CERT. No. QAC0946535　　CERT. No. HKG002005
(ISO9001)　　(ISO14001)

Product Specification

Customer:　　＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

Model Name:　　＿＿＿＿＿<u>IE-AI-1316CH07R24-CB-1</u>＿＿

Date:　　＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

Version:　　＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿＿

■ **Preliminary Specification**

☐ **Final Specification**

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by

Contents

1. Record of Revision

Version	Revise Date	Content	Editor
1.0	2024/03/19	First Release.	

2 General Specifications

Feature		Spec
Characteristics	Size	5.0inch
	Resolution	800(horizontal)*480(Vertical)
	Interface	RGB-24bit
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Pixel pitch (mm)	0.045 x 0.135
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	LCD Driver IC	
	Viewing Direction	Full view
Mechanical	LCM (W x H x D) (mm)	155*107*5
	Active Area(mm)	108 x 64.80
	With /Without TSP	With CTP
	Weight (g)	TBD
	LED Numbers	18 LEDs

Note 1: Viewing direction is following the data which measured by optics equipment.
Note 2: Requirements on Environmental Protection: RoHS
Note 3: LCM weight tolerance: +/- 5%

3 Input/Output Terminals

No.	Symbol	Description
1	VBL-	Backlight LED Cathode
2	VBL+	Backlight LED Anode.
3	GND	System Ground
4	VDD	Power supply for logic operation
5~12	R0~R7	Data bus
13~20	G0~G7	Data bus
21~28	B0~B7	Data bus
29	GND	System Ground
30	DCLK	Pixel clock signal
31	DISP	Display on/off control
32	HSYNC	Horizontal Sync signal
33	VSYNC	Vertical Sync signal
34	DEN	Data Enable
35	NC	No connect
36	GND	System Ground
37	XR(NC)	No connect
38	YD(NC)	No connect
39	XL(NC)	No connect
40	YU(NC)	No connect

No.	Symbol	Description
1	*GND*	Ground
2	*SDA*	I2C data input and output
3	*SCL*	I2C clock input
4	VDD	Power supply
5	INT	Interrupt request to the host
6	TP_RESET	Reset Pin for CTP

4 Absolute Maximum Ratings

The followings are maximum values which, if exceed, may cause faulty operation or damage

to the unit. The operational and non-operational maximum voltage and current values are

listed in Table 2

5 Electrical Characteristics

5.1 Typical operation conditions

(Note 1)

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Power voltage	DV_{DD}	3.0	3.3	3.6	V	Note 2
	AV_{DD}	10.2	10.4	10.6	V	
	V_{GH}	15.3	16.0	16.7	V	
	V_{GL}	-6.7	-6.0	-5.3	V	
Input signal voltage	V_{COM}	3.09	4.09	5.09	V	Note 4
Input logic high voltage	V_{IH}	$0.7 DV_{DD}$	-	DV_{DD}	V	Note 3
Input logic low voltage	V_{IL}	0	-	$0.3 DV_{DD}$	V	

Note 1: Be sure to apply DV_{DD} and V_{GL} to the LCD first, and then apply V_{GH}.
Note 2: DV_{DD} setting should match the signals output voltage (refer to Note 3) of
customer's system board.
Note 3: DCLK,HS,VS,RESET,U/D, L/R,DE,R0~R7,G0~G7,B0~B7,MODE,DITHB.
Note 4: Typical V_{COM} is only a reference value. It must be optimized according to each
LCM. Please use VR and base on below application circuit.

5.2 **Current Consumption**

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Current for Driver	I_{GH}	-	(0.50)	1	mA	V_{GH} =16.0V
	I_{GL}	-	(0.54)	1	mA	V_{GL} = -6.0V
	IDV_{DD}	-	(4.2)	10	mA	DV_{DD} =3.3V
	IAV_{DD}	-	(19)	50	mA	AV_{DD} =10.4V

5.2 **Driving Backlight**

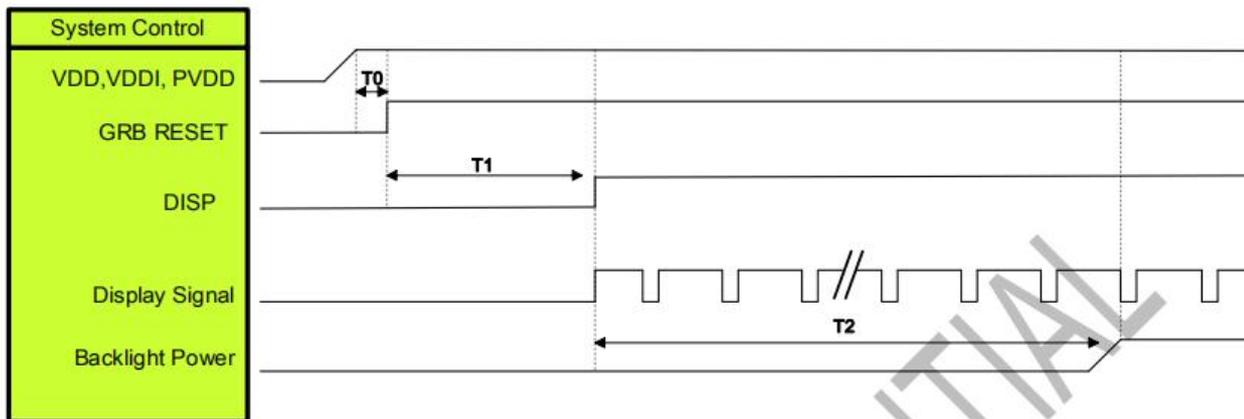| Item	Symbol	MIN	TYP	MAX	Unit	Remark
LED current	I_F	-	120	-	mA	
Power Consumption			-	-	mW	
LED Voltage	V_F	-	19.2	-	V	Note 1
LED Life Time	W_{BL}	25000			Hr	Note 2,3

Note 1: There are 6 Groups LED

Note 2: Ta = 25℃

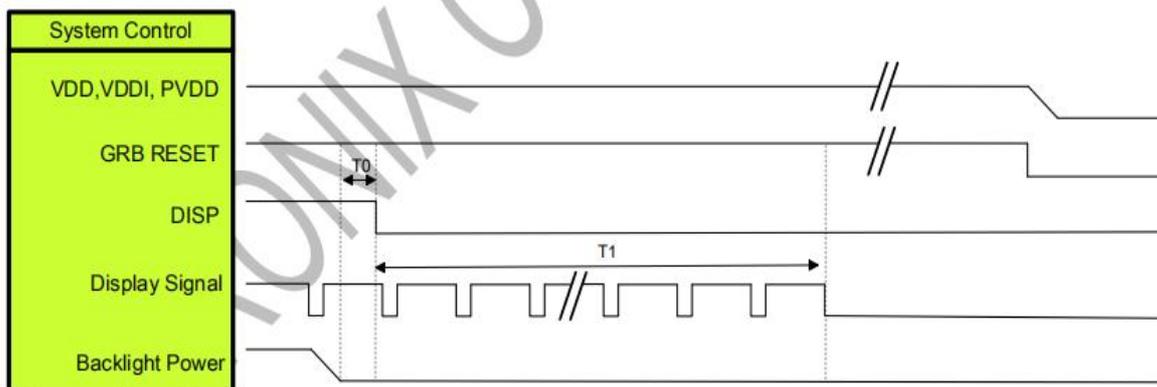Note 3: Brightness to be decreased to 50% of the initial value

6 Interface Timing

6.1 Power Sequence

Symbol	Description	Min. Time	Unit
T0	System power stability to GRB RESET signal	0	ms
T1	GRB RESET= "High" to DISP="High"	10	ms
T2	Display Signal output to Backlight Power on	250	ms

Note: RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]

11.2 Power Off Sequence

Symbol	Description	Min. Time	Unit
T0	Backlight Power off to DISP="Low"	5	ms
T1	DISP="Low" to IC internal voltage discharge complete	100	ms

Note: RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]

Note: LVDS interface Display signal: DCLK P/N; RX[3:0]P/N

6.2 Timing Conditions

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
HS setup time	T_{hst}	8	-	-	ns	
HS hold time	T_{hhd}	8	-	-	ns	
VS setup time	T_{vst}	8	-	-	ns	
VS hold time	T_{vhd}	8	-	-	ns	
Data setup time	T_{dsu}	8	-	-	ns	
Data hole time	T_{dhd}	8	-	-	ns	
DE setup time	T_{esu}	8	-	-	ns	
DE hole time	T_{ehd}	8	-	-	ns	
DV_{DD} Power On Slew rate	T_{POR}	-	-	20	ms	From 0 to 90% DV_{DD}
RESET pulse width	T_{Rst}	1	-	-	ms	
DCLK cycle time	T_{coh}	20	-	-	ns	
DCLK pulse duty	T_{cwh}	40	50	60	%	

6.3 Timing Diagram

Parallel 24-bit RGB Input Timing (PVDD=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

	Item	Symbol	Min.	Typ.	Max.	Unit	Remark
	DCLK Frequency	Fclk	23	25	27	MHz	
HSYNC	Period Time	Th	808	816	896	DCLK	
	Display Period	Thdisp		800		DCLK	
	Back Porch	Thbp	4	8	48	DCLK	
	Front Porch	Thfp	4	8	48	DCLK	
	Pulse Width	Thw	2	4	8	DCLK	
VSYNC	Period Time	Tv	488	496	504	HSYNC	
	Display Period	Tvdisp		480		HSYNC	
	Back Porch	Tvbp	4	8	12	HSYNC	
	Front Porch	Tvfp	4	8	12	HSYNC	
	Pulse Width	Tvw	2	4	8	HSYNC	

7.3.2 SYNC-DE Mode
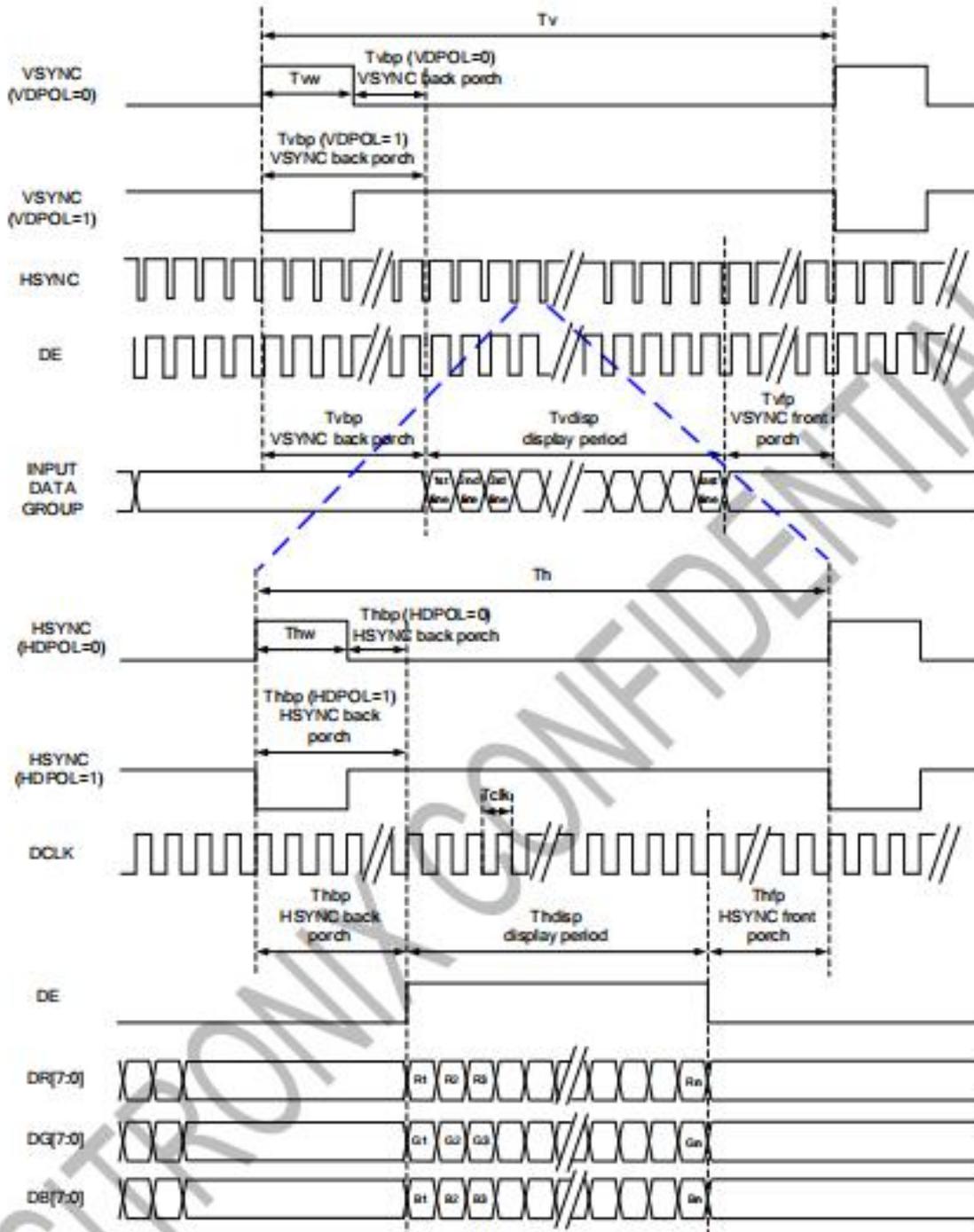
7.3.3 DE Mode
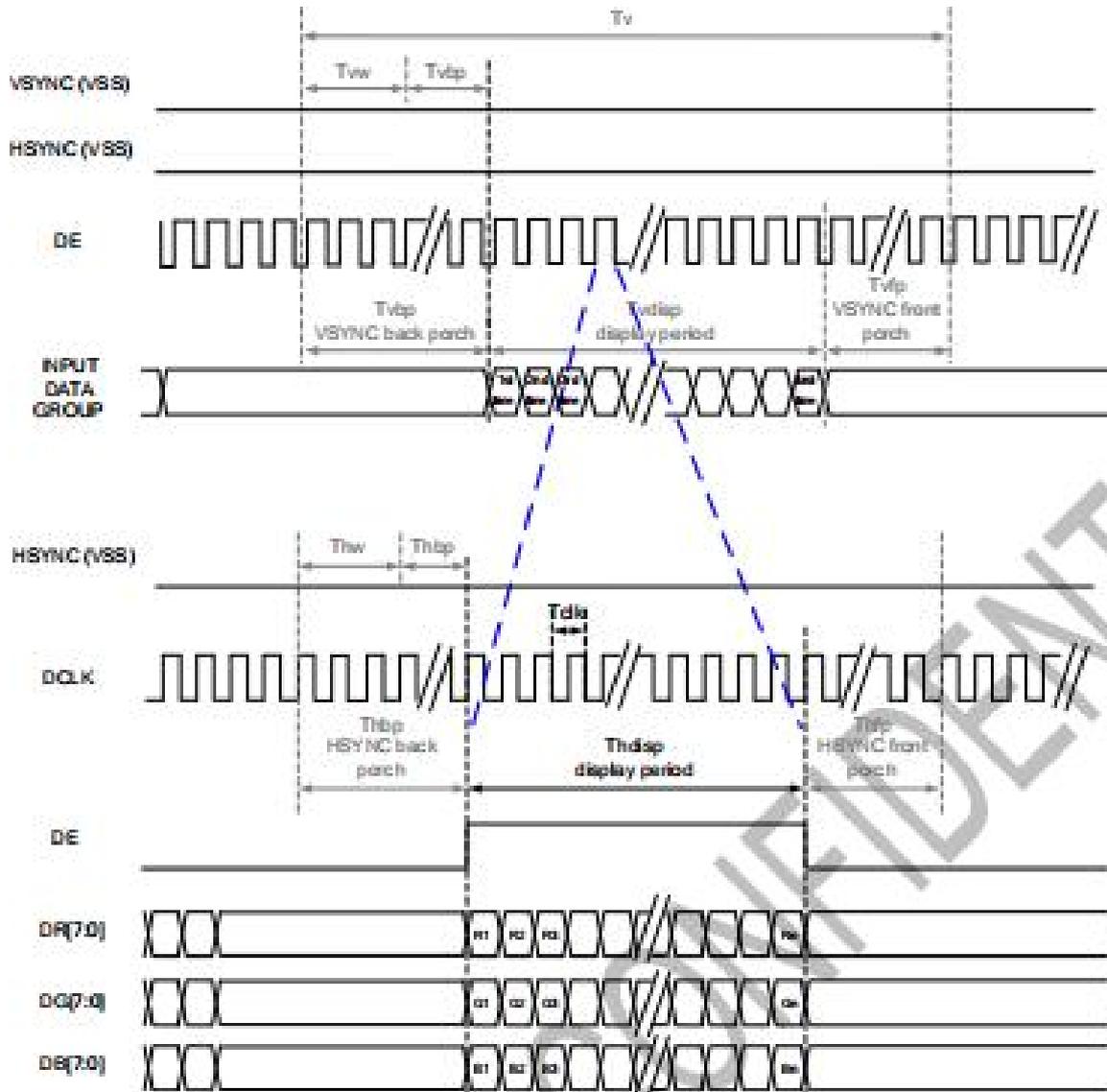
7 Optical Characteristics

Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θ_T	Center CR≥10		85	-	Degree.	Note2
		θ_B			85	-		
		θ_L			85	-		
		θ_R			85	-		
Contrast Ratio		CR	Θ =0	800		-	-	Note1, Note3
Response Time		T_{ON}	25°C	-	20	30	ms	Note1, Note4
		T_{OFF}		-	20	30		
Chromaticity	White	X_W	Backlight is on	0.324	0.326	0.328	-	Note1, Note5
		Y_W		0.364	0.366	0.368	-	
	Red	X_R		0.611	0.613	0.615	-	
		Y_R		0.333	0.335	0.337	-	
	Green	X_G		0.305	0.307	0.309	-	
		Y_G		0.558	0.560	0.562	-	
	Blue	X_B		0.133	0.135	0.137	-	
		Y_B		0.158	0.160	0.162	-	
Uniformity		U		80	-	-	%	Note1, Note6
NTSC					50		%	Note5
Luminance		L		-	500		nits	Note1, Note7

Test Conditions:
1. IF= 20mA (one channel), the ambient temperature is 25°C.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.
The optical characteristics should be measured in dark room. After 5 minutes operation, the optical
Properties are measured at the center point of the LCD screen. All input terminals LCD panel must
be ground when measuring the center area of the panel.

Item	Photo detector	Field
Contrast Ratio	BM-7A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	SR-3A	2°
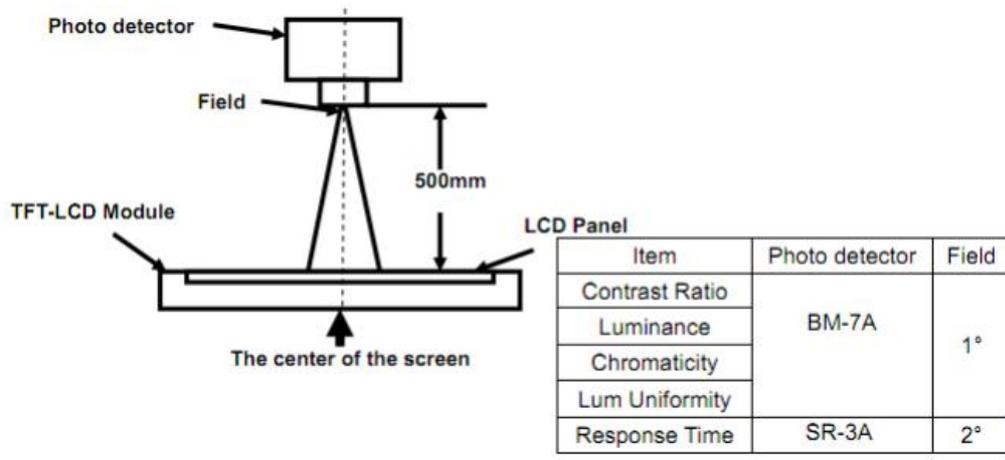
Note 2: Definition of viewing angle range and measurement system.
Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).
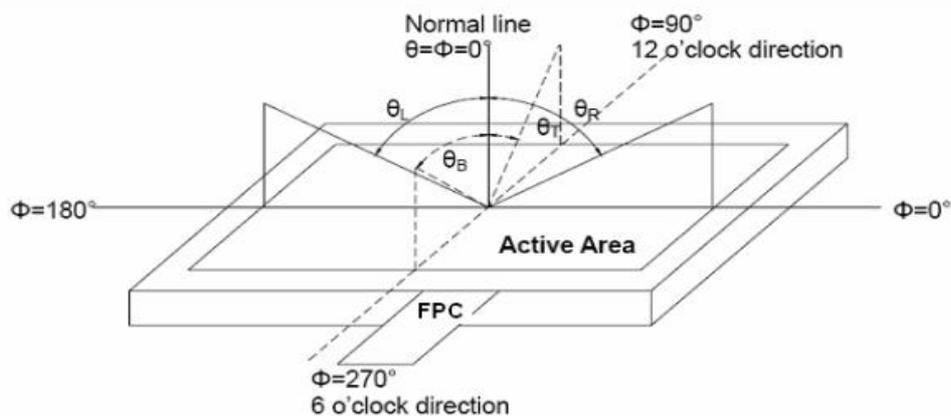

Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

Note 4: Definition of Response time
The response time is defined as the LCD optical switching time interval
Between "White" state and "Black" state.   Rise time (TON) is the time between
Photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is
The time between photo detector output intensity changed from 10% to 90%
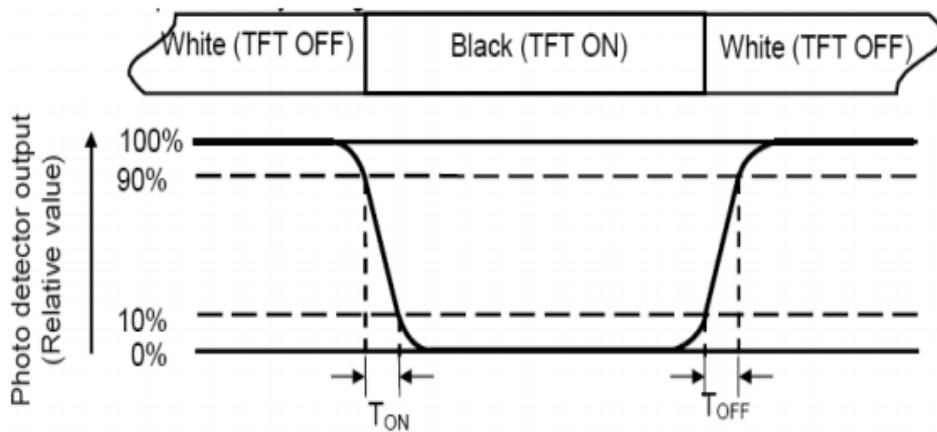
Note 5: Definition of color chromaticity (CIE1931)
        Color coordinates measured at center point of LCD.
Note 6: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the
Center of each measuring area
Luminance Uniformity (U) = Lmin/ Lmax X100%
L-------Active area length W----- Active area width
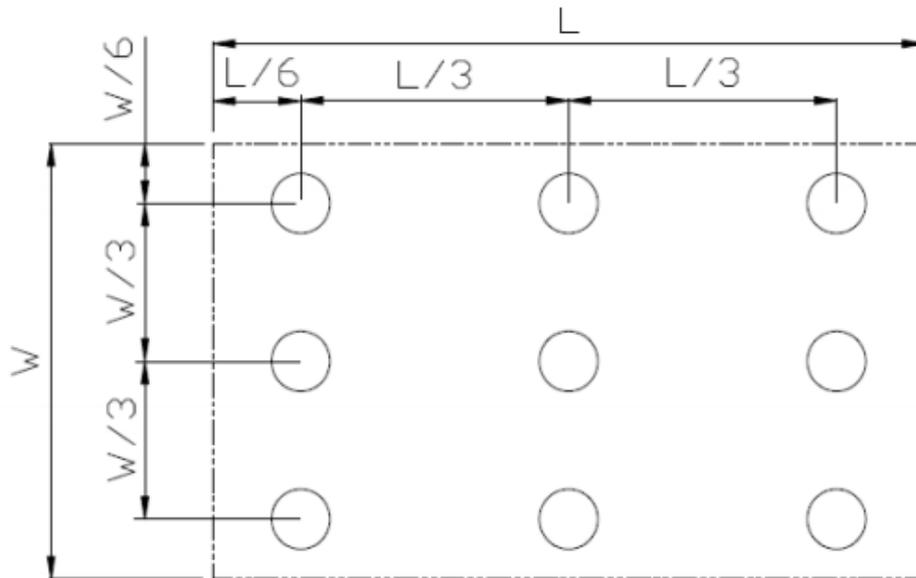

Fig. 2 Definition of uniformity

Lmax: The measured maximum luminance of all measurement position.
Lmin: The measured minimum luminance of all measurement position.
Note 7: Definition of Luminance:
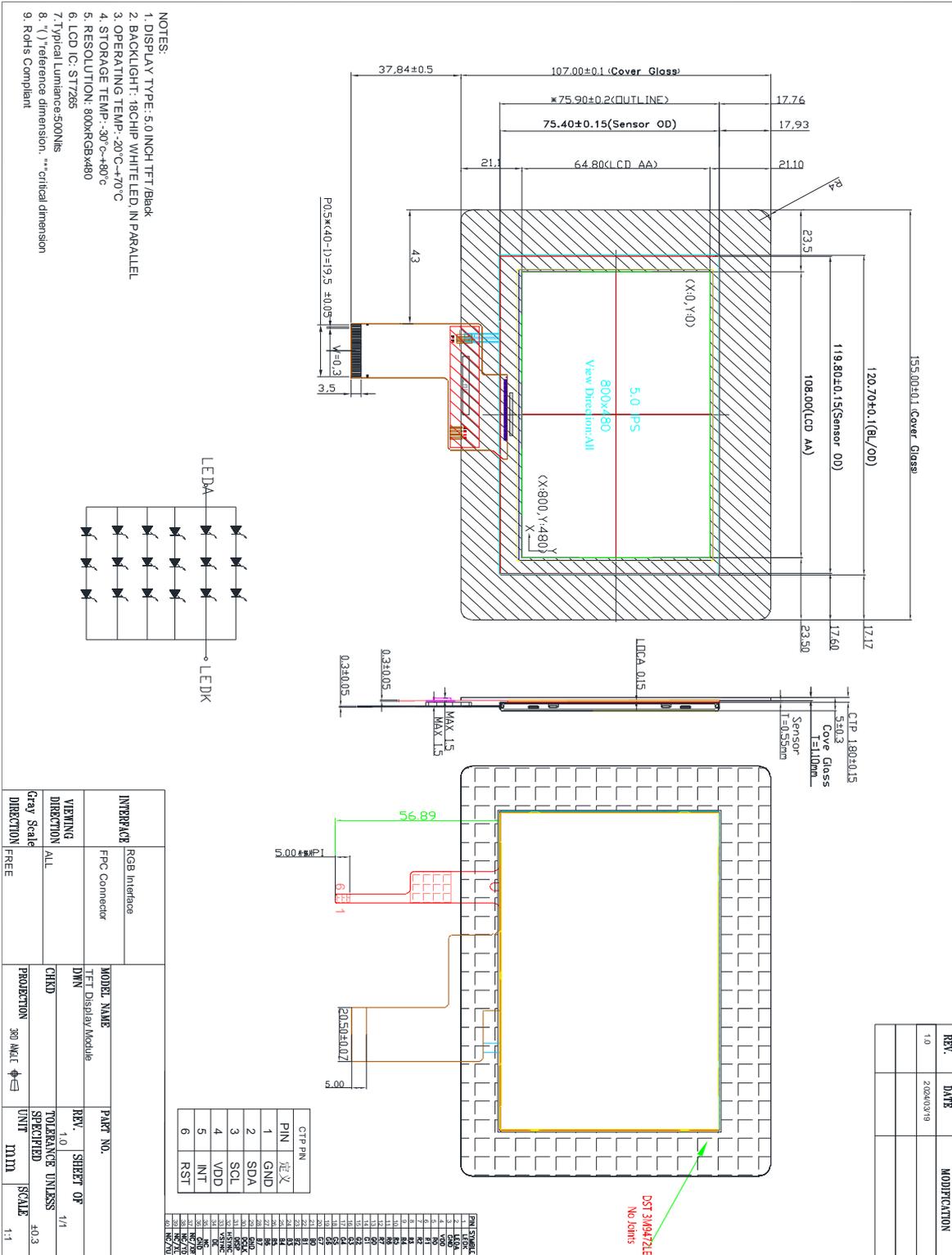Measure the luminance of white state at center point.

8 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts= +80℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	Ta= -30℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +85℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -35℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-35℃ 30 min ~ +85℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Operation)	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 60 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

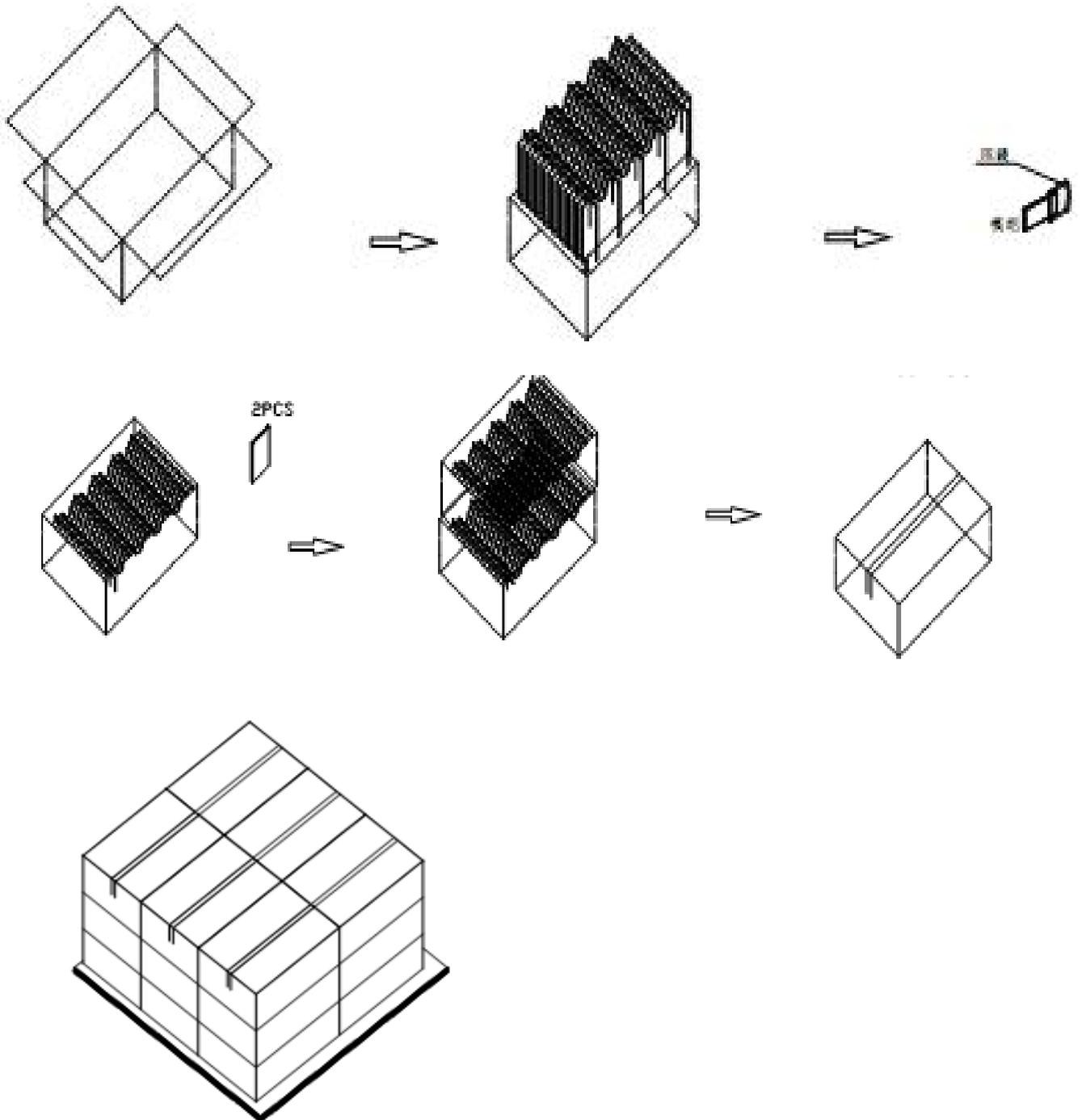Note: 1. T_S is the temperature of panel's surface.
     2. Ta is the ambient temperature of sample.

9. Mechanical Drawing

NOTES:
1. DISPLAY TYPE: 5.0 INCH TFT/Black
2. BACKLIGHT: 18CHIP WHITE LED. IN PARALLEL
3. OPERATING TEMP:-20℃~+70℃
4. STORAGE TEMP:-30℃~+80℃
5. RESOLUTION: 800xRGBx480
6. LCD IC: ST7265
7. Typical Lumiance:500Nits
8. "( )"reference dimension. "*"critical dimension
9. RoHs Compliant

LEDA
LEDK

37,84±0.5
107.00±0.1 (Cover Glass)
*75.90±0.2(OUTLINE)
17.76
75.40±0.15(Sensor OD)
17,93
21,1
64.80(LCD AA)
21.10
23,5
43
P0.5*(40-1)=19.5 ±0.05
(X:0,Y:0)
119.80±0.15(Sensor OD)
120.70±0.1(BL/OD)
155.00±0.1 (Cover Glass)
108.00(LCD AA)
800x480
5.0 IPS
View Direction:All
(X:800,Y:480)
X
Y
23.50
17.60
17.17
0,3
3,5

0.3±0.05
0.3±0.05
LOCA 0.15
MAX 1.5
MAX 1.5
Sensor T=1.10mm
Cove Glass T=0.55mm
5±0.3
CTP 1.80±0.15

56.89
5.00*PI
9 1
20.50±0.07
5.00

DST 3M9472LE
No Joints

| INTERFACE | RGB Interface |
| | FPC Connector |

VIEWING DIRECTION | ALL
Gray Scale DIRECTION | FREE

MODEL NAME | TFT Display Module
DWN |
CHKD |
PROJECTION | 3rd ANGLE

PART NO. |
REV. | 1.0
SHEET OF | 1/1
TOLERANCE UNLESS SPECIFIED
UNIT | mm
SCALE | 1:1
±0.3

CTP PIN	PIN	定义
	1	GND
	2	SDA
	3	SCL
	4	VDD
	5	INT
	6	RST

REV.	DATE	MODIFICATION
1.0	2024/03/19	

1 0.Packing

Packing Method

11. Precautions for Use of LCD modules

11.1 Handling Precautions

11.1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

11.1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure   not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

11.1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

11.1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

11.1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

Water ； Ketene ； Aromatic solvents

11.1.6. Do not attempt to disassemble the LCD Module.

11.1.7. If the logic circuit power is off, do not apply the input signals.

11.1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

11.1.8.1. Be sure to ground the body when handling the LCD Modules.

11.1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

11.1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

11.1.8.4. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

11.2 Storage Precautions

11.2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

11.2.2. The LCD modules should be stored under the storage temperature range If the LCD modules will be stored   for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃   Relatively humidity: ≤80%

11.2.3.   The LCD modules should be stored in the room without acid, alkali and harmful gas.

11.3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.