JTO 深圳市晶腾光电有限公司

SHENZHEN JINGTENG OPTOELECCTRONICS CO.   LTD.

Product Specification For LCD Module

CUSTOMER No: IP355

Model NO: JTO13164403001A

REVISION: 2.0

☐APPROVAL FOR SPECIFICATIONS ONLY

■APPROVAL FOR SPECIFICTAIONS AND SAMPLE

APPROVED BY	CUSTOMER	
DIRECTOR	QA	R&D

JTOLCM R&D CENTER			
APPROVED BY	CHECKED BY	PREPARED BY	
ZHANG	MARKE	GYD	
DIRECTOR	MANAGER	Electronic	Mechanism

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RECORD OF REVISION

REV	COMMENT	PAGE	DATE
1.0	Initial Release	1-20	2014-4-17
2.0	revise	1-21	2014-5-20

GENERAL SPECIFICATION

ITEM	CONTENTS
Module Size	95.2(W) × 42.0(H) × 5.0(T) mm
Display Format	131 × 64 DOTS
View Area	63.46 (W) × 23.0(H) mm
Dot Size	0.38mm* 0.32 mm
Dot Pitch	0.42mm * 0.36mm
LCD Type	FSTN / POSITIVE / TRANSFLECTIVE
View Angle	6 'clock
Controller IC	ST7565R
Duty Ratio	1/65 Duty
Bias	1/9 Bias
Connector	COG

LCM DRAWING

SHENZHEN JINGTENG OPTOELECTRONICS CO., LTD
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JTO13164403001A

VERSION:	VERSION
NO. 1	OF 1
UNIT:	MM
DATE:	2014-03-20

DESIGNED BY: GYD
CHECKED BY:
APPROVED BY:

ISSUE	AMENDMENT	DATE
1.0		2012.03.06
2.0	B	2012.08.02

APPROVED BY

ACCEPT □ REJECT □
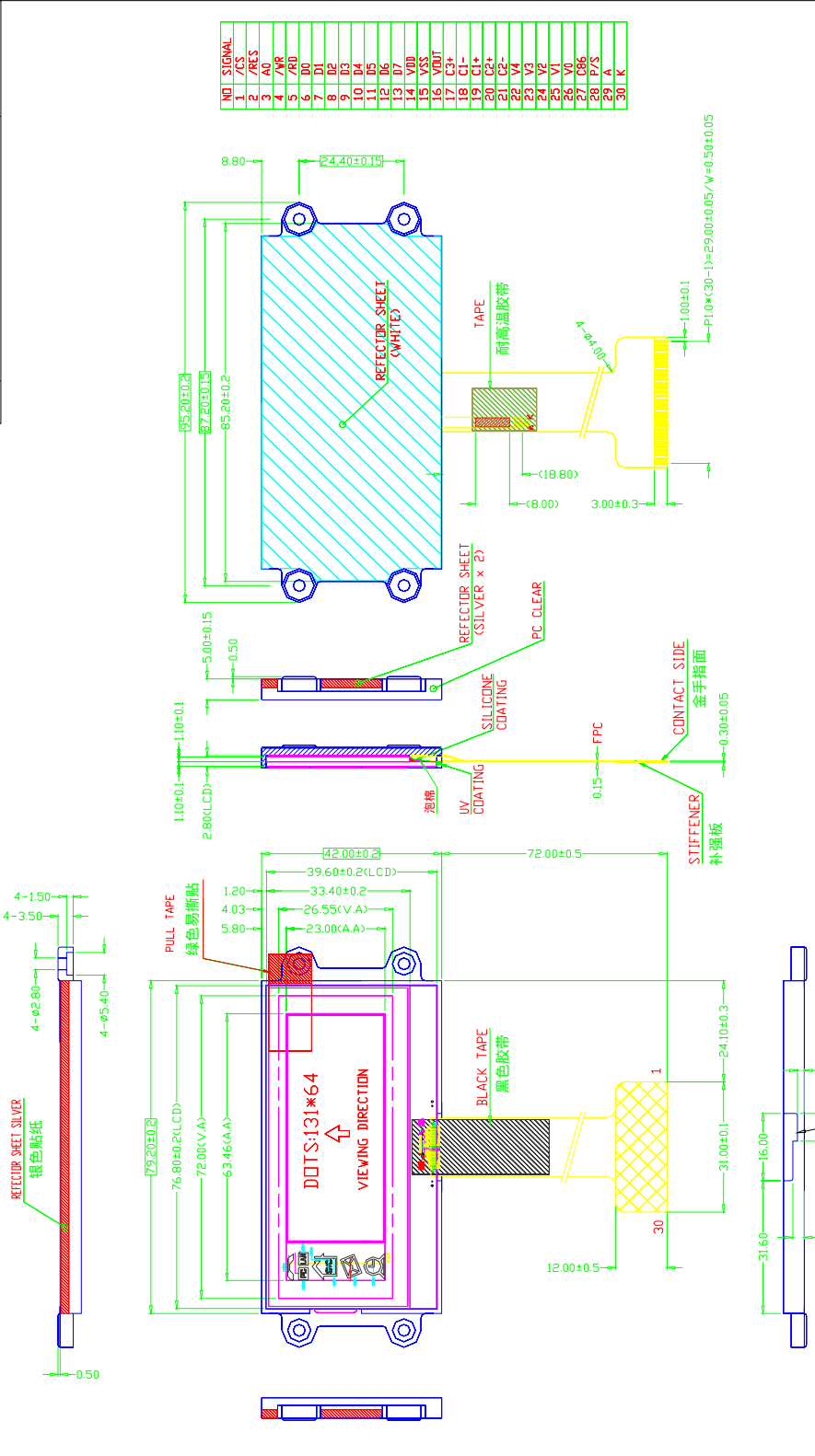
NO	SIGNAL
1	/CS
2	/RES
3	A0
4	/WR
5	/RD
6	D0
7	D1
8	D2
9	D3
10	D4
11	D5
12	D6
13	D7
14	VDD
15	VSS
16	VOUT
17	C3+
18	C1-
19	C1+
20	C2+
21	C2-
22	V4
23	V3
24	V2
25	V1
26	V0
27	C86
28	P/S
29	A
30	K

REFLECTOR SHEET (WHITE)
TAPE
REFLECTOR SHEET (SILVER x 2)
PC CLEAR
SILICONE COATING
UV COATING
FPC
CONTACT SIDE
STIFFENER
BACKLIGHT CIRCUIT
K A
PULL TAPE
REFLECTOR SHEET SILVER
BLACK TAPE
DOTS:131*64
VIEWING DIRECTION
B

8.80
24.40±0.15
85.20±0.2
87.20±0.15
85.20±0.2
(18.80)
(8.00)
3.00±0.3
1.00±0.1
4-φ4.00
P1.0X(30-1)=29.00±0.05/W=0.50±0.05
5.00±0.15
0.50
1.10±0.1
1.10±0.1
2.80(LCD)
0.30±0.05
0.15
42.00±0.2
39.60±0.2(LCD)
33.40±0.2
26.55(V.A)
23.00(A.A)
72.00±0.5
24.10±0.3
1.20
4.03
5.80
79.20±0.3
76.80±0.2(LCD)
72.00(V.A)
63.46(A.A)
4-1.50
4-3.50
4-φ2.80
4-φ5.40
0.50
31.00±0.1
31.60
1.58
16.00
6.60
2.70
12.00±0.5
1
30

NOTES:
1. DISPLAY TYPE: FSTN/POSITIVE
2. OPERATING VOLTAGE: 9.0V VDD:3.3V
3. OPERATING TEMPERATURE: -20℃~70℃
4. STORAGE TEMPERATURE: -30℃~80℃
5. DRIVE MODE: 1/65D,1/9B
6. VIEWING DIRECTION: 6:00
7. POLARIZER TYPE: TRANSFLECTIVE
8. CONNECTOR TYPE: COG/ST7565R
9. CUSTOMER No.: M355

ABSOLUTE MAXIMUM RATING

Item	Symbol	Min.	Type	Max.	Unit	Humidity
Power Supply Voltage	V_{DD}	0.3	--	3.6	Volt	
Power Supply for LCD	Vop	8.8	9.0	9.2	Volt	
Power Supply Voltage	V_{OUT}	-0.3	-	14.5	Volt	
Operating Temperature	Top	-20	-	+70		Note1
Storage Temperature	Tst	-30	-	+80		Note2

Note1: Background color changes slightly depending on ambient temperature. This phenomenon is
reversible.

 Ta   70   : 75%RH max

 Ta>70   : absolute humidity must be lower than the humidity of 75%RH at 70

Note2: Ta at -30   will be <48hrs, at 80   will be <120hrs when humidity is higher than 75%RH.
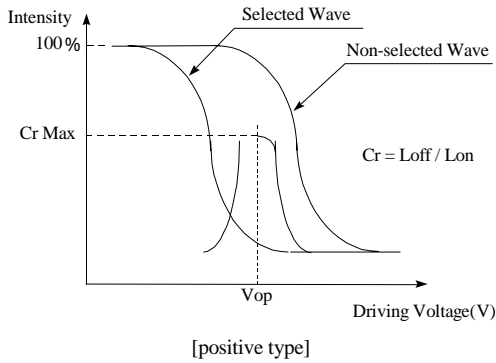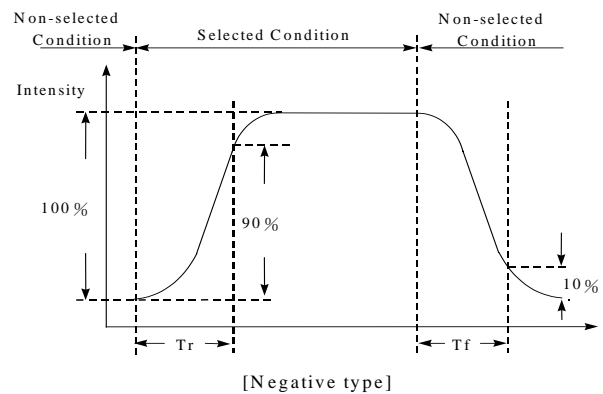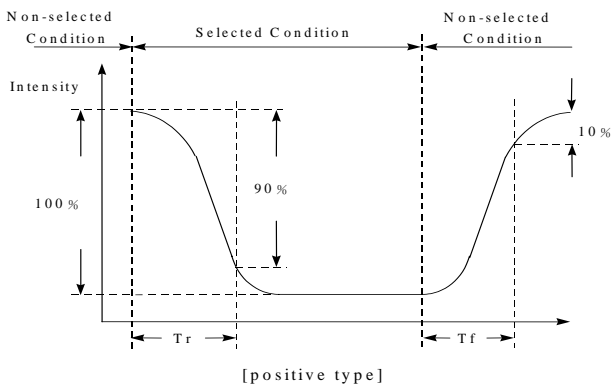
 Ta   80   : 75%RH max

 Ta>80   : absolute humidity must be lower than the humidity of 75%RH at 70

OPTICAL CHARACTERISTICS

Item		Symbol	Min.	Typ.	Max.	Unit	Condition	Note
Viewing Angle Cr $\geqq 2$	$\phi=0°$	$\theta 1$	--	--	30	deg.	T=25°C	1.2
	$\phi=180°$	$\theta 2$	--	--	10			
	$\phi=90°$	$\theta 3$	--	--	25			
	$\phi=270°$	$\theta 4$	--	--	25			
Contrast Ratio		Cr	--	7	--	--	T=25°C	3
Response Time (rise)		Tr	80	--	200	ms	T=25°C	4
Response Time (fall)		Tf	80	--	200	ms	T=25°C	4

BACKLIGHT

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
Supply Current	I	-	60	80	mA		
Supply Voltage	V	3.0	3.2	-	V	-	
Luminous Intensity	IV	150	--	-	Cd/m^2		
Uniformity	-	80	--	-	%		
Chromaticty Coordinate	X	0.24		0.31	nm		
	Y	0.24	--	0.31	nm		
Color	White						

Note 1. Definition of angle θ_1 & θ_2

TOP

Z

Y

θy

X

BOTTOM
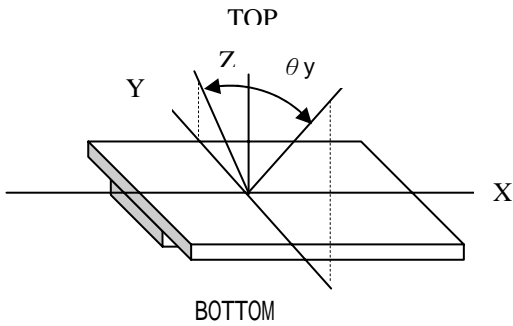
Note 2. Definition of angle θ_3 & θ_4

TOP

Y

Z

θx

X

BOTTOM
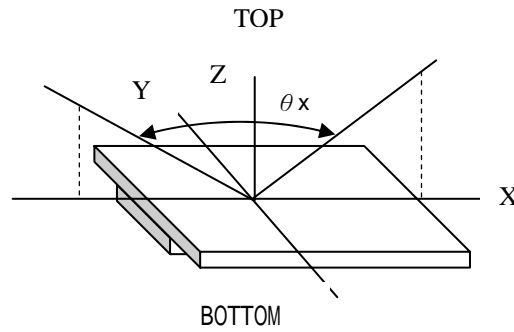
Note 3. Definition of contrast ratio (Cr)

Intensity
100

Selected Wave

Non-selected Wave

Cr Max

Cr = Loff / Lon

Vop

Driving Voltage(V)

[positive type]

Intensity
100

Selected Wave

Non-selected Wave

Cr Max

Cr = Lon / Loff

Vop

Driving Voltage(V)

[Negative type]
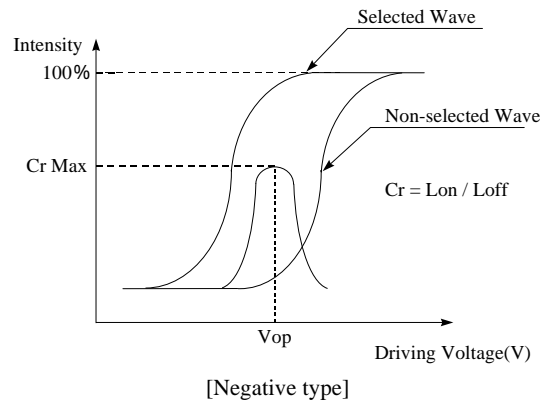
Note 4. Definition of response time

Non-selected Condition

Selected Condition

Non-selected Condition

Intensity

100 %

90 %

10 %

Tr

Tf

[positive type]

Non-selected Condition

Selected Condition

Non-selected Condition

Intensity

100 %

90 %

10 %

Tr

Tf

[Negative type]

INTERFACE PIN ASSIGNMENT

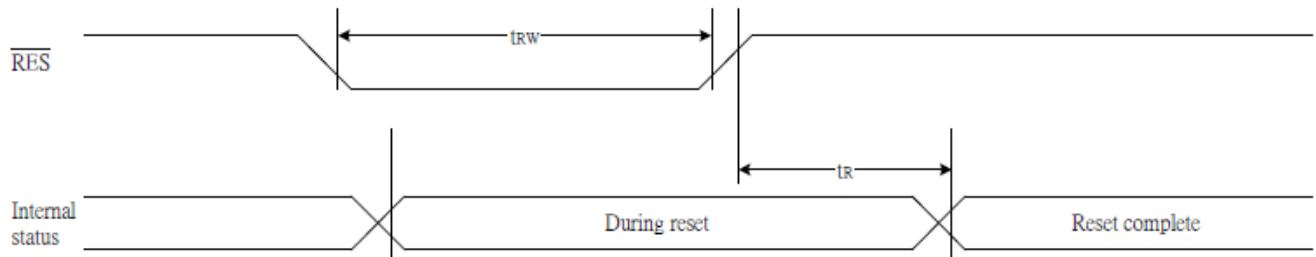| PIN	SYMBOL	FUNCTIONS
1	/CS	This is the chip select signal
2	/RES	settings are initialized
3	A0	" H" : Indicates that D0 to D7 are display data. " L" : Indicates that D0 to D7 are control data.
4	/WR	When R/W = " H" : Read. When R/W = " L" : Write
5	/RD	8080 6800
6	D0	This is an 8-bit
7	D1	This is an 8-bit
8	D2	This is an 8-bit
9	D3	This is an 8-bit
10	D4	This is an 8-bit
11	D5	This is an 8-bit
12	D6	This is an 8-bit
13	D7	This is an 8-bit
14	VDD	Power supply
15	VSS	Ground
16	VOUT	DC/DC voltage converter
17	C3+	DC/DC voltage converter
18	C1-	DC/DC voltage converter
19	C1+	DC/DC voltage converter
20	C2+	DC/DC voltage converter
21	C2-	DC/DC voltage converter
22	V4	V0 V1 V2 V3 V4 Vss
23	V3	V0 V1 V2 V3 V4 Vss
24	V2	V0 V1 V2 V3 V4 Vss
25	V1	V0 V1 V2 V3 V4 Vss
26	V0	V0 V1 V2 V3 V4 Vss
27	C86	" H" : 6800 Series MPU interface. C86 = " L" : 8080 MPU interface
28	PS	P/S = " H" : Parallel data input. P/S = " L" : Serial data input
29	A	LED+
30	K	LED-

TIMING CHARACTERISTICS

System Bus Read/Write Characteristics 1 (For the 8080 Series MPU)
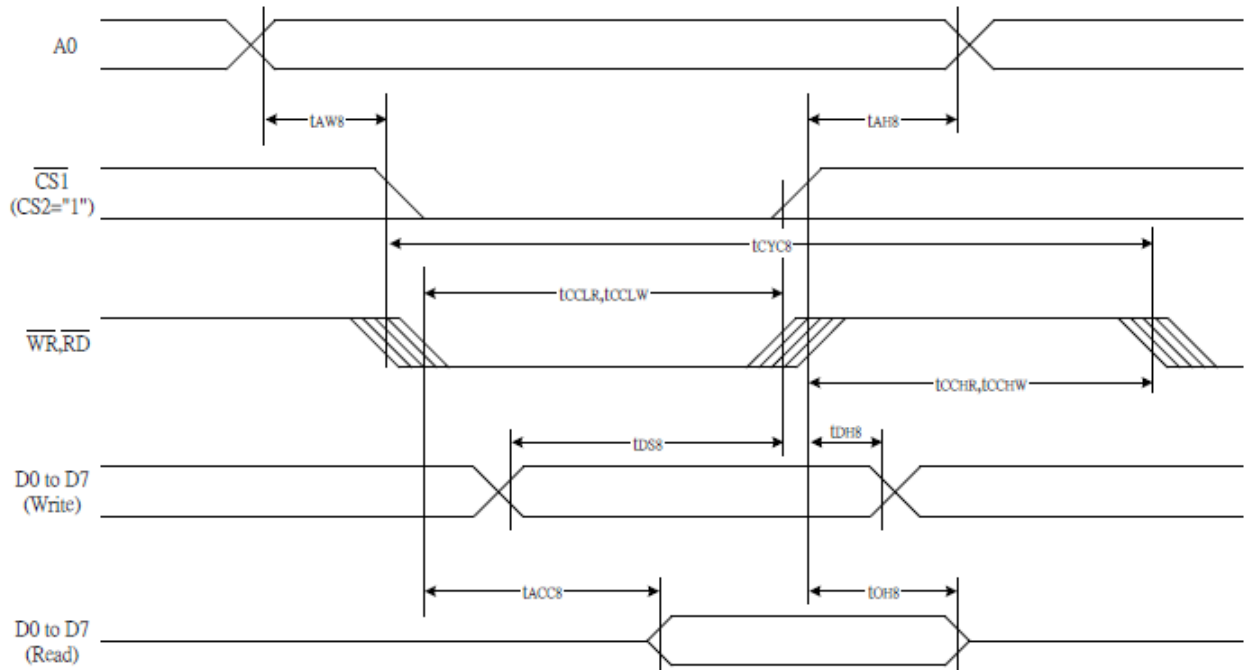
System Bus Read/Write Characteristics 2 (For the 6800 Series MPU)
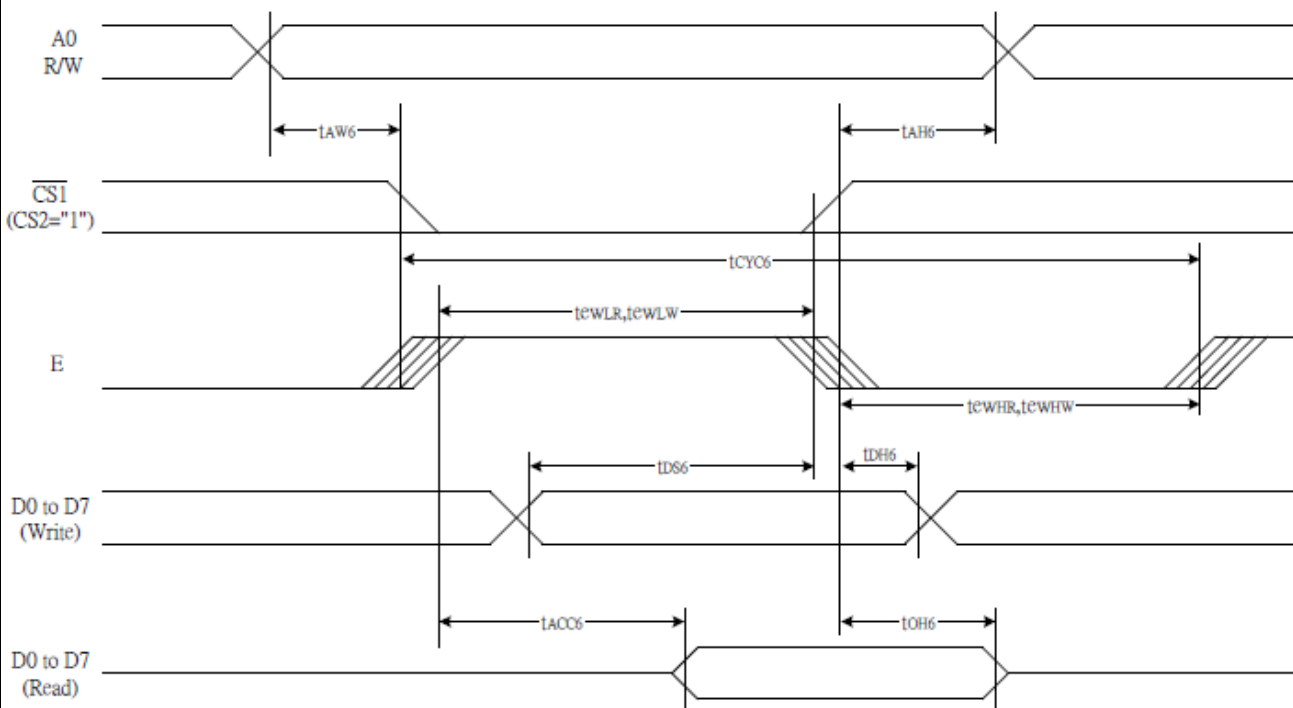
The Serial Interface
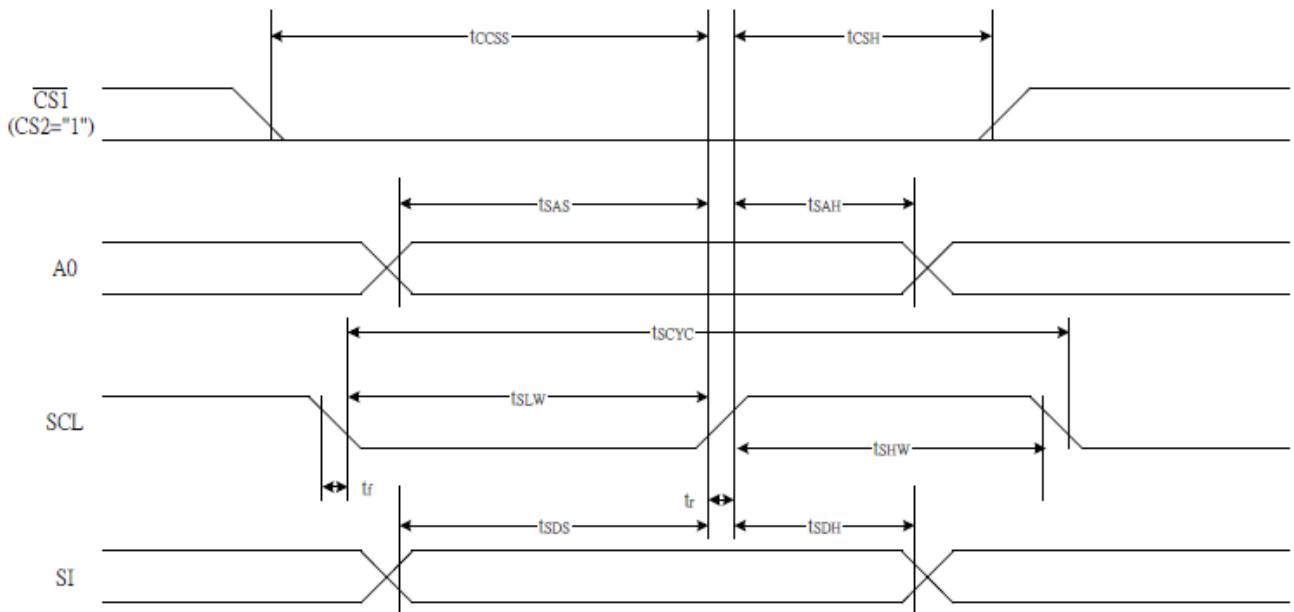
Reset Timing

DC CHARACTERISTICS

Item		Symbol	Condition		Rating			Units	Applicable Pin
					Min.	Typ.	Max.		
Operating Voltage (1)		V_{DD}			1.8	—	3.3	V	Vss*1
Operating Voltage (2)		V_{DD2}	(Relative to Vss)		2.4	—	3.3	V	Vss
High-level Input Voltage		V_{IHC}			0.8 x V_{DD}	—	V_{DD}	V	*3
Low-level Input Voltage		V_{ILC}			Vss	—	0.2 x V_{DD}	V	*3
High-level Output Voltage		V_{OHC}	I_{OH} = −0.5 mA		0.8 x V_{DD}	—	V_{DD}	V	*4
Low-level Output Voltage		V_{OLC}	I_{OL} = 0.5 mA		Vss	—	0.2 x V_{DD}	V	*4
Input leakage current		I_{LI}	V_{IN} = V_{DD} or Vss		−1.0	—	1.0	μA	*5
Output leakage current		I_{LO}	V_{IN} = V_{DD} or Vss		−3.0	—	3.0	μA	*6
Liquid Crystal Driver ON Resistance		R_{ON}	Ta = 25°C (Relative To V_{DD})	V_0 = 13.0 V	—	2.0	3.5	KΩ	SEGn COMn *7
				V_0 = 8.0 V	—	3.2	5.4		
Static Consumption Current		I_{SSQ}	V_0 = 13.0 V(Relative To V_{DD})		—	0.01	2	μA	V_{DD}, V_{DD2}
Output Leakage Current		I_{SQ}			—	0.01	10	μA	V0
Input Terminal Capacitance		C_{IN}	Ta = 25°C , f = 1 MHz		—	5.0	8.0	pF	
Oscillator Frequency	Internal Oscillator	f_{OSC}	1/65 duty 1/33 duty Ta = 25°C		17	20	24	kHz	*8
	External Input	f_{CL}			17	20	24	kHz	CL
	Internal Oscillator	f_{OSC}	1/49 duty 1/53 duty Ta = 25°C 1/55 duty		25	30	35	kHz	*8
	External Input	f_{CL}			25	30	35	kHz	CL

	Item	Symbol	Condition	Rating			Units	Applicable Pin
				Min.	Typ.	Max.		
Internal Power	Input voltage	V_{DD2}	(Relative To Vss)	2.4	—	3.3	V	Vss
	Supply Step-up output voltage Circuit	V_{OUT}	(Relative To Vss)	—	—	16.0	V	V_{OUT}
	Voltage regulator Circuit Operating Voltage	V_{OUT}	(Relative To Vss)	6.0	—	16.0	V	V_{OUT}
	Voltage Follower Circuit Operating Voltage	V_0	(Relative To Vss)	4.0	—	13.0	V	V0 * 9
	Base Voltage	V_R	Ta = 25°C , (Relative To Vss) −0.05%/°C	2.07	2.10	2.13	V	*10

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RELIABILITY

	No	Test Item	Content of Test	Test Condition
Environment Test	1	High Temperature Storage	Endurance test of high temperature for a long time.	80± 2 48Hrs
	2	Low Temperature Storage	Endurance test of low temperature for a long time.	-30± 2 48Hrs
	3	High Temperature Operation	Endurance test of electrical stress (Voltage & Current) and the thermal stress to the element.	70± 2 48Hrs
	4	Low Temperature Operation	Endurance test of electrical stress (Voltage & Current) and the thermal stress to the element	-20± 2 48Hrs
	5	High Temperature Humidity Storage	Endurance Test of high temperature and high humidity for a long time.	40± 2 70± 2%RH 48Hrs
	6	Thermal shock	Endurance test of low and high temperature cycles. (air to air) -10± 2 ⟷ 50± 2 (60min) ⟷ (60min)	10 cycle

Note: 1) When making the low temperature test, not to dewy.

2) Driving condition for operation test.

Power Supply Voltage for Logic System (VDD) =3.3V

Failure Judgment Criterion

After the above mentioned test.

(For Environmental Test, after 2 hours in room temperature.)

There should not be conspicuous failure of display quality and appearance.

2) Contrast ratio should be 50% of the initial contrast ratio.

3) There should not have any abnormality of functions.

SHIPMENT STANDARD

1 The Voltage Standard of Mass Production & Shipments: Vop should between +____ V ~ -____V (With an allowance of ±0.2V). If not acceptable, please inform the sales from SHENZHEN JINGTENG OPTOELECTRONICS Co., LTD.

量产出货时电压标准：Vop 控制在承认样品的 +____V ~ -____V 之间,（空白表明接受公司标准：±0.2V）
若有异议，请向深圳市   光电有限公司的业务人员提出

2 For product quality standard, please refer to "LCD Outgoing Quality Standard" and "Product Specifications". If there are any special requirements or disagreements, please inform the sales from SHENZHEN JINGTENG OPTOELECTRONICS Co., LTD.

出货质量标准见深圳市   光电有限公司的《LCM 出货标准》或《产品规格书》若对出货标准有异议或有特别
要求，请向深圳市蓝龙光电有限公司的业务人员提出

PACKAGING MODE
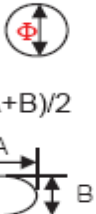
普通包装/ Regular Packaging
中性包装/Neutral Packaging
内包装使用"ROHS"标签/Symbolize the "RoHS" on the internal package
外包装使用"ROHS"标签/Symbolize the "RoHS" on the external package
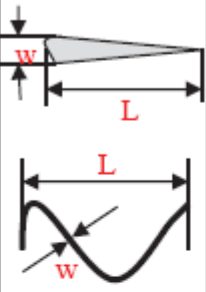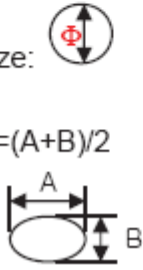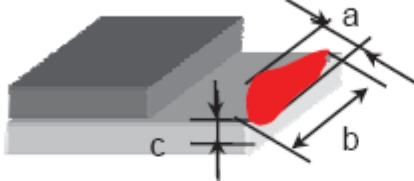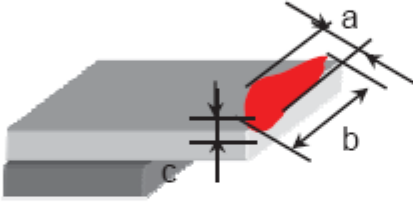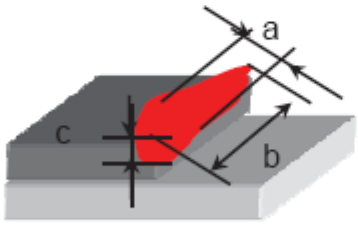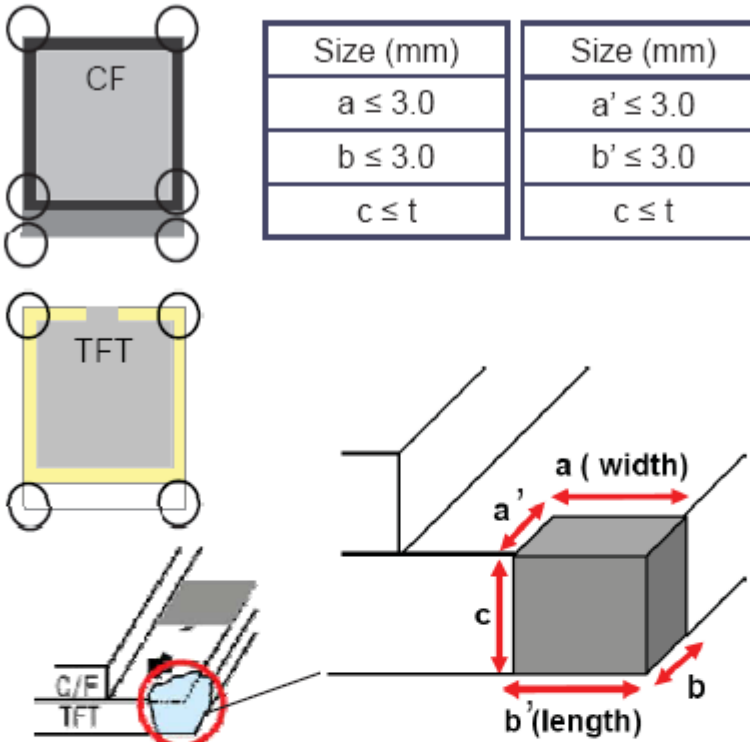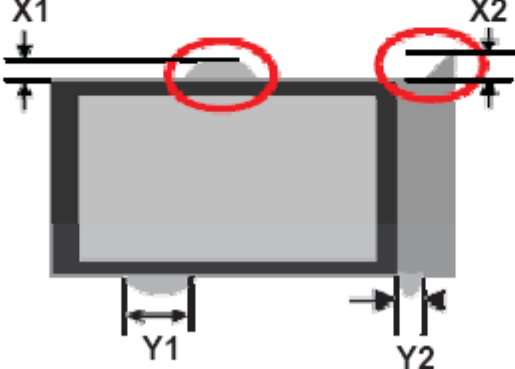
INSPECTION CRITERIA

Item	Criterion for Defects	Defect Type	Remark
Non Display	Non Display is not allowed	Major	
Line Defect	All Kinds of Line defects Such as Vertical, Horizontal, Cross are not allowed	Major	
Unnormally display	display unnormally is not allowed (data crack)	Major	
Panel	Leakage of liquid crystal is not acceptable	Major	
[Spot] Black Spot White Spot Bright Spot Foreign Particle Pinhole Dimple	Size: $\Phi=(A+B)/2$ 	Size(mm)	Acceptable Number
---	---
$\Phi \le 0.15$	2
$0.15 < \Phi \le 0.25$	1 | * Distance $\ge$ 5mm	Minor	

Item	Criterion for Defects	Defect Type	Remark
[Line] Black Line White Line Foreign Particle Scratch	* If we cannot see any line in the appropriate operating condition of LCM, It is Acceptable | Width(mm)	Length(mm)	Qty
---	---	---
$W \le 0.03$	$L \le 2$	2
$0.03 < W \le 0.05$	$2 < L \le 4$	1		Minor	
Polarizer Defect . Dent . Bubble	Size: $\Phi=(A+B)/2$ 	Size(mm)	Acceptable Number
---	---
$\Phi \le 0.15$	Ignore
$0.15 < \Phi \le 0.25$	2
$0.25 < \Phi \le 0.30$	1
$0.3 < \Phi$	0		Minor	

Item	Criterion for Defects	Defect Type	Remark
Glass Defect	Progressive crack is not allowed	Major	
	Chipping [Pad area] — Size (mm): a ≤ 0.5, b: Ignore, c ≤ t	Minor	
	Chipping [Real of Pad area] — Size (mm): a ≤ 1.0, b: Ignore, c ≤ t		
	Side Chipping [Except of Pad area] — Size (mm): a ≤ 1.0, b: Ignore, c ≤ t		

Item	Criterion for Defects	Defect Type	Remark
Glass Defect	**Chipping [Corner]** CF TFT 	Minor	

Size (mm)	Size (mm)
$a \leq 3.0$	$a' \leq 3.0$
$b \leq 3.0$	$b' \leq 3.0$
$c \leq t$	$c \leq t$

a (width)
a'
c
b
b' (length)

C/F
TFT

Glass burr

X1   X2

Y1   Y2

Width (mm)	Length (mm)	Acc. Number
X1, X2 ≤ 0.2	Y1, Y2: Ignore	Ignore
0.2 < X1, X2	-	0

Minor

Item	Criterion for Defects	Defect Type	Remark
Polarizer Defect Edge Bubble	(BM Area) (BM Area) (b) Width Line Bubble Dot Bubble (a) Depth 	구분	Size
Dot Type	a ≤ BM Area 50%, b : Ignore
Line Type	a ≤ BM Area 50%, b : Ignore | ※ The size measurement is adhesive POL of the criterion	Minor	

Precaution for use of LCD module

11.1、Handling Precautions

1) The display panel is made of glass. Do not subject it to a mechanical shock by dropping it   from a high place, etc.

2) If the display panel is damaged and the liquid crystal substance inside it leaks out ,be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly 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.

4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

5) If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

--Isopropyl alcohol

--Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer.

Especially, do not use the following:

--Water

--Ketone

--Aromatic solvents

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

11.2、Assembling Precautions

1) When mounting the LCD module make sure that it is free of twisting, warping, and distortion. Distortion has great influence upon display quality. Also keep the stiffness enough regarding the outer case.

2) Please handle the LCD module by its side.

3) NC terminal should be open. Do not connect anything.

4) If the logic circuit power is OFF, do not apply the input signals.

5) To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

·Be sure to ground the body when handling the LCD module.

·Tools required for assembly, such as soldering irons, must be properly grounded.

·To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

·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.

6) Be careful when treating the glass panel because it has very sharpened edge.

11.3、Storage Precautions

1) When storing the LCD module, avoid exposure to direct sunlight of to the light of fluorescent lamps and high temperature/high humidity. Whenever possible, the LCD module should be stored in the same conditions in which they were shipped from our company.

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

11.4、Design Precautions

The absolute maximum ratings represent the rated value beyond which LCD module can not

1) exceed. When the LCD modules are used in excess of this rated value, their operation characteristics may be adversely affected.

2) To prevent the occurrence of erroneous operation caused by noise, attention must be paid to satisfy

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V_{IL}, V_{IH} specification values including taking the precaution of using signal cables that are short.

3) The LCD exhibits temperature dependency characteristics. Since recognition of the display becomes difficult when the LCD is used outside its designated operating temperature range, be sure to use the LCD within this range. Also keep in mind that the LCD driving voltage levels necessary for clear displays will vary according to temperature.

4) We recommended that power supply lines (VDD) have over-current protection line. (Fuse etc. Recommend Value:0.5A)

5) Sufficiently notice the mutual noise interference occurred by peripheral devices.

6) To cope with EMI, take measures basically on outputting side.

7) When installing an LCD module, fasten it at the LCD panel.

8) The display panel is made of general float glass which is not guaranteed for strength. So please consider about following.

·Do not subject panel to a mechanical shock by dropping directly.

·Do not let case to touch to panel directly.

Others

1) Liquid crystal solidifies 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 LCD module is subjected to a strong shock at 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 module's resulting from destruction caused by static electricity, etc., exercise care to avoid touching the following section when handling this module: LCD's Terminal electrode sections.

4) Optimum voltage to obtain best contrast value depending on products. Therefore voltage adjustment with electric volume is required in each display.

5) Precaution for disposal of LCD module. When disposal of LCD module, ask specialization company of industrial waste which is permitted by the government. When burn up LCD module, obey the law of environmental hygienics.

wash it off well with soap and water.

PACKING METHOD