

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

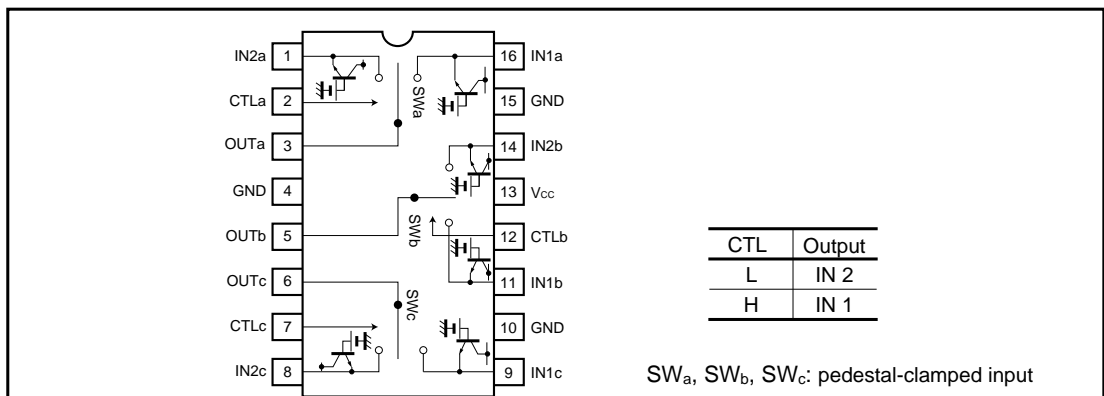
- 1) Three 2-input / 1-output switches.
- 2) Sync-tip clamped inputs.
- 3) 5V power supply.
- 4) Low power consumption (62.5mW Typ.).
- 5) Excellent frequency characteristics (10MHz, 0dB Typ.).
- 6) Wide dynamic range (2.9V_{P-P} Typ.).
- 7) Fast switching speed (50ns Typ.).

●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V _{CC}	9	V
Power dissipation	P _d	500*	mW
Operating temperature	T _{opr}	- 40 ~ + 85	°C
Storage temperature	T _{stg}	- 55 ~ + 125	°C

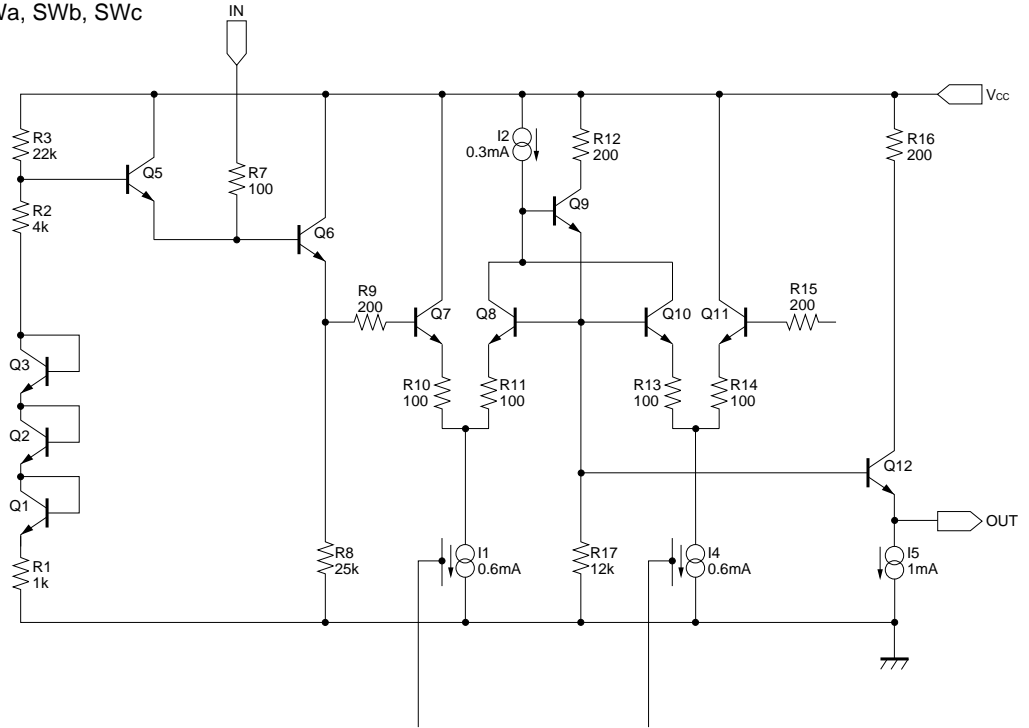
* Reduced by 5.0mW for each increase in Ta of 1°C over 25°C.

●Block diagram

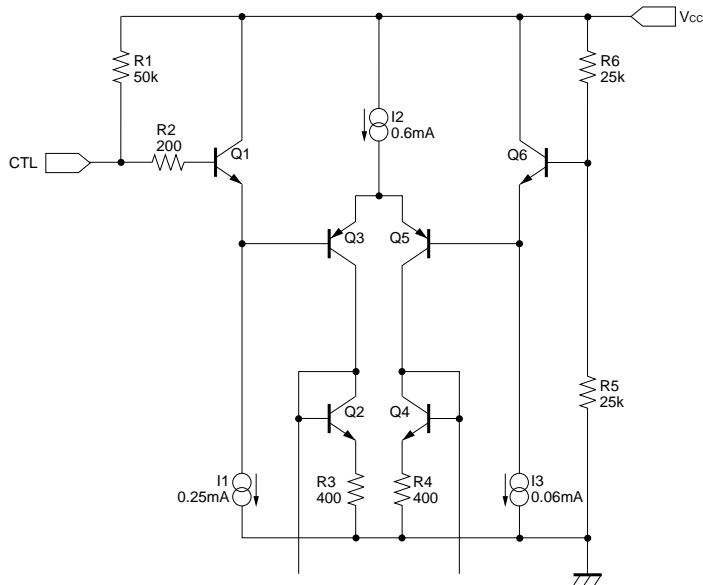


●Equivalent circuits

SWa, SWb, SWc



CTL



●Electrical characteristics (unless otherwise noted Ta = 25°C and Vcc = 5V)

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 = 1kHz, THD = 0.5%
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 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	—	Ω
Output impedance	—	30	—	Ω

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

● Measurement circuit

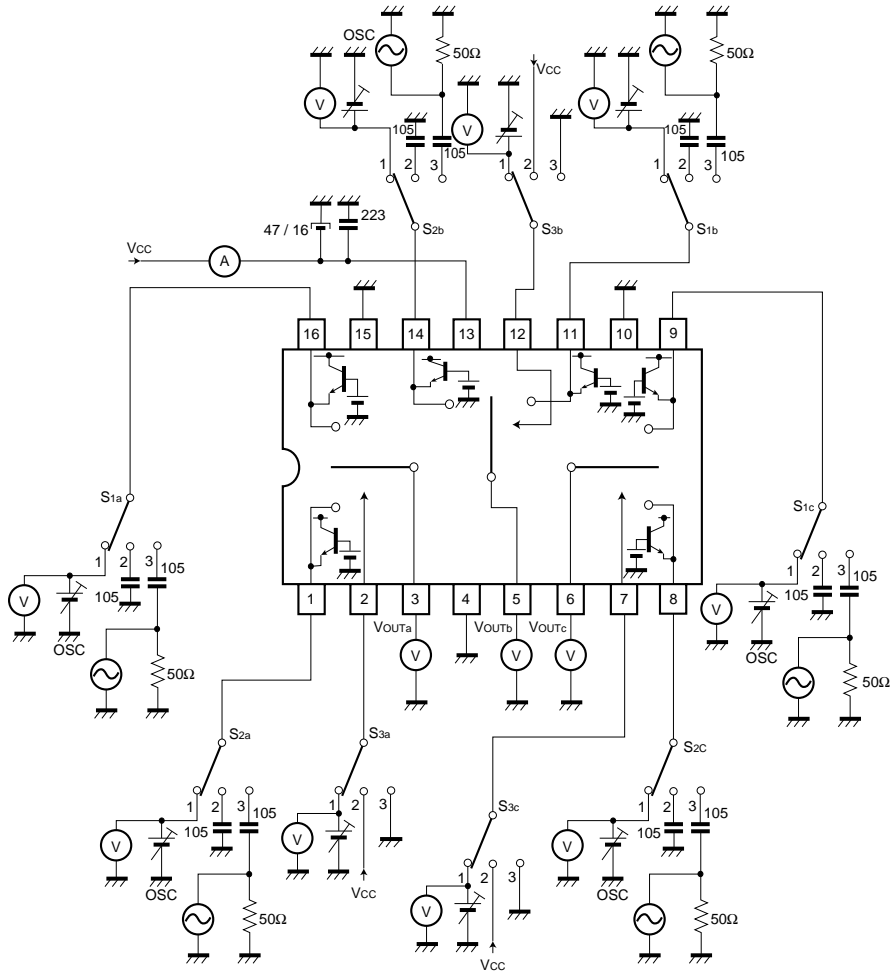


Fig.1

● 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	
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 = 1kHz, 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	
Inter-channel 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	CTLa	V _{TH}	1	2	1	2	2	2	2	2	2	Note 5
	CTLb	V _{TH}	2	2	2	1	2	1	2	2	2	
	CTLc	V _{TH}	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_{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 $G_f = 20 \log (V_{OUT} (f = 10\text{MHz}) / V_{OUT} (f = 1\text{MHz}))$.

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}.

●External dimensions (Units: mm)

