规格书

Product Specification

客户名称 Customer	
客户项目号 Part NO	
产品型号 Part NO	H0185Y005 V0
产品内容 Product type	Mode:Transmissive type .Normally black. TFTLCD Module LCD Module: 1.8”360RGB*360Dot 圆 MIPI/QSPI/8BIT/SRGB
客户确认签章 Signature by Customer:	

PREPARED BY	CHECKED BY	APPROVED BY

Records of Revision 修改记录

Rev 版本号	Date 修改日期	Description 内容	Page 页	Remarks 注释
V0	2023/09-22		31	

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1 General Description 规格简介

This display module is a transmissive type color active matrix TFT(Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This module is composed of a TFT LCD module, a driver circuit, and a back-light unit.The resolution of a 1.85" contains 360RGB x 360 dots and can display up to 262K colors.

该显示模块是一种采用非晶硅 TFT 作为开关器件的透射型彩色有源矩阵 TFT(薄膜晶体管)液晶显示器。该模块由 TFT 液晶显示模块、驱动电路和背光单元组成。1.85 英寸的分辨率包含 360RGB x 360 点，可显示高达 262K 的颜色。

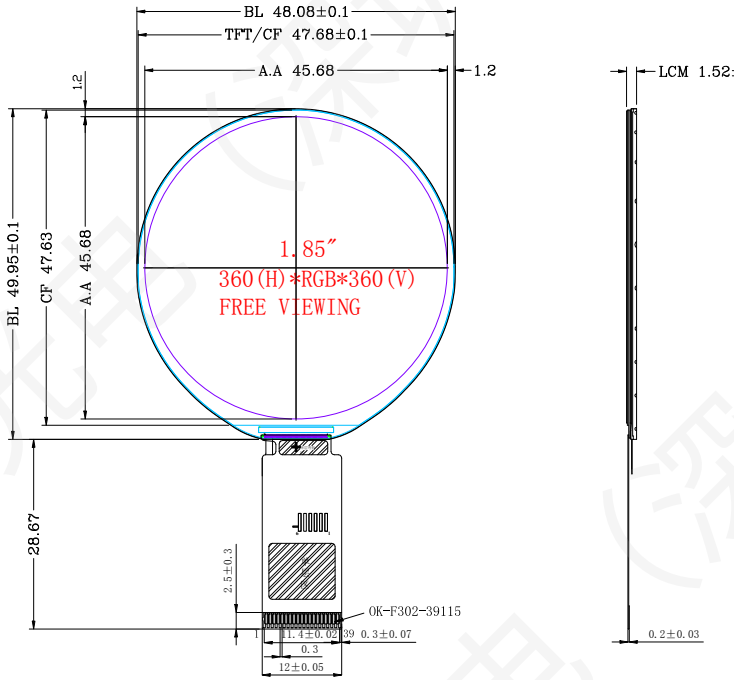
2 Module Parameter 模组参数

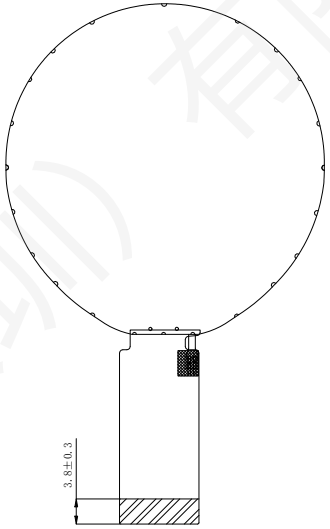
Features	Details	Unit
Display Size(Diagonal) 显示尺寸(对角线)	1.85	inch
LCD type 液晶显示屏类型	α-Si TFT	-
Display Mode 显示模式	IPS / Transmissive / Normally Black	-
Resolution 分辨率	360RGB x 360	-
Active Area 显示区	45.68(H)×45.68(V)	mm
Module Outline 模组外形	48.08(H) ×49.95(V)×1.52(T)	mm
Display Colors 显示颜色	262K	-
Interface 接口	MIPI/QSPI/8BIT/SRGB	-
Driver IC 驱动 IC	ST77916	-
TP Viewing Area TP 视窗	无	mm
TP Outline(assembly) TP 外形	无	mm
Luminance on surface 亮度	450	cd/m²
View Direction 视角方向	All	Best image
Contrast ratio 对比度	1200:1	
Color gamut 色域	70%	
PPI 图像点密集度	200	-
Window effect 视窗效果	无一体黑	-
Cover plate surface effect 盖板表面效果	无 AF/AG	-
Operating Temperature 工作温度	-20～60	℃
Storage Temperature 储存温度	-30～70	℃
Weight 重量	TBD	g
连接器	OK-F302-39115	

Note 1: Excluding hooks, posts , FPC/FPC tail etc.

3 Mechanical Drawings 结构图

REV.	DESCRIPTION	DATA	NAME

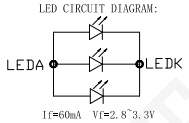




PIN	Define
1	GND
2	LEDK
3	LEDA
4	GND
5	CP
6	CN
7	GND
8	DOP
9	DON
10	GND
11	IM0
12	IM1
13	IM2
14	IOVCC
15	VCC
16	VS
17	HS
18	TE
19	RESET
20	GND
21	D7
22	D6
23	D5
24	D4
25	D3(SDA3)
26	D2(SDA2)
27	D1(SDA1)
28	D0(SDA0)
29	CS
30	RD(SCL)
31	WR
32	DCX
33	GND
34	TP-SCL
35	TP-SDA
36	TP-RESET
37	TP-INT
38	TP-VCC
39	GND

1	GND
2	TP-SCL
3	TP-SDA
4	TP-RESET
5	TP-INT
6	TP-VCC

LED CIRCUIT DIAGRAM:



If=60mA Vf=2.8~3.3V

Display Type	TFT
	NORMALLY BLACK
	TRANSMISSIVE
Front Polarizer	普通片
Viewing Angle	ALL
LCD Driver IC	ST77916
Operating Voltage	VDD=2.8V
Operation Temperature	-20°C+70°C
Storage Temperature	-30°C TO 80°C
Interface	MIPI/QSPI/8BIT/SRGB

有问题请扫图中二维码

华夏彩光电（深圳）有限公司
Huaxia RGB Display(shenzhen)Co., Ltd

DRAWN BY: 绘 图		PRODUCT NO: 产品编号	H0185Y005	SCALE: 比 例	1:1
CHECKED BY: 审 核		CLIENT NO: 客户编号		UNITS: 单 位	MM
DATA: 日 期		VERSION NUMBER: 版本号	V0	VIEW: 投影方式	

4 Module Interface 模组接口定义

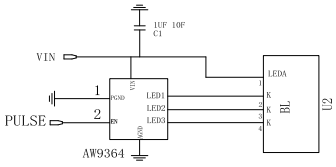
<table>
<tr><th>NO</th><th>SYMBOL</th><th>FUNCTION</th></tr>
<tr><td>1</td><td>GND</td><td>Power Ground</td></tr>
<tr><td>2</td><td>LEDK</td><td>LED Cathode</td></tr>
<tr><td>3</td><td>LEDA</td><td>LED Anode</td></tr>
<tr><td>4</td><td>GND</td><td>Power Ground</td></tr>
<tr><td>5</td><td>CP</td><td>MIPI-DSI clock lane positive-end input pin</td></tr>
<tr><td>6</td><td>CN</td><td>MIPI-DSI clock lane negative-end input pin</td></tr>
<tr><td>7</td><td>GND</td><td>Power Ground</td></tr>
<tr><td>8</td><td>D0P</td><td>MIPI-DSI data lane positive-end input pin. (Data lane 0 positive polarity))</td></tr>
<tr><td>9</td><td>D0N</td><td>MIPI-DSI data lane negative-end input pin.(Data lane 0 negative polarity)</td></tr>
<tr><td>10</td><td>GND</td><td>Power Ground</td></tr>
<tr><td>11</td><td>IM0</td><td rowspan="3"><table>
<tr><th>IM2</th><th>IM1</th><th>IM0</th><th>MPU Interface Mode</th><th>Data pin</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>3-line 9bit serial I/F</td><td>SDA: in/out</td></tr>
<tr><td>0</td><td>0</td><td>1</td><td>MIPI_3-line 9bit serial I/F</td><td>SDA: in/out
DP/DN</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>2 data lane serial I/F</td><td>SDA1: in/out
SDA2: in</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>QSPI I/F</td><td>SDA[3:0]: in/out</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>RGB_3-line 9bit serial I/F</td><td>SDA: in/out
DB[5:0]: out</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>RGB_4-line 8bit serial I/F</td><td>SDA: in/out
DB[5:0]: out</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>4-line 8bit serial I/F</td><td>SDA: in/out</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>80-8bit parallel I/F</td><td>DB[7:0]</td></tr>
</table></td></tr>
<tr><td>12</td><td>IM1</td></tr>
<tr><td>13</td><td>IM2</td></tr>
<tr><td>14</td><td>IOVCC</td><td>Power Supply for logic, VDDIO=1.65V~3.3V.</td></tr>
<tr><td>15</td><td>VCC</td><td>Power Supply for Analog, VDD=2.4V~3.3V</td></tr>
<tr><td>16</td><td>VS</td><td>Vertical (Frame) synchronizing input signal in RGB interface</td></tr>
<tr><td>17</td><td>HS</td><td>Horizontal (Line) synchronizing input signal in RGB interface</td></tr>
<tr><td>18</td><td>TE</td><td>Tearing effect output pin to synchronize MCU to frame writing. This pin is low when it is not activated. If not used, please open it</td></tr>
<tr><td>19</td><td>RESET</td><td>This signal low will reset the device and must be applied to properly initialize the chip. Signal is low active</td></tr>
<tr><td>20</td><td>GND</td><td>Power Ground</td></tr>
</table>

21	D7	Data signal for DBI Type B mode
22	D6	Data signal for DBI Type B mode
23	D5	Data signal for DBI Type B mode
24	D4	Data signal for DBI Type B mode
25	D3(SDA3)	Data signal for DBI Type B mode
26	D2(SDA2)	Data signal for DBI Type B mode
27	D1(SDA1)	Data signal for DBI Type B mode
28	D0(SDA0)	Data signal for DBI Type B mode
29	CS	Chip select pin of DBI Type B mode. Low active.
30	RD(SCL)	Read Control pulse H duration
31	WR	Write enable in MCU parallel interface
32	DCX	Display data/command selection pin in parallel interface
33	GND	Power Ground
34	TP-SCL	Touch panel I2C clock
35	TP-SDA	Touch panel I2C data
36	TP-RESET	Touch panel reset
37	TP-INT	Touch panel interrupt output.If not used, please open it.
38	TP-VCC	Touch panel Power output
39	GND	Power Ground

5 Application Circuit 应用电路

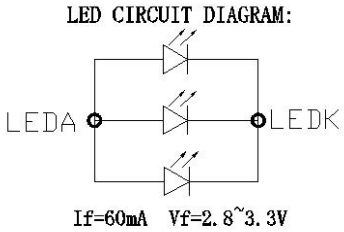
5.1 Backlight recommended circuit 背光电路参考

Motherboard driver backlight is need constant current circuit, if the rated voltage screen after light brightness difference.Current and power consumption of the machine are inconsistent, so recommend a backlight driving circuit is best rated current.It is recommended to use IC (AW9364). The reference circuit is as follows：



5.2Backlight recommended circuit 背光电路参数推荐

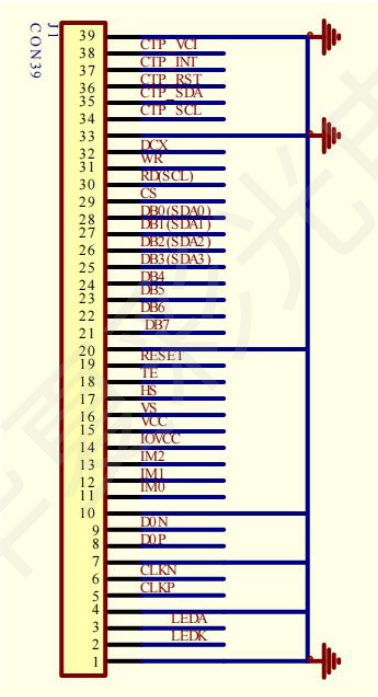
Motherboard driver backlight is need constant current circuit:



3 灯并联

Note: constant current circuit for every LED,and though LED lamp current is less than 20mA.Recommand between 15mA and 20 mA for every LED.

5.3 Application Circuit 应用电路（）



6 Absolute Maximum Ratings 绝对最大额定值

VSS=0V, Ta=25ºC

Item 项目		Symbol	Min.最小	Max.最大	Unit 单位
Supply Voltage 电源电压	Power supply 电力供应	VDD	-0.3	+4.6	V
	Analog 模拟	-	-	-	V
	IO	IOVDD	-0.3	+4.6	V
Input Voltage 输入电压		Vi	-0.3	IOVDD+0.3	V
Storage temperature 储存温度		T_{stg}	-30	+70	ºC
Operating temperature 工作温度		T_{op}	-20	+60	ºC
Storage humidity 存储湿度		H_{stg}	10	Note 1	%RH
Operating humidity 操作湿度		H_{op}	10	Note 1	%RH

Note 1: 90%RH max, If Ta is below 50ºC; 60%RH max, If Ta is over 60ºC.

7 Electrical Specification 电性规格

DC Characteristics 直流特性

Item 项目		Symbol	Min.最小	Typ.中间	Max.最大	Unit 单位
Supply Voltage 电源电压	Powersupply 电力供应	VDD	2.4	2.8	3.3	V
	Analog	VCI	2.4	2.8	3.3	V
	IO	IOVDD	1.65	1.8/2.8	3.3	V
Logic Low input voltage 输入电压低		V_{IL}	-0.3IOVDD	-	0.3IOVDD	V
Logic High input voltage 输入电压高		V_{IH}	0.7IOVDD	-	IOVDD	V
Logic Low output voltage 输出电压低		V_{OL}	-	-	0.2IOVDD	V
Logic High output voltage 输出电压高		V_{OH}	0.8IOVDD	-	-	V
Current Consumption 电流消耗	Normal display 正常的显示	Ivdd	-	30	-	mA
	Standby mode 待机模式	Ivdd	-	60	-	uA
Frame Frequency 帧频		f_{FR}	-	60	-	Hz

8 Initialization Code 初始化代码

send 0xF0

set 0x08

send 0xF2
set 0x08
send 0x9B
set 0x51
send 0x86
set 0x53
send 0xF2
set 0x80
send 0xF0
set 0x00
send 0xF0
set 0x01
send 0xF1
set 0x01
send 0xB0
set 0x54
send 0xB1
set 0x3F
send 0xB2
set 0x2A
send 0xB4
set 0x46
send 0xB5
set 0x34
send 0xB6
set 0xD5
send 0xB7
set 0x30
send 0xBA
set 0x00
send 0xBB
set 0x08
send 0xBC
set 0x08
send 0xBD
set 0x00
send 0xC0
set 0x80
send 0xC1
set 0x10
send 0xC2

set 0x37
send 0xC3
set 0x80
send 0xC4
set 0x10
send 0xC5
set 0x37
send 0xC6
set 0xA9
send 0xC7
set 0x41
send 0xC8
set 0x51
send 0xC9
set 0xA9
send 0xCA
set 0x41
send 0xCB
set 0x51
send 0xD0
set 0x91
send 0xD1
set 0x68
send 0xD2
set 0x69
send 0xF5
set 0x00
set 0xA5
send 0xDD
set 0x3F
send 0xDE
set 0x3F
send 0xF1
set 0x10
send 0xF0
set 0x00
send 0xF0
set 0x02
send 0xE0
set 0xF0
set 0x06

set 0x0B
set 0x09
set 0x09
set 0x16
set 0x32
set 0x44
set 0x4A
set 0x37
set 0x13
set 0x13
set 0x2E
set 0x34
send 0xE1
set 0xF0
set 0x06
set 0x0B
set 0x09
set 0x08
set 0x05
set 0x32
set 0x33
set 0x49
set 0x17
set 0x13
set 0x13
set 0x2E
set 0x34
send 0xF0
set 0x10
send 0xF3
set 0x10
send 0xE0
set 0x0A
send 0xE1
set 0x00
send 0xE2
set 0x00
send 0xE3
set 0x00
send 0xE4
set 0xE0

send 0xE5
set 0x06
send 0xE6
set 0x21
send 0xE7
set 0x00
send 0xE8
set 0x05
send 0xE9
set 0x82
send 0xEA
set 0xDF
send 0xEB
set 0x89
send 0xEC
set 0x20
send 0xED
set 0x14
send 0xEE
set 0xFF
send 0xEF
set 0x00
send 0xF8
set 0xFF
send 0xF9
set 0x00
send 0xFA
set 0x00
send 0xFB
set 0x30
send 0xFC
set 0x00
send 0xFD
set 0x00
send 0xFE
set 0x00
send 0xFF
set 0x00
send 0x60
set 0x42
send 0x61

set 0xE0
send 0x62
set 0x40
send 0x63
set 0x40
send 0x64
set 0x02
send 0x65
set 0x00
send 0x66
set 0x40
send 0x67
set 0x03
send 0x68
set 0x00
send 0x69
set 0x00
send 0x6A
set 0x00
send 0x6B
set 0x00
send 0x70
set 0x42
send 0x71
set 0xE0
send 0x72
set 0x40
send 0x73
set 0x40
send 0x74
set 0x02
send 0x75
set 0x00
send 0x76
set 0x40
send 0x77
set 0x03
send 0x78
set 0x00
send 0x79
set 0x00

send 0x7A
set 0x00
send 0x7B
set 0x00
send 0x80
set 0x48
send 0x81
set 0x00
send 0x82
set 0x05
send 0x83
set 0x02
send 0x84
set 0xDD
send 0x85
set 0x00
send 0x86
set 0x00
send 0x87
set 0x00
send 0x88
set 0x48
send 0x89
set 0x00
send 0x8A
set 0x07
send 0x8B
set 0x02
send 0x8C
set 0xDF
send 0x8D
set 0x00
send 0x8E
set 0x00
send 0x8F
set 0x00
send 0x90
set 0x48
send 0x91
set 0x00
send 0x92

set 0x09
send 0x93
set 0x02
send 0x94
set 0xE1
send 0x95
set 0x00
send 0x96
set 0x00
send 0x97
set 0x00
send 0x98
set 0x48
send 0x99
set 0x00
send 0x9A
set 0x0B
send 0x9B
set 0x02
send 0x9C
set 0xE3
send 0x9D
set 0x00
send 0x9E
set 0x00
send 0x9F
set 0x00
send 0xA0
set 0x48
send 0xA1
set 0x00
send 0xA2
set 0x04
send 0xA3
set 0x02
send 0xA4
set 0xDC
send 0xA5
set 0x00
send 0xA6
set 0x00

send 0xA7
set 0x00
send 0xA8
set 0x48
send 0xA9
set 0x00
send 0xAA
set 0x06
send 0xAB
set 0x02
send 0xAC
set 0xDE
send 0xAD
set 0x00
send 0xAE
set 0x00
send 0xAF
set 0x00
send 0xB0
set 0x48
send 0xB1
set 0x00
send 0xB2
set 0x08
send 0xB3
set 0x02
send 0xB4
set 0xE0
send 0xB5
set 0x00
send 0xB6
set 0x00
send 0xB7
set 0x00
send 0xB8
set 0x48
send 0xB9
set 0x00
send 0xBA
set 0x0A
send 0xBB

set 0x02
send 0xBC
set 0xE2
send 0xBD
set 0x00
send 0xBE
set 0x00
send 0xBF
set 0x00
send 0xC0
set 0x12
send 0xC1
set 0xAA
send 0xC2
set 0x65
send 0xC3
set 0x74
send 0xC4
set 0x47
send 0xC5
set 0x56
send 0xC6
set 0x00
send 0xC7
set 0x88
send 0xC8
set 0x99
send 0xC9
set 0x33
send 0xD0
set 0x21
send 0xD1
set 0xAA
send 0xD2
set 0x65
send 0xD3
set 0x74
send 0xD4
set 0x47
send 0xD5
set 0x56

send 0xD6
set 0x00
send 0xD7
set 0x88
send 0xD8
set 0x99
send 0xD9
set 0x33
send 0xF3
set 0x01
send 0xF0
set 0x00
send 0xF0
set 0x01
send 0xF1
set 0x01
send 0xA0
set 0x0B
send 0xA3
set 0x2A
send 0xA5
set 0xC3
delay_ms 1
send 0xA3
set 0x2B
send 0xA5
set 0xC3
delay_ms 1
send 0xA3
set 0x2C
send 0xA5
set 0xC3
delay_ms 1
send 0xA3
set 0x2D
send 0xA5
set 0xC3
delay_ms 1
send 0xA3
set 0x2E
send 0xA5

set 0xC3
delay_ms 1
send 0xA3
set 0x2F
send 0xA5
set 0xC3
delay_ms 1
send 0xA3
set 0x30
send 0xA5
set 0xC3
delay_ms 1
send 0xA3
set 0x31
send 0xA5
set 0xC3
delay_ms 1
send 0xA3
set 0x32
send 0xA5
set 0xC3
delay_ms 1
send 0xA3
set 0x33
send 0xA5
set 0xC3
delay_ms 1
send 0xA0
set 0x09
send 0xF1
set 0x10
send 0xF0
set 0x00
send 0x2A
set 0x00
set 0x00
set 0x01
set 0x67
send 0x2B
set 0x01
set 0x68

set 0x01
set 0x68
send 0x4D
set 0x00
send 0x4E
set 0x00
send 0x4F
set 0x00
send 0x4C
set 0x01
delay_ms 10
send 0x4C
set 0x00
send 0x2A
set 0x00
set 0x00
set 0x01
set 0x67
send 0x2B
set 0x00
set 0x00
set 0x01
set 0x67
send 0x21
send 0x11
delay_ms 120
send 0x29

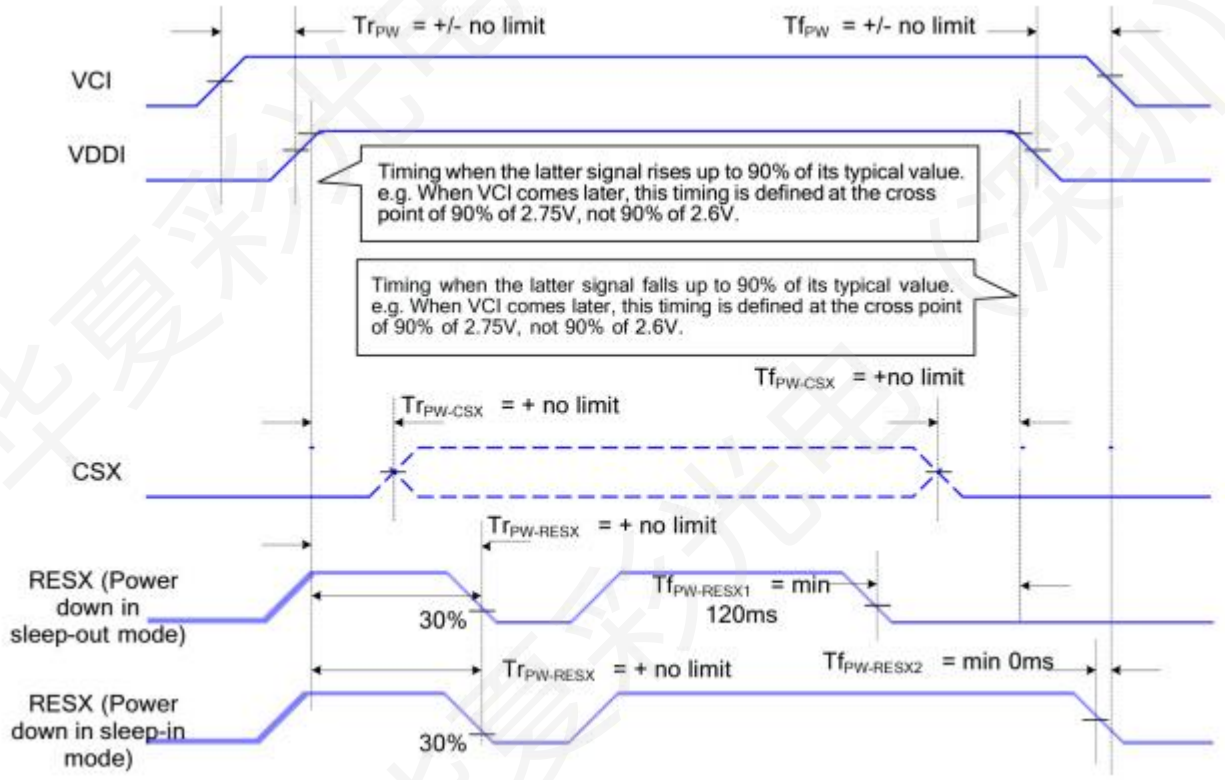
9 Optical Specifications 光学规格

9.1 Optical Specifications 光学规格

Ta=25ºC, VDD=2.8V, TN LC+ Polarizer

	Item 项目		Symbol 标志	Condition 条件	Specification 规范 Min. 最小	Typ. 中间	Max. 最大	Unit 单位
Backlight On (Transmissive Mode)	Luminance on surface(I_f =20mA) 表面亮度		*Lv*	Normally viewing angle $\theta_X=\theta_Y$ =0°		450	-	cd/m²
	Contrast ratio 对比度		*CR*		800	1200	-	-
	Response time 响应时间		*TR*		-	10	15	ms
			TF	-	-	20	20	
	Chromaticity Transmissive 色度	Red 红	*XR*	-	-	0.665	-	-
			YR		-	0.324	-	-
		Green 绿	*XG*		-	0.273	-	-
			YG		-	0.594	-	-
		Blue 蓝	*XB*		-	0.133	-	-
			YB		-	0.122	-	-
		White 白	*XW*		-	0.297	-	-
			YW		-	0.337	-	-
	Viewing Angle 视角	Horizontal	θX+	Center CR≥10	80	85	-	Deg.
			θX-		80	85	-	
		Vertical	θY+		80	85	-	
			θY-		80	85	-	
	NTSC Ratio(Gamut)		-	-	65	70	-	%

9.2 The power on/off sequence is illustrated below 电源启动/关闭顺序



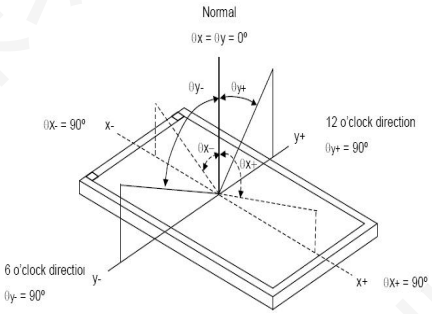
9.3 Definition of Contrast Ratio 对比度的定义

Contrast is measured perpendicular to display surface in reflective and transmissive mode. The measurement condition is:

Measuring Equipment 测量设备	**BM-7 or EQUI**
Measuring Point Diameter 测点直径	3mm//1mm
Measuring Point Location 测点位置	Active Area centre point
Test pattern 测试模式	A: All Pixels white
	B: All Pixel black
Contrast setting	Maximum

Definitions: CR (Contrast) = Luminance of White Pixel / Luminance of Black Pixel

9.4 Definition of Viewing Angles 视角的定义



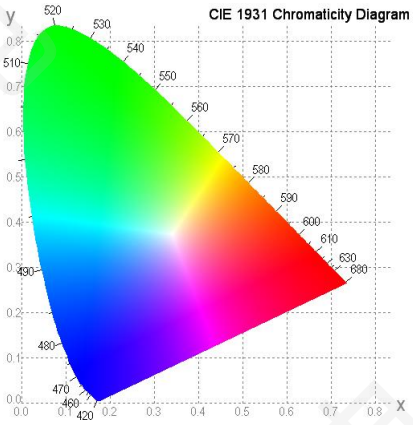
Measuring machine: LCD-5100 or EQUI

9.5 Definition of Color Appearance 色域的定义

R,G,B and W are defined by (x, y) on the IE chromaticity diagram

NTSC=area of RGB triangle/area of NTSC triangleX100%

Measuring picture: Red, Green, Blue and White (Measuring machine: BM-7)



9.6 Definition of Surface Luminance, Uniformity and Transmittance 表面亮度、均匀性和透光率的定义

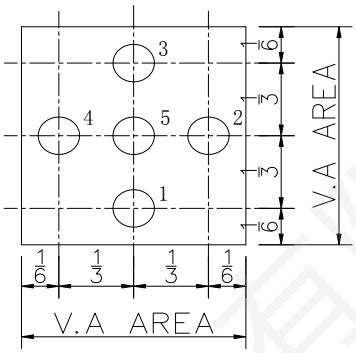
Using the transmissive mode measurement approach, measure the white screen luminance of the display panel and backlight.

9.6.1 Surface Luminance: LV = average (LP1:LP5)

9.6.2 Uniformity = Minimal (LP1:LP5) / Maximal (LP1:LP5) * 100%

9.6.3 Transmittance = LV on LCD / LV on Backlight * 100%

Note :Measuring machine:BM-7



10 Quality Assurance 质量标准

10.1 Purpose 目的

This standard for Quality Assurance assures the quality of LCD module products supplied to customer by HuaXia RGB Display.

10.2 Agreement Items 协议项目

HuaXia RGB Display and customer shall negotiate if the following situation occurs:

10.2.1 Discrepancies between HuaXia RGB Display's QA standards and customer's QA standards.

10.2.2 Additional requirement to be added in product specification.

10.2.3 Any other special problem.

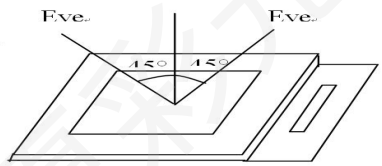
10.3 Standard of the Product Visual Inspection 产品外观检验标准

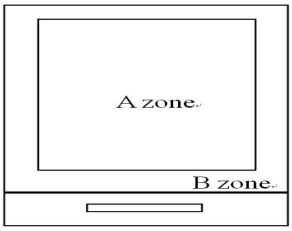
10.3.1 Appearance inspection:

10.3.1.1 The inspection must be under illumination about 1000 – 1500 lx, and the distance of view must be at 30cm ± 2cm.

10.3.1.2 The viewing angle should be 45° from the vertical line without reflection light or follows customer's viewing angle specifications.

10.3.1.3 Definition of area: A Zone: Active Area, B Zone: Viewing Area.





10.3.2 Basic principle:A set of sample to indicate the limit of acceptable quality level must be discussed by both HuaXia RGB Display and customer when there is any dispute happened.

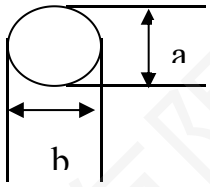
10.4 Inspection Specification 检验标准

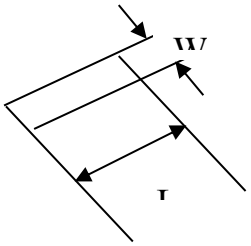
Sampling plan according to GB/T2828.1-2012/ISO 2859-1：1999 and ANSI/ASQC Z1.4-1993,normal level 2 and based on:

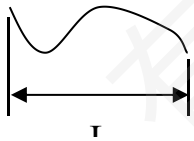
Major defect: AQL 0.4

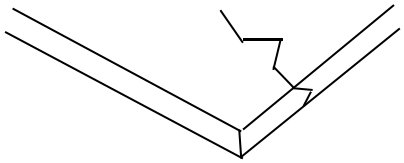
Minor defect: AQL 1.0

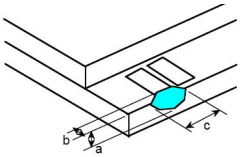
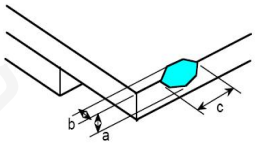
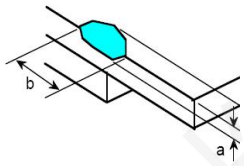
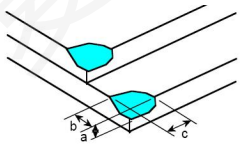
No.	Item 项目	Criteria (Unit: mm) 标准

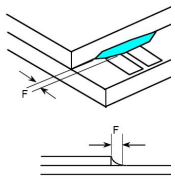
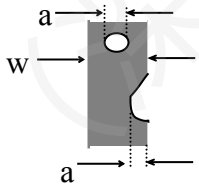
<table>
<tr><th>No.</th><th>Item 项目</th><th>Criteria (Unit: mm) 标准</th></tr>
<tr><td>01</td><td>Black / White spot
Foreign material
(Round type)
Pinholes Stain
Particles inside cell.
(Minor defect) 黑/白斑/异物
(圆类型)细胞内的针孔染色颗粒。(小瑕疵)</td><td>


<table>
<tr><th>Area
Size</th><th>Acc. Qty</th></tr>
<tr><td>φ≤0.10</td><td>Ignore</td></tr>
<tr><td>0.10<φ≤0.2</td><td>2</td></tr>
<tr><td>0.2<φ</td><td>0</td></tr>
<tr><td>Total</td><td>N≦3
NO include
φ≤ 0.10</td></tr>
</table>
φ= (a + b) /2
Distance between 2 defects should more than10mm apart.
</td></tr>
<tr><td>02</td><td>Black and White line Scratch
Foreign material
(Line type)
(Minor defect) 黑白线刮伤异物(类型)行(小瑕疵)</td><td>




<table>
<tr><th>Length</th><th>Width</th><th>Acc. Qty</th></tr>
<tr><td>/</td><td>W ≦ 0.03</td><td>Ignore</td></tr>
<tr><td>L ≦ 3</td><td>0.05 ＜ W ≦ 0.08</td><td>2</td></tr>
<tr><td>/</td><td>0.08 ＜ W</td><td>0</td></tr>
<tr><td colspan="2">Total</td><td>N≦2</td></tr>
</table>
Distance between 2 defects should more than 10mm apart.
Scratches not viewable through the back of the display are acceptable.
</td></tr>
<tr><td>03</td><td>Glass Crack
(Minor defect) 玻璃裂纹(小瑕疵)</td><td>

LCD with extensible crack line is unacceptable(When press the cracked LCD area, the line will expand, we define it is extensible crack line)
</td></tr>
<tr><td>04</td><td>Glass Chipping Pad Area: (Minor defect)
玻璃碎片面积:(轻微缺陷)</td><td>
<table>
<tr><th>Length and Width</th><th>Acc. Qty</th></tr>
<tr><td>c ＜ 5.0, b< 0.4</td><td>Ignore</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>No.</th><th>Item 项目</th><th>Criteria (Unit: mm) 标准</th></tr>
<tr><td></td><td>  </td><td></td></tr>
<tr><td>05</td><td>Glass Chipping Rear of PadArea:(Minordefect) 玻璃切屑垫区后方:(小瑕疵)
  </td><td>
<table>
<tr><td>Length and Width</td><td>Acc. Qty</td></tr>
<tr><td>c > 3.0, b< 1.0</td><td>1</td></tr>
<tr><td>c< 3.0, b< 1.0</td><td>2</td></tr>
<tr><td>c< 3.0, b< 0.5</td><td>4</td></tr>
<tr><td colspan="2">a<Glass Thickness</td></tr>
</table>
</td></tr>
<tr><td>06</td><td>Glass Chipping Except Pad Area: (Minor defect) 除垫区外的玻璃切屑:(小瑕疵)
  </td><td>
<table>
<tr><td>Length and Width</td><td>Acc. Qty</td></tr>
<tr><td>c ≤0.6, b< 5.0</td><td>Ignore</td></tr>
<tr><td colspan="2">aGlass Thickness</td></tr>
</table>
</td></tr>
<tr><td>07</td><td>Glass Corner Chipping: (Minor defect) 玻璃切角:(小瑕疵)
  </td><td>
<table>
<tr><td>Length and Width</td><td>Acc. Qty</td></tr>
<tr><td>c < 2.0, b< 1.5</td><td>Ignore</td></tr>
<tr><td>c < 1.5, b< 2</td><td>Ignore</td></tr>
<tr><td colspan="2">a<Glass Thickness</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><th>No.</th><th>Item 项目</th><th>Criteria (Unit: mm) 标准</th></tr>
<tr><td>08</td><td>Glass Burr:
(Minor defect) 玻璃磨:(小瑕疵)
  </td><td>Glass burr don’t affect assemble and module dimension.
<table><tr><td>Length</td><td>Acc. Qty</td></tr><tr><td>F < 0.5</td><td>Ignore</td></tr></table></td></tr>
<tr><td>09</td><td>FPC Defect:
(Minor defect) FPC 缺陷:(小瑕疵)
  </td><td>9.1 Dent, pinhole width a<w/3.
(w: circuitry width.)
9.2 Open circuit is unacceptable.
9.3 No oxidation, contamination and distortion.</td></tr>
<tr><td>10</td><td>Screen deformation 屏幕上的变形
  </td><td>Test for insertion of plug gauge at highest warping point：
(3.1-6.0inches)
H≦0.3MM
The client has special requirements,according to drawing</td></tr>
<tr><td>11</td><td>Bubble on Polarizer
(Minor defect) 偏光片上的气泡(小瑕疵)</td><td><table><tr><td>Diameter</td><td>Acc. Qty</td></tr><tr><td>φ≤0.15</td><td>Ignore</td></tr><tr><td>0.15 <φ≤0.25</td><td>2</td></tr><tr><td>0.25 <φ≤0.3</td><td>1</td></tr><tr><td>0.3 < φ</td><td>0</td></tr></table></td></tr>
<tr><td>12</td><td>Dent on Polarizer
(Minor defect) 偏光片上的凹痕(小瑕疵)</td><td><table><tr><td>Diameter</td><td>Acc. Qty</td></tr><tr><td>φ≤0.15</td><td>Ignore</td></tr><tr><td>0.15 <φ≤0.25</td><td>2</td></tr><tr><td>0.2 5<φ≤0.30</td><td>1</td></tr><tr><td>0.3< φ</td><td>0</td></tr></table></td></tr>
<tr><td>13</td><td>Bezel 边框</td><td>13.1 No rust, distortion on the Bezel.</td></tr>
</table>

No.	Item 项目	Criteria (Unit: mm) 标准
14	Touch Panel 触控面板	D: Diameter W: width L: length 14.1 Spot: D≤0.20 is acceptable 0.20<D≤0.3, acceptable QTY, 3 D>0.3 is unacceptable 14.2 Dent（dot): D≤0.20 is acceptable 0.20<D≤0.3, acceptable QTY, 3 D>0.30 is unacceptable 2dots are acceptable and the distance between defects should more than 10 mm. Dent（line） According to the limit sample 14.3 Scratch: W≤0.03, L≤10 is acceptable, 0.03<W≤0.10, L≤10 ,acceptable QTY, 3 W>0.10 is unacceptable. Distance between 2 defects should more than 10 mm.
15	PCB	15.1 No distortion or contamination on PCB terminals. 15.2 All components on PCB must same as documented on the BOM/component layout. 15.3 Follow IPC-A-600F.
16	Soldering 焊接	Follow IPC-A-610C standard
17	Electrical Defect (Major defect) 电气缺陷(主要缺陷)	The below defects must be rejected. 17.1 Missing vertical / horizontal segment, 17.2 Abnormal Display. 17.3 No function or no display. 17.4 Current exceeds product specifications. 17.5 LCD viewing angle defect. 17.6 No Backlight. 17.7 Dark Backlight. 17.8 Touch Panel no function. 17.9 Dark Dot –one Allowed. 17.10 Bright Dot – one Allowed. Remark: 1. A pixel defect is acceptable if one color is none functional and causes a bright dot. The display may have one case where one color is out and cause a dark dot. 2. Bright dot caused by scratch and foreign object accords to item1.
18	Light leak 漏光	Yellow light OK; White light,According to the limit sample

Remark: Visual and cosmetic defects are rejectable only if these fall within the LCD viewing area.

10.5 Classification of Defects 缺陷的分类

Visual defects (Except no / wrong label) are treated as minor defect and electrical defect is major.

10.6 Identification/marking criteria 识别/评分标准

Any unit with illegible / wrong /double or no marking/ label shall be rejected.

10.7 Packing 包装

10.7.1 There should be no damage of the outside carton box, each packaging box should has label in the correct location per packing drawing requirement.

10.7.2 All direct package materials shall offer ESD protection.

11 Reliability Specification 可靠性规范

Item 项目	Condition 条件	Cycle Time 周期时间	Quantity 数量	Remark 备注
Constant Temp. and Constant Humidity Operation Test 恒温恒湿运行试验	+40 ± 3ºC,90 ± 3%RH	96hrs	--	*1
High Temp. Operation Test 高温操作试验	+70 ± 3ºC	96hrs	--	
Low Temp. Operation Test 低温操作试验	-20 ± 3ºC	96hrs	--	
Thermal Shock Test 热冲击试验	-20 ± 3ºC (30min) +70 ± 3ºC (30min)	10cycles	--	
ESD Test(end product) ESD 测试(最终产品)	150pF, 330Ω, ±2KV,Contact 150pF, 330Ω, ±6KV, Air	10times	--	*2, *3
Vibration Test(for packaging) 振动测试(包装)	Frequency: 10Hz to 55Hz to10Hz,Swing:1.5mm,time：X,Y,Z each 2H.	6hrs	One inner carton	*4

Note 1. For humidity test, DI water should be used.

Inspection Standard: Inspect after 1-2hrs storage at room temperature, the sample shall be free from the following defects:

- Air bubble in the LCD
- Seal Leakage
- Non-display
- Missing Segment
- Glass Crack
- IDD is greater than twice initial value.
- Others as per QA Inspection Criteria

Note 2. No defect is allowed after testing

The End Product ESD value is only indicative and depends on customer ESD protection design for the whole system.

Note 3. ESD should be applied to LCD glass panel, not other areas (such as on IC and so on)

IDD should be within twice initial value.

In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.

Note 4. Only upon request.

12 Precautions and Warranty 注意事项和保证

12.1 Safety 安全

12.1.1 The liquid crystal in the LCD is poisonous. Do not put it in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water.

12.1.2 Since the liquid crystal cells are made of glass, do not apply strong impact on them. Handle with care.

12.2 Handling 处理

12.2.1 Reverse and use within ratings in order to keep performance and prevent damage.

12.2.2 Do not wipe the polarizer with dry cloth, as it might cause scratch. If the surface of the LCD needs to be cleaned, wipe it swiftly with cotton or other soft cloth soaked with petroleum IPA, do not use other chemicals.

12.3 Operation 操作

12.3.1 Do not drive LCD with DC voltage

12.3.2 Response time will increase below lower temperature

12.3.3 Display may change color with different temperature

12.3.4 Mechanical disturbance during operation, such as pressing on the display area, may cause the segments to appear “fractured”.

12.4 Static Electricity 静电

12.4.1 CMOS LSIs are equipped in this unit, so care must be taken to avoid the electro-static charge, by ground human body, etc.

12.4.2 The normal static prevention measures should be observed for work clothes and benches.

12.4.3 The module should be kept into anti-static bags or other containers resistant to static for storage.

12.5 Limited Warranty 有限质量保证

12.5.1 Unless otherwise agreed between HuaXia RGB Display and customer, HuaXia RGB Display will replace or repair any of its LCD and LCM which HuaXia RGB Display found to be defective electrically and visually when inspected in accordance with HuaXia RGB Display Quality Standards, for a period of one year from date of shipment.

12.5.2 The warranty liability of HuaXia RGB Display is limited to repair and/or replacement. HuaXia RGB Display will not be responsible for any consequential loss.

12.5.3 If possible, we suggest you use up all modules in six months. If the module storage time over twelve months, we suggest that recheck it before the module be used.

13 Packaging 包装

TBD

14 Prior Consult Matter 免责声明

1. For HuaXia RGB Display standard products, we keep the right to change material, process for improving the product property without prior notice to our customer.

2. For OEM products, if any changes are needed which may affect the product property, we will consult with our customer in advance.

3. If you have special requirement about reliability condition, please let us know before you start the test on our samples.

Reference 参考

Item 项目	Description 描述	Revision 修订
ST77916	IC Data sheet	V1.0
Panel 1.8 寸 360X360	LCM assembly drawing	V0