AN3294K

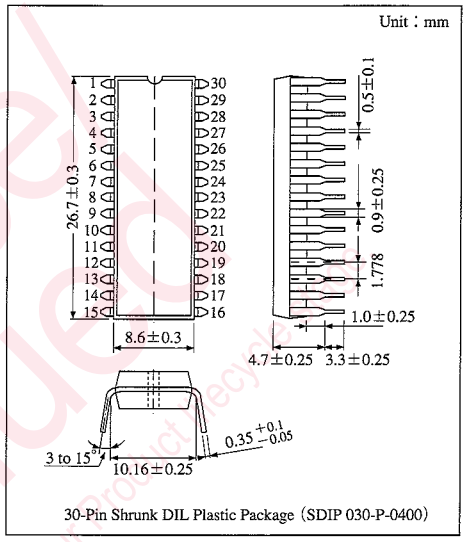
Y/C Separation and Interface IC

■ Overview

The AN3294K is an IC developed for Y/C separation and I/O interface for the S-VHS VCR. The I/O circuits are integrated on single chip in order to meet with rationalization of set.

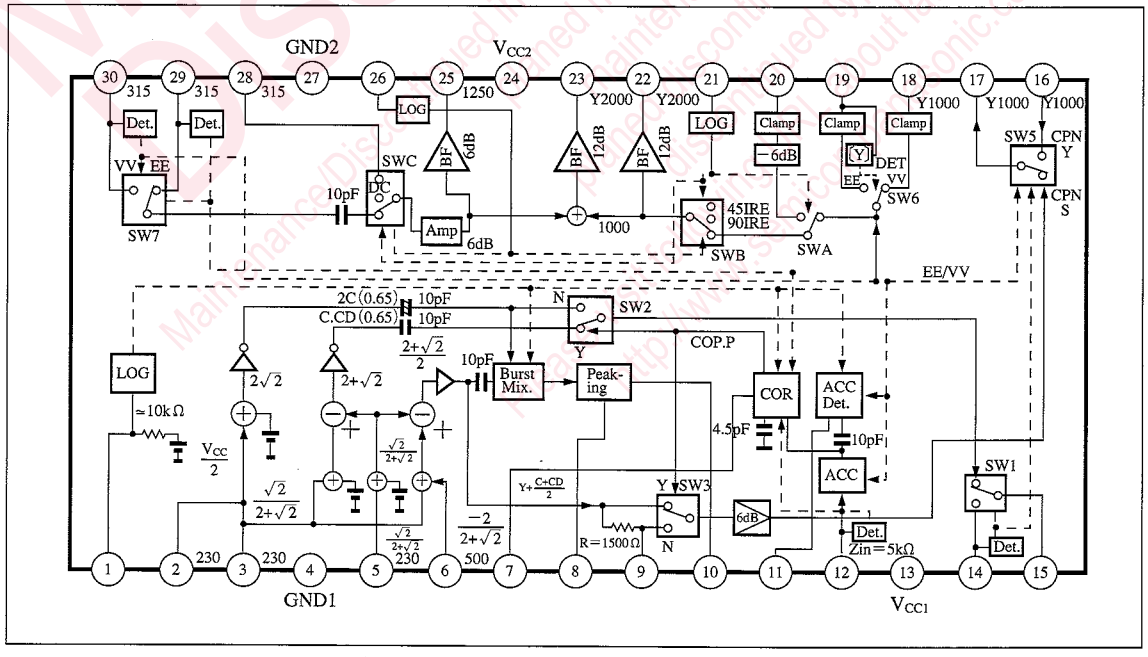
■ Features

- High-accuracy picture quality is prevented from deterioration at non-correlation by the color signal non-correlative-detection system.
- Built-in 75Ω drivers for Y, C, and Y+C.
- Built-in I/O selector switch for Y (C) component/composite signal.
- Character-insertion color-back function available for OSD.



30-Pin Shrunk DIL Plastic Package (SDIP 030-P-0400)

■ Block Diagram



■ Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Rating	Unit
Supply voltage	V_{CC}	6	V
Power dissipation (Ta=70℃)	P_D	470	mW
Operating ambient temperature	T_{opr}	−20 to +70	℃
Storage temperature	T_{stg}	−55 to +150	℃

■ Recommended Operating Range (Ta=25℃)

Parameter	Symbol	Range
Operating supply voltage range	V_{CC}	4.5V to 5.5V

■ Electrical Characteristics (Ta=25℃)

Parameter	Symbol	Condition	min	typ *	max	Unit	Note
Circuit current (EE)	I_1		45	(63)	79	mA	—
Circuit current (VV)	I_{13}		43	(60)	76	mA	—
Y/C signal CCD input gain	$G_{2\text{-}3}$	Pin⑭ Hi, Pin㉙ Lo, Input 325mV_{PP}, f=5MHz	−1.5	(−0.2)	0.5	dB	—
C comb main-signal gain	$G_{15\text{-}3M}$	Input 325mV_{PP}, f=5MHz	2.8	(3.8)	4.8	dB	—
C comb sub-signal gain difference	$\Delta G_{15\text{-}5}$	Input 325mV_{PP}, f=5MHz	−1.1	(−0.4)	0.5	dB	—
C through signal gain difference	$\Delta G_{15\text{-}3T}$	Pin⑭ Hi, Pin㉙ Lo Input 325mV_{PP}, f=5MHz	5.2	(6)	6.8	dB	—
C comb main-signal freq. characteristics	$F_{15\text{-}3M}$	Pin⑭ Hi, Pin㉙ Lo Input 325mV_{PP}, f=5M/1MHz	−1.5	(−0.5)	0.8	dB	—
CPN-C signal gain	$G_{15\text{-}14}$	Pin⑭ open Input 650mV_{PP}, f=5MHz	−1.5	(−0.1)	0.8	dB	—
Y comb main-signal gain	$G_{17\text{-}3}$	Pin⑭ Hi, Pin㉙ Lo Input 325mV_{PP}, f=5MHz	2.8	(3.7)	4.8	dB	—
Y comb Y. C. signal gain	$G_{17\text{-}6}$	Pin⑭ Hi, Pin㉙ Lo Input 650mV_{PP}, f=5MHz	5.5	(6.5)	7.5	dB	—
Y comb sub-signal gain difference	$\Delta G_{17\text{-}5}$	Pin⑭ Hi, Pin㉙ Lo Input 325mV_{PP}, f=5MHz	−1.1	(−0.1)	0.5	dB	—
Y comb main-signal freq. characteristics	$F_{17\text{-}3}$	Pin⑭ Hi, Pin㉙ Lo Input 325mV_{PP}, f=5M/1MHz	−1.5	(−0.2)	0.8	dB	—
CPN-Y signal gain	$G_{17\text{-}16}$	Pin⑭ open, Input 1000mVpp, f=5MHz	−0.7	(−0.1)	0.3	dB	—
Chroma signal peaking gain	$G_{10\text{-}3A}$	Pin⑭ open, Input 1000mV_{PP}, f=5MHz	−16	(−13.5)	−11	dB	Load 1kΩ
Chroma signal peaking gain difference	$\Delta G_{10\text{-}3B}$	Pin⑭ open, Input 1000mV_{PP}, f=5MHz	11.6	(12.7)	13.6	dB	Load 1kΩ
Chroma non-correlation detection level	$S_{17\text{-}12A}$	V_7=3.5V	4	(10)	17	mV_{PP}	—
VV Y signal gain	$G_{22\text{-}18}$	Pin㉖, Pin㉚ open, Video input 1V_{PP}	5.6	(6.4)	7	dB	—
EE Y signal gain	$G_{22\text{-}19}$	Pin㉖, Pin㉚ Hi Video input 1V_{PP}	5.6	(6.4)	7	dB	—
Y+C, Y signal difference	$\Delta G_{23\text{-}19}$	Pin㉖ Lo, Pin㉚ Hi Video input 1V_{PP}	−0.6	(−0.2)	0.4	dB	—
EE Y signal freq. characteristics	$F_{22\text{-}19}$	Pin㉖ Lo, Pin㉚ Hi Video input 1V_{PP}, f=5M/1MHz	−1	(−0.2)	1	dB	—
REP Y signal gain	$G_{22\text{-}20}$	Pin㉖ Lo, Pin㉑ Hi Input 2V_{PP}	−0.4	(0.4)	1	dB	—
EE C signal gain	$G_{25\text{-}29}$	Pin㉖ Lo, Pin㉚ Hi Input 325mV_{PP}, f=3.58MHz	11.6	(12.3)	13.2	dB	—

* Values with an asterisk are typical ones and not guaranteed values.

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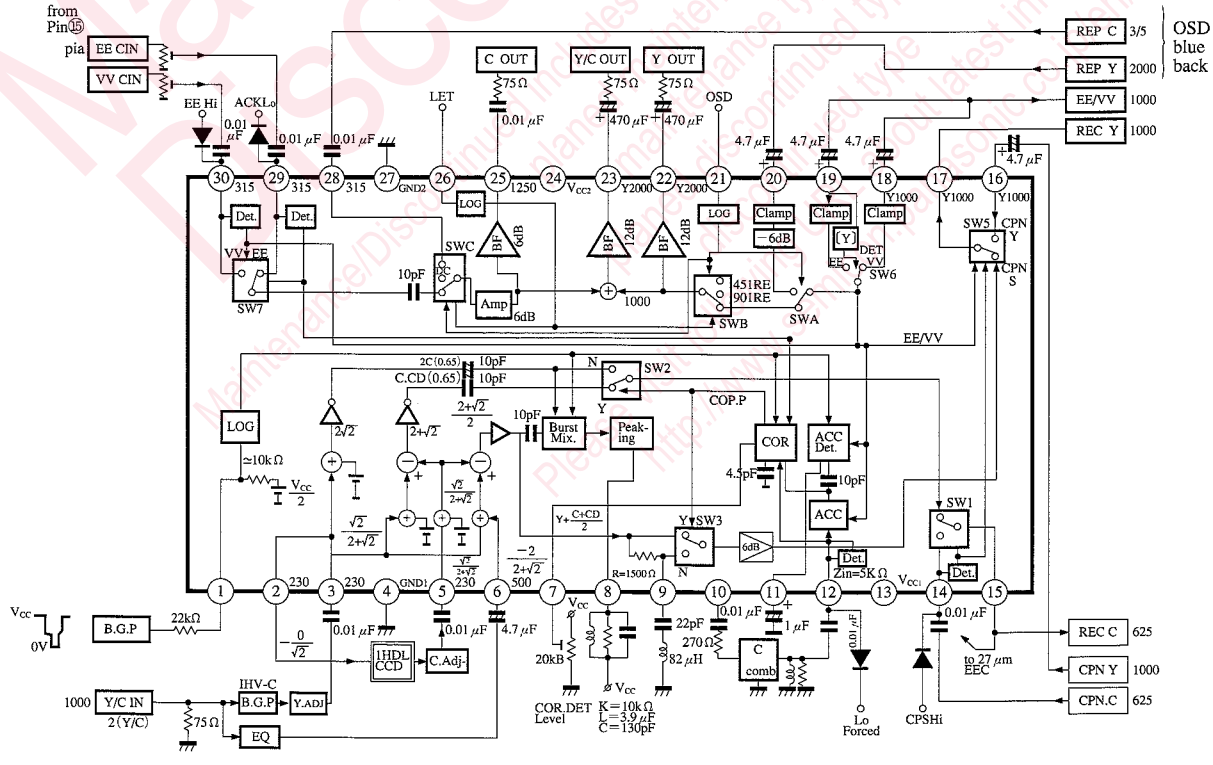
■ Electrical Characteristics (cont.) (Ta=25℃)

Parameter	Symbol	Condition	min	typ *	max	Unit	Note
Y+C, C signal gain difference	$\Delta G_{23\text{-}29}$	Pin㉖ Lo, Pin㉚ Hi f=3.58MHz, Pin⑲ =2.9V	−0.6	(−0.1)	0.6	dB	—
REP C signal gain	$G_{25\text{-}28}$	Pin㉖ Lo, Pin㉚ Hi f=3.58MHz, Pin⑳ =2.9V	12.9	(13.6)	14.5	dB	—
VV C signal gain	$G_{25\text{-}30}$	Pin㉖ Lo f=3.58MHz, Pin⑱ =2.9V	11.6	(12.3)	13.2	dB	—
Character insertion level (90IRE)	$V_{22\text{-}19A}$	Pin㉚ Hi, Pin㉑ Lo, Input 1Vpp Pin㉖ character input	74	(90)	100	IRE	—
BGP ON/OFF changeover Hi level	V_{1H}	Pin① external resistor, R1=22kΩ	2.8	—	—	V	—
BGP ON/OFF changeover Lo level	V_{1L}	Pin① external resistor, R1=22kΩ	—	—	2.2	V	—
Forced non-correlation changeover Lo level	V_{12L}	Pin① external resistor, R1=22kΩ	—	—	1	V	—
CPS/CPN mode changeover Hi level	V_{14H}	Pin① external resistor, R1=22kΩ	3.6	—	—	V	—
Forced VV input changeover Hi level at EE	V_{19H}	Pin① external resistor, R1=22kΩ	4.8	—	—	V	—
OSD changeover Hi level	V_{21H}	Pin① external resistor, R1=22kΩ	3.6	—	—	V	—
OSD changeover Mi level	V_{21M}	Pin① external resistor, R1=22kΩ	1.4	—	3	V	—
OSD changeover Lo level	V_{21L}	Pin① external resistor, R1=22kΩ	—	—	0.8	V	—
LET changeover Hi level	V_{26H}	Pin① external resistor, R1=22kΩ	3	—	—	V	—
LET changeover Lo level	V_{26L}	Pin① external resistor, R1=22kΩ	—	—	2	V	—
ACK mode changeover Lo level (ACK)	V_{29L}	Pin① external resistor, R1=22kΩ	—	—	1.4	V	—
EE/VV mode changeover Hi level (EE)	V_{30H}	Pin① external resistor, R1=22kΩ	3.6	—	—	V	—

* Values with an asterisk are typical ones and not guaranteed values.

■ Application Circuit



■ Pin Descriptions

Pin No.	Pin name	Typ. waveform	DC voltage	$Z_{in}Z_{out}$ (kΩ)	Pin No.	Pin name	Typ. waveform	DC voltage	$Z_{in}Z_{out}$ (kΩ)
1	B.G.P input		2.5	Z_{in}10	16	C.P.N Y signal input	≃1000mV$_{PP}$	2.3	Z_{in}30
2	Chroma signal output	≃200mV$_{PP}$	2.5	E.F	17	Y separate output	≃1000mV$_{PP}$	2.3	E.F
3	Chroma signal input	≃200mV$_{PP}$	1.75	Z_{in}30	18	VV Y AMP input	≃1000mV$_{PP}$	Sync. chip 2.3	Diode clamp
4	GND1	——	0	——	19	EE Y ANP input	≃1000mV$_{PP}$	Sync. chip 2.3	Diode clamp
5	1HDL chroma signal input	≃200mV$_{PP}$	1.75	Z_{in}30	20	REP Y ANP	≃2000mV$_{PP}$	Sync. chip 2.3	Diode clamp
6	Composite video signal input	≃500mV$_{PP}$	1.75	Z_{in}30	21	O.S.D mode changeover	3-value H/M/L	——	Base
7	Correlative detection level control	——	——	Z_{in} Base	22	Y AMP output	≃2000mV$_{PP}$	Sync. chip 1.5	to 0
8	3.58MHz peaking		5	——	23	Y+C AMP output	≃2000mV$_{PP}$	Sync. chip 1.4	to 0
9	3.58MHz trap	≃500mV$_{PP}$	2.2	Z_{OUT}1.5	24	V_{CC3}	——	5	——
10	Peaking output		2	E.F	25	C AMP output		2.3	to 0
11	ACC DET	——	3	Z_{OUT} to 5	26	LET		——	Base
12	ACC input/forced non-correlation changeover		3	Z_{in}5	27	GND3	——	0	——
13	V_{CC1}	——	5	——	28	REP C input		3	Z_{in}20
14	CP.N chroma input CPS・CPN changeover	CPN mode	2.2	Z_{in}20	29	EE C input	ACK=OFF	2.5	Z_{in}20
15	C separate output	≃500mV$_{PP}$	2.3	E.F	30	VV C input	VV mode	2.5	Z_{in}20

■ Supplementary Explanation

• Electrical Characteristics Design Reference Values (Ta=25℃)

Parameter	Symbol	Condition	min	typ	max	Unit
C through/C comb-main signal phase difference	$\Delta Td_{15\text{-}3M}$	Input 325mV$_{pp}$, f=3.58MHz Pin㉙ Lo/Pin㉙ open Pin㉙ Lo	——	(2)	8	deg
Chroma non-correlation detection variable range	$S_{17\text{-}12B}$	V_7=2.5V to 4V	2.5	——	4	V
EEY to VVY crosstalk	$CT_{22\text{-}19A}$	VV mode, Input 1000mV$_{pp}$, f=5MHz	——	(−50)	−40	dB
EEC to VVC crosstalk	$CT_{25\text{-}29}$	VV mode, Input 325mV$_{pp}$, f=3.58MHz	——	(−50)	−40	dB
SW2DC unbalance	$V_{15\text{-}12}$		——	(5)	20	mV$_{PP}$
EE Y 2nd harmonics	$2Y_{23\text{-}19}$	f=3.58MHz	——	(−44)	−35	dB
EE C 2nd harmonics	$2C_{23\text{-}19}$	f=3.58MHz	——	(−42)	−35	dB

Note) Values with an asterisk are typical ones and not guaranteed values.

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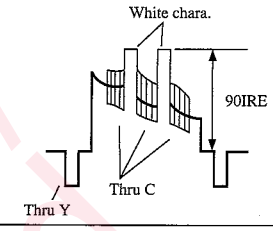
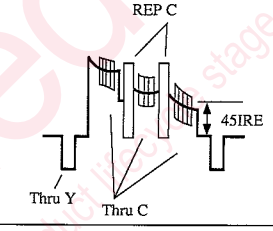
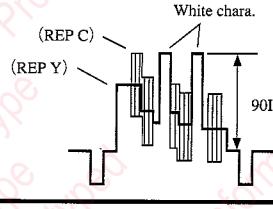
■ Supplementary Explanation (cont.)

• OSD Mode Selection Control Table

OSD Pin㉑	LET Pin㉖	SWA	SWB	SWC	Output	Output waveform Pin㉓
L	L	THRU	THRU	THRU	NORM	
	H		90IRE	DC	White superimposition	
M	L	THRU	THRU	THRU	NORM	
	H		45IRE	REP	White superimposition	
H	L	REP	THRU	REP	Color background	
	H		90IRE	DC	White Char. OSD	

OSD···Pin㉑ mode selector pin
LET···Pin㉖ character data input pin
SWA···Thru Y Pins⑱, ⑲/REP Y Pin⑳ selector switch
SWB···Thru/90IRE DC/45IRE DC selector switch
SWC···Thru Chroma Pin㉙, ㉚/REP chroma Pin㉘ selector switch

• Precautions on Use

1. Use this IC so that the Hi voltage (5V) is not applied to the ①, ⑦, ㉘, and ㉚ when the IC power is off.
2. The Pins㉔ and ㉗ are V_{CC} and GND for driver output (Pins㉒, ㉓, ㉕), respectively. When designing the PCB, therefore, separate them from the other pins sufficiently in pattern design.
3. Pay attention to the handling because upside-down mounting makes over-current, and characterics deterioration or damage may occur.
4. In the case, driver outputs (Pin㉒, ㉓, ㉕) are used for energy saving, Pin⑱ to ㉖ and Pin㉘ should be opened.
   In this case, only Y/C seperation circuit operates and consumption current decreases by approximately 23mA at EE mode.

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