PRODUCT SPECIFICATION

5.0” IPS TFT LCD MODULE
MODEL: PV05043H0540Q-CT Ver:1.0

< ◇> Preliminary Specification

< ◆> Finally Specification

CUSTOMER’S APPROVAL	
CUSTOMER :	
SIGNATURE:	DATE:

APPROVED BY	PM REVIEWED	PD REVIEWED	PREPARED BY

Revision History

Revision	Date	Originator	Detail	Remarks
Ver 1.0	20240326		Initial Release	

Table of Contents

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 , CTP and a backlight unit.

2. Module Parameter

Features	Details	Unit
Display Size(Diagonal)	5.0”	
LCD type	IPS TFT	
Display Mode	Transmissive /Normally Black	
Resolution	800 RGB x 480	Pixels
View Direction	ALL O’CLOCK	Best Image
Gray Scale Inversion Direction	-	
Module Outline	130.7(H) x 85.8(V) x 5.1(T) (Note1)	mm
Active Area	108(H) x64.8(V)	mm
Pixel Pitch	45*3(H) x 135(V)	um
Pixel Arrangement	RGB Vertical stripe	
Polarizer Surface Treatment	Anti-glare	
Driver IC	ST72568	
Display Colors	16.7M	
Interface	24bit RGB interface	
With or without the touch panel	With CTP	
Operating Temperature	**-30～85**	ºC
Storage Temperature	**-30～85**	ºC
Weight	-	g

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

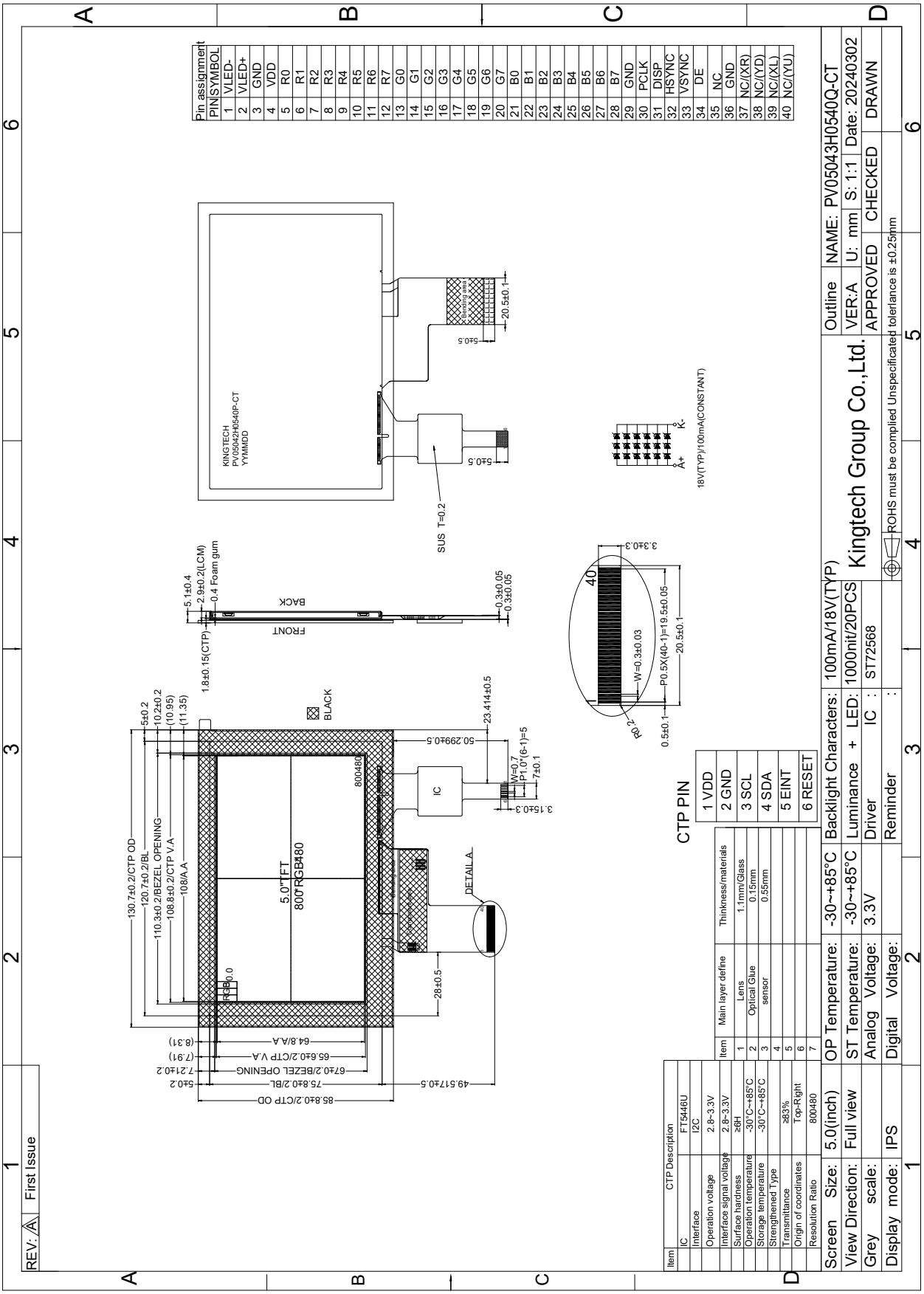
CTP Description

Item	CTP Description	
	IC	FT5446U
	Interface	I2C
	Operation voltage	2.8~3.3V
	Interface signal voltage	2.8~3.3V
	Surface hardness	≥6H
	Operation temperature	-30°C~+85°C
	Storage temperature	-30°C~+85°C
	Strengthened Type	
	Transmittance	≥83%
	Origin of coordinates	Top-Right
	Resolution Ratio	800480

Item	Main layer define	Thinkness/materials
1	Lens	1.1mm/Glass
2	Optical Glue	0.15mm
3	sensor	0.55mm
4		
5		
6		
7		

1 VDD
2 GND
3 SCL
4 SDA
5 EINT
6 RESET

2.1. Outline Drawing



3. Absolute Maximum Ratings

The followings are maximum values which, if exceed, may cause faulty operation or damage to the unit. The operational and non-operational maximum voltage and current values are listed in Table.

V_{SS}=0V, Ta=25ºC

Item	Symbol	Min.	Max.	Unit
Digital Supply Voltage	DVDD	-0.5	+3.6	V
Storage temperature	T_{STG}	-30	85	ºC
Operating temperature	T_{OP}	-30	85	ºC

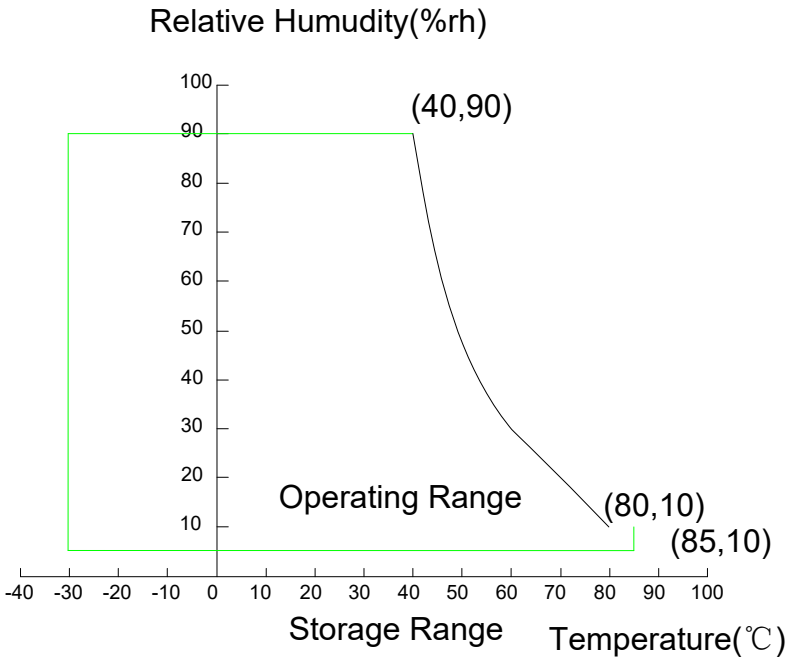
Note 1: If Ta below 50ºC, the maximal humidity is 90%RH, if Ta over 50ºC, absolute humidity should be less than 60%RH.

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

Note 3: These range above is maximum value not the actual operating temperature . Actual Operating temperature is no more than 40℃ and temperature refers to the LCM surface temperature ;

Note 4: GWD is not responsible for product problems beyond the use conditions.

Note 5: Temperature and relative humidity range are shown in the figure below.Wet bulb temperature should be 39 ℃ max. and no condensation of water.



4. DC Characteristics

Item		Symbol	Min.	Typ.	Max.	Unit
Supply Voltage		DVDD	3.1	-	3.6	V
Logic Low input voltage		V_{IL}	0	-	0.3*DVDD	V
Logic High input voltage		V_{IH}	0.7*DVDD	-	DVDD	V
Logic Low output voltage		V_{OL}	-	-	GND+0.4	
Logic High output voltage		V_{OH}	DVDD-0.4	-	-	
Current Consumption All Black	Logic	I_{CC+} I_{IN}	-	TBD	-	mA
	Analog					

Note 1: All of the voltage listed above are with respective to GND = 0v

Note 2:Device is subject to be damaged permanently if stresses beyond those absolute maximum rating listed above

5. Backlight Characteristic

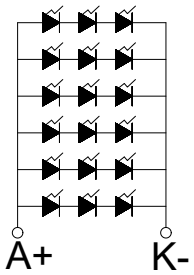
5.1. Backlight Characteristic

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V_F	Ta=25 ºC, I_F=20mA/LED	-	18	-	V
Forward Current	I_F	Ta=25 ºC, V_F=3.0V/LED	-	100	-	mA
Power dissipation	P_D	-	-	1800	-	mW
Uniformity	Avg	-	-	80	-	%
LED working life(25℃)	-		-	20,000	-	Hrs
Drive method	Constant current					
LED Configuration	18 White LEDs (3 LEDs in one string and 6 groups in parallel)					

Note1：LED life time defined as follows: The final brightness is at 50% of original brightness.

The environmental conducted under ambient air flow, at Ta=25±2 ºC,60%RH±5%, I_F=20mA.

5.2. Backlighting circuit



6. Optical Characteristics

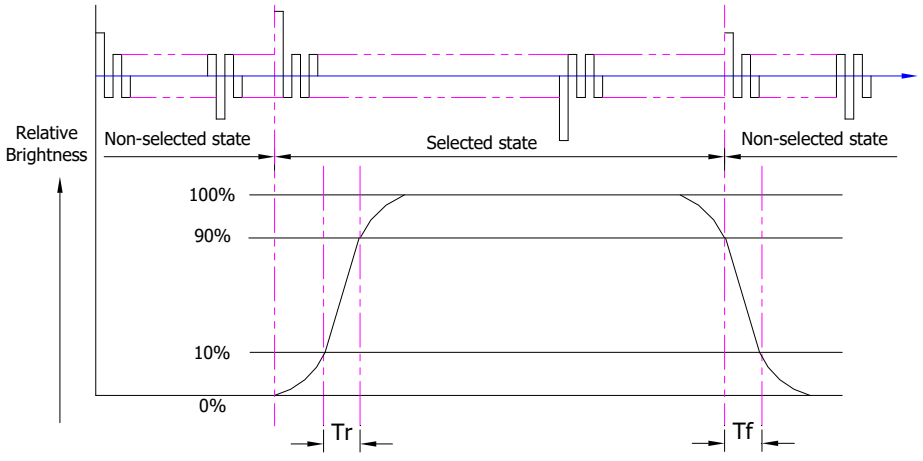
6.1. Optical Characteristics

Ta=25ºC, DVDD=3.3V

	Item		Symbol	Condition	Specification			Unit
					Min.	Typ.	Max.	
Backlight On (Transmissive Mode)	Luminance on TFT(I_f =20mA/LED)		Lv		850	1000	-	cd/m²
	Contrast ratio(See6.3)		CR		700	1000	-	
	Response time (See 6.2)		TR+TF		-	30	40	ms
	Chromaticity Transmissive (See 6.5)	White	Xw		0.273	0.323	0.373	
			Yw		0.316	0.366	0.416	
	Viewing Angle (See 6.4)	Horizontal	θx+	Center CR≥10	70	80	-	Deg.
			θx-		70	80	-	
		Vertical	φy+		70	80	-	
			φy-		70	80	-	
	NTSC ratio（Color gamut）				55	60	-	%

6.2. Definition of Response Time

6.2.1. Normally Black Type (Negative)

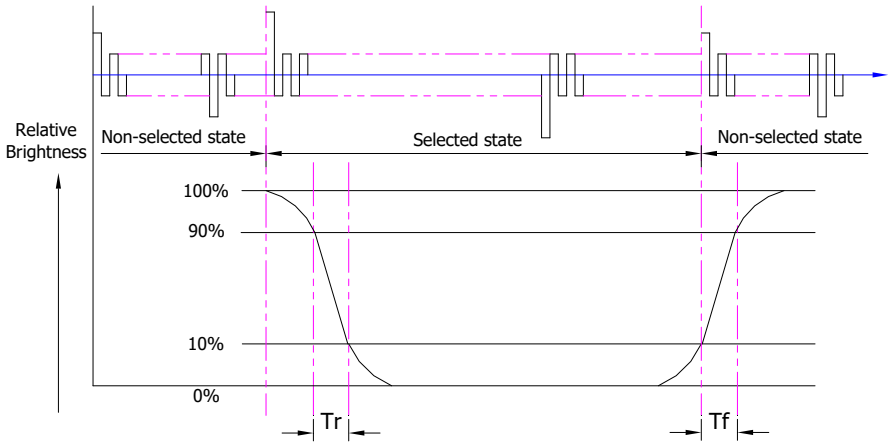


Tr is the time it takes to change form non-selected stage with relative luminance 10% to selected state with relative luminance 90%;

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

6.2.2. Normally White Type (Positive)



o

Tr is the time it takes to change form non-selected stage with relative luminance 90% t 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

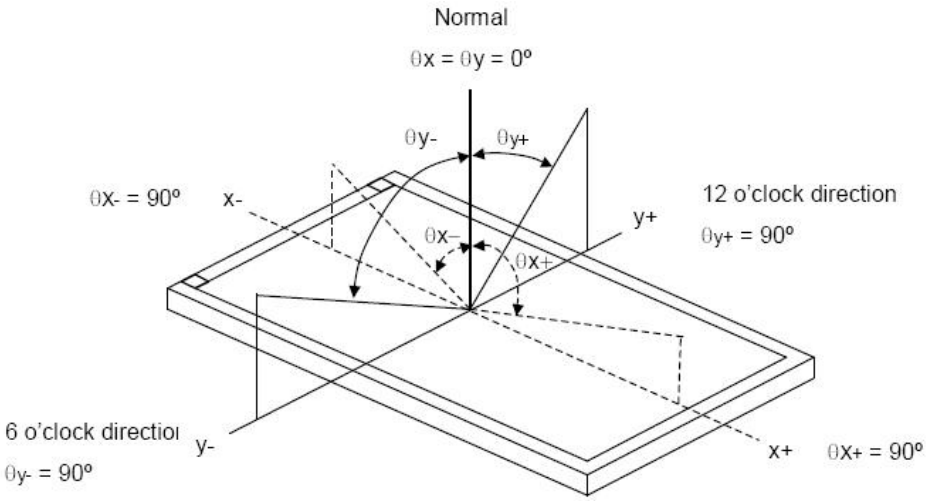
6.3. Definition of Contrast Ratio

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

6.4. Definition of Viewing Angles



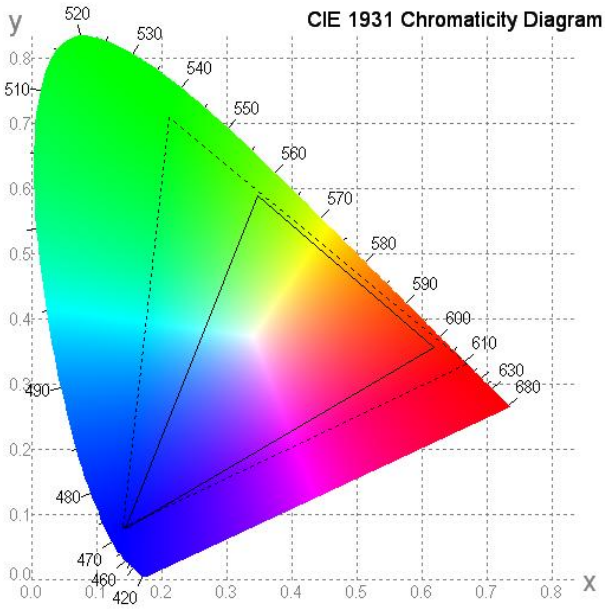
Measuring machine: LCD-5100 or EQUI

6.5. 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)



6.6. Definition of Surface Luminance, Uniformity and Transmittance

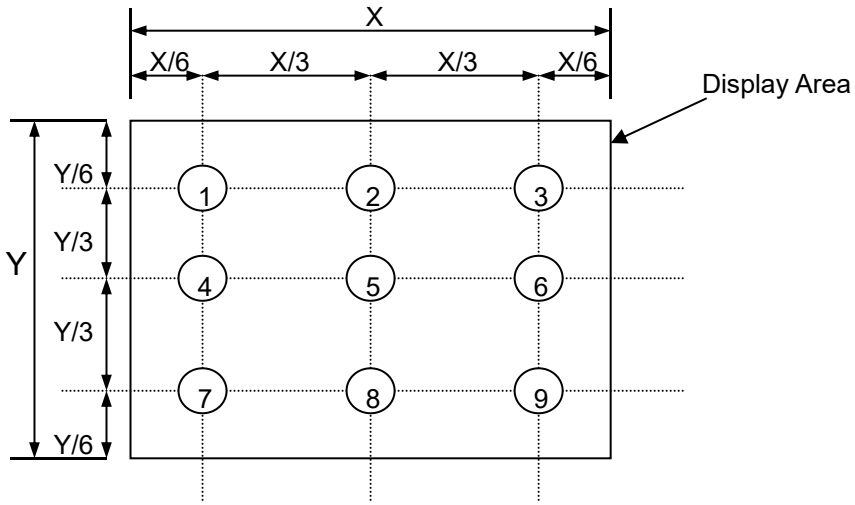
Using the transmissive mode measurement approach, measure the white screen luminance of the display panel and backlight.

6.6.1. Surface Luminance: L_V = average (L_{P1}:L_{P9})

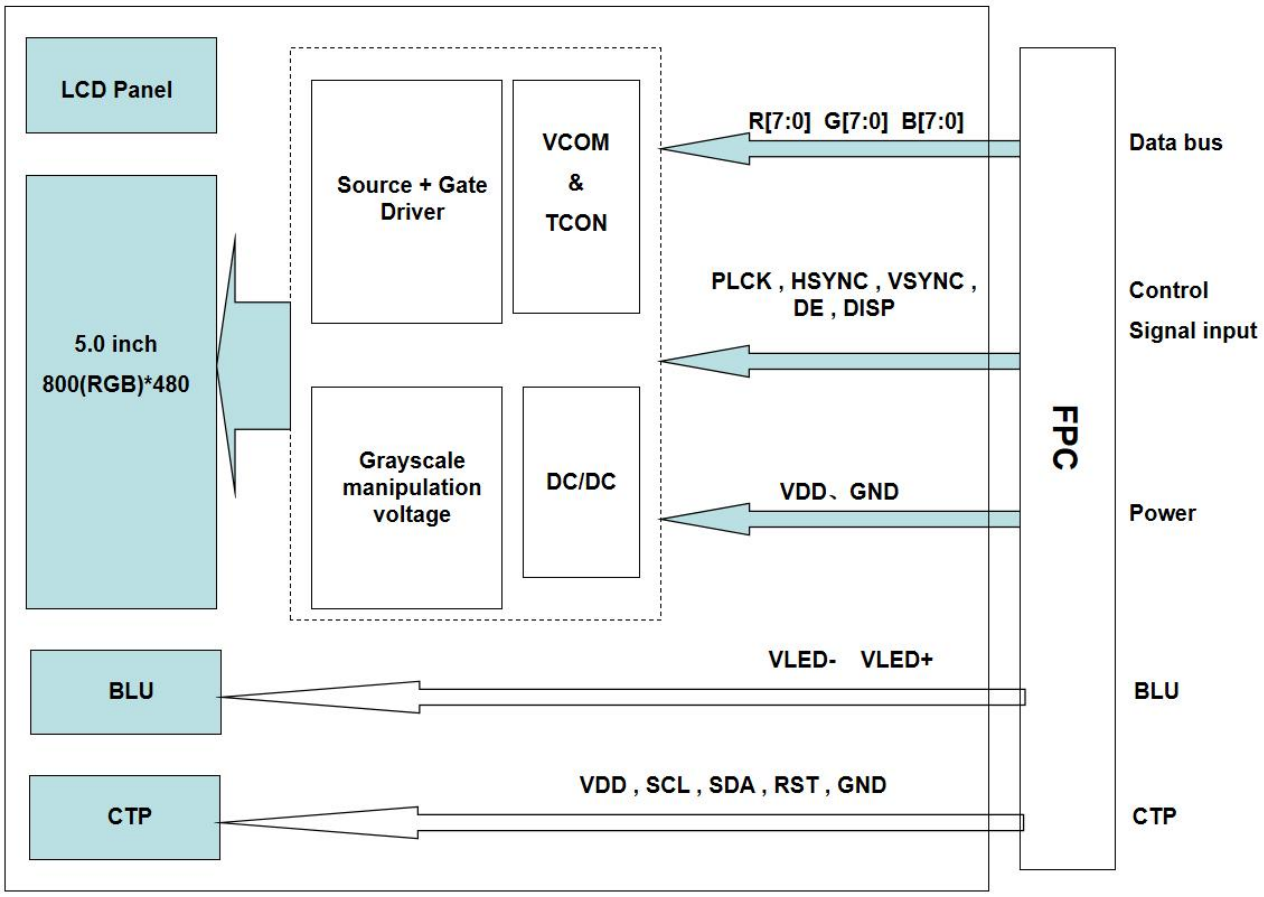
6.6.2. Uniformity = Minimal (L_{P1}:L_{P9}) / Maximal (L_{P1}:L_{P9}) * 100%

6.6.3. Transmittance = L_V on LCD / L_V on Backlight * 100%

Note: Measuring machine: BM-7



7. Block Diagram and Power Supply



8. Interface Pins Definition

No.	Symbol	Function
1	VLED-	Backlight Cathode
2	VLED+	Backlight Anode
3	GND	Ground
4	VDD	Power source
5	R0	Red data signal
6	R1	Red data signal
7	R2	Red data signal
8	R3	Red data signal
9	R4	Red data signal
10	R5	Red data signal
11	R6	Red data signal
12	R7	Red data signal
13	G0	Green data signal
14	G1	Green data signal
15	G2	Green data signal
16	G3	Green data signal
17	G4	Green data signal
18	G5	Green data signal
19	G6	Green data signal
20	G7	Green data signal
21	B0	Blue data signal
22	B1	Blue data signal
23	B2	Blue data signal
24	B3	Blue data signal
25	B4	Blue data signal
26	B5	Blue data signal
27	B6	Blue data signal
28	B7	Blue data signal
29	GND	Ground
30	PCLK	Clock signal to sample each data
31	DISP	Display on/off signal DISP=”H” Display on DISP=”L” Display off
32	Hsync	Horizontal synchronizing signal
33	Vsync	Vertical synchronizing signal
34	DE	Input data enable control.
35	NC	No connection
36	GND	Ground

37	NC(XR)	No connection
38	NC(YD)	No connection
39	NC(XL)	No connection
40	NC(YU)	No connection

CTP PIN symbol

1	VDD	Power Supply CTP	
2	GND	Ground	
3	SCL	I2C clock input	
4	SDA	I2C data input and output	
5	INT	Interrupt request to the host	
6	RESET	External Reset,Low is active	

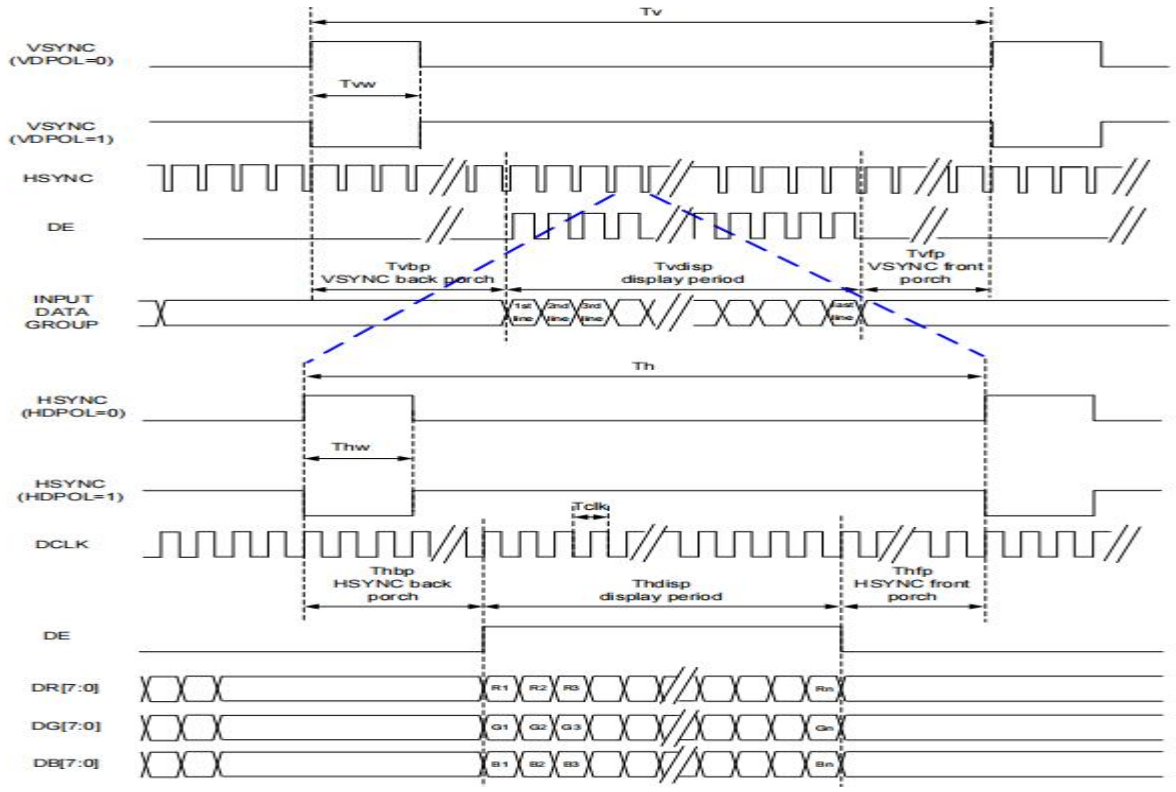
9. AC Characteristics

9.1. AC electrical characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
VDD Power Source Slew Time	TPOR	-	-	20	ms	From 0V to 99% VDD
GRB Pulse Width	tRSTW	10	50	-	us	R=10Kohm, C=1uF
SD Output Stable Time	Tst	-	-	12	us	Output settled within +20mV Loading = 6.8k+28.2pF.
GD Output Rise and Fall Time	Tgst	-	-	6	us	Output settled (5%~95%), Loading = 4.7k+29.8pF

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK Pulse Duty	Tcw	40	50	60	%	
VSYNC Setup Time	Tvst	10	-	-	ns	
VSYNC Hold Time	Tvhd	10	-	-	ns	
HSYNC Setup Time	Thst	10	-	-	ns	
HSYNC Hold Time	Thhd	10	-	-	ns	
Data Setup Time	Tdsu	10	-	-	ns	
Data Hold Time	Tdhd	10	-	-	ns	
DE Setup Time	Tdest	10	-	-	ns	
DE Hold Time	Tdehd	10	-	-	ns	

9.2. Data input format



9.3. Parallel RGB input timing table

Parallel 24-bit RGB Interface Timing Table							
Item		Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency		Fclk	23	25	27	MHz	.
HSYNC	Period Time	Th	808	816	848	DCLK	
	Display Period	Thdisp		800		DCLK	
	Back Porch	Thbp	4	8	24	DCLK	
	Front Porch	Thfp	4	8	24	DCLK	
	Pulse Width	Thw	2	4	8	DCLK	
VSYNC	Period Time	Tv	496	512	528	HSYNC	
	Display Period	Tvdisp		480		HSYNC	
	Back Porch	Tvbp	8	16	24	HSYNC	
	Front Porch	Tvfp	8	16	24	HSYNC	
	Pulse Width	Tvw	2	4	8	HSYNC	

Note: 1. The minimum blanking time depends on the GIP timing of the panel specification

2. To ensure the compatibility of different panels, it is recommended to use the typical setting.

3. It is necessary to keep Tvbp =16 and Thbp =8 in sync mode. DE mode is unnecessary to keep it.

10. Quality Assurance

10.1. Purpose

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

10.2. Standard for Quality Test

10.2.1. Sampling Plan:

GB2828.1-2012

Single sampling, general inspection level II

10.2.2. Sampling Criteria:

Visual inspection: AQL 1.5%

Electrical functional: AQL 0.65%.

10.2.3. Reliability Test:

Detailed requirement refer to Reliability Test Specification.

10.3. Nonconforming Analysis & Disposition

10.3.1. Nonconforming analysis:

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

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

10.3.1.3. If cannot finish the analysis on time, customer will be notified with the progress status.

10.3.2. Disposition of nonconforming:

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

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

10.4. Agreement Items

Shall negotiate with customer if the following situation occurs:

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

10.4.2. Additional requirement to be added in product specification.

10.4.3. Any other special problem.

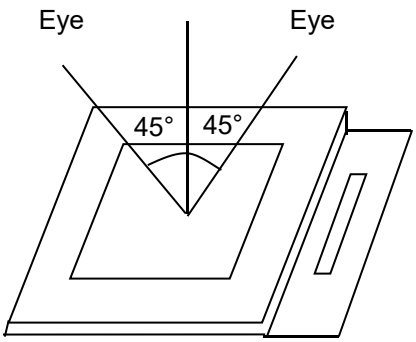
10.5. Standard of the Product Visual Inspection

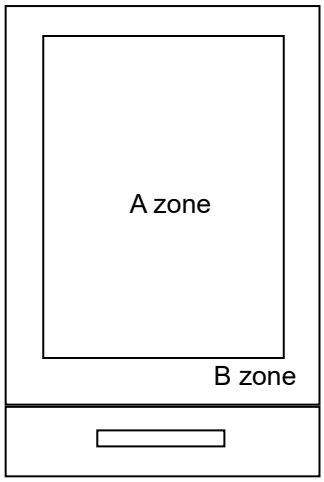
10.5.1. Appearance inspection:

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

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

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



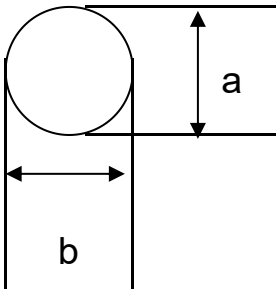


10.5.2. Basic principle:

10.5.2.1. 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.

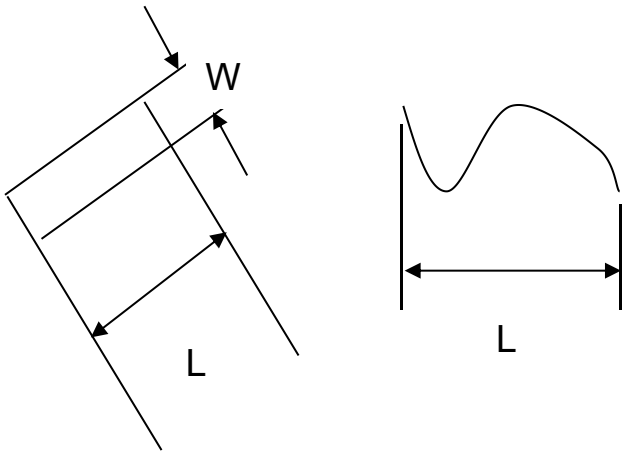
10.5.2.2. New item must be added on time when it is necessary.

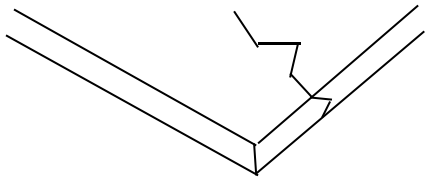
10.6.Inspection Specification

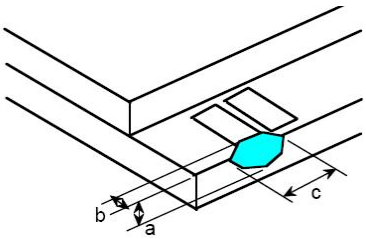
<table>
<tr><th>No.</th><th>Item</th><th>Criteria (Unit: mm)</th></tr>
<tr><td>01</td><td>Black / White spot
Foreign material
(Round type)
Pinholes
Stain
Particles inside cell.
(Minor defect)</td><td>


<table>
<tr><th>Size \ Area</th><th>Acc. Qty</th></tr>
<tr><td>φ≤0.20</td><td>Ignore</td></tr>
<tr><td>0.20<φ≤0.50</td><td>N≤3</td></tr>
<tr><td>0.50<φ</td><td>0</td></tr>
</table>
φ= (a + b) /2

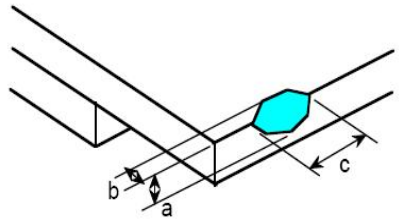
Distance between 2 defects should more than 5mm apart.
</td></tr>
<tr><td>02</td><td>Electrical Defect
(Minor defect)</td><td>
<table>
<tr><td rowspan="2">Bright dot</td><td>Display Area</td><td>Total</td><td rowspan="3">Note1</td></tr>
<tr><td>N≤2</td><td>N≤2</td></tr>
<tr><td>Dark dot</td><td>N≤4</td><td>N≤4</td></tr>
<tr><td>Total dot</td><td>N≤4</td><td>N≤4</td><td></td></tr>
<tr><td>Mura</td><td colspan="2">Not visible through 5% ND filters.</td><td>Note 2</td></tr>
</table>
Remark:
1. Bright dot caused by scratch and foreign object accords to item 1.
</td></tr>
</table>

<table>
<tr>
<td>03</td>
<td>Black and White line
Scratch
Foreign material
(Line type)
(Minor defect)</td>
<td>


<table>
<tr><th>Length</th><th>Width</th><th>Acc. Qty</th></tr>
<tr><td>/</td><td>W ≦ 0.1</td><td>Ignore</td></tr>
<tr><td>L ≦ 2.5</td><td>0.1 ＜ W ≦ 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>
</table>
Distance between 2 defects should more than 3mm apart. Scratches not viewable through the back of the display are acceptable.
</td>
</tr>
<tr>
<td>04</td>
<td>Glass Crack
(Minor defect)</td>
<td>

Crack is potential to enlarge, any type is not allowed.
</td>
</tr>
</table>

<table>
<tr>
<td>05</td>
<td>Glass Chipping Pad Area:
(Minor defect)


</td>
<td>
<table>
<tr><th>Length and Width</th><th>Acc. Qty</th></tr>
<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<Glass Thickness</td></tr>
</table>
</td>
</tr>
</table>

<table>
<tr>
<td>06</td>
<td>Glass Chipping Rear of Pad Area:
(Minor defect)
 
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<td><table>
<tr><td>Length and Width</td><td>Acc. Qty</td></tr>
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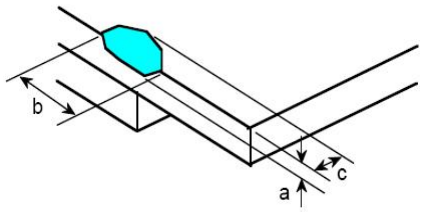
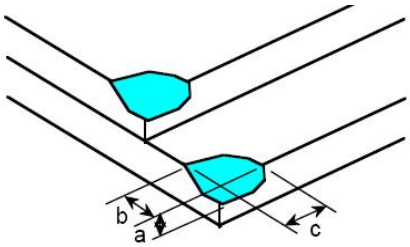
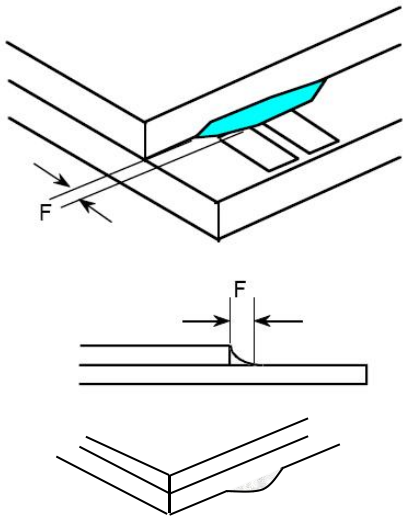
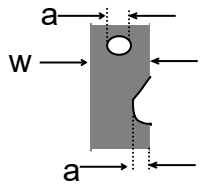
<tr><td>c< 3.0, b< 1.0</td><td>2</td></tr>
<tr><td>c< 3.0, b< 0.5</td><td>4</td></tr>
<tr><td colspan="2">a<Glass Thickness</td></tr>
</table></td>
</tr>
<tr>
<td>07</td>
<td>Glass Chipping Except Pad Area:
(Minor defect)
 
</td>
<td><table>
<tr><td>Length and Width</td><td>Acc. Qty</td></tr>
<tr><td>c > 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<Glass Thickness</td></tr>
</table></td>
</tr>
<tr>
<td>08</td>
<td>Glass Corner Chipping:
(Minor defect)
 
</td>
<td><table>
<tr><td>Length and Width</td><td>Acc. Qty</td></tr>
<tr><td>c < 3.0, b< 3.0</td><td>Ignore</td></tr>
<tr><td colspan="2">a<Glass Thickness</td></tr>
</table></td>
</tr>
<tr>
<td>09</td>
<td>Glass Burr:
(Minor defect)
 
</td>
<td><table>
<tr><td>Length</td><td>Acc. Qty</td></tr>
<tr><td>F < 1.0</td><td>Ignore</td></tr>
</table>
Glass burr don’t affect assemble and module dimension.</td>
</tr>
</table>

<table>
<tr><td>10</td><td>FPC Defect:
(Minor defect)
 
</td><td>10.1 Dent, pinhole width a<w/3.
(w: circuitry width.)
10.2 Open circuit is unacceptable.
10.3 No oxidation, contamination and distortion.</td></tr>
<tr><td>11</td><td>Bubble on Polarizer
(Minor defect)</td><td><table><tr><td>Diameter</td><td>Acc. Qty</td></tr><tr><td>φ≤0.30</td><td>Ignore</td></tr><tr><td>0.30 <φ≤0.50</td><td>N≤2</td></tr><tr><td>0.50 < φ</td><td>N=0</td></tr></table></td></tr>
<tr><td>12</td><td>Dent on Polarizer
(Minor defect)</td><td><table><tr><td>Diameter</td><td>Acc. Qty</td></tr><tr><td>φ≤0.25</td><td>Ignore</td></tr><tr><td>0.25 <φ≤0.50</td><td>N≤4</td></tr><tr><td>0.50 < φ</td><td>None</td></tr></table></td></tr>
<tr><td>13</td><td>Bezel</td><td>13.1 No rust, distortion on the Bezel.
13.2 No visible fingerprints, stains or other contamination.</td></tr>
<tr><td>14</td><td>Touch Panel</td><td>D: Diameter W: width L: length
14.1 Spot: D<0.25 is acceptable
0.25≤D≤0.4
2dots are acceptable and the distance between defects should more than 10 mm.
D>0.4 is unacceptable
14.2 Dent: D>0.40 is unacceptable
14.3 Scratch: W≤0.03, L≤10 is acceptable,
0.03<W≤0.10, L≤10 is acceptable
Distance between 2 defects should more than 10 mm.
W>0.10 is unacceptable.</td></tr>
<tr><td>15</td><td>LCD Ripple</td><td>Touch the touch panel, cannot see the LCD ripple.
Pen: R 0.8mm silicon rubber.
Operation Force:120g</td></tr>
<tr><td>16</td><td>PCB</td><td>16.1 No distortion or contamination on PCB terminals.
16.2 All components on PCB must same as documented on the BOM/component layout.
16.3 Follow IPC-A-600F.</td></tr>
</table>

17	Soldering	Follow IPC-A-610C standard
18	Electrical Defect (Major defect)	The below defects must be rejected. 18.1 Missing vertical / horizontal segment, 18.2 Abnormal Display. 18.3 No function or no display. 18.4 Current exceeds product specifications. 18.5 LCD viewing angle defect. 18.6 No Backlight. 18.7 Dark Backlight. 18.8 Touch Panel no function.

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

10.7.Classification of Defects

10.7.1. Visual defects (Except no / wrong label) are treated as minor defect and electrical defect is major.

10.7.2. Two minor defects are equal to one major in lot sampling inspection.

10.8.Identification/marking criteria

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

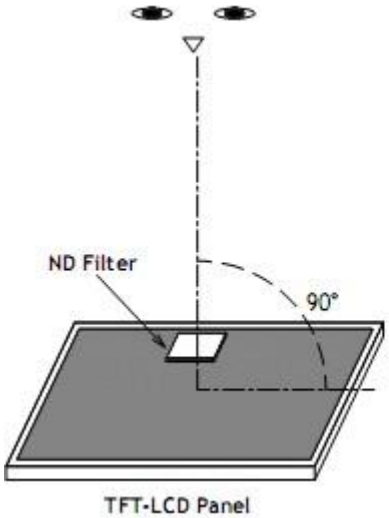
10.9.Packing

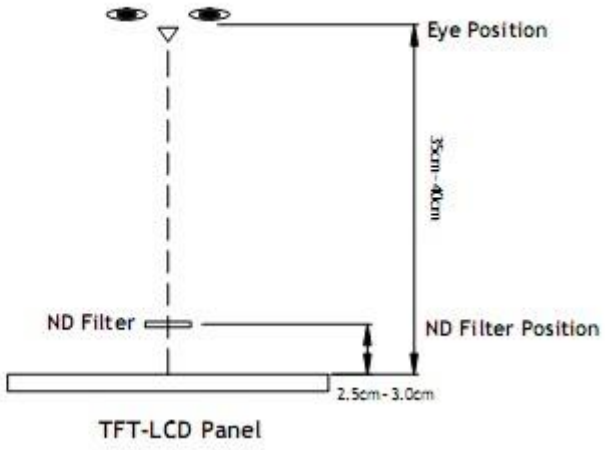
10.9.1. There should be no damage of the outside carton box, each packaging box should have one identical label.

10.9.2. Modules inside package box should have compliant mark.

10.9.3. 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 350mm±50mm.

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 350mm±50mm.

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

11. Reliability Specification

No	Item	Condition	Quantity	Criteria
1	High Temperature Operating	85℃, 96Hrs	2	GB/T2423.2 -2008
2	Low Temperature Operating	-30℃, 96Hrs	2	GB/T2423.1 -2008
3	High Humidity	50℃, 90%RH, 96Hrs	2	GB/T2423.3 -2006
4	High Temperature Storage	85℃, 96Hrs	2	GB/T2423.2 -2008
5	Low Temperature Storage	-30℃, 96Hrs	2	GB/T2423.1 -2008
6	Thermal Cycling Test	-30℃, 60min~85℃, 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:±8KV 150pF/330Ω 5 times Contact:±4KV 150pF/330Ω 5 times	2	GB/T17626.2 -2006
9	Drop Test (Packaged)	Height:80 cm,1 corner, 3 edges, 6 surfaces.	2	GB/T2423.8 -1995

Note1. After the reliability test, the product only guarantee function normally without any fatal defect (non-display, line defect, abnormal display). All the cosmetic specification is judged before the reliability test.

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

Note3. One product only can borne one item of reliability test. Can not take same single one product to do different reliability test .

Note4. All adjustment of display are performed after temperature of product back to room temperature and under static situation for 2 hrs.

Note5. Under no condensation of dew

12. Precautions and Warranty

12.1.Safety

12.1.1. 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.

12.1.2. Since the liquid crystal cells are made of glass, do not apply strong impact on them. Handle with care.

12.2.Handling

12.2.1. Reverse and use within ratings in order to keep performance and prevent damage.

12.2.2. 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.

12.3.Storage

12.3.1. Do not store the LCD module beyond the specified temperature ranges.

12.3.2. Strong light exposure causes degradation of polarizer and color filter

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

12.4.1. 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

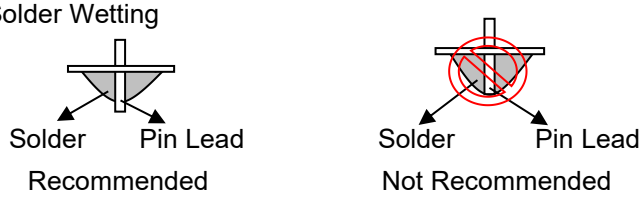
Maximum Solder Temperature: 370℃

Maximum Solder Time: 3s at the maximum temperature

Recommended Soldering Temp: 350±20℃

Typical Soldering Time: ≤3s

13.4.1.3 Solder Wetting



12.4.2. 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℃

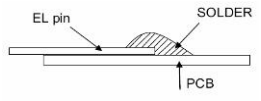
Typical Soldering Time: ≤2s

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

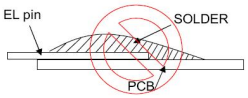
13.4.2.4 No horizontal press on the EL leads during soldering.

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

13.4.2.6 Solder Wetting

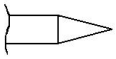


Recommended

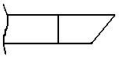


Not Recommended

13.4.2.7 The type of the solder iron:

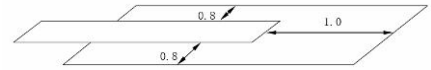


Recommended



Not Recommended

13.4.2.8 Solder Pad



12.5. Operation

12.5.1. Do not drive LCD with DC voltage
12.5.2. Response time will increase below lower temperature
12.5.3. Display may change color with different temperature
12.5.4. Mechanical disturbance during operation, such as pressing on the display area, may cause the segments to appear “fractured”.
12.5.5. Do not connect or disconnect the LCM to or from the system when power is on.
12.5.6. Never use the LCM under abnormal condition of high temperature and high humidity.
12.5.7. Module has high frequency circuits. Sufficient suppression to the electromagnetic interface shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.
12.5.8. Do not display the fixed pattern for long time（we suggest the duration time not longer than half an hour）because it may develop image sticking due to the TFT structure.

12.6. Static Electricity

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

12.7. Limited Warranty

12.7.1. Our warranty liability is limited to repair and/or replacement. We will not be responsible for any consequential loss.
12.7.2. 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.
12.7.3. 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.

13. Packaging

TBD