

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.

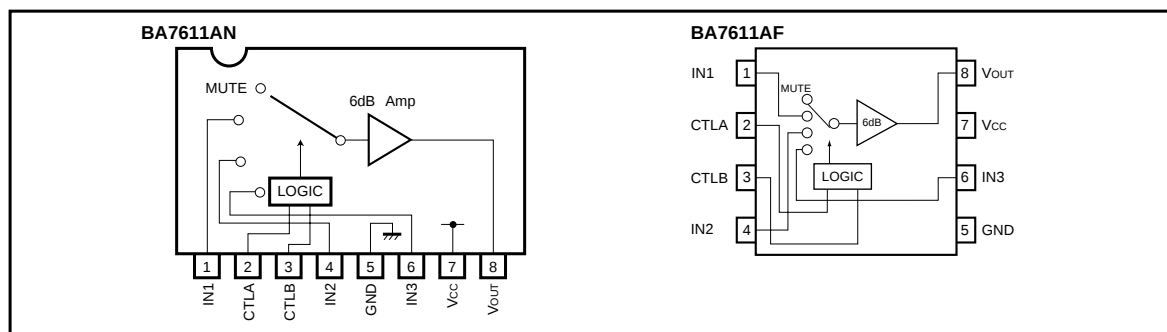
●Applications

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)

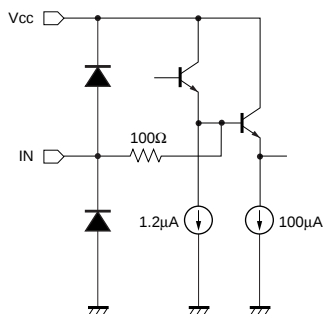
Parameter	Symbol	Limits	Unit
Power supply voltage	V _{CC}	13.5	V
Power dissipation	P _d	900* ¹ (SIP8) / 550* ² (SOP8)	mW
Operating temperature	T _{opr}	– 25 ~ + 75	°C
Storage temperature	T _{stg}	– 55 ~ + 125	°C

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

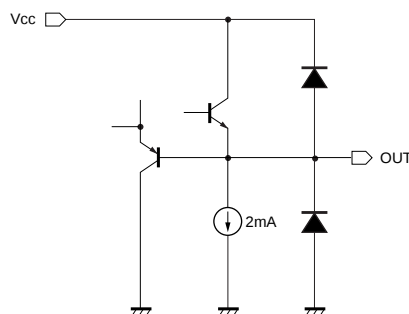
*2 Reduced by 5.5mW for each increase in Ta of 1°C over 25°C.

●Equivalent circuits

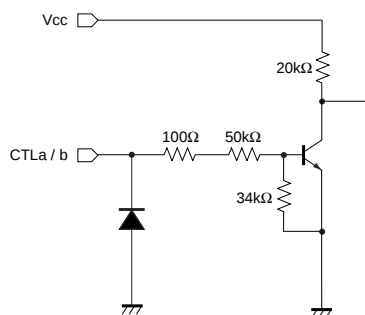
CLAMP INPUT



OUTPUT



CTLa / CTLb



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

●Electrical characteristics (unless otherwise noted, $T_a = 25^\circ\text{C}$ and $V_{CC} = 5\text{V}$)

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}	$f = 1\text{kHz}$, $\text{THD} = 0.5\%$	Fig.4
Voltage gain	G_V	5.5	6.0	6.5	dB	$f = 1\text{MHz}$, $V_{IN} = 1.0V_{P-P}$	Fig.4
Interchannel crosstalk	C_T	—	-65	—	dB	$f = 4.43\text{MHz}$, $V_{IN} = 1.0V_{P-P}$	Fig.4
Frequency characteristic	C_f	-3.0	0	1.0	dB	$f = 10\text{MHz} / 1\text{MHz}$, $V_{IN} = 1.0V_{P-P}$	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

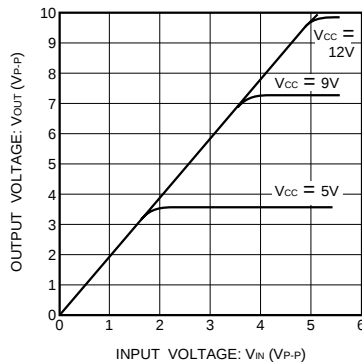


Fig. 1 V_{IN} vs. V_{OUT} ($f = 1\text{kHz}$)

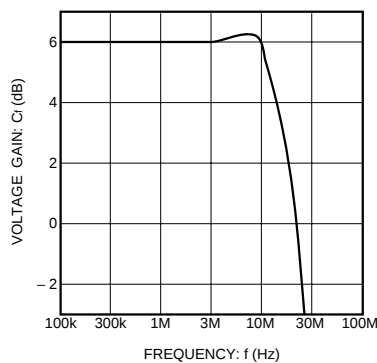


Fig. 2 Frequency characteristics

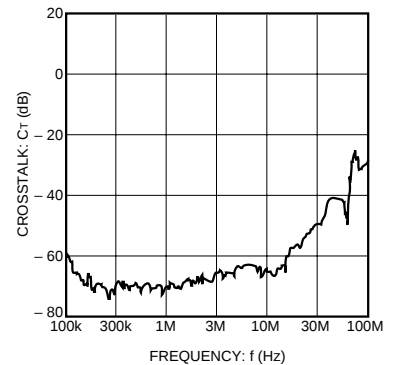


Fig. 3 Interchannel crosstalk

●Measurement circuit

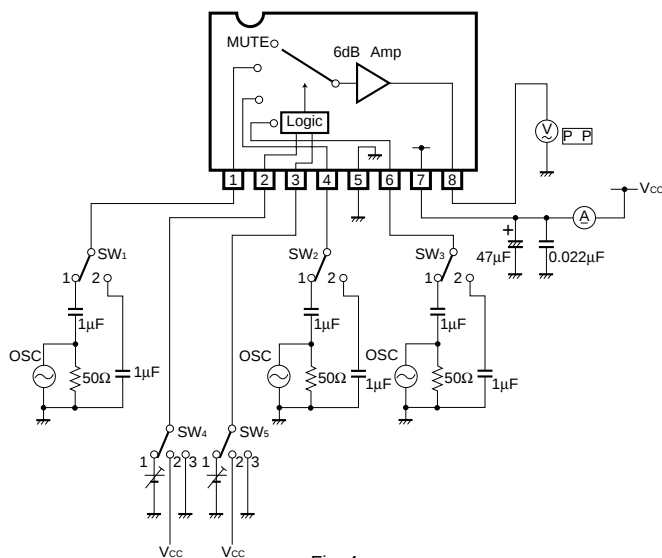


Fig. 4

● 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 $C_T = 20 \log (V_{OUT} / V_{IN})$.

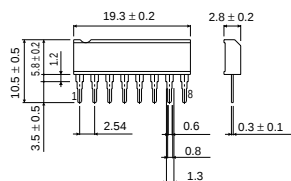
*4: Input 1V_{P-P}, 1MHz and 10MHz sine waves. The frequency characteristic is given by $G_f = 20 \log (V_{OUT} (f = 10\text{MHz}) / V_{OUT} (f = 1\text{MHz}))$.

*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}.

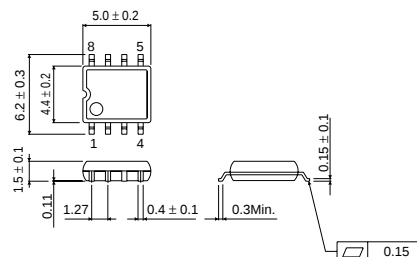
● External dimensions (Units: mm)

BA7611AN



SIP8

BA7611AF



SOP8