

PETÉRIC

國賓科技股份有限公司

產品承認書

Customer`s Approval	
Customer :	研揚科技
Approval:	

研揚料號： 9687Y00019

國賓型號： CF050KLDLWH-CA1 P01

製作時間： 2023/04/13

負責業務： Alan



Chefree Technology Corp.

TFT COLOR LCD MODULE

MODEL: CF050KLDLWH-CA1

(Complied with RoHS)

WVGA
LVDS interface

Version: P01

Customer : _____
Approved By : _____
Date: _____

CHEFREE		
APPROVAL	CHECKER	PREPARE
Tim	Mark	Benson

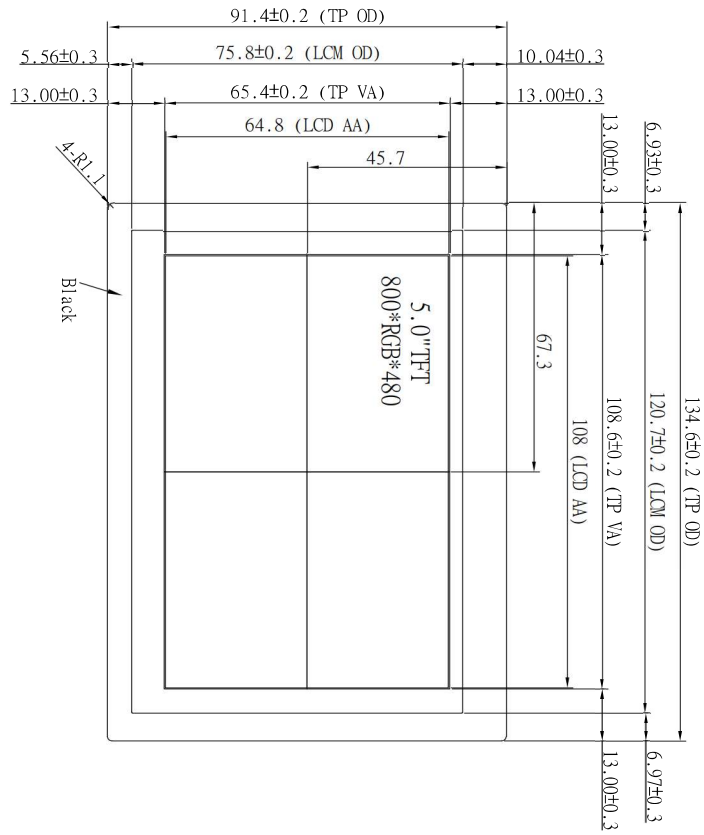
CONTENTS

1. RECORD OF REVISION.....	1
2. MECHANICAL SPECIFICATIONS	2
3. OUTLINE DIMENSIONS	3
4. INTERFACE PIN CONNECTION	4
5. BLOCK DIAGRAM.....	6
6. ABSOLUTE MAXIMUM RATINGS	7
7. ELECTRICAL CHARACTERISTICS.....	8
8. OPTICAL CHARACTERISTICS.....	10
9. TOUCH PANEL SPECIFICATIONS	12
10. TIMING SPECIFICATIONS	13
11. RELIABILITY TEST	16
12. PRECAUTIONS FOR USE.....	17

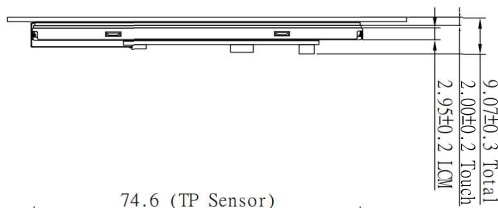
2. MECHANICAL SPECIFICATIONS

(1)	Number of Dots	800(R.G.B) x 480
(2)	Module Size(mm)	134.60(H) x 91.40(V) x 9.07 (D)
(3)	Active Area(mm)	108(H) x 64.80(V)
(4)	Pixel Pitch(mm)	0.135(H) x 0.135(V)
(5)	LCD Model	Normally Black
(6)	Backlight Color	White, LED
(7)	Viewing Direction	ALL direction
(8)	Electrical Interface	LVDS
(9)	Color Configuration	R.G.B Stripe
(10)	Touch Panel Mode	Built – in EETI 81W46 Controller
(11)	Module Weight(g)	TBD

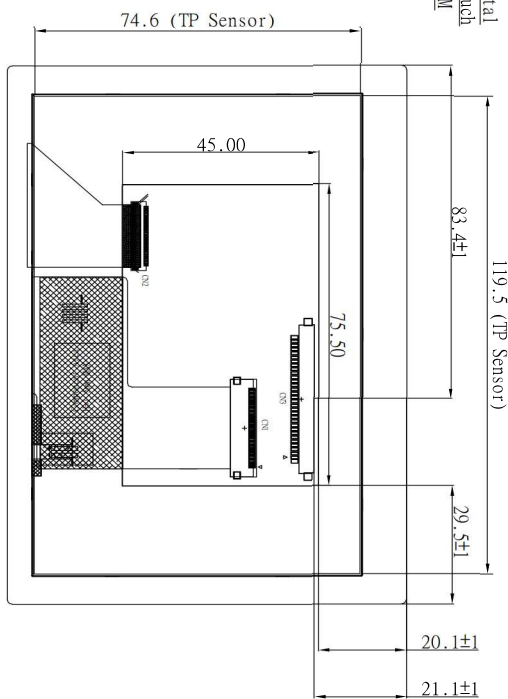
3. OUTLINE DIMENSIONS



Front view



Side view



Back view

- Specification:
1. Structure: Glass+Glass
 2. Interface: USB
 3. Touch Controller: EXC81W46
 4. Operating Voltage: USB 5V
 5. Operating Temp.: $-20^{\circ}\text{C}\sim+70^{\circ}\text{C}$
 6. Storage Temp.: $-30^{\circ}\text{C}\sim+80^{\circ}\text{C}$
 7. Transmittance: $\geq 85\%$
 8. Hardness: $\geq 6\text{H}$
 9. Without tolerance marked: $\pm 0.3\text{mm}$.

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NO.	Revised Area	Revised Content	Made	Date
		New Released		

REMARK	Unit: mm	Projection:	Scale: 1:1
DRAWN			
CHECK			
APP			
Description: Outline Drawing			Product No.: CF050KLDLWH-CA1

4. INTERFACE PIN CONNECTION

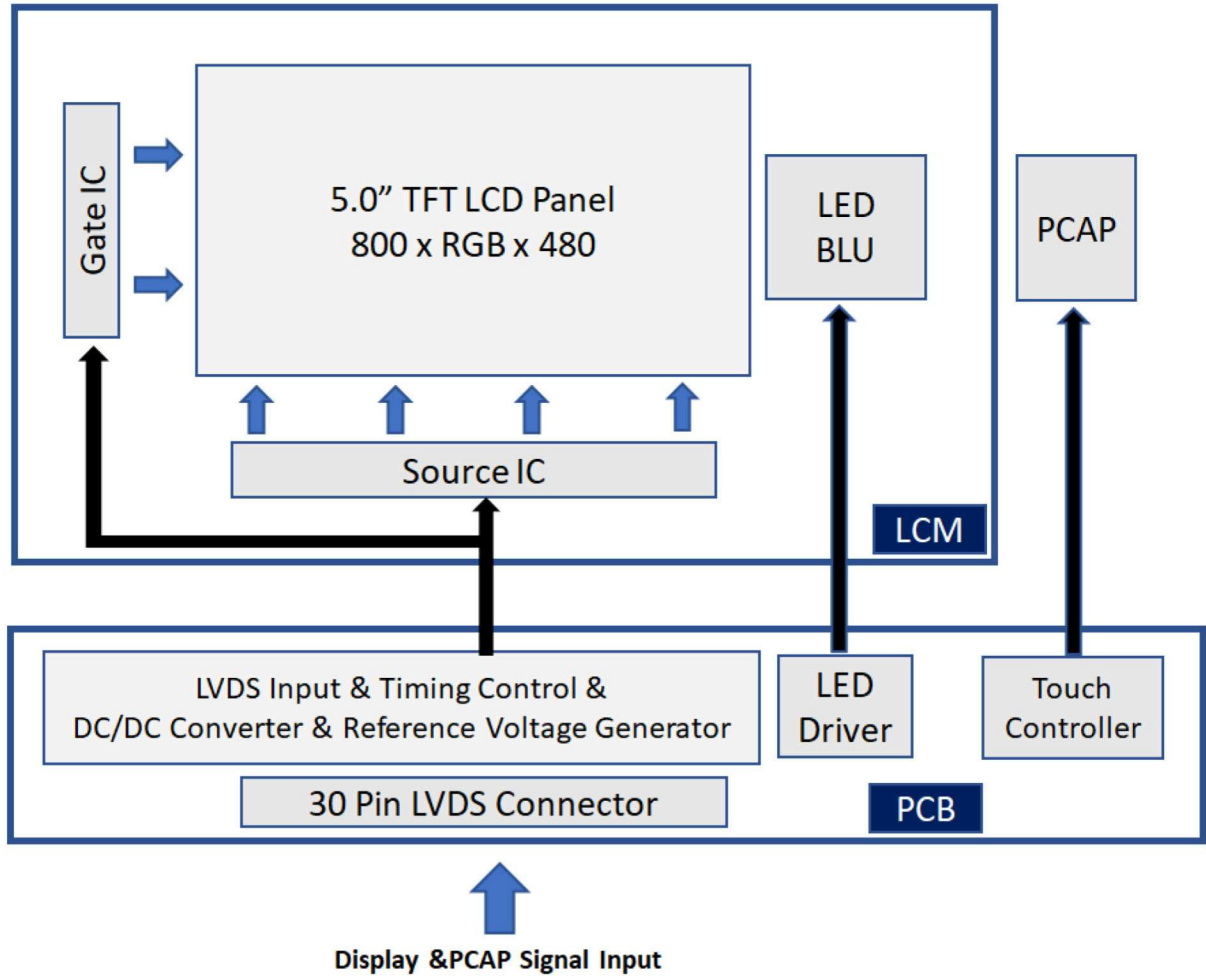
4.1 TFT LCM PANEL PIN DEFINE

CN1 Connector : STM MSBK2407P30 RF:HB or Equivalent

PIN NO.	Definition	I/O	Description	Remark
1	GND	P	Ground	
2	GND	P	Ground	
3	EN	I	Enable Control for Backlight	
4	PWM	I	Brightness Control for Backlight	
5	VLED	P	Power Supply for LED Backlight	
6	VLED	P	Power Supply for LED Backlight	
7	VDD	P	Power Supply for Digital Circuit (3.3V)	
8	R/L	I	Horizontal inversion H:from left to right (default) L:from right to left	
9	U/D	I	Vertical inversion H:from up to down(default) L:from down to up	
10	GND	P	Ground	
11	RxIN0-	I	Negative LVDS Differential Data Input	
12	RxIN0+	I	Positive LVDS Differential Data Input	
13	GND	P	Ground	
14	RxIN1-	I	Negative LVDS Differential Data Input	
15	RxIN1+	I	Positive LVDS Differential Data Input	
16	GND	P	Ground	
17	RxIN2-	I	Negative LVDS Differential Data Input	
18	RxIN2+	I	Positive LVDS Differential Data Input	
19	GND	P	Ground	
20	RxCLK-	I	Negative LVDS Differential Clock Input	
21	RxCLK+	I	Positive LVDS Differential Clock Input	
22	GND	P	Ground	
23	RxIN3-	I	Negative LVDS Differential Data Input	
24	RxIN3+	I	Positive LVDS Differential Data Input	
25	NC	-	No connection	
26	NC	-	No connection	
27	VCC	P	Power Supply for PCAP(5V)	
28	D-	I	Data-	
29	D+	I	Data+	
30	GND	P	Ground	

Note : 'P' stand for Power, ' I ' stand for Input

5. BLOCK DIAGRAM



6. ABSOLUTE MAXIMUM RATINGS

6.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power Supply Voltage	VDD	-0.5	5	V	
Power Voltage For CTP	VCC	-	-	V	

Note : The absolute maximum rating values of this product not allowed to be exceeded at any times. Should be module be used with any of absolute maximum ratings exceeded. The characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

6.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature(°C)	-20	70	-30	80	Note 1,2
Humidity(% RH)	10~90(Note3)		10~90(Note 3)		-

Note 1 : The response time will become lower when operated at low temperature.

Note 2 : Background color changes slightly depending on ambient temperature.

Note 3 : Storage Ta=40°C & RH=90% ≤ 96Hrs

7. ELECTRICAL CHARACTERISTICS

7.1 ELECTRICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Supply Voltage	VDD	3.0	3.3	3.6	V	
Supply Current	IDD	-	100	-	mA	Note 1

Note1: Test Condition: VDD=3.3V ; Test Pattern: White

7.2 BACKLIGHT UNITS

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Backlight Supply Voltage	VLED	-	5	-	V	
Backlight Supply Current	ILED	-	0.45	-	A	
LED Life Time	-	-	30,000	-	Hrs	

Note 1: Optical performance should be evaluated at Ta=25°C only.

Note 2: If LED is driven by high current, high ambient temperature & humidity condition. The life Time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

7.3 CTP ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Voltage For PCAP	VCC	-	5.0	-	V	

8. OPTICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio	CR	-	800	1000	-	-	Note 1
Response Time	TR+TF		-	30	40	ms	Note 4
Chromaticity	White	Wx	0.290	0.340	0.390	-	Note 5
		Wy	0.311	0.361	0.411	-	
	Red	Rx	0.565	0.615	0.665	-	
		Ry	0.286	0.336	0.386	-	
	Green	Gx	0.342	0.392	0.442	-	
		Gy	0.502	0.552	0.602	-	
	Blue	Bx	0.090	0.140	0.190	-	
		By	0.075	0.125	0.175	-	
Viewing Angle	Hor.	θ_T	-	80	-	Deg.	Note 6
		θ_B	-	80	-		
	Ver.	θ_L	-	80	-		
		θ_R	-	80	-		
NTSC	-	$\theta_x=\theta_y=0^\circ$	45	50	-	%	Note 5
Luminance	LV	$\theta_x=\theta_y=0^\circ$	800	900	-	cd/m ²	Note 2
Luminance Uniformity	YU		-	70	-	%	Note 3

Note 1 : Definition of Contrast Ratio (CR) :

Contrast ratio is defined mathematically by the following formula. For more information see FIG.2.

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

For contrast ratio, Surface Luminance, Luminance uniformity and CIE, the testing data is based on TOPCON's BM-5 or BM-7 photo detector or compatible.

Note 2 : Definition of surface luminance

Surface luminance is the luminance with pixels displaying white. For more information see FIG.2.

$$L_v = \text{Average Surface Luminance with all white pixels}(P_1, P_2, P_3, \dots, P_n)$$

Note 3 : 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.

$$YU = \frac{\text{Minimum surface luminance with all white pixels}(P_1, P_2, P_3, \dots, P_n)}{\text{Maximum surface luminance with all white pixels}(P_1, P_2, P_3, \dots, P_n)}$$

Note 4 : 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_r) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_f) is the time between photo detector output intensity changed from 10% to 90%. For additional information see FIG.1.

Note 5 : 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.

Note 6 : 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.

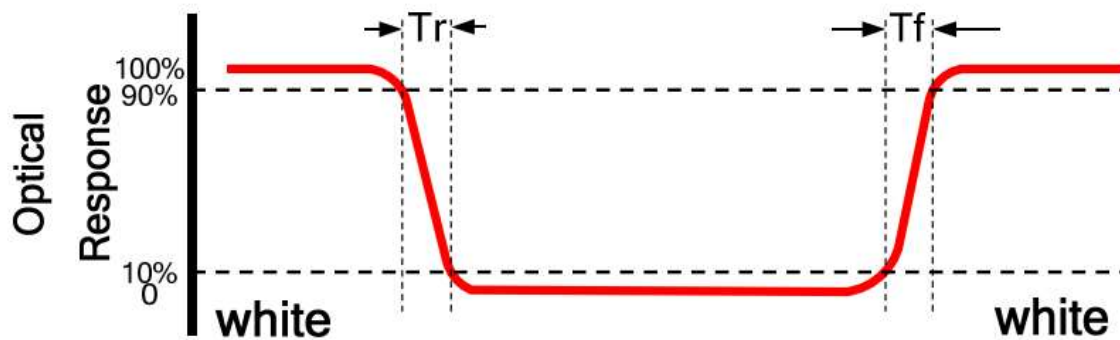


FIG.2 Measuring method for contrast ratio, surface luminance, luminance uniformity, CIE (x,y) chromaticity
 Size : $S \leq 5"$ (See Figure a) A: 5 mm B: 5mm
 H,V : Active area
 Light spot size $\Phi = 5\text{mm}$ (BM-5) or $\Phi = 7.7\text{mm}$ (BM-7) 50cm distance or compatible distance from the LCD surface to detector lens.
 Test spot position : see Figure a.
 Measurement instrument : TOPCON’ s luminance meter BM-5 or BM7 or compatible (see Figure c).

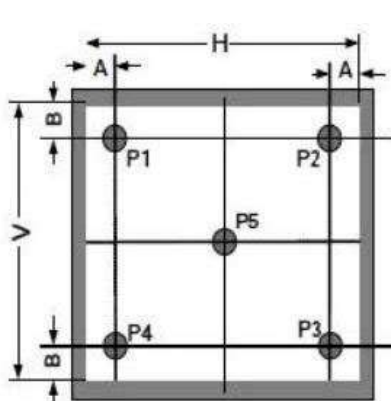


Figure a

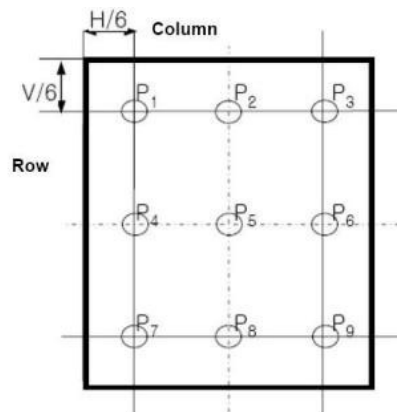


Figure b

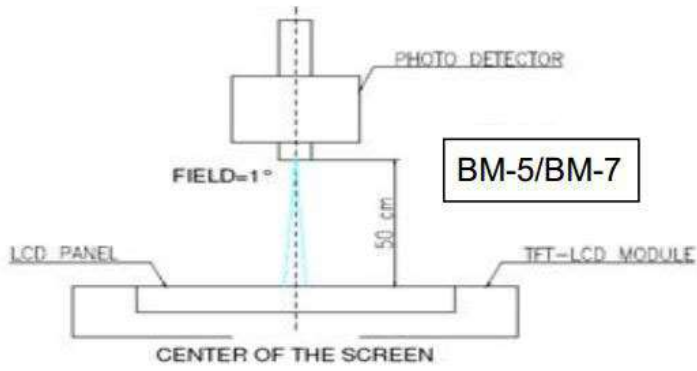
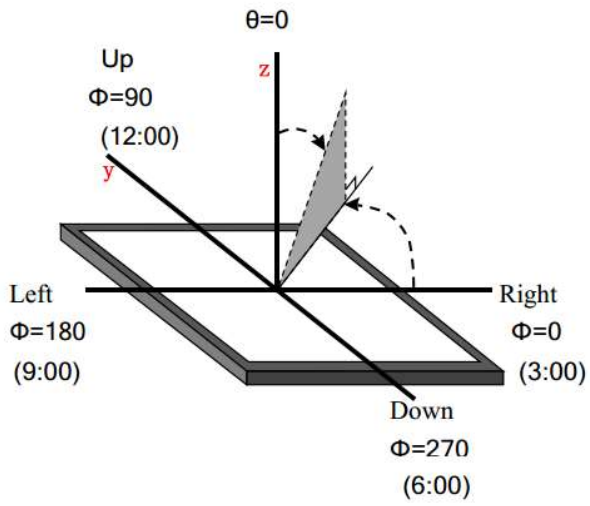


Figure c

FIG.3 The definition of viewing angle



9. TOUCH PANEL SPECIFICATIONS

9.1 Type :

9.1.1 Glass+Glass

9.2 STRUCTURE :

9.2.1 Thickness : 2.0±0.2mm

9.2.2 Thickness : 2.0mm (Cover 1.1t / Sensor 0.7t / COF 0.2)

9.3 IC MODEL :

9.3.1 IC manufacture : EETI

9.3.2 IC part number : EXC81W46

9.3.3 Interface : USB

9.4 ELECTRICAL CHARACTERISTICS :

9.4.1 Operating Voltage : +5V

9.5 MECHANICAL CHARACTERISTICS :

9.5.1 Surface hardness : 6H

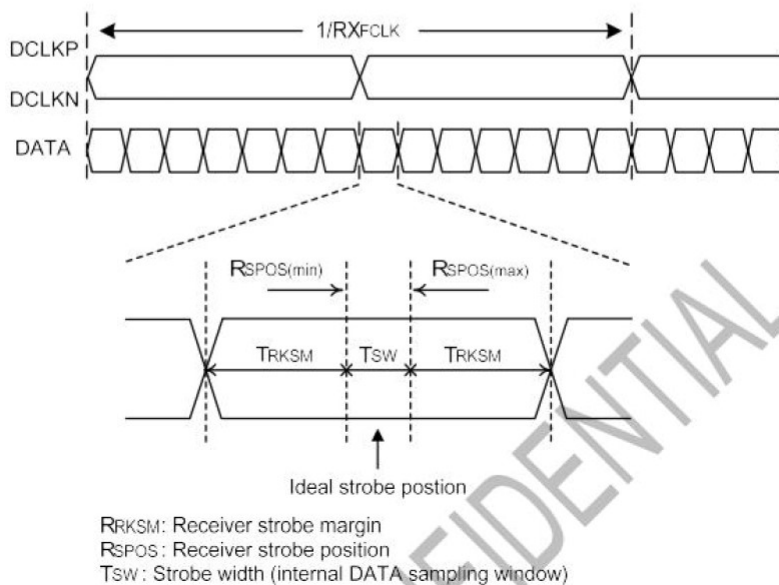
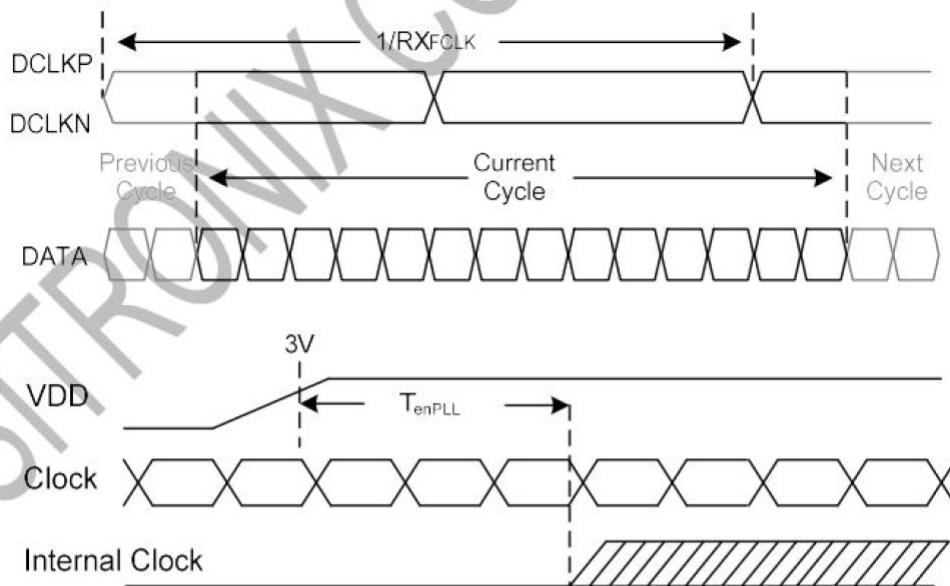
9.6 OPTICAL CHARACTERISTICS :

9.6.1 Transparency : $\geq 85\%$

9.6.2 Haze:TBD

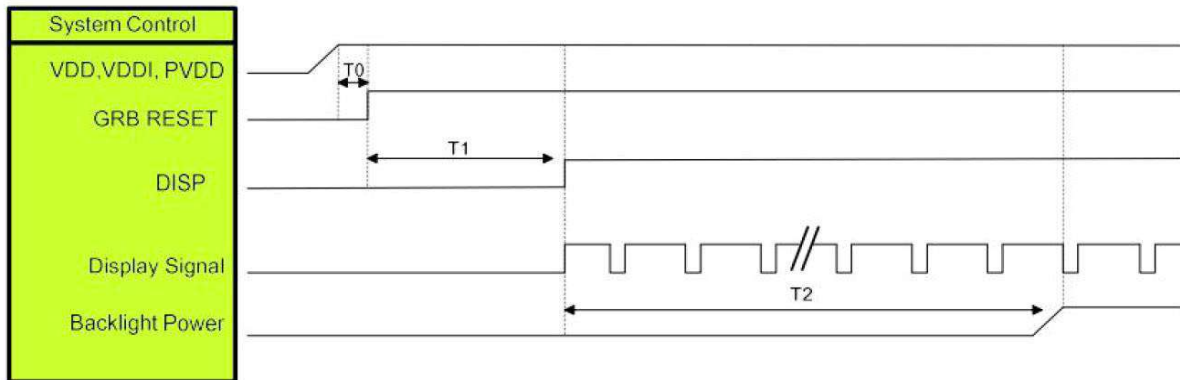
10. TIMING SPECIFICATIONS

10.1 Interface Timing



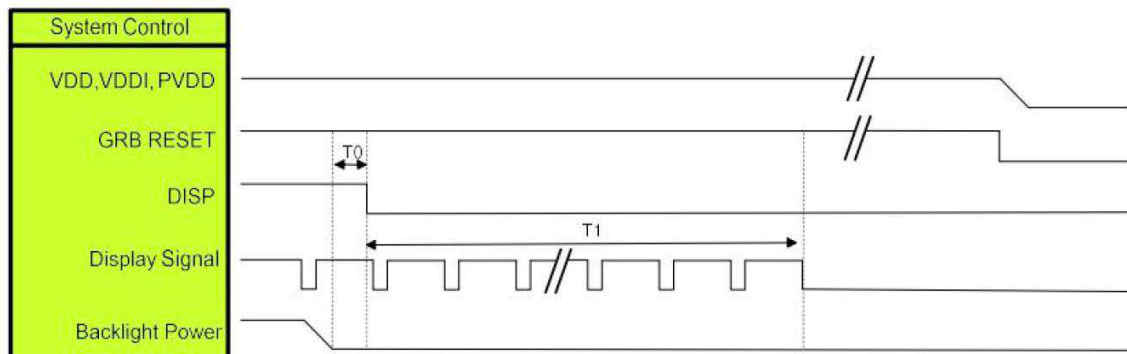
Item	Symbol	Min.	Typ.	Max.	Unit	Note
Clock Frequency	RX_{FCLK}	23	25	27	MHz	
Input Data Skew Margin	TR_{SKM}	400	-	-	ps	
Clock High Time	T_{LVCH}	$4/(7 \times RX_{FCLK})$			ns	
Clock Low Time	T_{LVCL}	$3/(7 \times RX_{FCLK})$			ns	
PLL Wake-up Time	T_{enPLL}	-	-	150	us	
LVDS Spread Spectrum Clocking (SSC) Tolerance of LVDS Receiver						
Modulation Frequency	SSC_{MF}	-	-	100	KHz	
Modulation Rate	SSC_{MR}	-	-	+/-3	%	

10.2 Power On Sequence



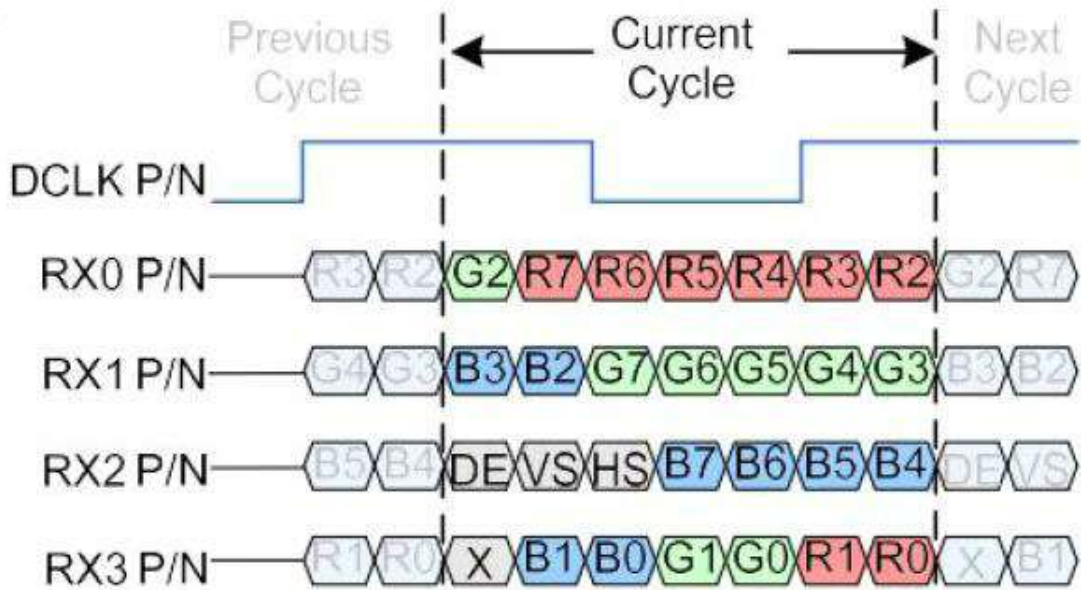
SYMBOL	DESCRIPTION	MIN. Time	UNIT
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET="High" to DISP="High"	10	ms
T2	Display Signal output to Backlight Power on	250	ms

10.3 Power Off Sequence



SYMBOL	DESCRIPTION	MIN. Time	UNIT
T0	Backlight Power off to DISP="Low"	5	ms
T1	DISP="Low" to IC internal voltage discharge complete	80	ms

10.4 LVDS Input Pin Mapping Table



4 Lane JEIDA Data Format Color Bit Map

11. RELIABILITY TEST

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	Ta= 80°C	96Hours	Note 1,3
2	Low Temperature Storage	Ta= -30°C	96Hours	Note 1,3
3	High Temperature Humidity Storage	60°C,90%RH	96Hours	Note 1,3
4	High Temperature Operation	Ts= 70°C	96Hours	Note 2,3
5	Low Temperature Operation	Ta= -20°C	96Hours	Note 1,3
6	Temperature Cycle	-20°C~+60°C	1H/cycle 30CYCLE	Note 2,4

In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note 1 : Ta is the ambient temperature of samples.

Note 2 : Ts is the temperature of panel's surface.

Note 3 : Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note 4 : Star with cold temperature and end with high temperature.

12. PRECAUTIONS FOR USE

12.1 SAFETY

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

12.2 STORAGE CONDITIONS

- (1) Store the panel or module in a dark place where the temperature is $23\pm 5^{\circ}\text{C}$ and the humidity is below $50\pm 20\%\text{RH}$.
- (2) Store in anti-static electricity container.
- (3) Store in clean environment, free from dust, active gas, and solvent.
- (4) Do not place the module near organics solvents or corrosive gases.
- (5) Do not crush, shake, or jolt the module.

12.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface of plate.
- (6) Do not use ketonic solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.
- (9) When the module is assembled, it should be attached to the system firmly, Be careful not to twist and bend the module.
- (10) Wipe off water droplets or oil immediately . If you leave the droplets for a long time, staining and discoloration may occur.
- (11) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth.
In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

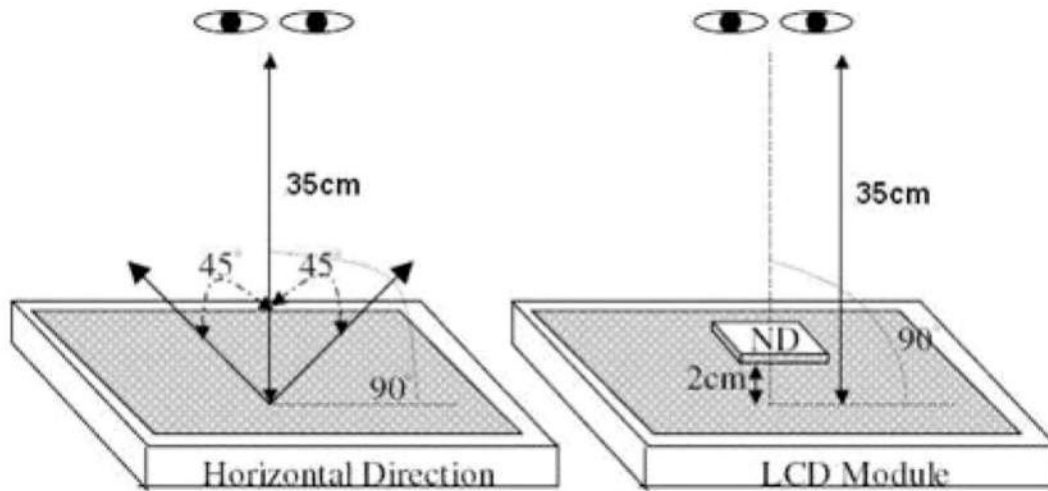
12.4 WARRANTY

- (1) Acceptance inspection period. The period is within one month after the arrival of contracted commodity at the buyer's factory site.
- (2) Applicable warrant period. The period is within 12 months since the date of shipping out under normal using and storage conditions.

國賓科技股份有限公司	研揚料號	9687Y00019
	頁次	第1頁，共6頁
CF050KLDLWH-CA1 P01 檢驗規範	版別	A0
	日期	2023/4/12

一、環境及檢測方法

- 1.1 環境溫度: 20°C~25°C。
- 1.2 環境溼度: 25~75 %RH。
- 1.3 室內照明亮度為300~700 Lux。
- 1.4 LCD目視距離應由正面目視10秒鐘距離30cm~40cm檢驗。 1.5 觀看角度正面直視LCD,橫向左右45度角檢視。
- 1.6 當使用ND濾光片5%應在距離2~3cm至顯示面板的前表面上, 距離30±5 cm,由正面目視10度做為判定依據,且離開NDFilter 1~2秒後再判定。

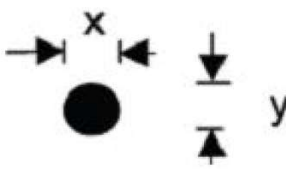


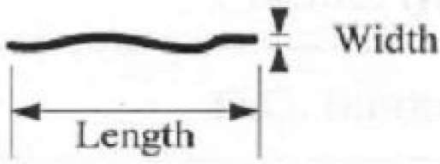

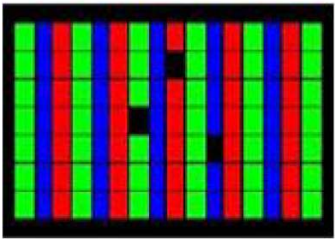
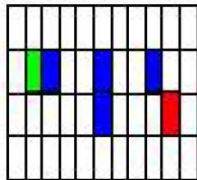
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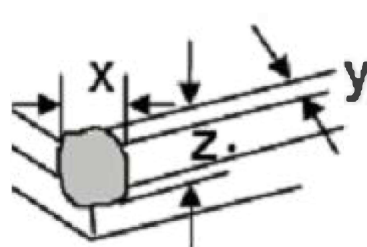
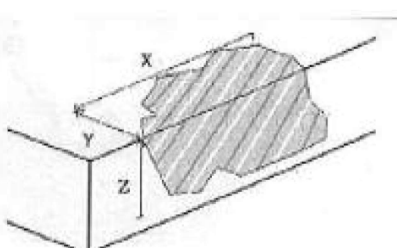
二、檢驗項目：

2.1 外觀檢驗：

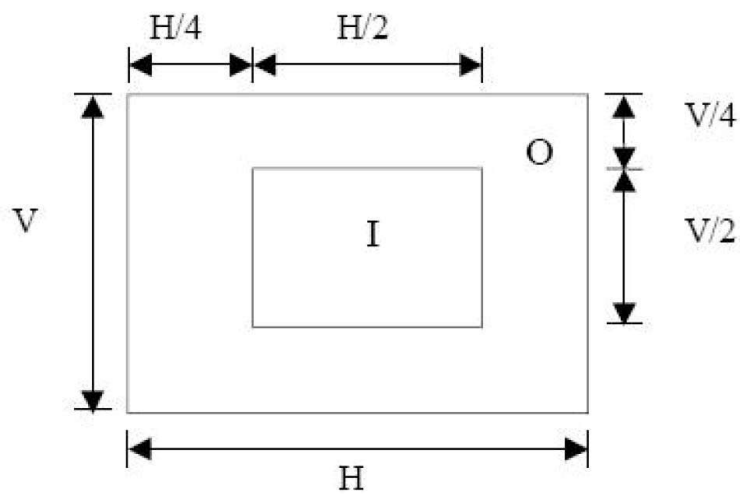
Item No	Items to be inspected	Inspection Standard
5.1.1	All functional defects	1) No display 2) Display abnormally 3) Short circuit 4) line defect
5.1.2	Missing	Missing function component
5.1.3	Crack	Glass Crack

Item No	Items to be inspected	Inspection standard	
5.2.1	Spot Defect Including Black spot White spot Pinhole Foreign particle Polarizer dirt	For dark/white spot is defined $\varphi = (x+y) / 2$	
			y
		Size φ (mm)	Acceptable Quantity

		$\phi \leq 0.2$	Ignore
		$0.2 < \phi \leq 0.5$	3
		$0.5 < \phi$	Not allowed
5.2.2	Line Defect Including Black line White line Scratch	Define: 	
		Width(mm) Length(mm)	Acceptable Quantity
		$W \leq 0.05$	Ignore
		$0.05 < W \leq 0.1$ $L \leq 2.5$	3
		$0.1 < W$, or $L > 2.5$	Not allowed
5.2.3	Polarizer Dent/Bubble	Size ϕ (mm)	Acceptable Quantity
		$\phi \leq 0.2$	Ignore
		$0.2 < \phi \leq 0.3$	2
		$0.3 < \phi \leq 0.5$	1
		$0.5 < \phi$	Not allowed
		Total QTY	3
5.2.4	Electrical Dot Defect	Bright and Black dot define:  and 	
			
		Two Adjacent Dot	
		Inspection pattern: Full white、Full black、Red、green and blue screens	
		Item	Acceptable Quantity

		I	O	Note
		2		(5mm ≤ Distance)
		1		
		1		
		Not allowed		
		2		
5.2.5	Glass defect	 <p>1. Corner Fragment:</p>		
		Size(mm)	Acceptable Quantity	
		X ≤ 0.1mm Y ≤ 0.1mm Z ≤ 0.1mm	Ignore X: Length Y: Width Z: thickness	
		2. Side Fragment:		
				
		Size(mm)	Acceptable Quantity	
X ≤ 0.1mm Y ≤ 0.1mm Z ≤ 0.1mm	X: Length Y: Width Z: thickness			

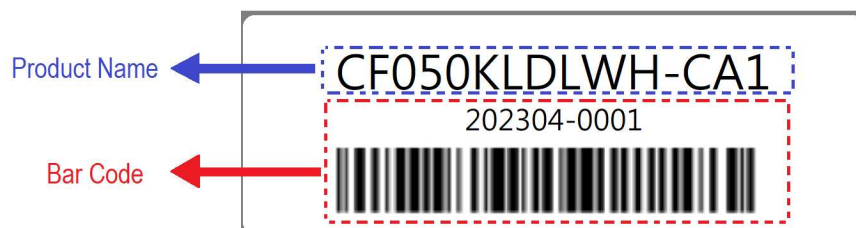
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	頁次	第5頁，共6頁
CF050KLDLWH-CA1 P01 檢驗規範	版別	A0
	日期	2023/4/12



I area & O area

- Note:
- 1). Dot defect is defined as the defective area of the dot area is larger than 50% of the dot area.
 - 2). The distance between two bright dot defects (red, green, blue, and white) should be larger than 15mm.
 - 3). The distance between black dot defects or black and bright dot defects should be more than 5mm apart.
 - 4). Polarizer bubble is defined as the bubble appears on active display area. The defect of polarizer bubble shall be ignored if the polarizer bubble appears on the outside of active display area.

LCM PRODUCT LABEL DEFINE



國賓科技股份有限公司	研揚料號	9687Y00019
	頁次	第6頁，共6頁
CH101ZPHMWN-CA2 檢驗規範	版別	A0
	日期	2023/4/12

2.2 檢驗重點注意事項:

Defect item(缺陷項目)		Inspection Criteria (檢驗標準)
沒有條碼、型號、規格、FW版本等標籤標示		不允收
標示、型號、規格、版本與承認書或樣品不同		不允收
Cable 與 Connector 破損斷裂 / 缺Pin		不允收
Film 凸起有氣泡		不允收
手指按壓會隆起、有明顯的波浪、水波紋、牛頓環等問題		不允收
菱格紋(明顯的線路蝕刻痕跡)		不允收
Sensor 蝕刻線路斷線破損		不允收
珊瑚狀氣泡		不允收
殘膠/溢膠		不允收
軟排線/電路板 (FPC)	90度死摺，且有明顯折線痕	不允收
	輕微彎折，沒有摺痕可接受	可允收
	金手指髒污/氧化/生鏽	不允收
	Control board 缺件/空冷焊/短路/破損	不允收
尺寸量測與承認書IIS或是限度樣品不符		不允收
油墨印刷與承認書IIS或是限度樣品不符		不允收
包裝未隔離，面板與面板之間互相堆疊		不允收
Sensor翹曲超過3mm		不允收