PRODUCT 产品 : LCD MODULE
MODEL NO模块 : YTSA1OWLBC-01-200C
SUPPLIER 供应商 : Yes Optoelectronics Co.,LTD.
DATE 日期 : Oct.16.2020

SPECIFICATION
规格书

Prepared by 制作	Checked 检查	Approved 批准
YEXINTAO	**LIJING**	**XIAOYU**

CUSTOMER 顾客:
MODEL NO.模块编号: DATE 日期:

Approved 批准	Checked 检查	Department 部门

ADD 地址: No.288 Yueling Road Anshan, Liaoning, CHINA
TEL 电话: 86-412-5211859 FAX: 86-412-5211729 P.C.:114045
E-mail 邮箱: yes@yes-lcd.com, yeslcd@globalsources.com
Web 网站: http://www.yes-lcd.com
http://www.asiansources.com/sante.comm

CONTENTS 目录

Revision Record 修正记录

Rev No. 修正版本	Rev Date 修正日期	Contents 内容	Remarks 备注
1.0	2020.10.16	New creation	

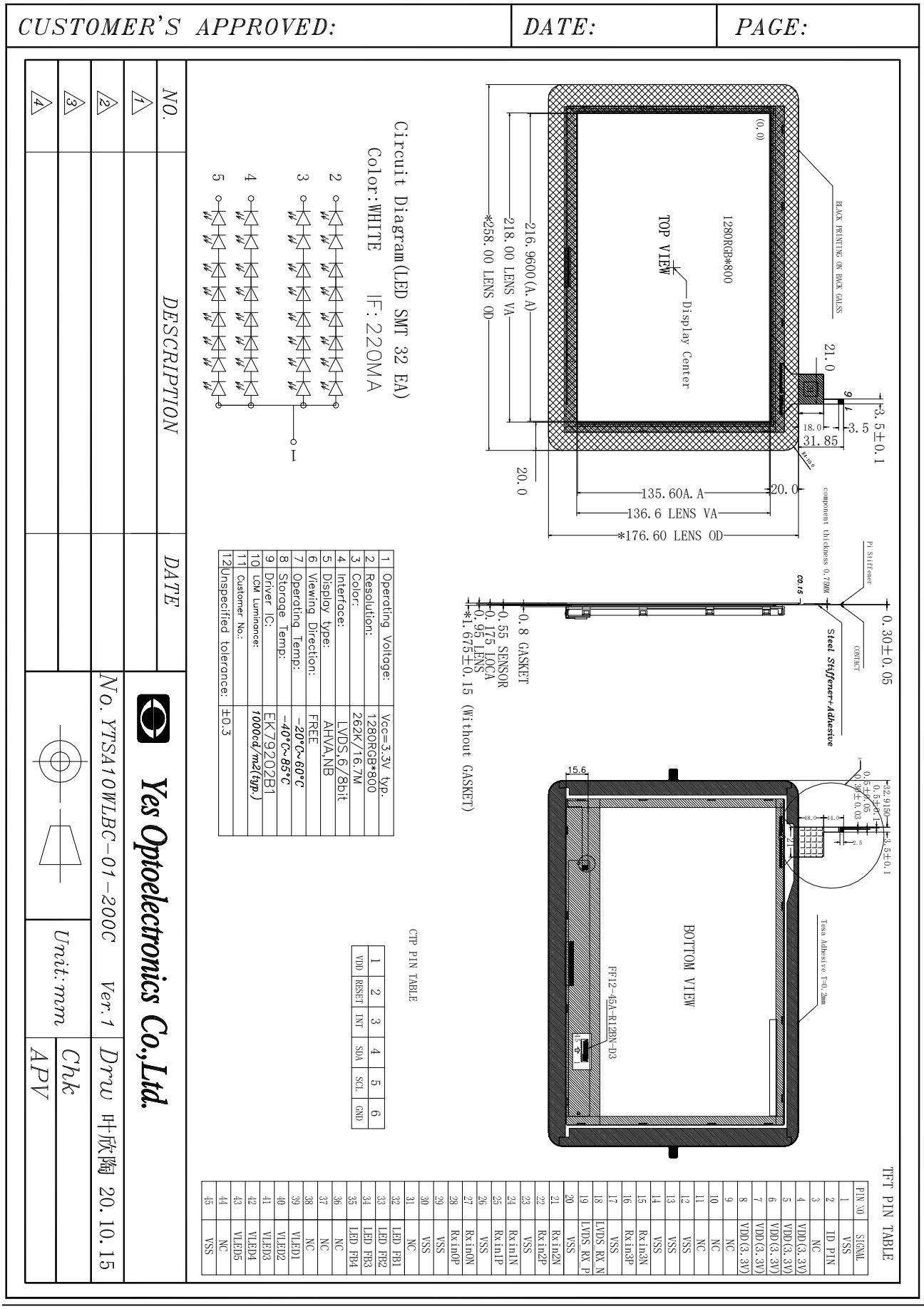
1. General Specifications 规格总览

No. 序号	Item 项目	Contents 内容	Unit 单位
1	Size尺寸	10.1	inch
2	Resolution分辨率	1280RGB*800	
3	Interface接口	LVDS,6/8bit	
4	Color Depth色彩深度	16.7	M
5	Technology Type技术类型	a-Si	
6	Pixel Pitch像素间距	0.1695*0.1695	mm
7	Pixel Arrangement像素排列	R.G.B Vertical Stripe	
8	Display Mode显示模式	Normally Black,Transmissive,IPS	
9	Viewing Direction视角	ALL	
10	LCM(W x H x D)外形尺寸	258*176*8.0	mm
11	Active Area (W x H)显示尺寸	216.96*135.60	mm
12	With/Without TSP有/没有触屏	With CTP	
13	LED Numbers LED数量	32	

Touch Panel Parameter

No. 序号	Features 特点	Details 细节	Note 备注
1	CTP Technology	MUTUAL CAPACITOR	
2	Input Method	Finger	
3	Touch point	5Point	
4	Positional Accuracy	2.5mm at 4 edges and 1.5mm at center	Unit: mm
5	Cover glass	Soda lime glass, chemically hardened	
6	Hardness	6H	
7	Surface treatment	NO	
8	Optical transmittance	87%	
9	Touch controller	ST1727	
10	Interface to Host	I2C	
11	I2C Address	0X55	
12	Connection Type	ZIF Connector	

2.Mechanical Drawing 外形图



PIN \V0	SIGNAL
1	VSS
2	ID PIN
3	NC
4	VDD(3.3V)
5	VDD(3.3V)
6	VDD(3.3V)
7	VDD(3.3V)
8	VDD(3.3V)
9	NC
10	NC
11	NC
12	VSS
13	VSS
14	VSS
15	Rxin3N
16	Rxin3P
17	VSS
18	LVDS_RX_N
19	LVDS_RX_P
20	VSS
21	Rxin2N
22	Rxin2P
23	VSS
24	Rxin1N
25	Rxin1P
26	VSS
27	Rxin0N
28	Rxin0P
29	VSS
30	VSS
31	NC
32	LED FB1
33	LED FB2
34	LED FB3
35	LED FB4
36	NC
37	NC
38	NC
39	VLED1
40	VLED2
41	VLED3
42	VLED4
43	VLED5
44	NC
45	VSS

1	Operating Voltage: Vcc=3.3V typ.
2	Resolution: 1280RGB*800
3	Color: 262K/16.7M
4	Interface: LVDS,6/8bit
5	Display type: AHVA,NB
6	Viewing Direction: FREE
7	Operating Temp: -20°C~60°C
8	Storage Temp: -40°C~85°C
9	Driver IC: EK79202B1
10	LCM Luminance: 1000cd/m2(typ.)
11	Customer No.:
12	Unspecified tolerance: ±0.3

1	2	3	4	5	6
VDD	RESET	INT	SDA	SCL	GND

3. PIN Assignment 引脚功能

Pin No. Pin顺序	Symbol 符号	I/O 接口	Function 说明	Remark 备注
1	VSS	P	Ground	
2	ID PIN	I	Set ID pin	
3	NC	-	No connection	
4	VDD(3.3V)	PI	Digital power.	
5	VDD(3.3V)	PI	Digital power.	
6	VDD(3.3V)	PI	Digital power.	
7	VDD(3.3V)	PI	Digital power.	
8	VDD(3.3V)	PI	Digital power.	
9	NC	-	No connection	
10	NC	-	No connection	
11	NC	-	No connection	
12	VSS	P	Ground	
13	VSS	P	Ground	
14	VSS	P	Ground	
15	Rxin3N	I	-LVDS differential data input	
16	Rxin3P	I	-LVDS differential data input	
17	VSS	P	Ground	
18	LVDS_RX_N	I	+LVDS differential clock input	
19	LVDS_RX_P	I	+LVDS differential clock input	
20	VSS	P	Ground	
21	Rxin2N	I	-LVDS differential data input	
22	Rxin2P	I	-LVDS differential data input	
23	VSS	P	Ground	
24	Rxin1N	I	-LVDS differential data input	
25	Rxin1P	I	-LVDS differential data input	
26	VSS	P	Ground	
27	Rxin0N	I	-LVDS differential data input	
28	Rxin0P	I	-LVDS differential data input	
29	VSS	P	Ground	
30	VSS	P	Ground	
31	NC	-	No connection	
32	LED FB1	P	LED Cathode	
33	LED FB2	P	LED Cathode	
34	LED FB3	P	LED Cathode	
35	LED FB4	P	LED Cathode	
36	NC	-	No connection	
37	NC	-	No connection	

38	NC	-	No connection	
39	VLED1	P	LED Anode	
40	VLED2	P	LED Anode	
41	VLED3	P	LED Anode	
42	VLED4	P	LED Anode	
43	VLED5	P	LED Anode	
44	NC	-	No connection	
45	VSS	P	Ground	

PS. For further details, please refer to EK79202B1 data sheet.

注:为进一步的细节，请参考 EK79202B1 数据表

4. Absolute Maximum Rating 极限参数

AGND = GND = 0V,Ta = 25℃

Item 项	Symbol 符号	Min 最小	Max 最大	Unit 单位	Remark 备注
Power Voltage 电源电压	VCC	2.3	3.6	V	
Operating Temperature 工作温度	TOPR	-20	60	°C	
Storage Temperature 存储温度	TSTG	-30	85	°C	

The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

在任何时候这个产品不准超过最大额定值。模块应该用于任何的绝对最大额定参数范围内，如超过模块可能无法恢复的特点,或者在一个极端的例子,该模块可能会永久破坏

5. Electrical Characteristics 模块电气特性

5.1. Recommended Operating Condition 工作条件

AGND = GND = 0V, Ta = 25℃

Item 项	Symbol 符号	Min 最小	Max 最大	Unit 单位	Remark 备注	Item 项
Power Voltage电源电压	VCC	-	3.3	-	V	
Input logic high voltage 输入逻辑高电压	VIH	0.8 VDD	-	VDD	V	
Input logic low voltage 输入逻辑低电压	VIL	VSS	-	0.2VDD	V	

5.2. Recommended Driving Condition for Backlight 背光驱动条件

Ta = 25℃

Item项目	Symbol符号	Min最小	Typ.典型	Max最大	Unit单位	Remark备注
Forward Voltage正向电压	Vf		24	27.6	V	
Forward Current正向电流	If		220		mA	
Operating Life Time寿命	-	50000			Hours	

Note 1: Ta means ambient temperature of TFT-LCD module.
Note 2: IF,VF are defined for one channel LED. There are two LED channel in back light unit.
Note 3: If the module is driven by high current or at high ambient temperature & humidity condition. The operating life will be reduced.
Note 4: Operating life means brightness goes down to 50% initial brightness. Minimum operating life time is estimated data.

注1:Ta意味着液晶模块的环境温度。

注 2:IF,VF 定义为一个通道。有两个 LED 频道在背景光单元。

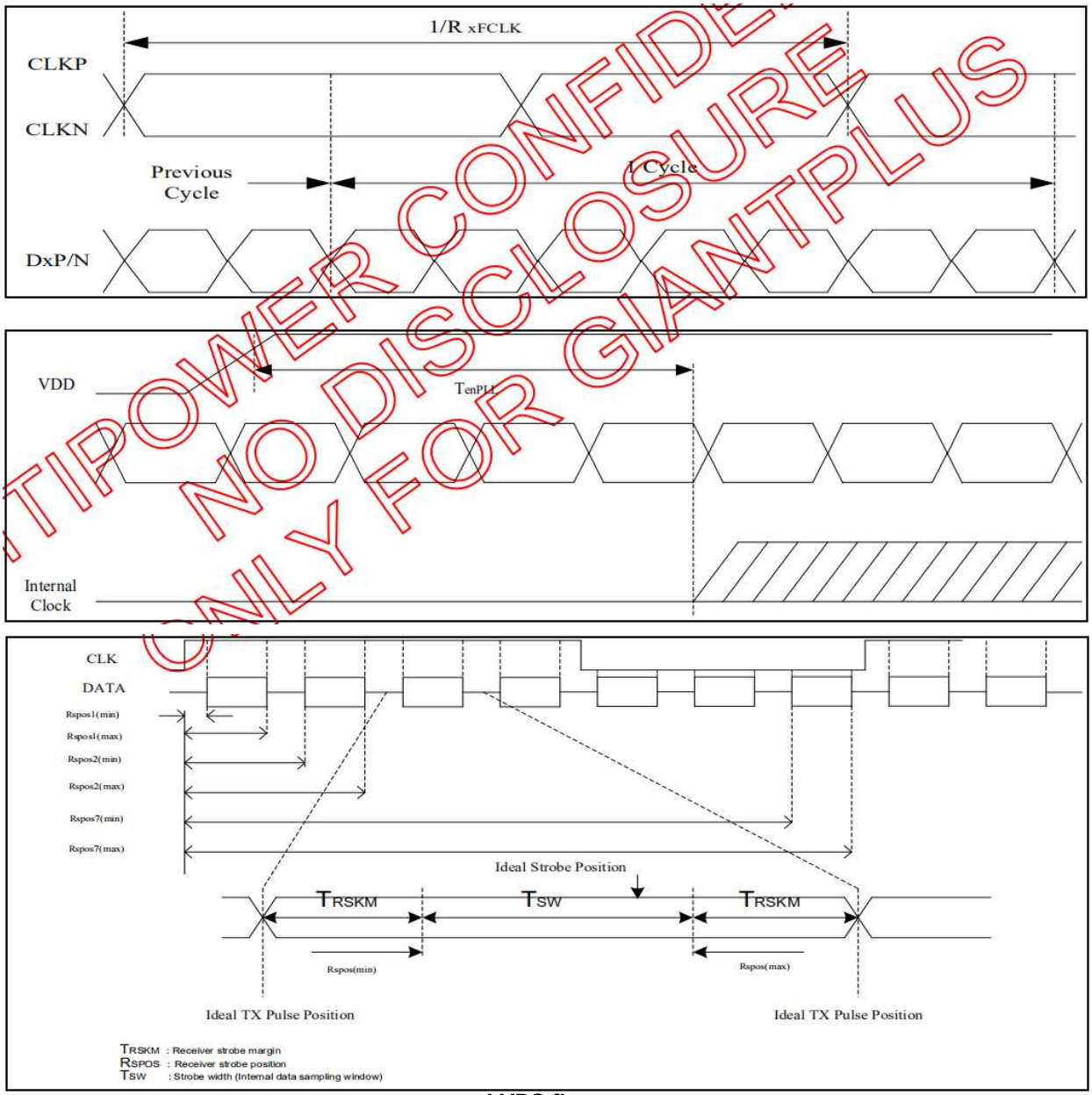
注 3:如果模块在高电流或在高环境温度和湿度条件时。寿命将会减少。

注 4:使用寿命意味着初始亮度亮度下降到 50%。最低使用寿命时间估计数据。

6. Timing Characteristics 时序特性

6.1. AC Electrical Characteristics 模拟电气特性

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Clock frequency	R_{xFCLK}	30	-	TBD	MHz	Refer to input timing table for each display resolution
Input data skew margin	T_{RSKM}	500	-	-	ps	|VID| = 200mV RxVCM = 1.2V RxFCLK = 81MHz
Clock high time	T_{LVCH}	-	4/(7* R_{xFCLK})	-	ns	
Clock low time	T_{LVCL}	-	3/(7* R_{xFCLK})	-	ns	
PLL wake-up time	T_{enPLL}	-	-	150	us	



LVDS figure

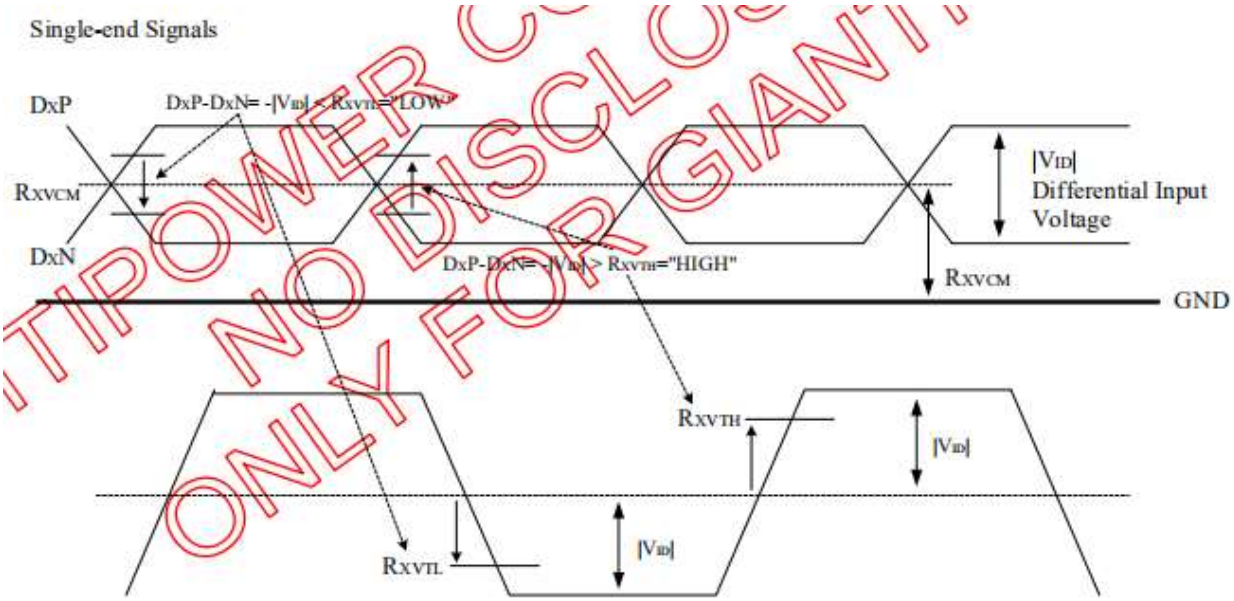
6. 2.DC Electrical Characteristics 数字电气特性

(Test condition: VDD=VDDIO=VDDIF=2.3~3.6V, TA=-20℃~+85℃,VSS=VSSA=0V)

Parameter		Symbol	Spec.			Unit	Note
			Min.	Typ.	Max.		
VDDIO Input high level voltage		VIH	0.8 x VDDIO		VDDIO	V	
VDDIO input low level voltage		VIL	VSS		0.2 x VDDIO	V	
Input Leakage Current		Ileak	(-1)		(+1)	μA	
VGH_REG output voltage		VGH_REG	9	16	22	V	
VGL_REG output voltage		VGL_REG	-15	-10	-4.5		
VGMP output voltage		VGMP	3.5	4.24	5.8	V	
VGMN output voltage		VGMN	-5.8	-4.64	-3.5	V	
VGL output voltage		VGL	-17	-12	-6	V	
VGH output voltage		VGH_O	11	18	24	V	
VCL output voltage		VCL	-3	-2.8	-2.1	V	
VCOM output voltage		VCOM	-2.405	-1.5	-0.5	V	
Input terminal resistance		ZID		100		ohm	
Source output level deviation	Graycode = 0 ~ 14 Graycode = 241 ~ 255			TBD		mV	
	Graycode = 15 ~ 31 Graycode = 208 ~ 240			TBD		mV	
	Graycode = 32 ~ 207			TBD		mV	
Source output offset deviation	Graycode = 0 ~ 14 Graycode = 241 ~ 255	-		TBD		mV	
	Graycode = 15 ~ 31 Graycode = 208 ~ 240	-		TBD		mV	
	Graycode = 32 ~ 207	-		TBD		mV	
Current consumption	Analog Operating	IAOP		TBD		mA	
	Analog Stand-by	IAST		TBD		mA	
Rush current		Ivddpeak		TBD		mA	

(VDD=VDDIO=VDDIF=2.3 to 3.6V, VSS=VSSA=VSS_IF=0V, TA=-20 to +85℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Differential input high threshold voltage	R_{XVTH}	+0.1	0.2	0.3	V	R_{XVCM}=1.2V
Differential input low threshold voltage	R_{XVTL}	-0.3	-0.2	-0.1	V	
Input voltage range (singled-end)	R_{XVIN}	0.7	-	1.7	V	
Differential input common mode voltage	R_{XVCM}	1	1.2	1.4	V	$\|V_{ID}\|$=0.2
Differential input impedance	Z_{ID}	80	100	125	ohm	
Differential input voltage	$\|V_{ID}\|$	0.2	-	0.6	V	
Differential input leakage current	I_{LCLVDS}	-10	-	+10	uA	
LVDS Digital Operating Current	$I_{VDDMIPI}$	-	15	20	mA	F_{DCLK}=80MHz,VDD=3.3V, Input pattern: 55h->Aah->55h->Aah
LVDS Digital Stand-by Current	I_{STMIPI}	-	-	250	uA	Clock & all Functions are stopped



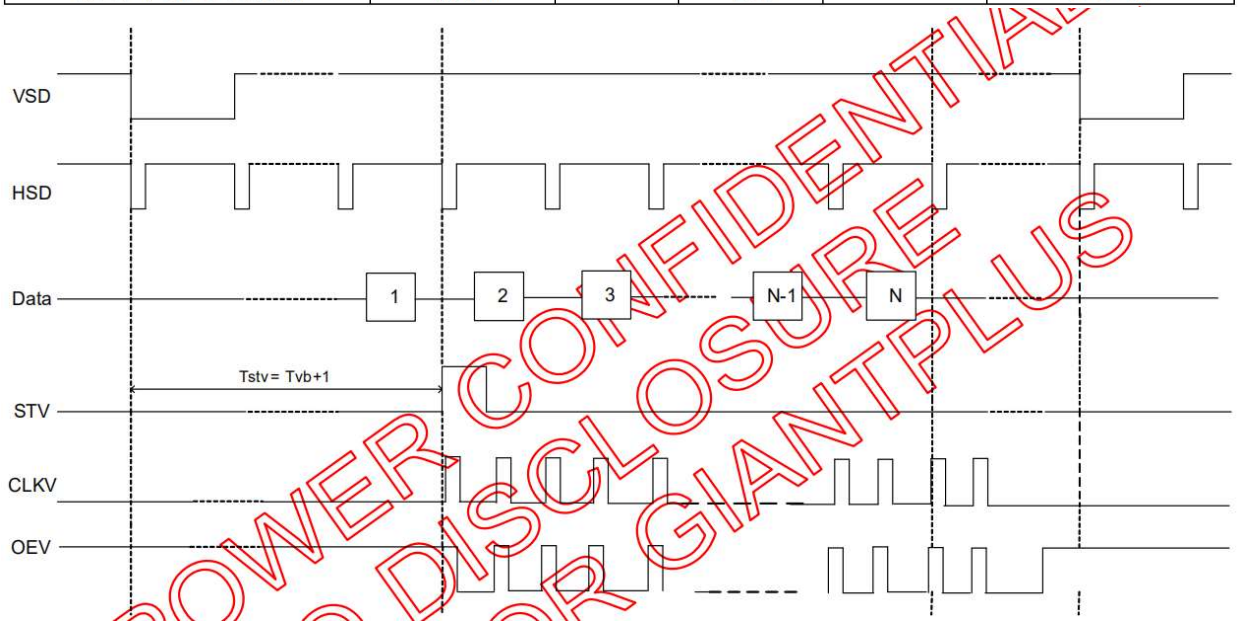
6. 3.Timing 时序

For 1280RGBx800

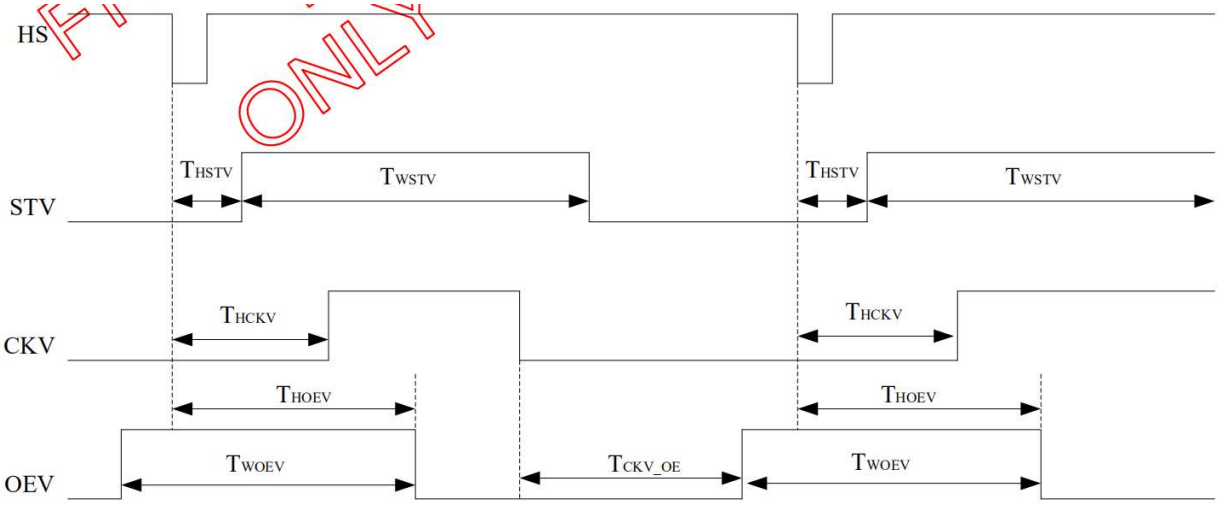
Parameter		Symbol	Value			Unit
			Min.	Typ.	Max.	
DCLK frequency @Frame rate=60Hz (LVDS)		F_{DCLK}	66.3	72.4	78.9	MHz
HSYNC period time		T_H	1380	1440	1500	DCLK
Horizontal display area		T_{HD}		1280		DCLK
HSYNC pulse width	Min.	T_{HPW}		2		
	Typ.			-		
	Max.			40		
HSYNC back porch(with pulse width)		T_{HBP}	88	88	88	DCLK
HSYNC front porch		T_{HFP}	12	72	132	DCLK
VSYNC period time		T_V	824	838	872	H
Vertical display area		T_{VD}		800		H
VSYNC pulse width	Min.	T_{VPW}		2		H
	Typ.			-		
	Max.			20		
VSYNC back porch(with pulse width)		T_{VBP}	23	23	23	H
VSYNC front porch		T_{VFP}	1	15	49	H

(VDD=2.3 to 3.6V, VSS=VSSA=VSS_IF=0V, TA=-20 to +85℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit
STV Pulse Width	T_{WSTV}	-	1	-	H
Time from HSD to STV	T_{HSTV}	-	2	-	DCLK
Time from HSD to CKV	T_{HCKV}	-	25	-	DCLK
Time from HSD to OEV	T_{HOEV}	-	35	-	DCLK
Time from CKV to OEV	T_{CKV_OE}	-	168	-	DCLK
OEV Pulse Width	T_{WOEV}	-	188	-	DCLK



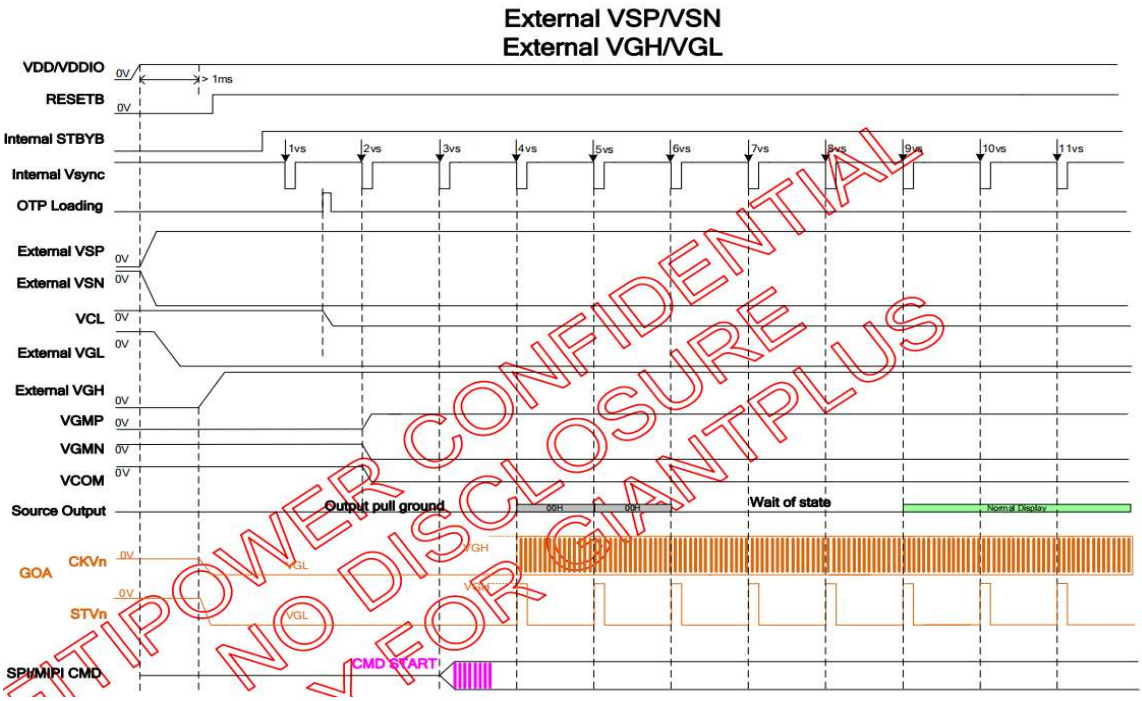
Vertical output timing



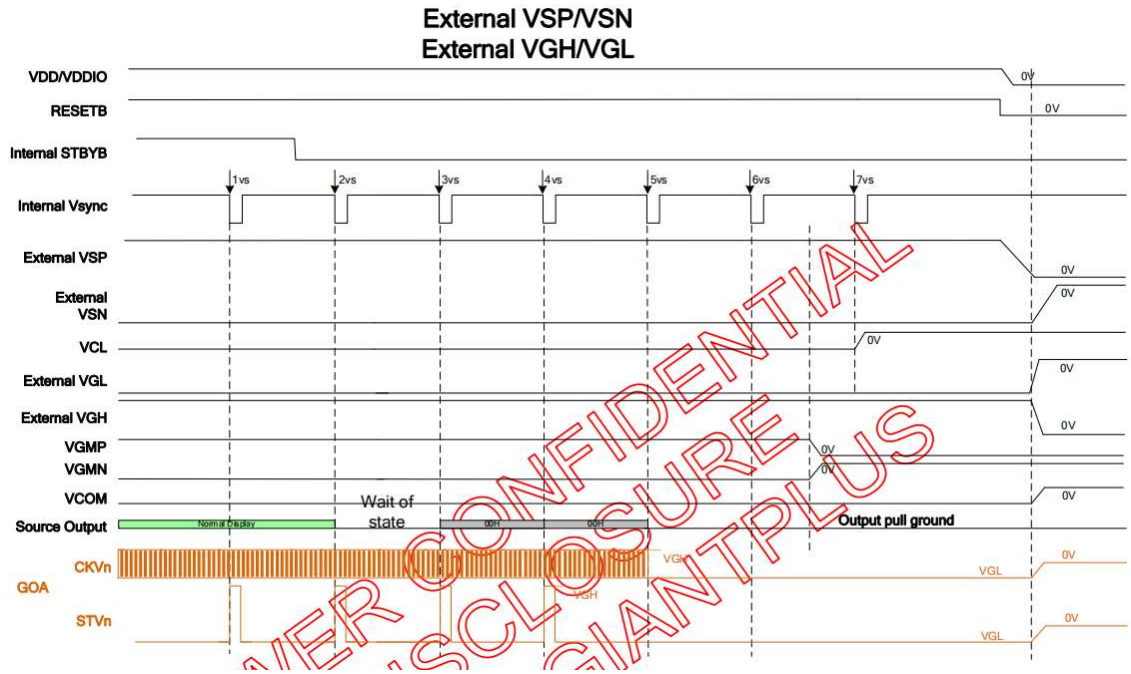
Gate output timing

6.4.Power ON/OFF Sequence 电源开/ 关特性

6.4.1 Power on sequence 电源开特性



6.4.2 Power off sequence 电源关特性



7. Optical Characteristics 光学特性

Item 项目		Symbol 符号	Condition 情况	Min 最小	Typ 典型	Max 最大	Unit 单位	Remark 备注
View Angles 视角		θT	CR≥10	70	80		Degree	Note 2
		θB		70	80			
		θL		70	80			
		θR		70	80			
Contrast Ratio 对比度		CR	θ = 0°	800	1000			Note 1 Note 3
Response Time 响应时间		$T_{ON+}T_{OFF}$	25°C	-	25	35	ms	Note 1 Note 4
Chromaticity 色度	Red	x	θ = 0°	-0.02	(0.618)	+0.02		Note 1 Note 5
		y			(0.328)			
	Green	x			(0.335)			
		y			(0.542)			
	Blue	x			(0.136)			
		y			(0.145)			
	White	x			(0.322)			
		y			(0.344)			
Luminance 亮度		L			1000		cd/m^2	Note 1 Note 5

Test Conditions:

1. If=20mA(Backlight current), VCC = 2.8 V, the ambient temperature is 25°C.
2. The test systems refer to Note 2.

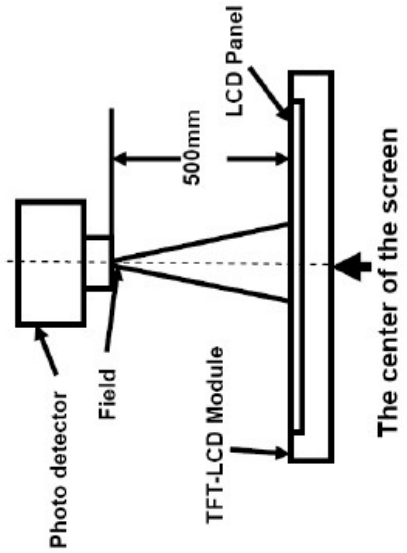
测试条件:

1.电流= 80mA(背光电流),VDD = 2.8 v,环境温度是25°C。

2.测试系统参考备注2。

Note1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5Minutes operation, the optical properties are measured at the center point of the LCD screen. ALL input terminals LCD panel must be ground when measuring the center area of the panel.



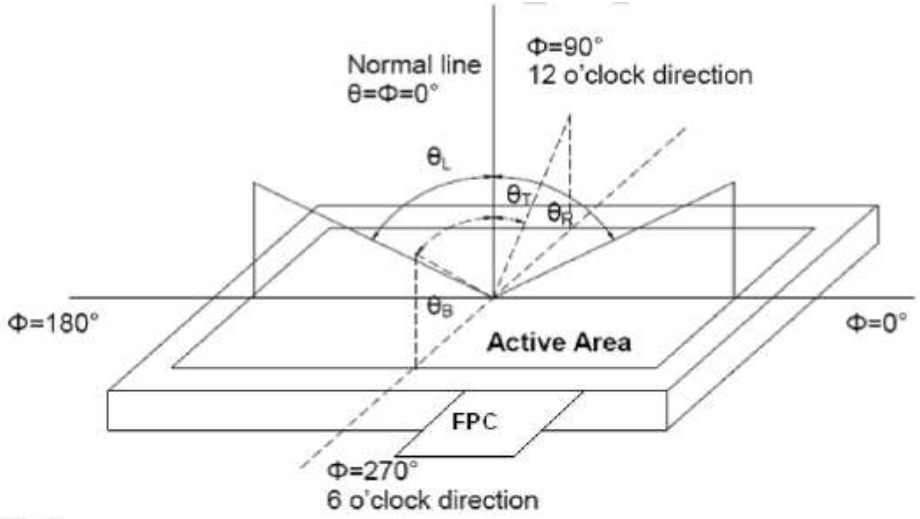
Item	Photo detector	Field
Contrast Ratio	CS1000	1º
Luminance		
Lum Uniformity		
Chromaticity	CS1000	
Response Time	DMS703	-

注 1: 光学测量系统的定义。

光学特性应该测量在黑暗的房间里进行。操做 5 分钟后,光学特性测量就在 LCD 屏幕中间。所有 LCD 面板输入终端,必须在测量面板的中心区域。

Note2: Definition of viewing angle range and measurement system.

Viewing angle is measured at the center point of the LCD by CONOSCOPE (DMS703)



注 2:定义视角

视角在中心点使用测量液晶的锥光偏振仪(DMS703)进行测量

Note3: Definition of contrast ratio

White state ":The state is that the LCD should drive by Vwhite.

$$\text{Contrast ratio(CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

"Black state ":The state is that the LCD should drive by Vblack.

Vwhite: To be determined Vblack: To be determined

注 3:对比度的定义

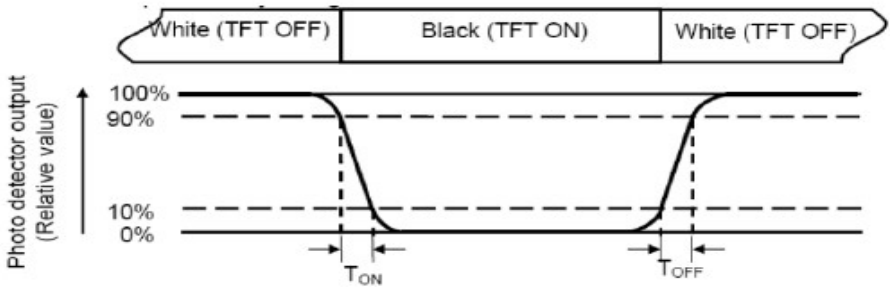
"白":这种情况由 LCD 应该由 Vwhite 这种情况促使的。

"黑": 这种情况由 LCD 应该由 Vwhite 这种情况促使的。

Vwhite:待定 Vblack:待定

Note4: Definition of Response time

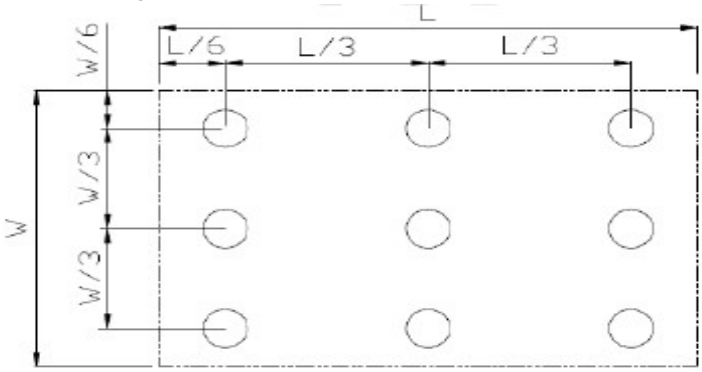
The response time is defined as the LCD optical switching time interval between “White”state and “Black” state. Rise time (T_{ON})is the time between photo detector output intensity changed from 90% to 10%.And fall time (T_{OFF})is the time between photo detector output intensity changed from 10% to90%.



注 4:响应时间的定义响应时间是指液晶光开关时间间隔在“白”状态和“黑”状态之间。上升时间(TON)是在光电探测器输出强度变化从 90%降至 10%之间。和下降时间(TOFF)是光电探测器输出强度变化从 90%降至 10%之间。

Note5: Definition of color chromaticity（CIE1931）
Color coordinates measured at center point of LCD.
注 5:定义颜色色度(CIE1931)色坐标测量液晶的中心点

Note6: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas(Refer Fig.2).Every measuring point is placed at the center of each measuring area.
Luminance Uniformity (U)=Lmin/Lmax
L-Active area length W-Active area width



L max: The measured Maximum luminance of all measurement position.
L min: The measured Minimum luminance of all measurement position.
注 6:亮度均匀性的定义
活动区域分为 9 测量领域(请参阅图 2)。每个测点都是放置在每个测量区域的中心。
亮度均匀性(U) = Lmin / Lmax
L - - - - - - - - - -活动区域长度 W - - - - - - - - - -活动区域宽度
L 最大:测量最大亮度的测量位置。
L 最小:测量最低亮度的测量位置。

Note7: Definition of luminance: Measure the luminance of white state at center point.
注 7: 亮度的定义:测量在中心点亮度白色的状态。

8. Environmental/Reliability Test 可靠性试验

No.	Test Item 测试项目	Test Condition 测试情况	Inspection after test 测试后检查
1	High Temperature Storage 高温存储	85±2℃/240 hours	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Sealleak; 3.Non-display; 4.Missing segments; 5.Glass crack; 6.Current Idd is twice higher than initial value. 检查后 2～4小时在室温下储存,样品应无缺陷: 1.在LCD气泡; 2.密封泄漏; 3.非显示 4.缺失的部分; 5.玻璃裂纹; 6.当前高于初始值的两倍
2	Low Temperature Storage 低温存储	-30±2℃/240 hours	
3	High Temperature Operating 高温工作	60±2℃/240 hours	
4	Low Temperature Operating 低温工作	-20±2℃/240 hours	
5	Temperature Cycle 温度循环	-30℃~ 25℃~ 85℃ × 10cycles (30min.) (5min.) (30min.)	
6	Damp Proof Test 防潮测试	40℃±5℃×90%RH/240 hours	
7	Vibration Test 振动实验	Frequency：10Hz~55Hz~10Hz Amplitude：1.5mm, X，Y，Z direction for total 3hours (Packing condition)	
8	Dropping test 跌落实验	Drop to the ground from 1m height, one time,every side of carton. (Packing condition)	
9	ESD test静电实验	Voltage:±8KV R: 330Ω C: 150pF Air discharge, 10time	
		Voltage:±6KV R: 330Ω C: 150pF Contact discharge, 10time	

Remark:
1. The test samples should be applied to only one test item.
2. Sample size for each test item is 5~10pcs.
3. For Damp Proof Test, Pure water(Resistance＞ 10MΩ) should be used.
4. In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.
5. Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.
6. Please use automatic switch menu(or roll menu) testing mode when test operating mode.

备注:
1.测试样品应适用于只有一个测试项目。
2.样本大小为每个测试项5～10个人。
3.对于防潮测试,纯净水(电阻> 10 mΩ)应该被使用。
4.防静电损坏造成的故障缺陷,如果它会恢复，正常状态重置后,会判定为好的部分。
5.失败的判断标准:基本规范,电气特性,机械特性、光学特性。
6.请使用自动切换菜单(或滚动菜单)测试模式时,测试操作模式。

9. Packing Drawing（TBD）包装方式(待定)

10. Standard Specifications For Product Quality 产品质量检验标准

10.1. Manner of test:检验方法

10.1.1 The test must be under 40W fluorescent light, and the distance of view must be at 35±5cm. 必须在 40w 荧光灯下且与产品距离 30cm 进行检验

10.1.2 Room temperature 25±5℃ Humidity: (65±5)%RH.

10.1.3 If the product is uneven and bright spot, use 2%ND filter to check and confirm. Not visible, OK.（产品不均、亮点现象使用 2%ND 滤镜检验确认不可见 OK。）

10.1.4 Inspection Angle: 检查角 The vision of inspector should be perpendicular to the surface of the Module. 检验员的视野应该垂直于模块的表面

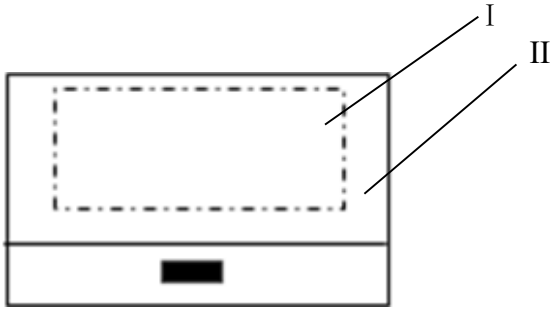
10.2. Quality specification

It shall be based on GB2828-87, inspection level II.

	IETM	CHECK LEVEL	AQL
MAJOR (MA)	1.Liquid crystal leakage 2.Wrong polarizer 3.Outside dimension 4. Bright dot,Dark dot 5. Display abnormal 6. Class crack	Ⅱ	0.65
MINOR (MI)	1. Spot Defect (Including black spot、white spot、 pinhole、foreign particle、bubbles、hurt) 2. fragment 3. Line Defect (Including black line,white line,scratch) 4. Incision defect 5. Newton's ring 6. Other visual defects	Ⅱ	1.0

10.3 Definition of area

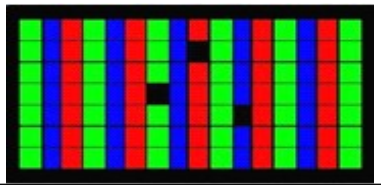
10.3.1 Ⅰ area: viewing area
Ⅱ area: outside viewing area



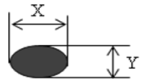
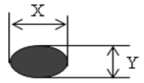
10.4. Standard of appearance test for Ⅰ area: (unit: mm)检验标准

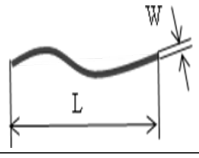
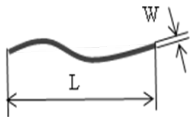
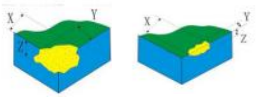
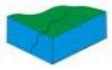
NOTE：Defect ignore for Ⅱ area.

10.4.1 Bright/Dark Dots explain

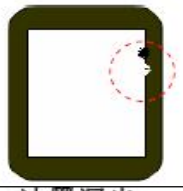
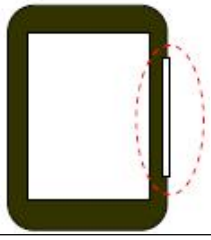
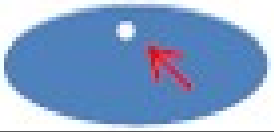
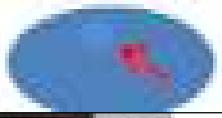
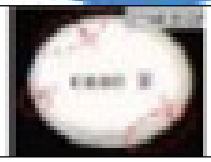
Name	Explain	Definition
Bright dot	Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern（在黑色模式下的液晶面板显示的大小点看起来是明亮的和不变的） 	The definition of dot: The size of a defective dot over 1/2 of single pixel dot is regarded as one defective dot . (一个缺陷点超过 1/2 像素点大小的点定义被认为是一个缺陷点) Note:One pixel consists of 3 sub-pixels, including R,G, and B dot.(Sub-pixel = Dot) （注意：一个像素包含 3 个子像素，包括红、绿和蓝
Dark dot	Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green, blue pattern. （在纯红、绿、蓝模式下LCD面板的大小点呈现黑色、尺寸不变的） 	
Adjacent Dot	Adjacent two sub-pixel are defect（define two dot defect）	

10.4.2 Inspection standard

No.	Items	Criterion				Checking manner	Defect classes
1	Bright/dark dot（亮、暗点）	LCD≤4.3"	4.3"＜LCD＜7"	7"≤LCD≤12"	LCD＞12"	Checking with eyes	MAJ
		Bright dot：N≤2 Dark dot：N≤3 Total：N≤4	Bright dot：N≤3 Dark dot：N≤4 Total：N≤6	Bright dot：N≤4 Dark dot：N≤5 Total：N≤8	Bright dot：N≤5 Dark dot：N≤6 Total：N≤10		
		The distance between the two defect dots shall be greater than 5mm The distance between two defect dots above 7 inches shall be more than 10 mm					
		Note: Adjacent dot defect N≤0					
2	Spot defects (black and white spot, pinhole, foreign matter, dent, backlight foreign matter)  D=(X+Y)/2	D≤0.15 Ignore 0.15＜D≤0.3 N≤3 0.3＜D N=0	D≤0.2 Ignore 0.2＜D≤0.5 N≤4 0.5＜D N=0	D≤0.2 Ignore 0.2＜D≤0.5 N≤5 0.5＜D N=0	D≤0.2 Ignore 0.2＜D≤0.5 N≤6 0.5＜D N=0	Checking with eyes	MIN
3	Bubble  D=(X+Y)/2	D≤0.2 Ignore 0.2＜D≤0.5 N≤3 0.5＜D N=0	D≤0.2 Ignore 0.2＜D≤0.5 N≤4 0.5＜D N=0	D≤0.2 Ignore 0.2＜D≤0.5 N≤5 0.5＜D N=0	D≤0.2 Ignore 0.2＜D≤0.5 N≤6 0.5＜D N=0		

4	Line defects(black and white line, backlight foreign matter etc.) 	LCD≤4.3" W≤0.03 Ignore 0.03＜W≤0.06 L≤5 N≤3 W＞0.06 L＞5 N=0	4.3"＜LCD＜7" W≤0.03 Ignore 0.03＜W≤0.1 L≤5 N≤4 W＞0.1 L＞5 N=0	7"≤LCD≤12" W≤0.03 Ignore 0.03＜W≤0.1 L≤5 N≤5 W＞0.1 L＞5 N=0	LCD＞12" W≤0.03 Ignore 0.03＜W≤0.1 L≤5 N≤6 W＞0.1 L＞5 N=0	Checking with eyes	MIN
5	Scratch 	W≤0.03 Ignore 0.03＜W≤0.2 1.0＜L≤5.0 N≤3 W＞0.2 L＞5 N=0	W≤0.03 Ignore 0.03＜W≤0.2 1.0＜L≤5.0 N≤4 W＞0.2 L＞5 N=0	W≤0.03 Ignore 0.03＜W≤0.2 1.0＜L≤5.0 N≤5 W＞0.2 L＞5 N=0	W≤0.03 Ignore 0.03＜W≤0.2 1.0＜L≤5.0 N≤6 W＞0.2 L＞5 N=0	Checking with eyes	MIN
6	Display abnormal	Not allowed				Checking with eyes	MAJ
7	Outside dimension	Accord with drawing				Calipers	MAJ
8	Class crack	Not allowed				Checking with eyes	MAJ
9	Leak	Not allowed				Checking with eyes	MAJ
10	Comer and side fragment	崩角 崩边 		**1.** Comer fragment： X，Y≤1mm Z≤T/2 allowed 2. Side fragment： X≤2.0mm Y≤1mm Z≤T/2 allowed		Calipers& Eyes	MIN
11	Crack			NG		Eyes	MAJ
12	Newton's ring （CTP or Cover board）			Newton's ring＜1/9 area ,after lightened ,no influence on words and lines		Checking with eyes	MIN

TP 标准

No.	Items	Phenomenon/picture	Criterion	Checking manner	Defect class
1	Outside dimension		Accord with drawing	Calipers& Eyes	MIN
2	Color deviation	Difference of ink color	Obvious deviation compared with samples	Eyes	MIN
3	Ink pinhole	油墨针孔 	No any holes near VA side 3mm Out of VA： D≤0.15mm N≤1 ,no present in reflection condition.	Eyes Film	MIN
4	Ink saw tooth	印刷锯齿 	W≤0.15mm N=1	Eyes Film	MIN
5	Ink light leakage	油墨漏光 	1、width of light leakage at the edge area ≤0.15mm OK 2、width of light leakage at the edge area >0.15mm NG	Eyes Film	MIN
6	Cover glass profile		No ink, adhesive, oil stain, etc.	Eyes	MIN
7	IR(LED)dot/black-white dot		φ≤0.2、N≤1 0.15 < φ、not allowed	Eyes& Film	MIN
8	IR(LED)dot black-white dot/different color		no present when use all viewing angle to determine at 35cm ,allowed	Eyes	MIN
9	Shooting hole		φ≤0.2、N≤1 0.15 < φ、not allowed	Eyes& Film	MIN
10	LOGO/ICON black-white dot		Diagram clear φ≤0.2、N≤1	Eyes& Film	MIN
11	FPC warped	FPC翘曲 	OK	Eyes	MIN

12	FPC broken, stained, oxidation	FPC折伤 	NG	Eyes	MAJ
13	Stain		No evident finger print，oil print，gelatinoids，etc.	Eyes	MIN
14	Sponge		Presented in AA area. NG	Eyes	MIN
15	Protection foil	Finished Protection foil	1、Protection foil stain：In normal inspection condition ,finger print，pen print and gelatinoids are presented. NG 2、Bubble≤5.0mm ,or according to client's limited sample 3、Protection foil worn and warped。NG 4、Scratch：W≤0.10mm，ignore length；0.10mm＜W≤0.20mm，L≤30mm，and N≤4,d＞15mm；OK;L＞30mm or W＞0.20mm;NG	Eyes& Film	MIN

11. Precautions for Use of LCD Modules 注意事项

11.1 Handing Precautions 管理措施

(1) The display panel is made of glass and polarizer.As glass is fragile. It tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock by dropping it or impact.

(2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.

(3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary. Do not touch the display with bare hands. This will stain the display area and degraded insulation between terminals (some cosmetics are determined to the polarizer).

(4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizer with anything harder than an HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on. Condensation on the surface and contact with terminals due to cold will damage,stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming is contacting with room temperature air.

(5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents

- Isopropyl alcohol
- Ethyl alcohol

Do not scrub hard to avoid damaging the display surface.

(6) Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.

- Water
- Ketone
- Aromatic solvents

Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contacting oil and fats.

(7) Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.

(8) Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I O cable or the backlight cable.

(9) Do not attempt to disassemble or process the LCD module.

(10) NC terminal should be open. Do not connect anything.

(11) If the logic circuit power is off, do not apply the input signals.

(12) Electro-Static Discharge Control, Since this module uses a CMOS LSI, the same careful attention should be paid to electrostatic discharge as for an ordinary CMOS IC. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

- Before remove LCM from its packing case or incorporating it into a set, be sure the module and your body have the same electric potential. Be sure to ground the body when handling the LCD modules.
- Tools required for assembling, such as soldering irons, must be properly grounded. make certain the AC power source for the soldering iron does not leak. When using an electric screwdriver to attach LCM, the screwdriver should be of ground potentiality to minimize as much as possible any transmission of electromagnetic waves produced sparks coming from the commutator of the motor.
- To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions. To reduce the generation of static electricity be careful that the air in the work is not too dried. A relative humidity of 50%-60% is recommended.

As far as possible make the electric potential of your work clothes and that of the work bench the ground potential.

The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.

(13) Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or

making any alterations or modifications to it.

- Do not alter, modify or change the shape of the tab on the metal frame.
- Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
- Do not damage or modify the pattern writing on the printed circuit board.
- Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector.
- Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
- Do not drop, bend or twist LCM.

11.2 Storage Precautions 防范措施

When storing the LCD modules, the following precaution is necessary.

(1) Store them in a sealed polyethylene bag. If properly sealed, there is no need for the dessicant.

(2) Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0℃ and 35℃.

(3) The polarizer surface should not come in contact with any other objects. (We advise you to store them in the container in which they were shipped).

11.3 Others

(1) Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

(2) If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear.A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

(3) To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

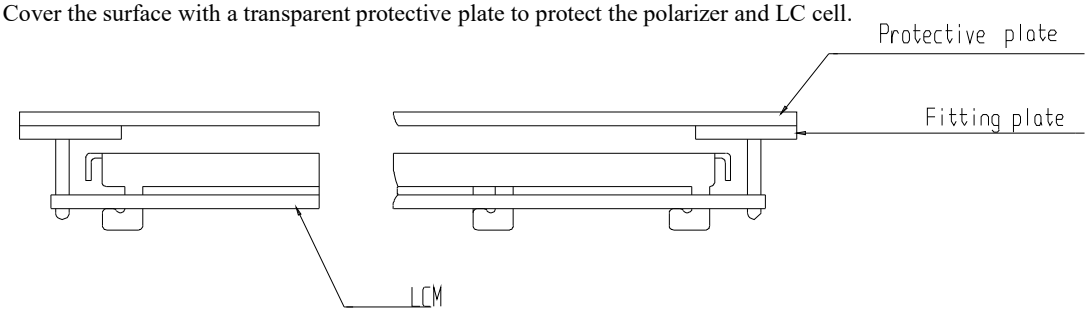
- Exposed area of the printed circuit board.
-Terminal electrode sections.

11.4 USING LCD MODULES

Installing LCD Modules

The hole in the printed circuit board is used to fix LCM as shown in the picture below. Attend to the following items when installing the LCM.

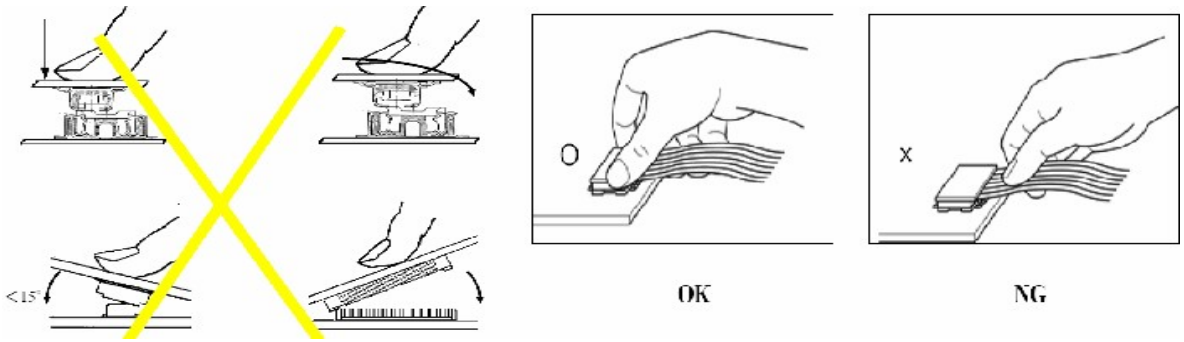
(1) Cover the surface with a transparent protective plate to protect the polarizer and LC cell.



(2) When assembling the LCM into other equipment, the spacer to the bit between the LCM and the fitting plate should have enough height to avoid causing stress to the module surface, refer to the individual specifications for measurements. The measurement tolerance should be 0.1mm.

Precaution for assemble the module with BTB connector:

Please note the position of the male and female connector position, don't assemble or assemble like the method which the following picture shows



Precaution for soldering to the LCM

	Hand soldering	Machine drag soldering	Machine press soldering
No ROHS Product	290 C~350 C. Time :3-5S.	330 C ~350 C. Speed : 4-8mm/s.	300 C~330C. Time : 3-6S. Press: 0.8~1.2Mpa
ROHS Product	340 C~370 C. Time:3-5S.	350 C ~370 C. Time : 4-8 mm/s.	330 C~360C. Time : 3-6S. Press: 0.8~1.2Mpa

(1) If soldering flux is used, be sure to remove any remaining flux after finishing to soldering operation. (This does not apply in the case of a non-halogen type of flux.) It is recommended that you protect the LCD surface with a cover during soldering to prevent any damage due to flux spatters.

(2) When soldering the electroluminescent panel and PC board, the panel and board should not be detached more than three times. This maximum number is determined by the temperature and time conditions mentioned above, though there may be some variance depending on the temperature of the soldering iron.

(3) When remove the electroluminescent panel from the PC board, be sure the solder has completely melted, the soldered pad on the PC board could be damaged.

Precautions for Operation

(1) It is an indispensable condition to drive LCD's within the specified voltage limit since the higher voltage then the limit cause the shorter LCD life. An electrochemical reaction due to direct current causes LCD's undesirable deterioration, so that the use of direct current drive should be avoided.

(2) Response time will be extremely delayed at lower temperature than the operating temperature range and on the other hand at higher temperature LCD's show dark color in them. However those phenomena do not mean malfunction or out of order with LCD's, which will come back in the specified operating temperature.

(3) If the display area is pushed hard during operation, the display will become abnormal. However, it will return to normal if it is turned off and then back on.

(4) A slight dew depositing on terminals is a cause for electro-chemical reaction resulting in terminal open circuit. Usage under the maximum operating temperature,50%RH or less is required.

(5) Input each signal after the positive/negative voltage becomes stable.

(6) Please keep the temperature within specified range for use and storage. Polarization degradation, bubble generation or polarizer peel-off may occur with high temperature and high humidity.

Safety

(1) It is recommended to crush damaged or unnecessary LCDs into pieces and wash them off with solvents such as acetone and ethanol, which should later be burned.

(2) If any liquid leaks out of a damaged glass cell and comes in contact with the hands, wash off thoroughly with soap and water.

11.5The disposal of waste

For waste disposal, our recommendations are as follows, please refer to your company, and the relevant provisions of the state laws and regulations of the act accordingly

1. Packing materials disposal for our packaging (carton/PS tray/EPE tray/PET tray)
   1) Our company used to recycle and reuse materials, packing materials can be you just need to transfer to material recycling companies
2. Our scrap module can't be recycled for reuse, so please dispose of:
   1) Our scrap module can't be recycled for reuse, products and components are "served" can lead to accidents
   2) Our scrap can be transfer to material recycling companies, dismantling, to ensure that scrap in relatively advanced technology products, environmental protection measures of relatively perfect environment for processing.
3. WEEE order must be executed in product scrap.

12. Prior Consult Matter 优先查询事项

1. (1) For YES standard products, we keep the right to change material, process…for improving the product property without notice on our customer.
   (2) For OEM products, if any change needed which may affect the product property, we will consult with our customer in advance.
2. If you have special requirement about reliability condition, please let us know before you start the test on our samples.

13. Factory 制造厂

FACTORY NAME: YES OPTOELECTRONICS DISPLAY CO.,LTD
FACTORY ADDRESS: No.288 Yueling Road Anshan, Liaoning, P.R.CHINA
FACTORY PHONE: 86-412-5211859
FAX: 86-412-5211729