

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.

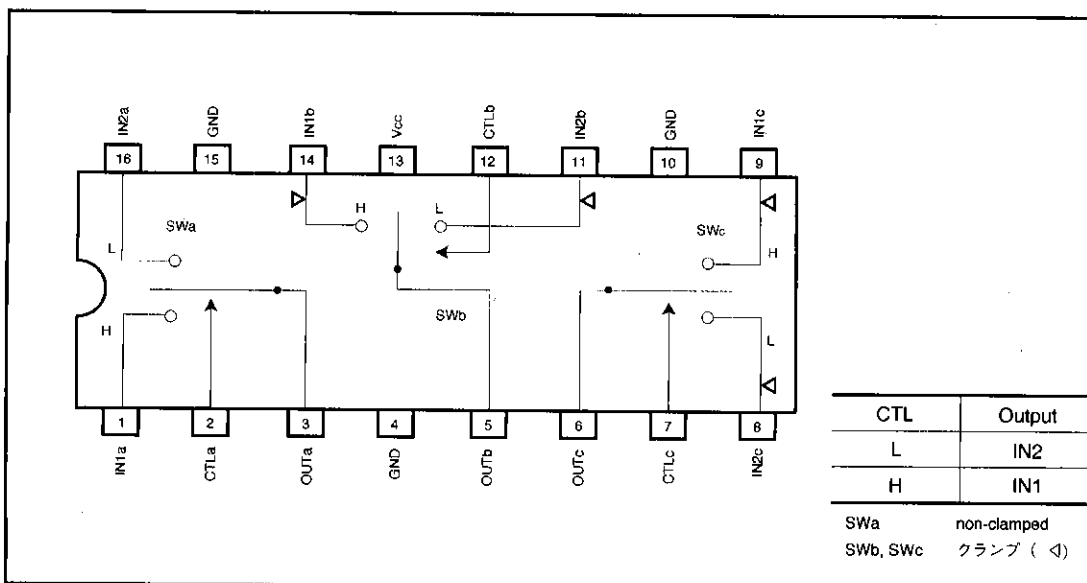
●Applications

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 16pin).

●Block diagram



●Absolute maximum ratings (Ta=25°C)

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

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

Audio/video signal selection switches

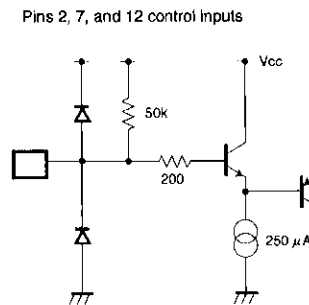
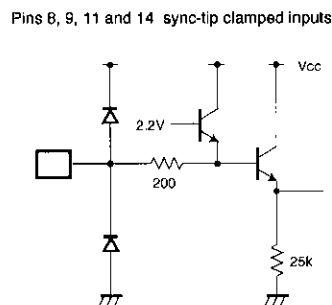
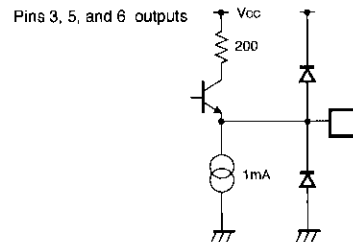
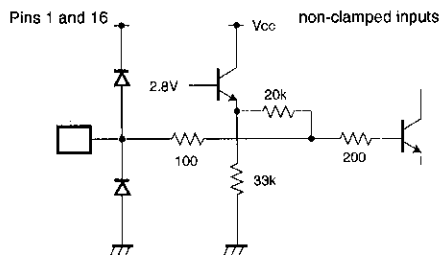
AV switches

●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



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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Test Circuit
Operating voltage	V _{CC}	4.5	5.0	5.5	V		Fig.1
Circuit current	I _{CC}	—	12.5	17.0	mA		Fig.1
Maximum output level 1	V _{OM}	2.6	2.9	—	V _{P-P}	f=1kHz THD=0.5% clamped input	Fig.1
Maximum output level 2	V _{OM}	2.7	3.0	—	V _{P-P}	f=1kHz THD=0.5% non-clamped input	Fig.1
Voltage gain	G _v	-0.5	0	0.5	dB	f=1MHz V _{in} =1V _{P-P}	Fig.1
Interchannel crosstalk	CT	—	-65	—	dB	f=4.43MHz V _{in} =1V _{P-P}	Fig.1
Frequency characteristic	G _f	-1	0	1	dB	10MHz / 1MHz V _{in} =1V _{P-P}	Fig.1
Input impedance	Z _{in}	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	%	V _{in} =1V _{P-P} Standard staircase signal	Fig.1
Differential phase	DP	—	0.3	1.0	deg	V _{in} =1V _{P-P} Standard staircase signal	Fig.1

●Measurement circuit

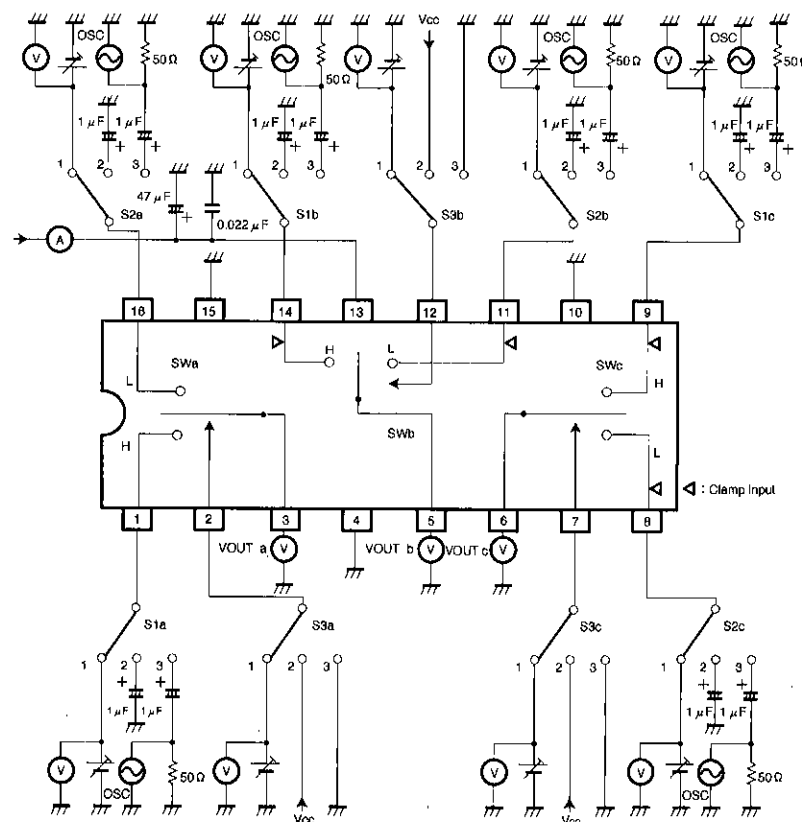


Fig.1

Audio/video signal selection switches

AV switches

● Measurement conditions

Parameter		Symbol	Switch settings									Measurement method
			S1a	S2a	S3a	S1b	S2b	S3b	S1c	S2c	S3c	
Current consumption		I _{cc}	2	2	2	2	2	2	2	2	2	
Maximum output level	In1a	V _{om}	3	2	2	2	2	2	2	2	2	f=1kHz THD=0.5% Note 1
	In2a	V _{om}	2	3	3	2	2	2	2	2	2	
	In1b	V _{om}	2	2	2	3	2	2	2	2	2	
	In2b	V _{om}	2	2	2	2	3	3	2	2	2	
	In1c	V _{om}	2	2	2	2	2	2	3	2	2	
	In2c	V _{om}	2	2	2	2	2	2	2	3	3	
Voltage gain	In1a	G _v	3	2	2	2	2	2	2	2	2	f=1MHz V=1V _{P-P} Note 2
	In2a	G _v	2	3	3	2	2	2	2	2	2	
	In1b	G _v	2	2	2	3	2	2	2	2	2	
	In2b	G _v	2	2	2	2	3	3	2	2	2	
	In1c	G _v	2	2	2	2	2	2	3	2	2	
	In2c	G _v	2	2	2	2	2	2	2	3	3	
Interchannel crosstalk	In1a	C _t	2	3	2	2	2	2	2	2	2	f=4.43MHz V=1V _{P-P} Note 3
	In2a	C _t	3	2	3	2	2	2	2	2	2	
	In1b	C _t	2	2	2	2	3	2	2	2	2	
	In2b	C _t	2	2	2	3	2	3	2	2	2	
	In1c	C _t	2	2	2	2	2	2	2	3	2	
	In2c	C _t	2	2	2	2	2	2	3	2	3	
Frequency characteristic	In1a	G _f	3	2	2	2	2	2	2	2	2	f=10MHz / f=1MHz V=1V _{P-P} Note 4
	In2a	G _f	2	3	3	2	2	2	2	2	2	
	In1b	G _f	2	2	2	3	2	2	2	2	2	
	In2b	G _f	2	2	2	2	3	3	2	2	2	
	In1c	G _f	2	2	2	2	2	2	3	2	2	
	In2c	G _f	2	2	2	2	2	2	2	3	3	
Input impedance	In1a	Z _{in}	1	2	2	2	2	2	2	2	2	Note 5
	In2a	Z _{in}	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	CTL _a	V _{TH}	3	2	1	2	2	2	2	2	2	Note 7
	CTL _b	V _{TH}	2	2	2	3	2	1	2	2	2	
	CTL _c	V _{TH}	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=1V _{P-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=1V _{P-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 V_{om} (V_{P-P}).

Note 2: Input a 1V_{P-P}, 1MHz sine wave. The voltage gain (in dB) is given by G_v = 20 log (V_{OUT}/V_{IN}).

Note 3: Input a 1V_{P-P}, 4.43MHz sine wave. The interchannel crosstalk (in dB) is given by C_t = 20 log (V_{OUT}/V_{IN}).

Note 4: Input 1V_{P-P}, 1MHz and 10MHz sine waves. The frequency characteristic (in dB) is given by G_f = 20 log (V_{OUT} (f = 10MHz)/V_{IN} (f = 1MHz)).

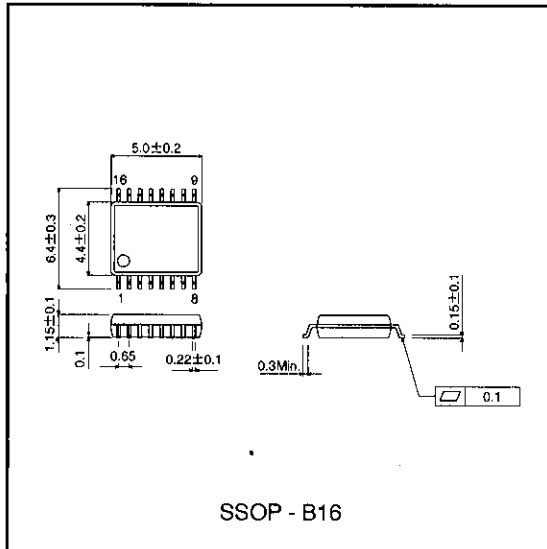
Note 5: Measure the input pin voltage V_{IN50} when a current of DC50 μA is flowing the input pin. Measure the input pin open-circuit voltage. The input impedance given by Z = (V_{IN50} - V_{IN0})/50 × 10⁻⁶ Ω.

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

Note 7: Input a 1V_{P-P}, 1MHz sine wave. Reduce the CTL pin voltage from V_{CC}. The pin switching level (V_{TH}) is the CTL pin voltage at which the V_{OUT} level drops 20mV_{P-P}.

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

●External dimensions (Units: mm)



Audio/video signal selection switches

AV switches

Notes

- The contents described in this catalogue are correct as of March 1997.
- No unauthorized transmission or reproduction of this book, either in whole or in part, is permitted.
- The contents of this book are subject to change without notice. Always verify before use that the contents are the latest specifications. If, by any chance, a defect should arise in the equipment as a result of use without verification of the specifications, ROHM CO., LTD., can bear no responsibility whatsoever.
- Application circuit diagrams and circuit constants contained in this data book are shown as examples of standard use and operation. When designing for mass production, please pay careful attention to peripheral conditions.
- Any and all data, including, but not limited to application circuit diagrams, information, and various data, described in this catalogue are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO., LTD., disclaims any warranty that any use of such device shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes absolutely no liability in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices; other than for the buyer's right to use such devices itself, resell or otherwise dispose of the same; no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by ROHM CO., LTD., is granted to any such buyer.
- The products in this manual are manufactured with silicon as the main material.
- The products in this manual are not of radiation resistant design.

The products listed in this catalogue are designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys). Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers, or other safety devices) please be sure to consult with our sales representatives in advance.

- Notes when exporting

- It is essential to obtain export permission when exporting any of the above products when it falls under the category of strategic material (or labor) as determined by foreign exchange or foreign trade control laws.
- Please be sure to consult with our sales representatives to ascertain whether any product is classified as a strategic material.