

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

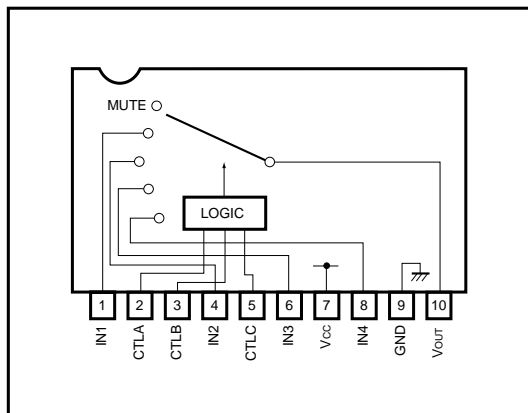
- 1) 4-input / 1-output switches.
- 2) Built-in mute.
- 3) Wide operating supply voltage range (4.5V to 13.0V).
- 4) Low power consumption (48mW Typ.).
- 5) Excellent frequency characteristics (10MHz, 0dB Typ.).
- 6) Wide dynamic range (3.5V_{P-P} Typ.).
- 7) High input impedance (20kΩ Typ.).
- 8) Low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

●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.

●Block diagram



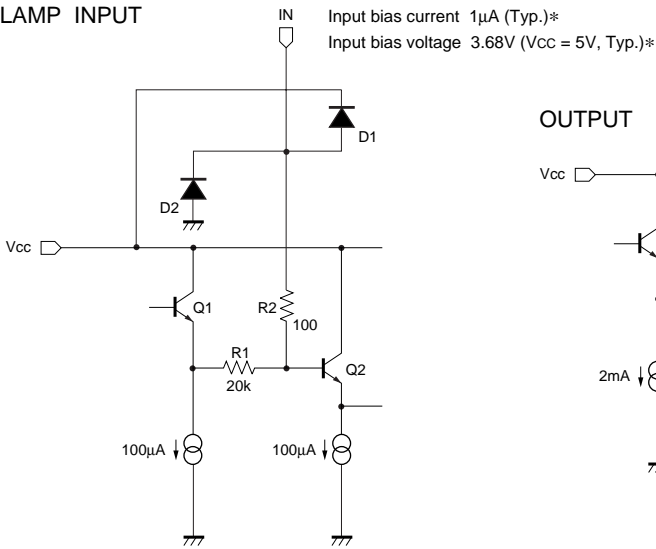
●Truth table

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

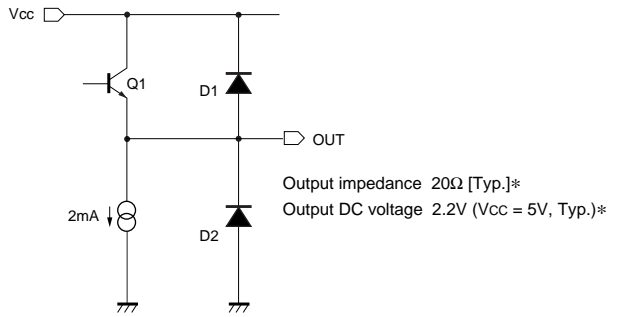
* Either "L (open)" or "H".

●Equivalent circuits

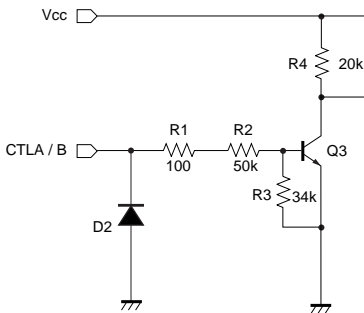
CLAMP INPUT



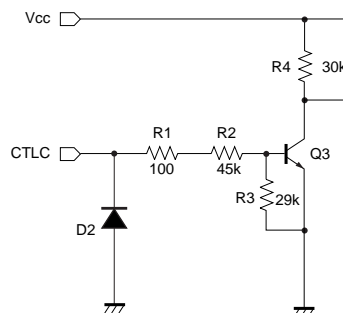
OUTPUT



CTLA / CTLB



CTLC



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

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

○Not designed for radiation resistance.

●Measurement circuit

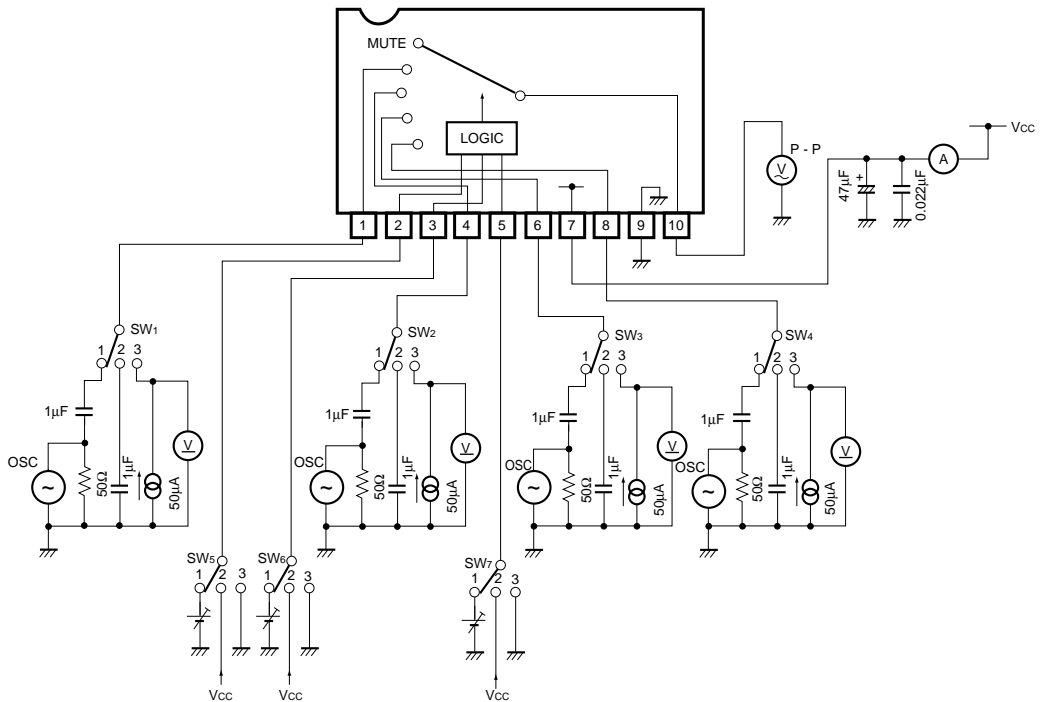


Fig. 1

● Measurement conditions

Parameter		Symbol	Switch settings							Measurement method
			SW ₁	SW ₂	SW ₃	SW ₄	SW ₅	SW ₆	SW ₇	
Current dissipation		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	
	IN3→MUTE	C _T	2	2	1	2	*	*	2	
IN4→MUTE	C _T	2	2	2	1	*	*	2		
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 is 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 = 10MHz) / V_{OUT} (f = 1MHz)).

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 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}, 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}.

●Electrical characteristic curves

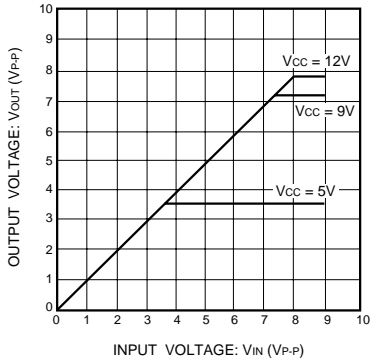


Fig. 2 VIN vs. VOUT (f = 1kHz)

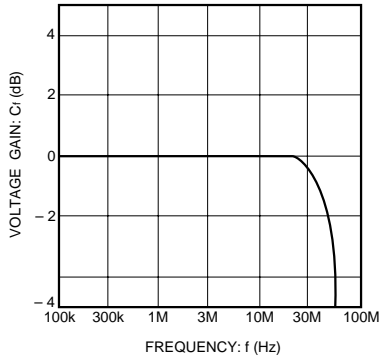


Fig. 3 Frequency characteristics

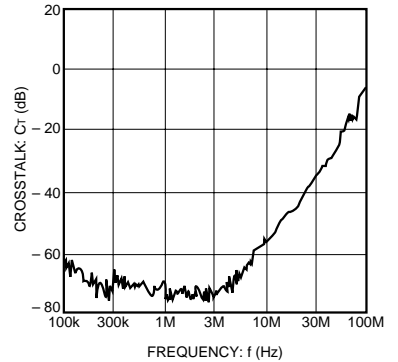
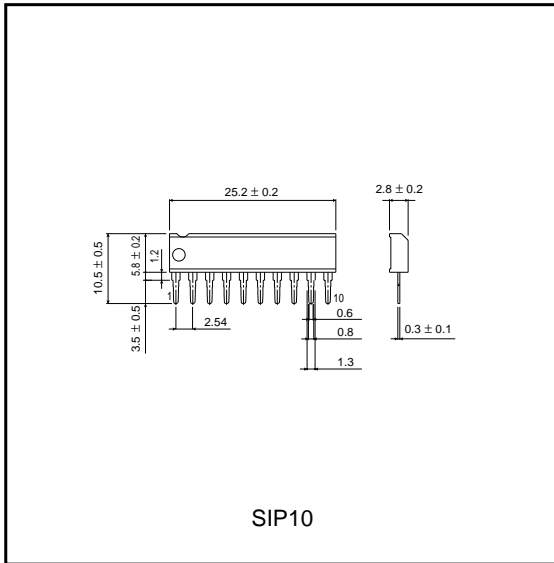


Fig. 4 Interchannel crosstalk

●External dimensions (Units: mm)





LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

LittleDiode.com

Looking forward to providing you with the best possible service.