

<b>深圳市阿美林电子科技有限公司</b> <b>Shenzhen Amelin Electronic Technology Co., Ltd.</b>	Doc.No.: AML-FRD397BP4511	
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# Specifications

**TFT-LCD module**

**Model No: AML-FRD397BP4511**

<b>For Customer's Acceptance</b>	
<b>Approved by</b>	<b>Comment</b>

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## 1 General Description

**AML-FRD397BP4511** 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 3.97inch and the resolution is 480x800. High image quality a-Si TFT LCD module. Partial-screen display function is available. Sleep and Stand-by modes are available for power saving.

### 1.1 Features

No	Item	Specification	Remark
1	Display Mode	Normally Black	
2	Screen Size	3.97inch (diagonal)	
3	Resolution	480xRGBx800	
4	Display Colors	16.7M	
5	Color Arrangement	TFT Active matrix	
6	Driver IC	ILI9806E-2C	
7	Back Light	White LED*8	
8	Viewing Direction	ALL DIRECTION	
9	Interface	3SPI-24bit RGB	
10	Surface Treatment	UV Cut	
11	touch panel	Without	

### 1.2 Application

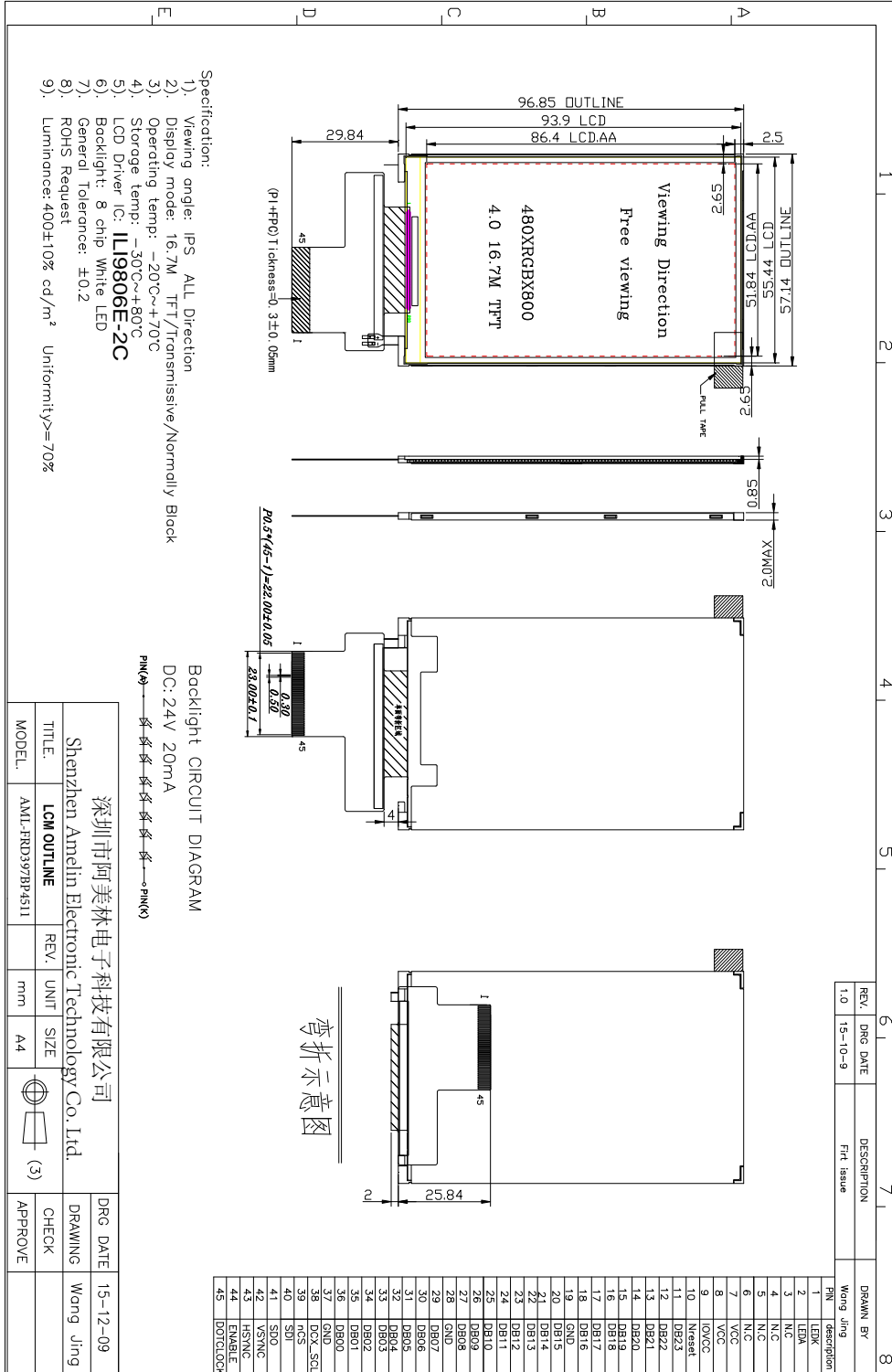
- ◆ Mobile phone.
- ◆ Portable multimedia device.

## 2 Outline Dimension

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

Parameter	Specifications	Unit
Outline dimensions	57.14(W) x96.85(H) x 2.0(D) (LCM, not include FPC)	mm
Active area	51.84(W) x86.40(H)	mm
Resolution	480(H)RGBx 800(V) dots	-
Dot size	0.108(H) x 0.108(V)	mm

Figure 1: Module specification of the module



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### 3 Electrical Characteristics

#### 3.1 TFT-LCD Module

Ta=25°C

Item	Symbo	Value			Unit	Notes
		Min	Typ	Max		
Supply Voltage for logic	IOVCC	1.65	2.8	3.3	V	
	VCC	2.5	2.8	3.3		
TFT Gate ON Voltage	VGH *	10	15	20	V	
TFT Gate OFF Voltage	VGL	-15	-8	-5	V	
Operating temperature	Top	-20		+70	°C	
Storage temperature	Tst	-30		+80	°C	

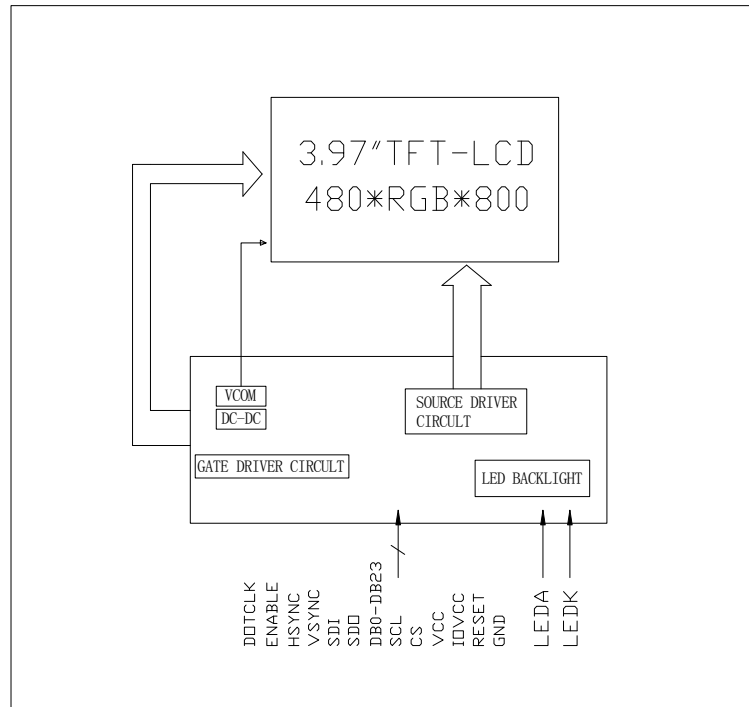
#### 3.2 Back-Light Unit

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Current	IF	--	20	25	mA	IF=20mA VF=25.6V
Forward voltage	VF	22.4	25.6	27.2	V	
Chroma	X	0.250		0.30		
	Y	0.250		0.30		
Brightness	L	280			Cd/m2	
Uniformity	UBL	80	85		%	

- ③ 8 LEDs used
- ③ The luminous intensity of LED is strongly dependent on the driving current.
- ③ It is recommended the input of backlight to be constant current rather than constant voltage.

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## 4 Block Diagram



## 5 TFT-LCM Interface Specification

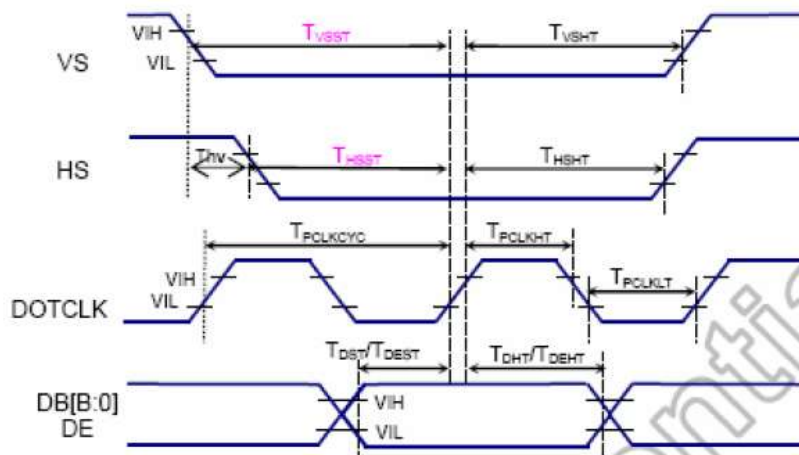
Pin No	Symbol	Description	Note
1	LEDK	Power supply Cathode input for backlight	
2	LEDA	Power supply Anode input for backlight	
3-6	NC	No connection	
7-8	VCC	Power supply input for LCM: 2.8V	
9	IOVCC	Power supply input for LCM: 1.8V	
10	/RESET	Reset signal input Pin	
11-18	DB23-DB16	Data Bus	
19	GND	Ground	
20-27	DB15-DB8	Data Bus	
28	GND	Ground	
29-36	DB7-DB0	Data Bus	
37	GND	Ground	
38	DCX_SCL	Serial Clock input pin	

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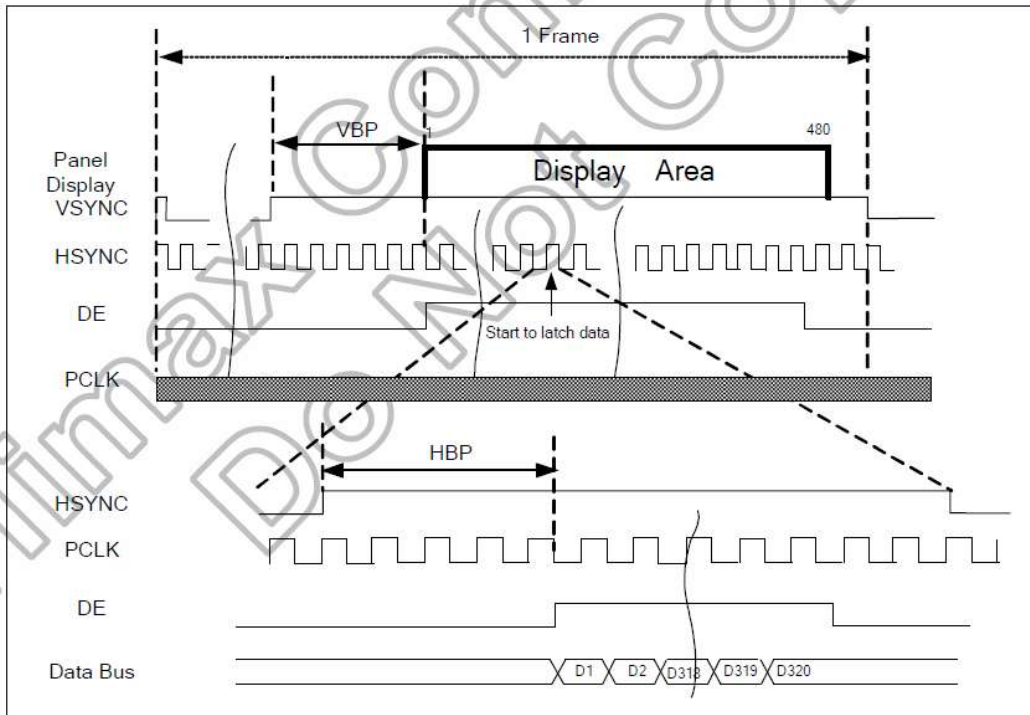
39	CS	Chip select signal	
40	SDI	Serial input Data BUS	
41	SDO	Serial output Data BUS	
42	VSYNC	Frame synchronizing signal for RGB interface operation	
43	HSYNC	Line synchronizing signal for RGB interface operation	
44	ENABLE	Data enable signal	
45	DOTCLK	Dot clock signal for RGB interface operation.	

## 6 Description of Interface Signal

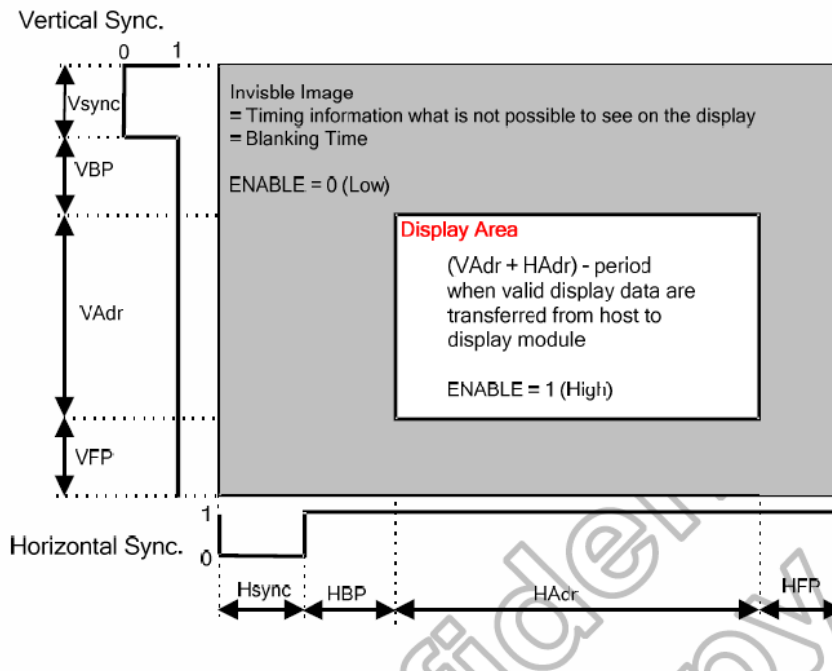
### DPI interface characteristics



Item	Symbol	Condition	Spec.			Unit
			Min.	Typ.	Max.	
Pixel low pulse width	$T_{CLKLT}$		15	-	-	ns
Pixel high pulse width	$T_{CLKHT}$		15	-	-	ns
Vertical Sync. set-up time	$T_{VSST}$		15	-	-	ns
Vertical Sync. hold time	$T_{VSHT}$		15	-	-	ns
Horizontal Sync. set-up time	$T_{HSST}$		15	-	-	ns
Horizontal Sync. hold time	$T_{HSHT}$		15	-	-	ns
Data Enable set-up time	$T_{DEST}$		15	-	-	ns
Data Enable hold time	$T_{DEHT}$		15	-	-	ns
Data set-up time	$T_{DST}$		15	-	-	ns
Data hold time	$T_{DHT}$		15	-	-	ns
Phase difference of sync signal falling edge	$T_{thv}$		0	-	320	Dotclk



**General timing diagram**



**Power on/off sequence**



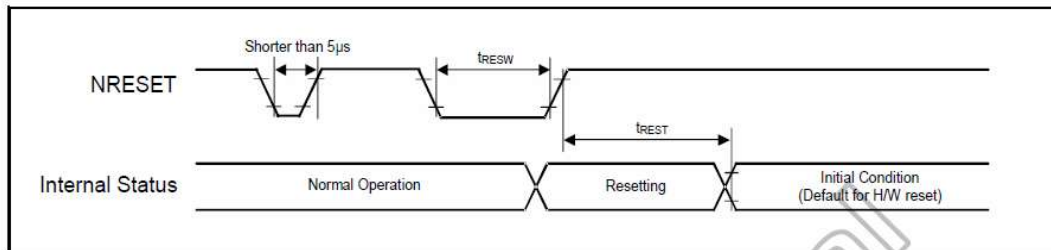
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Power source IOVCC, VCI can be applied and powered down in any order.  
IOVCC, VCI can be powered down in any order.  
During power off, if LCD is in the Sleep Out mode, IOVCC, VCI must be powered down minimum 120msec after NRESET has been released.  
During power off, if LCD is in the Sleep In mode, IOVCC, VCI can be powered down minimum 0msec after NRESET has been released.  
NCS can be applied at any timing or can be permanently grounded. NRESET has priority over NCS.

- Note:**
- (1) There will be no damage to the display module if the power sequences are not met.
  - (2) There will be no abnormal visible effects on the display panel during the Power On/Off Sequences.
  - (3) There will be no abnormal visible effects on the display between end of Power on Sequence and before receiving Sleep Out command. Also between receiving Sleep In command and Power Off Sequence.
  - (4) If NRESET line is not held stable by host during Power on Sequence as defined in Sections 5.11.1.1 and 5.11.1.2, then it will be necessary to apply a Hardware Reset (NRESET) after Host Power on Sequence to ensure correct operation. Otherwise correct function is not guaranteed.

If NRESET line is not held stable by host during Power on Sequence as defined in Sections 5.9.1.1 and 5.9.1.2 then it will be necessary to apply a Hardware Reset (NRESET) after Host Power on Sequence is complete to ensure correct operation, otherwise correct functionality is not guaranteed. The power on/off sequence is illustrated as below

## Reset Timing Characteristics



Symbol	Parameter	Related Pins	Spec.			Note	Unit
			Min.	Typ.	Max.		
tRESW	Reset low pulse width <sup>(1)</sup>	NRESET	10	-	-	-	µs
tREST	Reset complete time <sup>(2)</sup>	-	5	-	-	When reset applied during SLPIN mode	ms
		-	120	-	-	When reset applied during SLPOUT mode	ms

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**DC Characteristics (Vcc=2.4~ 3.3V, IOVcc=1.65-3.3V,Ta=-40 ~ 85°C)**

Parameter	Symbol	Conditions	Spec.			Unit
			Min.	Typ.	Max.	
<b>Power &amp; Operating Voltages</b>						
IO Operating voltage	IOVCC	I/O supply voltage	1.65	1.8	3.3	V
Driver Operating voltage	VCI	Operation voltage	2.5	2.8	3.3	
Source Drive Voltage	VSPROUT	Dual Pump				
	VSPROUT	Triple Pump				
	VSNROUT	Dual Pump				
	VSNROUT	Triple Pump				
Gate Drive High Voltage	VGH	VCI=2.8V Dual Pump (Typ:BT=001)				
		IVGH=80uA				
		IVGH=70uA				
		IVGH=60uA				
		IVGH=50uA				
Gate Drive Low Voltage	VGL	VCI=2.8V Dual Pump (Typ:BT=001)				
		IVGL=-80uA				
		IVGL=-70uA				
		IVGL=-60uA				
		IVGL=-50uA				
Drive Supply Voltage	VGH-VGL	-			32	
<b>Input / Output</b>						
High level input voltage	VIH	-	0.7IOVCC	-	IOVCC	V
Low level input voltage	VIL	-	VSSD	-	0.3IOVCC	
High level output voltage	VOH	IOH = -1.0mA	0.8IOVCC	-	IOVCC	
Low level output voltage	VOL	IOL = +1.0mA	VSSD	-	0.2IOVCC	
Input leakage current	IIL	-	-1	-	1	µA
Oscillator frequency	fOSC	Frame rate at 60hz,default Vs and Hs setting Ta=25°C				MHz

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## 7.Optical Specification

Item		Symbol	Conditions	Specifications (typ)	Unit	Note
Transmittance		T%	Viewing normal angle $\theta_x = \theta_y = 0^\circ$	4.0	%	All left side data are based on CMI's following condition – 1.CG : NTSC 70% 2.AR : 67.5% 3.Light Source : CMI LED BLU 4.Machine : DMS 803 5. Vwhite > 5.0 V, Vdark < 0.4V 6. Polarizer : NPF-TEGQ1465DUHC
Contrast Ratio		CR		700	--	
Response Time		Ton+ Toff		30	ms	
Viewing Angle	Hor.	$\theta_{x+}$	Center CR>10	80	deg.	
		$\theta_{x-}$		80		
	Ver.	$\theta_{y+}$		80		
		$\theta_{y-}$		80		
CF only Chromaticity	Red	$X_R$	Viewing normal angle $\theta_x = \theta_y = 0^\circ$	0.654	--	Under C light Simulation
		$Y_R$		0.326	--	
	Green	$X_G$		0.271	--	
		$Y_G$		0.586	--	
	Blue	$X_B$		0.150	--	
		$Y_B$		0.083	--	
	White	$X_W$		0.306	--	
		$Y_W$		0.318	--	

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

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

L63: Luminance of gray level 63

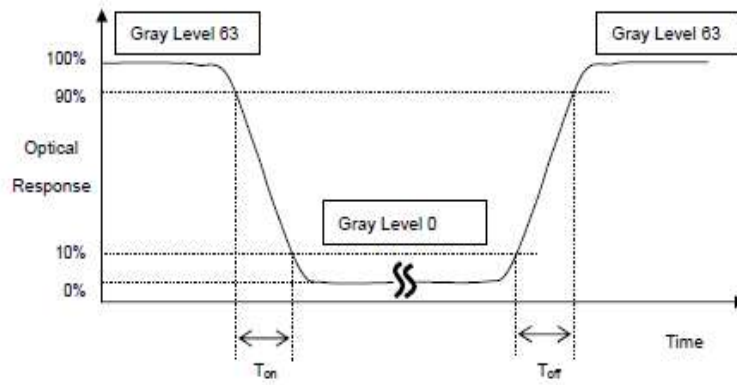
L 0: Luminance of gray level 0

$$CR = CR (5)$$

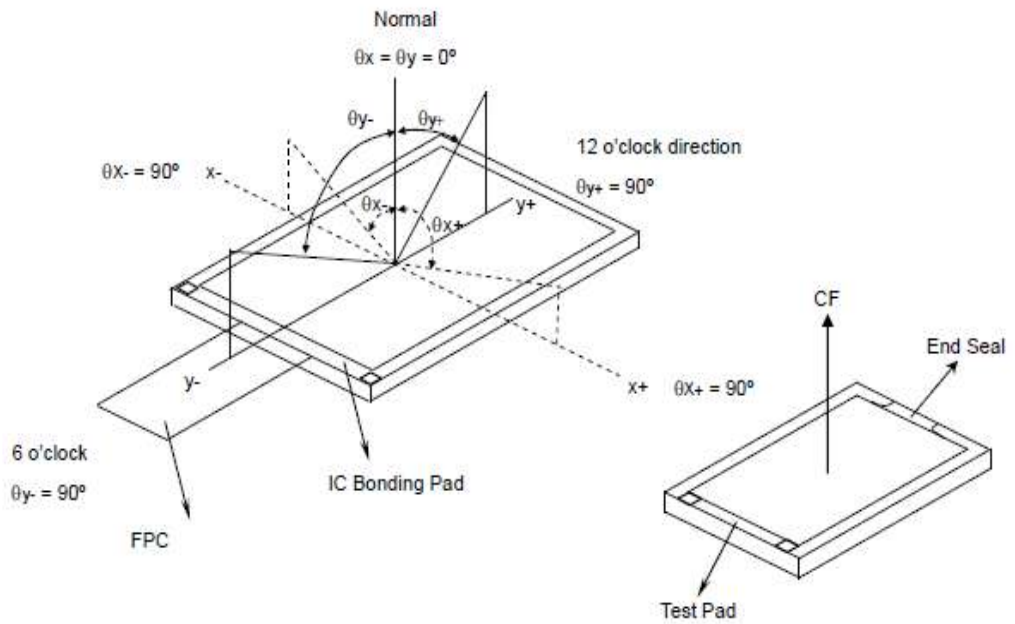
CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

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



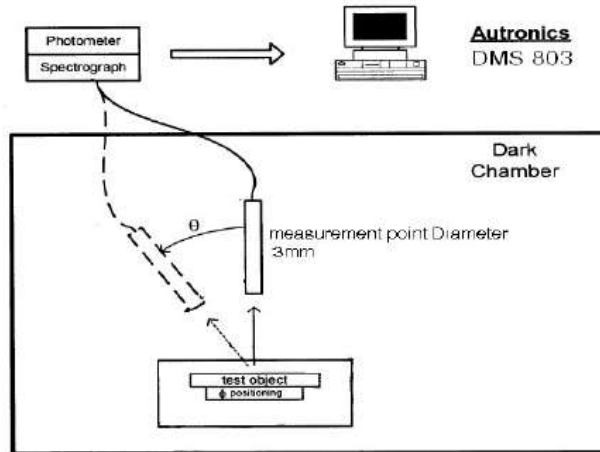
\*Note(3) Definition of Viewing Angle



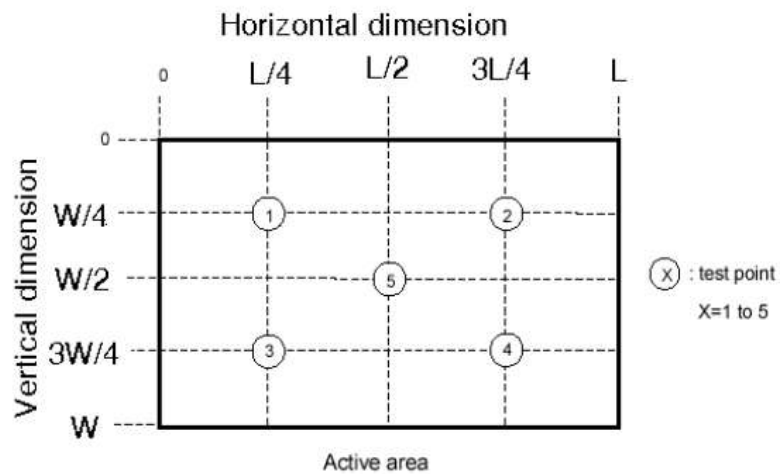
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\*Note (4) Measurement Set-Up:

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.



\*Note (5)

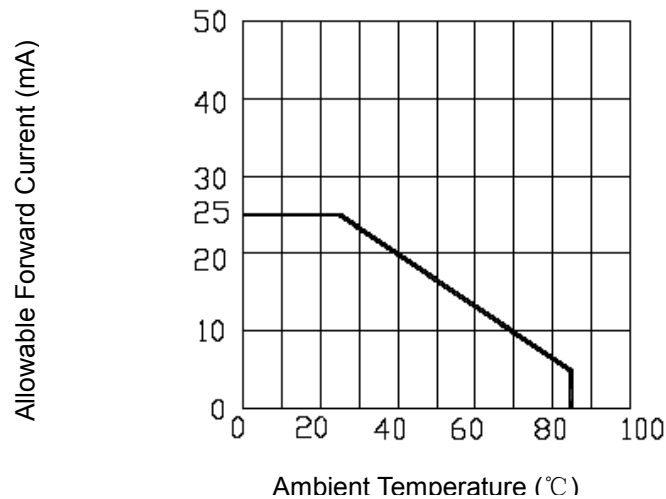


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## 8.Environment Absolute Maximum Ratings

Item	Symbol	Min	Max	Unit	Remark
Operation temperature range	Top	-20	70	°C	Ambient
Storage temperature range	Tst	-30	80	°C	Ambient

- ③ Corrosive gas environment is not acceptable.
- ③ TFT-LCD color will change slightly depending on environment temperature. This phenomenon is reversible. Current reduction rate of LED backlight is according to the graph indicated below:



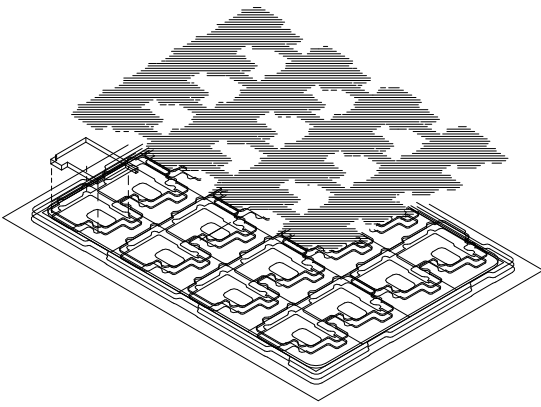
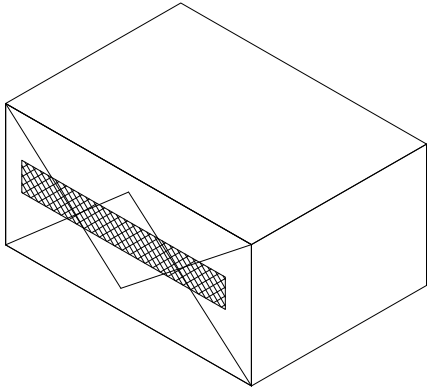
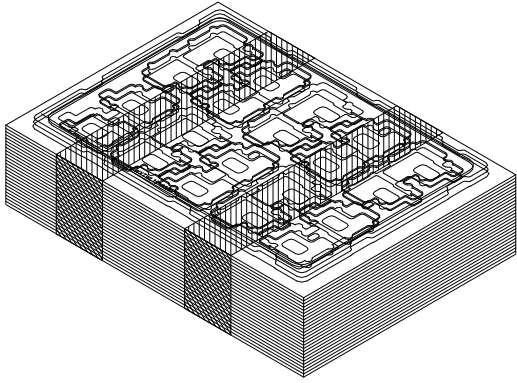
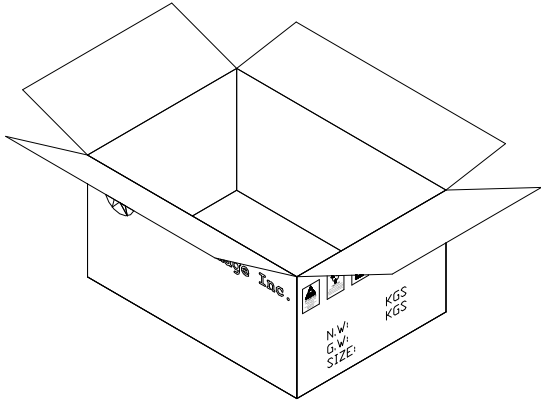
## 9.Reliability Test Items

Item	Test Condition		Criterion
High Temperature Storage	80 °C, 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 °C, 240 hrs		
High Temp. & High Humidity Storage	60 °C, 90% 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°C, 30 min /80°C, 30 min, 20 cycles		
High Temperature Operation	70 °C, 240 hrs		

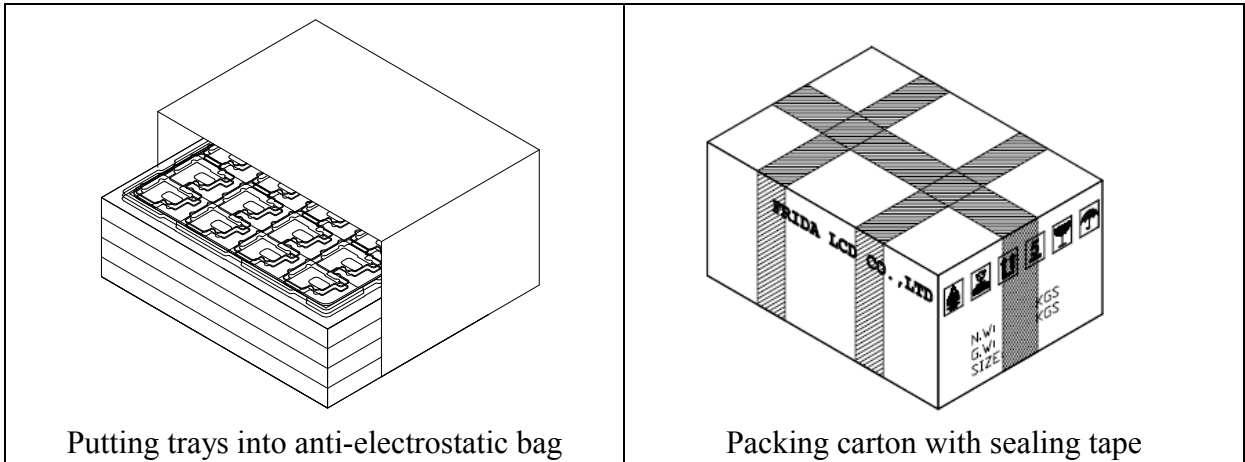
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Low temperature Operation	-20 °C, 240 hrs	
High Temperature & High Humidity (Operating)	50 °C, 90% RH, 240 hrs	
FPC Peeling Strength Test	Pull speed: 50 mm/min, +90°	> 400gf/cm

## 10. Package

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

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## 11.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.



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### **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.

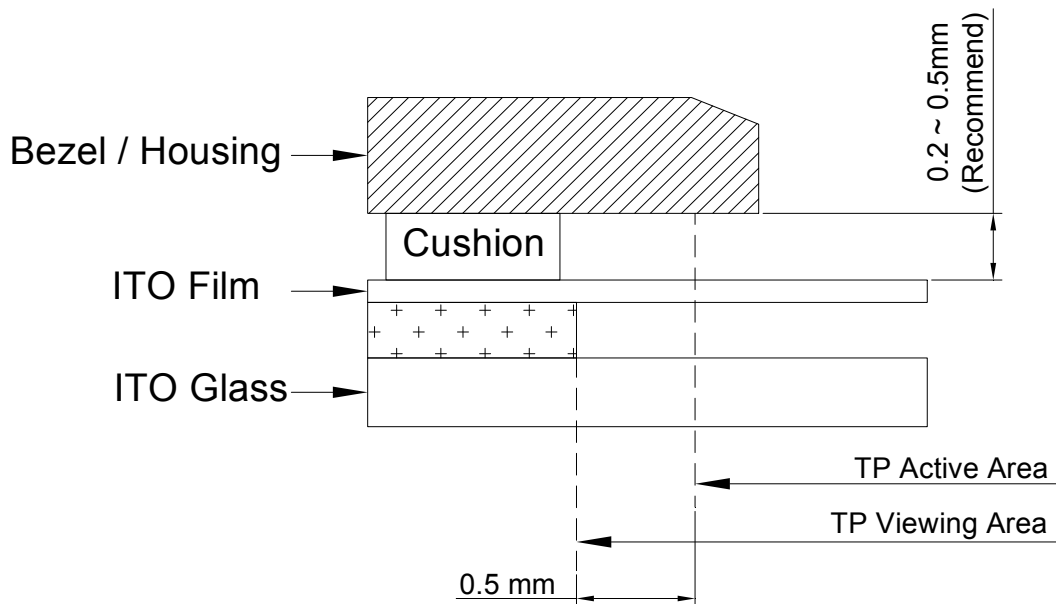
### **Touch Panel Mounting Notes**

- (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

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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

- If the liquid crystal leaks from the panel, it should be kept away from the eyes or mouth.
- For the fragility of polarizer, it is recommended to attach a transparent protective plate over the display surface.
- It is recommended to peel off the protection film on the polarizer slowly so that the electrostatic charge can be minimized.

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## 12. Incoming inspection standard

### 12.1 Description

These inspection standards shall be applied to 3.5IPS(CMI panel) supplied by FRIDA co.,ltd

### 12.2 The environmental condition of inspection

The environmental condition and visual inspection shall be conducted as below

(1) Ambient temperature:15~25℃

(2) Humidity:25~75%RH

(3) External appearance inspection shall be conducted by using a single 20W fluorescent lamp or equivalent illumination.

Cell visual inspection on the operation condition for cosmetic shall be conducted at the distance 35cm or more between the LCD Cell and eyes of inspector. And, the visual inspection viewing angle should be with in the 45° to perpendicular line

Ambient Illumination: 400~600 Lux for external appearance inspection.

Ambient Illumination:100~200 Lux for light on inspection.

### 12.3 Inspection criteria

#### Definition of dot defect

Definition of defect

a) The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot, and all brightness or dark dot defect must be visible through ND 5% filter

b) Bright dot: Dots appear bright and unchanged in size in which LCD Cell is displaying under black pattern.

c) Dark dot: Dots appear dark and unchanged in size in which LCD Cell is displaying under pure red, green, blue picture.

d) 2 dot adjacent=1pair=2dots



2 dot adjacent



2 dot adjacent



2 dot adjacent(vertical)

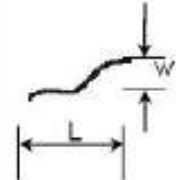
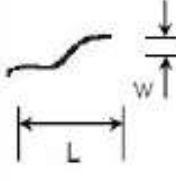


2 dot adjacent(slant)

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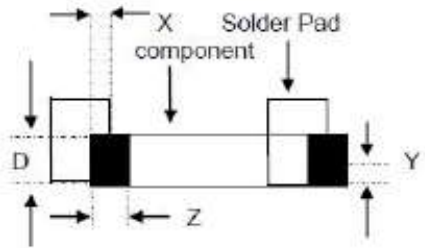
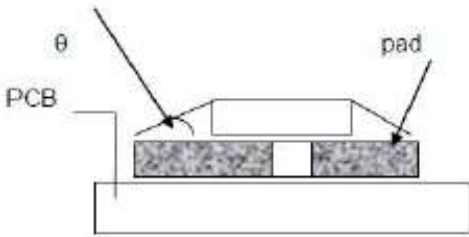
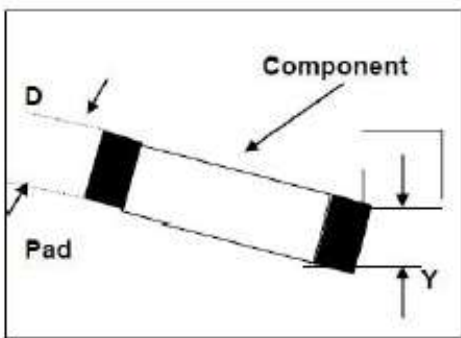
### Light on display inspection criteria

01	Outline Dimension	In accord with drawing																									
02	Position-fin ding Dimension Assemble Dimension	In accord with drawing																									
03	<p>Round type: non display 3.1 Small area LCD Unit : mm</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Dot item</th> <th style="text-align: center;">standard</th> <th style="text-align: center;">Notes</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Brightness dots</td> <td style="text-align: center;"><math>N \leq 1</math></td> <td></td> </tr> <tr> <td style="text-align: center;">Dark dots</td> <td style="text-align: center;"><math>N \leq 1</math></td> <td>Dia <math>\leq 0.1\text{mm}</math>, ignore 0.1 &lt; Dia <math>\leq 0.15\text{mm}</math>, 1 dot Dia &gt; 0.15mm, not allow</td> </tr> <tr> <td style="text-align: center;">Adjacent dots</td> <td style="text-align: center;">not allowed</td> <td></td> </tr> <tr> <td style="text-align: center;">Total bright and dark dot</td> <td style="text-align: center;"><math>N \leq 2</math></td> <td></td> </tr> <tr> <td style="text-align: center;">Touch panel newton ring</td> <td style="text-align: center;">not allow (Having the approved sample as reference)</td> <td></td> </tr> <tr> <td style="text-align: center;">LCD Ripple</td> <td style="text-align: center;">not allow (Having the approved sample as reference)</td> <td></td> </tr> <tr> <td style="text-align: center;">butterfly spot and leakage light</td> <td style="text-align: center;">not allow (Having the approved sample as reference)</td> <td></td> </tr> </tbody> </table>		Dot item	standard	Notes	Brightness dots	$N \leq 1$		Dark dots	$N \leq 1$	Dia $\leq 0.1\text{mm}$ , ignore 0.1 < Dia $\leq 0.15\text{mm}$ , 1 dot Dia > 0.15mm, not allow	Adjacent dots	not allowed		Total bright and dark dot	$N \leq 2$		Touch panel newton ring	not allow (Having the approved sample as reference)		LCD Ripple	not allow (Having the approved sample as reference)		butterfly spot and leakage light	not allow (Having the approved sample as reference)		
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		<table border="1" style="width: 50%; margin-left: auto; margin-right: auto;"> <tr> <td style="text-align: center;">0.15 &lt; D <math>\leq</math> 0.20</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">D &gt; 0.20</td> <td style="text-align: center;">0</td> </tr> </table>	0.15 < D $\leq$ 0.20	1	D > 0.20	0																					
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D > 0.20	0																										
		C-STN : if D > 0.1 , unqualified																									

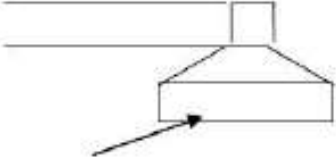
04	LCD black spots, white spots (Line Style)	<p>Unit : mm</p> 		<p>4.1 Small area LCD</p> <table border="1"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Qualified Quantity</th> </tr> </thead> <tbody> <tr> <td>-</td> <td><math>\leq 0.015</math></td> <td>Ignore</td> </tr> <tr> <td><math>\leq 1.0</math></td> <td><math>0.015 &lt; W \leq 0.025</math></td> <td>2</td> </tr> <tr> <td><math>\leq 2.0</math></td> <td><math>0.025 &lt; W \leq 0.05</math></td> <td>1</td> </tr> <tr> <td><math>\leq 1.0</math></td> <td><math>0.025 &lt; W \leq 0.05</math></td> <td>1</td> </tr> <tr> <td>-</td> <td><math>D &gt; 0.05</math></td> <td>According to circle</td> </tr> </tbody> </table>			Length	Width	Qualified Quantity	-	$\leq 0.015$	Ignore	$\leq 1.0$	$0.015 < W \leq 0.025$	2	$\leq 2.0$	$0.025 < W \leq 0.05$	1	$\leq 1.0$	$0.025 < W \leq 0.05$	1	-	$D > 0.05$	According to circle
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-	$D > 0.05$	According to circle																						
05	LCD Scratch , Threadlike Fiber	Same to NO.3 circle sightline and surface of LCD is vertical (2)Same to NO.3 line style																						
06	POL	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.																						
07	IC/FPC Bonding	Scratch	Reject																					

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		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	

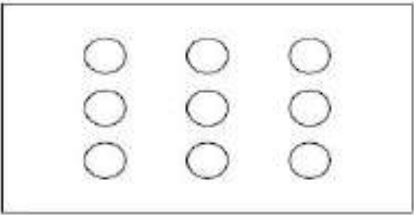
		Component Shift	 <p><math>X &lt; 3/4Z</math>      reject <math>y &gt; 1/3D</math>      reject</p>
		Few Tin	 <p>If <math>\theta \leq 20^\circ</math> reject</p>
08	SMT	Component Deflection	 <p>If <math>Y &gt; 1/3D</math> reject</p>
		Component Carcass Sideways	Reject

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		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	<p>Normal</p>  <p>Jointing side</p>		
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	



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10	Color Of CIE Coordinate		x	y	Drive LCD under normal condition, 25℃ Φ=0 Θ=0 Test white, red, green blue with DMS Record
		white	±0.05	±0.05	
		Red	±0.05	±0.05	
		Green	±0.05	±0.05	
		Blue	±0.05	±0.05	
According to the specification or sample customer have approved					
11	Brightness	In accord with product specification	Drive condition is according to specification Measure location is in Follow Picture 3, Adjust brightness instrument to zero, burrow against the surface of LCD, press "measure", record when the display is steady. (YOKOGAWA-3298)		
			 <p style="text-align: center;">Measure location</p>		
12	CR (Max)	According to specification	According to product specification Measure instrument ( DMS-501 )		
13	Response time	According to specification	According to product specification Measure instrument ( DMS-501 )		
14	Viewing angle	According to specification	According to product specification Measure instrument ( DMS-501 )		
15	Vibration, Ring	Compare with the sample customer supply	Compare with the sample customer supply when assemble		
16	Frequency Of FPC Bend	According to the use of product ( main FPC of foldaway cell phone ≥6 thousand )	Measure instrument Bend angle : 150° Fix FPC in the casement when customer supply		

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### 13.Records of Version

Version	Revise Date	Page	Content
A	2015-10-23	All	First version.
B	2015-9-24	20~29	Add touch content and iis part
C	2015-10-23	23	Change IIS part
D	2015-11-3	23	Change IIS part