广州市司诺电子科技有限公司

PRODUCT SPECIFICATION

3.5”a-Si TFT LCD MODULE

< ◇> Preliminary Specification

< ◆> Finally Specification

CUSTOMER’S APPROVAL	
CUSTOMER :	
SIGNATURE:	DATE:

广州市司诺电子科技有限公司

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1. Record of Revision

Rev	Issued Date	Description	Editor

2．General Specifications

Feature		Spec
Characteristics	Size	3.5inch
	Resolution	320(horizontal)*480(Vertical)
	Interface	MCU/SPI interface
	Connect type	connector
	Color Depth	16.7M
	Technology type	a-Si
	Display Spec.　Pixel pitch (mm)	0.153x 0.153
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally White
	Driver IC	ILI9488
	Surface Treatment	HC
	Viewing Direction	12 O'CLOCK
Mechanical	LCM (W x H x D) (mm)	54.50*83.00*2.34
	Active Area(mm)	48.96 x 73.44
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	6 LEDs

3. Input/Output Terminals

No.	Symbol	Description
1	NC	Dummy
2	NC	Dummy
3	NC	Dummy
4	NC	Dummy
5	GND	Ground
6	IOVCC	Power supply for I/O port(1.8/2.8V)
7	VCI	Power supply for the system (2.8V)
8	TE	Output a frame head pulse signal
9	CS/SPI_CS	Chip select input signal
10	RS/AO	Data/Command Selection pin
11	WR/SPI_SCL	serves as a write signal/Serial Clock when operates in the serial interface
12	RD	serve as a read signal
13	SPI_SDI/SDA	serial data input/output bi-direction pin
14	SPI_SDO	Serial data output
15	RESET	Chip reset signal
16	GND	Ground
17	DB0	DB0 are used as MCU parallel interface data bus
18	DB1	DB1 are used as MCU parallel interface data bus
19	DB2	DB2 are used as MCU parallel interface data bus
20	DB3	DB3 are used as MCU parallel interface data bus
21	DB4	DB4 are used as MCU parallel interface data bus
22	DB5	DB5 are used as MCU parallel interface data bus
23	DB6	DB6 are used as MCU parallel interface data bus
24	DB7	DB7 are used as MCU parallel interface data bus
25	DB8	DB8 are used as MCU parallel interface data bus
26	DB9	DB9 are used as MCU parallel interface data bus
27	DB10	DB10 are used as MCU parallel interface data bus
28	DB11	DB11 are used as MCU parallel interface data bus
29	DB12	DB12 are used as MCU parallel interface data bus
30	DB13	DB13 are used as MCU parallel interface data bus
31	DB14	DB14 are used as MCU parallel interface data bus
32	DB15	DB15 are used as MCU parallel interface data bus
33	LEDA	POWER SUPPLY FOR LED BACKLIGHT ANODE
34	LEDK	POWER SUPPLY FOR LED BACKLIGHT CATHODE
35	LEDK	POWER SUPPLY FOR LED BACKLIGHT CATHODE
36	LEDK	POWER SUPPLY FOR LED BACKLIGHT CATHODE
37	GND	Ground
38	IM0	Select the interface mode(IM0)
39	IM1	Select the interface mode(IM1)
40	IM2	Select the interface mode(IM2)

4. Absolute Maximum Ratings

4.1 Driving TFT LCD Panel

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	V_{DD}	2.8	3.3	V	
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	

5. Electrical Characteristics

Table 5

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (analog)	VCI-GND		2.6	2.8	3.3	V
Supply voltage (logic)	IOVDD-GND		1.65	1.8	3.3	V
Supply current (Logic & LCD)	ICC	VCI=2.8V	-	-	10	mA
Supply voltage of white LED backlight	VLED =$V_{(BL+)}$-$V_{(BL-)}$	Forward current =80 mA Number of LED dies = 4	3.0	3.2	3.4	V
Luminance (on the module surface)			-	300	-	cd/m^2

Note 1: Each LED : IF =20 mA, VF =3.2V.

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.

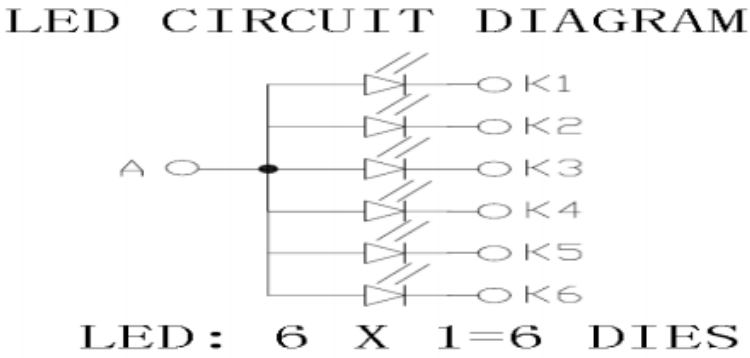
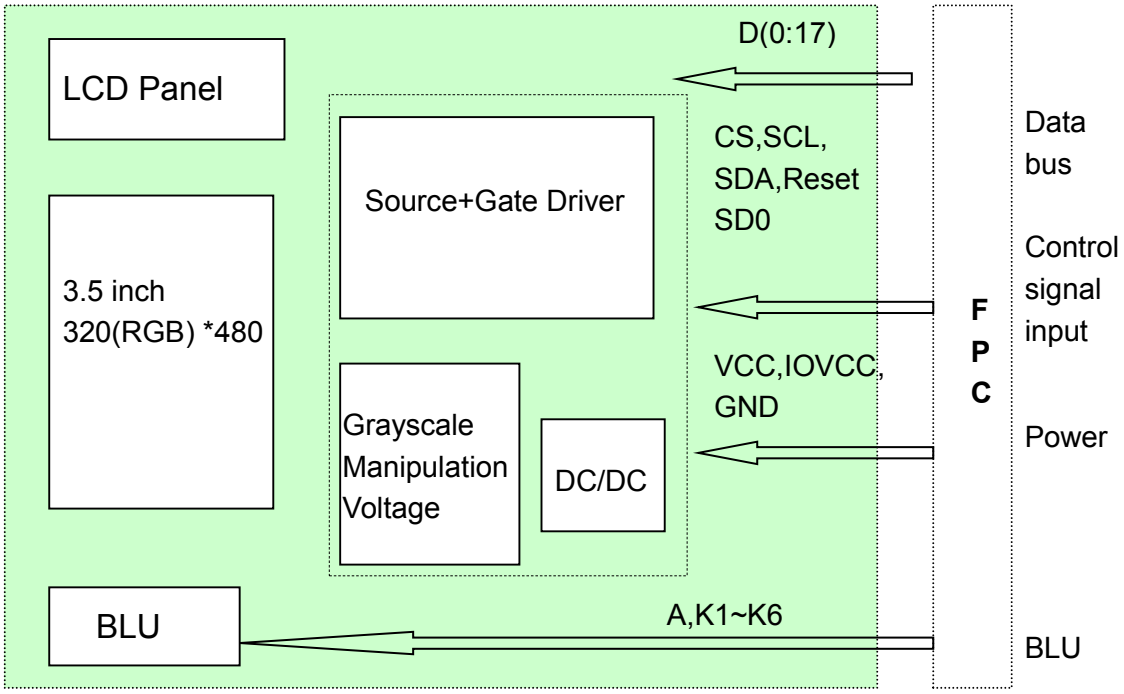


Figure : LED connection of backlight

5.3 Block Diagram



6. Optical Characteristics

Item	Symbol	Condition	Specification			Unit	Remark
			Min.	Typ.	Max.		
Response time (By Quick)	Tr+Tf	θ= 0°	-	20	40	ms	Note 5
Contrast ratio	CR	θ= 0°	-	500	-		Note 2,6
Viewing angle	Top	CR≧10	-	60	-	deg.	Note 2,6,7
	Bottom	CR≧10	-	60	-		
	Left	CR≧10	-	70	-		
	Right	CR≧10	-	70	-		
Color chromaticity (CF only with ITO, light source is C light, CIE 1931)	Wx	θ= 0°	0.292	0.307	0.322		Note 3
	Wy		0.312	0.327	0.342		
	Rx		0.609	0.624	0.639		
	Ry		0.316	0.331	0.346		
	Gx		0.281	0.296	0.311		
	Gy		0.562	0.577	0.592		
	Bx		0.128	0.143	0.158		
	By		0.094	0.109	0.124		
NTSC			57%	60%	-		Note 3
Cross talk	Ct		-	-	2%		Note 9
Transmittance	Trans		-	5.50%	-		Note 4

Note 1: Ambient temperature = 25°C.

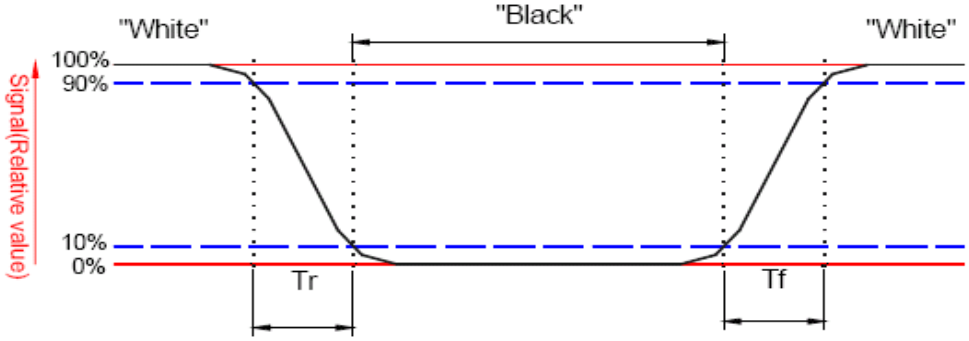
Note 2: To be measured with a viewing cone of 2°by Topcon luminance meter BM-5A.

Note 3: To be measured with Otsuta chromaticity meter LCF-2100M, CF only measure under C light simulation.

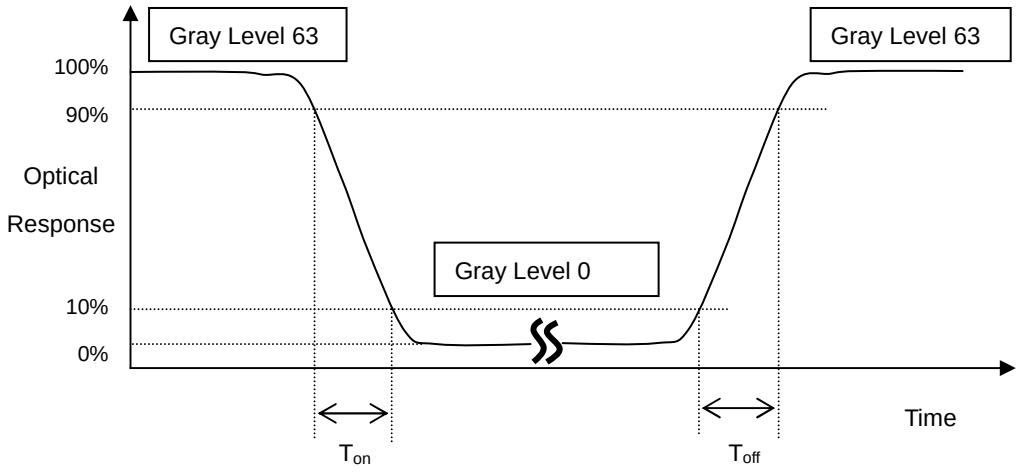
Note 4: CTC shipping status is cell without polarizer. Transmittance of Specification is cell with polarizer. The tolerance of Transmittance is ±10%.

Note 5: Definition of response time:

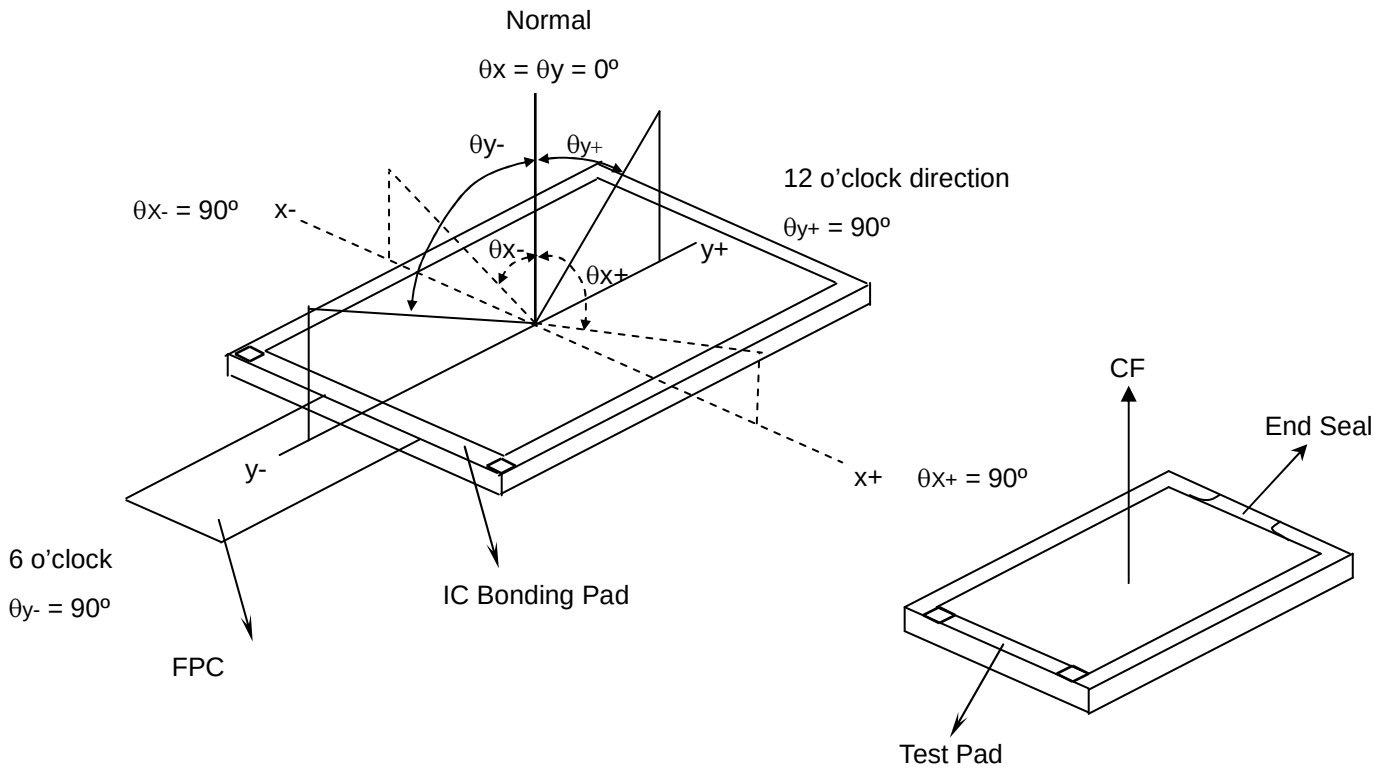
The output signals of TRD-100 are measured when the input signals are changed to “White” (falling time) and from “White” to “Black” (rising time), respectively. The interval is between the 10% and 90% of amplitudes. Refer to figure as below.



*Note (2) Definition of Response Time (T_{on}, T_{off}):

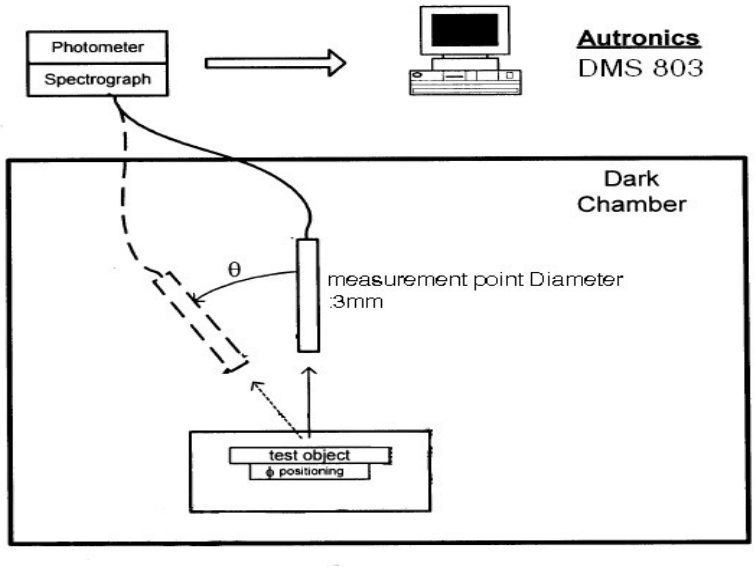


*Note(3) Definition of Viewing Angle

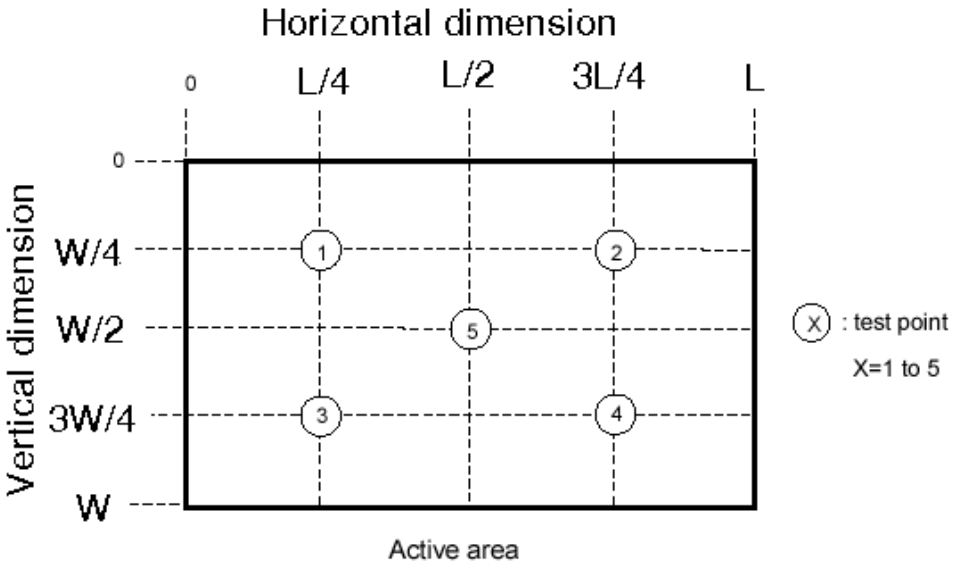


*Note (4) Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



*Note (5)



7. Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Opeartion	Ts= +70℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Opeartion	Ta= -20℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature,end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Opeartion)	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y , ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T_S is the temperature of panel's surface.
2. Ta is the ambient temperature of sample.

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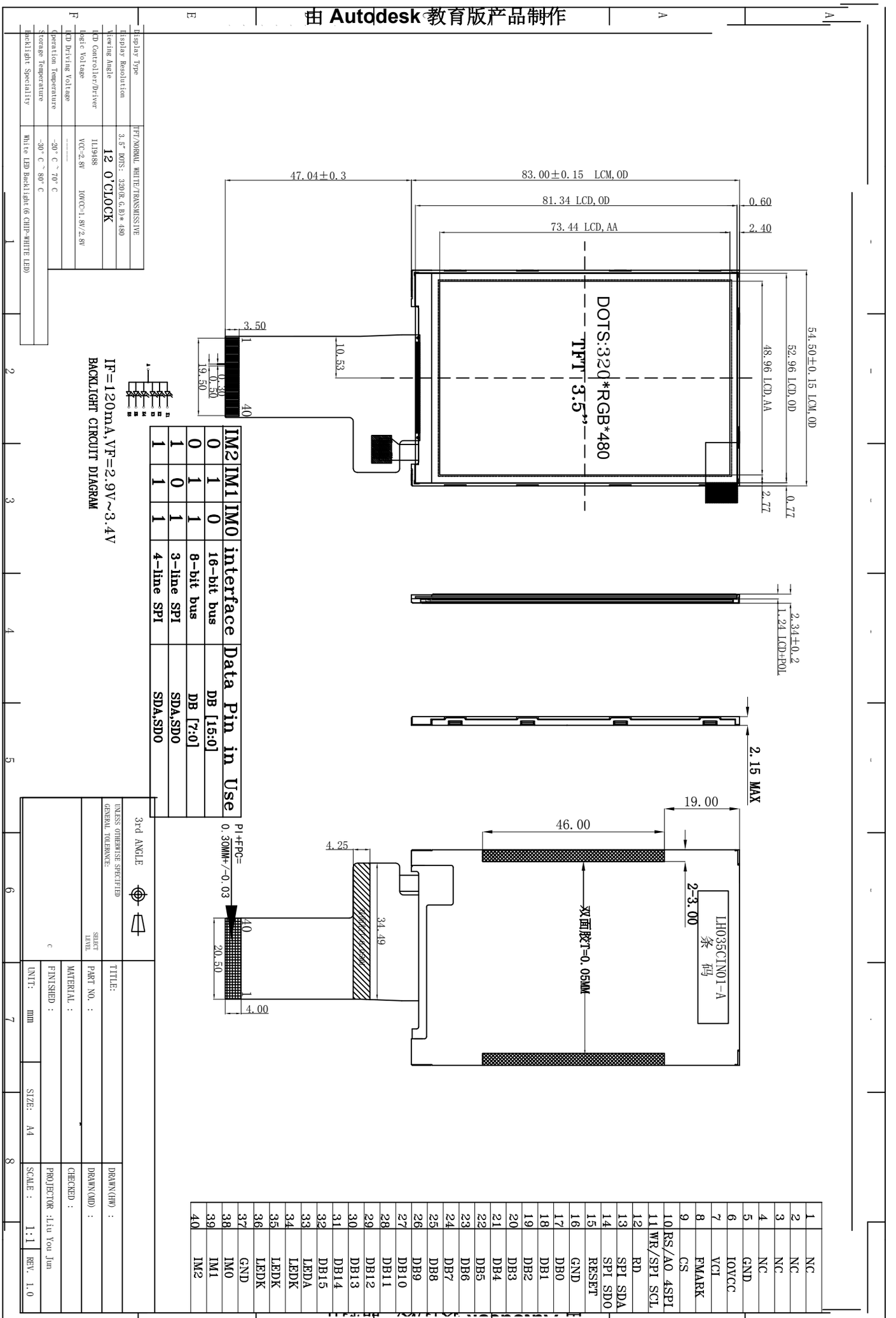
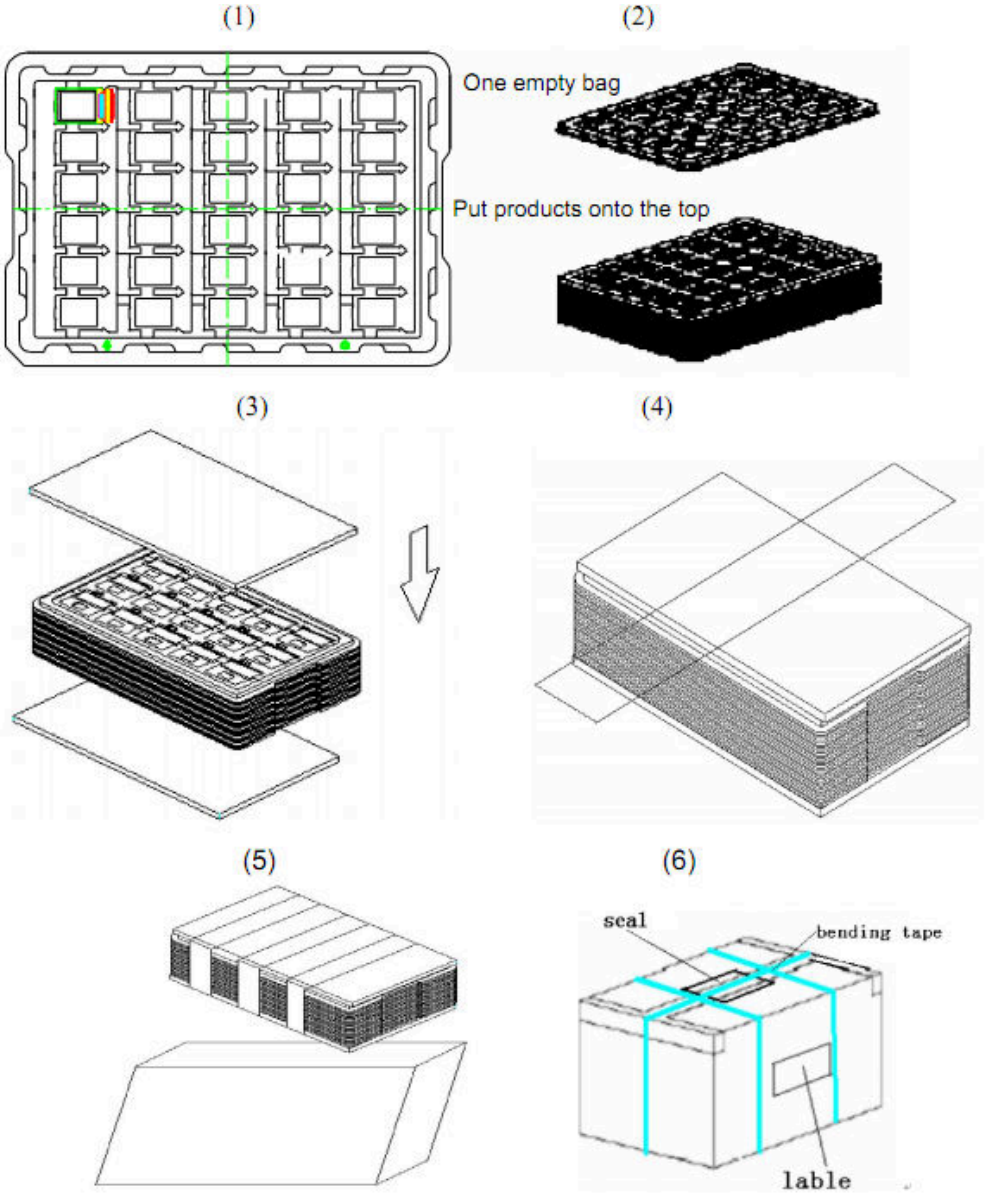
8．Mechanical Drawing



9 . Packing

Packing Method



1. Put module into tray cavity:
2. Tray stacking
3. Put 1 cardboard under the tray stack and 1 cardboard above:
4. Fix the cardboard to the tray stack with adhesive tape:
5. Put the tray stack into carton.
6. Carton sealing with adhesive tape.

10.Precautions For Use of LCD modules

10.1 Handling Precautions

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

10.1.2. 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.

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

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

10.1.5. 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

10.1.6. Do not attempt to disassemble the LCD Module.

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

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

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

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

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

10.1.8.4. 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

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

10.2.2. 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%

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

10.3 Transportation Precautions

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