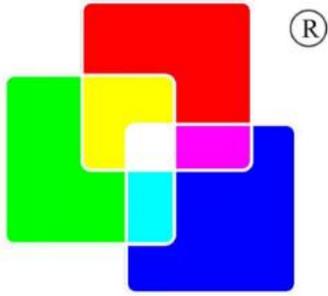


<p>PREPARED BY : 制作人 :ZFG 日期: 2024-10-12</p>	 <p>EASYQUICK TECHNOLOGY SPECIFICATION 深圳市易快来科技股份有限公司</p>	<p>SPEC No: (规格型号:) EQT105HEC002L</p>
<p>R&D APPROVED BY: 审核:GJM 日期: 2024-10-12</p>		<p>FILE No : (档案编号 :) EQ2024101201</p>
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<p>APPLICABLE DIVISION (适用范围)</p> <p>■ LCD DIVISION ■ 液晶模组</p>		

For **120*240** TFT LCD Module Model No

EQT105HEC002L

SPEC

Customer side signature (客户方签名)

部门 \ 签名 部门	Acknowled-ge (承认人)	Date (日期)	Remarks (备注)
Structure (结构)			
Electronics (电子)			
Item (项目)			
Quality (品质)			

EASYQUICK TECHNOLOGY

(易快来科技)

PEC No.	MODEL No.	Revised	PAGE
EQ2024101201	EQT105HEC002L	Ver02	1



1. Application (应用)

This data sheet is to introduce the specification of **EQT105HEC002L** active matrix **65K** color TFT LCD module.

Main color LCD module is controlled by Driver IC **GC9A01**.

If any problem occurs concerning the items not stated in this specification, it must be solved sincerely by both parties after deliberation.

As to basic specification of driver IC refer to the IC specification and handbook.

本规格书是为了介绍 **EQT105HEC002L** 有源矩阵 **65K** 彩色 TFT LCD 模块的规格。

主彩色液晶显示模块由驱动芯片 **GC9A01** 控制

本规范未尽事宜如有问题，双方必须认真协商解决。

驱动 IC 的基本规格参照《IC 规格书》和相关《手册》。

2. Construction and Outline (结构与大纲)

Construction: LCD panel, Driver (COG), FPC with electric components, **2** White LED lump, prism sheet, diffuser, light guide and reflector, plastic frame to fix them mechanically.

There shall be no scratches, stains, chips, distortions and other external drawbacks that may affect the display function.

In order to realize thin module structure, double-sided adhesive tapes are used to fix LCD panels. As these tapes do not guarantee to permanently fix the panels, LCD panel may rise from the module when shipped from factory.

So please make sure to design the system to hold the edges of LCD panel by the soft material such as sponge when LCD module is assembled into the cabinet.

结构:液晶面板，驱动或 COG，带电子元件的 FPC，**2** 个白光 LED 块，棱镜片，扩散器，导光器和反射器，塑料框架机械固定。

不应有可能影响显示功能的划痕、污迹、芯片、畸变等外部缺陷。

为了实现薄型模块结构，采用双面胶带固定液晶面板。由于这些胶带不能保证永久有效固定面板，LCD 面板在出厂时可能会从模块内移动。

所以在液晶模块组包装和进柜时，请务必将包装结构设计成用海绵等软材料支撑液晶面板的边缘。



3. Mechanical Specification (参数规格)

No.	Item	Contents	Unit
1	Screen size (屏幕尺寸)	1.05 inch	/
2	Display mode (显示模式)	Normally black	/
3	View Angle (视角)	FULL VIEW	/
4	Display format (分辨率)	120*240	/
5	Outline Dimensions (外形尺寸)	15.25(W)×30.1(H)×3(D)	mm
6	Active area (显示范围)	11.88(H)×23.76(V)	mm
7	Pixel size(像素)	0.099 (H) x 0.099 (V)	mm
8	Interface type (接口类型)	SPI	/
9	Color Depth (颜色深度)	65K	/
10	Module power consumption (模组功耗)	TBD	W
11	Back light type (背光类型)	LED	/
12	Driver IC (驱动 IC)	GC9A01	/
13	Weight (重量)	TBD	G

Note 1: Not include FPCs & Bezel extrude structure.

备注 1: 不包括排线和面板构造

4. ABSOLUTE MAXIMUM RATINGS(绝对最高额定值)

Item	Symbol	Min.	Max.	Unit	Note
Power supply input voltage for TFT (TFT 电源输入电压)	VDD	-0.3	4.6	V	
Operation temperature (运行温度)	Top	-20	+70	°C	
Storage temperature (储存温度)	Tst	-30	+80	°C	



5. ELECTRICAL CHARACTERISTICS (电气特性)

5.1 TFT DC CHARACTERISTICS(at Ta=25°C)

TFT 直流特性(at Ta=25°C)

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Power supply input voltage (电源输入电压)	VDD	2.5	2.8	3.3	V	
I/O logic voltage (I/O 逻辑电压)	VDDIO	-	-	-	V	
Input voltage 'H' level (输入电压高水平)	VIH	0.7VDD	-	VDD	V	
Input voltage 'L' level (输入电压低水平)	VIL	GND	-	0.3VDD	V	
Power supply current (电源电流)	IVDD	-	TBD	-	mA	
I/O logic voltage current (I/O 逻辑电压电流)	IVDDIO	-	TBD	-	mA	
TFT gate on voltage (TFT门打开电压) / Input positive voltage(输入正极电压)	VGH/VSP	-	-	-	V	
TFT gate off voltage (TFT门关闭电压) / Input Negative voltage(输入负极电压)	VGL/VSN	-	-	-	V	
Analog power supply voltage (模拟电源电压)	AVDD	-	-	-	V	
TFT input common mode voltage (TFT输入共模电压)	VCOM	-	-	-	V	Note1

Note1 : The value is just the reference value. The customer can optimize the setting value by the different D-IC

Vcom must be adjusted to optimize display quality, as Crosstalk and Contrast Ratio etc..

备注：该值只是参考值，应用于不同的驱动芯片需要优化设定值，VCOM 必须进行调整来优化显示质量，比如串扰、对比度等

5. 2 LED back light (背光灯)

At main panel the back light uses 2 pcs edge light type white LED.

在背光的主面板用 2 颗白色 LED 灯

Table 4 (表 4)

Parameter (参数)	Symbol (样品)	Min. (最小值)	Typ. (标准值)	Max. (最大值)	Unit (单位)	Remark (备注)
LED Voltage (LED 电压)	VLED	-	3.2	-	V	
LED Current (LED 电流)	ILED	-	120	-	mA	
Power Consumption (电功率)	WLED	-	384	-	mW	
Connection Type(Serial/Parallel/Other) 连接类型(串联/并联/其他)		1S2P LEDs				

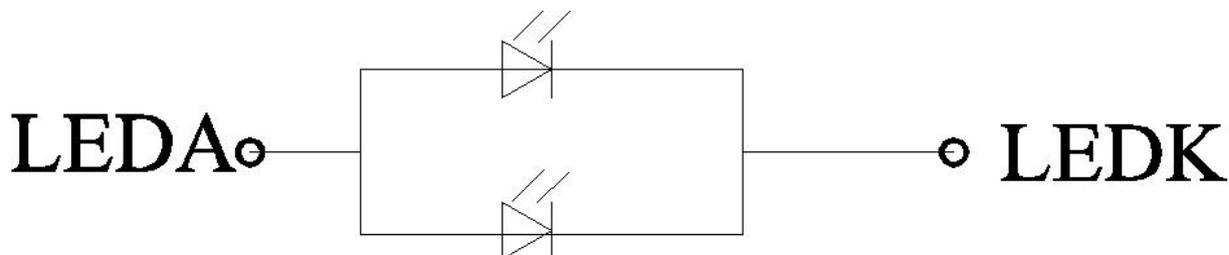
Note:

*2 pcs of LED

*Please consider Allowable Forward Current on used temperature

*2 颗灯

* 请考虑允许范围内的正向电流的使用温度



LED CIRCUIT DIAGRAM VF=3.2V IF=120mA

Fig.1*Schematics drawing of lighting (绘制照明图 图.1)

Note: Logic high and low levels are specified as 30% and 70% of IOVCC for Input signals.

Note: Ta = -20 to 70 °C, IOVCC=1.65V to 3.3V, VCI=2.5V to 3.3V, GND=0V

备注: 指定逻辑高和低电平作为输入信号IOVCC的70%和30%。

备注: Ta = -20 to 70 °C, IOVCC=1.65V to 3.3V, VCI=2.5V to 3.3V, GND=0V



6. Interface signals (接口信号)

TFT Module Interface description (TFT 模块接口描述)

Interface No.	Name	I/O or connect to	Description
1	TP0	/	No Connection
2	TP1	/	No Connection
3	SDA	I/O	Serial in/out signal
4	SCL	I	Serial interface clock
5	RS	I	Serves as command or parameter select
6	RES	I	LCD reset pin
7	CS	I	Chip select input pin
8	GND	P	Ground
9	NC	/	No Connection
10	VCC	P	Power for LCD(3.3V)
11	LEDK	P	Power for LED backlight(Cathode)
12	LEDA	P	Power for LED backlight(Anode)
13	GND	P	Ground

7. AC CHARACTERISTICS (交流特性)

7.3.4. Display Serial Interface Timing Characteristics (4-line SPI system)

Figure98.

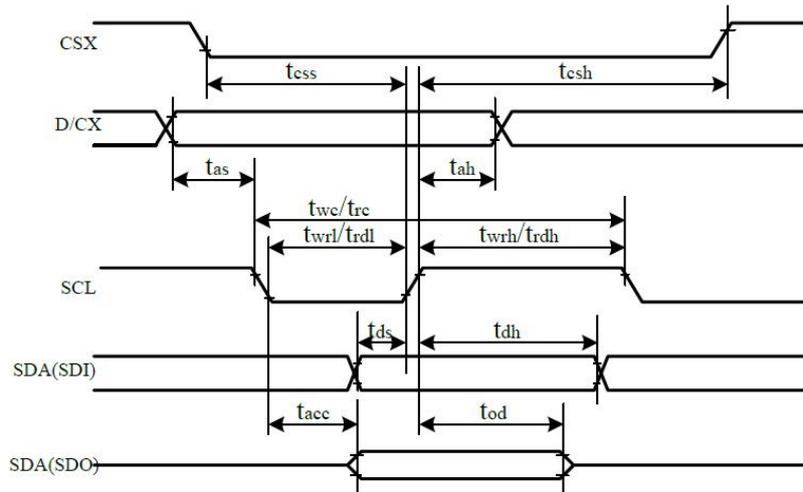
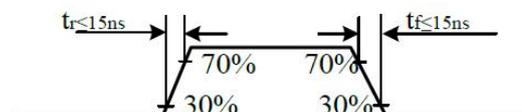


Table48.

Signal	Symbol	Parameter	min	max	Unit	Description
CSX	t_{css}	Chip select time (Write)	20	-	ns	
	t_{csh}	Chip select hold time (Read)	40	-	ns	
SCL	t_{wc}	Serial Clock Cycle (Write)	10	-	ns	
	t_{wrh}	SCL "H" Pulse Width (Write)	5	-	ns	
	t_{wrl}	SCL "L" Pulse Width (Write)	5	-	ns	
	t_{rc}	Serial Clock Cycle (Read)	150	-	ns	
	t_{rdh}	SCL "H" Pulse Width (Read)	60	-	ns	
	t_{rdl}	SCL "L" Pulse Width (Read)	60	-	ns	
D/CX	t_{asc}	D/CX setup time	10	-	ns	
	t_{ah}	D/CX hold time (Write/Read)	10	-	ns	
SDA/SDI (Input)	t_{ds}	Data setup time (Write)	5	-	ns	
	t_{dh}	Data hold time (Write)	5	-	ns	
SDA/SD0 (Output)	t_{acc}	Access time (Read)	10	-	ns	

Note: $T_a = 25^\circ\text{C}$, $IOVCC = 1.65\text{V to } 3.3\text{V}$, $VCI = 2.5\text{V to } 3.3\text{V}$, $AGND = VSS = 0\text{V}$

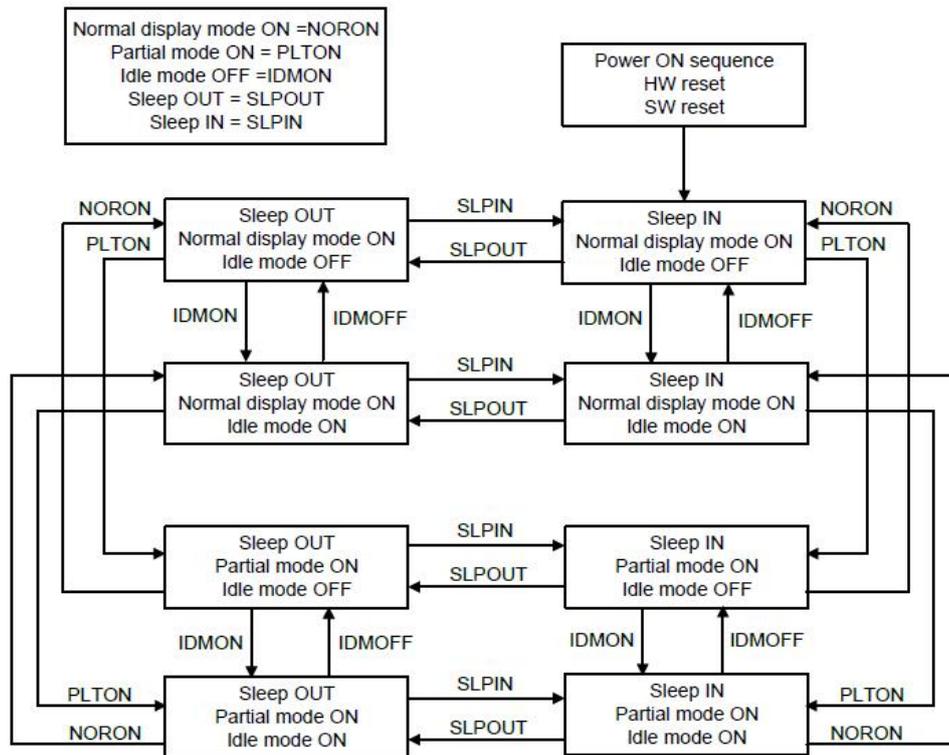
Figure99.



8. POWER SEQUENCE (电源时序)

5.10.2. Power Flow Chart

Figure89.



Note 1: There is not any abnormal visual effect when there is changing from one power mode to another power mode.

Note 2: There is not any limitation, which is not specified by User, when there is changing from one power mode to another power mode.



9. Optical Characteristics (光学特征)

Item 项目		Symbol (样品)	Condition (条件)	Min. (最小值)	Typ.(标准值)	Max. (最大值)	Unit (单位)	Remark (备注)
Response time (响应时间)	Rise (上升)	Tr +Tf	$\theta=0^\circ$	-	30	40	ms	Note 1 FIG.1
	+Fall (下降)							
Luminance (亮度)		Br	$\theta=0^\circ$	1800	1900	-	Cd/m ²	Note 3 FIG.2
Luminance uniformity (亮度均匀性)		YU	$\theta=0^\circ$	-	80	-	%	Note 4 FIG.2
Contrast ratio (对比度)		CR	$\theta=0^\circ$	800	1000	-	-	Note 2 FIG.2
Viewing angle(with Polarizer) (视角)	Top (顶部)		CR \geq 10	70	80	-	degree	Note 6 FIG.3
	Bottom (底部)			70	80	-		
	Left (左边)			70	80	-		
	Right (右边)			70	80	-		
White Chromaticity (白色色度)		X	CIE	0.26	0.29	0.32	-	Note 5 FIG.2
		Y		0.27	0.3	0.33	-	CIE1931
NTSC (色彩饱和度)			-	45	50	-	%	Note 5 FIG.2

Note1. Definition of response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%.

And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

For additional information see FIG1.

Note2. Definition of contrast ratio

Contrast ratio(Cr) is defined mathematically by the following formula.

For more information see FIG.2.

Contrast ratio= $\frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$



Measured at the center area of the LCD

Note3. Definition of surface luminance

Surface luminance is the luminance with all pixels displaying white.

For more information see FIG.2.

L_v = Average Surface Luminance with all white pixels(P1,P2,P3,,Pn)

Note4. Definition of luminance uniformity

The luminance uniformity in surface luminance is determined by measuring luminance at each test position 1 through n, and then dividing the maximum luminance of n points luminance by minimum luminance of n points luminance. For more information see FIG.2.

$$Y_u = \frac{\text{Minimum surface luminance with all white pixels (P1,P2,P3,.....,Pn)}}{\text{Maximum surface luminance with all white pixels (P1,P2,P3,.....,Pn)}}$$

Note5. Definition of color chromaticity (CIE1931)

CIE (x,y) chromaticity, The x,y value is determined by screen active area center position P5. For more information see FIG.2.

Note6. Definition of viewing angle

Viewing angle is the angle at which the contrast ratio is greater than 10. 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.

For more information see FIG.3.

For viewing angle and response time testing, the testing data is base on Autronic-Melchers's ConoScope or DMS series Instruments or compatible. For contrast ratio, Surface Luminance, Luminance uniformity and CIE, the testing data is base on TOPCON's BM-5 or BM-7 photo detector or compatible.

FIG.1. The definition of response Time

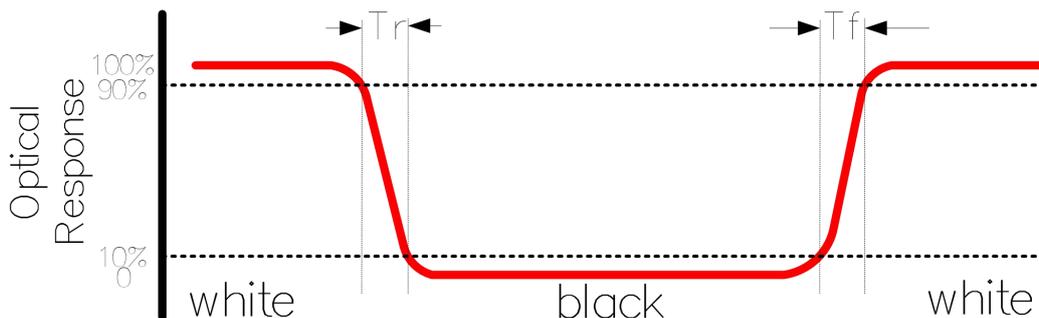


FIG.2. Measuring method for contrast ratio, surface luminance, luminance uniformity, CIE (x,y) chromaticity

H,V : Active area

Light spot size $\varnothing = 1.5\text{mm}$ (BM-7) 50cm distance or compatible distance from the LCM surface to detector lens.

Test spot position : see Figure a.

measurement instrument : TOPCON's luminance meter BM-7 or compatible ,see Figure b.

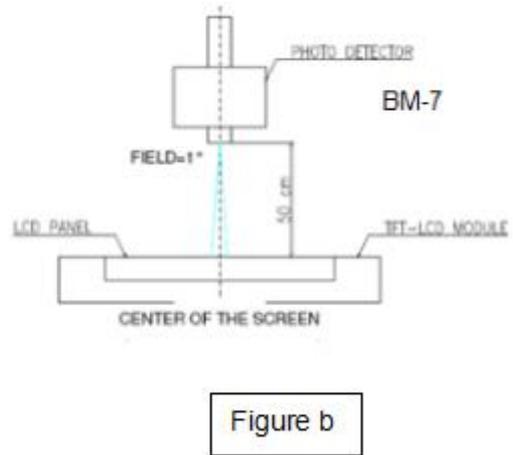
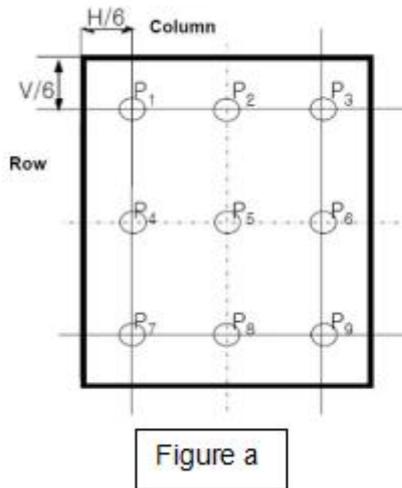
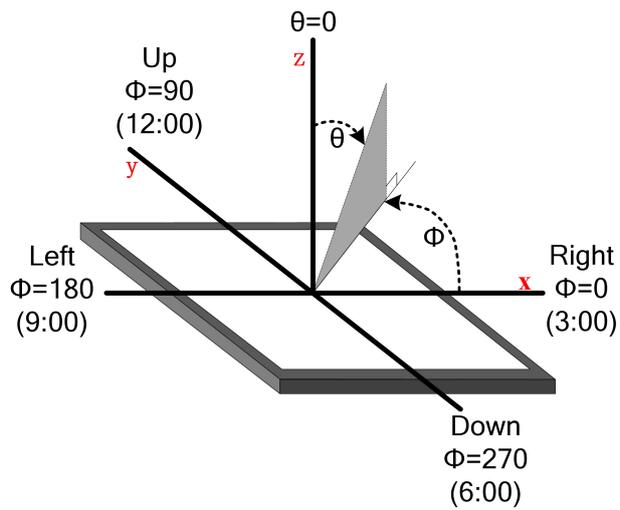


FIG.3. The definition of viewing angle



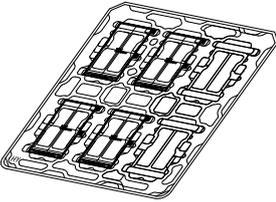
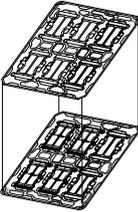
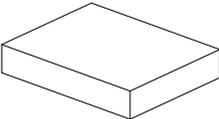
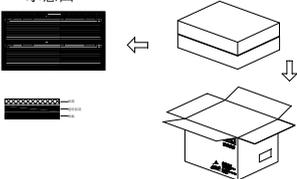
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11. Packaging Specification (包装规格)

- 1.1 Package quantity in one Box : TBD PCS
- 1.2 Box Size : TBD mm * TBD mm * TBD mm
- 1.3 1 BOX = TBD CARTON
- 1.4 1 CARTON = TBD (Full tray) + 1 (dummy / top tray) = TBD tray
- 1.5 1 TRAY = TBD PCS LCM

注：此为示意图

<p>(1) 模块平放入吸塑盘内, 每盘放6PCS产品</p> 	<p>(2) 吸塑盘交叉叠放</p> 	<p>(3) 十盘加一个空盘共10x6=60pcs 吸塑盘交叉叠放后用胶袋和胶 纸打包</p>  <p style="text-align: right;">叠放次序 B C A C B C A</p>
<p>(4) 真空包装 将打包好的产品装进包装袋并抽真空密封,</p> 	<p>(5) 产品装箱 先在纸箱底下放一个纸板, 让后放一小包产品进去, 在放一个纸板在上面, 最后在放一个纸板在上面, 二包叠加装箱</p> <p>示意图</p> 	<p>(6) 封箱 外箱标签中须体现供应 商名称、EQ料号及包装 数量。</p>  <p style="text-align: right;">外箱标签贴于侧面</p> <p>数量: 2x60=120 PCS/箱</p>