Ordering number:ENN3090

Monolithic Linear IC

LA7316A-N, 7316AM

VCR VHS Chroma Signal Processor

Overview

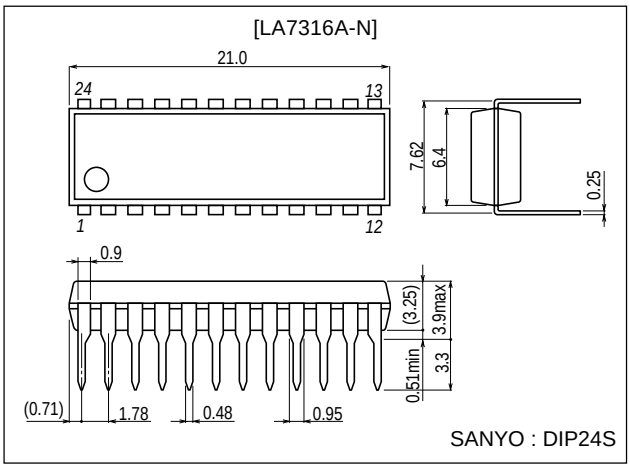
The LA7316A-N, 7316AM are VHS chroma signal processor ICs that have the following features.

1. Adjustment-free 3.58MHz VXO free-running OSC frequency, 160f_H VCO free-running OSC frequency, carrier leak, PB chroma level, except REC chroma level.
2. The chip size is greatly reduced by using our most advanced process technology for fine structure. Since the LA7316A-N, AM are designed for NTSC system, the package can be made so small as the DIP-24S and a minimum number of external parts is required and it occupies much less space on the board, thereby facilitating VCR set design.
3. Multifunction
   2f_{SC} generator for CCD drive, PB chroma (629k) level compensation amplifier, function to select APC loop input signal passed/not passed through comb filter, BGP output, 3rd lock protector of 3.58MHz OSC.
4. LPF usable for REC/PB
5. Capable of being operated from 5V supply.
6. Current drain : 48mA at REC mode
   50mA at PB mode

Package Dimensions

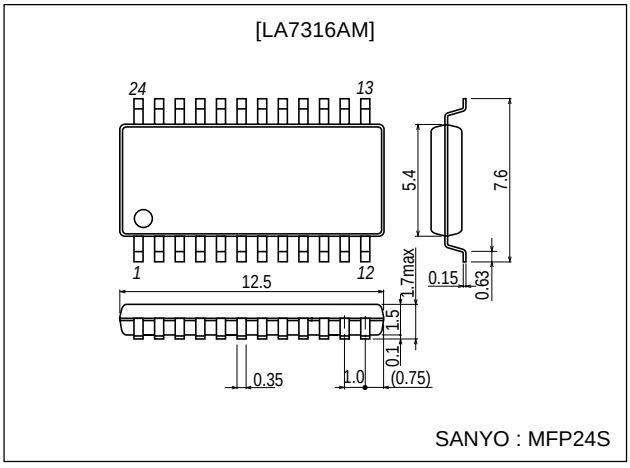
unit:mm

3067A-DIP24S



unit:mm

3112A-MFP24S



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Specifications

Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Maxumum supply voltage	V_{CC} max		7.0	V
Allowable power dissipation	Pd max	Ta≤65˚C LA7316A-N	400	mW
		LA7316AM	330	mW
Operating temperature	Topr		–10 to +65	˚C
Storage temperature	Tstg		–40 to +125	˚C

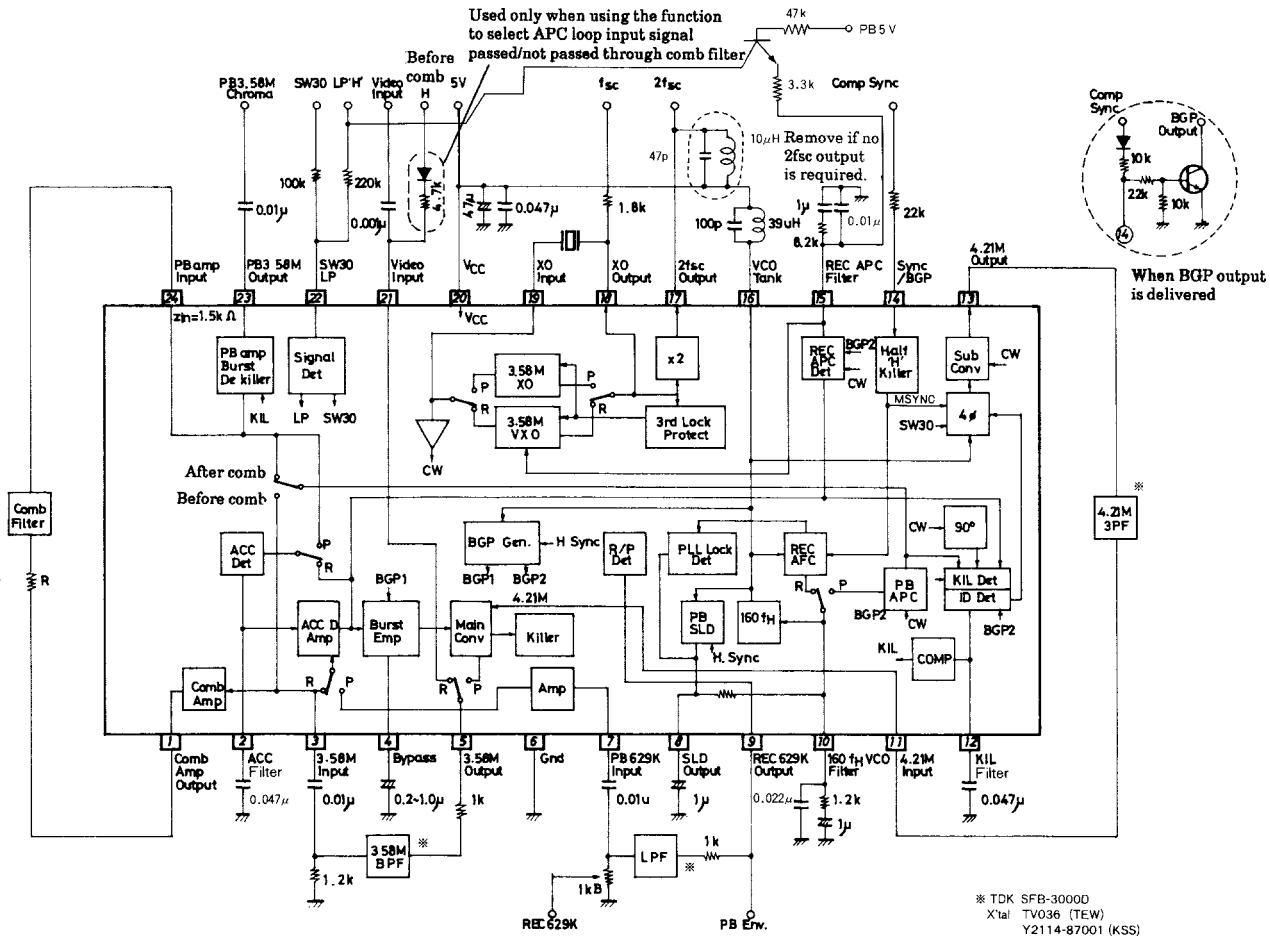
Operating Conditions at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Recommended supply voltage	V_{CC}		5.2	V
Operating voltage range	V_{CC} op		4.8 to 5.5	V

Operating Characteristics at Ta = 25˚C, V_{CC}=5.0V

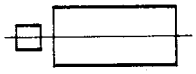
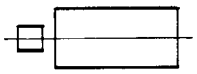
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
REC current drain	$I_{CC(R)}$		38	48	58	mA
REC output level	$V_{O(R)}$		210	300	390	mVp-p
REC ACC characteristics	$\Delta V_{O(R)}$	Input ±6dB	–0.5	0	+0.5	dB
ACC killer input level	V_{ACK}		–28	–25	–22	dB
VXO control sensitivity	S_{VXO}		2.5	3.7	5.5	Hz/mV
VXO OSC level	$V_{VXO(R)}$		0.65	0.85	1.00	Vp-p
Subconverter output level	V_{SUB}		200	250	300	mVp-p
BGP delay time	t_D			3.2		µs
BGP width	t_W			4.8		µs
REC APC pull-in range	Δf_{APC}		±350			Hz
REC AFC pull-in range	Δf_{AFC}		±1.0			kHz
$160f_H$ VCO control sensitivity	S_{VCO}		0.42	0.60	0.78	kHz/mV
PB current drain	$I_{CC(P)}$		40	50	60	mA
PB output level	$V_{O(P)}$		575	660	760	mVp-p
PB ACC characteristic	$\Delta V_{O(P)}$	Input ±6dB	–0.5		+0.5	dB
PB main converter carrier leak	$CL_{(P)}$	4.21MHz component		–40	–33	dB
PB XO output level	$V_{XO(P)}$		520	650	800	mVp-p
PB XO free-running frequency	$f_{XO(f)}$	Difference from 3579545Hz	–7	0	+7	Hz
$2f_{SC}$ output amplitude	V_{2fsc}		420	600	780	mVp-p
Burst emphasis amount	G_{BE}		5.5	6.0	6.5	dB
Burst de-emphasis amount	G_{BD}		–4.75	–4.5	–4.25	dB
Comb amplifier gain	G_{COMB}		11	13	15	dB

Equivalent Circuit Block Diagram and Sample Peripheral Circuit



Unit (resistance: Ω, capacitance: F)

Pin Description

Pin No.	Function	Input/Output State	Remarks
1	COMB AMPLIFIER OUT	E.F	Comb filter driver output. 
2	ACC FILTER	Output 1kΩ	
3	3.58MHz IN	Input 10kΩ	3.58MHz BPF output is connected. 
4	BYPASS		Setting of DC bias of burst emphasis circuit.
5	3.58MHz OUT	E.F	REC mode : Video signal PB mode : Main converter output
6	GND		
7	PB 629kHz IN	Input 10kΩ	Signal is applied through LPF from PB preamplifier outpu at PB mode. 
8	SLD OUT		Compensation output is delivered when 160f_H VCO frequency deviates from specified frequency.
9	REC 629kHz OUT	E.F	Main converter output at REC mode. When pin 9 voltage is raised to 2.2V or greater, PB mode is enterd.
10	160fH VCO FILTER		REC mode : AFC referenced to horizonta sync signal. PB mode : APC filter referenced to 3.58MHz OSC.

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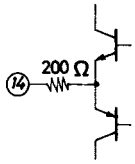
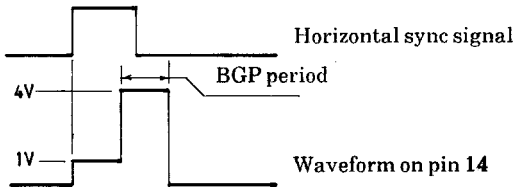
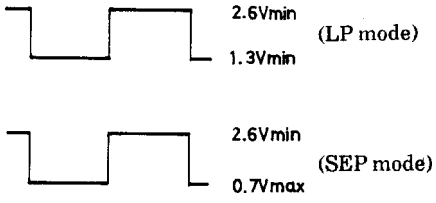
Pin No.	Function	Input/Output State	Remarks
11	4.21MHz IN	Input 1kΩ	Pin for inputting 4.21MHz for main converter. No matching resistor required. 
12	kIL FILTER		Color killer phase detector filter pin.
13	4.21MHz OUT	Output 1kΩ	Subconverter output pin. Low spurious output because of operational type. No filter matching resistor required.
14	SYNC IN/BGP OUT		Used for COMP, SYNC input/BGP output. 
15	REC APC FILTER SP-EP/LP (PB)		REC mode : REC APC detector filter pin PB mode : When the current flows in, LP mode is entered.
16	VCO TANK		Pin for external tank circuit for $160f_H$ VCO OSC.
17	2fsc OUT		CCD drive clock 2fsc output pin. LC are connected for spurious output and stray capacitance compensation. If no 2fsc output is required, this pin is left open or connected to V_{CC}.
18	XOUT	E.F	Crystal OSC crystal drive output pin. Supplies fsc to servo circuit through resistor. 
19	XO IN	Input 1.5kΩ at REC mode 500Ω at PB mode	Signal which passed through crystal is applied. OSC is provided separately for REC/PB mode. No free-running frequency adjustment required at PB mode.
20	V_{CC}		Power supply pin
21	VIDEO IN	Input/Output 15kΩ	Video signal is applied at REC mode. By pulling up to V_{CC} using 4.7kΩ and diode, APC loop at PB mode can be supplied to phase detector from before comb filter.
22	SW30 IN SP· EP/LP (REC)	Base input	SW30 input. Threshold is set to $1/2V_{CC}$. When lowest voltage of pulse drops to 0.7V or less, SEP mode is entered ; and when raised to 1.3V or greater, LP mode is entered. 
23	PB 3.58MHz OUT	E.F	PB chroma output to be applied to YC-MIX circuit. 
24	PB AMPLIFIER IN	Input 1.5kΩ	Signal which passed through comb filter is applied.