

TFT-DISPLAY DATASHEET

ONation
Model:OT084ISWDLV-00

BRIEF SPEC.:

Main Feature	LandscapeType Wide Viewing Angle Touch Screen
Active Screen Area	170.4 x 127.8 (mm)
Diagonal Format	8,4 " 4:3
Resolution	800 X 600
Colors	(6 Bit)
Backlight	LED White
Brightness	600 cd/m ²
LED Life Time	50K (h)
Interface	LVDS
Viewing Angle	80/80 L/R 80/80 up/down
Touchscreen	yes
Power Supply	3.3 V (Typ.)
Module Outline	199.5 x 149.0 x 9.75 (mm)
Operation Temperature	-20... +70 °C
Storage Temperature	-30... +80 °C
Surface Treatment	Anti-Glare



ONation Corporation

TFT COLOR LCD MODULE

MODEL: OT084ISWDLV-00

SVGA
LVDS interface (1port)

Version: V4.0

Customer : _____
Approved By : _____
Date: _____

ONATION		
APPROVAL	CHECKER	PREPARE
<i>John</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

C O N T E N T S

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1.RECORD OF REVISION

REV	DATE	PAGE	SUMMARY																																																																										
0.1	2013.10.11	ALL	Preliminary specification was first issued.																																																																										
0.2	2013.10.23	1	Modify (2) Module Size(mm) 199.7(H)X149.2(V)X9.0(D)→199.5(H)X149.0(V)X9.75(D)**																																																																										
		2	Modify 4.OUTLINE DIMENSIONS																																																																										
		3	Modify CN1 Connector STM MSB24013P20HA→HIROSE DF19L-20P-1H Modify Mating Connector STM P24013P20→HIROSE DF19G-20S-1C Modify Note 1																																																																										
		7	Modify 7.1 ELECTRICAL CHARACTERISTICS OF LCD Note2: Common mode voltage for LVDS receiver Common mode voltage for LVDS receiver (Thine THC63LVDF84B) Modify 7.2 BACKLIGHT UNITS VLED: MIN: - →11.0V, MAX: - →13.0V ILED: TYP: TBD → (600)mA, MAX: TBD → (650)mA Note 2: IL=(310)mA → (370)mA																																																																										
		9	Modify Luminance MIN:320cd/m2 →540cd/m2 , TYP:400cd/m2→600cd/m2																																																																										
16	Modify 10.RELIABILITY TEST																																																																												
1.0	2014.04.16	1	Modify 2.MECHANICAL SPECIFICATIONS (12) Module Weight(g) TBD → (12) Module Weight(g) 358±50/0																																																																										
		7	Modify 7. ELECTRICAL CHARACTERISTICS <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>ICC</td> <td>-</td> <td>(185)</td> <td>(220)</td> <td>mA</td> <td>→</td> </tr> <tr> <td>ICC</td> <td>-</td> <td>210</td> <td>260</td> <td>mA</td> <td></td> </tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>ILED</td> <td>-</td> <td>(600)</td> <td>(650)</td> <td>mA</td> <td>↔</td> </tr> <tr> <td>ILED</td> <td>-</td> <td>600</td> <td>720</td> <td>mA</td> <td></td> </tr> </table>	ICC	-	(185)	(220)	mA	→	ICC	-	210	260	mA		ILED	-	(600)	(650)	mA	↔	ILED	-	600	720	mA																																																			
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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	Wide Viewing Angle Horizontal : Right side 80°(typ.), Left side 80°(typ.) Vertical : Up side 80°(typ.), Down side 80°(typ.)
(9)	Gray Scale Inversion Direction	No GSI
(10)	Electrical Interface	LVDS Interface
(11)	Color Configuration	R.G.B Stripe
(12)	Module Weight(g)	358±5%

** Include connector thickness

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	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	NC	Non Connection (open)
17	U/D	Vertical display mode select signal Up / Down Scan control input.
18	L/R	Horizontal display mode select signal Left / Right Scan control input.
19	NC	Non Connection (open)
20	NC	Non Connection (open)

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

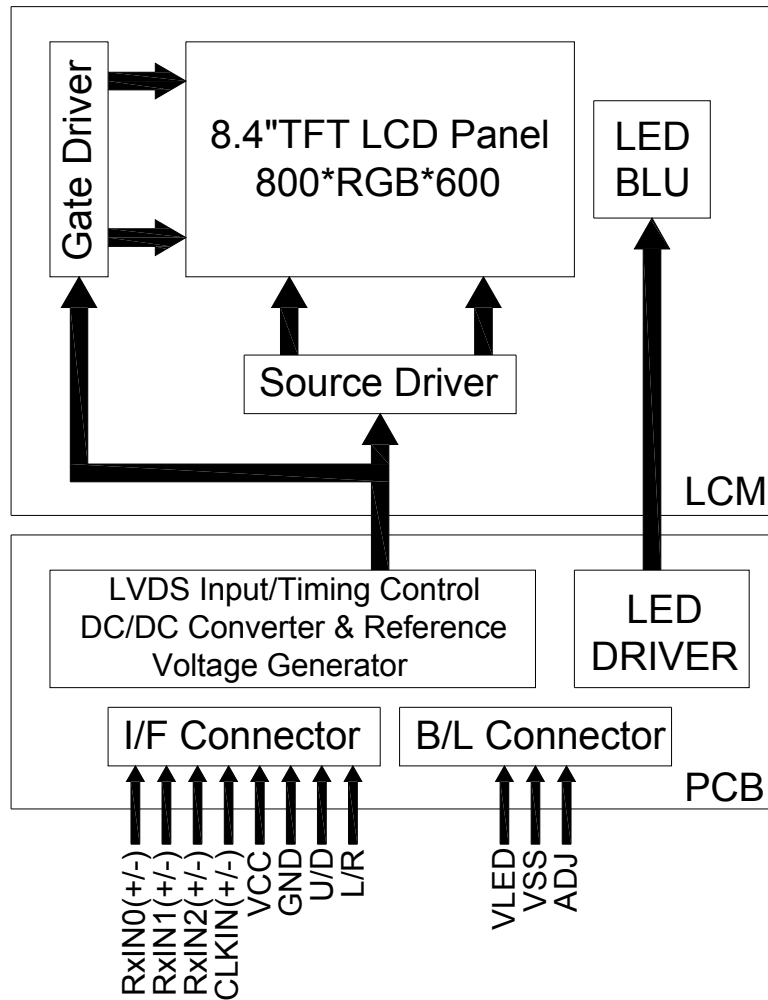
4.2 BACKLIGHT DRIVING SECTION

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 : 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	-	210	260	mA	Note 1
Differential Input Threshold Voltage	VTH	-	-	100	mV	At VCM =1.2V
	VTL	-100	-	-	mV	Note 2

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

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

7.2 BACKLIGHT UNITS

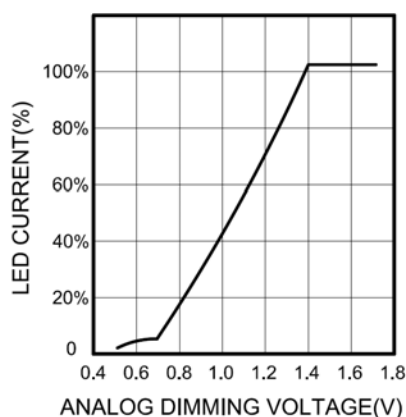
Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
LED Driving Voltage	VLED	11.0	12.0	13.0	V
	ILED (VLED=12V)	-	350	420	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.

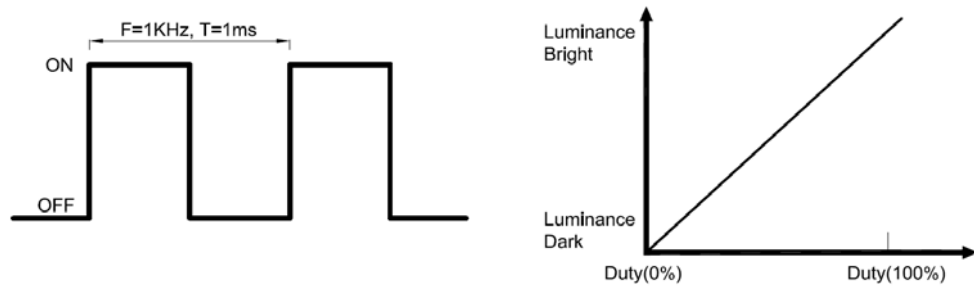
Note 2: The lifetime of LED is defined as the time when it continues to operate under the conditions at Ta= 25 ±2°C and IL = (370)mADC (LED forward current) until the brightness becomes ≤ 50% of its original value.

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:

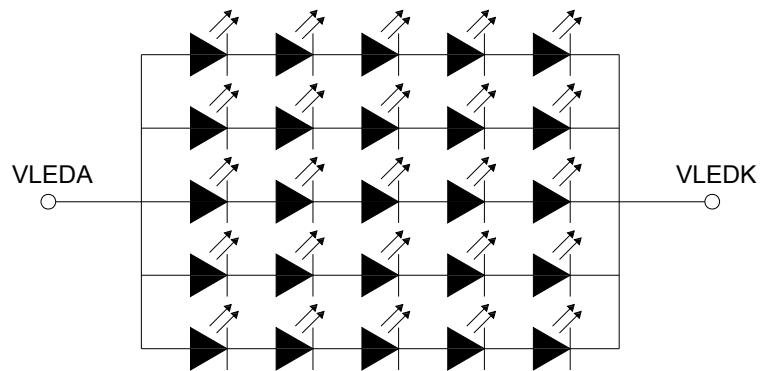


Note 4: ADJ signal $V_{p-p} = 1.4 \sim 5.0V$, operation frequency: 100Hz ~ 1 kHz

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	0.290	0.340	0.390	-	
Viewing Angle	Hor.	θ_{x+}	70	80	-	Deg.	Note 3
		θ_{x-}	70	80	-		
	Ver.	θ_{y+}	70	80	-		
		θ_{y-}	70	80	-		
Luminance	L	PWM=100%	540	600	-	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.

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

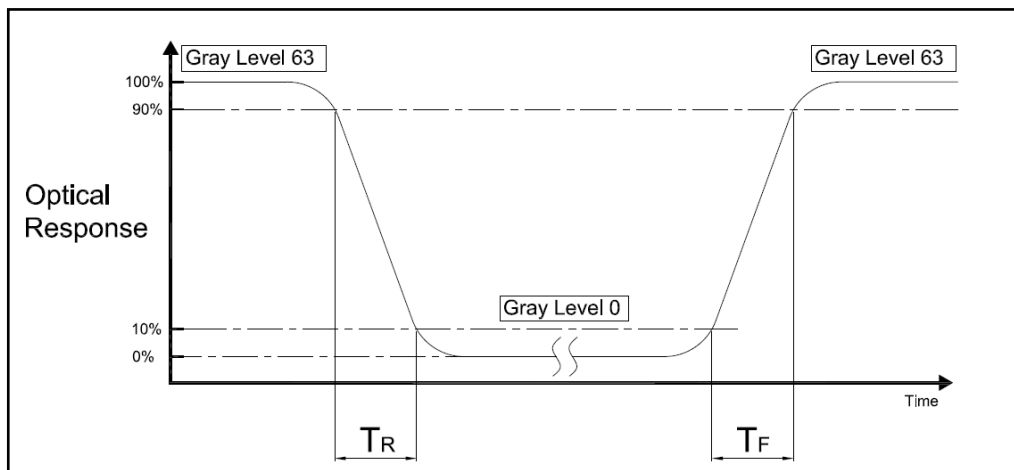
L63 : Luminance of gray level 63

L0 : Luminance of gray level 0

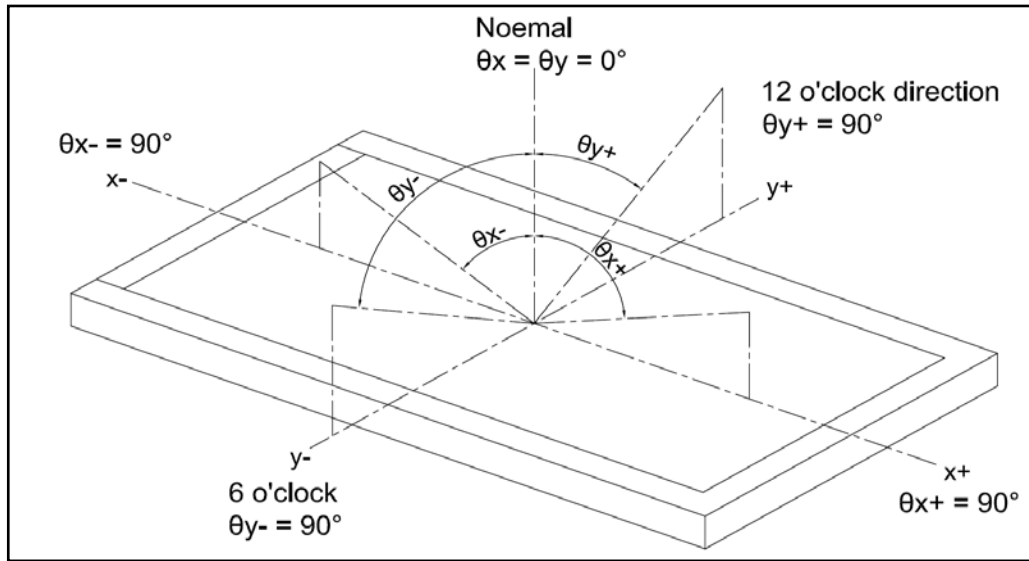
$$CR = CR(5)$$

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)

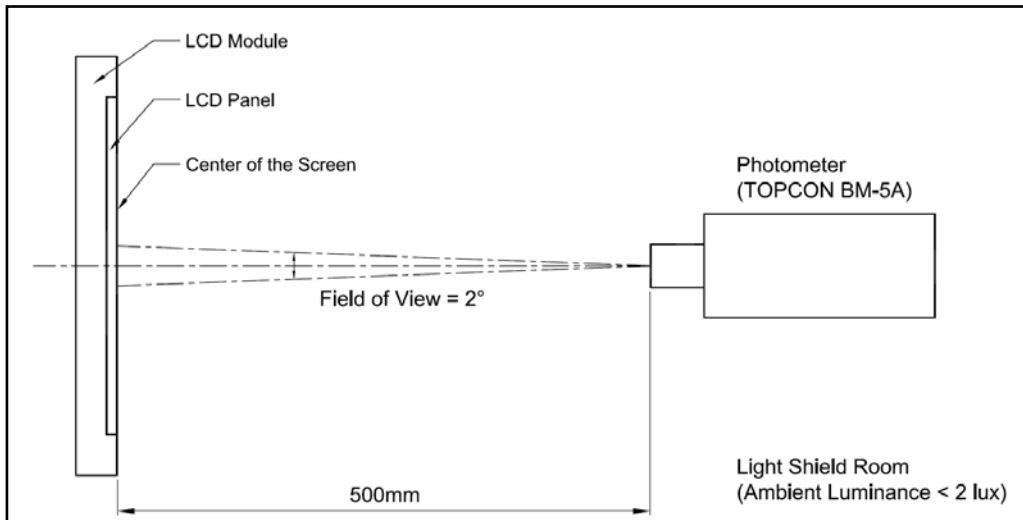


Note 3 : Definition of Viewing Angle

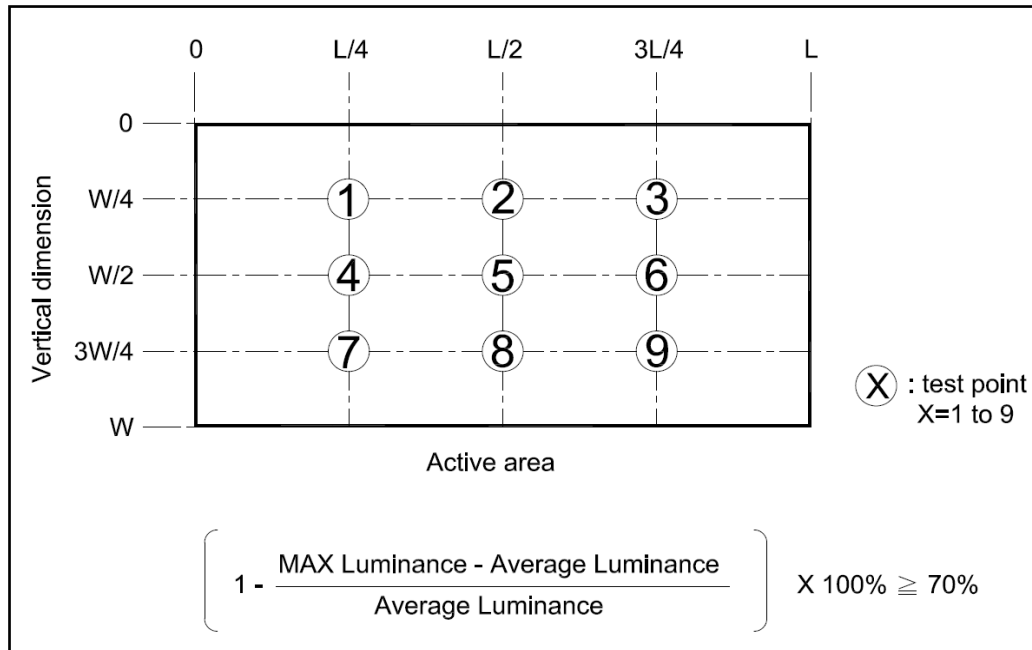


Note 4 : Measurement Set-Up:

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.



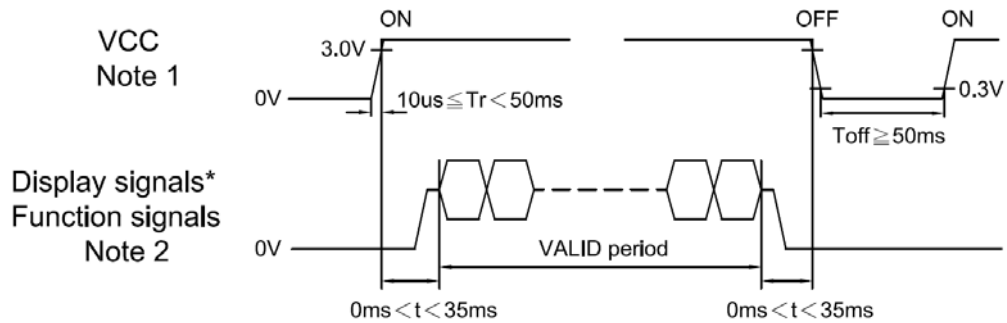
Note 5 :



9. TIMING SPECIFICATIONS

9.1 POWER SUPPLY VOLTAGE SEQUENCE

9.1.1 LCD panel signal processing board

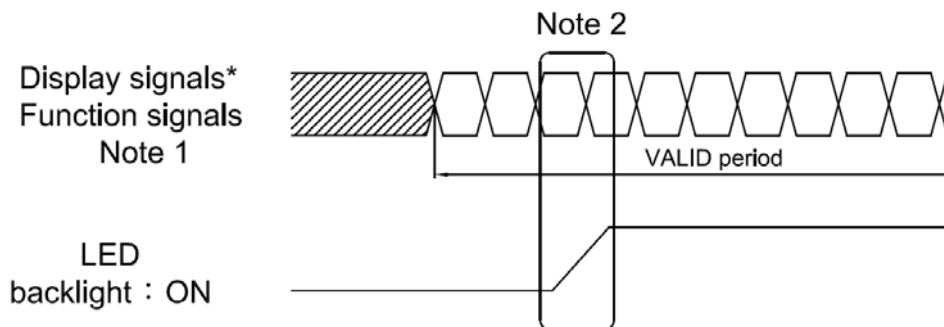


* These signals should be measured at the terminal of 100Ω resistance.

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

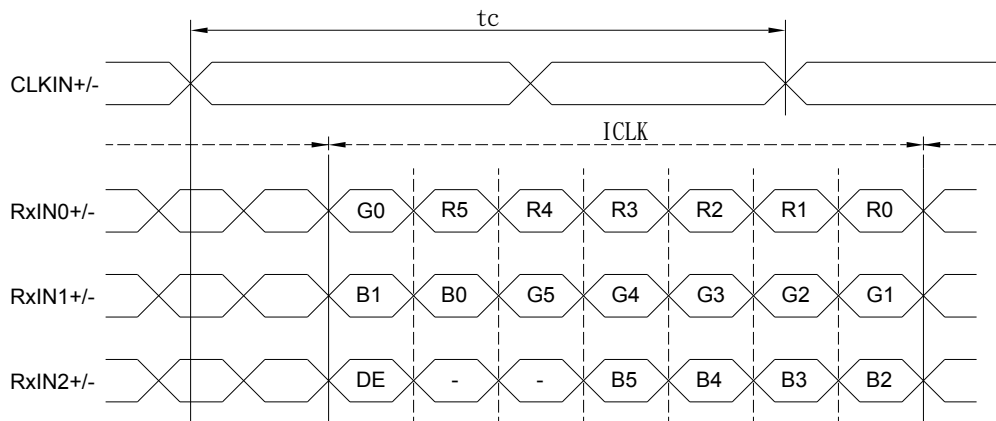


Note1: These are the display and function signals for LCD panel signal processing board.

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

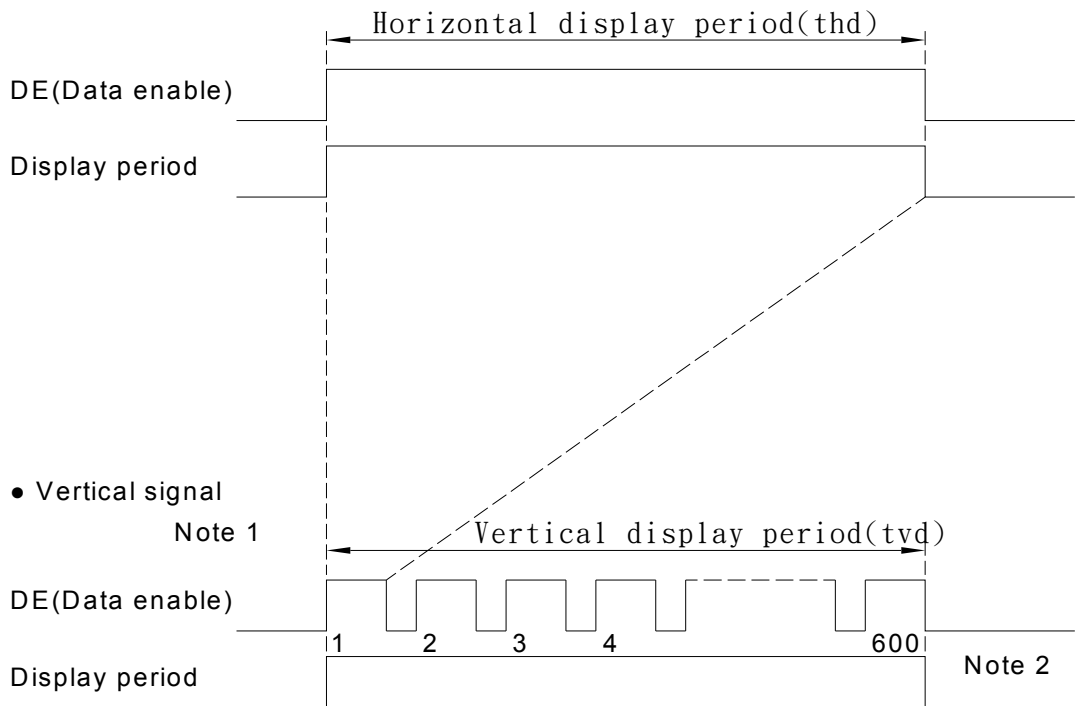
9.2.1 INPUT DATA SIGNAL



9.2.2 OUTLINE OF INPUT SIGNAL TIMINGS

- Horizontal 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					

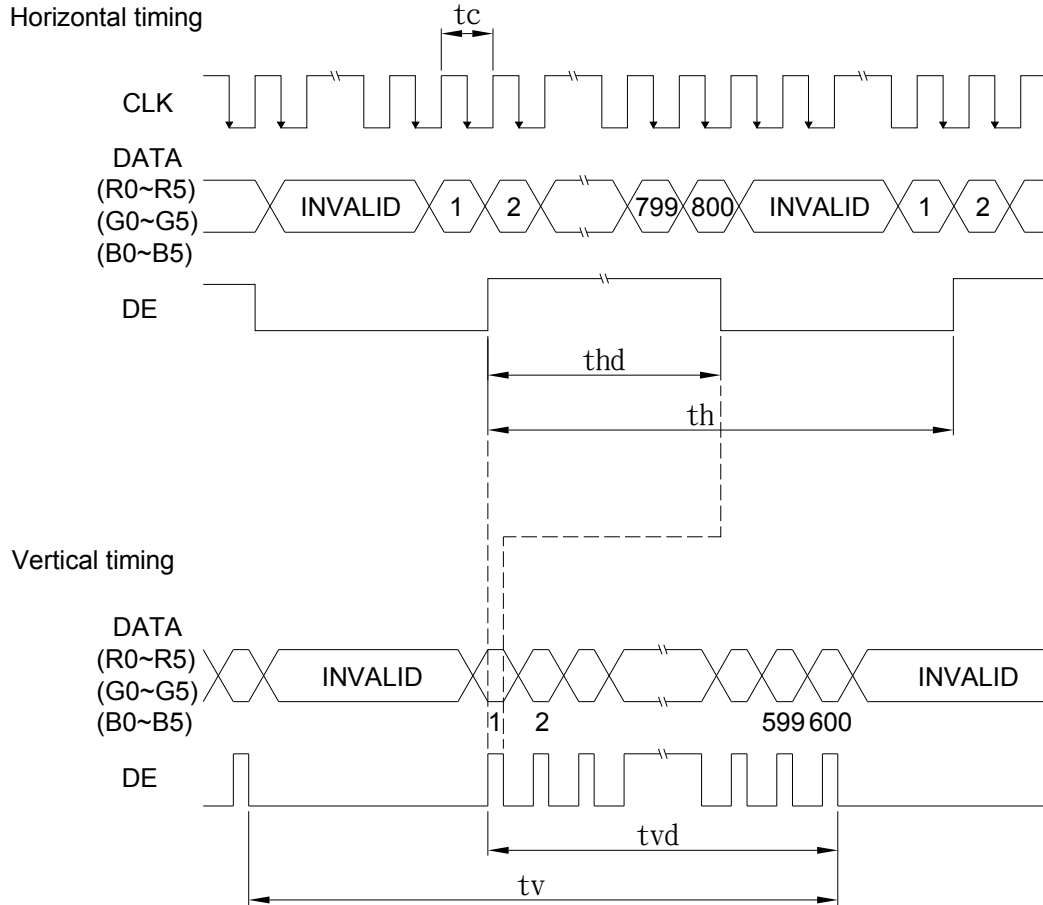
Note1: Definition of parameters is as follows.

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 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.

Note 4 :
$$\text{MTBF} = \frac{2 * (\text{Measured Quantity}) * (\text{Measured Time}) * (\text{Coefficient Of Thermal Acceleration})}{\text{Confidence Index}}$$

 (Hour)

$$\text{MTBF} = 2 * 30 * 240 * 5.66 / 4.61 = 17679.5\text{HRS}$$

Ambient Temperature	15°C	25°C	35°C	40°C
Coefficient Of Thermal Acceleration	2.83	5.66	11.31	16

Confidence Index	NG=0PCS	NG=1PCS	NG=2PCS	NG=3PCS
90% Coefficient	4.61	7.78	10.64	13.36
60% Coefficient	1.83	4.05	6.21	8.35
50% Coefficient	1.38	3.35	5.53	7.43

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 :

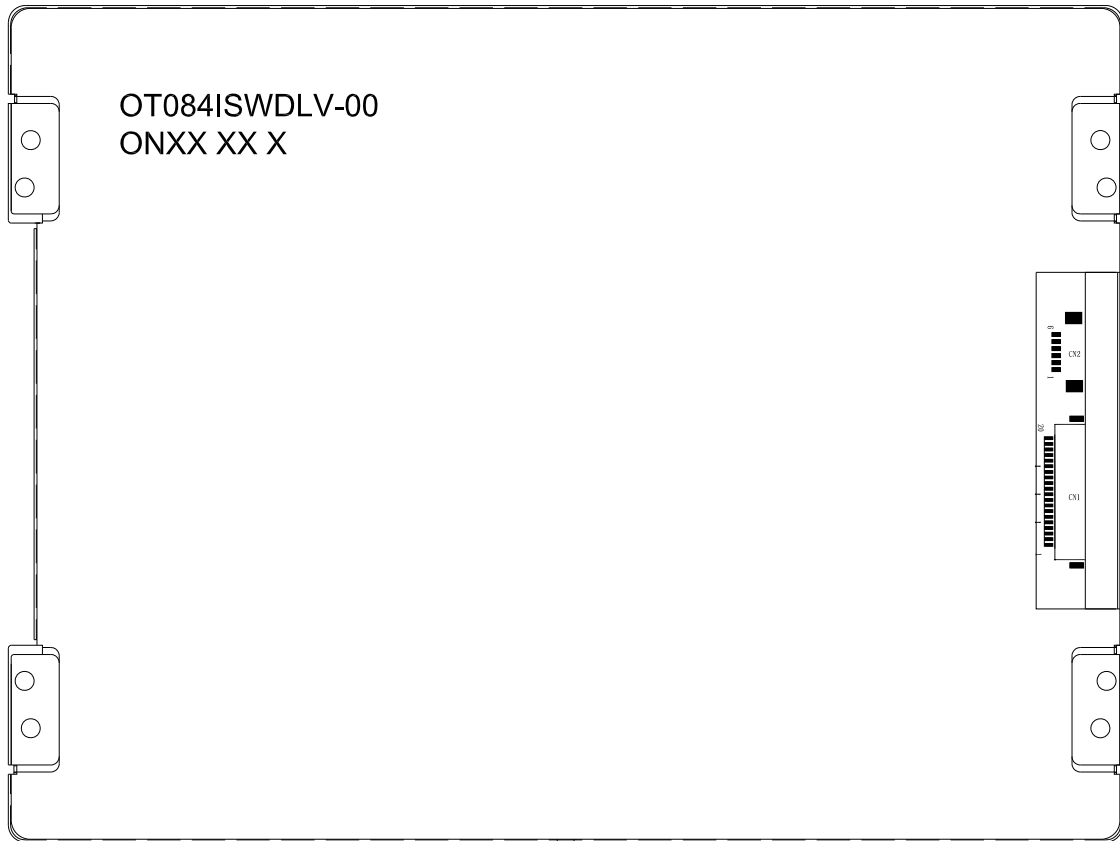
10.2.1 STATE LABORATORY ENVIRONMENT :

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 : 80G
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 : OT084ISWDLV-00

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

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

12.1 QUALITY LEVEL

INSPECTION PLAN:

SAMPLING LEVEL : II, normal inspection, single sampling inspection

Sampling Plan		MIL-STD-105E
		Normal Inspection, Single Sampling
		Level II
AQL	Major Defect	1.0%
	Minor Defect	2.5%

12.2 ENVIRONMENT CONDITIONS:

Ambient Temperature		20 ~ 25°C .
Ambient Humidity		65±5%RH
Ambient Illumination	Inspection	250~350 Lux

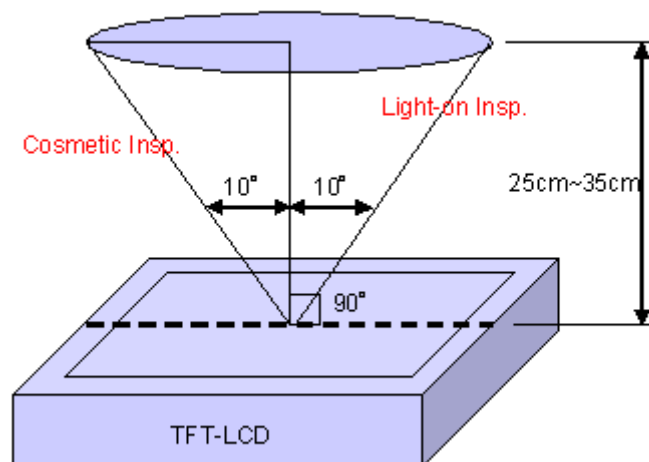
12.3 INSPECTION CONDITION

(1) Inspection Distance: 30 cm±5cm

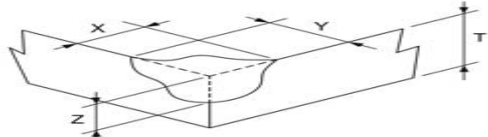
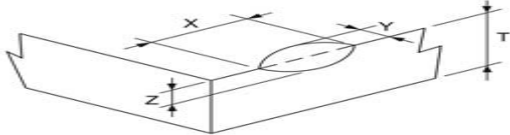
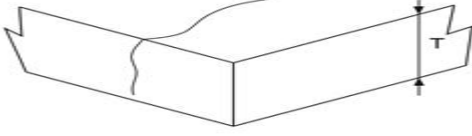
(2) View Angle:

Light-on Inspection Angle : ±10°

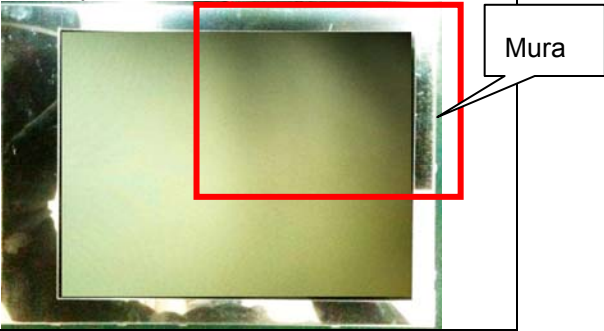
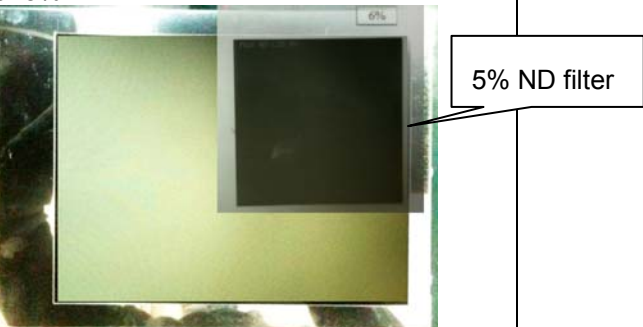
Cosmetic Inspection Angle : ±10°



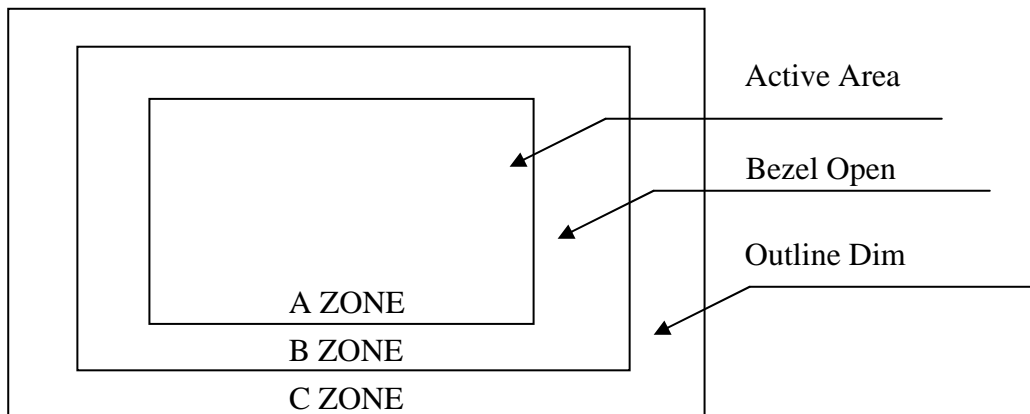
12.4 COSMETIC INSPECTION(Panel):

ITEM	JUDGMENT CRITERIA	CLASSIFICATION
Corner Flaw	 <p>$X \leq 3.0\text{mm}, Y \leq 3.0\text{mm}, Z \leq T$</p>	MA
Edge Flaw	 <p>$X \leq 3.0\text{mm}, Y \leq 3.0\text{mm}, Z \leq T$</p>	MI
Progressive Flaw	 <p>Not allowed</p>	MI
Scratch on Panel/Touch Panel *Note-2	<p>$W \leq 0.05\text{mm}$, Ignored $0.05\text{mm} < W \leq 0.1\text{mm}$ and $L \leq 8\text{mm}$: $N \leq 5$ $W > 0.1\text{mm}$ or $L > 8\text{mm}$, Not allowed</p>	MI
Bubble or Dent on Panel/Touch Panel *Note-3	<p>$D \leq 0.2\text{mm}$: Ignored $0.2\text{mm} < D \leq 0.6\text{mm}$: $N \leq 4$ Ignored $D > 0.6\text{mm}$: Not allowed</p>	MI
Bezel Deformation	Obvious deformation is not allowed	MI
Bezel Oxidation	Not allowed if it rusts continuously over 1 cm (It is out of warranty with rusted tin plate)	MI
Bezel Scratch	<p>Non-feeling abrasion: Ignored feeling abrasion, $L \leq 20\text{mm}$, $W \leq 0.3\text{mm}$, $N \leq 7$ Not allowed</p>	MI
Metal Squash Dent /Flange(Front Side)	$D(W) \leq 1\text{mm}$, $L \leq 3, N \leq 4$;	MI
B/L High Voltage Wire Denudation	Not allowed	MA
Polarizer flaw or leak out resin	Defect is defined as the active area.	MI
Outline Dimension	Must in Spec, refer to related product spec.	MI

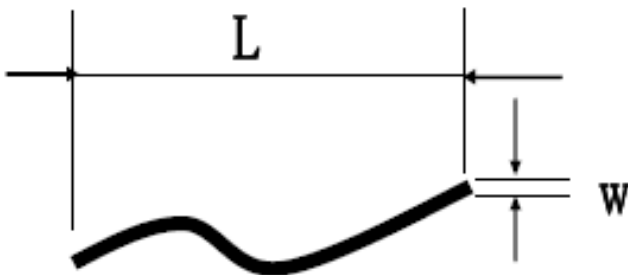
12.5 FUNCTIONAL INSPECTION:

ITEM	JUDGMENT CRITERIA			CLASSIFICATION
Point Defect	Bright dot	Random	2	MI
		2 dots adjacent	0	
		3 dots adjacent or more	0	
	Dark dot	Random	4	
		2 dots adjacent	0	
		3 dots adjacent or more	0	
	Total Dot Defect		4	
Distance	Distance between Bright and Bright dot	$L \geq 5\text{mm}$		
	Distance between Bright and Dark dot	$L \geq 5\text{mm}$		
	Distance between Dark dot	$L \geq 5\text{mm}$		
Line Defect	Obvious vertical or horizontal line defect is not allowed.			MA
Mura	1. Under the normal examination angle of view, the picture has the non-uniform phenomenon.			MI
				
Mura	2. Weak defect will be defined as Mura if it can be Observed through ND filter 5%			MI
				
Foreign Material in spot shape	$D \leq 0.15\text{mm}$: Ignored $0.15\text{mm} < D \leq 0.5\text{mm}$: $N \leq 4$ $D > 0.5\text{mm}$: Not allowed			MI
Foreign Material in line or spiral shape	$0.1\text{mm} < W \leq 0.5\text{mm}$, $0.3\text{mm} < L \leq 1.5\text{mm}$			MI
Display Function Abnormal	No Malfunction can be allowed			MA
Touch panel Malfunction	No Malfunction can be allowed in AA area.			MA

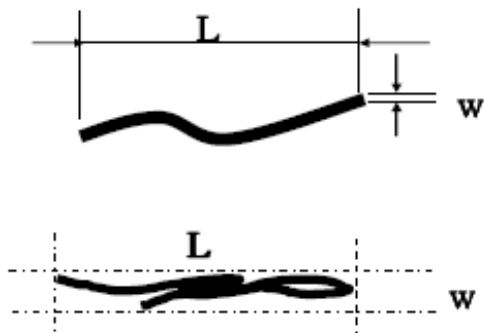
Note1: I/O Area Definition



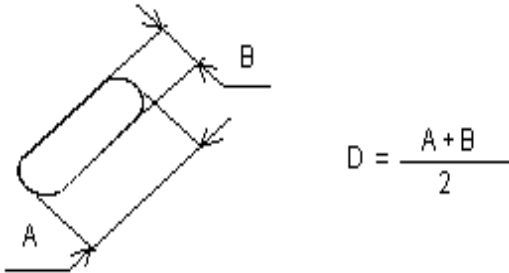
Note 2 : Polarizer Scratch



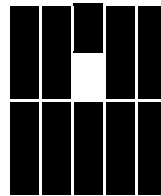
Note 3 : Line or Spiral Foreign Material



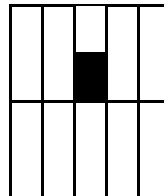
Note 4 : Spot Foreign Material



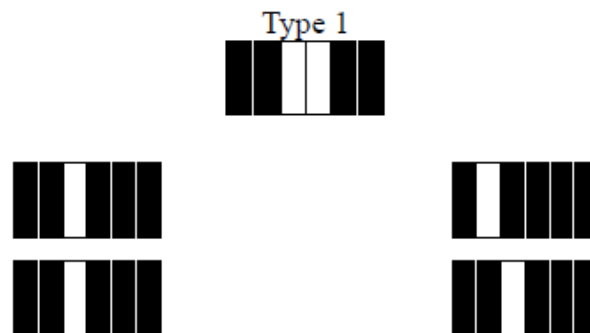
Note 5 : Bright dot defect description:



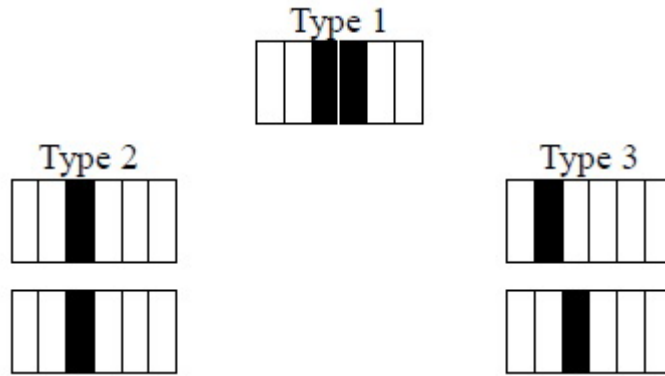
Note 6 : Dark dot defect description:



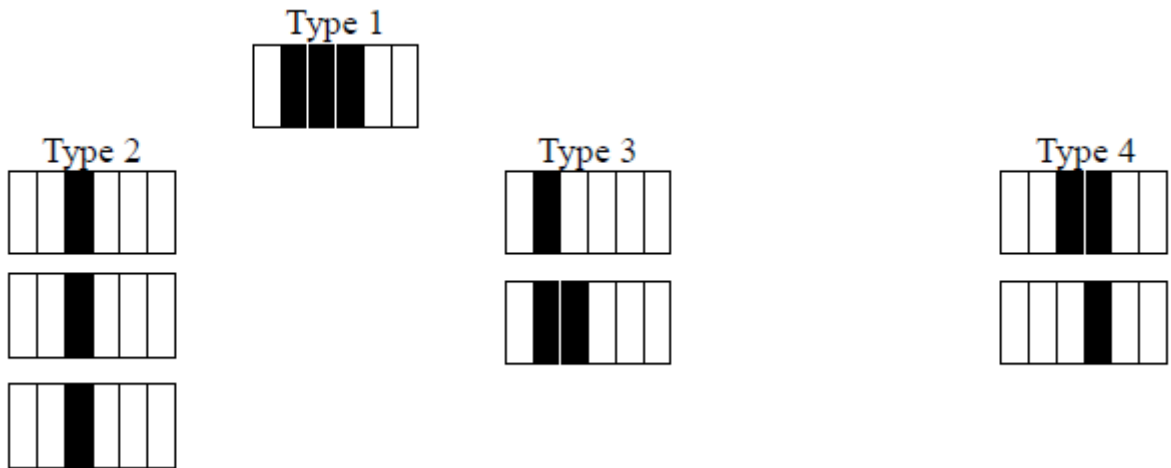
Note 7 : Bright dot defect description- Two adjacent.



Note 8 : Dark dot defect description- Two adjacent.

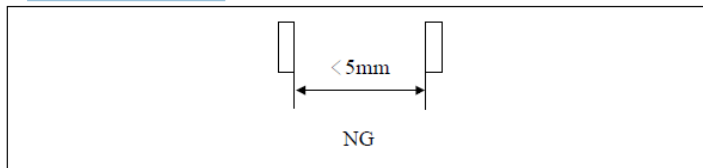


Note 9 : Dark dot defect description- Three adjacent.

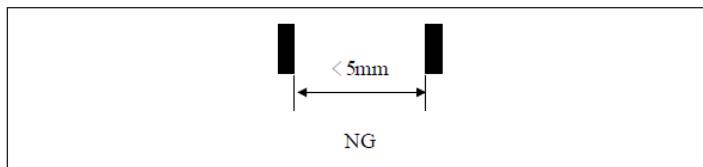


Note 10 : Minimum distance between dot defects :

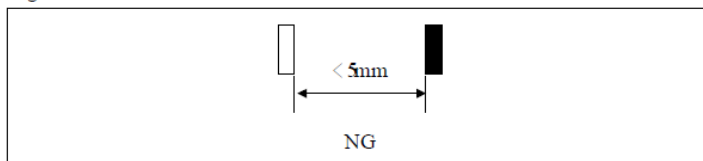
Bright dot to bright dot.



Dark dot to dark dot

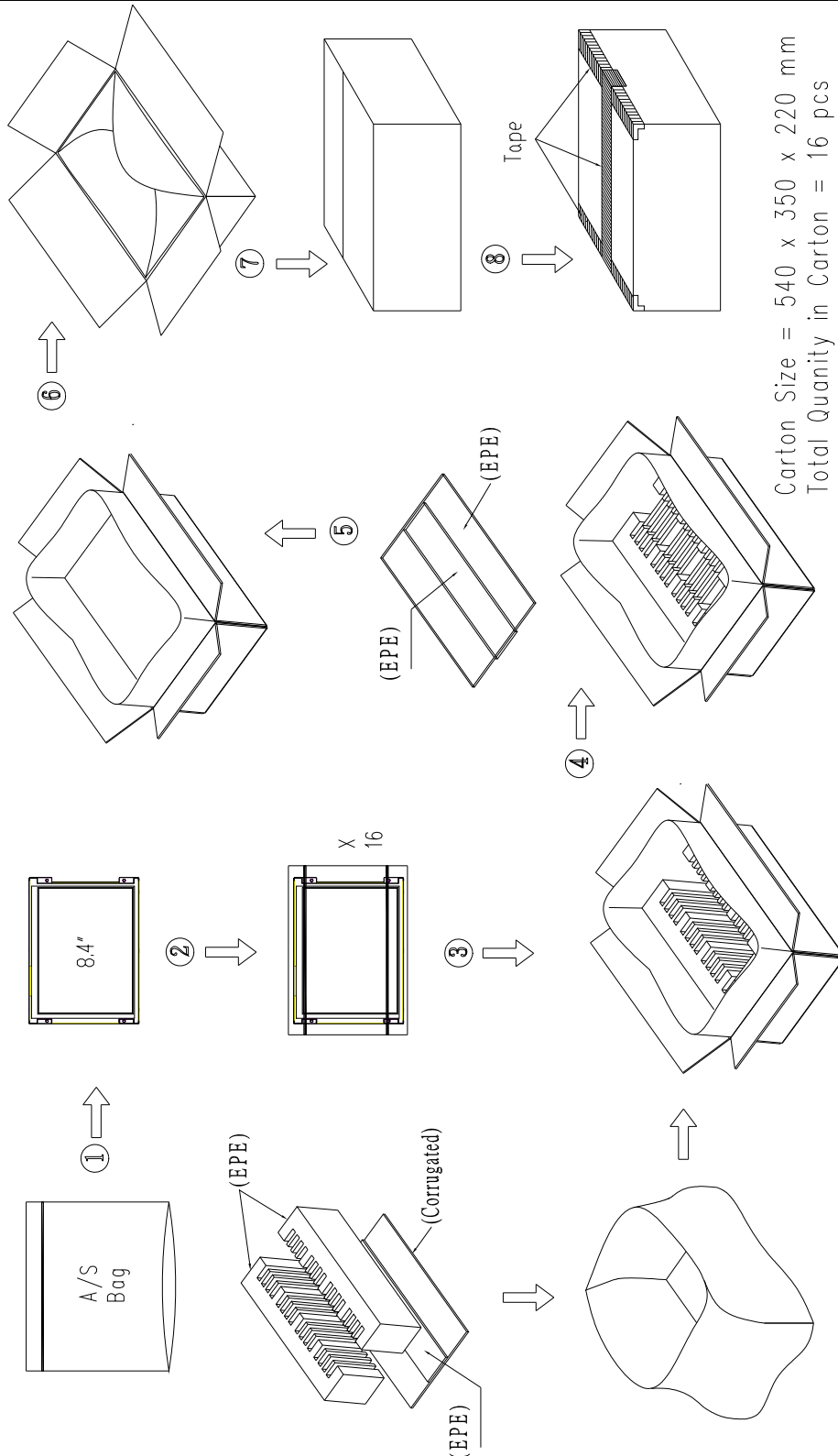


Bright dot to dark dot



13. PACKAGE INFORMATION

LCM Model	LCM Qty. in the box	Inner Box Size (mm)	Weight	REMARK
OT084ISWDLV-00	16PCS/Box	540*350*220	7.5Kg	



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.