TO：

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《新规 New · 变更》 Revision

产 品 规 格 书

Product Specification

产品名 Product：TP-LCD Module

机种名 Model：OST215FC63E1V01

【接收印栏】

※ 本基准书由封面、附件等全30页构成。 如果对该规格书有异议，请在下订单前提出。

※ This Product Specification have 30 pages including the coversheet and Appendices. Please negotiate the objection point before purchase order.

江苏奥斯汀光电科技股份有限公司

JIANGSU AUSTIN OPTRONICS TECHNOLOGY CO., LTD.

拟制	批准	审核

TP单元

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1. General Specification 产品规格

Item 项目	CONTENTS 内容	Unit 单位
Outline Dimension 外形尺寸	以确认工程图为准	mm
Active Area(W*L)动作区	476.5*267.6	mm
View Area 可视区	475.5*266.6	mm
TP size (inch) 英寸尺寸	21.5	inch
Interface Type 接口种类	IIC/USB （注1）	-
IC Type IC 型号	ILI2302M	-
Number of touchpoint 触点数量	5(10)	-
Operation Temperature 工作温度	TOPL = -10, TOPH =60	℃
Storage Temperature 储存温度	TSTL = -40, TSTH =85	℃
Sensor thickness ITO 厚度	0.7	mm
Coverlens thickness 钢化玻璃厚度	1.1	mm
Lens Color 盖板颜色	黑色	-
Input force 输入外力	<10	g
Surface hardness 表面硬度	>6	H

注1：订货时选择

2. Electrical Characteristics (Ta＝25℃) 电气参数

Item 项目	Symbol标识	Condition 条件	Min.最小值	Type典型值	Max.最大值	Unit 单位
Power Supply 电压	VCC	--	2.8	3.3	3.5	V
Supply Current 电流	IDD	Vcc =3.3V Free mode	--	--	--	mA
		Vcc =3.3V watch mode	-	-	--	mA
		Vcc =3.3V Active mode	-	-	--	mA
		Vcc =3.3V Fast mode	-	<30	-	mA

3. Optical Characteristics 光学参数

Item 项目	CONTENTS 内容	Remark 备注
Transparency 透过率	>86%	

4. Reliability 信赖性

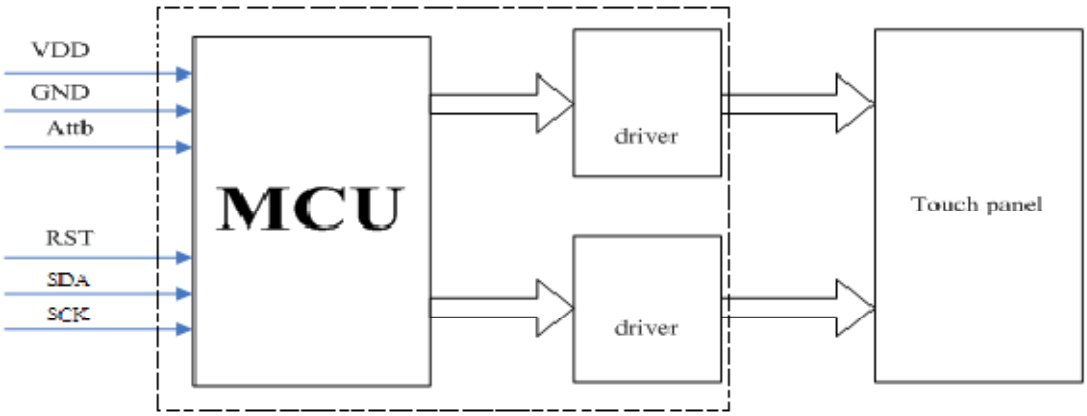
Item 项目	Specifications 规格	Remark 备注
High Temperature Storage 高温存储	70ºC,240hrs, Normalized for 2 hrs	
Low Temperature Storage 低温存储	-20ºC,240hrs, Normalized for 2 hrs	Non-condensing无结露
Temperature/ Humidity Storage储存温度/湿度	60ºC/90% RH,240hrs，normalized for 2 hrs	Non-condensing无结露
High Temperature Operation高温工作	55ºC,24hrs，Perform well	
Low Temperature Operation 低温工作	-10 ºC,24hrs，Perform well	Non-condensing无结露
Temperature/ Humidity Storage储存温度/湿度	60ºC/90%RH,24hrs，Normalized for 2 hrs	Non-condensing无结露
Thermal Shock 冷热冲击	-20 ~ 70℃, 60 Mins/cycle , Total 10 Cycles, Normalized for 2 hrs	

5. Touch panel description 触摸屏功能描述

5.1 touch panel drawing 外形图

See appendix(见附工程图)

5.2 Block diagram 功能方框图



5.3 Touch panel pin assignment 引脚定义

Pin	Symbol	Description
1	GND	Power ground.
2	GND	Power ground.
3	RESET	Reset pin for the TP.
4	INT	Attention request line, Should be pulled high.
5	GND	Power ground.
6	SCL	IIC clock signal. Must be pulled high
7	SDA	IIC data signal. Must be pulled high
8	VDD	Power supply.
9	GND	Power ground.
10	GND	Power ground.

6. Appearance Inspection 外观检验

6.1 Inspection Conditions 检验条件

1. Environment: 22 ± 3ºC, Inspection distance：30 ± 10cm.

2. Angle of Vision: 30º~ 90º

3. Lighting illumination: 17W fluorescent luminant lamp is used for appearance inspection.

Detail of settings is shown in figure 13.1 & 13.2 .

4. Minor impurities outside viewing area are acceptable unless their existence affect

electrical functions.

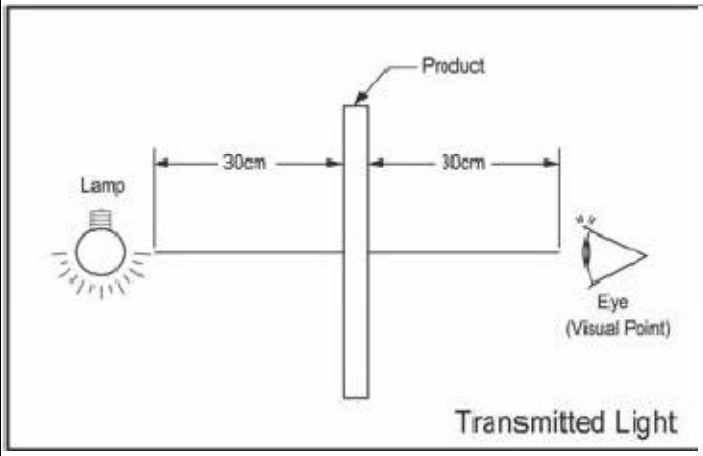


figure 13.1

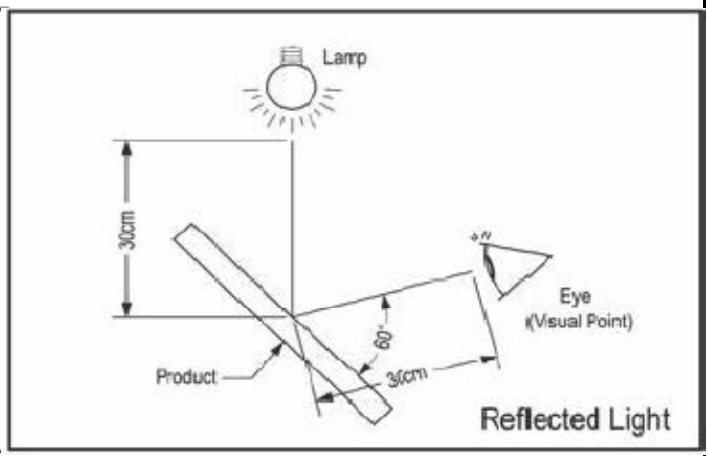
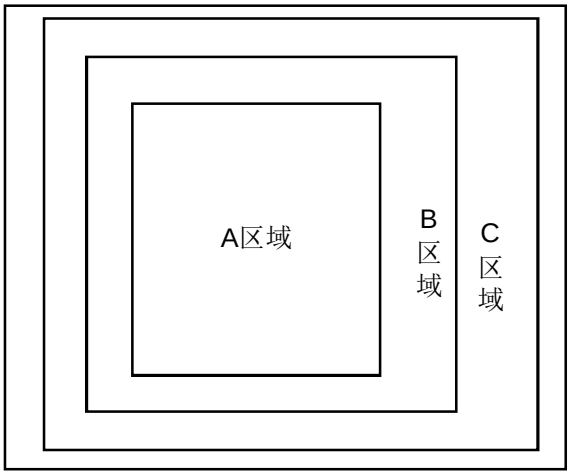


figure 13.2

6.2 Criteria 判定标准

涉及电线状不良判定标准如下（单位：MM）：两点或两条线间的间距不大于10MM

序号	点（用D表示大小）	允收程度			序号	长度（L表示）	宽度（W表示）	允收程度		
		A	B	C				A	B	C
1	D≤0.1	0个	3个间距大于5CM	0个	1	L≤3mm	W≤0.02	0个	0个	0个
2	0.1≤D≤0.15	1个	2个间距大于10CM	0个	2	L≤4mm	0.02≤W≤0.03	0个	1个	2个
3	0.15≤D≤0.2	1个	2个间距大于5CM	1个	3	L≤5mm	0.03≤W≤0.05	0个	1个	1个
4	D≤0.25	0个	1个	2个间距大于10CM	4	L≥5mm	W≥0.05	0个	0个	0个



注：A区域为显示屏中间三分之一的区域（即LCD中间部分所占整个LCD面积的二分之一的中间那一部分）

B区域为外侧至中间外侧边的二分之一的可视区域

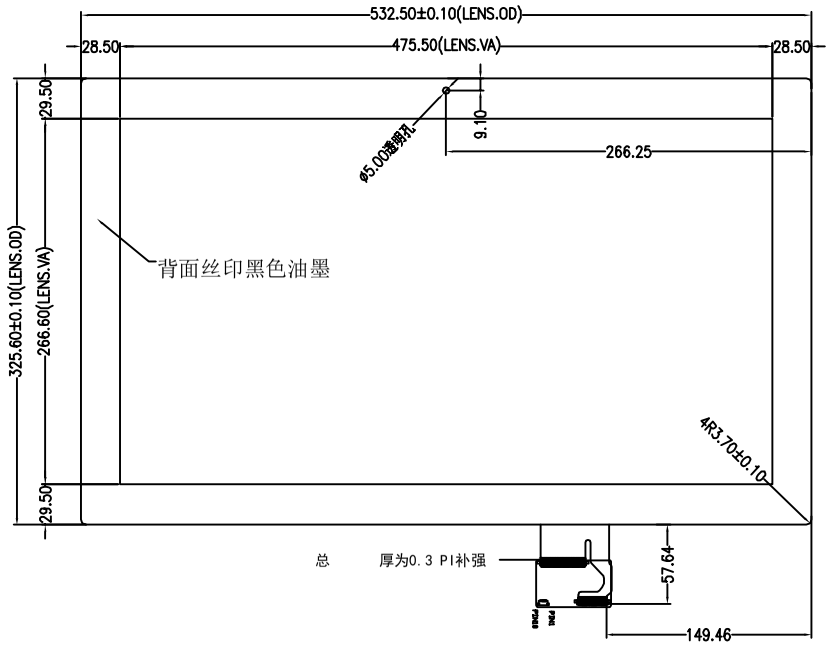
7. Precautions 注意事项

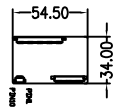
Storage	Store panel under the temperature and humidity range pre-specified. Direct sunlight exposure or piling should be avoided.
Unpack拆包	Unpack the box with the printed red arrow pointing up.
Handling 使用中	(1) Use clean sacks or glove to prevent fingerprints and/or stains left on the panel. Extra attention and carefulness should be taken while handling the glass edge. (2) Avoid high voltage and/or static charge (3) Holding the panel instead of the tail at all time.
Cleaning 清洁	(1) Use neutral detergent or isopropyl alcohol on a clean soft cloth to clean the panel surface (2) Prevent using any kind of chemical solvent, acidic or alkali solution.
installing 安装	(1) Excessive force or strain to the panel or tail is prohibited. (2) Retain at least 0.3 mm clearance between panel and display module. (3) Gasket or cushion pads around the edge of the panel may segregate waterand/or dust contamination.
Operating 操作	(1) Touch the panel with your finger or stylus only to assure normaloperation. Any sharp edged or hard objects are prohibited. (2) Operate the panel in a steady environment. Abrupt variation on temperature and humidity may cause malfunction of the panel.
Others 其他	(1) Keep the panel surface clean. Prevent any kind of adhesive applied on the surface. (2) Avoid high voltage and/or static charge.

REV:	DATE	CHANGE DESCRIPTION
1.0	2014/4/7	First Issue
1.1	2014/12/30	修改FPC对位标记

Document Title: OST215FC63E1V01 Product information | Page No: 9/30

正视图

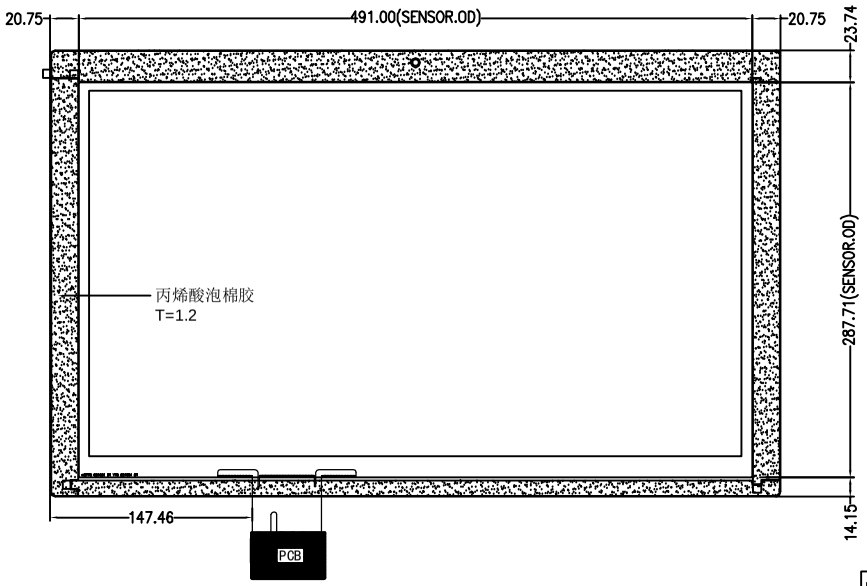


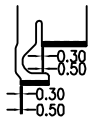


PCB硬板 T=1.6

侧视图

背视图





PIN	Definition
1	GND
2	GND
3	RESET
4	INT
5	GND
6	IIC_SCL
7	IIC_SDA
8	VDD
9	GND
10	GND

注：

1、 COVER LENS的表面硬度>6H,底色油墨区域没透光现象。
2、 油墨厚度8～12um,油墨硬度≧4H
3、 LENS通过钢球冲击实验：64克钢球,高度65CM作钢球冲击实验，无破碎。
4、 产品物料满足ROHS和无卤素要求。
5、无油墨处透光率≧86%
6、CS≧450MPA,DOL ≧8um。
7、储存温度： -40℃ to 85℃。
8、IC ：ILI2302M 35*61

DRAW No:				
DRAWING BY	XJH DEC30,2014			
CHECKED BY	YZG DEC30,2014	UNIT: MM	SCALE: 1:1	SHEET: 1/1
APPROVED BY		Unspecified Tolerance: ±0.2		REV: V1.1

TFT-LCD单元

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1. GENERAL DESCRIPTIONS

1.1 Introduction

The DT215LC03B model is a 21.5 inch wide TFT-LCD module with LED Backlight Unit and a 30-pin 2ch-LVDS interface. This module supports 1920 x 1080 Full HD (16:9 wide screen) mode and displays up to 16.7 millions colors. All input signals are 2-channel LVDS interface.

This module doesn't contain an inverter board for backlight.

1.2 Features

-Super wide viewing angle
-High contrast ratio
-Fast response time
-Low power consumption -FULL HD(1920 x 1080 pixels) resolution
-DE (Data Enable) only mode
-LVDS (Low Voltage Differential Signaling) interface
-RoHS compliance.

1.3 Applications

-Workstation & desktop monitor
-Display terminals for AV application

1.4 General information

Item	Specification		Unit
Module Size	495.6(H) X 292.2 (V) X 10.62(D)		mm
Display area	476.64 (H) x 268.11 (V) , (21.5 " diagonal)		mm
Bezel Opening Area	479.8(H)x271.3(V)		mm
Number of Pixel	1920 x R.G.B. x 1080		Pixels
Pixel pitch	0.248 (H) x 0.248 (V)		mm
Pixel arrangement	RGB Vertical Stripe		
Display color	16.7M		
Transmissive Mode	Normally White		
Surface treatment	Anti glare(Haze 25%), Hard-Coating(3H)		
Electrical Interface	2-ch LVDS		
Weight	200		
Power consumption	System	4.1 typical(Blackpattern,60Hz)	W
	B/L	12.48	
Color Gamut	72%		(NTSC)
Optimum viewing direction	+80/-80(H),+80/-70(V) Typ.(CR≥10)		

2. ABSOLUTE MAXIMUM RATINGS

2.1 Absolute Rating of Environment

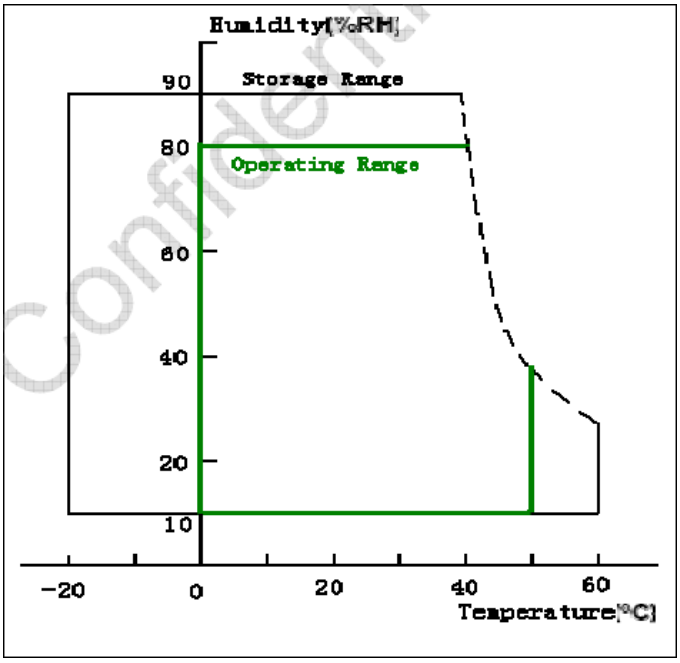
Item	Symbol	Min.	Max.	Unit	Conditions
Operating Temperature	TOP	0	+50	℃	
Operating Humidity	HOP	10	80	[%RH]	(1) (2) (3)
Storage Temperature	TST	-20	+60	℃	
Storage Humidity	HST	10	90	[%RH]	(1) (2) (3)

Note (1) Temperature and relative humidity range is shown in the figure below.

(a) 90 %RH Max. (Ta ≦ 40 °C).

(b) Wet-bulb temperature should be 40 ºC Max. (Ta < 40 ºC).

(c) No condensation..



Note (2) The maximum operating temperature is based on the test condition that the surface temperature of display area is less than or equal to 50° C with LCD module alone in a temperature controlled chamber. Thermal management should be considered in your product design to prevent the surface temperature of display area from being over 60 °C. The range of operating temperature may degrade in case of improper thermal management in your product design.

Note (3) The rating of environment is base on LCD module. Leave LCD cell alone, this environment condition can't be guaranteed. Except LCD cell, the customer has to consider the ability of other parts of LCD module and LCD module process.

2.2 Electrical Absolute Rating:

2.2.1 TFT LCD Module:

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power supply Voltage	VDD	0	+6.0	V	1,2

2.2.2 Back Light Unit:

Item	Symbol	Min.	Max.	Unit	Note
BLU current		--	300	mA	1,2

Note 1: With in Ta (25℃)

Note 2: Permanent damage to the device may occur if exceeding maximum values

3. ELECTRICAL CHARACTERISTICS

3.1 Back Light Unit:

Item	Symbol	Min.	TYP.	Max.	Unit	Note
BLU current	I	220	240	300	mA	(1) (2)(3)
BLU voltage	V		41		V	(2)(3)
BLU Power consumption	P_{BLU}		9.84		W	
Operating Lifetime	Hr	30,000	--	--	Hour	300 mA (4)
	Hr	20,000	--	30,000	Hour	315 mA (4) (2)

Note:

(1) Permanent damage may occur to the LCD module if beyond this specification.

Functional operation should be restricted to the conditions described under Normal Operating Conditions: **Operating with fixeddriving current.**

(2) To exceed 300 mA, life time accelerate drop down and if to exceed 315 mA has safety problem. If current lower than 5.0 mA, LED would be unstable .

(3) Within Ta=25±2°C

(4) LED life time (Hr) can be defined as the time in which it continues to operate under the condition : Ta=25±3℃, Typical value indicated in the above table and I=300 mA until the brightness becomes less than 50%.

3.2 TFT LCD Module: Ta = 25 ± 2 ºC

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		VDD	4.5	5.0	5.5	V	【Note 1】
Power Supply Ripple Voltage		VRP	-	TBD	--	mV	【Note 2】
Rush Current		IRUSH	-	TBD	--	A	【Note 2】
Power Supply Current	White	Icc	-	--	--	mA	
	Black		-	820	900	mA	
	Vertical Stripe		-	--	--	mA	
Power consumption		Plcd	-	4.1		W	
LVDS differential input voltage		Vid	100	-	600	mV	【Note 3】
LVDS common input voltage		Vic	1.0	1.2	1.5	V	

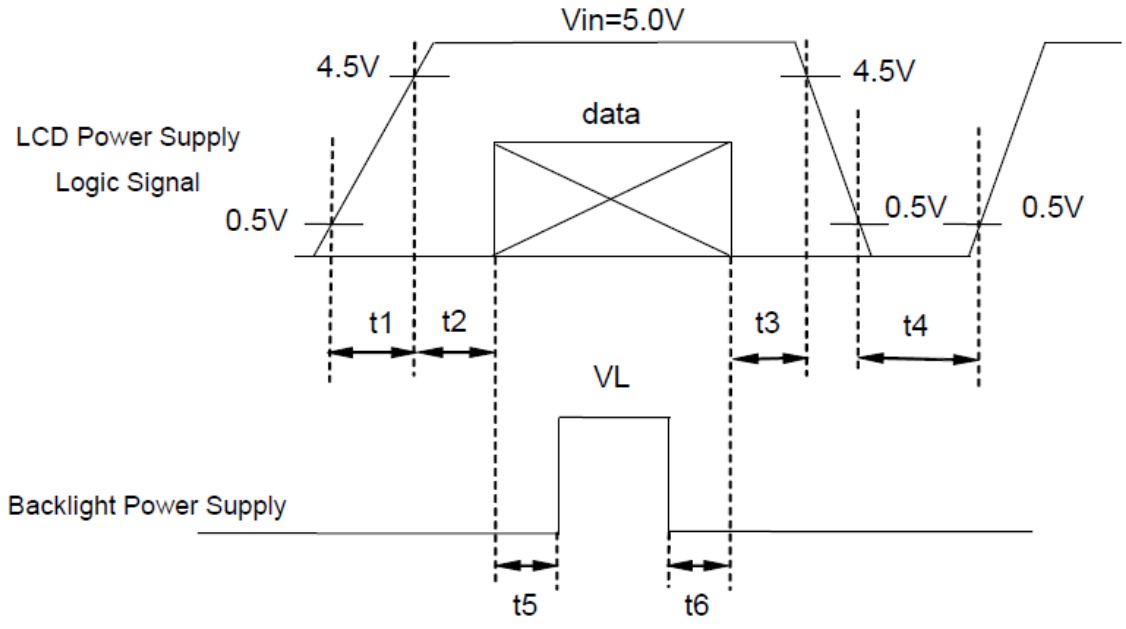
Note (1)

*1) Power、data sequence

0.50ms≦t1≦10ms t4≧1 sec

0.01ms＜t2≦50ms t5≧200ms

0.01ms＜t3≦50ms t6≧200ms



Data: RGB DATA, DCLK, DENA

※ Data: CLKIN±,RIN0±,RIN1±, RIN2±, RIN3±

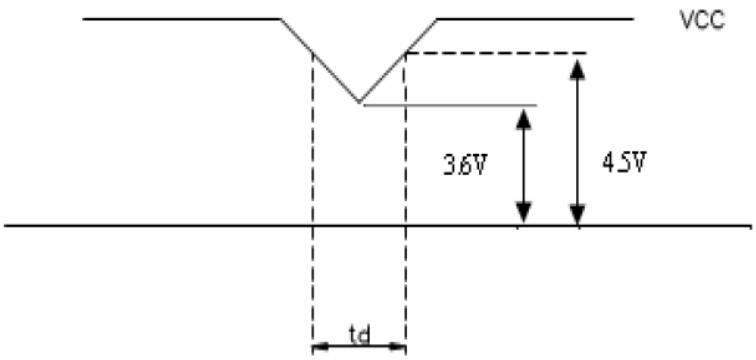
※ About the relation between data input and back light lighting, please base on the above-mentioned input sequence.

※ When back light is switched on before panel operation or after a panel operation stop, it may not display normally. But this phenomenon is not based on change of an incoming signal, and does not give damage to a liquid crystal display.

※ VCC-dip conditions:

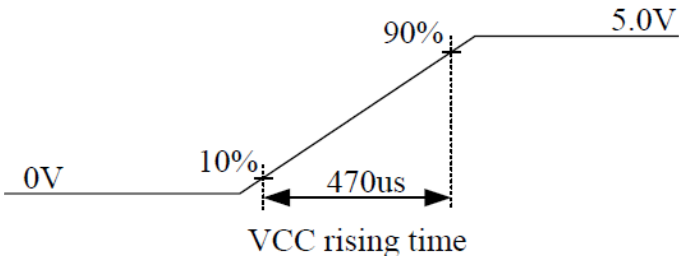
(1) When 3.6V≦VCC(min)<4.5V, td≦10 ms

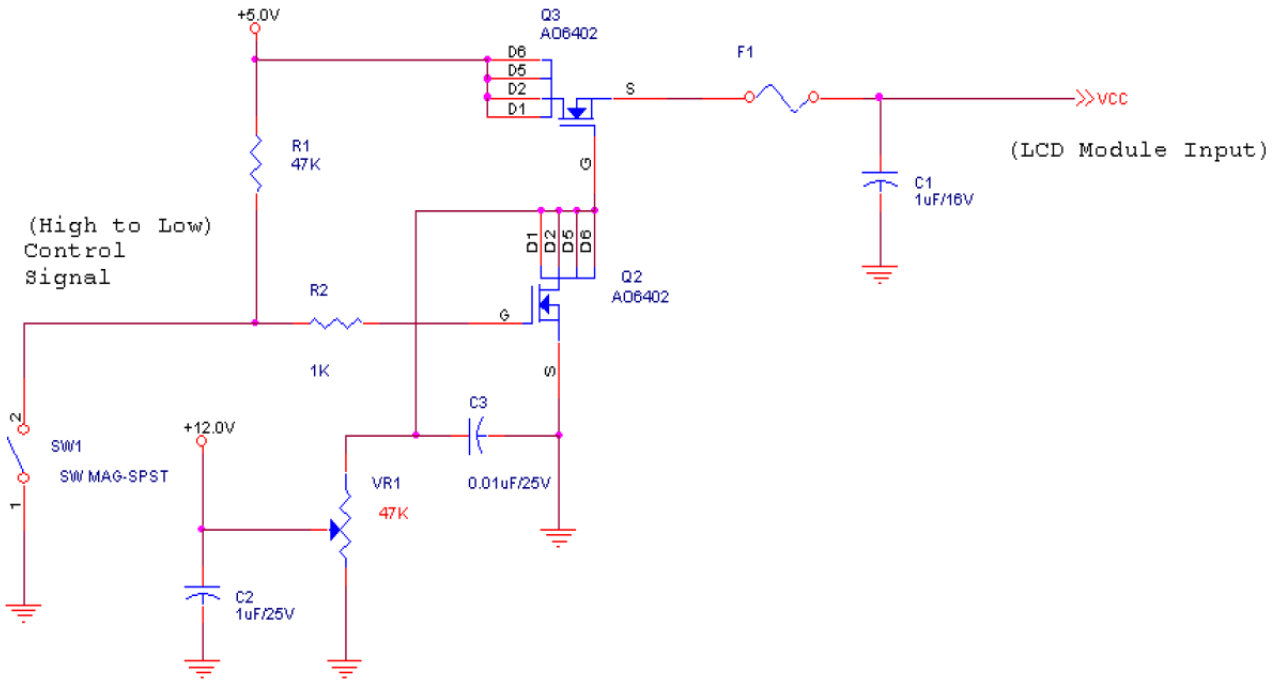
(2) When VCC <3.6 V, VCC-dip conditions should also follow the VCC-turn-on conditions.



Note (2) IRush Measurement Condition:

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

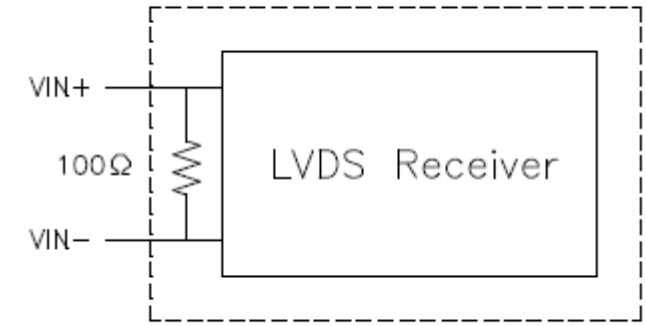


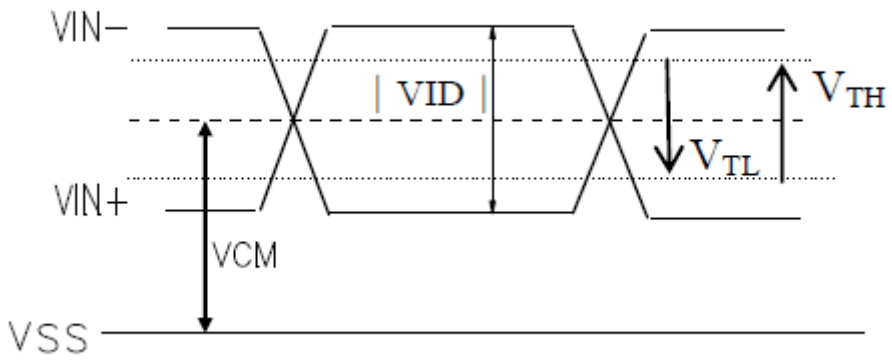


[Note3]

VIN+: Positive differential DATA & CLK Input

VIN -: Negative differential DATA & CLK Input





4. OPTICAL CHARACTERISTICS

4.1 LCM Optical specification

The optical characteristics are measured under stable conditions at 25℃:

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast		**CR**	$\Theta=0^0$ $\Phi=0^0$ Normal viewing angle	400	600	--	--	(1)(2)
Response time	**Rising**	**TR+TF**		--	5	8	msec	(1)(2)
	Falling			--	1.5	--		
Whiteluminance (center of screen)		**Y_L**		190	220	--	cd/㎡	(i=240mA)
Dark luminance (center of screen)		**Yi**		--	--	TBD	cd/㎡	
Color chromaticity (CIE1931)	**Red**	**Rx**		-0.050	0.633	+0.05 0		
		Ry			0.351			
	Green	**Gx**			0.322			
		Gy			0.630			
	Blue	**Bx**			0.152			
		By			0.050			
	White	**Wx**			0.313			
		Wy			0.329			
Viewing angle	**Hor.**	**$\Theta_{X-}+\Theta_{X+}$**	CR≥10	160	170	--		
	Ver.	**$\Theta_{Y-}+\Theta_{Y+}$**		150	160	--		
Brightness uniformity		**B_{UNI}**	$\Theta=0^0$ $\Phi=0^0$	75	80	--	%	
Color Gamut		**CG**		70	72	--	%	NTSC Ratio

4.2 Measuring Condition

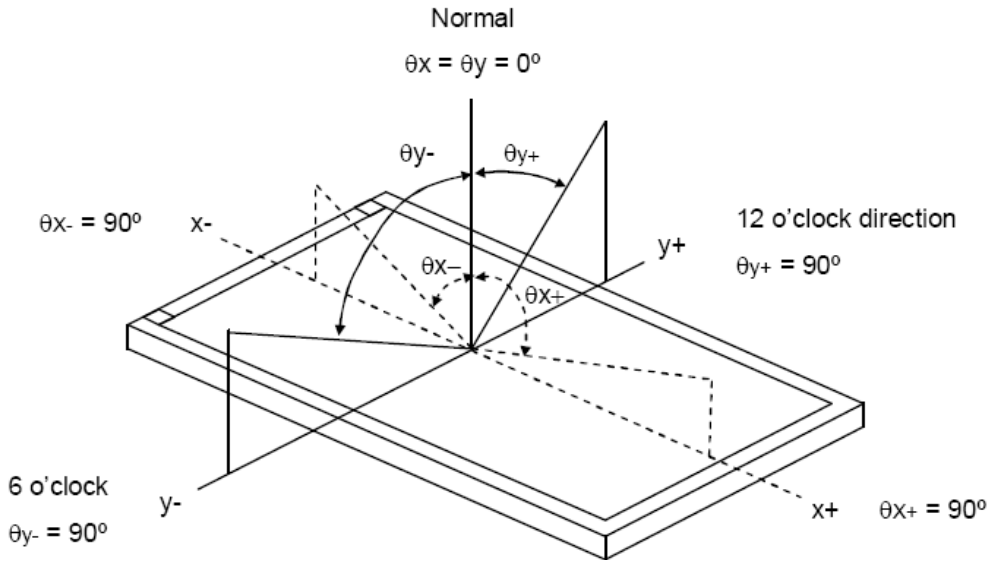
- ■ Measuring surrounding :dark room
- ■ Surrounding temperature : 25±2℃
- ■ 5min.Warm-up time

4.3 Measuring Equipment

- ●Utilized CA-210 or BM-7A for Chromaticity and optical characteristics.
- ● Measuring spot size : 10~12mm

Note (1) Definition of Viewing Angle (x, y):

Viewing angles are measured by EZ-Contrast 160R (Eldim)



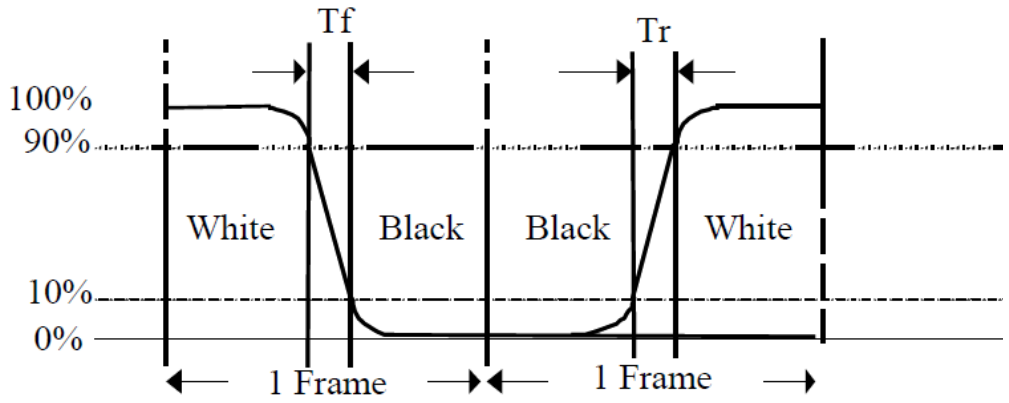
Note (2) Definition of Contrast Ratio(CR) :

measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white (L255)}}{\text{Luminance with all pixels black (L0)}}$$

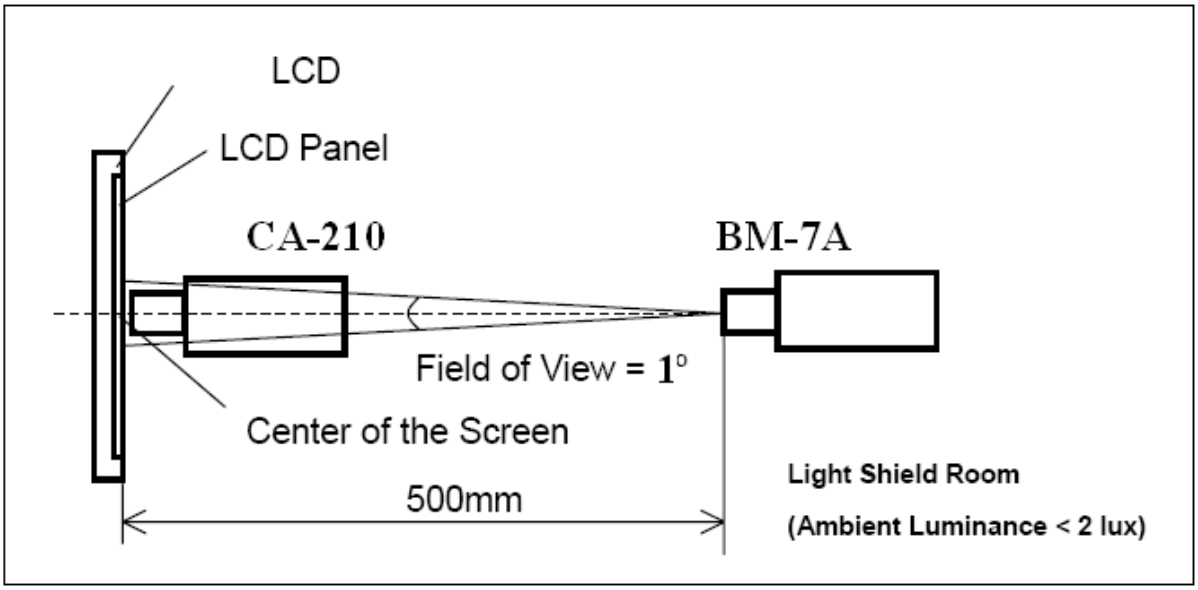
Note (3)

The output signals of photo detector are measured when the input signals are changed from “Full Black” to “Full White” (rising time, TR), and from “Full White” to “Full Black” (falling time, TF), respectively. The response time is interval between the 10% and 90% (1 frame at 60 Hz) of amplitudes.



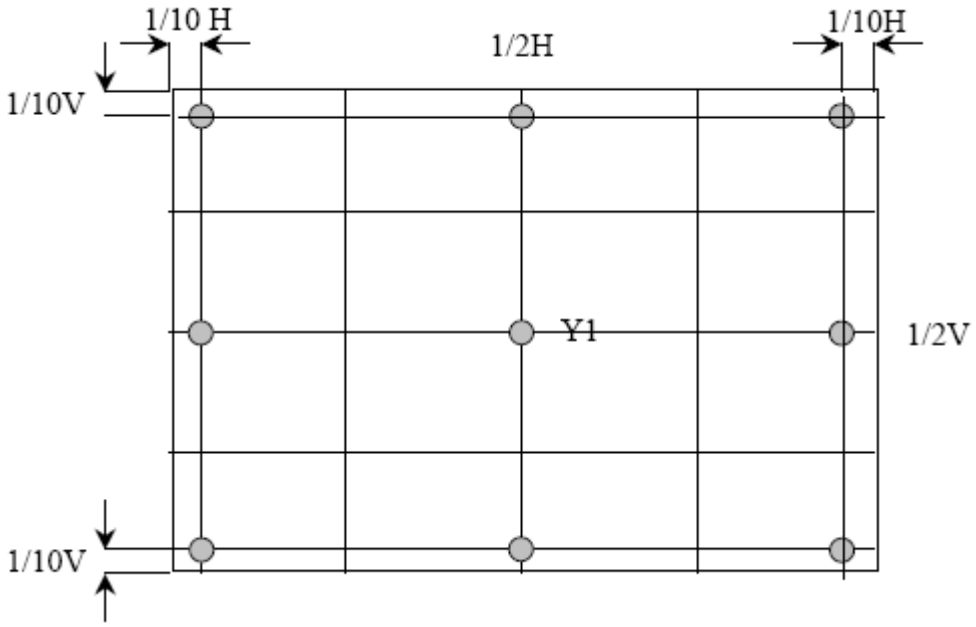
Response time=TR + TF

Note (4) Optical characteristic measurement setup



Note (5) Definition of Center Luminance of White (center)

Center Luminance= Y1

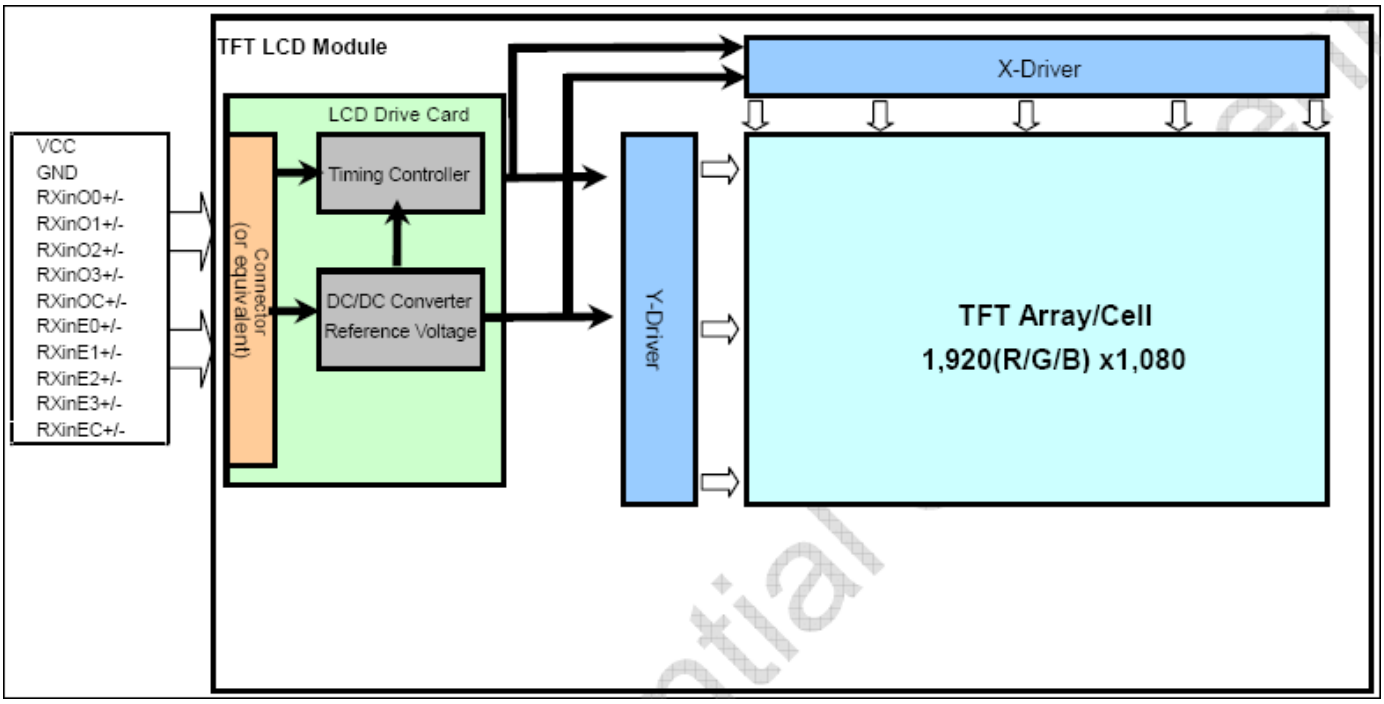


Note (6) Definition of brightness uniformity of White

$$\text{Luminance uniformity} = \frac{\text{(Min Luminance of 9 points)}}{\text{(Max Luminance of 9 points)}} \times 100\%$$

5. Functional BLOCK DIAGRAM

5.1 LCD Module Block Diagram:



5.2 Back Light Unit

6. Signal Characteristic

6.1 TFT LCD MODULE INPUT TERMINAL PIN ASSIGNMENT

Pin No.	Symbol	Function	Remark
1	RxOIN0-	Negative LVDS DATA input(ODD)	LVDS
2	RxOIN0+	Positive LVDS DATA input(ODD)	LVDS
3	RxOIN1-	Negative LVDS DATA input(ODD)	LVDS
4	RxOIN1+	Positive LVDS DATA input(ODD)	LVDS
5	RxOIN2-	Negative LVDS DATA input(ODD)	LVDS
6	RxOIN2+	Positive LVDS DATA input(ODD)	LVDS
7	GND	Ground	
8	RxOCLK-	Negative LVDS Clock input(ODD)	LVDS
9	RxOCLK+	Positive LVDS Clock input(ODD)	LVDS
10	RxOIN3-	Negative LVDS DATA input(ODD)	LVDS
11	RxOIN3+	Positive LVDS DATA input(ODD)	LVDS
12	RxEIN0-	Negative LVDS DATA input(EVEN)	LVDS
13	RxEIN0+	Positive LVDS DATA input(EVEN)	LVDS
14	GND	Ground	
15	RxEIN1-	Negative LVDS DATA input(EVEN)	LVDS
16	RxEIN1+	Positive LVDS DATA input(EVEN)	LVDS
17	GND	Ground	
18	RxEIN2-	Negative LVDS DATA input(EVEN)	LVDS
19	RxEIN2+	Positive LVDS DATA input(EVEN)	LVDS
20	RxCLK-	Negative LVDS Clock input(EVEN)	LVDS
21	RxCLK+	Positive LVDS Clock input(EVEN)	LVDS
22	RxEIN3-	Negative LVDS DATA input(EVEN)	LVDS
23	RxEIN3+	Positive LVDS DATA input(EVEN)	LVDS
24	GND	Ground	
25	NC	No connection(Do not connect)	
26	NC	No connection(Do not connect)	
27	NC	No connection(Do not connect)	
28	VDD	POWER +5V	
29	VDD	POWER +5V	
30	VDD	POWER +5V	

Note (1) Type/Part No.: FI-XB30SSRLA-HF-16(JAE) or compatible.

Note (2) Mating Receptacle/Part Number : FI-X30HL(JAE) or compatible.

Note (3) All input signals shall be low or Hi-Z state when VDD is off.

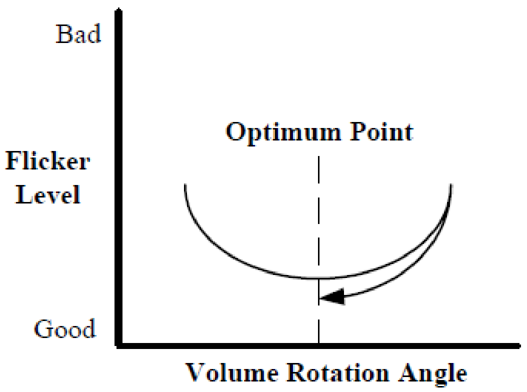
6.2 FLICKER ADJUSTMENT

(a) Adjustment Pattern: 2H1V Checker pattern as follow:

R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0
R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127
R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127
R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0
R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0
R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127
R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127	R 0	G 127	B 0	R 127	G 0	B 127

(b) Adjustment Method:

Flicker should be adjusted by turning the volume for flicker adjustment by the ceramic driver. It is adjusted to the point with least flickering of the whole screen. After making it surely overrun at once, it should be adjusted to the optimum point.



6.3 COLOR DATA INPUT ASSIGNMENT

Each basic color can be displayed in 256 gray scales from 8 bit data signals. According to the combination of total 24 bit data signals, the 16,7M colors display can be achieved on the screen.

	Colors & Gray scale	Gray Scale	Data signal																							
			R0	R1	R2	R3	R4	R5	R6	R7	G0	G1	G2	G3	G4	G5	G6	G7	B0	B1	B2	B3	B4	B5	B6	B7
Basic Color	Black	–	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	–	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	–	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	–	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	–	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	–	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	–	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	–	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of Red	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓					↓								↓								↓			
	⇩	↓					↓								↓								↓			
	Brighter	GS253	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇩	GS254	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	GS255	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	↓					↓								↓								↓			
	⇩	↓					↓								↓								↓			
	Brighter	GS253	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	⇩	GS254	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Green	GS255	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of Blue	Black	GS0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	⇧	GS1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker	GS2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	⇧	↓					↓								↓								↓			
	⇩	↓					↓								↓								↓			
	Brighter	GS253	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	1	1	1
	⇩	GS254	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
	Blue	GS255	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

Note 0: Low Level Voltage, 1: High Level Voltage

6.4 INPUT SIGNAL TIMING SPECIFICATIONS

(a) The input signal timing specifications are shown as the following table and timing diagram.

Item				Symbol	Min	Typ.	Max.	Unit
LCD Timing	DCLK		Freq.	fCLK	55	72	90	MHz
			Cycle	tCLK	18.18	13.89	11.11	ns
	DENA	Horizontal	Horizontal effective time	tHA	960	960	960	tCLK
			Horizontal blank time	tHB	32	100	115	tCLK
			Horizontal total time	tH	992	1060	1075	tCLK
		Vertical	Vertical frame Rate	Fr	50	60	75	Hz
			Vertical total time	tV	1084	1130	1170	tH
			Vertical effective time	tVA	1080	1080	1080	tH
			Vertical blank time	tVB	4	50	90	tH

[Note]

*1) DENA (data enable) usually is positive

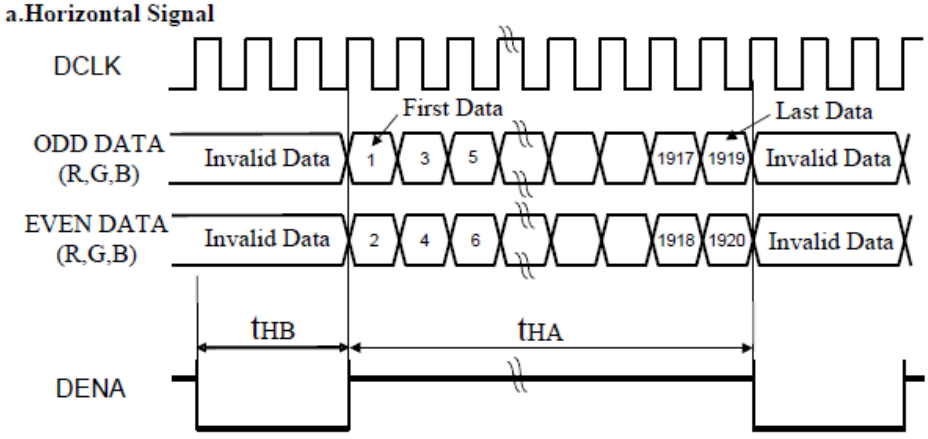
*2) DCLK still inputs during blanking

*3) DE mode only

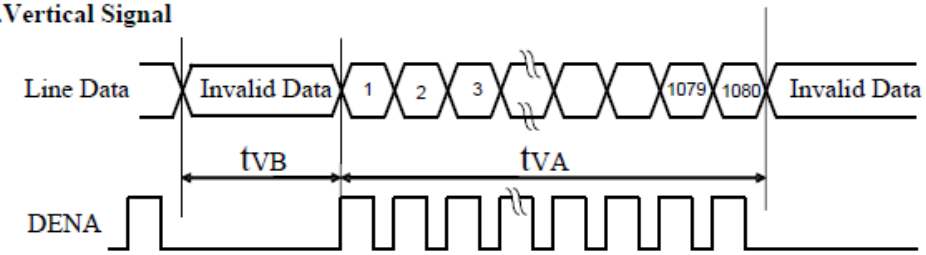
*4) It maybe cause flicker at 50Hz.

(b) Timing Chart

a.Horizontal Signal

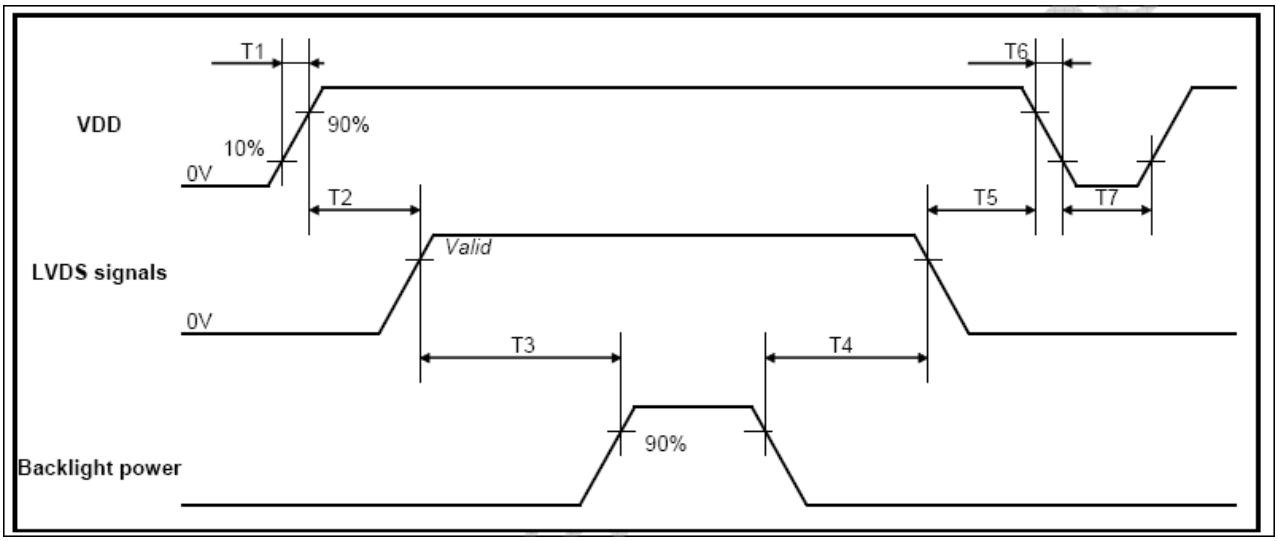


b.Vertical Signal



6.5 POWER ON/OFF SEQUENCE:

To prevent a latch-up or DC operation of LCD module, the power on/off sequence should follow the conditions shown in the following diagram.



Parameter	Symbol	Unit	Min	Typ	Max
VDD Rise Time	T1	ms	0.5	--	10
VDD Good to Signal Valid	T2	ms	0	--	50
Signal Valid to Backlight On	T3	ms	200	--	450
Backlight Off to Signal Disable	T4	ms	200	--	450
Signal Disable to Power Down	T5	ms	0	--	50
VDD Fall Time	T6	ms	0	--	100
Power Off	T7	s	500	--	--

Power ON/OFF Sequence

Note:

(1) The supply voltage of the external system for the module input should be the same as the definition of Vcc.

(2) Please apply the lamp voltage within the LCD operation range. When the backlight turns on before the LCD operation of the LCD turns off, the display may, instantly, function abnormally.

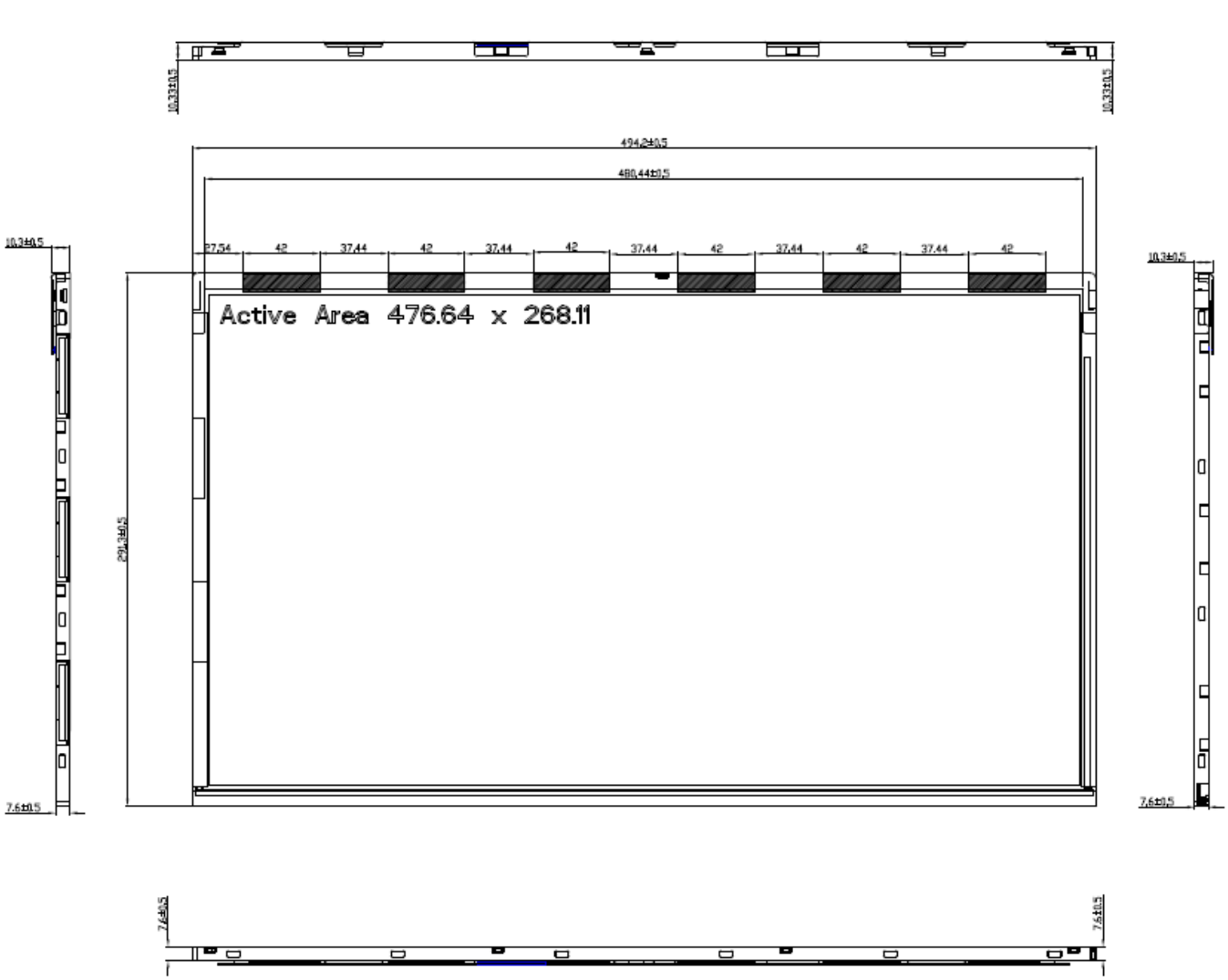
(3) In case of VCC = off level, please keep the level of input signals on the low or keep a high impedance.

(4) T4 should be measured after the module has been fully discharged between power on/off periods.

(5) Interface signal shall not be kept at high impedance when the power is on.

(6) The company will not guarantee or compensate for the product damage caused by not following the Power Sequence.

7. OUTLINE DIMENSION



8. Reliability Test

High Temperature Storage (HTS)	Ta= 60℃ , 240hours	
Low Temperature Storage (LTS)	Ta= -20℃ , 240hours	
Vibration Test (Non-operation)	Acceleration: 1.5 Grms	
	Wave: Half-sine	
	Frequency: 10 - 300 Hz	
	Sweep: 30 Minutes each Axis (X, Y, Z)	
Shock Test (Non-operation)	Acceleration: 50 G	
	Wave: Half-sine	
	Active Time: 11 ms	
	Direction: ±X, ±Y, ±Z (one time for each Axis)	
Drop Test Height:	60 cm, package test	
Thermal Shock Test (TST)	-20℃ /30min, 60℃ /30min, 100 cycles	1
On/Off Test	25℃,On/10sec, Off/10sec, 30,000 cycles	
ESD (Electro Static Discharge)	Contact Discharge: ± 8KV, 150pF(330Ω) 1sec, 8 points, 25 times/ point.	2
	Air Discharge: ± 15KV, 150pF(330Ω) 1sec 8 points, 25 times/ point.	

Note 1: The TFT-LCD module will not sustain damage after being subjected to 100 cycles of rapid temperature change. A cycle of rapid temperature change consists of varying the temperature from -20℃ to 60℃, and back again. Power is not applied during the test. After temperature cycling, the unit is placed in normal room ambient for at least 4 hours before power on.

Note 2: EN61000-4-2, ESD class B: Certain performance degradation allowed

No data lost

Self-recoverable

No hardware failures.

9 . GENERAL PRECAUTION

9.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

9.2 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. ACD does not warrant the module, if customers disassemble or modify the module.

9.3 Breakage of LCD Panel

9.3.1 If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.

9.3.2 If liquid crystal contacts m outh or eyes, rinse out with water immediately.

9.3.3 If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

9.3.4 Handle carefully with chips of glass that may cause injury, when the glass is broken.

9.4 Electric Shock

9.4.1 Disconnect power supply before handling LCD module.

9.4.2 Do not pull or fold the LED cable.

9.4.3 Do not touch the parts inside LCD modules and the fluorescent LED connector or cables in order to prevent electric shock.

9.5 Absolute Maximum Ratings and Power Protection Circuit

9.5.1 Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.

9.5.2 Please do not leave LCD module in the environment of high humidity and high temperature for a long time.

9.5.3 It's recommended employing protection circuit for power supply.

9.6 Operation

9.6.1 Do not touch, pu sh or rub the polarizer with anything harder than HB pencil lead. Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.

9.6.2 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

9.6.3 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.

9.6.4 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzene or other adequate solvent.

9.7 Mechanism

Please mount LCD module by using mounting holes arranged in four corners tightly.

9.8 Static Electricity

9.8.1 Protection film must remove v ery slowly from the surface of LCD module to prevent from electrostatic occurrence.

9.8.2 Because LCD module uses CMOS -IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge.

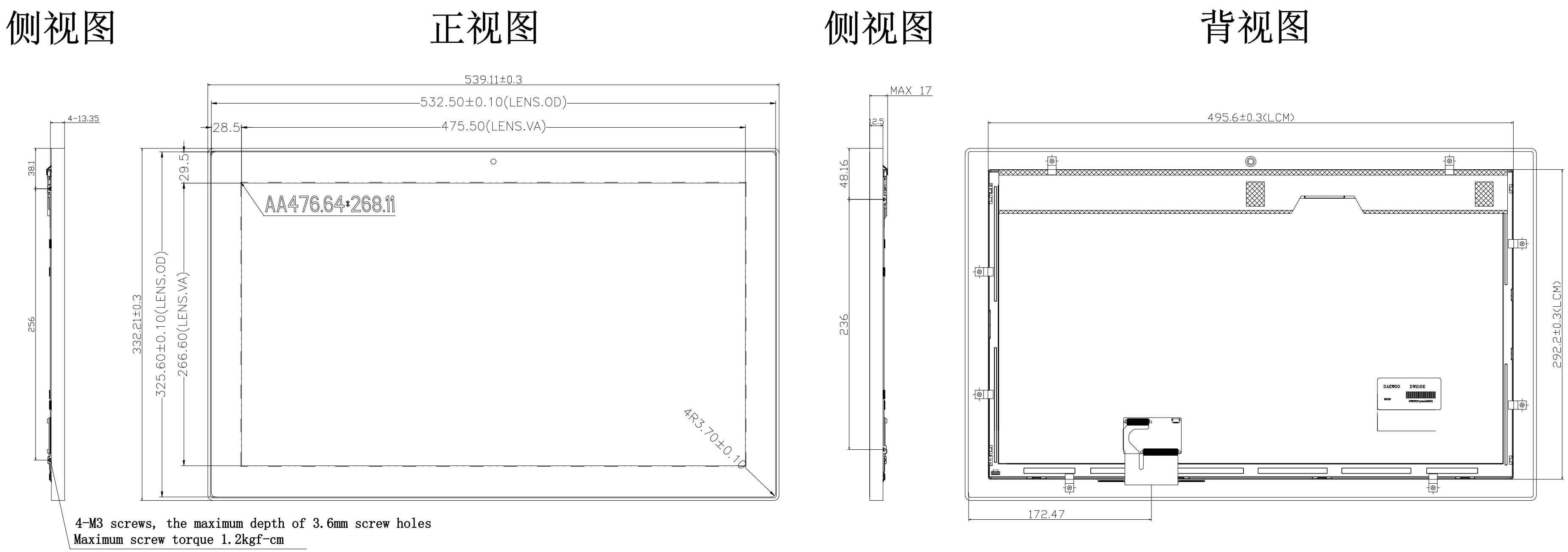
9.8.3 Persons who handle the module should be grounded through adequate methods.

9.9 Strong Light Exposure

The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.

9.10 Disposal

When disposing LCD module, obey the local environmental regulations.



江苏奥斯汀光电科技股份有限公司

图纸更改	3					21.5吋TP+LCM	产品型号	
	2						3D文件名	
	1							
	标记	数量	更改内容	签名	日 期			
设 计	何安会				2016-03-03		第三角投影	比 例	质 量
审 核								1:1	
批 准									
						版 本 号	单位：mm	共1 张	第 1 张

制图：　幅面：A1

Document Title

OST215FC63E1V01 Product information

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