



深圳市正晶浩电子有限公司

SHENZHEN ZJH DISPLAYER TECHNOLOGYCO., LTD



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专注TFT液晶屏生产销售

SPECIFICATION

LCD MODULE

P028H043

REVISION RECORD

DESIGN	CHECK	REVIEW
VERSION	DATE	CONTENTS
A	2016-10-08	First Release

CUSTOMER

Customer company:

Date:

Customer signature:

Date:

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CONTENTS

- ❏ **GENERAL INFORMATION**
- ❏ **ABSOLUTE MAXIMUM RATINGS**
- ❏ **ELECTRICAL CHARACTERISTICS**
- ❏ **TIMING OF POWER SUPPLY**
- ❏ **BACKLIGHT CHARACTERISTICS**
- ❏ **EXTERNAL DIMENSIONS**
- ❏ **INTERFACE SIGNALS**
- ❏ **ELECTRO-OPTICAL CHARACTERISTICS**
- ❏ **QUALITY LEVEL**
- ❏ **PACKAGING DRAWING**
- ❏ **PRECAUTIONS FOR USE OF LCD MODULES**

GENERAL INFORMATION

Item	Contents	Unit
Driver element	a-Si 2.8 TFT active matrix	--
Viewing direction	12	O' Clock
LCM OUTLINE DIMENSIONS	50(W) x 69.2(H) x 2.4(T)	mm
Active area (W×H)	43.2(H) × 57.6(V)MM	mm
Number of Dots	240RGB(H)×320(V)	Pixel
Driver IC	ILI9341V	--
Colors	262K	--
Weight	TBD	g
Backlight Type	LED	--
Interface Type	MCU 8/16 BIT SPI3/4 线 RGB555 RGB666	--
Input voltage	2.8~3.3V	V

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Supply voltage for analog	VDD	-0.3	3.3	V
Input voltage	VIN	-0.3	VDD+0.3	V
Operating temperature	TOP	-20	70	°C
Storage temperature	TST	-30	80	°C
Humidity	RH		90%(Max60°C)	RH

ELECTRICAL CHARACTERISTICS

DC CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage for analog	VDD	2.5	2.8	3.3	V
Input Current	I _{dd}	—	—	—	mA
Supply voltage for I/O circuit	IOVCC	1.65	1.8	3.3	V
Input voltage ' H ' level	V _{IH}	0.7 IOVCC	—	—	V
Input voltage ' L ' level	V _{IL}	—	—	0.3 IOVCC	V
Output voltage ' H ' level	V _{OH}	0.8 IOVCC	—	—	V
Output voltage ' L ' level	V _{OL}	—	—	0.2 IOVCC	V

TIMING OF POWER SUPPLY

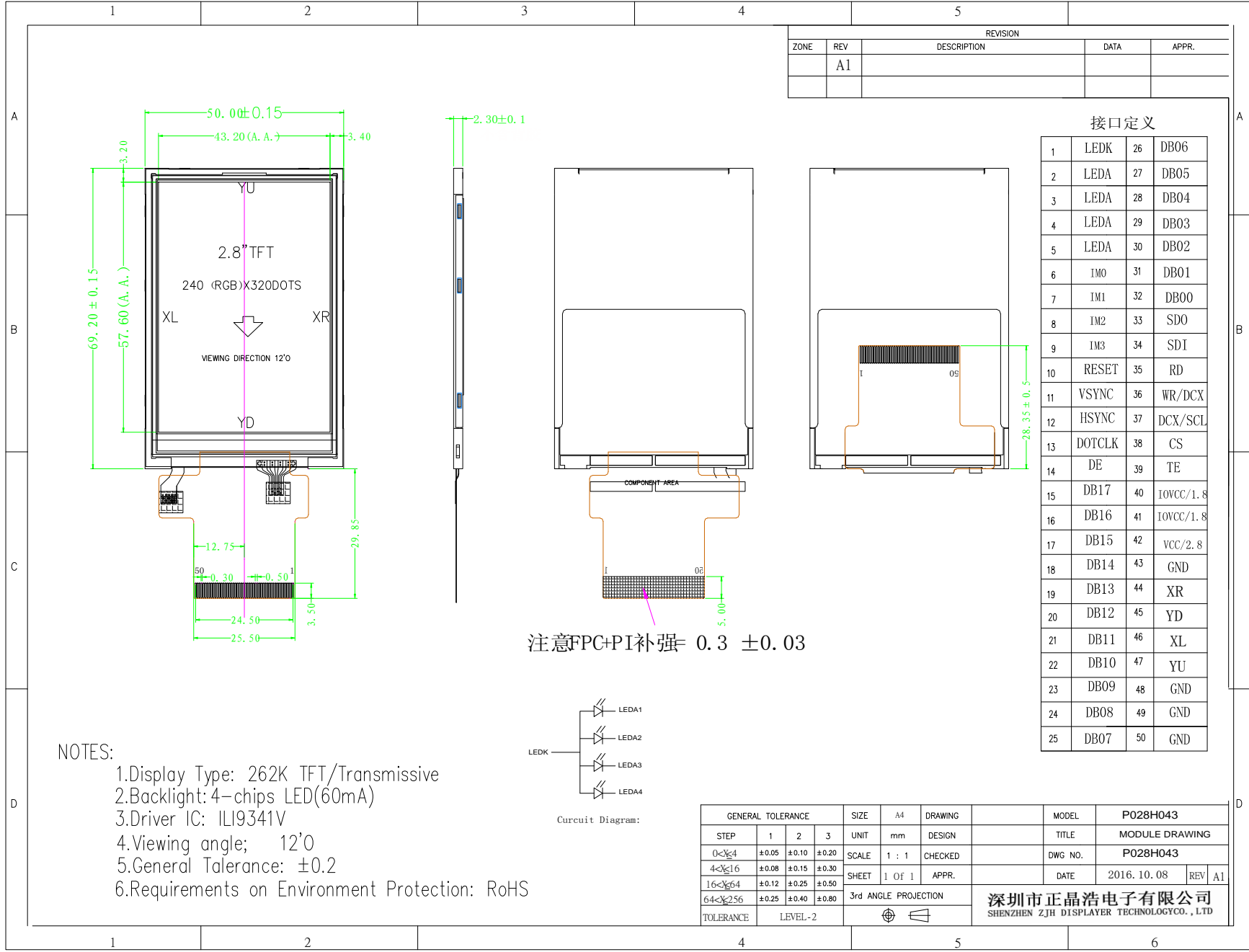
PLEASE REFER TO THE DRIVER IC SPECIFICATION.

BACKLIGHT CHARACTERISTICS

Item	Symbol	Min	Typ	Max	Unit	Condition
Forward voltage	V _f	5.6	6.4	6.6	V	If=80 mA
Luminance	L _v	5000		--	cd/m ²	
Number of LED	—	4			Piece	—
Connection mode	p	Parallel			—	—



EXTERNAL DIMENSION





PIN No.	Symbol	Description																																																																																													
1	LEDK	Cathode of Backlight (背光负极供电脚)																																																																																													
2	LEDA1	Anode of Backlight (3.0V-3.4V Typical:3.2V) (背光正极供电脚, 电压范围:3.0-3.4V, 典型值:3.2V)																																																																																													
3	LEDA2																																																																																														
4	LEDA3																																																																																														
5	LEDA4																																																																																														
6	IM0	<p>- Select the MCU interface mode</p> <table border="1"> <thead> <tr> <th rowspan="2">IM3</th> <th rowspan="2">IM2</th> <th rowspan="2">IM1</th> <th rowspan="2">IM0</th> <th rowspan="2">MCU-Interface Mode</th> <th colspan="2">DB Pin in use</th> </tr> <tr> <th>Register Content</th> <th>GRAM</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>80 MCU 8-bit bus interface I</td> <td>D[7:0]</td> <td>D[7:0]</td> </tr> <tr> <td>0</td> <td>0</td> <td>0</td> <td>1</td> <td>80 MCU 16-bit bus interface I</td> <td>D[7:0]</td> <td>D[15:0]</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>0</td> <td>80 MCU 9-bit bus interface I</td> <td>D[7:0]</td> <td>D[8:0]</td> </tr> <tr> <td>0</td> <td>0</td> <td>1</td> <td>1</td> <td>80 MCU 18-bit bus interface I</td> <td>D[7:0]</td> <td>D[17:0]</td> </tr> <tr> <td>0</td> <td>1</td> <td>0</td> <td>1</td> <td>3-wire 9-bit data serial interface I</td> <td colspan="2">SDA: In/OUT</td> </tr> <tr> <td>0</td> <td>1</td> <td>1</td> <td>0</td> <td>4-wire 8-bit data serial interface I</td> <td colspan="2">SDA: In/OUT</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>0</td> <td>80 MCU 16-bit bus interface II</td> <td>D[8:1]</td> <td>D[17:10], D[8:1]</td> </tr> <tr> <td>1</td> <td>0</td> <td>0</td> <td>1</td> <td>80 MCU 8-bit bus interface II</td> <td>D[17:10]</td> <td>D[17:10]</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>0</td> <td>80 MCU 18-bit bus interface II</td> <td>D[8:1]</td> <td>D[17:0]</td> </tr> <tr> <td>1</td> <td>0</td> <td>1</td> <td>1</td> <td>80 MCU 9-bit bus interface II</td> <td>D[17:10]</td> <td>D[17:9]</td> </tr> <tr> <td>1</td> <td>1</td> <td>0</td> <td>1</td> <td>3-wire 9-bit data serial interface II</td> <td colspan="2">SDI: In SDO: Out</td> </tr> <tr> <td>1</td> <td>1</td> <td>1</td> <td>0</td> <td>4-wire 8-bit data serial interface II</td> <td colspan="2">SDI: In SDO: Out</td> </tr> </tbody> </table> <p>MPU Parallel interface bus and serial interface select If use RGB Interface must select serial interface. *: Fix this pin at VDD1 or VSS.</p>	IM3	IM2	IM1	IM0	MCU-Interface Mode	DB Pin in use		Register Content	GRAM	0	0	0	0	80 MCU 8-bit bus interface I	D[7:0]	D[7:0]	0	0	0	1	80 MCU 16-bit bus interface I	D[7:0]	D[15:0]	0	0	1	0	80 MCU 9-bit bus interface I	D[7:0]	D[8:0]	0	0	1	1	80 MCU 18-bit bus interface I	D[7:0]	D[17:0]	0	1	0	1	3-wire 9-bit data serial interface I	SDA: In/OUT		0	1	1	0	4-wire 8-bit data serial interface I	SDA: In/OUT		1	0	0	0	80 MCU 16-bit bus interface II	D[8:1]	D[17:10], D[8:1]	1	0	0	1	80 MCU 8-bit bus interface II	D[17:10]	D[17:10]	1	0	1	0	80 MCU 18-bit bus interface II	D[8:1]	D[17:0]	1	0	1	1	80 MCU 9-bit bus interface II	D[17:10]	D[17:9]	1	1	0	1	3-wire 9-bit data serial interface II	SDI: In SDO: Out		1	1	1	0	4-wire 8-bit data serial interface II	SDI: In SDO: Out	
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10	RESET	LCM Reset pin Signal is active low. (屏复位脚, 低电平复位)
11	VSYNC	Frame synchronizing signal for RGB interface operation. <i>Flx to VDDI or VSS level when not in use.</i> (RGB 帧同步信号, 不用时接 VDDI 或者接地)
12	HSYNC	Line synchronizing signal for RGB interface operation. <i>Flx to VDDI or VSS level when not in use.</i> (RGB 行同步信号, 不用时接 VDDI 或者接地)
13	DOTCLK	Dot clock signal for RGB interface operation. <i>Flx to VDDI or VSS level when not in use.</i> (RGB 点时钟信号, 不用时接 VDDI 或者接地)
14	DE	Data enable signal for RGB interface operation. <i>Flx to VDDI or VSS level when not in use.</i> (RGB 数据使能信号, 不用时接 VDDI 或者接地)
15	DB17	18-bit parallel bi-directional data bus for MCU system and RGB interface mode <i>Flx to VSS level when not in use</i> (18位双向数据, 用于MCU和RGB接口, 不用时接地)
16	DB16	
17	DB15	
18	DB14	
19	DB13	
20	DB12	
21	DB11	
22	DB10	
23	DB9	
24	DB8	
25	DB7	
26	DB6	
27	DB5	
28	DB4	
29	DB3	
30	DB2	
31	DB1	
32	DB0	
33	SDO	Serial output signal. The data is outputted on the falling edge of the SCL signal. If not used, open this pin (串口数据输出信号, 不用时悬空)

34	SDI	<p>Serial input signal.</p> <p>The data is applied on the rising edge of the SCL signal.</p> <p>If not used, fix this pin at VDDI or GND</p> <p>(串口数据输入信号, 不用时接 VDDI 或者接地)</p>
35	RD	<p>Serves as a read signal and MCU read data at the rising edge.</p> <p>Fix to VDDI level when not in use.</p> <p>(并口的读控制脚, 不用时接 VDDI)</p>
36	WRX(D/CX)	<p>Serves as a write signal and writes data at the rising edge.</p> <p>-4-line system (D/CX): Serves as command or parameter select.</p> <p>Fix to VDDI level when not in use.</p> <p>(并口的写控制脚或者4线串口的寄存器/数据选择, 不用时接 VDDI)</p>
37	D/CX(SCL)	<p>This pin is used to select "Data or Command" in the parallel interface or serial data interface.</p> <p>(用于并口或者串口)</p> <p>Parallel(并口):</p> <p>When RS= '1', data is selected. (选择数据)</p> <p>When RS= '0', command is selected. (选择寄存器)</p> <p>Serial(串口):</p> <p>This pin is used serial interface clock in 3-wire 9-bit / 4-wire 8-bit serial data interface.</p> <p>(3线串口或者4线串口的时钟信号)</p> <p>If not used, this pin should be connected to VDDI or GND.</p> <p>(不用时接 VDDI 或者接地)</p>
38	CSX	<p>Chip select pin ("Low" enable)</p> <p>(屏驱动芯片片选脚, 低电平有效)</p>
39	TE	<p>Tearing effect output pin to synchronize MPU to frame writing, activated by S/W command. When this pin is not activated, this pin is low.</p> <p>If not used, open this pin.</p> <p>(帧同信号, 不用时悬空)</p>
40-41	VDDI	<p>Power supply for interface logic circuits (1.8 ~ 3.3 V)</p> <p>(逻辑电路供电脚)</p>
42	VCI	<p>Power supply for analog circuit(2.8V-3.3V)</p> <p>(模拟电路供电脚)</p>
43	GND	<p>Ground</p> <p>(接地脚)</p>

44	XR(NC)	Not connection (空脚)
45	YD(NC)	Not connection (空脚)
46	XL(NC)	Not connection (空脚)
47	YU(NC)	Not connection (空脚)
48	GND	Ground (接地脚)
49	GND	Ground (接地脚)
50	GND	Ground (接地脚)

APPLICATION CIRCUIT

Please consult our technical department for detail information.

INITIAL CODE

Please consult our technical department for detail information.

ELECTRO-OPTICAL CHARACTERISTICS

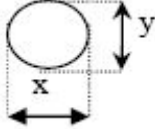
Item	Symbol	Condition	Min	Typ	Max	Unit	Remark	Note
Response time	Tr+Tf	$\theta = 0^\circ$ $E = 0^\circ$ $T_a = 25^\circ\text{C}$	-	20	30	ms	FIG 1.	4
Contrast ratio	Cr		-	400	500	-	FIG 2.	1
Luminance uniformity	δ WHITE		-	-	-	%	FIG 2.	3
Surface Luminance	Lv		300	-	-	cd/m ²	FIG 2.	2
Viewing angle range	CR>10	E 3	60	70	-	deg	FIG 3.	6
		E 9	60	65	-	deg	FIG 3.	
		E 12	60	70	-	deg	FIG 3.	
		E 6	50	65	-	deg	FIG 3.	
CIE(x, y) chromaticity	Red	x	0.586	0.636	0.686	FIG 2.	5	
		y	0.273	0.323	0.373			
	Green	x	0.252	0.277	0.297			
		y	0.529	0.549	0.569			
	Blue	x	0.122	0.142	0.162			
		y	0.102	0.122	0.142			
	White	x	0.283	0.303	0.323			
		y	0.305	0.325	0.345			

4. Standards of inspection items

4.1 Major Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.1.1	All functional defects	1.No display 2.Display abnormally 3.Missing vertical, horizontal segment 4.Short circuit 5. Back-light no lighting, flickering and abnormal lighting.	Major
4.1.2	Missing	Missing component	
4.1.3	Outline dimension	Overall outline dimension beyond the drawing is not allowed.	
4.1.4	linearity	No more than 1.5%	

4.2 Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects																									
4.21	Clear Spots Black and white Spot defect Pinhole, Foreign Particle, polarizer Dirt	For dark/white spot, size Φ is defined as $\Phi = \frac{(x + y)}{2}$ 	Minor																									
		1		<table border="1"> <thead> <tr> <th rowspan="2">Zone</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Size(mm)</td> <td>A</td> <td>B</td> <td>C</td> </tr> <tr> <td>$\Phi \leq 0.15$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$0.15 < \Phi \leq 0.20$</td> <td colspan="2">2</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.30$</td> <td colspan="2">1</td> </tr> <tr> <td>$\Phi > 0.30$</td> <td colspan="2">0</td> <td rowspan="4">Ignore</td> </tr> </tbody> </table>	Zone	Acceptable Qty			A	B	C	Size(mm)	A	B	C	$\Phi \leq 0.15$	Ignore		$0.15 < \Phi \leq 0.20$	2		$0.20 < \Phi \leq 0.30$	1		$\Phi > 0.30$	0		Ignore
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2 Cosmetic Defect

Item No	Items to be inspected	Inspection Standard					Classification of defects	
4.2.2	Line defect Black line, White line, Foreign material on polarizer	Size(mm)		Acceptable Qty			Minor	
		L(Length)	W(Width)	Zone				
				A	B	C		
		Ignore	$W \leq 0.01$	Ignore				Ignore
		$L \leq 3.0$	$0.01 < W \leq 0.03$	2				
		$L \leq 3.0$	$0.03 < W \leq 0.05$	1				
		$W > 0.05$	0					
4.2.2	Foreign material on TP film	The line can be seen after mobile phone in the operating condition:					Minor	
		Size(mm)		Acceptable Qty				
		L(Length)	W(Width)	Zone				
				A	B	C		
		Ignore	$W \leq 0.03$	Ignore				Ignore
		$L \leq 5.0$	$0.03 < W \leq 0.05$	3				
	$W > 0.05$	0						
4.2.3	Dim line defect Polarizer scratch TP film scratch	If the scratch can be seen after mobile phone cover assembling or in the operating condition, judge by the line defect of 4.2.2.					Minor	
		If the scratch can be seen only in non-operating condition or some special angle, judge by the following.						
		Size(mm)		Acceptable Qty				
		L(Length)	W(Width)	Zone				
				A	B	C		
		Ignore	$W \leq 0.03$	Ignore				Ignore
$5.0 < L \leq 10.0$	$0.03 < W \leq 0.05$	2						
$L \leq 5.0$	$0.05 < W \leq 0.08$	1						
		$W > 0.08$	0					
4.2.4	Polarize Air bubble	Air bubbles between glass & polarizer					Minor	
		Size(mm)	Zone	Acceptable Qty				
				A	B	C		
		$\Phi \leq 0.25$		Ignore				Ignore
		$0.25 < \Phi \leq 0.5$		2				
$\Phi > 0.50$		0						

Item No	Items to be inspected	Inspection Standard	Classification of defects
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4.35

Glass defect

Minor

(i) Chips on corner A:LCD Glass defect		
X(mm)	Y(mm)	Z(mm)
≤ 2.0	$\leq S$	Disregard
Notes: S=contact pad length Chips on the corner of terminal shall not be allowed to extend into the ITO pad or expose perimeter seal. B:TP Glass defect		
X(mm)	Y(mm)	Z(mm)
≤ 3.0	≤ 3.0	Disregard
(ii) Usual surface cracks A:LCD Glass defect		
X(mm)	Y(mm)	Z(mm)
≤ 3.0	< Inner border line of the seal	Disregard
B:TP Glass defect		
X(mm)	Y(mm)	Z(mm)
≤ 6.0	< 2.0	Disregard
(iii) Crack Cracks tend to break are not allowed.		