XINNOA(HK)Display Technology Co., Limited

规　格　书

客户名称 Customer	
产品型号 Part NO.	**XNY T1.3 240240-09**
产品内容 Product type	Mode: Transmissive　type .Normally Black. TFT LCD Module LCD Module: Graphic 240RGB*240Dot-matrix
备注栏 Remarks	☐APPROVAL FOR SEPCIFICATIONS ONLY ■APPROVAL FOR SEPCIFICATIONS AND SAMPLE
客户确认签章 Signature by Customer:	
备注 Notes:	

PREPARED　BY	CHECKED　BY	APPROVED　BY

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1. General Description

DH T1.3 240240-09 is a 240*240 dots matrix TFT LCD module. It has a TFT panel composed of 720sources and 240gates. The LCM can be easily accessed by micro-controller.

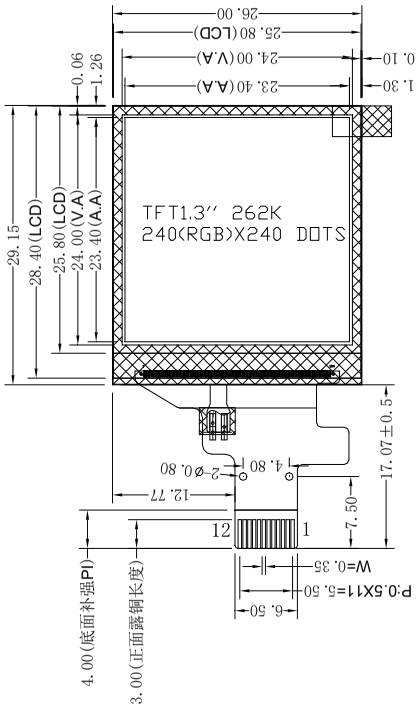
2. Features

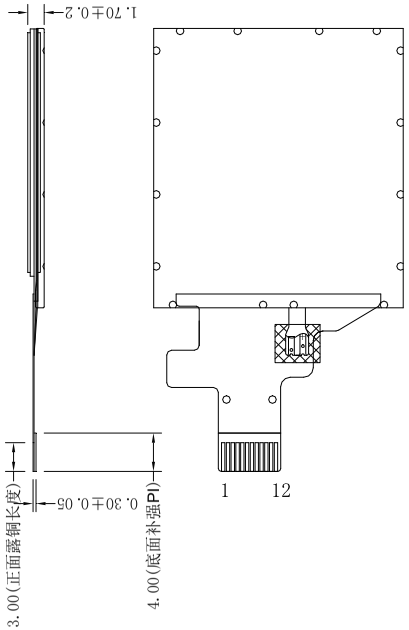
Display Mode	Transmissive
	a-TFT
Display Format	Graphic 240RGB*240Dot-matrix
Input Data	4-SPI Serial
Viewing Direction	ALL
Drive	ST7789P3

3. Mechanical Specification

Item	Specifications	Unit
Dimensional outline	26.16(H) x 29.22(V) x1.70(T) (FPC not include)	mm
Resolution	240RGB*240	dots
TP Active area	-------	mm
LCD Active area	23.40(H) x 23.40(V)	mm
Pixel Pitch	0.0975(H) x 0.0975(V)	mm

4.MechanicalDimens

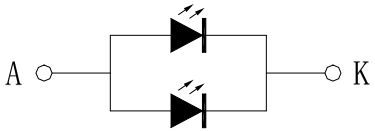




接口定义

PIN	SYMBOL
1	GND
2	LED-K
3	LED-A
4	VDD
5	GND
6	GND
7	RS
8	CS
9	SCLK
10	SDA
11	RST
12	GND

NOTE:
1. DISPLAY TYPE:1.3''TFT,TRANSMISSIVE
2. DRIVE IC:ST7789P3&Compatible LDI
3. VIEWING DIRECTION:ALL O'CLOCK
4. BACKLIGHT:2 CHIP-WHITE LED
5. BL INPUT CURRENT:30mA
6. OPERATING TEMP:-20° C +70° C
7. STORAGE TEMP:-30° C +80° C
8. GENERAL TOLERANCE:±0.2
9. The product should measure up with"ROHS"stardard



BL 驱动条件:IF=30mA,Vf=3.0V(TYP)

背光电路图
(CIRCUIT DIAGRAM)

NO.	REV.	REVISION RECORD	DATE	NO.	REV.	REVISION RECORD	DATE
1	00	新图	2025/09/10	5			
2	00			6			
3	01			7			
4				8			

CUSTOMER REF.	PROJECTION	APPROVAL	DRAFTING	ENGINEERING
		APPROVED BY	LY	
		DATE	2025/09/10	
SHEET 1 OF 1		DRAWN BY :		UNIT IN mm
SCALE SCALE	XNY T1.3-240240-09	XINNOA(HK)Display Technology Co., Limited		

5. Maximum Ratings

Item	Symbol	Min	Max	Unit	Remark
Analog Supply Voltage	VCI	2.4	3.3	V	
Operating Temperature	T_{ORT}	-20	70	℃	
Storage temperature	T_{STG}	-30	80	℃	

6. Electrical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	Logic	V_{CC}		2.4	2.8	3.3	V
Input Voltage	H level	T_{IH}		0.7*IOVCC		IOVCC	V
	L level	T_{IL}		-0.3		0.2* IOVCC	
Storage temperature		I_{DD}	With internal voltage generation V_{CC}=2.8V; T_{emp}=25℃			TBD	mA

7. Backlight Characteristic

Item	Symbol	Min	Typical	Max	Unit
LED module Forward voltage	V_{LED}		3.0		V
LED module current	V_{LED}		30		mA
L/G Surface Luminance ★1	L_S		--		Cd/m^3
LCM Surface brightness uniform ★2	L_D	80			%

★ 1Test condition is:

(a) Center point on active area.

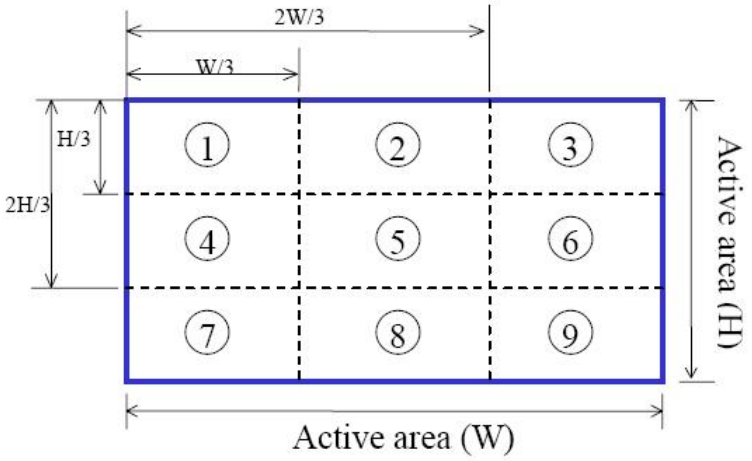
(b)Best Contrast.

★2Uniform measure condition:

(1)Measure 9 point. Measure location show below;

(2)Uniform=(Min. brightness /Max. brightness)*100%

(3)Best Contrast.

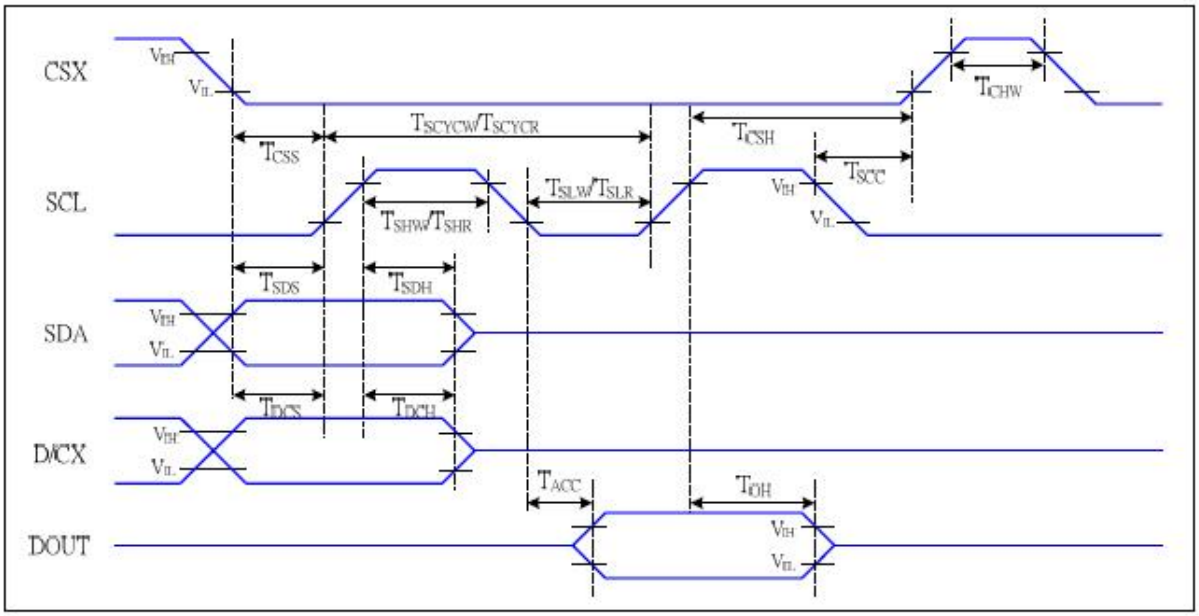


8. Module Function Description

8.1Pin Descriptions

Pin No.	Symbol	Functional	Notes
1	GND	Power Ground	
2	LED-K	Power supply for backlight cathode input terminal.	
3	LED-A	Power supply for backlight anode input terminal.	
4	VDD	Power supply 3.0V	
5,6	GND	Power Ground	
7	RS	register select signal.	
8	CS	Chip select signal input pin	
9	SCLK	Serial Clock line signal	
10	SDA	Date signal	
11	RST	Reset signal input terminal. Active at ‘L’.	
12	GND	Power Ground	

8.2Timing characteristics.



Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	15		ns	
	T_{CSH}	Chip select hold time (write)	15		ns	
	T_{CSS}	Chip select setup time (read)	60		ns	
	T_{SCC}	Chip select hold time (read)	65		ns	
	T_{CHW}	Chip select “H” pulse width	40		ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	16		ns	-write command & data ram
	T_{SHW}	SCL “H” pulse width (Write)	7		ns	
	T_{SLW}	SCL “L” pulse width (Write)	7		ns	
	T_{SCYCR}	Serial clock cycle (Read)	150		ns	-read command & data ram
	T_{SHR}	SCL “H” pulse width (Read)	60		ns	
	T_{SLR}	SCL “L” pulse width (Read)	60		ns	
D/CX	T_{DCS}	D/CX setup time	10		ns	
	T_{DCH}	D/CX hold time	10		ns	
SDA (DIN)	T_{SDS}	Data setup time	7		ns	
	T_{SDH}	Data hold time	7		ns	
DOUT	T_{ACC}	Access time	10	50	ns	For maximum CL=30pF
	T_{OH}	Output disable time	15	50	ns	For minimum CL=8pF

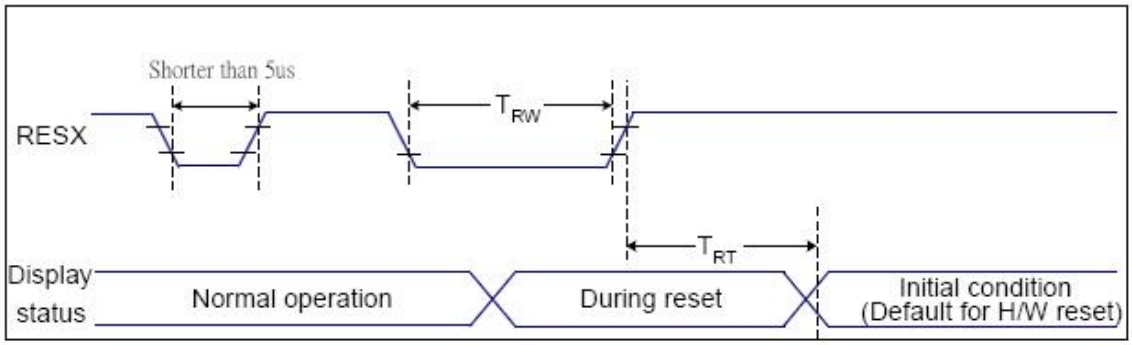


Figure 7 Reset Timing

VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=25℃

Related Pins	Symbol	Parameter	MIN	MAX	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1, 5)	ms
				120 (Note 1, 6, 7)	ms

9.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Transmittance (with Polarizer)		T(%)	—	(4.0)	(4.5)	—	%	w/o APCF Base on Vop=4.3V
Transmittance (without Polarizer)		T(%)	—	(14.5)	(16.1)	—	%	
Contrast Ratio		CR	Θ=0 Normal viewing angle	640	800	—	—	(1)(2) Base on Vop=4.3V
Response Time		T_R+T_F		—	35	40	msec	(1)(3)
Color Gamut		S(%)		43	48	—	%	
Color Chromaticity (CIE1931)	White	W_x		+/-0.02	0.315	+/-0.02		(1)(4) CF glass
		Wy			0.340			
	Red	Rx			0.618			
		Ry			0.324			
	Green	Gx			0.337			
		Gy			0.545			
	Blue	Bx			0.145			
		By			0.148			
Viewing Angle	Hor.	Θ_L	CR>10	70	80	—		Viewing Angle base on using Normal Polarizer, Reference Only
		Θ_R		70	80	—		
	Ver.	Θ_U		70	80	—		
		Θ_D		70	80	—		
Optima View Direction		ALL						(5)

9.2 Measuring Condition

_ Measuring surrounding : dark room

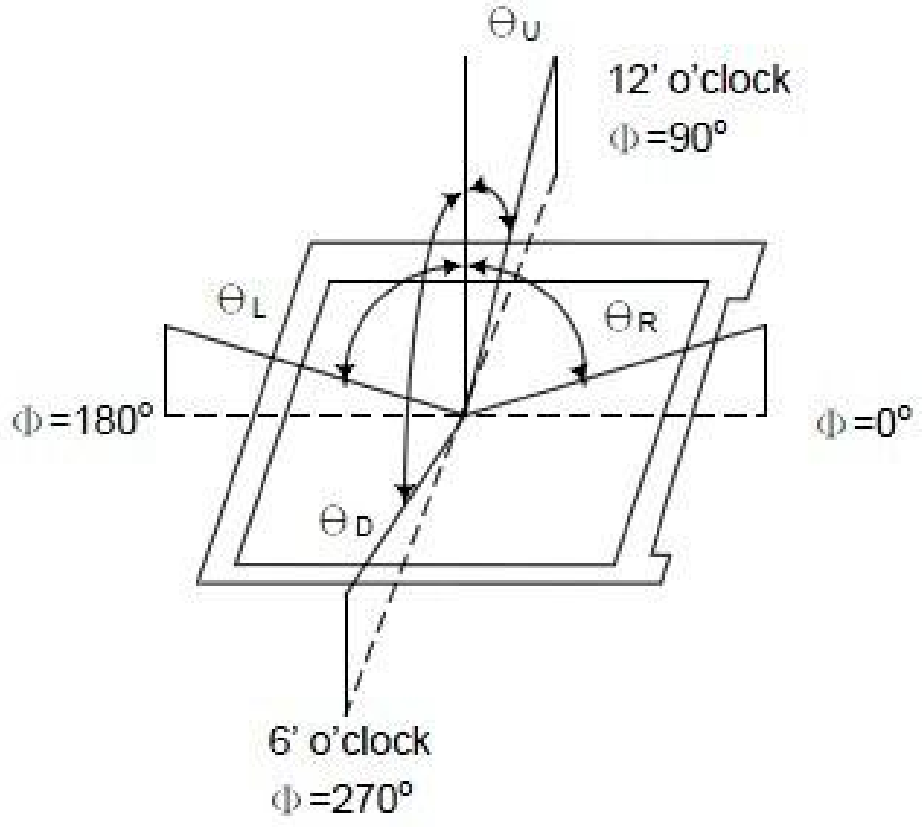
_ Ambient temperature : 25±2°C

_ 15min. warm-up time.

9.3 Measuring Equipment

_ FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

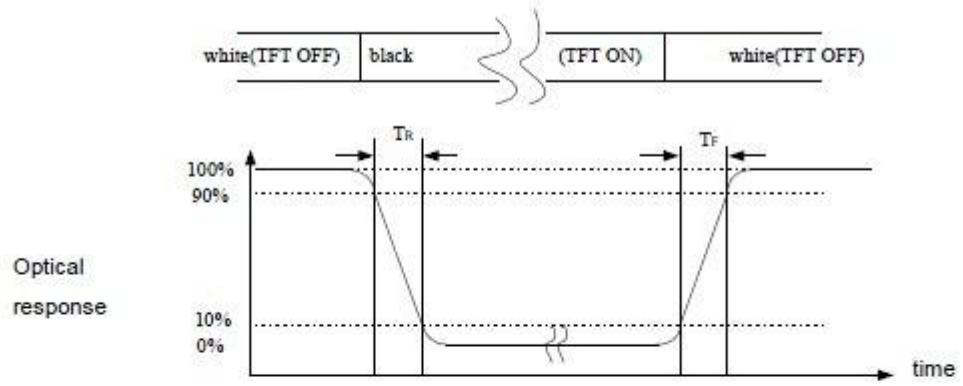
Note (1) Definition of Viewing Angle :



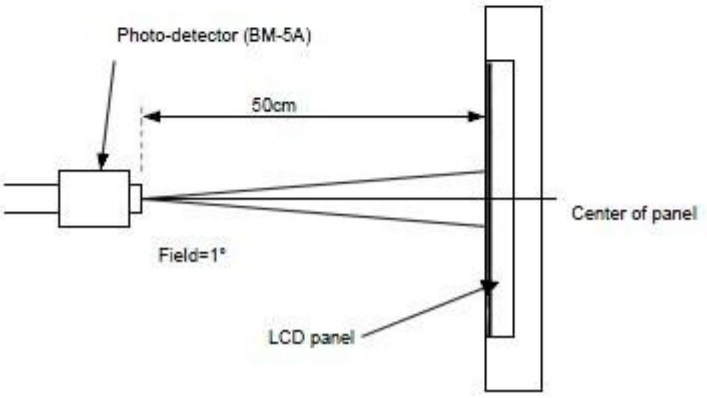
Note (2) Definition of Contrast Ratio(CR) :
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

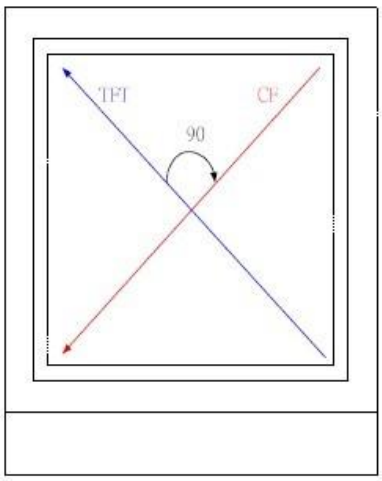
Note (3) Definition of Response Time : Sum of T_R and T_F



Note (4) Definition of optical measurement setup



Note (5) Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.



TFT Face up

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	80℃*240Hrs	。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	-30℃*240Hrs	
3	High Temperature/Humidity Non Operating Test	60℃*90%RH*240Hrs	
4	High Temperature Operating Test	70℃*240Hrs	
5	Low Temperature Operating Test	-20℃*240Hrs	
6	Thermal Shock Test	-20 ℃ (30Min) ν 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

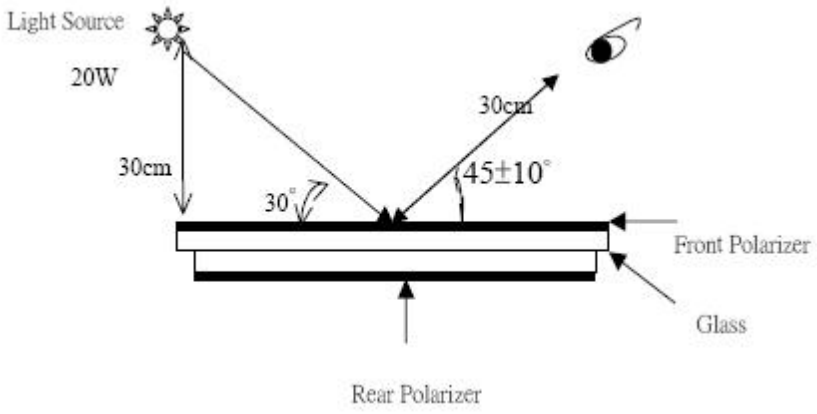
AQL of major and minor defect.

	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!

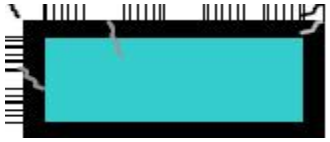
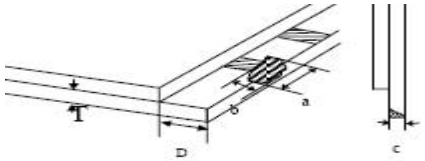
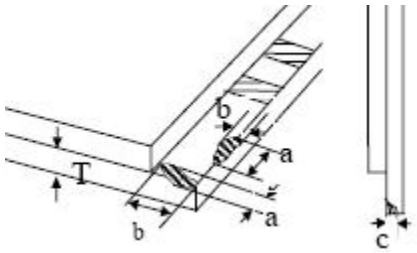
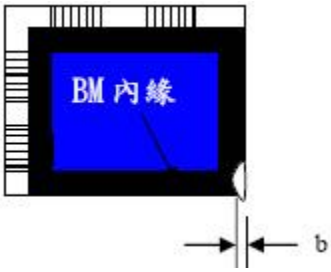
(As shown below)



3.Inspection item and criteria

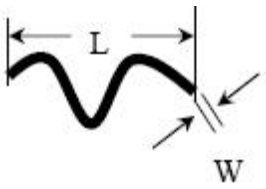
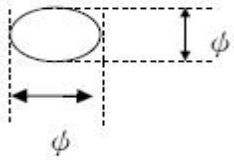
3.1 Visual inspection criterion in immobility

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≤0.5㎜ 【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)

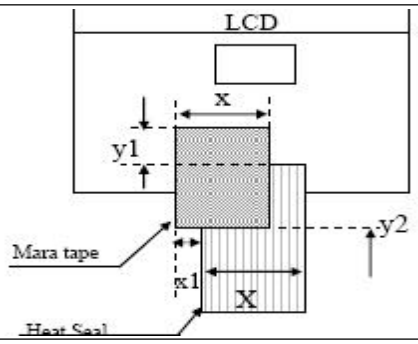
NO	Defect item	Criteria		Remark
1	Fiber、glass cratch、polarizer scratch/folded	Specification	Allowable	note1:L: Length, W: Width note2: disregard if out of AA
		W≦0.03mm	disregard	
		0.03mm<W≦0.05㎜;	2	

	(minor defect)	L≦3.0mm		
		0.05mm<W≦0.1mm; L≦3.0mm	1	
		W>0.1mm;L>3.0mm	0	
2	Polarizer bubble、concave and convex (minor defect)	ϕ≦0.2mm	disregard	note1: ϕ=(L+W)/2,L:Length, W :Width note2:disregard if out of AA
		0.2mm<ϕ≦0.3mm	2	
		0.3mm<ϕ≦0.5mm	1	
		0.5mm<ϕ	0	
3	Black dots、dirty dots、impurities、eye winker (minor defect)	ϕ≦0.15mm	disregard	note2:disregard if out of AA 
		0.15mm<ϕ≦0.25mm	2	
		0.25mm<ϕ≦0.3mm	1	
		0.3mm<ϕ	0	
4	Polarizer prick (minor defect)	ϕ≦0.1mm	disregard	note1: ϕ=(L+W)/2,L=Length, W=Width note2:the distance between two dots>5mm
		0.1mm<ϕ≦0.25mm	3	
		ϕ>0.25mm	0	

3.1.3FPC

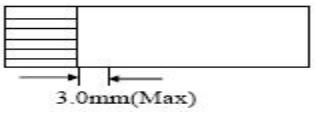
NO	Defect item	Criteria		Remark
1	Copper screen peel (minor defect)	Copper screen peel 【Reject】		
2	No release tape or peel	No release tape or peel 【Reject】		
3	Dirty dot and impurity of FPC for customer using side (minor defect)	Specification	Allowable	Note1: Cannot have stride ITO impurities
		ϕ≦0.25mm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

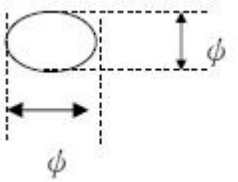
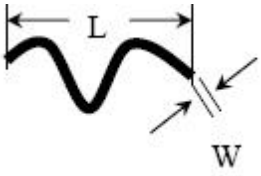
3	Tape position mistake (minor defect)	Not by engineering drawing	
4	Mara tape defect (minor defect)	Peel before pulling the protecting film 【Reject】	

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	Specification	Allowable	Note1:disregard if out of AA

	dots、eye winker (major defect)	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 mot apply excessive force on the surface.
(13)Bo 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
A01	**Original version**	**2025-09-12**