



PALM TECHNOLOGY CO., LTD.

The LCD(M) Specialist

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FOR MESSRS. : _____

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ACCEPTED BY : _____ PROPOSED BY : _____

RECORD OF REVISION

DATE	PAGE	SUMMARY

◆ LCD MODULE PHYSICAL DATA

● General Description

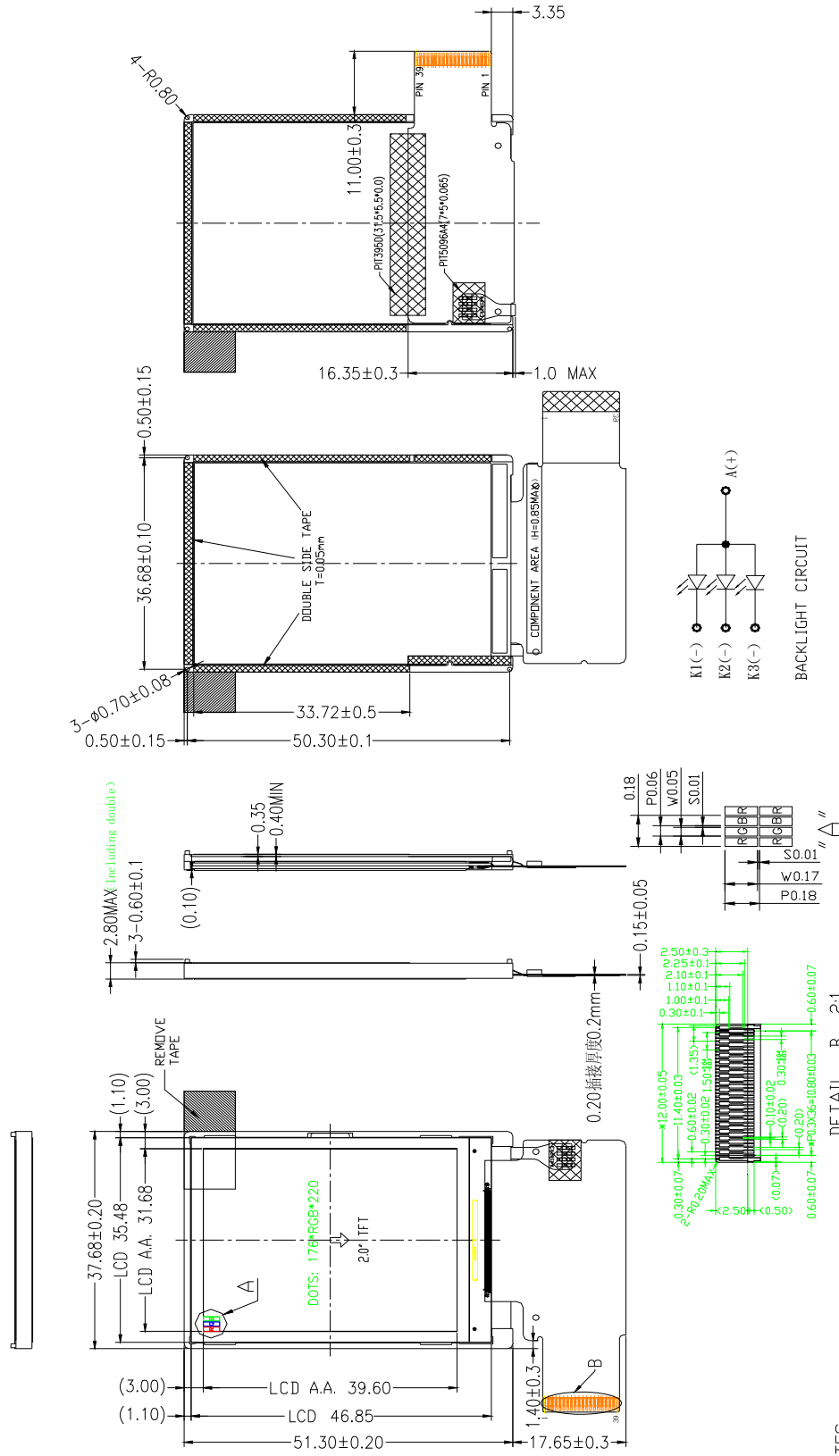
Display Type	262K TFT
Display Mode	POSITIVE
Viewing Direction	12'clock
Connection Type	COG
Operation temperature	-20°C ~70°C
Storage temperature	-30°C ~80°C
Driving IC	HX8340-B

● Mechanical Description

Item	Standard Value	Unit
Number of dots	176RGB×220dots	-
LCM dimension	37.68(W)×51.30(H)×2.80(T)	mm
LCD outline	35.48(W)×46.85(H)×1.35(T)	mm
Active area	31.68(W)×39.60(H)	mm
Dot size	0.17(W)×0.17 (H)	mm
Dot pitch	0.18(W)×0.18 (H)	mm
Backlight	3-CHIP-white LED Parallel	/

◆ EXTERNAL DIMENSIONS

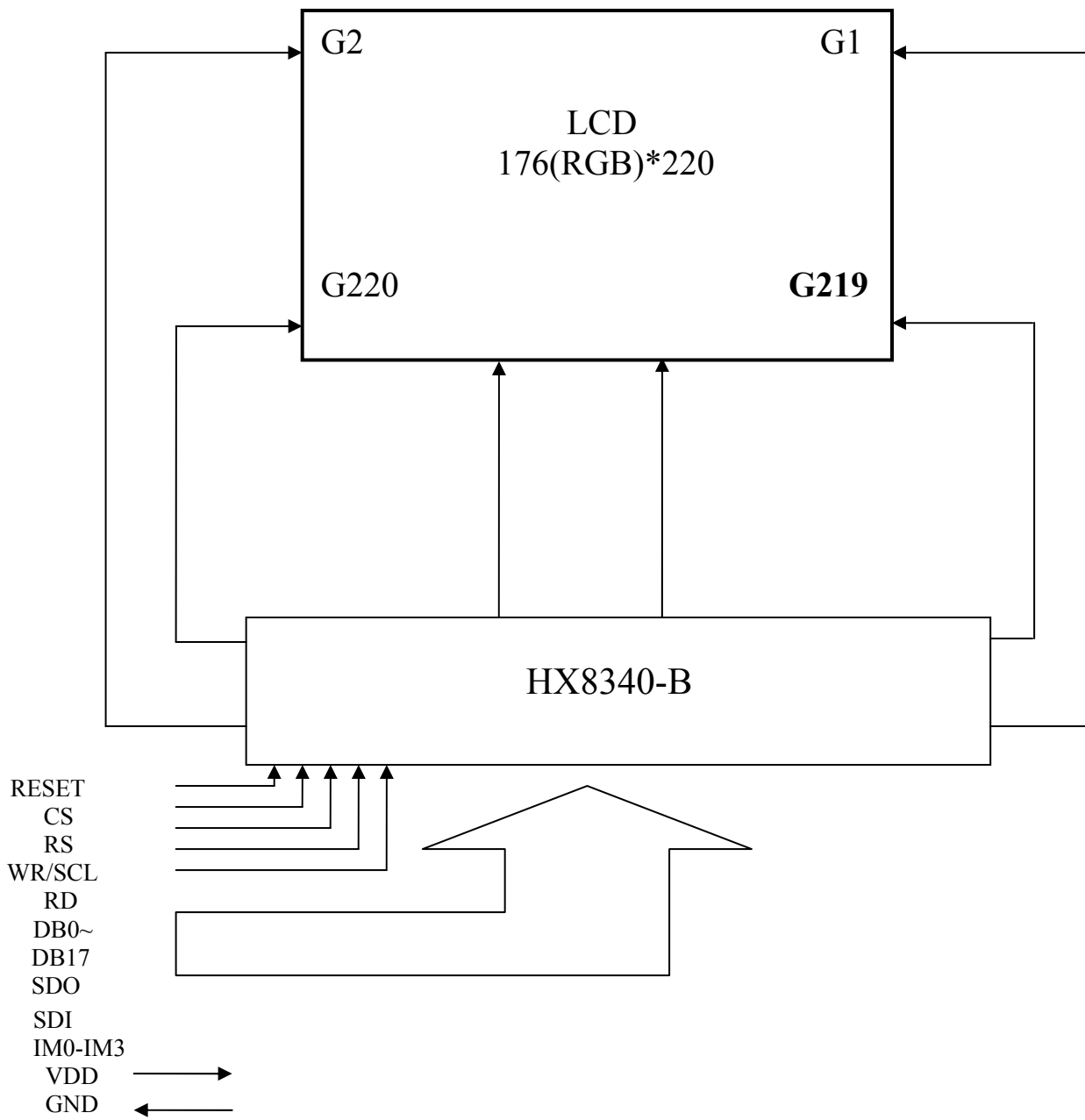
PIN	SYMBOL
1	GND
2	GND
3	DB17
4	DB16
5	DB15
6	DB14
7	DB13
8	DB12
9	DB11
10	DB10
11	DB9
12	DB8
13	DB7
14	DB6
15	DB5
16	DB4
17	DB3
18	DB2
19	DB1
20	DB0
21	GND
22	SDD
23	IM0
24	IM1
25	IM2
26	IM3
27	WR/SCL
28	RD
29	SDI
30	RESET
31	CS
32	RS
33	VDD
34	GND
35	A
36	K1
37	K2
38	K3
39	GND



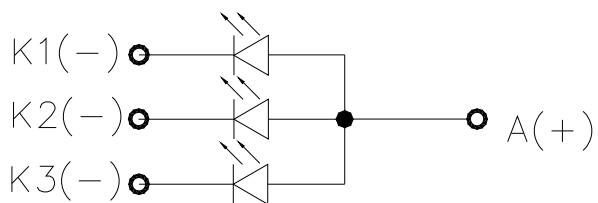
NOTES:

1. DISPLAY TYPE: TFT 262K COLOR
2. VIEWING DIRECTION: 12 O'CLOCK
3. FRONT POLARIZER: TRANSMISSIVE/POSITIVE
4. REAR POLARIZER: TRANSMISSIVE/POSITIVE
5. OPERATING TEMP: -20°C~70°C
6. STORAGE TEMP: -30°C~80°C
7. CONNECTOR: COG(C:HX8340-B)
8. "*" KEY DIMENSION
9. ALL MATERIALS MUST BE BHS-001 COMPLIANT

◆ **BLOCK DIAGRAM**



● **Black Light Unite**



◆ ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Rating	Unit
Operating temperature	Top	-20 to 70	°C
Storage temperature	Tst	-30 to 80	°C
Input voltage	Vin	-0.3 to VDD+0.5	V
Supply voltage for logic	VDD	-0.3 to +4.2	V
Supply voltage for LCD	VGH-VSSA	9 to 15.3	V

NOTE:

1. If the module is used above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2. VDD>GND must be maintained.

◆ ELECTRICAL CHARACTERISTICS

● DC Characteristics

$V_{SS} = 0V, T_a = 25^\circ C$

Item	Symbol	Condition	Min	Typ	Max	Unit
Input high voltage	V_{IH}	-	$0.7IOVCC$	-	$IOVCC$	V
Input low voltage	V_{IL}	-	V_{SS}	-	$0.3IOVCC$	V
Supply voltage for logic	$V_{DD}-V_{SS}$	$T_a=25^\circ C$	-	2.8	-	V
Operating voltage for LCD	V_{gh}	$T_a=25^\circ C$	-	-	15.3	V
Current consumption for LCD normal operation	I_{DD}	$V_{DD} = 2.8V$	-	-	3	mA

● Back-Light unit

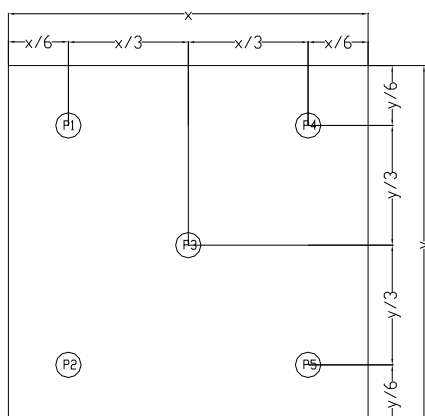
Item	Symbol	Min	Typ	Max	Unit	Remark
Current	I_{BL}	-	20	-	mA	1LED
CIE	X	0.25	-	0.29	-	X>Y
	Y	0.24	-	0.28	-	
Brightness	-	3000	-	3800	cd/m ²	-
Luminance Uniformity Ratio	-	80	-	-	%	-

Note:

1. Average Luminous Intensity of P1 ~ P5 (Using a luminance meter BM-7)

2. Luminous Intensity Ratio = min/max * 100%

Measured Method (X*Y: Light Area).



● AC Characteristics

Refer to the SPEC of HX8340-B

◆ INTERFACE PIN CONNECTIONS

NO.	Symbol	Function
1	GND	Ground
2	GND	
3	DB17	18-bit data bus
4	DB16	
5	DB15	
6	DB14	
7	DB13	
8	DB12	
9	DB11	
10	DB10	
11	DB9	
12	DB8	
13	DB7	
14	DB6	
15	DB5	
16	DB4	
17	DB3	
18	DB2	
19	DB1	
20	DB0	
21	GND	Ground
22	SDO	Serial data output pin in serial bus system interface.
23	IM0	System interface select pin.
24	IM1	System interface select pin.
25	IM2	System interface select pin.
26	IM3	System interface select pin.
27	WR/SCL	(NWR)Write enable pin I80 parallel bus system interface. (SCL) server as serial data clock in serial bus system interface.
28	RD	Read signal
29	SDI	Serial data input pin in serial bus system interface.
30	RESET	Reset signal
31	CS	Chip select pin
32	RS	Register select pin
33	VDD	Power supply
34	GND	Ground
35	A	Backlight positive
36	K1	Backlight negative
37	K2	
38	K3	
39	GND	Ground

◆ Recommend Initial Code

```
void init()
```

```
{  
    res=0;  
    delay(20);  
    res=1;  
    delay(20);//10ms  
  
/*Power voltage setting*/  
write_init(0x1f,0x02); //power control 7 set VREG1 voltage  
write_init(0x20,0x00); //power control 8  
write_init(0x24,0x53); //32 1c VCOMH//49  
write_init(0x25,0x34); //34 VCOML  
write_init(0x23,0x15); //17 15 3C VCOM offset//30  
  
/*Power on setting*/  
write_init(0x18,0x44);  
write_init(0x21,0x01);  
write_init(0x01,0x00);  
  
write_init(0x16,0x08);  
write_init(0x17,0x05);  
  
write_init(0x1c,0x03);  
write_init(0x19,0x06);  
delay(5);  
/* Driving ability setting*/  
write_init(0x60,0x00);  
write_init(0x61,0x06);  
write_init(0x62,0x00);  
write_init(0x63,0xC8);  
  
/*Gamma setting*/  
write_init(0x40,0x70);  
write_init(0x41,0x51);  
write_init(0x42,0x36);  
write_init(0x43,0x04);  
write_init(0x44,0x3b);  
write_init(0x45,0x0e);  
write_init(0x46,0x01);  
write_init(0x47,0x1d);  
write_init(0x48,0x09);  
write_init(0x50,0x72);  
write_init(0x51,0x20);  
write_init(0x52,0x60);  
write_init(0x53,0x01);  
write_init(0x54,0x33);  
write_init(0x55,0x0e);  
write_init(0x56,0x02);  
write_init(0x57,0x73);  
  
/*Set GRAM area*/
```

```
write_init(0x02,0x00);
write_init(0x03,0x00);
write_init(0x04,0x00);
write_init(0x05,0xaf);
write_init(0x06,0x00);
write_init(0x07,0x00);
write_init(0x08,0x00);
write_init(0x09,0xdb);
```

```
/*Display on setting*/
write_init(0x26,0x84);
delay(40);
write_init(0x26,0xb8);
delay(40);
write_init(0x26,0xbc);
```

```
write_command(0x22);
}
```

//Sleep In Code

```
void sleep_in()
{
write_command(0x26);
write_data(0x00,0xb8);
delay(50);

write_command(0x19);
write_data(0x00,0x01);
delay(50);

write_command(0x26);
write_data(0x00,0xa4);
delay(50);

write_command(0x26);
write_data(0x00,0x84);
delay(50);

write_command(0x1c);
write_data(0x00,0x00);

write_command(0x01);
write_data(0x00,0x02);

write_command(0x21);
write_data(0x00,0x00);
delay(20);

}
```

//Sleep Out Code

```
void sleep_out()
{
write_command(0x18);
write_data(0x00,0x44);

write_command(0x21);
write_data(0x00,0x01);

write_command(0x01);
write_data(0x00,0x00);

write_command(0x1c);
write_data(0x00,0x03);

write_command(0x19);
write_data(0x00,0x06);
delay(5);

write_command(0x26);
write_data(0x00,0x84);
delay(40);

write_command(0x26);
write_data(0x00,0xb8);
delay(40);

write_command(0x26);
write_data(0x00,0xbc);

write_command(0x22);
}
```

◆ ELECTRO-OPTICAL CHARACTERISTICS

Driving condition: VDD= 2.8V, I_{BL}=20mA/LED, Temperature =23°C±5°C , Humidity=60%±20%RH

Item	Light angle (°)	Temp (°C)	Symbol	Specifications			Unit	Conditions	Note		
				Min.	Typ.	Max.					
Transmissive	0	25	-	-	6.3	-	%	(Equipment :BM-7/CS-200)	(1)		
Contrast ratio	0	25	Cr	150	250	-	-		(2)		
Brightness	0	25	-	-	TBD	-	-		-		
Luminance uniformity (surface within panel)	0	25	Lu	70	80	-	%		(3)		
Cross talk	0	25	CTV	-	-	20	%		(4)		
Chromaticity	R x	0	25	Rx	-	TBD	-	-	-		
	R y			Ry	-	TBD	-				
	G x			Gx	-	TBD	-				
	G y			Gy	-	TBD	-				
	B x			Bx	-	TBD	-				
	B y			By	-	TBD	-				
	W x			Wx	-	TBD	-				
	W y			Wy	-	TBD	-				
Color Reproduction Area(NTSC)		0	25	-	-	TBD	-	%	CIE1931(x,y)	(5)	
Response time	Tr	0	25	-	-	15	30	ms	Viewing normal angle $\theta_x = \theta_y = 0^0$	-	
	Tf				-	35	50				
Viewing angle	Hor.	0	25	-	θ_{x+}	50	60	-	deg	Center CR≥10	-
					θ_{x-}	50	60	-			
	Ver.				θ_{y+}	35	45	-			
					θ_{y-}	25	35	-			

Note:

(1). Transmittance

Introduction

Transmittance (diffuse transmission factor) is a measure for the LCD panel transparency. The Light Source for this measurement is the accompanying LCD-module backlight system (LEDs, Lightguide...)

Measurement conditions:

Measuring Equipment	BM-7/CS-200
Measurement Point Diameter	3mm
Measurement Point Location	Active Area Center Point
Light source	LCD module backlight
Reflectance Plate	Reflectance Standard(cal. plate)
Test pattern	All pixels white
Contrast setting	Maximum

Measuring procedure:

Transmittance:

The light source is located at the backside of the panel.

- 1、 Measure the light source
- 2、 Place the LCD panel in front of the light source. Measure the luminance on the LCD panel surface

Definitions

$$\tau = \frac{Lv_{LCD-panel}}{Lv_{lightsource}} * 100\%$$

- (2) Definition of Contrast Ratio (C/R): Ratio of gray max (Gmax) & gray min (Gmin) at the center point.

$$CR = \frac{G(Max)}{G(Min)}$$

Where

Gmax: Luminance with all pixels white

Gmin: Luminance with all pixels black

- (3). Surface luminance uniformity within panel

Measurement conditions:

Measuring Equipment	CS200 // BM-7
Measurement Point Diameter	3mm // 1mm
Measurement Point Location	Active Area
Light Source	Transmissive Mode: Internal (Backlight)
Test pattern	White

Measuring procedure:

Measure the luminance L_i with the points in figure 1.

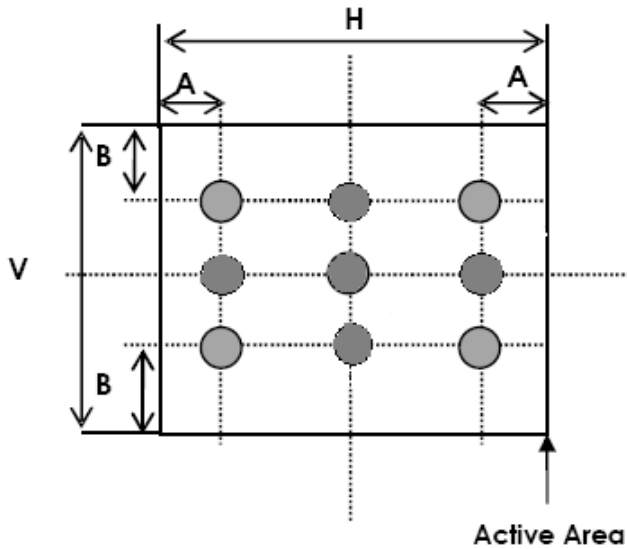


Figure 1

A: 5 mm B: 5 mm
H, V: Active Area

Uniformity value (L_u):

$$L_u = \frac{\min(L_i)}{\max(L_i)} * 100\%$$

(4). CROSS-TALK

Introduction:

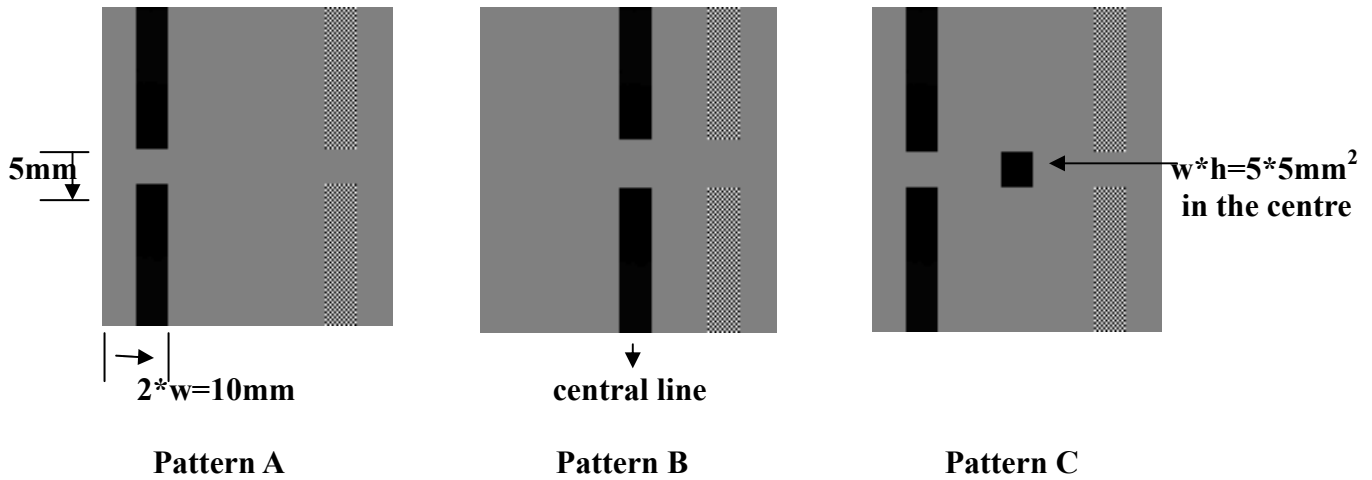
Crosstalk is an effect where the contrast of a display pixel is influenced by the state of the related pixels. A measure for this effect is the Cross Talk Value (CTV)

Measurement conditions:

Measuring Equipment	CS200 // BM-7
Measurement Point Diameter	3mm // 1mm
Measurement Point Location	
Light Source	Transmissive Mode: Internal (Backlight)
Contrast setting	Maximum

● Test Pattern (valid for all greyscales):

W: The width of the rectangle in the following pictures;



● Definitions:

Cross Talk Value:

$$CTV = |L_{vA} - L_{vB}| / L_{vA} * 100\%$$

Where:

L_{vA}: Luminance measured with the centre test point of pattern A

L_{vB}: Luminance measured with the centre test point of pattern B.

● Measuring procedure:

Adaptation of the display to the highest contrast ratio (CR = L_{vA}/L_{vC}) as defined by the test patterns and a test area of 14 x 14 dots.

Measurement of Luminance with test point A, B.

Determination of Crosstalk value (CTV)

(5). NTSC

Measurement conditions:

Measuring Equipment	LCD-5200
Measuring Point Diameter	3mm//1mm
Measuring point location	Active Area center point
Light source	Transmissive Mode: internal(Backlight)
Test pattern	All Pixels White Red.Green.Blue.White: Maximum colour saturation (maximum gradation level)
Contrast setting	Maximum

Definitions

Panel colour coordinates according the CIE colour system (CIE 1931). In general, It is always requested to measure the X, Y and Z values.

Here u' , v' and L^* are according CIE 1931:

$$x' = \frac{4 \cdot X}{X + 15 \cdot Y + 3 \cdot Z}$$

$$y' = \frac{9 \cdot Y}{X + 15 \cdot Y + 3 \cdot Z}$$

$$L^* = 116 \cdot \left(\frac{Y}{Y_n} \right)^{1/3} - 16$$

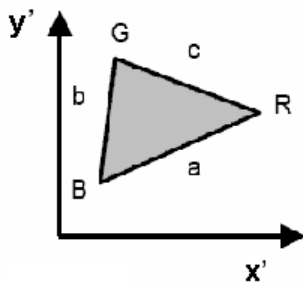
Colour distance definition (maximum allowed colour distance to specified typical colour coordinate):

$$\Delta x' y' = \sqrt{\Delta x'^2 + \Delta y'^2}$$

Where:

$$\Delta x' = \text{Max} \left\{ \left| x'_{typ} - x'_{max} \right|, \left| x'_{typ} - x'_{min} \right| \right\}$$

$$\Delta y' = \text{Max} \left\{ \left| y'_{typ} - y'_{max} \right|, \left| y'_{typ} - y'_{min} \right| \right\}$$



Color Gamut definition:

$$F = \sqrt{s(s-a)(s-b)(s-c)} * 1000$$

Where

$$s = \frac{(a + b + c)}{2}$$

$$a = \sqrt{(x'_{blue} - x'_{red})^2 + (y'_{blue} - y'_{red})^2}$$

$$b = \sqrt{(x'_{blue} - x'_{green})^2 + (y'_{blue} - y'_{green})^2}$$

$$c = \sqrt{(x'_{red} - x'_{green})^2 + (y'_{red} - y'_{green})^2}$$

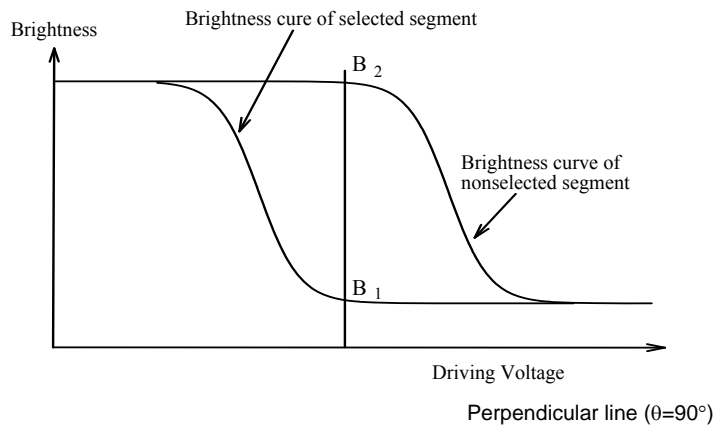
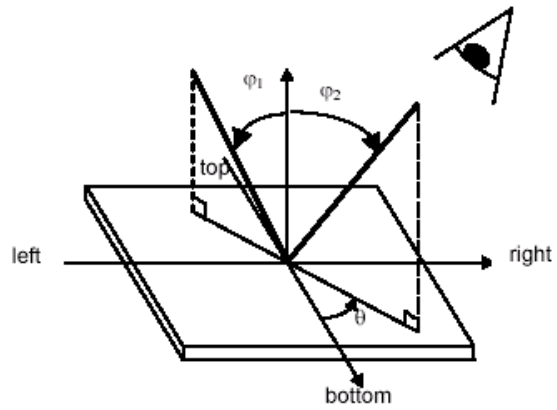
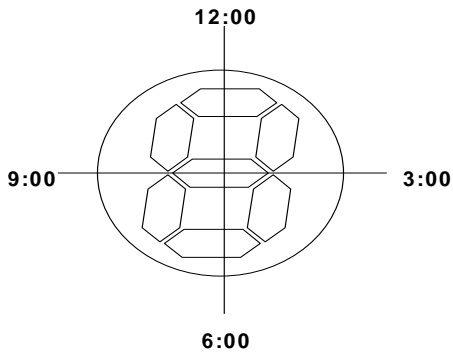
Color Gamut Ratio (NTSC) related to NTSC':

NTSC: =F (display)/F (NTSC')

NTSC' primaries:

	x'	y'
Red	0.67	0.33
Green	0.21	0.71
Blue	0.14	0.08

F (NTSC') =74.42



◆ SPECIFICATION OF QUALITY ASSURANCE

● Summary

The customer should check and accept the products of Palm Tech within one month after reception. This standard for quality assurance should affirm the quality of LCD products to supply to purchaser by Palm Technology Co., Ltd. Entire process is controlled according to ISO9001.

● Warranty period

Warranty period of this product is 12 months from manufacture code.

● Standard for quality test

- 1、 Inspection
Before delivering, the supplier should take the following test, and confirm the quality of product.
- 2、 Electro-Optical Characteristics
According to the individual specification to test the product.
- 3、 Test of Appearance Characteristics:
According to the individual specification to test the product.
- 4、 Test of Reliability Characteristics
According to the definition of reliability on specification for test product.
- 5、 Delivery Test
Before delivering, the supplier should take the delivery test
- 6、 Sampling Method: GB/T2828.1-2003, Level II
- 7、 The defects classify of AQL as following
Major defect : AQL=0.65
Minor defect:: AQL= 1.5

● Nonconforming Analysis & Deal With Manners

- ◇ Nonconforming Analysis
 - 1、 Purchaser should supply the detail data of nonconforming sample and the non-suitable state.
 - 2、 After accepting the detail data from purchaser ,the analysis of nonconforming should be finished in two weeks.
 - 3、 If supplier can not finish analysis on time ,must announce purchaser before two weeks.
- ◇ Disposition of nonconforming
 - 1、 If find any supplier defect during assembly line, supplier must change the good product for every defect after recognition.
 - 2、 Both supplier and customer should analysis the reason and discuss the disposition of nonconforming when the reason of nonconforming is not sure.

● Agreement items.

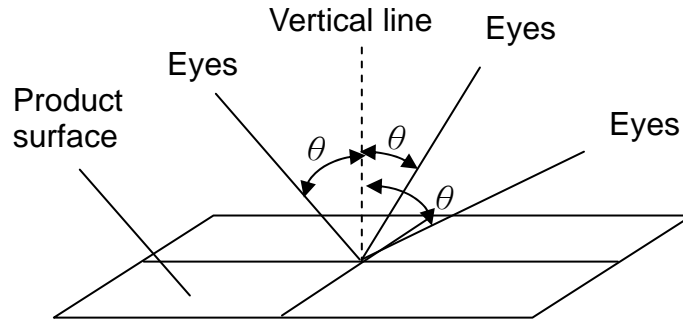
Both sides should discuss together when the following problems happen:

- 1、 There is any problem of standard of quality assurance, and both sides think that must be modifier.
- 2、 There is any argument item which does not record in the quality assurance.
- 3、 Any other special problem.

● **Standard of the Product Appearance Test**

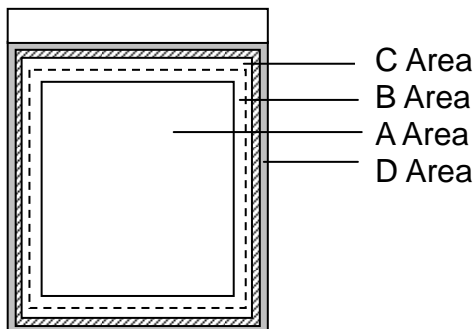
■ **Manner of appearance test**

- 1、 The test must be under 20W*2 or 40W fluorescent light ,and the distance of view must be at 30±5 cm;
- 2、 When test the model of Transmissive product must add the reflective plate.
- 3、 The test direction is base on about around 30 degree(within θ range)of vertical line, and the test time is below 5s.



4、 **Definition of Area:**

- A Area: Active area
- B Area: Viewing area
- C Area: Out of viewing area
- D Area: Seal area



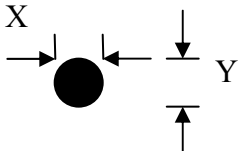
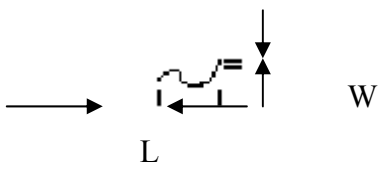
Note:

- A: Active Area is drawn in the drawing
- B: Viewing Area border is 2mm from Active Area border

■ **Basic principle:**

- 1、 It will accord to the AQL when the standard can not be described.
- 2、 The sample of the lowest acceptable quality level must be discussed by both supplier and customer when any dispute happened.
- 3、 Must add new item on time when it is necessary.

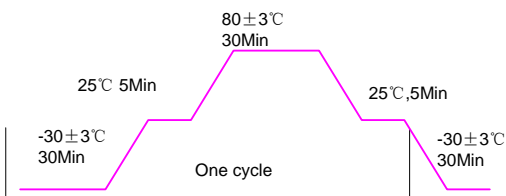
■ Inspection specification

NO	Item	Criterion	AQL																			
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 1.7 Contrast defect	0.65																			
02	LCM black spots, white spots, bright spots, contamination, (display/non-display)	As following drawing $\Phi=(x+y)/2$  <table border="1"> <thead> <tr> <th></th> <th>Size</th> <th>Acceptable QTY</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Common dots defect</td> <td>$\Phi \leq 0.15$</td> <td>Ignore</td> <td>/</td> </tr> <tr> <td>$0.15 < \Phi \leq 0.25$</td> <td>2</td> <td>more than 5mm between two defects</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.3$</td> <td>1</td> <td>/</td> </tr> <tr> <td>$0.3 < \Phi$</td> <td>0</td> <td>/</td> </tr> </tbody> </table>		Size	Acceptable QTY	Remark	Common dots defect	$\Phi \leq 0.15$	Ignore	/	$0.15 < \Phi \leq 0.25$	2	more than 5mm between two defects	$0.25 < \Phi \leq 0.3$	1	/	$0.3 < \Phi$	0	/	1.5		
	Size	Acceptable QTY	Remark																			
Common dots defect	$\Phi \leq 0.15$	Ignore	/																			
	$0.15 < \Phi \leq 0.25$	2	more than 5mm between two defects																			
	$0.25 < \Phi \leq 0.3$	1	/																			
	$0.3 < \Phi$	0	/																			
03	Scratches, line type contamination (display/non-display)	As following drawing  <table border="1"> <thead> <tr> <th>Length</th> <th>Width</th> <th>Acceptable QTY</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>---</td> <td>$W \leq 0.03$</td> <td>Ignore</td> <td>/</td> </tr> <tr> <td>$L \leq 3.5$</td> <td>$0.03 < W \leq 0.05$</td> <td>3</td> <td rowspan="2">More than 5mm between two defects</td> </tr> <tr> <td>$L \leq 3$</td> <td>$0.05 < W \leq 0.08$</td> <td>3</td> </tr> <tr> <td>---</td> <td>$0.08 < W$</td> <td>0</td> <td>/</td> </tr> </tbody> </table>	Length	Width	Acceptable QTY	Remark	---	$W \leq 0.03$	Ignore	/	$L \leq 3.5$	$0.03 < W \leq 0.05$	3	More than 5mm between two defects	$L \leq 3$	$0.05 < W \leq 0.08$	3	---	$0.08 < W$	0	/	
Length	Width	Acceptable QTY	Remark																			
---	$W \leq 0.03$	Ignore	/																			
$L \leq 3.5$	$0.03 < W \leq 0.05$	3	More than 5mm between two defects																			
$L \leq 3$	$0.05 < W \leq 0.08$	3																				
---	$0.08 < W$	0	/																			

04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction.			1.5
		Size	Acceptable QTY	Remark	
		$\Phi \leq 0.5$	ignore	/	
		$0.5 < \Phi \leq 1.0$	2	More than 5mm between two defects	
		$1.0 < \Phi$	0	/	
05	Backlight elements	5.1 Illumination source flickers when lit.			0.65
		5.2 Spots or scratches that appear when lit must be judged using LCD spot, lines and contamination standards.			1.5
		5.3 Backlight doesn't light or color is wrong			0.65
06	Soldering	6.1 No unmelted solder paste may be present on the PCB.			0.65
		6.2 No cold solder joints, missing solder connections, oxidation or icicle.			0.65
		6.3 No residue or solder balls on PCB.			1.5
		6.4 No short circuits in components on PCB.			0.65
07	General appearance	7.1 No oxidation, contamination, curves or, bends on interface pin (OLB) of FPC			1.5
		7.2 No cracks on interface pin(OLB) of FPC			0.65
		7.3 NO contamination, solder residue or solder balls on product.			1.5
		7.4 The IC on the FPC may not be damaged, circuits.			
		7.5 The residual rosin or tin oil of soldering (component or chip component) is not burned into brown or black color.			0.65
		7.6 Sealant on top of the ITO circuit has not hardened			1.5
		7.7 Pin type must match type in specification sheet.			
		7.8 LCD pin loose or missing pins.			1.5
		7.9 Product packaging must the same as specified on packaging specification sheet.			1.5
		7.10 Product dimension and structure must conform to product specification sheet.			0.65
				1.5	

◆ RELIABILITY

1. Environmental Test

No	Test Item	Test Condition& Criteria	Sample Size	Determinant Stand.
1-1	High Temperature Operation	Temperature: $70 \pm 3^\circ\text{C}$; Humidity: Except; Test method: Operation Duration: 96Hrs	Sample Do: $\geq 2\text{PCS}$ On Going: $\geq 3\text{PCS}/\text{LOT}$	TS
1-2	Low temperature Operation	Temperature: $-20 \pm 3^\circ\text{C}$; Humidity: Except; Test method: Operation Duration: 96Hrs	Sample Do: $\geq 2\text{PCS}$ On Going: $\geq 3\text{PCS}/\text{LOT}$	TS
1-3	High Temperature / High Humidity Operation	Temperature: $60 \pm 3^\circ\text{C}$; Humidity: $95\% \pm 3\% \text{RH}$; Test method: Operation Duration: 96Hrs	Sample Do: $\geq 2\text{PCS}$ On Going: $\geq 3\text{PCS}/\text{LOT}$	TS
1-4	Temperature Shock	Shock Temperature & Time:  Duration: 20cycle	Sample Do: $\geq 2\text{PCS}$ On Going: $\geq 3\text{PCS}/\text{LOT}$	TS
1-5	Temperature Cycle	Normal temperature 2H \rightarrow $-30 \pm 3^\circ\text{C}$, 10H(3H) \rightarrow $60 \pm 3^\circ\text{C}$, $90 \pm 3\% \text{RH}$ 10H(3H) \rightarrow $80 \pm 3^\circ\text{C}$, 10H(2H) \rightarrow (25°C) 5 cycles	Sample Do: $\geq 2\text{PCS}$ On Going: $\geq 3\text{PCS}/\text{LOT}$	TS

Item	FAULT JUDGMENT CRITERIA
TS	1. No clearly visible defects or deterioration of display quality allowed. 2. No function – related abnormalities.

NOTE:

- When temperature moves, LCD's valve voltage will be influenced by it, which leads to LCD's contrast and chroma change.
- In high temperature operation and storage tests in MQE test will make LCD's power consumption increase. The reason is that a few crystal molecules are apart because of high temperature when there is a long time storage and operation in high temperature, which leads to decrease of gross resistance ratio of crystal molecules. Hence, LCD's power consumption go up than that of before test.

2. Mechanical Reliability Test

No.	Test Item	Test Condition& Criteria	Sample Size	Determinant Spec.
2-1	ESD test	Discharge modality: Contact voltage:±1KV、 ±2KV; Air voltage: ±2KV、 ±4KV、 ±6KV; (Discharge R=330Ω;C=150PF)	2PCS	No software error

3. Soldering

- (1) Soldering temperature: 340+/-10°C.
- (2) Available times for repeated soldering: 5 times
- (3) Attentions paid when soldering:
 - A. FPC's golden finger and soldering pad are butt-jointed before soldered. Tolerance is within the 1/3 width of golden finger and 0.5~1mm of FPC's length is allowed to be exposed in the jointed soldering pad.
 - B. Coat proper tin in the iron-head when soldering, with dragging speed of 2.5cm/sec.
 - C. The soldering part is warmed up first with iron-head when there is a rework. Then heat it up from one side until tin is melted, last, take off FPC.

4. FPC cable flexing and bending test

- Number of Bending / Flexing Cycles: <10 times
Radius of the Bend Mandrels: >0.4 mm
Degree of Bend: <180°

◆ SUGGESTIONS FOR USING LCD MODULES

● Handling of LCM

- (1) The LCD screen is made of glass. Don't give excessive external shock, or drop from a high place.
- (2) If the LCD screen is damaged and the liquid crystal leaks out, do not lick and swallow. When the liquid is attach to your hand, skin, cloth etc, wash it off by using soap and water thoroughly and immediately.
- (3) Don't apply excessive force on the surface of the LCM.
- (4) If the surface is contaminated, clean it with soft cloth. If the LCM is severely contaminated, use Isopropyl alcohol/Ethyl alcohol to clean. Other solvents may damage the polarizer. The following solvents are especially prohibited: water, ketone Aromatic solvents etc.
- (5) Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.
- (6) Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.
- (7) Don't disassemble the LCM.
- (8) To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.
 - Be sure to ground the body when handling the LCD modules.
 - Tools required for assembling, such as soldering irons, must be properly grounded.
 - To reduce the amount of static electricity generated, do not conduct assembling and other work under dry conditions.
 - The LCD module is coated with a film to protect the display surface. Exercise care when peeling off this protective film since static electricity may be generated.
- (9) Do not alter, modify or change the shape of the tab on the metal frame.
- (10) Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
- (11) Do not damage or modify the pattern writing on the printed circuit board.
- (12) Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector
- (13) Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
- (14) Do not drop, bend or twist LCM.

Storage

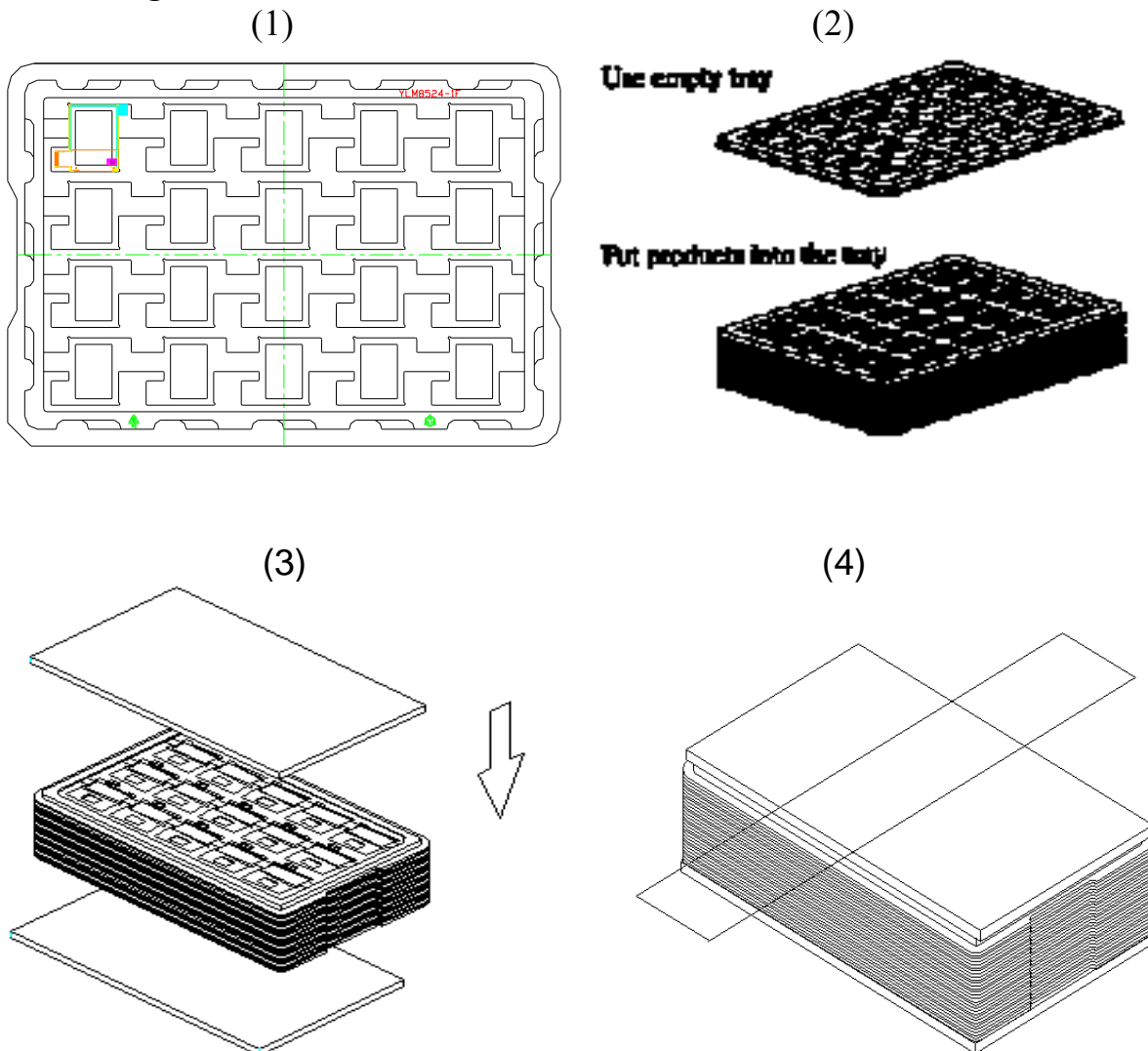
- (1) Store in an ambient temperature of 5 to 45 °C, and in a relative humidity of 40% to 60%. Don't expose to sunlight or fluorescent light.
- (2) Storage in a clean environment, free from dust, active gas, and solvent.
- (3) Store in antistatic container.

◆ PACKING

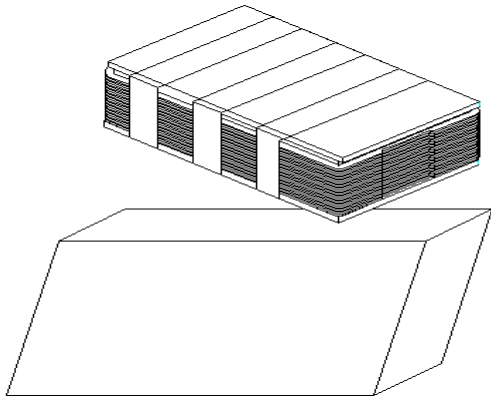
● Packing Materials

NO.	ITEM	Dimension(LXWXH) (mm)	Quantity
1	Tray	424X295X12	TBD
2	Carton	437X307X163	TBD

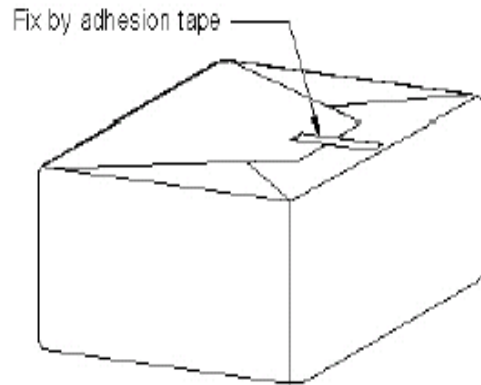
● Packing Method



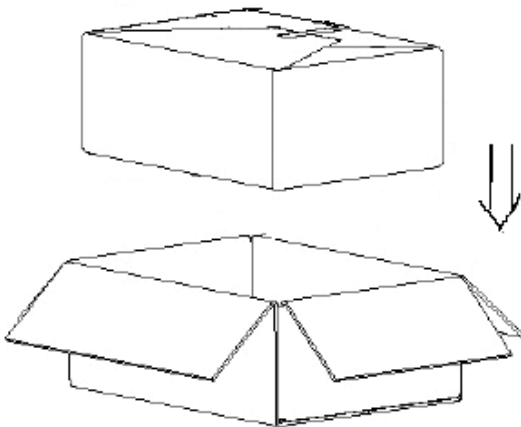
(5)



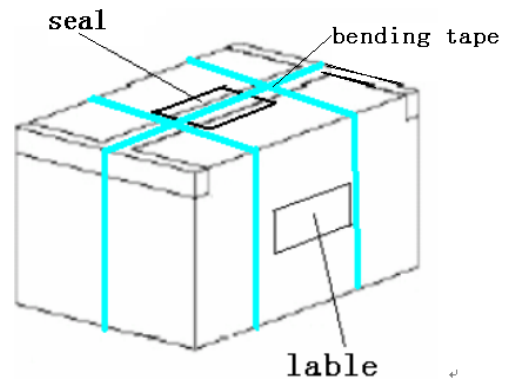
(6)



(7)



(8)



- (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 and 4 pcs desiccant into the LDPE bag
- (6). Fix the LDPE bag with adhesive tape:
- (7). Put LDPE bag with tray stack into carton.:
- (8). Carton sealing with adhesive tape.