Dimensions (LCM drawing):

- 164.9±0.2/LCM
- 156.7±0.2/Bezel Opening
- 154.214/LCD A.A
- 5.59±0.2
- (7.093)
- 3.6±0.2
- (4.705)
- 3.35±0.2/LCM
- 100±0.2/LCM
- 89.05±0.2/Bezel Opening
- 85.92/LCD A.A
- 7.0" TFT
- 1024 RGB*600
- Tear Tape
- Contact Side
- Stiffener
- Component Area
- UL and E-number
- 45.685±0.5
- 20±0.1
- 3.5±0.3
- 30±0.1
- 70.47±0.5
- 0.5±0.1
- W=0.3
- P0.5*39=19.5±0.1
- 20.5±0.1
- 0.3±0.05
- (5.315)
- single area
- 5±0.5
- 40
- 1

K-
A+

LCM

NO.	PIN NAME	NO.	PIN NAME	NO.	PIN NAME	NO.	PIN NAME
1	VCOM	11	RXIN1-	21	RXIN3+	31	LED-
2	VDD	12	RXIN1+	22	GND	32	LED-
3	VDD	13	GND	23	NC	33	L/R
4	NC	14	RXIN2-	24	NC	34	U/D
5	RESET	15	RXIN2+	25	GND	35	VGL
6	STBYB	16	GND	26	NC	36	NC
7	GND	17	RXCLKIN-	27	DIMO	37	NC
8	RXIN0-	18	RXCLKIN+	28	SELB	38	VGH
9	RXIN0+	19	GND	29	AVDD	39	LED+
10	GND	20	RXIN3-	30	GND	40	LED+

NOTES:
1. Display size:7.0"TFT
2. Viewing direction:FULL VIEW
3. Display mode:Transmissive/Normal Black/Glare
4. Operation temperature:-20℃~+70℃
5. Storage temperature:-30℃~+80℃
6. Power supply voltage:3.3V
7. Driver IC:EK79001HF3&EK73215
8. Backlight :White(24 LED)/9.6V/160mA
9. Brightness:370(TYP)cd/m2
10. ROHS must be complied
11. The dimension with mark brackets "()" just for reference
* Unspecification tolerance are ±0.2㎜

Tolerances:			Date	Name
			01/25	dr
Modifications		Date	Name	

YDP LCD I 700 G LVDS

knitter-switch

30 56 36

Page
1/26

PRODUCT SPECIFICATION

7.0" TFT LCD MODULE
MODEL: YDP LCD I 700 G LVDS   Ver:1.8

< ◇ >   Preliminary Specification

< ◆ >   Finally Specification

CUSTOMER'S APPROVAL	
CUSTOMER :	
SIGNATURE:	DATE:

APPROVED BY	PM REVIEWED	PD REVIEWED	PREPARED BY

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 and a backlight unit.

2. Module Parameter

Features	Details	Unit
Display Size(Diagonal)	7.0"	
LCD type	IPS TFT	
Display Mode	Transmissive/Normally black	
Resolution	1024 RGB x 600	Pixels
View Direction	FULL VIEW	Best Image
Module Outline	164.9(H) x 100(V) x 3.35(T)　(Note1)	mm
Active Area	154.214(H) x 85.92(V)	mm
Pixel Pitch	150.6 (H) x 143.2(V)	um
Pixel Arrangement	RGB vertical Stripe	
Polarizer Surface Treatment	Glare	
Display Colors	262K/16.7 M	
Interface	6/8 bit LVDS Interface	
Driver IC	EK79001&EK73215	-
Power Consumption	60	mW
With or Without Touch Panel	Without	
Operating Temperature	**-20～70**	℃
Storage Temperature	**-30～80**	℃
Weight	110	g

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

3. Absolute Maximum Ratings

V_{SS}=0V, Ta=25℃

Item	Symbol	Min.	Max.	Unit
Supply Voltage	VDD	-0.5	5.0	V
Storage temperature	T_{STG}	**-30**	**+80**	℃
Operating temperature	T_{OP}	**-20**	**+70**	℃

Note 1: If Ta below 50℃, the maximal humidity is 90%RH, if Ta over 50℃, 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.

4. DC Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage	VDD	3.0	3.3	3.6	V
	AVDD	-	9.6	-	V
	VGH	-	18	-	V
	VGL	-	-6	-	V
	VCOMH	-	3.3	-	V
	VCOML	-	3.1	-	V
Differential input high threshold voltage	RxVTH	-	-	0.1	V
Differential input low threshold voltage	RxVTL	-0.1	-	-	V
Input voltage range (singled-end)	RxVIN	0	-	2.4	V

Note 1: Typ. VCOM is only a reference value it must be optimized according to each LCM. Be sure to use VR.

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	8.4	**9.6**	10.2	V
Forward Current	I_F	Ta=25 °C, V_F=3.2V/LED	-	**160**	-	mA
Power dissipation	P_D		-	**1536**	-	mW
Uniformity	Avg		-	80	-	%
LED working life(25℃)	-		-	30,000	-	Hrs
Drive method	Constant current					
LED Configuration	24 White LEDs (3 LEDs in string and 8 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 °C,60%RH±5%, I_F=20mA/LED.

5.2. Backlighting circuit
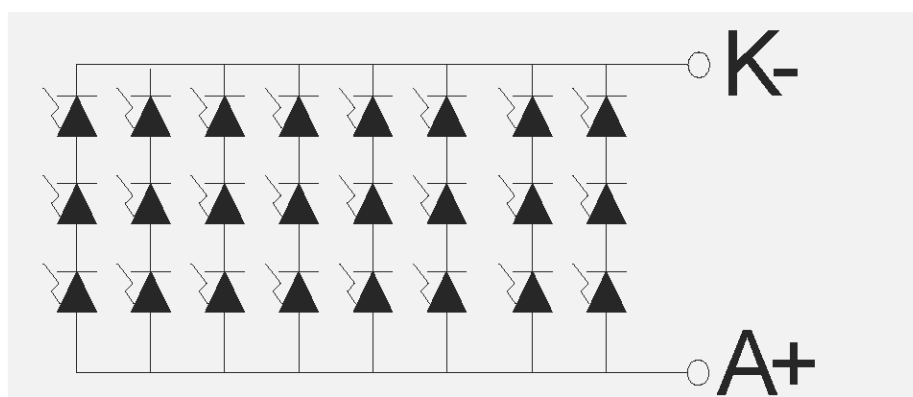
6. Optical Characteristics

Ta=25ºC, VDD=3.3V

	Item		Symbol	Condition	Specification			Unit
					Min.	Typ.	Max.	
Backlight On (Transmissive Mode)	Luminance on TFT(I_f=20mA/LED)		Lv		**290**	**370**	-	cd/m²
	Contrast ratio(See 7.3)		CR		-	800	-	
	Response time (See 7.2)		TR+TF		-	30	40	ms
	Chromaticity Transmissive (See 7.5)	Red	XR		0.523	0.573	0.623	
			YR		0.302	0.352	0.402	
		Green	XG		0.240	0.290	0.340	
			YG		0.534	0.584	0.634	
		Blue	XB		0.092	0.142	0.196	
			YB		0.042	0.092	0.142	
		White	XW		0.218	0.268	0.318	
			YW		0.264	0.314	0.364	
	Viewing Angle (See 7.4)	Horizontal	θx+	Center CR≥10	-	85	-	Deg.
			θx-		-	85	-	
		Vertical	φY+		-	85	-	
			φY-		-	85	-	
	NTSC Ratio(Gamut)				-	50	-	%

6.1. Definition of Response Time

6.1.1. Normally Black Type (Negative)
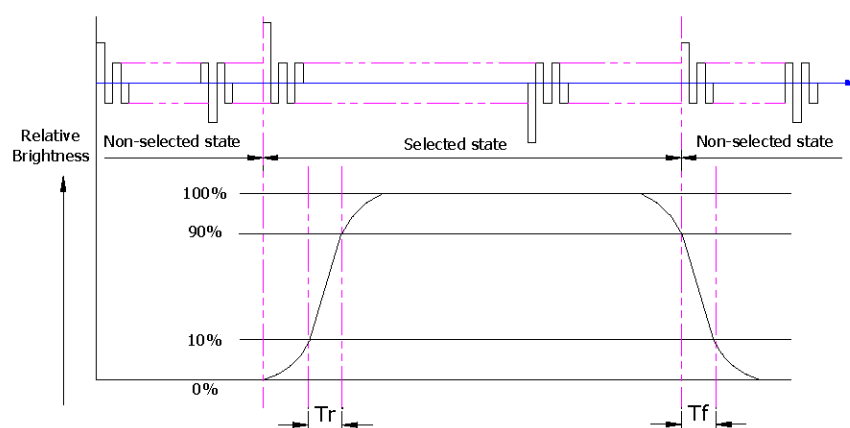
Tr is the time it takes to change form non-selected stage with relative luminance 10% to selected state with relative luminance 90%;

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

6.1.2. Normally White Type (Positive)
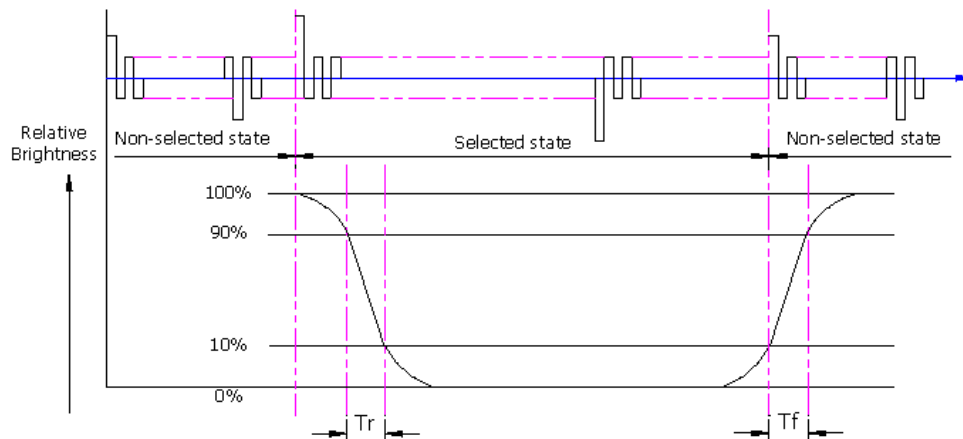
Tr is the time it takes to change form non-selected stage with relative luminance 90% to selected state with relative luminance 10%;

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

6.2. 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

6.3. Definition of Viewing Angles
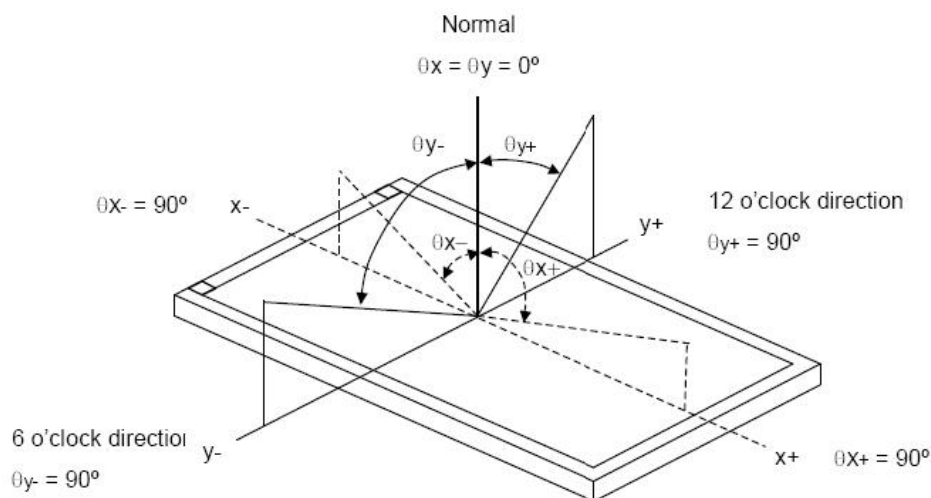
Measuring machine: LCD-5100 or EQUI

6.4. 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)
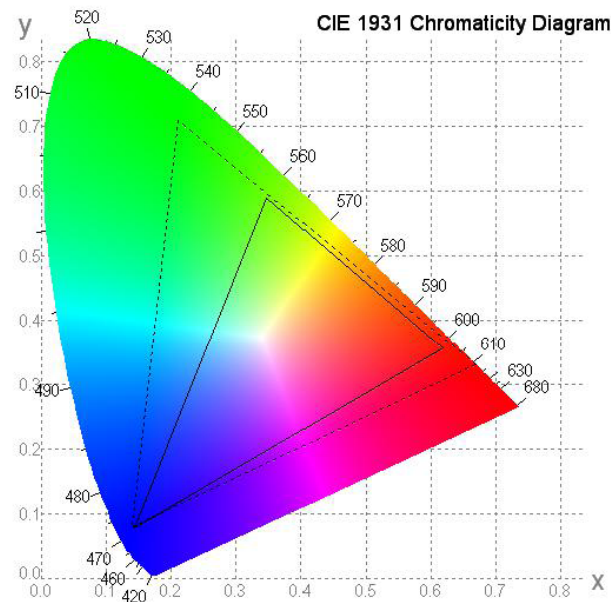
6.5. Definition of Surface Luminance, Uniformity and Transmittance

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

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

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

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

Note: Measuring machine: BM-7
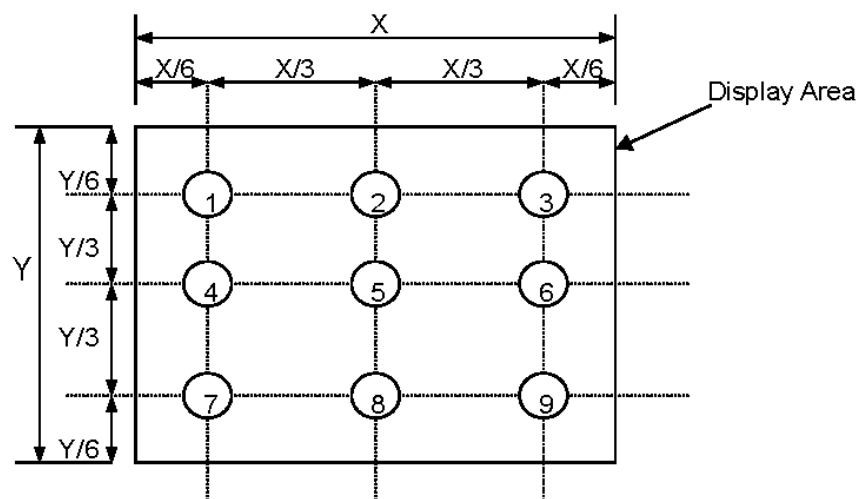
7. Block Diagram and Power Supply
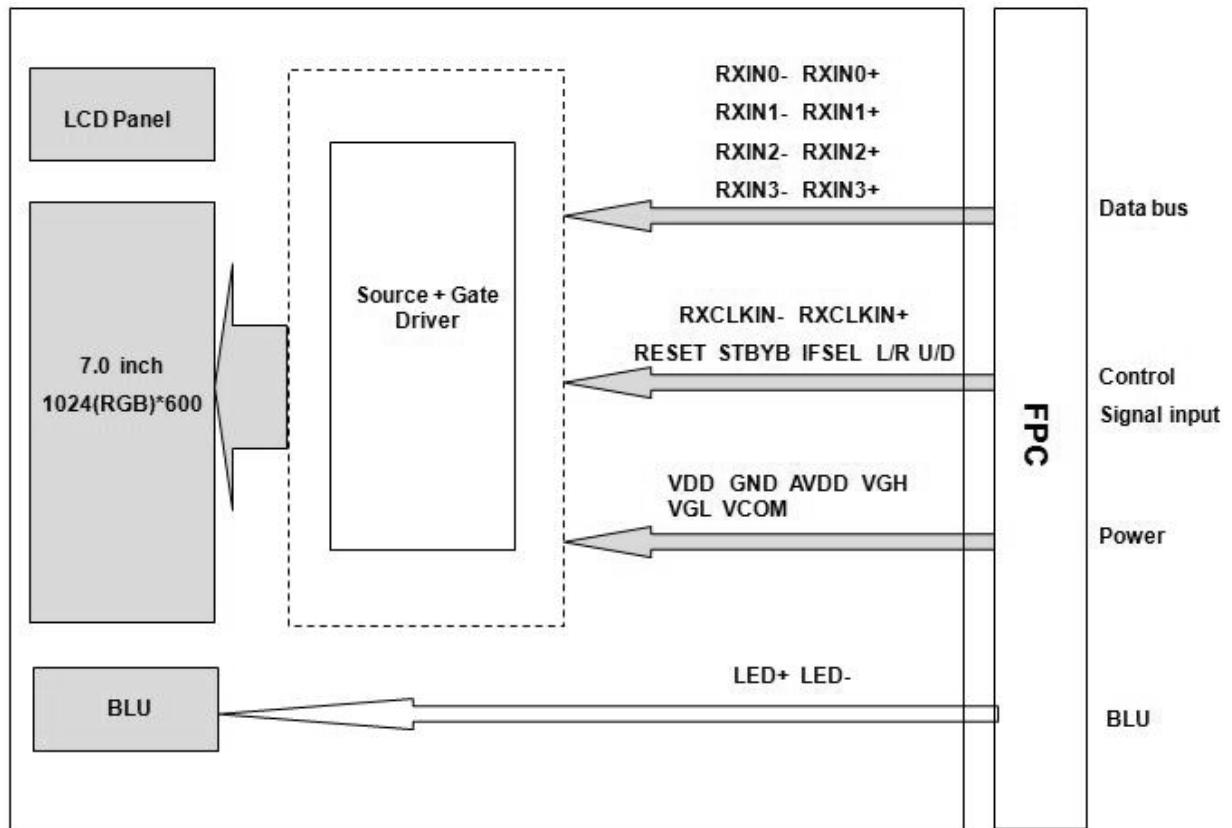
8. Interface Pins Definition

No.	Symbol	Function	Remark
1	VCOM	Common Voltage.	
2	VDD	Power Supply	
3	VDD	Power Supply	
4	NC	Not connected	
5	RESET	Global reset pin	
6	STBYB	Standby mode, Normally pulled high. STBYB="1", normal operation STBYB="0", timing controller, source driver will turn off	
7	GND	Ground	
8	RXIN0-	-LVDS differential data input.	
9	RXIN0+	+LVDS differential data input.	
10	GND	Ground	
11	RXIN1-	-LVDS differential data input.	
12	RXIN1+	+LVDS differential data input.	
13	GND	Ground	
14	RXIN2-	-LVDS differential data input.	
15	RXIN2+	+LVDS differential data input.	
16	GND	Ground	
17	RXCLKIN-	-LVDS differential clock input.	
18	RXCLKIN+	+LVDS differential clock input.	
19	GND	Ground	
20	RXIN3-	-LVDS differential data input.	
21	RXIN3+	+LVDS differential data input.	
22	GND	Ground	
23	NC	Not connected	
24	NC	Not connected	
25	GND	Ground	
26	NC	Not connected	
27	DIMO	Backlight CABC controller signal output	
28	IFSEL	"L": 8bit LVDS interface "H":6bit LVDS interface	
29	AVDD	Power for Analog Circuit	
30	GND	Ground	
31	LED-	LED Cathode.	
32	LED-	LED Cathode.	
33	L/R	Horizontal inversion.	NOTE1
34	U/D	Vertical inversion.	NOTE1
35	VGL	Gate OFF Voltage.	
36	NC	Not connected	
37	NC	Not connected	
38	VGH	Gate ON Voltage.	

39	LED+	LED Anode.	
40	LED+	LED Anode.	

Note 1:

SHLR	UPDN	Data shifting
DVDD	GND	Left→Right，Up→Down(default)
GND	GND	Right→Left，Up→Down
DVDD	DVDD	Left→Right，Down→Up
GND	DVDD	Right→Left，Down→Up
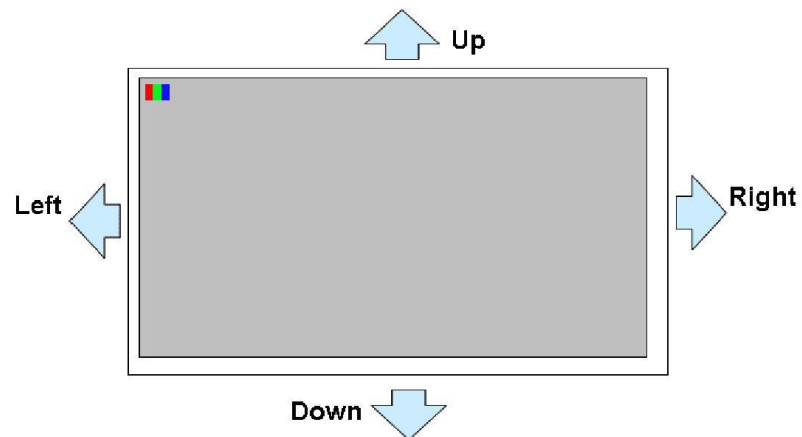
9. AC characteristics

9.1. Timing

LVDS mode

Parameter	Symbol	Min.	Typ.	Max.	Unit	Condition
Clock frequency	R_{xFCLK}	26.2		71	MHz	
Input data skew margin	T_{RSKM}	500			pS	$\|V_{ID}\| = 400mV$ $R_{xVCM} = 1.2V$ $R_{xFCLK} = 71\ MHz$
Clock high time	T_{LVCH}		$4/(7* R_{xFCLK})$		ns	
Clock low time	T_{LVCL}		$3/(7* R_{xFCLK})$		ns	
PLL wake-up time	T_{enPLL}			150	uS	

T_{RSKM}: Receiver strobe margin
R_{SPOS}: Receiver strobe position
T_{SW} : Strobe width (Internal data sampling window)
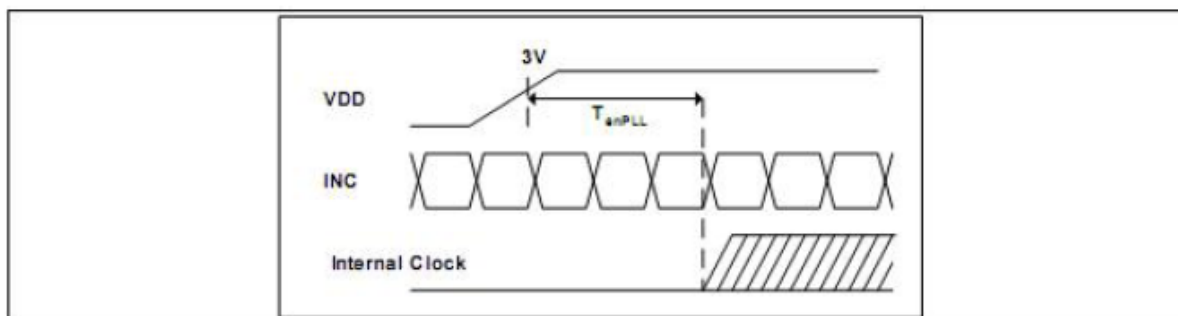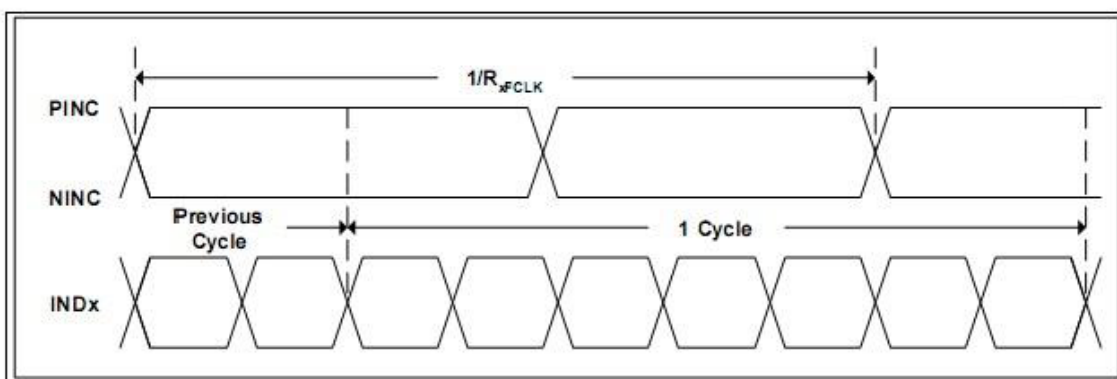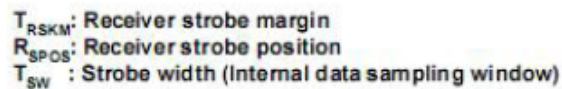
SSC torence of LVDS receiver						
Symbol	parameter	condition	Min.	Typ.	Max.	Units
SSC$_{MF}$	Modulation Frequency		23		93	KHz
SSC$_{MR}$	Modulation Rate	LVDS clock = 71MHz center spread			±3	%

9.2. Data Input Format for LVDS
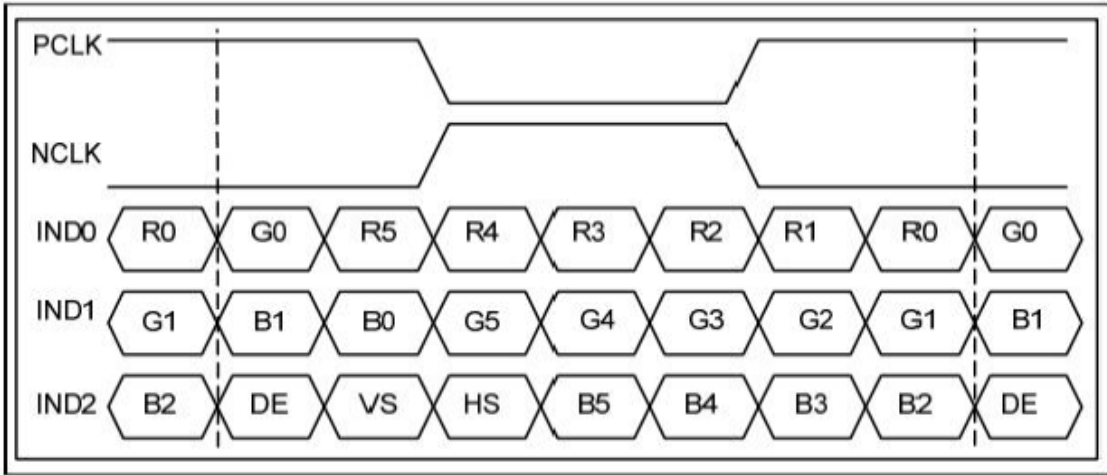
6 bit LVDS
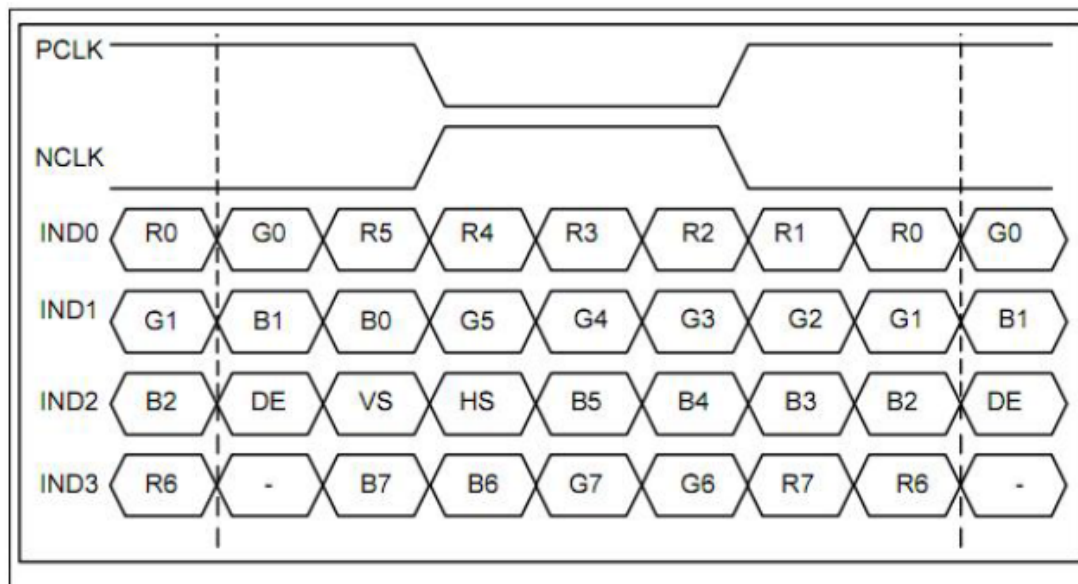
8 bit LVDS

DE mode						
Parameter	Symbol	Value			Unit	
		Min.	Typ.	Max.		
DCLK frequency @Frame rate=60hz	fclk	40.8	51.2	67.2	Mhz	
Horizontal display area	thd		1024		DCLK	
HSYNC period time	th	1114	1344	1400	DCLK	
HSYNC blanking	thb+thfp	90	320	376	DCLK	
Vertical display area	tvd		600		H	
VSYNC period time	tv	610	635	800	H	
VSYNC blanking	tvb+tvfp	10	35	200	H	

10. Power On/Off Sequence
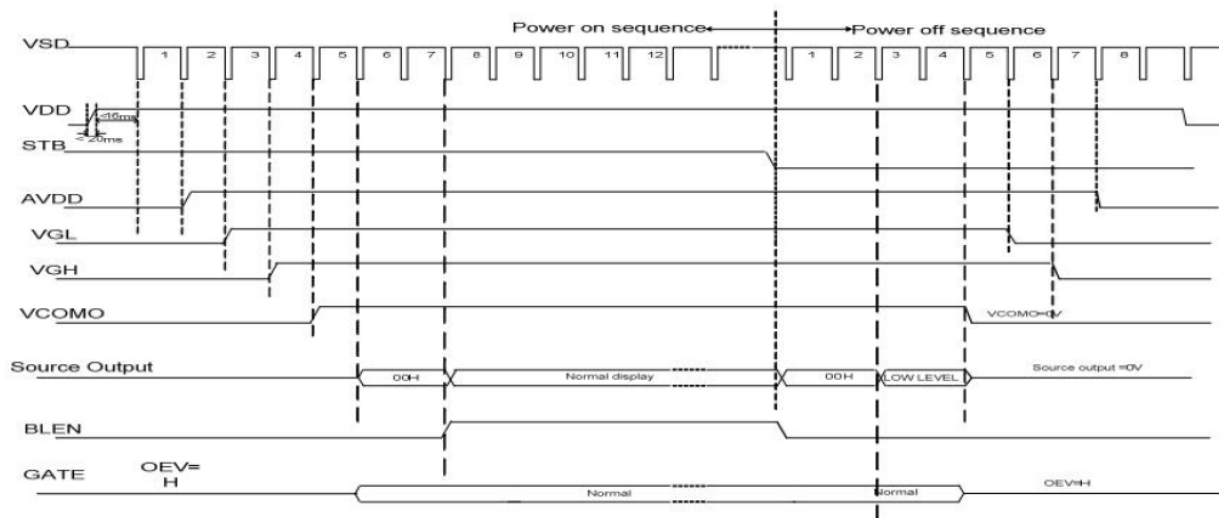
Power On/Off timing chart
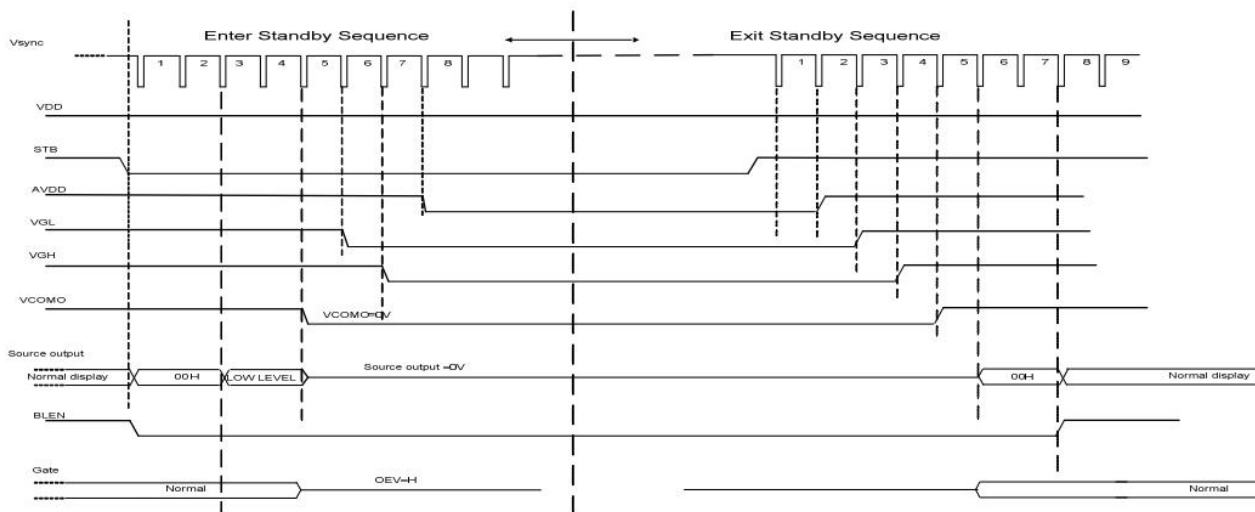
Enter and Exit Standby Mode timing chart

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 cannot 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,
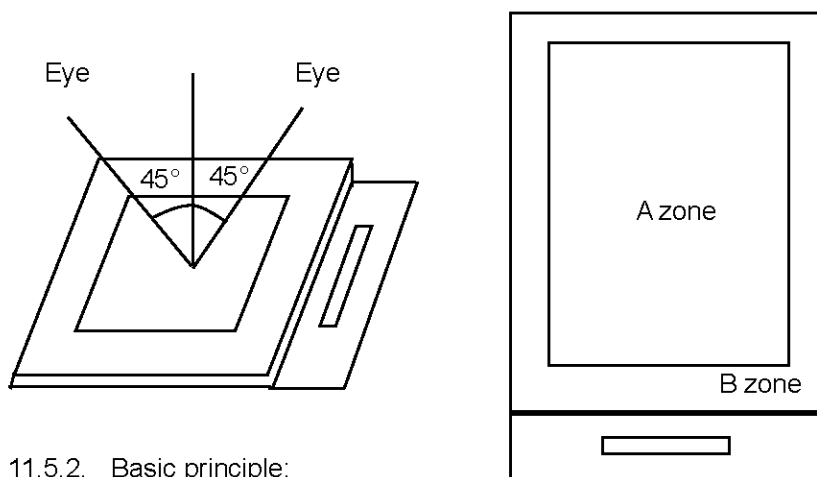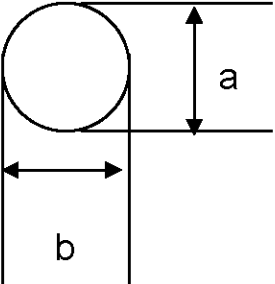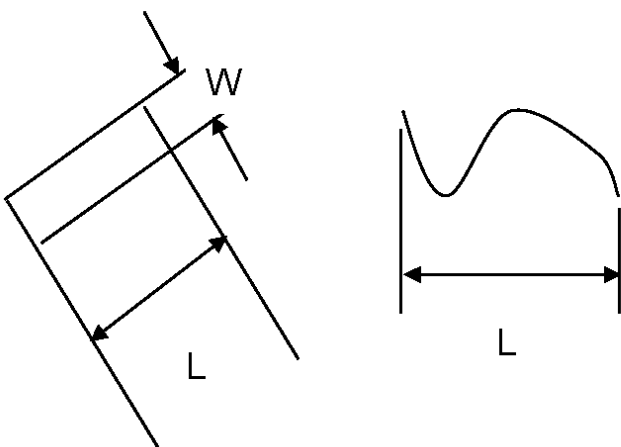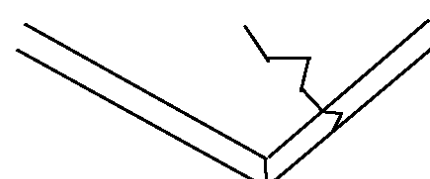
11.5.2. Basic principle:
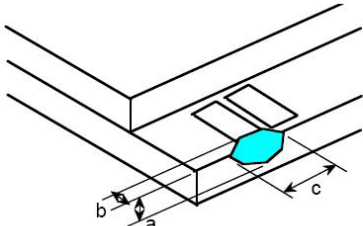
11.5.2.1. A set of sample to indicate the limit of acceptable quality level must be discussed by both us and customer when there is any dispute happened.
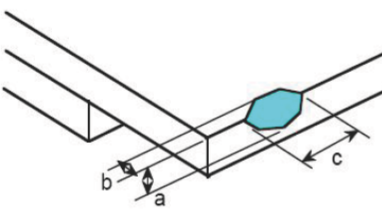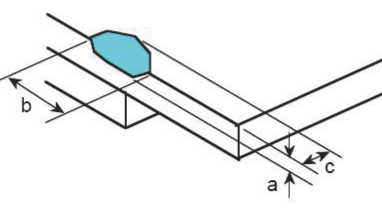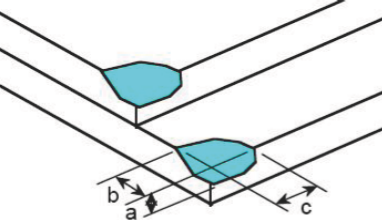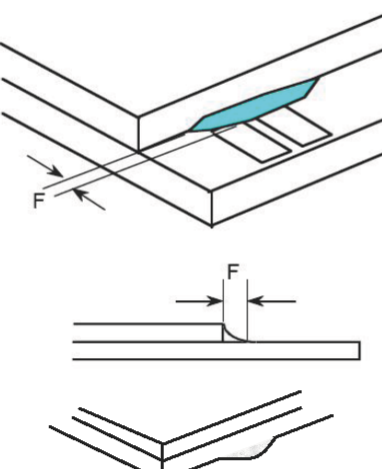
11.5.2.2. New item must be added on time when it is necessary.
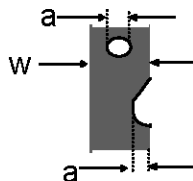
11.6. Inspection Specification for the TFT module

No.	Item	Criteria (Unit: mm)		
01	Black / White spot Foreign material (Round type) Pinholes Stain Particles inside cell. (Minor defect)	 $\varphi= (a + b) /2$ Distance between 2 defects should more than 5mm apart.	Size / Area	Acc. Qty
			$\varphi \leq 0.20$	Ignore
			$0.20 < \varphi \leq 0.50$	$N \leq 3$
			$0.50 < \varphi$	0

No.	Item	Criteria (Unit: mm)			
02	Electrical Defect (Minor defect)	Bright dot	Display Area	Total	Note1
			$N \leq 2$	$N \leq 2$	
		Dark dot	$N \leq 4$	$N \leq 4$	
		Total dot	$N \leq 4$	$N \leq 4$	
		Mura	**Not visible through 5% ND filters.**		Note 2
		Remark: 1. Bright dot caused by scratch and foreign object accords to item 1.			

03	Black and White line Scratch Foreign material (Line type) (Minor defect)	

Length	Width	Acc. Qty
/	W ≦ 0.1	Ignore
L ≦ 2.5	0.1 ＜ W ≦ 0.2	3
L＞2.5	0.2 ＜ W	0
Total		3

Distance between 2 defects should more than 3mm apart. Scratches not viewable through the back of the display are acceptable.

04	Glass Crack (Minor defect)	

Crack is potential to enlarge, any type is not allowed.

05	Glass Chipping Pad Area: (Minor defect)	

Length and Width	Acc. Qty
c > 3.0, b< 1.0	1
c< 3.0, b< 1.0	3
a<Glass Thickness	

06	Glass　Chipping Rear of Pad Area: (Minor defect)		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<Glass Thickness	

07	Glass　Chipping Except Pad Area: (Minor defect)		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<Glass Thickness	

08	Glass Corner Chipping: (Minor defect)		Length and Width	Acc. Qty
			c < 3.0, b< 3.0	Ignore
			a<Glass Thickness	

09	Glass Burr: (Minor defect)		Length	Acc. Qty
			F < 1.0	Ignore
		Glass burr don't affect assemble and module dimension.		

10	FPC Defect: (Minor defect) 	10.1 Dent, pinhole width a<w/3. (w: circuitry width.) 10.2 Open circuit is unacceptable. 10.3 No oxidation, contamination and distortion.
11	Bubble on Polarizer (Minor defect)	<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>
12	Dent on Polarizer (Minor defect)	<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>
13	Bezel	13.1 No rust, distortion on the Bezel. 13.2 No visible fingerprints, stains or other contamination.
14	PCB	14.1 No distortion or contamination on PCB terminals. 14.2 All components on PCB must same as documented on the BOM/component layout. 14.3 Follow IPC-A-600F.
15	Soldering	Follow IPC-A-610C standard
16	Electrical Defect (Major defect)	The below defects must be rejected. 16.1 Missing vertical / horizontal segment, 16.2 Abnormal Display. 16.3 No function or no display. 16.4 Current exceeds product specifications. 16.5 LCD viewing angle defect. 16.6 No Backlight. 16.7 Dark Backlight. 16.8 Touch Panel no function.

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

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/marking 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.
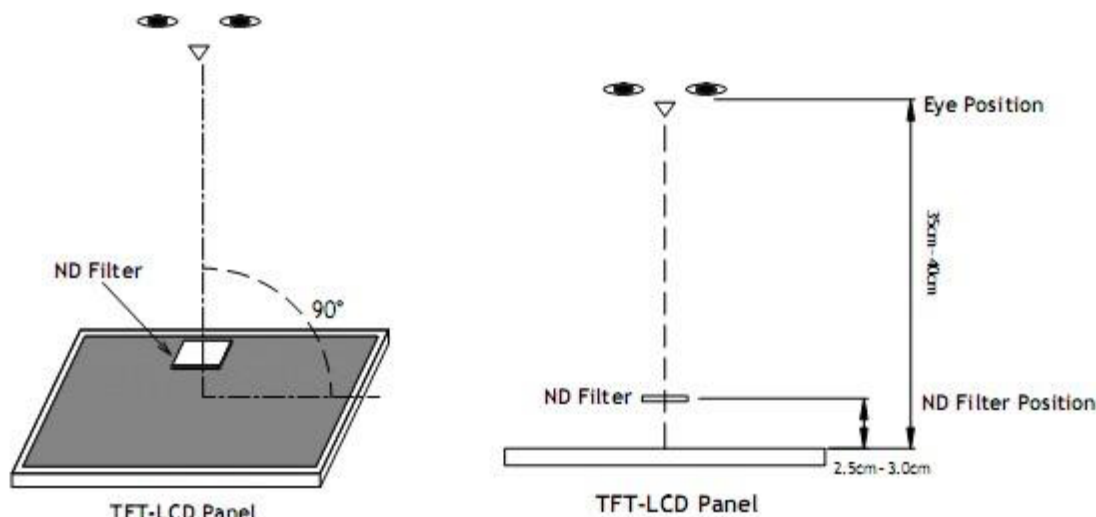
Bright dot: The bright dot size defect at black display pattern. It can be recognized by 2% transparency of filter when the distance between eyes and panel is 350mm±50mm.

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.

12. Reliability Specification

No	Item	Condition	Quantity	Criteria
1	High Temperature Operating	**70℃, 96Hrs**	2	GB/T2423.2 -2008
2	Low Temperature Operating	**-20℃, 96Hrs**	2	GB/T2423.1 -2008
3	High Humidity Storage	**50℃, 90%RH, 96Hrs**	2	GB/T2423.3 -2016
4	High Temperature Storage	**80℃, 96Hrs**	2	GB/T2423.2 -2008
5	Low Temperature Storage	**-30℃, 96Hrs**	2	GB/T2423.1 -2008
6	Thermal Cycling Test Storage	**-20℃, 60min~70℃, 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.	-	GB/T5170.14 -2009
8	Electrical Static Discharge	Air:±8KV 150pF/330Ω 5 times	2	GB/T17626.2 -2018
		Contact:±4KV 150pF/330Ω 5 times		
9	**Drop Test (Packaged)**	Height:80 cm,1 corner, 3 edges, 6 surfaces.	-	GB/T2423.8 -1995

Note1.　No defection 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.

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

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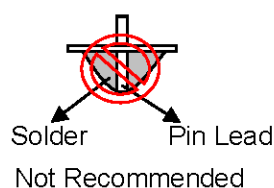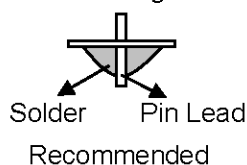
Solder Type: Sn96.3~94-Ag3.3~4.3-Cu0.4~1.1

Maximum Solder Temperature: 370℃

Maximum Solder Time: 3s at the maximum temperature

Recommended Soldering Temp: 350±20℃

Typical Soldering Time: ≤3s

13.4.1.3. Solder Wetting

Solder　Pin Lead　　Solder　　Pin Lead
Recommended　　Not Recommended

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℃

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.
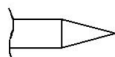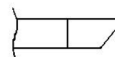
13.4.2.6. Solder Wetting
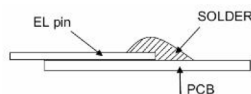
Recommended   Not Recommended

13.4.2.7. The type of the solder iron:
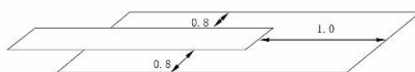

Recommended   Not Recommended

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".

13.5.5.   Do not connect or disconnect the LCM to or from the system when power is on.

13.5.6.   Never use the LCM under abnormal condition of high temperature and high humidity.

13.5.7.   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.

13.5.8.   Do not display the fixed pattern for long time（we suggest the time not longer than one hour）because it will develop image sticking due to the TFT structure.

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