

**PRODUCT** : LCD MODULE

**MODEL NO.** : YTS700RLAB-01-100N

**SUPPLIER** : ANSHAN YES

**DATE** : Oct.16.2012

# SPECIFICATION

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MODEL NO.:

DATE:

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## 1. SUMMARY

This technical specification applies to 7" TFT-LCD module with a LED Backlight unit and a 40-pin TTL interface. This module supports 800\*R.G.B x 480 WVGA mode and can display 262,144 colors.

## 2. FEATURES

- Thin and Light Weight.
- WVGA(800x480 pixels) resolution.
- 3.3 V TTL interface

## 3. GENERAL SPECIFICATIONS

Parameter		Specifications	Unit
Screen size		7"(Diagonal)	inch
Display Format		800 RGB x 480	dot
Active area		152.4x91.44	mm
Pixel size		190.5 x 190.5	um
Surface treatment		Anti-glare	
Color Saturation (NTSC)		45	%
Pixel Configuration		RGB Vertical Stripe	
Outline dimension		165(W) x 104.44(H) x 5.2 (D)	mm
Weight		TBD	g
View Angle direction (Gray inversion)		6 o'clock	
Temperature Range	Operation	-20~70	°C
	Storage	-30~80	°C

## 4. ABSOLUTE MAXIMUM RATINGS (GND=0V)

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Power Voltage	Vcc	GND=0	-0.3	6	V	-
Input logic voltage	Vi	GND=0	-0.3	Vcc+0.3	V	Note1

Note 1: DCLK, DE, R0~ R5, G0~ G5, B0~ B5

## 5. ELECTRICAL CHARACTERISTICS

### 5.1 Recommended Operation condition (GND=0,Ta=25)

Parameter		Symbol	Rating			Unit	Condition
			Min.	Typ.	Max.		
Power Supply Voltage		V <sub>cc</sub>	3	3.3	3.6	V	
Input logic	High Level	V <sub>IH</sub>	0.7V <sub>cc</sub>	-	V <sub>cc</sub>	V	Note 1
voltage	Low Level	V <sub>IL</sub>	0	-	0.3V <sub>cc</sub>	V	Note 1

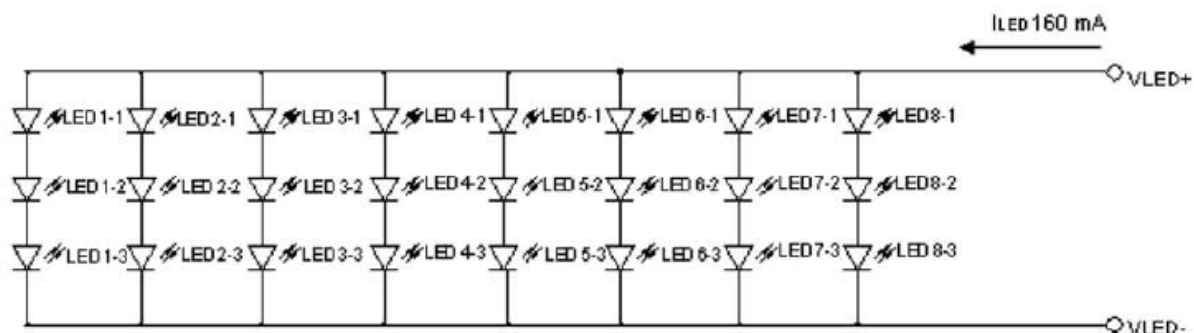
Note 1: DCLK, DE, R0~ R5, G0~ G5, B0~ B5.

### 5.2 LED Driving Conditions

Ta = 25

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	I <sub>LED</sub>	-	160	-	mA	Note 1
LED voltage	V <sub>LED</sub>	-	9.9	-	V	
LED Life Time	-	10,000	20,000	-	Hr	Note 2

Note 1: There are 8 Groups LED shown as below, V<sub>led</sub>=9.9V, I<sub>led</sub>=160mA



Note 2 : Brightness to be decreased to 50% of the initial value.

### 5.3 TFT-LCD current consumption

Parameter	Symbol	Rating			Unit	Condition
		Min.	Typ.	Max		
LCD power current	I <sub>cc</sub>	--	200	260	mA	black pattern
LED power current	I <sub>LED</sub>	--	160	200	mA	

## 6. AC CHARATERISTICS

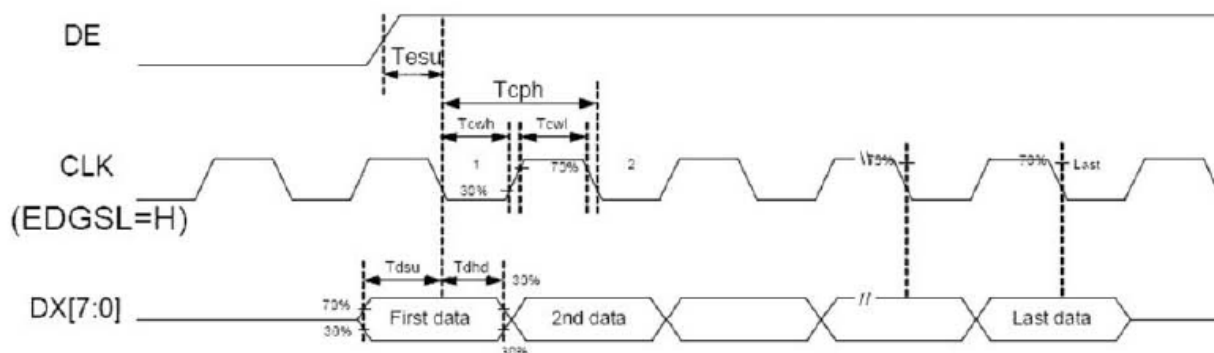
### 6.1 AC Electrical CHARATERISTICS

Parameter	Symbol	Rating			Unit
		Min.	Typ.	Max	
Data setup time	Tdsu	6	-	-	ns
Data hold time	Tdhd	6	-	-	ns
DE setup time	Tesu	6	-	-	ns
CLK frequency	F <sub>CPH</sub>	29.40	33.26	42.48	MHz
CLK period	T <sub>CPH</sub>	23.54	30.06	34.01	ns
CLK pulse duty	T <sub>CW H</sub>	40	50	60	%
CLK pulse duty	T <sub>CW L</sub>	40	50	60	%
DE period	T <sub>DEH</sub> +T <sub>DEL</sub>	1000	1056	1200	T <sub>CPH</sub>
DE pulse width	T <sub>DEH</sub>	-	800	-	T <sub>CPH</sub>
DE frame blanking	T <sub>DEB</sub>	10	45	110	T <sub>DEH</sub> +T <sub>DEL</sub>
DE frame width	T <sub>DE</sub>	-	480	-	T <sub>DEH</sub> +T <sub>DEL</sub>

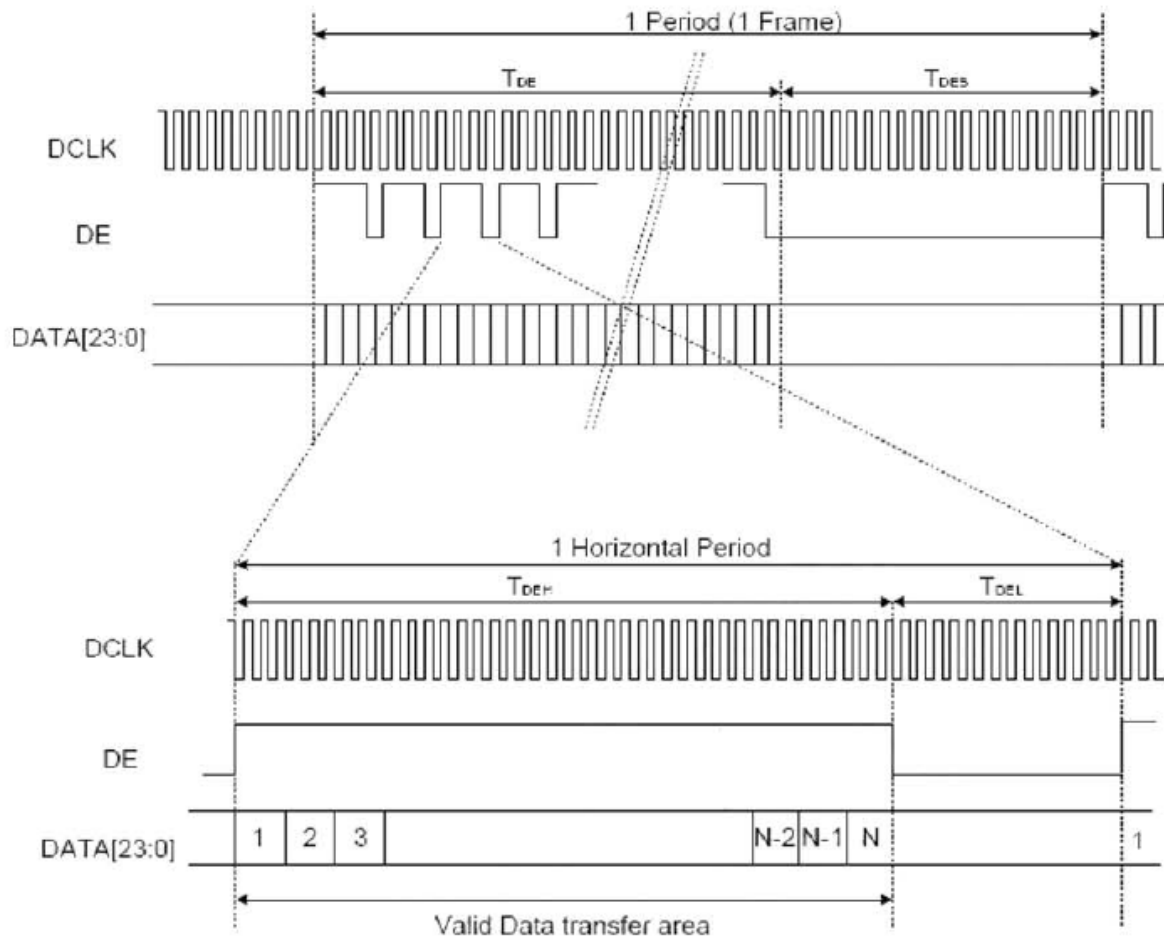
Note We suggest using the typical value, so it can have better performance.

### 6.2 Timing Controller Timing Chart

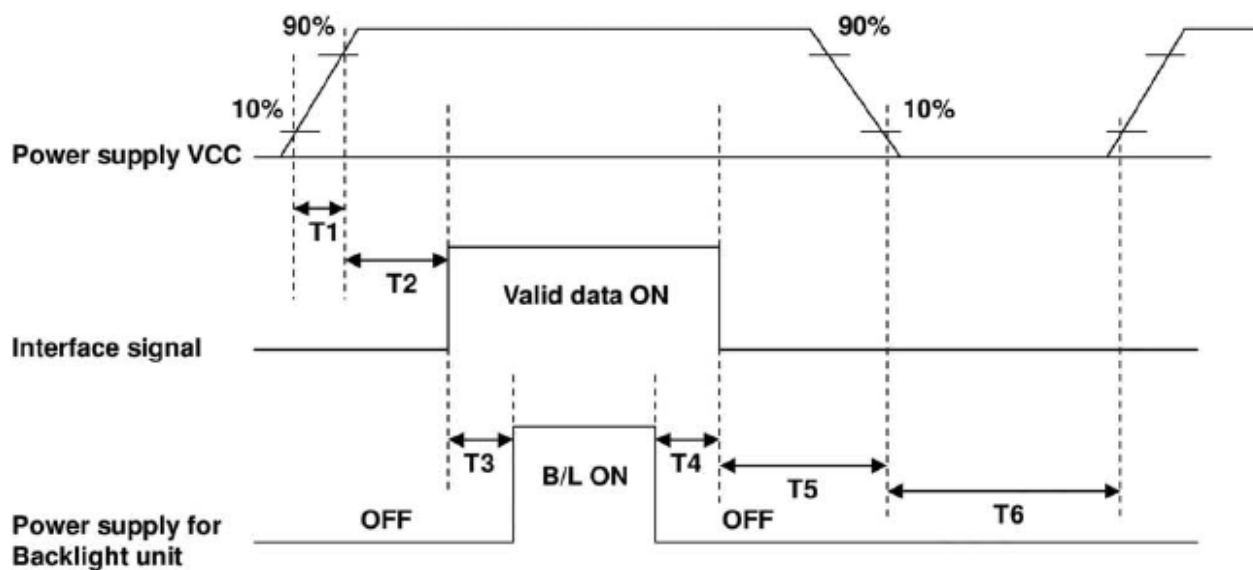
#### Clock and Data input waveforms



## 6.3 Data input format



## 6.4 Power ON/OFF sequence



Parameter	SPEC.			Unit
	Min.	Typ.	Max.	
T1	1		2	ms
T2	0	60		ms
T3	200			ms
T4	200			ms
T5	1			ms
T6	1000			ms

## 7. OPTICAL CHARACTERISTIC

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Brightness	-	Viewing normal angle $\theta=\varphi=0$	300	350	-	cd/m <sup>2</sup>	Center of display
Response time	Tr		-	5	10	ms	Note 3, 5
	Tf		-	11	16	ms	
Contrast ratio	CR		250	400	-	-	Note 4,5
Color Chromaticity	White Wx		0.249	0.299	0.349	-	Note 2, 6, 7
	Wy		0.278	0.328	0.378		
Viewing angle	Hor	$\theta R$	60	70	-	Deg.	Note 1
		$\theta L$	60	70	-		
	Ver	$\varphi I$	50	60	-		
		$\varphi B$	60	70	-		

Note 1: Definition of viewing angle range



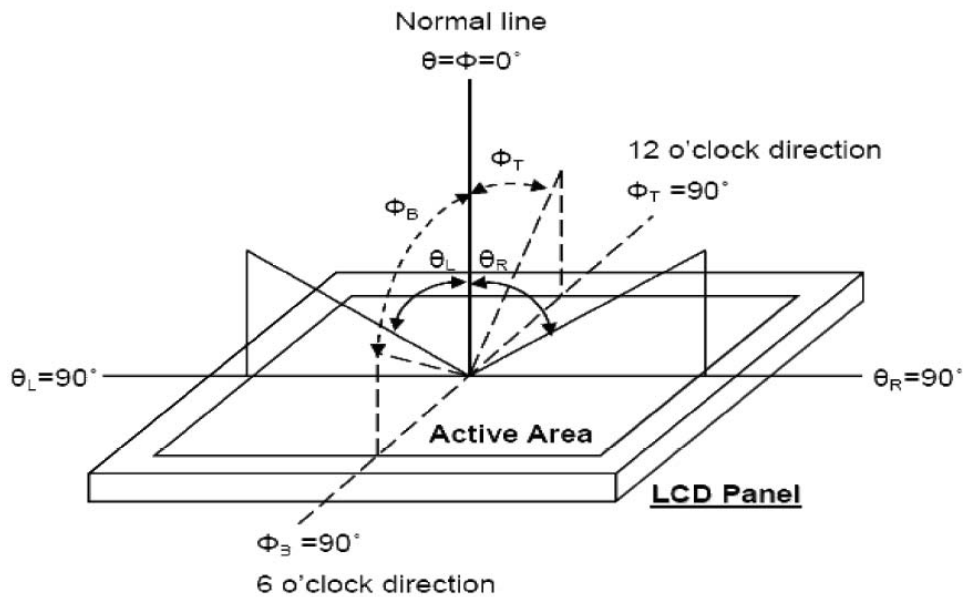


Fig. 7-1 Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

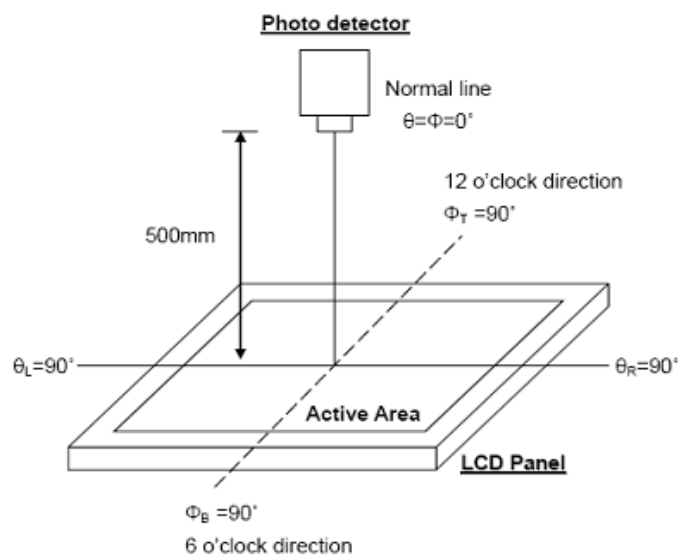


Fig.7-2 Optical measurement system setup

Note 3: Definition of Response time:

The response time is defined as the LCD optical switching time interval between "White state and "Black" state. Rise time,  $T_r$ , is the time between photo detector output intensity changed from 90% to 10%. And fall time,  $T_f$ , is the time between photo detector output Intensity changed from 10% to 90%

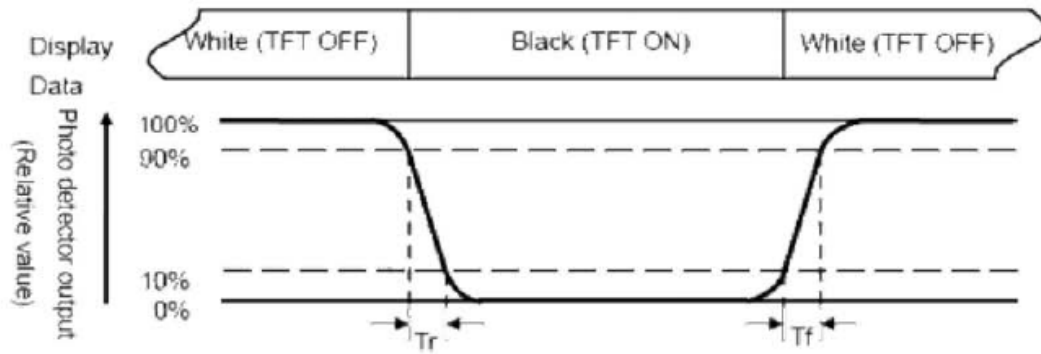


Fig. 7-3 Definition of response time

Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

Luminance measured when LCD on the "White" state

Luminance measured when LCD on the "Black" state

Contrast ratio (CR)=

Note 5: White  $V_i = V_{i50} \pm 1.5V$

Black  $V_i = V_{i50} \pm 2.0V$

"±" means that the analog input signal swings in phase with VCOM signal.

"±" means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

Note 8 : Uniformity (U) = 
$$\frac{\text{Brightness (min)}}{\text{Brightness (max)}} \times 100\% \text{ Brightness (max)}$$

## 8. INTERFACE

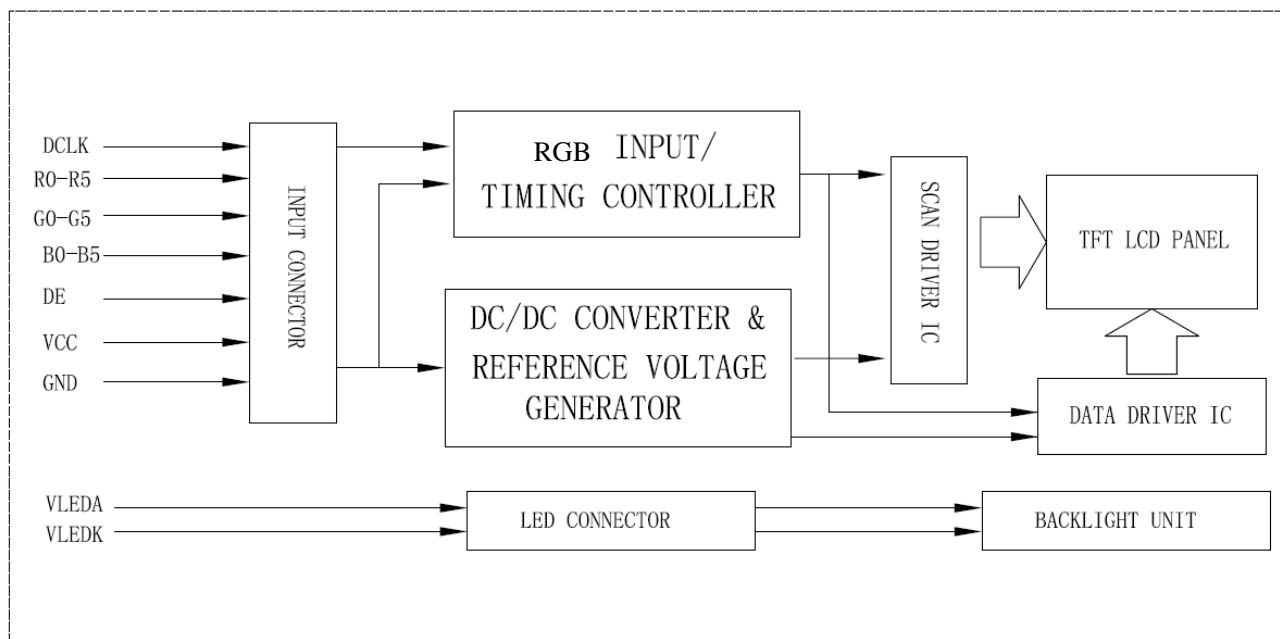
## 8.1 LCM PIN Definition

Pin No.	Symbol	Description	Remark
1	GND	Power Ground	
2	GND	Power Ground	
3	NC	Not Connect	
4	Vcc	Power Supply for Digital Circuit	
5	Vcc	Power Supply for Digital Circuit	
6	Vcc	Power Supply for Digital Circuit	
7	Vcc	Power Supply for Digital Circuit	
8	NC	Not Connect	
9	DE	Data Enable	
10	GND	Power Ground	
11	GND	Power Ground	
12	GND	Power Ground	
13	B5	Blue Data 5 (MSB)	
14	B4	Blue Data 4	
15	B3	Blue Data 3	
16	GND	Power Ground	
17	B2	Blue Data 2	
18	B1	Blue Data 1	
19	B0	Blue Data 0 (LSB)	
20	GND	Power Ground	
21	G5	Green Data 5 (MSB)	
22	G4	Green Data 4	
23	G3	Green Data 3	
24	GND	Power Ground	
25	G2	Green Data 2	
26	G1	Green Data 1	
27	G0	Green Data 0 (LSB)	
28	GND	Power Ground	
29	R5	Red Data 5 (MSB)	
30	R4	Red Data 4	
31	R3	Red Data 3	
32	GND	Power Ground	
33	R2	Red Data 2	
34	R1	Red Data 1	
35	R0	Red Data 0 (LSB)	
36	GND	Power Ground	
37	GND	Power Ground	
38	DCLK	Clock Signals ; Latch Data at the Falling Edge	
39	GND	Power Ground	
40	GND	Power Ground	

## 8.2 Backlight Driving Part

Pin No.	Symbol	Description
1	VLEDA	Red, LED_ Anode
2	VLEDK	White, LED_ Cathode

## 9. BLOCK DIAGRAM



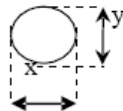
## 10. QUALITY ASSURANCE

No.	Test Items	Test Condition
1	High Temperature Storage Test	Ta=80℃ Dry 240h
2	LOW Temperature Storage Test	Ta=-30℃ Dry 240h
3	High Temperature Operation Test	Ta=70℃ Dry 240h
4	LOW Temperature Operation Test	Ta=-20℃ Dry 240h
5	High Temperature and High Humidity Operation Test	Ta=60℃ 90%RH 240h
6	Electro Static Discharge Test	150pF,330Ω,±8KV(Contact)/±15KV(Air),5points/panel, 5 times/point
7	Shock Test(non-operating)	Half sine wave,180G,2ms one shock of each six faces I.e.run 180G 2ms for all six faces
8	Vibration Test(non-operating)	Sine wave,10~500~10Hz 1.5G,0.37oct/min 3axis,1hour/axis
9	Thermat Shock Test	-20℃(0.5h)~70℃(0.5h)/100 cycles(Dry)

\*\*\*\*Ta=Ambient Temperature

## INSPECTION CRITERION

OUTGOING QUALITY STANDARD	PAGE 1 OF 4
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA	
<p>This specification is made to be used as the standard acceptance/rejection criteria for Color mobile phone LCM.</p> <p>1 Sample plan</p> <p>Sampling plan according to GB/T2828.1-2003/ISO 2859-1: 1999 and ANSI/ASQC Z1.4-1993, normal level 2 and based on:</p> <p>Major defect: AQL 0.65</p> <p>Minor defect: AQL 1.5</p> <p>2. Inspection condition</p> <p>Viewing distance for cosmetic inspection is about 30cm with bare eyes, and under an environment of 20~40W light intensity, all directions for inspecting the sample should be within 45° against perpendicular line.</p> <p>3. Definition of inspection zone in LCD.</p> <div data-bbox="526 1149 1070 1391" data-label="Diagram"> </div> <p>Zone A: character/Digit area</p> <p>Zone B: viewing area except Zone A (ZoneA+ZoneB=minimum Viewing area)</p> <p>Zone C: Outside viewing area (invisible area after assembly in customer's product)</p> <p>Fig.1 Inspection zones in an LCD.</p> <p>Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble for quality and assembly of customer's product.</p>	

OUTGOING QUALITY STANDARD			PAGE 2 OF 4			
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA						
4. Inspection standards						
4.1 Major Defect						
Item No	Items to be inspected	Inspection Standard			Classification of defects	
4.1.1	All functional defects	1) No display 2) Display abnormally 3) Missing vertical, horizontal segment 4) Short circuit 5) Back-light no lighting, flickering and abnormal lighting.			Major	
4.1.2	Missing	Missing component				
4.1.3	Outline dimension	Overall outline dimension beyond the drawing is not allowed.				
4.2 Cosmetic Defect						
Item No	Items to be inspected	Inspection Standard			Classification of defects	
4.2.1	Clear Spots	For dark/white spot, size $\Phi$ is defined as $\Phi = (x+y)/2$ 			Minor	
	Black and white Spot defect Pinhole, Foreign Particle, Dirt under polarizer	1.				
		Size(mm) \ Zone	Acceptable Qty			
			A	B		C
		$\Phi \leq 0.10$	Ignore			Ignore
		$0.10 < \Phi \leq 0.15$	2			
		$0.15 < \Phi \leq 0.20$	1			
	$\Phi > 0.20$	0				
	Dim Spots	2.				Minor
	Circle shaped and dim edged defects	2. Zone Size(mm) \	Acceptable Qty			
			A	B	C	
		$\Phi \leq 0.2$	Ignore		Ignore	
		$0.20 < \Phi \leq 0.40$	3			
		$0.40 < \Phi \leq 0.60$	2			
		$0.60 < \Phi \leq 0.80$	1			
		$0.80 < \Phi$	0			

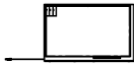
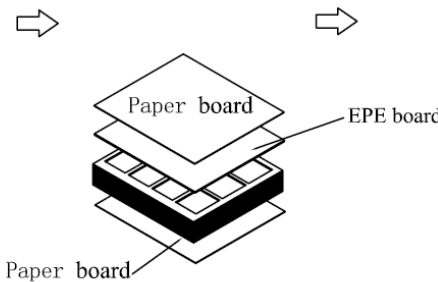
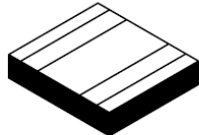
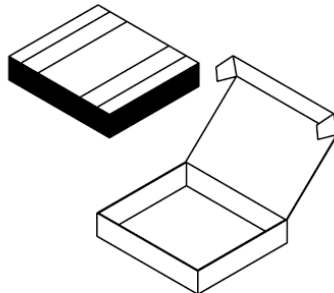
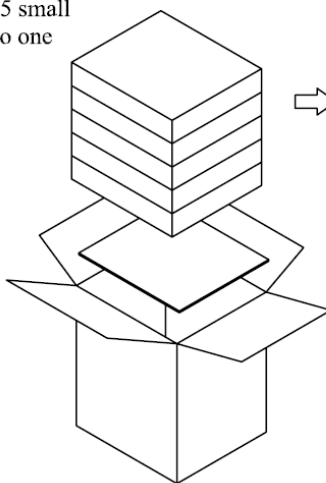
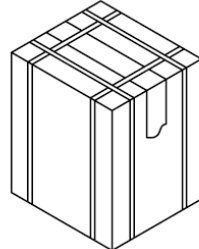
OUTGOING QUALITY STANDARD				PAGE 3 OF 4			
TITLE: FUNCTIONAL TEST & INSPECTION CRITERIA							
4.2. Cosmetic Defect							
Item No	Items to be inspected	Inspection Standard				Classification of defects	
4.2.2	Line defect Black line, White line, Foreign material under polarizer,	Size(mm)		Acceptable Qty			Minor
		L(Length)	W(Width)	Zone			
				A	B	C	
		Ignore	$W \leq 0.02$	Ignore		Ignore	
		$L \leq 3.0$	$0.02 < W \leq 0.03$	2			
		$L \leq 2.0$	$0.03 < W \leq 0.05$	1			
			$0.05 < W$	Define as spot defect			
4.2.3	Polarizer scratch	If the Polarizer scratch can be seen after mobile phone cover assembling or in the operating condition, judge by the line defect of 4.2.2. If the Polarizer scratch can be seen only in non-operating condition or some special angle, judge by the following.					Minor
		Size(mm)		Acceptable Qty			
		L(Length)	W(Width)	Zone			
				A		B C	
		Ignore	$W \leq 0.03$	Ignore		Ignore	
		$5.0 < L \leq 10.0$	$0.03 < W \leq 0.05$	2			
		$L \leq 5.0$	$0.05 < W \leq 0.08$	1			
	$0.08 < W$	0					
4.2.4	Polarize Air bubble	Air bubbles between glass & polarizer					Minor
		2. Zone Size(mm)	Acceptable Qty				
			A	B	C		
		$\Phi \leq 0.2$	Ignore		Ignore		
		$0.20 < \Phi \leq 0.30$	2				
		$0.30 < \Phi \leq 0.50$	1				
		$0.50 < \Phi$	0				



Item No	Items to be inspected	Inspection Standard	Acceptable QTY		Classification of detects
			Visible	Non-visible	
4.4	White spot	1/2 Dot< $\Phi\leq 1$ Dot	0	Ignore	Major
	Black spot	1/2 Dot< $\Phi\leq 1$ Dot	1		
	Connected black spot	/	0		
Note	Name	Characteristic description			Badness Spot define
	White spot	Visibly shiny and size not changed spot viewed in black picture.			The spot (size $\geq 1$ Pixel*50%) define as one white black spot
	Black spot	Visibly dark and size not changed spot viewed in RGB picture.			
	Connected black spot	The connected two pixels display bad performance at the same time.			



## 12. PACKAGE INFORMATION

<i>CUSTOMER'S APPROVED:</i>	<i>DATE: 2010.04.28</i>	<i>PAGE: 1/1</i>
<p>PRODUCT PART NO.:YTS700RLAB-01-100N</p> <p>PACKING TYPE: BY EPE TRAY(T320240A)</p> <p>PACKLING ORDER:</p> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="width: 30%;"> <p>1)Putting 3pcs products on each EPE tray.</p>  </div> <div style="width: 30%;"> <p>2)Putting 5pcs EPE trays together with EPE paper on the top of EPE tray. Adding EPE boards on both top tray and bottom tray</p>  </div> <div style="width: 30%;"> <p>3)Assembling the boards and the tray together with adhesive tape</p>  </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div style="width: 30%;"> <p>4)Putting in the inner small carton(TYPE:H82)</p>  </div> <div style="width: 30%;"> <p>5) Putting 5 small cartons into one outcarton</p>  </div> <div style="width: 30%;"> <p>6)Packing finished</p>  </div> </div> <p style="margin-top: 20px;">Note:3pcs in a tray, 5trays in a inner carton,,5 inner cartons in a out carton, so 3x5x5=75pcs/Outcarton</p> <div style="display: flex; justify-content: space-between;"> <p>Dimension (Small carton ): 385*325*87mm</p> <p>Dimension (Out carton ): 394*344*470mm</p> </div>		
DESIGN:	CHECK:	APPROVAL:
<b>ANSHAN YES OPTOELECTRONICS DISPLAY CO., LTD</b>		

## 13. PRECAUTIONS

Please pay attention to the following when you use this TFT LCD module.

### 13.1 MOUNTING PRECAUTIONS

- (1) You must mount a module using arranged in four corners or four sides.
- (2) You should consider the mounting structure so that uneven force (ex. Twisted stress) is not applied to the module. And the case on which a module is mounted should have sufficient strength so that external force is not transmitted directly to the module.
- (3) Please attach a transparent protective plate to the surface in order to protect the polarizer. Transparent protective plate should have sufficient strength in order to resist external force.
- (4) You should adopt radiation structure to satisfy the temperature specification.
- (5) Acetic acid type and chlorine type materials for the cover case are not describe because the former generates corrosive gas of attacking the polarizer at high temperature and the latter causes circuit break by electro-chemical reaction.
- (6) Do not touch, push or rub the exposed polarizers with glass, tweezers or anything harder than HB pencil lead. And please do not rub with dust clothes with chemical treatment. Do not touch the surface of polarizer for bare hand or greasy cloth. (Some cosmetics are determined to the polarizer)
- (7) When the surface becomes dusty, please wipe gently with adsorbent cotton or other soft materials like chamois soaks with petroleum benzene. Normal-hexane is recommended for cleaning the adhesives used to attach front / rear polarizers. Do not use acetone, toluene and alcohol because they cause chemical damage to the polarizer.
- (8) Wipe off saliva or water drops as soon as possible. Their long time contact with polarizer causes deformations and color fading.
- (9) Do not open the case because inside circuits do not have sufficient strength.

### 13.2 OPERATING PRECAUTIONS

- (1) The spike noise causes the mis-operation of circuits. It should be lower than following voltage  $V = \pm 200\text{mV}$  (Over and under shoot voltage)
- (2) Response time depends on the temperature. (In lower temperature, it becomes longer.)
- (3) Brightness depends on the temperature. (In lower temperature, it becomes lower) And in lower temperature, response time (required time that brightness is stable after turned on) becomes longer.
- (4) Be careful for condensation at sudden temperature change. Condensation makes damage to polarizer or electrical contacted parts. And after fading condensation, smear or spot will occur.
- (5) When fixed patterns are displayed for a long time, remnant image is likely to occur.
- (6) Module has high frequency circuits. Sufficient suppression to the electromagnetic interference shall be done by system manufacturers. Grounding and shielding methods may be important to minimize the interference.

### 13.3 ELECTROSTATIC DISCHARGE CONTROL

Since a module is composed of electronic circuits, it is not strong to electrostatic discharge. Make certain that treatment persons are connected to ground through wristband etc. And don't touch interface pin directly.

### 13.4 PRECAUTIONS FOR STRONG LIGHT EXPOSURE

Strong light exposure causes degradation of polarizer and color filter.

### 13.5 STORAGE

When storing modules as spares for a long time, the following precautions are necessary.

- (1) Store them in a dark place. Do not expose the module to sunlight or fluorescent light. Keep the temperature between 5 and 35 at normal humidity.
- (2) The polarizer surface should not come in contact with any other object. It is recommended that they be stored in the container in which they were shipped.

### **13.6 HANDLING PRECAUTIONS FOR PROTECTION FILM**

- (1) When the protection film is peeled off, static electricity is generated between the film and polarizer. This should be peeled off slowly and carefully by people who are electrically grounded and with well ion-blown equipment or in such a condition, etc.
- (2) The protection film is attached to the polarizer with a small amount of glue. Is apt to remain on the polarizer. Please carefully peel off the protection film without rubbing it against the polarizer.
- (3) When the module with protection film attached is stored for a long time, sometimes there remains a very small amount of glue still on the polarizer after the protection film is peeled off.
- (4) You can remove the glue easily. When the glue remains on the polarizer surface or its vestige is recognized, please wipe them off with absorbent cotton waste or other soft material like chamois soaked with normal-hexane.