v</sub>  | 2               | 3   | 3   | 2   | 2   | 2   | 2   | 2   | 2   | 3   |                                                                               |
|                               | IN1b  | G <sub>v</sub>  | 2               | 2   | 2   | 3   | 2   | 2   | 2   | 2   | 2   | 3   |                                                                               |
|                               | IN2b  | G <sub>v</sub>  | 2               | 2   | 2   | 2   | 3   | 3   | 2   | 2   | 2   | 3   |                                                                               |
|                               | IN1c  | G <sub>v</sub>  | 2               | 2   | 2   | 2   | 2   | 2   | 3   | 2   | 2   | 3   |                                                                               |
|                               | IN2c  | G <sub>v</sub>  | 2               | 2   | 2   | 2   | 2   | 2   | 2   | 3   | 3   | 3   |                                                                               |
| Inter-channel crosstalk       | IN1a  | C <sub>T</sub>  | 2               | 3   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 3   | OSC<br>f = 4.43MHz<br>V <sub>IN</sub> = 1V <sub>P-P</sub><br>Note 3           |
|                               | IN2a  | C <sub>T</sub>  | 3               | 2   | 3   | 2   | 2   | 2   | 2   | 2   | 2   | 3   |                                                                               |
|                               | IN1b  | C <sub>T</sub>  | 2               | 2   | 2   | 2   | 3   | 2   | 2   | 2   | 2   | 3   |                                                                               |
|                               | IN2b  | C <sub>T</sub>  | 2               | 2   | 2   | 3   | 2   | 3   | 2   | 2   | 2   | 3   |                                                                               |
|                               | IN1c  | C <sub>T</sub>  | 2               | 2   | 2   | 2   | 2   | 2   | 2   | 3   | 2   | 3   |                                                                               |
|                               | IN2c  | C <sub>T</sub>  | 2               | 2   | 2   | 2   | 2   | 2   | 3   | 2   | 3   | 3   |                                                                               |
| Frequency characteristic      | IN1a  | G <sub>f</sub>  | 3               | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 3   | OSC<br>f = 10MHz<br>f = 1MHz<br>V <sub>IN</sub> = 1V <sub>P-P</sub><br>Note 4 |
|                               | IN2a  | G <sub>f</sub>  | 2               | 3   | 3   | 2   | 2   | 2   | 2   | 2   | 2   | 3   |                                                                               |
|                               | IN1b  | G <sub>f</sub>  | 2               | 2   | 2   | 3   | 2   | 2   | 2   | 2   | 2   | 3   |                                                                               |
|                               | IN2b  | G <sub>f</sub>  | 2               | 2   | 2   | 2   | 3   | 3   | 2   | 2   | 2   | 3   |                                                                               |
|                               | IN1c  | G <sub>f</sub>  | 2               | 2   | 2   | 2   | 2   | 2   | 3   | 2   | 2   | 3   |                                                                               |
|                               | IN2c  | G <sub>f</sub>  | 2               | 2   | 2   | 2   | 2   | 2   | 2   | 3   | 3   | 3   |                                                                               |
| CTL pin switching level       | CTLa  | V <sub>TH</sub> | 3               | 2   | 1   | 2   | 2   | 2   | 2   | 2   | 2   | 3   | OSC<br>f = 1MHz<br>V <sub>IN</sub> = 1V <sub>P-P</sub><br>Note 5              |
|                               | CTLb  | V <sub>TH</sub> | 2               | 2   | 2   | 3   | 2   | 1   | 2   | 2   | 2   | 3   |                                                                               |
|                               | CTLc  | V <sub>TH</sub> | 2               | 2   | 2   | 2   | 2   | 2   | 3   | 2   | 1   | 3   |                                                                               |
| Clamp pin                     | Clamp | V <sub>ct</sub> | 2               | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | Note 6                                                                        |

Note 1: V<sub>omU</sub> is the value for V<sub>outU</sub> when V<sub>outU</sub> / V<sub>inU</sub> % – 1dB.

V<sub>omD</sub> is the value for V<sub>outD</sub> when V<sub>outD</sub> / V<sub>inD</sub> % – 1dB.

Note 2: G<sub>v</sub> = 20 log (V<sub>out</sub> / V<sub>in</sub>).

Note 3: C<sub>T</sub> = 20 log (V<sub>out</sub> / V<sub>in</sub>).

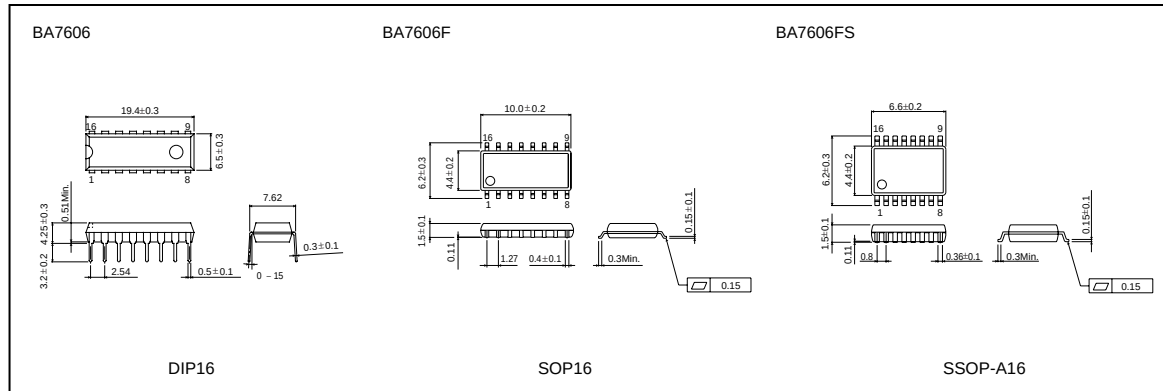
Note 4: G<sub>f</sub> = 20 log (V<sub>out</sub> (f = 10MHz) / V<sub>out</sub> (f = 1MHz)).

Note 5: Reduce the CTL pin voltage from V<sub>cc</sub>. The CTL pin switching level (V<sub>TH</sub>) is the CTL pin voltage at which the V<sub>out</sub> level drops below 20mV<sub>P-P</sub>.

Note 6: Clamp pulse voltage at which V<sub>out</sub> falls below 0.4V and clamp pulse voltage at which V<sub>out</sub> falls below 1.4V.

Multimedia ICs

●External dimensions (Unit : mm)



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