



PRODUCT SPECIFICATION

10.1" IPS TFT LCD MODULE

MODEL: IPS101B101A



< ◇ > Preliminary Specification

< ◆ > Finally Specification

CUSTOMER'S APPROVAL	
CUSTOMER :	
SIGNATURE:	DATE:

APPROVED BY	PM REVIEWED	PD REVIEWED	PREPARED BY

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1. General Description

The specification is a transmissive type color active matrix liquid crystal display (LCD) which uses amorphous thin film transistor (TFT) as switching devices. This product is composed of a TFT-LCD panel, driver ICs ,a touch panel and a backlight unit.

2. Module Parameter

Features	Details	Unit
Display Size(Diagonal)	10.1"	
LCD type	IPS TFT	
Display Mode	Transmissive/ Normally Black	
Resolution	1280 RGB x 800	Pixels
View Direction	FULL VIEWING	Best Image
Module Outline	237(H) x154(V) x 5.35(T) (Note1)	mm
Active Area	216.96 (H) x 135.6(V)	mm
Pixel Size	169.5 (H) x 169.5(V)	um
Pixel Arrangement	RGB Vertical Stripe	
Display Colors	262K	
Interface	6 bits-LVDS interface	
With or Without Touch Panel	Without	
Operating Temperature	-10~50	°C
Storage Temperature	-20~60	°C
Weight	TBD	g

Note 1: Exclusive hooks, posts , FFC/FPC tail etc.

3. Absolute Maximum Ratings

$V_{SS}=0V, T_a=25^{\circ}C$

Item	Symbol	Min.	Max.	Unit
Supply Voltage	VCCS	-0.5	5.0	V
	LED_VCCS	-0.5	15	V
Storage temperature	T _{STG}	-20	+60	°C
Operating temperature	T _{OP}	-10	+50	°C

Note 1: If Ta below 50°C, the maximal humidity is 90%RH, if Ta over 50°C, absolute humidity should be less than 60%RH.

Note 2: The response time will be extremely slow when the operating temperature is around -10°C, and the back ground will become darker at high temperature operating.

4. DC Characteristics

4.1. TFT Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	
Supply Voltage/current	VCCS	3.0	3.3	3.6	V	
Ripple Voltage	V _{rp}	-	-	100	mV	
Differential Input Voltage	V _{ID}	100	-	600	mV	
Common Input Voltage	V _{CM}	1.125	-	1.375	V	
Current Consumption All Black	Logic	I _{CC+} I _{IN}	-	TBD	-	mA
	Analog					

4.2. Backlight driver

Item	Symbol	Min.	Typ.	Max.	Unit
Backlight Supply Power	LED_VCCS	6	12	15	V
Backlight control signal	LED_PWM	100	-	30,000	Hz
Backlight enable(high)	LED_EN	3	-	6	V

5. Backlight Characteristic

5.1. Backlight Characteristic

Item	Symbol	Condition	Min	Typ	Max	Unit
Forward Voltage	V _F	T _a =25 °C	-	TBD	-	V
Forward Current	I _F	T _a =25 °C		TBD		mA
Power dissipation	P _D			TBD		mW
Uniformity	Avg		-	70	-	%
Drive method	Constant current					
LED Configuration	TBD					

5.2. Backlighting circuit

TBD

6. Touch Screen Panel Specifications

Technical parameters:

1. Cover GLASS+DITO GLASS+FPC
 - DITO GLASS:T=0.55mm
 - Cover GLASS:1.9mm
 - Lead line:FPC
 - IC model:FT5506
2. Operation voltage: 2.8V-3.3 V
3. Transmittance: $\geq 85\%$
4. Surface hardness: $\geq 6H$
5. Operation environment: $-10^{\circ}\text{C}\sim+60^{\circ}\text{C}$
6. Storage environment: $-20^{\circ}\text{C}\sim+70^{\circ}\text{C}$
7. ROHS must be complied
8. Unspecification tolerance are $\pm 0.2\text{mm}$
9. The GAP between LCD and CTP should be over 0.5mm

7. Optical Characteristics

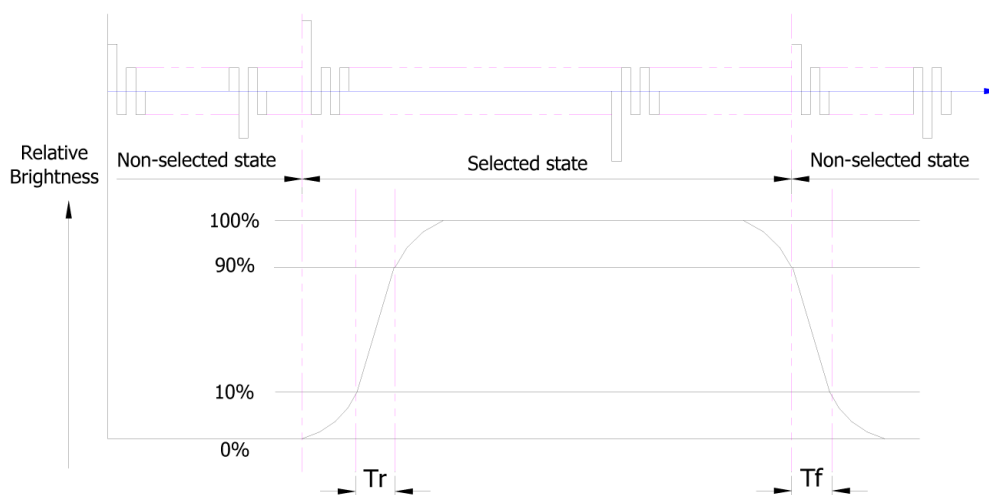
7.1. Optical Characteristics

Ta=25°C, V_{CCS}=3.3V

	Item	Symbol	Condition	Specification			Unit	
				Min.	Typ.	Max.		
Backlight On (Transmissive Mode)	Luminance on TFT(I _f =20mA/LED)	Lv	Normally viewing angle θ _X = φ _Y = 0°	280	320	-	cd/m ²	
	Contrast ratio(See 6.3)	CR		600	800	-		
	Response time (See 6.2)	T _{R+TF}		-	30	-	ms	
	Chromaticity Transmissive (See 6.5)	Red	X _R	Center CR≥10	-	TBD	-	-
			Y _R		-	TBD	-	
		Green	X _G		-	TBD	-	
			Y _G		-	TBD	-	
		Blue	X _B		-	TBD	-	
			Y _B		-	TBD	-	
	White	X _W	-	TBD	-			
		Y _W	-	TBD	-			
Viewing Angle (See 6.4)	Horizontal	θ _{X+}	Center CR≥10	-	85	-	Deg.	
		θ _{X-}		-	85	-		
	Vertical	φ _{Y+}		-	85	-		
		φ _{Y-}		-	85	-		

7.2. Definition of Response Time

7.2.1. Normally Black Type (Negative)

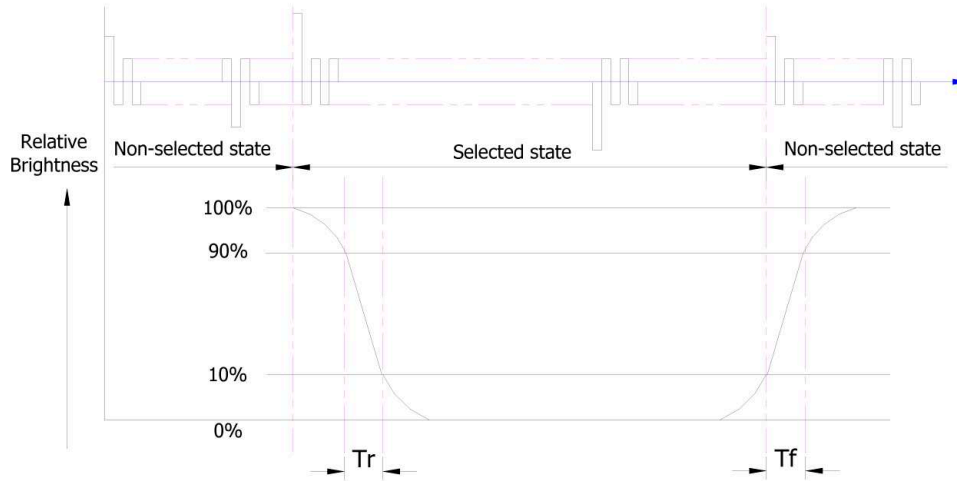


Tr is the time it takes to change from non-selected stage with relative luminance 10% to selected state with relative luminance 90%;

Tf is the time it takes to change from selected state with relative luminance 90% to non-selected state with relative luminance 10%.

Note : Measuring machine: LCD-5100

7.2.2. Normally White Type (Positive)



Tr is the time it takes to change from non-selected state with relative luminance 90% to selected state with relative luminance 10%;

Tf is the time it takes to change from selected state with relative luminance 10% to non-selected state with relative luminance 90%;

Note : Measuring machine: LCD-5100 or EQUI

7.3. Definition of Contrast Ratio

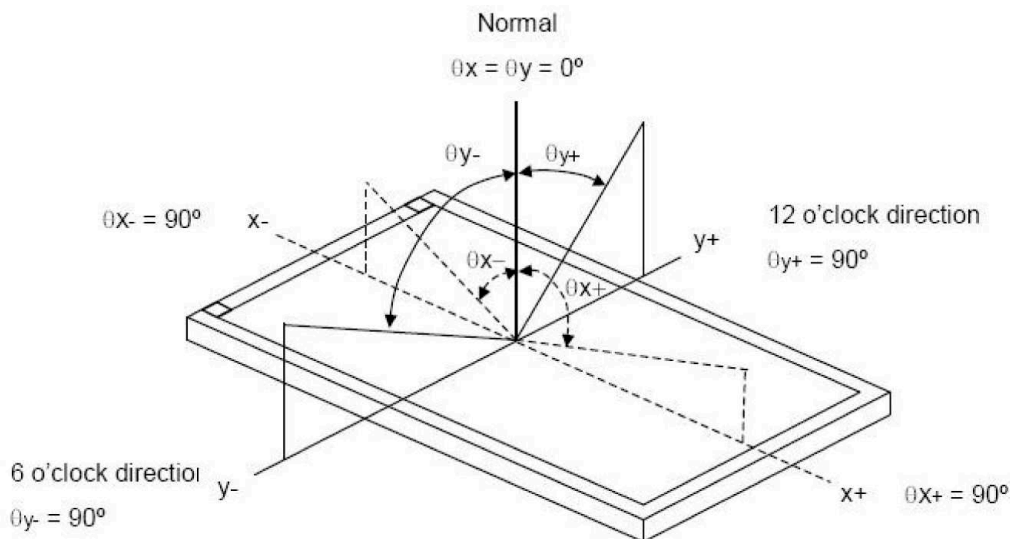
Contrast is measured perpendicular to display surface in reflective and transmissive mode.

The measurement condition is:

Measuring Equipment	Eldim or Equivalent
Measuring Point Diameter	3mm//1mm
Measuring Point Location	Active Area centre point
Test pattern	A: All Pixels white
	B: All Pixel black
Contrast setting	Maximum

Definitions: CR (Contrast) = Luminance of White Pixel / Luminance of Black Pixel

7.4. Definition of Viewing Angles



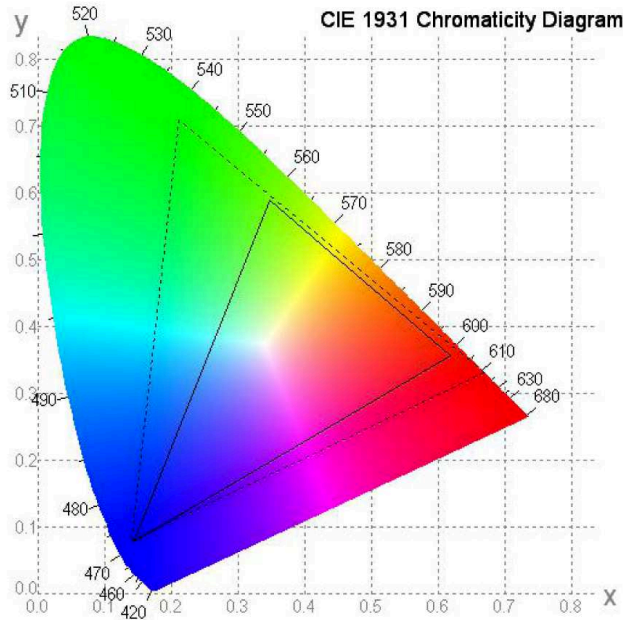
Measuring machine: LCD-5100 or EQUI

7.5. Definition of Color Appearance

R,G,B and W are defined by (x, y) on the IE chromaticity diagram

NTSC=area of RGB triangle/area of NTSC triangleX100%

Measuring picture: Red, Green, Blue and White (Measuring machine: BM-7)



7.6. Definition of Surface Luminance, Uniformity and Transmittance

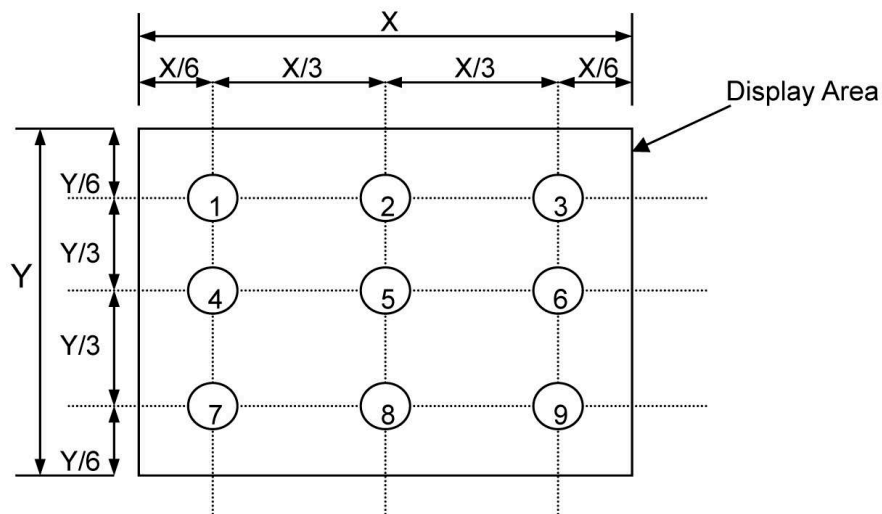
Using the transmissive mode measurement approach, measure the white screen luminance of the display panel and backlight.

7.6.1 Surface Luminance: $L_V = \text{average } (L_{P1}:L_{P9})$

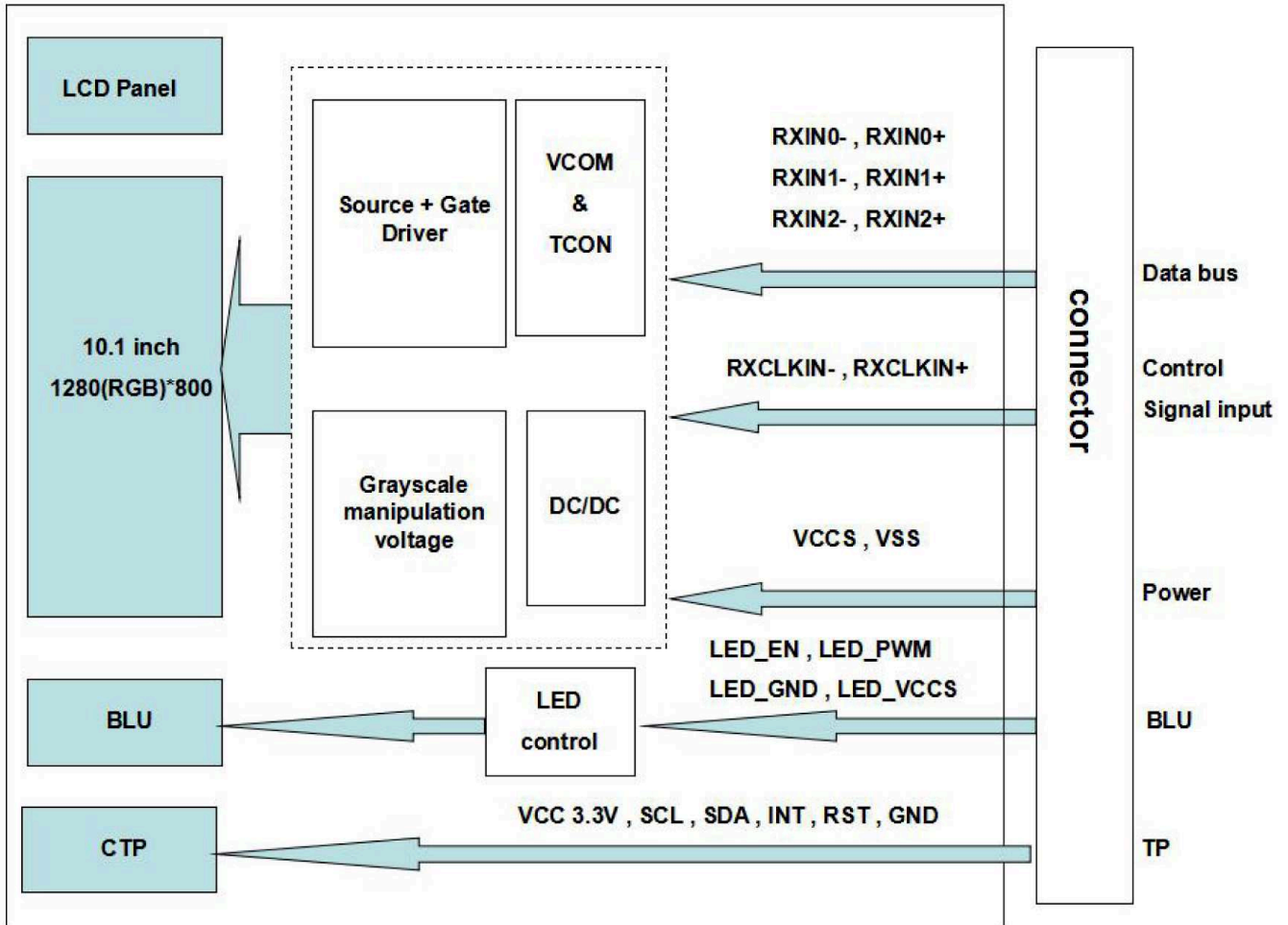
7.6.2 Uniformity = $\text{Minimal } (L_{P1}:L_{P9}) / \text{Maximal } (L_{P1}:L_{P9}) * 100\%$

7.6.3 Transmittance = $L_V \text{ on LCD} / L_V \text{ on Backlight} * 100\%$

Note : Measuring machine: BM-7



8. Block Diagram and Power Supply

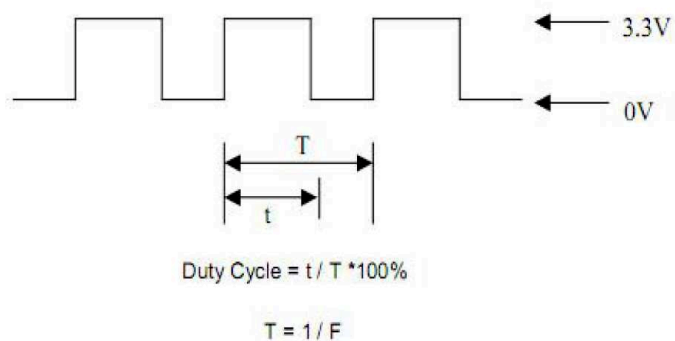
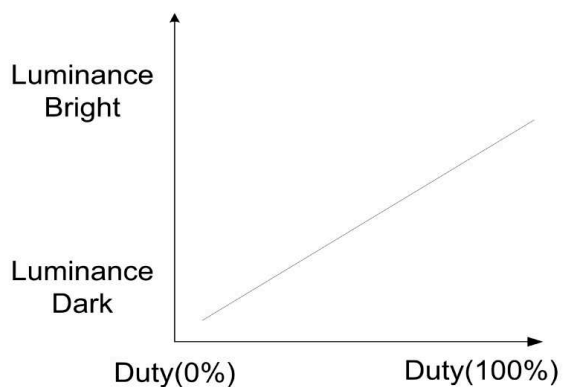


9. Interface Pins Definition

No.	Symbol	Function	Remark
1	NC	No connection	
2	VCCS	Power Supply	
3	VCCS	Power Supply	
4	VEDID	No connection	
5	NC	No connection	
6	CLKEDID	No connection	
7	DATAEDID	No connection	
8	RXIN0-	-LVDS differential data input	
9	RXIN0+	+LVDS differential data input	
10	VSS	Ground	
11	RXIN1-	-LVDS differential data input	
12	RXIN1+	+LVDS differential data input	
13	VSS	Ground	
14	RXIN2-	-LVDS differential data input	
15	RXIN2+	+LVDS differential data input	
16	VSS	Ground	
17	RXCLKIN-	-LVDS differential clock input	LVDS Clock
18	RXCLKIN+	+LVDS differential clock input	
19	VSS	Ground	
20	NC	No connection	
21	NC	No connection	
22	VSS	Ground	
23	NC	No connection	
24	NC	No connection	
25	VSS	Ground	
26	NC	No connection	
27	NC	No connection	
28	VSS	Ground	
29	ID1	No connection	
30	ID2	No connection	
31	LED_GND	LED Ground	
32	LED_GND	LED Ground	
33	LED_GND	LED Ground	
34	NC	No connection	
35	LED_PWM	Backlight control signal	Note1,2
36	LED_EN	LED enable input	
37	NC	No connection	
38	LED_VCCS	LED Power	
39	LED_VCCS	LED Power	
40	LED_VCCS	LED Power	

Note1: PWM is used to adjust the B/L brightness.

Note 2: PWM signal=3V~6V, Operation Frequency:100 Hz~30KHz.



10. Timing Characteristics

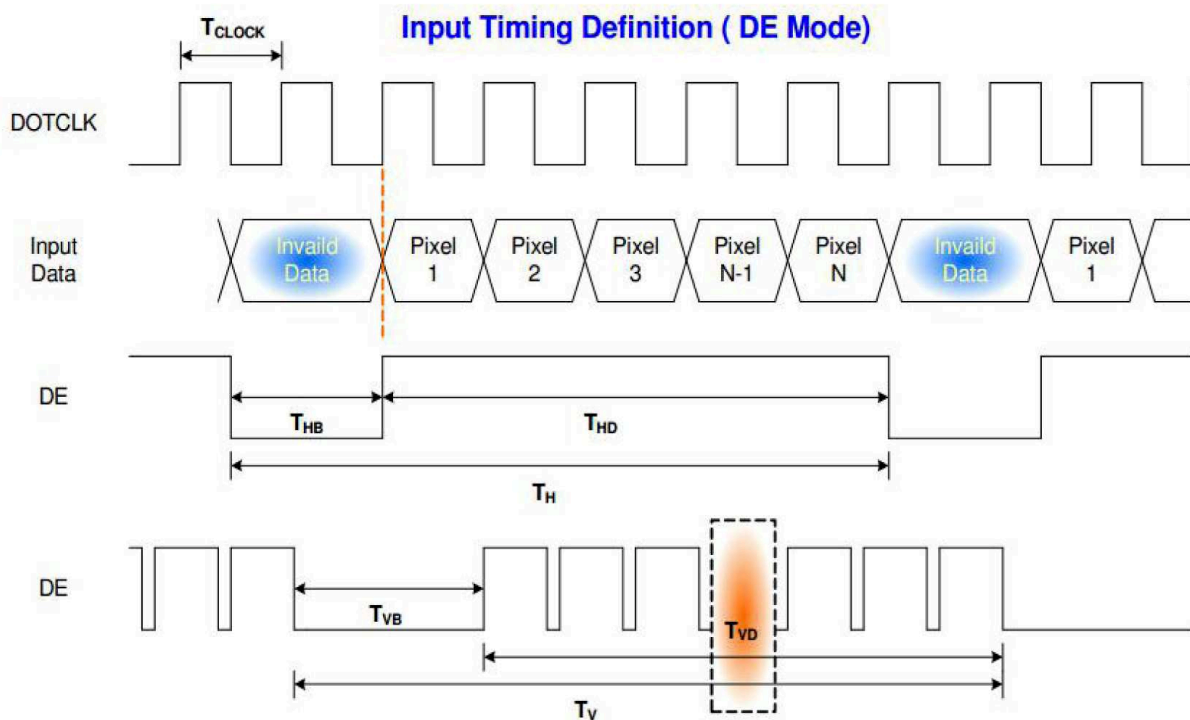
10.1. Timing Conditions

Basically, interface timings should match the 1280x800 /60Hz manufacturing guide line timing.

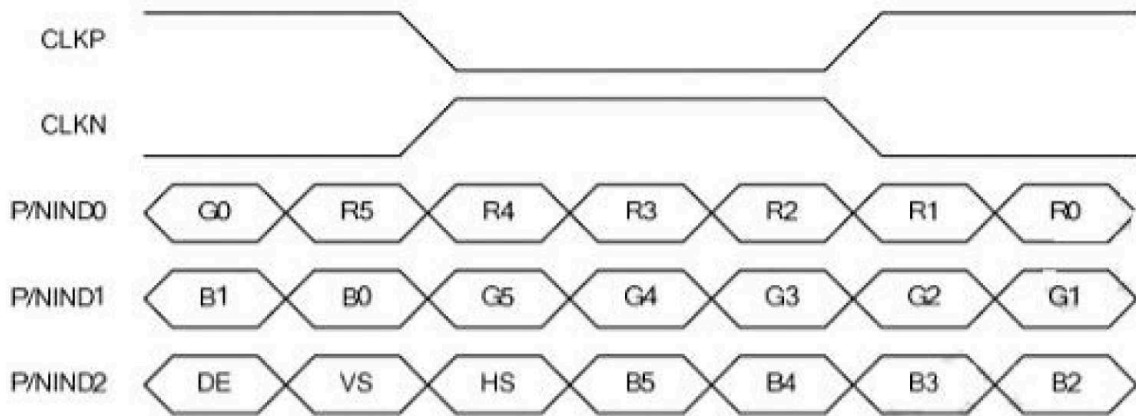
Parameter		Symbol	Min.	Typ.	Max.	Unit
Frame Rate		---	---	60	---	Hz
Clock frequency		$1/T_{\text{Clock}}$	---	66.1	69	MHz
Vertical Section	Period	T_V	---	810	---	T_{Line}
	Active	T_{VD}	800			
	Blanking	T_{VB}	8	10	---	
Horizontal Section	Period	T_H	---	1360	---	T_{Clock}
	Active	T_{HD}	1280			
	Blanking	T_{HB}	48	80	---	

Note : DE mode only

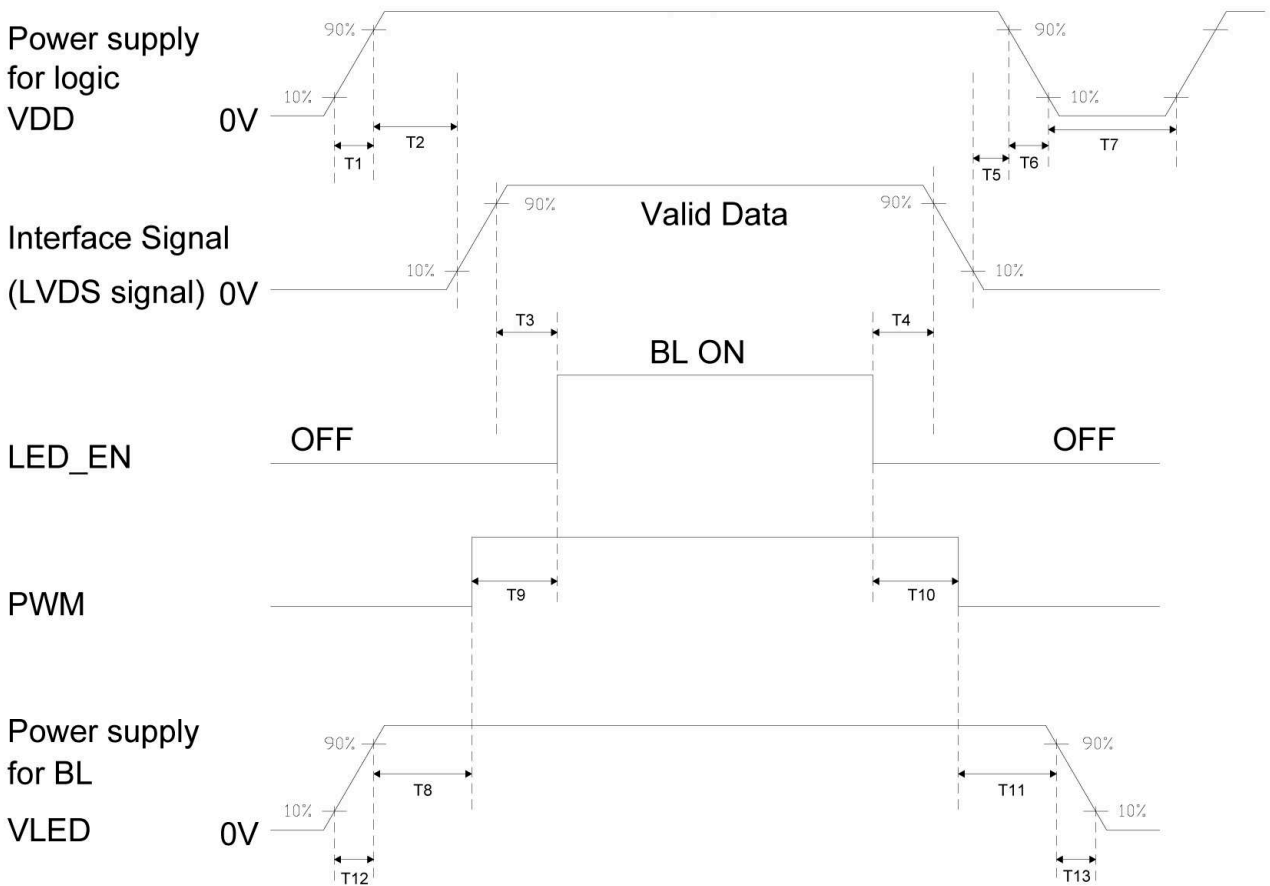
Timing Diagram



10.2. The Input Data Format



10.3. Power Sequence



Parameter	Value			Unit
	Min.	Typical.	Max.	
T1	0.5	-	10	[ms]
T2	0	40	50	[ms]
T3	200	-	-	[ms]
T4	200	-	-	[ms]
T5	0	16	50	[ms]
T6	0	-	10	[ms]
T7	500	-	-	[ms]
T8	10	-	-	[ms]
T9	0	-	180	[ms]
T10	0	-	180	[ms]
T11	10	-	-	[ms]
T12	0.5	-	10	[ms]
T13	0	-	10	[ms]

11. Quality Assurance

11.1. Purpose

This standard for Quality Assurance assures the quality of LCD module products supplied to customer.

11.2. Standard for Quality Test

11.2.1. Sampling Plan:

GB2828.1-2012

Single sampling, general inspection level II

11.2.2. Sampling Criteria:

Visual inspection: AQL 1.5%

Electrical functional: AQL 0.65%.

11.2.3. Reliability Test:

Detailed requirement refer to Reliability Test Specification.

11.3. Nonconforming Analysis & Disposition

11.3.1. Nonconforming analysis:

11.3.1.1. Customer should provide overall information of non-conforming sample for their complaints.

11.3.1.2. After receipt of detailed information from customer, the analysis of nonconforming parts usually should be finished in one week.

11.3.1.3. If can not finish the analysis on time, customer will be notified with the progress status.

11.3.2. Disposition of nonconforming:

11.3.2.1. Non-conforming product over PPM level will be replaced.

11.3.2.2. The cause of non-conformance will be analyzed. Corrective action will be discussed and implemented.

11.4. Agreement Items

Shall negotiate with customer if the following situation occurs:

11.4.1. There is any discrepancy in standard of quality assurance.

11.4.2. Additional requirement to be added in product specification.

11.4.3. Any other special problem.

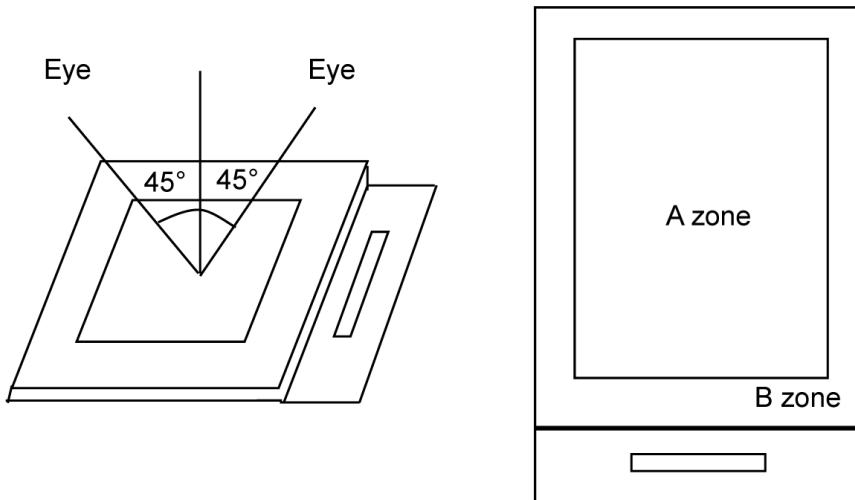
11.5. Standard of the Product Visual Inspection

11.5.1. Appearance inspection:

11.5.1.1. The inspection must be under illumination about 1000 – 1500 lx, and the distance of view must be at 30cm ± 2cm.

11.5.1.2. The viewing angle should be 45° from the vertical line without reflection light or follows customer's viewing angle specifications.

11.5.1.3. Definition of area: A Zone: Active Area, B Zone: Viewing Area,



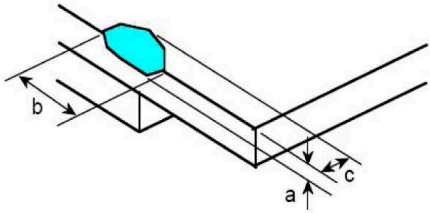
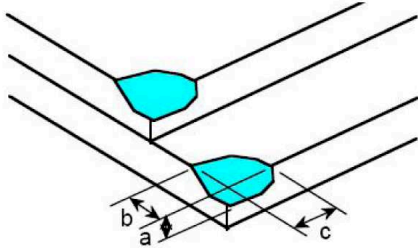
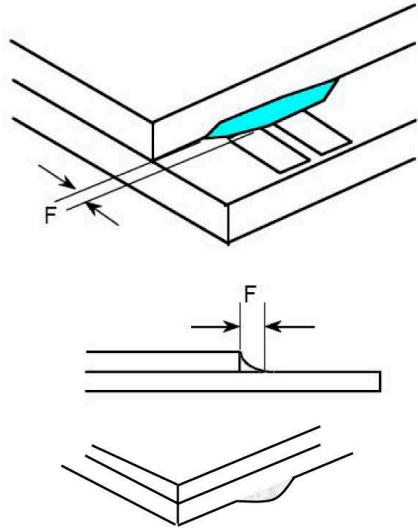
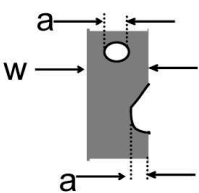
11.5.2. Basic principle:

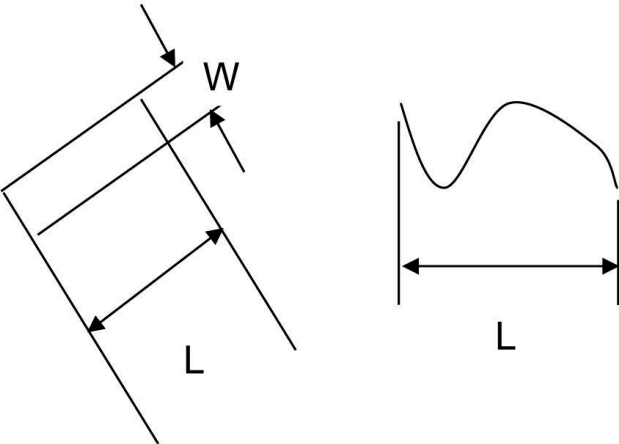
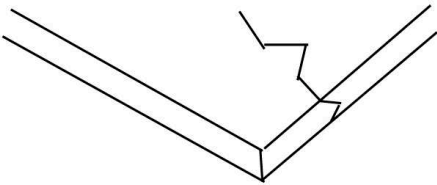
11.5.2.1. A set of sample to indicate the limit of acceptable quality level must be discussed by both us and customer when there is any dispute happened.

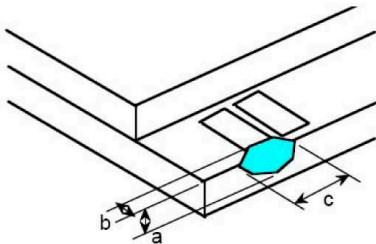
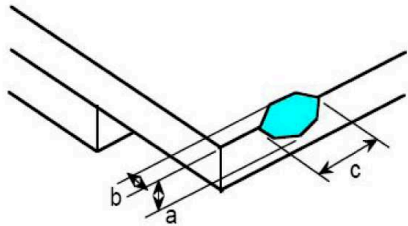
11.5.2.2. New item must be added on time when it is necessary.

11.6. Inspection Specification

No.	Item	Criteria (Unit: mm)																					
01	Black / White spot Foreign material (Round type) Pinholes Stain Particles inside cell. (Minor defect)	$\phi = (a + b) / 2$ Distance between 2 defects should more than 5mm apart.	<table border="1"> <thead> <tr> <th>Size</th> <th>Area</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>$\phi \leq 0.20$</td> <td></td> <td>Ignore</td> </tr> <tr> <td>$0.20 < \phi \leq 0.50$</td> <td></td> <td>N ≤ 3</td> </tr> <tr> <td>$0.50 < \phi$</td> <td></td> <td>0</td> </tr> </tbody> </table>	Size	Area	Acc. Qty	$\phi \leq 0.20$		Ignore	$0.20 < \phi \leq 0.50$		N ≤ 3	$0.50 < \phi$		0								
Size	Area	Acc. Qty																					
$\phi \leq 0.20$		Ignore																					
$0.20 < \phi \leq 0.50$		N ≤ 3																					
$0.50 < \phi$		0																					
02	Electrical Defect (Minor defect)	<table border="1"> <thead> <tr> <th rowspan="2">Bright dot</th> <th colspan="2">Display Area</th> <th rowspan="2">Total</th> <th rowspan="3">Note 1</th> </tr> <tr> <th>N ≤ 2</th> <th>N ≤ 2</th> </tr> </thead> <tbody> <tr> <th>Dark dot</th> <td>N ≤ 4</td> <td>N ≤ 4</td> <td></td> </tr> <tr> <th>Total dot</th> <td>N ≤ 4</td> <td>N ≤ 4</td> <td></td> </tr> <tr> <th>Mura</th> <td colspan="2">Not visible through 5% ND filters.</td> <td></td> <th>Note 2</th> </tr> </tbody> </table>	Bright dot	Display Area		Total	Note 1	N ≤ 2	N ≤ 2	Dark dot	N ≤ 4	N ≤ 4		Total dot	N ≤ 4	N ≤ 4		Mura	Not visible through 5% ND filters.			Note 2	Remark: 1. Bright dot caused by scratch and foreign object accords to item
Bright dot	Display Area			Total	Note 1																		
	N ≤ 2	N ≤ 2																					
Dark dot	N ≤ 4	N ≤ 4																					
Total dot	N ≤ 4	N ≤ 4																					
Mura	Not visible through 5% ND filters.			Note 2																			

<p>07</p>	<p>Glass Chipping Except Pad Area: (Minor defect)</p> 	<table border="1"> <thead> <tr> <th>Length and Width</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>$c > 3.0, b < 1.0$</td> <td>1</td> </tr> <tr> <td>$c < 3.0, b < 1.0$</td> <td>2</td> </tr> <tr> <td>$c < 3.0, b < 0.5$</td> <td>4</td> </tr> <tr> <td colspan="2" style="text-align: center;">$a < \text{Glass Thickness}$</td> </tr> </tbody> </table>	Length and Width	Acc. Qty	$c > 3.0, b < 1.0$	1	$c < 3.0, b < 1.0$	2	$c < 3.0, b < 0.5$	4	$a < \text{Glass Thickness}$	
Length and Width	Acc. Qty											
$c > 3.0, b < 1.0$	1											
$c < 3.0, b < 1.0$	2											
$c < 3.0, b < 0.5$	4											
$a < \text{Glass Thickness}$												
<p>08</p>	<p>Glass Corner Chipping: (Minor defect)</p> 	<table border="1"> <thead> <tr> <th>Length and Width</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>$c < 3.0, b < 3.0$</td> <td>Ignore</td> </tr> <tr> <td colspan="2" style="text-align: center;">$a < \text{Glass Thickness}$</td> </tr> </tbody> </table>	Length and Width	Acc. Qty	$c < 3.0, b < 3.0$	Ignore	$a < \text{Glass Thickness}$					
Length and Width	Acc. Qty											
$c < 3.0, b < 3.0$	Ignore											
$a < \text{Glass Thickness}$												
<p>09</p>	<p>Glass Burr: (Minor defect)</p> 	<table border="1"> <thead> <tr> <th>Length</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>$F < 1.0$</td> <td>Ignore</td> </tr> </tbody> </table> <p>Glass burr don't affect assemble and module dimension.</p>	Length	Acc. Qty	$F < 1.0$	Ignore						
Length	Acc. Qty											
$F < 1.0$	Ignore											
<p>10</p>	<p>FPC Defect: (Minor defect)</p> 	<p>10.1 Dent, pinhole width $a < w/3$. (w: circuitry width.)</p> <p>10.2 Open circuit is unacceptable.</p> <p>10.3 No oxidation, contamination and distortion.</p>										

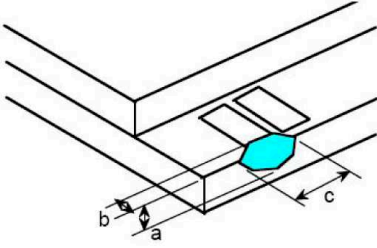
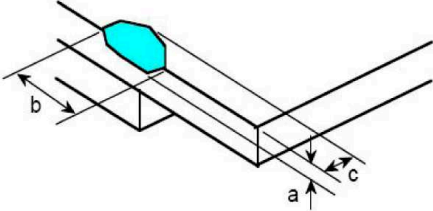
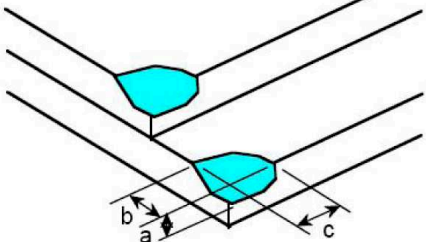
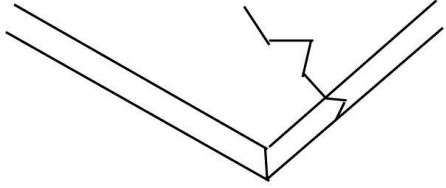
<p>03</p>	<p>Black and White line Scratch Foreign material (Line type) (Minor defect)</p>	 <table border="1" data-bbox="587 645 1236 918"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>/</td> <td>$W \leq 0.1$</td> <td>Ignore</td> </tr> <tr> <td>$L \leq 2.5$</td> <td>$0.1 < W \leq 0.2$</td> <td>3</td> </tr> <tr> <td>$L > 2.5$</td> <td>$0.2 < W$</td> <td>0</td> </tr> <tr> <td colspan="2">Total</td> <td>3</td> </tr> </tbody> </table> <p>Distance between 2 defects should more than 3mm apart. Scratches not viewable through the back of the display are acceptable.</p>	Length	Width	Acc. Qty	/	$W \leq 0.1$	Ignore	$L \leq 2.5$	$0.1 < W \leq 0.2$	3	$L > 2.5$	$0.2 < W$	0	Total		3
Length	Width	Acc. Qty															
/	$W \leq 0.1$	Ignore															
$L \leq 2.5$	$0.1 < W \leq 0.2$	3															
$L > 2.5$	$0.2 < W$	0															
Total		3															
<p>04</p>	<p>Glass Crack (Minor defect)</p>	 <p>Crack is potential to enlarge, any type is not allowed.</p>															


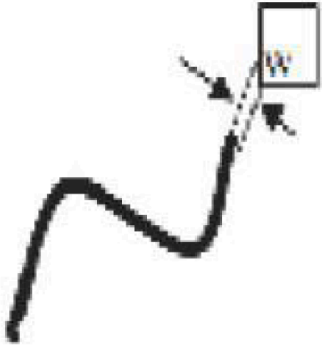
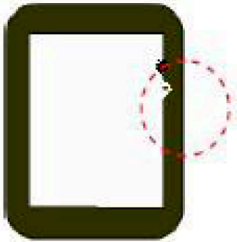
<p>05</p>	<p>Glass Chipping Pad Area: (Minor defect)</p> 	<table border="1" data-bbox="845 1478 1337 1657"> <thead> <tr> <th>Length and Width</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>$c > 3.0, b < 1.0$</td> <td>1</td> </tr> <tr> <td>$c < 3.0, b < 1.0$</td> <td>3</td> </tr> <tr> <td colspan="2">$a < \text{Glass Thickness}$</td> </tr> </tbody> </table>	Length and Width	Acc. Qty	$c > 3.0, b < 1.0$	1	$c < 3.0, b < 1.0$	3	$a < \text{Glass Thickness}$			
Length and Width	Acc. Qty											
$c > 3.0, b < 1.0$	1											
$c < 3.0, b < 1.0$	3											
$a < \text{Glass Thickness}$												
<p>06</p>	<p>Glass Chipping Rear of Pad Area: (Minor defect)</p> 	<table border="1" data-bbox="845 1825 1337 2049"> <thead> <tr> <th>Length and Width</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>$c > 3.0, b < 1.0$</td> <td>1</td> </tr> <tr> <td>$c < 3.0, b < 1.0$</td> <td>2</td> </tr> <tr> <td>$c < 3.0, b < 0.5$</td> <td>4</td> </tr> <tr> <td colspan="2">$a < \text{Glass Thickness}$</td> </tr> </tbody> </table>	Length and Width	Acc. Qty	$c > 3.0, b < 1.0$	1	$c < 3.0, b < 1.0$	2	$c < 3.0, b < 0.5$	4	$a < \text{Glass Thickness}$	
Length and Width	Acc. Qty											
$c > 3.0, b < 1.0$	1											
$c < 3.0, b < 1.0$	2											
$c < 3.0, b < 0.5$	4											
$a < \text{Glass Thickness}$												

11	Bubble on Polarizer (Minor defect)	Diameter		Acc. Qty
		$\varphi \leq 0.30$		Ignore
		$0.30 < \varphi \leq 0.50$		$N \leq 2$
		$0.50 < \varphi$		$N = 0$
12	Dent on Polarizer (Minor defect)	Diameter		Acc. Qty
		$\varphi \leq 0.25$		Ignore
		$0.25 < \varphi \leq 0.50$		$N \leq 4$
		$0.50 < \varphi$		None
13	Bezel	<p>13.1 No rust, distortion on the Bezel.</p> <p>13.2 No visible fingerprints, stains or other contamination.</p>		
14	Touch Panel	<p>D: Diameter W: width L: length</p> <p>14.1 Spot: $D < 0.25$ is acceptable $0.25 \leq D \leq 0.4$</p> <p>2dots are acceptable and the distance between defects should more than 10 mm.</p> <p>$D > 0.4$ is unacceptable</p> <p>14.2 Dent: $D > 0.40$ is unacceptable</p> <p>14.3 Scratch: $W \leq 0.03$, $L \leq 10$ is acceptable, $0.03 < W \leq 0.10$, $L \leq 10$ is acceptable</p> <p>Distance between 2 defects should more than 10 mm.</p> <p>$W > 0.10$ is unacceptable.</p>		
15	PCB	<p>15.1 No distortion or contamination on PCB terminals.</p> <p>15.2 All components on PCB must same as documented on the BOM/component layout.</p> <p>15.3 Follow IPC-A-600F.</p>		
16	LCD Ripple	<p>Touch the touch panel, cannot see the LCD ripple.</p> <p>Pen: R 0.8mm silicon rubber.</p> <p>Operation Force:120g</p>		
17	Soldering	Follow IPC-A-610C standard		
18	Electrical Defect (Major defect)	<p>The below defects must be rejected.</p> <p>18.1 Missing vertical / horizontal segment,</p> <p>18.2 Abnormal Display.</p> <p>18.3 No function or no display.</p> <p>18.4 Current exceeds product specifications.</p> <p>18.5 LCD viewing angle defect.</p> <p>18.6 No Backlight.</p> <p>18.7 Dark Backlight.</p> <p>18.8 Touch Panel no function.</p>		

Remark: LCD Panel Broken shall be rejected. Defect out of LCD viewing area is acceptable

Inspection Specification for the Capacitive Touch Panel

01	<p>Chipping Pad Area(Not include the cover lens): (Minor defect)</p> 	<p>The chip is seriously influence the product's function, any type is not allowed.</p>						
02	<p>Chipping Except Pad Area(Not include the cover lens): (Minor defect)</p> 	<table border="1" data-bbox="874 770 1366 904"> <thead> <tr> <th>Length and Width</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>$c < 1.5, b < 1$</td> <td>$N \leq 5$</td> </tr> <tr> <td colspan="2">$a < 1/2$ Glass Thickness</td> </tr> </tbody> </table>	Length and Width	Acc. Qty	$c < 1.5, b < 1$	$N \leq 5$	$a < 1/2$ Glass Thickness	
Length and Width	Acc. Qty							
$c < 1.5, b < 1$	$N \leq 5$							
$a < 1/2$ Glass Thickness								
03	<p>Corner Chipping(Not include the cover lens): (Minor defect)</p> 	<table border="1" data-bbox="874 1162 1366 1296"> <thead> <tr> <th>Length and Width</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>$c < 1.5, b < 0.5$</td> <td>Ignore</td> </tr> <tr> <td colspan="2">$a < 1/2$ Glass Thickness</td> </tr> </tbody> </table>	Length and Width	Acc. Qty	$c < 1.5, b < 0.5$	Ignore	$a < 1/2$ Glass Thickness	
Length and Width	Acc. Qty							
$c < 1.5, b < 0.5$	Ignore							
$a < 1/2$ Glass Thickness								
04	<p>Crack: (Minor defect)</p>	 <p>Crack is potential to enlarge, any type is not allowed.</p>						
05	<p>Cover lens must be without any chips, cracks or other damage when viewed from the front.</p>							

06	<p>Same/Different color spot</p> 	<p>D: Diameter W: width L: length</p> <table border="1" data-bbox="879 217 1350 353"> <thead> <tr> <th>Diameter</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>D < 0.20</td> <td>Ignore</td> </tr> </tbody> </table> <p>Active Area:</p> <table border="1" data-bbox="879 405 1350 633"> <thead> <tr> <th>Diameter</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>0.20 < D ≤ 0.30</td> <td>2</td> </tr> <tr> <td>0.30 < D ≤ 0.50</td> <td>1</td> </tr> <tr> <td>D > 0.5</td> <td>NG</td> </tr> </tbody> </table> <p>Viewing Area :</p> <table border="1" data-bbox="879 685 1350 931"> <thead> <tr> <th>Diameter</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>D < 0.20</td> <td>Ignore</td> </tr> <tr> <td>0.20 < D ≤ 0.5</td> <td>3</td> </tr> <tr> <td>D > 0.5</td> <td>NG</td> </tr> </tbody> </table> <p>Distance between 2 defects should more than 15mm apart.</p>	Diameter	Acc. Qty	D < 0.20	Ignore	Diameter	Acc. Qty	0.20 < D ≤ 0.30	2	0.30 < D ≤ 0.50	1	D > 0.5	NG	Diameter	Acc. Qty	D < 0.20	Ignore	0.20 < D ≤ 0.5	3	D > 0.5	NG
Diameter	Acc. Qty																					
D < 0.20	Ignore																					
Diameter	Acc. Qty																					
0.20 < D ≤ 0.30	2																					
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D > 0.5	NG																					
Diameter	Acc. Qty																					
D < 0.20	Ignore																					
0.20 < D ≤ 0.5	3																					
D > 0.5	NG																					
07	<p>Cover lens line Scratch</p> 	<table border="1" data-bbox="778 1084 1430 1402"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>/</td> <td>W ≤ 0.08mm</td> <td>Ignore</td> </tr> <tr> <td>L ≤ 5</td> <td>0.08 < W ≤ 0.15</td> <td>2</td> </tr> <tr> <td>L ≤ 3</td> <td>0.15 < W ≤ 0.20</td> <td>1</td> </tr> <tr> <td>-</td> <td>W > 0.2</td> <td>NG</td> </tr> <tr> <td>L > 5</td> <td>-</td> <td>NG</td> </tr> </tbody> </table> <p>Distance between 2 defects should more than 15mm apart.</p>	Length	Width	Acc. Qty	/	W ≤ 0.08mm	Ignore	L ≤ 5	0.08 < W ≤ 0.15	2	L ≤ 3	0.15 < W ≤ 0.20	1	-	W > 0.2	NG	L > 5	-	NG		
Length	Width	Acc. Qty																				
/	W ≤ 0.08mm	Ignore																				
L ≤ 5	0.08 < W ≤ 0.15	2																				
L ≤ 3	0.15 < W ≤ 0.20	1																				
-	W > 0.2	NG																				
L > 5	-	NG																				
08	<p>Printing sawtooth</p> 	<table border="1" data-bbox="778 1597 1430 1825"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Acc. Qty</th> </tr> </thead> <tbody> <tr> <td>/</td> <td>W ≤ 0.2mm</td> <td>2</td> </tr> <tr> <td>L ≤ 2</td> <td>0.2 < W ≤ 0.3</td> <td>1</td> </tr> <tr> <td>L ≤ 2</td> <td>W > 0.3</td> <td>NG</td> </tr> </tbody> </table>	Length	Width	Acc. Qty	/	W ≤ 0.2mm	2	L ≤ 2	0.2 < W ≤ 0.3	1	L ≤ 2	W > 0.3	NG								
Length	Width	Acc. Qty																				
/	W ≤ 0.2mm	2																				
L ≤ 2	0.2 < W ≤ 0.3	1																				
L ≤ 2	W > 0.3	NG																				

11.7. Classification of Defects

- 11.7.1. Visual defects (Except no / wrong label) are treated as minor defect and electrical defect is major.
- 11.7.2. Two minor defects are equal to one major in lot sampling inspection.

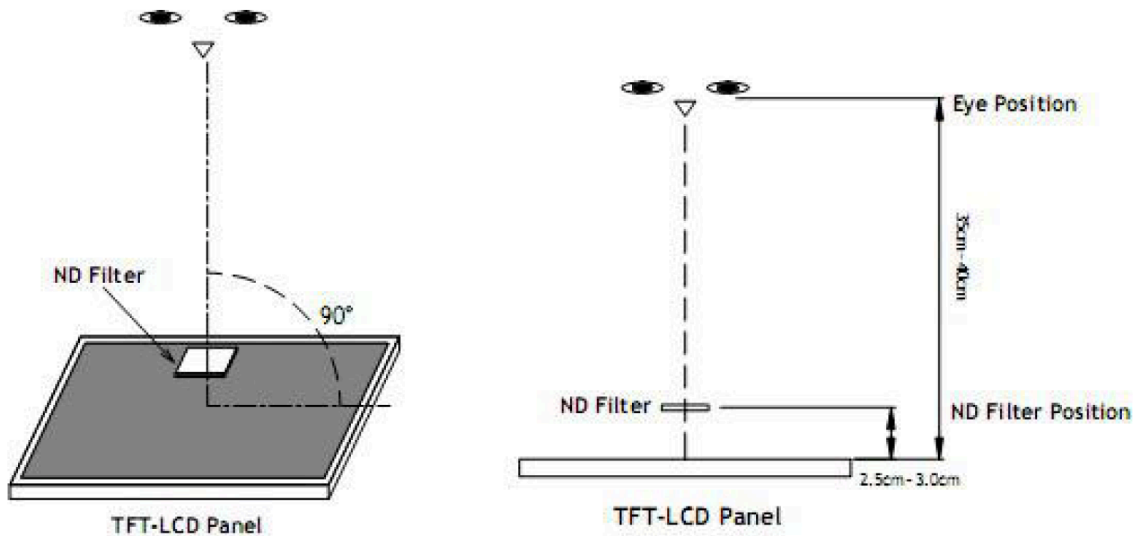
11.8. Identification/marketing criteria

Any unit with illegible / wrong /double or no marking/ label shall be rejected.

11.9. Packing

- 11.9.1. There should be no damage of the outside carton box, each packaging box should have one identical label.
- 11.9.2. Modules inside package box should have compliant mark.
- 11.9.3. All direct package materials shall offer ESD protection

Note1: Bright dot is defined as the defective area of the dot is larger than 50% of one sub-pixel area.



Bright dot: The bright dot size defect at black display pattern. It can be recognized by 2% transparency of filter when the distance between eyes and panel is $350\text{mm} \pm 50\text{mm}$.

Dark dot: Cyan, Magenta or Yellow dot size defect at white display pattern. It can be recognized by 5% transparency of filter when the distance between eyes and panel is $350\text{mm} \pm 50\text{mm}$.

Note2: Mura on display which appears darker / brighter against background brightness on parts of display area.

12. Reliability Specification

No	Item	Condition	Quantity	Criteria
1	High Temperature Operating	50°C, 96Hrs	2	GB/T2423.2-2008
2	Low Temperature Operating	-10°C, 96Hrs	2	GB/T2423.1-2008
3	High Humidity	40°C, 90%RH, 96Hrs	2	GB/T2423.3-2006
4	High Temperature Storage	60°C, 96Hrs	2	GB/T2423.2-2008
5	Low Temperature Storage	-20°C, 96Hrs	2	GB/T2423.1-2008
6	Thermal Cycling Test	-10°C, 60min~50°C, 60min, 20 cycles.	2	GB/T2423.22-2012
7	Packing vibration	Frequency range:10Hz~50Hz Acceleration of gravity:5G X,Y,Z 30 min for each direction.	2	GB/T5170.14-2009
8	Electrical Static Discharge	Air: ±4KV 150pF/330 Ω 5 times	2	GB/T17626.2-2006
		Contact: ±2KV 150pF/330 Ω 5 times		
9	Drop Test (Packaged)	Height:80 cm,1 corner, 3 edges, 6 surfaces.	2	GB/T2423.8-1995

Note1. No deflection cosmetic and operational function allowable.

Note2. Total current Consumption should be below double of initial value

13. Precautions and Warranty

13.1.Safety

- 13.1.1. The liquid crystal in the LCD is poisonous. Do not put it in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water.
- 13.1.2. Since the liquid crystal cells are made of glass, do not apply strong impact on them. Handle with care.

13.2.Handling

- 13.2.1. Reverse and use within ratings in order to keep performance and prevent damage.
- 13.2.2. Do not wipe the polarizer with dry cloth, as it might cause scratch. If the surface of the LCD needs to be cleaned, wipe it swiftly with cotton or other soft cloth soaked with petroleum IPA, do not use other chemicals.

13.3.Storage

- 13.3.1. Do not store the LCD module beyond the specified temperature ranges.

13.4.Metal Pin (Apply to Products with Metal Pins)

13.4.1. Pins of LCD and Backlight

13.4.1.1. Solder tip can touch and press on the tip of Pin LEAD during the soldering

13.4.1.2. Recommended Soldering Conditions

Solder Type: Sn96.3~94-Ag3.3~4.3-Cu0.4~1.1

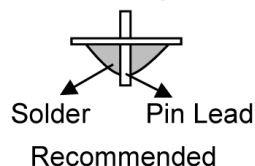
Maximum Solder Temperature: 370 °C

Maximum Solder Time: 3s at the maximum temperature

Recommended Soldering Temp: 350±20 °C

Typical Soldering Time: ≤3s

13.4.1.3. Solder Wetting



13.4.2. Pins of EL

13.4.2.1. Solder tip can touch and press on the tip of EL leads during soldering.

13.4.2.2. No Solder Paste on the soldering pad on the motherboard is recommended.

13.4.2.3. Recommended Soldering Conditions

Solder type: Nippon Alimit Leadfree SR-34, size 0.5mm

Recommended Solder Temperature: 270~290 °C

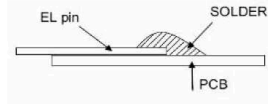
Typical Soldering Time: ≤2s

Minimum solder distance from EL lamp (body):2.0mm

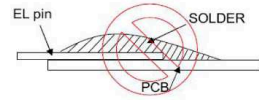
13.4.2.4. No horizontal press on the EL leads during soldering.

13.4.2.5. 180° bend EL leads three times is not allowed.

13.4.2.6. Solder Wetting

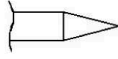


Recommended

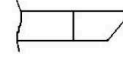


Not Recommended

13.4.2.7. The type of the solder iron:

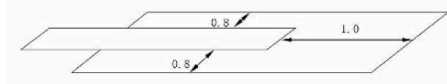


Recommended



Not Recommended

13.4.2.8. Solder Pad



13.5.Operation

- 13.5.1. Do not drive LCD with DC voltage
- 13.5.2. Response time will increase below lower temperature
- 13.5.3. Display may change color with different temperature
- 13.5.4. Mechanical disturbance during operation, such as pressing on the display area, may cause the segments to appear “fractured”.

13.6.Static Electricity

- 13.6.1. CMOS LSIs are equipped in this unit, so care must be taken to avoid the electro-static charge, by ground human body, etc.
- 13.6.2. The normal static prevention measures should be observed for work clothes and benches.
- 13.6.3. The module should be kept into anti-static bags or other containers resistant to static for storage.

13.7.Limited Warranty

- 13.7.1. Our warranty liability is limited to repair and/or replacement. We will not be responsible for any consequential loss.
- 13.7.2. If possible, we suggest customer to use up all modules in six months. If the module storage time over twelve months, we suggest that recheck it before the module be used
- 13.7.3. After the product shipped, any product quality issues must be feedback within three months, otherwise, we will not be responsible for the subsequent or consequential events.

14. Packaging

TBD

15. Outline Drawing

