DisplayModule

DM-TFT13-377

1.3" 240 x 240 IPS TFT Display Module-SPI

Contents

1 Revision History

Date	Changes
2018-10-30	First release

2 Main Features

Item	Specification	Unit
Diagonal Size	1.3	inch
Resolution	240 x 240	pixel
Controller IC	ST7789	-
Interface	4wire SPI	-
Active Area	23.4 x 23.4	mm
Module Dimension	39.22 x 27.78	mm
Dot pitch	0.0975 x0.0975	
View angle	ALL	
Weight	TBD	g

3 Pin Description

3.1 Panel Pin Description

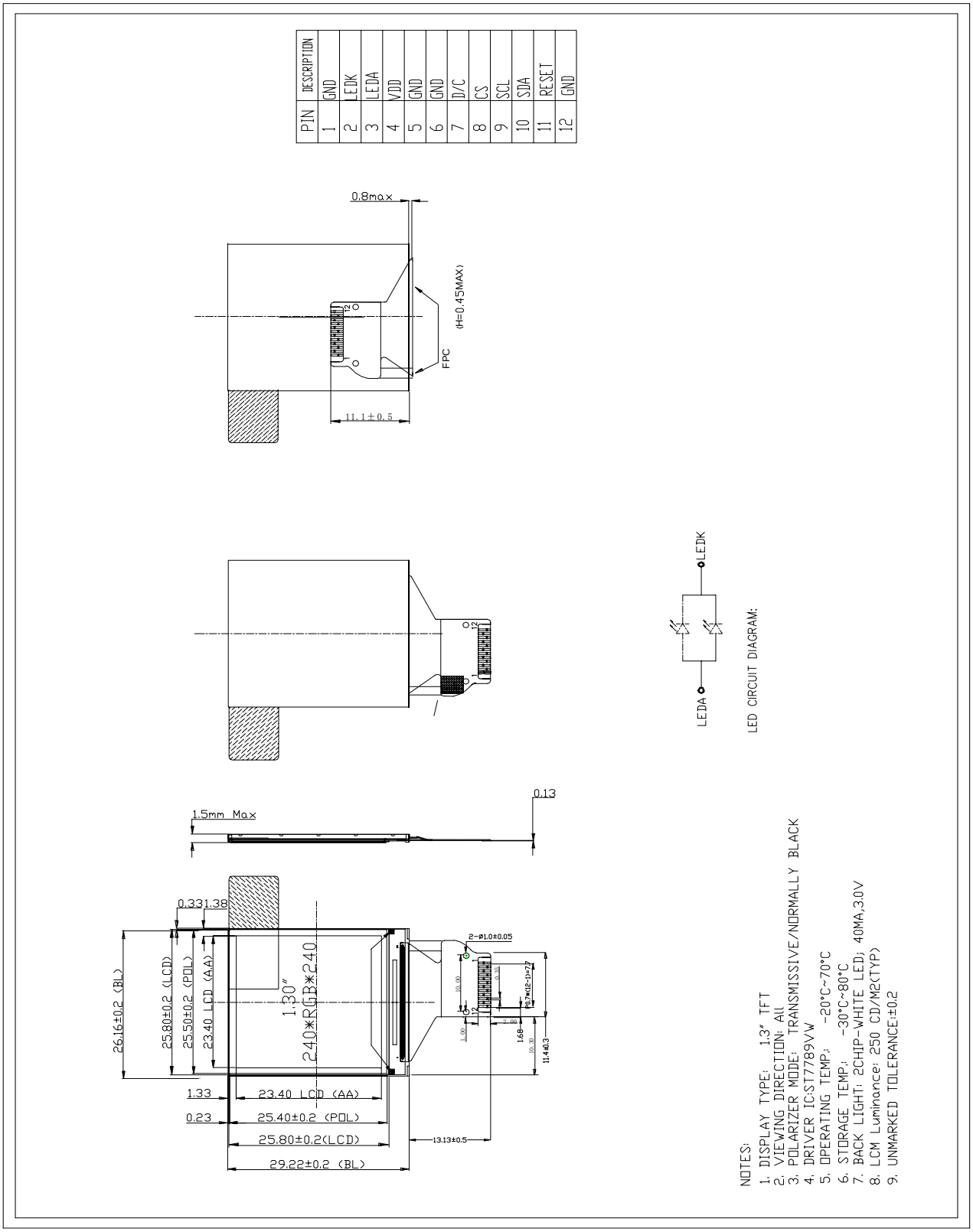
Pin No.	Symbol	Function Description
1	GND	Power Ground
2	LEDK	LED Cathode
3	LEDA	LED Anode
4	VDD	Power Supply for Analog
5	GND	Power Ground
6	GND	Power Ground
7	D/C	Display data/command selection pin in 4-line serial interface
8	CS	Chip selection pin, Low enable, high disable
9	SCL	This pin is used to be serial interface clock
10	SDA	SPI interface input/output pin. the data is latched on the rising edge of the SCL signal
11	RESET	This signal will reset the device and it must be applied to properly initialize the chip. Signal is active low
12	GND	Power Ground

3.2 Module Pin Description

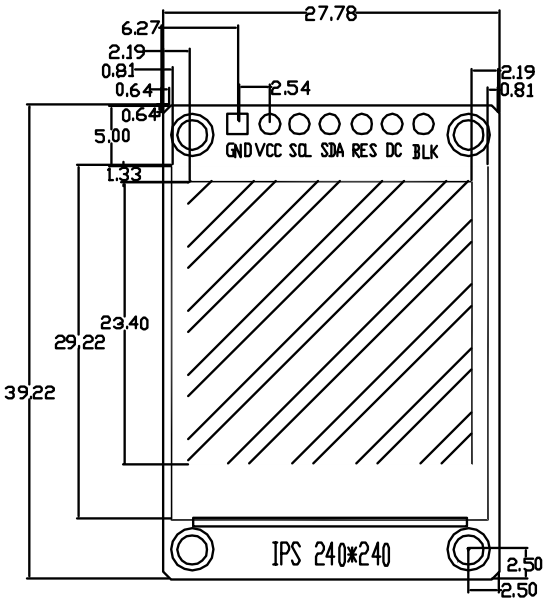
Pin No.	Symbol	Function Description
1	GND	Ground
2	VCC	Power Supply 3.3V
3	SCL	SPI Clock
4	SDA	SPI DATA
5	RES	OLED reset Pin.
6	D/C	Display data/command selection pin in 4-line serial interface
7	CS	Chip Select This pin is pulled low to active. Connect to ground if no used .

4 Mechanical Drawing

4.1 Panel Mechanical Drawing



4.2 Module Mechanical Drawing



5 Electrical Characteristics

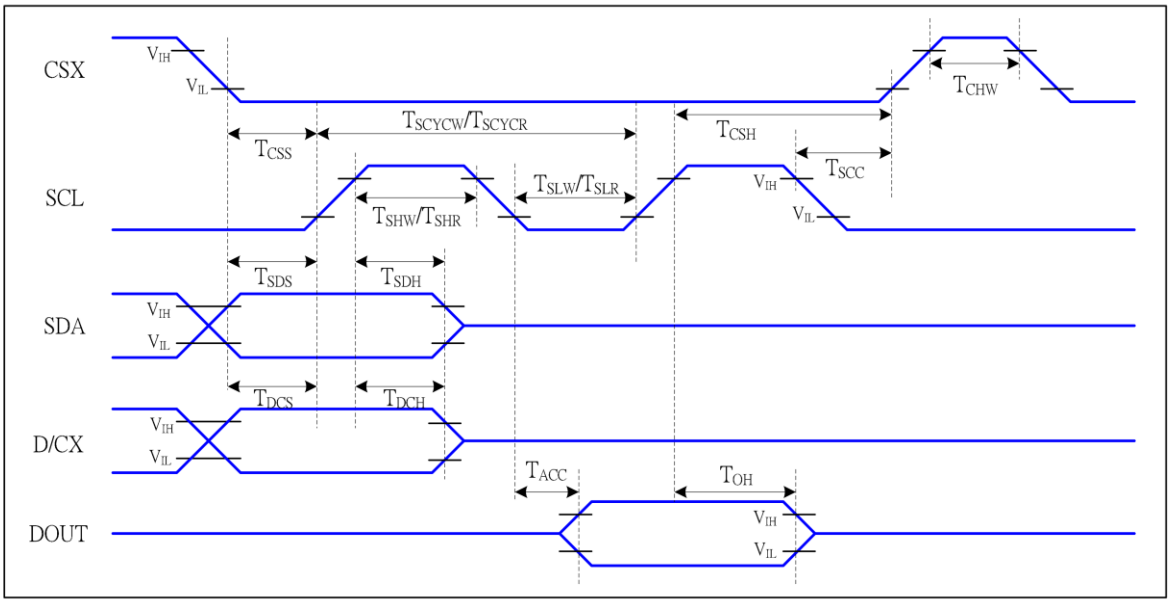
Item	Symbol	Condition	Min	Typ.	Max	Unit
Power supply	VDD		2.4	3.8	3.3	V
Interface Operation Voltage	VDDIO		1.65	1.8	3.3	V
Operating Current for VDD	IDD		-	8	10	mA
Operating Maximum Temperature	TOP		-20		70	℃
Storage Maximum Temperature	TST		-30		80	℃
Voltage for LED backlight	VLED		2.8	-	3.0	V
Current for LED backlight	ILED		30	-	40	mA

6 Optical Characteristics

Item	Symbol	Min	Typ	Max	Unit
View Angles	ALL	-	80	-	°
Response Time (25 ℃)	Tr + Tf	-	30	35	ns
Brightness	Lbr	200	250	-	cd/m ²
Dark room Contrast Ratio	CR	640	800	-	

7 AC characteristics

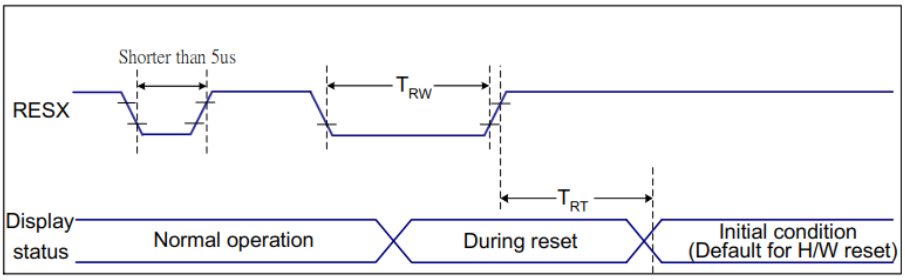
7.1 Serial Interface Timing Characteristics (4-wire SPI)



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

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	15		ns	
	T_{CSH}	Chip select hold time (write)	15		ns	
	T_{CSS}	Chip select setup time (read)	60		ns	
	T_{SCC}	Chip select hold time (read)	65		ns	
	T_{CHW}	Chip select “H” pulse width	40		ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	16		ns	-write command & data ram
	T_{SHW}	SCL “H” pulse width (Write)	7		ns	
	T_{SLW}	SCL “L” pulse width (Write)	7		ns	
	T_{SCYCR}	Serial clock cycle (Read)	150		ns	-read command & data ram
	T_{SHR}	SCL “H” pulse width (Read)	60		ns	
	T_{SLR}	SCL “L” pulse width (Read)	60		ns	
D/CX	T_{DCS}	D/CX setup time	10		ns	
	T_{DCH}	D/CX hold time	10		ns	
SDA (DIN)	T_{SDS}	Data setup time	7		ns	
	T_{SDH}	Data hold time	7		ns	
DOUT	T_{ACC}	Access time	10	50	ns	For maximum CL=30pF
	T_{OH}	Output disable time	15	50	ns	For minimum CL=8pF

7.2 Reset Timing



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

Related Pins	Symbol	Parameter	MIN	MAX	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1, 5)	ms
				120 (Note 1, 6, 7)	ms

Notes:

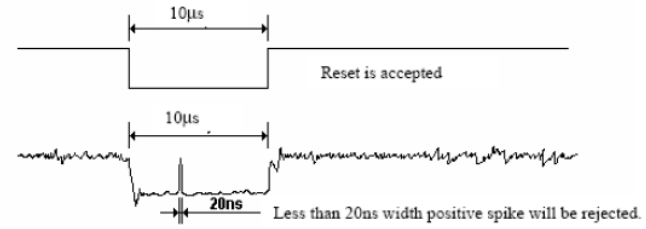
1. The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NVM (or similar device) to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.

2. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below:

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

3. During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode.) and then return to Default condition for Hardware Reset.

4. Spike Rejection also applies during a valid reset pulse as shown below:

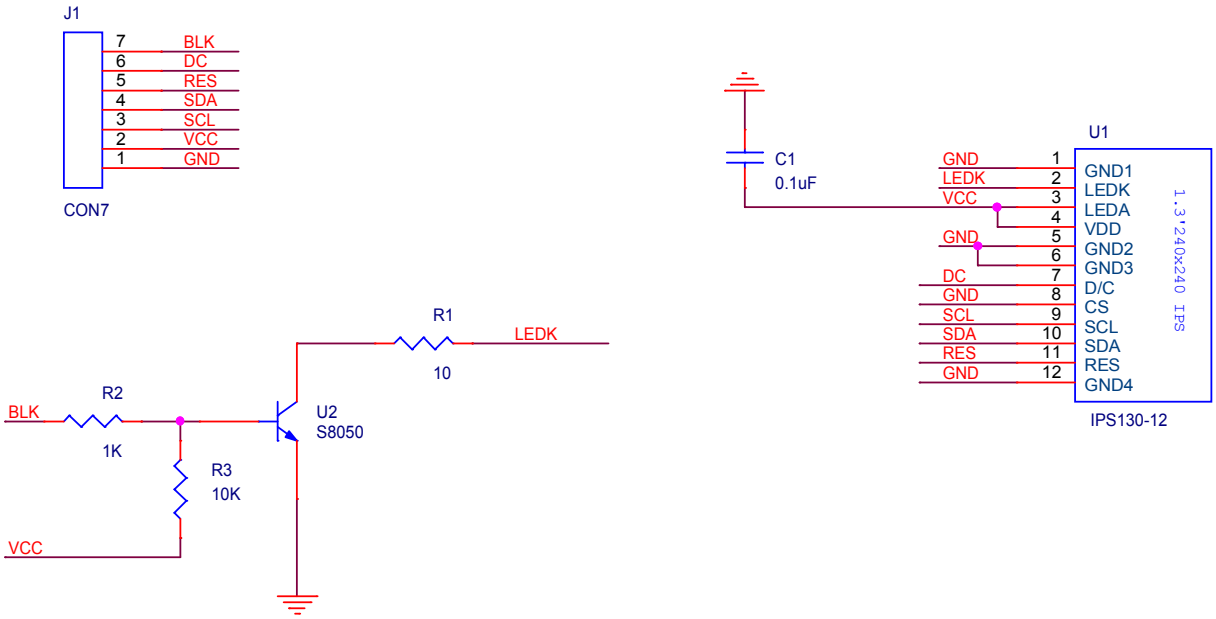


5. When Reset applied during Sleep In Mode.

6. When Reset applied during Sleep Out Mode.

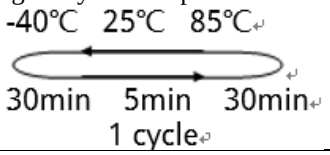
7. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

8 Schematic



9 Reliability

Test Item	Content of Test	Test Condition	Note
High Temperature Storage	Endurance test applying the high storage temperature for a long time.	80℃ 200hrs	2
Low Temperature Storage	Endurance test applying the high storage	-30℃	1,2

	temperature for a long time.	200hrs	
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70℃ 200hrs	-
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20 ℃ 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60℃,90%RH max, for 96hrs under no-load condition excluding the polarizer. Then taking it out and drying it at normal temperature.	60℃,90%RH 96hrs	1,2
Thermal Shock Resistance	The sample should be allowed stand the following 10 cycles of operation 	-30℃/80℃ 10 cycles	-
Vibration Test	Endurance test applying the vibration during transportation and using	Total fixed amplitude: 15mm; Vibration: 10~55Hz; One cycle 60 seconds to 3 directions of X, Y, Z, for each 16 minutes.	3
Static Electricity Test	Endurance test apply the electric stress to the terminal.	VS=800V, RS=1.5kΩ, CS=100pF, 1 time.	-

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.

Note3: Test performed on product itself, not inside a container.

10 Warranty and Conditions

http://www.displaymodule.com/pages/faq HYPERLINK "http://www.displaymodule.com/pages/faq"