SPECIFICATION

PRODUCT NO. : **X080DTLT-B03T**
VERSION　　　:　**Ver 1.1**
ISSUED DATE : **2021-4-07**

This module uses ROHS material

FOR CUSTOMER：_____

□：**APPROVAL FOR SPECIFICATION**
■：**APPROVAL FOR SAMPLE**

DATE	APPROVED　BY

Xinli Optoelectronics ：

Presented by	Reviewed by	Organized by

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1. Record of Revision

Revision	Description	Date
1.0	Initial Release	2021/3/05
1.1	Change glass and backlight	2021/4/07

2.   General Description and Features

The 8.0 inch Module named X080DTLT-B03T is a-Si TFT-LCD module, which is the type of transmissive. It is consisted of TFT-LCD Panel, Driver IC, FPC and Back-Light. Features of this product are listed in the following table.

NO	Item	Contents	Unit
(1)	Module Outline	204.4(H)*264.4(V)*8.18(T)	mm
(2)	LCD Active area	107.64(H)*172.224(V)	mm
(3)	Dot Number	800RGB*1280	/
(4)	Pixel size	134.55*134.55	um
(5)	LCD type	TFT Transmissive，Normally Black	/
(6)	Display Color	16.7M	/
(7)	Viewing direction	ALL	O'clock
(8)	Drive IC	JD9365DA-H3	
(9)	Power Supply	3.3（TYP)	V
(10)	Interface	TDB	/
(11)	Interface type	MIPI interface	/
(12)	Module weight	TDB	g

3. Mechanical Dimension

4. Interface Pin Connection

LCM interface Pin

NO	Symbol	Level	Description
1	GND	P	GROUND
2	VCC_LCD	P	Power supply for interface system except MIPI interface pin, VCC=3.3V
3	GND	P	GROUND
4	VCC_LCD	P	Power supply for interface system except MIPI interface pin, VCC=3.3V
5	LCD_RESET	I/O	LCM reset signal
6	GND	P	GROUND
7	GND	P	GROUND
8	MIPI_D0N	I/O	MIPI Negative data signal (-)
9	MIPI_D1P	I/O	MIPI Positive data si nal +
10	MIPI_D0P	I/O	MIPI Positive data signal (+)
11	MIPI_D1N	I/O	MIPI Ne ative data si nal -
12	GND	P	GROUND
13	GND	P	GROUND
14	MIPI_CLKN	I/O	MIPI Negative clock signal (-)
15	NC	-	No connection
16	MIPI_CLKP	I/O	MIPI Positive clock signal (+)
17	NC	-	No connection
18	GND	P	GROUND
19	GND	P	GROUND
20	NC	-	No connection
21	CABC	I/O	PWM control signal for LED driver (CABC)
22	NC	-	No connection
23	NC	-	No connection
24	GND	P	GROUND
25	NC	-	No connectio
26	NC	-	No connectio
27	GND	P	GROUND
28	LED-	P	LED cathode
29	LED+	P	LED anode

30	LED-	P	LED cathode
31	LED+	P	LED anode
32	GND	P	GROUND
33	CTP_VCC	P	Power supply for CTP,VCC=3.3V
34	CTP_SCL	I/O	IIC Clock
35	GND	P	GROUND
36	CTP_SDA	I/O	IIC Inputdata
37	CTP_RST	I/O	IIC Reset
38	CTP_INT	I/O	CTP Interrupt
39	NC	-	No connection
40	NC	-	No connection

5. Block Diagram
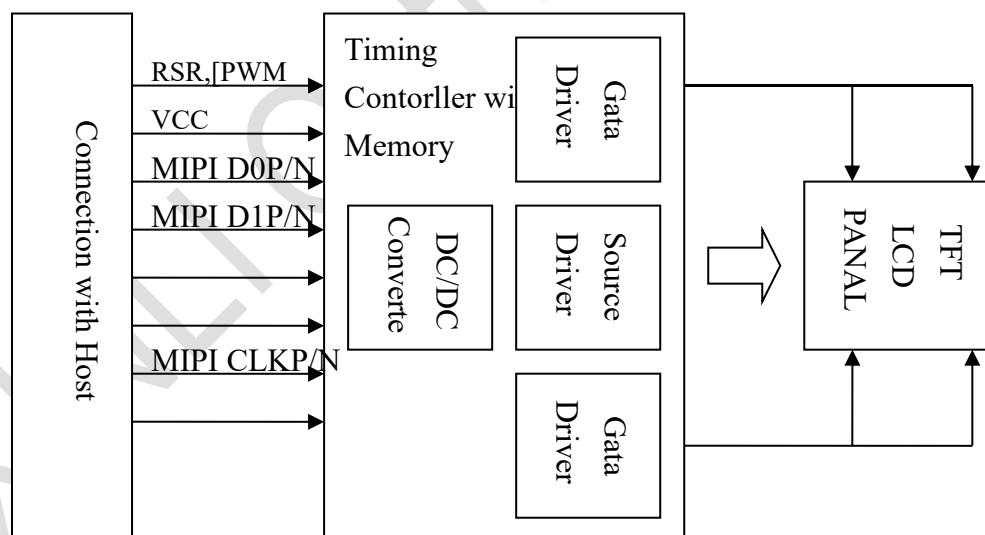
6. Maximum Rating

Item	Symbol	Rating	Unit
Operating temperature	Top	-20 to 70	℃
Storage temperature	Tst	-30 to80	℃
Power Voltage	VDDIN	-0.3~3.6	V
	AVDD	-0.3~6.3	V
	AVEE	-6.3~0.3	V

NOTE:

The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

7. Electrical Characteristics

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	VDDIN	2.5V	3.3V	3.6V	Power voltag	VDDIN
Input Logic High voltage	VIH	0.	-	VDDIN	Input Logic	VIH
Input Logic low voltage	VIL	0	-	0.3VDDIN	Input Logic	VIL

8. Backlight Characteristics

Item	syb	Min	Typ	Max	Unit	Condition
Voltage	Vf	-	TBD	-	V	TBD
Luminance(module)	Lv	-	600	-	cd/m2	
Number of LED	-	TBD			pcs	

9. Timing Characteristics

Timings for DSI Video mode
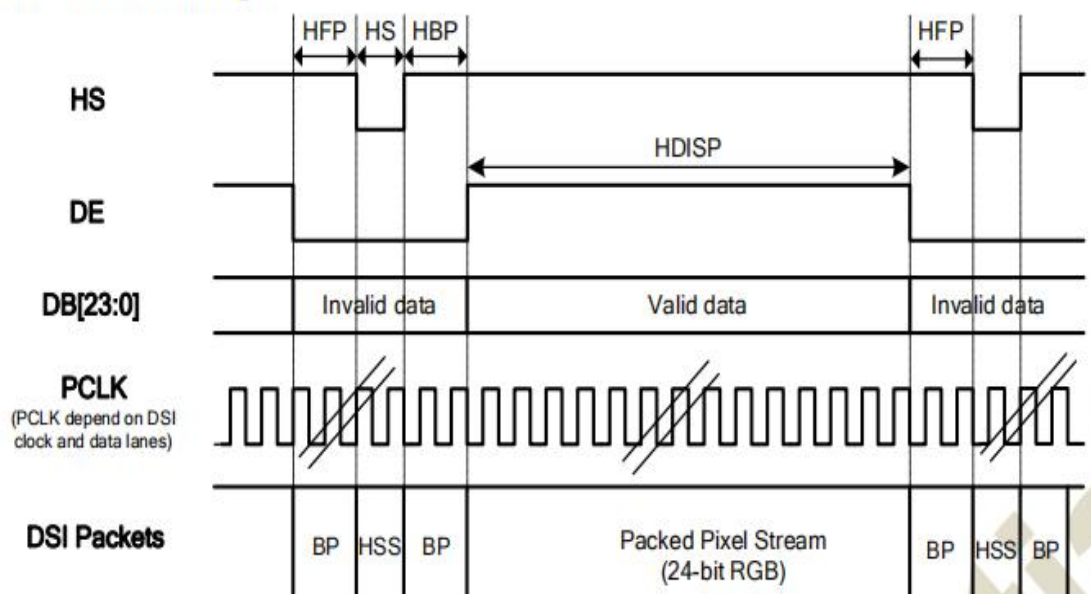
Vertical Timings
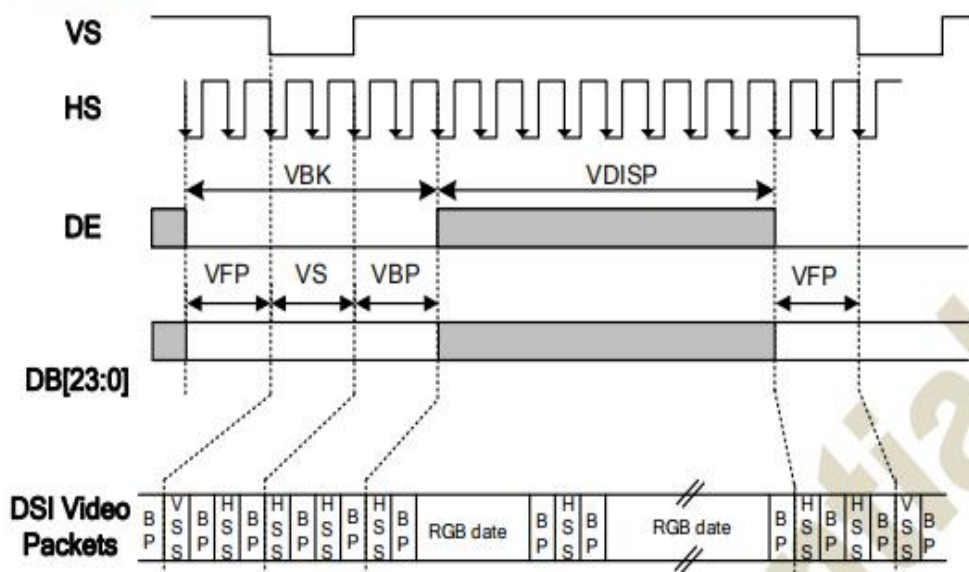
Vertical Timings for DPI I/F

Resolution=800x1280(T_A=25℃, IOVCC=1.8V, VCIP=2.8V, VCI=2.8V)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Vertical low pulse width	VS	-	2	4	200 Note(1)	Line
Vertical front porch	VFP	-	4	20	200	Line
Vertical back porch	VBP	-	2	10	200 Note(1)	Line
Vertical blanking period	VBK	VS+VBP+VFP	8	34	250	Line
Vertical active area	-	VDISP	-	1280	-	Line
Vertical Refresh rate	VRR	-	-	60	-	Hz

Note: (1) The VS and VBP pulse width are related to GIP start pulse and GIP clock pulse timing. The GIP start pulse and GIP clock pulse must be set at corresponding position for LCD normal display.

Horizontal Timings

Horizontal Timing for DSI Video mode I/F

Resolution=800x1280 (T_A=25℃, IOVCC=1.8V, VCIP=VCI=VCCH=2.8V)

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
HS low pulse width	HS	-	6	18	78	DCK
Horizontal back porch	HBP	-	5	18	78	DCK
Horizontal front porch	HFP	-	5	18	78	DCK
Horizontal blanking period	HBLK	HS+HBP+HFP	16	54 (Note1)	88	DCK
Horizontal active area	HDISP	-	-	800	-	DCK
Pixel Clock	PCLK	-	63.06 (Note2)	67.33 (Note2)	81.51 (Note2)	MHz

Note 1: HS+HBP > 0.5us.
Note 2: Pixel Clock = (HBLK+HDISP) * (VBK+VDISP) * Frame rate, Frame rate=60Hz.

Power on sequence for differential power mode

Symbol	Min	Typ	Max	Unit	Remark
tRamp	-	no limit	-	us	
tPWON	0	-	-	ms	
tON1	0	-	-	ms	
tMIPI-ON	0	-	tRPWIRES	ms	
tRPWIRES	5	-	-	ms	
tRESETL	10	-	-	us	
tRESETH	5	-	-	ms	
tSLPOUT	120	-	-	ms	
tBLON	0	-	-	ms	

BOOSTM[1:0]=10 / 11 (Internal DC/DC power mode : PFM, Charge Pump, JD5001)
VCCD=IOVCC=VCCH=1.65V ~ 3.6V, VCI=VCIP=2.5V ~ 4.8V.

Power on:

High-Speed Data Transmission in Bursts

Switching the Clock Lane between Clock Transmission and Low-Power Mode
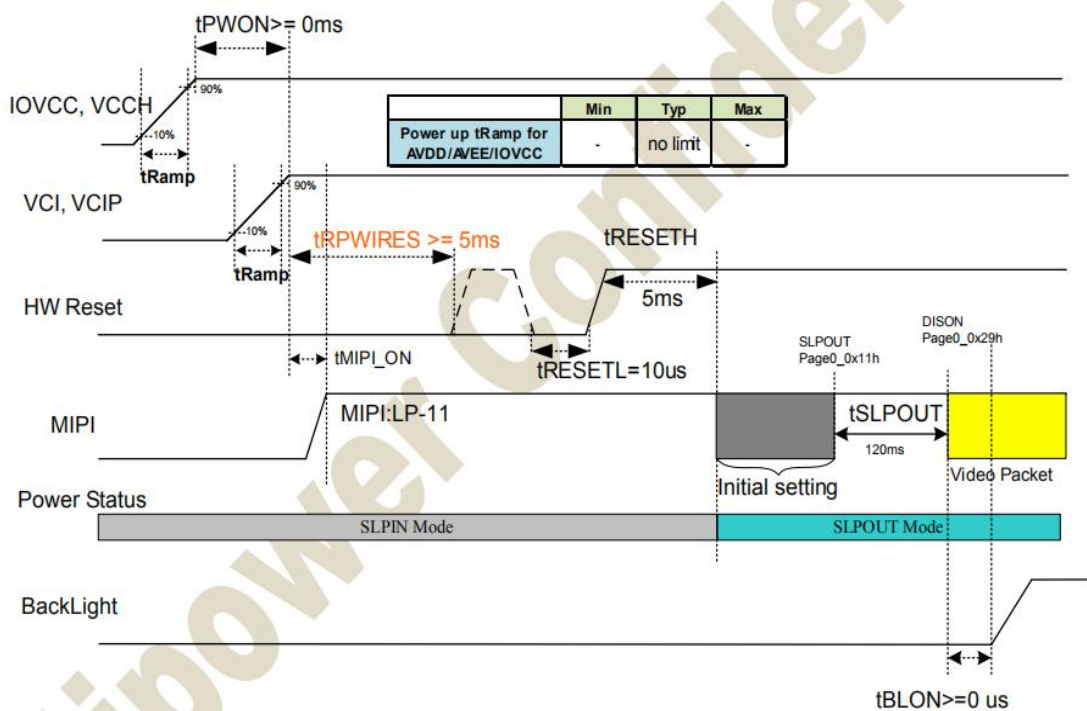
Vertical Timings

Vertical Timings for DPI I/F

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Vertical low pulse width	VS	-	2	4	200 Note(1)	Line
Vertical front porch	VFP	-	4	20	200	Line
Vertical back porch	VBP	-	2	10	200 Note(1)	Line
Vertical blanking period	VBK	VS+VBP+VFP	8	34	250	Line
Vertical active area	-	VDISP	-	1280	-	Line
Vertical Refresh rate	VRR	-	-	60	-	Hz

Note: (1) The VS and VBP pulse width are related to GIP start pulse and GIP clock pulse timing. The GIP start pulse and GIP clock pulse must be set at corresponding position for LCD normal display.

Horizontal Timings

Horizontal Timing for DSI Video mode I/F

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
HS low pulse width	HS	-	6	18	78	DCK
Horizontal back porch	HBP	-	5	18	78	DCK
Horizontal front porch	HFP	-	5	18	78	DCK
Horizontal blanking period	HBLK	HS+HBP+HFP	16	54 (Note1)	88	DCK
Horizontal active area	HDISP	-	-	800	-	DCK
Pixel Clock	PCLK	-	63.06 (Note2)	67.33 (Note2)	81.51 (Note2)	MHz

Note 1: HS+HBP > 0.5us.
Note 2: Pixel Clock = (HBLK+HDISP) * (VBK+VDISP) * Frame rate, Frame rate=60Hz.

Reset input timings
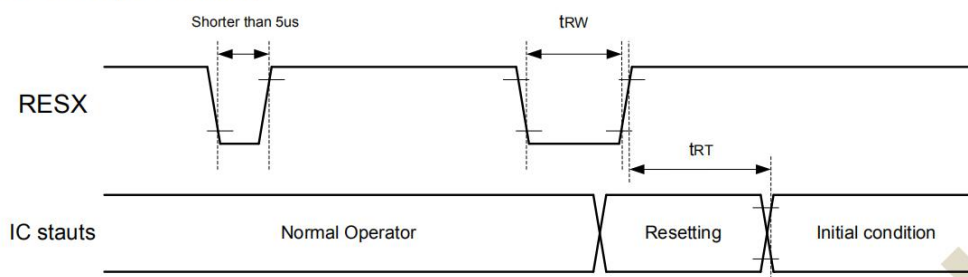
Reset input timings

Symbol	Parameter	Related pins	Min.	Max.	Unit
t$_{RW}$	Reset pulse width[2]	RESX	10	-	µs
t$_{RT}$	Reset complete time[3]	-	-	5 (Note 5)	ms
		-	-	120 (Note 6, 7)	ms

10. Application Circuit

Please consult our technical department for detail information.

11，QUALITY LEVEL

degrade usability for product applications, including all functional defects(such as no display, abnormal display, open or missing segment, short circuit, missing component), outline dimension beyond the drawing, progressive defects and those affecting reliability.

Minor defects (MI): A minor defect refers to a defect which is not considered to be able to substantially degrade the product application or a defect that deviates from existing standards almost unrelated to the effective use of the product or its operation, such as black spot, white spot, bright spot, pinhole, black line, white line, contrast variation, glass defect, polarizer defect, etc.

9.2 Definition of inspection range

For dot defect of TFT LCD which is not smaller than 3 inches, dividing three areas to make a judgment (according to figure 1). A area : center of viewing area B area : periphery of viewing area C area : Outside viewing area For other defects, dividing two areas to make a judgment (according figure 2). A zone : Inside Viewing area B zone : Outside Viewing area X1(A.A~V.A): 2mm X2(A.A~V.A): 2mm Y1(A.A~V.A): 2mm Y2(A.A~V.A): 2mm	 Figure 1 Figure 2
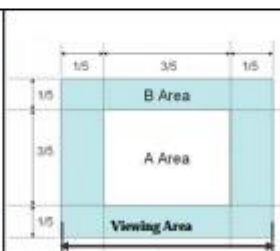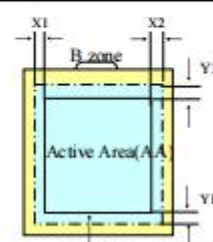
9.3 Inspection items and general notes

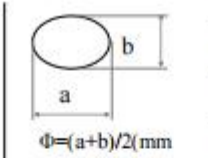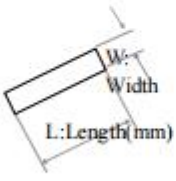|	

General notes	1.Should any defects which are not specified in this standard happen, additional standard shall be determined by mutual agreement between customer and SH.
	2.Viewing area should be the area which SH guarantees.
	3.Limit sample should be prior to this Inspection standard.
	4.Viewing judgment should be under static pattern.
	5.Inspection conditions
	    Inspection distance: 250 mm (from the sample) Temperature : 25±5 ℃
	    Inspection angle : 45 degrees in 6 o'clock direction (all defects in viewing area should be inspected from this direction)

Inspection items	**Pinhole, Bright spot, Black spot, White spot, Black line, White Line, Foreign particle, Bubble** — The color of a small area is different from the remainder. The phenomenon doesn't change with voltage
	Contrast variation — The color of a small area is different from the remainder. The phenomenon changes with voltage
	Polarizer defect — Scratch, Dirt, Particle, Bubble on polarizer or between polarizer and glass
	Dot defect (TFT LCD) — The pixel appears bright or dark abnormally when display
	Functional defect — No display, Abnormal display, Open or missing segment, Short circuit, False viewing direction

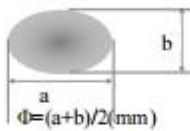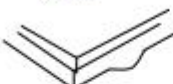|	Glass defect	Glass crack, Shaved corner of glass, Surplus glass
	PCB defect	Components assembly defect

9.4 Outgoing Inspection level
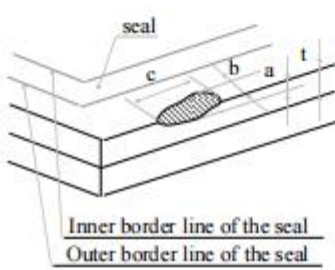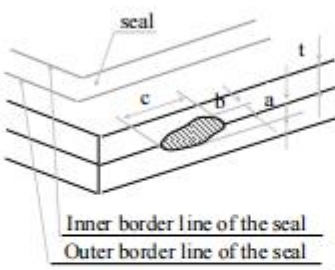
Outgoing Inspection standard	Inspection conditions	Inspection				
		Min.	Max.	Unit	IL	AQL
Major Defects	See 8.3 general notes	See 8.5			II	0.065
Minor Defects	See 8.3 general notes	See 8.5			II	0.065
Note：Sampling standard conforms to GB2828						

9.5 Inspection Items and Criteria

Inspection items			Judgment standard			
			Category		Acceptable number	
					A zone	B zone
1	Black spot, White spot, Pinhole, Foreign Particle, Particle in or on glass, Scratch on glass	$\Phi=(a+b)/2$(mm) (a/b<2.5)	A	$\Phi<=0.20$	Neglected	Neglected
			B	$0.20<\Phi<=0.25$	3	Neglected
			C	$0.25<\Phi<=0.3$	2	Neglected
			D	$0.3<\Phi<=0.4$	1	3
			E	$0.4<\Phi<=0.5$	0	2
			Total defective point(B,C)		1	-
2	Black line, White line, and Particle Between Polarizer and glass, Scratch on glass	W:Width L:Length(mm) L/W>=2.5	A	$W<=0.03$	Neglected	Neglected
			B	$0.03<W<=0.05$ $L<=3.0$	3	Neglected
			C	$0.05<W<=0.1$ $L<=3.0$	2	Neglected
			D	$0.05<W<=0.1$ $L<=4.0$	1	3
			E	$W>0.1$ $L>4.0$	0	2
			Total defective point(B,C)		1	-

3	Bright spot			any size	none	none
4	Contrast variation	$\Phi=(a+b)/2$(mm)	A	$\Phi<0.2$	Neglected	Neglected
			B	$0.2<\Phi<=0.3$	2	
			C	$0.3<\Phi<=0.4$	1	
			D	$0.4<\Phi$	0	
			Total defective point(B,C)		3	
5	Bubble inside cell			any size	none	none
6	Polarizer defect (if Polarizer is used)	Scratch ,damage on polarizer, Particle on polarizer or between polarizer and glass.	Refer to item 1 and item 2.			
		Bubble, dent and convex	A	$\Phi<=0.1$	Neglected	Neglected
			B	$0.1<\Phi<=0.2$	2	Neglected
			C	$0.2<\Phi<=0.3$	1	2
7	Surplus glass	Stage surplus glass	B<=0.3mm			
		Surrounding surplus glass	Should not influence outline dimension and assembling.			
8	Open segment or open common	Not permitted				
9	Short circuit	Not permitted				
10	False viewing direction	Not permitted				
11	Contrast ratio uneven	According to the limit specimen				
12	Crosstalk	According to the limit specimen				
13	Black /White spot(display)	Refer to item 1				
14	Black /White line(display)	Refer to item 2				

		Inspection items		Judgment standard		
				Category(application: B zone)		Acceptable number
15	Glass defect crack	i) The front of lead terminals	A	a≤ t, b≤1/5W, c≤3mm		Max.3 defects allowed
			B	Crack at two sides of lead terminals should not cover patterns and alignment mark		
		ii) Surrounding crack–non-contact side		b < Inner borderline of the seal		
		iii) Surrounding crack– contact side		b < Outer borderline of the seal		
		iv) Corner	A	a <= t, b <= 3.0, c <= 3.0		
			B	Glass crack should not cover patterns u and alignment mark and patterns.		

|		Inspection items	Judgment standard
			Category(application: B zone)
16	PCB defect	Component soldering: No cold soldering、short、open circuit、burr、tin ball The flat encapsulation component position deviation must be less than 1/3 width of the pin (Pic.1)；the sheet component deviation: Pin deviates from the pad and contact with the near components is not permitted（Pic.2）	
		lead defect: The lead lack must be less than 1/3 of its width; The lead burr must be less than 1/3 of the seam; Impurities connect with the near leads is not permitted	
		Connector soldering: Soldering tin is at contact position of the plug and socket is not permitted No foundation is scald Serious cave distortion on plug and socket contact pin is not permitted	
		Glue on root of the speaker receiver and motor lead: The insulative coat of the lead must join into the PCB; the protected glue must envelop to the insulative coat.	

12. Electro-Optical Characteristics

Item		Symbol	Condition	Min	Typ	Max	Unit	Note
Response time		Tr+Tf	θ =0°	-	30	40	ms	4
Uniformity （Five point）		δ WHITE	$\varnothing$=0° Ta=25℃	55	60	-	%	7
Contrast ratio		Cr		800	1000	-	-	3 ,5
Surface Luminance		Lv		-	600	-	-	3 ,7
Viewing angle range		θ	$\varnothing = 90°$	-	80	-	deg	6
			$\varnothing = 270°$	-	80	-	deg	
			$\varnothing = 0°$	-	80	-	deg	
			$\varnothing = 180°$	-	80	-	deg	
Color filter chromaticity (x, y)	White	X	$\theta = \phi = 0°$	-0.04	TBD	+0.04		7
		Y			TBD			
	Red	X			TBD			
		Y			TBD			
	Green	X			TBD			
		Y			TBD			
	Blue	X			TBD			
		Y			TBD			

Note 1: Ambient temperature=25℃±2℃

**Note 2: To be measured in the dark room with backlight unit.**

Note 3: To be measured at the center area of panel with a viewing cone of 1 by Topcon luminance meter BM-7A, after 10 minutes operation (module).
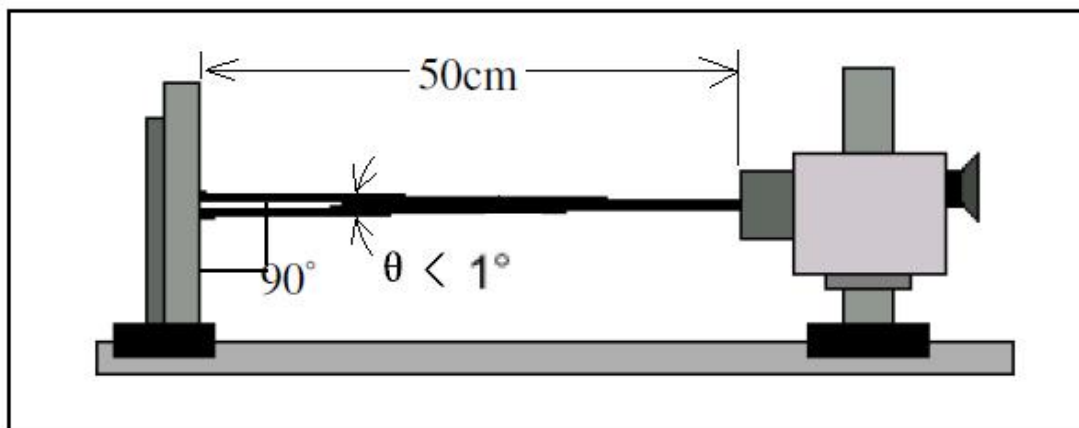
Note 4: Definition of response time:

   The output signals of photo detector are measured when the input signals are changed from "black" to "white" (rising time) and from "white" to "black" (falling time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes.
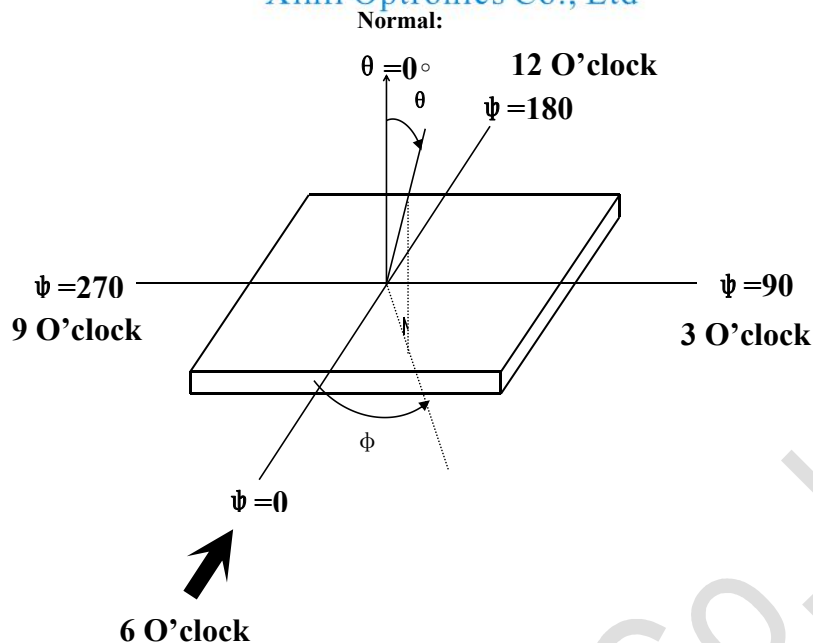
   Refer to figure as below.
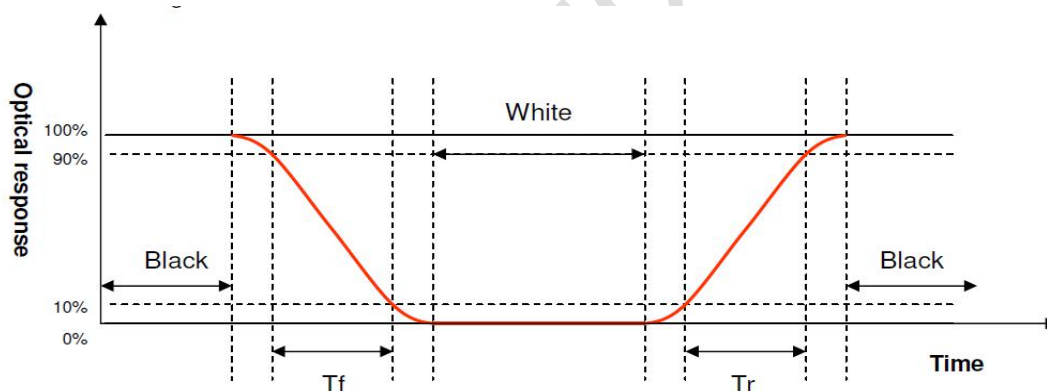
Note 5. Definition of contrast ratio:

   Contrast ratio is calculated with the following formula:

Contrast ratio (CR) = $\dfrac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$

Note 6. Definition of viewing angle

   Viewing angle is the angle at which the contrast ratio is greater than 10 for TFT module. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

Normal:

Note 7. Surface luminance is the LCD surface from the surface with all pixels displaying white. Refer to figure as below.

Measuring method for Contrast ratio, surface luminance, Luminance uniformity，CIE (x, y) chromaticity
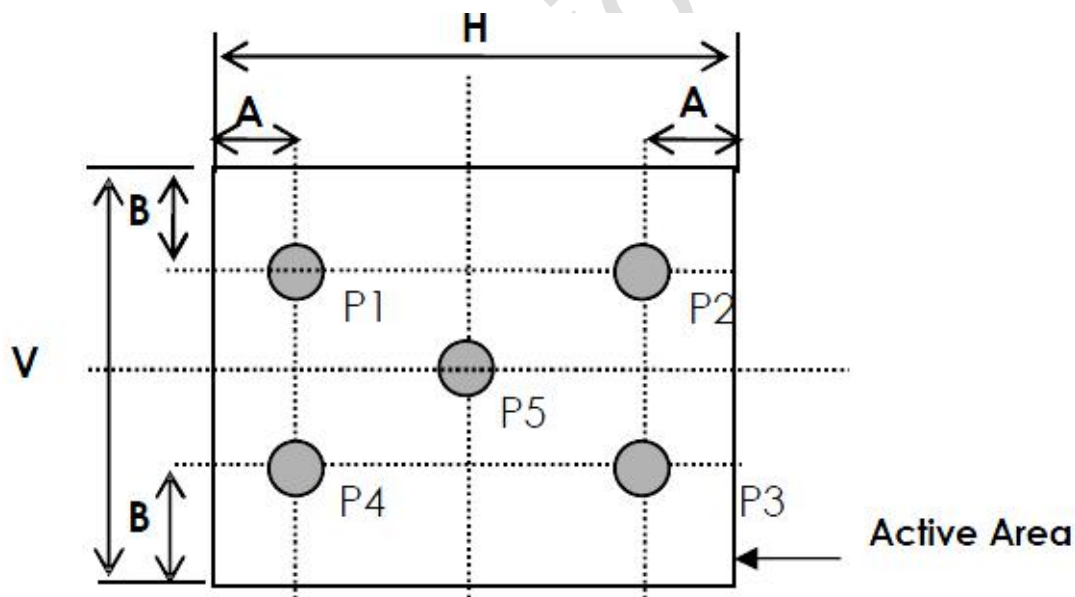
A : 5 mm   B : 5 mm   H,V : Active Area

Light spot size Æ=7mm, 500mm distance from the LCD surface to detector lens

measurement instrument is TOPCON's luminance meter BM-7A

Uniformity definition= [min of 5point/max of 5points]x100%

Lv = Surface Luminance with all white pixels (P5)

13．Reliability Test

This standard reliability test is done only for the first lot of MP products.

Customer and supplier must hold a discussion if other reliability test is requested
by customer.

If there is any abnormality, the normal temperature and humidity recovery 2 hours after
the display is OK, the result is judged as OK.

NO.	Test Item	Description	Test Condition
1	High temperature storage	Endurance test applying the high storage temperature for a long time	80℃,240 H
2	Low temperature storage	Endurance test applying the low storage temperature for a long time	-30℃,240H
3	High temperature operation	Endurance test applying the electric stress under high temperature for a long time	70℃,240H
4	Low temperature operation	Endurance test applying the electric stress under low temperature for a long time	-20℃,240H
5	High temperature /humidity operation	Endurance test applying the high temperature and high humidity storage for a long time	60℃,90% RH, 240H
6	Temperature Cycle (Non operation)	Endurance test applying the low and high temperature cycle -30℃← →25℃ ← →80℃ 30min←→5min←→30min ←———————→ one cycle	-30℃/80℃, 100 cycles

14. Precautions for Operation and Storage

1、 Precautions for Operation

(1)Since LCD panel made of glass,in order to prevent from glass broken or color tone change,please do not apply any mechanical shock or impact or excessive force to it when installing the LCD module.

(2)If LCD panel is broken and liquid crystal substance leaks out and contact your skin or clothes,please immediately wash it off by using soap and water.

(3)The polarizer on the LCD surface is soft and easily scratched.Please be careful when handling.

(4)If LCD surface becomes contaminated,please wipe it off gently by using moisten soft cloth with normal hexane,do not use acetone,ketone,ethanol, alcohol or water.If there is saliva or water on the LCD surface,please wipe it off immediately.

(5)When handing LCD module,please be sure that the body and the tools are properly grounded.And do not touch I/F pins with bare hands or contaminate I/F pins.

(6)Do not attempt to disassemble or process the LCD module.

(7)LCD module should be used under recommended operating conditions shown in chapter 6 and 7.

(8)Response time will be extremely slower at lower temperature than at specified temperature and LCD will show different color when at higher temperature.The phenomenon will disappear when returning to specified condition.

(9)Foggy dew,moisture condensation or water droplets deposited on surface and contact terminals will cause polarizer stain or damage,the deteriorated display quality and electrochemical reaction then leads to the shorter life time and permanent damage to the module probably.Please pay attention to the environmental temperature and humidity.

2、 Precautions for Storage

(1)Please store LCD module in a dark place,avoid exposure to sunlight,the light of fluorescent lamp or any ultraviolet ray.

(2)Keep the environment temperature between 10°C and 35°C, and humidity below 85%RH. Please maintain within 72 hours of accumulated length of storage time, with conditions of 60°C and room humidity of 90%RH.

(3)That keeps the LCD modules stored in the container shipped from supplier before using them is recommended.
(4)Do not leave any article on the LCD module surface for an extended period of time.

3、 Warranty period

Warrants for a period of 12 Months from the shipping date when stored or used under normal condition.

15. Package Specification

TBD