





# ONation Corporation

## CUSTOMER' S APPROVAL SPECIFICATIONS

**MODEL:OT070NGDDDN-00**  
**(Complied with RoHS)**

CUSTOMER: \_\_\_\_\_

Version:P0.1

### C O N T E N T S

**ISSUE:JUL.18.2013**

**Spec Condition:preliminary**

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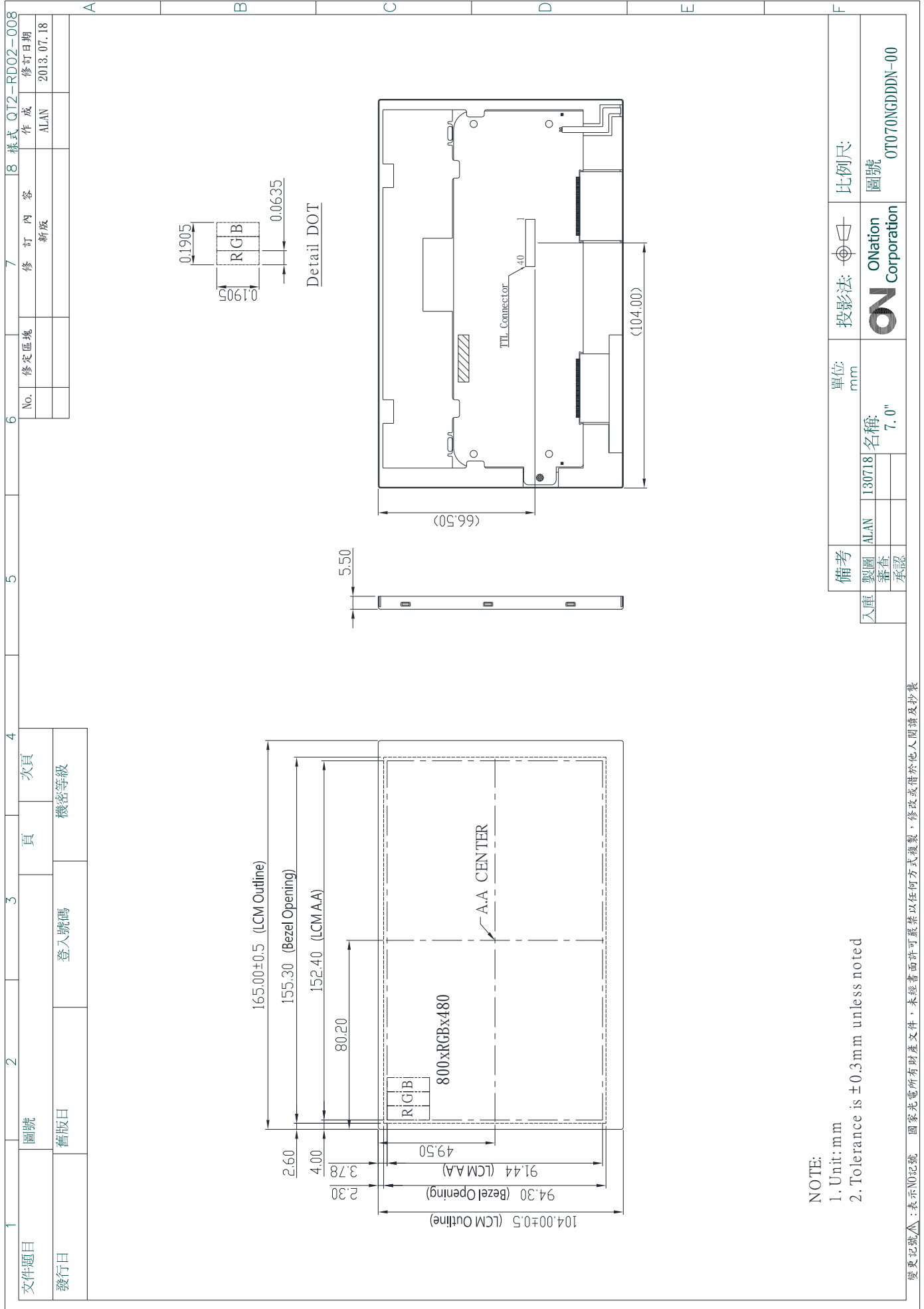
CUSTOMER	ONATION		
APPROVAL	APPROVAL	CHECKER	PREPARE
	<i>Joly</i>	<i>Joly</i>	<i>lan</i>



### 3. MECHANICAL SPECIFICATIONS

(1)	Number Of Dots (Dots)	800(R.G.B) X 480
(2)	Module Size(mm)	165.0(W) X 104.0(H) X 5.5(D)
(3)	Active Area(mm)	152.4(H) X 91.44(V)
(4)	Pixel Pitch(mm)	0.1905(H) X 0.1905(V)
(5)	LCD Model	TFT , Transmissive, Normally/White
(6)	Polarizer Model	Anti-Glare
(7)	LED Backlight Color	White
(8)	Viewing Direction	12 O'clock
(9)	Gray Scale Inversion Direction	6 O'clock
(10)	Electrical Interface	TTL Interface
(11)	Color Configuration	R.G.B Vertical Stripe
(12)	Driving Method	COG TYPE
(13)	Module Weight(g)	(210) ± 5

# 4. OUTLINE DIMENSIONS



NOTE:  
 1. Unit: mm  
 2. Tolerance is ± 0.3mm unless noted

備考	單位: mm	投影法:	比例尺:
製圖	ALAN	ON Corporation	圖號
審核	130718		OT070NGDDN-00
承認	名稱		
	7.0"		

變更記號: 表示NO記號 國家光電所有財產文件，未經書面許可嚴禁以任何方式複製，修改或借於他人閱讀及抄襲

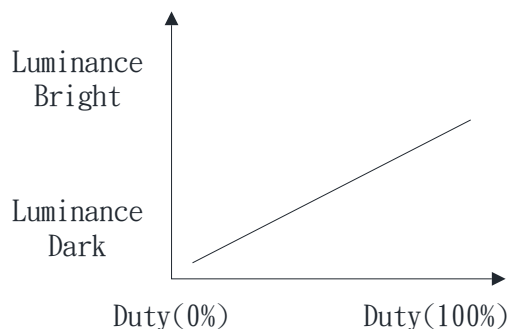
## 5. INTERFACE PIN CONNECTION

### 5.1 LCM PANEL DRIVING SECTION

CN1 Connector: Hirose FH33-40S-0.5SH(10) or Compatible

PIN NO	SYMBOL	FUNCTION	REMARK
1	VLED	Power Supply For LED Driver	
2	VLED	Power Supply For LED Driver	
3	ADJ	Adjust The Led Brightness With PWM Pulse	Note 1,2
4	GLED	Ground For LED Circuit	
5	GLED	Ground For LED Circuit	
6	VCC	Power Supply For Digital Circuit	
7	VCC	Power Supply For Digital Circuit	
8	MODE	DE or HV mode control	Note 3
9	DE	Data Enable	
10	VS	Vsync Signal Input	
11	HS	Hsync Signal Input	
12	GND	Power Ground	
13	B5	Blue Data Input (MSB)	
14	B4	Blue Data Input	
15	B3	Blue Data Input	
16	GND	Power Ground	
17	B2	Blue Data Input	
18	B1	Blue Data Input	
19	B0	Blue Data Input (LSB)	
20	GND	Power Ground	
21	G5	Green Data Input(MSB)	
22	G4	Green Data Input	
23	G3	Green Data Input	
24	GND	Power Ground	
25	G2	Green Data Input	
26	G1	Green Data Input	
27	G0	Green Data Input(LSB)	
28	GND	Power Ground	
29	R5	Red Data Input(MSB)	
30	R4	Red Data Input	
31	R3	Red Data Input	
32	GND	Power Ground	
33	R2	Red Data Input	
34	R1	Red Data Input	
35	R0	Red Data Input(LSB)	
36	GND	Power Ground	
37	DCLK	Sample Clock	
38	GND	Power Ground	
39	L/R	Select Left Or Right Scanning Direction	Note 4,5
40	U/D	Select Up Or Down Scanning Direction	Note 4,5

Note1: Pin3. is used to adjust brightness.



Note 2: ADJ signal=0 ~3.3V; Operating frequency:100 Hz ~ 25K Hz.

F=100 Hz ~ 25K Hz



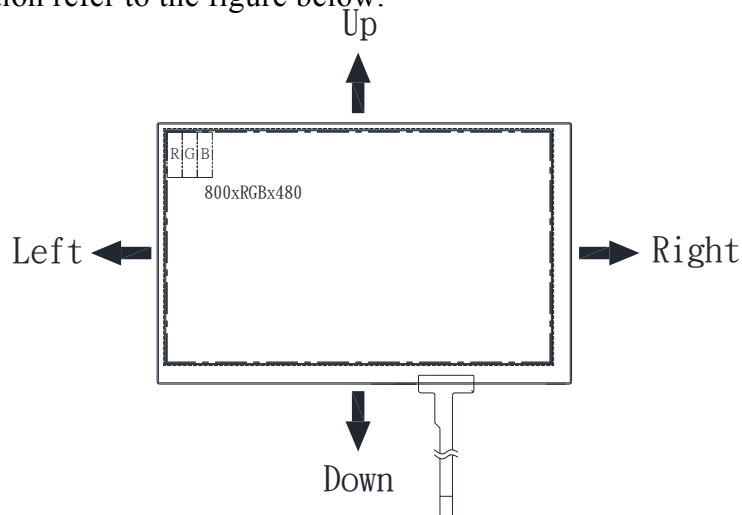
Note 3: DE Mode: Mode="H",HS floating and VS floating.

HV Mode: Mode="L" and DE floating.

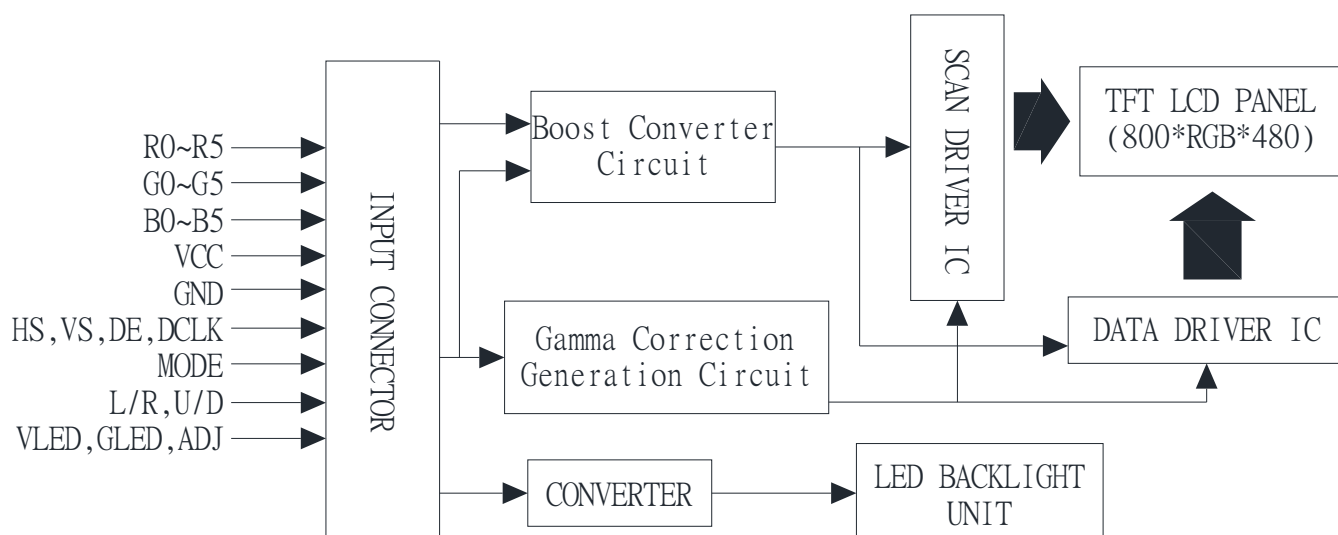
Note 4: Selection of scanning mode

SETTING OF SCAN CONTROL INPUT		SCANNING DIRECTION
U/D	L/R	
GND	VCC	Up To Down, Left To Right
VCC	GND	Down To Up, Right To Left
GND	GND	Up To Down, Right To Left
VCC	VCC	Down To Up, Left To Right

Note 5: Scanning direction refer to the figure below.



## 6. BLOCK DIAGRAM



## 7. ABSOLUTE MAXIMUM RATINGS

### 7.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power Supply Voltage	VCC	-0.3	6.0	V	
	VLED	-	5.5	V	
Logic Output Voltage	V <sub>I</sub>	-0.3	VCC+0.3	V	

### 7.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature(°C)	-20	70	-30	80	Note 1,2,3
Humidity(% RH)	-	90	-	90	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 & -20°C ≤ 240Hrs.

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



## 8.ELECTRICAL CHARACTERISTICS

### 8.1 ELECTRICAL CHARACTERISTICS OF LCD

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
Power Voltage for LCD	VCC	3.1	3.3	3.5	V
	ICC**	-	(250)	(300)	mA
Input High Voltage	V <sub>IH</sub>	0.7*VCC	-	VCC	V
Input Low Voltage	V <sub>IL</sub>	GND	-	0.3*VCC	V

\*\*test pattern : ALL Black

Note1: VCC setting should match the signals output voltage (refer to Note 4) of customer's system board.

Note 4: DCLK,DE, HS, VS, R0~ R5,,G0~ G5,B0~ B5.

### 8.2 BACKLIGHT UNITS

Ta=25°C

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
LED Driving Voltage	VLED	4.8	5.0	5.2	V
LED Driving Current	I <sub>LED</sub> (VLED=5.0V)	-	500	550	mA
ADJ Input Voltage	-	3.0	-	3.3	V
ADJ Frequency	-	100	-	25K	Hz
LED Life Time (For Reference only)	Ta=25°C 60-70%RH(Note1)	20000	-	-	Hr

Note 1: LED driving voltage.

Note 2: LED driving current.

Note 3: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25°C and VLED=5.0V. The LED lifetime could be decreased if operating VLED is larger than 5.0V.

## 9.OPTICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio	CR	At optimized Viewing angle	400	500	-	-	Note (1)
Response Time	TR	T=0	-	10	20	ms	Note (2)
	TF		-	15	30	ms	
Brightness		ADJ=3.3V Center point	240	300	-	cd/m2	
Uniformity			70	75	-	%	Note(5)
Chromaticity	White	x	0.26	0.31	0.36	-	Note (4)
		y	0.28	0.33	0.38	-	
Viewing Angle	ΘY+	CR ≥ 10	40	50	-	Deg.	Note (3)
	ΘY-		50	70	-		
	ΘX-		60	70	-		
	ΘX+		60	70	-		

\*Note (1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L63 / L0$$

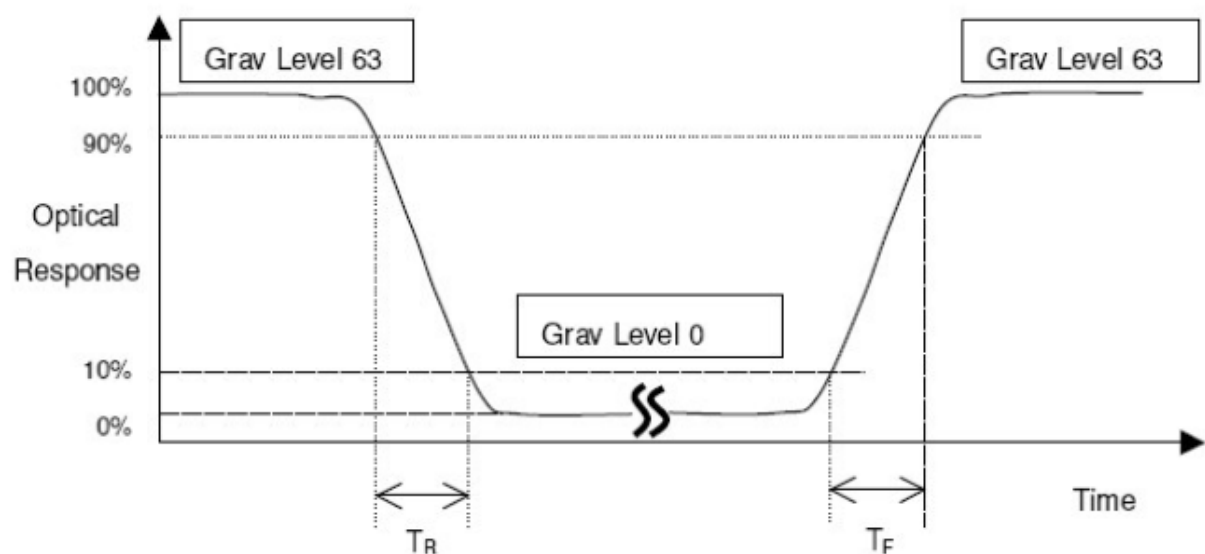
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

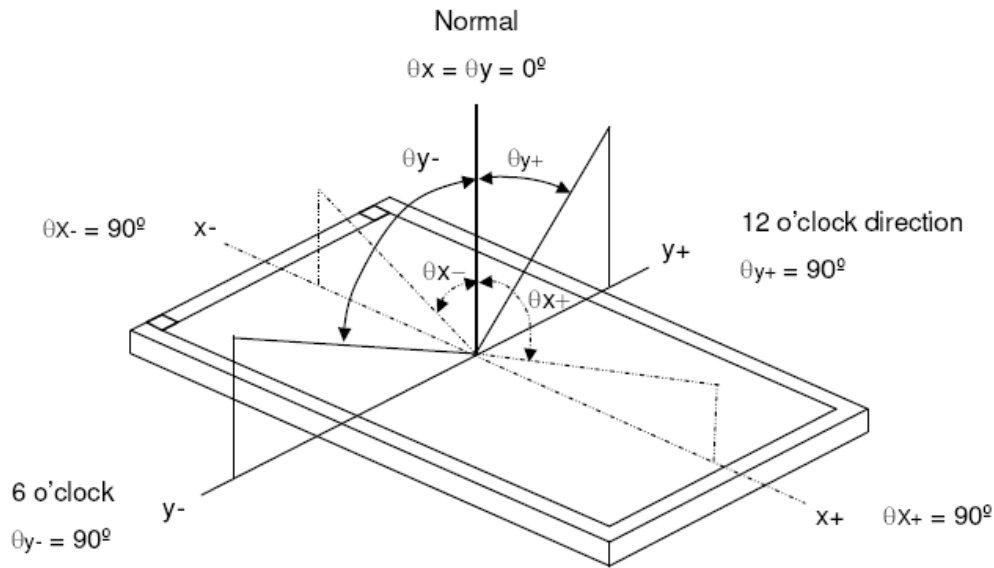
$$\text{CR} = \text{CR} (5)$$

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):

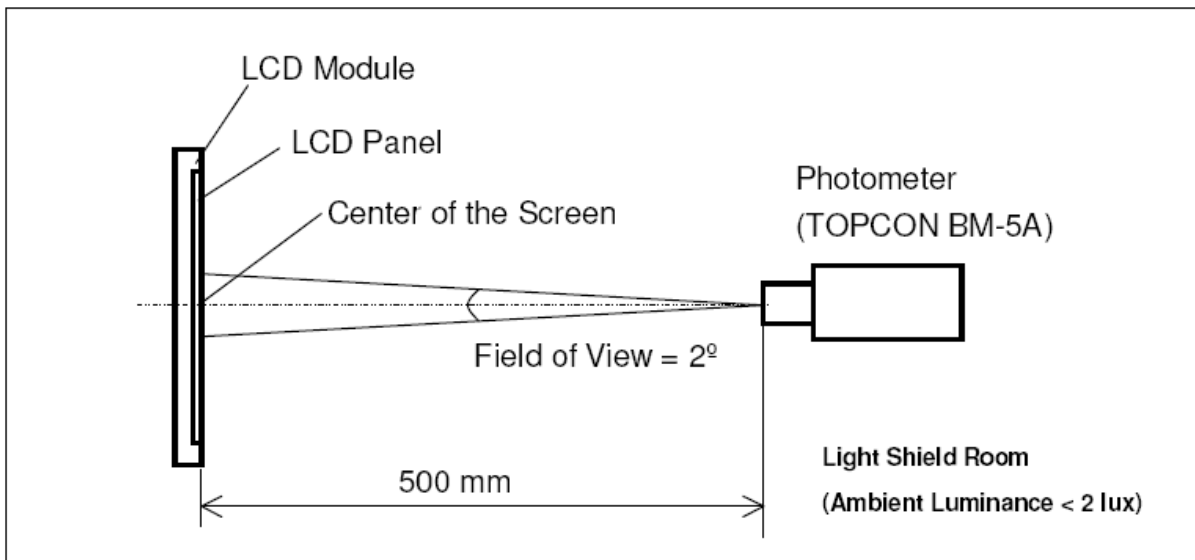


\*Note(3) Definition of Viewing Angle

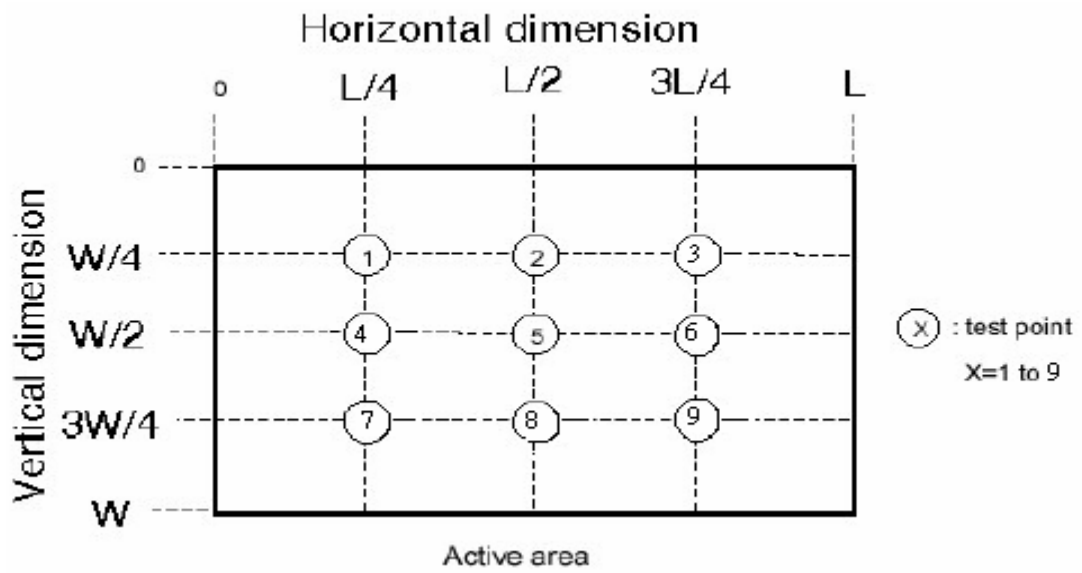


\*Note (4) Measurement Set-Up:

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



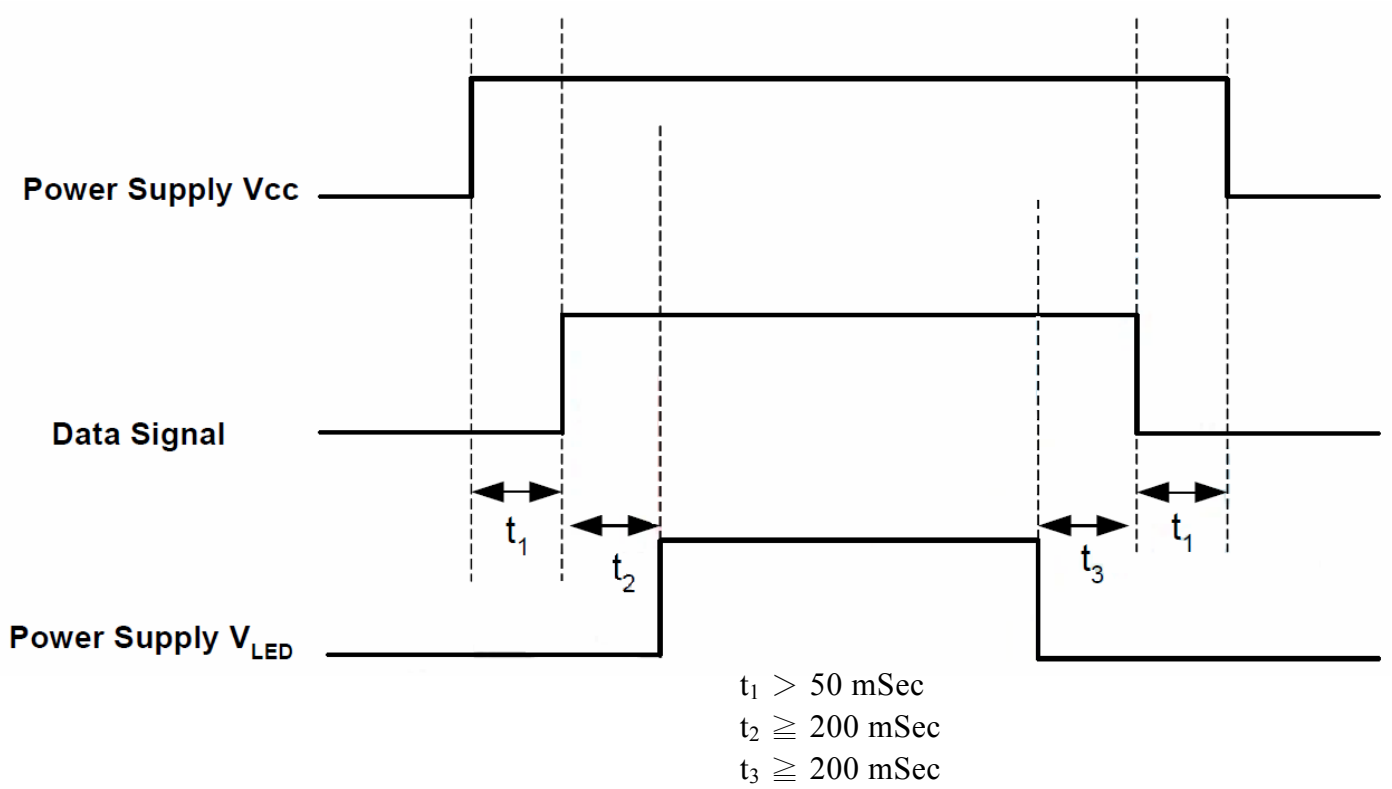
\*Note (5)



$$\left( 1 - \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}} \right) \times 100\% > 70\%$$

# 10. TIMING SPECIFICATIONS

## 10.1 POWER SIGNAL SEQUENCE



Note: Data Signal includes DCLK, DE, HS, VS, R0~ R5, G0~ G5, B0~ B5.

## 10.2 TIMING CHARACTERISTICS

### 10.2.1 Timing Conditions

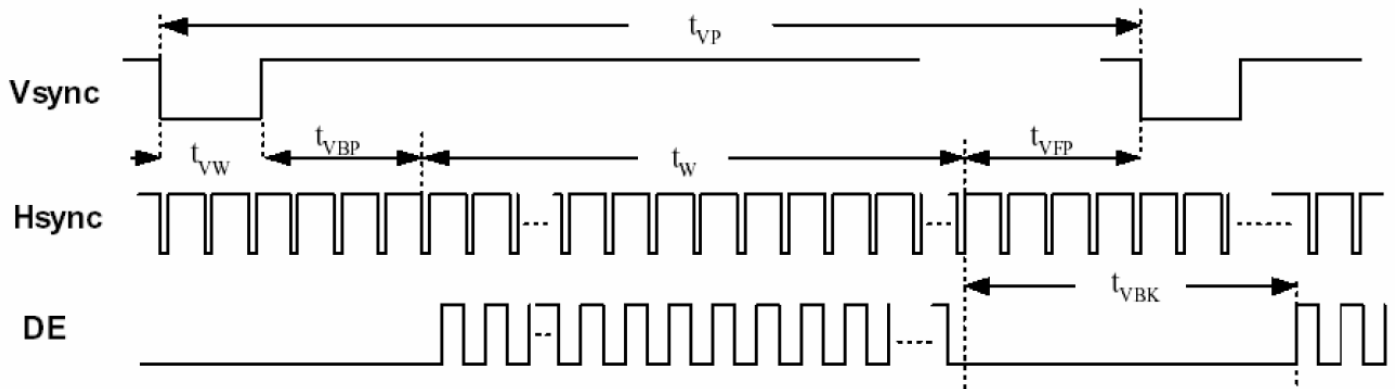
Input signal characteristics of SYNC mode.

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Clock Period	$t_{CLK}$	23.2	25.0	30.7	ns	
Clock Frequency	$f_{CLK}$	32.4	40.0	43.0	MHz	
Clock Low Level Width	$t_{WCL}$	8	-	-	ns	
Clock High Level Width	$t_{WCH}$	8	-	-	ns	
Clock Rise/Fall Time	$t_{CLKr}, t_{CLKf}$	-	-	3	ns	
HSYNC Period	$t_{HP}$	862	1056	1100	$t_{CLK}$	
HSYNC Pulse Width	$t_{HW}$	-	1	-	$t_{CLK}$	
HSYNC Back Porch	$t_{HBP}$	-	45	-	$t_{CLK}$	
HSYNC Width + Back Porch	$t_{hw} + t_{HBP}$	46			$t_{CLK}$	
Horizontal valid data width	$t_{HV}$	800			$t_{CLK}$	
HSYNC Front Porch	$t_{HFP}$	$t_{HP} - t_{HW} - t_{HBP} - t_{HV}$			$t_{CLK}$	
Horizontal Blank	$t_{HBK}$	$t_{HP} - t_{HV}$			$t_{CLK}$	
VSYNC Period	$t_{VP}$	628	635	650	$t_{HP}$	
VSYNC Pulse Width	$t_{VW}$	-	1	-	$t_{HP}$	
VSYNC Back Porch	$t_{VBP}$	22			$t_{HP}$	
Vertical valid data width	$t_w$	480			$t_{HP}$	
Vertical Front Porch	$t_{VFP}$	$t_{VP} - t_{VW} - t_{VBP} - t_w$			$t_{HP}$	
Vertical Blank tVBK	$t_{VP}$	$t_{VP} - t_w$			$t_{HP}$	
Data Setup Time	$t_{DS}$	5	-	-	ns	
Data Hold Time	$t_{DH}$	10	-	-	ns	

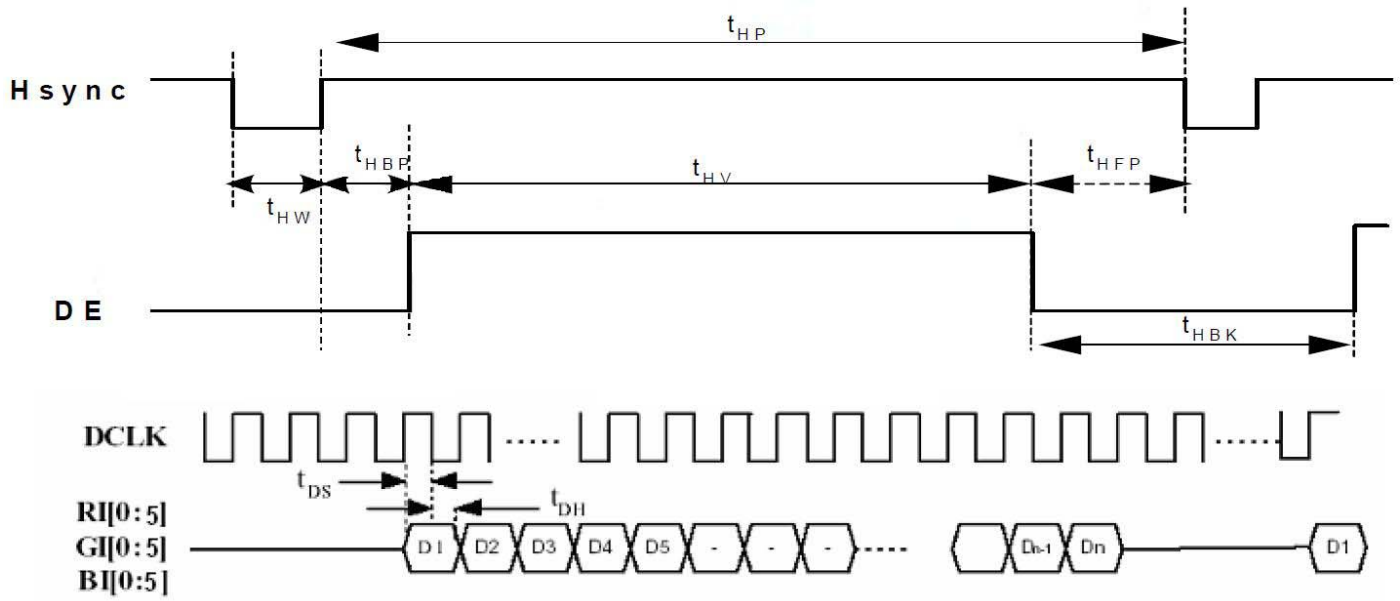
Input signal characteristics of DE mode.

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
DCLK	Period	$t_{CLK}$	23.2	25.0	30.7	ns	
	Frequency	$f_{CLK}$	32.4	40.0	43.0	MHz	
	Low Level Width	$t_{WCL}$	6	-	-	ns	
	High Level Width	$t_{WCH}$	6	-	-	ns	
	Rise/Fall Time	$t_{CLKr}, t_{CLKf}$	-	-	3	ns	
	Duty	-	0.45	0.50	0.55	-	$t_{CLKL} / t_{CLK}$
DE	Setup Time	$t_{DES}$	5	-	-	ns	
	Hold Time	$t_{DEH}$	10	-	-	ns	
	Rise/Fall Time	$t_{DEr}, t_{DEf}$	-	-	16	ns	
	Horizontal Period	$t_{HP}$	862	1056	1100	$t_{CLK}$	
	Horizontal Valid	$t_{HV}$	800			$t_{CLK}$	
	Horizontal Blank	$t_{HBK}$	$t_{HP} - t_{HV}$			$t_{CLK}$	
	Vertical Period	$t_{VP}$	628	635	650	$t_{HP}$	
	Vertical Valid	$t_w$	480			$t_{HP}$	
	Vertical Blank	$t_{VBK}$	$t_{VP} - t_w$			$t_{HP}$	
DATA	Setup Time	$t_{DS}$	5	-	-	ns	
	Hold DATA Time	$t_{DH}$	10	-	-	ns	
	Rise/Fall Time	$t_{Dr}, t_{Df}$	-	-	3	ns	

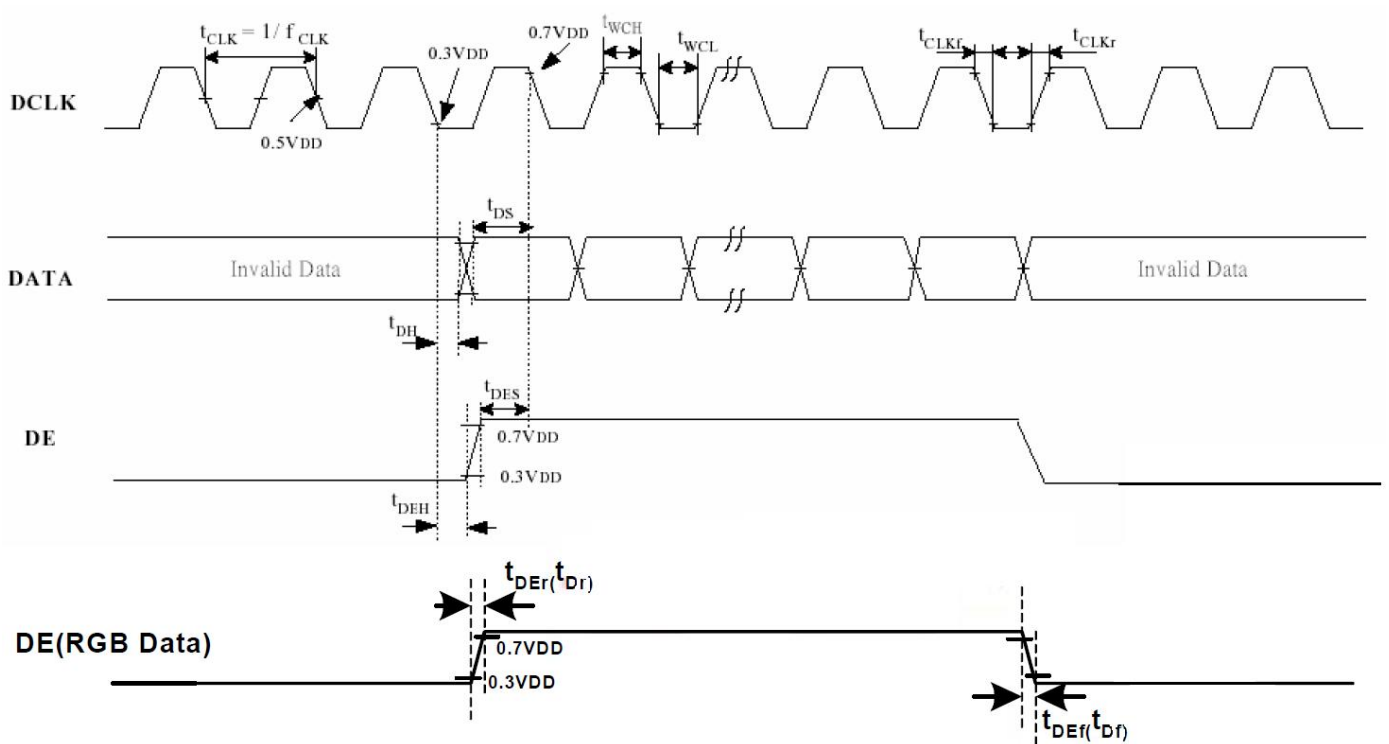
11.2.2 Timing Diagram



Input Vertical Timing



Input Horizontal Timing



DE and RGB Input Timing



## 11. RELIABILITY TEST

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	70°C	240HRS	
2	Low Temperature Storage	-30°C	240HRS	
3	High Temperature Operation	60°C	240HRS	
4	Low Temperature Operation	-20°C	240HRS	
5	Temperature Cycle	-30°C ← → 70°C (30min) (30min)	50CYCLE	
6	High Temperature Humidity Storage	40°C 90%RH	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.

## 12. PRECAUTIONS FOR USE

### 12.1 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.

### 12.2 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.

### 12.3 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.

### 12.4 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.