

Video signal switcher for AV amplifiers

BA7625

The BA7625 is a video signal switch that contains two five-channel analog multiplexers and wide-band 6dB amplifiers. It designed for use in video cassette recorders. By simply adding transistor buffers to the outputs, it is possible to construct a record/playback switch for two record/playback VCRs, and three video playback machines (eg. laser disk players). Input switching and VCR record switching can be done independently. The BA7625 has sync-tip clamp inputs which are ideal for switching video signals.

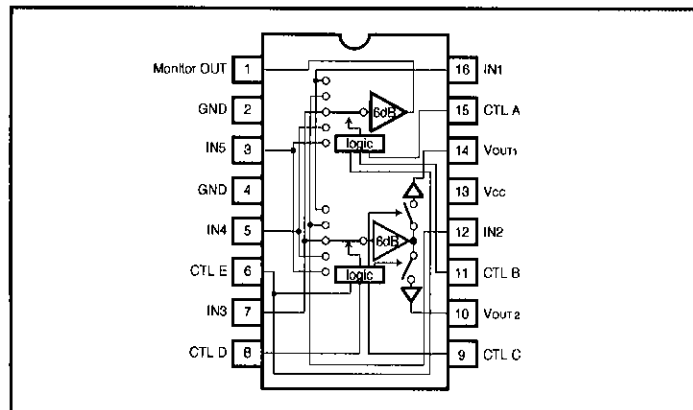
● Applications

AV amplifiers and video selectors

● Features

- 1) 5-input / 3-output switches.
- 2) Sync-tip clamp inputs.
- 3) Built-in 6dB amplifiers.
- 4) 5V supply voltage.

● Block diagram



● Truth table

A	B	E	Monitor OUT
L	L	*	IN1
H	L	*	IN2
L	H	*	IN3
H	H	L	IN4
H	H	H	IN5

C	D	E	VOUT1
L	L	*	—
H	L	*	IN2
L	H	*	IN3
H	H	L	IN4
H	H	H	IN5

C	D	E	VOUT2
L	L	*	IN1
H	L	*	—
L	H	*	IN3
H	H	L	IN4
H	H	H	IN5

Note 1: * indicates "don't care" (H or L).

Video signal selection switches

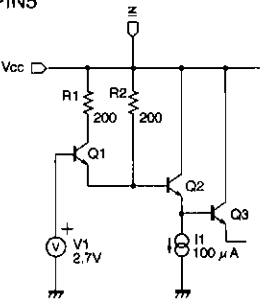
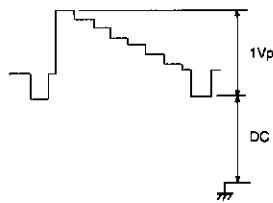
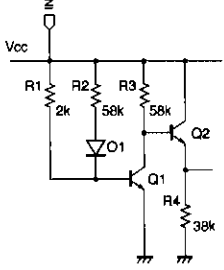
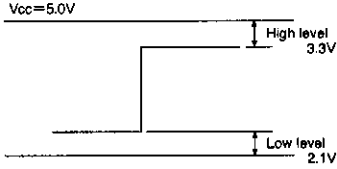
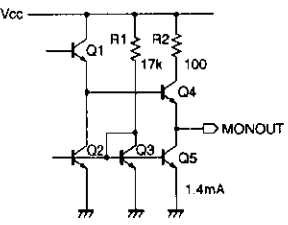
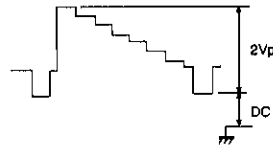
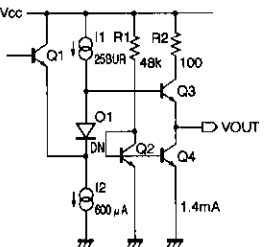
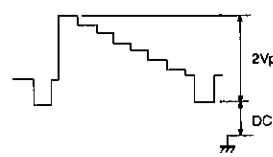
AV switches

●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}	-25~70	°C
Storage temperature	T _{stg}	-55~125	°C

* Reduced by 5mW for each increase in Ta of 1°C over 25°C.

●Equivalent input / output circuits

Input circuit	Waveform
<p>IN1~IN5</p> 	
<p>CTLA~CTLE</p> 	
<p>Monitor OUT</p> 	
<p>VOUT1, VOUT2</p> 	

Video signal selection switches

AV switches

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Operating voltage	V _{CC}	4.5	5.0	5.5	V	—
Circuit current	I _{CC}	—	15.0	20.0	mA	—
Maximum output level	V _{om}	2.6	2.9	—	V _{P-P}	f=1kHz, THD=0.5%
Voltage gain	G _v	5.7	6.2	6.7	dB	f=MHz, V _{IN} =1V _{P-P}
Interchannel crosstalk	CT	—	-65	-45	dB	f=4.43MHz, V _{IN} =1V _{P-P}
Mute level	CTM	—	-35	-25	dB	f=4.43MHz, V _{IN} =1V _{P-P}
Frequency characteristic	G _f	-3	0	3	dB	10MHz / 1MHz, V _{IN} =1V _{P-P}
CTL pin switch level	V _{TH}	2.2	—	3.3	V	—

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●Measurement circuit

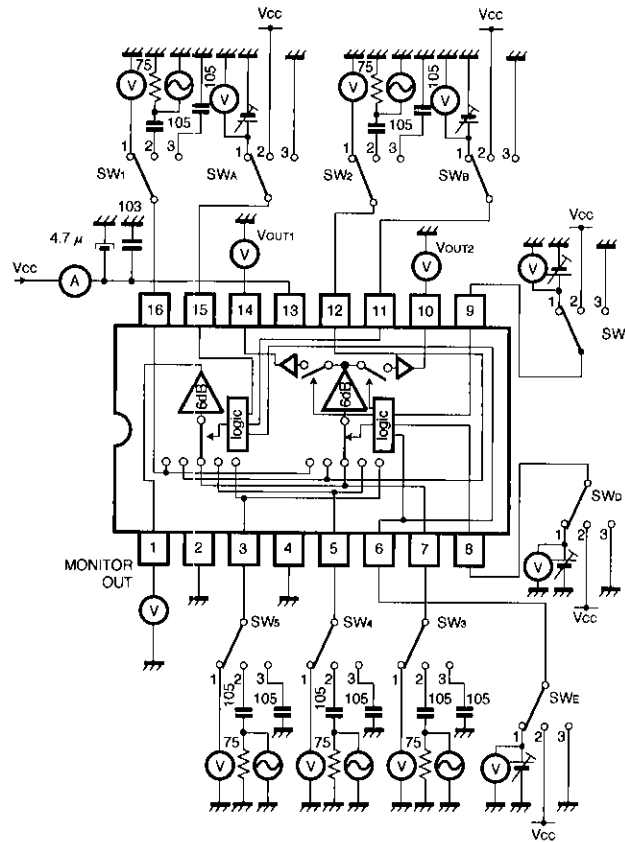


Fig.1

●Measurement conditions

Parameter	Symbol	Switch settings										Measurement method
		SW ₁	SW ₂	SW ₃	SW ₄	SW ₅	SW _A	SW _B	SW _C	SW _D	SW _E	
Current consumption	I _{cc}	3	3	3	3	3	2	2	2	2	2	
Monitor OUT maximum output level	V _{om} 1MON	2	3	3	3	3	3	3	*	*	*	Note 1
	V _{om} 2MON	3	2	↓	↓	↓	2	3	↓	↓	↓	
	V _{om} 3MON	↓	3	2	↓	↓	3	2	↓	↓	↓	
	V _{om} 4MON	↓	↓	3	2	2	2	2	↓	↓	3	
	V _{om} 5MON	↓	↓	↓	3	2	2	2	↓	↓	2	
Monitor OUT voltage gain	G _v 1MON	2	3	3	3	3	3	3	*	*	*	Note 2
	G _v 2MON	3	2	↓	↓	↓	2	3	↓	↓	↓	
	G _v 3MON	↓	3	2	↓	↓	3	2	↓	↓	↓	
	G _v 4MON	↓	↓	3	2	2	2	2	↓	↓	3	
	G _v 5MON	↓	↓	↓	3	2	2	2	↓	↓	2	
Monitor OUT interchannel crosstalk	CT1-2MON	2	3	3	3	3	2	3	*	*	*	Note 3
	CT1-3MON	↓	↓	↓	↓	↓	3	2	↓	↓	↓	
	CT1-4MON	↓	↓	↓	↓	↓	2	2	↓	↓	3	
	CT1-5MON	↓	↓	↓	↓	↓	2	2	↓	↓	2	
	CT2-1MON	3	2	3	3	3	3	3	*	*	*	
	CT2-3MON	↓	↓	↓	↓	↓	3	2	↓	↓	↓	
	CT2-4MON	↓	↓	↓	↓	↓	2	2	↓	↓	3	
	CT2-5MON	↓	↓	↓	↓	↓	2	2	↓	↓	2	
	CT3-1MON	3	3	2	3	3	3	3	*	*	*	
	CT3-2MON	↓	↓	↓	↓	↓	2	3	↓	↓	↓	
	CT3-4MON	↓	↓	↓	↓	↓	2	2	↓	↓	3	
	CT3-5MON	↓	↓	↓	↓	↓	2	2	↓	↓	2	
	CT4-1MON	3	3	3	2	3	3	3	*	*	*	
	CT4-2MON	↓	↓	↓	↓	↓	2	3	↓	↓	↓	
	CT4-3MON	↓	↓	↓	↓	↓	2	2	↓	↓	↓	
	CT4-5MON	↓	↓	↓	↓	↓	2	2	↓	↓	3	
	CT5-1MON	3	3	3	3	2	3	3	*	*	*	
	CT5-2MON	↓	↓	↓	↓	↓	2	3	↓	↓	↓	
	CT5-3MON	↓	↓	↓	↓	↓	2	2	↓	↓	↓	
	CT5-4MON	↓	↓	↓	↓	↓	2	2	↓	↓	2	
Monitor OUT frequency characteristic	G _f 1MON	2	3	3	3	3	3	3	*	*	*	Note 4
	G _f 2MON	3	2	↓	↓	↓	2	3	↓	↓	↓	
	G _f 3MON	↓	3	2	↓	↓	3	2	↓	↓	↓	
	G _f 4MON	↓	↓	3	2	↓	2	2	↓	↓	3	
	G _f 5MON	↓	↓	↓	3	2	2	2	↓	↓	2	
V _{OUT1} maximum output level	V _{om} 2OUT1	3	2	3	3	3	*	*	2	3	*	Note 1
	V _{om} 3OUT1	↓	3	2	↓	↓	↓	↓	3	2	↓	
	V _{om} 4OUT1	↓	↓	3	2	3	↓	↓	2	2	3	
	V _{om} 5OUT1	↓	↓	↓	3	2	↓	↓	2	2	2	

Video signal selection switches

AV switches

● Measurement conditions

Parameter	Symbol	Switch settings										Measurement method
		SW ₁	SW ₂	SW ₃	SW ₄	SW ₅	SW _A	SW _B	SW _C	SW _D	SW _E	
V _{OUT1} voltage gain	Gv 2OUT1	3	2	3	3	3	*	*	2	3	*	Note 2
	Gv 3OUT1	↓	3	2	↓	↓	↓	↓	3	2	↓	
	Gv 4OUT1	↓	↓	3	2	3	↓	↓	2	2	3	
	Gv 5OUT1	↓	↓	↓	3	2	↓	↓	2	2	2	
V _{OUT1} interchannel crosstalk	CT1-2OUT1	2	3	3	3	3	*	*	3	3	*	Note 3
	CT1-3OUT1	↓	↓	↓	↓	↓	↓	↓	3	2	↓	
	CT1-4OUT1	↓	↓	↓	↓	↓	↓	↓	2	2	3	
	CT1-5OUT1	↓	↓	↓	↓	↓	↓	↓	2	2	2	
	CT2-1OUT1	3	2	3	3	3	*	*	3	3	*	
	CT2-3OUT1	↓	↓	↓	↓	↓	↓	↓	3	2	↓	
	CT2-4OUT1	↓	↓	↓	↓	↓	↓	↓	2	2	3	
	CT2-5OUT1	↓	↓	↓	↓	↓	↓	↓	2	2	2	
	CT3-1OUT1	3	3	2	3	3	*	*	3	3	*	
	CT3-2OUT1	↓	↓	↓	↓	↓	↓	↓	2	3	↓	
	CT3-4OUT1	↓	↓	↓	↓	↓	↓	↓	2	2	3	
	CT3-5OUT1	↓	↓	↓	↓	↓	↓	↓	2	2	2	
CT4-1OUT1	3	3	3	2	3	*	*	3	3	*		
CT4-2OUT1	↓	↓	↓	↓	↓	↓	↓	2	3	↓		
CT4-3OUT1	↓	↓	↓	↓	↓	↓	↓	3	2	↓		
CT4-5OUT1	↓	↓	↓	↓	↓	↓	↓	2	2	2		
CT5-1OUT1	3	3	3	3	2	*	*	3	3	*		
CT5-2OUT1	↓	↓	↓	↓	↓	↓	↓	2	3	↓		
CT5-3OUT1	↓	↓	↓	↓	↓	↓	↓	3	2	↓		
CT5-4OUT1	↓	↓	↓	↓	↓	↓	↓	2	2	3		
V _{OUT1} frequency characteristic	Gr 2OUT1	3	2	3	3	3	*	*	2	3	*	Note 4
	Gr 3OUT1	↓	3	2	↓	↓	↓	↓	3	2	↓	
	Gr 4OUT1	↓	↓	3	2	3	↓	↓	2	2	3	
	Gr 5OUT1	↓	↓	↓	3	2	↓	↓	2	2	2	
V _{OUT2} maximum output level	V _{om} 1OUT2	2	3	3	3	3	*	*	3	3	*	Note 1
	V _{om} 3OUT2	3	2	↓	↓	↓	↓	↓	3	2	↓	
	V _{om} 4OUT2	↓	3	↓	2	↓	↓	↓	2	2	3	
	V _{om} 5OUT2	↓	↓	↓	3	2	↓	↓	2	2	2	
V _{OUT2} voltage gain	Gv 1OUT2	2	3	3	3	3	*	*	3	3	*	Note 2
	Gv 3OUT2	3	2	↓	↓	↓	↓	↓	3	2	↓	
	Gv 4OUT2	↓	3	↓	2	↓	↓	↓	2	2	3	
	Gv 5OUT2	↓	↓	↓	3	2	↓	↓	2	2	2	

Video signal switcher

BA7644AN

The BA7644AN is a four-channel analog multiplexer with mute, designed for use in video cassette recorders. It features a wide dynamic range, and wide operating frequency range, and is suitable for switching audio and video signals.

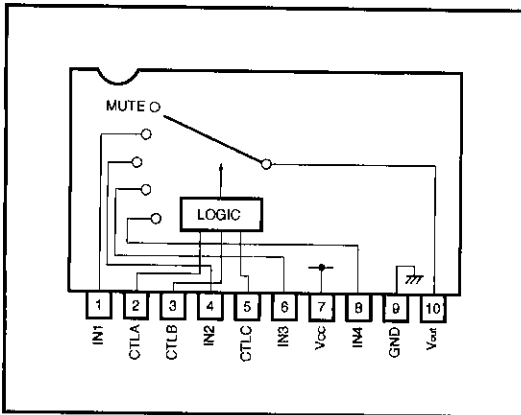
●Applications

VCR, TV and audio signal switching

●Features

- 1) 4-input / 1-output switches.
- 2) Built-in mute.
- 3) Wide operating supply voltage range (4.5V to 13.0V).
- 4) Low power consumption (48mW Typ.).
- 5) Excellent frequency characteristics (10MHz, 0dB Typ.).
- 6) Wide dynamic range (3.5V_{P-P} Typ.).
- 7) High input impedance (20kΩ Typ.).
- 8) Low interchannel crosstalk (-65dB Typ., f=4.43MHz).

●Block diagram



Truth table

CTL - A	CTL - B	CTL - C	OUT
L (OPEN)	L (OPEN)	L (OPEN)	IN1
L (OPEN)	H	L (OPEN)	IN2
H	L (OPEN)	L (OPEN)	IN3
H	H	L (OPEN)	IN4
*	*	H	MUTE

* Either "L" (open) or "H".

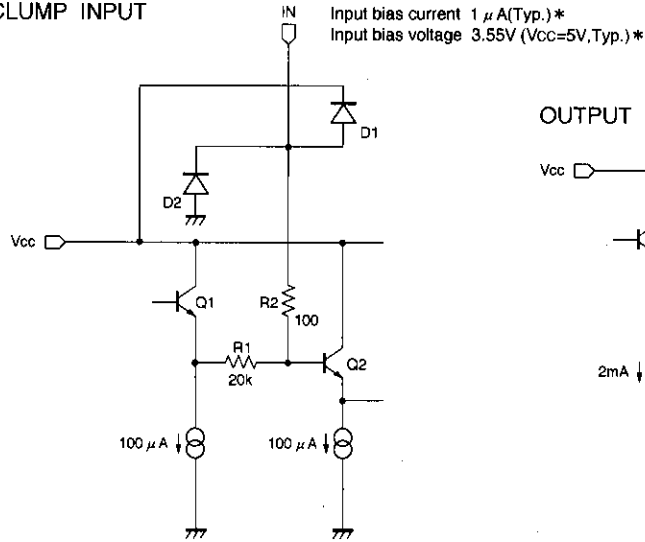
●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V _{cc}	13.5	V
Power dissipation	P _d	850 *	mW
Operating temperature	T _{opr}	-25~75	°C
Storage temperature	T _{stg}	-55~125	°C

* Reduced by 8.5mW for each increase in Ta of 1°C over 25°C.

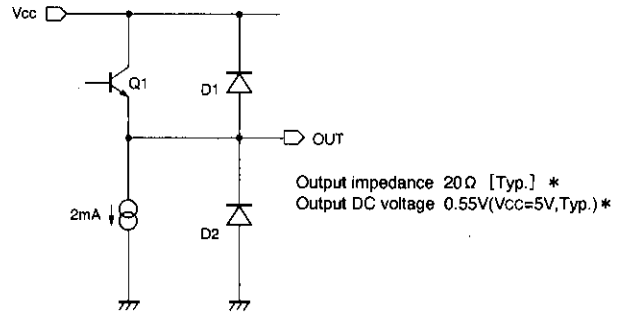
●Equivalent circuits

CLUMP INPUT

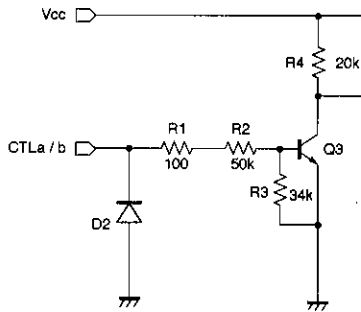


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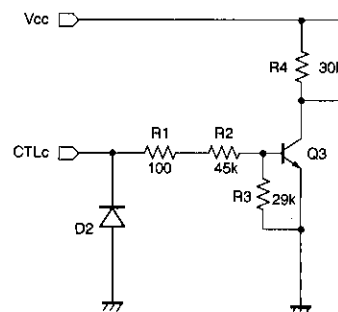
OUTPUT



CTLa / CTLb



CTLc



Audio/video signal selection switches
AV switches

●Electrical characteristics (Unless otherwise specified Ta=25°C and Vcc=5.0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	Measurement Circuit
Operating voltage	V _{CC}	4.5	—	13.0	V		Fig.1
Circuit current	I _{CC}	—	9.5	14.5	mA		Fig.1
Maximum output level	V _{OM}	3.0	3.5	—	V _{P-P}	f=1kHz, THD=0.5%	Fig.1
Voltage gain	G _V	-0.5	0	0.5	dB	f=1MHz, V _{in} =1.0V _{P-P}	Fig.1
Interchannel crosstalk	IN - IN	C _{Tin}	-65		dB	f=4.43MHz, V _{in} =1.0V _{P-P}	Fig.1
	IN - MUTE	C _{Tm}	-55		dB	f=4.43MHz, V _{in} =1.0V _{P-P}	Fig.1
Frequency characteristic	C _f	-3.0	0	1.0	dB	f=10MHz / 1MHz, V _{in} =1.0V _{P-P}	Fig.1
Total-harmonic distortion	THD	—	0.007		%	f=1kHz, V _{in} =1.0V _{P-P}	Fig.1
Input impedance	Z _{in}	14	20	26	kΩ		Fig.1
CTL pin switching level A	V _{TH-A}	1.0	2.0	3.0	V		Fig.1
CTL pin switching level B	V _{TH-B}	1.0	2.0	3.0	V		Fig.1
CTL pin switching level C	V _{TH-C}	1.0	2.0	3.0	V		Fig.1

○Not designed for radiation resistant.

●Measurement circuit

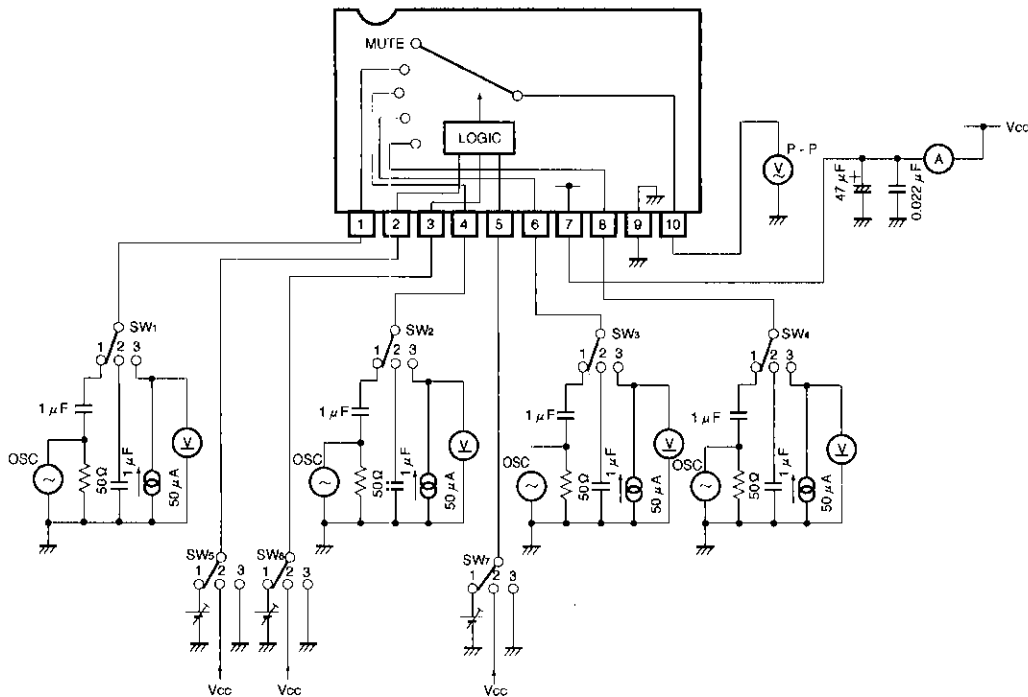


Fig.1

● Measurement conditions

Parameter	Symbol	Switch settings							Measurement method	
		SW ₁	SW ₂	SW ₃	SW ₄	SW ₅	SW ₆	SW ₇		
Current consumption	I _{cc}	2	2	2	2	2	2	2	Ammeter	
Maximum output level	IN 1	V _{om}	1	2	2	2	3	3	3	f=1kHz, THD=0.5% Note 1
	IN 2	V _{om}	2	1	2	2	3	2	3	
	IN 3	V _{om}	2	2	1	2	2	3	3	
	IN 4	V _{om}	2	2	2	1	2	2	3	
Voltage gain	IN1	G _v	1	2	2	2	3	3	3	f=1MHz, V _{in} =1V _{P-P} Note 2
	IN2	G _v	2	1	2	2	3	2	3	
	IN3	G _v	2	2	1	2	2	3	3	
	IN4	G _v	2	2	2	1	2	2	3	
Interchannel crosstalk	IN1→IN2	C _T	1	2	2	2	3	2	3	f=4.43MHz, V _{in} =1V _{P-P} Note 3
	IN1→IN3	C _T	1	2	2	2	2	3	3	
	IN1→IN4	C _T	1	2	2	2	2	2	3	
	IN1→MUTE	C _T	1	2	2	2	*	*	2	
	IN2→IN3	C _T	2	1	2	2	2	3	3	
	IN2→IN4	C _T	2	1	2	2	2	2	3	
	IN2→MUTE	C _T	2	1	2	2	*	*	2	
	IN3→IN4	C _T	2	2	1	2	2	2	3	
Frequency characteristic	IN 1	G _f	1	2	2	2	3	3	3	f=10MHz / f=1MHz V _{in} =1V _{P-P} Note 4
	IN 2	G _f	2	1	2	2	3	2	3	
	IN 3	G _f	2	2	1	2	2	3	3	
	IN 4	G _f	2	2	2	1	2	2	3	
Total-harmonic distortion	IN 1	THD	1	2	2	2	3	3	3	f=1kHz V _{in} =1V _{P-P} Note 5
	IN 2	THD	2	1	2	2	3	2	3	
	IN 3	THD	2	2	1	2	2	3	3	
	IN 4	THD	2	2	2	1	2	2	3	
Input impedance	IN 1	Z _{in}	3	2	2	2	3	3	3	Note 6
	IN 2	Z _{in}	2	3	2	2	3	2	3	
	IN 3	Z _{in}	2	2	3	2	2	3	3	
	IN 4	Z _{in}	2	2	2	3	2	2	3	
CTL pin switching level	CTL - A	V _{TH}	2	2	1	2	1	3	3	Note 7 Note 8
	CTL - B	V _{TH}	2	1	2	2	3	1	3	
	CTL - C	V _{TH}	1	2	2	2	3	3	1	

* Anywhere possible.

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 $G_f = 20 \log (V_{OUT}(f = 10\text{MHz})/V_{IN}(f = 1\text{MHz}))$.Note 5: Input a 1V_{P-P}, 1MHz sine wave and measure the total-harmonic distortion of the output using a total-harmonic distortion meter.Note 6: Measure the input pin voltage V_{in50} when a current of DC50 μA is flowing into the input pin. Measure the input pin open-circuit voltage. The input impedance is given by $Z = (V_{in50} - V_{in0})/50 \times 10^{-6} \Omega$.Note 7: 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 8: Input a 1V_{P-P}, 1MHz sine wave. Increase the CTL pin voltage from 0V. The CTL pin switching level (V_{TH}) is the CTL pin voltage at which the V_{out} level goes above 1.0V_{P-P}.

Audio/video signal selection switches

AV switches

● Electrical characteristic curves

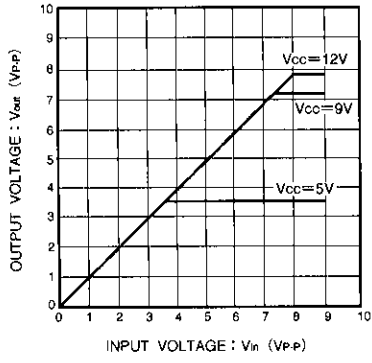


Fig. 2 Vin vs. Vout characteristics (f = 1kHz)

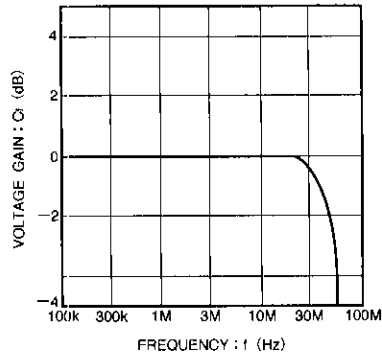


Fig. 3 Frequency characteristic

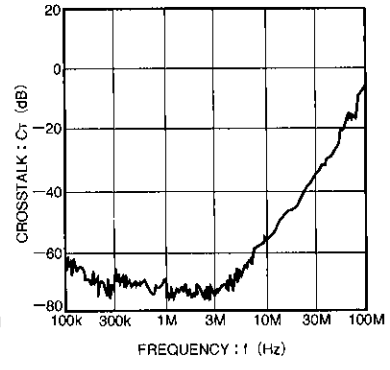
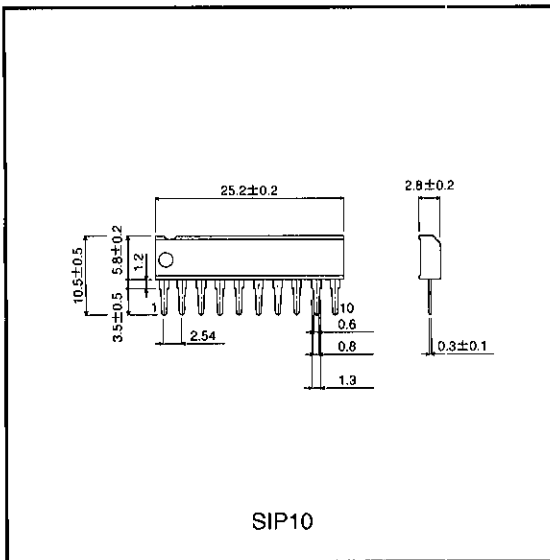


Fig. 4 Interchannel crosstalk characteristics

● External dimensions (Units: mm)



Notes

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