

TFT-DISPLAY DATASHEET

ONation
Model: OT084ISUDLV-02

BRIEF SPEC.:

Main Feature	Landscape Type White LED Backlight Wide Viewing Angle
Active Screen Area	170.4 x 127.8 [mm]
Diagonal Format	8,4" 4:3
Resolution	800 x 600
Colors	R.G.B Stripe
Backlight	LED, White
Brightness	1000 cd/m ²
LED Life Time	50,000h (Typ.)
Interface	LVDS
Viewing Angle	-65~75(H), -60~70(V)
Touchscreen	No
Power Supply	3,3V (Typ.)
Module Outline	199.5 x 149 x 9.75 [mm]
Operation Temperature	-20... +70 °C
Storage Temperature	-30... +80 °C
Surface Treatment	N/A



ONation Corporation

TFT COLOR LCD MODULE

MODEL: OT084ISUDLV-02

SVGA
LVDS interface (1port)

Version: P0.2

Customer : _____
Approved By : _____
Date: _____

ONATION		
APPROVAL	CHECKER	PREPARE
<i>Jan</i>	<i>Josh</i>	<i>Jan</i>

All information is subject to change without notice.
Please confirm the sales representative before starting to design your system

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1.RECORD OF REVISION

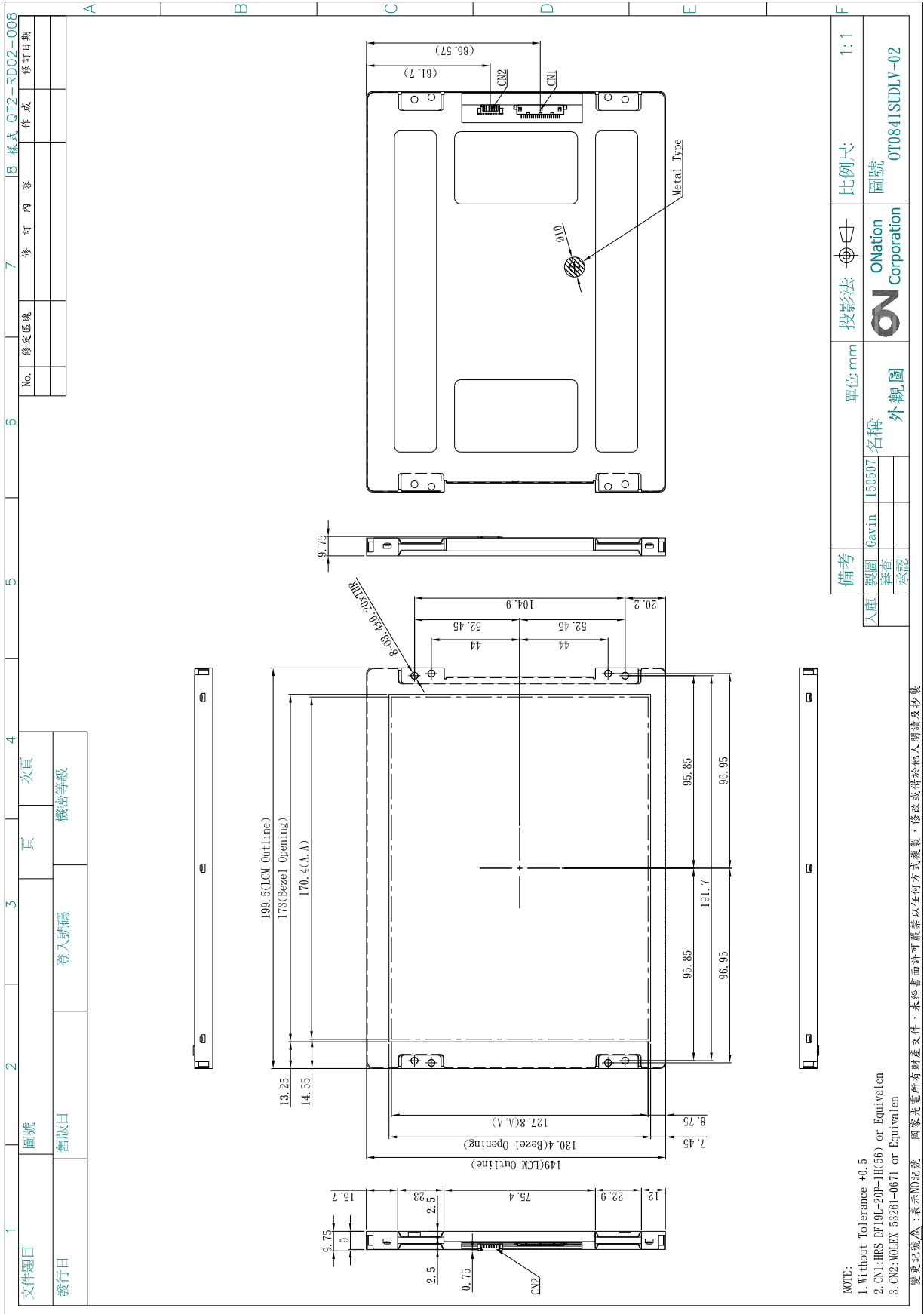
REV	DATE	PAGE	SUMMARY
0.1	2015.05.07	ALL	Preliminary specification was first issued.
0.2	2016.04.06	3	Modify 4.1 LCM PANEL DRIVING SECTION
		5	Modify 5. BLOCK DIAGRAM
		13	Modify 9.2.1 INPUT DATA SIGNAL

2.MECHANICAL SPECIFICATIONS

(1)	Number Of Dots (Dots)	800(R.G.B) X 600
(2)	Module Size(mm)	199.5(H) X 149.0(V) X9.75(D) **
(3)	Active Area(mm)	170.4(H) X 127.8(V)
(4)	Pixel Pitch(mm)	0.213 (H) X 0.213(V)
(5)	LCD / Polarizer Model	TFT , Transmissive, Normally/White, Anti-Glare
(6)	Backlight Color	White, LED
(7)	LED Type	Nichia NSSW157 or Equivalent
(8)	Viewing Direction	6 O'clock Horizontal : Right side 75°(typ.), Left side 75°(typ.) Vertical : Up side 70°(typ.), Down side 60°(typ.)
(9)	Gray Scale Inversion Direction	12 O'clock
(10)	Electrical Interface	LVDS Interface
(11)	Color Configuration	R.G.B Stripe
(12)	Module Weight(g)	TBD

** Include connector thickness

3. OUTLINE DIMENSIONS



4. INTERFACE PIN CONNECTION

4.1 LCM PANEL DRIVING SECTION

CN1 Connector : HIROSE DF19L-20P-1H or Equivalen

Mating Connector : HIROSE DF19G-20S-1C or Equivalen

PIN NO.	SIGNAL	FUNCTION
1	VCC	Power Supply For Digital Circuit
2	VCC	Power Supply For Digital Circuit
3	GND	Ground
4	SEL	LVDS 6/8 bit select function control, Low or NC → 8 bit Input Mode High → 6bit Input Mode
5	RxIN0-	Differential Data Input, CH0(Negative)
6	RxIN0+	Differential Data Input, CH0(Positive)
7	GND	Ground
8	RxIN1-	Differential Data Input, CH1(Negative)
9	RxIN1+	Differential Data Input, CH1(Positive)
10	GND	Ground
11	RxIN2-	Differential Data Input, CH2(Negative)
12	RxIN2+	Differential Data Input, CH2(Positive)
13	GND	Ground
14	CLKIN-	Differential Clock Input(Negative)
15	CLKIN+	Differential Clock Input(Positive)
16	GND	Ground
17	RxIN3-	Differential Data Input, CH3(Negative)
18	RxIN3+	Differential Data Input, CH3(Positive)
19	U/D	Vertical display mode select signal Up / Down Scan control input.
20	L/R	Horizontal display mode select signal Left / Right Scan control input.

Note1:



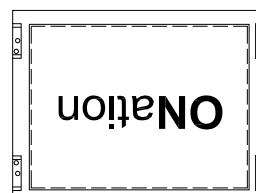
U/D=H
L/R=L
(Default)



U/D=H
L/R=H



U/D=L
L/R=L



U/D=L
L/R=H

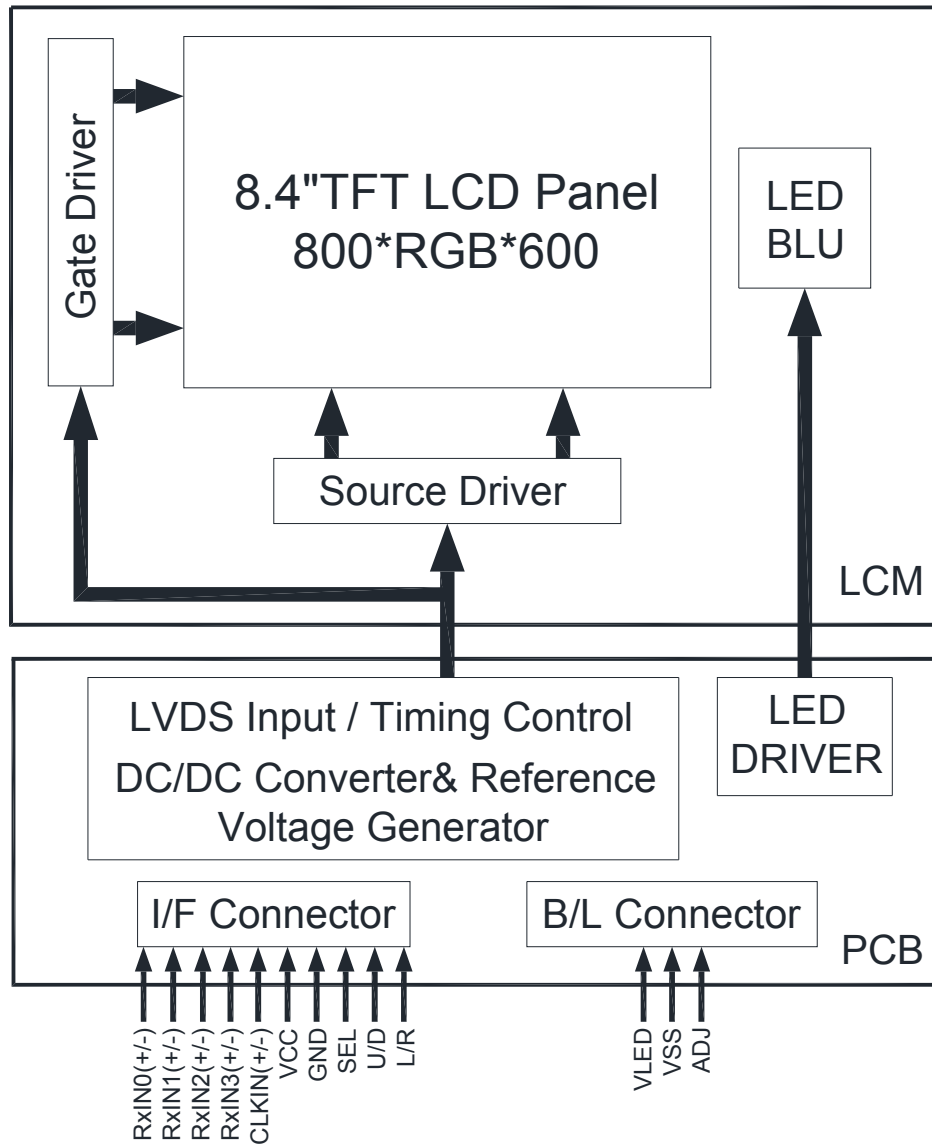
4.2 BACKLIGHT DRIVING SECTION

CN2 Connector : MOLEX 53261-0671 or Equivalent

Mating Connector : MOLEX 51021-0600 or Equivalent

PIN NO.	SIGNAL	FUNCTION
1	VLED	Power Supply : +12V
2	VLED	Power Supply : +12V
3	VSS	Ground
4	VSS	Ground
5	NC	Non Connection (open)
6	ADJ	Adjust Brightness Control For LED B/L

5. BLOCK DIAGRAM



6. ABSOLUTE MAXIMUM RATINGS

6.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Supply Voltage	VCC	-0.3	+4.0	V	
	VLED	-4.5	+36	V	

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

6.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature(°C)	-20	70	-30	80	Note 1,2
Humidity(% RH)	5	90	5	90	Note 3

Note 1 : The response time will become lower when operated at low temperature.

Note 2 : Background color changes slightly depending on ambient temperature.

Note 3 : Operation Ta=70°C & -20°C ≤ 240Hrs.

Note 4 : Storage Ta=40°C & RH=90% ≤ 240Hrs.

7. ELECTRICAL CHARACTERISTICS

7.1 ELECTRICAL CHARACTERISTICS OF LCD

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Voltage For LCD	VCC	3.0	3.3	3.6	V	
	ICC	-	(185)	(220)	mA	Note 1
Differential Input Threshold Voltage	VTH	-	-	100	mV	At VCM =1.2V Note 2
	VTL	-100	-	-	mV	

Note 1 : Test condition : VCC=3.3V ; Test Pattern : Black.

Note 2 : Common mode voltage for LVDS receiver (THine THC63LVDF84B).

7.2 BACKLIGHT UNITS

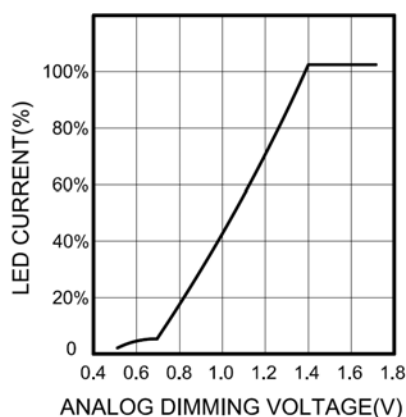
Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
LED Driving Voltage	VLED	11.0	12.0	13.0	V
	ILED VLED=12V	-	(700)	(800)	mA
ADJ Input Analog Dimming Voltage	-	0.7	-	1.4	VDC
ADJ Input PWM Dimming Voltage	-	1.4	-	5.0	Vp-p
ADJ Frequency	-	100	-	1000	Hz
LED Life Time (For Reference Only)	Ta=25°C 60-70%RH (Note 1)	(40,000)	(50,000)	-	Hr

Note 1: The LED of B/L is drive by current only, drive voltage is for reference only. drive voltage can make driving current under safety area(current between minimum and maximum). 40,000 hours is only an estimate for reference.

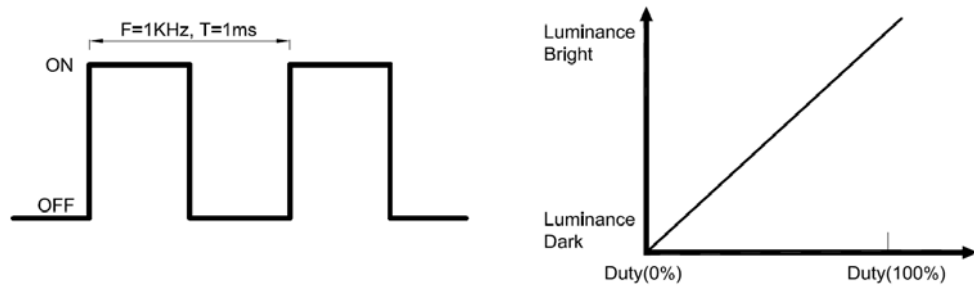
Note 2: The lifetime of LED is defined as the time when it continues to operate under the conditions at Ta= 25 ±2°C and IL = (370)mADC (LED forward current) until the brightness becomes ≤ 50% of its original value.

Note 3: When the ADJ pin voltage rises from 0.7VDC to 1.4VDC, the LED current will change from 0% to 100% of the maximum LED current:

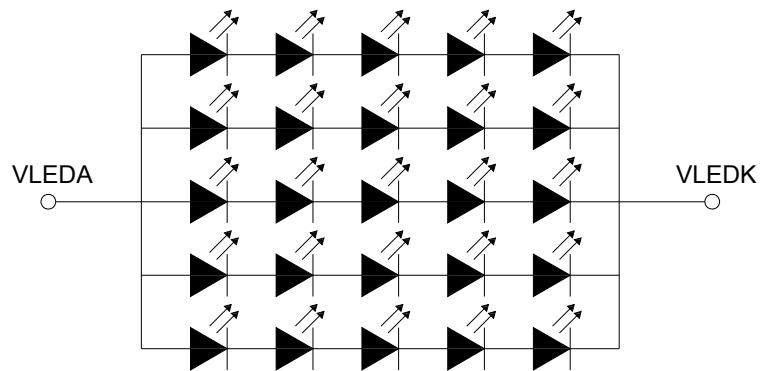


Note 4: ADJ signal $V_{p-p} = 1.4 \sim 5.0V$, operation frequency: 100Hz ~ 1 kHz

PWM DIMMING DUTY



Note 5: The figure below shows the connection of backlight LED.



8. OPTICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio	CR	Viewing Normal Angle $\Theta_x=\Theta_y=0^\circ$	(280)	(360)	-	-	Note 1
Response Time	TR		-	2	4	ms	Note 2
	TF		-	6	12	ms	
Chromaticity	White	x	(0.280)	(0.330)	(0.380)	-	Note 4
		y	(0.310)	(0.360)	(0.410)	-	
Viewing Angle	Hor.	θ_{x+}	65	75	-	Deg.	Note 3
		θ_{x-}	65	75	-		
	Ver.	θ_{y+}	60	70	-		
		θ_{y-}	50	60	-		
Luminance	L	PWM=100%	900	1000	-	cd/m2	
Luminance Uniformity	YU	PWM=100%	70	-	-	%	Note 5

Note 1 : Definition of Contrast Ratio (CR) :

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63}/L_0$$

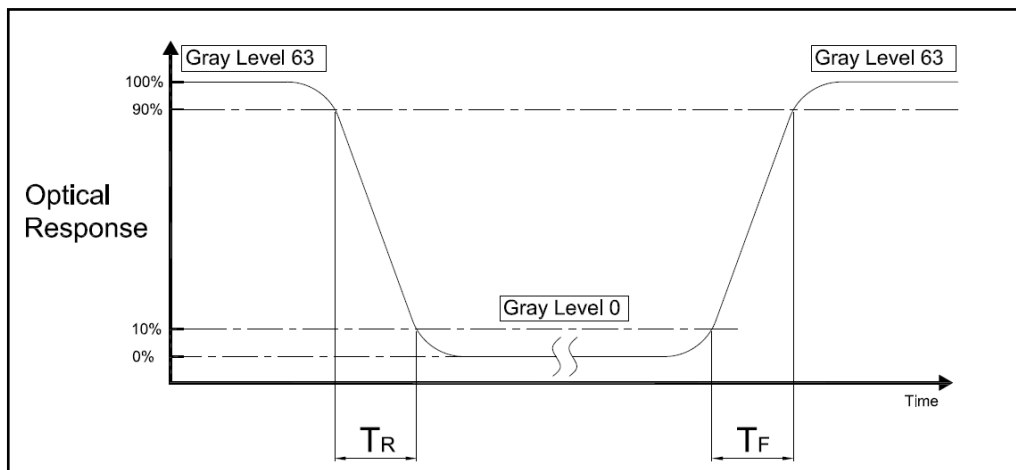
L63 : Luminance of gray level 63

L0 : Luminance of gray level 0

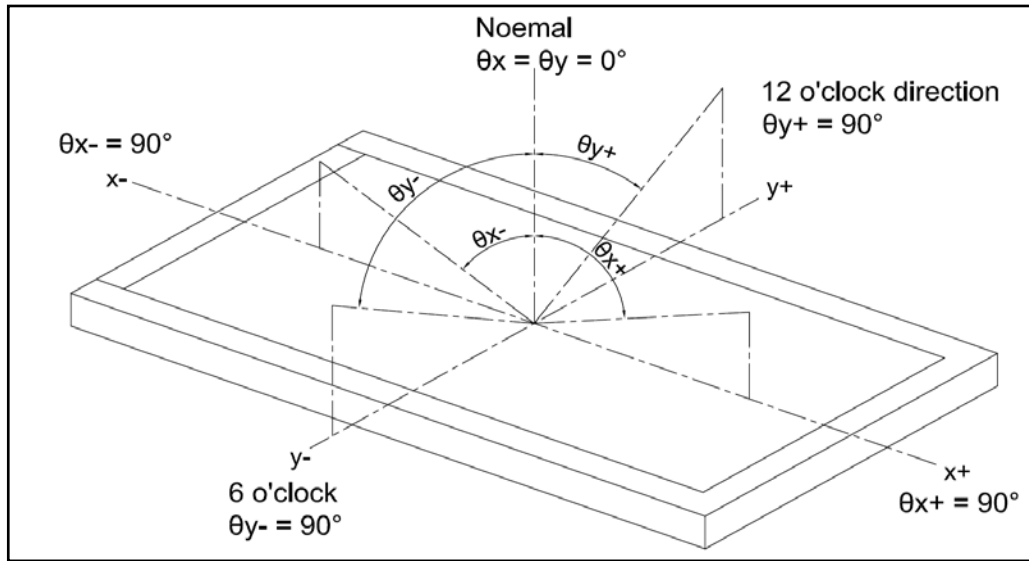
$$CR = CR(5)$$

CR(X) is corresponding to the Contrast Ratio of the point X at Figure in Note 5

Note 2 : Definition of Response Time (TR.TF)

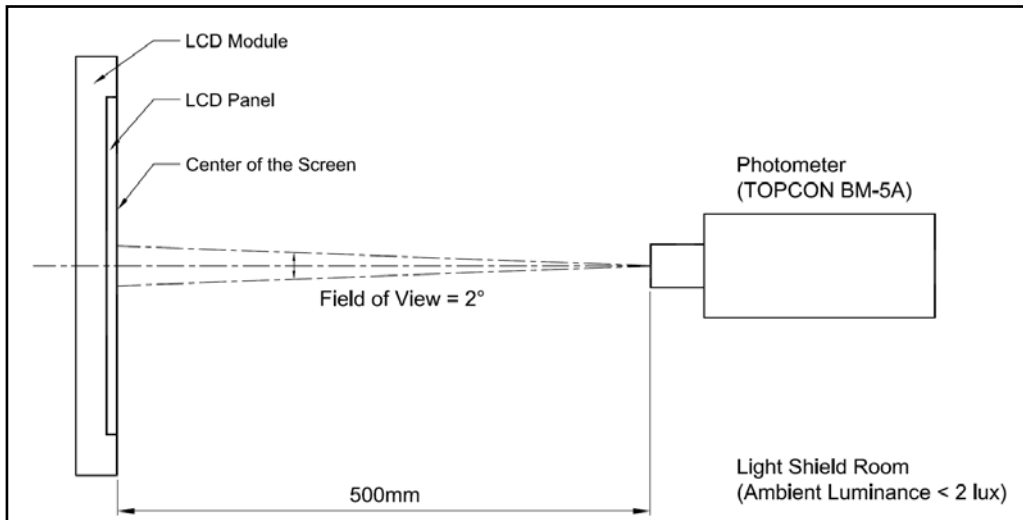


Note 3 : Definition of Viewing Angle

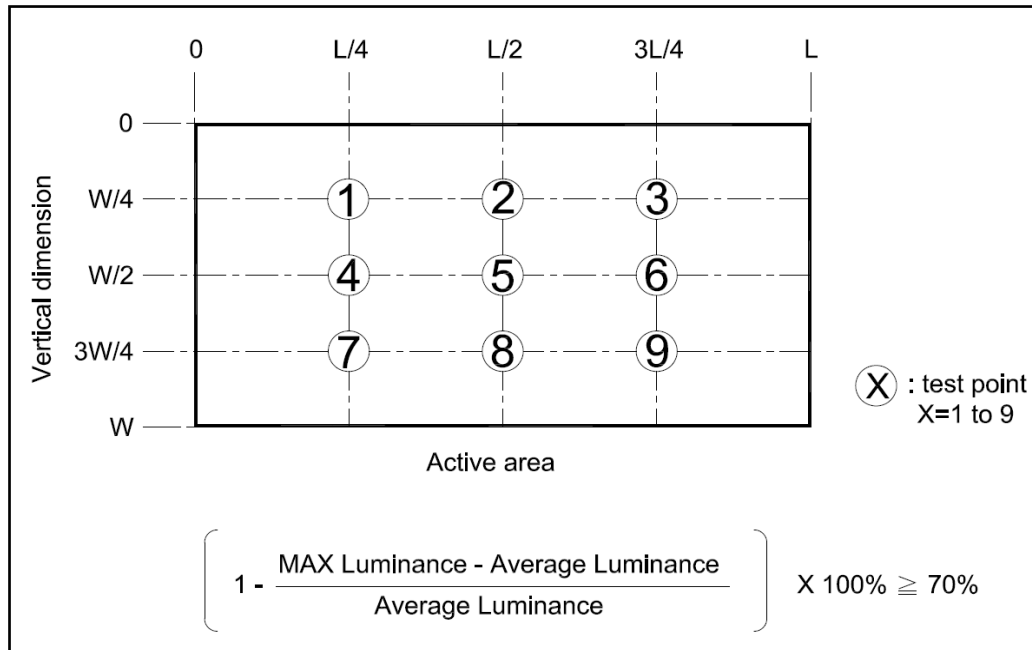


Note 4 : Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



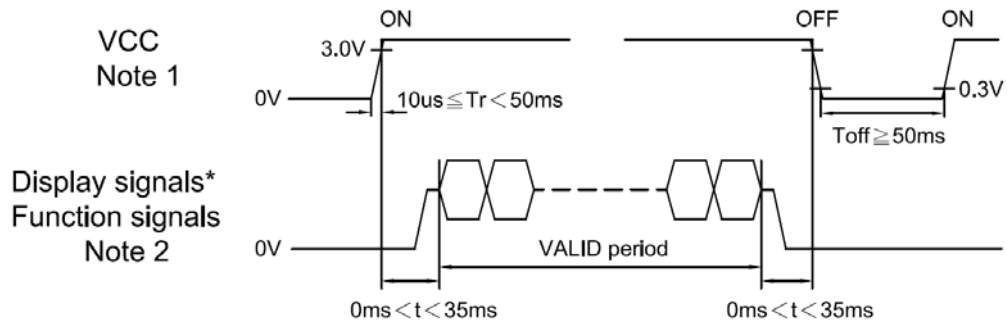
Note 5 :



9. TIMING SPECIFICATIONS

9.1 POWER SUPPLY VOLTAGE SEQUENCE

9.1.1 LCD panel signal processing board

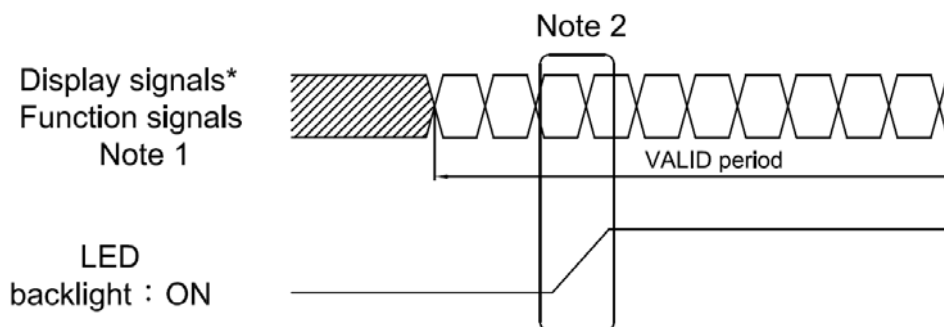


* These signals should be measured at the terminal of 100Ω resistance.

Note1: If there is a voltage variation (voltage drop) at the rising edge of VCC below 3.0V, there is a possibility that a product does not work due to a protection circuit.

Note2: Display signals (RxIN0+/-, RxIN1+/-, RxIN2+/- and CLKIN+/-), except the VALID period (See above sequence diagram), in order to avoid the circuitry damage. If some of display and function signals of this product are cut while this product is working, even if the signal input to it once again, it might not work normally. If a customer stops the display and function signals, VCC also must be shut down.

9.1.2 LED driver board



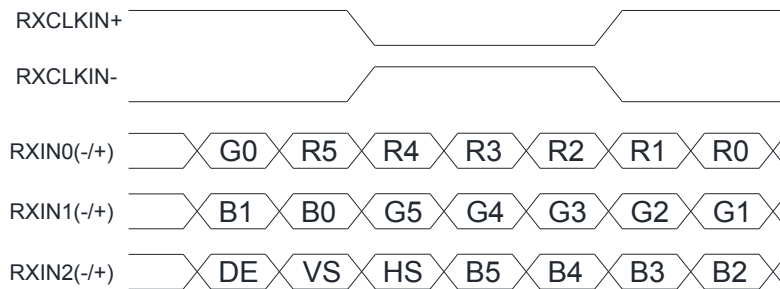
Note1: These are the display and function signals for LCD panel signal processing board.

Note2: The backlight should be turned on within the valid period of display and function signals, in order to avoid unstable data display.

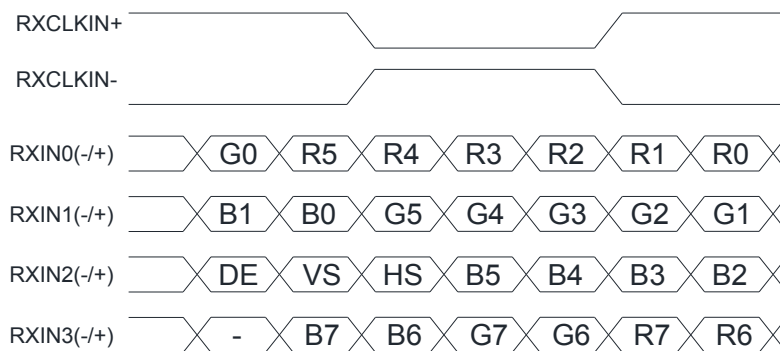
9.2 INTERFACE TIMING

9.2.1 INPUT DATA SIGNAL

SEL="High" for 6bits LVDS input



SEL="Low" or "NC" for 8bits LVDS input



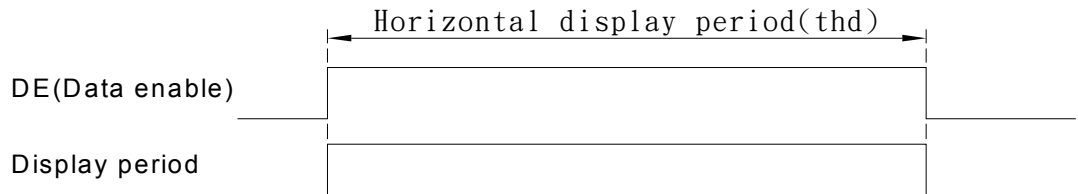
Note (1) R/G/B data 7: MSB, R/G/B data 0: LSB

Note (2) Please follow PSWG

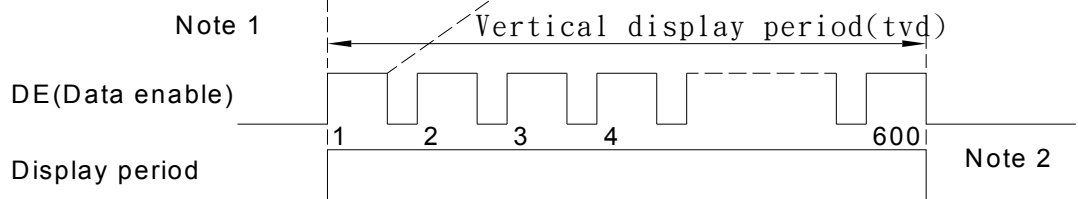
Signal Name	Description	Remark
R7	Red Data 7 (MSB)	Red-pixel Data
R6	Red Data 6	Each red pixel's brightness data consists of these 8bits pixel data.
R5	Red Data 5	
R4	Red Data 4	
R3	Red Data 3	
R2	Red Data 2	
R1	Red Data 1	
R0	Red Data 0 (LSB)	
G7	Green Data 7 (MSB)	Green-pixel Data
G6	Green Data 6	Each red pixel's brightness data consists of these 8bits pixel data.
G5	Green Data 5	
G4	Green Data 4	
G3	Green Data 3	
G2	Green Data 2	
G1	Green Data 1	
G0	Green Data 0 (LSB)	
B7	Blue Data 7 (MSB)	Blue-pixel Data
B6	Blue Data 6	Each red pixel's brightness data consists of these 8bits pixel data.
B5	Blue Data 5	
B4	Blue Data 4	
B3	Blue Data 3	
B2	Blue Data 2	
B1	Blue Data 1	

9.2.2 OUTLINE OF INPUT SIGNAL TIMINGS

- Horizontal signal
Note 1



- Vertical signal
Note 1



Note 1: This diagram indicates virtual signal for set up to timing.

Note 2: See "9.2.4 Input signal timing chart" for the pulse number.

9.2.3 TIMING CHARACTERISTICS

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARKS	
CLK	Frequency	1/tc	37.0	40.0	50.0	MHz	25.0ns(typ.)	
	Duty	-	-			-	-	
	Rise time, Fall time	-				ns		
DATA	CLK-DATA	Setup time	-			ns	-	
		Hold time				ns		
	Rise time, Fall time	-				ns		
DE	Horizontal	Cycle	-	25.0	-	μ s	40.0Hz(typ.)	
		Display period	thd	800		CLK		
	Vertical (One frame)	Cycle	-	16.5	-	ms		60.60Hz(typ.)
		Display period	tvd	600		H		
	CLK-DE	Setup time	-	-			ns	-
		Hold time	-				ns	
	Rise time, Fall time	-	ns					

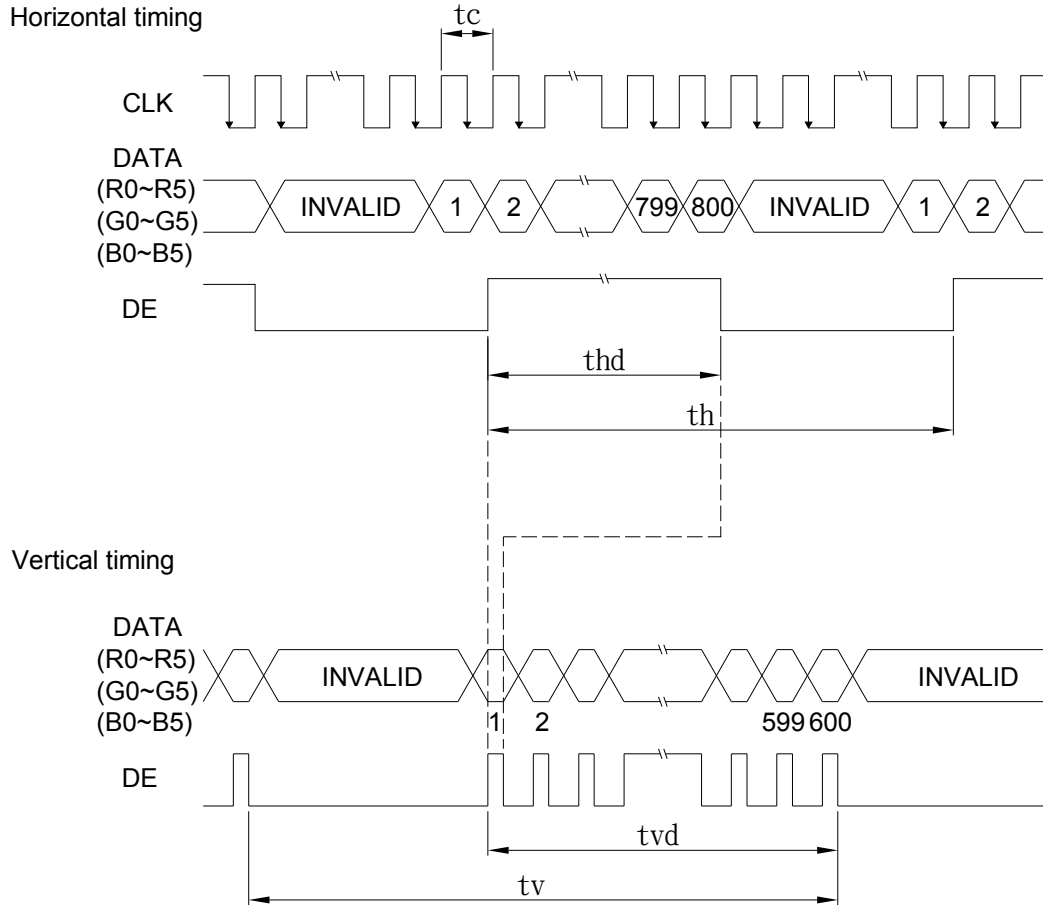
Note1: Definition of parameters is as follows.

tc=1CLK, th=1H

Note2: See the data sheet of LVDS transmitter.

Note3: Vertical cycle (tv) should be specified in integral multiple of Horizontal cycle (th).

9.2.4 Input signal timing chart



10. RELIABILITY TEST

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	80°C	240HRS	
2	Low Temperature Storage	-30±3°C	240HRS	
3	High Temperature Operation	70°C	240HRS	
4	Low Temperature Operation	-20°C	240HRS	
5	Temperature Cycle	-20°C ← 25°C → 70°C (30min) (5min) (30min)	10CYCLE	
6	High Temperature Humidity Storage	40°C 90%RH (No condensation)	240HRS	

Note 1: a. The module should work properly.

b. Before and after function test, The difference of consumptive current. Should be within 10%

Note 2: a. The module should work properly.

b. The module won't be deformative, Color changeable or broken.

c. The modules can't be apart.

Note 3: a. Before cosmetic and function test, The product must have enough recovery time, At least 2 hours at room temperature.

10.1 VIBRATION TEST :

10.1.1 STATE LABORATORY ENVIRONMENT :

Room temperature : $25\pm 3^{\circ}\text{C}$
Relative humidity : $55\pm 20\% \text{RH}$

10.1.2 TEST METHOD / SPECIFICATION :

Sample Status : Non-packaged single state
Waveform : Sine
Frequency : 10~55~10Hz
Full amplitude : 1.5mm
Vibration direction : X,Y,Z Axis (3 Axial)
Test time : Each 2Hour / X,Y,Z Axis , Altogether 6 Hour

10.2 MECHANICAL SHOCK TEST :

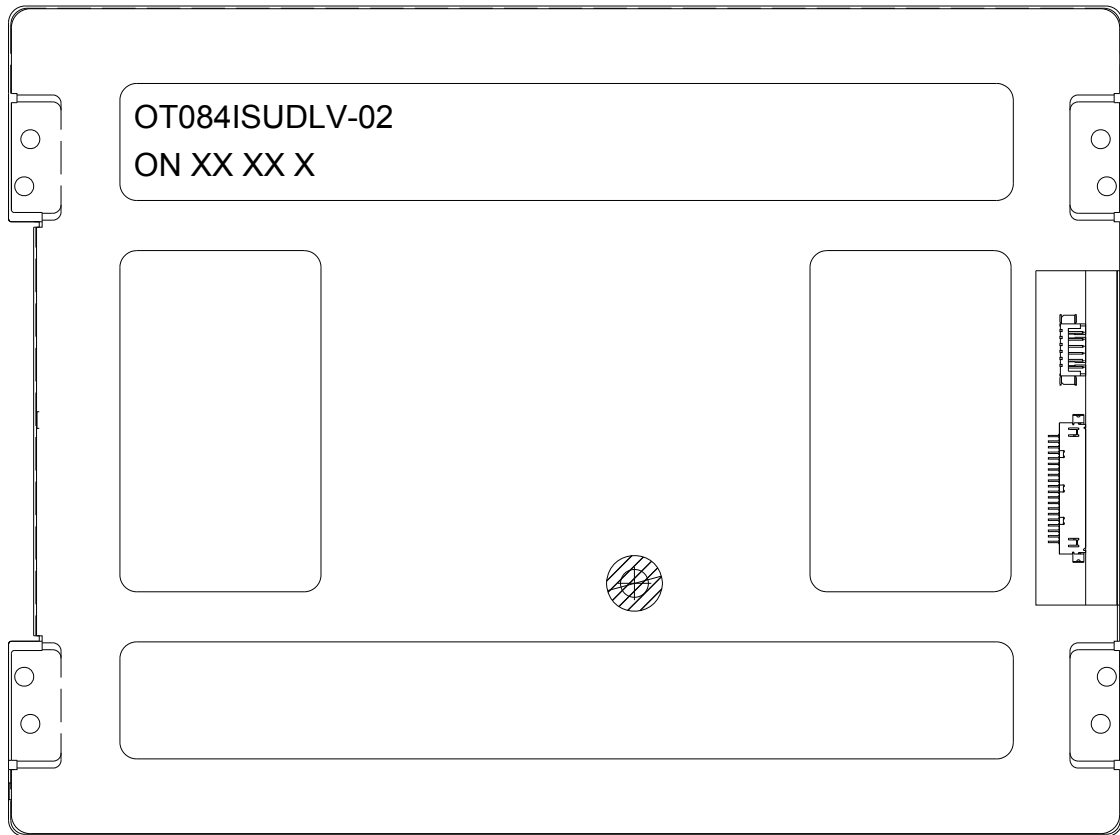
10.2.1 STATE LABORATORY ENVIRONMENT :

Room temperature : $25\pm 3^{\circ}\text{C}$
Relative humidity : $55\pm 20\% \text{RH}$

10.2.2 TEST METHOD / SPECIFICATION :

Sample Status : Non-packaged single state
Waveform : Half-sine
Acceleration : 5G
Shock Time : 6ms
Impact direction : 6 Directions ($\pm X, \pm Y, \pm Z$ axes)
Number of shocks : Each direction 3 Secondary , Altogether 18 Secondary

11.MODEL NUMBER SYSTEM



(a) MODEL NAME : OT084ISUDLV-02

(b) LOT NO : XX XX X
 Year Month Week

CODE	MEANING	DESCRIPTION
<u>XX</u>	Year	2014=14, 2015=15, 2016=16,
<u>XX</u>	Month	01,02,03,04,05,06,07,08,09,10,11,12
<u>X</u>	Week	1,2,3,4,5,6

12. LCM INSPECTION STANDARD

Inspection specifications refer ONation Corporation LCM INSPECTION STANDARD Document.
Document Number : QT3-QC-A-I003

13. PACKAGE INFORMATION

LCM Model	LCM Qty. in the box	Inner Box Size (mm)	Weight	REMARK
OT084ISUDLV-02	16PCS/Box	540*350*220	TBD	

14.PRECAUTIONS FOR USE

14.1 SAFETY

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

14.2 STORAGE CONDITIONS

- (1) Store the panel or module in a dark place where the temperature is $23\pm 5^{\circ}\text{C}$ and the humidity is below $50\pm 20\%\text{RH}$.
- (2) Store in anti-static electricity container.
- (3) Store in clean environment, free from dust, active gas, and solvent.
- (4) Do not place the module near organics solvents or corrosive gases.
- (5) Do not crush, shake, or jolt the module.

14.3 HANDLING PRECAUTIONS

- (1) Avoid static electricity which can damage the CMOS LSI.
- (2) The polarizing plate of the display is very fragile. So, please handle it very carefully.
- (3) Do not give external shock.
- (4) Do not apply excessive force on the surface.
- (5) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface of plate.
- (6) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (7) Do not operate it above the absolute maximum rating.
- (8) Do not remove the panel or frame from the module.
- (9) When the module is assembled, it should be attached to the system firmly, Be careful not to twist and bend the module.
- (10) Wipe off water droplets or oil immediately . If you leave the droplets for a long time, staining and discoloration may occur.
- (11) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

14.4 WARRANTY

- (1) Acceptance inspection period
The period is within one month after the arrival of contracted commodity at the buyer's factory site.
- (2) Applicable warrant period
The period is within 12 months since the date of shipping out under normal using and storage conditions.