SIGNAL PROCESSOR FOR COLOR TFT

■ GENERAL DESCRIPTION

The NJW1300B is a color TFT signal processor which include color signal modulator , count down circuit , RGB demodulator , RGB interface , and common pole driver , required by color TFT signal processing after Y/C separator.

It corresponds broadcasting systems of both NTSC and PAL , because it can select the down (1/525 or 1/625) by the internal switch.

The NJW1300B is suitable for TFT LCD panel and car navigation systems.

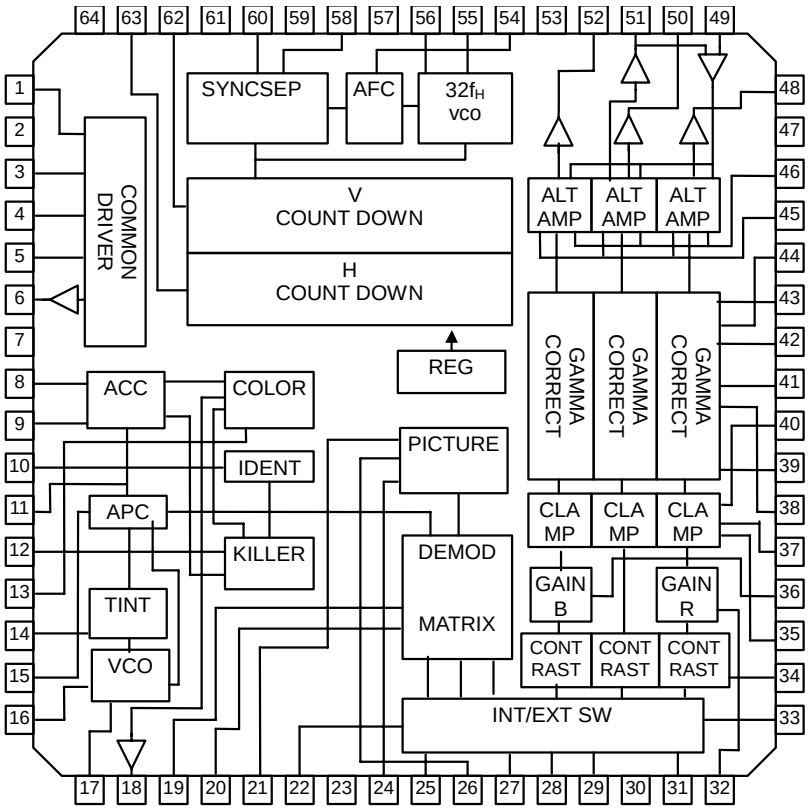
■ PACKAGE OUTLINE

NJW1300BFG1

■ FEATURES

- Supply Voltage 5V
- Y/C Separator Input
- NTSC/PAL System (3.58MHz, 4.43MHz)
- Unnecessary Adjustment of Oscillation Frequency for Internal Count Down Circuit.
- External One System Input for Analog RGB
- Internal Enhancer Circuit
- Internal GAMMA 1 Point Correction Circuit
- Internal Color TFT Common Pole Driver
- Bi-CMOS Technology
- Package Outline TQFP64

■ BROCK DIAGRAM



■ PIN CONFIGURATION

1.VCOMAMP	23.VCC1	45.BRIGHT
2.VCC3	24.YINH	46.FRP
3.VCOMIN	25.CLAMPB	47.VCC2
4.VCOMCENT	26.YIN	48.ROUT
5.VCOMFB	27.EXTING1	49.VCENTER
6.VCOMOUT	28.SW1	50.GOUT
7.VEE1	29.CLAMPG	51.CDET
8.ACCDET	30.NC	52.BOUT
9.CIN	31.EXTINR1	53.REGOUT
10.IDENT	32.GAINR	54.LPF
11.CLEANING	33.CRAMPR	55.VCOOUT
12.KILLER	34.CONTRAST	56.VCOIN
13.COLOR	35.GACLAMPR	57.GND1
14.TINT	36.GAINB	58.VS
15.APC	37.GACLAMPG	59.GND2
16.VCXO1	38.VG1	60.SYNCIN
17.VCXO2	39.VG2	61.VDD
18.CHROMAOUT	40.GACLAMPB	62.VD
19.RYIN	41.SUBVG2R	63.HD
20.BYIN	42.SUBVG2B	64.DIGREF
21.PICTURE	43.SUBVG1R	
22.EXTINB1	44.SUBVG1B	

■ ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETERS	SYMBOL	RATINGS	UNIT
Supply Voltage 1	Vcc1-GND	8.0	V
Supply Voltage 2	Vcc2-GND	8.0	V
Supply Voltage 3	Vcc3-V_{EE}1	15.0	V
Supply Voltage 4	V_{DD} - DIGREF	7.0	V
Supply Voltage 5	V_{EE}1-GND	-7.0	V
Power Dissipation	P_D	700	mW
Each Adjustment Terminal	V_{IN}	Vcc1	V
SYNC OUT Voltage	V_{SD}	V_{EE}1-15.0	V
Picture Input Voltage	V_{VDIN}	3.0	Vpp
External Input Voltage	EXT_{IN}	V_{CC}1	V
FRP Input Signal Voltage	FRP_{IN}	V_{CC}1	V
SYNC Input Voltage	$SYNC_{IN}$	V_{CC}1	V
Analog RGB Input Signal	RGB_{IN}	3.0	V_{PP}
Operating Temperature Range	Torp	-30 to +85	°C
Storage Temperature Range	Tstr	-40 to +125	°C

■ **RECOMMENDED OPERATING CONDITION** **(Ta=25°C)**

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage Range		V_{CC}1-GND	4.75	5.0	5.25	V
		V_{CC}2-GND	V_{CC}	5.0	5.25	V
		V_{CC}3-V_{EE}1	11.0	12.0	13.0	V
		V_{EE}1-GND	-5.25	-5.0	-4.75	V
		V_{DD}-DIGREF	4.75	5.0	5.25	V
Y Input Signal Voltage	Y_{IN}	Pedestal-White	0.30	0.35	0.40	Vpp
C Input Signal Voltage	C_{IN}	Amplitude of Burst Signal	0.10	0.15	0.20	Vpp
Analog RGB Input Signal	RGB_{IN}		0.6	0.7	0.8	Vpp
SYNC Input Signal	$SYNC_{IN}$		0.3	1.0	1.5	Vpp
Gamma 1 Control Voltage	VG1		1.5	-	3.5	V
Gamma 2 Control Voltage	VG2		1.5	-	3.8	V
Bright Control Voltage	BRIGHT		1.8	-	3.4	V

■ **ELECTRICAL CHARACTERISTICS (Ta=25°C,Vcc1=5V,Vcc2=5V,Vcc3=7V,V_{DD}=5V,V_{EE}1=-5V, V1=V4=V34=V45=2.5V,V21=V28=V60=0V,V13=2.9V,V14=2.7V,V38=1V,V39=3V)**

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX	UNIT
Operating Current 1	Icc1	Vcc1, No signal	-	33.5	45.0	mA
Operating Current 2	Icc2	Vcc2, No signal	-	6.5	8.4	mA
Operating Current 3	Icc3	Vcc3, No signal	-	5.8	8.7	mA
Operating Current 4	Icc4	$V_{DD,}$ No signal	-	4.7	6.6	mA
Operating Current 5	$I_{EE}1$	$V_{EE}1$, No signal	-11.8	-7.5	-	mA
Contrast Adjust Gain Variable Range	G_{CT1}	SG1 applied to V22, V27 and V31, SG10 applied to V46, SG2 applied to V60. Define the each amplitude (BLK-WHT) at V28=H and V34=0V, 2.5V, 5V as A,B and C. G_{ST1} = 20log(A / B) G_{ST2} = 20log(C / B) Measure Rout, Gout, Bout terminals.	-	-12.5	-9.0	dB
	G_{CT2}		1.0	2.5	-	dB
Sub Contrast Adjust Gain Variable Range	G_{SC1}	SG1 applied to V22 and V31, SG10 applied to V46, SG2 applied to V60. V28=H, V34=0V.Define the each amplitude(BLK-WHT) at V32=0V,2.5V, 5V,V36=0V, 2.5V, 5V as A,B, and C. G_{SC1} = 20log(A / B) G_{SC2} = 20log(C / B) Measure Rout, Gout, Bout terminals.	-	-2.5	-1.0	dB
	G_{SC2}		1.0	2.5	-	dB
Image Quality Adjust Variable Minimum Range	G_{PS}	SG3 (100KHz, 2.4MHz) applied to V24, V26, SG10 applied to V46, SG2 applied to V60. Define each gain of sin signal of frequency as A,B. When V21=0V G_P = A-B (at V21=0V)	-	0	-	dB
Image Quality Adjust Variable Maximum Range	G_{PM}	SG3 (100KHz, 2.4MHz) applied to V24, V26, SG10 applied to V46, SG2 applied to V60. Define each gain of sin signal of frequency as A,B. When V21=0V G_P= A-B (at V21=5V)	-	16.0	-	dB
Chroma Maximum Output (PAL)	V_{CMAX}	V14=0V, V13=V46=5V. SG6(4.43MHz) applied to V9, SG2 applied to V60. Measure the chroma amplitude on V18.	0.6	0.95	1.35	Vpp
ACC Characteristic (NTSC)	G_{A1}	V46=5V, SG6 (3.58MHz, 0dB, +6dB, -25dB) applied to V9, SG2 applied to V60. Measure the amplitude on V18 at 0dB,+6dB,-25dB. Define the each value as A,B, and C. G_{A1} = 20log(B / A) G_{A2} = 20log(C / A)	-	0	2.0	dB
	G_{A2}		-12.5	-7.5	-	dB

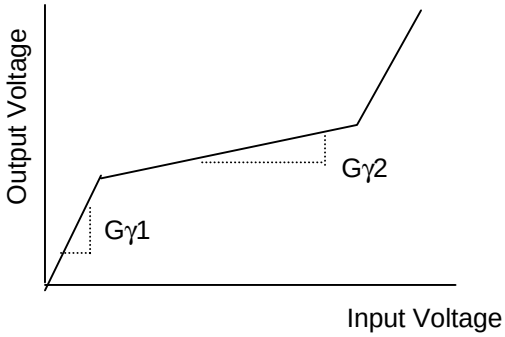
■ **ELECTRICAL CHARACTERISTICS (Ta=25°C,Vcc1=5V,Vcc2=5V,Vcc3=7V,V_{DD}=5V,V_{EE}1=-5V, V1=V4=V34=V45=2.5V,V21=V28=V60=0V,V13=2.9V,V14=2.7V,V38=1V,V39=3V)**

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX	UNIT
ACC Characteristic (PAL)	G_{A3}	V46=5V,V14=0V,SG6 (4.43MHz, 0dB, +6dB, -25dB) applied to V9, SG2 applied to V60. Measure the amplitude on V18 at 0dB, +6dB, -25dB. Define the each value as A, B, and C. G_{A3} = 20log(B / A) G_{A4} = 20log(C / A)	-	0	2.0	dB
	G_{A4}		-12.5	-7.5	-	dB
Color Control Gain Variable Range	G_{c1}	V46=5V, SG6 applied to V9, SG2 applied to V60. Define the each chroma amplitude at V14=0V,2.9V and 5V as A, B and C. G_{c1} = 20log(A / B) G_{c2} = 20log(C / B)	-	-30.0	-20.0	dB
	G_{c2}		0.7	2.7	-	dB
APC Capture Range (NTSC)	f_{A1}	SG6 (3.58MHz, 0dB) applied to V9, V46=5V, SG2 applied to V60. Adjust the BURST frequency until the voltage on V12 is 2V. Work out difference between the frequency at that time and 3.579545MHz. f_{A1} = when approach BURST frequency from low frequency. f_{A2} = when approach BURST frequency from high frequency	-	-2900	-700	Hz
	f_{A2}		+700	+1500	-	Hz
APC Capture Range (PAL)	f_{A3}	SG6 (4.43MHz, 0dB) applied to V9, V46=5V, Variable the BURST frequency until the voltage on V12 is 2V. Work out the difference between the frequency at that time and 4.433619MHz. f_{A3} = when approach BURST frequency from low frequency f_{A4} = when approach BURST frequency from high frequency	-	-2500	-600	Hz
	f_{A4}		+600	+1700	-	Hz
TINT Variable Range	θ_{T1}	SG6 applied to V9, SG2 applied to V60. Define the phase causing the maximum amplitude at V14=1.8V on Gout as A. Define the each phase causing the maximum amplitude at V14=2.7V, 3.6V on Gout as B and C. θ_{T1} = A-B θ_{T2} = C-B	-30	-60	-	deg
	θ_{T2}		-	+60	+30	deg
NTSC /PAL Switching Voltage	V_{TH}NP	Switch voltage of V14.	0.4	0.7	1.0	V
Color Killer Operating Input Level(NTSC)	V_{KIN1}	SG2 applied V60, SG6 (NTSC) applied to V9. Decrease the input amplitude until the killer is turned on, and measure the input attenuation.	-	-42	-37	dB
Color Killer Operating Input Level (PAL)	V_{KIN2}	SG2 applied V60, SG6 (PAL) applied to V9. Decrease the input amplitude until the killer is turned on, and measure the input attenuation.	-	-38	-32	dB

■ **ELECTRICAL CHARACTERISTICS (Ta=25°C,Vcc1=5V,Vcc2=5V,Vcc3=7V,V_{DD}=5V,V_{EE}1=-5V, V1=V4=V34=V45=2.5V,V21=V28=V60=0V,V13=2.9V,V14=2.7V,V38=1V,V39=3V)**

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX	UNIT
Output Black Level Voltage Difference among RGB	ΔVBRGB	SG2 applied to V60, V28=V34=V39=5V, V38=1.1V, SG1 (0.7Vpp) applied to V22, V27 and V31, SG10 applied to V46. Define the non-inverting side of Rout, Gout, Bout as VRB, VGB, and VBB, the invert side of them as VRBI, VGBI, and VBBI. ΔVBRGB =VRB-VGB, VBB-VGB, =VRBI-VGBI, VBBI-VGBI	-150	0	+150	mV
INT-EXT Output Black Level Voltage Difference	ΔVBIE	SG2 applied to V60, V28=5V, SG1 (0.7Vpp) applied to V22,V27,V31, SG10 applied to V46. Define the non-inverting side of Rout, Gout, Bout as VRB, VGB, and VBB, the invert side of them as VRBI, VGBI, and VBBI, V28=0V, SG4 applied to V26, define the non-inverting side of Rout, Gout, Bout as VRB(Y), VGB(Y), and VBB(Y), the invert side of VRBI(Y), VGBI(Y), and VBBI(Y). VBIE=VRB-VRBI(Y),VGB-VGBI, =VBB-VBB(Y),VRBI-VRBI(Y), =VGBI-VGBI(Y),VBBI-VBBI(Y)	-150	0	+150	mV
Gain Difference Between Invert And Non-invert	ΔGINV	V28=5V, SG1 (0.7Vpp) applied to V22, V27, V31, SG2 applied to V60, SG10 applied to V46. Measure the amplitude (BLK-WHT) of Rout, Gout, Bout. Define the non-inverting side of VRG, VGG, VBG, the invert side of VRGI, VGGI, VBGI. ΔGINV=20log(VRGI/VRG) =20log(VGGI/VGG) =20log(VBGI/VBG) ΔVRG=20log(VRG/VGG) =20log(VGG/VBG) =20log(VBG/VRG)	-0.6	0	+0.6	dB
Gain Difference Among RGB	ΔVRGB					
FRP Input Threshold Voltage	V_{TH}FRP	V28=5V, SG2 applied to V60, SG1 applied to V27. Increase V46 until the signal on Gout invert.	1.2	1.5	1.8	V
Interface Frequency Characteristic	f_{INT}	V28=5V, SG2 applied to V60, SG10 applied to V46, SG1 (100kHz) applied to V27. Adjust frequency of input signal. Define the input frequency of the sine wave amplitude of the non-invert signal on Gout increase the frequency until attenuate by 3dB from the amplitude at the 100kHz.	4.5	7	-	MHz
EXTRGB Input Threshold Voltage	V_{TH}EXH	Switching Voltage of V28. V_{TH}EXH=ON level voltage	3.3	-	-	V
	V_{TH}EXL	V_{TH}EXH=OFF level voltage	-	-	1.6	V

■ **ELECTRICAL CHARACTERISTICS (Ta=25°C,Vcc1=5V,Vcc2=5V,Vcc3=7V,V_{DD}=5V,V_{EE}1=-5V, V1=V4=V34=V45=2.5V,V21=V28=V60=0V,V13=2.9V,V14=2.7V,V38=1V,V39=3V)**

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX	UNIT
Gamma Characteristic	Gγ1	V28=5V,SG2 applied to V60. SG10 applied V46. SG7 applied to V22, V27 and V31. Measure the Gain of slope on Rout, Gout, and B_{OUT} , at V38=1.8V,V39=3.0V 	17.0	23.0	29.0	dB
	Gγ2		4.0	9.0	14.0	dB
AFC Lock Range	$\Delta f_{HL}1$	V46=5V, V28=5V, SG2 applied to V60. Define frequency of miss lock SYNC at valuable frequency of SG2 when AFC is lock. $\Delta f_{HL}1$=miss lock to high frequency $\Delta f_{HL}2$=miss lock to low frequency	-	+700	-	Hz
	$\Delta f_{HL}2$		-	-1000	-	Hz
AFC Capture Range	$\Delta f_{HP}1$	V46=5V, V28=5V, SG2 applied to V60. Define frequency of miss lock SYNC at valuable frequency of SG2 when AFC is miss lock. $\Delta f_{HP}1$=capture from high frequency $\Delta f_{HP}2$=capture from low frequency	-	+700	-	Hz
	$\Delta f_{HP}2$		-	-1000	-	Hz
AFC Free-run Frequency	f_{OH}	V46=5V, V60 is non-input. Measure the output frequency on V63.	15.2	15.7	16.2	kHz
Horizontal Output Pulse Width	P_WHD	V46=5V. Output pulse width on V63	3.5	3.9	4.3	uS
Horizontal Output Delay	T_PDH	V46=5V. Delay time of between before external filter and V63.	0.70	0.86	1.02	uS
Horizontal Output Saturation Level	V_OLH	V46=5V. Low level of output on V63	-	0.1	0.3	V
Vertical Output Pulse Width	P_WVD	Output pulse width on V62	3.5	4.0	4.5	H
Vertical Output Delay	T_PVD		0.45	0.65	0.85	H

(Point1) When suspected SYNC input to NJW1300B, necessary on 5H(1H:horizontal term, about 63.5us) of plush width of suspected SYNC.

■ **ELECTRICAL CHARACTERISTICS (Ta=25°C,Vcc1=5V,Vcc2=5V,Vcc3=7V,V_{DD}=5V,V_{EE}1=-5V, V1=V4=V34=V45=2.5V,V21=V28=V60=0V,V13=2.9V,V14=2.7V,V38=1V,V39=3V)**

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX	UNIT
Crosstalk Among RGB	CTRGB1	V28=5V,SG5 (1MHz, 700mVpp) applied to V22.V21, V27, V31=GND, V49=1.3V. Measure the amplitude of 1MHz component on Rout, Gout and Bout. Calculate the amplitude ratio of Rout and Gout to Bout.	-	-50	-40	dB
	CTRGB2	V28=5V,SG5 (1MHz, 700mVpp) applied to V27.V21, V23, V31=GND, V49=2.2V. Measure the amplitude of 1MHz component on Rout, Gout and Bout. Calculate the amplitude ratio of Rout and Bout to Gout.	-	-50	-40	dB
	CTRGB3	V28=5V,SG5 (1MHz, 700mVpp) applied to V31.V21, V23, V27=GND, V49=1.3V. Measure the amplitude of 1MHz component on Rout, Gout and Bout. Calculate the amplitude ratio of Rout to Gout and Bout.	-	-50	-40	dB
Crosstalk 1 Between SW (EXT1→INT)	CTE1IR	SG5 (1MHz, 700mVpp) applied to V31, SG2 applied to V60.V46=5V, V21, V26=GND, V49=1.3V.Measure the amplitude of 1MHz component on Rout. Calculate the amplitude ratio of V28=0V,5V.	-	-50	-35	dB
	CTE1IG	SG5 (1MHz, 700mVpp) applied to V27, SG2 applied to V60.V46=5V V21, V26=GND, V49=2.2V.Measure the amplitude of 1MHz component on Gout. Calculate the amplitude ratio of V28=0V,5V.	-	-50	-35	dB
	CTE1IB	SG5 (1MHz, 700mVpp) applied to V22, SG2 applied to V60.V46=5V V21, V26=GND, V49=1.3V.Measure the amplitude of 1MHz component on Bout. Calculate the amplitude ratio of V28=0V,5V.	-	-50	-35	dB
Crosstalk 5 Between SW (INT→EXT1)	CTIE1R	SG5 (1MHz, 350mVpp) applied to V26, SG2 applied to V60.V46=5V V21, V31=GND, V49=2.2V.Measure the amplitude of 1MHz component on Rout. Calculate the amplitude ratio of V28=0V,5V.	-	-50	-35	dB
	CTIE1G	SG5 (1MHz, 350mVpp) applied to V26, SG2 applied to V60.V46=5V V21, V27=GND, V49=2.2V.Measure the amplitude of 1MHz component on Gout. Calculate the amplitude ratio of V28=0V,5V.	-	-50	-35	dB
	CTIE1B	SG5 (1MHz, 700mVpp) applied to V26, SG2 applied to V60.V46=5V V21, V23=GND, V49=2.2V.Measure the amplitude of 1MHz component on Bout. Calculate the amplitude ratio of V28=0V,5V.	-	-50	-35	dB

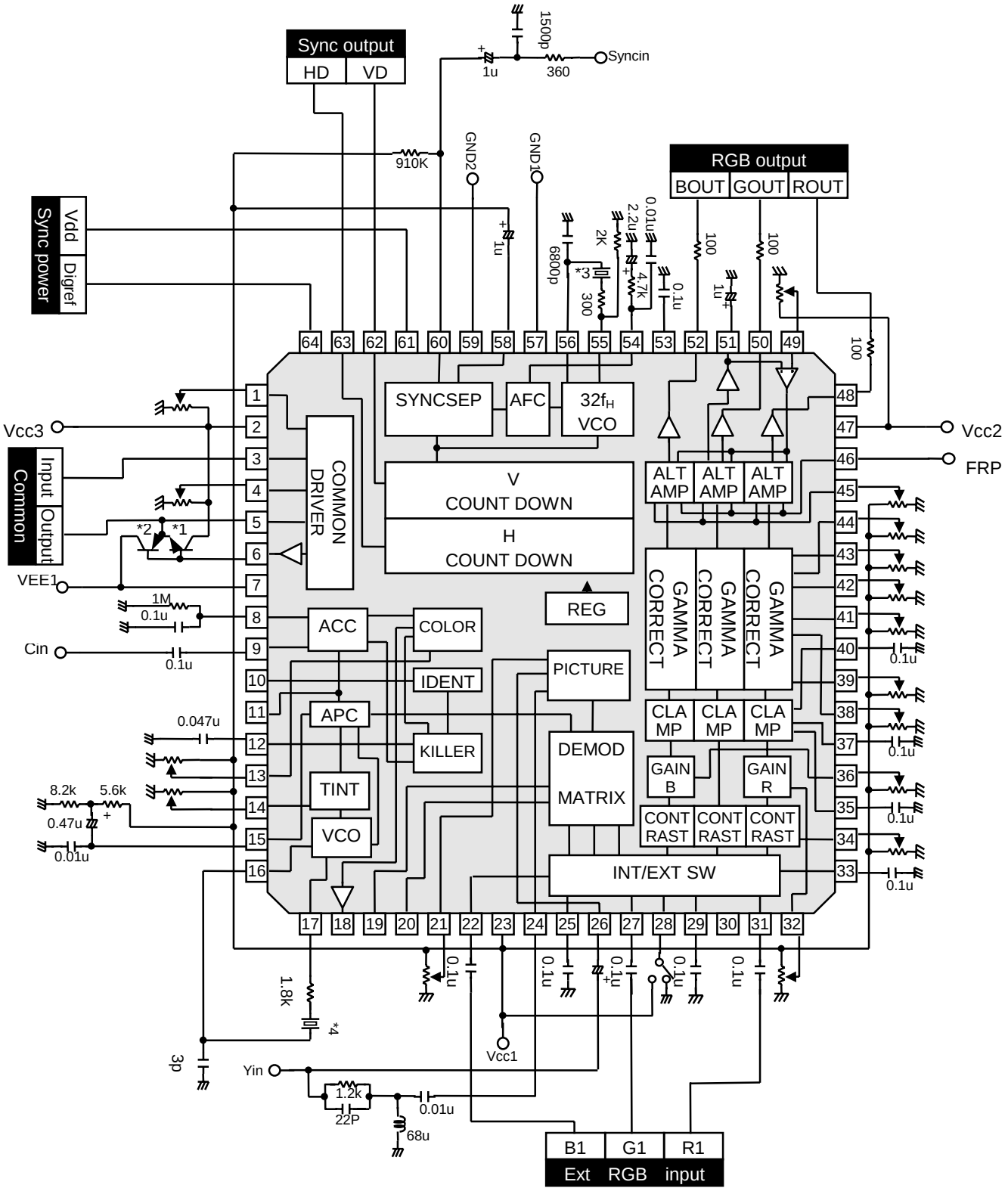
(Point2) Investigation Crosstalk level when design for depend to application.

■ **ELECTRICAL CHARACTERISTICS (Ta=25°C,Vcc1=5V,Vcc2=5V,Vcc3=7V,V_{DD}=5V,V_{EE}1=-5V, V1=V4=V34=V45=2.5V,V21=V28=V60=0V,V13=2.9V,V14=2.7V,V38=1V,V39=3V)**

PARAMETERS	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX	UNIT
VCOM Output Slew Rate	SRVCOM	SG9 applied to V3. Measure the output on V5.	4.0	9.0	-	V/uS
VCOM Center Voltage	VCVCOM	SG9 applied to V3. Measure the output on V5.	-	1.2	-	V
VCOM Amplitude	VAVCOM	SG9 applied to V3. Measure the output on V5.	-	6.5	-	V_{P-P}
Delay Between Y-C	ΔTdYC		-	400	-	nS

■ APPLICATION CIRCUIT (NTSC)

(V_{CC}1=5V,V_{CC}2=5V,V_{CC}3=7V,V_{DD}=5V,V_{EE1}=-5V,GND=0V,DIGREF=0V)



*1:2SC2120Y,2SC1959Y

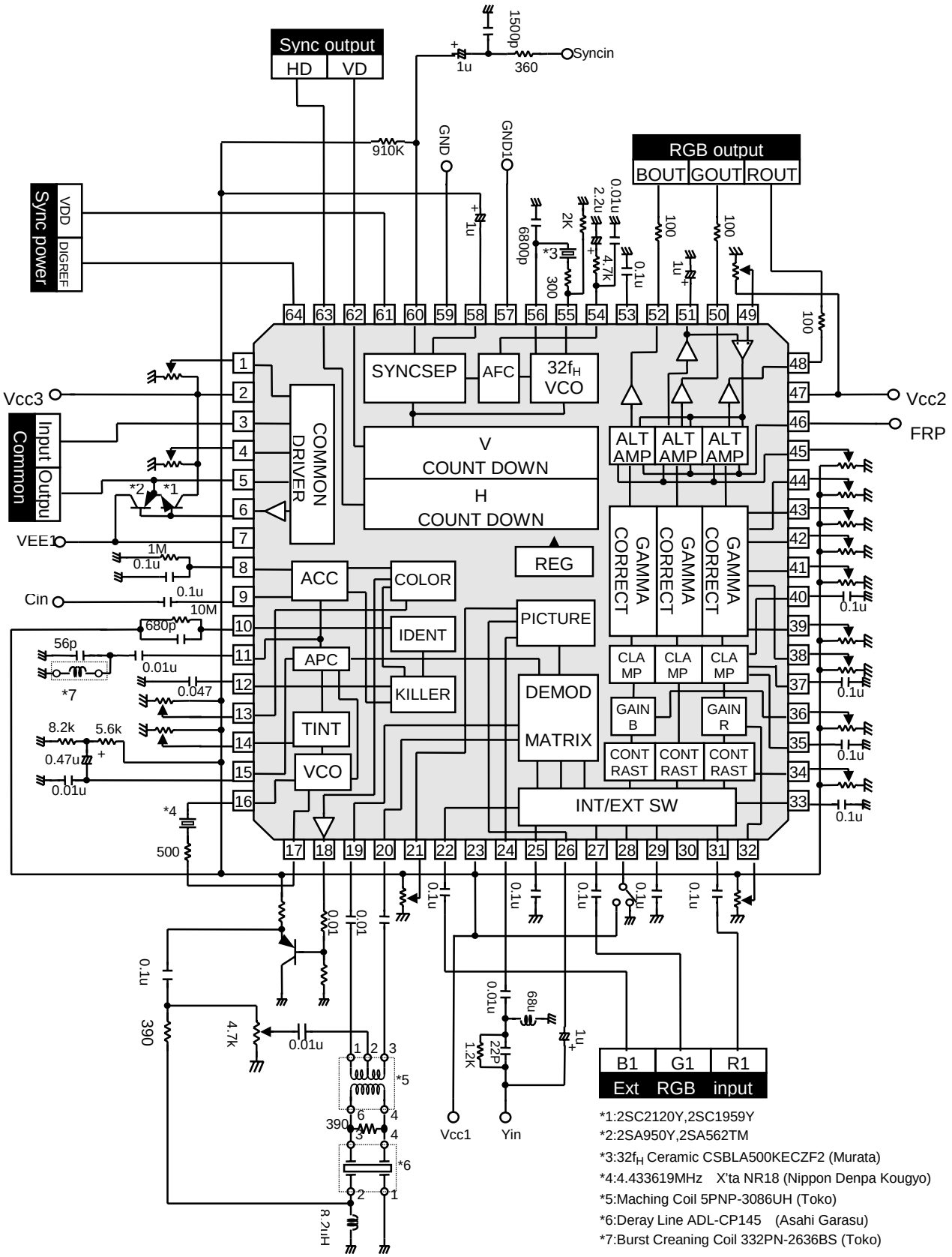
*2:2SA950Y,2SA562TM

*3:32f_H Ceramic CSBLA503KECZF2 (Murata)

*4:3.579545MHz X'tal NR18 (Nippon Denpa Kougyo)

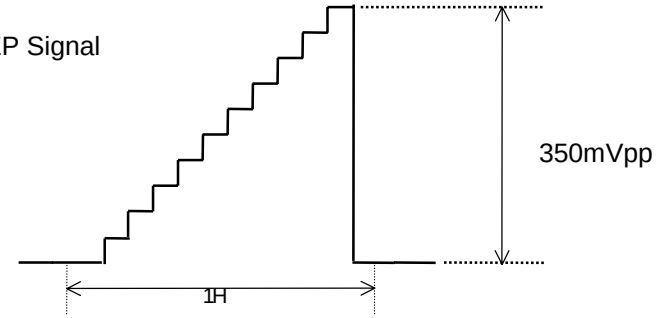
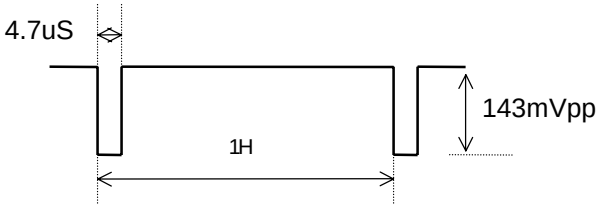
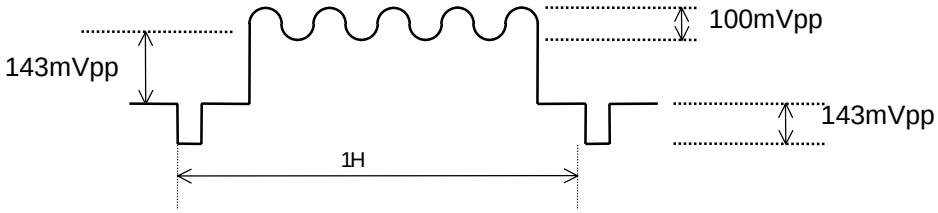
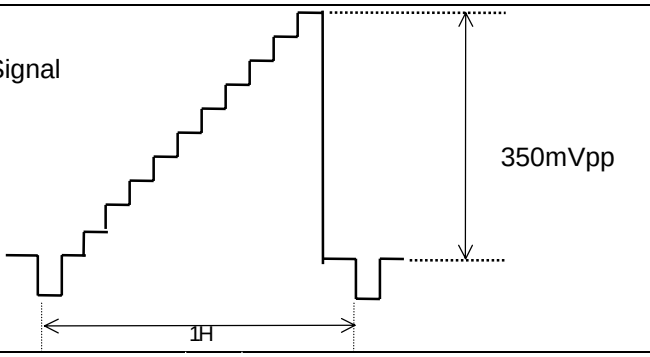
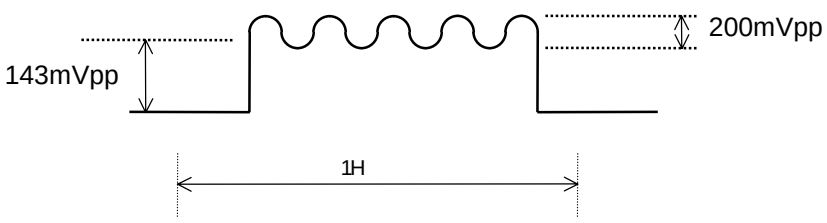
■ APPLICATION CIRCUIT (PAL)

(V_{CC}1=5V,V_{CC}2=5V,V_{CC}3=7V,V_{DD}=5V,V_{EE1}=-5V,GND=0V,DIGREF=0V)

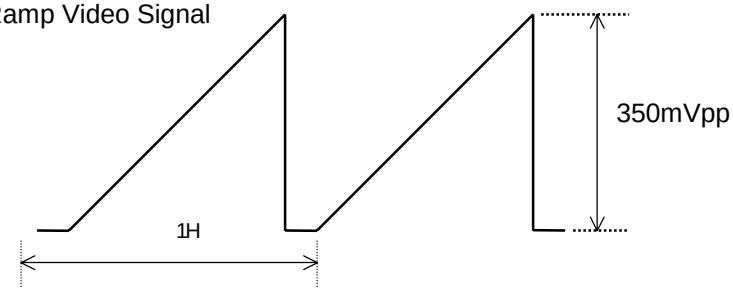
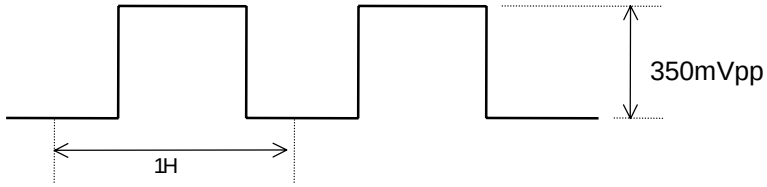
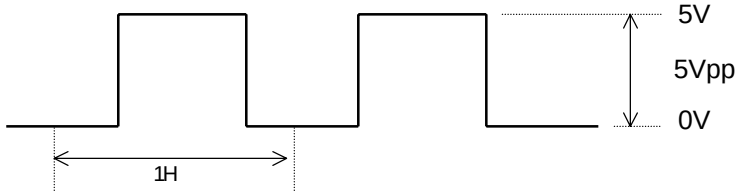
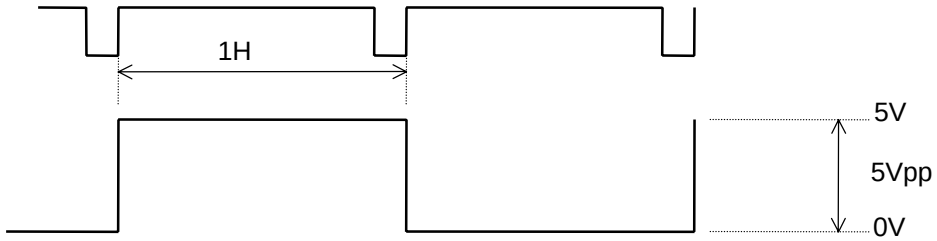


*1:2SC2120Y,2SC1959Y
*2:2SA950Y,2SA562TM
*3:32f_H Ceramic CSBLA500KECZF2 (Murata)
*4:4.433619MHz X'ta NR18 (Nippon Denpa Kougyo)
*5:Maching Coil 5PNP-3086UH (Toko)
*6:Deray Line ADL-CP145 (Asahi Garasu)
*7:Burst Creaning Coil 332PN-2636BS (Toko)

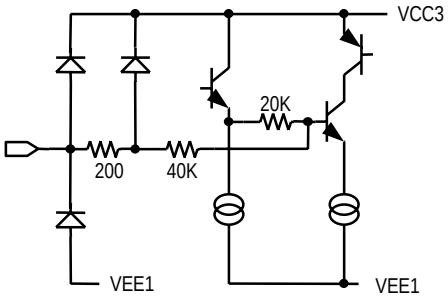
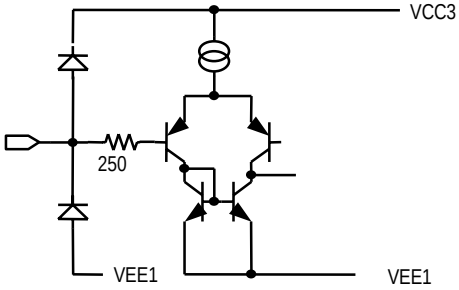
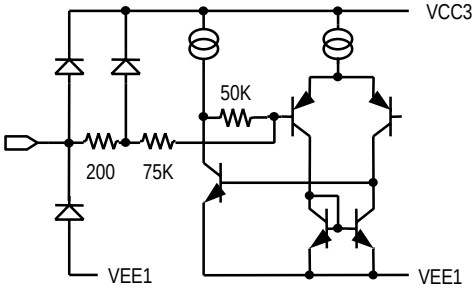
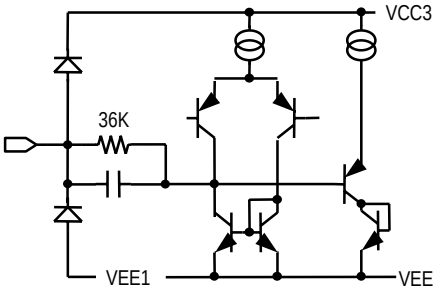
■ **INPUT SIGNAL**

SG1	No sync 10STEP Signal 
SG2	Composite Y Signal with Sync 
SG3	Sine Video Signal with Sync 
SG4	10STEP Video Signal 
SG5	No Sync Sine Video Signal 

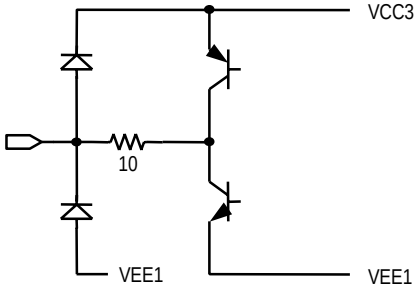
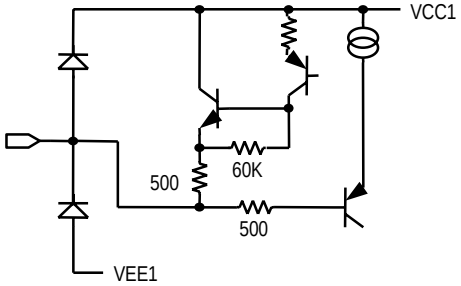
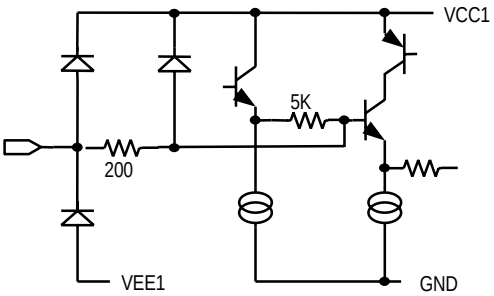
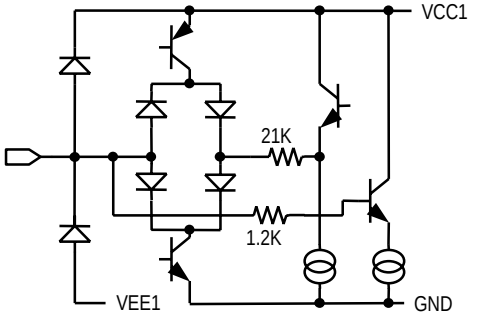
■ **INPUT SIGNAL**

SG6	C Signal  Burst Amplitude=150mVpp Chroma Amplitude=150mVpp
SG7	No Sync Ramp Video Signal 
SG8	Video Signal of Turn ON, Turn OFF Under 50nS 
SG9	Turn ON, Turn OFF Under 50nS 
SG10	 FRP Signal of Non-inverting Every 1H

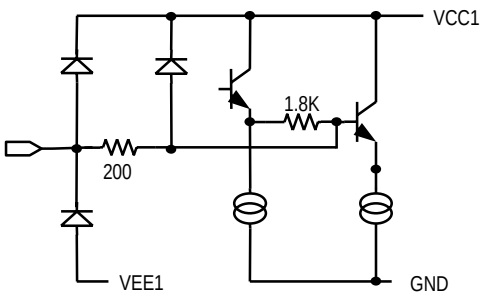
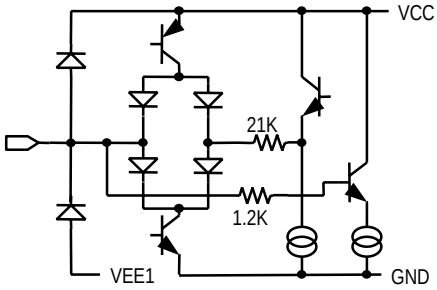
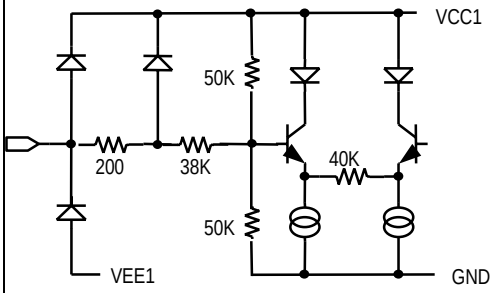
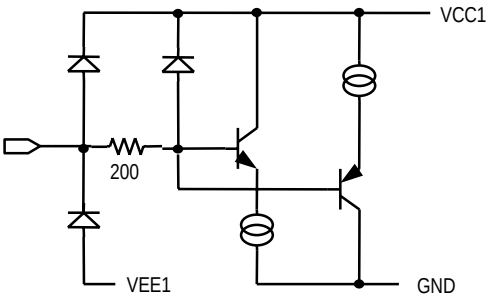
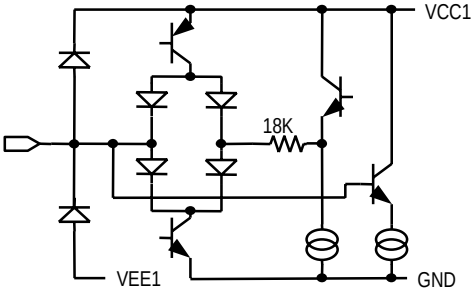
■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
1	VCOM AMP	Adjust the VCOM signal level. Adjustable range:VCOM=6.5V±2.0V	
2	VCC3	Supply to VCOM voltage. Connect to +7V supply.	
3	VCOM IN	VCOM 5Vpp signal input.	
4	VCOM CENT	Adjust the center of VCOM voltage. Adjustable range: VCOMCFNT=6.5V±2.0V	
5	VCOM FB	VCOM signal feedback. Input the feedback signal (VCOM OUT) through the discrete transistor buffer.	

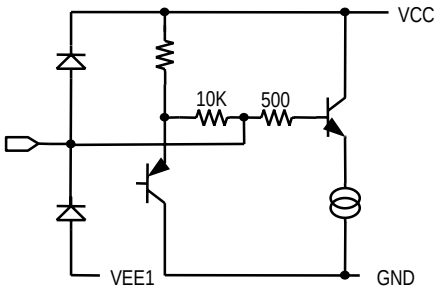
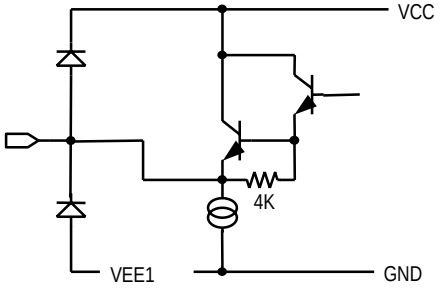
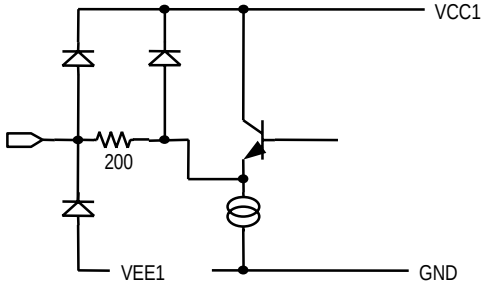
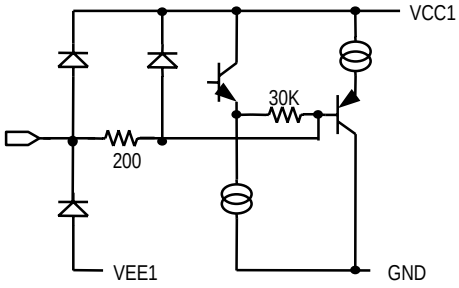
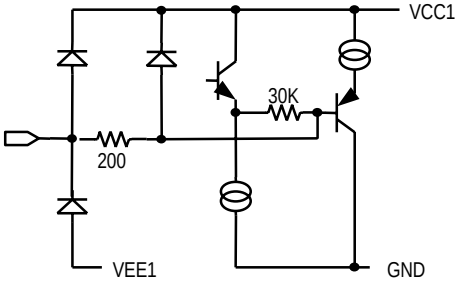
■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
6	VCOM OUT	VCOM signal output. Drive the common by connect discrete transistor.	
7	VEE1	Connect –5V supply at lowest voltage.	
8	ACC DET	Connect to the ACC filter.	
9	CIN	Chroma signal input, 150mVpp.	
10	IDENT	PAL mode:Connect to the IDENT filter. NTSC mode: OPEN	

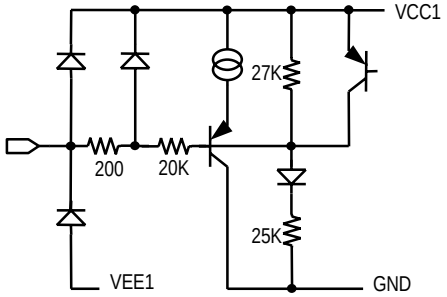
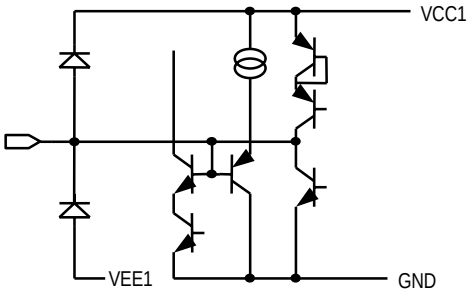
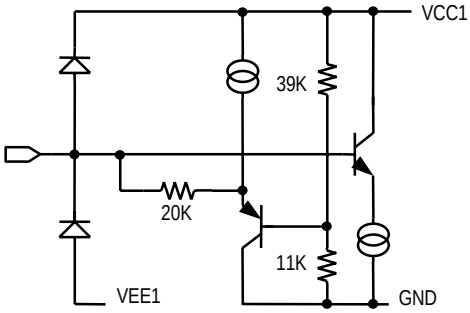
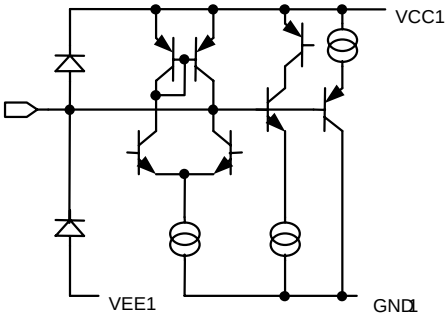
■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
11	CLEANING	PAL mode: Connect to the burst cleaning coil NTSC mode: OPEN	
12	KILLER	Connect to the collor filter.	
13	COLOR	Adjust color. Adjust the tint color by input voltage.	
14	TINT	In case of NTSC mode, adjust the tint color. This terminal also switches between the NTSC mode and PAL mode. In case of the PAL mode, select this terminal is connected to the GND.	
15	APC	Connect to the APC detector fillter.	

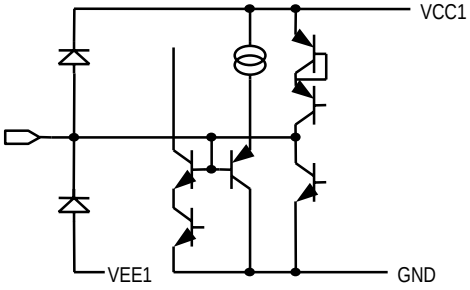
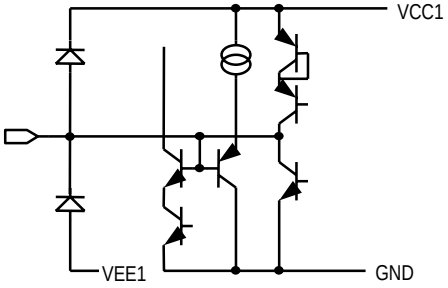
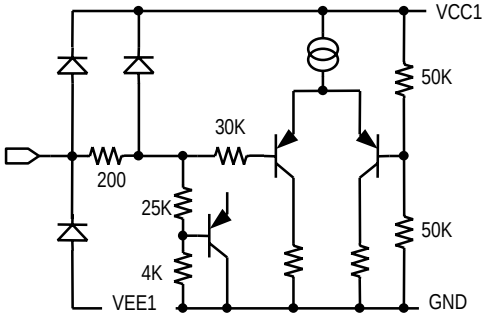
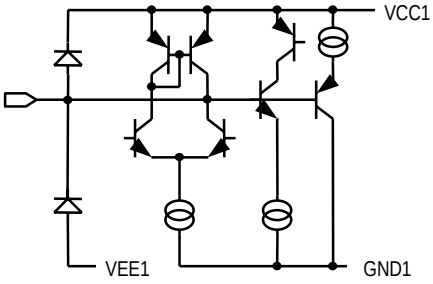
■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
16	VCXO1	VCXO input.	
17	VCXO2	VCXO output.	
18	CHROMA OUT	Outputs the chrominance signal whose color gain has been adjusted and whose burst signal has been removed.	
19	RYIN	Input the chrominance signal for the PAL demodulate circuit. NTSC mode: OPEN	
20	BYIN	Input the chrominance signal for the PAL demodulate circuit. NTSC mode: OPEN	

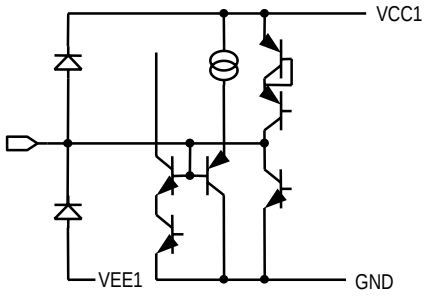
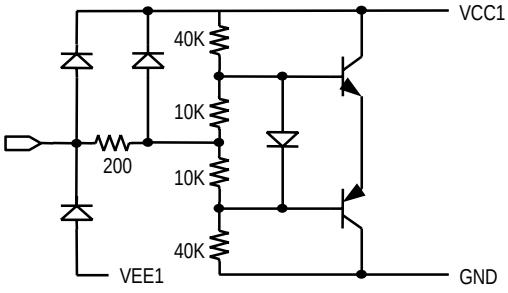
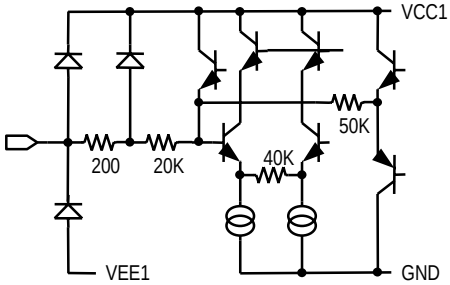
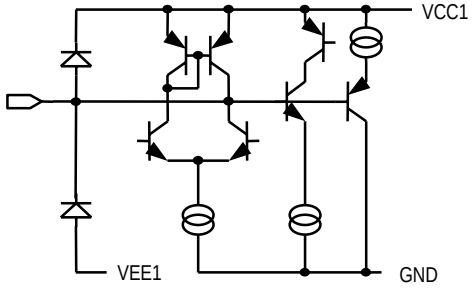
■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
21	PICTURE	Adjust the frequency of Y-signal for revise outline of Y-signal. Emphasize outline, when voltage increase.	
22	EXTINB1	External B(RGB) signal input, 700mVpp and source color signal.	
23	VCC1	Supply voltage, 5V.	
24	YINH	Y-signal input of high frequency division.	
25	CLAMPB	Connect to the CLAMP capacitor.	

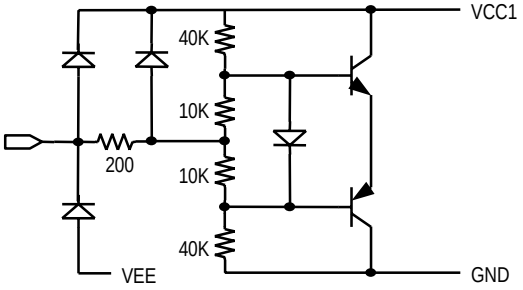
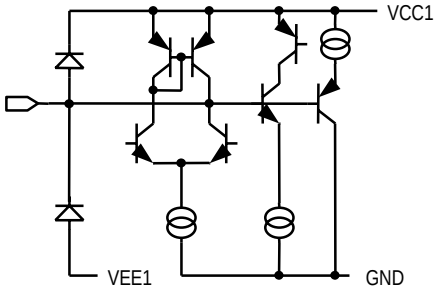
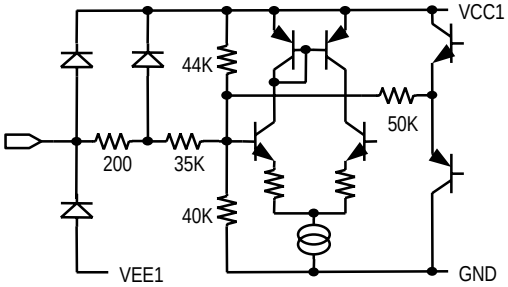
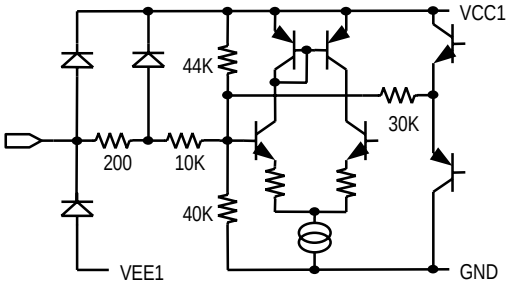
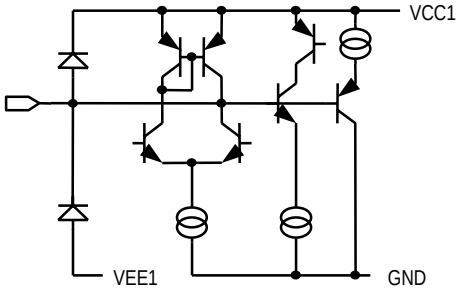
■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
26	YIN	Y-signal input, 350mVpp.	
27	EXTING1	External G(RGB) signal input, 700mVpp and source color signal.	
28	SW1	Select the internal/external signal. SW=Low: Internal signal mode =High: External signal mode	
29	CLAMPG	Connect to the CLAMP capacitor.	
30	NC		

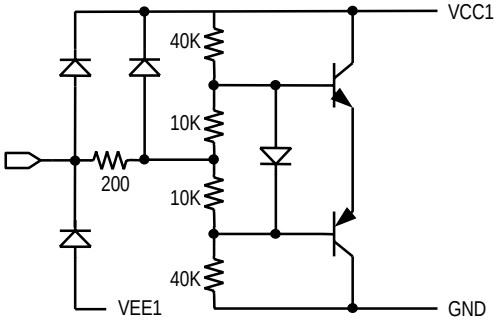
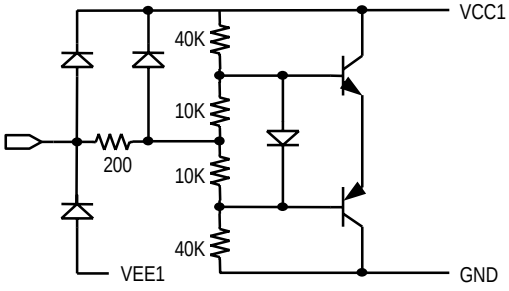
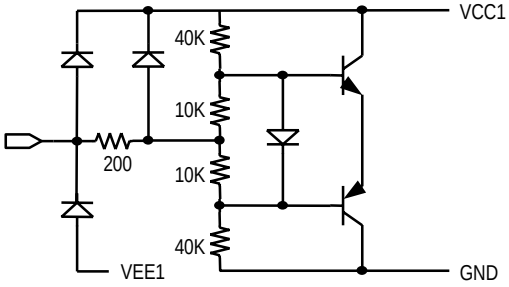
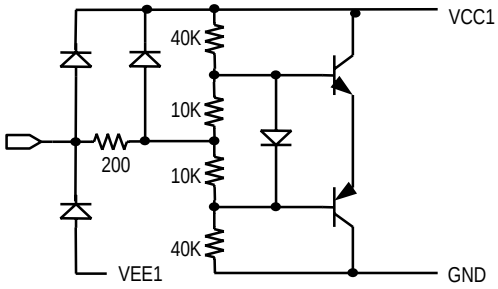
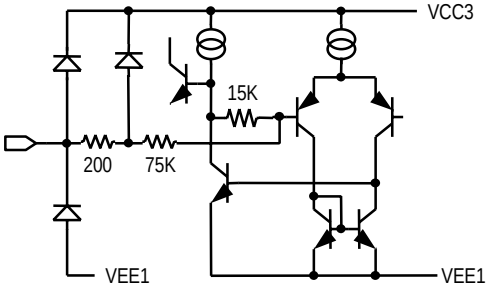
■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
31	EXTINR1	External R(RGB) signal input, 700mVpp and source color signal.	
32	GAINR	Adjust the gain of R-signal.	
33	CLAMPR	Connact to the CLAMP capacitor.	
34	CONTRAST	Adjust the gain of RGB signal. Adjust the RGB signal range by CONTRAST voltage. Pre-set and controlled RGB togther.	
35	GA CLAMPR	Connect to the CLAMP capacitor for CLAMP pedestal level of R signal. Leakless capacitor for use.	

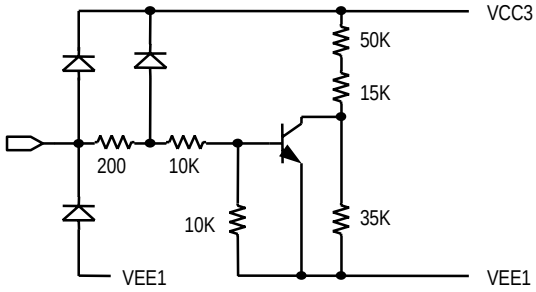
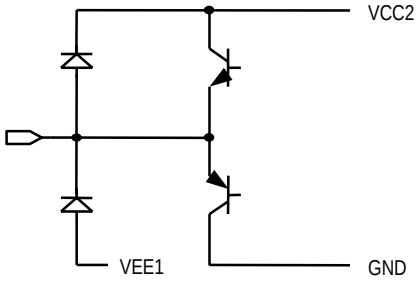
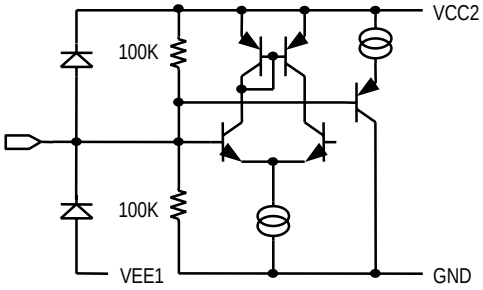
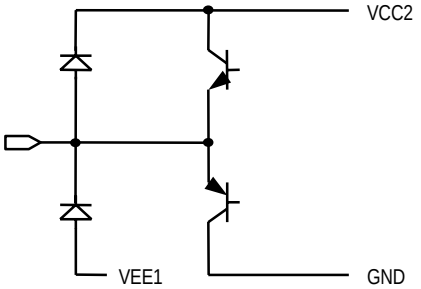
■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
36	GAINB	Adjust the gain of B-signal.	
37	GA CLAMPG	Connect to the CLAMP capacitor for CLAMP pedestal level of G signal. Leakless capacitor for use.	
38	VG1	Adjust the first point of low side in RGB γ characteristics. Pre-set and controlled RGB together.	
39	VG2	Adjust the secound point of high side in RGB γ characteristics. Pre-set and controlled RGB together.	
40	GA CLAMPB	Connect to the CLAMP capacitor for CLAMP pedestal level of B signal. Leakless capacitor for use.	

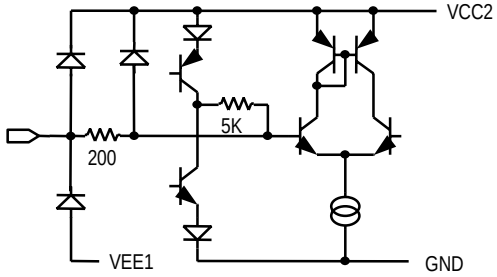
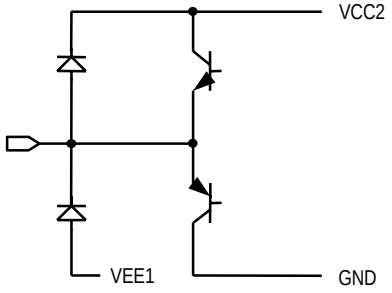
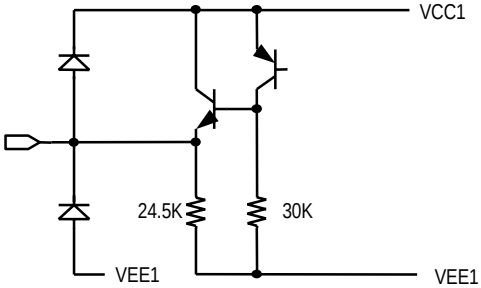
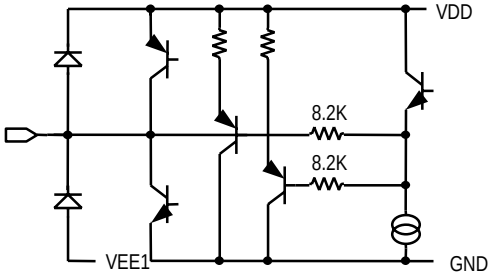
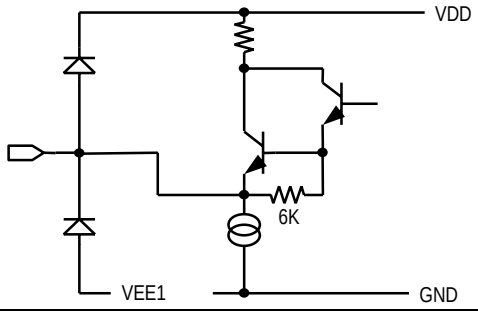
■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
41	SUB VG2R	Adjust the secound point of high side in R γ characteristics. Pre-set and not controlled RGB together, adjust the R signal only.	
42	SUB VG2B	Adjust the secound point of high side in B γ characteristics. Pre-set and not controlled RGB together, adjust the B signal only.	
43	SUB VG1R	Adjust the first point of low side in R γ characteristics. Pre-set and not controlled RGB together, adjust the R signal only.	
44	SUB VG1B	Adjust the first point of low side in B γ characteristics. Pre-set and not controlled RGB together, adjust the B signal only.	
45	BRIGHT	Adjust the bright of RGB signal. Pre-set and controlled black level of RGB togeter.	

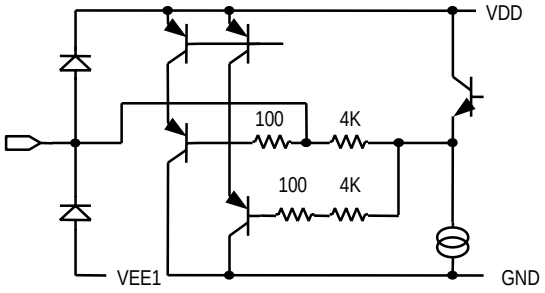
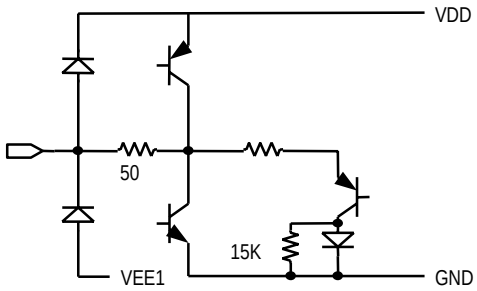
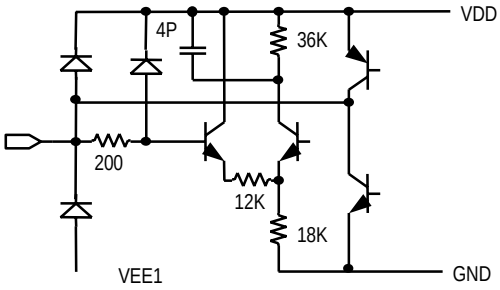
■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
46	FRP	Inverte pulth input for RGB output signal, 5Vpp.	
47	VCC2	Supply voltage for RGB output, 5V.	
48	ROUT	R-signal output.	
49	VCENTER	Input the center voltage of RGB output signal. Pre-set to 1/2 Vcc2	
50	GOUT	G-signal output.	

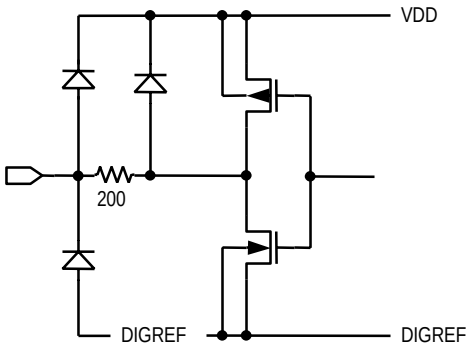
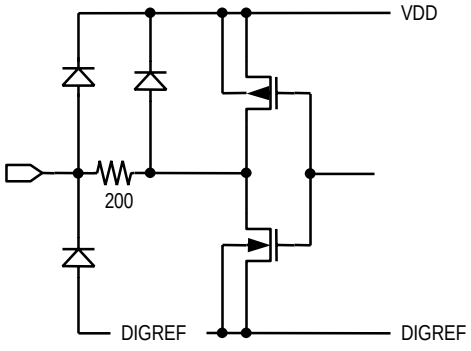
■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
51	CDET	Connect to the capacitor for demodulate of G signal center voltage. Leakless capacitor for use.	
52	BOUT	B-signal output.	
53	REGOUT	Regurator output, connect to decupling capacitor. Internal use only.	
54	LPF	Connect to the APC filer.	
55	VCOOUT	$32f_H$VCO output.	

■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
56	VCOIN	$32f_H$VCO output.	
57	GND1	Connect to GND.	
58	VS	Connect to the capacitor with Integrate vartical-synchronous -signal	
59	GND2	Connect to GND.	
60	SYNCIN	Synchronous signal input, synchronize with RGB OUT. Input level is 2Vpp maximum, and can input include Y-signal and composite video signal.	

■ **EQUIVALENT CIRCUIT**

PIN No.	SYMBOL	FUNCTION	INSIDE EQUIVALENT CIRCUIT
61	VDD	Supply voltage for suncronous, 5V.	
62	VD	Vertical synchronous signal output, CMOS output.	
63	HD	Horizontal synchronous signal output, CMOS output.	
64	DIGREF	Connect to GND.	

MEMO