Product Specification

To:

Product Name: DWM133GAF3.2

Document Issue Date: 2025/11/01

Proposed By			Customer Approval
Designed	Checked	Approved	

Note: 1. Please contact Ding Wei Company before designing your product based on this product.
2. The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by DWO for any intellectual property claims or other problems that may result from application based on the module described herein.

Revision	Date	Page	Revised Content/Summary	Remark
00	2025/11/01	--	First issued.	--
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1.0 General Descriptions

1.1 Introduction

The DWM133GAF3.2 is a Color Active-Matrix Liquid Crystal Display with a back light system. The matrix uses a-Si Thin Film Transistor as a switching device. This TFT LCD has a 13.3 inch diagonally measured active display area with FHD resolution (1920horizontal by 1080vertical pixels array).

1.2 Features

- Supported FHDR Resolution
- LVDS Interface
- Wide View Angle
- Compatible with RoHS Standard

1.3 Product Summary

Items	Specifications	Unit
Screen Diagonal	13.3	inch
Active Area (H x V)	293.76×165.24	mm
Number of Pixels (H x V)	1,920 x 1,080	-
Pixel Pitch (H x V)	0.1530x0.1530	mm
Pixel Arrangement	R.G.B. Vertical Stripe	-
Display Mode	Normally Black	-
White Luminance	500 (Typ.)	cd /m^2
Contrast Ratio	1200 (Typ.)	-
Response Time	30 (Typ.)	ms
Input Voltage	3.3 (Typ.)	V
Power Consumption	TBD (Max.)@ White pattern ,FV=60Hz	W
Weight	(TBD) (Max.)	g
Outline Dimension (H x V x D)	309.7 x 184.1 x 9.6 (Typ.)	mm
Electrical Interface (Logic)	LVDS (JEIDA mode)	-
Support Color	16.7 M	-
NTSC	72 (Typ.)	%
LCD Surface Treatment	AG	-

1.4 Functional Block Diagram

Figure 1 shows the functional block diagram of the LCD module.

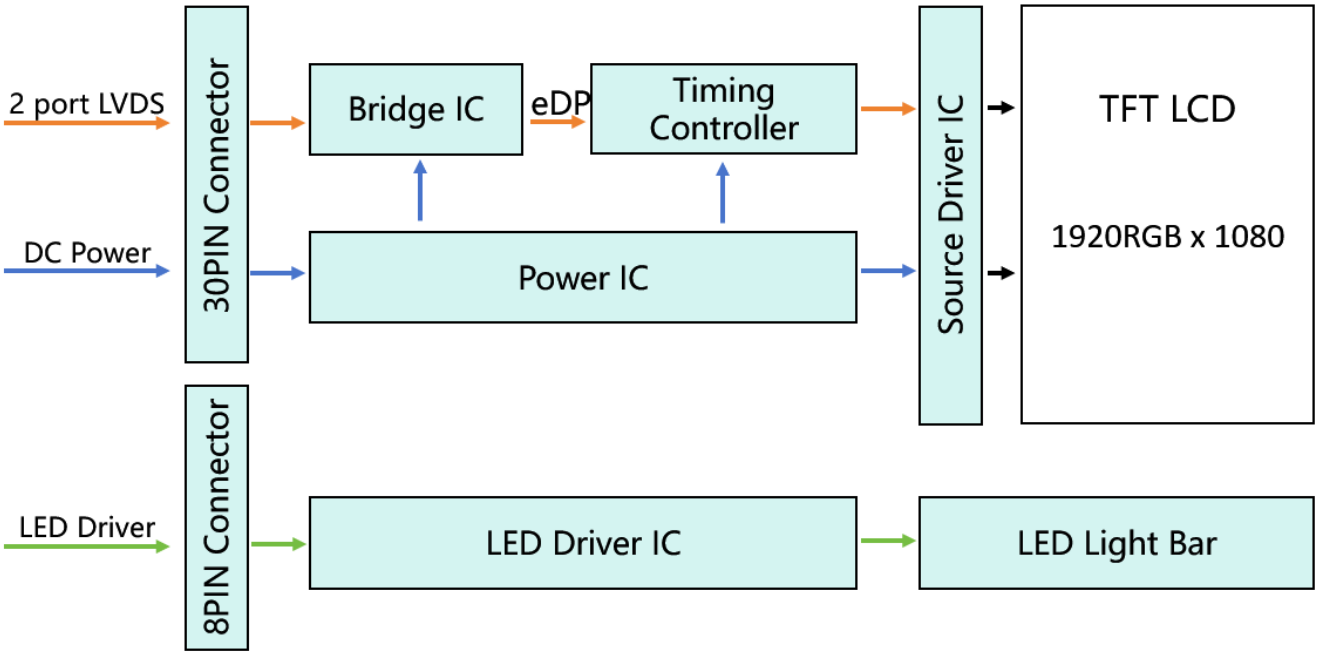


Figure 1 Block Diagram

1.5 Pixel Mapping

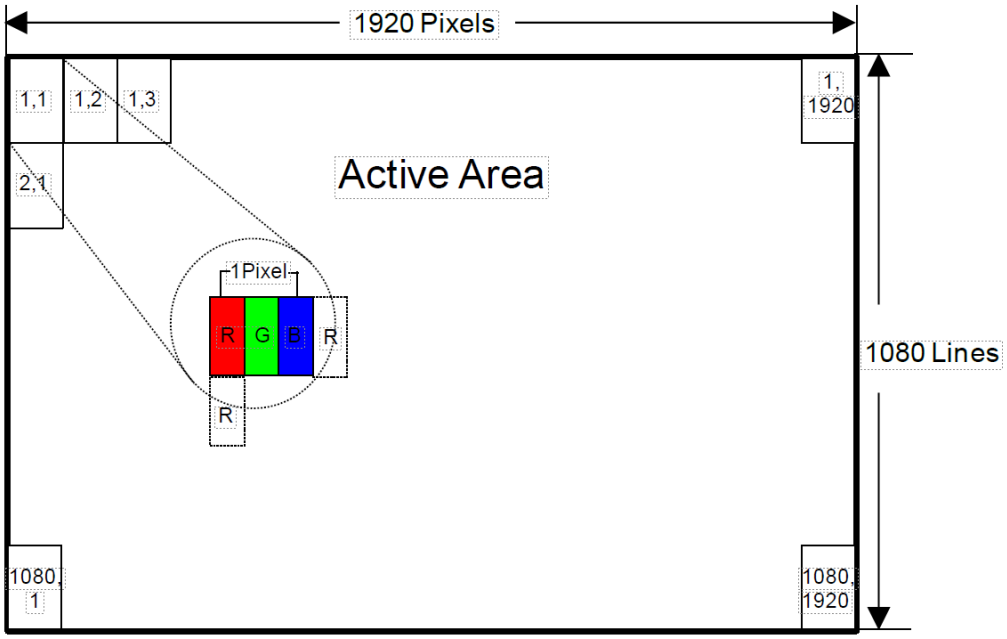


Figure 2 Pixel Mapping

2.0 Absolute Maximum Ratings

Table 1 Electrical & Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{cc}	(-0.3)	(3.6)	V	(1),(2), (3),(4)
Logic Signal Voltage	V_I	(-0.3)	(0.4)	V	
Operating Temperature	Ta	(-20)	(70)	℃	
Storage Temperature	Ta	(-30)	(80)	℃	

Note (1) All the parameters specified in the table are absolute maximum rating values that may cause faulty operation or unrecoverable damage, if exceeded. It is recommended to follow the typical value.

Note (2) All the contents of electro-optical specifications and display fineness are guaranteed under Normal Conditions. All the display fineness should be inspected under normal conditions. Normal conditions are defined as follow: Temperature: 25℃, Humidity: 55± 10%RH.

Note (3) Unpredictable results may occur when it was used in extreme conditions. T_a= Ambient Temperature, T_{gs}= Glass Surface Temperature. All the display fineness should be inspected under normal conditions.

Note (4) Temperature and relative humidity range are shown in the figure below. Wet bulb temperature should be lower than (57.8)℃, and no condensation of water. Besides, protect the module from static electricity.

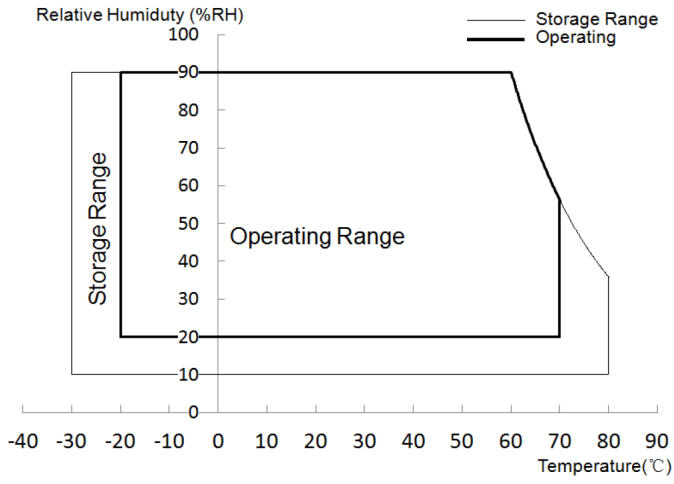


Figure 3 Absolute Ratings of Environment of the LCD Modu

3.0 Optical Characteristics

The optical characteristics are measured under stable conditions as following notes.

Table 2 Optical Characteristics

Item	Conditions		Min.	Typ.	Max.	Unit	Note
Viewing Angle (CR≥10)	Horizontal	θ_{x+}	(80)	(85)	-	degree	(1),(2),(3),(4)(8)
		θ_{x-}	(80)	(85)	-		
	Vertical	θ_{y+}	(80)	(85)	-		
		θ_{y-}	(80)	(85)	-		
Contrast Ratio	Center		(1,000)	(1,200)	-	-	(1),(2),(4),(8) θx=θy=0°
Response Time	Rising + Falling		-	(30)	(35)	ms	(1),(2),(5),(8) θx=θy=0°
Color Chromaticity (CIE1931)	Red x		Typ. -0.04	(TBD)	Typ. +0.04	-	(1),(2),(3),(8) θx=θy=0°
	Red y			(TBD)		-	
	Green x			(TBD)		-	
	Green y			(TBD)		-	
	Blue x			(TBD)		-	
	Blue y			(TBD)		-	
	White x			(0.311)		-	
	White y			(0.353)		-	
NTSC	-		-	(72)	-	%	(1),(2),(3),(8) θx=θy=0°
White Luminance	Center		（450）	(500)	-	cd/m^2	(1),(2),(6),(8) θx=θy=0°
Luminance Uniformity	9 Points		(70)	(80)		%	(1),(2),(7),(8) θx=θy=0°

Note (1) Measurement Setup:

The LCD module should be stabilized at given ambient temperature (25℃) for 30 minutes to avoid abrupt temperature changing during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 30 minutes in the windless room.

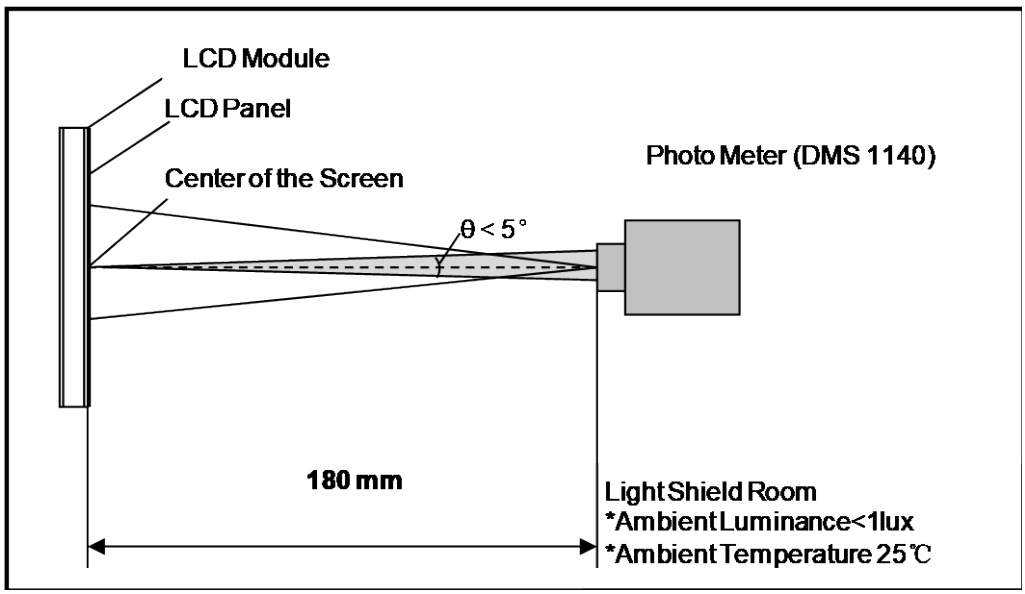


Figure 4 Measurement Setup

Note (2) The LED input parameter setting as:

I_{LED}:(80)mA, I_{LED}=(20)mA*4

Note (3) Definition of Viewing Angle

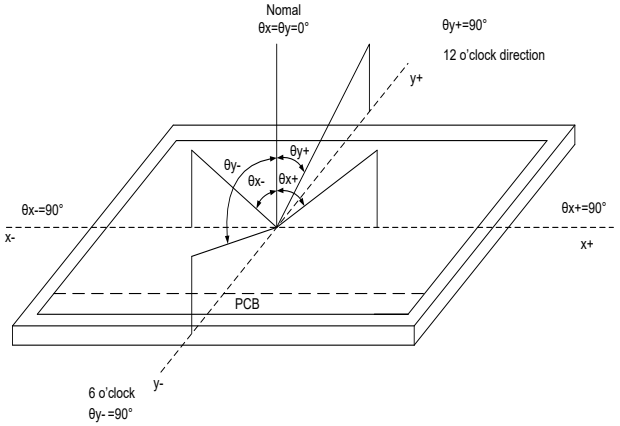


Figure 5 Definition of Viewing Angle

Note (4) Definition of Contrast Ratio (CR)

The contrast ratio can be calculated by the following expression:

Contrast Ratio (CR) = The luminance of White pattern/ The luminance of Black pattern

Note (5) Definition of Response Time (T_R, T_F)

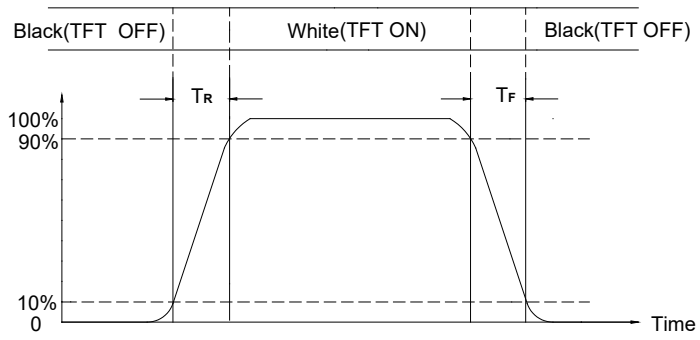


Figure 6 Definition of Response Time

Note (6) Definition of Luminance of White

Measure the luminance of White pattern (Ref.: Active Area)

Display Luminance=L1(center point)

Note (7) Definition of Luminance Uniformity (Ref.: Active Area)

Measure the luminance of White pattern at 9 points.

Luminance Uniformity= Min.(L1, L2, ... L9) / Max.(L1, L2, ... L9)

H—Active Area Width, V—Active Area Height, L—Luminance

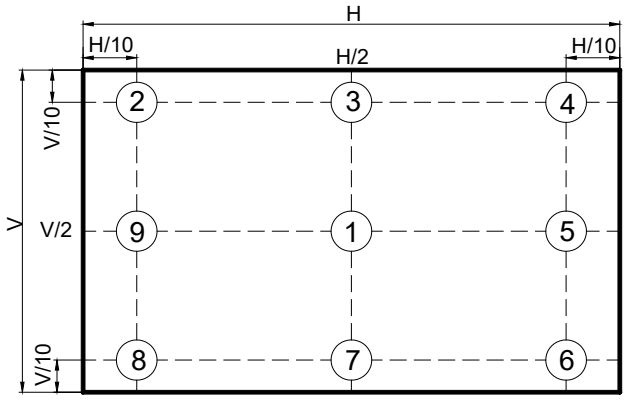


Figure 7 Measurement Locations of 9 Points

Note (8) All optical data are based on CH given system & nominal parameter & testing machine in this document.

4.0 Electrical Characteristics

4.1 Interface Connector

Table 3 LVDS Signal Connector Type

Item	Description
Mating Receptacle / Type (Reference)	DF19K-30P-1H(52)

Table 4 LDVS Signal Connector Pin Assignment

Pin No.	Symbol	Description	Remarks
1	RxOIN0-	Negative LVDS differential data input (Odd data)	
2	RxOIN0+	Positive LVDS differential data input (Odd data)	
3	RxOIN1-	Negative LVDS differential data input (Odd data)	
4	RxOIN1+	Positive LVDS differential data input (Odd data)	
5	RxOIN2-	Negative LVDS differential data input (Odd data, DSPTMG)	
6	RxOIN2+	Positive LVDS differential data input (Odd data, DSPTMG)	
7	GND	Power Ground	
8	RxOCLKIN-	Negative LVDS differential clock input (Odd clock)	
9	RxOCLKIN+	Positive LVDS differential clock input (Odd clock)	
10	RxOIN3-	Negative LVDS differential data input (Odd data)	
11	RxOIN3+	Positive LVDS differential data input (Odd data)	
12	RxEIN0-	Negative LVDS differential data input (Even data)	
13	RxEIN0+	Positive LVDS differential data input (Even data)	
14	GND	Power Ground	
15	RxEIN1-	Positive LVDS differential data input (Even data)	
16	RxEIN1+	Negative LVDS differential data input (Even data)	
17	GND	Power Ground	
18	RxEIN2-	Negative LVDS differential data input (Even data)	
19	RxEIN2+	Positive LVDS differential data input (Even data)	
20	RxECLKIN-	Negative LVDS differential clock input (Even clock)	
21	RxECLKIN+	Positive LVDS differential clock input (Even clock)	
22	RxEIN3-	Negative LVDS differential data input (Even data)	
23	RxEIN3+	Positive LVDS differential data input (Even data)	
24	GND	Power Ground	
25	BIST	Bist +3.3V（NC）	
26	VDD	Power +3.3V	

27	VDD	Power +3.3V	
28	SCL	For DWO internal use (NC)	
29	SDA	For DWO internal use (NC)	
30	GND	Power Ground	

Table 5 BL Signal Connector Type

Item	Description
Mating Receptacle / Type (Reference)	DF19G-8P-1H(52)

Table 6 BL Signal Connector Pin Assignment

Pin No	Symbol	Description
1	LED_EN	LED enable pin
2	LED_PWM	System PWM Single Input
3	NC	No connect
4	VLED	+12V
5	VLED	-12V
6	NC	No connect
7	GND	Ground
8	GND	Ground

4.2 Signal Electrical Characteristics

4.2.1 Signal Electrical Characteristics For LVDS Receiver

Table 1 LVDS Receiver Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	Vth	-	-	(100)	mV	V_{CM}=+1.2V
Differential Input Low Threshold	Vtl	(-100)	-	-	mV	V_{CM}=+1.2V
Input voltage range(singled-end)	RXVIN	(0.7)		(1.7)	V	-
Magnitude Differential Input Voltage	$\|V_{ID}\|$	(200)	-	(600)	mV	-
Common Mode Voltage	V_{CM}	(1.0)	(1.2)	(1.4)	V	|VID|=0.2

Note (1) Input signals shall be low or Hi- resistance state when Vcc is off.

Note (2) All electrical characteristics for LVDS signal are defined and shall be measured at the interface connector of LCD.

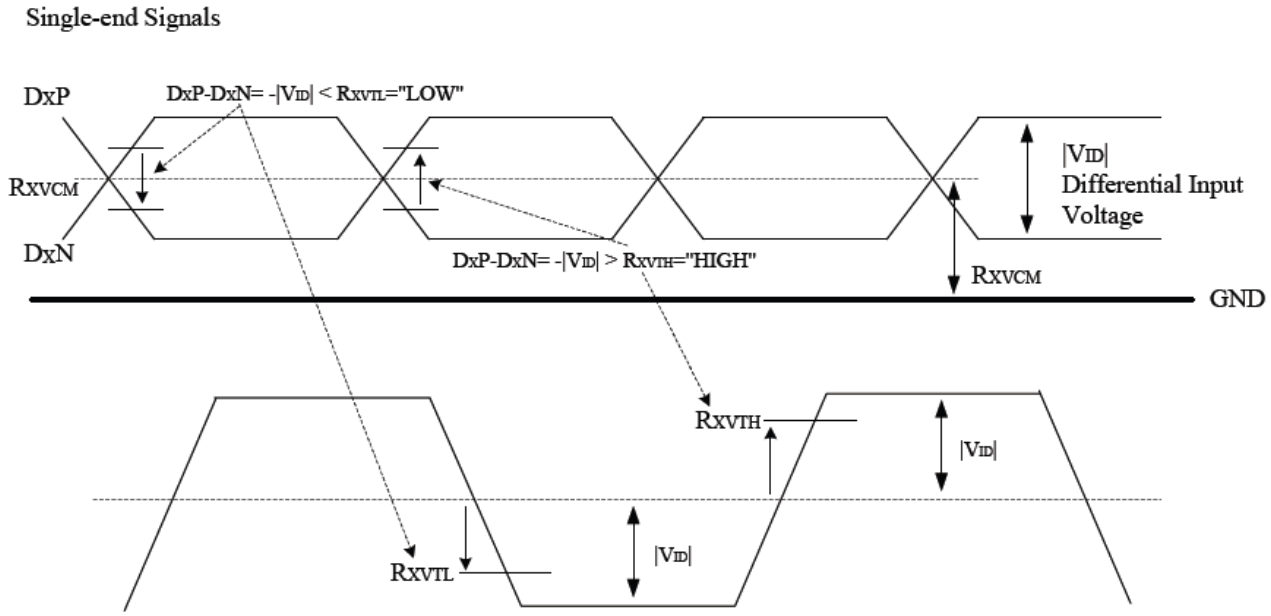


Figure 8 Voltage Definitions

4.2.2 LVDS Input Data Format

8 Bit JEIDA Mode

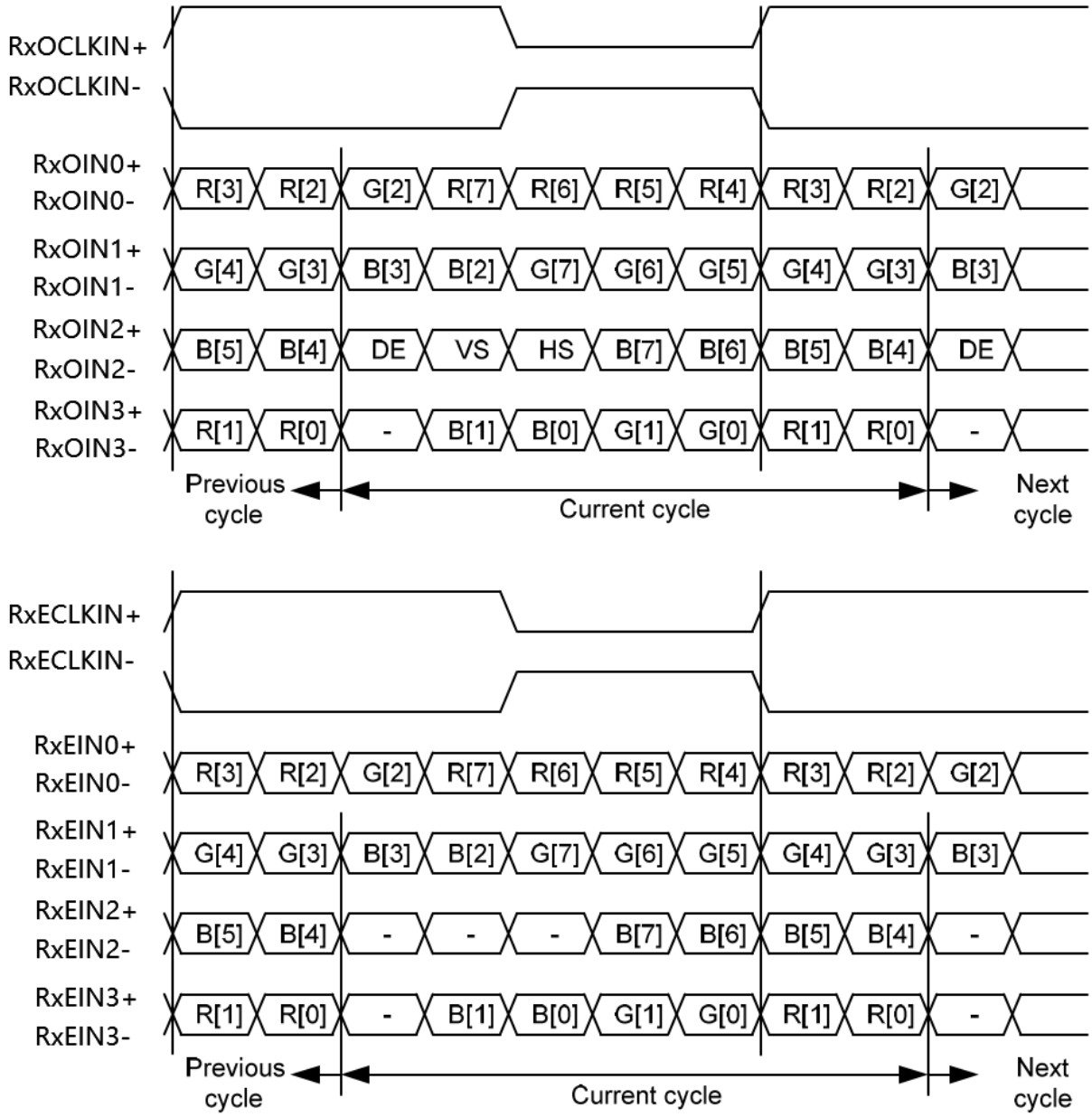


Figure 9 2-port LVDS signals, JEIDA format, 8-bit mode

4.3 Interface Timings

Table 2 Interface Timings

Parameter	Symbol	Min.	Typ.	Max.	Unit
LVDS Clock Frequency	Fclk	-	69.32	-	MHz
H Total Time	HT	-	1040	-	Clocks
H Active Time	HA	960			Clocks
V Total Time	VT	-	1111	-	Lines
V Active Time	VA	1080			Lines
Frame Rate	FV	-	60	-	Hz

Note1：The interface timing diagram provided is for reference only. The detailed configuration will be updated after the samples are produced.

Note2： All reliabilities are specified for timing specification based on refresh rate of 60Hz.

4.4 Input Power Specifications

Input power specifications are as follows.

Table 3 Input Power Specifications

Parameter		Symbol	Min.	Typ.	Max.	Unit	Note
System Power Supply							
LCD Drive Voltage (Logic)		V_{CC}	3.0	3.3	3.6	V	(1),(2)
VCC Current	White Pattern	I_{CC}	-	TBD	TBD	A	(1),(4)
VCC Power Consumption	White Pattern	P_{CC}	-	TBD	TBD	W	
Rush Current		I_{Rush}	-	-	TBD	A	(1),(5)
Allowable Logic/LCD Drive Ripple Voltage		V_{VCC-RP}	-	-	200	mV	(1)
LED Power Supply							
LED Input Voltage		V_{LED}	10.8	12	13.2	V	(1),(2)
LED Power Consumption		P_{LED}	-	-	（7.92）	W	(1), (6)
LED Forward Voltage		V_F	2.8	3.0	3.3	V	(1)
LED Forward Current		I_F	-	（50）	-	mA	
PWM Signal Voltage	High	Vpwm	3	-	3.6	V	
	Low		0	-	0.4		
LED Enable Voltage	High	VLED_EN	3	-	3.6	V	
	Low		0	-	0.4		
Input PWM Frequency		FPWM	100Hz	-	200Hz	Duty≥0.1%	(1),(2),(7)
			200Hz	-	500Hz	Duty≥0.4%	
			500Hz	-	1KHz	Duty≥0.8%	
			1KHz	-	2KHz	Duty≥1.5%	
			2KHz	-	5KHz	Duty≥4%	
			5KHz	-	10KHz	Duty≥8%	
			10KHz	-	30KHz	Duty≥12%	
Duty Ratio		PWM	0.1	-	100	%	(1),(8)
LED Life Time		LT	(50,000)	-	-	Hours	(1),(8)

Note (1) All of the specifications are guaranteed under normal conditions. Normal conditions are defined as follow: Temperature: 25℃, Humidity: 55± 10%RH.

Note (2) All of the absolute maximum ratings specified in the table, if exceeded, may cause faulty operation or unrecoverable damage.It is recommended to follow the typical value.

Note (3) The specified VDD current and power consumption are measured under the VDD = 3.3 V, FV = 60 Hz condition and white pattern.

Note (4) T The figure below is the measuring condition of VDD. Rush current can be measured when TRUSH is 0.5 ms.

Note (5) The power consumption of LED Driver are under the VLED = 12 V, Dimming of Max luminance

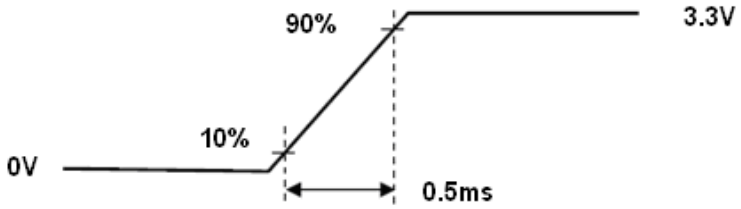


Figure 10 V_{cc} Rising Time

Note (6) Although acceptable range as defined, the dimming ratio is not effective at all conditions. The PWM frequency should be fixed and stable for more consistent luminance control at any specific level desired.

Note (7) The operation of LED Driver below minimum dimming ratio may cause flickering or reliability issue.

Note (8) The life time is determined as the sum of the lighting time till the luminance of LCD at the typical LED current reducing to 50% of the minimum value under normal operating condition

4.5 Power ON/OFF Sequence

1. Interface signals are also shown in the chart. Signals from any system shall be Hi-resistance state or low level when VCC voltage is off.

2. Please set timing according to the following figures, otherwise it may cause image sticking.

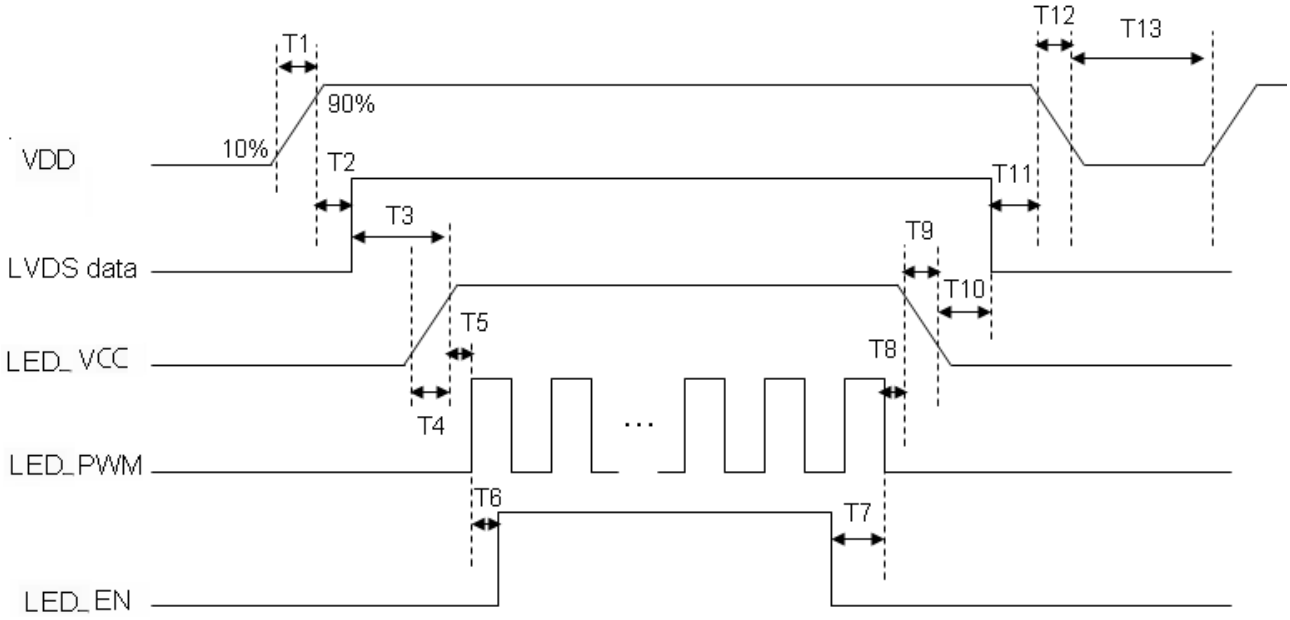


Figure 11 Power Sequence

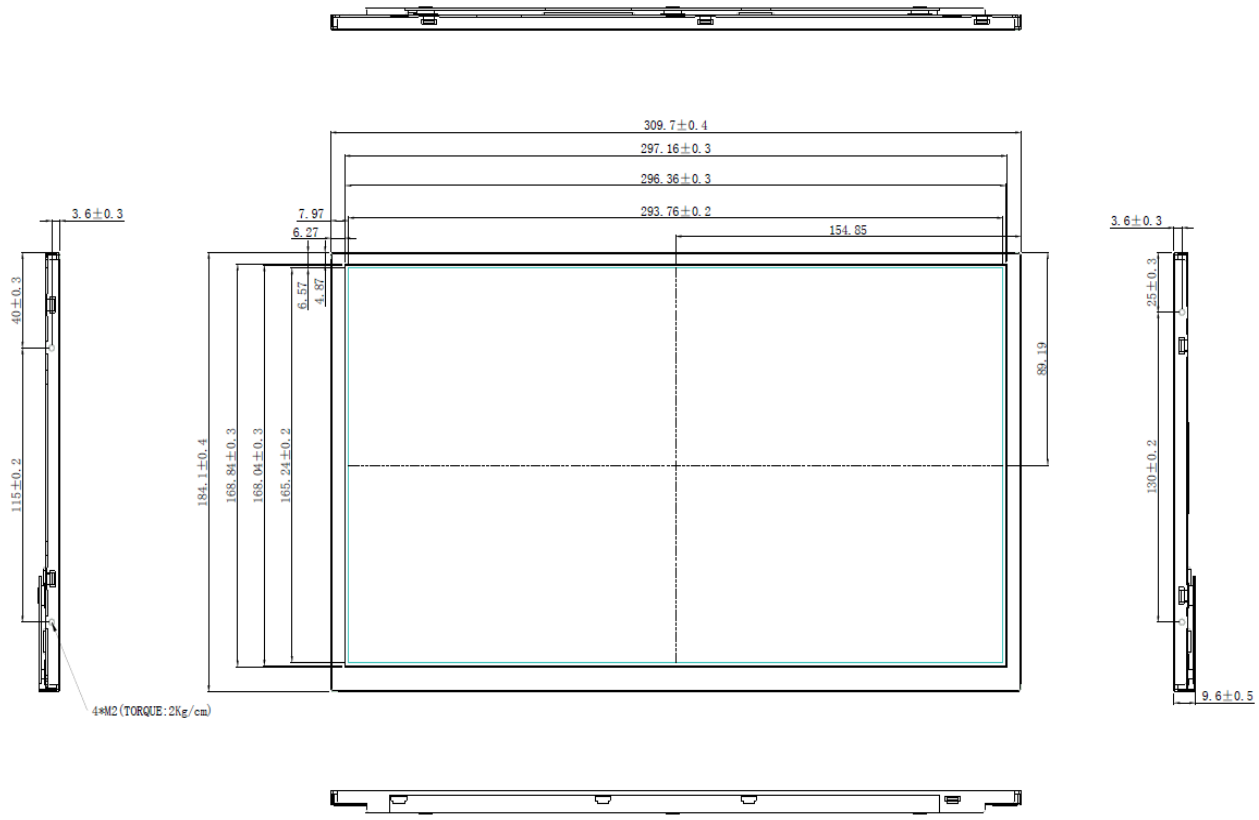
Table 4 Power Sequencing Requirements

Parameter	Symbol	Min.	Typ.	Max.	Unit
VCC Rise Time	T1	(0.5)	-	(10)	ms
VCC Good to RESET pull H	T2	(30)	-	(90)	ms
Signal Valid to Backlight On	T3	(200)	-	-	-
Backlight Power On Time	T4	(0.5)	-	-	ms
Backlight LED_VCC Good to System LED_ PWM On	T5	(10)	-	-	ms
System LED_ PWM On to Backlight LED_ EN On	T6	(10)	-	-	ms
Backlight LED_ EN Off to System LED_ PWM Off	T7	(0)	-	-	ms
System LED_ PWM Off to B/L Power Disable	T8	(10)	-	-	ms
Backlight Power Off Time	T9	(0.5)	(10)	(30)	ms

Backlight Off to Signal Disable	T10	(200)	-	-	ms
Signal Disable to Power Down	T11	(0)	-	-	ms
VDD Fall Time	T12	(0.5)	(10)	(30)	ms
Power Off	T13	(500)	-	-	ms

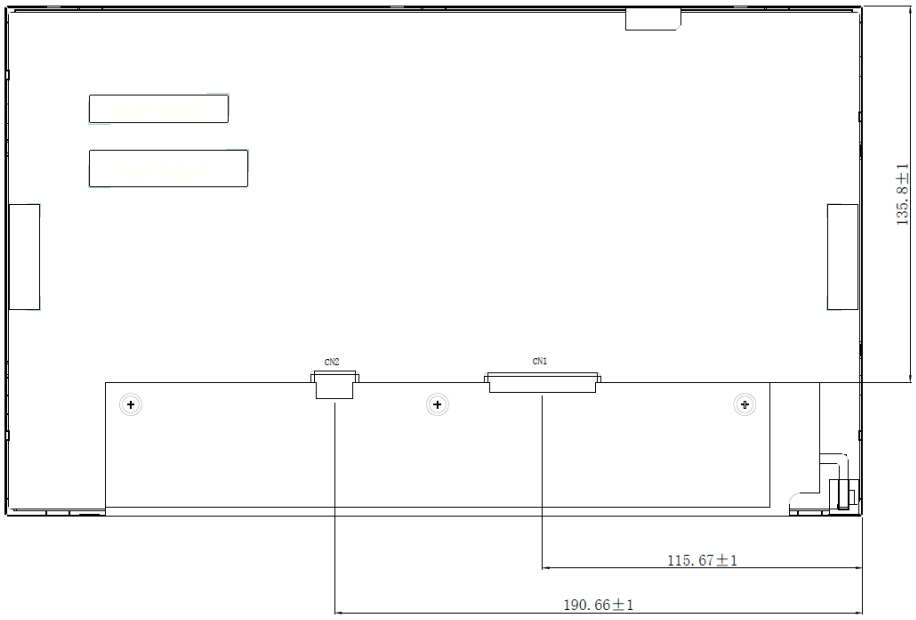
5.0 Mechanical Characteristics

5.1 Outline Drawing



Unit：mm

Figure 12 Reference Outline Drawing (Front Side)



Unit：mm

Figure 13 Reference Outline Drawing (Back Side)

Note: 1.Unnoted tolerance ±0.5mm;

5.2 Dimension Specifications

Table 10 Module Dimension Specifications

Item		Min.	Typ.	Max.	Unit
Width		(309.2)	(309.70)	(310.2)	mm
Height		(183.6)	(184.1)	(184.6)	mm
Thickness	With PCB	(9.1)	(9.6)	(10.1)	mm
Weight		-	-	(TBD)	g

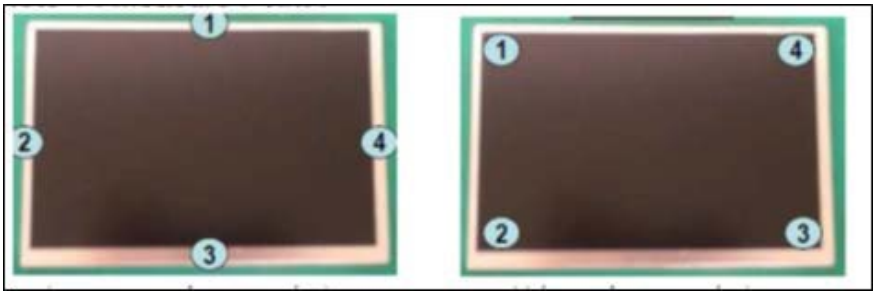
Note：Outline dimension measure instrument: Vernier Caliper.

6.0 Reliability Conditions

Table 11 Reliability Condition

Item		Package	Test Conditions		Note
High Temperature/High Humidity Operating Test		Module	T_a=60℃, 90%RH, 240 hours		(1),(2),(3),(4)
High Temperature Operating Test		Module	T_a=70℃, 240 hours		
Low Temperature Operating Test		Module	T_a= -20℃, 240 hours		
High Temperature Storage Test		Module	T_a=80℃, 240 hours		(1),(3),(4)
Low Temperature Storage Test		Module	T_a= -30℃, 240 hours		
Shock Non-operating Test		Module	240G, 2ms, 1time for ±x, ±y, ±z 6 directions		(1),(3),(5)
Vibration Non-operating Test		Module	1.5G, 10~500 Hz, x、y、z each axis/1hour.		
ESD Test	Operating	Module	Contact	±8KV, 150pF(330Ohm)	(1),(2),(6)
			Air	±15KV, 150pF(330Ohm)	

Note (1) A sample can only have one test. Outward appearance, image quality and optical data can only be checked at normal conditions according to the DWO document before reliable test. Only check the function of the module after reliability test. Note (2) The setting of electrical parameters should follow the typical value before reliability test. Note (3) During the test, it is unaccepted to have condensate water remains. Besides, protect the module from static electricity. Note (4) The sample must be released for 24 hours under normal conditions before judging. Furthermore, all the judgment must be made under normal conditions. Normal conditions are defined as follow: Temperature: 25°C, Humidity: 55± 10%RH. Ta= Ambient Temperature, Tgs= Glass Surface Temperature. Note (5) The module should be fixed firmly in order to avoid twisting and bending. Note (6) It could be regarded as pass, when the module recovers from function fault caused by ESD after resetting



Contact test points Air test points

7.0 Package Specification

TBD

8.0 Lot Mark

TBD

9.0 General Precaution

9.1 Using Restriction

This product is not authorized for using in life supporting systems, aircraft navigation control systems, military systems and any other appliance where performance failure could be life-threatening or lead to be catastrophic.

9.2 Operation Precaution

(1)The LCD product should be operated under normal conditions.
Normal conditions are defined as below:

Temperature: 25℃

Humidity: 55±10%

Display pattern: continually changing pattern (Not stationary)

(2) Brightness and response time depend on the temperature. (It needs more time to reach normal brightness in low temperature.)

(3) It is necessary for you to pay attention to condensation when the ambient temperature drops suddenly. Condensate water would damage the polarizer and electrical contacted parts of the module. Besides, smear or spot will remain after condensate water evaporating.

(4) If the absolute maximum rating value was exceeded, it may damage the module.

(5) Do not adjust the variable resistor located on the module.

(6) Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding may be important to minimize the interference.

(7) Image sticking may occur when the module displayed the same pattern for long time.

(8) Do not connect or disconnect the module in the “power on” condition. Power supply should always be turned on/off by the “power on/off sequence”

(9) Ultra-violet ray filter is necessary for outdoor operation.

9.3 Mounting Precaution

(1) All the operators should be electrically grounded and with Ion-blown equipment turning on when mounting or handling. Dressing finger-stalls out of the gloves is important for keeping the panel clean during the incoming inspection and the process of assembly.

(2) It is unacceptable that the material of cover case contains acetic or chloric. Besides, any other material that could generate corrosive gas or cause circuit break by electro-chemical reaction is not desirable.

(3) The case on which a module is mounted should have sufficient strength so that external force is not transmitted to the module directly.

(4) It is obvious that you should adopt radiation structure to satisfy the temperature specification.

(5) So as to acquire higher luminance, the cable of the power supply should be connected directly with a minimize length.

(6) It should be attached to the system tightly by using all holes for mounting, when the module is assembled. Be careful not to apply uneven force to the module，especially to the PCB on the back.
(7) A transparent protective film needs to be attached to the surface of the module.
(8) Do not press or scratch the polarizer exposed with anything harder than HB pencil lead. In addition, don't touch the pin exposed with bare hands directly.
(9) Clean the polarizer gently with absorbent cotton or soft cloth when it is dirty.
(10) Wipe off saliva or water droplet as soon as possible. Otherwise, it may cause deformation and fading of color.
(11)Clean the panel gently with absorbent cotton or soft cloth when it is dirty. Ethanol(C_2H_5OH) is allowed to be used. Ketone (ex. Acetone), Toluene, Ethyl acid, Methyl chloride, etc are not allowed to be used for cleaning the panel, which might react with the polarizer to cause permanent damage.
(12) Do not disassemble or modify the module. It may damage sensitive parts in the LCD module, and cause scratches or dust remains. DWO does not warrant the module, if you disassemble or modify the module.

9.4 Handling Precaution

(1) Static electricity will generate between the film and polarizer, when the protection film is peeled off. It should be peeled off slowly and carefully by operators who are electrically grounded and with Ion-blown equipment turning on. Besides, it is recommended to peel off the film from the bonding area.
(2) The protection film is attached to the polarizer with a small amount of glue. When the module with protection film attached is stored for a long time, a little glue may remain after peeling.
(3) If the liquid crystal material leaks from the panel, keep it away from the eyes and mouth. In case of contact with hands, legs or clothes, it must be clean with soap thoroughly.

9.5 Storage Precaution

When storing modules as spares for long time, the following precautions must be executed.
(1) Store them in a dark place. Do not expose to sunlight or fluorescent light. Keep the temperature between 5℃ and 35℃ at normal humidity.
(2) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.
(3) It is recommended to use it in a short-time period, after it's unpacked. Otherwise, we would not guarantee the quality.

9.6 Others

When disposing LCD module, obey the local environmental regulations.