Product Specification

SPECIFICATION

FOR

APPROVAL

(   ) Preliminary Specification

(●) Final Specification

Title	FS-8883E35012 REV.B

BUYER	
MODEL	TME68407

SUPPLIER	Shenzhen Jinghua Displays Electronics Co., Ltd.
MODEL	8883E35012
SUFFIX	Y2

SIGNATURE	DATE
_____ /	
_____ /	
_____ /	

Please return 1 copy for your confirmation with your signature and comments.

APPROVED BY	DATE
陈怀君 Chen Huaijun	2025.11.28
REVIEWED BY 郭建 Guo Jian	2025.11.28
REVIEWED BY 蓝丽娟 Lan Lijuan	2025.11.28
PREPARED BY 蔡卓成 Cai Zhuocheng	2025.11.28

Products Engineering Dept. Shenzhen Jinghua Displays Electronics Co., Ltd.

DOCUMENT REVISION HISTORY 1:

DOCUMENT REVISION FROM TO	DATE	DESCRIPTION	CHANGED BY	CHECKED BY
A	2025.11.7	First Release.	Cai Zhuocheng	Chen Huaijun
B	2025.11.27	1. Modify the LCD contrast ratio; 2. Delete the Quality Units that are irrelevant to this LCD; 3. Increase backlight characteristics.		

CONTENTS

深圳晶华显示电子股份有限公司
Shenzhen Jinghua Displays Electronics Co., Ltd.

Specification of LCD Module Type

Item No.: 8883E35012

1. General Description

- FSTN/Positive/Transflective LCD Module.
- Viewing Angle: 9 O'clock direction.
- Driving duty: 1/128 Duty, 1/11 bias.
- UC1638(COG)LCD Controller & Driver or equivalent.
- Power Supply: +3.3V.
- Interface type: FPC.
- White LED Backlight. (Side LED)
- Compliance ROHS.

2. Mechanical Specifications

The mechanical detail is shown in Fig. 1 and summarized in Table 1 below.

Table 1

Parameter	Specifications	Unit
Outline dimensions	77.55(L) × 67.9(W) × 13.9(H)　　(Exclude FPC)	mm
Viewing area	67.0(L) × 62.5(W)	mm
Display format	128*128	dots
Dot size	0.422 (L) × 0.40(W)	mm
Dot spacing	0.025(L) × 0.025(W)	mm
Dot pitch	0.442 (L) × 0.42(W)	mm
Panel size	☐LARGE　　■MIDDLE　　☐SMALL	

RoHS

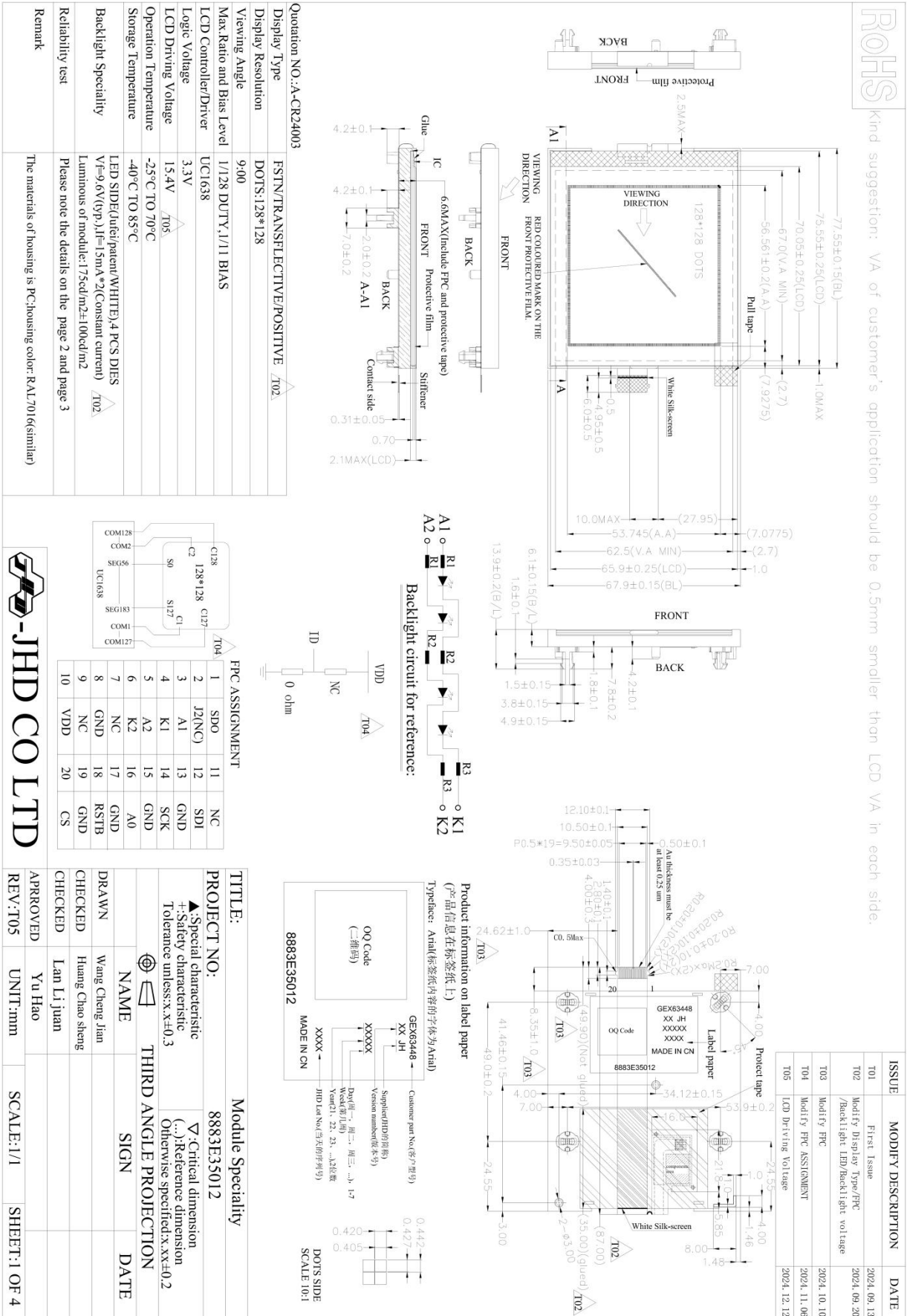kind suggestion: VA of customer's application should be 0.5mm smaller than LCD VA in each side.

Quotation NO.:A-CR24003	
Display Type	FSTN/TRANSFLECTIVE/POSITIVE
Display Resolution	DOTS:128*128
Viewing Angle	9:00
Max.Ratio and Bias Level	1/128 DUTY,1/11 BIAS
LCD Controller/Driver	UC1638
Logic Voltage	3.3V
LCD Driving Voltage	15.4V
Operation Temperature	-25°C TO 70°C
Storage Temperature	-40°C TO 85°C
Backlight Speciality	LED SIDE(3ufei/patent/WHITE),4 PCS DIES VF=9.6V(typ.),IF=15mA*2(Constant current) Luminous of module:175cd/m2±100cd/m2
Reliability test	Please note the details on the page 2 and page 3
Remark	The materials of housing is PC;housing color:RAL7016(similar)

FPC ASSIGNMENT

1	SDO	11	NC
2	J2(NC)	12	SDI
3	A1	13	GND
4	K1	14	SCK
5	A2	15	GND
6	K2	16	A0
7	NC	17	GND
8	GND	18	RSTB
9	NC	19	GND
10	VDD	20	CS

Backlight circuit for reference:

Product information on label paper
(产品信息在标签纸上)
Typeface: Arial(标签纸内容字体为Arial)

▲:Special characteristic
+:Safety characteristic
Tolerance unless:x.x±0.3
▽:Critical dimension
(...):Reference dimension
Otherwise specified:x.xx±0.2

JHD CO LTD

PROJECT NO:		8883E35012			
TITLE:		Module Speciality			THIRD ANGLE PROJECTION
	NAME		SIGN		DATE
DRAWN	Wang Cheng Jian				
CHECKED	Huang Chao sheng				
CHECKED	Lan Li juan				
APRROVED	Yu Hao				
REV:T05	UNIT:mm		SCALE:1/1		SHEET:1 OF 4

ISSUE	MODIFY DESCRIPTION	DATE
T01	First Issue	2024.09.13
T02	Modify Display Type/FPC /Backlight LED/Backlight voltage	2024.09.20
T03	Modify FPC	2024.10.10
T04	Modify FPC ASSIGNMENT	2024.11.06
T05	LCD Driving Voltage	2024.12.12

Figure 1a: Module Specification

1. 晶华公司的环保标志：
JHD Environment Sign(green shading)：

RoHS

ISSUE	MODIFY DESCRIPTION	DATE
T01	First Issue	2024.09.13
T02	Modify Display Type/FPC /Backlight LED/Backlight voltage	2024.09.20
T03	Modify FPC	2024.10.10
T04	Modify FPC ASSIGNMENT	2024.11.06
T05	LCD Driving Voltage	2024.12.12

Reliability test

Item	Condition	Quantity
High temperature operation	Temp:+70℃;Time:240H	
Low temperature operation	Temp:-25℃;Time:240H	
Humidity Operation	Temp: 60℃;93%RH; Time: 240H	
High temperature storage	Temp: +85℃ 24H	
Low temperature storage	Temp: -40℃ 24H	
Thermal shock operation	Temp:-40℃<-->+85℃ 30min<-->30min,LCD power off, 1000cycles	
Vibration	Frequency: 10-55 Hz, Amplitude: 0.75mm, Duration: 20 cycles in each direction, 3 directions	
Falling test (Packaged state)	Weight:5kg; Falling height: 80cm. Weight <15kg; Falling height: 100cm.	
ESD test	1.Test frequence:5points/panel,5times/point, LCD around and middle a total of 5 points. 2.Test apparatus parameter: C=150pF,R=330Ω 3.Environment:15~35℃ ,30%~60%RH,86Kpa~106Kpa 4.Test item: A. Contact:±8Kv;B. Air:±15KV , Arcing distance≤1cm 5.Test method:According to the above voltage level at each test point in order to test 5 times discharge under each voltage level.	

Item	Standard	Description
Seismic	IEC 60255-21-3	Flush mounted case Class 2
Shock and bump	IEC 60255-21-2 GB/T14537	Shock response Class 2 Shock withstand Class 2 Bump Class 2
Vibration	IEC 60255-21-1 GB/T11287	Flush mounted case Response Class 2 Endurance Class 2

注：这3种试验待产品做壳后验证。

-JHD CO LTD

Module Speciality

PROJECT NO: 8883E35012

TITLE:

▲:Special characteristic
+:Safety characteristic
Tolerance unless:x.x±0.3

▽:Critical dimension
(...):Reference dimension
Otherwise specified:x.x±0.2

THIRD ANGLE PROJECTION

	NAME	SIGN	DATE
DRAWN	Wang Cheng Jian		
CHECKED	Huang Chao sheng		
CHECKED	Lan Li juan		
APPROVED	Yu Hao		
REV:T05	UNIT:mm	SCALE:1/1	SHEET:2 OF 4

Figure 1b: Module Specification

1. 晶华公司的环保标志: JHD Environment Sign(green shading):

RoHS

ISSUE	MODIFY DESCRIPTION	DATE
T01	First Issue	2024.09.13
T02	Modify Display Type/FPC /Backlight LED/Backlight voltage	2024.09.20
T03	Modify FPC	2024.10.10
T04	Modify FPC ASSIGNMENT	2024.11.06
T05	LCD Driving Voltage	2024.12.12

Item	Description	Condition
Lifetime test	PSDB is power on during the test.The backlight current is in standard working condition	70 +/- 2 °C, 4000h, measure the backlight luminance at 0h, 2000h and 4000h

Item	Description	Condition	Judgement
Climatic Tests	Display is powered on, check all functions of Display during & after the test.	Temperature : $(-30 +/- 3)$ °C, $(-20 +/- 3)$ °C, $(-10 +/- 3)$ °C, $(20 +/- 3)$ °C, $(70 +/- 3)$ °C, $(85 +/- 3)$ °C, $(60 +/- 3)$ °C, Duration : 2 hours for each step	Function well
	Display is power off during the test. Check all functions of Display after finishing test & performing a 1 hour recovery under room temperature & humidity.	$(40 +/- 2)$ °C, $(95 +/- 2)\%$ RH;duration: 15days	visual inspecting & function testing well
	Display is power off during the test. Check all functions of Display after finishing test & performing a 1 hour recovery under room temperature & humidity	TA: $(25 +/- 3)$ °C TB: $(40 +/- 3)$ °C Humidity: 95% duration of each cycle: 24hours number of cycle: 15	visual inspecting & function testing well

JHD CO LTD

TITLE: Module Speciality
PROJECT NO: 8883E35012

THIRD ANGLE PROJECTION

▲:Special characteristic
+:Safety characteristic
Tolerance unless:x.xx±0.3
▽:Critical dimension
(...):Reference dimension
Otherwise specified:x.xx±0.2

	NAME	SIGN	DATE
DRAWN	Wang Cheng Jian		
CHECKED	Huang Chao sheng		
CHECKED	Lan Li juan		
APPROVED	Yu Hao		
REV:T05	UNIT:mm	SCALE:1/1	SHEET:3 OF 4

Figure 1c: Module Specification

1. 晶华公司的环保标志:
JHD Environment Sign(green shading):

RoHS

2. 晶华所执行的标准如下:
JHD perform Environment Standard as follows:

有害物质十种含量(ppm)——ICP 测试方式
Ten Injurant Contents (ppm)——ICP Test Style

镉及镉化合物 Cadmium and Cadmium ncompounds	铅及铅化合物 Lead and lead compounds	汞及汞化合物 Mercury and mercury compounds	6价铬化合物 Hexavalent chromium compounds	多溴联苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenylethers (PBDE)	邻苯二甲酸丁基苯酯 Butyl benzyl phthalate (BBP)	邻苯二甲酸二正丁酯 Dibutyl phthalate (DBP)	邻苯二甲酸二异丁酯 Diisobutyl phthalates (DIBP)	邻苯二甲酸二(2-乙基己基)酯 Bis (2-ethylhexyl) phthalate (DEBP)
<100	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000

3. 如有客户环保协议,按客户环保协议执行.
We Could Execute According To Customer's Environment Standard
If Customer Requires.

ISSUE	MODIFY DESCRIPTION	DATE
T01	First Issue	2024.09.13
T02	Modify Display Type/FPC /Backlight LED/Backlight voltage	2024.09.20
T03	Modify FPC	2024.10.10
T04	Modify FPC ASSIGNMENT	2024.11.06
T05	LCD Driving Voltage	2024.12.12

JHD-JHD CO LTD

	NAME	SIGN	DATE
DRAWN	Wang Cheng Jian		
CHECKED	Huang Chao sheng		
CHECKED	Lan Li juan		
APRROVED	Yu Hao		
REV:T05	UNIT:mm	SCALE:1/1	SHEET:4 OF 4

TITLE: Module Speciality
PROJECT NO: 8883E35012

▲.:Special characteristic
+:Safety characteristic
Tolerance unless:x.x±0.3

▽:Critical dimension
(...):Reference dimension
Otherwise specified:x.xx±0.2

⊕ ⊟ THIRD ANGLE PROJECTION

Figure 1d: Module Specification

3. Interface signals and circuit

<div align="center">Table 2</div>

Pin No.	Symbol	Description
1	SDO	Serial output data.
2	J2(NC)	No connection.
3	A1	Anode of the backlight.
4	K1	Cathode of the backlight.
5	A2	Anode of the backlight.
6	K2	Cathode of the backlight.
7	NC	No connection.
8	GND	Ground.
9	NC	No connection.
10	VDD	Power supply for logic.
11	NC	No connection.
12	SDI	Serial input data.
13	GND	Ground.
14	SCK	Serial input clock.
15	GND	Ground.
16	A0	Select control data or display data for read/write operation.
17	GND	Ground.
18	RSTB	Reset pin.
19	GND	Ground.
20	CS	Chip select pin,when CS=L,the chip is selected.

4.　Absolute Maximum Ratings

4.1　Electrical Maximum Ratings (Ta = 25 ºC)

<div align="center">Table 3</div>

Symbol	Parameter	Min.	Max.	Unit
Logic supply voltage.	VDD	-0.3	+4.0	V
LCD generated voltage.	VLCD	-0.3	+19.8	V
Digital input signal.	VIN	-0.4	VDD+0.5	V

Notes

1. Parameters are valid over operating temperature range unless otherwise specified. All voltages are with respect to VSS unless otherwise noted.

2. Stresses exceed the Limiting Values listed above may cause permanent damage to IC. These values are stresses only. IC should be operated under DC/Timing Characteristics condition for normal operation. If this condition is not met, IC operation may be error and the reliability may be deteriorated.

4.2 Environmental Condition

Table 4

Item	Operating Temperature(Topr)		Storage Temperature(Tstg)	
	Min	Max	Min	Max
Ambient Temperature (Ta)	-25°C	+70°C	-40°C	+85°C

5. Electrical Specifications

5.1 Typical Electrical Characteristics

At Ta = 25 °C, VDD = 3.3±0.1V, **GND=0V.**

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (Logic)	VDD-GND	Note 1	1.7	3.3	3.6	V
Supply voltage (LCD)	VLCD	VDD =+3.3V, Note 2	-	15.4	17.49	V
Input signal voltage	V_{IH}	"H" level	0.8VDD	-	-	V
	V_{IL}	"L" level	-	-	0.2VDD	V
Supply Current (Logic)	IDD (Exclude backlight)	Note 1	-	-	1.9	mA
Input supply voltage for single Backlight	VLED	Forward current=15mA*2	-	9.6	-	V

Note 1:　The voltage is IC can support. But the display effect isn't best.

Note 2:　There is tolerance in optimum LCD driving voltage during production and it will be within the specified range. The module will be display best within 3.3±0.03V for VDD.

5.2 Backlight characteristics

Ta=25℃　　　　　　　　　Table 6

Item of backlight characteristics	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward Voltage	Vf	-	9.6	-	V	If=15*2mA(Constant)
Number of LED	-	-	4	-	Piece	-
Luminance uniformity		80	-	-	%	-
Bcaklight Luminance	Lv	750	1200	1500	cd/m2	-
Module Luminance	Lv	75	175	275	cd/m2	-
Chromaticity coordinate	x	0.25	-	0.325		-
	y	0.25	-	0.325		-
Connection mode	-	-	parallel	-	-	-
Backlight lifetime			30000		hour	-
Color	White					

5.3 Optical characteristics

Table 7

No	Items		Min.	Typ.	Max.	Conditions	Unit
1	Operating Temperature			-25 ～ 70			℃
2	Storage Temperature			-40 ～ 85			℃
3	Typical Operating Voltage	25℃	15.25	15.4	15.55	θ=0℃ Φ=0℃	V
4	Response Time (LCD)	Tr 25℃		200	400	θ=0℃ Φ=0℃	Ms Note2
		Tf 25℃		230	460		
5	Viewing Angle (25℃)(Cr≥2) (Module)	θx	-	35	-	9：00(main)	Deg Note 1
		θx	-	25	-	3：00	
		θy	-	30	-	12：00	
		θy	-	30	-	6:00	
6	Contrast Ratio	25℃	-	3.5	-	-	Note 3
7	Operating Frequency Range	25℃	32	64	128	-	Hz
8	Display Mode	Positive	Transmissive (　) Reflective (　) Transflective(√)				
		Negative	Transmissive (　) Reflective (　) Transflective(　)				

Note 1: Definition of viewing angle and direction (θ):
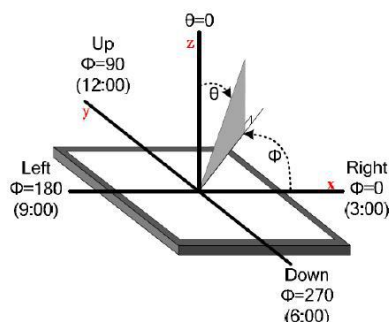
Note 2: Response Time (Ton , Toff) :
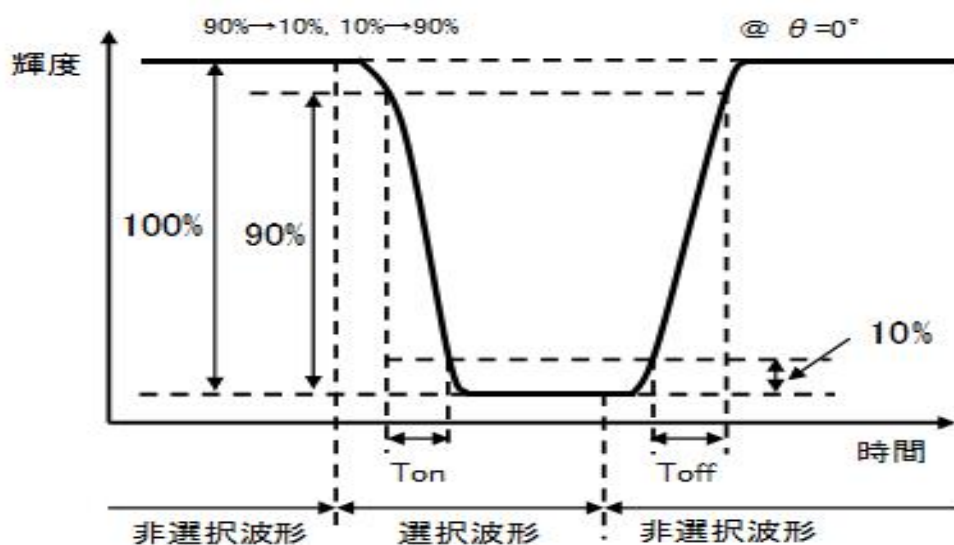
Note 3: Contrast Ratio (C.R):

POSITIVE TYPE:

$$\text{CONTRAST RATIO} = \frac{\text{BRIGHTNESS AT Vop (NON-SELECTED)}}{\text{BRIGHTNESS AT Vop (SELECTED)}}$$

NEGATIVE TYPE:

$$\text{CONTRAST RATIO} = \frac{\text{BRIGHTNESS AT Vop (SELECTED)}}{\text{BRIGHTNESS AT Vop (NON-SELECTED)}}$$

5.4 Timing Specifications

At Ta = -25 °C To +70 °C, VDD = 3.3±0.1V, GND = 0V.

Refer to Fig. 2, the bus-timing diagram for System Buses Read/Write Characteristics

Table 8

Symbol	Signal	Description	Condition	Min.	Max.	Unit
$(2.7V \leqslant V_{DD} \leqslant 3.6V, Ta= -30$ to $+85^{\circ}C)$				(read / write)		
t_{ASS8}	CD	Address setup time		0	–	nS
t_{AHS8}		Address hold time		15		
t_{CSSAS8}	CS1/CS0	Chip select setup time		5	–	nS
t_{CSHS8}		Chip select hold time		15		
t_{CYS8}	SCK	System cycle time		430 / 220	–	nS
t_{LPWS8}		Low pulse width		200 / 95		
t_{HPWS8}		High pulse width		200 / 95		
t_{DSS8}	SDA (Write)	Data setup time		-- / 25	–	nS
t_{DHS8}		Data hold time		-- / 15		
t_{ACCS8}	SDA (Read)	Read access time	$C_L = 100pF$	– / --	200	nS
t_{ODS8}		Output disable time		30 / --	–	

Note: tr (rising time), tf (falling time) : ≤ 15nS

Figure 2: System Buses Read/Write Characteristics (for S8)
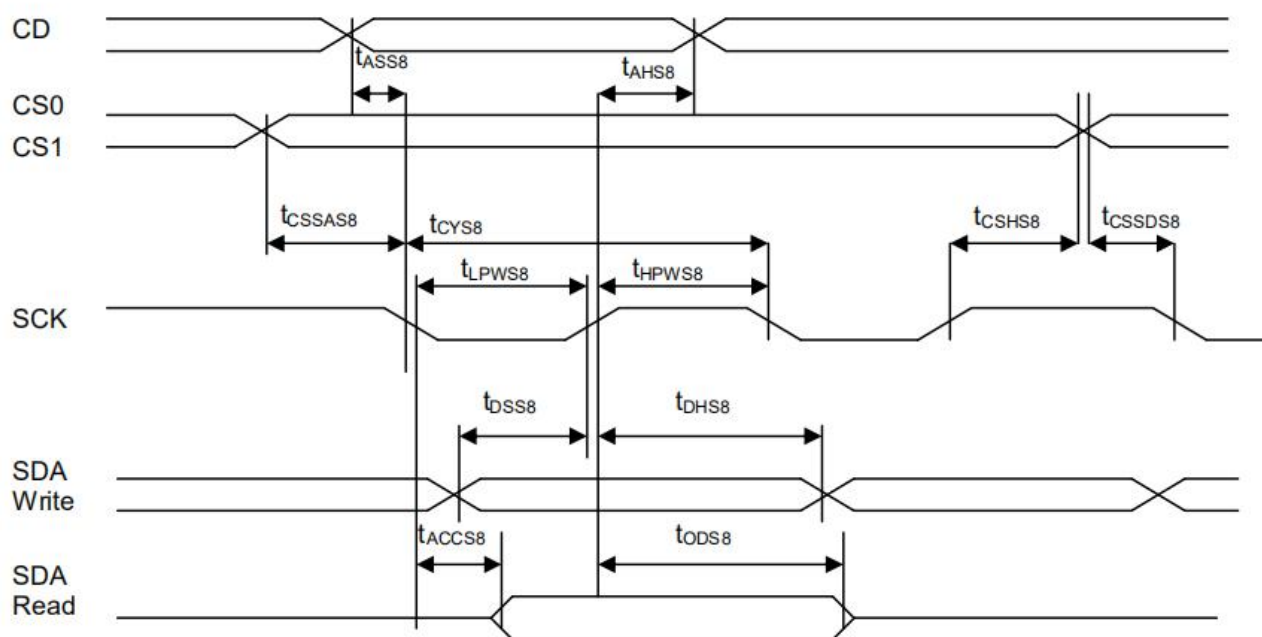
At Ta = -25 °C To +70 °C, VDD = 3.3V±0.1V, GND = 0V.

Refer to Fig. 3, the bus-timing diagram for Display Reset Timing.

Table 8

Symbol	Signal	Description	Min.	Max.	Unit
($2.7V \leq V_{DD} \leq 3.6V$, Ta= −40 to +95°C)					
t_{RW}	RST	Reset low pulse width	5	–	mS
t_R	RST, Internal Status	Reset to Internal Status pulse delay	10		uS
		Wait before Power Down	1		mS
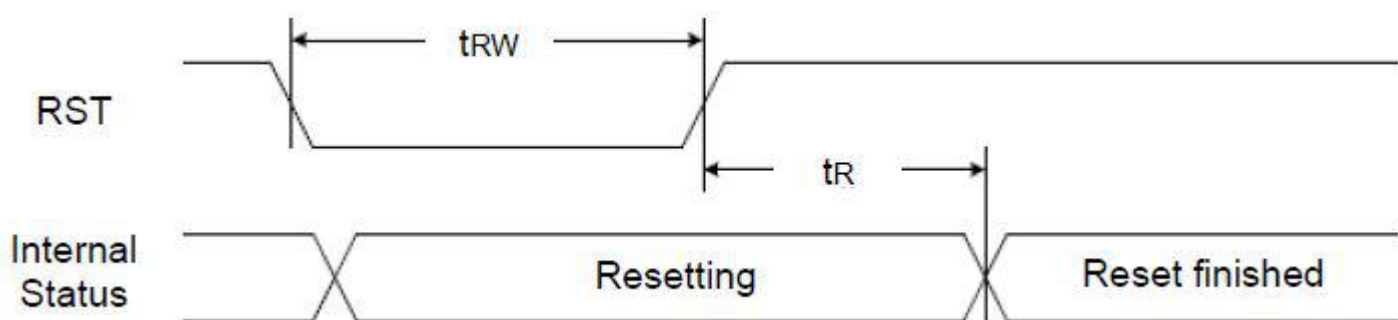
Figure 3: Reset Timing

5.5 Instruction table

The following is a list of host commands supported by UC1638c:

C/D: 0: Control, 1: Data　　W/R: 0: Write Cycle, 1: Read Cycle　　D7-D0: # : Useful Data bits –: Don't Care

No	Command	C/D	W/R	D7	D6	D5	D4	D3	D2	D1	D0	Action	Default
1.	Write Data Byte (multiple-byte command)	0	0	0	0	0	0	0	0	0	1	Write byte by byte	N/A
		1	0	#	#	#	#	#	#	#	#		
		:	:	:	:	:	:	:	:	:	:		
2.	Read Data Byte (multiple-byte command)	0	0	0	0	0	0	0	0	1	0	Read byte by byte	N/A
		1	1	#	#	#	#	#	#	#	#		
		:	:	:	:	:	:	:	:	:	:		
3.	Get Status (triple-byte command)	0	0	0	0	0	0	0	0	1	1	Get Status	N/A
		1	1	POR	MX	MY	PID	DE	WS	MD	MS		
		1	1	Ver[1:0]			PMO[5:0]						
4.	Set Column Address (double-byte command)	0	0	0	0	0	0	0	1	0	0	Set CA[7:0]	00H
		1	0	#	#	#	#	#	#	#	#		
5.	Set Temp. Compensation	0	0	0	0	1	0	0	#	#	#	Set TC[2:0]	100b
6.	Set Pump Control	0	0	0	0	1	0	1	1	0	#	Set PC	1b
7.	Set Adv. Program Control (double-byte command)	0	0	0	0	1	1	0	R	R	R	R = 0-5, Set APC[R][7:0]	N/A
		1	0	#	#	#	#	#	#	#	#		
8.	Set Scroll Line LSB	0	0	0	1	0	0	#	#	#	#	Set SL[3:0]	0H
	Set Scroll Line MSB	0	0	0	1	0	1	#	#	#	#	Set SL[7:4]	0H
9.	Set Page Address LSB	0	0	0	1	1	0	#	#	#	#	Set PA[3:0]	0H
	Set Page Address MSB	0	0	0	1	1	1	0	0	#	#	Set PA[5:4]	0H
10.	Set V$_{BIAS}$ Potentiometer (double-byte command)	0	0	1	0	0	0	0	0	0	1	Set PM[7:0]	54H
		1	0	#	#	#	#	#	#	#	#		
11.	Set Partial Display Control	0	0	1	0	0	0	0	1	0	#	Set LC[8]	0: Disable
12.	Set COM Scan Function	0	0	1	0	0	0	0	1	1	#	Set CSF	0b
13.	Set RAM Address Control	0	0	1	0	0	0	1	#	#	#	Set AC[2:0]	001b
14.	Set Display mode	0	0	1	0	0	1	0	1	#	#	Set DC[5:4]	00b
15.	Set Line Rate	0	0	1	0	1	0	0	0	#	#	Set LC[3:2]	10b
16.	Set All-Pixel-ON	0	0	1	0	1	0	0	1	0	#	Set DC[1]	0b
17.	Set Inverse Display	0	0	1	0	1	0	0	1	1	#	Set DC[0]	0b
18.	Set LCD Mapping Control	0	0	1	1	0	0	0	#	#	0	Set LC[1:0]	00b
19.	Set N-Line Inversion (double-byte command)	0	0	1	1	0	0	1	0	0	0	Set NIV[6:0]	00H
		1	0	0	#	#	#	#	#	#	#		
20.	Set Display Enable (double-byte command)	0	0	1	1	0	0	1	0	0	1	Set DC[3:2]	10b
		1	0	1	0	1	0	1	1	#	#		
21.	Set LCD Gray Shade 1	0	0	1	1	0	1	0	0	#	#	Set LC[5:4]	01b
22.	Set LCD Gray Shade 2	0	0	1	1	0	1	0	1	#	#	Set LC[7:6]	10b
23.	System Reset (double-byte command)	0	0	1	1	1	0	0	0	0	1	System Reset	N/A
		1	0	1	1	1	0	0	0	1	0		
24.	NOP	0	0	1	1	1	0	0	0	1	1	No operation	N/A
25.	Set Test Control (double-byte command)	0	0	1	1	1	0	0	1	TT		For testing only. Do not use.	N/A
		1	0	#	#	#	#	#	#	#	#		
26.	Set LCD Bias Ratio	0	0	1	1	1	0	1	0	#	#	Set BR[1:0]	11b: 12
27.	Reset Cursor Update Mode	0	0	1	1	1	0	1	1	1	0	AC[4]=0, CA=CR	N/A
28.	Set Cursor Update Mode	0	0	1	1	1	0	1	1	1	1	AC[4]=1, CR=CA	N/A
29.	Set COM End (double-byte command)	0	0	1	1	1	1	0	0	0	1	Set CEN[7:0]	159
		1	0	#	#	#	#	#	#	#	#		
30.	Set Partial Display Start (double-byte command)	0	0	1	1	1	1	0	0	1	0	Set DST[7:0]	0
		1	0	#	#	#	#	#	#	#	#		
31.	Set Partial Display End (double-byte command)	0	0	1	1	1	1	0	0	1	1	Set DEN[7:0]	159
		1	0	#	#	#	#	#	#	#	#		

No	Command	C/D	W/R	D7	D6	D5	D4	D3	D2	D1	D0	Action	Default
32.	Set Window Programming Starting Column Address	0	0	1	1	1	1	0	1	0	0	Set WPC0[7:0]	0
		1	0	#	#	#	#	#	#	#	#		
33.	Set Window Programming Starting Page Address	0	0	1	1	1	1	0	1	0	1	Set WPP0[5:0]	0
		1	0	0	0	#	#	#	#	#	#		
34.	Set Window Programming Ending Column Address	0	0	1	1	1	1	0	1	1	0	Set WPC1[7:0]	239
		1	0	#	#	#	#	#	#	#	#		
35.	Set Window Programming Ending Page Address	0	0	1	1	1	1	0	1	1	1	Set WPP1[5:0]	39
		1	0	0	0	#	#	#	#	#	#		
36.	Enable Window Program	0	0	1	1	1	1	1	0	0	#	Set AC[3]	0: Disable
37.	Set MTP Operation control (double-byte command)	0	0	1	0	1	1	1	0	0	0	Set MTPC[4:0]	10H
		1	0	0	0	0	#	#	#	#	#		
38.	Set MTP Write Mask (double-byte command)	0	0	1	0	1	1	1	0	0	1	Set MTPM[5:0]	00H
		1	0	0	0	#	#	#	#	#	#		
39.	Set MTP Read Potentiometer	0	0	1	1	1	1	1	0	1	0	Set RV[7:0] (BR=00b)	00H
		1	0	#	#	#	#	#	#	#	#		
40.	Set MTP Program/Erase Potentiometer	0	0	1	1	1	1	1	0	1	1	Set WV[7:0] (BR=10b)	46H
		1	0	#	#	#	#	#	#	#	#		
41.	Set MTP Write Timer (double-byte command)	0	0	1	1	1	1	1	1	0	0	Set WT[7:0]	40H
		1	0	#	#	#	#	#	#	#	#		
42.	Set MTP Read Timer (double-byte command)	0	0	1	1	1	1	1	1	0	1	Set RT[7:0]	03H
		1	0	#	#	#	#	#	#	#	#		

Warning: Any bit patterns other than the commands listed above may result in undefined behavior.

6. Quality Units

6.1 Purpose

This standard for quality assurance should define the quality of LCD module products to customer by JINGHUA DISPLAYS

LTD.

6.2 Scope

This document defines general provisions as well as inspection standards for LCD module supplied by JINGHUA DISPLAYS

LTD, except of those with special requirements from customer.

6.3 Definition

6.3.1 Definition of area

A Zone: Active area.

B Zone: Viewing area.

C Zone: Outside Viewing area.
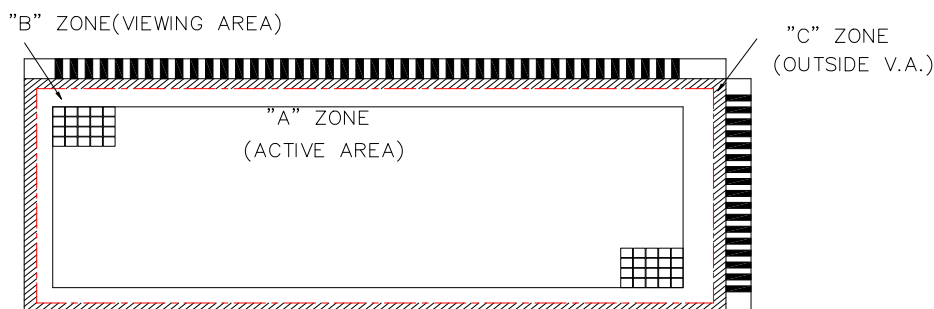
6.3.2 Definition of size

Large size(L):1～6 pcs LCD screens are cut out of from each 14 " ×16 " motherglass.

Middle size(M):7～99 pcs LCD screens are cut out of from each 14 " ×16 " unit motherglass.

Small size(S):> 99 pcs LCD screens are cut out of from each 14 " ×16 " unit motherglass.

For this project,LCD screens are middle size.

6.4 Quality Specification

6.4.1 Conditions of Inspection

6.4.1.1 Tests should be conducted under the following conditions:

Ambient temperature: 22±5℃.

Ambient humidity: 65±20%RH.

6.4.1.2 Judging time of steady defect：3s at most（it should be ignored if it's invisible）

6.4.1.3 Function test:

With fluorescent lamps, the light should be under 300 Lux, the product should be inspected with 30cm to LCD surface;

6.4.1.4 Cosmetic Inspection:

With fluorescent lamps, the light should be 700~1200Lux, the product should be inspected with 30cm to LCD surface;

6.4.1.4Diagram of inspection as following：

Excepting function defect，other defects should be judged
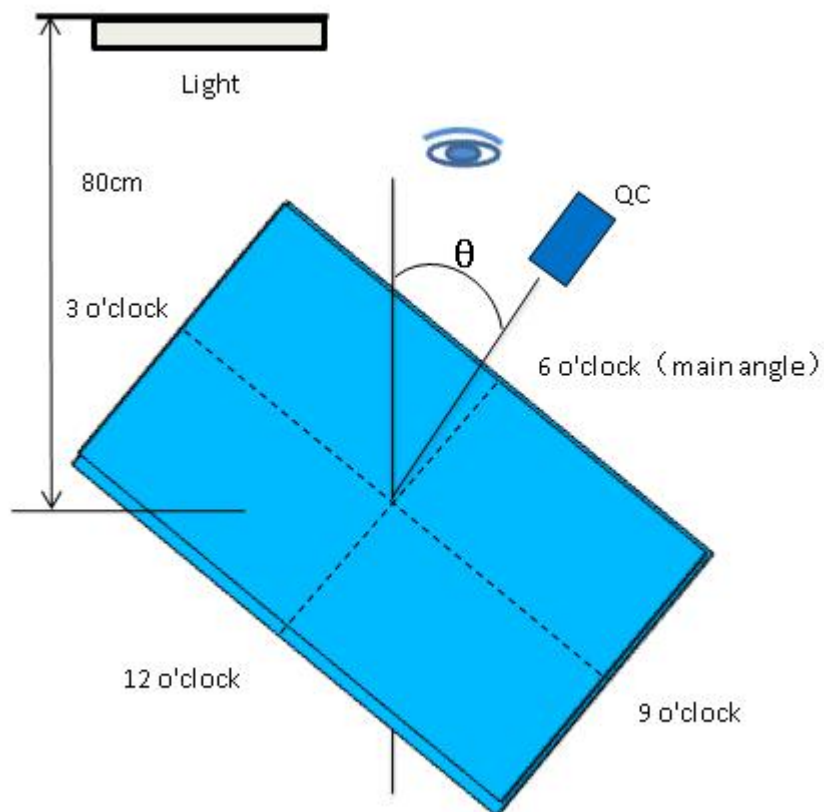
Diagram of 6 o'clock inspection viewing angle as follows：

6 o'clock inspection viewing angle rage from 15° to 25°
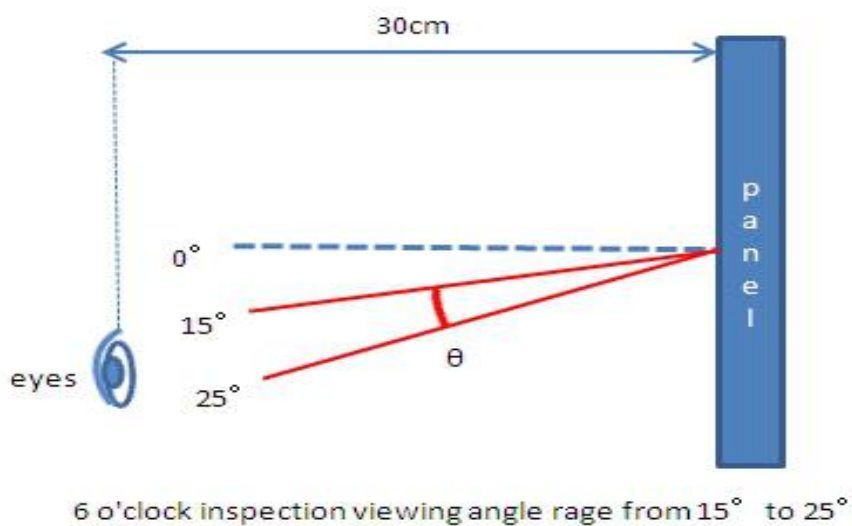
Diagram of 12 o'clock inspection viewing angle as follows：
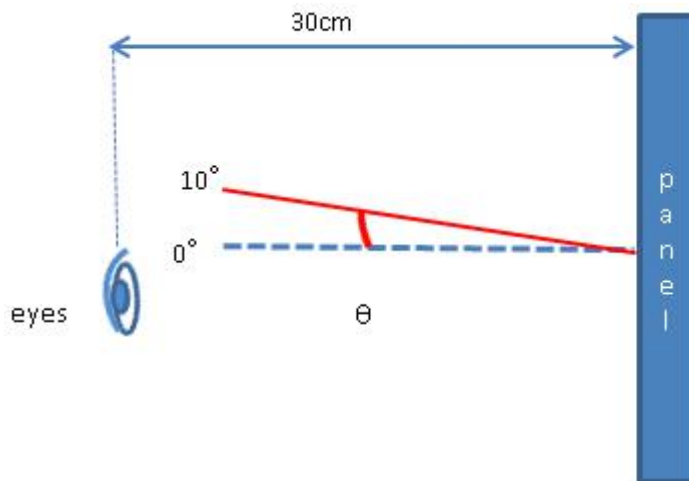
12 o'clock inspection viewing angle rage from 0° to 10°

Use only for appearance inspection requirement：

Definition of viewing angle θ1 and θ2

optimum vision with the naked eye and viewing angle θ at CR. max above are not always the same
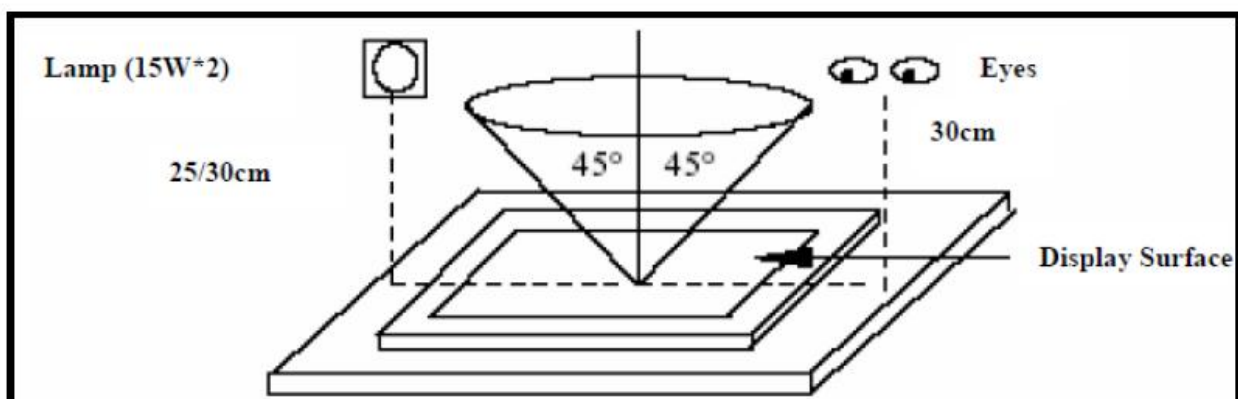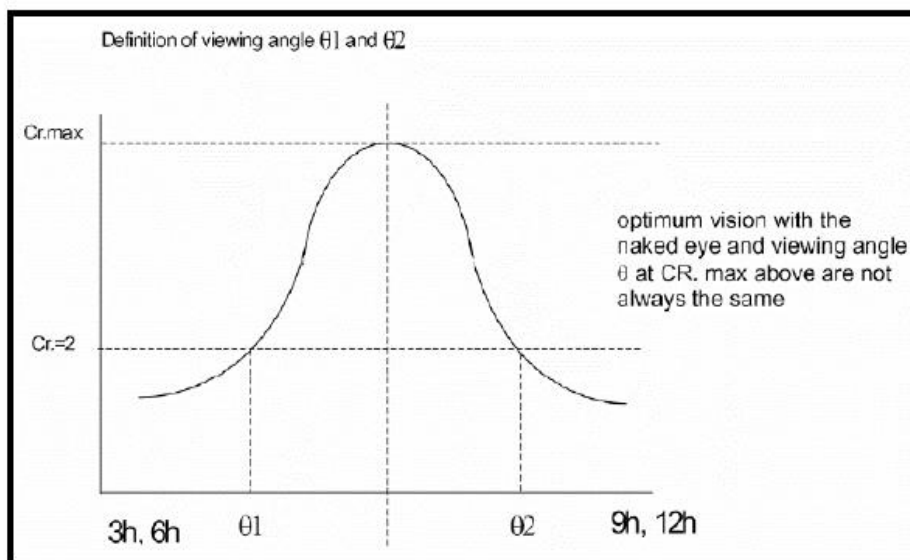
6.4.2 Sampling plan

Unless otherwise agreed in written, the sampling inspection shall be applied to the incoming inspection of customer.

   📖 Lot size: Quantity of shipment lot per model.

   📖 Sampling type: Normal inspection, single sampling.

   📖 Sampling Level: Level II.

   📖 Sampling table: GB/T2828.1. (GB-national standard of China.)

6.4.3 Classification of defects and Acceptable quality level

Defects and classified as either a major or minor defect defined as belows:

   📖 Major defect: It is a defect that is likely to result in failure or to reduce materially the usability of　the product

for the intended function.

   📖 Minor defect: It is a defect that will not result in functioning problem with deviation classified.

The AQL for major and minor defects is defined as following:

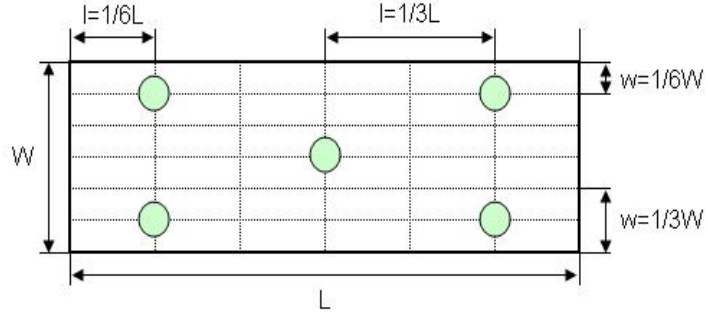| Partition	Definition	AQL
Major defect	Functional defective as product.	0.4
Minor defect	Satisfy all functions as product but not satisfy cosmetic standard.	1.0

6.4.4 Applicable instrument

   📖 LCD module tester.

   📖 Multi-meter.

   📖 Caliper.

   📖 Defect size filming standard.

6.4.5 Inspection quality criterion

6.4.5.1 Function Inspection：

Content	Item	Inspection item			Receive standard	Defect
Display	1	LCD cross short;			Reject	Maj.
	2	Segment missing, line missing, short, much dot;			Reject	Maj.
	3	Display uniformity not good;			Reject	Maj.
	4	No display or display error;			Reject	Maj.
	5	Pinholes: black spot (negative)/ white spot (positive) at activated state.				Min.
		Product Type	Defect Size	Accept Qt'y		
		Middle Size	D≤0.15	Ignorance		
			0.15＜D≤0.25	3		
			0.25＜D≤0.35	1		
			0.35＜D	0		
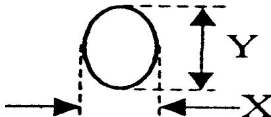
1. For the dot pattern: accept if the area of defect is less than or equal to half of one lattice's.

2. Only allow one defect in one segment.

3.The nearest distance allowed between two pinholes is above 20mm.

$D=(X+Y)/2$

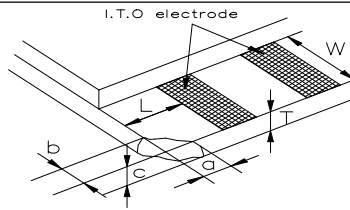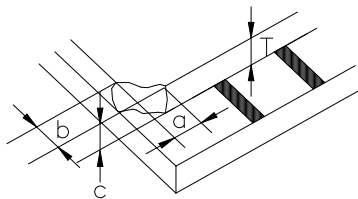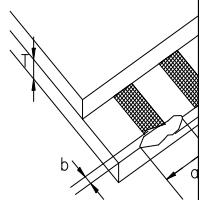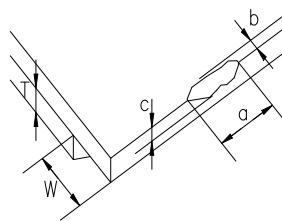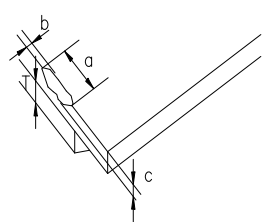| Content	Item	Inspection item	Receive standard	Defect
	6	When character displays, the background is deeper or lighter than simple.	Limit sample	Min.
	7	The color of character is lighter than sample;	Limit sample	Min.
Back-light	8	The backlight is not light;	Reject	Maj.
	9	When working, the light is flashing;	Reject	Maj.
	10	The backlight does not work or the color is wrong;	Reject	Maj.
	11	When working, the obvious gridding is visual;	Reject	Min
	12	The uniformity inspection: As following picture, we use the 5-points test method to confirm the uniformity, the standard is: Min/Max≥70%; Average both length and width to 6 parts, and test points as following(green points):		Min
Others	13	The product model does not match the specification;	Reject	Maj.
	14	LCD view angle does not match the specification;	Reject	Maj.
	15	The color is obviously different(pls reference for sample);	Limit sample	Min

6.4.5.2 Final Assembly cosmetic inspection
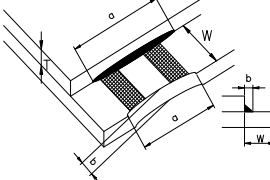
Content	Item	Inspection item	Receive standard	Defect
Final Assembly cosmetic inspection	1	The product structure should match the specification. It can not be titled or loosed;	Reject	Maj.
	2	The silica gel of LCD is over the upper polarizer;	Reject	Maj.
	3	When heating, the touch area of PAD/ ITO between two parts (eg: FFC to PCB; FFC to FFC)	should be ≧1/2w	Maj.
	4	The product holder is tilted(can not be assembled) or cracked;	Reject	Maj.
	5	Polarizer scalded: the protect film can not be torn off or can be seen in view area;	Reject	Maj.
	6	The size of LCM does not match the drawing;	Reject	Maj.

7	The height of silica gel is over the upper polarizer;	Reject	Min
8	The tape is missing;	Reject	Min
9	The position of label	should be sticked in right position and can not be missing;	Min
10	The item of label	can be scanned, and the ink can not be off easily;	Min
11	Protective film surface scratch	Ignore（it can'␣t scratch polarizer）	Min

6.4.5.3 LCD cosmetic inspection:

Content	Item	Inspection item	Receive standard	Defect
LCD	1	Crack on LCD	Reject	Maj.
	2	LCD rainbow	Limit sample （can't influence display effect）	Min
	3	Black/white spot、assemble spot、polarizer spot、polarizer dent、polarizer bubble		Min

①Zone A:

Product Type	Defect Size	Accept Qt'y
Positive Middle Size	$D \leq 0.15$	Ignorance
	$0.15 < D \leq 0.25$	3
	$0.25 < D \leq 0.35$	1
	$0.35 < D$	0

②Zone B: the defect size is 1.5 times than Zone A;

③Zone C: Ignore the spot defect;

The distance between two defect should longer than 20mm;

④LCD display defect judged in stable picture（defect is visible when change picture but invisible in stable picture should be judged OK）

⑤above defects which are visible in complete display picture but invisible in other picture should be judged OK

$$D=(X+Y)/2$$

	4	LCD rub defect judged in stable picture（defect is visible when change picture but invisible in stable picture should be judged OK）	Ignore	Min
		LCD rub defect which is visible in complete display picture but invisible in other picture should be judged OK	Ignore	

		LCD rub defect is visible （except complete display）	Limit sample	
	5	The scratch / line defect on LCD or polarizer		

① Zone A:

Product Type	Defect Width	Defect Length	Accept Qt'y
Positive Middle Size	W≤0.02	/	Ignorance
	0.02＜W≤0.03	L≤4	2
	0.02＜W≤0.03	L>4	0
	0.03＜W≤0.05	L≤3	2
	0.03＜W≤0.05	L>3	0
	W > 0.05	/	Same as the spot

②Zone B: the defect size is 1.5 times than Zone A;

③Zone C: Ignore the spot defect;

The distance between two defect should longer than 20mm;

	6	Chipped glass on corner:			Min

ITO side   Others

Zone	a	b	c	Acc Qt'y	
ITO side	a≤5mm(L≥5mm)	b≤W	c≤T	3	Min
	a<L(L<5mm)	b≤W	c≤T	3	
Others	not exceed 1/2 width of seal		c≤T	3	

	7	Glass chip on edge			Min

ITO touch side   ITO back side   Others

Zone	a	b	c	Acc Qt'y
ITO touch side(COG and TAB)	a≤3mm(and not exceed 4 ITO terminal	b≤W/5	c≤1/2T (T＞0.7mm) c≤T(T≤0.7mm)	3

		ITO touch side(except COG and TAB)	a≤4mm(and not exceed 4 ITO terminal	b≤W/4	c≤T	3	
		ITO back side(COG and TAB)	a≤3mm	b≤1/4W	c≤3/4T (T＞0.7mm) c≤T(T≤0.7mm)	3	
		ITO back side(except COG and TAB)	a≤5mm	b≤1/3W	C≤T	3	
		Others	a≤5mm	Not exceed 1/2 width of seal	c≤T	3	
	8	Extended crack inspector shall attempt to remove the chip with tweezers, re-evaluate if the remaining defect is still a crack or a chip: b≤1/4W, accept Qt'y: 2 ;					
	9	Frame bubble		≤1/2 frame width			Min
COG	1	The silica gel is missing;		Reject			Maj.
	2	The FPC is open, short;		Reject			Maj.
	3	The protection for COG ITO: ITO isn't fully cover with silica gel and the height of silica is over the LCD upper side, and the width overrun the side of LCD;(If there is special command, follow it) dust or foreign in this zone;		Reject			Min.
	4	The gobo tape isn't totally cover IC; The bubble under tape is more than 0.5mm;		Reject			Min.
	5	Missing the gobo tape/ silica gel/ protect tape etc.		Reject			Min.
Polarizer	6	Bubble under polarizer		Zone A: it is visual at 30cm inspection; Zone B: ignore			Min.
	7	The size or position of polarizer can not match the drawing; It isn't cover the view zone and exceed the edge of LCD or cover the ITO;		Reject			Min.
Silk	8	The silk is discontinuous;		Reject			Min.
	9	Burr: if the thick or thin is more than 1/4W		Reject			Min.
	10	Spot/ pinhole: same as the spec of LCD		Refer to LCD standard			Min.

Content	Item	Inspection item	Receive standard	Defect
		pinhole;		
	11	if the thick or thin is more than 1/2W. (W: normal width)	Reject	Min.
	12	The width of silk is not uniformity: when Wmax—Wmin>1/3W.	Reject	Min.
Others	13	Wrong assembly direction of LCD;	Reject	Maj.
	14	LC leakage;	Reject	Maj.
	15	Finger prints/ dirty on LCD surface;	Reject	Min.

6.4.5.4 PCBA Cosmetic Inspection

Content	Item	Inspection item	Receive standard	Defect
PCBA	1	The connecting finger of COB can not be leaked outside;	Reject	Maj
	2	The pinholes is deep to IC: not accept;	Reject	Maj.
	3	The surface of COB can not be scratched;	Reject	Min.
	4	The diameter of pinholes on Cob surface should be under 0.2mm; And there is no foreign;	Reject	Min.
	5	The height of COB doesn't match the specification;	Reject	Min.
	6	The glue isn't inside of PCB silk-circle;	Reject	Min.
	7	If there is some tin remained at the screw hole, it should be removed to make the hole surface smooth;	Reject	Min.
	8	The solder standard: IPC-610D;		/

6.4.5.5 Connector Inspection

Content	Item	Inspection list and Standard		Defect
TCP/ FPC	1	The pin should not be oxydic, dirty, bended, cracked;	Reject	Maj.
	2	TCP IC broken or torn off from LCD;	Reject	Maj.
	3	FPC/TCP broken (The circuit is broken)	Reject	Maj.
	4	The holder board should be sticked closely and the size should match the specification;	Reject	Min.
	5	FPC/TCP broken (The circuit is OK)	Reject	Min.
	6	FPC golden-finger different color	Ignore if no effective to function	Min
	7	FPC bending trace	Reject if there is white trace	Maj
	8	FPC reinforce plate bubble/spot	Ignore	Min
	9	FPC via hole shifting	≤1/2	Maj
	10	FPC via hole broken	Reject	Maj

6.4.5.6 Others

Content	Item	Inspection item	Receive standard	Defect
Back-light	1	The size doesn't match the specification;	Reject	Maj.
	2	Back-light is broken or cracked, bended;	Reject	Maj.
	3	The standard of spots/ scratches	Refer to LCD inspection	Min.
	4	BL shading tape raising	H≤0.5mm，L≤10mm	Min
	5	Excessive glue/alcohol or water trace	Reject	Min
Glue	1	Coating glue	Refer to drawing	Maj.
	2	The quantity of glue is not enough;	Reject	Min.
	3	The color of glue does not match the BOM or sample;	Reject	Maj.

6.4.5.7 Special Commands from Customer

If there is some standard need to be discussed or some special command, it should be confirmed by both customer and JHD.

6.5 Reliability

The LCD module shall not fail the following reliability test.

ITEM	Condition	Criterion
High temperature operation	+70℃, 240hrs.	1.Total current consumption should be below double of initial value. 2.Cosmetic defects should not be happened.
High temperature storage	+85℃, 24hrs.	
Low temperature operation	-25℃, 240hrs.	
Low temperature storage	-40℃, 24 hrs.	
Thermal shock operation	-40℃→+85℃30min←→30min, LCD power off,Total 1000cycles.	
Vibration	Frequency10~55Hz; Amplitude :0.75mm ;Duration :20cycles in each direction,3 direction	
ESD Test	1.Test frequence:5points/panel,5times/point (LCD around and middle a total of 5 points). 2.Test apparatus parameter: C=150pF,R=330Ω 3.Environment:15℃~35℃,30%~60%RH. 86Kpa~106Kpa. 4.Test item: A. Contact: ±8KV, B. Air: ±15KV, Arcing distance≤1cm. 5.Test method: According to the above voltage level at each test point in order to test 5 times discharge under each voltage level .	
Falling test (Packaged state)	Weight≥15kg; Falling height: 80cm. Weight＜15kg; Falling height: 100cm.	

Remark:

1.Product should be checked after 2 hours in normal environment

2.It should be judged OK if product displaying picture is deeper、lighter、nonuniform or delay in experience，but it becomes OK after 24 hours in normal environment

6.6 Quality Assurance

6.6.1 JINGHUA DISPLAYS will only replace or repair any of its LCD which is found defective electrically or visually when inspected in accordance with the LCM specification, for a period of one year from the date of shipment. Confirmation of such date shall be based on freight documents.

No warranty can be granted if any of the precautions stated in handing LCD and LCD Modules above have been disregarded.

6.2 In returning the LCD and LCD Modules, they must be properly packaged and there should be detailed description of the failures or defects. Broken glass, scratches on polarizers, mechanical damages as well as defects that are caused by accelerated environmental tests are excluded from warranty.

6.7 Precautions in Use of LCM

6.7.1 Handling of LCM

6.7.1.1 Don't give external shock.

6.7.1.2 Liquid crystal is chemical hazardous substance. Once the liquid crystal inside it leaks out, be sure not to get any in your mouth. If the liquid is adhered your skin or clothes etc, wash it off using soap and water thoroughly and immediately.

6.7.1.3 Don't apply excessive force on the display surface.

6.7.1.4 Don't scratch and dirty polarizer of covering the display surface of the LCD module.

6.7.1.5 In order to prevent static electricity from destructing, be sure to ware gauntlet that is tested up to grade.

6.7.2. Storage

6.7.2.1 Store in dark places and do not expose to sunlight or fluorescent light. Keep the temperature between 0℃ and 40℃ and the humidity lower than 60%RH. Please consult JINGHUA DISPLAYS LTD. for other storage requirements.

6.7.2.2 Storage in a clean environment, free-dust and well ventilated.

6.7.2.3 Storage in anti-static electricity container.

6.7.3. Soldering

6.7.3.1 The soldering temperature is 260+5 ℃ (with Pb)/ 330+5 ℃ (No Pb) and soldering Time should be less than 3 sec,and soldering iron power should be less than 30w.

6.7.3.2 Re-soldering: no more than 3 times.

6.7.3.3 The soldering point should be further than 1.6 mm from body.

6.7.3.4 Blister box should be staggered and stacked 25 boxes at most

"Shenzhen Jinghua Displays CO., LTD. reserves the right to change this specification"

- END -