

深圳市金逸晨电子有限公司

ShenZhen GoldenMorning Electronic Co.,Ltd

PRODUCT SPECIFICATION

Model No	T090BI-C10-01
Product Name	0.90 TFT LCD Module
Version	V1.0
Date	2024-09-11

- ☐ Preliminary Specification
☒ Final Specification

PREPARED BY	CHECKED BY	APPROVED BY

Revision History

Version	Date	Page	Revise record	Remarks
1.0	2024.09.11	-	First issued	-

TABLE OF CONTENT

NO.Contents	Page
1. General Parameter	4
2. Physical drawing	4
3. Mechanical Dimension	5
4. Absolute Maximum Ratings	6
5. DC Characteristics	6
6. Backlight Characteristic	6
7. Pins Definitions	7
8. Schematic Diagram	7
9. Timing Characteristics	8
10. Optical Characteristics	9
11. Reliability	11
12. Precautions	12

1. General Parameter

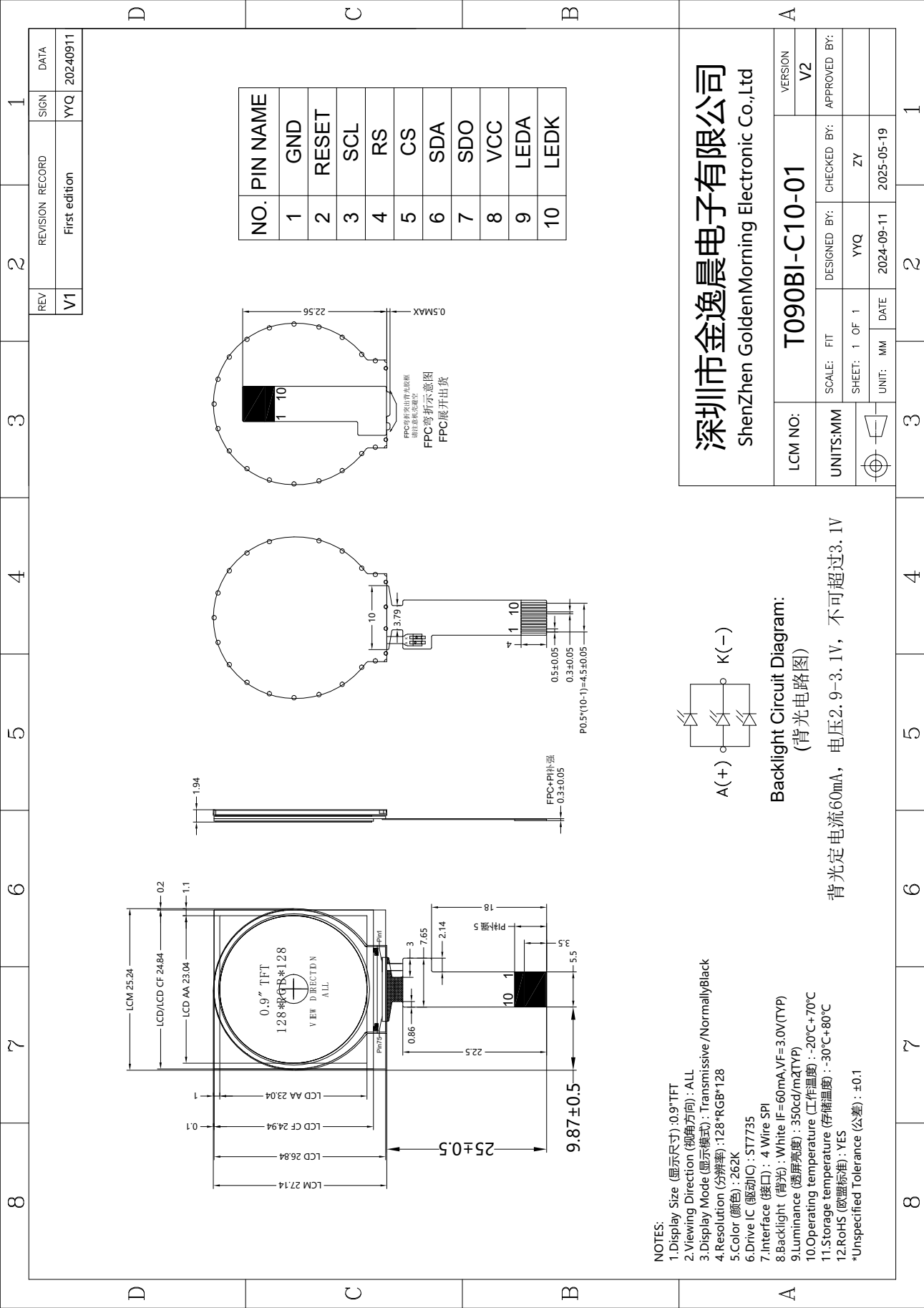
NO.	Features	Details	Unit
1	Display Size(Diagonal)	0.90"	-
2	LCD Type	IPS TFT	-
3	Display Mode	Normally black	-
4	Resolution	128 RGB(H) x 128(V)	Pixels
5	Viewing Direction	ALL	-
6	Module Size	25.24(W) x 27.14(H) x 1.95(T)	mm
7	Active Area	23.04(W) x 23.04(H)	mm
8	Pixel Pitch	180(W) x 180(H)	um
9	Color Arrangement	RGB Vtertical 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	-	g

Note 1: Please refer to the mechanical drawing.

2. Physical drawing



3. Mechanical Dimension



4. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Logic Supply Voltage	IOVCC	-0.3	4.6	V
Analog Supply Voltage	VCC/VCI	-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
Analog Supply Voltage	VCC	2.5	2.75	3.7	V
Logic Supply Voltage	IOVCC	1.65	1.8	3.7	V
Input High Voltage	V _{IN}	0.7*IOVCC	-	IOVCC	V
Input Low Voltage	V _{IL}	GND	-	0.3*IOVCC	V
Output High Voltage	V _{OH}	0.8*IOVCC	-	IOVCC	V
Output Low Voltage	V _{OL}	GND	-	0.2*IOVCC	V
Input Current	I _{IN}	-	20	-	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	-	60	-	mA	-
Power Dissipation	P _d	-	180	-	mW	-
LED Life Time(25 °C)	-	-	10000	-	Hrs	-

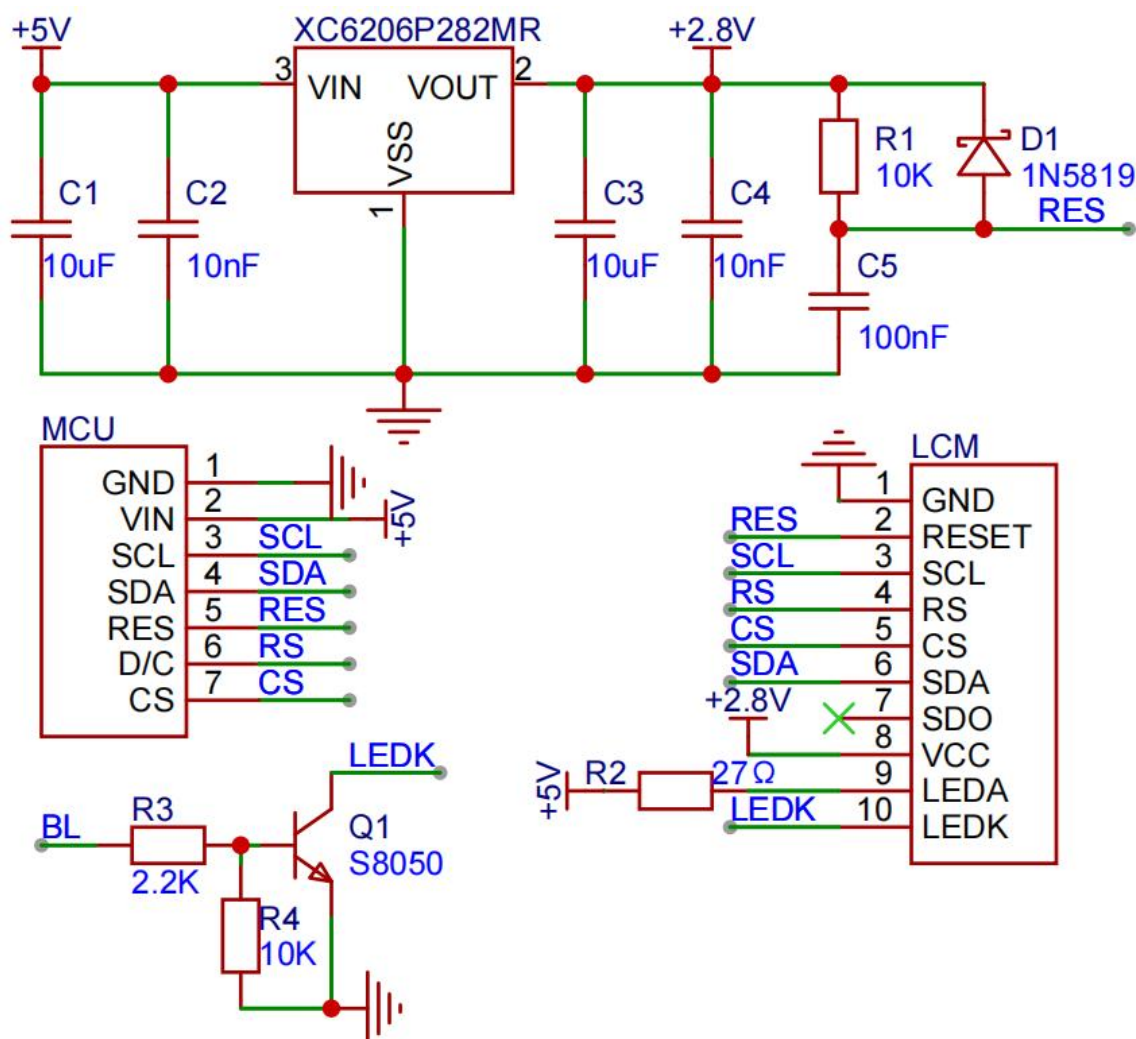
Note: LED life time defined as follows: The final brightness is at 50% of original brightness. Typical operating life time is estimated data.

7. Pins Definitions.

Pin.No	Symbol	Description
1	GND	Ground.
2	RESET	LCM Reset pin.
3	SCL	Serial clock pin.
4	RS	Register select pin.
5	CS	Chip select pin ("Low" enable).
6	SDA	SPI interface input/output pin.
7	SDO	SPI interface output pin.
8	VCC	Power supply for Analog.
9	LEDA	Backlit anode.
10	LEDK	Backlit cathode.

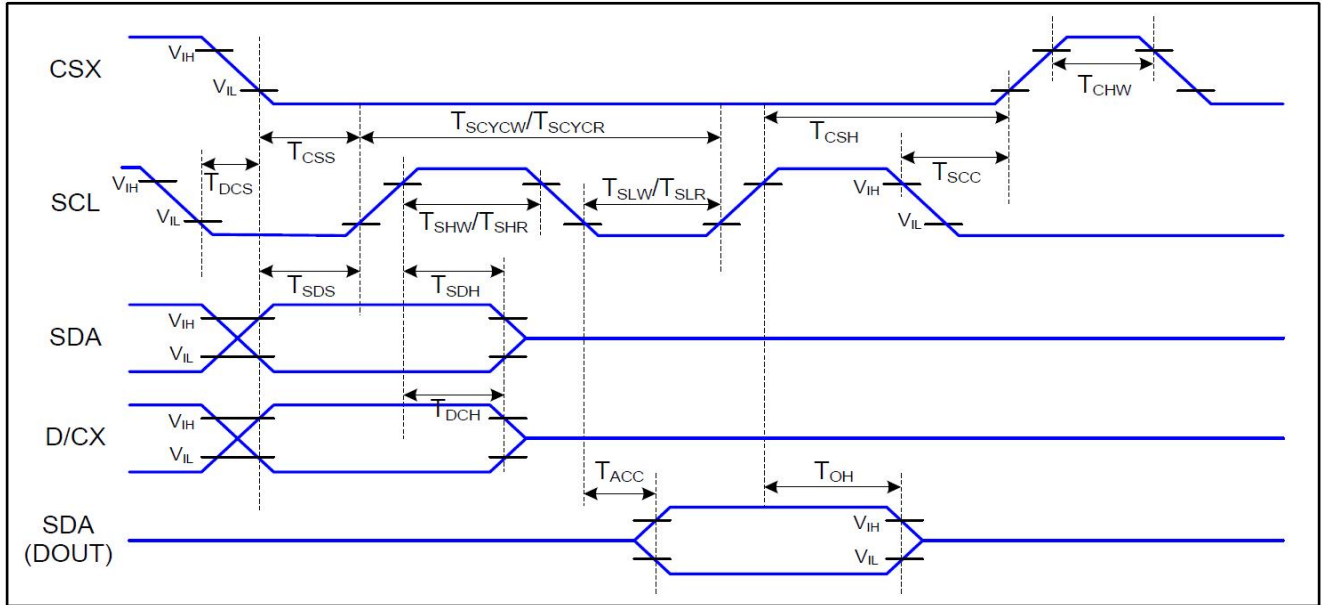
NOTE: The backlight LED is recommended to be powered independently by constant current drive.

8. Schematic Diagram.



4SPI 参考原理图

9. Timing Characteristics



4-line Serial Interface Timing

Ta=25 °C, VDDI=1.65~3.7V, VDD=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 VDDI for Input signals.

10. Optical Characteristics.

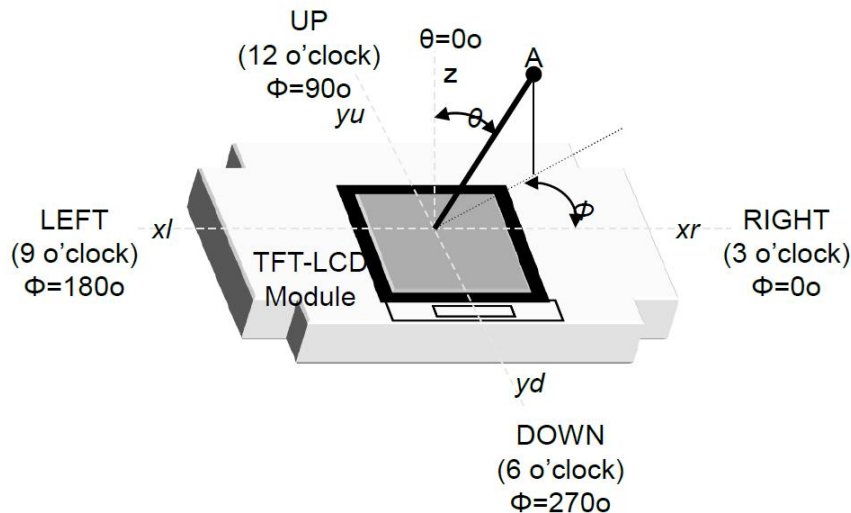
<Optical Specifications>

[Ta=25±2°C]

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle Range	Horizontal	Θ_3	CR > 10	80	85	-	Deg.	Note 5
		Θ_9		80	85	-	Deg.	
	Vertical	Θ_{12}		80	85	-	Deg.	
		Θ_6		80	85	-	Deg.	
Contrast Ratio		CR	$\Theta = 0^\circ$	800	1200	-		HC+Clear @silicate BLU With B-ITO Note 5.2/5.3
Cell Transmittance		Tr		4.4	5.2	-	%	
Chroma@CIE 1931		Rx	$\Theta = 0^\circ$	0.637	0.657	0.677	-	CF @C Light ±0.02 With B-ITO Note 5.4
		Ry		0.303	0.323	0.343	-	
		Gx		0.259	0.279	0.299	-	
		Gy		0.558	0.578	0.598	-	
		Bx		0.113	0.133	0.153	-	
		By		0.111	0.131	0.151	-	
		Wx		0.279	0.299	0.319	-	
		Wy		0.320	0.340	0.360	-	
Color Gamut			$\Theta = 0^\circ$	60	65	-	%	
Response Time		Tr+Tf	Ta= 25°C $\Theta = 0^\circ$	-	25	35	ms	Note 5.5

Note 1: Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see Figure 5).

<Viewing Angle Range Is Defined As Follows>

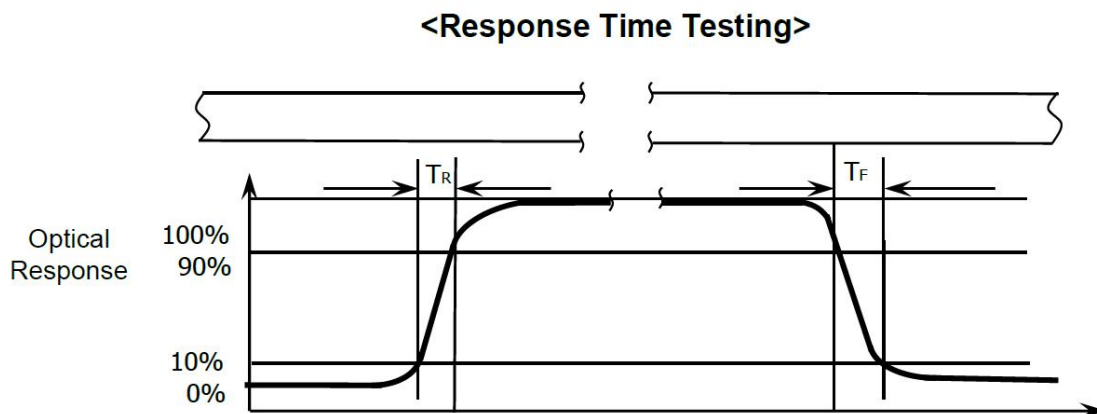


Note 2: Contrast measurements shall be made at viewing angle of $\Theta=0^\circ$ and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. Luminance Contrast Ratio (CR) is defined mathematically.

$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

Note 3: The color chromaticity coordinates specified in Table 5 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

Note 4: The electro-optical response time measurements shall be made as Figure 6 by switching the “data” input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is T_R , and 90% to 10% is T_F .



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℃*96Hrs	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℃*96Hrs	
3	High Humidity Storage	50℃*90%RH*96Hrs	
4	High Temperature Storage	80℃*96Hrs	
5	Low Temperature Storage	-30℃*96Hrs	
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。)