No.2867A

LA7330,7330M,~~7331N~~

Monolithic Linear IC

Chroma Signal Processor for VHS VTR Use

Overview

The LA7330,7331N are small-sized, multifunctional ICs that contain VHS VTR chroma signal processing circuitry in shrink type DIP24S packages. Since the package is made so small as DIP24S and a minimum number of external parts is required, the LA7330,7331N occupy much less space on the board, thus facilitating VTR set design. The chroma section is made adjustment-free (except REC chroma level), thus streamlining VTR set manufacture. The LA7331N is opposite to the LA7330 in head switch pulse polarity. The LA7330M is a miniflat package version of the LA7330.

Features

- Designed for NTSC/PAL/MESECAM systems
- Adjustment-free chroma section (except REC chroma level)
- Small-sized package (DIP24S and MFP24S)
- Minimum number of external parts required
- LPF usable for REC/PB
- Multifunction
  - $2f_{SC}$ generator for CCD drive
  - Function to select APC loop input signal passed/not passed through comb filter
  - BGP output
  - 3rd lock protector of VXO

Maximum Ratings at Ta = 25°C

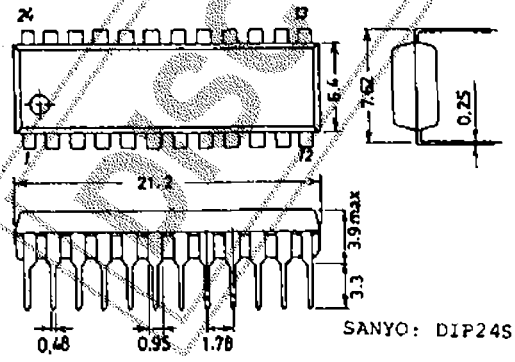
					unit
Maximum Supply Voltage	V_{CC} max			7.0	V
Allowable Power Dissipation	Pd max	(Ta≦65°C)	LA7330,7331N	850	mW
			LA7330M	470	mW
Operating Temperature	Topg			−10 to +65	°C
Storage Temperature	Tstg			−40 to +150	°C

Operating Conditions at Ta = 25°C

			unit
Recommended Supply Voltage	V_{CC}	5.0	V
Operating Voltage Range	V_{CC} op	4.8 to 5.2	V

Case Outline 3067-D24SIC
(unit : mm)

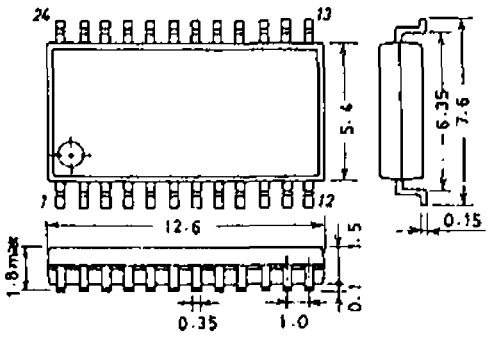
[LA7330,7331N]



SANYO: DIP24S

Case Outline 3112-IC
(unit : mm)

[LA7330M]



SANYO: MFP24S

SANYO Electric Co.,Ltd. Semiconductor Overseas Marketing Div.
Natsume Bldg., 18-6, 2-chome, Yushima, Bunkyo-ku, TOKYO 113 JAPAN

Operating Characteristics at Ta = 25°C, V_{CC} = 5.0V			min	typ	max	unit
REC Current Dissipation	I_{CC} (R)		49	62	75	mA
REC Output Level	Vo (R)		75	110	145	mVp-p
REC,ACC Characteristic	ΔVo (R)	Input ±6dB	−0.5	±0.1	+0.5	dB
ACC Killer Input Level	V_{ACK}		−25	−22	−19	dB
VXO Control Sensitivity	S_{VXO}		3.1	4.6	6.9	Hz/mV
VXO Oscillation Level	V_{VXO} (R)		0.77	1.01	1.19	Vp-p
Subconverter Output Level	V_{SUB}		97	122	147	mVp-p
BGP Delay Time	t_D			3.35		μs
BGP Width	t_W			4.9		μs
REC,APC Pull-in Range	Δf_{APC}		±350			Hz
REC,AFC Pull-in Range	Δf_{AFC}		±1.0			kHz
VCO Control Sensitivity	S_{VCO}		0.75	1.06	1.38	kHz/mV
PB Current Dissipation	I_{CC} (P)		51	64	77	mA
PB Output Level	Vo (P)		340	390	450	mVp-p
PB ACC Characteristic	ΔVo (P)	Input ±6dB	−0.5		+0.5	dB
PB Main Converter Carrier Leak	CL (P)	5.06MHz component		−38	−33	dB
PB XO Output Level	Vxo (P)		540	680	840	mVp-p
PB XO Free-running Frequency	f_{XO} (f)	Difference from 4433619Hz	−9	0	+9	Hz
$2f_{SC}$ Output Amplitude	$V2f_{SC}$		300	430	560	mVp-p
Burst Emphasis Amount	G_{BE}	NTSC mode	5.5	6.0	6.5	dB
Burst De-emphasis Amount	G_{BD}	NTSC mode	−5.8	−5.55	−5.3	dB
PAL/NTSC Select Voltage	$V_{P/N}$		1.0	1.35	1.7	V
NTSC/SECAM Select Voltage	$V_{N/S}$		3.2	3.55	3.9	V

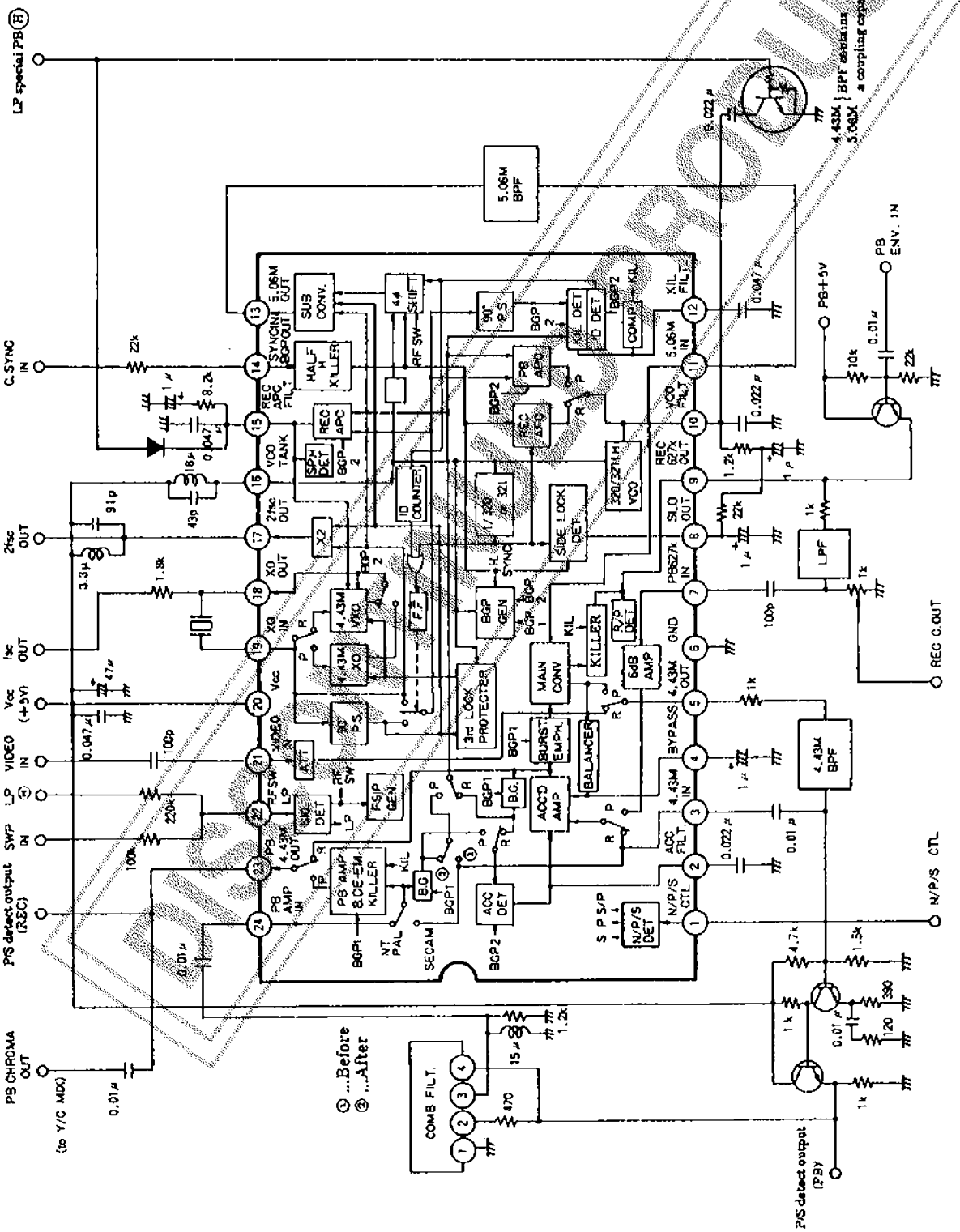
LA7330 Mode Guide

MODE		NTSC	PAL	MESECAM
N/P/S control (pin㉔)		M (2~3 V)	L (0~1 V)	H (4~5 V)
VCO frequency		$320f_H$	$321f_H$	$321f_H$
VCO control	REC	AFC	AFC	AFC
	PB	APC	APC	
VXO control	REC	APC*1	APC*1	free run
	PB	free run	free run	
PB APC loop	SP	after COMB*2	before COMB	
	LP	after COMB	after COMB	
	EP			
APC killer,ID		○	○	OFF
4-phase shift (rotation)	1CH (LOW)	Leads 90° every hour.	STOP	STOP
	2CH (High)	Lags 90° every hour.	Lags 90° every hour.	
4-phase shift clock	REC	H.SYNC	H.SYNC	
	PB	DPLL	DPLL	
	⑮pin: Ⓗ	H.SYNC	H.SYNC	
Burst emphasis, de-emphasis	SP	○		
	LP			
	EP	○		
SLD mask (inhibit)	⑲pin: Ⓗ ACC killer	Not masked	Not masked	
	Other than above	Masked during 191l period from SW pulse edge		

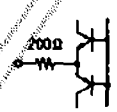
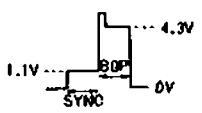
*1 Free-running at ACC killer mode (no signal, B&W, weak input)
*2 For 2-head use, it is desirable to select "before COMB". (Pin 21 control)

1. The comb amp and SLD output resistor are connected externally.
2. In the MESECAM mode, the video signal does not pass through the comb filter, but is processed inside the IC.
3. In the REC mode, pin 23 functions as REC ACC output pin.
4. The input impedance of pin 24 (PB amp input) is approximately 11.5kΩ.
5. In the PB killer mode, pin 23 is brought to GND level.

Equivalent Circuit Block Diagram and Sample Peripheral Circuit (PAL/MESECAM Systems)



LA7330,7331N Pin Description

Pin No.	Pin Name	I/O Configuration	DCV(typ.)	ACV(typ.)	Remarks
1	N/P/S CONTROL	PNP Tr. base input	PAL 0 to 1V NTSC 2 to 3V SECAM 4 to 5V		
2	ACC FILTER	Output 2kΩ	REC 1.4V PB 1.7 to 2.0V		
3	REC CHROMA IN	Input 10kΩ	3.2V	REC 70mVp-p PB 100mVp-p (burst level)	f_{SC} BPF output is connected.
4	DC FEEDBACK FILTER	Current drive	2.5V		
5	BPF DRIVE	E.F. (sink current 1mA)	REC 1.6V PB 2.6V	REC 180mVp-p PB 400mVp-p (burst level)	REC: CHROMA + ΔY PB: MAIN CONV.OUT
6	GND				
7	PB CHROMA IN	Input 10kΩ	3.2V	200mVp-p (burst level)	PB pre-amp output passed through LPF is applied.
8	SLD OUT	Current drive	2.7V		If VCO OSC frequency deviates from a specified value, correction output is delivered.
9	REC CHROMA OUT R/P SW CNT	E.F. (sink current 0.4mA)	REC (Color 1.9V Killer 1.0V PB mode at 2.1V or more	440mVp-p (burst level)	REC MAIN CONV.OUT
10	VCO FILTER	Current drive	2.7V		REC AFC filter PB APC filter
11	CONV. CARRIER IN	Input 1kΩ	2.6V	120mVp-p	
12	KILLER FILTER	Current drive	Color 1.9V Killer 3.1V		Threshold: $V_{CC}/2$
13	SUB CONV. OUT	Output 1kΩ	4.6V	250mVp-p	Low spurious interference due to operational type. No filter matching resistor required.
14	COMP.SYNC IN/BGP OUT				
15	REC APC FILTER	Current drive	2.3V Special PB mode at 3.8V or more		
16	VCO TANK	Output 2kΩ	5.0V	600mVp-p	

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Pin No.	Pin Name	I/O Configuration	DCV(typ.)	ACV(typ.)	Remarks
17	$2f_{SC}$ OUT	Output 3kΩ	5.0V	430mVp-p	CCD drive clock $2f_{SC}$ output. LC are connected to prevent spurious interference and compensate stray capacitance. Left open or connected to V_{CC} when not used.
18	XO OUT	E.F.	REC 3.1V PB 2.4V	REC 1.01Vp-p PB 680mVp-p	Crystal oscillator's crystal drive. Supplies f_{SC} to servo circuit through resistor.
19	XO IN	Input REC 2kΩ PB 500Ω	4.0V	REC 1.04Vp-p PB 800mVp-p	Signal passed through crystal is applied. Not necessary to adjust free-running frequency at PB mode.
20	V_{CC}		5.0V		
21	REC VIDEO IN	Input 15kΩ	1.6V	REC 240mVp-p (burst level)	When pulled up to V_{CC} using 4.7kΩ resistor and diode, APC loop not passed through comb filter can be supplied to phase detector.
22	SW PULSE IN LP CONTROL IN	PNP Tr. base input		SP/EP 3.4V 0V LP 5V 1.6V	SW pulse threshold is $1/2V_{CC}$. When the lowest potential of pulse on pin (22) is 0.8V or less, SP/EP mode is entered; and when 1.3V or more, LP mode is entered.
23	CHROMA OUT	E.F. (sink current 1mA)	REC 2.4V PB Color 2.0V Killer 0V	REC 270mVp-p PB 390mVp-p (burst level)	REC: ACC'D AMP OUT PB: PB CHROMA AMP OUT (to Y/C MIX)
24	PB AMP IN	Input 11.5kΩ	PB 3.4V	120mVp-p (burst level)	Signal passed through comb filter is applied.