

深圳市金逸晨电子有限公司

ShenZhen GoldenMorning Electronic Co.,Ltd

PRODUCT SPECIFICATION

Model No	DT160BQ-C12-01
Product Name	1.6 TFT LCD Module
Version	V1.0
Date	2022-11-28

- ☐ Preliminary Specification
- ☒ Final Specification

PREPARED BY	CHECKED BY	APPROVED BY

Revision History

Version	Date	Page	Revise record	Remarks
V1.0	2022.11.28	-	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. Optical Characteristics	8
10. Reliability	10
11. Precautions	11

1. General Parameter

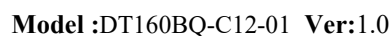
NO.	Features	Details	Unit
1	Display Size(Diagonal)	1.6"	Inch
2	LCD type	IPS TFT	-
3	Display Mode	Normally black	-
4	Resolution	400 RGB(H) x 400(V)	Pixels
5	Viewing Direction	ALL	-
6	Module size	42.15(W) x 44.24(H) x 1.96(T)	mm
7	Active Area	39.84(W) x 39.84(H)	mm
8	Pixel Size	-	mm
9	Color arrangement	RGB Vtertical stripe	-
10	Interface	MIPI	-
11	Display Colors	16M	-
12	Driver IC	ST7797	-
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



1



4. Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
I/O Supply Voltage	IOVCC	-0.3	4.6	V
Analog Supply Voltage	VCC	-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	2.6	2.75	3.3	V
I/O Supply Voltage	IOVCC	1.65	1.8	3.3	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}	-	20	-	mA

6. Backlight Characteristic

Item	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	V _F	2.8	3	3.2	V	-
Forward Current	I _F	-	60	-	mA	-
Power dissipation	P _d	-	180	-	mW	-
LED Life Time(25 °C)	-	-	-	-	Hrs	-

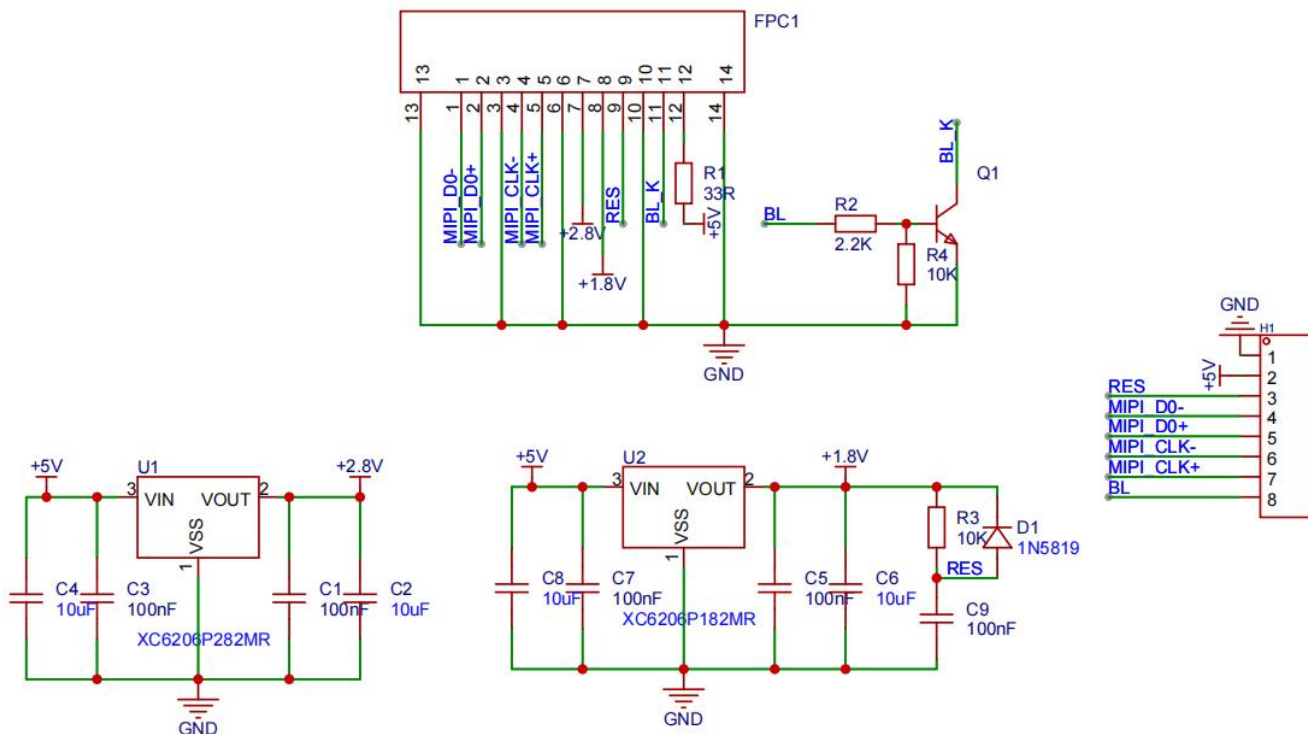
Note: LED life time defined as follows: The final brightness is at 50% of original brightness. Typical operating life time is estimated data.

7. Pins Definitions.

Pin.No	Symbol	Description
1	MIPI-DON	MIPI DSI data lane0-
2	MIPI-DOP	MIPI DSI data lane0+
3	GND	Ground
4	MIPI-CN	MIPI DSI data lane0-
5	MIPI-CP	MIPI DSI data lane0+
6	GND	Ground
7	VDD2.8V	Digit Power Supply for LCM2.8V
8	IOVCC1.8V	Digit Power Supply for LCM1.8V
9	RESET	LCM reset signal
10	GND	Ground
11	LEDK	Backlight.cathode
12	LEDA	Backlight anode

NOTE: The backlight LED can be powered separately or share a set of voltage supply with the VCC.

8. Schematic Diagram.



MIPI 参考原理图

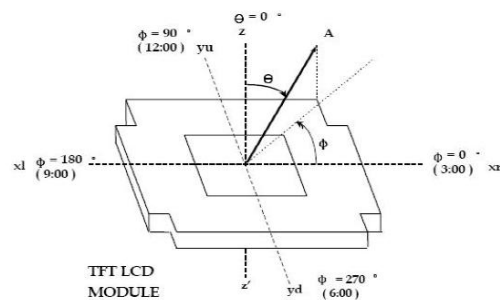
9. Optical Characteristics.

9.1. Optical Specifications.

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing Angle Range	Left	θ_L	$CR \geq 10$	-	85	-	degree
	Right	θ_R		-	85	-	
	Top	θ_T		-	85	-	
	Bottom	θ_B		-	85	-	
Response Time		Ton+Toff	$\theta = \Phi = 0^\circ$	-	25	35	ms
Contrast Ratio		CR	$\theta = \Phi = 0^\circ$	-	1200	-	-
Luminance		L	$\theta = \Phi = 0^\circ$	-		-	cd/m ²
Color Chromaticity (CIE1931)	White	W_x	Normal $\theta = \Phi = 0^\circ$	-0.02	0.294	+0.02	(1)(4) CF glass C-light
		W_y			0.335		
	Red	R_x			0.660		
		R_y			0.323		
	Green	G_x			0.280		
		G_y			0.571		
	Blue	B_x			0.134		
		B_y			0.132		
Uniformity		U_L	$\theta = \Phi = 0^\circ$	80	-	-	%
Flicker		-	-	No Visible			-

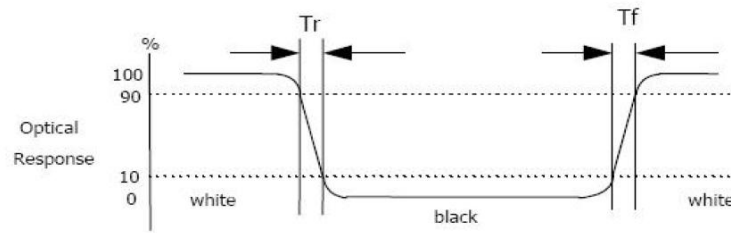
9.2. Measurement system

9.2.1. 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.

9.2.2. Response time



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

9.2.3. Contrast Ratio (CR)

Contrast Ratio (CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

Surface luminance is the center point across the LCD surface 500mm from the surface with all pixels displaying white.

10. Reliability

10.1. MTBF

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

10.2. 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.

11. Precautions

11.1. Storage Conditions

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

11.2. Handling Precautions

- 11.2.1. Avoid static electricity, which can damage the CMOS LSI.
- 11.2.2. The polarizing plate of the display is very fragile, please handle it very carefully.
- 11.2.3. Do not give external shock.
- 11.2.4. Do not apply excessive force on the surface.
- 11.2.5. 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.
- 11.2.6. Reverse and use within ratings in order to keep performance and prevent damage
- 11.2.7. Do not remove the panel or frame from the module.
- 11.2.8. 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.

11.3. Limited Warranty

- 11.3.1. 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。)
- 11.3.2. 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。)
- 11.3.3. 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。)