

AN2145NFHP, AN2146FHP, AN2147FHP

CCD Video Camera Signal Processor ICs

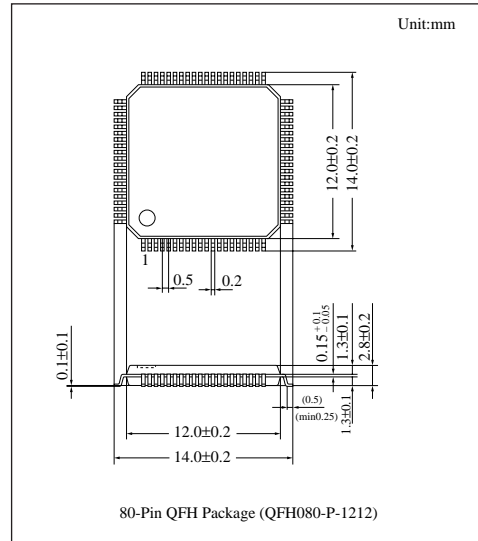
■ Overview

The AN2145NFHP is a CCD video camera signal processor IC for 510H CCD. It incorporates full chroma signal LPFs and horizontal aperture correction circuits. Because carrier-balance is rationalized and adjustment-free, adjustments and necessary external components are reduced half in number as compared with conventional versions of ours.

The AN2146FHP is for 670H CCD, and the AN2147FHP is for 768HCCD.

■ Features

- Improved color reproduction with 4-channel white balance
- Built-in high-luminance color-suppression circuit
- Improved S/N ratio at low brightness



■ Absolute Maximum Ratings (Ta=25 °C)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	5.5	V
Supply current	I _{CC}	100	mA
Power dissipation ^{Note 2)}	P _D	357	mW
Operating ambient temperature ^{Note 1)}	T _{opr}	-20 to +75	°C
Storage temperature ^{Note 1)}	T _{stg}	-55 to +125	°C

Note 1) Ta=25°C except operating ambient temperature and storage temperatures unless otherwise specified.

Note 2) Allowable power dissipation of the package at Ta=70°C.

■ Recommended Operating Range (Ta=25°C)

Parameter	Symbol	Range
Operating supply voltage range	V _{CC}	4.4V to 4.8V

■ Electrical Characteristics (VCC=4.6V, Ta=25±2°C)

Parameter	Symbol	Condition	min	typ	max	Unit
Total circuit current	I _{TOT}		42	60	78	mA
Reference voltage (or V _{REF} output voltage)	V _{REF}		1.68	1.8	1.92	V
Pulse separation level CPOB	V _{CPOB}		2.1	2.5	2.9	V
Pulse separation level PBLK	V _{PBLK}		0.6	1.0	1.4	V
Pulse separation level CP2	V _{CP2}		2.1	2.5	2.9	V
Pulse separation level CBLK	V _{CBLK}		0.6	1.0	1.4	V
Pulse separation level FH/2	V _{FH/2}		0.6	1.0	1.4	V
Pulse separation level SP	V _{SP}		0.4	0.8	1.2	V
Pulse separation level WBLK	V _{WBLK}		0.6	1.0	1.4	V
Pulse separation level SYNC	V _{DSYN}		1.1	1.5	1.9	V
Luminance AGC max. gain	V _{YMAX}	V ₆₅ =10STEP 50mV _{P-P}	22.5	26	28.5	dB
Luminance AGC mini. gain	V _{YMIN}	V ₆₅ =10STEP 1500mV _{P-P}	-9	-6	-4	dB
Color difference AGC min. gain ^{Note A)}	V _{CMAX}	V ₆₅ =Sin500kHz 50mV _{P-P}	22.5	26	28.5	dB
Color difference AGC max. gain ^{Note A)}	V _{CMIN}	V ₆₅ =Sin500kHz 1500mV _{P-P}	-9	-6	-4	dB
Luminance g characteristics (1)	V _{YGAM1}	V ₆₉ =10STEP 1000mV _{P-P} 3rd step	350	470	600	mV _{P-P}
Luminance g characteristics (2)	V _{YGAM2}	V ₆₉ =10STEP 1000mV _{P-P} 5 step	470	630	810	mV _{P-P}
Luminance g characteristics (3)	V _{YGAM3}	V ₆₉ =10STEP 1000mV _{P-P} 10 step	720	970	1260	mV _{P-P}
Luminance fade characteristics	V _{YFADE}	V ₁₆ =10STEP 300mV _{P-P}	—	—	-26	dB
Horizontal AP generation circuit characteristics ^{Note A)}	V _{HAP}	V ₁₆ =Sin3.5kHz 100mV _{P-P}	18.5	22	24.5	dB
Base clip characteristics ^{Note B)}	V _{BCLIP}	V ₁₁ =Sin500kHz 40mV _{P-P}	—	—	60	mV _{P-P}
Output luminance signal amplitude	V _{YOUT}	V ₂₉ =10STEP 600mV _{P-P}	580	680	800	mV _{P-P}
Output high-clip characteristics	V _{HCLIP}	V ₂₉ =10STEP 1000mV _{P-P}	800	890	1100	mV
Output low-clip characteristics	V _{LCLIP}	V ₂₉ =10STEP 200mV _{P-P} (reverse)	-50	-28	-12	mV
Synchronous signal level	V _{SYNC}	V ₂₉ =C-GND	268	295	322	mV _{P-P}
Pedestal control characteristics (1)	V _{PED1}	V ₂₉ =C-GND	40	60	100	mV
Pedestal control characteristics (2)	V _{PED2}	V ₂₉ =C-GND	-30	-10	0	mV
Chroma clip characteristics ^{Note B)}	V _{CCLIP}	V ₂₀ =Sin3.5MHz 600mV _{P-P} (V ₂₉ =white signal)	—	—	-20	dB
S/H characteristics	V _{SH}	V ₆₅ =square wave 500kHz 1V _{P-P}	300	450	600	mV _{P-P}
Switch level	V _{SW}	V ₄₈ , V ₅₀ , V ₅₄ , V ₅₆ =C-GND	-12	0	12	mV
Switch DC offset	V _{Swoff}	V ₄₈ , V ₅₀ , V ₅₄ , V ₅₆ =C-GND	-30	0	30	mV
RWB control characteristics	V _{RWB}	V ₅₆ =10STEP 200mV _{P-P}	420	580	760	mV _{P-P}
CY+G control characteristics	V _{CYG}	V ₅₄ =10STEP 200mV _{P-P}	420	580	760	mV _{P-P}
BWB control characteristics	V _{BWB}	V ₅₀ =10STEP 200mV _{P-P}	420	580	760	mV _{P-P}
YE+G control characteristics	V _{YEG}	V ₄₈ =10STEP 200mV _{P-P}	420	580	760	mV _{P-P}
R-Y matrix control characteristics	V _{RMAT}	V ₅₀ =10STEP 200mV _{P-P}	380	520	710	mV _{P-P}
B-Y matrix control characteristics	V _{BMAT}	V ₅₆ =10STEP 200mV _{P-P}	380	520	710	mV _{P-P}
γ control signal leak	V _{GAML}	V ₂₄ =10STEP 500mV _{P-P}	—	—	100	mV _{P-P}
Color difference γ characteristics (1)	V _{CGAM1}	V ₂₂ =10STEP 500mV _{P-P} V ₂₄ =10STEP 1V _{P-P} 3rd step	300	410	530	mV _{P-P}
Color difference γ characteristics (2)	V _{CGAM2}	V ₂₂ =10STEP 500mV _{P-P} V ₂₄ =10STEP 1V _{P-P} 5 step	380	530	690	mV _{P-P}

Note A) Sine wave with BLK and pedestal

Note B) Sine wave with BLK

The value in the above characteristics is not a guaranteed value, but reference one on design.

■ Electrical Characteristics (cont.) (VCC=4.6V, Ta=25±2°C)

Parameter	Symbol	Condition	min	typ	max	Unit
Color difference γ characteristics (3)	V _{CGAM3}	V ₂₂ =10STEP 500mV _{P-P} V ₂₄ =10STEP 1V _{P-P} 10 step	510	720	930	mV _{P-P}
Between channels γ characteristics	V _{GAM4}	V ₂₃ =10STEP 500mV _{P-P} V ₂₄ =10STEP 1V	-2	0	2	dB
Color difference gain control characteristics (1) ^{Note B)}	V _{CGC1}	V ₂₂ =Sin500kHz 600mV _{P-P}	700	1150	1500	mV _{P-P}
Color difference gain control characteristics (2) ^{Note B)}	V _{CGC2}	V ₂₃ =Sin500kHz 600mV _{P-P}	700	1150	1500	mV _{P-P}
Iris γ characteristics (1)	V _{IGAM1}	V ₅ =10STEP 1V _{P-P} 3rd step	220	300	390	mV _{P-P}
Iris γ characteristics (2)	V _{IGAM2}	V ₅ =10STEP 1V _{P-P} 5 step	350	480	620	mV _{P-P}
Iris γ characteristics (3)	V _{IGAM3}	V ₅ =10STEP 1V _{P-P} 10 step	470	630	800	mV _{P-P}
Luminance signal blanking level	V _{YBLK}	V ₆₉ =C-GND	-20	0	20	mV
Iris signal blanking level	V _{IBLK}	V ₅ =C-GND	-20	0	20	mV
R-Y blanking level	V _{RBLK}	V ₂₂ =C-GND	-20	0	20	mV
B-Y blanking level	V _{BBLK}	V ₂₃ =C-GND	-20	0	20	mV
VAP generation circuit gain ^{Note C)}	V _{VAP}	V ₅₄ =10STEP 200mV _{P-P} V ₅₆ =10STEP 200mV _{P-P}	310	450	610	mV _{P-P}
Edge suppression characteristics (1) ^{Note B)}	V _{EDGE1}	V ₂₂ =Sin500kHz 600mV _{P-P}	—	—	-20	dB
Edge suppression characteristics (2) ^{Note B)}	V _{EDGE2}	V ₂₃ =Sin500kHz 600mV _{P-P}	—	—	-20	dB
Luminance high-cut characteristics	V _{HC}	V ₆₅ =10STEP 1500mV _{P-P}	—	350	—	mV
AP mix circuit luminance amplification characteristics	V _{APY}	V ₁₆ =10STEP 300mV _{P-P}	—	6.9	—	dB
Horizontal APDL group delay ^{Note A, D)}	V _{APDL}	V ₁₆ =Sin3.5MHz 100mV _{P-P}	—	120	—	ns
Aperture mix circuit HAP gain ^{Note B)}	V _{APHAP}	V ₁₃ =Sin3.5MHz 600mV _{P-P}	—	3.4	—	dB
Aperture mix circuit VAP gain ^{Note B, E)}	V _{APVAP}	V ₁₁ =Sin500kHz 600mV _{P-P}	—	3.3	—	dB
Aperture suppression characteristics ^{Note B)}	V _{LLSP}	V ₁₃ =Sin3.5MHz 600mV _{P-P}	—	-12	—	dB
White fade characteristics	V _{WFADE}	V ₁₆ =Vref	—	515	—	mV
Delay signal amp. gain (1) ^{Note A)}	V _{DLAMP1}	V ₃₇ =Sin500kHz 500mV _{P-P} (V ₃₈ =0.5V)	—	0	—	dB
Delay signal amp. gain (2) ^{Note A)}	V _{DLAMP2}	V ₄₂ =Sin500kHz 500mV _{P-P} (V ₄₁ =0.5V)	—	0	—	dB
Delay signal amp. gain (3) ^{Note A)}	V _{DLAMP3}	V ₃₇ =Sin500kHz 500mV _{P-P} (V ₃₈ =3.0V)	—	8	—	dB
Delay signal amp. gain (4) ^{Note A)}	V _{DLAMP4}	V ₄₂ =Sin500kHz 500mV _{P-P} (V ₄₁ =3.0V)	—	8	—	dB
Color difference high-clip characteristics ^{Note B)}	V _{CHC}	V ₂₂ =V ₂₃ =Sin500kHz 600mV _{P-P} (V ₅ =white)	—	-26	—	dB
Color difference fade characteristics ^{Note B)}	V _{CFADE}	V ₂₂ =V ₂₃ =Sin500kHz 600mV _{P-P}	—	-26	—	dB
S/H LPF characteristics ^{Note A)}	V _{SHLPF}	V ₆₅ =Sin3.5MHz 1500mV _{P-P}	—	-30	—	dB
Color difference LPF characteristics ^{Note B)}	V _{CLPF}	V ₂₂ =V ₂₃ =Sin3.5MHz 600mV _{P-P}	—	-26	—	dB
VAP LPF characteristics (1) ^{Note A)}	V _{VLPF1}	V ₄₈ =V ₅₀ =Sin500kHz 200mV _{P-P}	—	0	—	dB
VAP LPF characteristics (2) ^{Note A)}	V _{VLPF2}	V ₄₈ =V ₅₀ =Sin3.5MHz 200mV _{P-P}	—	-25	—	dB
Edge HPF characteristics ^{Note A)}	V _{EHPF}	V ₅₄ =V ₅₆ =Sin500kHz 500mV _{P-P}	—	-4	—	dB

Note A) Sine waves with BLK and pedestal

Note B) Sine waves with BLK

Note C) For the AN2147FHP, 450mV_{P-P} min., 665mV_{P-P} typ., and 880mV_{P-P} max. under the conditions

V₄₈=10STEP 200mV_{P-P} and V₅₀=10STEP 200mV_{P-P}.

Note D) 90ns typ. for the AN2146FHP and the AN2147FHP

Note E) 6.0dB typ. for the AN2147FHP

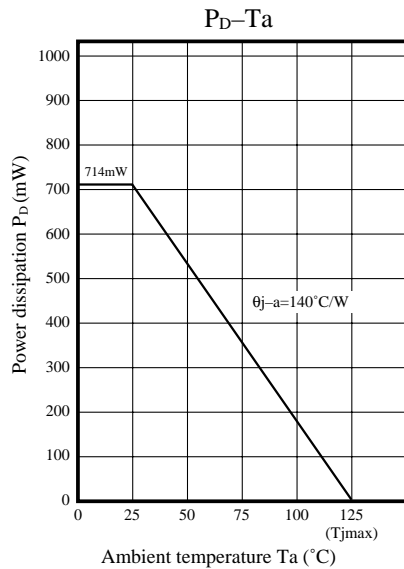
The value in the above characteristics is not a guaranteed value, but reference one on design.

Pin Descriptions

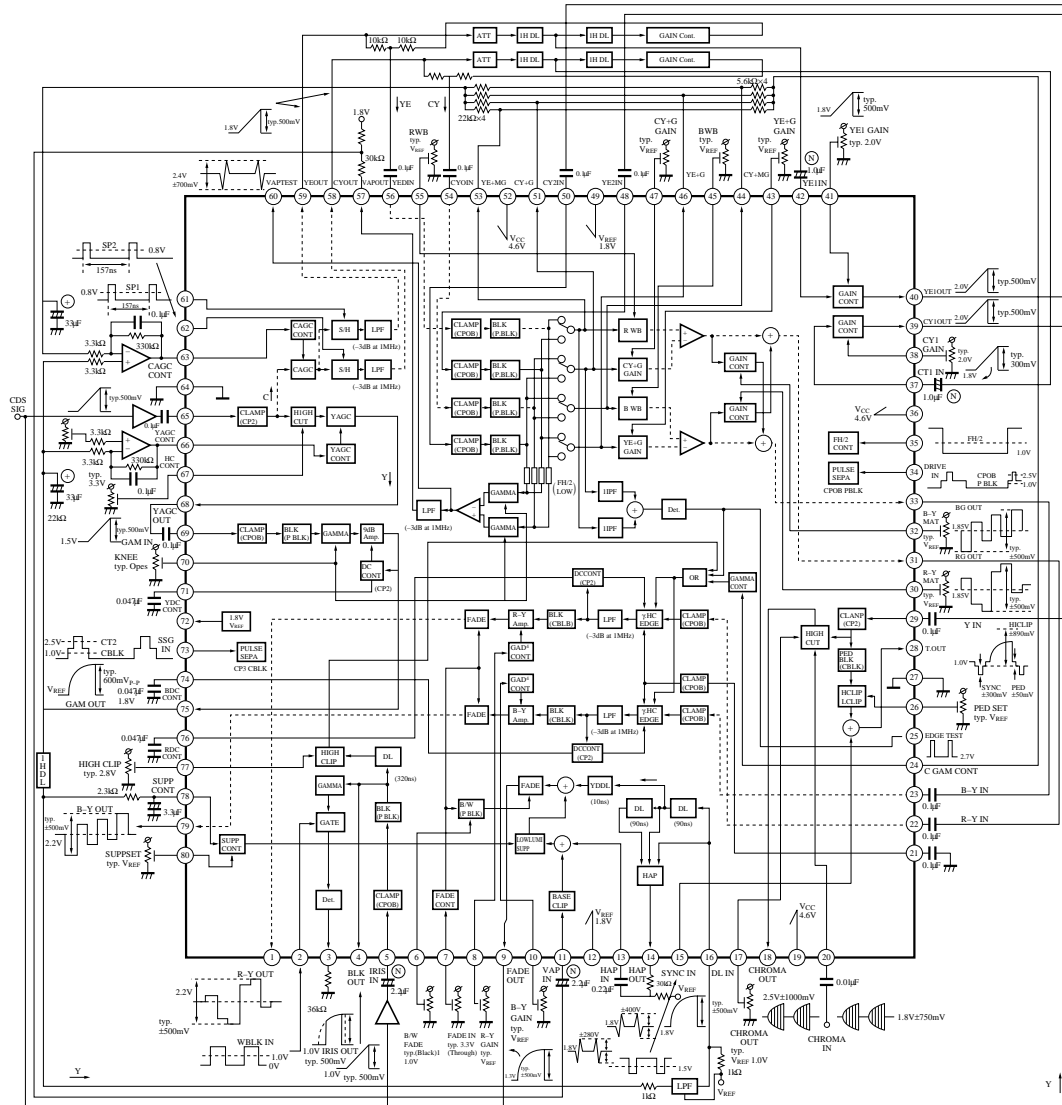
Pin No.	Pin name	Pin No.	Pin name
1	R-Y-Out	21	Dclamp
2	WBLK-In	22	R-Y-In
3	Iris-Out	23	B-Y-In
4	BLK-Out	24	C γ -Cont
5	Iris-In	25	Edge-Test
6	BW-Fade	26	Ped-Set
7	Fade-In	27	GND1
8	R-Y-Gain	28	Y-Out
9	Fade-Out	29	Y-In
10	B-Y-Gain	30	R-Y-Matrix
11	VAP-In	31	RG-Out
12	Vref1 (Typ. 1.8V In)	32	B-Y-Matrix
13	HAP-In	33	BG-Out
14	HAP-Out	34	Drive-In (Cpob, P. Blk)
15	Sync-In	35	FH2-In
16	DL-In	36	V _{CC2} (Typ. 4.6V)
17	Chroma-Clip	37	CY1-In
18	Chroma-Out	38	CY1-Gain
19	V _{CC1} (Typ. 4.6V)	39	CY1-Out
20	Chroma-In	40	YE1-Out

Pin No.	Pin name	Pin No.	Pin name
41	YE1-Gain	61	SPI-In
42	YE1-In	62	SP2-In
43	YE+G-Gain	63	CAGC-Cont
44	CY+Mg-Out	64	GND2
45	BWB-Gain	65	Sig-In
46	YE+G-Out	66	YAGC-Cont
47	CY+G-Gain	67	HC-Cont
48	YE2-In	68	YAGC-Out
49	Vref2 (Typ. 1.8V In)	69	γ -In
50	CY2-In	70	Knee-Cont
51	CY+G-Out	71	YDC-Cont
52	V _{CC3} (Typ. 4.6V)	72	Vre (Typ. 1.8V Out)
53	YE+MG-Out	73	SSG-In (Cp2, C. Blk)
54	CY0-In	74	BDC-Cont
55	RWB-Gain	75	γ -Out
56	YE0-In	76	RDC-Cont
57	VAP-Out	77	High-Clip
58	CY-Out	78	SUPP-Cont
59	YE-Out	79	B-Y-Out
60	VAP-Test	80	SUPP-Set

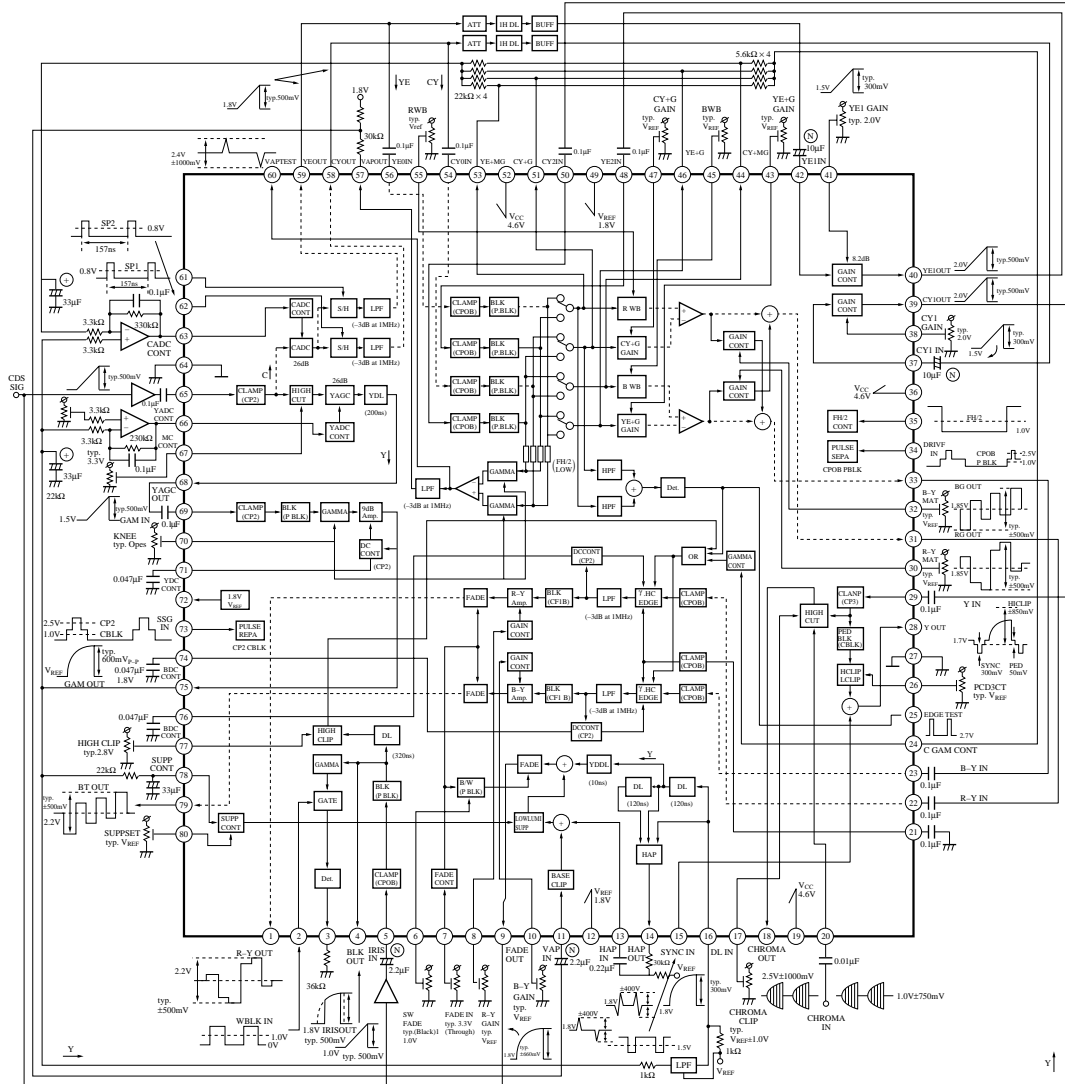
Reference



■ Block Diagrams (AN2145NFHP,AN2146FHP)



■ Block Diagram (AN2147FHP)



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