

# Audio / video switch for CANAL - Plus decoder

## BH7634AS

The BH7634AS is one-chip IC that contains audio and video switches that support 21-pin SECAM and PAL connectors.

The I<sup>2</sup>C BUS for switch control simplifies applications, while the two expansion ports allow up to two external inputs.

### ●Applications

VCRs

### ●Features

- 1) I<sup>2</sup>C BUS control.
- 2) Video input is sync tip clamped, and includes a small-capacity (0.022μF) input capacitor.
- 3) Three FSCOUT values.
- 4) Two expansion ports.
- 5) Audio mute function.
- 6) 75Ω driver output (pins 20 and 23) requires no attached capacitor.

### ●Absolute maximum ratings (Ta = 25°C)

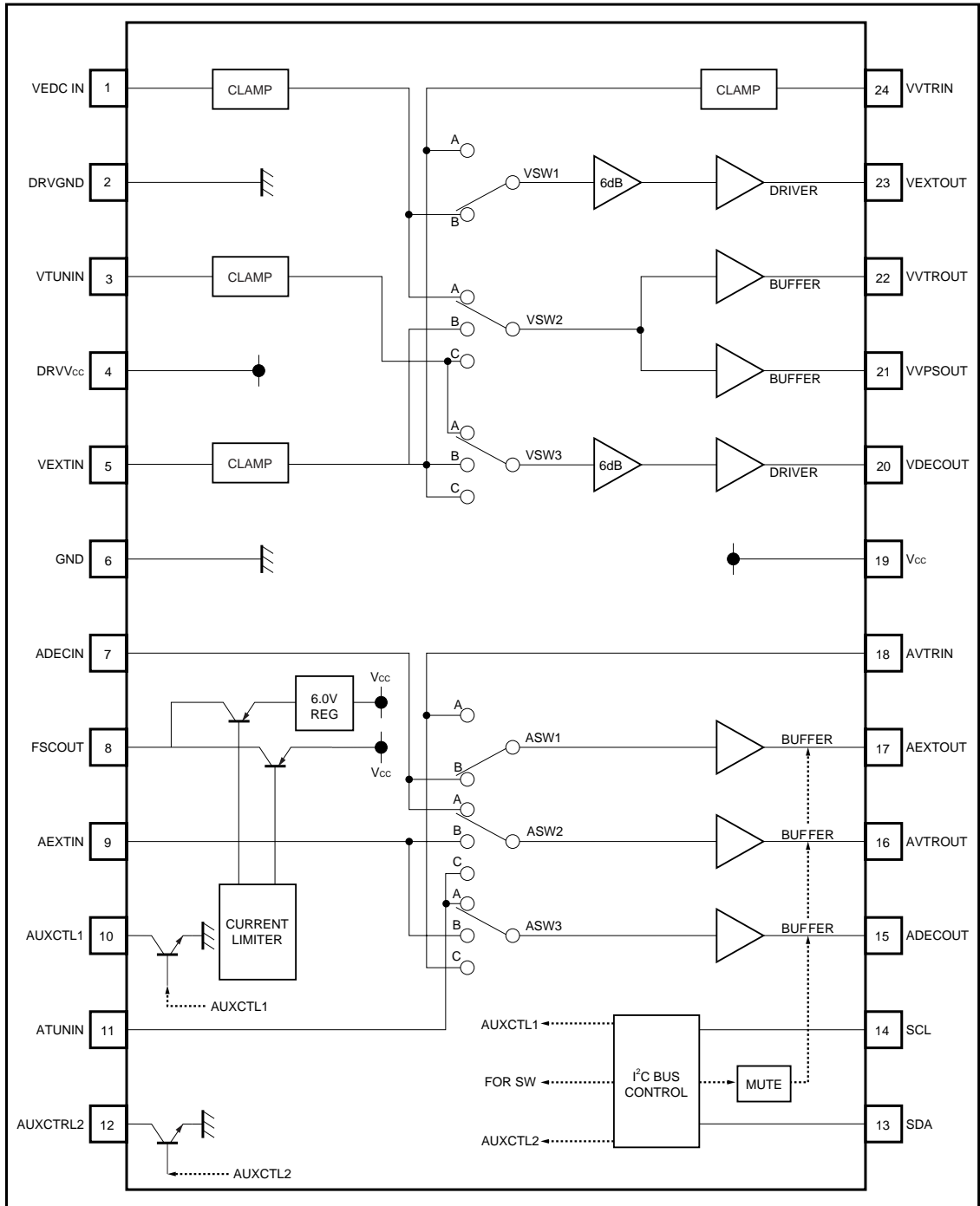
Parameter	Symbol	Limits	Unit
Power supply voltage	V <sub>CC</sub>	13.5	V
Power dissipation	P <sub>d</sub>	1200	mW
Operating temperature	T <sub>opr</sub>	- 25 ~ + 60	°C
Storage temperature	T <sub>stg</sub>	- 55 ~ + 125	°C

\* Reduce by 12mW for each increase in Ta of 1°C over 25°C.

### ●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Operating power supply voltage	V <sub>CC</sub>	8.5	12	13	V

●Block diagram



## ● Pin descriptions

Pin No.	Pin name	Function
1	VDECIN	Composite video signal input (sink chip clamp).
2	DRVGND	The driver ground. Not internally connected to the ground (pin 6).
3	VTUNIN	Composite video signal input (sink chip clamp).
4	DRVV <sub>cc</sub>	The driver power supply. Not internally connected to V <sub>cc</sub> (pin 19).
5	VEXTIN	Composite video signal input (sink chip clamp).
6	GND	Ground
7	ADECIN	Audio signal input.
8	FSCOUT	Outputs one of three values (11.8V, 5.9V or 0.2V) as controlled by the I <sup>2</sup> C BUS.
9	AEXTIN	Audio signal input.
10	AUXCTL1	Open collector. Normally pulled up to roughly 10k.
11	ATUNIN	Audio signal output.
12	AUXCTL2	Open collector. Normally pulled up to roughly 10k.
13	SDA	I <sup>2</sup> C BUS Serial Data input.
14	SCL	I <sup>2</sup> C BUS Serial Clock input.
15	ADECOUT	Audio output.
16	AVTROUT	Audio output.
17	AEXTOUT	Audio output.
18	AVTRIN	Audio input.
19	V <sub>cc</sub>	Power supply.
20	VDECOUT	Composite video signal output.
21	VVPSOUT	Composite video signal output.
22	VVTROUT	Composite video signal output.
23	VEXTOUT	Composite video signal output.
24	VVTRIN	Composite video signal input (sink chip clamp).

●Pin descriptions and input output equivalent circuits

Pin No.	Pin name	IN	OUT	Typ. voltage	I / O equivalent circuits	Pin description
1	VDECIN					Video signal input
3	VTUNIN	○	—	1.6V		For composite video signal input (sink chip clamp input).
5	VEXTIN					
24	VVTRIN					
2	DRVGND	—	—	0V		Ground
6	GND					DRVGND is the driver ground. GND is the ground for the circuit itself. GND and DRVGND are not connected internally.
4	DRVVcc	—	—	12V		Power supply
19	Vcc					DRVVcc is the driver power supply. Vcc is the power supply for the circuit itself. Vcc and DRVVcc are not connected internally.
7	ADECIN					Audio signal input
9	AEXTIN	○	—	5.3V		For audio signal input. Input impedance is 50k.
11	ATUNIN					
18	AVTRIN					
8	FSCOUT	—	○	—		FS control
						Three voltages are output via I <sup>2</sup> C BUS control: 11.8V, 5.9V, 0.2V.

Pin No.	Pin name	IN	OUT	Typ. voltage	I / O equivalent circuits	Pin description
10	AUXCTL1	—	○	—		External control  An open collector. Normally pulled up with a (roughly) 10kΩ resistor.
12	AUXCTL2	—	○	—		
13	SDA	○	—	—		I <sup>2</sup> C BUS data input  For serial data input compliant with the I <sup>2</sup> C BUS.
14	SCL	○	—	—		I <sup>2</sup> C BUS clock input  For clock input compliant with the I <sup>2</sup> C BUS.
15	ADECOUT	—	○	6V		Audio signal output  Outputs the audio signal. ADECOUT and AEXTOUT are respectively for decoder output and external output.
17	AEXTOUT	—	○	6V		
16	AVRTOUT	—	○	5.3V		Audio signal output  Outputs the audio signal. AVRTOUT outputs to the signal processor.

Pin No.	Pin name	IN	OUT	Typ. voltage	I / O equivalent circuits	Pin description
20	VDECOUT	—	○	1.7V		<p>Video signal output</p> <p>Outputs the composite video signal. VDECOUT and VEXTOUT are respectively for decoder output and external output.</p>
23	VEXTOUT					
21	VVPSOUT	—	○	1.0V		<p>Video signal output</p> <p>Outputs the composite video signal. VVPSOUT is output for VPS, VVTSOUT outputs to the signal processor.</p>
22	VVTROUT					

●Electrical characteristics (unless otherwise noted, Ta = 25°C, Vcc = 12V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
〈Device〉						
Supply current	I <sub>CC</sub>	30	46	62	mA	No signal
FSCOUT voltage, H	V <sub>FSC H</sub>	11.0	11.8	12.0	V	R <sub>L</sub> = 10kΩ
FSCOUT voltage, M	V <sub>FSC M</sub>	5.2	5.9	6.8	V	R <sub>L</sub> = 10kΩ
FSCOUT voltage, L	V <sub>FSC L</sub>	0	0.2	1.0	V	R <sub>L</sub> = 10kΩ
FSCOUT restriction current	I <sub>FSC</sub>	—	—	20	mA	V <sub>FSCO</sub> = 0V
External controller sink current	I <sub>SYN</sub>	1.0	—	—	mA	R <sub>L</sub> = 10kΩ
External controller voltage, L	V <sub>AUXL</sub>	0	0.2	1.0	V	R <sub>L</sub> = 10kΩ
〈Video switches〉						
Voltage gain	G <sub>VV</sub>	-1	0	1	dB	V <sub>IN</sub> = 1V <sub>P-P</sub> , f = 4.43MHz
Frequency characteristics	V <sub>F</sub>	-3	0	1	dB	V <sub>IN</sub> = 1V <sub>P-P</sub> , f = 100k / 7MHz
〈Audio switches〉						
Voltage gain	G <sub>VA</sub>	-1	0	1	dB	V <sub>IN</sub> = 1V <sub>rms</sub> , f = 1kHz
Maximum output level	V <sub>OMA</sub>	3.0	3.6	—	V <sub>rms</sub>	f = 1kHz, THD = 0.5%
Total harmonic distortion	THD	—	0.005	0.1	%	V <sub>IN</sub> = 1V <sub>rms</sub> , f = 1kHz
Input conversion noise voltage	V <sub>Min.</sub>	—	20	100	μV <sub>rms</sub>	DIN AUDIO R <sub>g</sub> = 600Ω
Input impedance	Z <sub>IN</sub>	40	50	60	kΩ	
Offset voltage	ΔV <sub>OF</sub>	—	—	20	mV	
〈Control〉						
"H" level voltage	V <sub>H</sub>	3.0	—	—	V	
"L" level voltage	V <sub>L</sub>	0	—	1.5	V	

Note: Supports I<sup>2</sup>C BUS input.

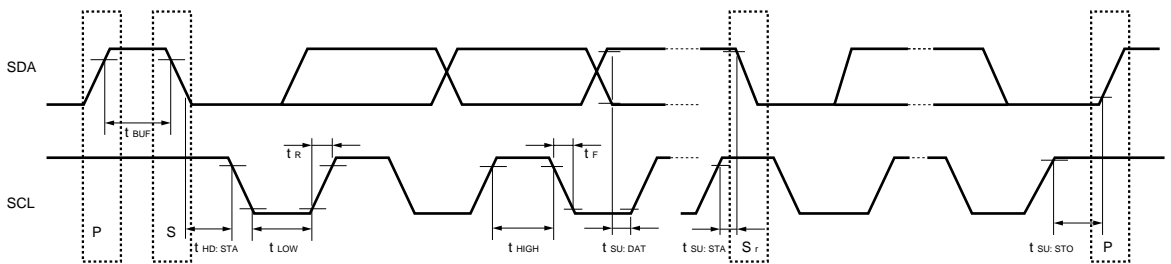
●Guaranteed design parameters (unless otherwise noted, Ta = 25°C, Vcc = 12V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
〈Video switches〉						
Interchannel crosstalk	CT <sub>V</sub>	—	-70	-50	dB	V <sub>IN</sub> = 1V <sub>P-P</sub> , f = 4.43MHz
Secondary harmonics	HD <sub>2</sub>	—	-45	-40	dB	V <sub>IN</sub> = 1V <sub>P-P</sub> , f = 4.43MHz
Tertiary harmonics	HD <sub>3</sub>	—	-50	-45	dB	V <sub>IN</sub> = 1V <sub>P-P</sub> , f = 4.43MHz
〈Audio switches〉						
Interchannel crosstalk	CT <sub>A</sub>	—	-90	-70	dB	V <sub>IN</sub> = 1V <sub>rms</sub> , f = 1kHz
Mute attenuation	V <sub>MTA</sub>	—	-90	-70	dB	V <sub>IN</sub> = 1V <sub>rms</sub> , f = 1kHz

● Recommended I<sup>2</sup>C BUS operating conditions

Parameter	Symbol	Min.	Max.	Unit	Conditions
SCL clock frequency	f <sub>SCL</sub>	0	100	kHz	
Data transfer waiting time	t <sub>BUF</sub>	4.7	—	μs	
Start holding time	t <sub>HD: STA</sub>	4.0	—	μs	
SCL“L”, holding time	t <sub>LOW</sub>	4.7	—	μs	
SCL“H”, holding time	t <sub>HIGH</sub>	4.0	—	μs	
Start setup time	t <sub>SU: STA</sub>	4.7	—	μs	
Data setup time	t <sub>SU: DAT</sub>	250	—	ns	
Signal rise time	t <sub>R</sub>	—	1000	ns	
Signal fall time	t <sub>F</sub>	—	300	ns	
Stop setup time	t <sub>SU: STO</sub>	4.0	—	μs	

I<sup>2</sup>C BUS control signal





● I<sup>2</sup>C BUS control inputI<sup>2</sup>C BUS format

S	SLAVE ADDRESS	A	DATA1	A	DATA2	A	P
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S : Start condition  
 SLAVE ADDRESS : Slave address

MSB								LSB	
1	0	0	0	0	0	0	1	0	

A : Confirmation response clock pulse  
 DATA1, 2 : Data byte

MSB		1st byte				LSB	
D9	D8	D7	D6	D5	D4	D3	D2

MSB		2nd byte				LSB	
D1	D0	0	0	0	0	0	0

## ● Switch input and mode selection

## SW1

D9	SELECT
H	A
L	B

## SW2

D8	D7	SELECT
H	H	A
H	L	A
L	H	B
L	L	C

## SW3

D6	D5	SELECT
H	H	A
H	L	A
L	H	B
L	L	C

## FSCOUT control

D4	D3	FSC OUT
H	H	LOW
H	L	MIDDLE
L	H	HIGH
L	L	HIGH

## External control 1

D1	AUX CTL1 OUT
H	HIGH
L	LOW

## External control 2

D0	AUX CTL2 OUT
H	HIGH
L	LOW

## MUTE control

D2	MUTE
H	MUTE
L	NORMAL

Note: When D2 is HIGH, only the audio switches are muted.

● Measurement circuit

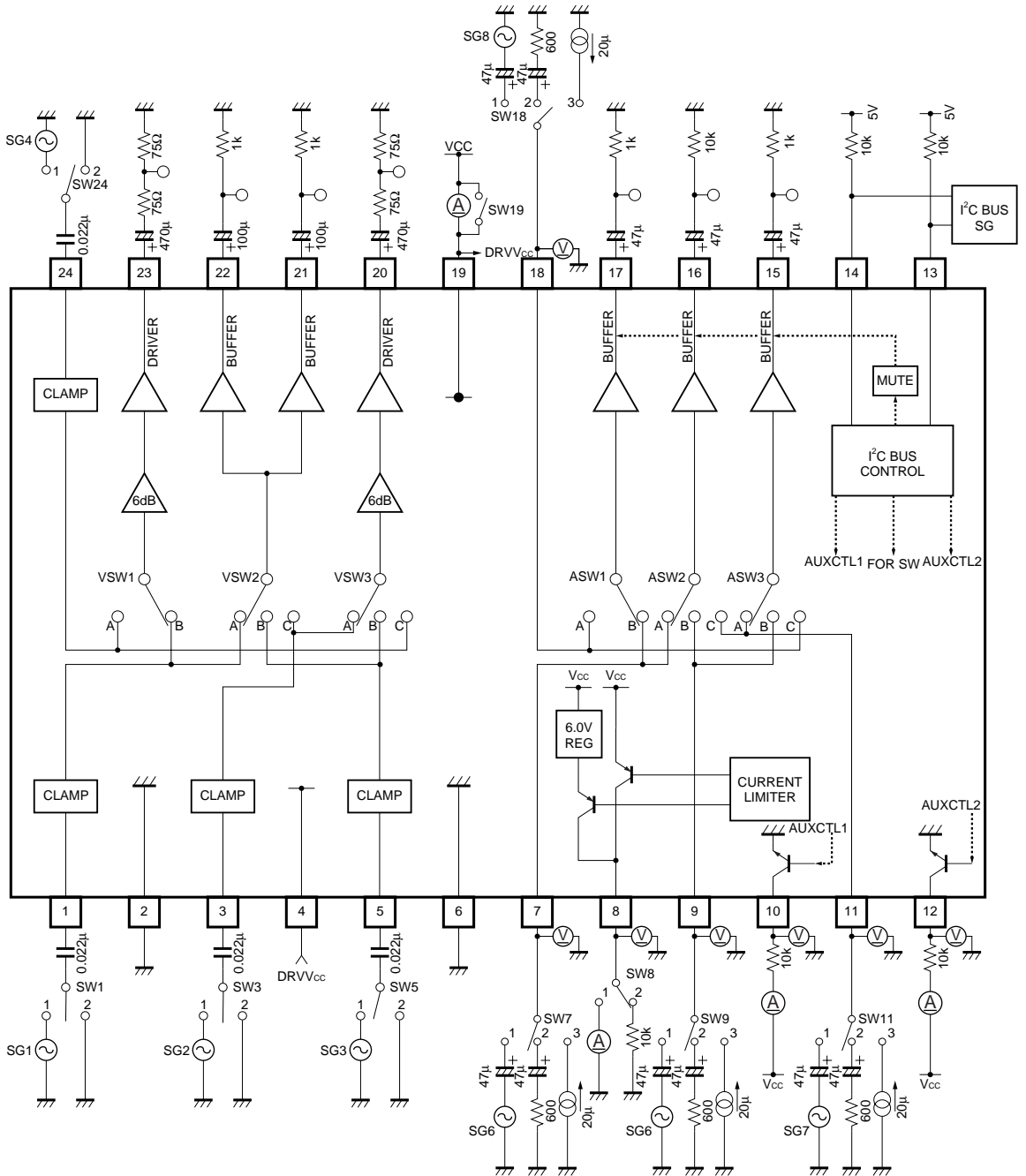


Fig. 1

● Application example

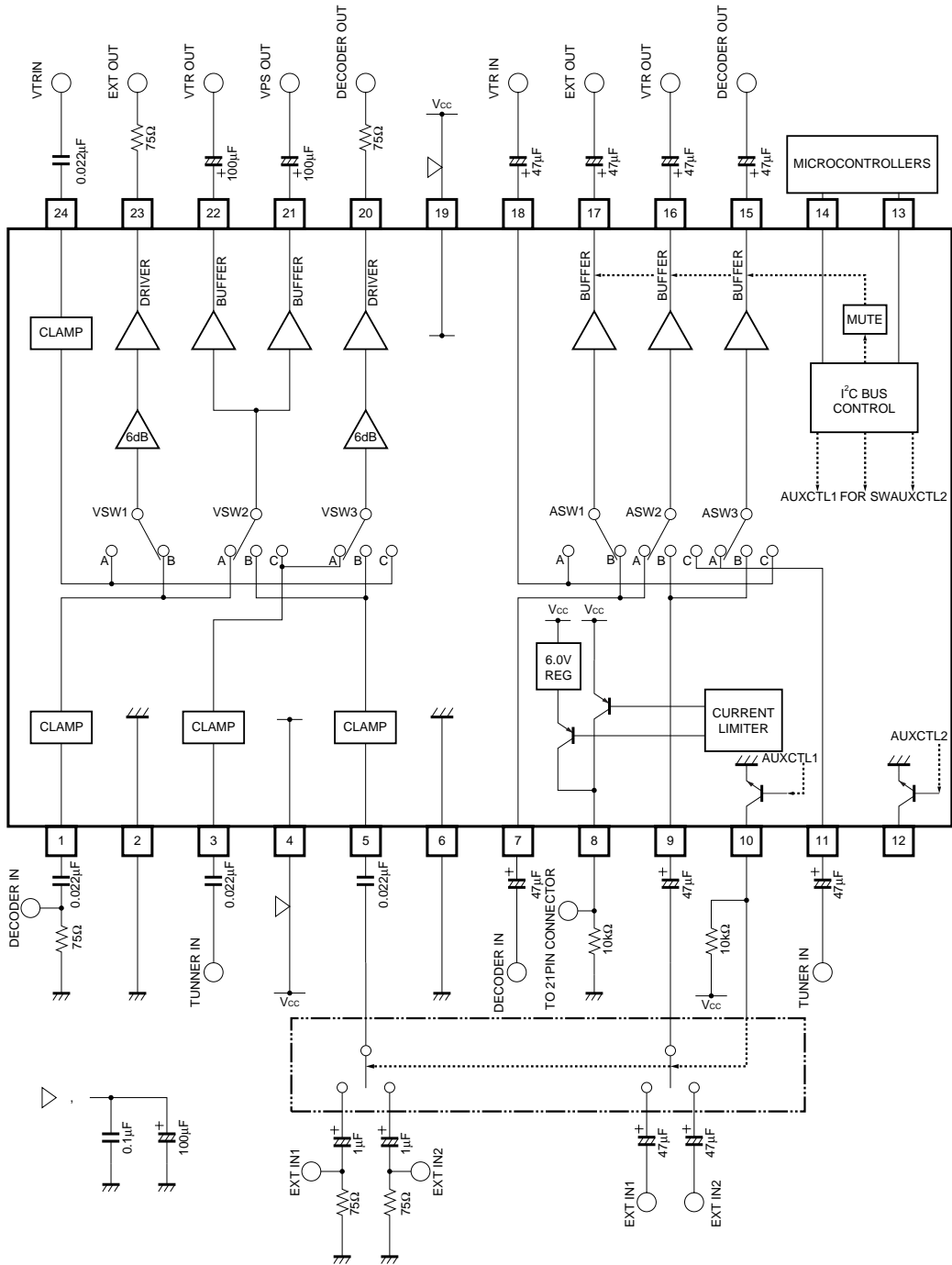


Fig. 2

●Electrical characteristic curves

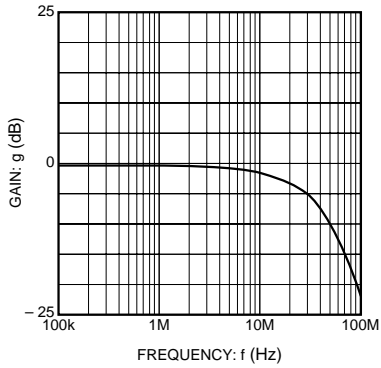


Fig. 3 Video output (pins 20, 23) frequency characteristics

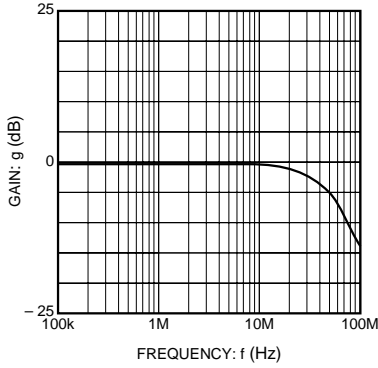


Fig. 4 Video output (pins 21, 22) frequency characteristics

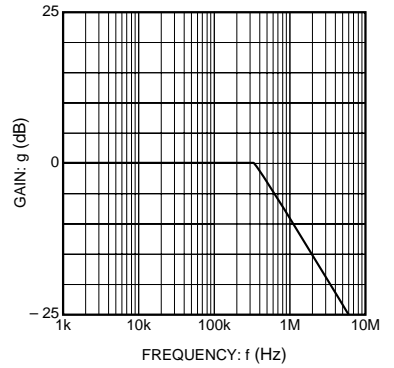


Fig. 5 Audio output (pins 15, 17) frequency characteristics

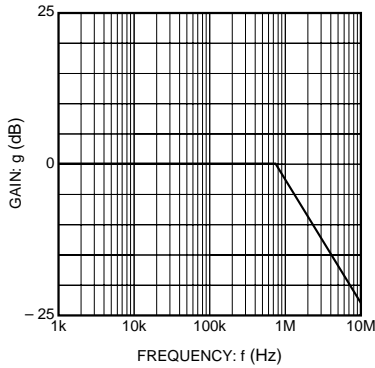


Fig. 6 Audio output (pin 16) frequency characteristics

●External dimensions (Units: mm)

