

DM-TFT114-397

**1.14" 135 × 240 IPS TFT DISPLAY
MODULE - SPI**

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1 Revision History

Date	Changes
2019-08-15	First release
2020-02-27	Second release

2 Main Features

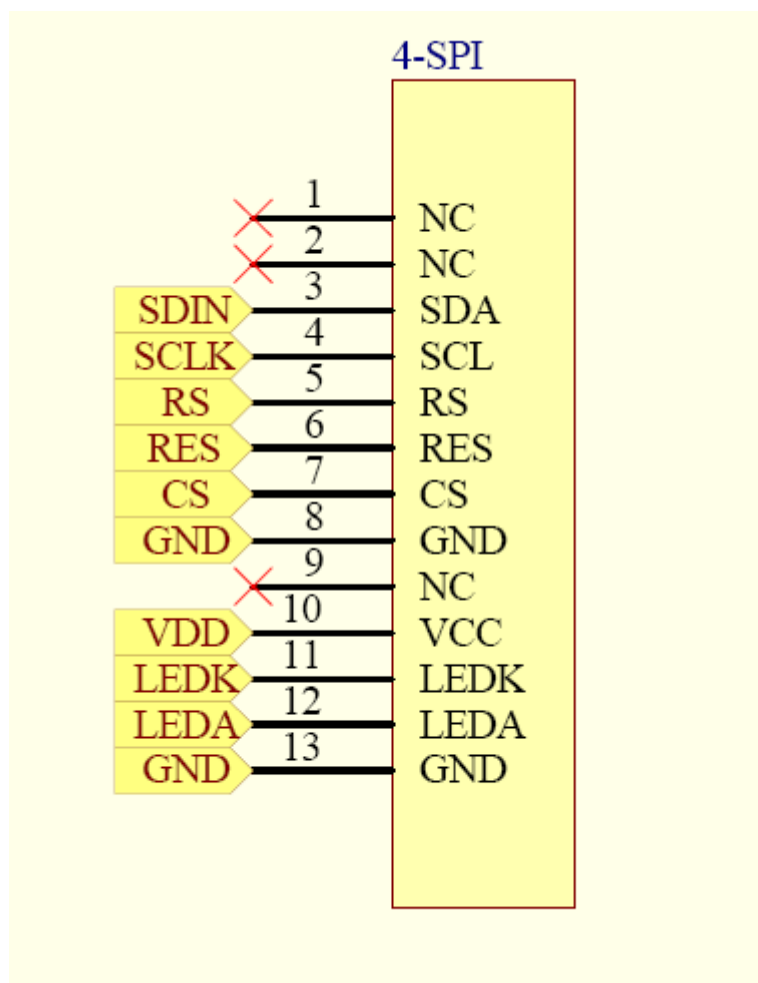
Item	Specification	Unit
Diagonal Size	1.14	inch
Display Mode	Normally black	-
Color arrangement	RGB Vertical stripe	-
Resolution	135RGB x 240	pixel
Controller IC	ST7789V	-
Interface	4 wire SPI	-
Active Area	14.864 x 24.912	mm
Panel Dimension	17.6 x 31.0 x 1.6	mm
Module Dimension	28.0 x 31.4 x 3.1	mm
Pixel Pitch	0.1101 x 0.1038	mm
Luminance	400(Type)	cd/m ²
Viewing Direction	All View	-
Backlight	1 White LED	-
Operating Temp.	-20°C ~ 70°C	°C
Storage Temp.	-30°C ~ 80°C	°C
Weight	TBD	g

3 Pin Description

3.1 Panel Pin Description

Pin No.	Symbol	Function 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 Cathode.
12	LEDA	LED Anode.
13	GND	Power Ground.

Note:

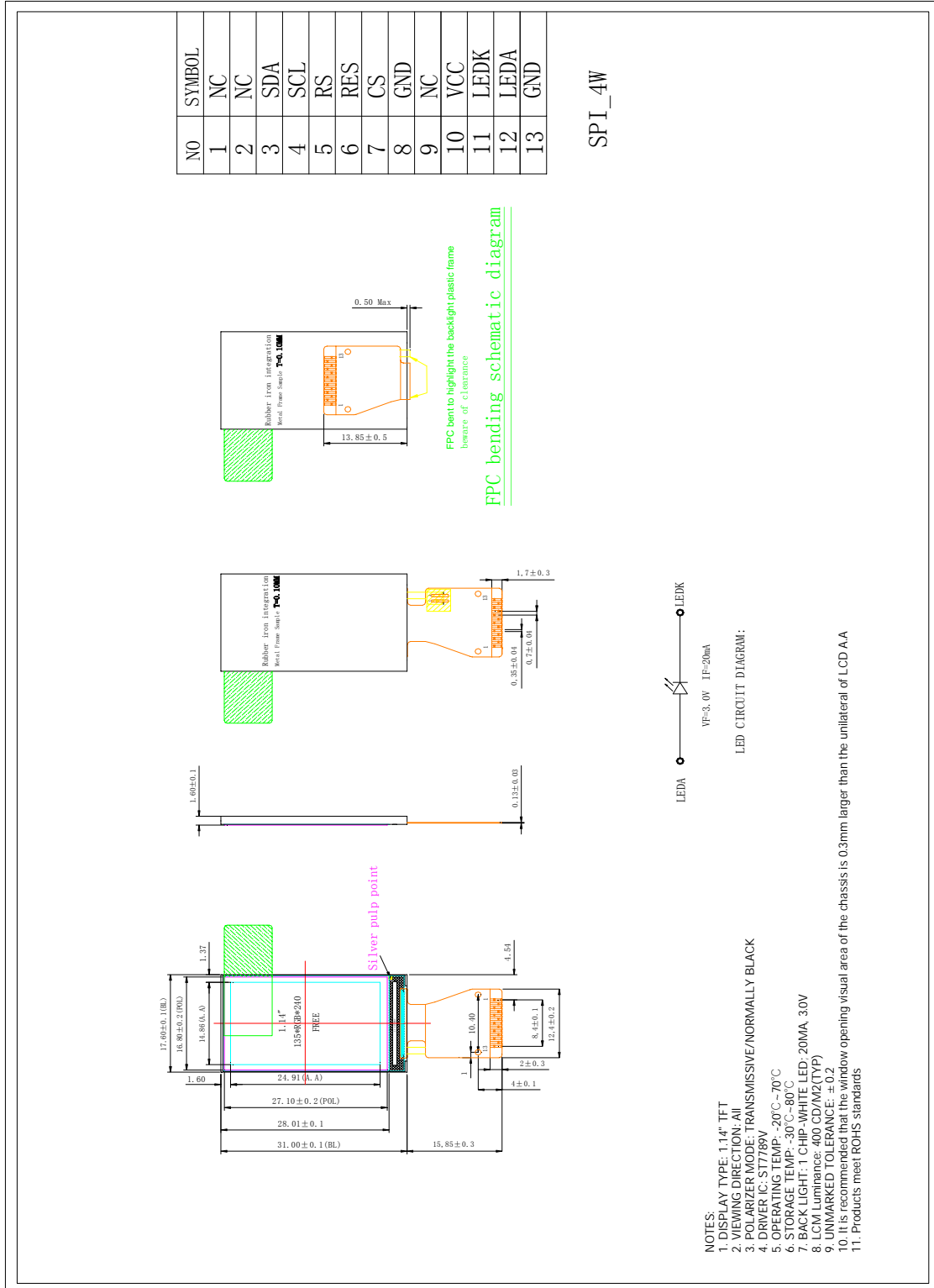


3.2 Module Pin Description

Pin No.	Symbol	Function Description
1	GND	Ground
2	VCC	Power Supply 3.3V
3	SCL	SPI Clock
4	SDA	SPI DATA
5	RES	Reset Pin
6	D/C	SPI Data/Command Select Pin
7	CS	SPI Chip Select
8	BLK	LCD Backlight Control The default is float, and the backlight is turned off at low power.

4 Mechanical Drawing

4.1 Panel Mechanical Drawing



5 Optics & Electrical Characteristics

5.1 Optical Characteristics

Item	Symbol	Min	Typ	Max	Unit	Remark
View Angles TOP	ΘU	-	80	-	°	25°C
View Angles Bottom	ΘD	-	80	-	°	
View Angles Right	ΘR	-	80	-	°	
View Angles Left	ΘL	-	80	-	°	
C.I.E. (White)	(x) (y)	-0.02	0.322 0.344	0.02	-	-
C.I.E. (Red)	(x) (y)		0.618 0.328			
C.I.E. (Green)	(x) (y)		0.335 0.543			
C.I.E. (Blue)	(x) (y)		0.136 0.145			
Response Time	Tr+Tf	-	30	35	ms	Θ=0°; 25°C
Brightness	L _{br}	350	400	-	cd/m ²	-
Contrast Ratio	CR	640	800	-	-	25°C
Transmittance (with polarizer)		-	-	4.8	%	-

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

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

5.2 Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
I/O Pins Supply Voltage	V _{DD}	-0.3	4.6	V
Analog Supply Voltage	V _{DDIO}	-0.3	4.6	V
Logic Input Supply Voltage	V _{IN}	-0.3	V _{DD} +0.3	V
Operating Temperature	T _{OP}	-20	70	°C
Storage Temperature	T _{STG}	-30	80	°C

5.3 DC Characteristics

Item	Symbol	Min	Typ.	Max	Unit	Remark
LED backlight Supply Voltage	V_{BL}	2.9	3.0	3.1	V	
Logic Supply Voltage	V_{DD}	2.4	2.8	3.3	V	
Interface Operation Supply Voltage	V_{DDIO}	1.65	1.8	3.3	V	
Gate Driver High Voltage	V_{GH}	12.2	-	14.97	V	
Gate Driver Low Voltage	V_{GL}	-12.5	-	-7.16	V	
VDD Operating Current	I_{DD}	-	8	10	mA	
Current for LED backlight	I_{bL}	-	20	-	mA	1 LED
Sleep In Mode V_{DD}	I_{dd}	-	15	30	μ A	
Sleep In Mode V_{DDIO}	I_{ddio}	-	5	10	μ A	

1. Test condition is:

a:Center point on active area

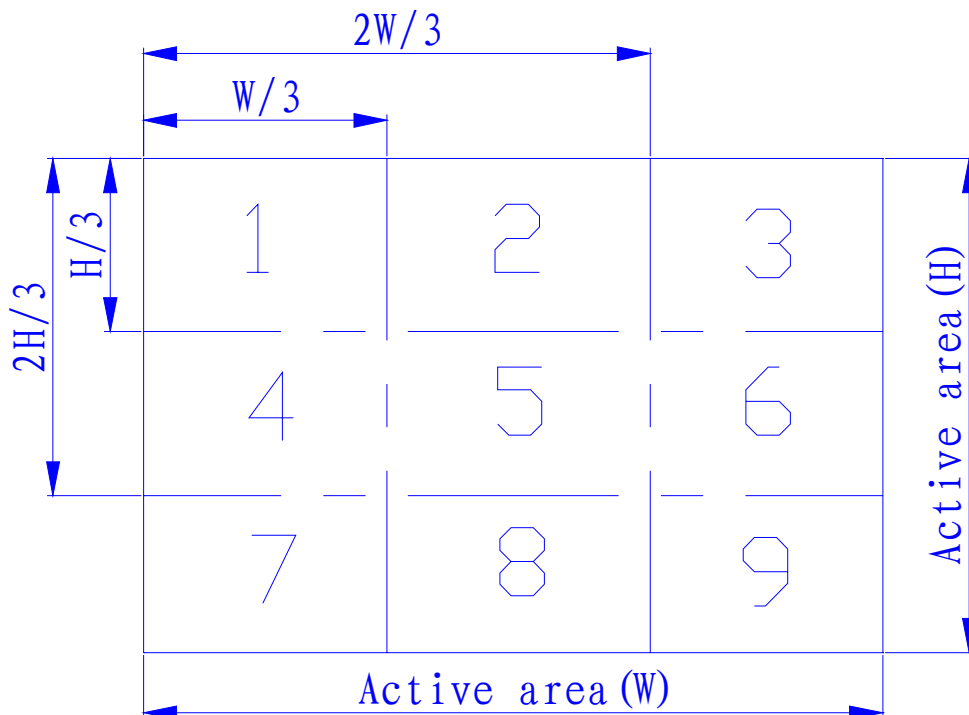
b:Best Contrast

2. Uniform measure condition:

a:Measure 9 point,Measure location is show below

b:Uniform= $(\text{Min brightness}/\text{Max.brightness}) \times 100\%$

c:Best Contrast.



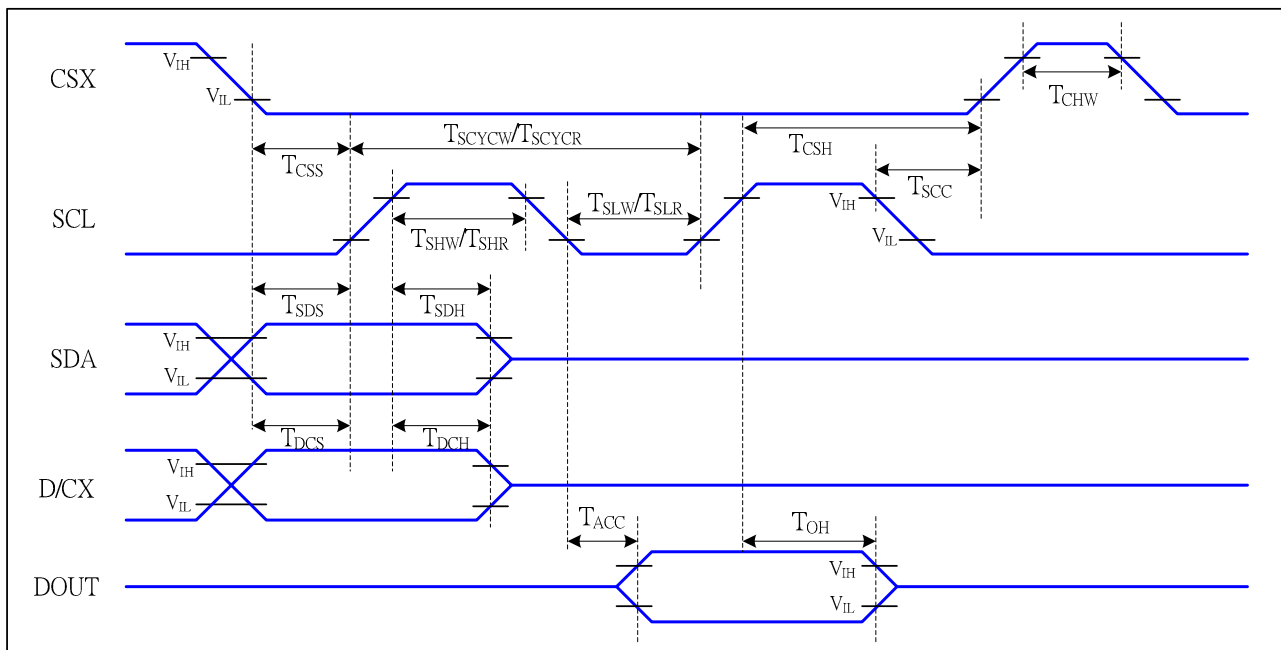
5.4 AC Characteristics

5.4.1 4-wire Serial Interface Timing Characteristics:

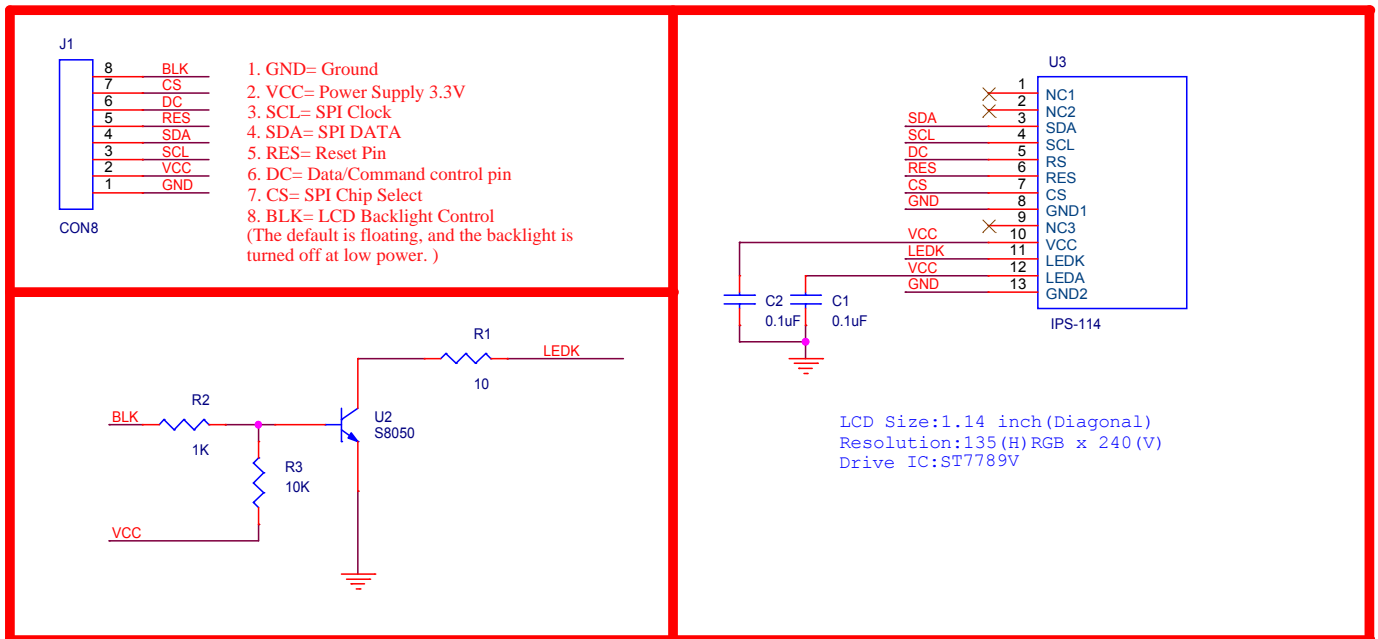
Signal	Symbol	Description	Min	Max	Unit	Remark
CSX	TCSS	Chip Select Setup Time (Write)	15	-	ns	
	TCSH	Chip Select Hold Time (Write)	15	-	ns	
	TCSS	Chip Select Setup Time (Read)	60	-	ns	
	TSCC	Chip Select Hold Time (Read)	65	-	ns	
	TCHW	Chip Select "H" Pulse Width	40	-	ns	
SCL	TSCYCW	Serial Clock Cycle (Write)	16	-	ns	-Write Command & Data Ram
	TSHW	SCL "H" Pulse Width (Write)	7	-	ns	
	TSLW	SCL "L" Pulse Width (Write)	7	-	ns	
	TSCYCR	Serial Clock Cycle (Read)	150	-	ns	-Read Command & Data Ram
	TSHR	SCL "H" Pulse Width (Read)	60	-	ns	
	TSLR	SCL "L" Pulse Width (Read)	60	-	ns	
D/CX	TDCS	D/CX Setup Time	10	-	ns	
	TDCH	D/CX Hold Time	10	-	ns	
SDA (DIN) (DOUT)	TSDS	Data Setup Time	7	-	ns	For Maximum CL=30pF For Minimum CL=8pF
	TSDH	Data Hold Time	7	-	ns	
	TACC	Access Time	10	50	ns	
	TOH	Output Disable Time	15	50	ns	

VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=25 °C

4-line Serial Interface Timing



6 Module Schematic



7 Reliability

Test Item	Content of Test	Test Condition	Note
High Temperature Storage	Endurance test applying the high storage temperature for a long time.	80°C 120hrs	2
Low Temperature Storage	Endurance test applying the high storage temperature for a long time.	-30°C 120hrs	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 120hrs	-
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20 °C 120hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max, for 96hrs under no-load condition excluding the polarizer. Then taking it out and drying it at normal temperature.	50°C,85%RH 120hrs	1,2
Thermal Shock Resistance	The sample should be allowed stand the following 10 cycles of operation	-10°C/60°C 12 cycles	-

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 rest chamber.

8 Warranty and Conditions

<http://www.displaymodule.com/pages/faq> HYPERLINK

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