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.: WF18-128160FD#0F0-FC

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

SALES BY	**APPROVED BY**	**CHECKED BY**	**PREPARED BY**
first FC components			葉虹蘭
ISSUED DATE: **2021/01/19**			

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

3.General Specifications

Item	Dimension	Unit
Size	1.77	inch
Dot Matrix	128 x RGB x 160(TFT)	dots
Module dimension	34.0(W) x 45.83(H) x 2.65(D)	mm
Active area	28.03 x 35.04	mm
Dot pitch	0.073 x 0.219	mm
LCD type	TFT, Normally White, Transmissive	
View Direction	6 o'clock	
Gray Scale Inversion Direction	12 o'clock	
Aspect Ratio	Portrait	
IC	ST7735S	
Backlight Type	LED,Normally White	
With /Without TP	Without TP	
Surface	Anti-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

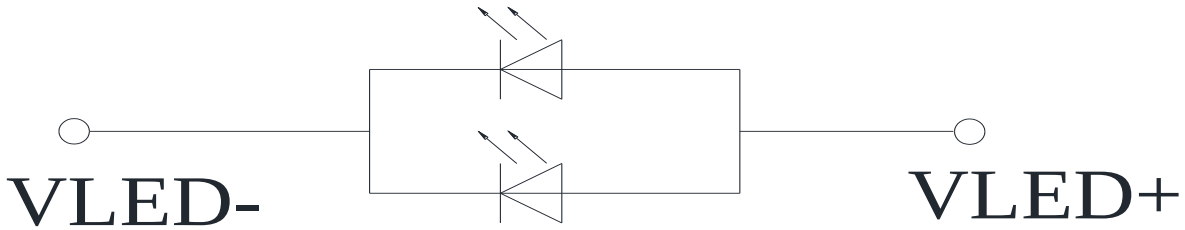
5.1. Operating conditions:

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Analog	VCI	—	2.5	2.75	4.8	V
Interface Operation Voltage	IOVCC	—	1.65	1.8	3.7	V
Supply LCM current	ICI(mA)	—	-	0.9	2	mA

5.2. LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current		-	40	-	mA	
Power Consumption		-	124	-	mW	
LED voltage	VBL+	2.9	3.1	3.4	V	Note 1
LED Life Time		-	50,000	-	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



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

7.Optical Characteristics

Item		Symbol	Condition.	Min	Typ.	Max.	Unit	Remark
Response time		Tr	θ=0°、Φ=0°	-	2	4	.ms	Note 3
		Tf			6	12	.ms	
Contrast ratio		CR	At optimized viewing angle	400	500	-	-	Note 4
Color Chromaticity	White	Wx	θ=0°、Φ=0	0.26	0.31	0.36		Note 2,6,7
		Wy		0.28	0.33	0.38		
Viewing angle (Gray Scale Inversion Direction)	Hor.	ΘR	CR≧10	-	75	-	Deg.	Note Note 1
		ΘL		-	75	-		
	Ver.	ΦT		-	75	-		
		ΦB		-	50	-		
Brightness		-	-	350	400	-	cd/m^2	Center of display
Uniformity		(U)	-	75	-	-	%	Note 5

Ta=25±2℃

Note: After adding a polarized O-film, its viewing angle is enlarged, but its still have gray scale appearance.

Note 1: Definition of viewing angle range

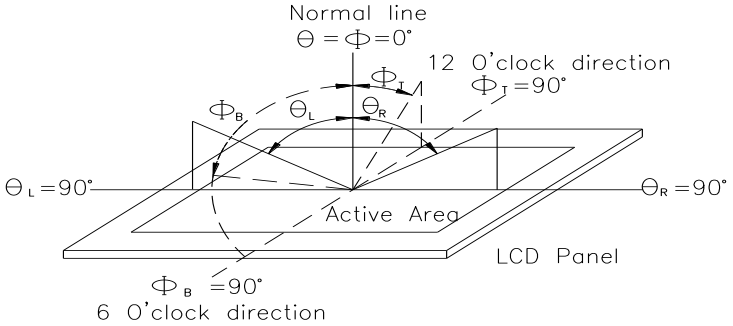
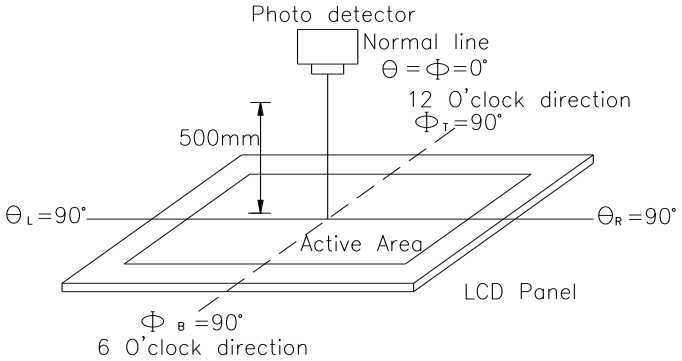


Fig.7.1. Definition of viewing angle

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.

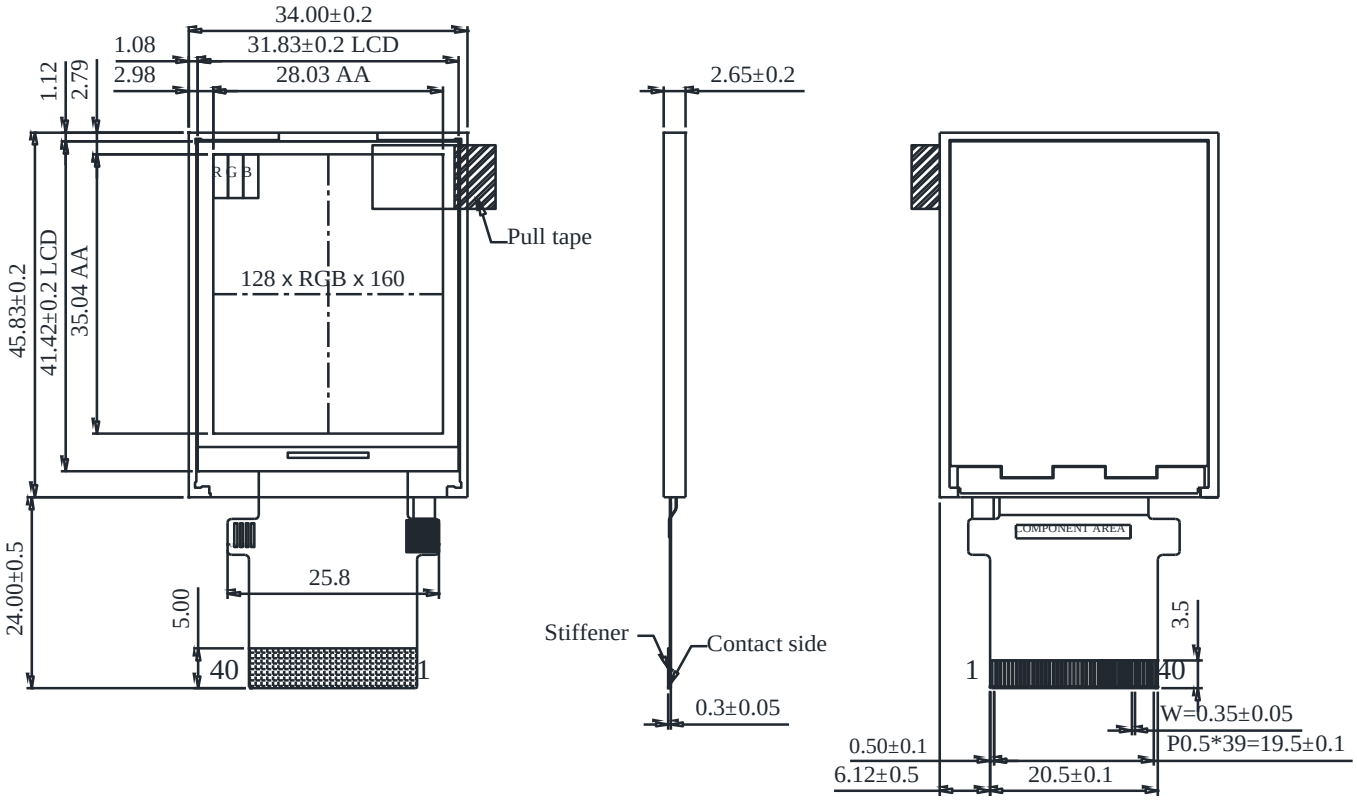


8.Interface

8.1. LCM PIN Definition

<table>
<tr><th>Pin</th><th>Symbol</th><th>I/O</th><th>Function</th><th>Remark</th></tr>
<tr><td>1</td><td>VLED-</td><td>P</td><td>Back light cathode</td><td></td></tr>
<tr><td>2</td><td>VLED+</td><td>P</td><td>Back light anode</td><td></td></tr>
<tr><td>3</td><td>IM0</td><td rowspan="2">I</td><td rowspan="2">- MCU Parallel Interface Type Selection
-If Not Used, Please Fix this Pin at VDDI or DGND Level.
<table><tr><th>IM1</th><th>IM0</th><th>Parallel Interface</th></tr><tr><td>0</td><td>0</td><td>MCU 8-bit Parallel</td></tr><tr><td>0</td><td>1</td><td>MCU 16-bit Parallel</td></tr><tr><td>1</td><td>0</td><td>MCU 9-bit Parallel</td></tr><tr><td>1</td><td>1</td><td>MCU 18-bit Parallel</td></tr></table></td><td rowspan="2"></td></tr>
<tr><td>4</td><td>IM1</td></tr>
<tr><td>5</td><td>IM2</td><td>I</td><td>MCU Parallel Interface Bus and Serial Interface select
IM2=’1’, Parallel Interface
IM2=’0’, Serial Interface</td><td></td></tr>
<tr><td>6</td><td>RESET</td><td>P</td><td>Reset signal</td><td></td></tr>
<tr><td>7-12</td><td>NC</td><td>-</td><td>No Connect</td><td></td></tr>
<tr><td>13-28</td><td>DB15-DB0(SPI_SDA)</td><td>I/O</td><td>DB15:0] are used as MCU parallel interface data bus.
-DBis the serial input/output signal in serial interface mode.
-In serial interface, DB15:1] are not used and should be fixed at VDDI or DGND level.</td><td></td></tr>
<tr><td>29</td><td>NC</td><td>-</td><td>No Connect</td><td></td></tr>
<tr><td>30</td><td>RD</td><td>I</td><td>Read Enable in 8080 MCU Parallel Interface.
-If not used, please fix this pin at VDDI or DGND level.</td><td></td></tr>
<tr><td>31</td><td>WR</td><td>I</td><td>Serial clock
-Write Enable in MCU Parallel Interface.
-If not used, please fix this pin at VDDI or DGND level.</td><td></td></tr>
<tr><td>32</td><td>D/C(SPI_SCL)</td><td>I</td><td>-Display data/command Selection Pin in MCU Interface.
-D/CX=’1’: Display Data or Parameter.
-D/CX=’0’: Command Data.
-In Serial Interface, this is used as SCL.
-If not used, please fix this pin at VDDI or DGND level.</td><td></td></tr>
<tr><td>33</td><td>CS(SPI_CS)</td><td>I</td><td>Chip enable</td><td></td></tr>
<tr><td>34</td><td>IOVCC</td><td>P</td><td>Interface Operation Voltage</td><td></td></tr>
<tr><td>35</td><td>VCI</td><td>P</td><td>Analog Supply Voltage</td><td></td></tr>
<tr><td>36</td><td>GND</td><td>P</td><td>Ground</td><td></td></tr>
<tr><td>37-40</td><td>NC</td><td>-</td><td>No Connect</td><td></td></tr>
</table>

10.Contour Drawing



PIN DESCRIPTION

NO.	SYMBOL
1	VLED-
2	VLED+
3	IM0
4	IM1
5	IM2
6	RESET
7	NC
8	NC
9	NC
10	NC
11	NC
12	NC
13-27	DB15-1
28	DB0(SPI_SDA)
29	NC
30	RD
31	WR
32	D/C(SPI_SCL)
33	CS(SPI_CS)
34	IOVCC
35	VCI
36	GND
37-40	NC

IM2	IM1	IM0	MPU Interface	GRAM
1	0	1	8080 MCU 16-bit bus	D[15:0]
1	0	0	8080 MCU 8-bit bus	D[7:0]
0	—	—	3-Line SPI	D0 : SDA) D/C :SCL) SPI_CS)

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