HY-LINE®
COMPUTER COMPONENTS

TFT-Display Datasheet

ONation
Model: OT215ZFWDBL-00

Brief spec.:

Main Feature	Landscape Type
	White LED Backlight
	Wide Viewing Angle

Active Screen Area	476.64 x 268.11 (mm)
Diagonal | Format	21,5" | 16:9
Resolution	1920 x 1080
Colors	R.G.B Stripe
Backlight	LED, White
Brightness	1400 cd/m²
LED Life Time	44,000h (Typ.)
Interface	LVDS
Viewing Angle	-70~80H), -50~70(V)
Touchscreen	No
Power Supply	5V (Typ.)
Module Outline	495.6 x 292.2 x 10.4 (mm)
Operation Temperature	-0... +50 °C
Storage Temperature	-20... +60 °C
Surface Treatment	Anti-Glare Hardness 3H

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ONation Corporation

TFT COLOR LCD MODULE

MODEL: OT215ZFWDBL-00
(Complied with RoHS)

Full HD
LVDS interface

Version: P0.1

Customer : _____

Approved By : _____

Date: _____

ONATION		
APPROVAL	**CHECKER**	**PREPARE**
Jun	Josh	Roger

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

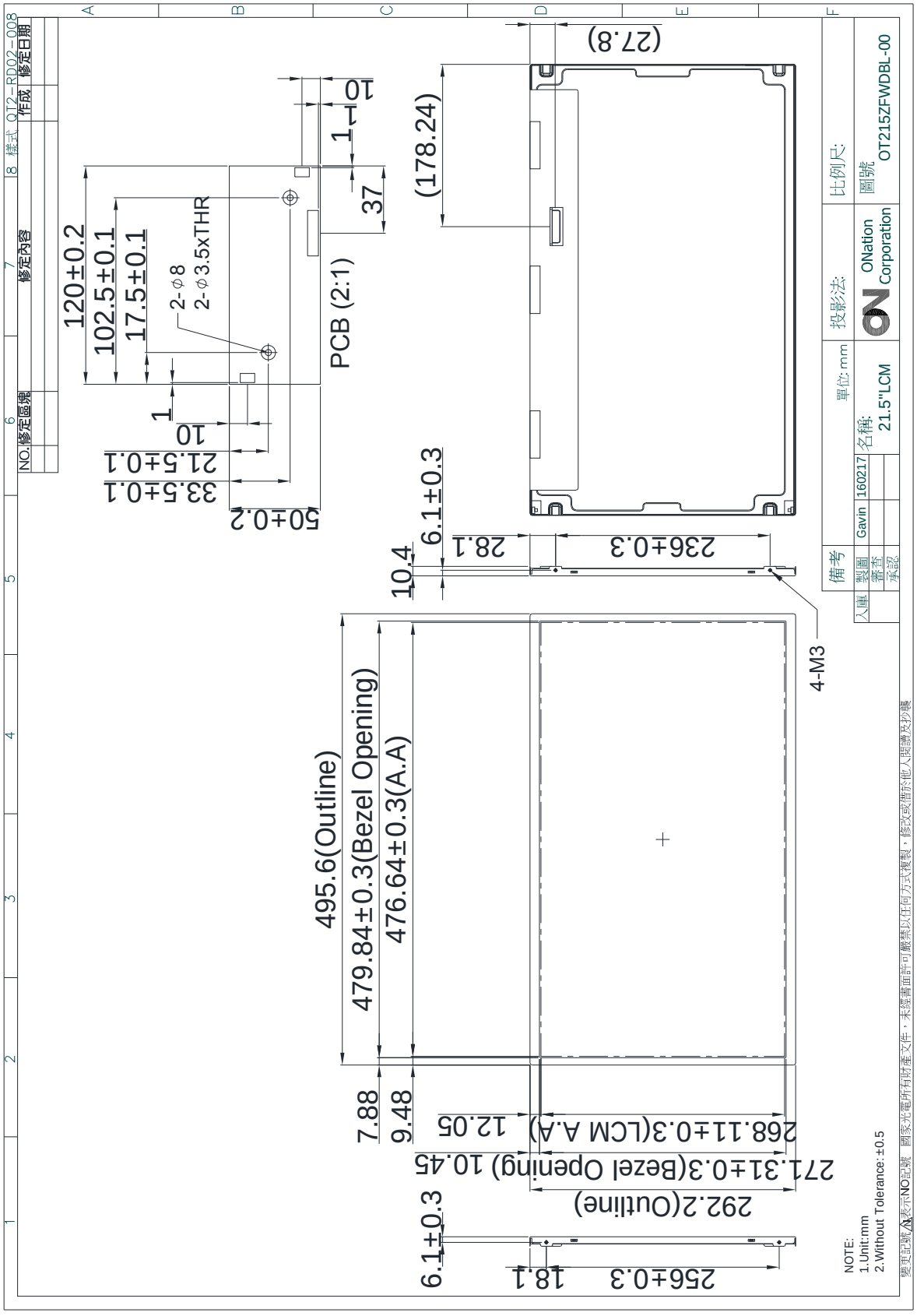
1.RECORD OF REVISION

Rev	DATE	PAGE	SUMMARY
0.1	2016.02.01	ALL	Preliminary specification was first issued.

2.MECHANICAL SPECIFICATIONS

(1)	Number Of Dots (Dots)	1920RGB x 1080
(2)	Module Size(mm)	495.6(H) X292.2 (V) X 10.4 (D) (Typ)
(3)	Active Area(mm)	476.64 (H) X 268.11 (V)
(4)	Pixel Pitch(μm)	248.25 (per one triad) x 248.25
(5)	LCD / Polarizer Model	TN , Normally/White,Anti-glare,Hardness 3H
(6)	LED Backlight Color	White
(7)	Viewing Direction	Wide Viewing Angle Horizontal：Right side 60°(typ.), Left side 60°(typ.) Vertical：Up side 70°(typ.), Down side 70°(typ.)
(8)	Gray Scale Inversion Direction	No GSI
(9)	Color Configuration	R.G.B Vertical Stripe

3. OUTLINE DIMENSIONS



4. INTERFACE PIN CONNECTION

4.1 LCM PANEL DRIVING SECTION

Connector:JAE-FI-XPB30SRLA-HF11P-TWO-187121-30091-3(A) or Equivalent

PIN NO.	SYMBOL	FUNCTION	REMARKS
1	RxOIN0-	Negative LVDS differential data input (Odd data)	
2	RxOIN0+	Positive LVDS differential data input (Odd data)	
3	RxOIN1-	Negative LVDS differential data input (Odd data)	
4	RxOIN1+	Positive LVDS differential data input (Odd data)	
5	RxOIN2-	Negative LVDS differential data input (Odd data,DSPTMG)	
6	RxOIN2+	Positive LVDS differential data input (Odd data,DSPTMG)	
7	GND	Power Ground	
8	RxOCLK-	Negative LVDS differential clock input (Odd clock)	
9	RxOCLK+	Positive LVDS differential clock input (Odd clock)	
10	RxOIN3-	Negative LVDS differential data input (Odd data)	
11	RxOIN3+	Positive LVDS differential data input (Odd data)	
12	RxEIN0-	Negative LVDS differential data input (Even data)	
13	RxEIN0+	Positive LVDS differential data input (Even data)	
14	GND	Power Ground	
15	RxEIN1-	Positive LVDS differential data input (Even data)	
16	RxEIN1+	Negative LVDS differential data input (Even data)	
17	GND	Power Ground	
18	RxEIN2-	Negative LVDS differential data input (Even data)	
19	RxEIN2+	Positive LVDS differential data input (Even data)	
20	RxECLK-	Negative LVDS differential clock input (Even clock)	
21	RxECLK+	Positive LVDS differential clock input (Even clock)	
22	RxEIN3-	Negative LVDS differential data input (Even data)	
23	RxEIN3+	Positive LVDS differential data input (Even data)	
24	GND	Power Ground	
25	NC	No connection (for AUO test only. Do not connect)	
26	NC	No connection (for AUO test only. Do not connect)	
27	NC	No connection (for AUO test only. Do not connect)	
28	VCC	Power +5V	
29	VCC	Power +5V	
30	VCC	Power +5V	

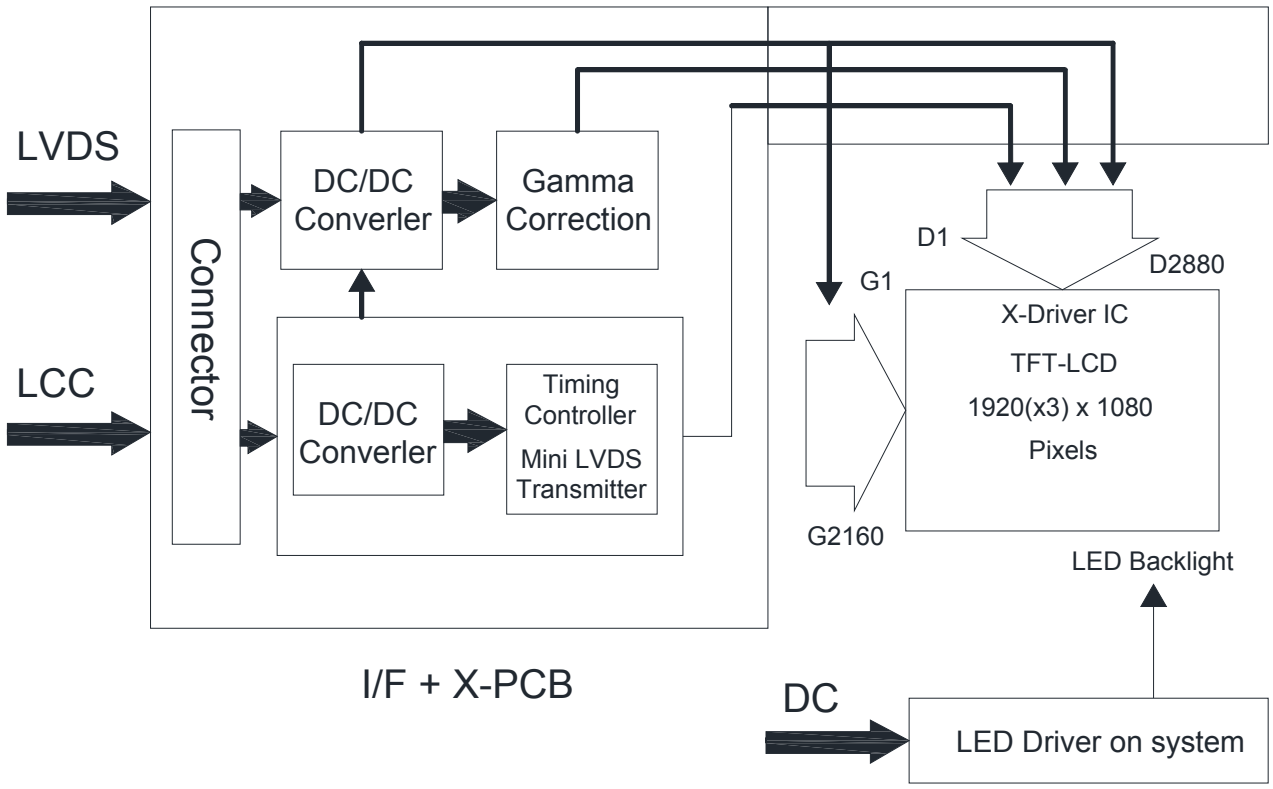
4.2 BACKLIGHT UNIT

Connector : CI0110M1HR0 (CviLux)

Mating Housing Part Number：CI0110S0000 (CviLux) or Equivalen

PIN NO.	SYMBOL	FUNCTION	REMARKS
1	VLED	12V	
2	VLED	12V	
3	VLED	12V	
4	VLED	12V	
5	GND	GND	
6	GND	GND	
7	GND	GND	
8	GND	GND	
9	Enable	+3.3V ON/ 0V OFF	
10	Dimming	PWM Dimming(140Hz to 240)	

5. BLOCK DIAGRAM



6.ABSOLUTE MAXIMUM RATINGS

6.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Logic/LCD Drive Voltage	VCC	0	6	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(℃)	0	50	-20	60	
Humidity(% RH)	5	95	5	90	

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=50℃ & RH=80% ≦ 300Hrs.

7.ELECTRICAL CHARACTERISTICS

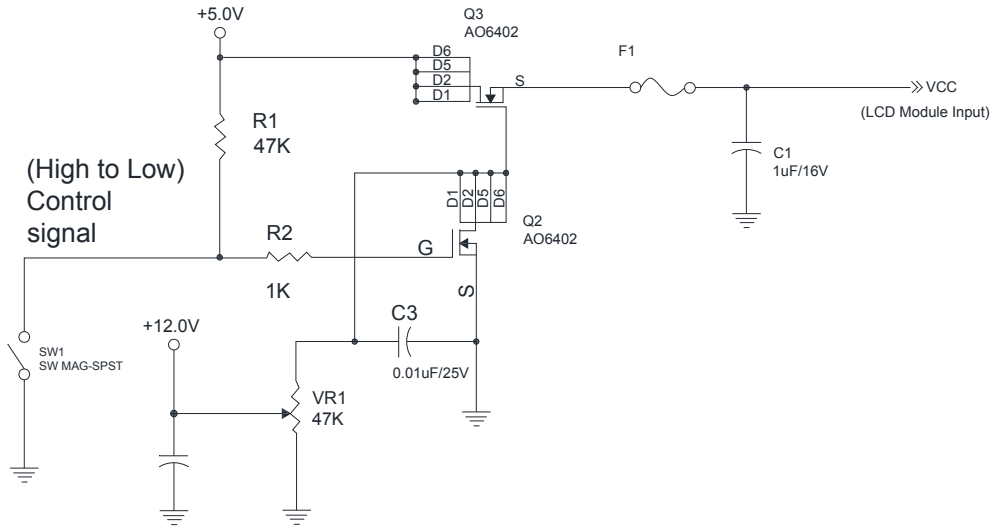
7.1 ELECTRICAL CHARACTERISTICS OF LCD

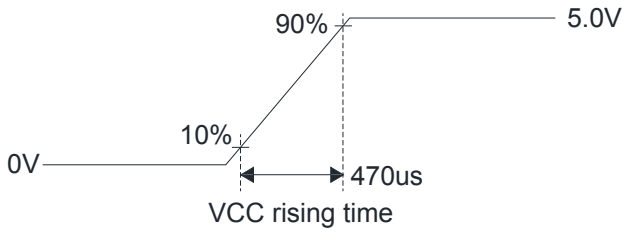
Ta=25℃

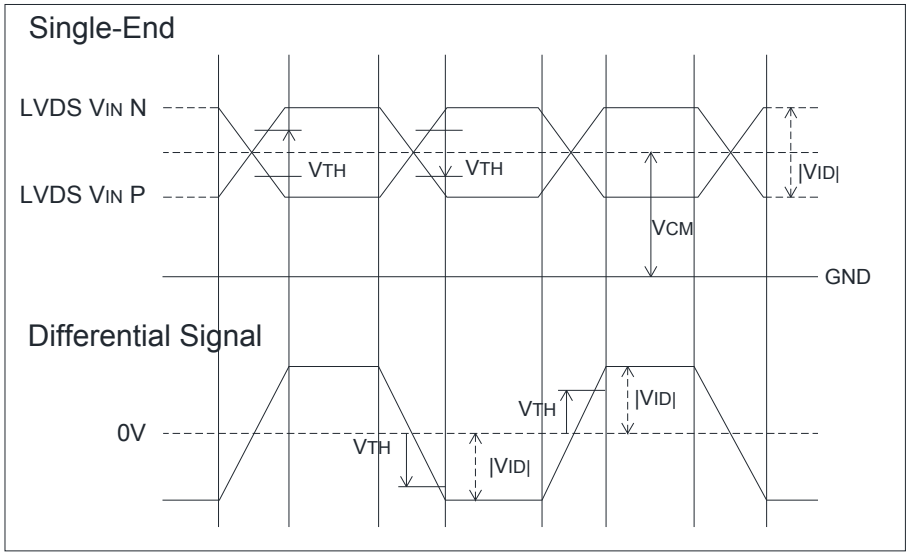
ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Logic/ LCD Drive Voltage		VCC	4.5	5.0	5.5	[Volt]	+/-10%
Input Current		ICC	-	1.13	1.36	[A]	VCC=5.0V,All Black Pattern At 60 Hz
				1.34	1.61		VCC=5.0V,All Black Pattern At 75 Hz
VCC Power VCC Power		PDD		5.65	6.80	[Watt]	VCC=5.0V,All Black Pattern At 60 Hz
			-	6.7	8.05		VCC=5.0V,All Black Pattern At 75 Hz
Inrush Current		IRush	-	-	3.0	[A]	Note1
Differential input	High Threshold	VTH	-	-	100	mV	VCM=1.2V
	Low Threshold	VTL	-100	-	-	mV	VCM=1.2V

Note 1 : Measurement conditions:

The duration of rising time of power input is 470us.







7.3 BACKLIGHT UNIT

Parameter guideline for LED driving is under stable conditions at 25℃ (Room Temperature):

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Input Voltage	VLED	-	12	-	Volt	
Input Curent	ILED	-	3.42	-	A	100% Dimming
Power Consumption	P_{LED}	-	41.04	-	Watt	100% Dimming
Inrush Current	Inrush	-	-	16	A	
On Control Voltage	V_{LED} on/off	2	-	5	Volt	
Off Control Voltage		0	-	0.8	Volt	
PWM Dimming Frequency	E_{PWM}	180	-	240	Hz	
High Voltage		2.0	-	3.3	Volt	
Low Voltage		0	-	0.8	Volt	
Dimming Duty Cycle		5	-	100	%	
LED Forward Current	I_F	-	720		mA	Ta=25℃(per string)
Operating Life		44000	-	-	Hrs	Ta=25℃

Note 1: Ta means ambient temperature of TFT-LCD module.
Note 2: If this module is driven at high ambient temperature & humidity condition. The operating life will be reduced.
Note 3: Operating life means brightness goes down to 50% initial brightness. Min. operating life time is estimated data.

8.OPTICAL CHARACTERISTICS

Ta=25℃

ITEM		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio		CR	Viewing Normal Angle Θx=Θy =0°	600	1000	-	-	Note (1)
Response Time		TR		-	3.8	5.5	ms	Note (2)
		TF		-	1.2	2.5	ms	
Chromaticity	White	Wx		0.251	0.301	0.351	-	Note (4)
		Wy		0.254	0.304	0.354	-	
Viewing Angle	Hor.	Θx-+	Horizontal CR=10	55	60	-	Deg.	Note (3)
		Θx+		55	60	-		
	Ver.	ΘY-+	Vertical CR=10	60	70	-		
		ΘY+		60	70	-		
Luminance		L	PWM =100%	1200	1400	-	cd/m2	-
Luminance uniformity		YU		75	80	-	%	Note (5)

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

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

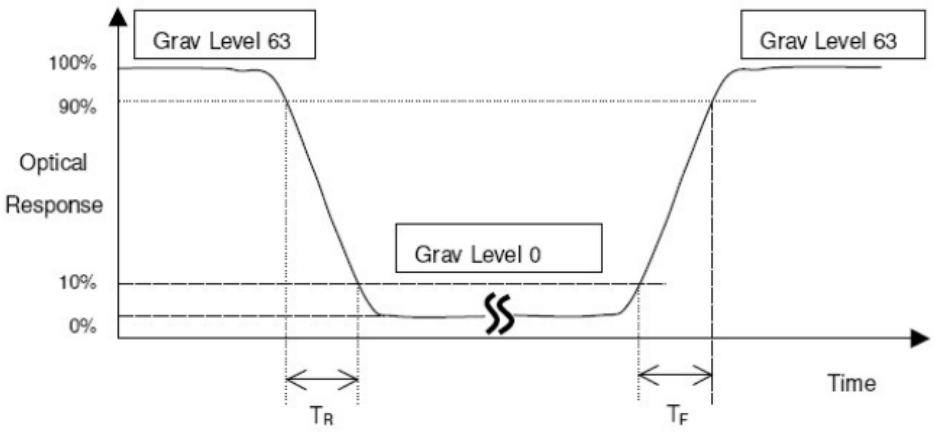
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

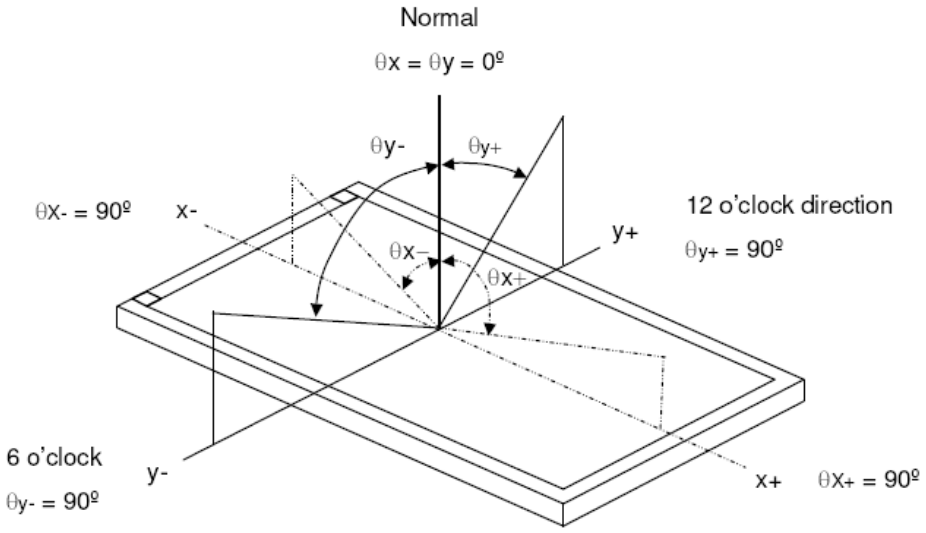
CR = CR (5)

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):

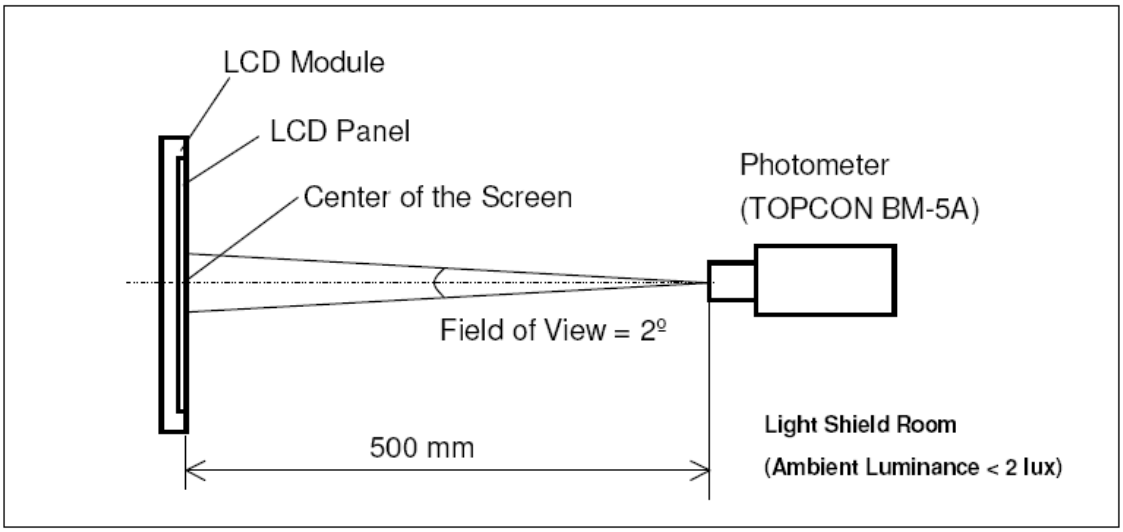


*Note(3) Definition of Viewing Angle

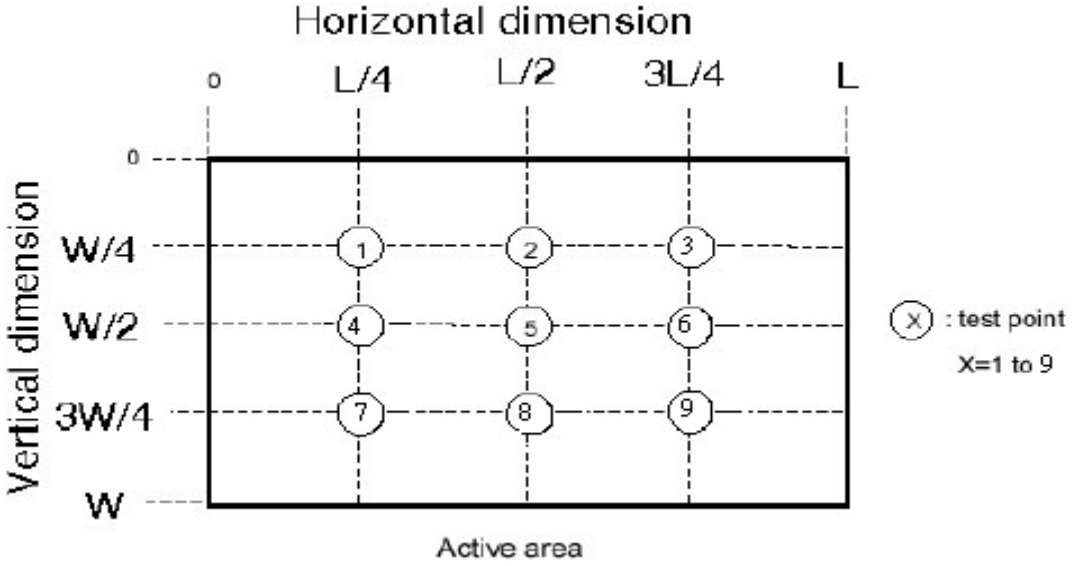


*|

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)



$$\left(1- \frac{\text{MAX Luminance} - \text{Average Luminance}}{\text{Average Luminance}}\right) \text{X100\% =YU}$$

9.TIMING SPECIFICATIONS

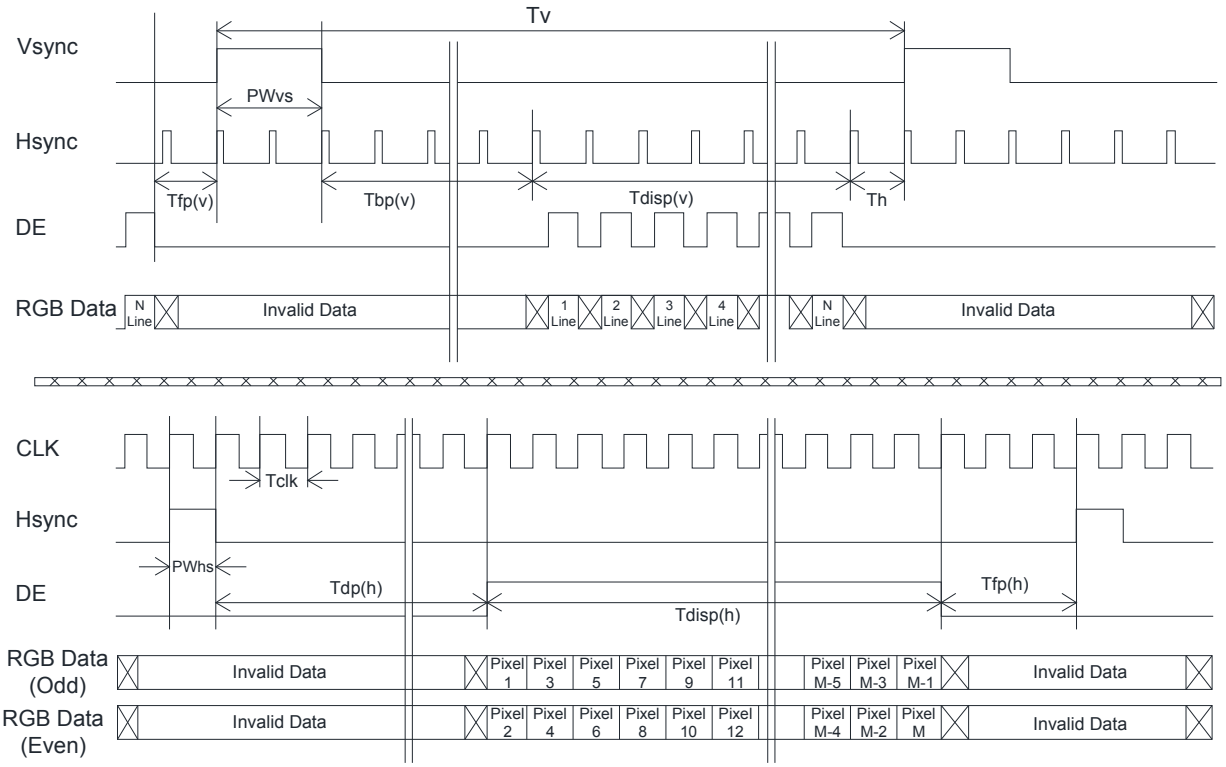
9.1 INTERFACE TIMING

9.1.1 TIMING CHARACTERISTICS

ITEM	Parameter		SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Clock Timing	Clock frequency		Tclk	10.6	14.0	17.7	MHz	
			Freq	56.5	71.2	94		
Vsync Timing	Vertical Section	Period	T_V	1092	1130	1818	T_h	
		Active	T_{VD}	1080	1080	1080		
		Blanking	T_{VB}	12	50	738		
Hsync Timing	Horizontal Section	Period	T_H	1034	1050	1100	Tclk	
		Active	T_{HD}	960	960	960		
		Blanking	T_{HB}	74	90	140		
Frame Rate			F	50	60	76	Hz	

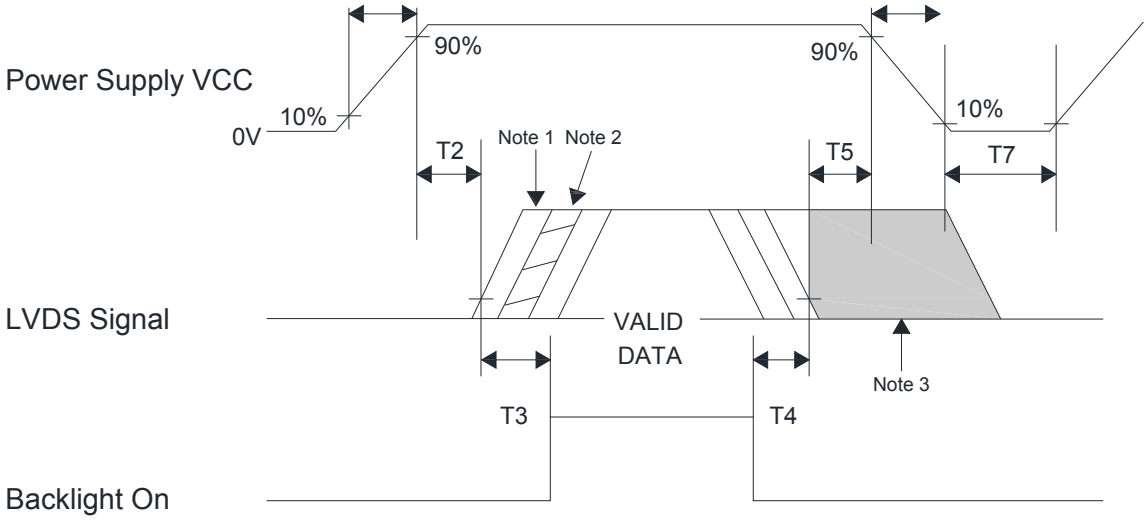
Note:DE mode only

9.1.2 TIMING DIAGRAM



9.2 POWER ON/OFF SEQUENCE

VCC power and lamp on/off sequence are as follows. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VCC is off.



POWER SEQUENCE TIMING				
ITEM	VALUE			UNIT
	MIN	TYP	MAX	
T1	0.5	-	10	ms
T2	0	-	50	ms
T3	500	-	-	ms
T4	100	-	-	ms
T5	0	-	50	ms
T6	0	-	100	ms
T7	1000	-	-	ms

10. RELIABILITY TEST

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	60℃	300HRS	Note1,4
2	Low Temperature Storage	-20℃	300HRS	Note1,4
3	High Temperature Humidity Storage	50℃,80%RH	300HRS	Note4
4	High Temperature Operation	50	300HRS	Note2,4
5	Low Temperature Operation	0℃	300HRS	Note1,4
6	Temperature Cycle	-20℃→60℃ (30min) (30min)	100CYCLE	Note4

Note1 : Ta is the ambient temperature of samples.

Note2 : Ts is the temperature of panel's surface.

Note3 : In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

Note4 : Before cosmetic and function test, the product must have enough recovery time, at least 2 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
OT215ZFWDBL-00	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±5°C and the humidity 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.