深圳市正晶浩电子有限公司

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APPROVAL SHEET

承 认 书

记录编号： 版本：v0.0

Customer 客户名称	
Part NO. 产品型号	Z180SN021
Product type 产品内容	Mode: Transmissive type .Normally white. TFT LCD Module LCD Module: Graphic 128RGB*160Dot-matrix
Remarks 备注栏	☐APPROVAL FOR SEPCIFICATIONS ONLY ■APPROVAL FOR SEPCIFICATIONS AND SAMPLE
Signature by Customer: 客户确认签章	

正晶浩确认

核准	审核	定制

客户确认

核准	审核	审核

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1.General Description

Z180SN021 is a 128RGB*160 dots matrix TFT LCD module. It has a TFT panel composed of 384sources and 128gates. The LCM can be easily accessed by micro-controller.

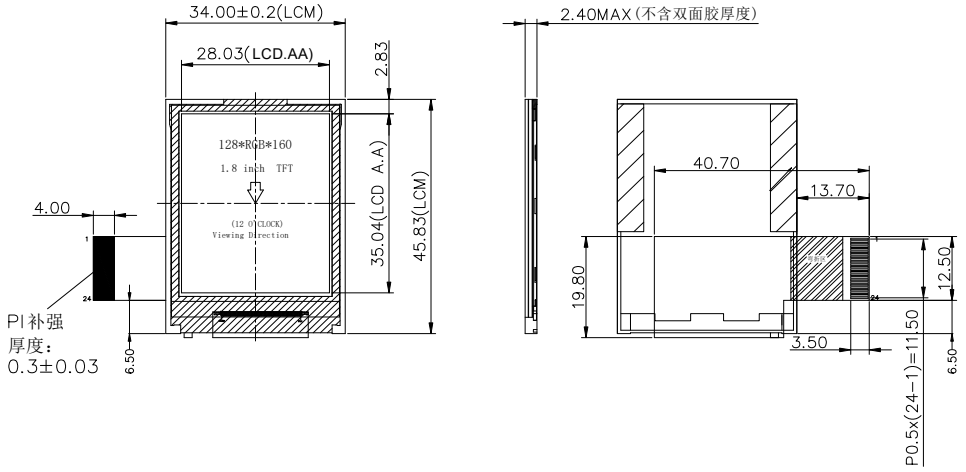
2. Features

Display Mode	Transmissive
	a-TFT
Display Format	Graphic 128RGB*160 Dot-matrix
Input Data	MCU 8bit interface
Viewing Direction	12 o'clock
Drive	ST7735S

3. Mechanical Specification

Item	Specifications	Unit
Dimensional outline	34.00(W)*45.83(H)*2.40MAX(T) (FPC not include)	mm
Resolution	128RGB*160	dots
LCD Active area	28.03 (W)*35.04 (H)	mm
Pixel size	0.219(W)*0.219(H)	mm

4. Mechanical Dimension

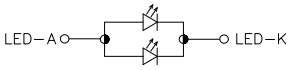


Pin	Descripti
1	LEDA
2	LEDK
3	GND
4	LCD_CS
5	LCD_A0
6	LCD_RST
7	GND
8	LCD_DATA7
9	LCD_DATA6
10	LCD_DATA5
11	LCD_DATA4
12	GND
13	LCD_DATA3
14	LCD_DATA2
15	LCD_DATA1
16	LCD_DATA0
17	GND
18	LCD_RD
19	LCD_WR
20	VCC_IO
21	NC
22	NC
23	NC
24	NC

备注：VCC_IO=3.3V

NOTES:
1. DISPLAY TYPE:262K/65K TFT TRANSMISSIVE NORMAL WHITE
2. OPERATING TEMP: -20° C~70° C
3. STORAGE TEMP: -30° C~80° C
4. LCD DRIVER: COG(IC:ST7735S);
5. BACKLIGHT: 2 CHIP-WHITE LED(Parellel)
6. GENERAL TOLERANCE:±0.20
7. ROHS

背光电路图:



CIRCUIT DIAGRAM
(I=30MA V=2.9-3.3V)

深 圳 市 正 晶 浩 电 子 有 限 公 司				第三视角:
产品型号:	Z180SN021			
部品型号:	LCM外形图		确认:	
版本:	v0.0	单位: MM	审核:	
日期:	2020.6.16	比例: 1:1	设计:	
UNMRKED TOLERANCE:±0.20 mm			页码:	1 OF 1

5. Maximum Ratings

Item	Symbol	Min	Max	Unit	Note
Supply voltage	**V**	**-0.3**	**4.6**	**V**	
Operating temperature	**V_T**	**-0.3**	**Vcc+0.3**	**V**	
Storage temperature	**T_{OPR}**	**-20**	**70**	**℃**	

Storage temperature	T_{STR}	-30	80	℃	

6. Electrical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Supply voltage	Logic	V_{CC}		2.7	2.8	3.3	V
Input Voltage	H level	T_{IH}		0.8*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	3.2	3.4	V
LED module current	V_{LED}		20		mA
L/G Surface Luminance ★1	L_S	1800			Cd/m³
LCM Surface brightness uniform ★2	L_D	80			%

★ 1Test condition is:

(a) Center point on active area.

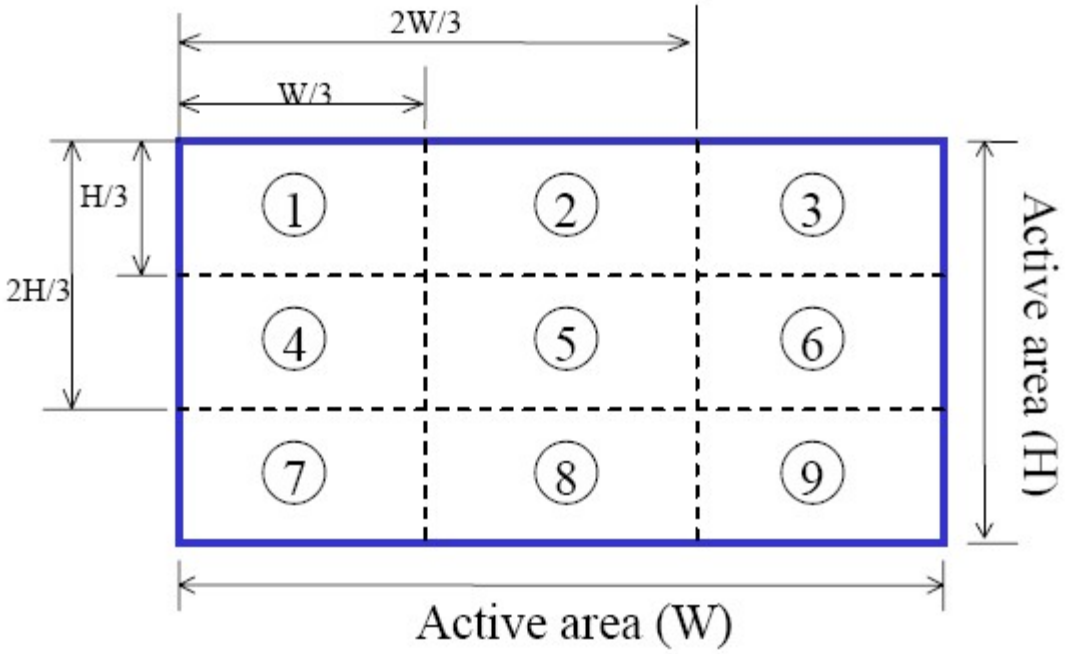
(b)Best Contrast.

★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

引脚序号 PIN No.	引脚名称 Symbol	作用描述 **Description**	备注 Notes

1	LEDA	Anode of Backlight(背光正极 3.0-3.3 伏供电)	
2	LEDK	Cathode of Backlight（背光负极）	
3	GND	Ground（接地脚）	
4	LCD_CS	Chip select pin (“Low” enable) （屏驱动芯片片选脚，低电平有效）	
5	LCD_A0	Register select pin（指令/数据寄存器选择脚） RS=’1’: Display data.（RS=’1’:选择数据寄存器） RS=’0’: Command data.（RS=’0’:选择指令寄存器）	
6	LCD_RST	LCM Reset pin（屏复位脚，低电平复位）	
7	GND	Ground（接地脚）	
8	LCD_DATA7	Data Bus（数据线）	
9	LCD_DATA6	Data Bus（数据线）	
10	LCD_DATA5	Data Bus（数据线）	
11	LCD_DATA4	Data Bus（数据线）	
12	GND	Ground（接地脚）	
13	LCD_DATA3	Data Bus（数据线）	
14	LCD_DATA2	Data Bus（数据线）	
15	LCD_DATA1	Data Bus（数据线）	
16	LCD_DATA0	Data Bus（数据线）	
17	GND	Ground（接地脚）	
18	LCD_RD	Read control pin（读控制脚）	
19	LCD_WR	Write control pin（写控制脚）	
20	VCC_IO	Power supply for LCM（屏电源供电脚 3.3V)	
21-24	NC	No connection（空脚）	

8.2Timing characteristics.

I80-System Interface Timing Characteristics

Normal Wrote Mode(IOVCC=1.65~3.3V,Vcc=2.8~3.3V)

Item		Symbol	Unit	Min.	Typ.	Max.	Test Condition
Bus cycle time	Write	t_{CYCW}	ns	100			
	Read	t_{CYCR}	ns	300			
Write low-level pulse width		PW_{LM}	ns	50		500	
Write high-level pulse width		PW_{HW}	ns	50			

Read low-level pulse width		PW_{LR}	ns	150			
Read high -level pulse width		PW_{HR}	ns	150			
Write/ Read rise/fall time		t_{WRr} /t_{WRt}	ns			25	
Setup time	Write(RS to nCS,E/nWR)	ns	ns	10			
	Read (RS to nCS,E/nWR)	ns	ns	5			
Address hold time		T_{AH}	ns	5			
Write data set up time		t_{osw}	ns	10			
Write data hold time		t_H	ns	15			
Read data set up time		t_{DDR}	ns			100	
Read data hold time		t_{OHR}	ns	5			

Read Timing Characteristics

Reset Timing Characteristics(VCC=1.8~3.3V.IOVCC=1.65~3.3V)

Item	Symbol	Unit	Min.	Typ..	Max
Reset low-level width	t_{RES}	ms	1		
Reset rise time	t_{RES}	μ s			10

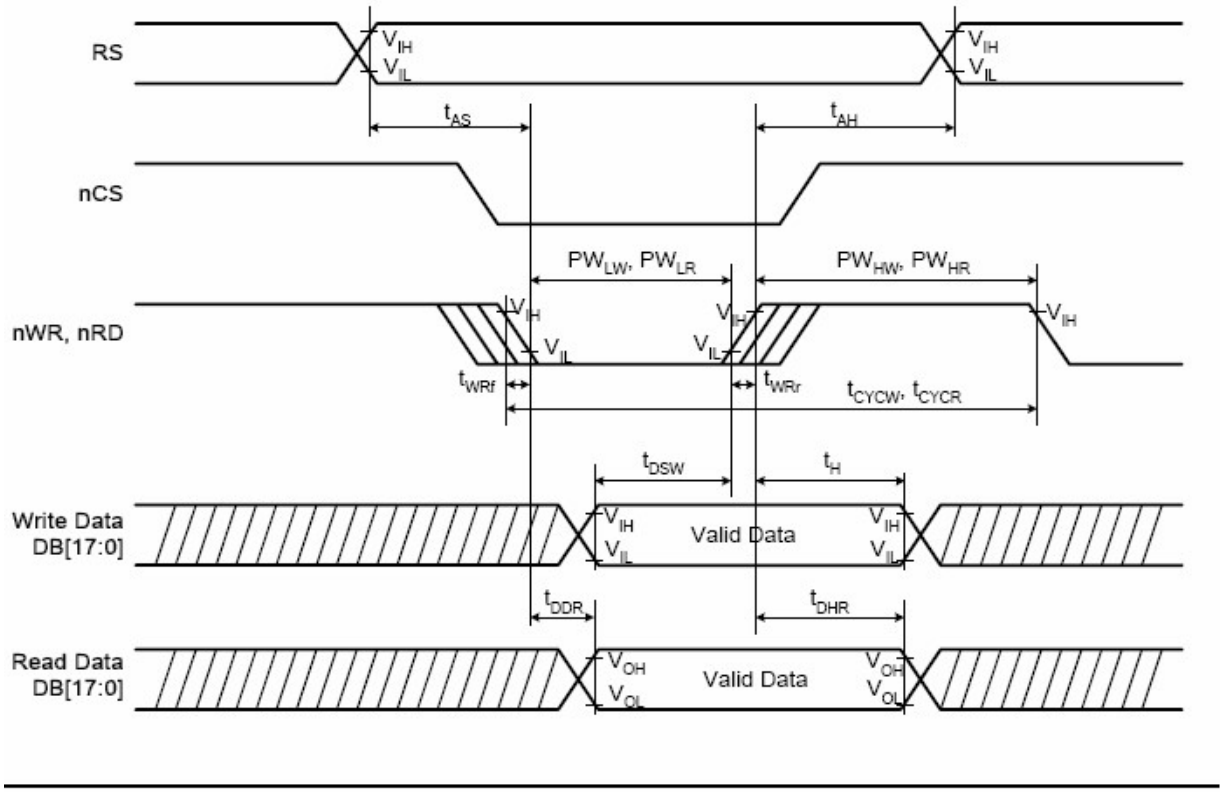
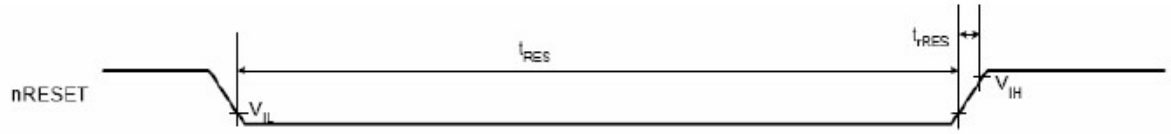


Figure 51 i80-System Bus Timing



Reset Timing

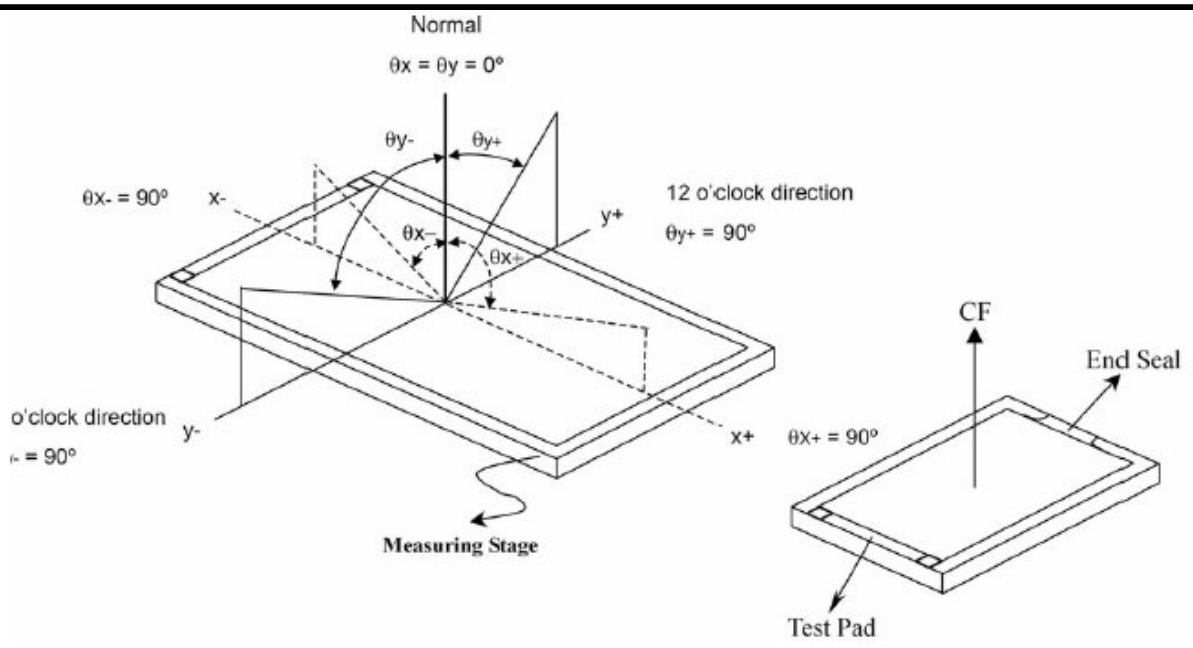
9.Electro-optical Characteristics

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 =0°(6”)	ϕ =90°(3”)	ϕ =180°(12”)			ϕ =270°(9”)		NOTE3
θ (25℃) CR≥10	TBD	TBD	TBD			TBD		NOTE3

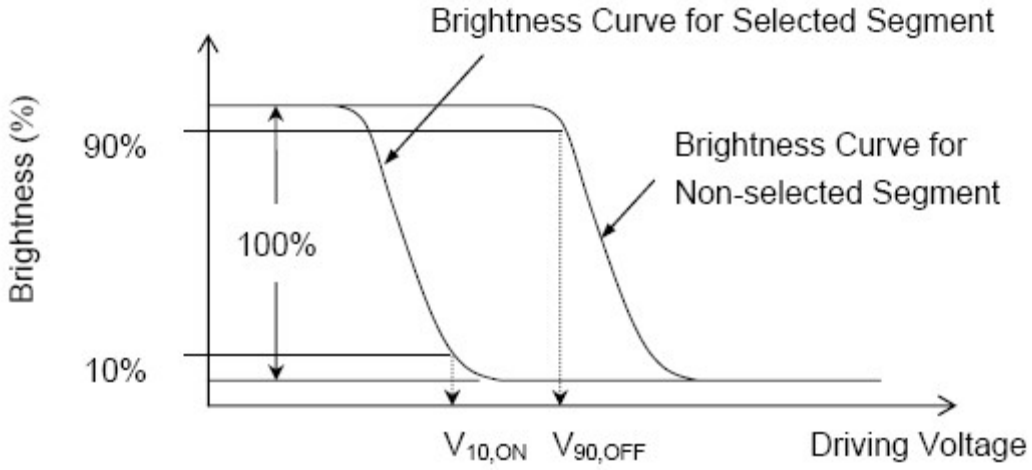
The above “viewing angle” is the measuring position with the largest contrast ratio. Not for good image quality. Viewing direction for good image quality is 12 O’clock.

●For panel only

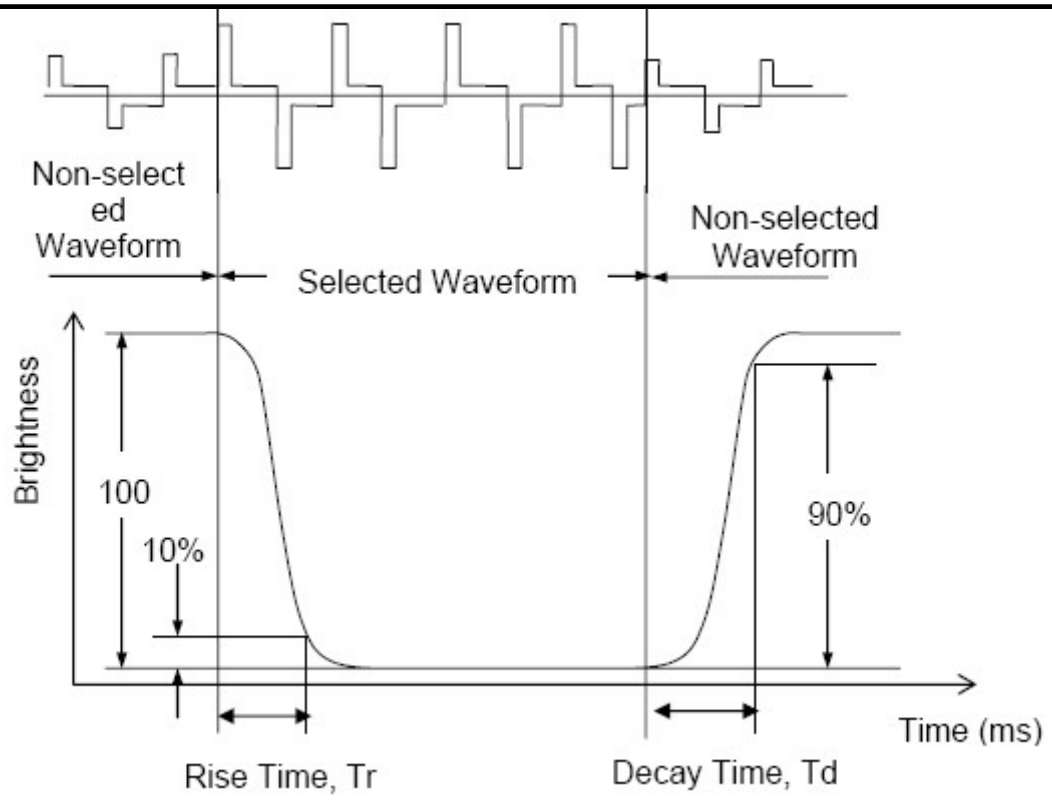
●Electro-Optical Characteristics Test Method



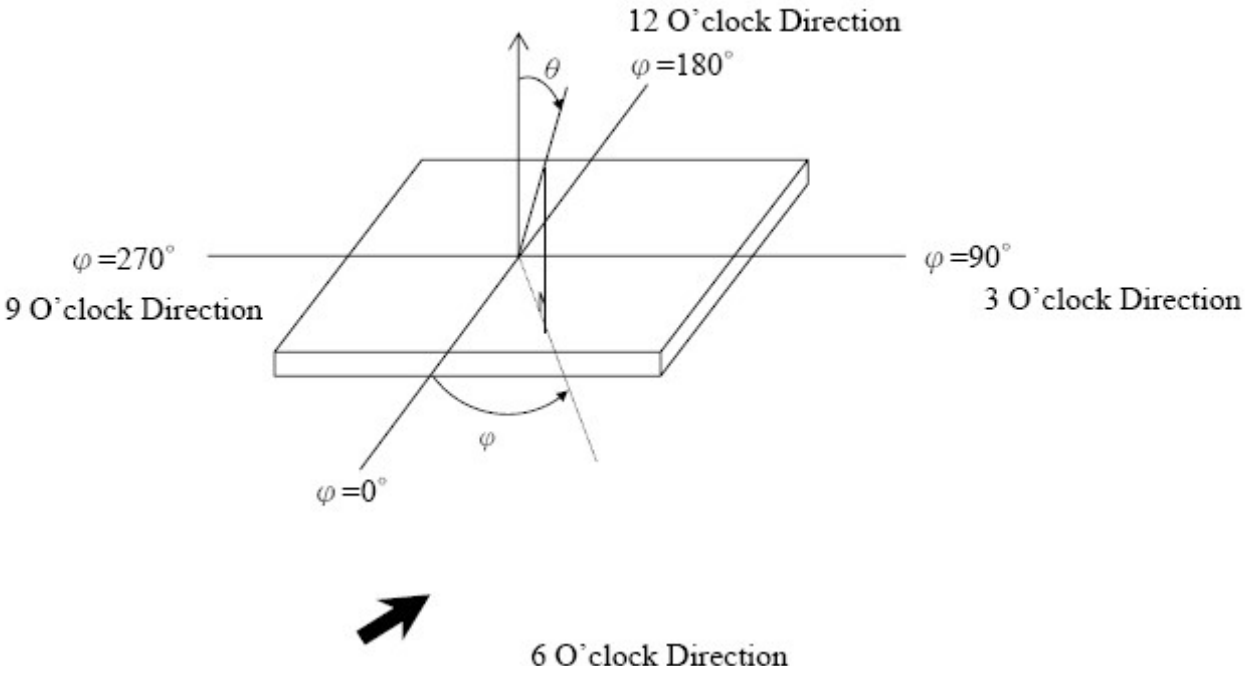
$$Vop = (V_{10,ON} + V_{90,OFF})/2$$



.Note2.Definition of Optical Response Time:

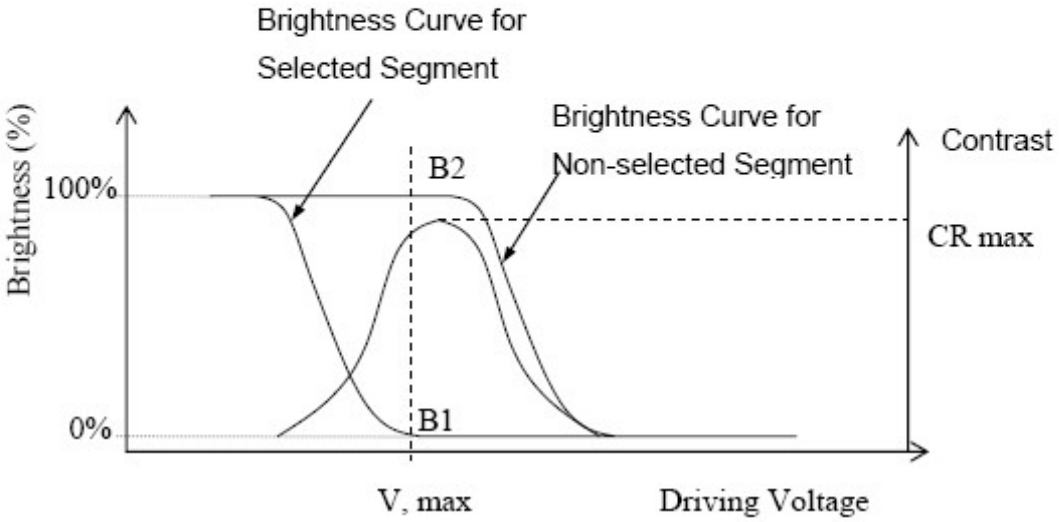


.Note3.Definition of Viewing Angle θ and ϕ :



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	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

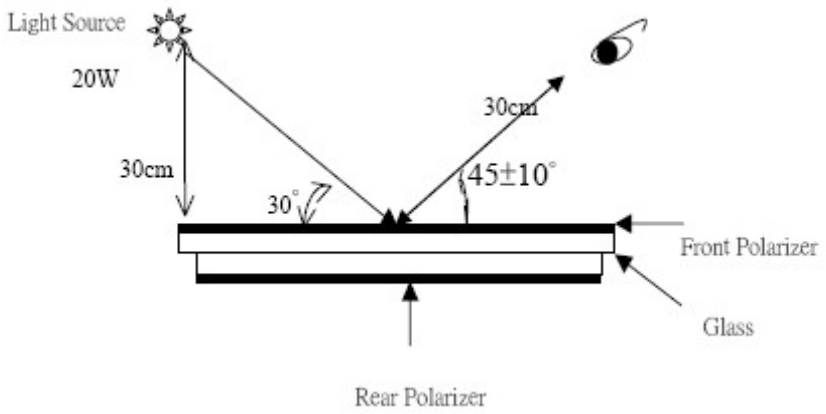
AQL of major and minor defect.

	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!

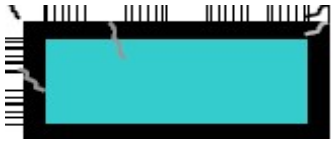
(As shown below)

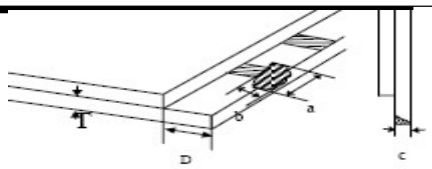
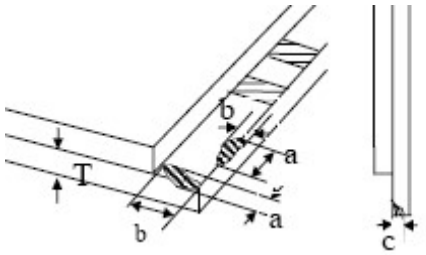
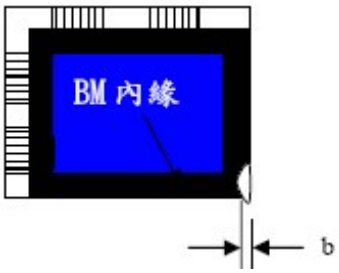


3.Inspection item and criteria

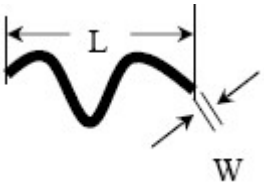
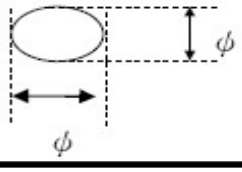
3.1 Visual inspection criterion in immobility

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≤0.5mm 【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

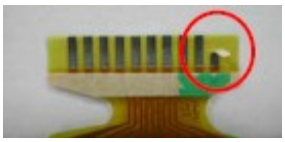
			
5	Pin-side,non-conductive area damaged (minor defect)	1)Damage area don't touch the ITO (Inclueling contraposition mark, except scribing mark) 【Accept】 2)C<T b≦BM1/3of width 【Accept】 3)c=T b not touch the seal glue 【Accept】 4)a disregards	a: Length, b: Width c: Thickness 
6	Non-pin-side damage (minor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

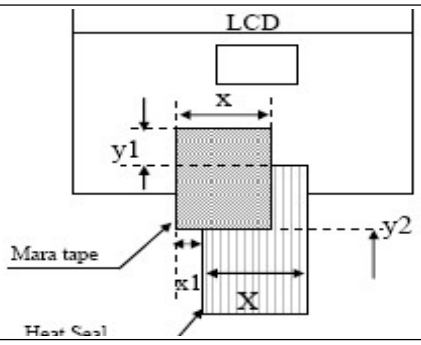
NO	Defect item	Criteria		Remark
1	Fiber、glass cratch、polarizer scratch/folded (minor defect)	Specification	Allowable	note1:L: Length, W: Width note2: disregard if out of AA 
		W≦0.03mm	disregard	
		0.03mm<W≦0.05mm; L≦3.0mm	2	
		0.05mm<W≦0.1mm; L≦3.0mm	1	
		W>0.1mm;L>3.0mm	0	
2	Polarizer bubble、concave 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

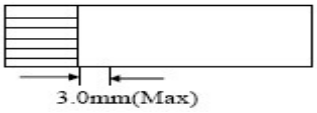
NO	Defect item	Criteria		Remark
1	Copper screen peel (minor defect)	Copper screen peel 【Reject】		
2	No release tape or peel	No release tape or peel 【Reject】		
3	Dirty dot and impurity of FPC for customer using side (minor defect)	Specification	Allowable	Note1: Cannot have stride ITO impurities
		φ≦0.25mm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

3.1.4Black tape &Mara tape

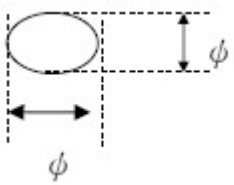
NO	Defect item	Criteria	Remark
1	FPC or H/S black tape (minor defect)	1. shift spec: 1) glue to the polarize 【Reject】 2) IC bare 【Reject】 2. left-and-right spec: 1)exceed of FPC edge or H-S edge【Reject】 2) IC bare 【Reject】	
2	No black tape (major defect)	No black tape 【Reject】	
3	Tape position mistake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

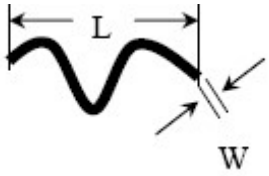
3.1.5Silicon and Taffy glue

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)	note: if customer has special requirement, refer to the technical

		【Reject】	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 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
v0.0	Original version	2020-10-12