COLOR TFT SIGNAL PROCESSOR RGB INTERFACE IC

■ GENERAL DESCRIPTION

The **NJM2517** is a RGB Interface for color TFT signal processor.
It contains all function, like as RGB interface, synchronous separate circuit, side-black control circuit, and common pole driver, required by color TFT signal processing.

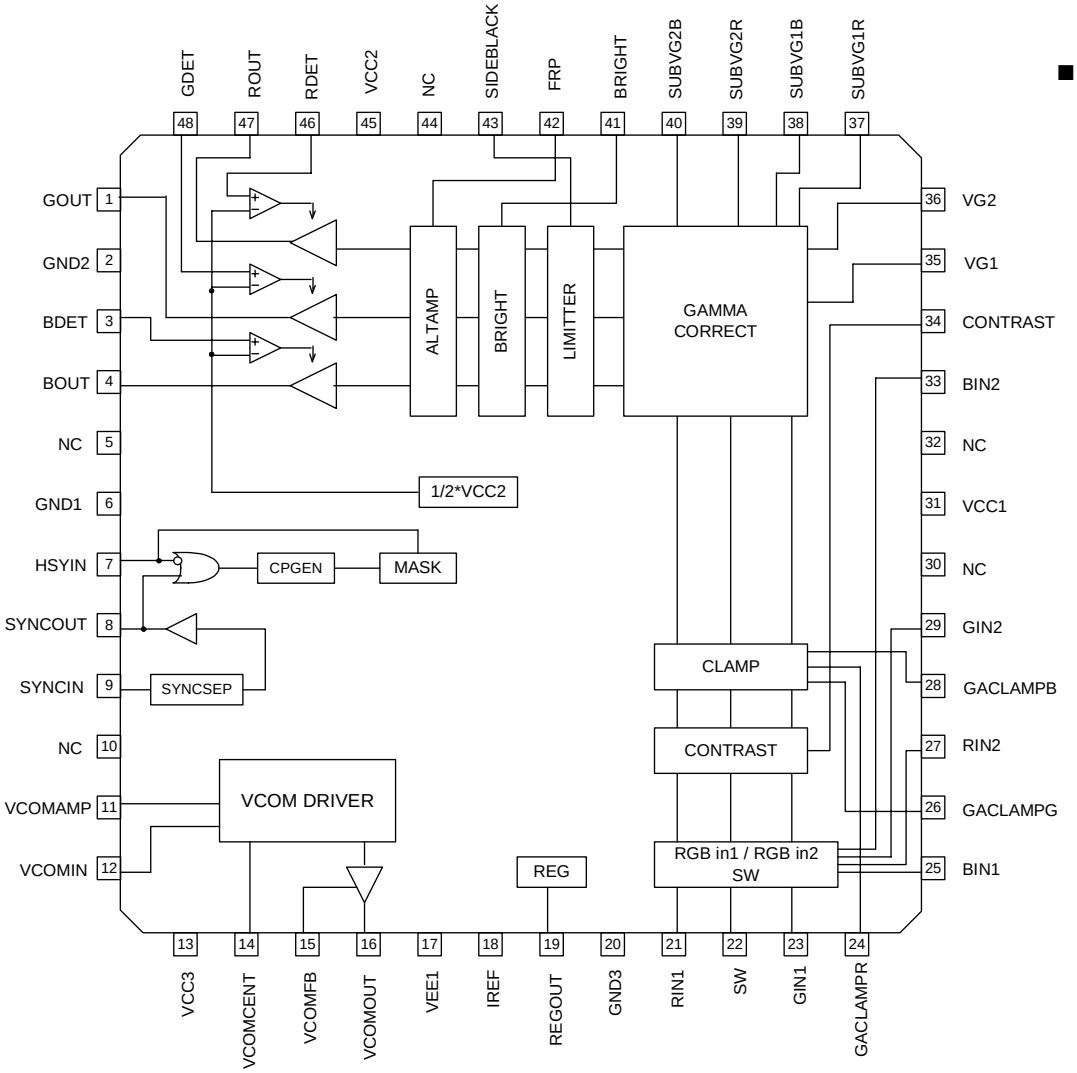
■ PACKAGE OUTLINE

NJM2517FR2

■ FEATURES

- NTSC/PAL matching
- Internal two systems input for analog RGB
- Internal synchronous separate circuit
- Internal black level insertion circuit (Use for aspect ratio change)
- Internal Gamma 2-point correction circuit
- Internal Color TFT Common Pole Driver
- Bipolar technology
- Package Outline QFP48-R2(7.0X7.0mm 0.5mmpitch)

■ BLOCK DIAGRAM



■ PIN CONFIGURATION

1 . GOUT	25.BIN 1
2 . GND2	26.GACLAMPG
3 . BDET	27.RIN 2
4 . BOUT	28.GACLAMPB
5 . NC	29.GIN 2
6 . GND1	30.NC
7 . HSYIN	31.VCC1
8 . SYNCOUT	32.NC
9 . SYNCIN	33.BIN 2
10.NC	34.CONTRAST
11.VCOMAMP	35.VG1
12.VCOMIN	36.VG2
13.VCC3	37.SUBVG1R
14.VCOMCENT	38.SUBVG1B
15.VCOMFB	39.SUBVG2R
16.VCOMOUT	40.SUBVG2B
17.VEE1	41.BRIGHT
18.IREF	42.FRP
19.REGOUT	43.SIDEBLACK
20.GND3	44.NC
21.RIN 1	45.VCC2
22.SW	46.RDET
23.GIN 1	47.ROUT
24.GACLAMPR	48.GDET

■ **ABSOLUTE MAXIMUM RATINGS** (Ta=25°C)

PARAMETERS	SYMBOL	RATINGS	UNIT
Supply Voltage 1	$V_{CC}1$ - GND	8.0	V
Supply Voltage 2	$V_{CC}2$ - GND	8.0	V
Supply Voltage 3	$V_{CC}3$ - $V_{EE}1$	15.0	V
Supply Voltage 4	$V_{EE}1$ - GND	-7.0	V
Power Dissipation	P_D	1000	mW
Each Adjustment Terminal	V_{IN}	$V_{CC}1$	V
Sync Out Voltage	V_{SD}	$V_{EE}1$+Vcc3	V
Analog RGB Input Signal	RGB_{IN}	$V_{CC}1$	V
FRP Input Signal Voltage	FRP_{IN}	$V_{CC}1$	V
SYNC Input Voltage	$SYNC_{IN}$	3.0	V_{P-P}
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-40 to +125	°C

*At on a board(117.0x84.0x0.8mm)

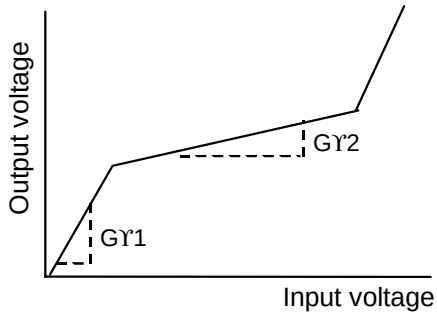
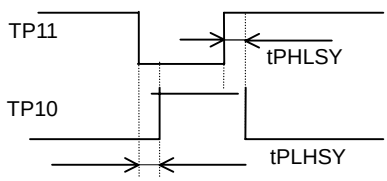
■ **RECOMMENDED OPERATING CONDITION** (Ta=25°C)

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	$V_{CC}1$	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
Analog RGB Input Signal	RGB_{IN}		0.6	0.7	0.8	V_{P-P}
SYNC Input Signal	$SYNC_{IN}$	C.CYNC Sync Tip to Pedestal	0.3	1.0	1.5	V_{P-P}
HSY Input Signal	HSY_{IN}		2	-	5	V_{P-P}
Contrast Adjust Voltage	CONTRAST		1.5	-	2.8	V
Gamma 1 Adjust Voltage	VG1		1.5	-	3.5	V
Gamma 2 Adjust Voltage	VG2		1.5	-	3.8	V
Sub Gamma 1 Adjust Voltage	SUBVG1R, B		0	-	5	V
Sub Gamma 2 Adjust Voltage	SUBVG2R, B		0	-	5	V
Bright Adjust Voltage	BRIGHT		1.9	-	3.6	V
VCOM Amp Adjust Voltage	VCOMAMP		0	-	5	V
VCOM Center Adjust Voltage	VCOMCENT		0	-	5	V

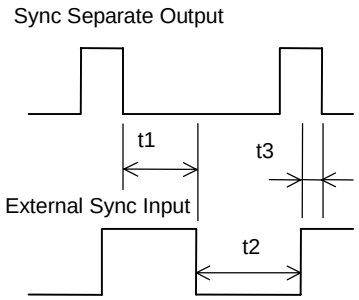
■ **ELECTRICAL CHARACTERISTICS** (Ta=25°C,V_{CC}1=5V, V_{CC}2=5V,V_{CC}3=7V, V_{EE}1=-5V,)

PARAMETER	SYMBOL	TEST CONDITION (TP=IC Pin No.)	MIN.	TYP.	MAX.	UNIT
Operating Current 1	$I_{CC}1$	V_{CC}1, No signal	-	27.0	36.0	mA
Operating Current 2	$I_{CC}2$	V_{CC}2, No signal	-	14.5	20.0	mA
Operating Current 3	$I_{CC}3$	V_{CC}3, No signal,	-	5.8	8.7	mA
Operating Current 4	$I_{EE}1$	V_{EE}1, No Signal,	-11.8	-7.5	-	mA
Contrast Adjust Gain Variable Range	$G_{CT}1$	SG1 applied to TP21, TP23 and TP25. SG7 applied to TP42, SG8 applied to TP7, SG2 applied to TP9, define the each amplitude (BLK-WHT) at TP22=0V, and TP34=0V, 2.5V, 5V as V1, V2 and V3. Then measure the each output of the non-inverting G_{CT1}=20LOG(V1/V2) G_{CT2}=20LOG(V3/V2) Measure points are Rout, Gout, Bout.	-	-12.0	-9.0	dB
	$G_{CT}2$		1.0	2.5	-	
Output Level Voltage Difference among RGB	ΔVBRGB	SG2 applied to TP9, SG8 applied to TP7, TP22=0V, SG1 (700mVpp) applied to TP21, TP23,TP25, SG7 applied to TP42. VRB, VGB, and VBB define the non-invert black level of TP47,TP1, TP4. VRBI, VGBI, and VBBI define the invert black level of them. ΔVBRGB=VRB-VGB,VBB-VGB =VRBI-VGBI, VBBI-VGBI	-150	0	+150	mV
Gain Difference Between Invert And Non-invert	ΔGINV	SG2 applied to TP9, SG8 applied to TP7, TP22=0V, SG1 (700mVpp) applied to TP21, TP23,TP25, SG7 applied TP42. This item measure the signal swing (BLK-WHT) of TP47, TP1, TP4. VRG, VGG, VBG define the non-inverting side of them. VRGI, VGGI, VBGI define the invert side of them. ΔGINV =20LOG(VRGI/VRG) =20LOG(VGGI/VGG) =20LOG(VBGI/VBG) ΔGRGB =20LOG(VRG/VGG) =20LOG(VGG/VBG) =20LOG(VBG/VRG)	-0.6	0	+0.6	dB
Gain Difference Among RGB	ΔGRGB		-0.6	0	+0.6	

■ **ELECTRICAL CHARACTERISTICS** (Ta=25°C,V_{CC}1=5V, V_{CC}2=5V,V_{CC}3=7V, V_{EE}1=-5V)

PARAMETER	SYMBOL	TEST CONDITION (TP=IC Pin No.)	MIN.	TYP.	MAX.	UNIT
FRP Input Threshold Voltage	V_{TH}FRP	SG2 applied to TP9, SG8 applied to TP7, TP22=0V, SG1 applied to TP23. This item define TP42 voltage at invert output of TP1 at increase TP42 voltage.	1.2	1.5	1.8	V
Interface Frequency as Characteristic	f_{INT}	SG2 applied to TP9, SG8 applied to TP7, TP22=0V, 1.5V applied to TP34 , 3.2V applied to TP35,SG3 (100kHz) applied to TP23. Sine wave of non-invert output signal of TP1 is input signal frequency at –3dB toward swing of 100kHz at variable frequency of SG3.	5.0	6.5	-	MHz
EXTRGB Input Threshold Voltage	V_{TH}EXH	Switching Voltage of TP22 V_{TH}EXH=ON Level Voltage	2.0	-	-	V
	V_{TH}EXL	Switching Voltage of TP22 V_{TH}EXL=OFF Level Voltage	-	-	0.8	
Gamma Characteristic	Gγ1	SG2 applied to TP9,SG8 applied to TP7,TP22=0V,SG7 applied to TP42 SG4(350mVpp) applied to TP21,TP23,TP25. This item measure the slope on TP47,TP1, and TP4 at TP35=1.8V,TP36=3.0V 	22.0	26.0	30.0	dB
	Gγ2		7.5	11.5	15.5	
Synchronous Separate Input Sensitivity Current	IIS	Current flow from TP9(B). Then measure current at TP8 change from High to Low.	-	21	30	µA
Synchronous Separate Output ON Voltage	VON	SG2 applied to TP9.Then Measure output signal level voltage of TP8.	-	0.2	0.5	V
Leak Current at Synchronous Separate Output OFF	ISL	Current 40uA flow from TP9(B).Then measure current of sink to TP8 at TP8=5V.	-	-	1.0	µA
Synchronous Separate Output Delay 1	tPHLSY	SG2 applied to TP9.Then Measure time difference of 50% swing level of TP9 and TP8 	-	0.3	-	µs
Synchronous Separate Output Delay 2	tPLHSY		-	0.4	-	

■ **ELECTRICAL CHARACTERISTICS** (Ta=25°C,V_{CC}1=5V, V_{CC}2=5V,V_{CC}3=7V,V_{EE}1=-5V)

PARAMETER	SYMBOL	TEST CONDITION (TP=IC Pin No.)	MIN.	TYP.	MAX.	UNIT
Synchronous Separate Output Turn OFF Time	ttHL	SG2 applied to TP9.Then measure time difference of 20% to 80% swing level of TP8.	-	0.2	-	µs
Synchronous Separate Output Turn OFF Time	ttLH		-	0.2	-	
External Synchronous Input Timing 1	t1		3.0	-	-	µs
External Synchronous Input Timing 2	t2		2.0	-	-	
External Synchronous Input Timing 3	t3		1.6	2.0	2.4	
RGB Output Delay Time 1	tPHL1	SG2 applied to TP9, SG8 applied to TP7, TP22=0V, SG4 (0.35Vpp) applied to TP21, TP23, TP25. Then measure time difference of 50% swing level of TP21 and TP47,TP23 and TP1, TP25 and TP4 tPHL1=turn ON tPHL2=turn OFF	—	0.1	-	µs
RGB Output Delay Time 2	tPHL2		-	0.1	-	
Crosstalk Among RGB	CTRGB1	SG2 applied to TP9, SG8 applied to TP7, TP22=0V, TP42=H, TP23= TP25=GND, SG3 (1MHz, 700mVpp) applied to TP21. Measure the output of 1MHz component on TP47, TP1 and TP4. Calculate the swing ratio of TP1, TP4 toward TP47.	-	-50	-40	dB
	CTRGB2	SG2 applied to TP9, SG8 applied to TP7, TP22=0V, TP42=H, TP21= TP25=GND, SG3 (1MHz, 700mVpp) applied to TP23. Measure the output of 1MHz component on TP47, TP1 and TP4. Calculate the swing ratio of TP47, TP4 toward TP1.	-	-50	-40	
	CTRGB3	SG2 applied to TP9, SG8 applied to TP7, TP22=0V, TP42=H, TP21=TP23=GND, SG3 (1MHz, 700mVpp) applied to TP25. Measure the output of 1MHz component on TP47, TP1 and TP4. Calculate the swing ratio of TP47, TP1 toward TP4.	-	-50	-40	

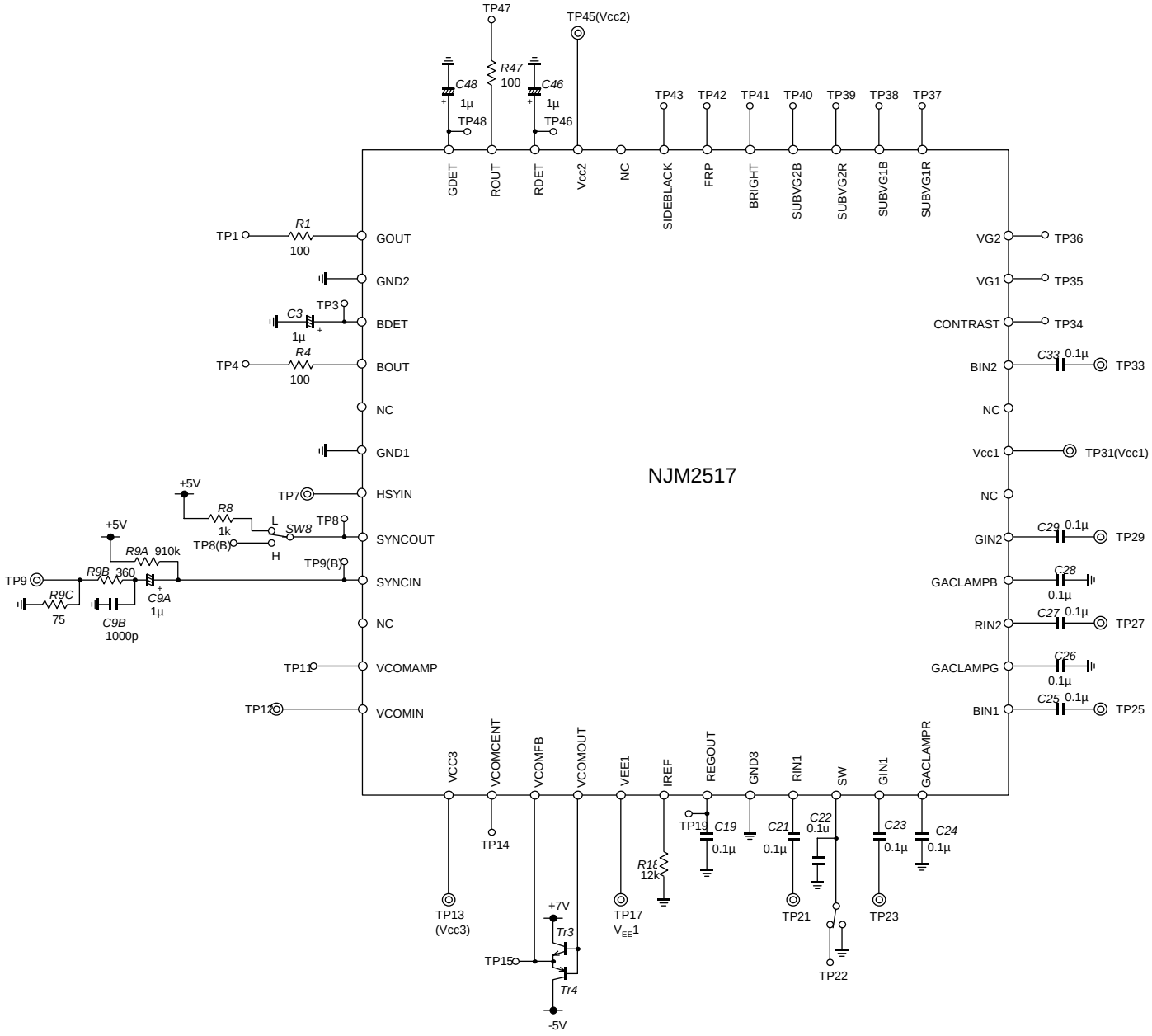
■ **ELECTRICAL CHARACTERISTICS** (Ta=25°C,V_{CC}1=5V, V_{CC}2=5V,V_{CC}3=7V, V_{EE}1=-5V)

PARAMETER	SYMBOL	TEST CONDITION (TP=IC Pin No.)	MIN.	TYP.	MAX.	UNIT
Crosstalk 1 Between SW (RGBIN1→RGBIN2)	CT1R	SG2 applied to TP9, SG8 applied to TP7, TP42=H, SG3 (1MHz, 700mVpp) applied to TP21, TP27=GND. Measure the output of 1MHz component on TP47. Calculate the swing ratio of TP22=0V, 5V.	-	-50	-35	dB
	CT1G	SG2 applied to TP9, SG8 applied to TP7, TP42=H, SG3 (1MHz, 700mVpp) applied to TP23, TP29=GND. Measure the output of 1MHz component on TP1. Calculate the swing ratio of TP22=0V, 5V.	-	-50	-35	
	CT1B	SG2 applied to TP9, SG8 applied to TP7, TP42=H, SG3 (1MHz, 700mVpp) applied to TP25, TP33=GND. Measure the output of 1MHz component on TP4. Calculate the swing ratio of TP22=0V, 5V.	-	-50	-35	
Crosstalk 2 Between SW (RGBIN2→RGBIN1)	CT2R	SG2 applied to TP9, SG8 applied to TP7, SW22=H, TP42=H, SG3 (1MHz, 700mVpp) applied to TP27, TP21=GND. Measure the output of 1MHz component on TP47. Calculate the swing ratio of TP22=0V, 5V.	-	-50	-35	dB
	CT2G	SG2 applied to TP9, SG8 applied to TP7, TP42=H, SG3 (1MHz, 700mVpp) applied to TP29, TP23=GND. Measure the output of 1MHz component on TP1. Calculate the swing ratio of TP22=0V, 5V.	-	-50	-35	
	CT2B	SG2 applied to TP9, SG8 applied to TP7, TP42=H, SG3 (1MHz, 700mVpp) applied to TP33, TP25=GND. Measure the output of 1MHz component on TP4. Calculate the swing ratio of TP22=0V, 5V.	-	-50	-35	

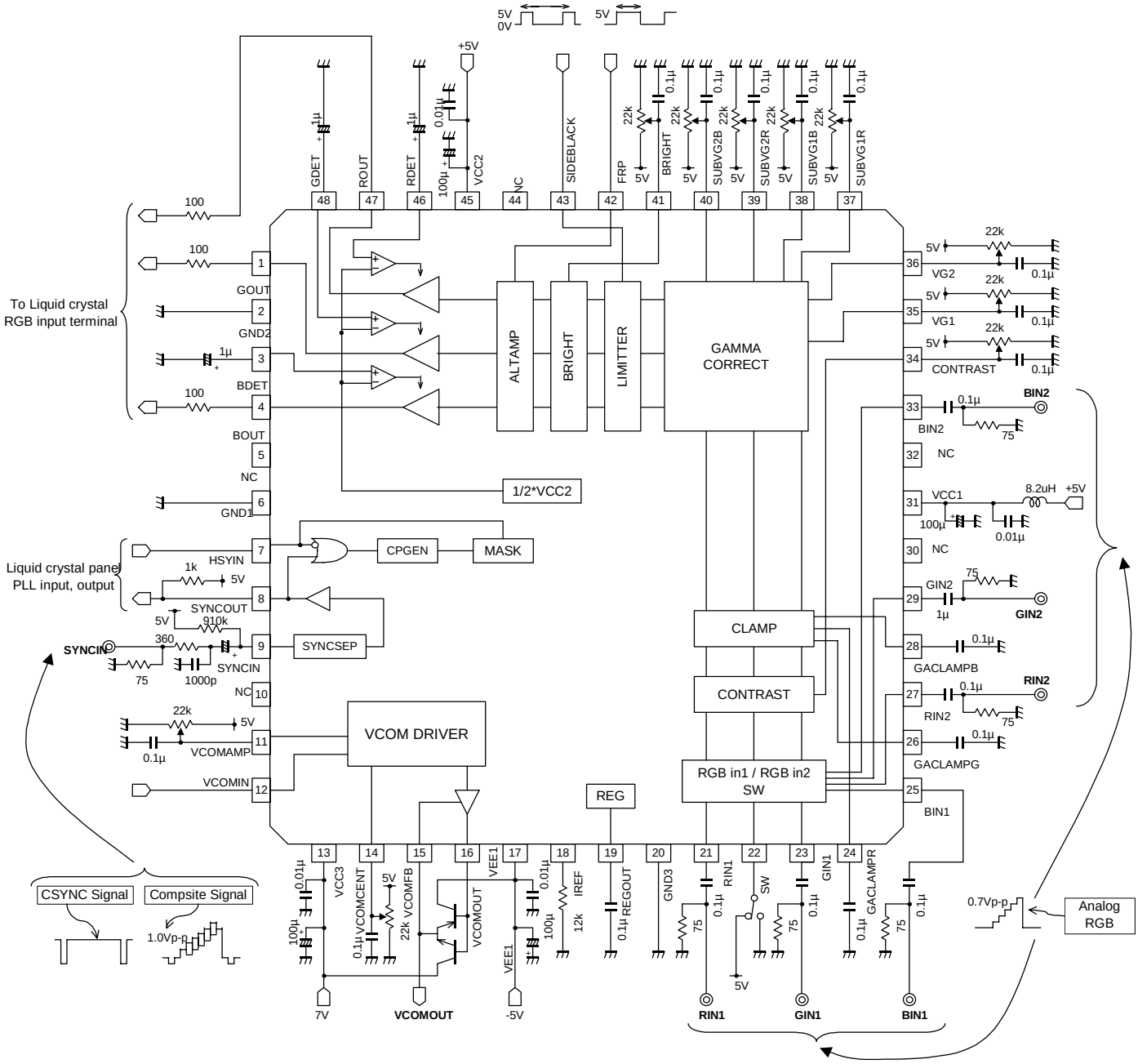
■ **ELECTRICAL CHARACTERISTICS** (Ta=25°C,V_{CC}1=5V, V_{CC}2=5V,V_{CC}3=7V, V_{EE}1=-5V)

PARAMETER	SYMBOL	TEST CONDITION (TP=IC Pin No.)	MIN.	TYP.	MAX.	UNIT
Side-black Level	V_{SB}	SG2 applied to TP9 , SG8 applied to TP7,TP22=0V,SG7 applied to TP42. When TP43=5V, define the non-invert black level of TP47, TP1, TP4 as VRB, VGB, VBB. When TP43=5V, define the invert black level of TP47,TP1,TP4 as VRBI,VGBI, VBBI. When TP43=0V, define the non-invert black level of TP47,TP1, TP4 as VRB (B), VGB (B), VBB (B). When TP43=0V, define the invert black level of TP47,TP1,TP4 as VRBI(B),VGBI (B), VBBI (B). V_{SB}=VRB-VRB (B), VGB-VGB (B), VBB-VBB (B) =VRBI (B)-VRBI, VGBI (B)-VGBI, VBBI (B)-VBBI	-	100	-	mV
VCOM Output Slew Rate	SRVCOM	SG6 applied toTP12. Measure the tern on and tern off time at 20% to 80% on TP3 output wave. Then convert to slew rate.	4.0	9.0	-	V/µs
VCOM Center Voltage	VCVCOM	SG6 applied to TP12. Measure the center voltage of TP3 output voltage.	0.9	1.2	1.5	V
VCOM Swing	VAVCOM	SG6 applied to TP12. Measure the output swing on TP3.	6.0	6.5	7.0	V_{P-P}
RGB Slew Rate	SR_{RGB}	SG2 applied to TP9.SG8 applied to TP7.TP22=0V, SG5 applied to TP21, TP23, TP25.TP9=SG2. Measure the tern on and tern off time at 20% to 80% of output wave on TP47,TP1, TP4.Then convert to slew rate.	-	80	-	V/µs

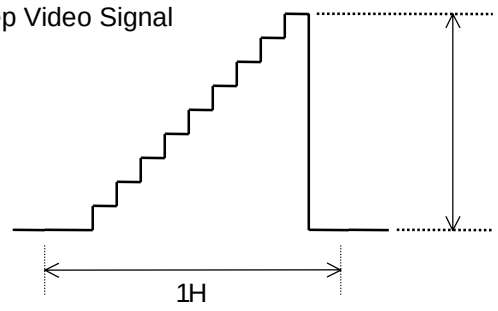
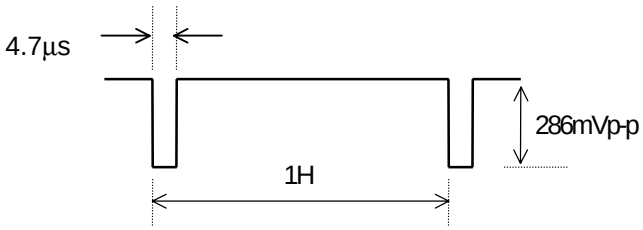
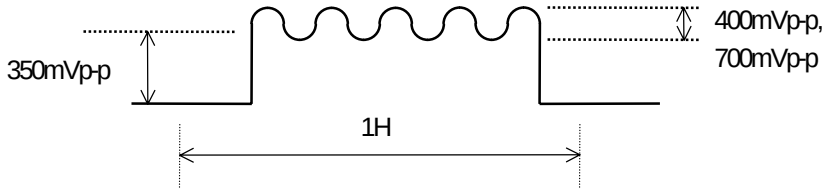
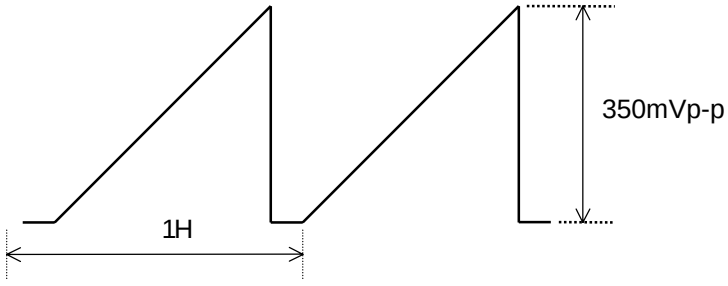
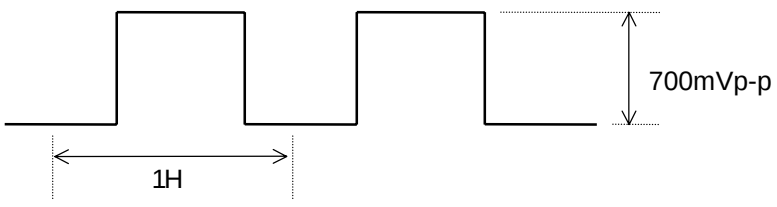
■ TEST CIRCUIT



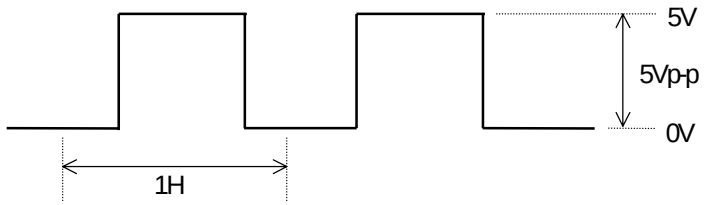
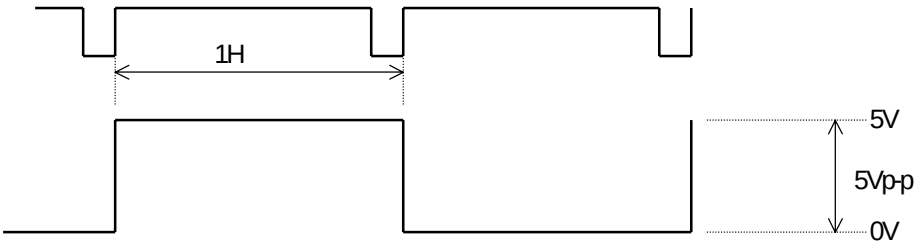
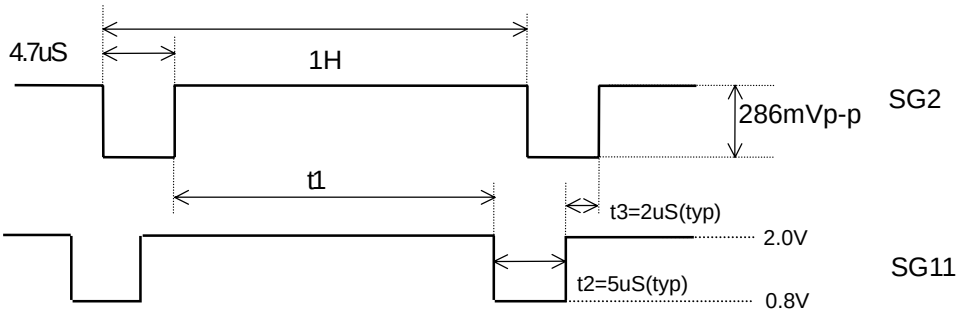
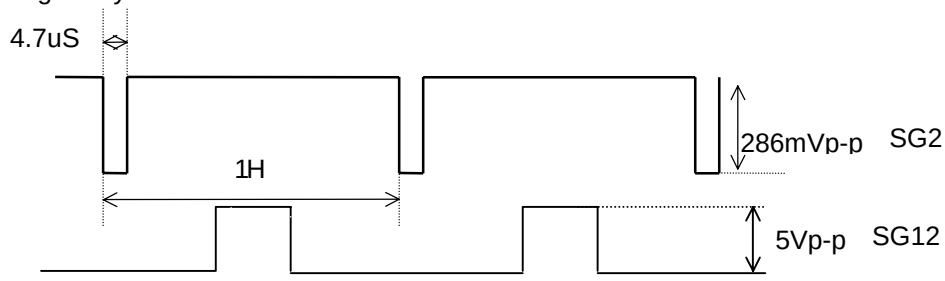
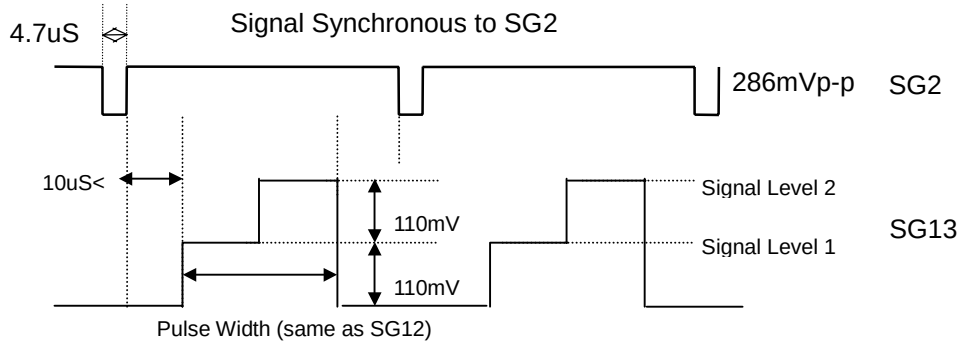
■ APPLICATION CIRCUIT EXAMPLE



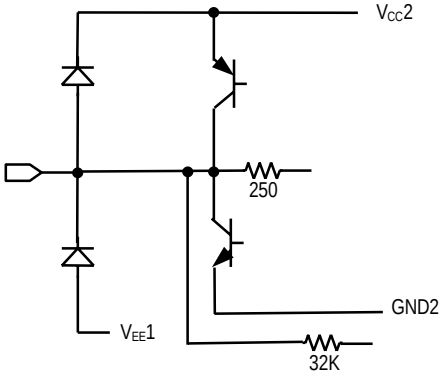
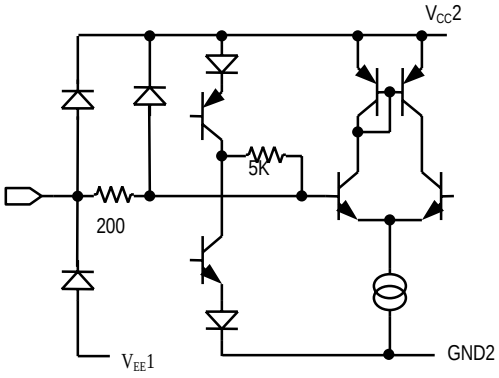
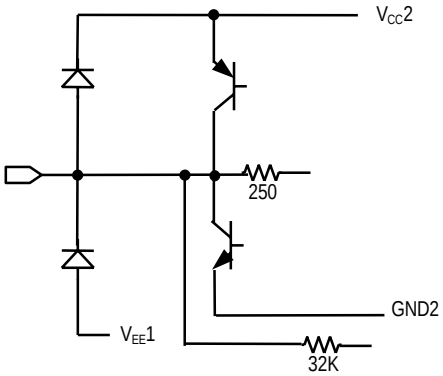
■ **INPUT SIGNAL**

SYMBOL	INPUT SIGNAL
SG1	No Sync 10 Step Video Signal 
SG2	Composite Y Signal with Sync signal or 10 STEP Signal 
SG3	Sine Video Signal without Sync 
SG4	Ramp Vide Signal without Sync 
SG5	Turn ON, Turn OFF Video Signal under 5ns 

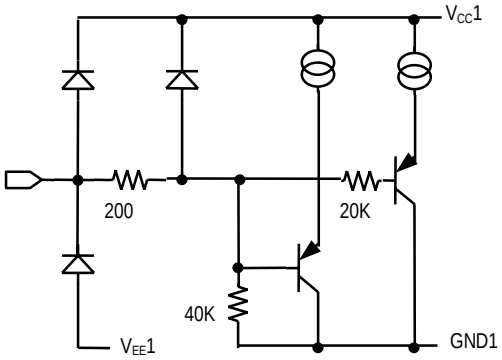
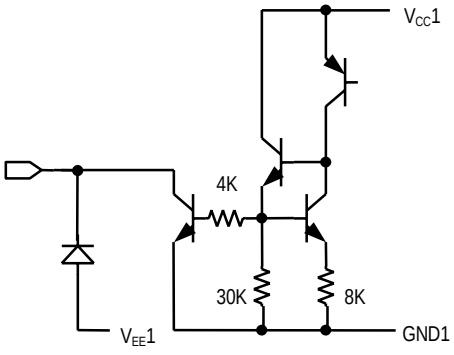
■ **INPUT SIGNAL**

SYMBOL	INPUT SIGNAL
SG6	Turn ON, Turn OFF Signal under 50ns 
SG7	FRP Signal of inverting Every 1H 
SG8	Horizontal Sync. Signal Synchronous to SG2 
SG9	SW Signal Synchronous to SG2 
SG10	

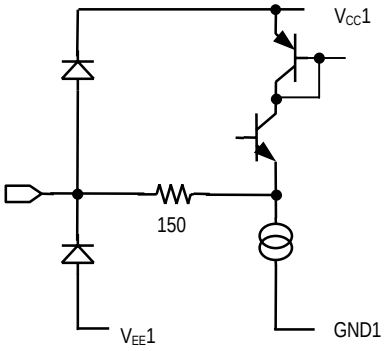
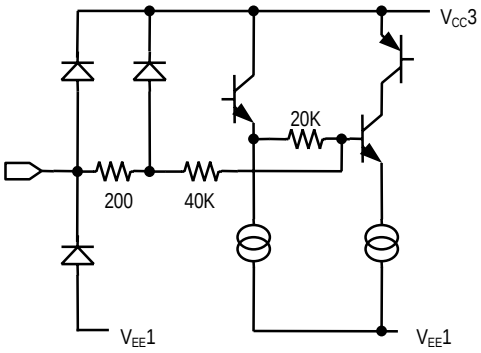
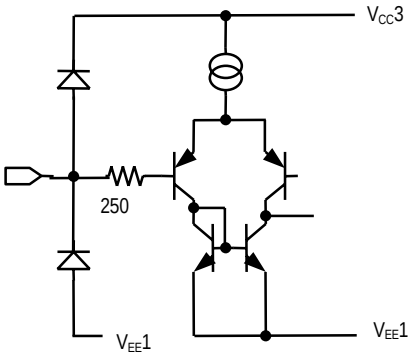
■ **EQUIVALENT CIRCUIT**

PI N NO.	SYMBOL	FUNCTION	INSIDE EQIVALENT CIRCUIT
1	GOUT	G signal output.	
2	GND2	Connect to GND.	
3	BDET	Connect to the capacitor for B signal center modulator. Leakless capacitor for use.	
4	BOUT	B signal output.	

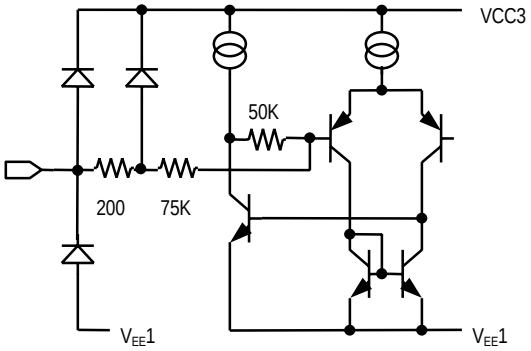
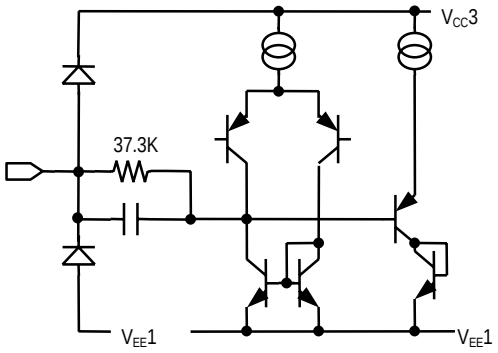
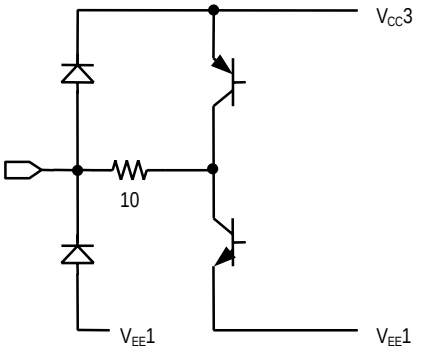
■ **EQUIVALENT CIRCUIT**

PI N NO.	SYMBOL	FUNCTION	INSIDE EQIVALENT CIRCUIT
5	NC		
6	GND1	Connect to GND.	
7	HSYIN	Connect to the outside synchronous.	
8	SYNCOUT	Composite synchronous signal output, non-inverting(active high) and open collector.	

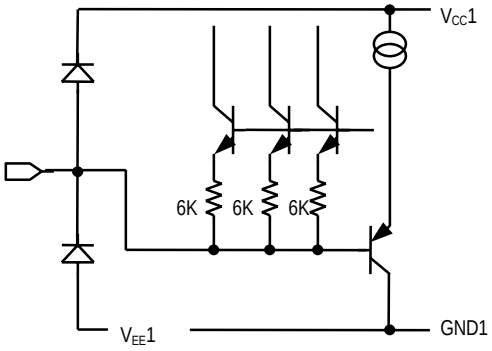
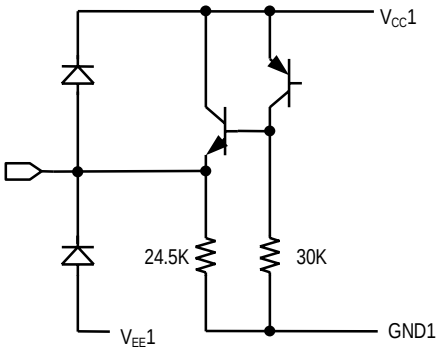
■ **EQUIVALENT CIRCUIT**

PI N NO.	SYMBOL	FUNCTION	INSIDE EQIVALENT CIRCUIT
9	SYNCIN	Synchronous signal input, synchronize with RGBOUT. Input level is 2Vp-p maximum,and can input include Y-signal and composite video signal.	
10	NC		
11	VCOM AMP	Adjust the VCOM signal level. Adjustable range:VCOM=6.5V±2.0V	
12	VCOMIN	VCOM $5V_{P-P}$ signal input.	

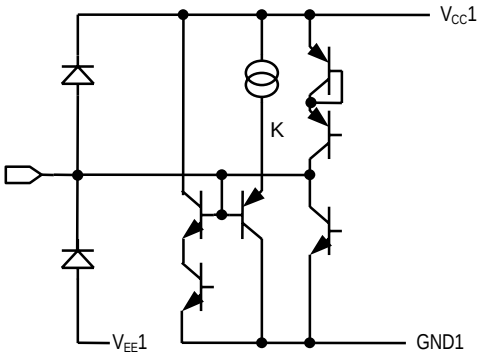
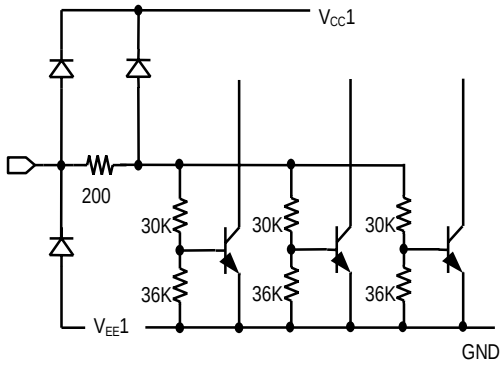
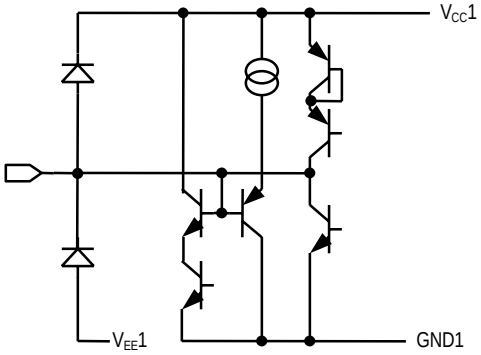
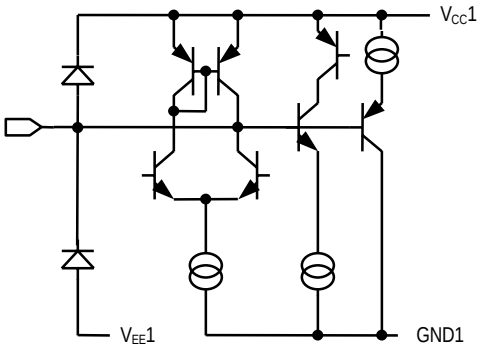
■ **EQUIVALENT CIRCUIT**

PI N NO.	SYMBOL	FUNCTION	INSIDE EQIVALENT CIRCUIT
13	VCC3	Supply to VCOM voltage. Connect to +7V supply.	
14	VCOM CENT	Adjust the center of VCOM voltage. Adjustable range: VCOMCENT=1.2V ± 1.5V.	
15	VCOMFB	VCOM feedback signal. Input the feedback signal (VCOMOUT) through the discrete transistor buffer.	
16	VCOM OUT	VCOM signal output. Drive the common by connect discrete Transistor.	

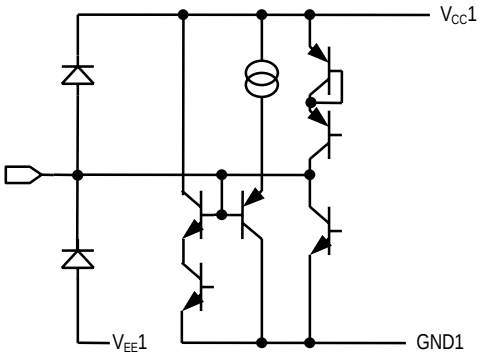
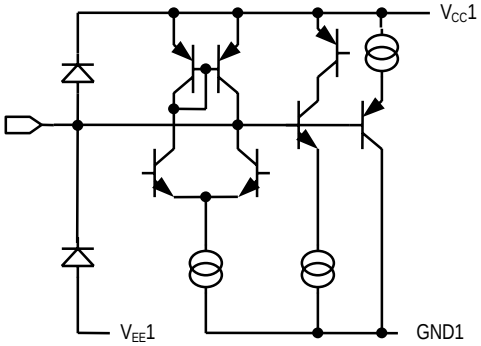
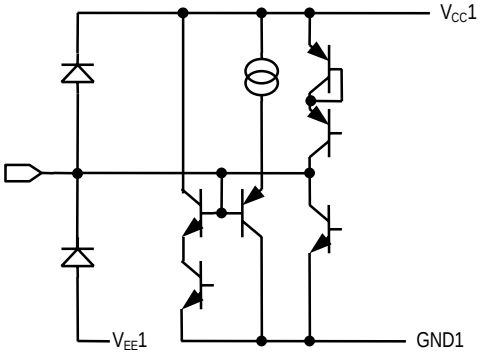
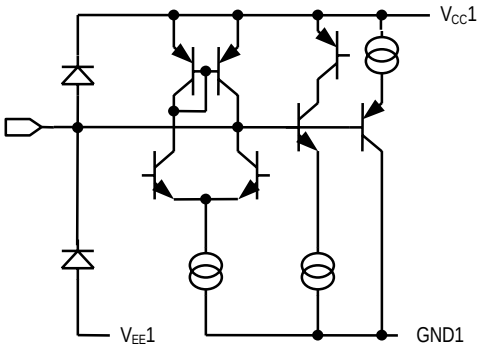
■ **EQUIVALENT CIRCUIT**

PI N NO.	SYMBOL	FUNCTION	INSIDE EQIVALENT CIRCUIT
17	VEE1	Connect -5V supply at lowest voltage.	
18	IREF	Connect with 12KΩ	
19	REGOUT	Regurator output,connect to decupling capacitor internal use only.	
20	GND3	Connect to GND.	

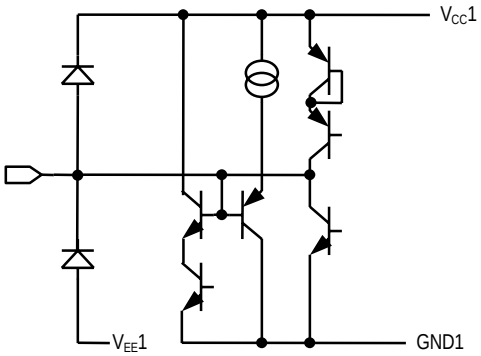
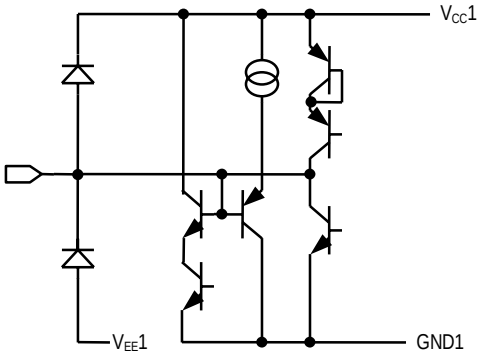
■ **EQUIVALENT CIRCUIT**

PI N NO.	SYMBOL	FUNCTION	INSIDE EQIVALENT CIRCUIT
21	RIN1	R(RGB) signal input, 700mV$_{P-P}$ and source color signal	
22	SW	Select the IN1/IN2 signal. SW=Low:RGB IN1 mode High:RGB IN2 mode SW | OUT L | IN1 H | IN2	
23	GIN1	G(RGB) signal input, 700mV$_{P-P}$ and source color signal.	
24	GA CLAMPR	Connect to the CLAMP pedestal level of R signal. Leakless capacitor for use.	

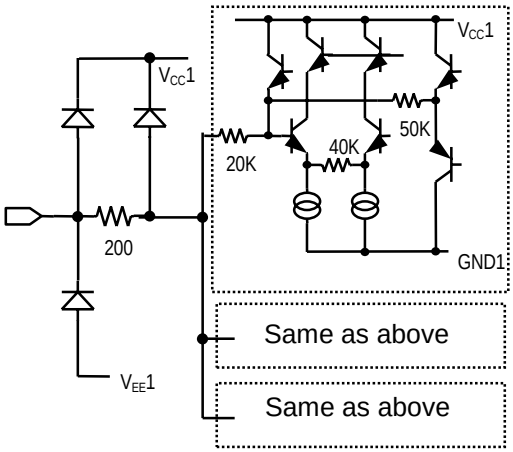
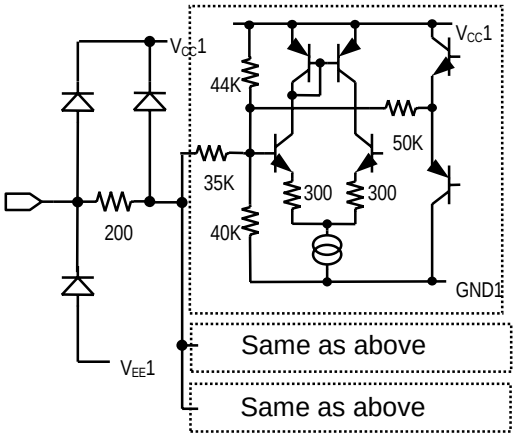
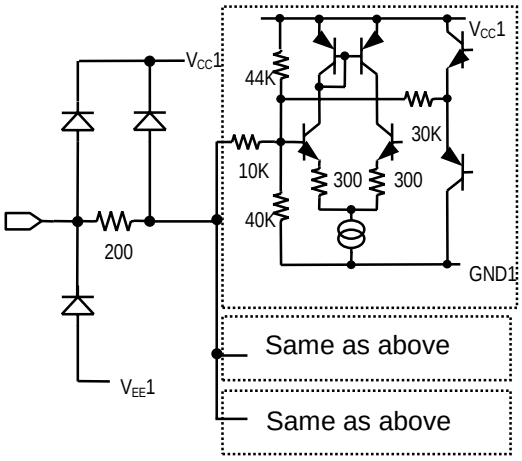
■ **EQUIVALENT CIRCUIT**

PI N NO.	SYMBOL	FUNCTION	INSIDE EQIVALENT CIRCUIT
25	BIN1	B(RGB) signal input, 700mV$_{P-P}$ and source color signal.	
26	GA CLAMPG	Connect to the CLAMP pedestal level of G signal. Leakless capacitor for use.	
27	RIN2	R(RGB) signal input, 700mV$_{P-P}$ and source color signal	
28	GA CLAMPB	Connect to the CLAMP pedestal level of B signal. Leakless capacitor for use.	

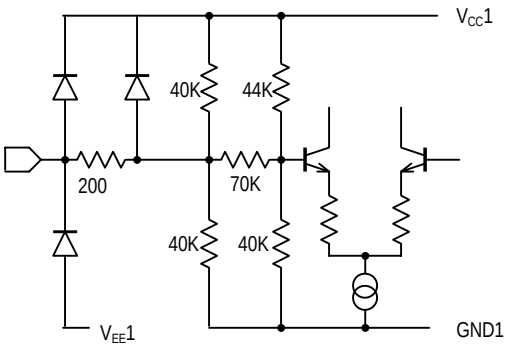
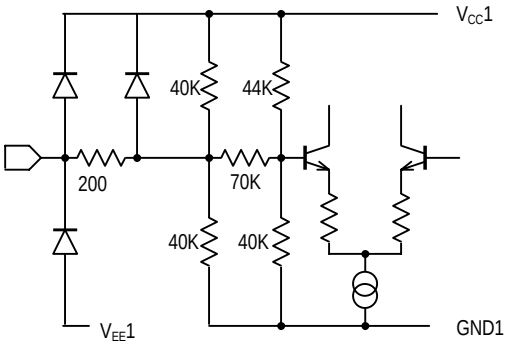
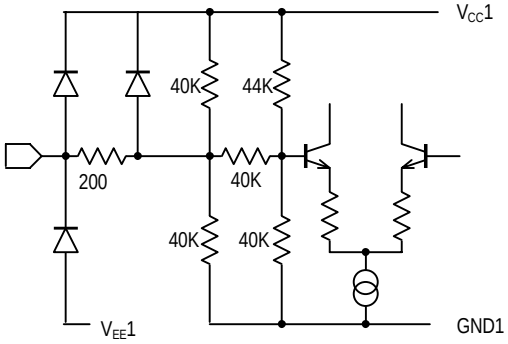
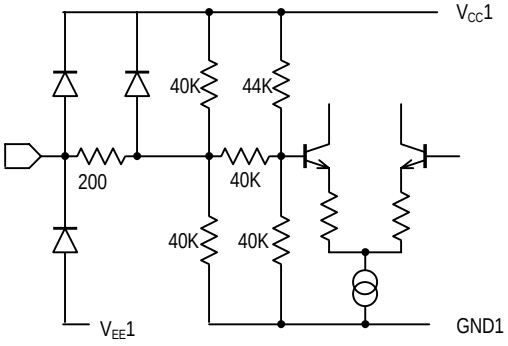
■ **EQUIVALENT CIRCUIT**

PI N NO.	SYMBOL	FUNCTION	INSIDE EQIVALENT CIRCUIT
29	GIN2	G(RGB) signal input, 700mV$_{P-P}$ and source color signal.	
30	NC		
31	VCC1	Supply voltage,+5V Connect to +5V supply	
32	NC		
33	BIN2	B(RGB) signal input, 700mV$_{P-P}$ and source color signal.	

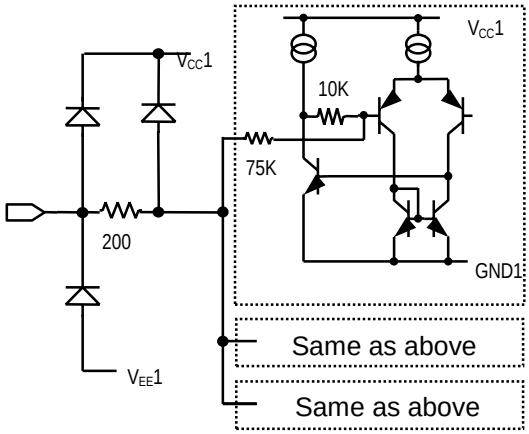
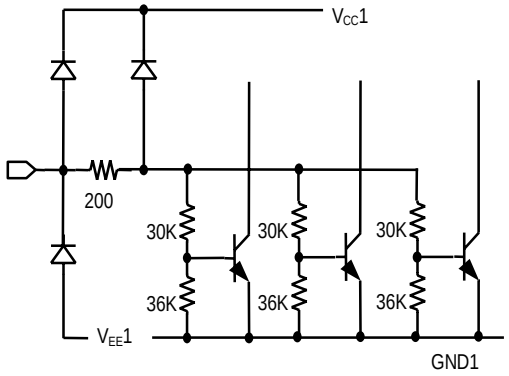
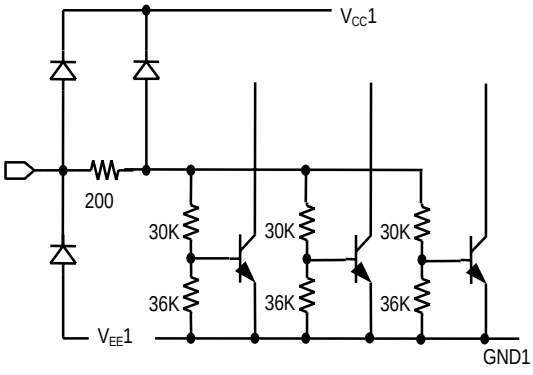
■ **EQUIVALENT CIRCUIT**

PI N NO.	SYMBOL	FUNCTION	INSIDE EQIVALENT CIRCUIT
34	CONT RAST	Adjust the gain of RGB signal. Adjust the RGB signal range by CONTRAST input voltage.	
35	VG1	Adjust the first point of low side in RGB γ characteristic. Pre-set and controlled RGB together.	
36	VG2	Adjust the first point of high side in RGB γ characteristic. Pre-set and controlled RGB together.	

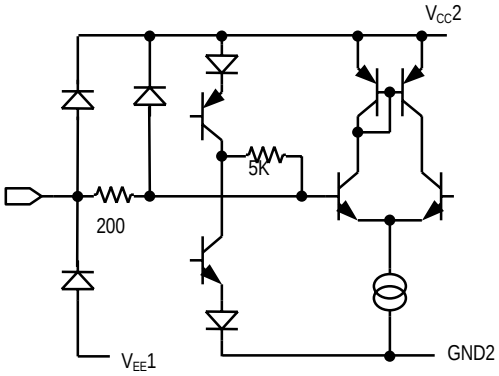
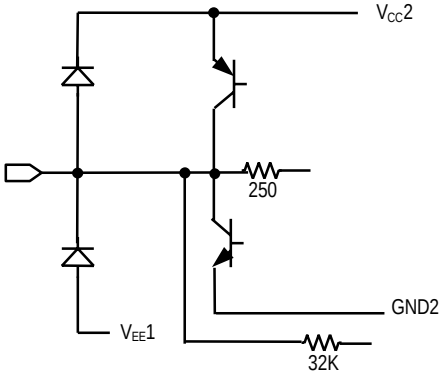
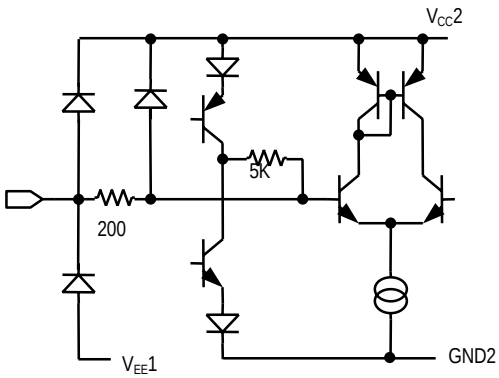
■ **EQUIVALENT CIRCUIT**

PI N NO.	SYMBOL	FUNCTION	INSIDE EQIVALENT CIRCUIT
37	SUBVG1R	Adjust the second point of low side in R signal γ characteristic. Pre-set and not controlled RGB together,adjust the R signal only.	
38	SUBVG1B	Adjust the second point of low side in B signal γ characteristic. Pre-set and not controlled RGB together,adjust the B signal only.	
39	SUBVG2R	Adjust the second point of high side in R signal γ characteristic. Pre-set and not controlled RGB together,adjust the R signal only.	
40	SUBVG2B	Adjust the second point of high side in B signal γ characteristic. Pre-set and not controlled RGB together,adjust the B signal only.	

■ **EQUIVALENT CIRCUIT**

PI N NO.	SYMBOL	FUNCTION	INSIDE EQIVALENT CIRCUIT
41	BRIGHT	Adjust the bright of RGB signal,controlled black level.	
42	FRP	Connect to the polarity reversal pulse of RGB output signal. Input: $5V_{P-P}$	
43	SIDE BLACK	Control signal input with both black side of moniter,when aspect ratio change 4:3 and 16:9. SIDEBLACK=High:Black level SIDEBLACK=Low or OPEN:Through RGB signal is controlled together.	
44	NC		

■ **EQUIVALENT CIRCUIT**

PI N NO.	SYMBOL	FUNCTION	INSIDE EQIVALENT CIRCUIT
45	VCC2	RGB output Supply voltage,+5V Connect to +5V supply. VCC2 ≥ VCC1	
46	RDET	Connect to the capacitor for R signal center modulator. Leakless capacitor for use.	
47	ROUT	R signal output.	
48	GDET	Connect to the capacitor for G signal center mpdulator. Leakless capacitor for use.	

■ **PIN FUNCTION at NO USE**

No	SYMBOL	FUNCTION	No	SYMBOL	FUNCTION
1	GOUT	OPEN	**25**	BIN1	OPEN
2	GND2	GND	**26**	GACLAMPG	Connect to clamp capacitor
3	BDET	Connect to capacitor for demodulate B signal	**27**	RIN2	OPEN
4	BOUT	OPEN	**28**	GACLAMPB	Connect to clamp capacitor
5	NC	OPEN only	**29**	GIN2	OPEN
6	GND1	GND	**30**	NC	OPEN only
7	HSYIN	Connects to external synchronous Signal without fail.	**31**	VCC1	Supply voltage (+5V)
8	SYNCOUT	OPEN	**32**	NC	
9	SYNCIN	Synchronous signal input	**33**	BIN2	OPEN
10	NC	OPEN only	**34**	CONTRAST	Input fixed DC voltage
11	VCOMAMP	OPEN	**35**	VG1	Input fixed DC voltage
12	VCOMIN	OPEN	**36**	VG2	Input fixed DC voltage
13	VCC3	OPEN: when do not use VCOM	**37**	SUBVG1R	OPEN
14	VCOMCENT	OPEN	**38**	SUBVG1B	OPEN
15	VCOMFB	OPEN	**39**	SUBVG2R	OPEN
16	VCOMOUT	OPEN	**40**	SUBVG2B	OPEN
17	VEE1	GND: when do not use VCOM	**41**	BRIGHT	Input fixed DC voltage
18	IREF	Connect with 12KΩ	**42**	FRP	Input inverting pulse of RGB output
19	REGOUT	Connect to capacitor without fail.	**43**	SIDEBLACK	OPEN
20	GND3	GND	**44**	NC	OPEN only
21	RIN1	OPEN	**45**	VCC2	Supply voltage (+5V ≥ VCC1)
22	SW	OPEN:IN1 mode only	**46**	RDET	Connect to capacitor for demodulate R signal
23	GIN1	OPEN	**47**	ROUT	OPEN
24	GACLAMPR	Connect to clamp capacitor	**48**	GDET	Connect to capacitor for demodulate G signal

■ **None-use PIN Connection**

1). Do not use VCOM Driver.

11pin-16pin are OPEN.
17pin(VEE1) connect to GND.

2). Do not use external analog RGB input1.

21pin, 23pin, 25pin and 22pin are 5V.

3). Do not use external analog RGB input2.

27pin, 29pin, 33pin and 22pin are OPEN.

4). Do not use synchronous signal processor.

Because it is necessary to produce BGP and Clamp Pulse in IC,
please use a synchronous signal processing circuit without fail.

5). Do not use C-SYNC output.

8pin is OPEN.

6). Do not use the adjust terminal of interface and Gamma circuit.

As for 34pin, 35pin, 36pin, 41pin, please input DC voltage of request without fail.
37-40pin are OPEN.

7). Do not use SIDE BLACK circuit.

43pin is OPEN.

■ FUNCTION DESCRIPTION

1. Synchronous Mode

The composite signal or synchronous signal input to pin-9 (SYNCIN).

The signal that was input to pin-9 (SYNCIN1) is separated synchronous.

The pin-7 (HSYIN) input external synchronous signal without fail.

In the case that HSY (Horizontal synchronous pulse) is not input, NJM2517 does not do a normal action, because inside clamp pulse does not generate.

2. RGBIN1/RGBIN2 Signal Switch Mode

The analog RGBIN1 signal ($0.7V_{P-P}$ typ.) input to pin-21, pin-23, and pin-25, and these signal clamps pedestal.

The analog RGBIN2 signal ($0.7V_{P-P}$ typ.) input to pin-27, pin-29, and pin-33, and these signal clamps pedestal.

The ext-signal select RGBIN1-signal or RGBIN2-signal by pin-22 (SW).

3. RGB Signal Mode

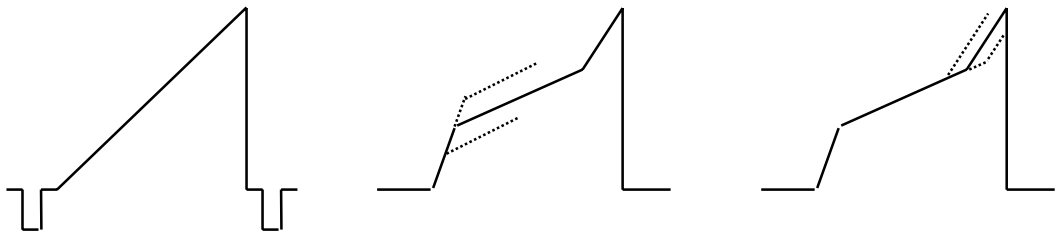
1) Contrast

The pin-34 (CONTRAST) adjusts the all of RGB signal, which is black-to-white range.

2) Gamma Amplifier

This circuit is non-liner amplifier to adjust the RGB signal equal to the luminous gamma characteristics.

There is two-point adjustment for accurate correction. The pin-35 (VG1) adjusts low side, and the pin-36 (VG2) adjusts high side.



Input Signal VG1 adjust VG2 adjust

3) Sub Gamma Circuit

This circuit adjusts gamma characteristics of B/R signal, and sub gamma adjusts white-balance for the monitor. The pin-37 (SUBVG1R) and pin-38 (SUBVG2R) adjust low side with R-signal and high side with gamma characteristics. The pin-39 (SUBVG1B) and pin-40 (SUBVG2B) adjust low side with B-signal and high side for gamma characteristics. These terminal controls R-signal and B-signal separately.

4) Bright

The pin-41 (BRIGHT) clamps the pedestal after the brightness adjustment (black to black).

5) Side Black

The side-black circuit output black level, when the mode is black mask for wide picture.

The RGB signal is black level when pin-43 (SIDEBLACK) input signal is low period only.

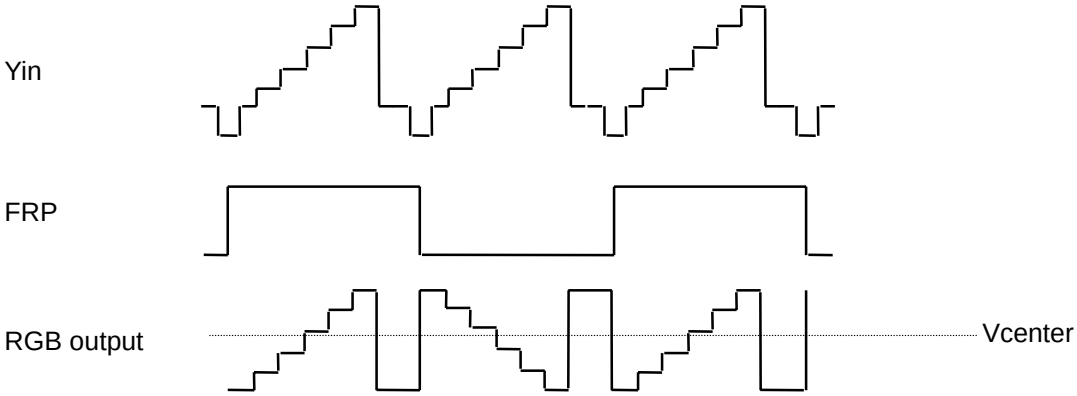
6) Output Amplifier

The pin-42 (FRP) input to the timing pulse with inverting RGB output, and output the inverting RGB signal per every 1H. The RGB outputs are:

FRP-High: Non-inverting output

FRP-Low: Inverting output

The center voltage is preset to half of Vcc2.



4. Common Driver

The LCD common invert RGB output, and the pin-12 (VCOMIN) input to the common driver signal ($5V_{P-P}$).

The pin-11 (VCOMAMP) adjusts the range, the pin-14 (VCOMCENT) adjusts the center voltage.

The pin-16 (VCOMOUT) connect external discreet buffer, and feedback the buffer output for pin-15 (VCOMFB).