

TFT DISPLAY SPECIFICATION



WINSTAR Display Co.,Ltd.
華凌光電股份有限公司



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華凌光電股份有限公司



WEB: <https://www.winstar.com.tw> E-mail: sales@winstar.com.tw

SPECIFICATION

CUSTOMER : _____

MODULE NO.: **WF101LSYJPLNGO**

APPROVED BY: (FOR CUSTOMER USE ONLY)	PCB VERSION: DATA:
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SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			周园园
ISSUED DATE: 2023/03/01			

TFT Display Inspection Specification: <https://www.winstar.com.tw/technology/download.html>

Precaution in use of TFT module: <https://www.winstar.com.tw/technology/download/declaration.html>

RECORDS OF REVISION

DOC. FIRST ISSUE

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2022/11/24		First issue
A	2022/12/27		Modify Static electricity test
B	2023/03/01		Correct LVDS Input Timing Table

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1.Module Classification Information

W F 101 L S Y J P L N G 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 : 10.1” TFT																																																																							
④	Model serials no.																																																																							
⑤	Backlight Type :	F→CCFL, White S→LED, High Light White						T→LED, White Z→Nichia LED, White																																																																
⑥	LCD Polarize Type/ Temperature range/ Gray Scale Inversion Direction	A→Transmissive, N.T, IPS TFT C→Transmissive, N. T, 6:00 ; F→Transmissive, N.T,12:00 ; I→Transmissive, W. T, 6:00 K→Transflective, W.T,12:00 L→Transmissive, W.T,12:00 N→Transmissive, Super W.T, 6:00						Q→Transmissive, Super W.T, 12:00 R→Transmissive, Super W.T, O-TFT V→Transmissive, Super W.T, VA TFT W→Transmissive, Super W.T, IPS TFT X→Transmissive, W.T, VA TFT Y→Transmissive, W.T, IPS TFT Z→Transmissive, W.T, O-TFT																																																																
⑦	A : TFT LCD B : TFT+SCREW HOLES+CONTROL BOARD C : TFT+ SCREW HOLES +A/D BOARD D : TFT+ SCREW HOLES +A/D BOARD+CONTROL BOARD E : TFT+ SCREW HOLES +POWER BOARD						F : TFT+CONTROL BOARD G : TFT+ SCREW HOLES H : TFT+D/V BOARD I : TFT+ SCREW HOLES +D/V BOARD J : TFT+POWER BD																																																																	
⑧	Resolution: <table><tr><td>A</td><td>128160</td><td>B</td><td>320234</td><td>C</td><td>320240</td><td>D</td><td>480234</td><td>E</td><td>480272</td><td>F</td><td>640480</td></tr><tr><td>G</td><td>800480</td><td>H</td><td>1024600</td><td>I</td><td>320480</td><td>J</td><td>240320</td><td>K</td><td>800600</td><td>L</td><td>240400</td></tr><tr><td>M</td><td>1024768</td><td>N</td><td>128128</td><td>P</td><td>1280800</td><td>Q</td><td>480800</td><td>R</td><td>640320</td><td>S</td><td>480128</td></tr><tr><td>T</td><td>800320</td><td>U</td><td>8001280</td><td>V</td><td>176220</td><td>W</td><td>1280398</td><td>X</td><td>1024250</td><td>Y</td><td>1920720</td></tr><tr><td>Z</td><td>800200</td><td>2</td><td>1024324</td><td>3</td><td>7201280</td><td>4</td><td>19201200</td><td>5</td><td>1366768</td><td>6</td><td>1280320</td></tr></table>												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	N	128128	P	1280800	Q	480800	R	640320	S	480128	T	800320	U	8001280	V	176220	W	1280398	X	1024250	Y	1920720	Z	800200	2	1024324	3	7201280	4	19201200	5	1366768	6	1280320
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⑨	D: Digital L : LVDS M:MIPI																																																																							
⑩	Interface: <table><tr><td>N</td><td colspan="3">Without control board</td><td>A</td><td>8Bit</td><td>B</td><td colspan="2">16Bit</td><td>H</td><td colspan="2">HDMI</td></tr><tr><td>I</td><td colspan="3">I2C Interface</td><td>R</td><td>RS232</td><td>S</td><td colspan="2">SPI Interface</td><td>U</td><td colspan="2">USB</td></tr></table>												N	Without control board			A	8Bit	B	16Bit		H	HDMI		I	I2C Interface			R	RS232	S	SPI Interface		U	USB																																					
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⑪	TS: <table><tr><td>N</td><td colspan="4">Without TS</td><td>T</td><td colspan="3">Resistive touch panel</td><td>C</td><td colspan="3">Capacitive touch panel (G-F-F)</td></tr><tr><td>G</td><td colspan="5">Capacitive touch panel (G-G)</td><td colspan="2">C1</td><td colspan="5">Capacitive touch panel (G-F-F)+OCA</td></tr><tr><td>C2</td><td colspan="5">Capacitive touch panel (G-F-F)+OCR</td><td colspan="2">G1</td><td colspan="5">Capacitive touch panel (G-G)+OCA</td></tr><tr><td>G2</td><td colspan="5">Capacitive touch panel (G-G)+OCR</td><td colspan="2">B</td><td colspan="5">CTP+GG+USB</td></tr></table>												N	Without TS				T	Resistive touch panel			C	Capacitive touch panel (G-F-F)			G	Capacitive touch panel (G-G)					C1		Capacitive touch panel (G-F-F)+OCA					C2	Capacitive touch panel (G-F-F)+OCR					G1		Capacitive touch panel (G-G)+OCA					G2	Capacitive touch panel (G-G)+OCR					B		CTP+GG+USB												
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⑬	Special Code		#:Fit in with ROHS directive regulations																																																																					

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2.Summary

TFT 10.1" is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit and a back light system. This TFT LCD has a 10.1 inch diagonally measured active display area with HD (1280 horizontal by 800 vertical pixel) resolution.

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3.General Specifications

Item	Dimension	Unit
Screen Diagonal	10.1	inch
Number of Pixels	1280 x 3(R GB) x 800	dots
Module dimension	257.96 x 168.6 x 25.88	mm
Active area	216.96 (H) x 135.6(V)	mm
Pixel pitch	0.1695 × 0.1695	mm
Display Mode	Normally Black , Transmissive	
Viewing Angle	80/80/80/80	
Pixel Arrangement	R.G.B. Vertical Stripe	
TFT Drive IC	EK79202B1 or Equivalent	
Backlight Type	LED, Normally White	
Aspect Ratio	16:10	
Interface	LVDS	
CTP FW Version	80	
CTP IC	GT928 or equivalent	
CTP Interface	I2C	
CTP Resolution	1280*800	
With /Without TP	With CTP	
Surface	Glare	

*Color tone slight changed by temperature and driving voltage.

4. 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

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

5. Electrical Characteristics

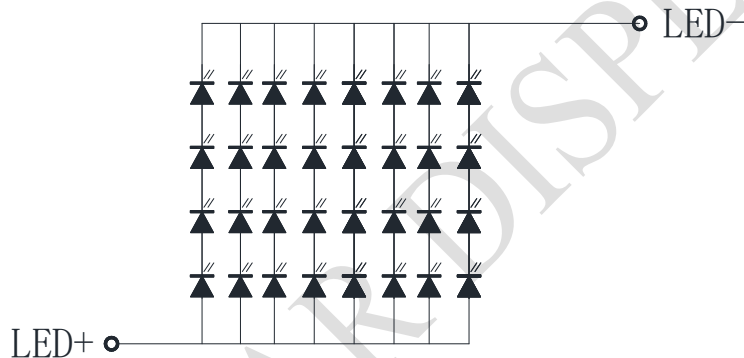
5.1. Typical Operation Conditions

Item	Symbol	Min	Typ	Max	Unit	Note
Supply Voltage For LCM +12V	DC12V	—	12.0	—	V	-
Supply Current For LCM +12V	I _{DC12V}	—	620	950	mA	-
Supply Voltage For CTP(I2C)	DC3V	3.15	3.3	3.45	V	I2C Type
Supply Current For CTP(I2C)	I _{DC3V}	—	14	21	mA	

5.2. Backlight Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
PWM Control Level (LED_PWM)	High Level	—	3.3	—	V	Note 5
	Low Level	—	0	—	V	Note 6
PWM Control Duty Ratio	-	1	—	100	%	
PWM Control Frequency	-	—	10K	—	Hz	
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

Note 5 : Turn ON the backlight when Turn ON BL_ON = LOW Turn OFF BL_ON = High

Note 6 : PWM_BL Control from low active.

6.AC Characteristics

6.1. LVDS mode AC electrical characteristics

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R _x FCLK	30	-	TBD	MHz	Refer to input timing table for each display resolution
Input data skew margin	T _{RSKM}	500	-	-	ps	VID = 200mV R _x VCM = 1.2V R _x FCLK = 81MHz
Clock high time	T _{LVCH}	-	4/(7* R _x FCLK)	-	ns	
Clock low time	T _{LVCL}	-	3/(7* R _x FCLK)	-	ns	
PLL wake-up time	T _{enPLL}	-	-	150	us	

Table 1: LVDS mode AC electrical characteristics

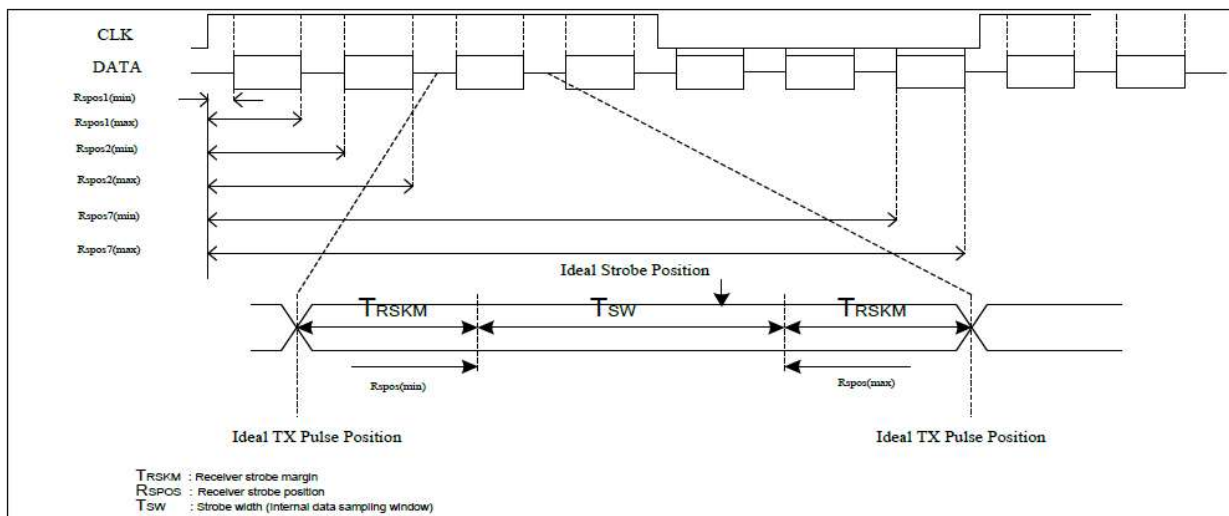
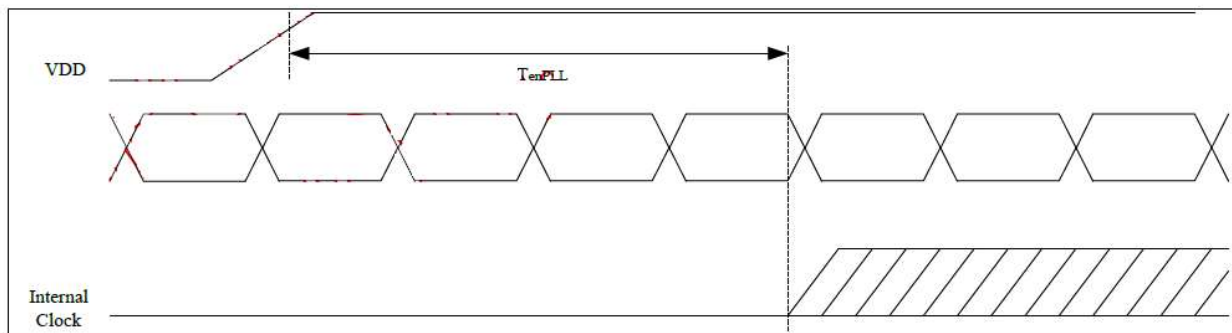
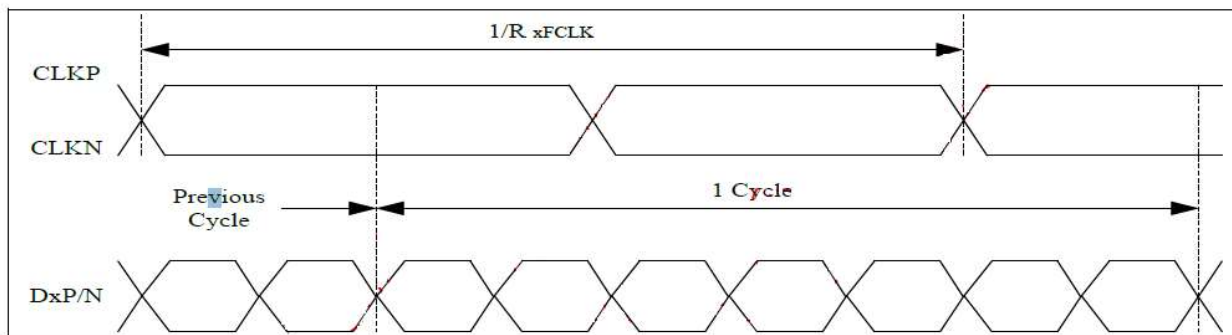


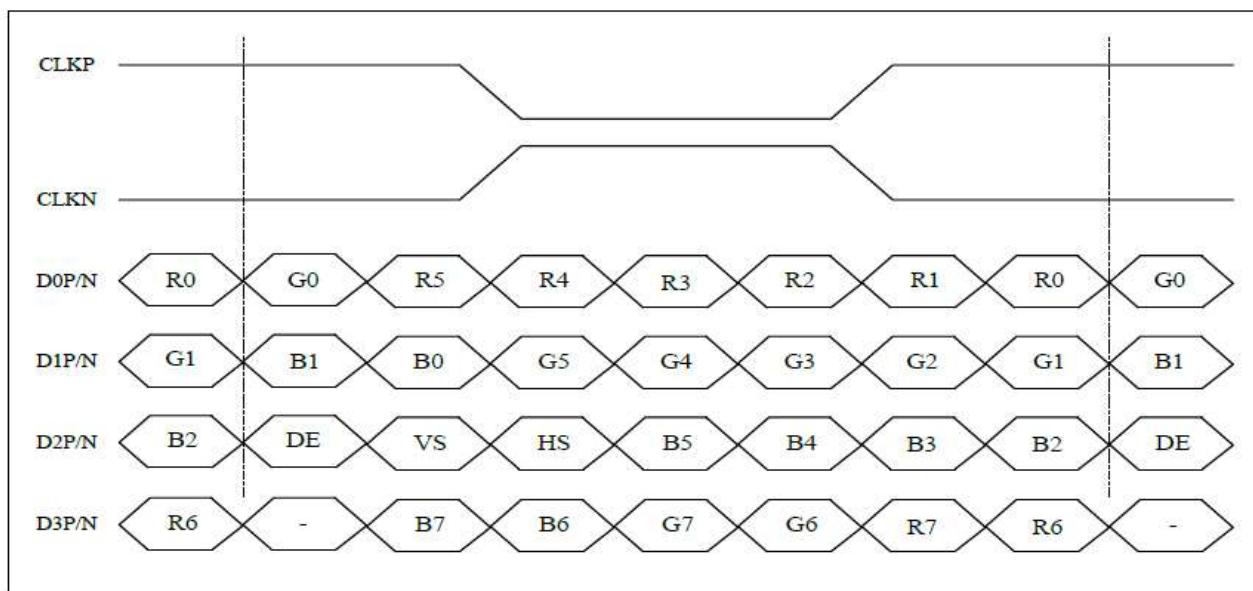
Figure 1: LVDS figure

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7.LVDS Input Timing Table

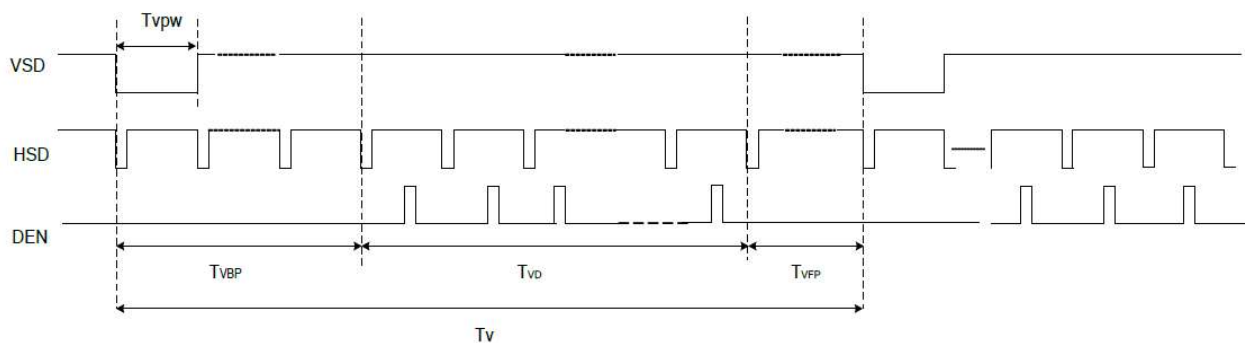
For 1280RGBx800 timing table

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60Hz (LVDS)	F_{DCLK}	68.2	72.4	78.4	MHz
Horizontal display area	T_{HD}	1280			DCLK
HSYNC period time	T_H	1380	1440	1500	DCLK
HSYNC blanking	$T_{HBP}+T_{HFP}$	100	160	220	DCLK
Vertical display area	T_{VD}	800			H
VSYNC period time	T_V	824	838	872	H
VSYNC blanking	$T_{VBP}+T_{VFP}$	24	38	72	H

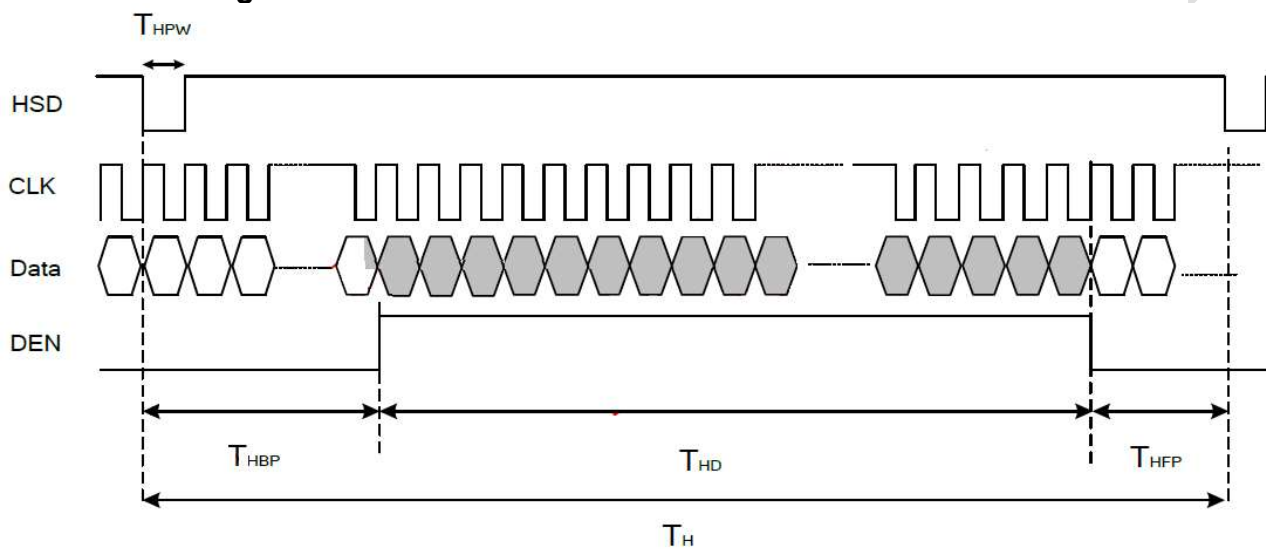


8-bit LVDS input

Vertical timing



Horizontal timing



8.Power Sequence

8.1. Power Generation

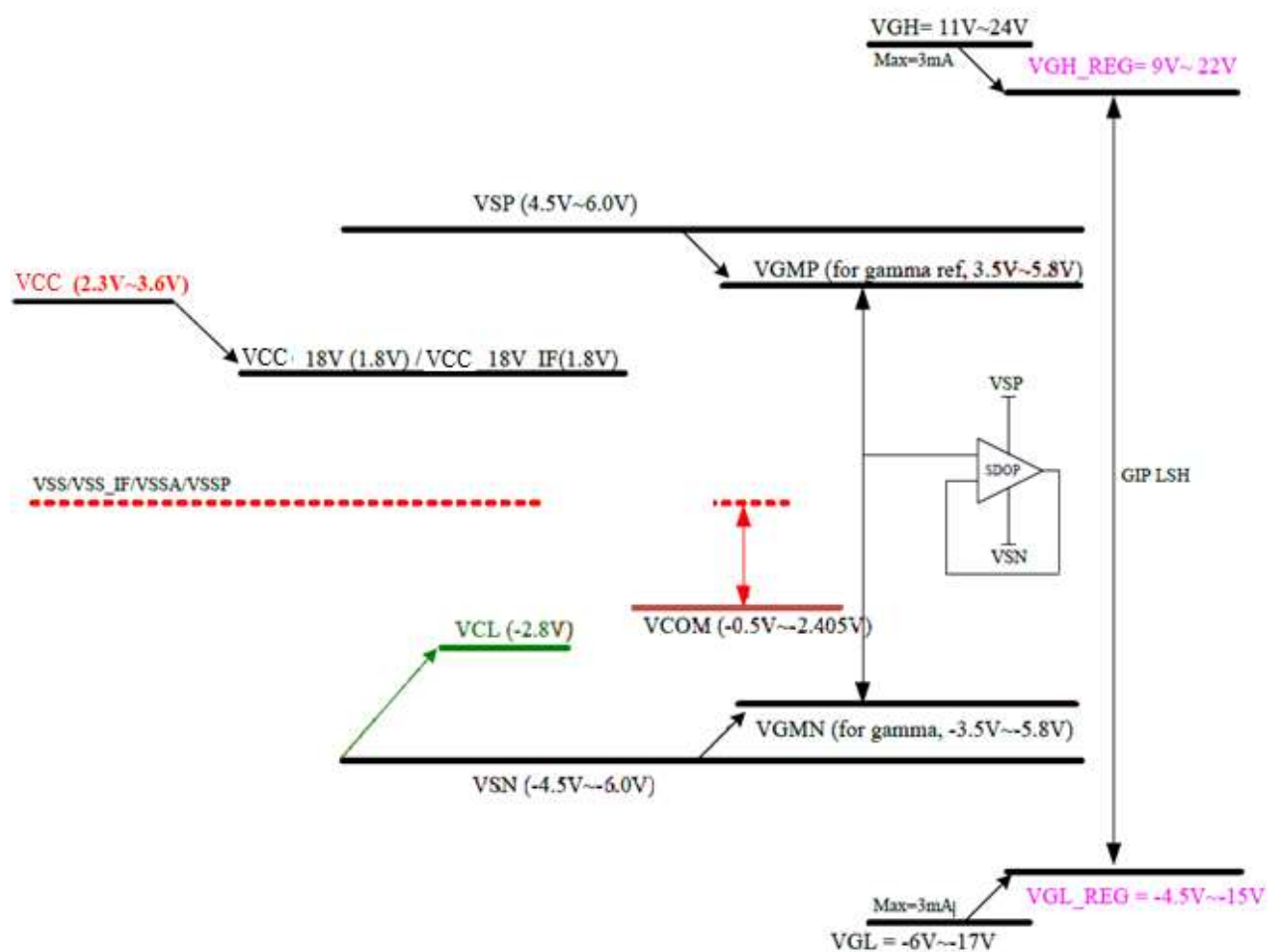
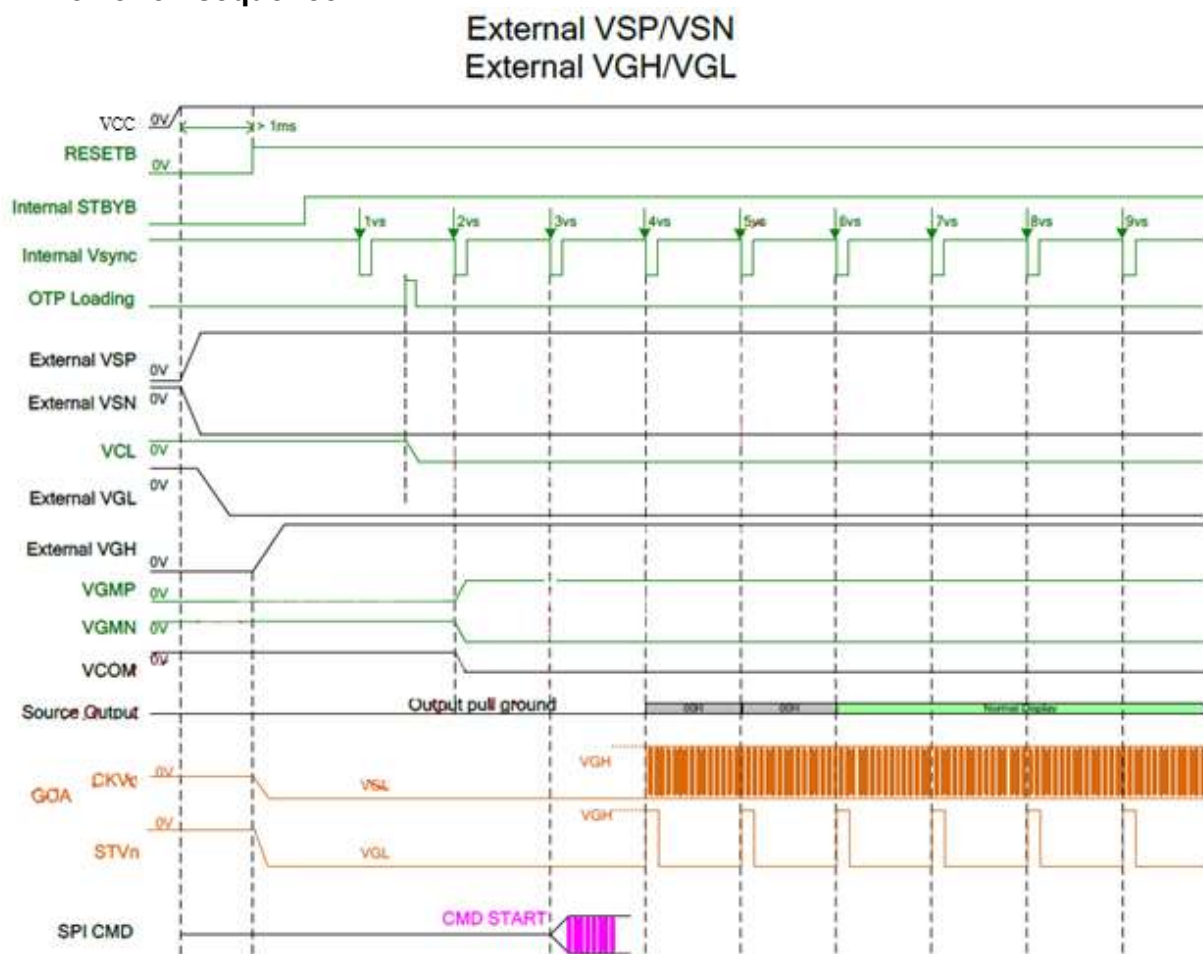
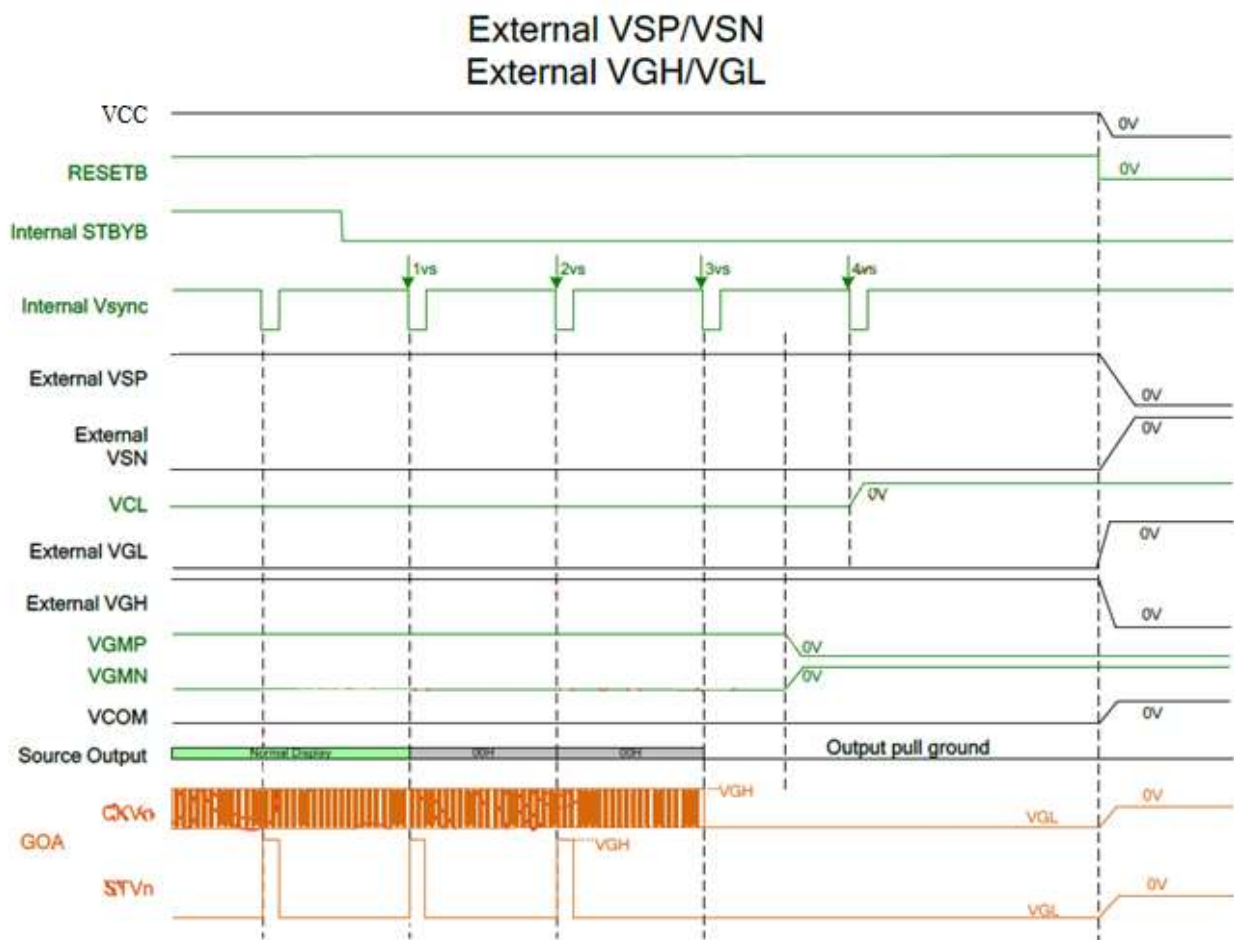


Figure 1 power generation

8.2. Power on sequence



8.3. Power off sequence



9.Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr+ Tf	$\theta=0^{\circ}$ 、 $\Phi=0^{\circ}$	-	25	35	.ms	Note 3
Contrast ratio		CR	At optimized viewing angle	800	1000	-	-	Note 4
Color Chromaticity	White	Wx	$\theta=0^{\circ}$ 、 $\Phi=0$	0.272	0.322	0.372	-	Note 2,6,7
		Wy		0.294	0.344	0.394	-	
Viewing angle	Hor.	ΘR	$CR \geq 10$	70	80	-	Deg.	Note 1
		ΘL		70	80	-		
	Ver.	ΦT		70	80	-		
		ΦB		70	80	-		
Brightness		-	-	800	900	-	cd/m ²	Center of display
Uniformity		(U)	-	70	-	-	%	Note 5

Ta=25±2°C

Note 1: Definition of viewing angle range

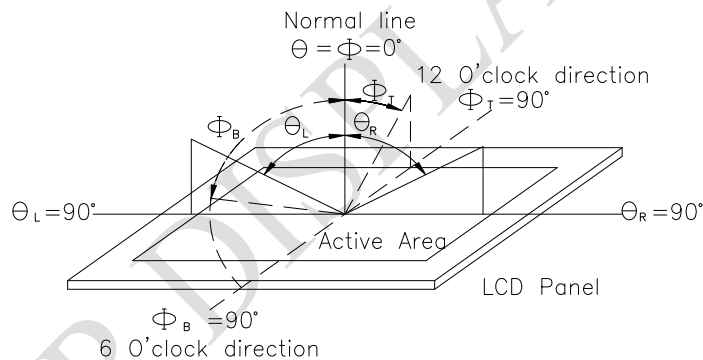


Fig. 9.1. Definition of viewing angle

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-7 or BM-5 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

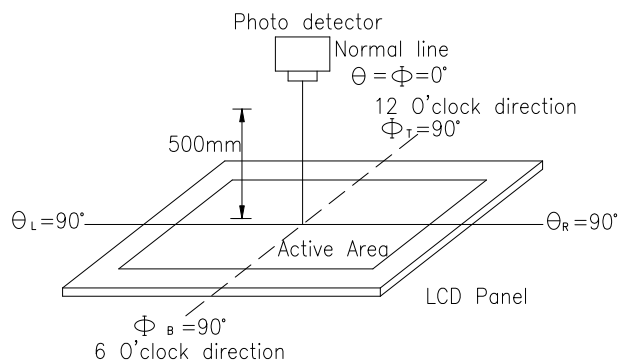
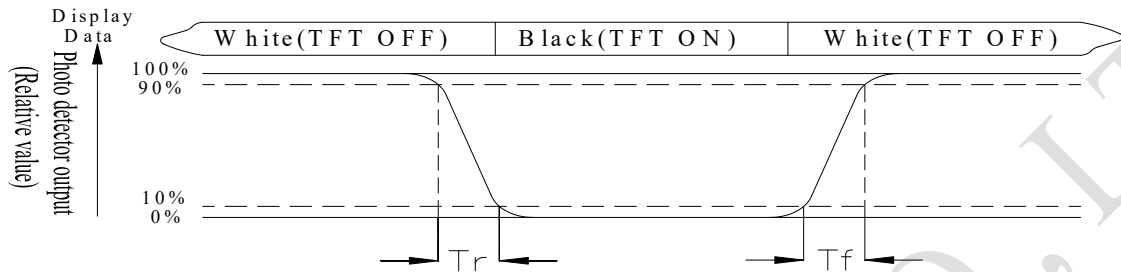


Fig. 9.2. Optical measurement system setup

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, 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.

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

L = Active area length

W = Active area width

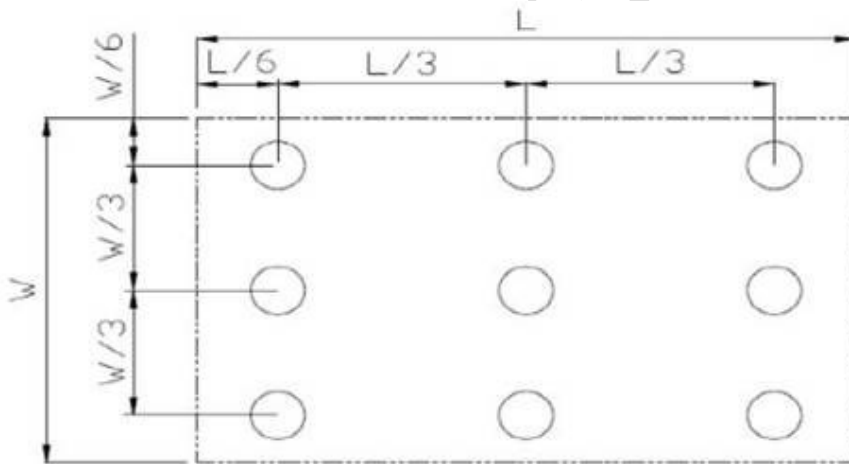


Fig9.3. Definition of uniformity

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.

10.Interface

10.1. LCM PIN Definition

Pin No.	Symbol	I/O	Function	Remark
1	DC12V	P	Power Supply	
2	DC12V	P	Power Supply	
3	DC12V	P	Power Supply	
4	NC	-	No connection	
5	GND	P	Ground	
6	GND	P	Ground	
7	GND	P	Ground	
8	Rxin0-	I	-LVDS Differential Data Input	R0-R5,G0
9	Rxin0+	I	+LVDS Differential Data Input	
10	GND	P	Ground	
11	Rxin1-	I	-LVDS Differential Data Input	G1G5,B0,B1
12	Rxin1+	I	+LVDS Differential Data Input	
13	GND	P	Ground	
14	Rxin2-	I	-LVDS Differential Data Input	B2-B5,HS,VS,DE
15	Rxin2+	I	+LVDS Differential Data Input	
16	GND	P	Ground	
17	RxCLK-	I	-LVDS Differential Clock Input	LVDS CLK
18	RxCLK+	I	+LVDS Differential Clock Input	
19	GND	P	Ground	
20	Rxin3-	I	-LVDS Differential Data Input	R6,R7,G6,G7,B6,B7
21	Rxin3+	I	+LVDS Differential Data Input	
22	GND	P	Ground	
23	PWM		This pin is connected to the external LED driver. PWM type control signal for brightness of the LED backlight. If not used, please float this pin.	
24	NC	-	No connection	
25	DC3V	P	Power Supply	
26	NC	-	No connection	
27	GND	P	Ground	
28	SDA	I/O	Serial communication data input.	

29	SCL	I	Serial communication clock input	
30	INT	O	External interrupt to the host	
31	RST	I	External Reset, Low is active	
32	GND	P	Ground	
33~43	NC	-	No connection	
44	GND	P	Ground	
45	GND	P	Ground	
46	GND	P	Ground	
47	NC	-	No connection	
48	DC12V	P	Power Supply	
49	DC12V	P	Power Supply	
50	DC12V	P	Power Supply	

I: input, O: output, P: Power

11.Reliability

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

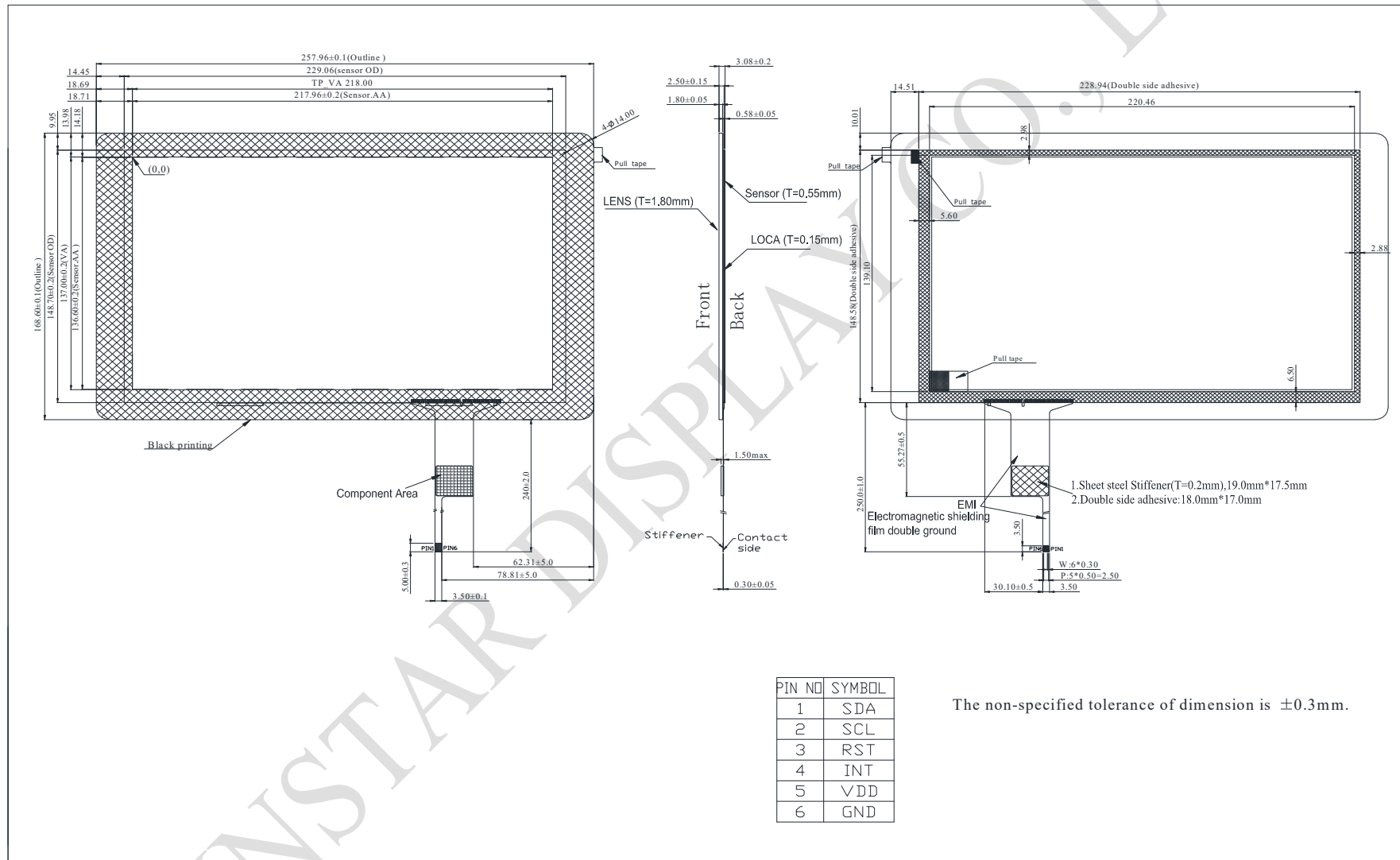
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature 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 -20°C 25°C 70°C 30min 5min 30min 1 cycle	-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 finished product housing.	Contact ±6KV Air ±8KV RS=330Ω CS=150pF 10 times	4

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.

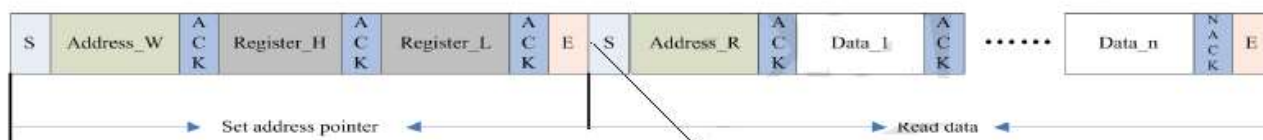
12.Touch Panel Information



12.1. Timing for Read Operation

First, set address pointer based on the aforesaid Write Operation timing sequence. Then, resend

Start condition to perform Read addressing and read data in the registers.



Address_R: Slave address with Read control bit.

NACK: Host issues NACK after reading the last byte.

After setting Read addresses, the host can read one or more than one byte at a time.

GT927/GT928/GT9110 will automatically increase the address pointer and send subsequent data in sequence.

The Stop condition (the first E signal as shown in the above diagram) after setting the address pointer is optional. However, the repeated Start condition has to be sent.

12.2. Coordinate registers

Addr	Access	bit7	bit6	bit5	bit4	bit3	bit2	bit1	bit0
0x8140	R	Product ID(first Byte, ASCII)							
0x8141	R	Product ID(second Byte, ASCII)							
0x8142	R	Product ID(third Byte, ASCII)							
0x8143	R	Product ID(forth Byte, ASCII)							
0x8144	R	Firmware version(HEX.low byte)							
0x8145	R	Firmware version (HEX.high byte)							
0x8146	R	x coordinate resolution (low byte)							
0x8147	R	x coordinate resolution (high byte)							
0x8148	R	y coordinate resolution (low byte)							
0x8149	R	y coordinate resolution (high byte)							

0x814A	R	Vendor_id(ID of the current module)				
0x814B	R	Reserved				
0x814C	R	Reserved				
0x814D	R	Reserved				
0x814E	R/W	buffer status	large detect	Reserved	HaveKey	number of touch points
0x814F	R	track id as 32 indicates HotKnot proximity detection signal				
0x8150	R	PxyOk	Reserved			
0x8151	R	PxyOk	Reserved			
0x8152	R	Reserved				
0x8153	R	Reserved				
0x8154	R	Reserved				
0x8155	R	Reserved				
0x8156	R	Reserved				
0x8157	R	pen_sta	Reserved			track id
0x8158	R	point 1 x coordinate (low byte)				
0x8159	R	point 1 x coordinate (high byte)				
0x815A	R	point 1 y coordinate (low byte)				
0x815B	R	point 1 y coordinate (high byte)				
0x815C	R	Point 1 size (low byte)				
0x815D	R	point 1 size (high byte)				
0x815E	R	Reserved				
0x815F	R	track id				
0x8160	R	point 2 x coordinate (low byte)				
0x8161	R	point 2 x coordinate (high byte)				
0x8162	R	point 2 y coordinate (low byte)				
0x8163	R	point 2 y coordinate (high byte)				
0x8164	R	point 2 size (low byte)				
0x8165	R	point 2 size (high byte)				
0x8166	R	Reserved				
0x8167	R	track id				
0x8168	R	point 3 x coordinate (low byte)				
0x8169	R	point 3 x coordinate (high byte)				
0x816A	R	point 3 y coordinate (low byte)				
0x816B	R	point 3 y coordinate (high byte)				
0x816C	R	point 3 size (low byte)				
0x816D	R	point 3 size (high byte)				
0x816F	R	track id				
0x8170	R	point 4 x coordinate (low byte)				
0x8171	R	point 4 x coordinate (high byte)				
0x8172	R	point 4 y coordinate (low byte)				

0x8173	R	point 4 y coordinate (high byte)
0x8174	R	point 4 size (low byte)
0x8175	R	point 4 size (high byte)
0x8176	R	Reserved
0x8177	R	track id
0x8178	R	point 5 x coordinate (low byte)
0x8179	R	point 5 x coordinate (high byte)
0x817A	R	point 5 y coordinate (low byte)
0x817B	R	point 5 y coordinate (high byte)
0x817C	R	point 5 size (low byte)
0x817D	R	point 5 size (high byte)
0x817E	R	Reserved
0x817F	R	track id
0x8180	R	point 6 x coordinate (low byte)
0x8181	R	point 6 x coordinate (high byte)
0x8182	R	point 6 y coordinate (low byte)
0x8183	R	point 6 y coordinate (high byte)
0x8184	R	point 6 size (low byte)
0x8185	R	point 6 size (high byte)
0x8186	R	Reserved
0x8187	R	track id
0x8188	R	point 7 x coordinate (low byte)
0x8189	R	point 7 x coordinate (high byte)
0x818A	R	point 7 y coordinate (low byte)
0x818B	R	point 7 y coordinate (high byte)
0x818C	R	point 7 size (low byte)
0x818D	R	point 7 size (high byte)
0x818E	R	Reserved
0x818F	R	track id
0x8190	R	point 8 x coordinate (low byte)
0x8191	R	point 8 x coordinate (high byte)
0x8192	R	point 8 y coordinate (low byte)
0x8193	R	point 8 y coordinate (high byte)
0x8194	R	point 8 size (low byte)
0x8195	R	point 8 size (high byte)
0x8196	R	Reserved
0x8197	R	track id
0x8198	R	point 9 x coordinate (low byte)
0x8199	R	point 9 x coordinate (high byte)
0x819A	R	point 9 y coordinate (low byte)
0x819B	R	point 9 y coordinate (high byte)

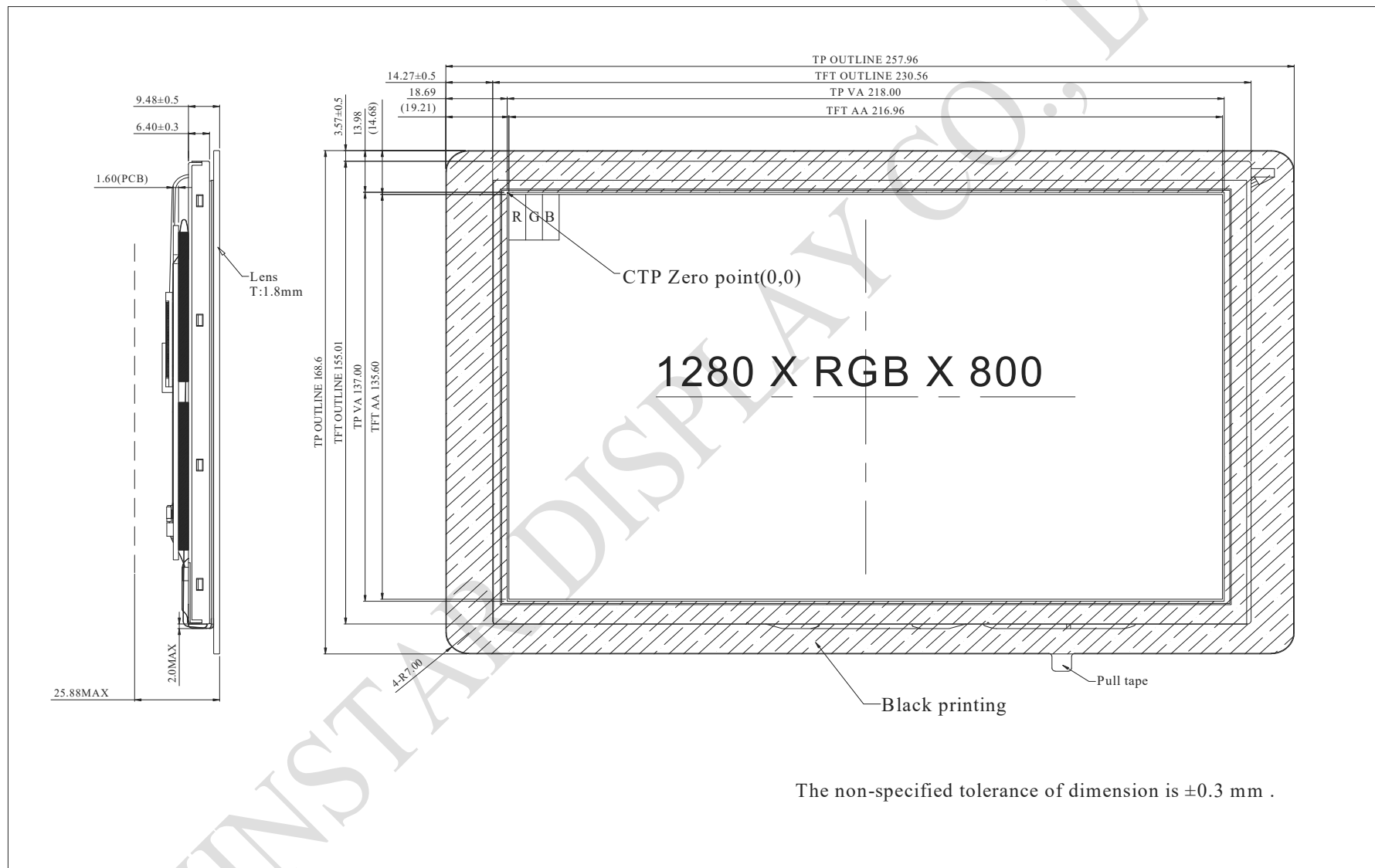
0x819C	R	point 9 size (low byte)
0x819D	R	point 9 size (high byte)
0x819E	R	Reserved
0x819F	R	track id
0x81A0	R	point 10 x coordinate (low byte)
0x81A1	R	point 10 x coordinate (high byte)
0x81A2	R	point 10 y coordinate (low byte)
0x81A3	R	point 10 y coordinate (high byte)
0x81A4	R	point 10 size (low byte)
0x81A5	R	point 10 size (high byte)
0x81A6	R	Reserved
0x81A7	R	KeyValue

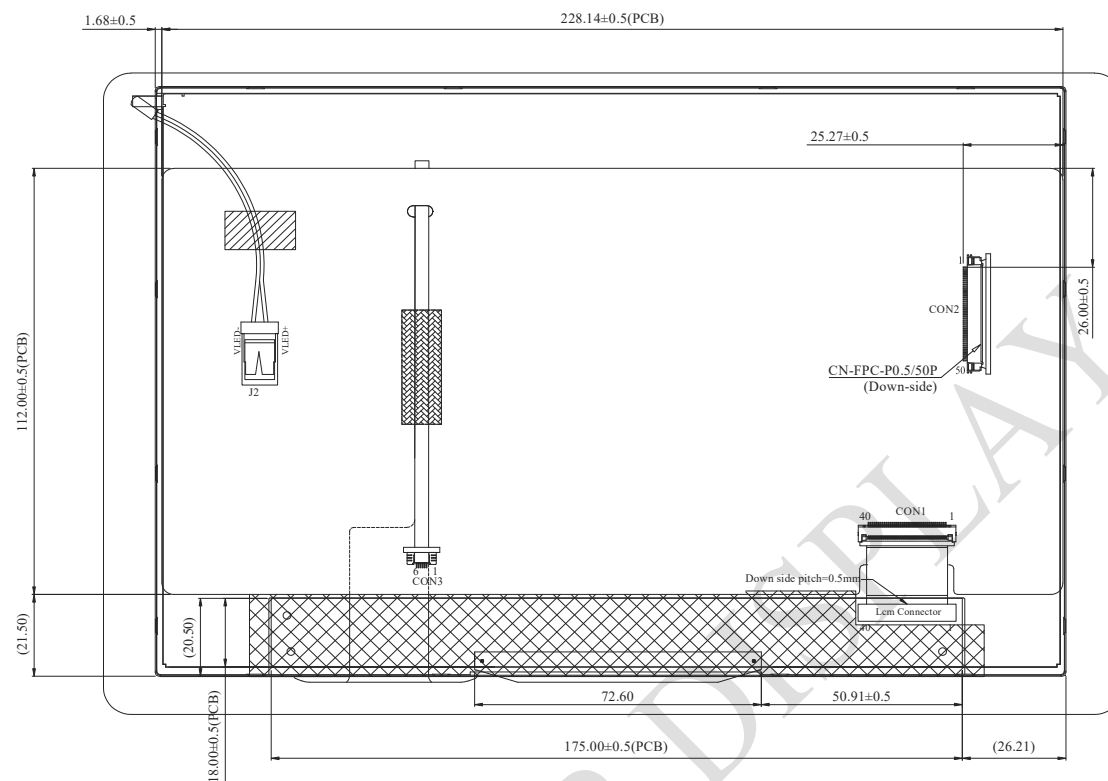
12.3. I2C protocol

3.3V ,400BPS ,pull high 2K ohm

Parameter	Symbol	Min.	Max.	Unit
SCL low period	t_{lo}	0.9	-	us
SCL high period	t_{hi}	0.8	-	us
SCL setup time for START condition	t_{st1}	0.4	-	us
SCL setup time for STOP condition	t_{st3}	0.4	-	us
SCL hold time for START condition	t_{hd1}	0.3	-	us
SDA setup time	t_{st2}	0.4	-	us
SDA hold time	t_{hd2}	0.4	-	us

13. Contour Drawing





CON2

PIN NO.	SYMBOL	PIN NO.	SYMBOL
1	DC12V	26	NC
2	DC12V	27	GND
3	DC12V	28	SDA
4	NC	29	SCL
5	GND	30	INT
6	GND	31	RST
7	GND	32	GND
8	Rxin0-	33	NC
9	Rxin0+	34	NC
10	GND	35	NC
11	Rxin1-	36	NC
12	Rxin1+	37	NC
13	GND	38	NC
14	Rxin2-	39	NC
15	Rxin2+	40	NC
16	GND	41	NC
17	RxCLK-	42	NC
18	RxCLK+	43	NC
19	GND	44	GND
20	Rxin3-	45	GND
21	Rxin3+	46	GND
22	GND	47	NC
23	PWM	48	DC12V
24	NC	49	DC12V
25	DC3V	50	DC12V

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



winstar

LCM Sample Estimate Feedback Sheet

Module Number : _____

Page: 1

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

- | | | |
|-----------------------------|-------------------------------|-------------------------------------|
| 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) | ☐ 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 , _____ |



Winstar Module Number : _____

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 : / /