MODEL NO. : TM035KBH11

ISSUED DATE: 2010-6-22

VERSION : Ver 1.0

■Preliminary Specification

□Final Product Specification

Customer :

Approved by	Notes

SHANGHAI TIANMA Confirmed :

Prepared by	Checked by	Approved by

This technical specification is subjected to change without notice

Table of Contents

Record of Revision

Rev	Issued Date	Description	Editor
1.0	2010-6-22	Preliminary Specification Released	Fan Jiang

1 General Specifications

Feature		Spec
Display Spec.	Size	3.5inch
	Resolution	320(RGB) x 240
	Interface	RGB/CCIR656/601
	Color Depth	16.7M dithering
	Technology Type	a-Si TFT
	Pixel Pitch (mm)	0.219 x 0.219
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	TM with Normally White
	Surface Treatment(Up Polarizer)	Clear type (3H)
	Surface Treatment(TSP)	Anti-glare type (3H)
	Viewing Direction	12 o'clock
	Gray Scale Inversion Direction	6 o'clock
Mechanical Characteristics	LCM (W x H x D) (mm)	76.90 x 63.90 x 4.00
	Active Area(mm)	70.08 x 52.56
	With /Without TSP	With TSP
	Weight (g)	40.55
	LED Numbers	6 LEDs Serial
Electronic	Driver IC	Novatek NT39016D

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 LCD Panel

No	Customer Symbol	SPEC Symbol	I/O	Description	Remarks
1	LED_Cathode	LED_Cathode	P	LED_Cathode	
2	LED_Cathode	LED_Cathode	P	LED_Cathode	
3	LED_Anode	LED_Anode	P	LED_Anode	
4	LED_Anode	LED_Anode	P	LED_Anode	
5	GND	NC	NC	Ground	
6	RESET	RESET	I	Reset	
7	GND	NC	NC	DUMMY	
8	Y1（YU）	Y1	O	Touch Panel	
9	X1（XR）	X1	O	Touch Panel	
10	Y2（YD）	Y2	O	Touch Panel	
11	X2（XL）	X2	O	Touch Panel	
12	B0	B0	I	Data Bus	
13	B1	B1	I	Data Bus	
14	B2	B2	I	Data Bus	
15	B3	B3	I	Data Bus	
16	B4	B4	I	Data Bus	
17	B5	B5	I	Data Bus	
18	B6	B6	I	Data Bus	
19	B7	B7	I	Data Bus	
20	G0	G0	I	Data Bus	
21	G1	G1	I	Data Bus	
22	G2	G2	I	Data Bus	
23	G3	G3	I	Data Bus	
24	G4	G4	I	Data Bus	
25	G5	G5	I	Data Bus	
26	G6	G6	I	Data Bus	
27	G7	G7	I	Data Bus	
28	R0	R0	I	Data Bus	
29	R1	R1	I	Data Bus	
30	R2	R2	I	Data Bus	
31	R3	R3	I	Data Bus	

32	R4	R4	I	Data Bus	
33	R5	R5	I	Data Bus	
34	R6	R6	I	Data Bus	
35	R7	R7	I	Data Bus	
36	HSYNC	HSYNC	I	Horizontal Synchronous Signal	
37	VSYNC	VSYNC	I	Vertical Synchronous Signal	
38	DOTCLK	CLK	I	Data Clock	
39	NC	NC	NC	DUMMY	
40	NC	NC	NC	DUMMY	
41	VCC	VCC	P	Power 3.3v	
42	VCC	VCC	P	Power 3.3v	
43	CS	SPENA	I	Serial Port Data Enable Signal	Note2-2
44	GND	GND	NC	DUMMY	
45	NC	NC	NC	DUMMY	
46	GND	GND	NC	DUMMY	
47	NC	NC	NC	DUMMY	
48	NC	NC	NC	DUMMY	
49	SCK	SPCK	I	SPI Serial Clock	
50	SDI	SPDA	I/O	SPI Serial Data Input/Output	
51	GND	GND	P	Ground	
52	DEN	DEN	I	Data Enable Signal	
53	GND	GND	P	Ground	
54	GND	GND	P	Ground	

Note2-1: I/O definition:

I----Input O----Output P----Power/Ground

Note 2-2:

Mode	D(23:16)	D(15:8)	D(7:0)	HSYNC	VSYNC	DEN
CCIR 656	D(23:16)	GND	GND	NC	NC	NC
CCIR 601	D(23:16)	GND	GND	HSYNC	VSYNC	NC
8 Bit RGB	D(23:16)	GND	GND	HSYNC	VSYNC	NC for HV mode
						DEN for DEN mode
24 Bit RGB	R(7:0)	G(7:0)	B(7:0)	HSYNC	VSYNC	NC for HV mode
						DEN for DEN mode

3 Absolute Maximum Ratings

Ta = 25℃

Item	Symbol	Min	Max	Unit	Remark
Power Supply Voltage	VCC	-0.3	5.0	V	
Logic Input Signal Voltage	R7~R2,G7~G2,B7~B2,RESET SPENA,SPCK SPDA,HSYNC VSYNC,CLK,DEN	-0.3	VCC+0.3	V	
Back Light Forward Current	I_{LED}	--	25	mA	For each LED
Operating Temperature	T_{OPR}	-20	60	℃	
Storage Temperature	T_{STG}	-30	70	℃	

4 Electrical Characteristics

4.1 Driving TFT LCD Panel

GND=0V, Ta=25℃

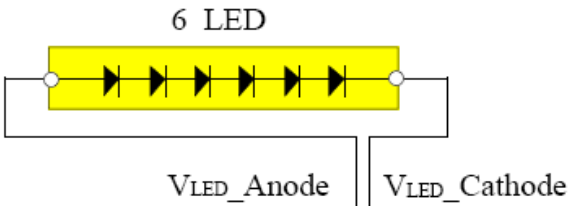
Item		Symbol	Min	Typ	Max	Unit	Remark
Power Supply Voltage		VCC	3.0	3.3	3.6	V	
Input Signal Voltage	Low Level	V_{IL}	0	--	0.2xVCC	V	D00~D23,RESET ,DEN SPENA,SPCK,SPDA HSYNC,VSYNC ,CLK
	High Level	V_{IH}	0.8xVCC	--	VCC	V	
(Panel+ LSI) Power Consumption		Black Mode (60Hz)	--	35	50	mW	
		Standby Mode	--	0.1	0.15	mW	

4.2 Driving Backlight

Ta=25℃

Item	Symbol	Min	Typ	Max	Unit	Remark
Forward Current	I_F	--	20	25	mA	For each LED
Forward Voltage	V_F	--	3.2	3.6	V	
Power Consumption	W_{BL}	--	384	--	mW	Note1,2,3

Note 1: The figure below shows the connection of LED



Note 2: One LED : I_F =20 mA, V_F =3.2V

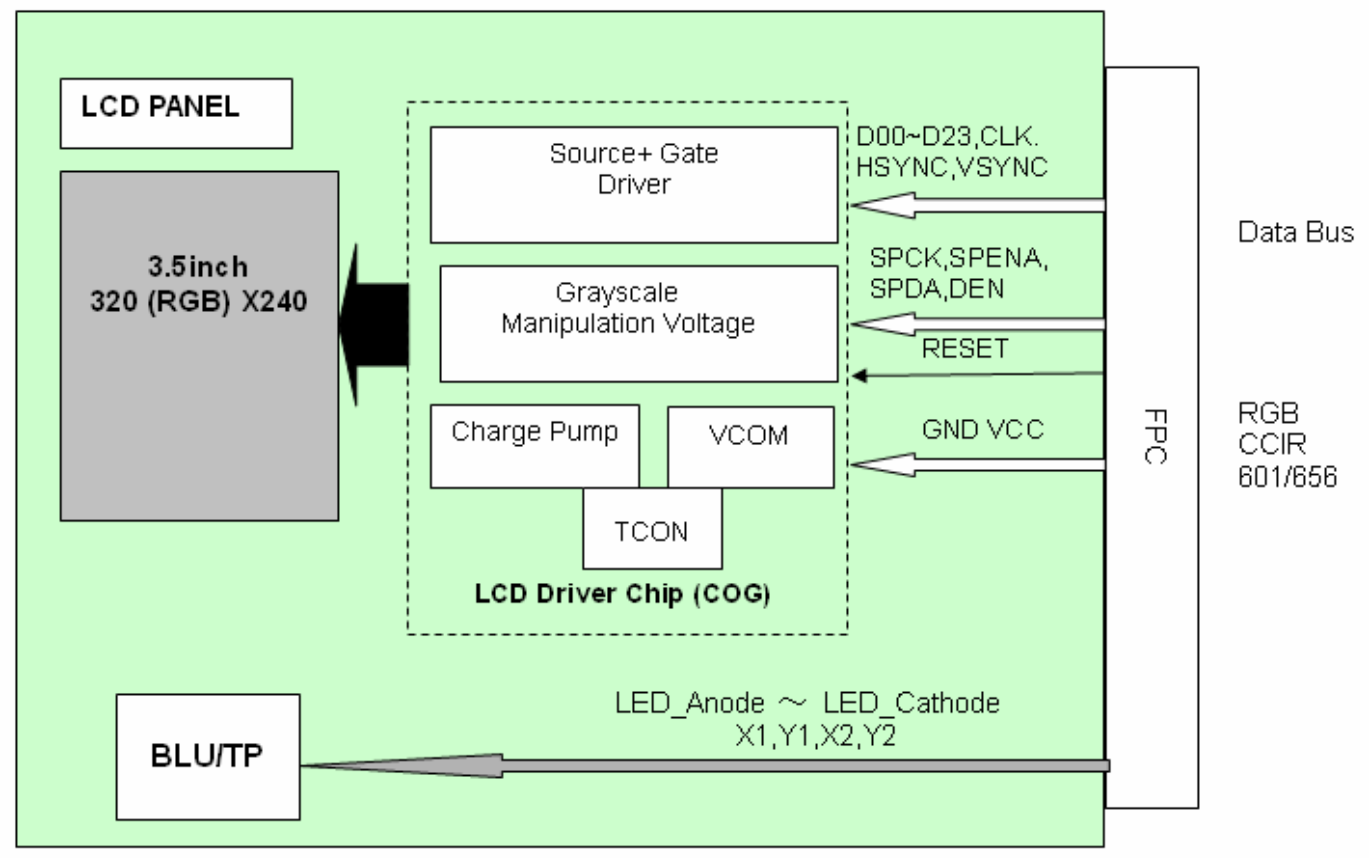
Note 3: IF is defined for one channel LED.

Optical performance should be evaluated at Ta=25℃ only.

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.

4.3 Block Diagram



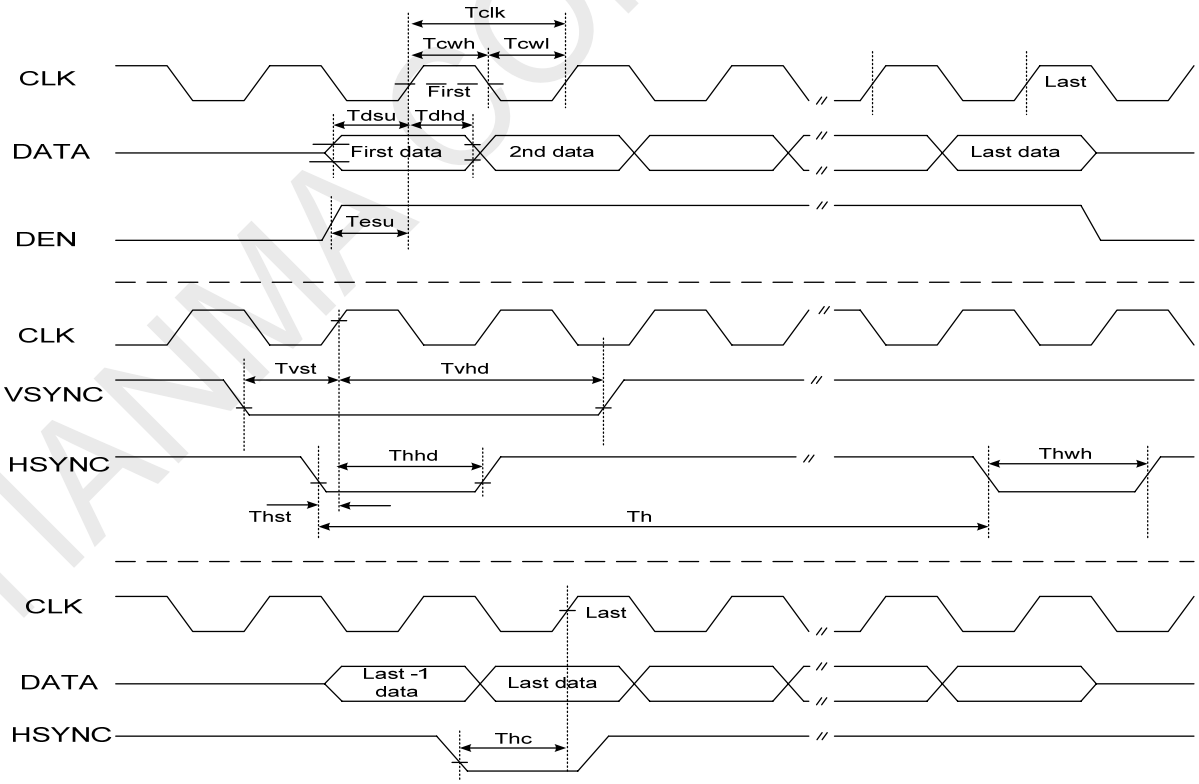
5 Timing Chart

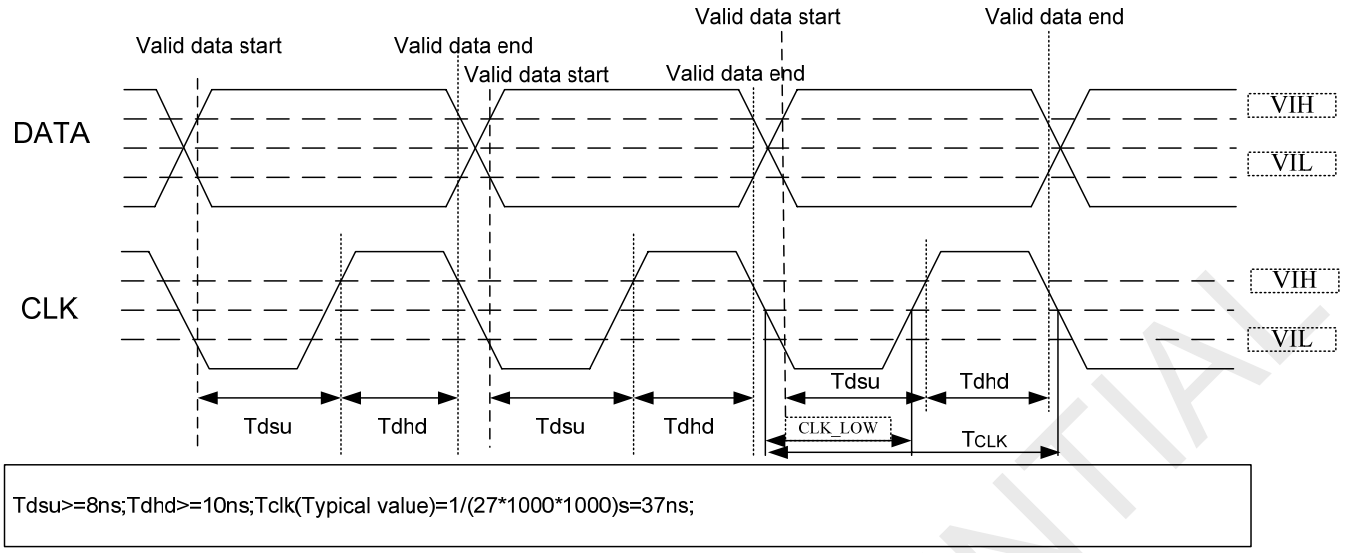
5.1 Timing Parameter

(VCC=3.3V GND =0V,Ta=25℃)

Parameter	Symbol	Min	Typ	Max	Unit	Condition
CLK Clock Time	T_{clk}	1/Max(Fclk)	--	1/Min(Fclk)	ns	
CLK Pulse Duty	T_{chw}	40	50	60	%	T_{clk}
HSYNC to CLK	T_{hc}	--	--	1	CLK	--
HSYNC Width	T_{hwh}	1	--	--	CLK	--
VSYNC Width	T_{vwh}	1	--	--	ns	--
HSYNC Period Time	T_h	60	63.56	67	ns	--
VSYNC Set-up Time	T_{vst}	8	--	--	ns	--
VSYNC Hold Time	T_{vhd}	10	--	--	ns	--
HSYNC Setup Time	T_{hst}	8	--	--	ns	--
HSYNC Hold Time	T_{hhd}	10	--	--	ns	--
Data Set-up Time	T_{dsu}	8	--	--	ns	D00~D23 to CLK
Data Hold Time	T_{dhd}	10	--	--	ns	D00~D23 to CLK
DEN Set up Time	T_{esu}	12	--	--	ns	DEN to CLK

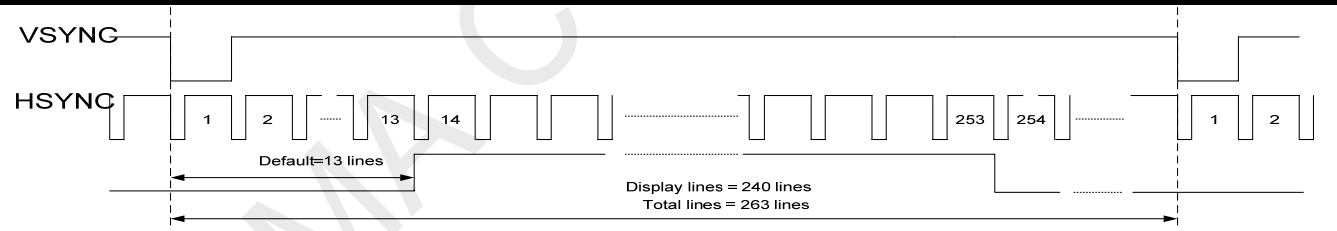
Note: Each CLK Frequency of 24 Bit RGB Mode,8 Bit RGB Mode,CCIR601and CCIR656 are different.

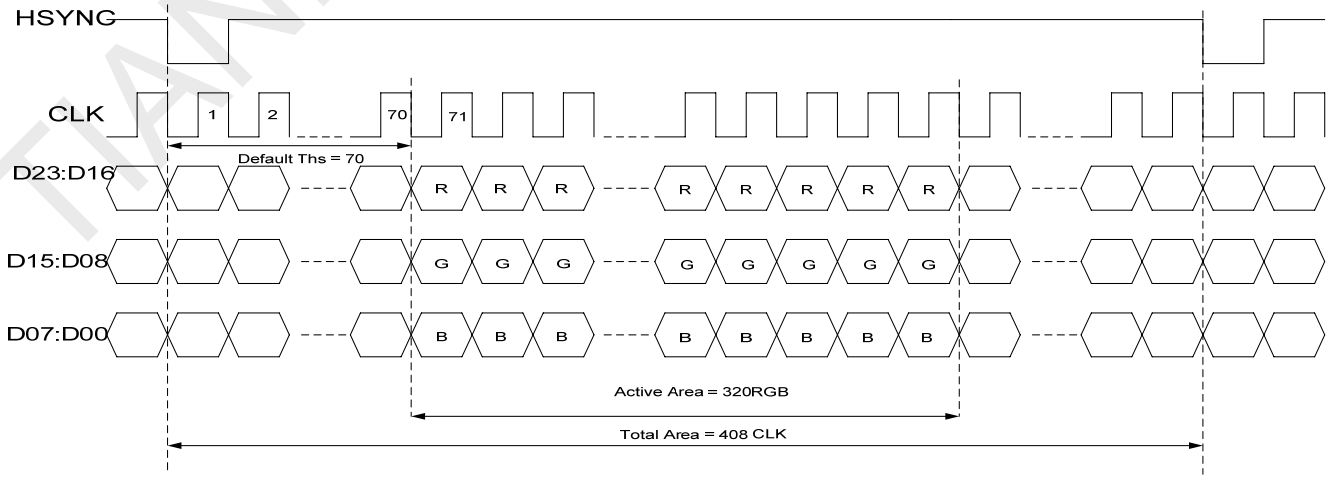




5.2 24 Bit RGB Mode for 320RGB x 240

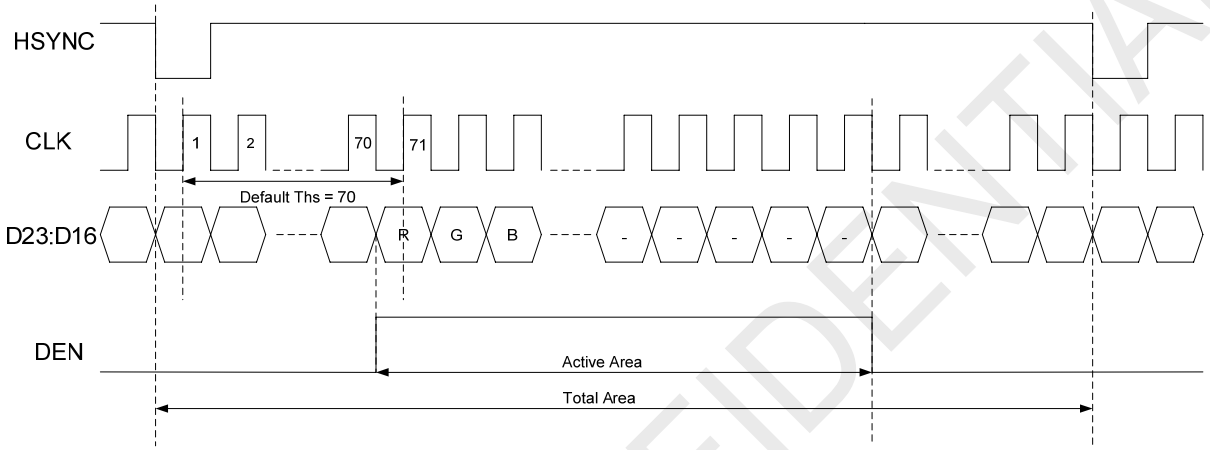
Parameter	Symbol	Min	Typ	Max	Unit	Condition
CLK Frequency	F_{clk}	6.1	6.4	8.0	MHz	VCC=3.0V~3.6V
CLK Cycle Time	T_{clk}	125	156	164	ns	
CLK Pulse Duty	T_{cwh}	40	50	60	%	
Time that HSYNC to 1 st data input(NTSC)	T_{hs}	40	70	255	CLK	DDLY =70, Offset = 0 (fixed)





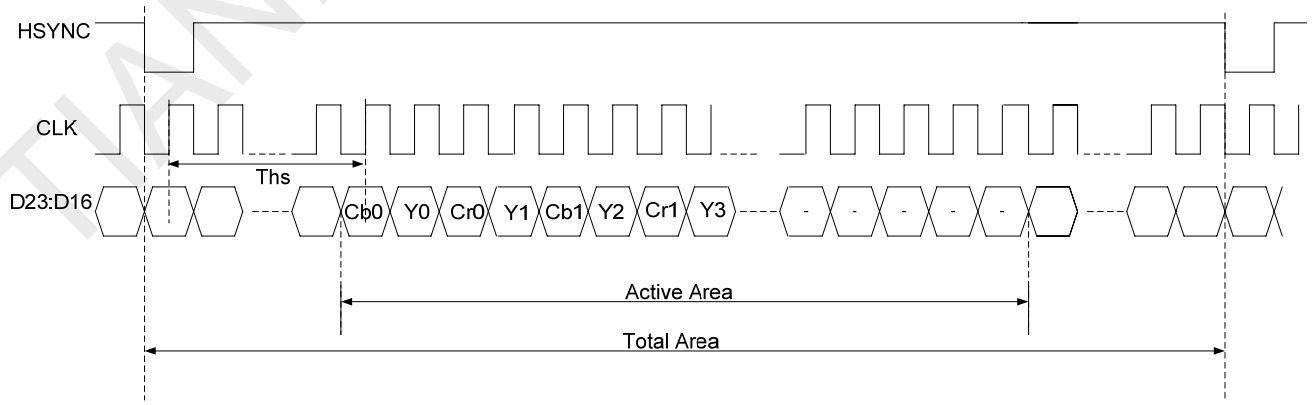
5.3 8 Bit RGB Mode for 320RGB x 240

Parameter	Symbol	Min	Typ	Max	Unit	Condition
CLK Frequency	Fclk	--	27	30	MHz	VCC=3.0~3.6V
CLK Cycle Time	Tclk	--	37	--	ns	
Time that HSYNC to 1'st data input(NTSC)	Ths	35	70	255	CLK	DDLY = 70, Offset = 0 (fixed)



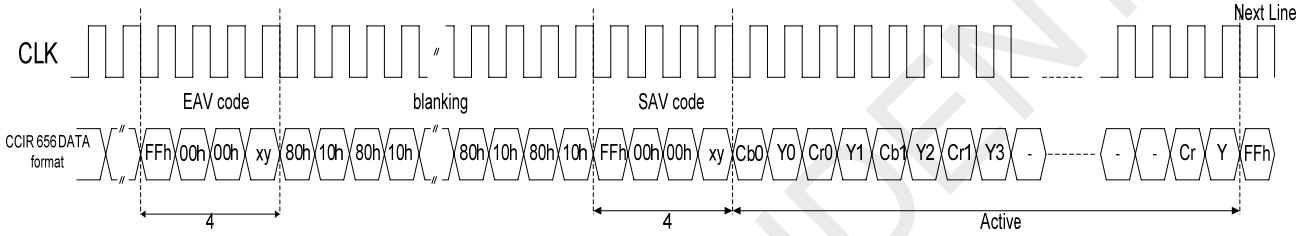
5.4 CCIR601

Parameter	Symbol	Min	Typ	Max	Unit	Condition
CLK Frequency	F_{clk}	--	24.54/ 27	30	MHz	VCC=3.0V~3.6V
CLK Cycle Time	T_{clk}	--	40/37	--	ns	
Time From HSYNC to1 st data input(PAL)	T_{hs}	128	264	--	CLK	DDLY = 136, Offset = 128 (fixed)
Time From HSYNC to1 st data input(NTSC)	T_{hs}	128	244	--	CLK	DDLY = 116, Offset = 128 (fixed)



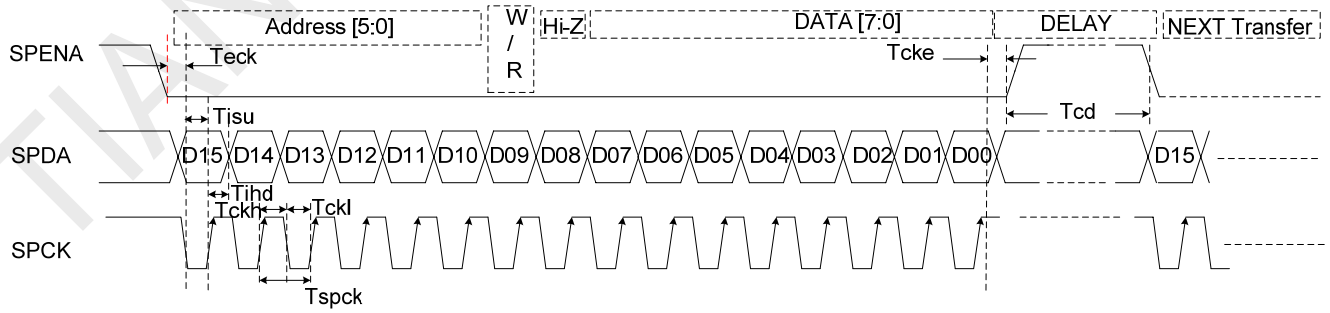
5.5 CCIR656

Parameter	Symbol	Min	Typ	Max	Unit	Condition
CLK Frequency	Fclk	--	27	30	MHz	VCC=3.0V~3.6V
CLK Cycle Time	Tclk	--	37	--	ns	
Time that EVA to 1'st data input(PAL)	Ths	128	288	--	CLK	DDLY = 152, Offset = 128 (fixed)
Time that EVA to1'stdatainput(NTSC)	Ths	128	276	--	CLK	DDLY = 140, Offset = 128 (fixed)



5.6 3-Wire Serial Communication AC Timing

Parameter	Symbol	Min	Typ	Max	Unit	Remark
Serial Clock	T_{SPCK}	320	--	--	ns	
SPCK Pulse Duty	T_{scdut}	40	50	60	%	
Serial Data Setup Time	T_{isu}	120	--	--	ns	
Serial Data Hold Time	T_{ihd}	120	--	--	ns	
Serial Clock High/Low	T_{ckh}/T_{ckl}	120	--	--	ns	
Chip Select Distinguish	T_{cd}	1	--	--	us	
SPENB input setup time	Teck	150	--	--	ns	
SPENB input hold time	Tcke	150	--	--	ns	



Note：DDLY Description (Ths= DDLY+ Offset)

R04: Source Timing Delay Control Register\

Bit	Name	Initial	Description
Bit [7:0]	DDLY[7:0]	46h	Select the HSD signal to 1'st input data delay timing Under CCIR601 mode, Ths = DDLY[7:0] + 128, (Unit = CLKIN) Under CCIR656 mode, Ths = DDLY[7:0] + 136, (Unit = CLKIN) Under RGB 8/24 bit mode, Ths = DDLY[7:0] , (Unit = CLKIN) The register value will be update to the different mode,such as 24RGB,8RGB,CCIR mode. Read the section of "24RGB, 8RGB, CCIR mode" for the detail.

5.7 3-Wire Control Registers List

3-Wire Registers		Register Description		
D[15:10]	Name	Init	R/W	Function Description
000000b	R00	07h	R/W	System control register
000001b	R01	00h	R/W	Timing controller function register
000010b	R02	03h	R/W	Operation control register
000011b	R03	CCh	R/W	Input data Format control register
000100b	R04	46h	R/W	Source timing delay control register
000101b	R05	0Dh	R/W	Gate timing delay control register
000110b	R06	00h	R/W	Reserved
000111b	R07	00h	R/W	Internal function control register
001000b	R08	08h	R/W	RGB contrast control register
001001b	R09	40h	R/W	RGB brightness control register
001010b	R0A	88h	R/W	Hue/Saturation control register
001011b	R0B	88h	R/W	R/B sub-contrast control register
001100b	R0C	20h	R/W	R sub-brightness control register
001101b	R0D	20h	R/W	B sub-brightness control register
001110b	R0E	10h	R/W	VCOMDC level control register
001111b	R0F	24h	R/W	VGL/VGH VOCMAC level control register
010000b	R10	04h	R/W	VGAM2 level control register
010001b	R11	24h	R/W	VGAM3/4 level control register
010010b	R12	24h	R/W	VGAM5/6 level control register
011110b	R1E	00h	R/W	VCOMDC Trim function control register
100000b	R20	00h	R/W	Wide and narrow display mode control register

Note :

R03: c4h:CCIR656 Mode

c2h:CCIR601 Mode

c8h:8 bit RGB Mode(HV Mode)

c9h:8 bit RGB Mode(DEN Mode)

cch(default):24 bit RGB Mode (HV mode)

cdh:24 bit RGB Mode (DEN mode)

R0E:

10h(default):if LCM is programed by OTP,please use this value.VCOM DC is decides by OTP's value.

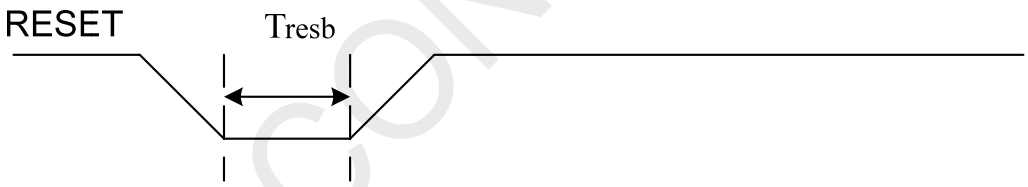
6Bh(recommend) :if LCM isn't programed by OTP,please use this value. VCOM DC=1.56V.

R0F:

A4h(default):VGH=15V,VGL=-10V.

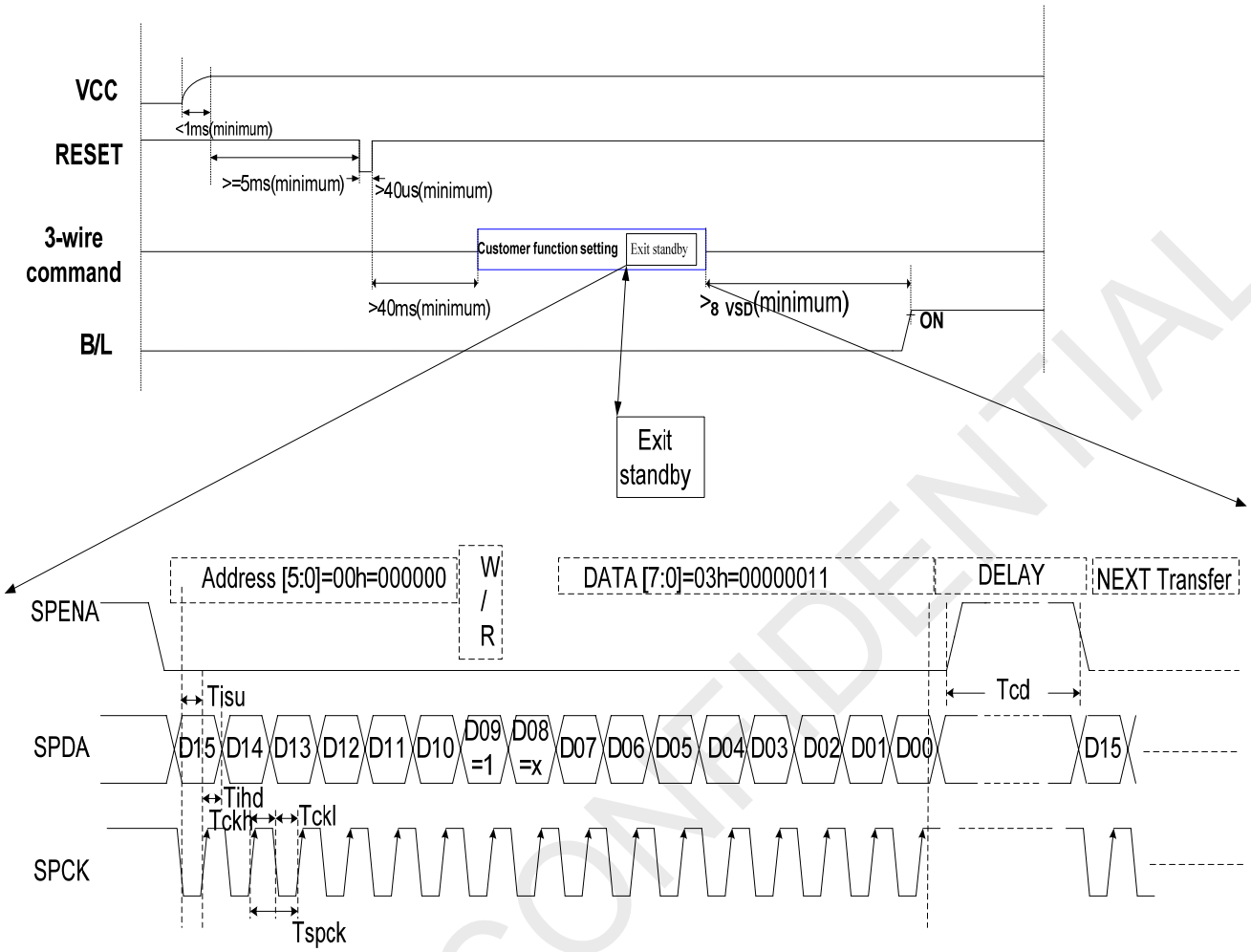
24h(recommend): VGH=15V,VGL=-7V.

5.8 Reset Timing



Parameter	Min	Typ	Max	Unit	Conditions
Tresb	40	-----	----	us	VCC = 3.3V

5.9 Power On Sequence



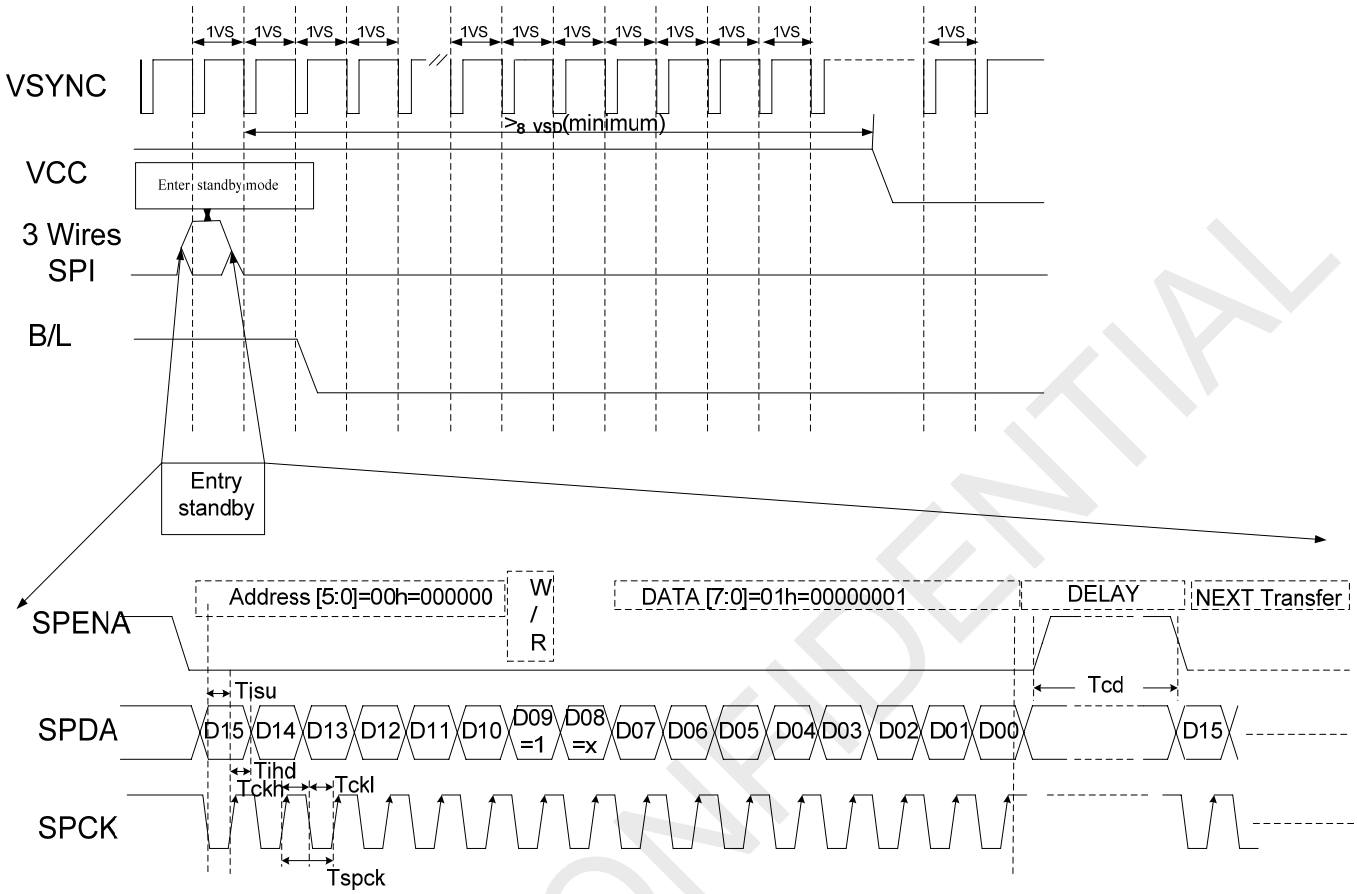
Note

1. Please exit to Standby Mode through 3-wire command, detail sequence that exit to Standby Mode under power on mode presentation as below.
2. Exit to standby mode, you can write data “0x03” to register “R00”, D09=1 for writing data to register. D09=0 for reading data from register.

   Under SPI write mode,D08=X , and ‘X’ means don’t care D08=‘1’ or ‘0’.

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Serial Clock	Tspck	320	-	-	ns	
SPCK Pulse Duty	Tscdut	40	50	60	%	
Serial Data Setup Time	Tisu	120	-	-	ns	
Serial Data Hold Time	Tihd	120	-	-	ns	
Serial Clock High/Low	Tssw	120	-	-	ns	Tckh or Tckl
Chip Select Distinguish	Tcd	1	-	-	us	

5.10 Power off Sequence



Note

1. 1VS=1VSYNC. Please entry Standby Mode through 3-wire command, detail sequence which enter Standby Mode under power off mode presentation as below.
2. Enter to standby mode, you can write data “0x01” to register “R00”, D09=1 for writing data to register. D09=0 for reading data from register.

   Under SPI write mode,D08=X , and ‘X’ means don’t care D08=‘1’ or ‘0’.

6 Optical Characteristics

Ta=25℃

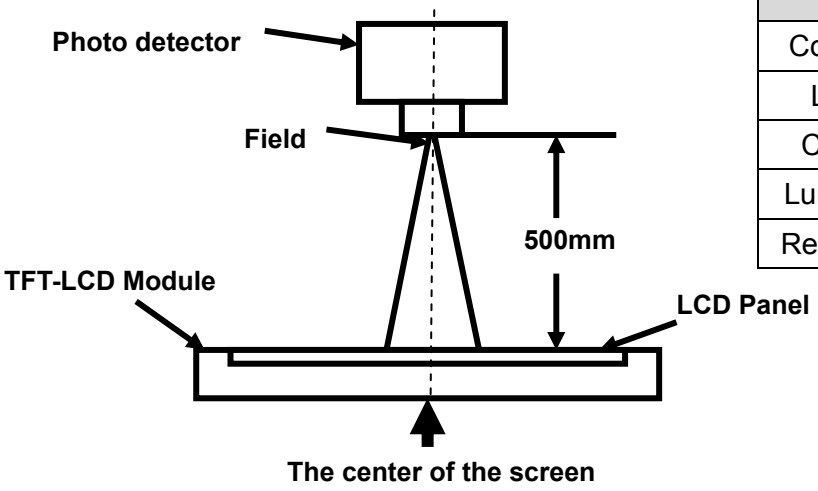
Item		Symbol	Condition	Min	Typ.	Max.	Unit	Remark
View Angles		θT	CR≧10	50	60	-	Degree	Note 2
		θB		60	70	-		
		θL		60	70	-		
		θR		60	70	-		
Contrast Ratio		CR	θ=0o	300	400	-		Note1,3
Response Time		Ton	25℃		20	30	ms	Note1,4
		Toff						
Chromaticity	White	x	-	0.270	0.320	0.370	-	Note1,5
		y		0.285	0.335	0.385		
	RED	x		0.570	0.620	0.670		
		y		0.310	0.360	0.410		
	GREEN	x		0.300	0.350	0.400		
		y		0.510	0.560	0.610		
	BLUE	x		0.095	0.145	0.195		
		y		0.050	0.100	0.150		
Uniformity		U	-	-	80	-	%	Note1,6
NTSC			-	-	50	-	%	Note 5
Luminance(w TSP)		L	-	280	350	-	cd/m2	Note1,7

Test Conditions:

1. VDD=3.3V, I_L =20mA(Backlight current), 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)。

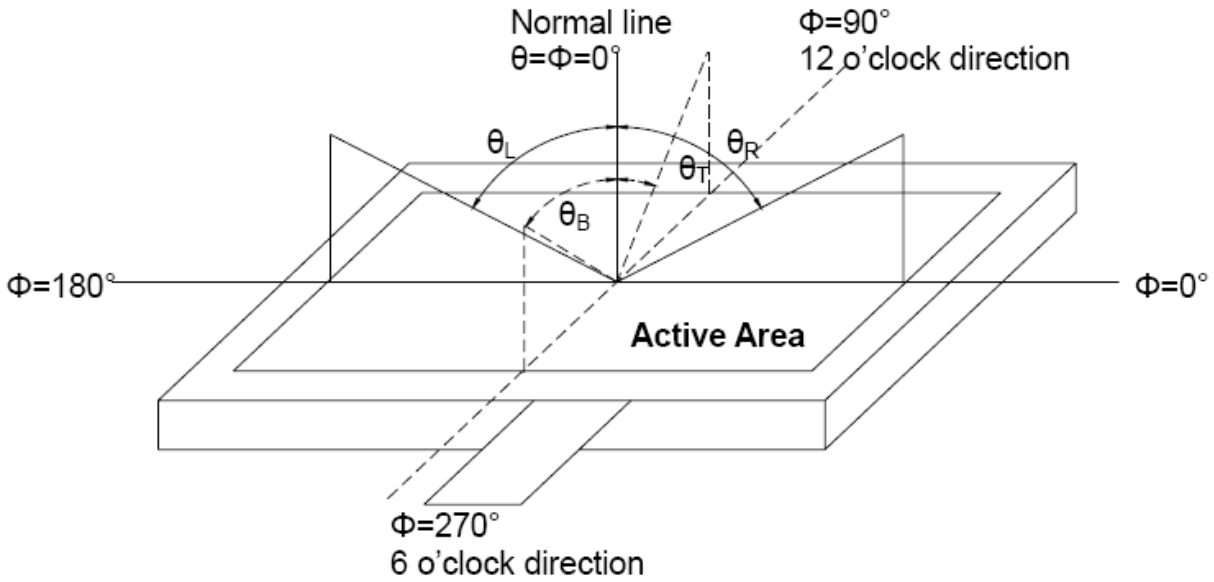


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

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

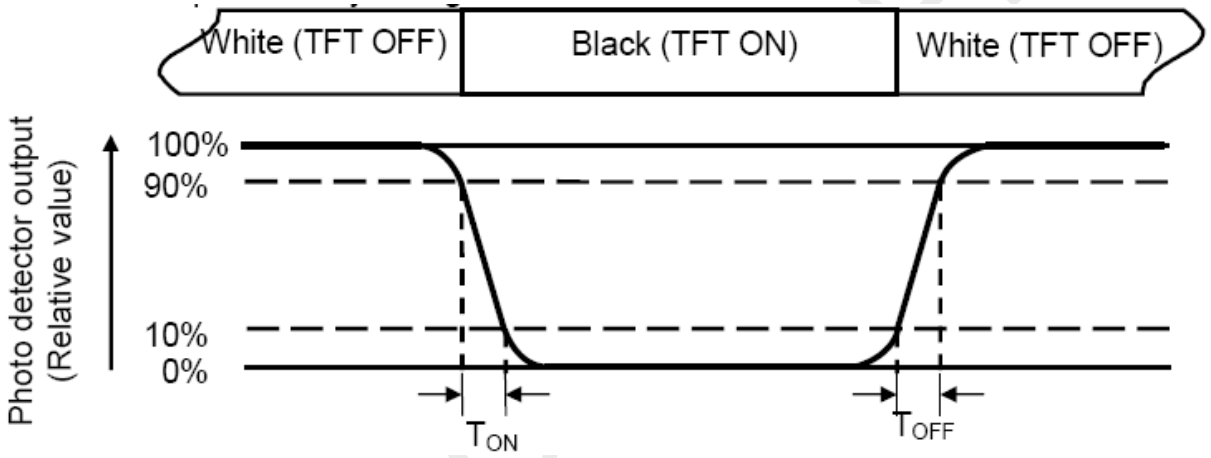
"White state ":The state is that the LCD is driven by $\mathbf{V}_{white}$.

"Black state": The state is that the LCD is driven by $\mathbf{V}_{black}$.

$\mathbf{V}_{white}$: To be determined $\mathbf{V}_{black}$: 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 (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) 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) = L_{min}/ L_{max}

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

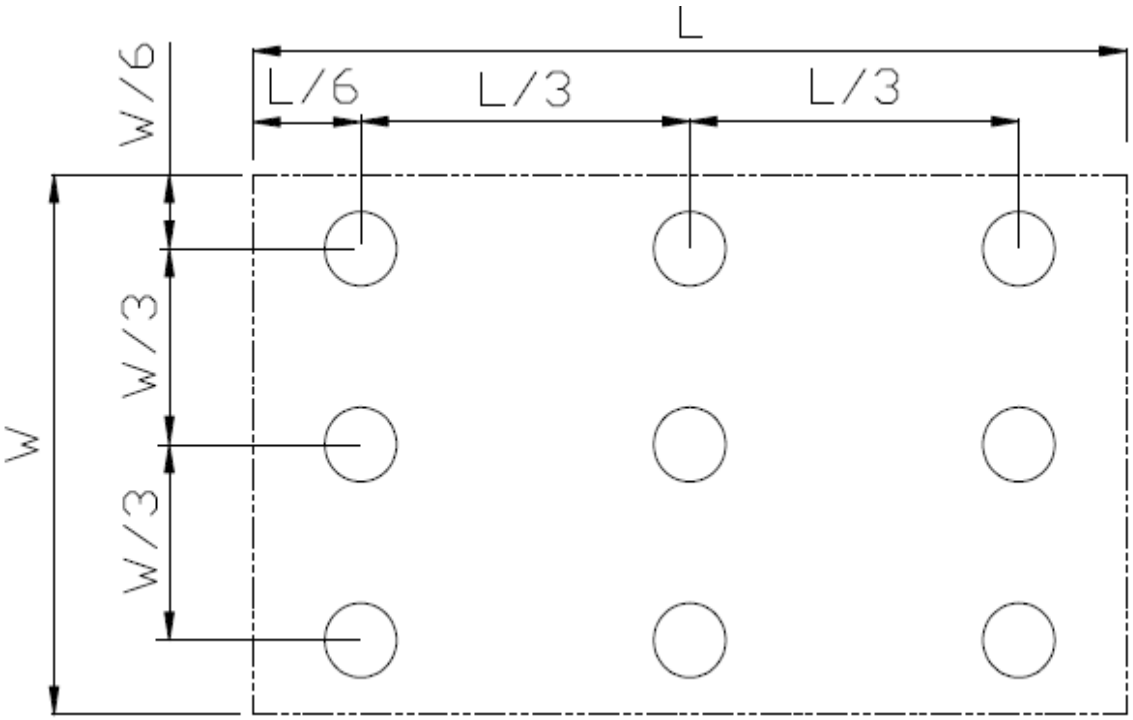


Fig. 2 Definition of uniformity

L_{max}: The measured maximum luminance of all measurement position.

L_{min}: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance :

Measure the luminance of white state at center point

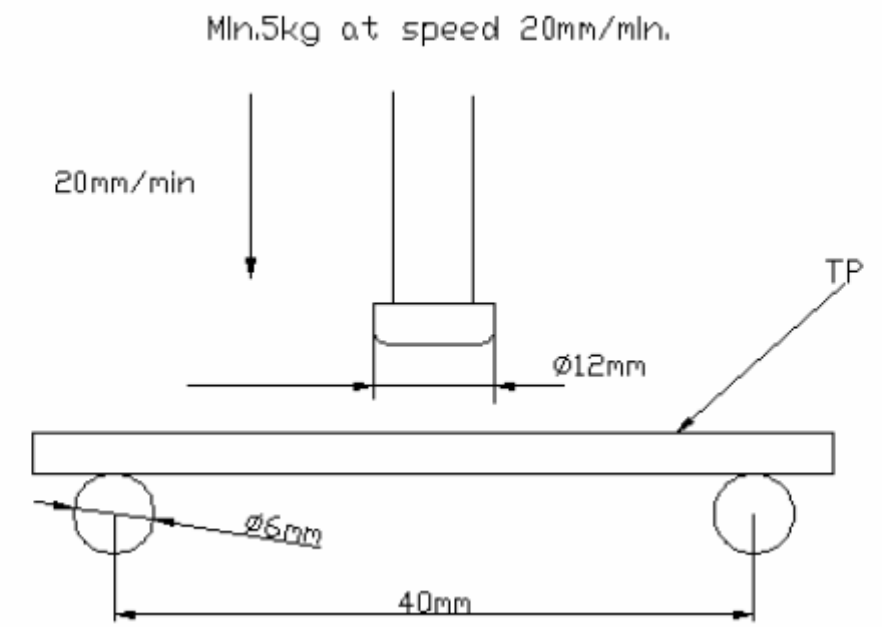
7 Environmental / Reliability Tests

No	Test Item	Condition	Remark
1	High Temperature Operation	Ts=+60℃, 240hrs	Note1 IEC60068-2-2,GB2423.2
2	Low Temperature Operation	Ta=-20℃, 240hrs	Note 2, IEC60068-2-1 GB2423.1
3	High Temperature Storage	Ta=+70℃, 240hrs	IEC60068-2-2, GB2423.2
4	Low Temperature Storage	Ta=-30℃, 240hrs	IEC60068-2-1 GB2423.1
5	High Temperature & High Humidity (Non-Operation)	+60℃, 90% RH max,240 hours	IEC60068-2-3, GB/T2423.3
6	Thermal Shock (Non-operation)	-30℃ 30 min~+70℃ 30 min, Change time:5min, 30 Cycle	Start with cold temperature, end with high temperature IEC60068-2-14,GB2423.22
7	Electro Static Discharge (Operation)	C=150pF, R=330Ω，5points/panel Air:±8KV，5times;Contact:±4KV，5 times; (Environment: 15℃～35℃， 30%～60%，86Kpa～106Kpa)	IEC61000-4-2 GB/T17626.2
8	Vibration (Non-operation)	Frequency range:10~55Hz, S-troke:1.5mm Sweep:10Hz~55Hz~10Hz 2 hours for each direction of X.Y.Z.(package condition)	IEC60068-2-6 GB/T2423.10
9	Shock (Non-operation)	60G 6ms, ±X,±Y,±Z 3times for each direction	IEC60068-2-27 GB/T2423.5
10	Package Drop Test	Height:80 cm，1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8
11	Impact Resistance	No glass break when Φ9.0mm steel ball is dropped on the panel film sur-face which places on the plastic board directly from 30 cm height at one time	
12	Static Load Test	Min 5 Kg at speed of 20mm/min	Note 3

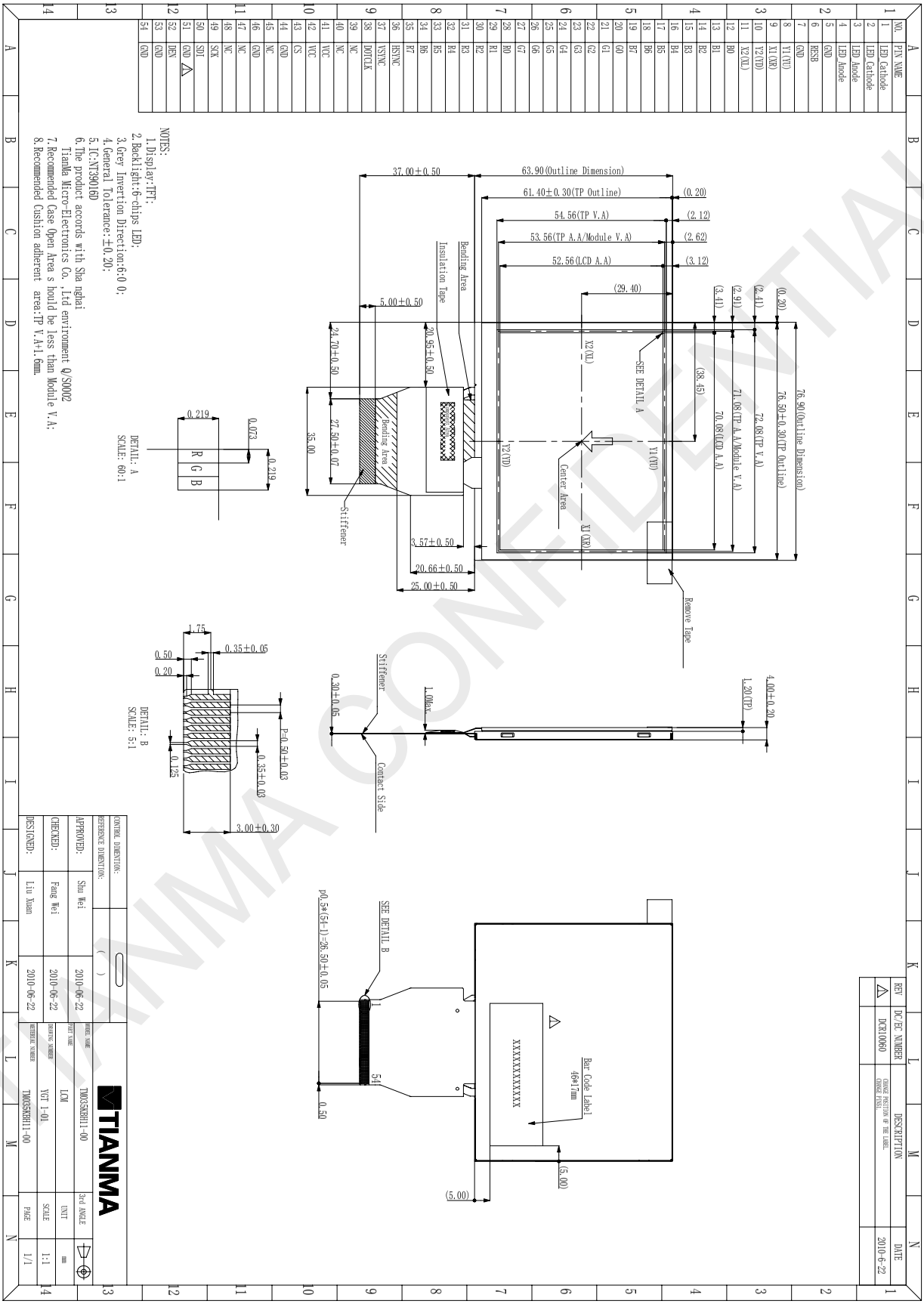
Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

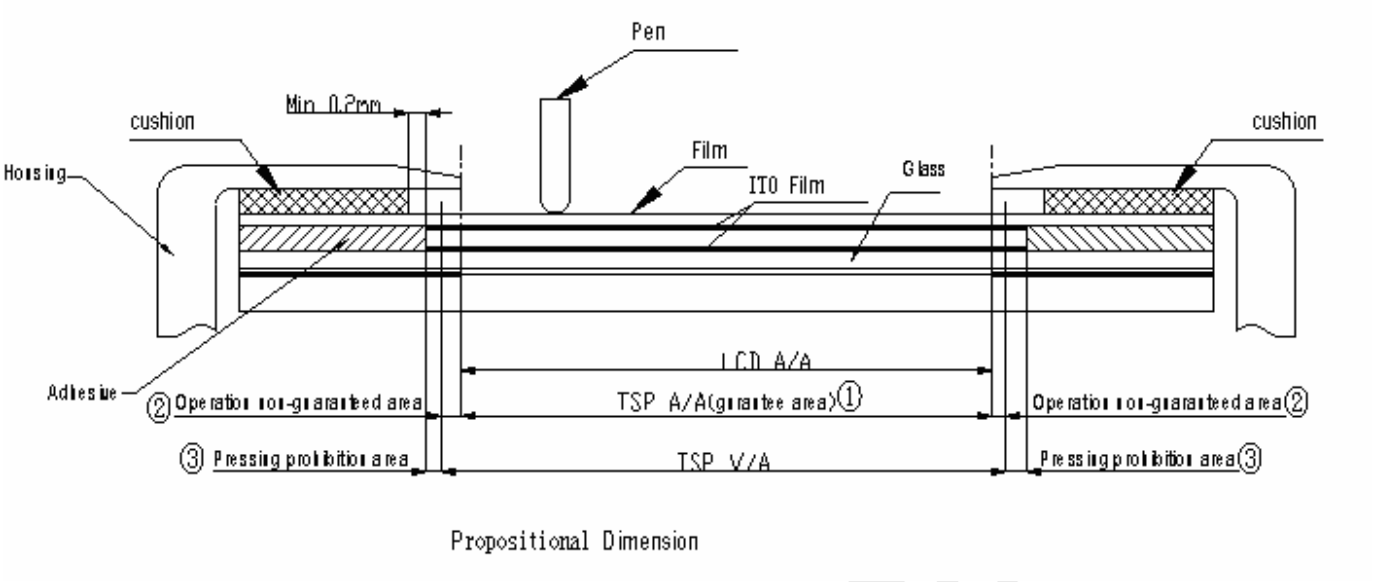
Note3:



8 Mechanical Drawing



9 Mechanical Design Guide



9.1 Explain:

①Active area

The area which guarantees a touch panel operation normally when pressed.

②Operation non-guaranteed area

The area which 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 0.5mm~1mm out side form a boundary of the active corresponds to this area.

③Pressing prohibition area

The area which forbids pressing, because an excessive load is applied a transparent electrode and a serious damage is given to touch panel function by pressing.

④Non-Active area

The area which does not activate even if passed.

9.2 The handling of sensitive area:

①The sensitive area is between the edge of the double-side tape and the edge of the active area. Because the double-side tape has a certain height, the more transformative the ITO layer is pressed, the easier it would be to be broken. So it is suggested that pointed tools should be put away from the sensitive area to avoid them touching the sensitive area during operation.

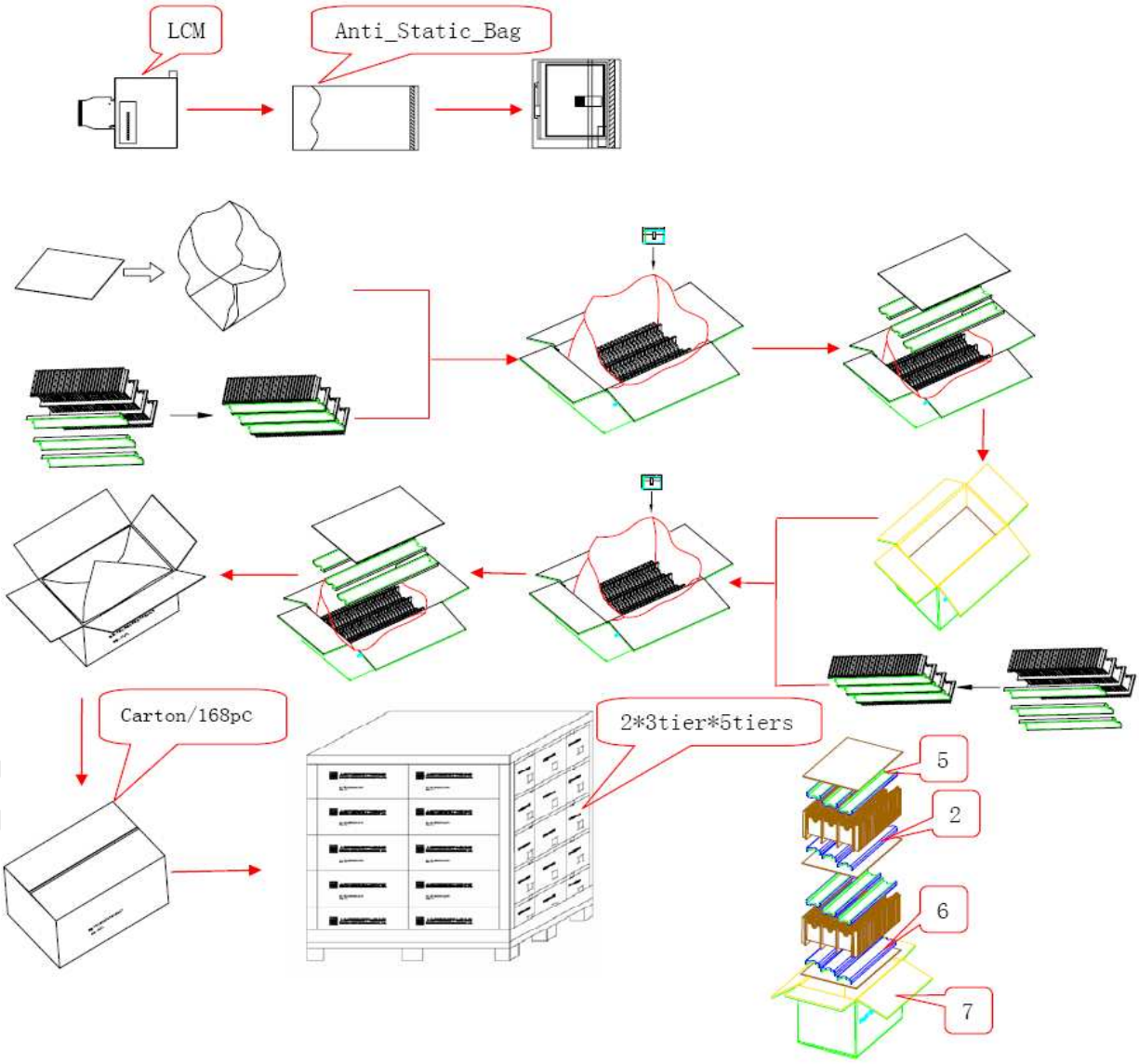
②When assembling the touch panel, it would be better to add a protective gasket on the surface of the product before assembling on to the housing. The gasket should be placed on the double-side tape and should not go beyond it.

③If the housing is designed bigger than the active area, the edge of the sensitive area would be left outside of it. In addition, the protective gasket adds the thickness of this area, so do not use pens or other pointed tools to score along with the screen edge which may cause the damage of the ITO layer. If the panel is drawn with large force, the glass would even be broken.

④If the housing is designed smaller than the active area, it can cover the sensitive area completely, in which case the scoring along with screen edge does no harm to the ITO layer. Nevertheless, due to the housing extending into the active area, the thickness of the gasket is very important. If it is too thick, the gap between the housing and the ITO film surface would be too wide which may affect the appearance of the product. If it is too thin, the housing would be pressed on the film surface which may cause short-circuit. The gap between the housing and the film should better be kept between 0.2mm and 0.3mm.

10 Packing Drawing

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	TM035KBH11	76.90 x 63.90 x 4.00	0.04	168	
2	Partition_1	Corrugated Paper	513 x 333 x 106	0.782	2	
3	Anti-Static Bag	PE	155 x 85 x 0.05	0.003	168	Anti-static
4	Dust-Proof Bag	PE	327.0x270.0	0.060	1	
5	Partition_2	Corrugated Paper	505 x 332 x 4.00	0.095	3	
6	Corrugated Bar	Corrugated Paper	513 x 117 x 4	0.032	12	
7	Carton	Corrugated Paper	530 x 350 x 250	1.1000	1	
8	Total weight（kg）	10.617±5%				



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.

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

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

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

d. 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

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