MODEL NO. : TM070RVHG01-01

ISSUED DATE: 2015/06/30

VERSION : V1.4

■Preliminary Specification
□Final Product Specification

Customer :

Approved by	Notes

TIANMA Confirmed :

Prepared by	Checked by	Approved by
Fen He	Fan Jiang	**Feng Qin**

This technical specification is subjected to change without notice

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Record of Revision

Rev	Issued Date	Description	Editor
1.0	2013-02-25	Preliminary release.	Jim
1.1	2013-10-31	Update format	Chengfeng Tao
1.2	2013-12-11	Update the CTP AA	Chengfeng Tao
1.3	2015-04-01	Change CTP driver IC from NT11003 to SSD2543	Gang li
1.4	2015-06-30	Update drawing, add packing, Optical Characteristics	Fen He

1 General Specifications

Feature		Spec
Display Spec.	Size	7.0 inch
	Resolution	800 RGB (H)×480(V)
	Technology Type	a-si TFT
	Pixel Configuration	RGB stripe
	Pixel pitch(mm)	0.1926x0.179
	Display Mode	Normally White
	Surface Treatment	Anti-Glare(3H)
	Viewing Direction	12 o'clock
	Gray Scale Inversion Direction	6 o'clock
TP Spec	Operation Technology	Projected capacitive
	Control IC	SSD2543
	Input Method	Bare finger
	Number of simultaneous touches	2 points
	Minimum Touch Area(mm)	Φ6
	Finger Pitch(mm)	13
	Product structure	Glass Lens－Glass Sensor
	Interface	I2C
Mechanical Characteristics	LCM (W x H x D) (mm)	164.90(w)×100(H)×5.7 (D)
	Active Area(mm)	154.08(H)×85.92(V)(TFT)
	View Area(mm)	155.24(W) x 87.12(H)(TP)
	With /Without TSP	With CTP
	Connection Type	ZIF
	LED Numbers	24LEDs
	Weight (g)	TBD
Electrical Characteristics	Interface	RGB 24 bits
	Color Depth	16.7 M
	Driver IC	HX8264Dx1 and HX8664Bx1

Note 1: Viewing direction for best image quality is different from TFT definition. There is a 180 degree shift.

Note 2: Requirements on Environmental Protection: Q/S0002

Note 3: LCM weight tolerance: ± 5%

2 Input/Output Terminals

2.1 TFT CN1 pin assignment

Connector type: FH28-60S-0.5SH

PIN	Symbol	I/O	Description	Remark
1	VLED+	P	Led anode	
2	VLED+	P	Led anode	
3	VLED-	P	Led cathode	
4	VLED-	P	Led cathode	
5	GND	P	Ground	
6	VCOM	P	Common voltage input	
7	VCC	P	Digital power supply	
8	MODE	I	DE/SYNC mode select. H:DE mode, L:SYNC mode	
9	DE	I	Data enable signal, active high to enable data,if not used,please pull low	
10	VSYNC	I	Vertical sync input, negative polarity,if not used,please pull High	
11	HSYNC	I	Horizontal sync input, negative polarity,if not used,please pull High	
12	B7	I	Blue data（MSB）	
13	B6	I	Blue data	
14	B5	I	Blue data	
15	B4	I	Blue data	
16	B3	I	Blue data	
17	B2	I	Blue data	
18	B1	I	Blue data	
19	B0	I	Blue data（LSB）	
20	G7	I	Green data（MSB）	
21	G6	I	Green data	
22	G5	I	Green data	
23	G4	I	Green data	
24	G3	I	Green data	
25	G2	I	Green data	
26	G1	I	Green data	
27	G0	I	Green data（LSB）	
28	R7	I	Red data（MSB）	
29	R6	I	Red data	
30	R5	I	Red data	
31	R4	I	Red data	
32	R3	I	Red data	
33	R2	I	Red data	
34	R1	I	Red data	
35	R0	I	Red data（LSB）	
36	GND	P	Ground	
37	DCLK	I	Clock for input data	
38	GND	P	Ground	

39	LR	I	Source left or right sequence control	
40	UD	I	Gate up or down scan control	
41	VGH	P	Positive power of TFT	
42	VGL	P	Negative power of TFT	
43	AVDD	P	Analog power supply	
44	RESET	I	Global reset pin	
45	NC	NC		
46	VCOM	P		
47	DITHB	I	Dithering setting. H: 6bit resolution, L: 8bit resolution	
48	GND	P	Ground	
49	NC	NC		
50	NC	NC		

Note1:I/O definition

I---Input, O---Output, P--- Power/Ground, NC-No connection

Table 2.1 terminal pin assignments

2.2 U/D R/L Function Description

Scan control input		Scanning direction
UD	LR	
GND	VCC	Up to down, left to right
VCC	GND	Down to up, right to left
GND	GND	Up to down, right to left
VCC	VCC	Down to up, left to right

2.3 TP pin assignment Connector type: FH19S-10S-0.5SH

Pin No.	Symbol	I/O	Description	Remark
1	SCL	I	I2C clock input	
2	SDA	I/O	I2C data input and output	
3	GND	P	Ground	
4	GND	P	Ground	
5	ATTN	I/O	External interrupt to the host	
6	GND	P	Ground	
7	VPP	I/O	External interrupt from the host	
8	VDD	P	CTP power supply	
9	GND	P	Ground	
10	GND	P	Ground	

3 Absolute Maximum Ratings

Ta = 25℃

Item	Symbol	Min	Max	Unit	Remark
Power Voltage	VDD	-0.50	5.00	V	
	AVDD	-0.50	15.00	V	
	VGH	-0.30	42.00	V	
	VGL	-20.0	0.30	V	
	VGH-VGL	-0.30	40.00	V	
Backlight Forward Current	ILED	-	200	mA	
Operating Temperature	TOPR	-20	70	℃	Note2
Storage Temperature	TSTG	-30	80	℃	

Table 3.1 absolute maximum rating

Note1: The parameter is for driver IC (gate driver, source driver) only

Note2: 80℃ is the surface temperature of module

4 Electrical Characteristics

4.1.1 Driving TFT LCD Panel

Ta = 25℃

Item		Symbol	Min	Typ	Max	Unit	Remark
Voltage for logic circuit		VCC	3.00	3.30	3.60	V	
Analog Supply Voltage		AVDD	9.88	10.4	10.92	V	
Gate On Voltage		VGG	14.4	16	17.6	V	
Gate Off Voltage		VEE	-7.70	-7.00	-6.30	V	
Common Electrode Driving Signal		VCOM	3.93	3.95	3.97	V	
Input Signal Voltage	Low Level	VIL	0	-	0.3xVCC	V	
	High Level	VIH	0.7xVCC	-	VCC	V	

Table 4.1 LCD module electrical characteristics

Note1: For different LCM, the value may have a bit of difference.
Note2: To test the current dissipation, use “all Black Pattern”.

4.1.2 TFT Driving Backlight

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Forward Voltage	VLED	I_F=160mA	--	9.6	10.8	V	Note 1
Forward Current	I_F	-	-	160	200	mA	
Backlight Power Consumption	WBL	I_F=160mA	--	1536	2160	mW	
Life Time	-	I_F=160mA	10,000	-	-	Hrs	Note 3

Table 4.1.2 LED backlight characteristics

Note 1: I_F is defined for one channel LED. There are total three LED channels in back light unit.Under LCM operating, the stable forward current should be inputted.

Note 2: Optical performance should be evaluated at Ta=25℃ only.
Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced. Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.

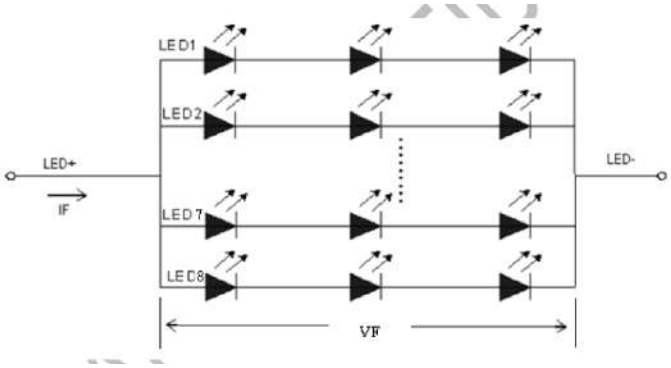


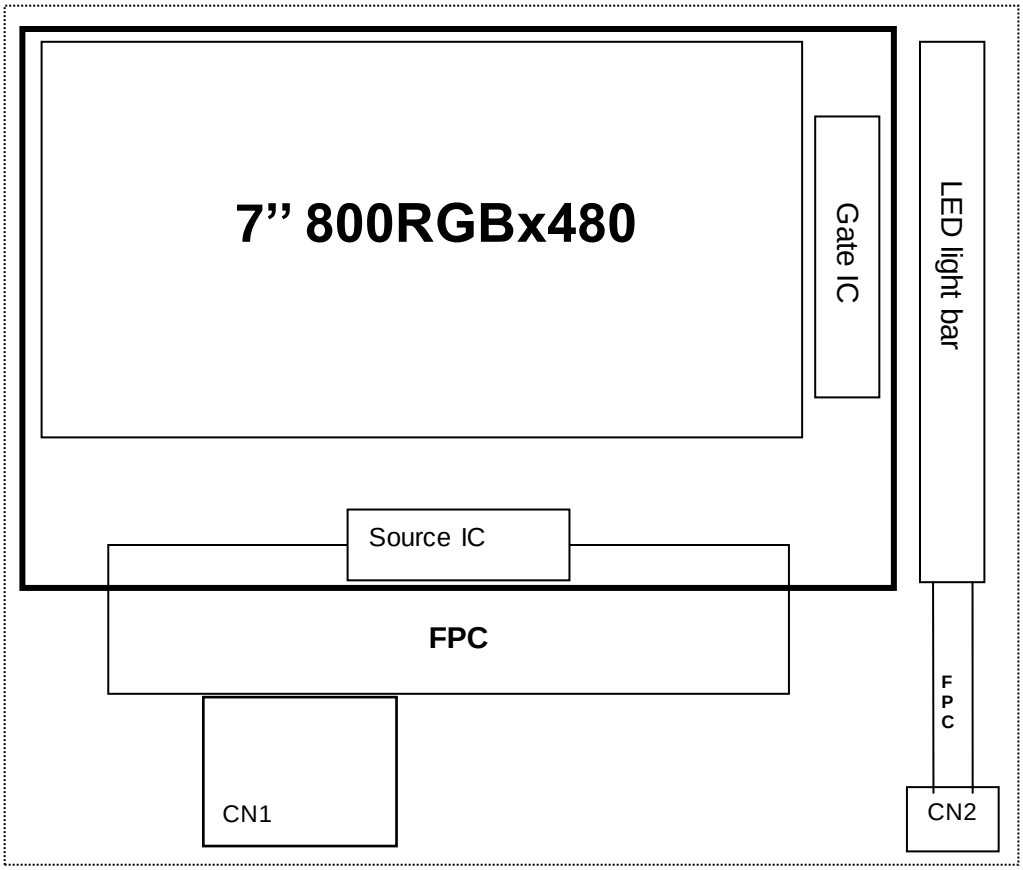
Figure 4.1.2 LED connection of backlight

4.2 TP DC Characteristics

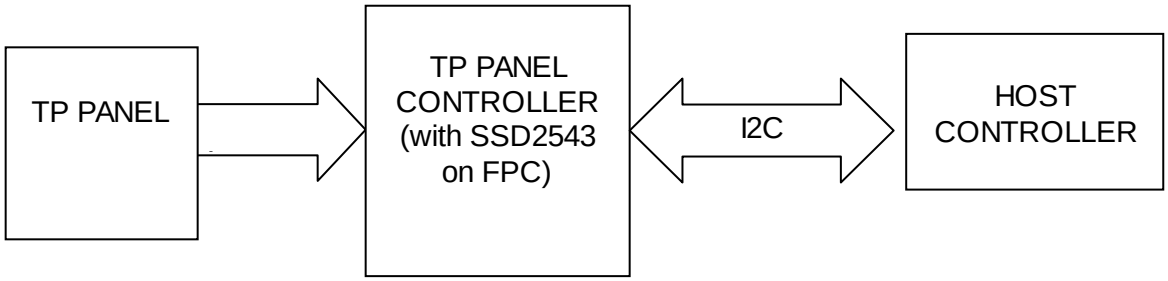
(T_A= 25℃,VDD=3.3V)

Item	Min	Typ	Max	Unit	Note
power supply voltage	2.7	3.3	3.6	V	DC(noise should be under 100mV)
Power supply current	--	--	10	mA	

4.3.1 TFT Block Diagram



4.3.2 TP Circuit Block Diagram



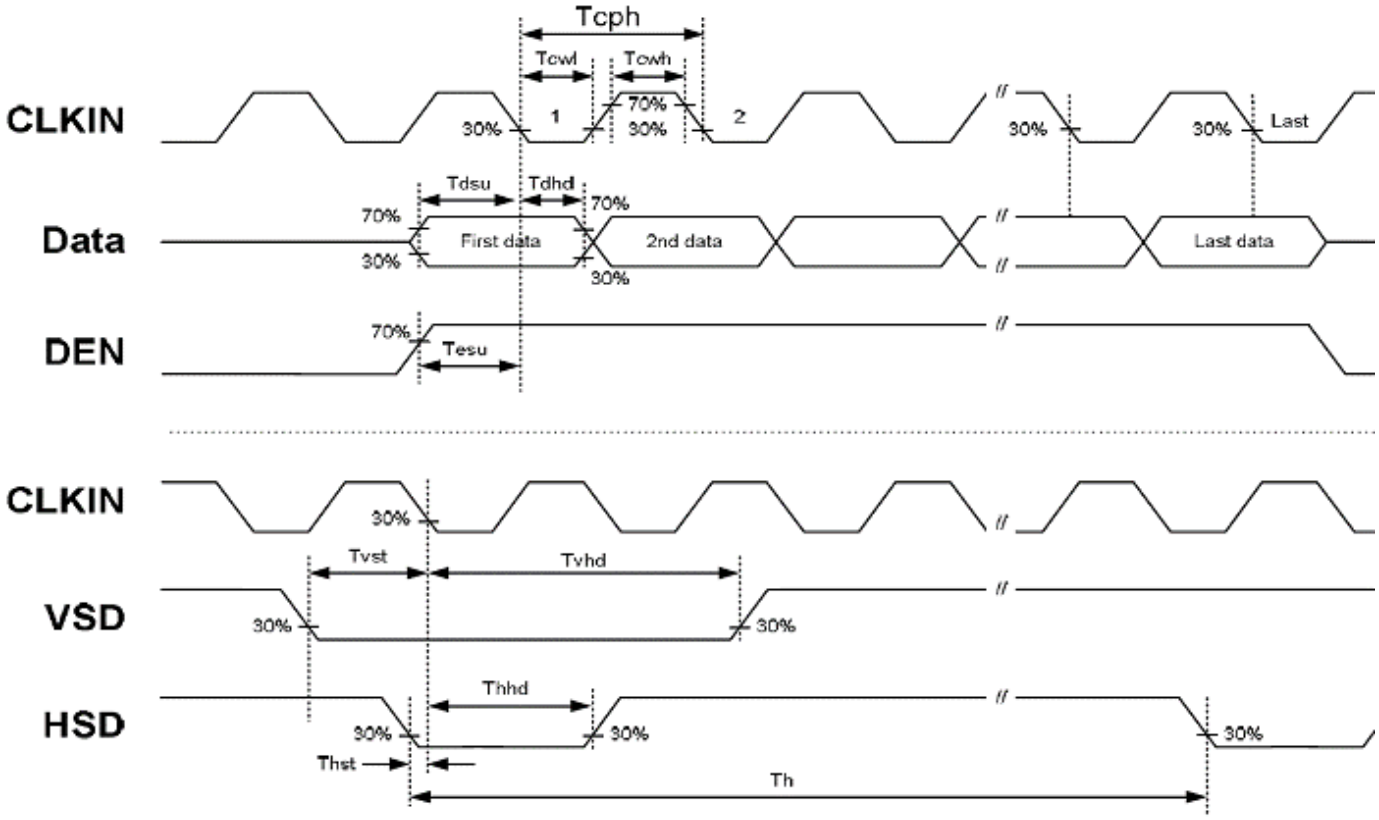
5 Timing Chart

5.1 TFT-LCD Input Timing

VCC=3.3V, GND=0V, Ta=25℃

Parameter	Symbol	Min	Typ	Max	Unit	Remark
DCLK frequency	F_{clk}	28	30.0	40.0	MHz	
DCLK cycle time	T_{cph}	25	33.3	36	ns	
DCLK pulse width	T_{cw}	40%	50%	60%	T_{cph}	
VS setup time	T_{vst}	8			ns	
VS hold time	T_{vhd}	8	-	-	ns	
HS setup time	T_{hst}	8			ns	
HS hold time	T_{hhd}	8	-	-	ns	
Data setup time	T_{dsu}	8			ns	Data to DCLK
Data hold time	T_{dhd}	8	-	-	ns	Data to DCLK
DE setup time	T_{esu}	8	-	-	ns	
DE hold time	T_{ehd}	8	-	-	ns	

Input Clock and Data timing Diagram:



5.2 Recommended Timing Setting Of TCON

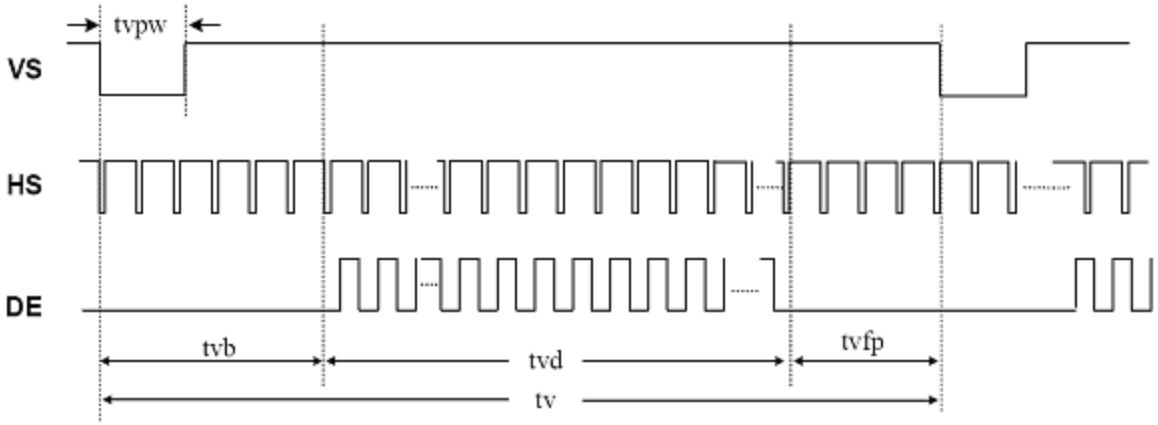
TCON (Embedded In Source IC) Input Timing (DCLK, HS, VS, DE)

VCC=3.3V, GND=0V, Ta=25℃

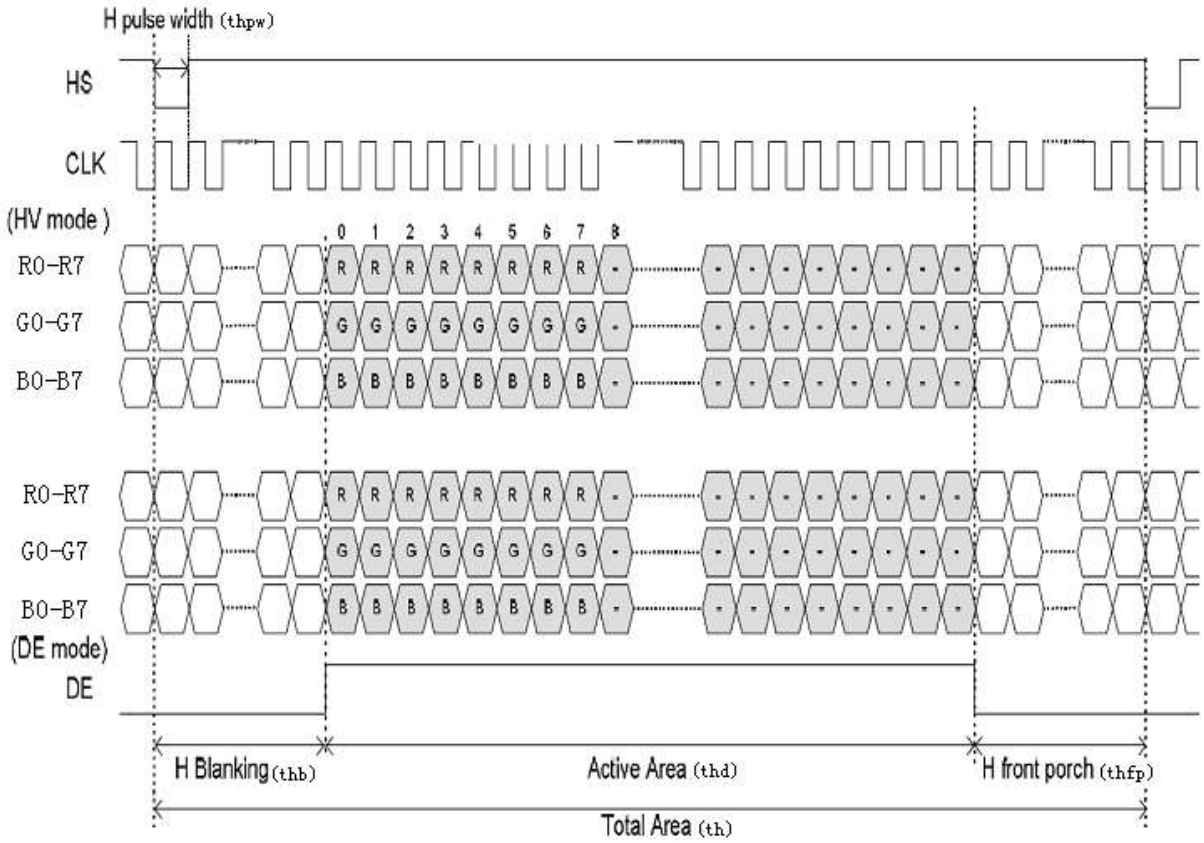
Parameter	Symbol	Min	Typ	Max	Unit	Remark
DCLK	Fclk	28	30	40	MHZ	
	tclk	20	33.3	36	ns	
HSD	th	862	1056	1200	tclk	
	thd	800	800	800	tclk	
	thpw	1	-	40	tclk	
	thb	46	46	46	tclk	
	thfp	16	210	354	tclk	
VSD	tv	510	525	650	th	
	tvd	480	480	480	th	
	tvpw	1	3	20	th	
	tvb	23	23	23	th	
	tvfp	7	22	147	th	

Note 1: DE timing refer to HS, VS input timing.

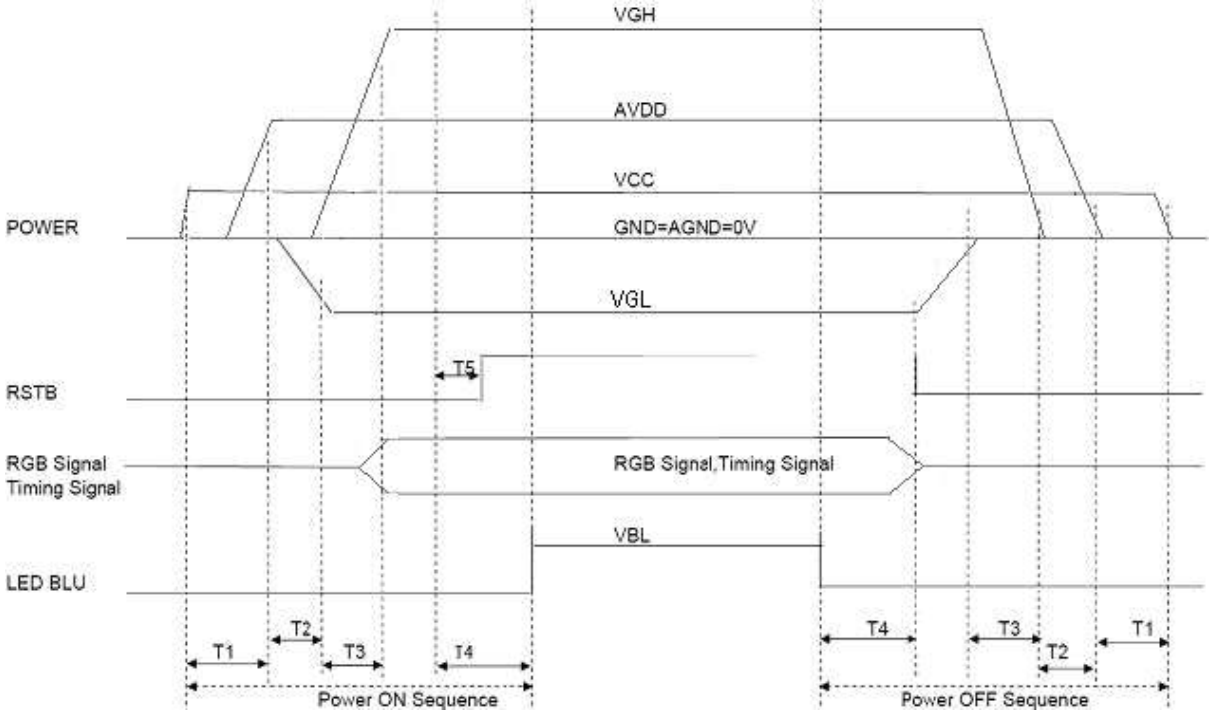
TCON Vertical Input Timing Diagram HV



TCON Horizontal Input Timing Diagram



5.3 POWER ON/OFF SEQUENCE



Note 1: T1≥20ms, T2≥20ms, T3≥5ms, T4≥100ms, T5≥5ms.

6 Optical Characteristics

6.1 TFT Optical Characteristics

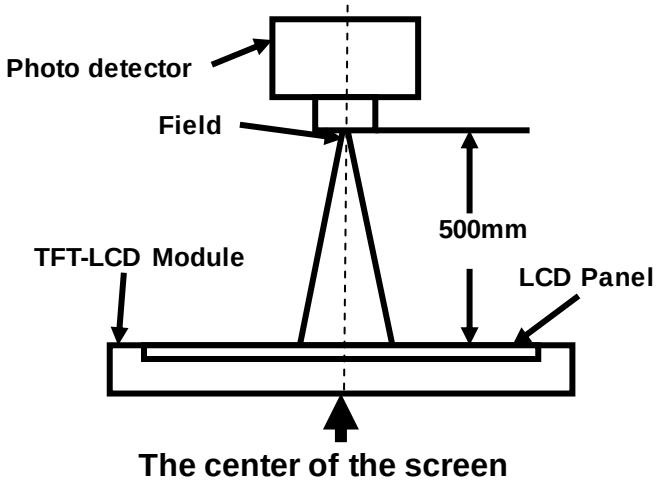
Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	50	60	--	Degree	Note 2
		θB		60	70	--		
		θL		60	70	--		
		θR		60	70	--		
Contrast Ratio		CR	θ=0°	400	500	--		Left/right 0° Top/bottom 5°
Response Time		T_{ON}	25℃	--	20	35	ms	Note1 Note4
		T_{OFF}						
Chromaticity	White	x	Backlight is on	0.252	0.302	0.352		Note5 Note1
		y		0.271	0.321	0.371		
	Red	x		0.534	0.584	0.634		
		y		0.301	0.351	0.401		
	Green	x		0.290	0.340	0.390		
		y		0.536	0.586	0.636		
	Blue	x		0.100	0.150	0.200		
		y		0.041	0.091	0.141		
Uniformity		U		--	75	--	%	Note1、Note6
NTSC				--	50	--	%	
Luminance		L		240	300	--	cd/m^2	Note7

Test Conditions:

1. I_F= 160mA, V_F=9.6V, the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

Note 1: Definition of optical measurement system.

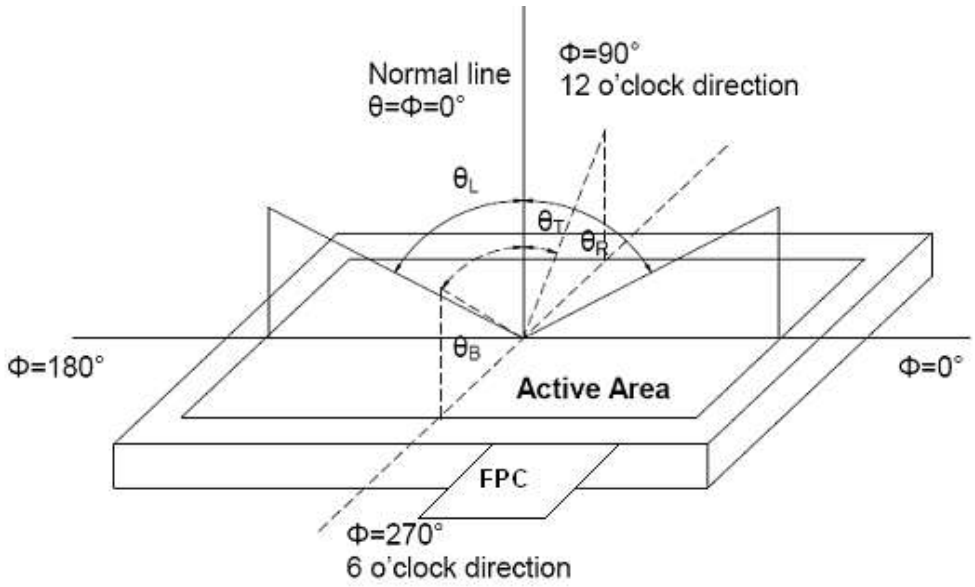
The optical characteristics should be measured in dark room. After 5 Minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

Note 2: Definition of viewing angle range and measurement system.

viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80)。



Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

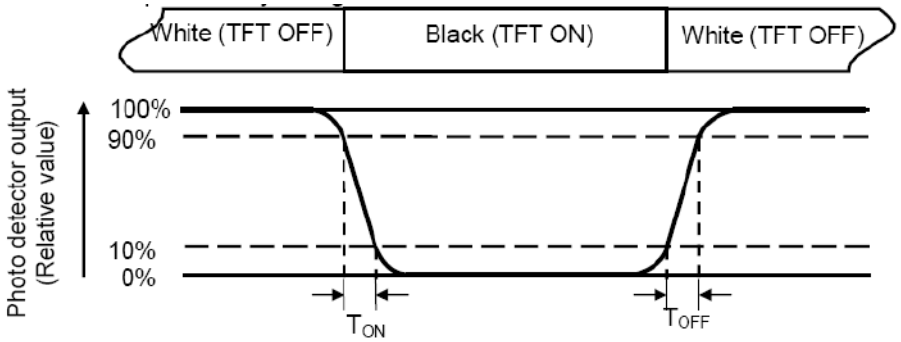
"White state ": The state is that the LCD should drive by Vwhite.

"Black state": The state is that the LCD should drive by Vblack.

Vwhite: To be determined Vblack: To be determined.

Note 4: 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_{ON}) is the time between photo detector output intensity changed from 90% to 10%. And fall time (T_{OFF}) is the time between photo detector output intensity changed from 10% to 90%.



Note 5: Definition of color chromaticity (CIE1931)

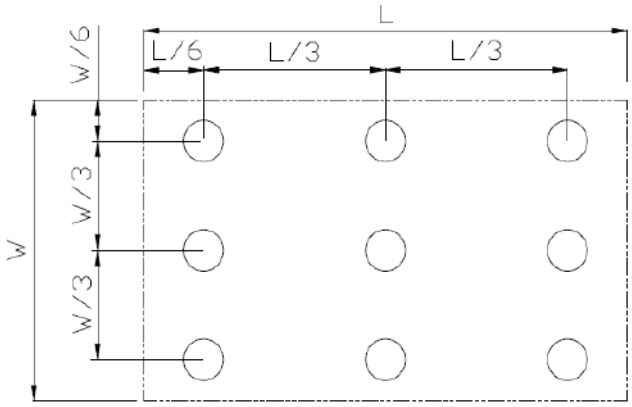
Color coordinates measured at center point of LCD.

Note 6: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.

Luminance Uniformity (U) = Lmin/ Lmax

L-------Active area length W----- Active area width



Lmax: The measured Maximum luminance of all measurement position.

Lmin: The measured Minimum luminance of all measurement position.

Note 7: Definition of Luminance:

Measure the luminance of white state at center point.

6.2 TP Optical Characteristics

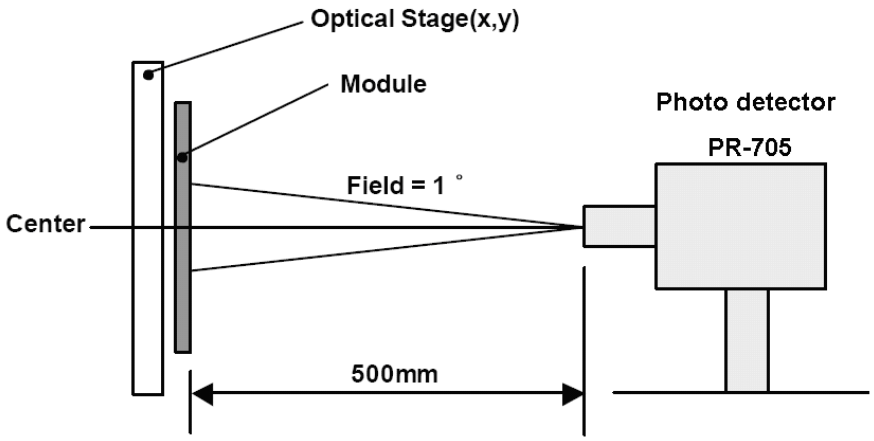
(Ta = 25 C)

No.	Item	Min.	Typ.	Max.	Unit	Remark
1	Transmission		88		%	Note 1
2	Reflectivity				%	Note 1,Note 2
3	HAZE				%	

Note1: Measuring equipments: DMS-501,PR-705. @550nm

Measuring condition:

- After stabilizing and leaving the panel alone at a given temperature for 30 min, the measurement should be executed,
- Measuring surroundings: a stable, windless and dark room,
- Measuring temperature: Ta=25°C,
- 30 min after lighting the back-light.



Note2: conform to National standard GB2410—80 /ASTM D1003—61(1997)

7 Environmental / Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ta = +70℃, 240 hours	Note1,Note6,Note7 IEC60068-2-1,GB2423.2
2	Low Temperature Operation	Ta = -20℃, 240 hours	Note1, Note7,IEC60068-2-1 GB2423.1
3	High Temperature Storage	Ta = +80℃, 240 hours	Note1, Note7,Note8 IEC60068-2-1 GB2423.2
4	Low Temperature Storage	Ta = -30℃, 240 hours	Note1, Note7,EC60068-2-1 GB2423.1
5	High Temperature & Humidity Storage	Ta=+65℃、RH=90%, 240 hours	Note1,Note3, Note4,Note7 IEC60068-2-78 GB/T2423.3
6	Thermal Shock/ Solder Joint Life Test	-30℃（30min）⇔80℃（30min）,Change Time:5min,100cycle	Note1,Note9 Start with cold temperature End with high temperature, IEC60068-2-14,GB2423.22
12	ESD	C=150pF、R=330Ω Air: ±8KV Contact:±8KV 5times (Environment:15℃~35℃, 30%~60%.86Kpa~106Kpa)	Note2,Note5, IEC61000-4-2 GB/T17626.2
13	Shock Test	Half Sine Wave 100G ,6ms,±X,±Y,±Z 3times for each direction	Note2
14	Drop Test(package state)	Height:60cm, 1corner,3edges,6surfaces	Note2,IEC60068-2-32 GB/T2423.8

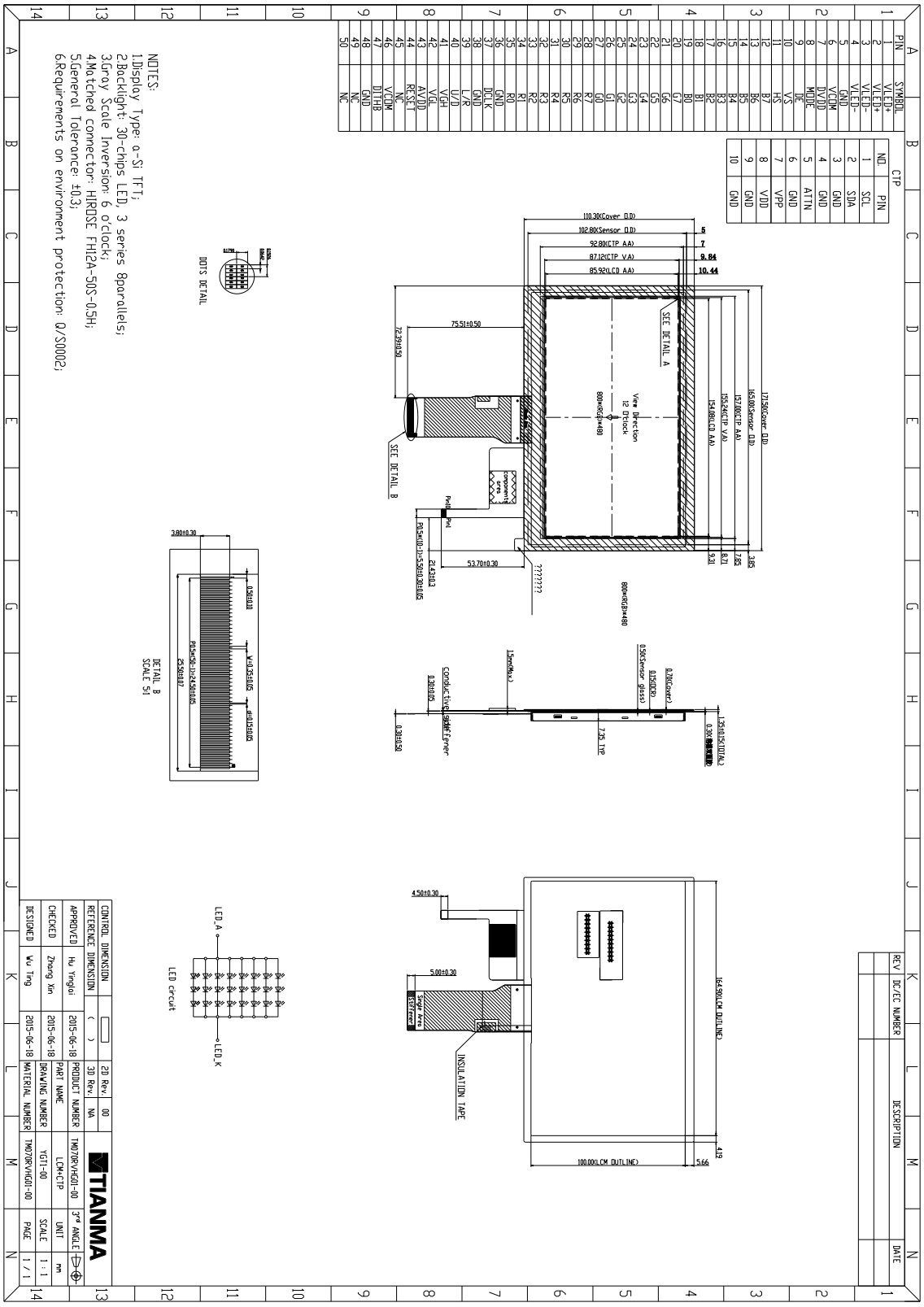
Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

Note3: Before cosmetic and function test, the product must have enough recovery time, at least 2 hours at room temperature.

Note 4: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but don't guarantee all of the cosmetic specification.

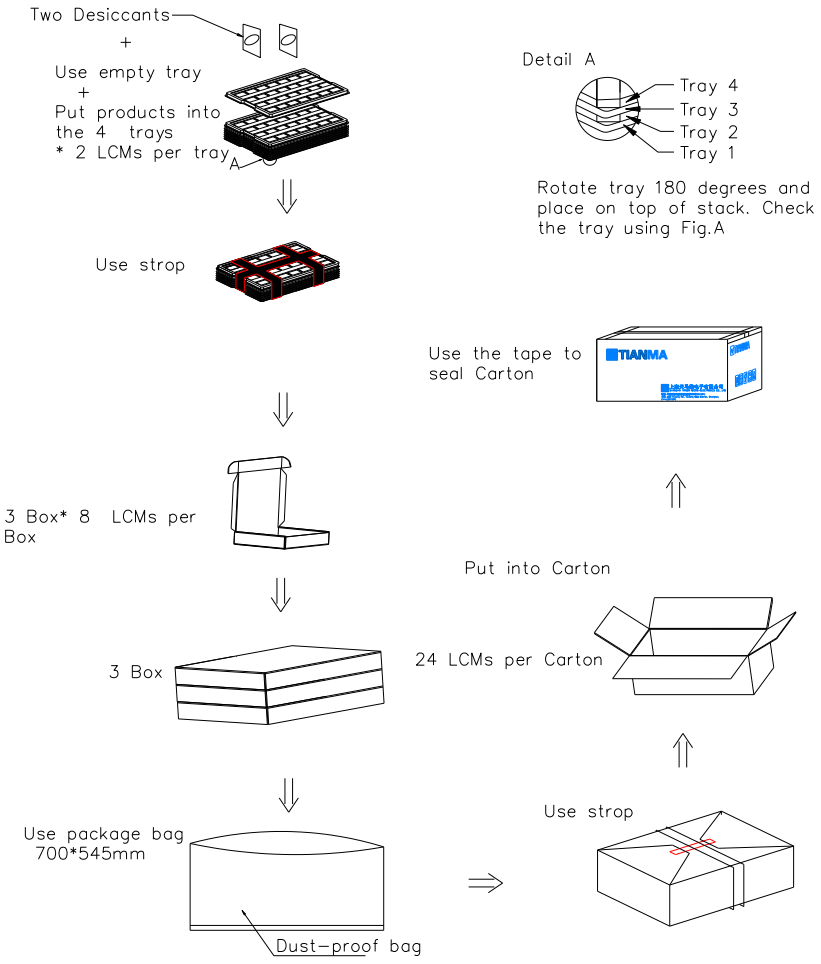
8 Mechanical Drawing



9 Packing Drawing

Per Carton

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	TM070RVHG01-00	164.90x100x5.7mm	TBD	24	
2	Tray	PET(Transmit)	485×330×17	TBD	15	
3	Dust-proof bag	PE	700×545	0.046	1	
4	BOX	CORRUGATED PAPER	520×345×74	0.40	3	
5	Desiccant	DESICCANT	45×35	0.002	6	
6	Carton	CORRUGATED PAPER	544×365×250	1.01	1	
7	Label	PP	100×52	0.001	1	
8	Total weight	TBD±5%kg				



10 Product Inspection Criteria

10.1 Classification of defects

Major defects (MA): A major defect refers to a defect that may substantially degrade usability for product applications, including all functional defects(such as no display, abnormal display, open or missing segment, short circuit, missing component), outline dimension beyond the drawing, progressive defects and those affecting reliability.

Minor defects (MI): A minor defect refers to a defect which is not considered to be able to substantially degrade the product application or a defect that deviates from existing standards almost unrelated to the effective use of the product or its operation, such as black spot, white spot, bright spot, pinhole, black line, white line, contrast variation, glass defect, polarizer defect, etc.

10.2 Definition of inspection range

For dot defect of TFT LCD which is not smaller than 3 inches, dividing three areas to make a judgment (according to figure 1).

A area : center of viewing area
B area : periphery of viewing area
C area : Outside viewing area

For other defects, dividing two areas to make a judgment (according figure 2).

A zone : Inside Viewing area
B zone : Outside Viewing area
X1(A.A~V.A): 0mm X2(A.A~V.A): 0mm
Y1(A.A~V.A): 0mm Y2(A.A~V.A): 0mm

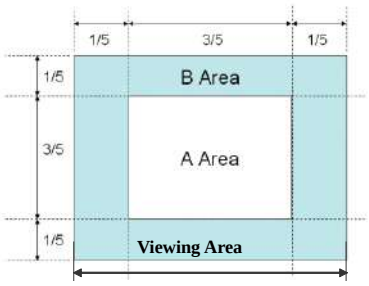


Figure 1

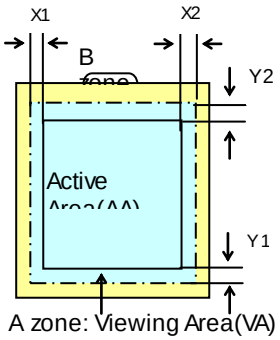


Figure 2

10.3 Inspection items and general notes

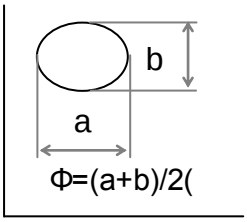
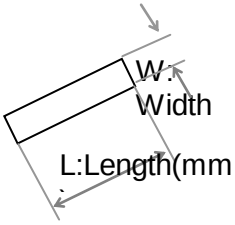
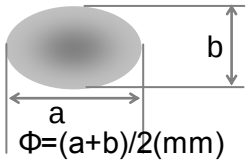
General notes	①Should any defects which are not specified in this standard happen, additional standard shall be determined by mutual agreement between customer and TIANMA. ②Viewing area should be the area which TIANMA guarantees. ③Limit sample should be prior to this Inspection standard. ④Viewing judgment should be under static pattern. ⑤Inspection conditions Inspection distance: 250 mm (from the sample) Temperature : 25±5 ºC Inspection angle : 45 degrees in 12 o'clock direction (all defects in viewing area should be inspected from this direction)	
Inspection items	Pinhole, Bright spot, Black spot, White spot, Black line, White Line, Foreign particle, Bubble	The color of a small area is different from the remainder. The phenomenon doesn't change with voltage
	Contrast variation	The color of a small area is different from the remainder. The phenomenon changes with voltage
	Polarizer defect	Scratch, Dirt, Particle, Bubble on polarizer or between polarizer and glass
	Dot defect (TFT LCD)	The pixel appears bright or dark abnormally when display

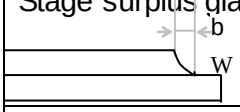
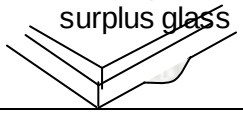
	Functional defect	No display, Abnormal display, Open or missing segment, Short circuit, False viewing direction
	Glass defect	Glass crack, Shaved corner of glass, Surplus glass
	PCB defect	Components assembly defect

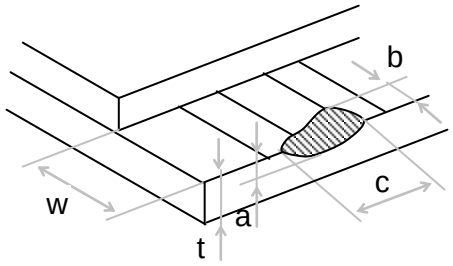
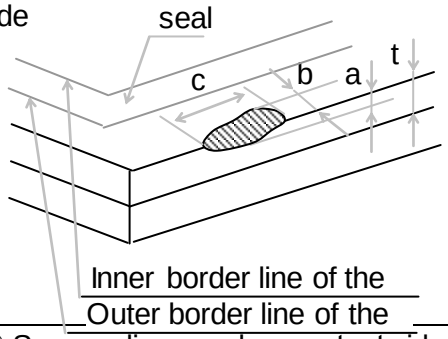
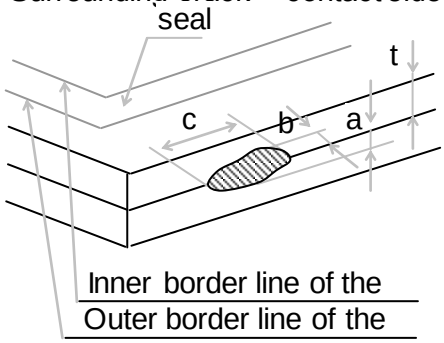
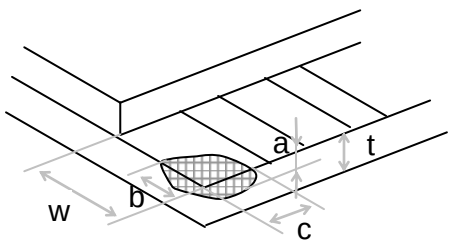
10.4 Outgoing Inspection level

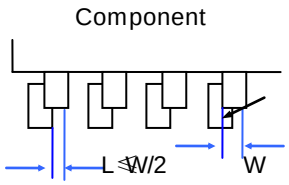
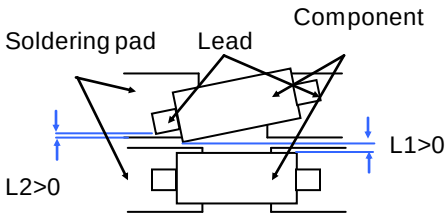
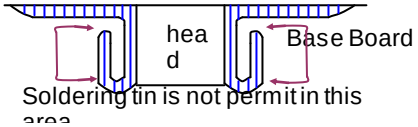
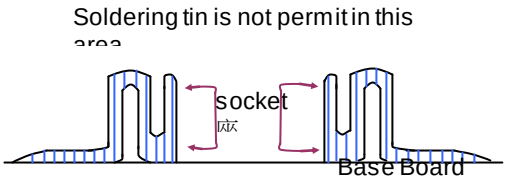
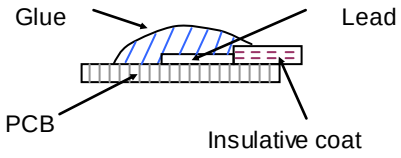
Outgoing Inspection standard	Inspection conditions	Inspection				
		Min.	Max.	Unit	IL	AQL
Major Defects	See 9.3 general notes	See 9.5			II	0.65
Minor Defects	See 9.3 general notes	See 9.5			II	1.5
Note：Sampling standard conforms to GB2828						

10.5 Inspection Items and Criteria

Inspection items			Judgment standard			
			Category		Acceptable number	
					A zone	B zone
1	Black spot, White spot, Bright Spot, Pinhole, Foreign Particle, Particle in or on glass, Scratch on glass		A	Φ≦0.10	Neglected	Neglected
			B	0.10<Φ≦0.15	2	
			C	0.15<Φ≦0.20	1	
			D	0.20<Φ	0	
			Total defective point(B,C)		3	
2	Black line, White line, and Particle Between Polarizer and glass, Scratch on glass		A	W≦0.01	Neglected	Neglected
			B	0.01<W≦0.03 L≦3.0	2	
			C	0.03<W≦0.05 L≦3.0	1	
			D	0.05<W	0	
			Total defective point(B,C)		3	
3	Contrast variation		A	Φ≦0.2	Neglected	Neglected
			B	0.2<Φ≦0.3	2	
			C	0.3<Φ≦0.4	1	
			D	0.4<Φ	0	
			Total defective point(B,C)		3	

<table>
<tr><td rowspan="11">4</td><td rowspan="11">Dot defect (if TFT LCD is used)</td><td rowspan="7">TFT LCD is smaller than 3 inches</td><td>LCD Class</td><td>Defect</td><td colspan="2">A area</td><td>B area</td></tr>
<tr><td rowspan="3">A</td><td>Bright dot</td><td colspan="2">1</td><td rowspan="6">Neglected</td></tr>
<tr><td>Dark dot</td><td colspan="2">2</td></tr>
<tr><td>Total</td><td colspan="2">2</td></tr>
<tr><td rowspan="3">B</td><td>Bright dot</td><td colspan="2">2</td></tr>
<tr><td>Dark dot</td><td colspan="2">3</td></tr>
<tr><td>Total</td><td colspan="2">4</td></tr>
<tr><td rowspan="7">TFT LCD between 3~10.4 inches</td><td>LCD Class</td><td>Defect</td><td>A area</td><td>B area</td><td>C area</td></tr>
<tr><td rowspan="3">A</td><td>Bright dot</td><td>1</td><td>1</td><td rowspan="6">Neglected</td></tr>
<tr><td>Dark dot</td><td>1</td><td>2</td></tr>
<tr><td>Total</td><td colspan="2">4</td></tr>
<tr><td rowspan="3">B</td><td>Bright dot</td><td>2</td><td>2</td></tr>
<tr><td>Dark dot</td><td>2</td><td>3</td></tr>
<tr><td>Total</td><td colspan="2">6</td></tr>
<tr><td colspan="6">Notes:
Bright dot: in R、G、B or dark display figure, the pixel appears bright.
Dark dot: in R、G、B or white display figure, the pixel appears dark.
Defect area must be less than an half size of the dot.</td></tr>
<tr><td>5</td><td colspan="2">Bubble inside cell</td><td colspan="2">any size</td><td>none</td><td>none</td></tr>
<tr><td rowspan="4">6</td><td rowspan="4">Polarizer defect (if Polarizer is used)</td><td>Scratch ,damage on polarizer, Particle on polarizer or between polarizer and glass.</td><td colspan="5">Refer to item 1 and item 2.</td></tr>
<tr><td rowspan="3">Bubble, dent and convex</td><td>A</td><td>Φ≦0.3</td><td>Neglected</td><td rowspan="3">Neglected</td></tr>
<tr><td>B</td><td>0.3<Φ≦0.7</td><td>2</td></tr>
<tr><td>C</td><td>0.7<Φ</td><td>0</td></tr>
<tr><td rowspan="2">7</td><td rowspan="2">Surplus glass</td><td>Stage surplus glass
 
</td><td colspan="4">b≦0.3mm</td></tr>
<tr><td>Surrounding surplus glass
  </td><td colspan="4">Should not influence outline dimension and assembling.</td></tr>
<tr><td>8</td><td colspan="2">Open segment or open common</td><td colspan="4">Not permitted</td></tr>
<tr><td>9</td><td colspan="2">Short circuit</td><td colspan="4">Not permitted</td></tr>
<tr><td>10</td><td colspan="2">False viewing direction</td><td colspan="4">Not permitted</td></tr>
<tr><td>11</td><td colspan="2">Contrast ratio uneven</td><td colspan="4">According to the limit specimen</td></tr>
<tr><td>12</td><td colspan="2">Crosstalk</td><td colspan="4">According to the limit specimen</td></tr>
<tr><td>13</td><td colspan="2">Black /White spot(display)</td><td colspan="4">Refer to item 1</td></tr>
<tr><td>14</td><td colspan="2">Black /White line(display)</td><td colspan="4">Refer to item 2</td></tr>
</table>

Inspection items			Judgment standard		
			Category(application: B zone)		Acceptable number
15	Glass defect crack	①The front of lead terminals 	A	a≤ t, b≤1/5W, c≤3mm	Max.3 defects allowed
			B	Crack at two sides of lead terminals should not cover patterns and alignment mark	
		②Surrounding crack—non-contact side 	b < Inner borderline of the seal		
		③ Surrounding crack— contact side 	b < Outer borderline of the seal		
		④Corner 	A	a ≦ t, b ≦ 3.0, c ≦ 3.0	
			B	Glass crack should not cover patterns u and alignment mark and patterns.	

Inspection items			Judgment standard Category(application: B zone)
16	PCB defect	Component soldering: No cold soldering、short、open circuit、burr、tin ball The flat encapsulation component position deviation must be less than 1/3 width of the pin (Pic.1)； the sheet component deviation: Pin deviates from the pad and contact with the near components is not permitted（Pic.2）	
		lead defect: The lead lack must be less than 1/3 of its width; The lead burr must be less than 1/3 of the seam; Impurities connect with the near leads is not permitted	
		Connector soldering: Soldering tin is at contact position of the plug and socket is not permitted No foundation is scald Serious cave distortion on plug and socket contact pin is not permitted	 
		Glue on root of the speaker receiver and motor lead: The insulative coat of the lead must join into the PCB; the protected glue must envelop to the insulative coat.	

11 Precautions for Use of LCD Modules

11.1 Handling Precautions

11.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

11.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

11.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

11.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

11.1.5 If the display surface is contaMinated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

11.1.6 Do not attempt to disassemble the LCD Module.

11.1.7 If the logic circuit power is off, do not apply the input signals.

11.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

11.1.8.1 Be sure to ground the body when handling the LCD Modules.

11.1.8.2 Tools required for assembly, such as soldering irons, must be properly ground.

11.1.8.3 To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

11.1.8.4 The LCD 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.

11.2 Storage precautions

11.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

11.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃ Relatively humidity: ≤80%

11.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

11.3 Transportation Precautions

11.3.1 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.