HY-LINE®
COMPUTER COMPONENTS

TFT-Display Datenblatt

Modell OT057ZVUDDN-01

Kurzdaten

Hersteller	ONation
Diagonale	5,7“ / 14,5 cm
Format	4:3
Auflösung	640 x 480
Backlight	LED / 900 cd/m²
Interface	RGB
Touchscreen	nein
Temperatur	-20… +70°C (Betrieb)

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ONation Corporation

ONation Corporation

CUSTOMER' S APPROVAL SPECIFICATIONS

MODEL: OT057ZVUDDN-01
(Complied With RoHS)

CUSTOMER: _____

Version: P0.2

C O N T E N T S

ISSUE:SEP.14.2012

Spec Condition preliminary

CUSTOMER	ONATION		
APPROVAL	APPROVAL	CHECKER	PREPARE
	ch lee	kevin	Randy

2.RECORD OF REVISION

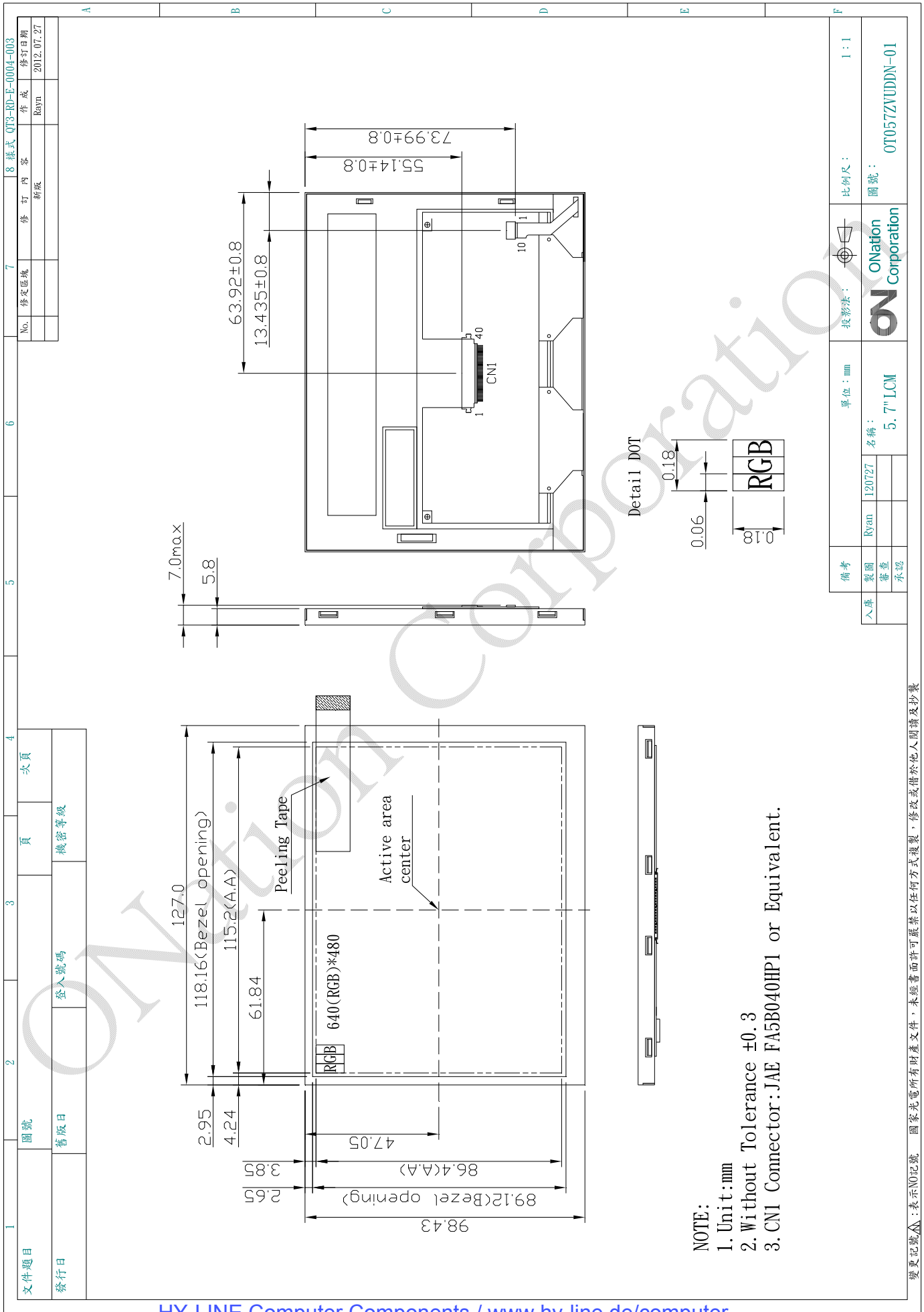
REV	DATE	PAGE	SUMMARY
0.1	2012.07.31	ALL	Preliminary specification was first issued.
0.2	2012.09.14	6	Power Supply Voltage for LED: TBD(TYP.), TBD(MAX.) →333(TYP.), 400(MAX.) LED Life Time: TBD(MIN.), -(TYP.) → -(MIN.), 50000(TYP.)

3.MECHANICAL SPECIFICATIONS

(1)	Number Of Dots (Dots)	640 (R.G.B) X 480
(2)	Module Size(mm)	127(H) X 98.43(V) X 7(D)
(3)	Active Area(mm)	115.2(H) X 86.4(V)
(4)	Pixel Pitch(mm)	0.18(H) X 0.18(V)
(5)	LCD Model	TFT , Transmissive , Normally/white
(6)	Polarizer Model	Clear
(7)	LED Backlight Color	White
(8)	Viewing Direction	6 O'clock
(9)	Gray Scale Inversion Direction	12 O'clock
(10)	Color Configuration	R.G.B Vertical Stripe
(11)	Weight(g)	110±5%

**Viewing direction for best image quality is different from TFT definition, there is the 180 degrees shift.

4. OUTLINE DIMENSIONS



5. INTERFACE PIN CONNECTION

5.1 LCM PANEL DRIVING SECTION

CN1：JAE FA5B040HP1 or Equivalent.

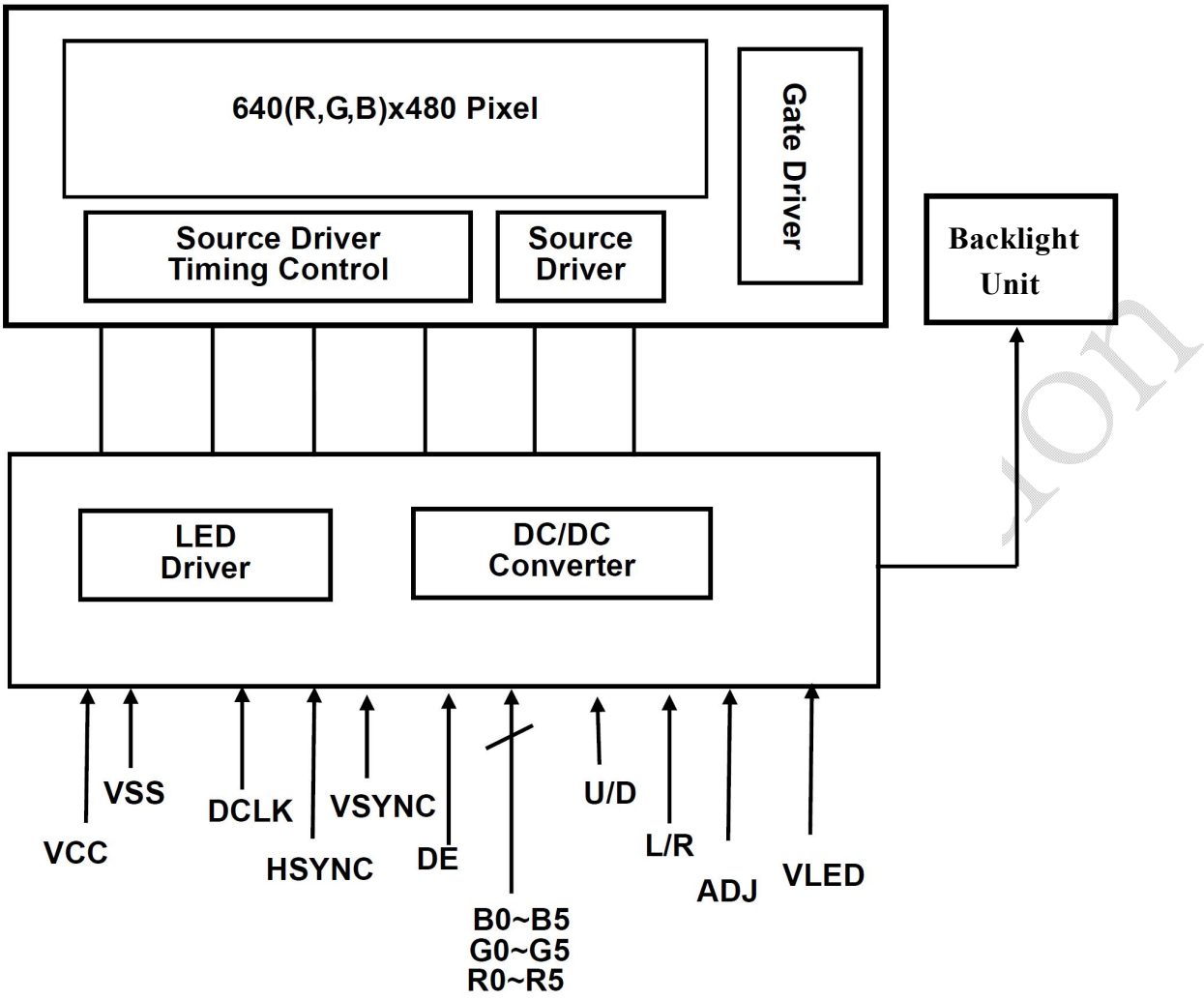
PIN NO.	SYMBOL	FUNCTION	REMARK
1	U/D	Up or Down Display Control	Note 1
2	NC	No Connection	
3	HSYNC	Horizontal SYNC.	
4	VLED	Power Supply for LED Driver circuit	
5	VLED	Power Supply for LED Driver circuit	
6	VLED	Power Supply for LED Driver circuit	
7	VCC	Power Supply for LCD	
8	VSYNC	Vertical SYNC.	
9	DE	Data Enable	Note 2
10	VSS	Power Ground	
11	VSS	Power Ground	
12	ADJ	Brightness control for LED B/L	
13	B5	Blue Data 5 (MSB)	
14	B4	Blue Data 4	
15	B3	Blue Data 3	
16	VSS	Power Ground	
17	B2	Blue Data 2	
18	B1	Blue Data 1	
19	B0	Blue Data 0 (LSB)	
20	VSS	Power Ground	
21	G5	Green Data 5 (MSB)	
22	G4	Green Data 4	
23	G3	Green Data 3	
24	VSS	Power Ground	
25	G2	Green Data 2	
26	G1	Green Data 1	
27	G0	Green Data 0 (LSB)	
28	VSS	Power Ground	
29	R5	Red Data5 (MSB)	
30	R4	Red Data 4	
31	R3	Red Data 3	
32	VSS	Power Ground	
33	R2	Red Data 2	
34	R1	Red Data 1	
35	R0	Red Data 0 (LSB)	
36	VSS	Power Ground	
37	VSS	Power Ground	
38	DCLK	Clock Signals; Latch Data at the Falling Edge	
39	VSS	Power Ground	
40	L/R	Left or Right Display Control	Note 1

Note 1:

L/R	U/D	FUNCTON
1	0	Normally display
0	0	Right and Left opposite
1	1	Up and Down opposite
0	1	Right and Left opposite, Up and Down opposite

Note 2: If DE signal is fixed low, SYNC mode is used. Otherwise, DE mode is used.

6. BLOCK DIAGRAM



7. ABSOLUTE MAXIMUM RATINGS

7.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS (GND=0V)

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power Supply Voltage	VCC	-0.3	5.0	V	
Input signal Voltage	VI	-0.3	VCC+0.3		

7.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		COMMENT
	MIN.	MAX.	MIN.	MAX.	
Ambient Temperature(℃)	-20	70	-30	80	Note 1,2
Humidity(% RH)	Note 3		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 : Operation Ta=60℃ & H=90% ≦ 240Hrs.

8. ELECTRICAL CHARACTERISTICS

8.1 LCM ELECTRICAL CHARACTERISTICS

Ta=25℃

I T E M	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Supply Voltage for LCD	VCC	3.0	3.3	3.6	V	
	ICC	-	(111)	(140)	mA	Note 1
Ripple Voltage	V_{RF}	-	-	100	mVp-p	
Logic Input Voltage	V_{IH}	0.7*VCC	-	VCC	V	Note 2
	V_{IL}	0	-	0.3*VCC	V	

Note 1: test pattern: all black.

Note 2: DCLK, HSYNC, VSYNC, DE, R0~R5, G0~G5, B0~B5.

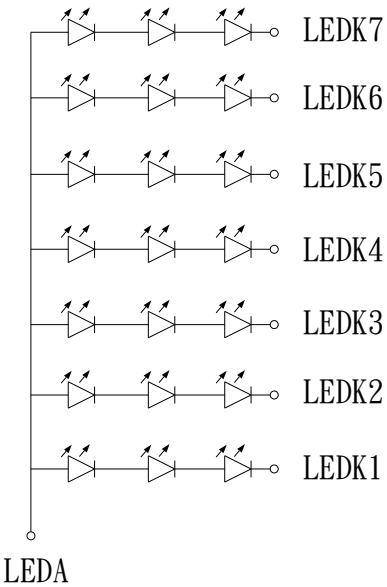
8.2 BACKLIGHT UNIT

Ta=25℃

I T E M	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Supply Voltage for LED	VLED	4.5	5.0	5.5	V	
	ILED	-	333	400	mA	VLED=5.0V
ADJ Frequency	-	19	20	21	KHz	
ADJ Input Voltage	V_{IH}	3.0	-	3.3	V	
	V_{IL}	0	-	0.3	V	
LED Life Time (For Reference Only)	-	-	50000	-	hr	

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and ILED =20mA.

Note 2: The “LED Life Time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and ILED =20mA. The LED lifetime could be decreased if operating ILED is larger than 20mA



9.OPTICAL CHARACTERISTICS

9.1 OPTICAL CHARACTERISTICS OF LCM PANEL

Ta=25℃

ITEM		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio		CR	Viewing Normal Angle ΘX=ΘY =0°	200	300	-	-	Note (1)
Response Time		TR		-	15	-	ms	Note (2)
		TF		-	35	-	ms	
Chromaticity	White	x		TBD	TBD	TBD	-	Note (4)
		y		TBD	TBD	TBD	-	
	Red	x		TBD	TBD	TBD	-	
		y		TBD	TBD	TBD	-	
	Green	x		TBD	TBD	TBD	-	
		y		TBD	TBD	TBD	-	
	Blue	x		TBD	TBD	TBD	-	
		y		TBD	TBD	TBD	-	
Viewing Angle		ΘX+	Viewing Normal Angle ΘX=ΘY =0° CR≧10	60	70	-	Deg.	Note (3)
		ΘX-		60	70	-		
		ΘY+		50	60	-		
		ΘY-		30	40	-		
Brightness		L	ΘX=ΘY=0° ADJ=3.3V	800	900	-	cd/m2	Note (5)
Uniformity		YU		70	80	-	%	
Image sticking		tis	2 hours	-	-	2	Sec	Note (6)

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

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

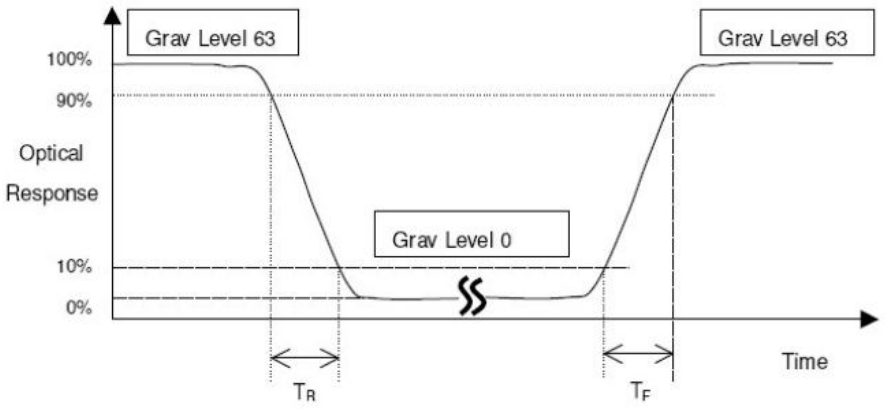
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

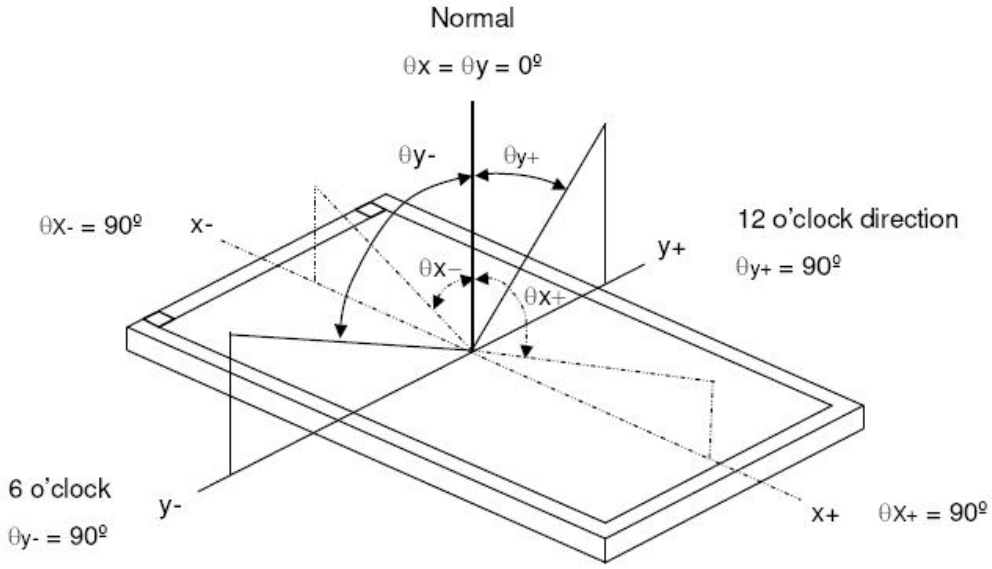
CR = CR (5)

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):

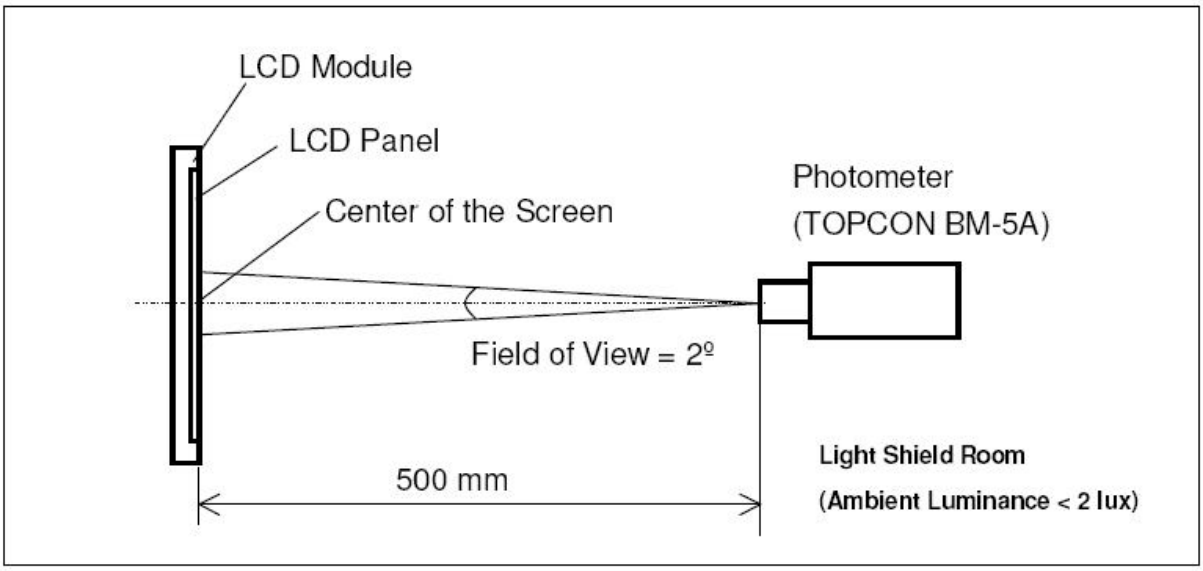


*Note(3) Definition of Viewing Angle

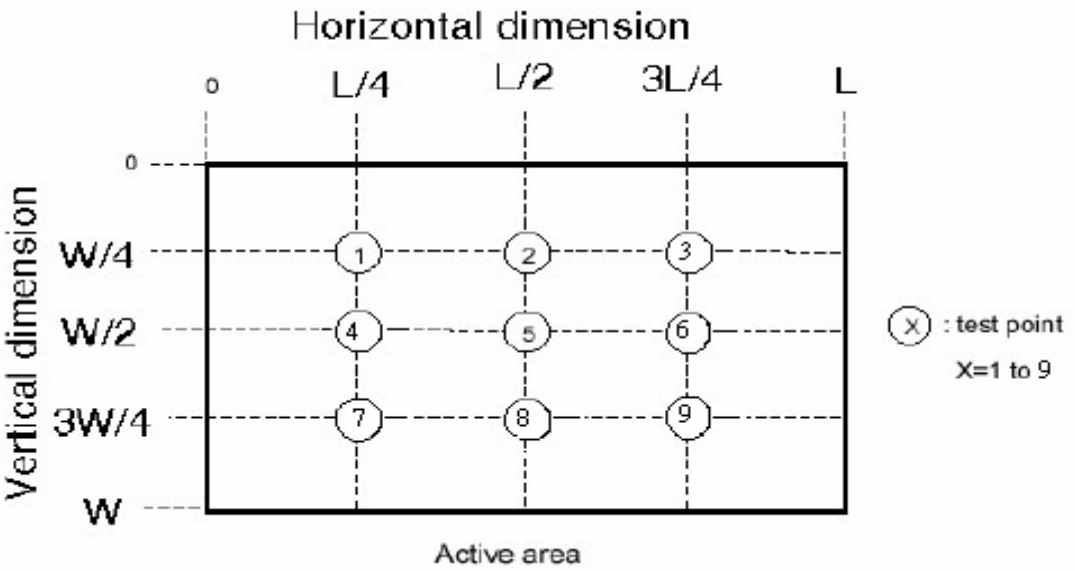


*Note (4) Measurement Set-Up:

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)

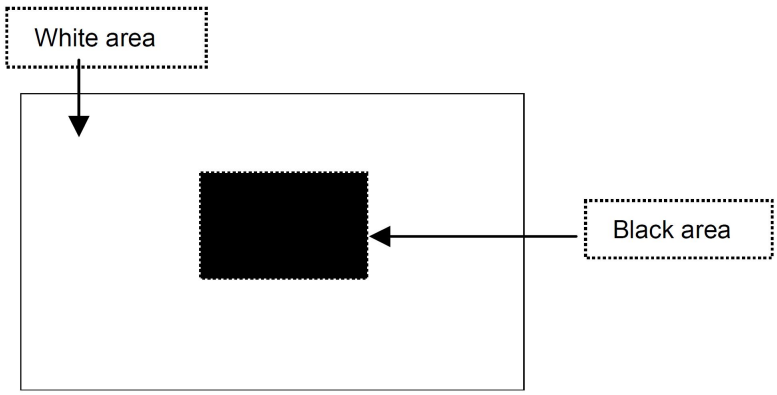


$$\left(1- \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}}\right) \times 100\% \quad \geqq 70\%$$

*Note (6) Definition of Image sticking (tis):

Continuously display the test pattern shown in the figure below for 2 hours. Then display a completely white screen. The previous image shall not persist more than 2 sec at 25 °C.

Image sticking pattern

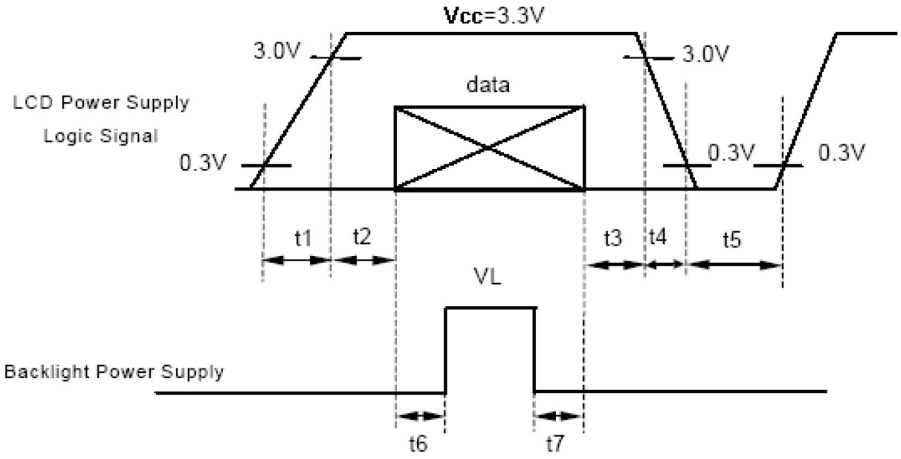


10. LCM TIMING CHARACTERISTICS

10.1 POWER SIGNAL SEQUENCE

t1 ≤10ms : 1 sec≤ t5
50ms≤ t2 : 200ms ≤t6
0<t3 ≤50ms: 200ms≤ t7
0<t4 ≤10ms

Power ON/OFF sequence timing

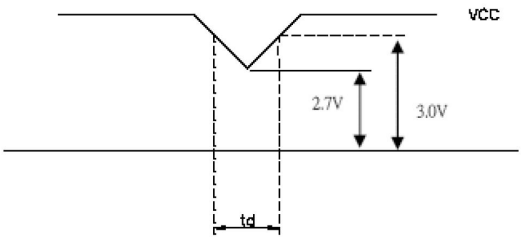


Data: RGB DATA, DCLK, DE

VCC-dip condition:

(1) 2.7 V ≤VCC <3.0V,td ≤ 10 ms

(2) VCC＞3.0V,VCC-dip condition should be the same with VCC-turn-on condition。



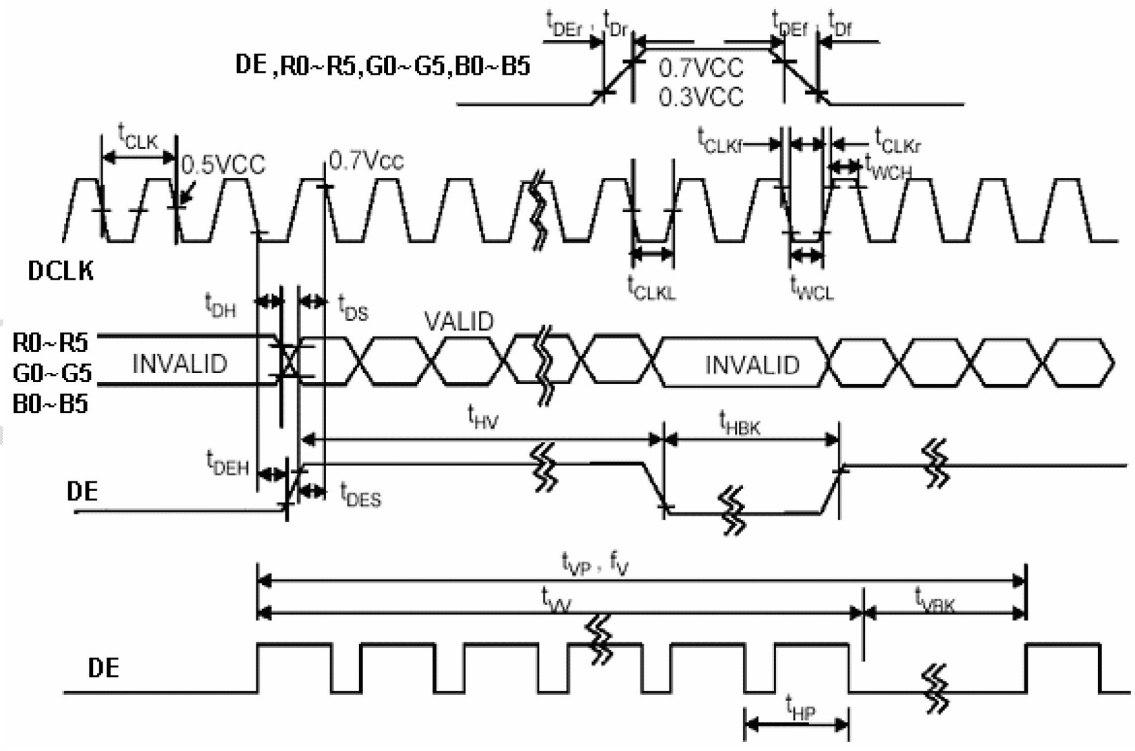
10.2 AC TIMING CHARATERISTICS

10.2.1 DE MODE INPUT SIGNAL CHARACTERISTICS

SIGNAL	PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
DCLK	Period	t_{CLK}	33	40	43	ns	
	Frequency	f_{CLK}	23	25	30	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	-	Note1
DE (Data Enable)	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}	750	800	900	t_{CLK}	
	Horizontal Valid	t_{HV}	640	640	640	t_{CLK}	
	Horizontal Blank	t_{HBK}	110	160	260	t_{CLK}	
	Vertical Period	t_{VP}	515	525	560	t_{HP}	
	Vertical Valid	t_{VV}	480	480	480	t_{HP}	
	Vertical Blank	t_{VBK}	35	45	80	t_{HP}	
	Vertical Frequency	f_V	55	60	65	Hz	
Data R,G,B	Setup Time	t_{DS}	5	-	-	ns	
	Hold Time	t_{DH}	10	-	-	ns	
	Rise, Fall Time	t_{Dr},t_{Df}	-	-	3	ns	

Note 1:t_{CLKL}/t_{CLK}

DE mode timing waveform



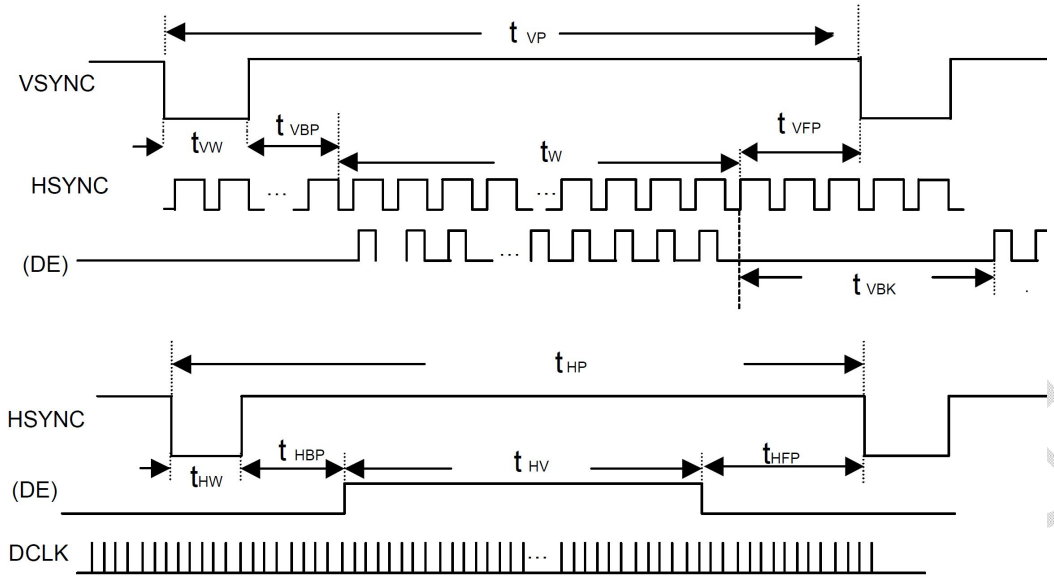
10.2.2 SYNC MODE INPUT SIGNAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Clock Period	t_{CLK}	33	40	43	ns	
Clock Frequency	f_{CLK}	23	25	30	MHz	
Clock Low Level Width	t_{WCL}	6	-	-	ns	
Clock High Level Width	t_{WCH}	6	-	-	ns	
Clock Rise, Fall Time	t_{CLKr},t_{CLKf}	-	-	3	ns	
HSYNC Period	t_{HP}	750	800	900	t_{CLK}	
HSYNC Pulse Width	t_{HW}	5	30	-	t_{CLK}	
HSYNC Front Porch	t_{HFP}	1	16	116	t_{CLK}	
HSYNC Back Porch	t_{HBP}	1	114	139	t_{CLK}	
HSYNC Width + Back Porch	t_{HW}+t_{HBP}	144	144	144	t_{CLK}	
Horizontal Blank	t_{HBK}	1	160	260	t_{CLK}	Note 1
Horizontal Valid	t_{HV}	640	640	640	t_{CLK}	
VSYNC Period	t_{VP}	515	525	560	t_{HP}	
VSYNC Pulse Width	t_{VW}	1	3	5	t_{HP}	
VSYNC Front Porch	t_{VFP}	1	10	45	t_{HP}	
VSYNC Back Porch	t_{VBP}	30	32	34	t_{HP}	
VSYNC Width + Back Porch	t_{VW}+t_{VBP}	35	35	35	t_{CLK}	
Vertical Blank	t_{VBK}	35	45	80	t_{HP}	
Vaild data Width	t_{w}	480	480	480	t_{HP}	
Data Setup Time	t_{DS}	5	-	-	ns	
Data Hold Time	t_{DH}	10	-	-	ns	

Note 1: t_{HBK}=t_{HFP}+t_{HW}+t_{HBP}

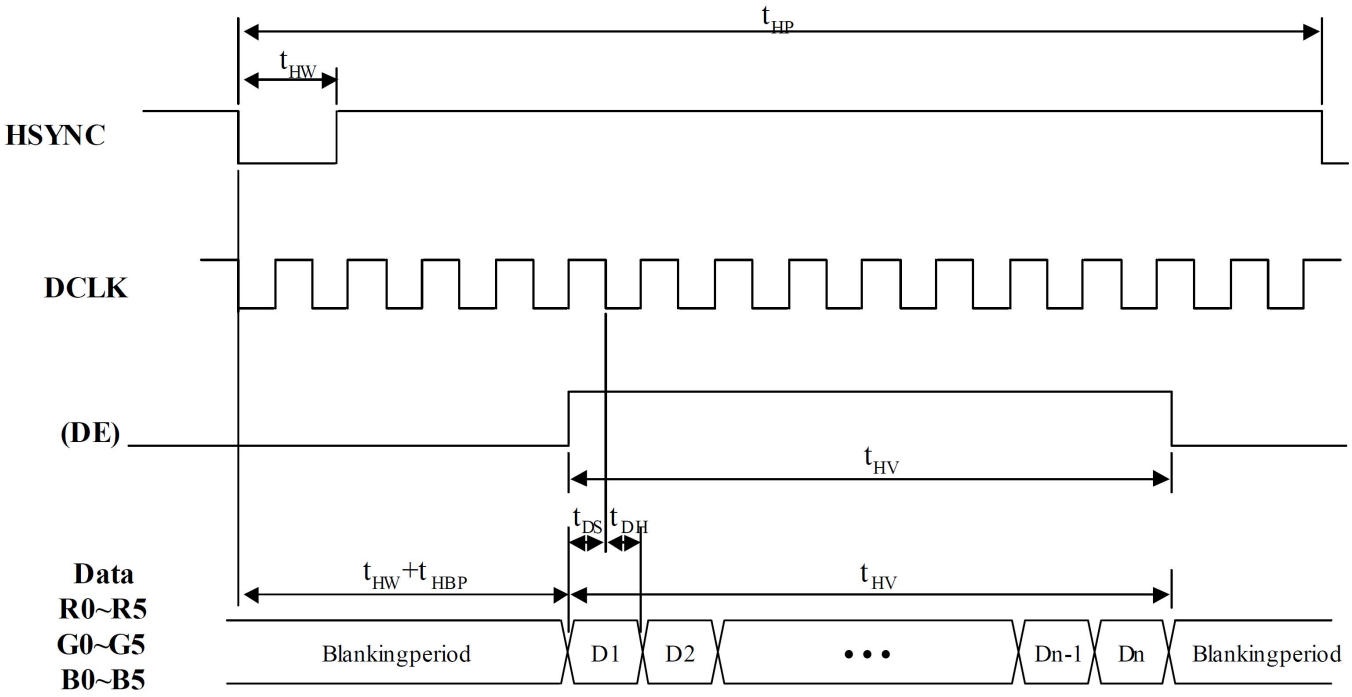
SYNC mode timing waveform

Input vertical timing



Remark: If SYNC mode is used, please fix DE signal to low, DE timing waveform is for reference only.

Input horizontal timing



Remark : If SYNC mode is used, please fix DE signal to low, DE timing waveform is for reference only.

11. RELIABILITY TEST

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	80℃	240HRS	-
2	Low Temperature Storage	-30℃	240HRS	-
3	High Temperature Humidity Operation	60℃ 90%RH	240HRS	NOTE(2)
4	High Temperature Operation	70℃	240HRS	NOTE(2)
5	Low Temperature Operation	-20℃	240HRS	NOTE(2)
6	Temperature Cycle	-30℃←25℃→80℃ (30min) (5min) (30min)	200CYCLE	NOTE(2)

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) : ENVIRONMENTAL TEST ITEN 1.~6. MEASURE AFTER 12 HOURS LEFT AT NORMAL TEMPERATURE AND HUMIDITY

12. PRECAUTIONS IN USE LCM

12.1 ASSEMBLY PRECAUTIONS

(1)You must mount a module using holes arranged in four corners or four sides.

(2)You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.

(3)Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment.

(4)Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.

(5)Do not open the case because inside circuits do not have sufficient strength.

(6)Please do not take a LCD module to pieces and reconstruct it. Resolving and reconstructing modules may cause them not to work well.

(7)Please do not touch metal frames with bare hands and soiled gloves. A color change of the metal frames can happen during a long preservation of soiled LCD modules.

(8)Please pay attention to handling lead wire of backlight so that it is not tugged in connecting with inverter.

12.2 OPERATING PRECAUTIONS

(1)Please be sure to turn off the power supply before connecting and disconnecting signal input cable.

(2)Please do not change variable resistance settings in LCD module. They are adjusted to the most suitable value. If they are changed, it might happen LCD does not satisfy the characteristics specification

(3)Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.

(4)When fixed patterns are displayed for a long time, remnant image is likely to occur.

(5)Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.

(6)Please consider that LCD backlight takes longer time to become stable of radiation characteristics in low temperature than in room temperature.

12.3 ELECTROSTATIC DISCHARGE CONTROL

(1)The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such the copper leads on the PCB and the interface terminals with any parts of the human body.

(2)The modules should be kept in antistatic bags or other containers resistant to static for storage.

(3)Only properly grounded soldering irons should be used.

(4)If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.

(5)The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended.

(6)Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

12.4 STORAGE PRECAUTIONS

(1)When you store LCDs for a long time, it is recommended to keep the temperature between 0°C-40°C without the exposure of sunlight and to keep the humidity less than 90%RH.

(2)Please do not leave the LCDs in the environment of high humidity and high temperature such as 60°C 90%RH.

(3)Please do not leave the LCDs in the environment of low temperature; below -20°C.

12.5 OTHERS.

(1)A strong incident light into LCD panel might cause display characteristics' changing inferior because of polarizer film, color filter, and other materials becoming inferior. Please do not expose LCD module direct sunlight Land strong UV rays

(2)Please pay attention to a panel side of LCD module not to contact with other materials in preserving it alone.

(3)For the packaging box, please pay attention to the followings:

a. Please do not pile them up more than 5 boxes.
(They are not designed so.) And please do not turn over.

b. Please handle packaging box with care not to give them sudden shock and vibrations. And also please do not throw them up.

c. Packing box and inner case for LCDs are made of cardboard. So please pay attention not to get them wet. (Such like keeping them in high humidity or wet place can occur getting them wet.)

12.6 LIMITED WARRANTY

Unless otherwise agreed between ONation and customer, ONation will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with ONation acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of ONation is limited to repair and/or replacement on the terms set forth above. ONation will not responsible for any subsequent or consequential events.