TFT DISPLAY SPECIFICATION

WINSTAR Display Co.,Ltd.
華凌光電股份有限公司

Winstar Display Co., LTD
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.: WF0675ATYAB6LNN0#

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

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
ISSUED DATE: 2024/03/05			

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

Winstar Display Co., LTD
華凌光電股份有限公司

MODLE NO：

RECORDS OF REVISION			DOC. FIRST ISSUE
VERSION	DATE	REVISED PAGE NO.	**SUMMARY**
0	2023/11/23		First issue
A	2024/03/05		Modify General Specifications and Power on/off Sequence

Contents

1.Module Classification Information

W	F	0675	A	T	Y	A	B6	L	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：067.5” 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:

M	1024768	N	128128	P	1280800	Q	480800	R	640320	S	480128
T	800320	U	8001280	V	176220	W	1280398	X	1024250	Y	1920720
A5	19201080	A6	480480	A7	10801920	A8	135240	A9	480640	B2	122250
B3	340800	B4	2801424	B5	12001920	B6	4801280	B7	800800	B8	40160

⑨				
	D: Digital	L:LVDS	M:MIPI	E:eDP

⑩ Interface:

N	Without control board	A	8Bit	B	16Bit	E	eDP	H	HDMI
I	I2C Interface	R	RS232	S	SPI Interface	U	USB		

⑪ TS:

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		

⑫			
	Version:	X:Raspberry pi	V: Raspberry pi 3B+

⑬		
	Special Code	#:Fit in with ROHS directive regulations

2.Summary

TFT 6.75” is a color active matrix a-Si LCD Q-Panel, using a-Si (amorphous silicon) TFTs (Thin Film Transistors) as an active switching devices. The module has a 6.75 inch diagonally measured active area with 480×1280 resolutions (480 horizontal by 1280 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors.

3.General Specifications

Item	Dimension	Unit
Size	6.75	inch
Dot Matrix	480 x 3(RGB) x 1280	dots
Module dimension	66.8 x 181.1 x 4.55	mm
Active area	60.19 x 160.512	mm
Pixel pitch	0.1254 x 0.1254	mm
LCD type	TFT, Normally Black ,Transmissive	
View Angle	85/85/85/85	
TFT Driver IC	NV3051F-L or Equivalent	
TFT Interface	LVDS	
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	TOP	-20	—	+70	℃
Storage Temperature	TST	-30	—	+80	℃

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

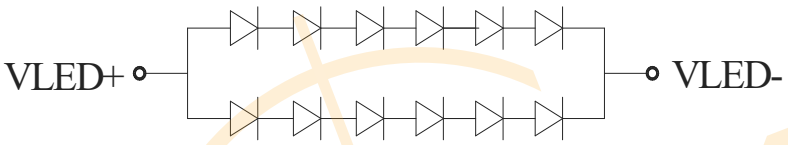
Operating conditions

Item	Symbol	Min	Typ	Max	Unit
Supply voltage for LCM	VCC	3.0	3.3	3.6	V
Supply LCM current	Icc	-	50	75	mA

LED driving conditions

Parameter	Symbol	Min	Typ	Max	Unit	Remark
LED current	—	—	120	—	mA	—
LED voltage	VLED+	15.6	18.0	20.4	V	Note 1
LED Life Time	—	—	50,000	—	Hr	Note 2,3

Note 1 : There are 1 Groups LED
Note 2 : Ta = 25°C



Backlight LED Circuit

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

6.LVDS characteristic

6.1. LVDS AC characteristic

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Clock Frequency	RxFCLK	-	30	-	TBD	MHz
Input data skew margin	TRSKM	|VID|=200mV RxVCM=1.2V RxFCLK=81MHz	500	-	-	ps
Clock High Time	TLVCH	-	-	4/(7*RxFCLK)	-	ns
Clock Low Time	TLVCL	-	-	3/(7*RxFCLK)	-	ns
PLL wake-up-time	TenPLL	-	-	-	150	us

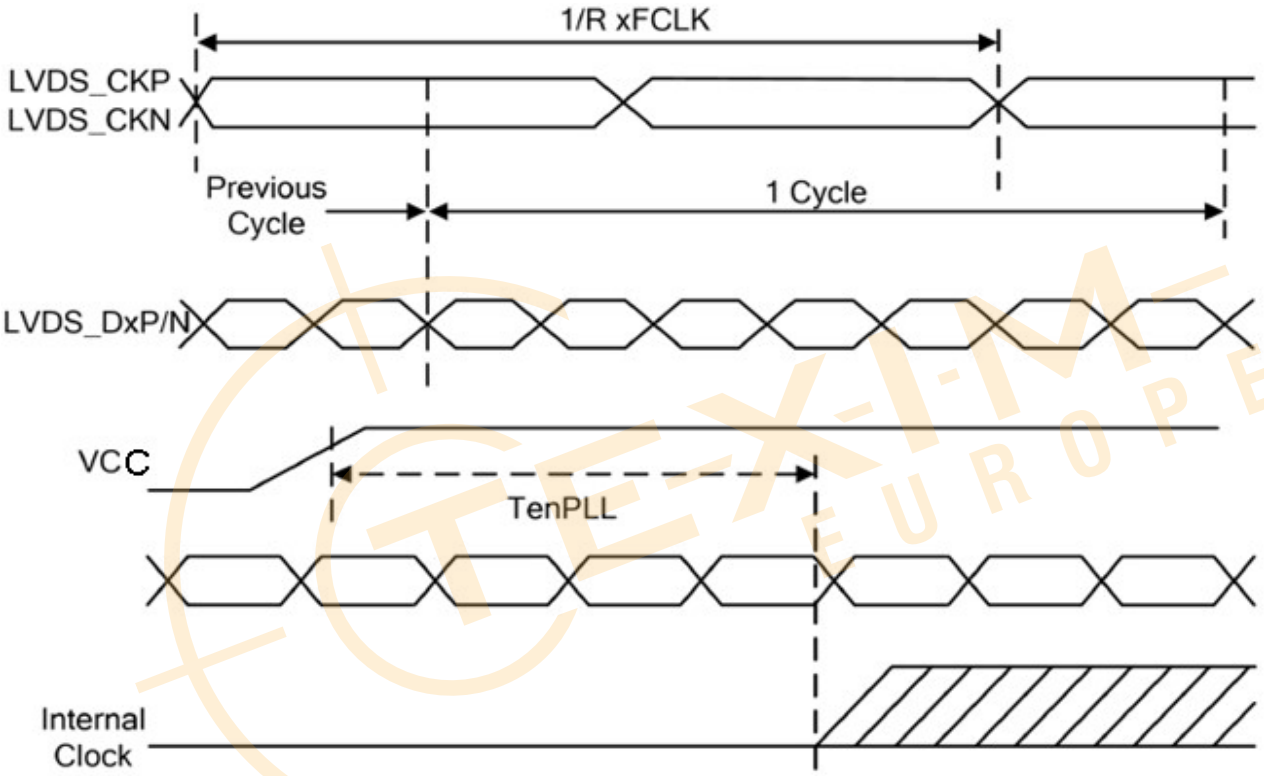


Figure LVDS figure

Parameter	Symbol	Min.	Typ.	Max.	Units	Condition
Modulation Frequency	SSCMF	23	-	93	KHz	
Modulation Rate	SSCMR	-	-	+3	%	

6.2. LVDS DC characteristic

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Differential input high threshold voltage	$V_{Rx,TH}$	V_{RxVCM}=1.2V	-	0.2	-	V
Differential input low threshold voltage	$V_{Rx,TL}$		-	-0.2	-	V
Input voltage range(single-end)	V_{RxIN}		0	-	1.8	V
Differential input common mode voltage	V_{RxVCM}		|VID|/2	1.2	1.8 - |VID|/2	V
Differential input voltage	| VID|		0.2	0.4	0.6	V
Differential input leakage current	I_{LCLVDS}		-10	-	10	uA
Differential input impedance	ZID		80	100	140	Ω

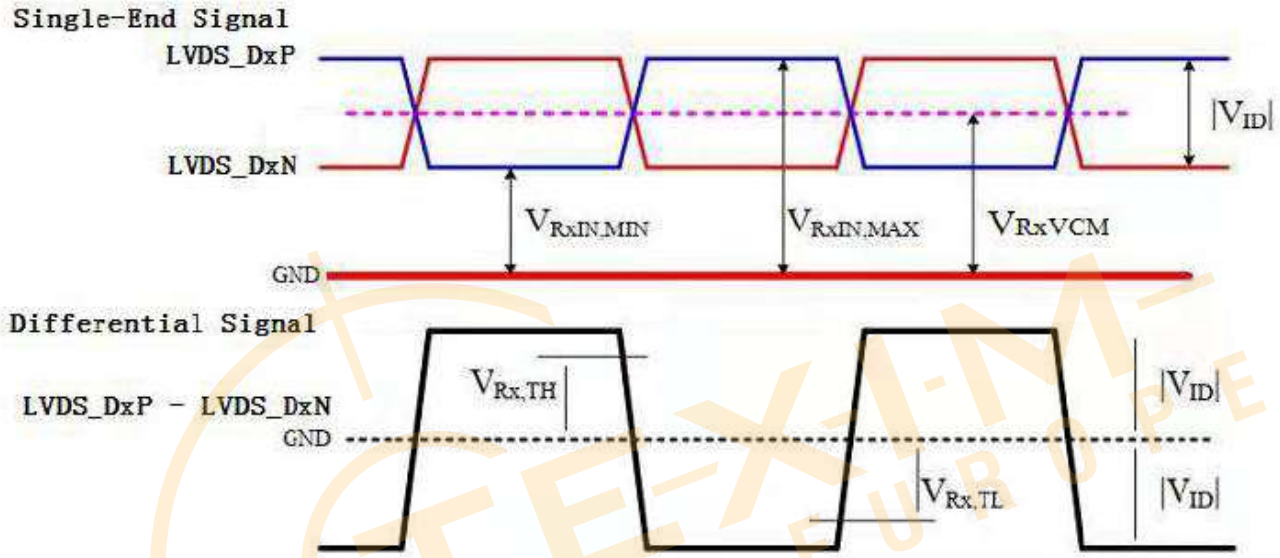
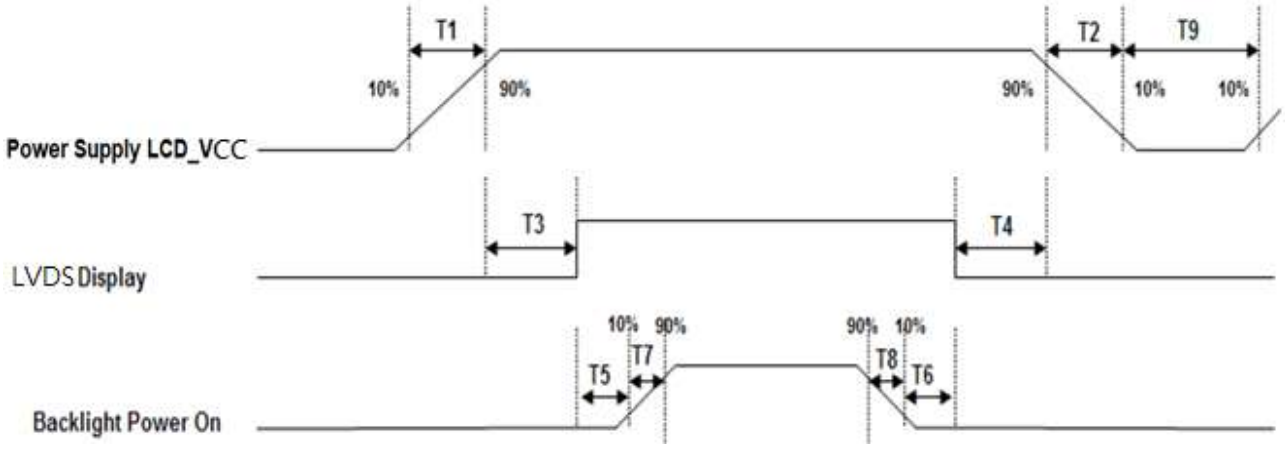


Figure: LVDS Receiver Differential Definition

7.Power sequence

VCC power on/off sequence is as follows. Interface signals are also shown in the chart.
Signals from any system shall be Hi-Z state or low level when VCC is off.



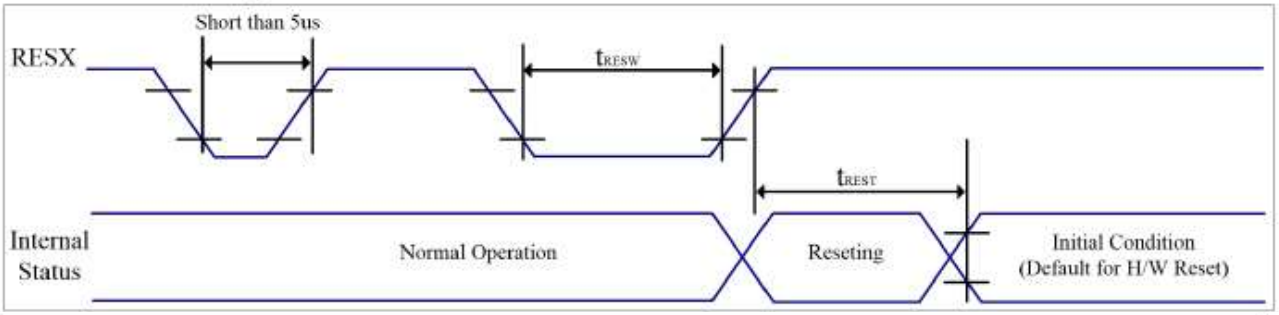
Power Sequence

Parameter	Unit	Min.	Max.
T1	ms	0.5	10
T2	ms	0	10
T3	ms	0	200
T4	ms	0	50
T5	ms	300	-
T6	ms	200	-
T7	ms	0.5	10
T8	ms	0	10
T9	ms	500	-

Power Sequencing Requirements

Note 1: There will be no damage to the display module if the power sequences are not met.
Note 2: There will be no abnormal visible effects on the display panel during the Power On/Off Sequences.
Note 3: There will be no abnormal visible effects on the display between end of Power On Sequence and before receiving Sleep Out command.
Also between receiving Sleep In command and Power Off Sequence.
If RESX line is not held stable by host during Power On Sequence, then it will be necessary to apply a Hardware Reset (RESX) after Host Power On Sequence is complete to ensure correct operation. Otherwise function is not guaranteed.
The power on/off sequence is illustrated above:

7.1. Reset timing characteristics



Symbol	Parameter	Related Pins	MIN	TYP	MAX	Note	Unit
T_{resw}	*1) Reset low pulse width	RESX	10	-	-	-	us
T_{rest}	*2) Reset complete time	-	-	-	5	When reset applied during Sleep in mode	ms
		-	-	-	120	When reset applied during Sleep out mode	ms

Table: Reset input timing

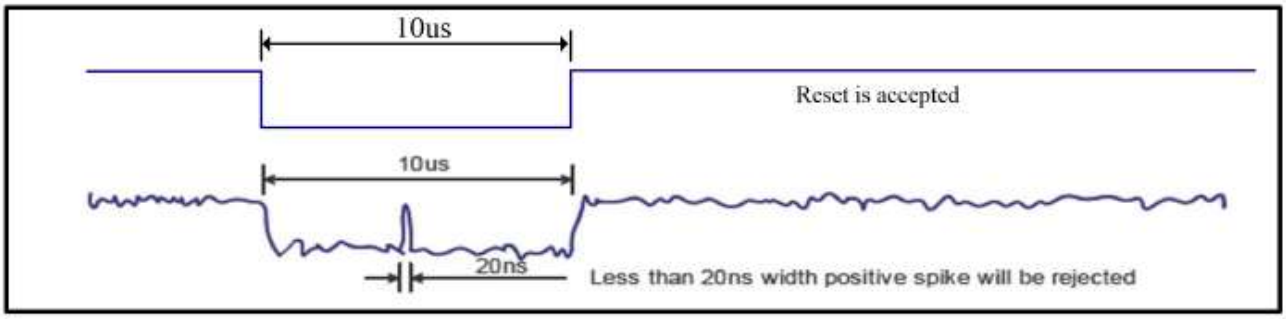
Note 1: Due to an electrostatic discharge on RESX line,spike does not cause irregular system reset according to
the table below.

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 10us	Reset
Between 5us and 10us	Reset starts (It depends on voltage and temperature condition.)

Note 2: During the resetting period, the display will be blanked (The display is entering blanking sequence,
which maximum time is 120ms, when Reset Starts in Sleep Out mode. The display remains the blank state in
Sleep In mode) , then return to default condition for H/W reset.

Note 3: During Reset Complete Time, ID1/ID2/ID3 and VCOM value in OTP will be latched to internal register.
After a rising edge of RESX, there is a H/W reset complete time (Trest) which lasted 5ms.The loading
operation will be done every time during this reset

Note 4: Spike Rejection also applies during a valid reset pulse as shown above:



Note 5. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command
cannot be sent for 120 msec.

7.2. Timing parameter by external Vertical-cycle and Horizontal cycle characteristics

Below Table provide the timing parameter by external Vertical-cycle
(Resolution for 480 horizontal x 1280 vertical display with Frame-Rate of 60Hz)

Parameters	Symbols	Min.	Typ	Max.	Unit
MIPI Vedio data-rate (4 lane)	-	-	347	-	Mbps
PCLK Frequency	FPCLK	-	57.62	-	MHz
Horizontal Synchronization	Hsync	-	2	-	PCLK
Horizontal Back Porch	HBP	-	30	-	PCLK
Horizontal Front Porch	HFP	-	24	-	PCLK
Hsync+ HBP+ HFP	-	-	56	-	PCLK
Horizontal Address (Display area)	Hadr	-	600	-	PCLK
Horizontal cycle	-	-	12.703	-	us
Vertical Synchronization	Vsync	-	2	-	Line
Vertical Back Porch	VBP	-	8	-	Line
Vertical Front Porch	VFP	-	16	-	Line
Vsync+ VBP+ VFP	-	-	26	-	Line
Vertical Address (Display area)	Vadr	-	1280	-	Line
Vertical cycle	-	-	16.66	-	ms
Frame-Rate	-	-	60	-	Hz

"-" means no limit.

Note : 1. If using Image Process Algorithm, Type value for H-blanking is minimum requirement.

Note: 2. Horizontal Address (Display area),The actual resolution of the glass is 480p, and black processing needs to be inserted on both sides.

8.Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr	θ=0°、Φ=0°	-	16	21	.ms	Note 3
		Tf		-	14	19	.ms	
Contrast ratio		CR	At optimized viewing angle	1000	1500	-	-	Note 4
Color Chromaticity	White	Wx	θ=0°、Φ=0	0.243	0.293	0.343	-	Note 2,6,7
		Wy		0.272	0.322	0.372	-	
Viewing angle	Hor.	ΘR	CR≧10	75	85	-	Deg.	Note 1
		ΘL		75	85	-		
	Ver.	ΦT		75	85	-		
		ΦB		75	85	-		
Brightness		-	-	400	500	-	cd/m2	Center of display
Uniformity		(U)	-	75	-	-	%	Note 5

Ta=25±2℃

Note 1: Definition of viewing angle range

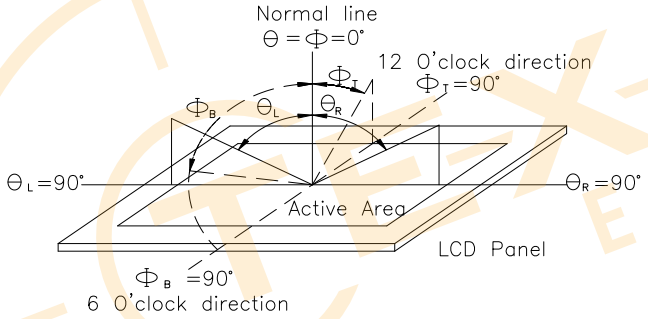


Fig 8.1. Definition of viewing angle

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.

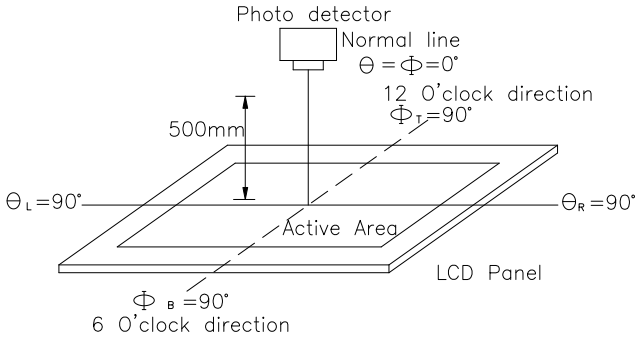
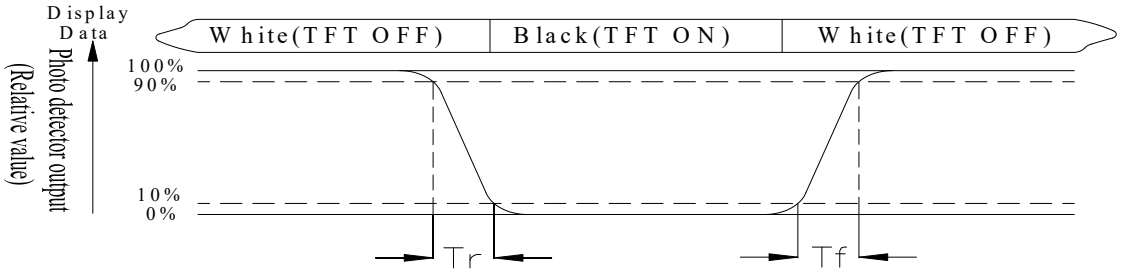


Fig8.2. Optical measurement system setup

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: 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) = Lmin/Lmax x100%
L = Active area length
W = Active area width

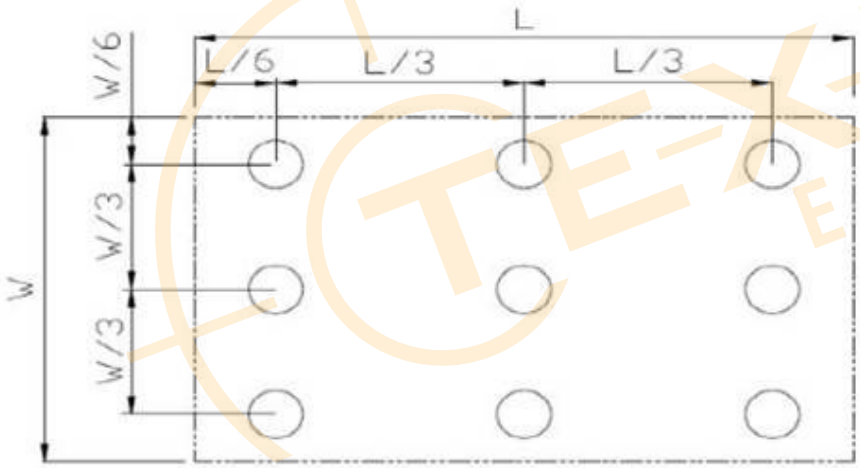


Fig 8.3. Definition of uniformity

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.

9.Interface

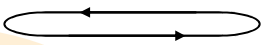
9.1. LCM PIN Definition

Pin No.	Symbol	Pin Description
1	NC	No connection
2 -3	VCC	Power supply
4	NC	No connection
5	RESET	Global Reset Signal. Active Low.
6	STBYB	Standby mode, normally pull high STBYB=”1”, normal operation STBYB=”0”,timming control, source driver will turn off, all output are high-Z
7	GND	Ground
8	RXIN0-	LVDS data Input
9	RXIN0+	LVDS data Input
10	GND	Ground
11	RXIN1-	LVDS data Input
12	RXIN1+	LVDS data Input
13	GND	Ground
14	RXIN2-	LVDS data Input
15	RXIN2+	LVDS data Input
16	GND	Ground
17	RXCLKIN-	LVDS clock Input.
18	RXCLKIN+	LVDS clock Input.
19	GND	Ground
20	RXIN3-	LVDS data Input
21	RXIN3+	LVDS data Input
22	GND	Ground
23	NC(YU)	No connection
24	NC(XL)	No connection
25	GND	Ground
26	NC(YD)	No connection
27	NC(XR)	No connection
28-29	NC	No connection
30	GND	Ground
31	VLED-	Power for LED backlight cathode

32	VLED-	Power for LED backlight cathode
33-38	NC	No connection
39	VLED+	Power for LED backlight anode
40	VLED+	Power for LED backlight anode

10.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 : 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	——

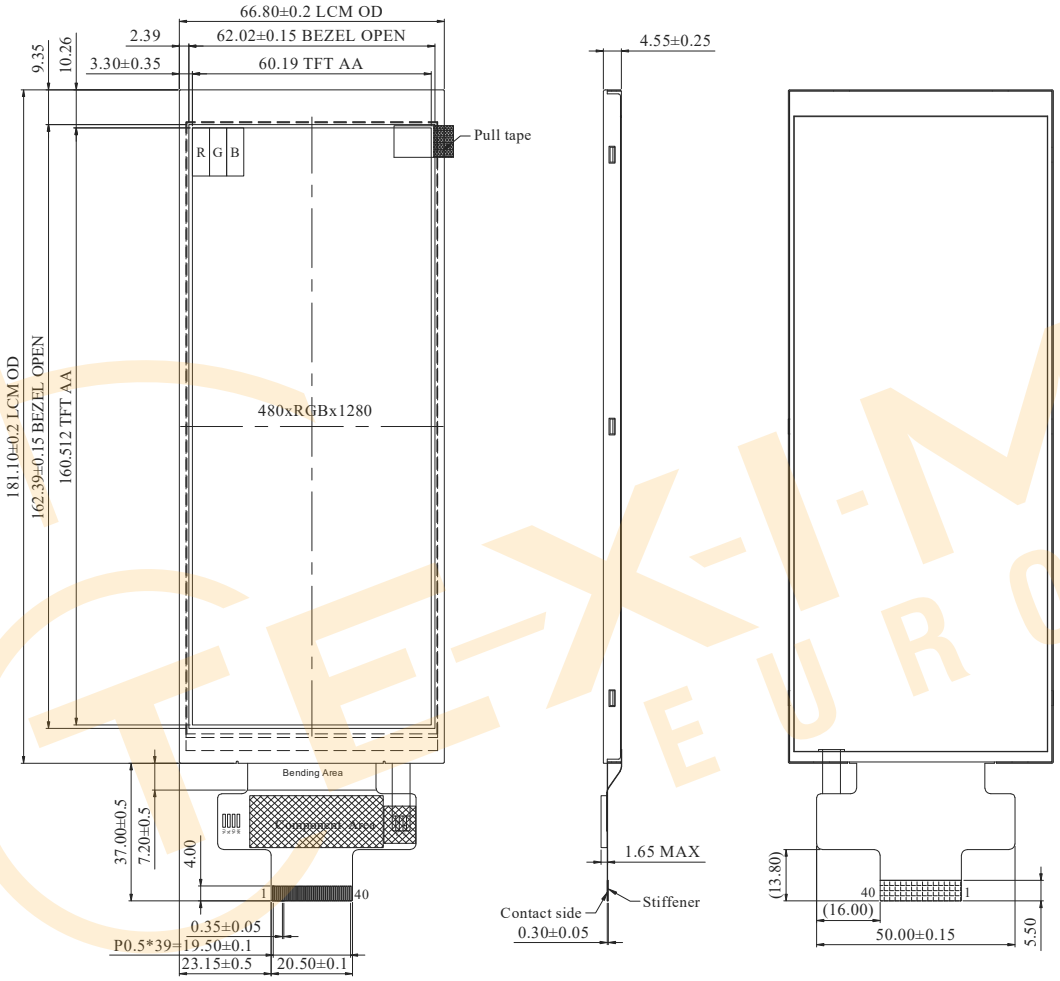
Note1: No dew condensation to be observed.

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.

11.Contour Drawing

PIN NO	SYMBOL	PIN NO	SYMBOL
1	NC	21	RXIN3+
2	VCC	22	GND
3	VCC	23	NC(YU)
4	NC	24	NC(XL)
5	RESET	25	GND
6	STBYB	26	NC(YD)
7	GND	27	NC(XR)
8	RXIN0-	28	NC
9	RXIN0+	29	NC
10	GND	30	GND
11	RXIN1-	31	VLED-
12	RXIN1+	32	VLED-
13	GND	33	NC
14	RXIN2-	34	NC
15	RXIN2+	35	NC
16	GND	36	NC
17	RXCLKIN-	37	NC
18	RXCLKIN+	38	NC
19	GND	39	VLED+
20	RXIN3-	40	VLED+



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

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

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**：____/____/____

Disclaimer

ALL PRODUCTS, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Texim Europe B.V. its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Texim”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Texim makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product.

It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application.

Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time.

All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts.

Please contact us if you have any questions about the contents of the datasheet.

This may not be the latest version of the datasheet. Please check with us if a later version is available.

Texim Europe - contact details

Headquarters & Warehouse

Elektrostraat 17
NL-7483 PG Haaksbergen
The Netherlands

T: +31 (0)53 573 33 33
E: info@texim-europe.com
Homepage: www.texim-europe.com

The Netherlands

Elektrostraat 17
NL-7483 PG Haaksbergen

T: +31 (0)53 573 33 33
E: nl@texim-europe.com

Belgium

Zuiderlaan 14, box 10
B-1731 Zellik

T: +32 (0)2 462 01 00
E: belgium@texim-europe.com

UK & Ireland

St Mary's House, Church Lane
Carlton Le Moorland
Lincoln LN5 9HS

T: +44 (0)1522 789 555
E: uk@texim-europe.com

Germany - North

Bahnhofstrasse 92
D-25451 Quickborn

T: +49 (0)4106 627 07-0
E: germany@texim-europe.com

Germany - South

Martin-Kollar-Strasse 9
D-81829 München

T: +49 (0)89 436 086-0
E: muenchen@texim-europe.com

Austria

Warwitzstrasse 9
A-5020 Salzburg

T: +43 (0)662 216 026
E: austria@texim-europe.com

Nordic

Søndre Jagtvej 12
DK-2970 Hørsholm

T: +45 88 20 26 30
E: nordic@texim-europe.com

Italy

Martin-Kollar-Strasse 9
D-81829 München

T: +49 (0)89 436 086-0
E: italy@texim-europe.com