



RAYSTAR

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RFC570C-SLW-DNS

SPECIFICATION

CUSTOMER:

APPROVED BY	
PCB VERSION	
DATE	

FOR CUSTOMER USE ONLY

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY

Release DATE:

TFT Display Inspection Specification: <https://www.raystar-optronics.com/download/products.htm>

Precaution in use of TFT module: <https://www.raystar-optronics.com/download/declaration.htm>

Revision History

VERSION	DATE	REVISED PAGE NO.	Note
0	2015/03/31		First issue
A	2015/04/28		Modify Reliability
B	2016/01/20		Modify pin27=NC. Add size, Surface &Resistance Touch Panel General Specification. Modify Static electricity test
C	2016/08/11		Modify Block Diagram
D	2016/11/17		Modify Vibration test
E	2019/12/02		Modify Summary Add Uniformity & Drive IC & Interface Modify Contour Drawing. Remove Package Specification

Contents

1. Module Classification Information
2. Summary
3. General Specification
4. Interface
5. Contour Drawing
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12. Touch Panel Information
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1.Module Classification Information

R	F	C	57	0C	-	S	L	W	-	D	N	S
1	2	3	4	5	-	6	7	8	-	9	10	11

Item	Description	
1	R : Raystar Optronics Inc.	
2	Display Type : F→TFT Type, J→ Custom TFT	
3	Solution: A: 128x160 B:320x234 C:320x240 D:480x234 E:480x272 F:800x480 G:640x480 H:1024x600 I:320x480 J:240x320 K:1280x800 L:240x400 M:1024x768 N:128x128 O:480x800 P:640x320 Q:800x600 S:480x128 T:800x320	
4	Display Size : 5.7" TFT	
5	Version Code.	
6	Model Type: A : TFT LCD E : TFT+FR+CONTROL BOARD J : TFT+FR+A/D BOARD N : TFT+FR+A/D BOARD+CONTROL BOARD S : TFT+FR+POWER BOARD (DC TO DC) 1 : TFT+CONTROL BOARD	6 : TFT+FR H : TFT+D/V BOARD I : TFT+FR+D/V BOARD B : TFT+POWER BD
7	Polarizer Type, Temperature range, View direction	I→Transmissive, W. T, 6:00 ; C→Transmissive, N. T, 6:00 L→Transmissive, W.T,12:00 ; F→Transmissive, N.T,12:00 Y→Transmissive,W.T, IPS TFT ; A→Transmissive, N.T, IPS TFT Z→Transmissive, W.T, O-TFT R→Transmissive, Super W.T, O-TFT N→Transmissive, Super W.T, 6:00; Q→Transmissive, Super W.T, 12:00 V→Transmissive, Super W.T, VA TFT
8	Backlight	W : LED, White H : LED, High Light White F : CCFL, White
9	Driver Method	D: Digital A: Analog L : LVDS M:MIPI
10	Interface	N : without control board A : 8Bit B : 16Bit S:SPI Interface R: RS232 U:USB I: I2C
11	TS	N : Without TS S : resistive touch panel C : capacitive touch panel capacitive touch panel (G-F-F) G : capacitive touch panel(G-G)

2.Summary

TFT 5.7" is a TN transmissive type color active matrix TFT liquid crystal display that use amorphous silicon TFT as switching devices. This module is a composed of a TFT_LCD module, It is usually designed for industrial application and this module follows RoHs,

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3.General Specifications

- Dot Matrix: 320 x RGBx240(TFT) dots
- Module dimension: 143.5 x 104.1 x 13.85 mm
- Active area: 115.2 x 86.4 mm
- Dot pitch: 0.12 x 0.36 mm
- LCD type: TFT, Normally White, Transmissive
- View Direction: 6 o'clock
- Gray Scale Inversion Direction: 12 o'clock
- Backlight Type: LED, Normally White
- Drive IC: HX8218+HX8615 or equivalent
- Interface: 18-bit RGB
- Aspect Ratio: 4:3
- With /Without TP: With RTP
- Surface: Anti-Glare

*Color tone slight changed by temperature and driving voltage.

4.Interface

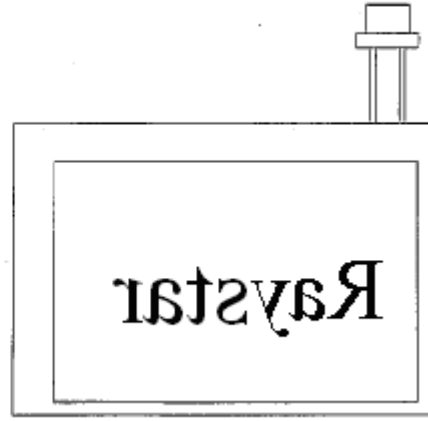
4.1. LCM PIN Definition

Pin	Symbol	Function	Remark
1	GND	Ground	
2	CK	Clock signal for sampling each data signal	
3	Hsync	Horizontal synchronous signal	
4	Vsync	Vertical synchronous signal	
5	GND	Ground	
6	R0	Red Data bit(LSB)	
7	R1	Red Data bit	
8	R2	Red Data bit	
9	R3	Red Data bit	
10	R4	Red Data bit	
11	R5	Red Data bit(MSB)	
12	GND	Ground	
13	G0	Green Data bit(LSB)	
14	G1	Green Data bit	
15	G2	Green Data bit	
16	G3	Green Data bit	
17	G4	Green Data bit	
18	G5	Green Data bit(MSB)	
19	GND	Ground	
20	B0	Blue Data bit(LSB)	
21	B1	Blue Data bit	
22	B2	Blue Data bit	
23	B3	Blue Data bit	
24	B4	Blue Data bit	
25	B5	Blue Data bit(MSB)	
26	GND	Ground	
27	NC	No connect	
28	VCC	+3.3V power supply	
29	VCC	+3.3V power supply	
30	R/L	Selection signal for horizontal scanning direction (L: Normally H: Right-and-left reversal)	Note 1
31	U/D	Selection signal for vertical scanning direction (H: Normally L: Up-and-Down reversal)	Note 1
32	NC	No connect	
33	GND	Ground	

Note1:



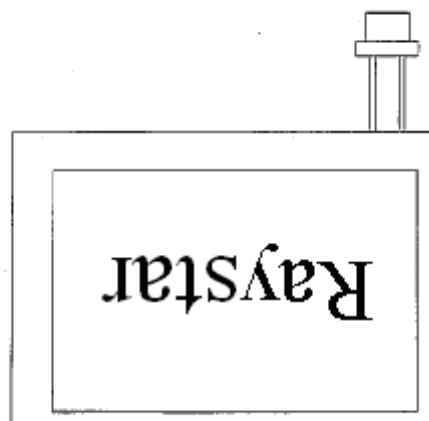
R/L =L ,UD=H



R/L=H,UD=H



R/L =L ,UD=L

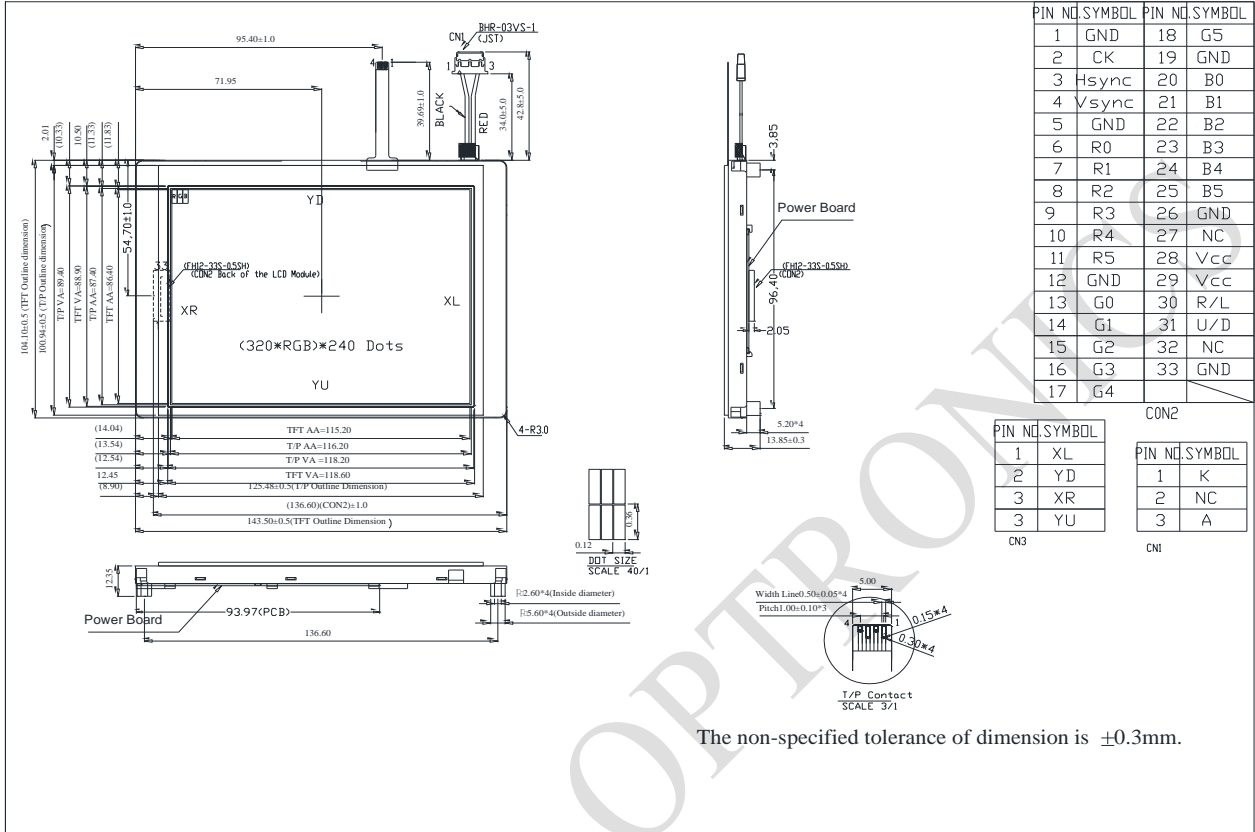


R/L=H,UD=L

4.2. Backlight PIN Definition

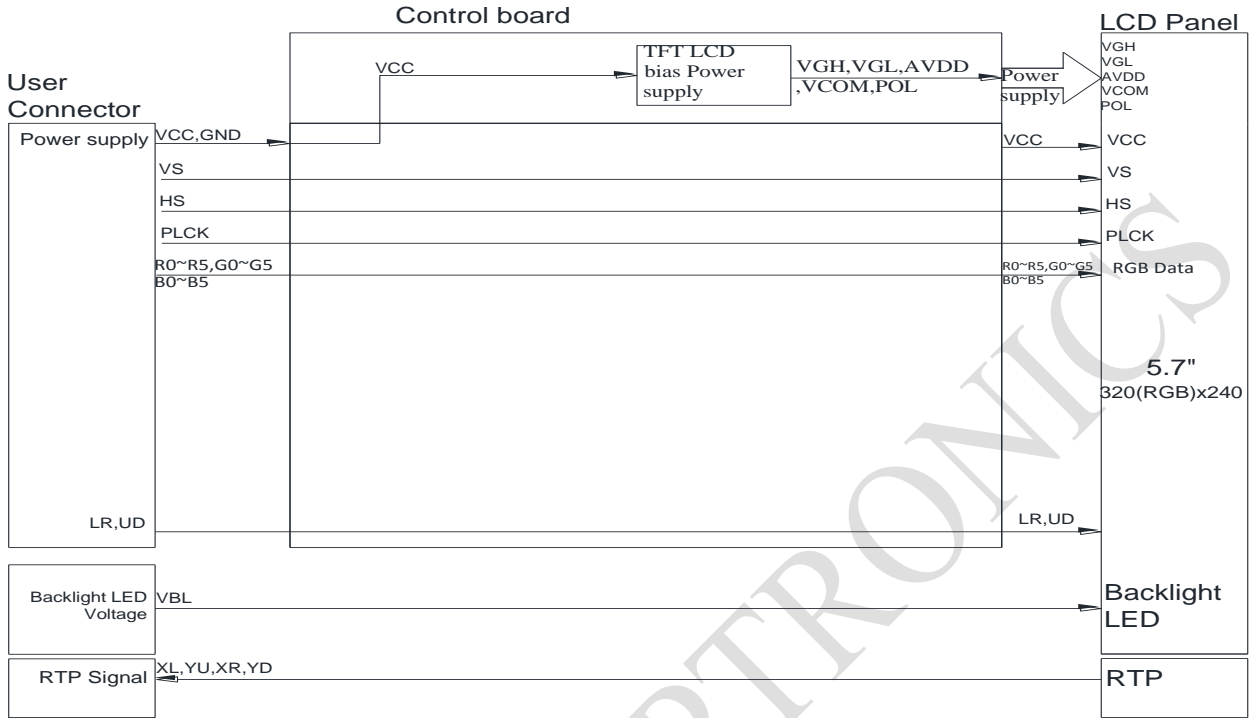
Pin No.	Symbol	Description
1	LED-(K)	Black, LED_ Cathode
2	NC	No connection
3	LED+(A)	Red, LED_ Anode

5. Contour Drawing



The non-specified tolerance of dimension is ±0.3mm.

6. Block Diagram



7. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	TOP	-20	—	+70	°C
Storage Temperature	TST	-30	—	+80	°C

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

- Temp. $\leq 60^{\circ}\text{C}$, 90% RH MAX. Temp. $> 60^{\circ}\text{C}$, Absolute humidity shall be less than 90% RH at 60°C

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8. Electrical Characteristics

8.1. Operating conditions:

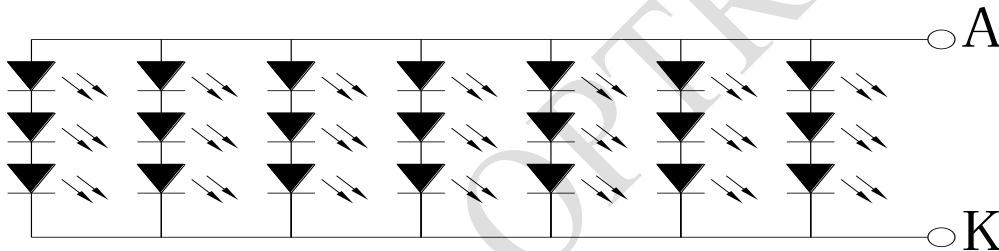
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Supply Voltage For LCM	VCC	—	3.0	3.3	3.6	V	
Supply Current For LCM	ICC	—	—	110	170	mA	Note1
Power Consumption	—	—	—	363	612	mW	VCC=3.3V

Note 1 : This value is test for VCC=3.3V , Ta=25 °C only

8.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current		-	140	-	mA	
Power Consumption		1260	-	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



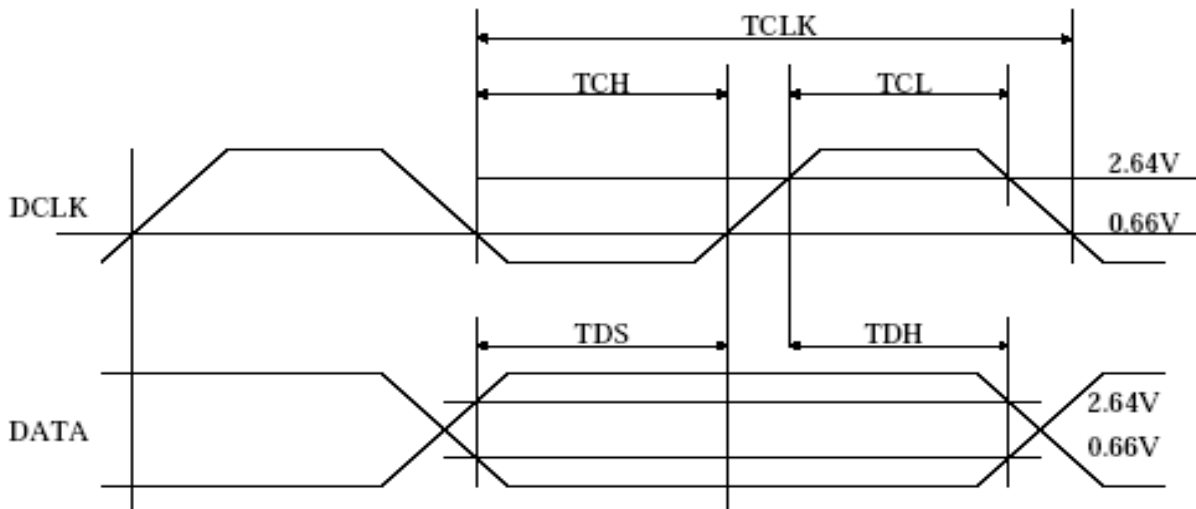
Note 2 : Ta = 25 °C

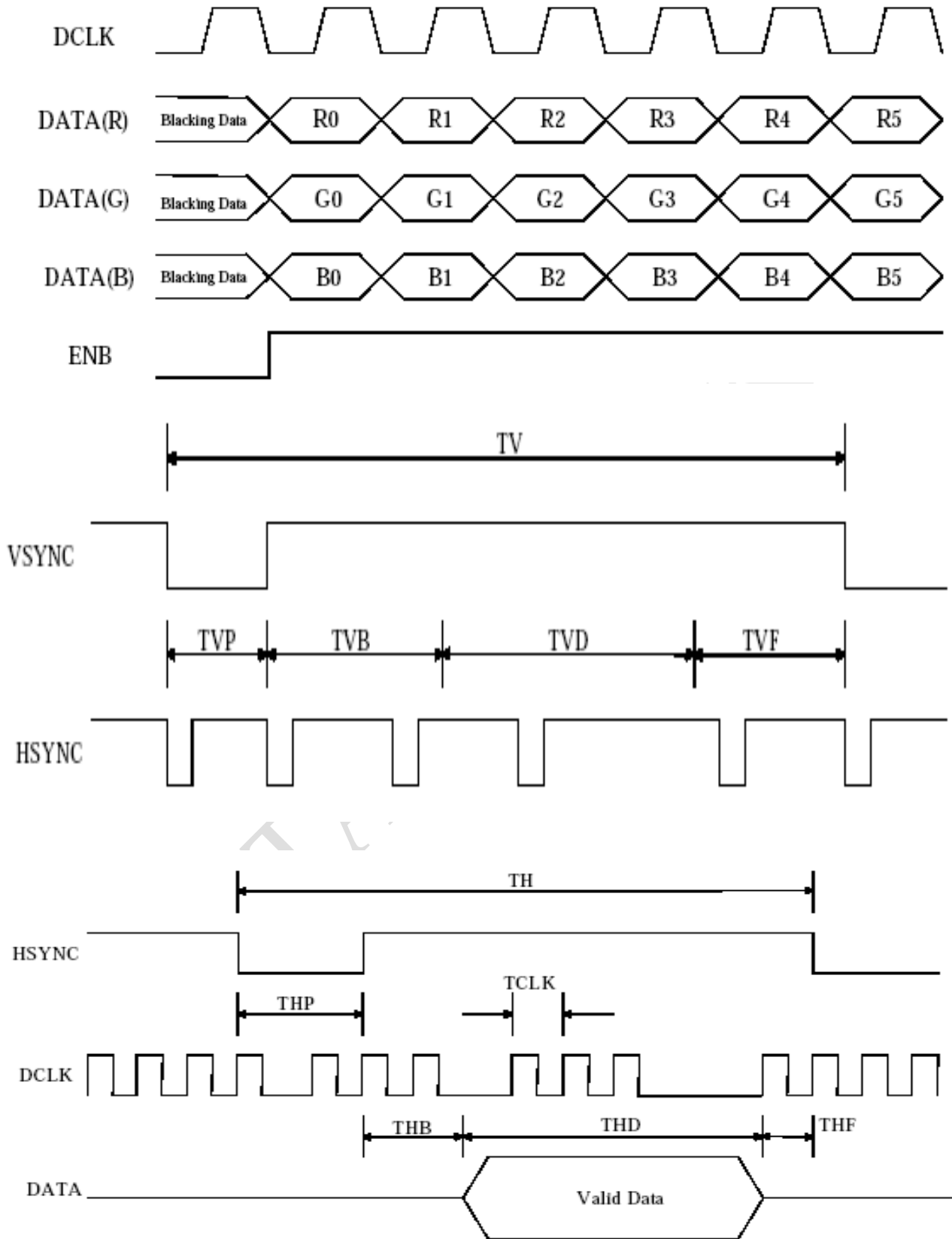
Note 3 : Brightness to be decreased to 50% of the initial value

Note 4 : The single LED lamp case

9. 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	-	262.5	-	DCLK	
		PAL		312.5			
	Pulse Width	Tvp	1	3	5	TH	
	Back-Porch	NTSC	Tvb	-	15	-	TH
					PAL		
	Display Period		Tvd	-	240	-	TH
	Front-Porch	NTSC	Tvf	-	4.5	-	TH
PAL					46.5		





9.1. Basic Display Color and Gray Scale

	Color & Gray scale	Data signal																		
		Gray Scale	R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	B4	B5
Basic color	Black	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	-	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Green	-	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Cyan	-	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Red	-	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	-	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	-	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of red	Black	CS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	CS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		CS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		∇				∇						∇						∇		
		∇				∇						∇						∇		
	Brighter	CS61	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
		CS62	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red	CS63	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of green	Black	CS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	CS1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
		CS2	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
		∇				∇						∇						∇		
		∇				∇						∇						∇		
	Brighter	CS61	0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	0
		CS62	0	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0
	Green	CS63	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Gray Scale of blue	Black	CS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	CS1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
		CS2	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
		∇				∇						∇						∇		
		∇				∇						∇						∇		
	Brighter	CS61	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1
		CS62	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1
	Blue	CS63	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

10. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time	Tr	$\theta=0^\circ$ 、 $\phi=0^\circ$	-	15	30	.ms	Note 3,
	Tf		-	35	50	.ms	
Contrast ratio	CR	At optimized viewing angle	150	200	-	-	Note 4,
Color Chromaticity	White	Wx	$\theta=0^\circ$ 、 $\phi=0$	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	$CR \geq 10$	60	70	Deg	Note 1
		Θ_L		60	70		
	Ver.	Φ_T		60	70		
		Φ_B		40	50		
Brightness	-	-	280	350	-	cd/m ²	Center of display
Uniformity	(U)	-	75	-	-	%	Note 5

Ta=25±2℃, IL=140mA

Note 1: Definition of viewing angle range

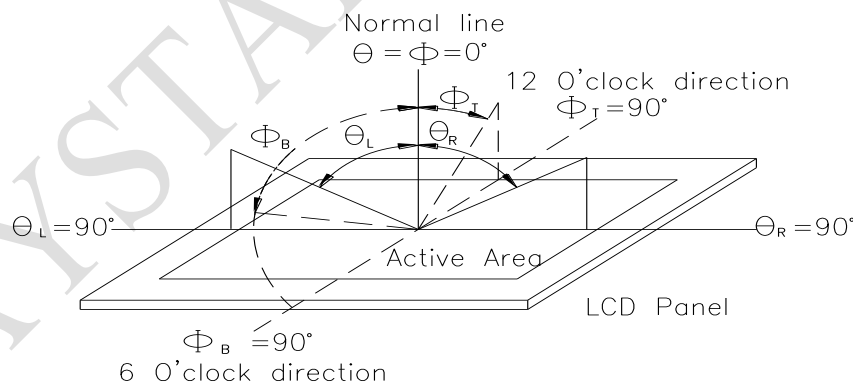


Fig.10.1. Definition of viewing angle

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.

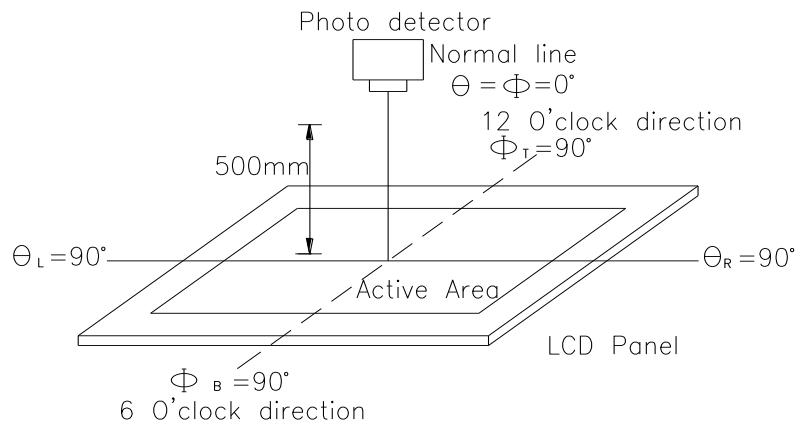
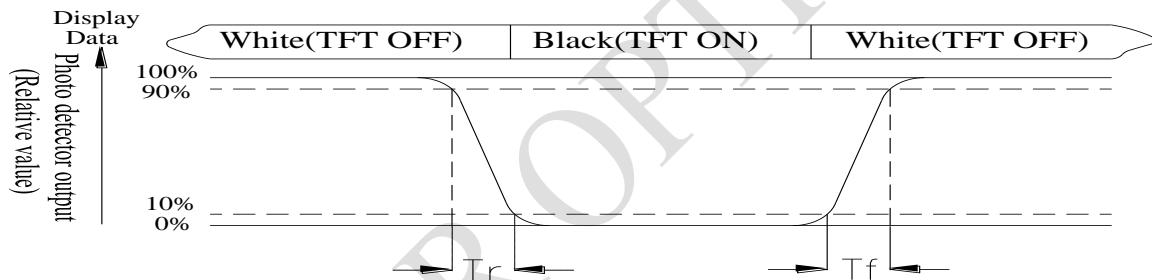


Fig. 10.2. Optical measurement system setup

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, T_r , is the time between photo detector output intensity changed from 90% to 10%. And fall time, T_f , 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: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (reference the picture in below). Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = L_{\min}/L_{\max} \times 100\%$$

L = Active area length

W = Active area width

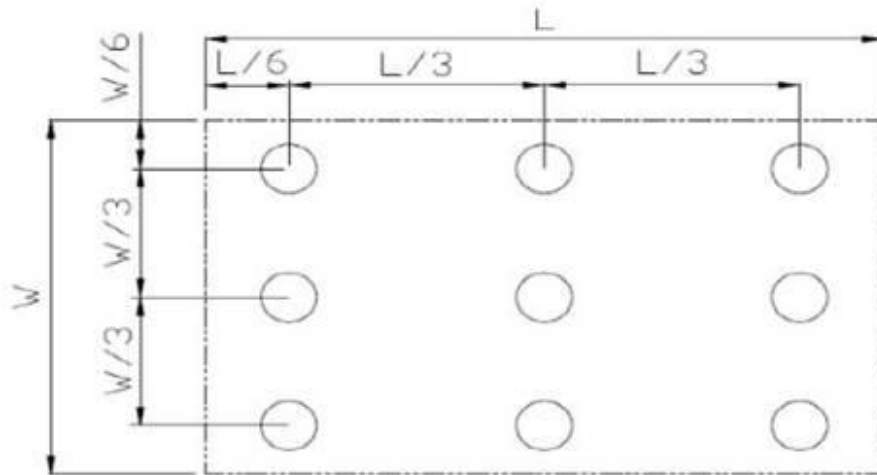


Fig. Definition of uniformity

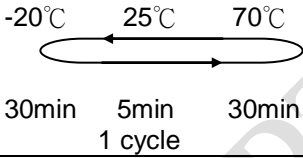
Note 6: Definition of color chromaticity (CIE 1931)

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.

11. Reliability

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

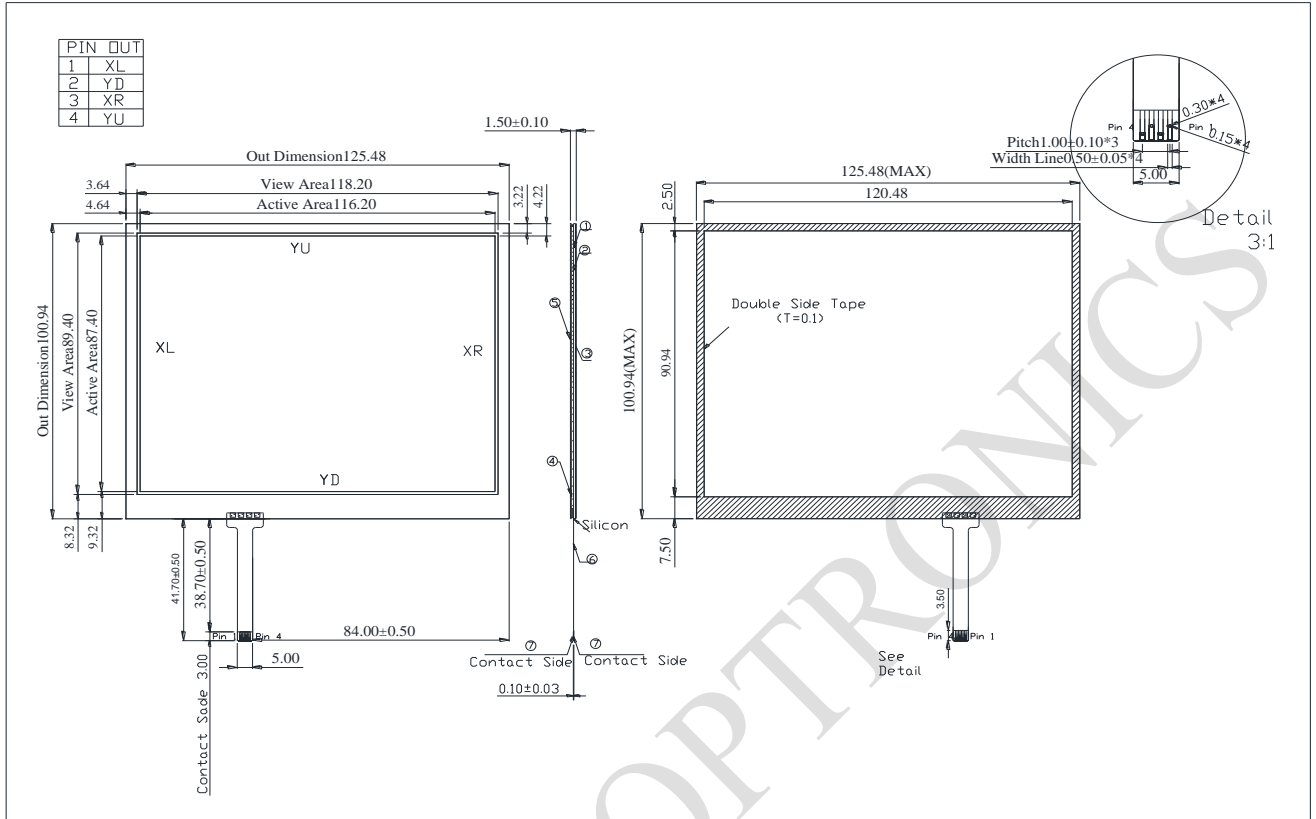
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max	60°C,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation <div style="text-align: center;">  <p>-20°C 25°C 70°C</p> <p>30min 5min 30min</p> <p>1 cycle</p> </div>	-20°C/70°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 1.5mm 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=±600V(contact) ,±800v(air), RS=330Ω CS=150pF 10 times	—

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.

12.Touch Panel Information



12.1. Resistance Touch Panel General Specifications

Item	Description
Driving condition	DC5V
Operating force	60~150g
Linearity max	$\leq \pm 1.5\%$
Insulating resistance	$> 20M\Omega$, 25V(DC)
Light transparence	70%
Structure type	ITO Film/ITO Glass(F/G)
Surface Hardness	3H typ
Pen Hitting Durability (with the silicon rubber)	$> 1000,000$ times
X Axis resistance	200~900 Ω
Y Axis resistance	200~900 Ω

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LCM Sample Estimate Feedback Sheet

Module Number : _____

1 、 Panel Specification :

1. Panel Type :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
2. View Direction :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
3. Numbers of Dots :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
4. View Area :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
5. Active Area :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
6. Operating Temperature :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
7. Storage Temperature :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
8. Others :	_____	

2 、 Mechanical Specification :

1. PCB Size :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
2. Frame Size :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
3. Material of Frame :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
4. Connector Position :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
5. Fix Hole Position :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
6. Backlight Position :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
7. Thickness of PCB :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
8. Height of Frame to PCB :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
9. Height of Module :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
10. Others :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____

3 、 Relative Hole Size :

1. Pitch of Connector :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
2. Hole size of Connector :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
3. Mounting Hole size :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
4. Mounting Hole Type :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
5. Others :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____

4 、 Backlight Specification :

1. B/L Type :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
2. B/L Color :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
3. B/L Driving Voltage (Reference for LED Type) :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
4. B/L Driving Current :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
5. Brightness of B/L :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
6. B/L Solder Method :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
7. Others :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____

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Module Number : _____		
5 · <u>Electronic Characteristics of Module</u> :		
1.Input Voltage :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
2.Supply Current :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
3.Driving Voltage for LCD :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
4.Contrast for LCD :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
5.B/L Driving Method :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
6.Negative Voltage Output :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
7.Interface Function :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
8.LCD Uniformity :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
9.ESD test :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
10.Others :	<input type="checkbox"/> Pass	<input type="checkbox"/> NG , _____
6 · <u>Summary</u> :		
<p style="text-align: right;">Sales signature : _____</p> <p style="text-align: right;">Customer Signature : _____ <u>Date</u> : / / _____</p>		

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[128-TU-20/7,5](#) [EP-LK007TFTPCAP](#) [FR7.0A00](#) [RC2002A-TIG-CSX](#) [NL6448BC2021C](#) [TX17D01VM2EAB](#) [TX14D23VM5BAA](#)
[TCG121WXLRXVNNANX35](#) [EIC-LCD-1080P](#) [T272480C07VR01](#) [1060632](#) [TCG070WVLPAANN-AN50](#) [TCG035QVLPDANN-GN50](#)
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