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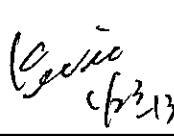
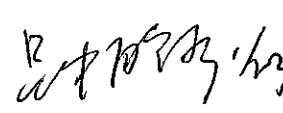
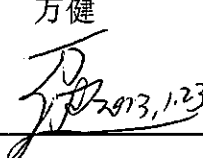
SPECIFICATION

CUSTOMER : _____

MODULE NO.: **WF35LTIBCDBT0#**

未出样, 参数仅供参考

<p align="center">APPROVED BY:</p> <p align="center">(FOR CUSTOMER USE ONLY)</p>	<p>PCB VERSION: _____</p> <p>DATA: _____</p>
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SALES BY	APPROVED BY	CHECKED BY	PREPARED BY
			<p>万健</p> 
<p>ISSUED DATE: 2013-1-18</p>			



MODLE NO :

RECORDS OF REVISION

DOC. FIRST ISSUE

VERSION	DATE	REVISED PAGE NO.	SUMMARY
0	2013.1.18		First issue

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2. Summary

This technical specification applies to 3.45" color TFT-LCD panel. The 3.45" color TFT-LCD panel is designed for camcorder, digital camera application and other electronic products which require high quality flat panel displays. This module follows RoHS.

3. General Specification

Item	Dimension	Unit
Dot Matrix	320 x RGBx240(TFT)	dots
Module dimension	93.5 x 66.44 x 9.06	mm
Active area	70.08 x 52.56	mm
Dot pitch	0.073 x 0.219	mm
LCD type	TFT, Negative, Transmissive	
View Direction	12 o'clock	
Gray Scale Inversion Direction	6 o'clock	
Backlight Type	LED, Normally White	

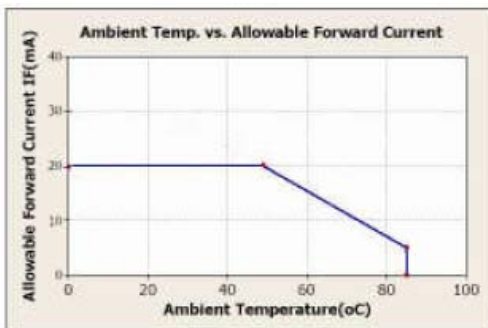
*Color tone slight changed by temperature and driving voltage.

4. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T _{OP}	-20	—	+70	°C
Storage Temperature	T _{ST}	-30	—	+80	°C

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above

1. Temp. $\leq 60^{\circ}\text{C}$, 90% RH MAX. Temp. $> 60^{\circ}\text{C}$, Absolute humidity shall be less than 90% RH at 60°C



5. Electrical Characteristics

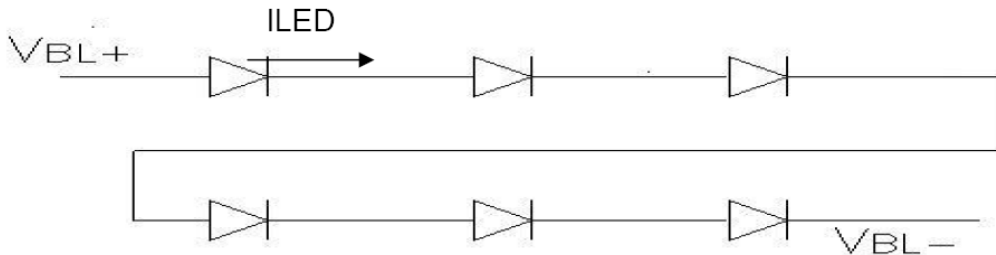
5.1. Operating conditions:

Item	Symbol	Condition	Min	Typ	Max	Unit
Supply Voltage For Logic	VCC	—	3.0	3.3	3.6	V

5.2 LED driving conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current		-	20	-	mA	
Power Consumption			384	408	mW	
LED voltage	VBL+	17.4	19.2	20.4	V	Note 1
LED Life Time		-	50,000	-	Hr	Note 2,3,4

Note 1 : There are 1 Groups LED



Note 2 : Ta = 25 °C

Note 3 : Brightness to be decreased to 50% of the initial value

Note 4 : The single LED lamp case

6. DC Characteristics

Parameter	Symbol	Rating			Unit	Condition
		Min.	Typ.	Max.		
Low level input voltage	V _{IL}	0	-	0.3 VCC	V	
High level input voltage	V _{IH}	0.7 VCC	-	VCC	V	

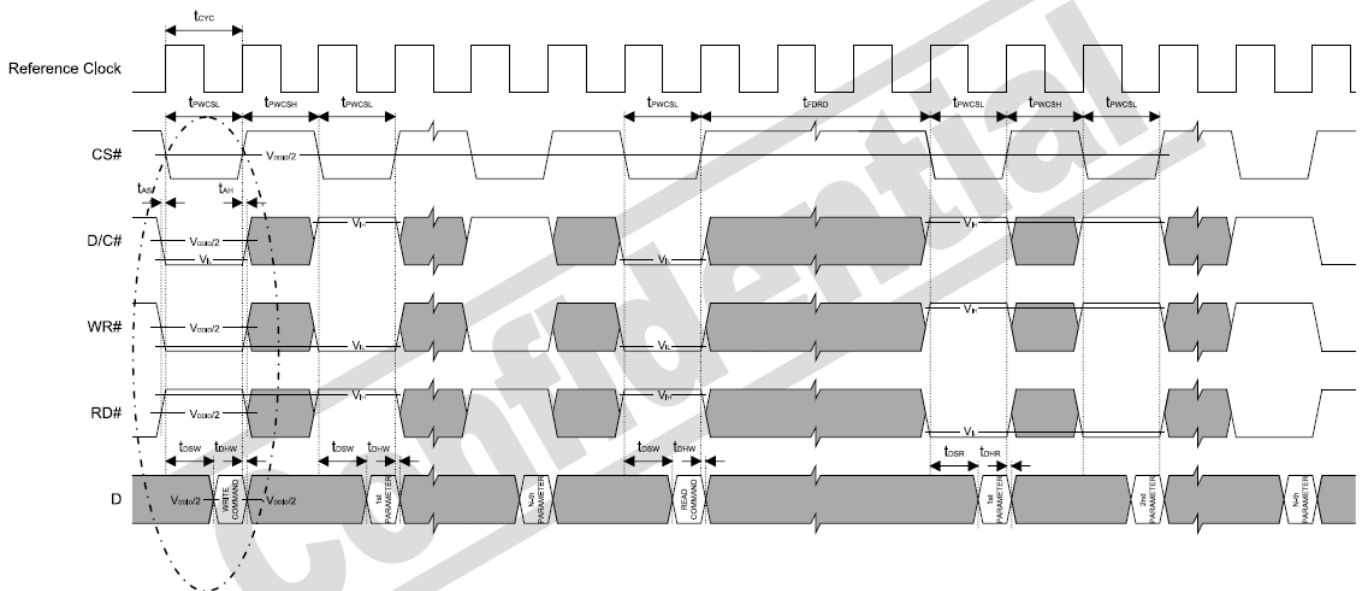
7. Interface Timing

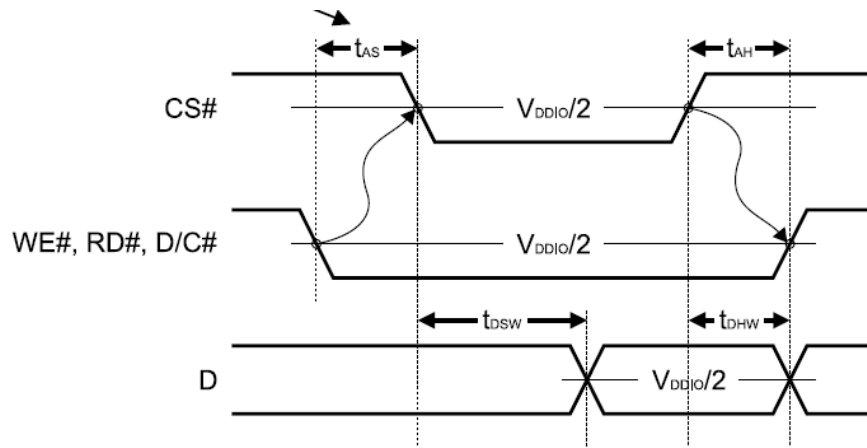
7.1.1 8080 Mode

The 8080 mode MCU interface consist of CS#, D/C#, RD#, WR#, D[23:0] and TE signals (Please refer to Table 6-1 for pin multiplexed with 6800 mode). This interface use WR# to define a write cycle and RD# for read cycle. If the WR# goes low when the CS# signal is low, the data or command will be latched into the system at the rising edge of WR#. Similarly, the read cycle will start when RD# goes low and end at the rising edge of RD#.

7.1.2 8080 Mode Write Cycle

Symbol	Parameter	Min	Typ	Max	Unit
t_{cyc}	Reference Clock Cycle Time	9	-	-	ns
t_{PWCSL}	Pulse width CS# low	1	-	-	t_{cyc}
t_{PWCSH}	Pulse width CS# high	1	-	-	t_{cyc}
t_{FDRD}	First Read Data Delay	5	-	-	t_{cyc}
t_{AS}	Address Setup Time	1	-	-	ns
t_{AH}	Address Hold Time	1	-	-	ns
t_{DSW}	Data Setup Time	4	-	-	ns
t_{DHW}	Data Hold Time	1	-	-	ns
t_{DSR}	Data Access Time	-	-	5	ns
t_{DHR}	Output Hold time	1	-	-	ns





7.1.3 Pixel Data Format

Interface	Cycle	D[23]	D[22]	D[21]	D[20]	D[19]	D[18]	D[17]	D[16]	D[15]	D[14]	D[13]	D[12]	D[11]	D[10]	D[9]	D[8]	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
24 bits	1 st	R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
18 bits	1 st							R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
16 bits (565 format)	1 st									R5	R4	R3	R2	R1	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1
16 bits	1 st									R5	R4	R3	R2	R1	R0	X	X	G5	G4	G3	G2	G1	G0	X	X
	2 nd									B5	B4	B3	B2	B1	B0	X	X	R5	R4	R3	R2	R1	R0	X	X
	3 rd									G5	G4	G3	G2	G1	G0	X	X	B5	B4	B3	B2	B1	B0	X	X
9 bits	1 st																R5	R4	R3	R2	R1	R0	G5	G4	G3
	2 nd																G2	G1	G0	B5	B4	B3	B2	B1	B0
8 bits	1 st																	R5	R4	R3	R2	R1	R0	X	X
	2 nd																	G5	G4	G3	G2	G1	G0	X	X
	3 rd																	B5	B4	B3	B2	B1	B0	X	X

X: Don't Care

8. Optical Characteristic

Item	Symbol	Condition.	Min	Typ.	Max.	Unit	Remark	
Response time	Tr	$\theta = 0^\circ$ 、 $\Phi = 0^\circ$	-	10		.ms	Note 3,5	
	Tf		-	15		.ms		
Contrast ratio	CR	At optimized viewing angle	300	400	-	-	Note 4,5	
Color Chromaticity	White	$\theta = 0^\circ$ 、 $\Phi = 0$	Wx	0.25	0.30	0.35		Note 2,6,7
			Wy	0.27	0.32	0.37		
Viewing angle	Hor.	$CR \geq 10$	ΘR	50	60		Deg.	Note 1
			ΘL	50	60			
	Ver.		ΦT	40	50			
			ΦB	45	55			
Brightness	-	-	250	-	370	cd/m	Center of display	

Ta=25±2°C, IL=20mA

Note 1: Definition of viewing angle range

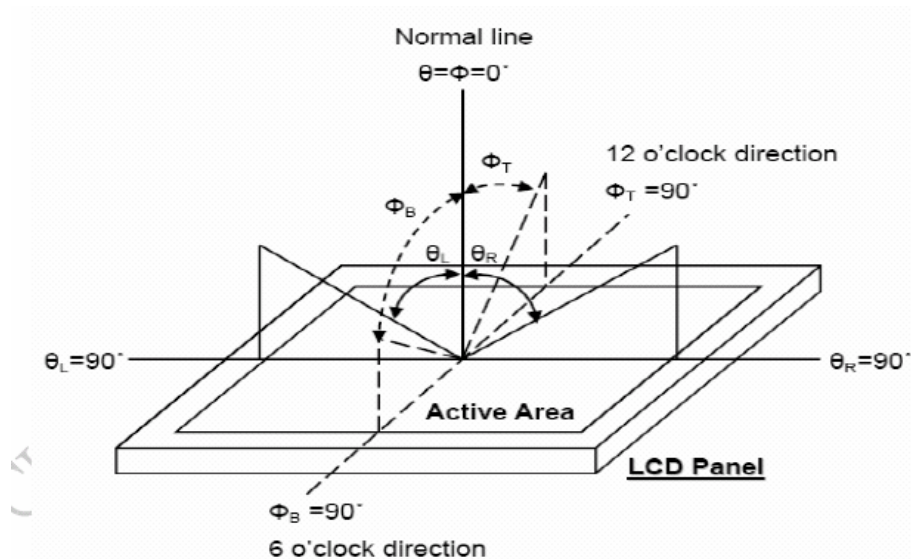


Fig. 8-1 Definition of viewing angle

Note 2: Test equipment setup:

After stabilizing and leaving the panel alone at a driven temperature for 10 minutes, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room. Optical specifications are measured by Topcon BM-7 luminance meter 1.0° field of view at a distance of 50cm and normal direction.

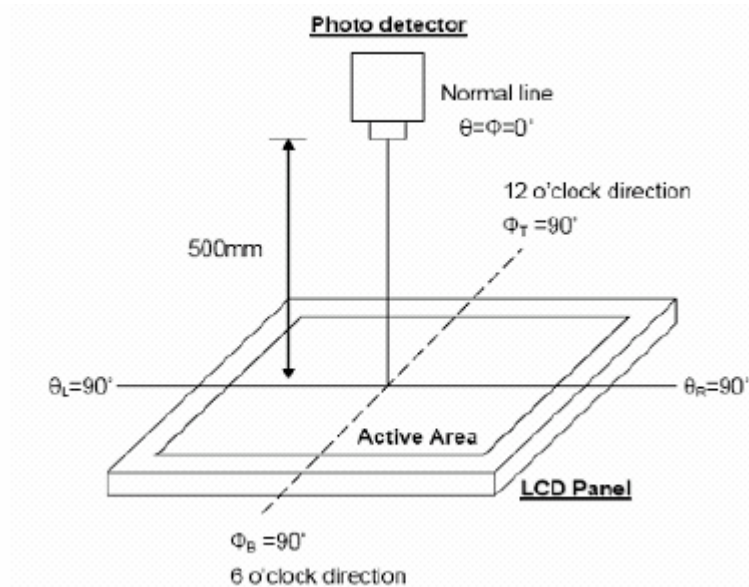


Fig. 8-2 Optical measurement system setup

Note 3: 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_r , is the time between photo detector output intensity changed from 90% to 10%. And fall time, T_f , is the time between photo detector output intensity changed from 10% to 90%

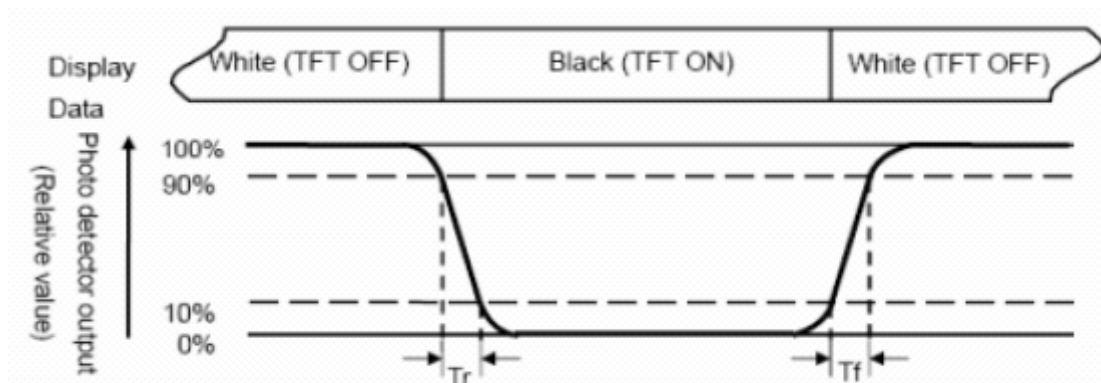


Fig. 3-3 Definition of response time

Note 4: Definition of contrast ratio:

The contrast ratio is defined as the following expression.

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

Note 5: White $V_i = V_{i50} \pm 1.5V$

Black $V_i = V_{i50} \pm 2.0V$

“±” means that the analog input signal swings in phase with VCOM signal.

“±” means that the analog input signal swings out of phase with VCOM signal.

The 100% transmission is defined as the transmission of LCD panel when all the input terminals of module are electrically opened.

Note 6: Definition of color chromaticity (CIE 1931)

Color coordinates measured at the center point of LCD

Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

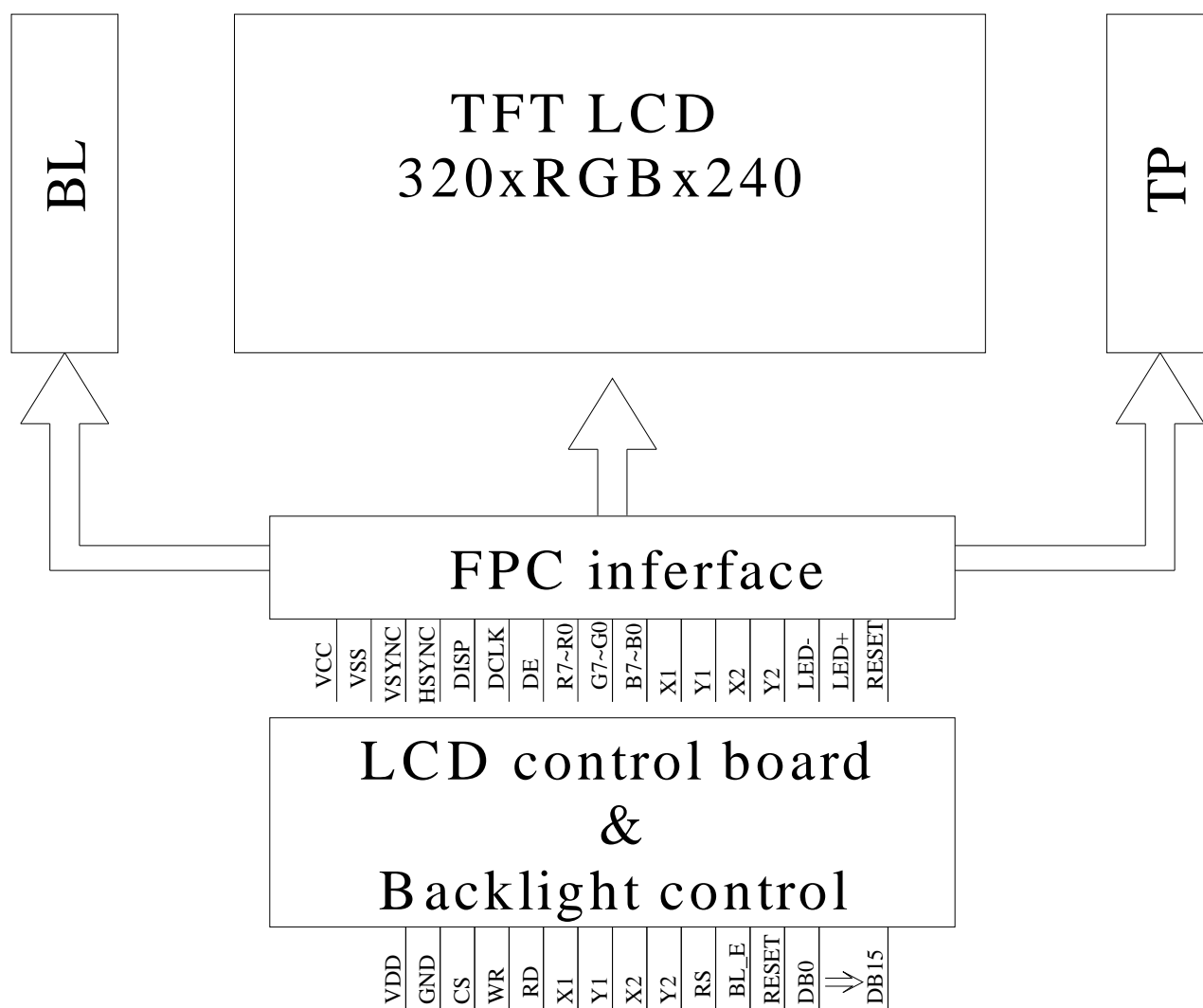
$$\text{Note 8 : Uniformity (U)} = \frac{\text{Brightness (min)}}{\text{Brightness (max)}} \times 100\%$$

9. Interfae

9.1. LCM PIN Definition

Pin	Symbol	I/O	Function	Remark
1	VSS	P	System ground pin of the IC. Connect to system ground.	
2	VDD	P	Power Supply : +3.3V	
3	BL_E	I	Backlight control signal , H: On \ L:Off	
4	RS	I	Data/Command select	
5	WR	I	Write strobe signal	
6	RD	I	Read strobe signal	
7	DB0	I	Data bus	
8	DB1	I	Data bus	
9	DB2	I	Data bus	
10	DB3	I	Data bus	
11	DB4	I	Data bus	
12	DB5	I	Data bus	
13	DB6	I	Data bus	
14	DB7	I	Data bus	
15	DB8	I	Data bus	
16	DB9	I	Data bus	
17	DB10	I	Data bus	
18	DB11	I	Data bus	
19	DB12	I	Data bus	
20	DB13	I	Data bus	
21	DB14	I	Data bus	
22	DB15	I	Data bus	
23	NC	-	No connect	
24	NC	-	No connect	
25	CS	I	Chip select	
26	RESET	I	Hardware reset	
27	NC	-	No connect	
28	X1	I	Right electrode	
29	Y1	I	Top electrode	
30	X2	I	Left electrode	
31	Y2	I	Down electrode	
32	NC	-	No connect	

10. Block Diagram



11. Reliability

Content of Reliability Test (Wide temperature, -20°C~70°C)

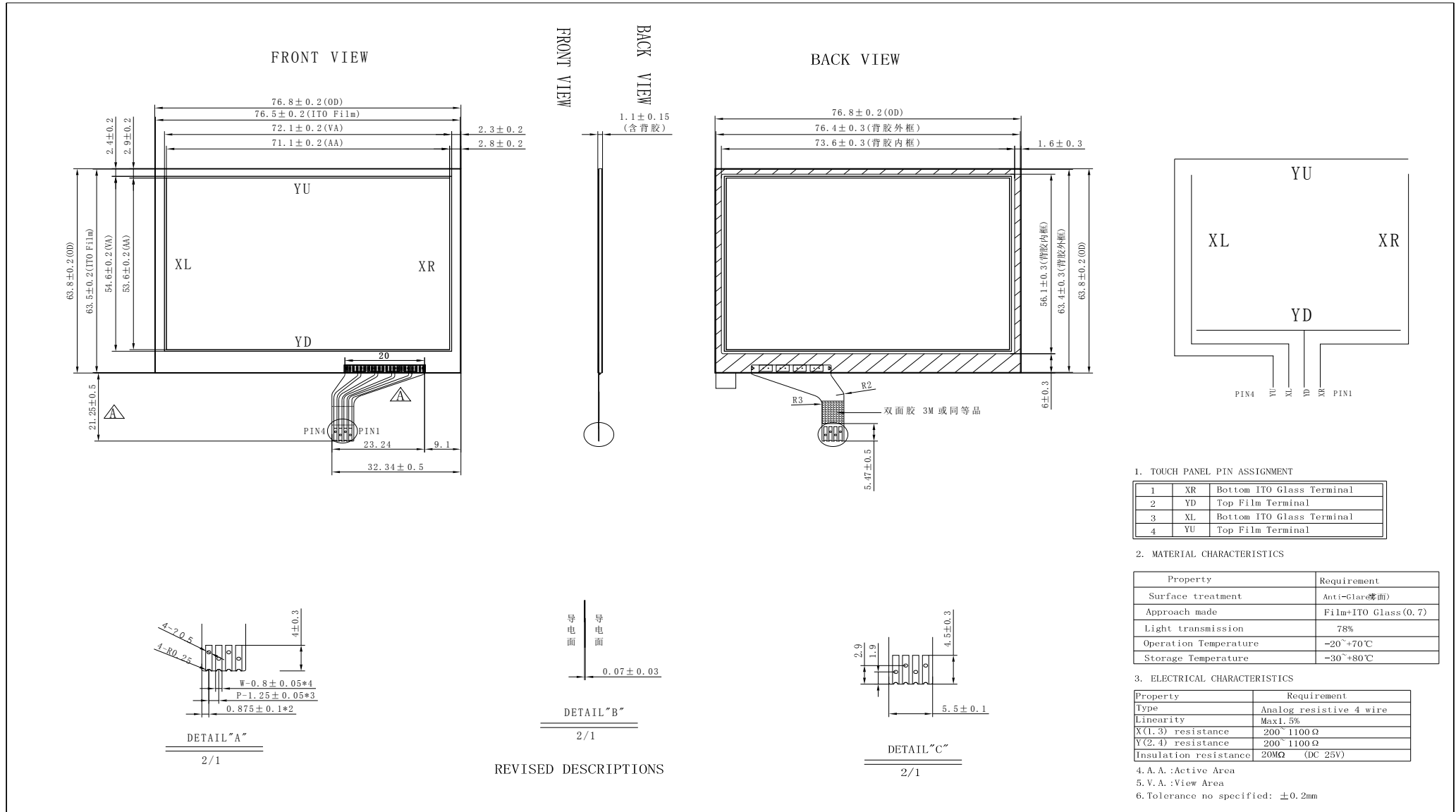
Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 200hrs	—
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60°C,90%RH max For 96hrs under no-load condition excluding the polarizer, Then taking it out and drying it at normal temperature.	60°C,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation <div style="text-align: center;"> <p style="margin: 0;">-20°C 25°C 70°C</p> <p style="margin: 0;">30min 5min 30min</p> <p style="margin: 0;">1 cycle</p> </div>	-20°C/70°C 10 cycles	—
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 3 15mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=800V,RS=1.5kΩ CS=100pF 1 time	—

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: Vibration test will be conducted to the product itself without putting it in a container.

12. Touch panel Information



1. TOUCH PANEL PIN ASSIGNMENT

1	XR	Bottom ITO Glass Terminal
2	YD	Top Film Terminal
3	XL	Bottom ITO Glass Terminal
4	YU	Top Film Terminal

2. MATERIAL CHARACTERISTICS

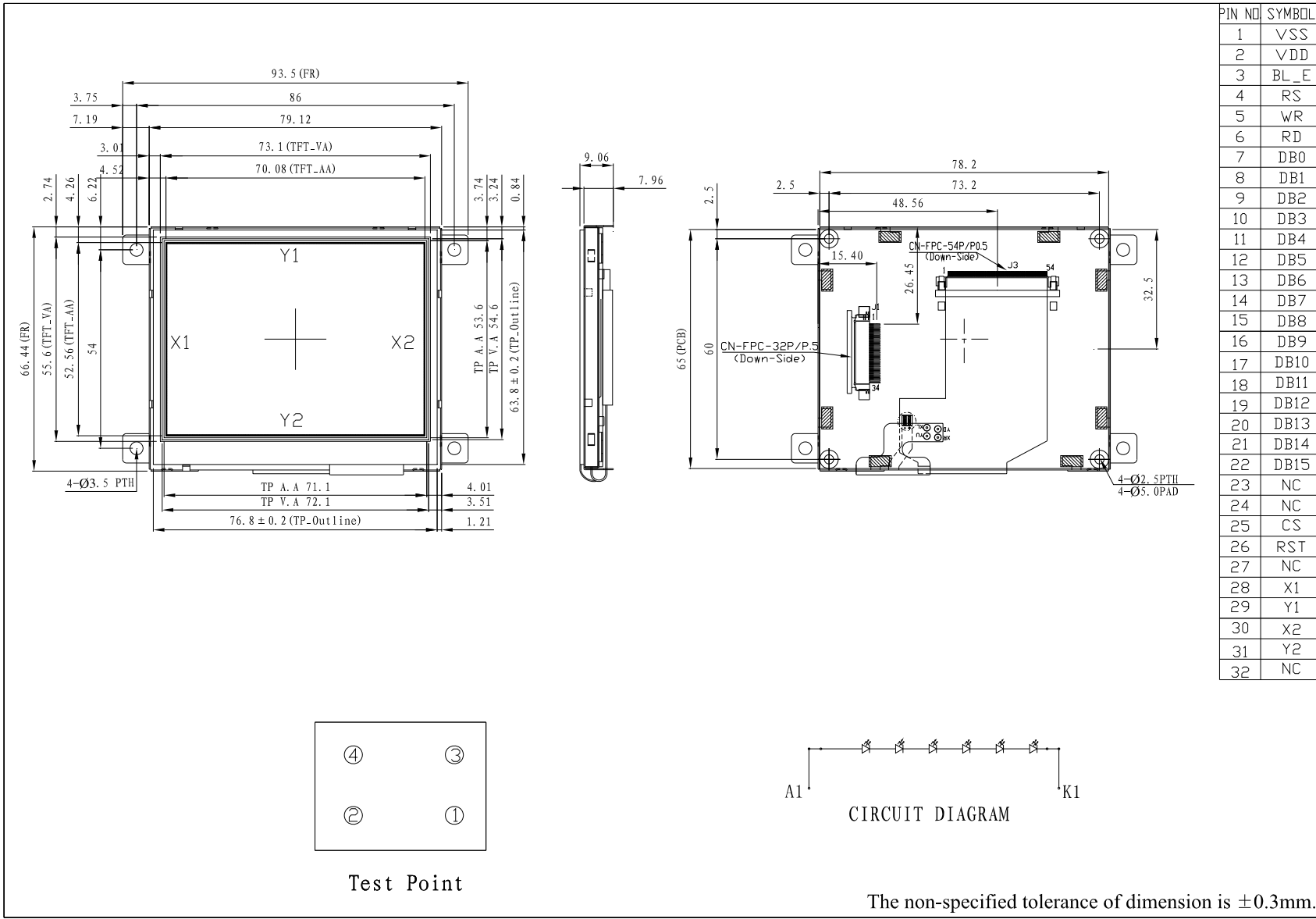
Property	Requirement
Surface treatment	Anti-Glare(雾面)
Approach made	Film+ITO Glass (0.7)
Light transmission	78%
Operation Temperature	-20~+70°C
Storage Temperature	-30~+80°C

3. ELECTRICAL CHARACTERISTICS

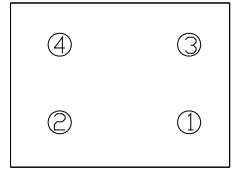
Property	Requirement
Type	Analog resistive 4 wire
Linearity	Max1.5%
X(1.3) resistance	200~1100 Ω
Y(2.4) resistance	200~1100 Ω
Insulation resistance	20MΩ (DC 25V)

- 4. A. A. :Active Area
- 5. V. A. :View Area
- 6. Tolerance no specified: ±0.2mm

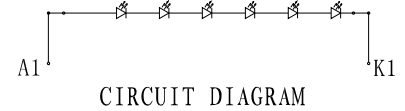
13. Contour Drawing



PIN NO	SYMBOL
1	VSS
2	VDD
3	BL_E
4	RS
5	WR
6	RD
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7
15	DB8
16	DB9
17	DB10
18	DB11
19	DB12
20	DB13
21	DB14
22	DB15
23	NC
24	NC
25	CS
26	RST
27	NC
28	X1
29	Y1
30	X2
31	Y2
32	NC



Test Point



CIRCUIT DIAGRAM

The non-specified tolerance of dimension is $\pm 0.3\text{mm}$.

14. PACKAGE SPECIFICATION

LCM Model	WF35LTIBCDBT0#	LCM 包裝規格書 LCM Packaging Specifications	Approve	Check	Contact
Drawing NO.			DATE	初版	版次 Ver
			12'11/15	12'11/15	0

1. 包裝材料規格表 (Packaging Material) :(per carton)

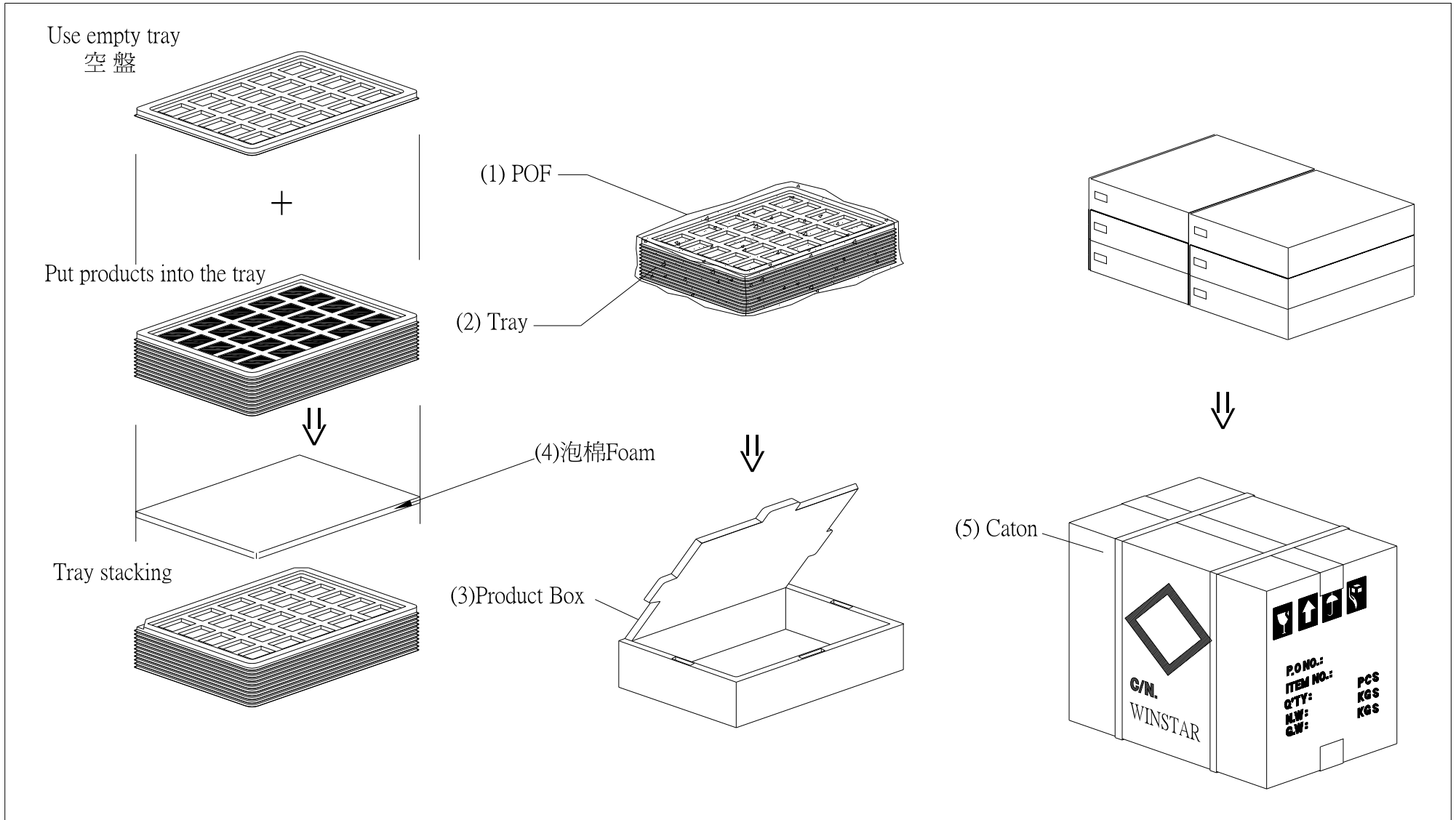
NO.	Item	Model	Dimensions	Quantity
1	成品 (LCM)	WF35LTIBCDBT0#	76.9 x 63.9x 3.26	432
2	TRAY 盤 (2)	PKCA1XXXXXXXXXXXX0232	315 x 265 x 13.5	72
3	BP01 內盒(3)Product Box	PK3R1XXXXXXXXXXXX0001	332 x 280 x 100	6
4	泡棉(4)Foam	-----	283 x 230 x 8	6
5	外紙箱(5)Carton	PK4Q1XXXXXXXXXXXX0000	565 x 340 x 320	1
6				
7				
8				
9				

2. 單箱數量規格表(Packaging Specifications and Quantity) :

(1)LCM quantity per box : no per tray	6	x no of tray	12	=	72
(2)Total LCM quantity in carton : quantity per box	72	x no of boxes	6	=	432

特 記 事 項 (REMARK)

<p>1. Label Specifications :</p> <div style="border: 1px solid black; padding: 5px; margin-top: 5px;"> MOOEL: LOT NO : QUANTITY: CHECK: </div>	<p>2. Rotate tray 180 degrees and place on top of stack. (TRAY 盤相疊時,需旋轉 180 度)</p>
---	--



15. Initial Code For Reference

```
void Initial_code()
{
    Unsigned int SOURCE,GATE;
    SOURCE=320;
    GATE=240;

    Reset = 1;
    Delay_ms(10);
    Reset = 0;
    Delay_ms(50);
    Reset = 1;
    Delay_ms(100);

    Write_Command(0x01);
    Delay_ms(10);
    Write_Command(0xe0);    //START PLL
    Write_Parameter(0x01);
    Delay_ms(5);
    Write_Command(0xe0);    //LOCK PLL
    Write_Parameter(0x03);
    Delay_ms(5);
    Write_Command(0xb0);
    Write_Parameter(0x0c);
    Write_Parameter(0x80);
    Write_Parameter((SOURCE-1)>>8);
    Write_Parameter(SOURCE-1);
    Write_Parameter((GATE-1)>>8);
    Write_Parameter(GATE-1);
    Write_Parameter(0x00);
    Write_Command(0xf0);
    Write_Parameter(0x03);
    Write_Command(0x3a);
    Write_Parameter(0x60);
    //Set the MN of PLL
    Write_Command(0xe2);
    Write_Parameter(0x1d);
    Write_Parameter(0x02);
    Write_Parameter(0x54);
    Write_Command(0xe6);
```

```
Write_Parameter(0x01);
Write_Parameter(0x40);
Write_Parameter(0xff);
//Set front porch and back porch
Write_Command(0xb4);
Write_Parameter(0x01);
Write_Parameter(0xb8);
Write_Parameter(0x00);
Write_Parameter(0x44);
Write_Parameter(0x07);
Write_Parameter(0x00);
Write_Parameter(0x00);
Write_Parameter(0x00);
Write_Command(0xb6);
Write_Parameter(0x01);
Write_Parameter(0x08);
Write_Parameter(0x00);
Write_Parameter(0x12);
Write_Parameter(0x07);
Write_Parameter(0x00);
Write_Parameter(0x00);
Write_Command(0x2a);
Write_Parameter(0x00);
Write_Parameter(0x00);
Write_Parameter((SOURCE-1)>>8); /
Write_Parameter(SOURCE-1);
Write_Command(0x2b);
Write_Parameter(0x00);
Write_Parameter(0x00);
Write_Parameter((GATE-1)>>8);
Write_Parameter(GATE-1);
Write_Command(0x29);
Write_Command(0x2c);
}
```



1、Panel Specification :

- 1. Panel Type : Pass NG , _____
- 2. View Direction : Pass NG , _____
- 3. Numbers of Dots : Pass NG , _____
- 4. View Area : Pass NG , _____
- 5. Active Area : Pass NG , _____
- 6. Operating Temperature : Pass NG , _____
- 7. Storage Temperature : Pass NG , _____
- 8. Others : _____

2、Mechanical Specification :

- 1. PCB Size : Pass NG , _____
- 2. Frame Size : Pass NG , _____
- 3. Material of Frame : Pass NG , _____
- 4. Connector Position : Pass NG , _____
- 5. Fix Hole Position : Pass NG , _____
- 6. Backlight Position : Pass NG , _____
- 7. Thickness of PCB : Pass NG , _____
- 8. Height of Frame to PCB : Pass NG , _____
- 9. Height of Module : Pass NG , _____
- 10. Others : Pass NG , _____

3、Relative Hole Size :

- 1. Pitch of Connector : Pass NG , _____
- 2. Hole size of Connector : Pass NG , _____
- 3. Mounting Hole size : Pass NG , _____
- 4. Mounting Hole Type : Pass NG , _____
- 5. Others : Pass NG , _____

4、Backlight Specification :

- 1. B/L Type : Pass NG , _____
- 2. B/L Color : Pass NG , _____
- 3. B/L Driving Voltage (Reference for LED Type) : Pass NG , _____
- 4. B/L Driving Current : Pass NG , _____
- 5. Brightness of B/L : Pass NG , _____
- 6. B/L Solder Method : Pass NG , _____
- 7. Others : Pass NG , _____

>> **Go to page 2** <<



Module Number : _____

5、Electronic Characteristics of Module :

- 1. Input Voltage : Pass NG , _____
- 2. Supply Current : Pass NG , _____
- 3. Driving Voltage for LCD : Pass NG , _____
- 4. Contrast for LCD : Pass NG , _____
- 5. B/L Driving Method : Pass NG , _____
- 6. Negative Voltage Output : Pass NG , _____
- 7. Interface Function : Pass NG , _____
- 8. LCD Uniformity : Pass NG , _____
- 9. ESD test : Pass NG , _____
- 10. Others : Pass NG , _____

6、Summary :

Sales signature : _____

Customer Signature : _____

Date : _____ / _____ / _____