TFT DISPLAY SPECIFICATION



WINSTAR Display Co.,Ltd.
華凌光電股份有限公司

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SPECIFICATION

CUSTOMER : _____

MODULE NO.: WF24-240320NS#0P0-FC

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

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
ISSUED DATE: 2022/07/11			

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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	2022/07/11		First issue

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Summary

TFT 2.4”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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General Specifications

Item	Dimension	Unit
Size	2.4”	inch
Dot Matrix	240 x RGB x 320(TFT)	dots
Module dimension	42.72(W) ×59.4(H) × 2.45(T)	mm
Active area	36.72 x 48.96	mm
Pixel Pitch	0.153 x 0.153	mm
LCD type	TFT, Normally Black, Transmissive	
TFT Interface	MCU_8BIT	
TFT Driver IC	ST7789V2 or Equivalent	
View Direction	6 o’clock	
Gray Scale Inversion Direction	12 o’clock	
Aspect Ratio	4:3	
Backlight Type	LED,Normally White	
With /Without TP	Without TP	
Surface	Anti-Glare	

*Color tone slight changed by temperature and driving voltage.

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℃

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Electrical Characteristics

Operating conditions

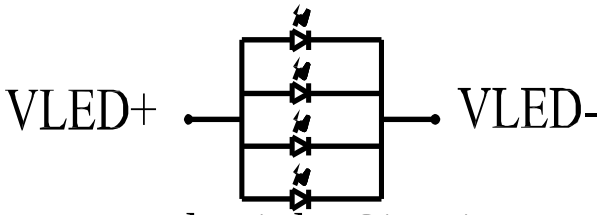
Item	Symbol	Min	Type	Max	Uint
Analog Voltage	VCC	2.6	2.8	3.3	V
Input logic high voltage	VIH	0.7VCC	-	VCC	V
Input logic low voltage	VIL	GND	-	0.3VCC	V
Output logic high voltage	VOH	0.8VCC	-	VCC	V
Output logic low voltage	VOL	GND	-	0.2VCC	V

LED driving conditions

Item	Symbol	Min	Type	Max	Uint
Forward voltage	V_F	2.8	3.0	3.2	V
Forward current	I_F	-	60	-	mA
Luminance	Lv	270	300	-	cd/m2
Power Consumption	P_{LED}	-	240	-	mW
Uniformity(with L/G)	Avg	75	80	-	%
LED Life-Time	Hr	-	30000	-	Hour

Note 1:The LED Supply Voltage is defined by the number of LED at Ta=25°C and IL=15mA/LED.

Note 2:The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25°C and IL=15mA/LED. The LED lifetime could be decreased if operating IL is large than 15mA/LED



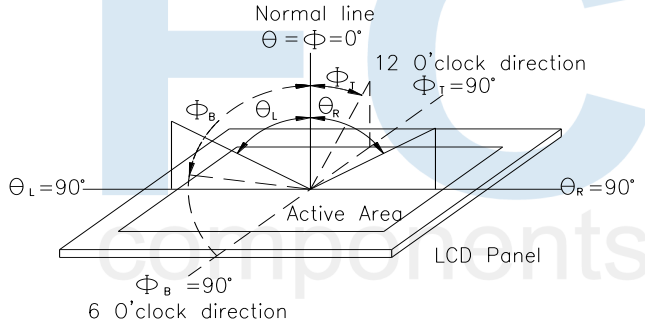
Back Light Circuit

Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr +Tf	θ=0°、Φ=0°	-	35	-	ms	Note 3
Contrast ratio		CR	At optimized viewing angle	640	800	-	-	Note 4
Color Chromaticity	White	Wx	θ=0°、Φ=0	0.210	0.310	0.360		Note 2,6,7
		Wy		0.286	0.336	0.386		
Viewing angle (Gray Scale Inversion Direction)	Hor.	ΘR	CR≧10	-	80	-	Deg.	Note 1
		ΘL		-	80	-		
	Ver.	ΦT		-	80	-		
		ΦB		-	80	-		
Brightness		-	-	270	300	-	cd/m²	Center of display
Uniformity		(U)	-	75	-	-	%	Note5

Ta=25±2℃

Note 1: Definition of viewing angle range



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.

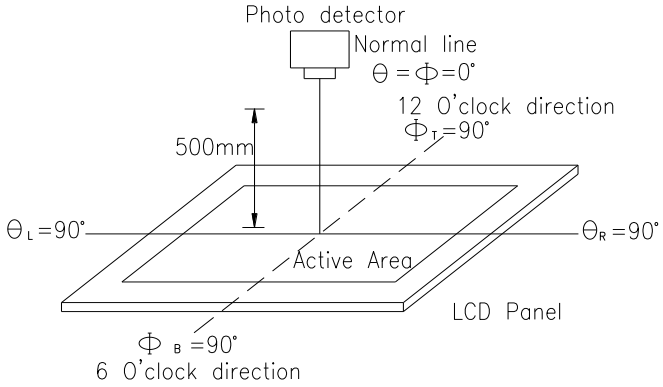


Fig. 7.2. Optical measurement system setup

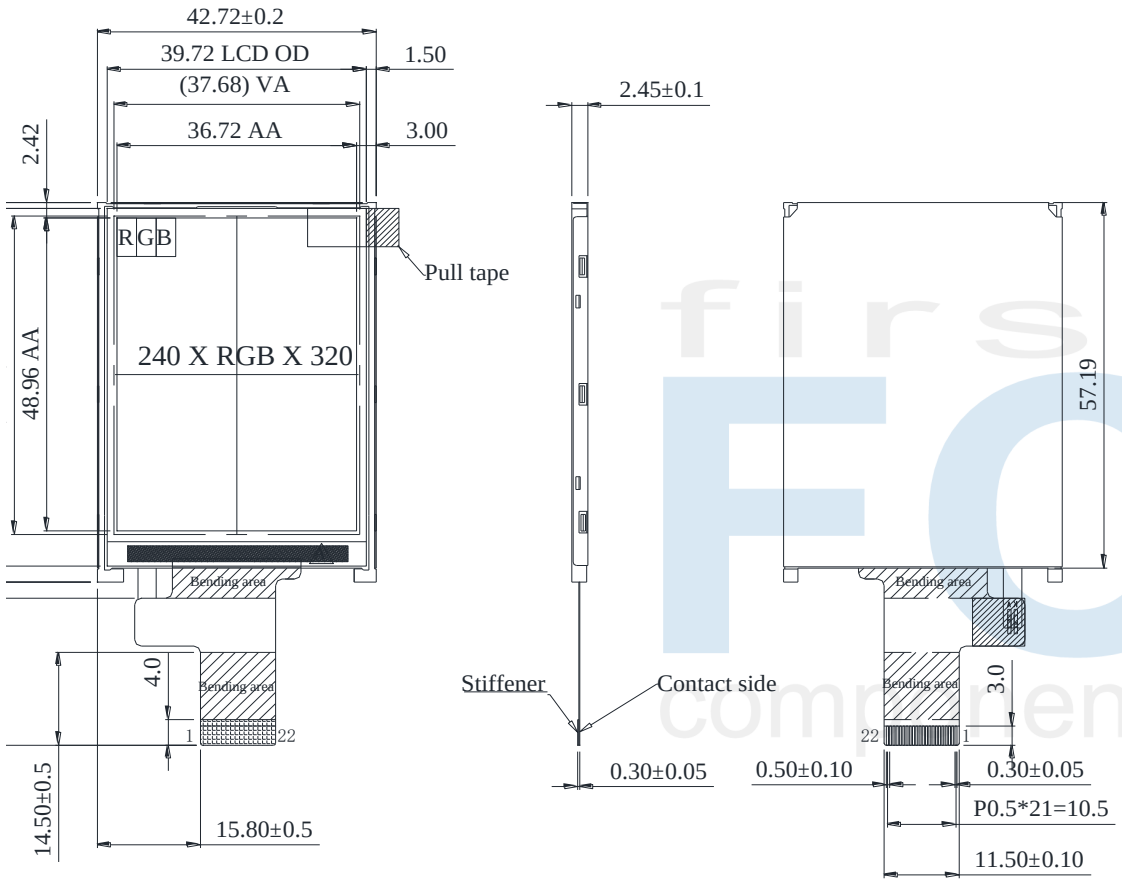
Interface

LCM PIN Definition

Pin NO.	Symbol	Description
1	VLED+	Back light anode
2	VLED-	Back light cathode
3	NC	Not connect
4	NC	Not connect
5	NC	Not connect
6	VCC_3.3v	Power supply
7	DB7	Data bus
8	DB6	Data bus
9	DB5	Data bus
10	DB4	Data bus
11	DB3	Data bus
12	DB2	Data bus
13	DB1	Data bus
14	DB0	Data bus
15	RDX	Read enable in 8080 MCU parallel interface
16	WRX	Write enable in MCU parallel interface
17	D/CX	Display data/command selection pin in parallel interface
18	CSX	A Chip Select signal
19	TE	Output for monitoring
20	RESX	Reset Signal pin
21	GND	Ground
22	GND	Ground

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Contour Drawing



PIN NO.	SYMBOL
1	VLED+
2	VLED-
3	NC
4	NC
5	NC
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7	DB7
8	DB6
9	DB5
10	DB4
11	DB3
12	DB2
13	DB1
14	DB0
15	RDX
16	WRX
17	D/CX
18	CSX
19	TE
20	RESX
21	GND
22	GND

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