

MAXEN ELECTRONICS LIMITED

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SPECIFICATION

MX-215FL30KFS-N09

For Customer's Acceptance:

Approved By	Comment		
PREPARED	CHECKED	VERIFIED BY QA DEPT	VERIFIED BY R&D DEPT

MAXEN ELECTRONICS LIMITED

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1. GENERAL DESCRIPTION

The specification is applied to 21.5" model (250nits) TFT Liquid Crystal Display open cell and it supports 1920 x 1080 FHD mode with 16.7M (8bit) colors. This product is with driver ICs and a 30-pins-2ch-LVDS circuit board and built in without backlight unit.

1.1 General Specifications

Item	Specification	Unit	Note
Screen Size	21.5 inch Diagonal	mm	-
Outline Dimension	487.44(H)x 278.182(V)	mm	D: cell thickness
Active area	476.64(H) x 268.11(V)	mm	-
Driver Element	a-Si TFT active matrix	-	-
Cell transmittance	5.1% (Typ.)	-	HKC BLU , center point
Pixel Number	1920 x 1080	pixel	-
Sub Pixel Pitch	0.08275(H) x 0.24825 (V)	mm	-
Pixel Arrangement	RGB Vertical	-	-
Display Colors	16.7M	color	8bit
Display Mode	Normally Black	-	-
Display Orientation	Signal input with"ABC"	-	-
Surface Treatment	Type=AG	-	-
	Haze=25%	-	-
	Top Surface Hardness : 3H	-	-
Weight	424	g	-

Note:

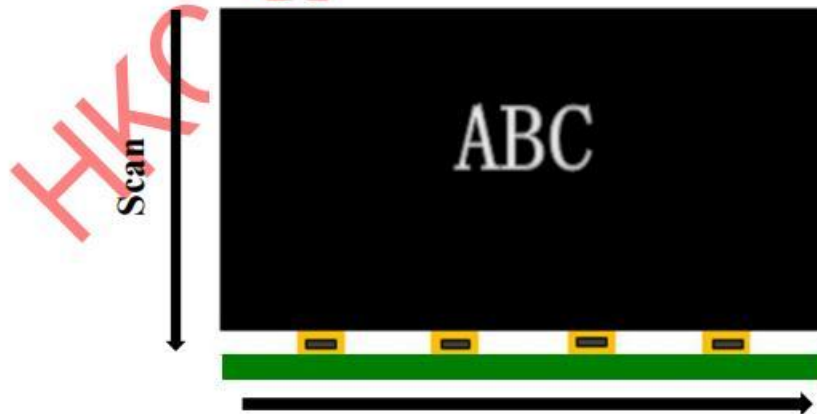


Fig. 1.1 Display Orientation

2. ABSOLUTE MAXIMUM RATINGS

2.1 Absolute Maximum Ratings

The followings are maximum values which, if exceeded, may cause damage to the unit.

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	V _{CC}	-0.3	6	V	(1)
Input Signal Voltage	V _{in}	-0.3	3.6	V	(1)

Note:

(1) Within Ta=25±2°C

2.2 Absolute Ratings of Environment

Temperature and relative humidity range are shown as below.

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	TST	-20	60	°C	(1)
Operating Temperature	TOP	0	50	°C	(1), (2)
Panel Surface Temperature of Display Area	PST	-	65	°C	(3)

Note:

- (1) a. 90 % RH Max. (Ta ≤ 40 °C).
b. Web-bulb temperature should be 39°C Max. (Ta > 40°C)
c. No condensation
d. Operating condition with a assemble module
- (2) Any point on the Driver surface must be less than 120°C under any condition. If the surface temperature is out of the spec, thermal solutions should be applied to avoid be damaged.
- (3) Surface temperature of display area is measured at 50°C dry condition.

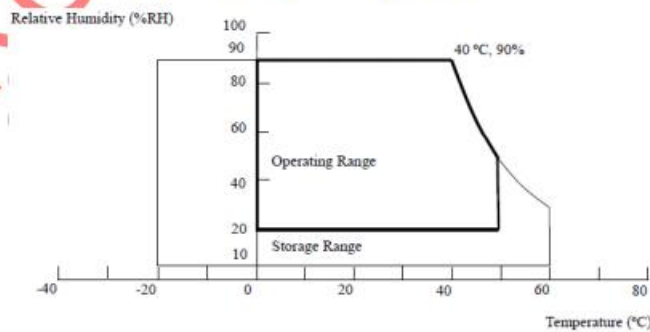


Fig. 2.1 Operating and storage environment

2.3 Package Storage

When storing open cell as spares for a long time, please follow the precaution instructions:

- (1) Do not store the open cell in high temperature and high humidity for a long time. It is highly recommended to store the module with temperature from 20°C to 30°C in normal humidity (50 ± 10%RH) with shipping package.
- (2) The open cell should be keep within one month shelf life.

3. ELECTRICAL SPECIFICATIONS

3.1 Electrical Characteristics

3.1.1 Power Consumption

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		V_{CC}	4.5	5	5.5	V	(2)
Rush Current		I_{RUSH}	-	-	4	A	(3)
Power Supply Current	White Pattern	I_{CC}	-	0.72	0.94	A	(4)
	Horizontal Stripe	I_{CC}	-	0.92	1.20	A	
	Black Pattern	I_{CC}	-	0.72	0.94	A	
Power Consumption		PLCD		3.6	4.68	Watt	White Pattern

Note:

- (1) Ambient temperature: $25 \pm 2^{\circ}\text{C}$
- (2) The ripple voltage should be controlled less than 10% of V_{CC} .
- (3) Measurement condition: V_{CC} rising time = $470\mu\text{s}$.

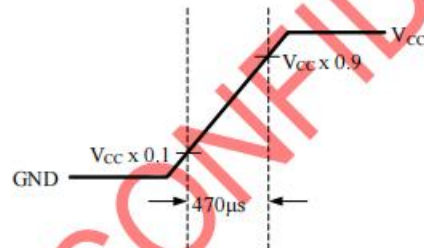


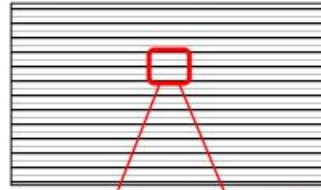
Fig. 3.1 V_{CC} rising time condition

(4) Measurement condition: $V_{CC} = 5.0$, $T_a = 25 \pm 2^\circ\text{C}$, $F = 60\text{ Hz}$. The test patterns are shown as below.

A. White Pattern



B. Horizontal Pattern



C. Black Pattern

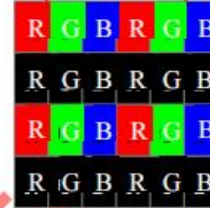


Fig. 3.2 Test patterns

3.1.2 LVDS Characteristics

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
LVDS Interface	Differential Input High Threshold Voltage	V_{TH}	+100	-	-	mV	(1)
	Differential Input Low Threshold Voltage	V_{TL}	-	-	-100	mV	
	Common Input Voltage	V_{CM}	1.0	1.2	1.4	V	
	Differential input voltage	$ V_{ID} $	200	-	600	mV	
	Terminating Resistor	R_T	80	100	120	ohm	
CMOS Interface	Input High Threshold Voltage	V_{IH}	2.7	-	3.3	V	
	Input Low Threshold Voltage	V_{IL}	0	-	0.6	V	

Note:

(1) The LVDS input signal has been defined as follows:

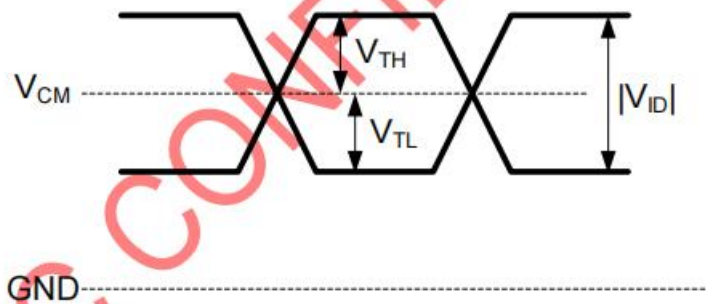


Fig. 3.3 LVDS Input signal

3.1.3 LVDS Format

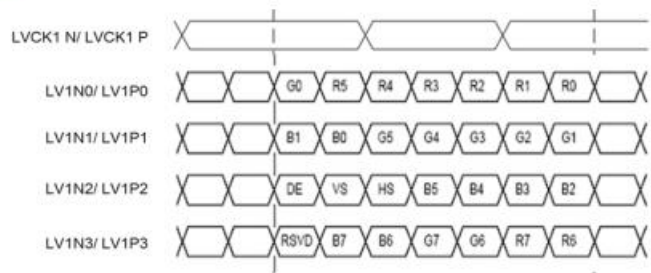


Fig. 3.4 VESA format

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3.2 Interface Connections

Interface Pin Assignment

CN1: 3-10122314-0 (XDYT) or equivalent 1mm pitch 30 pin (1)

Pin No.	Symbol	Description	Note
1	ORX0N	LVDS Data1(0) -	
2	ORX0P	LVDS Data1(0) +	
3	ORX1N	LVDS Data1(1) -	
4	ORX1P	LVDS Data1(1) +	
5	ORX2N	LVDS Data2(2) -	
6	ORX2P	LVDS Data2(2) +	
7	GND	Power Ground	
8	ORXC�	LVDS clock1 -	
9	ORXCP	LVDS clock1 +	
10	ORX3N	LVDS Data1(3) -	
11	ORX3P	LVDS Data1(3) +	
12	ERX0N	LVDS Data2(0) -	
13	ERX0P	LVDS Data2(0) +	
14	GND	Power Ground	
15	ERX1N	LVDS Data2(1) -	
16	ERX1P	LVDS Data2(1) +	
17	GND	Power Ground	
18	ERX2N	LVDS Data2(2) -	
19	ERX2P	LVDS Data2(2) +	
20	ERXC�	LVDS clock2 -	
21	ERXCP	LVDS clock2 +	
22	ERX3N	LVDS Data2(3) -	
23	ERX3P	LVDS Data2(3) +	
24	NC	No Connection	(2)
25	NC	No Connection	(2)
26	NC	No Connection	(2)
27	NC	No Connection	(2)
28	VIN5	Power supply +5.0V	
29	VIN5	Power supply +5.0V	
30	VIN5	Power supply +5.0V	

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Note:

- (1) Following finger shows the LVDS pin1 diagram.

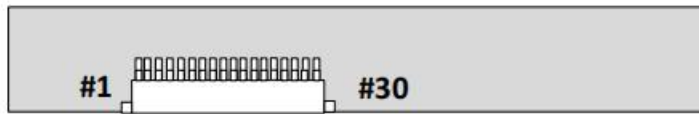
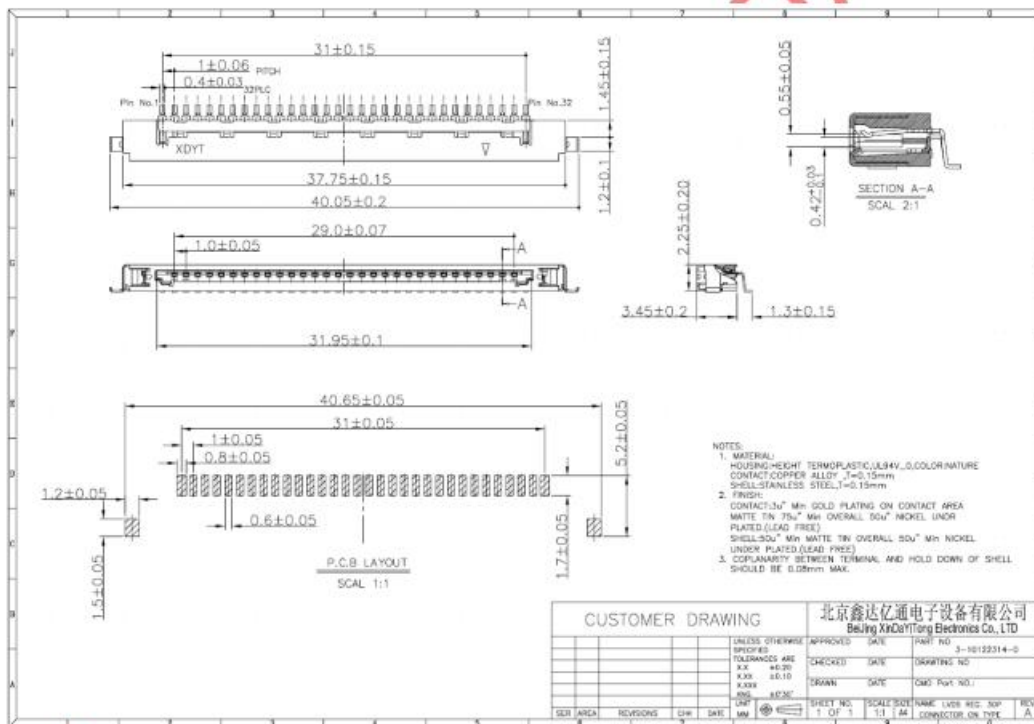


Fig. 3.5 LVDS connector direction sketch map

- (2) For HKC used only, please leave it open.

Connector Drawing



3.3 Timing Spec

The input signal timing specifications are shown as the following table and timing diagram.

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Clock	Frequency	F _{clk}	50	74.25	95	MHz	(1)
	Input cycle to cycle jitter	T _{rel}	—	—	200	ps	(2)
	Spread spectrum modulation range	F _{clk} _mod	F _{clk} -2%	—	F _{clk} +2%	MHz	(3)
	Spread spectrum modulation frequency	FSSM	—	—	200	KHz	
LVDS Receiver Data	Receiver Skew Margin	TRSM	-400	-	400	ps	(4)
Vertical Term	Frame Rate	F	48	60	75	Hz	
	Total	T _V	1096	1125	1836	T _H	T _V = T _{VD} + T _{VB}
	Active Display	T _{VD}	1080			T _H	
	Blank	T _{VB}	16	45	756	T _H	
Horizontal Term	Total	T _H	1050	1100	1678	T _{CLK}	T _H = T _{HD} + T _{HB}
	Active Display	T _{HD}	960			T _{CLK}	
	Blank	T _{HB}	90	140	718	T _{CLK}	

Attention:

The module is operated in DE only mode, H sync and V sync input signal have no effect on normal operation.

Note:

(1) Please make sure the range of pixel clock follows the following equations:

$$F_{clk}(\max) \geq F_{max} \times T_v \times T_H$$

$$F_{min} \times T_v \times T_H \geq F_{clk}(\min)$$

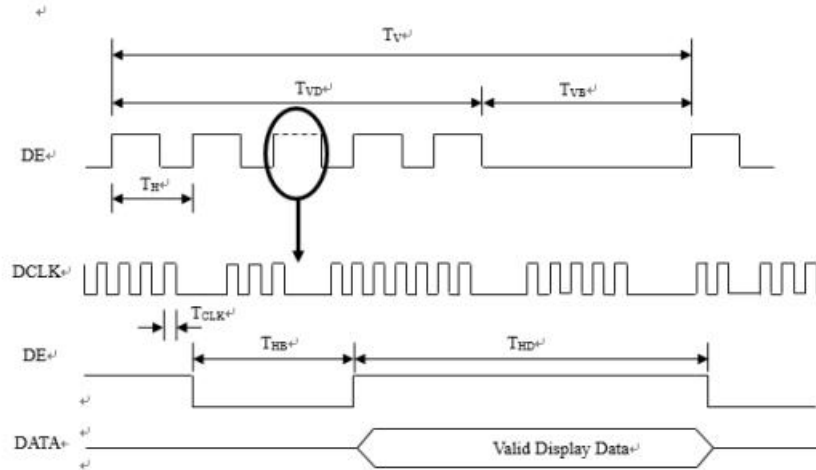


Fig 3.6 Signal timing diagram

(2) The input clock cycle-to-cycle is defined as below figures.

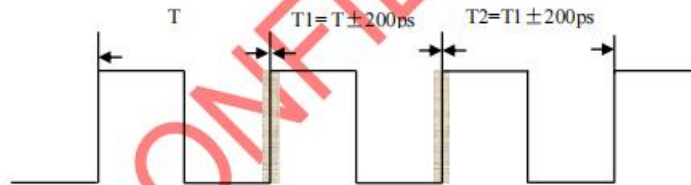


Fig. 3.7 Jitter

(3) The SSCG (Spread Spectrum Clock Generator) is defined as the following figure. The LVDS SSM's suggestion is off by default, SOC board must test all validation if SOC board open the LVDS SSM.

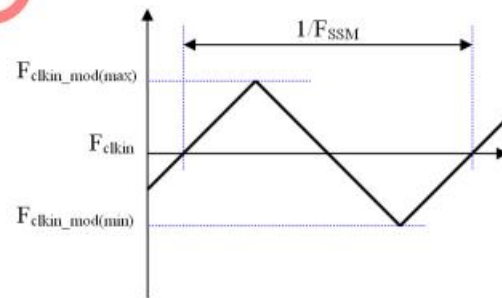


Fig. 3.8 SSCG

(4) The LVDS timing diagram and setup/hold time is defined and showed as the following figure.

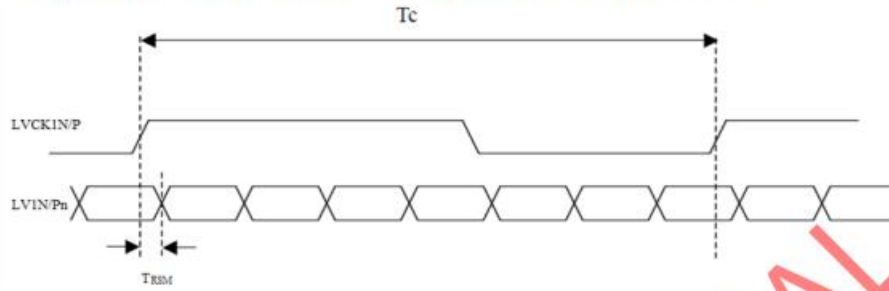


Fig. 3.9 LVDS receive interface timing diagram

3.4 Power On/Off Sequence

The power sequence specifications are shown as the following table and diagram.

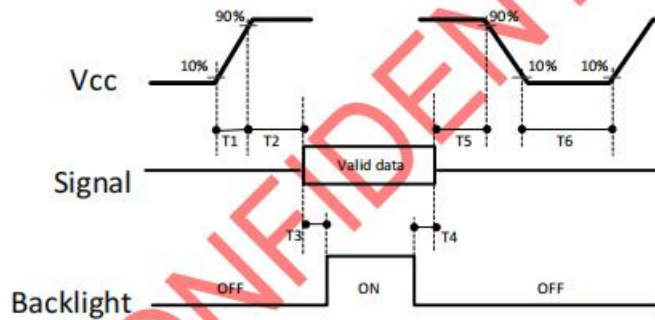


Fig. 3.10 Power on/off signal sequence

Parameter	Values			Unit
	Min.	Typ.	Max.	
T1	0.5	-	10	ms
T2	0	-	50	ms
T3	500	-	-	ms
T4	100	-	-	ms
T5	0	-	50	ms
T6	1000	-	-	ms

Attention:

- (1) The supply voltage of the external system for the module input should be the same as the definition.
- (2) To avoid some abnormal display noise, we suggest "V_{CC}" falling time to follow "T6" definition.
- (3) The product should be always operated within above ranges.
- (4) In case of V_{CC} is off level, please keep the level of input signals on the low or keep high impedance.

3.5 Flicker Adjustment

Flicker must be optimized after module assembly and aging. Its patterns are as follow:

sub pixel checker under 50% gray level.

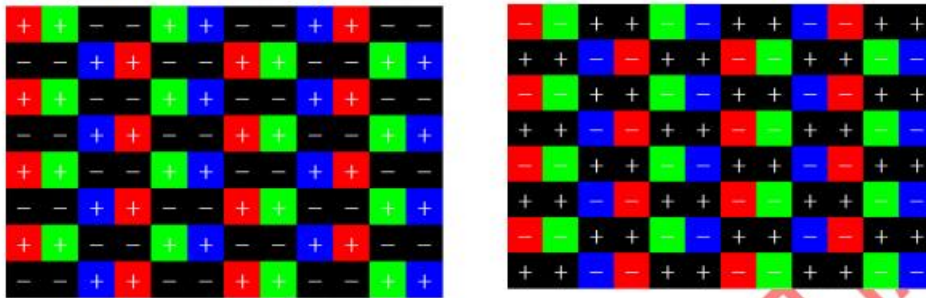


Fig. 3.11 Flicker pattern

3.6 Driver IC ESD Spec

If the LCD module is designed with the Plastic Bezel, we suggest ESD protection solutions should be applied to avoid IC damaged, as shown in Fig.3.12

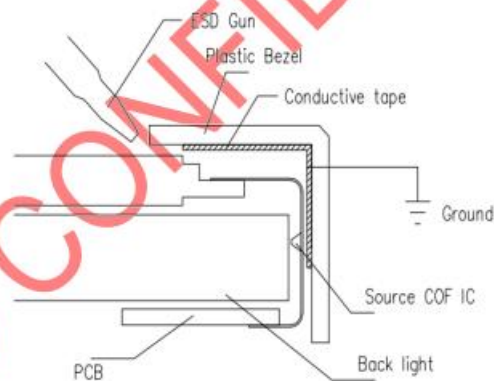


Fig. 3.12 Source COF IC ESD protection

4. OPTICAL CHARACTERISTICS

4.1 Measurement Conditions

The table below is the test condition of optical measurement.

Item	Symbol	Value	Unit
Ambient Temperature	T_A	25 ± 2	$^{\circ}\text{C}$
Ambient Humidity	H_A	50 ± 10	% RH
Supply Voltage	V_{CC}	5	V
Driving Signal	Refer to the typical value in Chapter 3: Electrical Specification		
Vertical Refresh Rate	F_V	60	Hz
Light source	HKC module White LED Backlight Module/ Film structure		
Warm up time	T_{warm}	$>30 \text{ min}$	min
Dark room	ED	$1 \text{ lux} >$	lux

To avoid abrupt temperature change during optical measurement, the measurement should be executed in a stable, windless, in dark room after lighting the light source, and the measurement position is the center of the panel.

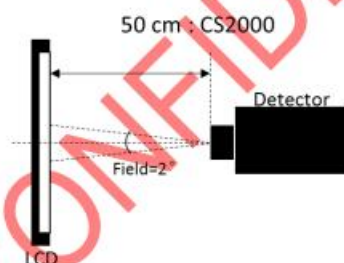


Fig. 4.1 Measurement equipment

4.2 Optical Specifications

The relative measurement methods of optical characteristics are shown in 4.2. The following items should be measured under the test conditions described in 4.1 and stable environment shown in 4.1.

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Color Chromaticity (CIE1931)	Red	Rx	$\theta_x=0^\circ, \theta_y=0^\circ$ Viewing Angle at Normal Direction at center point of panel, Light source is HKC BLU	Typ. - 0.03	0.646	Typ.+ 0.03	-	(1)
		Ry			0.337			
	Green	Gx			0.316			
		Gy			0.622			
	Blue	Bx			0.152			
		By			0.056			
	White	Wx			0.311			
		Wy			0.338			
Color Gamut		CG	68	72	-	%	(2)	
Transmittance		T%	4.5	5.1	-	%	(3)	
Contrast Ratio		CR	$\theta_x=0^\circ, \theta_y=0^\circ$ With HKC BLU	2000	3000	-	-	(4)
Response Time		T _g		-	7.0	12	ms	(5)
Viewing Angle	Horizontal	θ_{x+}	$CR \geq 10$ $\theta_x=0^\circ, \theta_y=0^\circ$	80	89	-	Deg.	(6)
		θ_{x-}		80	89	-		
	Vertical	θ_{y+}		80	89	-		
		θ_{y-}		80	89	-		

Note:

Light source here is the backlight of HKC BLU, and film structure is two diffuser sheets.

- (1) Each chromaticity coordinates (x, y) are measured in CIE1931 color space when full-screen displaying (Red, Green, Blue, White) and light source is defined by HKC BLU, measurements shall be made at the center of the panel, and setup of measurement is shown in Fig. 4.1.
- (2) The color gamut is defined as the fraction in percent of the area of the triangle bounded by R, G, B coordinates and the area is defined by NTSC 1931 color standard in the CIE color space. Chromaticity coordinates are measured by CS2000 and the standard setup of measurement is shown in Fig. 4.1.
- (3) Definition of Transmittance (T%):

The transmittance is measured with full white pattern (L_{max}) at the center of the LCD panel.

$$\text{Transmittance (T\%)} = \frac{\text{Luminance of LCD module}}{\text{Luminance of backlight}}$$

(4) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression,

$$\text{Contrast Ratio (CR): } CR = \frac{CR_W}{CR_D}$$

CR_W : Luminance of LCD module with full screen white pattern (255,255, 255) at center point.

CR_D : Luminance of LCD module with full screen Dark pattern (0, 0, 0) at center point.

Where the measure point of to the Contrast Ratio is the center of the panel

(5) Definition of Response time (Tg):

The Response time is measured under the condition of OD function on.

Average of gray to gray response time (T_g) means the average switching time of luminance ratios among 0%,25%,50%,75%, and 100% to each other and is optimized on frame rate =60Hz.

Measured Response time		To				
		0%	25%	50%	75%	100%
From	0%		$T_{0\%to25\%}$	$T_{0\%to50\%}$	$T_{0\%to75\%}$	$T_{0\%to100\%}$
	25%	$T_{25\%to0\%}$		$T_{25\%to50\%}$	$T_{25\%to75\%}$	$T_{25\%to100\%}$
	50%	$T_{50\%to0\%}$	$T_{50\%to25\%}$		$T_{50\%to75\%}$	$T_{50\%to100\%}$
	75%	$T_{75\%to0\%}$	$T_{75\%to25\%}$	$T_{75\%to50\%}$		$T_{75\%to100\%}$
	100%	$T_{100\%to0\%}$	$T_{100\%to25\%}$	$T_{100\%to50\%}$	$T_{100\%to75\%}$	

Table. 4.2 Switching time of luminance ratios matrix

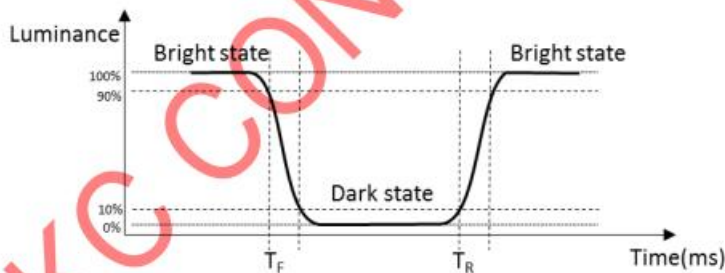


Fig. 4.3 The definition of T_R and T_F

Measured response time is determined by 10% to 90% brightness difference of rising (T_R) or falling (T_F) time.

(6) Definition of Viewing angle:

As Note (4) the static contrast ratio definition, the viewing angles are defined at the angle that the contrast ratio is larger than 10 at four directions relative to the perpendicular direction of the HKC's module (two vertical angles: up θ_{y+} and down θ_{y-} ; and two horizontal angles: right θ_{x+} and left θ_{x-}). The standard setup of measurement is shown in Fig. 4.1 & 4.4

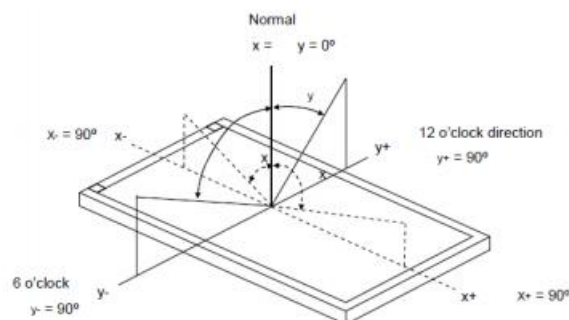
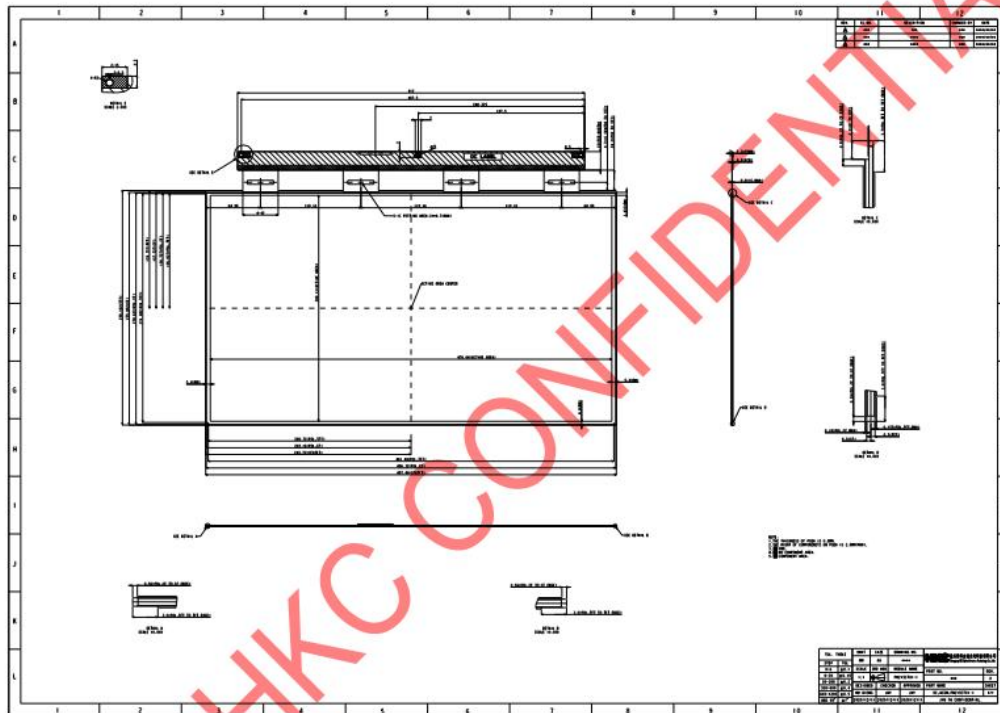


Fig. 4.4 View angle coordination system

5. MECHANICAL CHARACTERISTICS

5.1 Mechanical Specification



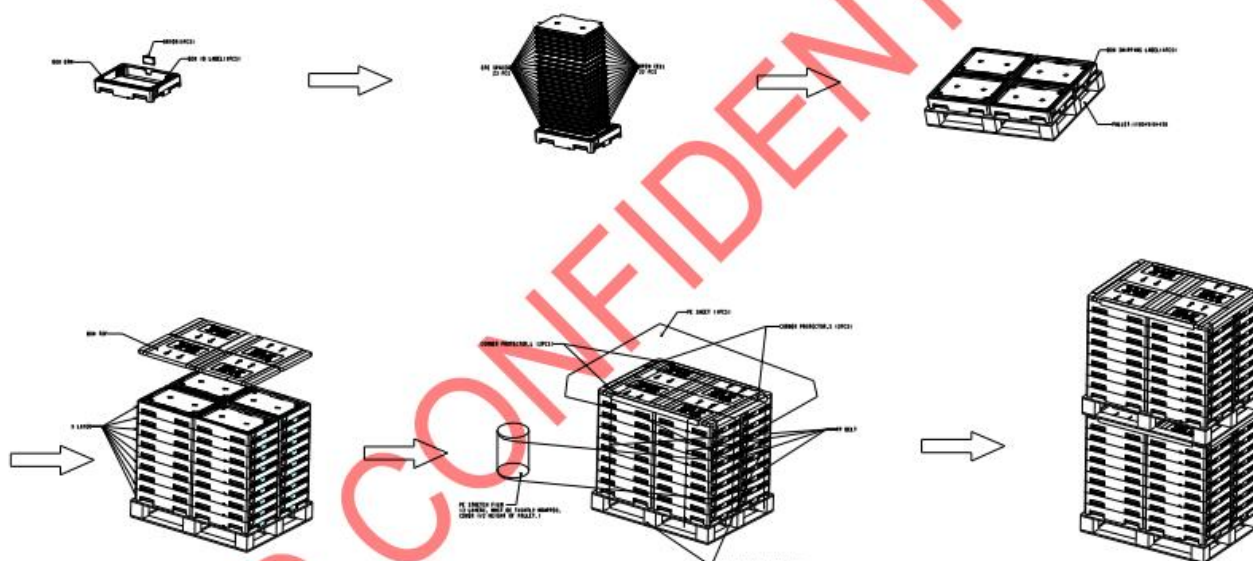
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5.2 Packing

5.2.1 Packing Specifications

Item	Specification			
	Quantity	Dimension(mm)	Item	Weight(Kg)
Packing Box	22 pcs/box	580(L) x 425(W) x 108(H)	Net Weight Gross Weight	9.33 9.92
Pallet	1	1190(L) x 910(W) x 150 (H)	Net Weight	16.5
Stack Layer	9			
Boxes per Pallet	36			
Pallet after Packing	792pcs/pallet	1190(L) x 910(W) x 1062(H)	Gross Weight	374



6.DEFINITION OF LABELS

TBD

7. PRECAUTION

Please pay attention to the followings when a TFT-LCD cell is used, handled and mounted.

7.1 Unpacking

Should use immediately after unpacking TFT -LCD cell to prevent the terminal corrosion.

Protection film for a polarizer on a TFT open cell should be slowly peeled off so that the electrostatic charge can be minimized.

Source PCB should be connected to the ground when peel off the protection film.

The protection film should not be contacted to the driver during peeling off.



Fig 7.1 Unpacking

Please pay attention to side glass scratch when a TFT-LCD cell is used for floating display, as shown in Fig.7.2.

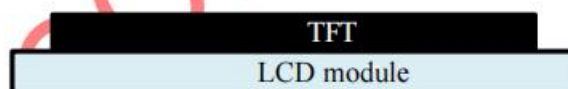


Fig 7.2 Floating display section

7.2 Storage Test

Any attachment on polarizer of open-cell, such as tape, is forbidden and not recommend, especially under the high temperature and high humidity environment.

8. GP REQUIREMENT

- a) RoHS, Directive 2011/65/EU of the European Parliament and council of 1 July 2011
- b) RoHS, Directive (EU) 2015/863 of the European Parliament and council of 31 March 2015
- c) PPW

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9.0 目的

为使背光件在采购及检验时有标准依据，特制定此规格书文件

10.0 范围

适用于背光 21.5 寸 215YN1 LED(备注：72 pcs LED)侧背光.配 HKC PC215CT01-1 玻璃。

11.0 职责

R D: 本规格书之制定与修改

采购：以本规格书为采购依据

Q A: 以本规格为标准执行检测

12.0 安全规格

ROHS 基准 环境物质管制基准

13.0 环境条件

项目	规格	备注
操作温度 (°C)	0—55	
操作湿度 (%)	5—95	最大值时温度 40 (°C)
储存温度 (°C)	-10—60	
储存湿度 (°C)	8—90	最大值时温度 50 (°C)

14.0 产品规格

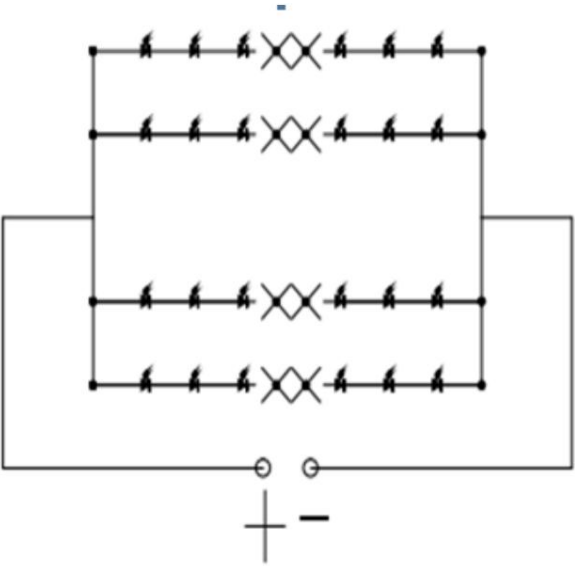
序号 NO.	项目 Item	规格描述 Specification	备注 Remark
1	发光类型 BLU TYP	LED	
2	铁框尺寸 Bezel size	495.6mm*292.2mm*9.5mm	
3	背光尺寸 Moudle size	495.6*292.2*9.5mm (YTP)	
4	显示区尺寸 Active area	477.5mm*268.6mm	M/F area
5	重量 Weight	TBD	-----
6	ROHS	ROHS compliant	

14.1 电气特性

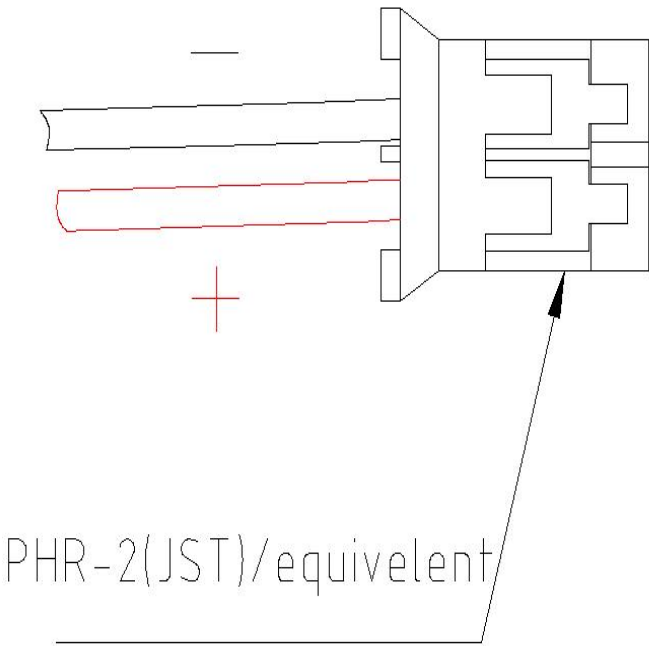
项目 Item	标记 Symbol	条件 Condition	数值 Values			单位 Unit	备注 Remark
			MIN	TYP	MAX		
灯条输入电压 Input lightbar votage	V_{pin}	单条 single	-----	51	58	V	NOTE 1/2
灯条输入电流 Input lightbar current	I_{pin}	单条 single	-----	240	-----	mA	
LED 寿命 Led life Time	Hours	-----	30000	-----	-----		

NOTE 1:

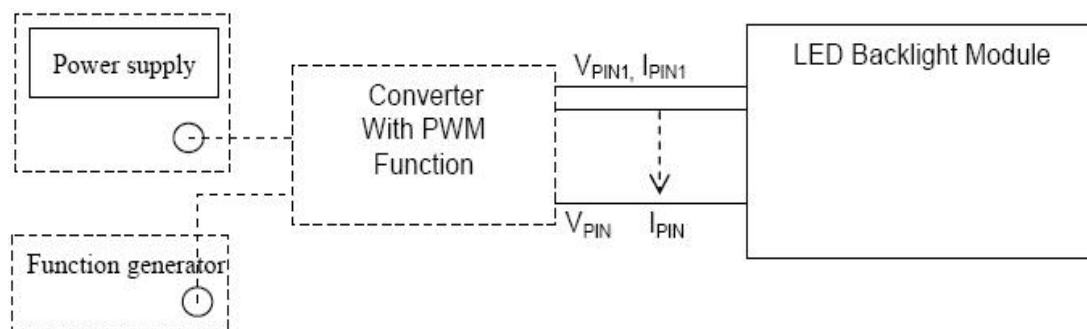
灯条串并定义及接口型号定义: Light bar Series and Parallel condition,interface type condition:
18 串 4 并 / 18 series 4 Parallel



原理图 18*4=72
电流: 240mA



NOTE 2:



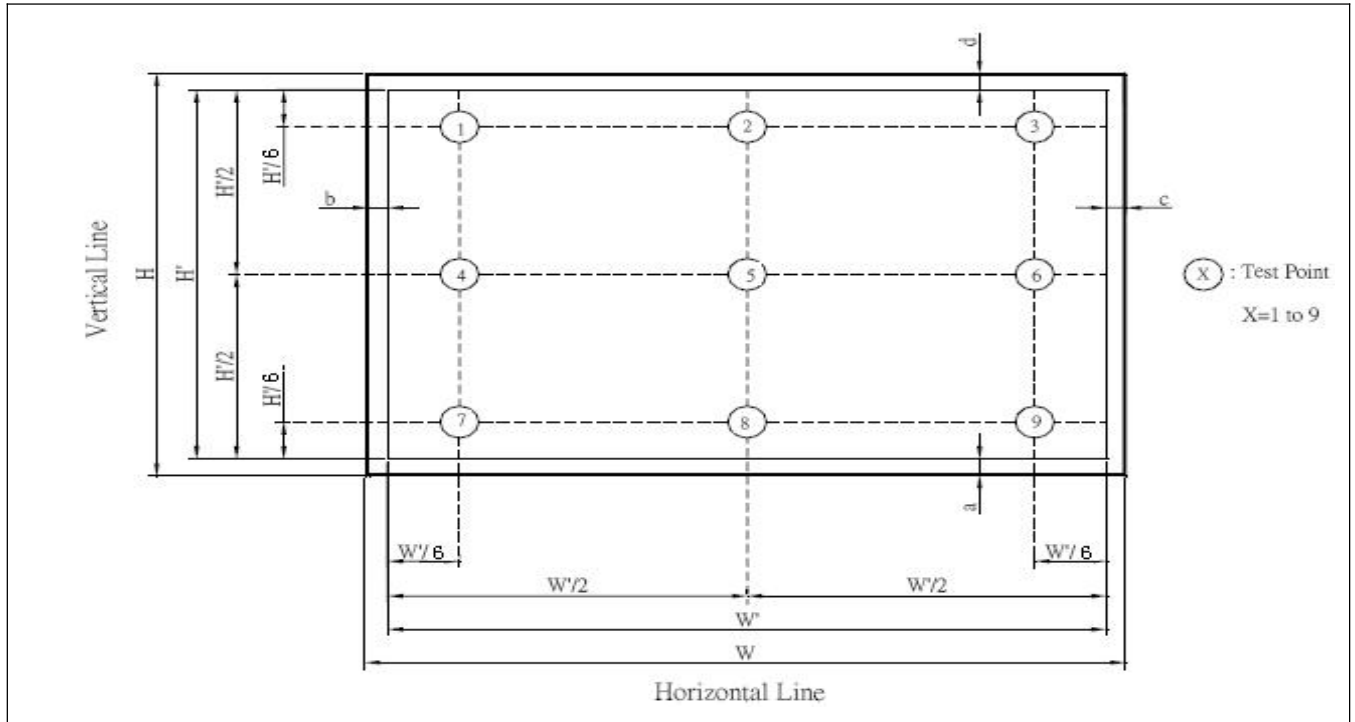
14.2 光学规格

环境温度(Ta)=25℃±2 湿度 HR=65%±10

項目 Item			單位 unit	規 格 Spction			备注 Remark
				MIN	TYP	MAX	
	模组亮度 BLU Brightness	Center point	cd/m ²	250	270	---	Center point (NOTE 1)
	均匀性 Uniformity	9 点	%	72	75	---	(NOTE2)

NOTE 1: 中心点为最亮点 The center brightness data ia the maximum

NOTE 2: 下图示中 9 点之最小数值点比中心点，均匀性定义：Minimum(1-9)/Maximum(5)
The figure blew the minimum value of 9 point divided by the center ,
Luminous uniformity is defined: Minimum(1-9)/Maximum(5)



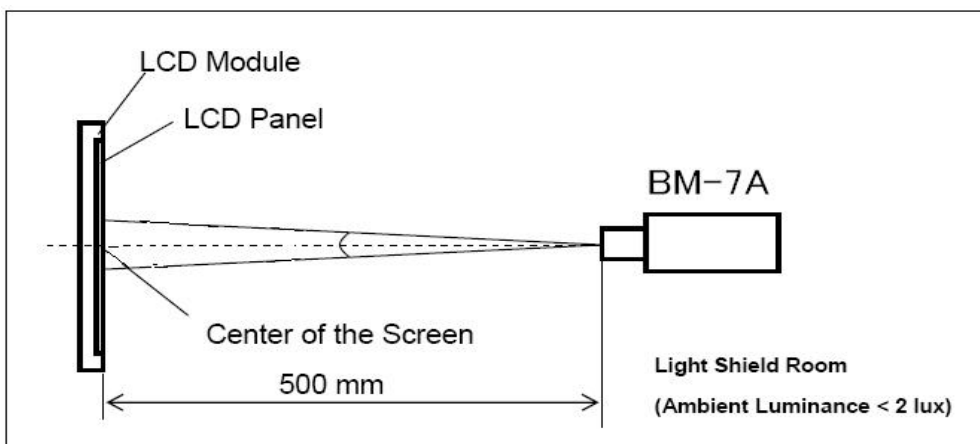
1. W: The length of BLU luminant area , H: The wide of BLU luminant area
2. $W' = W - b - c$ $H' = H - a - d$

14.3 光学测试标准

14.3.1 辉度计: TOPCON-7A 视角:1° 辉度计与被测物体距离: 500±50mm
 TOPCON-7A Angle:1° Distance:500±50mm

14.3.2 测试条件: 环境温度: 25°C±2°C, 湿度 (HR) =65±10%, 环境亮度≤2Lux,
 点亮 20 分钟后测试

Test conditions: the ambient temperatue is 25°C±2°C,humidity 65±10%,the ambient brightness≤2Lux, 20 minutes after lighting.



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15.1 背光检验规格

15.1.1 背光画面检验规格 BLU screen test specifications

序号	项目 Item	检验项目 Test project	规格 Specifications	判定 Determinant	检验工具 Inspection tools
1	背光 BLU	亮点,暗点, 异物	$D \leq 0.15$	忽略 ignore	菲林卡尺 Film caliper (NOTE 1) (NOTE 2) (NOTE3)
			$0.15 < D \leq 0.5$	$n \leq 3, S \geq 5$	
			$D \geq 0.5$	NOT allow	
		线状异物, 划伤,刮伤	$W \leq 0.1$	忽略 ignore	
			$0.1 < W \leq 0.2$ $0.3 \leq L \leq 5$	$n \leq 3, S \geq 5$	
			$0.2 < W, 0.3 < L$	NOT allow	
		亮暗不均 Mura	---	依限度样品 by limit sample	目视 eye
		水波纹 Ripple	---	依限度样品 by limit sample	目视 eye

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15.1.2 外观检验

Appearance Inspection Specification

序号 Item	项目 Item	检验项目 Test project	规格 Specifications	判定 Determinant	检验工具 Inspection tools
1	钣金 BEZEL	刮伤/压痕 Scratch/sunken	$W \leq 0.15$	忽略 ignore	菲林卡尺 Film caliper
			$0.15 < W \leq 0.25$ $L \leq 20\text{mm}$	$n \leq 4$	
			$0.15 < W \leq 0.25$ $20 < L \leq 50$	$n \leq 2$	
		无感刮伤	-----	不计	目视 eye
		毛边 Rough edge	$L > 0.1\text{mm}$	Not allow	目视 eye
		氧化生锈 Oxidation and RUST	-----	Not allow 断面依限度样品	目视 eye
		脏污/油污 Dirty filth/greasy dirt	-----	Not allow	目视 eye
2	线材 Wire	破裂 Broken	-----	Not allow	目视 eye
3	连接器 connector	破裂/变形 Broken/Deformation	-----	Not allow	目视 eye
4	胶带 Tape	偏移/浮起 Offset/Emerge	-----	Not allow	目视 eye
5	标签 Lable	无 No Lable	-----	Not allow	目视 eye
		破损 Broken	-----	Not allow	目视 eye
		脏污 Dirt	能够识别 Can be read	OK	目视 eye
		不清晰 Not clear	能够识别 Can be read	OK	目视 eye
		内容错误 Mistake	-----	Not allow	目视 eye

Note 1:

目视距离: $30 \pm 5\text{cm}$, 检查角度: 上下 ± 30 度, 左右 ± 45 度。

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Inspection distance: $30 \pm 5\text{cm}$,

Inspection Angle: ± 30 degress up and down the left ± 45 degress

Note 2:

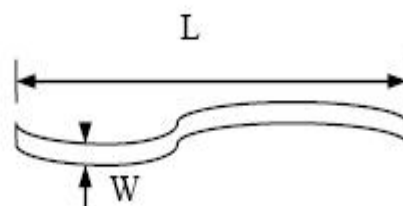
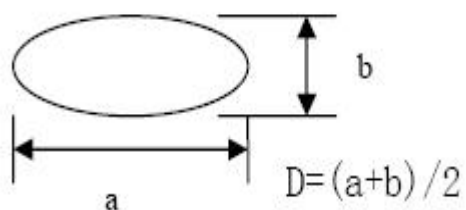
“S” 定义：点与点之间的距离

The “S” definition: The distance between the defect dot

Note 3:

a, b, D, W, L 的定义，具体如下：

The a, b, D, W, L definition, for the next:



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16.0 可靠性测试项目及条件

Reliability Test Items and Conditions

项目 Item		测试条件 Test condition	判定基准
动作 实验	高湿高湿 Operate at High Temperature and HUmidity	+45℃, 85%RH, 240Hrs	A,B,C,D,E,F
	高温 High temperature operation	Ta=60℃, 240Hrs	A,B,C,D,E
	低湿 Low temperature operation	0±2℃、240Hrs	A,B,C,D,E
	连续点灯	25±2℃, 65±10%RH/10000Hrs	A,B,C,D,E
	开/关灯 On/Off lighting	On(30sec)/Off(30sec)、10000 cycles	A,B,G
	冷热冲击 Thermal Shock	-20℃/30min-70℃/30min for a total 200 cycles, Start with cold temperature and end with high temperature	A,B,C,D,E,F
	高温 High temperature	60±2℃, 240Hrs,	A,B,C,D,E
	低温 Low temperature	-20±2℃、240Hrs	A,B,C,D,E
振动 实验	振动 Vibration Test	Sinusoidal Vibration level: 1.5G Bandwidth:10~300Hz Waveform: sine wave 30min for each direction X,Y,Z(1.5Hrs in total)	A,B
包装跌落实验 Packing drop test		0<W≤10, 106cm; 10<W≤24, 91cm 24<W≤45, 76cm, 1角3棱6面	A,B
线材 组	线材 Bending	导线折弯拉力: 0.6kgf±90°, 10次; 0.6kgf ±180°, 10次	A,B
	端子 Pulling	静荷重: 出现方向拉力维持 3kgf, 1min	A,B
Connector 强度		抗拉力大于 1.5 kgf	A,B

NOTE 1:

测试后, 须放置常温, 常温 2 小时后测试

After testing, shall be placed at normal room temperature and Humidity after 2 huors for judgment

判定基准：

- A. 点灯画面无异常
- B. 外观无异党(损坏、破裂、刮伤、锈蚀、严重变形等情形)
- C. 辉度值维持初始值 60%以上
- D. 辉度均匀度变化率小于 30%
- E. 色度变化 X,Y 小于 0.2
- F. 不能结露
- G. 辉度值维持初始值 50%以上

17.0 包装标示

TBD

18.0 注意事项 General Precautions

18.1.1 储存 Storage

1. 模组需储存在暗室，并要求室温在 $25 \pm 10^{\circ}\text{C}$ ，湿度在 $65 \pm 10\%\text{RH}$ ，不能暴露在阳光下
Stor the module ina dark room where must keep at $25 \pm 10^{\circ}\text{C}$, $65 \pm 10\%\text{RH}$, the module shall be exposed under strong light such as direct sunlight.

2. 请不要将产品放置在有机溶剂中或是有腐蚀性气体的场合

Do not store the produce in surroundings containing organic solvent or corrosive gas

3. 应当把产品储存在防静电容器中或是防静电膜中

Store the module in an anti-electrostatic container or film .

18.1.2 操作 Handling

1. 请不要施加机械振动或是过大外力在模组上

Do not subject the module to mechanical shock or to excessive force
On its surface

2. 禁止放置污染物在模组表面，不可使用裸露的手碰触产品。

To avoid contamination on the display surface, do not touch the module
Surface with bare hands

3. Must be the correct way to connec the power cable, otherwise it will
Cause damage

18.1.3 运输 transportation

1. 运输过程中严禁超高堆放挤压，倒放，整车装卸.

In transporting, Goods are strictly prohibited during the ultra-high stacking
Extrusion, upside down, entire vehicle liading and unloading.

2. 防静电措施 Static Electricity

人体在接触产品时，应当以适当的方式接地

Persons who handle the module should be grounded through adequate methods.

18.2 其它 Other

1. 对本规格书，如有任何议疑，经双方协议后处理.

About this specification, if any question, go through both sides agreement
Post-processing.

2. 任何变更都必须经过联络，并取得双方同意后主可变更，并针对变更内容记录管理.

Any changes must get into contant with each other, get tht agreement then
To change , and update the contents to record.

