

深圳市金逸晨电子有限公司

ShenZhen GoldenMorning Electronic Co.,Ltd

PRODUCT SPECIFICATION

Model No	HT286B5-C30-02
Product Name	2.86 TFT LCD Module
Version	V1.0
Date	2024-10-31

- ☐ Preliminary Specification
☒ Final Specification

PREPARED BY	CHECKED BY	APPROVED BY

Revision History

Version	Date	Page	Revise record	Remarks
V1.0	2024.10.31	-	First issued	-

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1. General Parameter

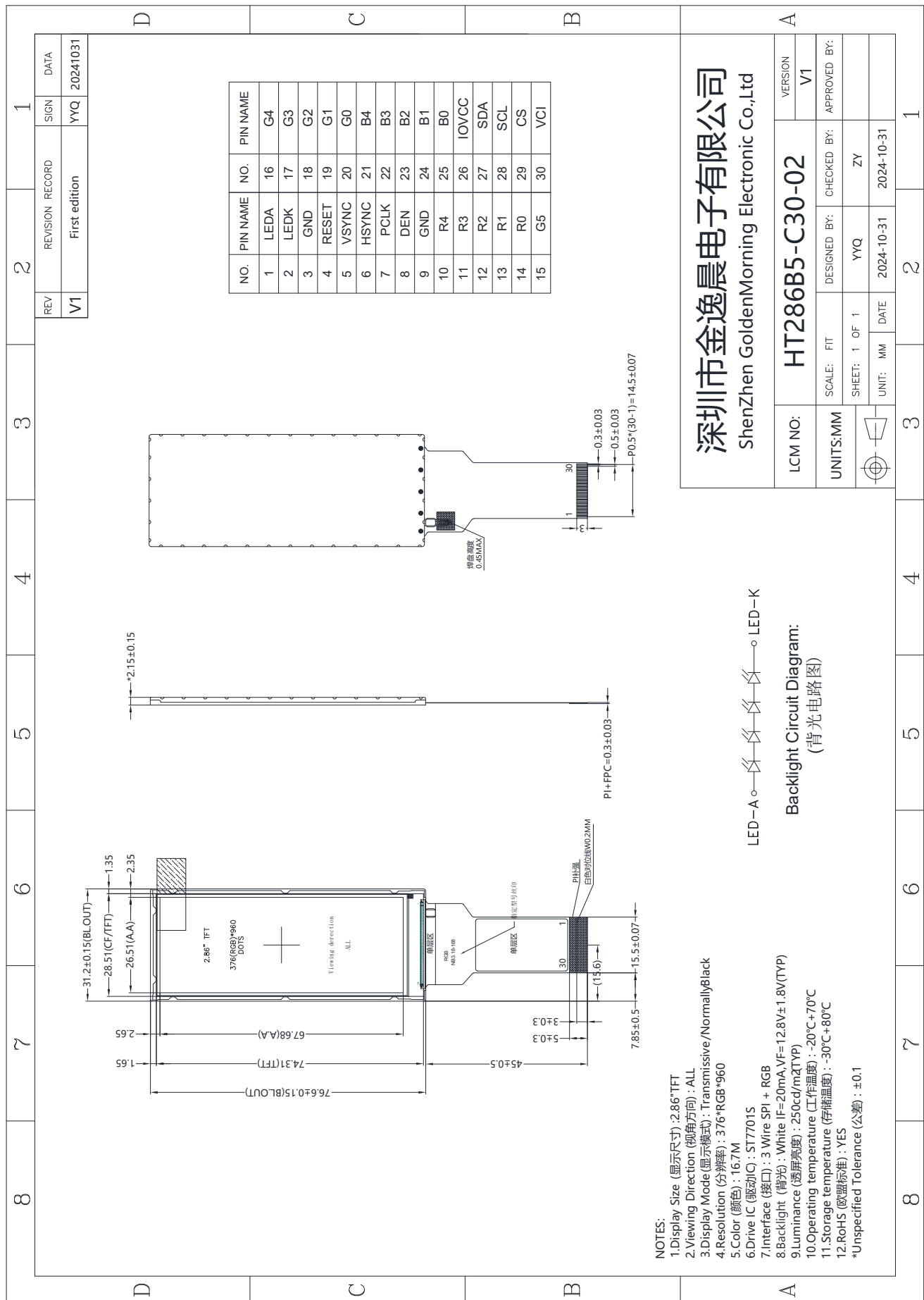
No.	Item 项目	Specification 规格	Unit 单位	Remark
1	LCD Size 液晶面板尺寸	2.86"	inch	-
2	Panel Type 面板类型	IPS	-	-
3	Resolution 分辨率	376RGBx960	Pixel	-
4	Display Mode 显示模式	Normally Black	-	-
5	Number of Colors 颜色数量	16.7M	-	-
6	Viewing Direction 使用视角	ALL	-	Note1
7	NTSC 色彩饱和度	55%	-	Typ.
8	Contrast Ratio 对比度	1500	-	
9	Luminance 亮度	250	cd/m2	Typ.
10	Module Size 模组尺寸	31.20(H)x76.6(V)x2.15(D)	mm	Note1
11	Panel Active Area 可视区域	26.51x68.08	mm	Note1
12	Pixel Pitch 像素尺寸	23.5(H)×3×70.5(V)	mm	-
13	Pixel Arrangement 像素排列	RGB-stripe		-
14	Weight 重量		g	-
15	Driver IC 驱动芯片	ST7701S	-	-
16	Driver IC RAM Size 记忆体	RAM less	bit	-
17	Light Source 背光源	4 LED	-	-
18	Interface 接口方式	3 Wire SPI + RGB 16BIT	-	-

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	4.0	V
Analog Supply Voltage	VCC	-0.3	4.6	V
Operating temperature		-20	70	°C
Storage temperature		-30	80	°C

Note 1: If Ambient 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	2.8	3.3	V
Logic Supply Voltage	IOVCC	1.65	1.8	3.3	V
Input high voltage	V _{IN}	0.8*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	-	12.8	-	V	-
Forward Current	I _F	-	20	-	mA	-
Power dissipation	P _d	-	256	-	mW	-
LED Life Time(25 °C)	-	-	10000	-	Hrs	-

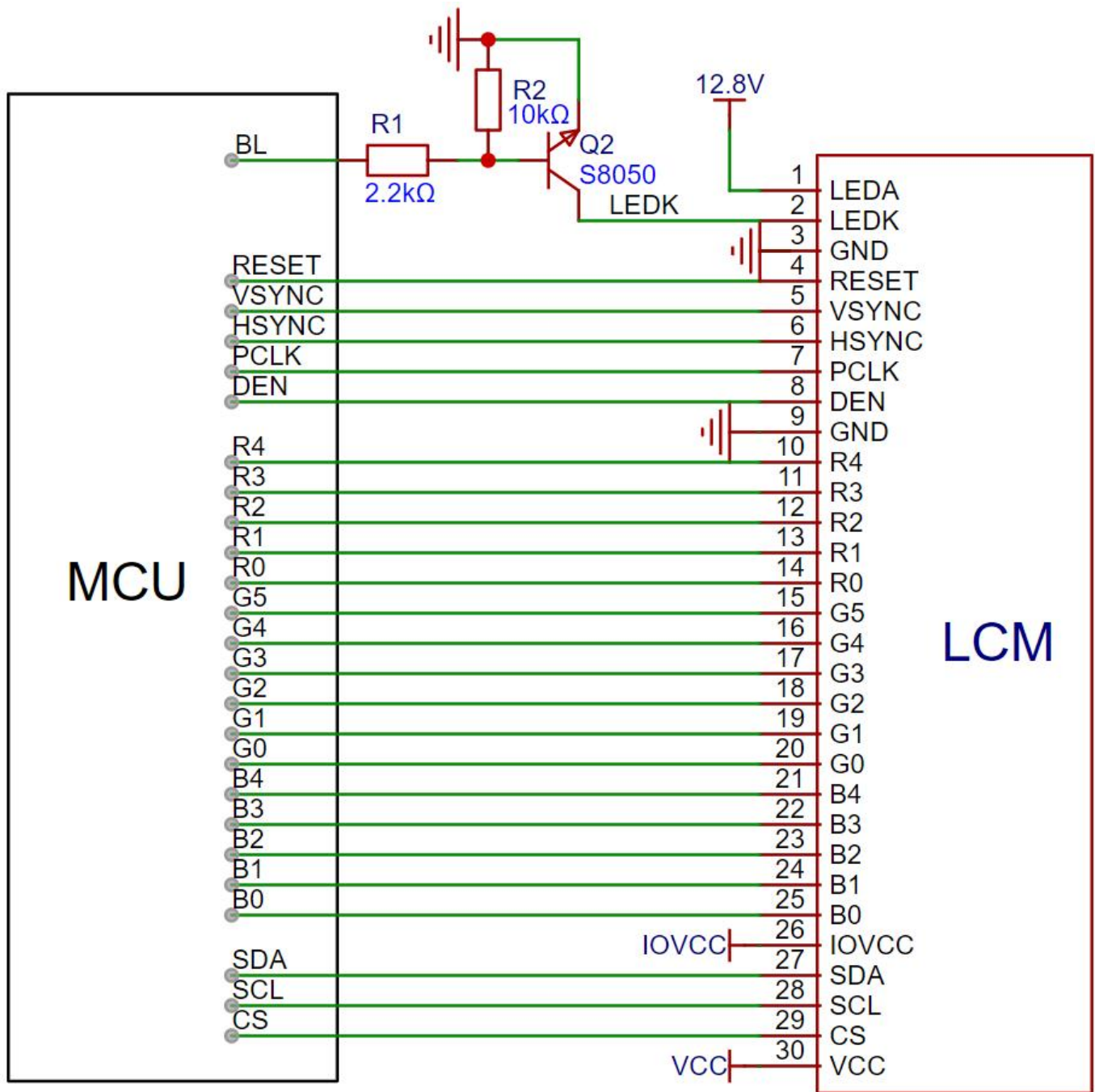
Note: LED life time defined as follows: The final brightness is at 50% of original brightness. Typical operating life time is estimated data.

7. Pins Definitions

Pin	Symbol	Function
1	LEDA	Backlight anode
2	LEDK	Backlight cathode
3	GND	Ground
4	RESET	The external reset input. Initializes the chip with a low input. Be sure to execute a power-on reset after supplying power
5	VS	Frame synchronizing signal for RGB interface operation
6	HS	Line synchronizing signal for RGB interface operation
7	PCLK	Dot clock signal for RGB interface operation
8	DE	Data enable signal for RGB interface operation Low: access enabled High: access inhibited
9	GND	Ground
10-14	R4-R0	Red data bus
15-20	G5-G0	Green data bus
21-25	B4-B0	Blue data bus
26	IOVCC	Digit Power Supply for LCM.
27	SDA	Serial data input pin for SPI Interface.
28	SCL	Serial clock input for SPI interface.
29	CS	Chip select pin signal Low: the chip is selected and accessible High: the chip is not selected and not accessible
30	VCC	Analog Power Supply for LCM.

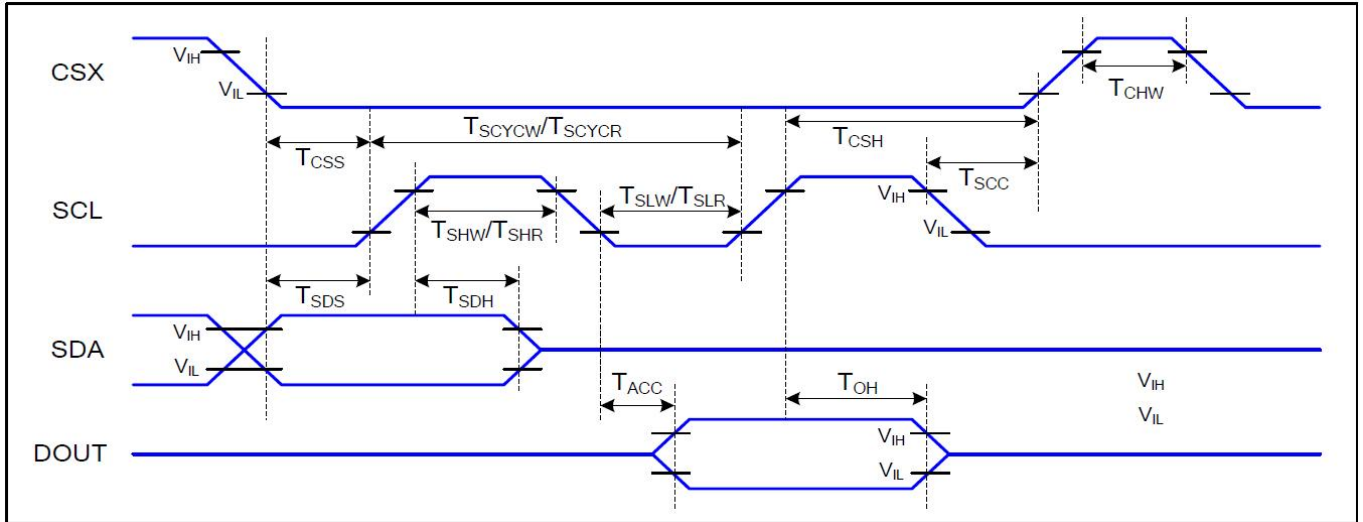
Note: The backlight LED is recommended to be powered independently by constant current drive.

8. Schematic Diagram



9. Timing Characteristics

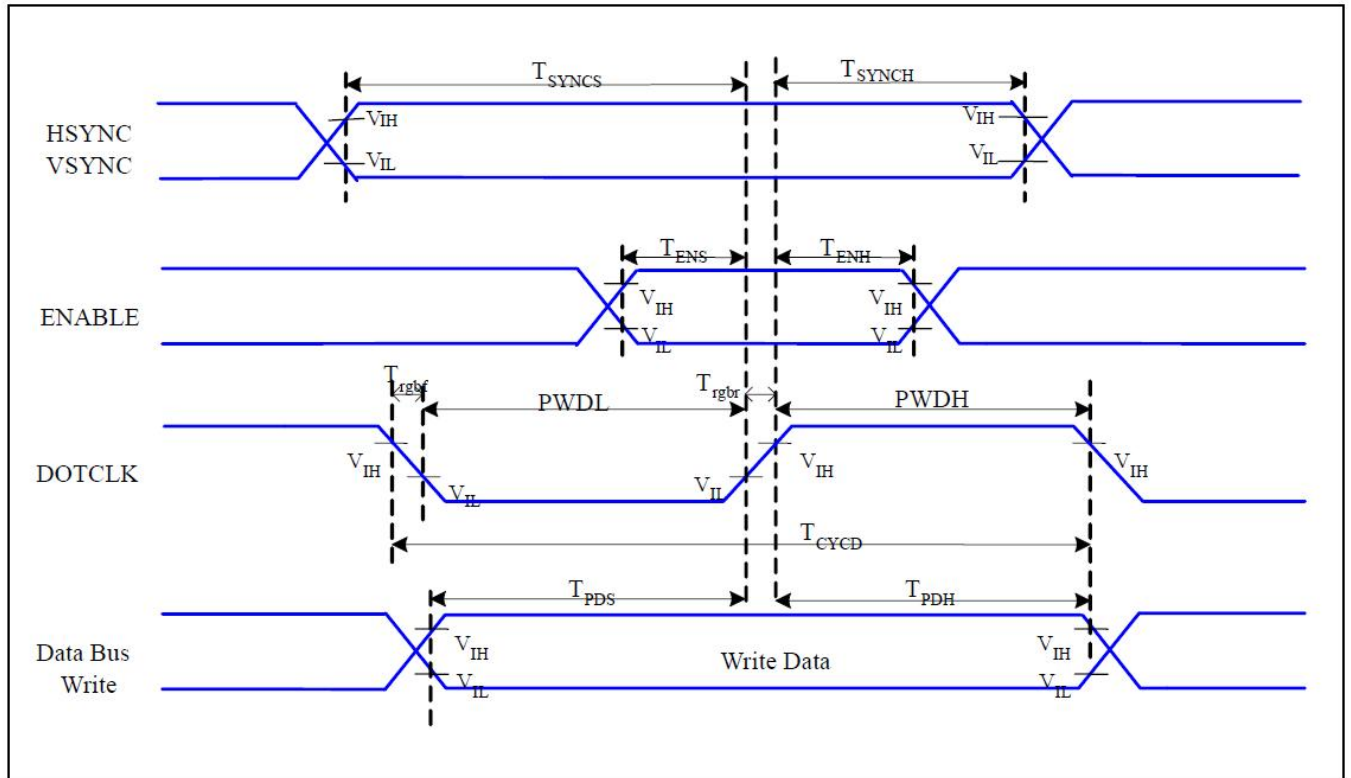
Serial interface characteristics (3 Wire SPI)



$V_{DDI}=1.8, V_{DD}=2.8, AGND=DGND=0V, T_a=25^{\circ}C$

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)	60		ns	
	T_{CHW}	Chip select "H" pulse width	40		ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	66		ns	
	T_{SHW}	SCL "H" pulse width (Write)	15		ns	
	T_{SLW}	SCL "L" pulse width (Write)	15		ns	
	T_{SCYCR}	Serial clock cycle (Read)	150		ns	
	T_{SHR}	SCL "H" pulse width (Read)	60		ns	
	T_{SLR}	SCL "L" pulse width (Read)	60		ns	
SDA (DIN)	T_{SDS}	Data setup time	10		ns	
	T_{SDH}	Data hold time	10		ns	
SDO (DOUT)	T_{ACC}	Access time	20	50	ns	Max: CL=30pF Min: CL=8pF
	T_{OH}	Output disable time	50	50	ns	

RGB Interface Characteristics



$V_{DDI}=1.8, V_{DD}=2.8, AGND=DGND=0V, T_a=25\text{ }^{\circ}\text{C}$

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
HSYNC, VSYNC	T_{SYNCS}	VSYSNC, HSYNC Setup Time	5	-	ns	
ENABLE	T_{ENS}	Enable Setup Time	5	-	ns	
	T_{ENH}	Enable Hold Time	5	-	ns	
DOTCLK	$PWDH$	DOTCLK High-level Pulse Width	15	-	ns	
	$PWDL$	DOTCLK Low-level Pulse Width	15	-	ns	
	T_{CYCD}	DOTCLK Cycle Time	33	-	ns	
	$Trghr, Trghf$	DOTCLK Rise/Fall time	-	15	ns	
DB	T_{PDS}	PD Data Setup Time	5	-	ns	
	T_{PDH}	PD Data Hold Time	5	-	ns	

Table 6 18/16 Bits RGB Interface Timing Characteristics

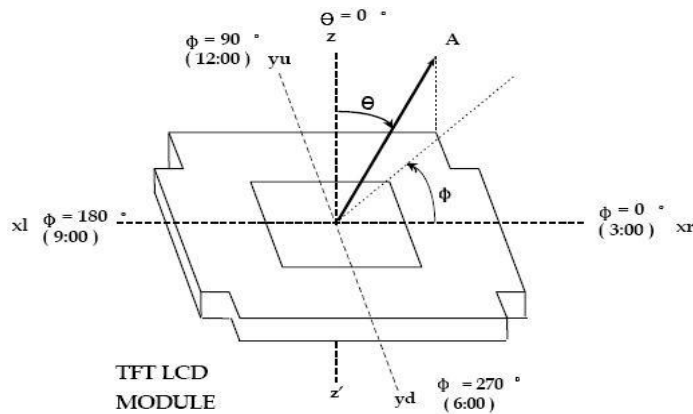
10. Optical Characteristics

10.1 LCM Optical Characteristics 液晶模组光学特性

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing Angle Range 视角	Left	θ_L	$CR \cong 10$	-	85	-	degree
	Right	θ_R		-	85	-	
	Top	θ_T		-	85	-	
	Bottom	θ_B		-	85	-	
Response Time 响应时间		Ton+Toff	$\theta=\Phi=0^\circ$	-	30		ms
Contrast Ratio 对比度		CR	$\theta=\Phi=0^\circ$	1000	1500	-	-
Luminance 亮度		L	$\theta=\Phi=0^\circ$	-	250	-	cd/m ²
Color Chromaticity (CIE1931) 色坐标	White	W_x	Normal $\theta=\Phi=0^\circ$	0.288	0.318	0.348	-
		W_y		0.310	0.340	0.370	
	Red	R_x		0.589	0.619	0.649	
		R_y		0.273	0.303	0.333	
	Green	G_x		0.533	0.563	0.593	
		G_y		0.579	0.594	0.609	
	Blue	B_x		0.105	0.135	0.165	
		B_y		0.104	0.134	0.164	
Uniformity 均匀度		U_L	$\theta=\Phi=0^\circ$	80	-	-	%
Flicker 闪烁		-	-	No Visible			-

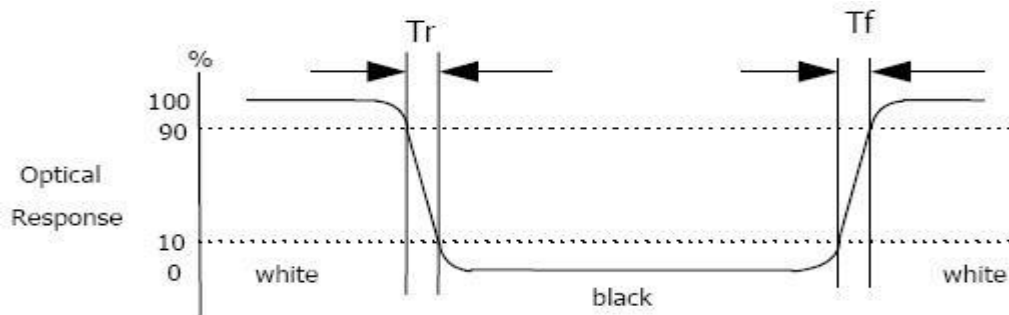
10.2 Measurement system 测量系统

10.2.1 LCM Viewing Angle



Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

10.2.2 Response time



Response time is the time required for the display to transition from white to black (Rising time, T_r) and from black to white (Falling time, T_f) for additional information.

10.2.3 Contrast ratio is calculated by the following formula

$$\text{Contrast ratio (CR)} = \frac{\text{Brightness on the "white" state}}{\text{Brightness on the "black" state}}$$

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 if 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。)