

Video signal switcher

BA7603/BA7603F

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

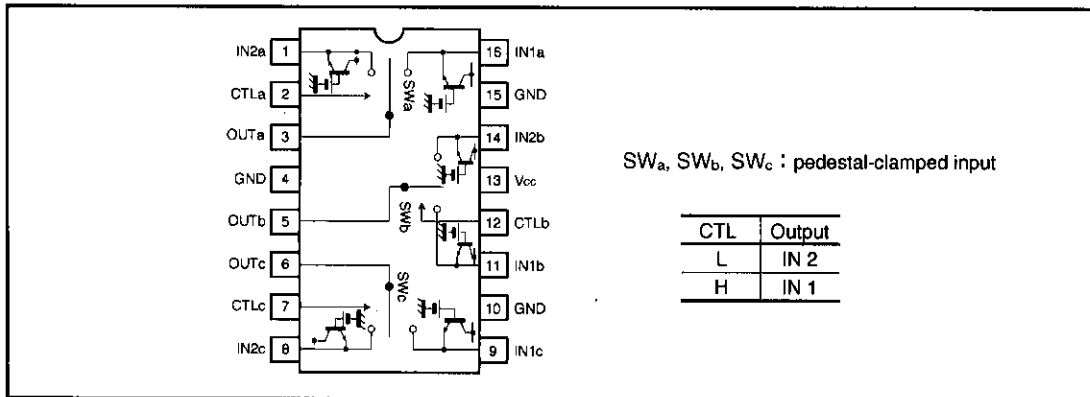
●Applications

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.).

●Block diagram



●Absolute maximum ratings (Ta=25°C)

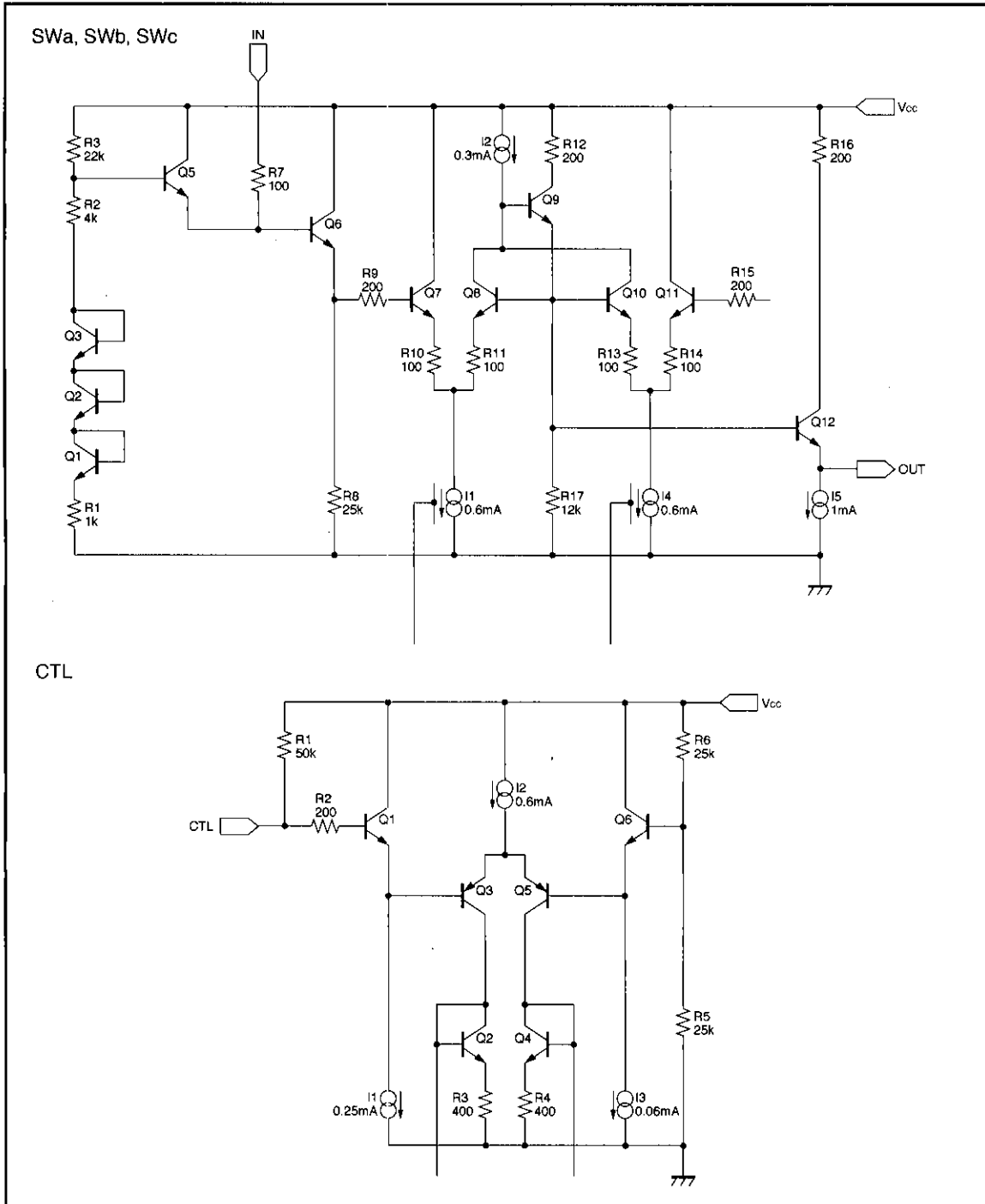
Parameter	Symbol	Limits	Unit
Power supply voltage	V _{cc}	9	V
Power dissipation	P _d	500 *	mW
Operating temperature	T _{opr}	-40~85	°C
Storage temperature	T _{stg}	-55~125	°C

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

Video signal selection switches

AV switches

●Equivalent circuits



● Electrical characteristics (Unless otherwise specified 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	
Circuit 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 characteristic	G _f	-3	0	1	dB	10MHz / 1MHz, V _{IN} =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: V_{dc}

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	V _{dc}
Input impedance (with clamp)	—	1.7M	—	Ω
Output impedance	—	30	—	Ω

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

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● Measurement circuit

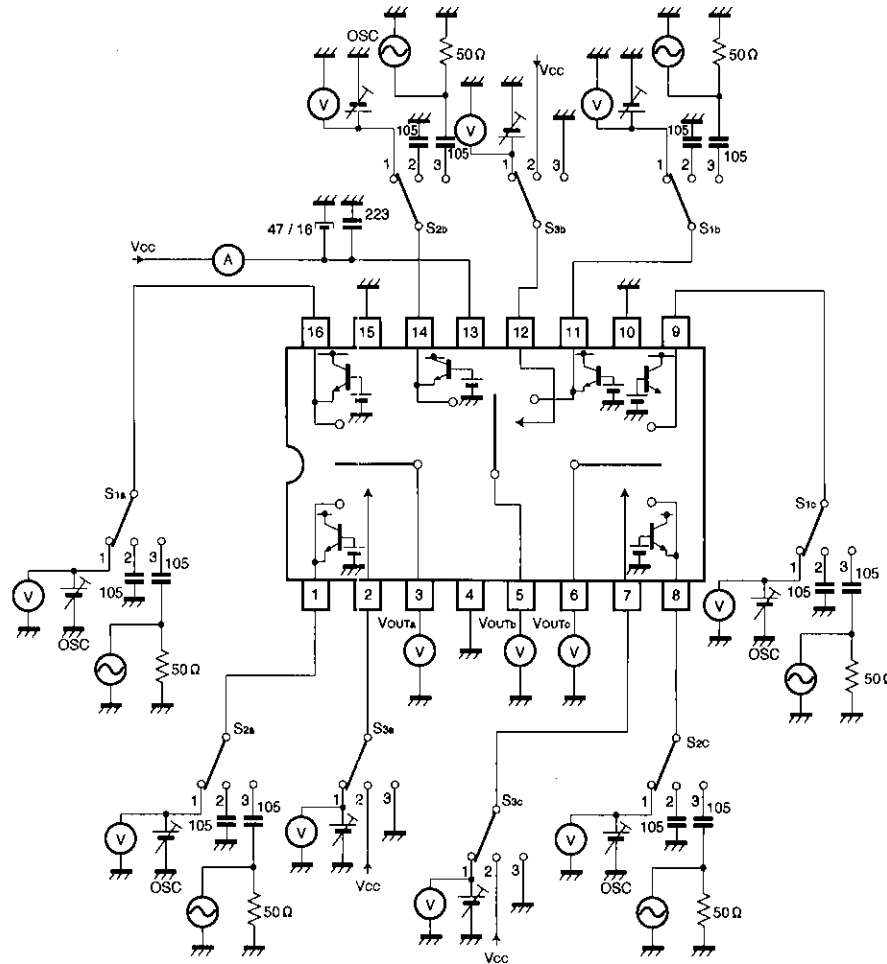


Fig.1

● 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	f=1kHz, THD=0.5% Note 1
	IN2a	V _{om}	2	3	3	2	2	2	2	2	
	IN1b	V _{om}	2	2	2	3	2	2	2	2	
	IN2b	V _{om}	2	2	2	2	3	3	2	2	
	IN1c	V _{om}	2	2	2	2	2	2	3	2	
Voltage gain	IN2c	V _{om}	2	2	2	2	2	2	2	3	
	IN1a	G _v	3	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	
	IN1b	G _v	2	2	2	3	2	2	2	2	
	IN2b	G _v	2	2	2	2	3	3	2	2	
IN1c	G _v	2	2	2	2	2	2	3	2		
Inter-channel crosstalk	IN2c	G _v	2	2	2	2	2	2	2	3	
	IN1a	C _T	2	3	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	
	IN1b	C _T	2	2	2	2	3	2	2	2	
	IN2b	C _T	2	2	2	3	2	3	2	2	
IN1c	C _T	2	2	2	2	2	2	2	3		
Frequency characteristic	IN2c	C _T	2	2	2	2	2	2	3	2	
	IN1a	G _i	3	2	2	2	2	2	2	2	f=10M / f=1M, V=1V _{P-P} Note 4
	IN2a	G _i	2	3	3	2	2	2	2	2	
	IN1b	G _i	2	2	2	3	2	2	2	2	
	IN2b	G _i	2	2	2	2	3	3	2	2	
IN1c	G _i	2	2	2	2	2	2	3	2		
CTL pin switching level	IN2c	G _i	2	2	2	2	2	2	2	3	
	CTLa	V _{TH}	1	2	1	2	2	2	2	2	Note 5
	CTLb	V _{TH}	2	2	2	1	2	1	2	2	
CTLc	V _{TH}	2	2	2	2	2	2	1	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 $C_T = 20 \log (V_{OUT}/V_{IN})$.

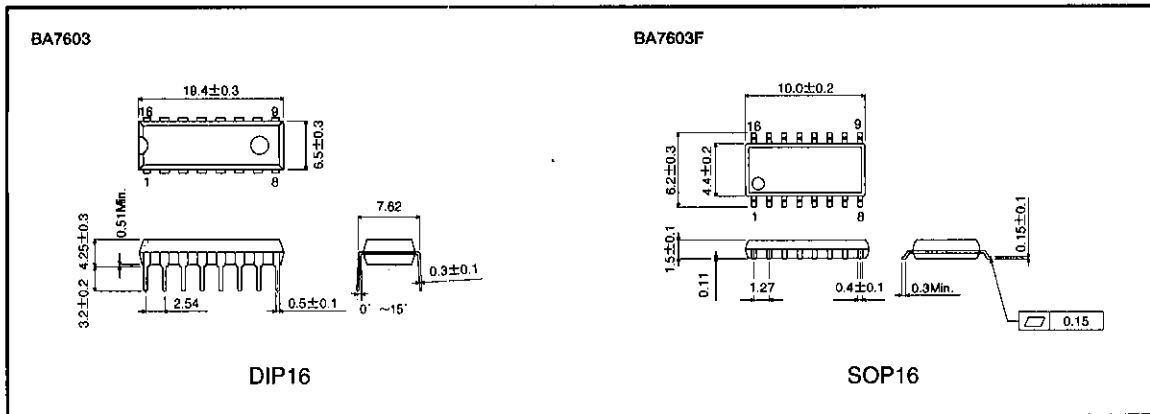
Note 4: Input 1V_{P-P}, 1MHz and 10MHz sine waves. The frequency characteristic is given by $G_i = 20 \log (V_{OUT} (f = 10\text{MHz})/V_{IN} (f = 1\text{MHz}))$.

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}.

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● External dimensions (Units: mm)



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