TFT-Display Datasheet

OT070ZAWDLN-02 | ONation

Features

Active Screen Area	154.21x85.92 [mm]
Size | Format	7“ | 16:9
Resolution	1024x600
Backlight	LED
Brightness	350 cd/m^2
LED Life Time	20K (h)
Interface	LVDS
Viewing Angle	L/R 85/85 - U/D 85/85
Touchscreen	no
Power Supply	3.3V [Typ.]
Module Outline	165.75x105.39x3.4 [mm]
Operation Temperature	-20… + 70°C
Storage Temperature	-30… + 80°C

Contact

HY-LINE Computer Components
Vertriebs GmbH
Inselkammerstr. 10
82008 Unterhaching
Germany

Support
Tel.: +49 89 614 503 40
Fax. +49 89 614 503 50

Send us an email
computer@hy-line.de

ONation Corporation

TFT COLOR LCD MODULE

MODEL: OT070ZAWDLN-02

WSVGA
LVDS interface (1port)

Version: P0.1

Customer : _____

Approved By : _____

Date: _____

ONATION		
APPROVAL	**CHECKER**	**PREPARE**
		Alan

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C O N T E N T S

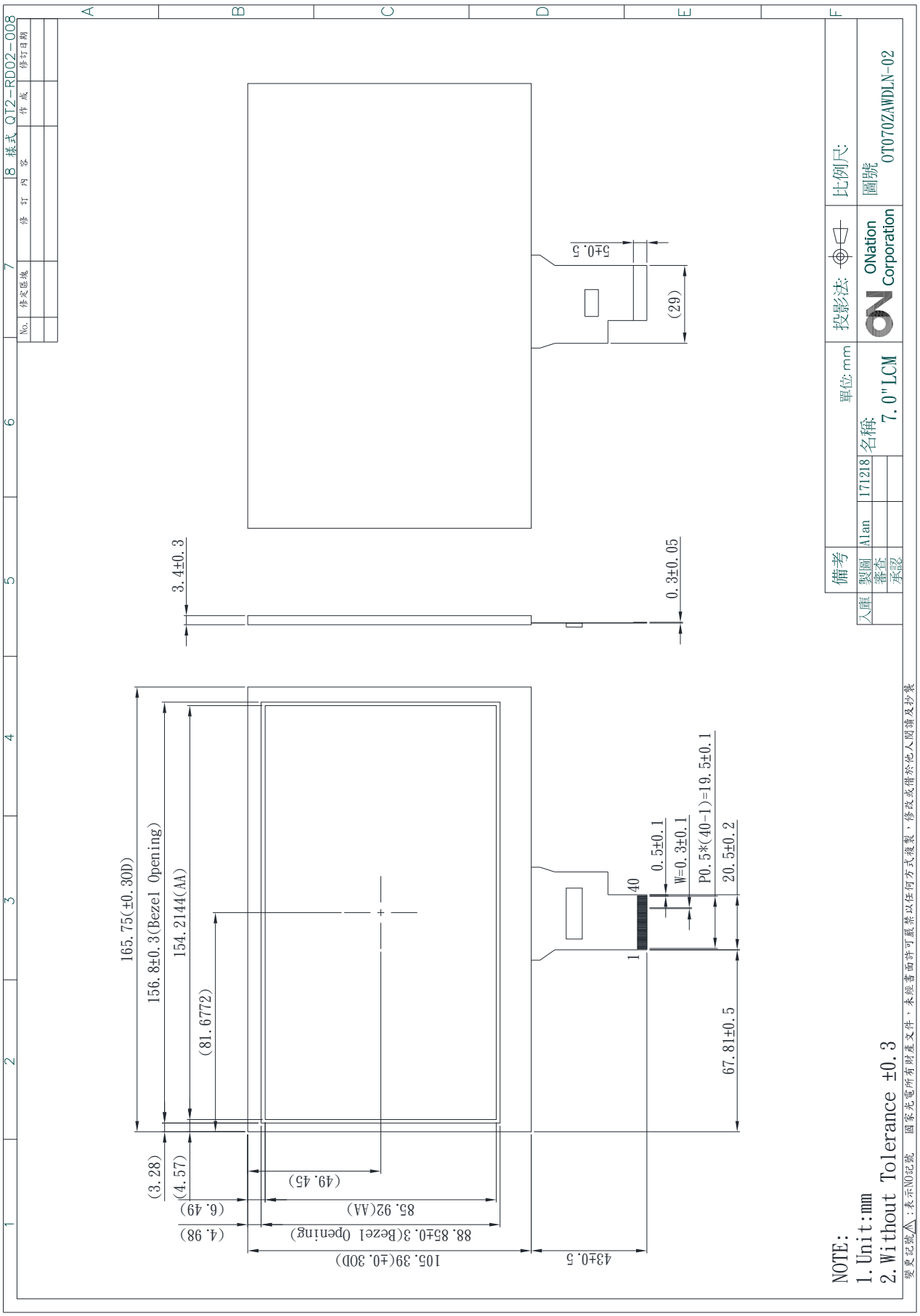
1.RECORD OF REVISION

REV	DATE	PAGE	SUMMARY
0.1	2017.12.18	ALL	Preliminary specification was first issued.

2.MECHANICAL SPECIFICATIONS

(1)	Number Of Dots (Dots)	1024(R.G.B) X 600
(2)	Module Size(mm)	165.75(H) X 105.39(V) X3.4(D)
(3)	Active Area(mm)	154.2144(H) X 85.92(V)
(4)	Pixel Pitch(mm)	0.1506(H) X 0.1432(V)
(5)	LCD / Polarizer Model	TFT , Transmissive, Normally/Black
(6)	Backlight Color	White, LED
(7)	Viewing Direction	Wide Viewing Angle Horizontal：Right side 85°(typ.), Left side 85°(typ.) Vertical：Up side 85°(typ.), Down side 85°(typ.)
(8)	Electrical Interface	LVDS Interface
(9)	Color Configuration	R.G.B Stripe
(10)	Module Weight(g)	(120)

3. OUTLINE DIMENSIONS



4. INTERFACE PIN CONNECTION

4.1 LCM PANEL DRIVING SECTION

Mating Connector：FH12A-40S-0.5SH by Hirse or Equivalen

P IN NO	SIGNAL	FUNCTION	REMARK
1	NC	No connection	
2	VDD	Power Voltage for digital circuit	
3	VDD	Power Voltage for digital circuit	
4	NC	No connection	
5	RESET	Hardware global reset and low active	
6	STBYB	Standby mode, Normally pulled high STBYB='1',mornal operation STBYB='0',timing controller, source driver will turn off, All output are High-Z.	
7	GND	Ground	
8	RXIN0-	-LVDS differential data input Input	
9	RXIN0+	+LVDS differential data input	
10	GND	Ground	
11	RXIN1-	-LVDS differential data input Input	
12	RXIN1+	+LVDS differential data input	
13	GND	Ground	
14	RXIN2-	-LVDS differential data input Input	
15	RXIN2+	+LVDS differential data input	
16	GND	Ground	
17	RXCLKIN-	-LVDS differential CLK data input	
18	RXCLKIN+	+LVDS differential CLK data input	
19	GND	Ground	
20	RXIN3-	-LVDS differential data input Input	
21	RXIN3+	+LVDS differential data input	
22	GND	Ground	
23	NC	No connection	
24	NC	No connection	
25	GND	Ground	
26	NC	No connection	
27	NC	No connection	
28	SELB	6/8bits LVDS data input selection [H:6bits L:8bits]	Note 1
29	AVDD	Power for Analog Circuit	
30	GND	Ground	

31	VLED-	LED Cathode	
32	VLED-	LED Cathode	
33	L/R	Horizontal inversion	Note 3
34	U/D	Vertical inversion	Note 3
35	VGL	Gate OFF Voltage	
36	NC	No connection	Note 2
37	NC	No connection	Note 2
38	VGH	Gate ON Voltage	
39	VLED+	LED Anode	
40	VLED+	LED Anode	

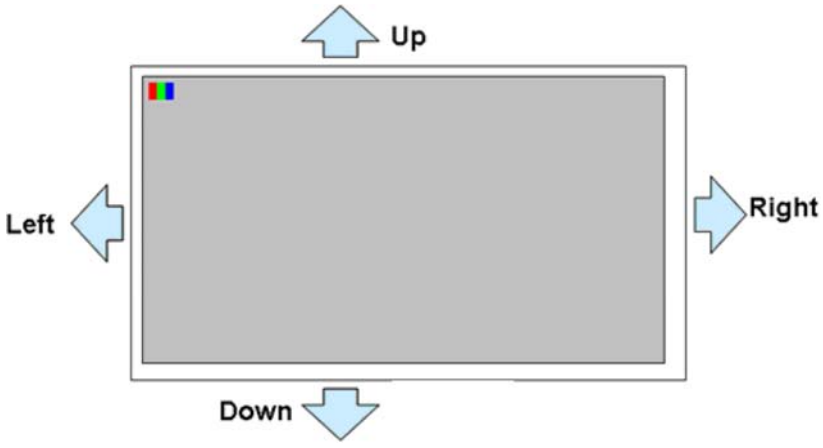
Note1: If LVDS input data is 6bit, SELB must be set High.

If LVDS input data is 8bit, SELB must be set Low.

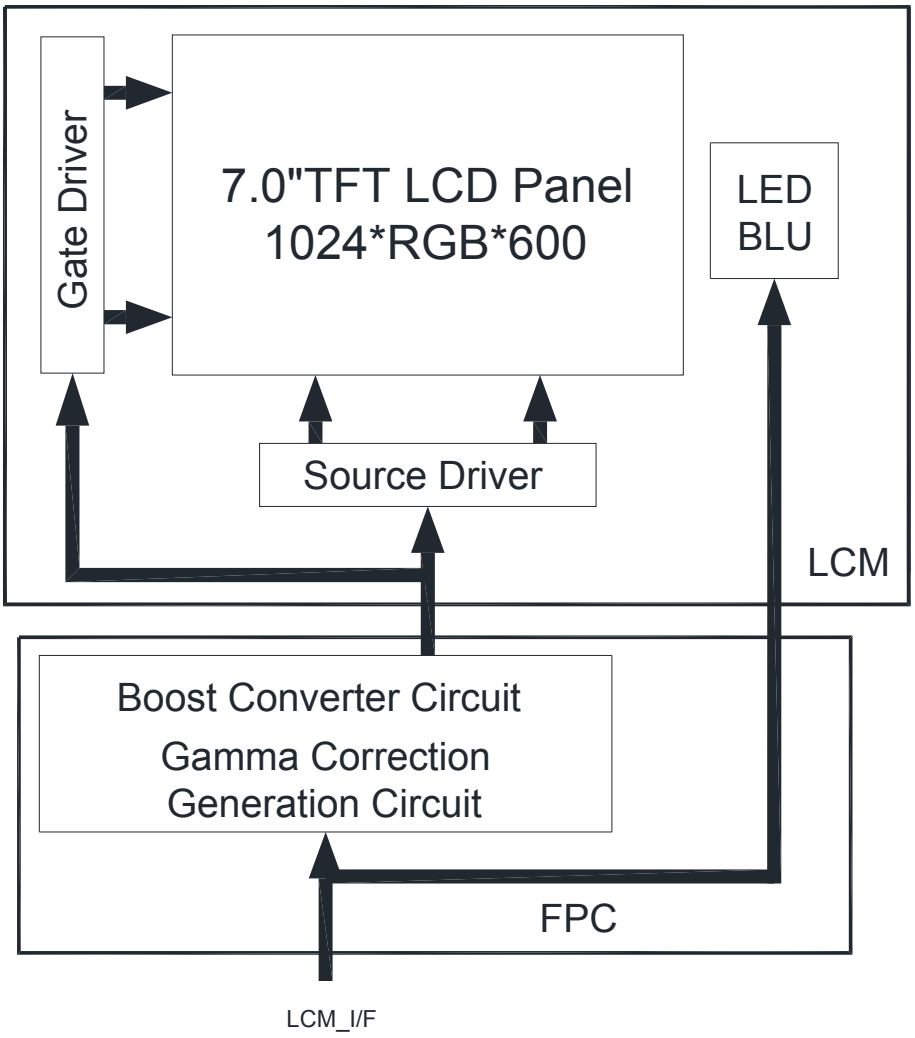
Note2: When CABC_EN=”00”, CABC OFF
When CABC_EN=”01”, use interface image.
When CABC_EN=”10”, still picture.
When CABC_EN=”11”, moving image.
When CABC off, don’t connect DIMO , else connect it to backlight.

Note3:

U/D	L/R	FUNCTION
0	1	Normal display
0	0	Inverse Left and Right
1	1	Inverse Up and Down
1	0	Inverse Left and Right Inverse Up and Down



5. BLOCK DIAGRAM



6. ABSOLUTE MAXIMUM RATINGS

6.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power Voltage For LCD	VDD	-0.5	5.0	V	
	AVDD	-0.5	15.0	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(℃)	-20	70	-30	80	Note 1,2
Humidity(% RH)	5~90		5~90		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 : Storage Ta=40℃ & RH=90% ≦ 240Hrs.

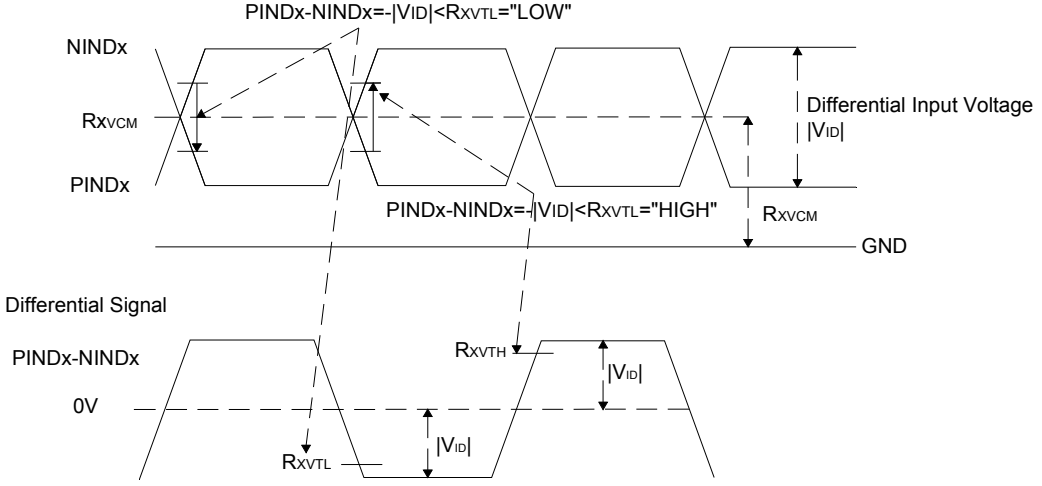
7. ELECTRICAL CHARACTERISTICS

7.1 LCM ELECTRICAL CHARACTERISTICS

Ta=25℃

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Voltage For LCD	VDD	2.5	3.3	3.6	V	
	IDD*	-	45	-	mA	Note1
	AVDD	9.4	9.6	9.8	V	
	VGH	17.0	18.0	19.0	V	
	VGL	-6.6	-6.0	-5.4	V	
Input High Voltage	VIH	0.7 x VDD	-	VDD	mA	
Input Low Voltage	VIL	GND	-	0.3 x VDD	V	
Differential input high Threshold voltage	RxVTH	-	-	+0.1	V	RxVCM=1.2V
Differential input low Threshold voltage	RxVTL	-0.1	-	-	V	
Input voltage range (singled-end)	RxVIN	0	-	2.4	V	
Differential input common mode voltage	RxVCM	|VID|/2	-	2.4-|VID|/2	V	
Differential input voltage	|VID|	0.2	-	0.6	V	
Differential input Leakage current	RVxIIZ	-10	-	+10	uA	
LVDS Digital Operating Current	Iddlvds	-	40	50	mA	
LVDS Digital Stand-by Current	Istlvds	-	10	50	uA	
	VTL	-100	-	-	mV	

Note 1 : Test Condition: VDD=3.3V ; Test Pattern: White.



7.2 BACKLIGHT UNITS

Ta=25℃

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
LED Driving Voltage	(VLED+)-(VLED-)	8.7	9.3	10.2	V	
LED Driving Current	(VLED+)-(VLED-)	-	180	-	mA	
LED Life Time	Lf	20000	-	-	Hr	

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and I_{VLED} =180mA.

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_{VLED} =180mA.The LED lifetime could be decreased if operation I_L is lager than 180mA.

8. OPTICAL CHARACTERISTICS

Ta=25℃

ITEM		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio		CR	Viewing Normal Angle Θx=Θy=0°	600	800	-	-	Note 1
Response Time		TR+TF		-	25	40	ms ms	Note 2
Chromaticity	White	x		(0.25)	(0.29)	(0.33)	-	Note 4
		y		(0.29)	(0.33)	(0.37)	-	
Viewing Angle	Hor.	θx+	Viewing Angle Θx=Θy=0° CR≧10	80	85	-	Deg.	Note 3
		θx -		80	85	-		
	Ver.	θy+		80	85	-		
		θy -		80	85	-		
Luminance		L	I_{VLED}=180mA	230	350	-	cd/m2	
Luminance Uniformity		YU		70	75	-	%	Note 5

Note 1：Definition of Contrast Ratio (CR)：

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63/L0

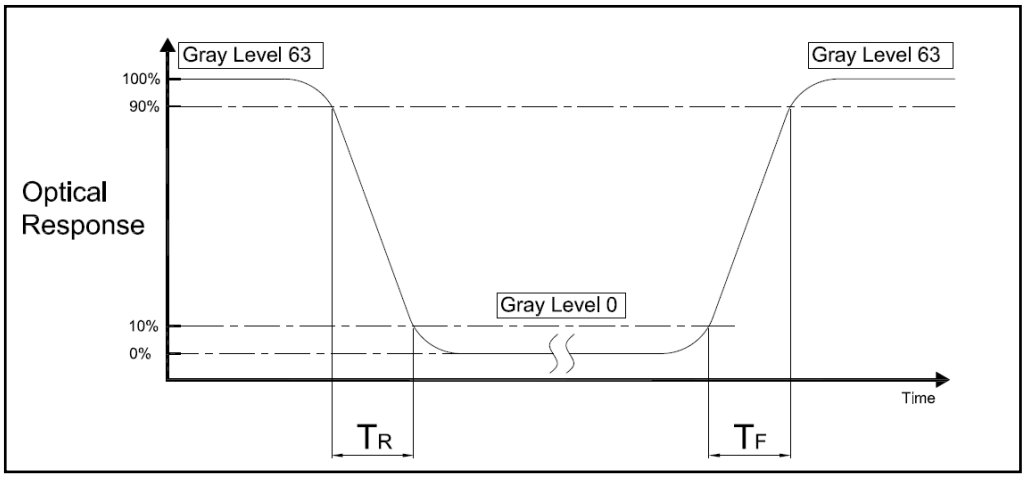
L63：Luminance of gray level 63

L0：Luminance of gray level 0

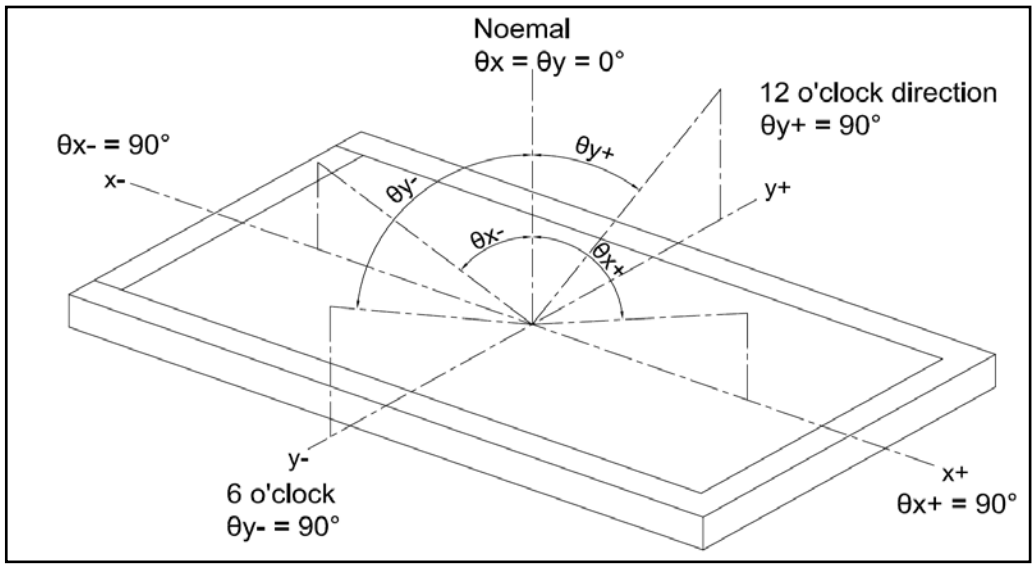
CR = CR(5)

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)

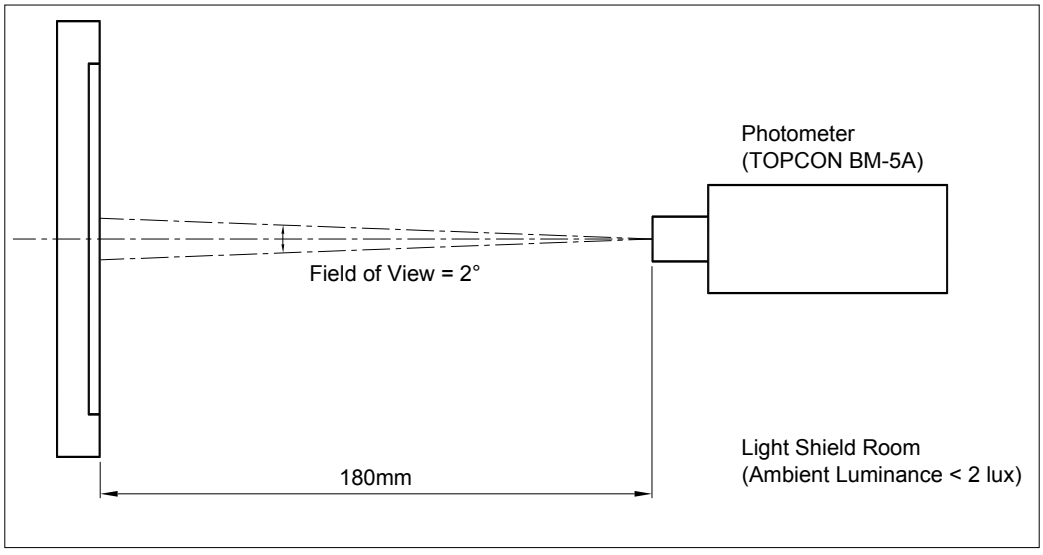


Note 3：Definition of Viewing Angle

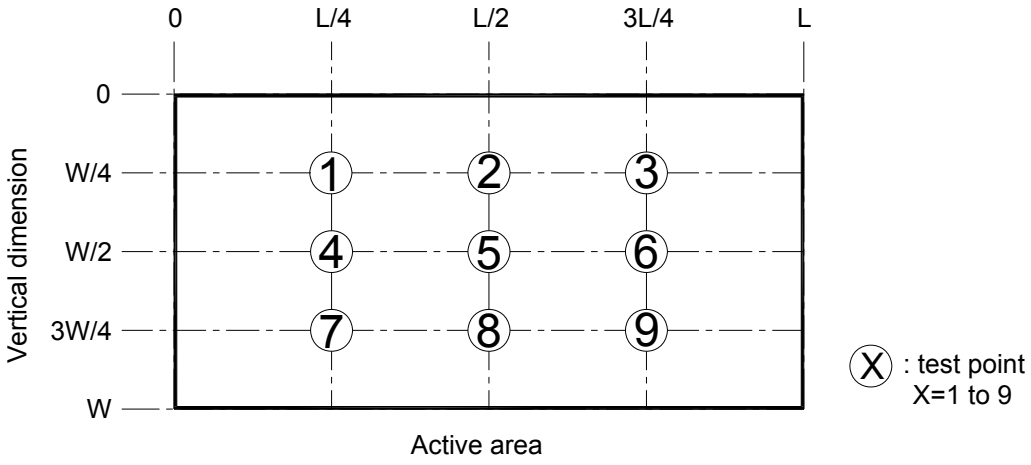


Note 4：Measurement Set-Up:

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：

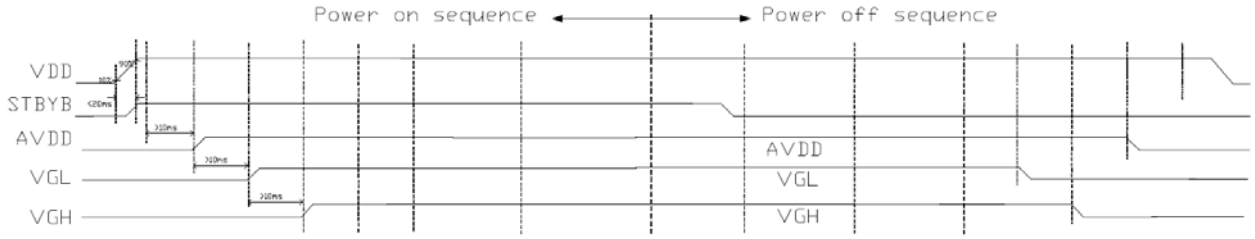


$$\left(1 - \frac{\text{MAX Luminance - Average Luminance}}{\text{Average Luminance}}\right) \text{ X } 100\% \geqq 70\%$$

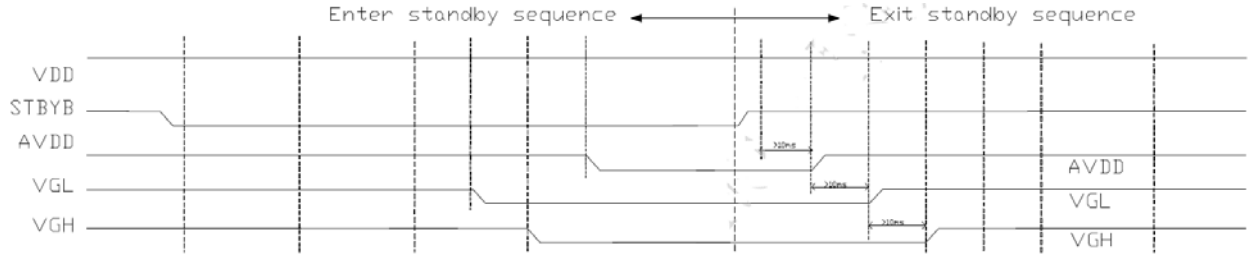
9. TIMING SPECIFICATIONS

9.1 POWER SIGNAL SEQUENCE

9.1.1 Power on:

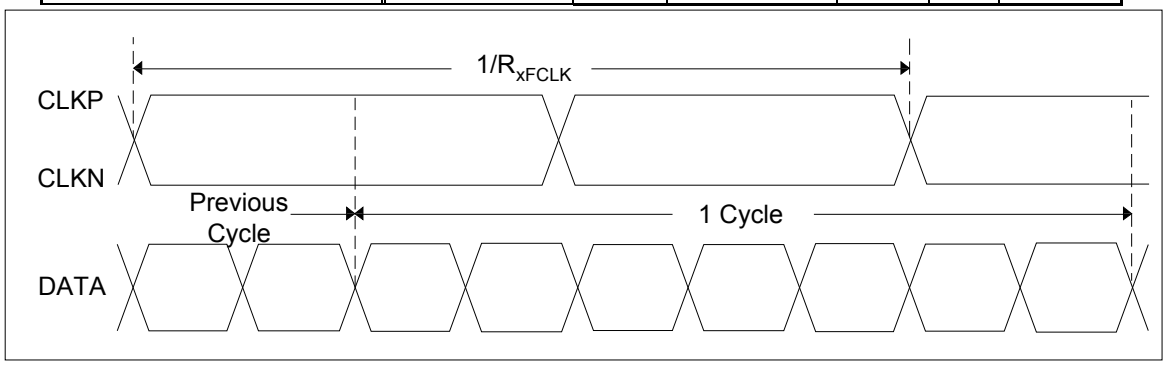


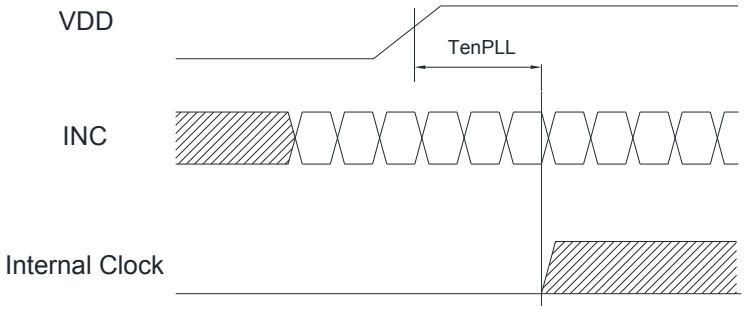
9.1.2 Power off:

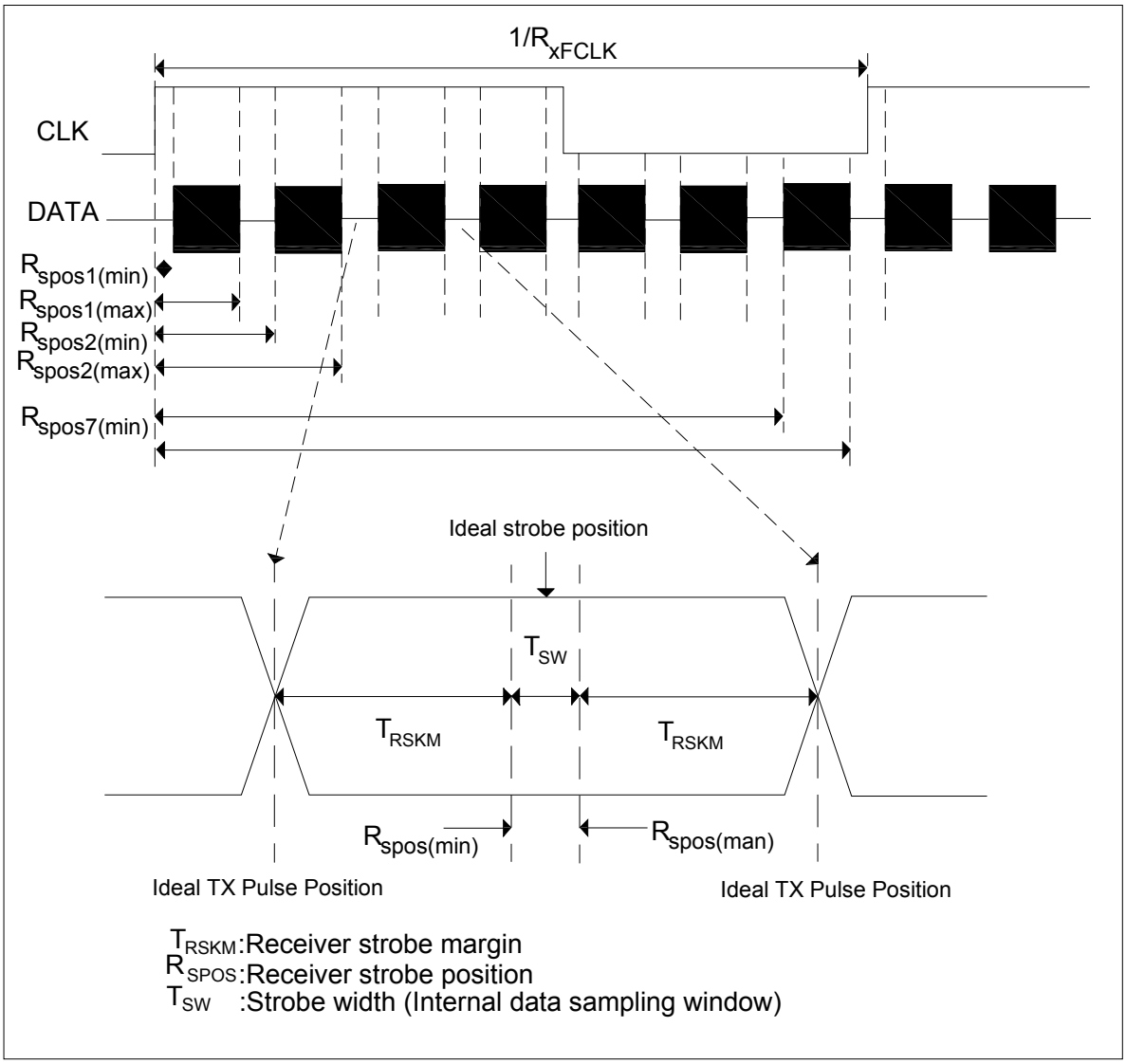


9.2 TIMING CHARACTERISTICS

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Clock frequency	Rx_{FCLK}	40.8	51.2	67.2	MHZ	
Input data skew margin	T_{RSKM}	500	-	-	ps	
Clock high time	T_{LVCH}	-	$4/(7* Rx_{FCLK})$	-	ps	
Clock low time	T_{LVCL}	-	$3/(7* Rx_{FCLK})$	-	ps	
PLL wake-up time	TenPLL			150	us	







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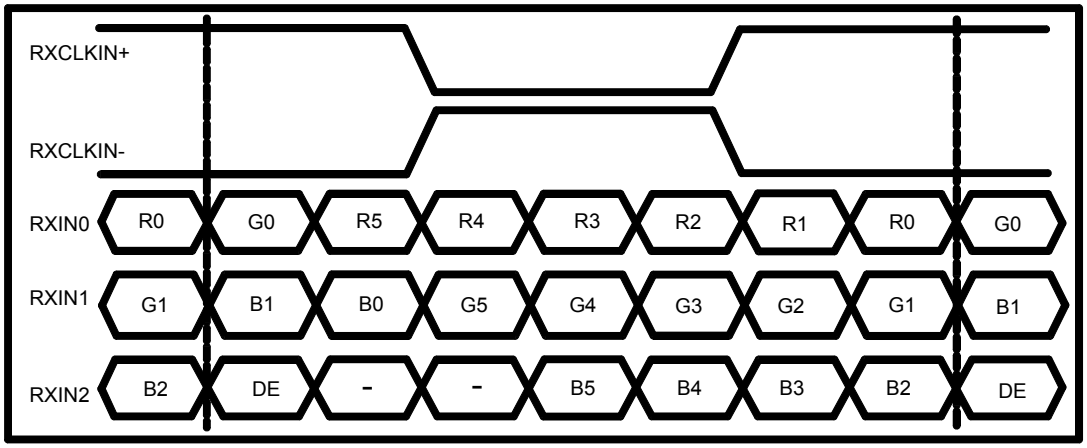
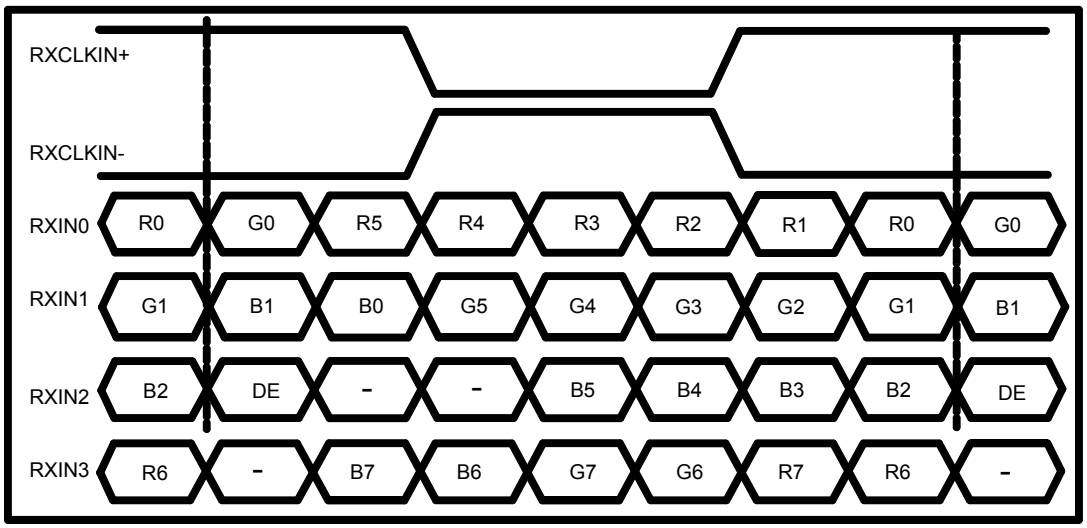
SSC torence of LVDS receiver						
Symbol	**parameter**	**condition**	**Min.**	**Typ.**	**Max.**	**Units**
SSC_{MF}	Modulation Frequency		23		93	KHz
SSC_{MR}	Modulation Rate	LVDS clock = 71MHz center spread			±3	%

9.3 LVDS INPUT DATA MAPPING

6bit LVDS input



8bit LVDS input



Note:Support DE timing mode only.SYNC mode not supported

10 RELIABILITY TEST

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	80℃	240HRS	Note1,3
2	Low Temperature Storage	-30℃	240HRS	Note1,3
3	High Temperature Operation	70℃	240HRS	Note2,3
4	Low Temperature Operation	-20℃	240HRS	Note1,3
5	Temperature Cycle	-20℃~70℃	1HRS/ 100CYCLE	Note 3,4
6	High Temperature Humidity Storage	40℃ 90%RH	240HRS	Note 3

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.

Note 1: Ta is the ambient temperature of samples.
Note 2: Ts is the temperature of panel's surface.
Note 3: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.
Note 4: Start with cold temperature and end with high 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
OT070ZAWDLN-02	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.

ONation Corporation

TFT COLOR LCD MODULE

MODEL: OT070ZAWDLN-02

WSVGA
LVDS interface (1port)

Version: P0.1

Customer : _____

Approved By : _____

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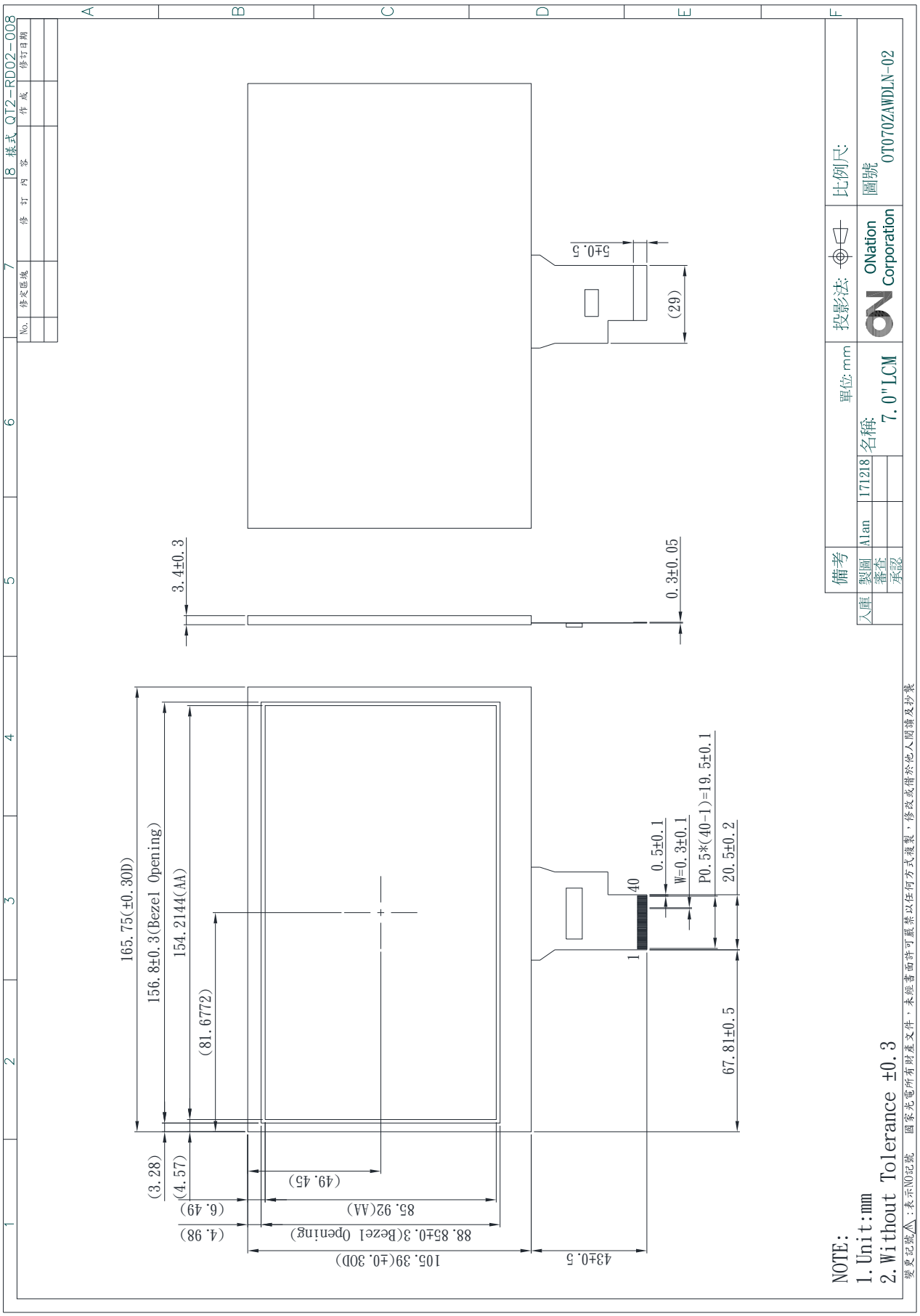
(6)	Backlight Color	White, LED
(7)	Viewing Direction	Wide Viewing Angle Horizontal：Right side 85°(typ.), Left side 85°(typ.) Vertical：Up side 85°(typ.), Down side 85°(typ.)
(8)	Electrical Interface	LVDS Interface
(9)	Color Configuration	R.G.B Stripe
(10)	Module Weight(g)	(120)

3. OUTLINE DIMENSIONS



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7	GND	Ground	
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9	RXIN0+	+LVDS differential data input	
10	GND	Ground	
11	RXIN1-	-LVDS differential data input Input	
12	RXIN1+	+LVDS differential data input	
13	GND	Ground	
14	RXIN2-	-LVDS differential data input Input	
15	RXIN2+	+LVDS differential data input	
16	GND	Ground	
17	RXCLKIN-	-LVDS differential CLK data input	
18	RXCLKIN+	+LVDS differential CLK data input	
19	GND	Ground	
20	RXIN3-	-LVDS differential data input Input	
21	RXIN3+	+LVDS differential data input	
22	GND	Ground	
23	NC	No connection	
24	NC	No connection	
25	GND	Ground	
26	NC	No connection	
27	NC	No connection	
28	SELB	6/8bits LVDS data input selection [H:6bits L:8bits]	Note 1
29	AVDD	Power for Analog Circuit	
30	GND	Ground	

31	VLED-	LED Cathode	
32	VLED-	LED Cathode	
33	L/R	Horizontal inversion	Note 3
34	U/D	Vertical inversion	Note 3
35	VGL	Gate OFF Voltage	
36	NC	No connection	Note 2
37	NC	No connection	Note 2
38	VGH	Gate ON Voltage	
39	VLED+	LED Anode	
40	VLED+	LED Anode	

Note1: If LVDS input data is 6bit, SELB must be set High.

If LVDS input data is 8bit, SELB must be set Low.

Note2: When CABC_EN=”00”, CABC OFF
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When CABC off, don’t connect DIMO , else connect it to backlight.

Note3:

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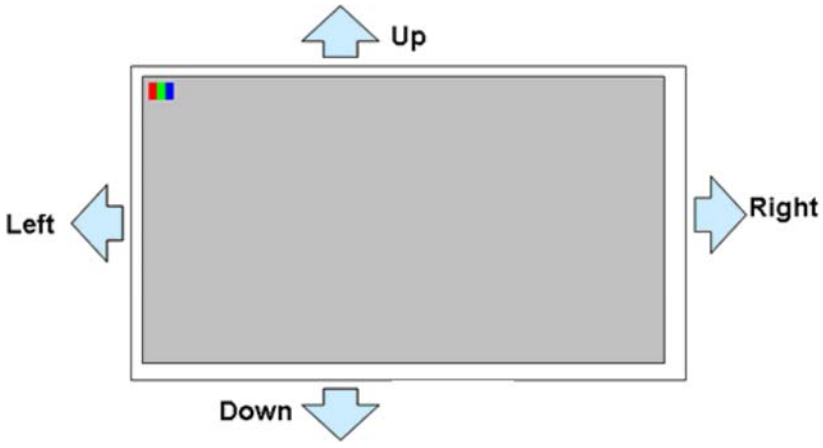
0	0	Inverse Left and Right
1	1	Inverse Up and Down
1	0	Inverse Left and Right Inverse Up and Down



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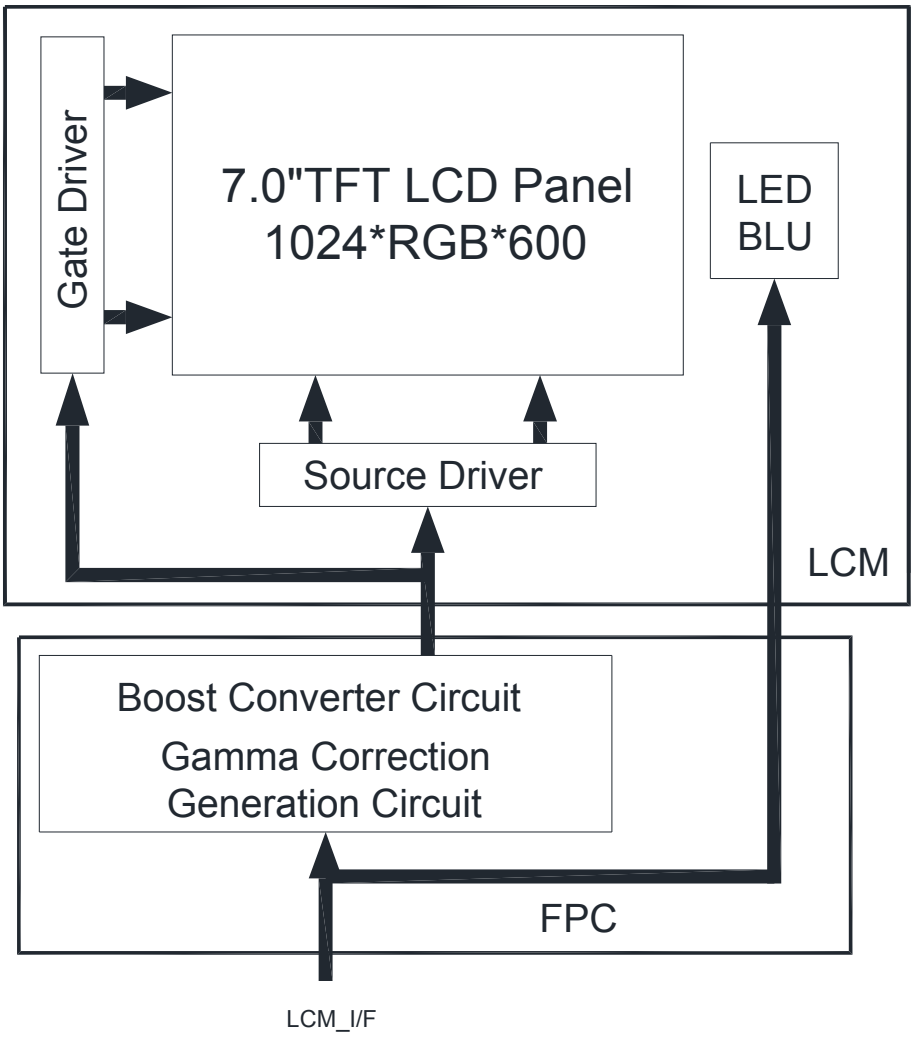


6. ABSOLUTE MAXIMUM RATINGS

6.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT	REMARK
Power Voltage For LCD	VDD	-0.5	5.0	V	
	AVDD	-0.5	15.0	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(℃)	-20	70	-30	80	Note 1,2
Humidity(% RH)	5~90		5~90		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 : Storage Ta=40℃ & RH=90% ≦ 240Hrs.

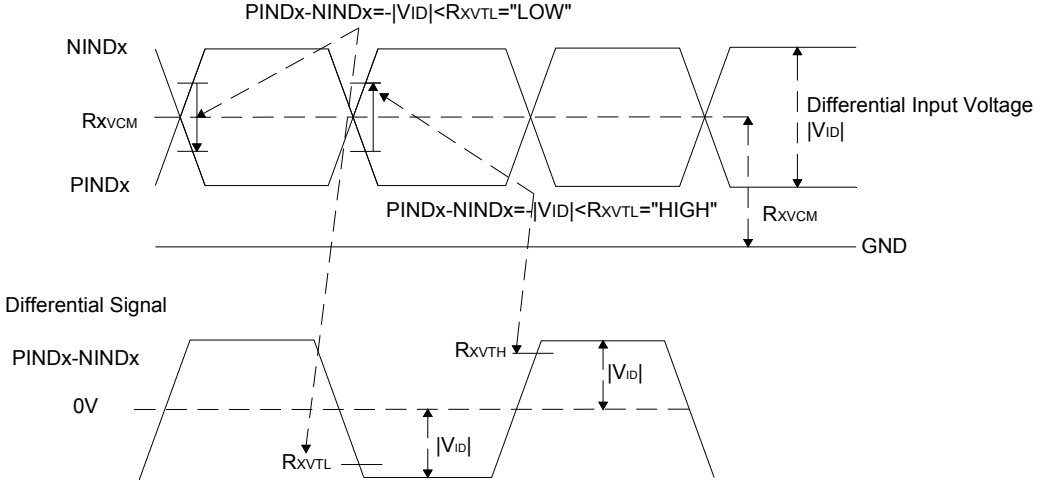
7. ELECTRICAL CHARACTERISTICS

7.1 LCM ELECTRICAL CHARACTERISTICS

Ta=25℃

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Power Voltage For LCD	VDD	2.5	3.3	3.6	V	
	IDD*	-	45	-	mA	Note1
	AVDD	9.4	9.6	9.8	V	
	VGH	17.0	18.0	19.0	V	
	VGL	-6.6	-6.0	-5.4	V	
Input High Voltage	VIH	0.7 x VDD	-	VDD	mA	
Input Low Voltage	VIL	GND	-	0.3 x VDD	V	
Differential input high Threshold voltage	RxVTH	-	-	+0.1	V	RxVCM=1.2V
Differential input low Threshold voltage	RxVTL	-0.1	-	-	V	
Input voltage range (singled-end)	RxVIN	0	-	2.4	V	
Differential input common mode voltage	RxVCM	|VID|/2	-	2.4-|VID|/2	V	
Differential input voltage	|VID|	0.2	-	0.6	V	
Differential input Leakage current	RVxIIZ	-10	-	+10	uA	
LVDS Digital Operating Current	Iddlvds	-	40	50	mA	
LVDS Digital Stand-by Current	Istlvds	-	10	50	uA	
	VTL	-100	-	-	mV	

Note 1 : Test Condition: VDD=3.3V ; Test Pattern: White.



7.2 BACKLIGHT UNITS

Ta=25℃

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
LED Driving Voltage	(VLED+)-(VLED-)	8.7	9.3	10.2	V	
LED Driving Current	(VLED+)-(VLED-)	-	180	-	mA	
LED Life Time	Lf	20000	-	-	Hr	

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and I_{VLED} =180mA.

Note 2: The “LED life time” is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_{VLED} =180mA.The LED lifetime could be decreased if operation I_L is lager than 180mA.

8. OPTICAL CHARACTERISTICS

Ta=25℃

ITEM		SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNIT	REMARK
Contrast Ratio		CR	Viewing Normal Angle Θx=Θy=0°	600	800	-	-	Note 1
Response Time		TR+TF		-	25	40	ms ms	Note 2
Chromaticity	White	x		(0.25)	(0.29)	(0.33)	-	Note 4
		y		(0.29)	(0.33)	(0.37)	-	
Viewing Angle	Hor.	θx+	Viewing Angle Θx=Θy=0° CR≧10	80	85	-	Deg.	Note 3
		θx -		80	85	-		
	Ver.	θy+		80	85	-		
		θy -		80	85	-		
Luminance		L	I_{VLED}=180mA	230	350	-	cd/m2	
Luminance Uniformity		YU		70	75	-	%	Note 5

Note 1：Definition of Contrast Ratio (CR)：

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63/L0

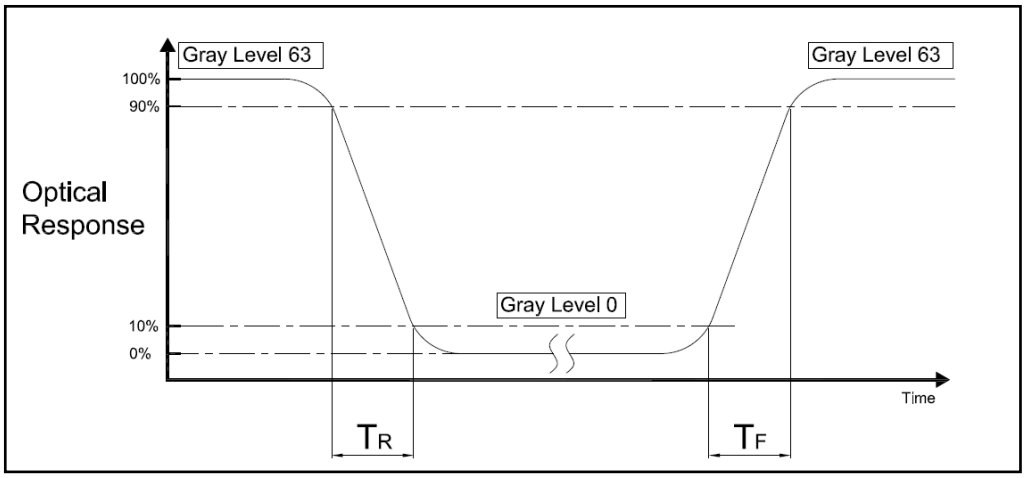
L63：Luminance of gray level 63

L0：Luminance of gray level 0

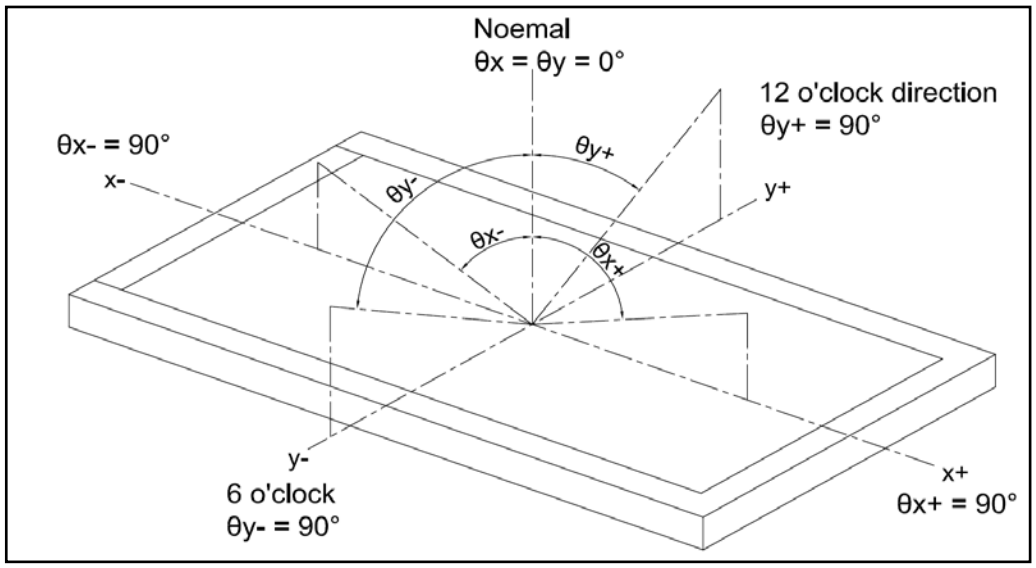
CR = CR(5)

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)

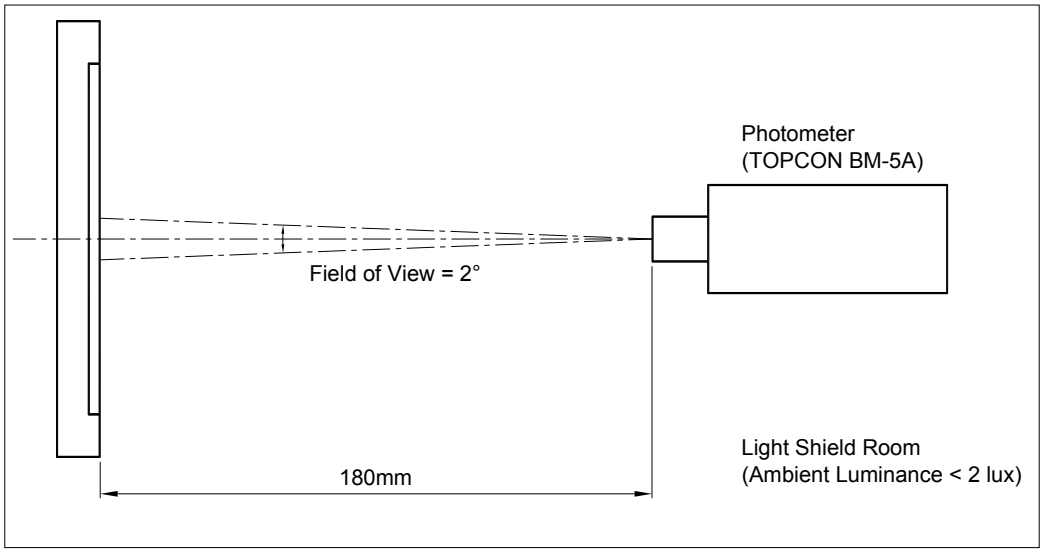


Note 3：Definition of Viewing Angle

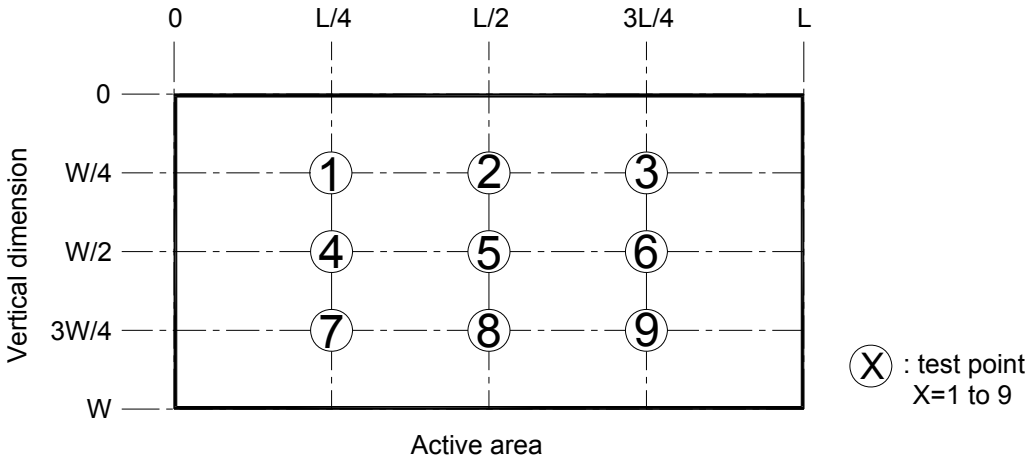


Note 4：Measurement Set-Up:

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：

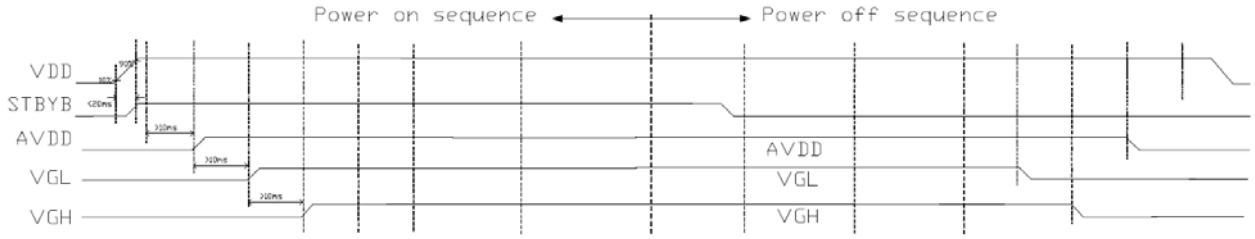


$$\left(1 - \frac{\text{MAX Luminance - Average Luminance}}{\text{Average Luminance}}\right) \text{ X } 100\% \geqq 70\%$$

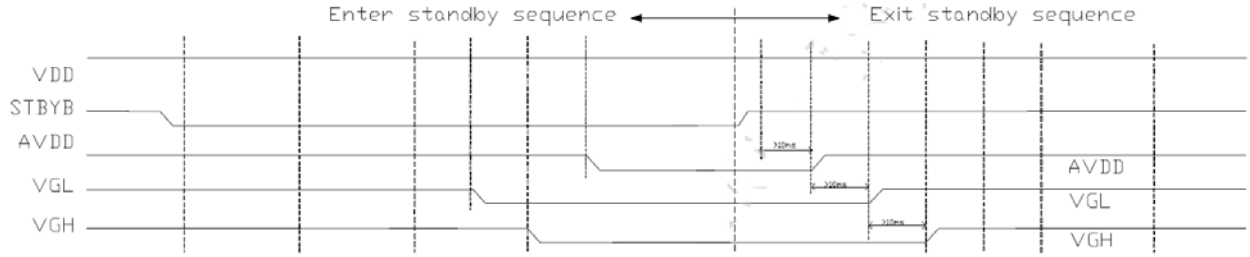
9. TIMING SPECIFICATIONS

9.1 POWER SIGNAL SEQUENCE

9.1.1 Power on:

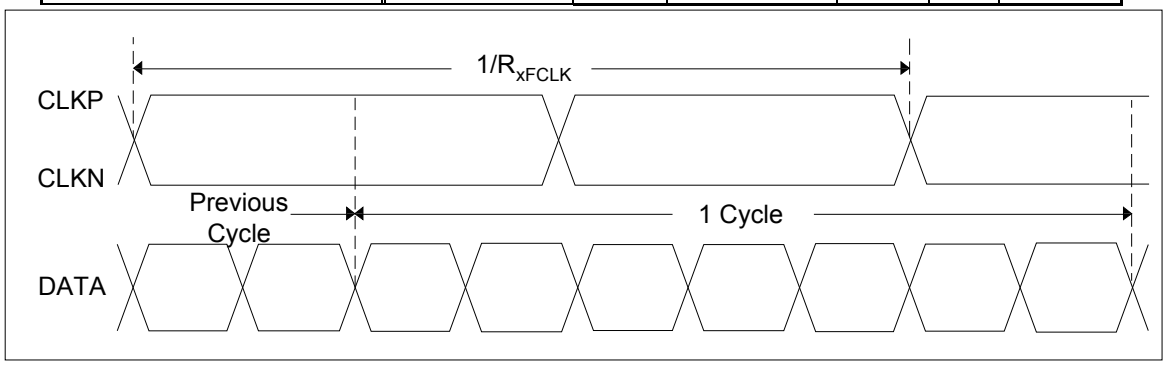


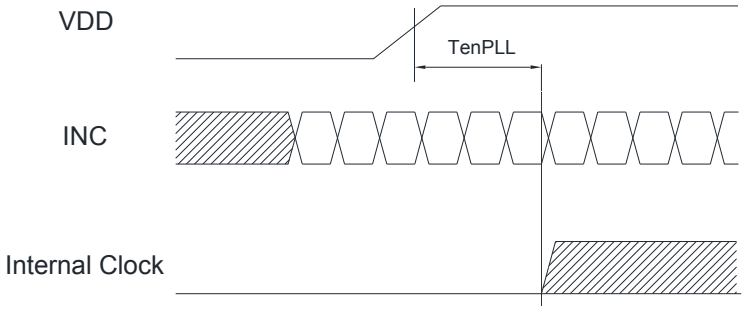
9.1.2 Power off:

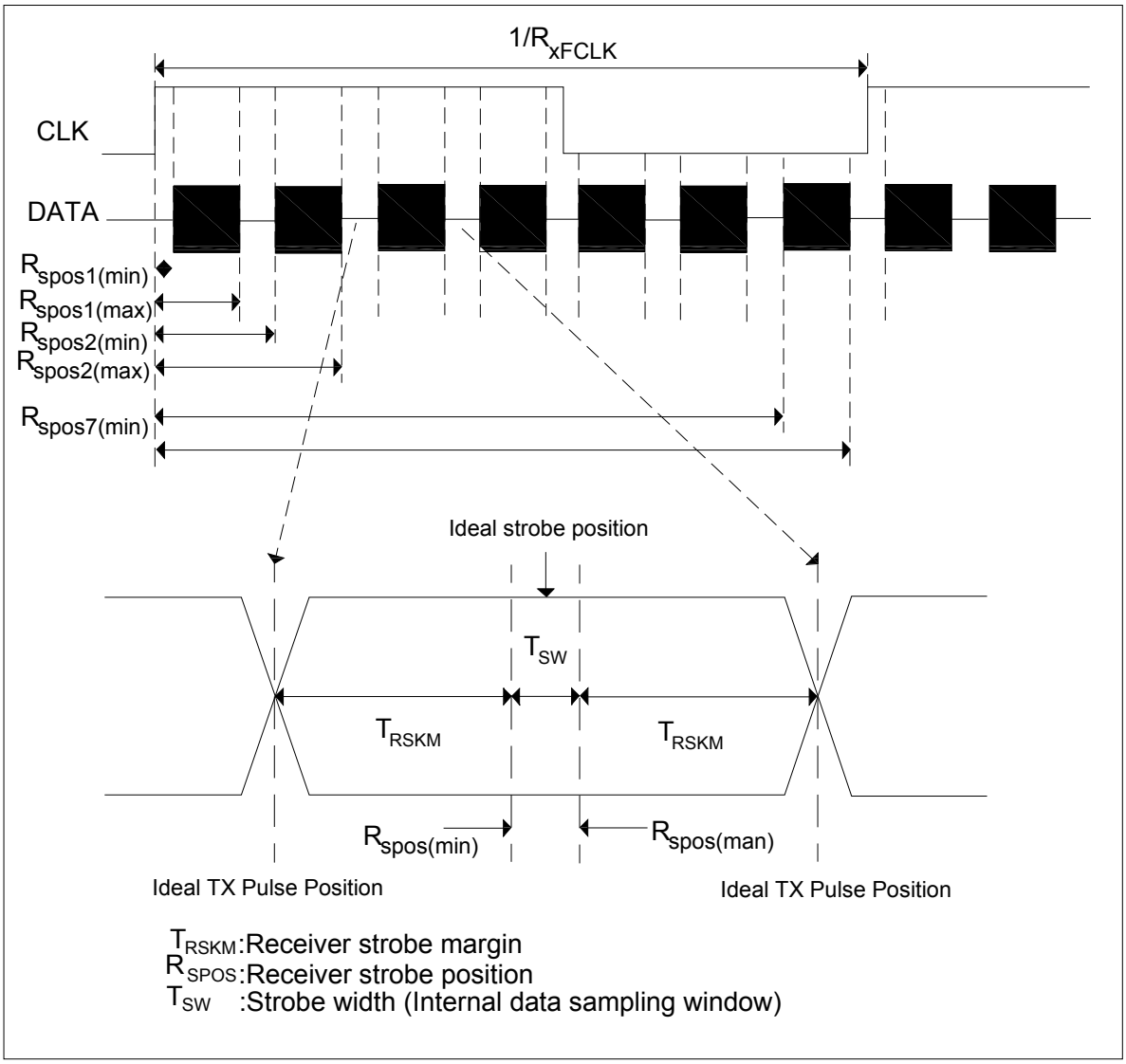


9.2 TIMING CHARACTERISTICS

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	REMARK
Clock frequency	Rx_{FCLK}	40.8	51.2	67.2	MHZ	
Input data skew margin	T_{RSKM}	500	-	-	ps	
Clock high time	T_{LVCH}	-	$4/(7* Rx_{FCLK})$	-	ps	
Clock low time	T_{LVCL}	-	$3/(7* Rx_{FCLK})$	-	ps	
PLL wake-up time	TenPLL			150	us	







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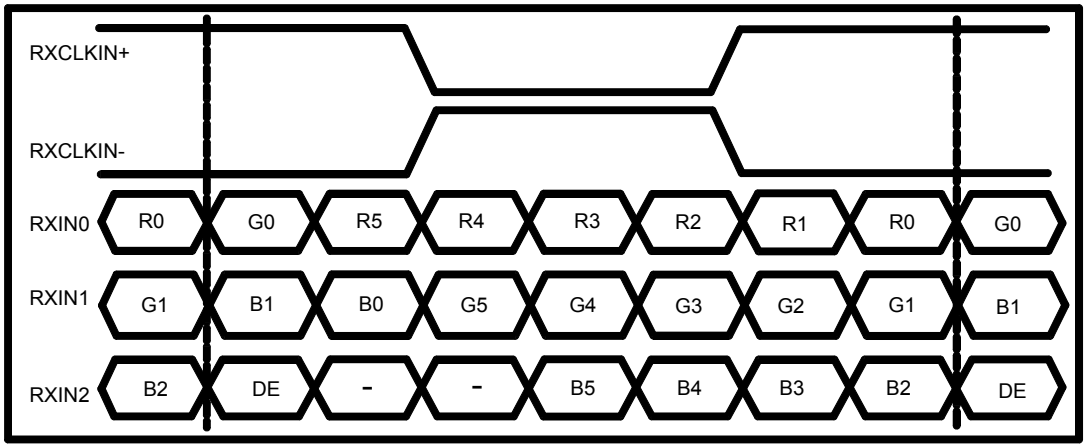
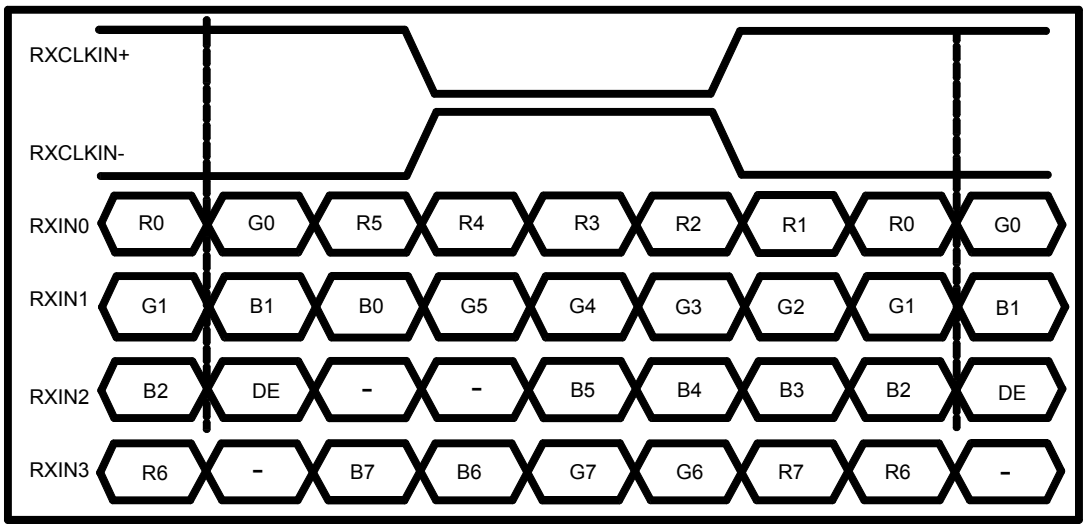
SSC torence of LVDS receiver						
Symbol	**parameter**	**condition**	**Min.**	**Typ.**	**Max.**	**Units**
SSC_{MF}	Modulation Frequency		23		93	KHz
SSC_{MR}	Modulation Rate	LVDS clock = 71MHz center spread			±3	%

9.3 LVDS INPUT DATA MAPPING

6bit LVDS input



8bit LVDS input



Note:Support DE timing mode only.SYNC mode not supported

10 RELIABILITY TEST

ENVIRONMENTAL TEST				
NO.	ITEM	CONDITIONS	TIME PERIOD	REMARK
1	High Temperature Storage	80℃	240HRS	Note1,3
2	Low Temperature Storage	-30℃	240HRS	Note1,3
3	High Temperature Operation	70℃	240HRS	Note2,3
4	Low Temperature Operation	-20℃	240HRS	Note1,3
5	Temperature Cycle	-20℃~70℃	1HRS/ 100CYCLE	Note 3,4
6	High Temperature Humidity Storage	40℃ 90%RH	240HRS	Note 3

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.

Note 1: Ta is the ambient temperature of samples.
Note 2: Ts is the temperature of panel's surface.
Note 3: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.
Note 4: Start with cold temperature and end with high 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
OT070ZAWDLN-02	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.