

Video signal switcher

BA7609 / BA7609F

The BA7609 and BA7609F are switching ICs developed for use in VCRs. Each contains three two-channel analog multiplexers. As one of the switches has sync-tip clamp inputs and the other two have non-clamped inputs these ICs are ideal for switching audio, video and chroma signals.

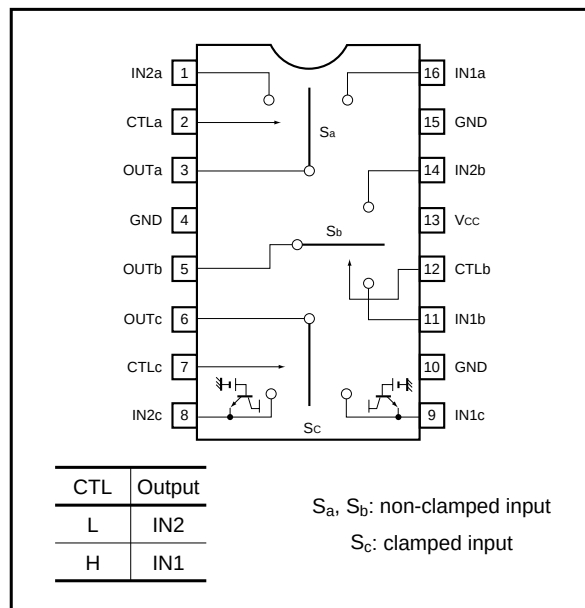
●Applications

Video cassette recorders and televisions

●Features

- 1) Three 2-input / 1-output switches (one with sync-clamped inputs, the other two non-clamped).
- 2) 5V power supply.
- 3) Low power consumption (62.5mW Typ.).
- 4) Excellent frequency characteristics (10MHz, 0dB Typ.).
- 5) Wide dynamic range (clamped input: $2.9V_{P-P}$ Typ., non-clamped input: $3.0V_{P-P}$ Typ.).
- 6) Fast switching speed (50ns Typ.).

●Block diagram



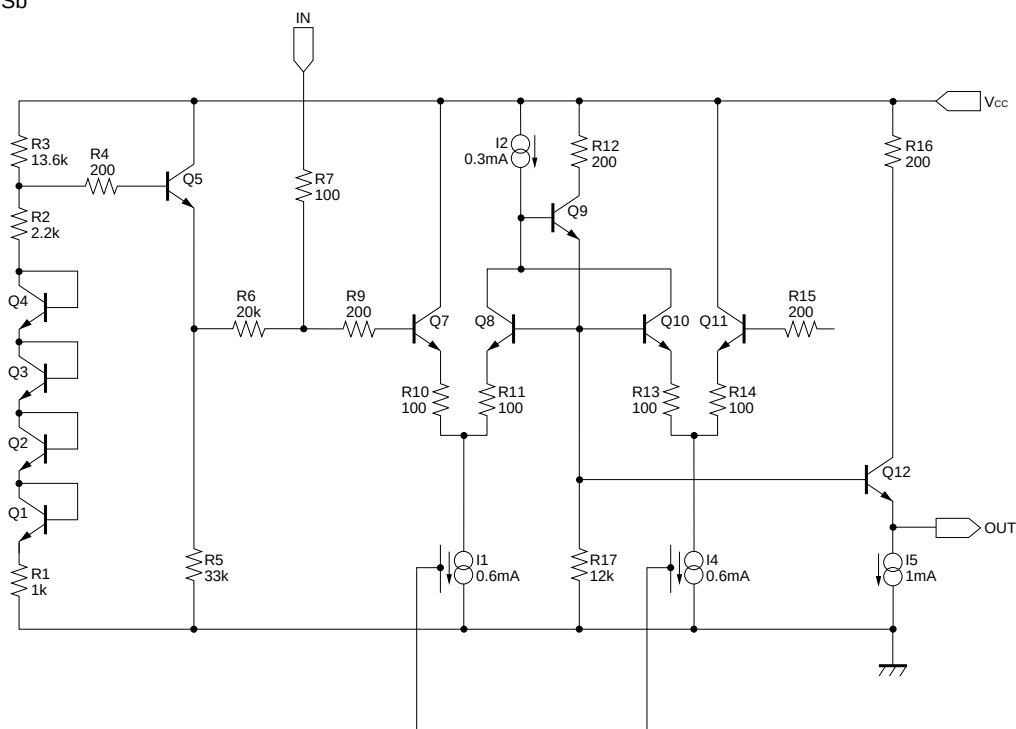
● Absolute maximum ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	9	V
Power dissipation	P_d	500*	mW
Operating temperature	T_{opr}	$-40 \sim +85$	$^\circ\text{C}$
Storage temperature	T_{stg}	$-55 \sim +125$	$^\circ\text{C}$

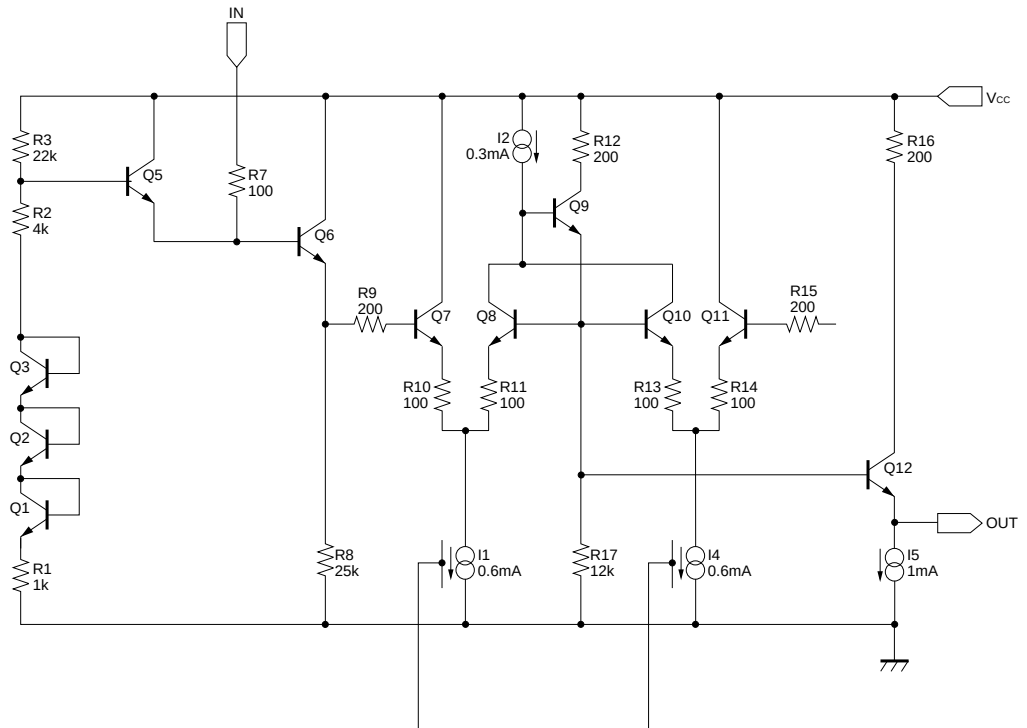
* Reduced by 5.0mW for each increase in T_a of 1°C over 25°C .

● Equivalent circuits

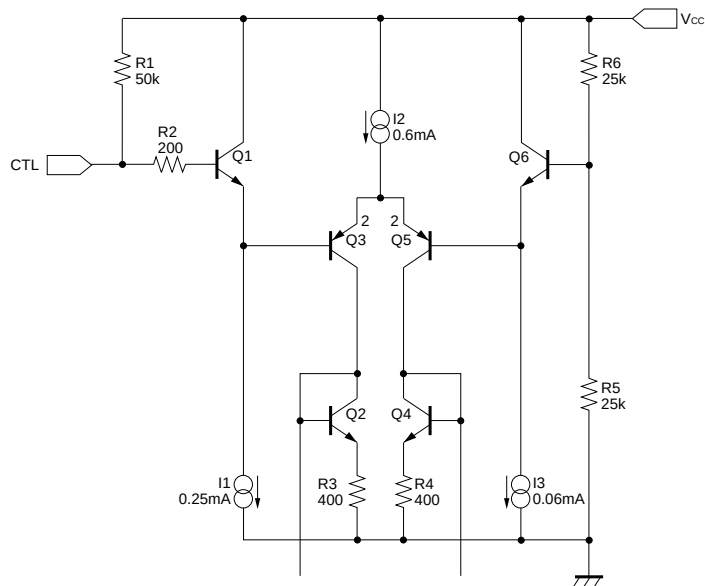
Sa, Sb



Sc



CTL



Units
: R = Ω

●Electrical characteristics (unless otherwise noted, Ta = 25°C and V_{CC} = 5V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Operating voltage	V _{CC}	4.5	5.0	5.5	V	—
Supply current	I _{CC}	—	12.5	20.0	mA	—
Maximum output level 1	V _{om}	2.6	2.9	—	V _{P-P}	f = 1kHz, THD = 0.5% clamped input
Maximum output level 2	V _{om}	2.7	3.0	—	V _{P-P}	f = 1kHz, THD = 0.5% non-clamped input
Voltage gain	G _V	− 0.5	0	0.5	dB	f = 1MHz, V _{IN} = 1V _{P-P}
Interchannel crosstalk	C _T	—	− 65	—	dB	f = 4.43MHz, V _{IN} = 1V _{P-P}
Frequency characteristic	G _f	− 3	0	1	dB	10MHz / 1MHz, V _{IN} = 1V _{P-P}
Input impedance	Z _{IN}	14	20	26	kΩ	non-clamped input
Total-harmonic distortion	THD	—	0.007	—	%	f = 1kHz, 1V _{P-P} non-clamped input
CTL pin switch level	V _{TH}	2.0	2.5	3.0	V	—

Note: Refer to the measurement circuit given in Fig. 1.

●Reference data

Pin DC voltages (reference values)

Units: Vdc

Pin No.	DC voltage	Pin No.	DC voltage
1	2.48	9	2.05
2	4.91	10	0
3	1.76	11	2.48
4	0	12	4.91
5	1.76	13	5.00
6	0.65	14	2.48
7	4.91	15	0
8	2.05	16	2.48

Electrical characteristics

Parameter	Min.	Typ.	Max.	Unit
Sync tip clamp level	0.49	0.65	0.80	Vdc
Input impedance (no clamp)	—	20k	—	Ω
Input impedance (with clamp)	—	1.7M	—	Ω
Output impedance	—	30	—	Ω

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

● Measurement circuit

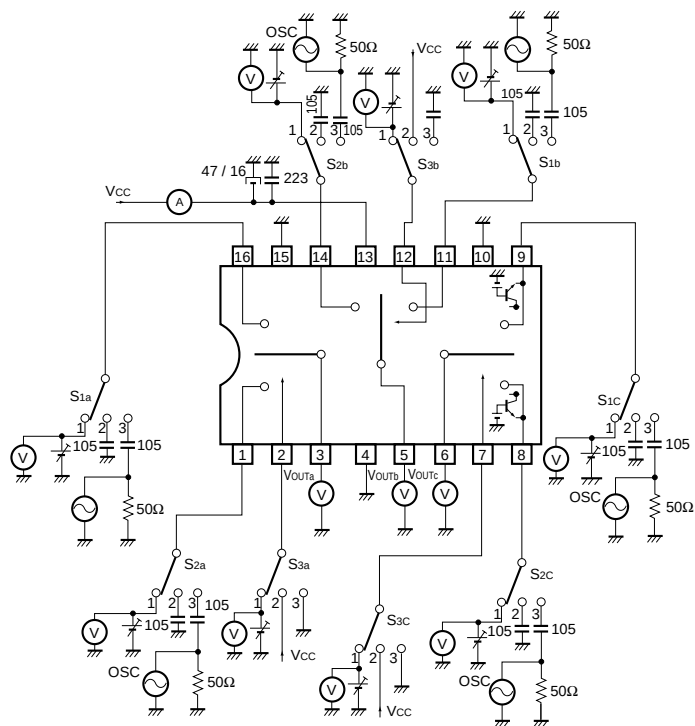


Fig.1

● Measurement conditions

Parameter		Symbol	Switch settings									Measurement method
			S _{1a}	S _{2a}	S _{3a}	S _{1b}	S _{2b}	S _{3b}	S _{1c}	S _{2c}	S _{3c}	
Current dissipation		I _{CC}	2	2	2	2	2	2	2	2	2	Ammeter
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	
CTL pin switching level	CTL _a	V _{TH}	3	2	1	2	2	2	2	2	2	Note 5
	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	
Input impedance	IN1a	Z _{IN}	1	2	2	2	2	2	2	2	2	Note 6
	IN2a	Z _{IN}	2	1	3	2	2	2	2	2	2	
	IN1b	Z _{IN}	2	2	2	1	2	2	2	2	2	
	IN2b	Z _{IN}	2	2	2	2	1	3	2	2	2	
Total-harmonic distortion	IN1a	THD	3	2	2	2	2	2	2	2	2	Note 7
	IN2a	THD	2	3	3	2	2	2	2	2	2	
	IN1b	THD	2	2	2	3	2	2	2	2	2	
	IN2b	THD	2	2	2	2	3	3	2	2	2	

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 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 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 is given by G_f = 20 log (V_{OUT}(f = 10MHz) / V_{OUT}(f = 1MHz)).

Note 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}.

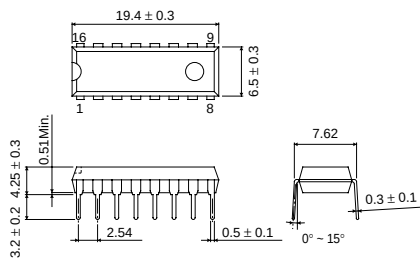
Note 6: Measure the input pin voltage V_{IN50} when a current of DC50μA is flowing into the input pin. Measure the input pin open-circuit voltage.

The input impedance is given by Z = (V_{IN50} - V_{IN0}) / 50 × 10⁻⁶[Ω].

Note 7: Input a 1V_{P-P}, 1kHz sine wave and measure the total-harmonic distortion of the output using a total-harmonic distortion meter.

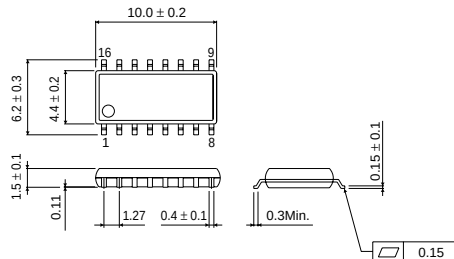
● External dimensions (Units: mm)

BA7609



DIP16

BA7609F



SOP16

Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein 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 devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature 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 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.
- Products listed in this document use silicon as a basic material.
Products listed in this document are no antiradiation design.

The products listed in this document 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 and other safety devices), please be sure to consult with our sales representative in advance.

About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.

In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.