和悦显示
HY Display

APPROVAL SHEET
承 认 书

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

PREPARED BY	CHECKED BY	APPROVED BY

TABLE OF Contents

1. General Description

HY010001 is a 80*160 dots matrix a-TFT LCD module. It has a TFT panel composed of 240 sources and160gates. The LCM can be easily accessed by micro-controller

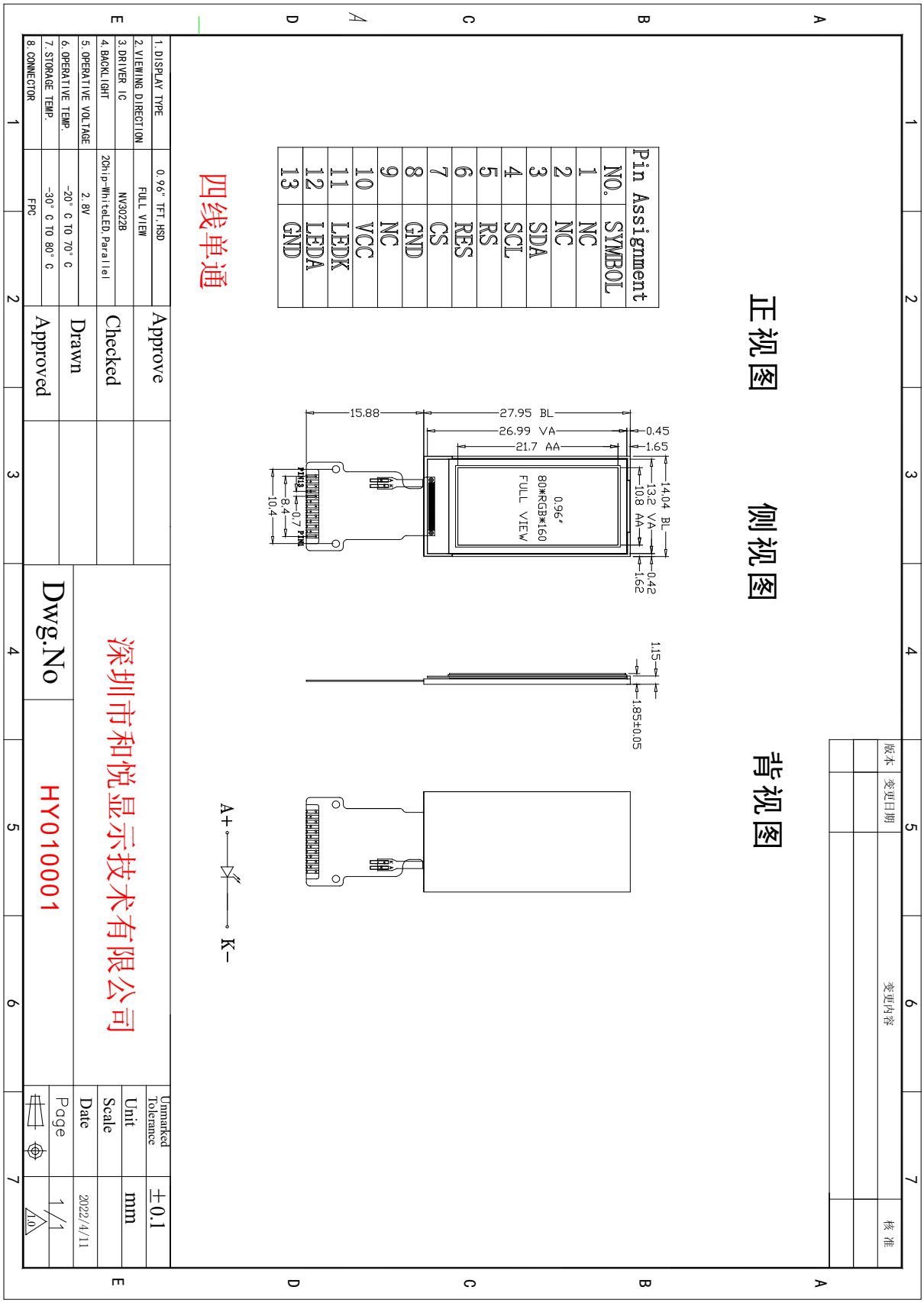
2. Features

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

3. Mechanical Specification

Item	Specifications	Unit
Dimensional outline	14.04(W)*27.95H)*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

4. MechanicalDimens



5. Maximum Ratings

Item	Symbol	Min	Max	Unit	Note
Supply voltage	V	-0.3	4.8	V	-
Operating temperature	T_{op}	-20	70	℃	-
Storage temperature	T_{STR}	-30	80	℃	-

6. Electrical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	Logic	V_{CC}	-	1.65	1.8	3.3	V
Input Voltage	H level	T_{IH}	-	0.7*IOVCC	-	IOVCC	V
	L level	T_{IL}		Vss	-	0.2* IOVCC	

7. INCELL Characteristic

Item	Symbol	Min	Typical	Max	Unit
LED module Forward voltage	V_{LED}	-	3.2	-	V
LED module current	V_{LED}	-	20	-	mA
INCELL Surface Luminance ★1	L_S	-	-	-	Cd/m^3
INCELL Surface brightness uniform ★2	L_D	-	-	-	%

★ 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

Pin No.	Symbol	Functional	Notes
1	NC	NC	
2	NC	NC	
3	SDA	data input and output	
4	SCL	clock input	
5	RS	Display data/command selection pin in 4-line serial interface	
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	

8.2Timing characteristics.

Refer to IC datasheet

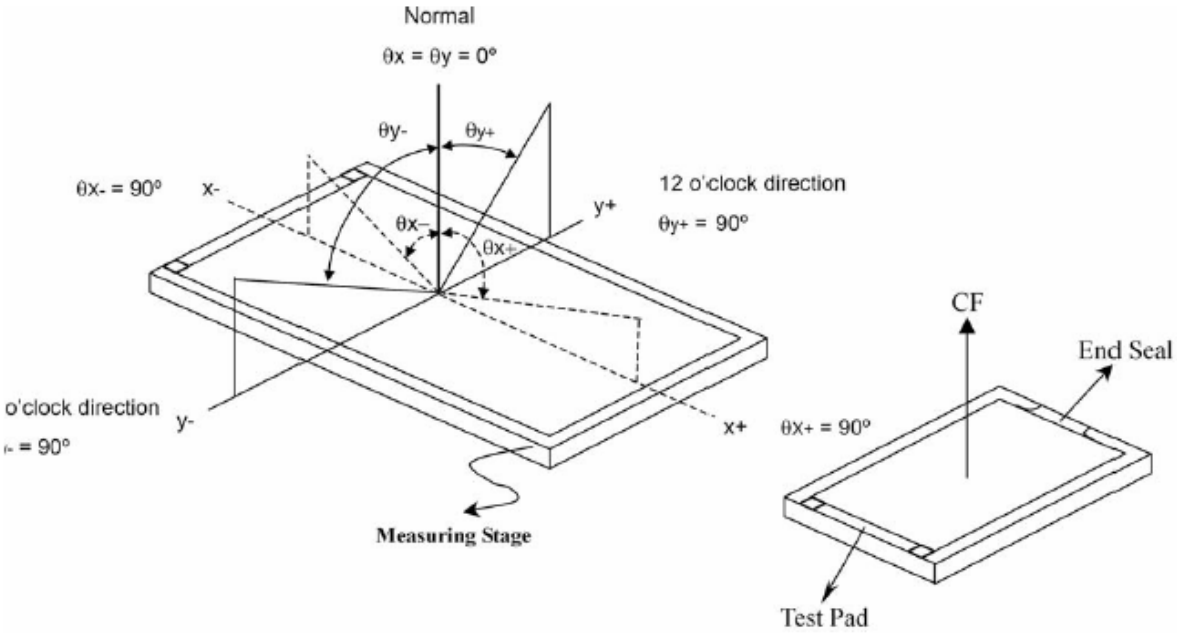
9.Electro-optical Characteristics

Item	Symbol	Conditions	Temp	Min.	Typ.	Max.	Unit	Note
Response Time	T_R	θ = ϕ =0	25℃	-	TBD	TBD	msec	NOTE2
	T_F			-	TBD	TBD	-	
Viewing Angle Range	ϕ =0⁰ (6”)	ϕ =90⁰ (3”)	ϕ =180⁰ (12”)		ϕ =270⁰ (9”)			NOTE3
θ (25℃) CR≥10	TBD	TBD	TBD		TBD			NOTE3

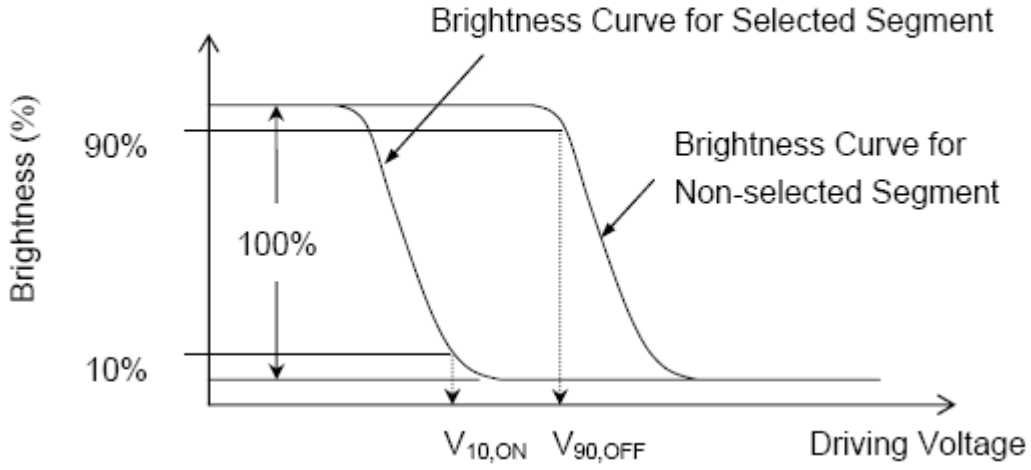
The above “viewing angle” is the measuring position with the largest contrast ratio. Not for good image quality. Viewing direction for good image quality is 12 O’clock.

●For panel only

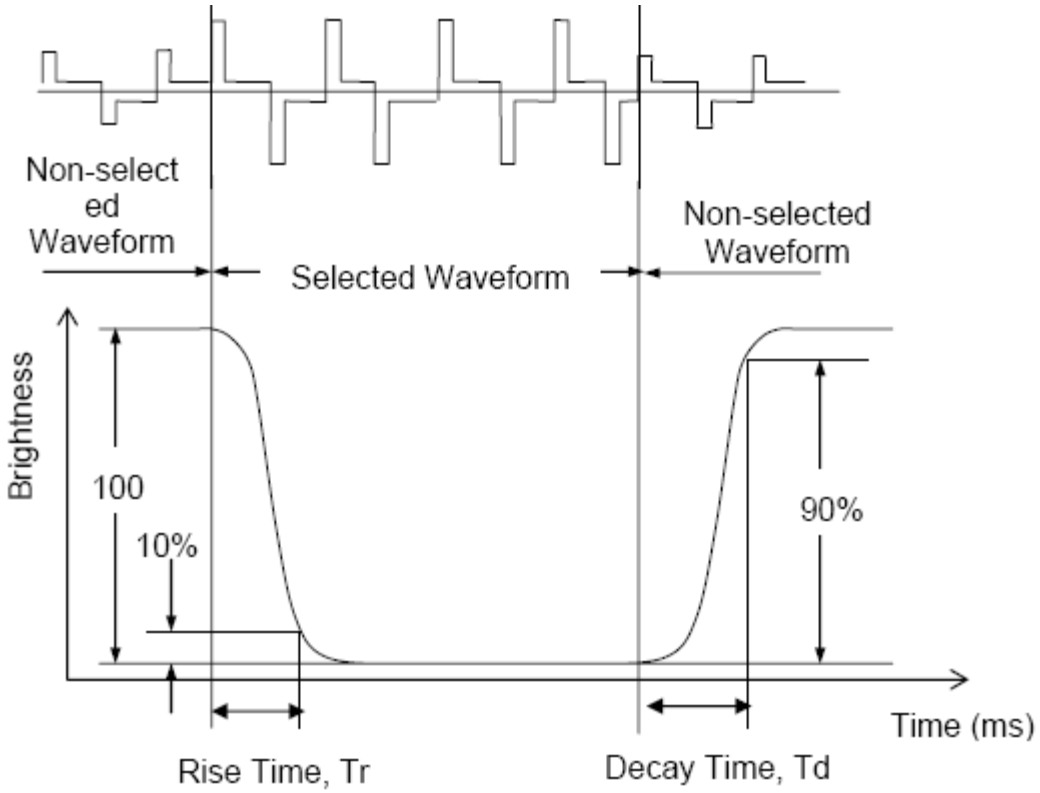
●Electro-Optical Characteristics Test Method



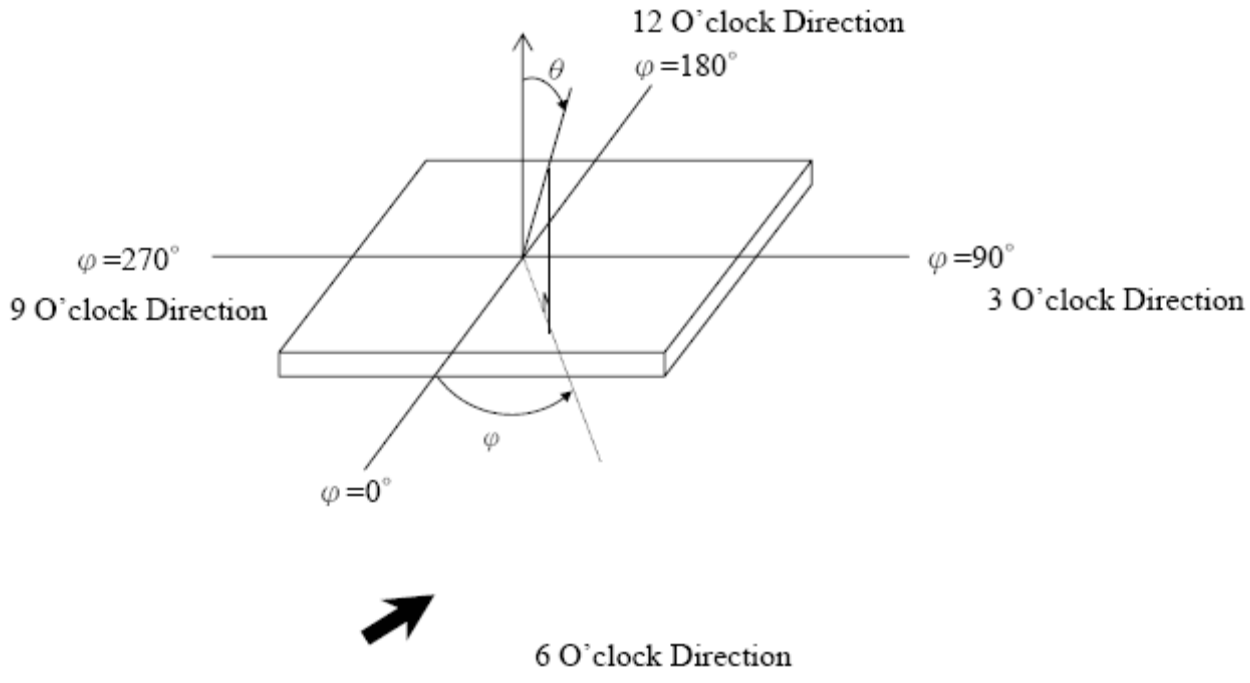
$$Vop = (V_{10,ON} + V_{90,OFF})/2$$



.Note2.Definition of Optical Response Time:

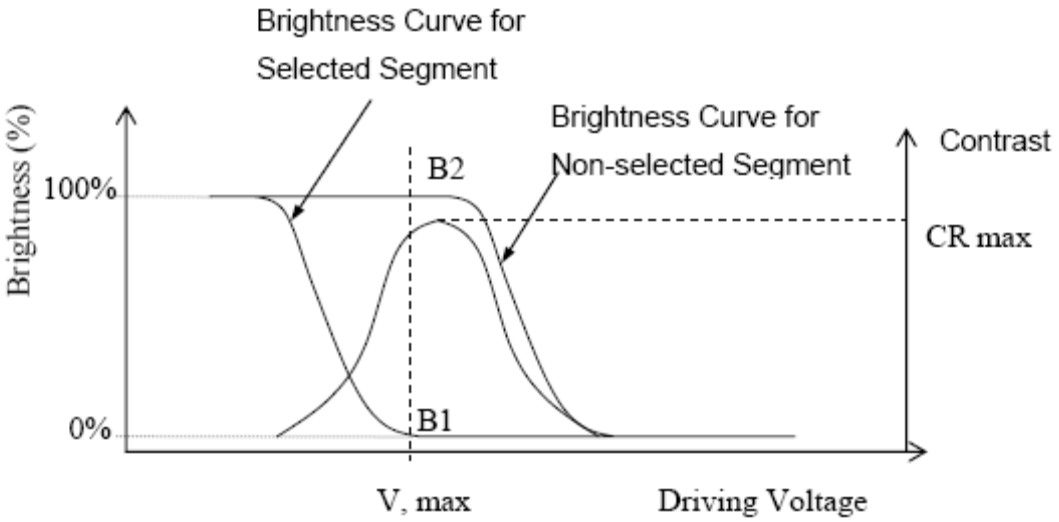


.Note3.Definition of Viewing Angle θ and ϕ :



Note4.Definition of Contrast ratio (CR):

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



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℃*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℃*48Hrs	
3	High Temperature/Humidity Non Operating Test	60℃*90%RH*48Hrs	
4	High Temperature Operating Test	70℃*48Hrs	
5	Low Temperature Operating Test	-20℃*48Hrs	
6	Thermal Shock Test	-20 ℃ (30Min) ↔70 ℃ (30Min) *10CYCLES	

Notes:

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

11.Inspection standards

1.AQL(Acceptable Quality Level)

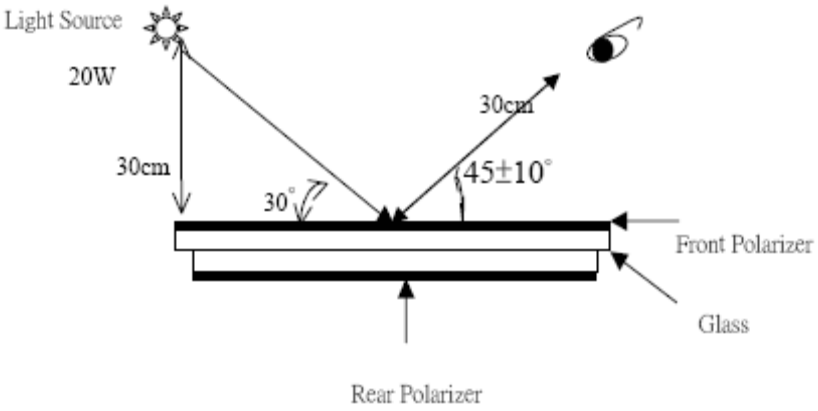
AQL of major and minor defect.

	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)

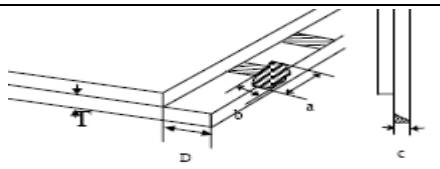
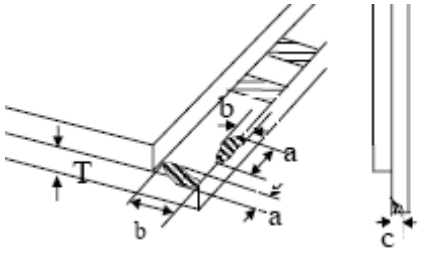
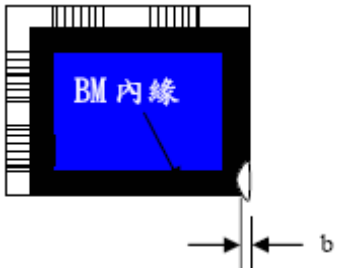


3.Inspection item and criteria

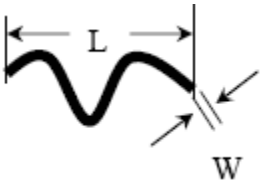
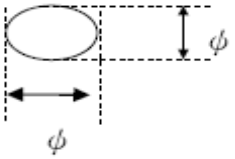
3.1 Visual inspection criterion in immobility

3.1.1Glass defect

NO	Defect item	Criteria	Remark
1	Dimension Unconformity (Major defect)	By Engineering Drawing	
2	Cracks (Major defect)	1. Linear cracks panel 【Reject】 2. Nonlinear crack contrast by limited sample	
3	Glass extrude the conductive area (minor defect)	a: disregards and no influence assemblage. 1) b≤1/3Pin width(non bonding area) 【Accept】 2)bonding area≤0. 5mm 【Accept】	A: Length, b: Width
4	Pin-side ,conductive area damaged (minor defect)	(a c: disregards) b≤1/3of effective length for bonding electrode 【Accept】	a: length, b: Width, c: Thickness

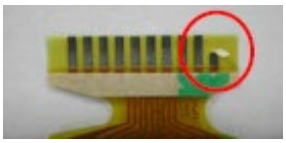
			
5	Pin-side,non-conductive area damaged (minor defect)	1)Damage area don't touch the ITO (Inclueling contraposition mark, except scribing mark) 【Accept】 2)C<T b≦BM1/3of width 【Accept】 3)c=T b not touch the seal glue 【Accept】 4)a disregards	a: Length, b: Width c: Thickness 
6	Non-pin-side damage (minor defect)	c<T 1)b exceeds 1/3Bm 【Reject】 c=T b not touch the seal glue 【Reject】	c: Thickness b: width of  damage

3.1.2LCD appearance defect(View area)

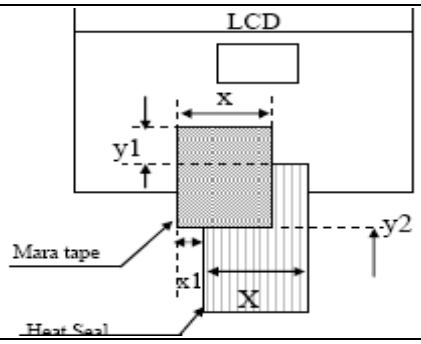
NO	Defect item	Criteria		Remark
1	Fiber、glass cratch、polarizer scratch/folded (minor defect)	Specification	Allowable	note1:L: Length, W: Width note2: disregard if out of AA 
		W≦0.03mm	disregard	
		0.03mm<W≦0.05mm; L≦2.0mm	2	
		0.05mm<W≦0.08mm; L≦2.0mm	1	
		W>0.08mm;L>2.0mm	0	
2	Polarizer bubble、concave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

	(minor defect)	0.1mm< ϕ ≦0. 15㎜	3	W=Width note2:the distance between two dots>5mm
		ϕ >0. 20㎜	0	

3.1.3FPC

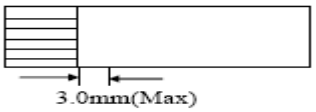
NO	Defect item	Criteria		Remark
1	Copper screen peel (minor defect)	Copper screen peel 【Reject】		
2	No release tape or peel	No release tape or peel 【Reject】		
3	Dirty dot and impurity of FPC for customer using side (minor defect)	Specification	Allowable	Note1: Cannot have stride ITO impurities
		ϕ ≦0.25mm	2	
		ϕ >0. 25	0	

3.1.4Black 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】	

3.1.5Silicon 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

3.2Electrical criteria

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
		Φ ≦0.15mm	disregard
		0.15mm< Φ ≦0. 25mm	2
		0.25mm< Φ ≦0. 3mm	1
		0.3mm< Φ	0
12	Fiber、glass crutch、Polarizer scratch/folded (major defect)	W≦0.03mm	disregard Note1:L: Length, W: Width Note2: disregard if out of AA
		0.03mm<W≦0. 0. 05mm L≦3. 0mm	2
		0.05mm<W≦0. 1mm L≦3. 0mm	1
		W>0.1mm;L>3.0mm	0

12.Precautions for using LCD modules.

12.1 Safety

(1)Do mot 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.

12.2Srorang Conditions

(4)Store the panel or module in a dark place where the temperature is 23±5℃and the humidity is below 45 ±20%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.

12.3Handling Precautions

(9)Avoid static electricity, which can damage the CMOS LSI.
(10)The polarizing plate of the display is very fragile, please handle if 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 ketonics 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.

12.4Warranty

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