

TOSHIBA

TA8851CN

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

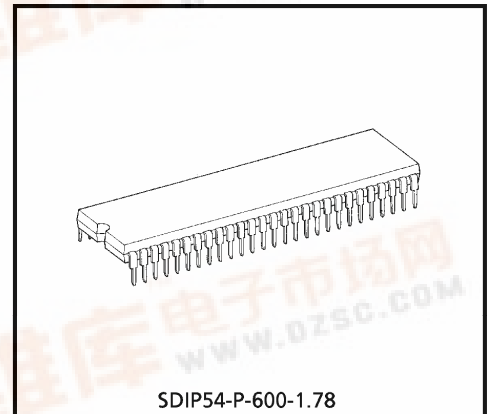
TA8851CN

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.



SDIP54-P-600-1.78

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)

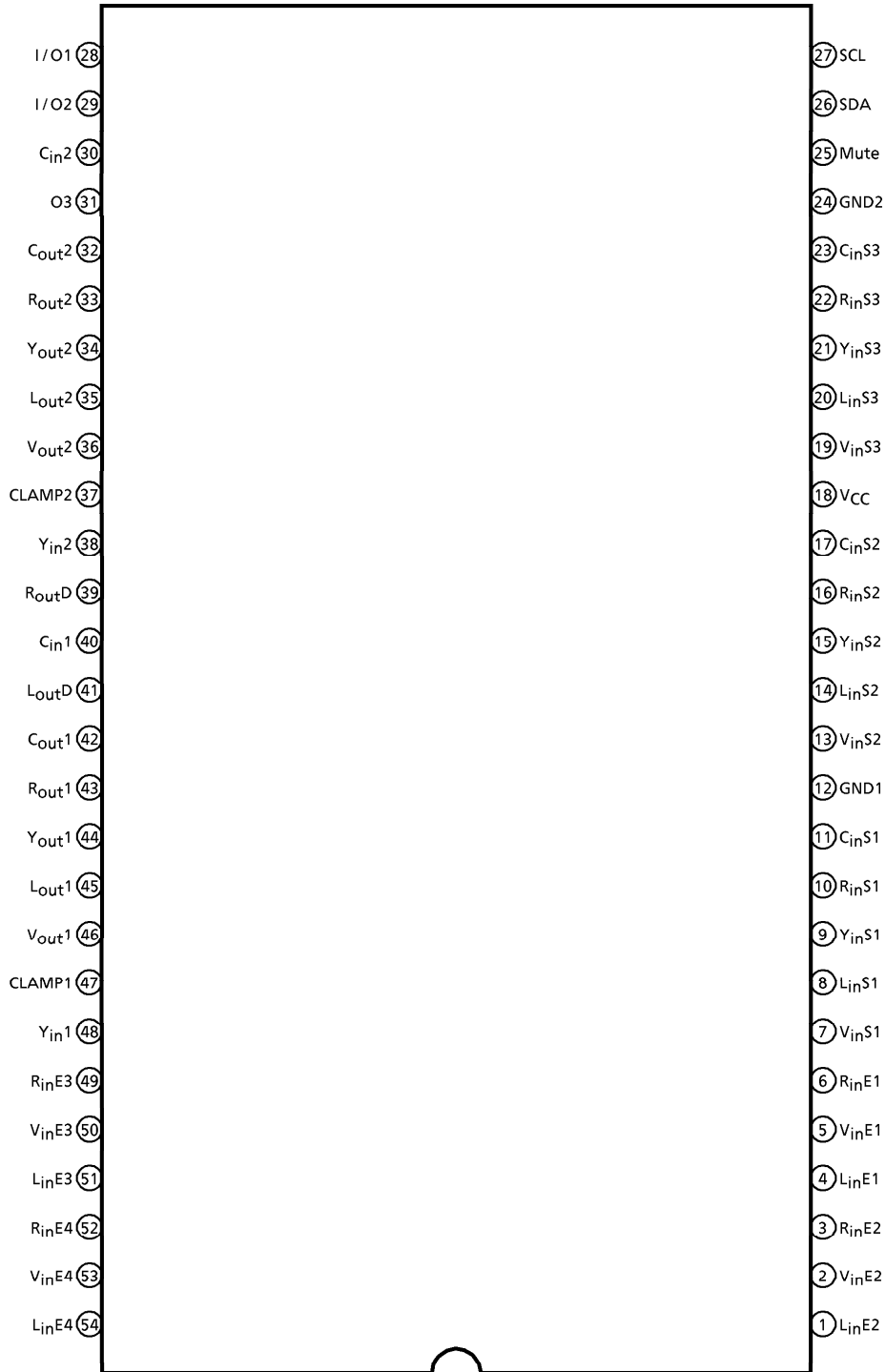
Functions

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

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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_{inS1} 15 : Y_{inS2} 21 : Y_{inS3} 11 : C_{inS1} 17 : C_{inS2} 23 : C_{inS3}	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_{inE1} 6 : R_{inE1}	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_{inE4} 54 : L_{inE4}	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_{inS1} 10 : R_{inS1} 14 : L_{inS2} 16 : R_{inS2} 20 : L_{inS3} 22 : R_{inS3} 1 : L_{inE2} 3 : R_{inE2} 51 : L_{inE3} 49 : R_{inE3}	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 : Y _{out1} 42 : C _{out1} 34 : Y _{out2} 32 : C _{out2}	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							
Write	Data 1	D07	D06	D05	D04	D03	D02	D01	D00
		—		DAC Output			Sound Selection	Sound Mute	
			(0)	(1)	(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)
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)	
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			
		D13	D12	D11	D10	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	—	—	—	V _{inS1}	R _{inS1}	L _{inS1}
		S	1							Y _{inS1} + C _{inS1}		
			—							1		
	S2	V	0	0	1	0	—	—	—	V _{inS2}	R _{inS2}	L _{inS2}
		S	1							Y _{inS2} + C _{inS2}		
			—							1		
	S3	V	0	0	0	1	—	—	0	V _{inS3}	R _{inS3}	L _{inS3}
		S	1							Y _{inS3} + C _{inS3}		
			—							1		
Mute		—	0	0	0	—	—	—	Mute	Mute	Mute	

Output switching (sub)

MODE		BUS DATA				S INPUT			OUTPUT SIGNAL			
		D23	D22	D21	D20	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	—	—	—	V _{inS1}	R _{inS1}	L _{inS1}
		S	1							Y _{inS1} + C _{inS1}		
			—							1		
	S2	V	0	0	1	0	—	—	—	V _{inS2}	R _{inS2}	L _{inS2}
		S	1							Y _{inS2} + C _{inS2}		
			—							1		
	S3	V	0	0	0	1	—	—	0	V _{inS3}	R _{inS3}	L _{inS3}
		S	1							Y _{inS3} + C _{inS3}		
			—							1		
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	—	—	—	—	—		
D15	0											
Y/C Sub	D24	0	—	—	—	—	Mute	—	—	—		
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

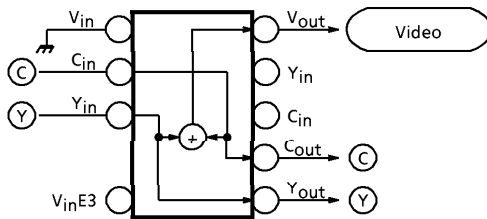
TERMINAL	INPUT	BUS	
		BIT	DATA
VinS1	L	D31	1
	H		0
VinS2	L	D32	1
	H		0
VinS3	L	D33	1
	H		0

ADC ident

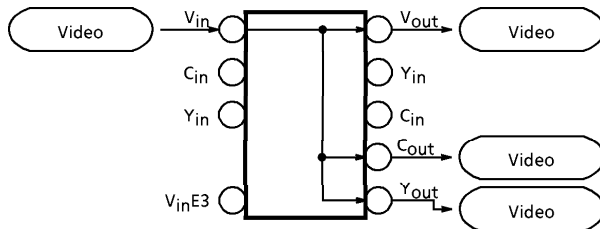
TERMINAL	INPUT	BUS	
		BIT	DATA
I/O1	L	D34	1
	H		0
I/O2	L	D35	1
	H		0
I3	L	D36	1
	H		0
I4	L	D37	1
	H		0

MODE EXPLANATION

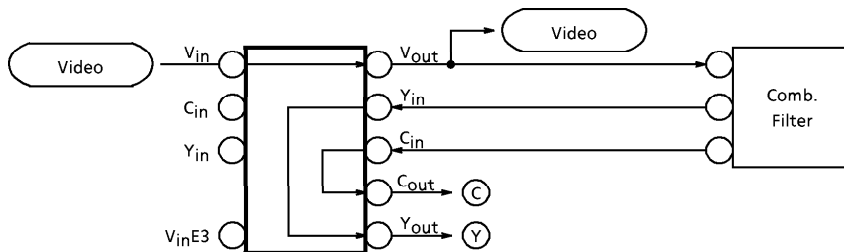
<S-terminal input mode>



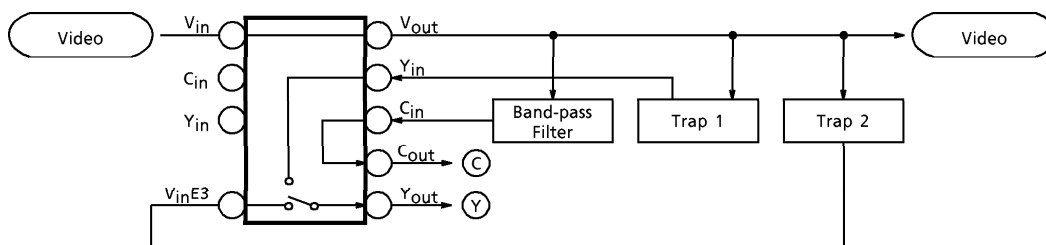
<Video input mode>



<Comb.1 input mode>



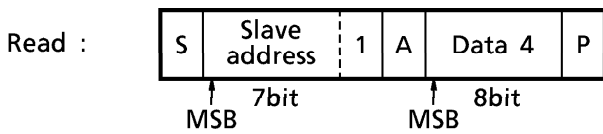
<Comb.2 input mode>



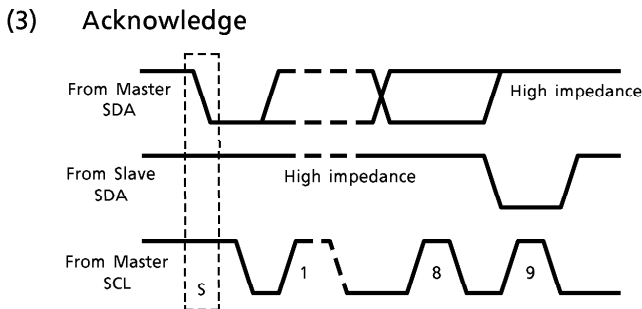
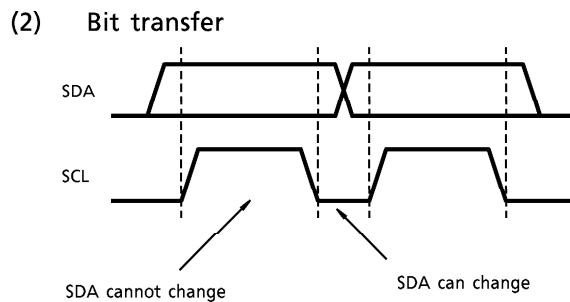
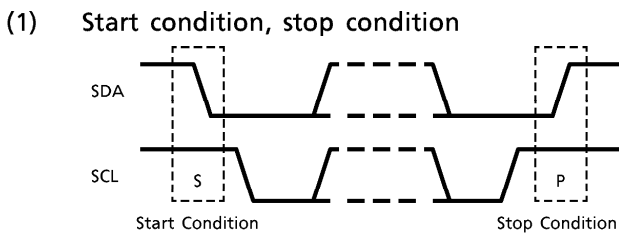
I²C BUS CONTROLLED FORMAT SUMMARY

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

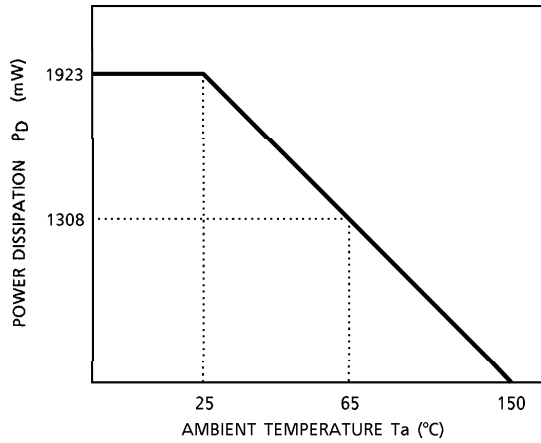
A6	A5	A4	A3	A2	A1	A0	R/ \bar{W}
1	0	0	1	0	0	0	1/0

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	Yout1	V44	1	—	3.4	3.7	4.0	V
45	Lout1	V45		—	3.7	4.0	4.3	
46	Vout1	V46		—	2.3	2.8	3.3	
47	CLAMP1	V47		—	2.7	3.2	3.7	
48	Yin1	V48		—	5.0	5.2	5.4	
49	RinE3	V49		—	5.0	5.2	5.4	
50	VinE3	V50		—	5.0	5.2	5.4	
51	LinE3	V51		—	5.0	5.2	5.4	
52	RinE4	V52		—	5.0	5.2	5.4	
53	VinE4	V53		—	5.0	5.2	5.4	
54	LinE4	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	IDIS	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 CIR-CUIT	TEST CONDITION	MIN.	TYP.	MAX.	UNIT			
Video Gain	(Main) G _{VID1}	2	(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}	2	(Note 6)	5.9	6.4	6.9	dB			
	(Sub) G _{Y / C2}			5.9	6.4	6.9				
Comb Gain	(Main) G _{COM1}			2	(Note 6)	- 0.5		0	0.5	dB
	(Sub) G _{COM2}					- 0.5		0	0.5	
S Video Gain	(Main) G _{S-V1}	2	(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}	2	(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}	2	(Note 9)	50	60	—	dB			
	(Sub) C _{VID2}		(Note 12)	50	60	—				
	(Clamp Off) C _{VID3}		(Note 12)	50	60	—				
Y Switch Crosstalk	(Main) C _{Y1}	2	(Note 10)	50	60	—	dB			
	(Sub) C _{Y2}			50	60	—				
C Switch Crosstalk	(Main) C _{C1}	2	(Note 11)	50	60	—	dB			
	(Sub) C _{C2}			50	60	—				
Video Mute Attenuation	G _{VM}	2	(Note 13)	50	60	—	dB			
Video Frequency Response	(Main) f _{VID1}	2	(Note 14)	9.0	—	—	MHz			
	(Sub) f _{VID2}			9.0	—	—				
	(Clamp Off) f _{VID3}			9.0	—	—				
Y / C Frequency Response	(Main) f _{Y / C1}	2	(Note 15)	9.0	—	—	MHz			
	(Sub) f _{Y / C2}			9.0	—	—				
Comb Frequency Response	(Main) f _{COM1}			2	(Note 15)	9.0		—	—	MHz
	(Sub) f _{COM2}					9.0		—	—	
S Video Frequency Response	(Main) f _{S-V1}	2	(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}	2	(Note 17)	9.0	—	—	MHz			
	(Sub) f _{B / W2}			9.0	—	—				
Clamp Level	C _L	2	(Note 18)	—	21	—	%			
Audio Dynamic Range	V _{dAUD}	2	(Note 19)	5.0	6.0	—	V _{p-p}			
Audio Gain	G _{AUD}	2	(Note 20)	- 0.5	0	0.5	dB			
Audio Frequency Response	f _{AUD}	2	(Note 21)	0.1	3.0	—	MHz			
Audio Switch Crosstalk	C _{AUD}	2	(Note 22)	60	70	—	dB			
Audio Mute Attenuation	G _{AM}	2	(Note 23)	60	70	—	dB			
Audio Select Offset	ΔV _{AUD}	2	(Note 24)	- 30	0	30	mV			
S Input Discriminating Voltage	V _{thS}	2	(Note 25)	2.4	2.6	2.8	V			
ADC Input Discriminating Voltage	V _{thADC}	2	(Note 26)	1.8	2.3	2.8	V			
External Mute-ON Voltage	V _{thMUTE}	2	(Note 27)	1.0	1.5	2.0	V			
DAC Output Low Level Voltage	V _{DAC}	2	(Note 28)	0	—	0.5	V			

TEST CONDITIONS		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)			
NOTE	ITEM	SW & VR MODE		MEASUREMENT METHOD	
		SW MODE	DATA 2		
1-(1)	V Input	V _{in} E2 V _{in} E1 V _{in} S1	S2-a , others-b / off S5-a , others-b / off S7A-a , others-b / off	***0110 ***0111 ***0011	(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.
	Dynamic Range (Main)	V _{in} S2 V _{in} S3 V _{in} E3 V _{in} E4	S13A-a, others-b / off S19A-a, others-b / off S50-a , others-b / off S53-a , others-b / off	***0010 ***0001 ***0101 ***0100	
1-(2)	V Input	V _{in} E2 V _{in} E1 V _{in} S1	S2-a , others-b / off S5-a , others-b / off S7A-a , others-b / off	DATA 3 ***0110 ***0111 ***0011	(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.
	Dynamic Range (Sub)	V _{in} S2 V _{in} S3 V _{in} E3 V _{in} E4	S13A-a, others-b / off S19A-a, others-b / off S50-a , others-b / off S53-a , others-b / off	***0010 ***0001 ***0101 ***0100	
1-(3)	V Input	V _{in} E2 V _{in} E1 V _{in} S1	S2-a , S47-on, others-b / off S5-a , S47-on, others-b / off S7A-a , S47-on, others-b / off	DATA 2 ***0110 ***0111 ***0011	(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.
	Dynamic Range (Clamp Off) (Main)	V _{in} S2 V _{in} S3 V _{in} E3 V _{in} E4	S13A-a, S47-on, others-b / off S19A-a, S47-on, others-b / off S50-a , S47-on, others-b / off S53-a , S47-on, others-b / off	***0010 ***0001 ***0101 ***0100	
1-(4)	V Input	V _{in} E2 V _{in} E1 V _{in} S1	S2-a , S37-on, others-b / off S5-a , S37-on, others-b / off S7A-a , S37-on, others-b / off	DATA 3 ***0110 ***0111 ***0011	(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.
	Dynamic Range (Clamp Off) (Sub)	V _{in} S2 V _{in} S3 V _{in} E3 V _{in} E4	S13A-a, S37-on, others-b / off S19A-a, S37-on, others-b / off S50-a , S37-on, others-b / off S53-a , S37-on, others-b / off	***0010 ***0001 ***0101 ***0100	

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)		MEASUREMENT METHOD		
		SW & VR MODE				
		SW MODE	DATA 2			
2-(1)	Y _C Input	Y _{in} S1	11111011	Measure the amplitude in the same way using pin 44.		
		Y _{in} S2	11111010			
	Y _{in} S3	11111001				
	Dynamic Range (Main)	Y _{in} 1	S48-a, others-b/off	0101****	Measure the amplitude in the same way using pin 42.	
		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		
	2-(2)	Y _C Input	Y _{in} S1	DATA 3	Measure the amplitude in the same way using pin 34.	
			Y _{in} S2	11111011		
		Y _{in} S3	11111010			
Y _{in} 2		11111001				
V _{in} E4		S38-a, others-b/off	0101****			
		S53-a, others-b/off	0100****			
Dynamic Range (Sub)		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****			
3-(1)	S Video	Y _{in} S1	DATA 2	Measure the amplitude in the same way using pin 46.		
		Y _{in} S2	11111011			
	Y _{in} S3	11111010				
	Dynamic Range (Main)	C _{in} S1	S21-a, others-b/off		11111001	
		C _{in} S2	S11-a, others-b/off		11111011	
		C _{in} S2	S17-a, others-b/off		11111010	
		C _{in} S3	S23-a, others-b/off		11111001	
	3-(2)	S Video	Y _{in} S1		DATA 3	Measure the amplitude in the same way using pin 36.
			Y _{in} S2		11111011	
		Y _{in} S3	11111010			
Dynamic Range (Sub)		C _{in} S1	S9-a, others-b/off	11111011		
		C _{in} S2	S15-a, others-b/off	11111010		
		C _{in} S3	S21-a, others-b/off	11111001		
		C _{in} S3	S11-a, others-b/off	11111011		

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, VCC = 9V, Ta = 25 ± 3°C)		
		SW & VR MODE		MEASUREMENT METHOD
		SW MODE	DATA 2	
3-(3)	S Video Dynamic Range (Clamp Off) (Main)	YinS1	11111011	Measure the amplitude in the same way using pin 46.
		YinS2	11111010	
		YinS3	11111001	
		CinS1	11111011	
		CinS2	11111010	
		CinS3	11111001	
3-(4)	S Video Dynamic Range (Clamp Off) (Sub)	YinS1	DATA 3	Measure the amplitude in the same way using pin 36.
		YinS2	11111011	
		YinS3	11111010	
		CinS1	11111001	
		CinS2	11111011	
		CinS3	11111010	
4-(1)	B / W Mode Dynamic Range (Main)	YinE2	DATA 2	Measure the amplitude in the same way using pins 44 and 42 to find the smaller one.
		YinE1	10100110	
		YinS1	10100111	
		YinS2	10100011	
		YinS3	10100010	
		YinE3	10100001	
4-(2)	B / W Mode Dynamic Range (Sub)	YinE2	DATA 3	Measure the amplitude in the same way using pins 34 and 32 to find the smaller one.
		YinE1	10100110	
		YinS1	10100111	
		YinS2	10100011	
		YinS3	10100010	
		YinE3	10100001	

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 _{pp} 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	
		DATA 3			
5-(2)	Video Gain (Sub)	V _{in} E2	S2-a , others-b / off	***0110	(1) V ₁ 15kHz, 1V _{pp} input. (2) For each, measure the amplitude on pin 36 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	
		DATA 2			
5-(3)	Video Gain (Clamp Off) (Main)	V _{in} E2	S2-a , S47-on, others-b / off	***0110	(1) V ₁ 15kHz, 1V _{pp} 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	
		DATA 2			
5-(4)	Video Gain (Clamp Off) (Sub)	V _{in} E2	S2-a , S37-on, others-b / off	***0110	(1) V ₁ 15kHz, 1V _{pp} input. (2) For each, measure the amplitude on pin 36 to find the gain.
		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	
		DATA 3			

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25 ± 3°C)				
		SW & VR MODE		MEASUREMENT METHOD		
		SW MODE	DATA 2			
6-(1)	Y / C Gain (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} T	S48-a, others-b / off	0101****		
		V _{in} E3	S50-a, others-b / off	0100****		
	C _{in} 1	C _{in} S1	S11-a, others-b / off	11111011	Measure the amplitude in the same way using pin 42.	
		C _{in} S2	S17-a, others-b / off	11111010		
		C _{in} S3	S23-a, others-b / off	11111001		
		C _{in} T	S40-a, others-b / off	0101****		
				DATA 3		
6-(2)	Y / C Gain (Sub)	Y _{in} S1	S9-a, others-b / off	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} Z	S38-a, others-b / off	0101****		
		V _{in} E4	S53-a, others-b / off	0100****		
	C _{in} 2	C _{in} S1	S11-a, others-b / off	11111011	Measure the amplitude in the same way using pin 32.	
		C _{in} S2	S17-a, others-b / off	11111010		
		C _{in} S3	S23-a, others-b / off	11111001		
		C _{in} T	S30-a, others-b / off	0101****		
				DATA 2		
7-(1)	S Video Gain (Main)	Y _{in} S1	S9-a, others-b / off	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			
	C _{in} 3				DATA 3	Measure the amplitude in the same way using pin 36.
		Y _{in} S1	S9-a, others-b / off	11111011		
		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			

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	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		
		DATA 3			
		Y _{in} S1	11111011		
		Y _{in} S2	11111010		
Y _{in} S3	11111001				
7-(4)	S Video Gain (Clamp Off) (Main)	C _{in} S1	11111011	Measure the amplitude in the same way using pin 46.	
		C _{in} S2	11111010		
		C _{in} S3	11111001		
		DATA 2			
		S2-a , others-b / off	10100110		
		S5-a , others-b / off	10100111		
		S7A-a , others-b / off	10100011		
		S13A-a , others-b / off	10100010		
		S19A-a , others-b / off	10100001		
S50-a , others-b / off	10100101				
S53-a , others-b / off	10100100				
8-(1)	B / W Mode Gain (Main)	V _{in} E2	10100110	Measure the amplitude in the same way using pin 44.	
		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		
		V _{in} E1	10100111		
		V _{in} S1	10100011		
		V _{in} S2	10100010		
		V _{in} S3	10100001		
		V _{in} E3	10100101		
		V _{in} E4	10100100		
		S2-a , others-b / off	10100110		
S5-a , others-b / off	10100111				
S7A-a , others-b / off	10100011				
S13A-a , others-b / off	10100010				
S19A-a , others-b / off	10100001				
S50-a , others-b / off	10100101				
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		Measure the amplitude in the same way using pin 32.
	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		
	B / W Mode Gain				

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, $V_{CC} = 9V$, $T_a = 25 \pm 3^\circ C$)			
		SW & VR MODE		MEASUREMENT METHOD	
		SW MODE	DATA 2		
9-(1)	V Switch Crosstalk (Main)	V_{inE2}	All-b/off except those specified on the left	****0110	(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.
		V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4} Y_{inS1}, C_{inS1} Y_{inS2}, C_{inS2} Y_{inS3}, C_{inS3}	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 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	****0111 ****0011 ****0010 ****0001 ****0101 ****0100 ****1011 ****1010 ****1001	
9-(2)	V Switch Crosstalk (Sub)	V_{inE2}	All-b/off except those specified on the left	DATA 3 ****0110	(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 36 and find its ratio to output in selected mode.
		V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4} Y_{inS1}, C_{inS1} Y_{inS2}, C_{inS2} Y_{inS3}, C_{inS3}	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 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	****0111 ****0011 ****0010 ****0001 ****0101 ****0100 ****1011 ****1010 ****1001	
10-(1)	Y Switch Crosstalk (Main)	Y_{inS1}	All-b/off except those specified on the left	DATA 2 11111011	Measure the maximum level of crosstalk in the same way using pin 44.
		Y_{inS2} Y_{inS3} Y_{in1} V_{inE3}	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	11111010 11111001 0101**** 0100****	
10-(2)	Y Switch Crosstalk (Sub)	Y_{inS1}	All-b/off except those specified on the left	DATA 3 11111011	Measure the maximum level of crosstalk in the same way using pin 34.
		Y_{inS2} Y_{inS3} Y_{in2} V_{inE3}	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	11111010 11111001 0101**** 0100****	

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, $V_{CC} = 9V$, $T_a = 25 \pm 3^\circ C$)				MEASUREMENT METHOD
		SW & VR MODE				
		SW MODE	DATA 2	DATA 3		
11-(1)	C Switch Crosstalk (Main)	All-b/off except those specified on the left	11111011		Measure the maximum level of crosstalk in the same way using pin 42.	
		All-b/off except those specified on the left	11111010			
		All-b/off except those specified on the left	11111001			
		All-b/off except those specified on the left	0101****			
11-(2)	C Switch Crosstalk (Sub)	All-b/off except those specified on the left	DATA 3		Measure the maximum level of crosstalk in the same way using pin 32.	
		All-b/off except those specified on the left	11111011			
		All-b/off except those specified on the left	11111010			
		All-b/off except those specified on the left	11111001			
12-(1)	V Switch Crosstalk (Clamp Off) (Main)	All-b/off except those specified on the left	DATA 2		(1) S47-ON, $V_3 = 0V$. (2) Measure the maximum level of crosstalk in the same way using pin 46.	
		All-b/off except those specified on the left	****0110			
		All-b/off except those specified on the left	****0111			
		All-b/off except those specified on the left	****0011			
		All-b/off except those specified on the left	****0010			
		All-b/off except those specified on the left	****0001			
		All-b/off except those specified on the left	****0101			
		All-b/off except those specified on the left	****0100			
		All-b/off except those specified on the left	****1011			
		All-b/off except those specified on the left	****1010			
		All-b/off except those specified on the left	****1001			
		12-(2)	V Switch Crosstalk (Clamp Off) (Sub)	All-b/off except those specified on the left		DATA 3
All-b/off except those specified on the left	****0110					
All-b/off except those specified on the left	****0111					
All-b/off except those specified on the left	****0011					
All-b/off except those specified on the left	****0010					
All-b/off except those specified on the left	****0001					
All-b/off except those specified on the left	****0101					
All-b/off except those specified on the left	****0100					
All-b/off except those specified on the left	****1011					
All-b/off except those specified on the left	****1010					
All-b/off except those specified on the left	****1001					

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25 ± 3°C)		MEASUREMENT METHOD
		SW & VR MODE	DATA 2	
13	V _{out1} Output	All-b/off except those specified on the left	****0000	(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.
			00*****	Measure the maximum level of crosstalk in the same way using pin 44.
	Y _{out1} Output	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.
	V _{out2} Output	All-b/off except those specified on the left	DATA 3	
			****0000	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.
	C _{out2} Output	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)	All-b/off except those specified on the left	DATA 2	
			****0000	(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)	All-b/off except those specified on the left	DATA 3	
			****0000	(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, T _a = 25 ± 3°C)		MEASUREMENT METHOD
		SW & VR MODE		
		SW MODE	DATA 2	
14-(1)	Video Frequency Response (Main)	V _{in} E2	***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	***0111	
		V _{in} S1	***0011	
		V _{in} S2	***0010	
		V _{in} S3	***0001	
		V _{in} E3	***0101	
		V _{in} E4	***0100	
14-(2)	Video Frequency Response (Sub)	V _{in} E2	DATA 3	(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	***0110	
		V _{in} S1	***0111	
		V _{in} S2	***0011	
		V _{in} S3	***0010	
		V _{in} E3	***0001	
		V _{in} E4	***0101	
		V _{in} E4	***0100	
14-(3)	Video Frequency Response (Clamp Off) (Main)	V _{in} E2	DATA 2	(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	***0110	
		V _{in} S1	***0111	
		V _{in} S2	***0011	
		V _{in} S3	***0010	
		V _{in} E3	***0001	
		V _{in} E4	***0101	
		V _{in} E4	***0100	
14-(4)	Video Frequency Response (Clamp Off) (Sub)	V _{in} E2	DATA 3	(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	***0110	
		V _{in} S1	***0111	
		V _{in} S2	***0011	
		V _{in} S3	***0010	
		V _{in} E3	***0001	
		V _{in} E4	***0101	
		V _{in} E4	***0100	

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25 ± 3°C)		MEASUREMENT METHOD
		SW & VR MODE	DATA 2	
15-(1)	Y / C Frequency Response (Main)	SW MODE	DATA 2	Measure the amplitude in the same way using pin 44.
		S9-a, others-b/off	11111011	
		S15-a, others-b/off	11111010	
		S21-a, others-b/off	11111001	
		S48-a, others-b/off	0101****	
		S50-a, others-b/off	0100****	
		C _{in} S1	11111011	
		C _{in} S2	11111010	
		C _{in} S3	11111001	
		C _{in} 1	0101****	
15-(2)	Y / C Frequency Response (Sub)	SW MODE	DATA 3	Measure the amplitude in the same way using pin 34.
		S9-a, others-b/off	11111011	
		S15-a, others-b/off	11111010	
		S21-a, others-b/off	11111001	
		S38-a, others-b/off	0101****	
		S53-a, others-b/off	0100****	
		C _{in} S1	11111011	
		C _{in} S2	11111010	
		C _{in} S3	11111001	
		C _{in} 2	0101****	
16-(1)	S Video Frequency Response (Main)	SW MODE	DATA 2	Measure the amplitude in the same way using pin 46.
		S9-a, others-b/off	11111011	
		S15-a, others-b/off	11111010	
		S21-a, others-b/off	11111001	
		S11-a, others-b/off	11111011	
		S17-a, others-b/off	11111010	
		S23-a, others-b/off	11111001	
		S30-a, others-b/off	0101****	
		C _{in} S1	11111011	
		C _{in} S3	11111001	
16-(2)	S Video Frequency Response (Sub)	SW MODE	DATA 3	Measure the amplitude in the same way using pin 36.
		S9-a, others-b/off	11111011	
		S15-a, others-b/off	11111010	
		S21-a, others-b/off	11111001	
		S11-a, others-b/off	11111011	
		S17-a, others-b/off	11111010	
		S23-a, others-b/off	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		MEASUREMENT METHOD		
		SW MODE	DATA 2			
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		
		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		Measure the amplitude in the same way using pin 42.
		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				

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25 ± 3°C)		MEASUREMENT METHOD		
		SW & VR MODE	DATA 3			
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			
		V _{out} 1 Output	DATA 2 ****0110			(1) Measure the voltage V _{CO} on pin 46 during no-signal intervals. (2) Input a V ₁ NTSC signal. (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%
		18	Clamp Level			
V _{out} 2 Output	DATA 3 ***0110			Measure the V _{CO} level in the same way using pin 36.		

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	L _{in} E2 L _{in} E1 L _{in} S1 L _{in} S2 L _{in} S3 L _{in} E3 L _{in} E4	S1-a , others-b / off	****0110	(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)
		S4-a , others-b / off	****0111	
		S8-a , others-b / off	****0011	
		S14-a , others-b / off	****0010	
		S20-a , others-b / off	****0001	
		S51-a , others-b / off	****0101	
		S54A-a, others-b / off	****0100	
		DATA 3		
	L _{in} E2 L _{in} E1 L _{in} S1 L _{in} S2 L _{in} S3 L _{in} E3 L _{in} E4	S1-a , others-b / off	****0110	Measure the amplitude in the same way using pin 35. (Data 1 D ₀₁ = 0 : mute off)
		S4-a , others-b / off	****0111	
		S8-a , others-b / off	****0011	
		S14-a , others-b / off	****0010	
		S20-a , others-b / off	****0001	
		S51-a , others-b / off	****0101	
		S54A-a, others-b / off	****0100	
		DATA 2, 3		
	L _{in} E1	S4-a , others-b / off	*****	Measure the amplitude 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
19	Audio R Dynamic Range	SW MODE	DATA 2
		S3-a , others-b / off	****0110
		S6-a , others-b / off	****0111
		S10-a , others-b / off	****0011
		S16-a , others-b / off	****0010
		S22-a , others-b / off	****0001
		S49-a , others-b / off	****0101
		S52A-a , others-b / off	****0100
		DATA 3	
		S3-a , others-b / off	****0110
	S6-a , others-b / off	****0111	
	S10-a , others-b / off	****0011	
	S16-a , others-b / off	****0010	
	S22-a , others-b / off	****0001	
	S49-a , others-b / off	****0101	
	S52A-a , others-b / off	****0100	
	DATA 2, 3		
	R _{in} E2	Measure the amplitude in the same way using pin 43. (Data 1 D ₀₀ = 0 : mute off)	
	R _{in} E1		
R _{in} E1	Measure the amplitude in the same way using pin 33. (Data 1 D ₀₁ = 0 : mute off)		
R _{in} E1	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		
20	Audio L Gain	L _{in} E2	S1-a, others-b/off	****0110	(1) V ₂ 1kHz, 1V _{p-p} input. (2) For each, measure the output amplitude on pin 45 to find the gain. (Data 1 D ₀₀ = 0 : mute off)
		L _{in} E1	S4-a, others-b/off	****0111	
		L _{in} S1	S8-a, others-b/off	****0011	
		L _{in} S2	S14-a, others-b/off	****0010	
		L _{in} S3	S20-a, others-b/off	****0001	
		L _{in} E3	S51-a, others-b/off	****0101	
		L _{in} E4	S54A-a, others-b/off	****0100	
			DATA 3		
	L _{in} E2	S1-a, others-b/off	****0110	Find the gain in the same way using pin 35. (Data 1 D ₀₁ = 0 : mute off)	
	L _{in} E1	S4-a, others-b/off	****0111		
	L _{in} S1	S8-a, others-b/off	****0011		
	L _{in} S2	S14-a, others-b/off	****0010		
	L _{in} S3	S20-a, others-b/off	****0001		
	L _{in} E3	S51-a, others-b/off	****0101		
L _{in} E4	S54A-a, others-b/off	****0100			
	DATA 2, 3				
	L _{in} E1	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, Ta = 25 ± 3°C)	
		SW & VR MODE	MEASUREMENT METHOD
20	Audio R Gain	SW MODE	
		R _{in} E2	DATA 2
		R _{in} E1	***0110
		R _{in} S1	***0111
		R _{in} S2	***0011
		R _{in} S3	***0010
		R _{in} E3	***0001
		R _{in} E4	***0101
			***0100
			DATA 3
			***0110
			***0111
			***0011
			***0010
			***0001
	***0101		
	***0100		
	DATA 2, 3		

	S _{3-a} , others-b / off	Find the gain in the same way using pin 43. (Data 1 D ₀₀ = 0 : mute off)	
	S _{6-a} , others-b / off		
	S _{10-a} , others-b / off		
	S _{16-a} , others-b / off		
	S _{22-a} , others-b / off		
	S _{49-a} , others-b / off		
	S _{52A-a} , others-b / off		
	S _{3-a} , others-b / off		
	S _{6-a} , others-b / off		
	S _{10-a} , others-b / off		
	S _{16-a} , others-b / off		
	S _{22-a} , others-b / off		
	S _{49-a} , others-b / off		
	S _{52A-a} , others-b / off		
	S _{6-a} , others-b / off	Find the gain in the same way using pin 39. (Data 1 D ₀₁ = 0 : mute off)	

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)		MEASUREMENT METHOD	
		SW & VR MODE	DATA 2		
21	Audio L Frequency Response	L _{in} E2 L _{in} E1 L _{in} S1 L _{in} S2 L _{in} S3 L _{in} E3 L _{in} E4	S1-a , others-b/off S4-a , others-b/off S8-a , others-b/off S14-a , others-b/off S20-a , others-b/off S51-a , others-b/off S54A-a, others-b/off	DATA 2 ***0110 ***0111 ***0011 ***0010 ***0001 ***0101 ***0100	(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 D ₀₀ = 0 : mute off)
		L _{in} E2 L _{in} E1 L _{in} S1 L _{in} S2 L _{in} S3 L _{in} E3 L _{in} E4	S1-a , others-b/off S4-a , others-b/off S8-a , others-b/off S14-a , others-b/off S20-a , others-b/off S51-a , others-b/off S54A-a, others-b/off	DATA 3 ***0110 ***0111 ***0011 ***0010 ***0001 ***0101 ***0100	Measure the amplitude in the same way using pin 35. (Data 1 D ₀₁ = 0 : mute off)
		L _{in} E1	S4-a , others-b/off	DATA 2, 3 *****	Measure the amplitude in the same way using pin 41. (Data 1 D ₀₂ = 0 : mute off)

NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25 ± 3°C)		MEASUREMENT METHOD	
		SW & VR MODE	DATA 2		
21	Audio R Frequency Response	R _{in} E2 R _{in} E1 R _{in} S1 R _{in} S2 R _{in} S3 R _{in} E3 R _{in} E4	SW MODE S3-a , others-b /off S6-a , others-b /off S10-a , others-b /off S16-a , others-b /off S22-a , others-b /off S49-a , others-b /off S52A-a, others-b /off	DATA 2 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	Measure the amplitude in the same way using pin 43. (Data 1 D ₀₀ = 0 : mute off)
		R _{in} E2 R _{in} E1 R _{in} S1 R _{in} S2 R _{in} S3 R _{in} E3 R _{in} E4	SW MODE S3-a , others-b /off S6-a , others-b /off S10-a , others-b /off S16-a , others-b /off S22-a , others-b /off S49-a , others-b /off S52A-a, others-b /off	DATA 3 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	
	R _{in} E1	SW MODE S4-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		
22	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	***0110	(1) V ₂ 1kHz, 1V _{p-p} input. (2) While sequentially switching S1, S3, S4, S6, 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 1 D ₀₀ = 0 : mute off)	
		All-b/off except those specified on the left	***0111		
		All-b/off except those specified on the left	***0011		
		All-b/off except those specified on the left	***0010		
		All-b/off except those specified on the left	***0001		
		All-b/off except those specified on the left	***0101		
		All-b/off except those specified on the left	***0100		
		L Switch Crosstalk	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			***0111	
			All-b/off except those specified on the left	***0011	
		All-b/off except those specified on the left	***0010		
		All-b/off except those specified on the left	***0001		
		All-b/off except those specified on the left	***0101		
		All-b/off except those specified on the left	***0100		

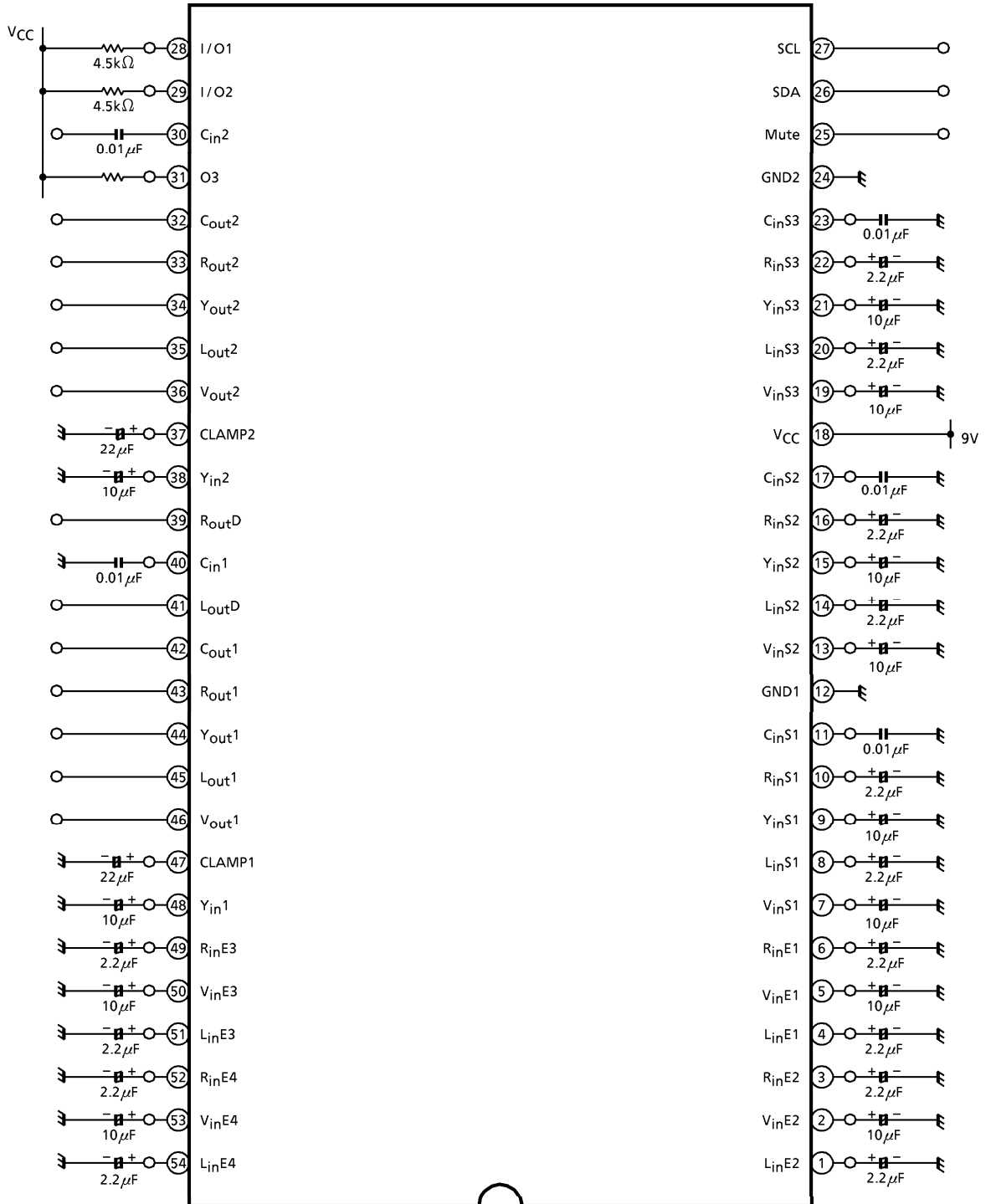
NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25 ± 3°C)		MEASUREMENT METHOD
		SW & VR MODE		
		SW MODE	DATA 2	
22	R Switch Crosstalk	R _{in} E2	All-b/off except those specified on the left ****0110	Measure the maximum level of crosstalk in the same way using pin 43. (Data 1 D ₀₀ = 0 : mute off)
		R _{in} E1	All-b/off except those specified on the left ****0111	
		R _{in} S1	All-b/off except those specified on the left ****0011	
		R _{in} S2	All-b/off except those specified on the left ****0010	
		R _{in} S3	All-b/off except those specified on the left ****0001	
		R _{in} E3	All-b/off except those specified on the left ****0101	
		R _{in} E4	All-b/off except those specified on the left ****0100	
			DATA 3	
	R _{in} E2	All-b/off except those specified on the left ****0110	Measure the maximum level of crosstalk in the same way using pin 33. (Data 1 D ₀₁ = 0 : mute off)	
	R _{in} E1	All-b/off except those specified on the left ****0111		
	R _{in} S1	All-b/off except those specified on the left ****0011		
	R _{in} S2	All-b/off except those specified on the left ****0010		
R _{in} S3	All-b/off except those specified on the left ****0001			
R _{in} E3	All-b/off except those specified on the left ****0101			
R _{in} E4	All-b/off except those specified on the left ****0100			
	DATA 2, 3			
TV-L Crosstalk	All-b/off except those specified on the left *****	Measure the maximum level of crosstalk in the same way using pin 41. (Data 1 D ₀₂ = 0 : mute off)		
TV-R Crosstalk	All-b/off except those specified on the left *****	Measure the maximum level of crosstalk 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	DATA 2, 3	
23	L Switch Mute Attenuation	SW MODE		(1) V ₂ 1kHz, 1V _{p-p} input. (2) Mute on (data 1 D ₀₀ = 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.
		All-b/off except those specified on the left	*****	Measure the maximum level of crosstalk in the same way using pin 35. (Data 1 D ₀₁ = 1 : mute on)
		All-b/off except those specified on the left	*****	Measure the maximum level of crosstalk in the same way using pin 43. (Data 1 D ₀₀ = 1 : mute on)
		All-b/off except those specified on the left	*****	Measure the maximum level of crosstalk in the same way using pin 33. (Data 1 D ₀₁ = 1 : mute on)
	R Switch Mute Attenuation	All-b/off except those specified on the left	*****	Measure the maximum level of crosstalk in the same way using pin 33. (Data 1 D ₀₁ = 1 : mute on)

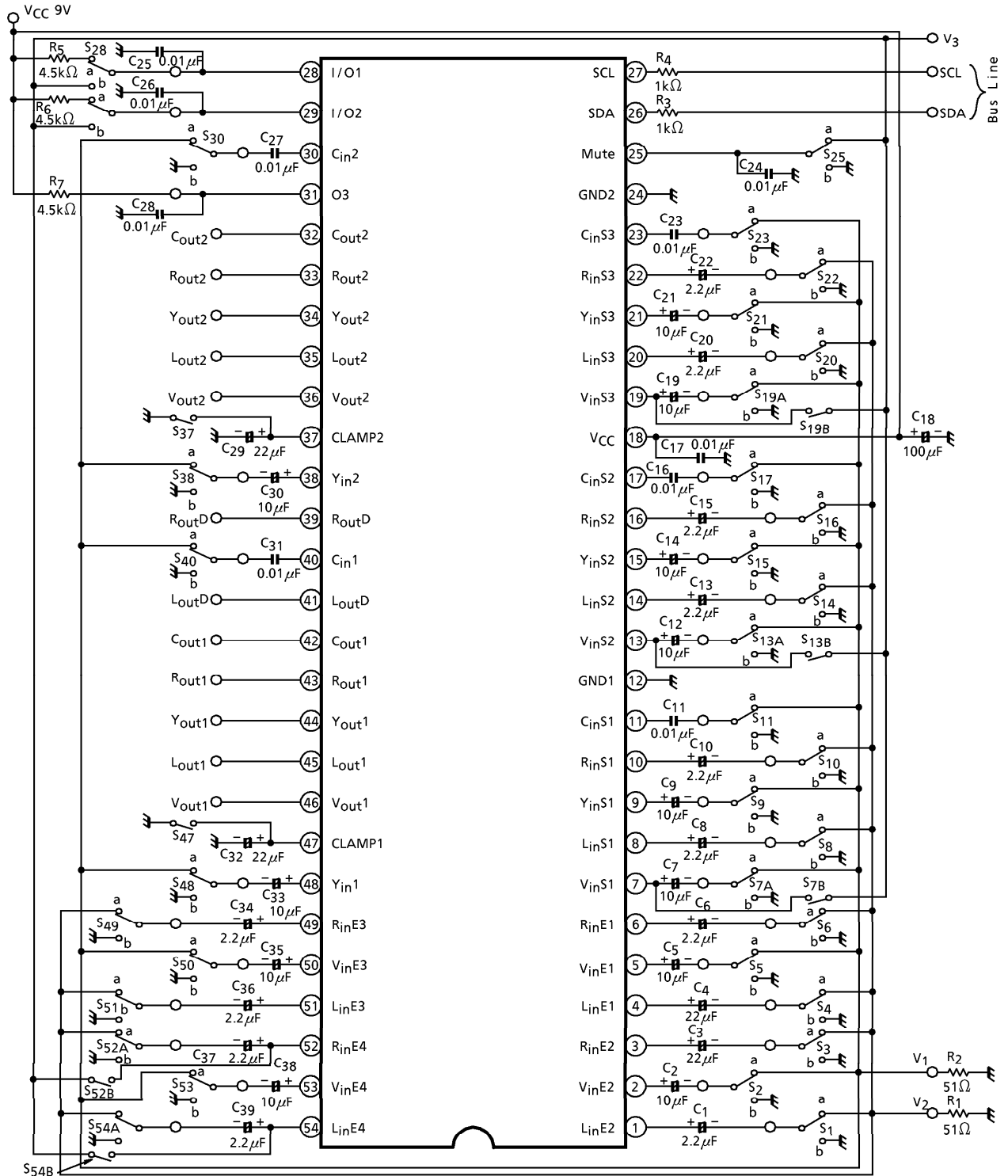
NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, T _a = 25 ± 3°C)		
		SW & VR MODE		MEASUREMENT METHOD
		SW MODE	DATA 2, 3	
24 Mode Switching Offset	L _{in} E2	All-b / off	***0110	(1) No-signal input. (2) Measure voltage fluctuations to find the maximum value in all input modes 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, Ta = 25 ± 3°C)		MEASUREMENT METHOD	
		SW & VR MODE	DATA 2, 3		
25	S Input Discriminating Voltage	V _{in} S1	S9-a, S7B-on, others-b/off	***0011	(1) V ₁ 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 D00, D01, D02 = 0 : mute off)
		V _{in} S2	S15-a, S13B-on, others-b/off	***0010	
		V _{in} S3	S21-a, S19B-on, others-b/off	***0001	
26	I Input Discriminating Voltage	I/O1	S28-a , others-b/off	*****	While gradually lowering the V ₃ voltage, find the voltage at which the data of B34, B35, B36, and B37 changes from 0 to 1, respectively. (Data 1 D03, D04 = 1 : I MODE)
		I/O2	S29-a , others-b/off	*****	
		R _{in} E4	S52B-on , others-b/off	*****	
		L _{in} E4	S54B-on , others-b/off	*****	
27	External Mute-ON Voltage	Mute	S4, S25-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	I/O1	All-b/off	*****	Find the voltage on pins 28, 29, and 31 when the data D03, D04, and D05 are 0, respectively.
		I/O2	All-b/off	*****	
		O3	All-b/off	*****	

TEST CIRCUIT 1
DC characteristics

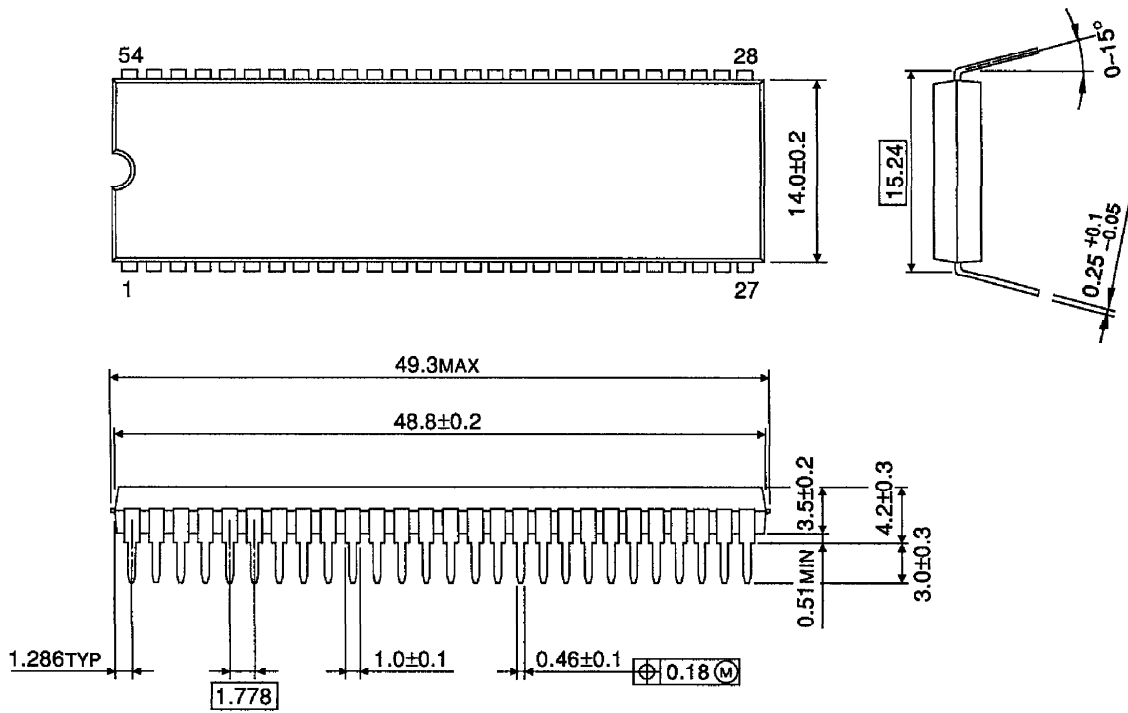


TEST CIRCUIT 2
AC characteristics



OUTLINE DRAWING
SDIP54-P-600-1.78

Unit : mm



Weight : 1.0g (Typ.)