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CERT. No.: 282Q19070712006



CERT. No.: 282E19070712007

## Product Specification

Model: TTX101BVE-01

**10.1" TFT Display Module (800\*1280)**

This module uses RoHS material

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# 1 Record of Revision

Rev	Issued Date	Description	Remark

## 2 General Specifications

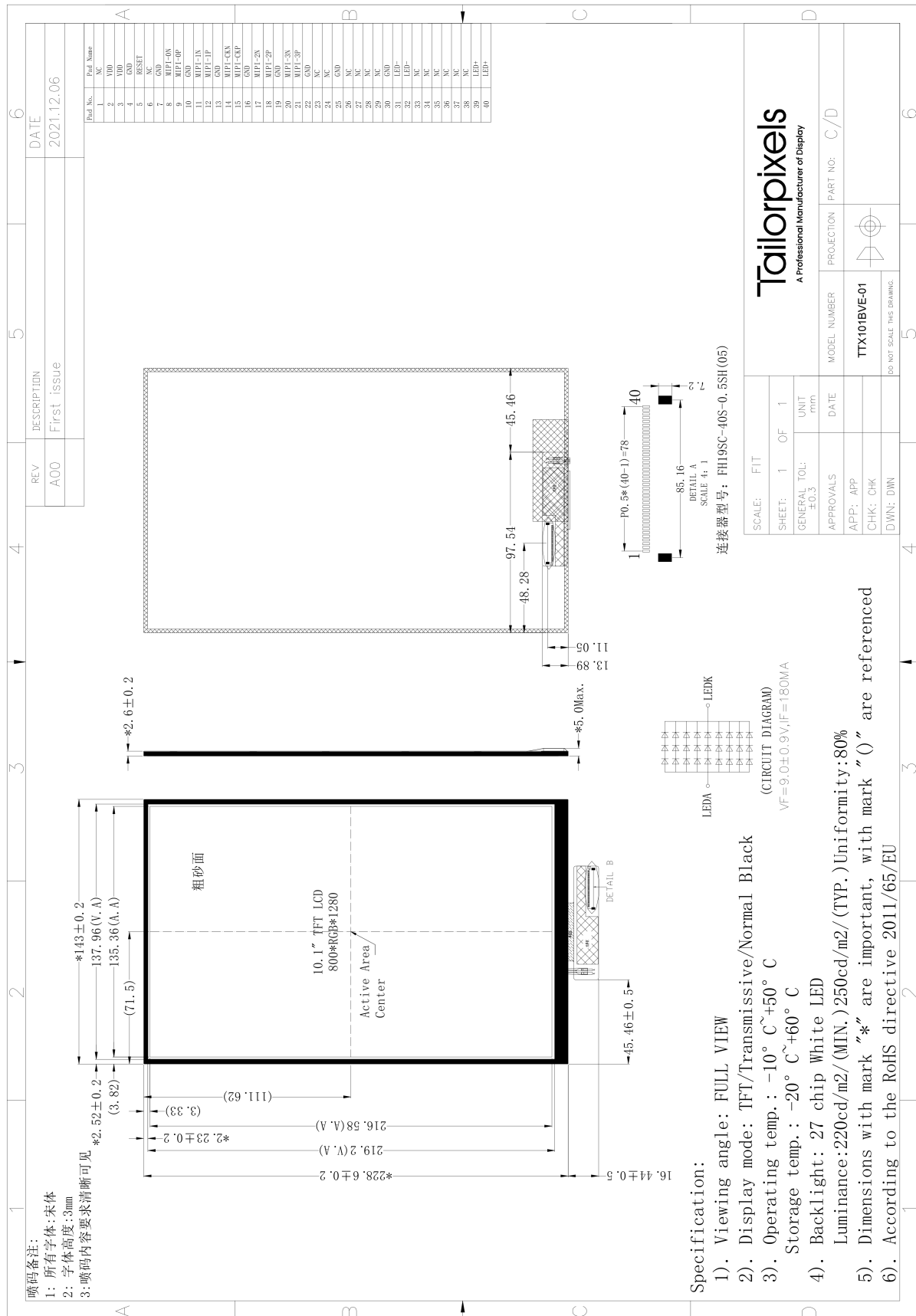
Feature		Spec
Characteristics	Size	10.1-inch
	Resolution	800(horizontal)*1280(Vertical)
	Interface	MIPI
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Display Spec. Pixel pitch (mm)	0.1692*0.1692
	Pixel Configuration	R.G.B.-Vertical Stripe
	Display Mode	Normally Black
	Driver IC	-
	Surface Treatment	HC
	Viewing Direction	ALL
Mechanical	LCM (W x H x D) (mm)	228.6(W)X143(H)X2.6(D)
	Active Area(mm)	216.58(H)x135.36(V)
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	27

Note 1: Viewing direction is follow the data which measured by optics equipment.

Note 2: Requirements on Environmental Protection: RoHS

Note 3: LCM weight tolerance: +/- 5%

### 3 Mechanical Drawing



## 4 Interface

Pin No.	Symbol	Function
1	NC	No connection.
2~3	VDD(3.3V)	Power supply.
4	GND	Ground.
5	RESET(3.3V)	Reset pin, active “L”
6	NC	No connection.
7	GND	Ground.
8	MIPI_D0N	MIPI differential data0- input
9	MIPI_D0P	MIPI differential data0+ input
10	GND	Ground.
11	MIPI_D1N	MIPI differential data1- input
12	MIPI_D1P	MIPI differential data1+ input
13	GND	Ground.
14	MIPI_CKN	MIPI differential CLK- input
15	MIPI_CKP	MIPI differential CLK+ input
16	GND	Ground.
17	MIPI_D2N	MIPI differential data2- input
18	MIPI_D2P	MIPI differential data2+ input
19	GND	Ground.
20	MIPI_D3N	MIPI differential data3- input
21	MIPI_D3P	MIPI differential data3+ input
22	GND	Ground.
23~24	NC	No connection.
25	GND	Ground.
26-29	NC	No connection.
30	GND	Ground.
31~32	LED -	LED cathode
33-38	NC	No connection.
39~40	LED +	LED anode.

## 5 Absolute Maximum Ratings

### 5.1 Electrical Absolute Maximum Ratings.( $V_{SS}=0V$ , $T_a=25^{\circ}C$ )

Power Supply Voltage	VDD	2.5	3.6	V	1, 2
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Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged.  
Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2.  $V_{DD} > V_{SS}$  must be maintained.

### 5.2 Environmental Absolute Maximum Ratings.

Item	Storage		Operating		Note
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature	-20°C	60°C	-10°C	50°C	1,2
Humidity	-	-	-	-	3

Notes:

1. The response time will become lower when operated at low temperature.
2. Background color changes slightly depending on ambient temperature.  
The phenomenon is reversible.
3.  $T_a \leq 40^{\circ}C$ : 85%RH MAX.  
 $T_a \geq 40^{\circ}C$ : Absolute humidity must be lower than the humidity of 85%RH at 40 °C.

## 6 Electrical Characteristics

### 6.1 TFT LCD Module

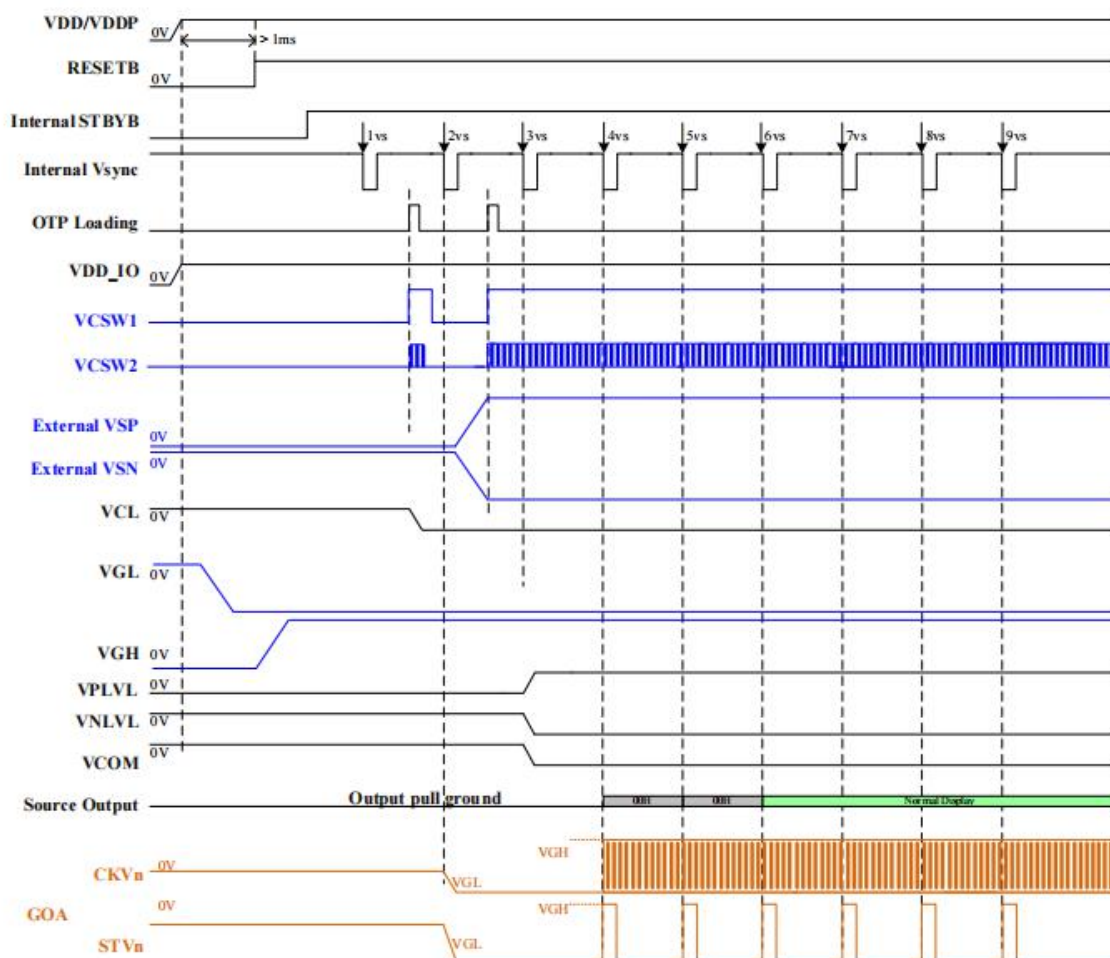
Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply	VDD	Ta=25°C	-	3.3	3.6	V	
Input voltage	'H'	V <sub>IH</sub>	V <sub>DD</sub> =3.3V	0.8V <sub>DD</sub>	-	V <sub>DD</sub>	V
	'L'	V <sub>IL</sub>	V <sub>DD</sub> =3.3V	0	-	0.2V <sub>DD</sub>	V

### 6.2 Timing characteristics

#### 6.2.1 Power on/off Sequence

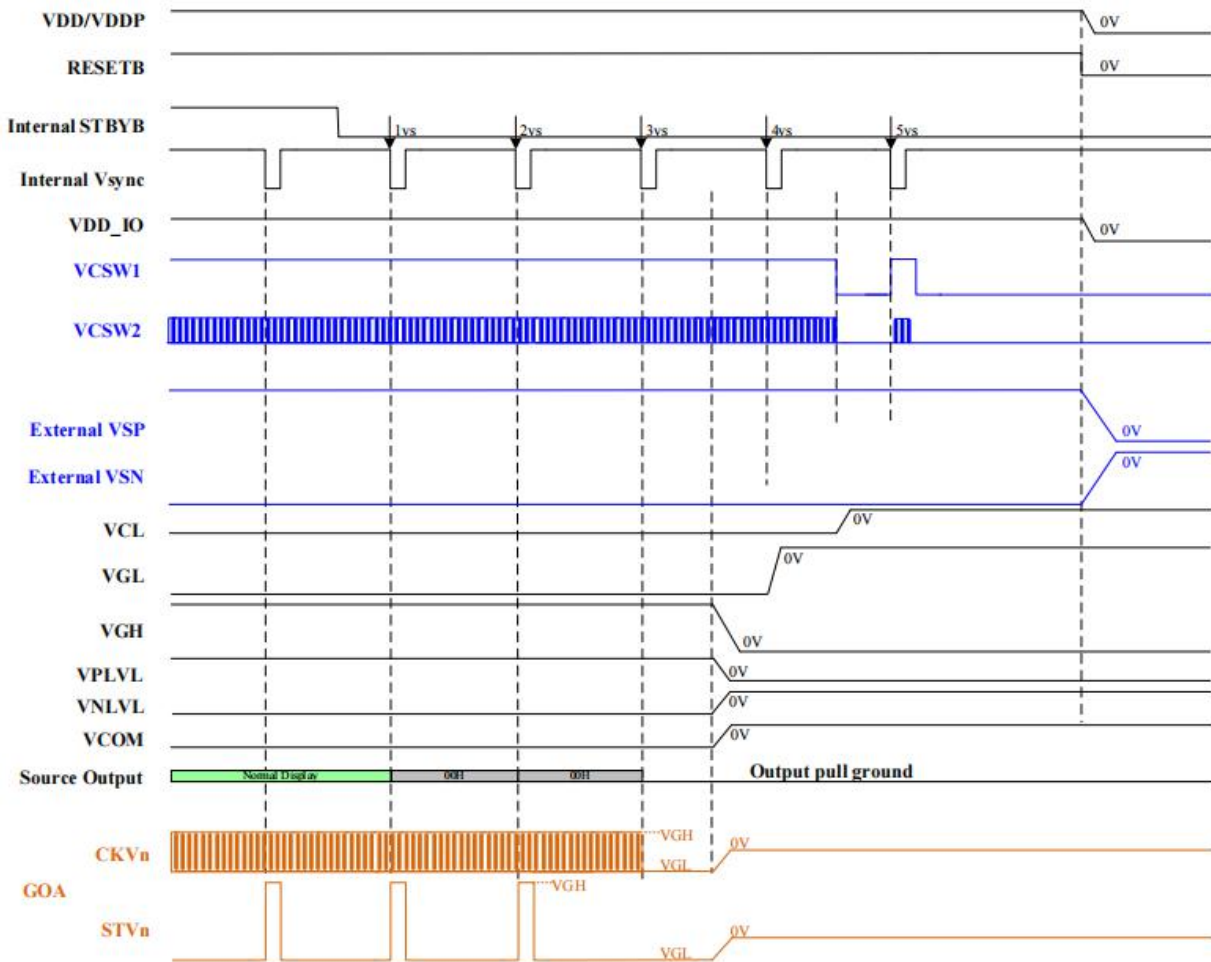
##### Power ON

JD5001/2 VSP/VSN  
External VGH/VGL

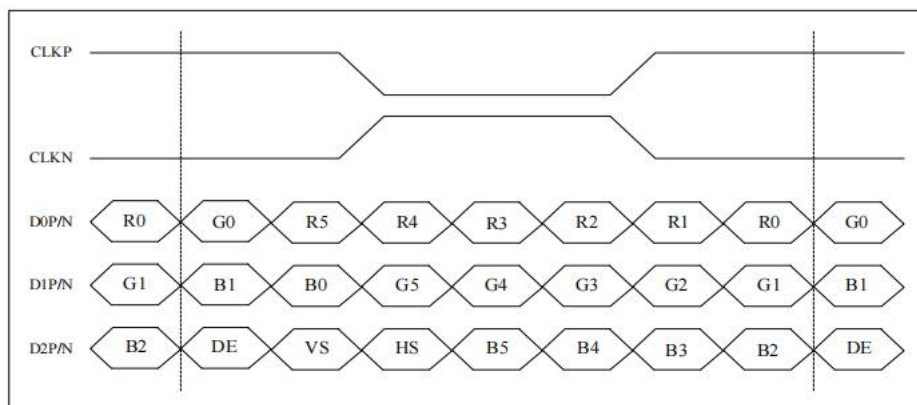




**Power OFF**  
**JD5001/2 VSP/VSN**  
**External VGH/VGL**



**6.2.2 Data input format for MIPI**



### 6.2.3 Input Timing Table

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK frequency @Frame rate=60Hz	F <sub>DCLK</sub>		71.9		MHz
HSYNC period time	T <sub>H</sub>		920		DCLK
Horizontal display area	T <sub>HD</sub>		800		DCLK
HSYNC pulse width	T <sub>HPW</sub>		24	-	DCLK
HSYNC back porch	T <sub>HBP</sub>		24	-	DCLK
HSYNC front porch	T <sub>FBP</sub>		72	-	DCLK
VSYNC period time	T <sub>V</sub>		1304		H
Vertical display area	T <sub>VD</sub>		1280		H
VSYNC pulse width	T <sub>VPW</sub>		2	-	H
VSYNC back porch	T <sub>VBP</sub>		10	-	H
VSYNC front porch	T <sub>VFP</sub>		12	-	H

### 6.3 Driving Backlight

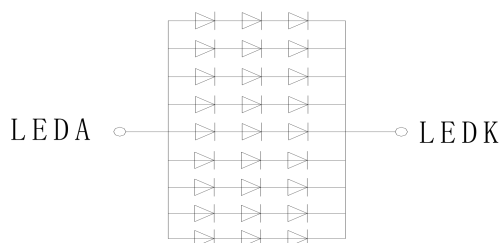
Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I <sub>F</sub>	-	180	-	mA	Note 1 Note 2 Note 3
Forward Voltage	V <sub>F</sub>	8.1	9.0	9.9	V	
LED Life Time	Time	20000	-	-	Hr	

Note 1: Each LED: I<sub>F</sub> =20 mA, V<sub>F</sub> =3.0V.

Note 2: Optical performance should be evaluated at Ta=25℃ only.

Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The lifetime of LED will be reduced. Operating life means brightness goes down to 50% initial brightness.

Typical operating lifetime is estimated data.



(CIRCUIT DIAGRAM)

V<sub>F</sub> = 9.0 ± 0.9 V, I<sub>F</sub> = 180 mA

## 7 Optical Characteristics

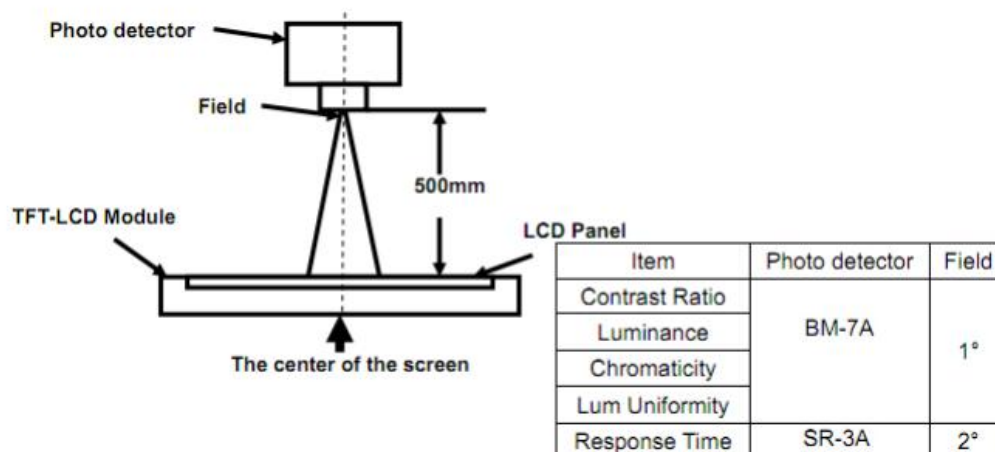
Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		$\theta_T$	Center CR≥10		85	-	Degree.	Note2
		$\theta_B$			85	-		
		$\theta_L$			85	-		
		$\theta_R$			85	-		
Contrast Ratio		CR	$\Theta = 0$	600	800	-	-	Note1, Note3
Response Time		T <sub>ON+<small>噴</small>off</sub>	25°C	-	30	35	ms	Note1, Note4
Chromaticity	Red	R <sub>X</sub>	$\Theta = 0$ Normal viewing angle	-0.05	0.621	+0.05	-	
		R <sub>Y</sub>			0.314		-	
	Green	G <sub>X</sub>			0.272		-	
		G <sub>Y</sub>			0.580		-	
	Blue	B <sub>X</sub>			0.141		-	
		B <sub>Y</sub>			0.113		-	
	White	W <sub>X</sub>			0.296		-	
		W <sub>Y</sub>			0.322		-	
Uniformity		U		-	50	60	%	Note1, Note6
Luminance		L		-	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 1: Definition of optical measurement system.

The optical characteristics should be measured in the darkroom. After 5 minutes of 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.



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).

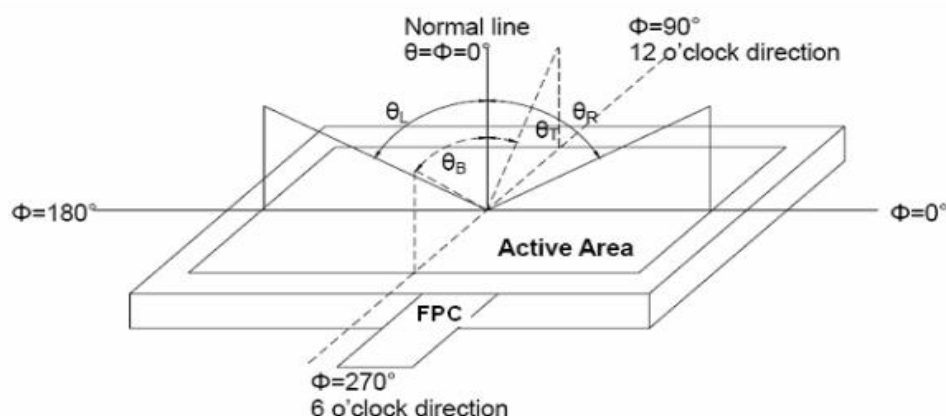


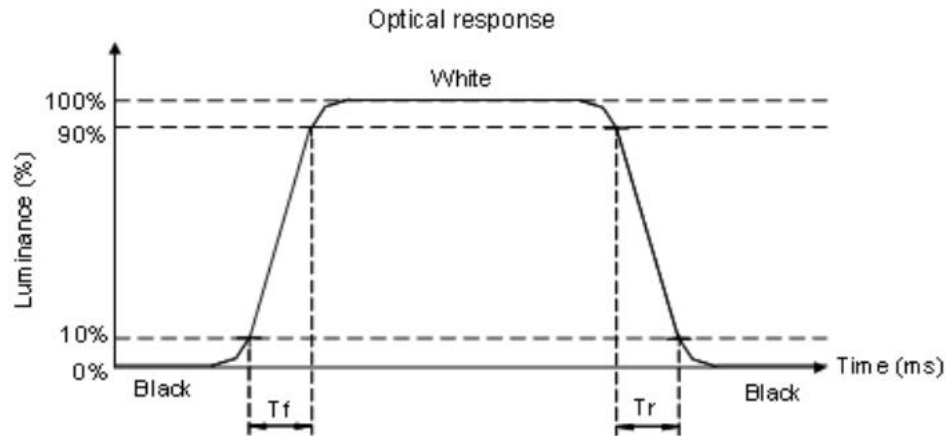
Fig. 1 Definition of viewing angle

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 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.  
Definition of response time: The response time is defined as the time interval between the 10% and 90% amplitudes



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

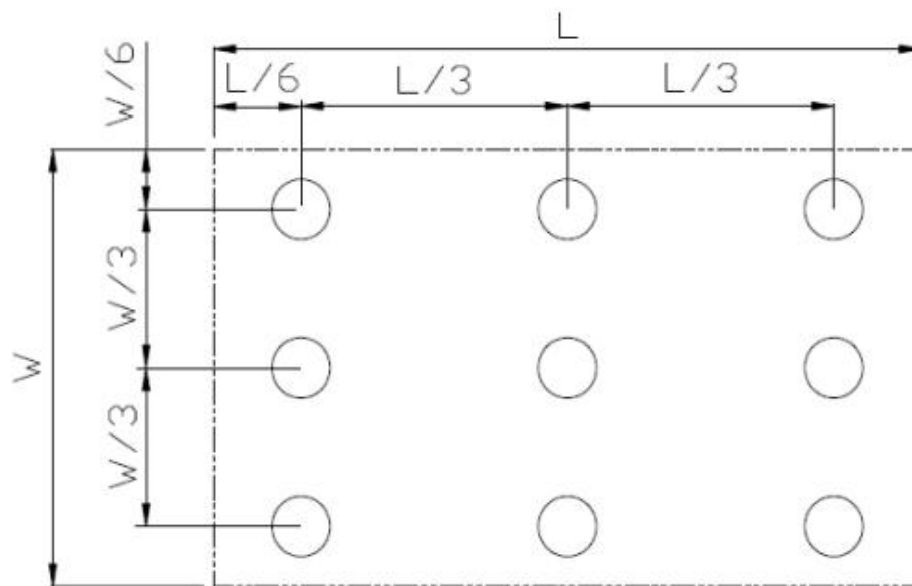


Fig. 2 Definition of uniformity

$L_{max}$ : 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.

## 8 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Operation	T <sub>s</sub> = +50℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	T <sub>a</sub> = -10℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	T <sub>a</sub> = +60℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	T <sub>a</sub> = -20℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	T <sub>a</sub> = +40℃, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-20℃ 30 min ~ +60℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Discharge (Operation) Static	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: 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.

## 9 Precautions For Use of LCD modules

### 9.1 Handling Precautions

- 9.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.
- 9.1.2 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.
- 9.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.
- 9.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.
- 9.1.5 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 the 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
- 9.1.6 Do not attempt to disassemble the LCD Module.
- 9.1.7 If the logic circuit power is off, do not apply the input signals.
- 9.1.8 To prevent the destruction of the elements by static electricity, be careful to maintain an optimum work environment.
  - 9.1.8.1 Be sure to ground the body when handling the LCD Modules.
  - 9.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.
  - 9.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.
  - 9.1.8.4 The LCD Module is coated with a film to protect the display surface. Be careful when peeling off this protective film since static electricity may be generated.

### 9.2 Storage Precautions

- 9.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.
- 9.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommended condition is:  
Temperature: 0℃ ~ 40℃, Relatively humidity: ≤80%
- 9.2.3 The LCD modules should be stored in the room without acid, alkali, and harmful gas.

### 9.3 Transportation Precautions

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