



PRODUCT SPECIFICATION

MODEL: ZTM050INXR1801-1

<◇>PRELIMINARY SPECIFICATION

<◆>APPROVAL SPECIFICATION

CUSTOMER		
APPROVED BY		
DATE:		
DESIGNED	CHECKED	APPROVED

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REVISION STATUS

Version	Revise Date	Page	Content	Modified by
V1.0	2022-4-23	-	First Issued.	WJW
V1.1	2022-5-16	-	修改实验温度，修改模组图	WJW



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1. GENERAL DESCRIPTION

1.1 DESCRIPTION

This LCM is a color active matrix thin film transistor (TFT) IPS liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, Driver ICs, FPC and Backlight.

1.2 FEATURES:

No.	Item	Specification	Unit
1	Panel Size	5.0"	inch
2	Number of Pixels	800x480	pixels
3	Active Area	108(H)x 64.8(V)	mm
4	Pixel pitch	135(V) × 3 × 45(H)	um
5	Outline Dimension	120.70(W)×77.8(H)×5.55(D)	mm
6	Number of Colors	16.7M	-
7	Display Mode	Transmission mode, normally black	-
8	Viewing Direction	Full viewing	-
9	Display Format	RGB vertical stripe	-
10	Surface Treatment	Anti-Glare	-
11	Interface	RGB	-
12	Backlight	White LED	-
13	Operation Temperature	-30°C ~+85°C	°C
14	Storage Temperature	-30°C ~+85°C	°C
15	Driver IC	ST7265	-
16	Weight	-	g



3 PIN DESCRIPTION

FPC Connector is used for the module electronics interface.

Pin No	Definition	Description
1	LEDK2	Backlight cathode
2	LEDK1	Backlight cathode
3	LEDA	Backlight anode
4	LEDA	Backlight anode
5	NC	No connection
6	GND	Ground
7	VDD_MTP	Please OPEN in customer's PCB board side
8	ROM_RLB	Please connect to ground.
9	SDA	Clock signal input for I2C interface; If the driver has been MTP the initial code, please open.
10	SCL	Data signal input for I2C interface; If the driver has been MTP the initial code, please open.
11	LR	Source driver Left/Right scan sequence LR=L: Right to Left. LR=H: Left to Right.
12	UD	Gate UP or Down scan selection UD=L: Down to UP. UD=H: UP to Down.
13	VCC	LCD Input power, +3.3V
14	VCC	LCD Input power, +3.3V
15	GND	Ground
16	DE	Data enable signal (DE) for DE mode or latch signal (LD) for source driver mode
17	HSYNC	Line synchronous signal (HS) for SYNC mode
18	VSYNC	Frame synchronous signal (VS) for SYNC mode or polarity (POL) for source driver mode
19	GND	Ground
20	CLK	Pixel clock input
21	GND	Ground
22	B07	Display data inputs for blue color
23	B06	
24	B05	
25	B04	
26	B03	
27	B02	
28	B01	
29	B00	
30	GND	Ground
31	G07	
32	G06	
33	G05	
34	G04	



35	G03	Display data inputs for green color
36	G02	
37	G01	
38	G00	
39	GND	Ground
40	R07	Display data inputs for red color
41	R06	
42	R05	
43	R04	
44	R03	
45	R02	
46	R01	
47	R00	
48	GND	Ground
49	RESET	Reset pin H : normal operation L : reset state, suggest to connecting with an RC circuit for stability
50	STBYB	Standby mode H : normal operation L : TCON, SD, power circuit and temp sensor will turn off

4. ELECTRICAL CHARACTERISTICS

4.1 ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Values		Unit	Remark
		Min.	Max.		
Digital Supply Voltage	VCI	-0.3	3.6	V	
Digital Supply Voltage	IOVCC	-0.3	3.6	V	
Supply Voltage	VSP	4.5	6.0	V	
Supply Voltage	VSN	-4.5	-6.0	V	

4.2 TFT LCD MODULE

4.2.1 Operating Conditions

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Digital Supply Voltage	VDD	3.0	3.3	3.6	V	
Digital Supply Voltage	IOVCC	1.6	1.8	3.6	V	
Logic Input Voltage	VIH	0.8VDD	-	VDD	V	
	VIL	GND	-	0.2VDD	V	

Note1: Please adjust VCOM to make the flicker level be minimum

Note2: TYP VCOM is only reference value. It must be optimized according to each LCM. Be sure to use VR and OP buffer on VCOM output. Please adjust VCOM to make the flicker level be minimum for getting excellent image.



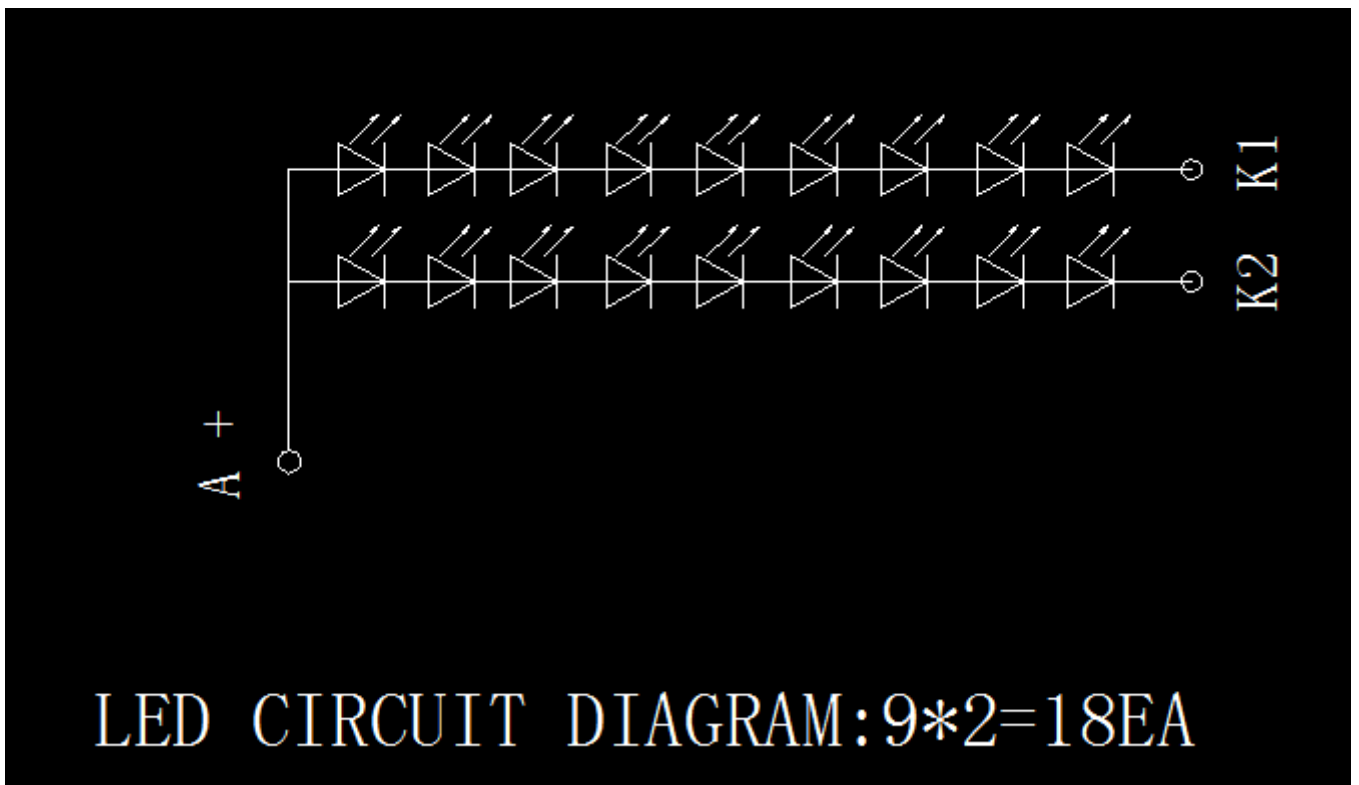
4.2.2 Current Consumption

Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Digital Current	IVCI	VDD= 3.3V	-	130	-	mA	Note1
Digital Current	IIOVCC	IOVCC=1.8V	-	20	-	mA	

Note1: Typ. specification : Gray-level test Pattern

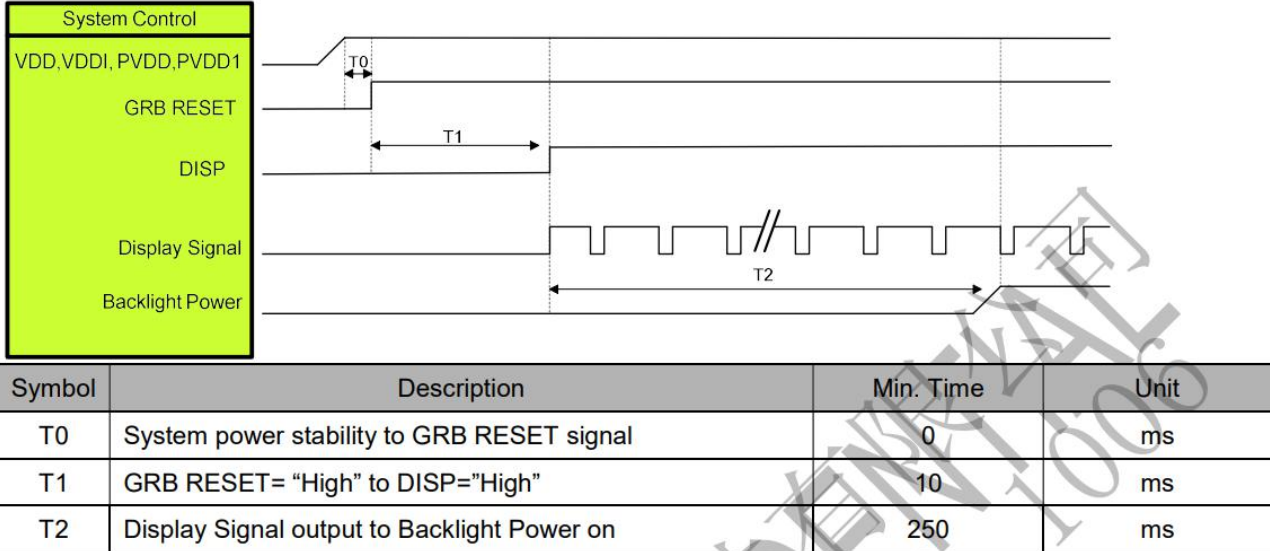
4.3 BACKLIGHT UNIT

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
LED Current	Iled	-	-	-	mA	Total LED
Forward voltage	VF	25.2	27	28.8	V	IF=100mA
Reverse current	IR	-	-	50	μA	VR=5V, 1LED
Power dissipation	Pd	2880			mW	Total LED
Peak forward current	IFP	150			mA	1LED
Reverse Voltage	VR	7			V	1LED



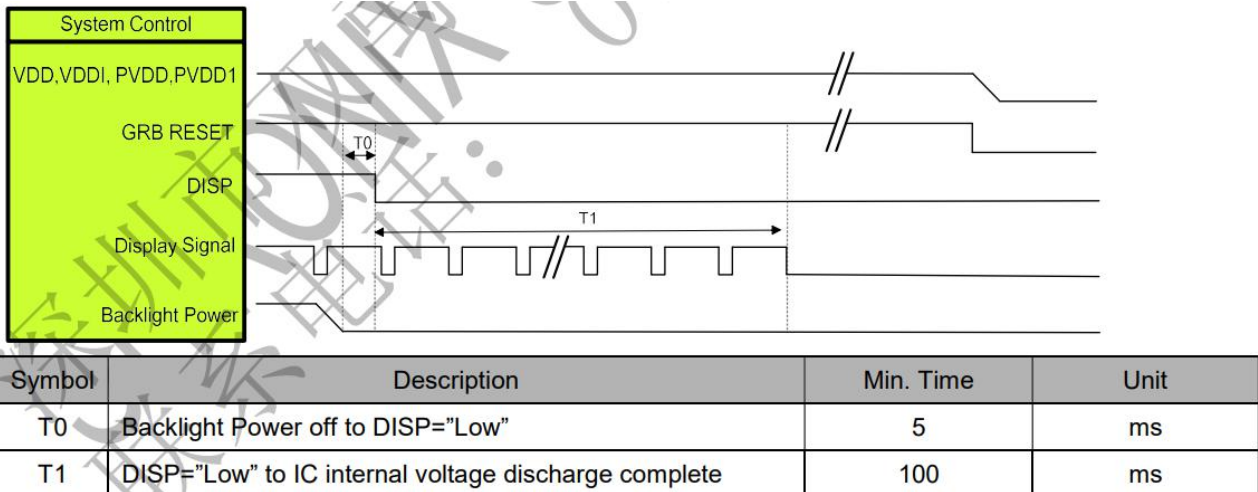


4.4 POWER ON/OFF SEQUENCE



Note :

1. When DISP pull "H" or "L", IC will execute the internal power on or power off procedures. Please be careful about the timing of DISP and do not interrupt it during power on or power off procedure, otherwise unexpected errors will occur.
2. RGB interface Display signal: DCLK; VSYNC; HSYNC; DE; DR[7:0]; DG[7:0]; DB[7:0]
3. LVDS interface Display signal: DCLK P/N; RX[3:0] P/N



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5. PARALLEL 24-BIT RGB INPUT TIMING TABLE

Parallel 24-bit RGB Input Timing (PVDD=PVDD1=VDD=VDDI= 3.3V, AGND= 0V, TA=25°C)

Parallel 24-bit RGB Interface Timing Table						
Item	Symbol	Min.	Typ.	Max.	Unit	Remark
DCLK Frequency	Fclk	23	25	27	MHz	
HSYNC	Period Time	Th	808	816	896	DCLK
	Display Period	Thdisp	800			DCLK
	Back Porch	Thbp	4	8	48	DCLK
	Front Porch	Thfp	4	8	48	DCLK
	Pulse Width	Thw	2	4	8	DCLK
VSYNC	Period Time	Tv	492	496	504	HSYNC
	Display Period	Tvdisp	480			HSYNC
	Back Porch	Tvbp	6	8	12	HSYNC
	Front Porch	Tvfp	6	8	12	HSYNC
	Pulse Width	Tvw	2	4	8	HSYNC

Note: 1. The minimum blanking time depends on the GIP timing of the panel specification

2. To ensure the compatibility of different panels, it is recommended to use the typical setting.

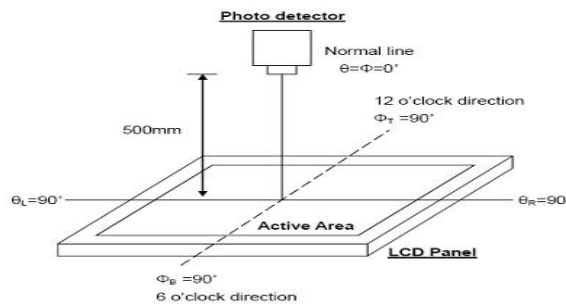
3. It is necessary to keep Tvbp =12 and Thbp =43 in sync mode. DE mode is unnecessary to keep it.

6.OPTICAL CHARACTERISTICS

Ta=25±2℃

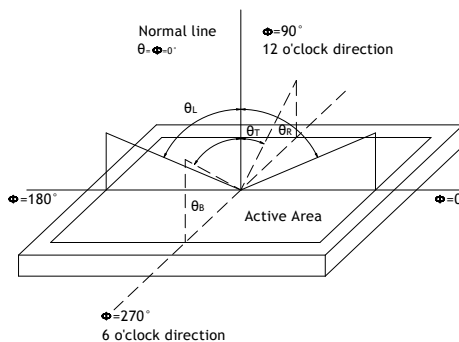
Item	Symbol	Min.	Typ.	Max.	Unit	Note	
Contrast Ratio	CR	700	1000	-		Note1 Note3	
Luminance(center)	L	1000	1200	-	cd/m ²	Note1 Note5 Note7	
Luminous tolerance	LU	75	80		%	Note7	
Response Time	Rising + Falling	-	30	40	ms	Note1 Note4	
Viewing Angle K=Contrast Ratio>10	Horizontal	θ_{x^+}	70	85	-	degr ee	Note2
		θ_{x^-}	70	85	-		
	Vertical	θ_{y^+}	70	85	-		
		θ_{y^-}	70	85	-		
Color Chromaticity (CIE1931)	Red	x	Typ- 0.05	0.640	Typ+ 0.05	Note1 Note5 Note7	
		y		0.341			
	Green	x		0.297			
		y		0.566			
	Blue	x		0.134			
		y		0.121			
	White	x		0.310			
		y		0.280			
Color gamut (NTSC ratio)		55	60		%		

Note1: Definition of optical measurement system (BM-7)



Note2: Definition of viewing angle range and measurement system

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



Note3: 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%.

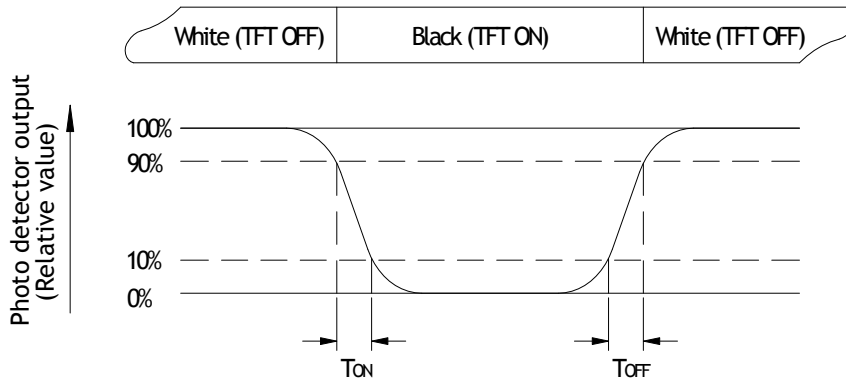


Fig. 6-3 Definition of response time

Note4: Definition of contrast ratio

$$\text{Contrast ratio(CR)} = \frac{\text{Luminance measured when LCD on the Whitestate}}{\text{Luminance measured when LCD on the Blackstate}}$$

“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.

Note5: Definition of color chromaticity (CIE1931)

Color coordinates measured at center point of LCD.

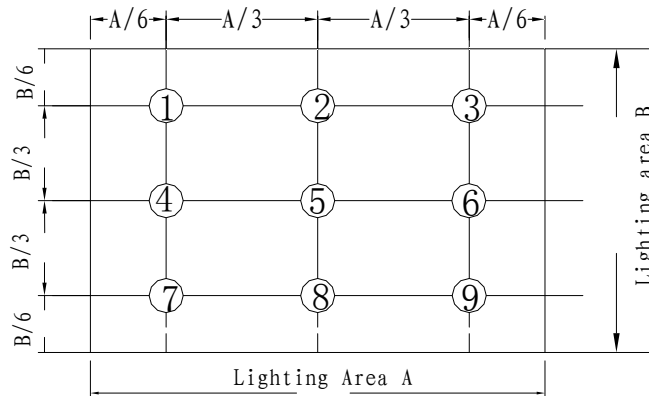
Note6: All input terminals LCD panel must be ground while measuring the center area of the panel. The LED driving condition is IL=100mA

Note7: Definition of Luminance Uniformity

Active area is divided into 9 measuring areas. Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (U)} = \text{Lmin} / \text{Lmax}$$

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



Bmax: The measured maximum luminance of all measurement position.

Bmin: The measured minimum luminance of all measurement position.



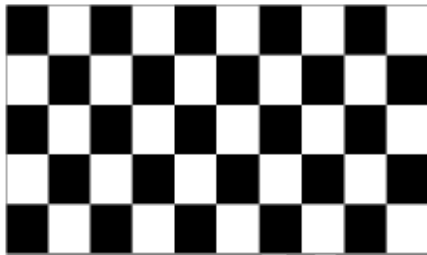
7. RELIABILITY TEST ITEMS

7.1 TEMPERATURE AND HUMIDITY

Test Item	Test Condition	Remark
High Temperature Storage	Ta=85°C; 240hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Storage	Ta=-30°C;240hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature Operation	Ta=85°C , 240Hrs	IEC60068-2-1 : 2007 GB2423.2-2008
Low Temperature Operation	Ta=-30°C; 240hrs	IEC60068-2-1 : 2007 GB2423.1-2008
High Temperature High Humidity Operation	Ta=60°C , 90%RH , 240Hrs(no condensation)	IEC60068-2-78 : 2001 GB/T2423.3-2006
Thermal Shock	-30°C(1h) ~ 80°C(1h) / 27 cycles	Start with cold temperature , End with high temperature , IEC60068-2-14:1984,GB2423.22-2002
Image Sticking	25°C ; 1hrs	Note1

Note1:Condition of image sticking test :25°C±2°C

Operation with test pattern sustained for 1 hrs,then change to gray pattern immediately.after 5 mins,the mura must be disappeared completely



(a) Test Pattern (chess board Pattern)



(b) Gray Pattern

7.2 VIBRATION&SHOCK

Test item	Conditions	Remark
Packing Shock (non-operation)	980m/s ² ,6ms, ±x,y,z 3times for direction	IEC60068-2-27 : 1987 GB/T2423.5-1995
Packing Vibration (non-operation)	Frequency range:10 HZ~50HZ Stroke:1.0mm,sweep:10 HZ ~50HZ x,y,z 2 hours for each direction	IEC60068-2-32 : 1990 GB/T2423.8-1995

7.3ESD

Test item	Conditions	Remark	
Electro Static Discharge Test (non-operation)	150pF , 330Ω , Contact:±2KV,Air:±4KV	1	Class C
	200pF , 0Ω , ±200V contact test	2	

Note: Measure point :

1. LCD glass and metal bezel
2. IF connector pins
- 3.ESD class B:some performance degradation allowed. Self-recoverable



No data lost, no hardware failures.

8. GENERAL PRECAUTION

8.1 SAFETY

1. Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
2. If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
3. If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

8.2 STORAGE CONDITIONS

1. Store the panel or module in a dark place where the temperature is $23\pm 5^{\circ}\text{C}$ and The humidity is below $50\pm 20\%RH$.
2. Store in anti-static electricity container.
3. Store in clean environment, free from dust, active gas, and solvent.
4. Do not place the module near organics solvents or corrosive gases.
5. Do not crush, shake, or jolt the module.

8.3 HANDLING PRECAUTIONS

1. Avoid static electricity which can damage the CMOS LSI.
2. The polarizing plate of the display is very fragile. So, please handle it very carefully.
3. Do not give external shock.
4. Do not apply excessive force on the surface.
5. Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the Surface of plate.
6. Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
7. Do not operate it above the absolute maximum rating.
8. Do not remove the panel or frame from the module.
9. When the module is assembled, it should be attached to the system firmly, Be careful not to twist and bend the module.
10. Wipe off water droplets or oil immediately. If you leave the droplets for a long time, staining and discoloration may occur.
11. If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth in case of contact with hands, legs or clothes, it must be washed away thoroughly with soap.

8.4 WARRANTY

1. The period is within twelve months since the date of shipping out under normal using and storage conditions.
2. Do not repaired or modified the LCM. It may cause function to lose efficacy, Starry does not warrant the LCM.
3. All process and material comply ROHS.



9. PACKAGE DRAWING

