



SPECIFICATIONS FOR LCM+HDMI Module

MODULE No:	KD070C-4_HDMI
CUSTOMER:	

STARTEK	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

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常备库存 Stock For Sale	长期供货 Long Time supply	支持小量 NO MOQ	品种齐全 In Full Range	



Revision History

[illegible]

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1. Scope

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, HDMI board and back-light unit. The resolution of a 7.0TFT-LCD contains 800x480 pixels, and can display up to 65K/262K/16.7M colors.

1.1 Basic Description

General Information	Items	Specifications	Unit	Note
		Main Panel		
	Display area(AA)	154.08(H)*85.92 (V) (7.0inch)	mm	
	Driver element	TFT active matrix	-	
	Display colors	65K/262K/16.7M	colors	
	Number of pixels	800(RGB)*480	dots	
	TFT Pixel arrangement	RGB vertical stripe	-	
	Pixel pitch	0.0642(H)*0.0.1790(V)	mm	
	Viewing angle	12:00	o'clock	
	TFT Controller IC	EK9713/EK7330	-	
	Operating temperature	-20 ~ +70	˚	
	Storage temperature	-30 ~ +80	℃	
	LCM Luminance	450 nits (Typ.)		
	Video Input	HDMI		
	HDMI it Firmware Version	KD070C-4_HDMI_V01		

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1.2 Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		120.70		mm	-
	Vertical(V)		75.80		mm	-
	Depth(D)		5.8		mm	-
Weight			TBD		g	-

1.3 Recommended Resolution

Recommended Resolution	800(RGB)*480 @55~60 Hz
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1.4 Plug & Play

DDC2B /VESA Standard

1.5 Power Supply Rating

Power Consumption	2.7W Watt (Typ.)
MICRO USB DC POWER	5V 2A(Typ.)

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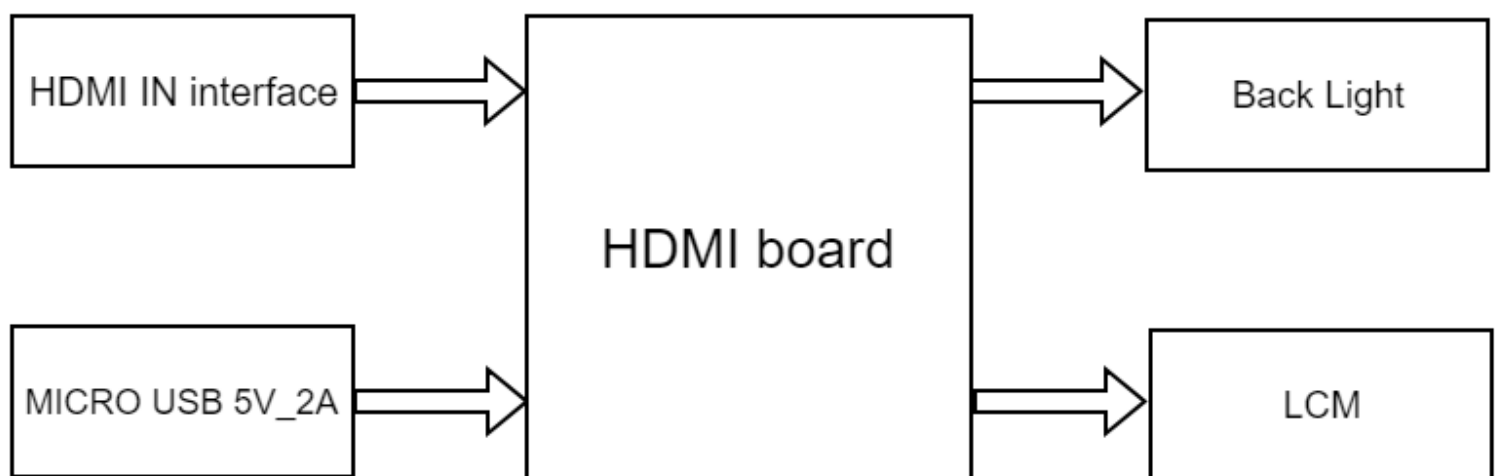
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1.6 Block Diagram



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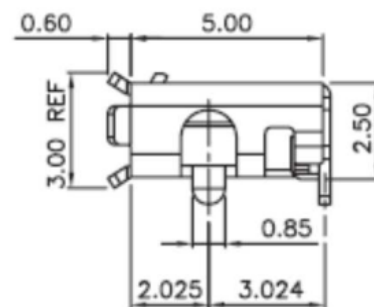
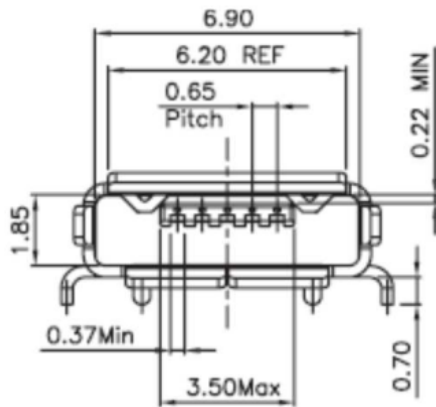
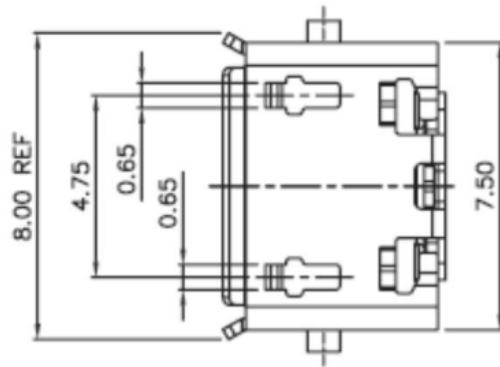


2. Input Terminal Pin Assignment

2.1 MICRO USB 5V_2A(Typ.) PIN Definition & Signal Connector

NO.	SYMBOL	DISCRIPTION	I/O
1	DC:5V,2A(Typ.)	Supply voltage(5.0V,2A Typ.).	P
2	NC	No Connection.	
3	NC	No Connection.	
4	NC	No Connection.	
5	GND	Ground.	P

Note: Mirco-USB Connector Dimension:



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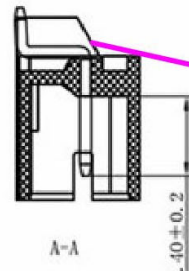
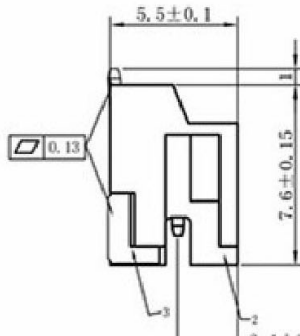
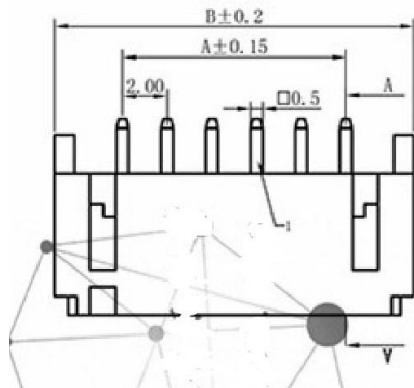
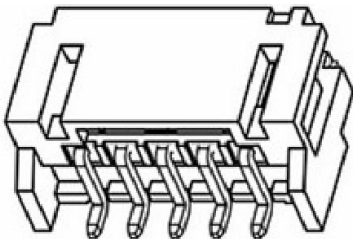
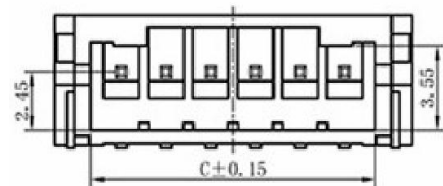
品种齐全
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2.2 POWER ON/OFF AND Backlight PWM extensions key PIN Definition & Signal Connector

note: SMT PH2.0mm spacing connector 4p

NO.	SYMBOL	DISCRIPTION
1	GND	Ground
2	POWER ON/OFF	ON/OFF KEY
3	PWM+	The backlight brightness of each button is increased by one level u ntil the maximum brightness reaches (9 level).
4	PWM-	The backlight brightness of each button is reduced by one evel until the lowest brightness reaches (level 9).

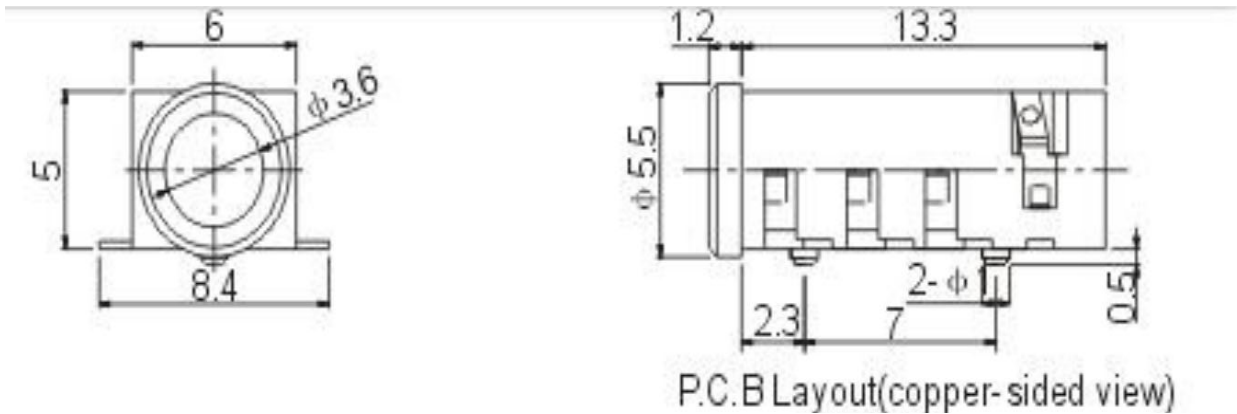


孔位 poles	A	B	C
2	2.00	8.00	4.75
3	4.00	10.00	6.75
4	6.00	12.00	8.75
5	8.00	14.00	10.75
6	10.00	16.00	12.75
7	12.00	18.00	14.75
8	14.00	20.00	16.75
9	16.00	22.00	18.75



2.3 Audio headphone socket PIN Define & Input Signal Connector

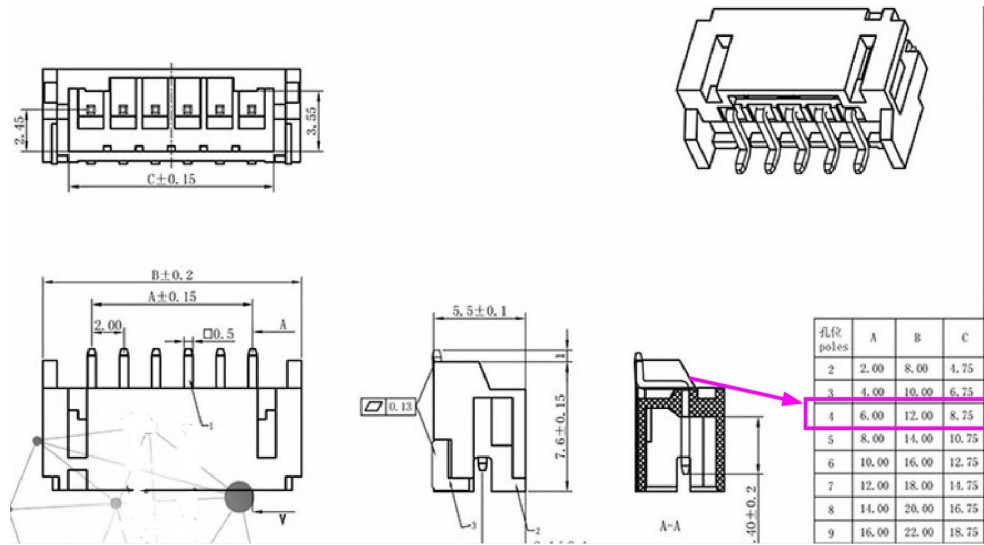
NO.	SYMBOL	DISCRIPTION
1	Left channel	Audio output left channel
2	Right channel	Audio output right channel
3	GND	Ground
4	GND	Ground



2.4 Two speaker outputs PIN Define & Input Signal Connector

note: SMT PH2.0mm spacing connector 4p

NO.	SYMBOL	DISCRIPTION
1	Left channel+	Audio output left channel
2	Left channel-	
3	Right channel-	Audio output right channel
4	Right channel+	



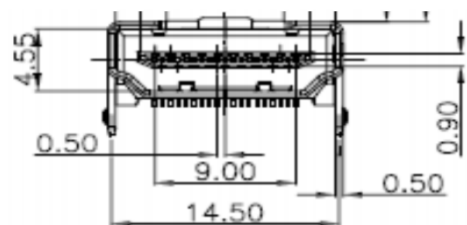
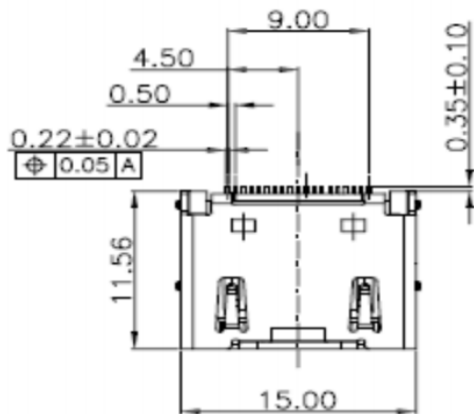
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2.5 HDMI PIN Defintion & Signal Connector

NO.	SYMBOL	DISCRIPTION	I/O
1	RX_D2+	HDMI Receiver channel 2 positive analog input.	I
2	GND	Ground.	P
3	RX_D2-	HDMI Receiver channel 2 negative analog input.	I
4	RX_D1+	HDMI Receiver channel 1 positive analog input.	I
5	GND	Ground.	P
6	RX_D1-	HDMI Receiver channel 1 negative analog input.	I
7	RX_D0+	HDMI Receiver channel 0 positive analog input.	I
8	GND	Ground.	P
9	RX_D0-	HDMI Receiver channel 0 negative analog input.	I
10	RX_CLK+	HDMI Receiver clock positive analog input.	I
11	GND	Ground.	P
12	RX_CLK-	HDMI Receiver clock negative analog input.	I
13	NC	No connect	
14	NC	No connect	
15	HDMI_SCL	HDMI Receiver DDC data channel.	I/O
16	HDMI_SDA	HDMI Receiver DDC clock channel.	I
17	GND	Ground.	P
18	HDMI_5V	HDMI Supply voltage (5.0V).	P
19	HPD	HDMI Receiver hot plug detect output	O

Note : HDMI Connector Dimension:





3. Operating Instructions:

- 3.1 This product supports the following operating systems: Windows 7/8/10, Raspberry Pi, Ubuntu, Android.
 3.2 Connect the HDMI cable to Windows 7/8/10 or Raspberry Pi or Ubuntu or Android.
 3.3 Connect the micro USB DC POWER.

4. LCD Optical Characteristics

4.1 Optical specification

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥10)	θ_L	$\Phi=180^\circ$ (9 o'clock)	60	70	-	degree	Note 1
	θ_R	$\Phi=0^\circ$ (3 o'clock)	60	70	-		
	θ_T	$\Phi=90^\circ$ (12 o'clock)	40	50	-		
	θ_B	$\Phi=270^\circ$ (6 o'clock)	60	70	-		
Response time	T_{ON}	Normal $\theta=\Phi=0^\circ$	-	10	20	msec	Note 3
	T_{OFF}		-	15	30	msec	Note 3
Contrast ratio	CR		400	500	-	-	Note 4
Color chromaticity	W_X		0.26	0.31	0.36	-	Note 2 Note 5
	W_Y		0.28	0.33	0.38	-	
Transmittance	$T_{\%}$		-	5.11	-	-	-

Test Conditions:

1. $V_{CC}=3.3V$, $AV_{DD}=10V$, the ambient temperature is $25^\circ C$.
2. The test systems refer to Note 2.

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Note 1: Definition of viewing angle range

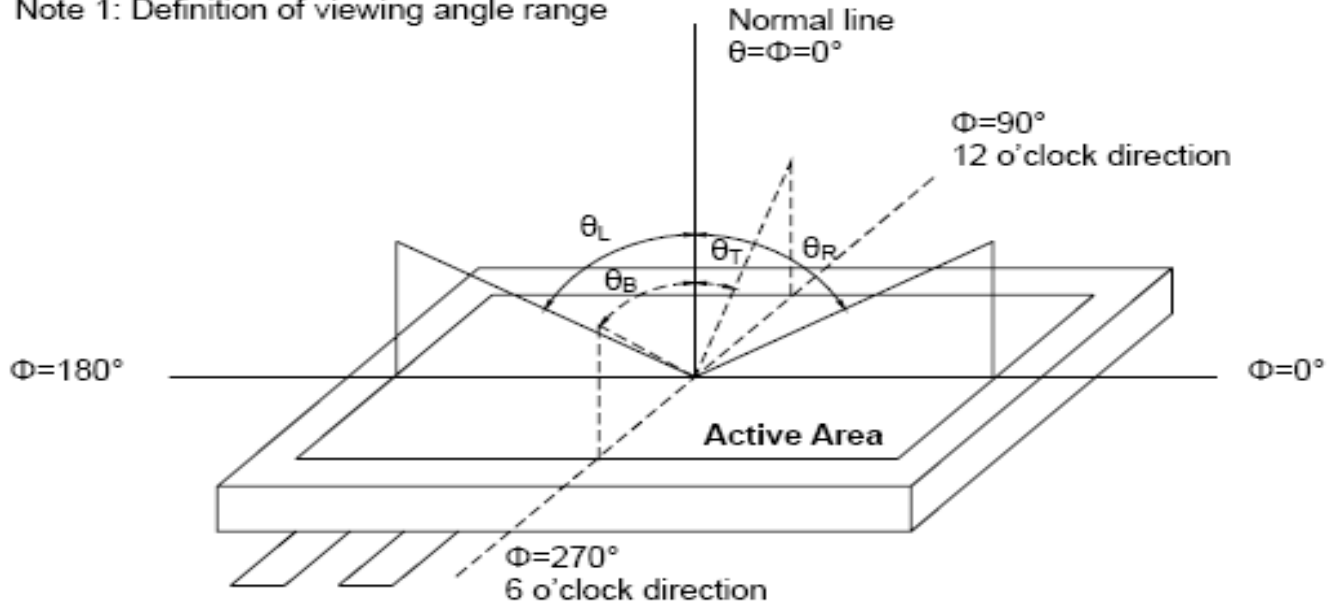


Fig. 4-1 Definition of viewing angle

Note 2: Definition of optical measurement system.

The optical characteristics should be measured in dark room. The optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° /Height: 500mm.)

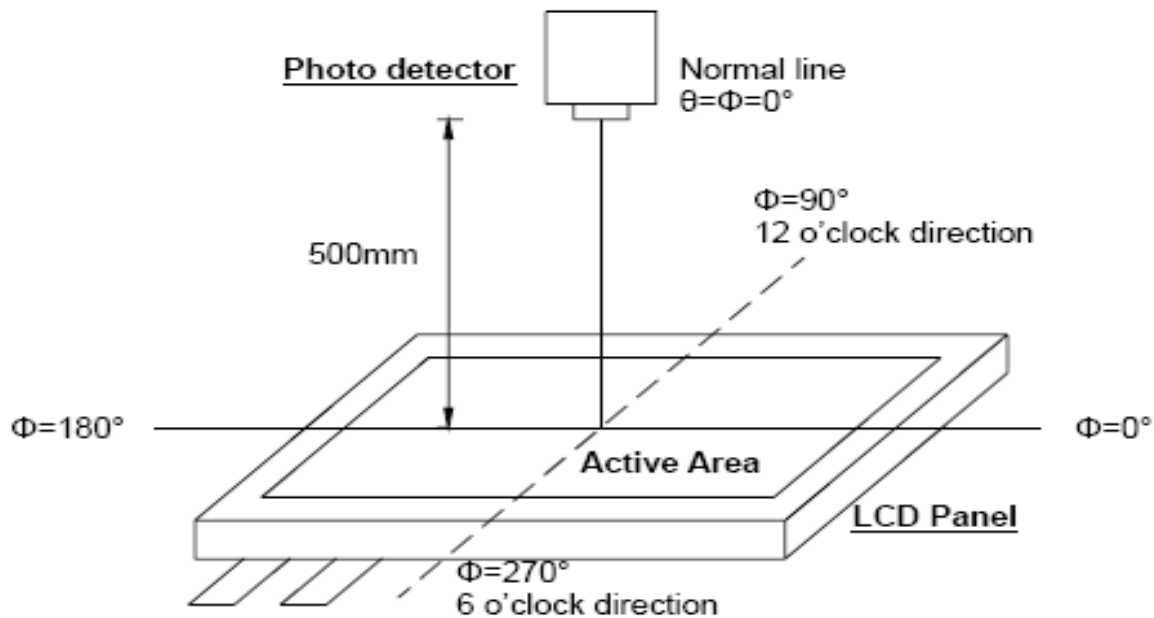


Fig. 4-2 Optical measurement system setup

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Note 3: Definition of Response time

The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (T_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.

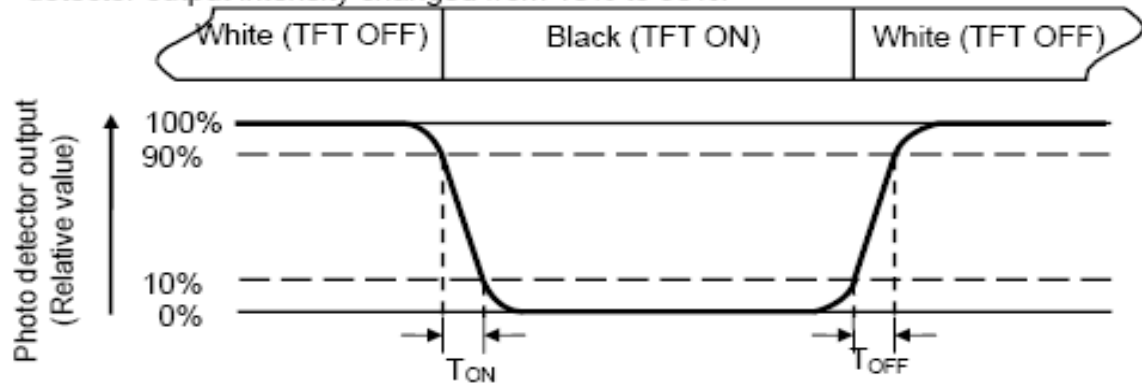


Fig. 4-3 Definition of response time

Note 4: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

Note 5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

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5. Electrical Characteristics:

5.1 Absolute Maximum Rating

Item	Symbol	Min.	Max.	Unit	Remake
Power supply voltage (Analog)	VDD-GND	-0.3	6.0	V	
	VDDp-GND	-0.3	6.0	V	
Input signal voltage (LED)	V _(LED)	-0.3	6.0	V	LED_EN
Input signal voltage (PWR)	V _(PWR)	-0.3	5.5	V	DCDC EN
Operating temperature	T _{OP}	-20	+70	°C	
Storage temperature	T _{ST}	-30	+80	°C	

NOTE1: If the products are exceeding the above range, they may be permanently damaged.

5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VDD	3.0	3.3	3.6	V	
Digital interface supply Voltage	VDDIO	3.0	3.3	3.6	V	
Normal mode Current consumption	IDD	--	150	--	mA	
Level input voltage	VIH	0.7VDDIO		VDDIO	V	
	VIL	GND		0.3VDDIO	V	
Level output voltage	VOH	0.8VDDIO		VDDIO	V	
	VOL	GND		0.2VDDIO	V	



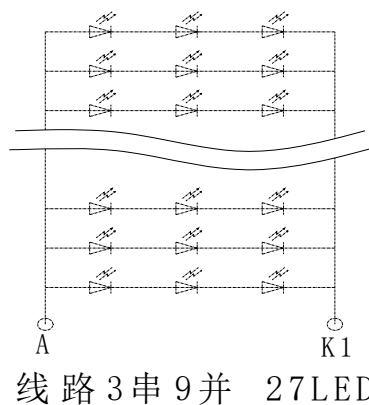
5.3 LED Backlight Characteristics

The back-light system is edge-lighting type with 27chips White LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	135	180	--	mA	
Forward Voltage	V_F	--	9.6	--	V	
LCM Luminance	L_v	450	--	--	cd/m ²	IF=180mA
LED life time	Hr	50000	--	--	Hour	Note1,2
Uniformity	AVg	80	--	--	%	

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 $I_L=180\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 180mA. The constant current driving method is suggested.

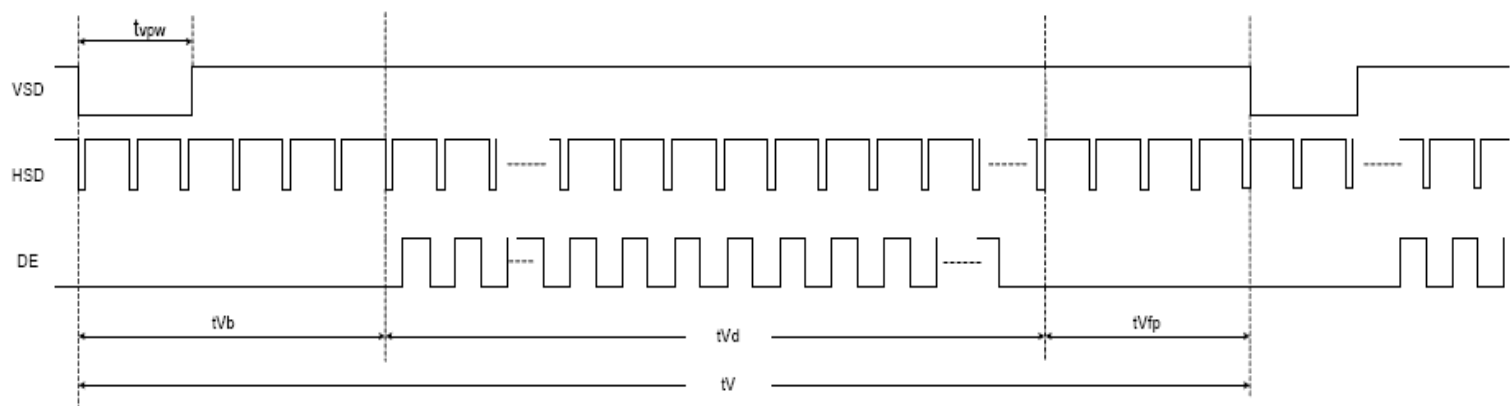


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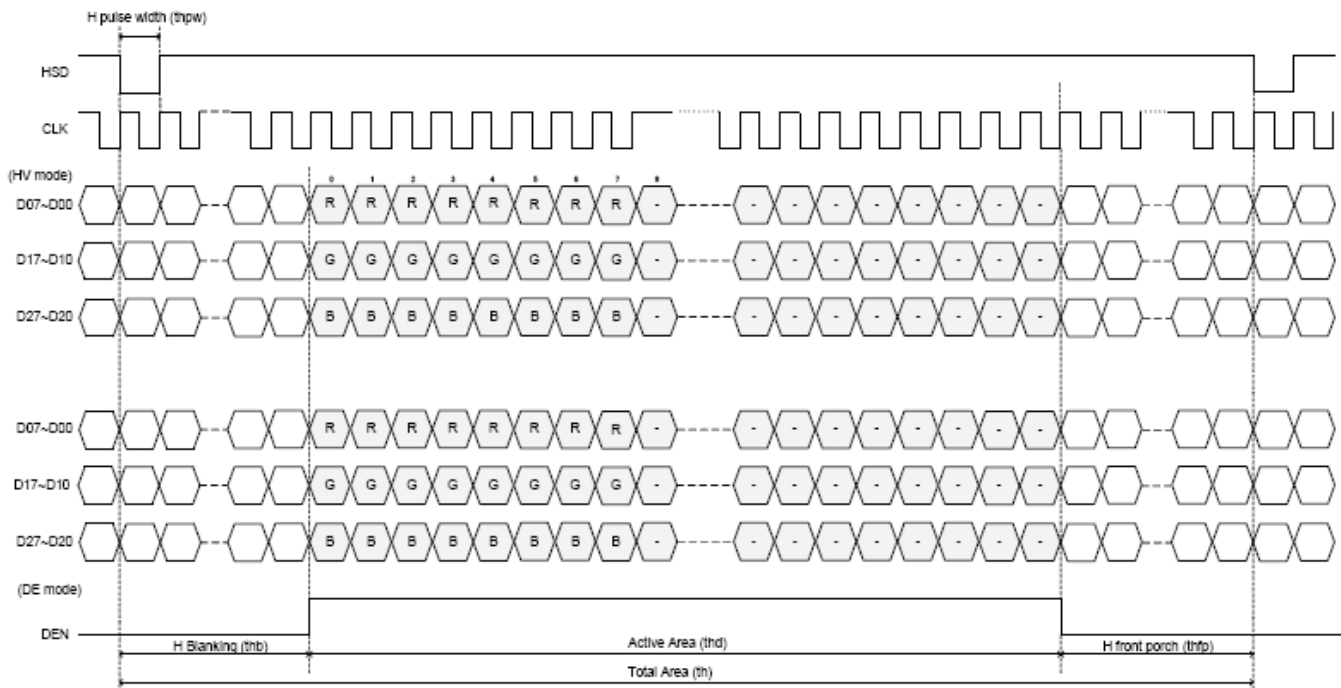


6. AC Characteristic

6.1 Input signal timing



Parameter	Symbol	Min.	Typ.	Max.	Unit
Vertical display area	tvd	480			H
VSD period time	tv	510	525	650	H
VSD pulse width	tvpw	1	-	20	H
VSD Back Porch (Blanking)	tvb	23	23	23	H
VSD Front Porch	tvfp	7	22	147	H

**6.1.2 Horizontal input timing**

Parameter		Symbol	Value			Unit
Horizontal display area		thd	800			DCLK
DCLK frequency		fclk	Min.	Typ.	Max	MHz
			-	33.3	50	
1 Horizontal Line		th	862	1056	1200	DCLK
HSD pulse width	Min.	thpw	1			
	Typ.		-			
	Max.		40			
HSD Back Porch (Blanking)		thb	46	46	46	
HSD Front Porch		thfp	16	210	354	

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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.

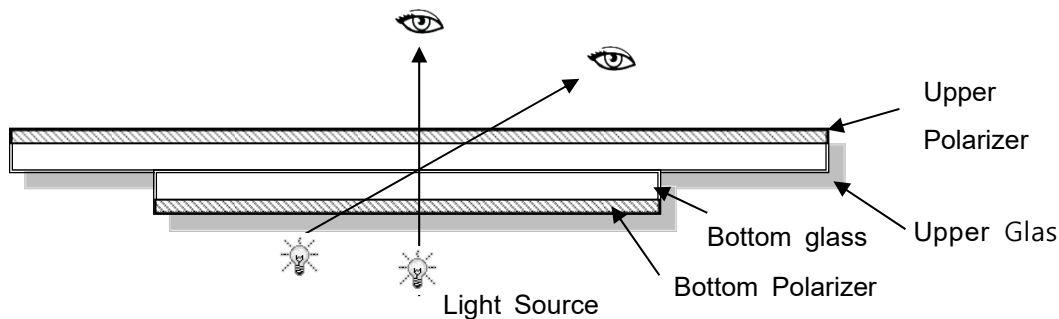
Temperature : $25\pm 5^{\circ}\text{C}$

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

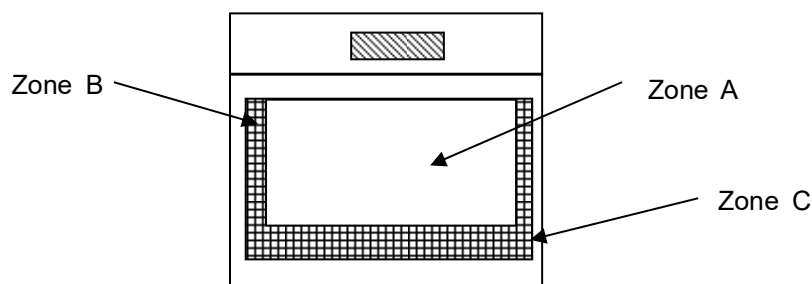
Viewing Angle : Normal viewing Angle.

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

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7.1.3 Sampling Plan

According to GB/T 2828.1-2003 ; , normal inspection, Class II

AQL:

Major defect	Minor defect
0.65	1.5

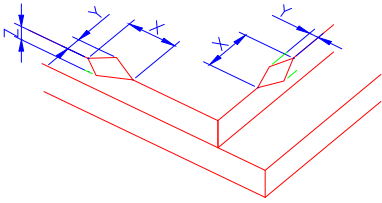
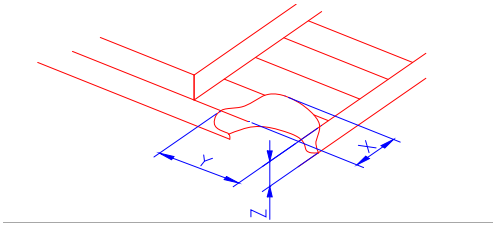
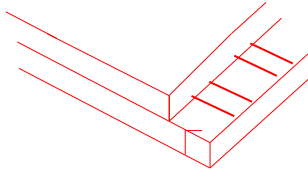
LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

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.	

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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							

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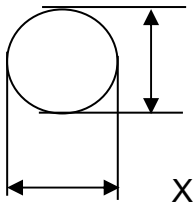
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2.0

Spot defect



$$\Phi = (X + Y) / 2$$

Y

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

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.10$	Ignore		Ignore
$0.10 < \Phi \leq 0.25$	3(distance $\geq 10\text{mm}$)		
$0.25 < \Phi \leq 0.3$	2		
$\Phi > 0.35$	0		

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

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.1$	Ignore		Ignore
$0.10 < \Phi \leq 0.25$	3(distance $\geq 10\text{mm}$)		
$0.25 < \Phi \leq 0.3$	2		
$\Phi > 0.35$	0		

③ Polarizer accidented spot

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.2$	Ignore		Ignore
$0.3 < \Phi \leq 0.5$	2(distance $\geq 10\text{mm}$)		
$\Phi > 0.5$	0		

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

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.1$	Ignore	Ignore	
$0.15 < \Phi \leq 0.25$	2(distance $\geq 10\text{mm}$)		
$\Phi > 0.3$	0		

⑤ Polarizer Bubble

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.2$	Ignore		Ignore
$0.3 < \Phi \leq 0.4$	3(distance $\geq 10\text{mm}$)		
$0.5 < \Phi \leq 0.6$	2		
$0.6 < \Phi$	0		

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3.0	Line defect (LCD/TP /Polarizer backlight black/white line, scratch, stain)	Width(mm)	Length(m m)	Acceptable Qty		
				A	B	C
		$\Phi\leq0.05$	Ignore	Ignore		Ignore
		$0.05<W\leq0.06$	$L\leq4.0$	$N\leq3$		
		$0.07<W\leq0.08$	$L\leq3.0$	$N\leq2$		
		$0.08<W$	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	LCD Mura	By 5% ND filter invisible.				

7.0	CTP Related	CTP Cover sensor acc identified black/white spot	<table><tr><th rowspan="2">Size Φ(mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>$\Phi \leq 0.1$</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.1 < \Phi \leq 0.2$</td><td colspan="2">3 (distance $\geq 10\text{mm}$)</td></tr><tr><td>$0.20 < \Phi \leq 0.25$</td><td colspan="2">2</td></tr><tr><td>$\Phi > 0.3$</td><td colspan="2">0</td></tr></table>				Size Φ (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.1$	Ignore		Ignore	$0.1 < \Phi \leq 0.2$	3 (distance $\geq 10\text{mm}$)		$0.20 < \Phi \leq 0.25$	2		$\Phi > 0.3$	0								
			Size Φ (mm)	Acceptable Qty																													
				A	B	C																											
			$\Phi \leq 0.1$	Ignore		Ignore																											
			$0.1 < \Phi \leq 0.2$	3 (distance $\geq 10\text{mm}$)																													
			$0.20 < \Phi \leq 0.25$	2																													
	$\Phi > 0.3$	0																															
	CTP Cover scratch	<table><tr><th rowspan="2">Width(mm)</th><th rowspan="2">Ignore (mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>$\Phi \leq 0.05$</td><td>Ignore</td><td colspan="3">Ignore</td></tr><tr><td>$0.05 < W \leq 0.06$</td><td>$L \leq 4.0$</td><td colspan="3">$N \leq 3$</td></tr><tr><td>$0.07 < W \leq 0.08$</td><td>$L \leq 3.0$</td><td colspan="3">$N \leq 2$</td></tr><tr><td>$0.08 < W$</td><td colspan="4">Define as spot defect</td></tr></table>				Width(mm)	Ignore (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.05$	Ignore	Ignore			$0.05 < W \leq 0.06$	$L \leq 4.0$	$N \leq 3$			$0.07 < W \leq 0.08$	$L \leq 3.0$	$N \leq 2$			$0.08 < W$	Define as spot defect			
		Width(mm)	Ignore (mm)	Acceptable Qty																													
				A	B	C																											
		$\Phi \leq 0.05$	Ignore	Ignore																													
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$0.07 < W \leq 0.08$		$L \leq 3.0$	$N \leq 2$																														
$0.08 < W$	Define as spot defect																																

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CTP Cover
Pinhole/ Lack of ink

Zone Size (mm)	Acceptable Qty
	C
$\Phi \leq 0.1$	Ignore
$0.1 < \Phi \leq 0.2$	3(distance $\geq 10\text{mm}$)
$0.25 < \Phi \leq 0.3$	2
$\Phi > 0.35$	0

CTP Bonding
bubble/
accidented
spot

Size $\Phi(\text{mm})$	Acceptable Qty	
	A	B
$\Phi \leq 0.1$	Ignore	
$0.15 < \Phi \leq 0.2$	3(distance $\geq 10\text{mm}$)	
$0.2 < \Phi \leq 0.25$	2	
$\Phi > 0.25$	0	

Assembly
deflection

beyond the edge of backlight $\leq 0.2\text{mm}$

TP cover broken

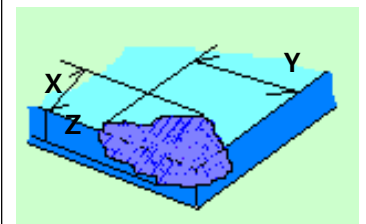
X : length

Y : width

Z : height

X	Y	Z
$X \leq 0.5\text{mm}$	$Y \leq 0.5\text{mm}$	$Z < \text{cover thickness}$

*
Circuitry broken is not allowed.



TP cover broken

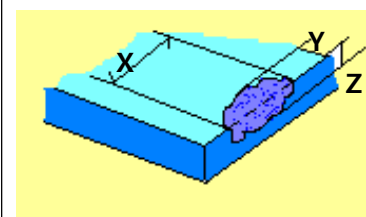
X : length

Y : width

Z : height

X	Y	Z
$X \leq 0.3\text{mm}$	$Y \leq 0.3\text{mm}$	$Z < \text{LCD thickness}$

* Circuitry broken is not allowed.





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



8. Reliability Test Results

Item	Condition	Inspection after test
High Temperature Operating	70°C,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°C, 96HR	
High Temperature Storage	80°C, 96HR	
Low Temperature Storage	-30°C, 96HR	
High Temperature & High Humidity Operating	+60°C, 90% RH ,96 hours.	
Thermal Shock (Non-operation)	-30°C,30 min ↔ 80°C,30 min, Change time:5min 20CYC.	
ESD test	C=150pF, R=330,5points/panel Air:±8KV, 5times; Contact:±6KV, 5 times; (Environment: 15°C~35°C, 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)	

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.

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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.

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10. Packing

----TBD-----

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