

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

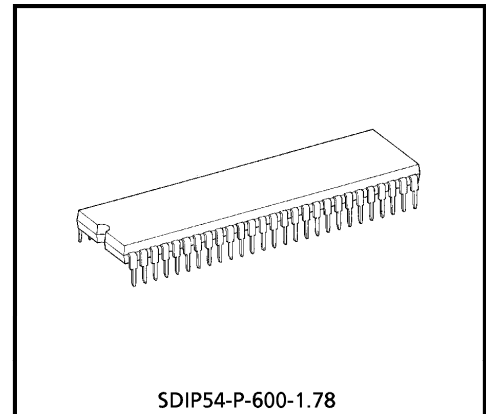
TA8851CN

AUDIO / VIDEO SWITCH IC FOR TV WITH S-TERMINALS

The TA8851CN is an A/V SWITCH IC, which has 7 input channels and 2 output channels. Because the 2 output channels can be switched independently of each other, the TA8851CN allows you to configure a PIP system input switching circuit easily.

The TA8851CN can be interfaced easily to a microcontroller via the I²C bus.

3 of 7 input channels can be used for Y/C separated input.



Weight : 1.0g (Typ.)

FEATURES

Video Stage

- Input
 - Composite video input : 7 channels
 - Y/C input : 3 channels
- Output
 - Composite video output : 2 channels (Main and Sub)
 - Y/C output : 2 channels (Main and Sub)

Audio Stage

- Input
 - L/R input : 7 channels
- Output
 - L/R output : 3 channels (2 of 3 depend on video, and the other is selectable from Main or Sub)

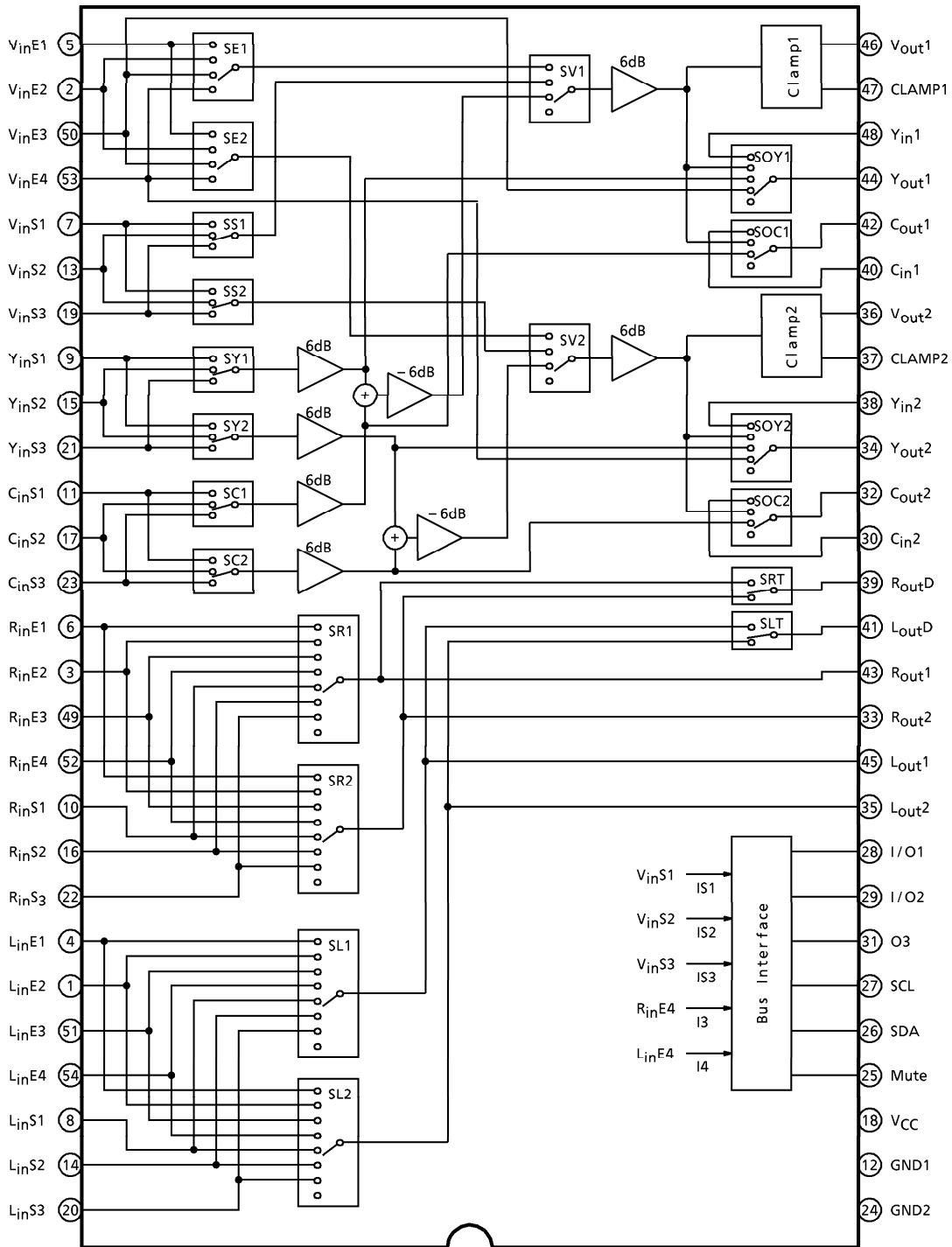
Functions

- I²C bus interface
- External mute circuit
- DAC output (3 outputs)
- Video clamp circuit
- Mode output
- ADC input (4 inputs)

961001EBA2

● TOSHIBA is continually working to improve the quality and the reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a TOSHIBA product could cause loss of human life, bodily injury or damage to property. In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent products specifications. Also, please keep in mind the precautions and conditions set forth in the TOSHIBA Semiconductor Reliability Handbook.

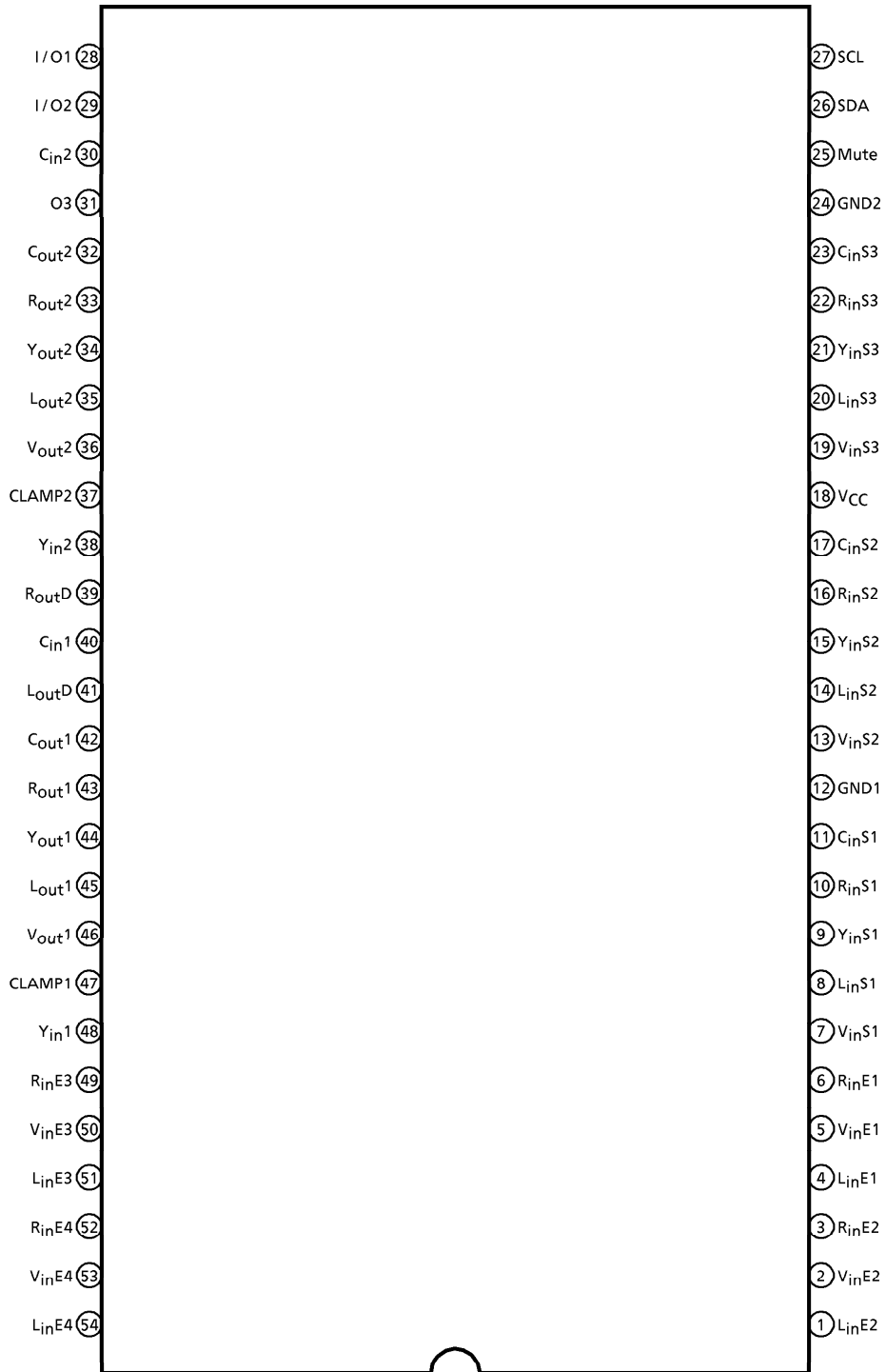
BLOCK DIAGRAM



961001EBA2'

- The products described in this document are subject to foreign exchange and foreign trade control laws.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA CORPORATION for any infringements of intellectual property or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any intellectual property or other rights of TOSHIBA CORPORATION or others.
- The information contained herein is subject to change without notice.

TERMINAL CONNECTION DIAGRAM



TERMINAL FUNCTION

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
2 : V_{inE2} 5 : V_{inE1}	Composite Video Signal Input	These pins are for composite video signal input. The recommendable input level is $1.0V_{p-p}$.	
50 : V_{inE3} 53 : V_{inE4}	Composite Video Signal/Y Signal Input	These pins can be used for composite video signal or Y signal input. The recommendable input level is $1.0V_{p-p}$.	
7 : V_{inS1} 13 : V_{inS2} 19 : V_{inS3}	Composite Video Signal Input and S-Mode Switch	These pins are for composite video signal input and S mode Switch. By setting DC voltage of one of these pins lower than 2.6V, that channel (S1, S2 or S3) turns to S-mode. And when it is higher than 2.6V, that pin is for composite video input. The recommendable input level is $1.0V_{p-p}$.	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
9 : Y _{in} S1 15 : Y _{in} S2 21 : Y _{in} S3 11 : C _{in} S1 17 : C _{in} S2 23 : C _{in} S3	Y Signal Input/ C Signal Input	These pins accept a Y signal from the S-terminal and a C signal as input. The recommended input signal level is 1.0V _{p-p} for Y signal and 300mV _{p-p} for C signal (burst).	
4 : L _{in} E1 6 : R _{in} E1	Audio Input (TV)	These pins accept the sound of the internal TV signal as input. The signal input to this pin is output from the main/sub output after being selected, as well as from the TV audio output terminal. The recommended input signal level is 300mV _{rms} .	
52 : R _{in} E4 54 : L _{in} E4	Audio Input/ ADC Input	These pins accept an audio signal as input. They also accept input from a 1bit ADC. In this case, if the voltage on these pins is below 2.3V the ADC outputs I ₃ and I ₄ become logic is. The recommended input signal level is 300mV _{rms} .	
8 : L _{in} S1 10 : R _{in} S1 14 : L _{in} S2 16 : R _{in} S2 20 : L _{in} S3 22 : R _{in} S3 1 : L _{in} E2 3 : R _{in} E2 51 : L _{in} E3 49 : R _{in} E3	Audio Input	These pins accept an audio signal as input. The recommended input signal level is 300mV _{rms} .	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
25 : Mute	Mute	If the voltage on this pin is above 1.5V, all audio outputs (main, sub, and TV) are disabled.	
46 : V _{out1} 36 : V _{out2}	Monitor Output	These pins output the selected composite signal. The standard output signal amplitude is 2.0V _{p-p} . These pins can sink a maximum current of 3.0mA.	
47 : CLAMP1 37 : CLAMP2	Clamp Filter	These pins are a filter terminal for the clamp circuit to maintain the monitor output at a constant DC level. If these pins are tied to GND, the clamp circuit is disabled, so that the DC voltage of the monitor output cannot be clamped to a constant level.	
48 : Y _{in1} 40 : C _{in1} 38 : Y _{in2} 30 : C _{in2}	Comb Y/C Input	These pins accept a Y/C separated signal from the comb filter as input. The recommended input signal level is 2.0V _{p-p} for Y signal and 600mV _{p-p} for C signal (burst).	

PIN No.	PIN NAME	FUNCTION	INTERFACE CIRCUIT
44 : Yout1 42 : Cout1 34 : Yout2 32 : Cout2	Y/C Output	These pins output the Y and C signals that are fed to the V/C/D circuits. The standard output signal level is 2.0V _{p-p} for Y signal and 600mV _{p-p} for C signal (burst). These pins can sink a maximum current of 2.5mA.	
28 : I/O1 29 : I/O2	I/O	These pins are for input and output to and from the 1bit DAC/ADC of the bus signal. These pins can source a maximum current of 2.0mA.	
31 : O3	O3	This pin is for output of the 1bit DAC of the bus signal. This pin can source a maximum current of 2.0mA.	
26 : SDA 27 : SCL	SCL/SDA	These pins are for input of the I ² C bus.	
33 : Rout2 35 : Lout2 39 : RoutD 41 : LoutD 43 : Rout1 45 : Lout1	Audio Output	These pins output an audio signal. These pins can sink a maximum current of 1.4mA.	

ADDRESS MAP

(Slave address 90H, 91H)

MODE	DATA No.	DATA							
		D07	D06	D05	D04	D03	D02	D01	D00
Write	Data 1	—		DAC Output			Sound Selection	Sound Mute	
				(0)	(1)	(1)	(1)	(1)	(1)
	Data 2 (main)	D17	D16	D15	D14	D13	D12	D11	D10
		Y/C Output Switching				F.VIDEO	Output Switching		
		(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)
	Data 3 (sub)	D27	D26	D25	D24	D23	D22	D21	D20
Y/C Output Switching				F.VIDEO	Output Switching				
	(0)	(0)	(0)	(0)	(0)	(0)	(0)	(0)	
Read	Data 4	D37	D36	D35	D34	D33	D32	D31	D30
		ADC Ident				S Input Ident			P.O.R
		(0)	(0)	(0)	(0)	(0)	(0)	(0)	(1)

F.VIDEO : Forced video mode
 P.O.R : Power On reset (power : ON (1))
 (0) (1) : preset

© Write mode
Output switching (main)

MODE		BUS DATA				S INPUT			OUTPUT SIGNAL			
		D ₁₃	D ₁₂	D ₁₁	D ₁₀	IS1	IS2	IS3	V _{out1}	R _{out1}	L _{out1}	
TV	E1	—	1	1	1	—	—	—	V _{inE1}	R _{inE1}	L _{inE1}	
	E2	—	1	1	0	—	—	—	V _{inE2}	R _{inE2}	L _{inE2}	
	E3	—	1	0	1	—	—	—	V _{inE3}	R _{inE3}	L _{inE3}	
	E4	—	1	0	0	—	—	—	V _{inE4}	R _{inE4}	L _{inE4}	
	S1	V	0	0	1	1	0	—	—	V _{inS1}	R _{inS1}	L _{inS1}
		S	1				—			Y _{inS1} +		
			—				1			C _{inS1}		
	S2	V	0	0	1	0	—	0	—	V _{inS2}	R _{inS2}	L _{inS2}
		S	1					—		Y _{inS2} +		
			—					1		C _{inS2}		
	S3	V	0	0	0	1	—	0	—	V _{inS3}	R _{inS3}	L _{inS3}
		S	1					—		Y _{inS3} +		
			—					1		C _{inS3}		
Mute		—	0	0	0	—	—	—	Mute	Mute	Mute	

Output switching (sub)

MODE		BUS DATA				S INPUT			OUTPUT SIGNAL			
		D ₂₃	D ₂₂	D ₂₁	D ₂₀	IS1	IS2	IS3	V _{out2}	R _{out2}	L _{out2}	
TV	E1	—	1	1	1	—	—	—	V _{inE1}	R _{inE1}	L _{inE1}	
	E2	—	1	1	0	—	—	—	V _{inE2}	R _{inE2}	L _{inE2}	
	E3	—	1	0	1	—	—	—	V _{inE3}	R _{inE3}	L _{inE3}	
	E4	—	1	0	0	—	—	—	V _{inE4}	R _{inE4}	L _{inE4}	
	S1	V	0	0	1	1	0	—	—	V _{inS1}	R _{inS1}	L _{inS1}
		S	1				—			Y _{inS1} +		
			—				1			C _{inS1}		
	S2	V	0	0	1	0	—	0	—	V _{inS2}	R _{inS2}	L _{inS2}
		S	1					—		Y _{inS2} +		
			—					1		C _{inS2}		
	S3	V	0	0	0	1	—	0	—	V _{inS3}	R _{inS3}	L _{inS3}
		S	1					—		Y _{inS3} +		
			—					1		C _{inS3}		
Mute		—	0	0	0	—	—	—	Mute	Mute	Mute	

Y/C output switching (main)

MODE		BUS DATA				OUTPUT SIGNAL		
		D17	D16	D15	D14	Y _{out1}	C _{out1}	
Y	S-terminal Input	EXCEPT	0	0	1	1	Y _{inS?}	—
	Video Input				1	0	V _{out1}	
	Comb1				0	1	Y _{in1}	
	Comb2				0	0	V _{inE3}	
C	S-terminal Input	1	1	—	—	—	C _{inS?}	
	Video Input	1	0				V _{out1}	
	Comb	0	1				C _{in1}	
Mute		0	0	—	—	Mute	Mute	

? : 1~3 (SY1、SC1 で選択)

Y/C output switching (sub)

MODE		BUS DATA				OUTPUT SIGNAL		
		D27	D26	D25	D24	Y _{out2}	C _{out2}	
Y	S-terminal Input	EXCEPT	0	0	1	1	Y _{inS?}	—
	Video Input				1	0	V _{out2}	
	Comb1				0	1	Y _{in2}	
	Comb2				0	0	V _{inE4}	
C	S-terminal Input	1	1	—	—	—	C _{inS?}	
	Video Input	1	0				V _{out2}	
	Comb	0	1				C _{in2}	
Mute		0	0	—	—	Mute	Mute	

? : 1~3 (SY2、SC2 で選択)

Mute mode

MODE	BUS		PIN 25	VIDEO OUTPUT				SOUND OUTPUT				
	BIT	DATA		MAIN		SUB		MAIN	SUB	Dual		
				Vout1	Yout1 Cout1	Vout2	Yout2 Cout2	Rout1 Lout1	Rout2 Lout2	RoutD LoutD		
Ext Mute	—	—	High level	—	—	—	—	Mute	Mute	Mute		
Bus Line Mute	Sound Mute SW	Main	D00	1	—	—	—	—	Mute	—	—	
		Sub	D01	1	—	—	—	—	—	Mute	—	
	Video & Sound Mute SW	Main	D10	0	—	Mute	—	—	Mute	—	—	
			D11	0								
			D12	0								
		Sub	D20	0	—	—	—	Mute	—	—	Mute	—
			D21	0								
D22	0											
Y/C	Main	D14	0	—	—	Mute	—	—	—	—		
	Sub	D15	0									
Y/C	Main	D24	0	—	—	—	—	Mute	—	—		
	Sub	D25	0									

DAC output

TERMINAL	BUS		OUTPUT
	BIT	DATA	
I/O1	D03	1	Open
		0	Low level
I/O2	D04	1	Open
		0	Low level
O3	D05	1	Open
		0	Low level

Dual Sound Selection

MODE	BUS		OUTPUT	
	BIT	DATA	RoutD	LoutD
MAIN	D02	1	Main Sound	Main Sound
SUB		0	Sub Sound	Sub Sound

© Read mode
S-Output ident

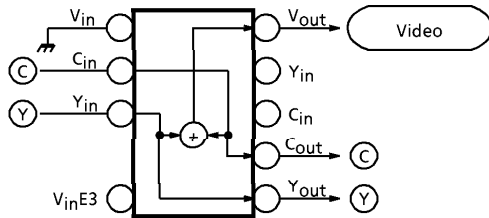
TERMINAL	INPUT	BUS	
		BIT	DATA
VinS1	L	D31	1
	H		0
VinS2	L	D32	1
	H		0
VinS3	L	D33	1
	H		0

ADC ident

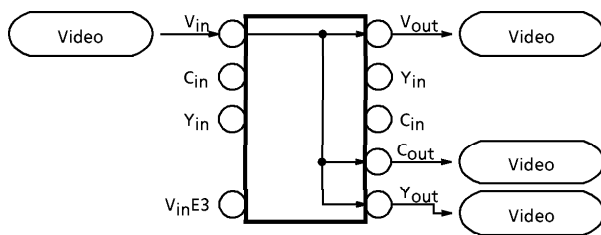
TERMINAL	INPUT	BUS	
		BIT	DATA
I/O1	L	D34	1
	H		0
I/O2	L	D35	1
	H		0
I3	L	D36	1
	H		0
I4	L	D37	1
	H		0

MODE EXPLANATION

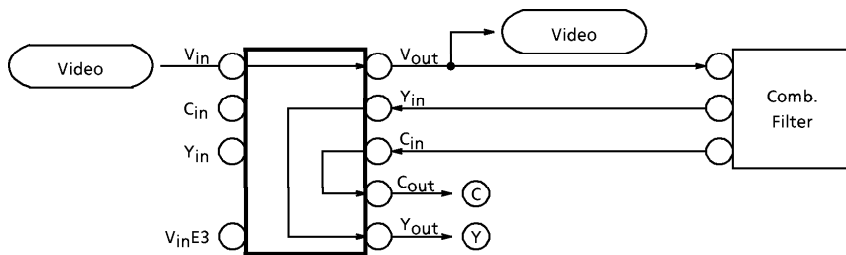
<S-terminal input mode>



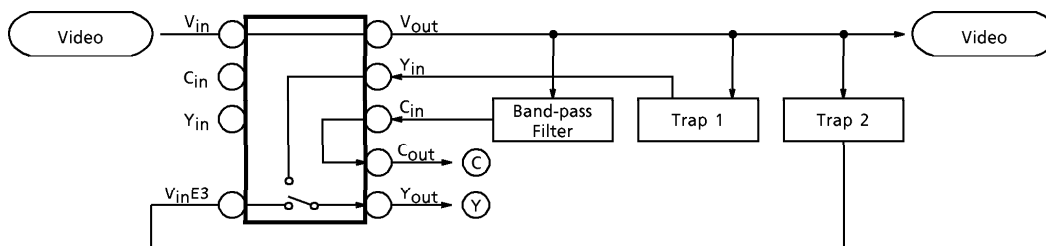
<Video input mode>



<Comb.1 input mode>



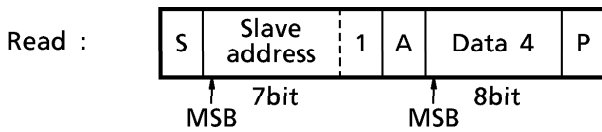
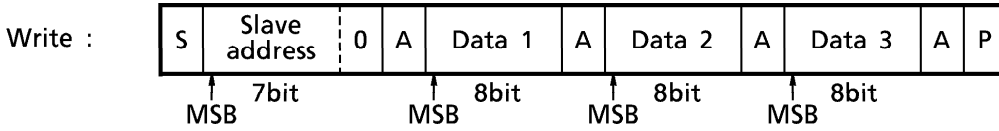
<Comb.2 input mode>



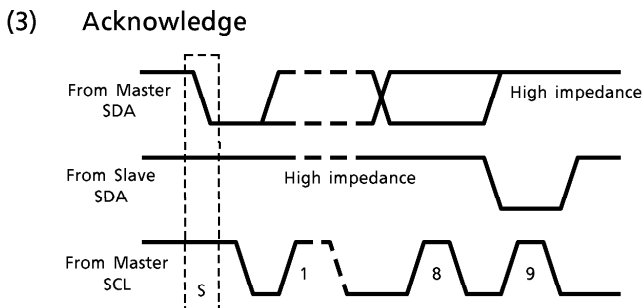
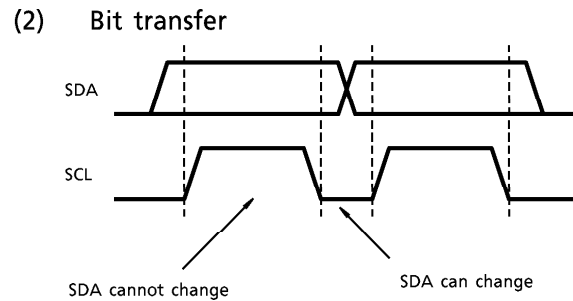
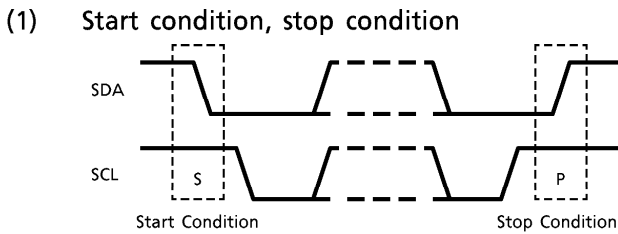
I²C BUS CONTROLLED FORMAT SUMMARY

Bus Controlled format of TA8851CN is based on I²C Bus Control format of Philips.

Data transfer format



S : Start Condition
 P : Stop Condition
 A : Acknowledge



(4) Slave address

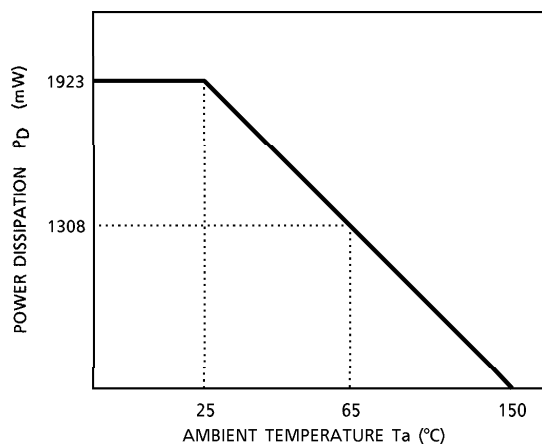
A6	A5	A4	A3	A2	A1	A0	R/W
1	0	0	1	0	0	0	1/0

Purchase of TOSHIBA I²C components conveys a license under the Philips I²C Patent Rights to use these components in an I²C system, provided that the system conforms to the I²C Standard Specification as defined by Philips.

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{CC}	13	V
Power Dissipation	P _{Dmax}	1923 (Note)	mW
Input Signal Voltage	e _{in}	5	V _{p-p}
Operating Temperature	T _{opr}	- 20~65	°C
Storage Temperature	T _{stg}	- 55~150	°C

(Note) When using the device at above Ta = 25°C, decrease the power dissipation by 15.4mW for each increase of 1°C.



RECOMMENDED OPERATING CONDITION

PIN No.	PIN NAME	MIN.	TYP.	MAX.	UNIT
18	V _{CC}	8.1	9.0	9.9	V

ELECTRICAL CHARACTERISTICS

DC CHARACTERISTICS

DC voltage characteristics (Unless other wise specified, $V_{CC} = 9V$, $T_a = 25^\circ C$)

PIN No.	PIN NAME	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
1	L _{in} E2	V ₁	1	—	5.0	5.2	5.4	V
2	V _{in} E2	V ₂		—	5.0	5.2	5.4	
3	R _{in} E2	V ₃		—	5.0	5.2	5.4	
4	L _{in} E1	V ₄		—	5.0	5.2	5.4	
5	V _{in} E1	V ₅		—	5.0	5.2	5.4	
6	R _{in} E1	V ₆		—	5.0	5.2	5.4	
7	V _{in} S1	V ₇		—	5.0	5.2	5.4	
8	L _{in} S1	V ₈		—	5.0	5.2	5.4	
9	Y _{in} S1	V ₉		—	5.0	5.2	5.4	
10	R _{in} S1	V ₁₀		—	5.0	5.2	5.4	
11	C _{in} S1	V ₁₁		—	5.0	5.2	5.4	
13	V _{in} S2	V ₁₃		—	5.0	5.2	5.4	
14	L _{in} S2	V ₁₄		—	5.0	5.2	5.4	
15	Y _{in} S2	V ₁₅		—	5.0	5.2	5.4	
16	R _{in} S2	V ₁₆		—	5.0	5.2	5.4	
17	C _{in} S2	V ₁₇		—	5.0	5.2	5.4	
19	V _{in} S3	V ₁₉		—	5.0	5.2	5.4	
20	L _{in} S3	V ₂₀		—	5.0	5.2	5.4	
21	Y _{in} S3	V ₂₁		—	5.0	5.2	5.4	
22	R _{in} S3	V ₂₂		—	5.0	5.2	5.4	
23	C _{in} S3	V ₂₃		—	5.0	5.2	5.4	
25	MUTE	V ₂₅		—	—	1.5	—	
26	SDA	V ₂₆		—	—	4.2	—	
27	SCL	V ₂₇		—	—	4.2	—	
28	I/O1	V ₂₈		—	8.5	9.0	—	
29	I/O2	V ₂₉		—	8.5	9.0	—	
30	C _{in} 2	V ₃₀		—	5.0	5.2	5.4	
31	O3	V ₃₁		—	8.5	9.0	—	
32	C _{out} 2	V ₃₂		—	3.4	3.7	4.0	
33	R _{out} 2	V ₃₃		—	3.7	4.0	4.3	
34	Y _{out} 2	V ₃₄		—	3.4	3.7	4.0	
35	L _{out} 2	V ₃₅		—	3.7	4.0	4.3	
36	V _{out} 2	V ₃₆		—	2.3	2.8	3.3	
37	CLAMP2	V ₃₇		—	2.7	3.2	3.7	
38	Y _{in} 2	V ₃₈		—	5.0	5.2	5.4	
39	R _{out} TV	V ₃₉		—	3.7	4.0	4.3	
40	C _{in} 1	V ₄₀		—	5.0	5.2	5.4	
41	L _{out} TV	V ₄₁		—	3.7	4.0	4.3	
42	C _{out} 1	V ₄₂		—	3.4	3.7	4.0	
43	R _{out} 1	V ₄₃		—	3.7	4.0	4.3	

PIN No.	PIN NAME	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
44	Y _{out1}	V44	1	—	3.4	3.7	4.0	V
45	L _{out1}	V45		—	3.7	4.0	4.3	
46	V _{out1}	V46		—	2.3	2.8	3.3	
47	CLAMP1	V47		—	2.7	3.2	3.7	
48	Y _{in1}	V48		—	5.0	5.2	5.4	
49	R _{inE3}	V49		—	5.0	5.2	5.4	
50	V _{inE3}	V50		—	5.0	5.2	5.4	
51	L _{inE3}	V51		—	5.0	5.2	5.4	
52	R _{inE4}	V52		—	5.0	5.2	5.4	
53	V _{inE4}	V53		—	5.0	5.2	5.4	
54	L _{inE4}	V54		—	5.0	5.2	5.4	

DC current characteristics (Unless other wise specified, V_{CC} = 9V, Ta = 25°C)

PIN No.	PIN NAME	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
18	V _{CC}	I _{CC}	1	—	48	60	80	mA

AC CHARACTERISTICS (Unless otherwise specified, V_{CC} = 9V, Ta = 25°C)

CHARACTERISTIC	SYMBOL	TEST CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Clamp Current	I _{DIS}	2	Discharge current	11	17	28	μA
	I _{CHR}		charge current	0.50	1.25	1.80	mA
Output Resistance	R _{M-AUD}	2	—	50	100	150	Ω
	R _{S-AUD}		—	65	130	195	
	R _{T-AUD}		—	40	80	120	
	R _{M-VID}		—	25	50	75	
	R _{S-VID}		—	50	100	150	
	R _{M-Y/C}		—	25	50	75	
Input Resistance	R _{iAUD}	2	—	49	70	100	kΩ
	R _{iVID}		—	20	30	40	
	R _{iY/C}		—	20	30	40	
Video Input Dynamic Range	(Main) V _{dVID1}	2	(Note 1)	1.6	2.1	—	V _{p-p}
	(Sub) V _{dVID2}			1.6	2.1	—	
	(Clamp off) V _{dVID3}			2.4	2.8	—	
Y/C Input Dynamic Range	(Main) V _{dY/C1}	2	(Note 2)	2.4	2.8	—	V _{p-p}
	(Sub) V _{dY/C2}			2.4	2.8	—	
Comb Input Dynamic Range	(Main) V _{dCOM1}	2	(Note 2)	5.1	6.5	—	V _{p-p}
	(Sub) V _{dCOM2}			5.1	6.5	—	
S Video Dynamic Range	(Main) V _{dS-v1}	2	(Note 3)	1.6	2.1	—	V _{p-p}
	(Sub) V _{dS-v2}			1.6	2.1	—	
	(Clamp off) V _{dS-v3}			2.4	2.8	—	
Monochrome Mode Dynamic Range	(Main) V _{dB/W1}	2	(Note 4)	1.6	2.1	—	V _{p-p}
	(Sub) V _{dB/W2}			1.6	2.1	—	

CHARACTERISTIC	SYMBOL	TEST CIRCUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Video Gain	(Main)	G _{VID1}	(Note 5)	5.7	6.2	6.7	dB
	(Sub)	G _{VID2}		5.7	6.2	6.7	
	(Clamp Off)	G _{VID3}		5.8	6.3	6.8	
Y / C Gain	(Main)	G _{Y / C1}	(Note 6)	5.9	6.4	6.9	dB
	(Sub)	G _{Y / C2}		5.9	6.4	6.9	
Comb Gain	(Main)	G _{COM1}	(Note 6)	-0.5	0	0.5	dB
	(Sub)	G _{COM2}		-0.5	0	0.5	
S Video Gain	(Main)	G _{S-V1}	(Note 7)	5.7	6.2	6.7	dB
	(Sub)	G _{S-V2}		5.7	6.2	6.7	
	(Clamp Off)	G _{S-V3}		6.0	6.5	7.0	
B / W Mode Gain	(Main)	G _{B / W1}	(Note 8)	5.7	6.2	6.7	dB
	(Sub)	G _{B / W2}		5.7	6.2	6.7	
Video Switch Crosstalk	(Main)	C _{VID1}	(Note 9)	50	60	—	dB
	(Sub)	C _{VID2}		50	60	—	
	(Clamp Off)	C _{VID3}	(Note 12)	50	60	—	
Y Switch Crosstalk	(Main)	C _{Y1}	(Note 10)	50	60	—	dB
	(Sub)	C _{Y2}		50	60	—	
C Switch Crosstalk	(Main)	C _{C1}	(Note 11)	50	60	—	dB
	(Sub)	C _{C2}		50	60	—	
Video Mute Attenuation		G _{VM}	(Note 13)	50	60	—	dB
Video Frequency Response	(Main)	f _{VID1}	(Note 14)	9.0	—	—	MHz
	(Sub)	f _{VID2}		9.0	—	—	
	(Clamp Off)	f _{VID3}		9.0	—	—	
Y / C Frequency Response	(Main)	f _{Y / C1}	(Note 15)	9.0	—	—	MHz
	(Sub)	f _{Y / C2}		9.0	—	—	
Comb Frequency Response	(Main)	f _{COM1}	(Note 15)	9.0	—	—	MHz
	(Sub)	f _{COM2}		9.0	—	—	
S Video Frequency Response	(Main)	f _{S-V1}	(Note 16)	9.0	—	—	MHz
	(Sub)	f _{S-V2}		9.0	—	—	
	(Clamp Off)	f _{S-V3}		9.0	—	—	
B / W Mode Frequency Response	(Main)	f _{B / W1}	(Note 17)	9.0	—	—	MHz
	(Sub)	f _{B / W2}		9.0	—	—	
Clamp Level		C _L	(Note 18)	—	21	—	%
Audio Dynamic Range		V _{dAUD}	(Note 19)	5.0	6.0	—	V _{p-p}
Audio Gain		G _{AUD}	(Note 20)	-0.5	0	0.5	dB
Audio Frequency Response		f _{AUD}	(Note 21)	0.1	3.0	—	MHz
Audio Switch Crosstalk		C _{AUD}	(Note 22)	60	70	—	dB
Audio Mute Attenuation		G _{AM}	(Note 23)	60	70	—	dB
Audio Select Offset		ΔV _{AUD}	(Note 24)	-30	0	30	mV
S Input Discriminating Voltage		V _{thS}	(Note 25)	2.4	2.6	2.8	V
ADC Input Discriminating Voltage		V _{thADC}	(Note 26)	1.8	2.3	2.8	V
External Mute-ON Voltage		V _{thMUTE}	(Note 27)	1.0	1.5	2.0	V
DAC Output Low Level Voltage		V _{DAC}	(Note 28)	0	—	0.5	V

TEST CONDITIONS

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25 ± 3°C)		MEASUREMENT METHOD
		SW & VR MODE	DATA 2	
1-(1)	V Input Dynamic Range (Main)	V _{in} E2	DATA 2	(1) V ₁ 15kHz, variable-amplitude input. (2) For each, measure the amplitude of V ₁ at which the waveform on pin 46 is distorted.
		V _{in} E1	DATA 2	
1-(2)	V Input Dynamic Range (Sub)	V _{in} E2	DATA 3	(1) V ₁ 15kHz, Variable-amplitude input. (2) For each, measure the amplitude of V ₁ at which the waveform on pin 36 is distorted.
		V _{in} E1	DATA 3	
1-(3)	V Input Dynamic Range (Clamp Off) (Main)	V _{in} E2	DATA 2	(1) V ₁ 15kHz, Variable-amplitude input, V ₃ = 0V. (2) For each, measure the amplitude of V ₁ at which the waveform on pin 46 is distorted.
		V _{in} E1	DATA 2	
1-(4)	V Input Dynamic Range (Clamp Off) (Sub)	V _{in} E2	DATA 3	(1) V ₁ 15kHz, variable-amplitude input, V ₃ = 0V. (2) For each, measure the amplitude of V ₁ at which the waveform on pin 36 is distorted.
		V _{in} E1	DATA 3	

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)		MEASUREMENT METHOD
		SW & VR MODE	DATA 2	
2-(1)	YC Input Dynamic Range (Main)	Y _{in} S1	11111011	Measure the amplitude in the same way using pin 44.
		Y _{in} S2	11111010	
		Y _{in} S3	11111001	
		Y _{in} 1	0101****	
		V _{in} E3	0100****	
		C _{in} S1	11111011	
		C _{in} S2	11111010	
		C _{in} S3	11111001	
		C _{in} 1	0101****	
		2-(2)	YC Input Dynamic Range (Sub)	
Y _{in} S2	11111011			
Y _{in} S3	11111010			
Y _{in} 2	11111001			
V _{in} E4	0101****			
C _{in} S1	0100****			
C _{in} S2	11111011			
C _{in} S3	11111010			
C _{in} 2	11111001			
3-(1)	S Video Dynamic Range (Main)			Y _{in} S1
		Y _{in} S2	11111011	
		Y _{in} S3	11111010	
		C _{in} S1	11111001	
		C _{in} S2	11111011	
		C _{in} S3	11111010	
		Y _{in} 1	11111001	
		Y _{in} 2	11111010	
		Y _{in} 3	11111011	
		Y _{in} 4	11111001	
3-(2)	S Video Dynamic Range (Sub)	Y _{in} S1	DATA 3	Measure the amplitude in the same way using pin 36.
		Y _{in} S2	11111011	
		Y _{in} S3	11111010	
		C _{in} S1	11111001	
		C _{in} S2	11111011	
		C _{in} S3	11111010	
		Y _{in} 1	11111001	
		Y _{in} 2	11111010	
		Y _{in} 3	11111011	
		Y _{in} 4	11111001	

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)				MEASUREMENT METHOD
		SW & VR MODE		DATA 2	DATA 3	
		SW MODE				
3-(3)	S Video Dynamic Range (Clamp Off) (Main)	Y _{in} S1	S9-a , S47-on, others-b/off	11111011	Measure the amplitude in the same way using pin 46.	
		Y _{in} S2	S15-a , S47-on, others-b/off	11111010		
Y _{in} S3	S21-a , S47-on, others-b/off	11111001				
C _{in} S1	S11-a , S47-on, others-b/off	11111011				
C _{in} S2	S17-a , S47-on, others-b/off	11111010				
C _{in} S3	S23-a , S47-on, others-b/off	11111001				
3-(4)	S Video Dynamic Range (Clamp Off) (Sub)	Y _{in} S1	S9-a , S37-on, others-b/off	DATA 3 11111011	Measure the amplitude in the same way using pin 36.	
		Y _{in} S2	S15-a , S37-on, others-b/off	11111010		
Y _{in} S3	S21-a , S37-on, others-b/off	11111001				
C _{in} S1	S11-a , S37-on, others-b/off	11111011				
C _{in} S2	S17-a , S37-on, others-b/off	11111010				
C _{in} S3	S23-a , S37-on, others-b/off	11111001				
4-(1)	B / W Mode Dynamic Range (Main)	V _{in} E2	S2-a , others-b / off	DATA 2 10100110	Measure the amplitude in the same way using pins 44 and 42 to find the smaller one.	
		V _{in} E1	S5-a , others-b / off	10100111		
V _{in} S1	S7A-a , others-b / off	10100011				
V _{in} S2	S13A-a, others-b / off	10100010				
V _{in} S3	S19A-a, others-b / off	10100001				
V _{in} E3	S50-a , others-b / off	10100101				
V _{in} E4	S53-a , others-b / off	10100100				
4-(2)	B / W Mode Dynamic Range (Sub)	V _{in} E2	S2-a , others-b / off	DATA 3 10100110	Measure the amplitude in the same way using pins 34 and 32 to find the smaller one.	
		V _{in} E1	S5-a , others-b / off	10100111		
V _{in} S1	S7A-a , others-b / off	10100011				
V _{in} S2	S13A-a, others-b / off	10100010				
V _{in} S3	S19A-a, others-b / off	10100001				
V _{in} E3	S50-a , others-b / off	10100101				
V _{in} E4	S53-a , others-b / off	10100100				

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)			
		SW & VR MODE		MEASUREMENT METHOD	
		SW MODE	DATA 2		
5-(1)	Video Gain (Main)	V _{in} E2	S2-a , others-b / off	****0110	(1) V ₁ 15kHz, 1V _{p-p} input. (2) For each, measure the amplitude on pin 46 to find the gain.
		V _{in} E1	S5-a , others-b / off	****0111	
V _{in} S1	S7A-a , others-b / off	****0011			
V _{in} S2	S13A-a , others-b / off	****0010			
V _{in} S3	S19A-a , others-b / off	****0001			
V _{in} E3	S50-a , others-b / off	****0101			
V _{in} E4	S53-a , others-b / off	****0100			
5-(2)	Video Gain (Sub)	V _{in} E2	S2-a , others-b / off	DATA 3 ****0110	
		V _{in} E1	S5-a , others-b / off	****0111	
V _{in} S1	S7A-a , others-b / off	****0011			
V _{in} S2	S13A-a , others-b / off	****0010			
V _{in} S3	S19A-a , others-b / off	****0001			
V _{in} E3	S50-a , others-b / off	****0101			
V _{in} E4	S53-a , others-b / off	****0100			
5-(3)	Video Gain (Clamp Off) (Main)	V _{in} E2	S2-a , S47-on, others-b / off	DATA 2 ****0110	(1) V ₁ 15kHz, 1V _{p-p} input. (2) For each, measure the amplitude on pin 46 to find the gain.
		V _{in} E1	S5-a , S47-on, others-b / off	****0111	
V _{in} S1	S7A-a , S47-on, others-b / off	****0011			
V _{in} S2	S13A-a , S47-on, others-b / off	****0010			
V _{in} S3	S19A-a , S47-on, others-b / off	****0001			
V _{in} E3	S50-a , S47-on, others-b / off	****0101			
V _{in} E4	S53-a , S47-on, others-b / off	****0100			
5-(4)	Video Gain (Clamp Off) (Sub)	V _{in} E2	S2-a , S37-on, others-b / off	DATA 3 ****0110	
		V _{in} E1	S5-a , S37-on, others-b / off	****0111	
V _{in} S1	S7A-a , S37-on, others-b / off	****0011			
V _{in} S2	S13A-a , S37-on, others-b / off	****0010			
V _{in} S3	S19A-a , S37-on, others-b / off	****0001			
V _{in} E3	S50-a , S37-on, others-b / off	****0101			
V _{in} E4	S53-a , S37-on, others-b / off	****0100			

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)			
		SW & VR MODE		MEASUREMENT METHOD	
		SW MODE	DATA 2		
6-(1)	Y/C Gain (Main)	Y _{in} S1	11111011	Measure the amplitude in the same way using pin 44.	
		Y _{in} S2	11111010		
		Y _{in} S3	11111001		
		Y _{in} 1	0101****		
		V _{in} E3	0100****		
		C _{in} S1	11111011		
		C _{in} S2	11111010		
		C _{in} S3	11111001		
6-(2)	Y/C Gain (Sub)	C _{in} 1	0101****	Measure the amplitude in the same way using pin 42.	
		DATA 3			
		Y _{in} S1	11111011		Measure the amplitude in the same way using pin 34.
		Y _{in} S2	11111010		
		Y _{in} S3	11111001		
		Y _{in} 2	0101****		
		V _{in} E4	0100****		
		C _{in} S1	11111011		
		C _{in} S2	11111010		
		C _{in} S3	11111001		
		C _{in} 2	0101****		
		7-(1)	S Video Gain (Main)		
Y _{in} S1	11111011				
Y _{in} S2	11111010				
Y _{in} S3	11111001				
C _{in} S1	11111011				
C _{in} S2	11111010				
C _{in} S3	11111001				
DATA 2					
S _{9-a} , others-b/off	11111011			Measure the amplitude in the same way using pin 46.	
S _{15-a} , others-b/off	11111010				
S _{21-a} , others-b/off	11111001				
S _{11-a} , others-b/off	11111011				
S _{17-a} , others-b/off	11111010				
S _{23-a} , others-b/off	11111001				
DATA 3					
Y _{in} S1	11111011	Measure the amplitude in the same way using pin 36.			
Y _{in} S2	11111010				
Y _{in} S3	11111001				
C _{in} S1	11111011				
C _{in} S2	11111010				
C _{in} S3	11111001				

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)			
		SW & VR MODE			
		SW MODE	DATA 2	MEASUREMENT METHOD	
7-(3)	S Video Gain (Clamp Off) (Sub)	Y _{in} S1	S9-a, S37-on, others-b/off	11111011	Measure the amplitude in the same way using pin 36.
		Y _{in} S2	S15-a, S37-on, others-b/off	11111010	
		Y _{in} S3	S21-a, S37-on, others-b/off	11111001	
C _{in} S1	S11-a, S37-on, others-b/off	11111011			
C _{in} S2	S17-a, S37-on, others-b/off	11111010			
C _{in} S3	S23-a, S37-on, others-b/off	11111001			
7-(4)	S Video Gain (Clamp Off) (Main)	Y _{in} S1	S9-a, S47-on, others-b/off	DATA 3 11111011	Measure the amplitude in the same way using pin 46.
		Y _{in} S2	S15-a, S47-on, others-b/off	11111010	
		Y _{in} S3	S21-a, S47-on, others-b/off	11111001	
C _{in} S1	S11-a, S47-on, others-b/off	11111011			
C _{in} S2	S17-a, S47-on, others-b/off	11111010			
C _{in} S3	S23-a, S47-on, others-b/off	11111001			
8-(1)	B/W Mode Gain (Main)	V _{in} E2	S2-a, others-b/off	DATA 2 10100110	Measure the amplitude in the same way using pin 44.
		V _{in} E1	S5-a, others-b/off	10100111	
		V _{in} S1	S7A-a, others-b/off	10100011	
		V _{in} S2	S13A-a, others-b/off	10100010	
		V _{in} S3	S19A-a, others-b/off	10100001	
		V _{in} E3	S50-a, others-b/off	10100101	
		V _{in} E4	S53-a, others-b/off	10100100	
		V _{in} E2	S2-a, others-b/off	10100110	
		V _{in} E1	S5-a, others-b/off	10100111	
		V _{in} S1	S7A-a, others-b/off	10100011	
		V _{in} S2	S13A-a, others-b/off	10100010	
		V _{in} S3	S19A-a, others-b/off	10100001	
		V _{in} E3	S50-a, others-b/off	10100101	
V _{in} E4	S53-a, others-b/off	10100100			

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)		
		SW & VR MODE		MEASUREMENT METHOD
		SW MODE	DATA 3	
8-(2) (Sub)	V _{in} E2	S2-a , others-b / off	10100110	Measure the amplitude in the same way using pin 34.
	V _{in} E1	S5-a , others-b / off	10100111	
	V _{in} S1	S7A-a , others-b / off	10100011	
	V _{in} S2	S13A-a , others-b / off	10100010	
	V _{in} S3	S19A-a , others-b / off	10100001	
	V _{in} E3	S50-a , others-b / off	10100101	
	V _{in} E4	S53-a , others-b / off	10100100	
	V _{in} E2	S2-a , others-b / off	10100110	
	V _{in} E1	S5-a , others-b / off	10100111	
	V _{in} S1	S7A-a , others-b / off	10100011	
	V _{in} S2	S13A-a , others-b / off	10100010	
	V _{in} S3	S19A-a , others-b / off	10100001	
	V _{in} E3	S50-a , others-b / off	10100101	
	V _{in} E4	S53-a , others-b / off	10100100	

NOTE	ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, VCC=9V, Ta = 25 ± 3°C)			
			SW & VR MODE		MEASUREMENT METHOD	
			SW MODE	DATA 2	DATA 2	MEASUREMENT METHOD
9-(1)	V Switch Crosstalk (Main)	VinE2	All-b/off except those specified on the left	DATA 2	(1) V1 3.58MHz, 1Vp-p input. (2) While sequentially switching S2, S5, S7A, S9, S11, S13A, S15, S17, S19A, S21, S23, S30, S38, S40, S48, S50, and S53 to 'a', measure the maximum level of crosstalk to pin 46 and find its ratio to output in selected mode.	
		VinE1	All-b/off except those specified on the left	****0110		
9-(2)	V Switch Crosstalk (Sub)	VinS1	All-b/off except those specified on the left	DATA 3	(1) V1 3.58MHz, 1Vp-p input. (2) While sequentially switching S2, S5, S7A, S9, S11, S13A, S15, S17, S19A, S21, S23, S30, S38, S40, S48, S50, and S53 to 'a', measure the maximum level of crosstalk to pin 36 and find its ratio to output in selected mode.	
		VinS2	All-b/off except those specified on the left	****0111		
10-(1)	Y Switch Crosstalk (Main)	VinS3	All-b/off except those specified on the left	DATA 2	Measure the maximum level of crosstalk in the same way using pin 44.	
		VinE3	All-b/off except those specified on the left	11111011		
10-(2)	Y Switch Crosstalk (Sub)	VinE4	All-b/off except those specified on the left	DATA 3	Measure the maximum level of crosstalk in the same way using pin 34.	
		YinS1, CinS1	All-b/off except those specified on the left	11111010		
		YinS2, CinS2	All-b/off except those specified on the left	11111010		
		YinS3, CinS3	All-b/off except those specified on the left	11111001		
		Yin1	All-b/off except those specified on the left	0101****		
		VinE3	All-b/off except those specified on the left	0100****		
		YinS1	All-b/off except those specified on the left	DATA 3		
		YinS2	All-b/off except those specified on the left	11111011		
		YinS3	All-b/off except those specified on the left	11111010		
		Yin2	All-b/off except those specified on the left	11111001		
		VinE3	All-b/off except those specified on the left	0101****		
		VinE2	All-b/off except those specified on the left	0100****		

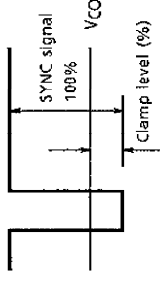
NOTE		ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)				
				SW & VR MODE		MEASUREMENT METHOD		
				SW MODE	DATA 2	DATA 3		
11-(1)	C Switch Crosstalk (Main)	C _{in} S1	All-b/off except those specified on the left	11111011	Measure the maximum level of crosstalk in the same way using pin 42.			
		C _{in} S2	All-b/off except those specified on the left	11111010				
		C _{in} S3	All-b/off except those specified on the left	11111001				
		C _{in} 1	All-b/off except those specified on the left	0101****				
11-(2)	C Switch Crosstalk (Sub)	C _{in} S1	All-b/off except those specified on the left	DATA 3 11111011	Measure the maximum level of crosstalk in the same way using pin 32.			
		C _{in} S2	All-b/off except those specified on the left	11111010				
		C _{in} S3	All-b/off except those specified on the left	11111001				
		C _{in} 2	All-b/off except those specified on the left	0101****				
12-(1)	V Switch Crosstalk (Clamp Off) (Main)	V _{in} E2	All-b/off except those specified on the left	DATA 2 ****0110	(1) S47-ON, V ₃ = 0V. (2) Measure the maximum level of crosstalk in the same way using pin 46.			
		V _{in} E1	All-b/off except those specified on the left	****0111				
		V _{in} S1	All-b/off except those specified on the left	****0011				
		V _{in} S2	All-b/off except those specified on the left	****0010				
		V _{in} S3	All-b/off except those specified on the left	****0001				
		V _{in} E3	All-b/off except those specified on the left	****0101				
		V _{in} E4	All-b/off except those specified on the left	****0100				
		Y _{in} S1, C _{in} S1	All-b/off except those specified on the left	****1011				
		Y _{in} S2, C _{in} S2	All-b/off except those specified on the left	****1010				
		Y _{in} S3, C _{in} S3	All-b/off except those specified on the left	****1001				
		12-(2)	V Switch Crosstalk (Clamp Off) (Sub)	V _{in} E2		All-b/off except those specified on the left	DATA 3 ****0110	(1) S37-ON, V ₃ = 0V. (2) Measure the maximum level of crosstalk in the same way using pin 36.
				V _{in} E1		All-b/off except those specified on the left	****0111	
V _{in} S1	All-b/off except those specified on the left			****0011				
V _{in} S2	All-b/off except those specified on the left			****0010				
V _{in} S3	All-b/off except those specified on the left			****0001				
V _{in} E3	All-b/off except those specified on the left			****0101				
V _{in} E4	All-b/off except those specified on the left			****0100				
Y _{in} S1, C _{in} S1	All-b/off except those specified on the left			****1011				
Y _{in} S2, C _{in} S2	All-b/off except those specified on the left			****1010				
Y _{in} S3, C _{in} S3	All-b/off except those specified on the left			****1001				

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)		MEASUREMENT METHOD
		SW & VR MODE		
		SW MODE	DATA 2	
13	V _{out1} Output	All-b/off except those specified on the left	***00000	(1) V ₁ 3.58MHz, 1V _{p-p} input. (2) While sequentially switching S ₂ , S ₅ , S _{7A} , S ₉ , S ₁₁ , S _{13A} , S ₁₅ , S ₁₇ , S _{19A} , S ₂₁ , S ₂₃ , S ₃₀ , S ₃₈ , S ₄₀ , S ₄₈ , S ₅₀ , and S ₅₃ to 'a', measure the maximum level of crosstalk to pin 46 and find its ratio to output in selected mode.
		All-b/off except those specified on the left	00*****	Measure the maximum level of crosstalk in the same way using pin 44.
	C _{out1} Output	All-b/off except those specified on the left	00*****	Measure the maximum level of crosstalk in the same way using pin 42.
			DATA 3	
	V _{out2} Output	All-b/off except those specified on the left	***00000	Measure the maximum level of crosstalk in the same way using pin 36.
	Y _{out2} Output	All-b/off except those specified on the left	00*****	Measure the maximum level of crosstalk in the same way using pin 34.
		All-b/off except those specified on the left	00*****	Measure the maximum level of crosstalk in the same way using pin 32.
	V _{out1} Output (Clamp Off)		DATA 2	
		All-b/off except those specified on the left	***00000	(1) S ₄₇ -ON, V ₃ = 0V (2) Measure the maximum level of crosstalk in the same way using pin 46.
	V _{out2} Output (Clamp Off)		DATA 3	
All-b/off except those specified on the left		***00000	(1) S ₄₇ -ON, V ₃ = 0V (2) Measure the maximum level of crosstalk in the same way using pin 36.	

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25 ± 3°C)			
		SW & VR MODE		MEASUREMENT METHOD	
		SW MODE	DATA 2		
14-(1)	Video Frequency Response (Main)	V _{in} E2	S2-a , others-b / off	DATA 2 ****0110	(1) V ₁ frequency-variable, 1V _{p-p} input. (2) For each, measure the output amplitude on pin 46 to find the frequency equivalent to -3dB.
		V _{in} E1	S5-a , others-b / off	****0111	
		V _{in} S1	S7A-a , others-b / off	****0011	
		V _{in} S2	S13A-a , others-b / off	****0010	
		V _{in} S3	S19A-a , others-b / off	****0001	
		V _{in} E3	S50-a , others-b / off	****0101	
		V _{in} E4	S53-a , others-b / off	****0100	
				DATA 3	
14-(2)	Video Frequency Response (Sub)	V _{in} E2	S2-a , others-b / off	DATA 3 ****0110	(1) V ₁ 15kHz, 1V _{p-p} input (2) For each, measure the output amplitude on pin 36 to find the frequency equivalent to -3dB.
		V _{in} E1	S5-a , others-b / off	****0111	
		V _{in} S1	S7A-a , others-b / off	****0011	
		V _{in} S2	S13A-a , others-b / off	****0010	
		V _{in} S3	S19A-a , others-b / off	****0001	
		V _{in} E3	S50-a , others-b / off	****0101	
		V _{in} E4	S53-a , others-b / off	****0100	
				DATA 2	
14-(3)	Video Frequency Response (Clamp Off) (Main)	V _{in} E2	S2-a , S47-on, others-b / off	DATA 2 ****0110	(1) V ₁ frequency-variable, 1V _{p-p} input, V ₃ = 0V. (2) For each, measure the output amplitude on pin 46 to find the frequency equivalent to -3dB.
		V _{in} E1	S5-a , S47-on, others-b / off	****0111	
		V _{in} S1	S7A-a , S47-on, others-b / off	****0011	
		V _{in} S2	S13A-a , S47-on, others-b / off	****0010	
		V _{in} S3	S19A-a , S47-on, others-b / off	****0001	
		V _{in} E3	S50-a , S47-on, others-b / off	****0101	
		V _{in} E4	S53-a , S47-on, others-b / off	****0100	
				DATA 3	
14-(4)	Video Frequency Response (Clamp Off) (Sub)	V _{in} E2	S2-a , S37-on, others-b / off	DATA 3 ****0110	(1) V ₁ frequency-variable, 1V _{p-p} input, V ₃ = 0V. (2) For each, measure the output amplitude on pin 36 to find the frequency equivalent to -3dB.
		V _{in} E1	S5-a , S37-on, others-b / off	****0111	
		V _{in} S1	S7A-a , S37-on, others-b / off	****0011	
		V _{in} S2	S13A-a , S37-on, others-b / off	****0010	
		V _{in} S3	S19A-a , S37-on, others-b / off	****0001	
		V _{in} E3	S50-a , S37-on, others-b / off	****0101	
		V _{in} E4	S53-a , S37-on, others-b / off	****0100	

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)						
		SW & VR MODE		MEASUREMENT METHOD				
		SW MODE	DATA 2					
15-(1)	Y/C Frequency Response (Main)	Y _{in} S1	S9-a, others-b/off	11111011	Measure the amplitude in the same way using pin 44.			
		Y _{in} S2	S15-a, others-b/off	11111010				
		Y _{in} S3	S21-a, others-b/off	11111001				
		Y _{in} 1	S48-a, others-b/off	0101****				
		V _{in} E3	S50-a, others-b/off	0100****				
		C _{in} S1	S11-a, others-b/off	11111011				
		C _{in} S2	S17-a, others-b/off	11111010				
		C _{in} S3	S23-a, others-b/off	11111001				
		C _{in} 1	S40-a, others-b/off	0101****				
		15-(2)	Y/C Frequency Response (Sub)	Y _{in} S1		S9-a, others-b/off	DATA 3 11111011	Measure the amplitude in the same way using pin 34.
Y _{in} S2	S15-a, others-b/off			11111010				
Y _{in} S3	S21-a, others-b/off			11111001				
Y _{in} 2	S38-a, others-b/off			0101****				
V _{in} E4	S53-a, others-b/off			0100****				
C _{in} S1	S11-a, others-b/off			11111011				
C _{in} S2	S17-a, others-b/off			11111010				
C _{in} S3	S23-a, others-b/off			11111001				
C _{in} 2	S30-a, others-b/off			0101****				
16-(1)	S Video Frequency Response (Main)			Y _{in} S1	S9-a, others-b/off	DATA 2 11111011	Measure the amplitude in the same way using pin 46.	
		Y _{in} S2	S15-a, others-b/off	11111010				
		Y _{in} S3	S21-a, others-b/off	11111001				
		C _{in} S1	S11-a, others-b/off	11111011				
		C _{in} S2	S17-a, others-b/off	11111010				
		C _{in} S3	S23-a, others-b/off	11111001				
		16-(2)	S Video Frequency Response (Sub)	Y _{in} S1	S9-a, others-b/off	DATA 3 11111011		Measure the amplitude in the same way using pin 36.
				Y _{in} S2	S15-a, others-b/off	11111010		
				Y _{in} S3	S21-a, others-b/off	11111001		
				C _{in} S1	S11-a, others-b/off	11111011		
C _{in} S2	S17-a, others-b/off			11111010				
C _{in} S3	S23-a, others-b/off			11111001				

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} =9V, T _a =25±3°C)			MEASUREMENT METHOD
		SW & VR MODE			
		SW MODE	DATA 2	DATA 3	
16-(3)	S Video Frequency Response (Clamp Off) (Main)	Y _{in} S1	S9-a , S47-on, others-b/off	11111011	Measure the amplitude in the same way using pin 46.
		Y _{in} S2	S15-a , S47-on, others-b/off	11111010	
		Y _{in} S3	S21-a , S47-on, others-b/off	11111001	
		C _{in} S1	S11-a , S47-on, others-b/off	11111011	
		C _{in} S2	S17-a , S47-on, others-b/off	11111010	
		C _{in} S3	S23-a , S47-on, others-b/off	11111001	
16-(4)	S Video Frequency Response (Clamp Off) (Sub)	Y _{in} S1	S9-a , S37-on, others-b/off	DATA 3 11111011	Measure the amplitude in the same way using pin 36.
		Y _{in} S2	S15-a , S37-on, others-b/off	11111010	
		Y _{in} S3	S21-a , S37-on, others-b/off	11111001	
		C _{in} S1	S11-a , S37-on, others-b/off	11111011	
		C _{in} S2	S17-a , S37-on, others-b/off	11111010	
		C _{in} S3	S23-a , S37-on, others-b/off	11111001	
17-(1)	B/W Mode Frequency Response (Main)	V _{in} E2	S2-a , others-b/off	DATA 2 10100110	Measure the amplitude in the same way using pin 44.
		V _{in} E1	S5-a , others-b/off	10100111	
		V _{in} S1	S7A-a , others-b/off	10100011	
		V _{in} S2	S13A-a, others-b/off	10100010	
		V _{in} S3	S19A-a, others-b/off	10100001	
		V _{in} E3	S50-a , others-b/off	10100101	
		V _{in} E4	S53-a , others-b/off	10100100	
		V _{in} E2	S2-a , others-b/off	10100110	
		V _{in} E1	S5-a , others-b/off	10100111	
		V _{in} S1	S7A-a , others-b/off	10100011	
		V _{in} S2	S13A-a, others-b/off	10100010	
		V _{in} S3	S19A-a, others-b/off	10100001	
		V _{in} E3	S50-a , others-b/off	10100101	
		V _{in} E4	S53-a , others-b/off	10100100	

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)			
		SW & VR MODE			
		SW MODE	DATA 3	MEASUREMENT METHOD	
17-(2)	B / W Mode Frequency Response (Sub)	V _{in} E2	10100110	Measure the amplitude in the same way using pin 34.	
		V _{in} E1	10100111		
		V _{in} S1	10100011		
		V _{in} S2	10100010		
		V _{in} S3	10100001		
		V _{in} E3	10100101		
		V _{in} E4	10100100		
		V _{in} E2	10100110		Measure the amplitude in the same way using pin 32.
		V _{in} E1	10100111		
		V _{in} S1	10100011		
	V _{in} S2	10100010			
	V _{in} S3	10100001			
	V _{in} E3	10100101			
	V _{in} E4	10100100			
	18	Clamp Level	V _{out} 1 Output	DATA 2 ***0110	<p>(1) Measure the voltage V_{CO} on pin 46 during no-signal intervals.</p> <p>(2) Input a V₁ NTSC signal.</p> <p>(3) Observe the waveform on pin 46 and find the V_{CO} level from the sync tip in percentage assuming that the SYNC signal level = 100%</p> 
			V _{out} 2 Output	DATA 3 ***0110	

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)		MEASUREMENT METHOD	
		SW & VR MODE			
		SW MODE	DATA 2		
19	Audio L Dynamic Range	LinE2	DATA 2	(1) V ₂ 1kHz, amplitude-variable input. (2) For each, measure the amplitude of V ₁ at which the waveform on pin 45 is distorted. (Data 1 D ₀₀ = 0 : mute off)	
		LinE1	DATA 2		
		LinS1	DATA 2		
		LinS2	DATA 2		
		LinS3	DATA 2		
		LinE3	DATA 2		
		LinE4	DATA 2		
		LinE2	DATA 3		Measure the amplitude in the same way using pin 35. (Data 1 D ₀₁ = 0 : mute off)
		LinE1	DATA 3		
		LinS1	DATA 3		
LinS2	DATA 3				
LinS3	DATA 3				
LinE3	DATA 3				
LinE4	DATA 3				
LinE1	DATA 2, 3	Measure the amplitude in the same way using pin 41. (Data 1 D ₀₂ = 0 : mute off)			
LinE1	DATA 2, 3				

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)			
		SW & VR MODE			
		SW MODE	DATA 2	MEASUREMENT METHOD	
19	Audio R Dynamic Range	R _{in} E2	***0110	Measure the amplitude in the same way using pin 43. (Data 1 D ₀₀ = 0 : mute off)	
		R _{in} E1	***0111		
		R _{in} S1	***0011		
		R _{in} S2	***0010		
		R _{in} S3	***0001		
		R _{in} E3	***0101		
		R _{in} E4	***0100		
		R _{in} E2	DATA 3		Measure the amplitude in the same way using pin 33. (Data 1 D ₀₁ = 0 : mute off)
		R _{in} E1	***0110		
		R _{in} S1	***0111		
R _{in} S2	***0011				
R _{in} S3	***0010				
R _{in} E3	***0001				
R _{in} E4	***0101				
R _{in} E4	***0100				
R _{in} E1	DATA 2, 3	Measure the amplitude in the same way using pin 39. (Data 1 D ₀₂ = 0 : mute off)			
R _{in} E1	*****				

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)		
		SW & VR MODE		MEASUREMENT METHOD
		SW MODE	DATA 2	
20 Audio L Gain	LinE2	S1-a , others-b / off	****0110	(1) V ₂ 1kHz, 1V _{pp} input. (2) For each, measure the output amplitude on pin 45 to find the gain. (Data 1 D ₀₀ = 0 : mute off)
	LinE1	S4-a , others-b / off	****0111	
	LinS1	S8-a , others-b / off	****0011	
	LinS2	S14-a , others-b / off	****0010	
	LinS3	S20-a , others-b / off	****0001	
	LinE3	S51-a , others-b / off	****0101	
	LinE4	S54A-a , others-b / off	****0100	
	LinE2	S1-a , others-b / off	DATA 3 ****0110	
	LinE1	S4-a , others-b / off	****0111	
	LinS1	S8-a , others-b / off	****0011	
	LinS2	S14-a , others-b / off	****0010	
	LinS3	S20-a , others-b / off	****0001	
	LinE3	S51-a , others-b / off	****0101	
	LinE4	S54A-a , others-b / off	****0100	DATA 2, 3
LinE1	S4-a , others-b / off	*****	Find the gain in the same way using pin 41. (Data 1 D ₀₂ = 0 : mute off)	

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)				
		SW & VR MODE		MEASUREMENT METHOD		
		SW MODE	DATA 2			
20	Audio R Gain	R _{in} E2	S ₃ -a , others-b /off	DATA 2 ***0110	Find the gain in the same way using pin 43. (Data 1 D ₀₀ = 0 : mute off)	
		R _{in} E1	S ₆ -a , others-b /off	***0111		
		R _{in} S1	S ₁₀ -a , others-b /off	***0011		
		R _{in} S2	S ₁₆ -a , others-b /off	***0010		
		R _{in} S3	S ₂₂ -a , others-b /off	***0001		
		R _{in} E3	S ₄₉ -a , others-b /off	***0101		
		R _{in} E4	S _{52A} -a , others-b /off	***0100		
		R _{in} E2	S ₃ -a , others-b /off	DATA 3 ***0110		Find the gain in the same way using pin 33. (Data 1 D ₀₁ = 0 : mute off)
		R _{in} E1	S ₆ -a , others-b /off	***0111		
		R _{in} S1	S ₁₀ -a , others-b /off	***0011		
R _{in} S2	S ₁₆ -a , others-b /off	***0010				
R _{in} S3	S ₂₂ -a , others-b /off	***0001				
R _{in} E3	S ₄₉ -a , others-b /off	***0101				
R _{in} E4	S _{52A} -a , others-b /off	***0100				
		DATA 2, 3				
		S ₆ -a , others-b /off	*****	Find the gain in the same way using pin 39. (Data 1 D ₀₂ = 0 : mute off)		

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)			
		SW & VR MODE			
		SW MODE	DATA 2	MEASUREMENT METHOD	
21	Audio L Frequency Response	LinE2 S1-a , others-b / off	****0110	(1) V ₂ frequency-variable, 1V _{p-p} input. (2) Measure the output amplitude on pin 45 and find the frequency equivalent to -3dB. (Data 1 D00 = 0 : mute off)	
		LinE1 S4-a , others-b / off	****0111		
		LinS1 S8-a , others-b / off	****0011		
		LinS2 S14-a , others-b / off	****0010		
		LinS3 S20-a , others-b / off	****0001		
		LinE3 S51-a , others-b / off	****0101		
		LinE4 S54A-a , others-b / off	****0100		
		LinE2 S1-a , others-b / off	DATA 3 ****0110		Measure the amplitude in the same way using pin 35. (Data 1 D01 = 0 : mute off)
		LinE1 S4-a , others-b / off	****0111		
		LinS1 S8-a , others-b / off	****0011		
	LinS2 S14-a , others-b / off	****0010			
	LinS3 S20-a , others-b / off	****0001			
	LinE3 S51-a , others-b / off	****0101			
	LinE4 S54A-a , others-b / off	****0100			
LinE1	S4-a , others-b / off	DATA 2, 3	Measure the amplitude in the same way using pin 41. (Data 1 D02 = 0 : mute off)		

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)				
		SW & VR MODE		MEASUREMENT METHOD		
		SW MODE	DATA 2			
21	Audio R Frequency Response	R _{in} E2	S ₃ -a , others-b / off	****0110	Measure the amplitude in the same way using pin 43. (Data 1 D ₀₀ = 0 : mute off)	
		R _{in} E1	S ₆ -a , others-b / off	****0111		
		R _{in} S1	S ₁₀ -a , others-b / off	****0011		
		R _{in} S2	S ₁₆ -a , others-b / off	****0010		
		R _{in} S3	S ₂₂ -a , others-b / off	****0001		
		R _{in} E3	S ₄₉ -a , others-b / off	****0101		
		R _{in} E4	S _{52A} -a, others-b / off	****0100		
		R _{in} E2	S ₃ -a , others-b / off	DATA 3		Measure the amplitude in the same way using pin 33. (Data 1 D ₀₁ = 0 : mute off)
		R _{in} E1	S ₆ -a , others-b / off	****0110		
		R _{in} S1	S ₁₀ -a , others-b / off	****0111		
		R _{in} S2	S ₁₆ -a , others-b / off	****0011		
		R _{in} S3	S ₂₂ -a , others-b / off	****0010		
		R _{in} E3	S ₄₉ -a , others-b / off	****0001		
		R _{in} E4	S _{52A} -a, others-b / off	****0101		
R _{in} E1	S ₄ -a , others-b / off	DATA 2, 3	Measure the amplitude in the same way using pin 39. (Data 1 D ₀₂ = 0 : mute off)			

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)		MEASUREMENT METHOD
		SW & VR MODE		
		SW MODE	DATA 2	
	L _{in} E2 L _{in} E1 L _{in} S1 L _{in} S2 L _{in} S3 L _{in} E3 L _{in} E4	All-b/off except those specified on the left All-b/off except those specified on the left All-b/off except those specified on the left All-b/off except those specified on the left All-b/off except those specified on the left All-b/off except those specified on the left All-b/off except those specified on the left	***0110 ***0111 ***0011 ***0010 ***0001 ***0101 ***0100	(1) V ₂ 1kHz, 1V _{p-p} input. (2) While sequentially switching S ₁ , S ₃ , S ₄ , S ₆ , S ₁₀ , S ₁₄ , S ₁₆ , S ₂₀ , S ₂₂ , S ₄₉ , S ₅₁ , S _{52A} , and S _{54A} to 'a', measure the maximum level of crosstalk to pin 45 and find its ratio to selected output. (Data 1 D ₀₀ = 0 : mute off)
22	L Switch Crosstalk	All-b/off except those specified on the left All-b/off except those specified on the left All-b/off except those specified on the left All-b/off except those specified on the left All-b/off except those specified on the left All-b/off except those specified on the left	DATA 3 ***0110 ***0111 ***0011 ***0010 ***0001 ***0101 ***0100	Measure the maximum level of crosstalk in the same way using pin 35. (Data 1 D ₀₁ = 0 : mute off)

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)	
		SW & VR MODE	MEASUREMENT METHOD
23	L Switch Mute Attenuation	SW MODE	(1) V ₂ 1kHz, 1V _{p-p} input. (2) Mute on (data 1 D00 = 1) and while sequentially switching S1, S3, S4, S6, S8, S10, S14, S16, S20, S22, S49, S51, S52A, and S54A to 'a', measure the maximum level of crosstalk to pin 45 and find its ratio to selected output.
		DATA 2, 3	*****
	R Switch Mute Attenuation	SW MODE	Measure the maximum level of crosstalk in the same way using pin 35. (Data 1 D01 = 1 : mute on)
		DATA 2, 3	*****
		SW MODE	Measure the maximum level of crosstalk in the same way using pin 43. (Data 1 D00 = 1 : mute on)
		DATA 2, 3	*****
		SW MODE	Measure the maximum level of crosstalk in the same way using pin 33. (Data 1 D01 = 1 : mute on)
		DATA 2, 3	*****

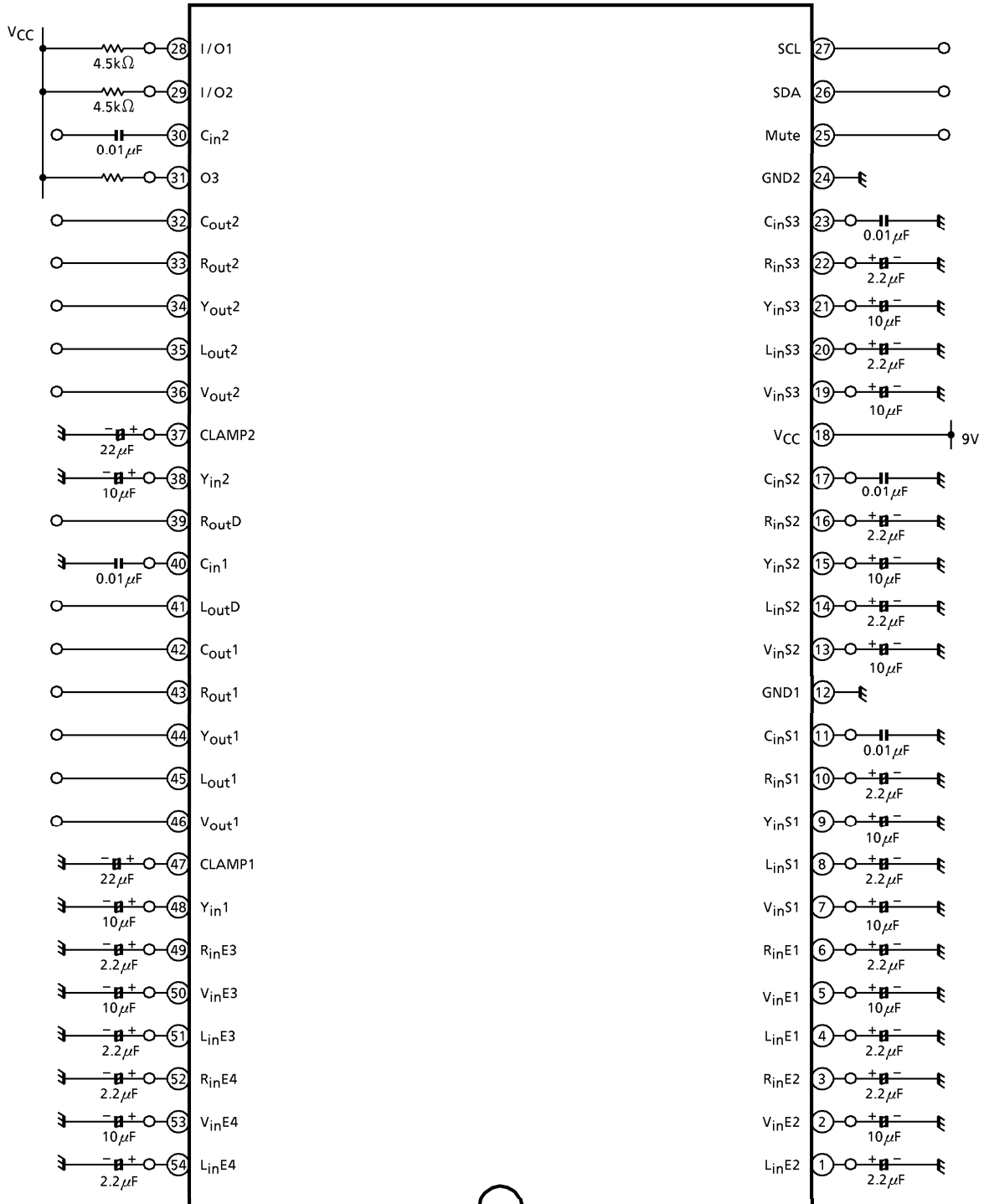
NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)		
		SW & VR MODE		MEASUREMENT METHOD
		SW MODE	DATA 2, 3	
24 Mode Switching Offset	L _{in} E2	All-b/off	****0110	(1) No-signal input. (2) Measure voltage fluctuations to find the maximum value in all input modes of data 2 for pin 45, and in all input modes of data 3 for pin 35.
	L _{in} E1	All-b/off	****0111	
	L _{in} S1	All-b/off	****0011	
	L _{in} S2	All-b/off	****0010	
	L _{in} S3	All-b/off	****0001	
	L _{in} E3	All-b/off	****0101	
	L _{in} E4	All-b/off	****0100	
	R _{in} E2	All-b/off	****0110	
	R _{in} E1	All-b/off	****0111	Find the maximum value in the same way using pin 43 (data 2) and pin 33 (data 3).
	R _{in} S1	All-b/off	****0011	
	R _{in} S2	All-b/off	****0010	
	R _{in} S3	All-b/off	****0001	
	R _{in} E3	All-b/off	****0101	
	R _{in} E4	All-b/off	****0100	
L _{in} E1	All-b/off	*****	Find the maximum value in the same way using pin 41.	
R _{in} E1	All-b/off	*****	Find the maximum value in the same way using pin 39.	

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)		MEASUREMENT METHOD
		SW & VR MODE	DATA 2, 3	
25	S Input Discriminating Voltage	S ₉ -a, S _{7B} -on, others-b / off	****0011	(1) V _i 1kHz, 1V _{pp} input. (2) While gradually lowering the V ₃ voltage, find the voltage where the output mode changes to the S mode (i.e., the voltage at which a waveform appears on pin 46). (Data 1 D ₀₀ , D ₀₁ , D ₀₂ = 0 : mute off)
			****0010	
			****0001	
26	I Input Discriminating Voltage	S ₂₈ -a , others-b / off	*****	While gradually lowering the V ₃ voltage, find the voltage at which the data of B ₃₄ , B ₃₅ , B ₃₆ , and B ₃₇ changes from 0 to 1, respectively. (Data 1 D ₀₃ , D ₀₄ = 1 : I MODE)

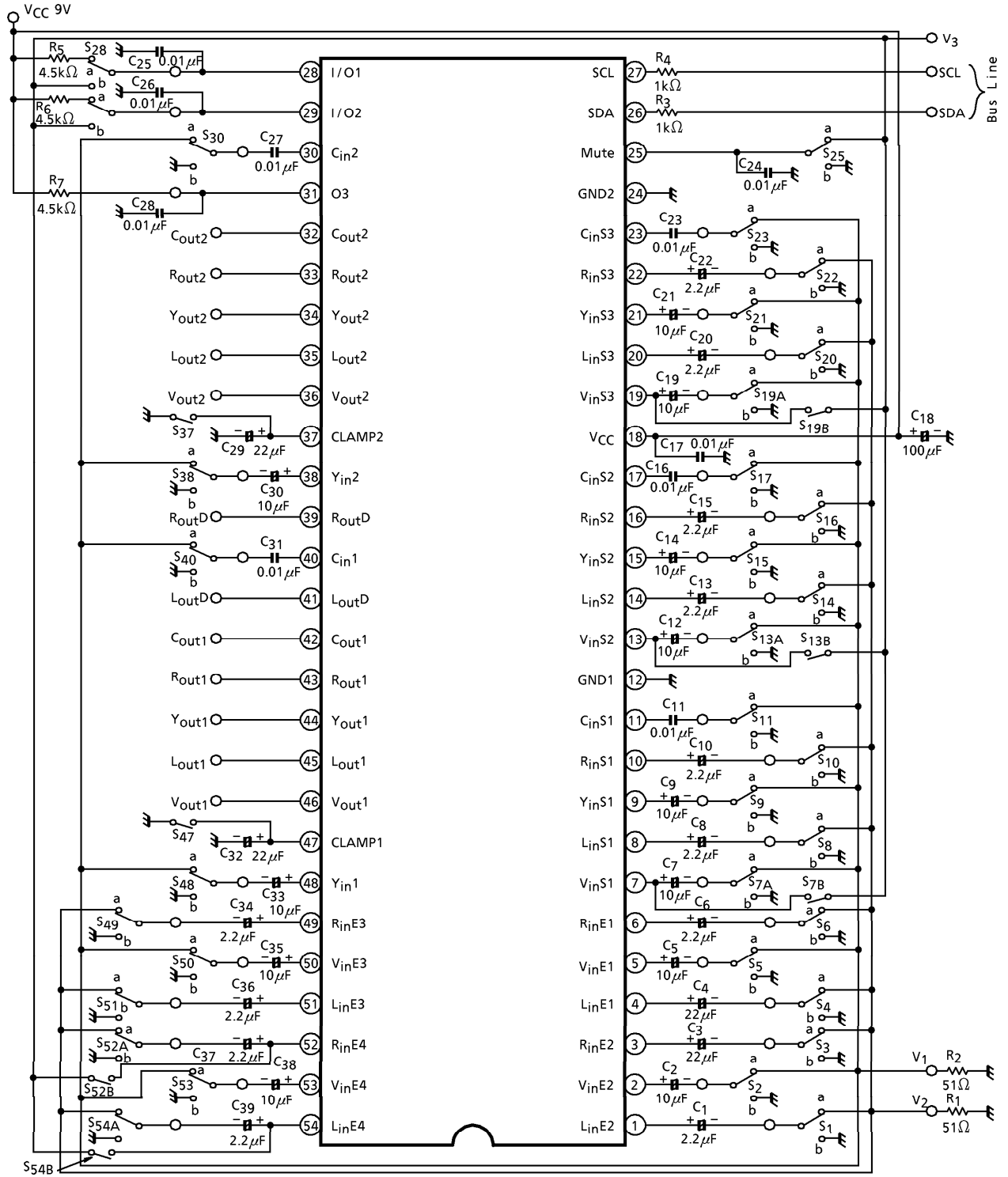
27	External Mute-ON Voltage	S ₄ , S ₂₅ -a, others-b / off	*****	While gradually raising the V ₃ voltage, find the voltage at which mute is turned on.

28	O Output Low Level Voltage	All-b / off	*****	Find the voltage on pins 28, 29, and 31 when the data D ₀₃ , D ₀₄ , and D ₀₅ are 0, respectively.

TEST CIRCUIT 1
DC characteristics

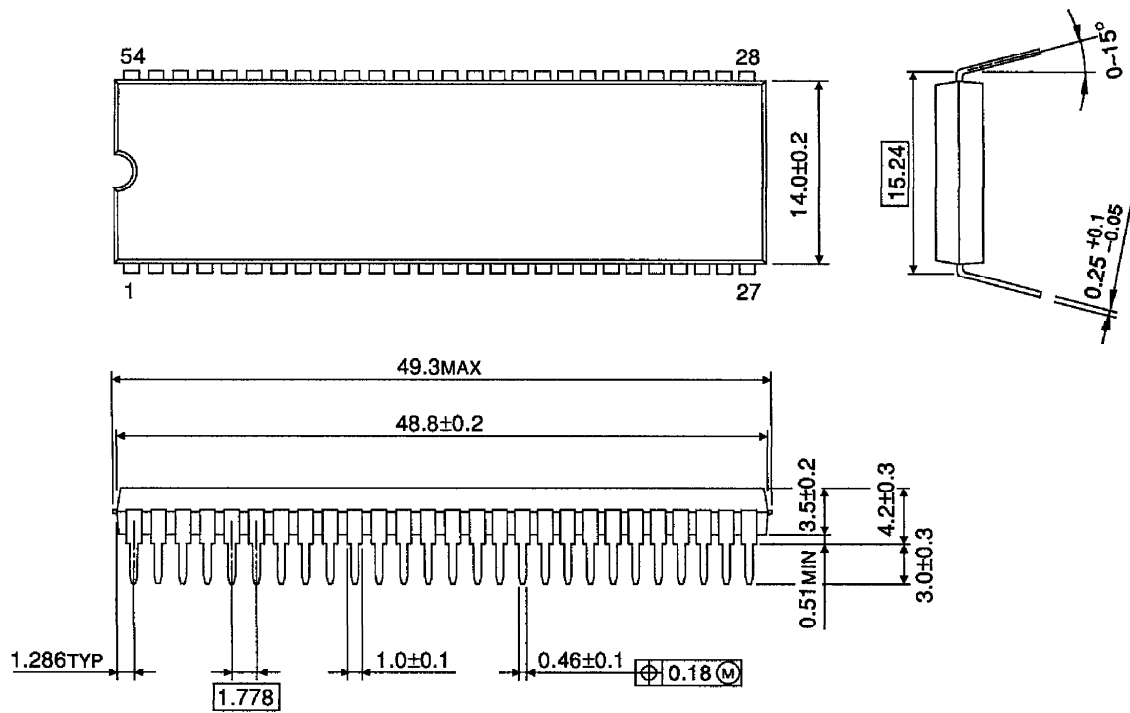


TEST CIRCUIT 2
AC characteristics



OUTLINE DRAWING
SDIP54-P-600-1.78

Unit : mm



Weight : 1.0g (Typ.)