



深圳市晶达显示技术有限公司
Shenzhen Jingda Display Technology Co., Ltd.

Product Specification For LCD Module

Model NO.: JDA1602-18079B2

CUSTOMER ITEM NO.:

REVISION : 01

☐ APPROVAL FOR SPECIFICATIONS ONLY

☒ APPROVAL FOR SPECIFICATIONS AND SAMPLE

CUSTOMER :

APPROVED BY :

JDA LCM R&D CENTER

APPROVED BY

CHECKED BY

DIRECTOR

MANAGER

地址：广东省深圳市坪山区坑梓街道沙田社区
开沃大厦新能源汽车基地c1605

地 址：13554851379

电 话：13554851379

传 真：13554851379

<https://www.szjd-display.com/>

深圳市晶达显示技术有限公司 Shenzhen Jingda Display Technology Co., Ltd	MODEL NO.		PAGE
		SPEC SAMPLE	2

2. TABLE OF CONTENTS

NO	CONTENTS	PAGE
1	COVER	1
2	TABLE OF CONTENTS	2
3	RECORD OF REVISION	3
4	GENERAL SPECIFICATION	4
5	LCD ELECTRO-OPTICAL CHARACTERISTICS	5
6	LCD OPTICAL CHARACTERISTICS	5
7	OPTICAL CHARACTERISTICS DEFINITION	6
8	INTERFACE PIN ASSIGNMENT	7
9	BACKLIGHT	8
10	BLOCK DIAGRAM	9
11	ELECTRICAL CHARACTERSITICS	10-13
12	INITIALIZATION OF LCM	14-19
13	RELIABLITY	20
14	INSPECTION CRITERIA	21-22
15	PRECAUTION FOR USE OF LCD MODULE	23-24
16	DIMENSIONAL OUTLINE	25

[illegible]

深圳市晶达显示技术有限公司 Shenzhen Jingda Display Technology Co., Ltd	MODEL NO.		PAGE
		SPEC SAMPLE	4

4. GENERAL SPECIFICATION

ITEM	CONTENTS
Module Size	80(W) ×36 (H)×11(T) mm(Without PIN)
Display View Area	64.5(W)×14.5(H) mm
LCD Type	STN/NEGATIVE/BLUE
View Angle	12 O'clock
Driver IC	AIP31066L/AIP3165LC OR COMPATIBLE
Backlight Driver type	LED/WHITE
Weight	TAB

深圳市晶达显示技术有限公司 Shenzhen Jingda Display Technology Co., Ltd	MODEL NO.		PAGE
		SPEC SAMPLE	5

5.LCD ELECTRO-OPTICAL CHARACTERISTICS (Ta =25℃)

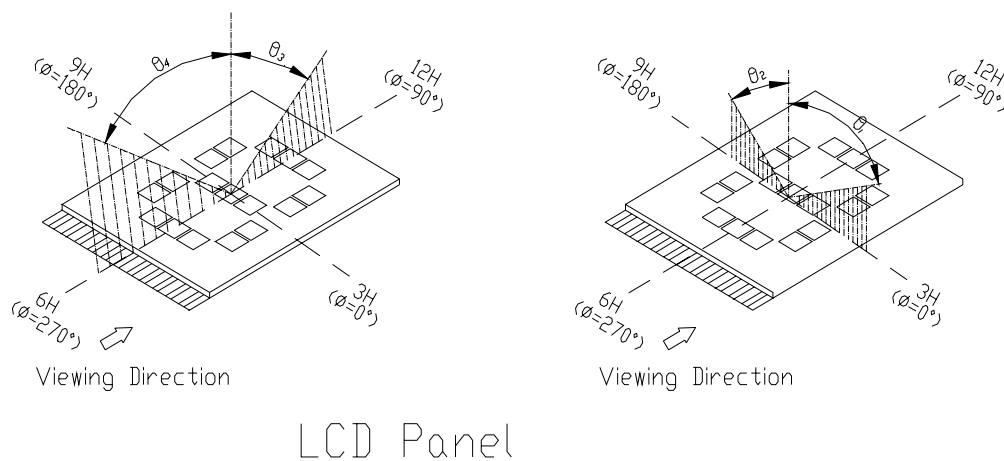
Item	Symbol	Condition	Min.	Typ.	Max.	Unit
LCD Module Driving Voltage	VDD	Ta=25℃	4.8	5.0	5.3	Volt
Operating Temperature	Top	--	-0 ℃	-	+50℃	℃
Storage Temperature	Tst	--	-10℃	-	+60℃	℃
Humidity	%	--	--	--	90%	

6. LCD OPTICAL CHARACTERISTICS

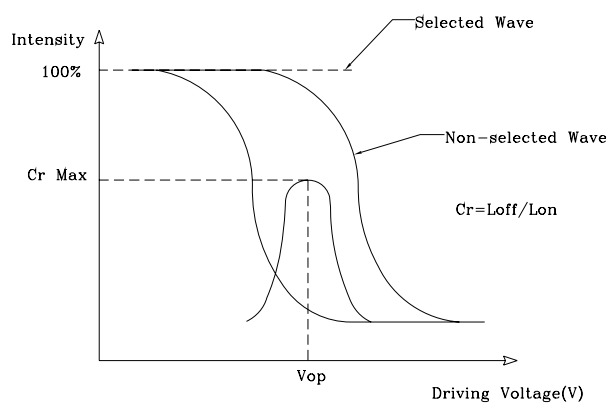
Item		Symbol	Temp(℃)	Rating			Unit	Reference
				Min	Typ	Max		
Recommended Driving Voltage		Vop	-20	4.6	4.8	5.0	V	
			25	4.5	4.7	4.9		
			70	4.0	4.2	4.4		
Response Time	Rise Time	Tr	25		180	230	ms	Note4
	Fall Time	Tf	25		180	230		
Frame Frequency		FR	25	70	75	80	Hz	
Viewing angle Cr≥2	Ø=0°	θ ₁	25	30	35		Deg	Note1
	Ø=180°	θ ₂		30	35			
	Ø=90°	θ ₃		15	20			
	Ø=270°	θ ₄		30	35			
Viewing Direction			6 O'clock					
Contrast Ratio	Cr		25	6	8			Note3

7. OPTICAL CHARACTERISTICS DEFINITION

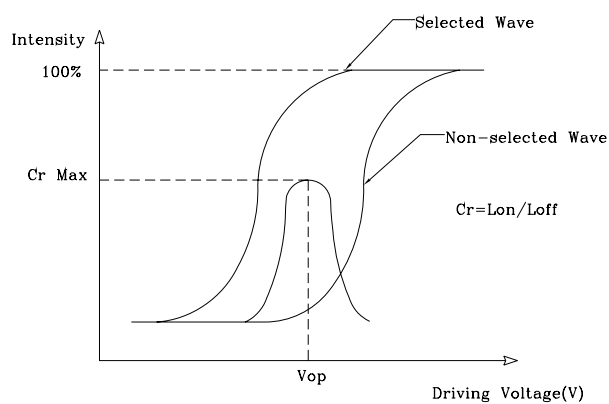
Note 1. Definition of angle $\theta 1$ & $\theta 2$, $\theta 3$ & $\theta 4$



Note 3. Definition of contrast ratio (Cr2)

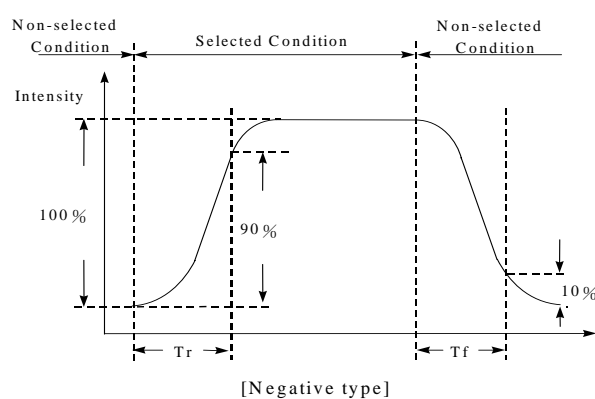
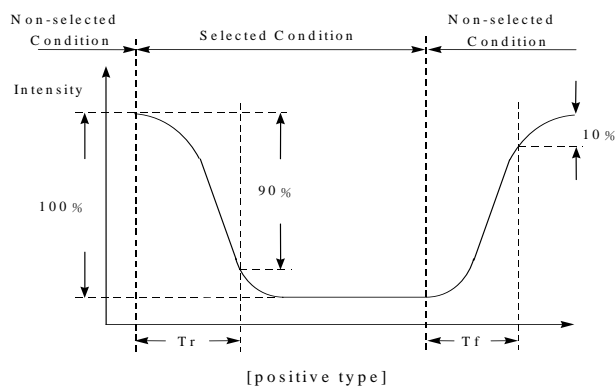


[Positive type]



[Negative type]

Note 4. Definition of response time



8. INTERFACE PIN ASSIGNMENT

PIN	SYMBOL	FUNCTIONS
1	VSS	Ground
2	VDD	Power supply (3.3V)
3	V0	Operation Voltage for LCD(NC)
4	RS	H:Data L:Instruction
5	R/W	H:read L:write
6	E	Enable signal
7	DB0	Data bus line
8	DB1	Data bus line
9	DB2	Data bus line
10	DB3	Data bus line
11	DB4	Data bus line
12	DB5	Data bus line
13	DB6	Data bus line
14	DB7	Data bus line
15	A	Backlight power supply (3.3V)
16	K	Backlight power ground

深圳市晶达显示技术有限公司 Shenzhen Jingda Display Technology Co., Ltd	MODEL NO.		PAGE
		SPEC SAMPLE	8

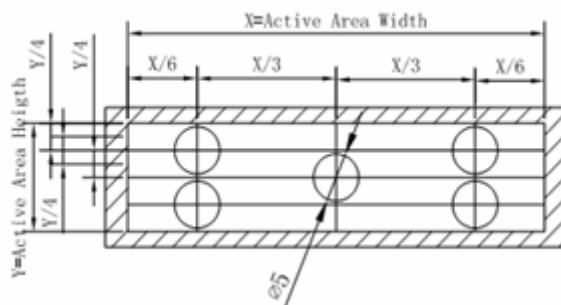
9. BACKLIGHT

BACKLIGHT ELECTRICAL-OPTICAL CHARACTERISTICS (Unless specified, Ambient temperature Ta=25°C)

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Reference
Supply Current I	-	15	-	mA			
WHITE LED	V	-	3.0	-	V		
Backlight Luminous Intensity	Lv	--	700	--	lm/m ²	33mA	Note1
Uniformity	--	60	90	100	%	33mA	Note1 Note2

NOTE:

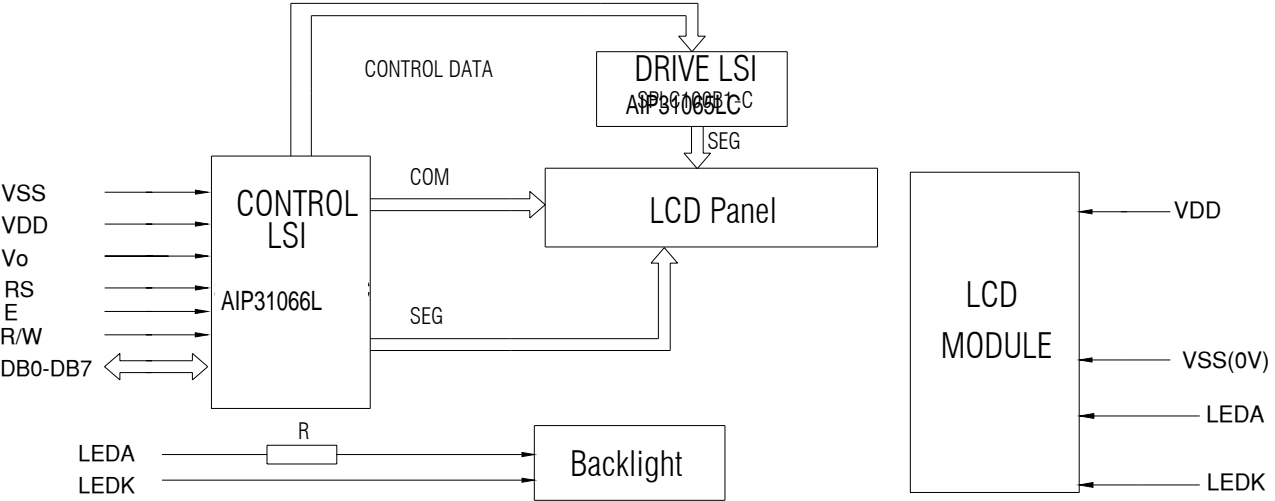
1. Backlight luminance: The measurement instrument is BM-7 luminance colorimeter. The aperture of colorimeter is $\varnothing 5\text{mm}$ and the distance between lens and backlight is 50cm. 5 points will be measured and the luminance of backlight is the average value of 5 points.



2. Backlight Uniformity = (The Luminance min / The Luminance max) x 100%

<div> <div>深圳市晶达显示技术有限公司</div> <div>Shenzhen Jingda Display Technology Co., Ltd</div> </div>	MODEL NO.		PAGE
		SPEC SAMPLE	9

10.BLOCK DIAGRAM



深圳市晶达显示技术有限公司 Shenzhen Jingda Display Technology Co., Ltd	MODEL NO.		PAGE
		SPEC SAMPLE	1 0

11. ELECTRICAL CHARACTERISTICS

11.1 DC characteristics (VDD=2.7V-4.5V,TA=25°C)

Characteristics	Symbol	Limit			Unit	Test Condition
		Min.	Typ.	Max.		
Operating Current	I _{DD}	-	0.2	0.4	mA	External clock (Note)
Input High Voltage	V _{IH1}	0.7VDD	-	VDD	V	Pins:(E, RS, R/W, DB0 - DB7)
Input Low Voltage	V _{IL1}	-0.3	-	0.55	V	
Input High Voltage	V _{IH2}	0.7VDD	-	VDD	V	Pin OSC1
Input Low Voltage	V _{IL2}	-0.2	-	0.2VDD	V	
Input High Current	I _{IH}	-1.0	-	1.0	μA	Pins: (RS, R/W, DB0 - DB7) VDD = 3.0V
Input Low Current	I _{IL}	-10.0	-50	-120	μA	
Output High Voltage (TTL)	V _{OH1}	0.75VDD	-	-	V	I _{OH} = - 0.1mA Pins: DB0 - DB7
Output Low Voltage (TTL)	V _{OL1}	-	-	0.2VDD	V	I _{OL} = 0.1mA Pins: DB0 - DB7
Output High Voltage (CMOS)	V _{OH2}	0.8VDD	-	-	V	I _{OH} = - 40μA, Pins: CL1, CL2, M, D
Output Low Voltage (CMOS)	V _{OL2}	-	-	0.2VDD	V	I _{OL} = 40μA, Pins: CL1, CL2, M, D
Driver ON Resistance (COM)	R _{COM}	-	-	20	KΩ	I _O = ±50μA, V _{LCD} = 4.0V Pins: COM1 - COM16
Driver ON Resistance (SEG)	R _{SEG}	-	-	30	KΩ	I _O = ±50μA, V _{LCD} = 4.0V Pins: SEG1 - SEG40
LCD Voltage	V _{LCD}	3.0	-	8.0	V	VDD-V5, 1/4 bias or 1/5 bias

Note: F_{OSC} = 250KHz, VDD = 3.0V, pin E = "L", RS, R/W, DB0 - DB7 are open, all outputs are no loads.

11.2 AC characteristics(VDD=2.7V-4.5V,TA=25°C)

Write mode (writing data from MPU to SPLC780D)

Characteristics	Symbol	Limit			Unit	Test Condition
		Min.	Typ.	Max.		
E Cycle Time	t _C	1000	-	-	ns	Pin E
E Pulse Width	t _{PW}	450	-	-	ns	Pin E
E Rise/Fall Time	t _R , t _F	-	-	25	ns	Pin E
Address Setup Time	t _{SP1}	60	-	-	ns	Pins: RS, R/W, E
Address Hold Time	t _{HD1}	20	-	-	ns	Pins: RS, R/W, E
Data Setup Time	t _{SP2}	195	-	-	ns	Pins: DB0 - DB7
Data Hold Time	t _{HD2}	10	-	-	ns	Pins: DB0 - DB7

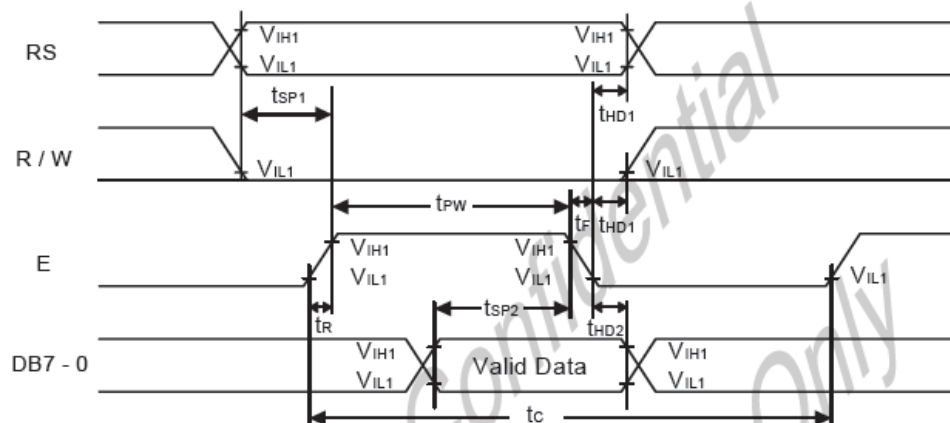


Figure 3. Write Mode Timing Diagram

Read mode (reading data from SPLC780D to MPU)

Characteristics	Symbol	Limit			Unit	Test Condition
		Min.	Typ.	Max.		
E Cycle Time	t_c	400	-	-	ns	Pin E
E Pulse Width	t_{PW}	150	-	-	ns	Pin E
E Rise/Fall Time	t_R, t_F	-	-	25	ns	Pin E
Address Setup Time	t_{SP1}	30	-	-	ns	Pins: RS, R/W, E
Address Hold Time	t_{HD1}	10	-	-	ns	Pins: RS, R/W, E
Data Output Delay Time	t_D	-	-	100	ns	Pins: DB0 - DB7
Data hold time	t_{HD2}	5.0	-	-	ns	Pin DB0 - DB7

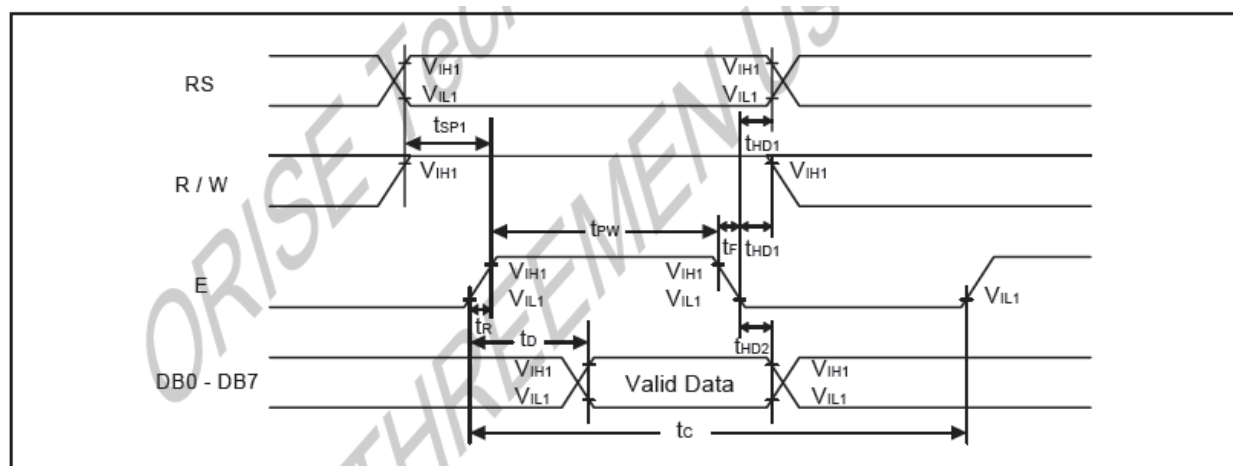


Figure 4. Read Mode Timing Diagram

Interface mode with LCD driver

Characteristics	Symbol	Limit			Unit	Test Condition
		Min.	Typ.	Max.		
Clock pulse width high	t_{PWH}	800	-	-	ns	Pins: CL1, CL2
Clock pulse width low	t_{PWL}	800	-	-	ns	Pins: CL1, CL2
Clock setup time	t_{CSP}	500	-	-	ns	Pins: CL1, CL2
Data setup time	t_{DSP}	300	-	-	ns	Pins: D
Data hold time	t_{HD}	300	-	-	ns	Pins: D
M delay time	t_D	-1000	-	1000	ns	Pins: M

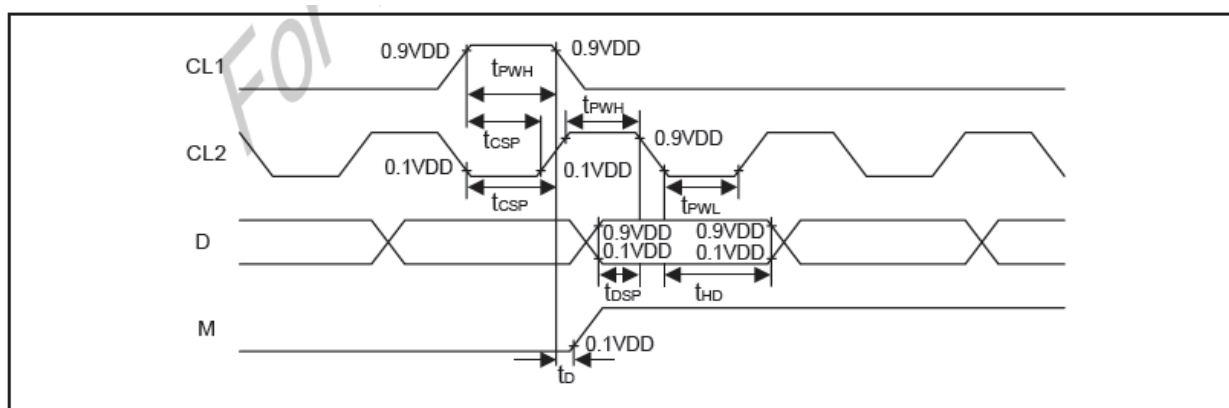


Figure 5. Interface Mode With Extension Driver Timing Diagram

INTERFACING TO MPU

There are two types of data operations: 4-bit and 8-bit operations. Using 4-bit MPU, the interfacing 4-bit data is transferred by 4-busline (DB4 to DB7). Thus, DB0 to DB3 bus lines are not used. Using 4-bit MPU to interface 8-bit data requires two times transferring. First, the higher 4-bit data is transferred by 4-busline (for 8-bit operation, DB7 to DB4). Secondly, the lower 4-bit data is transferred by 4-busline (for 8-bit operation, DB3 to DB0). For 8-bit MPU, the 8-bit data is transferred by 8-buslines (DB0 to DB7).

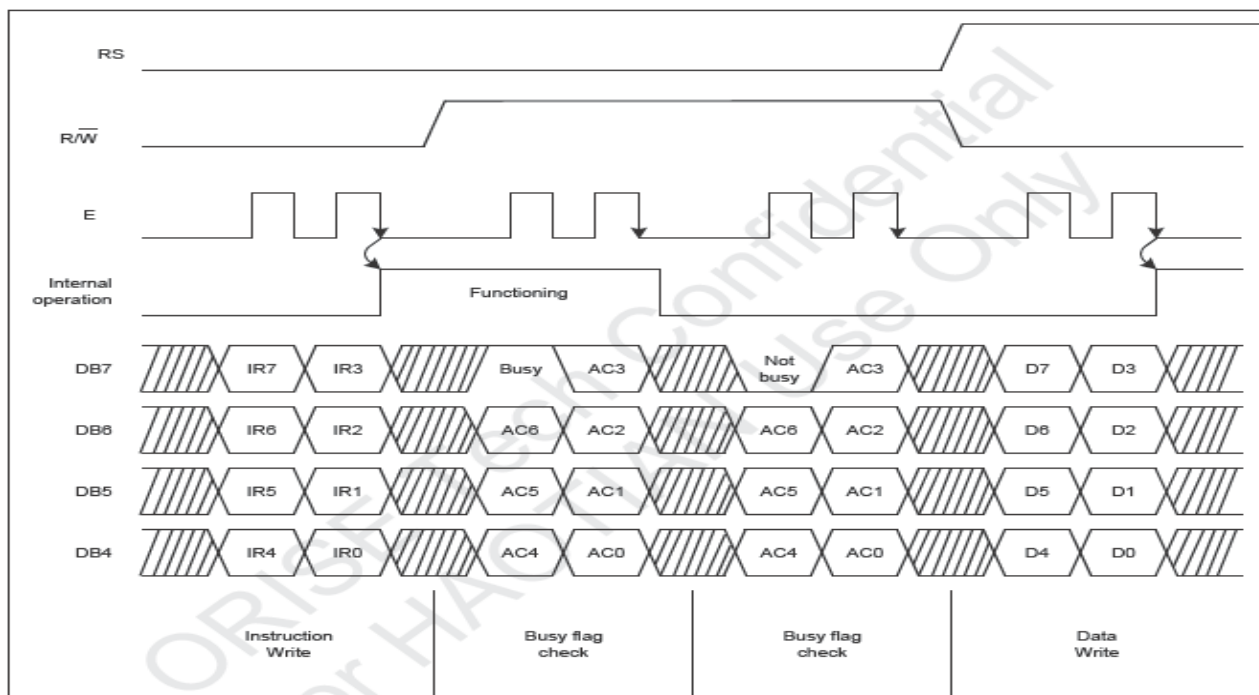
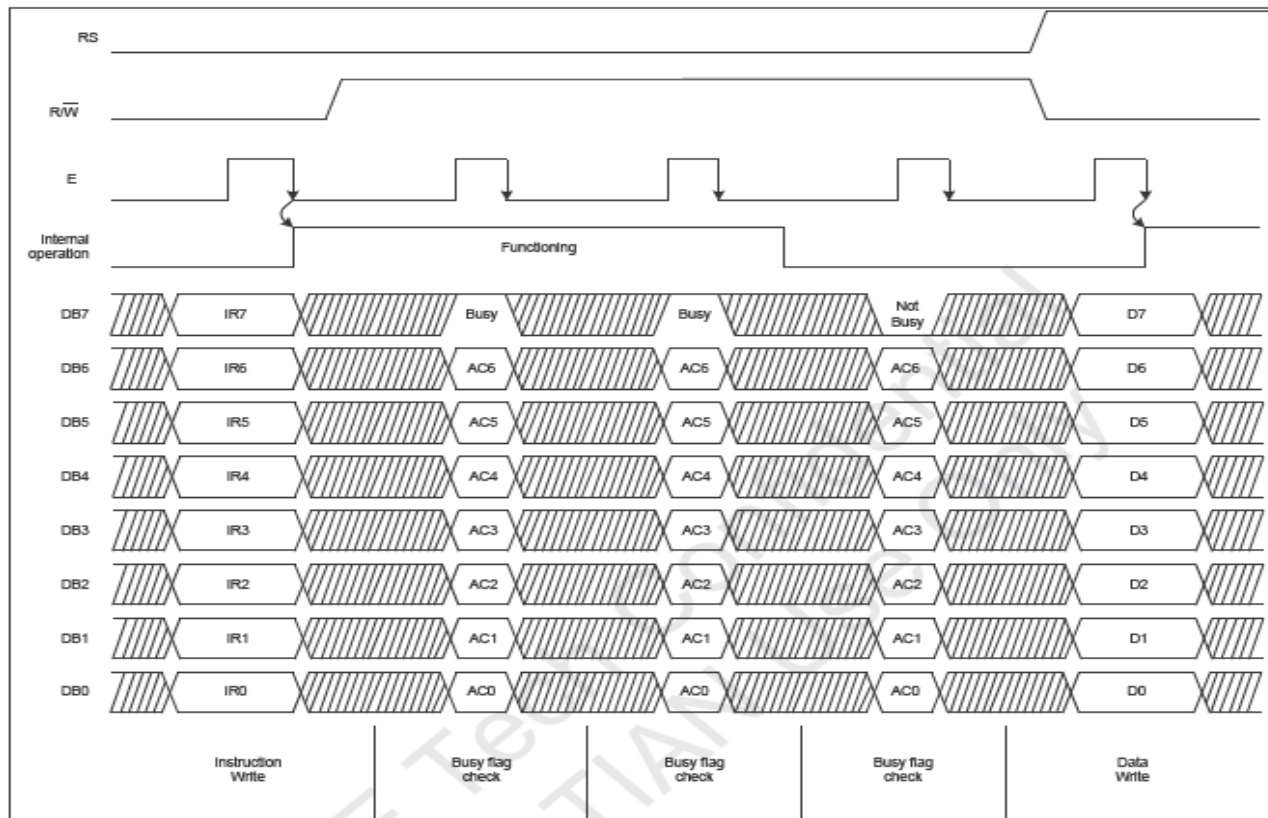


Figure 6. Example of 4-bit Data Transfer Timing Sequence



12. INITIALIZATION OF LCM

At power on, SPLC780D1 starts the internal auto-reset circuit and executes the initial instructions. The initial procedures are shown as follows:

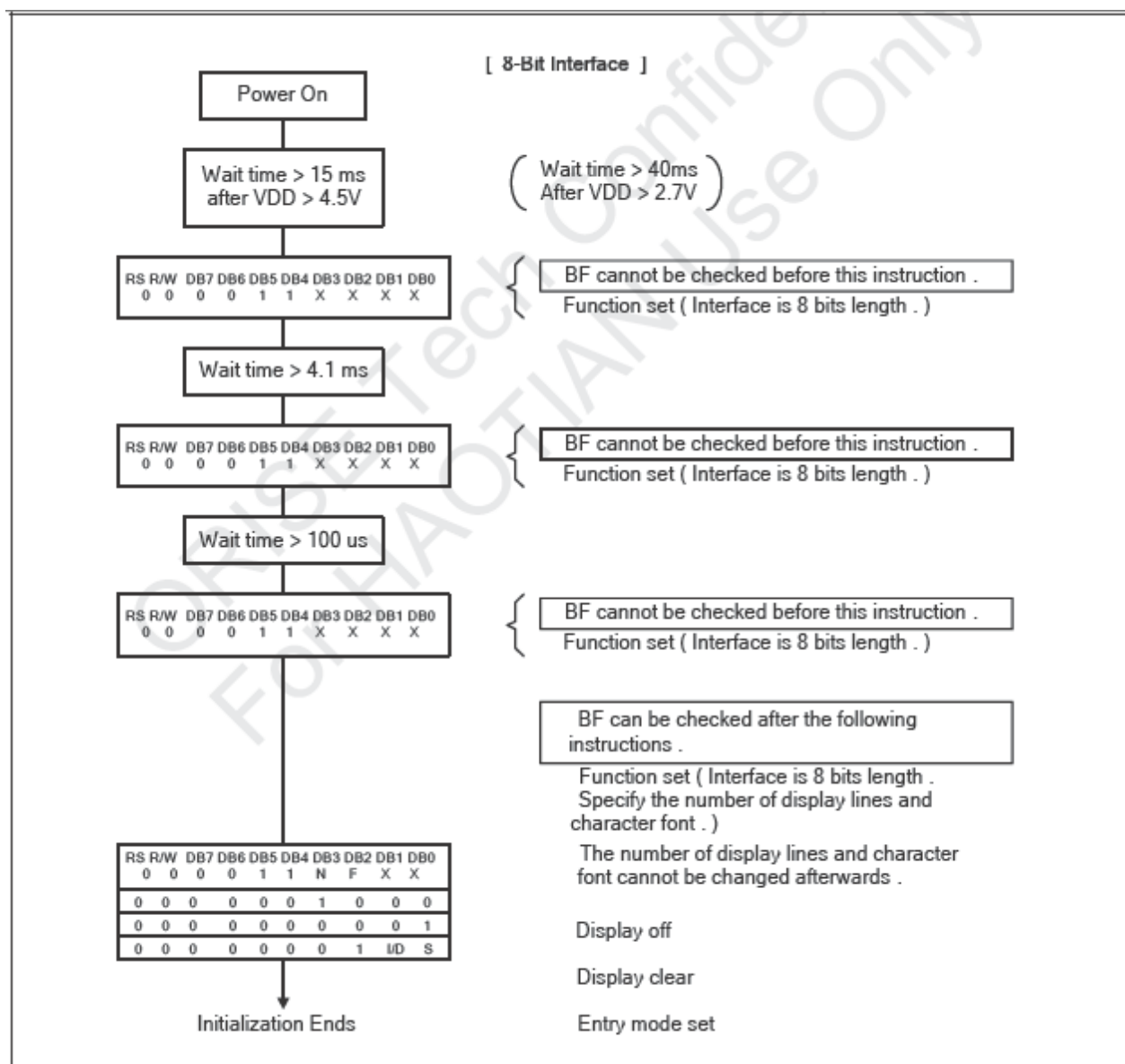
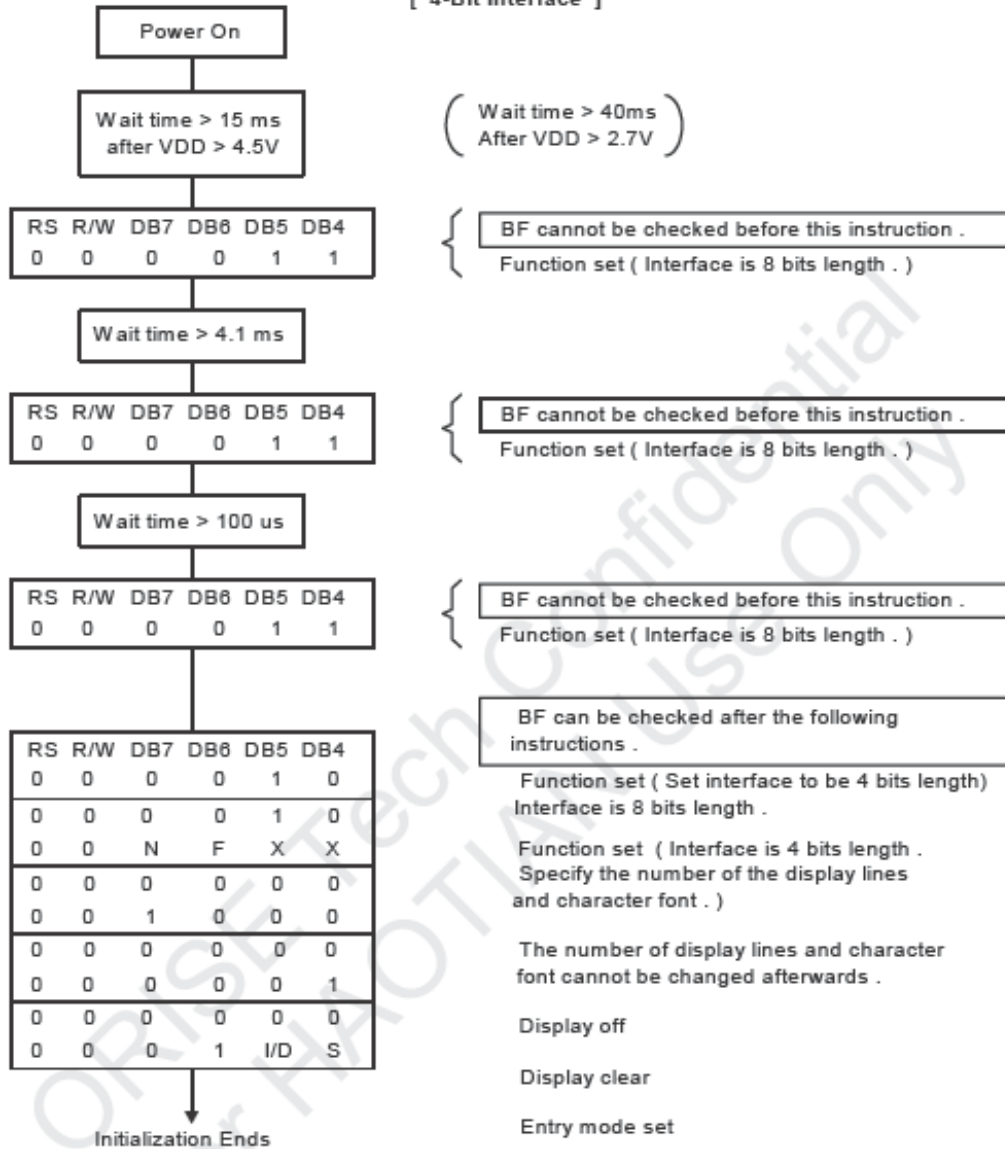


Figure 8. 8-bit Interface

[4-Bit Interface]



Instruction Table

Instruction	Instruction Code										Description	Execution time (Temp = 25℃)		
	RS	RW	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0		Fosc= 190KHz	Fosc= 270KHz	Fosc= 350KHz
Clear Display	0	0	0	0	0	0	0	0	0	1	Write "20H" to DDRAM and set DDRAM address to "00H" from AC	2.16ms	1.52ms	1.18ms
Return Home	0	0	0	0	0	0	0	0	1	-	Set DDRAM address to "00H" from AC and return cursor to its original position if shifted. The contents of DDRAM are not changed.	2.16ms	1.52ms	1.18ms
Entry Mode Set	0	0	0	0	0	0	0	1	I/D	S	Assign cursor moving direction and enable the shift of entire display	53μs	38μs	29μs
Display ON/ OFF Control	0	0	0	0	0	0	1	D	C	B	Set display (D), cursor(C), and blinking of cursor(B) on/off control bit.	53μs	38μs	29μs
Cursor or Display Shift	0	0	0	0	0	1	S/C	R/L	-	-	Set cursor moving and display shift control bit, and the direction, without changing of DDRAM data.	53μs	38μs	29μs
Function Set	0	0	0	0	1	DL	N	F	-	-	Set interface data length (DL: 8-bit/4-bit), numbers of display line (N: 2-line/1-line) and, display font type (F:5x10 dots/5x8 dots)	53μs	38μs	29μs
Set CGRAM Address	0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0	Set CGRAM address in address counter.	53μs	38μs	29μs
Set DDRAM Address	0	0	1	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Set DDRAM address in address counter	53μs	38μs	29μs
Read Busy Flag and Address Counter	0	1	BF	AC6	AC5	AC4	AC3	AC2	AC1	AC0	Whether during internal operation or not can be known by reading BF. The contents of address counter can also be read.			
Write Data to RAM	1	0	D7	D6	D5	D4	D3	D2	D1	D0	Write data into internal RAM (DDRAM/CGRAM).	53μs	38μs	29μs
Read Data from RAM	1	1	D7	D6	D5	D4	D3	D2	D1	D0	Read data from internal RAM (DDRAM/CGRAM).	53μs	38μs	29μs

Note1: "--": don't care

Note2: In the operation condition under -20℃ ~ 75℃, the maximum execution time for majority of instruction sets is 100us, except two instructions, "Clear Display" and "Return Home", in which maximum execution time can take up to 4.1ms.

Character Generator RAM

Character Code (DD RAM Data)								CG RAM Address						Character Patterns (CG RAM Data)							
b7	b6	b5	b4	b3	b2	b1	b0	b5	b4	b3	b2	b1	b0	b7	b6	b5	b4	b3	b2	b1	b0
0	0	0	0	X	0	0	0	0	0	0	0	0	0	X	X	X	1	1	1	1	1
																	0	0	1	0	0
																	0	0	1	0	0
																	0	0	1	0	0
																	0	0	1	0	0
																	0	0	1	0	0
																	0	0	1	0	0
																	0	0	1	0	0
0	0	0	0	X	0	0	1	0	0	1	0	0	1	X	X	X	0	1	1	1	0
																	0	0	1	0	0
																	0	0	1	0	0
																	0	0	1	0	0
																	0	0	1	0	0
																	0	0	1	0	0
																	0	0	1	0	0
																	0	1	1	1	0
																	0	0	0	0	0

Character Pattern Example (1)

Cursor Position

Character Pattern Example (2)

Note1: It means that the bit0~2 of the character code correspond to the bit3~5 of the CG RAM address.

Note2: These areas are not used for display, but can be used for the general data RAM.

Note3: When all of the bit4~7 of the character code are 0, CG RAM character patterns are selected.

Note4: "1": Selected, "0": No selected, "X": Do not care (0 or 1).

Note5: For example (1), set character code (b2 = b1 = b0 = 0, b3 = 0 or 1, b7-b4 = 0) to display "T". That means character code (00) 16, and (08) 16 can display "T" character.

Note6: The bits 0-2 of the character code RAM is the character pattern line position. The 8th line is the cursor position and display is formed by logical OR with the cursor.

4-bit Operation and 8-Digit 1-Line Display(Using Internal Reset)

No.	Instruction	Display	Operation
1	Power on. (SPLC780D1 starts initializing)		Power on reset. No display.
2	Function set RS R/W DB7 DB6 DB5 DB4 0 0 0 0 1 0		Set to 4-bit operation.
3	0 0 0 0 1 0 0 0 0 0 X X		Set to 4-bit operation and select 1-line display line and character font.
4	0 0 0 0 0 0 0 0 1 1 1 0	-	Display on. Cursor appears.
5	0 0 0 0 0 0 0 0 0 1 1 0	-	Increase address by one. It will shift the cursor to the right when writing to the DD RAM / CG RAM. Now the display has no shift.
6	1 0 0 1 0 1 1 0 0 1 1 1	W-	Write " W ". The cursor is incremented by one and shifted to the right.

8-bit Operation and 8-Digit 2-Line Display(Using Internal Reset)

No.	Instruction	Display	Operation
1	Power on. (SPLC780D1 starts initializing)		Power on reset. No display.
2	Function set RS R/W DB7 DB6 DB5 DB4 DB3 DB2 DB1 DB0 0 0 0 0 1 1 1 0 X X		Set to 8-bit operation and select 2-line display line and 5 x 8 dot character font.
3	Display on / off control 0 0 0 0 0 0 1 1 1 0	-	Display on. Cursor appear.
4	Entry mode set 0 0 0 0 0 0 0 1 1 0	-	Increase address by one. It will shift the cursor to the right when writing to the DD RAM / CG RAM. Now the display has no shift.
5	Write data to CG RAM / DD RAM 1 0 0 1 0 1 0 1 1 1	W-	Write " W ". The cursor is incremented by one and shifted to the right.
6	:	:	:
7	Write data to CG RAM / DD RAM 1 0 0 1 0 0 0 1 0 1	WELCOME-	Write " E ". The cursor is incremented by one and shifted to the right.
8	Set DD RAM address 0 0 1 1 0 0 0 0 0 0	WELCOME -	It sets DD RAM's address. The cursor is moved to the beginning position of the 2nd line.
9	Write data to CG RAM / DD RAM 1 0 0 1 0 1 0 1 0 0	WELCOME T-	Write " T ". The cursor is incremented by one and shifted to the right.
10	:	:	:
11	Write data to CG RAM / DD RAM 1 0 0 1 0 1 0 1 0 0	WELCOME TO PART-	Write " T ". The cursor is incremented by one and shifted to the right.
12	Entry mode set 0 0 0 0 0 0 0 1 1 1	WELCOME TO PART-	When writing, it sets mode for the display shift.
13	Write data to CG RAM / DD RAM 1 0 0 1 0 1 1 0 0 1	ELCOM O PARTY-	Write " Y ". The cursor is incremented by one and shifted to the right.
14	:	:	:
15	Return home 0 0 0 0 0 0 0 0 1 0	WELCOME TO PARTY	Both the display and the cursor return to the original position (address 0).

深圳市晶达显示技术有限公司 Shenzhen Jingda Display Technology Co., Ltd	MODEL NO.		PAGE
		SPEC SAMPLE	20

12. RELIABILITY

No	Test Item	Content of Test	Test Condition
1	High Temperature Storage	Endurance test of high temperature for a long time.	80±2℃ 96H
2	Low Temperature Storage	Endurance test of low temperature for a long time.	-30±2℃ 96H
3	High Temperature Operation	Endurance test of electrical stress (Voltage & Current) and the thermal stress to the element.	70±2℃ 96H
4	Low Temperature Operation	Endurance test of electrical stress (Voltage & Current) and the thermal stress to the element.	-20±2℃ 96H
5	High Temperature /Humidity Storage	Endurance Test of high temperature and high humidity for a long time.	45±2℃ 90±2%RH 96H
6	Thermal shock	Endurance test of low and high temperature cycles. -20±2℃ \longleftrightarrow 70±2℃ (60min) \longleftrightarrow (60min) 1 cycle	-20±2℃/70±2℃ 10 cycle

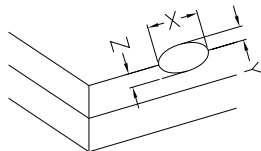
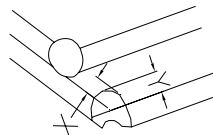
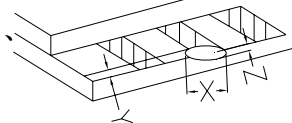
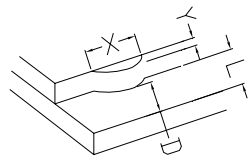
Failure Judgment Criterion

After the above mentioned test (For Environmental Test, after 2 hours in room temperature):

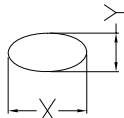
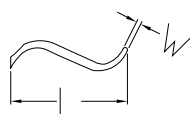
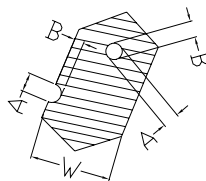
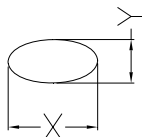
- 1) There should not be conspicuous failure of display quality and appearance.
- 2) Contrast ratio should be greater than or equal to 50% of the initial contrast ratio.
- 3) Abnormal function is a failure.

深圳市晶达显示技术有限公司 Shenzhen Jingda Display Technology Co., Ltd	MODEL NO.		PAGE
		SPEC SAMPLE	21

14. INSPECTION CRITERIA

NO	Item	Criterion	AQL																		
1	Electrical Testing	(1) non-display (2) segment missing (3) segment short	0.65																		
2	Dimension state	Dimension out of the specification	1.00																		
3	Glass crack	<p>Substrate check symbol Definition: X: Length direction Y: Short side direction Z: Thickness direction T: Glass thickness K:LCD length L: Single connector width</p> <p>(1) General crack</p>  <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$1/8K \geq$</td><td>Not over viewing area</td><td>$T \geq$</td></tr></table> <p>(2) Corner</p>  <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$1/8K \geq$</td><td>Not over viewing area</td><td>No check</td></tr></table> <p>(3) Contact pad crack</p>  <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$1/8K \geq$</td><td>$1/3L \geq$</td><td>No check</td></tr></table> <p>1. Cracks on the contact area cannot exceed 1/2 of the glass thickness. 2. Y not to exceed 1/3 seal width</p> <p>(4) Substrate protuberance and internal crack</p>  <p style="text-align: right;">$D < 2/3L$,Reject</p> <p>(5) No progressive glass cracks allowed</p>	X	Y	Z	$1/8K \geq$	Not over viewing area	$T \geq$	X	Y	Z	$1/8K \geq$	Not over viewing area	No check	X	Y	Z	$1/8K \geq$	$1/3L \geq$	No check	2.50
X	Y	Z																			
$1/8K \geq$	Not over viewing area	$T \geq$																			
X	Y	Z																			
$1/8K \geq$	Not over viewing area	No check																			
X	Y	Z																			
$1/8K \geq$	$1/3L \geq$	No check																			

深圳市晶达显示技术有限公司 Shenzhen Jingda Display Technology Co., Ltd	MODEL NO.		PAGE
		SPEC SAMPLE	22

NO	Item	Criterion	AQL												
4.	Black spot , white spot (including polarizer) $\varnothing = (X+Y) / 2$ unit:mm	(1) Round type  <table border="1"> <tr> <th>Size</th> <th>Acceptable QTY</th> </tr> <tr> <td>$\varnothing \leq 0.10$</td> <td>Accept</td> </tr> <tr> <td>$0.10 < \varnothing \leq 0.20$</td> <td>2</td> </tr> <tr> <td>$0.20 < \varnothing \leq 0.25$</td> <td>1</td> </tr> <tr> <td>$0.25 < \varnothing$</td> <td>0</td> </tr> </table>	Size	Acceptable QTY	$\varnothing \leq 0.10$	Accept	$0.10 < \varnothing \leq 0.20$	2	$0.20 < \varnothing \leq 0.25$	1	$0.25 < \varnothing$	0	1.50		
		Size	Acceptable QTY												
		$\varnothing \leq 0.10$	Accept												
		$0.10 < \varnothing \leq 0.20$	2												
		$0.20 < \varnothing \leq 0.25$	1												
$0.25 < \varnothing$	0														
(2) Line type  <table border="1"> <tr> <th>Length L</th> <th>Width W</th> <th>Acceptable QTY</th> </tr> <tr> <td>accept</td> <td>$0.015 \geq W$</td> <td>No check</td> </tr> <tr> <td>$3.0 \geq L$</td> <td>$0.050 \geq W$</td> <td rowspan="2">2</td> </tr> <tr> <td>$2.5 \geq L$</td> <td>$0.080 \geq W$</td> </tr> <tr> <td></td> <td>$0.100 < W$</td> <td>As round type</td> </tr> </table>	Length L	Width W	Acceptable QTY	accept	$0.015 \geq W$	No check	$3.0 \geq L$	$0.050 \geq W$	2	$2.5 \geq L$	$0.080 \geq W$		$0.100 < W$	As round type	
Length L	Width W	Acceptable QTY													
accept	$0.015 \geq W$	No check													
$3.0 \geq L$	$0.050 \geq W$	2													
$2.5 \geq L$	$0.080 \geq W$														
	$0.100 < W$	As round type													
(3) No more than 2 spots and lines within 3 mm. Maximum combined total of round and line defects is 4.															
(4) Scratches criterion is same as that of Round type.															
5.	Pixel deformation	Symbols: W: segment width \varnothing : average of diameter $= (A+B) / 2$ (1) Pin hole and deformation  <table border="1"> <tr> <th>Width</th> <th>Acceptable Defect</th> </tr> <tr> <td>$W < 0.4$</td> <td>$\varnothing \leq 0.20$ and $\varnothing \leq 1/2W$</td> </tr> <tr> <td>$W \geq 0.4$</td> <td>$\varnothing \leq 0.25$ and $\varnothing \leq 1/3W$</td> </tr> </table> <p>\varnothing under 0.10mm ,acceptable</p> (2) Pixel size should be in the range of 95% to 100% of the normal dimension and the gap between pixels should be less than 150% of normal dimension.	Width	Acceptable Defect	$W < 0.4$	$\varnothing \leq 0.20$ and $\varnothing \leq 1/2W$	$W \geq 0.4$	$\varnothing \leq 0.25$ and $\varnothing \leq 1/3W$	2.5						
		Width	Acceptable Defect												
$W < 0.4$	$\varnothing \leq 0.20$ and $\varnothing \leq 1/2W$														
$W \geq 0.4$	$\varnothing \leq 0.25$ and $\varnothing \leq 1/3W$														
6.	Polarizer bubble $\varnothing = (X+Y)/2$	 <table border="1"> <tr> <th>size \varnothing</th> <th>Acceptable QTY</th> </tr> <tr> <td>$\varnothing \leq 0.20$</td> <td>No check</td> </tr> <tr> <td>$0.20 < \varnothing \leq 0.50$</td> <td>3</td> </tr> <tr> <td>$0.50 < \varnothing \leq 1.00$</td> <td>2</td> </tr> <tr> <td>$1.00 < \varnothing$</td> <td>0</td> </tr> <tr> <td>Total QTY</td> <td>3</td> </tr> </table>	size \varnothing	Acceptable QTY	$\varnothing \leq 0.20$	No check	$0.20 < \varnothing \leq 0.50$	3	$0.50 < \varnothing \leq 1.00$	2	$1.00 < \varnothing$	0	Total QTY	3	1.5
size \varnothing	Acceptable QTY														
$\varnothing \leq 0.20$	No check														
$0.20 < \varnothing \leq 0.50$	3														
$0.50 < \varnothing \leq 1.00$	2														
$1.00 < \varnothing$	0														
Total QTY	3														
7.	Contrast	Under normal power supply, uneven contrast is unacceptable.	2.5												
8.	Rainbow	Obvious uneven color in LCD viewing area is not allowed.	2.5												

深圳市晶达显示技术有限公司 Shenzhen Jingda Display Technology Co., Ltd	MODEL NO.		PAGE
		SPEC SAMPLE	23

15. PRECAUTION FOR USE OF LCD MODULE

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, the liquid crystal substance leaks out ,do not ingest. If the substance contacts skin or clothes, promptly wash off using soap and water.
- 3) Do not apply excessive force to the display surface or adjoining areas since this may affect the LCD color
- 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.

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, use an adequately stiff 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 handling the glass panel because it has a very sharp edge.

深圳市晶达显示技术有限公司 Shenzhen Jingda Display Technology Co., Ltd	MODEL NO.		PAGE
		SPEC SAMPLE	24

3. Storage Precautions

- 1) When storing the LCD module, avoid exposure to direct sunlight, to the light of fluorescent lamps, to high temperature or to high humidity. Whenever possible, LCD modules should be stored in the same packaging they were shipped in.
- 2) Exercise care to minimize corrosion of the electrodes. Corrosion of the electrodes is accelerated by water droplets or by current flow in a high-humidity environment.

4. Design Precautions

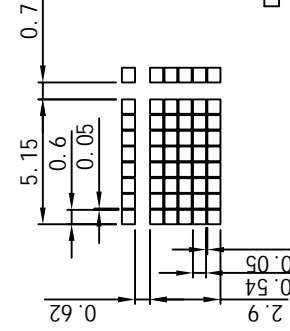
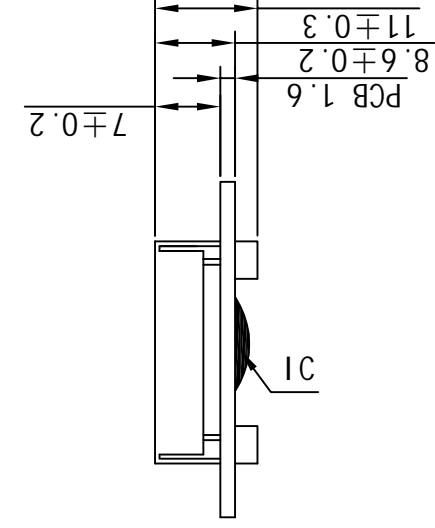
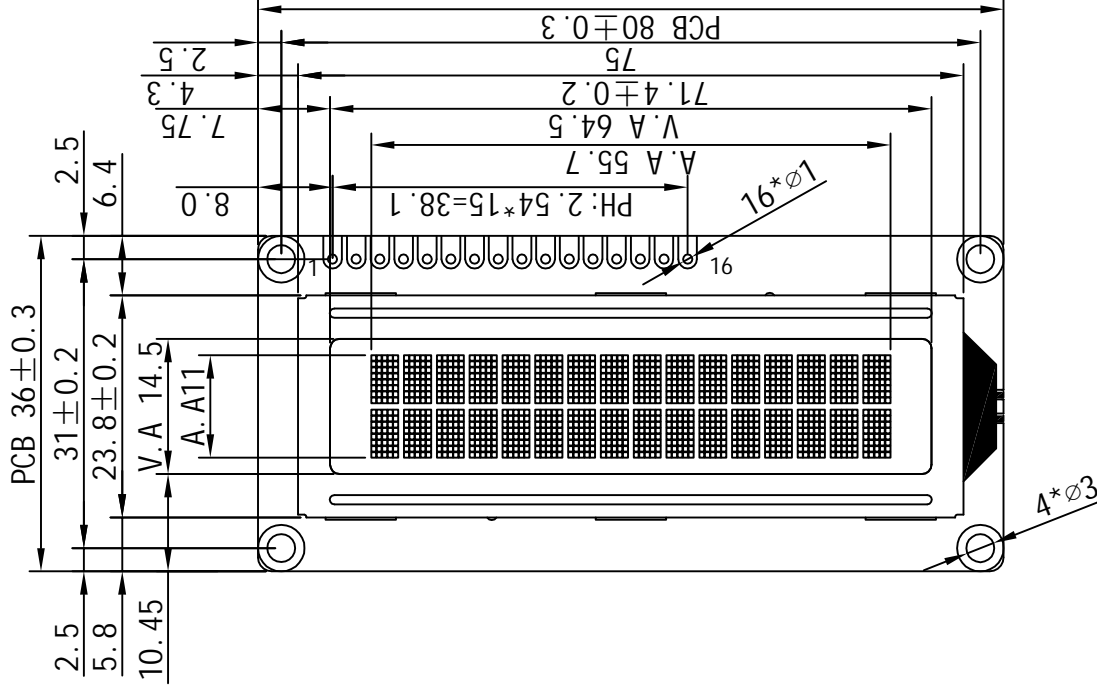
- 1) The absolute maximum ratings represent the rated value beyond which LCD module can not exceed. When the LCD modules are used in excess of this rated value, their operation characteristics may be adversely affected.
- 2) To prevent the occurrence of erroneous operation caused by noise, attention must be paid to satisfy 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 reduce electrical noise from peripheral devices.
- 6) To cope with EMI, take measures basically on outputting side.
- 7) Assemble LCD module tightly with the application case or PCB.

5. Other considerations

- 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 LCD's electrical connections.
- 4) LCD voltage adjustment may be necessary to obtain the best contrast on each LCD.
- 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 hygienic.

INTERFACE	
1	VSS
2	VDD
3	V0
4	RS
5	RW
6	E
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7
15	LED-A
16	LED-K

VER	DETIAL DISCRIPTION	DATE
00	FIRST ISSUE	2016-9-7



SPECIFICATION:

- 1). STN(BLUE) /NEGATIVE/TRANSMISSIVE
- 2). DUTY: 1/16. BIAS: 1/5. VOP=4.7V
- 3). VIEWING ANGLE: 6 O' CLOCK
- 4). OPERATING TEMPERATURE: 0~50℃
STORAGE TEMPERATURE: -10~60℃
- 5). BACKLIGHT: WHITE
- 6). DRIVE IC: AIP31066
- 7). DRIVE POWER: VDD= 5V

深圳市晶达显示技术有限公司

Unspecified Tolerance:	±0.20	UNITS: mm	DATE:	MODE NUMBER :		SHEET:	1 Of 1
DESIGN BY:	WZQ	2016/9/7	JDA1602-18079B2	DO NOT SCALE THIS DRAWING.		DATE:	2016/9/7
CHECKED BY:							
CUSTOM NO:							