

AN3294K

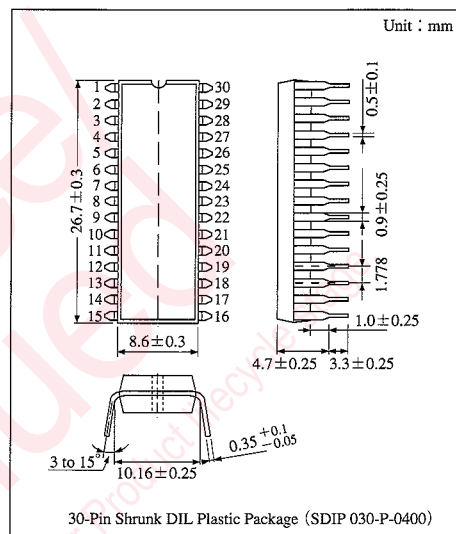
Y/C Separation and Interface IC

Overview

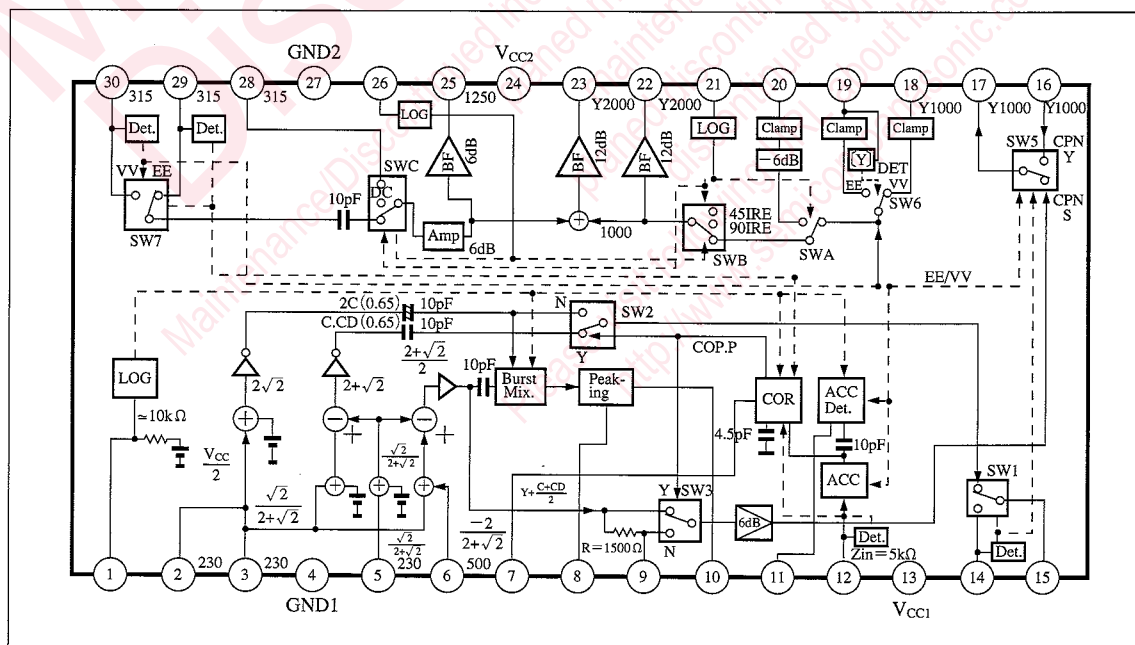
The AN3294K is an IC developed for Y/C separation and I/O interface for the S-VHS VCR. The I/O circuits are integrated on single chip in order to meet with rationalization of set.

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.



Block Diagram



Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Rating	Unit
Supply voltage	V _{CC}	6	V
Power dissipation (Ta=70°C)	P _D	470	mW
Operating ambient temperature	T _{opr}	-20 to +70	°C
Storage temperature	T _{stg}	-55 to +150	°C

Recommended Operating Range (Ta=25°C)

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

Electrical Characteristics (Ta=25°C)

Parameter	Symbol	Condition	min	typ *	max	Unit	Note
Circuit current (EE)	I _I		45	(63)	79	mA	—
Circuit current (VV)	I _{I3}		43	(60)	76	mA	—
Y/C signal CCD input gain	G ₂₋₃	Pin ¹⁴ Hi, Pin ²⁹ Lo, Input 325mV _{PP} , f=5MHz	-1.5	(-0.2)	0.5	dB	—
C comb main-signal gain	G _{15-3M}	Input 325mV _{PP} , f=5MHz	2.8	(3.8)	4.8	dB	—
C comb sub-signal gain difference	ΔG ₁₅₋₅	Input 325mV _{PP} , f=5MHz	-1.1	(-0.4)	0.5	dB	—
C through signal gain difference	ΔG _{15-3T}	Pin ¹⁴ Hi, Pin ²⁹ Lo Input 325mV _{PP} , f=5MHz	5.2	(6)	6.8	dB	—
C comb main-signal freq. characteristics	F _{15-3M}	Pin ¹⁴ Hi, Pin ²⁹ Lo Input 325mV _{PP} , f=5M/1MHz	-1.5	(-0.5)	0.8	dB	—
CPN-C signal gain	G ₁₅₋₁₄	Pin ¹⁴ open Input 650mV _{PP} , f=5MHz	-1.5	(-0.1)	0.8	dB	—
Y comb main-signal gain	G ₁₇₋₃	Pin ¹⁴ Hi, Pin ²⁹ Lo Input 325mV _{PP} , f=5MHz	2.8	(3.7)	4.8	dB	—
Y comb Y. C. signal gain	G ₁₇₋₆	Pin ¹⁴ Hi, Pin ²⁹ Lo Input 650mV _{PP} , f=5MHz	5.5	(6.5)	7.5	dB	—
Y comb sub-signal gain difference	ΔG ₁₇₋₅	Pin ¹⁴ Hi, Pin ²⁹ Lo Input 325mV _{PP} , f=5MHz	-1.1	(-0.1)	0.5	dB	—
Y comb main-signal freq. characteristics	F ₁₇₋₃	Pin ¹⁴ Hi, Pin ²⁹ Lo Input 325mV _{PP} , f=5M/1MHz	-1.5	(-0.2)	0.8	dB	—
CPN-Y signal gain	G ₁₇₋₁₆	Pin ¹⁴ open, Input 1000mV _{PP} , f=5MHz	-0.7	(-0.1)	0.3	dB	—
Chroma signal peaking gain	G _{10-3A}	Pin ¹⁴ open, Input 1000mV _{PP} , f=5MHz	-16	(-13.5)	-11	dB	Load 1kΩ
Chroma signal peaking gain difference	ΔG _{10-3B}	Pin ¹⁴ open, Input 1000mV _{PP} , f=5MHz	11.6	(12.7)	13.6	dB	Load 1kΩ
Chroma non-correlation detection level	S _{17-12A}	V ₇ =3.5V	4	(10)	17	mV _{PP}	—
VV Y signal gain	G ₂₂₋₁₈	Pin ²⁶ , Pin ³⁰ open, Video input 1V _{PP}	5.6	(6.4)	7	dB	—
EE Y signal gain	G ₂₂₋₁₉	Pin ²⁶ , Pin ³⁰ Hi Video input 1V _{PP}	5.6	(6.4)	7	dB	—
Y+C, Y signal difference	ΔG ₂₃₋₁₉	Pin ²⁶ Lo, Pin ³⁰ Hi Video input 1V _{PP}	-0.6	(-0.2)	0.4	dB	—
EE Y signal freq. characteristics	F ₂₂₋₁₉	Pin ²⁶ Lo, Pin ³⁰ Hi Video input 1V _{PP} , f=5M/1MHz	-1	(-0.2)	1	dB	—
REP Y signal gain	G ₂₂₋₂₀	Pin ²⁶ Lo, Pin ²¹ Hi Input 2V _{PP}	-0.4	(0.4)	1	dB	—
EE C signal gain	G ₂₅₋₂₉	Pin ²⁶ Lo, Pin ³⁰ 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.

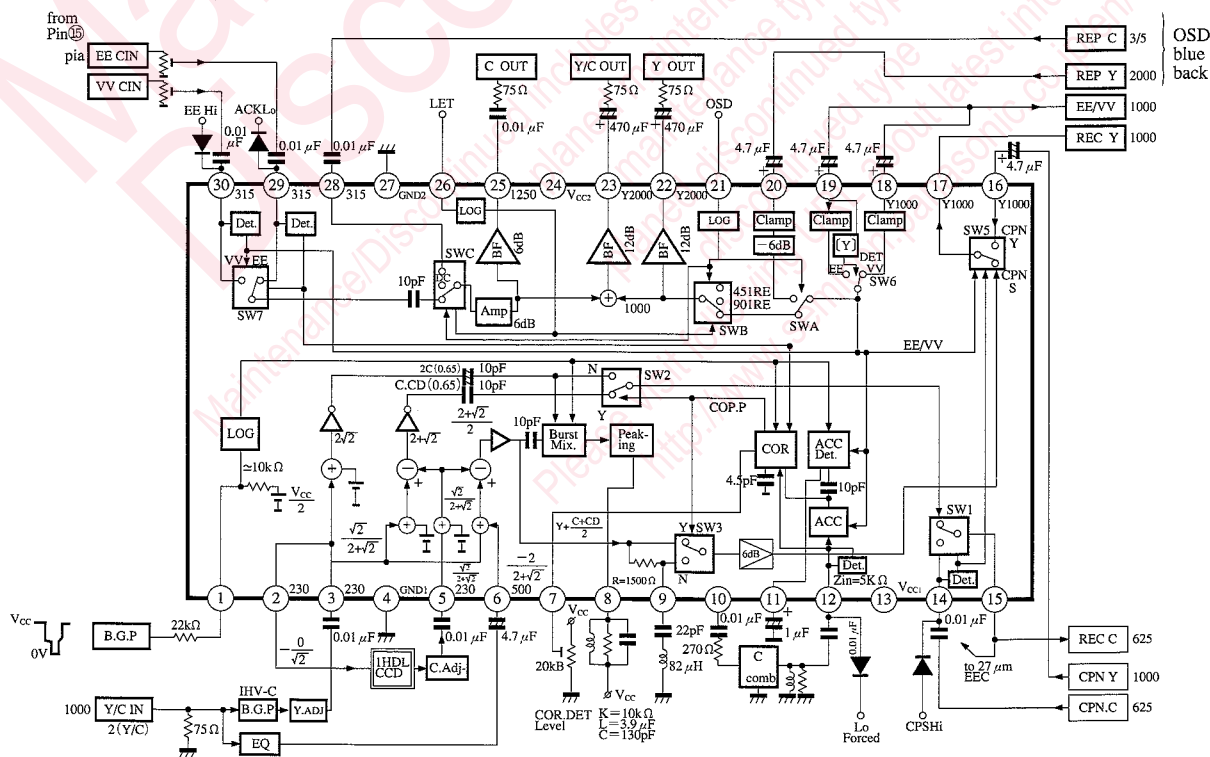
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Electrical Characteristics (cont.) (Ta=25°C)

Parameter	Symbol	Condition	min	typ *	max	Unit	Note
Y+C, C signal gain difference	ΔG_{23-29}	Pin ²⁶ Lo, Pin ³⁰ Hi f=3.58MHz, Pin ¹⁹ =2.9V	-0.6	(-0.1)	0.6	dB	—
REP C signal gain	G_{25-28}	Pin ²⁶ Lo, Pin ³⁰ Hi f=3.58MHz, Pin ²⁰ =2.9V	12.9	(13.6)	14.5	dB	—
VV C signal gain	G_{25-30}	Pin ²⁶ Lo f=3.58MHz, Pin ¹⁸ =2.9V	11.6	(12.3)	13.2	dB	—
Character insertion level (90IRE)	V_{22-19A}	Pin ³⁰ Hi, Pin ²¹ Lo, Input 1V _{pp} Pin ²⁶ character input	74	(90)	100	IRE	—
BGP ON/OFF changeover Hi level	V_{1H}	Pin ¹ external resistor, R1=22k Ω	2.8	—	—	V	—
BGP ON/OFF changeover Lo level	V_{1L}	Pin ¹ external resistor, R1=22k Ω	—	—	2.2	V	—
Forced non-correlation changeover Lo level	V_{12L}	Pin ¹ external resistor, R1=22k Ω	—	—	1	V	—
CPS/CPN mode changeover Hi level	V_{14H}	Pin ¹ external resistor, R1=22k Ω	3.6	—	—	V	—
Forced VV input changeover Hi level at EE	V_{19H}	Pin ¹ external resistor, R1=22k Ω	4.8	—	—	V	—
OSD changeover Hi level	V_{21H}	Pin ¹ external resistor, R1=22k Ω	3.6	—	—	V	—
OSD changeover Mi level	V_{21M}	Pin ¹ external resistor, R1=22k Ω	1.4	—	3	V	—
OSD changeover Lo level	V_{21L}	Pin ¹ external resistor, R1=22k Ω	—	—	0.8	V	—
LET changeover Hi level	V_{26H}	Pin ¹ external resistor, R1=22k Ω	3	—	—	V	—
LET changeover Lo level	V_{26L}	Pin ¹ external resistor, R1=22k Ω	—	—	2	V	—
ACK mode changeover Lo level (ACK)	V_{29L}	Pin ¹ external resistor, R1=22k Ω	—	—	1.4	V	—
EE/VV mode changeover Hi level (EE)	V_{30H}	Pin ¹ external resistor, R1=22k Ω	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} (k Ω)	Pin No.	Pin name	Typ. waveform	DC voltage	Z_{in}/Z_{out} (k Ω)
1	B.G.P input		2.5	$Z_{in}10$	16	C.P.N Y signal input		2.3	$Z_{in}30$
2	Chroma signal output		2.5	E.F	17	Y separate output		2.3	E.F
3	Chroma signal input		1.75	$Z_{in}30$	18	VV Y AMP input		Sync. chip 2.3	Diode clamp
4	GND1	—	0	—	19	EE Y ANP input		Sync. chip 2.3	Diode clamp
5	1HDL chroma signal input		1.75	$Z_{in}30$	20	REP Y ANP		Sync. chip 2.3	Diode clamp
6	Composite video signal input		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		Sync. chip 1.5	to 0
8	3.58MHz peaking		5	—	23	Y + C AMP output		Sync. chip 1.4	to 0
9	3.58MHz trap		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 · CP.N changeover		2.2	$Z_{in}20$	29	EE C input		2.5	$Z_{in}20$
15	C separate output		2.3	E.F	30	VV C input		2.5	$Z_{in}20$

ICs for VCR

Supplementary Explanation

• Electrical Characteristics Design Reference Values ($T_a = 25^\circ\text{C}$)

Parameter	Symbol	Condition	min	typ	max	Unit
C through/C comb-main signal phase difference	ΔT_{d15-3M}	Input 325mV _{pp} , $f = 3.58\text{MHz}$ Pin ²⁹ Lo/Pin ²⁹ open Pin ²⁹ Lo	—	(2)	8	deg
Chroma non-correlation detection variable range	S_{17-12B}	$V_7 = 2.5\text{V}$ to 4V	2.5	—	4	V
EEY to VVY crosstalk	CT_{22-19A}	VV mode, Input 1000mV _{pp} , $f = 5\text{MHz}$	—	(-50)	-40	dB
EEC to VVC crosstalk	CT_{25-29}	VV mode, Input 325mV _{pp} , $f = 3.58\text{MHz}$	—	(-50)	-40	dB
SW2DC unbalance	V_{15-12}		—	(5)	20	mV _{pp}
EE Y 2nd harmonics	$2Y_{23-19}$	$f = 3.58\text{MHz}$	—	(-44)	-35	dB
EE C 2nd harmonics	$2C_{23-19}$	$f = 3.58\text{MHz}$	—	(-42)	-35	dB

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

■ Supplementary Explanation (cont.)

• OSD Mode Selection Control Table

OSD Pin ^{②①}	LET Pin ^{②⑥}	SWA	SWB	SWC	Output	Output waveform Pin ^{②③}
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...Pin^{②①} mode selector pin

LET...Pin^{②⑥} character data input pin

SWA...Thru Y Pins^{⑬, ⑰}/REP Y Pin^{②⑩} selector switch

SWB...Thru/90IRE DC/45IRE DC selector switch

SWC...Thru Chroma Pin^{②⑨, ③①}/REP chroma Pin^{②⑧} selector switch

• Precautions on Use

1. Use this IC so that the Hi voltage (5V) is not applied to the ①, ⑦, ②③, and ③① when the IC power is off.
2. The Pins^{②④} and ②⑦ are V_{CC} and GND for driver output (Pins^{②②, 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 characteristics deterioration or damage may occur.
4. In the case, driver outputs (Pin^{②②, ②③, ②⑤}) are used for energy saving, Pin^{①③} to ②⑥ and Pin^{②⑧} should be opened.
In this case, only Y/C separation circuit operates and consumption current decreases by approximately 23mA at EE mode.

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