Product Specification

Product Name: DWM133CAF4.2

Document Issue Date: 2025/10/20

Proposed By			Customer Approval
Designed	Checked	Approved	

Note : 1. Please contact DWO 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	2025/10/20	--	First issued.	--

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1.0 General Descriptions

1.1 Introduction

The DWM133CAF4.2 is a Color Active Matrix Liquid Crystal Display with a light system. The matrix uses a-Si Thin Film Transistor as a switching device. This TFT LCD has a13.3inch diagonally measured active display area with FHD resolution (1, 920 horizontal by 1,080 vertical pixels array).

1.2 Features

- ■ Supported FHD Resolution
- ■ eDp Interface
- ■ Wide View Angle
- ■ Compatible with RoHS Standard

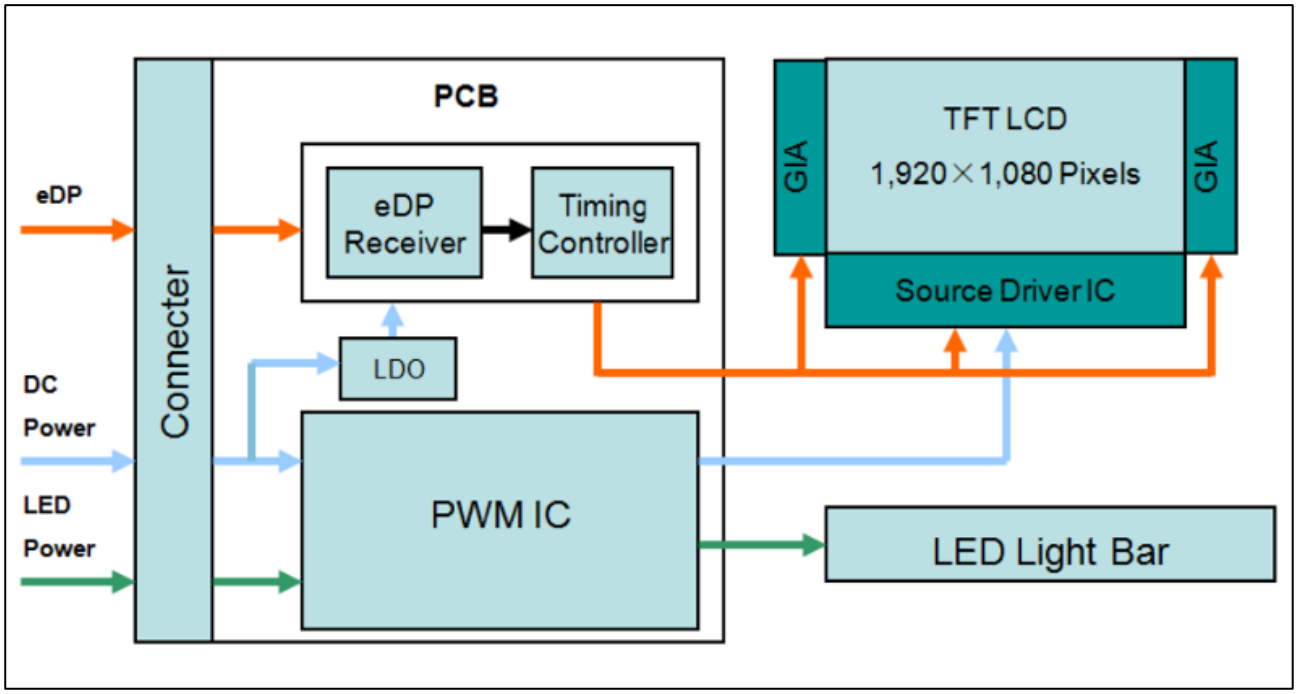
1.3 Product Summary

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)		0.1530 x 0.1530	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		4.67 (Max.)@ White pattern ,FV=60Hz	W
Weight		TBD (Max.)	g
Outline Dimension (H x V x D)	PCB side	300.26(Typ.) x 177.54(Typ.) x 4.8(Max.)	mm
	LCD side	300.26(Typ.) x 177.54(Typ.) x 2.65(Max.)	mm
Electrical Interface (Logic)		eDp	-
Support Color		6bit	-
NTSC		65(Typ.)	%
Viewing Direction		All	
Surface Treatment		AG	

1.4 Functional Block Diagram

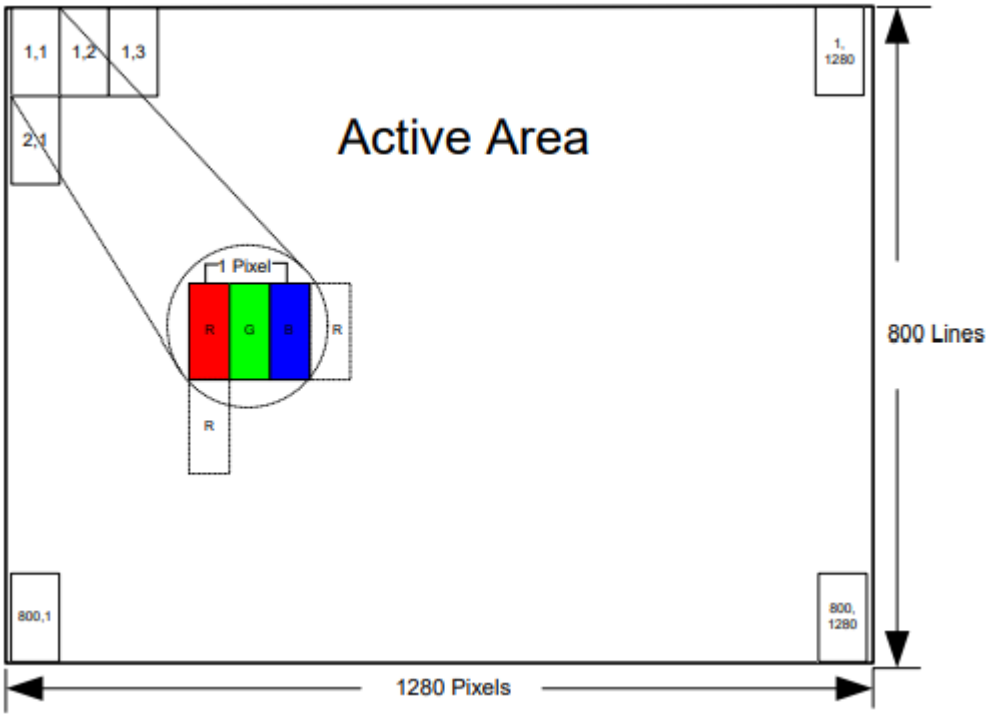
Figure 1 shows the functional block diagram of the LCD module.

Figure 1 Block Diagram



1.5 Pixel Mapping

Figure 2 Pixel Mapping



2.0 Absolute Maximum Ratings

This specification is intended to serve as a point of reference for our customers in the event that they choose to collaborate with us or utilize our products.

Table 1 Electrical & Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V_{DD}	-0.3	3.6	V	(1),(2), (3),(4)
Logic Signal Voltage	V_{signal}	0.2	0.4	V	
Operating Temperature	Tgs	0	50	℃	
Storage Temperature	Ta	-20	60	℃	

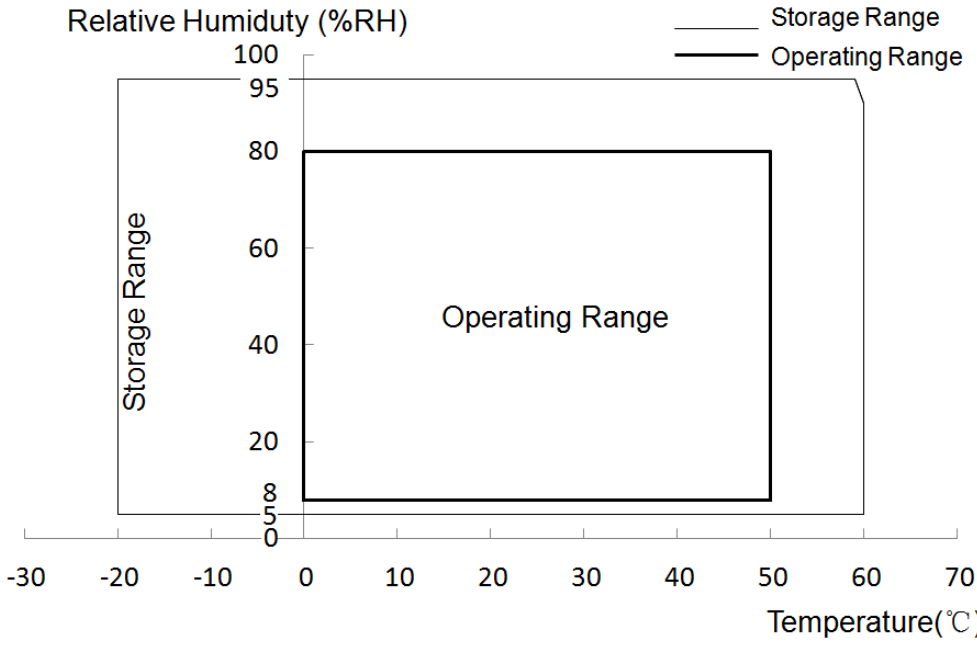
Note (1) All the parameters specified in the table are absolute maximum rating values that may cause faulty operation or unrecoverable damage, if exceeded. It is recommended to follow the typical value.

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 (46)℃, and no condensation of water. Besides, protect the module from static electricity.

Figure 3 Absolute Ratings of Environment of the LCD Module



3.0 Optical Characteristics

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

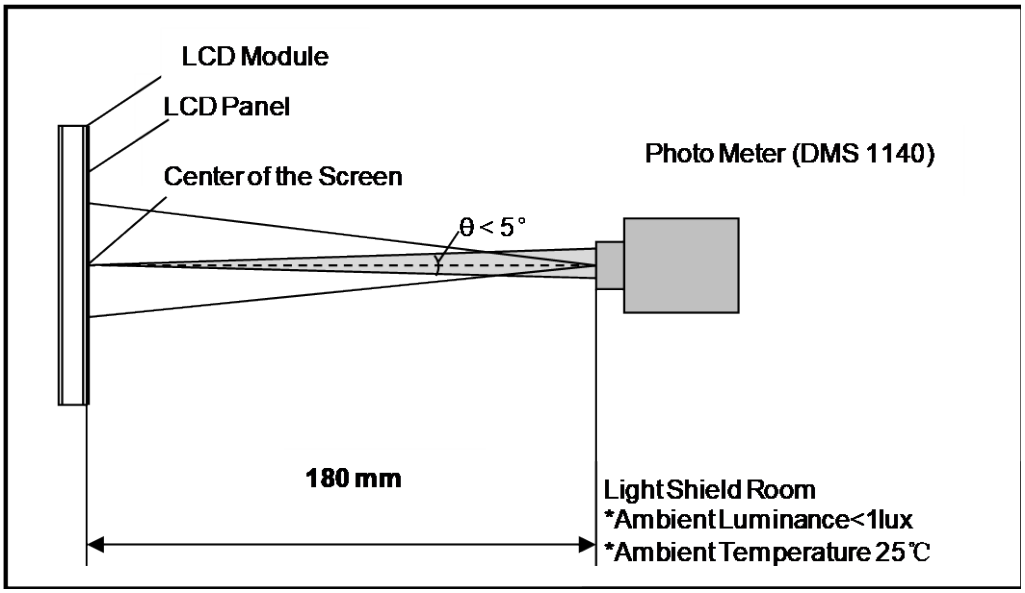
Table 2 Optical Characteristics

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		1000	1200	-	-	(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. -0.03	TBD	Typ. +0.03	-	(1),(2),(3),(8) θx=θy=0°
	Red y			TBD		-	
	Green x			TBD		-	
	Green y			TBD		-	
	Blue x			TBD		-	
	Blue y			TBD		-	
	White x			TBD		-	
	White y			TBD		-	
NTSC	-		65	-	-	%	(1),(2),(3),(8) θx=θy=0°
White Luminance	Center		-	500	-	cd/m^2	(1),(2),(6),(8) θx=θy=0°
Luminance Uniformity	5 Points		80	-	-	%	(1),(2),(7),(8) θx=θy=0°
	13 Points		60	-	-		

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



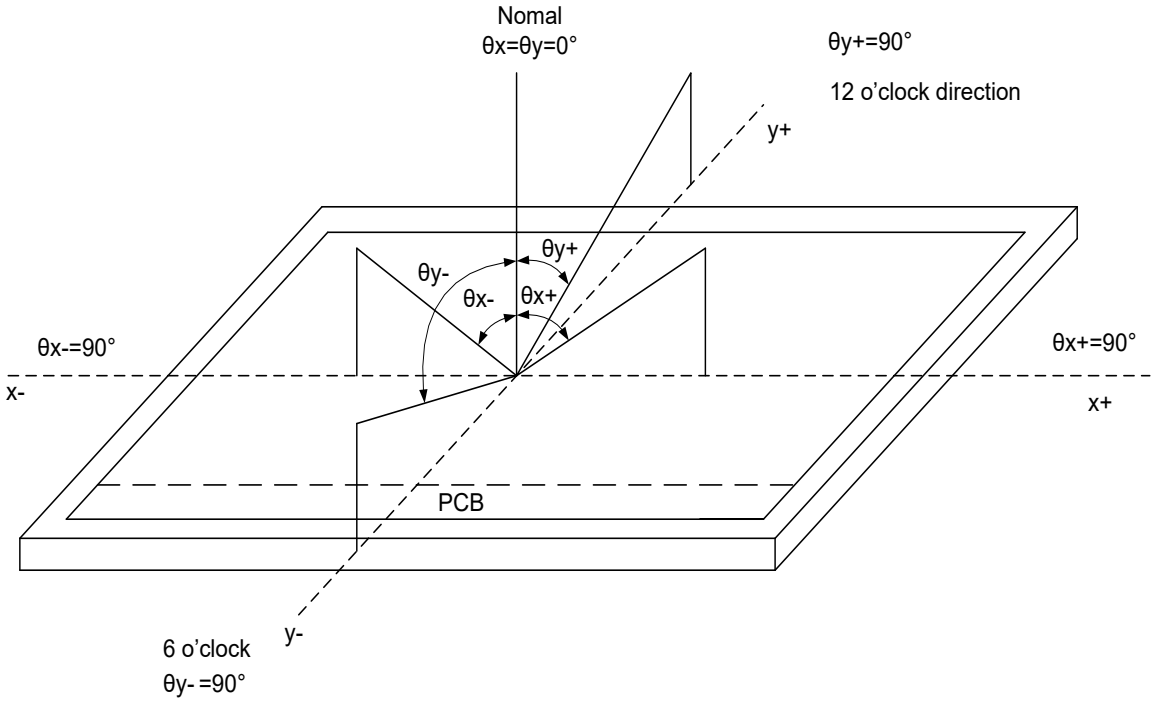
Note (2) The LED input parameter setting as:

V_{LED}=12V

PWM-LED=Duty 100%

Note (3) Definition of Viewing Angle

Figure 5 Definition of Viewing Angle



Note (4) Definition of Contrast Ratio (CR)

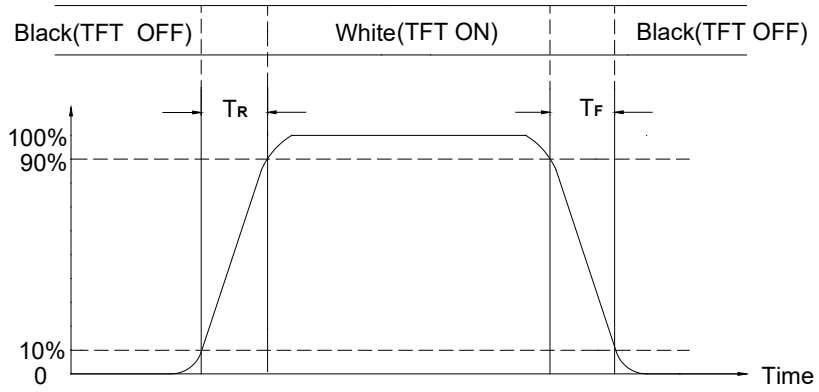
The contrast ratio can be calculated by the following expression:

Contrast Ratio (CR) = L255/L0

L255: Luminance of gray level 255, L0:Luminance of gray level 0

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

Figure 6 Definition of Response Time



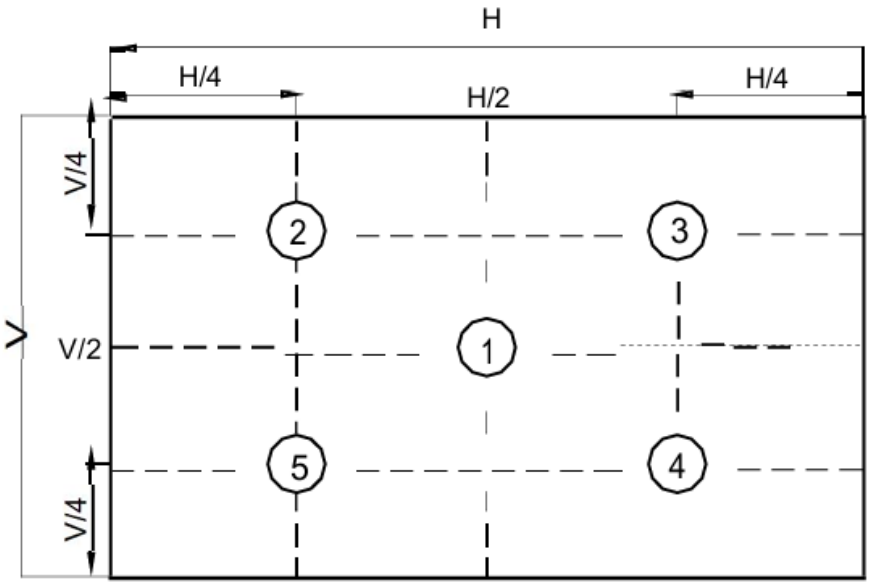
Note (6) Definition of Luminance of White

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

Display Luminance=(L1+L2+L3+L4+L5)/5

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

Figure 7 Measurement Locations of 5points



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

Measure the luminance of gray level 255 at 5 points.

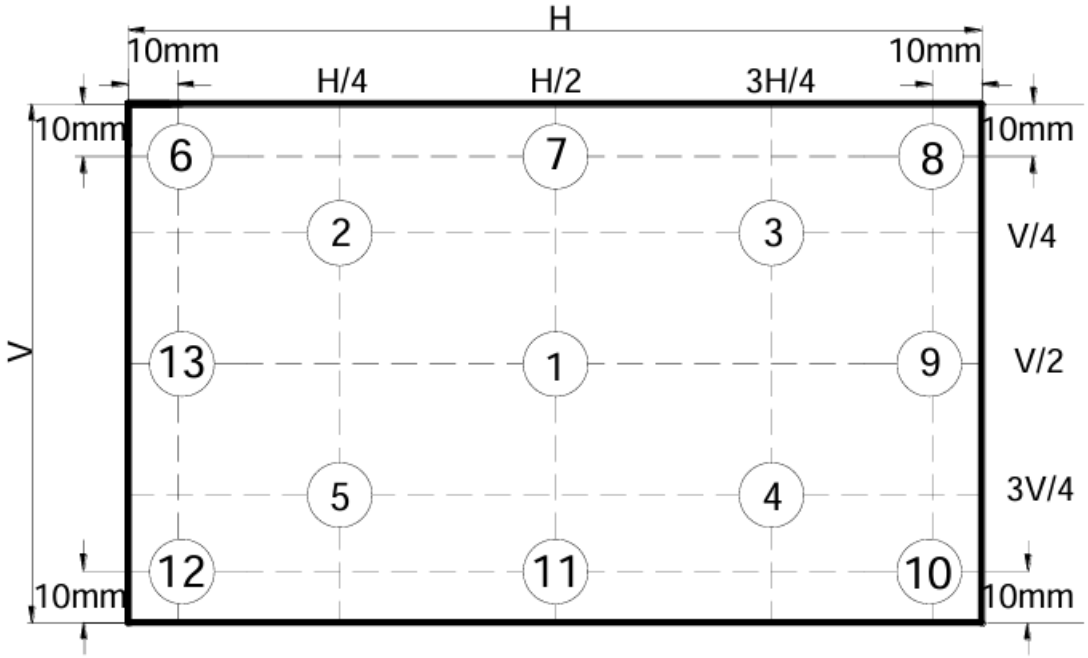
Luminance Uniformity= Min. (L1, L2, ... L5) / Max. (L1, L2, ... L5)

Measure the luminance of gray level 255 at 13 points.

Luminance Uniformity= Min. (L1, L2, ... L13) / Max. (L1, L2, ... L13)

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

Figure 8 Measurement Locations of 13 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 Signal Connector Type

Item	Description
Mating Receptacle / Type (Reference)	FP0515-03000ZM

Table 4 Signal Connector Pin Assignment

Pin No.	Symbol	Description	Remarks
1	NC	No Connection	
2	H_GND	Ground	
3	LANE1_N	eDP RX Channel 1 Negative	
4	LANE1_P	eDP RX Channel 1 Positive	
5	H_GND	Ground	
6	LANE0_N	eDP RX Channel 0 Negative	
7	LANE0_P	eDP RX Channel 0 Positive	
8	H_GND	Ground	
9	AUX_CH_P	eDP AUX CH Positive	
10	AUX_CH_N	eDP AUX CH Negative	
11	H_GND	Ground	
12	LCD_VCC	Power Supply, 3.3V (typ.)	
13	LCD_VCC	Power Supply, 3.3V (typ.)	
14	BIST	Panel Self Test Enable	
15	H_GND	Ground	
16	H_GND	Ground	
17	HPD	Hot Plug Detect Output	
18	BL_GND	LED Ground	
19	BL_GND	LED Ground	
20	BL_GND	LED Ground	
21	BL_GND	LED Ground	
22	BL_ENABLE	LED Enable Pin(+3.3V Input)	
23	BL_PWM	System PWM Signal Input	
24	NC	No Connection	
25	NC	No Connection	
26	BL_POWER	LED Backlight power (12V Typical)	

27	BL_POWER	LED Backlight power (12V Typical)	
28	BL_POWER	LED Backlight power (12V Typical)	
29	BL_POWER	LED Backlight power (12V Typical)	
30	NC	No connect	

4.2 Signal Electrical Characteristics

Table 5 DP DC specifications

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Main link common mode voltage	V_{IC}	-	0	-	2.0	V
Main link swing voltage	V_{ID}	2.7 Gbps	±60	-	±600	mV
		1.62 Gbps	-	-	±600	mV
AUX common mode voltage	V_{IC_AUX}	-	0	-	2.0	V
AUX swing voltage	V_{ID_AUX}	Transmitting	±0.195	-	±0.69	V
		Receiving	±0.16	-	±0.69	V

Figure 8 AUX CH VID_AUX and VIC_AUX definition

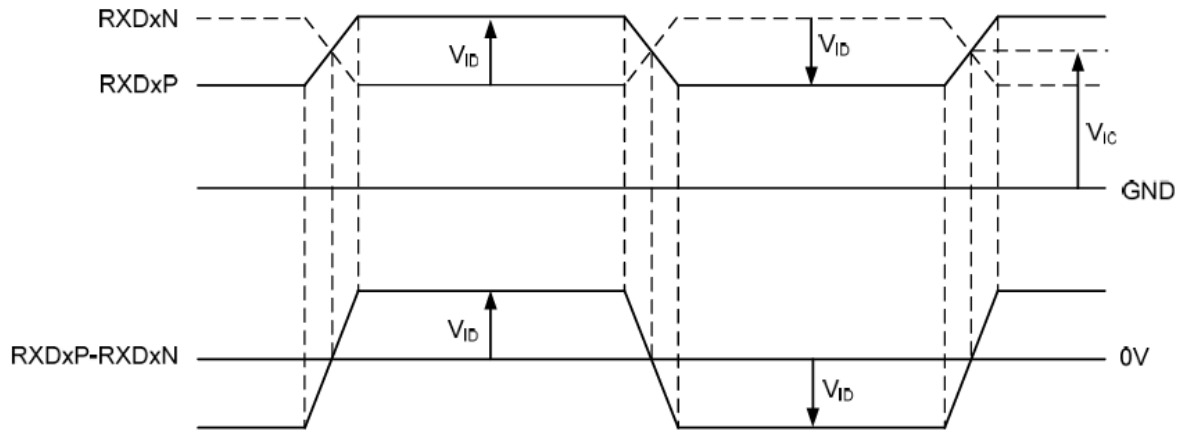


Figure 7.1: Main Link V_{ID} and V_{IC} definition

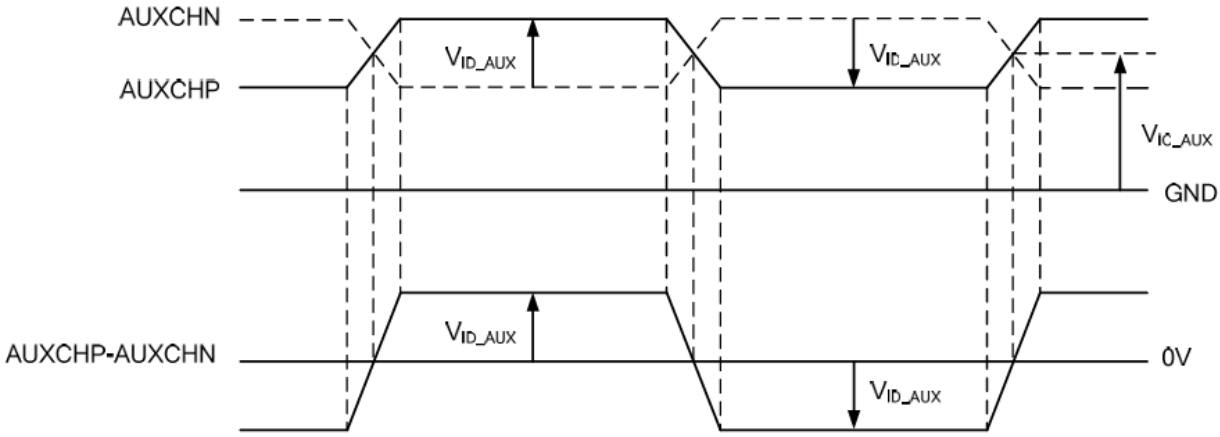


Table 6 Display port V_{HPD}

Parameter	Description	Min.	Typ.	Max.	Unit
V_{HPD}	HPD Voltage	2.25	-	3.6	V

4.3 Interface Timings

Table 7 Interface Timings

Parameter	Symbol	Min.	Typ.	Max.	Unit
LVDS Clock Frequency	Fclk	87.9	138.5	148.5	MHz
H Total Time	HT	2020	2080	3900	Clocks
H Active Time	HA		1920		Clocks
V Total Time	VT	1090	1111	2046	Lines
V Active Time	VA		1080		Lines
Frame Rate	FV	48	60	65	Hz

Note1：HT*VT*FV<148.5MHz

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 8 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),(3)
VCC Current	White Pattern	I_{DD}	-	-	(0.47)	A	(1),(4)
VCC Power Consumption	White Pattern	P_{CC}	-	-	(1.6)	W	
Rush Current		I_{Rush}	-	-	(1.5)	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}	-	-	(4.67)	W	(1), (6)
LED Forward Voltage		V_F	(2.8)	(2.9)	(3.3)	V	(1)
LED Forward Current		I_F	-	(22.5)	-	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		F_{PWM}	100	200	1000	Hz	(1),(2),(7)

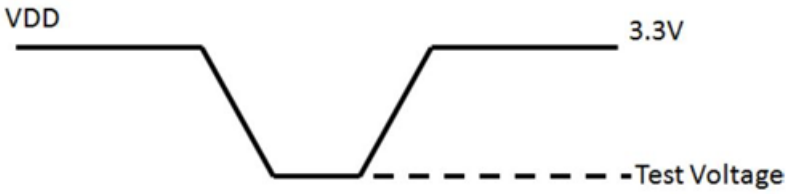
Duty Ratio	PWM	1	-	100	%	(1),(8)
LED Life Time	LT	(20,000)	(30,000)	-	Hours	(1),(8)

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) VDD Power Dip Condition for DWO.

Figure 11 VDD Power DiP



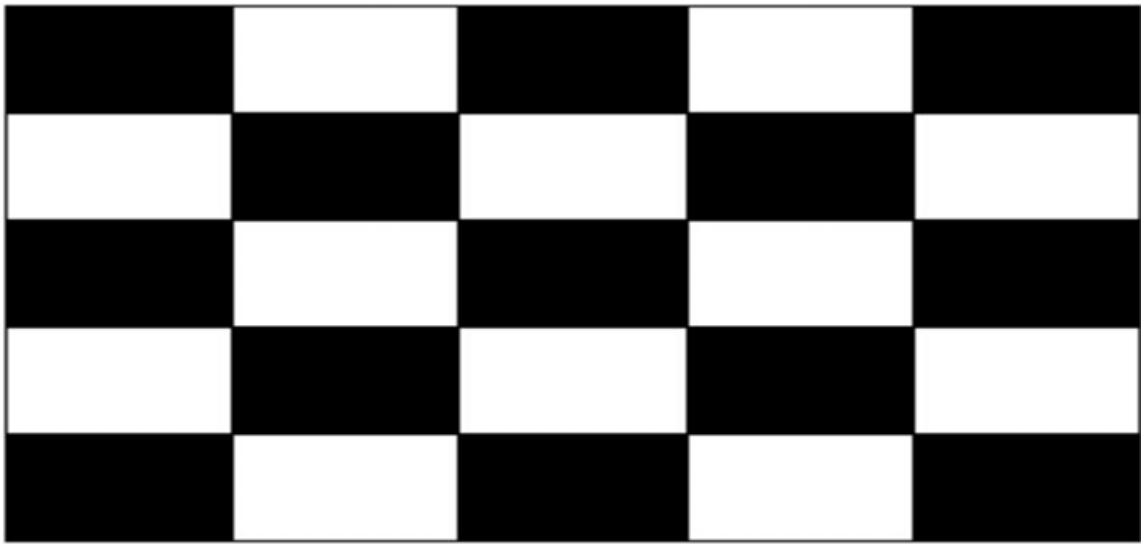
Test criteria:

1)2.4V≤Test voltage ≤ 3.3V: Normal operation

2)2.0V≤Test voltage < 2.4V: No abnormal display after back to 3.3V input.

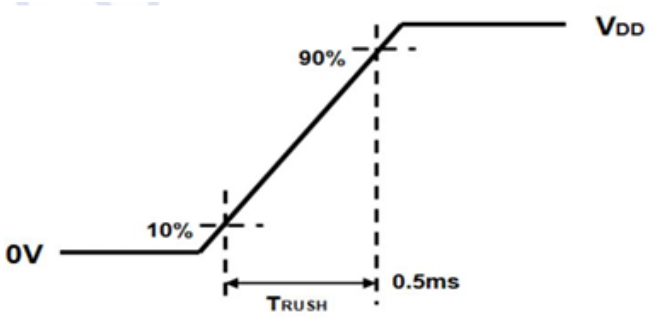
Note (4) The specified VDD current and power consumption are measured under the VDD=3.3V,Fv =60Hz condition and Mosaic pattern.

Figure 11 Mosaic pattern



Note (5) The figures below is the measuring condition of VDD. Rush current can be measured when TRUSH is 0.5ms.

Figure 12 13VDD Rising Time



Note(6) The power consumption of LED Driver are under the VLED=12.0V, Dimming of Max luminance.

Note (7) 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 (8) The operation of LED Driver below minimum dimming ratio may cause flickering or reliability issue.

Note (9) 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

Interface signals are also shown in the chart. Signals from any systems hall be Hi-resistance state or low level when VDD voltage is off.

Figure13 Power sequence

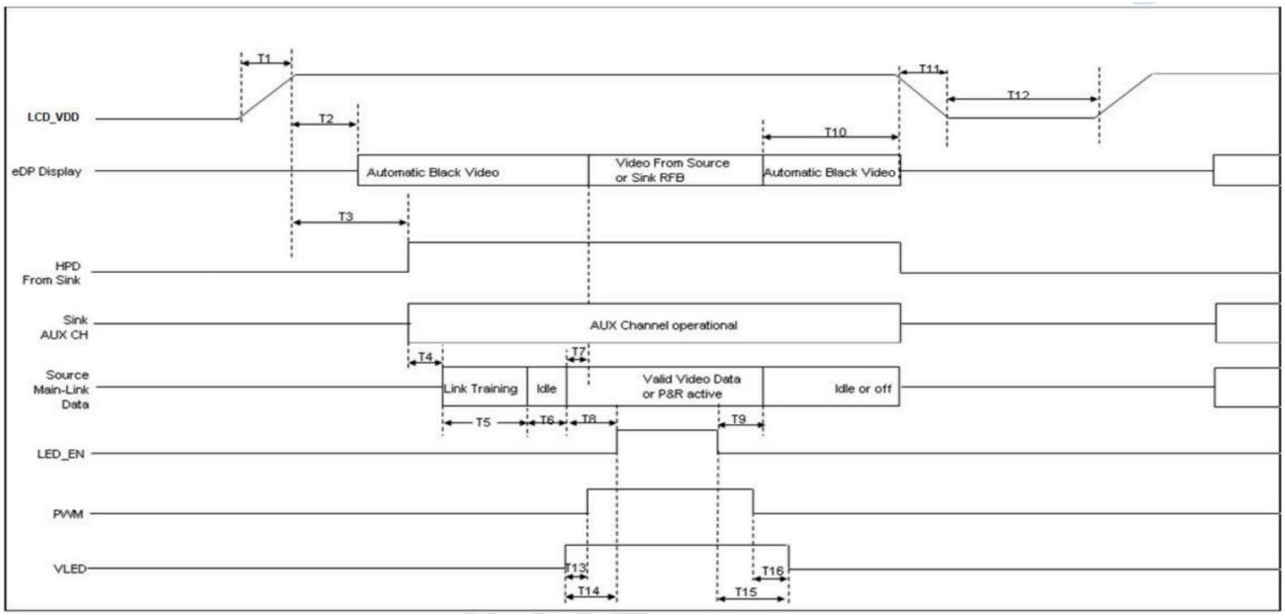


Table 9 Power Sequencing Requirements

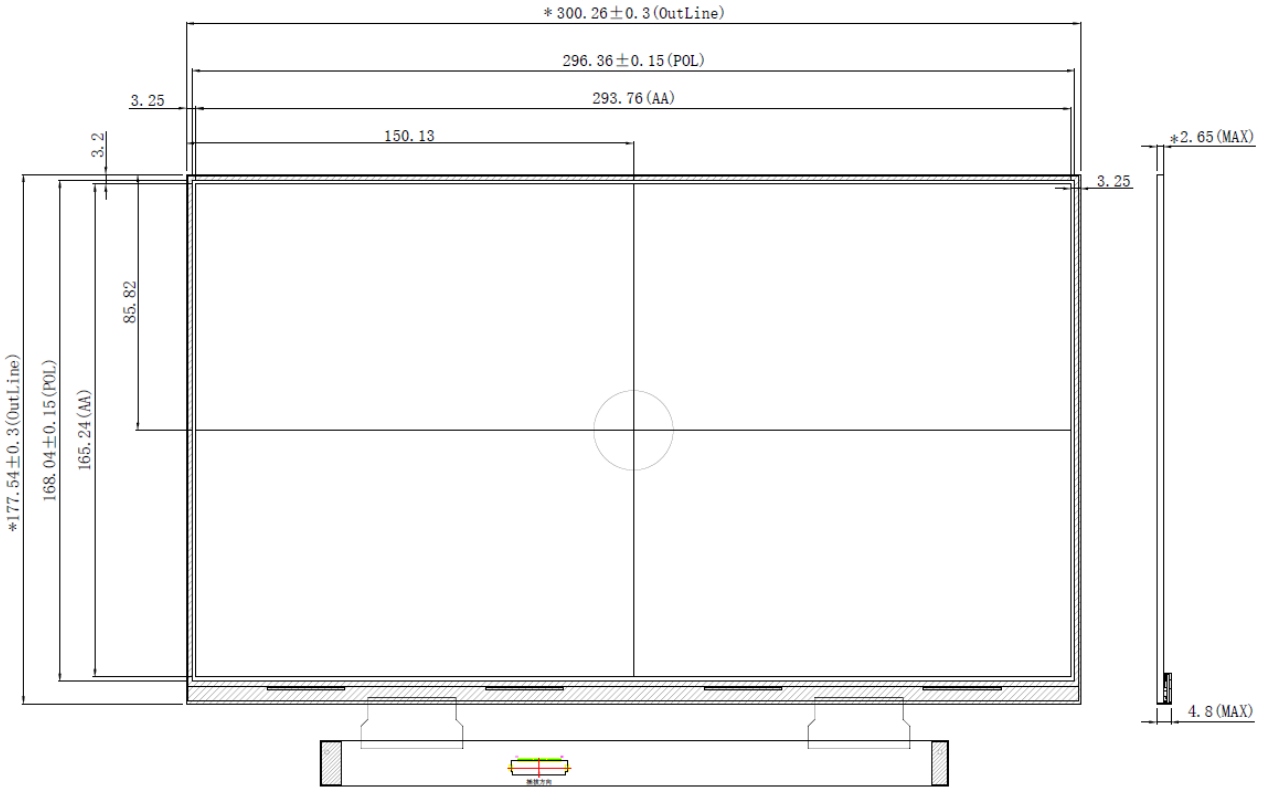
Parameter	Symbol	Min.	Typ.	Max.	Unit
VDD Rise Time (10% to 90%)	T1	0.5	-	10	ms
Delay from VDD to automatic Black Video generation	T2	0	-	200	ms
Delay from VDD to HPD high	T3	0	-	200	ms
Delay from HPD high to link training initialization	T4	-	-	-	ms
Link training duration	T5	-	-	-	ms
Link idle	T6	-	-	-	ms
Delay from valid video data from source to video on display	T7	0	-	50	ms
Delay from valid video data from source to backlight enable	T8	-	-	-	ms
Delay from back light disable to end of valid video date	T9	-	-	-	ms
Delay from end of valid video data from source to VDD off	T10	0	-	500	ms
VDD fall time(90%to10%)	T11	0	-	10	ms
VDD off time	T12	500	-	-	ms
Delay from VLED to PWM	T13	0	-	-	ms

Delay from VLED to backlight enable	T14	0	-	-	ms
Delay from backlight disable to VLED off	T15	0	-	-	ms
Delay from PWM off to VLED off	T16	0	-	-	ms

5.0 Mechanical Characteristics

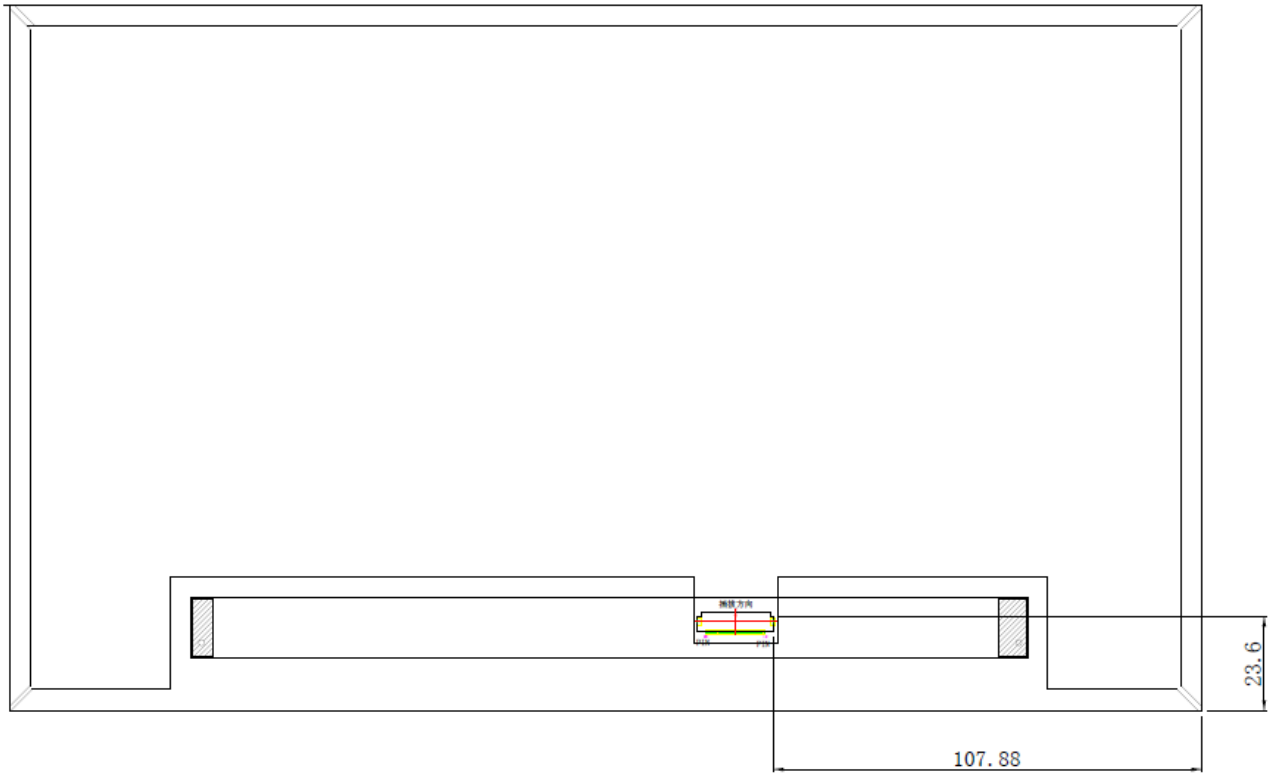
5.1 Outline Drawing

Figure14 Reference Outline Drawing (Front Side)



Unit：mm

Reference Outline Drawing (Front Side)



Unit：mm

Figure15 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		(299.96)	(300.26)	(300.56)	mm
Height		(177.24)	(177.54)	(177.84)	mm
Thickness	With PCB	-	-	(2.65)	mm
Weight		-	-	(TBD)	g

Note：Outline dimension measure instrument: Vernier Caliper.

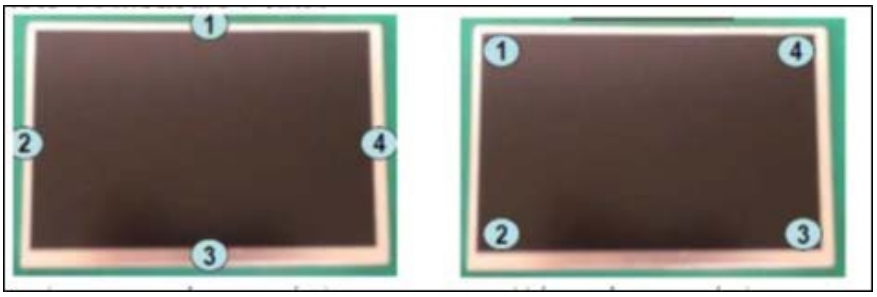
6.0 Reliability Conditions

Table 11 Reliability Condition

Item	Package	Test Conditions	Note
High Temperature/High Humidity Operating Test	Module	T_a=60℃, 60%RH, 240 hours	(1),(2), (3),(4)
High Temperature Operating Test	Module	T_a=50℃, 240 hours	
Low Temperature Operating Test	Module	T_a= 0℃, 240 hours	

High Temperature Storage Test		Module	T_a=60℃, 240 hours		(1),(3), (4)
Low Temperature Storage Test		Module	T_a= -20℃, 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

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. CH 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.