SONY

CXA1871S

NTSC/PAL Y/C/Jungle

Description

The CXA1871S is a bipolar IC which integrates the NTSC and PAL color TV luminance signal processing, chroma signal processing, sync signal processing, and RGB signal processing onto a single chip.

Features

- I^2C bus compatible. Various types of adjustments and user controls performed with two bus lines SCL and SDA.
- H and V oscillation frequencies made non-adjusting with a countdown system.
- Non-adjusting Y system filters (chroma trap, delay line)
- Built-in V picture distortion correction circuit
- Built-in delay line aperture compensation
- Auto cut-off function for automatic CRT cut-off adjustment and compensation for changes with time
- Multiple inputs
  Composite Video 2 systems
  (Built-in 2-input, 1-output video switch)
  Y/C separation input: 1 system
  On screen display input: 1 system
- Multiple system configuration possible using a non-adjusting SECAM chroma decoder.

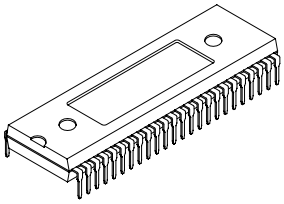
Applications

Color TV

Structure

Bipolar silicon monolithic IC

48 pin SDIP (Plastic)



Absolute Maximum Ratings (Ta=25 °C)

• Supply voltage	V_{CC}	12	V
• Operating temperature	Topr	–20 to +75	°C
• Storage temperature	Tstg	–65 to +150	°C
• Allowable power dissipation	P_D	1.8	W

Operating Conditions

Supply voltage	V_{CC}	9±0.5	V

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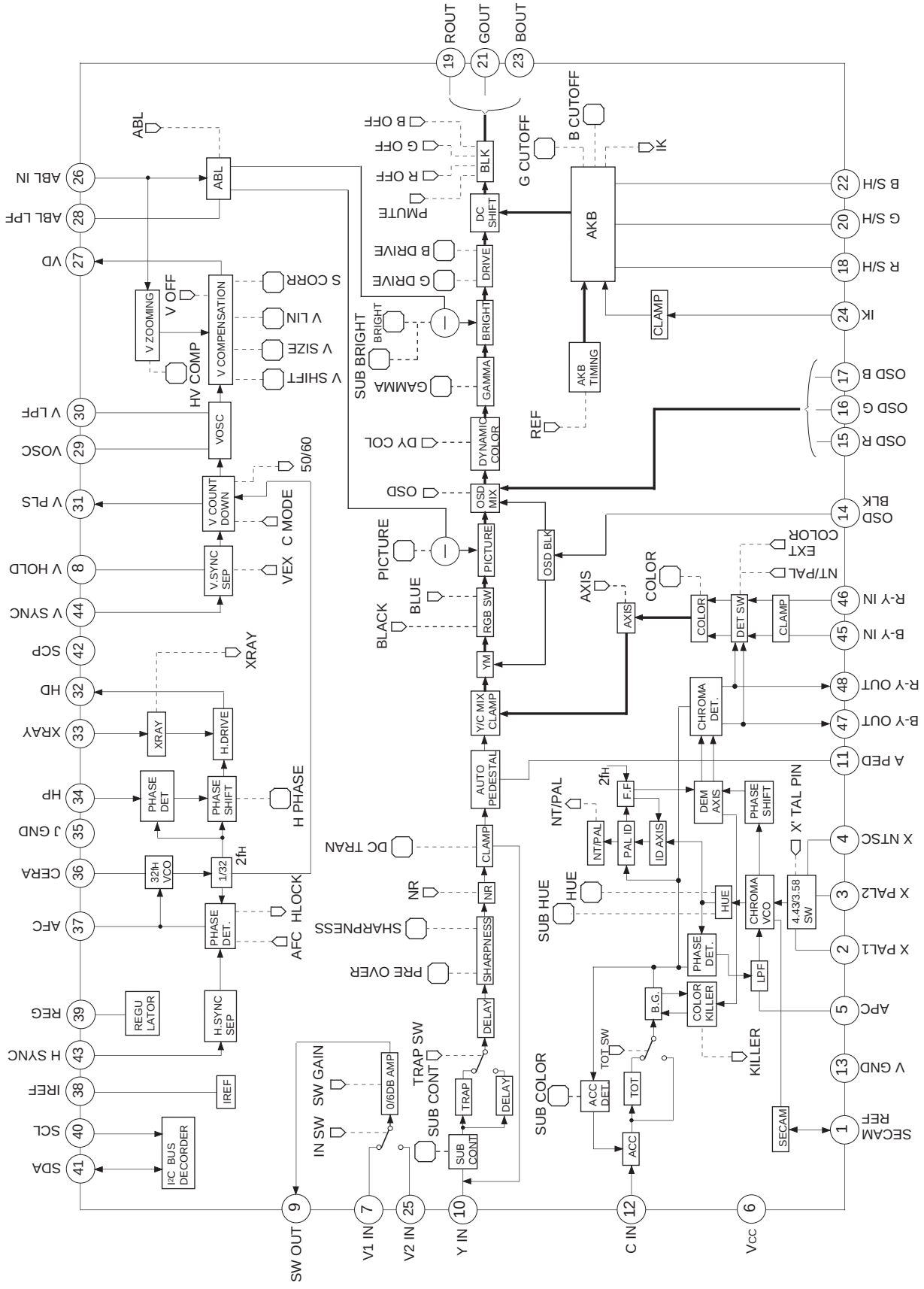
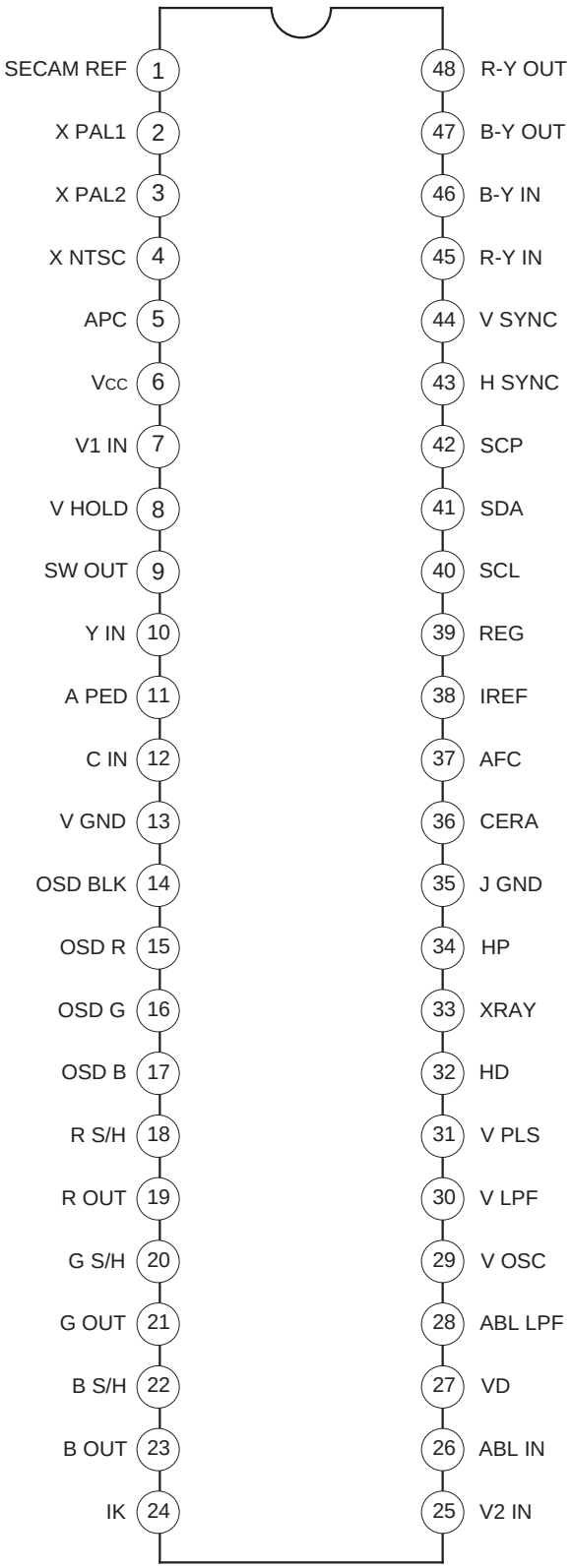
E95432-TE

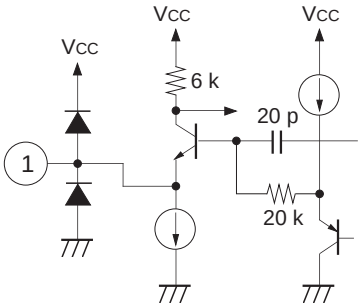
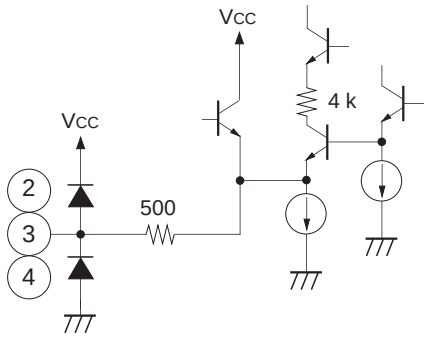
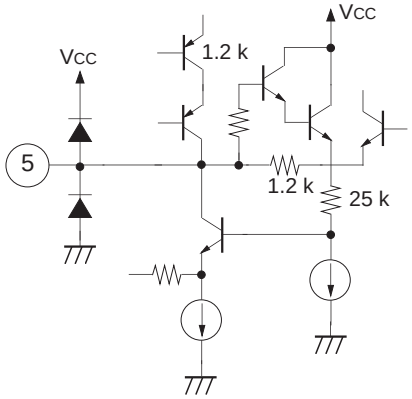
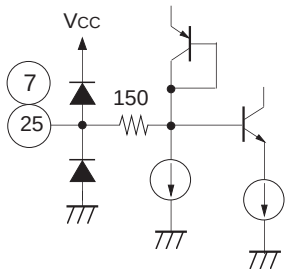
Block Diagram

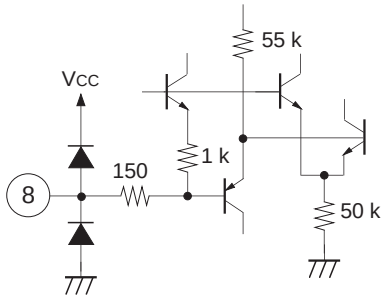
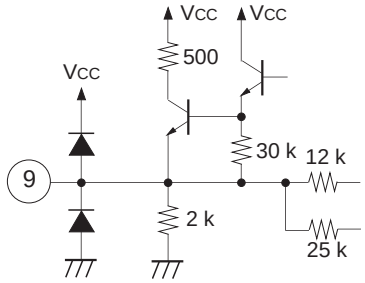
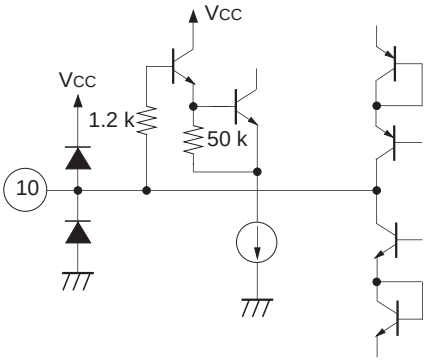
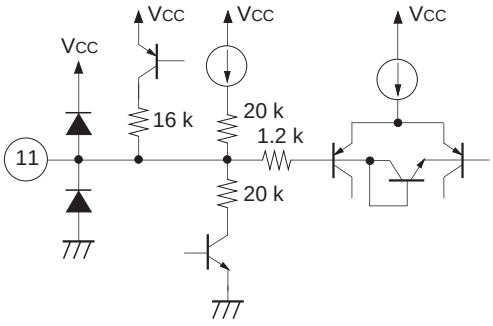


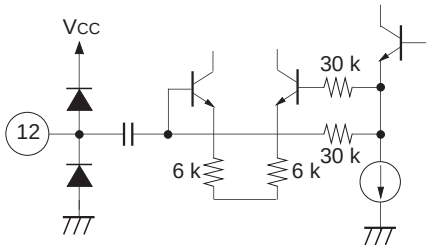
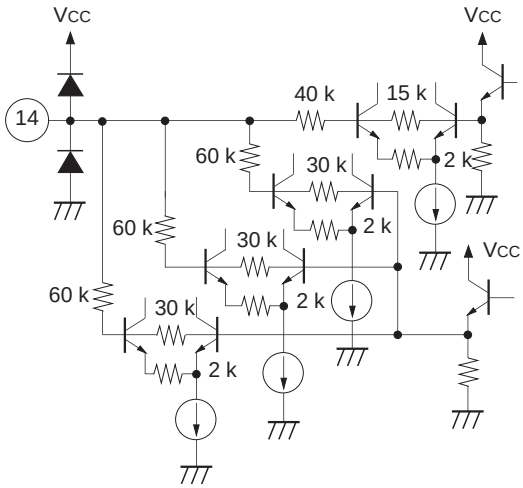
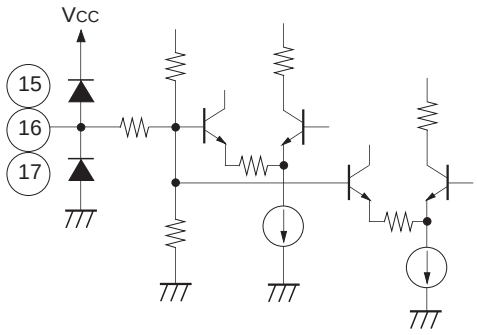
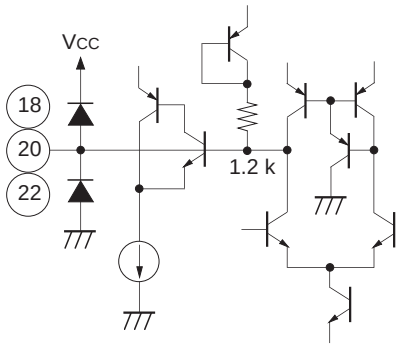
Pin Configuration

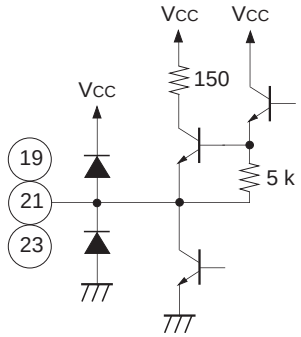
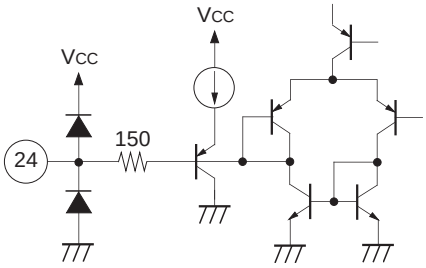
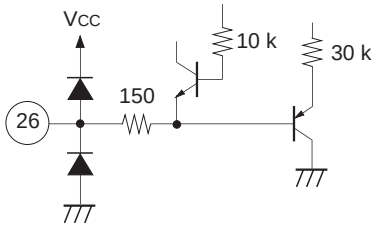
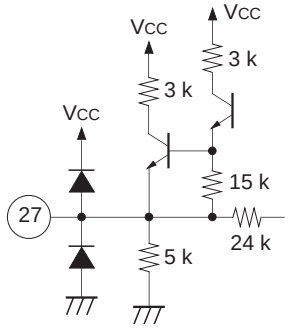
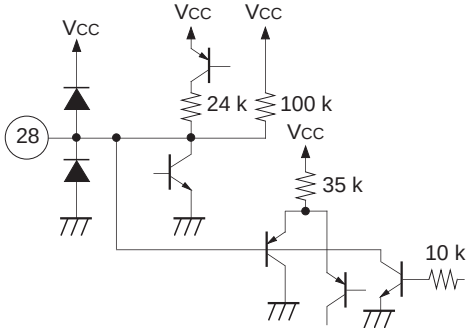


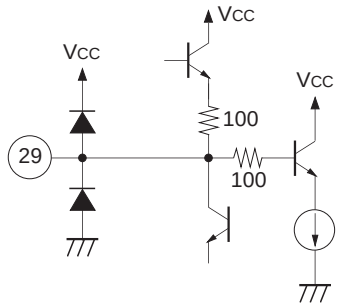
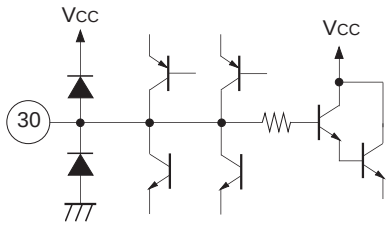
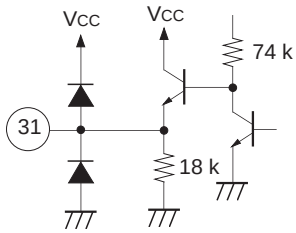
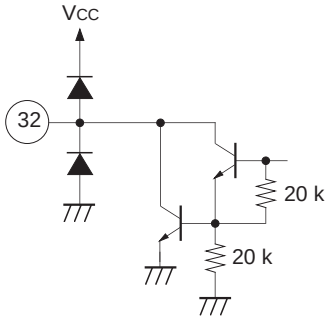
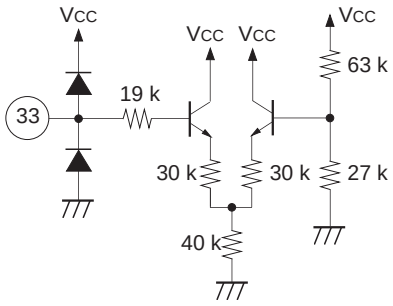
Pin Description

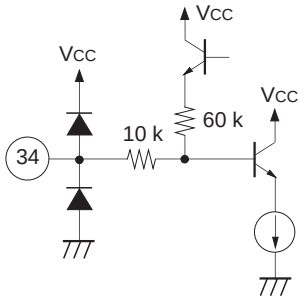
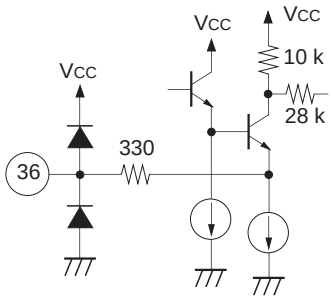
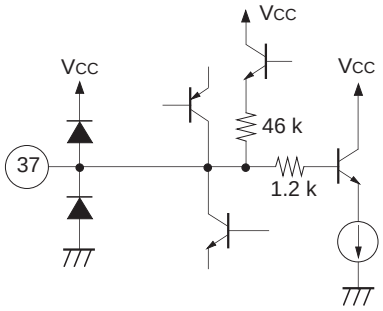
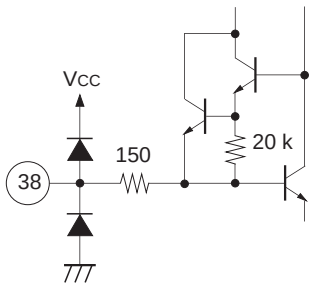
Pin No.	Symbol	Pin voltage	Equivalent circuit	Description
1	SECAM REF	1.3 V		When the IC is in the SECAM identification mode, the 4.43 MHz VCO oscillation waveform is output from this pin only during the VBLK period centering on DC = 1 V. If current of 150 µA is led from this pin during this identification mode, the IC switches to the SECAM mode. In the SECAM mode, DC = 5 V.
2 3 4	X PAL 1 X PAL 2 X NTSC	2.6 V		Crystal oscillator connection pins. Connect the PAL/N and 4.43 MHz crystals to Pin 2, the PAL/M crystal to Pin 3, and the NTSC crystal to Pin 4.
5	APC	5 V		APC lag-lead filter CR connection pin.
6	Vcc	9 V		Power supply pin.
7 25	V1 IN V2 IN	2 V		Video switch input pins. Sync tip clamping is performed, so input via capacitors.

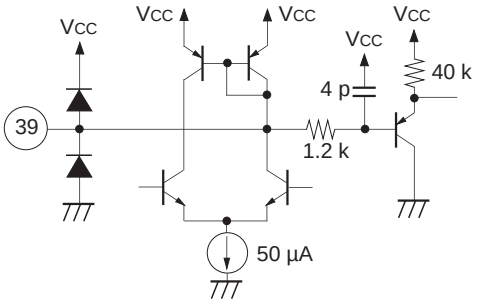
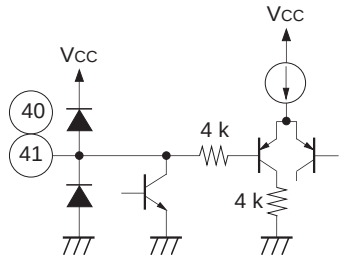
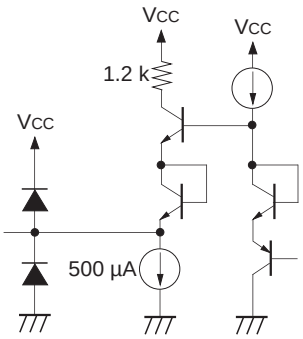
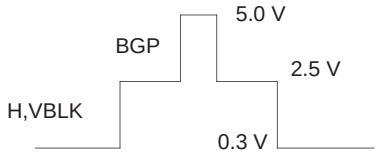
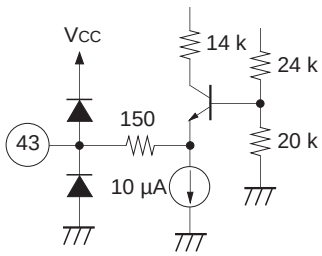
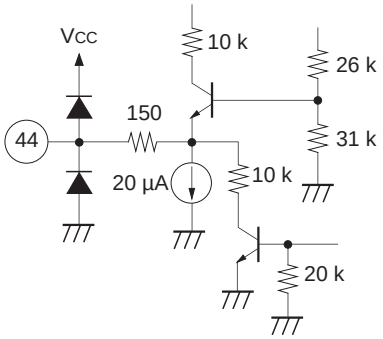
Pin No.	Symbol	Pin voltage	Equivalent circuit	Description
8	V HOLD	0.7 V		Peak hold pin for V sync separation. Connect a capacitor.
9	SW OUT	—		Video switch output pin.
10	Y IN	3.5 V		Y signal input pin. Input via a capacitor. Standard input level: 2 Vp-p
11	A PED	3.5 V		Auto pedestal (black stretch) black peak hold pin. Connect a capacitor.

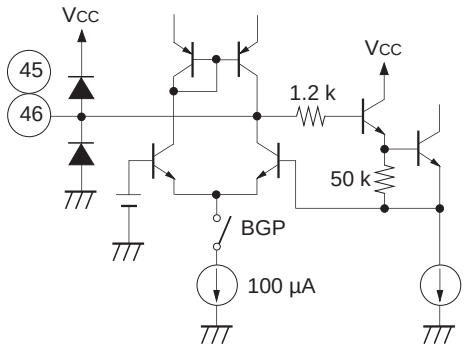
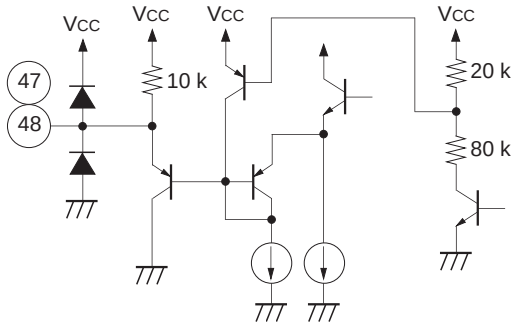
Pin No.	Symbol	Pin voltage	Equivalent circuit	Description
12	C IN	—		Chroma signal input pin. Standard input level (burst level) : 570 mVp-p
13	V GND	—		Video system (Y/C/RGB) GND pin.
14	OSD BLK	—		Blanking signal input pin for OSD RGB input. 0 to 1 V: Blanking not performed. 2 to 3 V: Signal from Y IN/C IN lowered by –6 dB. 4 to 6 V: R, G and B outputs become lower than black level.
15 16 17	OSD R OSD G OSD B	—		Digital R, G and B signal input pins for on screen display. 0 to 1 V: No OSD display. 2 to 3 V: OSD level 49 IRE (34 IRE) 4 to 6 V: OSD level 96 IRE (67 IRE) Figures in parentheses are for when the I²C OSD register is set to 0.
18 20 22	R S/H G S/H B S/H	—		Sample-and-hold pins for R, G and B AKB (Auto Kinetic Bias). Connect to GND via capacitors.

Pin No.	Symbol	Pin voltage	Equivalent circuit	Description
19 21 23	R OUT G OUT B OUT	—		R, G and B output pins.
24	IK	—		Inputs the signal obtained by converting the CRT beam current (IK) into voltage. Connect to an emitter follower via a capacitor.
26	ABL IN	—		ABL voltage input pin.
27	VD	—		Vertical deflection sawtooth wave output pin.
28	ABL LPF	—		ABL signal LPF pin. Connect a capacitor. If the AKB loop is unstable when the power is turned on, this pin is lowered to around 0.3 V.

Pin No.	Symbol	Pin voltage	Equivalent circuit	Description
29	V OSC	—		Connect a capacitor to generate the V sawtooth wave.
30	V LPF	5 V		Connect a capacitor to hold the AGC voltage which maintains the V sawtooth wave at a constant amplitude.
31	V PLS	—		V pulse output pin. A negative polarity pulse 3 to 3.5 H width is output from this pin. High level: 4.5 V Low level: 0 V
32	HD	—		H drive output pin. This pin is output at the open collector.
33	XRAY	—		X-ray protection circuit input pin. When a pulse with a width of 7 V or more is input, HD output becomes low and R, G and B outputs are blanked. This status is maintained until the power supply is turned off. Vilmax = 2.4 V Vihmin = 3.0 V

Pin No.	Symbol	Pin voltage	Equivalent circuit	Description
34	HP	3.3 V (at no signal)		H pulse input pin. Inputs a 3 to 5 Vp-p signal via a capacitor.
35	J GND	—		Jungle system (H/V) GND pin.
36	CERA	2.3 V		Connect a 32 fh (503.5 kHz) ceramic oscillator.
37	AFC	3.2 V		AFC lag-lead filter CR connection pin.
38	IREF	2.6 V		Connect a 15 kΩ resistor between this pin and GND.

Pin No.	Symbol	Pin voltage	Equivalent circuit	Description
39	REG	7 V		Regulator pin for voltage generated internally from Vcc. Connect a capacitor for stabilization.
40 41	SCL SDA	—		I²C bus SCL (Serial Clock) and SDA (Serial Data) pins. Vilmax = 1.5 V Vihmin = 3 V Volmax = 0.4 V
42	SCP	—		Outputs BGP, HBLK and VBLK as SCP (Sand Cathle Pulse). The Typ. waveform is as follows. 
43	H SYNC	2.6 V		H sync separation input pin. Inputs a 2 Vp-p video signal via a capacitor and resistor.
44	V SYNC	3.8 V		V sync separation input pin. Inputs a 2 Vp-p video signal via a capacitor and resistor.

Pin No.	Symbol	Pin voltage	Equivalent circuit	Description
45 46	R-Y IN B-Y IN	5.2 V		Color difference signal input pins. Input via capacitors. Standard input level B-Y: 1.33 Vp-p R-Y: 1.05 Vp-p
47 48	B-Y OUT R-Y OUT	5 V		Color difference signal output pins. Standard input level B-Y: 0.665 Vp-p R-Y: 0.525 Vp-p

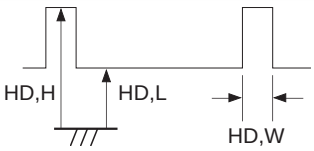
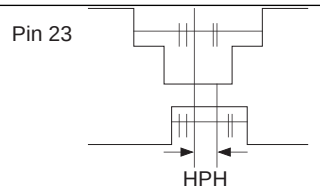
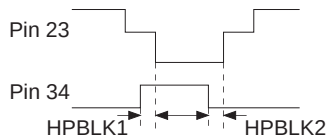
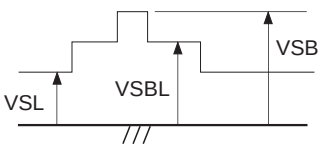
Electrical Characteristics

Setting conditions

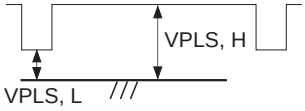
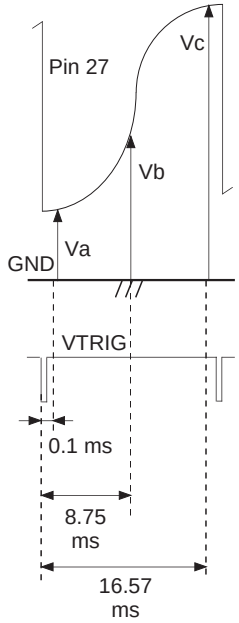
- Ta = 25 °C, V_{CC} = 9 V
- I^2C bus register should be set to "I^2C Bus Register Initial Settings".

No.	Item	Symbol	Measurement conditions	Measurement pin	Measurement method	Min.	Typ.	Max.	Unit
1	Current consumption 1	ICC1		6	Measure the V_{CC} pin inflow current.	70	105	140	mA

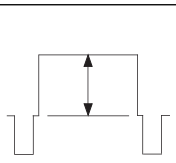
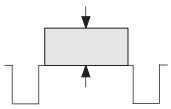
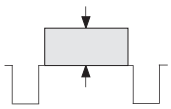
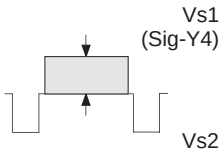
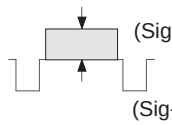
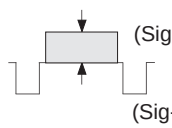
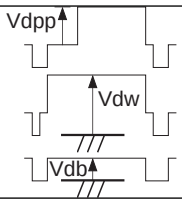
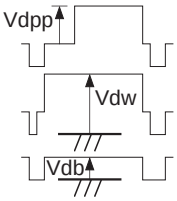
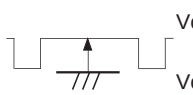
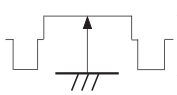
H system items

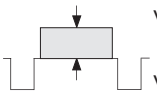
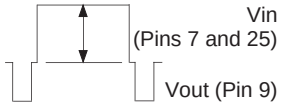
No.	Item	Symbol	Measurement conditions	Measurement pin	Measurement method	Min.	Typ.	Max.	Unit
2	Horizontal free running frequency	Hfree		32		15.47	15.65	15.83	kHz
3	Horizontal sync pull-in range	ΔH	Video In: Sig-H2,H3 AFC: 0		Check that I^2C register HLOCK is 1.	–400	—	400	Hz
4	AFC gain 1	AFCmax	Video In: Sig-H6 AFC: 0 Video In: Sig-H7 AFC: 0	34	t1: Video In: Time from fall of Sig-H6 to rise of Pin 34. t2: Video In: Time from fall of Sig-H7 to rise of Pin 34. AFCmax=t1-t2	0.12	0.30	0.48	µs
5	AFC gain 2	AFCcen	Video In: Sig-H6 AFC: 1 Video In: Sig-H7 AFC: 1	34	AFCcen=t1-t2	—	0.5	—	µs
6	AFC gain 3	AFCmin	Video In: Sig-H6 AFC: 2 Video In: Sig-H7 AFC: 2	34	AFCmin=t1-t2	0.75	1.2	1.75	µs
7	HD output pulse width	HD, W	Video In: Sig-H1	32		24	26	28	µs
8	HD output high level	HD, H	Video In: Sig-H1			8.7	9	—	V
9	HD output low level	HD, L	Video In: Sig-H1			0.5	0.8	1.1	V
10	Horizontal phase operating range 1	HPHmax	Video In: Sig-Y1 HPHASE: F	23 34		–4.3	–3.3	–2.3	µs
11	Horizontal phase operating range 2	HPHcen	Video In: Sig-Y1 HPHASE: 7			–1.5	–0.5	0.5	µs
12	Horizontal phase operating range 3	HPHmin	Video In: Sig-Y1 HPHASE: 0			1.3	2.3	3.3	µs
13	HP blanking delay time 1	HPBLK1	Video In: Sig-Y1	23 34		—	100	—	ns
14	HP blanking delay time 2	HPBLK2				—	100	—	ns
15	SCP BGP output level	VSB		42		4	5.0	6	V
16	SCP BLK output level	VSBL					2.5		V
17	SCP low level	VSL					0.3		V
18	Overvoltage protection circuit VTH	XVTH		32	Check that HD appears at 2.4 V and disappears at 2.8 V.	2.4	2.6	2.8	V

V system items

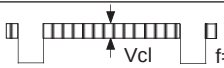
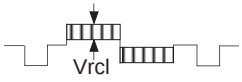
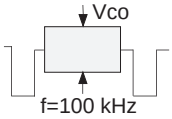
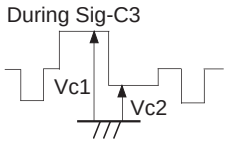
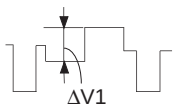
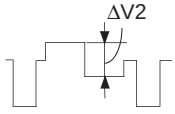
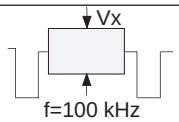
No.	Item	Symbol	Measurement conditions		Measurement pin	Measurement method		Min.	Typ.	Max.	Unit
19	V PLS high level	VPLS, H	Video In:Sig-V1		31			4	4.5	5	V
20	V PLS low level	VPLS, L						0	0.1	0.5	V
21	VD output center voltage	VDcen	V SHIFT:F	Video In: Sig-V1	27		Vb	2.75	2.9	3.05	V
22	V SHIFT variable range 1	VSHIFT–	V SHIFT:0				Vb-VDcen	–140	–125	–115	mV
23	V SHIFT variable range 2	VSHIFT+	V SHIFT:1F				Vb-VDcen	110	120	140	mV
24	V SIZE variable range 1	VSIZE–	V SIZE:0				Vc-Va	0.9	1.1	1.2	V
25	V SIZE variable range 2	VSIZE+	V SIZE:3F				Vc-Va	1.5	1.65	1.8	V
26	S CORR variable range 1		S CORR:0				Vsa=Va Vsc=Vc	45	65	85	mV
		ΔSa	S CORR:F				Va-Vsa				
27	S CORR variable range 2	ΔSc					Vc-Vsc	–55	–35	–15	mV
28	V LIN variable range 1		V LIN:0				Vla=Va Vlc=Vc	90	120	140	mV
		ΔLa	V LIN:F				Va-Vla				
29	V LIN variable range 2	ΔLc					Vc-Vlc	60	90	110	mV
30	V zooming 1		HV COMP: 0, Pin 26: 6 V				Vsmin= Vc-Va	0	3	15	mV
			HV COMP: 7, Pin 26: 6 V				Vsmax= Vc-Va				
		ΔVZ1	HV COMP: 0, Pin 26: 0 V				Vsmin- (Vc-Va)				
31	V zooming 2	ΔVZ2	HV COMP:7, Pin 26: 0 V				Vsmax- (Vc-Va)	60	80	100	mV

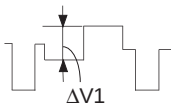
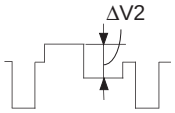
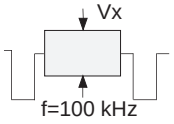
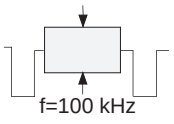
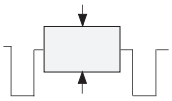
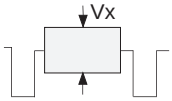
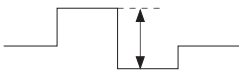
Y system items

No.	Item	Symbol	Measurement conditions		Measurement pin	Measurement method		Min.	Typ.	Max.	Unit
32	R output level	VR	Video In:Sig-Y1		19			—	2.5	—	V
33	Sub-contrast variable range 1	Gsc, max	SUBCONT: F	Video In: Sig-Y1			$20\log\frac{Vsc1}{VR}$	2.2	2.7	3.2	dB
34	Sub-contrast variable range 2	Gsc, min	SUBCONT: 0				$20\log\frac{Vsc2}{VR}$	–3.8	–3.3	–2.8	dB
35	Trap attenuation 1	ATT trap1	TRAP SW: 0	Video In: Sig-Y2 fsc= 3.58 MHz	19		$20\log\frac{Vtr2}{Vtr1}$	—	–30	–20	dB
			TRAP SW: 1								
36	Trap attenuation 2	ATT trap2	TRAP SW: 0	Video In: Sig-Y2 fsc= 4.43 MHz	19		$20\log\frac{Vtr2}{Vtr1}$	—	–30	–20	dB
			TRAP SW: 1								
37	Sharpness characteristics 1	Gsh, max	SHARP NESS: F	Video In: Sig-Y4	19		$20\log\frac{Vs2}{Vs1}$	5.5	7.0	8.5	dB
38	Sharpness characteristics 2	Gsh, cen	SHARP NESS: 7					1.5	2.5	4.5	dB
39	Sharpness characteristics 3	Gsh, min	SHARP NESS: 0	Video In: Sig-Y5				–7.5	–5.5	–3.0	dB
40	RGB output frequency response 1	Gfreq1	DELAY=0	Video In: Sig-Y4, Y6	19 21 23		$20\log\frac{Vf2}{Vf1}$	–6	–3.0	0	dB
41	RGB output frequency response 2	Gfreq2	DELAY=2	Video In: Sig-Y4, Y6	19 21 23		$20\log\frac{Vf2}{Vf1}$	–7	–4.2	–1	dB
42	DC transmission rate 1	Gdt1	DC TRAN: 0	Video In: Sig-Y3 Video In: Sig-Y1 Video In: Sig-H1	19		$\frac{Vdw-Vdb}{Vdpp}$	96	99	100	%
43	DC transmission rate 2	Gdt2	DC TRAN: 7	Video In: Sig-Y3 Video In: Sig-Y1 Video In: Sig-H1			$\frac{Vdw-Vdb}{Vdpp}$	73	78	85	%
44	Auto pedestal operation 1	Vdp1	Pin 11: 3 V	Video In: Sig-H1	19		Voff-Von	280	340	400	mV
			Pin 11: 5 V								
45	Auto pedestal operation 2	Vdp2	Pin 11: 3 V	Video In: Sig-Y10	19		Voff-Von	80	130	170	mV
			Pin 11: OPEN								

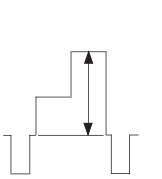
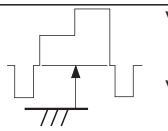
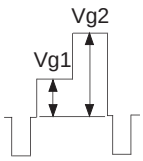
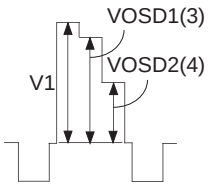
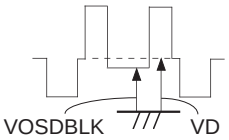
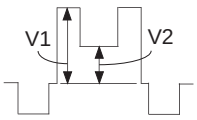
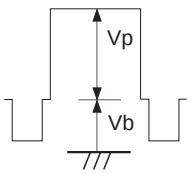
No.	Item	Symbol	Measurement conditions		Measurement pin	Measurement method		Min.	Typ.	Max.	Unit
46	NR operation	Gnr	NR: 1 NR: 0	Video In: Sig-Y7	19		$20\log \frac{Von}{Voff}$	–6	–4.5	–3	dB
47	SW gain 1	Gsw1	SW GAIN: 1	Video In: Sig-Y1	7, 25 9		$20\log \frac{Vout}{Vin}$	5.5	6	6.5	dB
48	SW gain 2	Gsw2	SW GAIN: 0					–0.5	0	0.5	dB

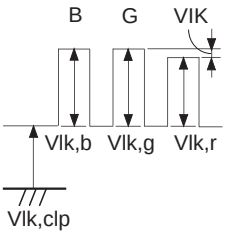
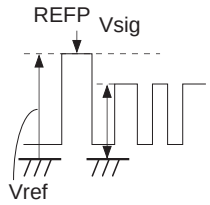
C system items

No.	Item	Symbol	Measurement conditions		Measurement pin	Measurement method		Min.	Typ.	Max.	Unit
49	APC pull-in range 1	Δf, apc1	Video-In: Sig-H1 C In: Sig-C1, C2		23	Check that the burst frequency is changed to 3579545 ±350 Hz and pulled in.		–350	—	350	Hz
50	APC pull-in range 2	Δf, apc2	Video-In: Sig-H1 C In: Sig-C1, C2			Check that the burst frequency is changed to 4433619 ±350 Hz and pulled in.		–350	—	350	Hz
51	Carrier leak	Vcl	Video-In: Sig-H1 COLOR: 3F SUBCOLOR: F		23	 f=fsc (3.58 MHz or 4.43 MHz)		—	—	50	mV
52	Residual carrier level	Vrcl	Video-In: Sig-H1 C In: Sig-C3 COLOR: 3F SUBCOLOR: F			 fsc (3.58 MHz or 4.43 MHz) component and 2 fsc component		—	—	200	mV
53	Color output level	Vco, cen		Video In: Sig-H1, C In: Sig -C5	23			0.6	0.9	1.2	V
54	Color variable range 1	Gco, max	COLOR: 3F				$20\log \frac{Vco1}{Vco0}$	5.6	6.3	6.9	dB
55	Color variable range 2	Gco, min	COLOR: 0				$20\log \frac{Vco2}{Vco0}$	—	–50	–40	dB
56	Sub-color variable range 1	Gsc, max	SUB COLOR : F				$20\log \frac{Vsc1}{Vco0}$	2.1	2.7	3.3	dB
57	Sub-color variable range 2	Gsc, min	SUB COLOR : 0				$20\log \frac{Vsc2}{Vco0}$	–5.4	–3.7	–2.0	dB
58	Hue variable range 1	ϕcen		Video In: Sig-H1, C In: Sig -C3 -C4	20			–10	0	10	deg
59	Hue variable range 2	ϕmax	HUE: 3F				$\tan^{-1} \frac{Vc1-Vc2}{Vc4-Vc3}$	–54	–44	–34	deg
60	Hue variable range 3	ϕmin	HUE: 0					23	33	43	deg
61	Sub-hue variable range 1	ϕs, max	SUB HUE: F					–21	–15	–9	deg
62	Sub-hue variable range 2	ϕs, min	SUB HUE:0					8	13	20	deg
63	Detective axis R1	ϕr1	AXIS: 0	Video In: Sig-H1, C In: Sig -C4 -C3	19		$90°+\tan^{-1} \frac{Vr2}{Vr1}$	105	112	119	deg
64	Detective axis G1	ϕg1			21		$270°-\tan^{-1} \frac{Vg2}{Vg1}$	244	251	259	deg
65	Detective output ratio R1	Gr1	AXIS: 0	Video In: Sig-H1, C In: Sig -C5	19		$\frac{Vx}{Gcomax} \frac{VBW}{VRW}$	0.7	0.8	0.9	—
66	Detective output ratio G1	Gg1			21		$\frac{Vx}{Gcomax} \frac{VBW}{VGW}$	0.26	0.3	0.34	—

No.	Item	Symbol	Measurement conditions		Measurement pin	Measurement method		Min.	Typ.	Max.	Unit
67	Detective axis R2	$\phi r2$	AXIS: 1	Video In: Sig-H1, C In: Sig-C4, -C3	19		$90°+\tan^{-1}\frac{Vr2}{Vr1}$	83	90	97	deg
68	Detective axis G2	$\phi g2$			21		$270°-\tan^{-1}\frac{Vg2}{Vg1}$	229	236	243	deg
69	Detective output ratio R2	Gr2	AXIS: 1	Video In: Sig-H1 C In: Si -C5	19		$\frac{Vx}{Gcomax}\frac{VBW}{VRW}$	0.49	0.56	0.63	—
70	Detective output ratio G2	Gg2			20		$\frac{Vx}{Gcomax}\frac{VBW}{VGW}$	0.29	0.34	0.39	—
71	AGC characteristics 1	Gacc1	Video In: Sig-H1	C In: Sig-C6,	20		$20\log\frac{Vac1}{Vco0}$	–1.0	0.1	1.0	dB
72	AGC characteristics 2	Gacc2		C In: Sig-C7			$20\log\frac{Vac2}{Vco0}$	–3	–1	0	dB
73	Killer point 1	KPNT	During NTSC input	Video In: Sig-H1	23	 Check that output disappears at –38 dB and appears at –30 dB.		–38	–34	–30	dB
74	Killer point 2	KPPAL	During PAL input	C In: Sig-C8 -C9				–38	–34	–30	dB
75	Chroma frequency response 1-1	Gcf1–	TOT SW: 1 Video-In: Sig-H1 fsc =3.58 MHz	C In: Sig-C5 -C11	23		$20\log\frac{Vx}{Vref}$ Vref= Vx (Sig-C5)	—	–3	—	dB
76	Chroma frequency response 1-2	Gcf1+		C In: Sig-C10				—	–1	—	dB
77	Chroma frequency response 2-1	Gcf2–	TOT SW: 0 Video-In: Sig-H1 fsc =3.58 MHz	C In: Sig-C5 -C11				–2.3	—	0.2	dB
78	Chroma frequency response 2-2	Gcf2+		C In: Sig-C10				–2.7	—	0.2	dB
79	Chroma frequency response 3-1	Gcf3–	TOT SW: 1 Video-In: Sig-H1 fsc =4.43 MHz	C In: Sig -C5 -C11				—	–3	—	dB
80	Chroma frequency response 3-2	Gcf3+		C In: Sig-C10				—	–1	—	dB
81	Chroma frequency response 4-1	Gcf4–	TOT SW: 0 Video-In: Sig-H1 fsc =4.43 MHz	C In: Sig-C5 -C11				–2.3	—	0.2	dB
82	Chroma frequency response 4-2	Gcf4+		C In: Sig-C10				–2.7	—	0.2	dB
83	R-Y output amplitude	VRY	Video-In: Sig-H1 C In: Sig-C13		48			—	0.5	—	Vp-p
84	B-Y output amplitude	VBY	Video-In: Sig-H1 C In: Sig-C12		47			—	0.62	—	Vp-p
85	Output amplitude ratio	VBR			—	VBR=VBY/VRY		—	1.26	—	

RGB system items

No.	Item	Symbol	Measurement conditions		Measurement pin	Measurement method		Min.	Typ.	Max.	Unit
86	Drive variable range 1	Gdr1	G DRIVE: 1F B DRIVE: 1F	Video-In: Sig-H1 Y In: Sig-R1	19 21 23		$20\log\frac{Vdr1}{Vr0}$	0.7	1.5	2.2	dB
87	Drive variable range 2	Gdr2	G DRIVE: 0 B DRIVE: 0				$20\log\frac{Vdr2}{Vr0}$	–5.2	–4.5	–3.3	dB
88	Picture variable range	Gpic	PICTURE: 0		19 21 23		$20\log\frac{Vr1}{Vr0}$	–15.7	–14.7	–13.7	dB
89	Dynamic color operation R	Gdy, r	DY COL: 0	Video-In: Sig-H1 Y In: Sig-R1	19		$\frac{Vdyr}{Vr0}$ X100	94.5	97	98.5	%
90	Dynamic color operation B	Gdy, b			23		$\frac{Vdyb}{Vdr1}$ X100	103	105.5	107	%
91	Gamma characteristics 1 (50 IRE)	GAM1	GAMMA: 0/7	Video-In: Sig-H1 Y In: Sig-R1	19 21 23		$\frac{Vg1\ (GAMMA: 7) - Vg1\ (GAMMA: 0)}{Vg2\ (GAMMA: 0)}$	10	18	26	IRE
92	Gamma characteristics 2 (100 IRE)	GAM2					$\frac{Vg2\ (GAMMA: 7) - Vg2\ (GAMMA: 0)}{Vg2\ (GAMMA: 0)}$	–8	0	8	IRE
93	OSD level 1	Vosd1	OSD: 0	Video-In: Sig-H1 OSD BLK: Sig-R3	19 21 23		$\frac{VOSD}{V1}$ X100 V1=100IRE	55	65	75	IRE
94	OSD level 2	Vosd2						23	33	43	IRE
95	OSD level 3	Vosd3	OSD: 1					82	92	102	IRE
96	OSD level 4	Vosd4						36	46	56	IRE
97	OSD BLK black variation	ΔVosd	OSD BLK: Sig-R2 (5 V)	Video In: Sig-Y1	19 21 23		VD – VOSDBLK	–150	190	410	mV
98	OSD BLK attenuation	Gosd	OSD BLK: Sig-R2 (3 V)	Video In: Sig-Y1	19 21 23		$20\log\frac{V2}{V1}$	–7	–6	–5	dB
99	ABL threshold value	Vth, abl	Video In: Sig-Y1		19	Vary the voltage applied to Pin 26 and measure the voltage at which picture ABL operates		1.1	1.2	1.3	V
100	ABL gain	Gabl1	ABL: 3	Video In: Sig-Y1 Pin 28: 9 V/5 V	19		$20\log\frac{Vp, 5\ V}{Vp, 9\ V}$	–3.4	–2.4	–1.4	dB
101	ABL black level 1	Vabl1					Vb, 5 V- Vb, 9 V	140	240	340	mV
102	ABL gain 2	Gabl2	ABL: 0				$20\log\frac{Vp, 5\ V}{Vp, 9\ V}$	–8.8	–6.8	–4.8	dB
103	ABL black level 2	Vabl2					Vb, 5 V- Vb, 9 V	–100	0	100	mV
104	Blanking level	Vblk	Video In: Sig-R1		19 21 23	Measure the R, G and B blanking levels.		0	0.2	0.4	V

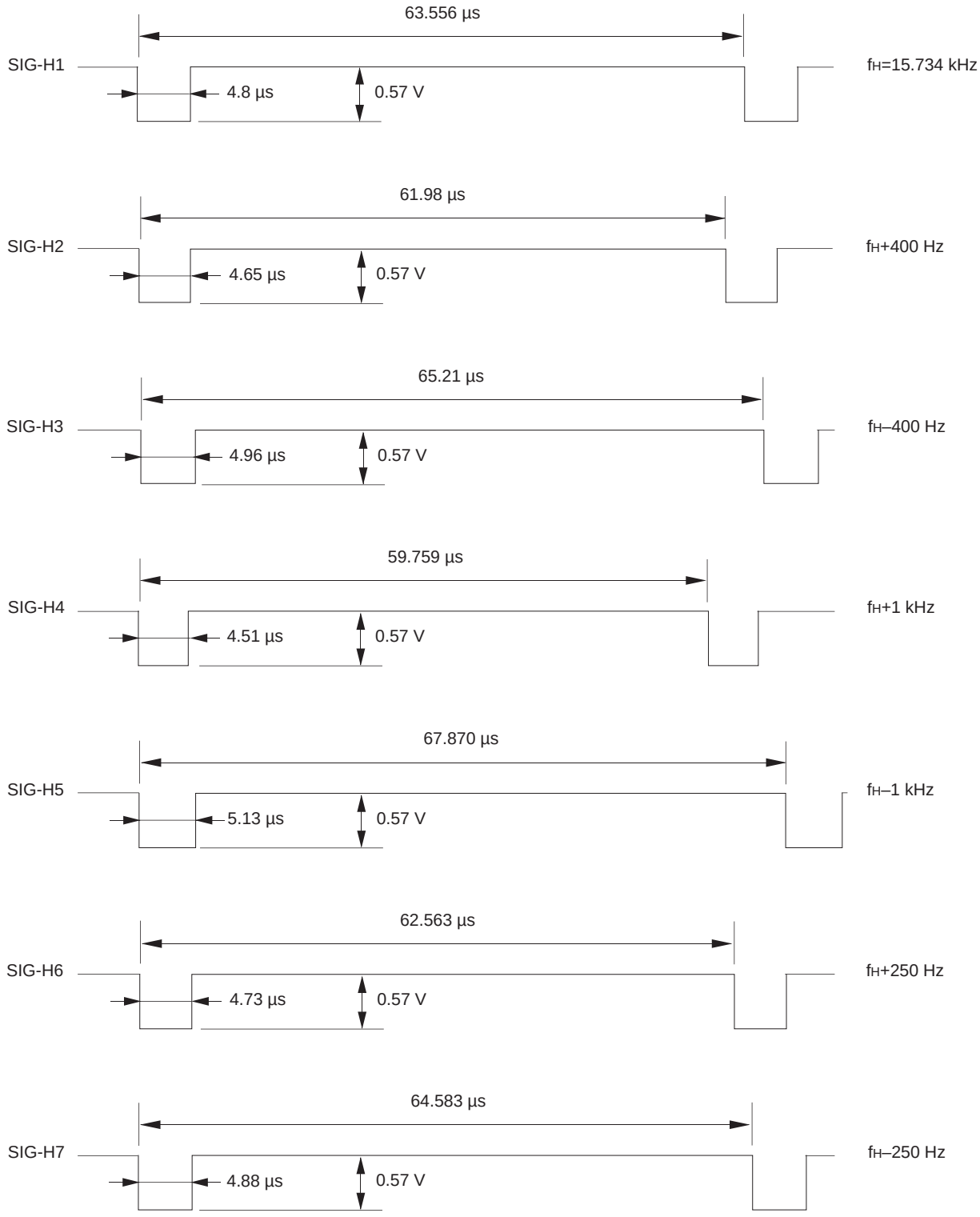
No.	Item	Symbol	Measurement conditions		Measurement pin	Measurement method		Min.	Typ.	Max.	Unit
105	Ik clamp level	VIk, clp		Video In: Sig-V1	24			1.25	1.35	1.45	V
106	Ik R level	VIk, r						0.76	0.86	0.96	V
107	Ik variable range 1	VIk, max	G CUTOFF: F B CUTOFF: F				Vlkg, b-Vlk, r	0.25	0.35	0.45	V
108	Ik variable range 2	VIk, min	G CUTOFF: 0 B CUTOFF: 0					–0.64	–0.54	–0.44	V
109	RGB output DC range 1	Vref, max	Vsh: 4.6 V (Pins 18, 20 and 22)	Video In: Sig-V1	19 21 23		Vref	3.2	3.5	4.0	V
110	RGB output DC range 2	Vref, min	Vsh: 8 V (Pins 18, 20 and 22)					0.45	0.85	1.25	V
111	Bright center -R	Vbcen, r	BRIGHT: 1F		19		Vsig-Vref	–0.5	–0.4	–0.3	V
112	Bright center -G, B	Vbcen, gb			21 23			–0.46	–0.36	–0.26	V
113	Bright variable range 1-R	Vbrt1, r	BRIGHT: 3F		19		Vsig (BRIGHT: 1F) –Vsig	0.3	0.35	0.4	V
114	Bright variable range 1-G, B	Vbrt1, gb			21 23			0.27	0.32	0.37	V
115	Bright variable range 2-R	Vbrt2, r	BRIGHT: 0		19			–0.38	–0.33	–0.28	V
116	Bright variable range 2-G, B	Vbrt2, bg			21 23			–0.36	–0.31	–0.26	V
117	Sub-bright variable range 1-R	Vsbrt1, r	SUB BRIGHT: 3F		19			0.3	0.35	0.4	V
118	Sub-bright variable range 1-G, B	Vsbrt1, gb			21 23			0.27	0.32	0.37	V
119	Sub-bright variable range 2-R	Vsbrt2, r	SUB BRIGHT: 0		19			–0.38	–0.33	–0.28	V
120	Sub-bright variable range 2-G, B	Vsbrt2, gb			21 23			–0.36	–0.34	–0.26	V

I²C bus system items

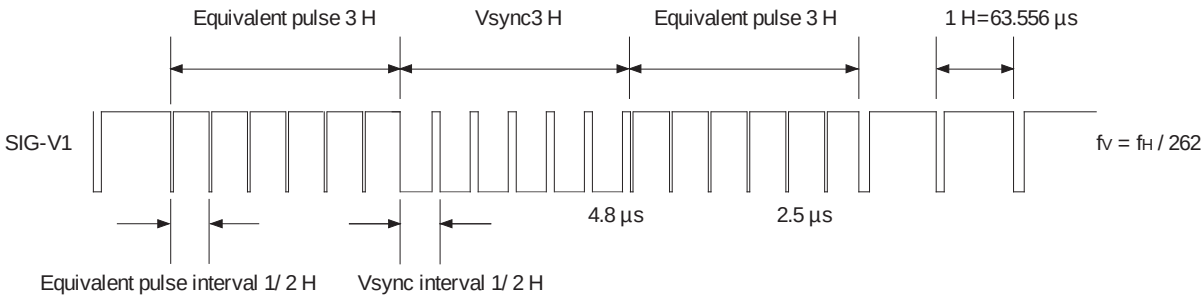
No.	Item	Symbol	Min.	Typ.	Max.	Unit
121	High level input voltage	Vih	3.0	—	5.0	V
122	Low level input voltage	Vil	0	—	1.5	V
123	High level input current	Iih	—	—	10	µA
124	Low level input current	Iil	—	—	10	µA
125	Low level output voltage During current inflow of 3 mA to SDA (Pin 41)	Vol	0	—	0.4	V
126	SDA inflow current	Iol	3	—	—	mA
127	Input capacitance	Ci	—	—	10	pF
128	Clock frequency	fscl	0	—	100	kHz
129	Data change minimum waiting time	tbuf	4.7	—	—	µs
130	Data transfer start waiting time	thd;sta	4.0	—	—	µs
131	Low level clock pulse width	tlow	4.7	—	—	µs
132	High level clock pulse width	thigh	4.0	—	—	µs
133	Start preparation waiting time	tsu;sta	4.7	—	—	µs
134	Data hold time	thd;dat	5	—	—	µs
135	Data preparation time	tsu;dat	250	—	—	ns
136	Rise time	tr	—	—	300	ns
137	Fall time	tf	—	—	300	ns
138	Stop preparation waiting time	tsu;sto	4.7	—	—	µs

Signals Used for Measurements

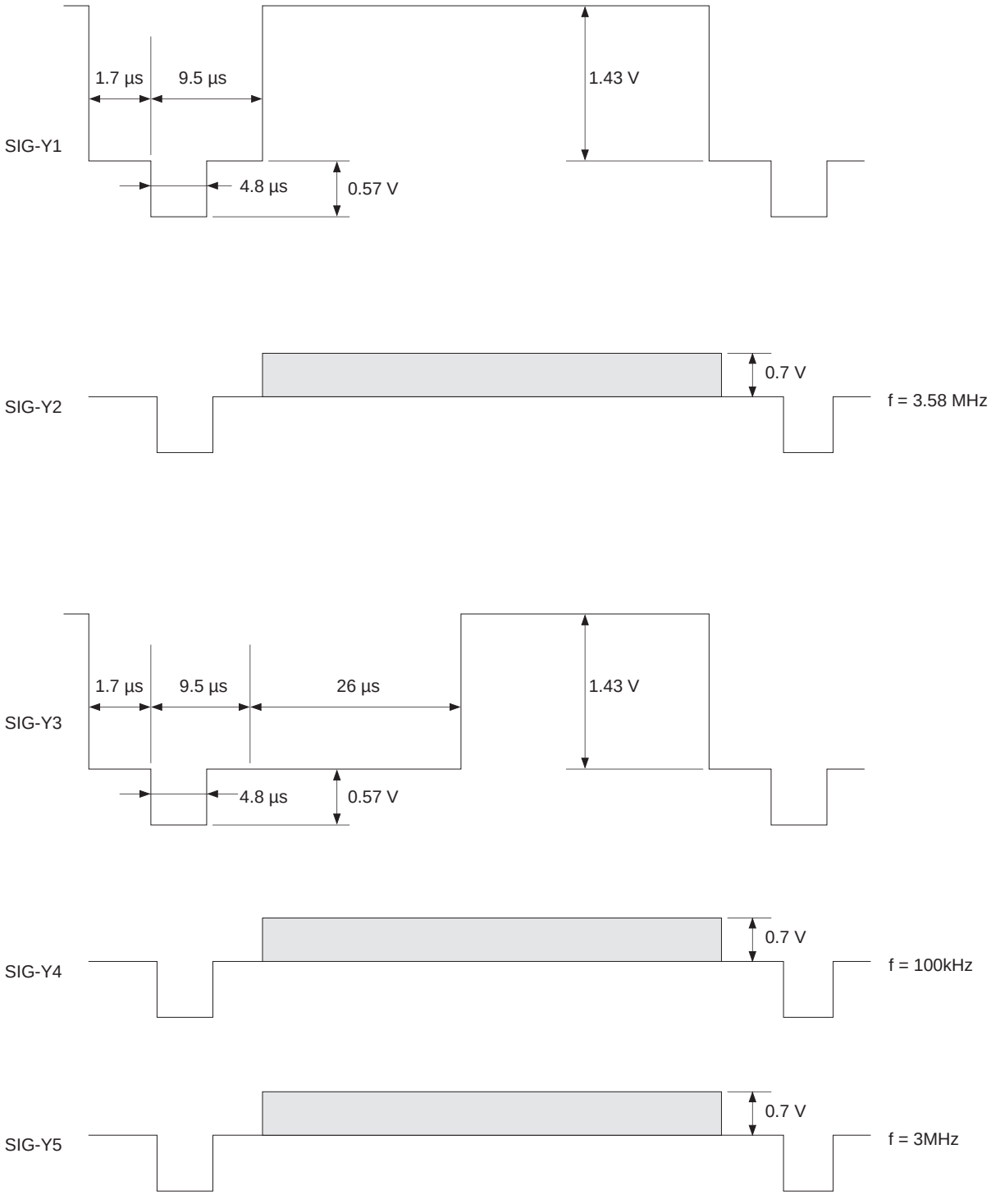
H system

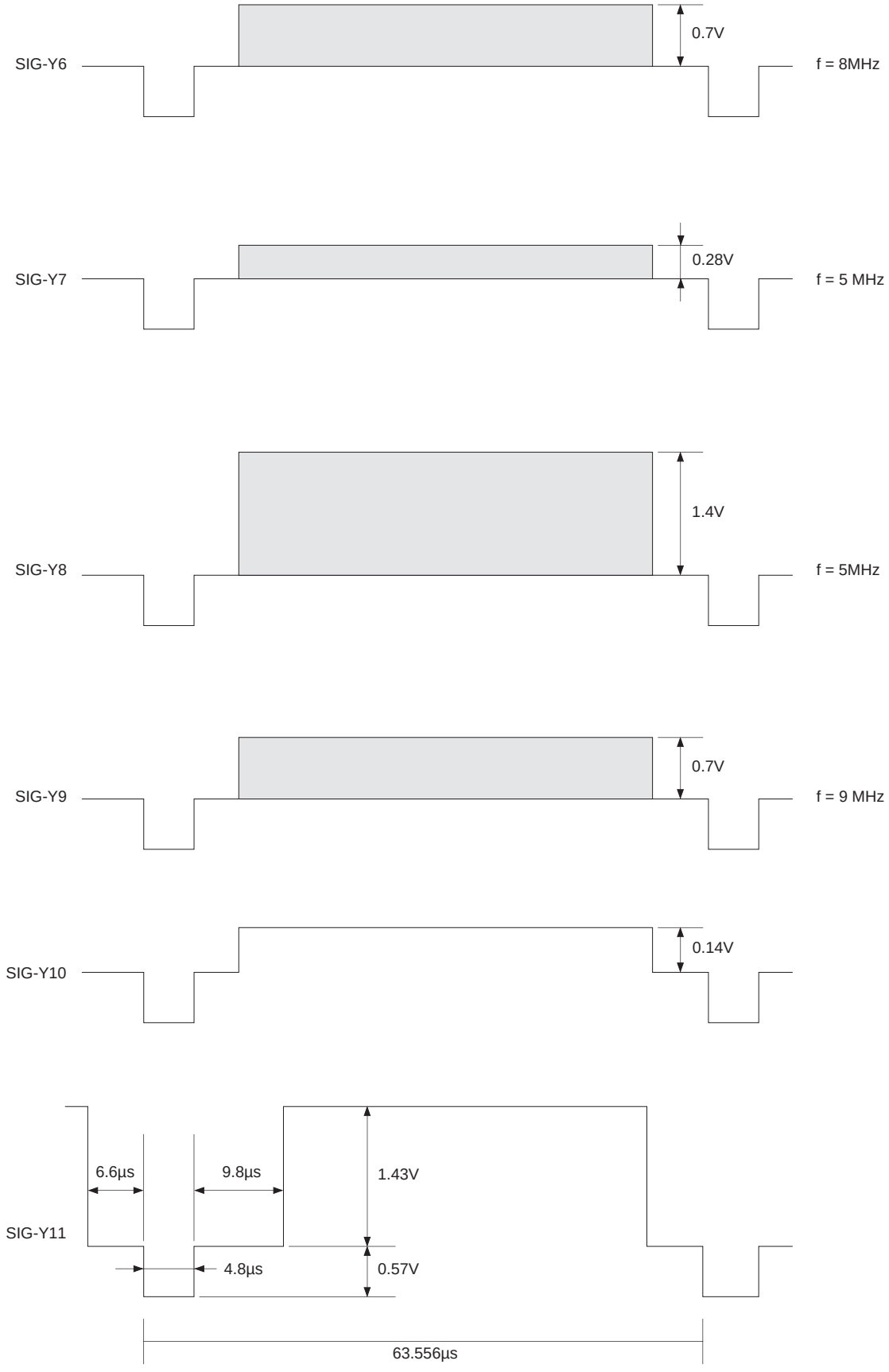


V system

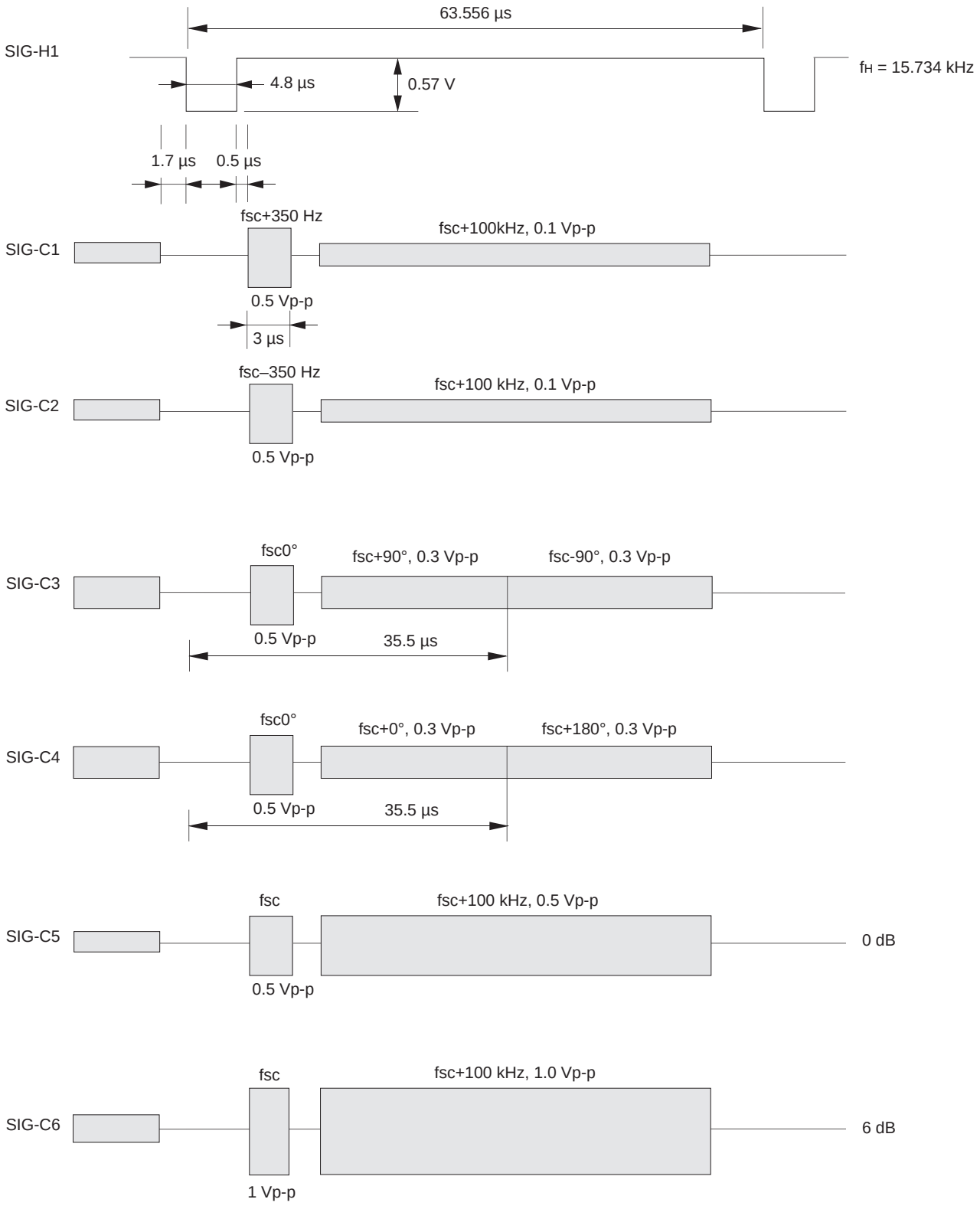

Equivalent pulse 3 H
Vsync3 H
Equivalent pulse 3 H
1 H=63.556 µs
SIG-V1
fv = fH / 262
4.8 µs
2.5 µs
Equivalent pulse interval 1/ 2 H
Vsync interval 1/ 2 H

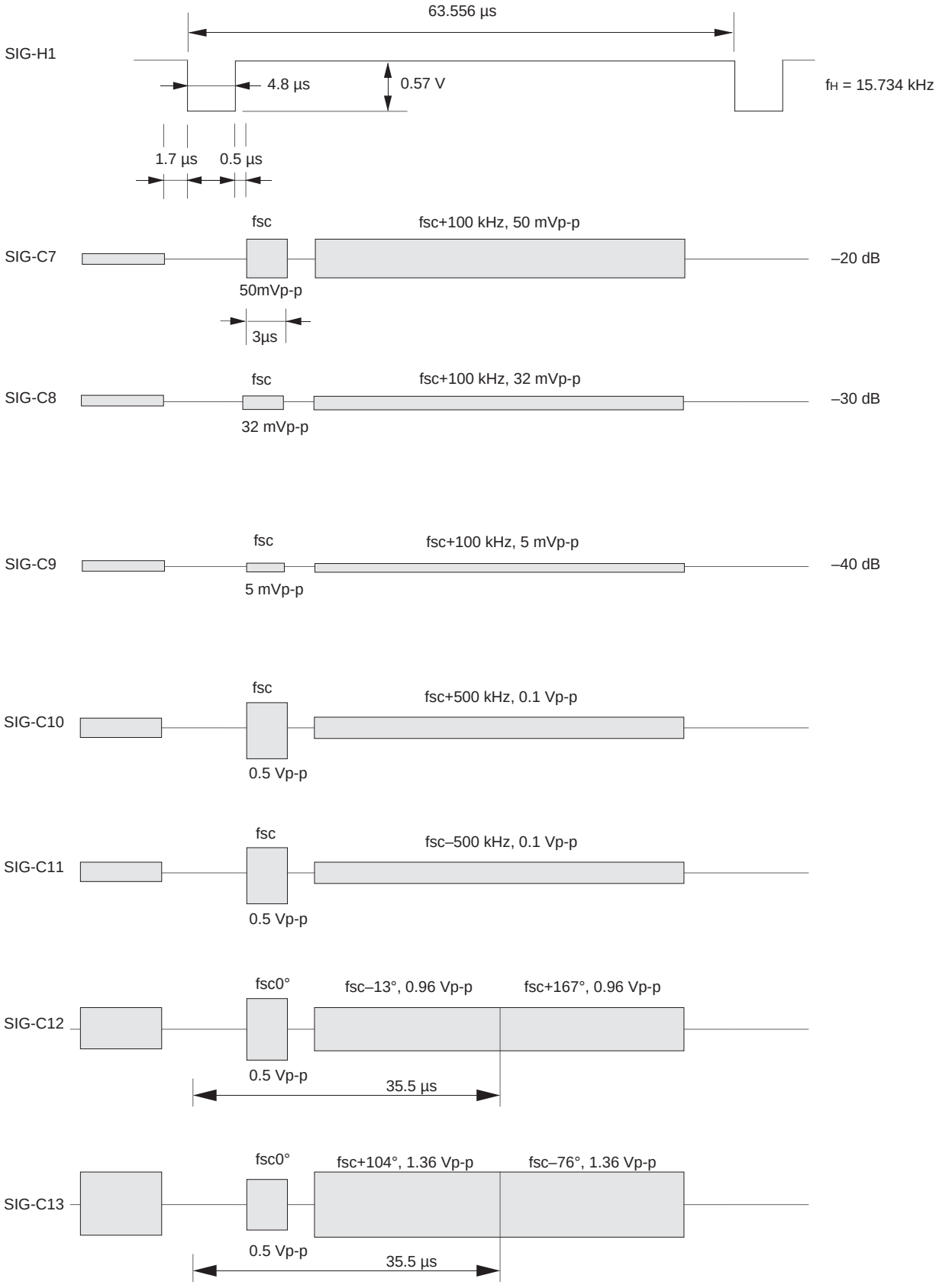
Y system


1.7 µs
9.5 µs
1.43 V
SIG-Y1
4.8 µs
0.57 V
0.7 V
SIG-Y2
f = 3.58 MHz
1.7 µs
9.5 µs
26 µs
1.43 V
SIG-Y3
4.8 µs
0.57 V
0.7 V
SIG-Y4
f = 100kHz
0.7 V
SIG-Y5
f = 3MHz

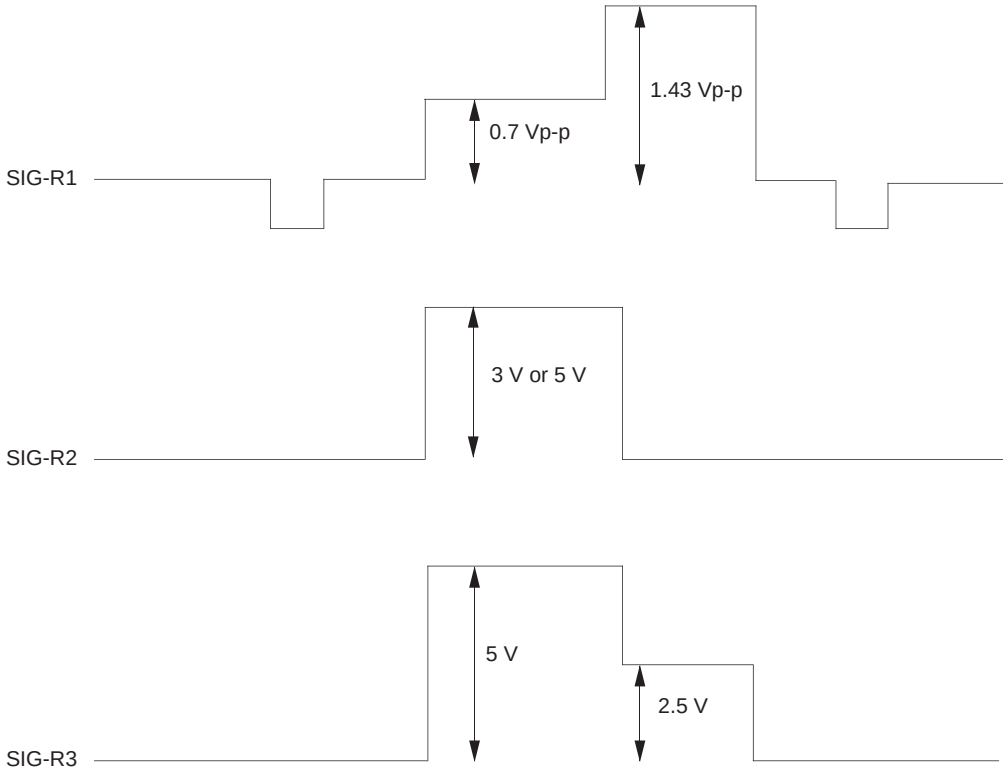

SIG-Y6
0.7V
f = 8MHz
SIG-Y7
0.28V
f = 5 MHz
SIG-Y8
1.4V
f = 5MHz
SIG-Y9
0.7V
f = 9 MHz
SIG-Y10
0.14V
SIG-Y11
6.6µs
9.8µs
1.43V
4.8µs
0.57V
63.556µs

C system


63.556 µs
SIG-H1
4.8 µs
0.57 V
fH = 15.734 kHz
1.7 µs
0.5 µs
fsc+350 Hz
fsc+100kHz, 0.1 Vp-p
SIG-C1
0.5 Vp-p
3 µs
fsc–350 Hz
fsc+100 kHz, 0.1 Vp-p
SIG-C2
0.5 Vp-p
fsc0°
fsc+90°, 0.3 Vp-p
fsc-90°, 0.3 Vp-p
SIG-C3
0.5 Vp-p
35.5 µs
fsc0°
fsc+0°, 0.3 Vp-p
fsc+180°, 0.3 Vp-p
SIG-C4
0.5 Vp-p
35.5 µs
fsc
fsc+100 kHz, 0.5 Vp-p
SIG-C5
0 dB
0.5 Vp-p
fsc
fsc+100 kHz, 1.0 Vp-p
SIG-C6
6 dB
1 Vp-p


63.556 µs
SIG-H1
4.8 µs
0.57 V
fH = 15.734 kHz
1.7 µs
0.5 µs
fsc
fsc+100 kHz, 50 mVp-p
SIG-C7
–20 dB
50mVp-p
3µs
fsc
fsc+100 kHz, 32 mVp-p
SIG-C8
–30 dB
32 mVp-p
fsc
fsc+100 kHz, 5 mVp-p
SIG-C9
–40 dB
5 mVp-p
fsc
fsc+500 kHz, 0.1 Vp-p
SIG-C10
0.5 Vp-p
fsc
fsc–500 kHz, 0.1 Vp-p
SIG-C11
0.5 Vp-p
fsc0°
fsc–13°, 0.96 Vp-p
fsc+167°, 0.96 Vp-p
SIG-C12
0.5 Vp-p
35.5 µs
fsc0°
fsc+104°, 1.36 Vp-p
fsc–76°, 1.36 Vp-p
SIG-C13
0.5 Vp-p
35.5 µs

RGB system



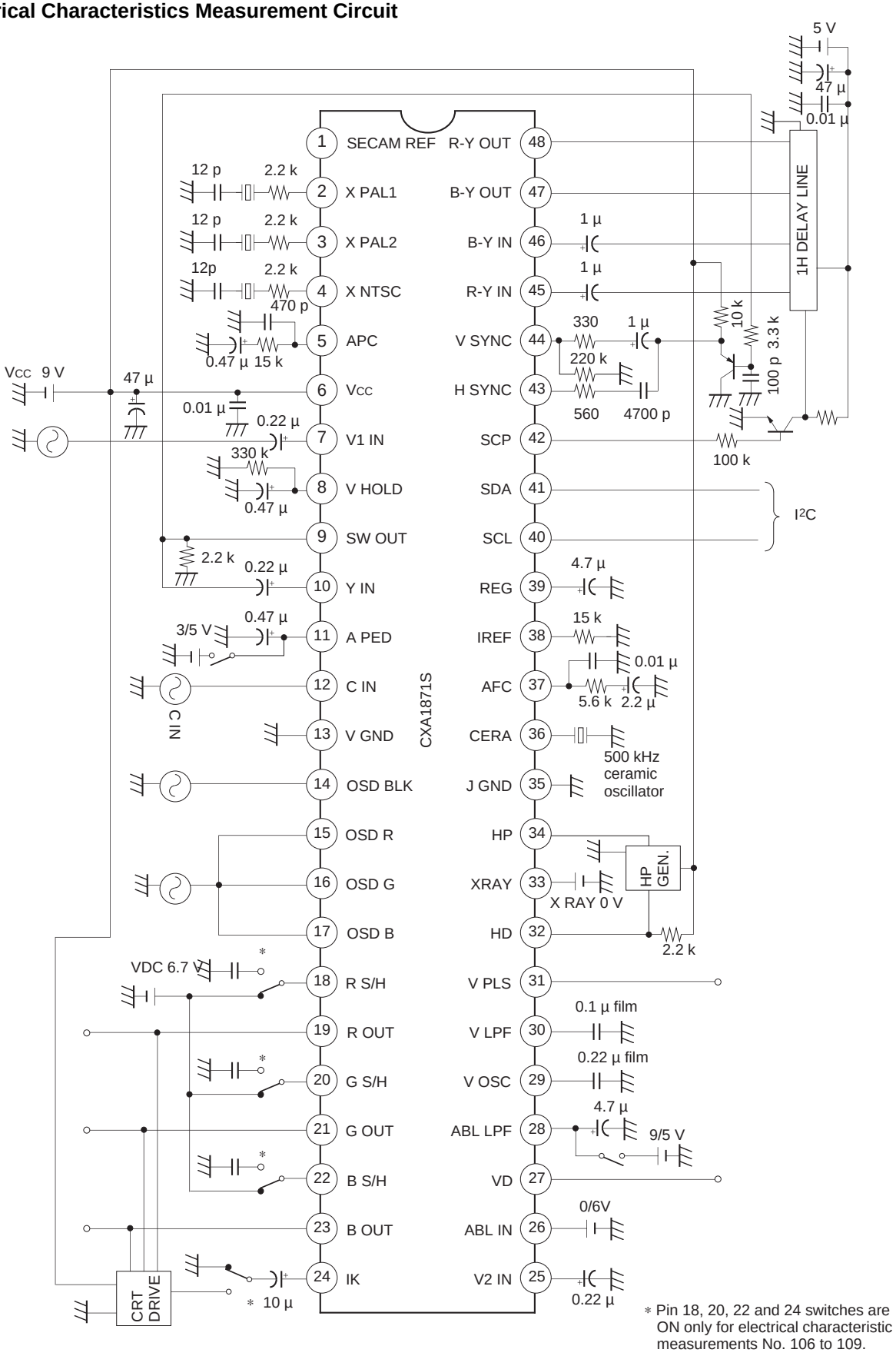
Mesurement Method

I²C Bus Register Initial Settings

Register name	No. of bits	Initial setting	Description
PICTURE	6	3 FH	Maximum value
RGB LIM	2	3 H	Maximum value
HUE	6	1 FH	Center value
IN SW	1	0 H	V1 IN selected
COLOR	6	1 FH	Center value
SW GAIN	1	0 H	0 dB gain
BRIGHT	6	1 FH	Center value
NR ON	1	0 H	NR OFF
SHARPNESS	4	7 H	Center value
SUB CONT	4	7 H	Center value
SUB HUE	4	7 H	Center value
SUB COLOR	4	7 H	Center value
SUB BRIGHT	6	1 FH	Center value
TRAP ON	1	0 H	TRAP OFF
TOT ON	1	0 H	TOT OFF
PIX ON	1	1 H	Picture mute OFF
R ON	1	1 H	R output ON
G ON	1	1 H	G output ON
B ON	1	1 H	B output ON
PRE OVER	3	0 H	Minimum value
AXIS	1	0 H	NTSC detective axis
BLACK	1	0 H	BLACK OFF
DYCOL OFF	1	1 H	DY COL OFF
REF	2	1 H	Center value
ABL	2	0 H	Minimum value
BLUE	1	0 H	BLUE OFF

Register name	No. of bits	Initial setting	Description
OSD	1	0 H	Luminance level small
G DRIVE	5	FH	Center value
DC TRAN	3	0 H	Minimum value
B DRIVE	5	FH	Center value
GAMMA	3	0 H	Correction OFF
G CUTOFF	4	7 H	Center value
B CUTOFF	4	7 H	Center value
H PHASE	4	7 H	Center value
V ON	1	1 H	VD output ON
V EX OFF	1	1 H	V sync expansion OFF
AFC	2	1 H	Center value
V SHIFT	5	FH	Center value
HV COMP	3	3 H	Center value
V SIZE	6	1 FH	Center value
C MODE	1	0 H	Countdown ON
V LIN	4	7 H	Center value
SCORR	4	7 H	Center value
SYSTEM1	1	1	Fixed mode
SYSTEM2	1	0	60 Hz
SYSTEM3	1	0	60 Hz
SYSTEM4	2	0	NTSC
SYSTEM5	1	0	3.58 MHz
X'TAL PIN	2	2	Pin 4
DELAY	2	0	Y Delay 0ns
4.43X'TAL	1	0	3.58 MHz x'tal
EXT COLOR	1	0	Identification switching

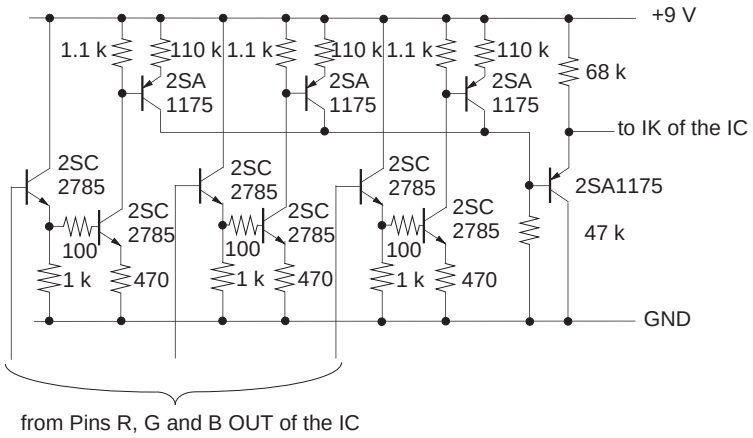
Electrical Characteristics Measurement Circuit



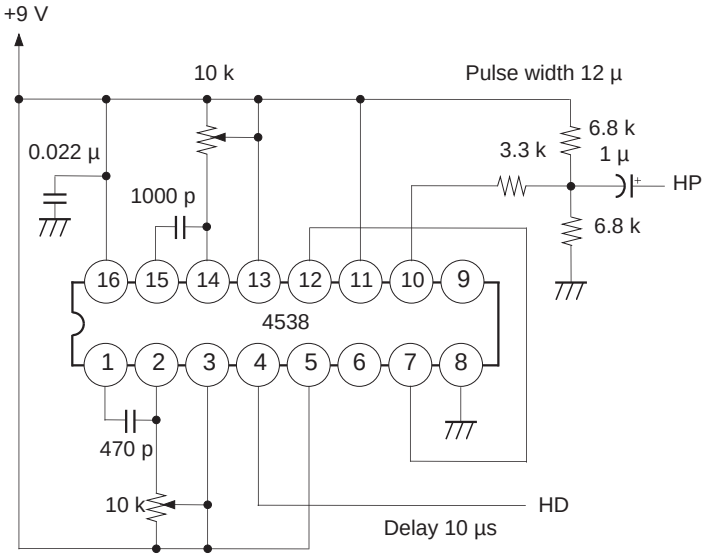
* Pin 18, 20, 22 and 24 switches are ON only for electrical characteristic measurements No. 106 to 109.

Reference Circuit

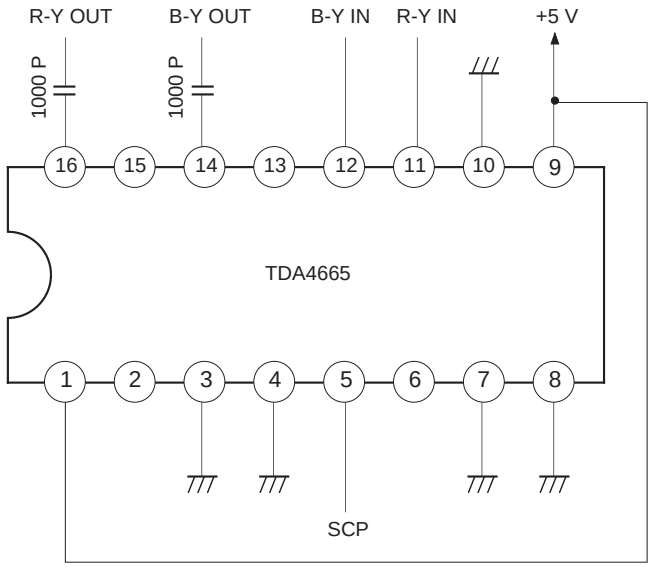
CRT Drive Circuit



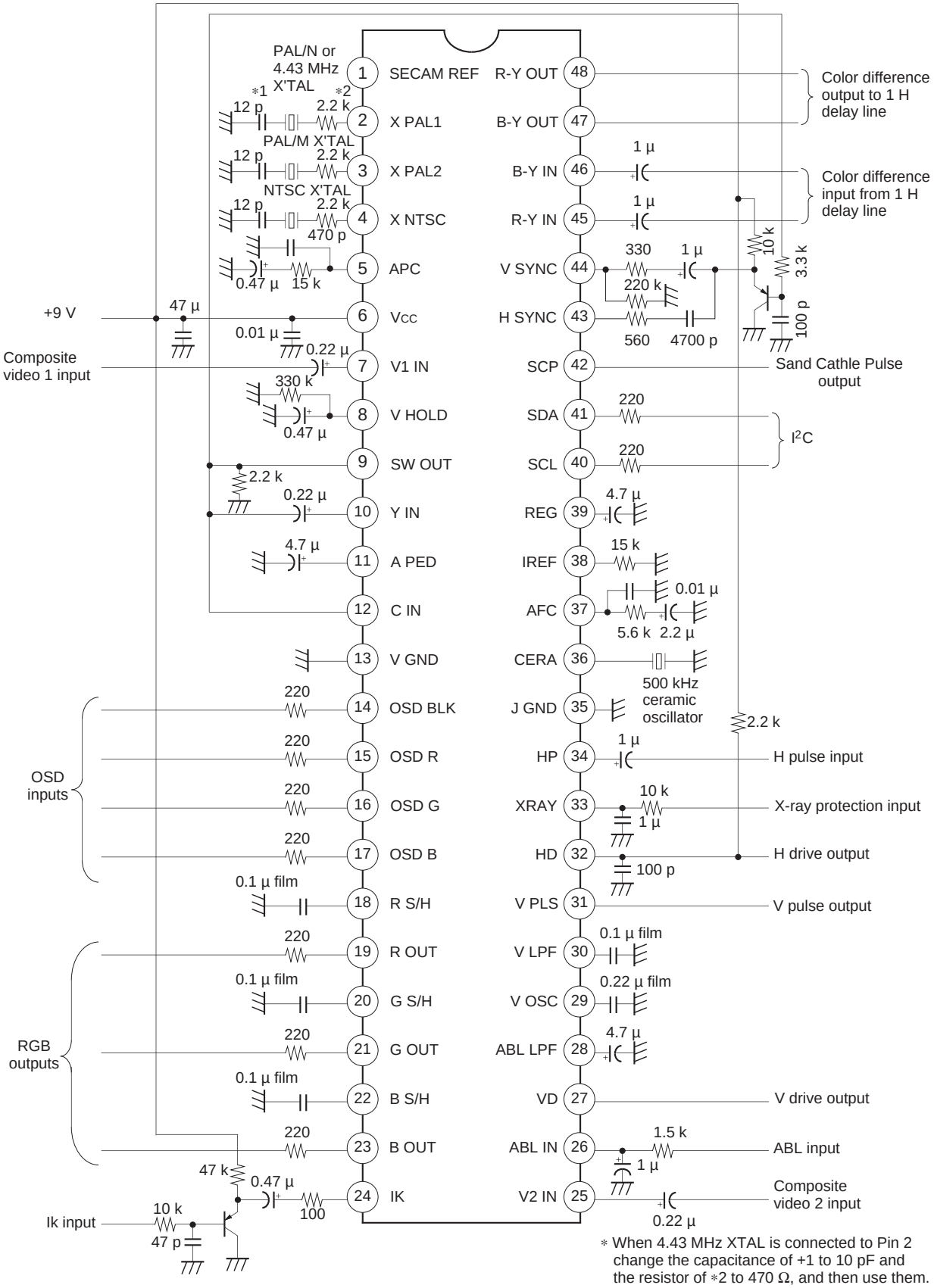
HP Gen



1H DELAY LINE



Application Circuit



∗ When 4.43 MHz XTAL is connected to Pin 2 change the capacitance of +1 to 10 pF and the resistor of ∗2 to 470 Ω, and then use them.

Application circuits shown are typical examples illustrating the operation of the devices. Sony cannot assume responsibility for any problems arising out of the use of these circuits or for any infringement of third party patent and other right due to same.

Description of Operation

1. Synchronizing and picture distortion correction systems

The video signals (2 Vp-p standard) input to Pins 43 and 44 are led to the horizontal and vertical sync separation circuits for sync separation.

This horizontal sync signal is compared with the signal obtained by 1/32 frequency dividing the 32 fh VCO output using the ceramic oscillator (frequency: 503.5 kHz) to detect a phase difference. The error voltage resulting from the phase difference is applied to the H oscillator after attenuating the medium and high frequency components by a lag-lead filter. The phase of the H oscillator output is compared and shifted to match the phase of the H deflection pulse (flyback pulse) input from Pin 34, and then output from Pin 32.

After the vertical sync signal is synchronized to the input signal by the V countdown system, a sawtooth wave is generated by charging and discharging the capacitor attached externally to Pin 29. AGC is performed to ensure that the amplitude of the sawtooth wave output is maintained constant regardless of the vertical frequency of the input, after which the sawtooth wave passes through the picture distortion correction circuit and is output from Pin 27.

Note that there is no need to adjust the free running frequency for either the H or V oscillator.

When voltage of 3 V or more is applied to Pin 33, the H drive output is held at low level. A time constant circuit is included to protect against overvoltages, and H drive is output normally when high voltage input continues for less than 7 V cycles. To release holddown, the IC must be turned off and then started up again.

BGP, HBLK and VBLK are output to Pin 42 as SCP (Sand Cathle Pulse).

Note)

If external capacitance of Pin 30 is used with 0.1 µF or less of the recommended value, vertical sync output may be unstable.

When changing the capacitance value, use it with 0.047 µF or more.

2. Y/C system

The Y/C system has the following three input systems.

Composite video input (1 Vp-p/2 Vp-p) → 2 systems (The gain can be switched between 0 and 6 dB for both systems.)

Y/C separation input (2 Vp-p) → 1 system

The Y signal (specified input level 2 Vp-p) input to Pin 10 is passed through the sub-contrast control, chroma trap (or delay line), delay line, sharpness control, noise reduction, clamp and auto pedestal circuits. The signal is then mixed with the color difference signal, passed through the clamp and Y/C MIX circuits again, and input to the RGB interface system block.

Since a built-in chroma trap is provided, the video signal can be directly input. Trap frequency adjustment is not necessary as a dummy filter is provided inside the IC and feedback is applied using the 3.58 MHz or 4.43 MHz signal generated by a crystal oscillator for reference. When the chroma trap is off, the Y system frequency response is approximately 8 MHz, –3 dB for R, G and B outputs.

Sharpness control is delay line type with a variable PRE/OVER ratio.

Dynamic picture control consists of pulling in the signal below 40 IRE to the black side so that the signal black peak held by Pin 11 becomes the pedestal level.

The chroma signal (specified input level, burst 570 mVp-p, or video signal 2 Vp-p) input to Pin 12 is passed through the ACC and TOT, and the burst only is set to the maximum gain by the B.G. This burst is then peak detected by ACC DET, level controlled by the I^2C bus register, and fed back to the ACC again. When the B.G. output burst signal is smaller than a certain level, killer turns on, the chroma signal is replaced with DC by the B.G., and the color gain is set to the minimum. The burst signal is detected using the VCO oscillation output which has received hue control as the carrier, and a signal (the R-Y axis sub-carrier due to chroma demodulation) whose phase is offset 90° from the burst signal is generated. During PAL input, this sub-carrier is inverted 180° every 1 H and output. The phase is not inverted during NTSC input. The chroma signal is demodulated into the color difference signals R-Y and B-Y by this sub-carrier. The signal is set to 6 dB during NTSC input, or passed through the 1 H delay line and set to 0 dB during SECAM and PAL input, after which it is input to the matrix circuit where the G-Y color difference signal is generated. Then, the color difference signals are passed through the Y/C MIX circuit, and input together with the Y signal to the RGB interface system block.

The detective axis (NTSC/PAL) can be switched by the I^2C bus register.

NTSC or PAL input is automatically identified and output to the status register. In addition, during PAL input, the phase relationship between the burst and R-Y sub-carrier is detected. If a phase error is detected at this time, it is corrected by applying feedback to the flip flop.

3. RGB interface system

YS/YM switching is performed according to the amplitude of the OSD RGB input blanking signal input from Pin 14.

0 to 1.5 V → TV (Y/C input)
1.5 to 3.5 V → TV –6 dB
3.5 to 5.5 V → Black

The R, G and B signals of the Y/C system pass through the RGB switch (BLUE and BLACK ON/OFF) and receive picture control. These signals are mixed with the digital R, G and B signals (specified input level 0 to 5 V DC) input from Pins 15, 16 and 17, passed through the dynamic color, gamma correction, bright control, drive adjustment (R channel is fixed, G and B channels are variable.), cut-off adjustment (R channel is fixed, G and B channels are variable.) and auto cut-off DC level shift circuits, and then output from Pins 19, 21 and 23 as the R, G and B signals. The RGB output amplitude has a limit voltage whose setting value can be controlled with the I^2C bus register. The digital R, G and B signals are mainly used for on screen display of channels, etc. and the display level can be set with the I^2C bus register.

The signal input to Pin 26 (ABL IN) is compared with the internal reference voltage and is then integrated by the capacitor connected to Pin 28 (ABL LPF) for picture and brightness control. Picture ABL mode and combined picture ABL and brightness ABL mode can be switched with the I^2C bus register.

Note)

When the digital R, G and B signals and OSDBLK signal are not used, connect Pins 14, 15, 16 and 17 to GND.

Auto cut-off

For white balance, drive control (gain control between R, G and B outputs) and cut-off control (black side DC level control) are involved. This IC uses the I^2C bus register for drive control. For cut-off control, a loop is formed between the IC and CRT to achieve auto cut-off control.

This auto cut-off arrangement makes it possible to compensate for CRT changes with time. To absorb the CRT variance, the cut-off voltages of the G and B outputs are adjusted by the I^2C bus register.

The auto cut-off loop is configured as described below.

(1) R, G and B reference pulses for auto cut-off, shifted 1H each in the order mentioned, are added to the top of the picture.
(2) The IK of each of the R, G and B outputs is converted to a voltage and input to Pin 24.
(3) The voltage input to Pin 24 is compared with the reference voltage in the IC to change the DC level of the reference pulses.

The loop mentioned above determines the shift level of the R, G and B outputs and lets the capacitances connected to Pins 18, 20 and 22 hold the DC shift level during the 1 V period. If the voltage at any one of Pins 18, 20 and 22 is less than 4.2 V, the status register IK (bit 6) becomes “1”. Use this information to blank the R, G and B outputs with the I^2C bus register. The positions of the reference pulses can be changed by the I^2C bus register.

System Identification Method (when 443XTAL = 0)

	f_{SC}	f_H	f_V	PIN NO.	Conditions for locking the system to this pin	Conditions for releasing the lock
PAL/N	3582056 [Hz]	15625 [Hz]	50 [Hz]	Pin 2	(1) KILLER=ON (2) 50/60 identification result = 50 Hz∗1	(1) KILLER=ON (2) When NT/PAL identification result changes from PAL to NTSC∗2
PAL/M	3575611 [Hz]	15734 [Hz]	60 [Hz]	Pin 3	(1) KILLER=OFF	(1) KILLER=ON (2) When NT/PAL identification result changes from PAL to NTSC∗2 (3) When 50/60 identification result changes from 60 to 50
NTSC	3579545 [Hz]	15734 [Hz]	60 [Hz]	Pin 4	(1) KILLER=OFF	(1) KILLER=ON (2) When 50/60 identification result changes from 60 to 50

∗1 When the 50/60 identification result changes from 60 Hz to 50 Hz, pin switching is performed until the system is locked to Pin 2. However, when the 50/60 identification result changes from 50 Hz to 60 Hz, identification is ignored.

∗2 NTSC→PAL = Don't care

System Identification Method (when 443XTAL = 1)

	f_{SC}	f_H	f_V	PIN NO.	Conditions for locking the system to this pin	Conditions for releasing the lock
4.43/PAL	4433619 [Hz]	15625 [Hz]	50 [Hz]	Pin 2	(1) KILLER=ON (2) 50/60 identification result = 50 Hz∗1	(1) KILLER=ON (2) When NT/PAL identification result changes from PAL to NTSC∗2
SECAM	4406250 4250000 [Hz]	15625 [Hz]	50 [Hz]		(1) KILLER=ON (2) 50/60 identification result = 50 Hz∗1 (3) SECAM ID=ON	(1) When any one of the conditions to the left is not met
4.43 NTSC	4433619 [Hz]	15734 [Hz]	60 [Hz]		(1) KILLER=OFF	(1) KILLER=ON
PAL/M	3575611 [Hz]	15734 [Hz]	60 [Hz]	Pin 3	(1) KILLER=OFF	(1) KILLER=ON (2) When NT/PAL identification result changes from PAL to NTSC∗2 (3) When 50/60 identification result changes from 60 to 50
NTSC	3579545 [Hz]	15734 [Hz]	60 [Hz]	Pin 4	(1) KILLER=OFF	(1) KILLER=ON (2) When 50/60 identification result changes from 60 to 50

∗1 When the 50/60 identification result changes from 60 Hz to 50 Hz, pin switching is performed until the system is locked to Pin 2. However, when the 50/60 identification result changes from 50 Hz to 60 Hz, identification is ignored.

∗2 NTSC→PAL = Don't care

Definition of I²C Bus Registers

Slave addresses

88H: Slave Receiver

89H: Slave Transmitter

Register table

- All registers are set to 0 when the IC power is turned on.
- "X" indicates "don't care"; "*" indicates undefined.

Control registers

Sub Address	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0
XXX00000	PICTURE						RGB LIM	
XXX00001	HUE						*	IN SW
XXX00010	COLOR						*	SW GAIN
XXX00011	BRIGHT						*	NR ON
XXX00100	SHARPNESS				SUB CONT			
XXX00101	SUB HUE				SUB COLOR			
XXX00110	SUB BRIGHT						TRAP ON	TOT ON
XXX00111	PIX ON	R ON	G ON	B ON	PRE OVER			AXIS
XXX01000	BLACK	DY COL OFF	REF		ABL		BLUE	OSD
XXX01001	G DRIVE					DC TRAN		
XXX01010	B DRIVE					GAMMA		
XXX01011	G CUTOFF				B CUTOFF			
XXX01100	H PHASE				V ON	VEX OFF	AFC	
XXX01101	VSHIFT					HV COMP		
XXX01110	V SIZE						0	C MODE
XXX01111	V LIN				S CORR			
XXX10000	SYSTEM1	SYSTEM2	SYSTEM3	SYSTEM4		SYSTEM5	X'TAL PIN	
XXX10001	DELAY		4.43X'TAL	EXT COLOR	*	*	*	*

Status register

bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit0
H LOCK	IK	KILLER	XRAY	NT/PAL	50/60	VCO-F	SECAM

Description of I²C Bus Registers

Sub Address 00000

PICTURE (6) Picture control
- 0 = Minimum
- 63 = Maximum

RGB LIM (2) RGB output amplitude limiter voltage control
- 0 = Limited at 4.9 V (with a black level of 2 V)
- 1 = Limited at 5.1 V (with a black level of 2 V)
- 2 = Limited at 5.3 V (with a black level of 2 V)
- 3 = Limited at 5.5 V (with a black level of 2 V)

Sub Address 00001

HUE (6) Hue control
- 0 = Skin color nearer to red
- 63 = Skin color nearer to green

IN SW (1) Input selector switch
- 0 = V1 IN
- 1 = V2 IN

Sub Address 00010

COLOR (6) Color control
- 0 = Minimum
- 63 = Maximum

SW GAIN (1) SW output gain switching
- 0 = SW GAIN 0dB
- 1 = SW GAIN 6dB

Sub Address 00011

BRIGHT (6) Brightness control
- 0 = Minimum
- 63 = Maximum

NR ON (1) Y signal noise reduction ON/OFF
- 0 = OFF
- 1 = ON

Sub Address 00100

SHARPNESS (4) Sharpness control
- 0 = Minimum
- 15 = Maximum

SUB CONT (4) Sub-contrast control
- 0 = Minimum
- 15 = Maximum

Sub Address 00101

SUB HUE (4) Hue center control
- 0 = Skin color nearer to red
- 15 = Skin color nearer to green

SUB COLOR (4) Color center control
- 0 = Minimum
- 15 = Maximum

Sub Address 00110

SUB BRIGHT (6) Sub-bright control
- 0 = Minimum
- 63 = Maximum

TRAP ON(1) Chroma trap in Y system ON/OFF
- 0 = OFF
- 1 = ON

TOT ON (1) Chroma TOT filter ON/OFF
- 0 = OFF
- 1 = ON

Sub Address 00111

PIX ON (1) Picture mute ON/OFF
- 0 = Picture mute (Auto cut-off reference pulse also muted.)
- 1 = Picture mute released.

R ON (1) R OUT ON/OFF
- 0 = R OUT OFF
- 1 = R OUT ON

G ON (1) G OUT ON/OFF
- 0 = G OUT OFF
- 1 = G OUT ON

B ON (1) B OUT ON/OFF
- 0 = B OUT OFF
- 1 = B OUT ON

PRE OVER (3) Sets the sharpness preshoot and overshoot ratio.
- 0 = Pre Shoot 100 %, Over shoot 0 %
- 7 = Pre Shoot 25 %, Over shoot 75 %

AXIS(1) Detective axis switching
- 0 = NTSC
- 1 = PAL

Sub Address 01000

BLACK (1) Blanks the Y IN/C IN signals and sets the R, G and B outputs to black level.
- 0 = OFF
- 1 = ON

DY COL OFF (1) Dynamic color ON/OFF
- 0 = Dynamic color ON
- 1 = Dynamic color OFF

REF (2) Switches the auto cut-off reference pulse position.
- 0 = B-18H G-19H R-20H
- 1 = B-20H G-21H R-22H
- 2 = B-22H G-23H R-24H
- 3 = B-24H G-25H R-26H

ABL (2) ABL mode setting
- 0 = Picture ABL mode (including protective bright ABL)
- 1 = Combined picture ABL and bright ABL mode (bright ABL low)
- 2 = Combined picture ABL and bright ABL mode (bright ABL medium)
- 3 = Combined picture ABL and bright ABL mode (bright ABL high)

BLUE (1) On screen display B IN ON/OFF. Setting to ON turns the entire screen BLUE.
- 0 = OFF
- 1 = ON

OSD (1) On screen display luminance setting
- 0 = Level small
- 1 = Level large

Sub Address 01001

G DRIVE (5) G OUT drive control
- 0 = Minimum
- 31 = Maximum

DC TRAN (3) DC transmission ratio setting
- 0 = Maximum (100 %)
- 7 = Minimum (75 %)

Sub Address 01010

B DRIVE (5) B OUT drive control
- 0 = Minimum
- 31 = Maximum

GAMMA (3) γcorrection value setting
- 0 = Correction OFF
- 7 = Maximum correction

Sub Address 01011

G CUTOFF (4) G OUT cut-off voltage control
- 0 = Minimum
- 15 = Maximum

B CUTOFF (4) B OUT cut-off voltage control
- 0 = Minimum
- 15 = Maximum

Sub Address 01100

HPHASE (4) Horizontal position control
- 0 = Screen shifted to right
- 15 = Screen shifted to left

V ON(1) VD output ON/OFF
- 0 = VD output stopped. (Picture mute applied simultaneously. Auto cut-off reference pulse also muted.)
- 1 = VD output

V EX OFF (1) V sync expansion ON/OFF
- 0 = V sync expansion ON
- 1 = V sync expansion OFF

AFC (2) AFC loop gain switching
- 0 = AFC loop gain large
- 1 = AFC loop gain medium
- 2 = AFC loop gain small
- 3 = AFC loop open, free running mode

Sub Address 01101

V SHIFT (5) Vertical position control
- 0 = Rise
- 31 = Lower

HV COMP (3) Vertical correction amount setting for high voltage fluctuations
- 0 = Correction amount minimum
- 7 = Correction amount maximum

Sub Address 01110

V SIZE (6) Vertical amplitude control
- 0 = V size minimum
- 63 = V size maximum

C MODE (1) V countdown system mode switching
- 0 = Non-standard signal mode, standard signal mode and no signal mode switched automatically.
- 1 = Fixed to non-standard signal mode (wide V sync window mode).

Sub Address 01111

V LIN (4) Vertical linearity control

0 = Top of screen compressed, bottom of screen expanded.

15 = Top of screen expanded, bottom of screen compressed.

S CORR (4) Vertical S correction control

0 = S correction amount minimum

15 = S correction amount maximum

Sub Address 10000

SYSTEM1(1) Selects the internal mode switching method.
- 0 = Automatic switching
- 1 = Fixed according to the bus data

(When ∗1 is selected, the SYSTEM3 to 5 and X'TAL PIN registers below must be designated.)

SYSTEM2 (1) Selects the V cycle when sync cannot be obtained if automatic switching is selected by SYSTEM1.
- 0 = Outputs 60 Hz pulses when sync cannot be obtained.
- 1 = Outputs 50 Hz pulses when sync cannot be obtained.

SYSTEM3(1) Selects the V cycle.
- 0 = 60 Hz
- 1 = 50 Hz

SYSTEM4 (2) Inputs the input signal broadcast system.
- 0 = NTSC
- 1 = PAL
- 2 = SECAM
- 3 = SECAM

SYSTEM5 (1) Selects the VCO frequency
- 0 = 3.58 MHz
- 1 = 4.43 MHz

X'TAL PIN (2) Selects which of the crystals connected to the various pins to use.
- 0 = Pin 2
- 1 = Pin 3
- 2 = Pin 4
- 3 = Pin 4

4.43X'TAL (1) Inputs whether the crystal connected to Pin 2 is 3.58 MHz or 4.43 MHz. (When connecting a 4.43 MHz crystal, be sure to connect it to Pin 2.)
- 0 = 3.58 MHz
- 1 = 4.43 MHz

EXT COLOR (1) Forcibly switches the DET SW input to external input (R-Y IN, B-Y IN).
- 0 = Switched according to the NTSC/PAL identification results
- 1 = External input

Sub Address 10001

DELAY (2) Allows the following delay times to be added to the Y signal.
- 0 = 0 ns
- 1 = 40 ns
- 2 = 80 ns
- 3 = 120 ns

H LOCK (1) Returns whether the H oscillator of the IC and the signal input to H SYNC are locked.

0 = Not locked
1 = Locked

IK (1) Returns the AKB loop stable status by detecting the IK current.

0 = IK current stable for each of R, G and B
1 = IK current unstable

KILLER (1) Returns the color killer ON/OFF status.

0 = OFF
1 = ON

XRAY(1) Returns the X-ray protection status.

0 = OFF (X-ray protection is not functioning.)
1 = ON (X-ray protection is functioning.)

NT/PAL (1) Identifies whether the input signal is NTSC or PAL and returns the results.

0 = NTSC
1 = PAL

50/60 (1) Returns the 50/60 Hz identification results.

0 = 60 Hz
1 = 50 Hz

VCO-F (1) Detects the burst frequency of the input signal and returns the results.

0 = 3.58 MHz
1 = 4.43 MHz

SECAM (1) Identifies whether the input signal is SECAM or a different signal and returns the results.

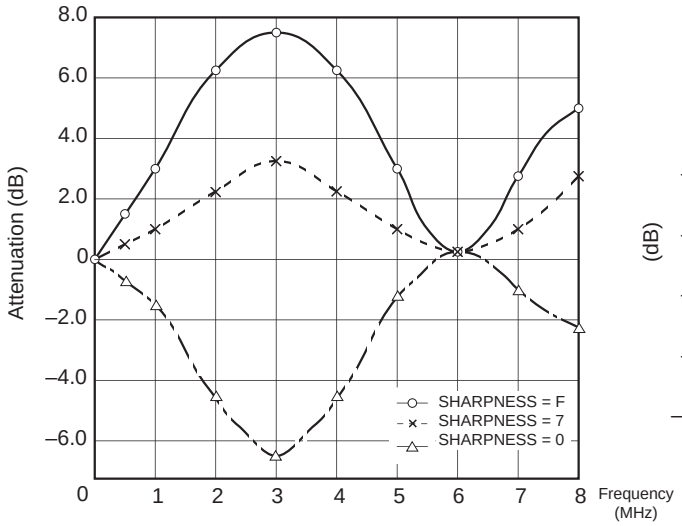


Fig 1. Sharpness characteristics

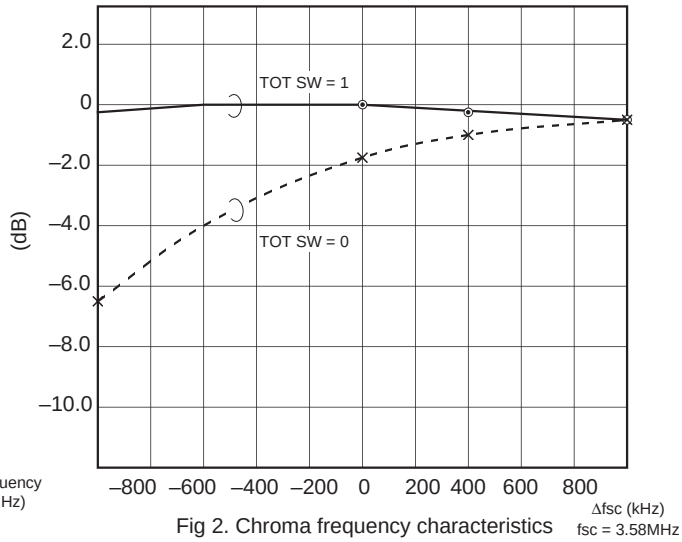


Fig 2. Chroma frequency characteristics

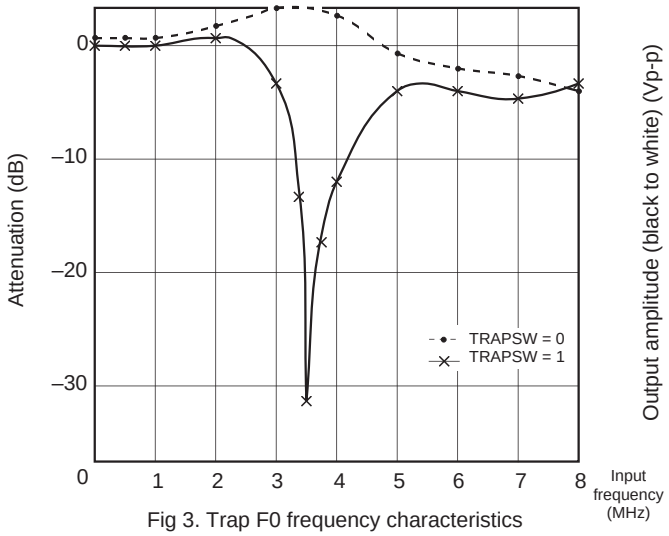


Fig 3. Trap F0 frequency characteristics

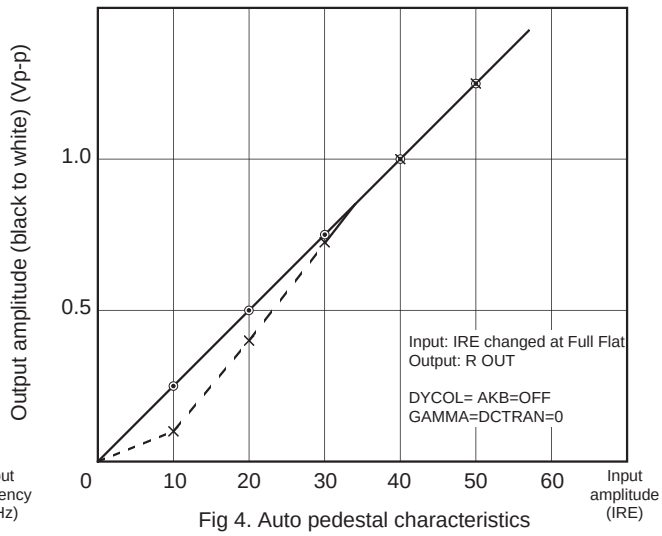


Fig 4. Auto pedestal characteristics

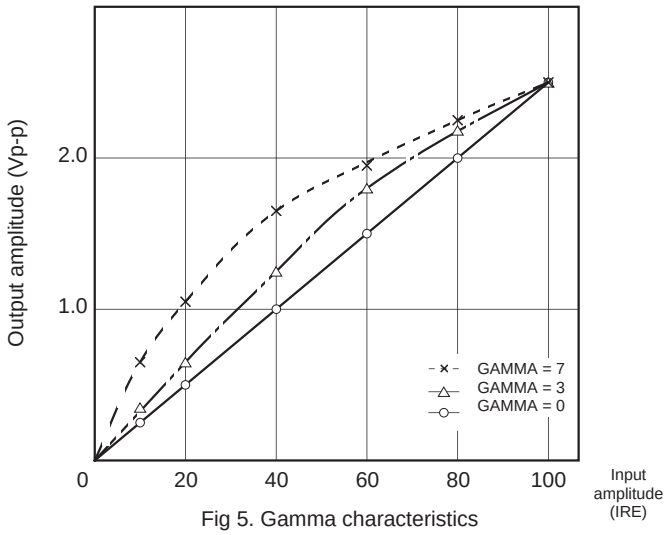


Fig 5. Gamma characteristics

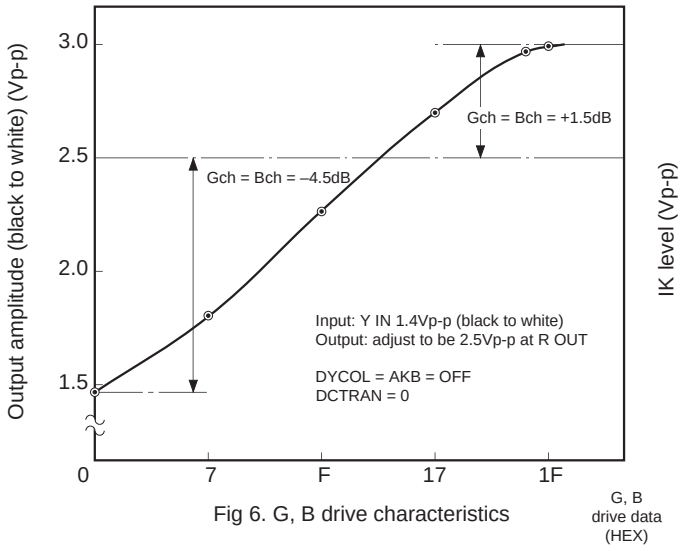


Fig 6. G, B drive characteristics

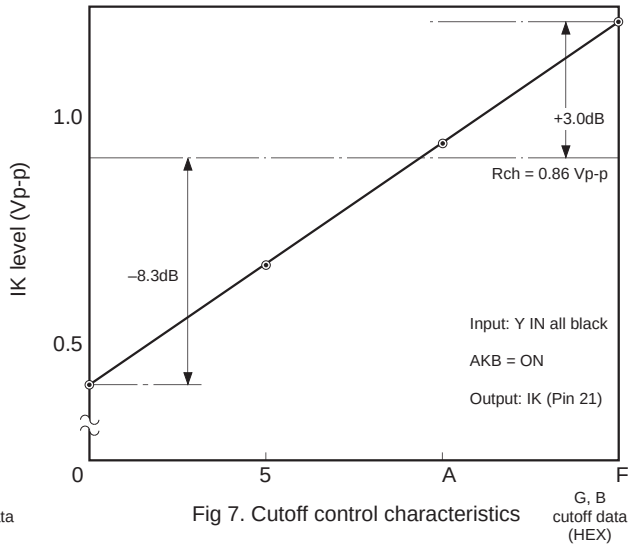


Fig 7. Cutoff control characteristics

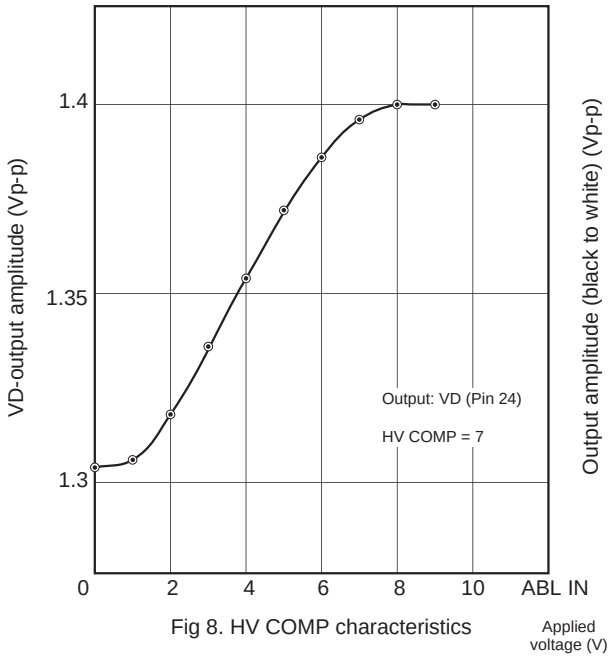


Fig 8. HV COMP characteristics

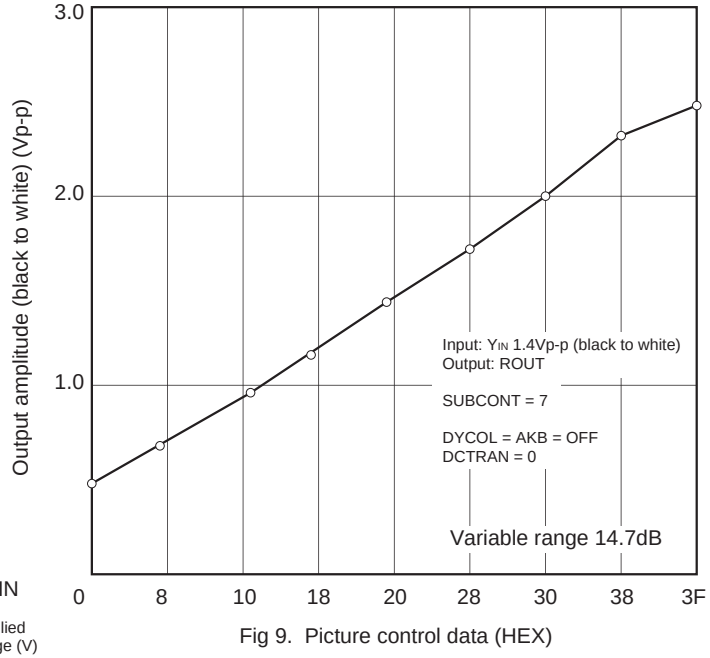


Fig 9. Picture control data (HEX)

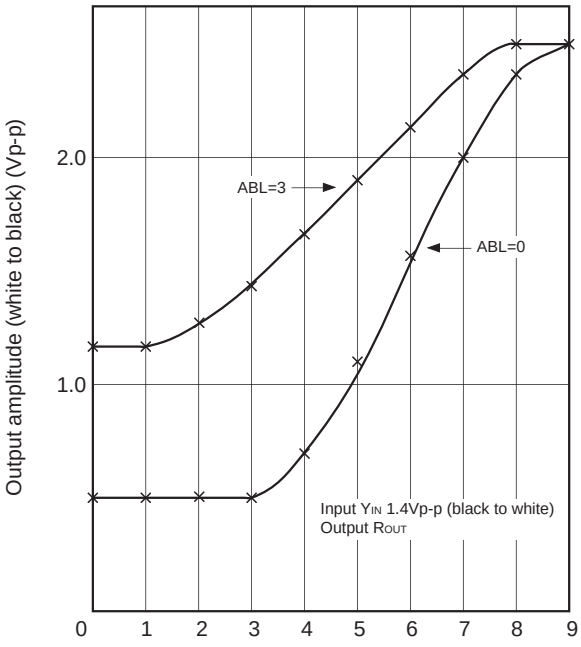


Fig 10. ABL characteristics (picture)

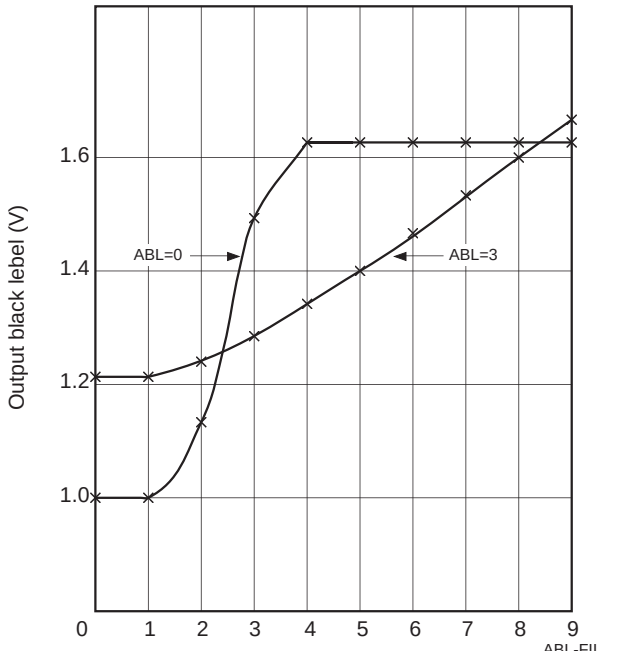


Fig 11. ABL characteristics (bright)

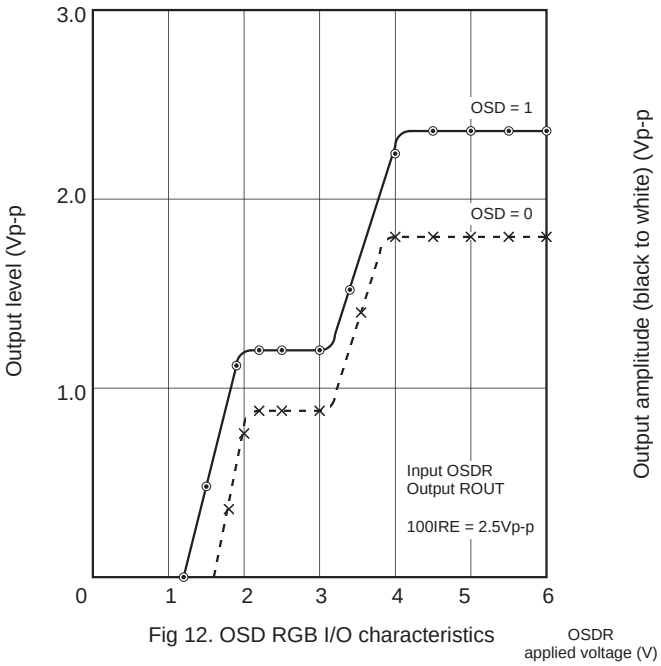


Fig 12. OSD RGB I/O characteristics

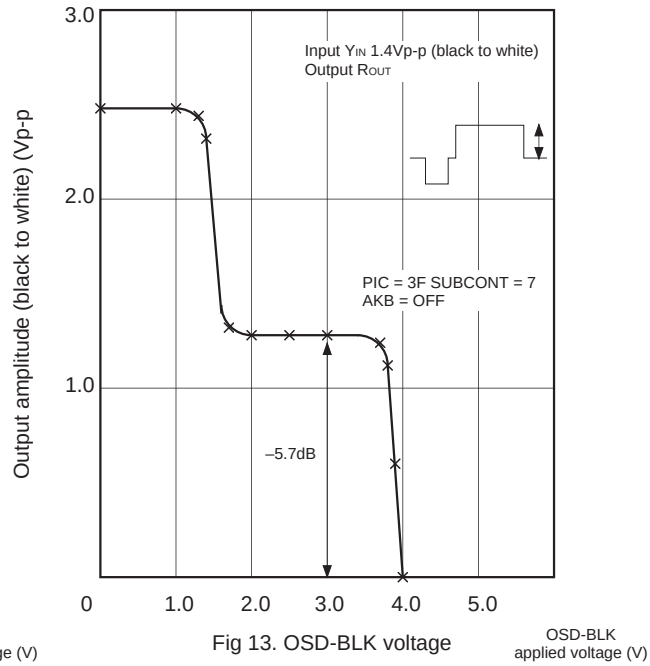
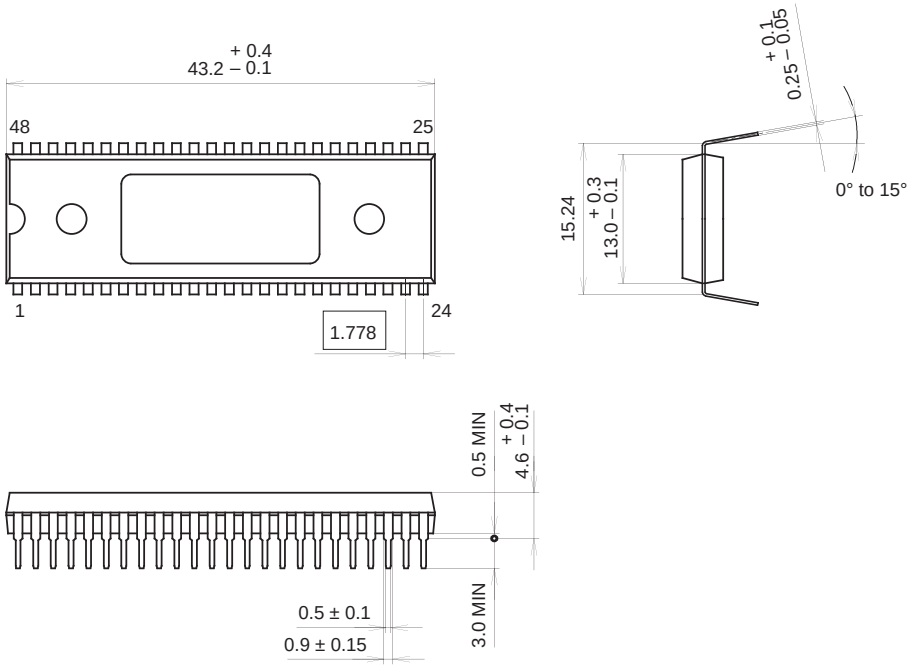


Fig 13. OSD-BLK voltage

Package Outline Unit : mm

48PIN SDIP (PLASTIC)



Two kinds of package surface:
1.All mat surface type.
2.Center part is mirror surface.

SONY CODE	SDIP-48P-02
EIAJ CODE	SDIP048-P-0600
JEDEC CODE	————

PACKAGE STRUCTURE

PACKAGE MATERIAL	EPOXY RESIN
LEAD TREATMENT	SOLDER/PALLADIUM PLATING
LEAD MATERIAL	42/COPPER ALLOY
PACKAGE MASS	5.1g