深圳市勋瑞光电科技有限公司
Xunrui photoelectric technology （shenzhen）CO,.LTD.

Product Specification

Customer: _____

ModelName: H035SHV50I3030

Date: _____

Version: _____

■ **Preliminary Specification**

☐ **Final Specification**

For Customer's Acceptance

Approved by	Comment

Approved by	Reviewed by	Prepared by

Contents

1. Document revision history :

DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY	APPROVED BY
1.0	2020-07-17	First Release.		

2.General Description

H035SHV50I3030 is a transmissive type a-Si TFT-LCD (amorphous silicon thin film transistor liquid crystal display) module, which is composed of a TFT-LCD panel, a driver circuit a backlight unit, The panel size is 3.5inch and the resolution is 320x480. High image quality a-Si TFT LCD module. Partial-screen display function is available. Sleep and Stand-by modes are available for power saving.

2.1 Features

No	Item	Specification	Remark
1	Display Mode	Normally Black	
2	Screen Size	3.5inch	
3	Resolution	320 × RGB × 480	
4	Color Number	262K	
5	Color Arrangement	Tft Active Matrix	
6	Driver IC	IlI9488	
7	Back Light	White Led*6	
8	Viewing Direction	All Direction	
9	Interface	SPI/MCU/RGB	
10	Surface Treatment	Uv Cut	
11	touch panel	Without TP	

2.2 Application

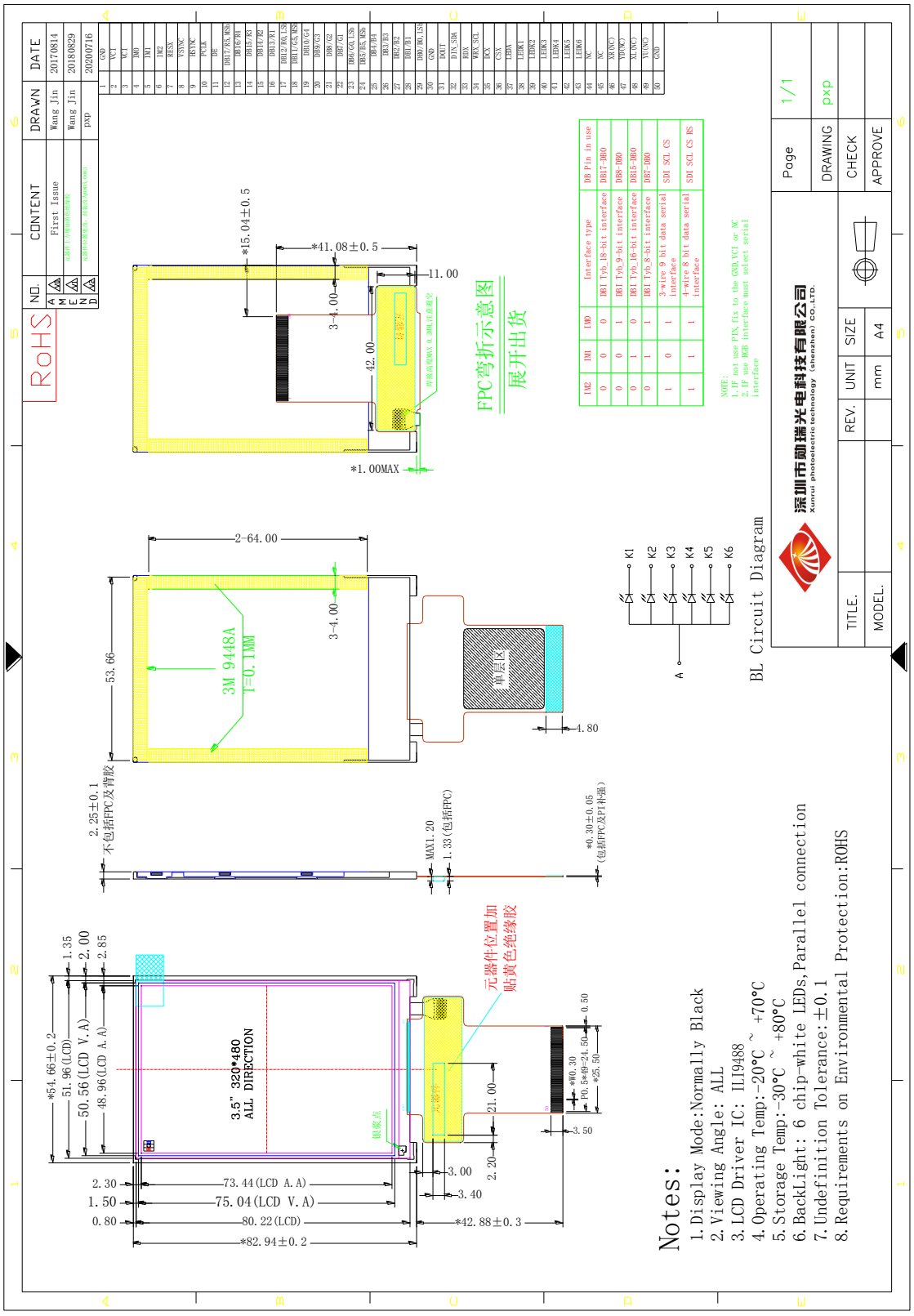
- Mobile phone.
- Portable multimedia device.

3.Outline Dimension

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

Parameter	Specifications	Unit
Outline dimensions	54.66(W) ×82.94(H) × 2.25(D) (LCM, not include FPC)	mm
Active area	48.96(W) ×73.44(H)	mm
Resolution	320(H)×RGB× 480(V) dots	
Dot size	0.153(H) × 0.153(V)	mm

Figure 1: Module specification of the module



4.TFT-LCM Interface Specification

Pin No	Symbol	Description	Note
1	GND	System Ground	
2	VCI	Power supply input for LCM: 2.8V	
3	VCI	Power supply input for LCM: 1.8V/2.8V	
4	IM0	Interface Mode Select	
5	IM1	Interface Mode Select	
6	IM2	Interface Mode Select	
7	RESX	Reset signal input PIN	
8	VSYNC	Frame Synchronizing Signal For RGB Interface Operation	
9	HSYNC	Line Synchronizing Signal For RGB Interface Operation	
10	PCLK	Pixel clock signal	
11	DE	Data input enable	
12-29	DB17-DB0	Data Bus	
30	GND	System Ground	
31	DOUT	Serial data output	
32	DIN_SDA	SPI input and output pin	
33	RDX	Read Signal And Read Data	
34	WRX_SCL	Write signal/ serial clock input signal	
35	DCX	Register Select Signal	
36	CSX	Chip Select PIN	
37	LEDA	Power supply Anode input for backlight	
38	LEDK1	Power supply Cathode input for backlight	
39	LEDK2	Power supply Cathode input for backlight	
40	LEDK3	Power supply Cathode input for backlight	
41	LEDK4	Power supply Cathode input for backlight	
42	LEDK5	Power supply Cathode input for backlight	
43	LEDK6	Power supply Cathode input for backlight	
44	NC	Not Connect	
45	NC	Not Connect	
46	XR/NC	Not Connect	
47	YD/NC	Not Connect	
48	XL/NC	Not Connect	
49	YU/NC	Not Connect	
50	GND	System Ground	

5. Absolute Maximum Ratings

5.1 Electrical Maximum Ratings – for IC Only

Table 3: Electrical Maximum Ratings – for IC

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage (VCI)	VCI	-0.3	+4.0	V	1
Power supply voltage (IOVCC)	IOVCC	-0.3	+3.6	V	1

Note:

1. IOVCC,VCI, GND must be maintained.
2. The modules may be destroyed if they are used beyond the absolute maximum ratings.

5.2 Environmental Condition

Table 4

Item	Operating temperature (Topr)		Storage temperature (Tstg) (Note 1)		Remark
	Min.	Max.	Min.	Max.	
Ambient temperature	-20℃	+70℃	-30℃	+80℃	Dry
Humidity (Note 1)	≤80% RH				No condensation
	Maximum operating temperature				

Note 1: Product cannot sustain at extreme storage conditions for long time.

6. Electrical Specifications

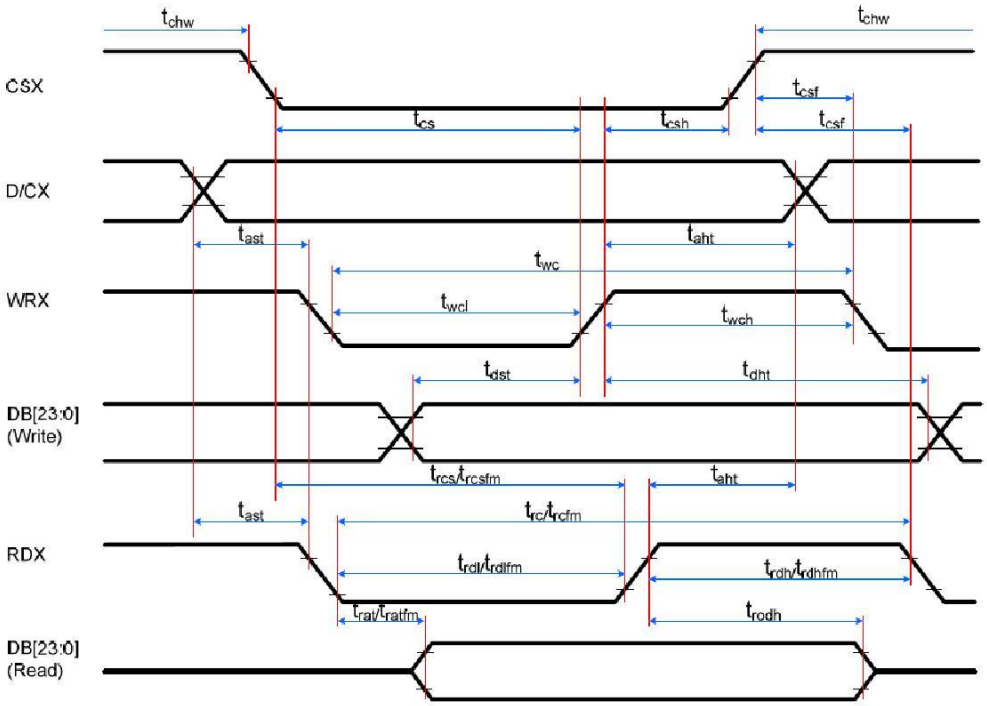
Typical Electrical Characteristics

At Ta = 25 ℃, VCI = 2.6V to 3.3V, IOVCC= 1.65V to 3.3V GND=0V.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (analog)	VCI-GND		2.6	2.8	3.3	V
Supply voltage (logic)	IOVDD-GND		1.65	1.8	3.3	V
Supply current (Logic & LCD)	ICC	VCI=2.8V	-	-	10	mA
Supply voltage of white LED backlight	Vf	Forward current =20mA	2.9	3.2	3.5	V
	If	6White LED In Parallel	90	108	120	mA
Reverse Voltage	Vr	10uA	-	-	5	V
Luminance (on the module surface)		Number of LED dies = 6	280	300	350	cd/m^2
Life Time		If=120mA	50000	-	-	Hr

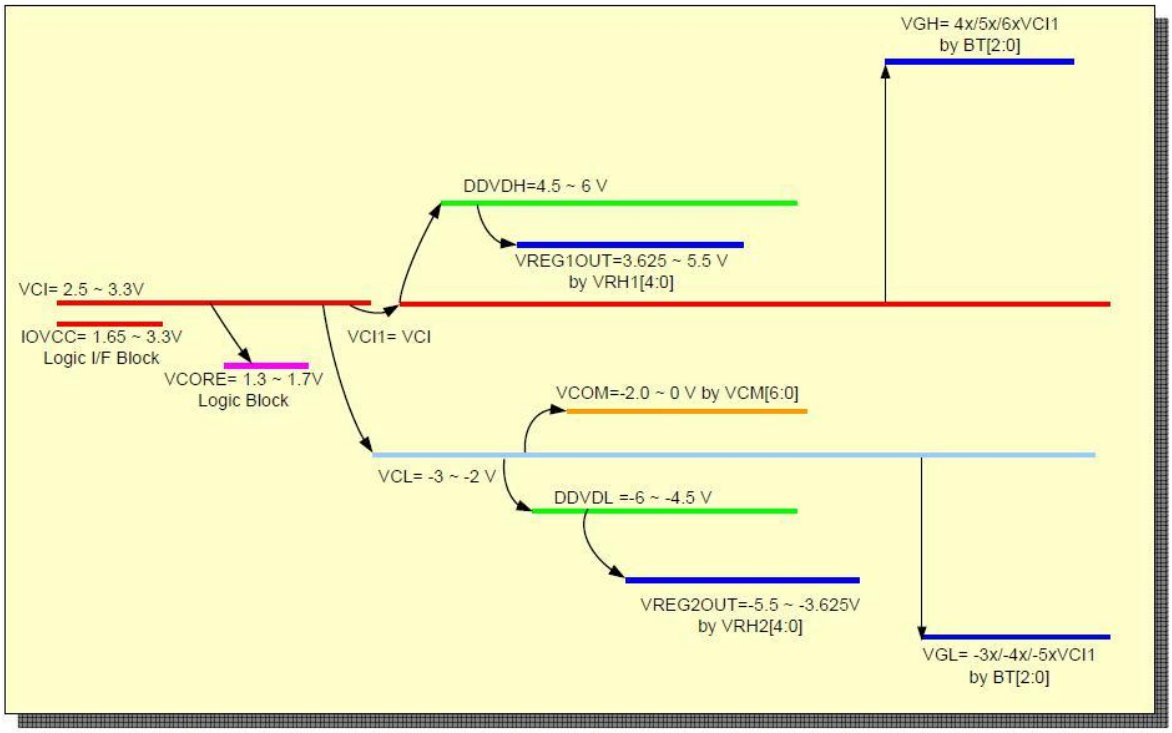
7.Timing Characteristics

DBI Type B (Display Parallel 8-/9-/16-/18-/24-bit interface) Timing Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	-	ns	-
	that	Address hold time (Write/Read)	0	-	ns	-
CSX	tchw	CSX "H" pulse width	0	-	ns	-
	tcs	Chip Select setup time (Write)	15	-	ns	-
	trcs	Chip Select setup time (Read ID)	45	-	ns	-
	trcsfm	Chip Select setup time (Read FM)	355	-	ns	-
	tcsf	Chip Select Wait time (Write/Read)	0	-	ns	-
WRX	twc	Write cycle	30	-	ns	-
	twrh	Write Control pulse H duration	15	-	ns	-
	twrl	Write Control pulse L duration	15	-	ns	-
RDX (FM)	trcfm	Read Cycle (FM)	450	-	ns	When read from Frame Memory
	trdhfm	Read Control H duration (FM)	90	-	ns	
	trdlfm	Read Control L duration (FM)	355	-	ns	
RDX (ID)	trc	Read cycle (ID)	160	-	ns	When read ID data
	trdh	Read Control pulse H duration	90	-	ns	
	trdl	Read Control pulse L duration	45	-	ns	
DB [23:0], DB [17:0], DB [15:0], DB [8:0], DB [7:0]	tdst	Write data setup time	10	-	ns	For maximum, CL=30pF For minimum, CL=8pF
	tdht	Write data hold time	10	-	ns	
	trat	Read access time	-	40	ns	
	tratfm	Read access time	-	340	ns	
	trod	Read output disable time	20	80	ns	

8.Power Supply Configuration



Note: The DDVDH, DDVDL, VREG1OUT, VREG2OUT, VCOM, VGH, VGL and VCL output voltage levels are lower than their theoretical levels (ideal voltage levels) due to the current consumption at respective outputs.

9.Optical Specification

Item		Symbol	Conditions	Specifications (typ)	Unit	Note
Transmittance		T%	Viewing normal angle $q_X = q_Y = 0°$	4.3	%	All left side data are based on INX's following condition – 1.CG : NTSC 69% 2.AR : 67.5% 3.Light Source : INX LED BLU 4.Machine : DMS 803 5. Vwhite > 5.0 V, Vdark < 0.3V 6. Polarizer : NPF-TEGQ1465DUHC
Contrast Ratio		CR		700	--	
Response Time		Ton+ Toff		30	ms	
Viewing Angle	Hor.	q_{X+}	Center CR>10	80	deg.	
		q_{X-}		80		
	Ver.	q_{Y+}		80		
		q_{Y-}		80		
CF only Chromaticity	Red	X_R	Viewing normal angle $q_X = q_Y = 0°$	0.660	--	Under C light Simulation
		Y_R		0.325	--	
	Green	X_G		0.277	--	
		Y_G		0.568	--	
	Blue	X_B		0.145	--	
		Y_B		0.072	--	
	White	X_W		0.309	--	
		Y_W		0.332	--	

*Note (1)Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

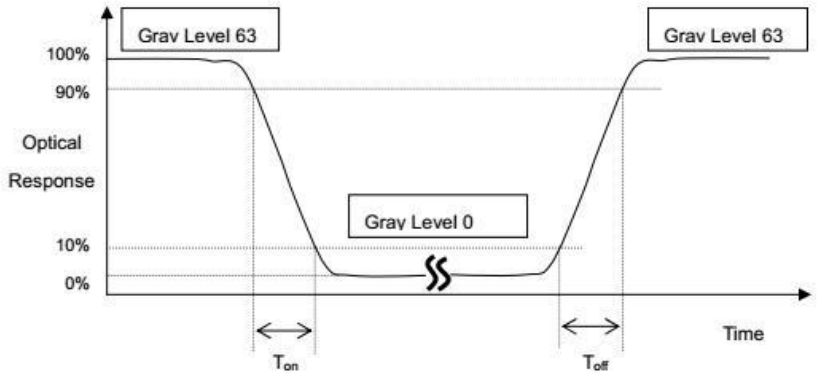
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

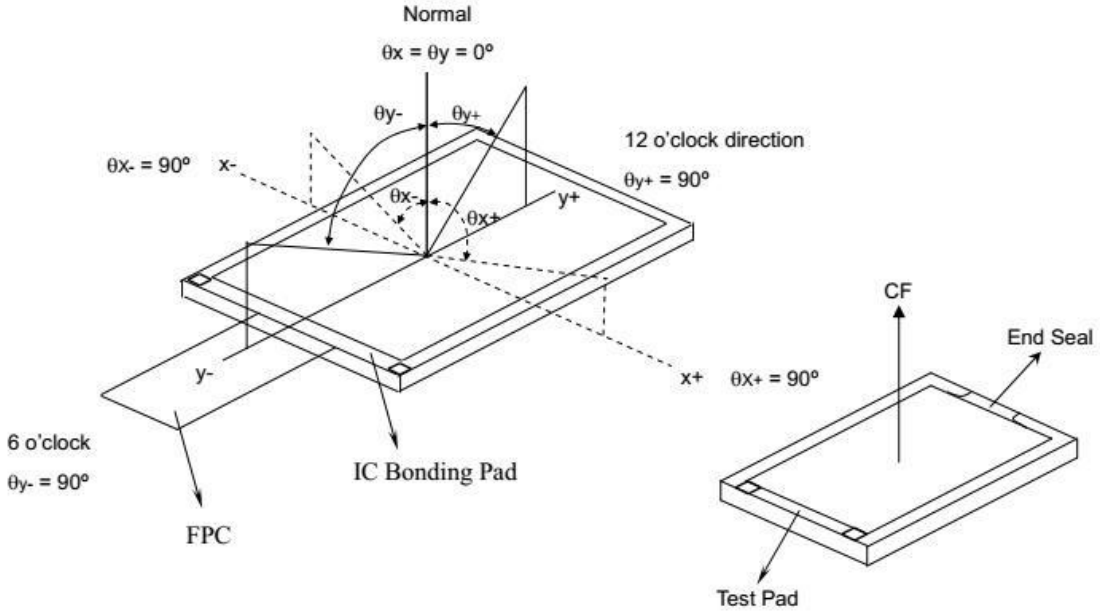
CR = CR (5)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

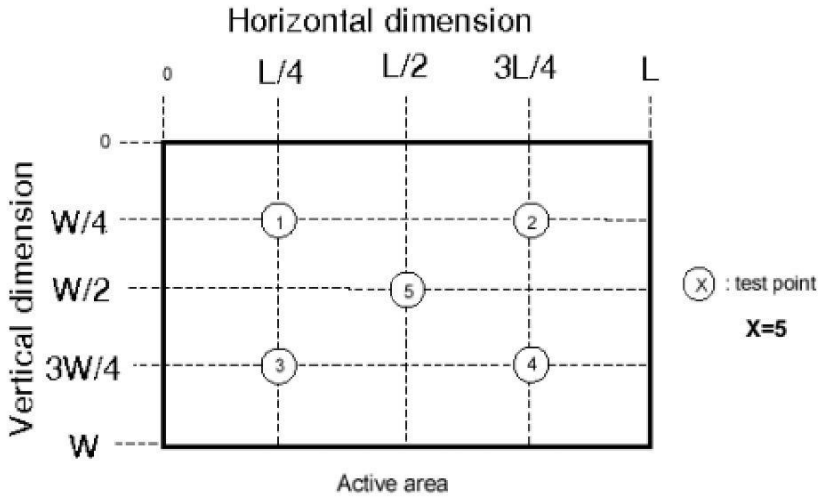
*Note (2) Definition of Response Time (T_{on}, T_{off}):



*Note(3) Definition of Viewing Angle

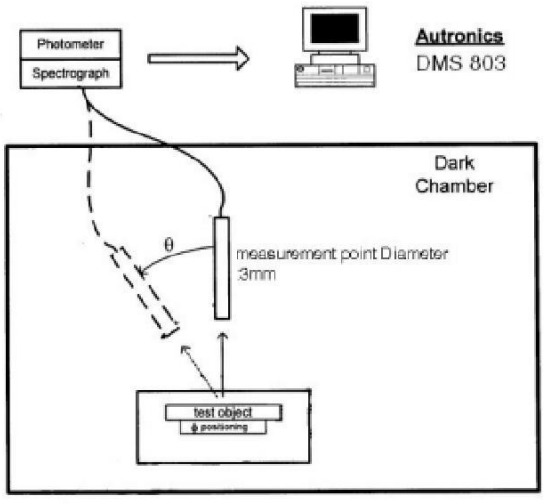


*Note (5)



*Note (4) Measurement Set-Up:

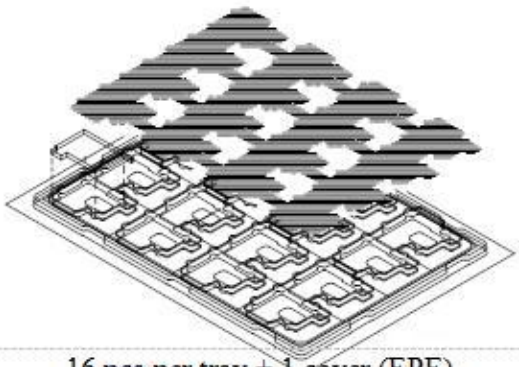
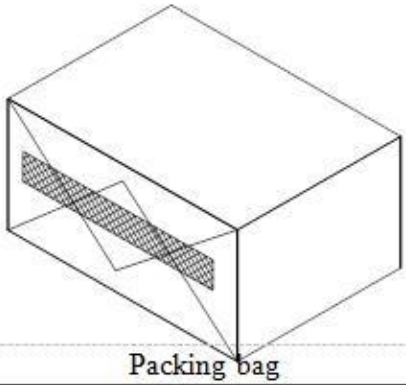
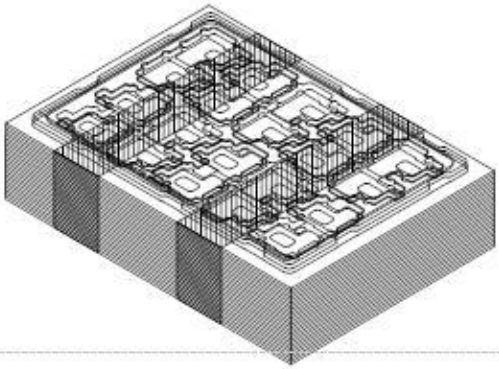
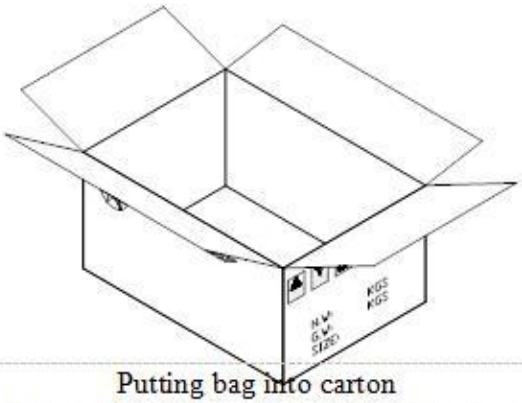
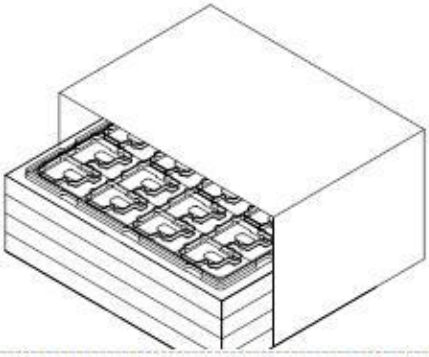
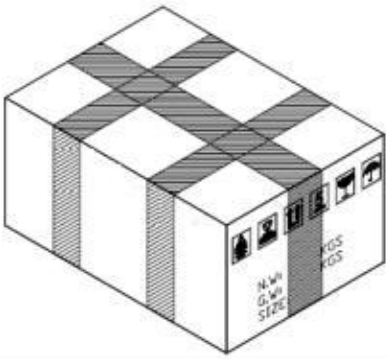
The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



10.Reliability Test Items

Item	Test Condition		Criterion
High Temperature Storage	80 ℃, 240 hrs		There should be no change which might affect the practical display function when the display quality test is conducted under normal operating condition.
Low Temperature Storage	-30 ℃ 240 hrs		
High Temp. & High Humidity Storage	50 ℃, 80% RH, 240 hrs		
Vibration Test (Non-operating)	Freq.:10~55~10 Hz, Amp.:1.5mm 1 hr for each direction of X, Y, Z		
Electrostatic Discharge Test (Non-operating)	Terminals	150 pF, 0 Ω, ±300 V, Contact	
	Panel	150 pF, 330 Ω, ±8 KV, Air	
Thermal Shock (Static)	-30 ℃, 30 min /80 ℃, 30 min, 20 cycles		
High Temperature Operation	70 ℃, 240 hrs		
Low temperature Operation	-20 ℃, 240 hrs		
High Temperature & High Humidity (Operating)	50 ℃, 80% RH, 240 hrs		
FPC Peeling Strength Test	Pull speed: 50 mm/min, +90 °		> 400gf/cm

11. Package

1  16 pcs per tray + 1 cover (EPE)	4  Packing bag
2  25 trays + 1 dummy tray = 400 ps	5  Putting bag into carton Protected by 6 pieces of cushion EPE sheet
3  Putting trays into anti-electrostatic bag	6 

12.Precautions

Please pay attentions to the followings as using the LCD module.

Handling

(a) Do not apply strong mechanical stress like drop, shock or any force to LCD module. It may cause improper operation, even damage.

(b) Because the polarizer is very fragile and easy to be damaged, do not hit, press or rub the display surface with hard materials.

(c) Do not put heavy or hard material on the display surface, and do not stack LCD modules.

(d) If the display surface is dirty, please wipe the surface softly with cotton swab or clean cloth.

(e) Avoid using Ketone type materials (e.g. Acetone), Toluene, Ethyl acid or Methyl chloride to clean the display surface. It might damage the touch panel surface permanently. The recommended solvents are water and Isopropyl alcohol.

(f) Wipe off water droplets or oil immediately.

(g) Protect the LCD module from ESD. It will damage the LSI and the electronic circuit.

(h) Do not touch the output pins directly with bare hands.

(i) Do not disassemble the LCD module.

(j) Do not lift the FPC of Touch Panel.

Storage

(a) Do not leave the LCD modules in high temperature, especially in high humidity for a long time.

(b) Do not expose the LCD modules to sunlight directly.

(c) The liquid crystal is deteriorated by ultraviolet. Do not leave it in strong ultraviolet ray for a long time.

(d) Avoid condensation of water. It may cause improper operation.

(e) Please stack only up to the number stated on carton box for storage and transportation. Excessive weight will cause deformation and damage of carton box.

Operation

(a) When mounting or dismounting the LCD modules, turn the power off.

(b) Protect the LCD modules from electric shock.

(c) The Driver IC control algorithms stated above should always obeyed to avoid damaging the LSI and electronic circuit.

(d) Be careful to avoid mixing up the polarity of power supply for backlight.

(e) Absolute maximum rating specified above has to be always kept in any case. Exceeding it may cause non-recoverable damage of electronic components or, nevertheless, burning.

(f) When a static image is displayed for a long time, remnant image is likely to occur.

(g) Be sure to avoid bending the FPC to an acute shape, it might break FPC.

(h) Most of the touch screens have air vent to equalize the inside air pressure to the outside one. The air vent must be open and liquid contact must be avoided as the liquid may be absorbed if the liquid is accumulated near the air vent.

(i) For the fragility of ITO film, it should avoid to use too tapering pen as the input material.

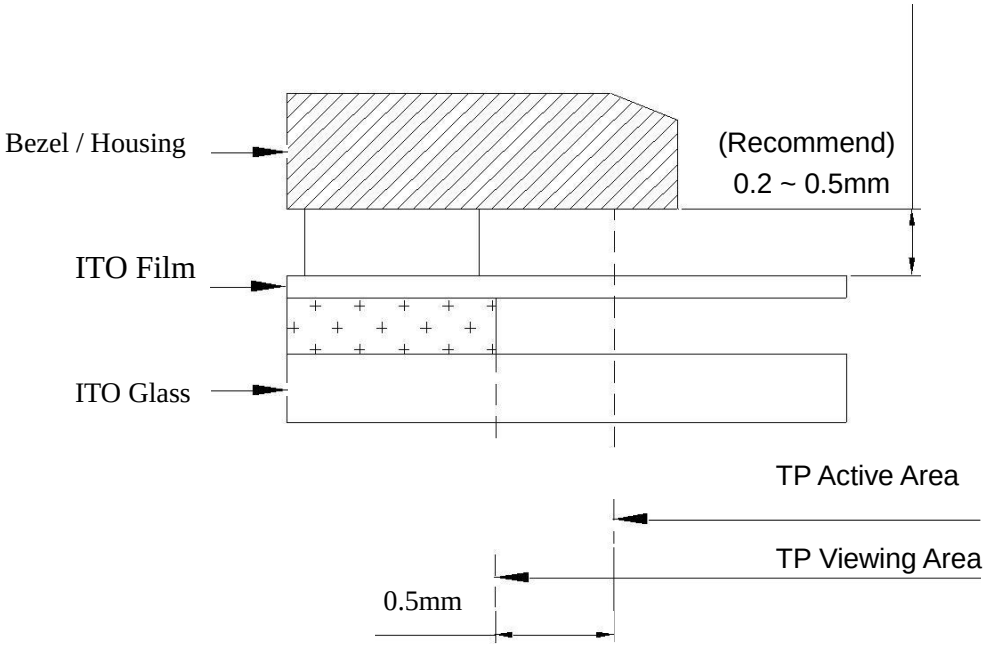
Touch Panel Mounting Notes

(a) If a cushion is used between bezel/housing and film must be choose as free as enough to absorb the expansion and contraction to avoid the distortion of film.

(b) The cushion must be placed out of the Viewing Area.

(c) Bezel/Housing edge must be posited between Key Area and Viewing Area. The edge enters the Key Area may cause unexpected input if the gap is too narrow or foreign particles like dusts exist between Bezel/Housing and ITO film.

(d) Mounting example:



The corner part has conductivity. Do not touch any metal part after mounting.

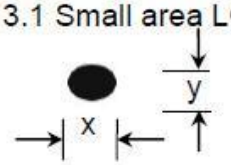
Others

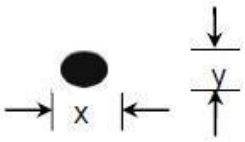
a) If the liquid crystal leaks from the panel, it should be kept away from the eyes or mouth.

b) For the fragility of polarizer, it is recommended to attach a transparent protective plate over the display surface.

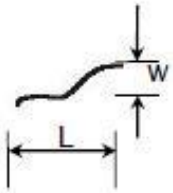
c) It is recommended to peel off the protection film on the polarizer slowly so that the electrostatic charge can be minimized.

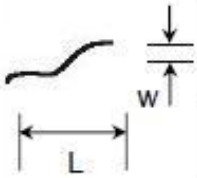
13. Inspection standard

<table>
<tr><th>No</th><th>Item</th><th>Criterion</th><th></th></tr>
<tr><td>01</td><td>Outline Dimension</td><td>In accord with drawing</td><td></td></tr>
<tr><td>02</td><td>Position-finding Dimension Assemble Dimension</td><td>In accord with drawing</td><td></td></tr>
<tr><td rowspan="2">03</td><td rowspan="2">LCD black spots, white spots (Round type)</td><td>Round type: non display
3.1 Small area LCD
Unit : mm
 

<table>
<tr><th>Dimension</th><th>Qualified Quantity</th></tr>
<tr><td>D≤0.1</td><td>Ignore</td></tr>
<tr><td>0.1＜D≤0.15</td><td>2</td></tr>
<tr><td>D＞0.15</td><td>0</td></tr>
</table></td><td></td></tr>
<tr><td>3.2Large area LCD
 

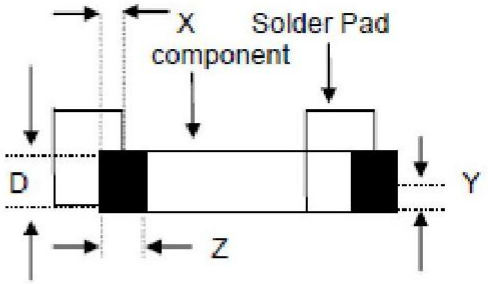
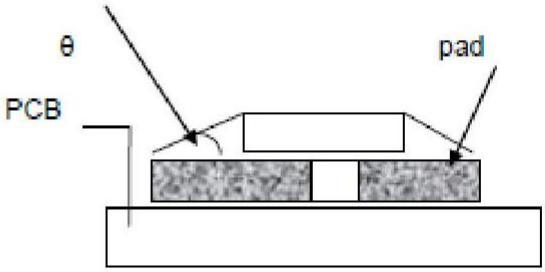
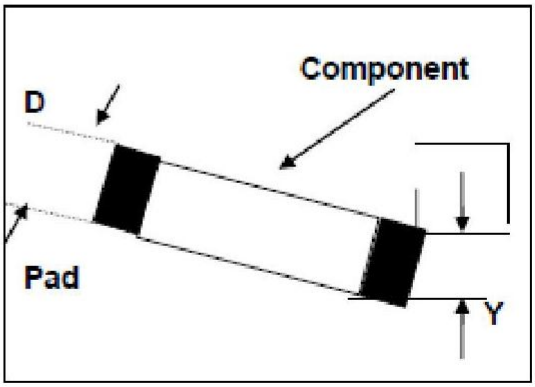
<table>
<tr><th>Dimension</th><th>Qualified Quantity</th></tr>
<tr><td>D≤0.1</td><td>Ignore</td></tr>
<tr><td>0.1＜D≤0.15</td><td>2</td></tr>
<tr><td>0.15＜D≤0.20</td><td>1</td></tr>
<tr><td>D＞0.20</td><td>0</td></tr>
</table>
C-STN : if D＞0.1 , unqualified</td><td></td></tr>
</table>

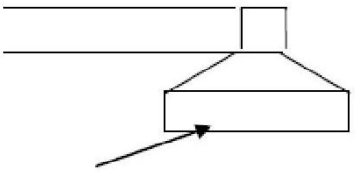
<table>
<tr>
<td>04</td>
<td>LCD black spots, white spots (Line Style)</td>
<td>
4.1 Small area LCD
Unit : mm


<table>
<tr><th>Length</th><th>Width</th><th>Qualified Quantity</th></tr>
<tr><td>-</td><td>≤0.015</td><td>Ignore</td></tr>
<tr><td>≤1.0</td><td rowspan="2">0.015<W≤ 0.025</td><td>2</td></tr>
<tr><td>≤2.0</td><td>1</td></tr>
<tr><td>≤1.0</td><td>0.025<W≤ 0.05</td><td>1</td></tr>
<tr><td>-</td><td>D>0.05</td><td>According to circle</td></tr>
</table>
4.2Large area LCD


<table>
<tr><th>Length</th><th>Width</th><th>Qualified Quantity</th></tr>
<tr><td>-</td><td>≤0.015</td><td>Ignore</td></tr>
<tr><td>≤2.0</td><td>0.015<W≤ 0.025</td><td>2</td></tr>
<tr><td>≤1.0</td><td>0.025<W≤ 0.05</td><td>1</td></tr>
<tr><td>-</td><td>D>0.05</td><td>According to circle</td></tr>
</table>
CSTN : If W ⩾ 0.015 , unqualified
Ignore beyond viewing area
</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>LCD Scratch 、 Threadlike Fiber</td>
<td colspan="2">Same to NO.3 circle
sightline and surface of LCD is vertical
(2)Same to NO.3 line style</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>POL</td>
<td colspan="2">It is not admissible that POL is beyond the edge of glass, else, unqualified.
It is essential that POL is over the 50 percent of width of frame , else ,unqualified.
According to the drawing in case of special definition.</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>IC/FPC Bonding</td>
<td>Scratch</td>
<td>Reject</td>
<td></td>
</tr>
</table>

		Intensity Of Adhesion	If lower than specification, reject	
		Gold Fold Twist	Reject	
07	IC/FPC Bonding	Silicon	According to outline, no gold outside, seal can not be higher than LCD	
		FPC Gold Sever	Reject	
08	SMT	Lack of Component、Polarity Inverse	If exist, reject	
		Leak Solder、Virtual Solder	If exist, reject	
		Short Circuit In Solder Point	If exist, reject	
		Tin Ball	If exist, reject	
		Tin Acumination	If visual, reject	
		Height Solder Point	If higher 0.5mm than component. reject	
		Height of component	Either side higher 0.5mm than component, reject	

		Component Shift	 X<3/4Z reject y>1/3D reject	
08	SMT	Few Tin	 If θ≤20° reject	
		Component Deflection	 If Y >1/3D reject	
		Component Carcass Sideways	Reject	

		Component Carcass Sideways	If exist with visual inspection , reject	
		Lot Tin	A: Tin accrete the solder side completely , hollowly ,Ok B: Tin accrete the solder side completely , full circle arc , ok C: Jointing include whole solder side, height of tin>50 percent of height of component, reject	
		Few Tin	A: Tin accrete the solder side completely , hollowly ,Ok B: height of tin > 1/3 of solder side of component , ok C: height of tin ≤ 1/3 of solder side of component, reject	
08	SMT	Normal  Jointing side		
09	Light	Short circuit 、 Open circuit	Forbid	
		Quality of CSTN Display	1、Rolling strake with visual inspection, forbid 2、Differentness of color in viewing area with visual inspection (full white、red、green、blue), forbid 3 、 Display change with visual inspection , forbid	