

# TFT-DISPLAY DATASHEET

ONation  
Model: OT121ZSDDLN-00

## BRIEF SPEC.:

Main Feature Landscape Type  
White LED Backlight

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Active Screen Area	246 x 184.5 (mm)
Diagonal   Format	12,1"   4:3
Resolution	800 x 600
Colors	R.G.B Stripe
Backlight	LED, White
Brightness	450 cd/m <sup>2</sup>
LED Life Time	50,000h (Typ.)
Interface	LVDS
Viewing Angle	-70~80(H), -50~60 (V)
Touchscreen	No
Power Supply	3,3V (Typ.)
Module Outline	276 x 209 x 9.1 (mm)
Operation Temperature	-20... +70 °C
Storage Temperature	-30... +80 °C
Surface Treatment	Anti-Glare



# ONation Corporation

## TFT COLOR LCD MODULE

MODEL: OT121ZSDDLN-00

SVGA  
LVDS interface (1port)

Version: P0.1

Customer : _____
Approved By : _____
Date: _____

ONATION		
APPROVAL	CHECKER	PREPARE
<i>Zinc</i>	<i>Zinc</i>	<i>Aidara</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**

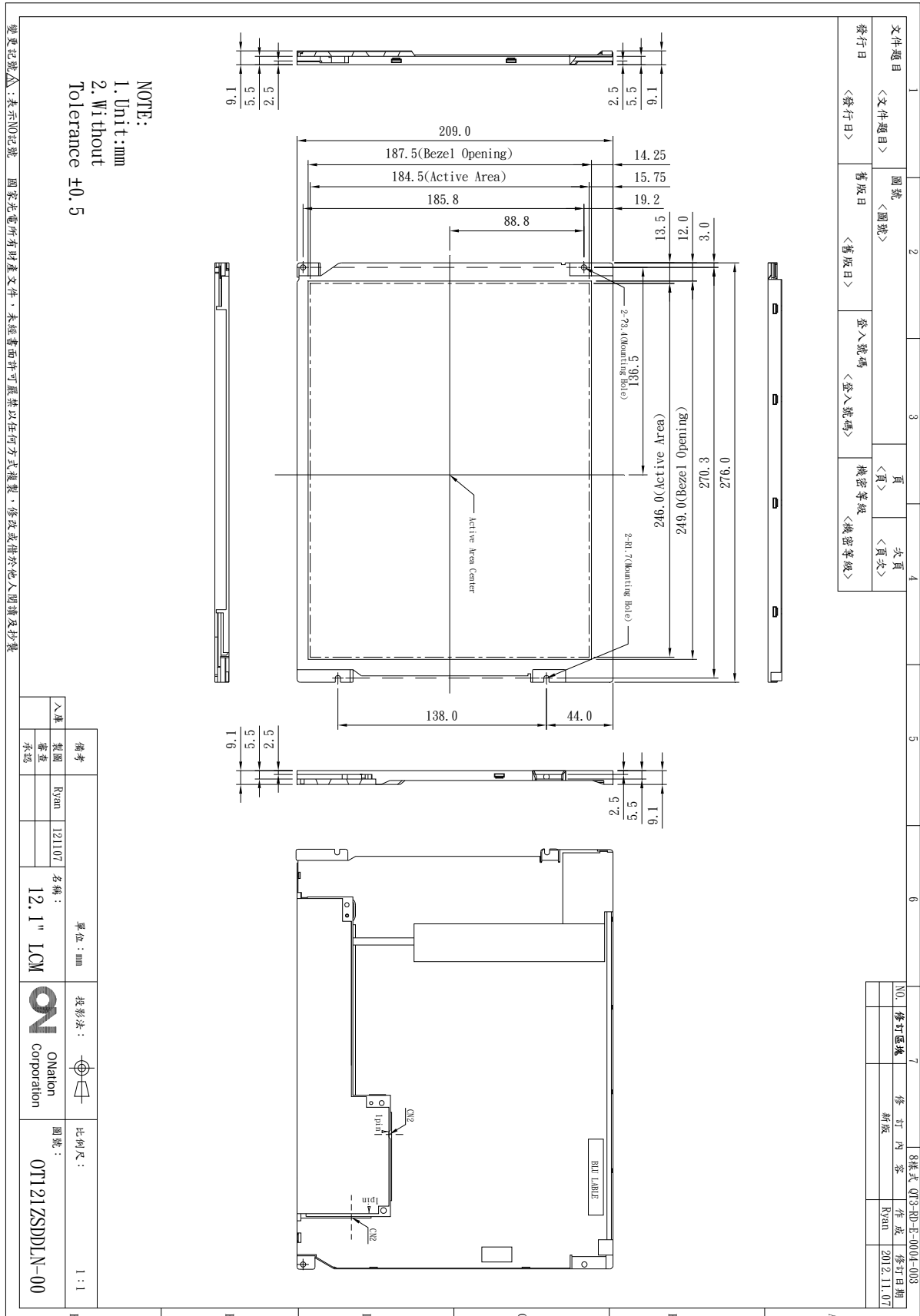
REV	DATE	PAGE	SUMMARY
0.1	2013.11.06	ALL	Preliminary specification was first issued.

## 2.MECHANICAL SPECIFICATIONS

(1)	Number Of Dots (Dots)	800(R.G.B) X 600
(2)	Module Size(mm)	276.0(H) X 209.0(V) X9.1(D) (**)
(3)	Active Area(mm)	246.0(H) X 184.5(V)
(4)	Pixel Pitch(mm)	0.3075 (H) X 0.3075(V)
(5)	LCD / Polarizer Model	TFT , Transmissive, Normally/White, Anti-Glare
(6)	Backlight Color	White, LED
(7)	Viewing Direction	12 O'clock Horizontal : Right side 80°(typ.), Left side 80°(typ.) Vertical : Up side 60°(typ.), Down side 80°(typ.)
(8)	Gray Scale Inversion Direction	6 O'clock
(9)	Electrical Interface	LVDS Interface
(10)	Color Configuration	R.G.B Stripe
(11)	Module Weight(g)	(700)

(\*\* )Module include PCB and component.

### 3. OUTLINE DIMENSIONS



## 4. INTERFACE PIN CONNECTION

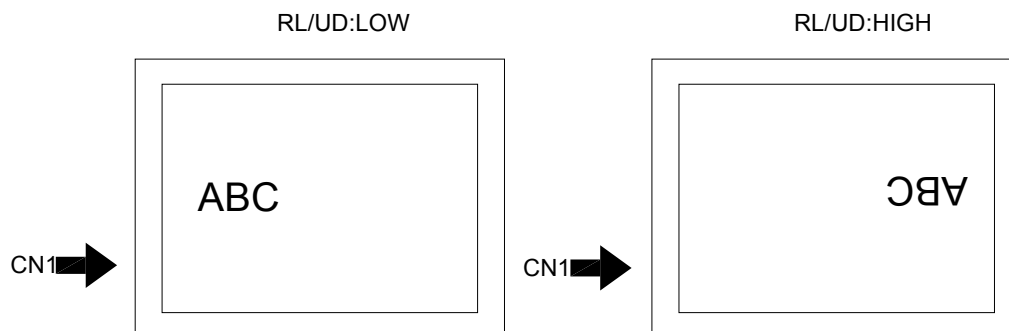
### 4.1 LCM PANEL DRIVING SECTION

CN1 Connector : Starconn 076B20-0048RA-G4 or Equivalen

Mating Connector : FI-SE20M or FI-S20S(Japan Aviation Electronics Industry Co,Ltd)

PIN NO.	SIGNAL	FUNCTION
1	VCC	Power Supply For Digital Circuit
2	VCC	Power Supply For Digital Circuit
3	GND	Ground
4	GND	Ground
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	NC	Non connection
18	RL/UD	RL/UD drawing,LOW/HIGH
19	GND	Ground
20	GND	Ground

Note1:



## 4.2 BACKLIGHT DIAGRAM

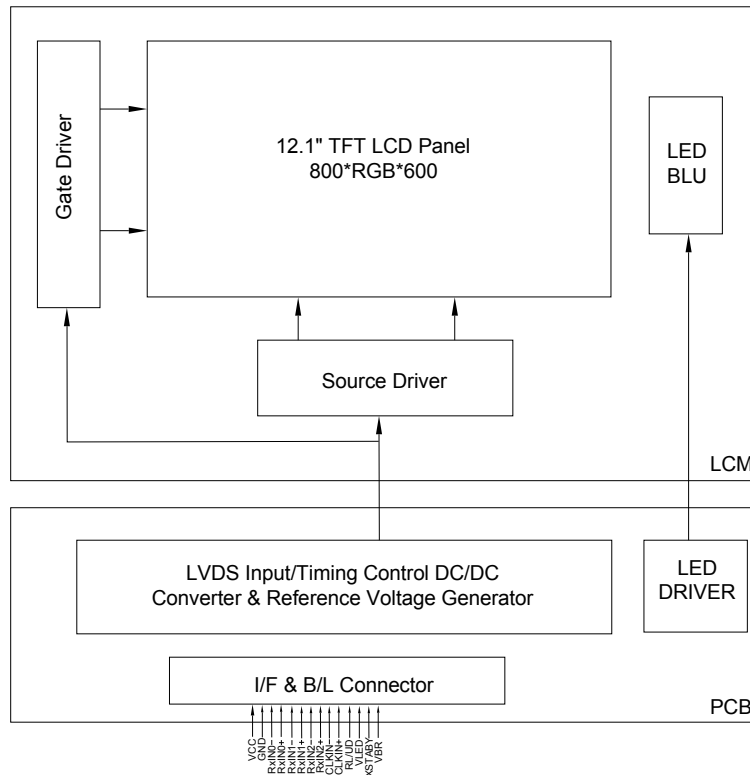
CN2 Connector : SM06B-SHLS-TF(J.S.T.Mfg.Co.Ltd) or Equivalen

Mating Connector : SHLP-06V-S-B

PIN NO.	SIGNAL	FUNCTION
1	VLED	Power Supply For Backlight
2	VLED	Power Supply For Backlight
3	GND	Ground
4	GND	Ground
5	XSTABY	Enable Pin
6	VBR	System PWM Signal Input



## 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	-0.3	15.0	V	
Input Voltage	VI4	-0.3	VLED	V	XSTABY VBR

### 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)	Note 3		Note 4		Without condensation

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=50°C & RH=85% ≤ 500Hrs.

Note 4 : Storage Ta=50°C & RH=95% ≤ 500Hrs.

## 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	-	(270)	(350)	mA	Note 1
Differential Input THreshold Voltage	VTH	-	-	Vcm+100	mV	Note 2
	VTL	Vcm-100	-	-	mV	Vcm=1.2V

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

Note 2 : VTH and VTL is defined in RxIN0+/- 、 RxIN1+/- 、 RxIN2+/- 、 CKIN+/- signal voltage level, Vcm : LVDS Commom mode voltage.

### 7.2 BACKLIGHT UNITS

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK	
LED Driving Voltage	VLED	10.2	12.0	13.8	V		
	ILED	-	570	670	mA	VLED=12V Duty=100%	
XSTABY Control Level	Backlight On	VIH_BL1	2.4	-	VLED	V	
EN Control Level	Backlight Off	VIL_BL1		-	0.2	V	
PWM Control Level	PWM High Level	VIH_BL2	2.1	-	VLED	V	
PWM Control Level	PWM Low Level	VIL_BL2	-	-	0.8	V	
Permissive Input Ripple Voltage		VRP_BL		-	200	mVp-p	VLED=12V
PWM Control Duty Ratio		DPWN	10	-	100	%	
PWM Control frequency		FPWN	200	-	1K	Hz	
LED Life Time (For Reference only)		-	50,000	-	-	Hr	Note 1

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). 50,000 hours is only an estimate for reference.

Note 2: If the module is driven at high ambient temperature & humidity condition. The operating Life will be reduced.

Note 3: Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

### 8. OPTICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio	CR	Viewing Normal Angle $\Theta_x=\Theta_y=0^\circ$	500	800	-	-	Note (1)
Response Time	TR		-	7	-	ms	Note (2)
	TF		-	23	-	ms	
Chromaticity	White	x	(0.250)	(0.300)	(0.350)	-	Note (4)
		y	(0.265)	(0.315)	(0.365)	-	
Viewing Angle	Hor.	$\theta_{x+}$	70	80	-	Deg.	Note (3)
		$\theta_{x-}$	70	80	-		
	Ver.	$\theta_{y+}$	50	60	-		
		$\theta_{y-}$	70	80	-		
Luminance	L	PWM=100%	350	450	-	cd/m2	
Luminance Uniformity	YU	PWM=100%	75	-	-	%	Note (5)

Note 1 : Definition of Contrast Ratio (CR) :

The contrast ratio can be calculated by the following expression.

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

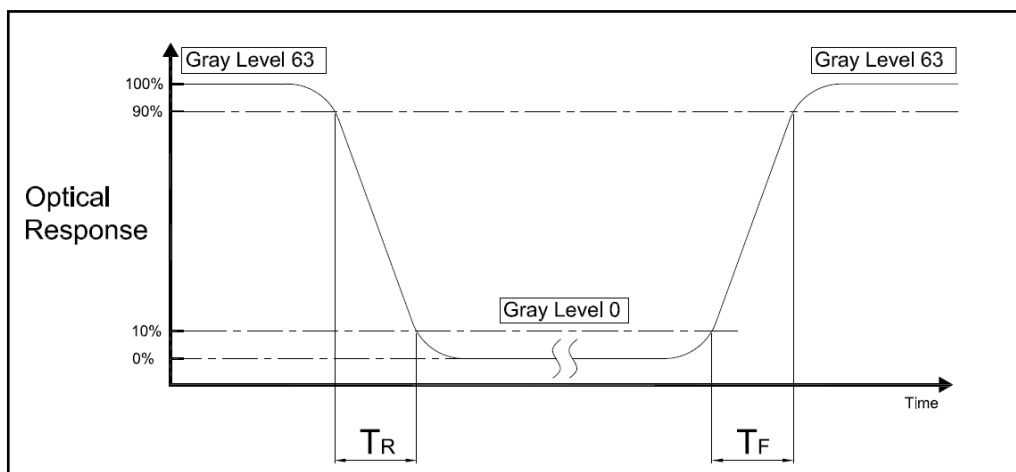
L63 : Luminance of gray level 63

L0 : Luminance of gray level 0

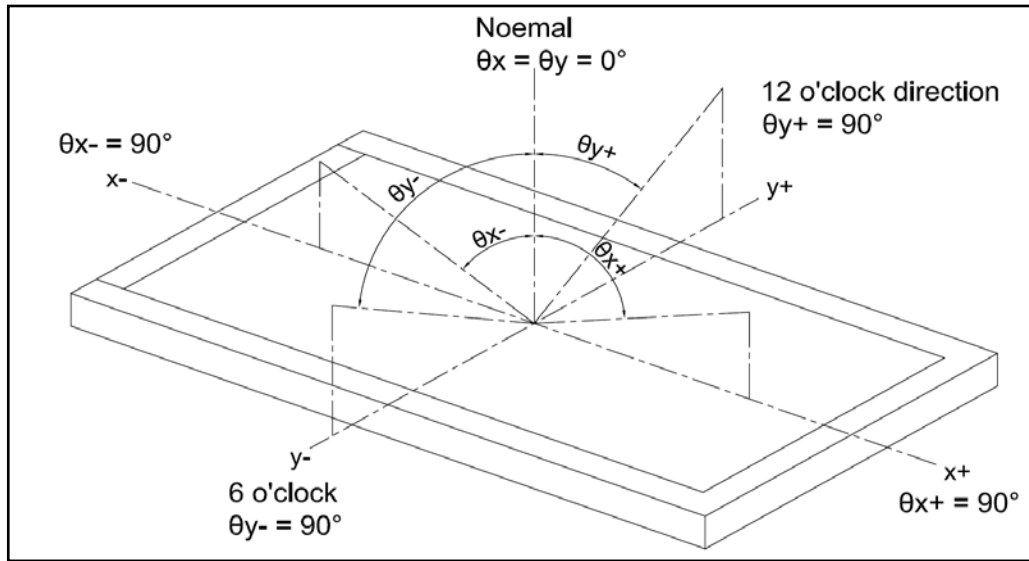
$$CR = CR(5)$$

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)

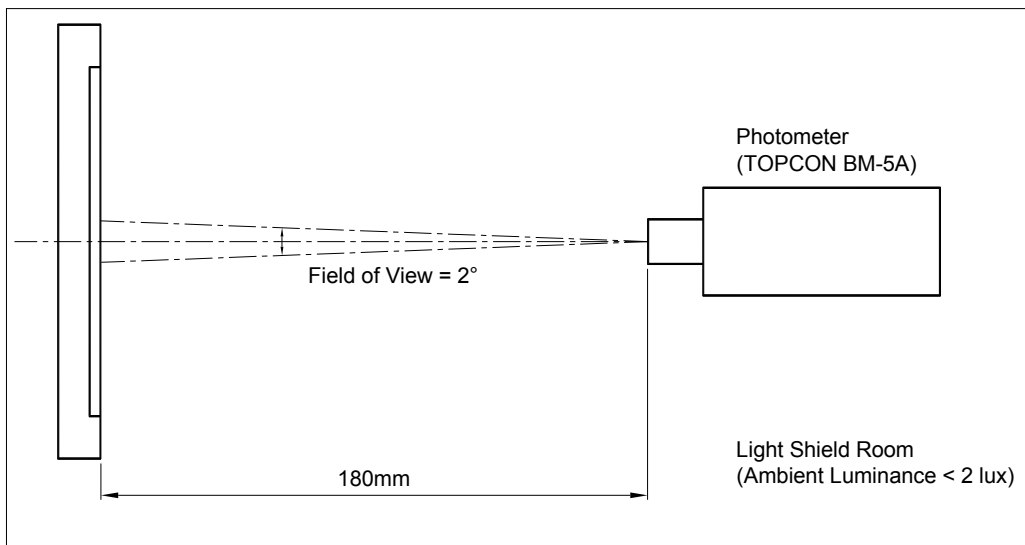


Note 3 : Definition of Viewing Angle

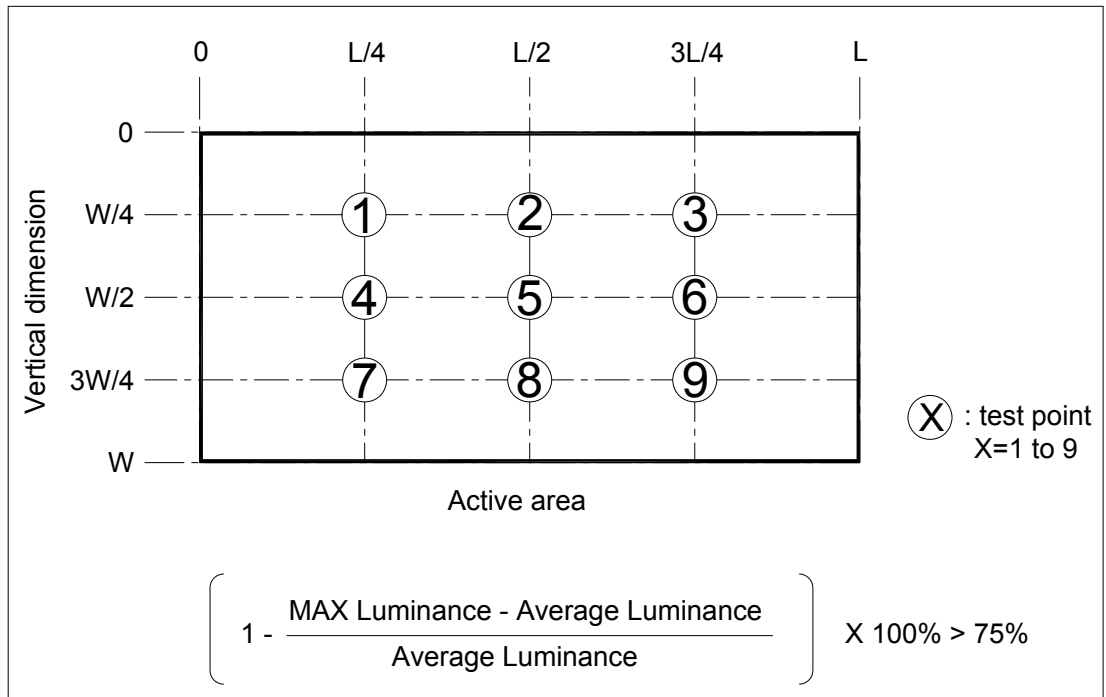


Note 4 : Measurement Set-Up:

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.



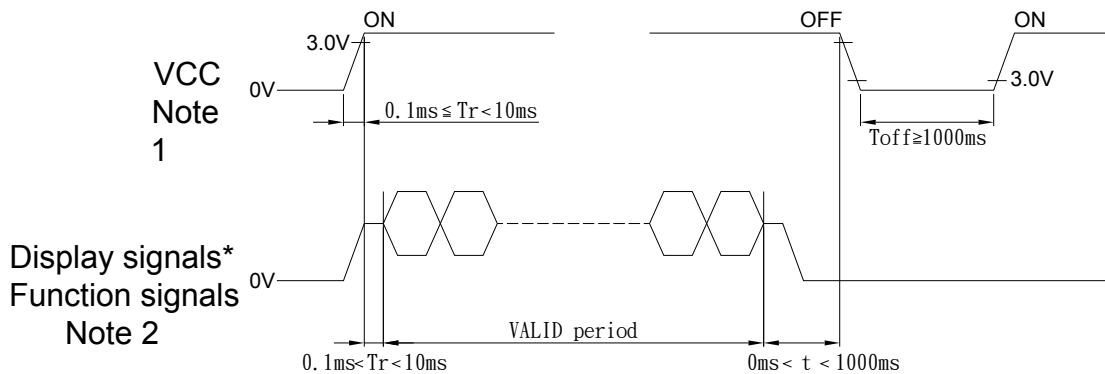
Note 5 :



## 9. TIMING SPECIFICATIONS

### 9.1 POWER SUPPLY VOLTAGE SEQUENCE

#### 9.1.1 LCD panel signal processing board

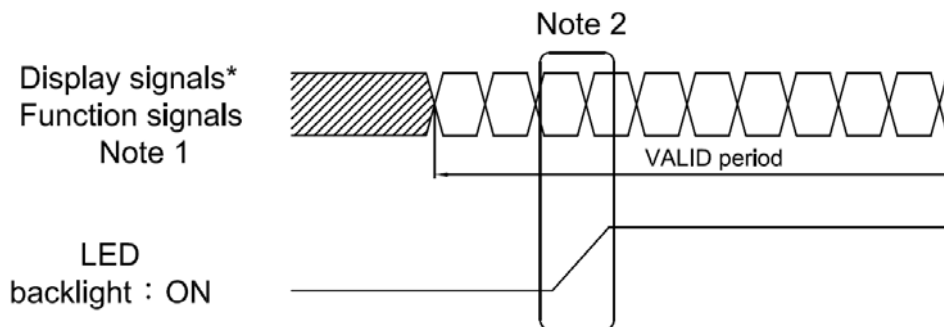


\* These signals should be measured at the terminal of 100Ω resistance.

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 CKIN+/-), 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

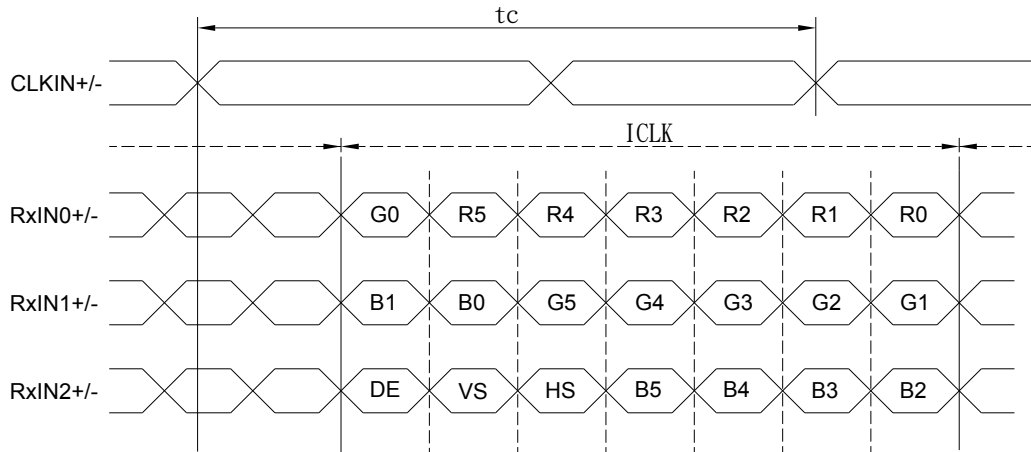


Note1: These are the display and function signals for LCD panel signal processing board.

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

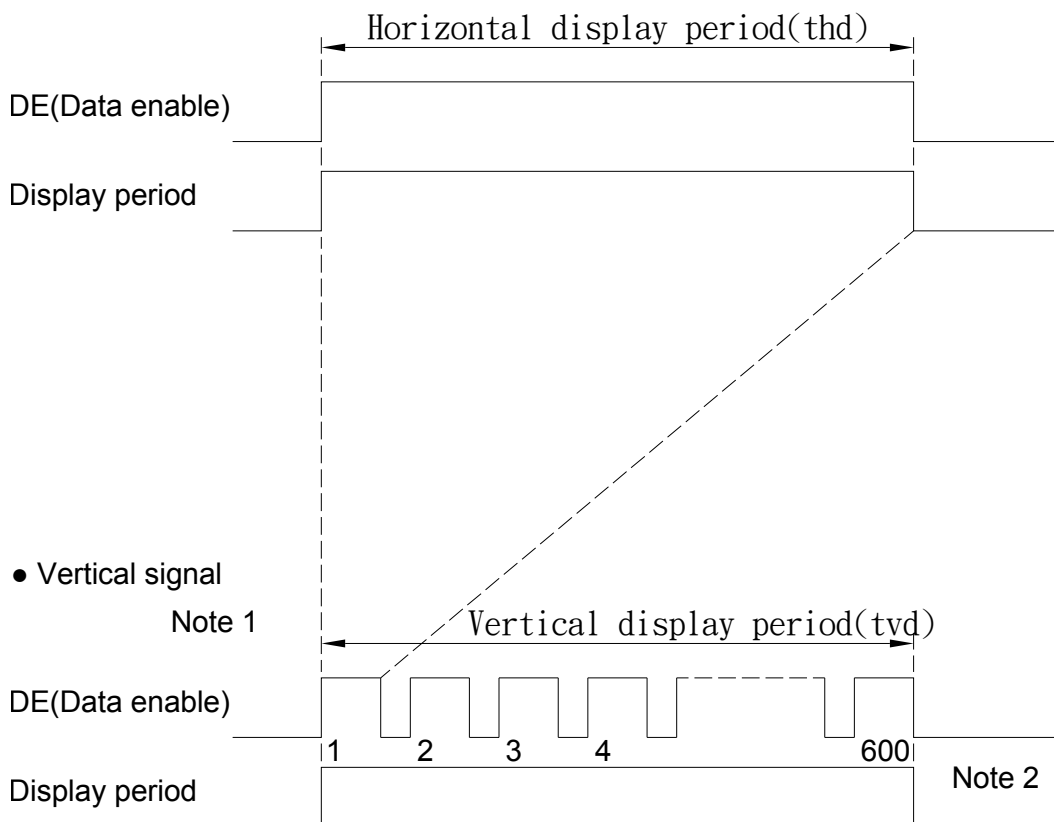
### 9.2.1 INPUT DATA SIGNAL



### 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	35.4	42.2	66.8	MHz	23.7ns(typ.)		
	Duty	-				-	-		
	Rise time, Fall time	-				ns	-		
DATA	CLK-DATA	Setup time				ns	-		
		Hold time				ns			
	Rise time, Fall time	-				ns			
DE	Horizontal	Cycle	th	20.88	25.02	26.54	μs	39.96Hz(typ.)	
		Display period	thd	800			CLK		
	Vertical (One frame)	Cycle	tv	10.52	16.7	19.86	ms		60.0Hz(typ.)
		Display period	tvd	600			H		
	CLK-DE	Setup time	-				ns	-	
		Hold time	-				ns		
		Rise time, Fall time	-				ns		

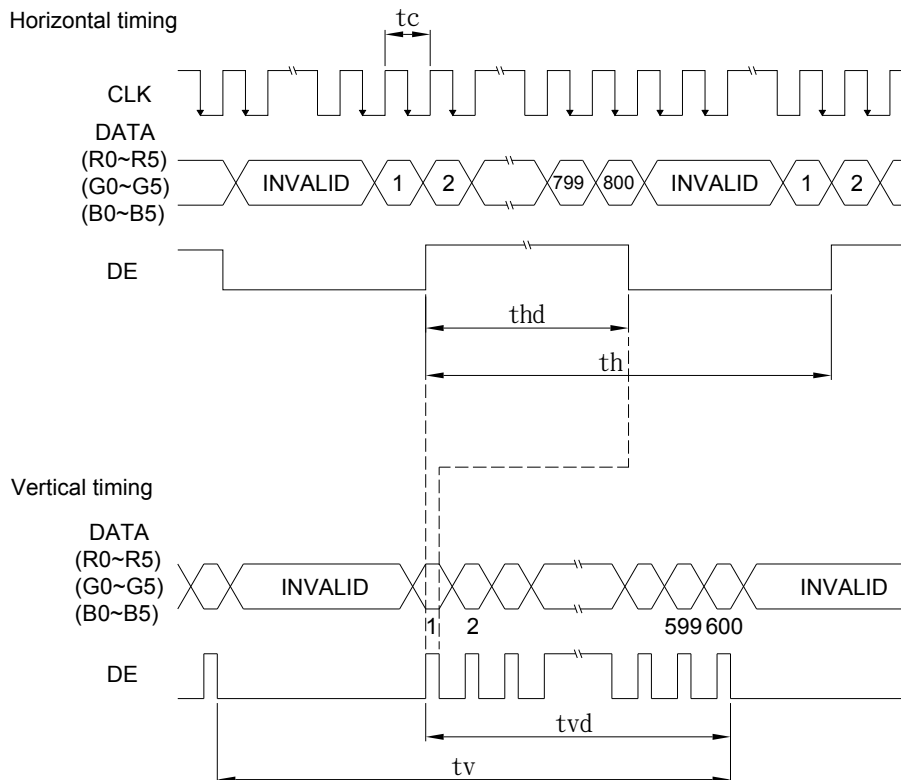
Note1: Definition of parameters is as follows.

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	500HRS	
2	Low Temperature Storage	-30°C	500HRS	
3	High Temperature Operation	70°C	500HRS	
4	Low Temperature Operation	-20°C	500HRS	
5	Temperature Cycle	-30°C ↔ 80°C (30min) (30min)	200CYCLE	
6	High Temperature Humidity Operation	50°C 85%RH	500HRS	
7	High Temperature Humidity Storage	50°C 95%RH	500HRS	

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 modlue 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 :

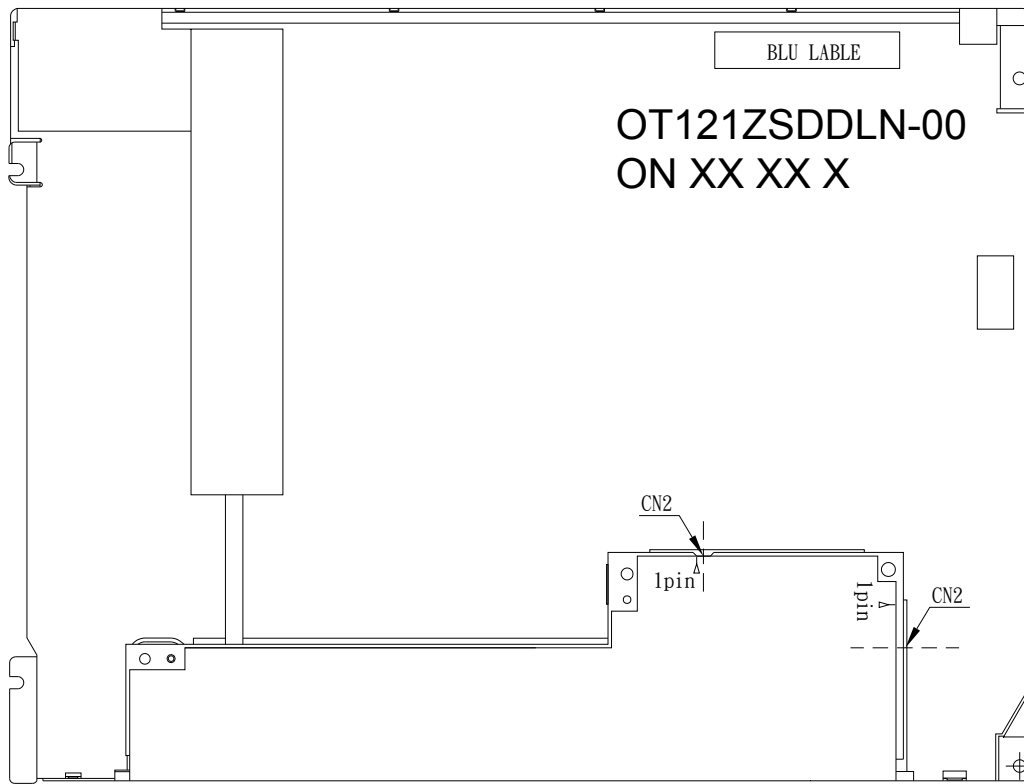
### 10.2.1 STATE LABORATORY ENVIRONMENT :

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 : 70G  
Shock Time : 11ms  
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 : OT121ZSDDLN-00

(b) LOT NO : XX XX X

CODE	MEANING	DESCRIPTION
<u>XX</u>	Year	2013=13, 2014=14, 2015=15, ....
<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 : TBD

## 13 PACKAGE INFORMATION

LCM Model	LCM Qty. in the box	Inner Box Size (mm)	Weight	REMARK
OT121ZSDDLN-00	TBD	TBD	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.