HY-LINE®
COMPUTER COMPONENTS

TFT-Display Datasheet

ONation
Model: OT070NGDDDT-00

Brief spec.:

Main Feature	LandscapeType
	Transmissive
	Touch Screen
Active Screen Area	152.4 x 91.44 (mm)
Diagonal | Format	7 " | 15:9
Resolution	800 X 480
Colors	(6 Bit)
Backlight	LED
Brightness	240 cd/m²
LED Life Time	20K (h)
Interface	TTL
Viewing Angle	70/70 L/R 50/70 up/down
Touchscreen	yes
Power Supply	3.3 V (Typ.)
Module Outline	165.0x 104.0 x 6.55 (mm)
Operation Temperature	-20... +60 °C
Storage Temperature	-30... +70 °C
Surface Treatment	Anti-glare

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ONation Corporation

CUSTOMER' SAPPROVAL SPECIFICATIONS

MODEL:OT070NGDDDT-00
(Complied with RoHS)

CUSTOMER:_____

Version:P0.1

C O N T E N T S

ISSUE:APR.2.2013

Spec Condition:preliminary

CUSTOMER	ONATION		
APPROVAL	APPROVAL	CHECKER	PREPARE
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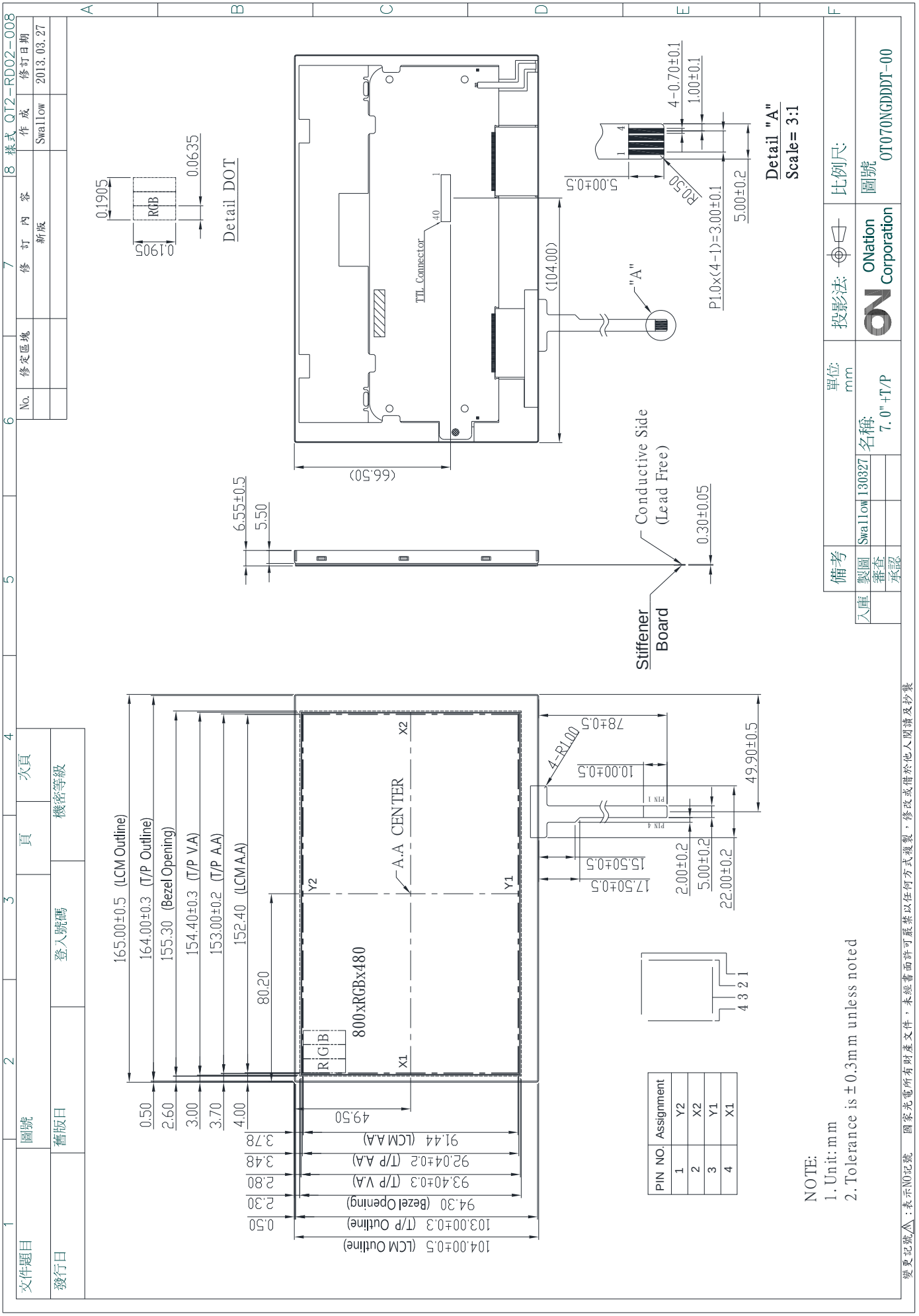
2.RECORD OF REVISION

REV	DATE	PAGE	SUMMARY
0.1	2013.04.02	ALL	Preliminary specification was first issued.

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 6.55(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



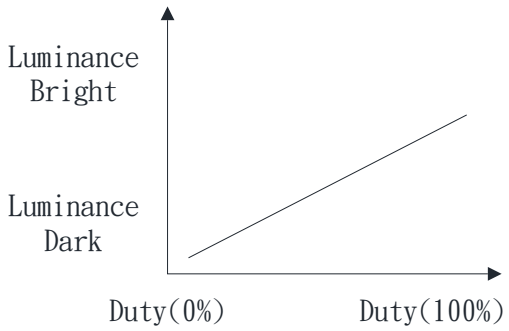
5. INTERFACE PIN CONNECTION

5.1 LCM PANEL DRIVING SECTION

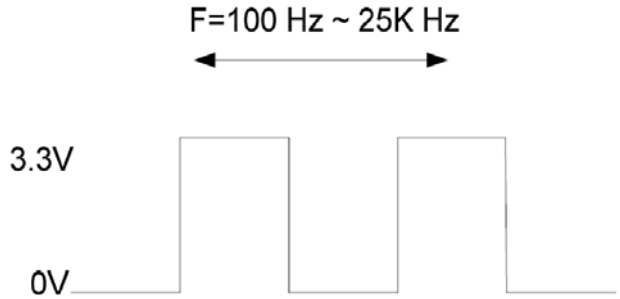
CN1 Connector: Hirose FH33-40S-0.5SH(10) or Compatible

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.

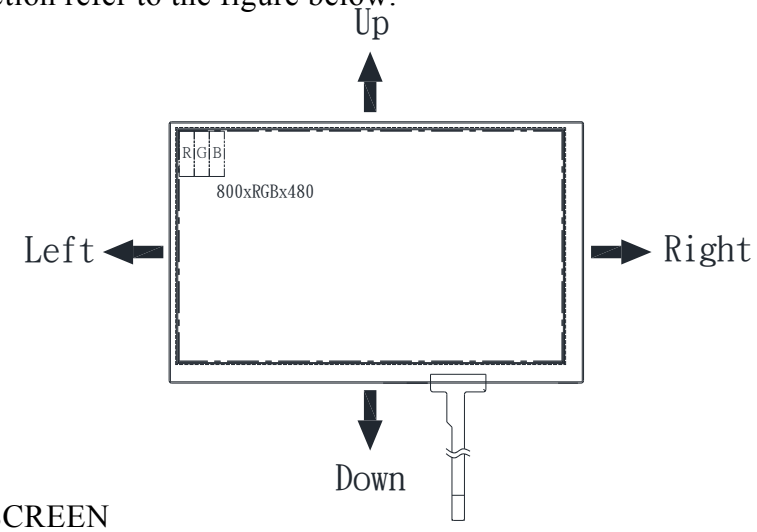


Note 3: DE Mode: Mode="H",HS floating and VS floating.
HV Mode: Mode="L" and DE floating.

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.

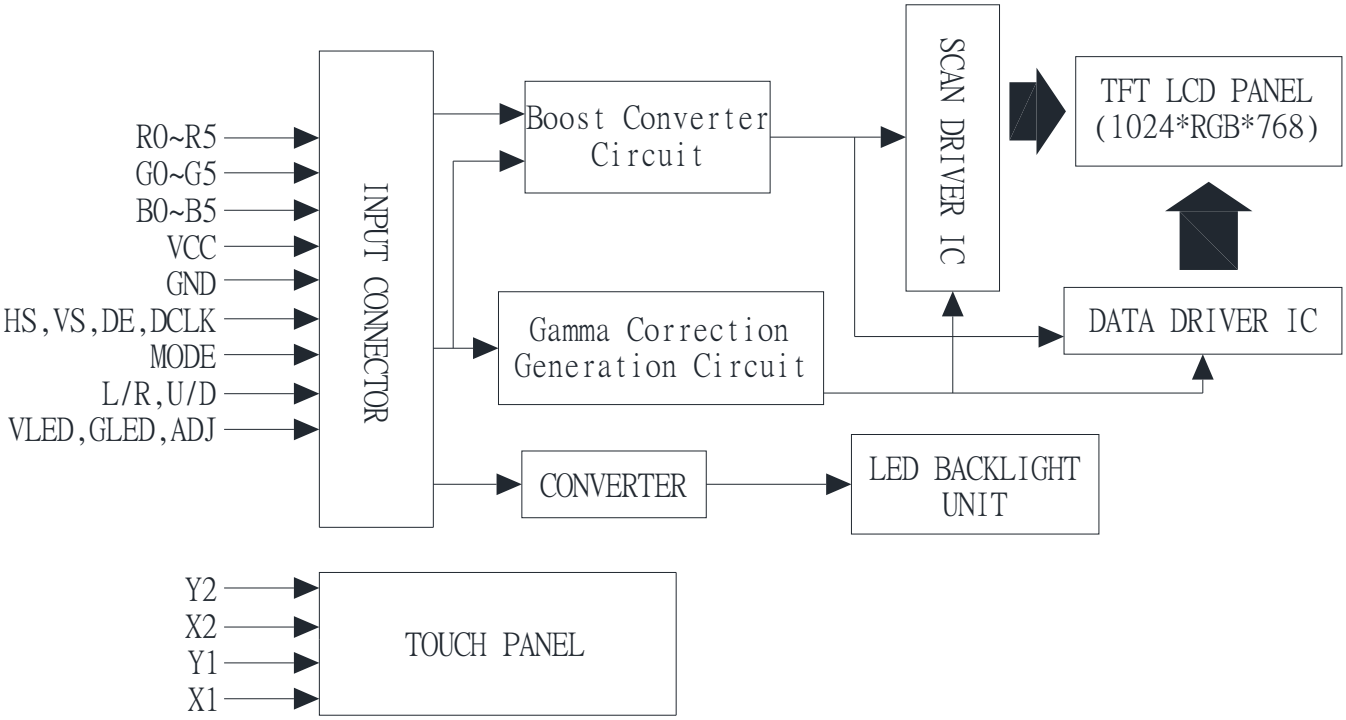


5.2 TOUCH PANEL SCREEN

CN2 Connector: (FPC PITCH=1.0mm)

PIN NO	SYMBOL	FUNCTION	REMARK
1	Y2	Touch Panel Signal(Y-TOP)	
2	X2	Touch Panel Signal(X-Right)	
3	Y1	Touch Panel Signal(Y-Bottom)	
4	X1	Touch Panel Signal(X-Left)	

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_I	-0.3	VCC+0.3	V	

7.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature(℃)	-20	60	-30	70	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℃ & -20℃ ≦ 240Hrs.
Note 4 : Storage Ta=40℃ & H=90% ≦ 240Hrs.

8.ELECTRICAL CHARACTERISTICS

8.1 ELECTRICAL CHARACTERISTICS OF LCD

Ta=25℃

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_{IH}	0.7*VCC	-	VCC	V
Input Low Voltage	V_{IL}	GND	-	0.3*VCC	V

**test pattern：ALL Black

8.2 BACKLIGHT UNITS

Ta=25℃

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
LED Driving Voltage	VLED	4.8	5.0	5.2	V
LED Driving Current	ILED(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℃ 60-70%RH(Note1)	20000	-	-	Hr

Note 1： The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and VLED=5.0V. The LED lifetime could be decreased if operating VLED is larger than 5.0V.

9.OPTICAL CHARACTERISTICS

Ta=25℃

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	200	240	-	cd/m2	
Uniformity				70	75	-	%	Note(5)
Chromaticity	White	x	Viewing Angle $\Theta x=\Theta y=0°$	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.

Contrast Ratio (CR) = L63 / L0

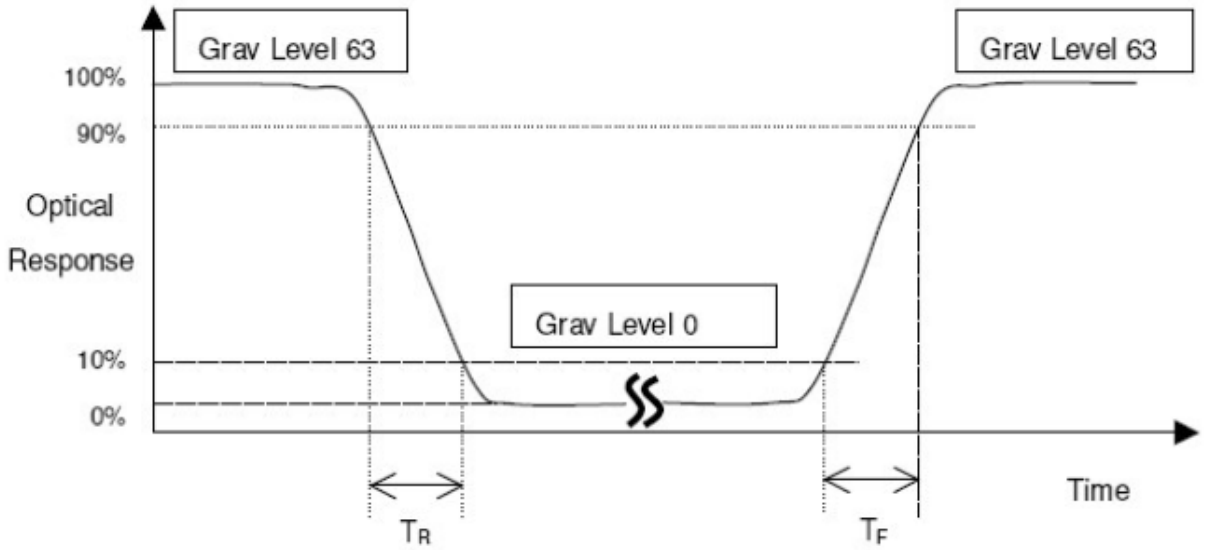
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

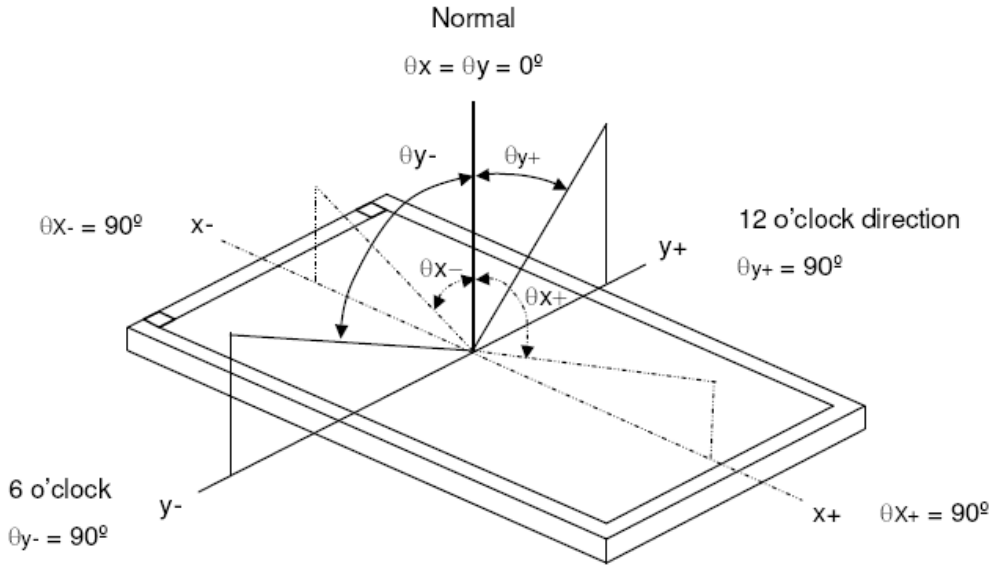
CR = CR (5)

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

*Note (2) Definition of Response Time (T_R, T_F):

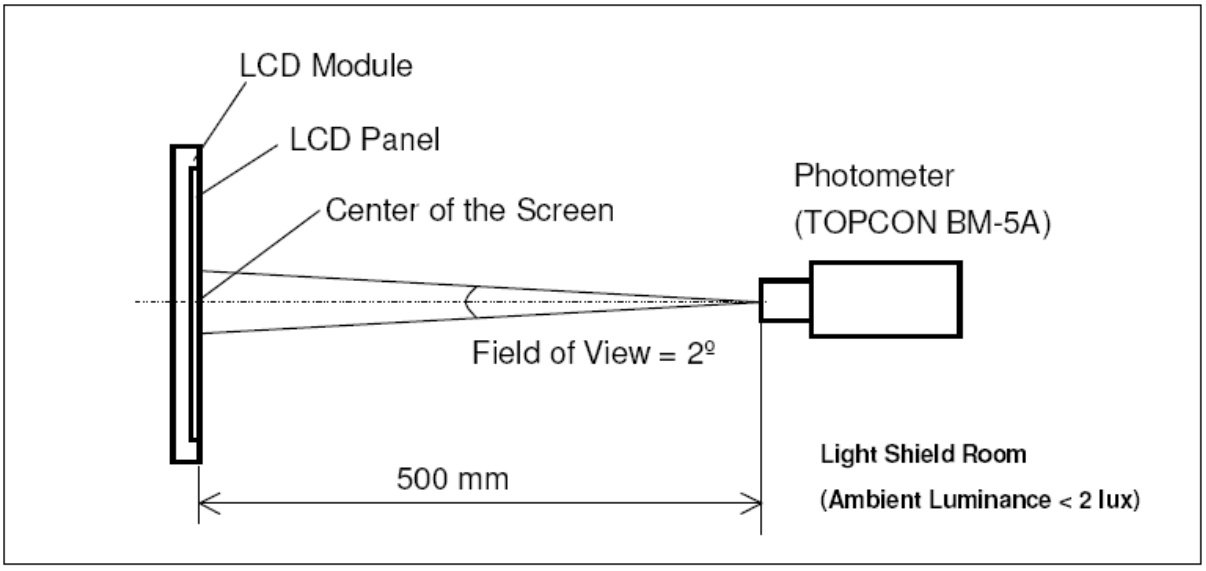


*Note(3) Definition of Viewing Angle

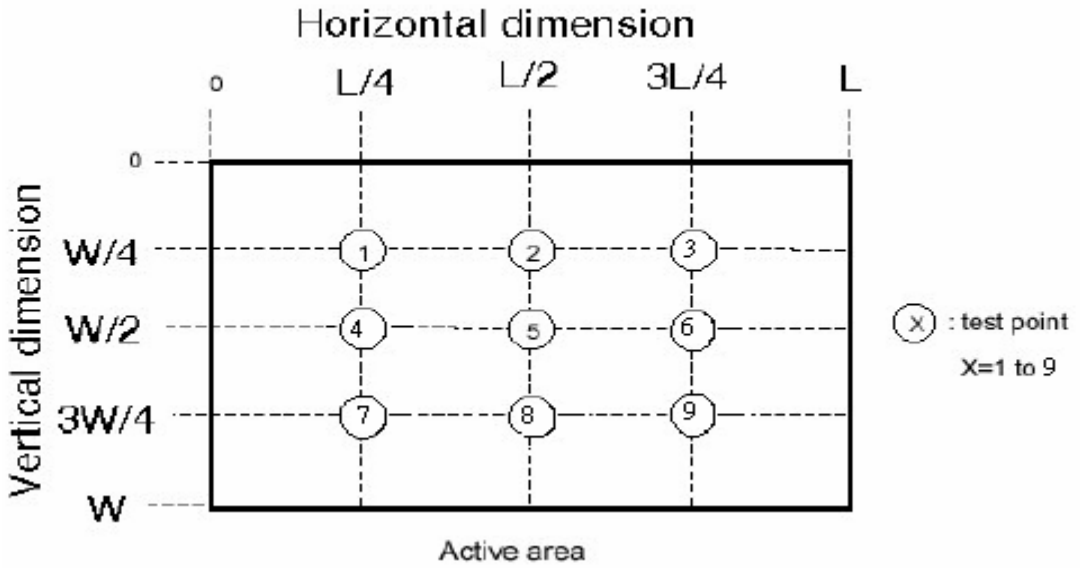


*Note (4) Measurement Set-Up:

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.TOUCH PANEL SPECIFICATIONS

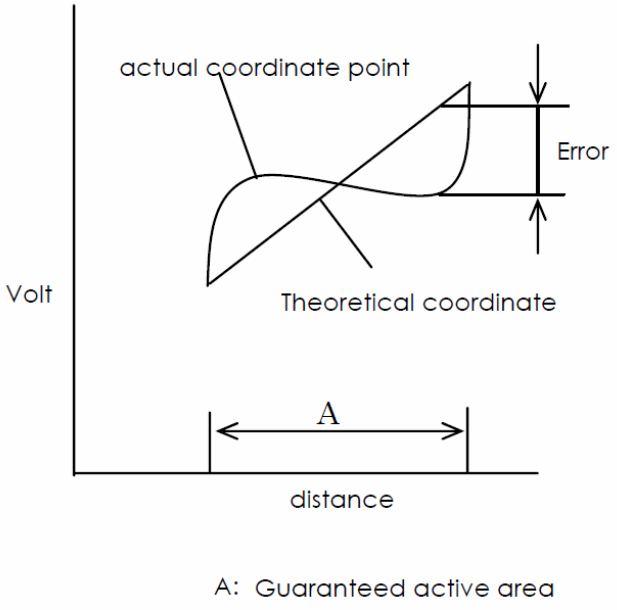
10.1 ELECTRICAL CHARACTERISTICS OF TOUCH PANEL

ITEM		SPECIFICATIONS	
(1)	Loop Resistance	X: 300Ω~1000Ω,Y: 100Ω~700Ω	
(2)	Linearity	X≦1.5%,Y≦1.5%(see Note1)	
(3)	Chattering	≦20ms	
(4)	Insulation	≧10MΩ/25V(DC)	
(5)	Working Voltage	DC 7V Max.	
(6)	Min Input Force	Pen	Max:80gf(see Note2)
		Finger	
(7)	Mechanical Characteristics	Notes life	10^5 words min
		Input life	10^6 times min

Note 1

Difference between actual voltage & theoretical voltage is an error at ant points.

Linearity is the value max. error voltage divided by voltage difference on active area inside 2mm.



A: Guaranteed active area

Note 2

Test Area is 3mm/R0.8 inside of active area, but not on the edge and Dot-Spacer.

Measurement condition of minimum input force:

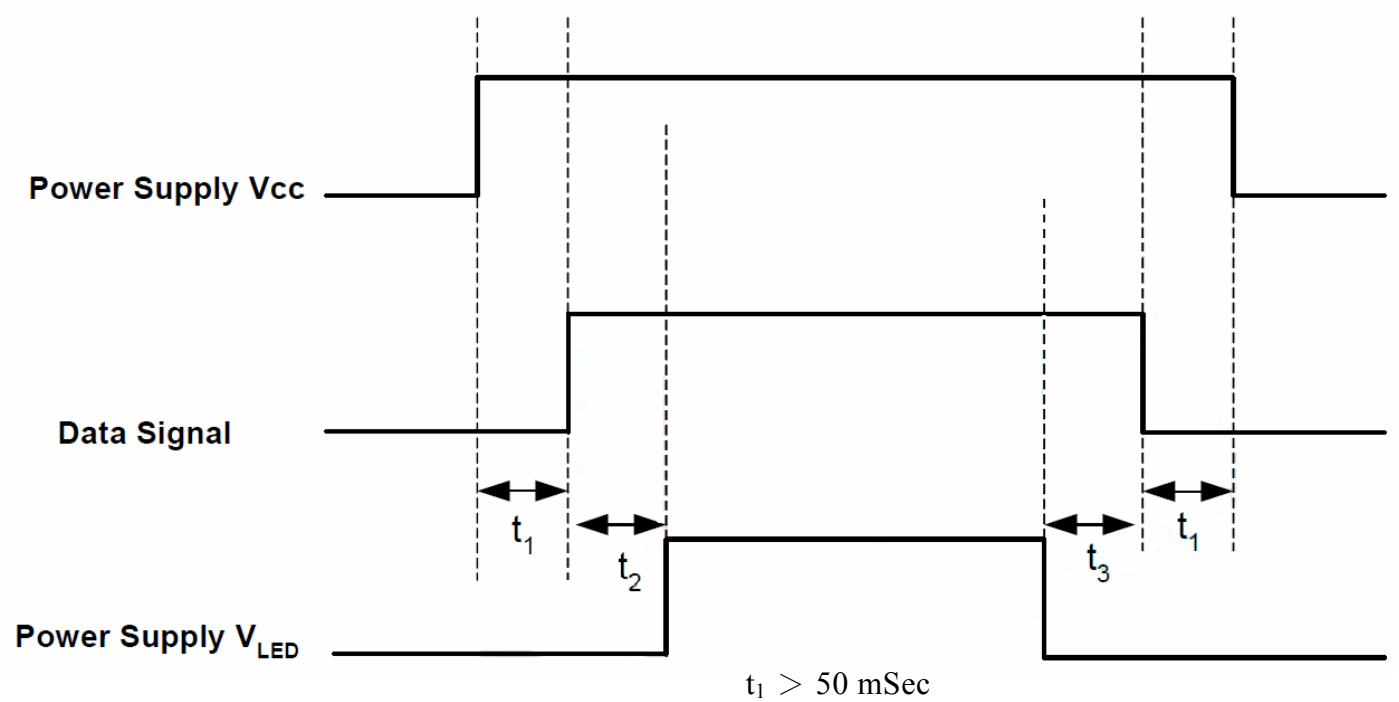
Resistance between X & Y axis must be equal or lower than 2kΩ (Ron ≤ 2kΩ).

10.2 TOUCH PANEL SCREEN

PIN NO.	DESCRIPTION
1	Y2
2	X2
3	Y1
4	X1

11. TIMING SPECIFICATIONS

11.1 POWER SIGNAL SEQUENCE



$t_1 > 50$ mSec
$t_2 \geqq 200$ mSec
$t_3 \geqq 200$ mSec

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

11.2 TIMING CHARACTERISTICS

11.2.1Timing Conditions

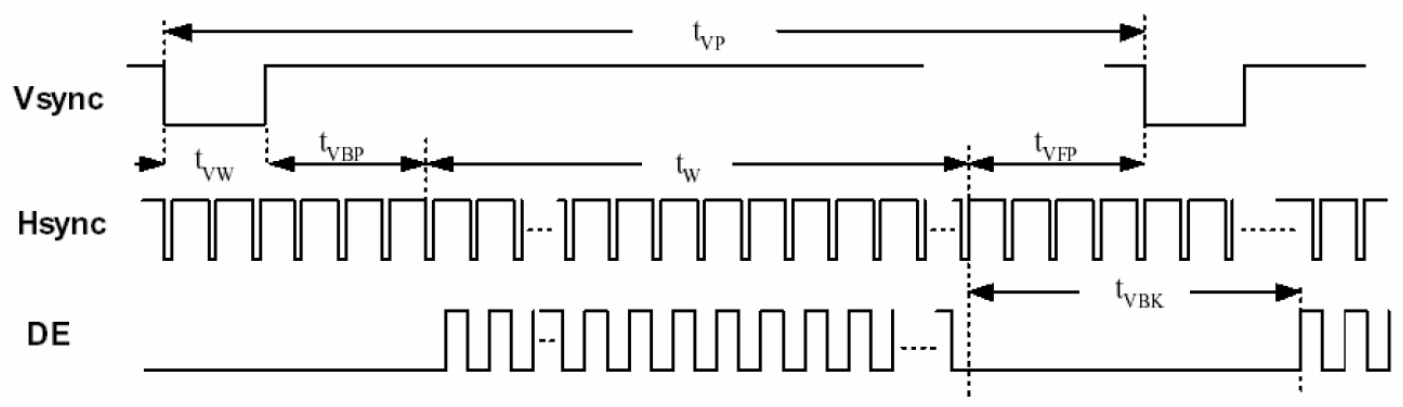
Input signal characteristics of SYNC mode.

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}	tHP - tHW - tHBP - tHV			t_{CLK}	
Horizontal Blank	t_{HBK}	tHP - tHV			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	tw	480			t_{HP}	
Vertical Front Porch	t_{VFP}	tVP - tVW - tVBP - tw			t_{HP}	
Vertical Blank tVBK	t_{VP}	tVP - tw			t_{HP}	
Data Setup Time	t_{DS}	5	-	-	ns	
Data Hold Time	t_{DH}	10	-	-	ns	

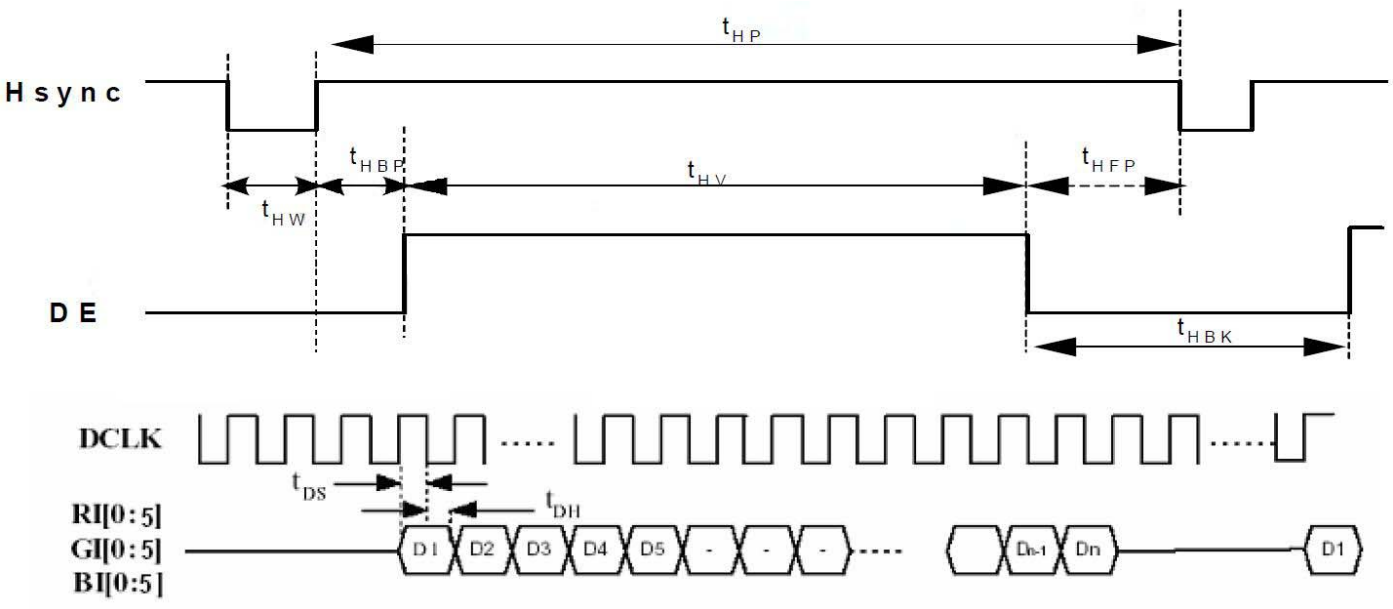
Input signal characteristics of DE mode.

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	

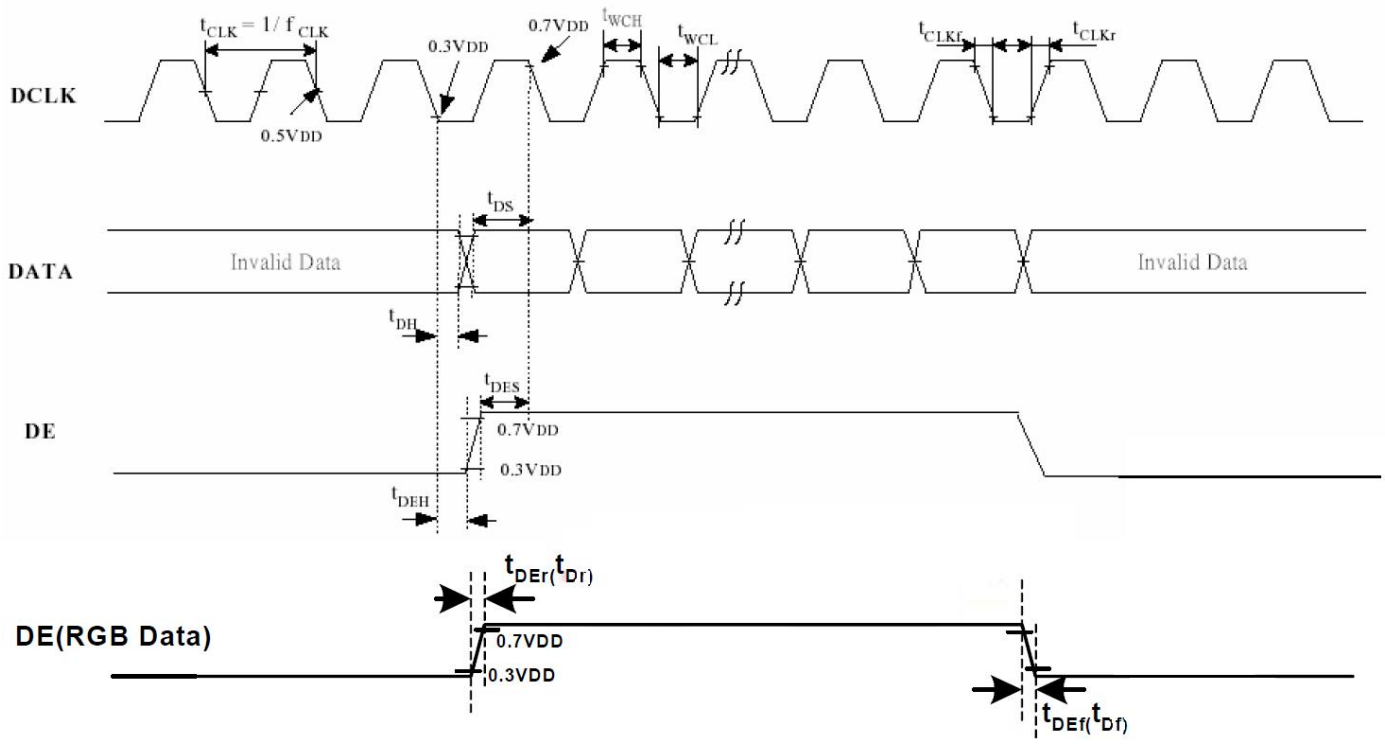
11.2.2Timing Diagram



Input Vertical Timing



Input Horizontal Timing



DE and RGB Input Timing

12. RELIABILITY TEST

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

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±5°C and thehumidity is below 50±20%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.