

TFT LCD MODULE

1.14 inch 135RGB*240DOTS

Customer:
Approved by

1. General Description

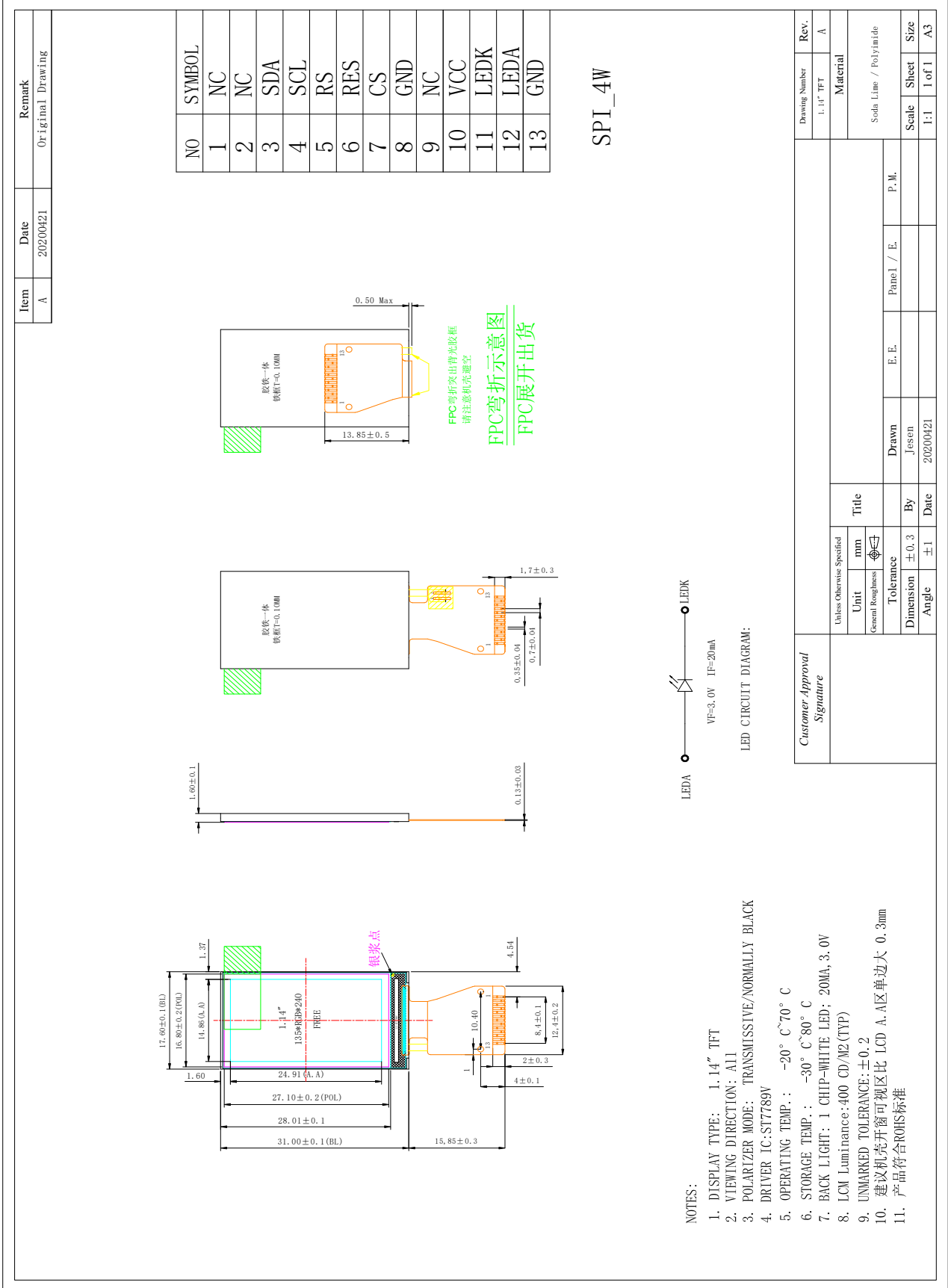
1.1 Description

this is a 135RGBX240 dot-matrix TFT LCD module. This module is composed of a TFT LCD Panel, driver ICs, FPC and a Backlight unit.

1.2 Features

NO.	Item	Contents	Unit
1	LCD Size	1.14 inch(Diagonal)	-
2	Display Mode	Normally black	-
3	Resolution	135(H)RGB x 240(V)	-
4	Dot pitch	0.1101(H) x 0.1038(V) mm	-
5	Active area	14.864(H) x 24.912(V) mm	-
6	Module size	17.6(H) x 31.0(V) x1.6 (D) mm	-
7	Color arrangement	RGB Vvertical stripe	-
8	Interface	4 Line SPI	-
9	Drive IC	ST7789V	-
10	Luminance(cd/m2)	400 (TYP)	
11	Viewing Direction	All View	
12	Backlight	1 White LED	
13	Operating Temp.	-20°C ~ + 70°C	°C
14	Storage Temp.	-30°C ~ + 80°C	°C
15	Weight	1.8	g

2.Mechanical Drawing

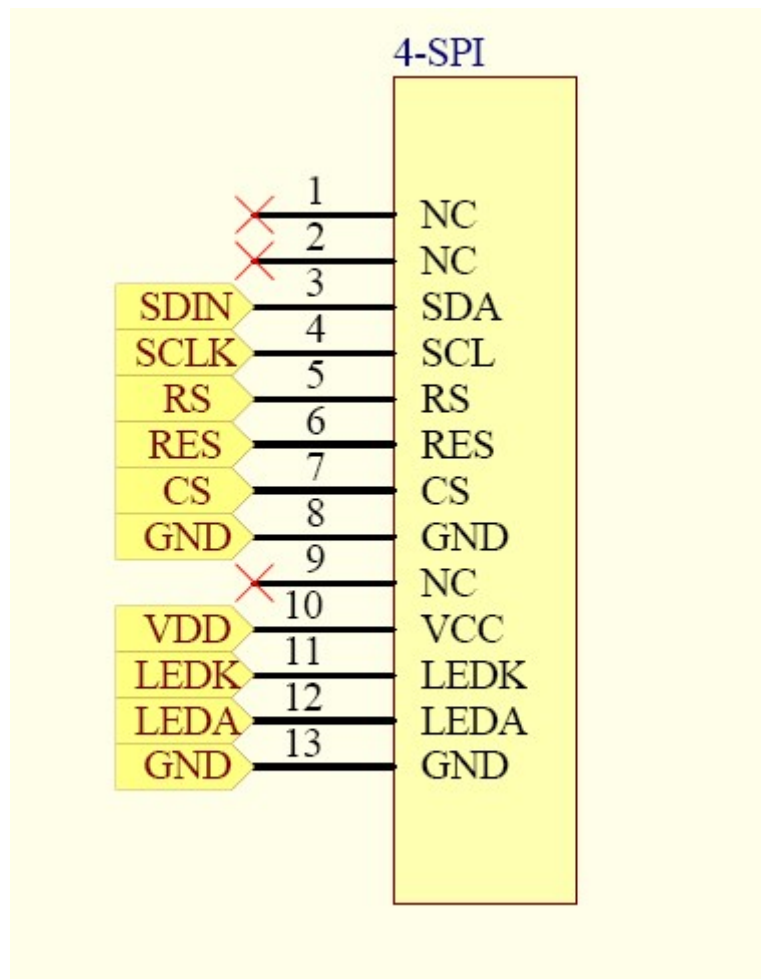


3. Pin Definition

FPC Connector is used for the module electronics interface.

NO.	Symbol	Description
1	NC	No Connect.
2	NC	No Connect.
3	SDA	SPI interface input/output pin.
4	SCL	This pin is used to be serial interface clock.
5	RS	Display data/command selection pin in 4-line serial interface.
6	RESET	This signal will reset the device,Signal is active low.
7	CS	Chip selection pin,Low enable,High disable.
8	GND	Power Ground.
9	NC	No Connect.
10	VDD	Power Supply for Analog
11	LEDK	LED Canthode
12	LEDA	LED Anode
13	GND	Power Ground.

Note:



4. Electrical Characteristics

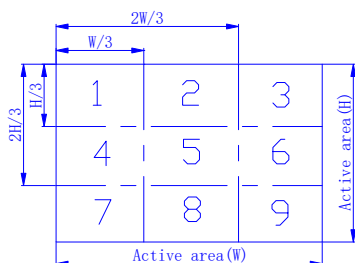
4.1 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Supply Voltage (I/O)	VDD	-0.3	4.6	V	
Analog Supply Voltage	VDDIO	-0.3	4.6	V	
Logic Input Voltage	VIN	-0.3	VDD+0.3	V	
Operation Temperature	Top	-20	70	°C	
Storage Temperature	Tst	-30	80	°C	

4.2 Model Characteristics

Parameter	Symbol	Min	TYP	MAX	Unit	Notes
Voltage for LED backlight	V _{bl}	2.9	3.0	3.1	V	
Supply Voltage for Logic	VDD	2.4	2.8	3.3	V	
Interface Operation Voltage	VDDIO	1.65	1.8	3.3	V	
Gate Driver High Voltage	VGH	12.2	-	14.97	V	
Gate Driver Low Voltage	VGL	-12.5	-	-7.16	V	
Operating Current for V _{DD}	I _{DD}	--	8	10	mA	
Current for LED backlight	I _{bl}		20	-	mA	1 LED
Brightness	L _{br}	350	400	--	cd/m ²	
Sleep In Mode VDD	I _{dd}	--	15	30	uA	
Sleep In Mode VDDIO	I _{ddio}	--	5	10	uA	

- 1 Test condition is:
 - a:Center point on active area
 - b:Best Contrast
- 2 Uniform measure condition:
 - a:Measure 9 point,Measure location is show below:
 - b:Uniform=(Min brightness/Max.brightness)x100%
 - c:Best Contrast.

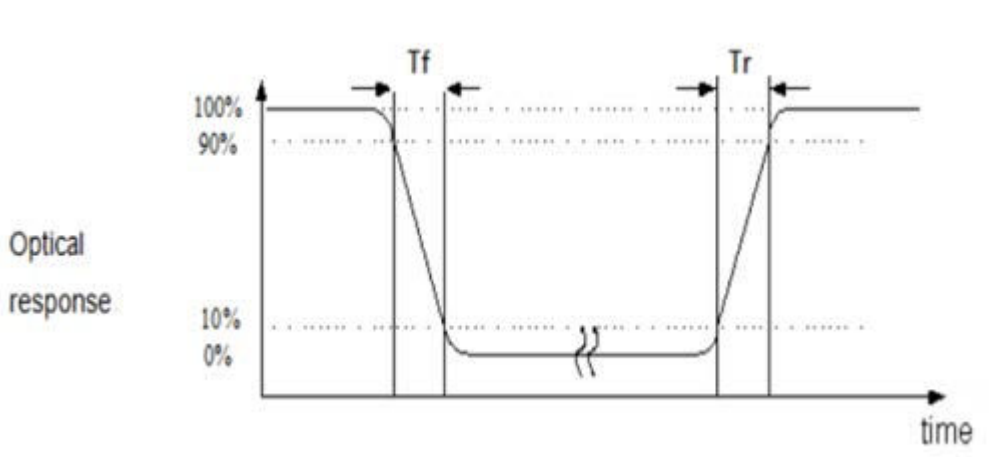


5. Optical characteristics

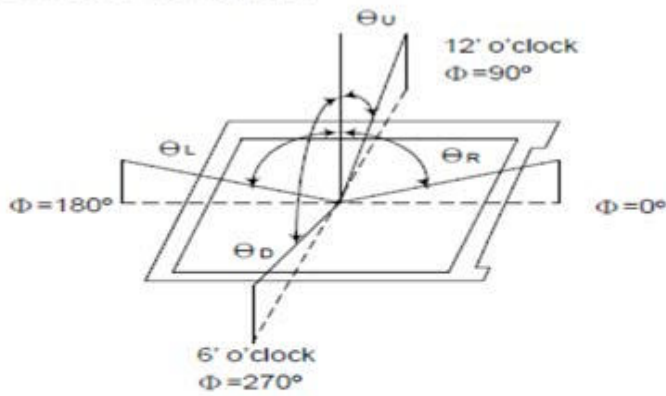
Item	Symbol	Measuring Conditions		Min.	Typ.	Max.	Unit	Remark
Response Time	Tr+Tf	$\theta = 0^\circ$ $\phi = 0^\circ$	25 °C	-	30	35	ms	Note3
Viewing Angle	θ	$\phi = 0^\circ$	25 °C	-	80	-	Deg	Note1
		$\phi = 180^\circ$	25 °C	-	80	-		
	θ	$\phi = 90^\circ$	25 °C	-	80	-		
		$\phi = 270^\circ$	25 °C	-	80	-		
Contrast Ratio	CR	-	25 °C	640	800	-	-	Note2
Color of CIE Coordinate	White	X	25 °C	-0.02	0.322	+0.02	-	
		Y	25 °C		0.344			
	Red	X	25 °C		0.618			
		Y	25 °C		0.328			
	Green	X	25 °C		0.335			
		Y	25 °C		0.543			
	Blue	X	25 °C		0.136			
		Y	25 °C		0.145			
Transmittance (with polarizer)					4.8		%	

Note3: Definition of Response Time.(white-black)

The response time is defined as the time interval between the 10% and 90% amplitudes



Note (1) Definition of Viewing Angle:



Note (2) Definition of Contrast Ratio (CR):
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

6. Reliability

6.1 Contents of Reliability Tests

Item	Conditions	Criteria
High Temperature Operation	70°C, 120 hrs	The operational functions work.
Low Temperature Operation	-20°C, 120 hrs	
High Temperature Storage	80°C, 120 hrs	
Low Temperature Storage	-30°C, 120 hrs	
High Temperature/Humidity Operation	50°C, 85% RH, 120 hrs	
Temperature Cycling	-10°C \leftrightarrow 25°C \leftrightarrow 60°C \leftrightarrow 25°C, 60mins/Cycle, 12 Cycles	

Note:

No moisture condensation is observed during tests.

Condition of image sticking test : 25°C \pm 2°C.

6.2 Shock and Vibration

Test Item	Conditions
Packing Vibration	Frequency range 10~50HZ, Stroke: 1.0mm, sweep: 10~50Hz, X,y,z 2 hours for each direction

6.3 ESD

Test Item	Conditions
ESD	150pF , 330 Ω , Contact: \pm 2KV,
	150pF , 330 Ω , Air: \pm 4KV