

AN5306NFBS

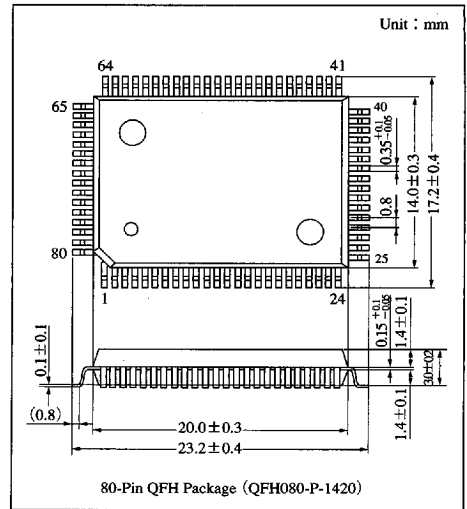
NTSC Video Signal Processor IC

Overview

The AN5306NFBS is used to process video, chroma, RGB, synchronization, and deflection signals. It incorporates an IIC bus controller.

Features

- Video : Wide bandwidth filter, adjustable preshoot and overshoot for contour enhancement, ABL input
- Chroma : ACC filter, color difference signal output
- RGB : Color difference signal input, RGB signal output
- Synchronization : Synchronous BLK input/output, adjustable AFC1 time-constant, adjustable horizontal position
- Deflection : Generation of parabola waves and saw-tooth waves, distortion correction



Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	$V_{CC1} = 9.6$	V
		$V_{CC2} = 5.6$	
Supply current	I_{CC}	$I_{CC1(+15I)} = 113$	mA
		$I_{CC2(18)} = 89$	
		$I_{44} = 26$	
Power dissipation ^{Note 2)}	P_D	947	mW
Operating ambient temperature ^{Note 1)}	T_{opr}	-20 to +70	°C
Storage temperature ^{Note 1)}	T_{sig}	-55 to +150	°C

Note 1) $T_a = 25^\circ\text{C}$ except operating ambient temperature and storage temperature.

Note 2) Allowable power dissipation of the package at $T_a = 70^\circ\text{C}$.

Recommended Operating Range ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Range
Operating supply voltage range	V_{CC1} $V_{56-34, 46, 74}$	8.5V to 9.0V to 9.5V
	V_{CC2} $V_{8-34, 46, 74}$	4.5V to 5.0V to 5.5V
Operating supply current range	I_{44}	15mA to 20mA to 25mA

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■ Electrical Characteristics (Ta=25±2°C)

Parameter	Symbol	Condition	min	typ	max	Unit
DC Characteristics						
Circuit current	I ₅₆₊₅₁	Pin④ is connected to 12V via 380Ω. V _{CC1} : 9V, V _{CC2} : 5V	74	90	106	mA
Circuit current	I ₈	Pin④ is connected to 12V via 380Ω. V _{CC1} : 9V, V _{CC2} : 5V	59	71	83	mA
Synchronous input pin voltage	V ₂₀₋₃₄	Pin④ is connected to 12V via 380Ω. V _{CC1} : 9V, V _{CC2} : 5V	0.8	1.3	1.8	V
Synchronous input pin voltage	V ₂₂₋₃₄	Pin④ is connected to 12V via 380Ω. V _{CC1} : 9V, V _{CC2} : 5V	0.8	1.3	1.8	V
Video input pin voltage	V ₄₃₋₇₄	Pin④ is connected to 12V via 380Ω. V _{CC1} : 9V, V _{CC2} : 5V	2.7	3.2	3.7	V
ABL input pin voltage	V ₆₋₇₄	Pin④ is connected to 12V via 380Ω. V _{CC1} : 9V, V _{CC2} : 5V	2.5	3.0	3.5	V
ACL input pin voltage	V ₁₆₋₇₄	Pin④ is connected to 12V via 380Ω. V _{CC1} : 9V, V _{CC2} : 5V	2.5	3.0	3.5	V
Blooming level pin voltage	V ₉₋₇₄	Pin④ is connected to 12V via 380Ω. V _{CC1} : 9V, V _{CC2} : 5V	2.2	2.7	3.2	V
Chroma input pin voltage	V ₇₋₇₄	Pin④ is connected to 12V via 380Ω. V _{CC1} : 9V, V _{CC2} : 5V	1.5	2.0	2.5	V
B-Y output pin voltage	V ₇₇₋₇₄	Pin④ is connected to 12V via 380Ω. V _{CC1} : 9V, V _{CC2} : 5V	2.3	2.8	3.3	V
R-Y output pin voltage	V ₇₆₋₇₄	Pin④ is connected to 12V via 380Ω. V _{CC1} : 9V, V _{CC2} : 5V	2.3	2.8	3.3	V
Horizontal Signal Processing						
Horizontal stabilized supply voltage	HV _{CC}	Pin④ is connected to 12V via 380Ω. V _{CC1} : 9V, V _{CC2} : 5V	5.9	6.3	6.7	V
Constant current source operation resistance	RHV _{CC}	I ₄₄ : 15 to 25mA	—	—	30	Ω
Horizontal free-run frequency (1)	f _{HO-1}		15.45	15.75	16.05	kHz
Horizontal free-run frequency (2)	f _{HO-2}	At Hold Down	16.3	16.4	16.8	kHz
f _{HO} supply rising drift	$\frac{\Delta f_{HO}}{V_{CC3}}$	f _{HO} frequency difference when other supply OFF→ON	0	100	200	Hz
Horizontal output pulse duty	τ _{HO}	Hold down off	34.4	37.5	40.6	%
Horizontal output starting voltage	V _{PH (S)}	When f=10k to 20kHz and horizontal oscillation output is more than 1V _{P-P}	—	—	5.2	V
Horizontal output level	V _{PH}		2.4	2.9	3.4	V
Horizontal pull-in range	f _{PH}	f _{HO} =15.75kHz	±400	—	—	Hz
H center variable range (1)	T _{DH}	Phase lead of 1A [10]→[00]*	1.8	2.5	3.2	μs
H center variable range (2)	T _{DH}	Phase lead of 1A [10]→[1F]*	-3.0	-2.3	-1.6	μs
Lock detector output voltage (1)	V _{23-M}	Synchronous	5.1	5.8	6.5	V
Lock detector output voltage (2)	V _{23-L}	Asynchronous	-0.1	0	0.5	V
Lock detector output voltage (3)	V _{23-T}	Hold-down	7.6	8.3	9.0	V
Hold-down operation voltage	V _{Hd}		2.5	2.8	3.1	V
Burst gate pulse width	T _{BGP}	Sandcastle output	1.8	2.5	3.2	μs
Sandcastle pulse output level (BGP)	V _{BGP}	V _{CC} : typ.	4.0	4.3	4.6	V
Sandcastle pulse output level (HBLK)	V _{HBLK}	V _{CC} : typ.	2.7	3	3.3	V
Sandcastle pulse output level (VBLK)	V _{VBLK}	V _{CC} : typ.	1.2	1.5	1.8	V
Vertical Signal Processing						
Vertical output pulse width	τ _{VO}		360	380	400	μs

* Refer to table 1

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Electrical Characteristics (cont.) ($T_a = 25 \pm 2^\circ\text{C}$)

Parameter	Symbol	Condition	min	typ	max	Unit
Vertical output level	V_{29}		1.3	1.8	2.3	V
Vertical output free-run frequency	f_{VO}		58.8	60	61.2	Hz
Vertical blanking pulse width	τ_{VBLK}		1.37	1.4	1.43	ms
Y Signal Processing						
Video voltage gain	AY_G	Cont : max. Sharp : min.	17	20	23	dB
Video voltage gain relative ratio	AY	Ratio between RGB channels drive ; typ.	-2.5	0	2.5	dB
Video voltage gain relative ratio DL	AY_{Gdl}	Y delay line ON/OFF	-1.5	0	1.5	dB
Sharpness 1	$AG_{(SH)2}$	$f = 4\text{MHz}$ sharpness : $\phi \phi \rightarrow 7F$ aper. - con. SW : 250n	11.5	14.5	17.5	dB
Sharpness 2	$AG_{(SH)2}$	$f = 3\text{MHz}$ sharp : $\phi \phi \rightarrow 7F$ aper. - con. SW : 300n	11.5	14.5	17.5	dB
Contrast control range max.	$AG_{(CON)}$	Sharp : min. Cont : typ.	3.5	6	8.5	dB
Contrast control min. value	$yG_{(CON)min.}$	Contrast : min.	—	30	200	mV
Brightness variable quantity	V_{BR}	No input Bright : min. \rightarrow max.	3.0	3.7	4.4	V
DC regeneration rate 1	TDC1	APL10 \rightarrow 90% DC transmission quantity change-over : -direction	90	96	102	%
DC regeneration rate 2	TDC2	APL10 \rightarrow 90% DC transmission quantity change-over : +direction	96	103	110	%
Y signal delay time 1	t_{DL1}	Y delay line : ON	260	325	390	ns
Y signal delay time 2	t_{DL2}	Y delay line : OFF	160	205	250	ns
Y frequency characteristics 1	$\Delta y_1 (Y)$	10MHz attenuation quantity DL for $f = 3\text{MHz}$: ON	-6	-3	+1	dB
Y frequency characteristics 2	$\Delta y_2 (Y)$	10MHz attenuation quantity DL for $f = 3\text{MHz}$: OFF	-5	-2	+2	dB
ACL characteristics	Δy_{ACL}	Pin $\text{\textcircled{16}}$ 3V \rightarrow 3.5V	8	11	14	dB/V
ABL characteristics	ΔY_{ABL}	Pin $\text{\textcircled{6}}$ 2.7 \rightarrow 3.5V	2.7	3.4	4.1	V/V
Black extension quantity	ΔY_{BL1}	Input : full black Pin $\text{\textcircled{15}}$: 3V CR filter	-0.1	0	0.1	V
Black extension gain	ΔY_{BL2}	Input : full black Pin $\text{\textcircled{15}}$: 3V Black gain : min. \rightarrow max.	1.6	1.95	2.3	V
Black extension start point 1	ΔY_{BL3}	Pin $\text{\textcircled{15}}$: 5V after 2.4V $_{P-P}$ by contrast Pin $\text{\textcircled{15}}$ CR filter	-0.12	0	0.12	V
Black extension start point 2	ΔY_{BL4}	Black level : min. after 1.7V $_{P-P}$ by drive Black level : max.	-0.1	0.35	0.8	V
γ correction quantity min. to max.	Y_γ	White γ gain : max. White γ level : min. to max.	0.5	0.85	1.2	V
Blooming level drift quantity	ΔY_{BLM}	Blooming DC Pin $\text{\textcircled{9}}$: 0.5V \rightarrow 4.5V	3.2	3.9	4.6	V
Pedestal level (standard)	Y_G	Cut-off : 80	2.0	2.4	2.8	V
Chroma Signal Processing						
ACC characteristics 1	ACC1	Color bar signal (burst 300mV $_{P-P}$)	-1	0	+1	dB
ACC characteristics 2	ACC2	Color bar signal (burst 15mV $_{P-P}$)	-4	-1.5	+1	dB
Killer tolerance on	e_k	Color bar burst 0dB = 150mV $_{P-P}$	-48	-43	-38	dB

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■ Electrical Characteristics (cont.) (Ta=25±2°C)

Parameter	Symbol	Condition	min	typ	max	Unit
Killer tolerance off	e_k	Color bar signal. (Burst 0dB=150mV _{P-P})	-44	—	—	dB
Demodulation output amplitude B-Y	e_{OB}	Color bar signal. (Burst 150mV _{P-P})	0.85	1.25	1.64	V _{P-P}
Demodulation output amplitude R-Y	e_{OR}	Color bar signal. (Burst 150mV _{P-P})	0.67	1.0	1.32	V _{P-P}
Demodulation output ratio	R/B	Rainbow signal R-Y/B-Y output ratio	0.48	0.56	0.64	times
Demodulation angle B-Y	$\angle B$		-8	-2.5	3	deg.
Demodulation angle R-Y	$\angle R$		83	88	93	deg.
Color residue	e_{killer}	Killer filter terminal grounded by 20kΩ	—	—	50	mV _{P-P}
Demodulation output residual carrier	e_{car}	No signal input	—	—	50	mV _{P-P}
APC pull-in range Low	f_{pull}	Burst frequency change	500	600	—	Hz
APC pull-in range High	f_{pull}	Burst frequency change	-500	-600	—	Hz
CW output amplitude	e_{cw}		600	800	1100	mV _{P-P}
Free-run frequency	f_{co}	Deviation from 3.579545MHz	-200	0	200	Hz

RGB Signal Processing

Tint center *	θ_t	Pin⑦ 356mV _{P-P} Pin⑩ 200mV _{P-P} . DAC value where R,B output coincident	[3F]**	[4C]**	[5C]**	—
Tint variable range max. *	$\Delta\theta_1$	Tint : typ.→max.	25	35	—	deg.
Tint variable range min. *	$\Delta\theta_2$	Tint : typ.→min.	-32	-42	—	deg.
R-Y demodulation axis variable range *	$\Delta\theta_{Dem}$	Demodulation axis : min.→max.	16	28	39	deg.
B-Y ratio variable range (1) *	AB-Ymin.	Demodulation ratio : typ.→min.	—	0	0.25	times
B-Y ratio variable range (2) *	AB-Ymin.	Demodulation ratio : typ.→min.	1.25	1.5	1.75	times
G-Y/R-Y ratio (1) *	e_G/e_{R2}	G-Y ratio change-over : 02	0.29	0.36	0.43	times
G-Y/R-Y ratio (2) *	e_G/e_{R3}	G-Y ratio change-over : 03	0.27	0.35	0.44	times
G-Y/B-Y ratio (1) *	e_G/e_{B2}	G-Y ratio change-over : 02	0.15	0.23	0.31	times
G-Y/B-Y ratio (2) *	e_G/e_{B3}	G-Y ratio change-over : 03	0.3	0.36	0.42	times
RGB output blanking voltage	E_{BLK}	Bright : typ. cut-off	0.7	1.1	1.5	V
Color control range max. *	A_{B-YCl} max.	Cont : typ. Color : typ.→max.	3.4	5.0	6.6	dB
Color control min. value *	A_{B-YCl} min.	Cont : typ. Color : typ.→min.	—	25	50	mV
Color difference contrast variable range *	A_B (CON)	Color : typ. Cont : typ.	3.5	6	8.5	dB
Drive control range	A_R (DR)	Drive SW : 00→04 Drive : min.→max.	4	6	8	dB
Cut-off R · B control range	$V_{(CO)}$	Cut-off SW Cut-off : min.→max.	1.6	2.1	2.6	V
Cut-off G control range	$V_{(CO)G}$	Cut-off : min.→max.	0.6	1.1	1.6	V
On-screen voltage gain	A_{yG}	$Y_S=1V$ Contrast : max.	8	10	12	dB
On-screen contrast range	A_{yG} (ON)	$Y_S=1V$ typ.→max.	0	1.5	3.5	dB
On-screen contrast min. value	A_{yG} (ON) min.	0.5V input	0.1	0.3	0.5	V _{P-P}
On-screen frequency characteristics	Δe	Attenuation quantity of f=10MHz to f=3MHz	-6	-3	+1	dB

Deflection Signal Processing

Standard vertical sawtooth output amplitude	V_{out}	Pin⑤, ⑥ short	2.2	2.6	3.0	V _{P-P}
Standard EW parabola output amplitude	V_{EW}		1.8	2.2	2.6	V _{P-P}

* The state in which R, B output amplitudes and G amplitude are made coincident, by means of drive I, II adjustments when Y signal is applied to Pin⑩.

** Refer to table 1

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Electrical Characteristics ($T_a = 25 \pm 2^\circ\text{C}$) [Reference Value]

Parameter	Symbol	Condition	min	typ	max	Unit
Horizontal Signal Processing						
Synchronous separable input	V_{IN}	Input ; full black Sync. level	(0.2)	(1.0)	—	V_{P-P}
f_{HO} ambient temperature dependency	$\frac{\Delta f_{HO}}{T_a}$	$T_a = -20$ to $+70^\circ\text{C}$	—	(5.5)	—	Hz/ $^\circ\text{C}$
Horizontal oscillation frequency control sensitivity	β_H		—	(1.2)	—	Hz/mV
AFC1 reference current (1)	$I_{30(1)}$	0D [30]*	—	(0.83)	—	mA
AFC1 reference current (2)	$I_{30(2)}$	0D [20]*	—	(1.33)	—	mA
AFC1 reference current (3)	$I_{30(3)}$	0D [10]*	—	(1.83)	—	mA
AFC1 reference current (4)	$I_{30(4)}$	0D [00]*	—	(2.33)	—	mA
F.B.P slice level (blanking)	V_{FBP-1}		—	(0.7)	—	V
F.B.P slice level (AFCI)	V_{FBP-2}		—	(2.5)	—	V
F.B.P delay time range	T_{H-FBP}	H center ; Typ. Hout rise to FBP center	—	—	(19)	μs
B.G.P start position	—	Horizontal Sync. rear edge to burst gate pulse front edge	—	(0.3)	—	μs
Sandcastle pulse output temperature characteristics	$\Delta V_{27(Ta)}$		—	(1.8)	—	mV/deg
Sandcastle pulse input thresh level temperature characteristics	$\Delta V_{26(Ta)}$		—	(0)	—	mV/deg
FBP input threshold level temperature characteristics HBLK	$\Delta V_{28(Ta)}$		—	(-1.8)	—	mV/deg
FBP input threshold level temperature characteristics AFCI	—		—	(1)	—	mV/deg
X-ray inner reference temperature characteristics	—	Zener temperature characteristics + 1.8mV/deg	—	(0)	—	mV/deg
Sandcastle pulse output supply voltage dependency BGP	—	$V_{CC2} 5V \pm 0.5V$	—	(1)	—	V/V
Sandcastle pulse output supply voltage dependency HBLK	—	$V_{CC2} 5V \pm 0.5V$	—	(0.74)	—	V/V
Sandcastle pulse output supply voltage dependency VBLK	—	$V_{CC2} 5V \pm 0.5V$	—	(0.44)	—	V/V
Vertical Signal Processing						
Vertical BLK phase wide	PVBLK (W)	Period from VBLK rise to vertical Sync. fall	—	(3.87)	—	ms
Vertical BLK phase normal	PVBLK	Period from VBLK rise to vertical Sync. fall	—	(0.2)	—	ms
CRT neck break operation Pin ²⁷ voltage	V_{27}	Pin ²⁹ : 1.5V	(1.5)	—	—	V
Vertical BLK pulse width wide	TVBLK (W)		—	(5.05)	—	ms
Y Signal Processing						
Contrast variable range	$A_{YG(CON)min.}$	Contrast : min./max.	—	(40)	—	dB
Y output amplitude V_{CC} dependency	$\Delta Y_G (V_{CC})$		—	(0.4)	—	dB/V
Y output DC voltage V_{CC} dependency	$\Delta Y_G (V_{CC})$		—	(0.18)	—	V/V
Y noise level	V_{YNL}		—	(7)	(50)	mV
Delay line dynamic range	$V_{DLmax.}$		—	(0.7)	—	V
Y output amplitude ambient temperature dependency R	$\Delta y_R (T_a)$	-20 to $+70^\circ\text{C}$	—	(-6)	—	%
Y output amplitude ambient temperature dependency G	$\Delta y_G (T_a)$	-20 to $+70^\circ\text{C}$	—	(-8)	—	%
Y output amplitude ambient temperature dependency B	$\Delta y_B (T_a)$	-20 to $+70^\circ\text{C}$	—	(-6)	—	%
APL detection voltage	A_{APL}	APL50 \rightarrow 100%	(1)	(2)	(4)	times
Sharpness output voltage	V_{31}	Sharpness : typ.	(1.8)	(2.1)	(2.4)	V
Sharpness output variable range	ΔV_{31}	Sharpness : min. \rightarrow max.	(2.7)	(3.0)	(3.3)	V

Note) The characteristics value in parentheses is not a guaranteed value, but reference one on design.

* Refer to table 1

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■ Electrical Characteristics (Ta=25±2°C) [Reference Value]

Parameter	Symbol	Condition	min	typ	max	Unit
Chroma Signal Processing						
Demodulation output amplitude V _{CC} dependency	e _{0-v}		—	(0)	—	dB/V
VCO V _{CC} dependency	Δf _{CO-v}		—	(220)	—	Hz/V
Burst-chroma ratio tolerance	Δe ₀ (bst)	Burst compression tolerance for color bar chroma	—	(-40)	—	%
Demodulation output ambient temperature dependency R-Y	Δe _{R-Y} (Ta)	-20 to +70°C	—	(-3)	—	%
Demodulation output ambient temperature dependency B-Y	Δe _{B-Y} (Ta)	-20 to +70°C	—	(-3)	—	%
RGB Signal Processing						
Y→RGB crosstalk	e _{CT1}	Cross-hatch signal (Y input)	—	(-45)	—	dB
RGB→Y crosstalk	e _{CT2}	Cross-hatch signal (OSD input)	—	(-40)	—	dB
Color difference input dynamic range	ΔV _{max}		—	(2.2)	—	V
Internal external pedestal difference voltage	ΔE _(YS)		(-100)	(0)	(100)	mV
OSD input dynamic range	ΔV _{max}		—	(1.5)	—	V
RGB output amplitude V _{CC} dependency	Δe _G (V _{CC})	V _{CC1} 8.5 to 9.5V V _{CC2} 4.5 to 5.5V	—	(0.4)	—	V/V
OSD output amplitude V _{CC} dependency	Δe _s (V _{CC})	V _{CC1} 8.5 to 9.5V V _{CC2} 4.5 to 5.5V	—	(0)	—	V/V
RGB color difference signal amplitude temperature dependency	Δe _G (Ta)	-20 to +70°C	—	(20)	—	%
OSD output amplitude temperature dependency	Δe _s (Ta)	-20 to +70°C	—	(6)	—	%
Color control range (external)	Δe _{color}	0Ei [40]* To DAC Control ratio	—	(28)	—	%
White character slice level range	V _w	Blooming DC 2.5V Color difference no input	(0.6)	(0.8)	(1.0)	V
White character correction quantity	ΔV _w	Blooming DC 2.5V Color difference no input	(0.6)	(0.8)	(1.0)	V
Deflection Signal Processing						
Vertical amplitude variation ratio (1)	ΔV _{amp}	Vertical amplitude : typ.→max.	(10)	(19)	(28)	%
Vertical amplitude variation ratio (2)	ΔV _{amp}	Vertical amplitude : typ.→min.	(-10)	(-19)	(-28)	%
Vertical linearity variation width max.	ΔV _{lin}	Vertical linearity typ.→max.	(5)	(12)	(19)	%
Vertical linearity variation width min.	ΔV _{lin}	Vertical linearity typ.→min.	(-5)	(-12)	(-19)	%
Vertical S character amplitude variation ratio	ΔV _{SC}	Vertical S-correction : min.→max.	(-33)	(-18)	(-3)	%
Vertical position variation width	ΔV _{shift}	Vertical position : min.→max.	(0.6)	(0.8)	(1.0)	V
Vertical EHT amplitude variation ratio	ΔV _{EHT}	Pin [⊕] =0V Vertical EHT : typ.→max.	(3)	(10)	(19)	%
Vertical EHT amplitude variation ratio	ΔV _{EHT}	Pin [⊕] =1V Vertical EHT : typ.→min.	(-3)	(-10)	(-19)	%
EW parabola variation width	ΔV _{parabola}	EW parabola amplitude : min.→max.	(2)	(3.2)	(4.4)	V _{P-P}
Horizontal amplitude variation width	ΔV _{H-WIDTH}	Horizontal amplitude : min.→max.	(3.4)	(4.6)	(5.8)	V
Trapezoidal distortion correction variation ratio 1	ΔV _{Trapz}	Trapezoidal distortion correction : typ.→max.	(48)	(72)	(96)	%
Trapezoidal distortion correction variation ratio 2	ΔV _{Trapz}	Trapezoidal distortion correction : typ.→min.	(-48)	(-72)	(-96)	%
Corner correction variation ratio 1	ΔV _{comer}	EW corner 1 : min.→max.	(-40)	(-28)	(-16)	%
Corner correction variation ratio 2	ΔV _{comer}	EW corner 2 : min.→max.	(-38)	(-26)	(-14)	%
Horizontal EHT correction variable range	ΔV _{H-EHT}	Pin [⊕] =1V Horizontal EHT : min.→max.	(1.4)	(2.2)	(3.0)	V
Deflection Signal Processing						
Comer correction slice level pin voltage	V ₆₇		—	(0.55)	—	V

Note) The characteristics value in parentheses is not a guaranteed value, but reference one on design.

* Refer to table 1

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Electrical Characteristics (cont.) ($T_a = 25 \pm 2^\circ\text{C}$) [Reference Value]

Parameter	Symbol	Condition	min	typ	max	Unit
Comer correction gain adjustment pin voltage	V_{57}		—	(2.5)	—	V
EW output V_{CC} drift	$\Delta V_{EW} (V_{CC})$	$V_{CC1} 8.5$ to $9.5V$ $V_{CC2} 4.5$ to $5.5V$	—	(0)	—	%
EW amp. drive current	I_{EW-dr}		—	(1.4)	—	mA
Ramp wave form normal	ΔV_{ramp}	0D [00]*	—	(2.5)	—	V_{P-P}
Ramp wave form wide	$\Delta V_{ramp(W)}$	0D [40]*	—	(2.5)	—	V_{P-P}
AGC input output current	I_{48}	Service SW : ON Pin ^{④⑨} sweep	—	(± 140)	—	μA
Ramp input output current (1)	I_{49}	Pin ^{④⑨} : 1.5V, Pin ^{④⑨} : 2.5V Vpulse : ON	—	(4.4)	—	mA
Ramp input output current (2)	I_{49}	Pin ^{④⑨} : 1.5V, Pin ^{④⑨} : 2.5V Vpulse : OFF	—	(-90)	—	μA
DC level of vertical scan stop-mode	V_{49-SW}	0D [80]*	—	(1.2)	—	V
Input Signal						
Chroma input tolerant level	e_{Cin}	Color bar chroma 330mV _{P-P} burst level	(90)	(150)	—	mV _{P-P}
Y input tolerant level	y_{in}	Sync. to white 100%	—	(0.5)	(0.7)	V_{P-P}
H Sync. input tolerant level	v_{Hin}	Sync. to pedestal	(0.5)	(1.0)	(2.0)	V_{P-P}
V Sync. input tolerant level	v_{Vin}	Sync. to pedestal	(0.5)	(1.0)	(2.0)	V_{P-P}
Sandcastle pulse external input BGP	$V_{BGP\ in}$	V_{CC} : typ.	(4.0)	(4.3)	(4.6)	V_{P-P}
Sandcastle pulse external input HBLK	$V_{HBLK\ in}$	V_{CC} : typ.	(2.7)	(3.0)	(3.3)	V_{P-P}
Sandcastle pulse external input VBLK	$V_{VBLK\ in}$	V_{CC} : typ.	(1.2)	(1.6)	(1.8)	V_{P-P}
FBP input	$V_{FBP\ in}$	V_{CC} : typ.	—	—	(3.5)	V
Ys input level	V_{63}	V_{CC} : typ.	(2.0)	—	(3.5)	V
On-screen input R	e_{69}		—	(0.71)	(1.0)	V_{P-P}
On-screen input G	e_{68}		—	(0.71)	(1.0)	V_{P-P}
On-screen input B	e_{66}		—	(0.71)	(1.0)	V_{P-P}
I ² C bus SDA input level H	V_{45}	V_{CC2} (=5V)	(4.0)	—	(V_{CC2})	V
I ² C bus SDA input level L	V_{45}	V_{CC2} (=5V)	(0)	—	(0.7)	V
I ² C bus SCL input level H	V_{47}	V_{CC2} (=5V)	(4.0)	—	(V_{CC2})	V
I ² C bus SCL input level L	V_{47}	V_{CC2} (=5V)	(0)	—	(0.7)	V

Note) The characteristics value in parentheses is not a guaranteed value, but reference one on design.

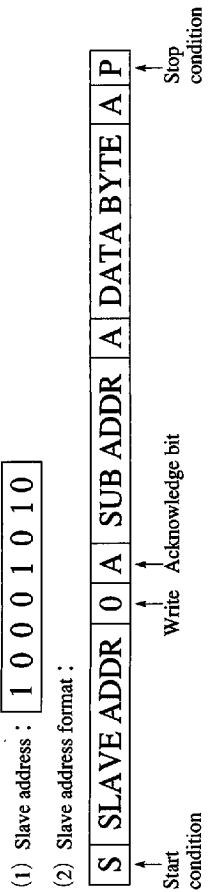
* Refer to table 1

 ICs for
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Table 1 I²C Bus Protocol



AN5306N DAC CONTROL

No.	DAC name	bit number	Sub address	Data address	Remarks	Standard measurement condition
1	Color control	7 (+offSW)	00 (00000000)	00 to 40 to 7F	DATA : Color OFF with [00]	40
2	Tint control	7	01 (00000001)	00 to 40 to 7F		40
3	Brightness control	8	02 (00000010)	00 to 80 to FF		80
4	Contrast control	7	03 (00000011)	00 to 40 to 7F		7F
5	Sharpness control	7	04 (00000100)	00 to 40 to 7F		00
6	Cut-off R	8 (+2SW)	05 (00000101)	00 to 80 to FF	4 stage change-over by SW	FF
7	Cut-off G	8	06 (00000110)	00 to 80 to FF		FF
8	Cut-off B	8 (+2SW)	07 (00000111)	00 to 80 to FF	4 stage change-over by SW	FF
9	Drive R	7 (+SW)	08 (00001000)	00 to 40 to 7F	2 stage change-over by SW	7F
10	Drive B	7 (+SW)	09 (00001001)	00 to 40 to 7F	2 stage change-over by SW	7F
11	Vertical amplitude	7	0A (00001010)	00 to 40 to 7F		40
12	EW parabola amplitude	6	0B (00001011)	00 to 20 to 3F		20
13	Horizontal amplitude	6	0C (00001100)	00 to 20 to 3F		20
14	Y delay line change-over	1	0D (00001101)	01 (00000001)	For [00] ON, for [01] OFF.	
15	Aper.con. delay quantity change-over	1	0D (00001101)	02 (00000010)	For [00] 50ms, 250ms [02] 0ms, 300ms	
16	DC transmission quantity change-over	1	0D (00001101)	04 (00000100)	For [00] - direction, for [04] + direction	
17	Output blanking ON/OFF	1	0D (00001101)	08 (00001000)	For BLK pulse, [00] has [04] not	08
18	AFC1 gain change-over	2	0D (00001101)	10, 20	With [30] → [00] AFC1μ increases	
19	BLK pulse width change-over	1	0D (00001101)	40 (01000000)	For [00] normal screen for [40] wide screen	
20	Service SW ON/OFF	1	0D (00001101)	80 (10000000)	For [00] normal state, for [60] def V output DC	
21	Sand castle pulse change-over	1	0E (00001110)	01 (00000001)	For [00] internal SCP, for [01] external SCP	
22	Vertical amp. polarity change-over	1	0E (00001110)	02 (00000010)	For FB terminal polarity of def Vertical amp., - in [00], + in [02]	
23	Color track ON/OFF	1	0E (00001110)	04 (00000100)	For color track, OFF in [00], ON in [04]	
24	Mute ON/OFF	1	0E (00001110)	10 (00010000)	For [00] normal state, for [10] RGB output OFF	00
25	Sharpness ON/OFF	1	0E (00001110)	20 (00100000)	For sharpness, ON in [00], OFF in [20]	
26	Black detection/color change-over	1	0E (00001110)	40 (01000000)	For black detection pin, black detection in [00], color terminal in [40]	

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Table 1 (cont.)

No.	DAC name	bit number	Sub address	Data address	Remarks	Standard measurement condition
27	Cut-off R switch-1	1	0F (00001111)	01 (00000001)	Cut-off R level increased with {00} → {01} → {02} → {03}	
28	Cut-off R switch-2	1	0F (00001111)	02 (00000010)	Drive R gain increased with {00} → {04}	
29	Drive R switch	1	0F (00001111)	04 (00000100)	Drive B gain increases with {00} → {08}	11
30	Drive B switch	1	0F (00001111)	08 (00001000)	Cut-off B level increases with {00} → {20} → {30}	
31	Cut-off B switch-1	1	0F (00001111)	10 (00010000)	For chroma BGP, H-BLK with {00}, BBP1 with {40}	
32	Cut-off B switch-2	1	0F (00001111)	20 (00100000)		
33	H blanking change-over	1	0F (00001111)	40 (01000000)		
34	Pre-shoot/over-shoot quantity	3	10 (00010000)	00 to 04 to 07		04
35	Black extension gain	4	11 (00010001)	00 to 08 to 0F		00
36	White γ level	4	12 (00010010)	00 to 08 to 0F		08
37	White γ gain	4	13 (00010011)	00 to 08 to 0F		08
38	Black elongation slice position	3 + offsw	14 (00010100)	00 to 04 to 07	For contrast, interlock with {00} → {07}, independent with {03} → {0F}	04
39	Demodulation axis R-Y	5	15 (00010101)	00 to 10 to 1F		00
40	Demodulation ratio B-Y	6	16 (00010110)	00 to 20 to 3F		20
41	G-Y ratio change-over	2	17 (00010111)	00 to 02 to 03	{00}, {01} ; TYPE1 {02} ; TYPE2 {03} ; TYPE1	00
42	White character correction	4	18 (00011000)	00 to 08 to 0F		00
43	White character slice voltage	4	19 (00011001)	00 to 08 to 0F		00
44	H center position	5	1A (00011010)	00 to 10 to 1F		10
45	Vertical S-correction	6	1B (00011011)	00 to 20 to 3F		20
46	Vertical linearity	6	1C (00011100)	00 to 20 to 3F		20
47	Vertical position	6	1D (00011101)	00 to 20 to 3F		20
48	Trapezoidal correction	6	1E (00011110)	00 to 20 to 3F		20
49	EW corner 1	3	1F (00011111)	00 to 04 to 07		04
50	EW corner 2	3	20 (00100000)	00 to 04 to 07		04
51	Vertical EHT	4	21 (00100001)	00 to 08 to 0F		08
52	Horizontal EHT	4	22 (00100010)	00 to 08 to 0F		08

Note : DAC default value is center (eg. : {80} in 8bit)

SW default value is {00}

G-Y ratio change-over

TYPE1 : G-Y = -0.34 (R-Y) -0.28 (B-Y)

TYPE2 : G-Y = -0.33 (R-Y) -0.17 (B-Y)

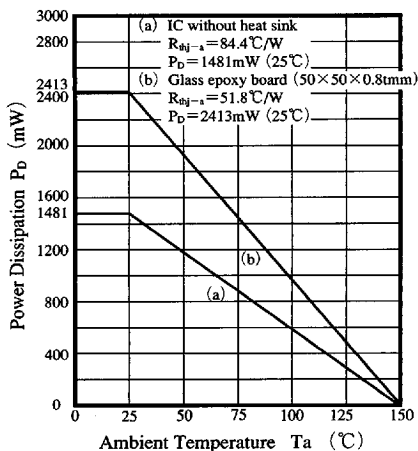
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Pin Descriptions

Pin No.	Pin name	Pin No.	Pin name
2	3.58MHz CW output	44	Hor. power supply (HV _{CC})
3	Killer filter	45	I ² C SDA input
4	Color track filter	46	I ² C GND
6	ABL input (Brightness control)	47	I ² C SCL input
7	Chroma input	48	Reference ramp waveform AGC filter
8	5V power supply (V _{CC2})	49	Reference ramp waveform generation
9	Blooming level input	50	Ver. deflection saw-tooth feedback input
10	Filter for APL detection	51	Sync. 9V power supply
14	Filter for white peak detection	54	Ver. deflection saw-tooth output
15	Black min. det. filter/color control	55	EW output
16	ACL input contrast control	56	9V power supply (V _{CC1})
17	Y signal input	57	R output
18	Slave address switching - 1	58	Corner gain control
19	V sync. sep filter	59	G output
20	H sync. input	61	B output
21	Slave address switching - 2	62	EHT voltage detection
22	V sync. input	63	Ys input
23	Lock det. filter	66	On-Screen B input
26	Sandcastle pulse input	67	Corner slice level control
27	Sandcastle pulse output	68	On-screen G input
28	Flyback pulse (FBP) input	69	On-screen R input
29	V pulse output	70	B - Y input
30	AFC1 filter	71	R - Y input
31	Sharpness control output	74	V/C/RGB GND
34	Sync. Def GND	76	R - Y output
35	503kHz VCO	77	B - Y output
37	ACF filter	78	3.58MHz VCO
38	High voltage det. input (X-ray)	79	Chroma APC filter
39	High voltage det. reference voltage	5, 11, 36, 42, 60, 75	No-connection
43	Hor. drive pulse output	1, 12, 13, 24, 25, 32, 33, 40	GND
-		41, 52, 53, 64, 65, 72, 73, 80	

Reference

 $P_D - T_a$


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