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Production Custom designs Installation

Mechanical design



SPECIFICATION
FOR
LCM Module

MODULE:	ET080BA01-K
CUSTOMER:	

REV	DESCRIPTION	DATE
1.4	Add packaging diagram	2024.03.05

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[illegible]

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* Description

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 8" TFT-LCD contains 1600X480 pixels, and can display up to 16.7M colors.

* Features

-Low Input Voltage: 3.3V(TYP)

-Display Colors of TFT LCD: 16.7M colors

Interface: 6/8Bit LVDS Interface

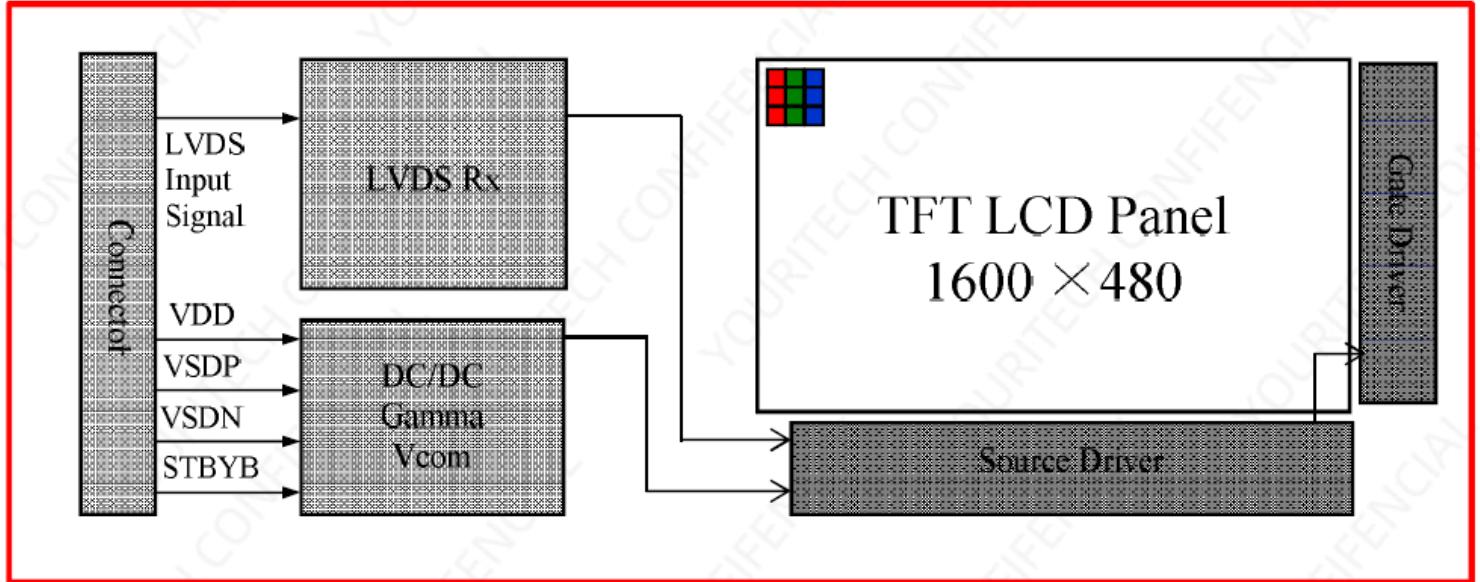
General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	194.4(H) *58.32(V) (8.0inch)	mm	-
Driver element	TFT active matrix	-	-
Display colors	16.7M	colors	-
Number of pixels	1600(RGB)*480	dots	-
TFT Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.1215 (H) x 0.1215(V)	mm	-
Viewing angle	All	o'clock	-
Controller IC	HX8249 & HX8678	-	-
Display mode	Transmissive/Normally Black	-	-
Operating temperature	-20~+70	°C	-
Storage temperature	-30~+80	°C	-

* Mechanical Information

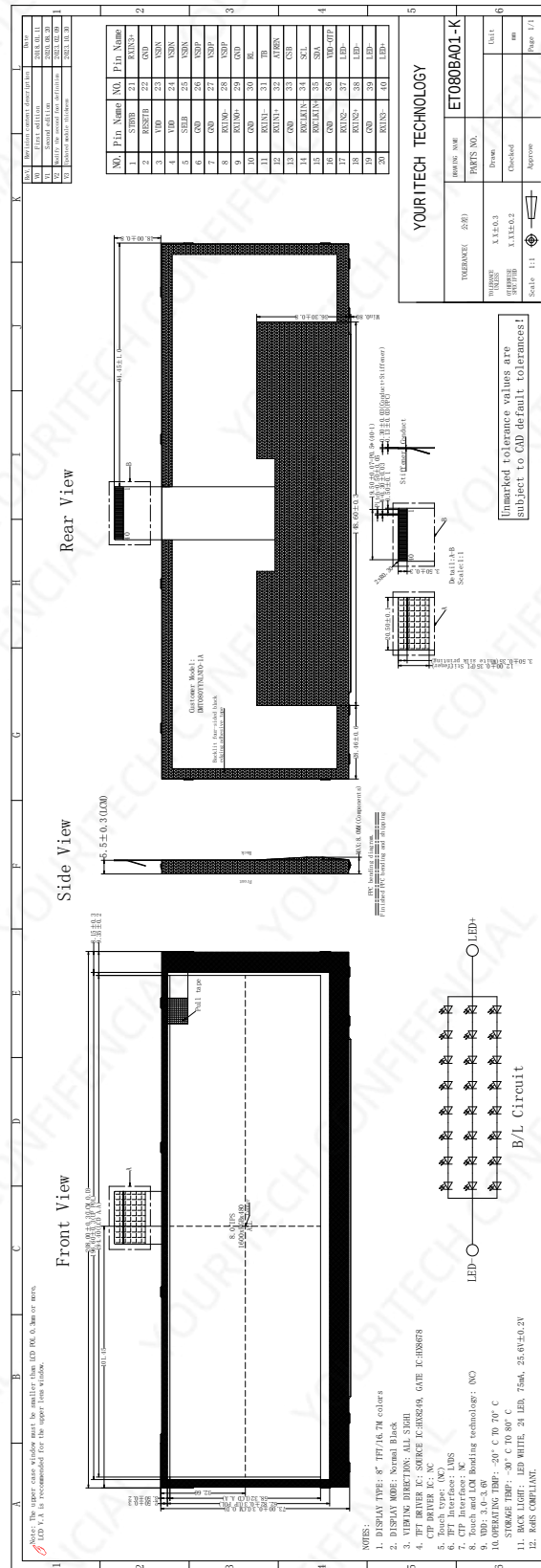
Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		208.00		mm	-
	Vertical(V)		73.00		mm	-
	Depth(D)		5.5		mm	-
Weight			108		g	-



1. Block Diagram



2. Outline dimension



3. Input terminal Pin Assignment

NO.	SYMBOL	DISCRIPTION	I/O
1	STBYB	Enale IC	Note 1
2	Reset	Reset IC	Note 2
3	VDD	Digital power-3.3v	P
4	VDD	Digital power-3.3v	P
5	SELB	6bit/8bit mode select	Note 3
6	GND	Ground	P
7	GND	Ground	P
8	RXINO-	Negative LVDS differential data input	I
9	RXINO+	Positive LVDS differential data input	I
10	GND	Ground	P
11	RXIN1-	Negative LVDS differential data input	I
12	RXIN1+	Positive LVDS differential data input	I
13	GND	Ground	P
14	RXCLKIN-	Negative LVDS differential data input	I
15	RXCLKIN+	Positive LVDS differential data input	I
16	GND	Ground	P
17	RXIN2-	Negative LVDS differential data input	I
18	RXIN2+	Positive LVDS differential data input	I
19	GND	Ground	P
20	RXIN3-	Negative LVDS differential data input	I
21	RXIN3+	Positive LVDS differential data input	I
22	GND	Ground	P
23	VSDN	Power for Driver IC	P
24	VSDN	Power for Driver IC	P
25	VSDN	Power for Driver IC	P



26	VSDP	Power for Driver IC	P
27	VSDP	Power for Driver IC	P
28	VSDP	Power for Driver IC	P
29	GND	Ground	P
30	RL	Horizontal shift direction	Note 4
31	TB	Vertical shift direction	Note 4
32	ATREN	Only for OTP program	I
33	CSB	SPI	-
34	SCL	SPI	-
35	SDA	SPI	-
36	VDD-OTP	7.5V for OTP program	P
37	LED-	LED Cathode	P
38	LED-	LED Cathode	P
39	LED+	LED Anode	P
40	LED+	LED Anode	P

Note.1

STBYB=H(3.3V),normal operarion.

STBYB=L(GND),timing controller,source driver will run off,all opout are High-Z.

Note.2

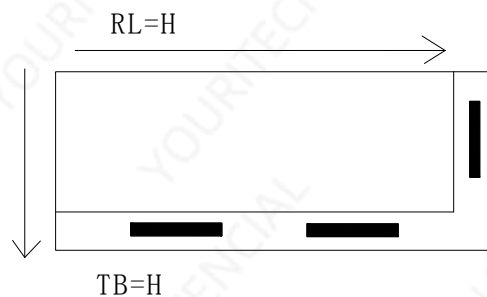
Suggest to connection with an RC reset circuit for stability,Normally pull high.
(47KΩ+0.1uF or extirnal MCU control)

Note.3

If LVDS iput data is 8 bit,SELB must be set to hight.

Note.4

Scan control Input		Scanning direcrion
RL	TB	
VDD	VDD	Up to Down,Left to Right
GND	VDD	Up to Down,Right to left
VDD	GND	Down to Up,Left to Right
GND	GND	Down to Up,Right to left.



4. LCD Optical Characteristics

4.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	$\Theta=0$ Normal viewing angle	700	900	--		
Response time	Rising	T_R+T_F		--	25	35	msec	
	Falling			--				
Color gamut		S(%)		45	50	--	%	
Color Filter Chromaticity	White	W_X		0.252	0.292	0.332		
		W_Y		0.255	0.295	0.335		
	Red	R_X		0.598	0.608	0.628		
		R_Y		0.329	0.349	0.369		
	Green	G_X		0.267	0.307	0.327		
		G_Y		0.527	0.547	0.567		
	Blue	B_X		0.122	0.142	0.162		
		B_Y		0.070	0.090	0.110		
Viewing angle	Hor.	Θ_L	CR>10	--	85	--		
		Θ_R		--	85	--		
	Ver.	Θ_U		--	85	--		
		Θ_D		--	85	--		
Option View Direction		ALL						

4.2 Measuring Condition

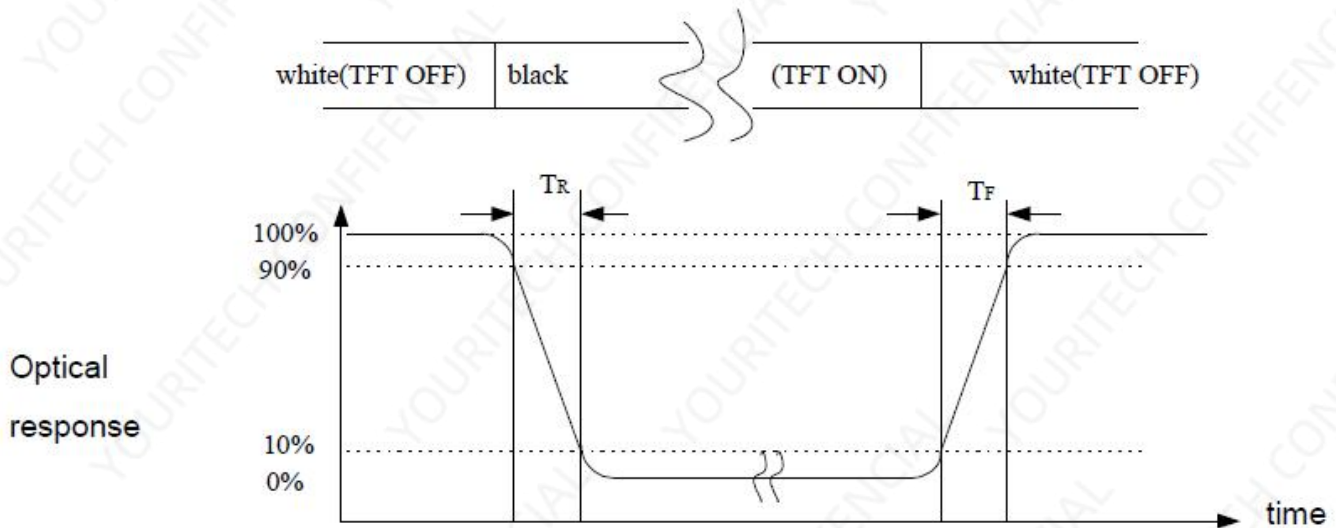
- Measuring surrounding: dark room
- Ambient temperature: $25\pm 2^\circ\text{C}$
- 15min. warm-up time.



Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note (3) Definition of Response Time : Sum of T_R and T_F



5. Electrical Characteristics

5.1 Absolute Maximum Rating (Ta=25 VSS=0V)

Characteristics	Symbol	Min.	Max.	Unit
Digital Supply Voltage	VDD	2.8	3.5	V
Operating temperature	T _{OP}	-20	+70	°C
Storage temperature	T _{ST}	-30	+80	°C

NOTE: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

5.2 DC Electrical Characteristics

Characteristics		Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage		VDD	3.0	3.3	3.6	V	
Current consumption VDD		IDD	--	25	--	mA	
Supply Voltage IC& GAMA		VSDP	5.4	5.5	5.6	V	
Current consumption VSDP		IVSDP	--	25	--	mA	
Supply Voltage IC& GAMA		VSDN	-5.4	-5.5	-5.6	V	
Current consumption VSDN		IVSDN	--	25	--	mA	
CMOS Interface		VIH	2.6	-	3.3	V	
		VIL	GND	-	0.8	V	
LVDS Interface	Differential Input High Threshold Voltage	VLVTH	100	-	300	mV	
	Differential Input Low Threshold Voltage	VLVTL	-300	-	-100	mV	



Common Input Voltage	VLVC	1	1.2	1.77-VID/2	V	
Differential Input Voltage	VID	0.2	-	0.6	V	

5.3 LED Backlight Characteristics

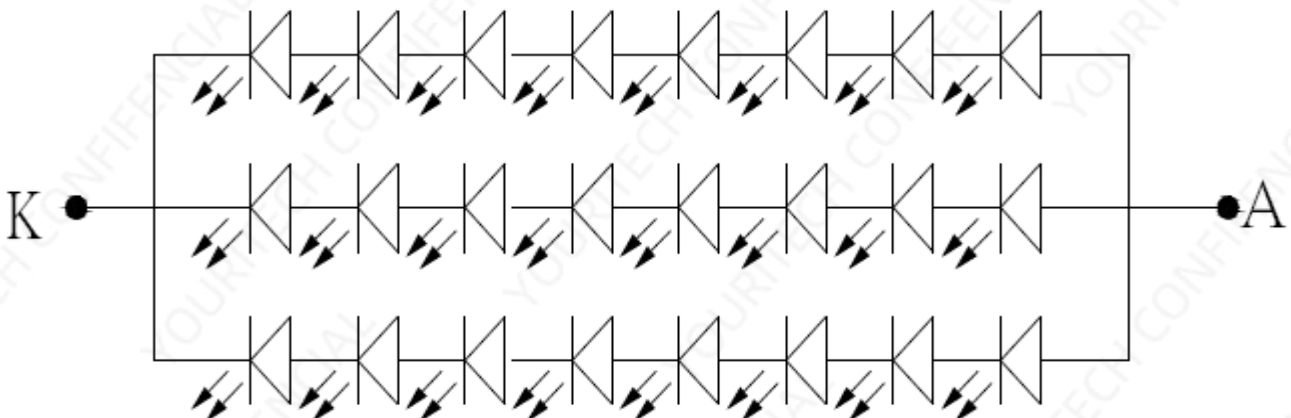
The back-light system is edge-lighting type with 24 chips White LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	60	75	--	mA	
Forward Voltage	V_F	--	25.6	--	V	
LCM Luminance	L_V	450	500	--	cd/m ²	Note3
LED life time	Hr	50000	--	--	Hour	Note1,2
Uniformity	AVg	80	--	--	%	Note3

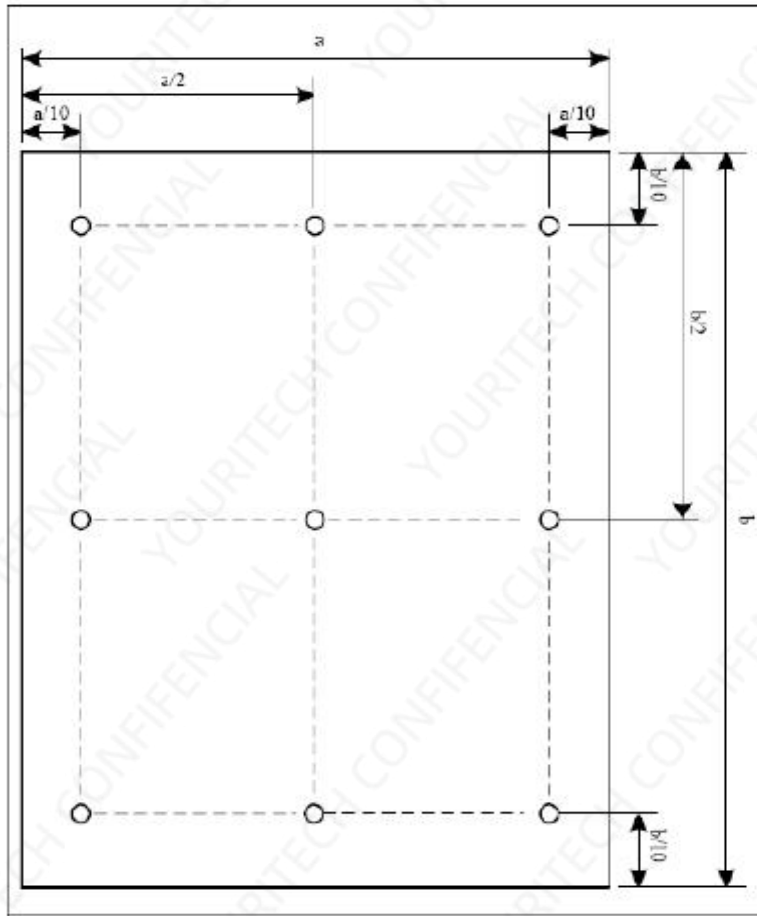
Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition:

$T_a=25\pm3\text{ }^{\circ}\text{C}$, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note (2) The “LED life time” is defined as the module brightness decrease to 50% original brightness at $T_a=25^{\circ}\text{C}$ and $IL=75\text{mA}$. The LED lifetime could be decreased if operating IL is larger than 75mA. The constant current driving method is suggested.



NOTE 3: Luminance Uniformity of these 9 points is defined as below:



$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$



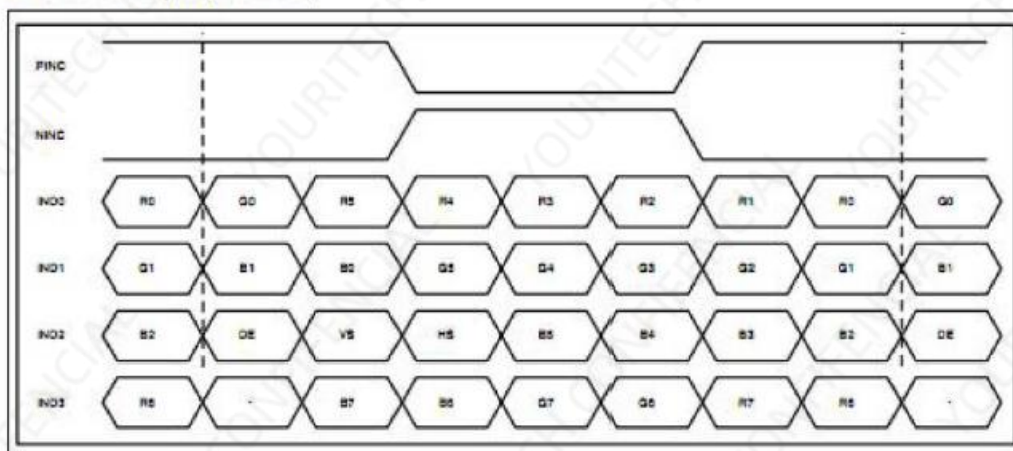
6.SIGNAL TIMING SPECIFICATIONS

6.1 Timing Parameters(Sync mode)

Parameter	Symbol	Value			Unit.	Note
		Min.	Typ.	Max.		
DCLK Frequency	FDCLK	48.69	52.59	60.83	MHz	
Horizontal valid data	thd	1600			DCLK	
Hsync Pulse Width	thpw	1	2	140	DCLK	
Hsync back porch	thbp	5	16	141	DCLK	
Hsync front porch	thfp	19	44	155	DCLK	
1 Horizontal Line	th	1656	1660	1760	DCLK	
Vertical valid data	tvd	480			H	
Vsync Pulse Width	tvpw	1	2	90	H	
Vsync back porch	tvbp	5	5	91	H	
Vsync front porch	tvfp	5	43	91	H	
1 Vertical field	tv	490	528	576	H	

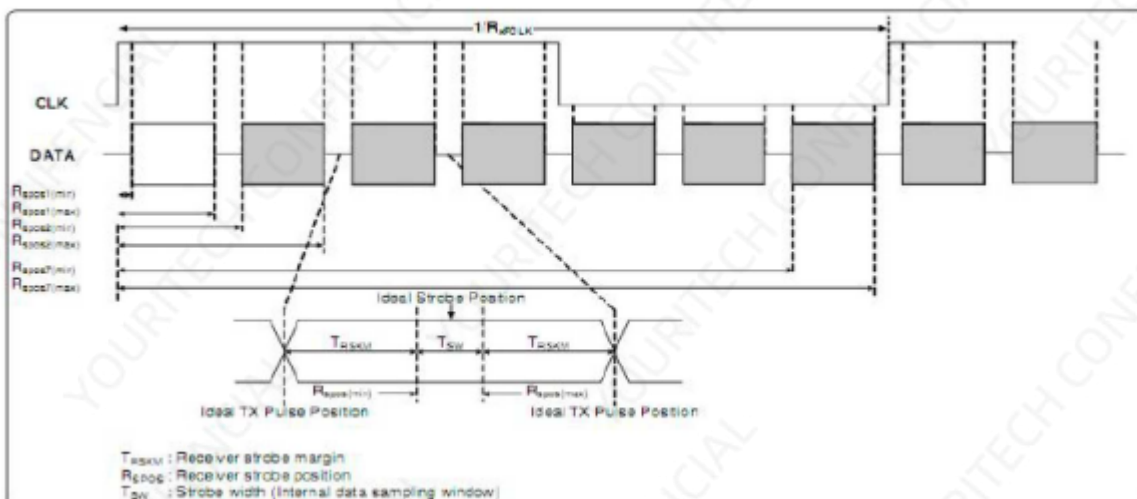
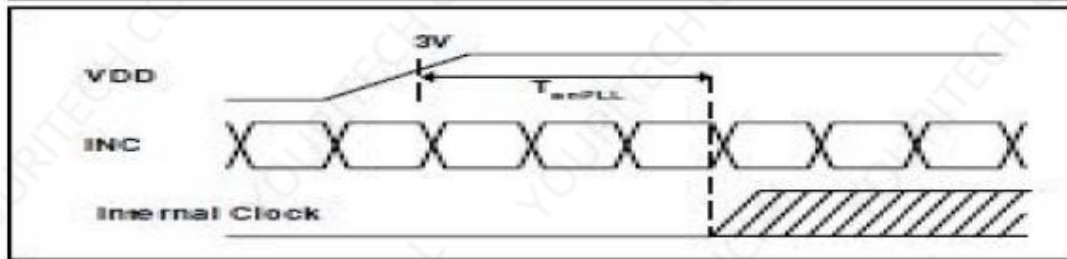
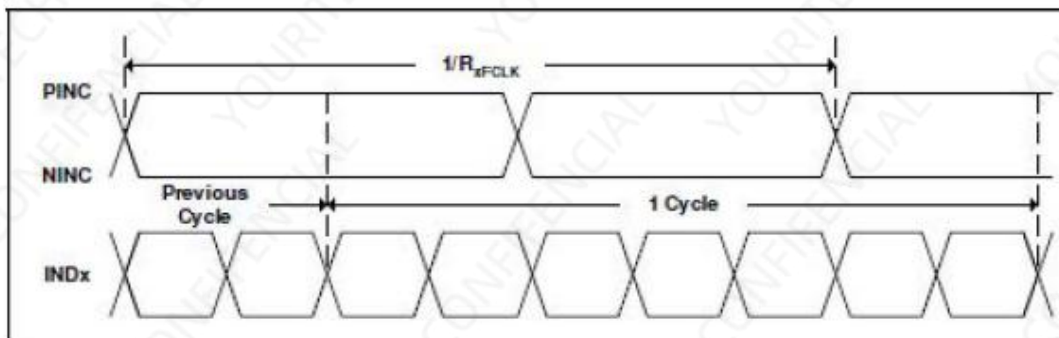
Notes: This product is Sync mode

8-bit LVDS input (HSD='L')



6.2 LVDS Rx Interface Timing Parameter

Parameter	Symbol	Value			Unit.	Condition
		Min.	Typ.	Max.		
Clock frequency	RxFCLK	TBD	TBD	TBD	MHz	
Input data skew margin	TRSKM	500	-	-	ps	VID =400mV, RxVCM=1.2V, RxFCLK=71MHz
Clock high time	TLVCH	-	$4/(7 \cdot RxFCLK)$	-	ns	
Clock low time	TLVCL	-	$3/(7 \cdot RxFCLK)$	-	ns	
PLL wake-up time	TenPLL	-	-	150	us	



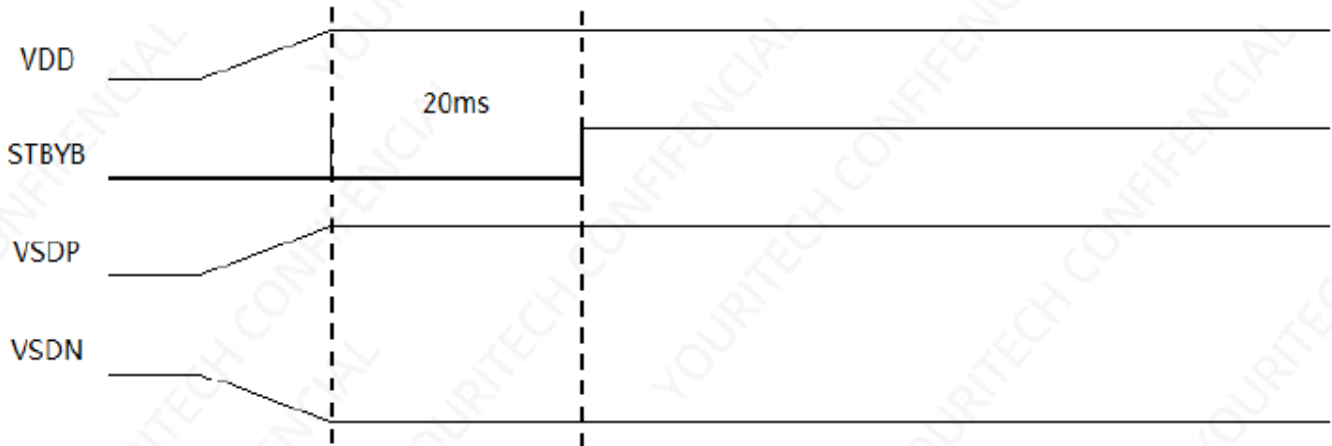
6.3 Input Signals, Basic Display Colors & Gray Scale Of Colors

Color & Gray Scale		Input Data Signal																							
		Red Data								Green Data								Blue Data							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale of Red	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	▽	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale of Green	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	▽	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale of Blue	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Darker	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	▽	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
Gray Scale of White	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	△	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
	Darker	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0
	△	↑								↑								↑							
	▽	↓								↓								↓							
	Brighter	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1
	▽	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1



6.4 Power Sequence

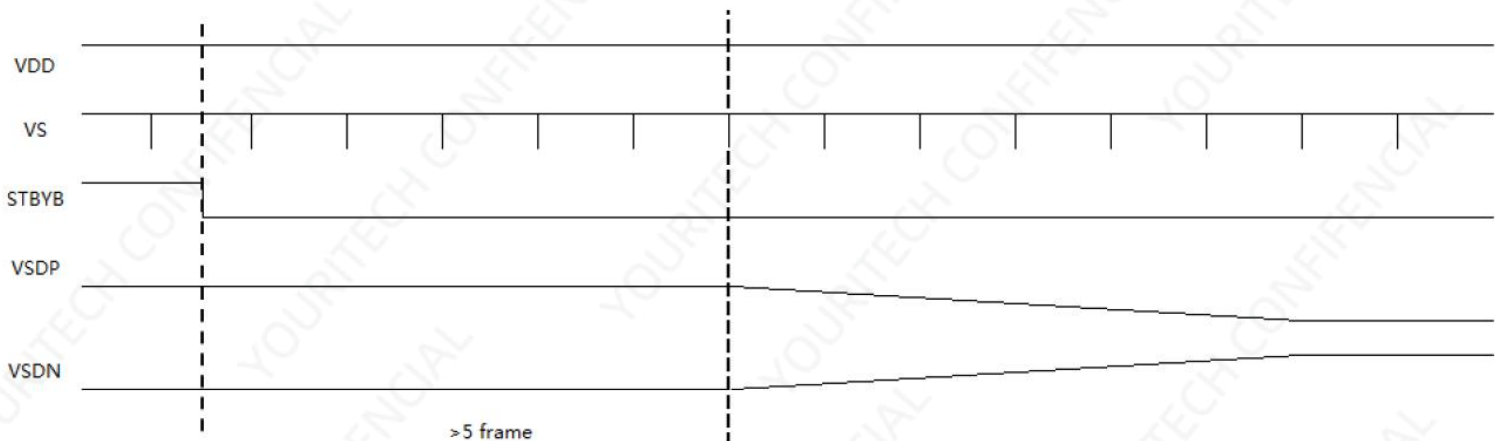
Power on Sequence



Notes:

1. When the power supply VDD is 0V, keep the level of input signals on the low or keep high impedance.
2. Do not keep the interface signal high impedance when power is on. Back Light must be turn on after power for logic and interface signal are valid.

Power off Sequence



7. LCD Module Out-Going Quality Level

7.1 VISUAL & FUNCTION INSPECTION STANDARD

7.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

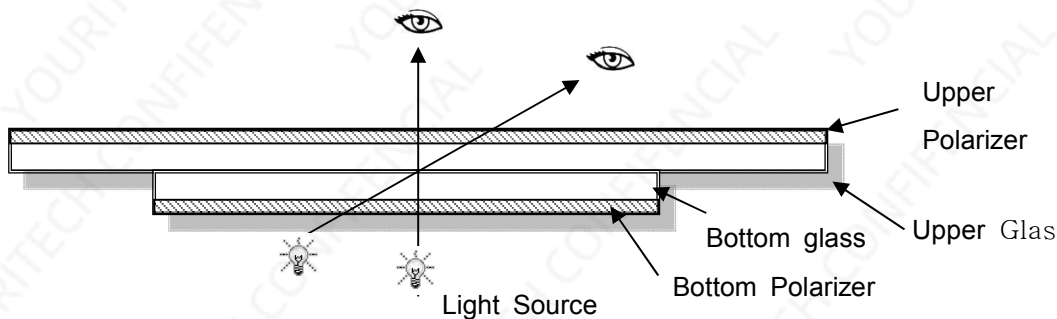
Temperature : $25\pm 5^{\circ}\text{C}$

Humidity : $65\%\pm 10\%\text{RH}$

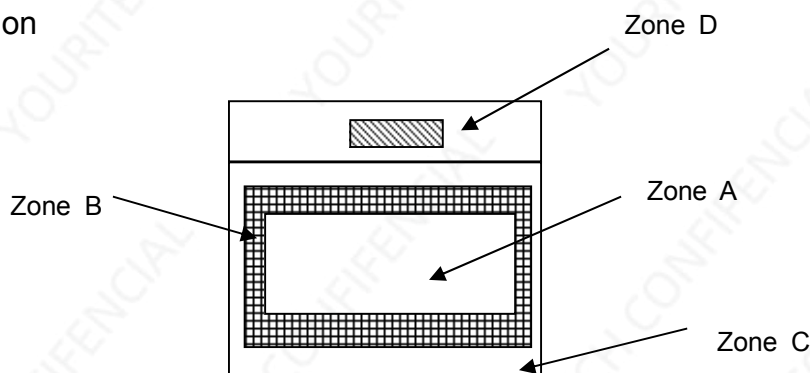
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance:30-50cm



7.1.2 Definition



Zone A : Effective Viewing Area(Character or Digit can be seen)

Zone B : Viewing Area except Zone A

Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Zone D : IC Bonding Area

Note:

As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer



7.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class II

AQL:

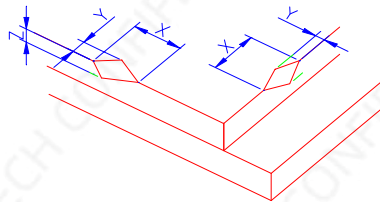
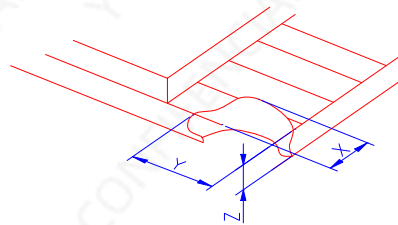
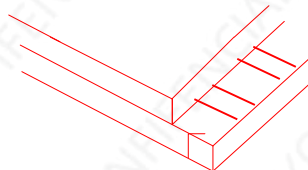
Major defect	Minor defect
0.65	1.5

LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Spot Line defect	Light dot , Dim spot,Polarizer Bubble ; Polarizer accidented spot.	
6	Soldering appearance	Good soldering , Peeling off is not allowed.	
7	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

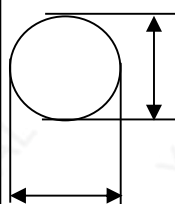


7.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken NOTE: X: Length Y: Width Z: Height L: Length of IT O, T: Height of LCD	(1) The edge of LCD broken	 <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0mm</td><td><Inner border line of the seal</td><td>≤T</td></tr></table>	X	Y	Z	≤3.0mm	<Inner border line of the seal	≤T
	X	Y	Z					
	≤3.0mm	<Inner border line of the seal	≤T					
(2)LCD corner broken	 <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0mm</td><td>≤L</td><td>≤T</td></tr></table>	X	Y	Z	≤3.0mm	≤L	≤T	
X	Y	Z						
≤3.0mm	≤L	≤T						
(3) LCD crack	 Crack Not allowed							



Spot defect



Y

X

Φ=(X+Y)/2

2.0

① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)

Zone Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.10	Ignore		
0.10<Φ≤0.25	3(distance ≥ 10mm)		
0.25<Φ≤0.3	2		
Φ>0.35	0		

②Dim spot (LCD/TP/Polarizer dim dot, light leakage、dark spot)

Zone Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.1	Ignore		
0.10<Φ≤0.25	3(distance ≥ 10mm)		
0.25<Φ≤0.3	2		
Φ>0.35	0		

③ Polarizer accidented spot

Zone Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		
0.3<Φ≤0.5	2(distance ≥ 10mm)		
Φ>0.5	0		

④Pixel bad points (light dot, Dim dot, color dot)

Zone Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.1	Ignore		
0.15<Φ≤0.25	2(distance ≥ 10mm)		
Φ>0.3	0		

⑤ Polarizer Bubble

Zone Size (mm)	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		
0.3<Φ≤0.4	3(distance ≥ 10mm)		
0.4<Φ≤0.5	2		



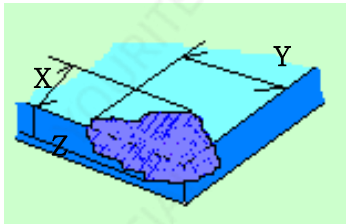
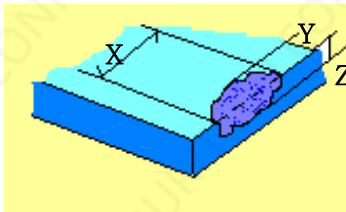
3.0	Line defect (LCD/TP /Polarizer backlight black/white line, scratch, stain)	Width(mm)	Length(m m)	Acceptable Qty		
				A	B	C
		$\Phi \leq 0.05$	Ignore	Ignore		Ignore
		$0.05 < W \leq 0.06$	$L \leq 3.0$	$N \leq 2$		
		$0.07 < W \leq 0.08$	$L \leq 2.0$	$N \leq 1$		
		$0.08 < W$	Define as spot defect			
4.0	Electronic Components SMT	Not allow missing parts , solderless connection , cold solder joint , mismatch , The positive and negative polarity opposite				
5.0	Display color& Brightness	1. Color : Measuring the color coordinates, The measurement standard according to the datasheet or samples. 2. Brightness : Measuring the brightness of White screen, The measurement standard according to the datasheet or Samples.				

6.0	RTP Related	TP film bubble/ accidented spot				
			Size Φ (mm)	Acceptable Qty		
				A	B	C
			$\Phi \leq 0.1$	Ignore		Ignore
			$0.1 < \Phi \leq 0.2$	3 (distance $\geq 10\text{mm}$)		
			$0.25 < \Phi \leq 0.3$	2		
			$\Phi > 0.35$	0		



TP film scratch	Width(mm)	Length (mm)	Acceptable Qty		
			A	B	C
	$\Phi\leq0.05$	Ignore	Ignore		Ignore
	$0.05<W\leq0.06$	$L\leq3.0$	$N\leq2$		
	$0.07<W\leq0.08$	$L\leq2.0$	$N\leq1$		
$0.08<W$	Define as spot defect				
Assembly deflection	beyond the edge of backlight $\leq0.2\text{mm}$				
Bulge (undulation include d)	The ITO film plumped below 0.40mm, it's ok. 				
Newton Ring	Newton Ring area>1/3 TP area NG				
	Newton Ring area $\leq$ 1/3 TP area OK				
					



		TP corner broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$X \leq 3\text{mm}$</td><td>$Y \leq 3\text{mm}$</td><td>$Z < \text{COVER thickness}$</td></tr></table> * *Circuitry broken is not allowed.	X	Y	Z	$X \leq 3\text{mm}$	$Y \leq 3\text{mm}$	$Z < \text{COVER thickness}$	
X	Y	Z								
$X \leq 3\text{mm}$	$Y \leq 3\text{mm}$	$Z < \text{COVER thickness}$								
		TP edge broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$X \leq 4\text{mm}$</td><td>$Y \leq 2\text{mm}$</td><td>$Z < \text{COVER thickness}$</td></tr></table> * Circuitry broken is not allowed.	X	Y	Z	$X \leq 4\text{mm}$	$Y \leq 2\text{mm}$	$Z < \text{COVER thickness}$	
X	Y	Z								
$X \leq 4\text{mm}$	$Y \leq 2\text{mm}$	$Z < \text{COVER thickness}$								

Criteria (functional items)

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	TP no function	Not allowed



Item	Condition	Inspection after test
High Temperature Operating	70℃,96H	Inspection after 2~4hours storage at room temperature, the sample shall be free from defects: 1.Air bubble in the LCD; 2.Non-display; 3.Missing segments/line; 4.Glass crack; 5.Current IDD is twice higher than initial value.
Low Temperature Operating	-20℃, 96HR	
High Temperature Storage	80℃, 96HR	
Low Temperature Storage	-30℃, 96HR	
High Temperature & High Humidity Storage	+60℃, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-30℃,30 min ↔ 80℃,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±15KV, 5times; Contact:±8KV, 5 times; (Environment: 15℃~35℃, 30%~60%).	
Vibration (Non-operation)	Frequency range:10~55Hz, Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z. (6 hours for total) (Package condition).	
Box Drop Test	1 Corner 3 Edges 6 faces,80cm(MEDIUM BOX)	

8. Reliability Test Result

Remark:

- 1.The test samples should be applied to only one test item.
- 2.Sample size for each test item is 5~10pcs.



3. For Damp Proof Test, Pure water (Resistance > 10MΩ) should be used.
4. In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.
5. Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

9. Cautions and Handling Precautions

9.1 Handling and Operating the Module

- (1) When the module is assembled, it should be attached to the system firmly.
Do not warp or twist the module during assembly work.
- (2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.
- (3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.
- (4) Do not allow drops of water or chemicals to remain on the display surface.
If you have the droplets for a long time, staining and discoloration may occur.
- (5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
- (6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.
Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
- (7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.
- (8) Protect the module from static; it may cause damage to the CMOS ICs.
- (9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (10) Do not disassemble the module.
- (11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
- (12) Pins of I/F connector shall not be touched directly with bare hands.
- (13) Do not connect, disconnect the module in the "Power ON" condition.
- (14) Power supply should always be turned on/off by the item 6.1 Power On Sequence & 6.2 Power Off Sequence

9.2 Storage and Transportation.

- (1) Do not leave the panel in high temperature, and high humidity for a long time.
It is highly recommended to store the module with temperature from 0 to 35 °C and relative humidity of less than 70%.
- (2) Do not store the TFT-LCD module in direct sunlight.
- (3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for

protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.

(4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module.

In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.

(5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.

