SPECIFICATION FOR APPROVAL

Customer: _____

Model Name: BR101JIE4250-B4 V.4 _____

Date: 2020.09.22 _____

Version: 1.0 _____

■ **Preliminary Specification**

☐ **Final Specification**

For Customer's Acceptance

Approved by	Comment

PLEASE RETURN TO US ONE COPY OF" SPECIFICATION

FOR APPROVAL" WITH YOUR APPROVED SIGNATURES.

Approved by	Reviewed by	Prepared by

Contents

1. Record of Revision

Version	Revise Date	Page	Content	Editor
1.0	2020/09/22		First Release.	

2 General Specifications

Feature		Spec
Characteristics	LCD Size	10.1 inch
	Display Format	1024 (RGB) × 600
	Interface	4Lane-MIPI
	Color Depth	16.7M
	Technology type	a-Si
	Display Spec.	-
	Display Mode	Normally White
	Driver IC	EK79007+EK73217
	Surface Treatment	-
	Viewing Direction	12 O'CLOCK
	Gray Viewing Direction	6 O'CLOCK
Mechanical	LCM (W x H x D) (mm)	235.0*143.0*4.5
	Active Area(mm)	222.72*125.28
	With /Without TSP	Without
	Weight (g)	TBD
	LED Numbers	42 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

Pin No	Symbol	I/O	Function	
1	VCOM	P	VCOM Voltage	
2	VDD1V8	P	Power supply for digital circuit.	
3	VDD1V8	P	Power supply for digital circuit.	
4	NC	–	Not connection	
5	RESET	I	Global reset pin	
6	STBYB	I	Standby mode control. Normally pull high STBYB=L: TCON and source driver are off and all source outputs keep low level. STBYB=H: Normal operation. (Default)	
7	GND	P	Ground	
8	MIPI-TDN0	I	MIPI data Lane0 input	
9	MIPI-TDP0	I	MIPI data Lane0 input	
10	GND	P	Ground	
11	MIPI-TDN1	I	MIPI data Lane1 input	
12	MIPI-TDP1	I	MIPI data Lane1 input	
13	GND	P	Ground	
14	MIPI-CLKN	I	MIPI CLK input	
15	MIPI-CLKP	I	MIPI CLK input	
16	GND	P	Ground	
17	MIPI-TDN2	I	MIPI data Lane2 input	
18	MIPI-TDP2	I	MIPI data Lane2 input	
19	GND	P	Ground	
20	MIPI-TDN3	I	MIPI data Lane3 input	
21	MIPI-TDP3	I	MIPI data Lane3 input	
22	GND	P	Ground	
23	NC	–	Not connection	
24	AVDD	P	Power supply for analog circuit.	
25	NC	–	Not connection	
26	VGL	P	Negative power for TFT	
27	NC	–	Not connection	
28	VGH	P	Positive power for TFT	
29	NC	–	Not connection	
30	GND	P	Ground	

I: input, O: output, P: Power

4 Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	D_{Vdd}	-0.3	+2.0	V	
Analog Supply Voltage, AVDD,VGH,VGL	V_{AVDD}	-0.3	+15.0	V	
	VGH	-0.3	+30.0	V	
	VGL	-15.0	+0.3	V	
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	

The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

5 Electrical Characteristics

5.1 Operating conditions:

(TA = 25°C, GND = AGND = 0V)

Parameter	Symbol	Min	Typ.	Max	Unit	Remark
Power Voltage	VDD	1.71	1.8	1.89	V	
	AVDD	10.0	10.4	10.8	V	
	VCOM	4.0	4.4	4.8	V	Note 3
	VGH	20.0	25.0	26.0	V	Note 1
	VGL	−8.0	−7.0	−6.0	V	Note 2
Input logic high voltage	V_{IH}	0.8VDD	–	VDD	V	
Input logic low voltage	V_{IL}	0	–	0.2VDD	V	

Note:

*1. VGH is TFT Gate operating Voltage.

*2. VGL is TFT Gate operating Voltage.

   The storage structure of this model is C_{ST} (Storage on Common)

*3. Vcom must be adjusted to optimize display quality Crosstalk, Contrast Ratio and etc.

5.2   Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
LED current	I_F	126	140	175	mA	
Power Consumption		-	-	-	mW	
LED Voltage	V_F	17.4	18.3	20.4	V	Note 1
LED Life Time	W_{BL}	30000	-	-	Hr	Note 2

Note 1 : There are 6series*7=42   LED

Note 2 : The "LED life time" is defined as the module brightness decrease to 50%

   original brightness at Ta=25°C and I_L =140mA. The LED lifetime could be
   decreased if operating I_L is lager than 175mA.

6 AC electrical Specification &Interface Timing

## 6.1 MIPI Interface DC Characteristic

Parameter	Symbol	Min.	Typ.	Max.	Unit
MIPI Characteristics for High Speed Receiver					
Single-ended input low voltage	V_{ILHS}	-40	-	-	mV
Single-ended input high voltage	V_{IHHS}	-	-	460	mV
Common-mode voltage	V_{CDRXDC}	70	-	330	mV
Differential input impedance	Z_{ID}		100		ohm
HS transmit differential voltage(VOD=VDP-VDN)	$|V_{OD}|$	140	200	250	mV
MIPI Characteristics for Low Power Mode					
Pad signal voltage range	V_I	-50	-	1350	mV
Ground shift	V_{GNDSH}	-50	-	50	mV
Logic 0 input threshold	V_{IL}	0	-	550	mV
Logic 1 input threshold	V_{IH}	880	-	1350	mV
Input hysteresis	V_{HYST}	25	-	-	mV
Output low level	V_{OL}	-50	-	50	mV
Output high level	V_{OH}	1.1	1.2	1.3	V
Output impedance of Low Power Transmitter	Z_{OLP}	80	100	125	ohm
Logic 0 contention threshold	$V_{ILCD,MAX}$	-	-	200	mV
Logic 0 contention threshold	$V_{IHCD,MIN}$	450	-	-	mV
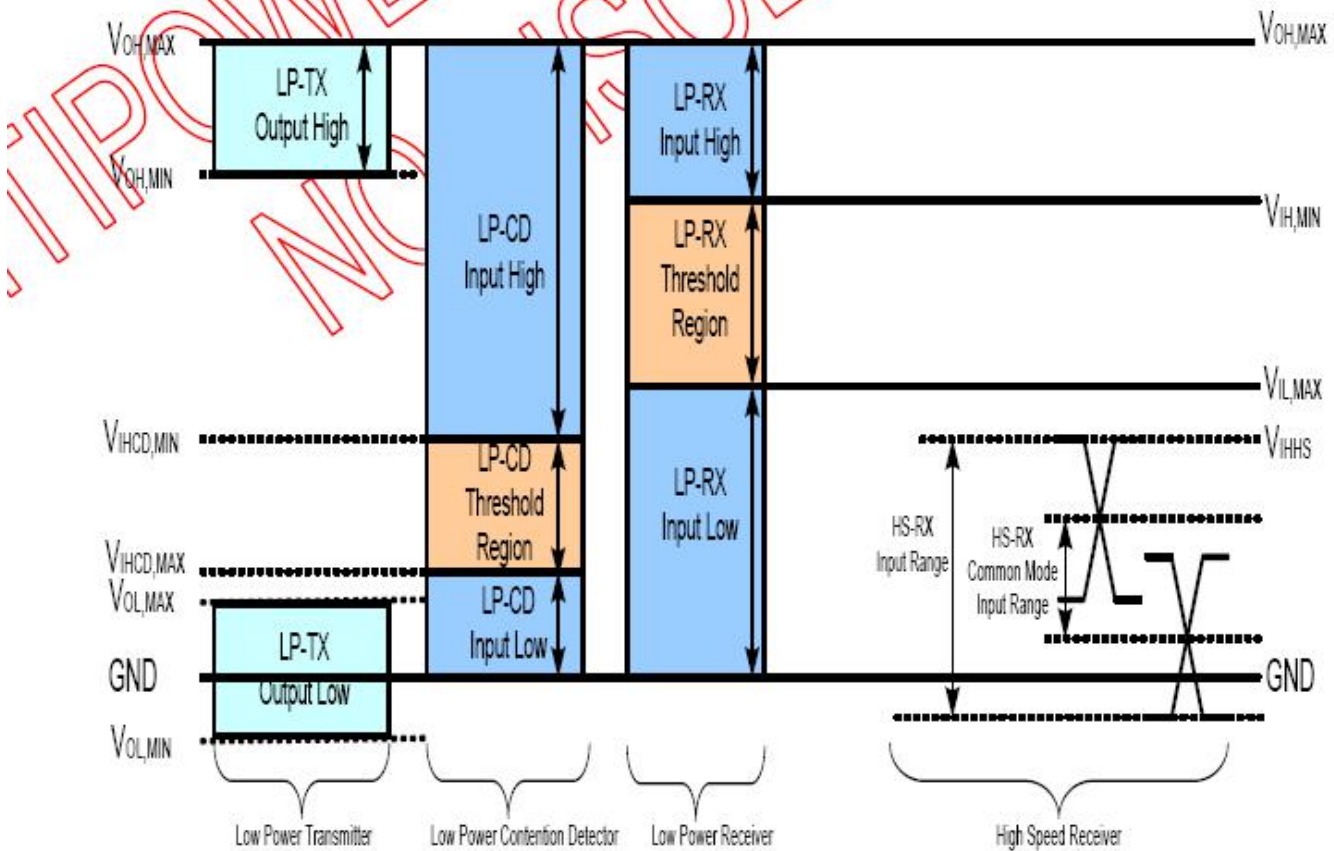
6.2 MIPI AC Characteristic

6.2.1 LP Transmitter AC Specification

Parameter		Symbol	Min	Typ	Max	Units	Notes
15%~85% rising time and falling time		T_{RLP} /T_{FLP}	-	-	25	ns	-
30%~85% rising time and falling time		T_{REOT}	-	-	35	ns	-
Pulse width of LP exclusive-OR clock	First LP EXOR clock pulse after STOP state or Last pulse before stop state	$T_{LP-PULSE-TX}$	40	-	-	ns	-
	All other pulses		20	-	-	ns	-
Period of the LP EXOR clock		$T_{LP-PER-TX}$	90	-	-	mV/ns	-
Slew Rate @C_{LOAD} =0pF		δ V/δ t_{SR}	30	-	500	mV/ns	-
Slew Rate @C_{LOAD} =5pF			30	-	200	mV/ns	-
Slew Rate @C_{LOAD} =20pF			30	-	150	mV/ns	-
Slew Rate @C_{LOAD} =70pF			30	-	100	mV/ns	-
Load Capacitance		T_{RLP}	-	-	70	pF	-
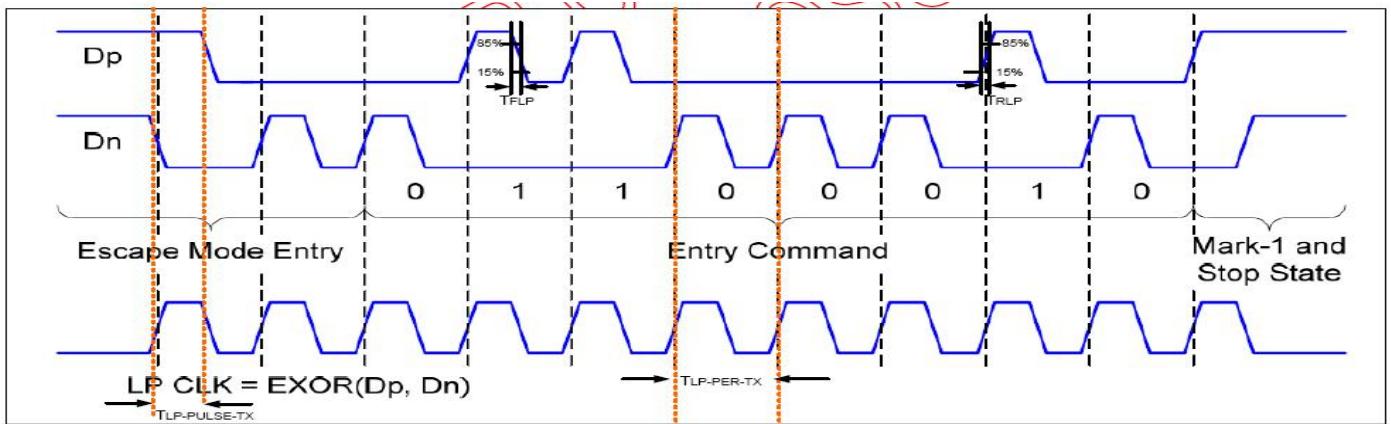
6.2.2 Turnaround Procedure

Turnaround Procedure Operation Timing Parameters

Parameter	Symbol	Min	Typ	Max	Units
Length of any Low-Power state period: Master side	T_{LPX}	50	-	75	ns
Length of any Low-Power state period: Slave side	T_{LPX}	50	55.56	58.34	ns
Ratio of T_{LPX}(Master)/ T_{LPX} (Slave) between Master and Slave side	Ratio T_{LPX}	2/3	-	3/2	
Time-out before new TX side start driving	$T_{TA-Sure}$	T_{LPX}	-	2T_{LPX}	ns
Time to drive LP-00 by new TX	T_{TA-GET}	-	5T_{LPX}	-	ns
Time to drive LP-00 after Turnaround Request	T_{TA-GO}	-	4T_{LPX}	-	ns
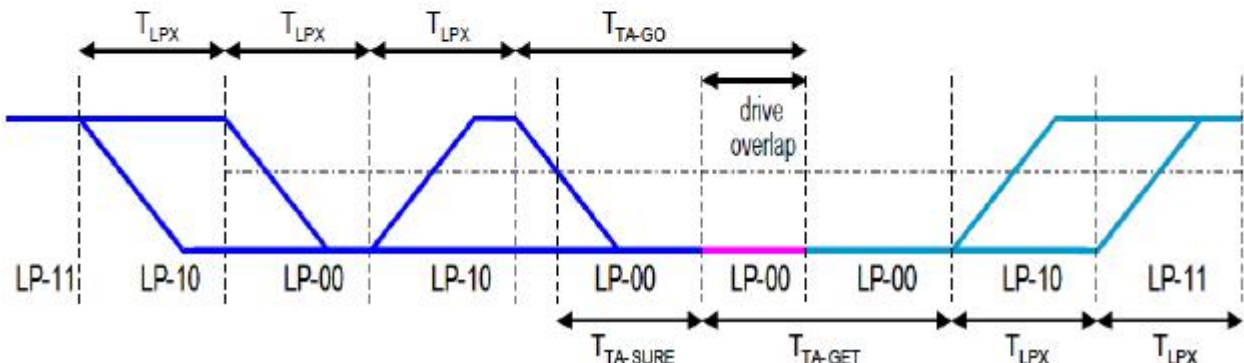
．．High speed transmission

Parameter	Symbol	Min	Typ	Max	Units
UI instantaneous	UI_{INST}	2	-	12.5	ns
Data to Clock Skew(measured at transmitter)	$T_{SKEW(TX)}$	-0.15	-	0.15	UI_{INST}
Data to Clock Setup time(measured at receiver)	$T_{SETUP(RX)}$	0.15	-	-	UI_{INST}
Data to Clock Hold time(measured at receiver)	$T_{HOLD(RX)}$	0.15	-	-	UI_{INST}
20%~80% rise time and fall time	T_R, T_F	150	-		ps
		-	-	0.3	UI_{INST}
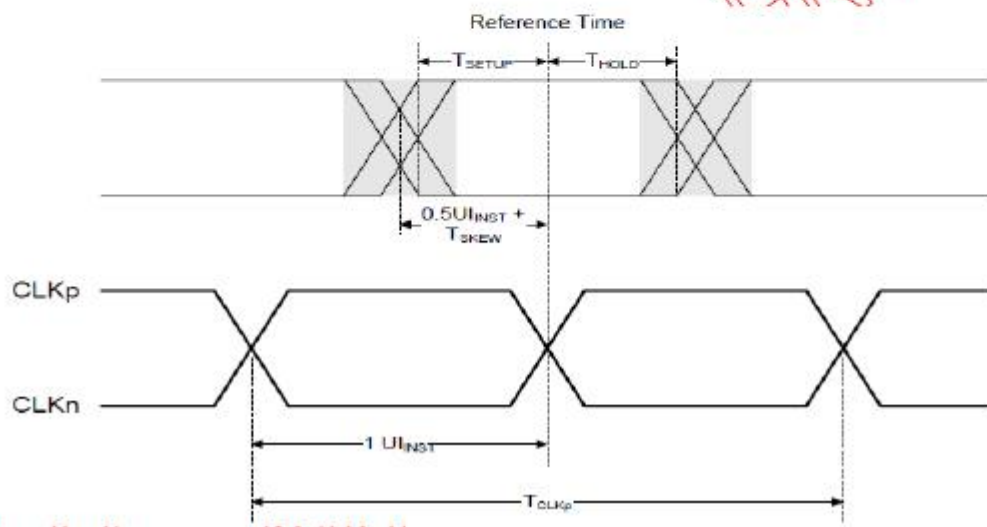
6.2.4 High Speed Clock Transmission

| Parameter	Symbol	Min	Typ	Max	Units
Time that the transmitter shall continue sending HS clock after the last associated Data Lane has transitioned to LP mode	$T_{CLK-POST}$	60+52UI	-	-	ns
Detection time that the clock has stopped toggling	$T_{CLK-MISS}$	-	-	60	ns
Time to drive LP-00 to prepare for HS clock transmission	$T_{CLK-PREPARE}$	38	-	95	ns
Minimum lead HS-0 drive period before starting clock	$T_{CLK-PREPARE} + T_{CLK-ZERO}$	300	-	-	ns
Time to enable Clock Lane receiver line termination measured from when Dn cross $V_{IL,MAX}$	$T_{HS-TERM-EN}$	-	-	38	ns
Minimum time that the HS clock must be prior to any associated data lane beginning the transmission from LP to HS mode	$T_{CLK-PRE}$	8	-	-	UI
Time to drive HS differential state after last payload clock bit of a HS transmission burst	$T_{CLK-TRAIL}$	60	-	-	ns
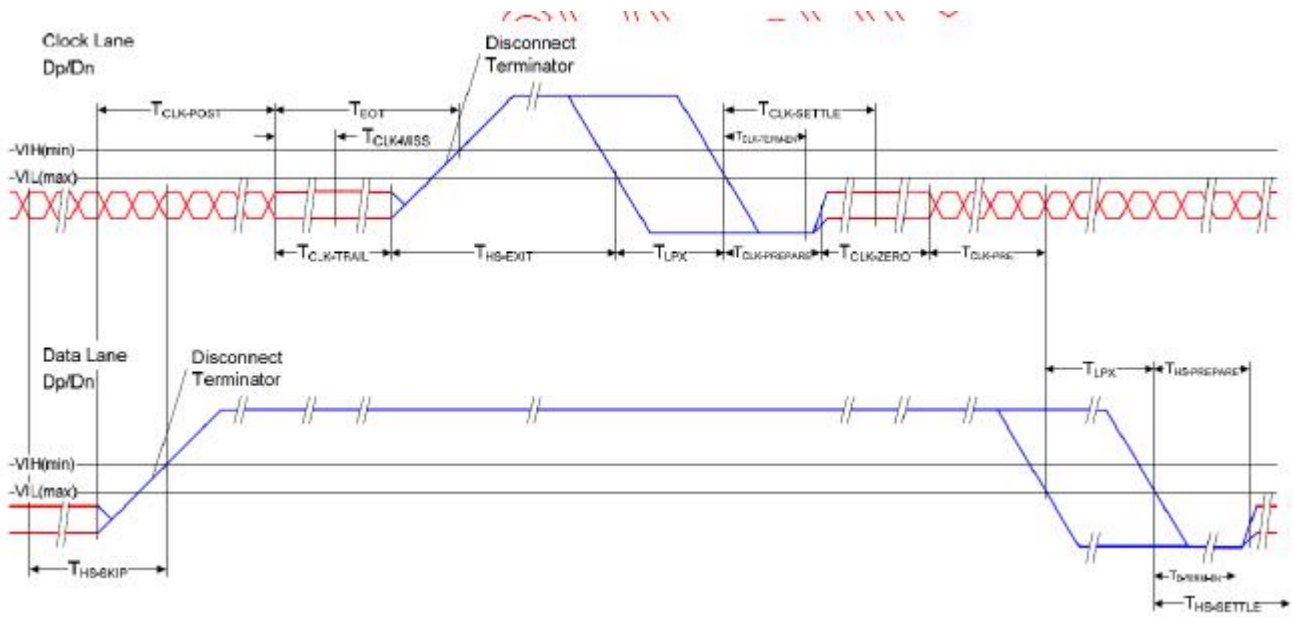
6.2.5 High Speed Data Transmission in Bursts
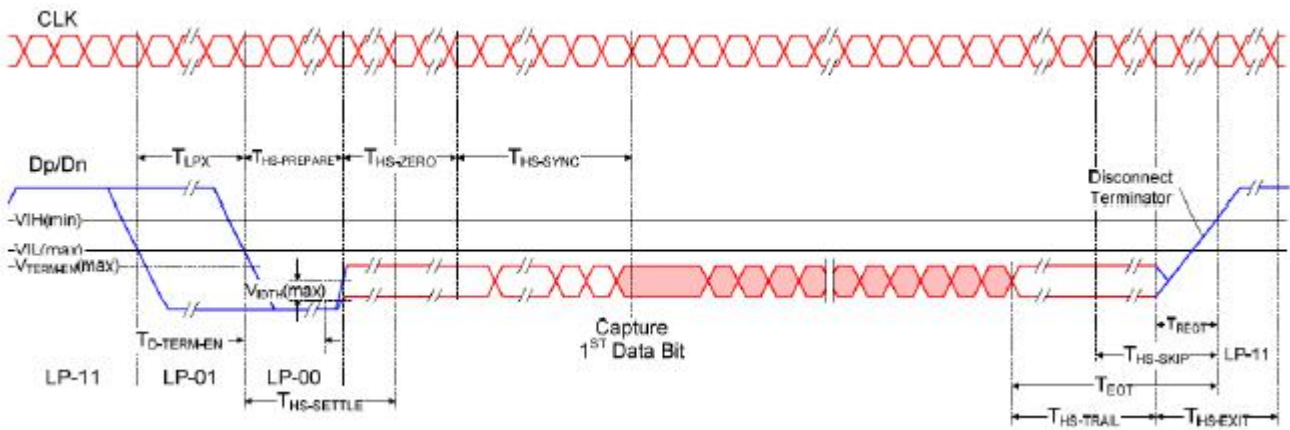
6.4 Reset Timing:

VDD/GRB AC characteristic

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
VDD power slew rate	T_{POR}	-	-	20	ms	From 0 to 90% VDD
GRB active pulse width	T_{GRB}	1	-	-	ms	VDD=VDD_IF= 1.8V
VDD resettle time	T_{RES}	1	-	-	s	
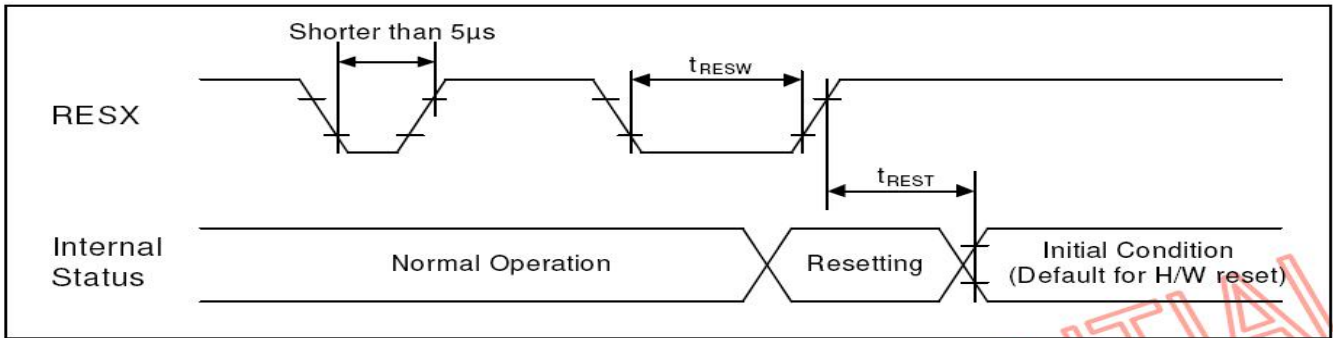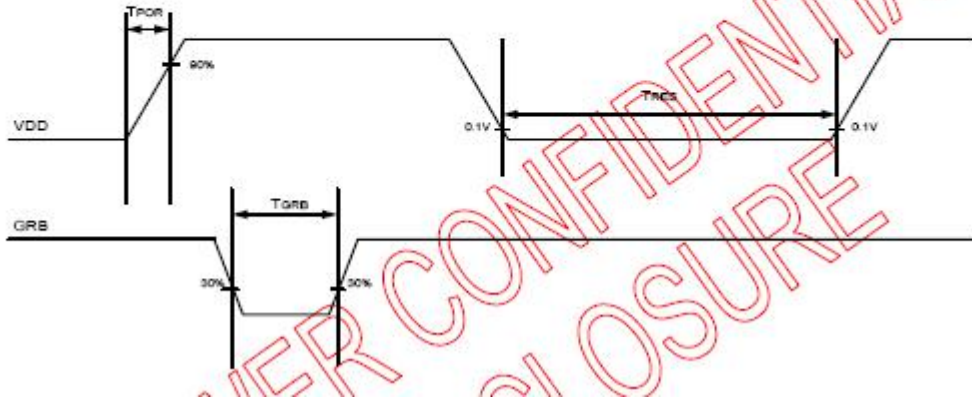
7 Optical Characteristics

Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θ_T	Center CR≥10	55	70	-	Degree.	Note2
		θ_B		45	60	-		
		θ_L		60	70	-		
		θ_R		60	70	-		
Contrast Ratio		CR	Θ =0	600	800	-	-	Note1, Note3
Response Time		T_{ON}	25°C	-	10	15	ms	Note1, Note4
		T_{OFF}		-	15	20		
Chromaticity	White	X_W	Backlight is on	0.230	0.280	0.330	-	Note1, Note5
		Y_W		0.280	0.330	0.380	-	
	Red	X_R			TBD		-	
		Y_R			TBD		-	
	Green	X_G			TBD		-	
		Y_G			TBD		-	
	Blue	X_B			TBD		-	
		Y_B			TBD		-	
Uniformity		U		70	75	-	%	Note1, Note6
NTSC					50		%	Note5
Luminance		L		400	450			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°
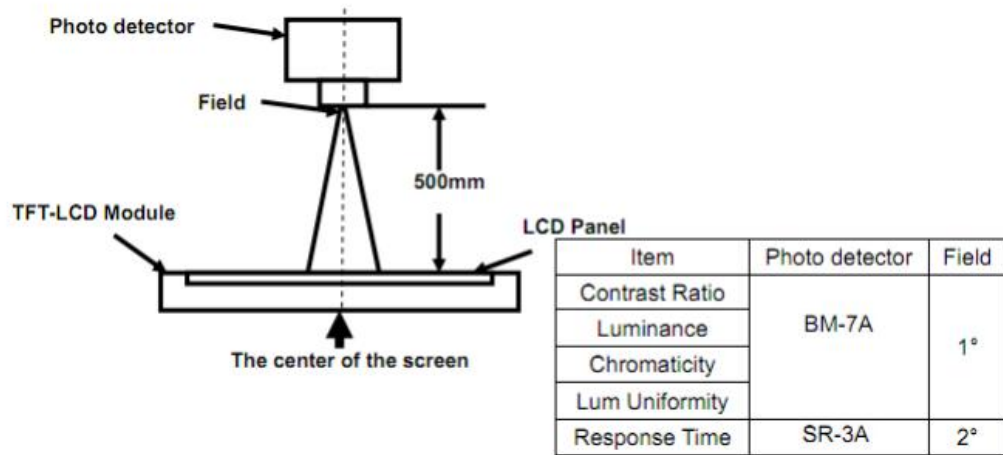
Note 2: Definition of viewing angle range and measurement system.
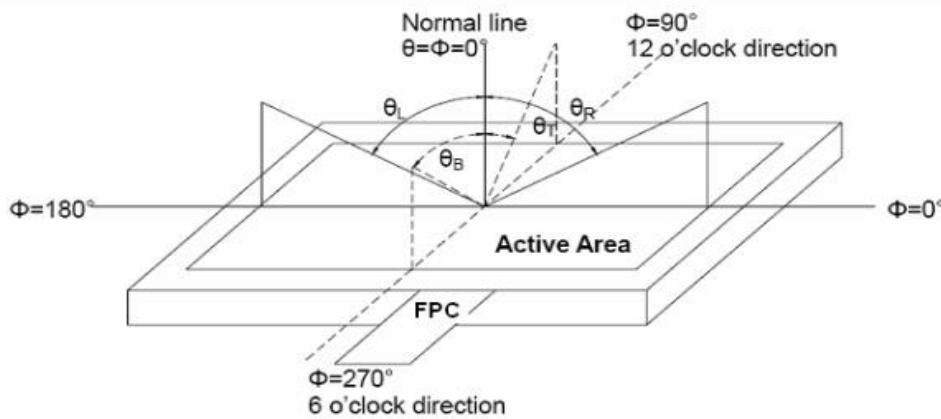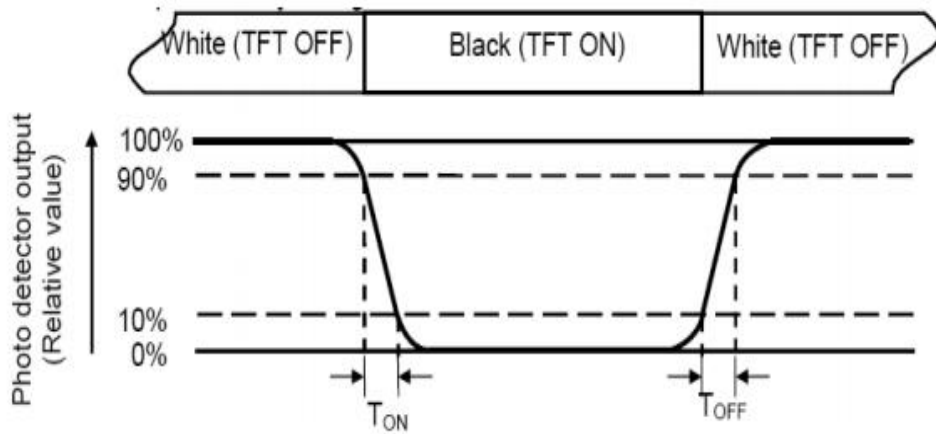Viewing angle is measured at the center point of the LCD by CONOSCOPE (ergo-80).

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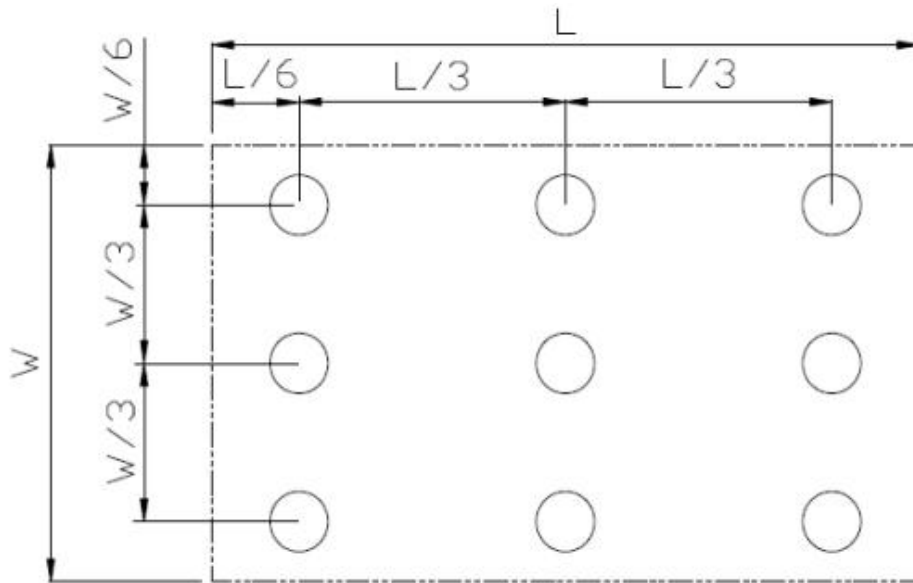
L-------Active area length W----- Active area width

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= +70℃, 96hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Operation	Ta= -20℃, 96hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80℃, 96hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30℃, 96hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 96 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 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.

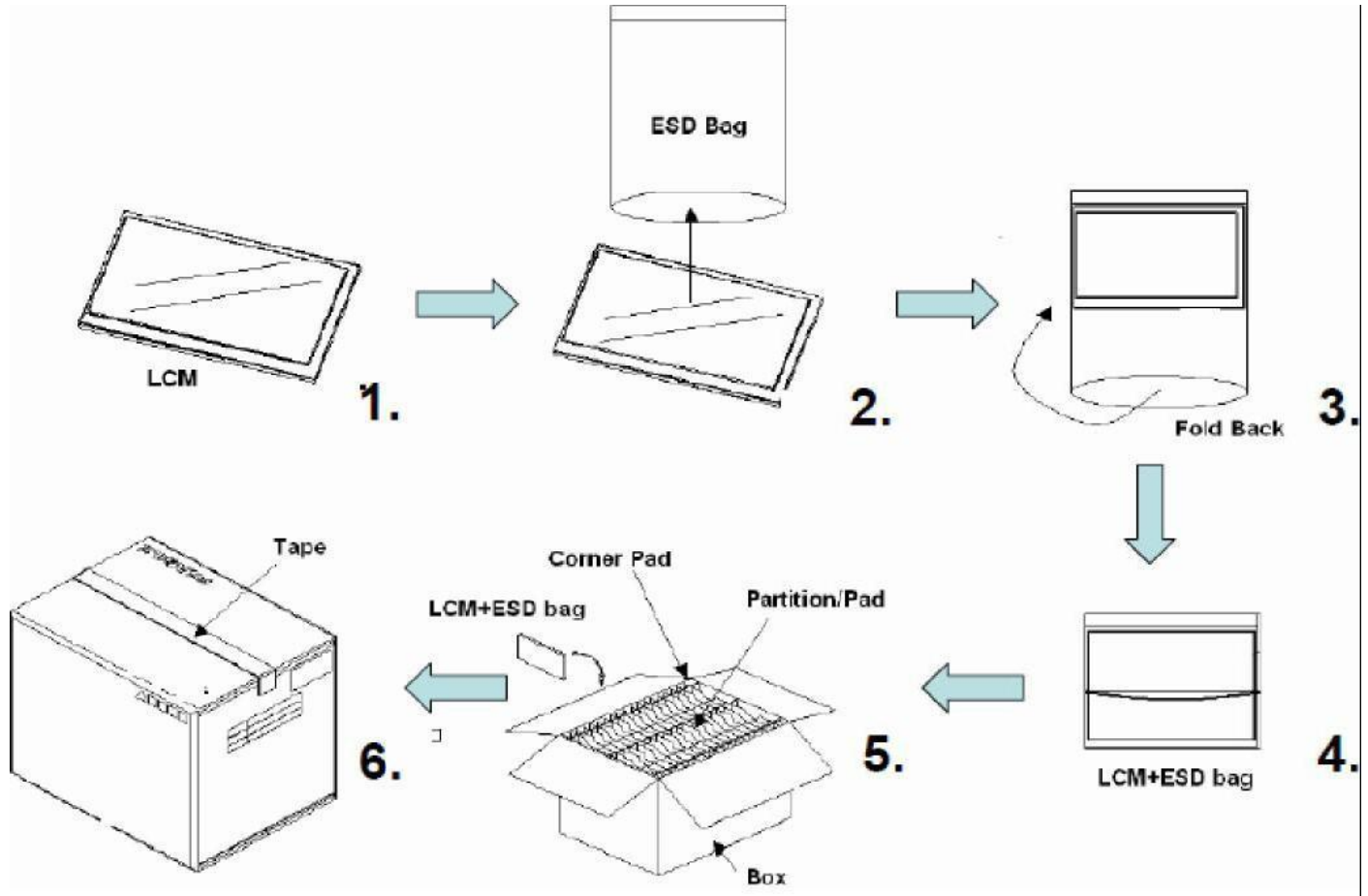2. Ta is the ambient temperature of sample.

9 Mechanical Drawing
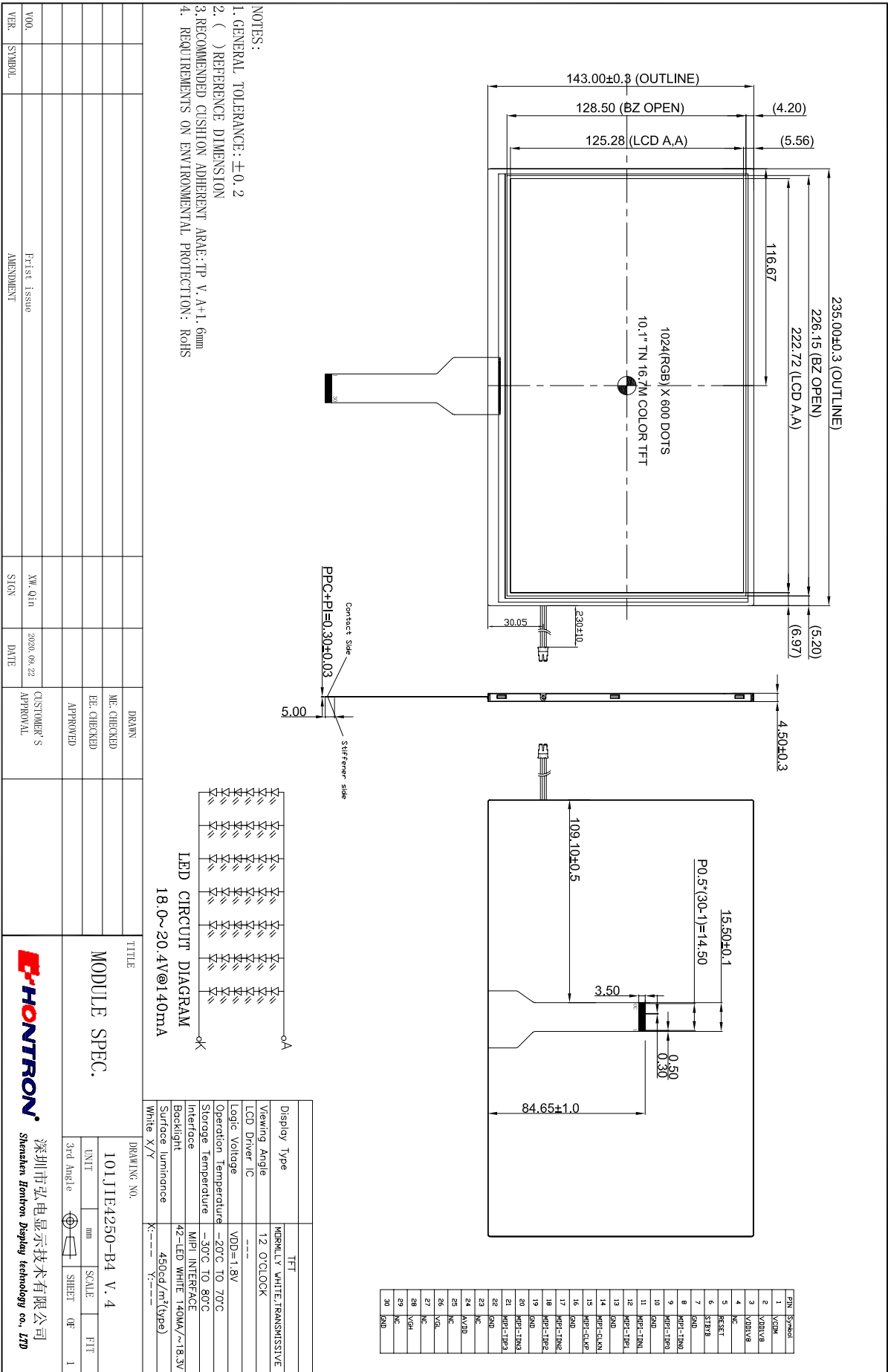
1 0.Packing

10.1Packing form

LCM Model	LCM Qty. in the box	Inner Box Size (mm)	Note
101JIE4250 -B4 V.4	40 pcs/box	430±5 x 320±5 x 210±5	

10.2 Packing assembly drawings

Items	Material	Notice
Box	Corrugated Paper Board	AB Flute
Partition/Pad	Corrugated Paper Board	B Flute
Corner Pad	Corrugated Paper Board	AB Flute
ESD bag	PE	

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.