Version : *1.0*

TECHNICAL SPECIFICATION

MODEL NO. : P25EN1

■ *Customer Approval* *Company Name :* _____

Approved By: _____ *Date :* _____

Approved by Product Section Manager	*Checked by Product Engineer*	*Prepared by FAE section Manager*
張永昇 10/4 2000	方俊民 10/4	郭光揚 10/4

Date : Sep. 29, 2000

PRIME VIEW INTERNATIONAL CO.,LTD.
3,LI SHIN RD. 1,SCIENCE-BASED INDUSTRIAL PARK,HSINCHU,TAIWAN,R.O.C.
TEL : 886-3-5798299 FAX : 86-3-5773033
http://www.pvi.com.tw

This technical specification is subject to change without notice.
Please return 1 copy with your signature on this page for approval.

TECHNICAL SPECIFICATION

CONTENTS

1. Application

This technical specification applies to 2.5" color TFT-LCD panel. The 2.5” color TFT LCD panel is designed for camcorder, digital camera application and other electronic products which require high quality flat panel displays.

2. Features

. Controller IC is not necessary

. Compatible with NTSC or PAL system

. High Resolution：112,320 Dots

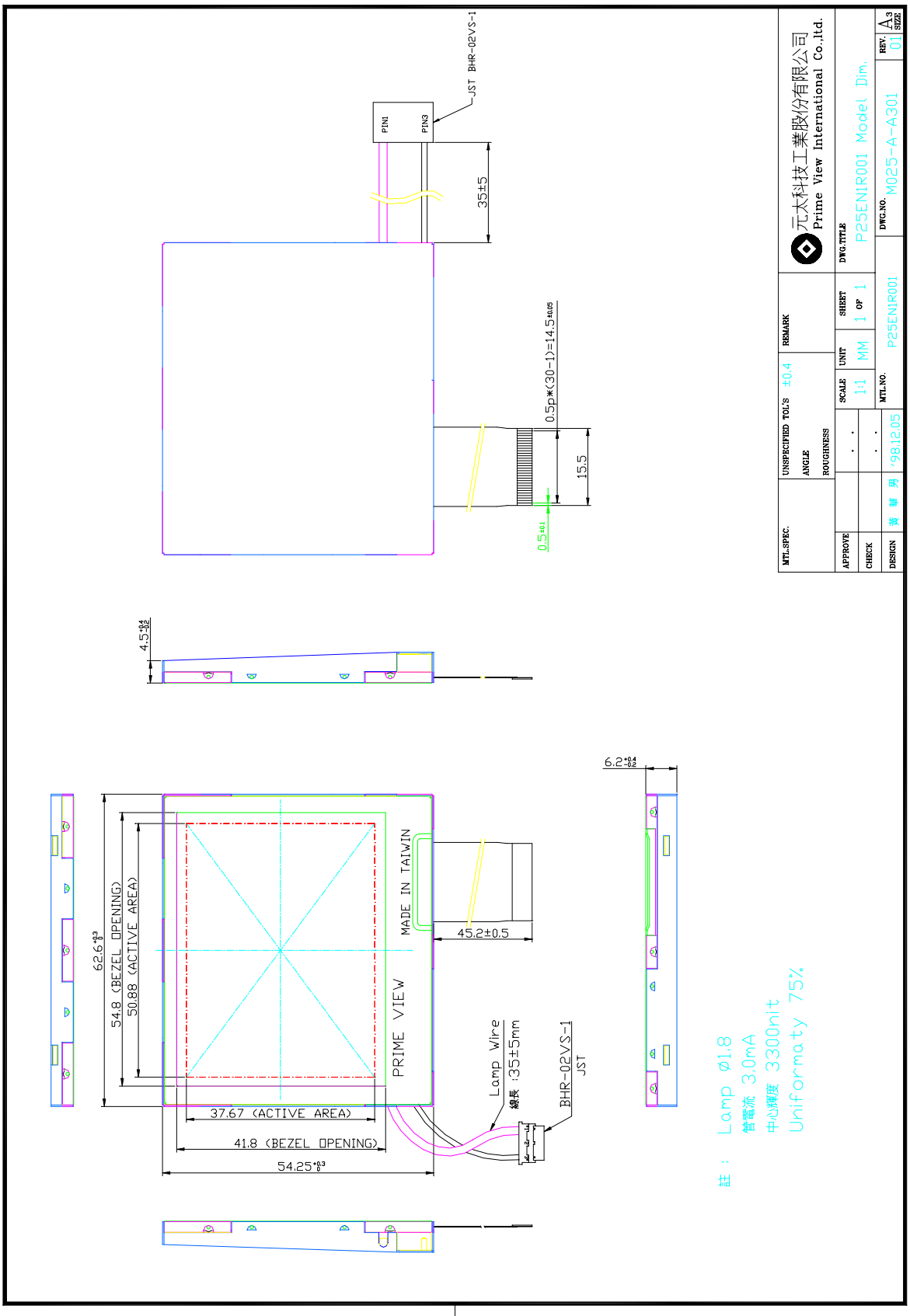
. Optimum Viewing Direction： 6 o’clock

. Up/Down and Left/Right Image Reversion

3. Mechanical Specifications

Parameter	Specifications	Unit
Screen Size	2.5 (diagonal)	inch
Display Format	480× 234	dot
Active Area	50.88× 37.67	mm
Dot Pitch	0.106 (W)× 0.161(H)	mm
Pixel Configuration	Delta	
Outline Dimension	See Mechanical Drawing	mm
Weight	36	g

4. Mechanical Drawing of panel:



5.Input / Output Terminals

Pin No	Symbol	I/O	Description	Remark
1	V_{COM}	I	Common Electrode Voltage	Note 5-1
2	V_{BBA}	I	Supply Voltage for Level Shifter (Low Level)	Note 5-2
3	PV_{DD}	I	Supply voltage for panel	Note 5-3
4	V_{BBC}	I	Supply voltage for panel	Note 5-2
5	V_{SS}	I	Ground for panel	
6	V_{CC}	I	Supply Voltage for Level Shifter (High Level)	Note 5-4
7	V_{PIN}	I	Pulse high level for Level Shifter (High Level)	Note 5-5
8	V_{MIN}	I	Pulse low level for Level Shifter (Low Level)	Note 5-5
9	FRP	O	Control Signal for Video Inversion	
10	$\overline{VSY}$	I/O	Vertical Sync.	
11	$\overline{HSY}$	I/O	Horizontal Sync.	
12	C_{SYNC}	I	Composite Sync.	
13	PD	O	Phase Detector	Note 5-6
14	OSC	I	Clock Input for LC Oscillator	Note 5-6
15	V_{DD}	I	Supply Voltage for Logic Circuit	Note 5-3
16	CKC	I	Control Pin for Select I/O Signal	Note 5-12
17	UD	I	Up / Down Control	Note 5-11
18	LR	I	Left / Right Shift Control	Note 5-7
19	NP	I	NTSC / PAL Selector	Note 5-8
20	V_B	I	Video Input B	
21	V_G	I	Video Input G	
22	V_R	I	Video Input R	
23	GND	I	Ground for High voltage logic	
24	GND	I	Ground for logic	
25	DV_{EE}	I	Voltage supply for source driver high logic	Note 5-9
26	C_{COM}	I	Reference for Sample and Hold	Note 5-10
27	AV_{EE}	I	Voltage supply for sample & hold	Note 5-9
28	GND	I	Ground	
29	OV_{EE}	I	Voltage supply for operation amplifier	Note 5-9
30	VP+	I	Pre-charge high level	Note 5-9

Note 5-1：V_{COM} should be adjusted accurately to get the best contrast ratio.

Note 5-2：V_{BBA},V_{BBC} = -5V (Typ.)

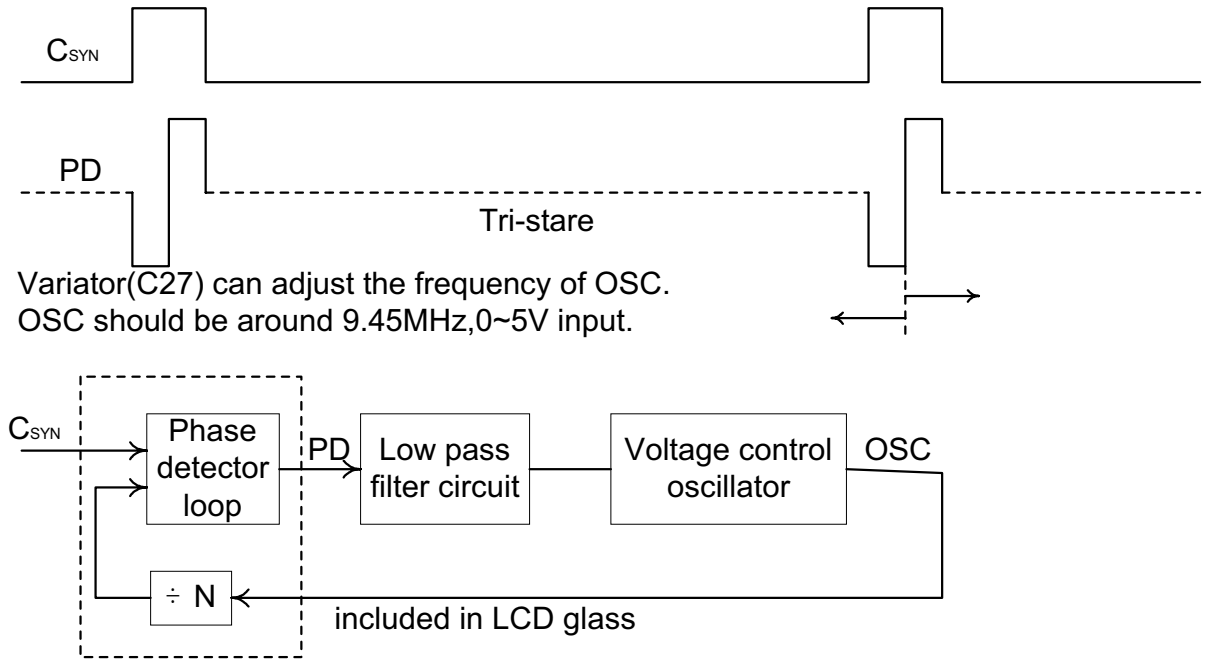
Note 5-3：V_{DD},PV_{DD} = +5V (Typ.)

Note 5-4：V_{CC}=+20V(Typ.)

Note 5-5：V_{PIN} must be more positive than V_{MIN}.

Pin	Symbol	min	Typ.	Max.	Unit
7	V_{PIN}	12	13	14	V
8	V_{MIN}	5	6	7	V

Note 5-6：PD output(0~5V range) from phase detector loop which is included in source driver.



Note 5-7：Left / Right SHIFT .

Note 5-8：Hi (+5V) for NTSC；Low (0V) for PAL.

Note 5-9：DV_{EE},AV_{EE},OV_{EE} and VP+ all equal to +14V

Note 5-10：C_{COM}≒+5V (Typ.)

Note 5-11：UP / Down Shift

Note 5-12；Pin 16(CKC) can select the function for Pin 11($\overline{HSY}$) and Pin 10($\overline{VSY}$).

CKC	$\overline{HSY}$	CSY	$\overline{VSY}$
Hi	$\overline{HSY}$	CSY Input	$\overline{VSY}$ Output
Low	External $\overline{HSY}$ Input	External Clock Input	External $\overline{VSY}$ Input

6.Absolute Maximum Ratings:

GND = 0 V， Ta = 25 ℃

Parameter		Symbol	MIN.	MAX.	Unit	Remark
Supply Voltage for Source Driver		DV_{EE} ,AV_{EE} OV_{EE} ,VP+	0	+16	V	
Supply Voltage for Gate Driver	H Level	V_{CC}	0	+26	V	
	L Level	V_{BBA}, V_{BBC}	-7	+20	V	
Supply voltage for controller		PV_{DD},V_{DD}	0	+6.5	V	
DC bias voltage of common electrode		Vcom	+2	+6	V	
Analog input signals		V_B,V_R,V_G		+12	V	

7. Electrical Characteristics

7-1) Recommended Operating Conditions:

A)Driving for TFT-LCD panel

GND = 0V， Ta = 25 ℃

Parameter		Symbol	MIN.	TYP	MAX.	Unit	Remark
Supply voltage for source driver		DV_{EE},AV_{EE} OV_{EE},VP+	+13.5	+14	+15	V	
Supply voltage for gate driver	H Level	V_{CC}	+19	+20	+24	V	
	L level	V_{BBA}, V_{BBC}	-5.5	-5	-4	V	
Supply voltage for controller		PV_{DD},V_{DD}	+4.7	+5	+5.3	V	
Analog input voltage	Amplitude	V_B,V_R,V_G	+1.1		12	V	
	DC component		+4	+6	+8	V	

** Turn on sequence: -5V、+5V Input →$C_{SYNC.}$ V_B,V_R,V_G Input → +14V、+20V Input
Turn off sequence: +14V、+20V Input →$C_{SYNC.}$ V_B,V_R,V_G Input →-5V、+5V Input

B) Driving for Backlight

Ta= 25 ℃

Parameter	Min.	Typ.	Max.	Unit	Remark
Lamp voltage		220		Vrms	
Lamp current		3		mA	
Lamp frequency		35		KHz	

7-2) Power Consumption

Parameter	Conditions	TYP.	Unit	Remark
Current for V_{CC}	V_{CC} = +20V	1.5	mA	
Current for V_{BBA}	V_{BBA} = -5V	1.3	mA	
Current for V_{BBC}	V_{BBC} = -5V	0.05	mA	
Current for DV_{EE}	DV_{EE} = +14V	0.5	mA	
Current for AV_{EE}	AV_{EE} = +14V	3.0	mA	
Current for OV_{EE}	OV_{EE} = +14V	4.0	mA	
Current for PV_{DD}	PV_{DD} = +5V	0.2	mA	
Current for V_{DD}	V_{DD} = +5V	4.8	mA	
LCD Panel Power Consumption		0.18	W	
Backlight Power Consumption		0.66	W	

7-3) Input / Output Timing

Parameter		Symbol	MIN.	TYP.	MAX.	Unit	Remarks
Horizontal	Width	T_{HO}	4.2	4.7	5.2	μs	
Sync. Output	Phase Difference	T_{HP}	0	2		μs	
Pulse	Rising Time	T_{HR}	-	-	0.5	μs	
	Falling Time	T_{HF}	-	-	0.5	μs	
Vertical Sync.	Width	T_{VO}	-	4H	-	μs	H=1/15.75K HZ
Output Pulse	Phase Difference	T_{VPO}	-	1H	-	μs	odd field
	Phase Difference	T_{VPE}	-	0.5H	-	μs	even field
	Rising Time	T_{VR}	-	-	2	μs	
	Frequency	f_{FRP}	7.67	7.87	8.07	KH_Z	
Polarity	Delay time	T_{FD}	-	-	4	μs	
Alternating Signal	Falling Time	T_{VF}	-	-	2	μs	

7-4) Display Time Range

A) When sync. signal of NTSC system is applied.

a) Horizontally

12.6 ~ 63.39 μs.

b)Vertical

19 ~ 253 H

B) When sync. signal of PAL system is applied.

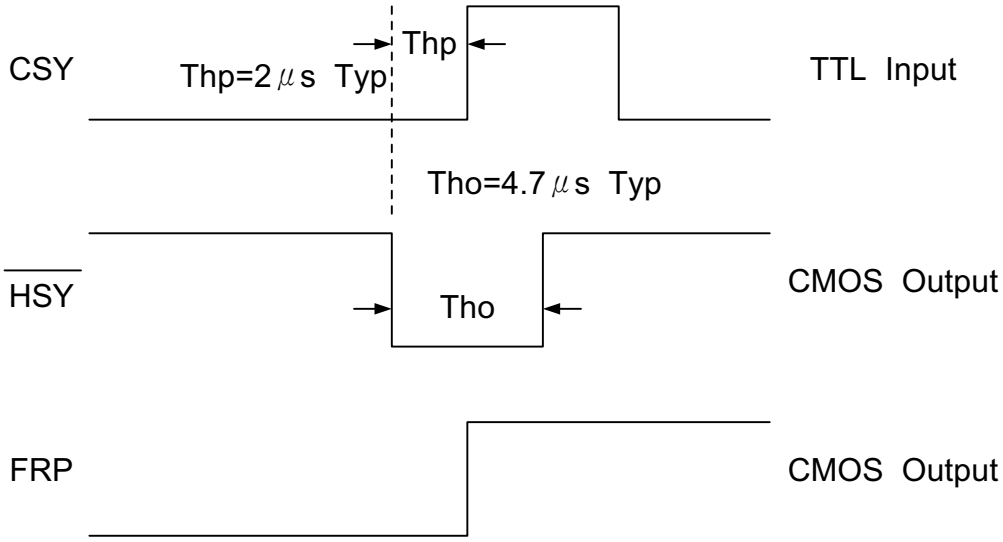
a) Horizontally

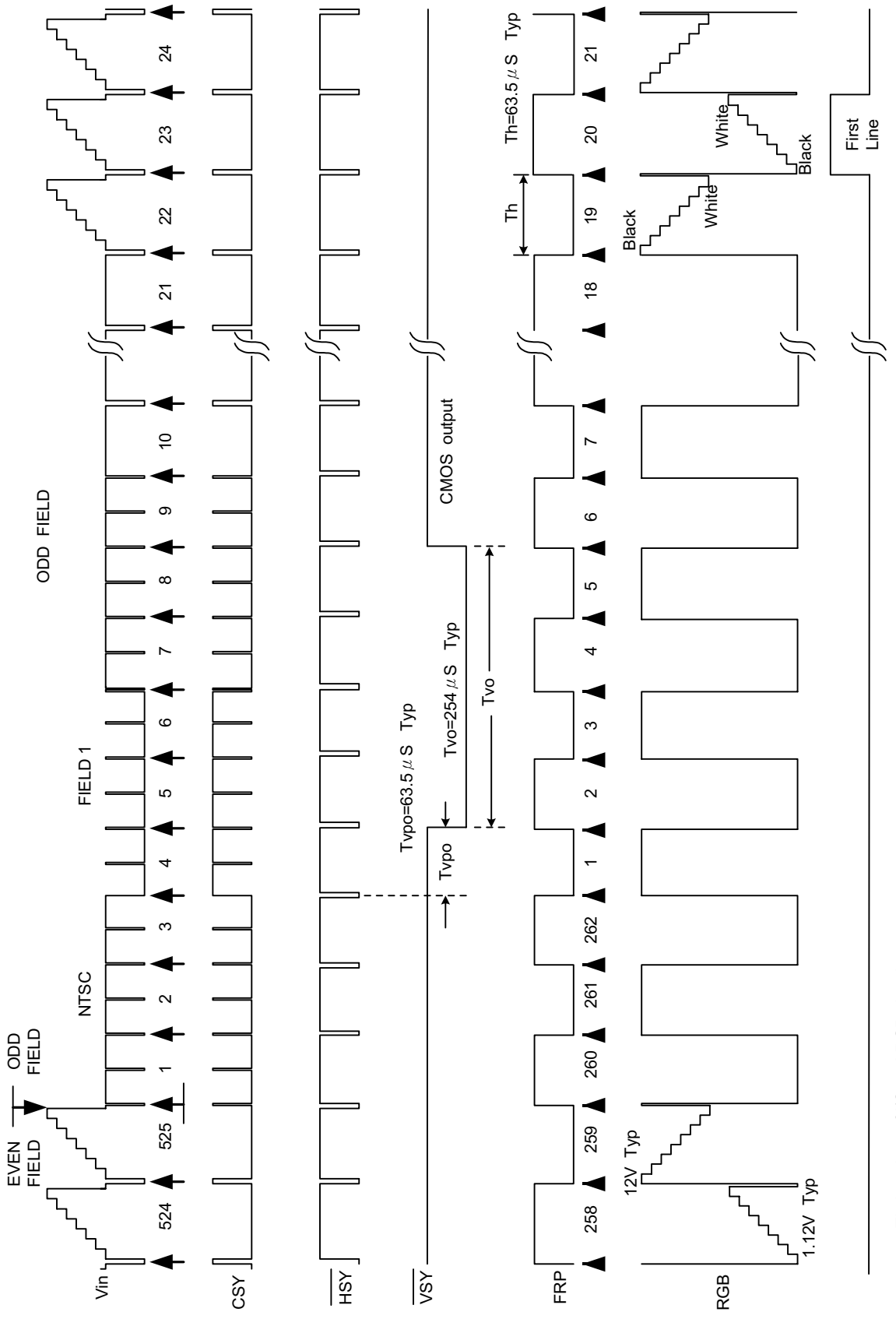
13.0 ~ 63.8 μs .

b) Vertical

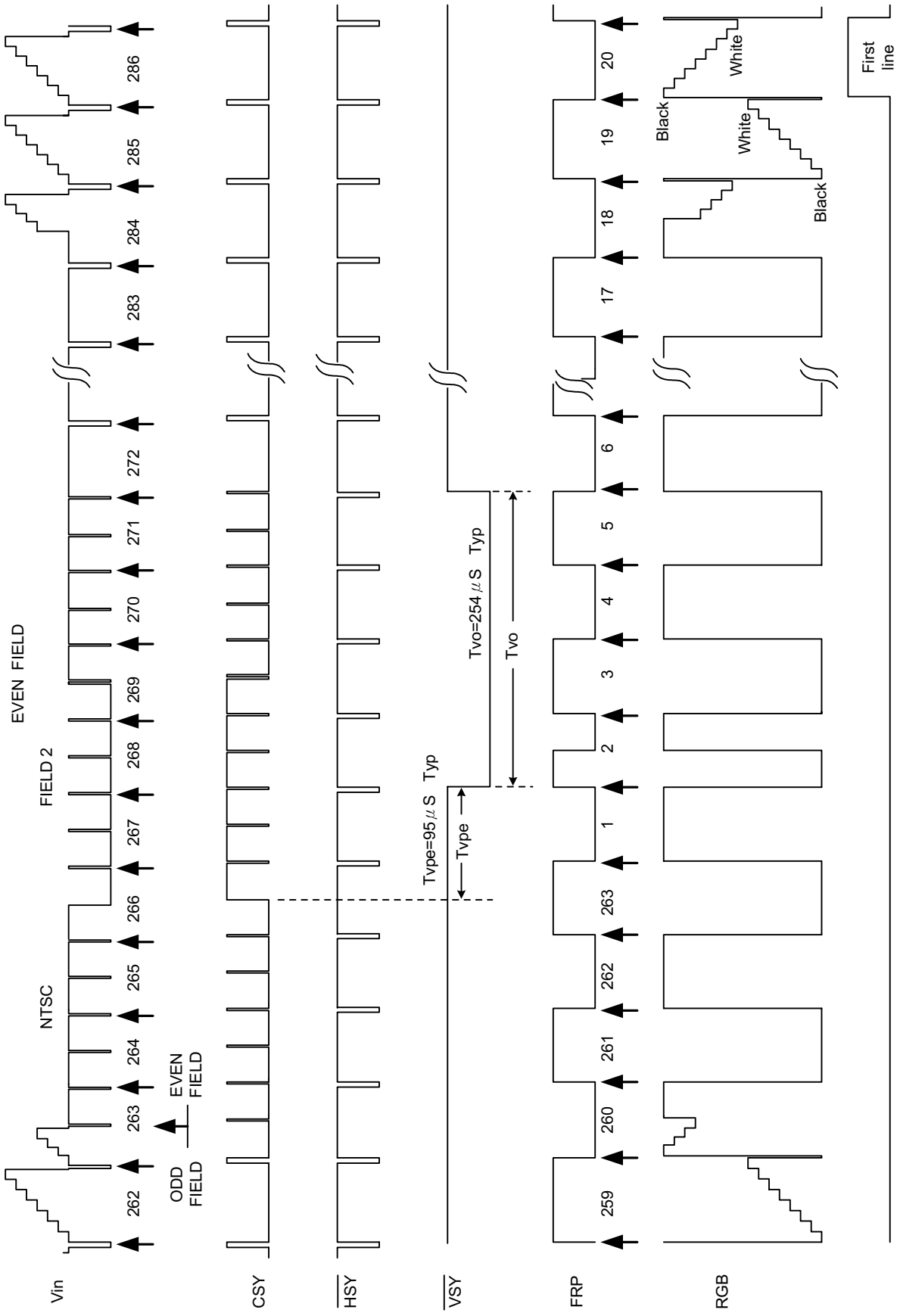
26 ~ 298 H

c) odd field : Scan lines 14n+17 14n+23 (n = 1, 2, 3..) are not displayed.
even field : Scan lines 14n+12 14n+20 (n = 1, 2, 3..) are not displayed.

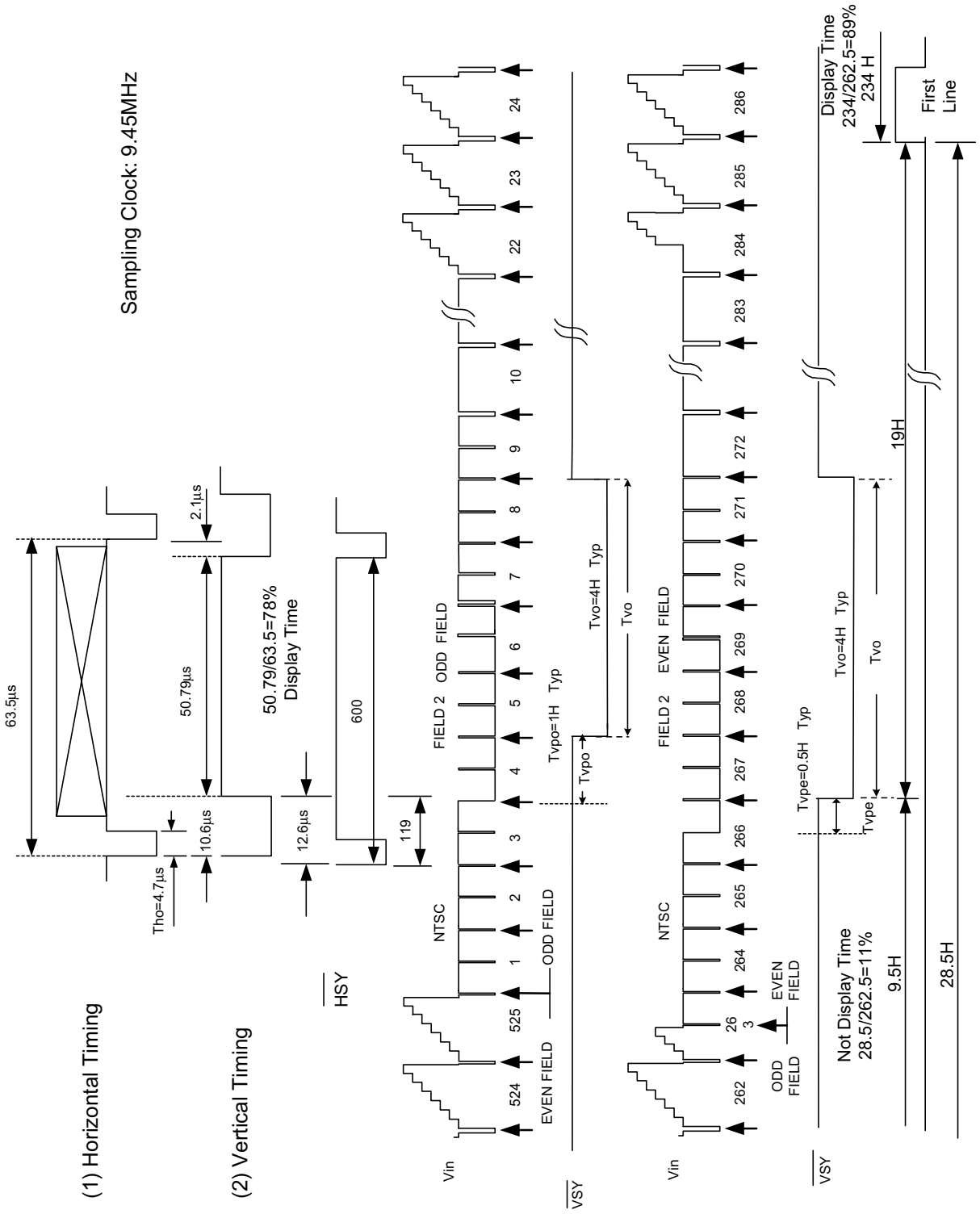




Timing chart of I/O and RGB signal



Timing chart of I/O and RGB signal



8.Optical Characteristics

8-1)Specification

Ta = 25℃

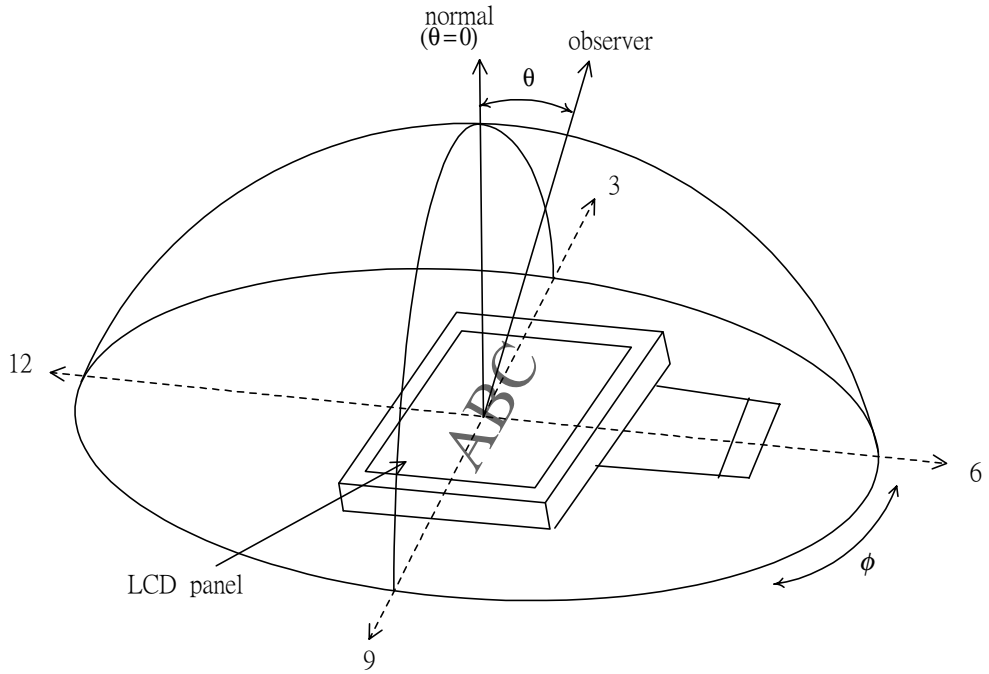
Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	θ	CR≧10	± 45	± 55		deg	Note 8-3
	Vertical	θ (to 12 o'clock)		10	15		deg	
		θ (to 6 o'clock)		30	35		deg	
Contrast Ratio		CR		80	120			Note 8-1
Response time	Rise	Tr	θ=0°			30	ms	Note 8-4
	Fall	Tf	φ=0°			50	ms	
Reflectance	Ratio	R			2.0		%	
Brightness					200		cd/㎡	Note 8-2
Lamp Life Time	+25℃			10,000			hr	

Note 8-1：$CR = \frac{\text{Luminance when LCD is White}}{\text{Luminance when LCD is Black}}$

Contrast Ratio is measured in optimum common electrode voltage.
The test configurations of contrast ratio see section 8-2.

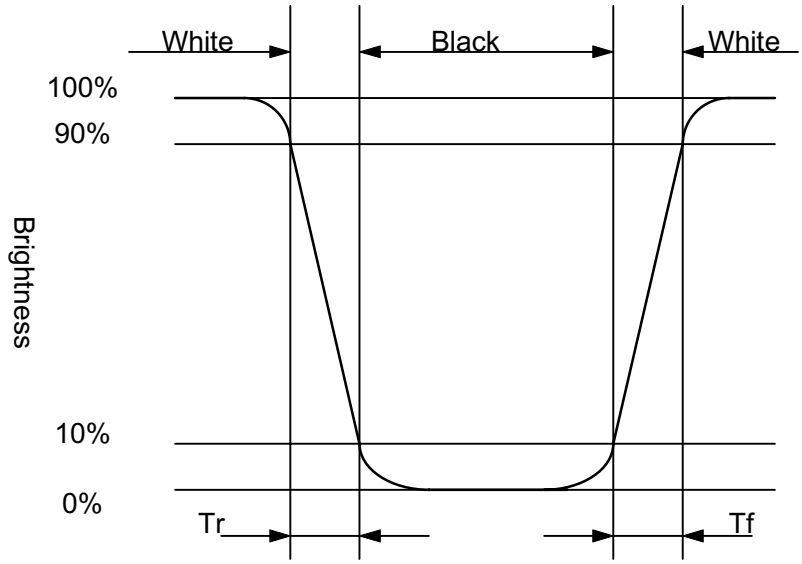
Note 8-2：Topcon BM-7(fast) luminance meter 1° field of view is used in the testing (after 20~30 minutes operation).

Note 8-3：The definition of viewing angle diagrams :

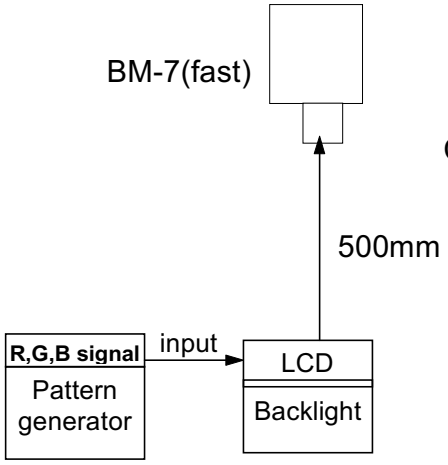


ϕ : Viewing direction
θ : Viewing angle

Note 8-4: The definitions of response time:

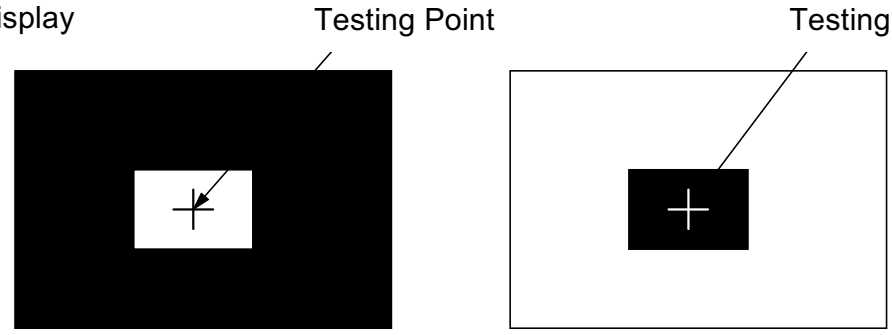


8-2) Test Configuration



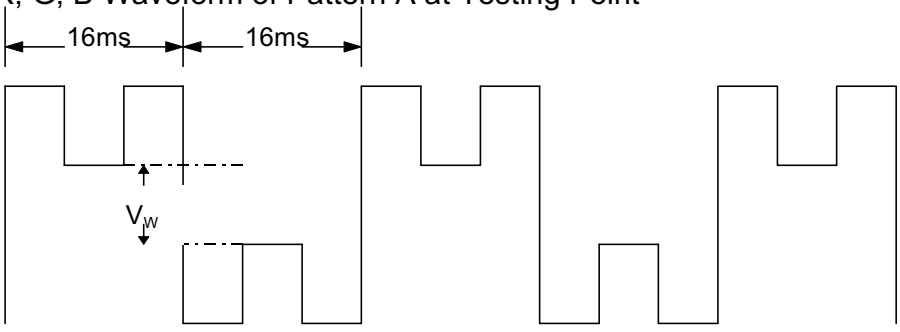
Caution: 1. Environmental illumination ≦ 1 lux
2. Before test CR, Vcom voltage must be adjusted carefully to get the best CR.

- LCD Display



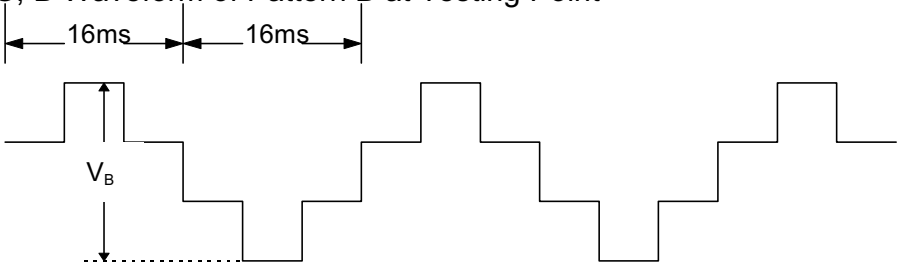
Pattern A Pattern B

- R, G, B Waveform of Pattern A at Testing Point



V_W=2.2V ± 0.2V

- G, B Waveform of Pattern B at Testing Point



V_B=9.2V ± 0.2V

9. Reliability

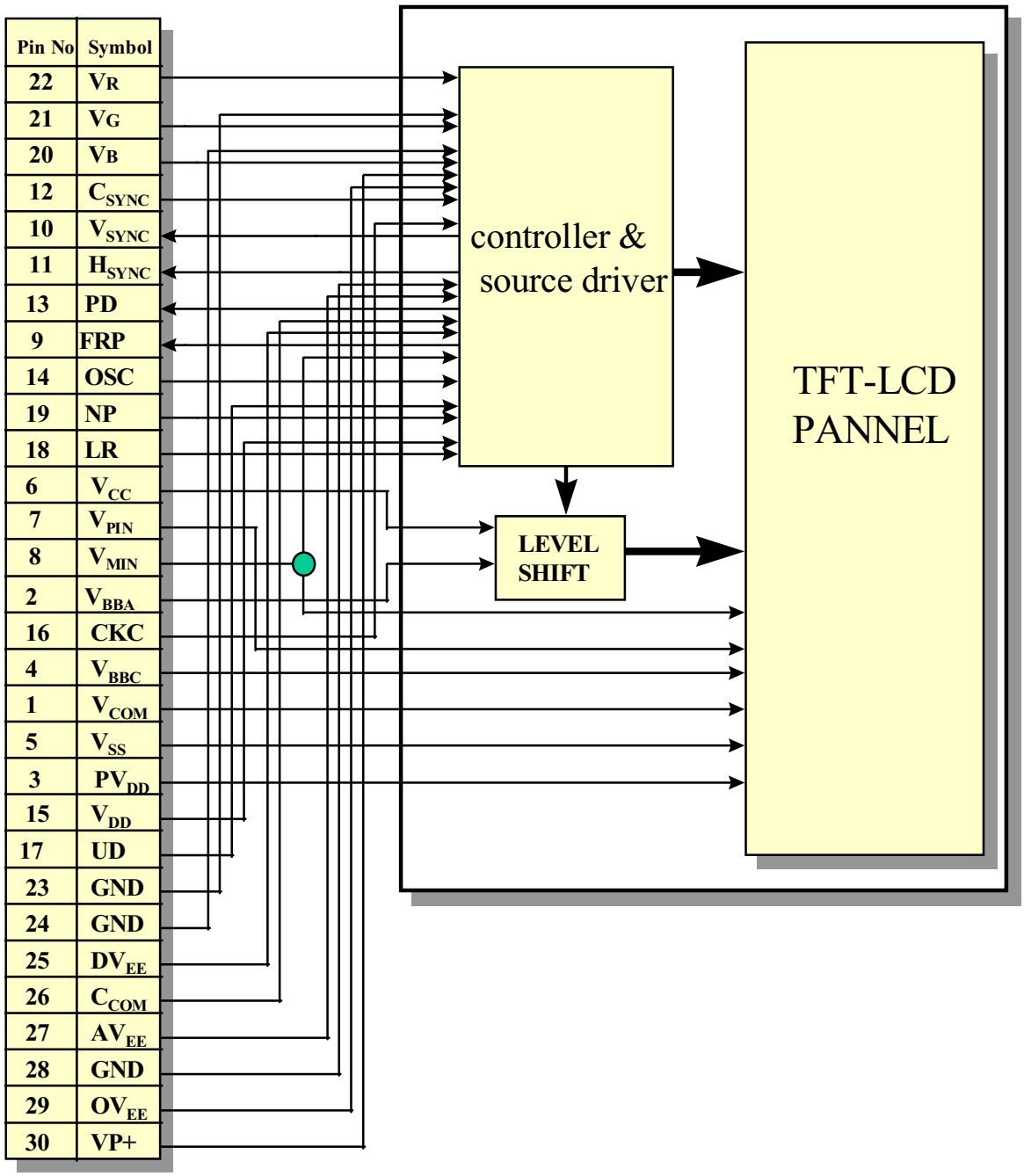
No	Test Item	Test Condition
1	High Temperature Storage Test	Ta = +80 ℃, 240 hrs
2	Low Temperature Storage Test	Ta = -30℃, 240 hrs
3	High Temperature Operation Test	Tp = +60 ℃, 240 hrs
4	Low Temperature Operation Test	Tp = -10 ℃, 240 hrs
5	High Temperature & High Humidity Operation Test	Tp = +60℃, 95%RH, 240 hrs
6	Thermal Cycling Test(non-operating)	-25℃ →+25℃→ +70℃, 200 Cycles 30 min 5min 30 min
7	Vibration Test (non-operating)	Frequency：10 ~ 55 H_Z Amplitude：1.5 mm Sweep time: 11 mins Test period: 3 hrs for each direction of X, Y, Z
8	Shock Test (non-operating)	100G, 6ms Direction: ± X, ± Y, ± Z Cycle: 2 times
9	Electrostatic Discharge Test	150pF, 330Ω 10 times/point, 4 points/panel face

Ta: ambient temperature
Tp: panel temperature

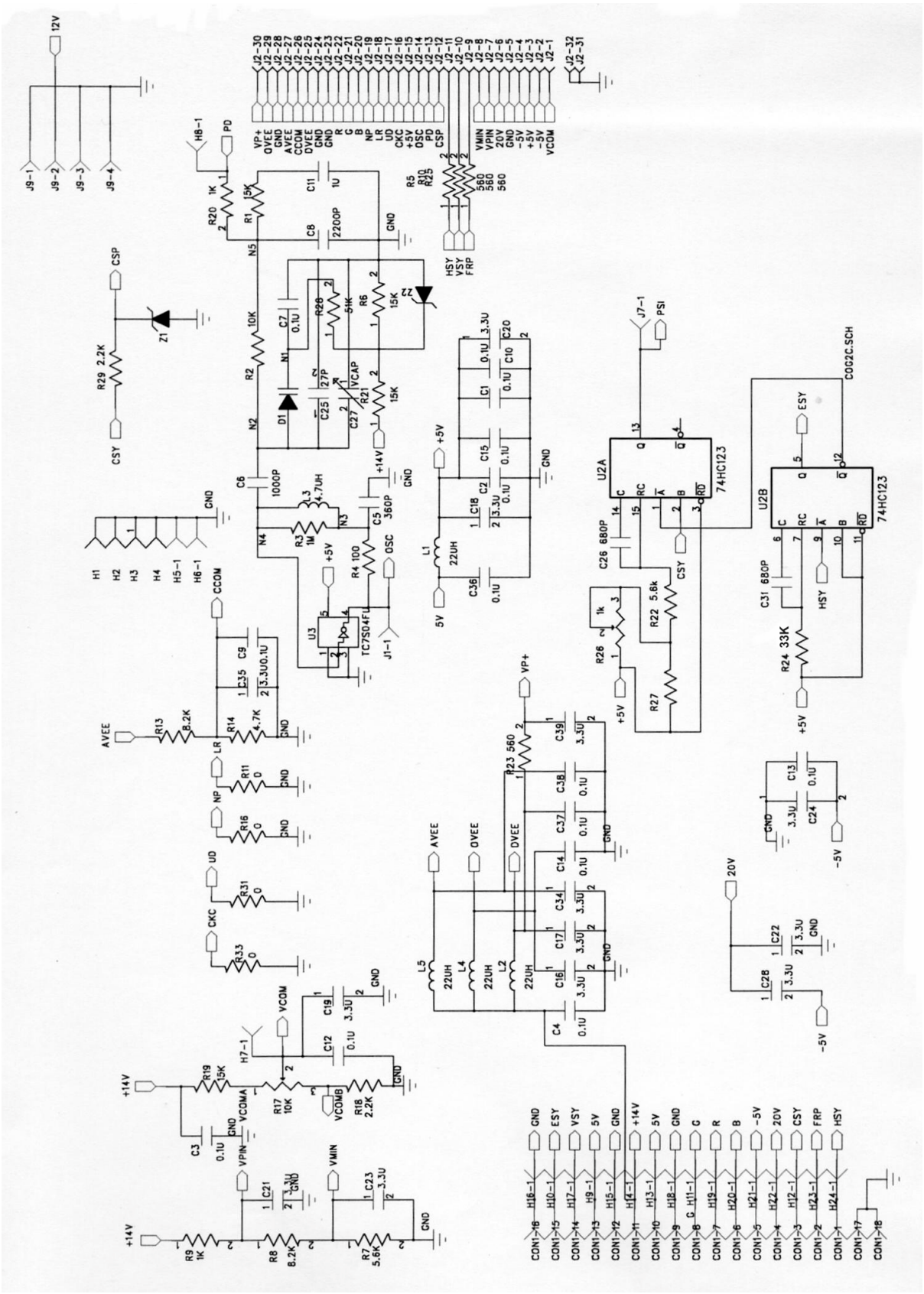
[Criteria]

Under the display quality test conditions with normal operation state, there should be no change which may affect practical display function.

10. Block Diagram



Appendix A: **Interface Circuit**

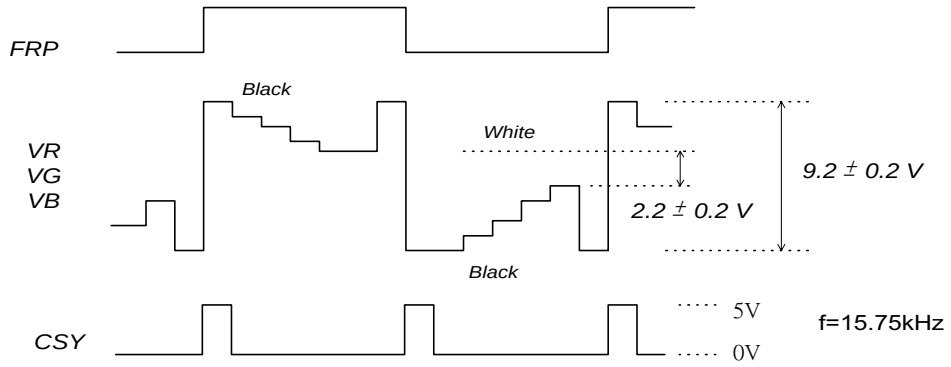


Description of the signal 16 pin connector on interface circuit

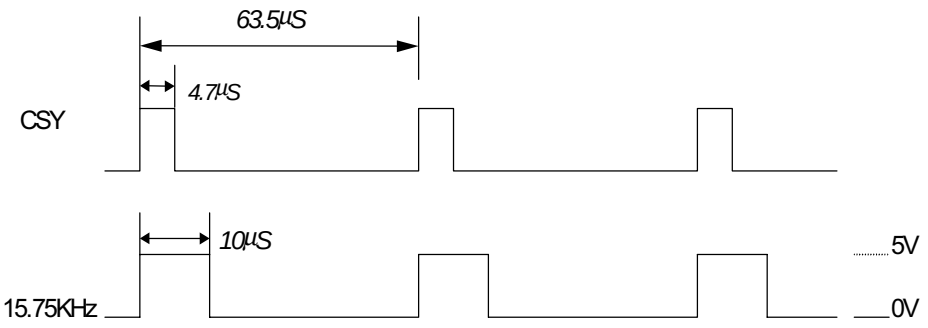
1.16 pin description:

Pin No	Symbol	I/O	Description	Remark
1	$\overline{HSY}$	I/O	Horizontal Sync. Input / Output	
2	FRP	O	Video Polarity Alternating Signal	Note 1
3	CSY	I	Composite Sync. Signal	
4	V_{GH}	I	Supply Voltage for Gate Driver (+20 V Hi level)	
5	V_{GL}	I	Supply Voltage for Gate Driver (-5V Low level)	
6	V_B	I	Specific Video Signal (Blue)	Note 1
7	V_R	I	Specifoc Video Signal (Red)	Note 1
8	V_G	I	Specific Video Signal (Green)	Note 1
9	GND	I	Ground	
10	V_{DD}	I	Supply voltage for controller (+5V)	
11	V_{SH}	I	Supply voltage for source driver (+14V)	
12	GND	I	Ground	
13	V_{DD}	I	Supply voltage for controller (+5 V)	
14	$\overline{VSY}$	I/O	Vertical Sync. Input/ Output	
15	PSI	O	Synchronize Pulse for Decorder	Note 2
16	GND	O	Ground	

Note 1:



Note 2: The frequency of PSI is 15.75KHz.



2. Recommended operation condition:

GND = 0V， Ta = 25 ℃

Parameter		Symbol	MIN.	TYP	MAX.	Unit	Remark
Supply voltage for source driver		V_{SH}	+13.5	+14	+14.5	V	
Supply voltage for gate driver	H Level	V_{GH}	+19	+20	+24	V	
	L Level	V_{GL}	-5.5	-5	-4	V	
Supply voltage for controller		V_{DD}	+4.7	+5	+5.3	V	
Input Signal voltage	H Level		+2.4	-	+5	V	Note 1
	L Level		-0.3	-	+0.8	V	
Output Signal voltage	H Level		+2.4	+4	+5	V	Note 2
	L Level		0		+0.5	V	

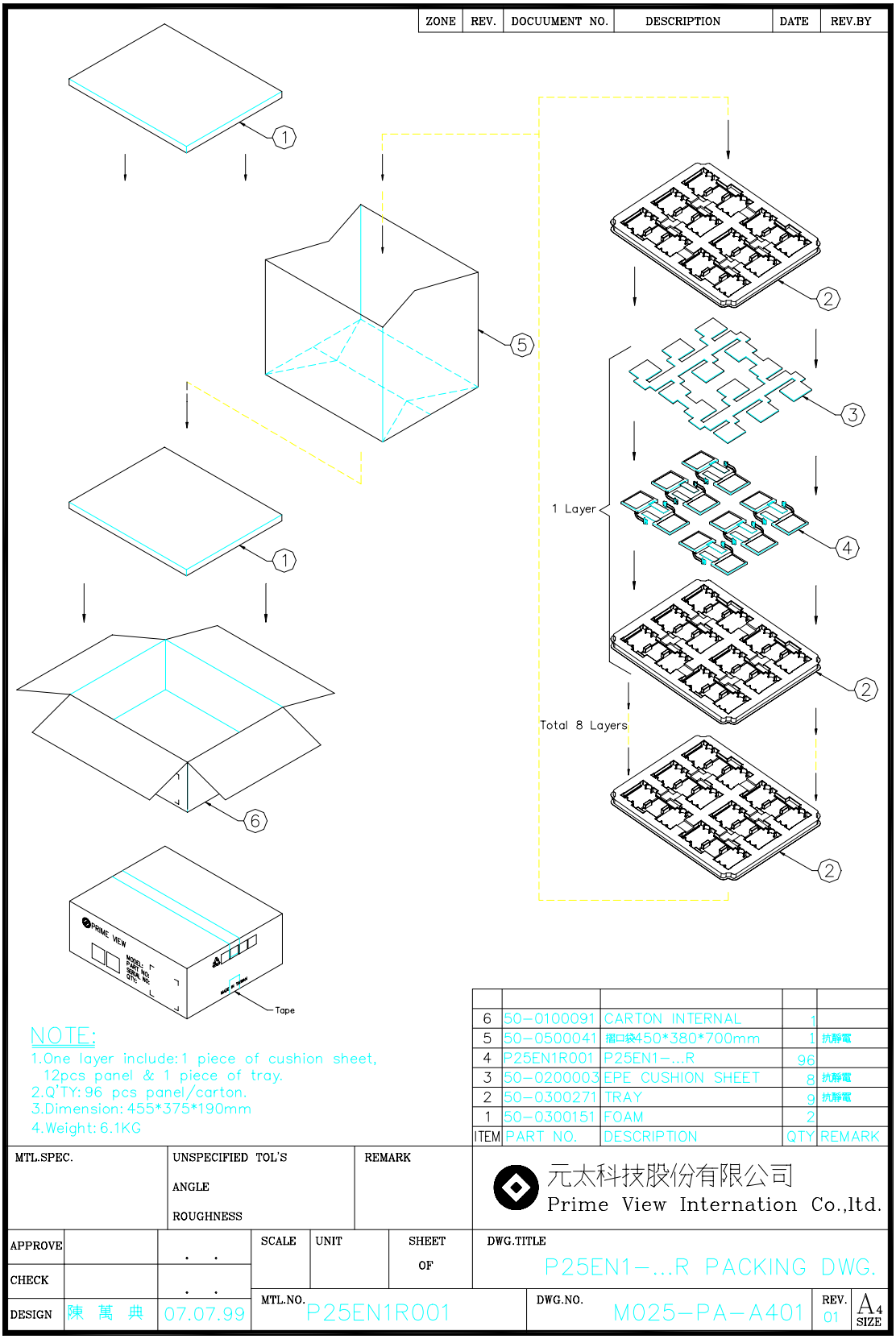
Note 1 : $\overline{\text{HSY}}$, CSY, $\overline{\text{VSY}}$,

Note 2 : $\overline{\text{HSY}}$, FRP, $\overline{\text{VSY}}$, PSI,

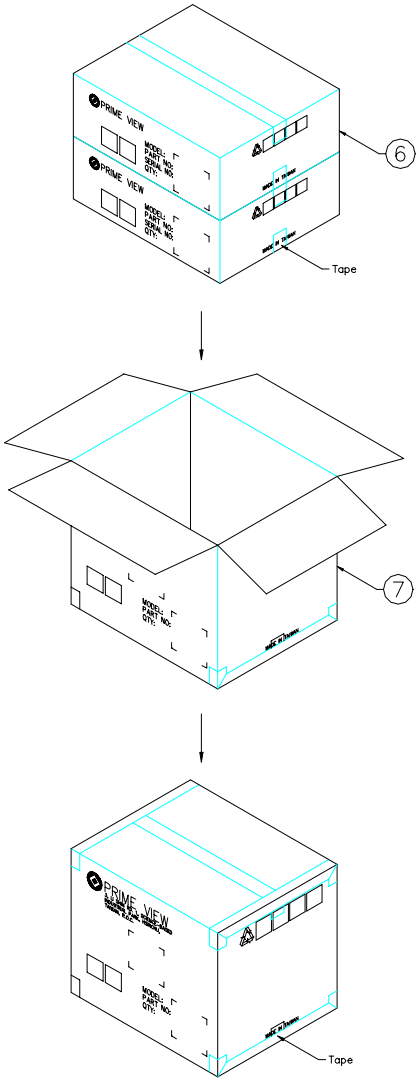
3. Special components specification of the interface circuit

C27 : Variable capacitor (20pF) Supplier : Kyocera
D1 : Variable capacitor diode (1SV214) Supplier : Toshiba
U3 : IC TC7S04F Supplier : Toshiba
Z1 : 5.1V Zenor diode
Z2 : 6.2V Zenor diode

Appendix B : Package Drawing



ZONE	REV.	DOCUUMENT NO.	DESCRIPTION	DATE	REV.BY



NOTE:

1.Q'TY: 192pcs panel/carton.
2.Dimension: 480*396*405mm
3.Weight: 13.2KG

ITEM	PART NO.	DESCRIPTION	QTY	REMARK
7	50-0100101	CARTON EXTERNAL	1	

MTL.SPEC.	UNSPECIFIED TOL'S ANGLE ROUGHNESS	REMARK	元太科技股份有限公司 Prime View Internation Co.,ltd.

APPROVE		. .	SCALE	UNIT	SHEET OF	DWG.TITLE P25EN1-...R PACKING DWG.
CHECK		. .				
DESIGN	陳 萬 典	07.07.99	MTL.NO. P25EN1R001		DWG.NO. M025-PA-A402	REV. 01 / A4 SIZE

Revision History

Rev.	Issued Date	Revised Contents
Pre.	*Feb. 22 1999'*	*Preliminary Specification*
1.0	*Sep. 29 2000'*	*The Interface circuit、Package drawing is added*