深圳华显美科技有限公司

Shen Zhen Ku Wei Technology Co.,Limited

APPROVAL SHEET

承　认　书

Customer 客户名称	
Part NO. 产品型号	HXM070TFT-006
Product type 产品内容	Mode: Tran missive type .Normally white. TFT LCD Module LCD Module: Graphic 1024RGB*600Dot-matrix
Remarks 备注栏	☐APPROVAL FOR SEPCIFICATIONS ONLY ■APPROVAL FOR SEPCIFICATIONS AND SAMPLE ■ USED PANNEL: BOE
Signature by Customer: 客户确认签章	

Issued by	Checked by	Approved by	
		PD	QA

REVISION RECORD

REV NO	REV DATE	PAGE	CONTENTS	ISSUER
1.0	2015-04-06	19	First Release	YE IN BO

TABLE OF CONTENT

1.0 GENERAL SPECIFICATIONS

KW-B203I-21B-50P **is a color active matrix LCD module incorporating amorphous silicon TFT (Thin Film Transistor). It is composed of a color TFT-LCD panel, driver IC, FPC and a back light unit. The module display area contains 1024X600 pixels. This product accords with RoHS environmental criterion.**

Item	Contents	Unit
Viewing direction	IPS	
Number of Dots	1024(RGB) x600	/
Display Mode	Normally White	/
Interface Type	Parallel RGB 24-bit	/
Number of color	16.7M	
Response Time (Tr+Tf)	25ms (Typ)	
LCM Luminance	350(Typ)	
Contrast Ratio	200(Typ)	
Input voltage	3.3	V

2.0 ABSOLUTE MAXIMUM RATINGS

The following are maximum values which, if exceeded ,may cause fauity operation or damage to the unit

Item	Symbol	Min	Max	Unit	Note
Digital Supply Voltage	VDD VDD-LVDS	-0.3	5	V	
Analog Supply Voltage	AVDD	-0.5	15	V	
Gate On Voltage	VGH	-0.3	42	V	
Gate Off Voltage	VGL	-20	0.3	V	
Gate On-Gate Off Voltage	VDDG-VEEG	12	40	V	

Note :If users use the product out off the environment operation range (temperature and humidity ,it will have visual quality concerns.

3.0 ELECTRICAL CHARACTERISTICS

Item	*Symbol*	*Min*	*Typ*	*Max*	*Unit*	*Remarks*
Digital Power Supply Voltage	*VCC*	*3.0*	*3.3*	*3.6*	*V*	
Analog Power Supply Voltage	*AVDD*	*9.6*	*9.8*	*10.0*	*V*	
Gate On Power Supply Voltage	*VGH*	*17.5*	*18.5*	*19.5*	*V*	
Gate Off Power Supply Voltage	*VGL*	*-6.7*	*-6.2*	*-5.7*	*V*	
Common Power Supply Voltage	*VCOM*	*3.2*	*3.4*	*3.6*	*V*	

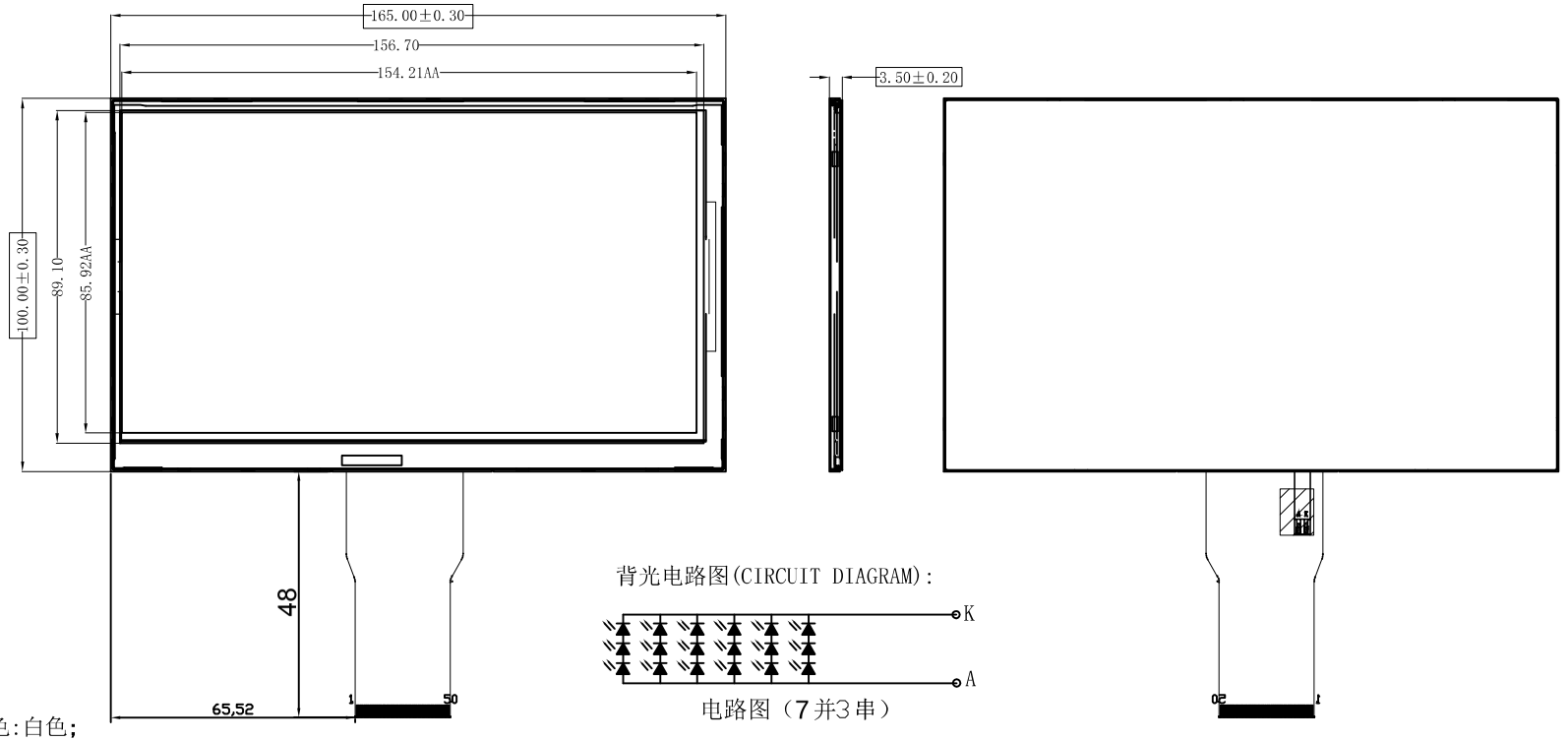
Item	*Symbol*	*condition*	*Min*	*Typ*	*Max*	*Unit*	*Remarks*
Gate on power current	*IVGH*	*VGH =18*		*0.5*		*mA*	
Gate off power current	*IVGL*	*VGL=-6*		*0.5*		*mA*	
Digital power current	*IVCC*	*VCC =3.2*		*8*		*mA*	
Analog power current	*IAVDD*	*AVDD =9.6*		*30*		*mA*	

3.1 BACKLIGHT CHARACTERISTICS

Item	Symbol	Min	Typ	Max	Unit	Condition
Forward voltage	**Vf**	9.0	9.6	10.5	**V**	If=140mA
Luminance	**Lv**	--	350	--	**cd/m2**	If=140mA
Connection mode	**P**	3chips serial *7			--	--

REF 修改	DATE 日期	DESCRIPTION 描述	NAME 修改人

第三角法 | DATE 日期 | 2017.02.28



背光电路图(CIRCUIT DIAGRAM):

电路图（7并3串）

备注:

1. 颜色:白色;
2. **单位:mm;**
3. **未按比例出图;**
4. **⚠为更改标记;**
5. 标示 请贵司确认;
6. 尺寸测量方法: ;
7. 未注尺寸公差±0.20，未注圆角**R0.2;**
8. ( )为参考尺寸,▭为重点控制尺寸;
9. 所有材料均符合"RoHS"要求。

NO.	TITLE	QUANTITY
10.	Steel BOX (铁框)	2
9.	REFLECTIVE (反射屏布)	1
8.	THIN BEF-L (下增光膜)	1
7.	THIN BEF-U (上增光膜)	1
6.	DIFFUSER TAPE (扩散贴布)	1
5.	PCB (电路板)	1
4.	FPC (软革板)	1
3.	LIHGT GUIDE (导光板)	1
2.	HOUSING (胶框)	1
1.	SMD LED(020)	18

Item	Symbol	Min	Typ	Max	Unit	Condition
Forward Voltage	Vf	8.60	9.60	10.5	V	If=140 mA
Reverse Current	Ir	—	—	15*10	uA	Vr= 5 V
色坐标 CIE	X	0.25	--	0.315	—	If=140 mA
	Y	0.25	--	0.315		
亮度(通过LCD) Luminance	Lv		--	—	cd/m²	
Uniformity	Δ	80	--	—	%	
Operating Temperature	Topr	-20	—	70	?	—
Storage Temperature	Tstg	-30	—	80	?	—

CUSTOMER'S NAME 客户名称	CUSTOMER'S CODE 客户编号	EDITION 版本
BRT.CODE 产品编号	PRODUCT.CODE 产品编号	EDITION 版本
		A
DESIGN 设计	CHECK 审核	REVIEW 确认
杨洋		

＊ 注意保存,保存条件不好时,会降低反射膜(扩散膜)与导光板(胶框）的粘附力;推荐保存条件为:温度: 25° C±10° C,湿度:65%RH±20%RH.

5.0 INTERFACE PIN CONNECTIONS

Pin No.	Symbol	Function
1,2	VLED+	Power for LED backlight (Anode)
3,4	VLED-	Power for LED backlight (Cathode)
5	GND	Power ground
6	VCOM	Common Voltage
7	DVDD	Digital Power
8	MODE	DE/SYNC mode select. Normally pull high H: DE mode. L: HSD/VSD mode
9:	DE	Data Enable signal.
10	VSD	Vertical sync input. Negative polarity
11	HSD	Horizontal sync input. Negative polarity
12-19	B7-B0	Blue Data
20-27	G7-G0	Green Data
28-35	R7-R0	Red Data
36	GND	Ground
37	DCLK	Clock signal
38	GND	Power Ground
39	SHLR	Left or Right Display Control
40	UPDN	Up / Down Display Control
41	VDDG	Positive Power for TFT
42	VEEG	Negative Power for TFT
43	AVDD	Analog Power
44	RSTB	Global reset pin. Active low to enter reset state. Suggest to connecting with an RC reset circuit for stability. Normally pull high. (R=10KΩ， C=1μF)
45	NC	Not connect
46	VCOM	Common Voltage
47	DITH	Dithering setting DITH=”H” 6bit resolution(last 2 bit of input data truncated) DITH=”L” 8bit resolution(default setting)
48	GND	Power ground
49	NC	Not connect
50	NC	Not connect

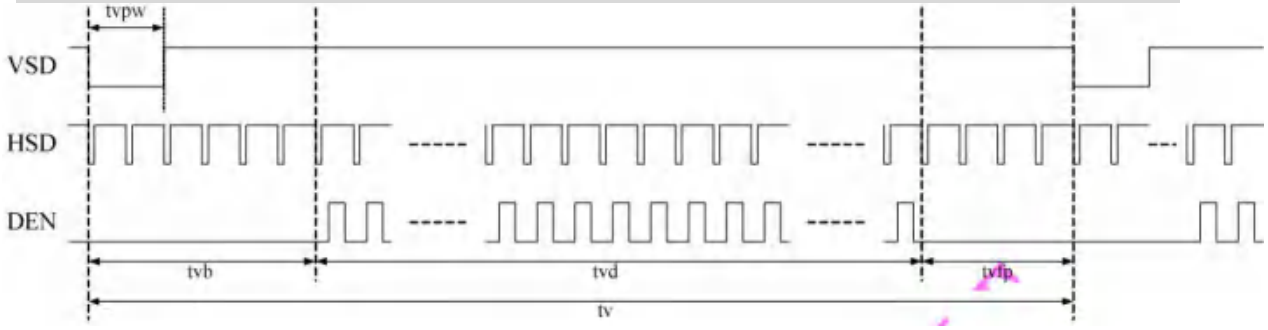
6. 0 Timing characteristics

Horizontal input timing

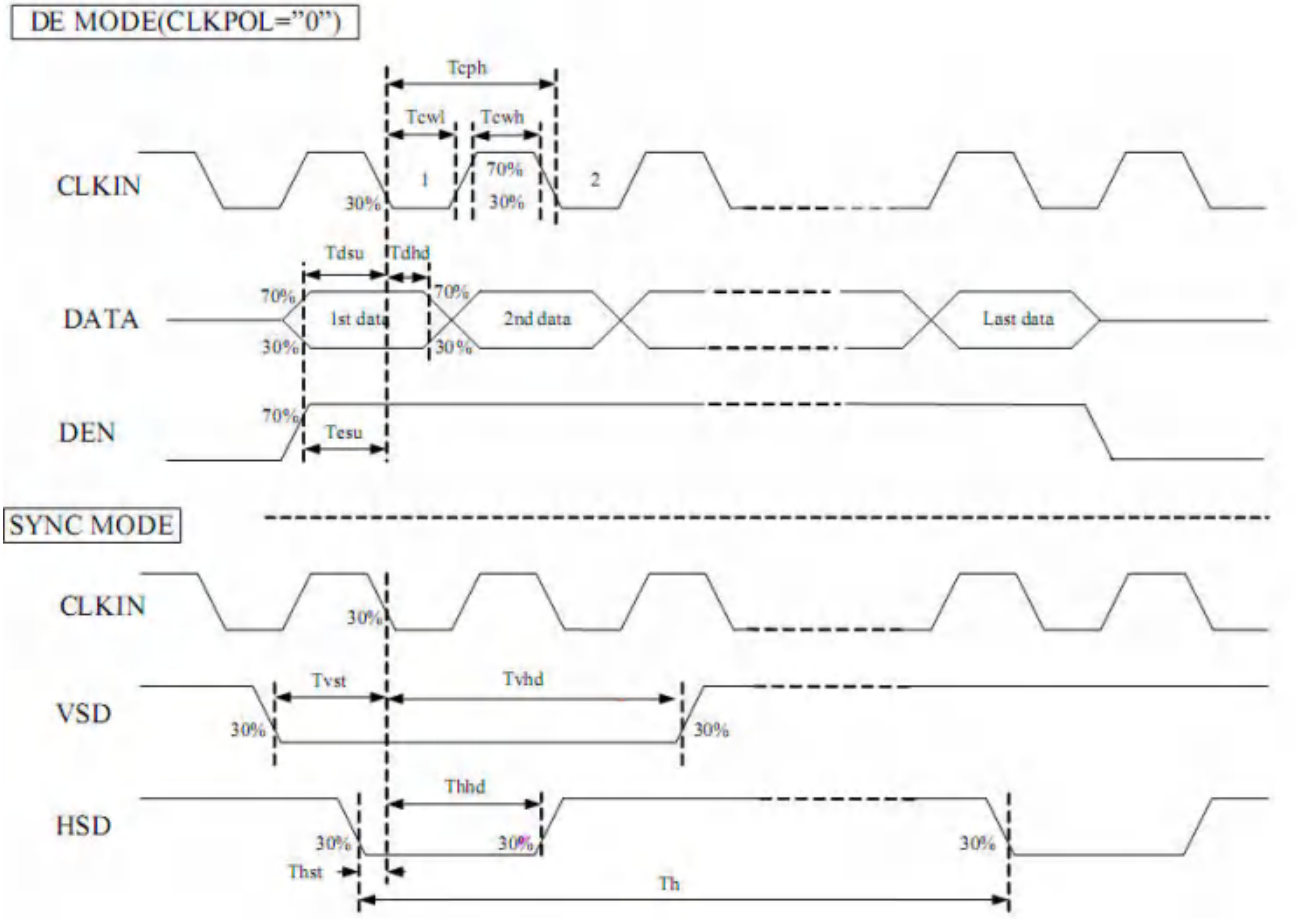
Parameter		Symbol	Value			Unit
Horizontal display area		thd	1024			DCLK
DCLK frequency @ Frame rate = 60Hz		fclk	Min.	Typ.	Max.	
			44.9	51.2	63	MHz
1 Horizontal Line		th	1200	1344	1400	DCLK
HSYNC pulse width	Min.	thpw	1			
	Typ.		-			
	Max.		140			
HSYNC blanking		thb	160	160	160	
HSYNC front porch		thfp	16	160	216	

Vertical input timing

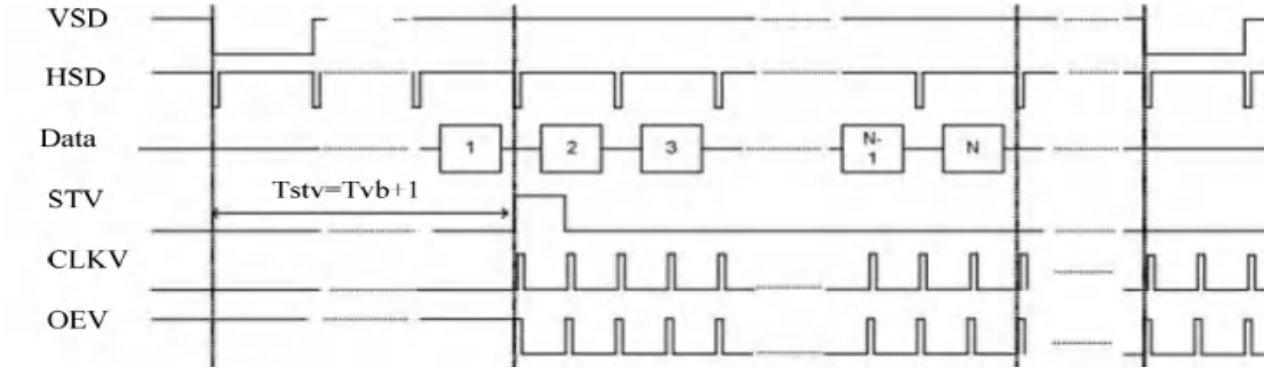
Parameter	Symbol	Value			Unit
		Min.	Typ.	Max.	
Vertical display area	tvd		600		H
VSYNC period time	tv	624	635	750	H
VSYNC pulse width	tvpw	1	-	20	H
VSYNC Blanking (tvb)	tvb	23	23	23	H
VSYNC Front porch (tvfp)	tvfp	1	12	127	H



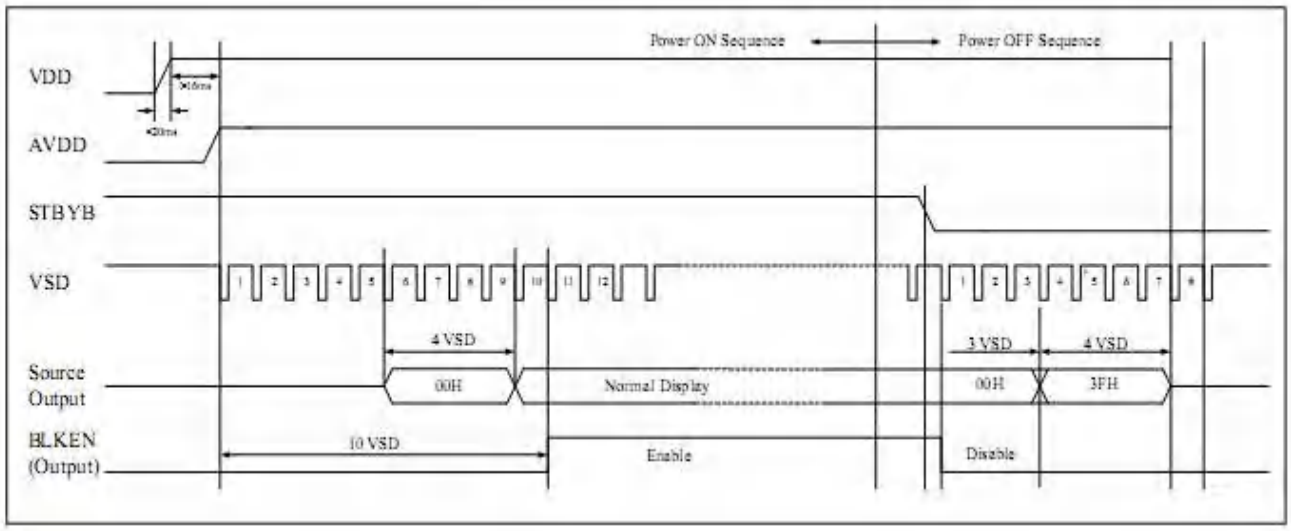
Input Clock and Data Timing Diagram



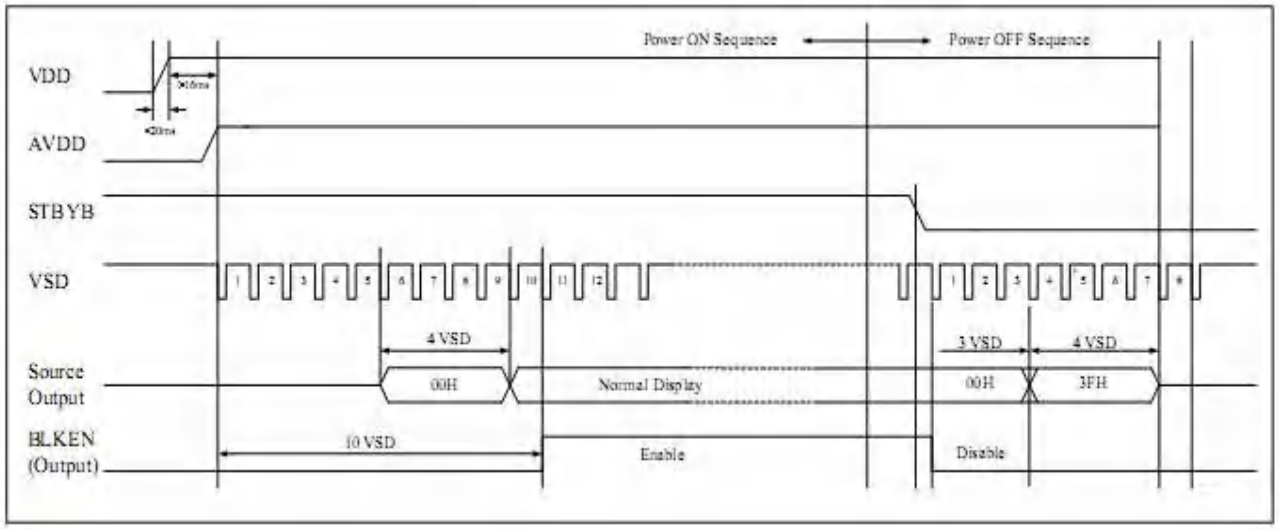
Vertical Timing Diagram DE (Dual Gate)



6.1Power On/Off Sequence



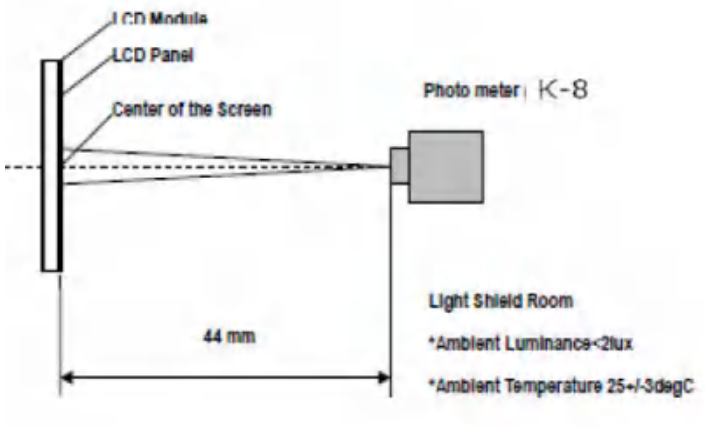
Standby Mode Sequence



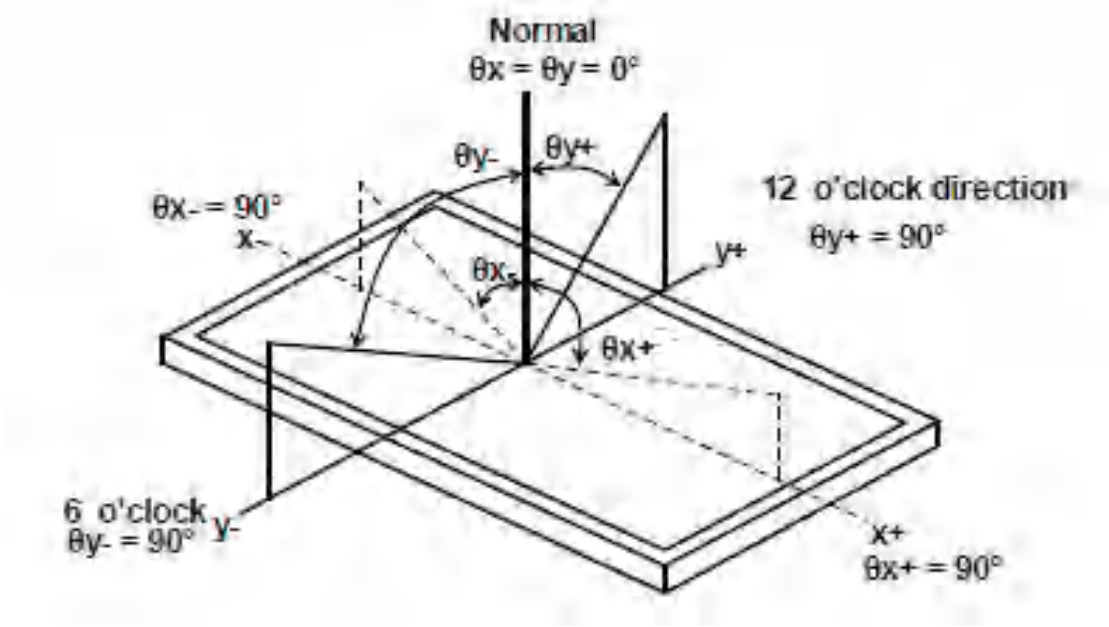
7.0 ELECTRO-OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Panel Transmittance		T	θ =φ 0°	4.8	5.1	--	%	
Luminance		T	θ =φ 0°	--	220	--		
Luminance Uniformity		YU	9points	75	80	--	%	Note5
Contrast Ratio		CR	Point-9	--	200	–	-	Note3
Response Time		Rr+Tf	Point-5	--	25	35	ms	Note4
Viewing Angle K=Contrast Ratio>10	Horizontal	Θ L	Point-5 CR≧ 10	--	45	--		Note2
		Θ R		--	45	--		
	Vertical	Θ U		--	20	--	--	
		Θ D		--	45	--	--	
Color Filter Chromaticity	White	X	θ =φ 0°	0.260	0.310	0.360		Note1
		Y		0.280	0.330	0.380		
	Red	X	θ =φ 0°	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
	Green	X	θ =φ 0°	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
	Blue	X	θ =φ 0°	TBD	TBD	TBD		
		Y		TBD	TBD	TBD		
Color gamut (NTSC ratio)					TBD		%	

Note1: Measure condition :25°c±2°c,60±100%RH,under 10 Lux in the dark room. K-8,Viewing angle 2 °.Measurement after lighting on 10 minus



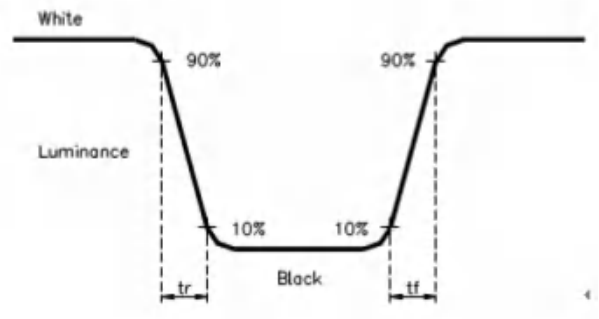
Note2: Definition of Viewing Angle

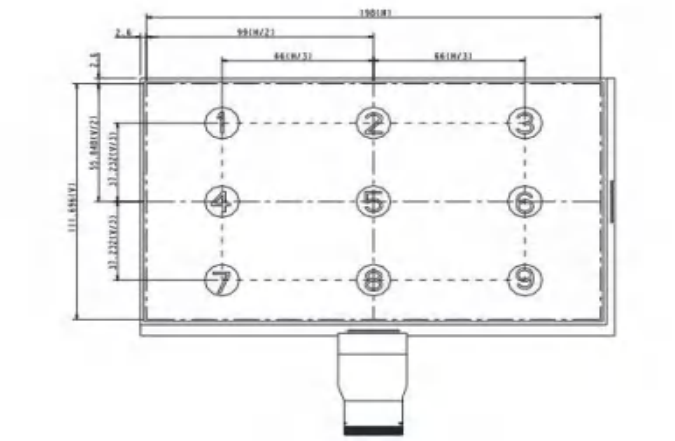


Note3: Definition of Contrast Ratio (CR)

CR=White luminance(on)÷Black luminance(OFF)

Note4: Definition of Response Time (TR, TF)





8. 0 RELIABILITY

8.1 MTBF

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal. (25°C in the room without sunlight)

8.2 TESTS

NO.	Test Item	Test condition	Criterion
1	High Temperature Storage	60℃±2℃ 96H Restore 2H at 25℃ Power off	Aftertesting,cosmetic and electrical defects should not happen.
2	Low Temperature Storage	-10℃±2℃ 96H Restore 2H at 25℃ Power off	
3	High Temperature Operation	60℃±2℃ 96H Restore 2H at 25℃ Power on	
4	Low Temperature Operation	0℃±2℃ 96H Restore 2H at 25℃ Power on	
5	High Temperature & Humidity Operation	60℃±2℃ 90%RH 96H Power on	
6	Temperature Cycle	-10℃←→25℃←→60℃ 30min 5min 30min after 10cycle, Restore 2H at 25℃ Power off	
7	Vibration Test	10Hz~45Hz, 100m/s2, 120min	
8	Shock Test	Half-sinewave,300m/s2,11ms	
9	Drop Test(package state)	800mm, concrete floor,1corner, 3edges, 6 sides each time	1.After testing, cosmetic and electrical defects should not happen. 2.the product should remain at initial place 3.Product uncovered or package broken is not permitted.
10	Electro Static Discharge Test (non-operation)	150pF，330Ω，Contact:±4KV,Air:±8KV Measure point :LCD glass and metal bezel	IEC61000-4-2：2001 GB/T17626.2-2006
		200pF，0Ω，±200V contact test Measure point :IF connector pins	

9.0 INSPECTION STANDARDS

9.1 Inspection Conditions

9.1.1 Environmental conditions

The environmental conditions for inspection shall be as follows

Room temperature: 20±3°C ; Humidity: 65±20%RH

9.1.2 The external visual inspection

With a single 20-watt fluorescent lamp as the light source, the inspection was in the distance of 30cm or more from the LCD to the inspector's eyes .

9.2 Classification of defects

9.2.1 Major defect

A major defect refers to a defect that may substantially degrade usability for product applications.

9.2.2 Minor defect

A minor defect refers to a defect which is not considered to be able substantially degrade the product application or a defect that deviates from existing standards almost unrelated to the effective use of the product or its operation.

9.3 尺寸标准：

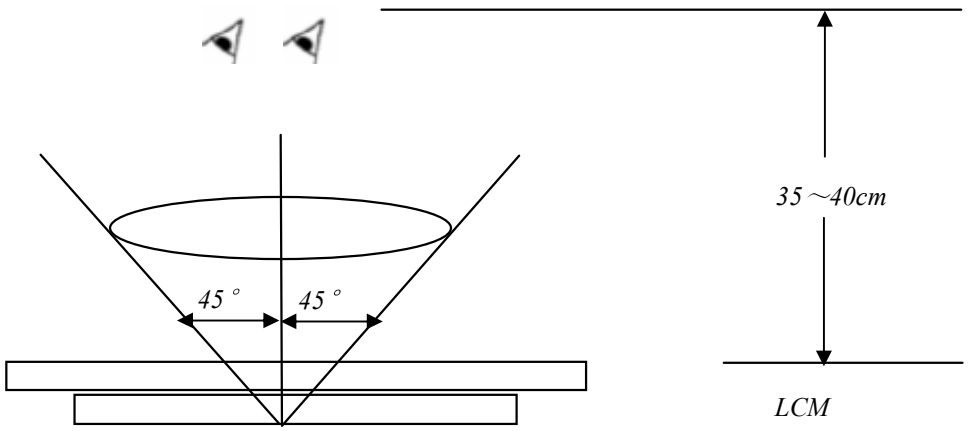
9.3.1 测量器具：游标卡尺，投影机等等；

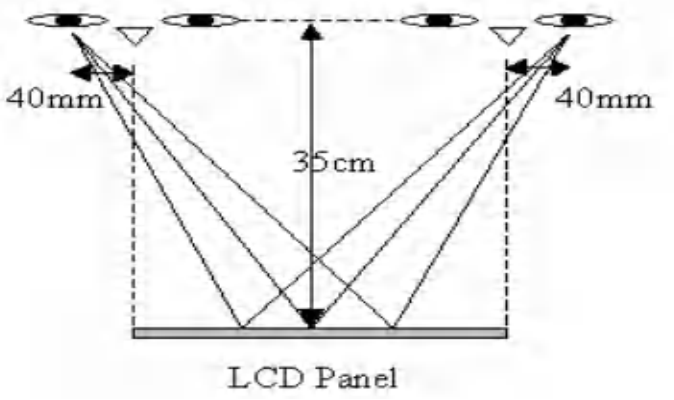
9.3.2 检测参数：见外形尺寸图；

9.3.3 判定标准：以客户回签样品为准；

9.4 检验条件

眼睛距离产品 35～40CM；以产品法线为中心上下左右 45° 进行检查，见下图：

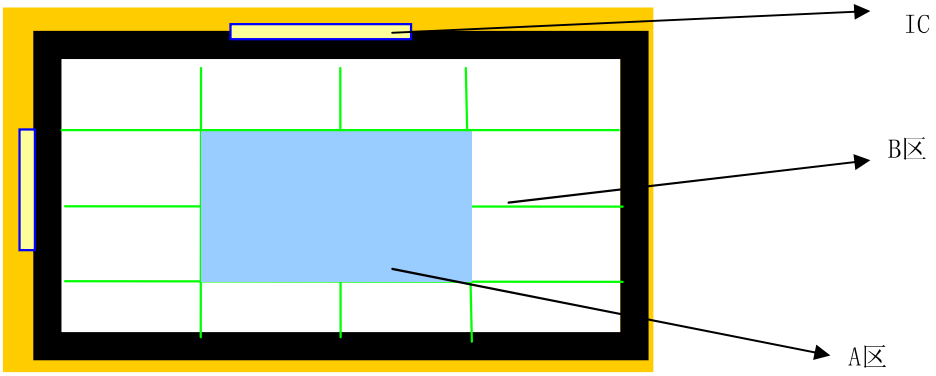




9.5 显示区 A 区与 B 区的定义

A区：以屏四边为基准各向屏中心点延伸1/4区域，所剩下的中心区域视为A区（如下图所示）。

B 区：以屏四边为基准各向屏中心点延伸 1/4 的区域，视为 B 区（如下图所示）



9.6 检验标准

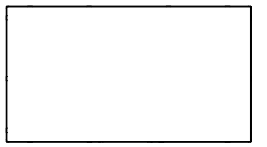
<table>
<tr><td>不良项目</td><td>不良现象描述</td><td colspan="3">判定标准</td><td>缺陷</td><td>备注</td></tr>
<tr><td>点缺陷</td><td>LCD 玻璃点状</td><td colspan="3">屏幕尺寸</td><td>项目</td><td>判定标准</td></tr>
<tr><td rowspan="15">线缺陷</td><td rowspan="11">BL 点状</td><td>4.3寸至9寸（不含9寸）</td><td>亮点</td><td>A区：N≤0；B区：N≤2</td><td rowspan="15">Maj
大小
大小
Maj</td><td rowspan="15">间隔大于15mm
允许数量
允许数量
//</td></tr>
<tr><td rowspan="4">4.3寸至9寸（不含9寸）
9寸（含9寸）至13.3寸</td><td>暗点</td><td>A区：N≤2；B区：N≤3</td></tr>
<tr><td>两连点</td><td>A区：N≤0；B区：N≤1</td></tr>
<tr><td>总数</td><td>N≤4</td></tr>
<tr><td>亮点</td><td>A区：N≤0；B区：N≤3</td></tr>
<tr><td rowspan="4">9寸（含9寸）至13.3寸
备注：
Φ=直径
Φ ≤ 0.20mm 忽略不计
0.20mm<Φ≤0.30mm 可接收个数如上列表（间隔大于15mm）
Φ >0.30mm N=0（不可接收）</td><td>暗点</td><td>A区：N≤2；B区：N≤4</td></tr>
<tr><td>两连点</td><td>A区：N≤0；B区：N≤1</td></tr>
<tr><td>总数</td><td>N≤5</td></tr>
<tr><td>总数</td><td>N≤5</td></tr>
<tr><td colspan="3">屏幕尺寸</td></tr>
<tr><td rowspan="4">BL 点状
POL 类点状</td><td>4.3 寸至 9 寸（不含 9 寸）</td><td>Φ≤0.20mm</td><td>忽略不计</td></tr>
<tr><td rowspan="2">4.3 寸至 9 寸（不含 9 寸）
9 寸（含 9 寸）至 13.3 寸</td><td>0.20mm<Φ≤0.30mm</td><td>3</td></tr>
<tr><td>Φ>0.30mm</td><td>0</td></tr>
<tr><td>Φ≤0.20mm</td><td>忽略不计</td></tr>
<tr><td rowspan="3">9 寸（含 9 寸）至 13.3 寸
备注：BL 点状不分 A、B 区</td><td>0.20mm<Φ≤0.40mm</td><td>4（间隔大于 15mm）</td></tr>
<tr><td>Φ>0.40mm</td><td>0</td></tr>
<tr><td>Φ>0.40mm</td><td>0</td></tr>
<tr><td colspan="3">屏幕尺寸</td></tr>
</table>

<table>
<tr><td rowspan="8"></td><td rowspan="8">POL 类点状 LCD/偏光片/TP/黑白点,线状划伤,线状异物</td><td>4.3 寸至 9 寸（不含 9 寸）</td><td>Φ≤0.20mm</td><td>忽略不计</td><td rowspan="8"></td><td rowspan="8"></td></tr>
<tr><td rowspan="3">4.3 寸至 9 寸（不含 9 寸）
9 寸（含 9 寸）至 13.3 寸</td><td>0.20mm<Φ≤0.3mm</td><td>3（间隔大于 15mm）</td></tr>
<tr><td>Φ>0.3mm</td><td>0</td></tr>
<tr><td>Φ≤0.20mm</td><td>忽略不计</td></tr>
<tr><td rowspan="3">9 寸（含 9 寸）至 13.3 寸
备注：POL 点状不分 A、B 区</td><td>0.20mm<Φ≤0.4mm</td><td>4（间隔大于 15mm）</td></tr>
<tr><td>Φ>0.4mm</td><td>0</td></tr>
<tr><td>Φ>0.4mm</td><td>0</td></tr>
<tr><td colspan="3">W≤0.05mm 忽略不计
0.05mm<W≤0.10mm L≤10mm 允许 3 个
W＞0.10mm L＞10mm 不接收</td></tr>
<tr><td>漏液</td><td>在任意画面黑色点状液晶</td><td colspan="3">NG</td><td>Maj</td><td>/</td></tr>
<tr><td>缺划</td><td>在任意画面看到的横线、纵线的缺失</td><td colspan="3">NG</td><td>Maj</td><td>/</td></tr>
<tr><td>画面异常</td><td>所有的画面异常，主要如下：
※ 横显与竖显不一致
※ 部分不显示或显示部分出现闪动等</td><td colspan="3">NG</td><td>Maj</td><td>/</td></tr>
<tr><td>残影(阴影)</td><td>后一画面余留前一画面的影像（影像残留）</td><td colspan="3">残影不良超过 5 秒不消失为 NG</td><td>Maj</td><td>/</td></tr>
<tr><td>Mura(显示不均)</td><td>显示屏亮度不均匀</td><td colspan="3">用 6%ND 遮住不可见属 OK</td><td>Min</td><td></td></tr>
<tr><td>画面闪烁</td><td>检验时出现画面忽亮忽暗或跳动现象</td><td colspan="3">NG</td><td>Maj</td><td>/</td></tr>
<tr><td>静电线</td><td>影响画面或产品特性之静电线，一般表示为某个画面出现</td><td colspan="3">NG</td><td>Maj</td><td>/</td></tr>
</table>

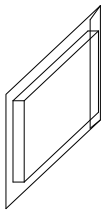
底色不符	底色不一致	依据限度样品	Maj	/
视角反向（显示淡）	片视角贴反	NG	Maj	/
BL 漏光	因片材质问题出现偏淡（批量）	依据限度样品	Maj	
	灯前有光斑或者光束	依据限度样品	Min	/
灯眼	组合缝隙漏光	依据限度样品	Min	/
	点亮后 LED 灯仔发光区域比其它区域要特别亮	NG	Maj	/
LED 亮度	点亮时 LED 灯不亮	NG	Maj	/
BL 色差	LED 灯点亮闪烁	NG	Maj	/
	亮度太高或者太低，亮度不一致	NG	Maj	/
	同一批物料中出现两中色过 度	依据限度样品	Min	/
LED 正负极检查	LED 正负极与设计 OBM 规格书不一致，正负极反向	LED 正负极必须与 FPC 丝印正负极要求，及 BOM 规格书要求一致，不可出现反向，出现反向 NG	Maj	/
点屏水波纹	点击显示区，非点击区出现抖动的水波纹	依据限度样品	Min	
点线状不良	BL 导光板白点、线	以 LCD 点状判定为基准，超出标准 NG	Min	/
导光膜划伤	产品点亮后以法眼正常光线下距产品 30CM，直视 45 度角观察看不到视为 OK 品，反之 NG	NG	Min	/
TP 触摸失效	点触无功能	NG	Maj	/
TP 触摸漂移	点触出现反应位置偏差	NG	Maj	/

10.0 PACKING DRAWING

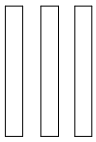
包装图:



将1PCS模组产品
装在PE袋包裹。

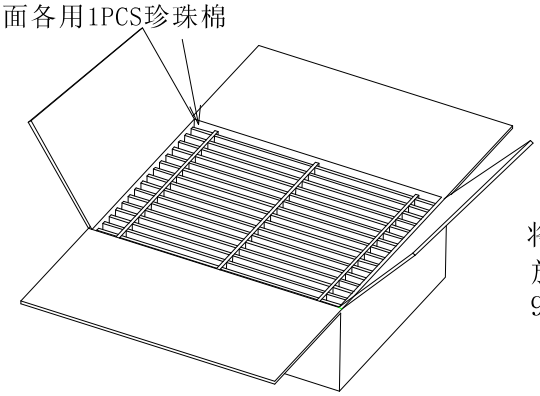


备注：2PCS产品模组的LCD
面对面,第三片模组LCD
第二片模组的背对背

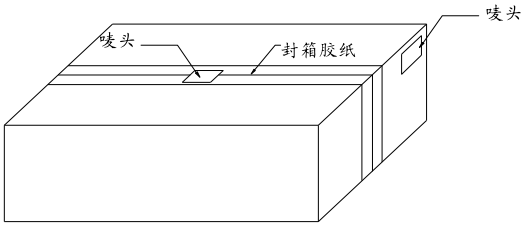


将3PCS产品
放入纸箱里,共计
90pcs

在纸箱里的卡板上下
两面各用1PCS珍珠棉



使用封口胶封口
并贴附唛头



REVSION 版 本	A0	☑ 正式规格 ☐ 临时规格	REVISER 修订人	MODEL NO 产品料号	APPROVED BY 核 准	CHECKED BY 审 核	DRAWN BY 绘 图
DATE 日 期							
PAGE 页 码							

11. 0 HANDLING PRECAUTION

(1) Don’t disassemble and reassemble the module by self.
(禁止自行拆解)
(2) Acid, alkali, alcohol or touched directly by hand will damage the display.
(酸性、碱性、酒精或手的直接接触将会损伤显示面)
(3) Static electricity will damage the module. Please configure grounding device.
(静电会损伤模组，请装配接地设备)
(4)The strong vibration, shock, twist or bend will cause material damage, even module broken.
(强烈的撞击、震动、扭转或弯曲将会造成原材损伤，甚至面板破裂)
(5) It is easy to cause image sticking while displaying the same pattern for very long time.
(长期显示同一画面会造成影像残留)
(6) The response time, brightness and performance will vary from different temperature.
(响应时间、亮度与均匀性会因温度而有所改变)