Winstar Display Co., LTD
華凌光電股份有限公司
WEB: http://www.winstar.com.tw *E-mail: winstar@winstar.com.tw*

SPECIFICATION

CUSTOMER : _____

MODULE NO.: WF57DTIACDNN0#

APPROVED BY: **(FOR CUSTOMER USE ONLY)**	**PCB VERSION:** **DATA:**

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
ISSUED DATE: 2015/07/14			

TFT Display Inspection Specification: http://www.winstar.com.tw/service.php

MODLE NO：

DOC. FIRST ISSUE

RECORDS OF REVISION

VERSION	DATE	REVISED PAGE NO.	**SUMMARY**
0	2013/09/24		First issue
A	2014/03/06		Modify Package Specification. Correct Electrical Characteristics
B	2015/04/08		Add size & Surface. Modify Block Diagram
C	2015/04/27		Modify Reliability.
D	2015/07/14		Modify contour drawing (Supporting tape=12mm)

Contents

1.Module Classification Information

W	F	57	D	T	I	A	C	D	N	N	0	#
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	⑬

①	Brand：WINSTAR DISPLAY CORPORATION		
②	Display Type：F→TFT Type, J→Custom TFT		
③	Display Size：5.7” TFT		
④	Model serials no.		
⑤	Backlight Type：	F→CCFL, White S→LED, High Light White	T→LED, White
⑥	LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction	C→Transmissive, N. T, 6:00 ; I→Transmissive, W. T, 6:00 F→Transmissive, N.T,12:00 ; L→Transmissive, W.T,12:00 N→Transmissive, Super W.T, 6:00 Q→Transmissive, Super W.T, 12:00 X→Transmissive, W.T, VA TFT V→Transmissive, Super W.T, VA TFT R→Transmissive, Super W.T, O-TFT Z→Transmissive, W.T, O-TFT A→Transmissive, N.T, IPS TFT Y→Transmissive, W.T, IPS TFT	
⑦	A：TFT LCD B：TFT+FR+CONTROL BOARD C：TFT+FR+A/D BOARD D：TFT+FR+A/D BOARD+CONTROL BOARD E：TFT+FR+POWER BOARD F：TFT+CONTROL BOARD	G：TFT+FR H：TFT+D/V BOARD I：TFT+FR+D/V BOARD J：TFT+POWER BD	
⑧	Resolution:		
	A: 128160	B:320234	C:320240	D:480234	E:480272	F: 640480	G: 800480
	H:1024600	I:320480	J:240320	K:800600	L:240400	M :1024768	P :1280800
	S:480128	T:800320					
⑨	D: Digital L：LVDS						
⑩	Interface： N：without control board A：8Bit B：16Bit						
⑪	TS：N：Without TS T：resistive touch panel C：capacitive touch panel (G-F-F) G：capacitive touch panel(G-G)						
⑫	Version						
⑬	Special Code	#:Fit in with ROHS directive regulations					

2.Summary

This technical specification applies to 5.7’ color TFT-LCD panel. The 5.7’ color TFT-LCD panel is designed for camcorder, digital camera application and other electronic products which require high quality flat panel displays. This module follows RoHS.

3.General Specifications

Item	Dimension	Unit
Size	5.7	inch
Dot Matrix	320 x RGBx240(TFT)	dots
Module dimension	126.00(W) x 101.55(H) x 6.0(D)(MAX)	mm
Active area	115.2 x 86.40	mm
Dot pitch	0.12 x 0.36	mm
LCD type	TFT, Normally White, Transmissive	
View Direction	12 o'clock	
Gray Scale Inversion Direction	6 o'clock	
Backlight Type	LED,Normally White	
With /Without TP	Without TP	
Surface	Glare	

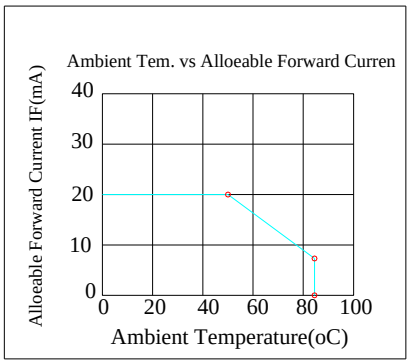
*Color tone slight changed by temperature and driving voltage.

4.Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T_{OP}	-20	—	+70	℃
Storage Temperature	T_{ST}	-30	—	+80	℃
Power Supply Voltage	V_{GH}	-0.3	—	32.0	V
	V_{GL}	-22	—	0.3	V
	V_{GH} - V_{GL}	-0.3	—	+45	V

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp. ≦60℃, 90% RH MAX. Temp.＞60℃, Absolute humidity shall be less than 90% RH at 60℃



5.Electrical Characteristics

5.1. Operating conditions:

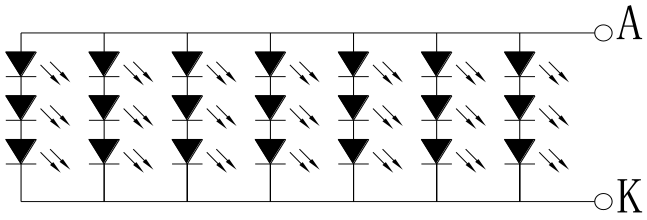
Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For LCM	VCC	—	3.0	3.3	3.6	V
Input High Volt.	V_{IH}	—	0.7 VCC	—	VCC	V
Input Low Volt.	V_{IL}	—	0	—	0.3 VCC	V
LCD Driving Supply Voltage	V_{GH} *1	Ta=25℃		15		V *3
	V_{GL}*2			-10		
	VcomH		2.5		5.5	
	VcomL		-2.0		0	
Supply Current For LCM	I_{VCC}	VCC=3.3V	—	5	8	mA

Notes:
*1) VGH is TFT Gate on operating voltage.
*2) VGL is TFT Gate off operating voltage, VGL signal must be fluctuates with same phase as Vcom when Storage on Gate structure.
*3) Vcom must be adjusted to optimize display quality_Crosstalk Contrast Ratio and etc.

5.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current		-	140	-	mA	
Power Consumption			1365	1470	mW	
LED voltage	VBL+	9.0	-	10.5	V	Note 1
LED Life Time		-	50,000	-	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



Note 2 : Ta = 25 ℃
Note 3 : Brightness to be decreased to 50% of the initial value
Note 4 : The single LED lamp case

6.DC CHARATERISTICS

Parameter	Symbol	Rating			Unit	Condition
		Min	Typ	Max		
Low level input voltage	V_{IL}	0	-	0.3VCC	V	
High level input voltage	V_{IH}	0.7VCC	-	VCC	V	

7.AC CHARATERISTICS

7.1. CCIR601/656 Interface

Input signal characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
CLK period	Tosc	-	37	-	ns
Data setup time	Tsu	12	-	-	ns
Data hold time	THo	12	-	-	ns

Hardware reset timing

Parameter	Symbol	Min.	Typ.	Max.	Unit
Reset low pulse width	TRSB	10	-	-	μ s

Output signal characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit
Rising time		Tr	-	-	10	ns
Falling time		Tf	-	-	10	ns
Intemal STH setup time		Tsus	12	-	-	ns
Intemal STH hold time		THDS	12	-	-	ns
Intemal data setup time		TSUD	60	-	-	ns
Intemal data hold time		THDD	40	-	-	ns
OEH pulse width		TOEH	-	1248	-	ns
OEV pulse width		TOEV	-	4992	-	ns
CKV pulse width		TCKV	-	3744	-	ns
Hsync-DEH time		T1	-	4368	-	ns
Hsync-CKV time		T2	-	2496	-	ns
Hsync-OEV time		T3	-	624	-	ns
Vsync-setup time		TSUV		1872	-	ns
Vsync-pulse time		TSTV		1	-	TH
Vsync-STV time	NTSC	TVS1	-	19	-	TH
	PAL	TVS1	-	27	-	TH
OEH-STV time		THE	-	2	-	TH
Output settling time		TOES	-	12	20	μ s

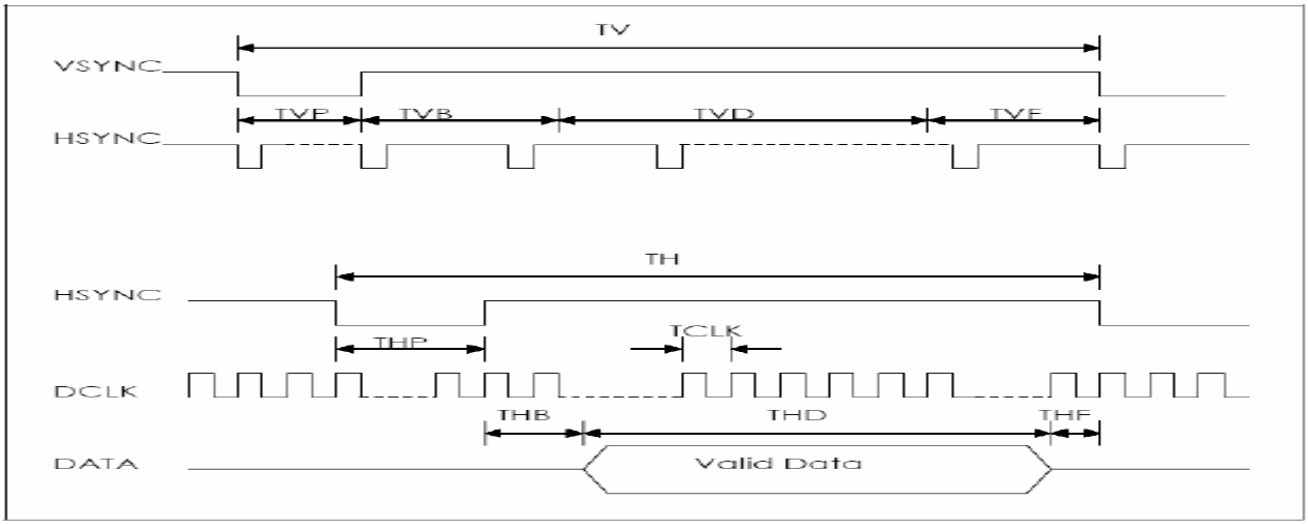
7.2. 24-bits parallel RGB Interface

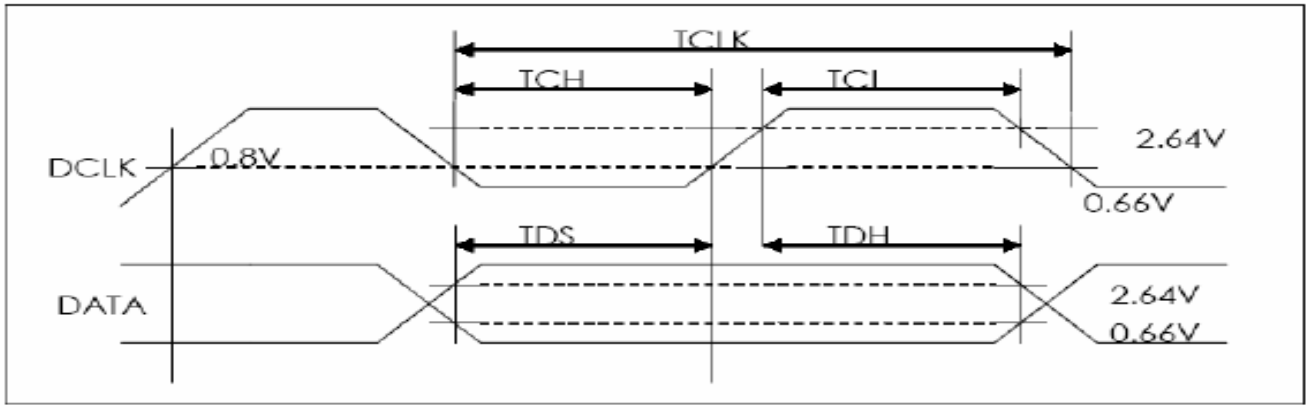
AC Timing Characteristics

Signal	Item	Symbol	Min.	Typ.	Max.	Unit
Dclk	Frequency	Dclk	-	6.4	-	MHZ
	High time	Tch	-	78	-	ns
	Low time	Tcl	-	78	-	ns
Data	Setup time	Tds	12	-	-	ns
	Hold time	Tdh	12	-	-	ns
Hsync	Period	TH	-	408	-	DCLK
	Pulse Width	Thp	-	30	-	DCLK
	Back-Porch	Thb	-	38	-	DCLK

	Display Period		Thd	-	320	-	DCLK
	Front-Porch		Thf	-	20	-	DCLK
Vsync	Period	NTSC	TV	-	262.5	-	DCLK
		PAL			312.5		
	Pulse Width		Tvp	1	3	5	TH
	Back-Porch	NTSC	Tvb	-	15	-	TH
		PAL			23		
	Display Period		Tvd	-	240	-	TH
	Front-Porch	NTSC	Tvf	-	4.5	-	TH
		PAL			46.5		

AC Timing Diagrams



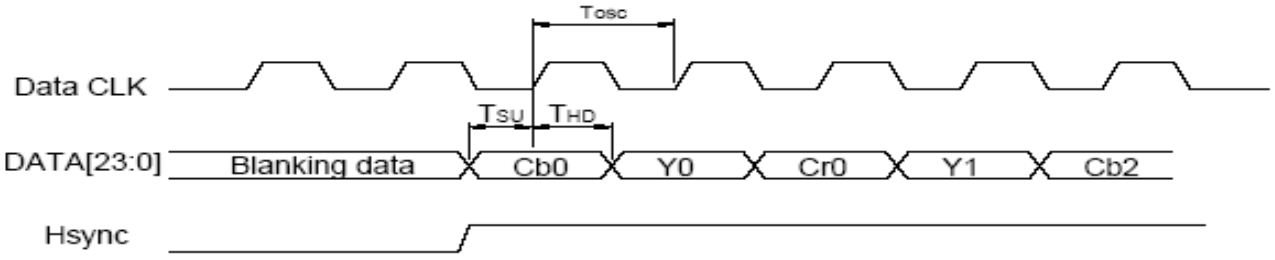


8.Waveform

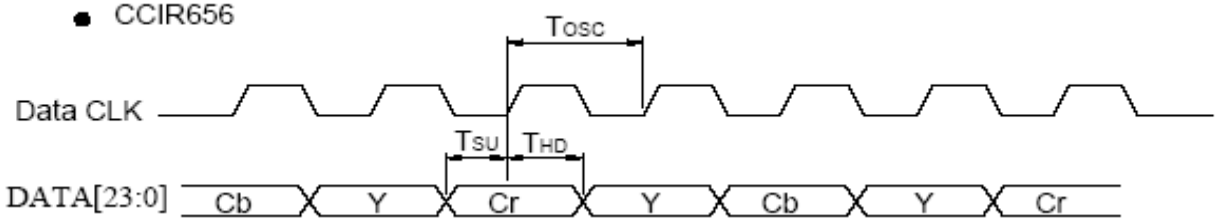
8.1. Timing Controller Timing Chart

Clock and Data waveform

- CCIR601(HS_POL="L" in Register R2)



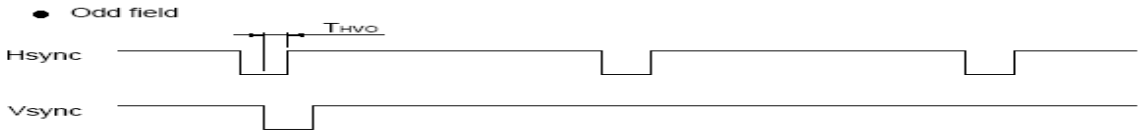
- CCIR656



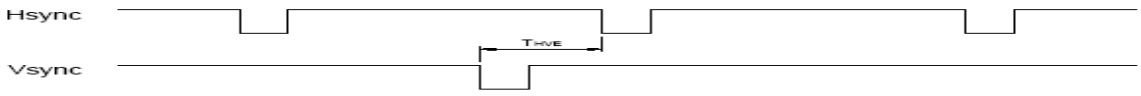
8.2. Digital / Analog RGB timing waveform

Hsync and Vsync timing

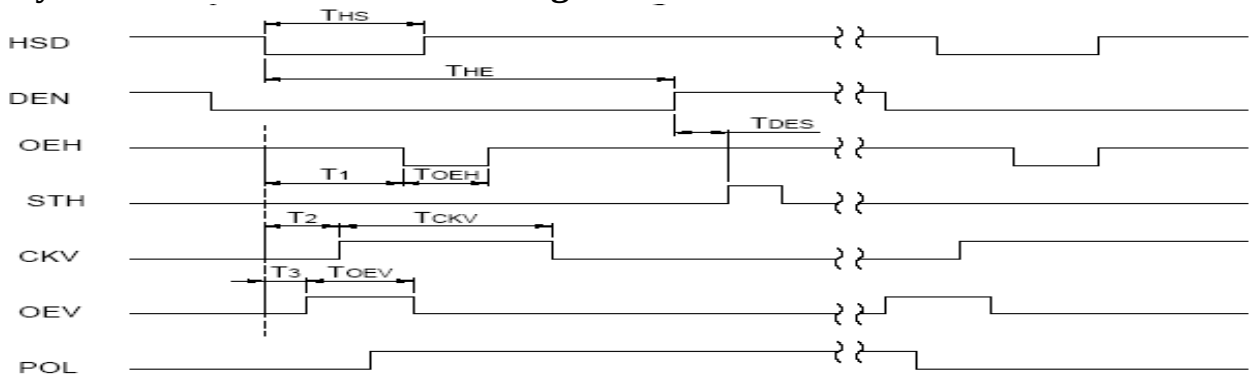
- Odd field



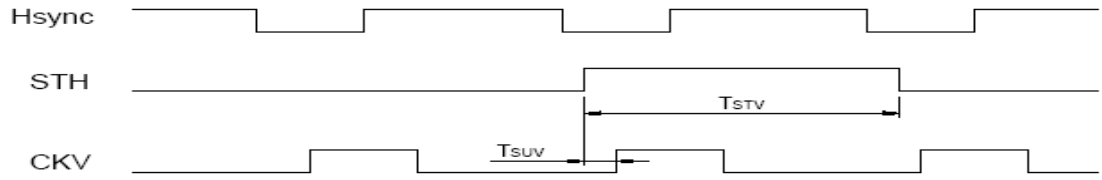
- Even field



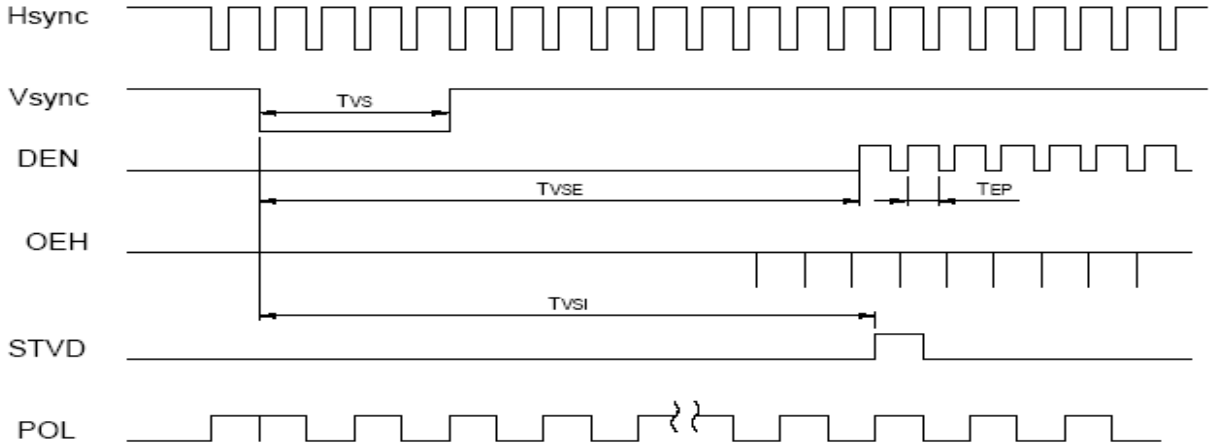
Hsync and horizontal control timing waveform



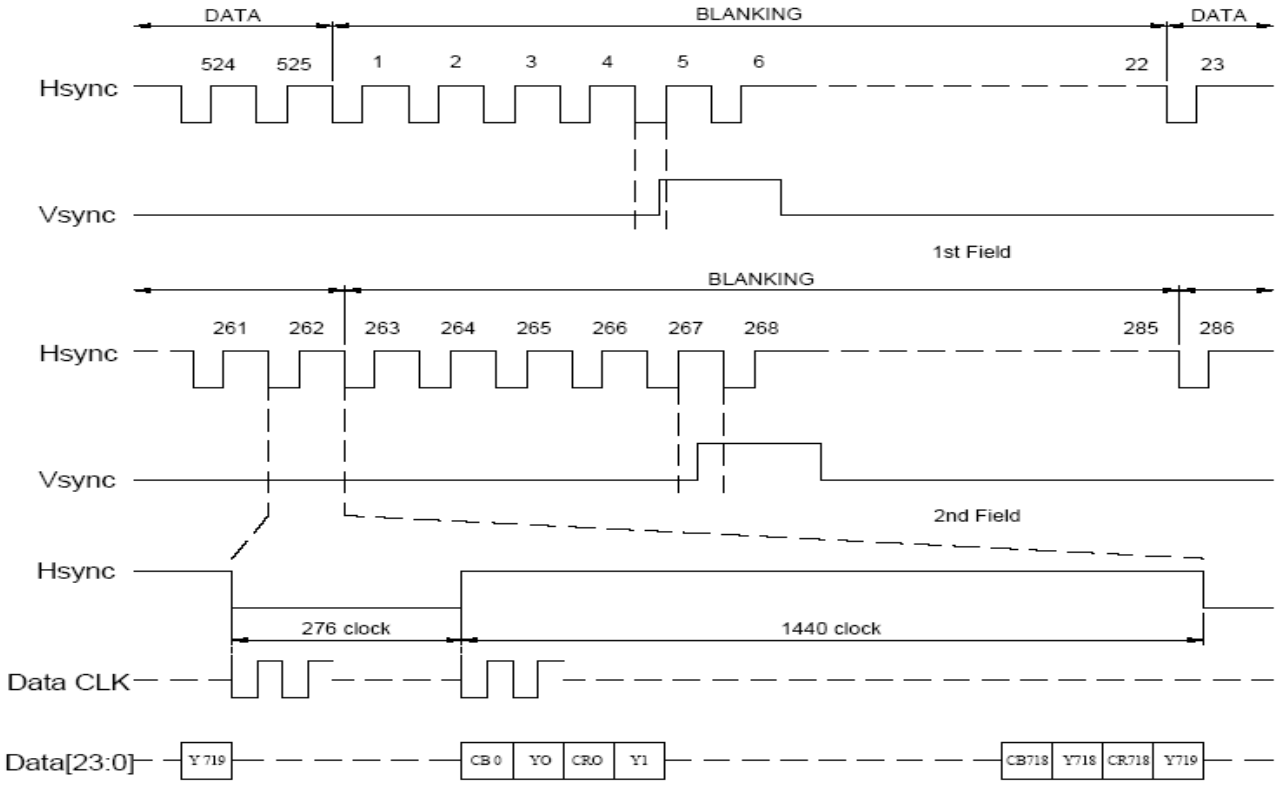
Hsync and vertical shift clock timing waveform



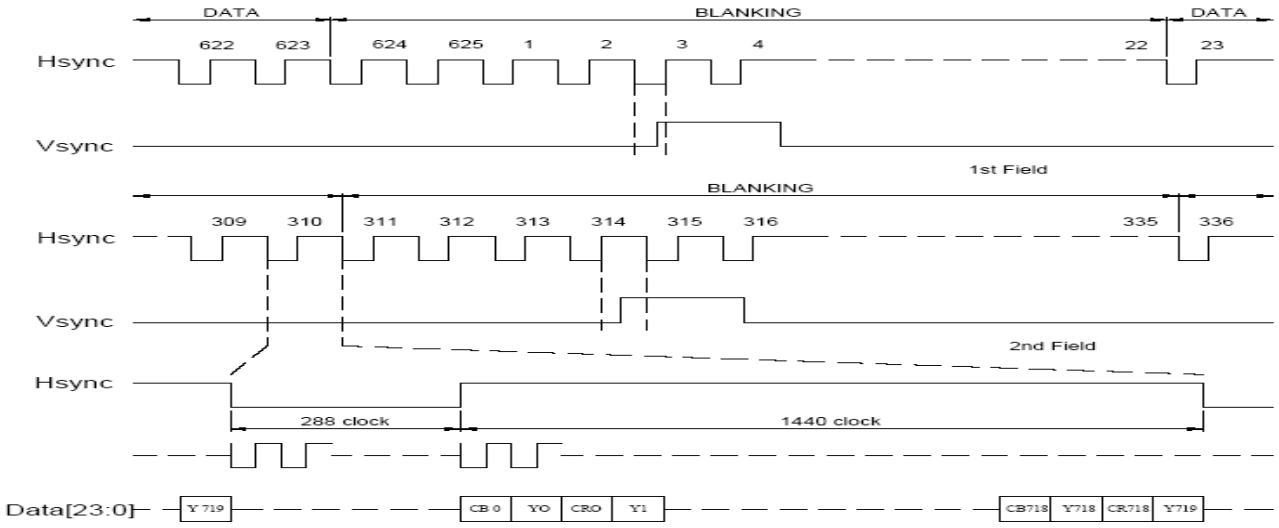
Hsync and vertical shift clock timing waveform



8.3. CCIR601 timing waveform (VS_POL="H" , HS_POL="L" in Register R2)



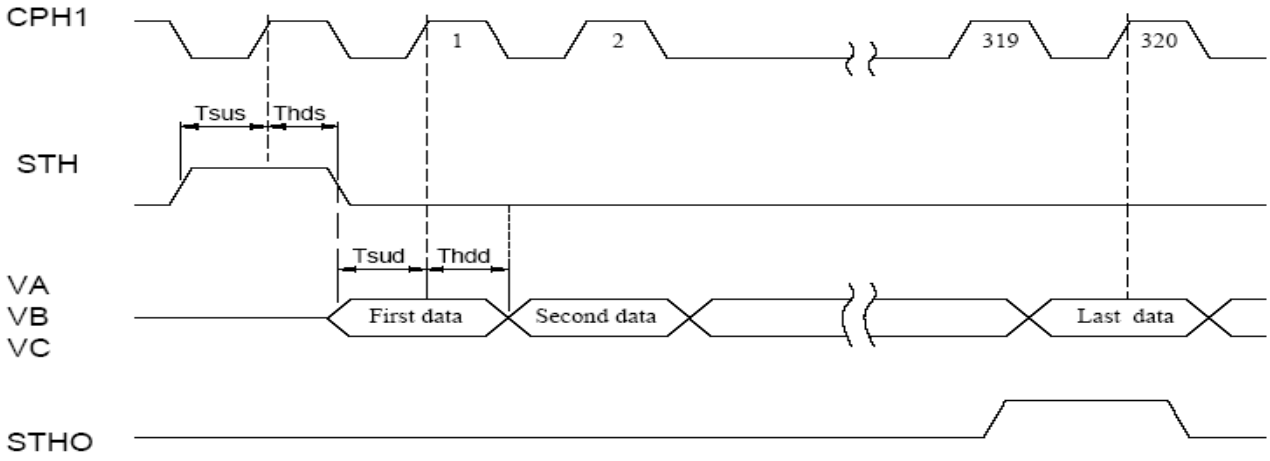
ITU-BT.601 NTSC Input Timing



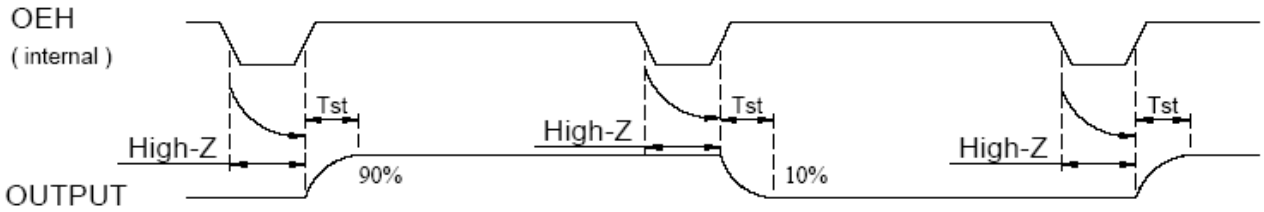
ITU-BT.601 PAL Input Timing

8.4. Source Driver Timing Chart

Clock and Start Pulse timing waveform



8.5. OEH and Data Output timing waveform



8.6. Analog video signal characteristics

PARAMETER	Symbol	Min.	Typ.	Max.	Unit
Video signal amplitude (VA, VB, VC)	V_{IAC}	-	3.81	-	V
	V_{IDC}	-	2.385	-	V

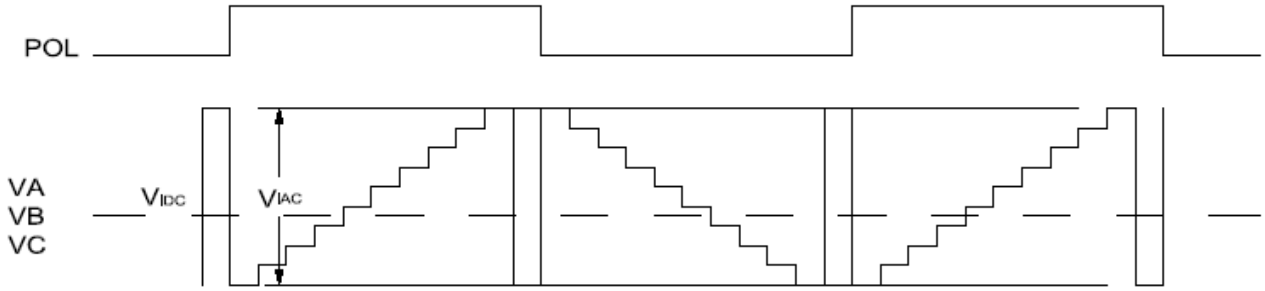
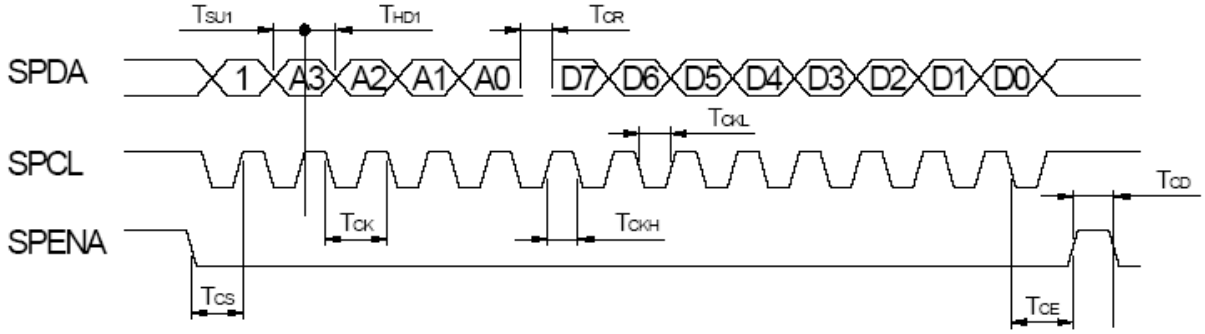


Fig. 4-(a) Horizontal timing

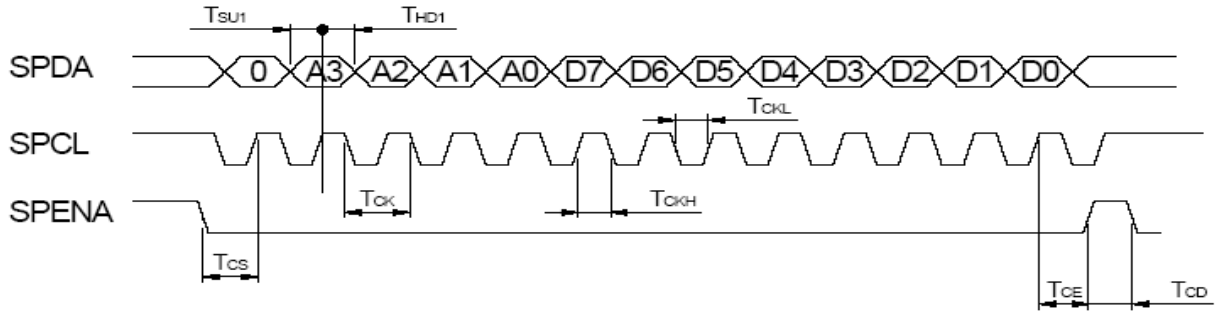
8.7. SPI timing characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
SPCL period	T_{CK}	60	-	-	ns
SPCL high width	T_{CKH}	30	-	-	ns
SPCL low width	T_{CKL}	30	-	-	ns
Data setup time	T_{SU1}	12	-	-	ns
Data hold time	T_{HD1}	12	-	-	ns
SPENA to SPCK setup time	T_{CS}	20	-	-	ns
SPENA to SPDA hold time	T_{CE}	20	-	-	ns
SPENA high pulse width	T_{CD}	50	-	-	ns
SPDA output latency	T_{CR}		1/2	-	T_{CK}

- SPI "read" timing

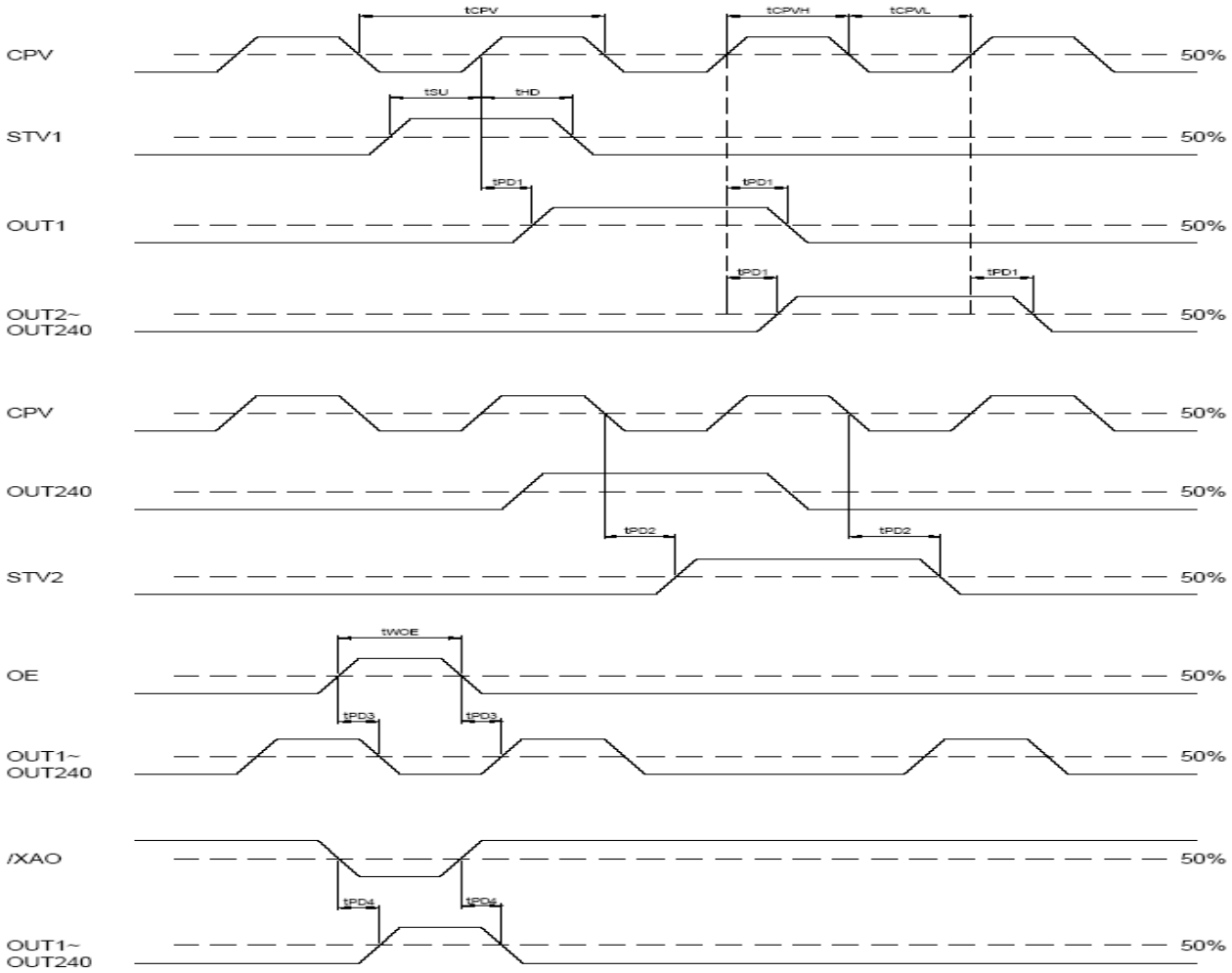


- SPI "write" timing



8.8. Gate Driver Timing Chart

Parameter	Symbol	Condition	Spec		Unit
			Min.	Max.	
Operation frequency	tCPV		5	-	μs
CPV pulse width	tCPVH,tCPVL	50%duty cycle	2.5	-	
OE pulse width	twOE		1	-	
Data setup time	tsu		0.4	-	us
Data hold time	thd		0.7	-	
Output delay time	tpd1	CL=300pF	-	1	
Output delay time	tpd2	CL=300pF	-	0.8	
Output delay time	tpd3	CL=300pF	-	0.8	
Output delay time	tpd4	CL=300pF	-	10	



9.Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr	θ =0°、Φ=0°	-	15	30	ms	Note 3,5
		Tf		-	35	50	ms	
Contrast ratio		CR	At optimized viewing angle	150	250	-	-	Note 4,5
Color Chromaticity	White	Wx	θ =0°、Φ=0	0.282	0.312	0.342		Note 2,6,7
		Wy		0.319	0.349	0.379		
Viewing angle (Gray Scale Inversion Direction)	Hor.	Θ R	CR≧10	60	70		Deg.	Note 1
		Θ L		60	70			
	Ver.	Φ T		40	50			
		Φ B		60	70			
Brightness		-	-	400	500		cd/㎡	Center of display

Ta=25±2℃, IL=140mA

Note 1: Definition of viewing angle range

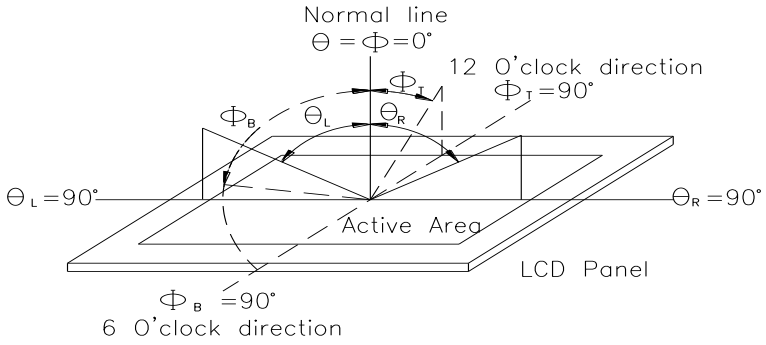


Fig.9.1. Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7orBM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

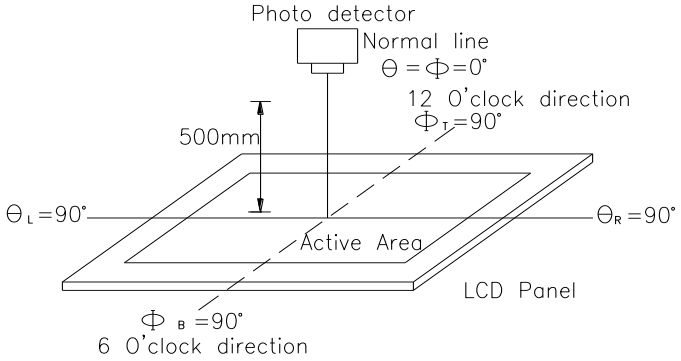
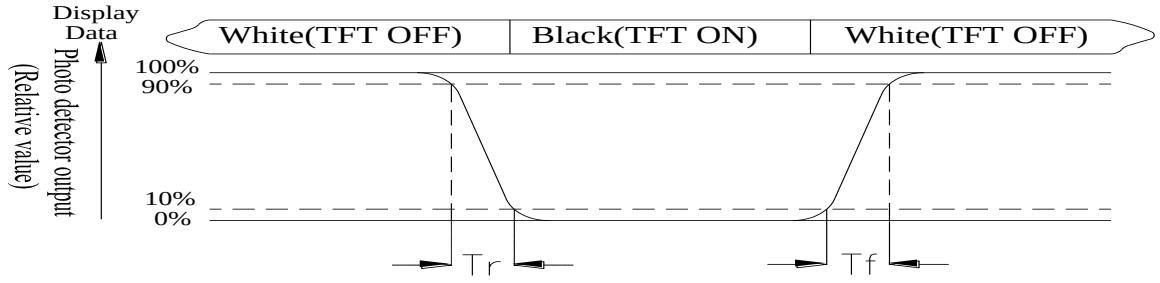


Fig. 9.2. Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time, Tr, is the time between photo detector output intensity changed from 90%to 10%. And fall time, Tf, is the time between photo detector output intensity changed from 10%to 90%



Note 4: Definition of contrast ratio:
The contrast ratio is defined as the following expression.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: White Vi = Vi50 ± 1.5V
Black Vi = Vi50 ± 2.0V
"±" means that the analog input signal swings in phase with VCOM signal.
"±" means that the analog input signal swings out of phase with VCOM signal.
The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)
Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

10.Interface

10.1. LCM PIN Definition

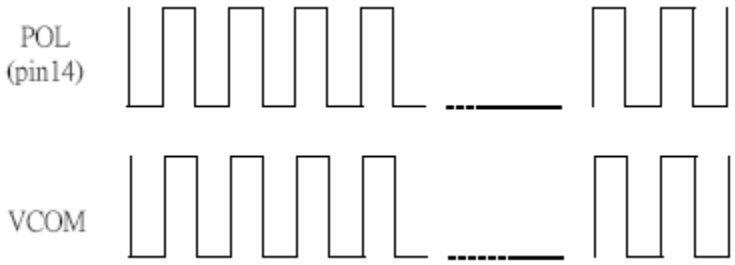
Pin No.	Symbol	I/O	Description	Remark
1	IF1	I	Input data format control (Note1)	Note1
2	IF2	I	Input data format control (Note1)	Note1
3	POL	O	Polarity Signal connect to VCOM driving circuit.	Note3
4	RESET	I	Hardware reset.	
5	SPENA	I	Chip select	Note2
6	SPCL	I	Serial Clock	Note2
7	SPDA	I/O	Serial Data	
8	B0	I	Blue Data bit (LSB)	
9	B1	I	Blue Data bit	
10	B2	I	Blue Data bit	
11	B3	I	Blue Data bit	
12	B4	I	Blue Data bit	
13	B5	I	Blue Data bit	
14	B6	I	Blue Data bit	
15	B7	I	Blue Data bit(MSB)	
16	G0	I	Green Data bit(LSB)	
17	G1	I	Green Data bit	
18	G2	I	Green Data bit	
19	G3	I	Green Data bit	
20	G4	I	Green Data bit	
21	G5	I	Green Data bit	
22	G6	I	Green Data bit	
23	G7	I	Green Data bit(MSB)	
24	R0	I	Red Data bit(LSB)	
25	R1	I	Red Data bit	
26	R2	I	Red Data bit	
27	R3	I	Red Data bit	
28	R4	I	Red Data bit	
29	R5	I	Red Data bit	
30	R6	I	Red Data bit	
31	R7	I	Red Data bit(MSB)	
32	Hsync	I	Horizontal synchronous signal	
33	Vsync	I	Vertical synchronous signal	
34	Data CLK	I	Dot data clock	
35	AVDD	I	4.5V~5.5V	
36	AVDD	I	4.5V~5.5V	
37	Vcc	I	3V~3.6V	
38	Vcc	I	3V~3.6V	
39	NPC	O	NTSC/PAL mode Auto detection result H:NTSC/L:PAL	
40	VGL	I	Gate off power	
41	VGL	I	Gate off power	
42	UD	I	Up/Down scan setting. H: Reverse scan / L: Normal scan	
43	VGH	I	Gate on power	

44	LRC	I	Shift direction of device internal shift register control.	
45	GND	I	GROUND	
46	VCOM	I	VCOM driving input	Note3
47	VCOM	I	VCOM driving input	
48	ENB	I	Data enable input. Normally pull low.	Note4
49	GND	I	GROUND	
50	GND	I	GROUND	

Note: 1.Control the input data format.

IF2,IF1	Input data format
L,L(default)	Serial RGB
L,H	Parallel RGB
H,L	CCIR601
H,H	CCIR656

2. Pin 5、Pin 6 usually pull high.
3. The polarity of VCOM (Pin 46,47) should be generated from POL (Pin 3).
4. For digital RGB input data format, both SYNC mode and DE+SYNC mode are supported. If ENB signal is fixed low, SYNC mode is used. Otherwise, DE+SYNC mode is used.
5. The phase of POL (pin 3):

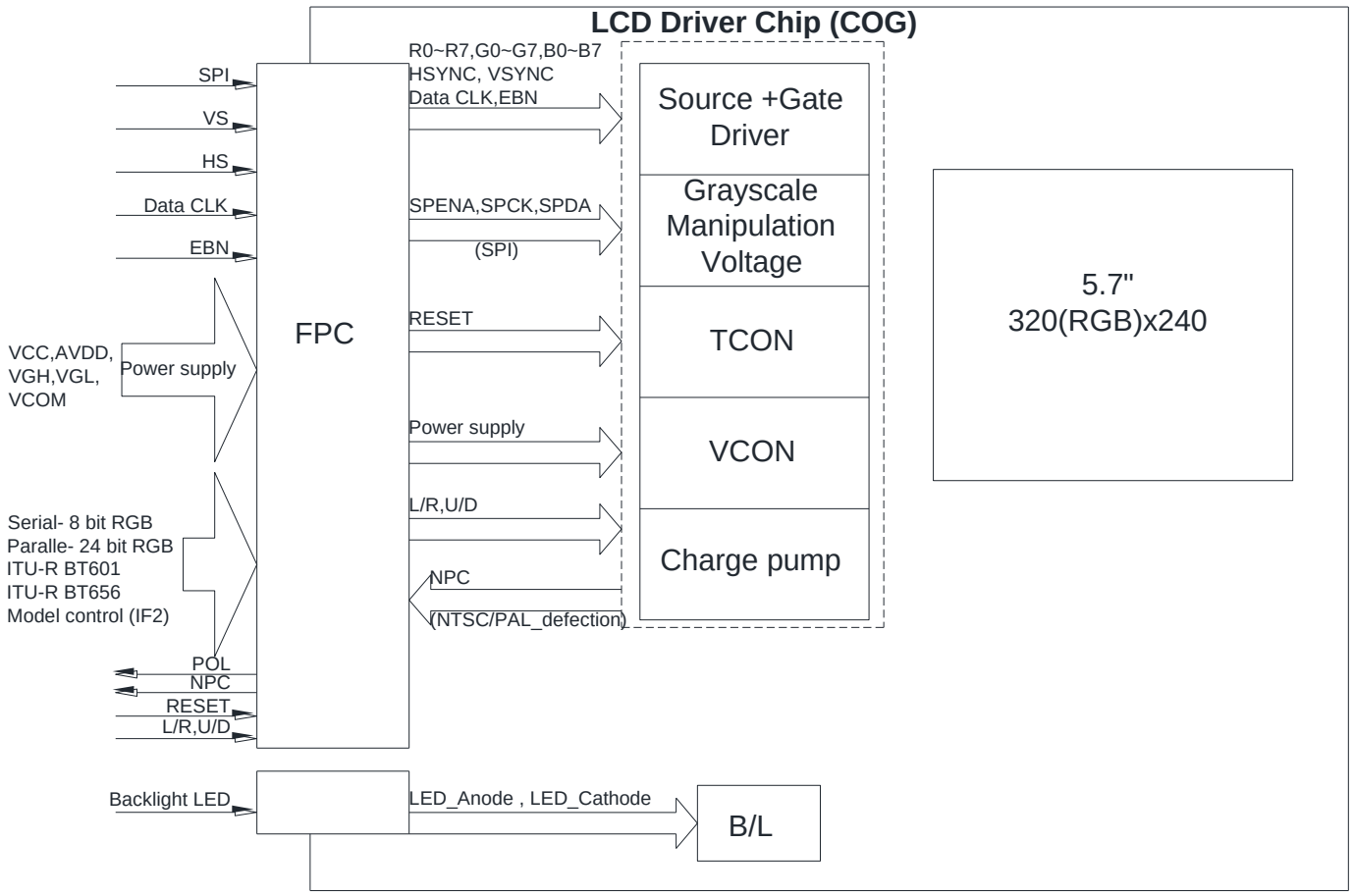


10.2. Backlight PIN Definition

Pin No.	Symbol	I/O	Description
1	VLED+	I	Red, LED_ Anode
2	VLED-	I	Black, LED_ Cathode

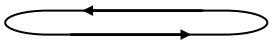
Note: The backlight interface connector is a model **PHR-2** manufactured by JST or equivalent.
The matching connector part number is **S 2B-PH-K-S** manufactured by JST or equivalent.

11.Block Diagram



12.Reliability

Content of Reliability Test (Wide temperature, -20℃~70℃)

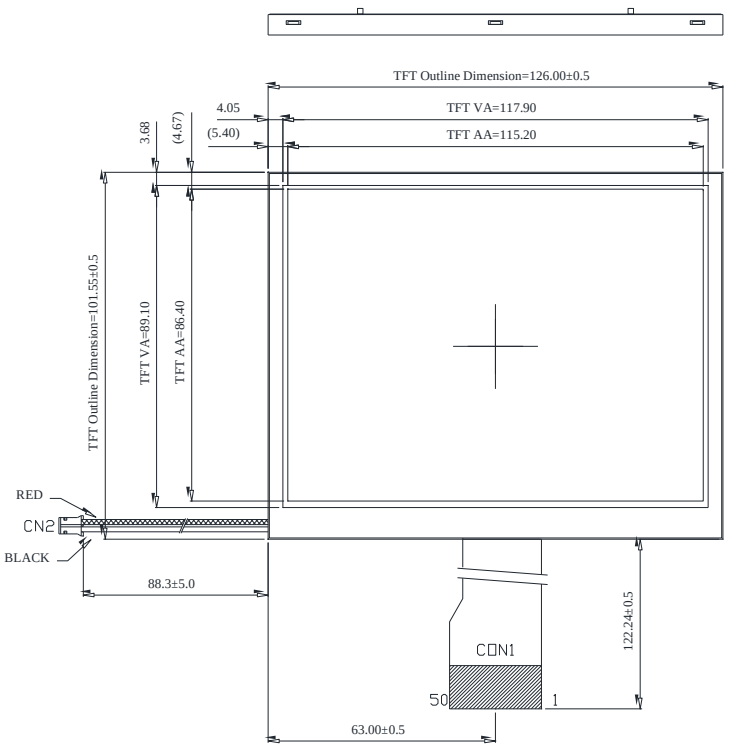
Environmental Test			
Test Item	**Content of Test**	**Test Condition**	**Note**
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80℃ 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30℃ 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70℃ 200hrs	——
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20℃ 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60℃,90%RH max	60℃,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation -20℃ 25℃ 70℃  30min 5min 30min 1 cycle	-20℃/70℃ 10 cycles	——
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 15mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=800V, RS=1.5kΩ CS=100pF 1 time	——

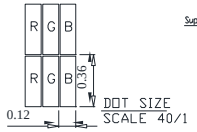
Note1: No dew condensation to be observed.

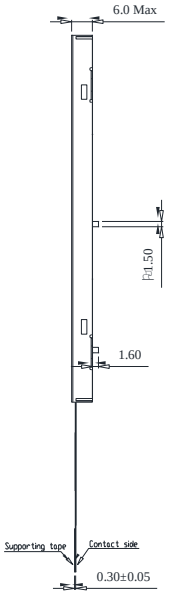
Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

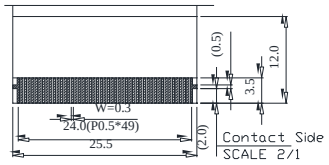
13.Contour Drawing







PIN NO.	SYMBOL	PIN NO.	SYMBOL	PIN NO.	SYMBOL
1	IF1	21	G5	41	VGL
2	IF2	22	G6	42	UD
3	POL	23	G7	43	VGH
4	RESET	24	R0	44	LRC
5	SPENA	25	R1	45	GND
6	SPCL	26	R2	46	VCOM
7	SPDA	27	R3	47	VCOM
8	B0	28	R4	48	ENB
9	B1	29	R5	49	GND
10	B2	30	R6	50	GND
11	B3	31	R7		
12	B4	32	Hsync	CN2	
13	B5	33	Vsync	RED	+
14	B6	34	Data CLK	BLACK	−
15	B7	35	AVDD		
16	G0	36	AVDD		
17	G1	37	Vcc		
18	G2	38	Vcc		
19	G3	39	NPC		
20	G4	40	VGL		



14.PACKAGE SPECIFICATION

LCM Model	WF57DTIACDNN0#
Drawing NO.	

LCM 包裝規格書

LCM Packaging Specifications

Approve	Check	Contact
DATE	初版	版次 Ver
14’02/07	13'11/08	A

1.包裝材料規格表（Packaging Material）:(per carton)

NO.	Item	Model	Dimensions	Quantity
1	成品（LCM）	WF57DTIACDNN0#		90
2	TRAY 盤 (2)	PKCA1XXXXXXXXXXX0184	315mm*265mm	30
3	BP01 內盒(3)Product Box	PK3Y1XXXXXXXXXXX0001	332*280*100mm	6
4	泡棉(4)Foam	-----		6
5	外紙箱(5)Carton	PK4X1XXXXXXXXXXX0000	565*340*320mm	1
6				
7				
8				
9				

2.單箱數量規格表(Packaging Specifications and Quantity) :

(1)LCM quantity per box : no per tray 3 x no of tray 5 = 15

(2)Total LCM quantity in carton : quantity per box 15 x no of boxes 6 = 90

特 記 事 項 (REMARK)

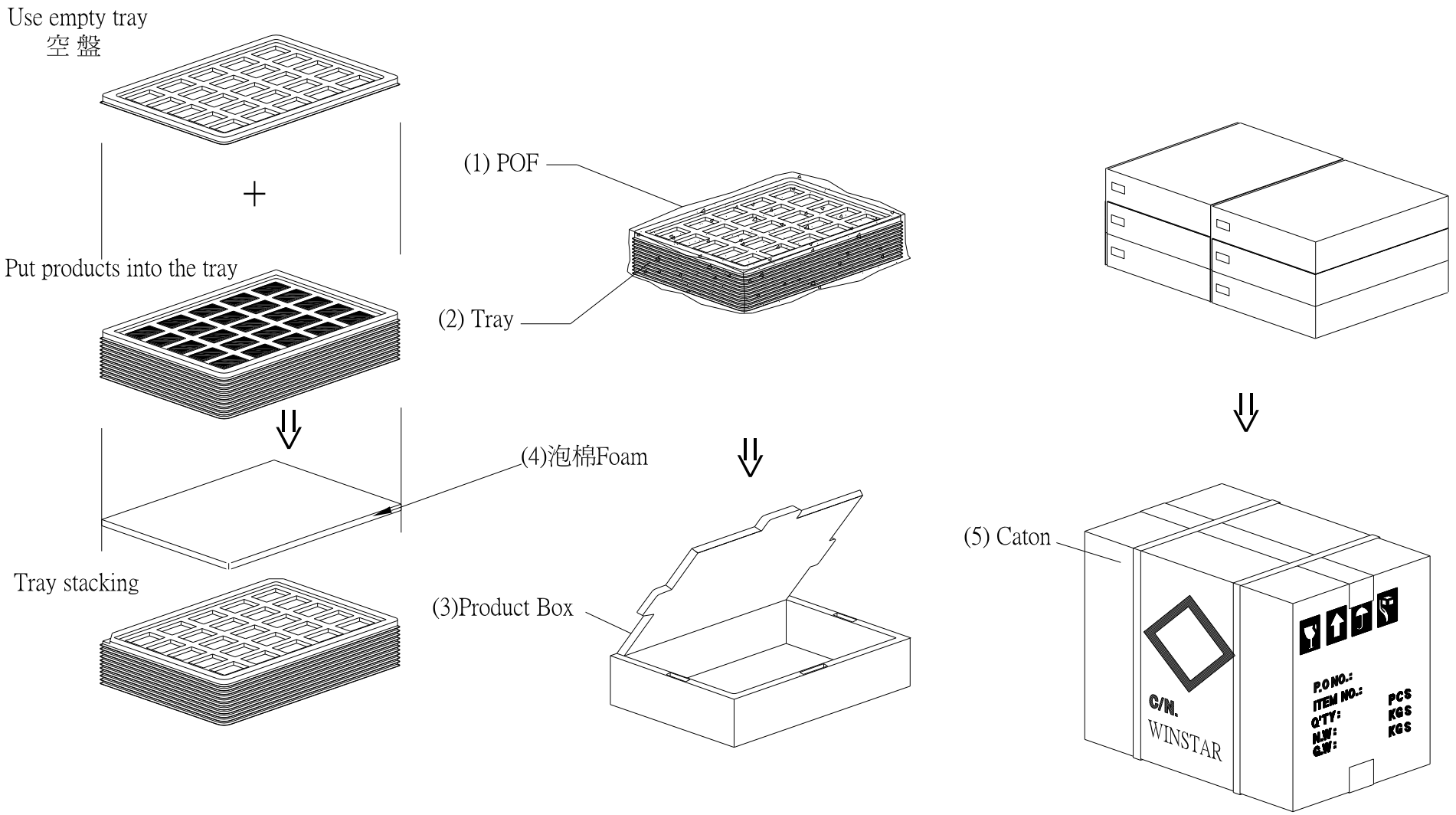
1. Label Specifications :

MOOEL:

LOT NO :

QUANTITY:

CHECK:


Use empty tray
空盤
Put products into the tray
Tray stacking
(1) POF
(2) Tray
(4)泡棉Foam
(3)Product Box
(5) Caton
C/N.
WINSTAR
P.O NO.:
ITEM NO.:
Q'TY:
N.W:
G.W:
PCS
KGS
KGS

winstar

LCM Sample Estimate Feedback Sheet

Module Number： _____

1、Panel Specification：

1. Panel Type： □ Pass □ NG ,_____
2. View Direction： □ Pass □ NG ,_____
3. Numbers of Dots： □ Pass □ NG ,_____
4. View Area： □ Pass □ NG ,_____
5. Active Area： □ Pass □ NG ,_____
6. Operating Temperature： □ Pass □ NG ,_____
7. Storage Temperature： □ Pass □ NG ,_____
8. Others：_____

2、Mechanical Specification：

1. PCB Size： □ Pass □ NG ,_____
2. Frame Size： □ Pass □ NG ,_____
3. Material of Frame： □ Pass □ NG ,_____
4. Connector Position： □ Pass □ NG ,_____
5. Fix Hole Position： □ Pass □ NG ,_____
6. Backlight Position： □ Pass □ NG ,_____
7. Thickness of PCB： □ Pass □ NG ,_____
8. Height of Frame to PCB： □ Pass □ NG ,_____
9. Height of Module： □ Pass □ NG ,_____
10. Others： □ Pass □ NG ,_____

3、Relative Hole Size：

1. Pitch of Connector： □ Pass □ NG ,_____
2. Hole size of Connector： □ Pass □ NG ,_____
3. Mounting Hole size： □ Pass □ NG ,_____
4. Mounting Hole Type： □ Pass □ NG ,_____
5. Others： □ Pass □ NG ,_____

4、Backlight Specification：

1. B/L Type： □ Pass □ NG ,_____
2. B/L Color： □ Pass □ NG ,_____
3. B/L Driving Voltage (Reference for LED Type)： □ Pass □ NG ,_____
4. B/L Driving Current： □ Pass □ NG ,_____
5. Brightness of B/L： □ Pass □ NG ,_____
6. B/L Solder Method： □ Pass □ NG ,_____
7. Others： □ Pass □ NG ,_____

>> **Go to page 2** <<

5、Electronic Characteristics of Module：

1.	Input Voltage：	□ Pass	□ NG ,_____
2.	Supply Current：	□ Pass	□ NG ,_____
3.	Driving Voltage for LCD：	□ Pass	□ NG ,_____
4.	Contrast for LCD：	□ Pass	□ NG ,_____
5.	B/L Driving Method：	□ Pass	□ NG ,_____
6.	Negative Voltage Output：	□ Pass	□ NG ,_____
7.	Interface Function：	□ Pass	□ NG ,_____
8.	LCD Uniformity：	□ Pass	□ NG ,_____
9.	ESD test：	□ Pass	□ NG ,_____
10.	Others：	□ Pass	□ NG ,_____

6、Summary：

Sales signature：_____

Customer Signature：_____ **Date：** / /