

# Video signal switcher

## BA7603 / BA7603F

The BA7603 and BA7603F are switching ICs developed for use in VCRs. Each contains three two-channel analog multi-plexers. The switches have sync-tip clamped inputs and are ideal for switching video signals.

●Applications

Video cassette recorders and televisions

●Features

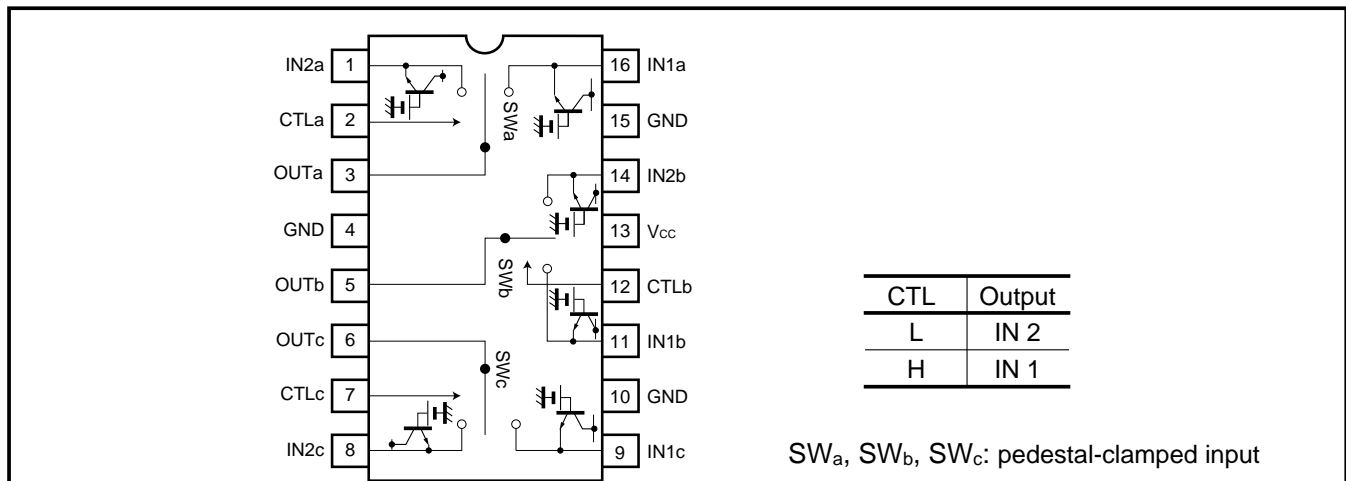
- 1) Three 2-input / 1-output switches.
- 2) Sync-tip clamped inputs.
- 3) 5V power supply.
- 4) Low power consumption (62.5mW Typ.).
- 5) Excellent frequency characteristics (10MHz, 0dB Typ.).
- 6) Wide dynamic range (2.9V<sub>P-P</sub> Typ.).
- 7) Fast switching speed (50ns Typ.).

●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V <sub>cc</sub>	9	V
Power dissipation	P <sub>d</sub>	500*	mW
Operating temperature	T <sub>opr</sub>	- 40 ~ + 85	°C
Storage temperature	T <sub>stg</sub>	- 55 ~ + 125	°C

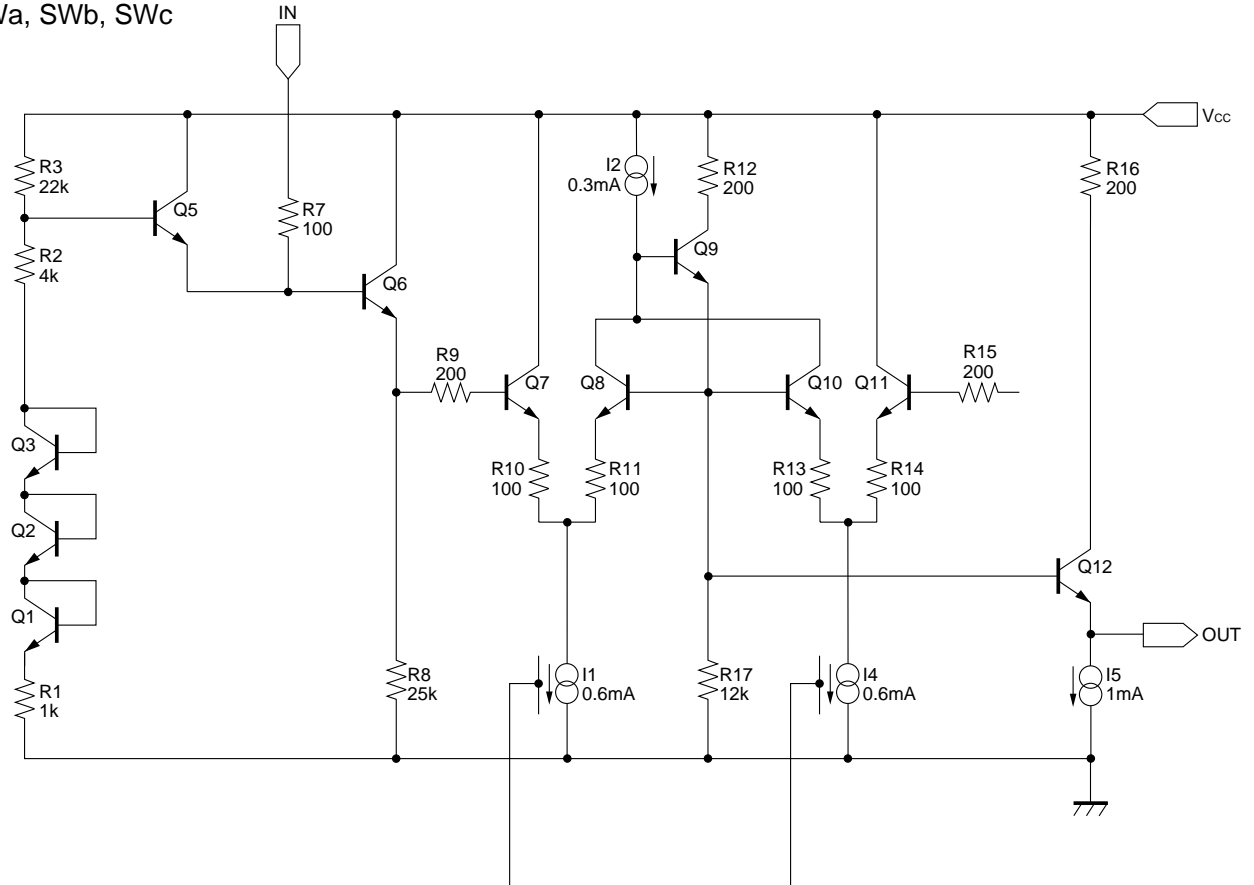
\* Reduced by 5.0mW for each increase in Ta of 1°C over 25°C.

●Block diagram

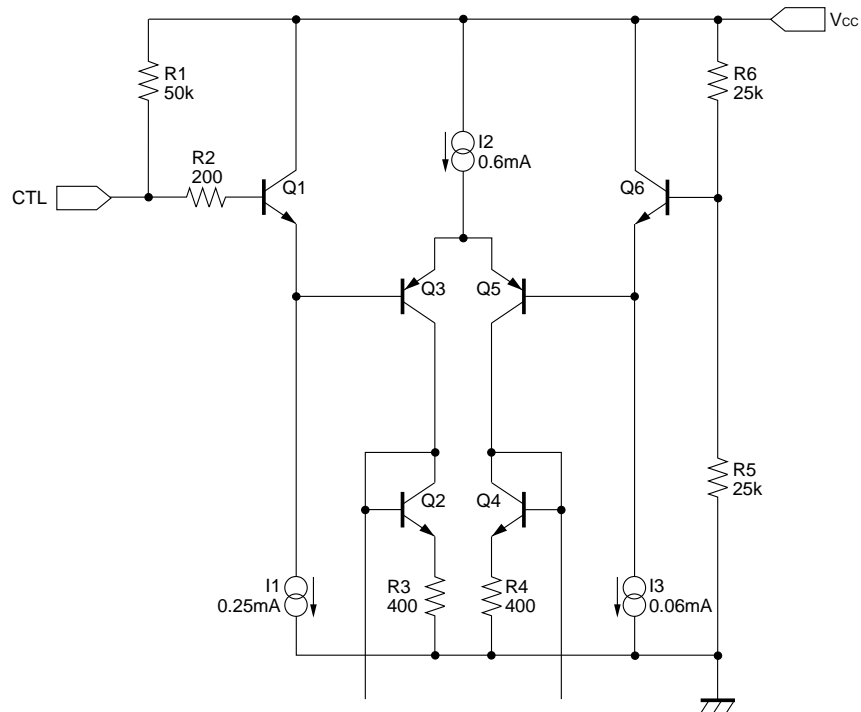


●Equivalent circuits

SWa, SWb, SWc



CTL



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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Operating voltage	$V_{CC}$	4.5	5.0	5.5	V	—
Supply current	$I_{CC}$	—	13.0	20.0	mA	—
Maximum output level	$V_{om}$	2.7	2.9	—	$V_{P-P}$	$f = 1\text{kHz}$ , THD = 0.5%
Voltage gain	$G_V$	-0.5	0	0.5	dB	$f = 1\text{MHz}$ , $V_{IN} = 1V_{P-P}$
Interchannel crosstalk	$C_T$	—	-65	—	dB	$f = 4.43\text{MHz}$ , $V_{IN} = 1V_{P-P}$
Frequency characteristics	$G_f$	-3	0	1	dB	10MHz / 1MHz, $V = 1V_{P-P}$
CTL pin switch level	$V_{TH}$	2.0	2.5	3.0	V	—

\* 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	2.05	9	2.05
2	4.91	10	0
3	0.65	11	2.05
4	0	12	4.91
5	0.65	13	5.00
6	0.65	14	2.05
7	4.91	15	0
8	2.05	16	2.05

Electrical characteristics

Parameter	Min.	Typ.	Max.	Unit
Sync tip clamp level	0.49	0.65	0.80	Vdc
Input impedance (with clamp)	—	1.7M	—	$\Omega$
Output impedance	—	30	—	$\Omega$

The input coupling capacitor values should be  $0.1\mu\text{F}$  to  $1\mu\text{F}$ .

● Measurement circuit

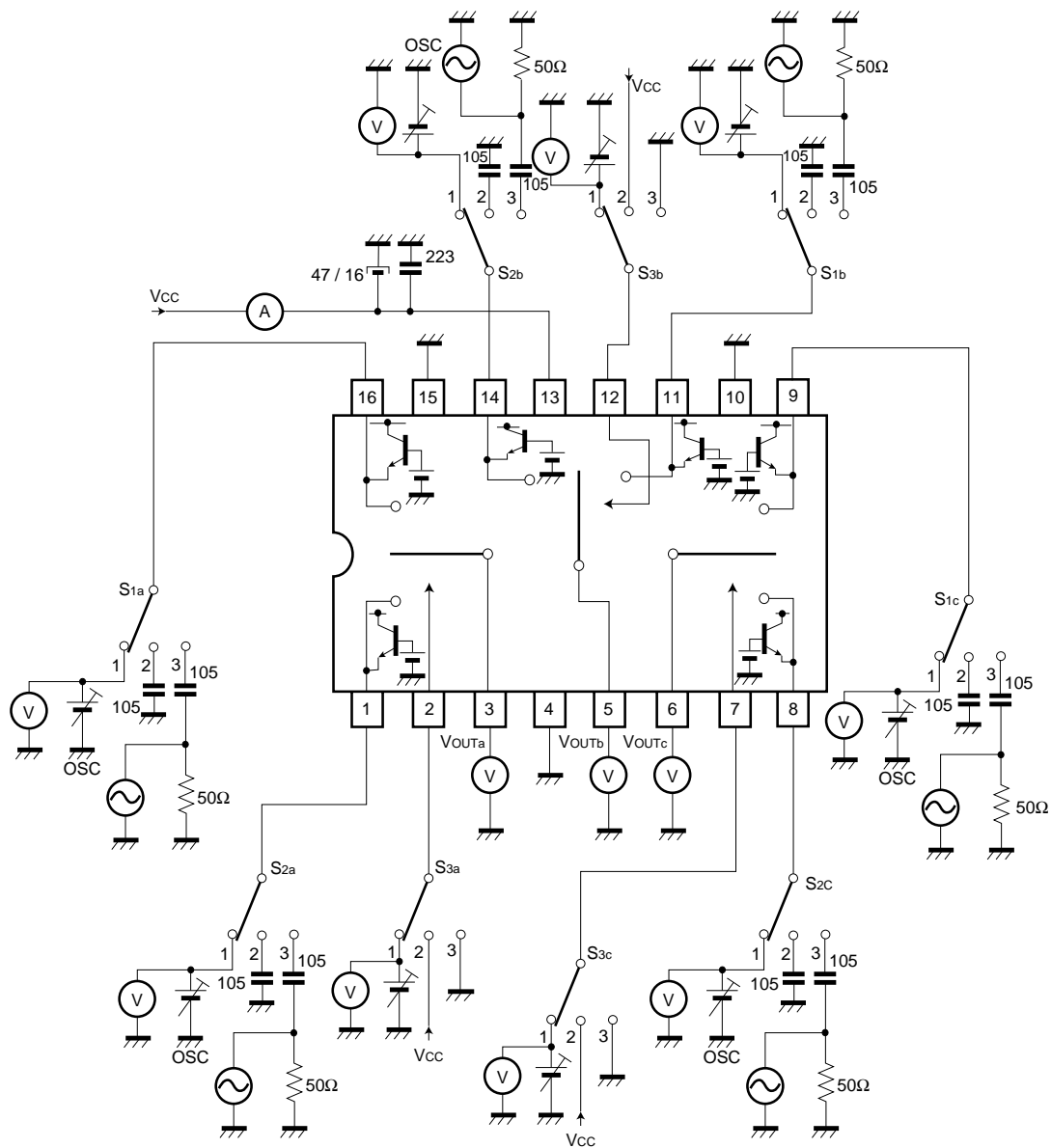


Fig.1

## ● Measurement conditions

Parameter	Symbol	Switch settings									Measurement method	
		S <sub>1a</sub>	S <sub>2a</sub>	S <sub>3a</sub>	S <sub>1b</sub>	S <sub>2b</sub>	S <sub>3b</sub>	S <sub>1c</sub>	S <sub>2c</sub>	S <sub>3c</sub>		
Current dissipation	I <sub>CC</sub>	2	2	2	2	2	2	2	2	2	2	
Maximum output level	IN1a	V <sub>om</sub>	3	2	2	2	2	2	2	2	2	f = 1kHz, THD = 0.5% Note 1
	IN2a	V <sub>om</sub>	2	3	3	2	2	2	2	2	2	
	IN1b	V <sub>om</sub>	2	2	2	3	2	2	2	2	2	
	IN2b	V <sub>om</sub>	2	2	2	2	3	3	2	2	2	
	IN1c	V <sub>om</sub>	2	2	2	2	2	2	3	2	2	
	IN2c	V <sub>om</sub>	2	2	2	2	2	2	2	3	3	
Voltage gain	IN1a	G <sub>V</sub>	3	2	2	2	2	2	2	2	2	f = 1kHz, V = 1V <sub>P-P</sub> Note 2
	IN2a	G <sub>V</sub>	2	3	3	2	2	2	2	2	2	
	IN1b	G <sub>V</sub>	2	2	2	3	2	2	2	2	2	
	IN2b	G <sub>V</sub>	2	2	2	2	3	3	2	2	2	
	IN1c	G <sub>V</sub>	2	2	2	2	2	2	3	2	2	
	IN2c	G <sub>V</sub>	2	2	2	2	2	2	2	3	3	
Inter-channel crosstalk	IN1a	C <sub>T</sub>	2	3	2	2	2	2	2	2	2	f = 4.43MHz, V = 1V <sub>P-P</sub> Note 3
	IN2a	C <sub>T</sub>	3	2	3	2	2	2	2	2	2	
	IN1b	C <sub>T</sub>	2	2	2	2	3	2	2	2	2	
	IN2b	C <sub>T</sub>	2	2	2	3	2	3	2	2	2	
	IN1c	C <sub>T</sub>	2	2	2	2	2	2	2	3	2	
	IN2c	C <sub>T</sub>	2	2	2	2	2	2	2	3	3	
Frequency characteristic	IN1a	G <sub>f</sub>	3	2	2	2	2	2	2	2	2	f = 10MHz / f = 1MHz, V = 1V <sub>P-P</sub> Note 4
	IN2a	G <sub>f</sub>	2	3	3	2	2	2	2	2	2	
	IN1b	G <sub>f</sub>	2	2	2	3	2	2	2	2	2	
	IN2b	G <sub>f</sub>	2	2	2	2	3	3	2	2	2	
	IN1c	G <sub>f</sub>	2	2	2	2	2	2	3	2	2	
	IN2c	G <sub>f</sub>	2	2	2	2	2	2	2	3	3	
CTL pin switching level	CTLa	V <sub>TH</sub>	1	2	1	2	2	2	2	2	2	Note 5
	CTLb	V <sub>TH</sub>	2	2	2	1	2	1	2	2	2	
	CTLc	V <sub>TH</sub>	2	2	2	2	2	2	1	2	1	

Note 1: Connect a distortion meter to the output, and input a f = 1kHz sine wave. Adjust the output level until the output distortion is 0.5%.

This output voltage at this time is the maximum output level V<sub>om</sub> (V<sub>P-P</sub>).

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

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

Note 4: Input 1V<sub>P-P</sub>, 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<sub>P-P</sub>, 1MHz sine wave. Reduce the CTL pin voltage from V<sub>CC</sub>.

The CTL pin switching level (V<sub>TH</sub>) is the CTL pin voltage at which the V<sub>OUT</sub> level drops below 20mV<sub>P-P</sub>.

●External dimensions (Units: mm)

