



**SPECIFICATIONS
FOR
LCM+HDMI Module**

MODULE No:	KD070FHFID015_HDMI
CUSTOMER:	

STARTEK	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

Part. No	KD070FHFID015_HDMI	REV	V1.1	Page 1 of 22
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

Date	Rev. No.	Page	Summary
2019.06.17	V1.0	ALL	First version
2019.11.08	V1.1	7	Drawing



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1. Scope

This specifications cover the requirements of 7.0” TFT-LCD module with HDMI interface. This module is consist of a Transmissive TFT-LCD Panel, driver circuit, a capacitive touch panel, backlight unit. The LCD module can meet the requirement of RoHS compliance.

1.1 Basic Description

General Information	Items	Specifications	Unit	Note
		Main Panel		
Display area(AA)		94.5(H)*151.2(V) (7.0 inch)	mm	
Driver element		TFT active matrix		
Display colors		16.7M	colors	
Number of pixels		1200(RGB)*1920	Pixels	
Pixel arrangement		RGB vertical stripe		
Pixel pitch		0.07875(H)*0.07875(V)	mm	
Viewing angle		Free	o'clock	
LCM Interface		4 LANE MIPI		
Display mode		Transmissive /Normally Black		
Operating temperature		-10~+60	°C	
Storage temperature		-30~+70	°C	
LCM		588 nits (Typ.)		
Video Input		HDMI		
HDMI it Firmware Version		KD070FHFID015_HDMI_V01		



1.2 Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)	-	98.70	-	mm	
	Vertical(V)	-	160.80	-	mm	
	Depth(D)	-	1.98	-	mm	
Weight		-	TBD	-	g	

1.3 Recommended Resolution

Recommended Resolution	1200(RGB)*1920 @55~60 Hz
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1.4 Plug & Play

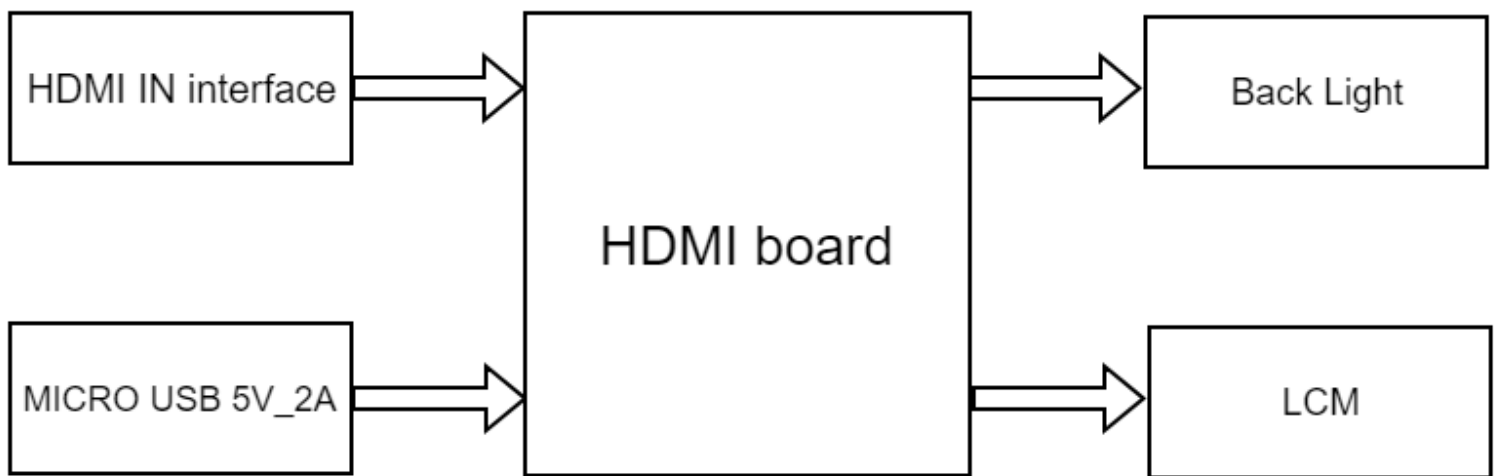
DDC2B /VESA Standard

1.5 Power Supply Rating

Power Consumption	2.8W Watt (Typ.)
-------------------	------------------



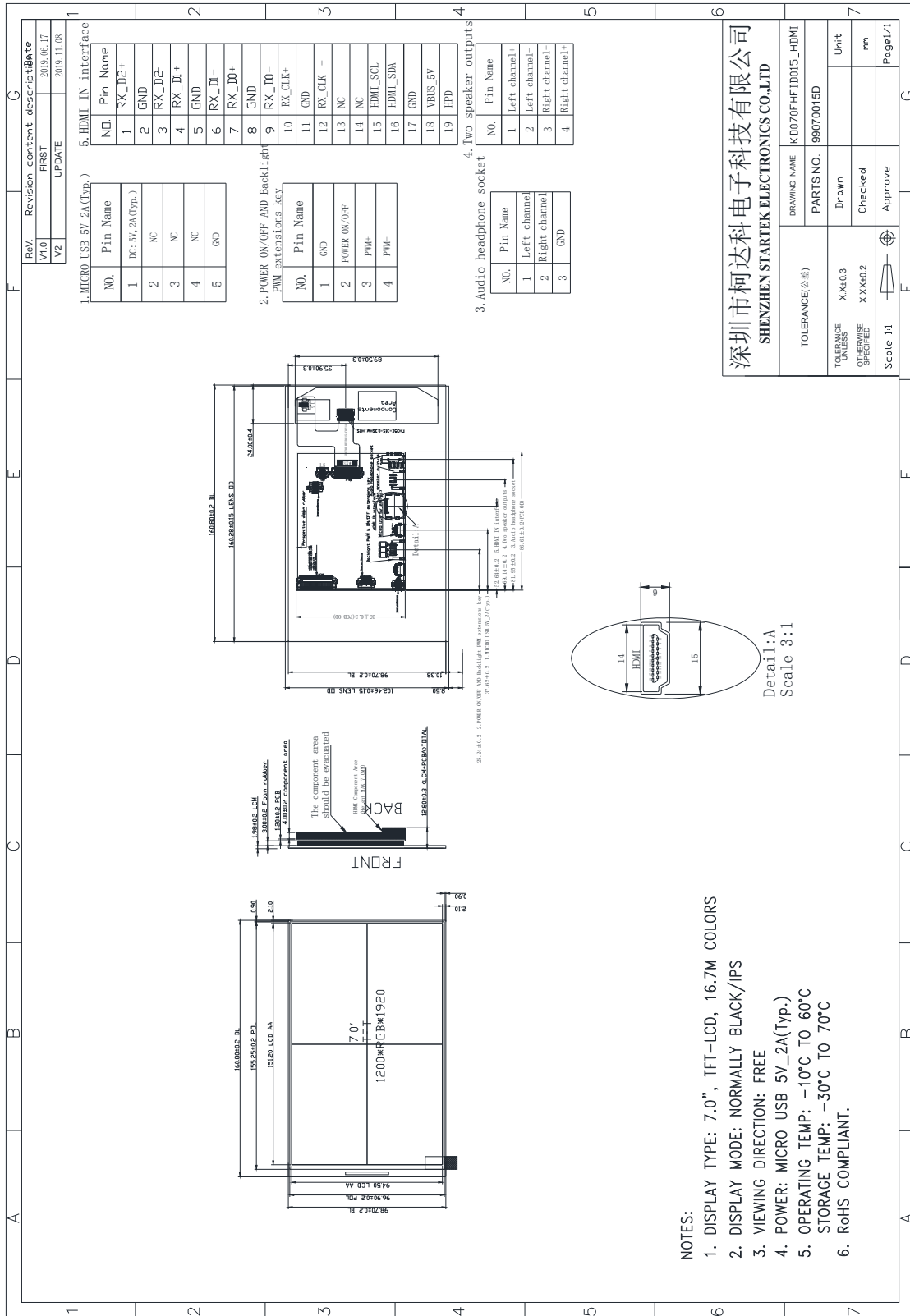
1.6 Block Diagram



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1.7 Outline Dimension



DRAWING NAME: KD070FHFID015_HDMI	
PARTS NO. 98070015D	
TOLERANCE(公差)	Unit
X.X±0.3	mm
X.XX±0.2	mm
Scale 1:1	
Page/1	

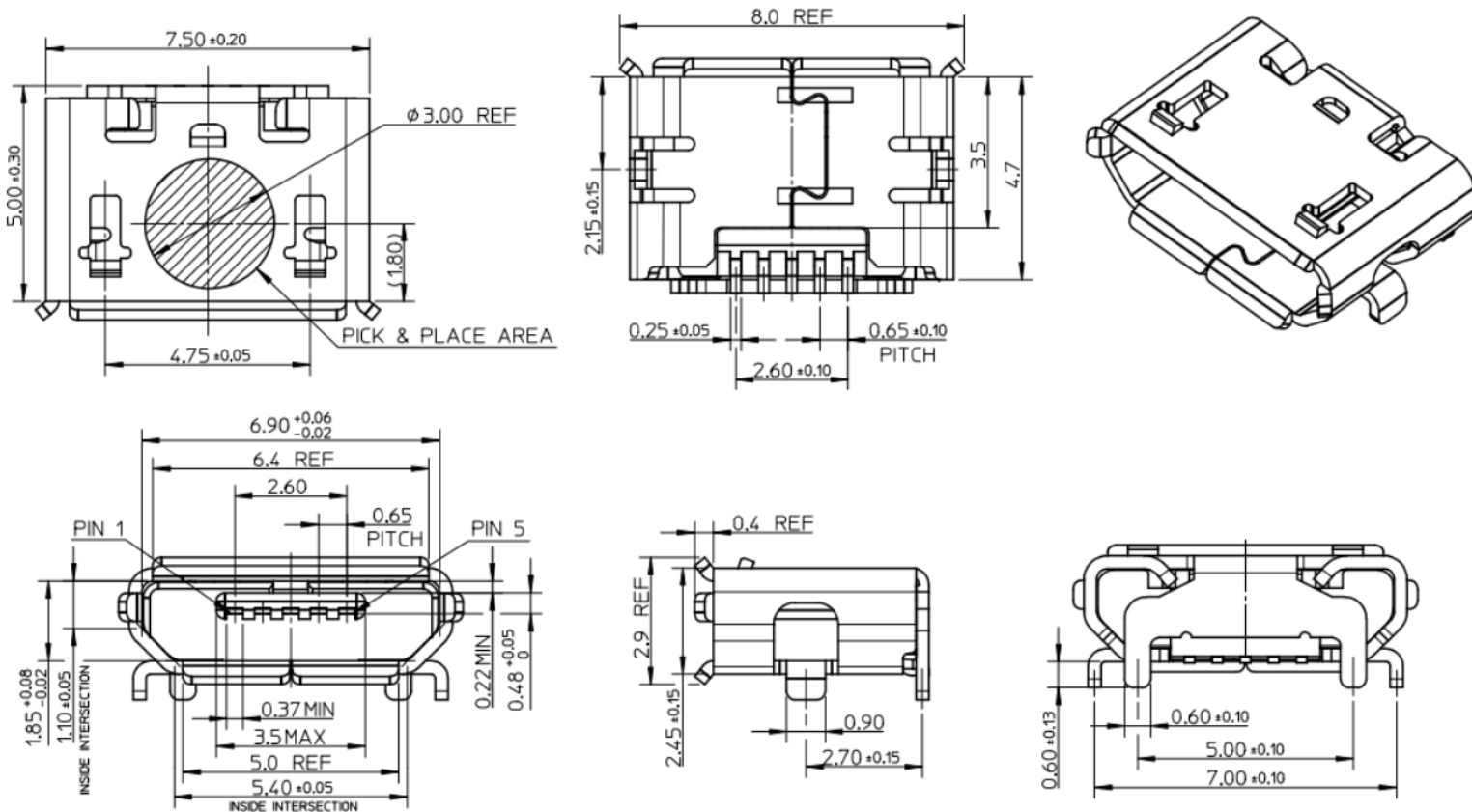
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2. Input Terminal Pin Assignment

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



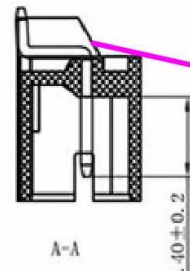
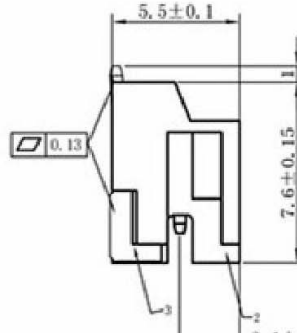
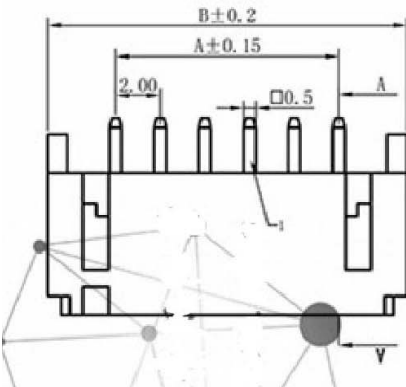
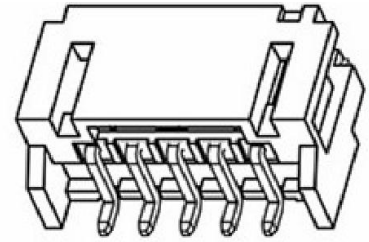
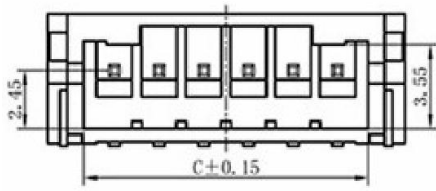
2.2 POWER ON/OFF AND Backlight PWM extensions key PIN Definition & Signal Connector

note: SMT PH2.0mm spacing connector 4p

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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 until the maximum brightness reaches (9 level).
4	PWM-	The backlight brightness of each button is reduced by one level until the lowest brightness reaches (level 9).



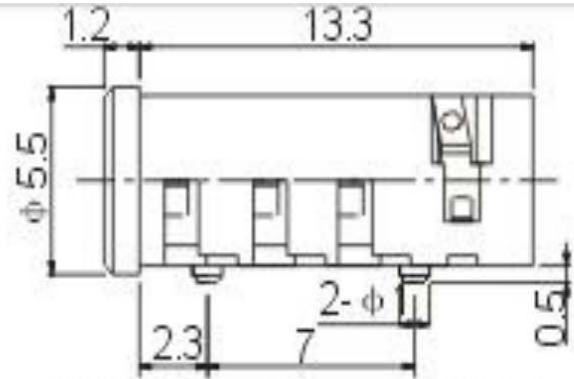
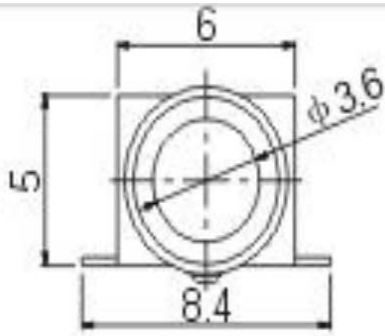
孔位 poles	A	B	C
2	2.00	8.00	4.75
3	4.00	10.00	6.75
4	6.00	12.00	8.75
5	8.00	14.00	10.75
6	10.00	16.00	12.75
7	12.00	18.00	14.75
8	14.00	20.00	16.75
9	16.00	22.00	18.75

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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



P.C.B Layout(copper-sided view)

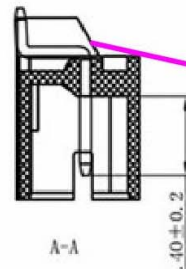
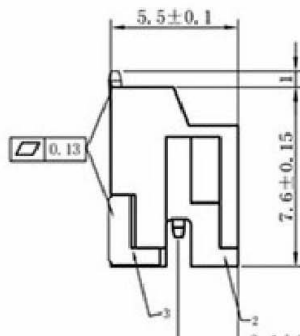
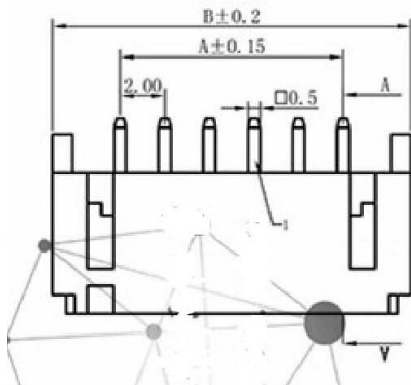
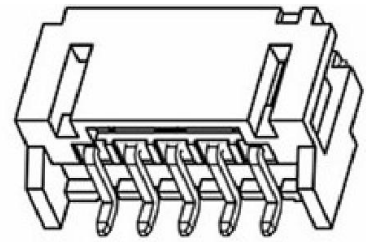
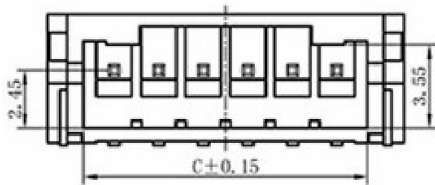
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2.4 Two speaker outputs PIN Define & Input Signal Connector

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+	



孔(N) 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

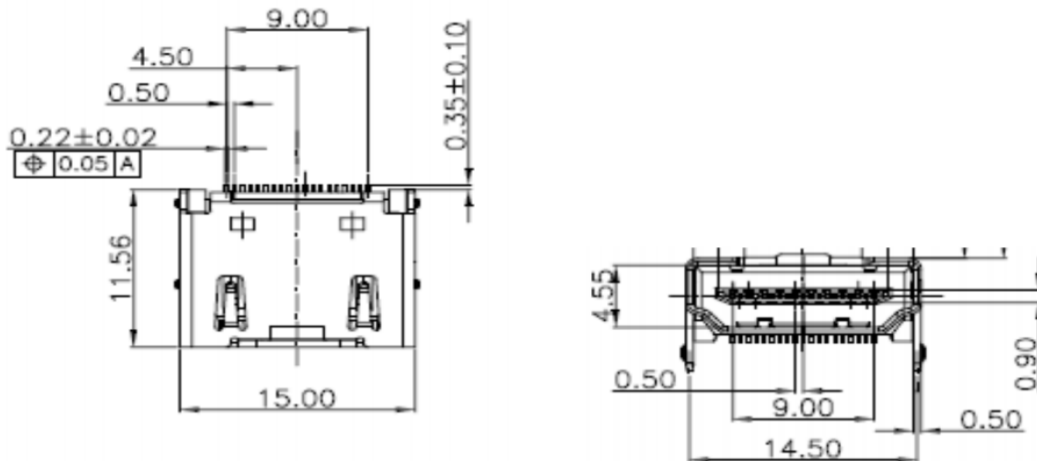
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2.5 HDMI PIN Defintion & Signal Connector

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:



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3. Operating Instructions:

- 3.1 This product supports the following operating systems: Windows 10.
- 3.2 Connect the HDMI cable to Windows 10.
- 3.3 Connect the micro USB DC POWER.

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	1100	--		
Uniformity	S(%)		--	71.5	--	%	
Color Filter Chromacity	White	W_x	0.27	0.31	0.35		
		W_y	0.29	0.33	0.37		
	Red	R_x	0.60	0.64	0.68		
		R_y	0.29	0.33	0.37		
	Green	G_x	0.27	0.31	0.35		
		G_y	0.57	0.61	0.65		
	Blue	B_x	0.11	0.15	0.19		
		B_y	0.01	0.05	0.09		
Viewing angle	Hor.	Θ_L	CR>10	80	-	--	1) 2)
		Θ_R		80	-	--	
	Ver.	Θ_U		80	-	--	
		Θ_D		80	-	--	
Option View Direction	Free						



5. Electrical Characteristics:

5.1 Absolute Maximum Rating

Item ¹⁾	Symbol	Min.	Max.	Unit	Remark
Power supply voltage (Analog)	VDD-GND	-0.3	6.0	V	
	VDDp-GND	-0.3	6.0	V	
Power supply voltage (Logic)	IOVCC	-0.3	4.6	V	
Input signal voltage (RES)	V _I	-0.3	IOVCC+0.3	V	XRES
Input signal voltage (DSI)	V _{I(DSI)}	-0.3	1.8	V	
Input signal voltage (LED)	V _{I(LED)}	-0.3	6.0	V	LED_EN
Input signal voltage (PWR)	V _{I(PWR)}	-0.3	5.5	V	DCDC_EN
Operating temperature	T _{OP}	-10	+60	°C	²⁾
Storage temperature	T _{STG}	-30	+70	°C	²⁾

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

6. Init Timing Command sequence(on sequence)

sequence	Data Type (hex)	index (hex)	parameters # (hex)	description	comment
SLEEP MODE					
↓					
DCDC_EN L->H				DCDC_EN L->H (VSP,VSN on)	
wait 20ms					
command	05	01	-	soft reset	
wait 5ms					
command	23	B0	1	00	MCAP
command	29	B3	1	04	Interface setting
			2	08	
			3	00	
			4	22	
			5	00	
command	29	B4	1	0C	Interface ID setting
command	29	B6	1	3A	DSI control
			2	D3	
command	15	51	1	E6	write display brightness
command	15	53	1	2C	write control display
command	15	3A	1	77	set pixel format
command	39	2A	1	00	set column address
			2	00	
			3	04	
			4	AF	
command	39	2B	1	00	set page address
			2	00	
			3	07	
			4	7F	
send image	39	2C/3C			write memory / write memory continue
command	05	11	-	-	exit sleep mode
wait 120ms					
command	05	29	-	-	set display on
wait min 0ms					
LED_EN L->H				LED_EN L->H	
↓					
NORMAL MODE					



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.

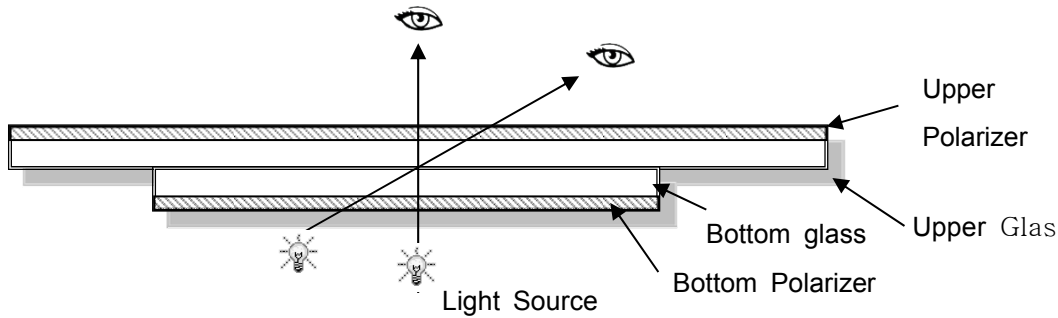
Temperature : 25±5℃

Humidity : 65%±10%RH

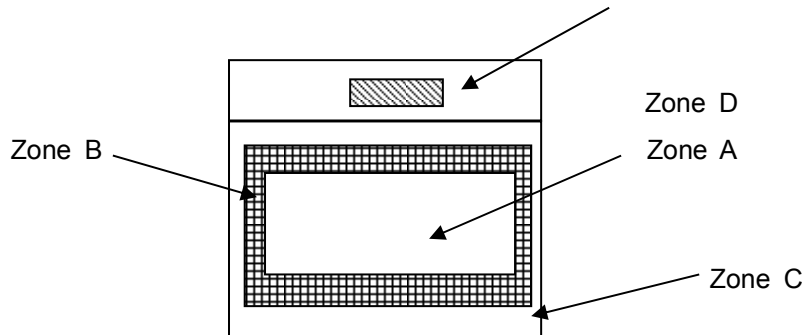
Viewing Angle : Normal viewing Angle.

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:

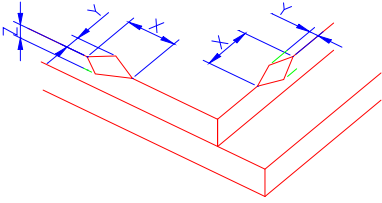
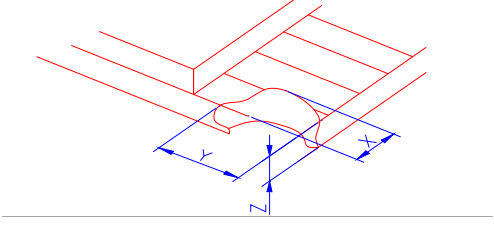
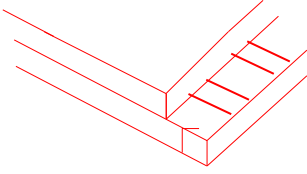
Major defect	Minor defect
0.65	1.5

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.	



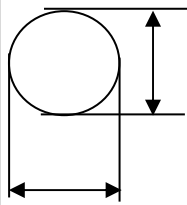
7.1.4 Criteria (Visual)

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 border="1" data-bbox="756 667 1455 815"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>≤3.0mm</td> <td><Inner border line of the seal</td> <td>≤T</td> </tr> </tbody> </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 border="1" data-bbox="836 1122 1375 1220"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>≤3.0mm</td> <td>≤L</td> <td>≤T</td> </tr> </tbody> </table>	X	Y	Z	≤3.0mm	≤L	≤T
X	Y	Z						
≤3.0mm	≤L	≤T						
	(3) LCD crack	 <p style="text-align: center;">Crack Not allowed</p>						



2.0

Spot defect



Y

X

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

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		
$0.10 < \Phi \leq 0.25$	4(distance $\geq 10\text{mm}$)		
$0.25 < \Phi \leq 0.35$	3		
$\Phi > 0.4$	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		
$0.10 < \Phi \leq 0.25$	4(distance $\geq 10\text{mm}$)		
$0.25 < \Phi \leq 0.35$	3		
$\Phi > 0.4$	0		

③ Polarizer accidented spot

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.2$	Ignore		
$0.3 < \Phi \leq 0.5$	3(distance $\geq 10\text{mm}$)		
$\Phi > 0.5$	1		

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

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.15$	Ignore		
$0.2 < \Phi \leq 0.3$	2(distance $\geq 10\text{mm}$)		
$\Phi > 0.4$	1		

⑤ Polarizer Bubble

Zone Size (mm)	Acceptable Qty		
	A	B	C
$\Phi \leq 0.2$	Ignore		
$0.3 < \Phi \leq 0.4$	4(distance $\geq 10\text{mm}$)		
$0.4 < \Phi \leq 0.5$	3		



3.0	Line defect (LCD/TP /Polarizer backlight black/white line, scratch, stain)	Width(mm)	Length(m)	Acceptable Qty		
				A	B	C
		$\Phi \leq 0.05$	Ignore	Ignore		Ignore
		$0.05 < W \leq 0.06$	$L \leq 5.0$	$N \leq 3$		
		$0.07 < W \leq 0.08$	$L \leq 4.0$	$N \leq 2$		
$0.08 < W$	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.				

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 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	Air: ±6KV, 5times; Contact: ±4KV, 5 times; 5points/panel.	
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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