

深圳市金逸晨电子有限公司

ShenZhen GoldenMorning Electronic Co.,Ltd

PRODUCT SPECIFICATION

Model No	T177C6-H14-01
Product Name	1.77 TFT LCD Module
Version	V1.0
Date	2024-01-12

- ☐ Preliminary Specification
☒ Final Specification

PREPARED BY	CHECKED BY	APPROVED BY

Revision History

Version	Date	Page	Revise record	Remarks
V1.0	2024-01-12	-	First issued	-

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1. General Parameter

NO.	Features	Details	Unit
1	Display Size(Diagonal)	1.77"	Inch
2	LCD type	TN TFT	-
3	Display Mode	Transmissive/Normally White	-
4	Resolution	128 RGB(H) x 160(V)	Pixels
5	Viewing Direction	12 o'clock	-
6	Module size	34.00(W) x 43.70(H) x 2.54(T)	mm
7	Active Area	28.03(W) x 35.04(H)	mm
8	Pixel Size	0.219(W) x 0.219(H)	mm
9	Color arrangement	RGB Vertical stripe	-
10	Interface	4-line SPI	-
11	Display Colors	262K	-
12	Driver IC	ST7735	-
13	With or Without Touch Panel	Without	-
14	Operating Temperature	-20℃~70℃	℃
15	Storage Temperature	-30℃~80℃	℃
16	Weight	5.16	g

Note 1: Please refer to the mechanical drawing.

2. Physical drawing



[illegible]

4. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Supply Voltage	VDD	-0.3	4.8	V
Supply Voltage (Logic)	VDDI	-0.3	4.6	V
Operating temperature	Top	-20	70	°C
Storage temperature	Tst	-30	80	°C

Note 1: If tAmbient temperature below 50°C, the maximal humidity is 90%RH, if Ambient temperature over 50°C, absolute humidity should be less than 60%RH.

Note 2: The response time will be extremely slow when the operating temperature is around -10°C, and the back ground will become darker at high temperature operating.

Note 3: If one of the above items is exceeded its maximum limitation momentarily, the quality of the product may be degraded. Absolute maximum limitation, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the recommend range.

5. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	VDD	2.5	2.75	4.8	V
Interface Operation Voltage	VDDI	1.65	1.8	3.7	V
Input high voltage	V _{IN}	0.7*IOVCC	-	IOVCC	V
Input low voltage	V _{IL}	VSS	-	0.3*IOVCC	V
Output high voltage	V _{OH}	0.8*IOVCC	-	IOVCC	V
Output low voltage	V _{OL}	VSS	-	0.2*IOVCC	V
Input Current	I _{IN}	-	2	3	mA

6. Backlight Characteristic

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V _F	2.9	3.0	3.1	V	-
Forward Current	I _F	-	80	-	mA	-
Power dissipation	P _d	-	240	-	mW	-
LED Life Time(25 °C)	-	-	10000	-	Hrs	-

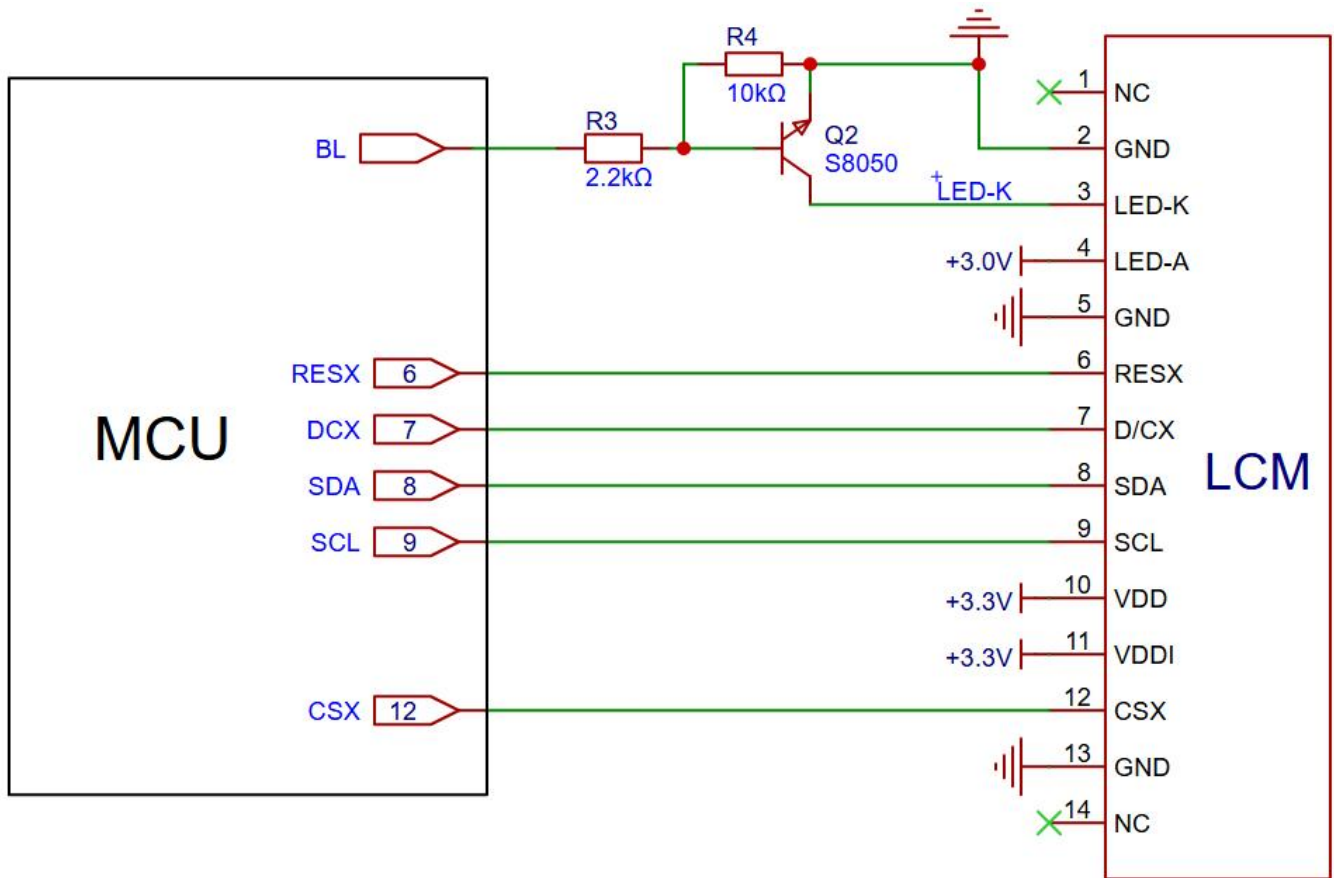
Note: LED life time defined as follows: The final brightness is at 50% of original brightness. Typical operating life time is estimated data.

7. Pins Definitions.

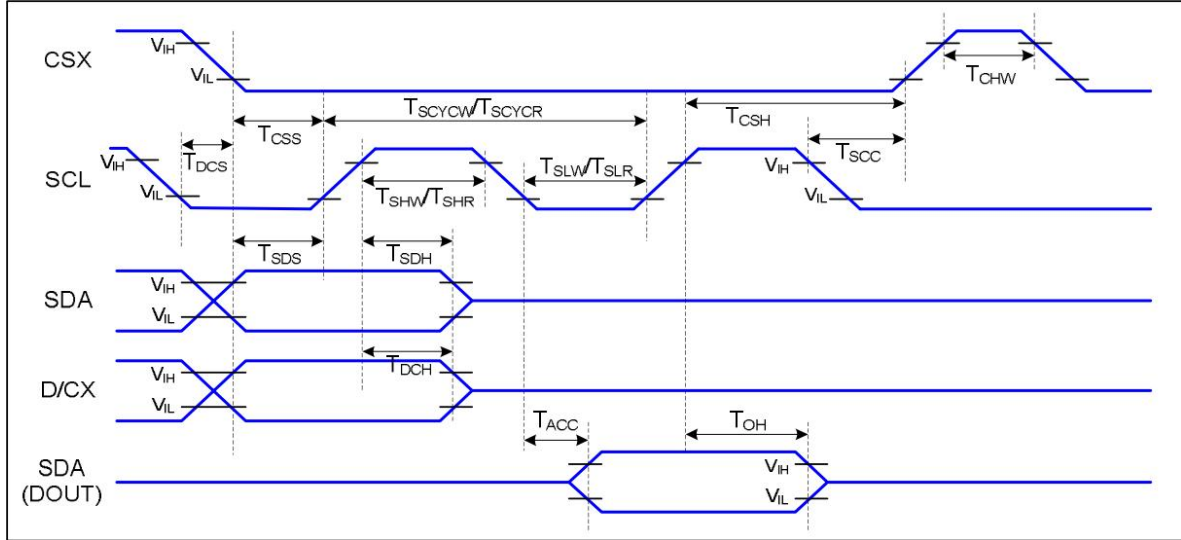
Pin.No	Symbol	Description
1	NC	No connect
2	GND	Ground.
3	LED-K	Backlight cathode
4	LED-A	Backlight anode
5	GND	Ground.
6	RESX	This signal will reset the device and it must be applied to properly initialize the chip. -Signal is active low
7	D/CX	Display data/command selection pin
8	SDA	SPI interface input/output pin.
9	SCL	Serial interface clock.
10	VDD	Power Supply for Analog, Digital System and Booster Circuit.
11	VDDI	Power Supply for I/O system.
12	CSX	Chip selection pin, Low enable, High disable.
13	GND	Ground.
14	NC	No connect.

Note: The backlight LED is recommended to be powered independently by constant current drive.

8. Schematic Diagram.



9. Timing Characteristics.



4-Line serial Interface Timing Characteristics

T_a=25 °C, V_{DDI}=1.65~3.7V, V_{DD}=2.5~4.8V

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	TCSS	Chip Select Setup Time (Write)	45		ns	
	TCSH	Chip Select Hold Time (Write)	45		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)	66		ns	-Write Command & Data Ram
	TSHW	SCL "H" Pulse Width (Write)	15		ns	
	TSLW	SCL "L" Pulse Width (Write)	15		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	10		ns	For Maximum CL=30pF For Minimum CL=8pF
	TSDH	Data Hold Time	10		ns	
	TACC	Access Time	10	50	ns	
	TOH	Output Disable Time	15	50	ns	

4-Line serial Interface Characteristics

Note : The rising time and falling time (Tr, Tf) of input signal are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of V_{DDI} for Input signals.

10. Optical Characteristics.

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Response time 响应时间	Tr+Tf	$\theta = 0^\circ$	-	30	60	ms	Note 6
Contrast ratio 对比度	CR	$\theta = 0^\circ$	200	300	-		Note 3,7
Viewing angle 视角	Top	$CR \geq 10$	40	45	-	deg.	Note 3,7,8
	Bottom	$CR \geq 10$	15	20	-		
	Left	$CR \geq 10$	40	45	-		
	Right	$CR \geq 10$	40	45	-		
CF Color chromaticity(CIE) CF色度	Wx	$\theta = 0^\circ$	-0.02	0.308	+0.02		Note 4
	Wy			0.327			
	Rx			0.610			
	Ry			0.329			
	Gx			0.299			
	Gy			0.567			
	Bx			0.143			
	By			0.111			
Cross talk 串扰	ct				2%		Note 10
Transmittance 透射率	Trans		6.21%	6.9%	-		Note 5

Note 1: Ambient temperature = 25°C.

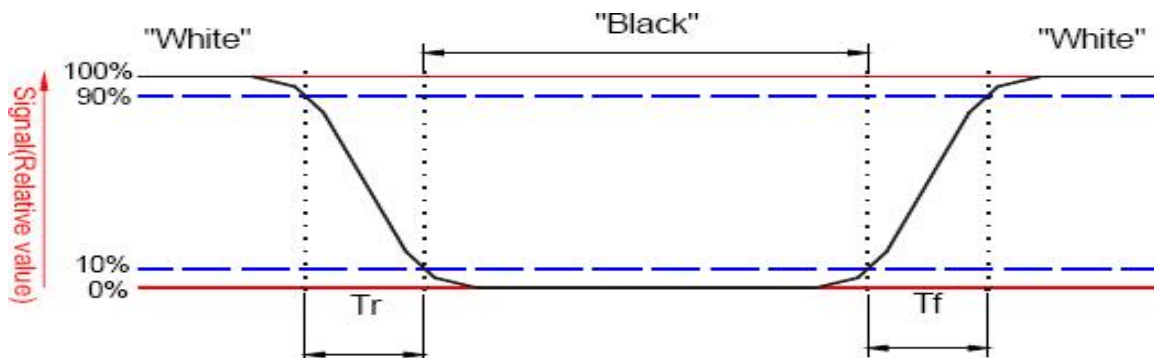
Note 2: To be measured in dark room after LED backlight warm up 5 minutes.

Note 3: To be measured with a viewing cone of 2° by Topcon luminance meter BM-5A.

Note 4: To be measured with Otsuta chromaticity meter LCF-2100M, CF only measure with C light.

Note 5: CDY shipping status is cell without polarizer. Transmittance of Specification is cell with polarizer.

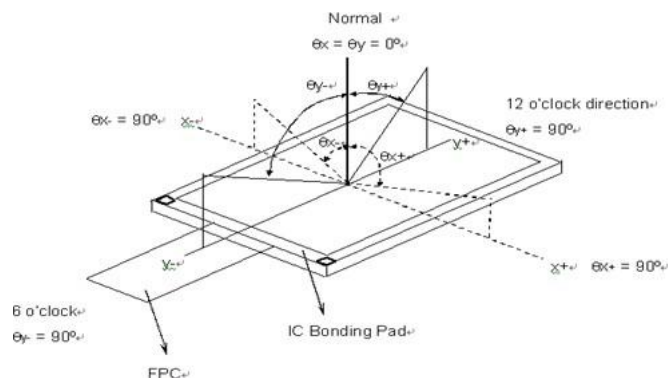
Note 6: Definition of response time: The output signals of TRD-100 are measured when the input signals are changed to "White" (falling time) and from "White" to "Black" (rising time), respectively. The interval is between the 10% and 90% of amplitudes. Refer to figure as below.



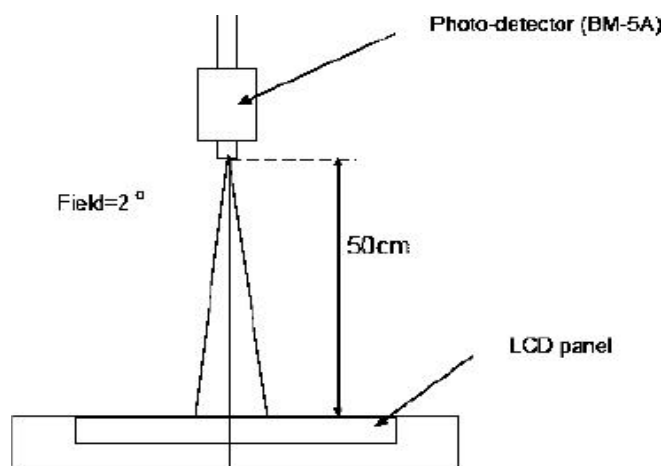
Note 7: Contrast ratio is calculated by the following formula:

$$\text{对比度 Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state
“白色”状态下的亮度}}{\text{Brightness on the "black" state
“黑色”状态下的亮度}}$$

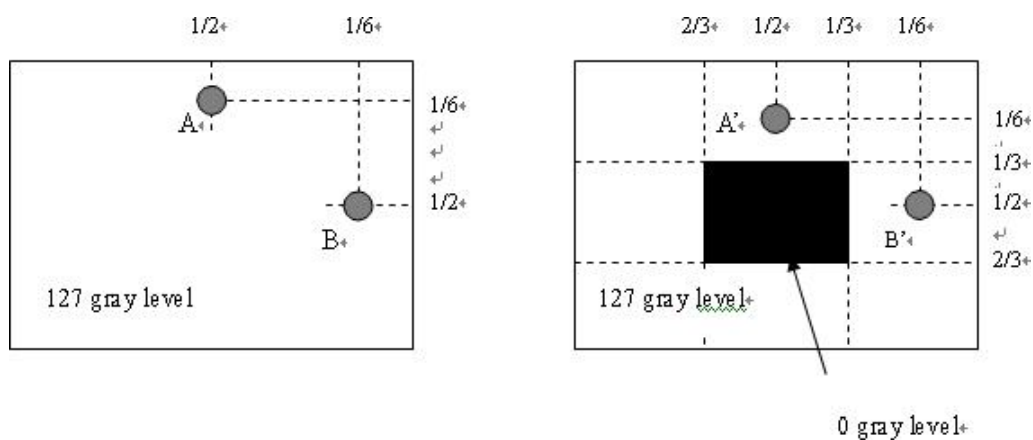
Note 8: Definition of viewing angle (视角的定义)



Note 9: Optical characteristic measurement setup. (光学特性测量设置)



Note 10:



$|LA - LA'| / LA \times 100\% = 2\% \text{ max.}$, LA and LA' are brightness at location A and A'
 $|LB - LB'| / LB \times 100\% = 2\% \text{ max.}$, LB and LB' are brightness at location B and B'

11. Reliability

11.1. MTBF

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal.

11.2. Test Condition

No	Item	Condition	Criteria
1	High Temperature Operating	70℃*24Hrs	1. No Defect Of Operational Function In Room Temperature Are Allowable. 2. IDD of LCM in Pre-and Post-Test Should Follow Specification.
2	Low Temperature Operating	-20℃*24Hrs	
3	High Humidity Storage	50℃*90%RH*24Hrs	
4	High Temperature Storage	80℃*24Hrs	
5	Low Temperature Storage	-30℃*24Hrs	
6	Thermal Cycling Test Storage	-	
7	Packing vibration	-	
8	Electrical Static Discharge	-	
		-	
9	Drop Test (Packaged)	-	

Note1. The test samples should be applied to only one test item.

Note2. Sample size for each test item is 2pcs.

Note3. No defection function allowable.

12. Precautions

12.1. Storage Conditions

- 12.1.1. Store the panel or module in a dark place where the temperature is $23\pm5^{\circ}\text{C}$ and the humidity is below $45\pm20\%\text{RH}$.
- 12.1.2. Store in anti-static electricity container.
- 12.1.3. Store in clean environment, free from dust, active gas, and solvent.
- 12.1.4. Do not place the module near organics solvents or corrosive gases.
- 12.1.5. Do not crush, shake, or jolt the module.
- 12.1.6. Strong light exposure causes degradation of polarizer and color filter.

12.2. Handling Precautions

- 12.2.1. Avoid static electricity, which can damage the CMOS LSI.
- 12.2.2. The polarizing plate of the display is very fragile, please handle it very carefully.
- 12.2.3. Do not give external shock.
- 12.2.4. Do not apply excessive force on the surface.
- 12.2.5. Do not wipe the polarizer with dry cloth, as it might cause scratch. If the surface of the LCD needs to be cleaned, wipe it swiftly with cotton or other soft cloth soaked with petroleum IPA, do not use other chemicals.
- 12.2.6. Reverse and use within ratings in order to keep performance and prevent damage.
- 12.2.7. Do not remove the panel or frame from the module.
- 12.2.8. Except for soldering the interface, do not make any alterations or modifications with a soldering iron; Ensure welding temperature at 320°C to 350°C , the welding time control within the 10 s, welding note don't stay too long in the same place to avoid scald FPC.

12.3. Limited Warranty

- 12.3.1. Our warranty liability is limited to repair and/or replacement. We will not be responsible for any consequential loss. (我们的保证责任仅限于修理和/或更换。我们将不负任何相应的损失。)
- 12.3.2. If possible, we suggest customer to use up all modules in six months. If the module storage time over twelve months, we suggest that recheck it before the module be used. (如果可能，我们建议客户在6个月内用完所有模块。如果模块存放时间超过12个月，我们建议在使用模块前重新检查。)
- 12.3.3. The warranty period is twelve months from the date of delivery. Buyer shall complete the assembly of all processes within twelve months of validity. During the warranty period, if the product quality problems, our company will be responsible for repair and replacement. All products must be stored and handled in accordance with regulations. Under warranty. When the goods do not comply with the above terms, we do not provide warranty services. (保修期为交货之日起十二个月。买方应在12个月内完成所有流程的组装。在保修期内，如果产品出现质量问题，我公司将负责维修和更换。所有产品必须按照规定储存和处理。在保修期内。当货物不符合上述条款时，我们不提供保修服务。)