

**深圳市鸿展光电有限公司**  
SHENZHEN Great Prospect Optoelectronics CO., LTD

APPROVAL SHEET  
 承 认 书

客户名称 Customer	
产品型号 Part NO.	<b>HY010001</b>
产品内容 Product type	Mode: Transmissive type .Normally black. TFT LCD Module LCD Module: Graphic 80RGB*160Dot-matrix
备注栏 Remarks	<input type="checkbox"/> APPROVAL FOR SEPCIFICATIONS ONLY <input checked="" type="checkbox"/> APPROVAL FOR SEPCIFICATIONS AND SAMPLE
客户确认签章 Signature by Customer:	

PREPARED BY	CHECKED BY	APPROVED BY

**深圳市鸿展光电有限公司**  
**SHENZHEN Great Prospect Optoelectronics CO., LTD**

**TABLE OF Contents**

1. General Description.....	2
2. Features.....	2
3. Mechanical Specification.....	2
4. Mechanical Dimension.....	3
5. Maximum Ratings.....	4
6. Electrical Characteristics.....	4
7. Backlight Characteristic.....	4
8. Module Function Description.....	5
9. Electro-optical Characteristics.....	6
10. Reliability.....	9
11. Inspection Standards.....	9
12. Precautions For Using LCD Modules.....	13
13. Factory.....	14
14. Revision History.....	14

# 深圳市鸿展光电有限公司

## SHENZHEN Great Prospect Optoelectronics CO., LTD

### 1. General Description

HY010001 is a 80\*160 dots matrix a-TFT LCD module. It has a TFT panel composed of 240 sources and 160 gates. The LCM can be easily accessed by micro-controller

### 2. Features

Display Mode	Transmissive
	a-TFT
Display Format	Graphic 80RGB*160 Dot-matrix
Input Data	SPI
Viewing Direction	ALL VIEW (IPS)
Display Driver IC	NV3022B

### 3. Mechanical Specification

Item	Specifications	Unit
Dimensional outline	14.04(W)*27.95(H)*1.85(T) (FPC not include)	mm
Resolution	80RGB*160	dots
Display Area	10.8(W)*21.696(V)	mm
Pixel size	0.135(W)*0.1356(H)	mm



# 深圳市鸿展光电有限公司

## SHENZHEN Great Prospect Optoelectronics CO., LTD

### 5. Maximum Ratings

Item	Symbol	Min	Max	Unit	Note
Supply voltage	V	-0.3	4.8	V	-
Operating temperature	T <sub>op</sub>	-20	70	°C	-
Storage temperature	T <sub>STR</sub>	-30	80	°C	-

### 6. Electrical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	Logic	V <sub>CC</sub>	-	1.65	1.8	3.3	V
Input Voltage	H level	T <sub>IH</sub>	-	0.7*IOVCC	-	IOVCC	V
	L level	T <sub>IL</sub>		V <sub>SS</sub>	-	0.2* IOVCC	

### 7. INCELL Characteristic

Item	Symbol	Min	Typical	Max	Unit
LED module Forward voltage	V <sub>LED</sub>	-	3.2	-	V
LED module current	V <sub>LED</sub>	-	20	-	mA
INCELL Surface Luminance ★1	L <sub>S</sub>	-	-	-	Cd/m <sup>3</sup>
INCELL Surface brightness uniform ★2	L <sub>D</sub>	-	-	-	%

★ 1Test condition is:

- (a) Center point on active area.
- (b)Best Contrast.

★2Uniform measure condition:

- (1)Measure 9 point. Measure location show below;
- (2)Uniform=(Min. brightness /Max. brightness)\*100%
- (3)Best Contrast.

### 8. Module Function Description

#### 8.1Pin Descriptions

**深圳市鸿展光电有限公司**  
**SHENZHEN Great Prospect Optoelectronics CO., LTD**

Pin No.	Symbol	Functional	Notes
1	NC	NC	
2	NC	NC	
3	SDA	I2C data input and output	
4	SCL	I2C clock input	
5	RS	RS	
6	RES	LCM_RST	
7	CS	Chip Select Pin	
8	GND	Power Ground	
9	NC	NC	
10	VCC	VI0_PMU	-
11	LEDK	LCD_LEDK	
12	LEDA	LCD_LEDA	
13	GND	Power Ground	

## 8.2 Timing characteristics.

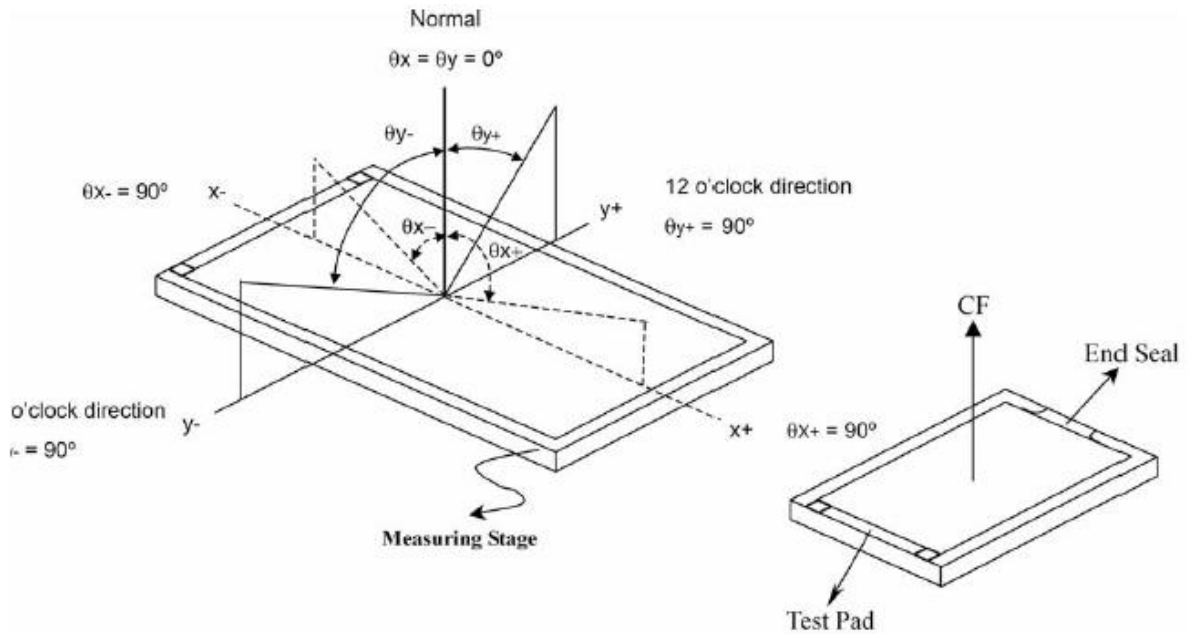
Refer to IC datasheet

### 9. Electro-optical Characteristics

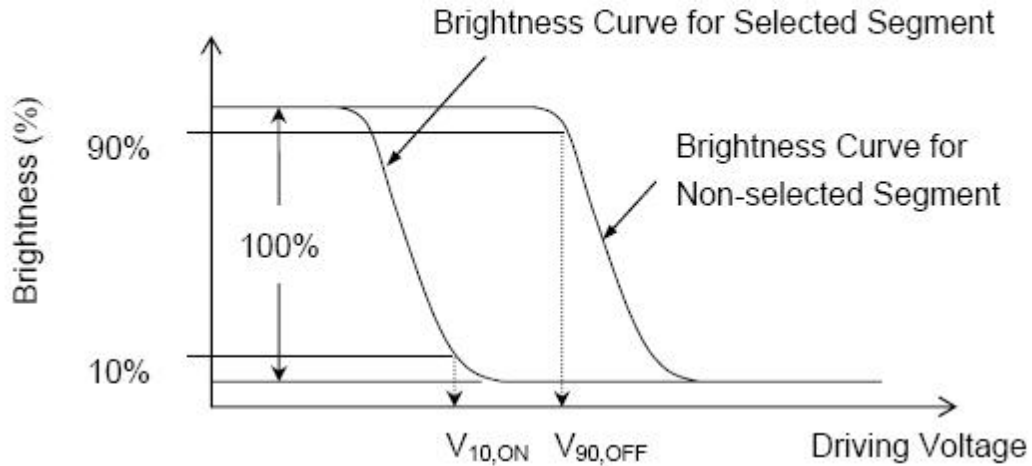
Item	Symbol	Conditions	Temp	Min.	Typ.	Max.	Unit	Note
Response Time	$T_R$	$\theta = \phi = 0$	25°C	-	TBD	TBD	msec	NOTE2
	$T_F$			-	TBD	TBD	-	
Viewing Angle Range	$\phi = 0^\circ (6'' )$	$\phi = 90^\circ (3'' )$		$\phi = 180^\circ (12'' )$		$\phi = 270^\circ (9'' )$		NOTE3
$\theta (25^\circ\text{C}) CR \geq 10$	TBD	TBD		TBD		TBD		NOTE3

The above “viewing angle” is the measuring position with the largest contrast ratio. Not for good image quality. Viewing direction for good image quality is 12 O’clock.

- For panel only
- Electro-Optical Characteristics Test Method

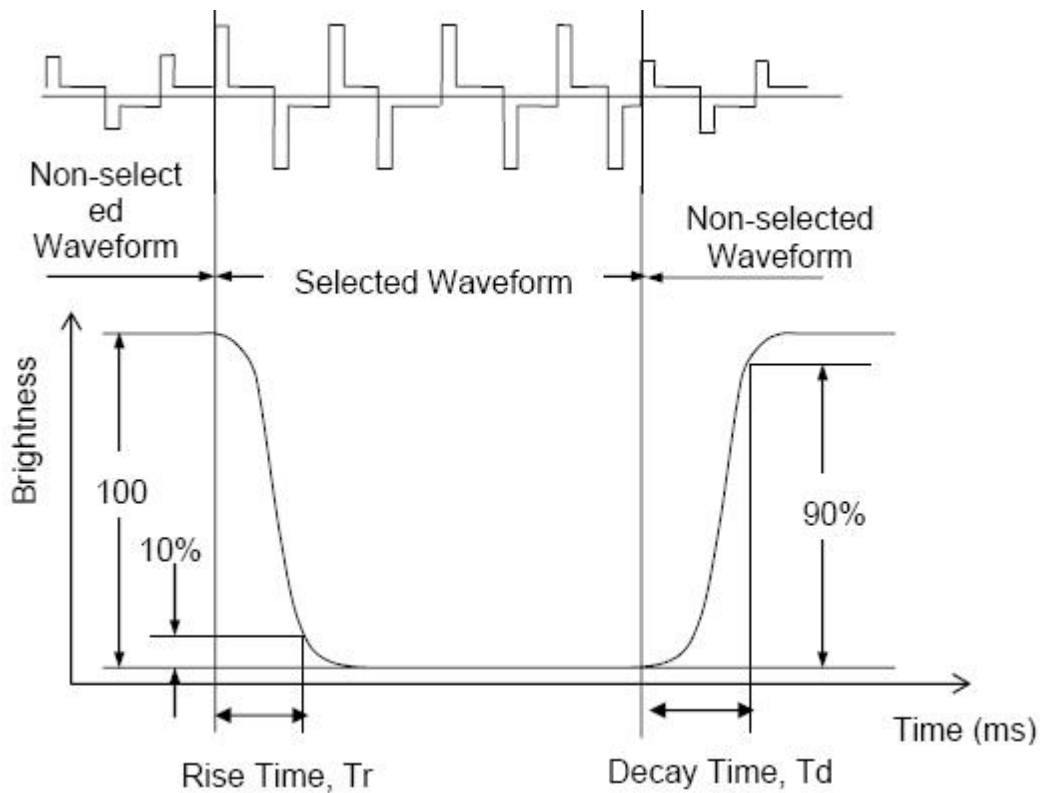


$$V_{op} = (V_{10, ON} + V_{90, OFF})/2$$



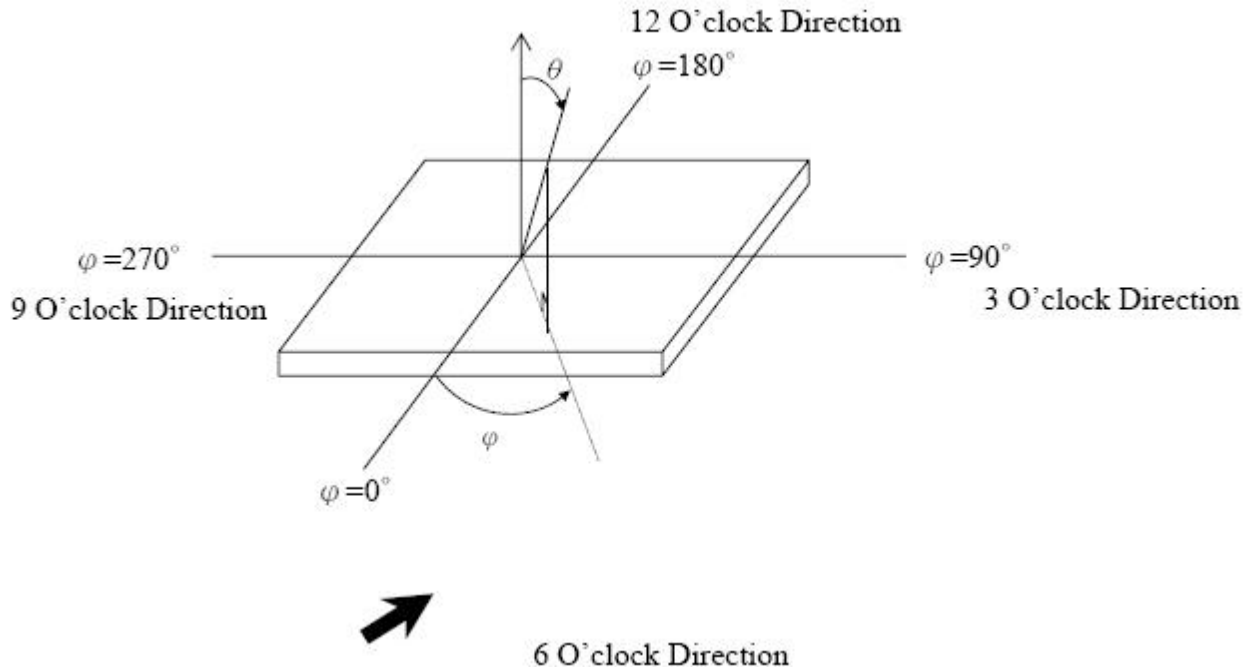
**.Note2.Definition of Optical Response**

**Time:**



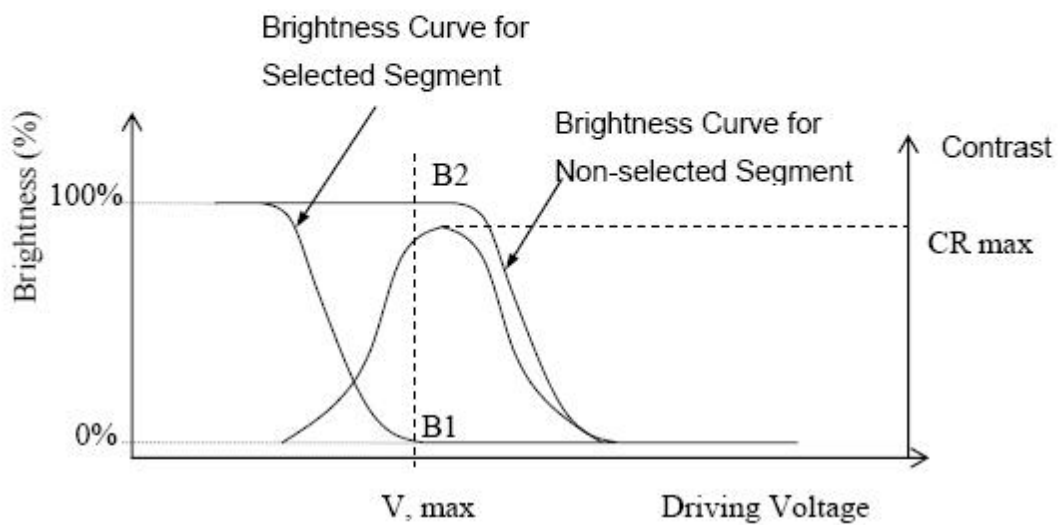
**.Note3.Definition of Viewing Angle  $\theta$  and  $\phi$  :**





**Note4.Definition of Contrast ratio (CR):**

$$CR = \frac{\text{Brightness of Non-selected Segment (B2)}}{\text{Brightness of Selected Segment (B1)}}$$



# 深圳市鸿展光电有限公司

## SHENZHEN Great Prospect Optoelectronics CO., LTD

### 10. Reliability

#### 10.1Mtbf

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

#### 10.2Test condition

NO.	ITEM	CONDITION	CRITERION
1	High Temperature Non-Operating Test	70°C*48Hrs	。 No Defect Of Operational Function In Room Temperature Are Allowable 。 IDD of LCM in Pre-and Post-Test Should Follow Specification
2	Low Temperature Non-Operating Test	-20°C*48Hrs	
3	High Temperature/Humidity Non Operating Test	60°C*90%RH*48Hrs	
4	High Temperature Operating Test	70°C*48Hrs	
5	Low Temperature Operating Test	-20°C*48Hrs	
6	Thermal Shock Test	-20 °C (30Min) ↔ 70 °C (30Min) *10CYCLES	

Notes:

- Judgments should be made after exposure in room temperature for two hours.
- The distill water is used for the high temperature/humidity test.
- The sample above is individually for every reliability tests condition.

### 11.Inspection standards

#### 1.AQL(Acceptable Quality Level)

AQL of major and minor defect.

	MAJOR DEFECT	MINOR DEFECT
AQL	0.65	1.5

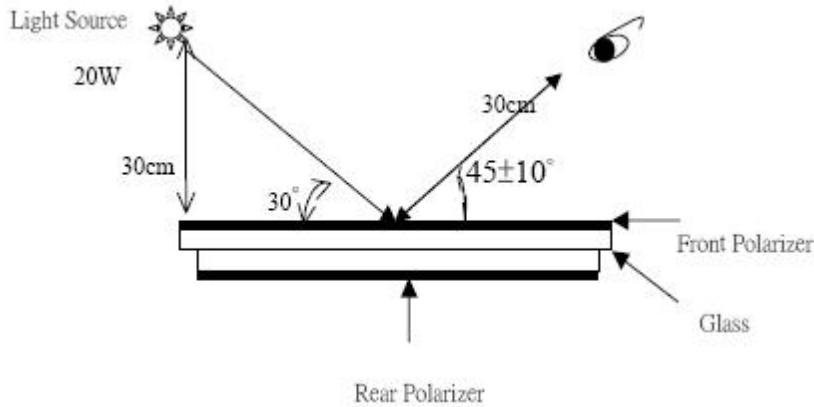
#### 2. Basic conditions for inspection

The LCM face to us, in normal environment, the lux is 1000±200.(Darkroom's lux: 100±50),About an angle of incidence 30,a distance of 30 cm with an angle of 45 degree to check the products without uncovering the film!

**(As shown below)**

# 深圳市鸿展光电有限公司

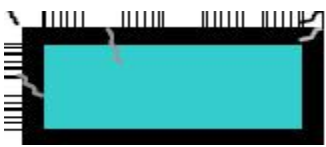
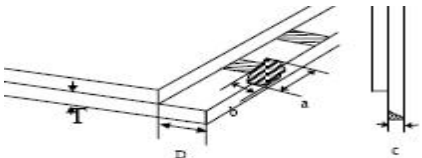
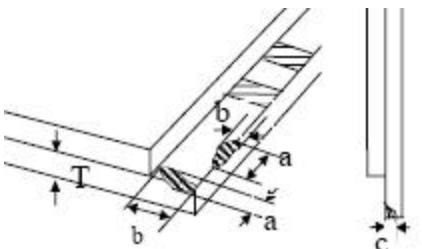
## SHENZHEN Great Prospect Optoelectronics CO., LTD



### 3. Inspection item and criteria

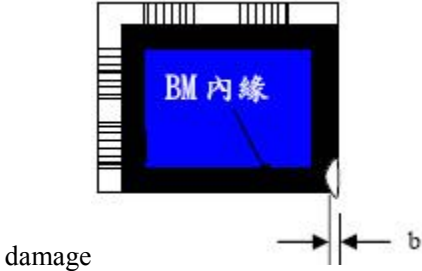
#### 3.1 Visual inspection criterion in immobility

##### 3.1.1 Glass defect

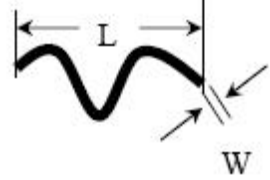
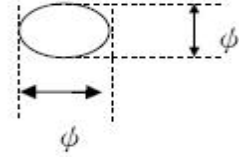
NO	Defect item	Criteria	Remark
1	Dimension Unconformity (Major defect)	By Engineering Drawing	
2	Cracks (Major defect)	1. Linear cracks panel 2. Nonlinear crack contrast by limited sample	 <b>【Reject】</b>
3	Glass extrude the conductive area (minor defect)	a: disregards and no influence assemblage. 1) $b \leq 1/3$ Pin width (non bonding area) 2) bonding area $\leq 0.5$ mm	A: Length, b: Width <b>【Accept】</b> <b>【Accept】</b>
4	Pin-side ,conductive area damaged (minor defect)	(a c: disregards) $b \leq 1/3$ of effective length for bonding electrode	a: length, b: Width, c: Thickness  <b>【Accept】</b>
5	Pin-side, non-conductive area damaged (minor defect)	1) Damage area don't touch the ITO (Including contraposition mark, except scribing mark) 2) $C < T$ $b \cong BM/3$ of width 3) $c = T$ b not touch the seal glue	a: Length, b: Width c: Thickness  <b>【Accept】</b> <b>【Accept】</b> <b>【Accept】</b>

# 深圳市鸿展光电有限公司


## SHENZHEN Great Prospect Optoelectronics CO., LTD

		4)a disregards	
6	Non-pin-side damage (minor defect)	$c < T$ 1)b exceeds $1/3B_m$ <b>【Reject】</b>  $c = T$ b not touch the seal glue <b>【Reject】</b>	c: Thickness b: width of 

### 3.1.2 LCD appearance defect(View area)

NO	Defect item	Criteria		Remark
		Specification	Allowable	
1	Fiber、glass cratch、polarizer scratch/folded (minor defect)	$W \leq 0.03\text{mm}$	disregard	note1:L: Length, W: Width note2: disregard if out of AA 
		$0.03\text{mm} < W \leq 0.05\text{mm};$ $L \leq 2.0\text{mm}$	2	
		$0.05\text{mm} < W \leq 0.08\text{mm};$ $L \leq 2.0\text{mm}$	1	
		$W > 0.08\text{mm}; L > 2.0\text{mm}$	0	
2	Polarizer bubble、 concave and convex (minor defect)	$\phi \leq 0.1\text{mm}$	disregard	note1: $\phi = (L+W)/2$ , L:Length, W :Width note2:disregard if out of AA
		$0.1\text{mm} < \phi \leq 0.15\text{mm}$	2	
		$0.15\text{mm} < \phi \leq 0.2\text{mm}$	1	
		$0.2\text{mm} < \phi$	0	
3	Black dots、dirty dots、 impurities、eye winker (minor defect)	$\phi \leq 0.10\text{mm}$	disregard	note2:disregard if out of AA 
		$0.10\text{mm} < \phi \leq 0.15\text{mm}$	2	
		$0.15\text{mm} < \phi \leq 0.2\text{mm}$	1	
		$0.2\text{mm} < \phi$	0	
4	Polarizer prick (minor defect)	$\phi \leq 0.1\text{mm}$	disregard	note1: $\phi = (L+W)/2$ , L=Length, W=Width note2:the distance between two dots>5mm
		$0.1\text{mm} < \phi \leq 0.15\text{mm}$	3	
		$\phi > 0.20\text{mm}$	0	

### 3.1.3FPC

NO	Defect item	Criteria	Remark
1	Copper screen peel (minor defect)	Copper screen peel <b>【Reject】</b>	
2	No release tape or peel	No release tape or peel	

# 深圳市鸿展光电有限公司

## SHENZHEN Great Prospect Optoelectronics CO., LTD

		【Reject】		
3	Dirty dot and impurity of FPC for customer using side (minor defect)	Specification	Allowable	Note1: Cannot have stride ITO impurities
		$\phi \leq 0.25\text{mm}$	2	
		$\phi > 0.25$	0	

### 3.1.4 Black tape & Mara tape

NO	Defect item	Criteria	Remark
1	FPC or H/S black tape (minor defect)	1. shift spec: 1) glue to the polarize 【Reject】 2) IC bare 【Reject】 2. left-and-right spec: 1) exceed of FPC edge or H-S edge 【Reject】 2) IC bare 【Reject】	
2	No black tape (major defect)	No black tape 【Reject】	
3	Tape position mistake (minor defect)	Not by engineering drawing	
4	Mara tape defect (minor defect)	Peel before pulling the protecting film 【Reject】	

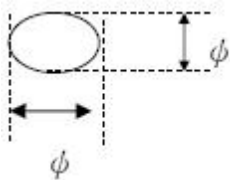
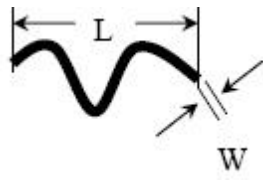
### 3.1.5 Silicon and Taffy glue

NO	Defect item	Criteria	Remark
1	Quantity of silicon (major defect)	Uncover the ITO and circuit area 【Reject】	note: compared by engineering
2	Taffy glue (major defect)	1. Uncover the reveal copper area【Reject】 2. Cover layer 0.3mm(Min)~3.0mm(Max) 【Reject】	note: if customer has special requirement, refer to the technical document 
3	Depth of glue covering (major defect)	Depth of glue covering overtop front Polarizer 【Reject】	Except of the special requirement

### 3.2 Electrical criteria

# 深圳市鸿展光电有限公司

## SHENZHEN Great Prospect Optoelectronics CO., LTD

NO	Defect item	Criteria	Remark	
1	No display (major defect)	No display 【Reject】		
2	Missing line (major defect)	Missing line 【Reject】		
3	Seg-com light and dark (major defect)	Seg-com light and dark 【Reject】	ND filter 2% test	
4	No display in immobility (major defect)	No display in immobility 【Reject】		
5	Flicker of Pattern (major defect)	Flicker of Pattern 【Reject】		
6	Mura (major defect)	ND filter 2%test		
7	Over current (major defect)	Over current 【Reject】		
8	Voltage out of specification (major defect)	Voltage out of specification 【Reject】		
9	Pattern blur, error code (major defect)	Pattern blur, error code 【Reject】		
10	Dark light, Flicker (major defect)	Dark light, Flicker 【Reject】		
11	Black/white dots 、 Dirty dots、 eye winker (major defect)	Specification	Allowable	Note1:disregard if out of AA 
		$\phi \leq 0.15\text{mm}$	disregard	
		$0.15\text{mm} < \phi \leq 0.25\text{mm}$	2	
		$0.25\text{mm} < \phi \leq 0.3\text{mm}$	1	
		$0.3\text{mm} < \phi$	0	
12	Fiber、glass crutch、Polarizer scratch/folded (major defect)	$W \leq 0.03\text{mm}$	disregard	Note1:L: Length, W: Width Note2: disregard if out of AA 
		$0.03\text{mm} < W \leq 0.05\text{mm}$ $L \leq 3.0\text{mm}$	2	
		$0.05\text{mm} < W \leq 0.1\text{mm}$ $L \leq 3.0\text{mm}$	1	
		$W > 0.1\text{mm}; L > 3.0\text{mm}$	0	

## 12.Precautions for using LCD modules.

### 12.1 Safety

# 深圳市鸿展光电有限公司

## SHENZHEN Great Prospect Optoelectronics CO., LTD

- (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

- (4) Store the panel or module in a dark place where the temperature is  $23 \pm 5^{\circ}\text{C}$  and the humidity is below  $45 \pm 20\% \text{RH}$ .
- (5) Store in anti-static electricity container.
- (6) Store in clean environment, free from dust, active gas, and solvent.
- (7) Do not place the module near organics solvents or corrosive gases.
- (8) Do not crush, shake, or jolt the module.

### 12.3 Handling Precautions

- (9) Avoid static electricity, which can damage the CMOS LSI.
- (10) The polarizing plate of the display is very fragile, please handle it very carefully.
- (11) Do not give external shock.
- (12) Do not apply excessive force on the surface.
- (13) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (14) Do not use ketonic solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (15) Do not operate it above the absolute maximum rating.
- (16) Do not remove the panel or frame from the module.

### 12.4 Warranty

The period is within twelve months since the date of shipping out under normal using and storage conditions.

### 13. Factory

FACTORY NAME:

FACTORY ADDRESS:

FACTORY PHONE:

### 14. Revision history

Version	Revise record	Date
V1.0	Original version	2021-04-14