M61303FP

IIC BUS controled 3channel video pre-amplifier for LCD display monitor.

DESCRIPTION

M61303FP is integrated Circuit for LCD Display Monitor.It is controlled IIC BUS and Band Wide is 180MHz.
It includes OSD Blanking ,OSD Mixing,Wide Band Amplifier,Main/Sub Contrast Main/Sub Brightness ,and 2 Input routes.
Vcc Voltage is 5V and Flat package is used. then it is the suitable to LCD monitor.

FEATURES

1.Frequency Band Width : RGB 180MHz(at -3dB)
OSD 80MHz

2.Input : RGB Input dynamic range:Max1V_{P-P}positive
2 input routes is changed by IIC BUS
RGB OSD 3.5V_{P-P}~5.0V_{P-P}(positive)
OSD BLK 3.5V_{P-P}~5.0V_{P-P}(positive)

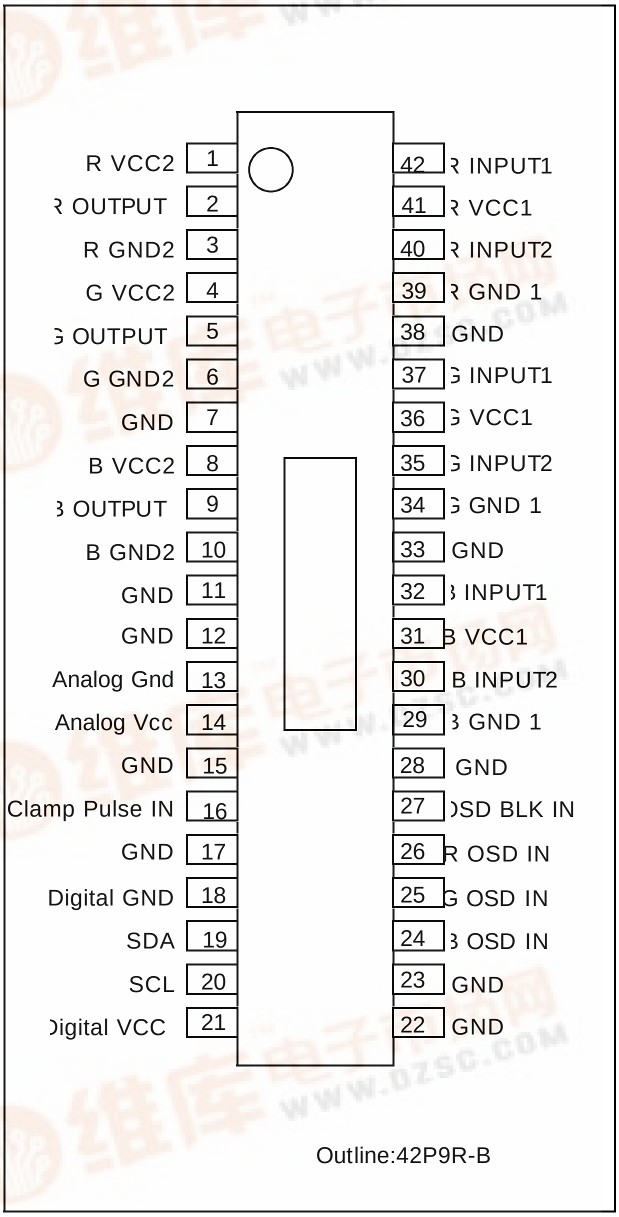
3.Output : RGB 2.2V_{P-P} (Max)
OSD 2.0V_{P-P} (Max)
Output dynamic range 0.5~2.2V
It can drive 14pF

4.Contrast : Both of sub and main contrast are controlled by IIC Bus(8bit).
Control Range :-15dB~+15dB.

5.Brightness : Both of sub and main contrast are controlled by IIC Bus(8bit).
Control Range :0.5V~2.2V.

6.OSD Adjust :2 Control Ranges (Max1V_{P-P} or Max2V_{P-P}) are able to be changed by IIC Bus.

PIN CONFIGURATION

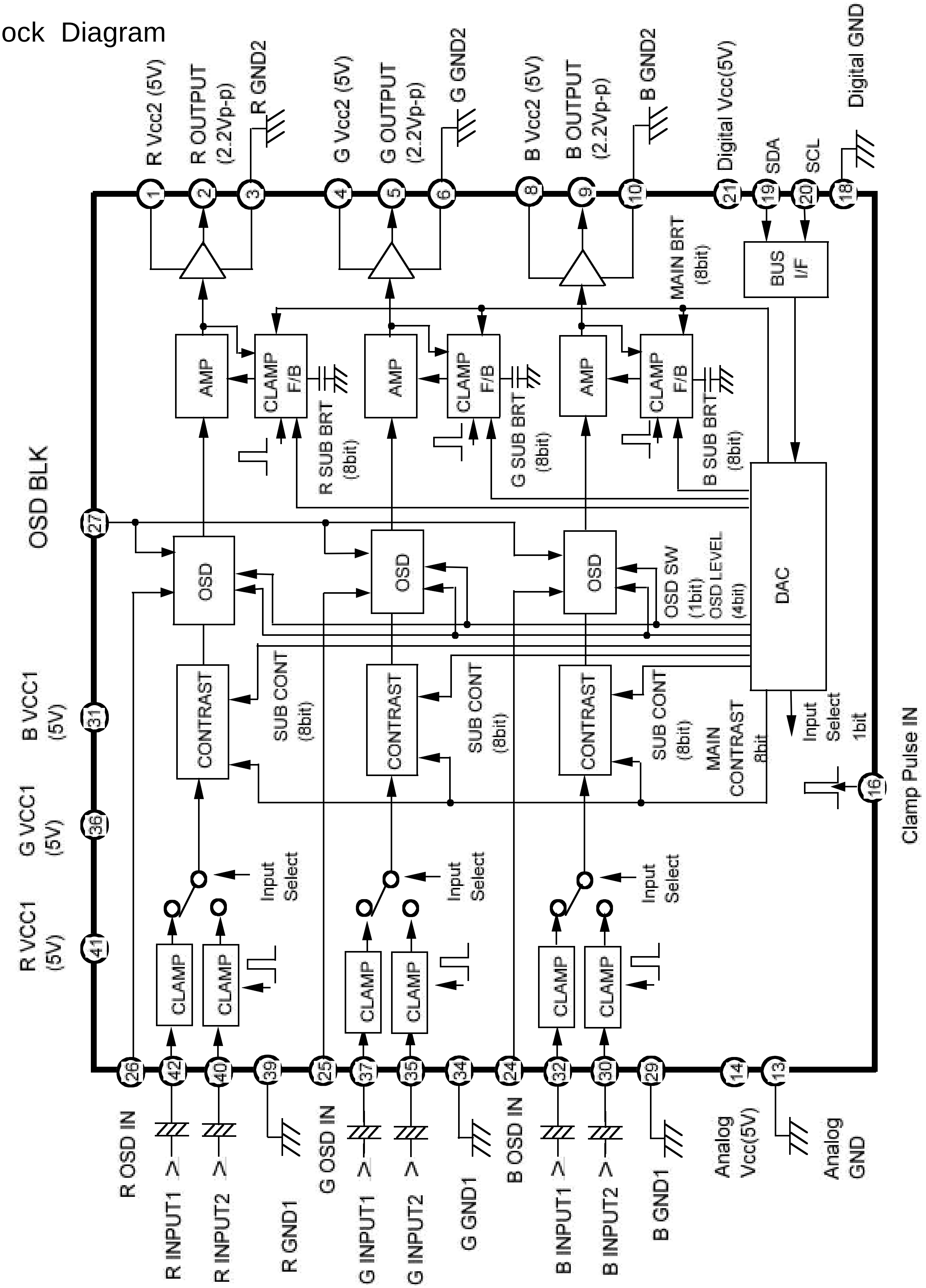


Outline:42P9R-B

RECOMMENDED OPERATING CONDITIONS

Supply Voltage Range 4.7V ~ 5.3V
Rated Supply Voltage 5.0V
Consumption of electricity 800mW

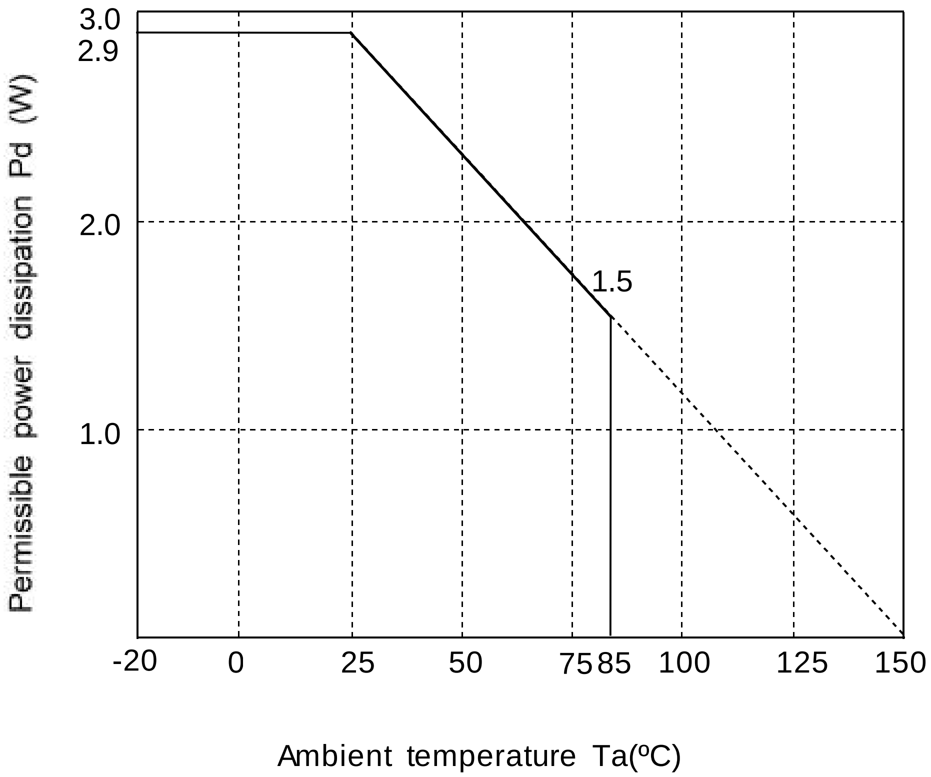
Block Diagram



Absolute Maximum Rating (Ambient temperature: 25ºC)

Parameter	Symbol	Rating	Unit
Supply voltage	Vcc	6.0	V
Power dissipation	Pd	2900	mW
Ambient temperature	Topr	–20 to +85	ºC
Storage temperature	Tstg	–40 to +150	ºC
Recommended supply	Vopr	5.0	V
voltage range	Vopr'	4.7 to 5.3	V

Thermal Derating Curve



BUS CONTROL TABLE

(1) Slave address:

	D7	D6	D5	D4	D3	D2	D1	R/W	
M61303FP	1	0	0	0	1	0	0	0	=88H

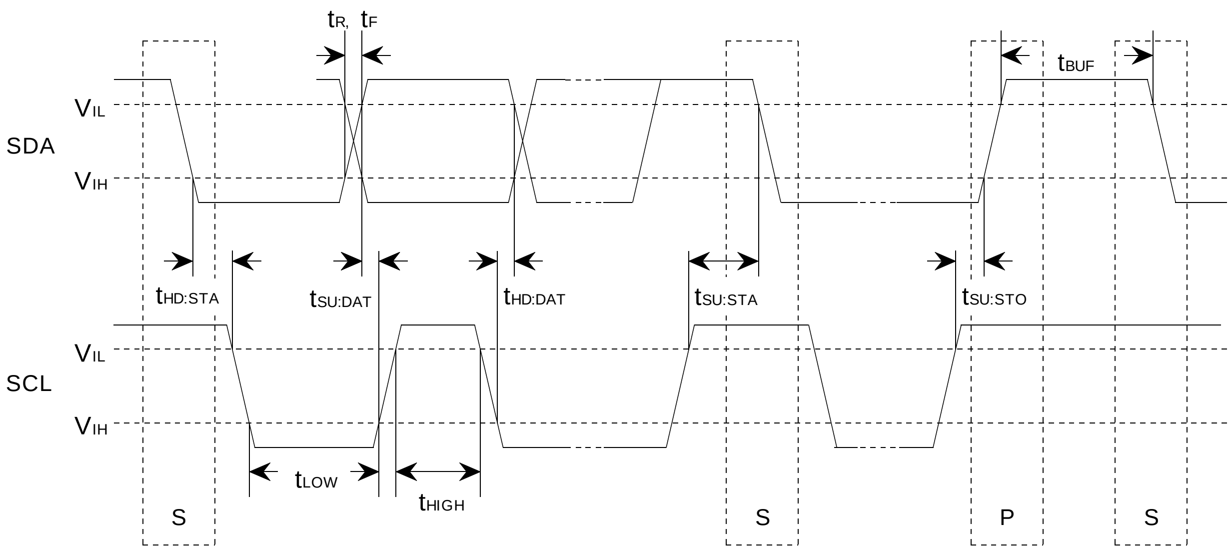
(2) Each function's sub address:

NO.	function	bit	sub add.	Data Byte D7	D6	D5	D4	D3	D2	D1	D0
1	Main contrast	8	00H	A07	A06	A05	A04	A03	A02	A01	A00
				0	1	0	0	0	0	0	0
2	Sub contrast R	8	01H	A17	A16	A15	A14	A13	A12	A11	A10
				1	0	0	0	0	0	0	0
3	Sub contrast G	8	02H	A27	A26	A25	A24	A23	A22	A21	A20
				1	0	0	0	0	0	0	0
4	Sub contrast B	8	03H	A37	A36	A35	A34	A33	A32	A31	A30
				1	0	0	0	0	0	0	0
5	Main bright	8	04H	A47	A46	A45	A44	A43	A42	A41	A40
				1	0	0	0	0	0	0	0
6	Sub bright R	8	05H	A57	A56	A55	A54	A53	A52	A51	A50
				1	0	0	0	0	0	0	0
7	Sub bright G	8	06H	A67	A66	A65	A64	A63	A62	A61	A60
				1	0	0	0	0	0	0	0
8	Sub bright B	8	07H	A77	A76	A75	A74	A73	A72	A71	A70
				1	0	0	0	0	0	0	0
9	OSD level	4	08H	-	-	-	-	A83	A82	A81	A80
				0	0	0	0	0	0	0	0
10	INPUT SW	1	09H	-	-	-	-	-	-	-	A90
				0	0	0	0	0	0	0	0
11	OSD SW	1	0AH	-	-	-	-	-	-	-	AA0
				0	0	0	0	0	0	0	0

I^2C BUS CONTROL SECTION

SDA,SCL CHARACTERISTICS

parameter	symbol	MIN	MAX	unit
min. input LOW voltage.	V_{IL}	-0.5	1.5	V
max. input HIGH voltage.	V_{IH}	3.0	5.5	V
SCL clock frequency.	f_{SCL}	0	100	KHz
Time the bus must be free before a new transmission can start.	t_{BUF}	4.7	-	us
Hold time start condition.After this period the first clock pulse is generated.	$t_{HD:STA}$	4.0	-	us
The LOW period of the clock.	t_{LOW}	4.7	-	us
The HIGH period of the clock.	t_{HIGH}	4.0	-	us
Set up time for start condition. (Only relevant for a repeated start condition.)	$t_{SU:STA}$	4.7	-	us
Hold time DATA.	$t_{HD:DAT}$	0	-	us
Set-up time DATA.	$t_{SU:DAT}$	250	-	ns
Rise time of both SDA and SCL lines.	t_R	-	1000	ns
Fall time of both SDA and SCL lines.	t_F	-	300	ns
Set-up time for stop condition.	$t_{SU:STO}$	4.0	-	us



If SW connect is not designated RGB Input SW :
SW(30,35,40)=a(b) SW(32,37,42)=b (a),SW(2,5,9,16,19,20,24,25,26,27)= a

Vcc=5V Ta=25 ºC

No	parameter	Symbol	Test Point	RGB Input Signal	SW Connect	BUS CTL (H)											Standard			Unit	re-mark
						00H Main cont	01H Sub cont 1	02H Sub cont 2	03H Sub cont 3	04H Main brt	05H Sub brt1	06H Sub brt2	07H Sub brt3	08H OSD Adj	09H INPUT SW	0AH OSD SW	MIN	TYP	MAX		
1	Circuit current1	Icc1	IA	–	RGBInput SW =a(ALL)	A6H 166	A6H 166	A6H 166	A6H 166	00H 0	00H 0	00H 0	00H 0	00H 0	–	–	–	155	185	mA	
2	Output dynamic range	Vomax	OUT	SG2	–	↓	↓	↓	↓	Variable	Variable	Variable	Variable				2.2	–	–	Vp-p	
3	Maximum input1	Vimax1	IN OUT	SG2 Amplitude Variable	↓	7FH 127	7FH 127	7FH 127	7FH 127	40H 64	7FH 127	7FH 127	7FH 127				1.0	–	–	Vp-p	
4	Maximum input2	Vimax2	IN OUT	SG2 Amplitude Variable	SW(30,35,40)=b SW(32,37,42)=a	↓	↓	↓	↓								1.0	–	–	Vp-p	
5	Maximum gain	Gv	OUT	SG1	–	FFH 255	FFH 255	FFH 255	FFH 255								11.9	13.9	15.9	dB	
6	Relative maximum gain	ΔGv	–	–		–	–	–	–								0.8	1.0	1.2	–	
7	Main contrast control characteristics 1	VC1	OUT	SG1		C8H 200	7FH 127	7FH 127	7FH 127								6.4	7.9	9.4	dB	
8	Main contrast control characteristics 2	VC2	OUT	SG1		64H 100											2.3	4.1	5.9	dB	
9	Main contrast control characteristics 3	VC3	OUT	SG1		00H 0	↓	↓	↓								0.2	0.4	0.6	Vp-p	
10	Sub contrast control characteristics 1	VSC1	OUT	SG1		7FH 127	C8H 200	C8H 200	C8H 200								6.3	7.8	9.4	dB	
11	Sub contrast control characteristics 2	VSC2	OUT	SG1			64H 100	64H 100	64H 100								2.6	4.3	6.0	dB	
12	Sub contrast control characteristics 3	VSC3	OUT	SG1		↓	00H 0	00H 0	00H 0								0.2	0.4	0.6	Vp-p	
13	Main/sub contrast control characteristics	VMSC	OUT	SG1	↓	A6H 166	A6H 166	A6H 166	A6H 166	↓							1.7	2.0	2.3	Vp-p	
14	Main brightness control characteristics 1	VB1	OUT	–	RGBInput SW =a(ALL)	A6H 166	A6H 166	A6H 166	A6H 166	7FH 127							1.3	1.7	2.0	V	
15	Main brightness control characteristics 2	VB2	OUT	–						00H 0	↓	↓	↓				0.4	0.6	0.8	V	
16	Sub brightness control characteristics 1	VSB1	OUT	–						7FH 127	FFH 255	FFH 255	FFH 255				1.7	2.2	2.6	V	
17	Sub brightness control characteristics 2	VSB2	OUT	–							7FH 127	7FH 127	7FH 127				1.3	1.7	2.0	V	
18	Sub brightness control characteristics 3	VSB3	OUT	–	↓	↓				↓	00H 0	00H 0	00H 0	↓	↓	↓	0.7	1.0	1.3	V	
19	Frequency characteristics 1 (50MHz-2Vpp)	ΔFC1	OUT	SG3	–	Variable				40H 64	7FH 127	7FH 127	7FH 127	00H 0	–	–	-3.0	0	3.0	dB	refer-ence
20	Frequency relative characteristics 1 (180MHz-2Vpp)	ΔFC1	–	–		A6H 166											-1.0	0	1.0	dB	
21	Frequency characteristics 2 (50MHz-2Vpp)	FC2	OUT	SG3													-4.0	-3.0	1.0	dB	
22	Frequency relative characteristics 2 (50MHz-2Vpp)	ΔFC2	–	–													-1.0	0	1.0	dB	
23	Frequency characteristics 3 (180MHz-1Vpp)	FC3	OUT	SG3		↓											-1.0	0	1.0	dB	
24	Frequency relative characteristics 3 (180MHz-1Vpp)	ΔFC3	–	–	↓	37H 55											-1.0	0	1.0	dB	
25	Frequency characteristics 4 (180MHz-2Vpp-Cap)	FC4	OUT	SG3	SW(2,5,9)=b	↓											-4.0	-3.0	1.0	dB	
26	Frequency relative characteristics 4 (180MHz-2Vpp-Cap)	ΔFC4	–	–	–	A6H 166									↓		-1.0	0	1.0	dB	
27	Crosstalk 1 input1 - 2 50MHz-1	INCT1	OUT(2) OUT(5) OUT(9)	SG3	SW(42)=b,Other SW=a SW(37)=b,Other SW=a SW(32)=b,Other SW=a										00H 0		–	-35	-30	dB	
28	Crosstalk 1' input1 - 2 50MHz-1	INCT1'	OUT(2) OUT(5) OUT(9)	SG3	↓										↓		–	-15	-10	dB	
29	Crosstalk 2 input1 - 2 50MHz-2	INCT2	OUT(2) OUT(5) OUT(9)	SG3	SW(40)=b,Other SW=a SW(35)=b,Other SW=a SW(30)=b,Other SW=a										01H 1		–	-35	-30	dB	
30	Crosstalk 2' input1 - 2 50MHz-2	INCT2'	OUT(2) OUT(5) OUT(9)	SG3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	–	-15	-10	dB	↓

If SW connect is not designated RGB Input SW :
SW(30,35,40)=a(b) SW(32,37,42)=b (a),SW(2,5,9,16,19,20,24,25,26,27)= a

Vcc=5V Ta=25 ºC

No	parameter	Symbol	Test Point	RGB Input Signal	SW Connect	BUS CTL (H) 00H Main cont	01H Sub cont 1	02H Sub cont 2	03H Sub cont 3	04H Main brt	05H Sub brt1	06H Sub brt2	07H Sub brt3	08H OSD Adj	09H INPUT SW	0AH OSD SW	Standard MIN	TYP	MAX	Unit	re-mark
31	Crosstalk 1 between RGB ch 50MHz-1	CHCT1	OUT	SG3	SW(42)=b,OtherSW=a	A6H 166	A6H 166	A6H 166	A6H 166	40H 64	7FH 127	7FH 127	7FH 127	00H 0	—	—	—	-25	-20	dB	refer-ence
32	Crosstalk 1`between RGB ch 180MHz-1	CHCT1'	OUT	SG3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	-15	-10	dB	↓
33	Crosstalk 2 between RGB ch 50MHz-2	CHCT2	OUT	SG3	SW(37)=b,OtherSW=a	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	-25	-20	dB	↓
34	Crosstalk 2' between RGB ch 180MHz-2	CHCT2'	OUT	SG3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	-15	-10	dB	↓
35	Crosstalk 3 between RGB ch 50MHz-3	CHCT3	OUT	SG3	SW(32)=b,OtherSW=a	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	-25	-20	dB	↓
36	Crosstalk 3' between RGB ch 50MHz-3	CHCT3'	OUT	SG3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	-15	-10	dB	↓
37	Pulse characteristics Tr1	Tr1	OUT	SG1	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	1.1	—	nS	↓
38	Relative pulse characteristics Tr1	ΔTr1	—	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	-0.8	0.0	0.8	nS	↓
39	Pulse characteristics Tf1	Tf1	OUT	SG1	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	1.1	—	—	↓
40	Relative pulse characteristics Tf1	ΔTf1	—	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	-0.8	0.0	0.8	—	↓
41	Pulse characteristics Tr2	Tr2	OUT	SG1	SW(2,5,9)=b	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	2.0	—	nS	↓
42	Relative pulse characteristics Tr2	ΔTr2	—	—	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	-0.8	0.0	0.8	nS	↓
43	Pulse characteristics Tf2	Tf2	OUT	SG1	SW(2,5,9)=b	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	2.0	—	—	↓
44	Relative pulse characteristics Tf2	ΔTf2	—	—	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	-0.8	0.0	0.8	—	↓
45	Clamp pulse threshold voltage	VthCP	OUT	SG1		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	1.5	2.0	2.5	V	
46	Clamp pulse minimum width	WCP	OUT	SG1		↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0.2	0.5	—	uS	
47	OSD Pulse characteristics Tr	OTr	OUT	—	SW(24,25,26,27)=b	00H 0	00H 0	00H 0	00H 0	40H 64	7FH 127	7FH 127	7FH 127	0FH 15	↓	00H 0	—	3.0	6.0	ns	refer-ence
48	OSD Pulse characteristics Tf	OTf	—	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	3.0	6.0	ns	↓
49	OSD adjust control characteristics 1	Oaj1	OUT	—	↓	A6H 166	A6H 166	A6H 166	A6H 166	↓	↓	↓	↓	00H 0	↓	00H 0	0	0	0.2	Vp-p	
50	OSD adjust control characteristics 2	Oaj2	OUT	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	01H 1	↓	00H 0	0.9	1.2	1.5	Vp-p	
51	OSD adjust control relative characteristics 2	ΔOaj2	—	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	↓	—	0.75	1.0	1.25	—	
52	OSD adjust control characteristics 3	Oaj3	OUT	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	0FH 15	↓	00H 0	1.8	2.1	2.5	Vp-p	
53	OSD adjust control relative characteristics 3	ΔOaj3	—	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	↓	—	0.75	1.0	1.25	—	
54	OSD adjust control characteristics 4	Oaj4	OUT	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	00H 0	↓	01H 1	0	0	0.2	Vp-p	
55	OSD adjust control characteristics 5	Oaj5	OUT	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	01H 1	↓	01H 1	0.4	0.6	0.8	Vp-p	
56	OSD adjust control relative characteristics 5	ΔOaj5	—	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	↓	—	0.75	1.0	1.25	—	
57	OSD adjust control characteristics 6	Oaj6	OUT	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	0FH 15	↓	01H 1	0.9	1.2	1.5	Vp-p	
58	OSD adjust control relative characteristics 6	ΔOaj6	—	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	↓	—	0.75	1.0	1.25	—	
59	OSD BLK characteristics	OBLK	OUT	—	SW(24,25,26)=a SW(27)=b	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0.0	0.1	0.3	Vpp	
60	OSD BLK relative characteristics	ΔOBLK	—	—	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	-0.15	0.0	0.15	V	
61	OSD input threshold voltage	VthOSD	OUT	—	SW(24,25,26,27)=a	↓	↓	↓	↓	↓	↓	↓	↓	0FH 15	↓	00H 0	2.0	2.5	3.0	V	
62	OSD BLK input threshold voltage	VthBLK	OUT	SG1	SW(27)=b	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	2.0	2.5	3.0	V	

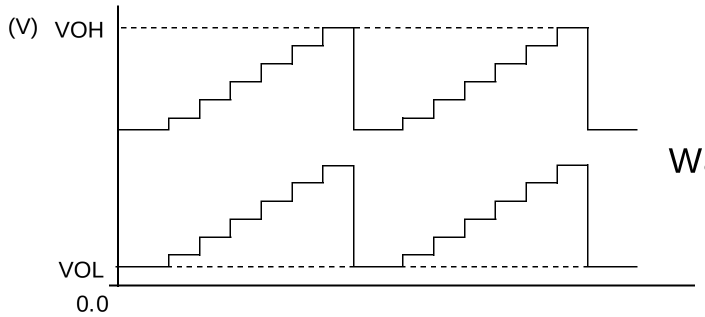
If SW connect is not designated RGB Input SW :
SW(30,35,40)=a(b) SW(32,37,42)=b (a),SW(2,5,9,16,19,20,24,25,26,27)= a

Vcc=5V Ta=25 ºC

No	parameter	Symbol	Test Point	RGB Input Signal	SW Connect	BUS CTL (H) 00H Main cont	01H Sub cont 1	02H Sub cont 2	03H Sub cont 3	04H Main brt	05H Sub brt1	06H Sub brt2	07H Sub brt3	08H OSD Adj	09H INPUT SW	0AH OSD SW	Standard MIN	TYP	MAX	Unit	re-mark
63	Pin19 Input Current H	I_{19H}	I_{19}	−	SW(19)=b V19=5V	−	−	−	−	−	−	−	−	−	−	−	-1.0	0.0	—	uA	
64	Pin19 Input Current L	I_{19L}	I_{19}	−	SW(19)=b V19=0V	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	0.6	2.0	uA	
65	Pin20 Input Current H	I_{20H}	I_{20}	−	SW(20)=b V20=5V	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	-1.0	0.0	—	uA	
66	Pin20 Input Current L	I_{20L}	I_{20}	−	SW(20)=b V20=0V	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	0.6	2.0	uA	
67	Pin24 25 26 Input Current H	I_{OSDH}	I_{24} I_{25} I_{26}	−	SW(24,25,26)=b VOSD=5V	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	-2.0	-1.3	—	mA	
68	Pin24 25 26 Input Current L	I_{OSDL}	I_{24} I_{25} I_{26}	−	SW(24,25,26)=b VOSD=0V	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	1.3	2.0	mA	
69	Pin27 Input Current H	I_{27H}	I_{27}	−	SW(27)=b V27=5V	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	-2.0	-1.3	—	mA	
70	Pin27 Input Current L	I_{27L}	I_{27}	−	SW(27)=b V27=0V	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	—	1.3	2.0	mA	

1) Measuring conditions are as listed in supplementary Table.
Measured with a current meter at test point IA.

2) Decrease Main Bat or Sub Bat gradually, and measure the voltage when the bottom of waveform output is distorted. The voltage is called VOL.
Next, increase V30 gradually, and measure the voltage when the top of waveform output is distorted. The voltage is called VOH.Voltage Vomax is calculated by the equation below:
Vomax =VOH-VOL



3) Increase the input signal(SG2) at Input1 amplitude gradually, starting from 700mVp-p.
Measure the amplitude of the input signal when the output signal starts becoming distorted.

4) Increase the input signal(SG2) at Input amplitude gradually, starting from 700mVp-p.
Measure the amplitude of the input signal when the output signal starts becoming distorted.

5) Input SG1, and read the amplitude output at OUT(2,5,9). The amplitude is called VOUT(2,5,9).Maximum gain GV is calculated by the equation below:

$$GV = 20\ LOG \frac{VOUT}{0.7}\ \ (dB)$$

6) Relative maximum gain ΔGV is calculated by the equation below:

$$\Delta GV = VOUT(2) / VOUT(5),\ VOUT(5) / VOUT(9),\ VOUT(9) / VOUT(2)$$

7) Measuring the amplitude output at OUT(2,5,9). The measured value is called VOUT(2,5,9).

$$VC1=20\ LOG \frac{VOUT}{0.7}\ \ (dB)$$

8) Measuring condition and procedure are the same as described in Note7.

9) Measuring condition and procedure are the same as described in Note7.

10) Measuring condition and procedure are the same as described in Note7.

11) Measuring condition and procedure are the same as described in Note7.

12) Measuring condition and procedure are the same as described in Note7.

13) Measuring condition and procedure are the same as described in Note7.

14) Measure the DC voltage output at OUT(2,5,9). The measured value is called VB1.

15) Measuring condition and procedure are the same as described in Note14.

16) Measuring condition and procedure are the same as described in Note14.

17) Measuring condition and procedure are the same as described in Note14.

18) Measuring condition and procedure are the same as described in Note14.

19) First, SG3 to 1MHz is as input signal.
Control the main contrast in order that the amplitude of sine wave output is 2.0Vp-p.Control the brightness in order that the bottom of sine wave output is 1.0V.By the same way, measure the output amplitude when SG3 to 50MHz is as input signal.The measured value is called VOUT(2,5,9).
Frequency characteristics FC1(2,5,9) is calculated by the equation below:

$$FC1=20\ LOG\ \frac{VOUT\ \ Vp\text{-}p}{\text{output amplitude when imputed SG3(1MHz) : 2.0Vp-p}}\ (dB)$$

20) Relative characteristicsΔFC1 is calculated by the difference in the output between the channels.

21) Measuring condition and procedure are the same as described in Note19,expect SG3.

22) Relative characteristicsΔFC2 is calculated by the difference in the output between the channels.

23) SG3 to 1MHz is as input signal. Control the main contrast in order that the amplitude of sine wave output is 1.0Vp-p.By the same way, measure the output amplitude when SG3 to 180MHz is as input signal.

24) Relative characteristics ΔFC3 is calculated by the difference in the output between the channels.

25) Change OUT SW from a to b .Measuring condition and procedure are the same as described in Note19

26) Relative characteristics ΔFC4 is calculated by the difference in the output between the channels.

27) Input SG3 (50MHz) to pin42 only, set Input SW of IIC BUS to 0 and then measure the waveform amplitude output at OUT(2).The measured value is called VOUT(2).On equal terms set Input SW of IIC BUS to 1.And then measure the waveform amplitude output at OUT(2)'.Crosstalk INCT1 is calculated by the equation below:

$$INCT1 = 20\ LOG \frac{VOUT(2)'}{VOUT(2)} \quad (dB)$$

Similarly measure the waveform amplitude output at OUT(5) when signal input only Pin37 and OUT when signal input only Pin32 and calculate crosstalk

28) Measuring condition and procedure are the same as described in Note27,expect SG3 to 180MHz.

29) Input SG3 (50MHz) to pin40 only, set Input SW of IIC BUS to 1 and then measure the waveform amplitude output at OUT(2).The measured value is called VOUT(2).On equal terms set Input SW of IIC BUS to 0.And then measure the waveform amplitude output at OUT(2)'.Crosstalk INCT2 is calculated by the equation below:

$$INCT2 = 20\ LOG \frac{VOUT(2)'}{VOUT(2)} \quad (dB)$$

Similarly measure the waveform amplitude output at OUT(5) when signal input only Pin35 and OUT when signal input only Pin30 and calculate crosstalk.

30) Measuring condition and procedure are the same as described in Note29,expect SG3 to 180MHz.

31) Input SG3 (50MHz) to pin42 only, and then measure the waveform amplitude output at OUT(2,5,9).The measured value is called VOUT(2,5,9).Crosstalk CHCT1 is calculated by the equation below:

$$CHCT1 = 20\ LOG \frac{VOUT(5,9)}{VOUT(2)} \quad (dB)$$

32) Measuring condition and procedure are the same as described in Note31,expect SG3 to 180MHz.

33) Input SG3 (50MHz) to pin37 only, and then measure the waveform amplitude output at OUT(2,5,9).The measured value is called VOUT(2,5,9).Crosstalk CHCT2 is calculated by the equation below:

$$CHCT2 = 20\ LOG \frac{VOUT(2,9)}{VOUT(5)} \quad (dB)$$

34) Measuring condition and procedure are the same as described in Note33,expect SG3 to 180MHz.

35) Input SG3 (50MHz) to pin32 only, and then measure the waveform amplitude output at OUT(2,5,9).The measured value is called VOUT(2,5,9).Crosstalk CHCT3 is calculated by the equation below:

$$CHCT3 = 20\ LOG \frac{VOUT(2,5)}{VOUT(9)} \quad (dB)$$

36) Measuring condition and procedure are the same as described in Note35,expect SG3 to 180MHz.

37) Control the contrast in order that the amplitude of output signal is 2.0Vp-p.
Control the brightness in order that the Black level of output signal is 1.0V.
Measure the time needed for the input pulse to rise from 10 % to 90 % (Trin) and for the output pulse to rise from 10 % to 90 % (Trout) with an active prove.
Pulse characteristics TAR is calculated by the equations below :

$$Tr1 = \sqrt{(Trin)^2 - (Trout)^2} \quad (nsec)$$

38) Relative Pulse characteristics ΔTr1 is calculated by the equation below:

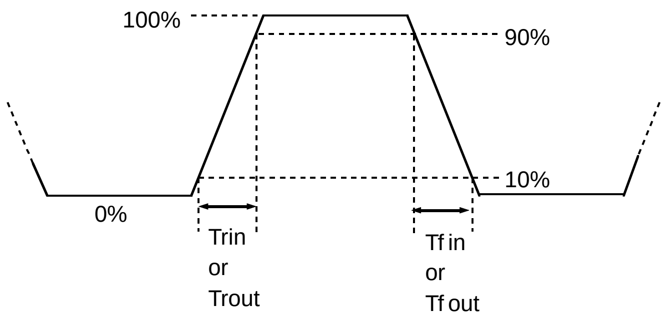
ΔTr1= VOUT(2) - VOUT(5) , VOUT(5) - VOUT(9) , VOUT(9) - VOUT(2)

39) Measure the time needed for the input pulse to fall from 90 % to 10 % (Tfin) and for the output pulse to fall from 90 % to 10 % (Tfout) with an active prove.
Pulse characteristics TO is calculated by the equations below :

$$Tf1 = \sqrt{(Tfin)^2 - (Tfout)^2} \quad (nsec)$$

40) Relative Pulse characteristics ΔTf1 is calculated by the equation below:

Δ Tf1 = VOUT(2) - VOUT(5) , VOUT(5) - VOUT(9) , VOUT(9) - VOUT(2)



41) Change SW(2,5,9) from (a) to (b) . Measuring condition and procedure are the same as described in Note37.

42) Measuring condition and procedure are the same as described in Note39,except of SW(2,5,9) condition.

43) Change SW(2,5,9) from (a) to (b) . Measuring condition and procedure are the same as described in Note39.

44) Measuring condition and procedure are the same as described in Note40,except of SW(2,5,9) condition..

45) Reduce the SG4 input level gradually from 5.0Vp-p, monitoring the waveform output.Measure the top level of input pulse when the output pedestal voltage turn decrease with unstable.

46) Decrease the SG4 pulse width gradually from 0.Gus, monitoring the output. Measure the SG4 pulse width (a point of 1.5V) when the output pedestal voltage turn decrease with unstable.

47) Measure the time needed for the output pulse to rise from 10% to 90% (OTr) with an active prove.

48) Measure the time needed for the output pulse to fall from 90% to 10% (OTf) with an active prove.

49) Measure the amplitude output at OUT(2,5,9). The measured value is called VOUT(2,5,9), and is treated as Oaj1.

50) Measuring condition and procedure are the same as described in Note49.

51) Relative characteristics ΔOaj1 is calculated by the equation below:

ΔOaj1 = VOUT(2) / VOUT(5), VOUT(5) / VOUT(9), VOUT(9) / VOUT(2)

52) Measuring condition and procedure are the same as described in Note49.

53) Measuring condition and procedure are the same as described in Note51.

54) Measuring condition and procedure are the same as described in Note49.

55) Measuring condition and procedure are the same as described in Note49.

56) Measuring condition and procedure are the same as described in Note51.

57) Measuring condition and procedure are the same as described in Note49.

58) Measuring condition and procedure are the same as described in Note51.

59) Measuring the amplitude output at OUT(2,5,9). The measured value is called OBLK.

60) Relative OSD BLK characteristics ΔOBLK is calculated by the equation below:

ΔOBLK = VOUT(2) / VOUT(5), VOUT(5) / VOUT(9), VOUT(9) / VOUT(2)

61) Reduce the SG5 input level gradually, monitoring output.Measure the SG5 level when the output reaches 0V. The measured value is called VthOSD.

62) Confirm that output signal is being blanked by the SG5 at the time. Monitoring to output signal, decreasing the level of SG5. Measure the top level of SG6 when the blanking period is disappeared. The measured value is called VthBLK.

63) Supply 5V to V19,and then measure input current into Pin19

64) Supply 0V to V19,and then measure input current into Pin19

65) Supply 5V to V20,and then measure input current into Pin20

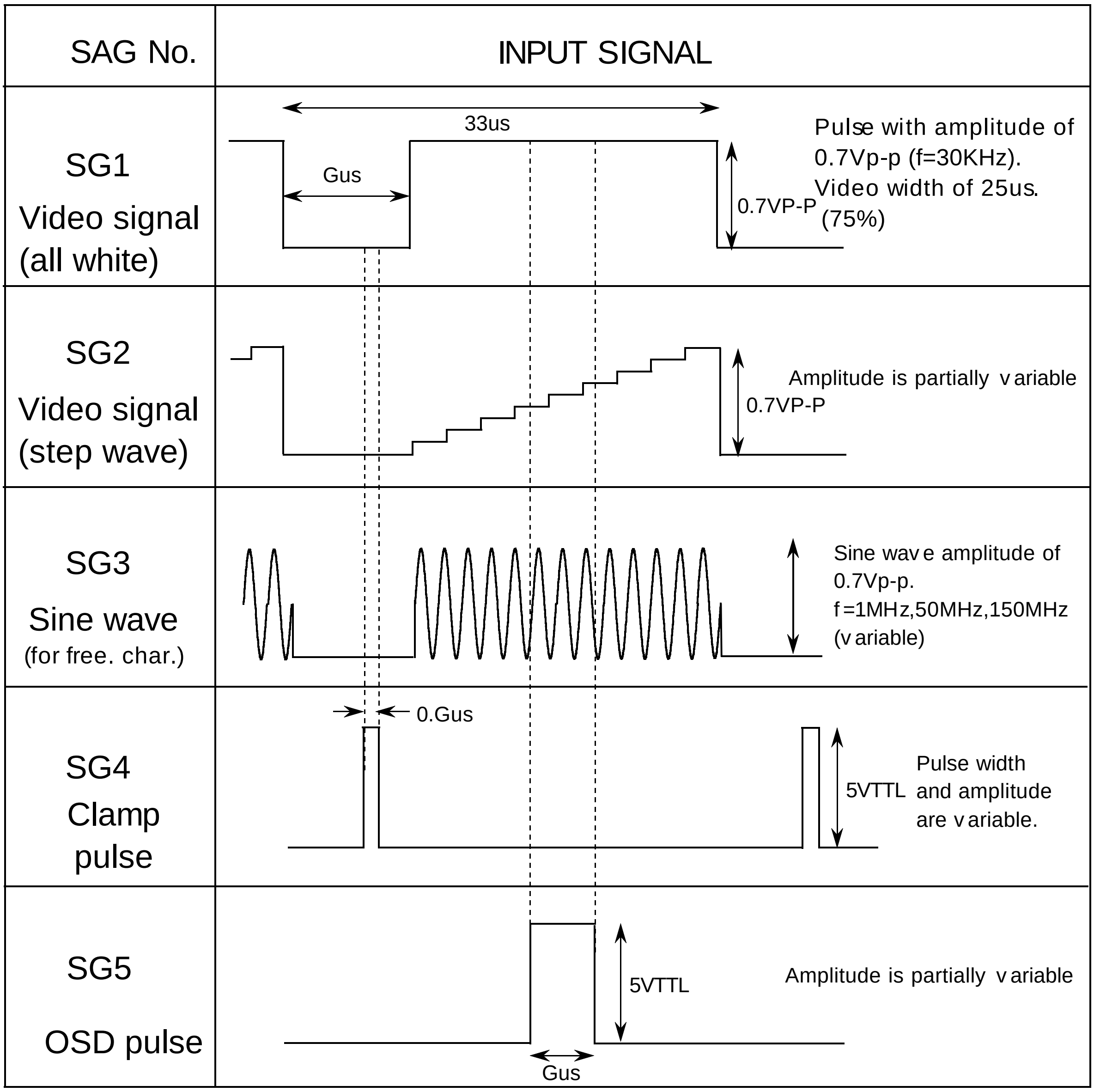
66) Supply 0V to V20,and then measure input current into Pin20

67) Supply 5V to V(24,25,26)and then measure input current into Pin(24,25,26)

68) Supply 0V to V(24,25,26)and then measure input current into Pin(24,25,26)

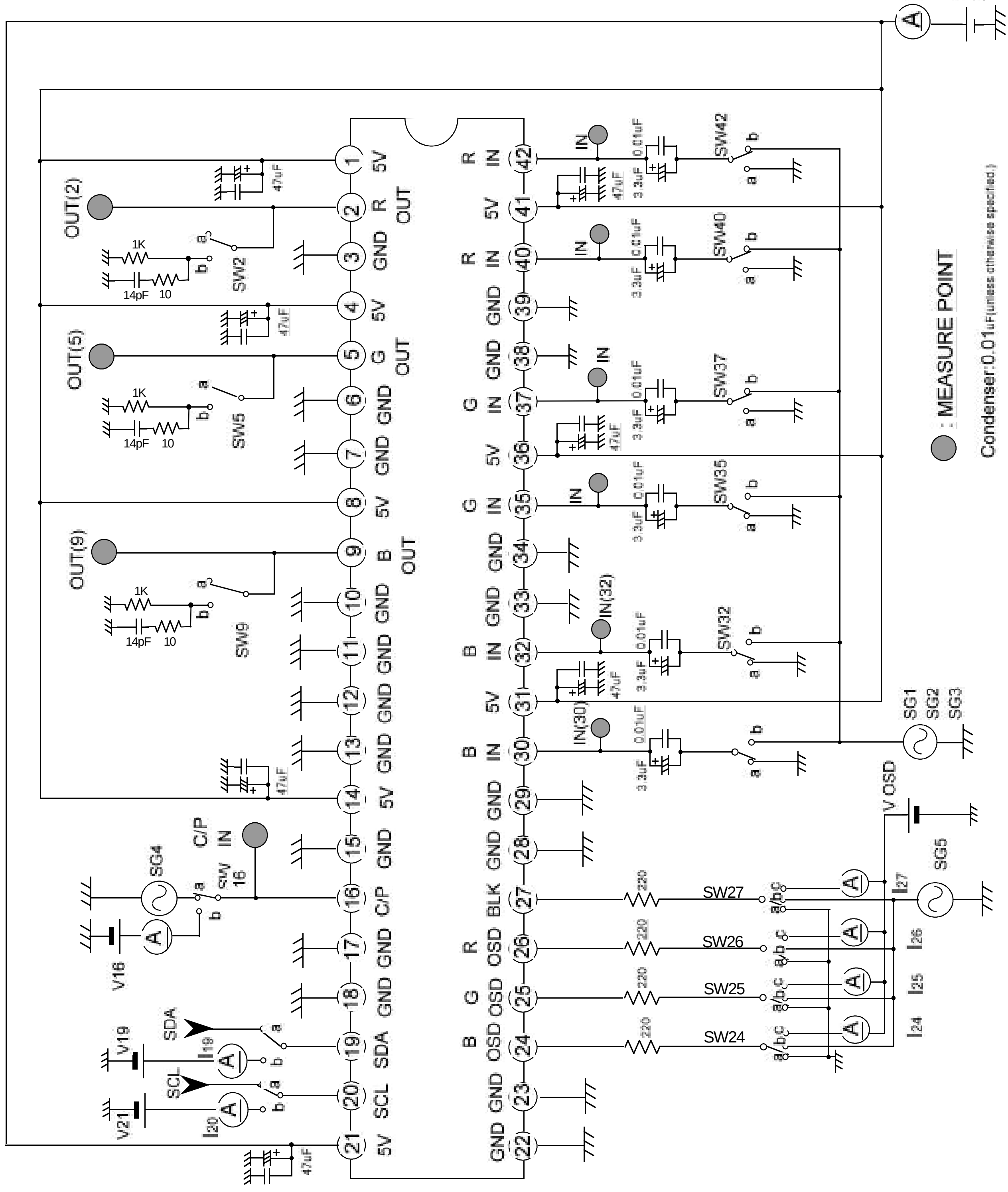
69) Supply 5V to V27,and then measure input current into Pin27

70) Supply 0V to V27,and then measure input current into Pin27


SAG No.
INPUT SIGNAL
SG1
Video signal
(all white)
33us
Gus
0.7VP-P
Pulse with amplitude of
0.7Vp-p (f=30KHz).
Video width of 25us.
(75%)
SG2
Video signal
(step wave)
0.7VP-P
Amplitude is partially variable
SG3
Sine wave
(for free. char.)
Sine wave amplitude of
0.7Vp-p.
f=1MHz,50MHz,150MHz
(variable)
SG4
Clamp
pulse
0.Gus
5VTTL
Pulse width
and amplitude
are variable.
SG5
OSD pulse
5VTTL
Amplitude is partially variable
Gus

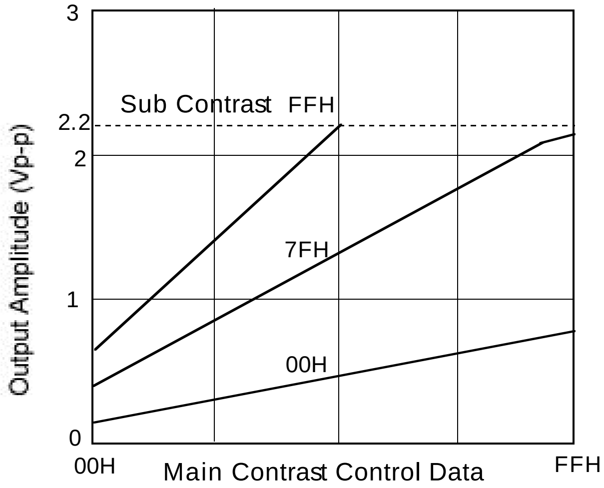
fH=30KHz

TEST CIRCUIT

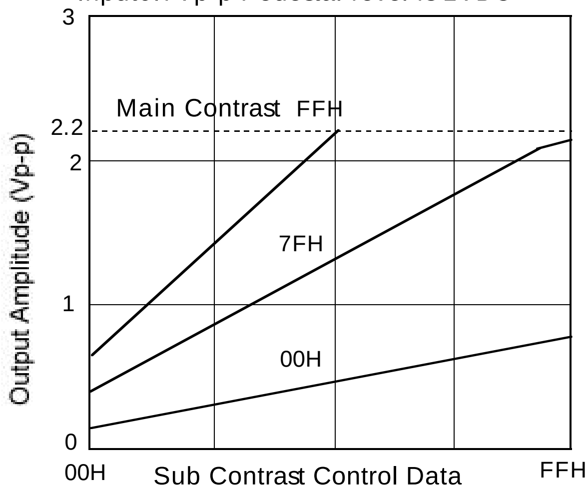


Electrical Characteristics

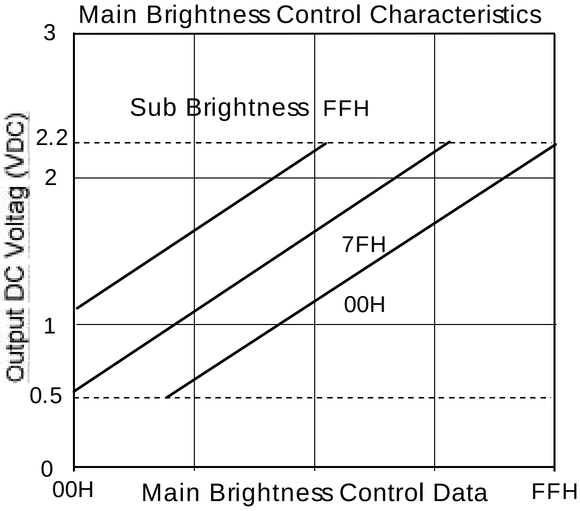
Main Contrast Control Characteristics
Input0.7Vp-p Pedestal revel is 1VDC



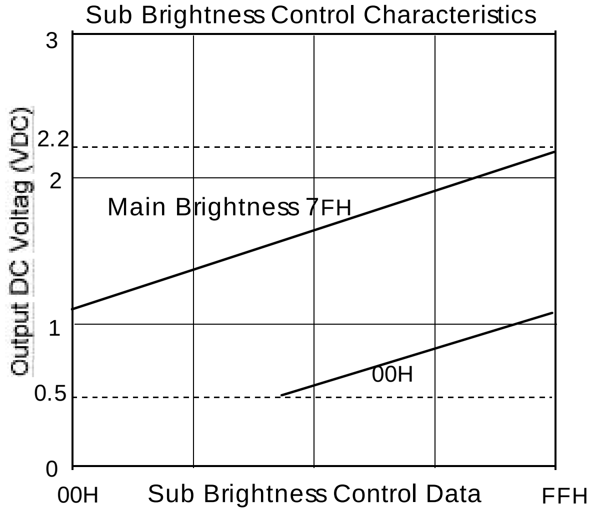
Sub Contrast Control Characteristics
Input0.7Vp-p Pedestal revel is 1VDC



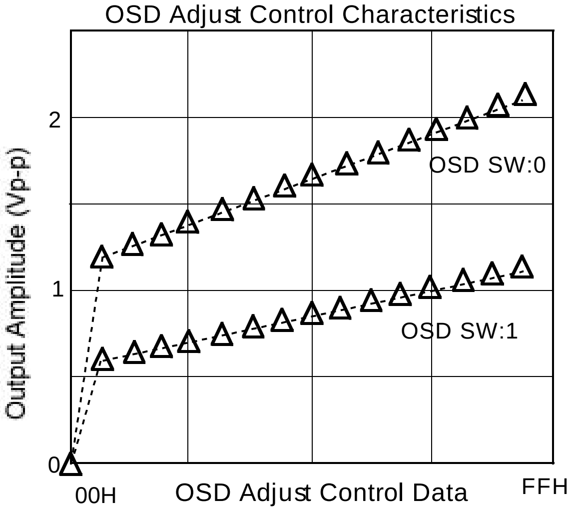
Main Brightness Control Characteristics



Sub Brightness Control Characteristics



OSD Adjust Control Characteristics

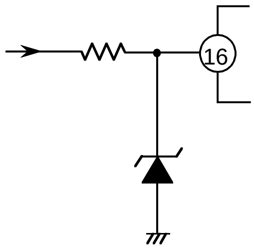


Application Method

CLAMP PULSE INPUT

Clamp pulse width is recommended
above 15 KHz, 1.0 usec
above 30 KHz, 0.5 usec
above 64 KHz, 0.3 usec

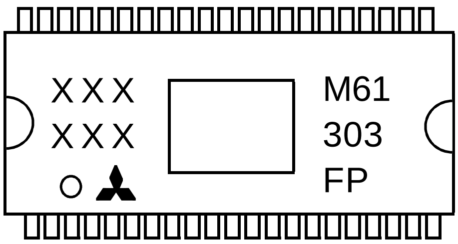
The clamp pulse circuit in ordinary set is a long round about way, and beside high voltage, sometimes connected to external terminal, it is very easy affected by large surge.
Therefore, the Fig. shown right is recommended.



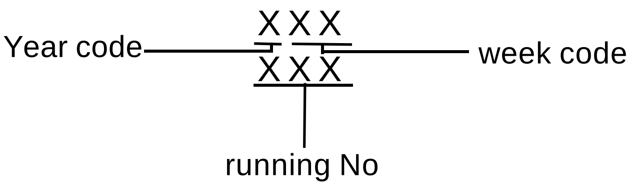
Notice of application

1.Recommended pedestal voltage of IC output signal is 1V.
2.This IC has 2 Input routes. When the 2 Input signal input at different timing,clamp pulses which synchronize with selected signals is needed. In this case,it is necessary to change clamp pulses by the outside circuit.
3.Connect cuppling Cap(0.01u) as nearer as can to Vcc Pin. If not response of waveform is getting wrong.

MARK



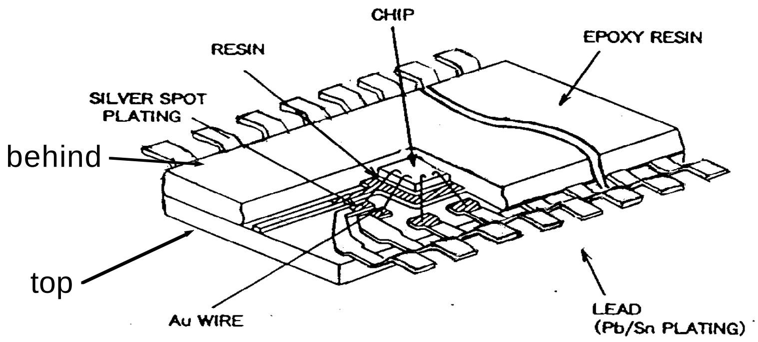
Lot No.



Material

Resin:	Epoxy resin
Lead plating:	Solder plating
Frame:	Copper alloy
Die bond:	resin
Wiring:	Au
Passibation:	Nitride coat

Construction



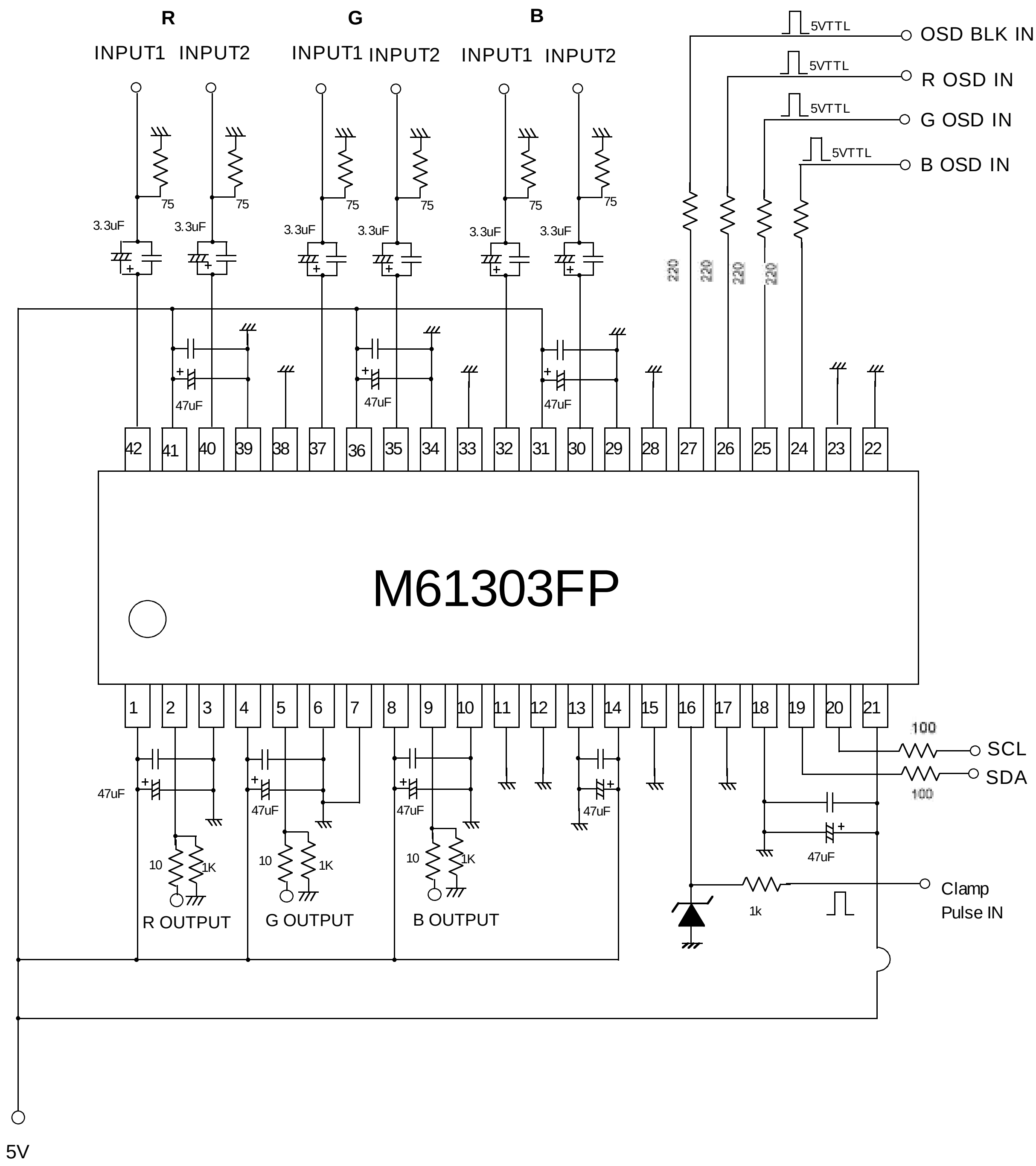
Country of origin

Japan

Factory of mass production

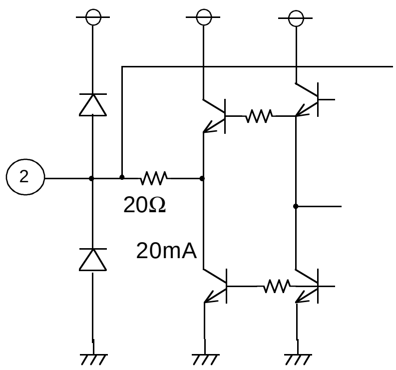
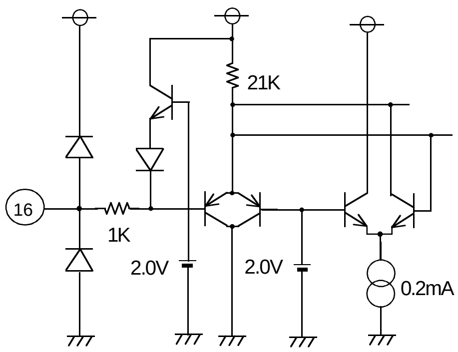
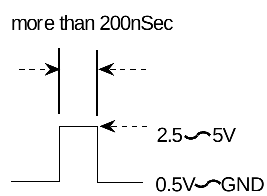
FUKUOKA Factory

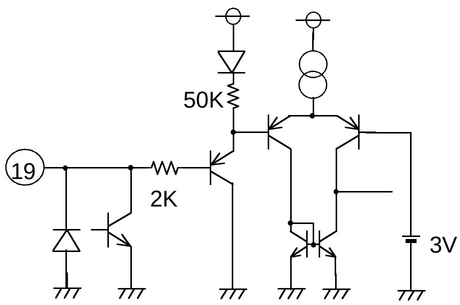
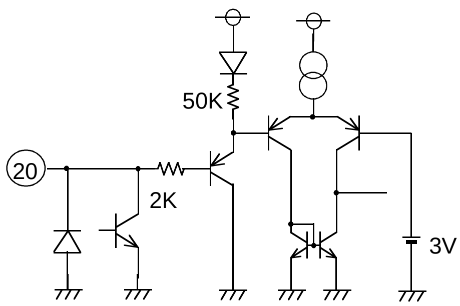
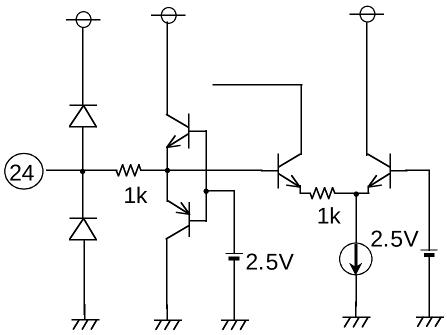
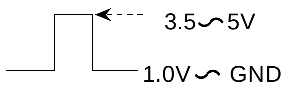
APPLICATION EXAMPLE

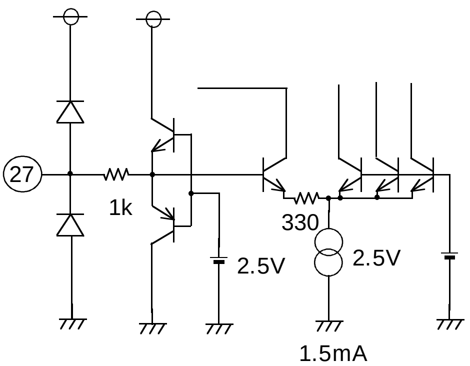
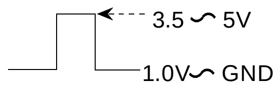
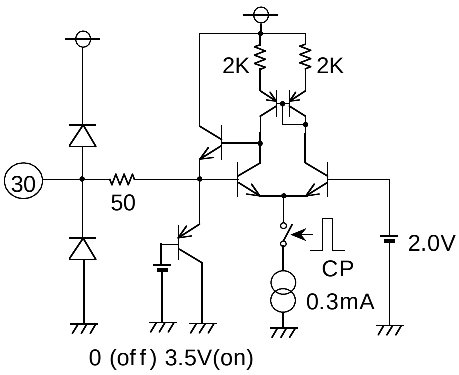


Condenser:0.01uF(unless otherwise specified.)

Terminal Description

No.	Name	DC Voltage (V)	peripheral Circuit	Remark
1 4 8	R VCC 2 G VCC 2 B VCC2	5	——	——
2 5 9	OUTPUT (R) OUTPUT (G) OUTPUT (B)	—		Pull down about 1k for valance control Tr and Tf
3 6 10	R GND 2 G GND 2 B GND 2	GND	——	——
13	Analog Gnd	GND	——	——
14	Analog Vcc	5	——	——
16	Clamp Pulse In	—		 Input at low impedance.

No.	Name	DC Voltage (V)	peripheral Circuit	Remark
18	Digital GND	GND	——	——
19	SDA	—		SDA for II C (Serial data line) VTH=2.3V
20	SCL	—		SCL for II C (Serial clock line) VTH=2.3V
21	Digital Vcc	5V	——	——
24 25 26	B OSD IN G OSD IN R OSD IN	—		Input pulses 

No.	Name	DC Voltage (V)	peripheral Circuit	Remark
27	OSD BLK IN	—		Input pulses  Connected to GND if not used.
29 34 39	B GND 1 G GND 1 R GND 1	GND	—	—
30 32 35 37 40 42	B INPUT 2 B INPUT 1 G INPUT 2 G INPUT 1 R INPUT 2 R INPUT 1	2.1 V		· Clamped to about 2.1 V due to clamp pulses from pin16. · Input at low impedance.
31 36 41	R VCC 1 G VCC 1 B VCC 1	5	—	—
7 11 12 15 17 22 23 28 33 38	NC	—	—	Connect GND for radiation of heat