SPECIFICATION FOR H133RICTW01AA

Module No.（模块型号）	**H133RICTW01AA**
Product type（产品类型）	Standard LCD Module 1920(RGB)x 1080 Pixels 13.3 " TFT LCD
Customer（客户）	

Customer Approved(客户核准）:

Prepared By（制定）	Checked By（审核）	Approved By（核准）

CONTENTS

1.Document revision history:

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
V00	2021.12.25	First Release.	TIGER	

2. General Description

Characteristics	Size	13.3 inch
	Resolution	1920(horizontal)x1080(Vertical)
	Interface	eDP1.2/2.7Gbps/2lane
	Connect type	20455-030E-76 (I-PEX)
	Color Depth	16.7M
	Technology type	A-si
	Display Spec. Pixel pitch (mm)	0.153 x 0.153
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	TP Driver IC	GT9110
	LCD Surface Treatment	Anti-glare coating:(3H)
	Viewing Direction	U/D/L/R:85/85/85/85
	Contrast Ratio	1000(TYP.)
	Color gamut	72%
	Luminance(cd/m2)	250(TYP.)
	Consumption of Power	LCD：1.8(W)(Max.)(White Pattern) BL：4.5W(W)(Max.)(w/o Driver)
	LED Numbers	54 LEDS
	Weight (g)	360
Mechanical	Outline (W x H x D) (mm)	321.7x203x4.45
	TP Lens view area(mm)	294.6 x 166.05
	LCM (W x H x D) (mm)	305.2x177.69x2.8
	LCD Active Area(mm)	293.76 x 165.24
	With /Without TSP	With TSP

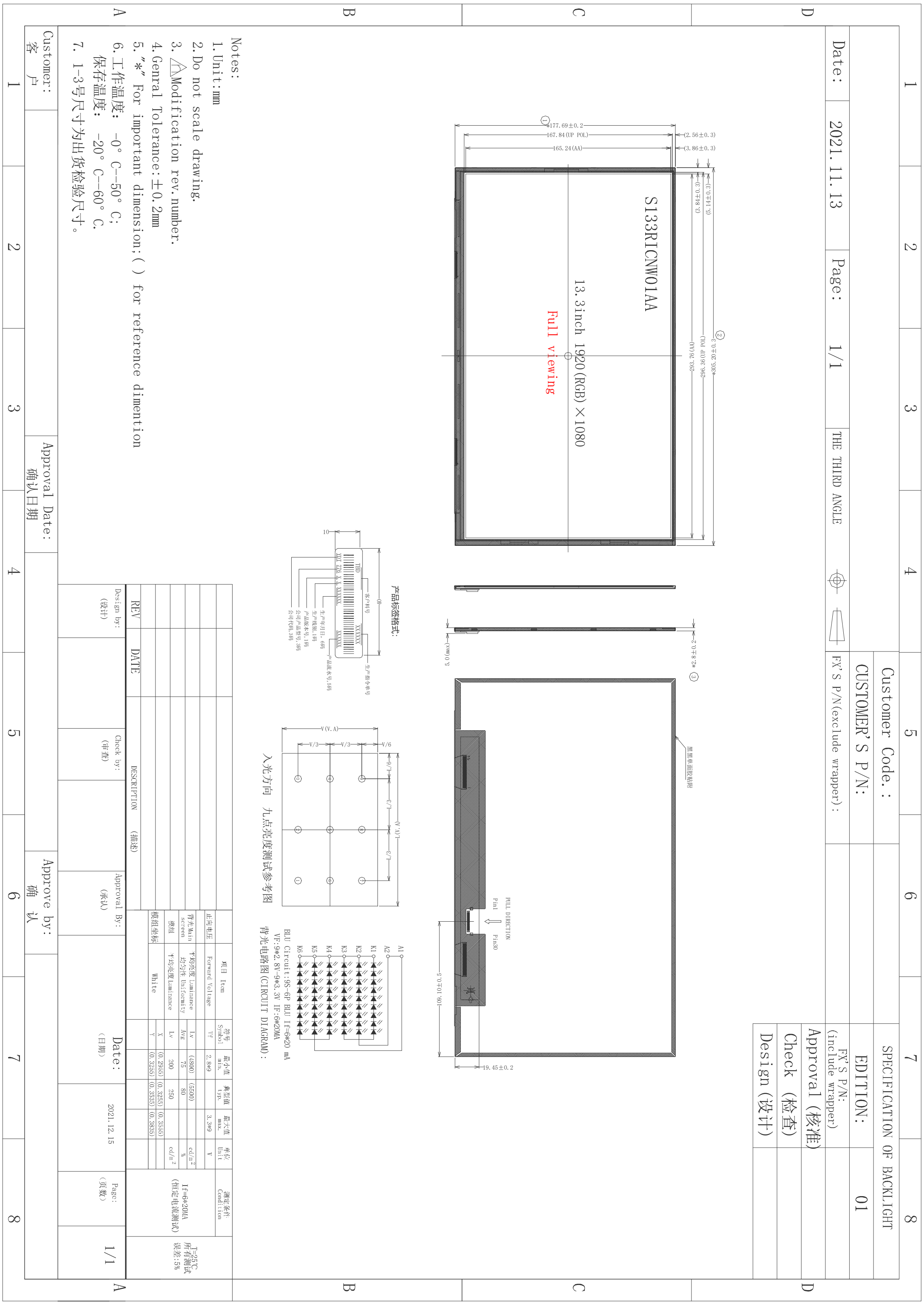
Note 1: Viewing direction is follow the data which measured by optics equipment.

Note 2: Requirements on Environmental Protection: RoHS

Note 3: LCM weight tolerance: +/- 5

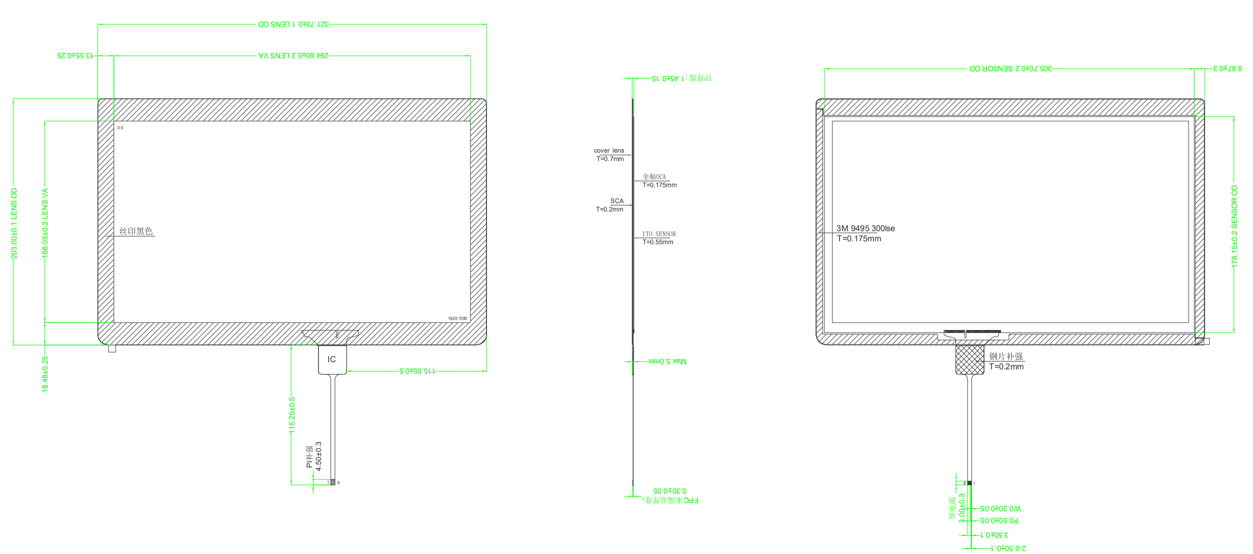
3. Mechanical Specifications

Figure 1: Outline Drawing



图纸名称：TP结构图	版本：A/0	生效日期：2021-12-23
我司名称：	客户名称：	

Front View　　　Side View　　　Back View



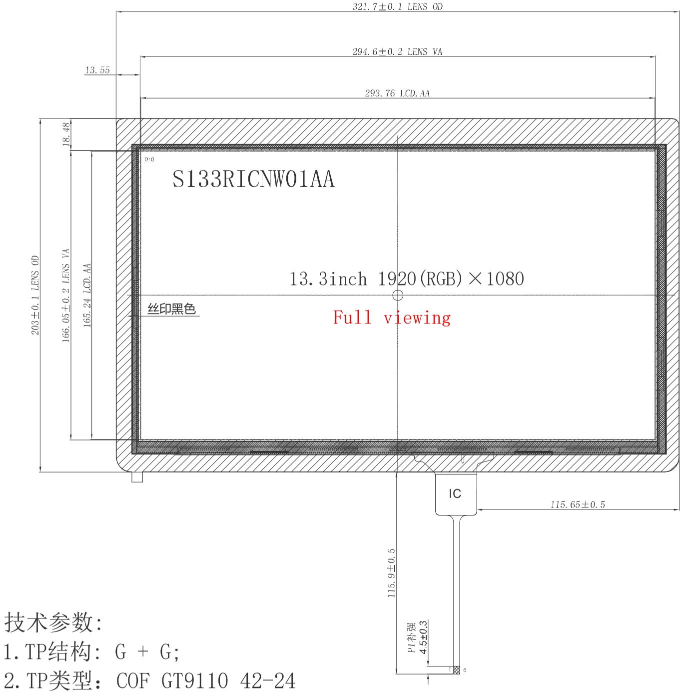
PIN 定义	
1	RST
2	VDD
3	GND
4	INT
5	SDA
6	SCL

技术参数:
1.TP结构：G + G;
2.TP类型：COF GT9110 42-24
3.供电电压：2.8-3.3V
LCM分辨率:
5.透光率：≥ 86%.
6.表面硬度 ≥6H.
7.工作环境：-20℃~+70℃，≤85%RH
8.储存环境：-30℃~+80℃，≤85%RH
9.盖板强度:64g钢球,高度50cm中心跌落三次不破碎。
10.未注尺寸公差按±0.2mm
11.产品符合RoHS标准.

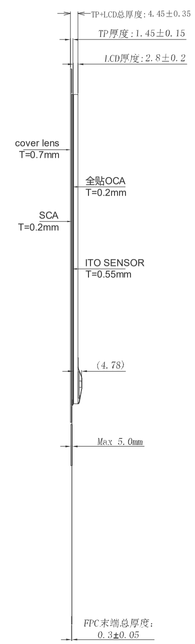
	REVISION RECORD	DATE							
1			设 计	liu	2021.12.23	批 准		比 例 1 : 1	单 位 mm
2			制 图			材 质			
3			审 核			数 量			
4					共 页	第 页		图纸编号：FM-QP06-09-A	

		Customer Code.:		SPECIFICATION OF BACKLIGHT	
		CUSTOMER'S P/N:		EDITION:	01
Date: 2021.12.15	Page: 1/1	THE THIRD ANGLE	FX'S P/N(exclude wrapper):	FX'S P/N: (include wrapper)	
				Approval (核准)	
				Check (检查)	
				Design (设计)	

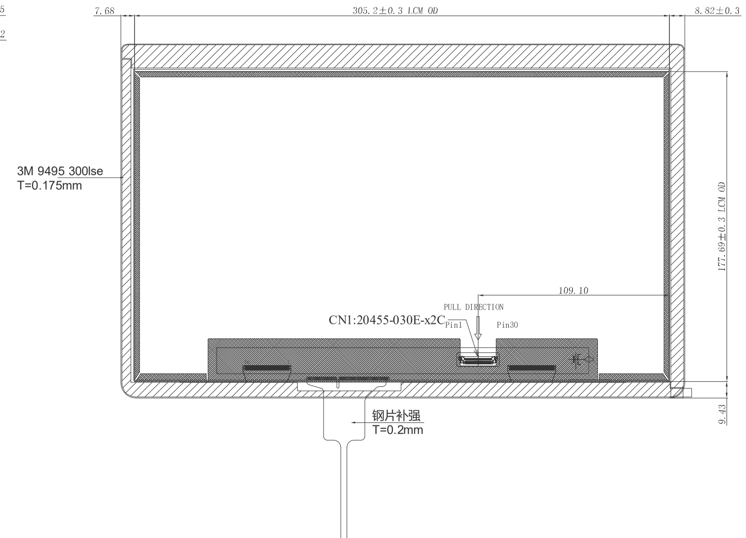
Front View



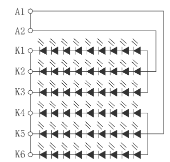
Side View



Back View



CTP



BLU Circuit:9S-6P BLU If=6*20 mA
VF:9*2.8V-9*3.3V IF:6*20MA
背光电路图(CIRCUIT DIAGRAM):

技术参数:
1.TP结构: G + G;
2.TP类型: COF GT9110 42-24
3.供电电压: 2.8-3.3V
4.LCM分辨率: 1920*1080
5.透光率: ≥ 86%.
6.表面硬度 ≥6H.
7.工作环境: -20℃~+70℃, ≤85%RH
8.储存环境: -30℃~+80℃, ≤85%RH
9.盖板强度:64g钢球,高度50cm中心跌落三次不破碎。
10.未注尺寸公差按±0.2mm
11.产品符合RoHS标准.

	项目 Item	符号 Symbol	最小值 min.	典型值 typ.	最大值 max.	单位 Unit		
正向电压	Forward Voltage	Vf	2.8*9		3.3*9	V	If=6*20MA (恒定电流测试)	T=25℃ 所有测试 误差:5%
背光Main screen	平均亮度 Luminance	Lv	(4800)	(5500)		cd/m^2		
	均匀性 Uniformity	Avg	75	80		%		
模组	平均亮度Luminance	Lv	200	250		cd/m^2		
模组坐标	White	X	(0.2955)	(0.3255)	(0.3555)			
		Y	(0.3255)	(0.3535)	(0.3835)			

Customer: 客户	Approval Date: 确认日期	Approve by: 确认

4. Input Terminals

4-1.Interface Description 接口定义描述

CN1 (eDP signals , +3.3V DC power supply and B/L power supply)

Table 2: Pin assignment

Pin No.	Symbol	I/O	Function	Remark
1	NC	-	NC(NOT USE)	[Note4-1-1]
2	H_GND	P	High Speed Ground	[Note4-1-2]
3	Lane1_N	I	Complement Signal Link Lane 1	
4	Lane1_P	I	True Signal Link Lane 1	
5	H_GND	P	High Speed Ground	[Note4-1-2]
6	Lane0_N	I	Complement Signal Link Lane 0	
7	Lane0_P	I	True Signal Link Lane 0	
8	H_GND	P	High Speed Ground	[Note4-1-2]
9	AUX_CH_P	I	True Signal Auxiliary Channel	
10	AUX_CH_N	I	mplement Signal Auxiliary Channel	
11	H_GND	P	High Speed Ground	[Note4-1-2]
12	LCD_VCC	P	CD logic and driver power(3.3V)	
13	LCD_VCC	P	CD logic and driver power(3.3V)	
14	NC	-	NC(NOT USE)	[Note4-1-1]
15	LCD_GND	P	LCD logic and driver ground	
16	LCD_GND	P	LCD logic and driver ground	
17	HPD	O	HPD Signal	[Note4-1-3]
18	LED-1	P	Backlight LED-	
19	LED-2	P	Backlight LED-	
20	LED-3	P	Backlight LED-	
21	LED-4	P	Backlight LED-	
22	LED_PWMO	O	BL/LED PWM OUT	
23	LED_PWMI	I	BL/LED PWM IN	[Note4-1-4]
24	NC	-	Reserved for LCD manufacturer's use	[Note4-1-1]
25	NC	-	Reserved for LCD manufacturer's use	[Note4-1-1]
26	LED-5	P	Backlight LED-	
27	LED-6	P	Backlight LED-	
28	BL_PWR	P	Backlight power LED+	
29	BL_PWR	P	Backlight power LED+	
30	NC	-	Reserved for LCD manufacturer's use	[Note4-1-1]

*1 P: POWER I: Input O: Output

[Note 4-1-1] Don't input any signals or any powers into a NC pin. Keep the NC pin open.

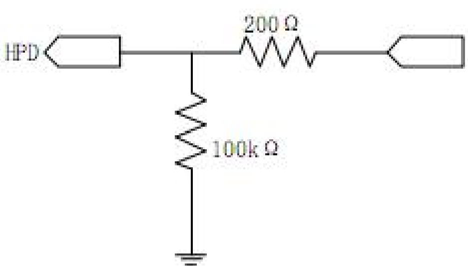
[Note 4-1-2] The shielding case is connected with signal GND.

・Connector used :20455-030E-76(I-PEX)

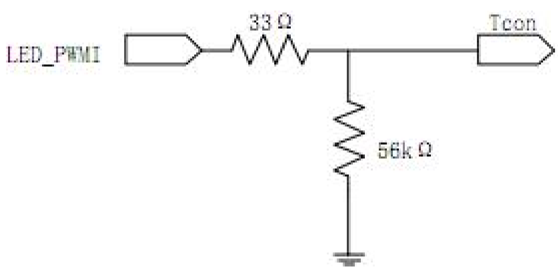
・Corresponding connector : 20453-030T (I-PEX)

(Panda is not responsible to its product quality, if the user applies a connector not corresponding to the above model.)

The equivalent circuit figure of the terminal.



[Note 4-1-3]Input circuit is as below.



[Note 4-1-4]Input circuit is as below.

4-2 TP Interface Description 触摸屏接口定义描述

Pin No. 序号	Symbol 符号	I/O	Description 描述	When not in use 不用时
1	RST	I	Reset Signal pin (“Low” is enable)(3.3V)	
2	VDD	P	Power supply(3.3V)	
3	GND	P	System Ground	
4	INT	O	An interrupt signal to inform the host processor that touch data is ready for read	
5	SDA	I/O	Serial Data Input And Output.(3.3V)	
6	SCL	I	Serial Clock Input.(3.3V)	

4-3.Backlight driving

Parameter	Symbol	Min.	Typ.	Max.	Units	Condition
LED input	VLED	25.2	-	29.7	[V]	Ta=25[deg C]
LED Forward Voltage	VF	2.8	3.3	3.4	[V]	Ta=25[deg C]
LED Forward Current	IF		120		[mA]	Note C
B/L Power Consumption	P_B/L	-	-	4.5	[W]	Ta=25[deg C]
LED Life Time	LT	10000	-	-	Hours	Ta=25[deg C]
LED Number	NLED	-	54	-	PCS	7 serial,8 parallel

Note A: Calculator value for LED chip specification.

Note B: The LED life time define as the estimated time to 50% degradation of initial luminous.

Note C: ILED=20 mA (Per LED)

4-4.eDP interface

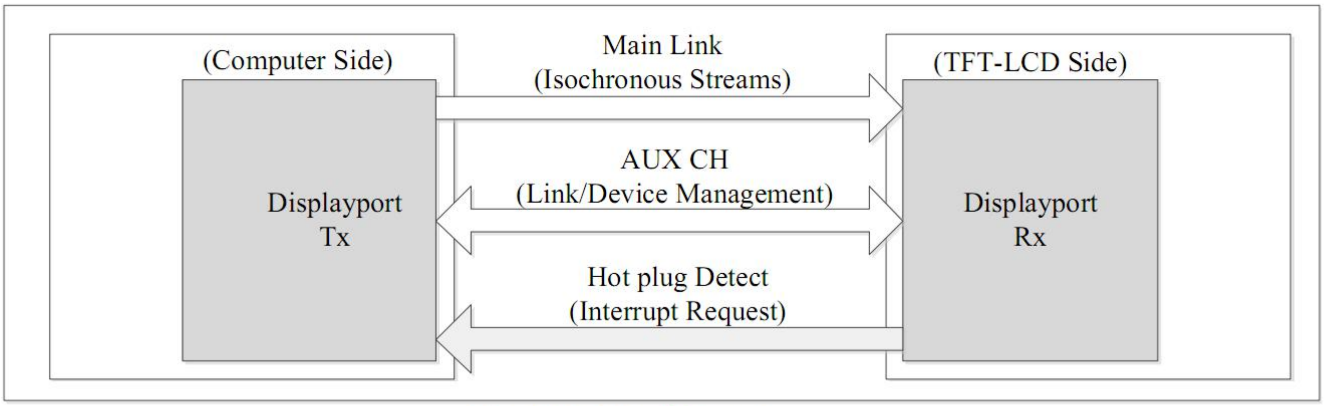


Fig.4-2-1 DP architecture

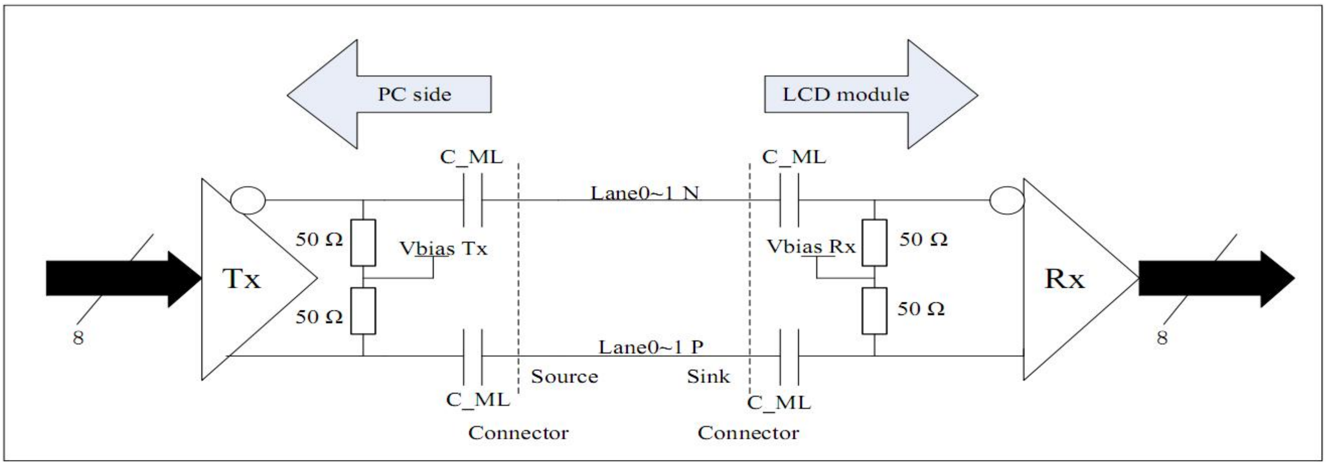


Fig.4-2-2 Main Link differential pair

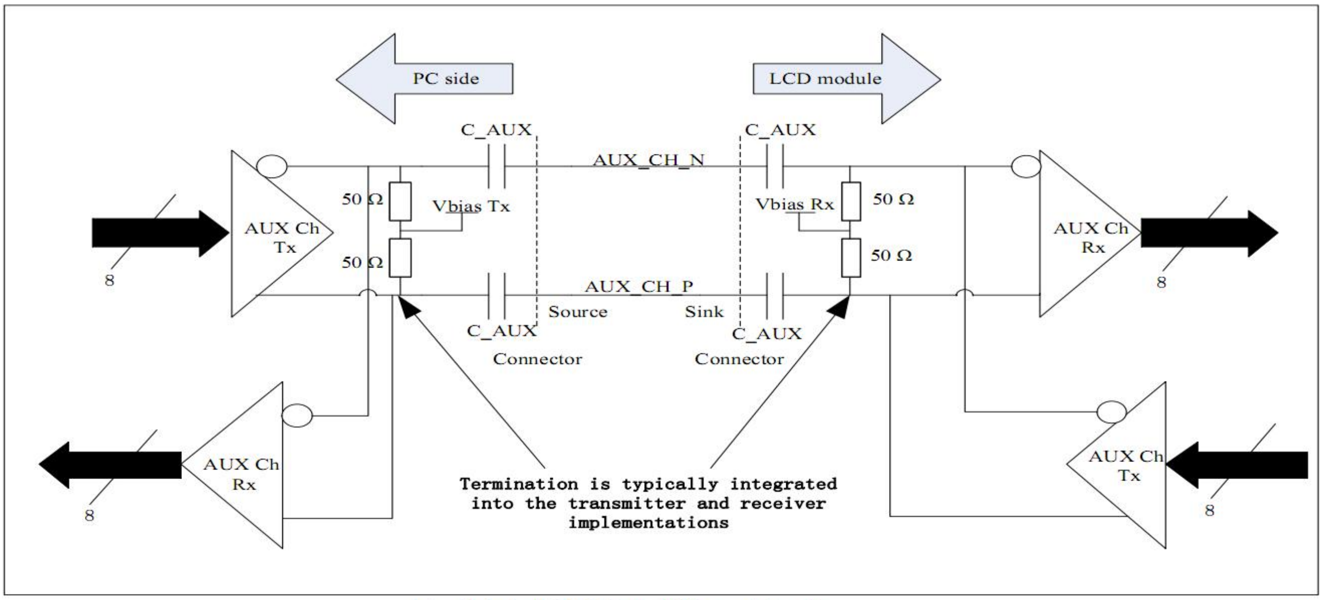


Fig.4-2-3 AUX Link differential pair

Lane0	Lane1
R0-7:0	R1-7:0
G0-7:0	G1-7:0
B0-7:0	B1-7:0
R2-7:0	R3-7:0
G2-7:0	G3-7:0
B2-7:0	B3-7:0
R4-7:0	R5-7:0
G4-7:0	G5-7:0
B4-7:0	B5-7:0

eDP 2lane 8bit input data mapping

5. Absolute Maximum Ratings

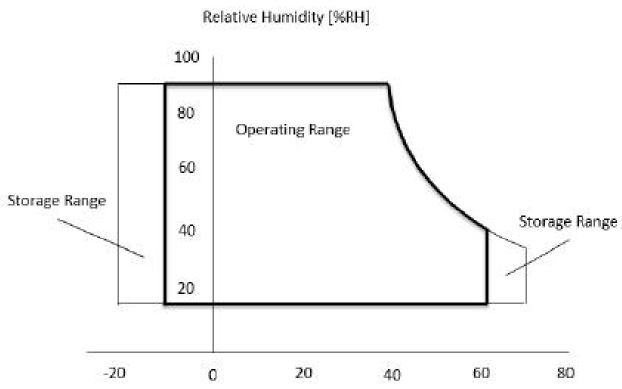
Parameter	Symbol	Condition	Ratings		Unit	Remark
			Min.	Max.		
+3.3V supply voltage	VDD	Ta=25°C	-0.3	+4.0	V	
Backlight supply voltage	V_{BL}	Ta=25°C	-0.3	+26.5	V	
Input voltage(eDP)	VI	Ta=25°C	-0.3	+1.5	V	[Note 5-1]
Storage temperature	Tstg	-	-20	+60	℃	[Note 5-2]
Operation temperature	Topa	-	-0	+50	℃	

[Note 5-1] eDP signals

[Note 5-2] Humidity: 90%RH Max.at Ta≦+40 C.

Maximum wet-bulb temperature at +39 C or less at Ta>+40 C,

No condensation.



Temperature[℃]

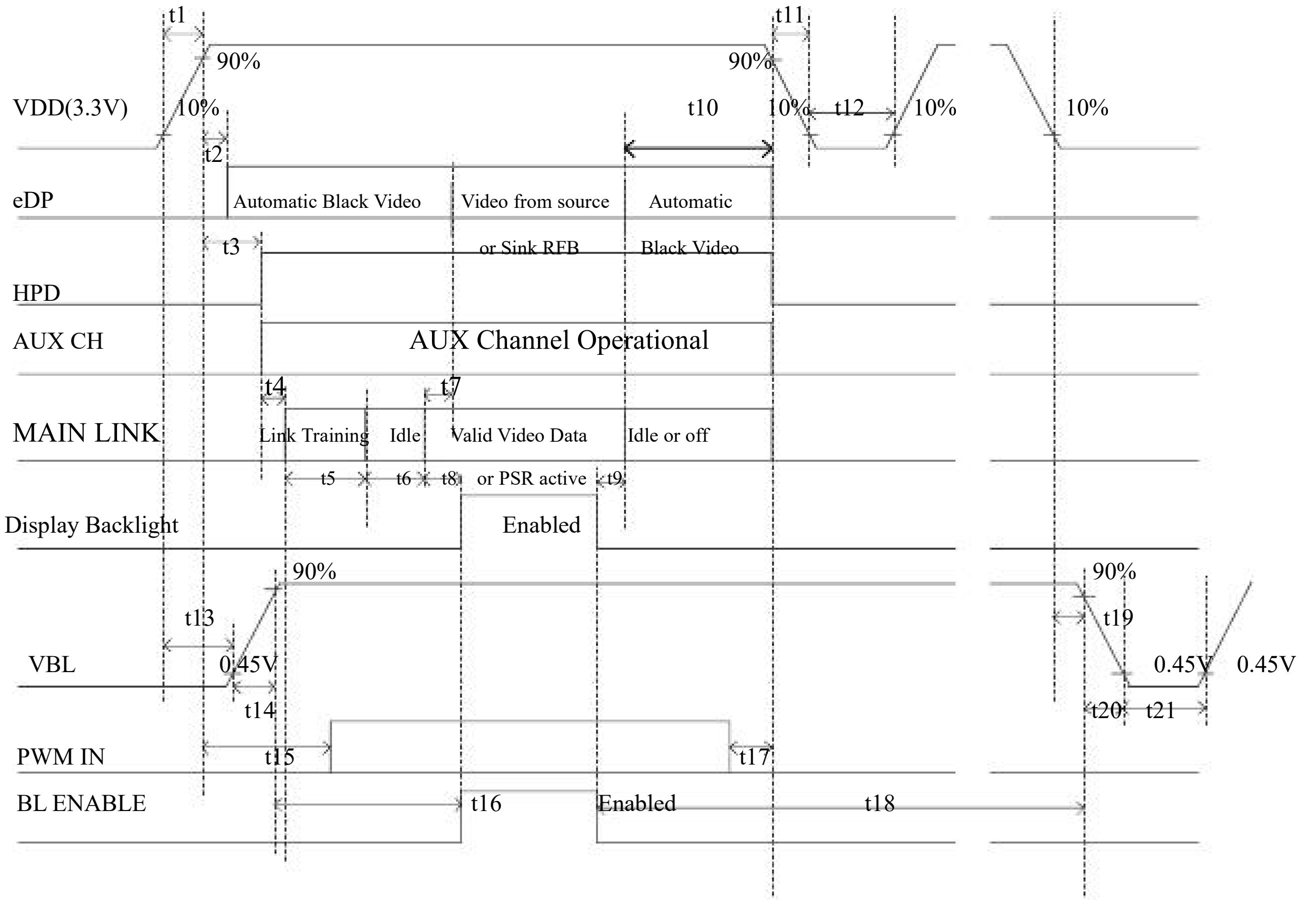
6. DC Characteristics

6-1. TFT-LCD panel driving

Ta=+25℃

DC Electrical Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
+3.3V supply voltage	VDD	+3.0	+3.3	+3.6	V	[Note 6-1-1]
Current dissipation	IDD	-	370	450	mA	[Note 6-1-4]
Permissible input ripple voltage	V_{RP}	-	-	100	mVp-p	VDD=+3.3V
eDP HPD Signal Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
HPD High level output voltage	VOH_{HPD}		VDD-0.1	-		
HPD Low level output voltage	VOL_{HPD}	-	0			
eDP AUX Channel Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Unit Interval for AUX channel	UI_{AUX}	0.4	0.5	0.6	μS	
Peak-to-peak voltage at TP1	$V_{AUX-DIFF-pp}$	0.32	-	1.36	V	
AUX DC Common mode Voltage	$V_{AUX-DC-CM}$	0	-	2.0	V	
AUX Short current limit	I_{AUX_SHORT}	-	-	90	mA	
AUX CH termination Cresistor	R_{AUX_TERM}	-	100	-	Ω	Differential input
AUX AC coupling capacitor	C_{AUX}	75	-	200	nF	
Number of pre-charge pulses	Pre-charge pulses	10	-	16	-	
eDP Main Link Receiver Characteristics						
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Link clock down spreading	Down_Spread_Amplitude	0		0.5	%	
Differential Peak-to-peak Input Voltage at Rx package pins	$V_{RX-DIFFp-p}$	90	-	1200	mV	
Differential Return Loss at 1.35GHz at Rx package pins	$RL_{RX-DIFF}$	9	-	-	dB	
Differential termination resistance	$R_{RX-TERM}$	-	100	-	Ω	
RX short circuit Current Limit	$I_{RX-SHORT}$	-	-	50	mA	
Lane Intra-pair Skew at RX package pins	$T_{RX-SKEW-INTRA-PAIR-High-Bit-Rate}$	-	-	50	ps	

[Note 6-1-1] ON-OFF conditions for supply voltage



[Note6-1-2] Do not keep the interface signal high-impedance or unusual signal when power is on

Symbol	Min	Max	Unit	Note
t1	(0.5)	(10)	ms	
t2	0	200	ms	
t3	0	(100)	ms	
(t4)	-	-	ms	
(t5)	-	-	ms	
(t6)	-	-	ms	
(t7)	(0)	(50)	ms	
(t8)			ms	
(t9)			ms	
(t10)	(0)	(500)	ms	
t11	(1)	50	ms	[Note1]
t12	500	-	ms	
(t13)	-	-	ms	
t14	0.5	10	ms	
t15	(100)		ms	
(t16)	-	-	ms	
t17	0	-	ms	
(t18)	-	-	ms	

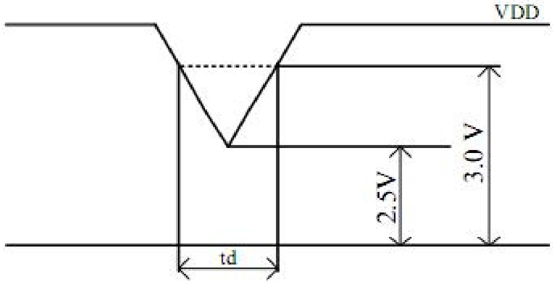
t19	-	-	ms	
t20	(0.1)	-	ms	
t21	(100)		ms	

[Note 6-1-3]As for the power off sequence for VDD (t11), be sure to keep above mentioned timing.
If the VDD power off sequence timing is other than shown above, LCD may cause permanent damage.
*1 : As for the power sequence for backlight, it is recommended to apply above mentioned input timing.
If the backlight is light on and off at a timing other than shown above, displaying image maybe getdisturbed.

VDD-dip-conditions

1) 2.5 V≦VDD＜3.0 V

td≦10 ms



Under above condition, the display image should return to an appropriate figure after VDD voltage recovers.

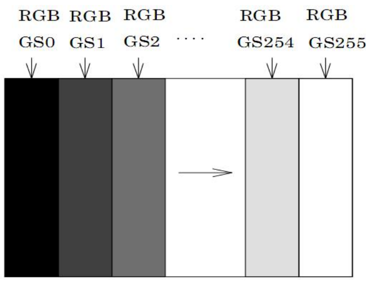
2) VDD＜2.5 V

VDD-dip conditions should also follow the ON-OFF conditions for supply voltage.

[Note 6-1-4]

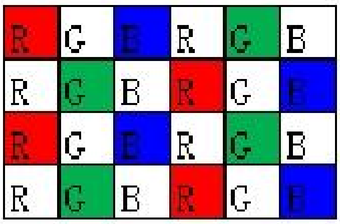
Typical current condition: 16-gray-bar pattern.

VDD＝+3.3V



Maximum current condition: Vertical stripe pattern.

VDD＝+3.3V

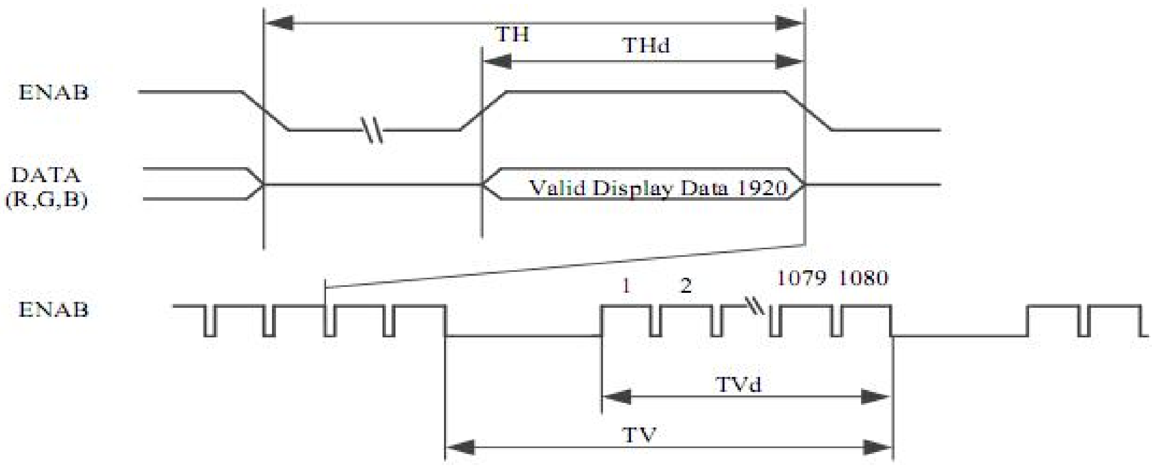


7. Timing characteristics of input signals

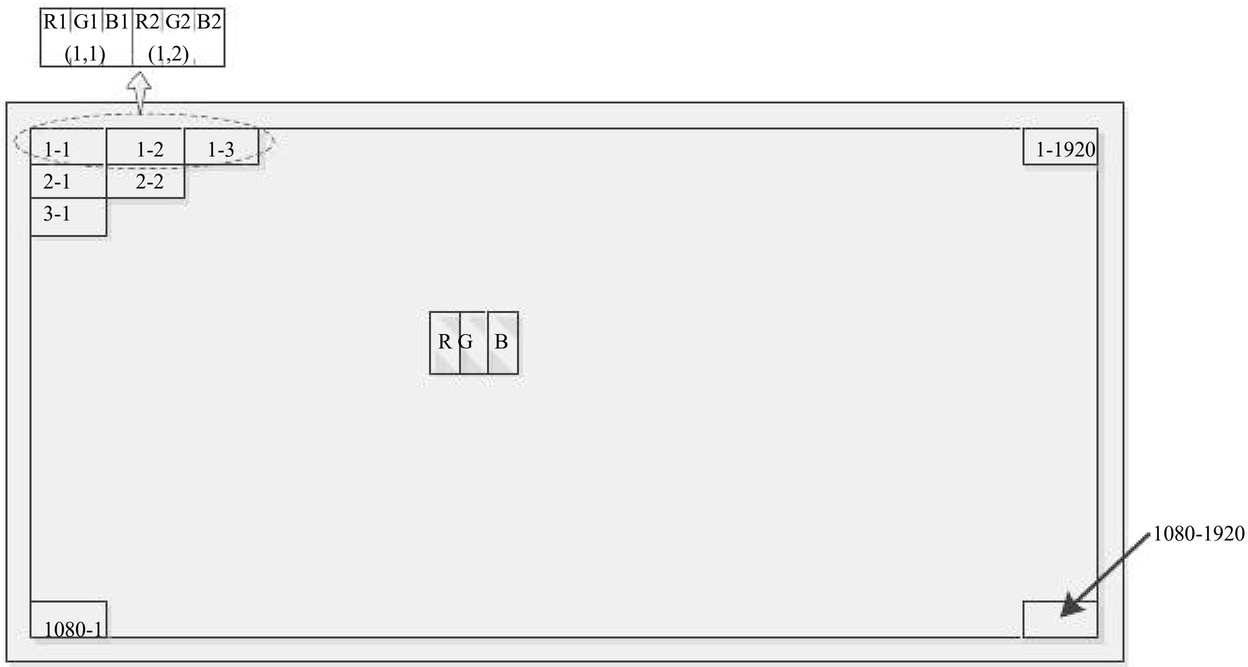
7-1.Timing Characteristics

Parameter		Symbo	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	1/TC	132.0	138.5	140.0	MHz	[Note7-1-1]
Data enable signal	Horizontal period	TH	2020	2080	2400	clock	
			-	15.02	-	µs	
	Horizontal period (High)	THd	-	1920	-	clock	
	Vertical period	TV	1090	1111	1200	line	
			-	16.685	-	ms	
	Vertical period (High)	TVd	-	1080	-	line	

[Note 7-1-1] In case of using the long vertical period, the deterioration of display quality, flicker, etc, may occur.



7-2. Input data signals and display position on the screen



Display position of input data(V • H)

8. Input signal, basic display colors and gray scale of each color

	Colors & Gray Scale	Gray Scale	R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7
			Data signal																							
			LSB							MSB	LSB							MSB	LSB							MSB
Basic Color	Black	–	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	–	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	–	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	–	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	–	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	–	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	–	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	–	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of Red	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓	↓								↓								↓							
	⇩	↓	↓								↓								↓							
	Brighter	GS253	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇩	GS254	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	GS255	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓	↓								↓								↓							
	⇩	↓	↓								↓								↓							
	Brighter	GS253	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	⇩	GS254	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Green	GS255	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of Blue	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	⇧	↓	↓								↓								↓							
	⇩	↓	↓								↓								↓							
	Brighter	GS253	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1
	⇩	GS254	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
	Blue	GS255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

0: Low level voltage, 1:High level voltage

Each basic color can be displayed in 256 gray scales from 8 bit data signals.

According to the combination of 24 bit data signals, the 16.7M color display can be achieved on the screen.

9. Optical Characteristics

(Contrast、RT、viewing angle results are using CTO FOB+ SLW’ s BLU)

Table 6: Optical specifications

Items		Symbol	Condition	Specifications Min.	Specifications Typ.	Specifications Max.	Unit	
Contrast Ratio		CR	θ=0deg.	700	1000		-	Note
Luminance of white		YLI		200	250		cd/m²	
Response Time		$T_{R}+T_{F}$			30	35	ms	
Chromaticity	Red	X_R			(0. 642)		-	
		Y_R			(0. 333)		-	
	Green	X_G			(0. 301)		-	
		Y_G			(0. 621)		-	
	Blue	X_B			(0. 153)		-	
		Y_B			(0. 055)		-	
	White	X_W			(0. 313)		-	
		Y_W			(0. 329)		-	
Viewing angle	Hor.	Φ1(3 o’clock)	Center CR≥10	80	85		deg.	
		Φ2(9 o’clock)		80	85			
	Ver.	θ2(12 o’clock)		80	85			
		θ1(6 o’clock)		80	85			
NTSC ratio		%		65	72		%	

Note 1: Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

L63: Luminance of gray level 63

L0: Luminance of gray level 0

CR = CR (10)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5.

Note 2: Definition of Response Time (TR, TF):

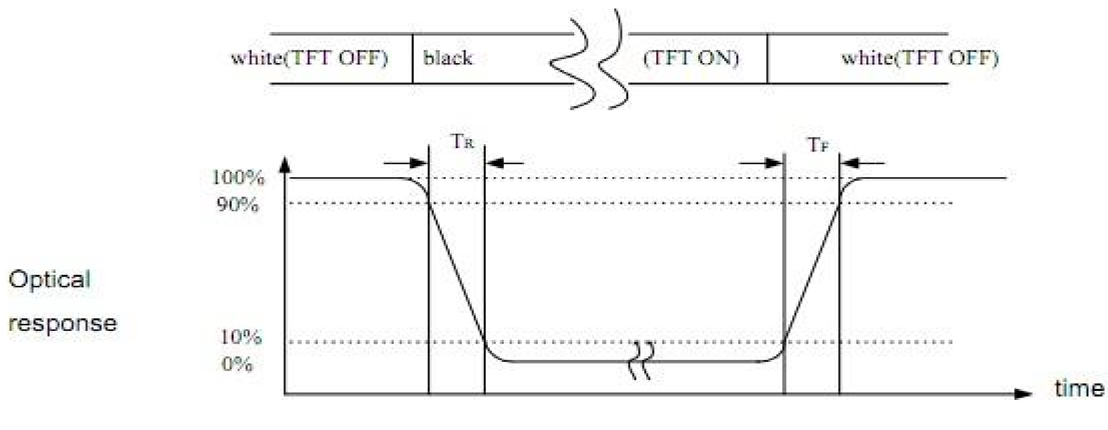


Figure 2

Note 3: Viewing Angle

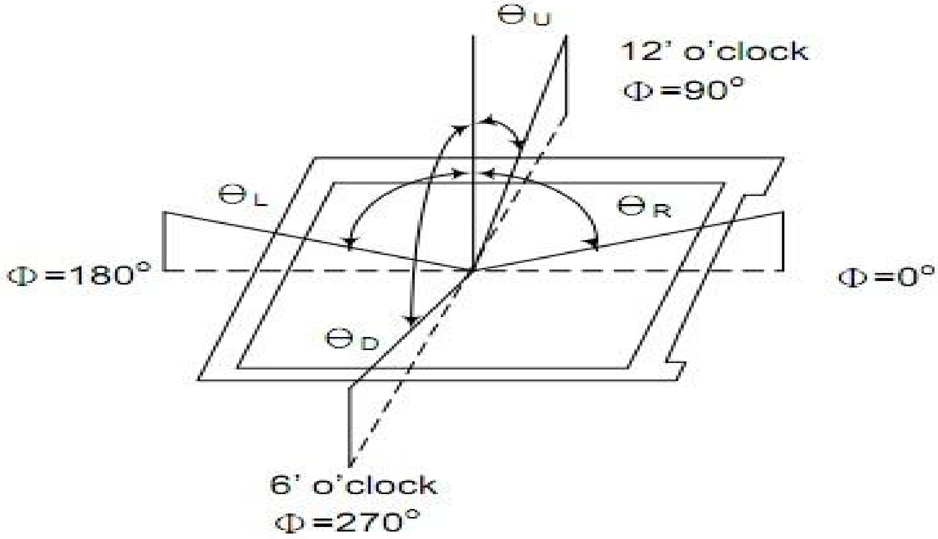


Figure 3

The above "Viewing Angle" is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is Free. Module maker can increase the "Viewing Angle" by applying Wide View Film.

Note 4: Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.

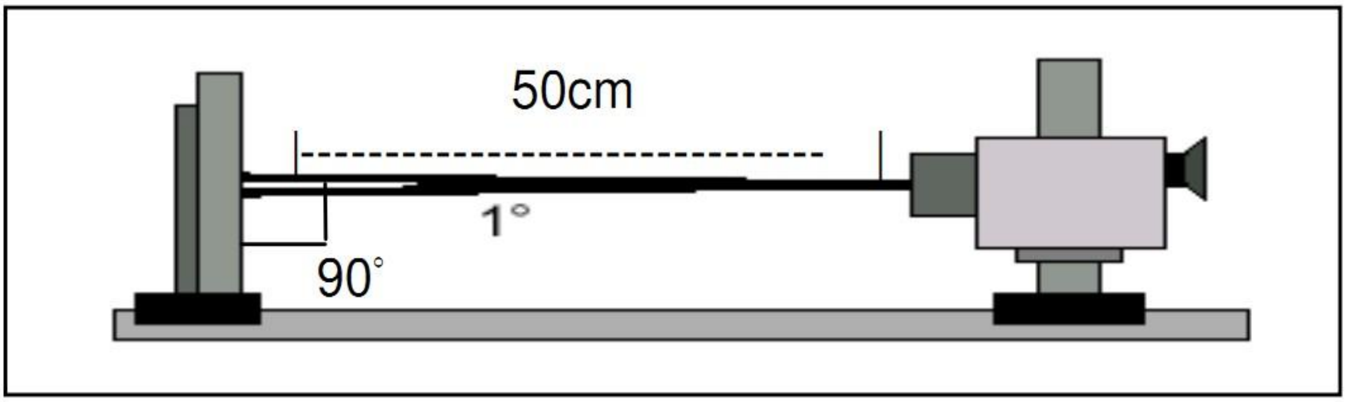


Figure 4

10. Suggestions for using LCD modules 使用注意事项

10.1 Handling of LCM 处理注意事项

10.1.1 The LCD screen is made of glass. Don't give excessive external shock, or drop from a high place.
液晶屏是用玻璃做成的。不要给过多的外部冲击，或从高处跌楼。

10.1.2 If the LCD screen is damaged and the liquid crystal leaks out, do not lick and swallow. When the liquid is attach to your hand, skin, cloth etc, wash it off by using soap and water thoroughly and immediately.
如果液晶屏幕损坏,液晶泄漏出去,不要舔和吞咽。当液体附着在你的手,皮肤、衣服等,请立即用肥皂和水彻底洗。

10.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary. Do not touch the display with bare hands. This will stain the display area and degraded insulation between terminals (some cosmetics are determined to the polarizer).
请勿施加过大的压力于显示屏或连接部位，否则会引起色调变化。不要用手接触显示屏，这将弄脏显示区和降低端子之间的绝缘能力（一些外观是由偏光片决定的）。

10.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on it. Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming in to contact with room temperature air.
覆盖液晶显示模块显示平面的偏光片是软性且易被擦伤，请小心轻拿。请勿用任何硬度大于 HB 铅笔芯的物品（玻璃，镊子等） 接触、撞压或摩擦裸露偏光片。不要放置或粘附物体在显示区域上以免留下痕迹。冷凝在表面和端子将会损坏或弄脏偏光片。产品在低温下测试之后，与室温空气接触之前必须在容器内升温。

10.1.5 If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents
-Isopropyl alcohol
- Ethyl alcohol
Do not scrub hard to avoid damaging the display surface.
如果显示平面受污，可对平面吹热气且轻轻地用软性干布擦除。如果受污严重，用含下列一种溶剂的湿布擦除:
-甘油
-酒精
请勿用力擦拭以免损坏显示平面。

11.1.6 Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.
-Water
-Ketone
-Aromatic solvents
Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contact with oil and fats.

除以上提到的溶剂外，其他溶剂可能会损坏偏光片，特别要避免使用以下溶剂：

-水

-酮

-芳烃溶剂

立即擦掉唾液或水滴，长时间与水接触会引起变形或褪色。避免接触油和油脂。

10.1.7 Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.

特别注意最小限度地减少电极腐蚀，电极腐蚀会因水滴、湿度冷凝或在高湿环境下通电而加速。

10.1.8 Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.

使用安装孔装配液晶显示模块，安装时一定不要弯曲、扭曲和变形。要特别注意不要用力拔，弯曲传输线或背光线。

10.1.9 Do not attempt to disassemble or process the LCD module.

请勿拆卸液晶显示模块。

10.1.10 NC terminal should be open. Do not connect anything.

悬空端应断开，不要连接任何器件。

10.1.11 If the logic circuit power is off, do not apply the input signals.

如果逻辑电路电源是断开的，不要施加输入信号。

10.1.12 Electro-Static Discharge Control， Since this module uses a CMOS LSI, the same careful attention should be paid to electrostatic discharge as for an ordinary CMOS IC. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

由于液晶显示模块使用 CMOS 集成，要特别注意静电放电问题。对 CMOS 器件，要特别注意静电。为防止静电损坏，注意保持合宜的工作环境。

-Before removing LCM from its packing case or incorporating it into a set, be sure the module and your body have the same electric potential. Be sure to ground the body when handling the LCD modules.

液晶显示模块移出包装盒和安装之前， 要保证模块和人体具有相同的电位。处理模块时，可靠接地。

-Tools required for assembling, such as soldering irons, must be properly grounded. Make certain the AC power source for the soldering iron does not leak. When using an electric screwdriver to attach LCM, the screwdriver should be of ground potentiality to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.

-使用工具如电烙铁，要可靠接地，并确保烙铁使用交流电，不要漏电。用电批固定模块时，电批应接地，尽可能降低电动换向器火花产生的电磁波。

-To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions. To reduce the generation of static electricity be careful that the air in the work is not too dry. A relative humidity of 50%-60% is recommended. As far as possible make the electric potential of your work clothes and that of the work bench the ground potential.

-为减少静电产生，不在干燥组装或其它操作。为降低静电，工作场地一定不要太干燥。建议相对湿度为 50%-60% 。尽可能使你的工作服和工作台接地。

- The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.

-液晶显示模块表面有一个保护膜。需要小心操作以减少撕保护膜时静电的产生。

10.1.13 Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.

由于液晶显示模块由高精度装配和调节制成，应避免对模块过大的冲击或做任何更改。

-Do not alter, modify or change the shape of the tab on the metal frame.

-不要改动金属架上的翼片形状。

-Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.

-不要在印制电路板上钻额外的孔，修改形状或更改印制线路板上元件的位置。

-Do not damage or modify the pattern writing on the printed circuit board.

-不要更改或损坏印制线路板上的图案。

-Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector.

-绝对不要更改斑马条（导电胶条）或导电纸连接器。

-Except for soldering the interface, do not make any alterations or modifications with a soldering iron.

-除焊接接口外，不要用烙铁做任何更改。

-Do not drop, bend or twist the LCM.

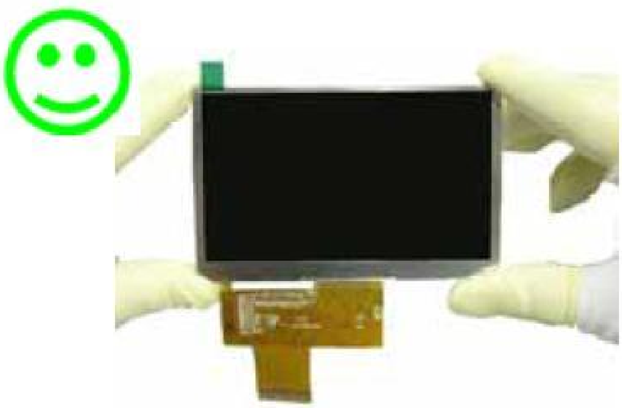
-不要扔、弯和扭模块

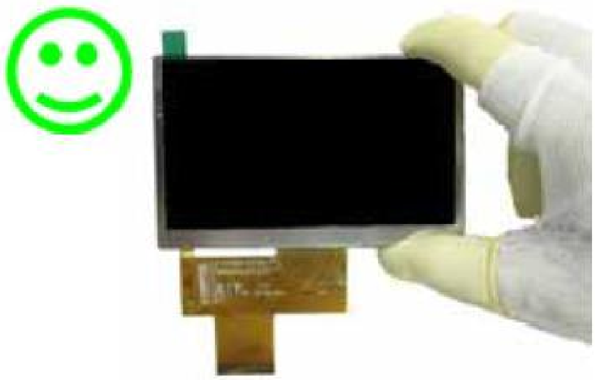
10.2. Handing Precautions for LCM 模块操作规范

10.2.1 LCM is easy to be damaged. Please note below and be careful for handling

液晶显示模块很容易被损坏，请注意以下并小心操作

10.2.2 Correct handling; 正确操作





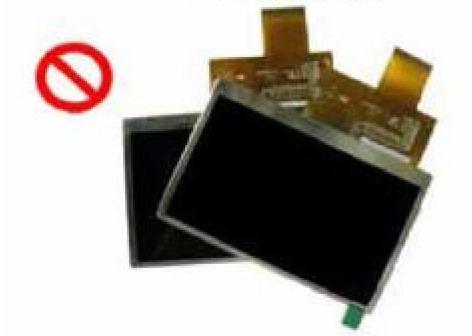
As above picture,please handle with anti-static gloves around LCM edges.

像上面的图片，请戴抗静电手套，并拿模块边缘。

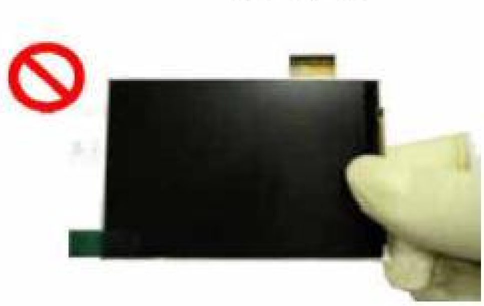
10.2.3 Incorrect handling; 错误操作

Please don't hold the surface of panel,
请不要拿模块的表面

Please don't stretch the FPC
请不要拉扯 FPC



Please don't stack LCM.
请不要把模块叠在一起



Please don't hold the surface of IC.
请不要拿 IC 的表面

Please don't press LCM
请不要挤压模组

Please don't operation with sharp stick
请不要用尖锐物体操作

10.3. Storage Precautions　储存注意事项

10.3.1 When storing the LCD modules, the following precaution are necessary.

液晶显示模块的存储依照以下几点：

10.3.1.1 Store them in a sealed polyethylene bag.　If properly sealed, there is no need for the desiccant.

使用聚乙烯袋密封，如果密封得当，不需要干燥剂。

10.3.1.2 Store them in a dark place.　Do not expose to sunlight or fluorescent light, keep the temperature between 0°C and 35°C, and keep the relative humidity between 40%RH and 60%RH.

避光保存，避免直接暴露在太阳光或黄光灯下，保持温度在 0~35 摄氏度之间,保持相对湿度在 40%RH 和 60%RH 之间。

10.3.1.3 The polarizer surface should not come in contact with any other objects (We advise you to store them in the anti-static electricity container in which they were shipped).

偏光片表面避免接触其他物质（建议存放在货运防静电包装中）。

10.3.2 Others 其它

9.3.2.1 Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

液晶在低温会凝固（低于储存温度范围以下），会导致缺陷或产生气泡（黑或白）。如果模块处于低温下，也会产生气泡。

10.3.2.2 If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

如果液晶显示模块长时间工作于同一个显示图案，换屏时会出现鬼影，也会出现轻微的对比度不均。停止使用一段时间后可恢复到正常状态。此现象不会严重影响性能可靠性。

10.3.2.3 To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

工作为最小限度地降低由静电等导致液晶显示模块性能降低，使用模块时慎重使用下列区域：

- Exposed area of the printed circuit board.

-印制电路板裸露区域。

-Terminal electrode sections.

-印制电路板引出端子区域。

10.4. Using LCD modules 使用液晶显示模块

10.4.1 Installing LCD Modules 安装液晶显示模块

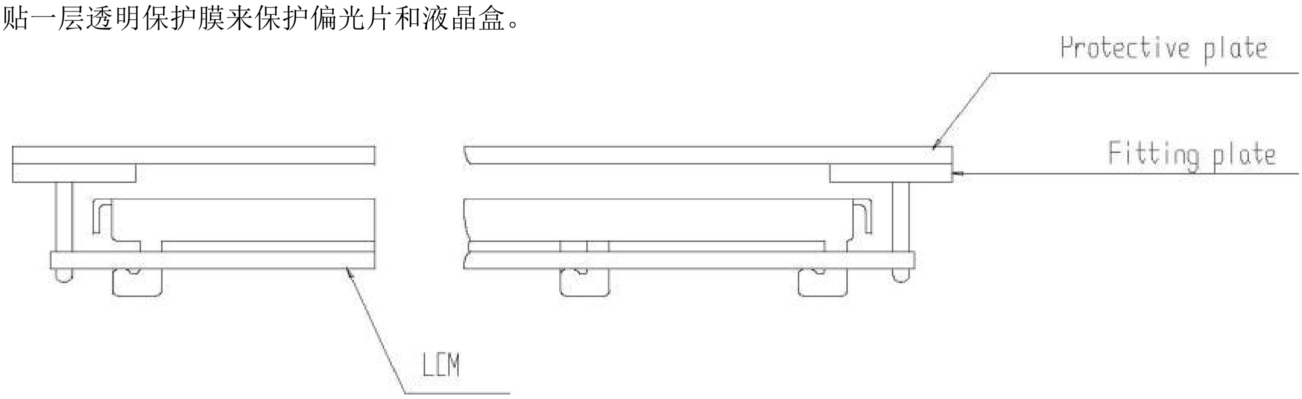
The hole in the printed circuit board is used to fix LCM as shown in the picture below.

Attend to the following items when installing the LCM.

印制线路板上的孔用来固定液晶显示屏，如下图所示。安装液晶显示模块时，注意以下事项：

11.4.1.1 Cover the surface with a transparent protective plate to protect the polarizer and LC cell.

贴一层透明保护膜来保护偏光片和液晶盒。



10.4.1.2 When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be ±0.1mm.

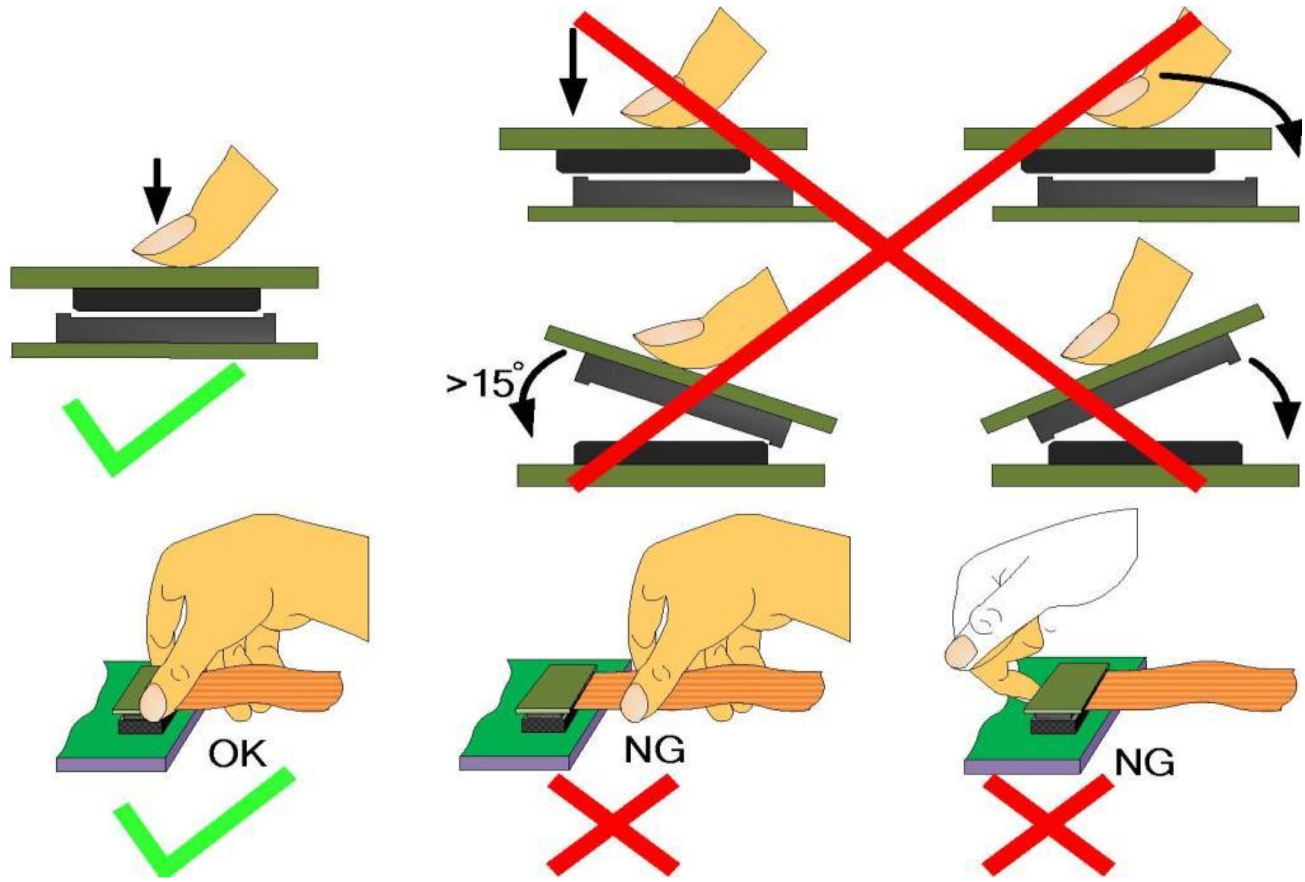
将模块安装进入其它设备时， 模块和安装板之间间隔应有足够的高度以避免模块表面受压。参照专业度量技术标准。量度公差应是±0.1 毫米。

10.4.2 Precaution for assemble the module with BTB connector:

用板对板连接器安装液晶显示模块注意事项：

Please note the position of the male and female connector position, don’t assemble or assemble like the method which the following picture shows

请注意连接器的公母及连接位置，请勿出现下图所示的连接方式。



10.4.3 Precaution for soldering the LCM 焊接模块注意事项

	Manual soldering 手工焊接	Machine drag soldering 机器拖焊	Machine press soldering 机器压焊
No RoHS Product 非环保产品	290°C ~350°C. Time : 3-5S.	330°C ~350°C. Speed : 4-8 mm/s.	300°C ~330°C. Time : 3-6S. Press: 0.8~1.2Mpa
RoHS Product 环保产品	340°C ~370°C. Time : 3-5S.	350°C ~370°C. Time : 4-8 mm/s.	330°C ~360°C. Time : 3-6S. Press: 0.8~1.2Mpa

10.4.3.1 If soldering flux is used, be sure to remove any remaining flux after finishing to soldering operation (This does not apply in the of a non-halogen type of flux). It is recommended that you protect the LCD surfaccase e with a cover during soldering to prevent any damage due to flux spatters.

如果使用助焊剂，完成焊接后一定要清除剩余的助焊剂（除非卤化物助焊剂）。

建议焊接时用盖子保护显示屏面以避免因焊剂油溅出造成的任何损坏。

10.4.3.2 When soldering the electroluminescent panel and PC board, the panel and board should not be detached more than three times. This maximum number is determined by the temperature and time conditions mentioned above, though there may be some variance depending on the temperature of the soldering iron.

焊接背光源和线路板时， 不应装卸多于三次。尽管焊接温度会有变化， 但不应超过上面提到的焊接温度和时间最大值。

10.4.3.3 When remove the electroluminescent panel from the PC board, be sure the solder has completely melted, the soldered pad on the PC board could be damaged.

从线路板上移除背光源时，要保证焊锡已完全熔化，不要损坏线路板上的焊接位。

10.4.4 Precautions for Operation 工作运行注意事项:

10.4.4.1 Viewing angle varies with the change of liquid crystal driving voltage (VLCD). Adjust VLCD to show the best contrast.

视角应随液晶驱动电压(VLCD) 变化而变化.调整 VLCD 可显示最好的对比度。

10.4.4.2 It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life. An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.

在液晶驱动电压内来操作模块是必要的。超过限定电压会缩短液晶寿命。直流电会引起液晶的电化学反应，导致液晶老化，因此要避免直流电驱动液晶。

10.4.4.3 Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD's show dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operating temperature.

液晶响应时间在低温时比常温要慢，高温时，液晶底色会深。然而,这并不是指液晶显示屏工作异常,显示屏在温度恢复时，效果会恢复正常。

10.4.4.4 If the display area is pushed hard during operation, the display will become abnormal. However, it will return to normal if it is turned off and then back on.

如果在运行过程中显示区受到挤压,显示将会异常.然而挤压中断,将恢复正常。

10.4.4.5 A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit. Usage under the maximum operating temperature, 50%RH or less is required.

接线端冷凝会引起电化学反应而断路。因此必须在最大的操作温度之内，湿度小于 50% 的条件下使用液晶显示模块。

10.4.4.6 Input logic voltage before apply analog high voltage such as LCD driving voltage when power on. Remove analog high voltage before logic voltage when power off the module. Input each signal after the positive/negative voltage becomes stable.

开机时，先让逻辑电压，再接通模拟高压， 如显示屏驱动电压。关机时，先断开模拟高压，再关逻辑电压。正负电源都稳定后再送控制信号。

10.4.4.7 Please keep the temperature within the specified range for use and storage. Polarization degradation, bubble generation or polarizer peel-off may occur with high returned with sufficient description of the failures or defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB eyelet, conductors and terminals.

模块维修清单将按双方协议送呈客户。模块详细缺陷描述须模块一并退回。顾客安装的连接器或电缆必须在不破坏线路板孔，线路和引线端条件下全部移去。

11. Environmental / Reliability Test 环境/可靠性测试

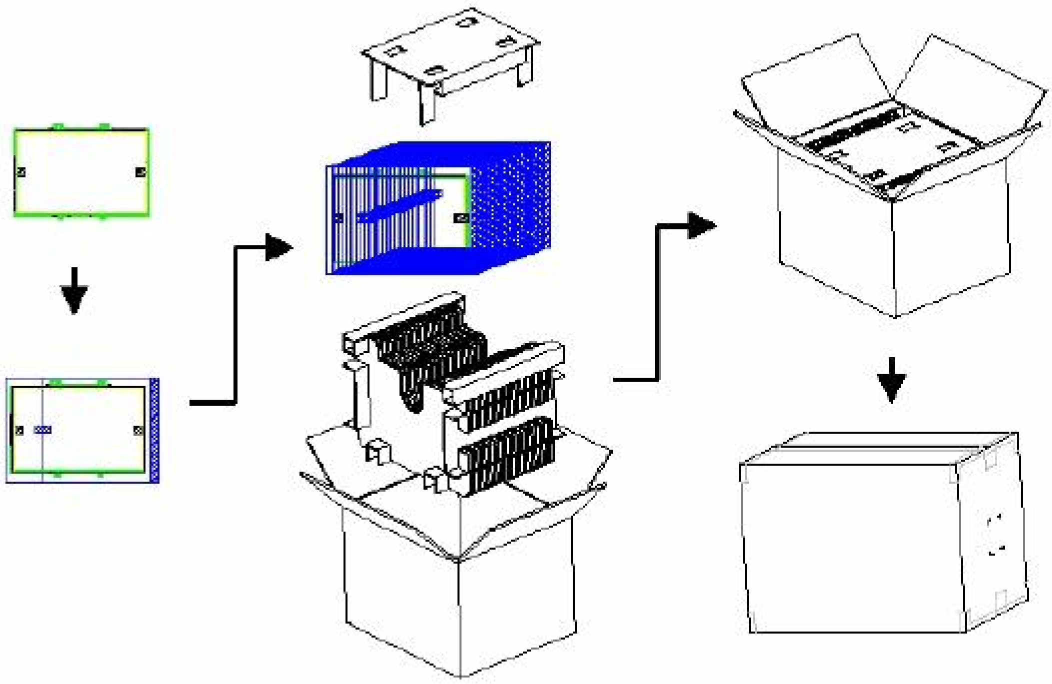
No	Test Item	Condition	Remarks
1	High Temperature Opeartion	Ts= +50℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Opeartion	Ta= -0℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +60℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -20℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +50℃, 80% RH max, 240 hours	IEC60068-2-3 GB/T2423.3-2006

Note: 1. [Result Evaluation Criteria] Under the display quality test condition with normal operation state. Do not change these condition as such changes may affect practical display function.

2. [Normal operation state] temperature： + 15~ + 35℃， Humidity：45~75%， Atmospheric pressure：86~106kPa

12. Packing Specification 包装规格（Reference only 仅供参考)

12.1 Packing Method 包装方式



12.2 Notes

- Box Dimension: 445mm×414mm×260mm
- Package Quantity in one Box:40 pcs
- Total Weight: 15.4kg/Box