



Product Specification

Customer: _____

Model Name: H101BHD40I3537

Date: 2023-04-13

Version: A0

Preliminary Specification

Final Specification

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by



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Xunrui Shenzhen Optoelectronics Technology Co., Ltd.

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2 General Specifications

	Feature	Spec
Characteristics	Size	10.1 inch
	Resolution	1280(horizontal)*800(Vertical)
	Interface	LVDS 8bit
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Display Spec. Pixel pitch (mm)	0.1695(H)×RGB×0.1695(V)
	Pixel Configuration	R.G.B.-Stripe
	Display Mode	Normally Black
	Driver IC	TBD
	Surface Treatment	HC
	Viewing Direction	ALL
	Gray scale Direction	FREE
Mechanical	LCM (W x H x D) (mm)	229.5*149.1*2.6
	Active Area(mm)	216.96x 135.6
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	36LEDs

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%



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3 Input/Output Terminals

No.	Symbol	Description
1	NC	Non connection
2	VDDIN	Power supply VDDIN=3.3V (Typ.)
3	VDDIN	
4	VDDIN	
5	NC	Non connection
6	GND	Ground
7	GND	Ground
8	RXIN0-	LVDS Negative data signal (-)
9	RXIN0+	LVDS Positive data signal (+)
10	GND	Ground
11	RXIN1-	LVDS Negative data signal (-)
12	RXIN1+	LVDS Positive data signal (+)
13	GND	Ground
14	RXIN2-	LVDS Negative data signal (-)
15	RXIN2+	LVDS Positive data signal (+)
16	GND	Ground
17	LVDS_CLK-	LVDS Negative CLK signal (-)
18	LVDS_CLK+	LVDS Positive CLK signal (+)
19	GND	Ground
20	RXIN3-	LVDS Negative data signal (-)
21	RXIN3+	LVDS Positive data signal (+)
22	GND	Ground
23	NC	Non connection
24	NC	Non connection
25	GND	Ground
26	SCL_S	Reserved for LCD manufacturer' s use , not connection
27	SDA_S	Reserved for LCD manufacturer' s use , not connection
28	GND	Ground
29	NC	Non connection
30	NC	Non connection
31	GND	Ground



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32	GND	Ground
33	GND	Ground
34	NC	Non connection
35	LED_PWM	LED PWM signal pin
36	NC	Non connection
37	NC	Non connection
38	LED+	LED Anode
39	LED+	LED Anode
40	LED+	LED Anode

4 Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Digital Supply Voltage	V_{DD}	VSS-0.3	3.6	V	
TFT Gate on Voltage	VGH	-0.3	40	V	
TFT Gate off Voltage	VGL	VGH-42	0.3	V	
Analog power Supply Voltage	AVDD	-0.5	15	V	
Operating Temperature	T_{OPR}	-10	50	°C	
Storage Temperature	T_{STG}	-20	60	°C	



5 Electrical Characteristics

5.1 TFT LCD Module

< Table 3. LCD Module Electrical specifications > [Ta=25±2 °C]

Parameter	Symbol	Values			Unit	Notes	
		Min.	Typ.	Max.			
Power Supply Voltage	VDD	3.0	3.3	3.6	V		
	VRP			300	mV	Ripple	
Power Supply Current	IDD	-	127	343	mA	Note 1	
Power Consumption	PLCD	-	0.42	1.13	W		
Rush current	IRUSH	-	-	3.0	A		
CMOS Interface	Input Voltage	VIH	2.7		3.3	V	
		VIL	0		0.5	V	
	Output Voltage	VOH	2.7		3.3	V	
		VOL	0		0.5	V	

5.2 Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I _F	-	120	-	mA	
Forward Voltage	V _F	16.2	18	19.8	V	
LED Life Time	W _{BL}	25000	-	-	Hr	

Note 1: Each LED : I_F =20 mA, V_F =3.0V.

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

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



5.3 Interface timing Parameter

Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
DCLK Frequency	Fdclk	66.3	72.4	78.9	MHz
Horizontal display area	Thd	1280			pixel
HSYNC period time	Th	1380	1440	1500	pixel
HSYNC blanking	thbp+ thfp	100	160	220	pixel
Vertical display area	Tvd	800			H
Frequency	fV	55	60	65	Hz
VSYNC period time	Tv	824	838	872	H
VSYNC blanking	Tvbp+ Tvfp	24	38	72	H





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<Table 6. LVDS AC Timing Specification >

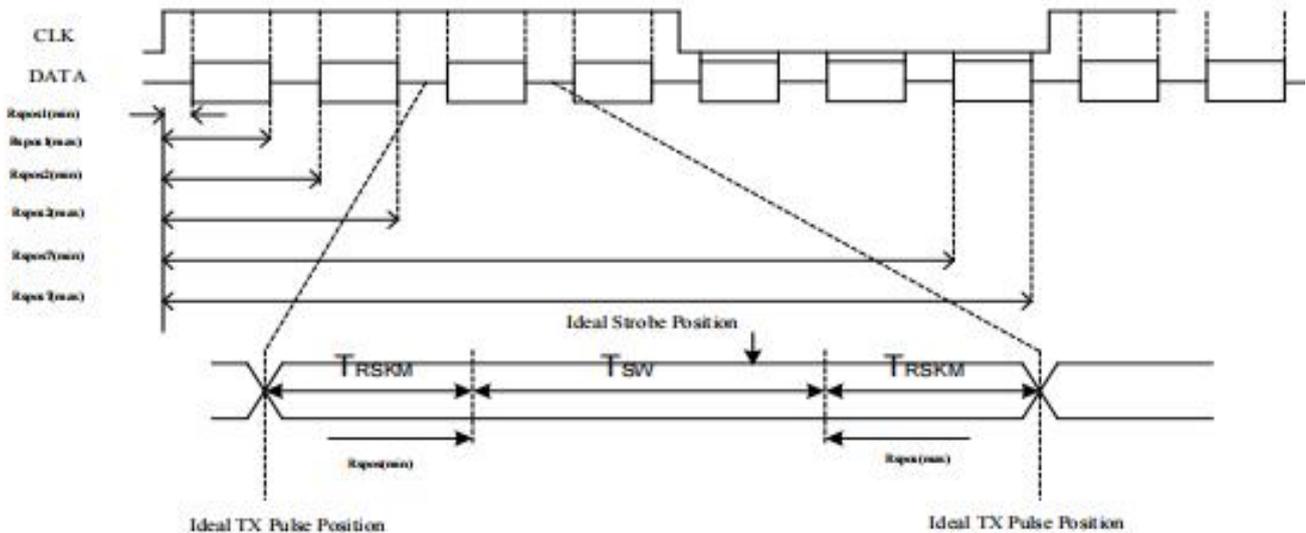
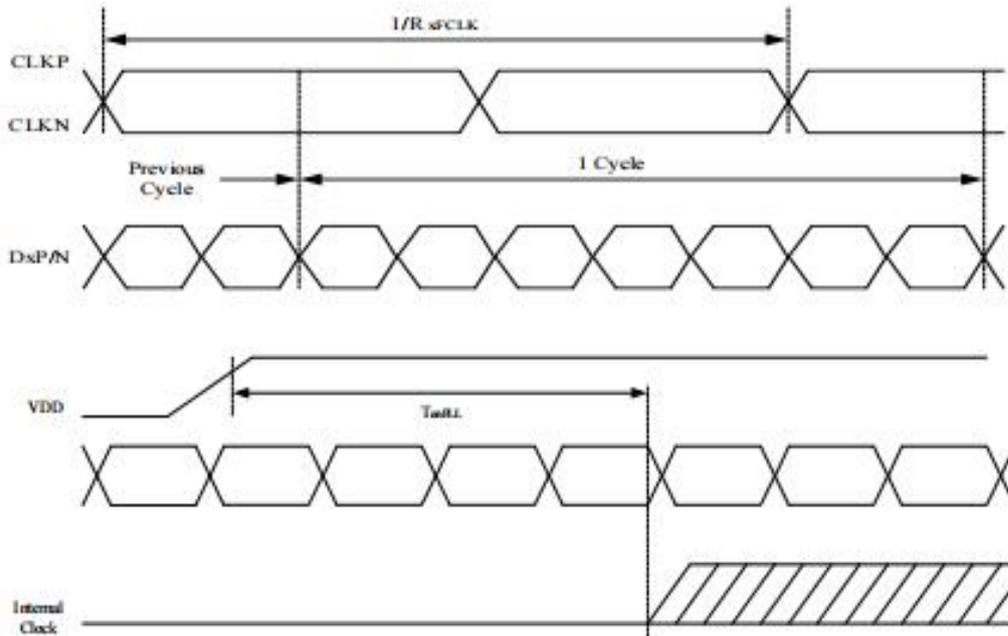
Item	Symbol	Min	Typ	Max	Unit	Remark
Clock frequency	RxFCLK	30	-	TBD	MHz	Refer to input timing table for each display resolution
Input data skew margin	TRSKM	500	-	-	ps	VID = 200mV RxVCM = 1.2V RxFCLK = 81MHz
Clock high time	TLVCH	-	$4/(7 * RxFCLK)$	-	ns	
Clock low time	TLVCL	-	$3/(7 * RxFCLK)$	-	ns	
PLL wake-up time	TenPLL	-	-	150	us	
Clock frequency	RxFCLK	30	-	TBD	MHz	Refer to input timing table for each display resolution
Input data skew margin	TRSKM	500	-	-	ps	VID = 200mV RxVCM = 1.2V RxFCLK = 81MHz
Clock high time	TLVCH	-	$4/(7 * RxFCLK)$	-	ns	
Clock low time	TLVCL	-	$3/(7 * RxFCLK)$	-	ns	

5.4 Interface timing Parameter



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T_{RSKM} : Receiver strobe margin
 $RSPOS$: Receiver strobe position
 T_{SW} : Strobe width (internal data sampling window)



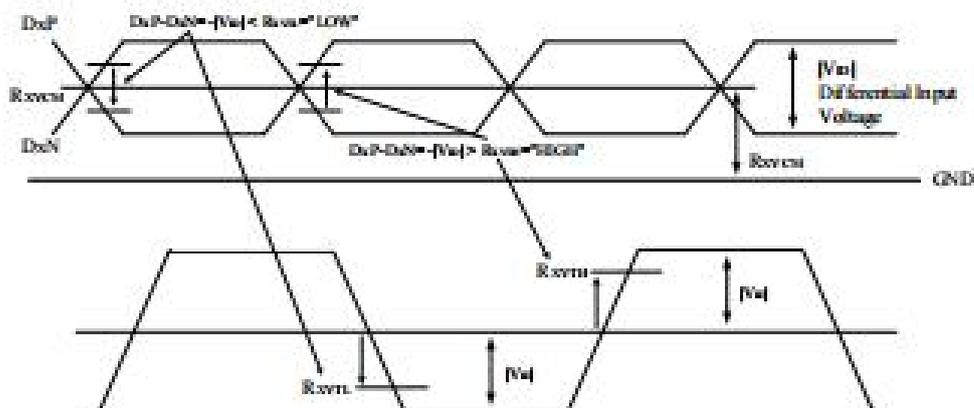
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<Table7. LVDS DC Timing Specification>

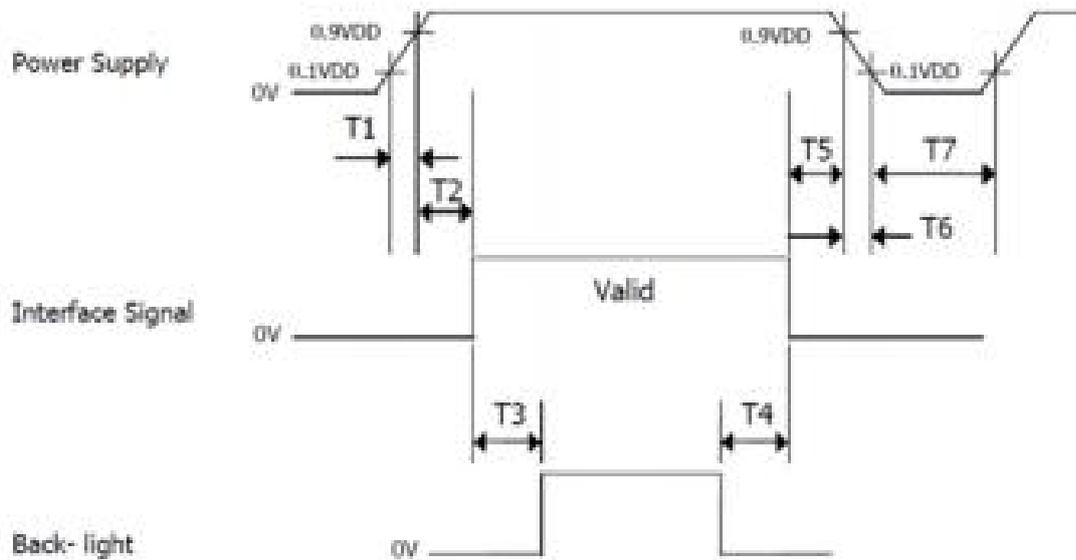
Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential input high threshold voltage	RXVTH	+0.1	0.2	0.3	V	RXVCM=1.2V
Differential input low threshold voltage	RXVTL	-0.3	-0.2	-0.1	V	
Input voltage range (single-ended)	RXVIN	0.7	-	1.7	V	
Differential input common mode voltage	RXVCM	1	1.2	1.4	V	$ VID =0.2$
Differential input impedance	ZID	80	100	125	ohm	
Differential input voltage	$ VID $	0.2	-	0.6	V	
Differential input leakage current	ILCLVDS	-10	-	+10	uA	
LVDS Digital Operating Current	IVDDMIPI	-	15	20	mA	FDCLK=80MHz, VDD=3.3V, Input pattern: 55h->Aah->55h->Aah
LVDS Digital Stand-by Current	ISTMIPI	-	-	250	uA	Clock & all Functions are stopped

Single-ended Signals





5.5 Power Sequence



< Table8. Sequence Table >

Parameter	Values			Units
	Min	Typ	Max	
T1	0	-	10	ms
T2	0	-	50	ms
T3	200	-	-	ms
T4	500	-	-	ms
T5	0	-	50	ms
T6	0	-	10	ms
T7	500	-	-	ms



6 Optical Characteristics

Items	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	
Viewing angles	θ_T	Center CR \geq 10	70	80	-	Degree.	Note2	
	θ_B		70	80	-			
	θ_L		70	80	-			
	θ_R		70	80	-			
Contrast Ratio	CR	$\Theta = 0$	-	1000	-	-	Note1 Note3	
Response Time	T _{ON}	25° C	-	30	35	ms	Note1	
	T _{OFF}		-	30	35		Note4	
Chromaticity	White	Backlight is on	X _W	0.262	0.302	0.342	-	Note1 Note5
			Y _W	0.298	0.338	0.378	-	
	Red		X _R	0.588	0.618	0.648	-	
			Y _R	0.299	0.329	0.359	-	
	Green		X _G	0.253	0.283	0.313	-	
			Y _G	0.512	0.542	0.572	-	
	Blue		X _B	0.109	0.139	0.169	-	
			Y _B	0.134	0.164	0.194	-	
Uniformity	U		70	75	-	%	Note1 Note6	
NTSC			45	50		%	Note5	
Luminance	L		300	350			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.

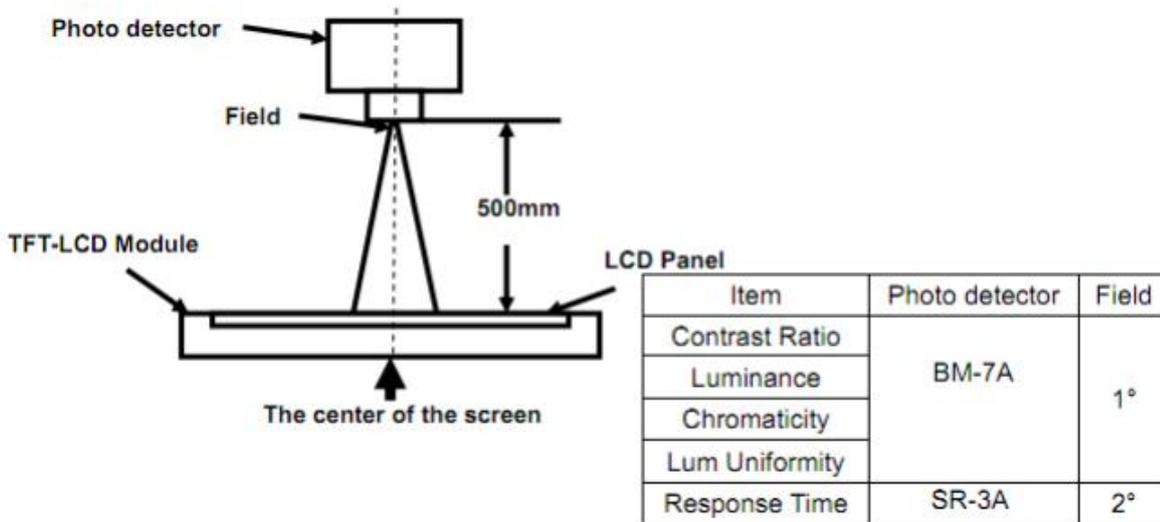
Note 1:Definition of optical measurement system.

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.

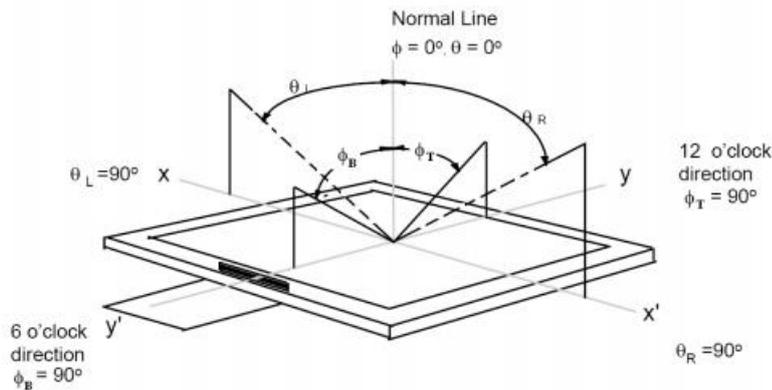


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Note 2: The definition of Viewing Angle Refer to the graph below marked by θ and ϕ



Note 3: The definition of Contrast Ratio

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

(Contrast Ratio is measured in optimum common electrode voltage)

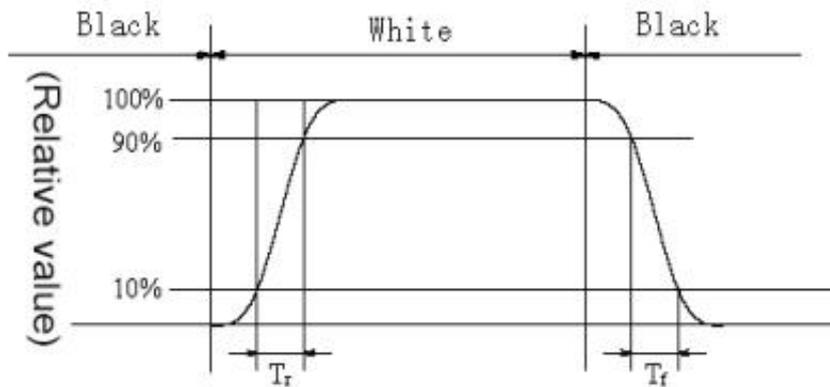


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Note 4: Definition of Response time.(Test LCD using RD80S or similar equipments):

The output sign also photo detector are measured when the input sign also are changed from "black " to "white" (Voltage falling time)and from "white" to "black" (Voltage rising time), respectively . The response time is defined as the time interval between the 10% and 90% of amplitudes . Refer to figures below.



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.

$$\text{Luminance Uniformity}(U) = L_{\min} / L_{\max} \times 100\%$$

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

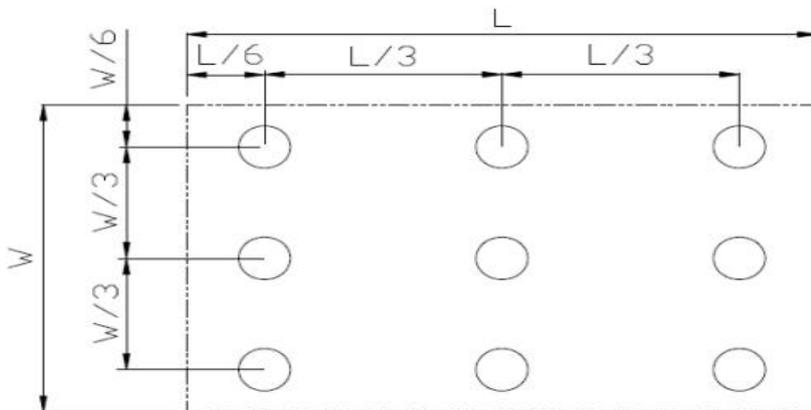


Fig. 2 Definition of uniformity



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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.



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7 Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Opeartion	Ts= +50°C, 96hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Opeartion	Ta= -10°C, 96hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +60°C, 96hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -20°C, 96hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60°C, 90% RH max, 72 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-20°C 30 min ~ +70°C 30 min Change time: 5min, 20 Cycle	Start with cold temperature,end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Opeartion)	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. Ts is the temperature of panel's surface.

2. Ta is the ambient temperature of sample.



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9 Packing

TBD



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
- Ketone
- 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℃ ~ 40℃ 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.