

AN2527NFHP

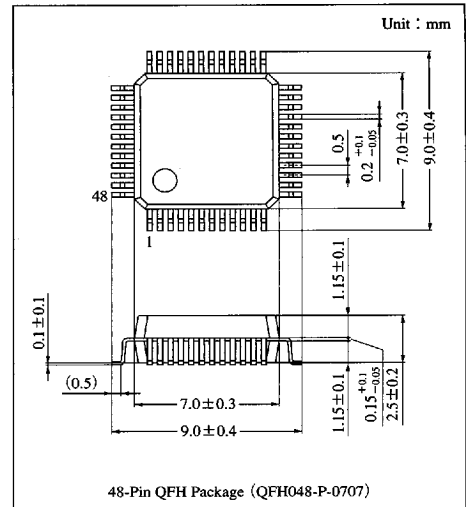
Signal Processor for IC Color LCD

Overview

The AN2527NFHP is a signal processor IC for video camera with a color-LCD. It alternates RGB components of a video signal at intervals of 1H. It is for 12 to 14V LCD panel.

Features

- Compatible with NTSC and PAL
- Built-in color-character insertion circuit
- Responding to composite and component signal processing
- Built-in a γ correction circuit



Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC1}	5.5	V
	V_{CC2}	15.5	
Power dissipation ^{Note 2)}	P_D	209	mW
Operating ambient temperature ^{Note 1)}	T_{opr}	-20 to +70	$^\circ\text{C}$
Storage temperature ^{Note 1)}	T_{sig}	-55 to +125	$^\circ\text{C}$

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

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

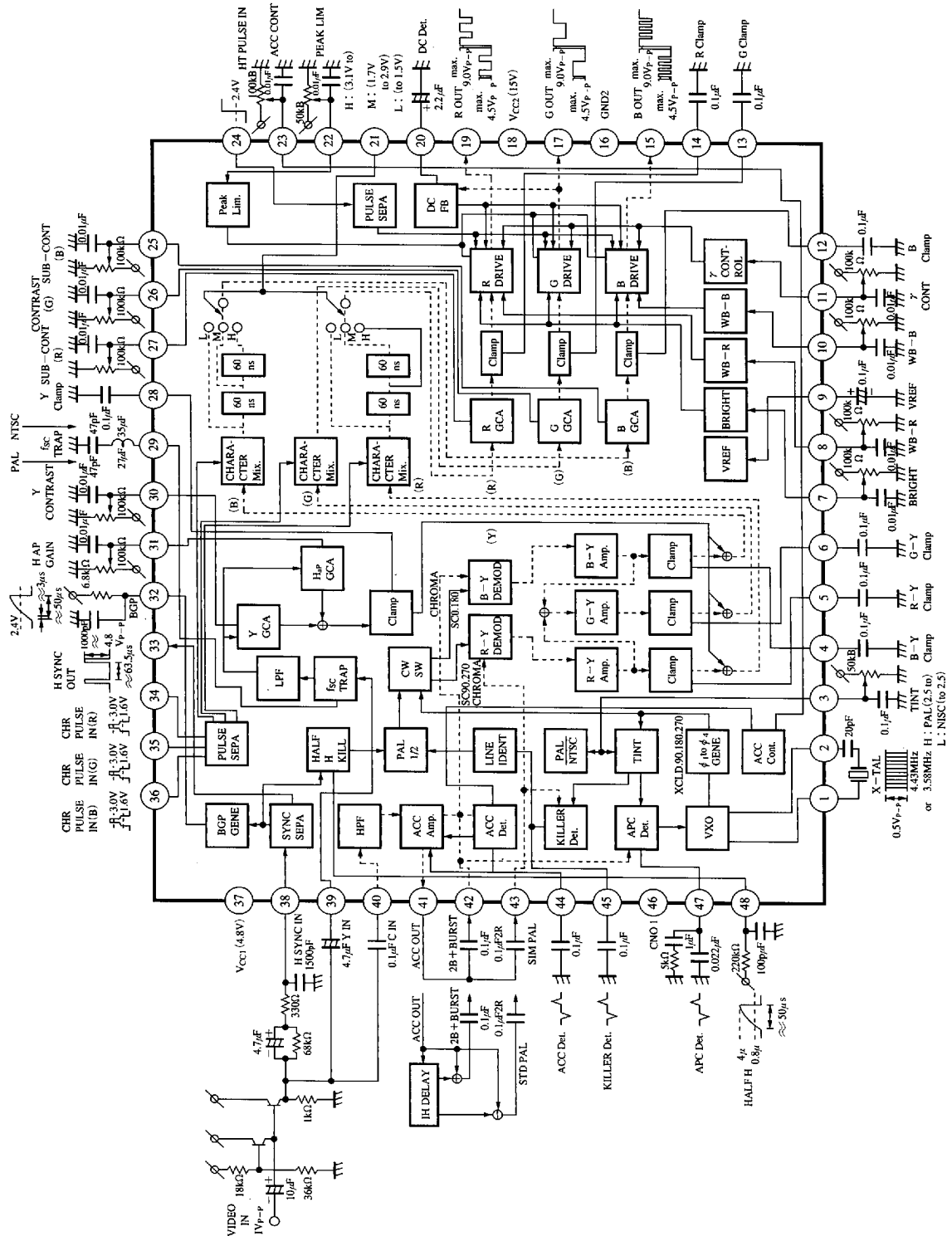
Recommended Operating Range ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Range
Operating supply voltage range	V_{CC1}	4.5V to 5.1V
	V_{CC2}	11.5V to 15.3V

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Block Diagram



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

Parameter	Symbol	Condition	min	typ	max	Unit
Circuit current (4.8V system)	I ₅₇	V _{CC1} =4.8V, V _{CC2} =15V	19	24	29	mA
Circuit current (15V system)	I ₁₈	V _{CC1} =4.8V, V _{CC2} =15V	1	3	6	mA
APC pull-in (Hi)	AP _H	V _{CC1} =4.8V, V _{CC2} =15V	0.5	—	—	kHz
APC pull-in (Low)	AP _L	V _{CC1} =4.8V, V _{CC2} =15V	—	—	-0.5	kHz
ACC output characteristics	AC ₄₁	Input=600mV _{P-P}	300	500	700	mV _{P-P}
ACC control characteristics	AG ₂₃	Input=600mV _{P-P}	5.0	8.0	11.0	dB
TINT control sensitivity	TI ₃	V ₃ =1.0/2.0V	100	350	600	mV _{P-P}
Killer characteristics	VK ₄₅	V _{CC1} =4.8V, V _{CC2} =15V	—	—	50	mV _{P-P}
Chroma leak (in case of killer-on)	L _K	V _{CC1} =4.8V, V _{CC2} =15V	—	—	-20	dB
SYNC output amplitude	V ₃₃	Input=1.0V _{P-P}	4.0	—	—	V _{P-P}
Minimum synchronous separation capability	MS ₃₃	Input=1.0V _{P-P}	—	—	80	mV _{P-P}
Y contrast adjustment	YC ₃₀	V ₃₀ =1.5/2.5V	3.7	5.7	7.7	dB
Sharpness adjustment	SH ₃₁	Input=1.0V _{P-P}	3	6	9.0	dB
Character level threshold (M)	V _{T(M)}	V _{CC1} =4.8V, V _{CC2} =15V	1.3	1.6	1.9	V
Character level threshold (H)	V _{T(H)}	V _{CC1} =4.8V, V _{CC2} =15V	2.7	3.0	3.3	V
DL threshold (M)	V _{DM}	V _{CC1} =4.8V, V _{CC2} =15V	1.3	1.6	1.9	V
DL threshold (H)	V _{DH}	V _{CC1} =4.8V, V _{CC2} =15V	2.7	3.0	3.3	V
Contrast (G ch)	CG ₂₆	Input=1.0V _{P-P}	3.0	4.0	5.0	dB
Sub-contrast (R ch)	SR ₂₇	Input=1.0V _{P-P}	1.0	2.0	3.0	dB
Sub-contrast (B ch)	SB ₂₅	Input=1.0V _{P-P}	1.0	2.0	3.0	dB
γ characteristics (1)	γ _{11A}	Input=1.0V _{P-P}	5.0	7.5	10.0	dB
γ characteristics (2)	γ _{11B}	Input=1.0V _{P-P}	3.0	5.5	8.0	dB
Brightness variable range (Lo)	BR _{7(L)}	Input=1.0V _{P-P} , V ₇ =0V	—	—	1.7	V
Brightness variable range (Hi)	BR _{7(H)}	Input=1.0V _{P-P} , V ₇ =4.8V	2.8	—	—	V
White balance adjustment Lo	WB _L	Input=1.0V _{P-P} , V ₈ , V ₁₀ =0V	—	—	1.9	V
White balance adjustment Hi	WB _H	Input=1.0V _{P-P} , V ₈ , V ₁₀ =4.8V	2.1	—	—	V
Output signal limiter level (Black side)	V _{RL(B)}	Input=1.0V _{P-P} , V ₁₁ =0V	1.0	1.3	1.6	V
Output signal limiter level (White side)	V _{RL(W)}	Input=1.0V _{P-P} , V ₁₁ =4.8V	13.0	13.7	14.4	V
Output terminal absolute voltage (R ch)	V	Input=1.0V _{P-P}	7.25	7.5	7.75	V
Output terminal absolute voltage (G ch)	V _{17A}	Input=1.0V _{P-P}	7.25	7.5	7.75	V
Output terminal absolute voltage (B ch)	V _{15A}	Input=1.0V _{P-P}	7.25	7.5	7.75	V
Output terminal relative voltage (R ch)	V _{19B}	Input=1.0V _{P-P}	-0.25	0	0.25	V
Output terminal relative voltage (B ch)	V _{15B}	Input=1.0V _{P-P}	-0.25	0	0.25	V

■ Electrical Characteristics [for reference only] (Ta=25±2°C)

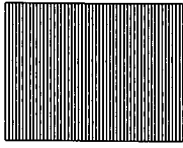
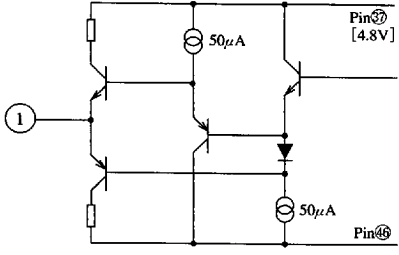
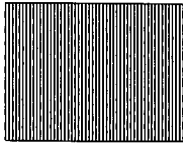
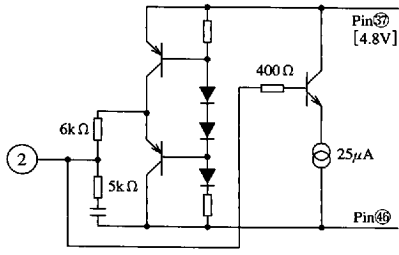

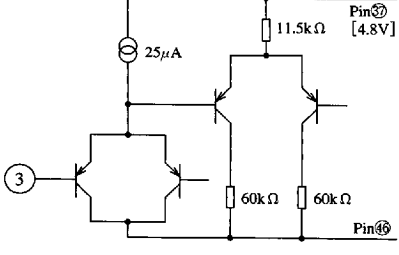
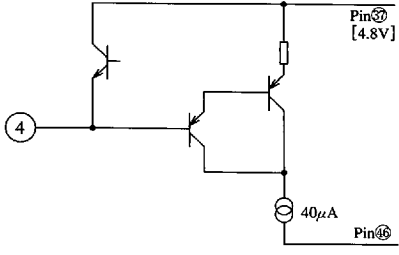
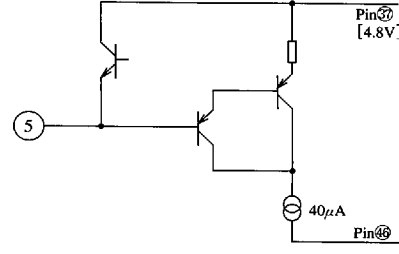
Parameter	Symbol	Condition	min	typ	max	Unit
Y→G signal gain	G ₁₇₋₃₉	Input=1.0V _{P-P}	—	13	—	dB
C→R signal gain	GN ₁₉	Input=600mV _{P-P}	—	15	—	dB
C→G signal gain	GN ₁₇	Input=600mV _{P-P}	—	10	—	dB
C→B signal gain	GN ₁₅	Input=600mV _{P-P}	—	16	—	dB
Y→G signal f characteristics	F ₁₇₋₃₉	Input=1.0V _{P-P}	—	-6	—	dB
G ch character level (Lo)	CG _L	Input=1.0V _{P-P}	—	5	—	IRE
G ch character level (Hi)	CG _H	Input=1.0V _{P-P}	—	85	—	IRE

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

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Pin Descriptions

Pin No.	Pin name	Waveform	Description	Equivalent circuit
1	XTAL 1	<p>NTSC 3.58MHz PAL 4.43MHz</p> 	<ul style="list-style-type: none"> To a XTAL Forming a pair of input terminals with Pin② 	
2	XTAL 2	<p>NTSC 3.58MHz PAL 4.43MHz</p> 	<ul style="list-style-type: none"> To a XTAL Forming a pair of input terminals with Pin① 	
3	TINT		<ul style="list-style-type: none"> TINT control input H (more than 2.5V) : PAL L (up to 2.5V) : NTSC 	
4	B-Y CLAMP	<p>0.1 µF</p>	<ul style="list-style-type: none"> To a B-Y clamp capacitor H.SYNC pulse clamps the B-Y signal to the reference voltage 	
5	R-Y CLAMP	<p>0.1 µF</p>	<ul style="list-style-type: none"> To a R-Y clamp capacitor H.SYNC pulse clamps the R-Y signal to the reference voltage 	

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■ Pin Descriptions (cont.)

Pin No.	Pin name	Waveform	Description	Equivalent circuit
6	G-Y CLAMP	0.1 μ F	<ul style="list-style-type: none"> To a R-Y clamp capacitor H.SYNC pulse clamps the G-Y signal to the reference voltage 	
7	BRIGHT	<p>G_{OUT} waveform at Pin 17</p>	<ul style="list-style-type: none"> Brightness control Used to control the pedestal level of R, G, and B outputs at the same time 	
8	WB-R	<p>R_{OUT} waveform at Pin 19</p>	<ul style="list-style-type: none"> R-output white balance control Used to fine-control the pedestal level of R output 2V typ. 	
9	VREF		<ul style="list-style-type: none"> Reference voltage output 2V typ. 	
10	WB-B	<p>B_{OUT} waveform at Pin 15</p>	<ul style="list-style-type: none"> B-output white balance control Used to fine-control the pedestal level of B output 2V typ. 	

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■ Pin Descriptions (cont.)

Pin No.	Pin name	Waveform	Description	Equivalent circuit
11	γ CONT		<ul style="list-style-type: none"> • γ characteristics control • Used to control the γ-curve knee point of R, G, and B outputs 	
12	B CLAMP		<ul style="list-style-type: none"> • To a B-signal clamp capacitor • 0.1 μF typ. 	
13	G CLAMP		<ul style="list-style-type: none"> • To a G-signal clamp capacitor • 0.1 μF typ. 	
14	R CLAMP		<ul style="list-style-type: none"> • To a R-signal clamp capacitor • 0.1 μF typ. 	
15	B OUT		<ul style="list-style-type: none"> • B-signal output • 70-Ω output impedance 	

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■ Pin Descriptions (cont.)

Pin No.	Pin name	Waveform	Description	Equivalent circuit
16	GND2		<ul style="list-style-type: none"> Ground for the V_{CC2} (12V) subsystem 	
17	G OUT		<ul style="list-style-type: none"> G-signal output 70-Ω output impedance 	
18	V _{CC2}		<ul style="list-style-type: none"> 12V power supply input Typ. 4mA current consumption 	
19	R OUT		<ul style="list-style-type: none"> R-signal output 70-Ω output impedance 	
20	DC Det.		<ul style="list-style-type: none"> R, G, B output DC voltage stabilizing capacitor pin Used to adjust the center level of G output (and thereby R and B outputs) to 1/2 V_{CC2} 0.1 μF typ. 	

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Pin Descriptions (cont.)

Pin No.	Pin name	Waveform	Description	Equivalent circuit
21	DL SW		<ul style="list-style-type: none"> • Delay switch • Used to switch the delay of R and B signals with respect to G signal 	
22	PEAK LIM	<p>G-output waveform at Pin 17</p>	<ul style="list-style-type: none"> • Peak limiter level control • Used to control the peak limiter level of R, G, and B output signals 	
23	ACC CONT		<ul style="list-style-type: none"> • ACC output amplitude control • Used to control the level of ACC output amplitude • V_{REF} typ. 	
24	HT PULSE IN	<p>input waveform</p>	<ul style="list-style-type: none"> • HT pulse input • R, G, and B signals synchronized with HT pulse are outputted 	
25	SUB CONT -B	<p>B-output waveform at Pin 15</p>	<ul style="list-style-type: none"> • B-output signal subcontrast control • Used to fine-control B-output signal contrast • 1.8V typ. 	

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■ Pin Descriptions (cont.)

Pin No.	Pin name	Waveform	Description	Equivalent circuit
26	CONTRAST	G-output waveform at Pin⑭	<ul style="list-style-type: none"> · Contrast control · Used to control the contrast of R, G, and B output signals at same time 	
27	SUB CONT-R	R-output waveform at Pin⑰	<ul style="list-style-type: none"> · Used to fine-control R-output signal contrast · 1.8V typ. 	
28	Y-CLAMP	—	<ul style="list-style-type: none"> · To a Y-signal clamp capacitor · 0.1 μF typ. 	
29	FSP TRAP	—	<ul style="list-style-type: none"> · To FSC trap network · Not used for component signals · For NTSC, C=47pF and L=35 μH · For PAL, C=47pF and L=27 μH 	
30	Y-CONT	—	<ul style="list-style-type: none"> · Y-signal amplitude control · Used to control the amplitude of Y signal which is mixed with R-Y, B-Y, and G-Y · V_{REF} typ. 	

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Pin Descriptions (cont.)

Pin No.	Pin name	Waveform	Description	Equivalent circuit
31	H-AP GAIN		<ul style="list-style-type: none"> H-AP signal amplitude adjust H-AP signals are amplified, and then mixed with Y signals, and luminance signals are generated V_{REF} typ. 	
32	BGP		<ul style="list-style-type: none"> To a BG pulse generating CR network Delay is determined by C and R 	
33	H-SYNC OUT		<ul style="list-style-type: none"> H.SYNC pulse output H.SYNC is separated from the signal which is input at Pin 33, and is output 	
34	CHA PULSE IN (R)		<ul style="list-style-type: none"> Character pulse (R) input Character with black-frame can be outputted at Pin 19 of R-output by character pulse input 	
35	CHA PULSE IN (G)		<ul style="list-style-type: none"> Character pulse (G) input Character with black frame can be outputted at Pin 17 of G-output 	

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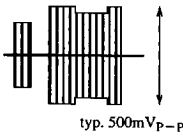
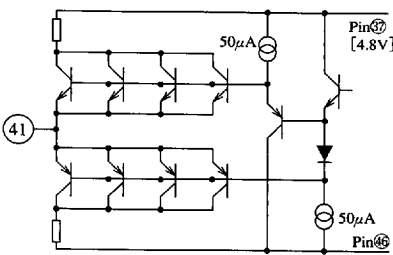
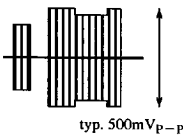
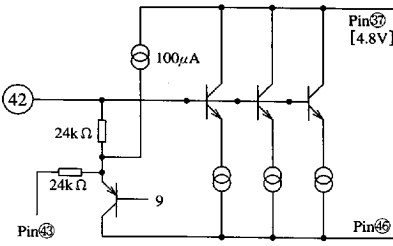
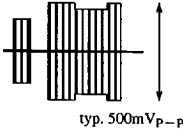
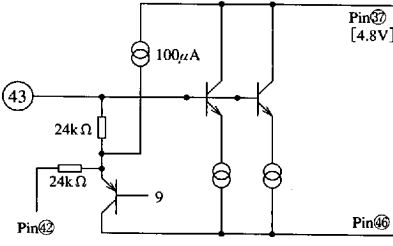
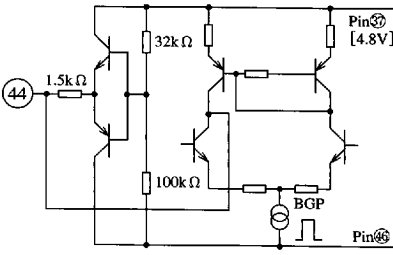
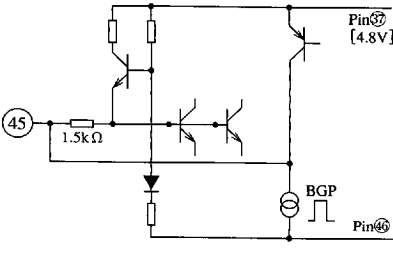
■ Pin Descriptions (cont.)

Pin No.	Pin name	Waveform	Description	Equivalent circuit
36	CHA PULSE IN (B)		<ul style="list-style-type: none"> Character with black-frame can be outputted at G-output by character pulse (B) input-Pin③ 	
37	V _{CC1} (4.8V)		<ul style="list-style-type: none"> 4.8V power supply input 20mA typ. current consumption 	
38	HSYNC IN	<p>Input signal example : video signal</p>	<ul style="list-style-type: none"> H.SYNC input Input composite video signal 	
39	Y IN	<p>Input signal example : video signal</p>	<ul style="list-style-type: none"> Luminance signal input Input composite video signal 	
40	C IN	<p>Input signal example : video signal</p>	<ul style="list-style-type: none"> Chroma input Input composite video signal 	

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■ Pin Descriptions (cont.)

Pin No.	Pin name	Waveform	Description	Equivalent circuit
41	ACC OUT	<p>Output waveform 3.58MHz (4.43MHz)</p>  <p>typ. 500mV_{P-P}</p>	<ul style="list-style-type: none"> · Chroma output through ACC · After being processed in ACC, input chroma signal of Pin④ is outputted. · The output amplitude can be adjusted at Pin②③. · 500mV_{P-P} typ. 	
42	2B+Burst	<p>Input waveform (simplified PAL)</p>  <p>typ. 500mV_{P-P}</p>	<ul style="list-style-type: none"> · 2B+Burst input · For simplified PAL, ACC OUT of Pin④ is inputted to this pin. 	
43	2R	<p>Input waveform (simplified PAL)</p>  <p>typ. 500mV_{P-P}</p>	<ul style="list-style-type: none"> · 2R input · For simplified PAL, ACC OUT of Pin④ is inputted to this pin. 	
44	ACC Det.	0.1 µF	<ul style="list-style-type: none"> · To an ACC capacitor · Used for automatic adjustment of burst signal amplitudes 	
45	KILLER Det.	0.1 µF	<ul style="list-style-type: none"> · To a KILLER capacitor · Used to cut chroma signals, and produce monochrome images for preventing the image-deterioration, when burst signal amplitude is low 	

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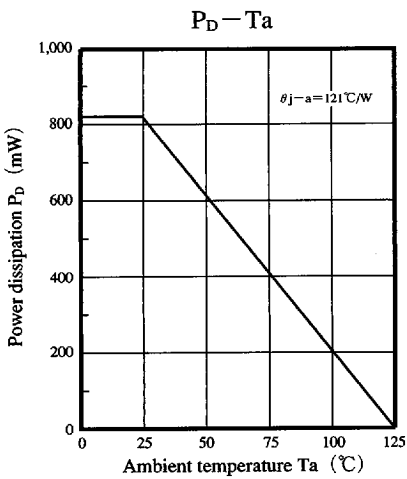
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■ Pin Descriptions (cont.)

Pin No.	Pin name	Waveform	Description	Equivalent circuit
46	GND1	—	<ul style="list-style-type: none"> Ground for V_{CC1} system (4.8V) 	—
47	APC Det.	$0.1\mu\text{F}$	<ul style="list-style-type: none"> To APC capacitor Used to match the phase of crystal oscillation with that of burst signals 	
48	HALF H	—	<ul style="list-style-type: none"> To CR network for HALF H. KILLER Used for HALF H operation when PAL signals are inputted 	

■ Reference



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