MODEL NO : TM057KVHG01

MODEL VERSION: 41

SPEC VERSION : 1.0

ISSUED DATE: 2019/2/21

■**Preliminary Specification**
□**Final Product Specification**

Customer :

Approved by	Notes

TIANMA Confirmed :

Prepared by	Checked by	Approved by
Yanzhong_kong	Wensheng_zheng Jiacheng_zhong	

This technical specification is subjected to change without notice

Table of Contents

Record of Revision

Rev	Issued Date	Description	Editor
1.0	2019/2/21	First release	Yanzhong_kong

1. General Specifications

Feature		Spec
Display Spec.	Size	5.7 inch
	Resolution	320(RGB) X 240
	Technology Type	a-Si TFT
	Pixel Configuration	R.G.B Vertical Stripe
	Pixel pitch(mm)	0.360 (H) x 0.360(V)
	Display Mode	TM,NW
	Surface Treatment	Anti Glare
	Viewing Direction	12 o'clock
	Gray Scale Inversion Direction	6 o'clock (Source IC direction:6 o'clock)
Mechanical Characteristics	LCM (W x H x D) (mm)	LCM:144.0x104.6x12.3
		CTP+LCM: 144.0x104.6x13.95
	Active Area(mm)	115.2x86.4
	With /Without TSP	With TSP
	Matching Connection Type	089H33-000100-G2-R (STARCONN)
	LED Numbers	15 LEDS
	Weight (g)	203.8
Electrical Characteristics	Interface	RGB 18 bits
	Color Depth	262K
	Driver IC	Source IC: NT39413TH; Gate IC: NT39208H-D/3IB
		CTP:ILI2118A

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 CN1 pin assignment (Signal interface)

Connector type: 089H33-000100-G2-R (STARCONN)

No	Symbol	I/O	Description	Comment
1	GND	P	Ground	
2	DCLK	I	Dot clock. Latch data at falling edge of DOTCLK.	
3	Hsync	I	Horizontal sync signal in SYNC mode. Pull low in DE mode.	
4	Vsync	I	Vertical sync signal in SYNC mode. Pull low in DE mode.	
5	GND	P	Ground	
6	R0	I	Red data (LSB)	
7	R1	I	Red data	
8	R2	I	Red data	
9	R3	I	Red data	
10	R4	I	Red data	
11	R5	I	Red data (MSB)	
12	GND	P	Ground	
13	G0	I	Green data(LSB)	
14	G1	I	Green data	
15	G2	I	Green data	
16	G3	I	Green data	
17	G4	I	Green data	
18	G5	I	Green data(MSB)	
19	GND	P	Ground	
20	B0	I	Blue data(LSB)	
21	B1	I	Blue data	
22	B2	I	Blue data	
23	B3	I	Blue data	
24	B4	I	Blue data	
25	B5	I	Blue data(MSB)	
26	GND	P	Ground	
27	ENABLE	I	Data enable signal in DE mode. This pin must pull high in SYNC mode.	
28	VCC	P	Power supply	
29	VCC	P	Power supply	
30	R/L	I	Set horizontal scan direction: Low/NC: right to left （default） High: left to right	Note3

31	U/D	I	Set vertical scan direction: High/NC: down to up（default） Low: up to down	Note3
32	NC	-	No connection	
33	GND	P	Ground	

Note1: I/O definition:
I----Input O----Output P----Power/Ground
Note2: CN1 Matching FPC type: 33 pin, pitch: 0.5mm, height: 0.3mm.
Note3:According to Source IC view in 6 o'clock direction.

2.2 CN2 pin assignment (Backlight interface)

Connector type: SHLP-06V-S-B (JST)

No	Symbol	I/O	Description	Remark
1	AN1	P	LED driving anode 1 (high voltage)	
2	AN2	P	LED driving anode 2 (high voltage)	
3	AN3	P	LED driving anode 3 (high voltage)	
4	CA1	P	LED driving cathode 1 (low voltage)	
5	CA2	P	LED driving cathode 2 (low voltage)	
6	CA3	P	LED driving cathode 3 (low voltage)	

Note1: CN2 Matching Connector type: SM06B-SHLS-TF (JST)

Table2.2 Backlight terminal pin assignments

3. Absolute Maximum Ratings

GND=0V

Item	Symbol	MIN	MAX	Unit	Remark
Power Voltage	VCC	-0.5	5.0	V	Note1
Input voltage	V_{IN}	-0.5	5.0	V	
Operating Temperature	Top	-20	70	℃	
Storage Temperature	Tst	-30	80	℃	

Table 3.1 absolute maximum rating

Note1: Input voltage include R0~R5, G0~G5, B0~B5, Dotclk, Hsync, Vsync, Enable, R/L, U/D.

Note2: Ta means the ambient temperature.
It is necessary to limit the relative humidity to the specified temperature range.
Condensation on the module is not allowed.

4. Electrical Characteristics

4.1 LCD DC Characteristics

GND=0V,Ta=25℃

Item		Symbol	MIN	TYP	MAX	Unit	Remark
Supply Voltage		VCC	3.1	3.3	3.5	V	
Input Signal Voltage	Low Level	V_{IL}	0	-	0.3*VCC	V	
	High Level	V_{IH}	0.7*VCC	-	VCC	V	
Output Signal Voltage	Low Level	V_{OL}	GND	-	GND+0.4	V	
	High Level	V_{OH}	VCC-0.4	-	-	V	
Common Electrode Driving Signal		VCOM	-	4.87	-	V	Note1
Current of VCC Power supply		I_{VCC}	-	145	225	mA	Note2

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

Table 4.1 LCD module electrical characteristics

4.2 Backlight Unit Driving Condition

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Channel 1 Forward Current	$I_{channel\ 1}$	-	25.0	-	mA	
Channel 2 Forward Current	$I_{channel\ 2}$	-	25.0	-	mA	
Channel 3 Forward Current	$I_{channel\ 3}$	-	25.0	-	mA	
Forward Voltage	V_{BL}	14.25	16.5	18.5	V	Note 2
Backlight Power Consumption	W_{BL}	-	1238	-	mW	Note 1
Life time	-		50000		Hrs	Note 3

Note 1: The LED driving condition is defined for total backlight consumption.
Note 2: Forward Voltage adjusting must depend on Forward Current setting.
One LED: I_F =25 mA, V_F =3.3V.
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.

Table 4.2 LED backlight characteristics

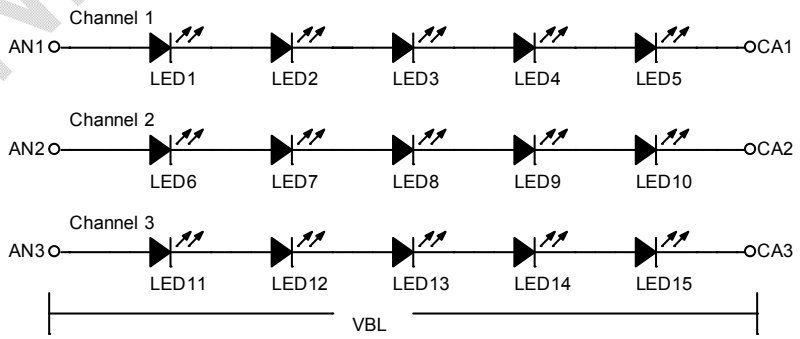


Figure 4.2 LED connection of backlight

4.3 Block Diagram

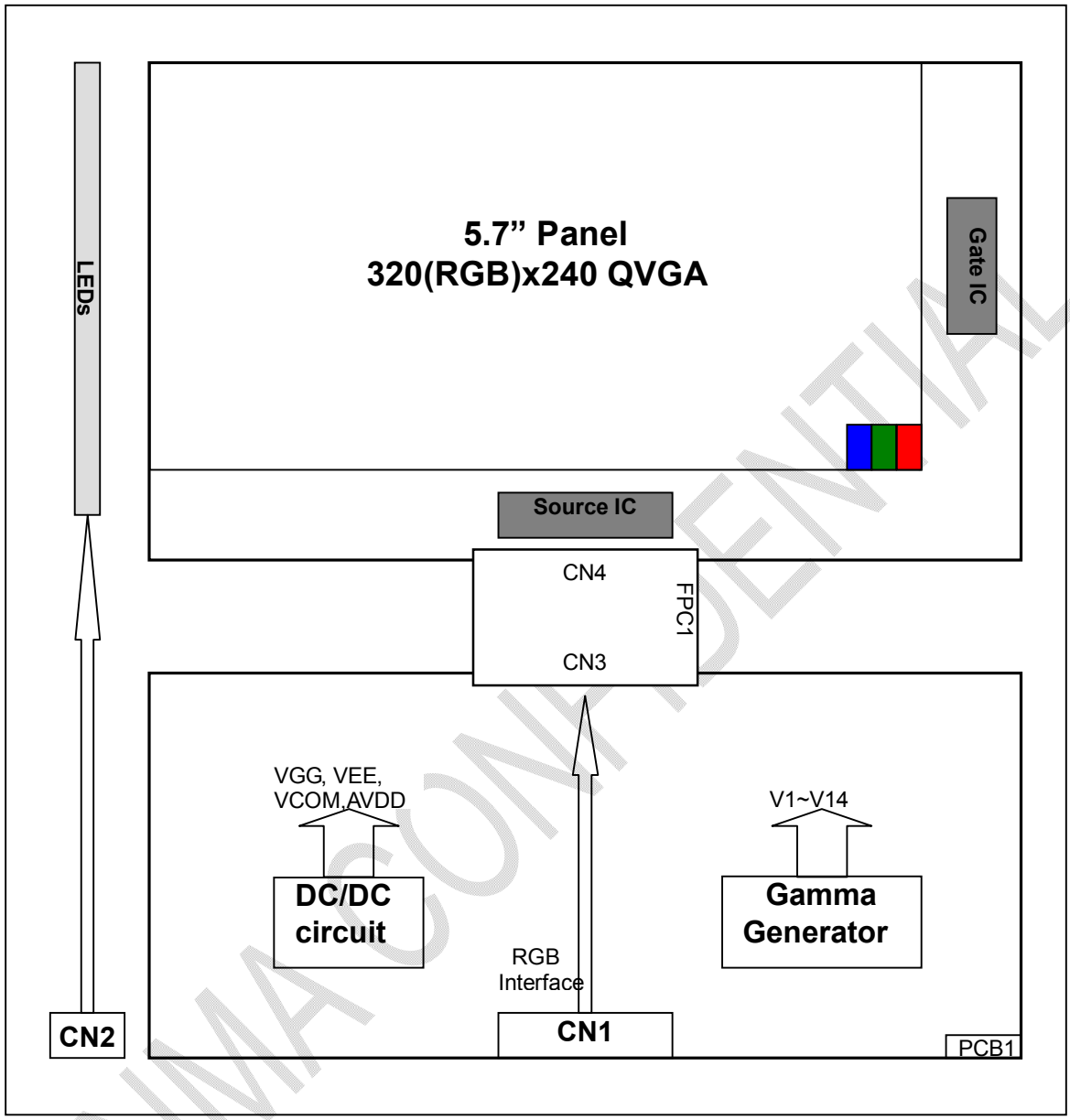


Figure 4.3

Note：

At 6 o'clock to Source IC Tianma defines the direction of view, As shown.

5. Timing Chart

5.1 TCON (Embedded In Source IC) Input Timing

Parameter	Symbol	Symbol	Min.	Typ.	Max.	Unit
Dotclk	Dotclk frequency	Fclk	6.2	6.4	12.1	MHz
	Dotclk cycle	Tclk	82.64	156.25	161.29	ns
Hsync	Horizontal display area	Thd	320	320	320	Tclk
	1 horizontal line	Th	406	408	560	Tclk
	Hsync pulse width	Thpw	1	-	-	Tclk
	Horizontal blank	Thb	70	70	70	Tclk
	Horizontal front porch	Thfp	16	18	170	Tclk
Vsync	Vertical display area	Tvd	240	240	240	Th
	Vsync period time	Tv	254	263	360	Th
	Vsync pulse width	Tvpw	1	-	-	Th
	Vsync blank	Tvb	13	13	13	Th
	Vsync front porch	Tvfp	1	10	107	Th

Note: DE timing refer to Hsync, Vsync input timing.

Table 5.1 Input Timing Control Conditions

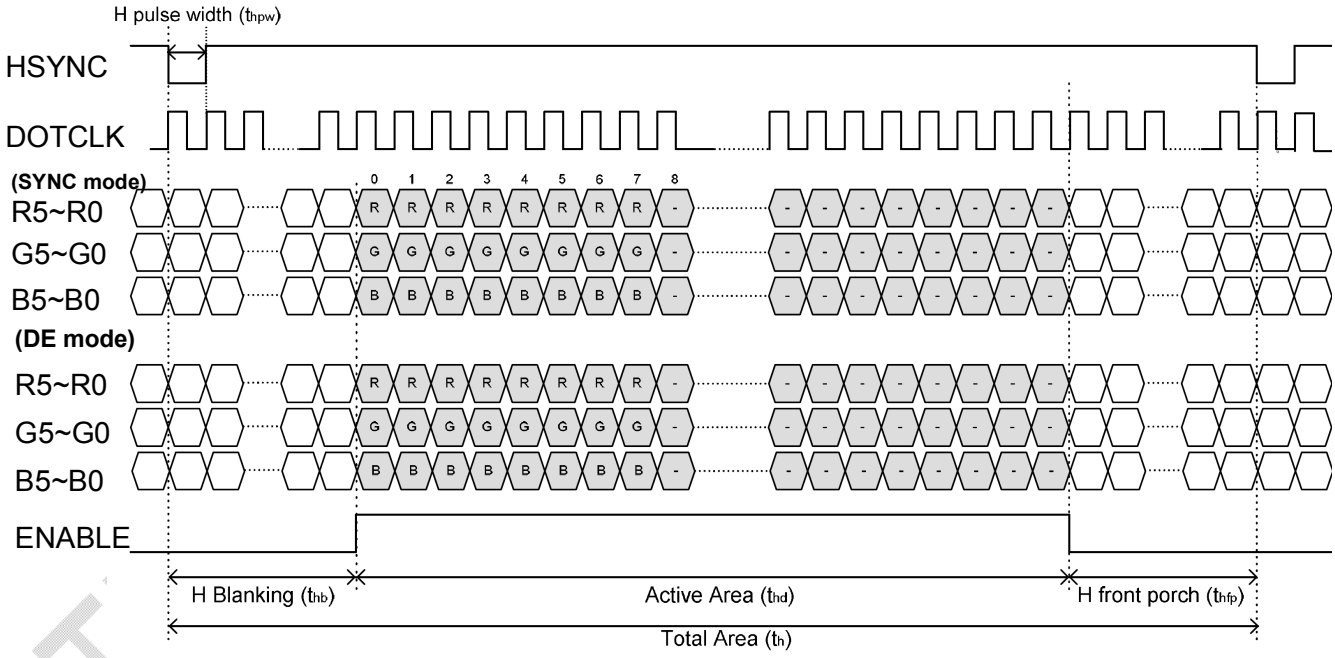


Figure 5.1.1 RGB interface input timing

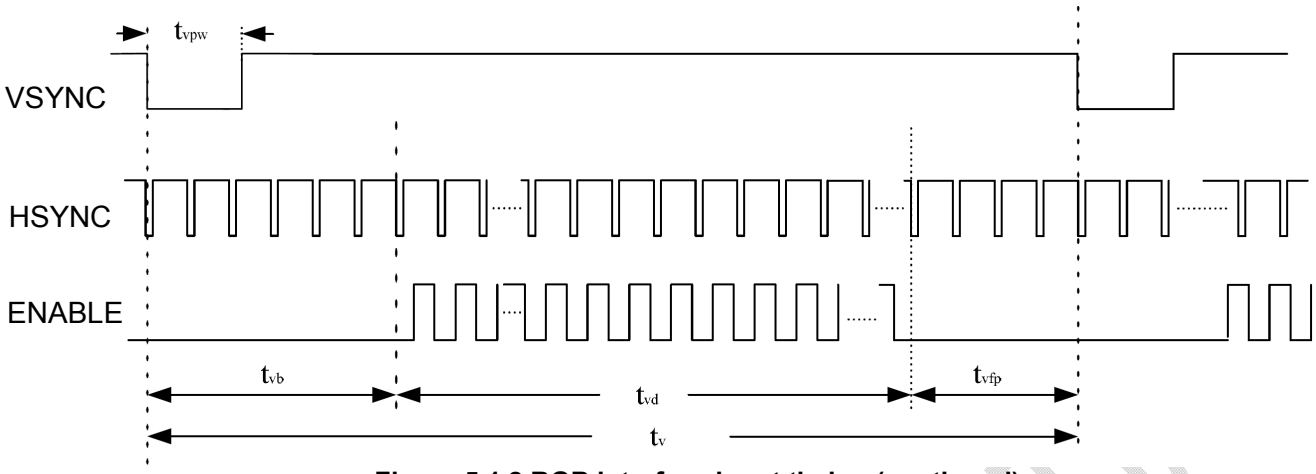


Figure 5.1.2 RGB interface input timing (continued)

5.2 AC input characteristics

(VCC=3.3V, AVDD=10.65V, AVSS=GND=0V, Ta=25℃)

Parameter	Symbol	Min	Typ	Max	Unit	Conditions
DOTCLK pulse duty	Tcwh	40%	50%	60%	Tclk	Tcph is DCLK cycle
VSYNC setup time	Tvst	10	-	-	ns	
VSYNC hold time	Tvhd	10	-	-	ns	
HSYNC setup time	Thst	10	-	-	ns	
HSYNC hold time	Thhd	10	-	-	ns	
Data setup time	Tdsu	10	-	-	ns	Rn, Gn, Bn to DCLK
Data hold time	Tdhd	10	-	-	ns	Rn, Gn, Bn to DCLK
Enable setup time	Tesu	10			ns	

Table 5.2 AC input characteristics

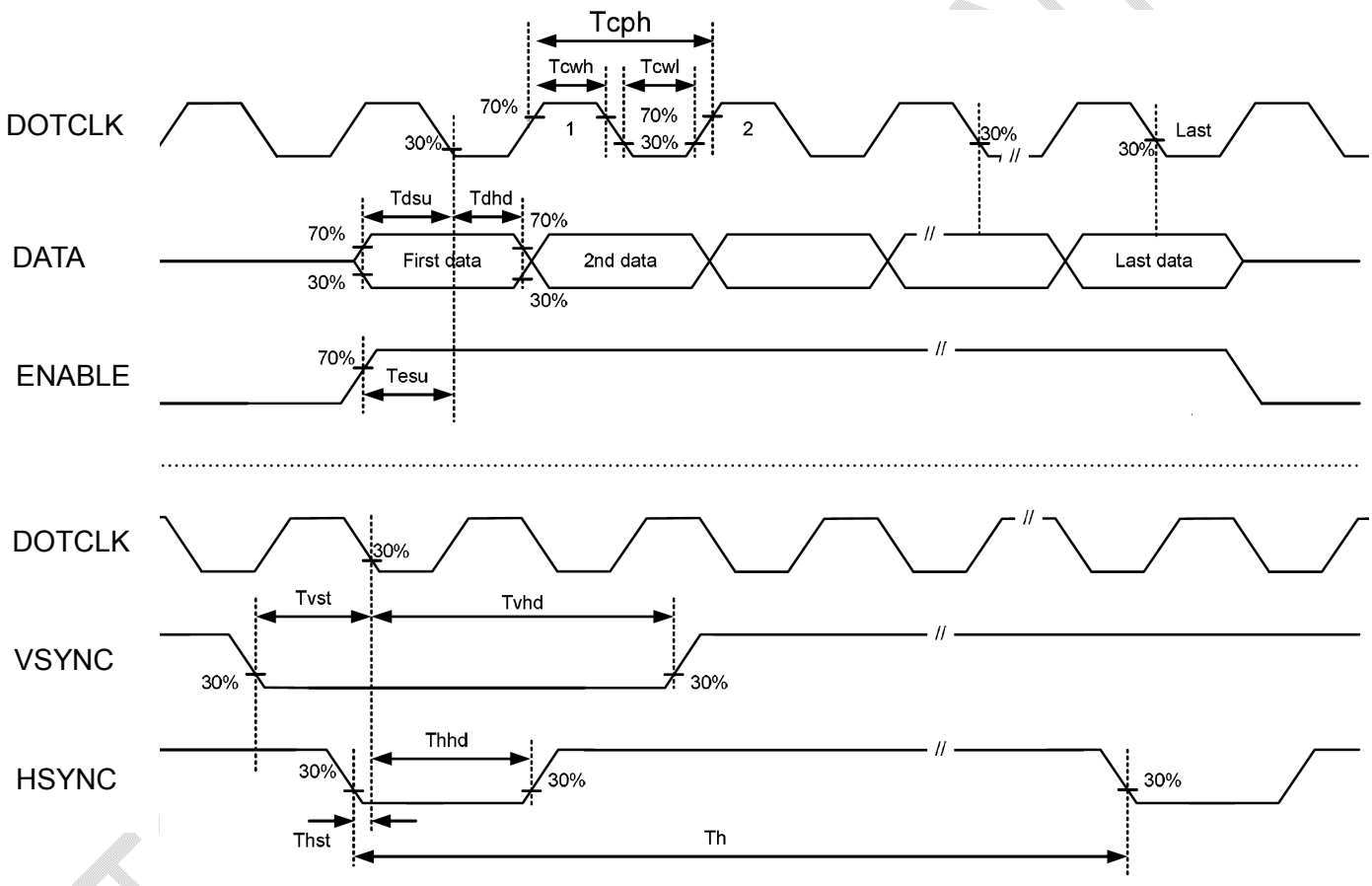


Figure 5.2 AC input characteristics

6. POWER ON/OFF SEQUENCE

Item	Symbol	MIN	TYP	MAX	Unit	Remark
VCC 3.0V to signal starting	Tp1	5	-	50	ms	
Signal starting to backlight on	Tp2	50	-	-	ms	
Signal off to VCC 3.0V	Tp3	0	-	50	ms	
Backlight off to signal off	Tp4	50	-	-	ms	

Table 6.0 Power on/off sequence

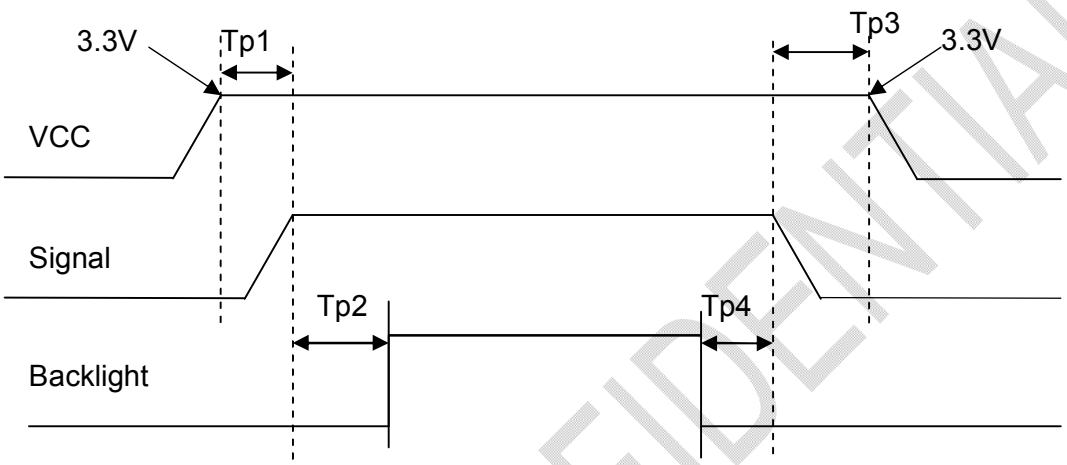


Figure 6.0 Power on/off sequence

7. Optical Characteristics

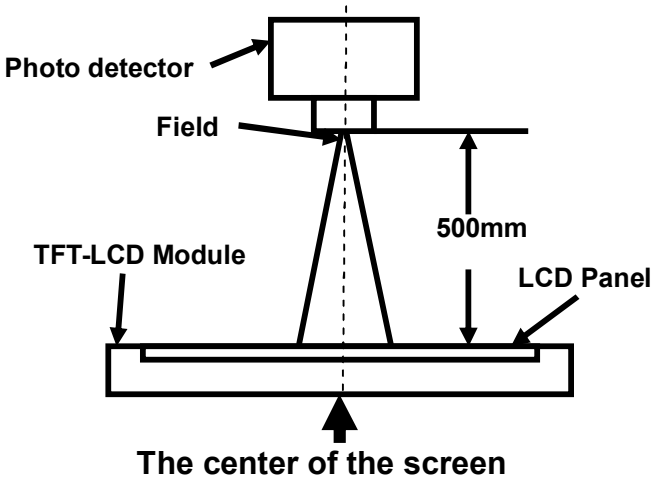
Item		Symbol	Condition	Min	Typ	Max	Unit	Remark
View Angles		θT	CR≧10	50	60	-	Degree	Note2,3
		θB		60	70	-		
		θL		60	70	-		
		θR		60	70	-		
Contrast Ratio		CR	θ=0°	400	500	-		Note 3
Response Time		T_{ON}	25℃	-	20	30	ms	Note 4
		T_{OFF}						
Chromaticity	**White**	x	Backlight is on	0.257	0.307	0.357		Note 1,5
		y		0.297	0.347	0.397		
	Red	x		0.527	0.577	0.627		Note 1,5
		y		0.287	0.337	0.387		
	Green	x		0.286	0.336	0.386		Note 1,5
		y		0.547	0.597	0.647		
	Blue	x		0.097	0.147	0.197		Note 1,5
		y		0.064	0.114	0.164		
Uniformity		U		75	80	-	%	Note 6
NTSC				45	50	-	%	Note 5
Luminance		L		350	400	-	cd/m^2	Note 7

Test Conditions:

1. I_F= 75 mA, and the ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

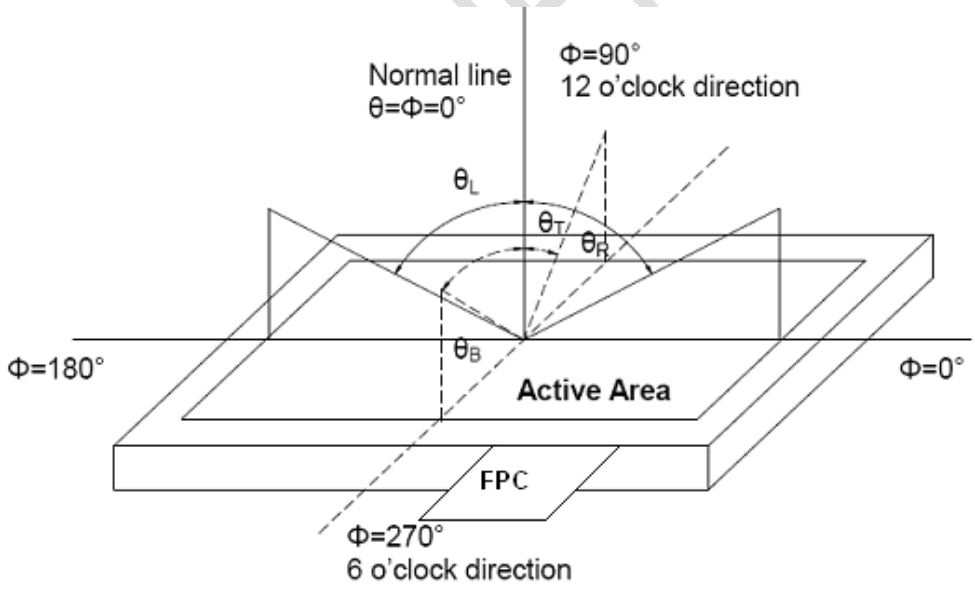
Note 1: Definition of optical measurement system.

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.



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

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

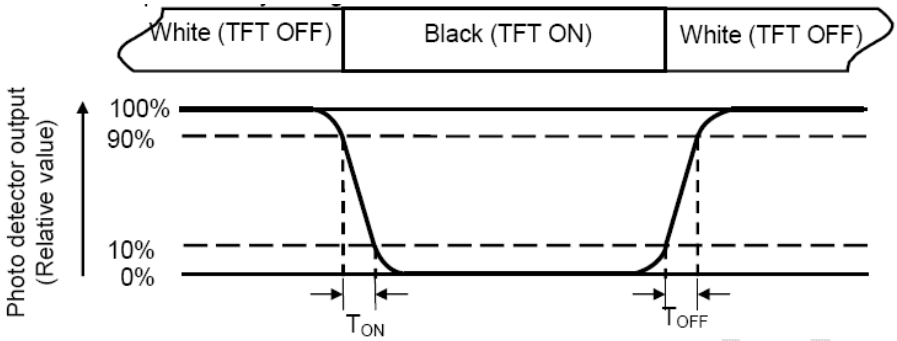
"White state ": The state is that the LCD should drive by Vwhite.

"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)

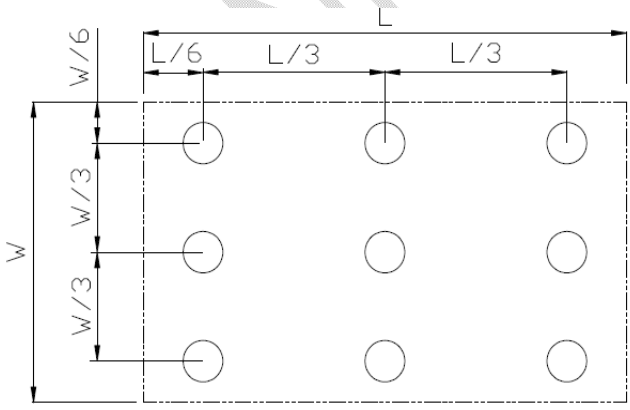
Color coordinates measured at center point of LCD.

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.

8. Environmental / Reliability Test

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts = +70℃, 240 hours	IEC60068-2-1:2007 GB2423.2-2008
2	Low Temperature Operation	Ta = -20℃, 240 hours	IEC60068-2-1:2007 GB2423.1-2008
3	High Temperature Storage	Ta = +80℃, 240 hours	IEC60068-2-1:2007 GB2423.2-2008
4	Low Temperature Storage	Ta = -30℃, 240 hours	IEC60068-2-1:2007 GB2423.1-2008
5	Storage at High Temperature and Humidity	Ta = +60℃, 90% RH max,240hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30℃ 30 min~+80℃ 30 min, Change time:5min, 100 Cycle	Start with cold temperature, End with high temperature, IEC60068-2-14:1984,GB2423.22-2002
7	ESD	C=150pF,R=330Ω,5point/panel Air:±8Kv,5times; Contact:±4Kv,5times (Environment:15℃~35℃, 30%~60%.86Kpa~106Kpa)	IEC61000-4-2:2001 GB/T17626.2-2006
8	Vibration Test (non-operation)	Frequency range: 5-20-200HZ， PSD：0.01-0.01-0.001 Total:0.781g2/HZ,x/y/z 30min）	IEC60068-2-6:1982 GB/T2423.10—1995
10	Package Drop Test	Height: 60cm（＞10Kg），80cm（＜10Kg） 1 corner, 3 edges, 6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

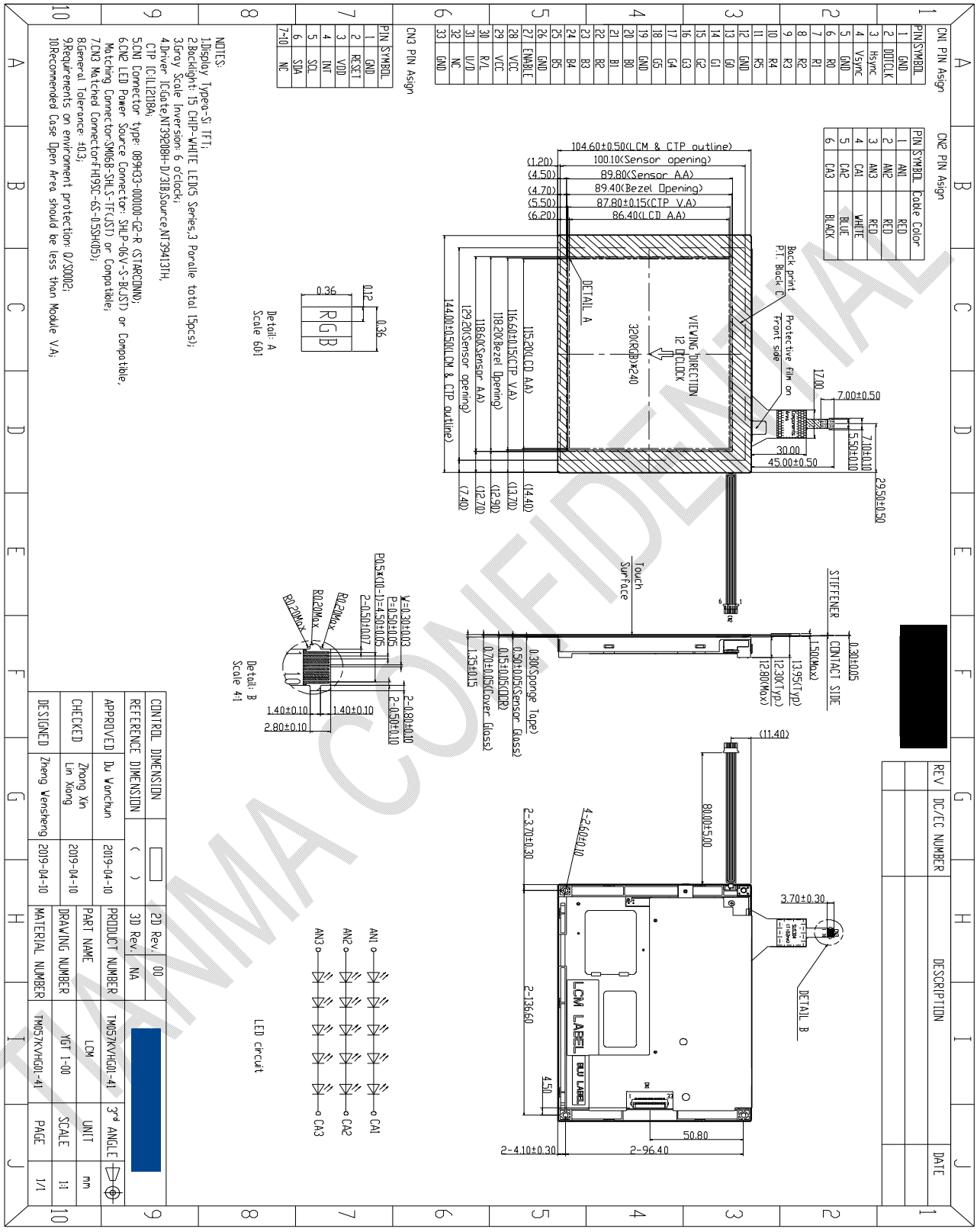
Note1: Ts is the temperature of panel's surface.

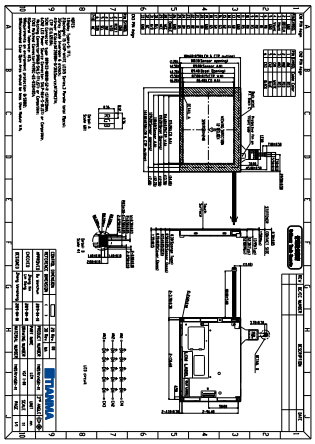
Note2: Ta is the ambient temperature of sample.

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.

9. Mechanical Drawing

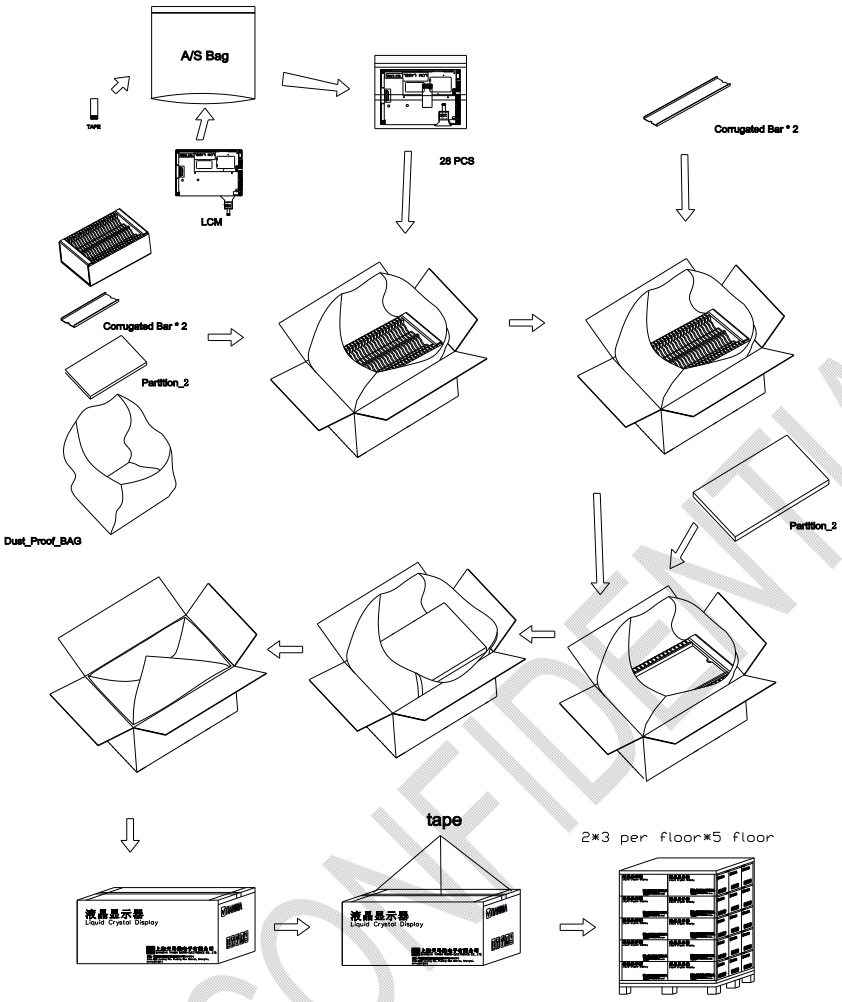




10. Packing Drawing

Per Carton

No	Item	Model (Material)	Dimensions(mm)	Unit Weight(Kg)	Quantity	Remark
1	LCM module	TM057KVHG01-41	144X104.6X13.95	0.2038	28	
2	Partition_1	Corrugated paper	333X215	1.388	1	
3	Anti-static Bag	PE	170×200×3.0	0.001	28	Anti-static
4	Dust-Proof Bag	PE	700X545X0.05	0.06	1	
5	Partition_2	Corrugated Paper	505X332X4.0	0.098	2	
6	Corrugated Bar	Corrugated paper	513X110×31	0.048	4	
7	Carton	Corrugated paper	530X350X250	1.12	1	
8	Total weight	8.7KG±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.

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.