POWERTIP TECH. CORP.

SPECIFICATIONS

CUSTOMER	:	PTC
SAMPLE CODE	:	SH240320T075-ZEA04
MASS PRODUCTION CODE	:	PH240320T075-ZEA04
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	002
DRAWING NO. (Ver.)	:	JLMD-PH240320T075-ZEA04_001
PACKAGING NO. (Ver.)	:	JPKG-PH240320T075-ZEA04_001

Customer Approved

Date:

POWERTIP
2023.08.10
JS RD APPROVED

Approved	Checked	Designer
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□ Preliminary specification for design input

■ Specification for sample approval

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History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
07/10/2023	01	001	Preliminary.	-	王琦
08/04/2023	01	002	First Sample	-	王琦

Total: 29 Pages

Contents

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	240 * 3 (RGB) * 320 Dots
LCD Type	Full Viewing Angle , Normally Black , Transmissive type
Screen size(inch)	2.8 inch
Color configuration	RGB-Strip
Interface	16-bits 8080 Interface
Other(controller/driver IC)	ST7789T3-G4-1 (Or Compatible IC)
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website: http://www.powertip.com.tw/news_detail.php?Key=1&cID=1

Note : For detailed information please refer to IC data sheet :

Primacy(TFT LCD): Sitrnox ST7789T3-G4-1 (Or Compatible IC)

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	50.0(W) *69.2 (L) *2.45(H)	mm

LCD Panel

Item	Standard Value	Unit
Active Area	43.2(W) *57.6 (L)	mm
Pixel Size	0.18(W) *0.18 (H)	mm

Note : For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
System Power Supply Voltage	VCC	GND=0	-0.3	4.6	V
Operating Temperature	T_{OP} (Ts)	Note 1	-20	70	°C
Storage Temperature	T_{ST} (Ta)	Note 2	-30	80	°C
Storage Humidity	H_D	Ta ≦ 60 °C	10	90	%RH

The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

Note 1：Ts is the temperature of panel’ s surface.
Note 2：Ta is the ambient temperature of samples.

1.4 DC Electrical Characteristics

GND = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	VCC	-	2.4	2.8	3.3	V
Input H/L Level Voltage	VIH	-	0.7VCC	-	VCC	V
	VIL	-	GND	-	0.3VCC	V
Supply Current	I_{dd}	VCC =2.8 V	-	10	15	mA

1.5 Optical Characteristics

VCC=2.8V, Ta=25°C

Item	Symbol		Condition	Min.	Typ.	Max.	unit	
Response time	Tr+Tf		Ta = 25°C θX, θY = 0°	-	40	60	ms	Note 2
Viewing angle	Top	θY+	CR ≥ 10	-	80	-	Deg.	Note 4
	Bottom	θY-		-	80	-		
	Left	θX-		-	80	-		
	Right	θX+		-	80	-		
Contrast ratio		CR	Ta = 25°C θX , θY = 0°	650	800	-		Note 3
Color of CIE Coordinate	White	X		0.22	0.27	0.32	-	Note1
		Y		0.25	0.30	0.35		
	Red	X		0.59	0.64	0.69		
		Y		0.28	0.33	0.38		
	Green	X		0.25	0.30	0.35		
		Y		0.58	0.63	0.68		
	Blue	X		0.10	0.15	0.20		
		Y		0.00	0.05	0.10		
Average Brightness (With LCD)*1	IF		IF= 80 mA	300	350	-	cd/m^2	Note1
Uniformity (With LCD)*2	ΔB		IF=80 mA	70	-	-	%	Note1

Note 1:

*1：△B=B(min) / B(max) * 100%

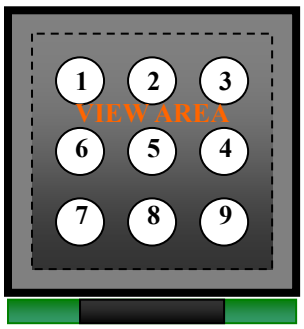
*2：Measurement Condition for Optical Characteristics:

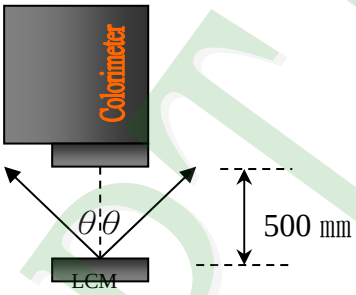
a：Environment: 25℃±5℃ / 60±20%R.H，no wind，dark room below 10 Lux at typical lamp current and typical operating frequency.

b：Measurement Distance: 500 ± 50 ㎜ ，(θ= 0°)

c：Equipment: TOPCON BM-7 fast，(field 1°)，after 10 minutes operation.

d：The uncertainty of the C.I.E coordinate measurement ±0.01，Average Brightness ± 4%





Colorimeter=BM-7 fast

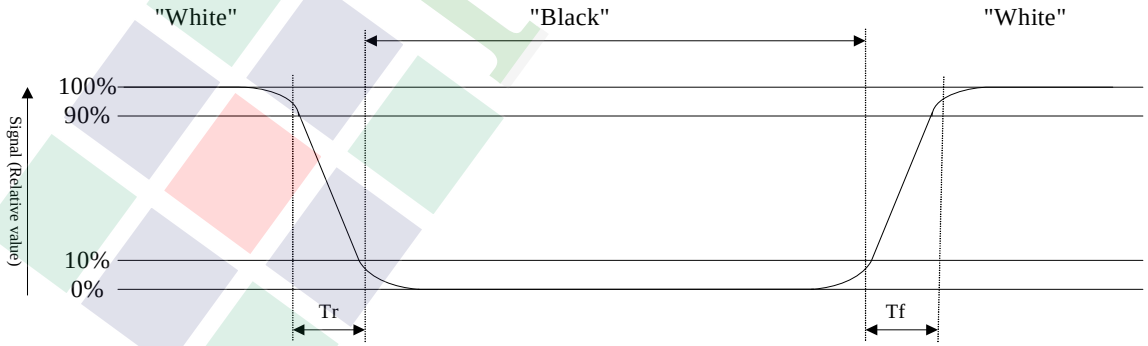
To be measured at the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-7, after 10 minutes operation (module)

Note2: Definition of response time:

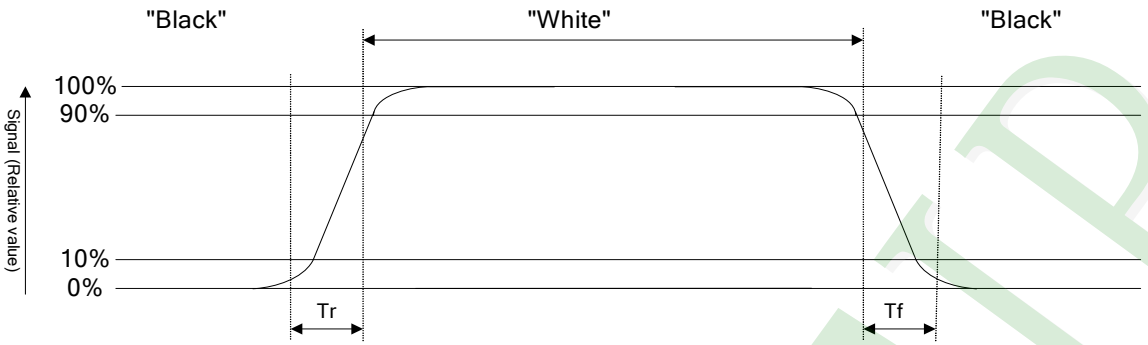
The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



Normally Black



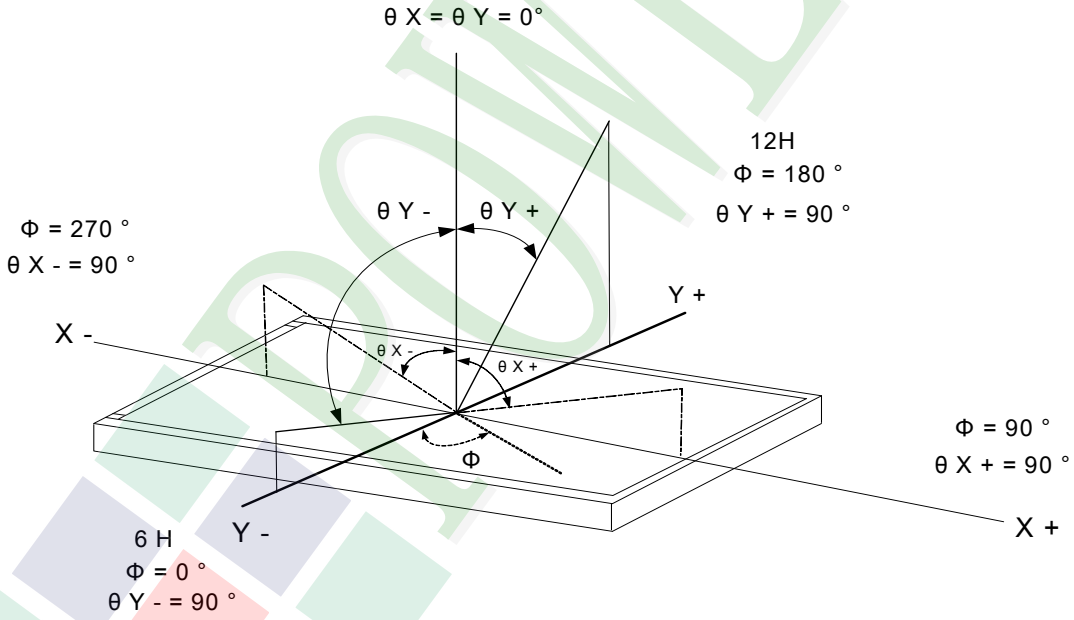
Note3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at “White” state}}{\text{Photo detector output when LCD is at “Black” state}}$$

Note4: Definition of viewing angle:

Refer to figure as below:



1.6 Backlight Unit Characteristics

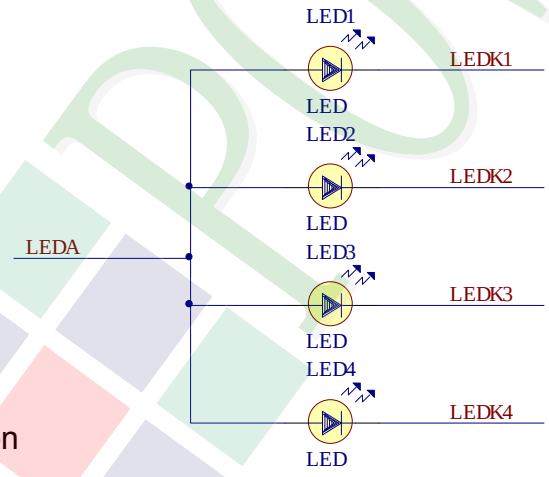
Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
LED Forward Current	IF	Ta =25℃	-	30/Per LED	mA
LED Reverse Voltage	VR		-	5	V
Power consumption	Pd			288	mW

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	If= 80mA	2.8	3.2	3.6	
Average Brightness (Without LCD)	IV		8500	10000	-	cd/m^2
CIE Color Coordinate (Without LCD)	X		0.26	0.28	0.33	-
	Y		0.26	0.28	0.33	
Color	White					

B/L Internal Circuit Diagram:



Other Description

Item	Conditions	Description
Life Time	Ta =25℃ IF= 80mA	50,000 hrs

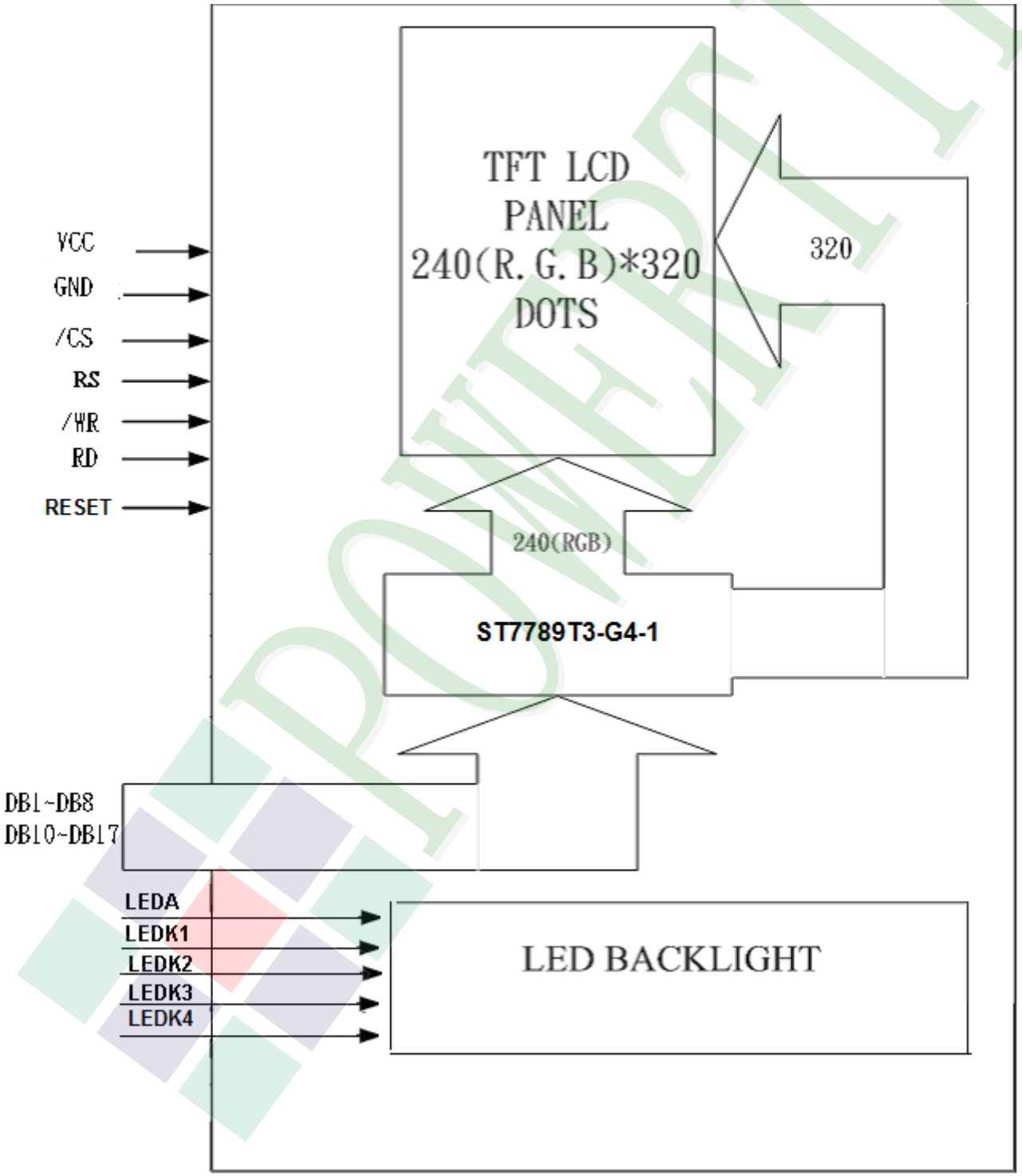
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

Pin No.	Symbol	Function
1	DB1	Bi-directional data bus
2	DB2	Bi-directional data bus
3	DB3	Bi-directional data bus
4	DB4	Bi-directional data bus
5	GND	Signal ground.(0V)
6	VCC	Power supply for the internal logic circuit
7	/CS	Chip select signal , Active at ”L”
8	RS	When RS = 0: Command. When RS = 1: Display data
9	/WR	Write signal input，active at Low.
10	RD	Read data at the rising edge
11	NC	No connect
12	XR/X+	No connect
13	YU/Y+	No connect
14	XL/X-	No connect
15	YD/Y-	No connect
16	LEDA	Power supply for LED Backlight Anode input
17	LEDK1	Power supply for LED Backlight Cathode input
18	LEDK2	Power supply for LED Backlight Cathode input
19	LEDK3	Power supply for LED Backlight Cathode input
20	LEDK4	Power supply for LED Backlight Cathode input
21	NC	No connect
22	DB5	Bi-directional data bus
23	DB10	Bi-directional data bus
24	DB11	Bi-directional data bus
25	DB12	Bi-directional data bus

Pin No.	Symbol	Function
26	DB13	Bi-directional data bus
27	DB14	Bi-directional data bus
28	DB15	Bi-directional data bus
29	DB16	Bi-directional data bus
30	DB17	Bi-directional data bus
31	RESET	Reset input pin for TFT LCD. When RESET is “L”, initialization is executed
32	VCC	Power supply for the internal logic circuit.
33	VCC	Power supply for the internal logic circuit.
34	GND	Signal ground.(0V)
35	DB6	Bi-directional data bus
36	DB7	Bi-directional data bus
37	DB8	Bi-directional data bus

2.2.1 Refer Initial code:

```
void Initial_Main(void)                          // For    ST7789VI

{

      WriteCOM_Main(0x00,0x11);//exit sleep
         Delay(120);
      WriteCOM_Main(0x00,0x36); //Memory access Control
      WriteDAT_Main(0x00,0x00);

      WriteCOM_Main(0x00,0x3A); //Interface pixel format
      WriteDAT_Main(0x00,0x05);


//--------------------------------ST7789VI Frame rate setting---------------------------------//
      WriteCOM_Main(0x00,0xB2);
      WriteDAT_Main(0x00,0x0c);
      WriteDAT_Main(0x00,0x0c);
      WriteDAT_Main(0x00,0x00);
      WriteDAT_Main(0x00,0x33);
      WriteDAT_Main(0x00,0x33);

      WriteCOM_Main(0x00,0xB7);
      WriteDAT_Main(0x00,0x35);
//---------------------------------ST7789VI Power setting-----------------------------------//

      WriteCOM_Main(0x00,0xbb); //VCOMS Setting
      WriteDAT_Main(0x00,0x3D);

      WriteCOM_Main(0x00,0xc0);
      WriteDAT_Main(0x00,0x2c);

      WriteCOM_Main(0x00,0xc2);
      WriteDAT_Main(0x00,0x01);

    WriteCOM_Main(0x00,0xc3);
    WriteDAT_Main(0x00,0x0B);
```

```
WriteCOM_Main(0x00,0xc4);
WriteDAT_Main(0x00,0x20);

  WriteCOM_Main(0x00,0xc6);
  WriteDAT_Main(0x00,0x0f);

WriteCOM_Main(0x00,0xd0);
WriteDAT_Main(0x00,0xa4);
WriteDAT_Main(0x00,0xa1);

WriteCOM_Main(0x00,0x21);

//-----------set gamma-----------------

WriteCOM_Main(0x00,0xe0); //set gamma
   WriteDAT_Main(0x00,0x70);
WriteDAT_Main(0x00,0x04);
WriteDAT_Main(0x00,0x08);
WriteDAT_Main(0x00,0x07);
WriteDAT_Main(0x00,0x06);
WriteDAT_Main(0x00,0x04);
WriteDAT_Main(0x00,0x21);
WriteDAT_Main(0x00,0x42);
WriteDAT_Main(0x00,0x38);
WriteDAT_Main(0x00,0x37);
WriteDAT_Main(0x00,0x13);
WriteDAT_Main(0x00,0x13);
WriteDAT_Main(0x00,0x25);
WriteDAT_Main(0x00,0x2C);


WriteCOM_Main(0x00,0xe1); //set gamma
WriteDAT_Main(0x00,0x70);
WriteDAT_Main(0x00,0x00);
WriteDAT_Main(0x00,0x02);
WriteDAT_Main(0x00,0x08);
WriteDAT_Main(0x00,0x07);
WriteDAT_Main(0x00,0x22);
WriteDAT_Main(0x00,0x1F);
```

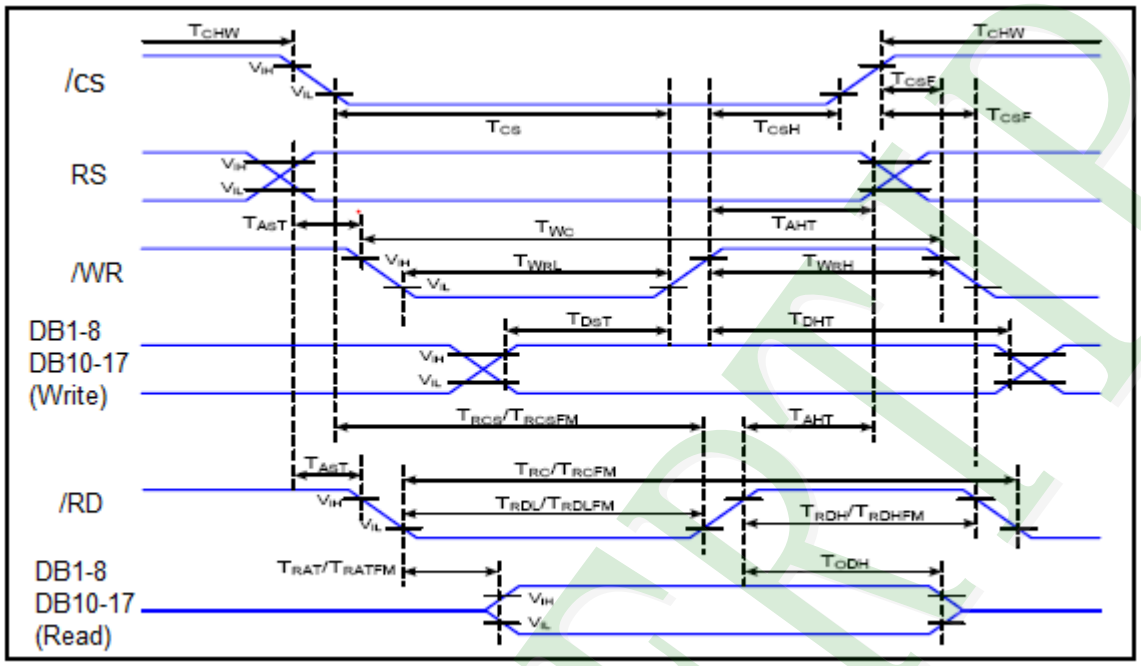
```
    WriteDAT_Main(0x00,0x23);
    WriteDAT_Main(0x00,0x39);
    WriteDAT_Main(0x00,0x28);
    WriteDAT_Main(0x00,0x14);
    WriteDAT_Main(0x00,0x15);
    WriteDAT_Main(0x00,0x26);
    WriteDAT_Main(0x00,0x2D);

    WriteCOM_Main(0x00,0x29);//Display on


}
```

2.3 Timing Characteristics

8080 Series MCU Parallel Interface Characteristics:18/16/9/8-Bit Bus

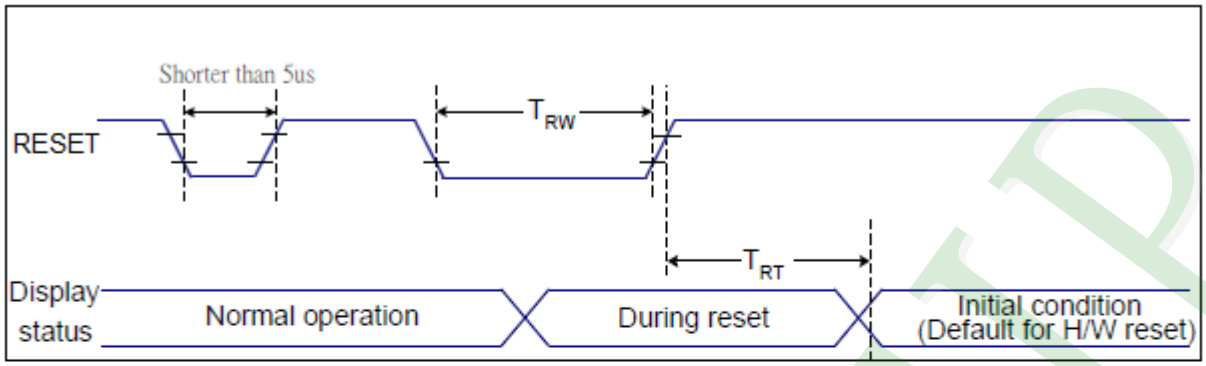


Parallel Interface Timing Characteristics (8080-Series MCU Interface)

VCC= 2.8V, Ta=25℃

Signal	Symbol	Parameter	Min	Max	Unit
RS	TAST	Address Setup time	0	-	ns
	TAHT	Address Hold time(Write/Read)	10	-	ns
/CS	TCHW	Chip select “H” pulse width	0	-	ns
	TCS	Chip select Setup time (Write)	15	-	
	TRCS	Chip Select setup time (Read ID)	45		ns
	TRCSFM	Chip select Setup time (Read FM)	355	-	ns
	TCSF	Chip select wait time(Write/Read)	10	-	ns
	TCSH	Chip select hold time	10	-	ns
/WR	TWC	Write Cycle	66	-	ns
	TWRH	Control pulse ”H” duration	15	-	ns
	TWRL	Control pulse ”L” duration	15	-	ns
RD(FM)	TRCFM	Read Cycle(FM)	450	-	ns
	TRDHFM	Read Control “H” duration (FM)	90	-	ns
	TRDLFM	Read Control “L” duration (FM)	355	-	ns
RD(ID)	TRC	Read Cycle(ID)	160		ns
	TRDH	Control pulse “H” duration(ID)	90		ns
	TRDL	Control pulse “L” duration(ID)	45		ns
DB1~DB8 DB10~DB17	TDST	Data setup time	10		ns
	TDHT	Data hold time	10		ns
	TRAT	Read access time(ID)	-	40	ns
	TRATFM	Read access time(FM)	-	340	ns
	TODH	Output disable time	20	80	ns

Reset Timing:



Reset Timing

VDDI=1.65 to 3.6V, VDD=2.4 to 3.6V, AGND=DGND=0V, Ta=25℃

Related Pins	Symbol	Parameter	Min	Max	Unit
RESET	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1, 5)	ms
				120 (Note 1, 6, 7)	ms

Reset Timing

Notes:

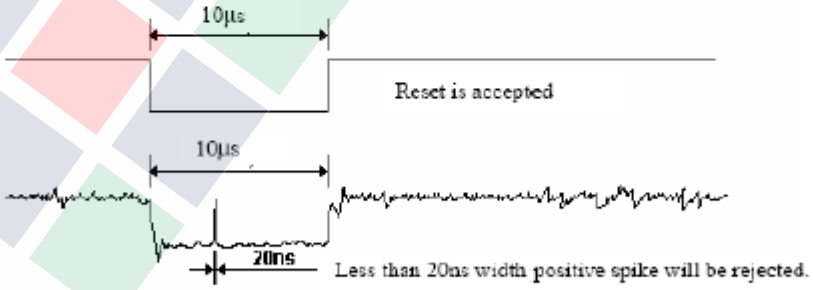
1. The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NVM (or similar device) to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.

2. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below:

RESET Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

3. During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In –mode.) and then return to Default condition for Hardware Reset.

4. Spike Rejection also applies during a valid reset pulse as shown below:



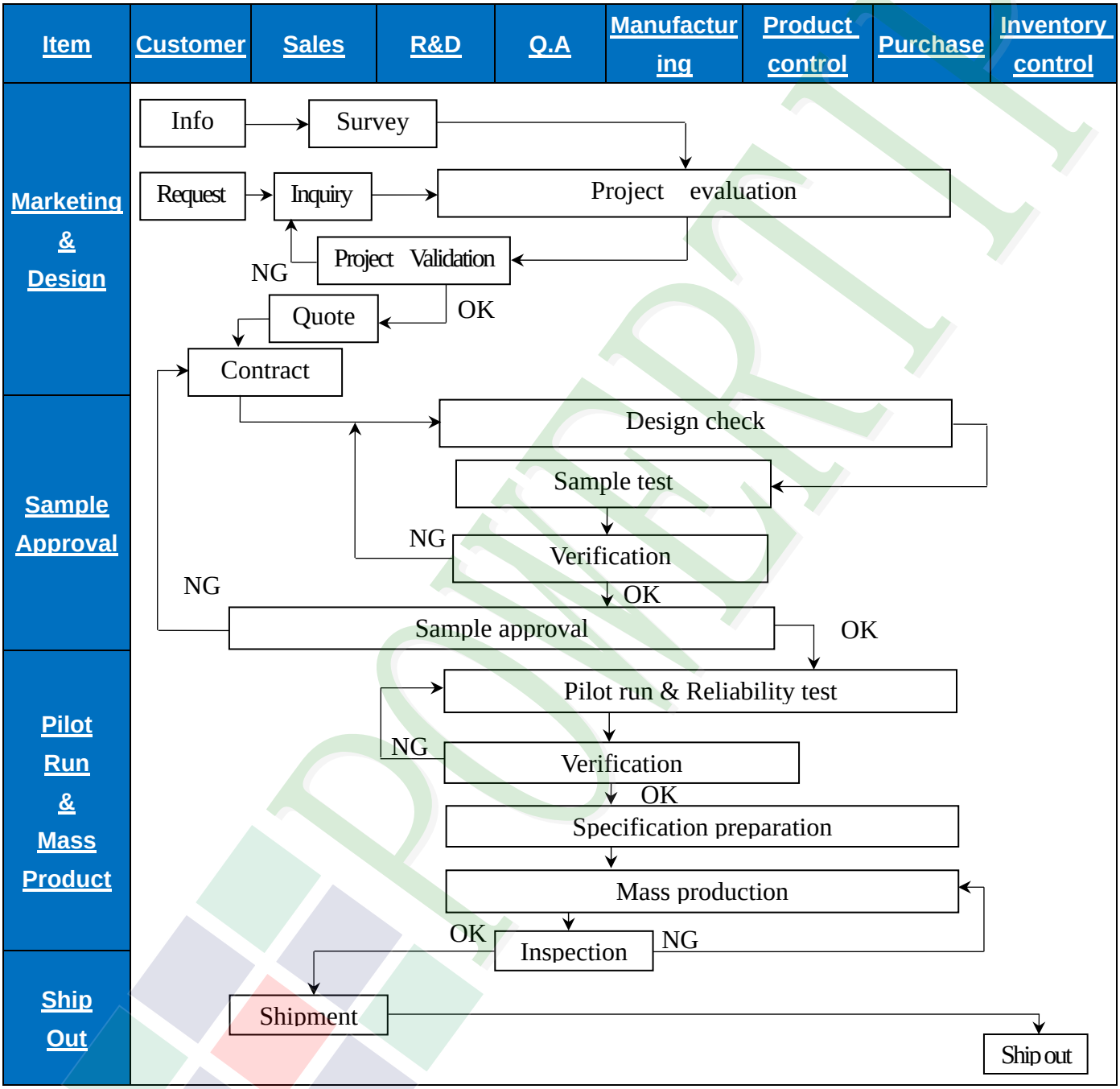
5. When Reset applied during Sleep In Mode.

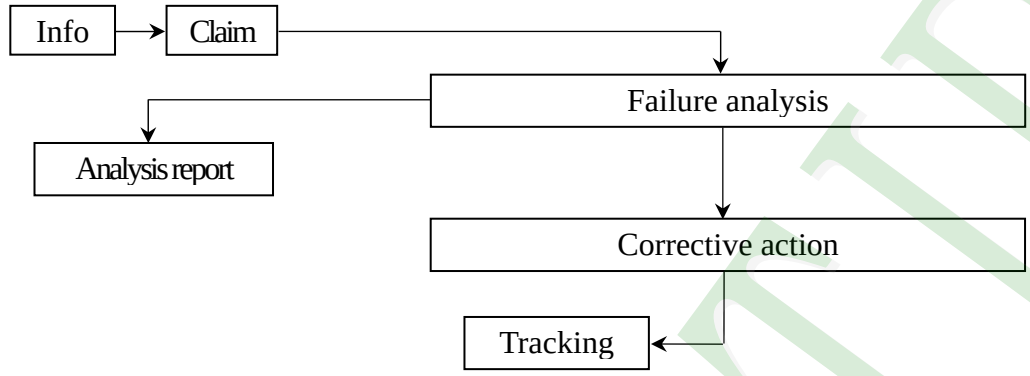
6. When Reset applied during Sleep Out Mode.

7. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service								
Q.A Activity	1. ISO 9001 Maintenance Activities 2. Process improvement proposal 3. Equipment calibration 4. Education And Training Activities 5. Standardization Management							

3.2. Inspection Specification

◆Scope ：The document shall be applied to TFT-LCD Module for less than 3.5″ (Ver.B01).

◆Inspection Standard：MIL-STD-105E Table Normal Inspection Single Sampling Level Ⅱ.

◆Equipment：Gauge、MIL-STD、Powertip Tester、Sample

◆Defect Level：Major Defect AQL： 0.4 ； Minor Defect AQL： 1.5

◆OUT Going Defect Level: Sampling.

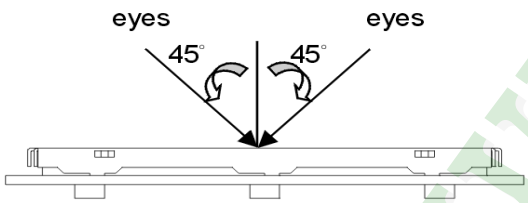
◆Standard of the product appearance test：

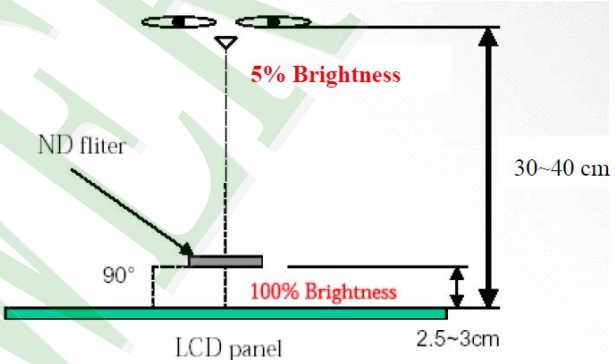
a. Manner of appearance test：

(1). The test best be under 20W×2 fluorescent light (about 300lux ～500lux)

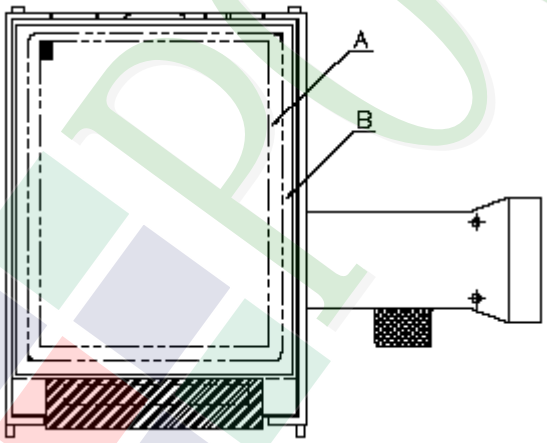
，and distance of view must be at 30~40 cm.

(2). The test direction is base on about around 45° of vertical line.





(3). Definition of area.



A area : viewing area

B area : Outside of viewing area

(4). Standard of inspection： (Unit：mm)

◆Specification For TFT-LCD Module Less Than 3.5″： (Ver.B01)

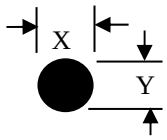
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="3">01</td><td rowspan="3">Product condition</td><td>1. 1The part number is inconsistent with work order of production.</td><td>Major</td></tr>
<tr><td>1. 2 Mixed product types.</td><td>Major</td></tr>
<tr><td>1. 3 Assembled in inverse direction.</td><td>Major</td></tr>
<tr><td>02</td><td>Quantity</td><td>2. 1The quantity is inconsistent with work order of production.</td><td>Major</td></tr>
<tr><td>03</td><td>Outline dimension</td><td>3. 1 Product dimension and structure must conform to structure diagram.</td><td>Major</td></tr>
<tr><td rowspan="6">04</td><td rowspan="6">Electrical Testing</td><td>4. 1 Missing line character and icon.</td><td>Major</td></tr>
<tr><td>4. 2 No function or no display.</td><td>Major</td></tr>
<tr><td>4. 3 Display malfunction.</td><td>Major</td></tr>
<tr><td>4. 4 LCD viewing angle defect.</td><td>Major</td></tr>
<tr><td>4. 5 Current consumption exceeds product specifications.</td><td>Major</td></tr>
<tr><td>4. 6 Mura cannot be seen through 5% ND filter at 50% Gray , should be judged by the viewing angle of 90 degree.</td><td>Minor</td></tr>
<tr><td>05</td><td>Dot defect

(Bright dot、Dark dot)

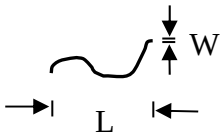
On -display</td><td>
<table>
<tr><th colspan="2">Item</th><th>Acceptance (Q’ty)</th></tr>
<tr><td rowspan="4">Dot Defect</td><td>Bright Dot</td><td>≦ 2</td></tr>
<tr><td>Dark Dot</td><td>≦ 3</td></tr>
<tr><td>Joint Dot</td><td>≦ 2</td></tr>
<tr><td>Total</td><td>≦ 3</td></tr>
</table>
5. 1 Inspection pattern：full white , full black , Red , Green and blue screens.
5. 2 It is defined as dot defect if defect area ＞1/2 dot.
5. 3 The distance between two dot defect ≧5 mm.
5. 4 Bright dot : Dots appear bright and unchanged in visible with 5% ND filter is defined.
5.5 Tiny bright dot: bright dot area ≦1/2 dot.
a. Dots appear bright and unchanged in visible with 5% ND filter is defined defect and is judged in accordance with 6.1
b. Dots invisible with 5% ND Filter is Ignored.
</td><td>Minor</td></tr>
</table>

◆Specification For TFT-LCD Module Less Than 3.5″： (Ver.B01)

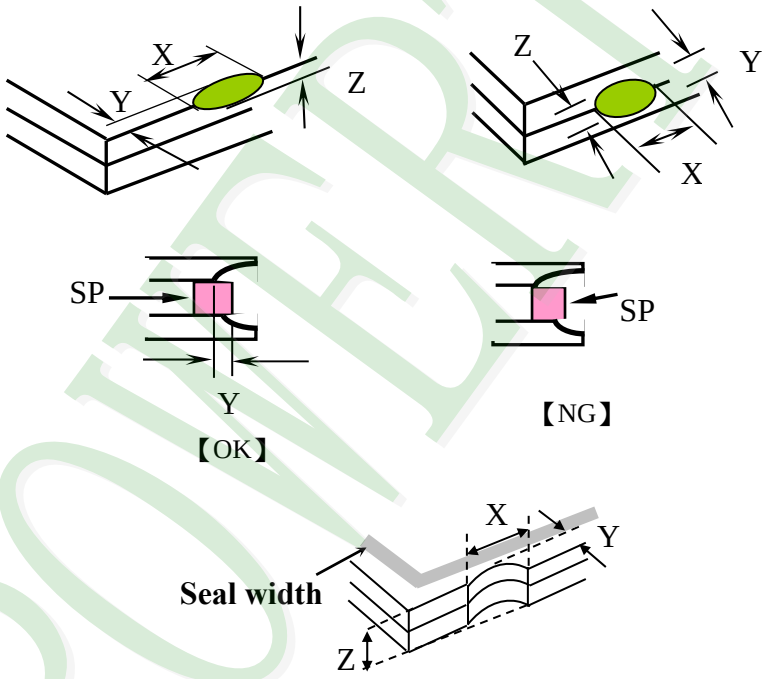
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>06</td><td>Black or white dot、scratch、contamination

Round type
 

Φ＝(x＋y) / 2

Line type
 
</td><td>6.1 Round type (Non-display or display)：
<table><tr><th rowspan="2">Dimension
(diameter：Φ)</th><th colspan="2">Acceptance (Q’ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td>Φ ≦ 0.15</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.15 ＜ Φ ≦ 0.20</td><td>2</td></tr><tr><td>0.20 ＜ Φ ≦ 0.30</td><td>2</td></tr><tr><td>Φ ＞ 0.30</td><td>0</td></tr><tr><td>Total</td><td>3</td><td></td></tr></table>6.2 Line type(Non-display or display)：
<table><tr><th colspan="2">Dimension</th><th colspan="2">Acceptance (Q’ty)</th></tr><tr><th>Length (L)</th><th>Width (W)</th><th>A area</th><th>B area</th></tr><tr><td>---</td><td>W ≦ 0.03</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>L ≦5.0</td><td>0.03 ＜W ≦ 0.05</td><td>3</td></tr><tr><td>---</td><td>W ＞0.05</td><td>As round type</td></tr><tr><td colspan="2">Total</td><td>3</td></tr></table></td><td>Minor</td></tr>
<tr><td>07</td><td>Polarizer Bubble</td><td><table><tr><th rowspan="2">Dimension
(diameter：Φ)</th><th colspan="2">Acceptance (Q’ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td>Φ ≦ 0.20</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.20 ＜ Φ ≦ 0.50</td><td>3</td></tr><tr><td>Φ ＞ 0.50</td><td>0</td></tr><tr><td>Total</td><td>3</td></tr></table></td><td>Minor</td></tr>
</table>

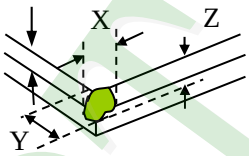
◆Specification For TFT-LCD Module Less Than 3.5″ : (Ver.B01)

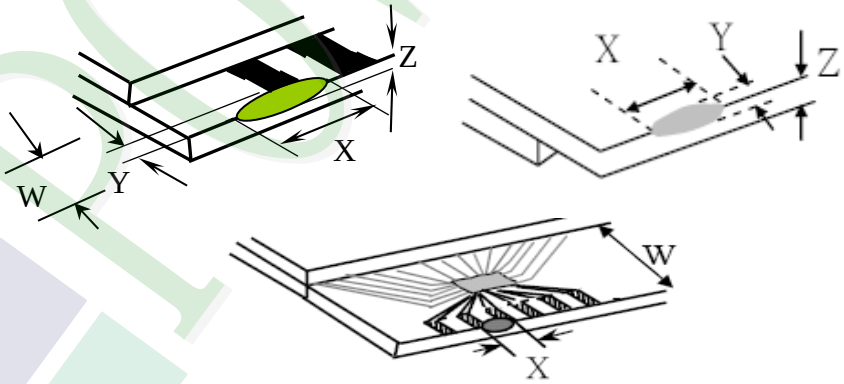
NO	Item	Criterion	Level
08	The crack of glass	Symbols : X : The length of crack Y : The width of crack. Z : The thickness of crack W : terminal length t : The thickness of glass a : LCD side length 8.1 General glass chip : 8.1.1 Chip on panel surface and crack between panels: 	Minor

X	Y	Z
≦ a	Crack can't enter viewing area	≦1/2 t
≦ a	Crack can't exceed the half of SP width.	1/2 t < Z ≦2 t

◆Specification For TFT-LCD Module Less Than 3.5″ : (Ver.B01)

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="3">08</td><td rowspan="3">The crack of glass</td><td>Symbols :

X : The length of crack
Z : The thickness of crack
t : The thickness of glass
Y : The width of crack.
W : terminal length
a : LCD side length</td><td rowspan="3">Minor</td></tr>
<tr><td>8.1.2 Corner crack :
 

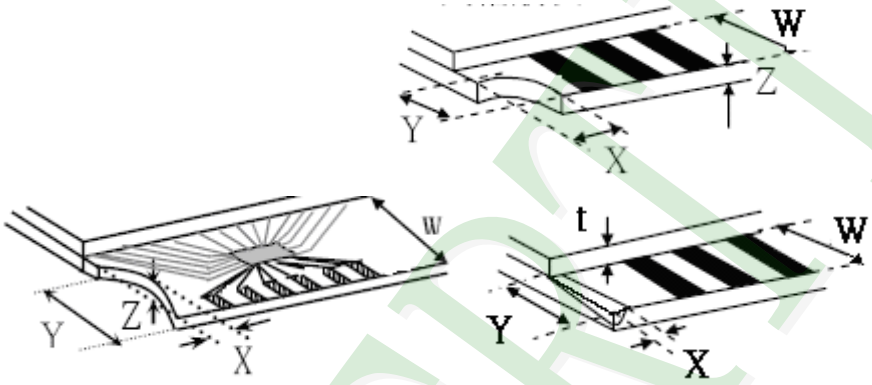
<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦1/5 a</td><td>Crack can’t enter viewing area</td><td>Z ≦ 1/2 t</td></tr>
<tr><td>≦1/5 a</td><td>Crack can’t exceed the half of SP width.</td><td>1/2 t < Z ≦ 2 t</td></tr>
</table></td></tr>
<tr><td>8.2 Protrusion over terminal :
8.2.1 Chip on electrode pad :
 

<table>
<tr><th></th><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>Front</td><td>≦ a</td><td>≦ 1/2 W</td><td>≦ t</td></tr>
<tr><td>Back</td><td>≦ a</td><td>≦ W</td><td>≦ 1/2 t</td></tr>
</table></td></tr>
</table>

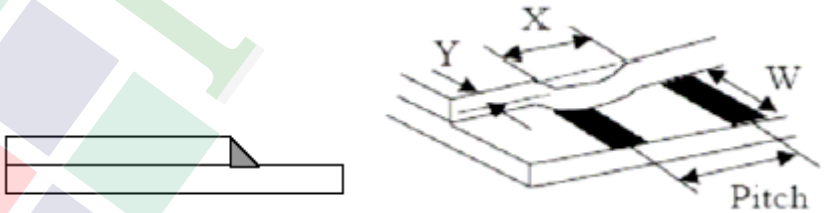
◆Specification For TFT-LCD Module Less Than 3.5″ : (Ver.B01)

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>08</td><td>The crack of glass</td><td>
Symbols :

X : The length of crack Y : The width of crack.
Z : The thickness of crack W : terminal length
t : The thickness of glass a : LCD side length

8.2.2 Non-conductive portion :


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦ 1/3 a</td><td>≦W</td><td>≦t</td></tr>
</table>
⊙ If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.

8.2.3 Glass remain :


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦ a</td><td>≦ 1/3 W</td><td>≦t</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

◆Specification For TFT-LCD Module Less Than 3.5″： (Ver.B01)

NO	Item	Criterion	Level
09	Backlight elements	9. 1 Backlight can't work normally.	Major
		9. 2 Backlight doesn't light or color is wrong.	Major
		9. 3 Illumination source flickers when lit.	Major
10	General appearance	10. 1 Pin type、quantity、dimension must match type in structure diagram.	Major
		10. 2 No short circuits in components on PCB or FPC.	Major
		10. 3 Parts on PCB or FPC must be: no wrong parts, missing parts or excess parts.	Major
		10. 4 Product packaging must the same as specified on packaging specification sheet.	Minor
		10. 5 The folding and peeled off in polarizer are not acceptable.	Minor
		10. 6 The PCB or FPC between B/L assembled distance(PCB or FPC) is ≦1. 5 mm.	Minor

4. RELIABILITY TEST

4.1 Reliability Test Condition (Ver.B01)

<table>
<tr><th>NO.</th><th>TEST ITEM</th><th>TEST CONDITION</th></tr>
<tr><td>1</td><td>High Temperature Storage Test</td><td>Keep in +80 ±5℃ 240 hrs</td></tr>
<tr><td>2</td><td>Low Temperature Storage Test</td><td>Keep in -30 ±5℃ 240 hrs</td></tr>
<tr><td>3</td><td>High Temperature / High Humidity Storage Test</td><td>Keep in +60 ℃ / 90% R.H duration for 240 hrs
(Excluding the polarizer)</td></tr>
<tr><td>4</td><td>Temperature Cycling Storage Test</td><td>-30℃ → +25℃ → +80℃ → +25℃
(30mins) (5mins) (30mins) (5mins)
20 Cycle</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">ESD Test</td><td>Air Discharge:
Apply 2 KV with 5 times
Discharge for each polarity +/-</td><td>Contact Discharge:
Apply 250 V with 5 times
discharge for each polarity +/-</td></tr>
<tr><td colspan="2">1. Temperature ambiance : 15℃～35℃
2. Humidity relative : 30%～60%
3. Energy Storage Capacitance(Cs+Cd) : 150pF±10%
4. Discharge Resistance(Rd) : 330Ω±10%
5. Discharge, mode of operation :
Single discharge (time between successive discharges at least 1 sec)
(Tolerance if the output voltage indication : ±5%)</td></tr>
<tr><td>6</td><td>Vibration Test (Packaged)</td><td colspan="2">1. Sine wave 10～55 Hz frequency (1 min/sweep)
2. The amplitude of vibration :1.5 mm
3. Each direction (X、Y、Z) duration for 2 Hrs</td></tr>
<tr><td>7</td><td>Drop Test (Packaged)</td><td colspan="2"><table><tr><th>Packing Weight (Kg)</th><th>Drop Height (cm)</th></tr><tr><td>0 ~ 45.4</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table>Drop Direction :※1 corner / 3 edges / 6 sides each 1time</td></tr>
</table>

◎Inspection conditions after test:

Temperature：+20~30℃

Humidity：50~70%

Atmospheric pressure：86~106Kpa

5. PRECAUTION RELATING PRODUCT HANDLING

5.1 SAFETY

5.1.1 If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin.

5.1.2 If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

5.2 HANDLING

5.2.1 Avoid any strong mechanical shock which can break the glass.

5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module, be sure to ground your body and any electrical equipment you may be using.

5.2.3 Do not remove the panel or frame from the module.

5.2.4 The polarizing plate of the display is very fragile. So, please handle it very carefully, do not touch, push or rub the exposed polarizing with anything harder than an HB pencil lead (glass, tweezers, etc.)

5.2.5 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.

5.2.6 Do not touch the display area with bare hands, this will stain the display area.

5.2.7 Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.

5.2.8 To control temperature and time of soldering is 320 ± 10°C and 3-5 sec.

5.2.9 To avoid liquid (include organic solvent) stained on LCM

5.2.10 Caution!(LCM products with Capacitive Touch Panel)
Strong EMI-sources such as switch-mode power supplies (SMPS) can lead to touch malfunction (e.g. ghost-touches).
Therefore, the touch needs to be thoroughly tested inside the target application.

5.2.11 CAUTION: Continuously displaying same static image will result in high possibility of image sticking/image burn-in effect due to TFT panel characteristic.

5.2.12 Double-sided tape designed to be attach with the customer's mechanical device, please follow up the rules and regulations published by the original manufacturer of double-sided tape for the attachment operation.

5.3 STORAGE

5.3.1 Store the panel or module in a dark place where the temperature is 25°C ± 5°C and the humidity is below 65% RH.

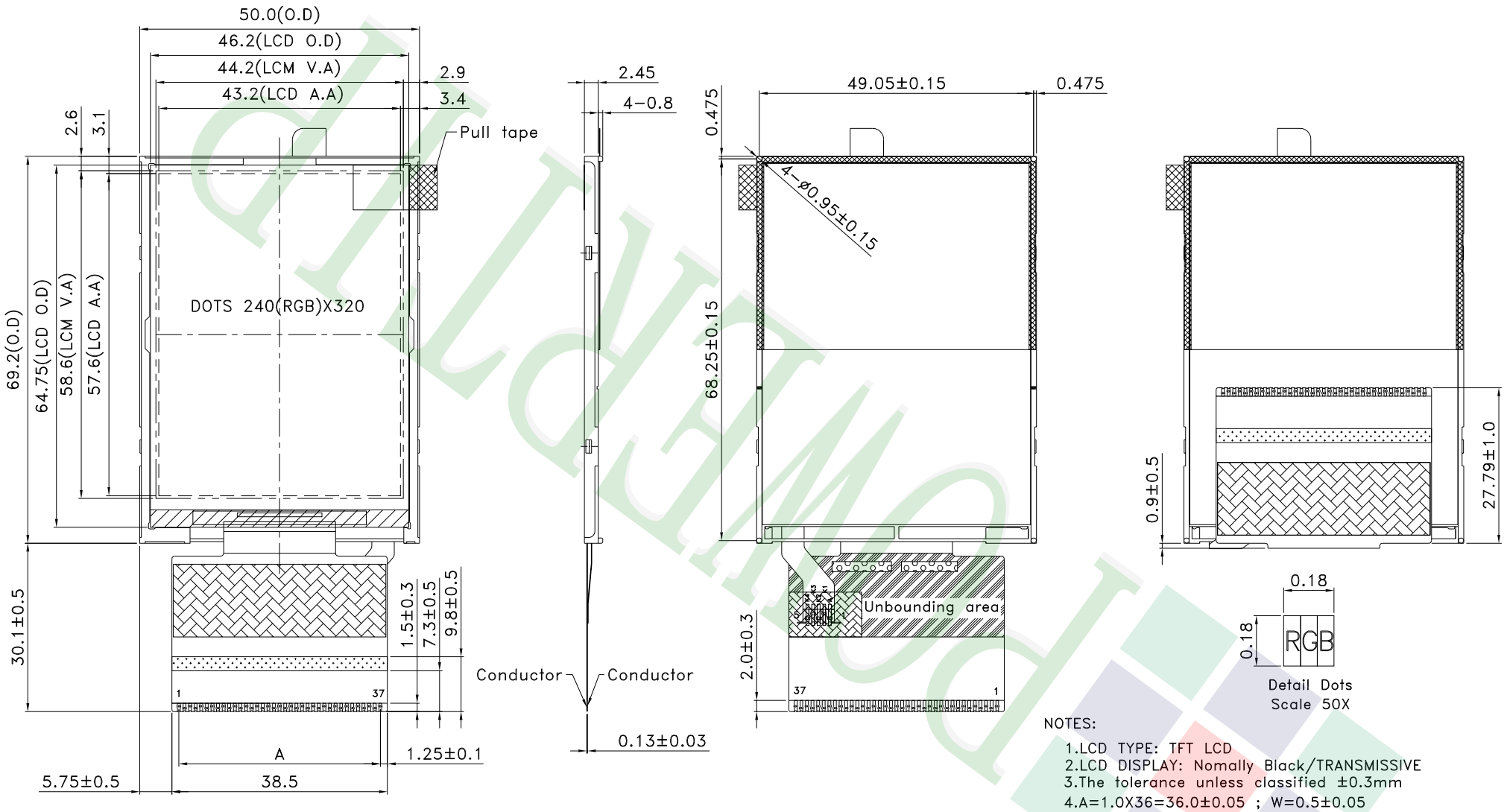
5.3.2 Do not place the module near organics solvents or corrosive gases.

5.3.3 Do not crush, shake, or jolt the module.

5.4 TERMS OF WARRANTY

5.4.1 Applicable warrant period The period is within thirteen months since the date of shipping out under normal using and storage conditions.

5.4.2 Unaccepted responsibility
This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in nuclear power control equipment, aerospace equipment, fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required.



NOTES:

1.LCD TYPE: TFT LCD
2.LCD DISPLAY: Nomally Black/TRANSMISSIVE
3.The tolerance unless classified ±0.3mm
4.A=1.0X36=36.0±0.05 ; W=0.5±0.05
5. Shielding tape, FPC Component Area H=1.5Max
Double tape T=0.05mm

REV	REV BY	REVISER	DATE
007			
006			
005			
004			
003			
002			
001	NEW DRAWING	Sally	2023/07/11

PART NO: PH240320T075-ZEA04

DRAWING NAME : JLMD-PH240320T075-ZEA04

TITLE: LCD MODULE DRAWING

久正光電股份有限公司
POWERTIP TECHNOLOGY CORPORATION

Design	Sally	(3)	Surface		
Check	Air	Unit	MM	Material	
Scale	FIT			Thickness	
Approve	LiuJin	Page	1/1	Quantity	

Length(Min) (mm) \ Tolerance \ Precision	Precision Level
1 ~ 4	-
4 ~ 16	-
16 ~ 63	-
63 ~ 250	-
250 ~ 1000	-

PT-A-054-01

Ver.001

Documents NO.	JPKG-PH240320T075-ZEA04

包裝規格書
Packaging Specifications
(For Tray)

Approve	Check	Contact
LiuJin	Air	Sally

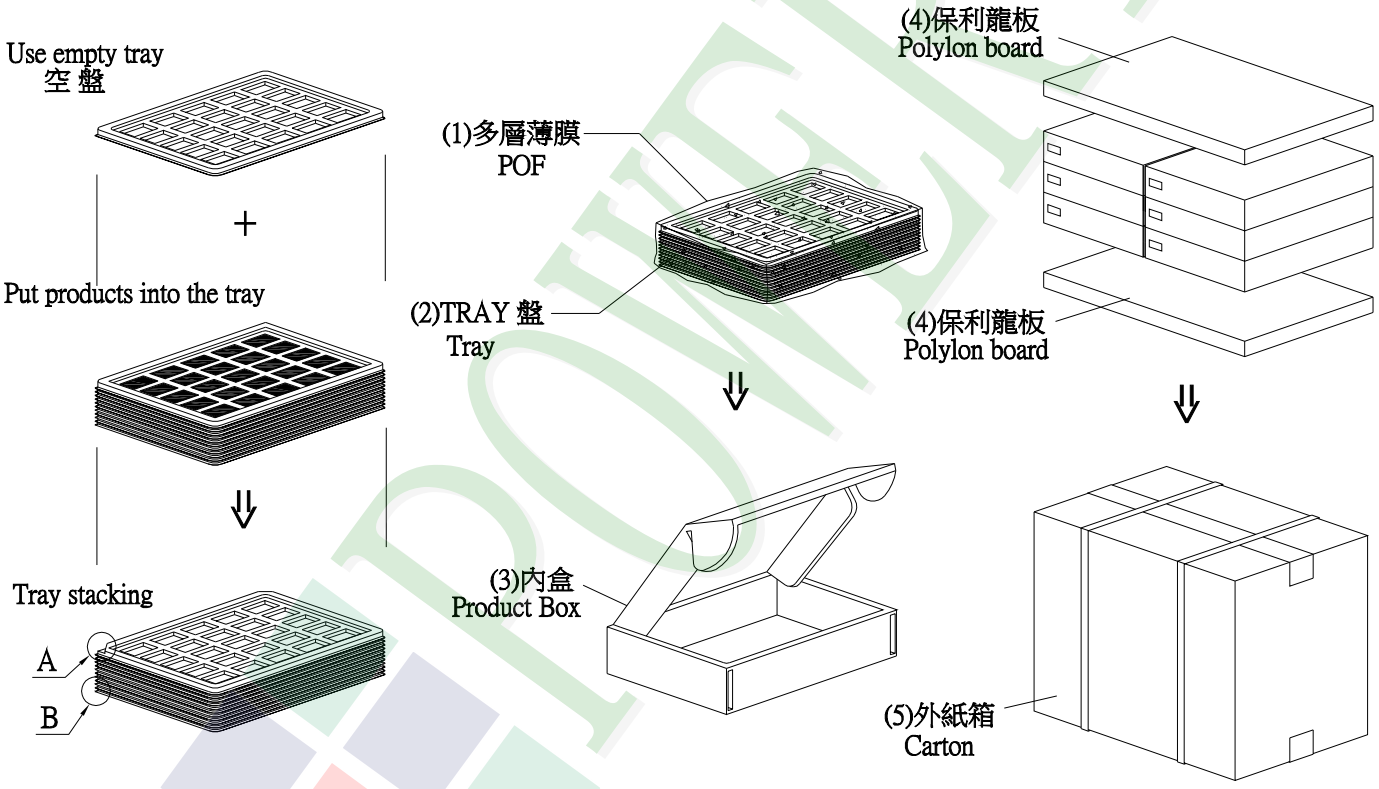
1.包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH240320T075-ZEA04	50.0X69.2X2.45	0.0116	432	5.0112
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	——	6	——
3	TRAY 盤 (2)Tray	TYSG000000197	352 X 260 X 11.6	0.08432	54	4.5533
4	內盒(3)Product Box	BX36627063ABBA	383 X 270 X 66	0.182	6	1.092
5	保利龍板(4)Polylon board	OTPLB00PL08ABA	550 X 393 X 20	0.0284	2	0.0568
6	外紙箱(5)Carton	BX57041027CCBA	570 X 410 X 265	1.0	1	1.0
7						
8						
9						

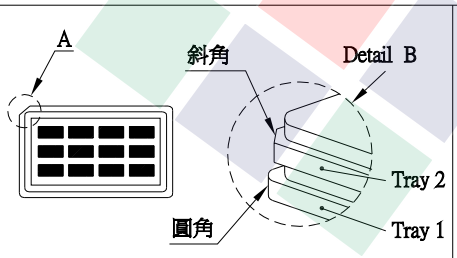
2.一 整箱總重量 (Total LCD Weight in carton) : 13.38 Kg±10%

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

(1)LCM quantity per box : no per tray	9	x no of tray	8	=	72
(2)Total LCM quantity in carton : quantity per box	72	x no of boxes	6	=	432



特 記 事 項 (REMARK)



4.TRAY盤相疊時,需旋轉180度,請詳見B視圖
Rotate tray 180 degrees and place on top of stack.
Check the tray stack using Fig. B.

5.產品放置如下圖：