

Video signal switcher

BA7611AN / BA7611AF

The BA7611AN and BA7611AF are a three-channel analog multiplexers with built-in mute and a 6dB amplifier. The ICs designed for use in video cassette recorders. It features a large dynamic range and wide operating frequency range, and have sync-tip clamp inputs which are ideal for switching video signals.

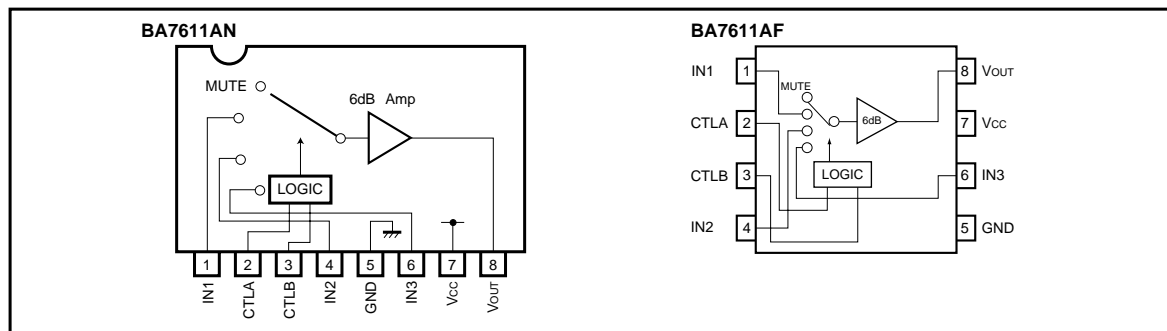
●Applications

Video cassette recorders and televisions

●Features

- 1) 3-input / 1-output switches.
- 2) Built-in 6dB amplifier.
- 3) Built-in mute.
- 4) Sync-tip clamp inputs.
- 5) Wide operating supply voltage range (4.5V to 13.0V).
- 6) Low power consumption (50mW Typ.).
- 7) Excellent frequency characteristics (10MHz, 0dB Typ.).
- 8) Wide dynamic range (3.5V_{P-P} Typ.).
- 9) Low interchannel crosstalk (– 65dB Typ., f = 4.43MHz).

●Block diagram



●Truth table

| CTL - A | CTL - B | OUT |
|----------|----------|------|
| L (OPEN) | L (OPEN) | IN1 |
| L (OPEN) | H | IN2 |
| H | L (OPEN) | IN3 |
| H | H | MUTE |

●Absolute maximum ratings (Ta = 25°C)

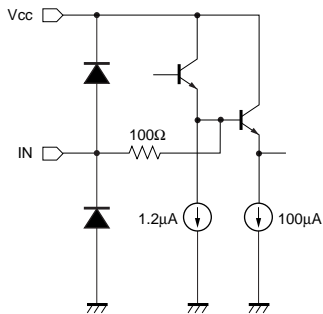
| Parameter | Symbol | Limits | Unit |
|-----------------------|--------|-----------------------------|------|
| Power supply voltage | Vcc | 13.5 | V |
| Power dissipation | Pd | 900*1 (SIP8) / 550*2 (SOP8) | mW |
| Operating temperature | Topr | - 25 ~ + 75 | °C |
| Storage temperature | Tstg | - 55 ~ + 125 | °C |

*1 Reduced by 9mW for each increase in Ta of 1°C over 25°C.

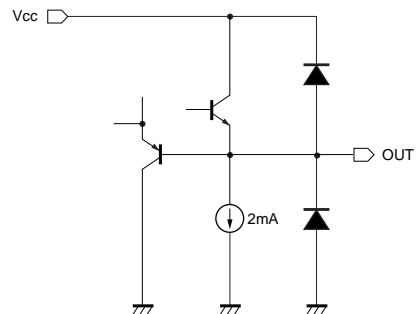
*2 Reduced by 5.5mW for each increase in Ta of 1°C over 25°C.

●Equivalent circuits

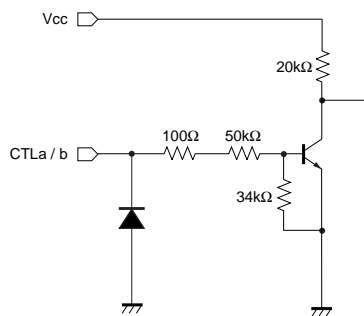
CLAMP INPUT



OUTPUT



CTLa / CTLb



Note:
 Input bias current 1μA [Typ.]
 Output impedance 20Ω [Typ.]

●Electrical characteristics (unless otherwise noted, Ta = 25°C and Vcc = 5V)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions | Measurement Circuit |
|--------------------------|-------------------|------|------|------|------------------|---|---------------------|
| Operating voltage | V _{CC} | 4.5 | — | 13.0 | V | — | Fig.4 |
| Supply current | I _{CC} | — | 10.5 | 15.5 | mA | — | Fig.4 |
| Maximum output level | V _{om} | 3.0 | 3.5 | — | V _{P-P} | f = 1kHz, THD = 0.5% | Fig.4 |
| Voltage gain | G _V | 5.5 | 6.0 | 6.5 | dB | f = 1MHz, V _{IN} = 1.0V _{P-P} | Fig.4 |
| Interchannel crosstalk | C _T | — | -65 | — | dB | f = 4.43MHz, V _{IN} = 1.0V _{P-P} | Fig.4 |
| Frequency characteristic | C _f | -3.0 | 0 | 1.0 | dB | f = 10MHz / 1MHz, V _{IN} = 1.0V _{P-P} | Fig.4 |
| CTL pin switch level A | V _{TH-A} | 1.0 | 2.0 | 3.0 | V | — | Fig.4 |
| CTL pin switch level B | V _{TH-B} | 1.0 | 2.0 | 3.0 | V | — | Fig.4 |

○Not designed for radiation resistance.

●Electrical characteristic curves

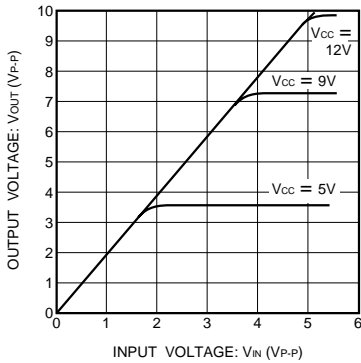


Fig. 1 V_{IN} vs. V_{OUT} (f = 1kHz)

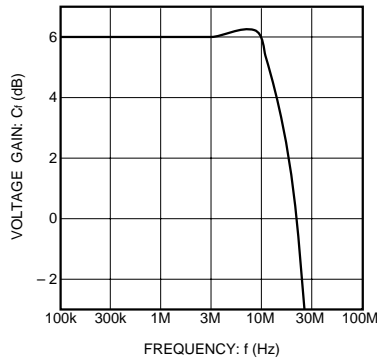


Fig. 2 Frequency characteristics

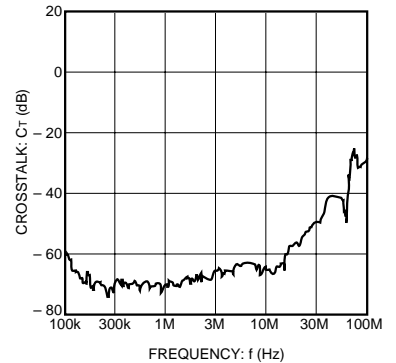


Fig. 3 Interchannel crosstalk

●Measurement circuit

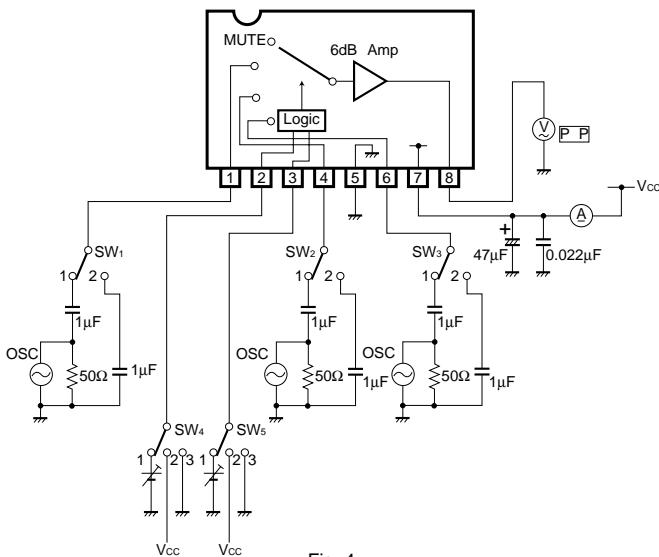


Fig. 4

●Measurement conditions

| Parameter | | Symbol | Switch settings | | | | | Measurement method |
|--------------------------|----------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---|
| | | | SW ₁ | SW ₂ | SW ₃ | SW ₄ | SW ₅ | |
| Current dissipation | | I _{CC} | 2 | 2 | 2 | 2 | 2 | Ammeter |
| Maximum output level | IN1 | V _{om} | 1 | 2 | 2 | 3 | 3 | f = 1kHz, THD = 0.5% * 1 |
| | IN2 | V _{om} | 2 | 1 | 2 | 3 | 2 | |
| | IN3 | V _{om} | 2 | 2 | 1 | 2 | 3 | |
| Voltage gain | IN1 | G _V | 1 | 2 | 2 | 3 | 3 | f = 1MHz, V = 1V _{P-P} * 2 |
| | IN2 | G _V | 2 | 1 | 2 | 3 | 2 | |
| | IN3 | G _V | 2 | 2 | 1 | 2 | 3 | |
| Interchannel crosstalk | IN1→IN2 | C _T | 1 | 2 | 2 | 3 | 2 | f = 4.43MHz V = 1V _{P-P} * 3 |
| | IN1→IN3 | C _T | 1 | 2 | 2 | 2 | 3 | |
| | IN1→MUTE | C _T | 1 | 2 | 2 | 2 | 2 | |
| | IN2→IN3 | C _T | 2 | 1 | 2 | 2 | 3 | |
| | IN2→MUTE | C _T | 2 | 1 | 2 | 2 | 2 | |
| | IN3→MUTE | C _T | 2 | 2 | 1 | 2 | 2 | |
| Frequency characteristic | IN1 | G _f | 1 | 2 | 2 | 3 | 3 | f = 10MHz f = 1MHz V = 1V _{P-P} * 4 |
| | IN2 | G _f | 2 | 1 | 2 | 3 | 2 | |
| | IN3 | G _f | 2 | 2 | 1 | 2 | 3 | |
| CTL pin switching level | CTLa | V _{TH} | 2 | 2 | 1 | 1 | 3 | * 5 |
| | CTLb | V _{TH} | 2 | 1 | 2 | 3 | 1 | |

*1: Connect a distortion meter to the output, and input a f = 1kHz sine wave. Adjust the input level until the output distortion is 0.5%. This output voltage at this time is the maximum output level V_{om} (V_{P-P}).

*2: Input a 1V_{P-P}, 1MHz sine wave. The voltage gain is given by $G_V = 20 \log (V_{OUT} / V_{IN})$.

*3: Input a 1V_{P-P}, 4.43MHz sine wave. The interchannel crosstalk is given by $C_T = 20 \log (V_{OUT} / V_{IN})$.

*4: Input 1V_{P-P}, 1MHz and 10MHz sine waves. The frequency characteristic is given by $G_f = 20 \log (V_{OUT} (f = 10\text{MHz}) / V_{OUT} (f = 1\text{MHz}))$.

*5: Input a 1V_{P-P}, 1MHz sine wave. Reduce the CTL pin voltage from V_{CC}.

The CTL pin switching level (V_{TH}) is the CTL pin voltage at which the V_{OUT} level drops below 20mV_{P-P}.

●External dimensions (Units: mm)

