

TFT DISPLAY SPECIFICATION

Distributed by:



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.: WF88BTYF8MHG1V#

APPROVED BY: (FOR CUSTOMER USE ONLY)	PCB VERSION:	DATA:
	<input type="checkbox"/> TFT Display Inspection Specification: https://www.winstar.com.tw/technology/download.html	<input type="checkbox"/> Precaution in use of TFT module: https://www.winstar.com.tw/technology/download/declaration.html

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			葉虹蘭
ISSUED DATE:	2025/11/20		



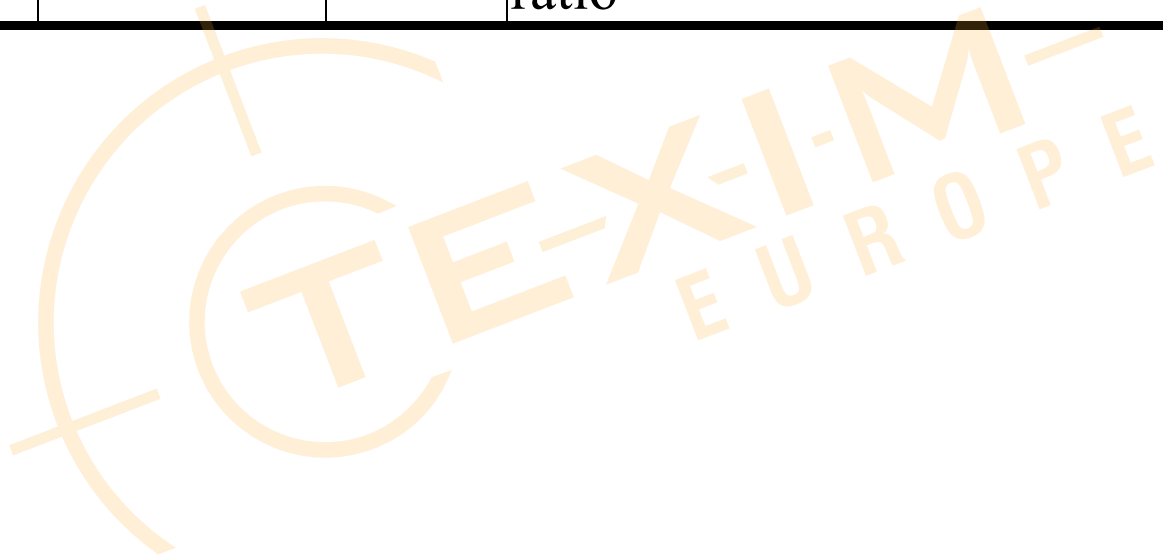
Winstar Display Co., LTD
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MODLE NO :

RECORDS OF REVISION

DOC. FIRST ISSUE

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2024/12/18		First issue
A	2025/03/31		Add PWM definition Modify PCB and Reliability
B	2025/11/20		Add Static electricity test Modify type C and Contrast ratio



Contents

1. Module Classification Information
2. Summary
3. General Specifications
4. Absolute Maximum Ratings
5. Electrical Characteristics
6. Optical Characteristics
7. Interface
8. Reliability
9. Contour Drawing
10. Other



1. Module Classification Information

W F 88 B T Y F 8 M H G 1 V#
 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 : 8.8" 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:																	
	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	7	1280480	8	4801920	9	480854								
⑨	D: Digital L : LVDS M:MIPI																	
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: V: Raspberry pi 3B+																	
⑬	Special Code				#:Fit in with ROHS directive regulations													

2.Summary

WF88 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 8.8 (1:4) inch diagonally measured active display area with (480 horizontal by 1920 vertical pixel) resolution.



3. General Specifications

Item	Dimension	Unit
Size	8.8	inch
Dot Matrix	480 x R.G.B. x 1920	dots
Module dimension	241.3* 74.3 * 26.6	mm
Active area	218.88 *54.72	mm
Pixel pitch	0.114 x 0.114	mm
LCD type	TFT, Normally black, Transmissive	
Viewing angle	85/85/85/85	
Aspect Ratio	1:4	
Backlight Type	LED ,Normally White	
Electrical Interface (Logic)	DVI	
CTP FW Version	0x66	
CTP IC	GT928or equivalent	
CTP Interface	USB	
CTP Resolution	480*1920	
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. $\leq 60^{\circ}\text{C}$, 90% RH MAX. Temp. $> 60^{\circ}\text{C}$, Absolute humidity shall be less than 90% RH at 60°C



5. Electrical Characteristics

5.1. Operating conditions:

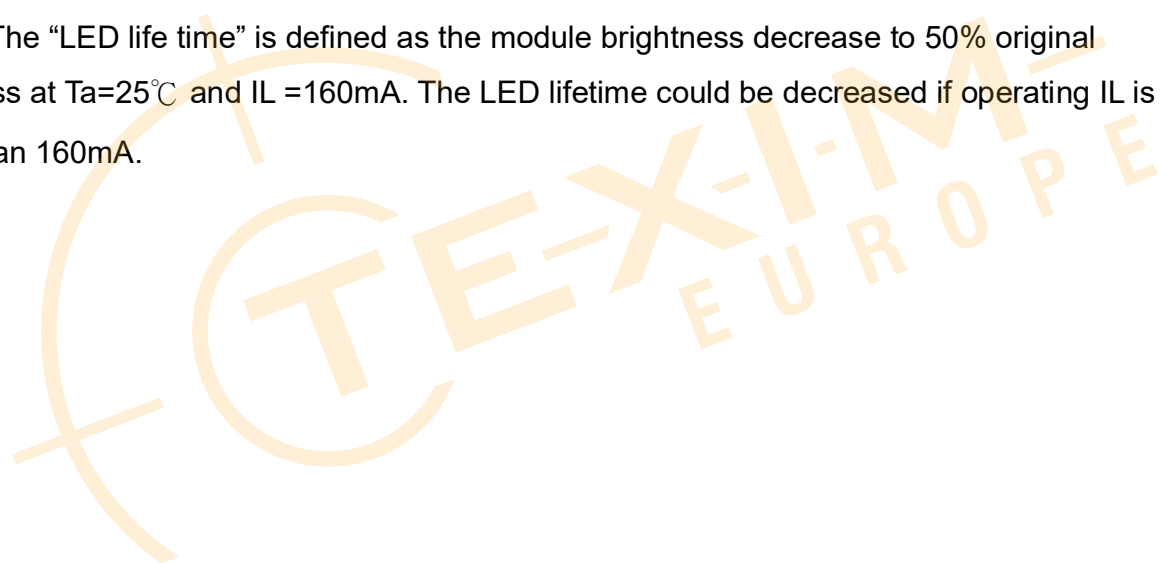
Item	Symbol	Min	Typ	Max	Unit	Remark
Supply Voltage For LCM	VDD	4.75	5	5.25	V	—
Supply Current For LCM	IDD	—	813	1220	mA	Note 1
LED Life Time	-	-	30,000	-	Hr	

Note 1 : This value is test for VDD =5.0V , Ta=25°C only

Note 2 : Please make sure to support enough current

Note3 : CTP driver is base on the mouse driver program and through USB port connect to PC or embedded board.Can only support the single touch.

Note 4: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and IL =160mA. The LED lifetime could be decreased if operating IL is larger than 160mA.



6. Optical Characteristics

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr+ Tf	$\theta=0^\circ$ 、 $\Phi=0^\circ$	-	30	40	.ms	Note 3	
Contrast ratio	CR	At optimized viewing angle	520	650	-	-	Note 4	
Color Chromaticity	White	Wx	$\theta=0^\circ$ 、 $\Phi=0$	0.250	0.300	0.350	Note 2,6,7	
		Wy		0.272	0.322	0.372		
Viewing angle	Hor.	Θ_R	$CR \geq 10$	75	85	-	Deg.	Note 1
		Θ_L		75	85	-		
	Ver.	Φ_T		75	85	-		
		Φ_B		75	85	-		
Brightness	-	-	350	450	-	cd/m ²	Center of display	
Uniformity	(U)	-	70	-	-	%	Note 5	

Ta=25±2°C,

Note 1: Definition of viewing angle range

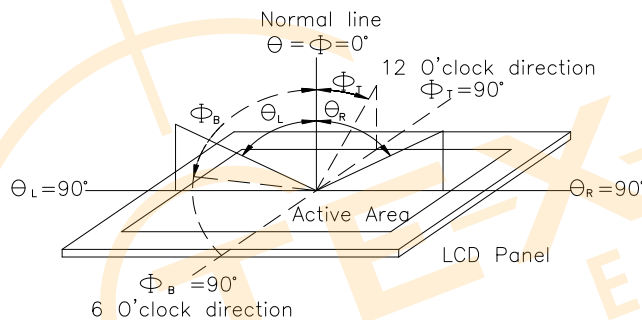


Fig 8.1. Definition of viewing angle

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

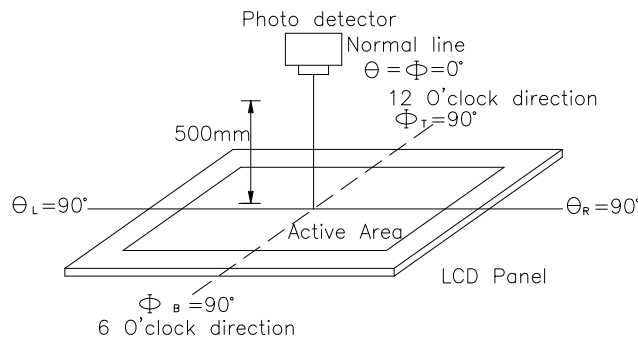
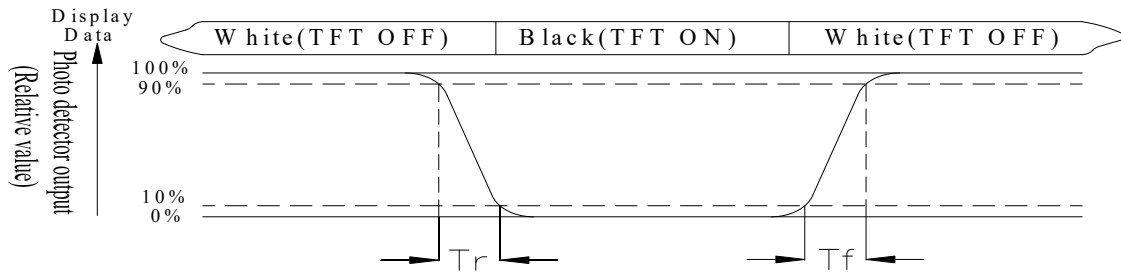


Fig 8.2. Optical measurement system setup

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, 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

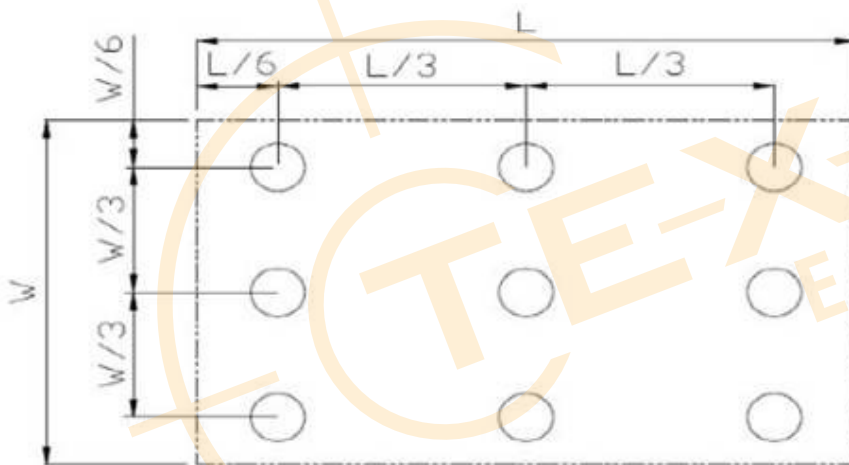


Fig Definition of uniformity

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.

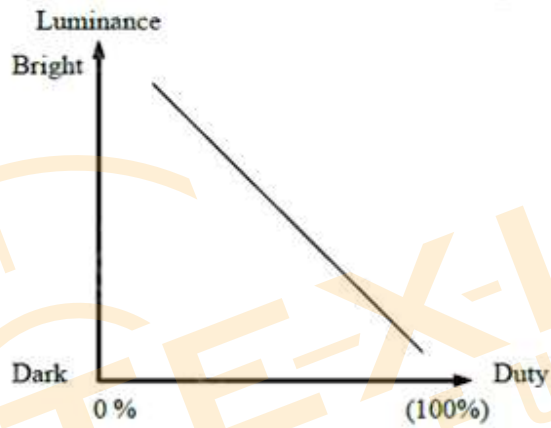
7.Interface

7.1. LCM PIN Definition(CON4)

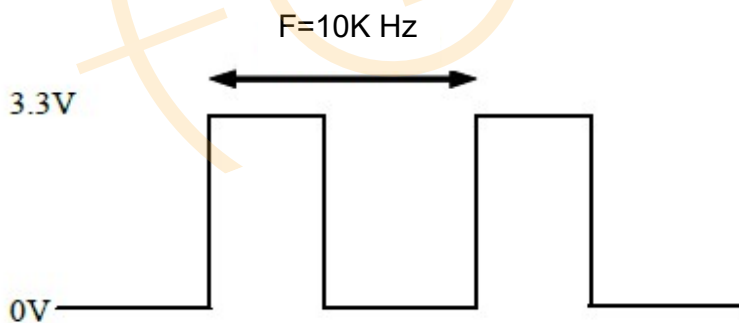
Pin No.	Symbol	Function	Remark
1	NC	No connection	
2	5V	Raspberry Pi:Power 5V	
3	GPIO02	Raspberry Pi:GPIO02	
4	5V	Raspberry Pi:Power 5V	
5	GPIO03	Raspberry Pi:GPIO03	
6	GND	Raspberry Pi:GND	
7	GPIO04	Raspberry Pi:GPIO04	
8	GPIO14	Raspberry Pi:GPIO14	
9	GND	Raspberry Pi:GND	
10	GPIO15	Raspberry Pi:GPIO15	
11	GPIO17	Raspberry Pi:GPIO17	
12	BL-PWM GPIO18	Raspberry Pi:GPIO18 (Backlight Enable)	Note 1 Note 2
13	GPIO27	Raspberry Pi:GPIO27	
14	GND	Raspberry Pi:GND	
15	GPIO22	Raspberry Pi:GPIO22	
16	GPIO23	Raspberry Pi:GPIO23	
17	NC	No connection	
18	GPIO24	Raspberry Pi:GPIO24	
19	GPIO10	Raspberry Pi:GPIO10	
20	GND	Raspberry Pi:GND	
21	GPIO09	Raspberry Pi:GPIO09	
22	GPIO25	Raspberry Pi:GPIO25	
23	GPIO11	Raspberry Pi:GPIO11	
24	GPIO08	Raspberry Pi:GPIO08	
25	GND	Raspberry Pi:GND	
26	GPIO07	Raspberry Pi:GPIO07	
27	ID_SD	Raspberry Pi:ID_SD	
28	ID_SC	Raspberry Pi:ID_SC	
29	GPIO05	Raspberry Pi:GPIO05	
30	GND	Raspberry Pi:GND	

31	GPIO06	Raspberry Pi:GPIO06	
32	GPIO12	Raspberry Pi:GPIO12	
33	GPIO13	Raspberry Pi:GPIO13	
34	GND	Raspberry Pi:GND	
35	GPIO19	Raspberry Pi:GPIO19	
36	GPIO16	Raspberry Pi:GPIO16	
37	GPIO26	Raspberry Pi:GPIO26	
38	GPIO20	Raspberry Pi:GPIO20	
39	GND	Raspberry Pi:GND	
40	GPIO21	Raspberry Pi:GPIO21	

Note 1: Adjust the PWM signal in order to control LED Backlight's brightness. The higher the duty cycle, the lower the brightness.



Note 2: PWM signal operation frequency is 10KHz



7.2. (CON5)

Pin No.	Symbol	Function	Remark
1	3.3V	TFT Module Power limit can only output 3.3V,100mA	Note3
2	5V	Raspberry Pi:Power 5V	
3	GPIO02	Raspberry Pi:GPIO02	
4	5V	Raspberry Pi:Power 5V	
5	GPIO03	Raspberry Pi:GPIO03	
6	GND	Raspberry Pi:GND	
7	GPIO04	Raspberry Pi:GPIO04	
8	GPIO14	Raspberry Pi:GPIO14	
9	GND	Raspberry Pi:GND	
10	GPIO15	Raspberry Pi:GPIO15	
11	GPIO17	Raspberry Pi:GPIO17	
12	BL-PWM GPIO18	Raspberry Pi:GPIO18 (Backlight Enable)	
13	GPIO27	Raspberry Pi:GPIO27	
14	GND	Raspberry Pi:GND	
15	GPIO22	Raspberry Pi:GPIO22	
16	GPIO23	Raspberry Pi:GPIO23	
17	3.3V	TFT Module Power limit can only output 3.3V,100mA	Note3
18	GPIO24	Raspberry Pi:GPIO24	
19	GPIO10	Raspberry Pi:GPIO10	
20	GND	Raspberry Pi:GND	
21	GPIO09	Raspberry Pi:GPIO09	
22	GPIO25	Raspberry Pi:GPIO25	
23	GPIO11	Raspberry Pi:GPIO11	
24	GPIO08	Raspberry Pi:GPIO08	
25	GND	Raspberry Pi:GND	
26	GPIO07	Raspberry Pi:GPIO07	
27	ID_SD	Raspberry Pi:ID_SD	
28	ID_SC	Raspberry Pi:ID_SC	
29	GPIO05	Raspberry Pi:GPIO05	
30	GND	Raspberry Pi:GND	
31	GPIO06	Raspberry Pi:GPIO06	
32	GPIO12	Raspberry Pi:GPIO12	

33	GPIO13	Raspberry Pi:GPIO13	
34	GND	Raspberry Pi:GND	
35	GPIO19	Raspberry Pi:GPIO19	
36	GPIO16	Raspberry Pi:GPIO16	
37	GPIO26	Raspberry Pi:GPIO26	
38	GPIO20	Raspberry Pi:GPIO20	
39	GND	Raspberry Pi:GND	
40	GPIO21	Raspberry Pi:GPIO21	

Note3: The 3.3V supply current is limited; please pay special attention to use



7.3. DVI

Pin No.	Symbol	I/O	Function	Remark
1	Rx2+	I	Channel-2 positive receiver input; low-voltage signal differential- input pair.	
2	GND	P	Ground	
3	Rx2-	I	Channel-2 negative receiver input; low-voltage signal differential- input pair.	
4	Rx1+	I	Channel-1 positive receiver input; low-voltage signal differential- input pair.	
5	GND	P	Ground	
6	Rx1-	I	Channel-1 negative receiver input; low-voltage signal differential- input pair.	
7	Rx0+	I	Channel-0 positive receiver input; low-voltage signal differential- input pair.	
8	GND	P	Ground	
9	Rx0-	I	Channel-0 negative receiver input; low-voltage signal differential- input pair.	
10	RxC+	I	Clock positive receiver input; low-voltage signal differential- input pair.	
11	GND	P	Ground	
12	RxC-	I	Clock negative receiver input; low-voltage signal differential- input pair.	
13-14	NC	-	No connection	
15	SCL	I/O	DDC(Data Display Channel) Clock	
16	SDA	I/O	DDC(Data Display Channel) Data	
17	GND	P	Ground	
18	HDMI_5V	P	Power Supply	
19	Detect	I/O	Hot plug detect	

I: input, O: output, P: Power

7.4. USB

Pin No	Symbol	Function	Remark
A1	GND	Power Ground	
A4	NC	No connection	
A5	NC	No connection	
A6	D+	Data line +	
A7	D-	Data line -	
A8	NC	No connection	
A9	NC	No connection	
A12	GND	Power Ground	
B12	GND	Power Ground	
B9	NC	No connection	
B8	NC	No connection	
B7	D-	Data line -	
B6	D+	Data line +	
B5	NC	No connection	
B4	NC	No connection	
B1	GND	Power Ground	

7.5. PW_5V

Pin No	Symbol	Function	Remark
A1	GND	Power Ground	
A4	VBUS	Power 5V	
A5	CC1	Configuration channel	
A6	NC	No connection	
A7	NC	No connection	
A8	NC	No connection	
A9	VBUS	Power 5V	
A12	GND	Power Ground	
B12	GND	Power Ground	
B9	VBUS	Power 5V	
B8	NC	No connection	
B7	NC	No connection	
B6	NC	No connection	
B5	CC2	Configuration channel	
B4	VBUS	Power 5V	
B1	GND	Power Ground	

8. 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	2
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	1,2
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 style="margin: 0;">-20°C 25°C 70°C</p> <p style="margin: 0;">30min 5min 30min</p> <p style="margin: 0;">1 cycle</p> </div>	-20°C/70°C 10 cycles	2
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=±6KV(contact), ±8KV(air), RS=330Ω CS=150pF 10 times	4

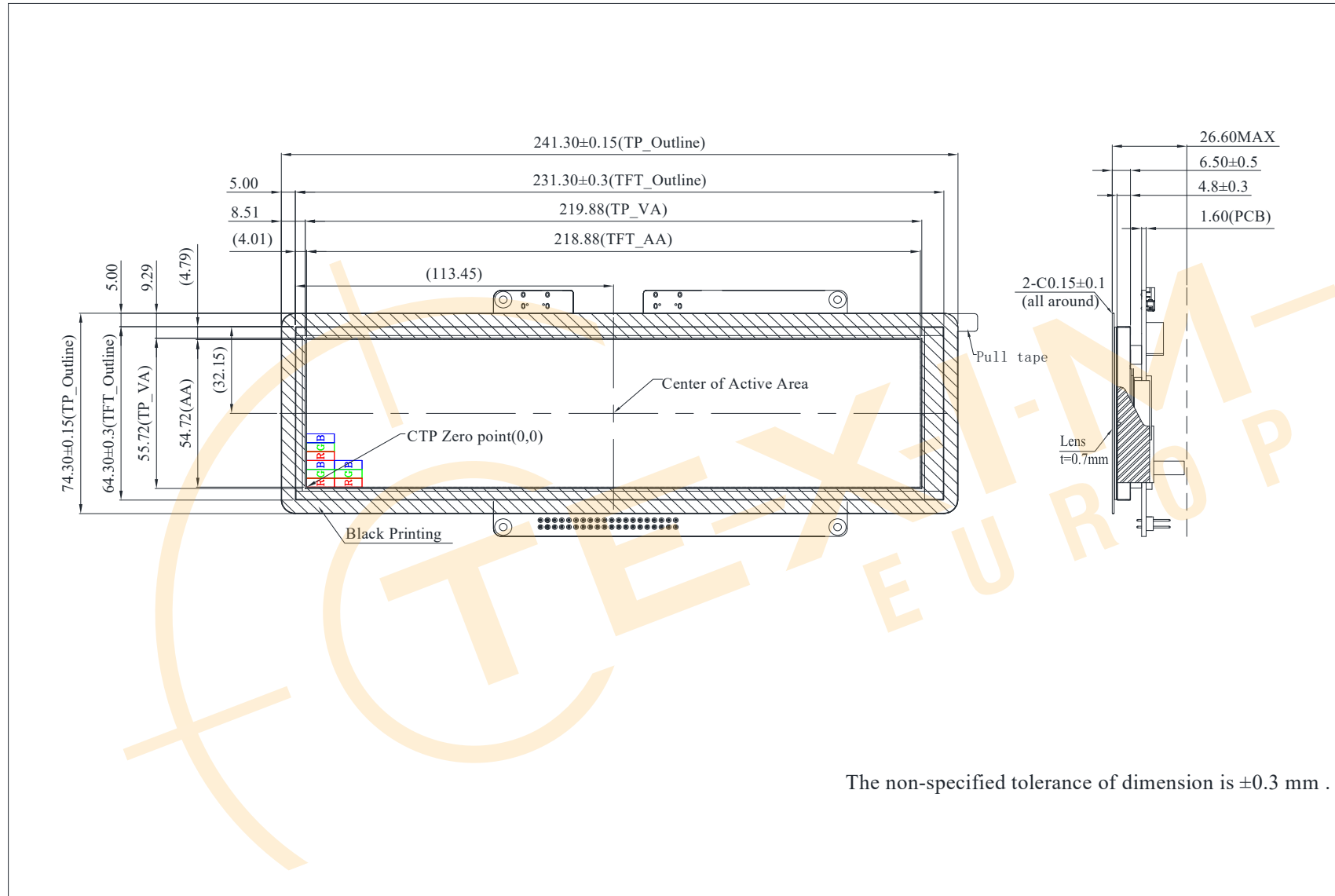
Note1: No dew condensation to be observed.

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.

Note4: Endurance test applying the electric stress to the finished product housing

9. Contour Drawing



CON4

Pin	Symbol	Pin	Symbol
1	NC	21	GPIO09
2	5V	22	GPIO25
3	GPIO02	23	GPIO11
4	5V	24	GPIO08
5	GPIO03	25	GND
6	GND	26	GPIO07
7	GPIO04	27	ID_SD
8	GPIO14	28	ID_SC
9	GND	29	GPIO05
10	GPIO15	30	GND
11	GPIO17	31	GPIO06
12	BL-PWM GPIO18	32	GPIO12
13	GPIO27	33	GPIO13
14	GND	34	GND
15	GPIO22	35	GPIO19
16	GPIO23	36	GPIO16
17	NC	37	GPIO26
18	GPIO24	38	GPIO20
19	GPIO10	39	GND
20	GND	40	GPIO21

CON5

Pin	Symbol	Pin	Symbol
1	3.3V	21	GPIO09
2	5V	22	GPIO25
3	GPIO02	23	GPIO11
4	5V	24	GPIO08
5	GPIO03	25	GND
6	GND	26	GPIO07
7	GPIO04	27	ID_SD
8	GPIO14	28	ID_SC
9	GND	29	GPIO05
10	GPIO15	30	GND
11	GPIO17	31	GPIO06
12	BL-PWM GPIO18	32	GPIO12
13	GPIO27	33	GPIO13
14	GND	34	GND
15	GPIO22	35	GPIO19
16	GPIO23	36	GPIO16
17	3.3V	37	GPIO26
18	GPIO24	38	GPIO20
19	GPIO10	39	GND
20	GND	40	GPIO21

PW_5V

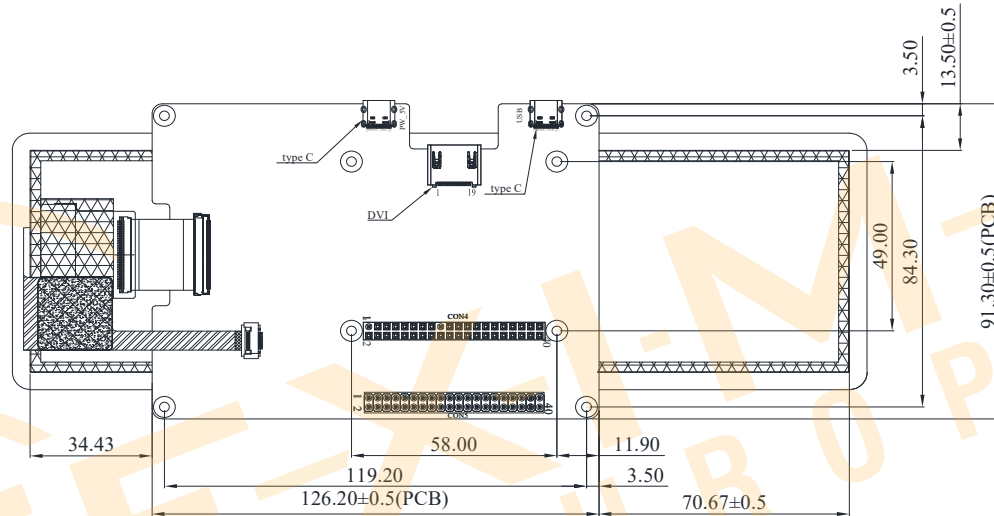
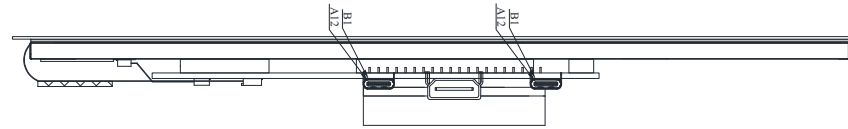
Pin	Symbol	Pin	Symbol
A1	GND	B12	GND
A4	VBUS	B9	VBUS
A5	CC1	B8	NC
A6	NC	B7	NC
A7	NC	B6	NC
A8	NC	B5	CC2
A9	VBUS	B4	VBUS
A12	GND	B1	GND

DVI

Pin	Symbol	Pin	Symbol
1	Rx2+	11	GND
2	GND	12	RxC-
3	Rx2-	13	NC
4	Rx1+	14	NC
5	GND	15	SCL
6	Rx1-	16	SDA
7	Rx0+	17	GND
8	GND	18	HDMI_5V
9	Rx0-	19	Detect
10	RxC+		

USB

Pin	Symbol	Pin	Symbol
A1	GND	B12	GND
A4	NC	B9	NC
A5	NC	B8	NC
A6	D+	B7	D-
A7	D-	B6	D+
A8	NC	B5	NC
A9	NC	B4	NC
A12	GND	B1	GND



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 , _____

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



Winstar Module Number : _____

Page: 2

5、Electronic Characteristics of Module :

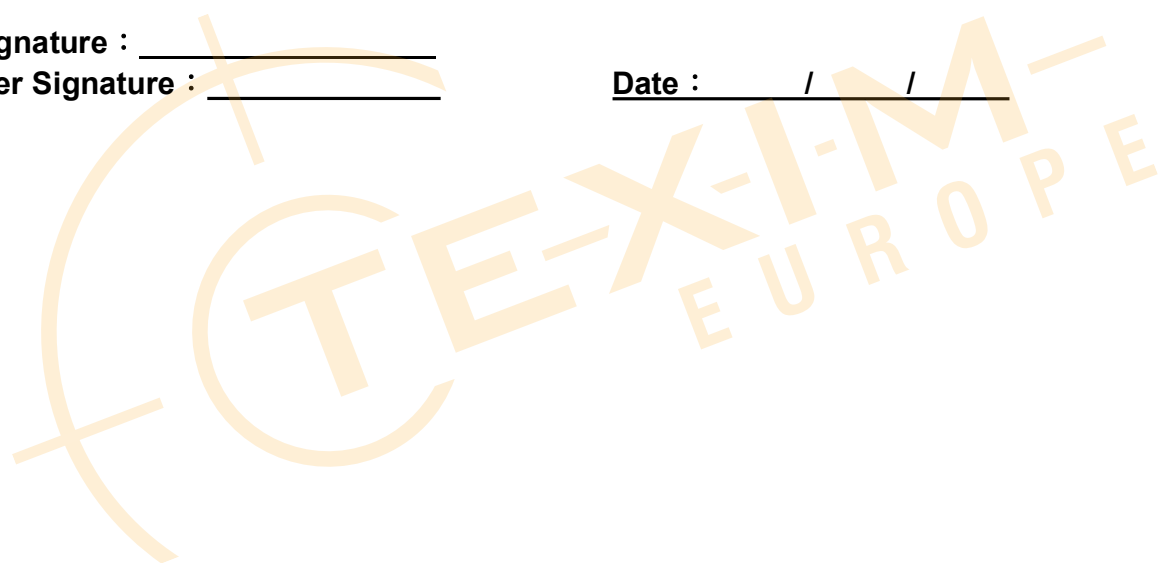
- | | | | |
|------------------------------|-------------------------------|-------------------------------|-------|
| 1. Input Voltage : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , | _____ |
| 2. Supply Current : | <input type="checkbox"/> Pass | <input type="checkbox"/> NG , | _____ |
| 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、Summary :

Sales signature : _____

Customer Signature : _____

Date : / / _____



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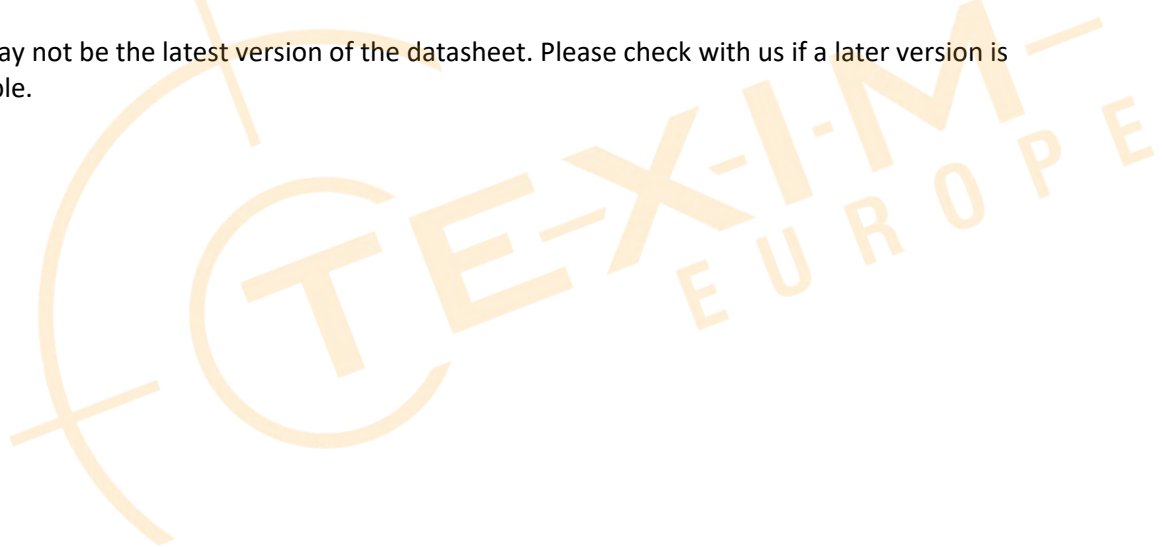
It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application.

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.





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