SPECIFICATION

PV07053T0124E-CO

■ Preliminary Specification

□ Final Specification

Kingtech Group Co.,Ltd

CUSTOMER:

Made By:
Checked By:
Approved By:
Quality:
Date:
Note:

Approved By:
Date:
Note:

Records of Revision

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2021-04-10		V01	First Issue	

Contents

![KINGTECH Kingtech Group Co., Ltd. ---- Lcd Touchscreen Expert]

Add: 2nd Floor, Building C, Jia Huang Yuan Technical Park, Tiegang, Xixiang, Bao'an District, Shenzhen city, Guangdong province, P.R.China 518126.
E-mail: Helen@kingtechgroup.cn　　TEL: 86-755- 23037763　　Mobile: +86-139-2528-0716　　Web: www.kingtechgroup.cn

1. General Specification

Item	Contents	Unit
LCD TYPE	TFT/TRANSMISSIVE	
MODULE SIZE (W*H*T)	165.62*107.45*2.8	MM
ACTIVE SIZE (W*H)	150.72*94.2	MM
PIXEL PITCH (W*H)	0.11775*0.11775	MM
NUMBER OF DOTS	1280*800	
LCM DRIVER IC	ILI9881	
INTERFACE TYPE	MIPI	
TOP POLARIZER TYPE	ANTI-GLARE	
RECOMMEND VIEWING DIRECTION	ALL	O'CLOCK
GRAY SCALE INVERSION DIRECTION	--	O'CLOCK
BACKLIGHT TYPE	20-CHIP WHITE LED	
TOUCH PANEL TYPE	CAPACITIVE	

2. Mechanical Drawing

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3. Block Diagram

VIO28/VIO18
GND
LRSTB
LPTE
LCD_ID

"ILITEK"
ILI9881
(COG)
LCD
Controller/
Driver or
Equivalent

Gate:800

7.0″
TFT LCD Panel
1280(RGB)*800

MIPI_TDN/P2
MIPI_TDN/P1
MIPI_TDN/P0
MIPI_TCN/P

MIPI

Source:1280*RGB

VDD
D+
D-
GND

TOUCH PANEL

VLED_P
VLED_N

BL Circuit(20-Dies LED)

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4. Interface Pin Function

Pin No.	Symbol	Description
1	GND	GROUND
2	VLED_N	LED CATHODE
3	LRSTB	RESET PIN
4	LPTE	TEARING EFFECT
5	VI028_PMU	POWER SUPPLY FOR ANALOG
6	VI018_PMU	POWER SUPPLY FOR LOGIC
7	LCD_ID	Product ID signal output (1.8V)
8	GND	GROUND
9	MIPI_TDN2	MIPI DATA NEGATIVE SIGNAL(2N)
10	MIPI_TDP2	MIPI DATA NEGATIVE SIGNAL(2P)
11	GND	GROUND
12	GND	GROUND
13	GND	GROUND
14	VLED_P	LED ANODE
15	GND	GROUND
16	MIPI_TCP	MIPI CLK POSITIVE SIGNAL(CLKP)
17	MIPI_TCN	MIPI CLK NEGATIVE SIGNAL(CLKN)
18	GND	GROUND
19	MIPI_TDN0	MIPI DATA NEGATIVE SIGNAL(0N)
20	MIPI_TDP0	MIPI DATA NEGATIVE SIGNAL(0P)
21	GND	GROUND
22	MIPI_TDN1	MIPI DATA NEGATIVE SIGNAL(1N)
23	MIPI_TDP1	MIPI DATA NEGATIVE SIGNAL(1P)
24	GND	GROUND

CTP PIN

Pin No.	Symbol	Description
1	VDD	Power supply
2	D-	Data bus.
3	D+	Data bus.
4	GND	Ground
5	GND	Ground

5. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply voltage for analog	VI028_PMU	-0.3	6.6	V
Supply voltage for logic	VI018_PMU	-0.3	3.6	V
Supply current (One LED)	I_{LED}		30	mA
Operating temperature	T_{OP}	-20	+70	°C
Storage temperature	T_{ST}	-30	+80	°C

Note: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

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6. Electrical Characteristics

6.1 Input Power

Item	Symbol	Min	Typ.	Max	Unit	Applicable terminal
Supply Voltage for Analog	VI028_PMU	2.5	2.8	6.6	V	
Supply Voltage for Logic	VI018_PMU	1.65	1.8	3.3	V	
Input Voltage	V_{IL}	-0.3	-	0.3* VI018_PMU	V	
	V_{IH}	0.7* VI018_PMU	-	VI018_PMU		
Input leakage Current	I_{LKG}	-		-	μA	

6.2 Backlight Driving Conditions

Item	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V_F	14.5	16	16.5	V	I_L =80mA
Current for LED Backlight	I_L		80		mA	
Power Consumption	P		1.28		W	
LED Life Time		30,000	50,000		Hr	Note

Note: Brightness to be decreased to 50% of the initial value at ambient temperature TA=25℃

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6.3 CTP Electrical characteristics

Item	Contents	Unit
Structure	G+G	
Outline dimension	170.00*115.00±0.2	mm
Outline dimension of sensor	164.62*106.45±0.2	mm
View area	151.72*95.20±0.2	mm
Drive IC	ILI2511	
Interface type	USB	
Supply voltage	5V	V
I/O voltage	3.3V	V
Number of touch point	10	Point
Connector type	53261-0571	
Transmittance of view area	≥85%	
Hardness	≥7H	

Item	Symbol	Value	Unit
Power supply voltage	VBUS	4.4~5.5	V
I/O digital voltage	IOVCC	1.71~3.6	V
Operating temperature	Topr	-20~+70	℃
Storage temperature	Tstg	-30~+80	℃

7. Optical Characteristics

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
				MIN	TYP.	MAX		
Luminance		L	I_L =80mA	200	250	350	Cd/m^2	
Contrast Ratio		CR	θ=0°	700	850			
Response Time		T_{ON}	25°C	--	30	35	ms	
		T_{OFF}						
CIE Color Coordinate	Red	X_R	Viewing normal angle	0.573	0.613	0.653		
		Y_R		0.317	0.357	0.397		
	Green	X_G		0.300	0.340	0.380		
		Y_G		0.540	0.580	0.620		
	Blue	X_B		0.118	0.158	0.198		
		Y_B		0.126	0.166	0.206		
	White	X_W		0.280	0.320	0.360		
		Y_W		0.330	0.370	0.410		
Viewing Angle	Hor.	θ_{X+}	CR≥10	80	85		Degree	
		θ_{X-}		80	85			
	Ver.	θ_{Y+}		80	85			
		θ_{Y-}		80	85			
Uniformity		Un		70	75		%	

Note 1: Definition of Viewing Angle θx and θy:
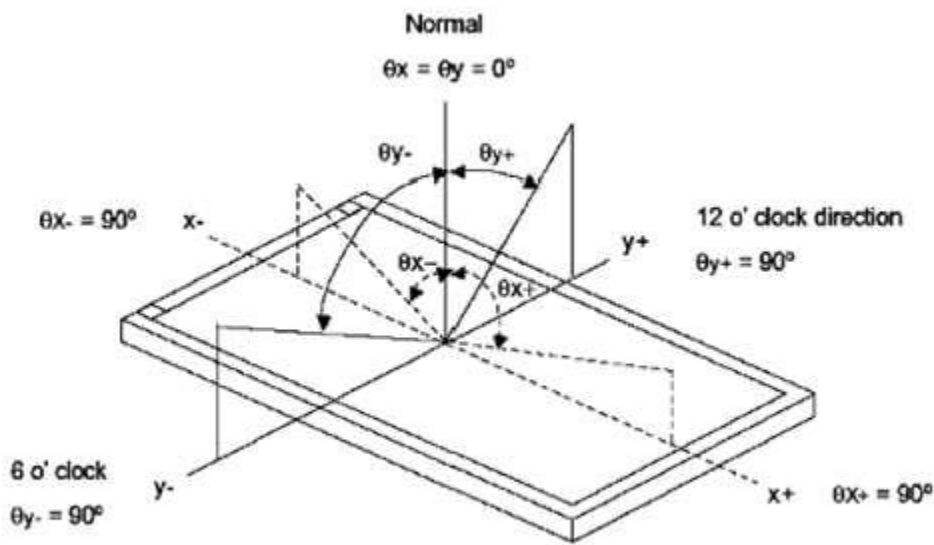
Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Luminance of white state}}{\text{Luminance of black state}}$$

Note 3: Definition of Response Time(Tr,Tf)
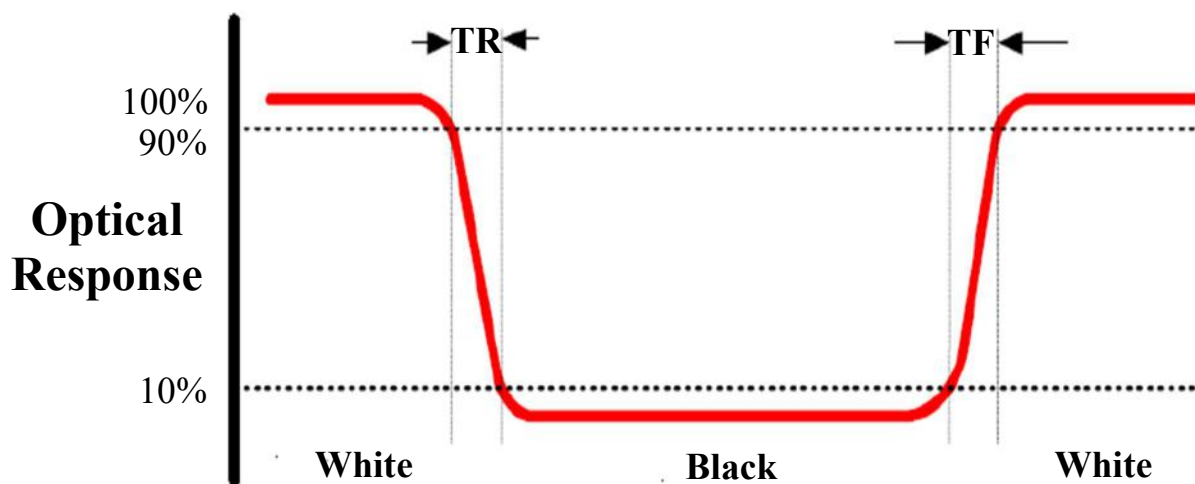
Note 4: Definition of Luminance

①The Brightness Test Equipment Setup

Field=2°(As measuring "black" image, field=2°is the best testing condition)

BM-7

Field=2°

50cm

TFT-LCD Panel

The center of the screen
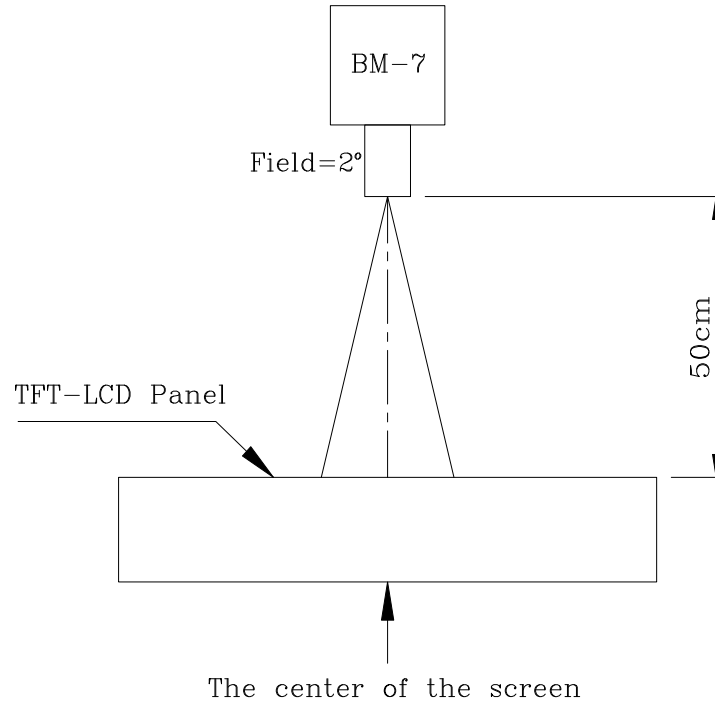
②The Brightness Test Point Setup

H/6

H/3

Active area
H

H/3

H/6

L/6   L/6   L/6   L/6

L

Active area

Unit: mm
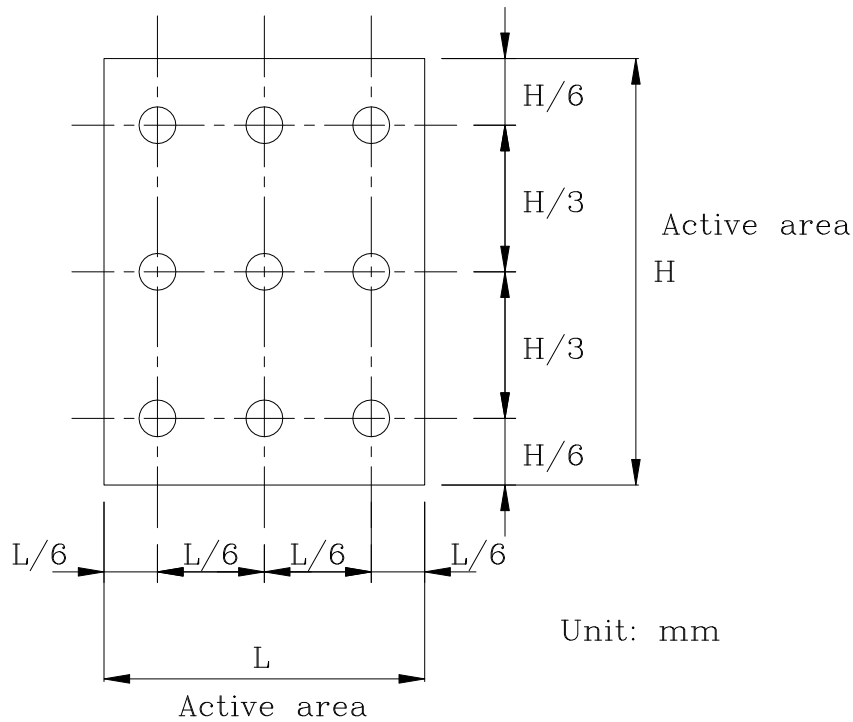
8. Timing Characteristics

8.1 Signal timing
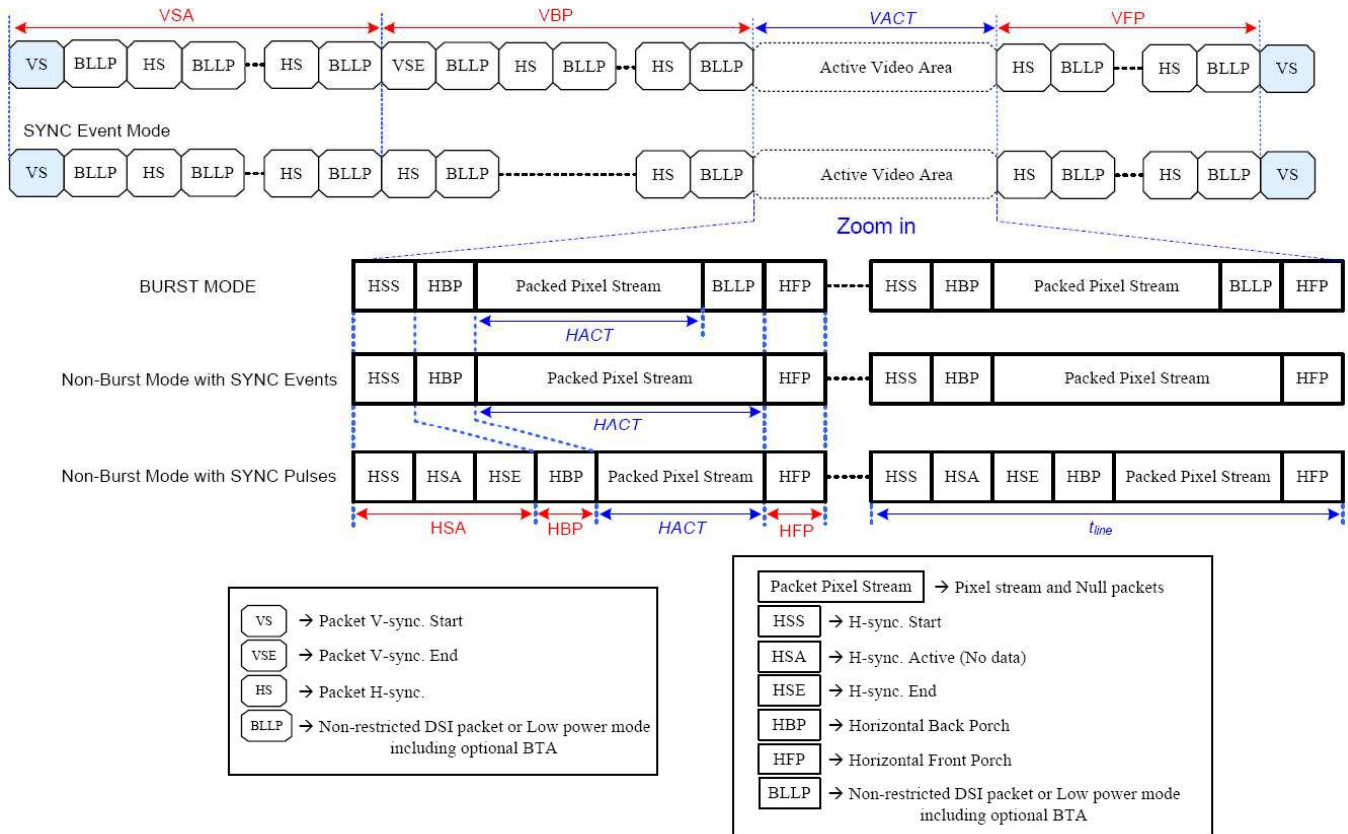
Parameters	Symbols	Min.	Typ.	Max.	Units
Vertical sync. active	VSA	2 (Note5)	-	-	Line
Vertical Back Porch	VBP	14 (Note5)	-	-	Line
Vertical Front Porch	VFP	8 (Note5)	-	-	Line
Active lines per frame	VACT	-	1280	-	Line
Horizontal sync. active	HSA	2	-	-	Pixel
Horizontal Porch period	HSA + HBP + HFP	1.6	-	-	us
Active pixels per line	HACT	-	720	-	Pixel
Bit rate	BR$_{bps}$	385		Note4	Mbps/lane

1UI=1/Bit rate
HAS(pixel)=(tHSA*lane number)/(UI*pixel format)
HBP(pixel)=(tHBP*lane number)/(UI*pixel format)
HFP(pixel)=(tHFP*lane number)/(UI*pixel format)

$$Frame\ Rate = \frac{BR_{bps}\ x\ Lane_{num}}{(VACT + VSA + VBP + VFP)x(HACT + HSA + HBP + HFP)x\ Pixel\ Format}$$

Example: BR$_{bps}$ = 457Mbps/lane, 1UI =2.1883ns, Frame rate=60Hz,VACT=1280,VSA=2, VBP=30, VFP=20, HACT=720, HAS=33, HBP=100, HFP=100, Lane$_{num}$=4(lane), Pixel Format=24(bit).

Note:
1. Lane$_{num}$: Date lane of MIPI-DSI.
2. The formula exists slightly error because of the host-transmission way.
3. The best frame rate setting: 2data lanes :50~60Hz/ 3data lanes :50~70Hz/ 4data lanes: 50~70Hz.
4. Limited Clock Channel Speed

Data type	Two Lanes speed	Three Lanes speed	Four Lanes speed
Data Type = 00 1110 (0Eh), RGB 565, 16 UI per Pixel	566 Mbps	466 Mbps	366 Mbps
Data Type = 01 1110 (1Eh), RGB 666, 18 UI per Pixel	637 Mbps	525 Mbps	412 Mbps
Data Type = 10 1110 (2Eh), RGB 666 Loosely, 24 UI per Pixel	850 Mbps	700 Mbps	550 Mbps
Data Type = 11 1110 (3Eh), RGB 888, 24 UI per Pixel	850 Mbps	700 Mbps	550 Mbps

5. The minimum values of this table mean the limitation of IC without considering the panel GIP. The actual values of VSA, VBP and VFP will be changed by different panel GIP setting.

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9.Standard Specification for Reliability

9.1Standard Specification for Reliability of LCD Module

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts = +70°C, 240 hours	IEC60068-21:2007 GB2423.2-2008
2	Low Temperature Operation	Ta = -20°C, 240 hours	IEC60068-2-1:2007 GB/2423.1-2008
3	High Temperature Storage	Ta = +80°C, 240 hours	IEC60068-21:2007 GB/2423.2-2008
4	Low Temperature Storage	Ta = -30°C, 240 hours	IEC60068-21:2007 GB/2423.1-2008
5	Storage at High Temperature and Humidity	Ta = +60°C, 90% RH max,240hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30°C 30 min~+80°C30 min, Change time:5min, 20 Cycle	Start with cold temperature, End with high temperature, IEC60068-214:1984, GB/2423.22-2002
7	ESD	C=150pF,R=330Ω,5point/panel Air:±8Kv,5times; Contact:±4Kv,5times (Environment:15°C~35°C, 30%~60%.86Kpa~106Kpa)	IEC61000-42:2001 GB/T17626.2-2006
8	Vibration Test	Frequency range:10~55Hz Stroke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z (6 hours for total)	IEC60068-2-6:1982 GB/T2423.101995
9	Mechanical Shock (Non Op)	Half Sine Wave60G 6ms, ±X,±Y,±Z 3times for each direction	IEC60068-2-27:1987 GB/T2423.5—1995
10	Package Drop Test	Height:80cm, 1corner,3 edges,6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

Note1: Ts is the temperature of panel's surface.
Note2: Ta is the ambient temperature of sample.

9.2 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 9.2, standard specifications for reliability will be 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.

9.3 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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10.Specification of Quality Assurance

This standard of Quality Assurance confirms to the quality of LCD module products supplied by Kingtech

10.1 Quality Test

Before delivering, the supplier should conduct the following tests to confirm the quality of products.

- Electrical-Optical Characteristics: According to the individual specification to test the product.
- Appearance Characteristics: According to the individual specification to test the product.
- Reliability Characteristics: According to the definition of reliability on the specification for testing products.

10.2 Delivery Test

Before delivering, the supplier should conduct the delivery test.

- Test method: According to MIL-STD105E.General Inspection Level II take a single Time.
- The defects classify of AQL as following:
  Major defect: AQL = 0.65
  Minor defect: AQL = 1.5
  Total defects: AQL = 1.5

10.3 Non-conforming Analysis & Deal With Manners

10.3.1 Non-conforming Analysis

- Purchaser should provide the data detail of non-conforming sample and the non-conforming.
- After receiving the data detail from purchaser, the analysis of non-conforming should be finished within two weeks.
- If the analysis can't be finished on time, supplier must notice purchaser 3 days in advance.

10.3.2 Disposition of non-conforming

- If any product defect be found during assembling, supplier must change the good for every defect after confirmation.
- Both supplier and customer should analyze the reason and discuss the disposition of non-conforming when the reason of nonconforming is not sure.

10.4 Agreement items

　　Both parties should negotiate together when the following problems happen.
- There is any problem of standard of quality assurance, and both sides should agree that it must be modified.
- There is any argument item which does not record in the standard of quality assurance.
- Any other special problem.

10.5 Standard of The Product Appearance Test

10.5.1 Manner of appearance test

- The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30±5cm.
- When test the model of transmissive product must add the reflective plate.
- The test direction is base on around 10° of vertical line.
- Temperature: 25±5°C　　Humidity: 60±10%RH
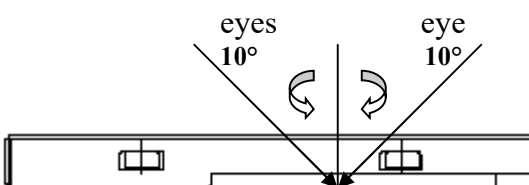
- Definition of area:
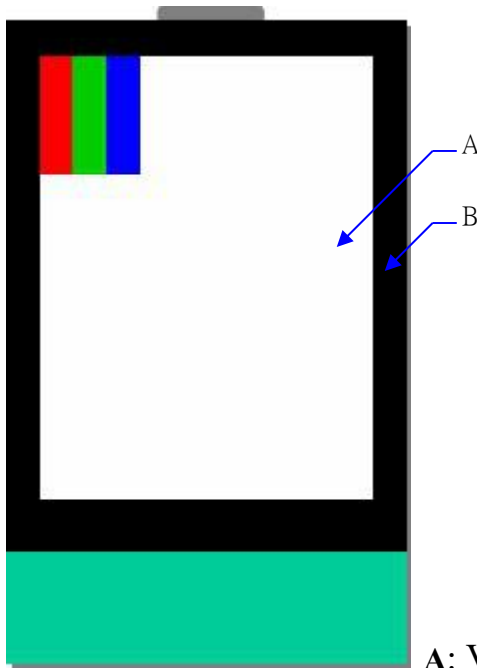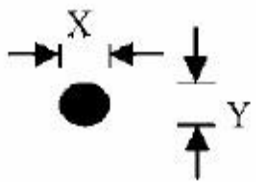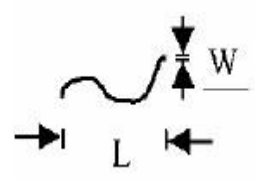
A: Viewing area B: Outside viewing area

10.5.2 Basic principle
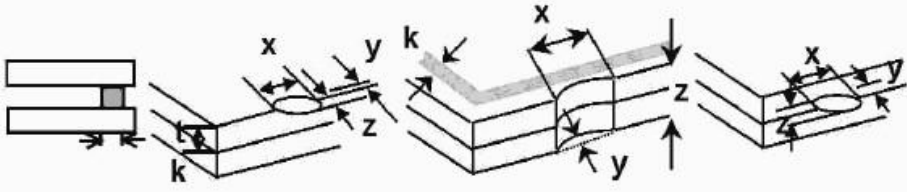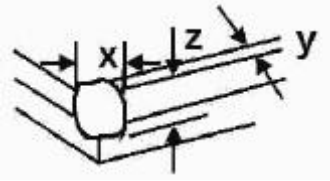
- When the standard can not be described, AQL will be applied.
- The sample of the lowest acceptable quality level must be negotiated by both supplier and customer when any dispute happened.
- New item must be added on time when it is necessary.

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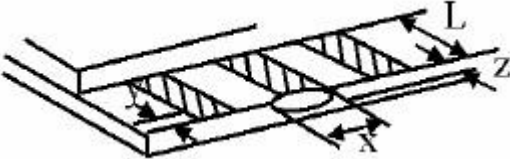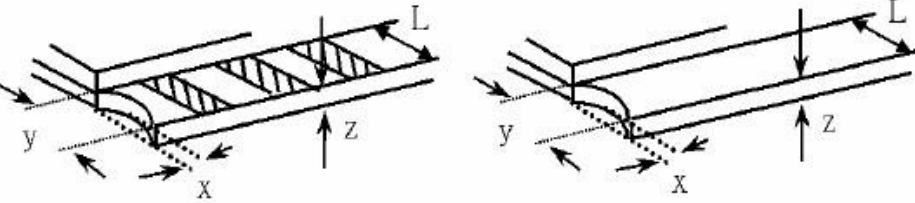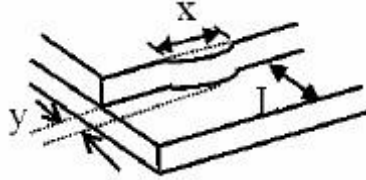
10.6 Inspection Specification

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.	**1.5**
03	LCD and Touch Panel black spots, white spots, contamination (non – display)	3.1 Round type: As following drawing $\Phi = (X+Y) / 2$ * Densely spaced: No more than two spots within 3mm. 3.2 Line type: (As following drawing) * Densely spaced: No more than two lines within 3mm.	**1.5** **1.5**

Table in 3.1:

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
$0.25 < \Phi \leqq 0.30$	1
$0.30 < \Phi$	0

Table in 3.2:

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

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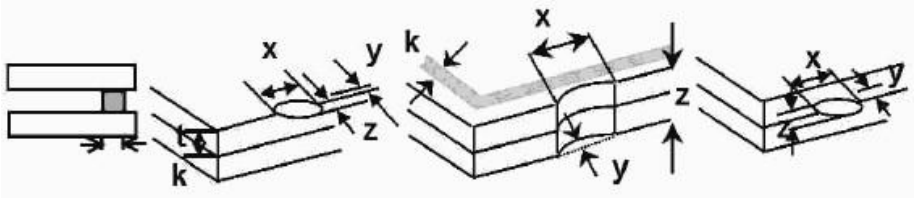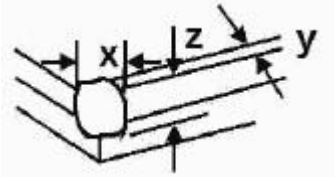| NO.	Item	Criterion			AQL
04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction	Size Φ(mm)	Acceptable Q'ty	1.5
			$\Phi \leqq 0.30$	Accept no dense	
			$0.30 < \Phi \leqq 0.50$	0	
			$0.50 < \Phi \leqq 1.00$	0	
			$1.00 < \Phi$	0	
			Total Q'ty	0	
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:			1.5

z: Chip thickness	y: Chip width	x: Chip length
$Z \leqq 1/2t$	Not over viewing area	$x \leqq 2MM$
$1/2t < z \leqq 2t$	Not exceed $1/3k$	$x \leqq 2MM$

⊙ Unit: mm
⊙ If there are 2 or more chips, x is the total length of each chip
6.1.2 Corner crack:

z: Chip thickness	y: Chip width	x: Chip length
$Z \leqq 1/2t$	Not over viewing area	$x \leqq 2MM$
$1/2t < z \leqq 2t$	Not exceed $1/3k$	$x \leqq 2MM$

⊙ 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
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: 7.2.2 Non-conductive portion: ⊙ 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 	1.5

7.2.1 table:

y: Chip width	x: Chip length	z: Chip thickness
y ≦ 0.5mm	x ≦ 2MM	0< z ≦ t

7.2.2 table:

y: Chip width	x: Chip length	z: Chip thickness
y ≦ L	x ≦ 2MM	0< z ≦ t

7.2.3 table:

y: width	x: length
y ≦ 1/3L	X ≦ 2MM

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

Add: 2nd Floor, Building C, Jia Huang Yuan Technical Park, Tiegang, Xixiang, Bao'an District, Shenzhen city, Guangdong province, P.R.China 518126.

E-mail: Helen@kingtechgroup.cn   TEL: 86-755- 23037763   Mobile: +86-139-2528-0716   Web: www.kingtechgroup.cn
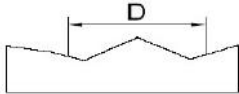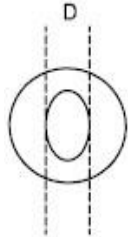
NO.	Item	Criterion	AQL
08	Cracked glass	No crack is allowed.	1.5
09	Backlight elements	9.1 Illumination source flickers when lit. 9.2 Spots or scratches that appear when lit must be judged. Using LCD spot, lines and contamination standards. 9.3 Backlight doesn't light or color is wrong.	1.5 1.5 0.65
10	Bezel	No scratches with W>0.1 and Length>2.5mm.	1.5
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.	1.5 1.5 1.5 1.5 0.65 0.65
12	FPC	FPC damage per IPC guidelines.(IPC-A-610) Nicks or damage along the edges of the flexible printed cir-cuitry and cutouts,providing the penetration does not exceed 50% of the distance from the edge to the nearest conductor to 2.5mm[0.1in], Whichever is less.	1.5
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. 13.3 Soldering per IPC guidelines.(IPC-A-610)	1.5 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: <table><tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr><tr><td>$Z \leqq t$</td><td>$\leqq 1/2$ k and not over viewing area</td><td>$x \leqq 2MM$</td></tr></table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 14.1.2 Corner crack: <table><tr><td>z: Chip thickness</td><td>y: Chip width</td><td>x: Chip length</td></tr><tr><td>$z \leqq t$</td><td>$\leqq 1/2$ k and not over viewing area</td><td>$x \leqq 2MM$</td></tr></table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip	1.5

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NO.	Item	Criterion	AQL
15	Touch Panel(Fish eye、dent and bubble on film)	SIZE(mm) / Acceptable Q'ty table: $\Phi \leqq 0.2$ — Accept no dense; $0.2< D \leqq 0.4$ — 5; $0.4< D \leqq 0.5$ — 2; $0.5< D$ — 0	1.5
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.	1.5
17	Touch Panel Linearity	Less than 1.5% is acceptable.	1.5
18	LCD Ripple	Touch the touch panel , can not see the LCD ripple. Pen: R 1.0mm silicon rubber. Operation Force: 80g	1.5
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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11. Handling Precaution

11.1 Handling of LCM

- Avoid external shock.
- Don't apply excessive force on the surface.
- Liquid in LCD is hazardous substance, do not lick or swallow. When the liquid is attaching to your hand, skin, cloth, etc., wash it thoroughly and immediately.
- Don't operate it above the absolute maximum rating.
- Don't disassemble the LCM.
- The operators should wear protections 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 careful when peeling off this protective film since static electricity may be generated.

11.2 Storage

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

11.3 Soldering

Use only soldering irons with proper grounding and no leakage.
Iron: no higher than 280±10°C and less than 3 sec during hand soldering.
Rewiring: no more than 2 times.

12.Packing Method

No.	Item	Dimensions(mm)	Quantity	Remark
1	LCM Module	170.00*115.00*6.37	24PCS	
2	TRAY	375*330*17 (include 2pcs products/one tray)	14PCS	
3	SMALL CARTON	393*345*115 (include 10pcs products/one carton)	2PCS	
4	LARGE CARTON	430*380*270 (include 20pcs products/one carton)	1PCS	