



CERT. No. QAC0946535 (ISO9001)      CERT. No. IIKG002005 (ISO14001)

## Product Specification

**Customer:** \_\_\_\_\_

**Model Name:**      YH046WVI-A40-0825

**Date:** \_\_\_\_\_

**Version:** \_\_\_\_\_

**Preliminary Specification**

**Final Specification**

### For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by

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## 1. Record of Revision

Version	Revise Date	Content	Editor
1.0	2022/03/23	First Release.	Gary Luo

## 2 General Specifications

	Feature	Spec
Characteristics	Size	4.58 inch
	Resolution	320(horizontal)*960(Vertical)
	Interface	3SPI+16Bits RGB
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Pixel pitch (um)	114.9x114.9
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	LCD Driver IC	-
	Viewing Direction	ALL
	Gray Scale Inversion Direction	ALL
Mechanical	LCM (W x H x D) (mm)	41.57*118.8*2.5
	Active Area(mm)	36.768 x 110.304
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	8 LED

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

Pin.No	Symbol	Function
1	VLED+	Power for LED backlight (Anode)
2-3	VLED-	Power for LED backlight (Cathode)
4	GND	Power ground
5	VDD	Power Supply 2.8V
6	RSTB	LCM RESET signals
7	NC	NC
8	NC	NC
9	SDA	SPI Data signal
10	SCL	SPI Clock signal
11	CS	SPI Chip select signal
12	DCLK	RGB dot clock signal
13	DE	RGB data enable signal
14	VS	RGB frame synchronizing signal
15	HS	RGB line synchronizing signal
16-33	DB0-DB17	RGB data signal
34	GND	Ground
35	TP_INT/NC	Touch Interrupt/NC
36	TP_SDA/NC	Touch IIC Data signal/NC
37	TP_SCL/NC	Touch IIC Clock signal/NC
38	TP_RESET/NC	Touch Reset Signal/NC
39	TP_VCI/NC	Touch Power supply/NC
40	GND	Ground

### 4 Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	$V_{DD}$	-0.3	3.6	V	
Input Signal Voltage	$V_{in}$	-0.3	$V_{DD}+0.3$	V	
Logic Output Voltage	$V_{OUT}$	-0.3	$V_{DD}+0.3$	V	
Operating Temperature	$T_{OPR}$	-20	70	°C	
Storage Temperature	$T_{STG}$	-30	80	°C	

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## 5 Electrical Characteristics

### 5.1 Operating conditions:

Parameter	Symbol	MIN	TYP	MAX	Unit	Remark
Power Voltage	V <sub>CC</sub>	3.0	3.3	3.6	V	
MIPI Supply Voltage	V <sub>CC_IF</sub>	1.4	--	1.6	V	
VDD Input high voltage level	V <sub>IH</sub>	0.7*VDD	-	VDD	V	
VDD Input low voltage level	V <sub>IL</sub>	0	-	0.3*VDD	V	
VDD Output high voltage level	V <sub>OH</sub>	0.8*VDD	-	-		
VDD Output low voltage level	V <sub>OL</sub>	V <sub>OL</sub>	-	-	V	

### 5.2 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
LED current	I <sub>F</sub>	-	40	-	mA	Note 1 Note 2,3
Power Consumption			-	-	mW	
LED Voltage	V <sub>F</sub>	11.2	12	12.8	V	
LED Life Time	W <sub>BL</sub>	25000		-	Hr	

Note 1 : There are 4\*2 Groups LED

Note 2 : Ta = 25°C

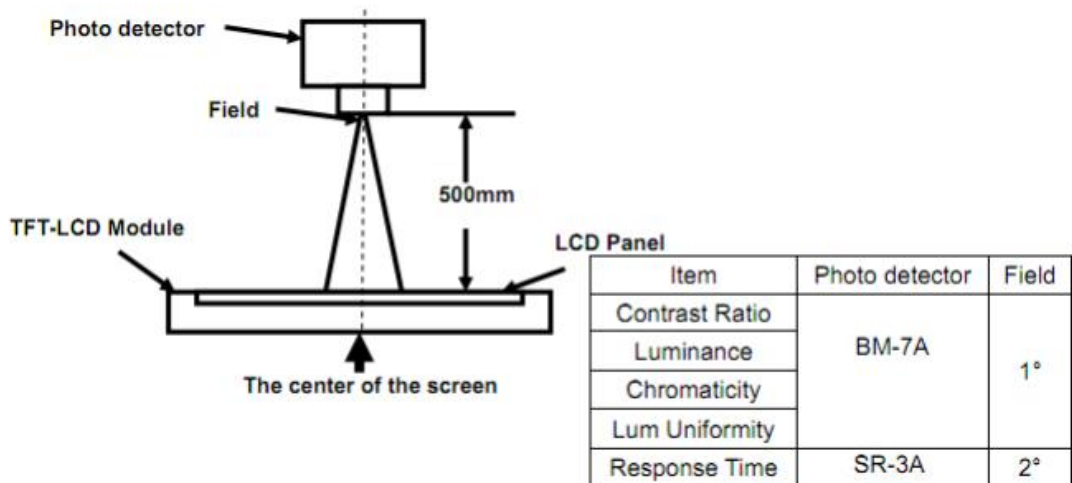
Note 3 : Brightness to be decreased to 50% of the initial value

## 6. Optical Characteristics

Items	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	
Viewing angles	$\theta_T$	Center CR $\geq$ 10	-	80	-	Degree.	Note2	
	$\theta_B$		-	80	-			
	$\theta_L$		-	80	-			
	$\theta_R$		-	80	-			
Contrast Ratio	CR	$\Theta = 0$	1000	1200	-	-	Note1, Note3	
Response Time	$T_{ON}$	25°C	-	25	35	ms	Note1, Note4	
	$T_{OFF}$		-	25	35			
Chromaticity	White	Backlight is on	$X_W$	-	0.302	-	-	Note1, Note5
			$Y_W$	-	0.319	-	-	
	Red		$X_R$	-	0.590	-	-	
			$Y_R$	-	0.347	-	-	
	Green		$X_G$	-	0.340	-	-	
			$Y_G$	-	0.581	-	-	
	Blue		$X_B$	-	0.153	-	-	
			$Y_B$	-	0.104	-	-	
Uniformity	U		80	-	-	%	Note1, Note6	
NTSC				50		%	Note5	
Luminance	L		260	300			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 2: Definition of viewing angle range and measurement system.  
Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).

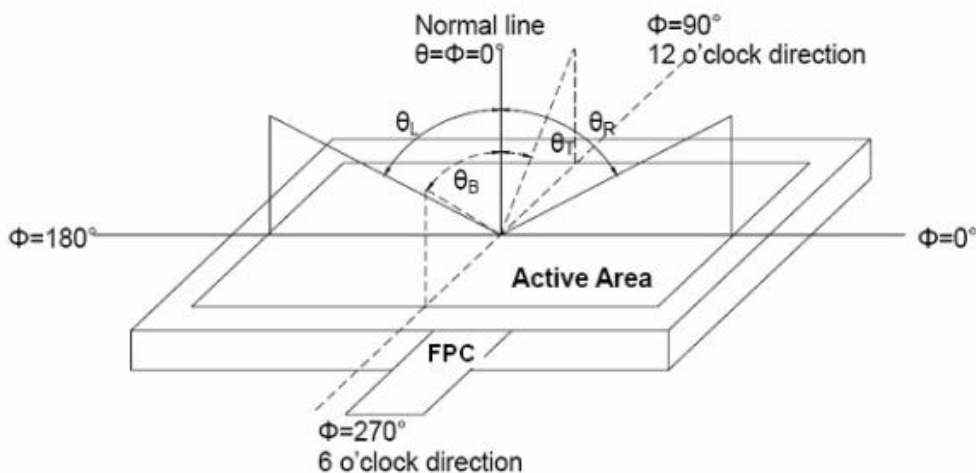


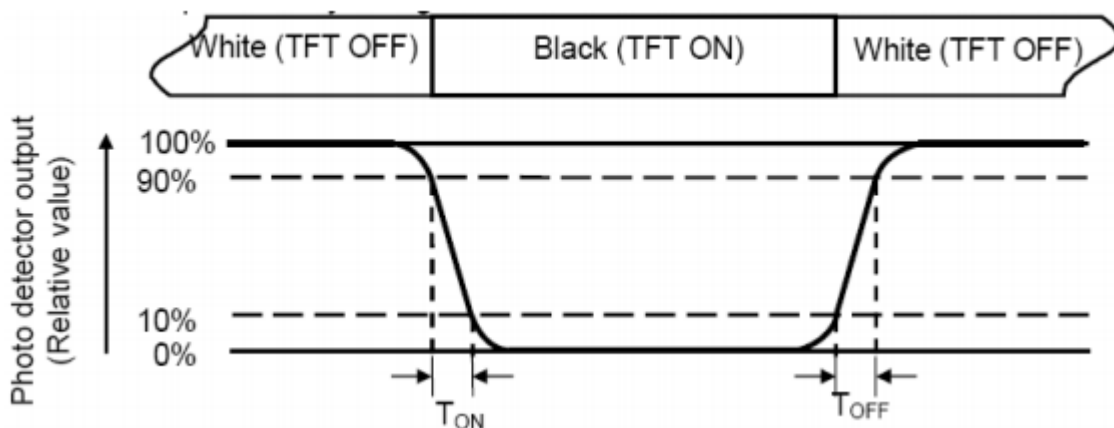
Fig. 1 Definition of viewing angle

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) =  $L_{min} / L_{max} \times 100\%$

L-----Active area length W----- Active area width

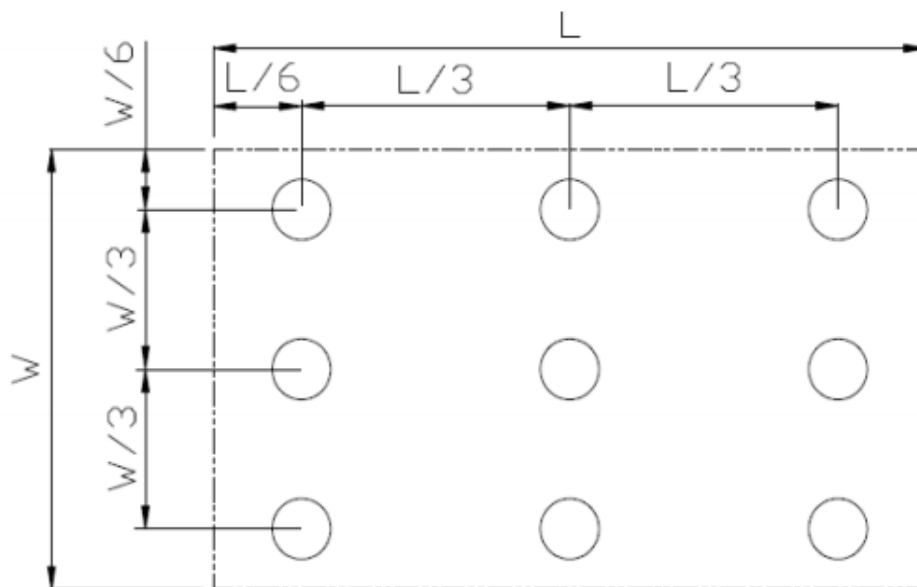


Fig. 2 Definition of uniformity

$L_{max}$ : The measured maximum luminance of all measurement position.

$L_{min}$ : The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

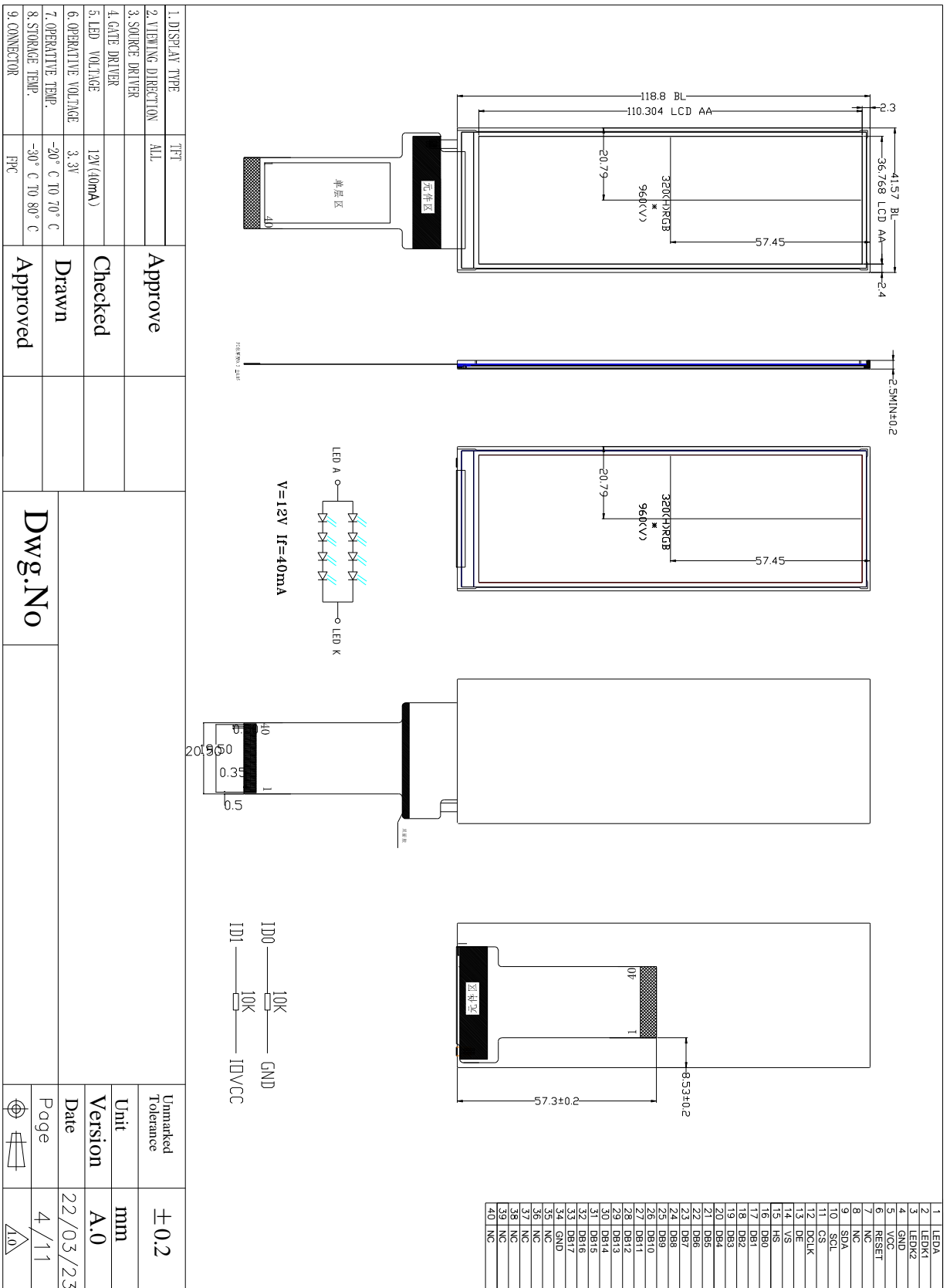
## 7. Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	T <sub>s</sub> = +70°C, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	T <sub>a</sub> = -20°C, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	T <sub>a</sub> = +80°C, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	T <sub>a</sub> = -30°C, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	T <sub>a</sub> = +60°C, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30°C 30 min ~ +80°C 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°C ~ 35°C, 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: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T<sub>S</sub> is the temperature of panel's surface.

2. T<sub>a</sub> is the ambient temperature of sample.

# 8. Mechanical Drawing

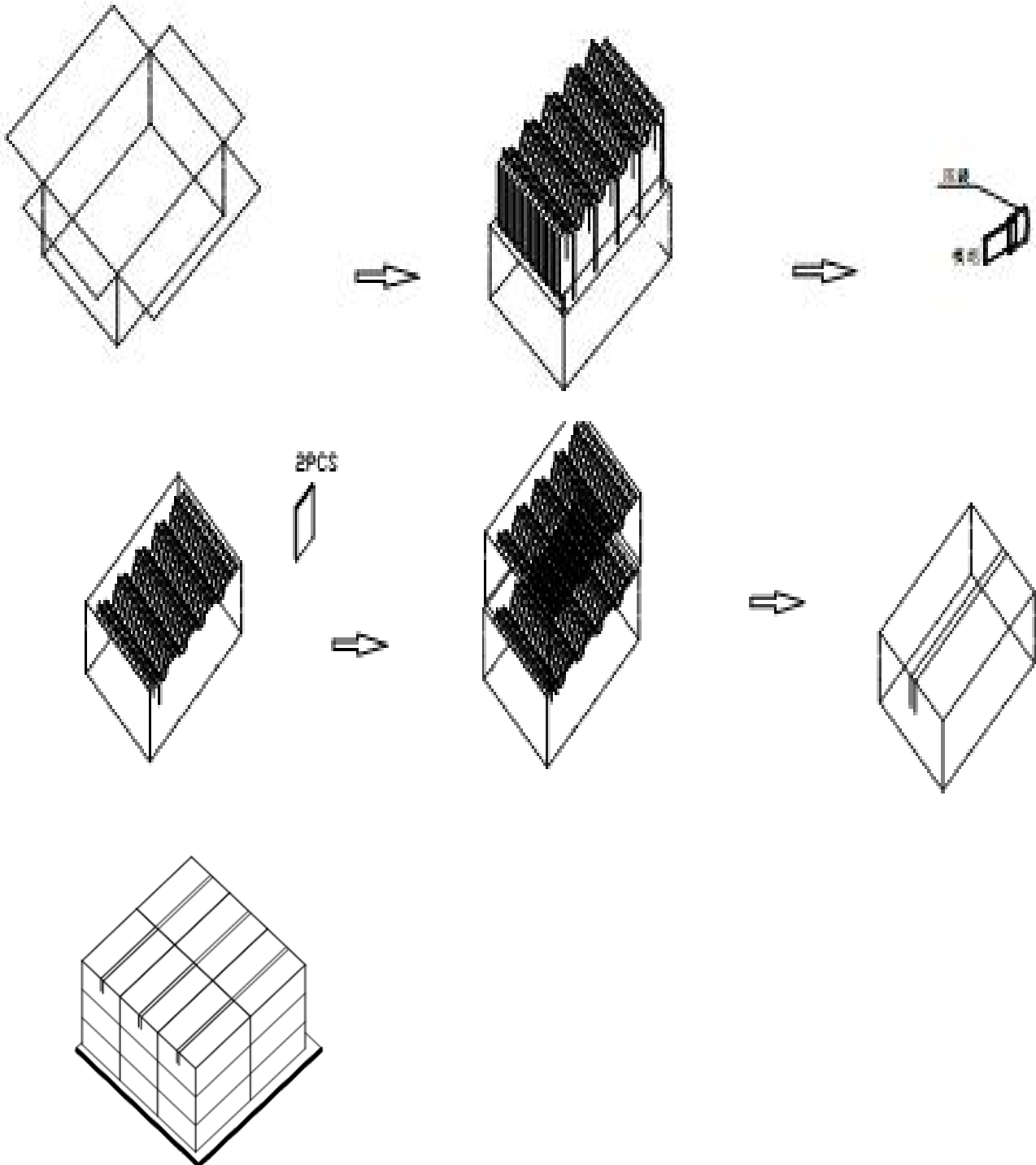


1. DISPLAY TYPE	TFT	Approve	Approved	Dwg.No	Date	Page	Version	Unit	Unmarked Tolerance	±0.2
2. VIEWING DIRECTION	ALL									
3. SOURCE DRIVER										
4. GATE DRIVER		Checked	Drawn	Approved						
5. LED VOLTAGE	12V(40mA)									
6. OPERATIVE VOLTAGE	3.3V									
7. OPERATIVE TEMP.	-20° C TO 70° C									
8. STORAGE TEMP.	-30° C TO 80° C									
9. CONNECTOR	PPC									

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## 9. Packing

### Packing Method



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## 10. Precautions for Use of LCD modules

### 10.1 Handling Precautions

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

10.1.2. 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.

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

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

10.1.5. 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

10.1.6. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

10.1.8.4. 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.

### 10.2 Storage Precautions

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

10.2.2. 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°C ~ 40°C      Relatively humidity: ≤80%

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

### 10.3 Transportation Precautions

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

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	Feature	Spec
Characteristics	Size	4.58 inch
	Resolution	320(horizontal)*960(Vertical)
	Interface	3SPI+16Bits RGB
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Pixel pitch (um)	114.9x114.9
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally Black
	LCD Driver IC	-
	Viewing Direction	ALL
	Gray Scale Inversion Direction	ALL
Mechanical	LCM (W x H x D) (mm)	41.57*118.8*2.5
	Active Area(mm)	36.768 x 110.304
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	8 LED

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

Pin.No	Symbol	Function
1	VLED+	Power for LED backlight (Anode)
2-3	VLED-	Power for LED backlight (Cathode)
4	GND	Power ground
5	VDD	Power Supply 2.8V
6	RSTB	LCM RESET signals
7	NC	NC
8	NC	NC
9	SDA	SPI Data signal
10	SCL	SPI Clock signal
11	CS	SPI Chip select signal
12	DCLK	RGB dot clock signal
13	DE	RGB data enable signal
14	VS	RGB frame synchronizing signal
15	HS	RGB line synchronizing signal
16-33	DB0-DB17	RGB data signal
34	GND	Ground
35	TP_INT/NC	Touch Interrupt/NC
36	TP_SDA/NC	Touch IIC Data signal/NC
37	TP_SCL/NC	Touch IIC Clock signal/NC
38	TP_RESET/NC	Touch Reset Signal/NC
39	TP_VCI/NC	Touch Power supply/NC
40	GND	Ground

### 4 Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	$V_{DD}$	-0.3	3.6	V	
Input Signal Voltage	$V_{in}$	-0.3	$V_{DD}+0.3$	V	
Logic Output Voltage	$V_{OUT}$	-0.3	$V_{DD}+0.3$	V	
Operating Temperature	$T_{OPR}$	-20	70	°C	
Storage Temperature	$T_{STG}$	-30	80	°C	

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## 5 Electrical Characteristics

### 5.1 Operating conditions:

Parameter	Symbol	MIN	TYP	MAX	Unit	Remark
Power Voltage	V <sub>CC</sub>	3.0	3.3	3.6	V	
MIPI Supply Voltage	V <sub>CC_IF</sub>	1.4	--	1.6	V	
VDD Input high voltage level	V <sub>IH</sub>	0.7*VDD	-	VDD	V	
VDD Input low voltage level	V <sub>IL</sub>	0	-	0.3*VDD	V	
VDD Output high voltage level	V <sub>OH</sub>	0.8*VDD	-	-		
VDD Output low voltage level	V <sub>OL</sub>	V <sub>OL</sub>	-	-	V	

### 5.2 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
LED current	I <sub>F</sub>	-	40	-	mA	Note 1 Note 2,3
Power Consumption			-	-	mW	
LED Voltage	V <sub>F</sub>	11.2	12	12.8	V	
LED Life Time	W <sub>BL</sub>	25000		-	Hr	

Note 1 : There are 4\*2 Groups LED

Note 2 : Ta = 25°C

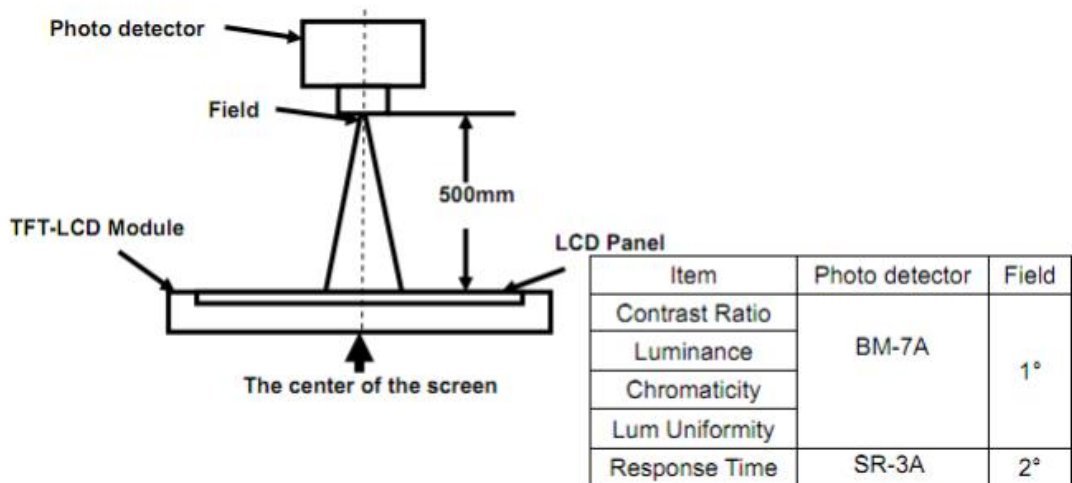
Note 3 : Brightness to be decreased to 50% of the initial value

## 6. Optical Characteristics

Items	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	
Viewing angles	$\theta_T$	Center CR $\geq$ 10	-	80	-	Degree.	Note2	
	$\theta_B$		-	80	-			
	$\theta_L$		-	80	-			
	$\theta_R$		-	80	-			
Contrast Ratio	CR	$\Theta = 0$	1000	1200	-	-	Note1, Note3	
Response Time	$T_{ON}$	25°C	-	25	35	ms	Note1, Note4	
	$T_{OFF}$		-	25	35			
Chromaticity	White	Backlight is on	$X_W$	-	0.302	-	-	Note1, Note5
			$Y_W$	-	0.319	-	-	
	Red		$X_R$	-	0.590	-	-	
			$Y_R$	-	0.347	-	-	
	Green		$X_G$	-	0.340	-	-	
			$Y_G$	-	0.581	-	-	
	Blue		$X_B$	-	0.153	-	-	
			$Y_B$	-	0.104	-	-	
Uniformity	U		80	-	-	%	Note1, Note6	
NTSC				50		%	Note5	
Luminance	L		260	300			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 2: Definition of viewing angle range and measurement system.

Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).

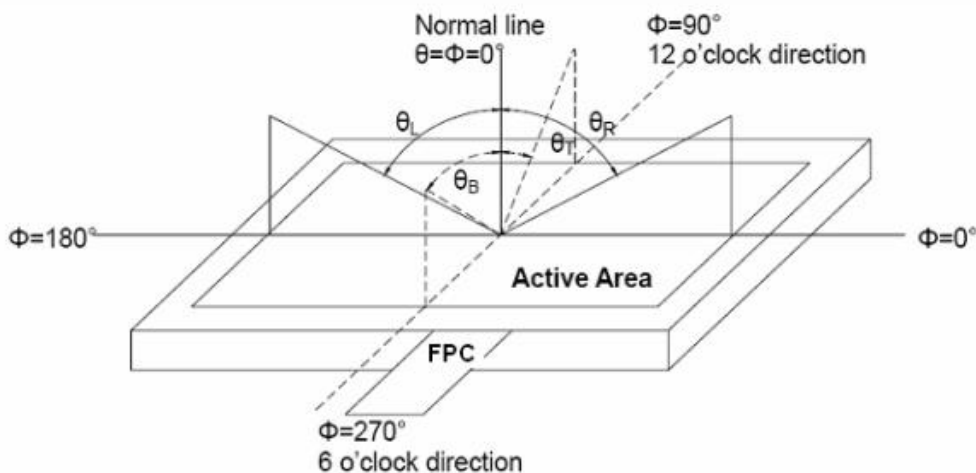


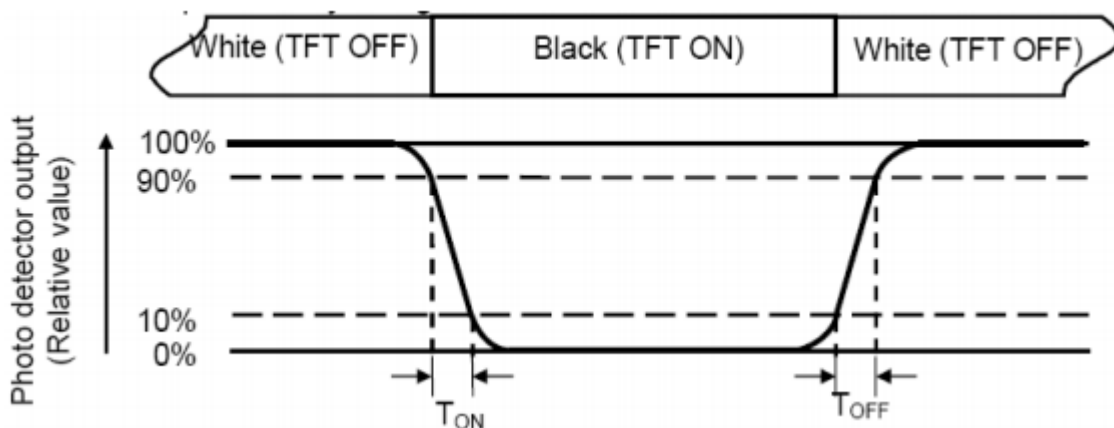
Fig. 1 Definition of viewing angle

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) =  $L_{min} / L_{max} \times 100\%$

L-----Active area length W----- Active area width

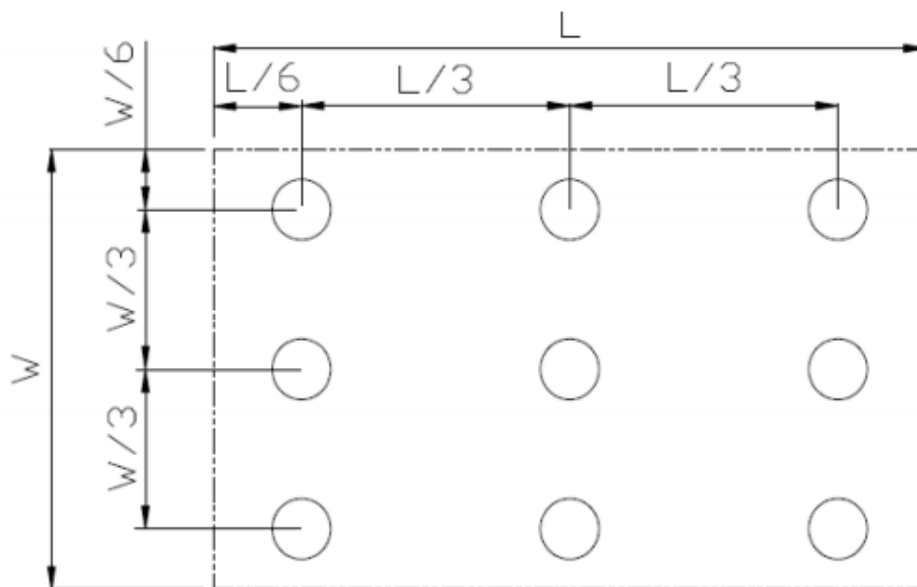


Fig. 2 Definition of uniformity

$L_{max}$ : The measured maximum luminance of all measurement position.

$L_{min}$ : The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

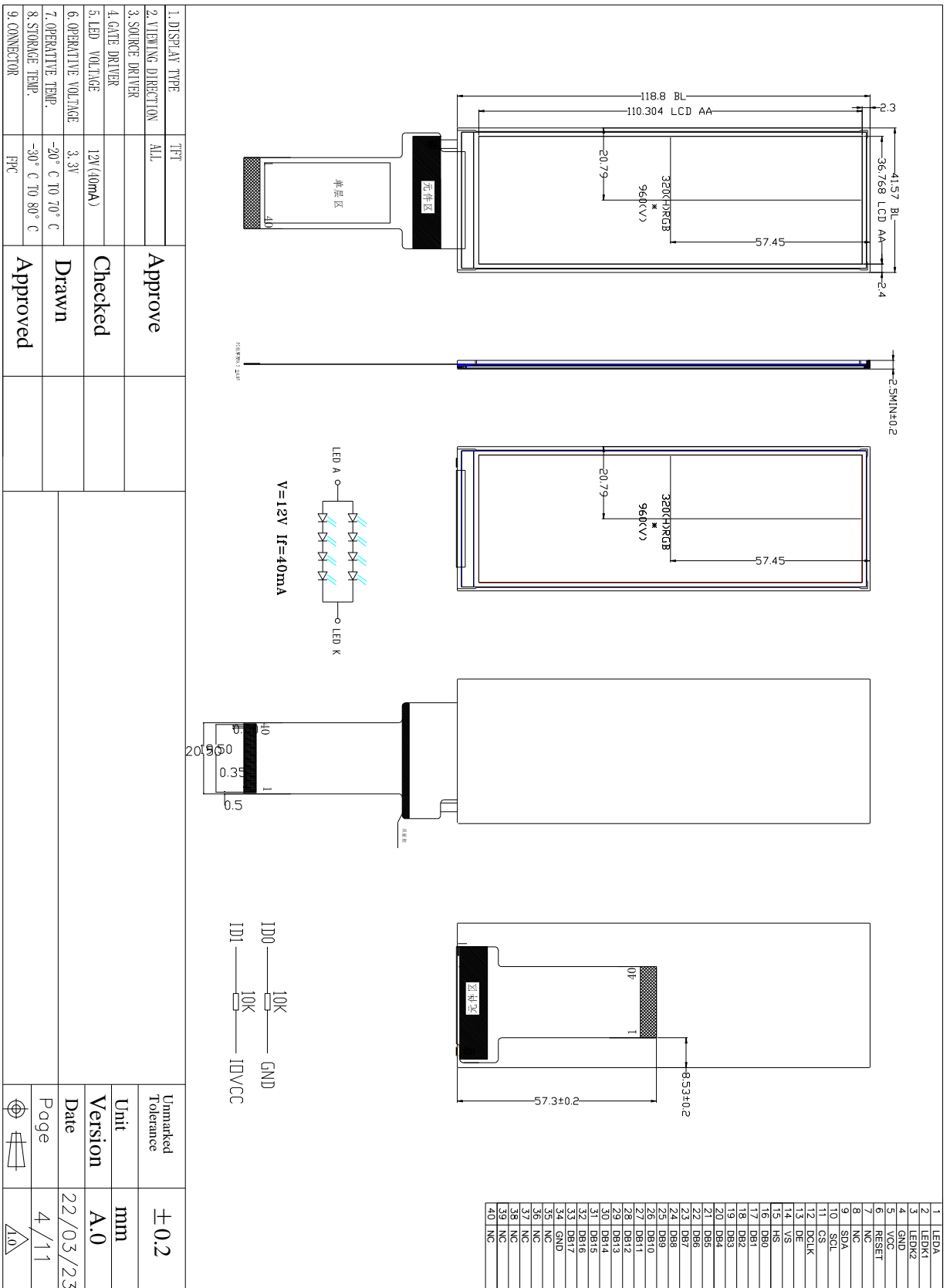
## 7. Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	T <sub>s</sub> = +70°C, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	T <sub>a</sub> = -20°C, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	T <sub>a</sub> = +80°C, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	T <sub>a</sub> = -30°C, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	T <sub>a</sub> = +60°C, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30°C 30 min ~ +80°C 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°C ~ 35°C, 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: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T<sub>S</sub> is the temperature of panel's surface.

2. T<sub>a</sub> is the ambient temperature of sample.

# 8. Mechanical Drawing



1. DISPLAY TYPE	TFT	Approve
2. VIEWING DIRECTION	ALL	Checked
3. SOURCE DRIVER		Drawn
4. GATE DRIVER		Approved
5. LED VOLTAGE	12V(40mA)	
6. OPERATIVE VOLTAGE	3.3V	
7. OPERATIVE TEMP.	-20° C TO 70° C	
8. STORAGE TEMP.	-30° C TO 80° C	
9. CONNECTOR	PVC	

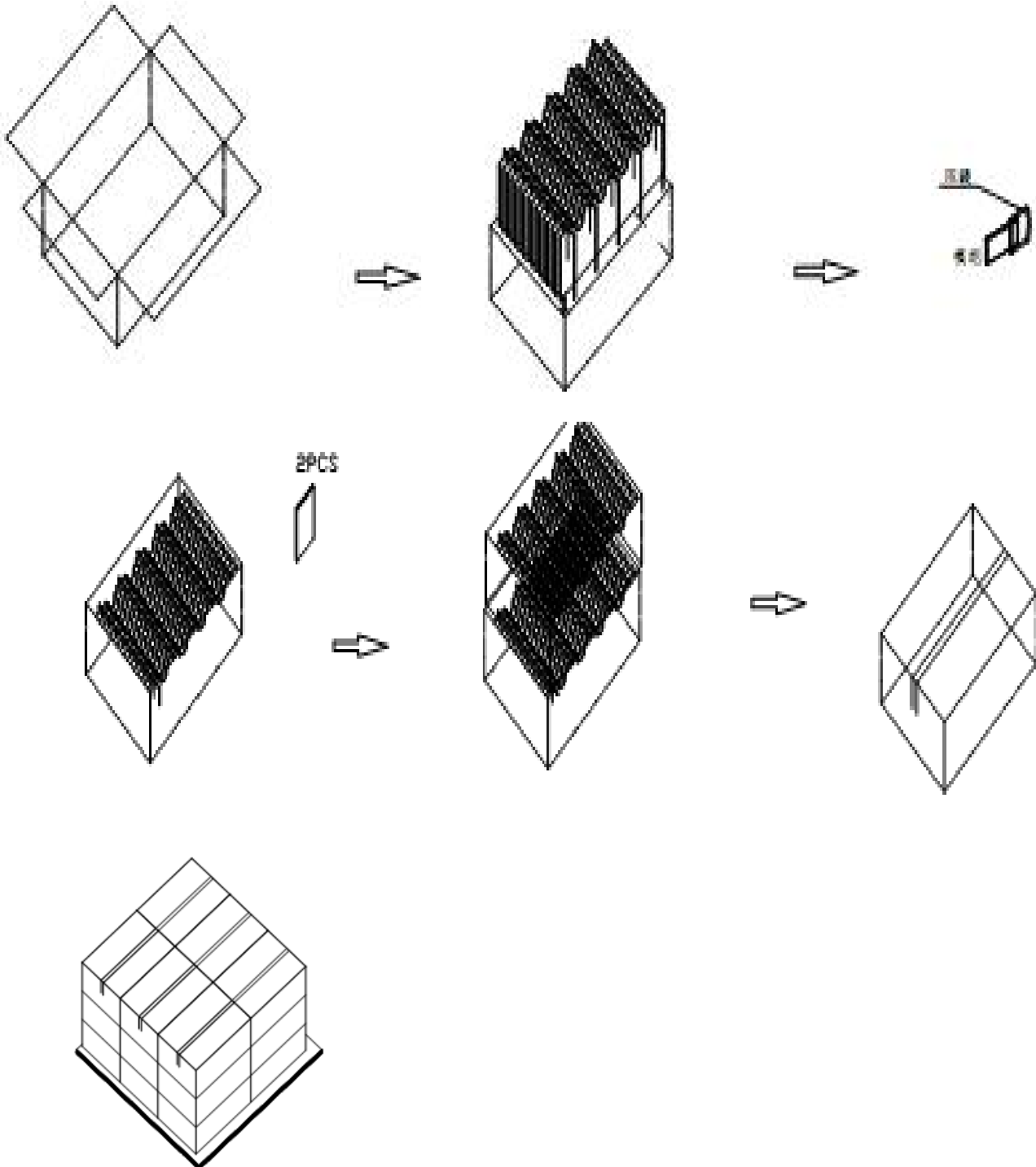
Unit	mm
Version	A.0
Date	22/03/23
Page	4/11

Unmarked Tolerance	±0.2
Symbol	10K
Symbol	10K
Symbol	IDVCC

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## 9. Packing

### Packing Method



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## 10. Precautions for Use of LCD modules

### 10.1 Handling Precautions

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

10.1.2. 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.

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

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

10.1.5. 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

10.1.6. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

10.1.8.4. 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.

### 10.2 Storage Precautions

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

10.2.2. 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°C ~ 40°C      Relatively humidity: ≤80%

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

### 10.3 Transportation Precautions

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