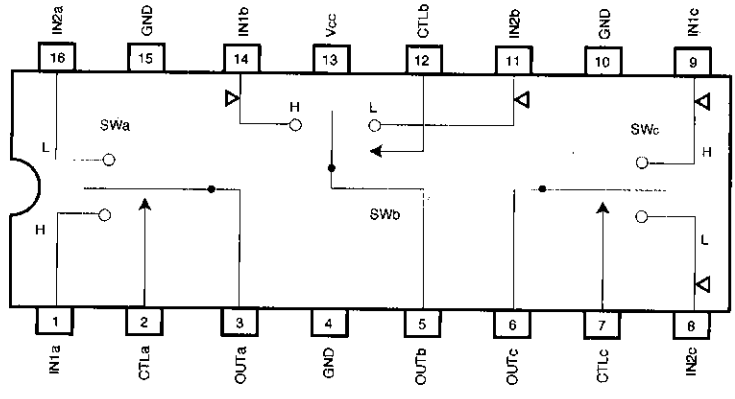
Video signal switcher
BA7627FV

The BA7627FV is a switching IC developed for use in video equipment. It contains three two-channel analog multiplexers; two two with sync-tip clamp inputs and one with a DC-biased input, and is ideal for switching audio, video, brightness and chroma signals.

●Applications
Video cassette recorders and camcorders

●Features
1)Three 2-input / 1-output switches (two with sync-tip clamped inputs, the other one non-clamped).
2)5V power supply.
3)Low power consumption (62.5mW Typ.).
4)Excellent frequency characteristics (10MHz, 0dB Typ.).
5)Wide dynamic range
6)Fast switching speed (50ns Typ.).
7)Small package (SSOP 16pm).

●Block diagram



CTL	Output
L	IN2
H	IN1

SWa non-clamped
SWb, SWc クランプ（◁）

●Absolute maximum ratings (Ta=25℃)

Parameter	Symbol	Limits	Unit
Power supply voltage	Vcc	9	V
Power dissipation	Pd	450 *	mW
Operating temperature	Topr	−40～85	℃
Storage temperature	Tstg	−55～125	℃

* Reduced by 4.5mW for each increase in Ta of 1℃ over 25℃

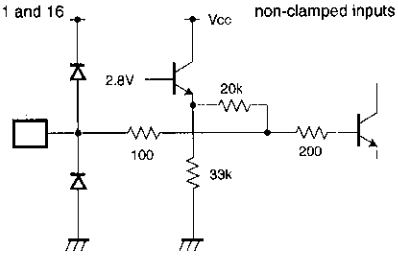
●Pin descriptions

Pin No.	Pin Name	Function
1	IN1a	Non-clamped SWa input pin 1 (bias input)
2	CTLa	SWa control pin. "L" selects IN2a, "H" selects IN1a
3	OUTa	SWa output pin
4	GND	Earth connection*
5	OUTb	SWb output pin
6	OUTc	SWc output pin
7	CTLc	SWc control pin. "L" selects IN2c, "H" selects IN1c
8	IN2c	SWc input pin 2 (sync-tip clamp input)
9	IN1c	SWc input pin 1 (sync-tip clamp input)
10	GND	Earth connection*
11	IN2b	SWb input pin 2 (sync-tip clamp input)
12	CTLb	SWb control pin. "L" selects IN2b, "H" selects IN1b
13	Vcc	Power supply
14	IN1b	SWb input pin 1 (sync-tip clamp input)
15	GND	Earth connection*
16	IN2a	Non-clamped SWa input pin 2 (bias input)

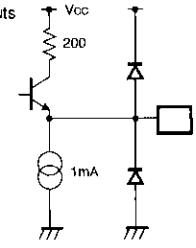
* GND pins 4, 10 and 15 are common connections.

●Input/output circuits

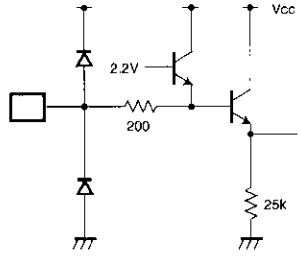
Pins 1 and 16 non-clamped inputs



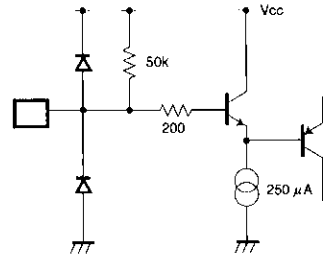
Pins 3, 5, and 6 outputs



Pins 8, 9, 11 and 14 sync-tip clamped inputs



Pins 2, 7, and 12 control inputs



●Electrical characteristics (Unless otherwise specified Ta=25℃ and Vcc=5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Test Circuit
Operating voltage	Vcc	4.5	5.0	5.5	V		Fig.1
Circuit current	Icc	—	12.5	17.0	mA		Fig.1
Maximum output level 1	Vom	2.6	2.9	—	V_{P-P}	f=1kHz THD=0.5% clamped input	Fig.1
Maximum output level 2	Vom	2.7	3.0	—	V_{P-P}	f=1kHz THD=0.5% non-clamped input	Fig.1
Voltage gain	Gv	−0.5	0	0.5	dB	f=1MHz Vin=$1V_{P-P}$	Fig.1
Interchannel crosstalk	CT	—	−65	—	dB	f=4.43MHz Vin=$1V_{P-P}$	Fig.1
Frequency characteristic	Gf	−1	0	1	dB	10MHz / 1MHz Vin=$1V_{P-P}$	Fig.1
Input impedance	Zin	14	20	26	kΩ	1,16pin	Fig.1
Total-harmonic distortion	THD	—	0.007	—	%	f=1kHz $1V_{P-P}$ non-clamped input	Fig.1
CTL pin switch level	V_{TH}	2.0	2.5	3.0	V		Fig.1
Differential gain	DG	—	0.5	1.0	%	Vin=$1V_{P-P}$ Standard staircase signal	Fig.1
Differential phase	DP	—	0.3	1.0	deg	Vin=$1V_{P-P}$ Standard staircase signal	Fig.1

●Measurement circuit

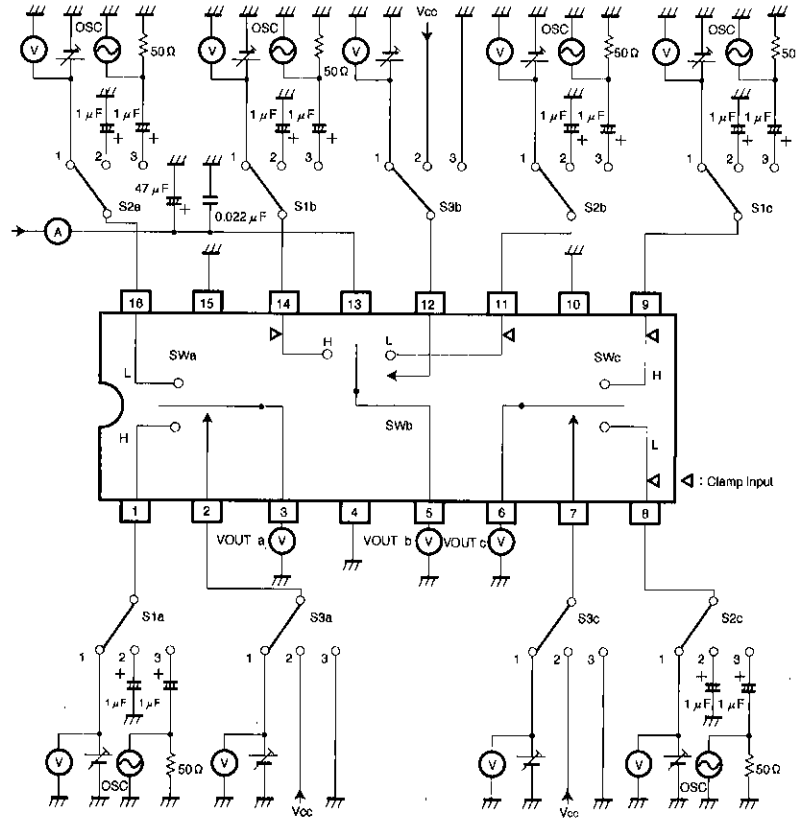


Fig.1

●Measurement conditions

Parameter		Symbol	Switch settings									Measurement method
			S1a	S2a	S3a	S1b	S2b	S3b	S1c	S2c	S3c	
Current consumption		Icc	2	2	2	2	2	2	2	2	2	
Maximum output level	In1a	Vom	3	2	2	2	2	2	2	2	2	f=1kHz THD=0.5% Note 1
	In2a	Vom	2	3	3	2	2	2	2	2	2	
	In1b	Vom	2	2	2	3	2	2	2	2	2	
	In2b	Vom	2	2	2	2	3	3	2	2	2	
	In1c	Vom	2	2	2	2	2	2	3	2	2	
	In2c	Vom	2	2	2	2	2	2	2	3	3	
Voltage gain	In1a	Gv	3	2	2	2	2	2	2	2	2	f=1MHz V=1VP-P Note 2
	In2a	Gv	2	3	3	2	2	2	2	2	2	
	In1b	Gv	2	2	2	3	2	2	2	2	2	
	In2b	Gv	2	2	2	2	3	3	2	2	2	
	In1c	Gv	2	2	2	2	2	2	3	2	2	
	In2c	Gv	2	2	2	2	2	2	2	3	3	
Interchannel crosstalk	In1a	Ct	2	3	2	2	2	2	2	2	2	f=4.43MHz V=1VP-P Note 3
	In2a	Ct	3	2	3	2	2	2	2	2	2	
	In1b	Ct	2	2	2	2	3	2	2	2	2	
	In2b	Ct	2	2	2	3	2	3	2	2	2	
	In1c	Ct	2	2	2	2	2	2	2	3	2	
	In2c	Ct	2	2	2	2	2	2	3	2	3	
Frequency characteristic	In1a	Gf	3	2	2	2	2	2	2	2	2	f=10MHz / f=1MHz V=1VP-P Note 4
	In2a	Gf	2	3	3	2	2	2	2	2	2	
	In1b	Gf	2	2	2	3	2	2	2	2	2	
	In2b	Gf	2	2	2	2	3	3	2	2	2	
	In1c	Gf	2	2	2	2	2	2	3	2	2	
	In2c	Gf	2	2	2	2	2	2	2	3	3	
Input impedance	In1a	Zin	1	2	2	2	2	2	2	2	2	Note 5
	In2a	Zin	2	1	3	2	2	2	2	2	2	
Total-harmonic distortion	In1a	THD	3	2	2	2	2	2	2	2	2	Note 6
	In2a	THD	2	3	3	2	2	2	2	2	2	
CTL pin switching level	CTLa	VTH	3	2	1	2	2	2	2	2	2	Note 7
	CTLb	VTH	2	2	2	3	2	1	2	2	2	
	CTLc	VTH	2	2	2	2	2	2	3	2	1	
Differential gain	In1a	DG	3	2	2	2	2	2	2	2	2	Standard staircase signal V=1VP-P Note 8
	In2a	DG	2	3	3	2	2	2	2	2	2	
	In1b	DG	2	2	2	3	2	2	2	2	2	
	In2b	DG	2	2	2	2	3	3	2	2	2	
	In1c	DG	2	2	2	2	2	2	3	2	2	
	In2c	DG	2	2	2	2	2	2	2	3	3	
Differential phase	In1a	DP	3	2	2	2	2	2	2	2	2	Standard staircase signal V=1VP-P Note 8
	In2a	DP	2	3	3	2	2	2	2	2	2	
	In1b	DP	2	2	2	3	2	2	2	2	2	
	In2b	DP	2	2	2	2	3	3	2	2	2	
	In1c	DP	2	2	2	2	2	2	3	2	2	
	In2c	DP	2	2	2	2	2	2	2	3	3	

Note 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 Vom (VP-P).

Note 2: Input a 1VP-P, 1MHz sine wave. The voltage gain (in dB) is given by Gv = 20 log (VOUT/VIN).

Note 3: Input a 1VP-P, 4.43MHz sine wave. The interchannel crosstalk (in dB) is given by CT = 20 log (VOUT/VIN).

Note 4: Input 1VP-P, 1MHz and 10MHz sine waves. The frequency characteristic (in dB) is given by Gf = 20 log (VOUT (f = 10MHz)/VIN (f = 1MHz)).

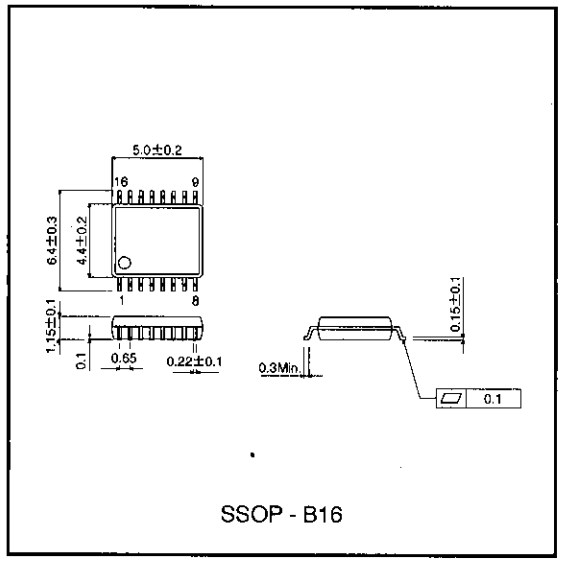
Note 5: Measure the input pin voltage VIN50 when acurrent of DC50 μA is flowing the input pin. Measure the input pin open-circuit voltage. The input impedance given by Z=(VIN50-VIN0)/50 X $10^{-6}\Omega$.

Note 6: Input a 1VP-P, 1kHz sine wave and measure the total-harmonic distortion the output using a total-harmonic distortion meter.

Note 7: Input a 1VP-P, 1MHz sine wave.Reduce the CTL pin voltage from VCC. The pin switching level(VTH) is the CTL pin voltage at which the VOUT level drops 20mVP-P.

Note 8: Input a 1VP-P staircase signal. Measure the phase differential on a vectorscope.

●External dimensions (Units: mm)



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