



產品規格書

產品型號：SL-3.5-320240-CTMN-17

PRODUCT NO. : SL-3.5-320240-CTMN-17

VERSION : Ver 1.0

ISSUED DATE : 2023-03-24

This module uses ROHS material

FOR CUSTOMER : _____

: APPROVAL FOR SPECIFICATION

: APPROVAL FOR SAMPLE

DATE	APPROVED BY

Solonic :

Presented by	Reviewed by	Organized 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, RTP and a backlight unit.

2. Module Parameter

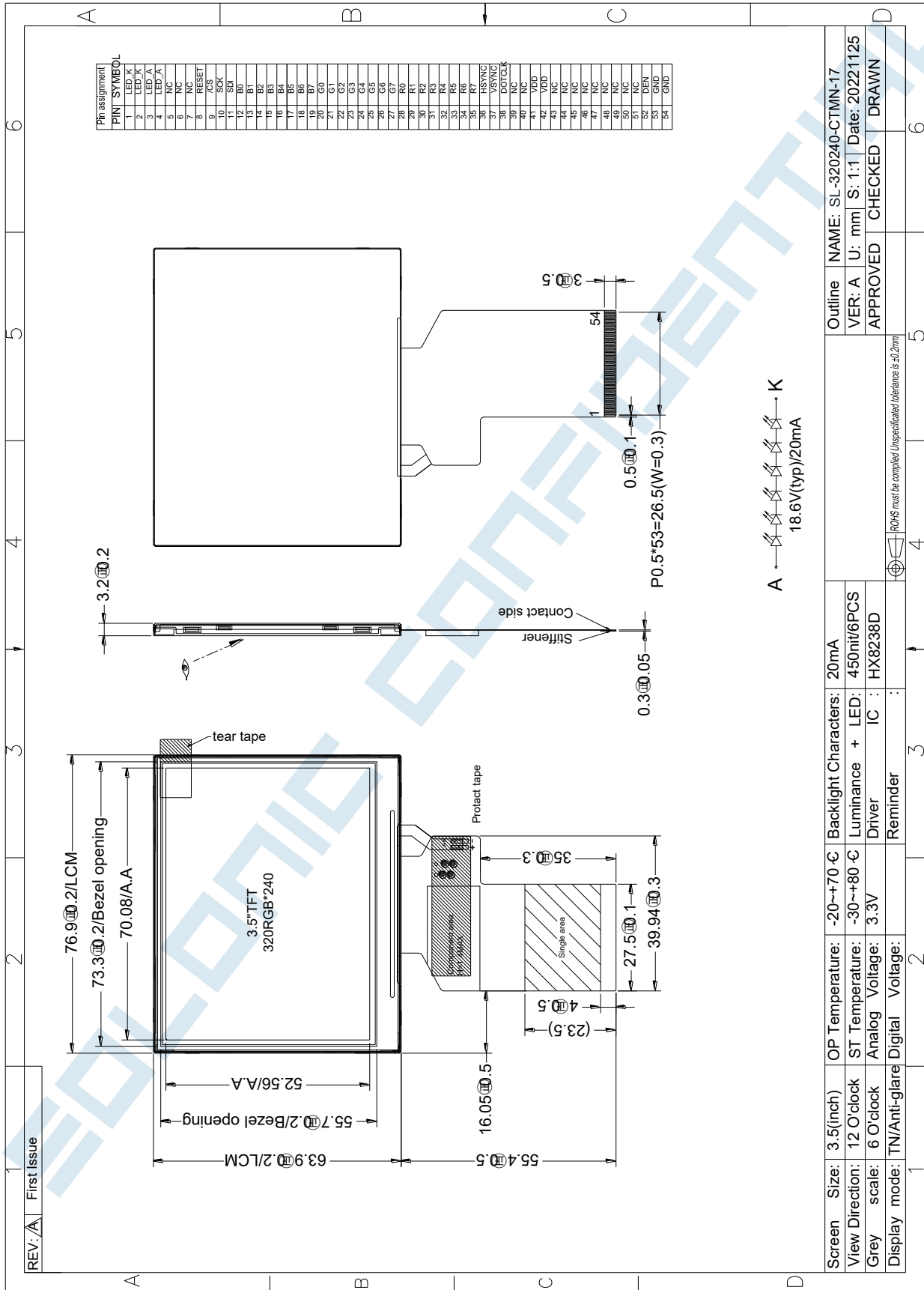
Features	Details	Unit
Display Size(Diagonal)	3.5"	
LCD type	TN TFT	
Display Mode	Transmissive /Normally White	
Resolution	320 RGB x 240	Pixels
View Direction	12 O'CLOCK	Best Image
Gray Scale Inversion Direction	6 O'CLOCK	
Module Outline	76.9(H) x 63.9(V) x 3.2(T) (Note1)	mm
Active Area	70.08(H) x52.56(V)	mm
Pixel Pitch	219(H) x 219(V)	um
Pixel Arrangement	RGB Vertical stripe	
Polarizer Surface Treatment	Anti-glare	
Driver IC	HX8238D	
Display Colors	16.7M	
Interface	24bit RGB interface	
With or without the touch panel	Without	
Operating Temperature	-20~70	°C
Storage Temperature	-30~80	°C
Weight	30.3	g

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

Note 2: Structure Reminder

If the panel of this product was post-processed like cutting. Pls consider the light-leak phenomenon along cutting side. It is inevitable to avoid through TFT-module structure designing, no matter the top frame or cover black along POL marginal, more or less will see the light which pass through TFT and CF glass. Suggest the designing of customer housing open window consider this point. Or add cover lens by oca bonding.

2.1. Outline Drawing



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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=25°C

Item	Symbol	Min.	Max.	Unit
Digital Supply Voltage	DVDD	-0.3	5.0	V
Storage temperature	T _{STG}	-30	80	°C
Operating temperature	T _{OP}	-20	70	°C

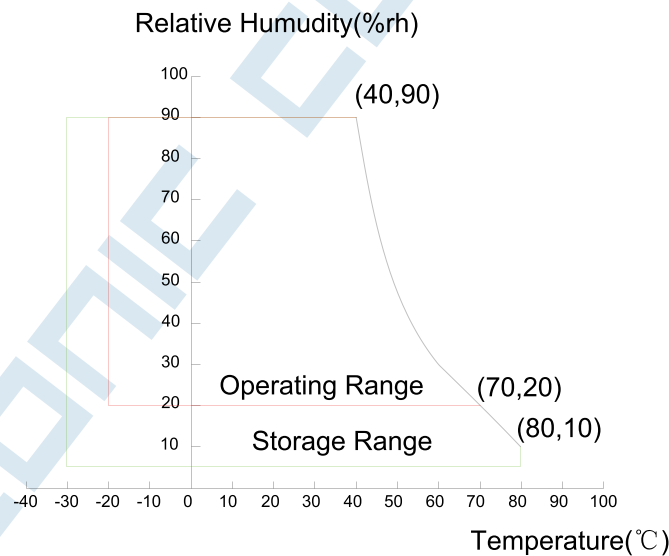
Note 1: If Ta below 50°C, the maximal humidity is 90%RH, if Ta over 50°C, absolute humidity should be less than 60%RH.

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.

Note 3: These range above is maximum value not the actual operating temperature. Actual Operating temperature is no more than 40°C 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 °C max. and no condensation of water.



4. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	
	VDD	3.0	3.3	3.6	V	
Logic Low input voltage	V _{IL}	0	-	0.2*VDD	V	
Logic High input voltage	V _{IH}	0.8*VDD	-	VDD	V	
Logic Low output voltage	V _{OL}	GND	-	0.1*VDD		
Logic High output voltage	V _{OH}	0.9*VDD	-	VDD		
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

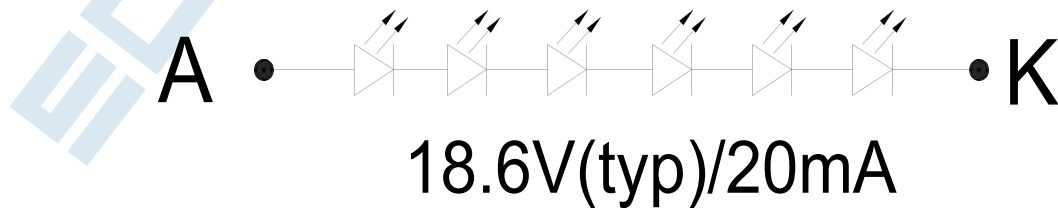
5.1. Backlight Characteristic

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V _F	Ta=25 °C, I _F =20mA/LED	-	18.6	-	V
Forward Current	I _F	Ta=25 °C, V _F =3.1V/LED	-	20	-	mA
Power dissipation	P _D	-	-	372	-	mW
Uniformity	Avg	-	-	80	-	%
LED working life(25°C)	-	-	-	20,000	-	Hrs
Drive method	Constant current					
LED Configuration	6 White LEDs in series					

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 °C,60%RH±5%, I_F=20mA.

5.2. Backlighting circuit



6. Optical Characteristics

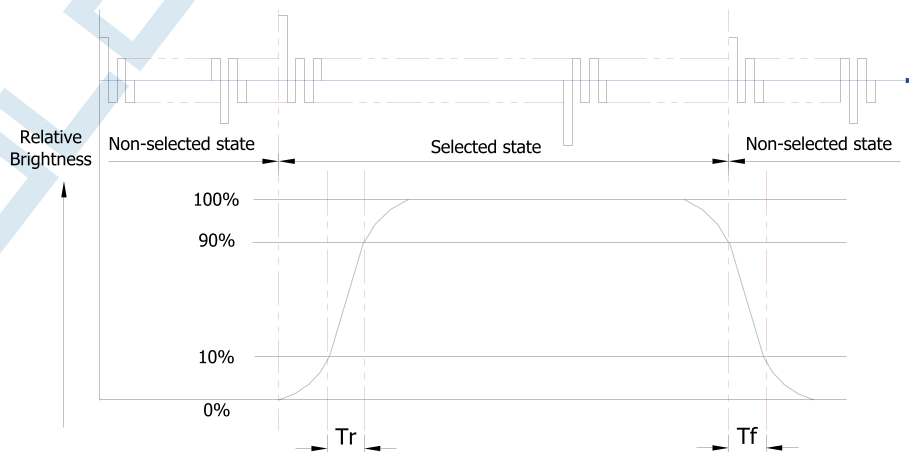
6.1. Optical Characteristics

Ta=25°C, DVDD=3.3V

	Item	Symbol	Condition	Specification			Unit	
				Min.	Typ.	Max.		
Backlight On (Transmissive Mode)	Luminance on TFT($I_f=20\text{mA/LED}$)	Lv		360	450	-	cd/m ²	
	Contrast ratio(See 6.3)	CR		300	350	-		
	Response time (See 6.2)	TR+TF		-	25	-	ms	
	Chromaticity Transmissive (See 6.5)	Red	X _R	Center CR≥10	0.618	0.633	0.648	
			Y _R		0.318	0.333	0.348	
		Green	X _G		0.275	0.290	0.305	
			Y _G		0.574	0.589	0.604	
		Blue	X _B		0.123	0.138	0.153	
			Y _B		0.133	0.148	0.163	
	White	X _W	0.251		0.266	0.281		
		Y _W	0.290		0.305	0.320		
	Viewing Angle (See 6.4)	Horizontal	θ _{X+}		-	65	-	Deg.
			θ _{X-}		-	55	-	
Vertical		φ _{Y+}	-		65	-		
		φ _{Y-}	-		65	-		
NTSC ratio (Color gamut)					55	60	-	%

6.2. Definition of Response Time

6.2.1. Normally Black Type (Negative)



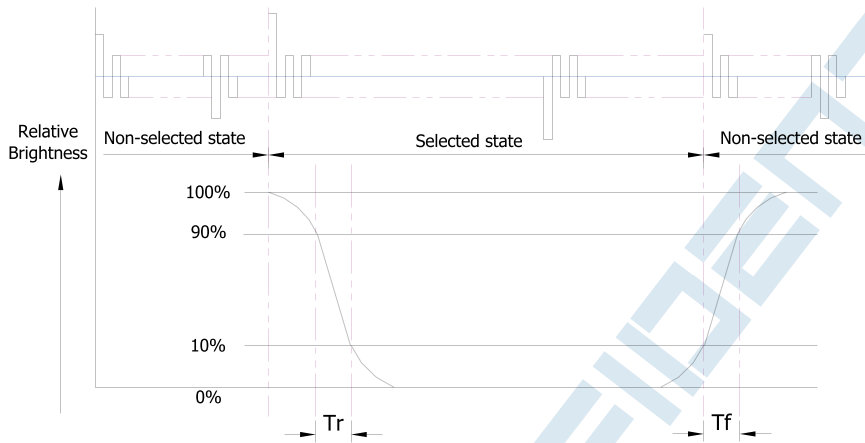
Tr is the time it takes to change form non-selected stage with relative luminance 10% to

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)



Tr is the time it takes to change form non-selected stage 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

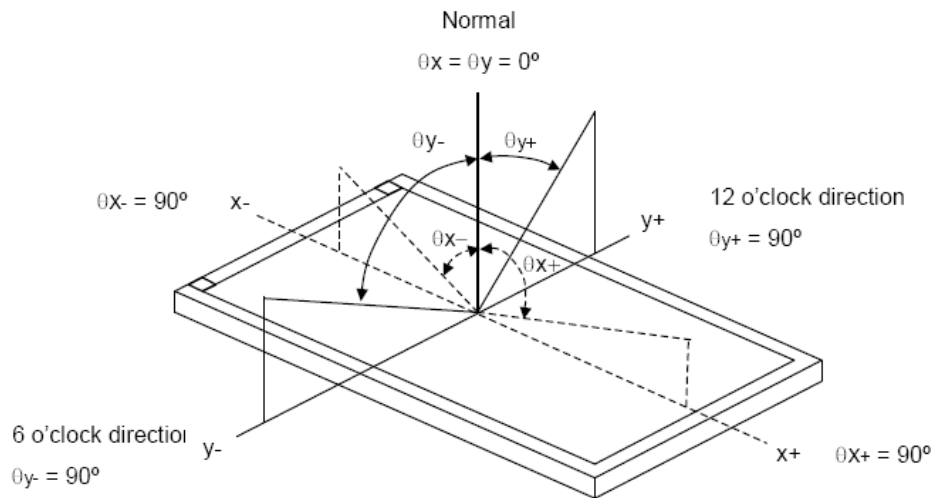
6.3. Definition of Contrast Ratio

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



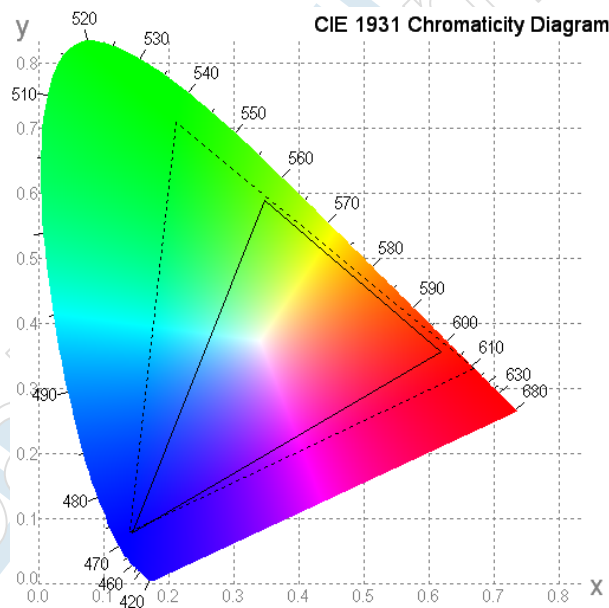
Measuring machine: LCD-5100 or EQUI

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)

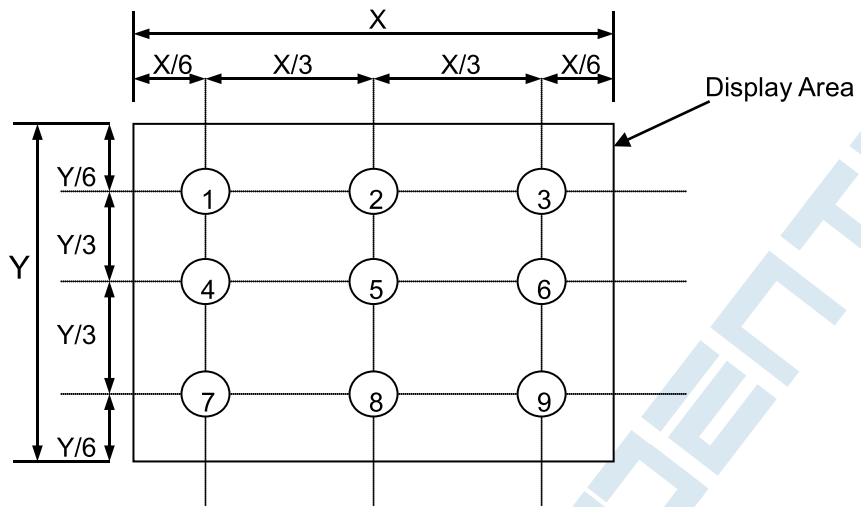


6.6. Definition of Surface Luminance, Uniformity and Transmittance

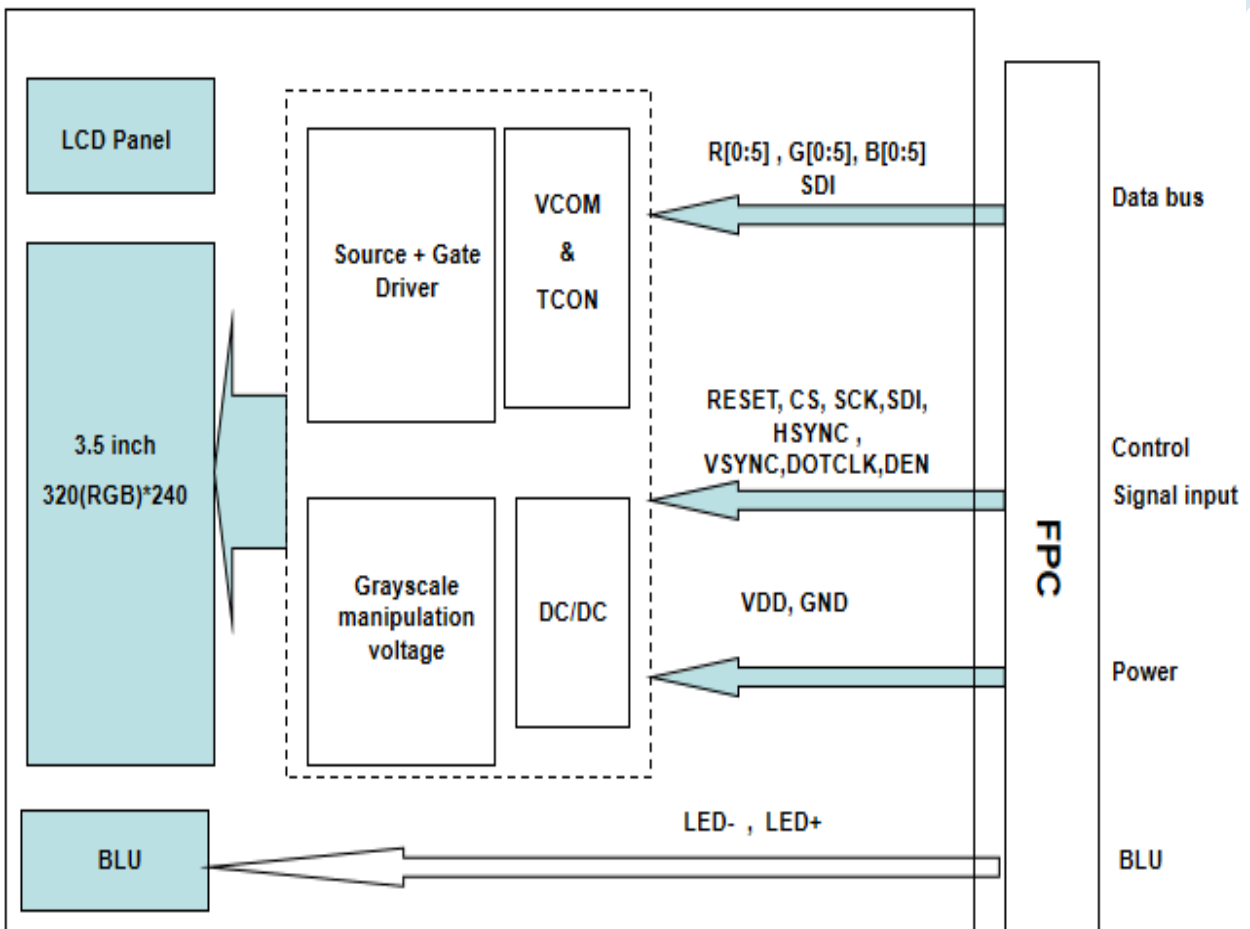
Using the transmissive mode measurement approach, measure the white screen luminance of the display panel and backlight.

- 6.6.1. Surface Luminance: $L_v = \text{average } (L_{P1}:L_{P9})$
- 6.6.2. Uniformity = $\text{Minimal } (L_{P1}:L_{P9}) / \text{Maximal } (L_{P1}:L_{P9}) * 100\%$
- 6.6.3. Transmittance = $L_v \text{ on LCD} / L_v \text{ on Backlight} * 100\%$

Note: Measuring machine: BM-7



7. Block Diagram and Power Supply



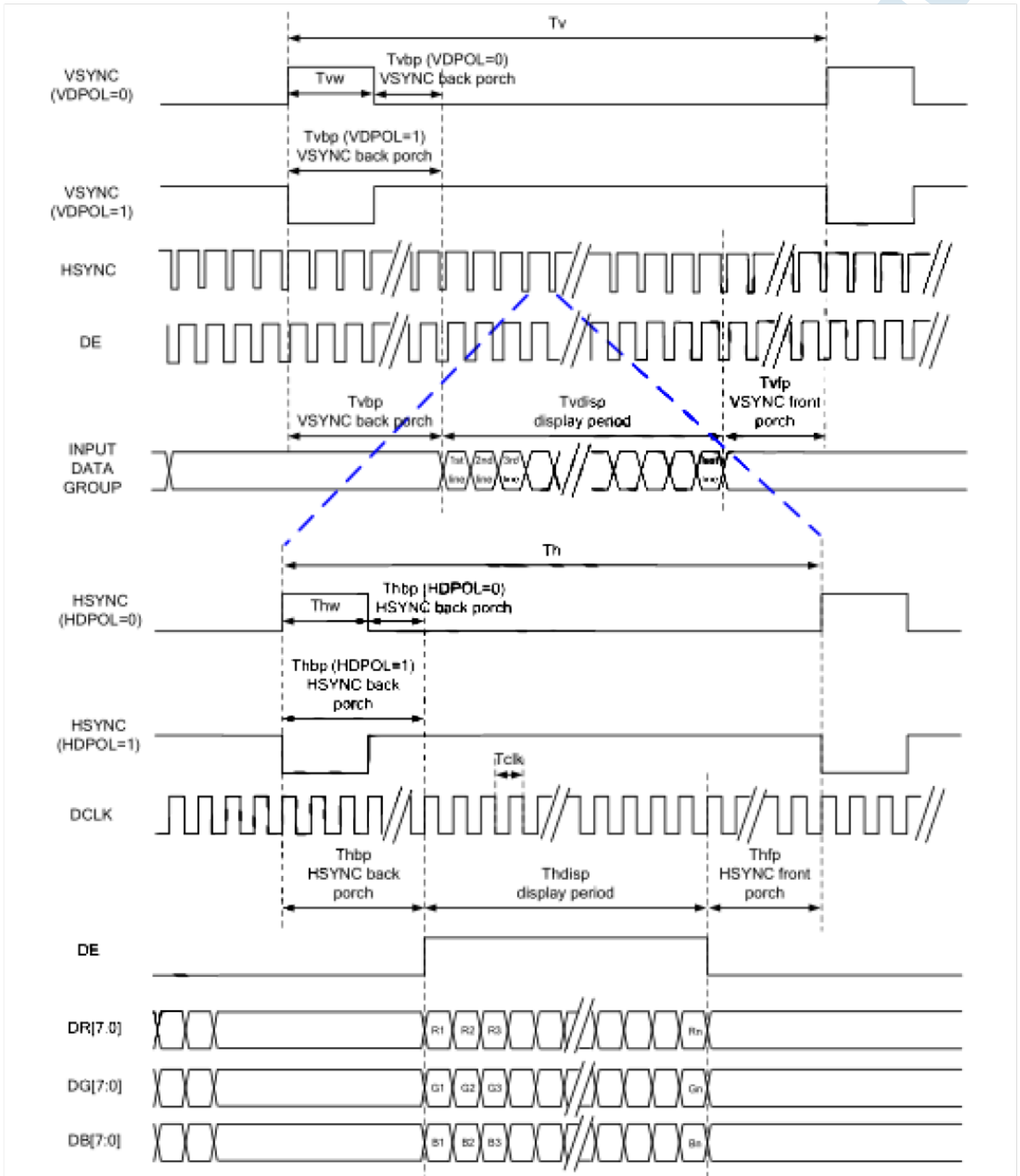
8. Interface Pins Definition

No.	Symbol	Function
1	VLED-	LED power cathode
2	VLED-	LED power cathode
3	VLED+	LED power anode
4	VLED+	LED power anode
5	NC	No connection
6	NC	No connection
7	NC	No connection
8	RESET	Reset signal, Low active
9	CS	Data input enable for TTL mode
10	SCK	SPI Serial Clock
11	SDI	SPI Serial Data Input/output
12	B0	Blue data
13	B1	Blue data
14	B2	Blue data
15	B3	Blue data
16	B4	Blue data
17	B5	Blue data
18	B6	Blue data
19	B7	Blue data
20	G0	Green data
21	G1	Green data
22	G2	Green data
23	G3	Green data
24	G4	Green data
25	G5	Green data
26	G6	Green data
27	G7	Green data
28	R0	Red data
29	R1	Red data
30	R2	Red data
31	R3	Red data
32	R4	Red data
33	R5	Red data
34	R6	Red data
35	R7	Red data
36	HSYNC	Horizontal sync. Signal in RGB I/F mode
37	VSYNC	Vertical sync. Signal in RGB I/F mode

38	DOTCLK	Data clock input
39	NC	No connection
40	NC	No connection
41	VDD	Power Supply
42	VDD	Power Supply
43	NC	No connection
44	NC	No connection
45	NC	No connection
46	NC	No connection
47	NC	No connection
48	NC	No connection
49	NC	No connection
50	NC	No connection
51	NC	No connection
52	DEN	Data enabling signal
53	GND	Ground
54	GND	Ground

9. AC Characteristics

9.1. AC electrical characteristics



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9.2. Parallel RGB input timing table

Parallel 24-bit RGB Input Timing Table							
Item	Symbol	Min.	Typ.	Max.	Unit	Note	
DCLK Frequency	Fclk	5	6	8	MHz		
DCLK Period	Tclk	125	167	200	ns		
HSYNC	Period Time	Th	325	371	438	DCLK	
	Display Period	Thdisp		320		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	SYNC mode back porch control by H_BLANKING[7:0] setting Thbp= H_BLANKING[7:0]
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	43	DCLK	
VSYNC	Period Time	Tv	244	260	289	HSYNC	
	Display Period	Tvdisp		240		HSYNC	
	Back Porch	Tvbp	2	12	12	HSYNC	SYNC mode back porch control by V_BLANKING[7:0] setting Tvbp= V_BLANKING[7:0]
	Front Porch	Tvfp	2	8	37	HSYNC	
	Pulse Width	Tvw	2	4	12	HSYNC	

Serial 8-bit RGB Input Timing Table							
Item	Symbol	Min.	Typ.	Max.	Unit	Remark	
DCLK Frequency	Fclk	15	18	21	MHz		
DCLK Period	Tclk	47	55	66	ns		
HSYNC	Period Time	Th	965	1011	1078	DCLK	
	Display Period	Thdisp		960		DCLK	
	Back Porch	Thbp	3	43	43	DCLK	SYNC mode back porch control by H_BLANKING[7:0] setting Thbp= H_BLANKING[7:0]
	Front Porch	Thfp	2	8	75	DCLK	
	Pulse Width	Thw	2	4	43	DCLK	
VSYNC	Period Time	Tv	244	260	289	HSYNC	
	Display Period	Tvdisp		240		HSYNC	
	Back Porch	Tvbp	2	12	12	HSYNC	SYNC mode back porch control by V_BLANKING[7:0] setting Tvbp= V_BLANKING[7:0]
	Front Porch	Tvfp	2	8	37	HSYNC	
	Pulse Width	Tvw	2	4	12	HSYNC	

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.

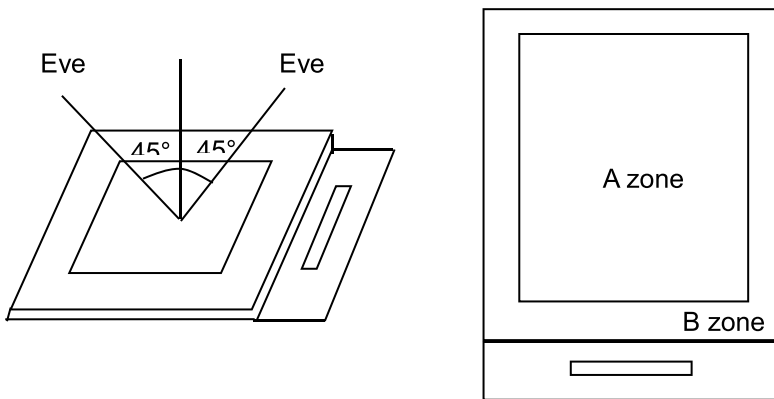
10.5. Standard of the Product Visual Inspection

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

These inspection standards shall be applied to LCD Module supplied by INNOLUX Optoelectronics Corporation. This model is only used in CE product, if it is used in other product applications; it still adopts this copy of specification. If there are any other product applications such as handwriting recognition, Industrial use, Medical use, Aerospace usage and so on, the specifications should be negotiated separately.

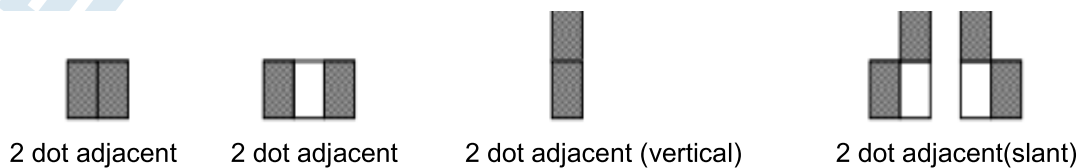
01 Definition of dot defect induced from the panel inside

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

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

c) 2 dot adjacent = 1 pair = 2 dots

Picture:



No.	Display Inspection		
02	Items	Criteria (Unit: mm)	
	Bright dot	Random	$N \leq 1$
		2 dots adjacent	$N \leq 0$
		3 dots adjacent	$N \leq 0$
	Dark dot	Random	$N \leq 2$
		2 dots adjacent	$N \leq 0$
		3 dots adjacent	$N \leq 0$
	Total bright dot and dark dot		$N \leq 2$
Distance	Minimum Distance Between dark dots Minimum Distance Between dark and bright dots	5mm	
Tiny bright dot		visible through 6% ND filter $D \leq 0.1\text{mm}$, Ignore $0.1\text{mm} < D \leq 0.3\text{mm}$, $N \leq 2$ Distance $\geq 5\text{mm}$	
Display failure (V-line/Cross line etc)			
Mura/Waving/Hot spot	Not visible through 6% ND filter in 50% gray or judge by limit sample if necessary		

*Note: Defect which is on the Black Matrix (outside of Active Area) are not considered as a defect.

No.	Appearance & Display inspection	
03	Items	Criteria (Unit: mm)
	Foreign Black/White/Bright Spot (Display & Appearance)	$D \leq 0.1\text{mm}$, Ignore, $0.1\text{mm} < D \leq 0.3\text{mm}$, $N \leq 2$ Distance $\geq 5\text{mm}$, It is shown in Fig. 2.
	Foreign Black/White/Bright Line (Display & Appearance)	$W \leq 0.03\text{ mm}$, Ignore $0.03 < W \leq 0.05\text{ mm}$ $L \leq 3.0\text{ mm}$, $N \leq 3$ It is shown in Fig. 3.
	Polarizer Dent/Air Bubble	$D \leq 0.1\text{mm}$, Ignore $0.1\text{mm} < D \leq 0.3\text{mm}$, $N \leq 2$ Distance $\geq 5\text{mm}$
	Polarizer Scratches	$W \leq 0.03\text{ mm}$, Ignore $0.03 < W \leq 0.05\text{ mm}$ $L \leq 3.0\text{ mm}$, $N \leq 3$

Notes: If any specific defect is not included in the above defect table, this defect should be judged by INX/ODM/Brand customer discussion.

- 1. W : Width 3. D : Average Diameter
- 2. L : Length 4. N : Count

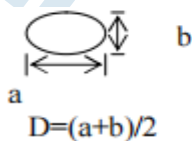


Fig. 2

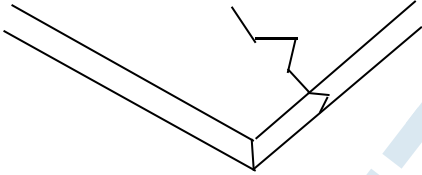
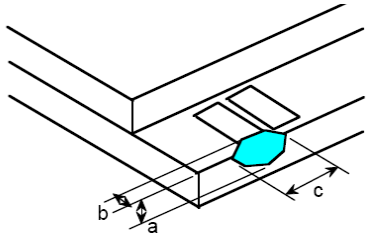
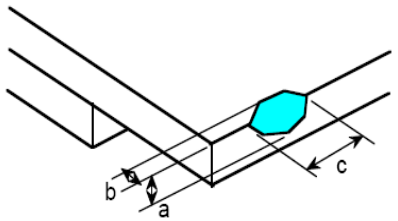
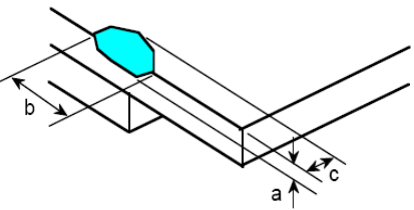


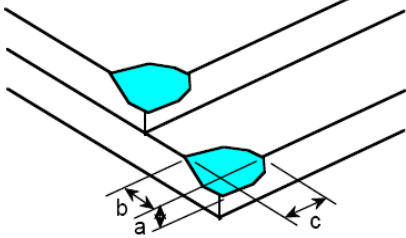
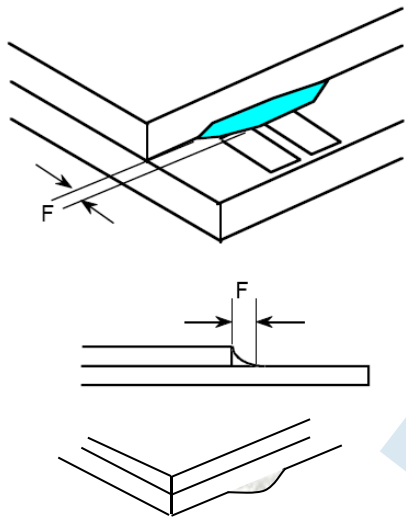
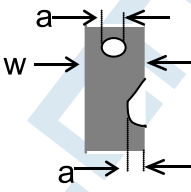
W: width, L : length

Fig. 3

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No.	Item	Criteria (Unit: mm)										
04	Glass Crack (Minor defect)	 <p>Crack is potential to enlarge, any type is not allowed.</p>										
05	Glass Chipping Pad Area: (Minor defect)	 <table border="1" data-bbox="831 712 1299 887"> <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											
$a < \text{Glass Thickness}$												
06	Glass Chipping Rear of Pad Area: (Minor defect)	 <table border="1" data-bbox="831 1099 1299 1317"> <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											
$a < \text{Glass Thickness}$												
07	Glass Chipping Except Pad Area: (Minor defect)	 <table border="1" data-bbox="831 1473 1299 1691"> <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											
$a < \text{Glass Thickness}$												

<p>08</p>	<p>Glass Corner Chipping: (Minor defect)</p> 	<table border="1"> <tr> <th>Length and Width</th> <th>Acc. Qty</th> </tr> <tr> <td>$c < 3.0, b < 3.0$</td> <td>Ignore</td> </tr> <tr> <td colspan="2">$a < \text{Glass Thickness}$</td> </tr> </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"> <tr> <th>Length</th> <th>Acc. Qty</th> </tr> <tr> <td>$F < 1.0$</td> <td>Ignore</td> </tr> </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>11</p>	<p>Bubble on Polarizer (Minor defect)</p>	<table border="1"> <tr> <th>Diameter</th> <th>Acc. Qty</th> </tr> <tr> <td>$\varphi \leq 0.30$</td> <td>Ignore</td> </tr> <tr> <td>$0.30 < \varphi \leq 0.50$</td> <td>$N \leq 2$</td> </tr> <tr> <td>$0.50 < \varphi$</td> <td>$N = 0$</td> </tr> </table>	Diameter	Acc. Qty	$\varphi \leq 0.30$	Ignore	$0.30 < \varphi \leq 0.50$	$N \leq 2$	$0.50 < \varphi$	$N = 0$
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)	<table border="1" data-bbox="828 230 1299 400"> <tr> <th>Diameter</th> <th>Acc. Qty</th> </tr> <tr> <td>$\varphi \leq 0.25$</td> <td>Ignore</td> </tr> <tr> <td>$0.25 < \varphi \leq 0.50$</td> <td>$N \leq 4$</td> </tr> <tr> <td>$0.50 < \varphi$</td> <td>None</td> </tr> </table>	Diameter	Acc. Qty	$\varphi \leq 0.25$	Ignore	$0.25 < \varphi \leq 0.50$	$N \leq 4$	$0.50 < \varphi$	None
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 $0.25 \leq D \leq 0.4$ 2dots are acceptable and the distance between defects should more than 10 mm. $D > 0.4$ 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 Distance between 2 defects should more than 10 mm. $W > 0.10$ is unacceptable.</p>								
15	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>								
16	PCB	<p>16.1 No distortion or contamination on PCB terminals.</p> <p>16.2 All components on PCB must same as documented on the BOM/component layout.</p> <p>16.3 Follow IPC-A-600F.</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.

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/marketing criteria

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

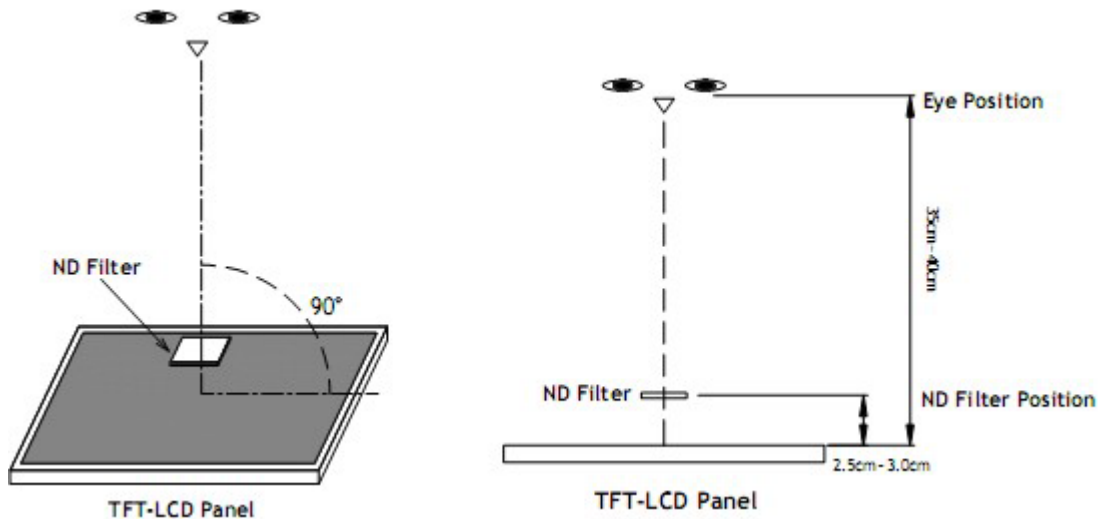
10.9. Packing

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 $350\text{mm} \pm 50\text{mm}$.

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.

11. Reliability Specification

No	Item	Condition	Quantity	Criteria
1	High Temperature Operating	70°C, 120Hrs	2	GB/T2423.2-2008
2	Low Temperature Operating	-20°C, 120Hrs	2	GB/T2423.1-2008
3	High Humidity	Refer to Item 3 ,note(5)	2	GB/T2423.3-2006
4	High Temperature Storage	80°C, 120Hrs	2	GB/T2423.2-2008
5	Low Temperature Storage	-30°C, 120Hrs	2	GB/T2423.1-2008
6	Thermal Cycling Test	-20°C, 60min~70°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: ±8KV 150pF/330 Ω 5 times	2	GB/T17626.2-2006
		Contact: ±4KV 150pF/330 Ω 5 times		
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

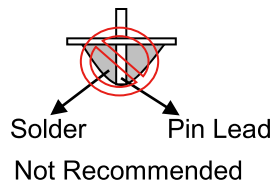
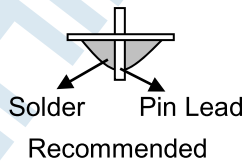
Maximum Solder Temperature: 370 °C

Maximum Solder Time: 3s at the maximum temperature

Recommended Soldering Temp: 350±20 °C

Typical Soldering Time: ≤3s

13.4.1.3 Solder Wetting



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 °C

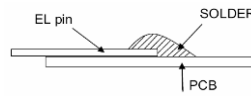
Typical Soldering Time: ≤2s

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

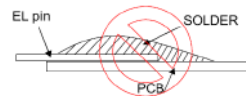
13.4.2.4 No horizontal press on the EL leads during soldering.

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

13.4.2.6 Solder Wetting

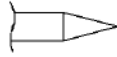


Recommended

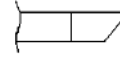


Not Recommended

13.4.2.7 The type of the solder iron:

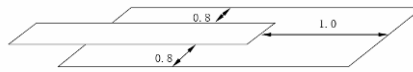


Recommended



Not Recommended

13.4.2.8 Solder Pad



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

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