SPECIFICATION
FOR
LCD MODULE

MODULE NO: PV10103TD40D-C
Doc.Version:01

Customer Approval:

☐ Accept ☐ Reject

KINGTECH	NAME	SIGNATURE	DATE
Prepare	Electronic Engineer		
Check	Mechanical Engineer		
Verify			
Approval			

■APPROVAL FOR SPECIFICATIONS ONLY

■APPROVAL FOR SPECIFICATIONS AND SAMPLE

KINGTECH Kingtech Group Co., Ltd. ---- *Lcd Touchscreen Expert*

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1. Revision History

Sample Version	DOC. Version	DATE	DESCRIPTION		CHANGED BY
A0	00	2019-9-4	FULL SPEC	First issue	Yangrongwu
A1	01	2020-3-12		Update drawing	xiao

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2. Table of Contents:

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3. General Specification:

ITEM	CONTENTS
Module Size	171.8(W) * 255.8(H) * 3.95(T) mm
Display Size(Diagonal)	10.1 inch
Display Format	1200* 1920 Pixels
Active Area	135.36(W) *216.58(H) mm
Pixel Pitch	37.6 (W)x 112.8(H) um
LCD Type	TFT/ Normally BLACK
View Angle	ALL
Drive IC	HX8279D
Weight	TBD

4. LCM drawing:

Specification:
1. DISPLAY TYPE: TFT-LCD, TRANSMISSIVE, NORMAL BLACK
2. Driver IC: HX8297-C
3. OPERATING TEMP: -20°C~70°C
4. STORAGE TEMP: -30°C~80°C
5. VIEWING DIRECTION: FREE
6. BACK LIGHT Uniformity:70%(Min)
   VF:22.4V(Min):24V(Typ):26.4V(Max); IF:100mA(Fix)
7. Luminous instensity(9 AVG):
   Module:450cd/㎡ (MIN), 500cd/㎡
   Color chromaticity:X=0.31±0.05,Y=0.33±0.05
8. CL glass:康宁三代 厚度T=0.7mm
   AF Coating:初始水滴角≥110°, 摩擦测试后水滴角≥100°
   Surface harness:7H
9. TP Controller IC:ILI2511 通道数:TX24*RX39
10. Channel NO:48*30+3KEY
11. TP 初始水滴角≥110°, 摩擦测试后水滴
12. 中断方式: 下拉脉冲 IO电压:≥85%
13. 支持手套触摸, 支持5mm触动笔, 1.8V
14. 支持手套触摸, 支持5mm触动笔, 需防水
13. GENERAL TOLERANCE: ±0.4
14. 符合ROHS标准

Viewing direction:ALL
1200*RGB*1920
10.1" IPS TFT

VF=22.4V-26.4V IF=4*25=100mA

LED+   LED-

Kingtech Group Co.,Ltd.

UNIT	mm
SIZE	A4
SCALE	N-T-S

| MOD. Name | PV10103TD40D-C |

DESIGNED | CHECKED | VERIFIED | APPROVED

FILE NAME

Count Dwg.

Sheet 1 of 1

Sensor ID
OPT1=GND
OPT2=GND

Count drawing & Spec.revision record during discussion with customer

Rec.	Revision content description	Date
#1	FIRST ISSUE	2019-09-19
#2		2019-09-23
#3	修改厚度公差	2020-03-20
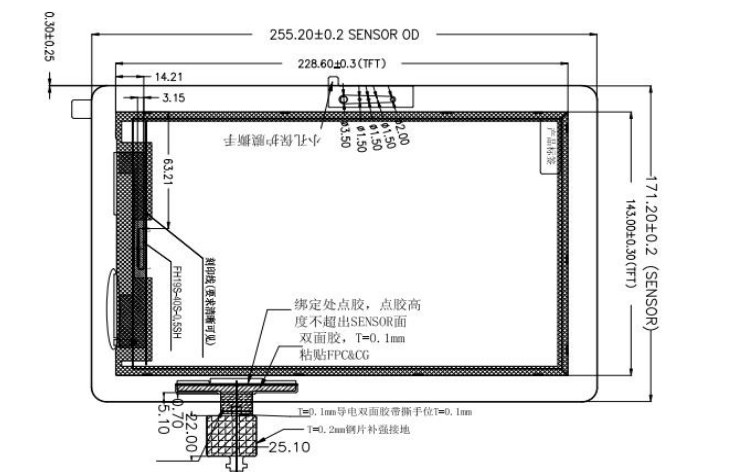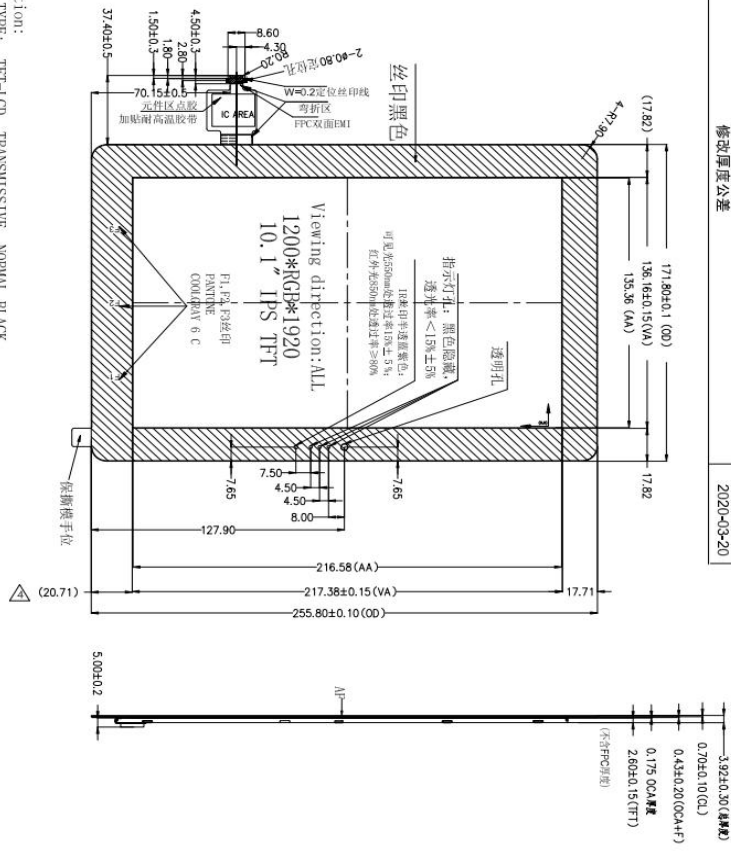
Customer Model

TP-PIN DESCRIPTION
PIN	Definition
1	VDD1(3.3V)
2	VDD(3.3V)
3	GND
4	GND
5	VDD1.8V
6	TP-RESET (1.8V)
7	TP-INT(1.8V)
8	TP-SDA1(1.8V)
9	TP-SCL(1.8V)
10	GND
11	NC
12	NC

TFT-PIN DESCRIPTION

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5. Electrical Characteristics

5-1 Absolute Maximum Ratings   (Ta=25℃ VSS=0V)

Item	Symbol	Min.	Type	Max.	Unit	Remark
Input Voltage	V_{CI}-V_{SS}	-0.3	-	+3.9	Volt	Note1
Supply Voltage	V_{DDIO}-V_{SS}	-0.3	-	+3.6	Volt	Note1
Operating Temperature	Topr	-10	-	+50	℃	-
Storage Temperature	Tstg	-20	-	+60	℃	-

Note1: Absolute maximum rating is the limit value beyond which the IC maybe broken.
      They do not assure operations.

5-2 Operating Conditions
(VDD=2.8 ~ 3.3V, T_A=-40 ~ 85 °C)

Parameter	Symbol	Test condition	Spec. Min.	Spec. Typ.	Spec. Max.	Unit	Note
Input high voltage	V_{IH}	VDD= 2.8 ~ 3.3V	0.7 V_{DD1}	-	VDD1	V	-
Input low voltage	V_{IL}		0	-	0.3 V_{DD1}	V	-
VPP	V_{IH}	VPP	8.0	8.25	8.5	V	(1)
	V_{IL}					V	
Output high voltage **(SDO, CABC_PWM_OUT)**	V_{OH1}	I_{OH} = -1.0 mA	0.8 V_{DD1}	-	VDD1	V	-
Output low voltage **(SDO, CABC_PWM_OUT)**	V_{OL1}	VDD= 1.7 ~ 2.0V I_{OL} = 1.0 mA	0	-	0.2 V_{DD1}	V	-
Logic High level input current	I_{IH}	VSYNC, HSYNC	-	-	1	uA	-
		RESX, DCX, CSX, SCL	-	-	1		-
	I_{IHD}	DB[23:0], SDI, DCX	-	-	1	uA	-
		DB[23:0]	-	-	1		
Logic Low level input current	I_{IL}	VSYNC, HSYNC	-1	-	-	uA	-
		RESX, DCX, CSX, SCL	-1	-	-		-
	I_{ILD}	DB[23:0], SDI, DCX	-1	-	-	uA	
		DB[23:0]	-1	-	-		-
Current consumption standby mode **(VDD3-VSSA)**	$I_{ST(VDD)}$	VDD3/HS_VCC=2.8V, VDD1=1.8V T_A =25°C (DSI Ultra Low Power mode)	-	--	TBD	μA	-
Current consumption standby mode **(VDD1– VSSD)**	$I_{ST(VDD1)}$		-	--	TBD	μA	-
Current consumption standby mode which include HS_VCC **(HS_VCC-HS_VSS)**	$I_{ST(VDD1)}$		-	--	TBD	μA	-
Oscillator tolerance	△ OSC	T_A =25°C	-5	-	5	%	-

5-3 TIMING CHARACTERISTICS
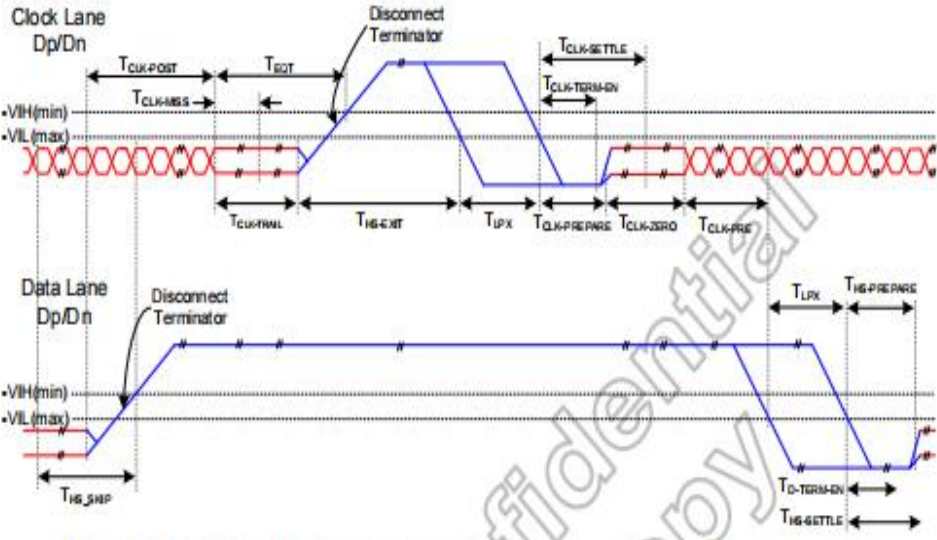
13.1 MIPI AC characteristics

Figure 13.1: Switching the clock lane between clock transmission and low-power mode
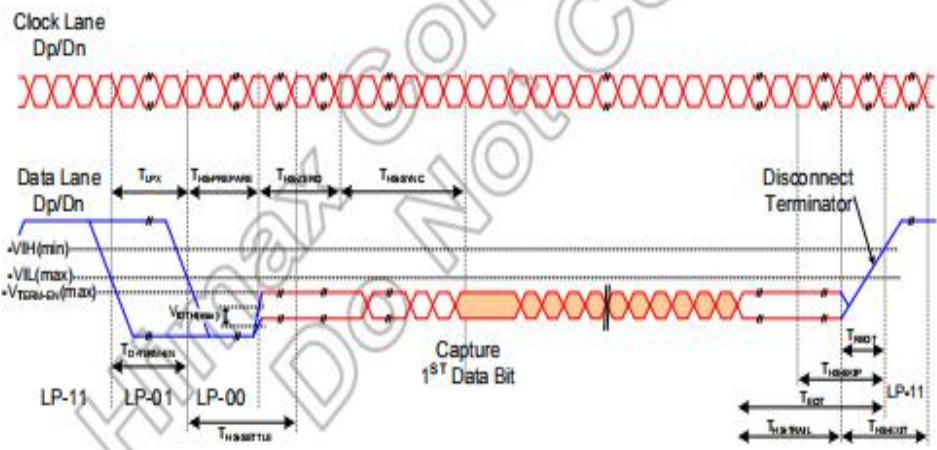

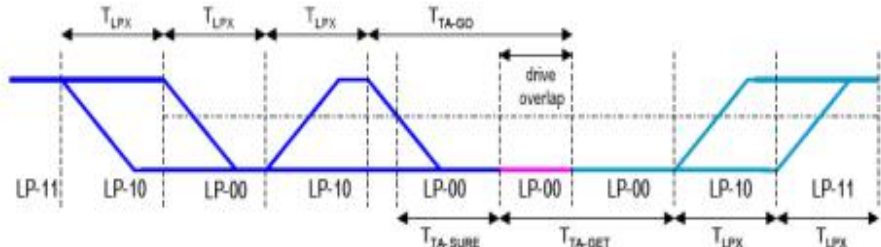Figure 13.2: Timing of high-speed data transmission in bursts

Figure 13.3: Turnaround Procedure

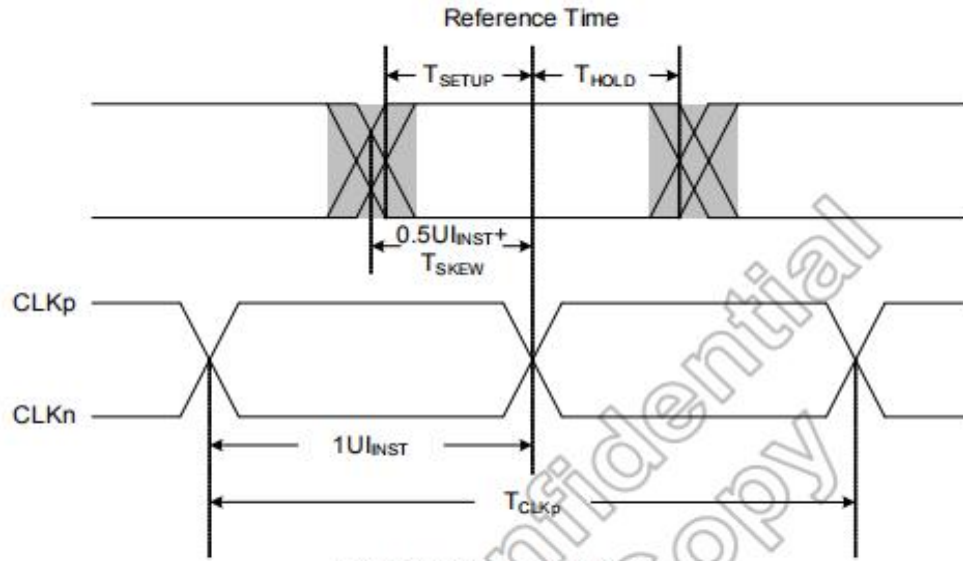## 13.2 MIPI data-clock timing specification

Figure 13.4: Data to clock timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
UI instantaneous	UI_{INST}	1.0	-	12.5[1]	ns
Data to clock setup time	T_{SETUP}	0.3	-	-	UI_{INST}
Data to clock hold time	T_{HOLD}	0.3	-	-	UI_{INST}

Note: (1) This value corresponds to a minimum 80 Mbps data rate.

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6. Optical Characteristics:

6. OPTICAL SPECIFICATION

Item		Symbol	Conditions	Specifications			Unit	Note
				Min.	Typ.	Max.		
Transmittance (w/o APCF)		T%	Viewing normal angle $\theta_X = \theta_Y = 0°$	3.53%	4.04%		%	All left side data are based on INX's following condition –
Contrast Ratio		CR		800	1000		–	1.LC : AAS .
Response Time		$T_{on}+T_{off}$			25		ms	2.CF : CG 70% CF. 3.Light Source : INX LED BLU. 4.Polarizer :
Viewing Angle	Hor.	θ_{X+}		80	85		deg.	CF:SRWD62APN1LT4 TFT:SRWD62AWL2/APFV3 5.Machine : DMS 803, (ConoScope for View Angle). 6. VLC dark $\leq$ 0.3 V, VLC white $\geq$ 4.1 V 7.Back light structure: Diffuser+BEF+BEF+ Diffuse
		θ_{X-}		80	85			
	Ver.	θ_{Y+}		80	85			
		θ_{Y-}		80	85			
CF only Color Chromaticity (CIE 1931)	Red	Rx	Viewing normal angle $\theta_X = \theta_Y = 0°$	0.631	0.651	0.671	-	Under C light Simulation
		Ry		0.311	0.331	0.351	-	
	Green	Gx		0.255	0.275	0.295	-	
		Gy		0.54	0.56	0.58	-	
	Blue	Bx		0.12	0.14	0.16	-	
		By		0.075	0.095	0.115	-	
	White	Wx		0.28	0.3	0.32	-	
		Wy		0.305	0.325	0.345	-	
Color Gamut					65			

"Note(1)   INX LED BLU Spectrum:
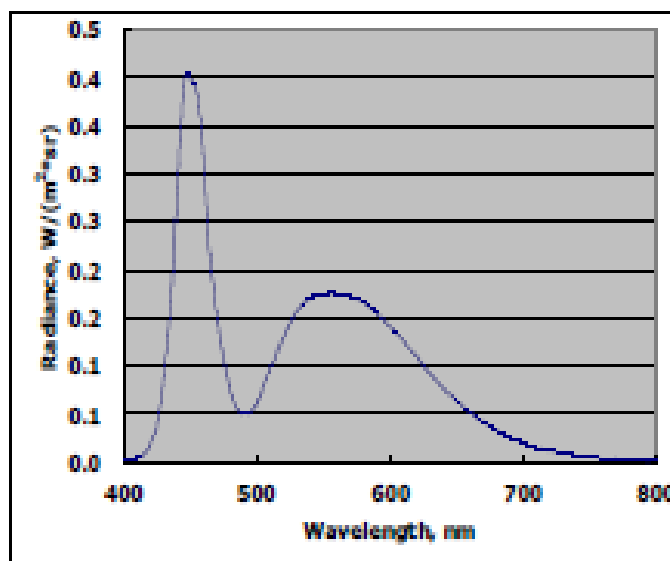
*Note (2)   Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

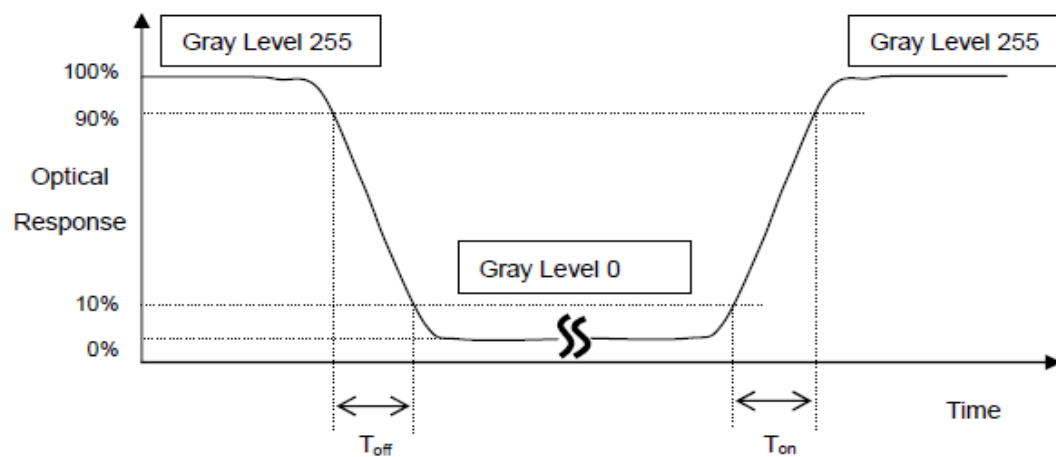L63: Luminance of gray level 63
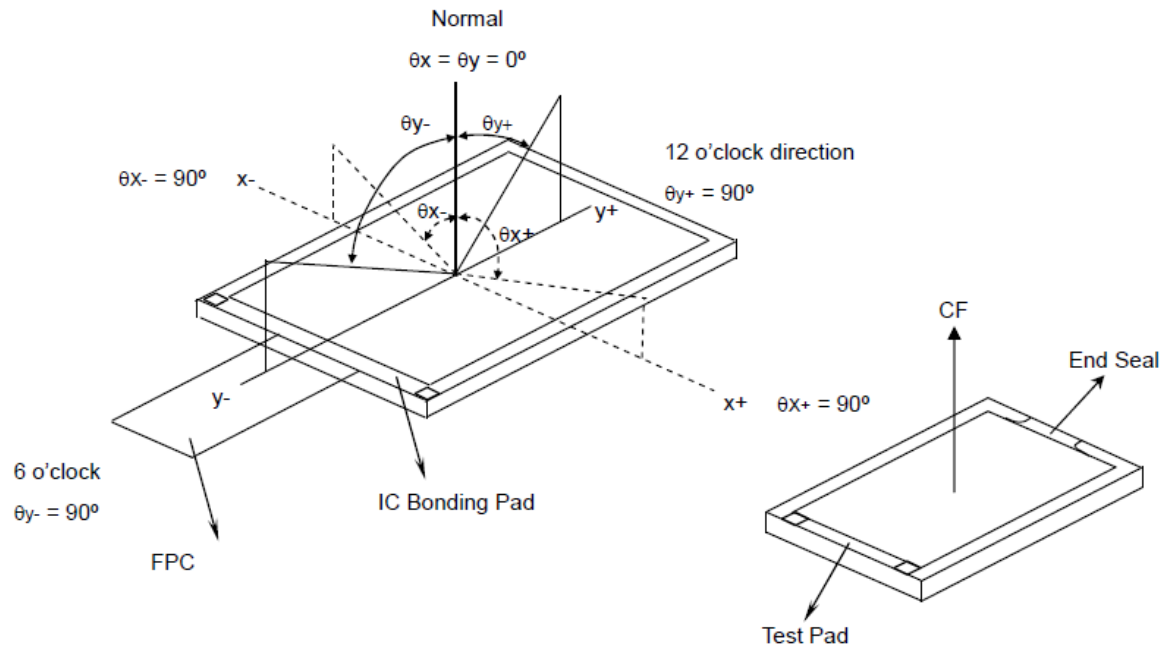
L 0: Luminance of gray level 0

CR = CR (5)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

*Note (3)   Definition of Response Time (T_{on}, T_{off}):

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*Note(4)   Definition of Viewing Angle

*Note (5)   Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.
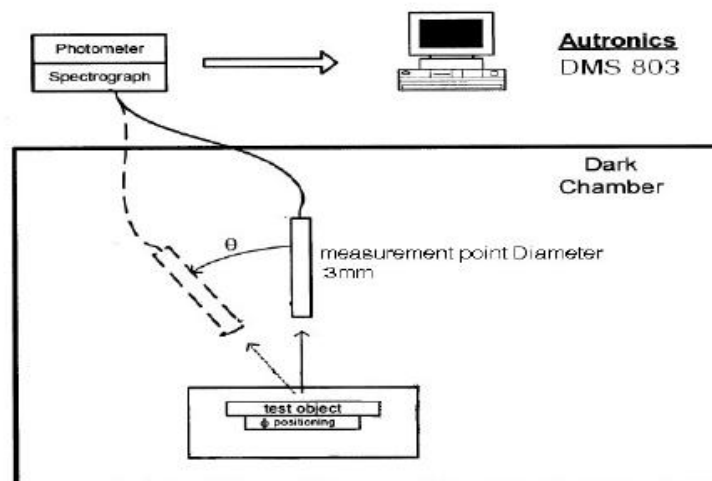
*Note (6)
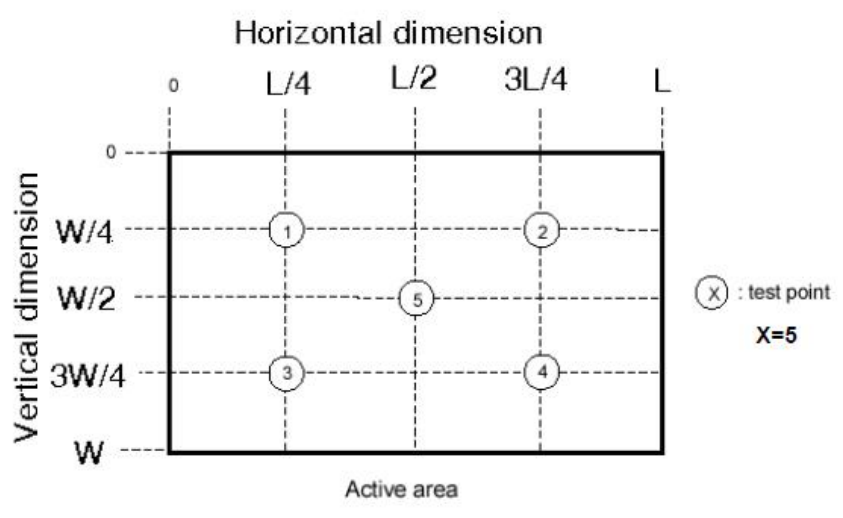
7. Interface Pin Assignment:

7-1 LCM FPC Interface

Pin NO.	Symbol	Level	Remark
1	NC	/	/
2	VDD3.3V	H	A supply voltage 3.3V
3	VDD1.8V	H	A supply voltage 1.8V
4	GND	L	Ground
5	/RESET(1.8V)	H/L	Reset pin
6	NC	/	/
7	GND	L	Ground
8	D0_N	H/L	MIPI_DP0- are differential data signal line
9	D0_P	H/L	MIPI_DP0+ are differential data signal line
10	GND	L	Ground
11	D1_N	H/L	MIPI_DP1- are differential data signal line
12	D1_P	H/L	MIPI_DP1+ are differential data signal line
13	GND	L	Ground
14	CLK_N	H/L	CLOCK Lane negative-end input pin
15	CLK_P	H/L	CLOCK Lane positive-end input pin
16	GND	L	Ground
17	D2_N	H/L	MIPI_DP2- are differential data signal line
18	D2_P	H/L	MIPI_DP2+ are differential data signal line
19	GND	L	Ground
20	D3_N	H/L	MIPI_DP3- are differential data signal line
21	D3_P	H/L	MIPI_DP3+ are differential data signal line
22	GND	L	Ground
23	NC	/	/
24	NC	/	/
25	GND	L	Ground
26~29	NC	/	/
30	GND	L	Ground
31	LEDK	L	Backlight Cathode
32	LEDK	L	Backlight Cathode
33~38	NC	/	/
39	LED_A	H	Backlight Anode
40	LED_A	H	Backlight Anode

CTP PIN

NO.	Symbol	remark
1	VDD(3.3V)	Power supply
2	VDDD(3.3V)	Power supply
3	GND	Ground
4	GND	Ground
5	VDD(1.8V)	Power supply
6	TP-RESET(1.8V)	Hardware reset pin
7	TP-SCL(1.8V)	Serial data input pin
8	TP-SDA(1.8V)	Serial data input pin
9	TP-INT(1.8V)	Interrupt pin
10	GND	Ground
11	NC	/
12	NC	/

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8. Backlight:

1. Standard Lamp Styles (Edge Lighting Type):
   The LED chips are distributed over the edge light area of the
   illumination unit, which gives the less power consumption:

2. The Main Advantages of the LED Backlight are as following:
   2.1 The brightness of the backlight can simply be adjusted.
       By a resistor or a potentiometer.

3. Data About LED Backlight:

PARAMETER	Sym.	Min.	Typ.	Max.	Unit	Test Condition	Note
Supply Current	I	-	120		mA	V=30V	
Supply Voltage	V	28		32	V	If=120mA	
Luminous Intensity for LCM(without CTP)	IV	450	500	-	Cd/m^2	If=120mA	2
Uniformity for LCM	-	70	-	-	%		3
Life Time	-		30000	-	Hr.		4
Color	White						

NOTE:
1. Backlight Only
2. Average Luminous Intensity of P1-P9
3. Uniformity = Min/Max * 100%
4. LED life time defined as follows: The final brightness is at 70% of original brightness

Measured Method: (X*Y: Light Area)   **Internal Circuit Diagram**

9. Packing

TBD

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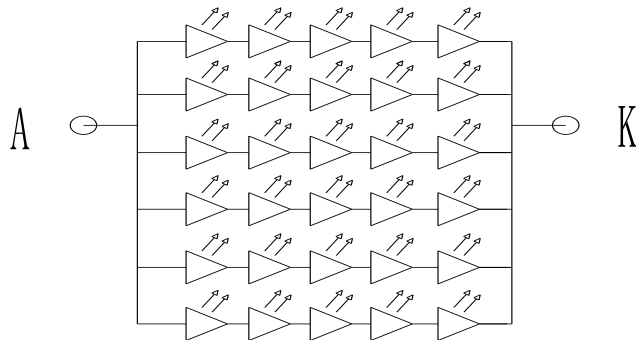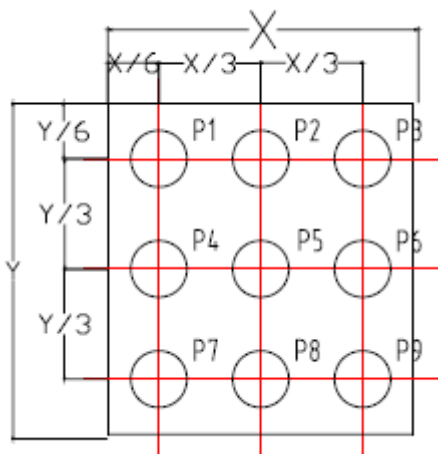
10. Standard Specification for Reliability:

10–1. Standard Specifications for Reliability of LCD Module

No	Item	Description
01	High temperature operation	The sample should be allowed to stand at 50℃ for 96 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
02	Low temperature operation	The sample should be allowed to stand at -10℃ for 96 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.
03	High temperature storage	The sample should be allowed to stand at 60℃ for 96 hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 2 hours.
04	Low temperature storage	The sample should be allowed to stand at -20℃ for 96 hours under no-load condition, then returning it to normal temperature condition, and allowing it stand for 2 hours.
05	Moisture storage	The sample should be allowed to stand at 50℃±5℃,90%RH MAX for 120 hours under no-load condition, then taking it out and drying it at normal temperature for 2 hours.
06	Thermal shock storage	-10°C(30min) ~+25°C(5min)~ +60°C(30min) for 10 cycles
07	Packing vibration	Frequency range : 10Hz ~ 55Hz Amplitude of vibration : 1.5mm Sweep time: 12 min X,Y,Z 2 hours for each direction.
08	Packing drop test	According to ISTA 1A 2001.
09	Electrical Static Discharge	Air: ±15KV 150pF/330Ω 5 times
		Contact: ±8KV 150pF/330Ω 5 time

*Sample size for each test item is 3~5pcs

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10 - 2. Testing Conditions and Inspection Criteria

For the final test the testing sample must be stored at room temperature for 24 hours, after the tests listed in Table 10.2, Standard specifications for Reliability have been executed in order to ensure stability.

No	Item	Test Model	In section Criteria
01	Current Consumption	Refer To Specification	The current consumption should conform to the product specification.
02	Contrast	Refer To Specification	After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests.
03	Appearance	Visual inspection	Defect free.

10- 3. MTBF

MTBF	Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature (25±5℃), normal humidity (50±10% RH), and in area not exposed to direct sun light.

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11. Specification of Quality Assurance:

11-1. Purpose

This standard for Quality Assurance should affirm the quality of LCD module products to supply to purchaser by Kingtech Group Co.,Ltd (Supplier).

11-2. Standard for Quality Test

a. Inspection:

Before delivering, the supplier should take the following tests, and affirm the quality of product.

b. Electro-Optical Characteristics:

According to the individual specification to test the product.

c. Test of Appearance Characteristics:

According to the individual specification to test the product.

d. Test of Reliability Characteristics:

According to the definition of reliability on the specification for testing products.

e. Delivery Test:

Before delivering, the supplier should take the delivery test.

(i) Test method: According to MIL-STD105E.General Inspection Level Ⅱ take a single time.

(ii) The defects classify of AQL as following:

Major defect: AQL = 0.65

Minor defect: AQL = 2.5

Total defects: AQL = 2.5

11-3. Non- conforming Analysis & Deal With Manners

a. Non- conforming Analysis:

(i)   Purchaser should supply the detail data of non- conforming sample and the non-conforming.

(ii)   After accepting the detail data from purchaser, the analysis of non- conforming should be finished in two weeks.

(iii)   If supplier can not finish analysis on time, must announce purchaser before 3 days.

b. Disposition of non- conforming:

(i) If find any product defect of supplier during assembly time, supplier must change the good product for every defect after recognition.

(ii) Both supplier and customer should analyze the reason and discuss the disposition of non- conforming when the reason of nonconforming is not sure.

11-4. Agreement items

Both sides should discuss together when the following problems happen.

a.   There is any problem of standard of quality assurance, and both sides should think that must be modified.

b.   There is any argument item which does not record in the standard of quality assurance.

c.   Any other special problem.

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11-5. Standard of The Product Appearance Test
     a. Manner of appearance test:
      (i) The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30±5cm.
      (ii) When test the model of transmissive product must add the reflective plate.
      (iii)The test direction is base on around 10° of vertical line.
      (iiii)Temperature: 25±5℃   Humidity: 60±10%RH
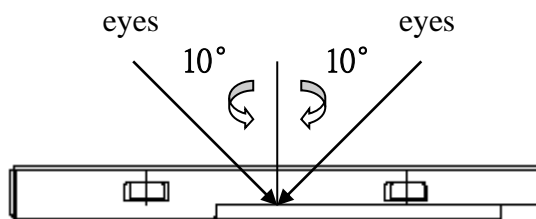
     (iv) Definition of area:
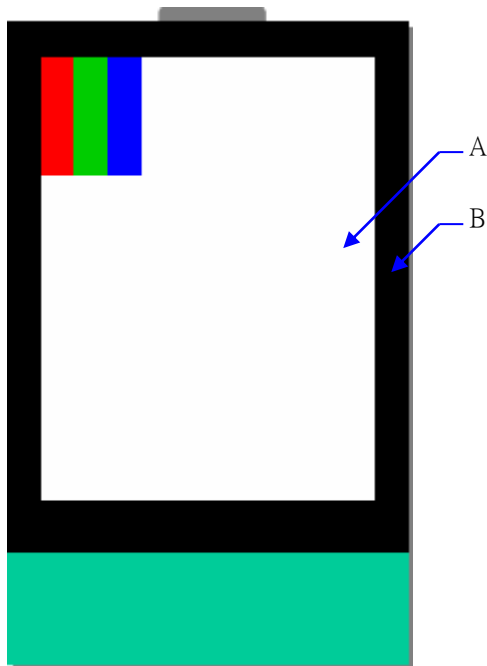
A. Area: Viewing area.
B. Area: Out of viewing area.
       (Outside viewing area)
b. Basic principle:
  (i) It will accord to the AQL when the standard can not be described.
  (ii) The sample of the lowest acceptable quality level must be discussed by both supplier and
      customer when any dispute happened.
  (iii) Must add new item on time when it is necessary.
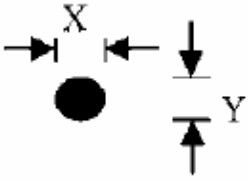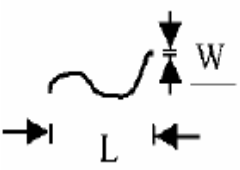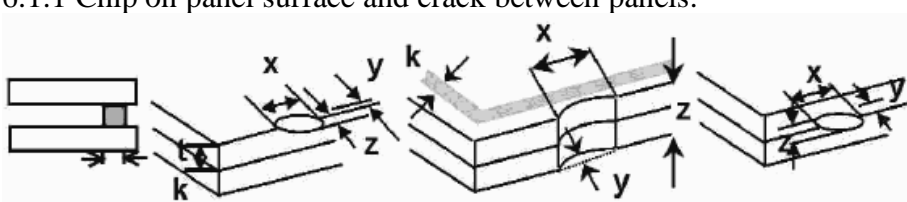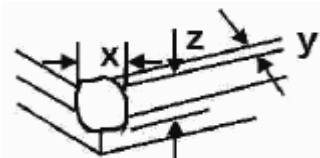
c. Standard of inspection: (Unit: mm)

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11-6. Inspection specification
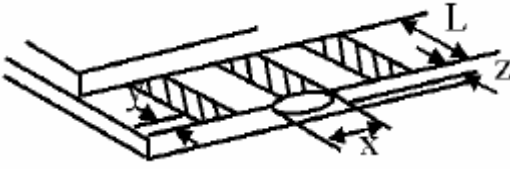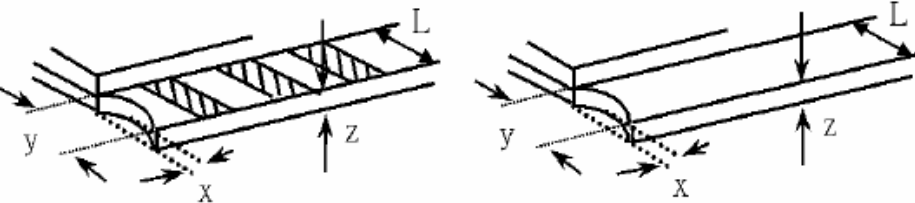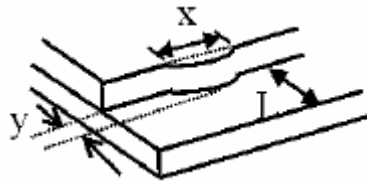
NO	Item	Criterion	AQL
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 1.7 Mixed product types. 1.8 Flicker	**0.65**
02	Black or White spots or Bright spots or Color spots on LCD (Display only)	2.1 White and black or color spots on display $\leqq$ 0.25mm, no more than Five spots. 2.2 Densely spaced: No more than three spots within 3mm.	**2.5**
03	LCD and Touch Panel black spots, white spots, contamination (non – display)	3.1 Round type: As following drawing $\Phi = (X+Y) / 2$ | Size(mm)	Acceptable Q'ty
---	---
$\Phi \leqq 0.10$	Accept no dense
$0.10 < \Phi \leqq 0.20$	2
$0.20 < \Phi \leqq 0.25$	2
$0.25 < \Phi \leqq 0.30$	0
$0.30 < \Phi$	0	 * Densely spaced: No more than two spots within 3mm.	**2.5**
		3.2 Line type: (As following drawing) | Length(mm)	Width(mm)	Acceptable Q'ty
---	---	---
---	$W \leqq 0.02$	Accept no dense
$L \leqq 3.0$	$0.02 < W \leqq 0.05$	2
$L \leqq 2.5$	$0.03 < W \leqq 0.08$	
---	$0.08 < W$	Rejection | * Densely spaced: No more than two lines within 3mm.	**2.5**

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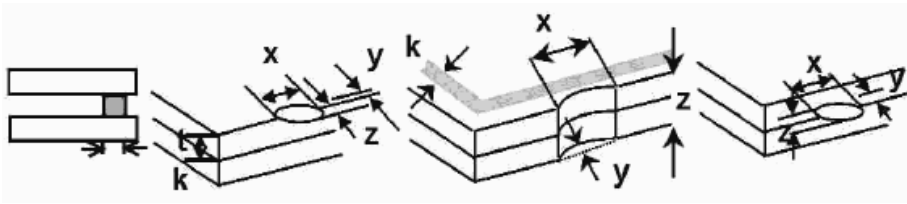| NO	Item	Criterion	AQL
04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction <table><tr><td>Size Φ(mm)</td><td>Acceptable Q'ty</td></tr><tr><td>Φ≦0.20</td><td>Accept no dense</td></tr><tr><td>0.20< Φ≦0.50</td><td>3</td></tr><tr><td>0.50< Φ≦1.00</td><td>0</td></tr><tr><td>1.00< Φ</td><td>0</td></tr><tr><td>Total Q'ty</td><td>3</td></tr></table>	2.5
05	Scratches	Follow NO.3 -2 Line Type.	
06	Chipped glass	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 6.1 General glass chip: 6.1.1 Chip on panel surface and crack between panels: <table><tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr><tr><td>Z≦1/2t</td><td>Not over viewing area</td><td>x≦1/8a</td></tr><tr><td>1/2t< z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr></table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 6.1.2 Corner crack: <table><tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr><tr><td>Z≦1/2t</td><td>Not over viewing area</td><td>x≦1/8a</td></tr><tr><td>1/2t< z≦2t</td><td>Not exceed 1/3k</td><td>x≦1/8a</td></tr></table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip	2.5

NO	Item	Criterion	AQL

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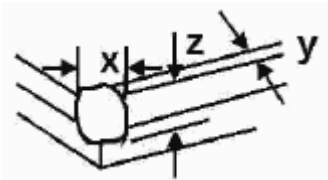
| 07 | Glass crack | Symbols:
x: Chip length　　y: Chip width　　z: Chip thickness
k: Seal width　　　t: Glass thickness　a: LCD side length
L: Electrode pad length
7.2 Protrusion over terminal:
7.2.1 Chip on electrode pad: | 2.5 |

Symbols:
x: Chip length　　　y: Chip width　　　z: Chip thickness
k: Seal width　　　　t: Glass thickness　a: LCD side length
L: Electrode pad length

7.2 Protrusion over terminal:

7.2.1 Chip on electrode pad:

y: Chip width	x: Chip length	z: Chip thickness
$y \leqq 0.5mm$	$x \leqq 1/8a$	$0 < z \leqq t$

7.2.2
Non-conductive portion:

y: Chip width	x: Chip length	z: Chip thickness
$y \leqq L$	$x \leqq 1/8a$	$0 < z \leqq t$

⊙ If   there
    chipped area touches the ITO terminal, over 2/3 of the ITO must
    remain and be inspected according to electrode terminal
    specifications.

⊙ If the product will be heat sealed by the customer, the alignment mark
    must mot be damaged.

7.2.3 Substrate protuberance and internal crack

y: width	x: length
$y \leqq 1/3L$	$X \leqq a$

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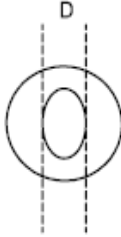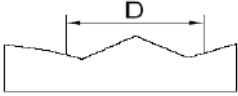
NO	Item	Criterion	AQL
08	Cracked glass	The LCD with extensive crack is not acceptable.	2.5
09	Backlight elements	9.1 Illumination source flickers when lit. 9.2 Spots or scratches that appear when lit must be judged. Using LCD spot, lines and contamination standards. 9.3 Backlight doesn't light or color is wrong.	2.5 2.5 0.65
10	Bezel	Bezel must comply with product specifications.	2.5
11	PCB、COB	11.1 COB seal may not have pinholes larger than 0.2mm or contamination. 11.2 COB seal surface may not have pinholes through to the IC. 11.3 The height of the COB should not exceed the height indicated in the assembly diagram. 11.4 There may not be more than 2mm of sealant outside the seal area on PCB. And there should be no more than three places. 11.5 Parts on PCB must be the same as on the production characteristic chart, There should be no wrong parts, missing parts or excess parts. 11.6 The jumper on the PCB should conform to the product characteristic chart.	2.5 2.5 2.5 2.5 0.65 0.65
12	FPC	12.1 FPC terminal damage $\leqq$ 1/2 FPC terminal width and can not affect the function , we judge accept. 12.2 FPC alignment hole damage $\leqq$ 1/2 alignment area and can not affect the function , we judge accept.	2.5 2.5
13	Soldering	13.1 No cold solder joints, missing solder connections, oxidation or icicle. 13.2 No short circuits in components on PCB or FPC.	2.5 0.65

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NO	Item	Criterion	AQL
14	Touch Panel Chipped glass	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Touch Panel Total thickness a: LCD side length L: Electrode pad length 14.1 General glass chip: 14.1.1 Chip on panel surface and crack between panels: 14.1.2 Corner crack: 	2.5

14.1.1 table:

z: Chip thickness	y: Chip width	x: Chip length	
$Z \leqq t$	$\leqq 1/2$ k and not over viewing area	$x \leqq 1/8a$	⊙ Unit:

mm
⊙ If there are 2 or more chips, x is the total length of each chip

14.1.2 table:

z: Chip thickness	y: Chip width	x: Chip length	
$z \leqq t$	$\leqq 1/2$ k and not over viewing area	$x \leqq 1/8a$	⊙ Unit:

mm
⊙ If there are 2 or more chips, x is the total length of each chip

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NO	Item	Criterion	AQL
15	Touch Panel(Fish eye、dent and bubble on film)	<table><tr><td>SIZE(mm)</td><td>Acceptable Q'ty</td></tr><tr><td>Φ≦0.2</td><td>Accept no dense</td></tr><tr><td>0.2< D ≦0.4</td><td>5</td></tr><tr><td>0.4< D ≦0.5</td><td>2</td></tr><tr><td>0.5< D</td><td>0</td></tr></table>	2.5
16	Touch Panel Newton ring	Newton ring dimension $\leqq$ 1/2 touch panel area and not affect font and line distortion($\leqq$2.5%) , it is acceptable.	2.5
17	Touch Panel Linearity	Less than 2.5% is acceptable.	2.5
18	LCD Ripple	Touch the touch panel , can not see the LCD ripple. Pen: R 1.0mm silicon rubber. Operation Force: 80g	2.5
19	General appearance	19.1 Pin type must match type in specification sheet. 19.2 LCD pin loose or missing pins. 19.3 Product packaging must the same as specified on packaging specification sheet. 19.4 Product dimension and structure must conform to product specification sheet.	0.65 0.65 0.65 0.65

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12. Handling Precaution:

12-1 Handling of LCM

- Don't give external shock.
- Don't apply excessive force on the surface.
- Liquid in LCD is hazardous substance. Must not lick and swallow. when the liquid is attach to your hand, skin, cloth etc. Wash it out thoroughly and immediately.
- Don't operate it above the absolute maximum rating.
- Don't disassemble the LCM.
- The operators should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads,the copper leads on the PCB and the interface terminals with any parts of the human body.
- The modules should be kept in antistatic bags or other containers resistant to static for storage.
- The module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

12-2 Storage

- Store in an ambient temperature of 25±10℃, and in a relative humidity of 50±10%RH. Don't expose to sunlight or fluorescent light.
- Storage in a clean environment, free from dust, active gas, and solvent.
- Store in anti-static electricity container.
- Store without any physical load.

12-3 Soldering

- Use only soldering irons with proper grounding and no leakage.
- Iron: No higher than 280±10℃ and less than 3 sec during Hand soldering.
- Rewiring: no more than 2 times.