SPECIFICATIONS FOR LCD MODULE

FOR CUSTOMER	
LCD MODEL	ZQ3506_V0
CUSTOMER APPROVED	

PREPARED BY	CHECKED BY	APPROVED BY	DATE
		JANCY	2010-10-9

■ Preliminary Specification

□ Final Specification

Note : All Materials And The Craft Must Conform To The RoHS
    Environmental Protection Requirement

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2. Revision History

Version	Content	Page	Date
1.0	Generation first version		2010-10-9

Note : The Product and specifications are subject to change without any notice.

Please ask for the latest Product Standards to guarantee the satisfaction of our product requirements.

4. PRODUCT INFORMATION

4.1. Description

ZQ3506_V0 is a color active matrix LCD module incorporating amorphous silicon TFT(Thin Film Transistor). It is composed of a color TFT-LCD panel, driver ICs, FPC and a backlight unit. The **3.5″ display area contains 320 (RGB) x 240 pixels and can display up to 262K colors.**

4.2. Applications

UMPC

Portable DVD

GPS

4.3. Features

High Resolution: 320(RGB) x 240 Dots

Adopting a high aperture ratio

2x3 LED backlight

Dot-Inversion

4.4. General Specifications

Item	Specification	Unit	Remark
Display Mode	Normally White	-	-
Display Technology	α-Si TFT active matrix	-	-
Outline Dimension	76.9 (H) X 63.9 (V) X 2.6(T)	mm	-
Active Area	70.08 (H) X 52.56 (V)	mm	-
Resolution	320X(RGB)X240	dots	-
Pixel Pitch	73X219	μm	-
Pixel Configuration	RGB Stripe	-	-
Weight	TBD	g	-
Backlight	6 LED	-	-
Luminance	(250)(Typ.)	cd/m2	-
Surface Treatment	Anti-Glare	-	-
Signal Interface	Digital 18-bits RGB	-	-
Viewing Direction	12：00	o'clock	

5. ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values Min.	Values Max.	Unit	Remark
Power voltage	VDD	-0.3	3.6	V	
Input voltage	Logic input	-0.	VDD+0.3	V	
Operation temperature	TOP	-10	60	℃	
Storage temperature	TST	-20	70	℃	
LED Reverse Voltage	VR	-	1.2	V	Each LED
LED Forward Current	IF	-	25	25	Each LED

6. ELECTRICAL SPECIFICATIONS(Ta=25°C)

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6-.1. DC CHARACTERISTICS
6.2.Backlight Driving Section
6-3 BACKLIGHT CHARACTERISTICS

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage for logic	VDD-VSS	2.8	3.3	3.6	V
Supply voltage for analog	Vci	—	—	—	V
Supply voltage for interface I/O	IOVcc	—	—	—	V
Input Current	Idd	—	2.08	3.26	mA
Input voltage 'H'level	VIH	0.8VDD	—	—	V
Input voltage 'L'level	VIL	—	—	0.18VDD	V
Output voltage 'H'level	VOH	0.9VDD	—	—	V
Output voltage 'L'level	VOL	—	—	0.1VDD	V

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LED Voltage	VL	-	19.2		V	-
LED Current	IL	-	20	-	mA	Note 7-1
Power Consumption	PLED	-	1.73	-	W	Note 7-2
Life Time	-	-	(50,000)	-	hr	Note 7-3

Note：
6-1: The LED driving condition is 20mA for each LED;
6-2: PLED is a calculated reference value (IL × VL);
6-3: The "lamp life time" is defined as the module luminance decrease to 50% original
luminance at Ta=25℃， IL=40 mA. (This is the reference value)

7. OPTICAL SPECIFICATIONS(Ta=25℃)

Item		Symbol	Min.	Typ.	Max.	Unit	Remarks
Contrast Ratio		C/R	-	250	-		Fig.1
Brightness			-	200	-	cd/m2	Full White Pattern
Brightness Uniformity			-	80	-	%	Full White Pattern Fig.1,2
Response Time		Tr+Tf	-	-	-	ms	Fig.3
Color Coordinate	WHITE	Wx	-	TBD	-		IBL=20mA
		Wy	-	TBD	-		Full White Pattern
view angle		θl	-	TBD	-	Degree	Fig.4 Center (C/R>5)
		θr	-	TBD	-		
		θu	-	TBD	-		
		θd	-	TBD	-		
Transmittance Ratio		TR		5.5		%	LCD With POL

Note:
1. Contrast Ratio(CR) is defined mathematically as :

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

2. Surface luminance is the center point across the LCD surface 500mm from the surface with all
pixels displaying white. For more information see FIG 1.
3. Response time is the time required for the display to transition from black to white (Rise Time, Tr) and from white
to black(Decay Time, Tf). For additional information see FIG 3.
4. Viewing angle is the angle at which the contrast ratio is greater than 5. The angles are determined for the
horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For
more information see FIG 4.
5. Optimum contrast is obtained by adjusting the LCD Threshold voltage (Vth& Vsat)

8. Viewing Modes

Reflective Type   Transflective Type   Transmissive Type
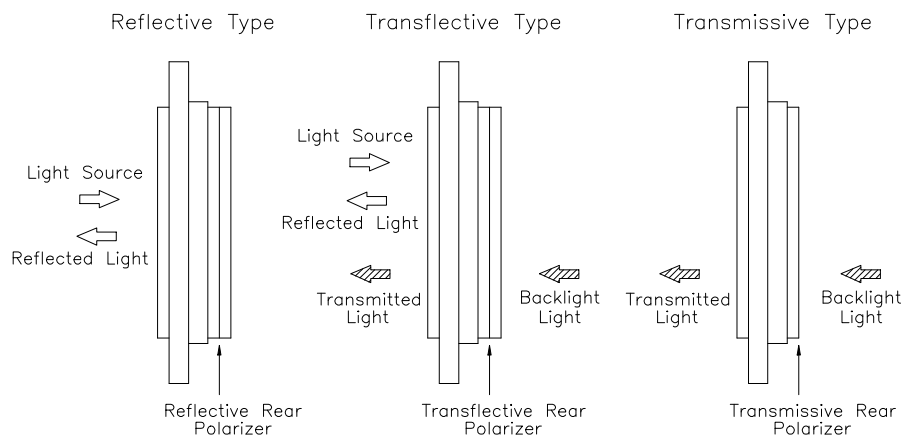
9. Electro-Optical Characteristics Test Method

<Transmissive Mode>
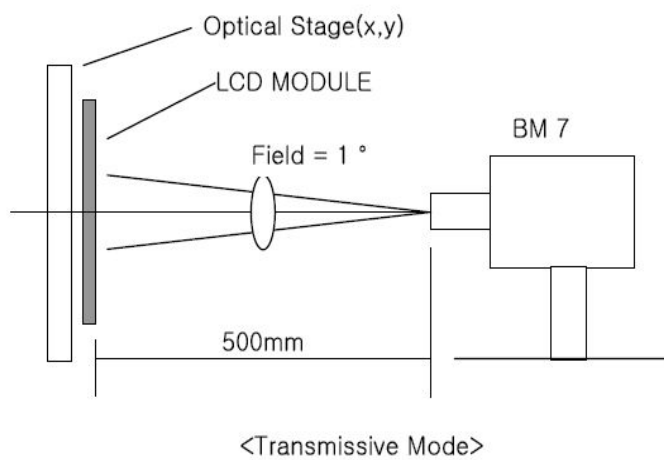
FIG. 1 Optical Characteristic Measurement Equipment and Method
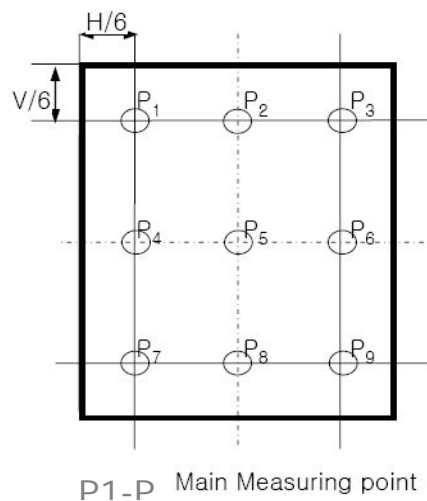

P1-P   Main Measuring point

Fig. 2 Measuring Points

The response time is defined as the following figure and shall be measured by switching the input signal for "black" and "white".
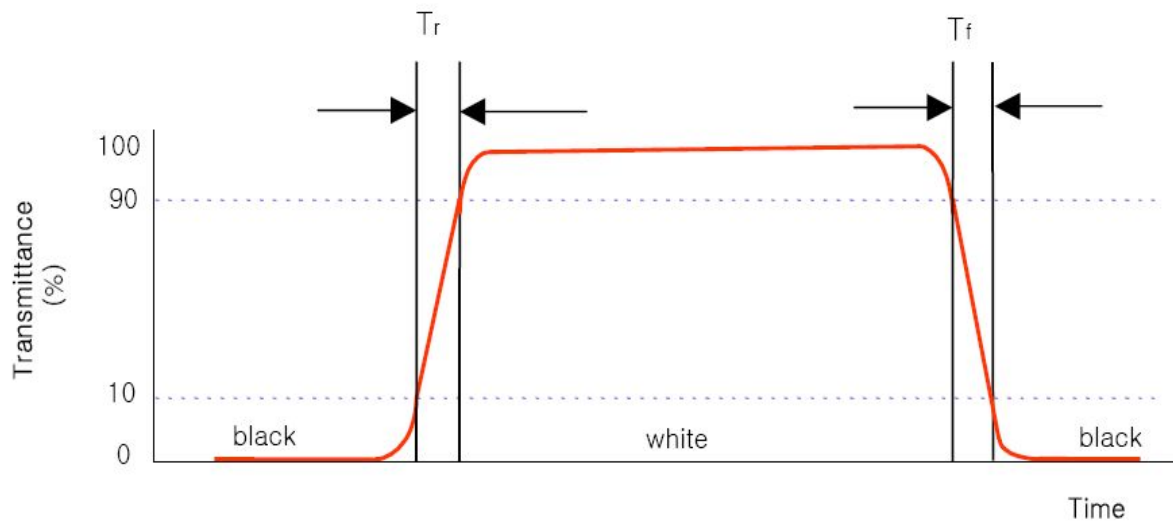

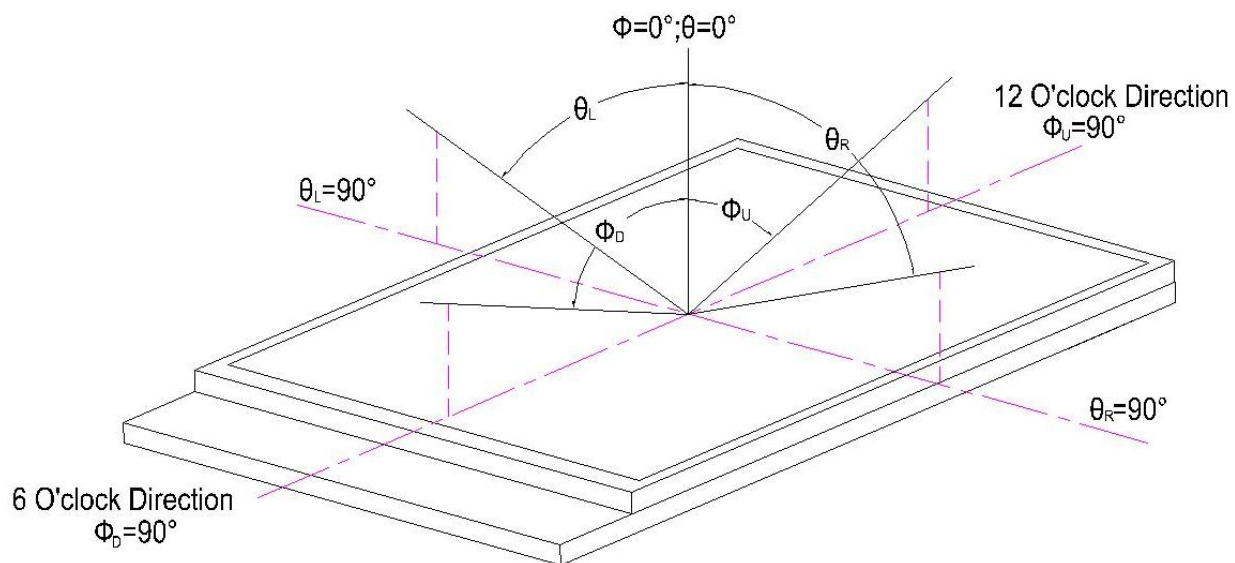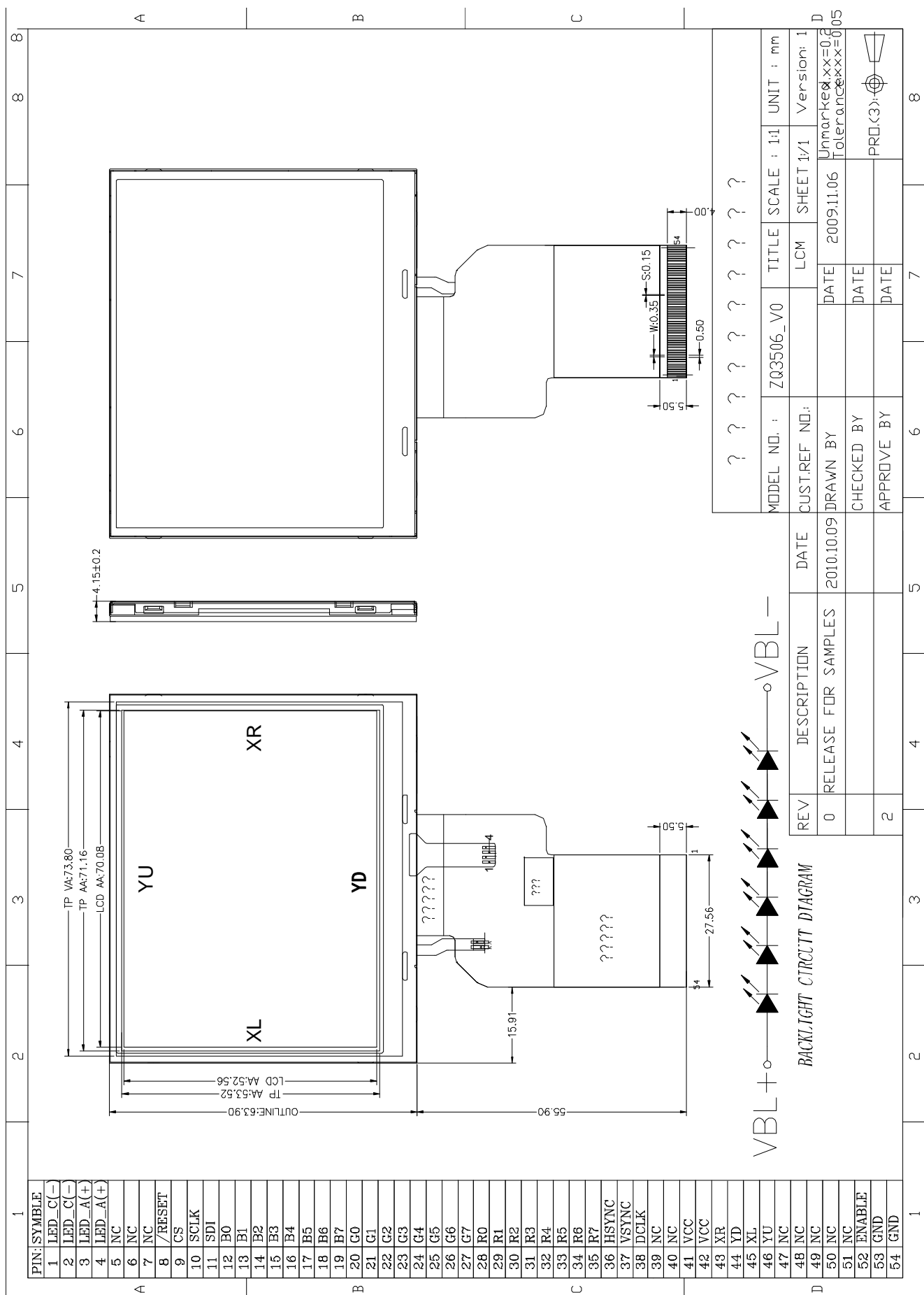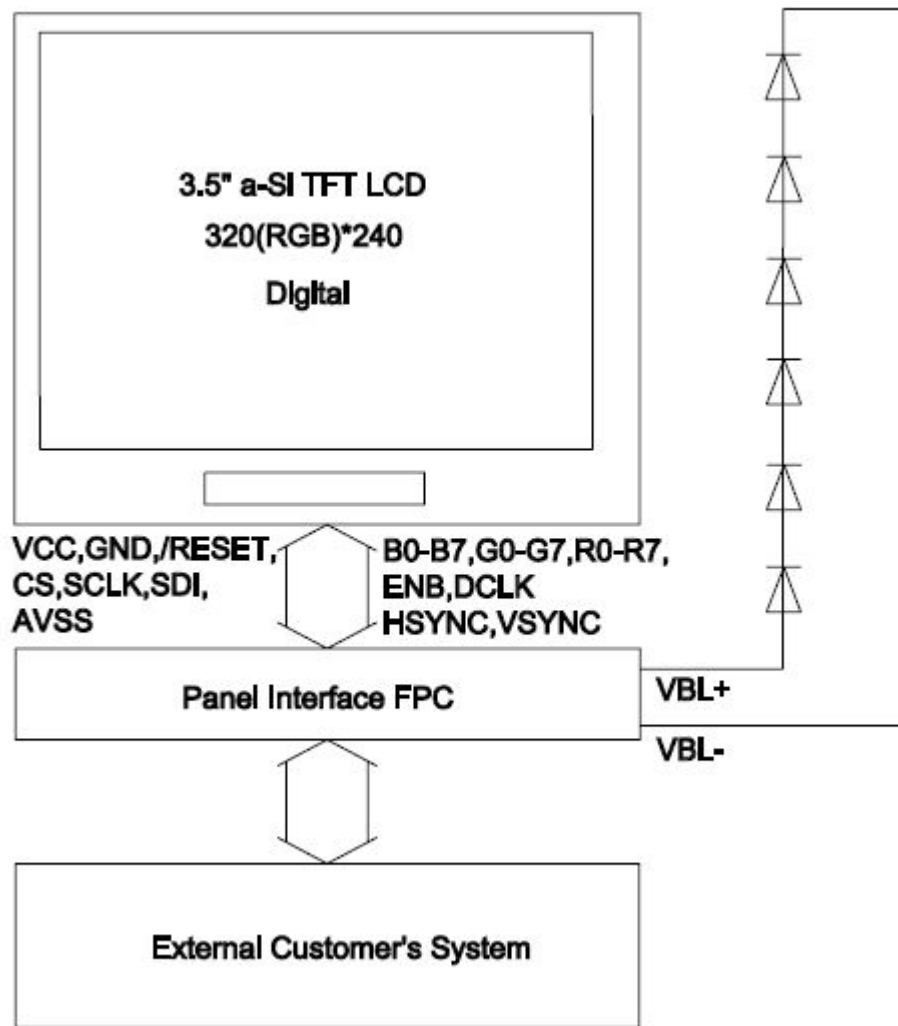FIG.3 The definition of Response Time

FIG.4 The definition of Viewing Angle

10. <Outline dimension>

BACKLIGHT CIRCUIT DIAGRAM

VBL+ ○——— ○VBL-

PIN:	SYMBLE
1	LED_C(-)
2	LED_C(-)
3	LED_A(+)
4	LED_A(+)
5	NC
6	NC
7	NC
8	/RESET
9	CS
10	SCLK
11	SDI
12	B0
13	B1
14	B2
15	B3
16	B4
17	B5
18	B6
19	B7
20	G0
21	G1
22	G2
23	G3
24	G4
25	G5
26	G6
27	G7
28	R0
29	R1
30	R2
31	R3
32	R4
33	R5
34	R6
35	R7
36	HSYNC
37	VSYNC
38	DCLK
39	NC
40	NC
41	VCC
42	VCC
43	XR
44	YD
45	XL
46	YU
47	NC
48	NC
49	NC
50	NC
51	NC
52	ENABLE
53	GND
54	GND

MODEL NO.: ZQ3506_V0
CUST.REF NO.:
TITLE: LCM
SCALE : 1:1   SHEET 1/1   UNIT : mm   Version: 1
DATE 2009.11.06
DRAWN BY
CHECKED BY
APPROVE BY

PRO.<3>
Unmarked xx=0.2
Tolerance xxx=0.05

REV	DESCRIPTION	DATE
0	RELEASE FOR SAMPLES	2010.10.09

TP VA:73.80
TP AA:71.16
LCD AA:70.08
LCD AA:52.56
TP AA:53.52
OUTLINE:63.90
55.90
4.15±0.2
27.56
15.91
5.50
YU XR YD XL
W:0.35 S:0.15 0.50 4.00

11. <Block diagram>

12. <Table of Pin Assignment >

Pin No.	Symbol	I/O	Description	Remark
1	VBL-	P	Backlight LED Power Supply(Cathode)	
2	VBL-	P	Backlight LED Power Supply(Cathode)	
3	VBL+	P	Backlight LED Power Supply(Anode)	
4	VBL+	P	Backlight LED Power Supply(Anode)	
5	NC	I	No Connection	
6	NC	I	No Connection	
7	NC	-	No Connection	
8	/RESET	I	Chip Reset Execution Control Pin	
9	CS	I	Chip Select Pin of Serial Interface	
10	SCLK	I	Clock Input of Serial Interface	
11	SDI	I	Data Input of Serial Interface	
12	B0	I	No Connection	
13	B1	I	No Connection	

14	B2	I	Blue Data Bit 0(LSB)	
15	B3	I	Blue Data Bit 1	
16	B4	I	Blue Data Bit 2	
17	B5	I	Blue Data Bit 3	
18	B6	I	Blue Data Bit 4	
19	B7	I	Blue Data Bit 5 (MSB)	
20	G0	I	No Connection	
21	G1	I	No Connection	
22	G2	I	Green Data Bit 0(LSB)	
23	G3	I	Green Data Bit 1	
24	G4	I	Green Data Bit 2	
25	G5	I	Green Data Bit 3	
26	G6	I	Green Data Bit 4	
27	G7	I	Green Data Bit 5 (MSB)	
28	R0	I	No Connection	
29	R1	I	No Connection	
30	R2	I	Red Data Bit 0(LSB)	
31	R3	I	Red Data Bit 1	
32	R4	I	Red Data Bit 2	
33	R5	I	Red Data Bit 3	
34	R6	I	Red Data Bit 4	
35	R7	I	Red Data Bit 5 (MSB)	
36	HSYNC	I	Horizontal Synchronization Input	
37	VSYNC	I	Vertical Synchronization Input	
38	DCLK	I	Dot Clock Input	
39	NC	–	No Connection	
40	NC	–	No Connection	
41	VCC	I	Power Supply(+3.3V Typ)	
42	VCC	I	Power Supply(+3.3V Typ)	
43	XR	I	Touch Panel X Input Terminal, right side	
44	YD	I	Touch Panel Y Input Terminal, down side	
45	XL	–	Touch Panel X Input Terminal, left side	
46	YU	–	Touch Panel Y Input Terminal, up side	
47	NC	–	No Connection	
48	NC	–	No Connection	
49	NC	–	No Connection	
50	NC	–	No Connection	
51	NC	–	No Connection	
52	ENB	I	Data Enable Input	

| 53 | GND | P | Power Ground(0V) | |
| 54 | AVSS | P | Power Ground(0V) | |

13. 〈Command/AC Timing〉

    13.1. Timing Conditions

    13.1.1. Timing Diagram

Figure6 Parallel RGB Input Signal Timing

    13.2. timing specifications:

Parameter	Symbol	Min.	Typ.	Max.	Unit.	Note
DCLK Frequency	$1/t_{DCLK}$	-	6.4	11	MHz	
Horizontal Period	t_h	-	408	-	t_{DCLK}	
Horizontal Display Period	t_{hd}	320	320	320	t_{DCLK}	
Horizontal Back Porch	t_{hb}	2	38	-	t_{DCLK}	
Horizontal Front Porch	t_{hf}	2	-	-	t_{DCLK}	
Horizontal Pulse Width	t_{hp}	1	1	-	t_{DCLK}	
Vertical Period	t_v	-	262	-	t_h	
Vertical Display Period	t_{vd}	240	240	240	t_h	
Vertical Back Porch	t_{vb}	2	18	-	t_h	
Vertical Front Porch	t_{vf}	2	4	-	t_h	
Vertical Pulse Width	t_{vp}	1	1	-	t_h	
Data setup time	t_{su}	12	-	-	ns	
Data hold time	t_{hold}	12	-	-	ns	

14．Touch panel characteristics

Operation life	Tapping durability	
	Pen sliding durability	>1,000,00 times
	Operation force	10-100g
Electric characteristics	Electric characteristics	Film：400~950Ω，Glass：200~600Ω
	Insulation resistance	≥10MΩ（DC25V）
	Linearity	≤1.5%
	Chattering Time	<10ms

Structure, and Area definition

Area-(A) : Active area

The area guarantees a touch panel operation with the following characteristics when pressed.

（ⅰ）Operation force（ⅱ）Electric characteristics

(ⅲ) Tapping durability (ⅳ) Pen sliding durability

Area-(B) : Operation non-guaranteed area

The area does not guarantee a touch panel operation and its function. When this area is pressed, touch panel shows degradation of its performance and durability such as a pen sliding durability becomes about one-tenth compared with the active area (Area- (A) as guaranteed area) and its operation force requires about double. About 0.5 mm outside from a boundary of the active area corresponds to this area.

Area-(C) : Pressing prohibition area

The area forbids pressing because an excessive load is applied to a transparent electrode and a serious damage is given to a touch panel function by pressing. About 0.5mm outside from a boundary of Area-(B)" the operation non-guaranteed area" corresponds to this area.

Area-(D) : Non-Active area (Frame)

The area does not activate even if pressed.

(Remark: In order to prevent unusual performance degradation and malfunction of a touch panel, please inspect firstly whether the set case designing and touch panel assembling method are reasonable or not.)

Area-(B)+Area-(C)：Sensitive area

Area–(B) and area-(C) both belong to the sensitive area. This area has a clearance between top and bottom contact side. Great press resulting in transparent electrode cracks, function defect to be exact, will deform surface transparent electrode. Please think about structure of sensitive area and case in order to avoid terminal user to fail to touch this area.

15. Handling Precautions

(1) Safety

The liquid crystal in the LCD is poisonous. Do not put it in your mouth. If the liquid crystal touches your skin or clothes, wash it off immediately using soap and water.

(2) Handling

A. The LCD and touch panel is made of plate glass. Do not subject the panel to mechanical shock or to excessive force on its surface.

B. Do not handle the product by holding the flexible pattern portion in order to assure the reliability

C. Transparency is an important factor for the touch panel. Please wear clear finger sacks, gloves and mask to protect the touch panel from finger print or stain and also hold the portion outside the view area when handling the touch panel.

D. Provide a space so that the panel does not come into contact with other components.

E. To protect the product from external force, put a covering lens (acrylic board or similar board) and keep an appropriate gap between them.

F. Transparent electrodes may be disconnected if the panel is used under environmental conditions where dew condensation occurs.

G. Property of semiconductor devices may be affected when they are exposed to light, possibly resulting in IC malfunctions.

H. To prevent such IC malfunctions, your design and mounting layout shall be done in the way that the IC is not exposed to light in actual use.

(3) Static Electricity

A. Ground soldering iron tips, tools and testers when they are in operation.

B. Ground your body when handling the products.

C. Power on the LCD module before applying the voltage to the input terminals.

D. Do not apply voltage which exceeds the absolute maximum rating.

E. Store the products in an anti-electrostatic bag or container.

(4) Storage

A. Store the products in a dark place at +25℃±10℃ with low humidity (40% RH to 60% RH). Don't expose to sunlight or fluorescent light.

B. Storage in a clean environment, free from dust, active gas, and solvent.

(5) Cleaning

A. Do not wipe the touch panel with dry cloth, as it may cause scratch.

B. Wipe off the stain on the product by using soft cloth moistened with ethanol. Do not allow ethanol to get in between the upper film and the bottom glass. It may cause peeling issue or defective operation. Do not use any organic solvent or detergent other than ethanol.

16.　　ackaging
　　DBT