

TFT-DISPLAY DATASHEET

ONation
Model: OT121ABWDLV-HO

BRIEF SPEC.:

Main Feature	Landscape Type White LED Backlight Wide Viewing Angle
Active Screen Area	261.12 x 163.2 (mm)
Diagonal Format	12,1" 16:10
Resolution	1280 x 800
Colors	R.G.B Stripe
Backlight	LED, White
Brightness	1000 cd/m ²
LED Life Time	50,000h (Typ.)
Interface	LVDS
Viewing Angle	-80~88(H), -80~88(V)
Touchscreen	No
Power Supply	3,3V (Typ.)
Module Outline	278 x 184 x 10 (mm)
Operation Temperature	-10... +70 °C
Storage Temperature	-20... +80 °C
Surface Treatment	Anti-Glare



ONation Corporation

TFT COLOR LCD MODULE

MODEL: OT121ABWDLV-H0
(Complied with RoHS)

WXGA
LVDS interface (1port)

Version: P0.1

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

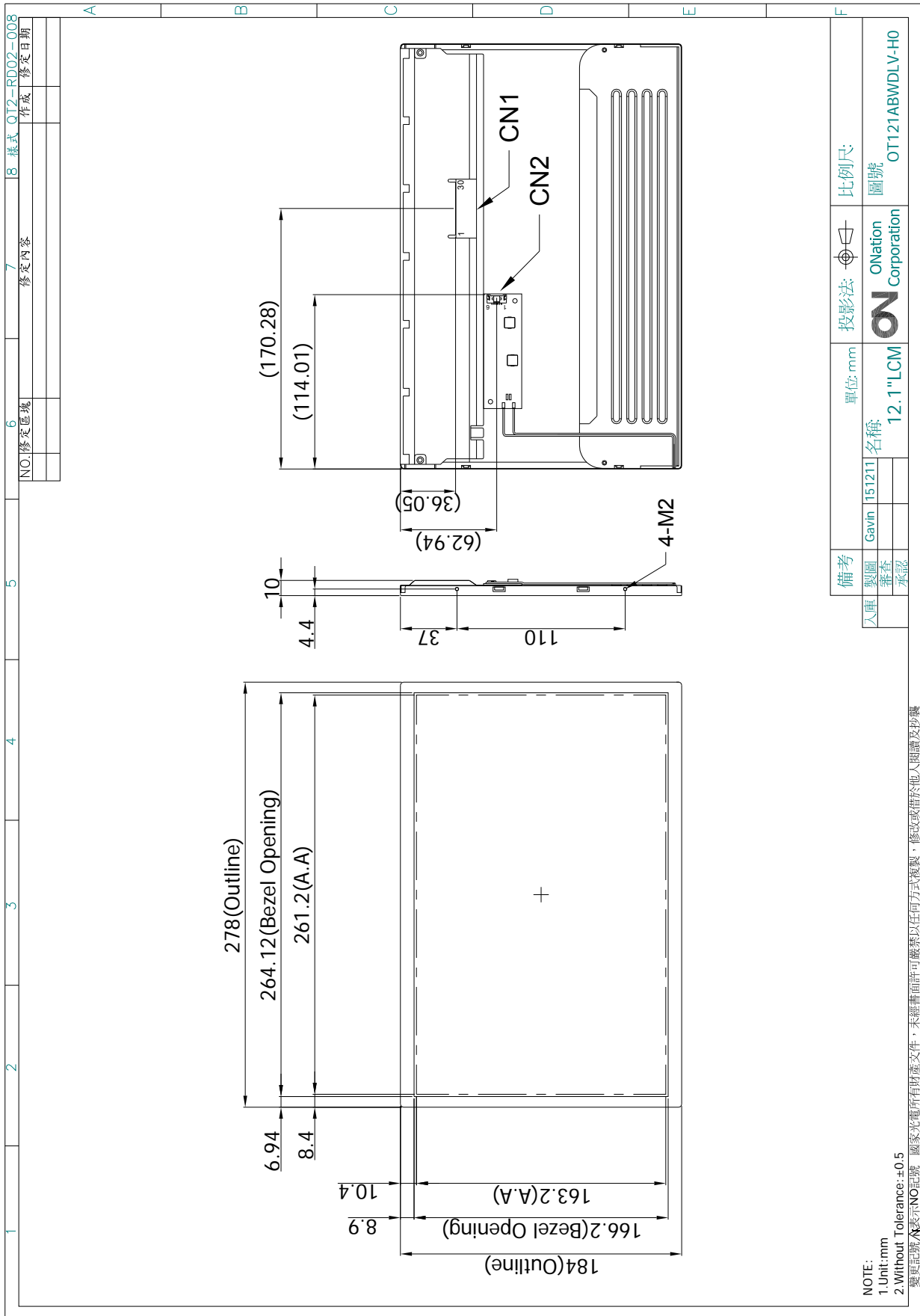
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2.MECHANICAL SPECIFICATIONS

(1)	Number Of Dots (Dots)	1280(R.G.B) X 800
(2)	Module Size(mm)	278(H) X 184(V) X 10(D)
(3)	Active Area(mm)	261.12(H) X 163.2(V)
(4)	Pixel Pitch(mm)	0.204 (H) X 0.204(V)
(5)	LCD / Polarizer Model	TFT , Transmissive, Normally/ Black, Anti-Glare
(6)	Backlight Color	White, LED
(7)	Viewing Direction	Wide Viewing Angle Horizontal : Right side 88°(typ.), Left side 88°(typ.) Vertical : Up side 88°(typ.), Down side 88°(typ.)
(8)	Gray Scale Inversion Direction	No GSI
(9)	Electrical Interface	LVDS Interface
(10)	Color Configuration	R.G.B Stripe
(11)	Module Weight(g)	TBD±5%

3. OUTLINE DIMENSIONS



4. INTERFACE PIN CONNECTION

4.1 LCM PANEL DRIVING SECTION

CN1 Connector : Starconn 093G30-B0001A-G4 or Equivalen

PIN NO	SYMBOL	FUNCTION	REMARK
1	NC	No Connection	
2	NC	No Connection	
3	NC	No Connection	
4	NC	No Connection	
5	NC	No Connection	
6	NC	No Connection	
7	GND	Ground	
8	GND	Ground	
9	VCC	Power supply: +3.3V	
10	VCC	Power supply: +3.3V	
11	GND	Ground	
12	GND	Ground	
13	RXIN0-	Negative transmission data of pixel 0	
14	RXIN0+	Positive transmission data of pixel 0	
15	GND	Ground	
16	RXIN1-	Negative transmission data of pixel 1	
17	RXIN1+	Positive transmission data of pixel 1	
18	GND	Ground	
19	RXIN2-	Negative transmission data of pixel 2	
20	RXIN2+	Positive transmission data of pixel 2	
21	GND	Ground	
22	RXCLK-	Negative of clock	
23	RXCLK+	Positive of clock	
24	GND	Ground	
25	RXIN3-	Negative transmission data of pixel 3	
26	RXIN3+	Positive transmission data of pixel 3	
27	GND	Ground	
28	SEL6/8	LVDS 6/8 bit select function control,	Note 1
		Low or NC→6 bit Input Mode	
		High→8bit Input Mode	
29	GND	Ground	
30	GND	Ground	

Note 1 "Low" stands for 0V. "High" stands for 3.3V

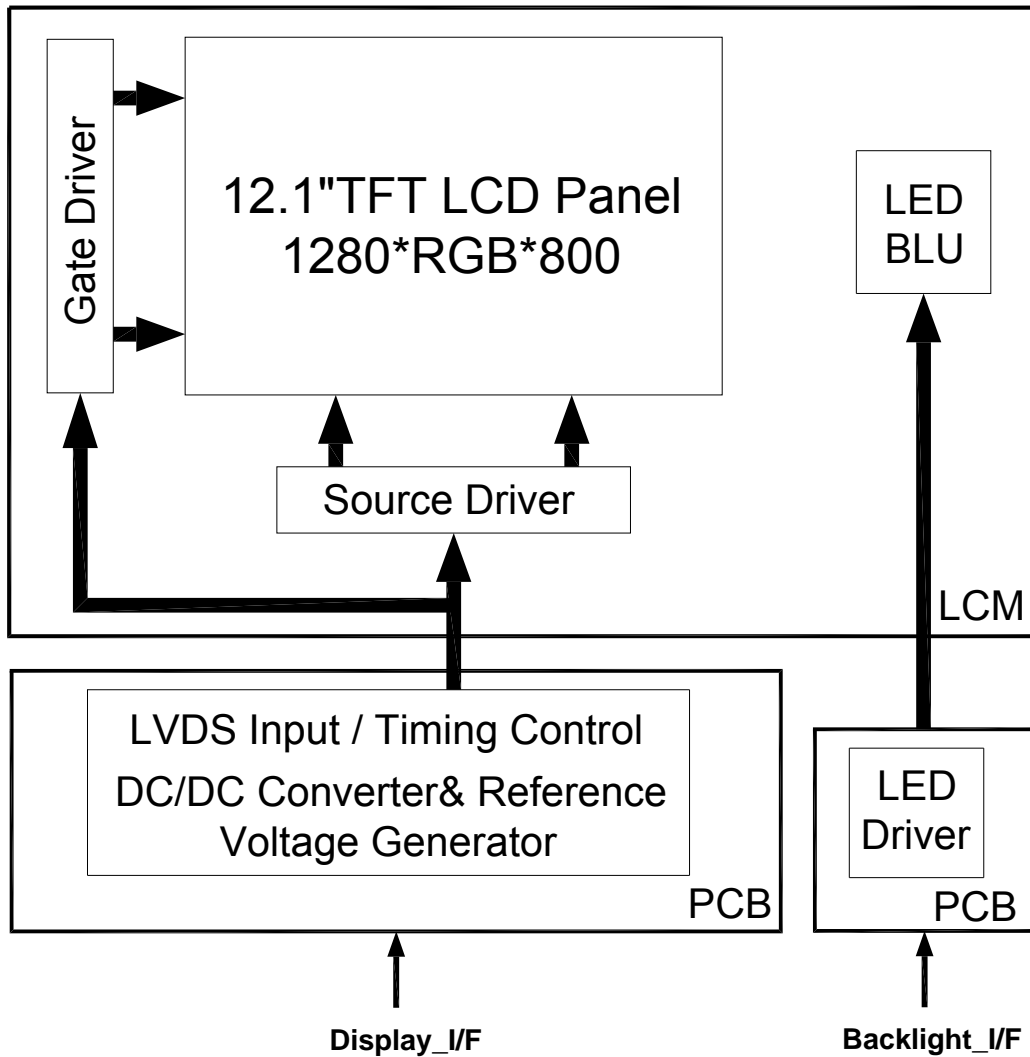
4.2 BACKLIGHT DRIVING SECTION

CN2 Connector : 3808K-Q06N-03R or Equivalen

Mating Connector : H208K-P06N-02B or Equivalen

PIN NO.	SIGNAL	FUNCTION	REMARK
1	VLED	Converter input voltage	
2	VLED	Converter input voltage	
3	EN	Enable pin (3.3V-ON,0V-OFF)	
4	ADJ	Dimming(PWM)	
5	GND	Converter ground Ground	
6	GND	Converter ground Ground	

5. BLOCK DIAGRAM



6. ABSOLUTE MAXIMUM RATINGS

6.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

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

Note1 : 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)	-10	(70)	-20	80	Note 1,2,3
Humidity(% RH)	Note 4		Note 4		Note 4

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) & -10°C ≤ 240Hrs.

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

7. ELECTRICAL CHARACTERISTICS

7.1 ELECTRICAL CHARACTERISTICS OF LCD

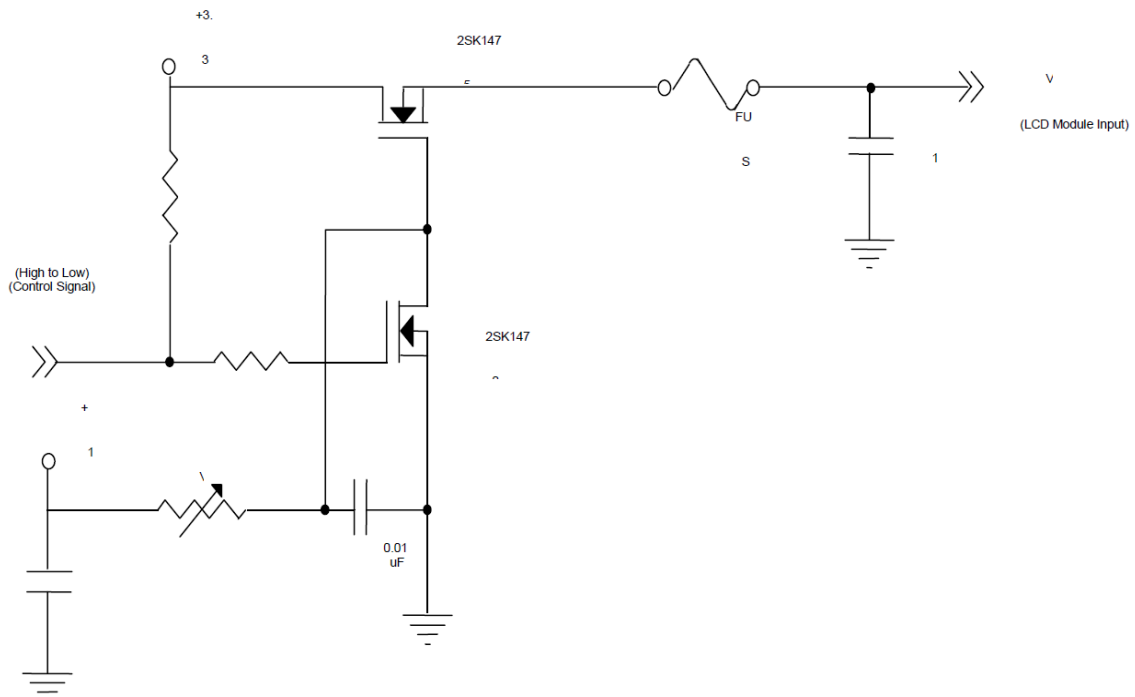
Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
Power Voltage for LCD	VCC	3.0	3.3	3.6	V
	ICC**	450	500	550	mA
Permissive Ripple Voltage	VRP	-	50	-	mV
Rush Current	IRUSH	-	-	1.5	A
Initial Stage Current	IIS	-	-	1.0	A
LVDS Differential Input High Threshold	VTH(LVDS) VCM=1.2V	-	-	+100	mV
LVDS Differential Input Low Threshold	VTL(LVDS) VCM=1.2V	-100	-	-	mV
LVDS Common Mode Voltage	VCM	1.125	-	1.375	V
LVDS Differential Input Voltage	VID	100	-	600	mV
Terminating Resistor	RT	-	100	-	Ohm
Power per EBL WG	PEBL	-	2.68	-	W

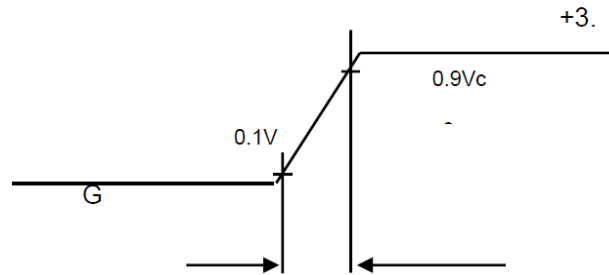
**test pattern : ALL White

Note 1 : The assembly should be always operated within above ranges.

Note 2 : Measurement Conditions:



VCC rising time is 470us



Note 3 : The specified power supply current is under the conditions at Vcc = 3.3 V, Ta = 25 ± 2 °C, fv = 60 Hz,

7.2 BACKLIGHT UNITS

Ta=25°C

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT
LED Driving Voltage		VLED	9.0	12.0	15.0	V
		ILED (VLED=12.0V)	-	(1.4)	(1.7)	A
PWM Control Level	PWM High Level	-	3.0	3.3	3.6	V
	PWM Low Level	-	0	-	1.0	V
PWM Control Duty Ratio		-	0	-	100	%
PWM Control Frequency		f _{PWM}	100	-	2000	Hz
LED Life Time (For Reference Only)		Ta=25°C 60-70%RH (Note 1)	-	50000	-	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). 50,000 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 PWM=100% until the brightness becomes ≤ 50% of its original value.

8. OPTICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio	CR		800	1000	-	-	Note 1
Response Time	TR		-	15	20	ms	Note 2
	TF		-	10	15	ms	
Chromaticity	Red	x	(0.515)	(0.565)	(0.615)	-	Note 4
		y	(0.301)	(0.351)	(0.401)	-	
	Green	x	(0.307)	(0.357)	(0.407)	-	
		y	(0.540)	(0.590)	(0.640)	-	
	Blue	x	(0.105)	(0.155)	(0.205)	-	
		y	(0.081)	(0.131)	(0.181)	-	
	White	x	(0.263)	(0.313)	(0.363)	-	
		y	(0.279)	(0.329)	(0.379)	-	
Viewing Angle	Hor.	θ_{x+}	80	88	-	Deg.	Note 3
		θ_{x-}	80	88	-		
	Ver.	θ_{y+}	80	88	-		
		θ_{y-}	80	88	-		
Luminance	L	PWM=100%	-	1000	-	cd/m ²	
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.

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

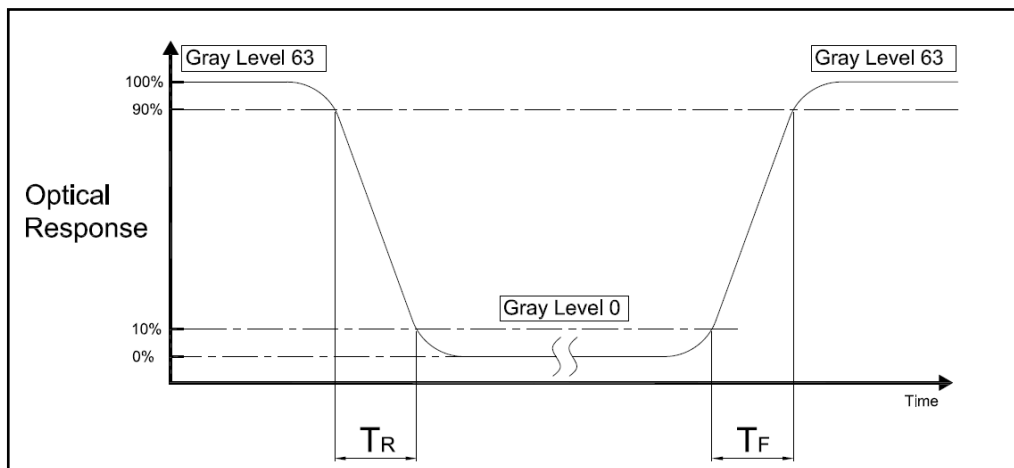
L63 : Luminance of gray level 63

L0 : Luminance of gray level 0

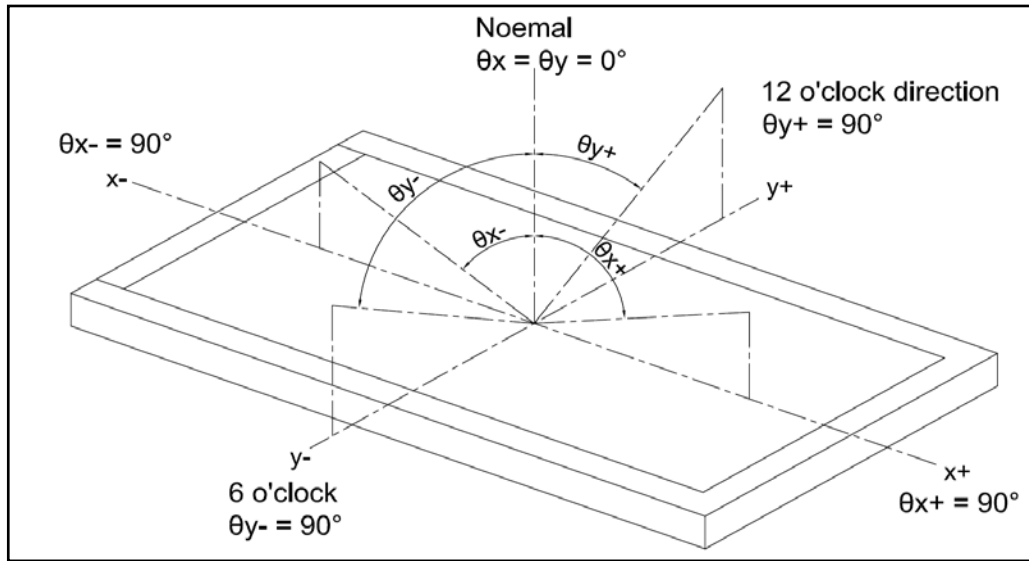
$$CR = CR(5)$$

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)

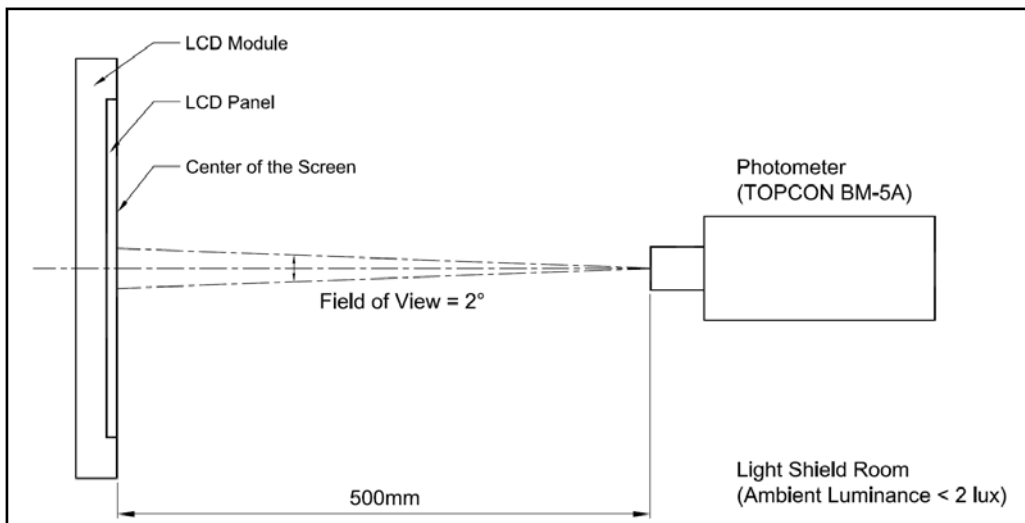


Note 3 : Definition of Viewing Angle

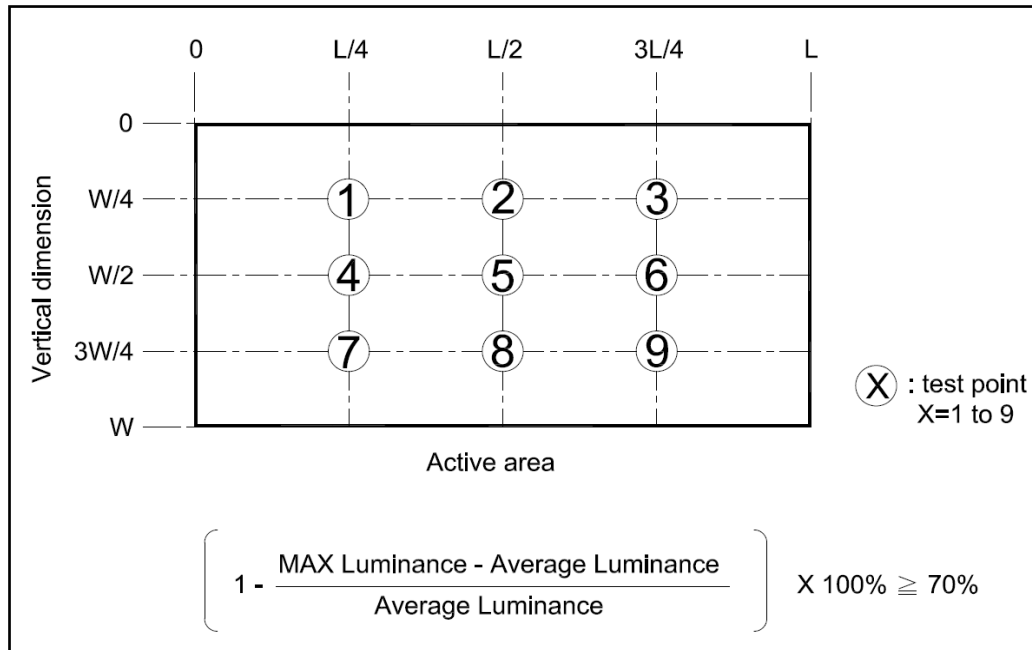


Note 4 : Measurement Set-Up:

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 :

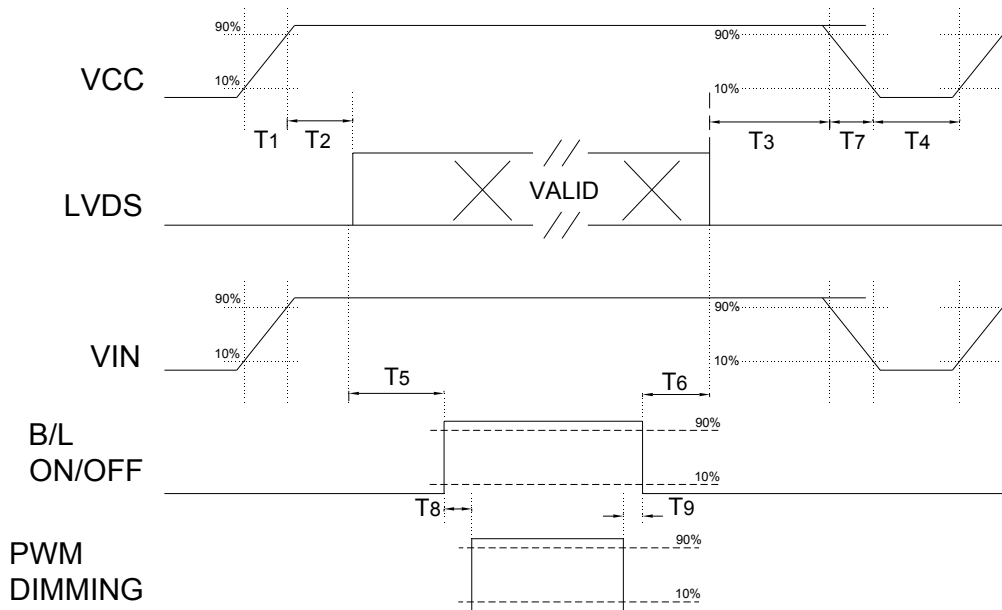


9. TIMING SPECIFICATIONS

9.1 POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of LCD assembly, the power on/off sequence should be as the diagram below.

Power ON/OFF sequence



Note 1 Please avoid floating state of interface signal at invalid period.

Note 2 When the interface signal is invalid, be sure to pull down the power supply of LCD VCC to 0 V.

Note 3 The Backlight converter power must be turned on after the power supply for the logic and the Interface signal is valid. The Backlight converter power must be turned off before the power supply for the logic and the interface signal is invalid.

ITEM	MIN.	TYP.	MAX.	UNIT
T1	0.5	-	10	ms
T2	0	-	50	ms
T3	0	-	50	ms
T4	500	-	-	ms
T5	200	-	-	ms
T6	20	-	-	ms
T7	5	-	300	ms
T8	10	-	-	ms
T9	10	-	-	ms

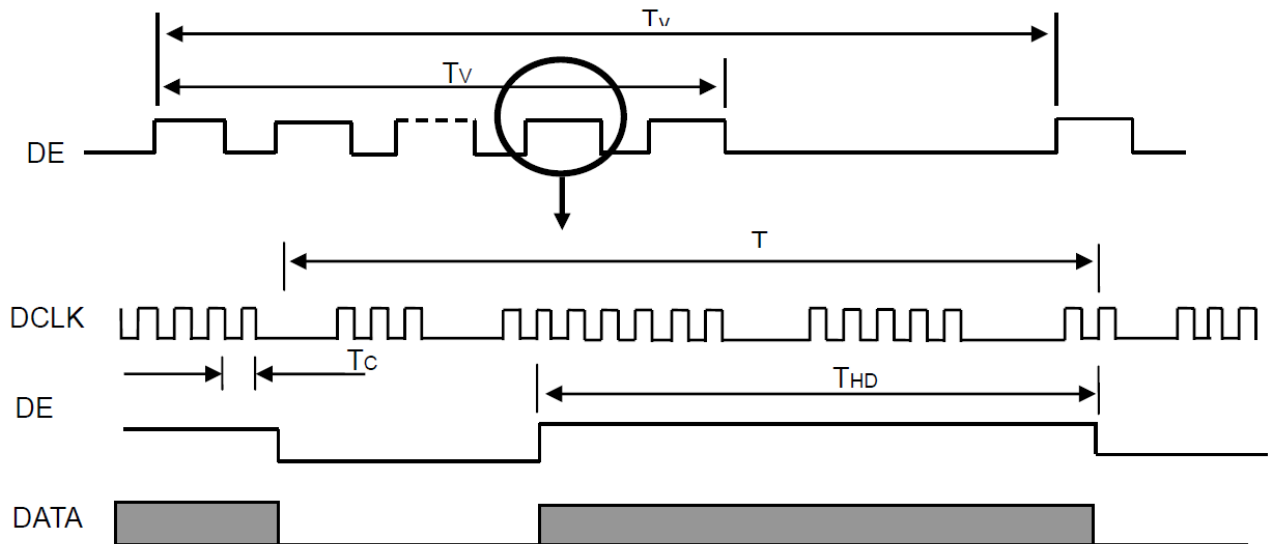
9.2 DISPLAY TIMING SPECIFICATIONS

The input signal timing specifications are shown as the following table and timing diagram.

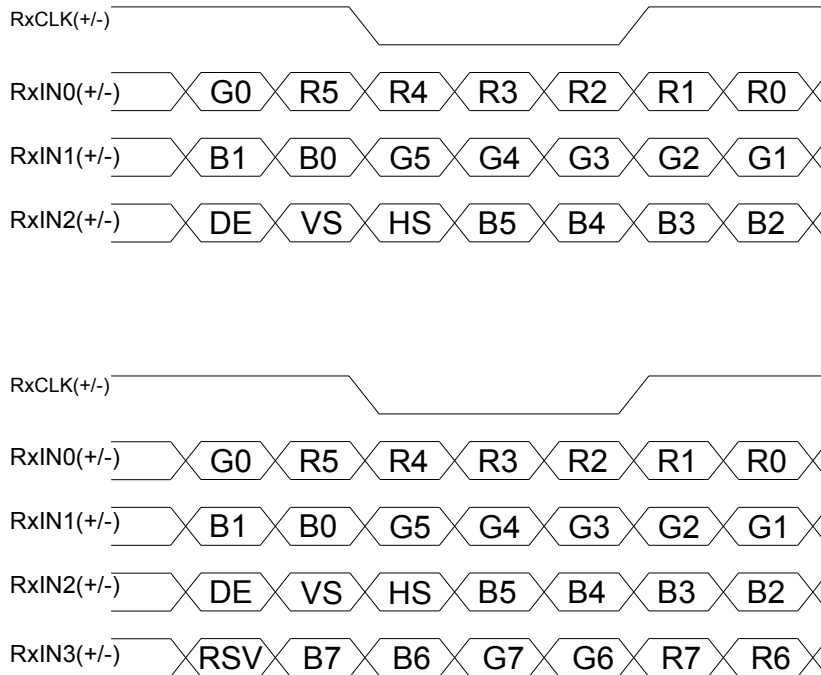
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Frequency	1/Tc	67.45	71	74.55	MHz	
Vertical Total Time	TV	810	823	1000	TH	
Vertical Addressing Time	TVD	800	800	800	TH	
Horizontal Total Time	TH	1360	1440	1600	Tc	
Horizontal Addressing Time	THD	1280	1280	1280	Tc	

Note: Because this module is operated by DE only mode, Hsync and Vsync input signals are ignored.

INPUT SIGNAL TIMING DIAGRAM



9.3 THE INPUT DATA FORMAT



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

Note 2 : Please follow PSWG

SIGNAL NAME	DESCRIPTION	REMARK
R7 R6 R5 R4 R3 R2 R1 R0	Red Data 7(MSB) Red Data 6 Red Data 5 Red Data 4 Red Data 3 Red Data 2 Red Data 1 Red Data 0(LSB)	Red-pixel Data Each red pixel's brightness data consists of these 8 bits pixel data.
G7 G6 G5 G4 G3 G2 G1 G0	Green Data 7(MSB) Green Data 6 Green Data 5 Green Data 4 Green Data 3 Green Data 2 Green Data 1 Green Data 0(LSB)	Green-pixel Data Each green pixel's brightness data consists of these 8 bits pixel data.
B7 B6 B5 B4 B3 B2 B1 B0	Blue Data 7(MSB) Blue Data 6 Blue Data 5 Blue Data 4 Blue Data 3 Blue Data 2 Blue Data 1 Blue Data 0(LSB)	Blue-pixel Data Each blue pixel's brightness data consists of these 8 bits pixel data.
RxCLK	LVDS Clock Input	
DE	Display Enable	
VS	Vertical Sync	
HS	Horizontal Sync	

Note 3 : Output signals from any system shall be low or Hi-Z state when VCC is off

9.4 LVDS INPUT SIGNAL SPECIFICATIONS

COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 6-bit gray scale data input for the color.

The higher the binary input, the brighter the color. The table below provides the assignment of color.

Color		Data Signal																	
		Red						Green						Blue					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale Of Red	Red(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(61)	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale Of Green	Green(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(61)	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0
	Green(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Gray Scale Of Blue	Blue(0)/Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
	Blue(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

Note 1 0: Low Level Voltage, 1: High Level Voltage

10. RELIABILITY TEST

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	80°C	240HRS	
2	Low Temperature Storage	-20°C	240HRS	
3	High Temperature Operation	(70°C)	240HRS	
4	Low Temperature Operation	-10°C	240HRS	
5	Temperature Cycle	-20°C ← 25°C → 70°C (30min) (5min) (30min)	100CYCLE	
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 24 hours at room temperature.

11. LCM INSPECTION STANDARD

Inspection specifications refer ONation Corporation LCM INSPECTION
STANDARD Document.
Document Number : TBD

12. PACKAGE INFORMATION

LCM MODEL	LCM QTY. IN THE BOX	INNER BOX SIZE (mm)	WEIGHT	REMARK
OT121ABWDLV-H0	TBD	TBD	TBD	

13.PRECAUTIONS FOR USE

13.1 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.

13.2 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.

13.3 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.

13.4 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.