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DATA SHEET

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Monolithic Linear IC

For DVD Recorder

LA73031V — Video Signal Input Switch

Overview

This LA73031V is a video signal input switch for DVD recorder.

Functions

- Six input switches × one channel
- Five input switches × two channels
- Keyed clamp
- 6dB amplifier
- 6MHz low pass filter
- Video signal detection
- Composite sync output
- Standby mode

Specifications

Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Maximum supply voltage	V_{CC} max		7.0	V
Allowable power dissipation	Pd max	Ta ≤ 75°C *	780	mW
Operating temperature	Topr		-20 to +75	°C
Storage temperature	Tstg		-40 to +150	°C

∗ When mounted on a 114.3×76.1×1.6mm^3 glass epoxy resin.

Recommended Operating Conditions at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Recommending operation voltage	V_{CC}		5.0	V
Operating voltage range	V_{CC} opr		4.75 to 5.25	V
Input pin voltage application range	V_{IN}		-0.3 to V_{CC} opr + 0.3	V

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Electrical Characteristics at Ta = 25°C, $V_{CC}V = \pm5.0V$

Parameter	Symbol	Input signal Point	Signal	Freq [Hz]	Amplitude [p-p]	Output Point	Test Conditions	Ratings min	typ	max	Unit	V4	V7	V9	V17	V19	V21	V23	V25	V28
Current dissipation	$I_{CC}1$					$V_{CC}1$ $V_{CC}2$ $V_{CC}3$ $V_{CC}4$	Measure the sum of currents flowing into $V_{CC}1$, $V_{CC}2$, $V_{CC}3$ and $V_{CC}4$ with no signal.	60	75	90	mA	0	0	5	5	0	0	0	0	0
Current dissipation at standby mode	$I_{CC}2$					$V_{CC}1$ $V_{CC}2$ $V_{CC}3$ $V_{CC}4$	Measure the sum of currents flowing into $V_{CC}1$, $V_{CC}2$, $V_{CC}3$ and $V_{CC}4$ at standby mode.	7.5	9	10.5	mA							5		
Output level of composite	C40	$V_{IN}40$	SG1		1V	T38	Measure the output sync tip level at T38.	0.7	0.8	0.9	V	0	5	5	0	0	0	0	0	5
	C42	$V_{IN}42$	SG1		1V	T38		0.7	0.8	0.9	V	0	5	5	5	0	0	0	0	5
	C44	$V_{IN}44$	SG1		1V	T38		0.7	0.8	0.9	V	0	5	5	0	5	0	0	0	5
	C1	$V_{IN}1$	SG1		1V	T38		0.7	0.8	0.9	V	0	5	5	5	5	0	0	0	5
	C3	$V_{IN}3$	SG1		1V	T38		0.7	0.8	0.9	V	0	5	5	0	0	5	0	0	5
Output level of chroma	C8	$V_{IN}8$	SG2		714mV	T31	Measure the output center level at T31.	1.9	2.2	2.5	V	0	5	0	0	0	0	0	0	5
	C10	$V_{IN}10$	SG2		714mV	T31		1.9	2.2	2.5	V	0	5	0	5	0	0	0	0	5
	C12	$V_{IN}12$	SG2		714mV	T31		1.9	2.2	2.5	V	0	5	0	0	5	0	0	0	5
	C14	$V_{IN}14$	SG2		714mV	T31		1.9	2.2	2.5	V	0	5	0	5	5	0	0	0	5
	C16	$V_{IN}16$	SG2		714mV	T31		1.9	2.2	2.5	V	0	5	0	0	0	5	0	0	5
Output level of Y	C18	$V_{IN}18$	SG3		1V	T29	Measure the output sync tip level at T29.	0.7	0.8	0.9	V	0	5	0	0	0	0	0	0	5
	C20	$V_{IN}20$	SG3		1V	T29		0.7	0.8	0.9	V	0	5	0	5	0	0	0	0	5
	C22	$V_{IN}22$	SG3		1V	T29		0.7	0.8	0.9	V	0	5	0	0	5	0	0	0	5
	C24	$V_{IN}24$	SG3		1V	T29		0.7	0.8	0.9	V	0	5	0	5	5	0	0	0	5
	C26	$V_{IN}26$	SG3		1V	T29		0.7	0.8	0.9	V	0	5	0	0	0	5	0	0	5
Pedestal level of component output	PC38	$V_{IN}6$	SG4		1V	T38	Measure the output pedestal level at T38 and T29.	2.2	2.3	2.4	V	5	5	0	0	0	0	0	0	5
	PC31	$V_{IN}8$	SG4		1V	T31		2.2	2.3	2.4	V	5	5	0	0	0	0	0	0	5
		$V_{IN}18$	SG3		1V															
6dB amp gain	G40H	$V_{IN}40$	SG1	100k	1V	T38	Measure the gain to input of each output. $20\log(V_{OUT}/V_{IN})$	5.5	6	6.5	dB	0	5	5	0	0	0	0	0	5
	G8H	$V_{IN}8$	SG1	100k	714mV	T31		5.5	6	6.5	dB	0	5	0	0	0	0	0	0	5
	G18H	$V_{IN}18$	SG1	100k	1V	T29		5.5	6	6.5	dB	0	5	0	0	0	0	0	0	5
0dB amp gain	G40L	$V_{IN}40$	SG1	100k	1V	T38	Measure the gain to input of each output. $20\log(V_{OUT}/V_{IN})$	-0.5	0	0.5	dB	0	0	5	0	0	0	0	0	5
	G8L	$V_{IN}8$	SG1	100k	714mV	T31		-0.5	0	0.5	dB	0	0	0	0	0	0	0	0	5
	G18L	$V_{IN}18$	SG1	100k	1V	T29		-0.5	0	0.5	dB	0	0	0	0	0	0	0	0	5
Frequency characteristics in LPF-off	F40	$V_{IN}40$	SG1	10M	1V	T38	Ga-Gb	-0.5	0	0.5	dB	0	5	5	0	0	0	0	0	5
	F8	$V_{IN}8$	SG1	10M	714mV	T31	Ga=$20\log(V_{OUT}/V_{IN})$ for 100kHz	-0.5	0	0.5	dB	0	5	0	0	0	0	0	0	5
	F18	$V_{IN}18$	SG1	10M	1V	T29	Gb=$20\log(V_{OUT}/V_{IN})$ for 10MHz	-0.5	0	0.5	dB	0	5	0	0	0	0	0	0	5
Frequency characteristics in LPF-on1	F40LP1	$V_{IN}40$	SG1	6M	1V	T38	Ga-Gb	-3	-1	0.5	dB	0	5	5	0	0	0	0	0	0
	F8LP1	$V_{IN}8$	SG1	6M	714mV	T31	Ga=$20\log(V_{OUT}/V_{IN})$ for 100kHz	-3	-1	0.5	dB	0	5	0	0	0	0	0	0	0
	F18LP1	$V_{IN}18$	SG1	6M	1V	T29	Gb=$20\log(V_{OUT}/V_{IN})$ for 6MHz	-3	-1	0.5	dB	0	5	0	0	0	0	0	0	0

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Continued from preceding page.

| Parameter | Symbol | Input signal | | | | Output Point | Test Conditions | Ratings | | | Unit | Control Voltage Unit: V | | | | | | | | |
		Point	Signal	Freq [Hz]	Amplitude [p-p]			Min	Typ	Max		V4	V7	V9	V17	V19	V21	V23	V25	V28
Frequency characteristics in LPF-on2	F40LP2	$V_{IN}40$	SG1	14.3M	1V	T38	Ga-Gb Ga=20log(VOUT/VIN) for 100kHz Gb=20log(VOUT/VIN) for 14.3MHz		-40	-30	dB	0	5	5	0	0	0	0	0	0
	F8LP2	$V_{IN}8$	SG1	14.3M	714mV	T31			-40	-30	dB	0	5	0	0	0	0	0	0	0
	F18LP2	$V_{IN}18$	SG1	14.3M	1V	T29			-40	-30	dB	0	5	0	0	0	0	0	0	0
Output 2nd order distortion	H40	$V_{IN}40$	SG1	5M	1V	T38	Measure the output 2nd harmonics component of 5MHz.		-45	-35	dB	0	5	5	0	0	0	0	0	0
	H8	$V_{IN}8$	SG1	5M	714mV	T31			-45	-35	dB	0	5	0	0	0	0	0	0	0
	H18	$V_{IN}18$	SG1	5M	1V	T29			-45	-35	dB	0	5	0	0	0	0	0	0	0
C.SYNC Separator output high level	CV40H	$V_{IN}40$	SG3		1V	T34	Measure the output high level at T34.	V_{CC} -0.5		V_{CC}	V	0		5	0	0	0	0	0	
C.SYNC Separator output high level	CV40L	VIN40	SG3		1V	T34	Measure the output low level at T34.	0	0.3	0.6	V	0		5	0	0	0	0	0	
C.Sync separator output pulse delay time	CT40	$V_{IN}40$	SG3		1V	T34	Measure the pulse delay for input signal at T34.	0.85	1.2	1.6	μs	0		5	0	0	0	0	0	
C.Sync separator output pulse width	CW40	$V_{IN}40$	SG3		1V	T34	Measure the pulse width at T34.	3.2	4.2	5.2	μs	0		5	0	0	0	0	0	
V.Sync separator output high level	VV40H	$V_{IN}40$	SG6		1V	T36	Measure the output high level at T36.	V_{CC} -0.5		V_{CC}	V	0		5	0	0	0	0	0	
V.Sync separator output low level	VV40L	$V_{IN}40$	SG6		1V	T36	Measure the output low level at T34.	0	0.3	0.6	V	0		5	0	0	0	0	0	
V.Sync separator output pulse delay time	VT40	$V_{IN}40$	SG6		1V	T36	Measure the pulse delay for input signal at T36.	11	19	27	μs	0		5	0	0	0	0	0	
V.Sync separator output pulse width	VW40	$V_{IN}40$	SG6		1V	T36	Measure the pulse width at T36.	150	190	240	μs	0		5	0	0	0	0	0	
V-DET output high level	VDET40	$V_{IN}40$	SG1		1V	T43	Input signal	V_{CC} -0.5		V_{CC}	V	0		5	0	0	0	0	0	
V-DET output low level						T43	No signal	0	0.3	0.6	V	0		5	0	0	0	0	0	
DG	DGLP38	$V_{IN}40$	SG5	3.58M	1V	T38		-2	0	2	%	0	5	5	0	0	0	0	0	0
DP	DPLP38	$V_{IN}40$	SG5	3.58M	1V	T38		-1.5	0	1.5	deg	0	5	5	0	0	0	0	0	0
Crosstalk CVBS	CTCV	$V_{IN}40$ $V_{IN}42$	GND SG1	5M	1V	T38			-60	-55	dB	0	5	5	0	0	0	0	0	
Crosstalk C	CTC	$V_{IN}8$ $V_{IN}10$	GND SG2	5M	714mV	T31			-60	-55	dB	0	5	0	0	0	0	0	0	
Crosstalk Y	CTY	$V_{IN}18$ $V_{IN}20$	GND SG3	5M	1V	T29			-60	-55	dB	0	5	0	0	0	0	0	0	
Video S/N	SN40	$V_{IN}40$	SG3		1V	T38	BW = HPF100kHz, LPF5MHz 20log (noise/signal)		-65	-60	dB	0	5	5	0	0	0	0	0	0

Package Dimensions

unit : mm (typ)

3277

SANYO : SSOP44(275mil)
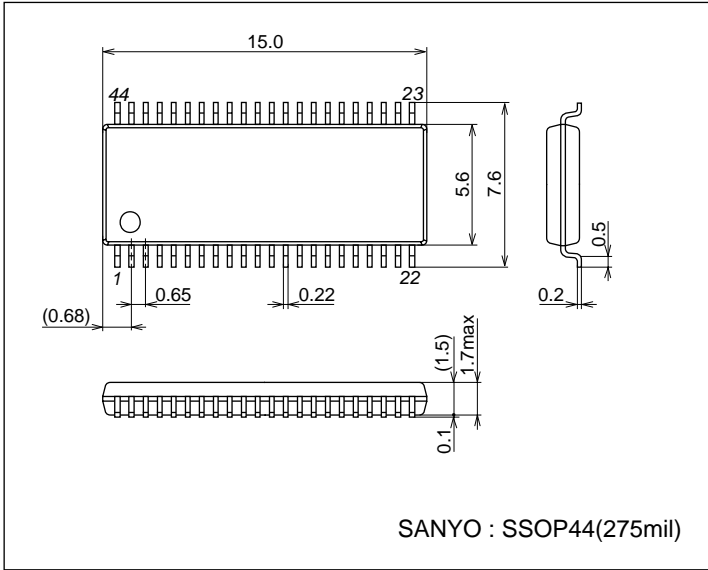
Control Specification

   Pin control voltage Low level: 0 to 0.7V, High level: 2.6 to 5V

Input selection control

PIN21	PIN19	PIN17	PIN9	PIN4	PIN23	Output			
INSEL3	INSEL2	INSEL1	YOUTSEL	COMPONENT	Stand-by	CVBSOUT	Y OUT	C OUT	C.SYNC
L	L	L	L	L	L	CVBS1	Y1	C1	Y1
L	L	H	L	L	L	CVBS2	Y2	C2	Y2
L	H	L	L	L	L	CVBS3	Y3	C3	Y3
L	H	H	L	L	L	CVBS4	Y4	C4	Y4
H	L	L	L	L	L	CVBS5	Y5	C5	Y5
L	L	L	H	L	L	CVBS1	CVBS1	C1	CVBS1
L	L	H	H	L	L	CVBS2	CVBS2	C2	CVBS2
L	H	L	H	L	L	CVBS3	CVBS3	C3	CVBS3
L	H	H	H	L	L	CVBS4	CVBS4	C4	CVBS4
H	L	L	H	L	L	CVBS5	CVBS5	C5	CVBS5
				H	L	Cb	Y1	Cr (C1)	Y1
					H				CVBS2/Y2 (*1)

Other Controls

Pin No	Control item	L control	H control
7	Gain-CTL	0dB	6dB
28	LPF ON/OFF	ON	OFF

*1: At the time of standby, if a signal is in Y2, the sync of the signal of Y2 will be separated.

Standby mode

CVBS2	Y2	C.Sync output
Input	No Input	CVSB2
Input	Input	Y2
No Input	Input	Y2
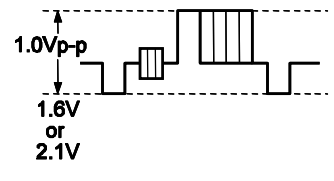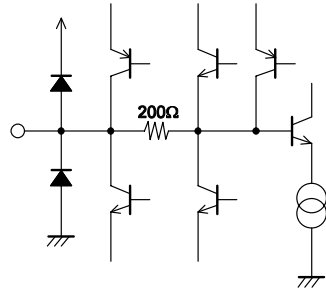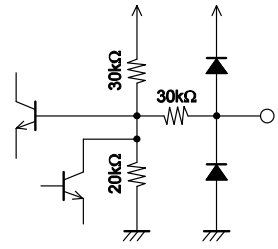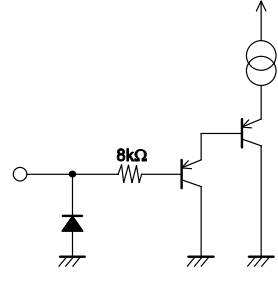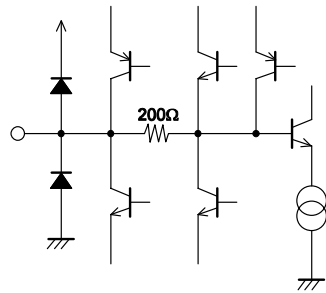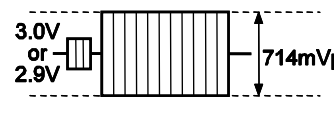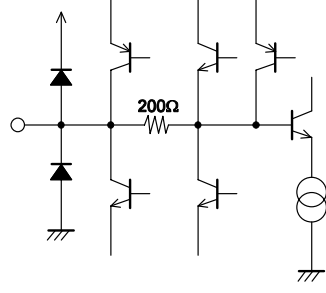
*2: Since Pin25 is test mode control, please apply GND level.

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Block Diagram and Application Circuit Example

The parts connected by wide lines operate even at standby mode.
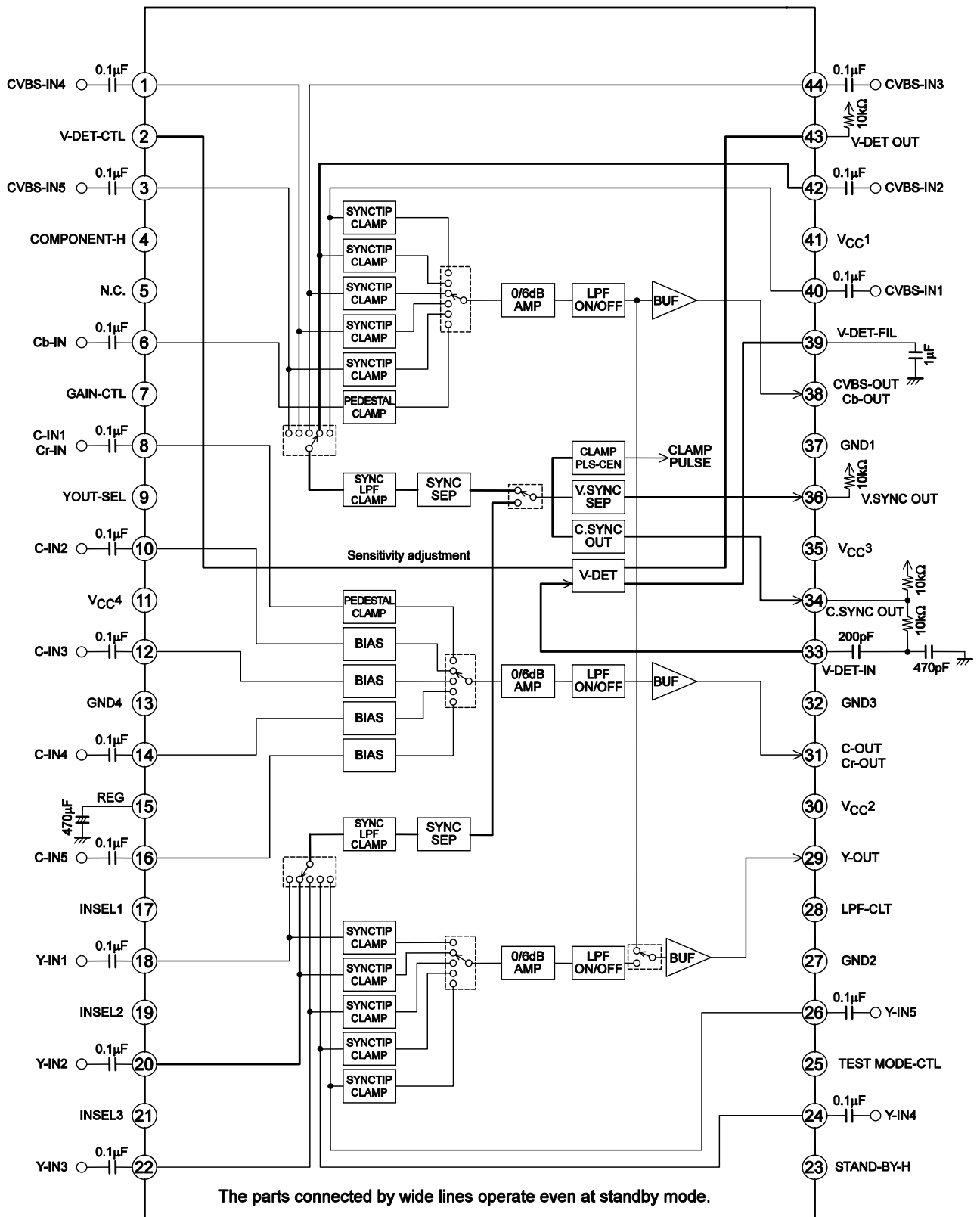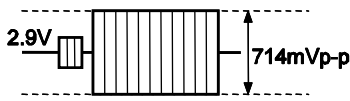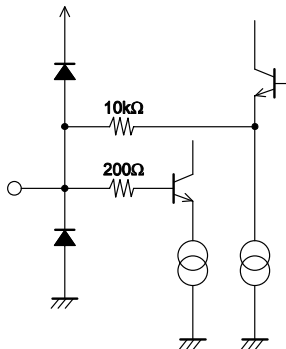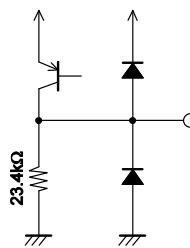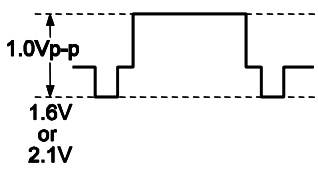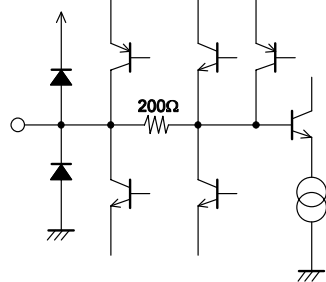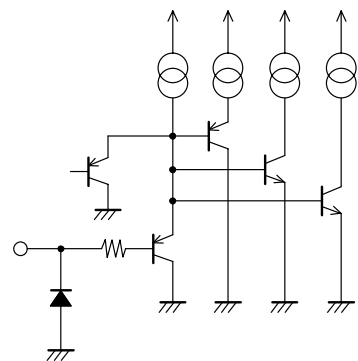
Pin Functions

Pin No.	Pin name	Signal wave form	DC voltage AC level	Equivalent circuit
1 3 40 42 44	CVBS-IN4 CVBS-IN5 CVBS-IN1 CVBS-IN2 CVBS-IN3	1.0Vp-p 1.6V or 2.1V	0dB: 1.6V 6dB: 2.1V	
		DC	No signal: 1.6V	
2	V-DET-CTL	DC	1.7 to 2.0V	30kΩ 30kΩ 20kΩ
4	COMPONENT-H	DC	Except component mode: 0V Component mode: 5V	
7	GAIN-CTL	DC	0dB: 0V 6dB: 5V	
9	Y-OUT-SEL	DC	Y output: 0V CVBS output :5V	
17 19 21	INSEL1 INSEL2 INSEL3	DC	Low: 0V High: 5V	8kΩ
23	STAND-BY-H	DC	Normal mode: 0V Standby mode: 5V	
28	LPF-CTL	DC	LPF-ON: 0V LPF-OFF: 5V	
6	Cb-IN	3.0V or 2.9V 700mVp-p	0dB: 3.0V 6dB: 2.9V	200Ω
		DC	No signal: 1.6V	
8	C-IN1/ Cr-IN	3.0V or 2.9V 714mVp-p	0dB: 3.0V 6dB: 2.9V	200Ω
		DC	No signal: 1.6V	

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Pin No.	Pin name	Signal wave form	DC voltage AC level	Equivalent circuit
10 12 14 16	C-IN2 C-IN3 C-IN4 C-IN5	2.9V ⊢⊣ 714mVp-p	2.9V	10kΩ 200Ω
		DC	No signal: 2.9V	
11 30 35 41	$V_{CC}4$ $V_{CC}2$ $V_{CC}3$ $V_{CC}1$			
13 27 32 37	GND4 GND2 GND3 GND1			
15	REG	DC	2.5V	23.4kΩ
18 20 22 24 26	Y-IN1 Y-IN2 Y-IN3 Y-IN4 Y-IN5	1.0Vp-p 1.6V or 2.1V	0dB: 1.6V 6dB: 2.1V	200Ω
		DC	No signal: 1.6V	
25	TEST MODE-CTL		GND	

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Pin No.	Pin name	Signal wave form	DC voltage AC level	Equivalent circuit
29	Y-OUT	1.0Vp-p or 2.0Vp-p / 0.8V	0.8V	
31	C-OUT/ Cr-OUT	2.3V 714mVp-p or 1.4Vp-p / 2.3V 700mVp-p or 1.4V	2.3V	
38	CVBS-OUT/ Cb-OUT	1.0V or 2.0V / 0.8V / 2.3V 700mVp-p or 1.4V	CVBS output: 0.8V Component output: 2.3V	
33	V-DET-IN	5V / 0.3V		
34 36	C.SYNC OUT V.SYNC OUT	5V / 0.3V		
43	V-DET OUT	DC	No signal: 0.3V Input signal: 5V	
39	V-DET-FIL	DC		

Test Circuit

Input Signal

SG1

SINE WAVE 3.58MHz   140IRE

1H

40IRE

SG2

SINE WAVE 3.58MHz   100IRE

1H

SG3

140IRE

1H

SG4

140IRE

1H

SG5

SINE WAVE 3.58MHz   140IRE

40IRE

1H

40IRE

SG6

2.35μs   4.7μs   2.35μs   4.7μs

3H   3H   3H   11H