TFT DISPLAY SPECIFICATION



WINSTAR Display Co.,Ltd.
華凌光電股份有限公司

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Winstar Display Co., LTD
華凌光電股份有限公司

SPECIFICATION

CUSTOMER : _____

MODULE NO.: **WF24-240320RD#0P0-FC**

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

SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
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ISSUED DATE: 2024/07/11			

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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	2024/07/11		First issue

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2.General Specifications

Item	Dimension	Unit
Size	2.4”	
Dot Matrix	240 x RGB x 320(TFT)	dots
Module dimension	42.72(W) x 60.26(H) x 2.8(D)	mm
Active area	36.72 x 48.96	mm
Pixel pitch	0.153 x 0.153	mm
LCD type	TFT, Normally Black, Transmissive	
TFT Driver IC	ILI9340X or equivalent	
TFT Interface	MCU/SPI	
Viewing angle	80/80/80/80	
Aspect Ratio	Portrait	
Backlight Type	LED,Normally White	
With /Without TP	Without TP	
Surface	Glare	

*Color tone slight changed by temperature and driving voltage.

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3.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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4.Electrical Characteristics

5.1. Operating conditions:

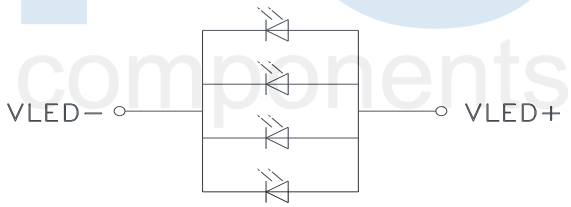
Item	Symbol	Min	Typ	Max	Unit
Supply Voltage For Analog	VCI	2.5	—	3.3	V
Supply Voltage For Logic	IOVCC	2.5	—	3.3	V
Supply Current For LCM	ICC	IOVCC=VCI =VCC=3.3V	23.0	35.0	mA

Note: to avoid power supply noise, please avoid using driving conditions close to min. or max. value.

5.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	—	—	80	—	mA	—
Power Consumption	—	—	280	—	mW	—
LED voltage	VLED+	2.8	3.5	3.7	V	Note 1
LED Life Time	—	50,000	—	—	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



Back Light Circuit

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

5.Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr	θ=0°、Φ=0°	-	16	21	ms	Note 3
		Tf		-	19	24	ms	
Contrast ratio		CR	At optimized viewing angle	640	800	-	-	Note 4
Color Chromaticity	White	Wx	θ=0°、Φ=0	0.26	0.31	0.36		Note 2,6,7
		Wy		0.286	0.336	0.386		
Viewing angle	Hor.	ΘR	CR≧ 10	-	80	-	Deg.	Note 1
		ΘL		-	80	-		
	Ver.	ΦT		-	80	-		
		ΦB		-	80	-		
Brightness		-	-	400	500	-	cd/m²	Center of display
Uniformity		(U)	-	75	-	-	%	Note 5

Ta=25±2℃,ILED=80mA

Note 1: Definition of viewing angle range

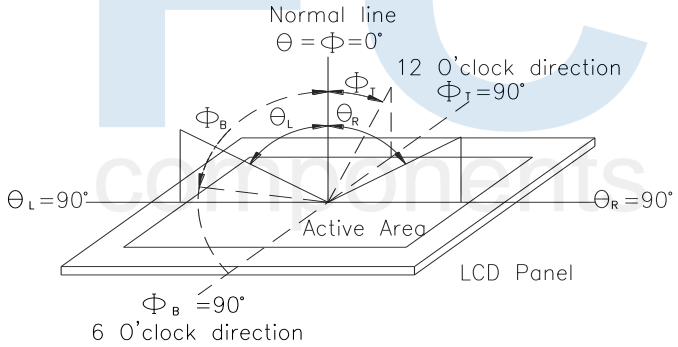


Fig. 9.1. Definition of viewing angle

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.

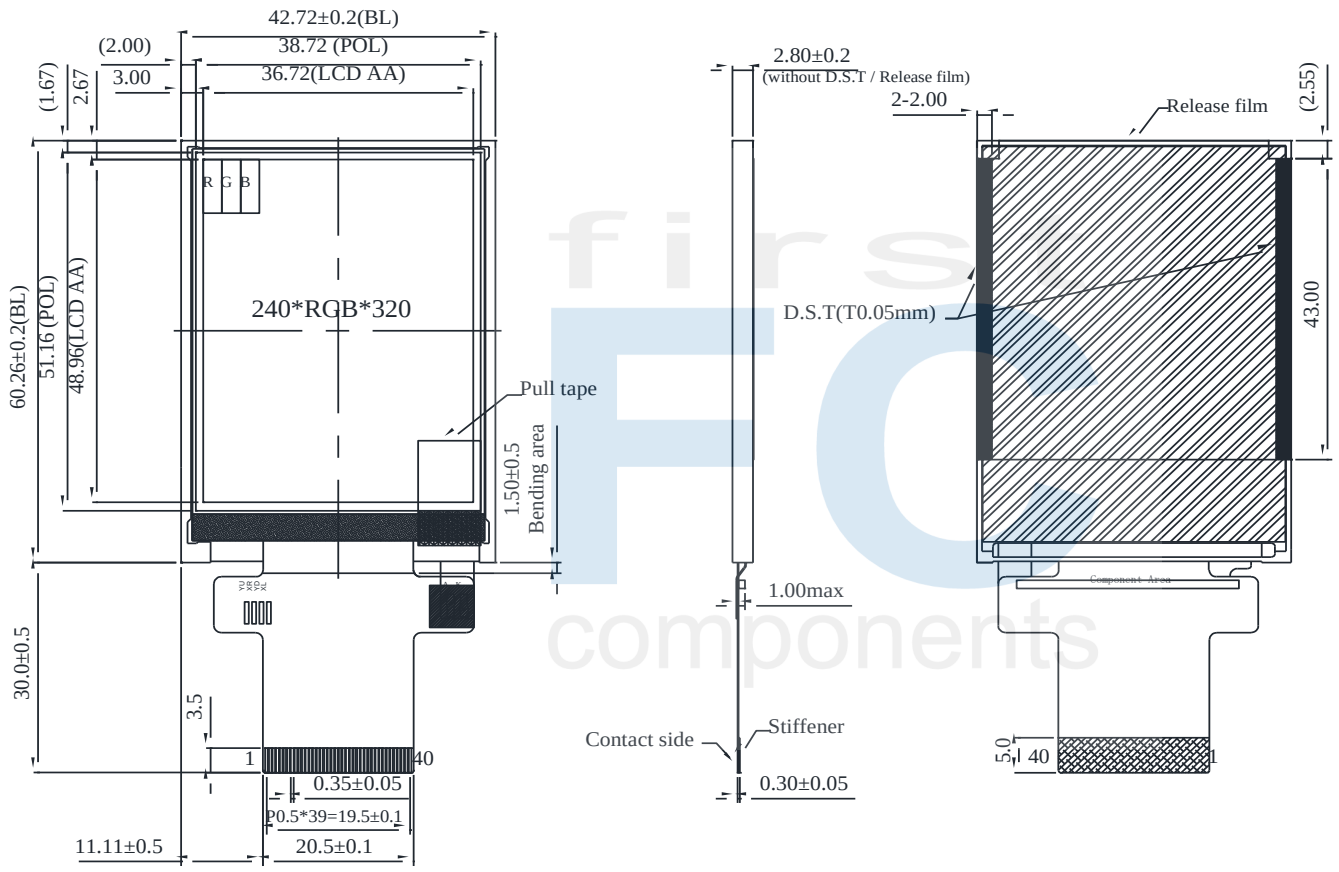
6. Interface

10.1. LCM PIN Definition

NO	Symbol	Function	I/O
1	GND	Ground	P
2	NC	No connection	-
3	NC	No connection	-
4	NC	No connection	-
5	NC	No connection	-
6	NC	No connection	-
7	VCI	High voltage power supply for analog circuit blocks (2.5 ~ 3.3 V)	P
8	IOVCC	Low voltage power supply for interface logic circuits (2.5 ~ 3.3 V)	P
9	TE	Tearing effect output pin to synchronize MPU to frame writing, activated by S/W command. When this pin is not activated, this pin is low. If not used, open this pin.	O
10	CS	Chip select signal.	I
11	D/CX(SCL)	(DCX) This pin is used to select “Data or Command” in the parallel interface. When DCX = ’1’, data is selected. When DCX = ’0’, command is selected. (SCL) This pin is also used as serial interface clock in 3-line 9-bit / 4-line 8-bit serial data interface. If it’s not used, this pin should be connected to IOVCC or Ground.	I
12	WR(SPI_D/C)	- 8080-Ⅰ/8080-Ⅱ system (WRX): Serves as a write signal and writes data at the rising edge. - 4-line system (D/CX): Serves as Data or Command select. - In serial interface "2-data-lane data" transfers mode, serves as a second data pin (SDA2) *Fix to IOVCC or GND level when not in use.*	I
13	RD	8080-Ⅰ/8080-Ⅱ system (RDX): Serves as a read signal and MCU read data at the rising edge. *Fix to IOVCC or GND level when not in use.*	I
14-29	DB0~DB15	18-bit parallel bi-directional data bus for MCU system. Fix to GND level when not in use.	I/O
30	RESET	This signal will reset the device and must be applied properly to initialize the chip. Signal is active low.	I
31	IM0	Select the MCU interface mode	I

<table>
<tr><td>32</td><td>IM1</td><td rowspan="2"><table>
<tr><th rowspan="2">IM2</th><th rowspan="2">IM1</th><th rowspan="2">IM0</th><th rowspan="2">MCU-Interface Mode</th><th colspan="2">DB Pin in use</th></tr>
<tr><th>Register/Content</th><th>GRAM</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>80 MCU 8-bit bus interface I</td><td>DB[7:0]</td><td>DB[7:0]</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>80 MCU 16-bit bus interface I</td><td>DB[7:0]</td><td>DB[15:0]</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>80 MCU 9-bit bus interface I</td><td>DB[7:0]</td><td>DB[8:0]</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>80 MCU 18-bit bus interface I</td><td>DB[7:0]</td><td>DB[17:0]</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>3-line 9-bit data serial interface I</td><td colspan="2">SDA: In/Out</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>4-line 8-bit data serial interface I</td><td colspan="2">SDA: In/Out</td></tr>
</table>
MPU Parallel interface bus and serial interface select
When the RGB Interface is used, the serial interface is selected for
command setting.
* : Fix these pins at IOVCC or GND.</td><td></td></tr>
<tr><td>33</td><td>IM2</td></tr>
<tr><td>34</td><td>DB16</td><td rowspan="2">18-bit parallel bi-directional data bus for MCU system and RGB interface mode
Fix to GND level when not in use.</td><td rowspan="2">I/O</td></tr>
<tr><td>35</td><td>DB17</td></tr>
<tr><td>36</td><td>VLED-</td><td>Cathode of LED backlight.</td><td>P</td></tr>
<tr><td>37</td><td>VLED-</td><td>Cathode of LED backlight.</td><td>P</td></tr>
<tr><td>38</td><td>VLED+</td><td>Anode of LED backlight.</td><td>P</td></tr>
<tr><td>39</td><td>SDA</td><td>SDA : Serial in/out signal.
The data is applied on the rising edge of the SCL signal.
If not used, fix this pin at IOVCC or GND.</td><td>I/O</td></tr>
<tr><td>40</td><td>NC</td><td>Not used, open this pin</td><td>N</td></tr>
</table>

7. Contour Drawing



PIN NO.	SYMBOL
1	GND
2	NC
3	NC
4	NC
5	NC
6	NC
7	VCI
8	IOVCC
9	TE
10	CS
11	D/CX(SCL)
12	WR(SPI_D/C)
13	RD
14~29	DB0~DB15
30	RESET
31	IM0
32	IM1
33	IM2
34	DB16
35	DB17
36	VLED-
37	VLED-
38	VLED+
39	SDA
40	NC

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

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