

## Approval sheet

**Customer:** \_\_\_\_\_  
**Model name:**                     JT220MTQI-01                      
**Spec NO:** \_\_\_\_\_  
**Date:**                     2013-9-3                      
**Version:**                     01                    

- Preliminary Specification**  
 **Final Specification**

### For Customer's Acceptance

Approved by	Content

Approved by	Reviewed by	Prepared by



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## 1. Introduction

### 1.1 Scope of application

This specification applies to the Negative type TFT transmissive dot matrix LCD module.

LCD specification: Dots 240xRGBx320.

As to basic specification of the driver IC, refer to the IC (ILI9341V ) specification and datasheet.

### 1.2 Structure:

Double display structure:

TFT Module + FPC +BL

262K FULL Dithering Color 2.2 inch TFT LCD size for main LCD;

One bare chip with gold bump (COG) TECH;

### 1.3 TFT features:

Structure: TFT PANNEL+IC+FPC+BL;

Transmissive Type LCD

240 dot-source and 320 dot-gate outputs;

White LED back light;

### 1.4 Applications:

Mobile phone

PSP

PDA

GPS

Etc...

## 2. General specification

ITEM	Standard value	UNIT
LCD Type	TFT Transmissive	---
Driver element	a-Si TFT	
Number of Dots	240*(RGB)*320	Dots
Pixel Arrangement	RGB Vertical Stripe	
Active Area	33.84x45.12	mm
Viewing Area (W*H)	--	mm
Viewing Direction	12 0' clock	
Driver IC	ILI9341V	
LCM Module Size(W*H*T)	41.04x56.45x2.85	mm
Approx. Weight	TBD	g
Back Light	White LED	
System interface	18 bit RGB interface	



## 4. ABSOLUTE MAXIMUM RATINGS

### DRIVING TFT LCD PANEL

Item	Symbol	Min	Max	Unit
Supply voltage	VCI	-0.3	4.6	V
Driver Supply voltage	VGH-VGL	-0.3	+32	V
Logic Supply voltage	IOVCC	-0.3	4.6	V
Operating temperature	T <sub>OP</sub>	-20	+70	°C
Storage temperature	T <sub>ST</sub>	-30	+80	°C

## 5. ELECTRICAL CHARACTERISTICS

### BACKLIGHT

Item	Symbol	Min	Typ	Max	Unit	REMARK
Forward Current	IF	--	45	--	mA	
Forward voltage	V <sub>BL</sub>	3	3.2	3.4	V	With 3 LEDS
Backlight Power Consumption	W <sub>BL</sub>	--	144	--	mW	
LIFE TIME			25000		HRS	

### TFT LCD PANEL

Item	Symbol	Min	TYP	Max	Unit	REMARK
Supply voltage	VCI	2.5	2.8	3.3	V	
Logic Supply voltage	IOVCC	1.65	2.8	3.3	V	

## 6. Data input timing

### 6.1 Signal AC Timing

(VCI=2.5~3.2V, Ta=25°C)

Parameter	Description	Min	Max	Unit
tSYNCS	VSYNC/HSYNC setup time	15		ns
tSYNCH	VSYNC/HSYNC	15		ns
tENS	ENAB	15		ns
tENH	ENAB	15		ns
tPOS	Data	15		ns
tPDH	Data	15		ns
PWDH	DCLK high-level period	15		ns
PWDL	DCLK low-level period	15		ns
tCYCD	DCLK cycle time	100		ns
trgbr , trgbf	DCLK,HSYNC,VSYNC rise/fall		15	ns

Table 6.1 RGB Interface Characteristics

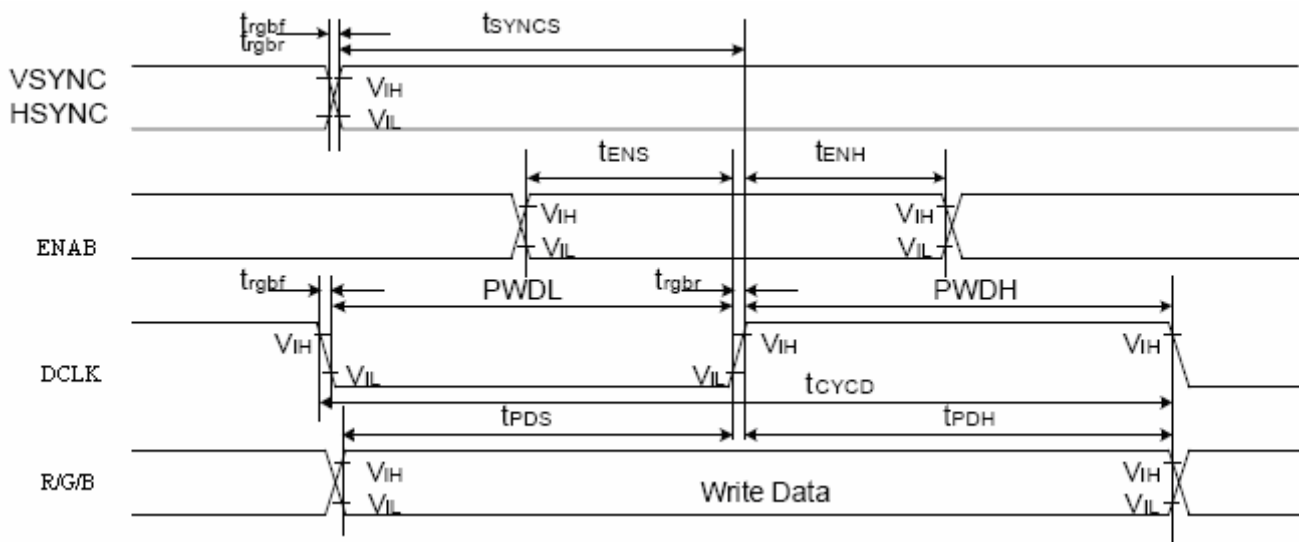


Fig.6-1 RGB Interface Timing

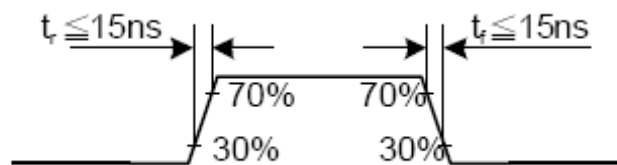


Fig.6-2 Input signal's rise and fall times



6.2 Recommend RGB Interface Timing

(VCI=2.5~3.2V, Ta=25°C)

Parameter	Symbol	Symbol	Min	Typ	Max	Unit
DCLK	DCLK frequency	fDCYC		5.64	10	MHz
	DCLK period	tDCYC	100	177.15		ns
HSYNC	Horizontal	T <sub>hd</sub>	240			DCLK
	1horizontalline	T <sub>h</sub>		310		
	Horizontal blank	T <sub>hb</sub>	56	60		
	Horizontal front porch	T <sub>hfp</sub>	2	10	16	
VSYNC	Vertical display area	T <sub>vd</sub>	320			Line
	Vsync period time	T <sub>v</sub>		328		
	Vsync blank	T <sub>vb</sub>	2	4		
	Vsync Front porch	T <sub>vfp</sub>	2	4		

Tab.6-2 Recommend Input Timing (DCLK, HSYNC, VSYNC, ENAB)

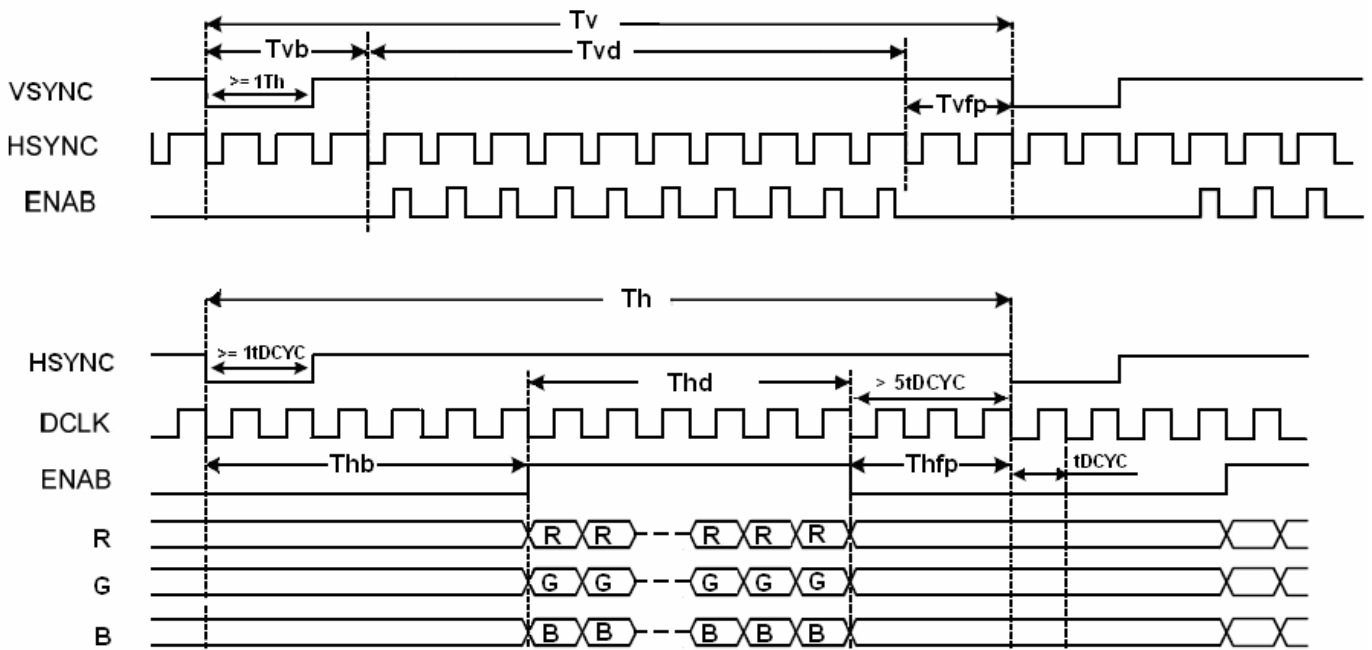


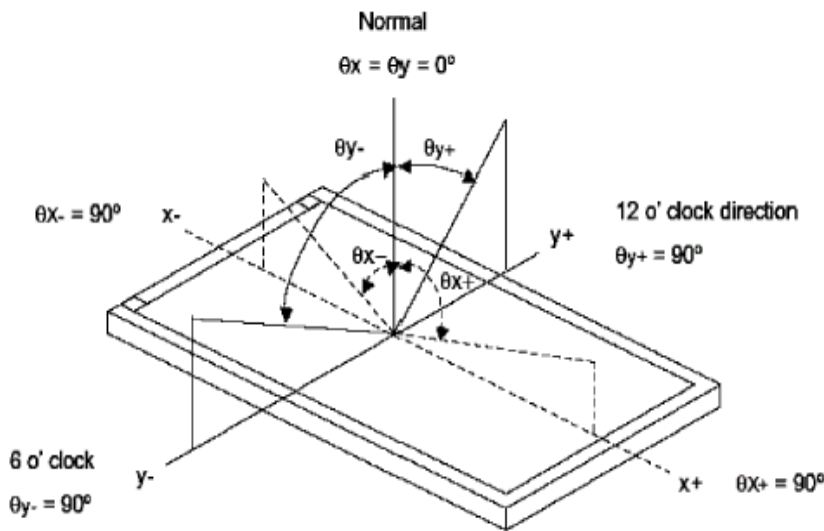
Fig.6-3 Recommend RGB Interface Timing

7. OPTICAL CHARACTERISTICS

Ta=25°C

ITEM	SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE	
			MIN.	TYP.	MAX			
Brightness	B	Viewing normal angle	--	200	--	Cd/m <sup>2</sup>	All left side data are based on TIANMA's product reference only	
Contrast Ratio	CR		250	350	--	--		
Response Time	Tr+Tf		--	40	60	ms		
CIE Color coordinate	Red		X <sub>R</sub>	0.253	0.303	0.353		
			Y <sub>R</sub>	0.309	0.359	0.409		
	Green		X <sub>G</sub>	0.581	0.631	0.681		
			Y <sub>G</sub>	0.265	0.315	0.365		
	Blue	X <sub>B</sub>	0.261	0.311	0.361			
		Y <sub>B</sub>	0.478	0.528	0.578			
White	X <sub>w</sub>	0.081	0.131	0.181				
	Y <sub>w</sub>	0.119	0.169	0.219				
Viewing Angle	Hor.	θ <sub>X+</sub>	40	45	--	Deg.		
		θ <sub>X-</sub>	40	45	--			
	Ver.	θ <sub>Y+</sub>	45	50	--			
		θ <sub>Y-</sub>	15	20	--			
Uniformity	Un		80			%		

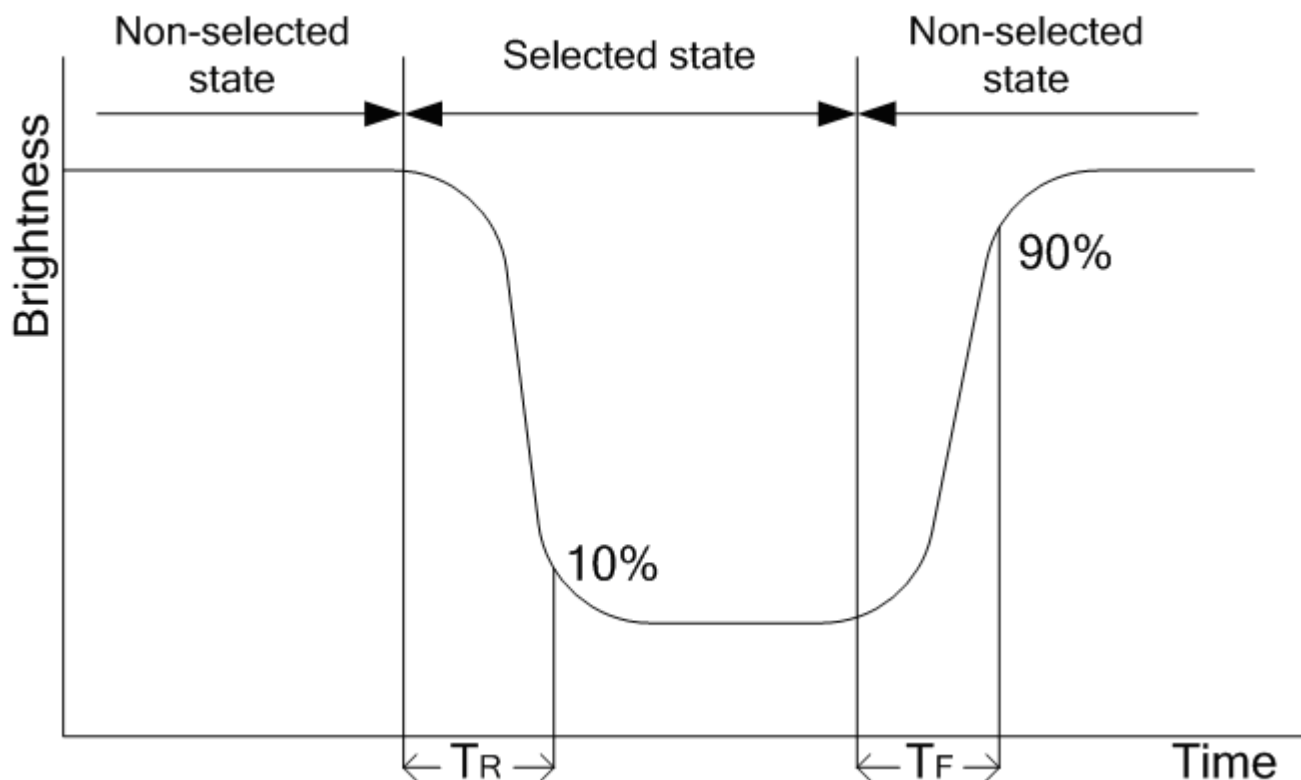
Note 1 : Definition of Viewing Angle θ<sub>x</sub> and θ<sub>y</sub> :



Note 2: Definition of contrast ratio CR:

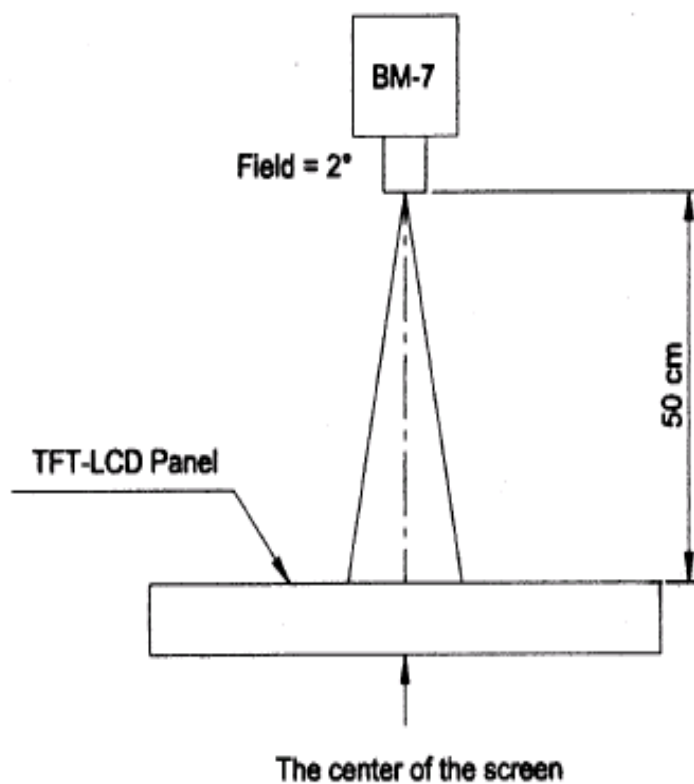
$$CR = \frac{\text{Brightness of non-selected dots (white)}}{\text{Brightness of selected dots (black)}}$$

Note 3: Definition of response time ( $T_R$ ,  $T_F$ )

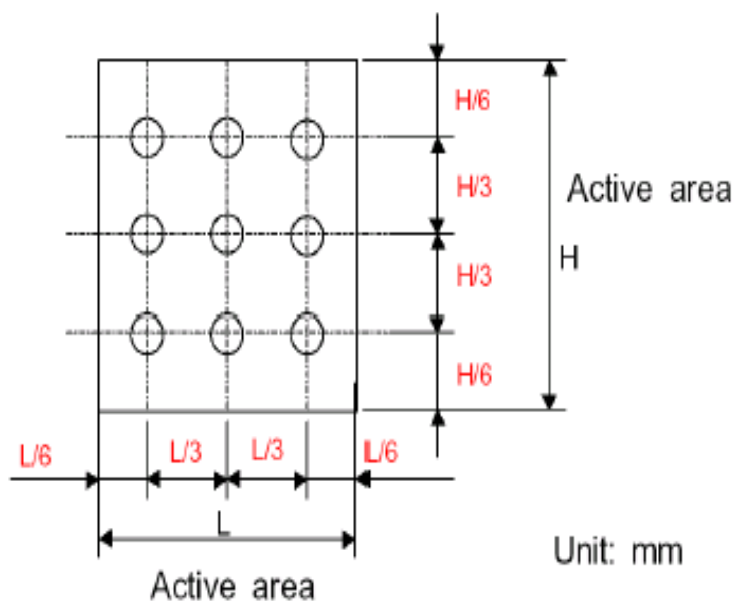


**The brightness test equipment setup**

20mA Field=2° (As measuring "black" image, field=2° is the best testing condition)



**Note 4 :**



## 8. Interface Pin Function

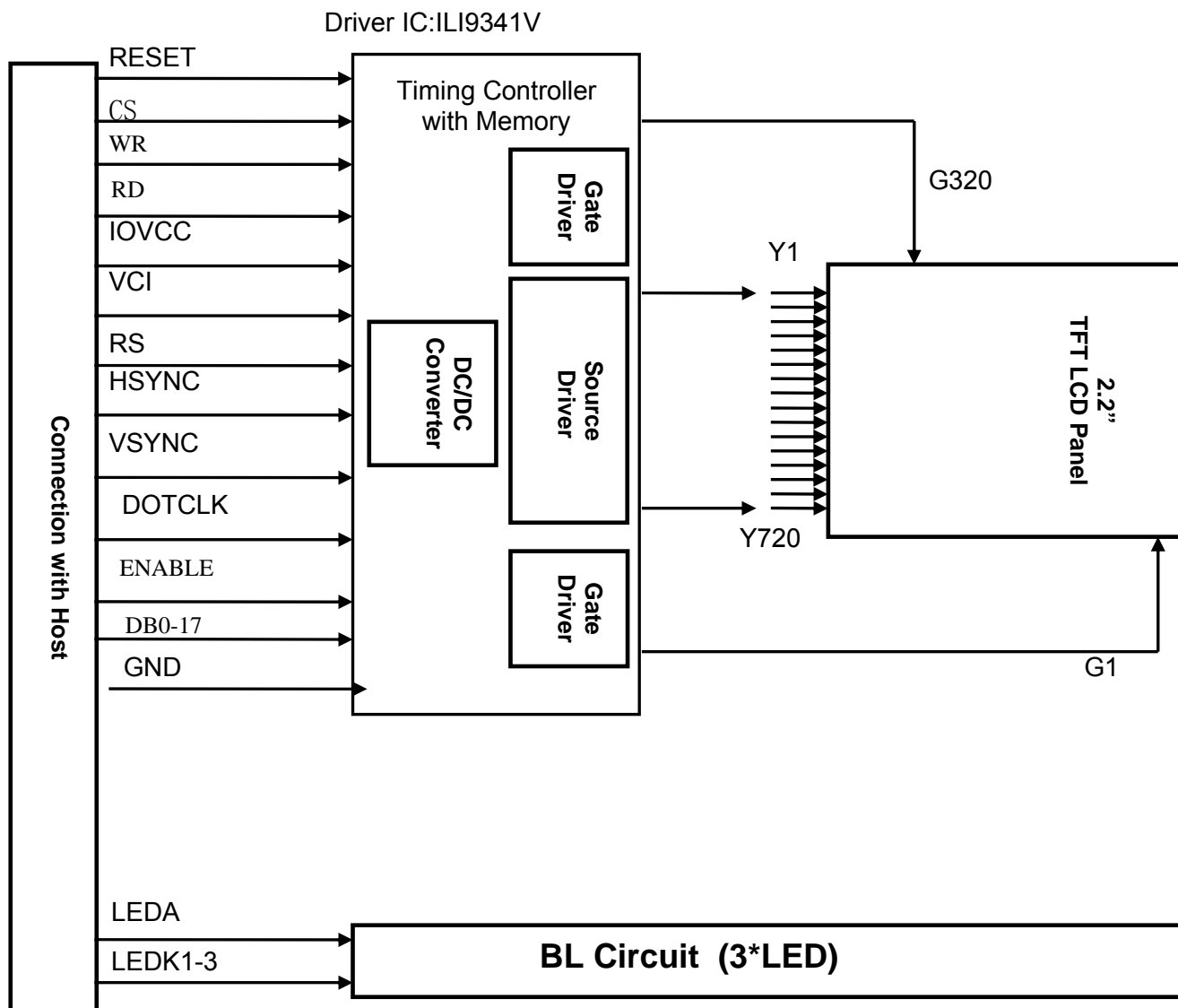
. Table 2: Pin assignment

Pin No.	Symbol	Description
1	GND	Ground
2	IM0	Select the MCU interface mode
3	IM1	Select the MCU interface mode
4	IM2	Select the MCU interface mode
5	IM3	Select the MCU interface mode
6	RESET	Reset input terminal
7	VSYNC	Vertical sync input in RGB mode
8	HSYNC	Horizontal sync input in RGB mode
9	DOTCLK	Pixel clock input in RGB mode
10	ENABLE	Data enable input in RGB mode
11	DB17	Data bus
12	DB16	Data bus
13	DB15	Data bus
14	DB14	Data bus
15	DB13	Data bus
16	DB12	Data bus
17	DB11	Data bus
18	DB10	Data bus
19	DB9	Data bus
20	DB8	Data bus
21	DB7	Data bus
22	DB6	Data bus
23	DB5	Data bus
24	DB4	Data bus
25	DB3	Data bus
26	DB2	Data bus
27	DB1	Data bus
28	DB0	Data bus
29	SDI	Serial data input
30	RD	Read signal
31	WR	Serves as command or parameter select
32	RS	Select data or command
33	CS	Chip select
34	FMARK	Synchronize MPU to frame writing
35	IOVCC	Power supply
36	VCI	Power supply

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37	GND	Ground
38	LEDA	LED+
39	LEDK1	LED-
40	LEDK2	LED-
41	LEDK3	LED-

## 9. BLOCK DIAGRAM



## 10. LCM Quality Criteria

### 10.1 VISUAL & FUNCTION INSPECTION STANDARD

#### 10.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

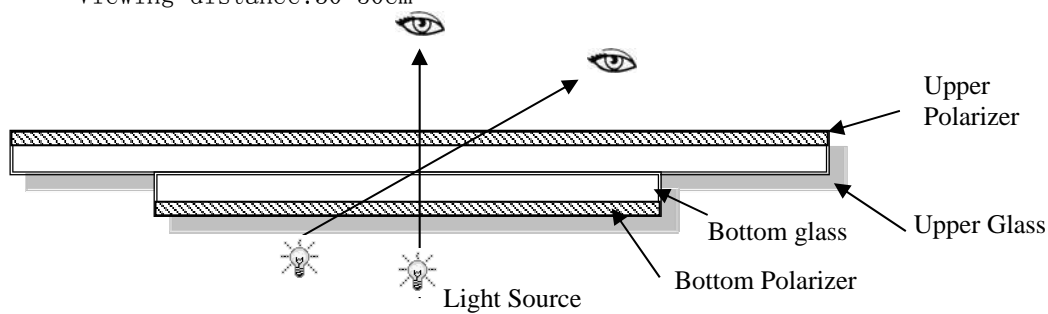
Temperature :  $25 \pm 5^{\circ}\text{C}$

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

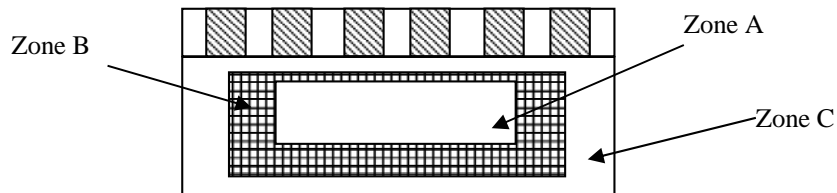
Viewing Angle : Normal viewing Angle.

Illumination: Single fluorescent lamp (300 to 700Lux)

Viewing distance: 30-50cm



#### 10.1.2 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 .)

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.



### 10.1.3 Sampling Plan

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

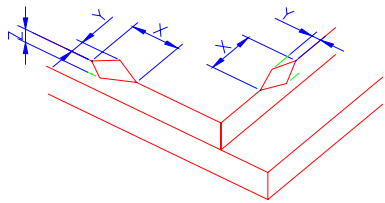
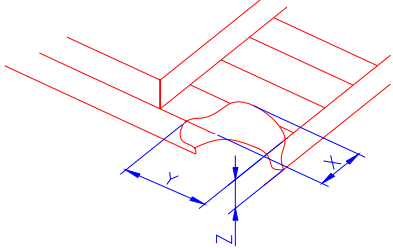
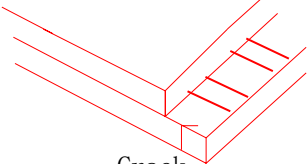
AQL:

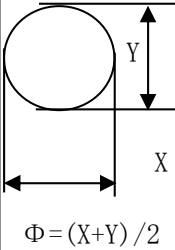
Major defect	Minor defect
0.65	1.5

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




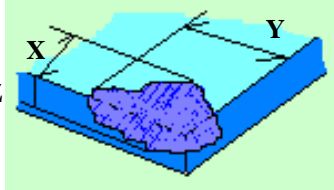
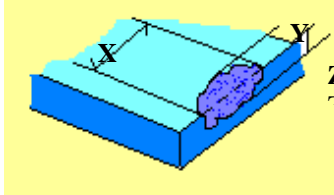
No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing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

10.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken  NOTE: X: Length Y: Width Z: Height L: Length of ITO, T: Height of LCD	(1) The edge of LCD broken	 <table border="1" data-bbox="852 819 1398 976"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td><math>\leq 3.0\text{mm}</math></td> <td>&lt;Inner border line of the seal</td> <td><math>\leq T</math></td> </tr> </tbody> </table>	X	Y	Z	$\leq 3.0\text{mm}$	<Inner border line of the seal	$\leq T$
X	Y	Z						
$\leq 3.0\text{mm}$	<Inner border line of the seal	$\leq T$						
	(2) LCD corner broken	 <table border="1" data-bbox="914 1305 1337 1379"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td><math>\leq 3.0\text{mm}</math></td> <td><math>\leq L</math></td> <td><math>\leq T</math></td> </tr> </tbody> </table>	X	Y	Z	$\leq 3.0\text{mm}$	$\leq L$	$\leq T$
X	Y	Z						
$\leq 3.0\text{mm}$	$\leq L$	$\leq T$						
	(3) LCD crack	 <p style="text-align: center;">Crack Not allowed</p>						

Number	Items	Criteria (mm)																																																									
2.0	Spot defect  $\Phi = (X+Y)/2$	<p>① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)</p> <table border="1" data-bbox="443 564 1235 927"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.10</math></td> <td colspan="2">Ignore</td> <td rowspan="4">Ignore</td> </tr> <tr> <td><math>0.10 &lt; \Phi \leq 0.15</math></td> <td colspan="2">3 ( distance <math>\geq 10\text{mm}</math>)</td> </tr> <tr> <td><math>0.15 &lt; \Phi \leq 0.2</math></td> <td colspan="2">1</td> </tr> <tr> <td><math>0.2 &lt; \Phi</math></td> <td colspan="2">0</td> </tr> </tbody> </table> <p>②Dim spot (LCD/TP/Polarizer dim dot, light leakage, dark spot)</p> <table border="1" data-bbox="443 999 1235 1361"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.1</math></td> <td colspan="2">Ignore</td> <td rowspan="4">Ignore</td> </tr> <tr> <td><math>0.1 &lt; \Phi \leq 0.2</math></td> <td colspan="2">2 ( distance <math>\geq 10\text{mm}</math>)</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.3</math></td> <td colspan="2">1</td> </tr> <tr> <td><math>\Phi &gt; 0.3</math></td> <td colspan="2">0</td> </tr> </tbody> </table> <p>③ Polarizer accidented spot</p> <table border="1" data-bbox="443 1433 1235 1738"> <thead> <tr> <th rowspan="2">Zone Size (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.2</math></td> <td colspan="2">Ignore</td> <td rowspan="3">Ignore</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.5</math></td> <td colspan="2">2 ( distance <math>\geq 10\text{mm}</math>)</td> </tr> <tr> <td><math>\Phi &gt; 0.5</math></td> <td colspan="2">0</td> </tr> </tbody> </table>	Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.10$	Ignore		Ignore	$0.10 < \Phi \leq 0.15$	3 ( distance $\geq 10\text{mm}$ )		$0.15 < \Phi \leq 0.2$	1		$0.2 < \Phi$	0		Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.1$	Ignore		Ignore	$0.1 < \Phi \leq 0.2$	2 ( distance $\geq 10\text{mm}$ )		$0.2 < \Phi \leq 0.3$	1		$\Phi > 0.3$	0		Zone Size (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.2$	Ignore		Ignore	$0.2 < \Phi \leq 0.5$	2 ( distance $\geq 10\text{mm}$ )		$\Phi > 0.5$	0	
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	Line defect (LCD/TP /Polarizer black/white line, scratch, stain)	<table border="1"> <thead> <tr> <th rowspan="2">Width (mm)</th> <th rowspan="2">Length (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.03</math></td> <td>Ignore</td> <td colspan="2">Ignore</td> <td rowspan="3">Ignore</td> </tr> <tr> <td><math>0.03 &lt; W \leq 0.05</math></td> <td><math>L \leq 3.0</math></td> <td colspan="2"><math>N \leq 2</math></td> </tr> <tr> <td><math>0.05 &lt; W \leq 0.08</math></td> <td><math>L \leq 2.0</math></td> <td colspan="2"><math>N \leq 2</math></td> </tr> <tr> <td><math>0.08 &lt; W</math></td> <td colspan="3">Define as spot defect</td> <td></td> </tr> </tbody> </table>				Width (mm)	Length (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.03$	Ignore	Ignore		Ignore	$0.03 < W \leq 0.05$	$L \leq 3.0$	$N \leq 2$		$0.05 < W \leq 0.08$	$L \leq 2.0$	$N \leq 2$		$0.08 < W$	Define as spot defect			
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3.0	Polarizer Bubble	<table border="1"> <thead> <tr> <th rowspan="2">Size (mm) \ Zone</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.2</math></td> <td colspan="2">Ignore</td> <td rowspan="4">Ignore</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.4</math></td> <td colspan="2">2 (distance <math>\geq 10\text{mm}</math>)</td> </tr> <tr> <td><math>0.4 &lt; \Phi \leq 0.6</math></td> <td colspan="2">1</td> </tr> <tr> <td><math>0.6 &lt; \Phi</math></td> <td colspan="2">0</td> </tr> </tbody> </table>				Size (mm) \ Zone	Acceptable Qty			A	B	C	$\Phi \leq 0.2$	Ignore		Ignore	$0.2 < \Phi \leq 0.4$	2 (distance $\geq 10\text{mm}$ )		$0.4 < \Phi \leq 0.6$	1		$0.6 < \Phi$	0							
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$0.6 < \Phi$	0																														
4.0	SMT	According to IPC-A-610C class II standard . Function defect and missing part are major defect , the others are minor defect.																													
		TP bubble/ accidented spot	<table border="1"> <thead> <tr> <th rowspan="2">Size <math>\Phi</math> (mm)</th> <th colspan="3">Acceptable Qty</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.1</math></td> <td colspan="2">Ignore</td> <td rowspan="4">Ignore</td> </tr> <tr> <td><math>0.1 &lt; \Phi \leq 0.2</math></td> <td colspan="2">2</td> </tr> <tr> <td><math>0.2 &lt; \Phi \leq 0.3</math></td> <td colspan="2">1</td> </tr> <tr> <td><math>0.3 &lt; \Phi</math></td> <td colspan="2">0</td> </tr> </tbody> </table>			Size $\Phi$ (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.1$	Ignore		Ignore	$0.1 < \Phi \leq 0.2$	2		$0.2 < \Phi \leq 0.3$	1		$0.3 < \Phi$	0							
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	Assembly deflection	beyond the edge of backlight $\leq 0.15\text{mm}$																													

5.0	TP Related	Newton Ring	Newton Ring area > 1/3 TP area NG	 <p>1 规律性</p>  <p>2 非规律性</p>  <p>似牛顿环</p>	Newton Ring area ≤ 1/3 TP area OK							
			TP corner broken X: length Y: width Z: height		<table border="1"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </tr> <tr> <td>X ≤ 3.0mm</td> <td>Y ≤ 3.0mm</td> <td>Z &lt; LCD thickness</td> </tr> </table> <p>* Circuitry broken is not allowed.</p>	X	Y	Z	X ≤ 3.0mm	Y ≤ 3.0mm	Z < LCD thickness	
			X		Y	Z						
X ≤ 3.0mm	Y ≤ 3.0mm	Z < LCD thickness										
TP edge broken X: length Y: width Z: height	<table border="1"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </tr> <tr> <td>X ≤ 6.0mm</td> <td>Y ≤ 2.0mm</td> <td>Z &lt; LCD thickness</td> </tr> </table> <p>* Circuitry broken is not allowed.</p>	X	Y	Z	X ≤ 6.0mm	Y ≤ 2.0mm	Z < LCD thickness					
X	Y	Z										
X ≤ 6.0mm	Y ≤ 2.0mm	Z < LCD thickness										

Criteria ( functional items)

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

10.2 RELIABILITY TEST

NO	ITEM	CONDITION	STANDARD
1	High Temp. Storage	70°C, 240 hours	1. Functional test OK

2	Low Temp. Storage	-30°C, 240 hours	
3	High Temp. Operation	60°C, 240 hours	
4	Low Temp. Operation	-20°C, 240 hours	
5	High temperature and high Humidity storage	40°C, 90%RH, 240 hours	
6	Thermal and cold shock	Static state, -30°C (30 Min) ~70°C (30 Min) ~ -30°C (30Min), packaging, 20 cycles	
7	Vibration test	Packaging, Frequency : 10-55Hz Amplitude : 1.0mm, Each direction on X,Y axe 0.5 hours, circle 2 hours	
8	Dropping test	Pack products into the carton box. Drop it from 80cm height to ground. Once for each side of the carton	

**NOTE:**

- 10.2.1 The reliability items will be fully performed in new sample qualification,
- 10.2.2 The reliability status will be tested as monitor during mass production.  
Individual reliability test shall be performed by lot, Moreover,  
the individual reliability item shall be decided according to reliability plan.
- 10.2.3 All samples are inspected after keeping in the room with normal temperature and humidity for 2 hours or above.
- 10.2.4 Vibration test: It is not necessary to test for those products without assembly frame, back light, PCB and so on.
- 10.2.5 Dropping test: It is necessary for affirming new package.
- 10.2.6 For the high temperature and high humidity test, pure water of over 10 MΩ.cm should be used.
- 10.2.7 Each test item applies for test LCM only once. Then tested LCM cannot be used again in any other test item.
- 10.2.8 The quantity of LCM examination for each test item is 5pcs to 10pcs.

**10.3 Safety instructions**

- 10.3.1 If the LCD panel breaks, be careful not to get any liquid crystal substance in your mouth.
- 10.3.2 If the liquid crystal substance touches your skin or clothes, please wash it off immediately by using soap and water.

**10.4 Handling Precautions**

- 10.4.1 Avoid static electricity damaging the LSI.
- 10.4.2 Do not remove the panel or frame from the module.
- 10.4.3 The polarizing plate of the display is very fragile. So, please handle it very carefully.
- 10.4.4 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of the plate.
- 10.4.5 The color tone of display and background of LCM has the possibility to be changed

in the storage temperature range.

10.4.6 Pay attention to the working environment, as the element may be destroyed by static electricity.

--Be sure to ground human body and electric appliance during work.

--Avoid working in a dry environment to minimize the generations of static electricity.

--Static electricity may be generated when the protective film is fast peeled off.

10.4.7 When soldering the terminal of LCM, make certain the AC power source of soldering iron does not leak.

10.4.8 If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft-dry-clean cloth. If it is heavily contaminated, moisten cloth with the following solvent(ex:Ethyl alcohol). Solvents other than those above- mentioned may damage the polarizer

(Especially, do not use them .ex: Warter / Ketone)

## 10.5 Operation instructions

10.5.1 It is recommended to drive the LCD within the specified voltage limits, try to adjust the operating voltage for the optimal contrast, the color and contrast of LCD panel will varies at different temperature.

10.5.2 Response time is greatly delayed at low operating temperature range. However, this does not mean the LCD will be out of the order, It will recover when it returns to the specified temperature range.

10.5.3 If the display area is pushed hard during operation, the display will become abnormal.

10.5.4 Do not operate the LCD at the environments over the specified conditions, this may cause damage on the LCD and shorten the lifetime.

## 10.6 Storage instructions:

10.6.1 Store LCDs in a sealed polyethylene bag.

10.6.2 Store LCDs in a dark place, Do not expose to sunlight or fluorescent light. Keep the temperature between 0°C and 35°C.

10.6.3 Avoid the polarizer touch any other object, ( It is recommended to store them in the container in which they were shipped.)

## 10.7 Limited Warranty

10.7.1 will replace or repair any of its LCD modules, which are found to be defective, when inspected in accordance with LCM acceptance standards ( copies available upon request ) for a period of 12 months from ink- print date on product

10.7.2 Any defects must be returned to within 60 days since ship-out. Confirmation of such date shall be based on freight documents. The warranty liability of wasam limited to repair and/or replacement on defects above (7.1,7.2)

10.7.3 No warranty can be granted if the precautions stated above have been disregarded. The typical samples are as below:

-- LCD glass crack/break

--PCB outlet is damaged or modified.

--PCB conductors damaged.

--Circuit modified with by grinding, engraving or painting varnish.

--FPC crack

10.7.4 Modules must be returned with sufficient description of the failures of defects. Any connectors or cable installed by the customer must be removed completely without damaging the PCB outlet, conductors and terminals. Modules must be packed with the container in which they were shipped.

## 11. Packing method

--TBD