

TOSHIBA BIPOLAR LINEAR INTEGRATED CIRCUIT SILICON MONOLITHIC

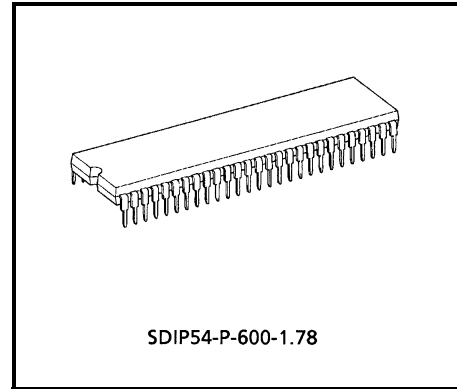
TA8851BNG,TA8851CNG

AUDIO / VIDEO SWITCH IC FOR TV WITH S-TERMINALS

The TA8851BNG / CNG 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 TA8851BNG / CNG allows you to configure a PIP system input switching circuit easily.

The TA8851BNG / CNG can be interfaced easily to a microcontroller via the I²C bus.

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



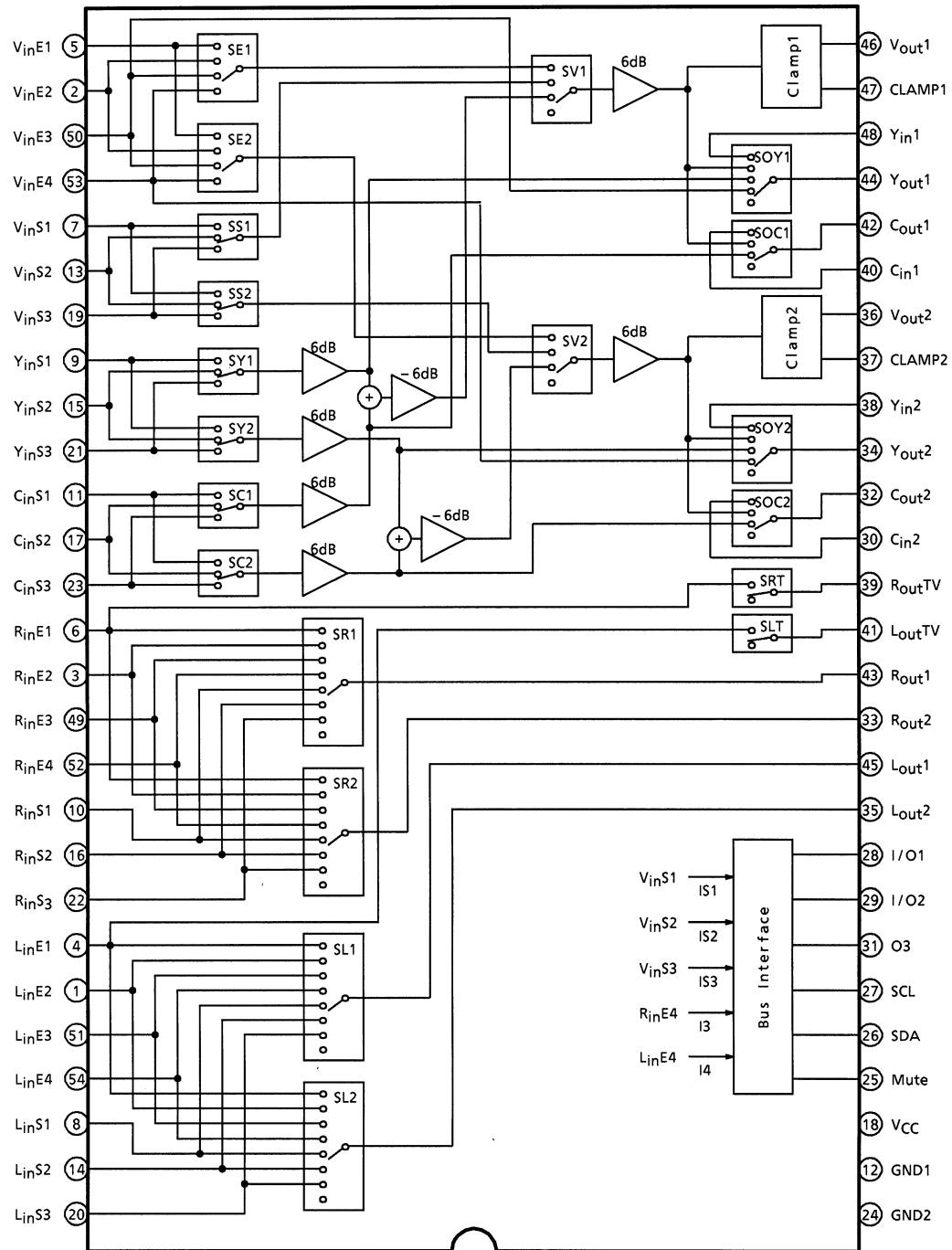
Weight: 5.44 g (Typ.)

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)

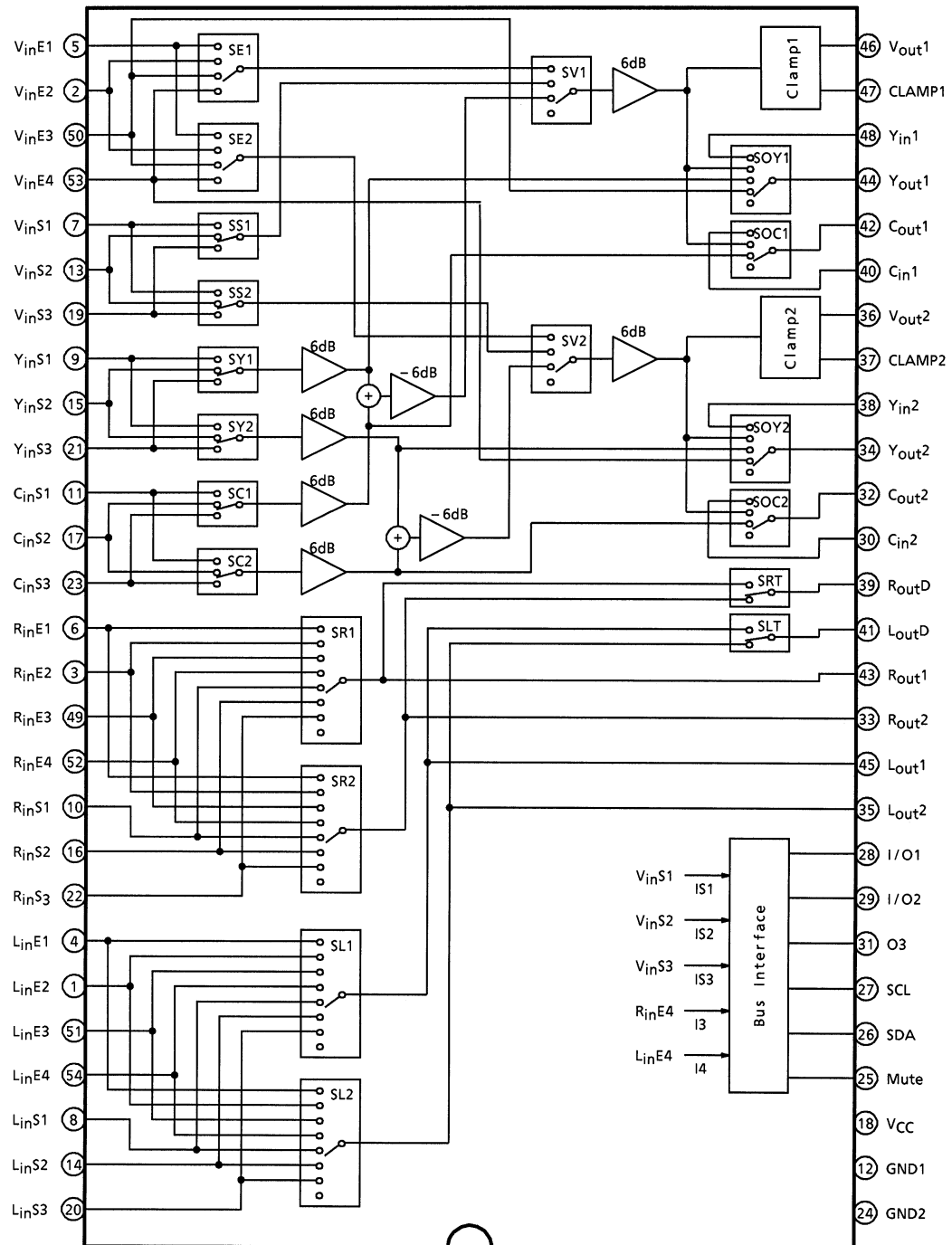
BLOCK DIAGRAM

TA8851BNG

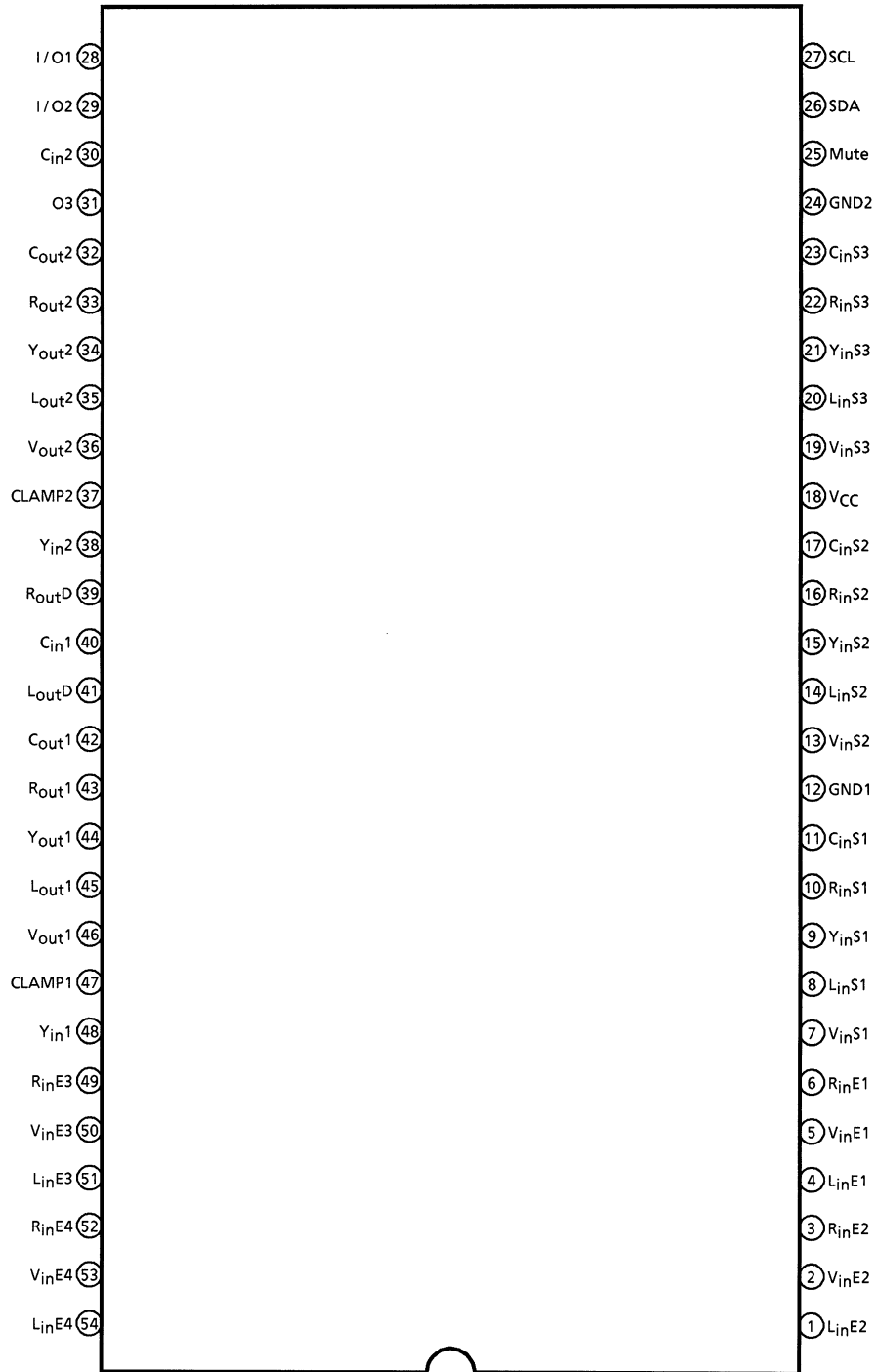


BLOCK DIAGRAM

TA8851CNG



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: 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: R _{out2} 35: L _{out2} 39: R _{outD} / R _{outTV} 41: L _{outD} / L _{outTV} 43: R _{out1} 45: L _{out1}	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	D ₀₇	D ₀₆	D ₀₅	D ₀₄	D ₀₃	D ₀₂	D ₀₁	D ₀₀
	TA8851BNG	—		DAC Output (0) (1) (1)			Sound Mute (1) (1) (1)		
	TA8851CNG						Dual Sound Output (1)	Sound Mute (1) (1)	
	Data 2 (main)	D ₁₇	D ₁₆	D ₁₅	D ₁₄	D ₁₃	D ₁₂	D ₁₁	D ₁₀
						F.VIDEO (0)			
	Data 3(sub)	D ₂₇	D ₂₆	D ₂₅	D ₂₄	D ₂₃	D ₂₂	D ₂₁	D ₂₀
		Y / C Output Switching (0) (0) (0) (0)				F.VIDEO (0)	Output Switching (0) (0) (0)		
Read	Data 4	D ₃₇	D ₃₆	D ₃₅	D ₃₄	D ₃₃	D ₃₂	D ₃₁	D ₃₀
		ADC Ident (0) (0) (0) (0)				S Input Ident (0) (0) (0)			P.O.R (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 _{in} E1	R _{in} E1	L _{in} E1
	E2		—	1	1	0	—	—	—	V _{in} E2	R _{in} E2	L _{in} E2
	E3		—	1	0	1	—	—	—	V _{in} E3	R _{in} E3	L _{in} E3
	E4		—	1	0	0	—	—	—	V _{in} E4	R _{in} E4	L _{in} E4
	S1	V	0	0	1	1	0	—	—	V _{in} S1	R _{in} S1	L _{in} S1
		S	1				—			Y _{in} S1 + C _{in} S1		
			—				1					
	S2	V	0	0	1	0	—	0	—	V _{in} S2	R _{in} S2	L _{in} S2
		S	1					—		Y _{in} S2 + C _{in} S2		
			—					1				
	S3	V	0	0	0	1	—	—	0	V _{in} S3	R _{in} S3	L _{in} S3
		S	1						—	Y _{in} S3 + C _{in} S3		
			—						1			
	Mute			—	0	0	0	—	—	—	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 _{in} E1	R _{in} E1	L _{in} E1
	E2		—	1	1	0	—	—	—	V _{in} E2	R _{in} E2	L _{in} E2
	E3		—	1	0	1	—	—	—	V _{in} E3	R _{in} E3	L _{in} E3
	E4		—	1	0	0	—	—	—	V _{in} E4	R _{in} E4	L _{in} E4
	S1	V	0	0	1	1	0	—	—	V _{in} S1	R _{in} S1	L _{in} S1
		S	1				—			Y _{in} S1 + C _{in} S1		
			—				1					
	S2	V	0	0	1	0	—	0	—	V _{in} S2	R _{in} S2	L _{in} S2
		S	1					—		Y _{in} S2 + C _{in} S2		
			—					1				
	S3	V	0	0	0	1	—	—	0	V _{in} S3	R _{in} S3	L _{in} S3
		S	1						—	Y _{in} S3 + C _{in} S3		
			—						1			
	Mute			—	0	0	0	—	—	—	Mute	Mute

Output switching (Dual sound output) : This table is only applied for TA8851CNG.

MODE		BUS DATA	OUTPUT SIGNAL	
		D ₀₂	R _{out} TV	L _{out} TV
TV	Main	1	R _{out1}	L _{out1}
	Sub	0	R _{out2}	L _{out2}

Y / C output switching (main)

MODE		BUS DATA				OUTPUT SIGNAL	
		D17	D16	D15	D14	Y _{out} 1	C _{out} 1
Y	S-terminal Input	EXCEPT 0 0		1	1	Y _{in} S1 to Y _{in} S3 (*1)	—
	Video Input			1	0	V _{out} 1	
	Comb1			0	1	Y _{in} 1	
	Comb2			0	0	V _{in} E3	
C	S-terminal Input	1	1	—	—	—	C _{in} S1 to C _{in} S3 (*2)
	Video Input	1	0				V _{out} 1
	Comb	0	1				C _{in} 1
Mute		0	0	—	—	Mute	Mute

* 1: SY1 switches between Y_{in}S1~Y_{in}S3

* 2: SC1 switches between C_{in}S1~C_{in}S3

Y / C output switching (sub)

MODE		BUS DATA				OUTPUT SIGNAL	
		D27	D26	D25	D24	Y _{out} 2	C _{out} 2
Y	S-terminal Input	EXCEPT 0 0		1	1	Y _{in} S1 to Y _{in} S3 (*1)	—
	Video Input			1	0	V _{out} 2	
	Comb1			0	1	Y _{in} 2	
	Comb2			0	0	V _{in} E4	
C	S-terminal Input	1	1	—	—	—	C _{in} S1 to C _{in} S3 (*2)
	Video Input	1	0				V _{out} 2
	Comb	0	1				C _{in} 2
Mute		0	0	—	—	Mute	Mute

* 1: SY2 switches between Y_{in}S1~Y_{in}S3

* 2: SC2 switches between C_{in}S1~C_{in}S3

Mute mode

MODE			BUS		PIN 25	VIDEO OUTPUT				SOUND OUTPUT		
			BIT	DATA		MAIN		SUB		MAIN	SUB	Dual
						V _{out1}	Y _{out1} C _{out1}	V _{out2}	Y _{out2} C _{out2}	R _{out1} L _{out1}	R _{out2} L _{out2}	R _{outD} L _{outD}
Ext Mute			—	—	High level	—	—	—	—	Mute	Mute	Mute
Bus Line Mute	Sound Mute SW	Main	D ₀₀	1	—	—	—	—	—	Mute	—	—
		Sub	D ₀₁	1	—	—	—	—	—	—	Mute	—
		TV (*)	D ₀₂	1	—	—	—	—	—	—	—	Mute
	Video & Sound Mute SW	Main	D ₁₀ D ₁₁ D ₁₂	0 0 0	—	Mute	—	—	—	Mute	—	—
		Sub	D ₂₀ D ₂₁ D ₂₂	0 0 0	—	—	—	Mute	—	—	Mute	—
		Y / C main	D ₁₄ D ₁₅	0 0	—	—	Mute	—	—	—	—	—
		Y / C Sub	D ₂₄ D ₂₅	0 0	—	—	—	—	Mute	—	—	—

*: TV mode is only applied for TA8851BNG

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

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

**Read mode
S-Output ident**

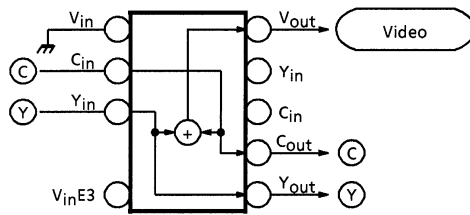
TERMINAL	INPUT	BUS	
		BIT	DATA
VinS1	L	D31	1
	H		0
VinS2	L	D32	1
	H		0
VinS3	L	D33	1
	H		0

ADC ident

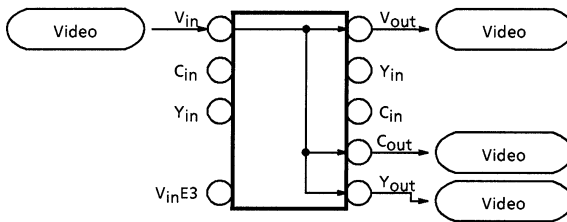
TERMINAL	INPUT	BUS	
		BIT	DATA
I / O1	L	D34	1
	H		0
I / O2	L	D35	1
	H		0
I3	L	D36	1
	H		0
I4	L	D37	1
	H		0

MODE EXPLANATION

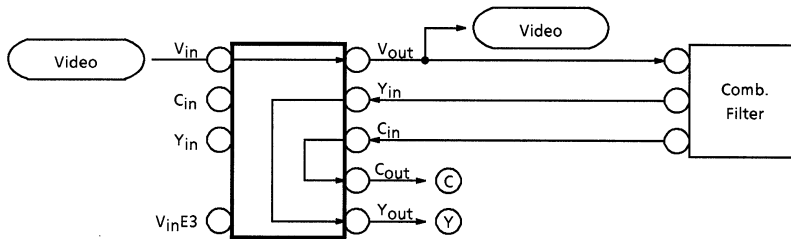
<S-terminal input mode>



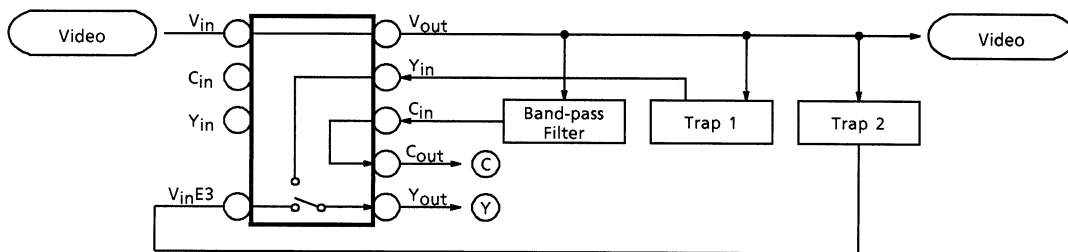
<Video input mode>



<Comb.1 input mode>

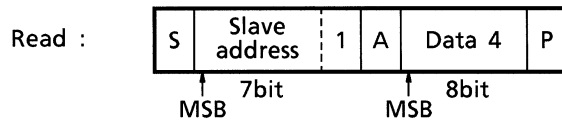
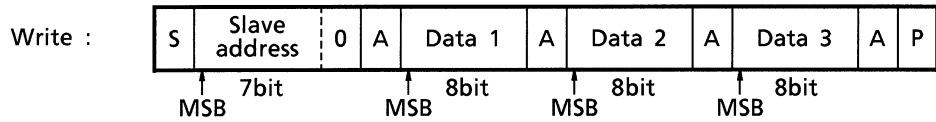


<Comb.2 input mode>



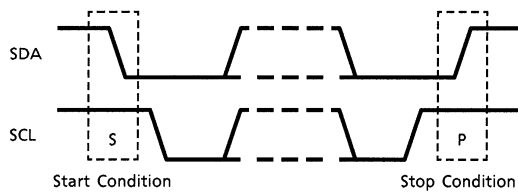
I²C BUS CONTROLLED FORMAT SUMMARY

Data transfer format

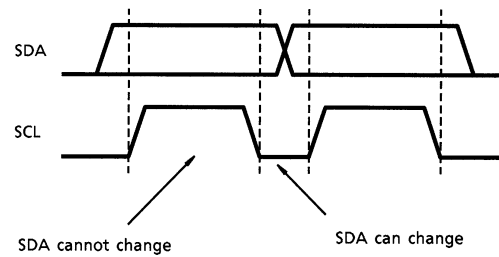


S : Start Condition
P : Stop Condition
A : Acknowledge

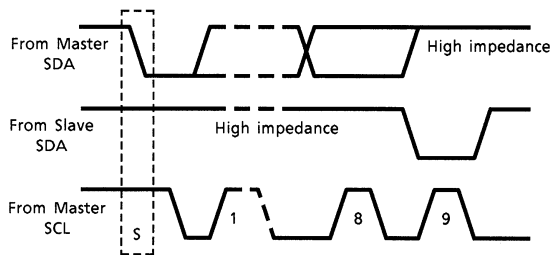
(1) Start condition, stop condition



(2) Bit transfer



(3) Acknowledge



(4) Slave address

A ₆	A ₅	A ₄	A ₃	A ₂	A ₁	A ₀	R / $\overline{W}$
1	0	0	1	0	0	0	1/0

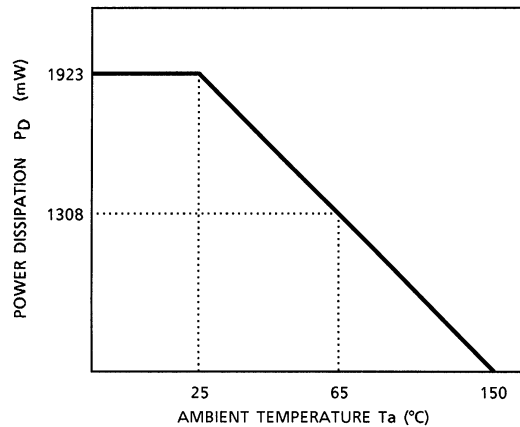
I²C BUS Conditions

Characteristics	Symbol	Min	Typ.	Max	Unit
Low level input voltage	V _{IL}	0	—	1.5	V
High level input voltage	V _{IH}	2.7	—	V _{CC}	V
Low level output voltage at 3 mA sink current	V _{OL1}	0	—	0.4	V
Input current each I/O pin with an input voltage between 0.1 V _{DD} and 0.9 V _{DD}	I _I	-10	—	10	μA
Capacitance for each I/O pin	C _I	—	—	10	pF
SCL clock frequency	f _{SCL}	0	—	100	kHz
Hold time START condition	t _{HD;STA}	4.0	—	—	μs
Low period of SCL clock	t _{LOW}	4.7	—	—	μs
High period of SCL clock	t _{HIGH}	4.0	—	—	μs
Set-up time for a repeated START condition	t _{SU;STA}	4.7	—	—	μs
Data hold time	t _{HD;DAT}	100	—	—	ns
Data set-up time	t _{SU;DAT}	250	—	—	ns
Set-up time for STOP condition	t _{SU;STO}	4.0	—	—	μs
Bus free time between a STOP and START condition	t _{BUF}	4.7	—	—	μs

MAXIMUM RATINGS (Ta = 25°C)

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V_{CC}	13	V
Input pin voltage	V_{in}	GND – 0.3~ $V_{CC} + 0.3$	V
Power Dissipation	P_{Dmax}	1923 (Note)	mW
Operating Temperature	T_{opr}	–20~65	°C
Storage Temperature	T_{stg}	–55~150	°C

Note: When using the device at above $T_a = 25^{\circ}\text{C}$, 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 _{out} 1	V ₄₄	1	—	3.4	3.7	4.0	V
45	L _{out} 1	V ₄₅		—	3.7	4.0	4.3	
46	V _{out} 1	V ₄₆		—	2.3	2.8	3.3	
47	CLAMP1	V ₄₇		—	2.7	3.2	3.7	
48	Y _{in} 1	V ₄₈		—	5.0	5.2	5.4	
49	R _{in} E3	V ₄₉		—	5.0	5.2	5.4	
50	V _{in} E3	V ₅₀		—	5.0	5.2	5.4	
51	L _{in} E3	V ₅₁		—	5.0	5.2	5.4	
52	R _{in} E4	V ₅₂		—	5.0	5.2	5.4	
53	V _{in} E4	V ₅₃		—	5.0	5.2	5.4	
54	L _{in} E4	V ₅₄		—	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 other wise 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	
	R _{S-Y / C}		—	40	80	120	
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}			-0.5	0	0.5	
	(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}			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	—	—
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}			9.0	—	—	
	(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 CONDITION

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	
1-(1)	V Input Dynamic Range (Main)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , others-b / off S_{5-a} , others-b / off S_{7A-a} , others-b / off S_{13A-a} , others-b / off S_{19A-a} , others-b / off S_{50-a} , others-b / off S_{53-a} , others-b / off	****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	(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.
1-(2)	V Input Dynamic Range (Sub)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , others-b / off S_{5-a} , others-b / off S_{7A-a} , others-b / off S_{13A-a} , others-b / off S_{19A-a} , others-b / off S_{50-a} , others-b / off S_{53-a} , others-b / off	DATA 3 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	(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.
1-(3)	V Input Dynamic Range (Clamp Off) (Main)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , S_{47-on} , others-b / off S_{5-a} , S_{47-on} , others-b / off S_{7A-a} , S_{47-on} , others-b / off S_{13A-a} , S_{47-on} , others-b / off S_{19A-a} , S_{47-on} , others-b / off S_{50-a} , S_{47-on} , others-b / off S_{53-a} , S_{47-on} , others-b / off	DATA 2 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	(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.
1-(4)	V Input Dynamic Range (Clamp Off) (Sub)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , S_{37-on} , others-b / off S_{5-a} , S_{37-on} , others-b / off S_{7A-a} , S_{37-on} , others-b / off S_{13A-a} , S_{37-on} , others-b / off S_{19A-a} , S_{37-on} , others-b / off S_{50-a} , S_{37-on} , others-b / off S_{53-a} , S_{37-on} , others-b / off	DATA 3 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	(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.

NOTE	ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25±3°C)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
2-(1)	YC Input Dynamic Range (Main)	Y _{in} S1	S ₉ -a , others-b / off	11111011	Measure the amplitude in the same way using pin 44.
		Y _{in} S2	S ₁₅ -a , others-b / off	11111010	
		Y _{in} S3	S ₂₁ -a , others-b / off	11111001	
		Y _{in} 1 V _{in} E3	S ₄₈ -a , others-b / off S ₅₀ -a , others-b / off	0101**** 0100****	
		C _{in} S1	S ₁₁ -a , others-b / off	11111011	Measure the amplitude in the same way using pin 42.
		C _{in} S2	S ₁₇ -a , others-b / off	11111010	
		C _{in} S3	S ₂₃ -a , others-b / off	11111001	
		C _{in} 1	S ₄₀ -a , others-b / off	0101****	
2-(2)	YC Input Dynamic Range (Sub)	Y _{in} S1	S ₉ -a , others-b / off	DATA 3 11111011	Measure the amplitude in the same way using pin 34
		Y _{in} S2	S ₁₅ -a , others-b / off	11111010	
		Y _{in} S3	S ₂₁ -a , others-b / off	11111001	
		Y _{in} 2 V _{in} E4	S ₃₈ -a , others-b / off S ₅₃ -a , others-b / off	0101**** 0100****	
		C _{in} S1	S ₁₁ -a , others-b / off	11111011	Measure the amplitude in the same way using pin 32.
		C _{in} S2	S ₁₇ -a , others-b / off	11111010	
		C _{in} S3	S ₂₃ -a , others-b / off	11111001	
		C _{in} 2	S ₃₀ -a , others-b / off	0101****	
3-(1)	S Video Dynamic Range (Main)	Y _{in} S1	S ₉ -a , others-b / off	DATA 2 11111011	Measure the amplitude in the same way using pin 46.
		Y _{in} S2	S ₁₅ -a , others-b / off	11111010	
		Y _{in} S3	S ₂₁ -a , others-b / off	11111001	
		C _{in} S1	S ₁₁ -a , others-b / off	11111011	
		C _{in} S2	S ₁₇ -a , others-b / off	11111010	
		C _{in} S3	S ₂₃ -a , others-b / off	11111001	
3-(2)	S Video Dynamic Range (Sub)	Y _{in} S1	S ₉ -a , others-b / off	DATA 3 11111011	Measure the amplitude in the same way using pin 36.
		Y _{in} S2	S ₁₅ -a , others-b / off	11111010	
		Y _{in} S3	S ₂₁ -a , others-b / off	11111001	
		C _{in} S1	S ₁₁ -a , others-b / off	11111011	
		C _{in} S2	S ₁₇ -a , others-b / off	11111010	
		C _{in} S3	S ₂₃ -a , others-b / off	11111001	

NOTE	ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25±3°C)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
3-(3)	S Video Dynamic Range (Clamp Off) (Main)	Y _{in} S1	S ₉ -a , S ₄₇ -on, others-b / off	11111011	Measure the amplitude in the same way using pin 46.
		Y _{in} S2	S ₁₅ -a , S ₄₇ -on, others-b / off	11111010	
		Y _{in} S3	S ₂₁ -a , S ₄₇ -on, others-b / off	11111001	
		C _{in} S1	S ₁₁ -a , S ₄₇ -on, others-b / off	11111011	
		C _{in} S2	S ₁₇ -a , S ₄₇ -on, others-b / off	11111010	
		C _{in} S3	S ₂₃ -a , S ₄₇ -on, others-b / off	11111001	
3-(4)	S Video Dynamic Range (Clamp Off) (Sub)	Y _{in} S1	S ₉ -a , S ₃₇ -on, others-b / off	DATA 3	Measure the amplitude in the same way using pin 36.
		Y _{in} S2	S ₁₅ -a , S ₃₇ -on, others-b / off	11111011	
		Y _{in} S3	S ₂₁ -a , S ₃₇ -on, others-b / off	11111010	
		C _{in} S1	S ₁₁ -a , S ₃₇ -on, others-b / off	11111001	
		C _{in} S2	S ₁₇ -a , S ₃₇ -on, others-b / off	11111011	
		C _{in} S3	S ₂₃ -a , S ₃₇ -on, others-b / off	11111010	
4-(1)	B / W Mode Dynamic Range (Main)	V _{in} E2	S ₂ -a , others-b / off	DATA 2	Measure the amplitude in the same way using pins 44 and 42 to find the smaller one.
		V _{in} E1	S ₅ -a , others-b / off	10100110	
		V _{in} S1	S _{7A} -a , others-b / off	10100111	
		V _{in} S2	S _{13A} -a , others-b / off	10100011	
		V _{in} S3	S _{19A} -a , others-b / off	10100010	
		V _{in} E3	S ₅₀ -a , others-b / off	10100001	
		V _{in} E4	S ₅₃ -a , others-b / off	10100101	
				10100100	
4-(2)	B / W Mode Dynamic Range (Sub)	V _{in} E2	S ₂ -a , others-b / off	DATA 3	Measure the amplitude in the same way using pins 34 and 32 to find the smaller one.
		V _{in} E1	S ₅ -a , others-b / off	10100110	
		V _{in} S1	S _{7A} -a , others-b / off	10100111	
		V _{in} S2	S _{13A} -a , others-b / off	10100011	
		V _{in} S3	S _{19A} -a , others-b / off	10100010	
		V _{in} E3	S ₅₀ -a , others-b / off	10100001	
		V _{in} E4	S ₅₃ -a , others-b / off	10100101	
				10100100	

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	
5-(1)	Video Gain (Main)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , others-b / off S_{5-a} , others-b / off S_{7A-a} , others-b / off S_{13A-a} , others-b / off S_{19A-a} , others-b / off S_{50-a} , others-b / off S_{53-a} , others-b / off	****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	(1) V_1 15kHz, $1V_{p-p}$ input. (2) For each, measure the amplitude on pin 46 to find the gain.
5-(2)	Video Gain (Sub)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , others-b / off S_{5-a} , others-b / off S_{7A-a} , others-b / off S_{13A-a} , others-b / off S_{19A-a} , others-b / off S_{50-a} , others-b / off S_{53-a} , others-b / off	DATA 3 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	(1) V_1 15kHz, $1V_{p-p}$ input. (2) For each, measure the amplitude on pin 36 to find the gain.
5-(3)	Video Gain (Clamp Off) (Main)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , S_{47-on} , others-b / off S_{5-a} , S_{47-on} , others-b / off S_{7A-a} , S_{47-on} , others-b / off S_{13A-a} , S_{47-on} , others-b / off S_{19A-a} , S_{47-on} , others-b / off S_{50-a} , S_{47-on} , others-b / off S_{53-a} , S_{47-on} , others-b / off	DATA 2 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	(1) V_1 15kHz, $1V_{p-p}$ input. (2) For each, measure the amplitude on pin 46 to find the gain.
5-(4)	Video Gain (Clamp Off) (Sub)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , S_{37-on} , others-b / off S_{5-a} , S_{37-on} , others-b / off S_{7A-a} , S_{37-on} , others-b / off S_{13A-a} , S_{37-on} , others-b / off S_{19A-a} , S_{37-on} , others-b / off S_{50-a} , S_{37-on} , others-b / off S_{53-a} , S_{37-on} , others-b / off	DATA 3 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	(1) V_1 15kHz, $1V_{p-p}$ input. (2) For each, measure the amplitude on pin 36 to find the gain.

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 Y _{in} S2 Y _{in} S3	S _{9-a} , others-b / off S _{15-a} , others-b / off S _{21-a} , others-b / off	11111011 11111010 11111001	Measure the amplitude in the same way using pin 44.
		Y _{in} 1 V _{in} E3	S _{48-a} , others-b / off S _{50-a} , others-b / off	0101**** 0100****	
		C _{in} S1 C _{in} S2 C _{in} S3	S _{11-a} , others-b / off S _{17-a} , others-b / off S _{23-a} , others-b / off	11111011 11111010 11111001	Measure the amplitude in the same way using pin 42.
		C _{in} 1	S _{40-a} , others-b / off	0101****	
6-(2)	Y / C Gain (Sub)	Y _{in} S1 Y _{in} S2 Y _{in} S3	S _{9-a} , others-b / off S _{15-a} , others-b / off S _{21-a} , others-b / off	DATA 3 11111011 11111010 11111001	Measure the amplitude in the same way using pin 34
		Y _{in} 2 V _{in} E4	S _{38-a} , others-b / off S _{53-a} , others-b / off	0101**** 0100****	
		C _{in} S1 C _{in} S2 C _{in} S3	S _{11-a} , others-b / off S _{17-a} , others-b / off S _{23-a} , others-b / off	11111011 11111010 11111001	Measure the amplitude in the same way using pin 32.
		C _{in} 2	S _{30-a} , others-b / off	0101****	
7-(1)	S Video Gain (Main)	Y _{in} S1 Y _{in} S2 Y _{in} S3	S _{9-a} , others-b / off S _{15-a} , others-b / off S _{21-a} , others-b / off	DATA 2 11111011 11111010 11111001	Measure the amplitude in the same way using pin 46.
		C _{in} S1 C _{in} S2 C _{in} S3	S _{11-a} , others-b / off S _{17-a} , others-b / off S _{23-a} , others-b / off	11111011 11111010 11111001	
7-(2)	S Video Gain (Sub)	Y _{in} S1 Y _{in} S2 Y _{in} S3	S _{9-a} , others-b / off S _{15-a} , others-b / off S _{21-a} , others-b / off	DATA 3 11111011 11111010 11111001	Measure the amplitude in the same way using pin 36.
		C _{in} S1 C _{in} S2 C _{in} S3	S _{11-a} , others-b / off S _{17-a} , others-b / off S _{23-a} , others-b / off	11111011 11111010 11111001	

NOTE	ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25±3°C)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
7-(3)	S Video Gain (Clamp Off) (Sub)	Y _{in} S1	S _{9-a} , S _{37-on} , others-b / off	11111011	Measure the amplitude in the same way using pin 36.
		Y _{in} S2	S _{15-a} , S _{37-on} , others-b / off	11111010	
		Y _{in} S3	S _{21-a} , S _{37-on} , others-b / off	11111001	
		C _{in} S1	S _{11-a} , S _{37-on} , others-b / off	11111011	
		C _{in} S2	S _{17-a} , S _{37-on} , others-b / off	11111010	
		C _{in} S3	S _{23-a} , S _{37-on} , others-b / off	11111001	
7-(4)	S Video Gain (Clamp Off) (Main)	Y _{in} S1	S _{9-a} , S _{47-on} , others-b / off	DATA 3	Measure the amplitude in the same way using pin 46.
		Y _{in} S2	S _{15-a} , S _{47-on} , others-b / off	11111011	
		Y _{in} S3	S _{21-a} , S _{47-on} , others-b / off	11111010	
		C _{in} S1	S _{11-a} , S _{47-on} , others-b / off	11111001	
		C _{in} S2	S _{17-a} , S _{47-on} , others-b / off	11111011	
		C _{in} S3	S _{23-a} , S _{47-on} , others-b / off	11111010	
8-(1)	B / W Mode Gain (Main)	V _{in} E2	S _{2-a} , others-b / off	DATA 2	Measure the amplitude in the same way using pin 44.
		V _{in} E1	S _{5-a} , others-b / off	10100110	
		V _{in} S1	S _{7A-a} , others-b / off	10100111	
		V _{in} S2	S _{13A-a} , others-b / off	10100011	
		V _{in} S3	S _{19A-a} , others-b / off	10100010	
		V _{in} E3	S _{50-a} , others-b / off	10100001	
		V _{in} E4	S _{53-a} , others-b / off	10100101	
		V _{in} E2	S _{2-a} , others-b / off	10100100	Measure the amplitude in the same way using pin 42.
		V _{in} E1	S _{5-a} , others-b / off	10100110	
		V _{in} S1	S _{7A-a} , others-b / off	10100111	
		V _{in} S2	S _{13A-a} , others-b / off	10100011	
		V _{in} S3	S _{19A-a} , others-b / off	10100010	
		V _{in} E3	S _{50-a} , others-b / off	10100001	
		V _{in} E4	S _{53-a} , others-b / off	10100101	

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 3	
8-(2)	B / W Mode Gain (Sub)	$V_{in}E2$	S_{2-a} , others-b / off	10100110	Measure the amplitude in the same way using pin 34.
		$V_{in}E1$	S_{5-a} , others-b / off	10100111	
		$V_{in}S1$	S_{7A-a} , others-b / off	10100011	
		$V_{in}S2$	S_{13A-a} , others-b / off	10100010	
		$V_{in}S3$	S_{19A-a} , others-b / off	10100001	
		$V_{in}E3$	S_{50-a} , others-b / off	10100101	
		$V_{in}E4$	S_{53-a} , others-b / off	10100100	
		$V_{in}E2$	S_{2-a} , others-b / off	10100110	Measure the amplitude in the same way using pin 32.
		$V_{in}E1$	S_{5-a} , others-b / off	10100111	
		$V_{in}S1$	S_{7A-a} , others-b / off	10100011	
		$V_{in}S2$	S_{13A-a} , others-b / off	10100010	
		$V_{in}S3$	S_{19A-a} , others-b / off	10100001	
		$V_{in}E3$	S_{50-a} , others-b / off	10100101	
		$V_{in}E4$	S_{53-a} , others-b / off	10100100	

NOTE	ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25±3°C)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
9-(1)	V Switch Crosstalk (Main)	V _{in} E2	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 _{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	
9-(2)	V Switch Crosstalk (Sub)	V _{in} E2	All-b / off except those specified on the left	DATA 3	(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 _{in} E1	All-b / off except those specified on the left	****0110	
		V _{in} S1	All-b / off except those specified on the left	****0111	
		V _{in} S2	All-b / off except those specified on the left	****0011	
		V _{in} S3	All-b / off except those specified on the left	****0010	
		V _{in} E3	All-b / off except those specified on the left	****0001	
		V _{in} E4	All-b / off except those specified on the left	****0101	
		Y _{in} S1, C _{in} S1	All-b / off except those specified on the left	****0100	
		Y _{in} S2, C _{in} S2	All-b / off except those specified on the left	****1011	
		Y _{in} S3, C _{in} S3	All-b / off except those specified on the left	****1010	
10-(1)	Y Switch Crosstalk (Main)	Y _{in} S1	All-b / off except those specified on the left	DATA 2	Measure the maximum level of crosstalk in the same way using pin 44.
		Y _{in} S2	All-b / off except those specified on the left	11111011	
		Y _{in} S3	All-b / off except those specified on the left	11111010	
		Y _{in} 1	All-b / off except those specified on the left	11111001	
		V _{in} E3	All-b / off except those specified on the left	0101****	
				0100****	
10-(2)	Y Switch Crosstalk (Sub)	Y _{in} S1	All-b / off except those specified on the left	DATA 3	Measure the maximum level of crosstalk in the same way using pin 34.
		Y _{in} S2	All-b / off except those specified on the left	11111011	
		Y _{in} S3	All-b / off except those specified on the left	11111010	
		Y _{in} 2	All-b / off except those specified on the left	11111001	
		V _{in} E3	All-b / off except those specified on the left	0101****	
				0100****	

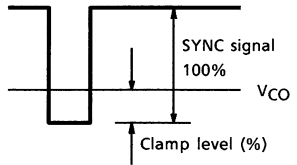
NOTE	ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, $V_{CC} = 9V$, $T_a = 25 \pm 3^\circ C$)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
11-(1)	C Switch Crosstalk (Main)	$C_{in}S1$ $C_{in}S2$ $C_{in}S3$ $C_{in}1$	All-b / off except those specified on the left All-b / off except those specified on the left tAll-b / off except those specified on the left tAll-b / off except those specified on the left	11111011 11111010 11111001 0101****	Measure the maximum level of crosstalk in the same way using pin 42.
11-(2)	C Switch Crosstalk (Sub)	$C_{in}S1$ $C_{in}S2$ $C_{in}S3$ $C_{in}1$	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 11111011 11111010 11111001 0101****	Measure the maximum level of crosstalk in the same way using pin 32.
12-(1)	V Switch Crosstalk (Clamp Off) (Main)	$V_{in}E2$ $V_{in}E1$ $V_{in}S1$ $V_{in}S2$ $V_{in}S3$ $V_{in}E3$ $V_{in}E4$ $Y_{in}S1, C_{in}S1$ $Y_{in}S2, C_{in}S2$ $Y_{in}S3, C_{in}S3$	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	DATA 2 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100 ****1011 ****1010 ****1001	(1) S_{47} -ON, $V_3 = 0V$. (2) Measure the maximum level of crosstalk in the same way using pin 46.
12-(2)	V Switch Crosstalk (Clamp Off) (Sub)	$V_{in}E2$ $V_{in}E1$ $V_{in}S1$ $V_{in}S2$ $V_{in}S3$ $V_{in}E3$ $V_{in}E4$ $Y_{in}S1, C_{in}S1$ $Y_{in}S2, C_{in}S2$ $Y_{in}S3, C_{in}S3$	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	DATA 3 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100 ****1011 ****1010 ****1001	(1) S_{37} -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, $V_{CC} = 9V$, $T_a = 25 \pm 3^\circ C$)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
13	Mute Attenuation	V_{out1} Output	All-b / off except those specified on the left	****0000	(1) V_1 3.58MHz, 1Vp-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.
		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	Measure the maximum level of crosstalk in the same way using pin 36.
				****0000	
		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	(1) S_{47} -ON, $V_3 = 0V$
				****0000	(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	(1) S_{47} -ON, $V_3 = 0V$
				****0000	(2) Measure the maximum level of crosstalk in the same way using pin 36.

NOTE	ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, $V_{CC} = 9V$, $T_a = 25 \pm 3^\circ C$)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
14-(1)	Video Frequency Response (Main)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , others-b / off S_{5-a} , others-b / off S_{7A-a} , others-b / off S_{13A-a} , others-b / off S_{19A-a} , others-b / off S_{50-a} , others-b / off S_{53-a} , others-b / off	****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	(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.
14-(2)	Video Frequency Response (Sub)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , others-b / off S_{5-a} , others-b / off S_{7A-a} , others-b / off S_{13A-a} , others-b / off S_{19A-a} , others-b / off S_{50-a} , others-b / off S_{53-a} , others-b / off	DATA 3 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	(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.
14-(3)	Video Frequency Response (Clamp Off) (Main)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , S_{47-on} , others-b / off S_{5-a} , S_{47-on} , others-b / off S_{7A-a} , S_{47-on} , others-b / off S_{13A-a} , S_{47-on} , others-b / off S_{19A-a} , S_{47-on} , others-b / off S_{50-a} , S_{47-on} , others-b / off S_{53-a} , S_{47-on} , others-b / off	DATA 2 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	(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.
14-(4)	Video Frequency Response (Clamp Off) (Sub)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , S_{37-on} , others-b / off S_{5-a} , S_{37-on} , others-b / off S_{7A-a} , S_{37-on} , others-b / off S_{13A-a} , S_{37-on} , others-b / off S_{19A-a} , S_{37-on} , others-b / off S_{50-a} , S_{37-on} , others-b / off S_{53-a} , S_{37-on} , others-b / off	DATA 3 ****0110 ****0111 ****0011 ****0010 ****0001 ****0101 ****0100	(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.

NOTE	ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25±3°C)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
15-(1)	Y / C Frequency Response (Main)	Y _{in} S1	S _{9-a} , others-b / off	11111011	Measure the amplitude in the same way using pin 44.
		Y _{in} S2	S _{15-a} , others-b / off	11111010	
		Y _{in} S3	S _{21-a} , others-b / off	11111001	
		Y _{in} 1 V _{in} E3	S _{48-a} , others-b / off S _{50-a} , others-b / off	0101**** 0100****	
		C _{in} S1	S _{11-a} , others-b / off	11111011	Measure the amplitude in the same way using pin 42.
		C _{in} S2	S _{17-a} , others-b / off	11111010	
		C _{in} S3	S _{23-a} , others-b / off	11111001	
		C _{in} 1	S _{40-a} , others-b / off	0101****	
15-(2)	Y / C Frequency Response (Sub)	Y _{in} S1	S _{9-a} , others-b / off	DATA 3	Measure the amplitude in the same way using pin 34
		Y _{in} S2	S _{15-a} , others-b / off	11111011	
		Y _{in} S3	S _{21-a} , others-b / off	11111010	
		Y _{in} 2 V _{in} E4	S _{38-a} , others-b / off S _{53-a} , others-b / off	11111001 0101**** 0100****	
		C _{in} S1	S _{11-a} , others-b / off	11111011	Measure the amplitude in the same way using pin 32.
		C _{in} S2	S _{17-a} , others-b / off	11111010	
		C _{in} S3	S _{23-a} , others-b / off	11111001	
		C _{in} 2	S _{30-a} , others-b / off	0101****	
16-(1)	S Video Frequency Response (Main)	Y _{in} S1	S _{9-a} , others-b / off	DATA 2	Measure the amplitude in the same way using pin 46.
		Y _{in} S2	S _{15-a} , others-b / off	11111011	
		Y _{in} S3	S _{21-a} , others-b / off	11111010	
		C _{in} S1	S _{11-a} , others-b / off	11111001	
		C _{in} S2	S _{17-a} , others-b / off	11111011	
		C _{in} S3	S _{23-a} , others-b / off	11111010	
				11111001	
16-(2)	S Video Frequency Response (Sub)	Y _{in} S1	S _{9-a} , others-b / off	DATA 3	Measure the amplitude in the same way using pin 36.
		Y _{in} S2	S _{15-a} , others-b / off	11111011	
		Y _{in} S3	S _{21-a} , others-b / off	11111010	
		C _{in} S1	S _{11-a} , others-b / off	11111001	
		C _{in} S2	S _{17-a} , others-b / off	11111011	
		C _{in} S3	S _{23-a} , others-b / off	11111010	
				11111001	

NOTE	ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25±3°C)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
16-(3)	S Video Frequency Response (Clamp Off) (Main)	Y _{in} S1	S _{9-a} , S _{47-on} , others-b / off	11111011	Measure the amplitude in the same way using pin 46.
		Y _{in} S2	S _{15-a} , S _{47-on} , others-b / off	11111010	
		Y _{in} S3	S _{21-a} , S _{47-on} , others-b / off	11111001	
		C _{in} S1	S _{11-a} , S _{47-on} , others-b / off	11111011	
		C _{in} S2	S _{17-a} , S _{47-on} , others-b / off	11111010	
		C _{in} S3	S _{23-a} , S _{47-on} , others-b / off	11111001	
16-(4)	S Video Frequency Response (Clamp Off) (Sub)	Y _{in} S1	S _{9-a} , S _{37-on} , others-b / off	DATA 3	Measure the amplitude in the same way using pin 36.
		Y _{in} S2	S _{15-a} , S _{37-on} , others-b / off	11111011	
		Y _{in} S3	S _{21-a} , S _{37-on} , others-b / off	11111010	
		C _{in} S1	S _{11-a} , S _{37-on} , others-b / off	11111001	
		C _{in} S2	S _{17-a} , S _{37-on} , others-b / off	11111011	
		C _{in} S3	S _{23-a} , S _{37-on} , others-b / off	11111010	
17-(1)	B / W Mode Frequency Response (Main)	V _{in} E2	S _{2-a} , others-b / off	DATA 2	Measure the amplitude in the same way using pin 44.
		V _{in} E1	S _{5-a} , others-b / off	10100110	
		V _{in} S1	S _{7A-a} , others-b / off	10100111	
		V _{in} S2	S _{13A-a} , others-b / off	10100011	
		V _{in} S3	S _{19A-a} , others-b / off	10100010	
		V _{in} E3	S _{50-a} , others-b / off	10100001	
		V _{in} E4	S _{53-a} , others-b / off	10100101	
		V _{in} E2	S _{2-a} , others-b / off	10100100	Measure the amplitude in the same way using pin 42.
		V _{in} E1	S _{5-a} , others-b / off	10100110	
		V _{in} S1	S _{7A-a} , others-b / off	10100111	
		V _{in} S2	S _{13A-a} , others-b / off	10100011	
		V _{in} S3	S _{19A-a} , others-b / off	10100010	
		V _{in} E3	S _{50-a} , others-b / off	10100001	
		V _{in} E4	S _{53-a} , others-b / off	10100101	

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 3	
17-(2)	B / W Mode Frequency Response (Sub)	V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , others-b / off S_{5-a} , others-b / off S_{7A-a} , others-b / off S_{13A-a} , others-b / off S_{19A-a} , others-b / off S_{50-a} , others-b / off S_{53-a} , others-b / off	10100110 10100111 10100011 10100010 10100001 10100101 10100100	Measure the amplitude in the same way using pin 34.
		V_{inE2} V_{inE1} V_{inS1} V_{inS2} V_{inS3} V_{inE3} V_{inE4}	S_{2-a} , others-b / off S_{5-a} , others-b / off S_{7A-a} , others-b / off S_{13A-a} , others-b / off S_{19A-a} , others-b / off S_{50-a} , others-b / off S_{53-a} , others-b / off	10100110 10100111 10100011 10100010 10100001 10100101 10100100	Measure the amplitude in the same way using pin 32.
18	Clamp Level	V_{out1} Output	S_{2-a} , others-b / off	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% 
		V_{out2} Output	S_{2-a} , others-b / off	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, Ta = 25±3°C)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
19	Audio L Dynamic Range	L _{in} E2	S ₁ -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)
		L _{in} E1	S ₄ -a , others-b / off	****0111	
		L _{in} S1	S ₈ -a , others-b / off	****0011	
		L _{in} S2	S ₁₄ -a , others-b / off	****0010	
		L _{in} S3	S ₂₀ -a , others-b / off	****0001	
		L _{in} E3	S ₅₁ -a , others-b / off	****0101	
		L _{in} E4	S _{54A} -a , others-b / off	****0100	
		L _{in} E2 L _{in} E1 L _{in} S1 L _{in} S2 L _{in} S3 L _{in} E3 L _{in} E4	S ₁ -a , others-b / off S ₄ -a , others-b / off S ₈ -a , others-b / off S ₁₄ -a , others-b / off S ₂₀ -a , others-b / off S ₅₁ -a , others-b / off S _{54A} -a , others-b / off	DATA 3	Measure the amplitude in the same way using pin 35. (Data 1 D ₀₁ = 0 : mute off)
				****0110	
				****0111	
				****0011	
				****0010	
				****0001	
				****0101	
				****0100	
		L _{in} E1	S ₄ -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)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
19	Audio R Dynamic Range	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 R _{in} E1 R _{in} S1 R _{in} S2 R _{in} S3 R _{in} E3 R _{in} E4	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	DATA 3	Measure the amplitude in the same way using pin 33. (Data 1 D ₀₁ = 0 : mute off)
				****0110	
				****0111	
				****0011	
				****0010	
				****0001	
				****0101	
				****0100	
		R _{in} E1	S ₆ -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, Ta = 25±3°C)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
20	Audio L Gain	L _{in} E2	S ₁ -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	S ₄ -a , others-b / off	****0111	
		L _{in} S1	S ₈ -a , others-b / off	****0011	
		L _{in} S2	S ₁₄ -a , others-b / off	****0010	
		L _{in} S3	S ₂₀ -a , others-b / off	****0001	
		L _{in} E3	S ₅₁ -a , others-b / off	****0101	
		L _{in} E4	S _{54A} -a , others-b / off	****0100	
		L _{in} E2 L _{in} E1 L _{in} S1 L _{in} S2 L _{in} S3 L _{in} E3 L _{in} E4	S ₁ -a , others-b / off S ₄ -a , others-b / off S ₈ -a , others-b / off S ₁₄ -a , others-b / off S ₂₀ -a , others-b / off S ₅₁ -a , others-b / off S _{54A} -a , others-b / off	DATA 3	Find the gain in the same way using pin 35. (Data 1 D ₀₁ = 0 : mute off)
				****0110	
				****0111	
				****0011	
				****0010	
				****0001	
				****0101	
				****0100	
		L _{in} E1	S ₄ -a, others-b / off	DATA 2, 3	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
			SW MODE	DATA 2	
20	Audio R Gain	R _{in} E2	S ₃ -a , others-b / off	****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 R _{in} E1 R _{in} S1 R _{in} S2 R _{in} S3 R _{in} E3 R _{in} E4	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	DATA 3	Find the gain in the same way using pin 33. (Data 1 D ₀₁ = 0 : mute off)
				****0110	
				****0111	
				****0011	
				****0010	
				****0001	
				****0101	
				****0100	
		R _{in} E1	S ₆ -a , others-b / off	DATA 2, 3	Find the gain in the same way using pin 39. (Data 1 D ₀₂ = 0 : mute off)

NOTE	ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, $V_{CC} = 9V$, $T_a = 25 \pm 3^\circ C$)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
21	Audio L Frequency Response	L _{in} E2	S ₁ -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 D ₀₀ = 0 : mute off)
		L _{in} E1	S ₄ -a , others-b / off	****0111	
		L _{in} S1	S ₈ -a , others-b / off	****0011	
		L _{in} S2	S ₁₄ -a , others-b / off	****0010	
		L _{in} S3	S ₂₀ -a , others-b / off	****0001	
		L _{in} E3	S ₅₁ -a , others-b / off	****0101	
		L _{in} E4	S _{54A} -a , others-b / off	****0100	
		L _{in} E2 L _{in} E1 L _{in} S1 L _{in} S2 L _{in} S3 L _{in} E3 L _{in} E4	S ₁ -a , others-b / off S ₄ -a , others-b / off S ₈ -a , others-b / off S ₁₄ -a , others-b / off S ₂₀ -a , others-b / off S ₅₁ -a , others-b / off S _{54A} -a , others-b / off	DATA 3	Measure the amplitude in the same way using pin 35. (Data 1 D ₀₁ = 0 : mute off)
				****0110	
				****0111	
				****0011	
				****0010	
				****0001	
				****0101	
				****0100	
		L _{in} E1	S ₄ -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)		
			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 R _{in} E1 R _{in} S1 R _{in} S2 R _{in} S3 R _{in} E3 R _{in} E4	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	DATA 3	Measure the amplitude in the same way using pin 33. (Data 1 D ₀₁ = 0 : mute off)
				****0110	
				****0111	
				****0011	
				****0010	
				****0001	
				****0101	
				****0100	
		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, Ta = 25±3°C)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2	
22	L Switch Crosstalk	L _{in} E2	All-b / off except those specified on the left	****0110	(1) V ₂ 1kHz, 1Vp-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)
		L _{in} E1	All-b / off except those specified on the left	****0111	
		L _{in} S1	All-b / off except those specified on the left	****0011	
		L _{in} S2	All-b / off except those specified on the left	****0010	
		L _{in} S3	All-b / off except those specified on the left	****0001	
		L _{in} E3	All-b / off except those specified on the left	****0101	
		L _{in} E4	All-b / off except those specified on the left	****0100	
		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	DATA 3	Measure the amplitude in the same way using pin 35. (Data 1 D ₀₁ = 0 : mute off)
				****0110	
				****0111	
				****0011	
				****0010	
				****0001	
				****0101	
				****0100	

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

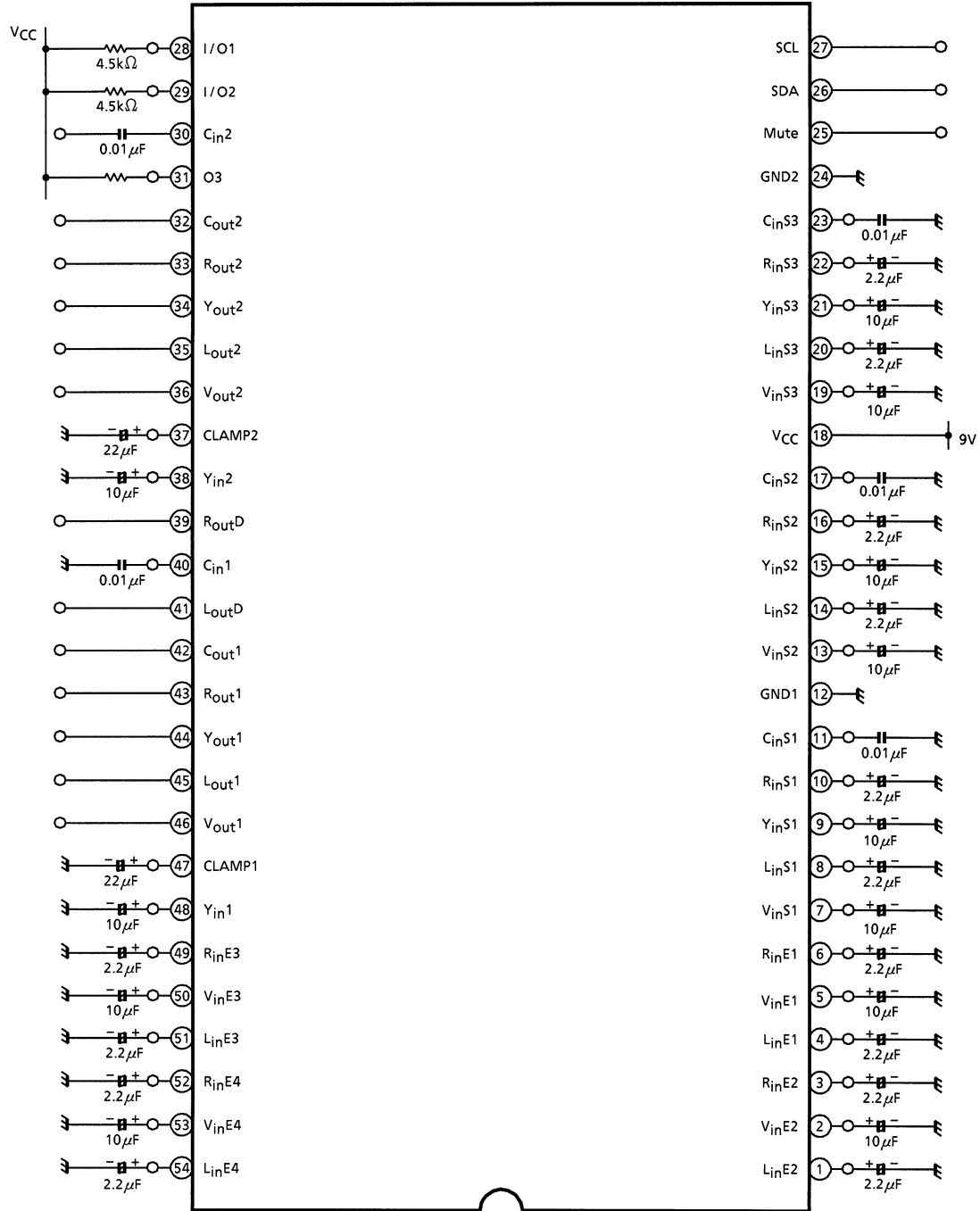
NOTE	ITEM	MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, $V_{CC} = 9V$, $T_a = 25 \pm 3^\circ C$)		
		SW & VR MODE		MEASUREMENT METHOD
		SW MODE	DATA 2, 3	
23	L Switch Mute Attenuation	All-b / off except those specified on the left	*****	(1) V_2 1kHz, $1V_{p-p}$ input. (2) Mute on (data 1 $D_{00} = 1$) and while sequentially switching $S_1, S_3, S_4, S_6, S_8, S_{10}, S_{14}, S_{16}, S_{20}, S_{22}, S_{49}, S_{51}, S_{52A}$, and S_{54A} to 'a', measure the maximum level of crosstalk to pin 45 and find its ratio to selected output.
		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)
	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 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)

NOTE	ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 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	Find the maximum value in the same way using pin 43 (data 2) and pin 33 (data 3).
		R _{in} E1	All-b / off	****0111	
		R _{in} S1	All-b / off	****0011	
		R _{in} S2	All-b / off	****0010	
		R _{in} S3	All-b / off	****0001	Find the maximum value in the same way using pin 41.
		R _{in} E3	All-b / off	****0101	
		R _{in} E4	All-b / off	****0100	Find the maximum value in the same way using pin 39
		L _{in} E1	All-b / off	*****	
		R _{in} E1	All-b / off	*****	

NOTE	ITEM		MEASURING CONDITIONS (UNLESS OTHERWISE SPECIFIED, V _{CC} = 9V, Ta = 25±3°C)		
			SW & VR MODE		MEASUREMENT METHOD
			SW MODE	DATA 2, 3	
25	S Input Discriminating Voltage	V _{in} S1	S ₉ -a, S _{7B} -on, others-b / off	****0011	(1) V ₁ 1kHz, 1V _{p-p} 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)
		V _{in} S2	S ₁₅ -a, S _{13B} -on, others-b / off	****0010	
		V _{in} S3	S ₂₁ -a, S _{19B} -on, others-b / off	****0001	
26	I Input Discriminating Voltage	I / O1	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)
		I / O2	S ₂₉ -a , others-b / off	*****	
		R _{in} E4	S _{52B} -on , others-b / off	*****	
		L _{in} E4	S _{54B} -on , others-b / off	*****	
27	External Mute-ON Voltage	Mute	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	I / O1	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.
		I / O2	All-b / off	*****	
		O3	All-b / off	*****	

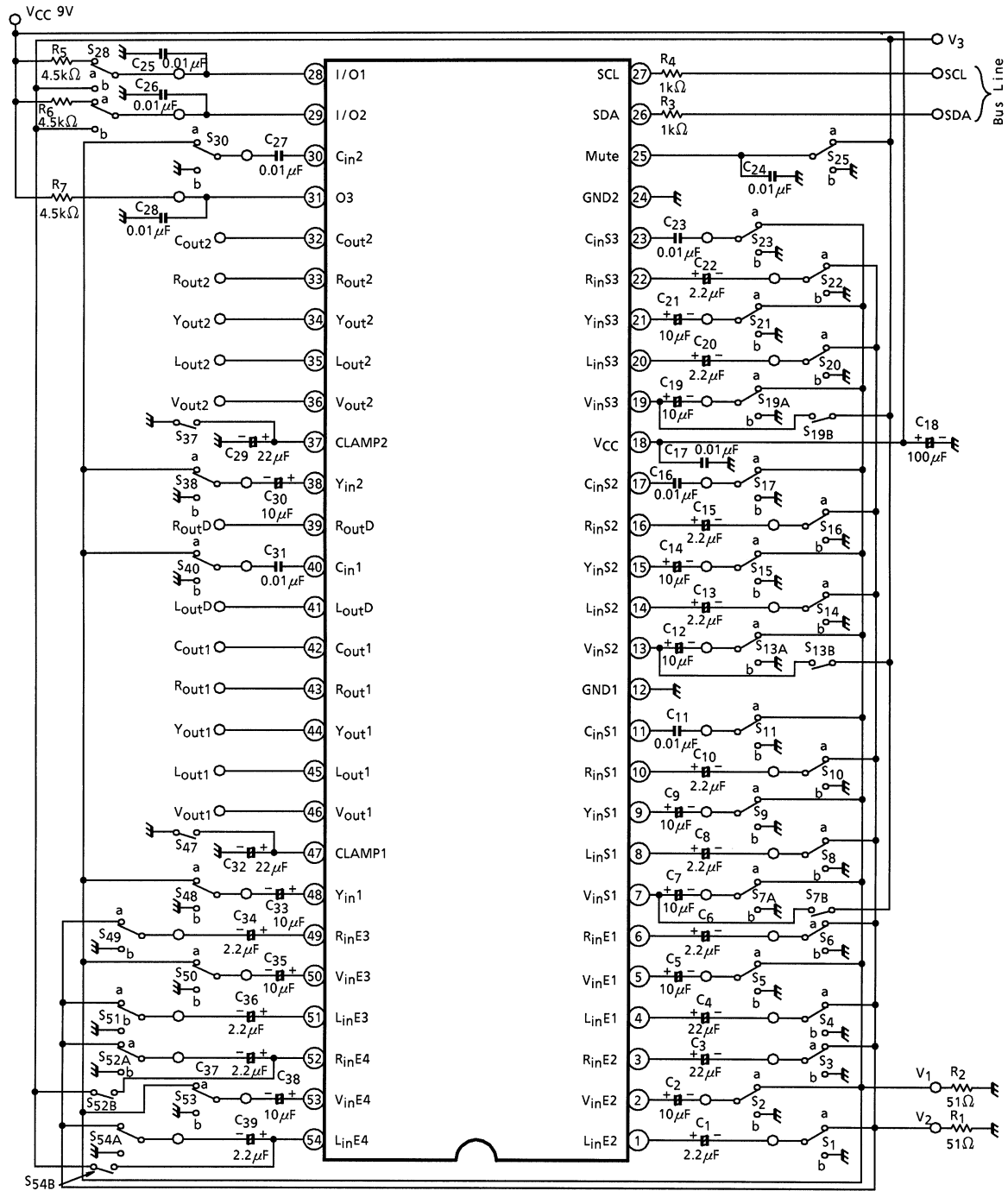
TEST CIRCUIT 1

DC characteristics



TEST CIRCUIT 2

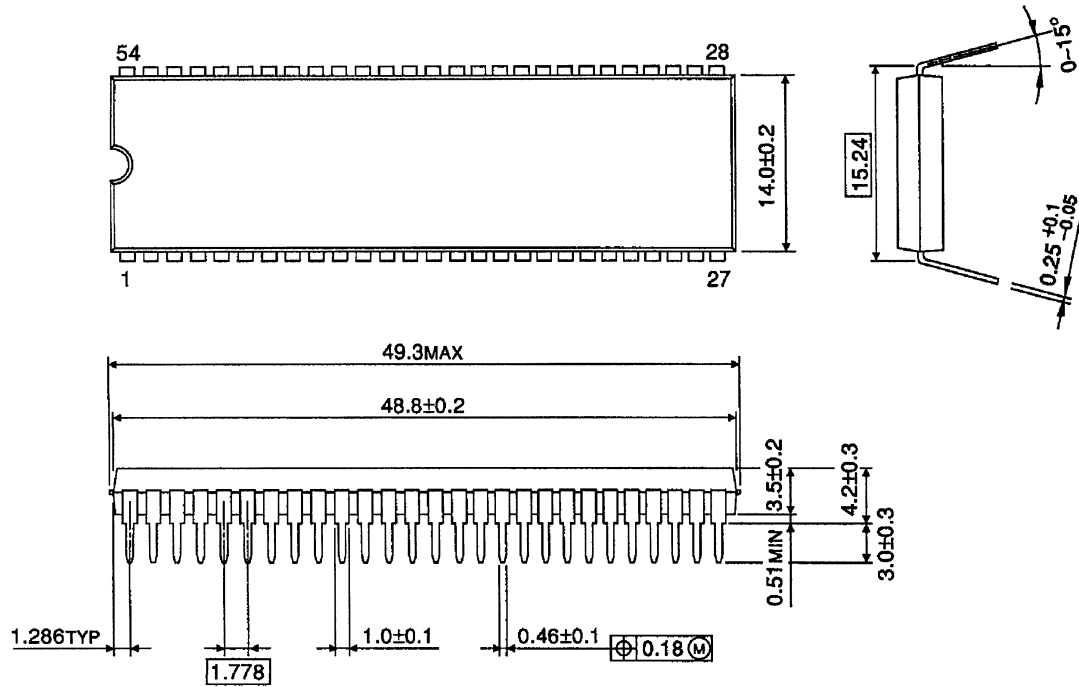
AC characteristics



PACKAGE DIMENSIONS

SDIP54-P-600-1.78

Unit : mm



Weight: 5.44 g (Typ.)

About solderability, following conditions were confirmed

- Solderability

- (1) Use of Sn-63Pb solder Bath

- solder bath temperature = 230°C
 - dipping time = 5 seconds
 - the number of times = once
 - use of R-type flux

- (2) Use of Sn-3.0Ag-0.5Cu solder Bath

- solder bath temperature = 245°C
 - dipping time = 5 seconds
 - the number of times = once
 - use of R-type flux

RESTRICTIONS ON PRODUCT USE

030619EBA

- The information contained herein is subject to change without notice.
- The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.
- TOSHIBA is continually working to improve the quality and 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 comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products 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 TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc..
- The TOSHIBA products listed in this document are intended for usage in general electronics applications (computer, personal equipment, office equipment, measuring equipment, industrial robotics, domestic appliances, etc.). These TOSHIBA products are neither intended nor warranted for usage in equipment that requires extraordinarily high quality and/or reliability or a malfunction or failure of which may cause loss of human life or bodily injury ("Unintended Usage"). Unintended Usage include atomic energy control instruments, airplane or spaceship instruments, transportation instruments, traffic signal instruments, combustion control instruments, medical instruments, all types of safety devices, etc.. Unintended Usage of TOSHIBA products listed in this document shall be made at the customer's own risk.
- The products described in this document are subject to the foreign exchange and foreign trade laws.
- TOSHIBA products should not be embedded to the downstream products which are prohibited to be produced and sold, under any law and regulations.