POWERTIP TECH. CORP.

SPECIFICATIONS

CUSTOMER	:	PTC
SAMPLE CODE	:	SH240320T062-LAA07
MASS PRODUCTION CODE	:	PH240320T062-LAA07
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	003
DRAWING NO. (Ver.)	:	JLMD- PH240320T062-LAA07_001
PACKAGING NO. (Ver.)	:	JPKG- PH240320T062-LAA07_002

Customer Approved

Date:

Approved	Checked	Designer
閆偉	劉進	夏子豪

□ Preliminary specification for design input

■ Specification for sample approval

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History of Version

Date	Ver.	Edi.	Description	Page	Design by
07/25/2017	01	001	Sample Specification	-	張佑雨
10/16/2017	01	002	Modify Color of CIE Coordinate	6	張佑雨
07/03/2017	01	003	Modify LCM Packaging	Appendix	夏子豪

Total: 28 Pages

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   - 5.3 Storage
   - 5.4 Terms of Warranty

Appendix： LCM Drawing
LCM Packaging

POWERTIP

1. SPECIFICATIONS

1.1 Features

Main LCD Panel

Item	Standard Value
Display Type	240 * (R、G、B) * 320 Dots
LCD Type	a-Si TFT , Positive, Transmissive
Screen size(inch)	2.4” (Diagonal)
Other(controller / driver IC)	ST7789VI
Viewing Direction	12 O’clock
Color configuration	R.G.B. vertical stripe
Interface	8080-8 &16 Bits data bus
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web site : http://www.powertip.com.tw/news.php?area_id_view=1085560481/

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	42.72 (W) * 61.46 (L) *2.55(H)	mm

LCD Panel & Touch Panel

Item	Standard Value	Unit
Viewing Area(LCD)	37.72(W) *49.96(L)	mm
Active Area(LCD)	36.72(W) * 48.96(L)	mm

Note : For detailed information please refer to LCM drawing.

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit
System Power Supply Voltage	VDD2	-	-0.3	+4.6	V
	IOVDD	-	-0.3	+4.6	V
	VGH	-	+13	+17	V
	VGL	-	-12	-7	
Input Voltage	VIN	-	0.5	IOVDD +0.5	V
Operating Temperature	TOP	-	-30	+80	°C
Storage Temperature	TST	-	-40	+85	°C
Storage Humidity	HD	Ta < 60 °C	-	90	%RH

.

1.4 DC Electrical Characteristics

Module GND = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
System Voltage	VDD2	-	2.4	2.75	3.3	V
Interface Operation Voltage	IOVDD	-	1.65	1.8	3.3	V
Input High Voltage	VIH	-	0.8* IOVDD	-	IOVDD	V
Input Low Voltage	VIL	-	VSS	-	0.2* IOVDD	V
Output High Voltage	VOH	IOH=-1.0mA	0.8* IOVDD	-	IOVDD	V
Output Low Voltage	VOL	IOL=+1.0mA	VSS	-	0.2* IOVDD	V
Supply Current	IDD*1	VDD2=IOVDD=2.8V	-	7	11	mA

Note1 : IDD contains the current of the VDD2 and IOVDD .

1.5 Optical Characteristics

TFT LCD Panel VDD2= 2.8V, Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	unit	
Response time		Tr + Tf	-	-	27	41	ms	Note2
Viewing angle	Rear	θY+	CR ≥ 10	-	60	-	Deg.	Note4
	Front	θY-		-	60	-		
	Left	θX-		-	60	-		
	Right	θX+		-	60	-		
Contrast ratio		CR	-	500	600	-	-	Note3
Color of CIE Coordinate	White	X	IF=80 mA	0.24	0.29	0.34	-	Note1
		Y		0.26	0.31	0.36		
	Red	X		0.54	0.59	0.64		
		Y		0.29	0.34	0.39		
	Green	X		0.29	0.34	0.39		
		Y		0.55	0.60	0.65		
	Blue	X		0.10	0.15	0.20		
		Y		0.01	0.06	0.11		
Average Brightness Pattern=white display		IV	IF=80 mA	120	160	-	cd/m2	Note1
Uniformity		△B	IF= 80 mA	80	-	-	%	Note1

Note1:

1：△B= B(min) / B(max) × 100%.

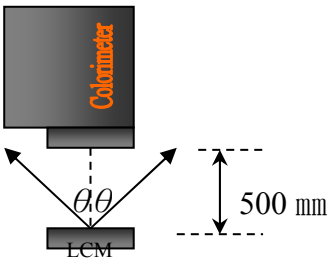
2：Measurement Condition for Optical Characteristics:

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%.

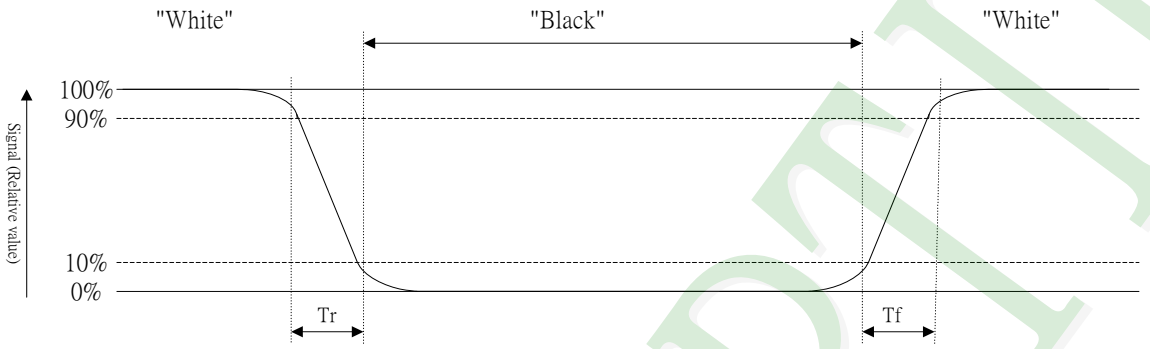


Colorimeter=BM-7 fast

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:



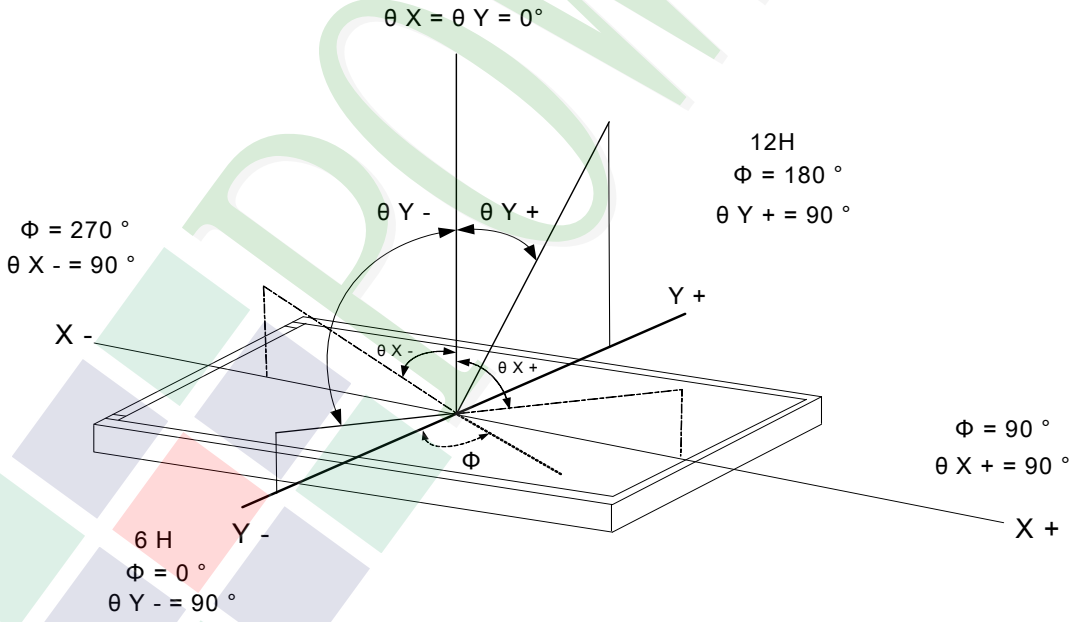
Note3: Definition of contrast ratio:

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 Characteristics

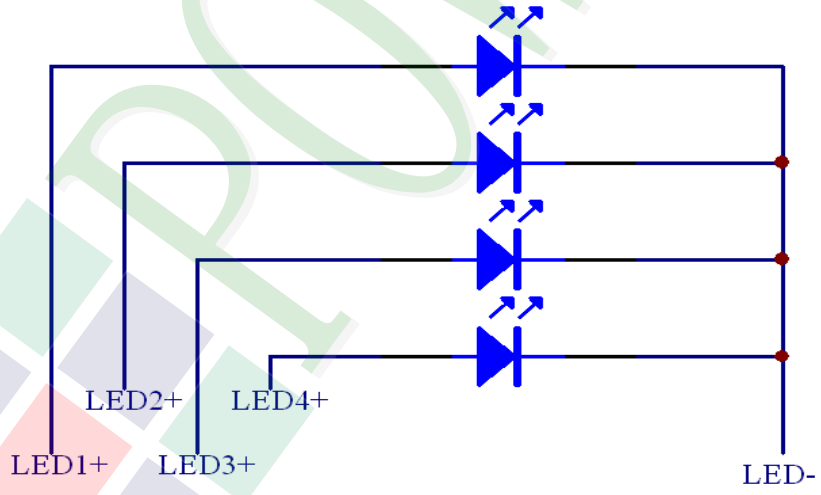
Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25℃	-	120	mA
Forward Voltage	VF	Ta =25℃	-	3.6	V
Reverse Voltage	VR	Ta =25℃	-	5.0	V
Power Dissipation	PD	Ta =25℃	-	360	mW

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 80mA	2.8	3.2	3.6	V
Average Brightness	IV	IF= 80mA	3800	4200	-	cd/m^2
Color of CIE Coordinate	X	IF= 80mA	0.25	0.28	0.31	-
	Y		0.25	0.28	0.31	
Color	White					

Internal Circuit Diagram :



Other Description

Item	Conditions	Description
Life Time	Ta =25℃ IF= 80 mA	20000 hrs

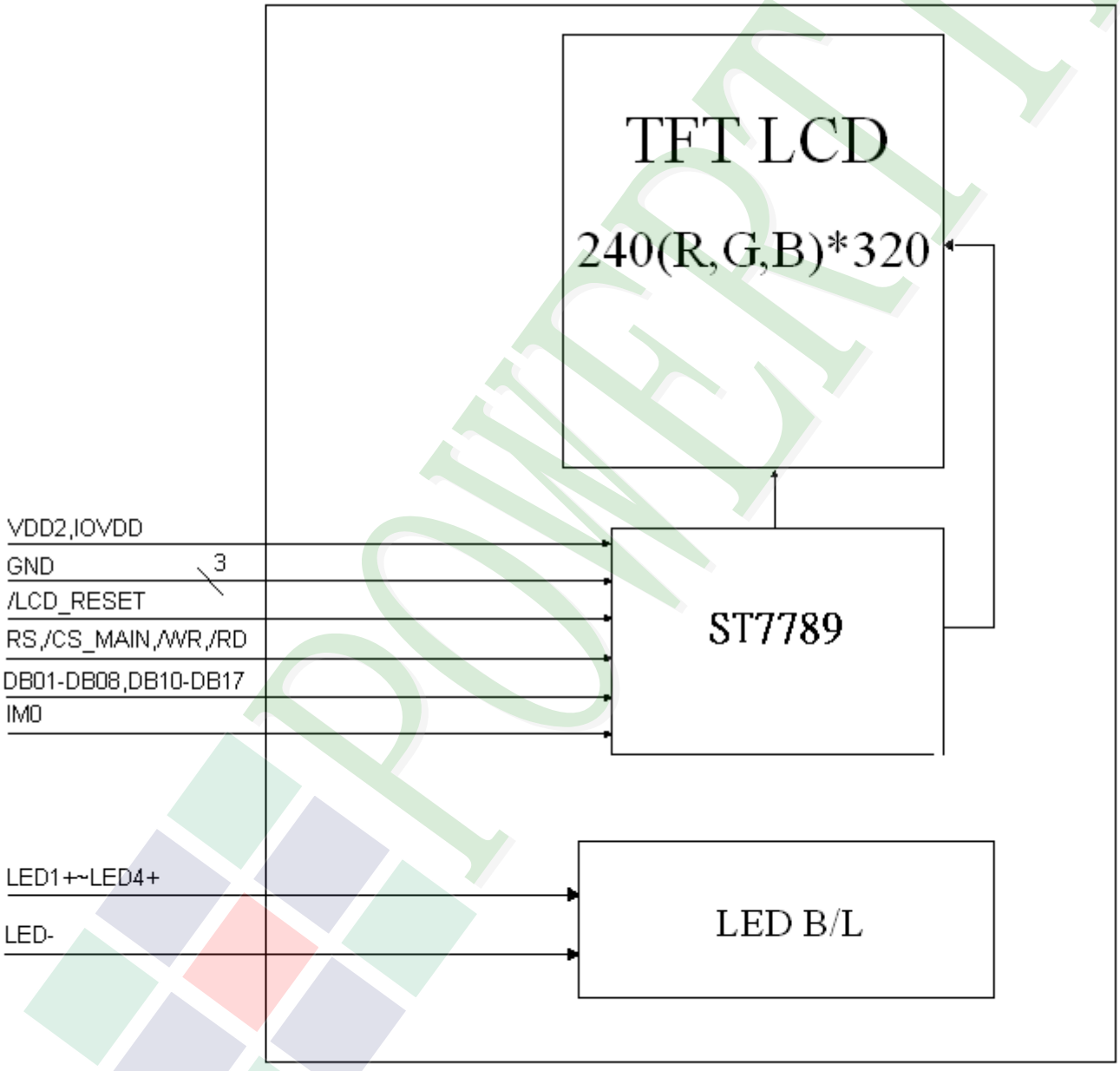
2. MODULE STRUCTURE

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	GND	System Ground.
2	/CS_MAIN	Chip select signal, Active ”L”
3	RS	When RS = 0: Command. When RS = 1: Display data.
4	/WR	Write signal input，active at Low.
5	/RD	Read signal input，active at Low.
6	NC	Not connect
7	DB01	Bi-directional data bus
8	DB02	Bi-directional data bus
9	DB03	Bi-directional data bus
10	DB04	Bi-directional data bus
11	DB05	Bi-directional data bus
12	DB06	Bi-directional data bus
13	DB07	Bi-directional data bus
14	DB08	Bi-directional data bus
15	NC	Not connect
16	DB10	Bi-directional data bus
17	DB11	Bi-directional data bus
18	DB12	Bi-directional data bus
19	DB13	Bi-directional data bus
20	DB14	Bi-directional data bus
21	DB15	Bi-directional data bus
22	DB16	Bi-directional data bus
23	DB17	Bi-directional data bus
24	/LCD_RESET	Reset input pin for TFT LCD. When RESET is “L”, initialization is executed.
25	NC	Not connect

Pin No	Symbol	Function
26	IM0	IM0=0,16 Bit, i80-system,DB pin assignDB17-DB10,DB8-DB1; IM0=1, 8 Bit, i80-system, DB pin assignDB17-DB10.
27	GND	System Ground.
28	X+	NC
29	Y+	NC
30	X-	NC
31	Y-	NC
32	GND	System Ground.
33	IOVDD	Power Supply for I/O System.(2.8V)
34	VDD2	Power Supply for Analog, Digital System and Booster Circuit (2.8V)
35	LED1+	Power supply for LED Backlight Anode input
36	LED2+	Power supply for LED Backlight Anode input
37	LED3+	Power supply for LED Backlight Anode input
38	LED4+	Power supply for LED Backlight Anode input
39	LED-	Power supply for LED Backlight Cathode input

2.2.1 Refer Initial Code

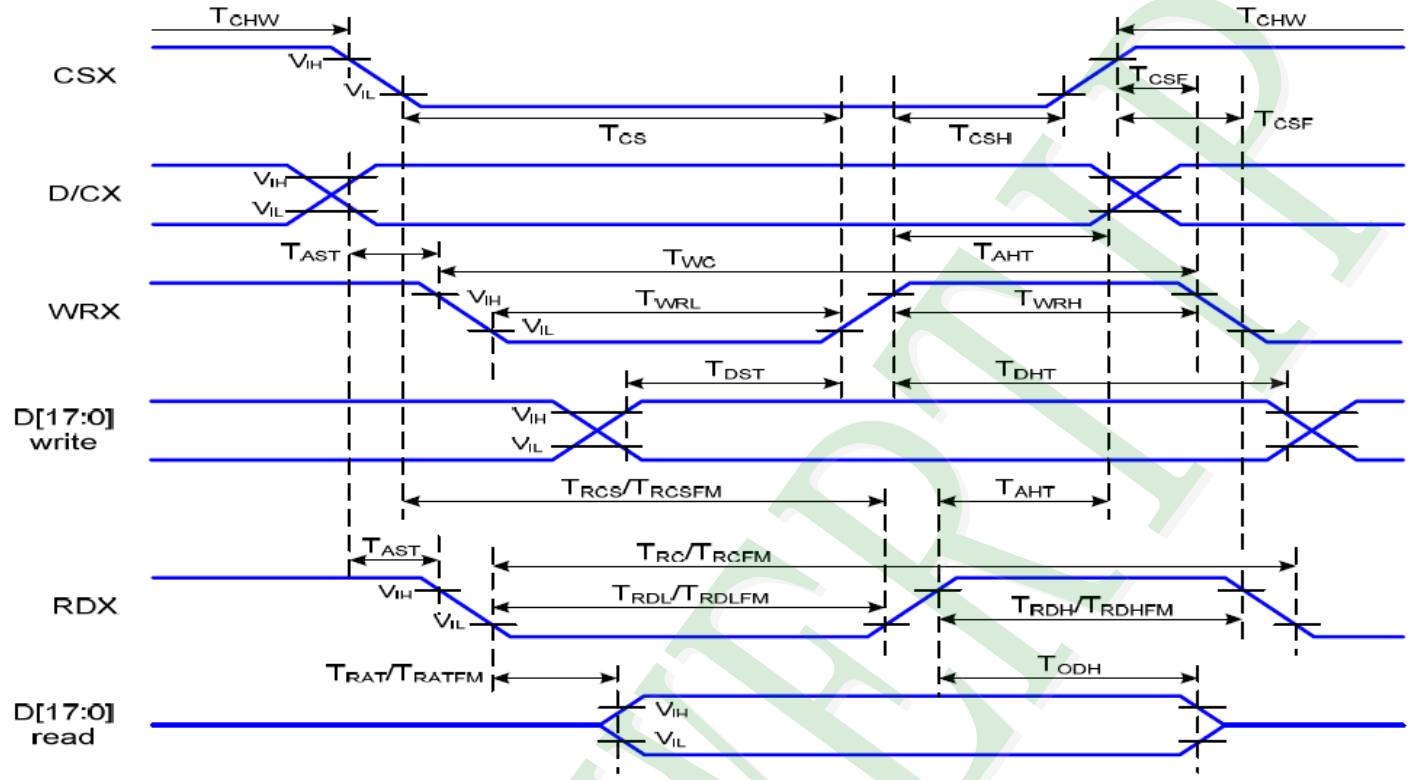
```
void int_lcd()
{    write_com(0x00,0x01);//Software reset
     write_com(0x00,0x13);      //normal display mode on
     write_com(0x00,0x20);      //Display inversion off
     write_com(0x00,0x2a);      //Column address set
     write_dat(0x00,0x00);
     write_dat(0x00,0x00);
     write_dat(0x00,0x00);
     write_dat(0x00,0xef);
     write_com(0x00,0x2b);      //Row address set
     write_dat(0x00,0x00);
     write_dat(0x00,0x00);
     write_dat(0x00,0x01);
     write_dat(0x00,0x3f);
     write_com(0x00,0x2c);      //Memory write
     write_com(0x00,0x36);      //Memory data access control
     write_dat(0x00,0x00);
     write_com(0x00,0x3a);      //Interface pixel format
     write_dat(0x00,0x55);
     write_com(0x00,0x55);
     write_dat(0x00,0x90);
     write_com(0x00,0xb2);      //porch set
     write_dat(0x00,0x0C);
     write_dat(0x00,0x0C);
     write_dat(0x00,0x00);
     write_dat(0x00,0x33);
     write_dat(0x00,0x33);
     write_com(0x00,0xb7);      //gate control
     write_dat(0x00,0x35);
     write_com(0x00,0xbb);      //VCOM CONTROL
     write_dat(0x00,0x1F);
     write_com(0x00,0xc0);      //Power control
     write_dat(0x00,0x2c);
     write_com(0x00,0xc2);      //VDV and VRH command enable
     write_dat(0x00,0x01);
     write_com(0x00,0xc3);      //vrh set
     write_dat(0x00,0x17);
```

```
        write_com(0x00,0xc4);       //vdv set
        write_dat(0x00,0x20);
        write_com(0x00,0xc6);       //frame rate control in normal mode
        write_dat(0x00,0x0f);
        write_com(0x00,0xc8);
        write_dat(0x00,0x08);
        write_com(0x00,0xca);
        write_dat(0x00,0x0f);
        write_com(0x00,0xd0);       //Power control
        write_dat(0x00,0xa4);
        write_dat(0x00,0xa1);
        write_com(0x00,0xfc);       //NVM SETTIING
        write_dat(0x00,0x00);
        write_dat(0x00,0x00);
//gamma set-----------------------------------------------
        write_com(0x00,0xe0);       //positive
        write_dat(0x00,0xD0);
        write_dat(0x00,0x00);
        write_dat(0x00,0x14);
        write_dat(0x00,0x15);
        write_dat(0x00,0x13);
        write_dat(0x00,0x2C);
        write_dat(0x00,0x42);
        write_dat(0x00,0x43);
        write_dat(0x00,0x4E);
        write_dat(0x00,0x09);
        write_dat(0x00,0x16);
        write_dat(0x00,0x14);
        write_dat(0x00,0x18);
        write_dat(0x00,0x21);
        write_com(0x00,0xe1);       //Negetive
        write_dat(0x00,0xD0);
        write_dat(0x00,0x00);
        write_dat(0x00,0x14);
        write_dat(0x00,0x15);
        write_dat(0x00,0x13);
        write_dat(0x00,0x0B);
        write_dat(0x00,0x43);
```

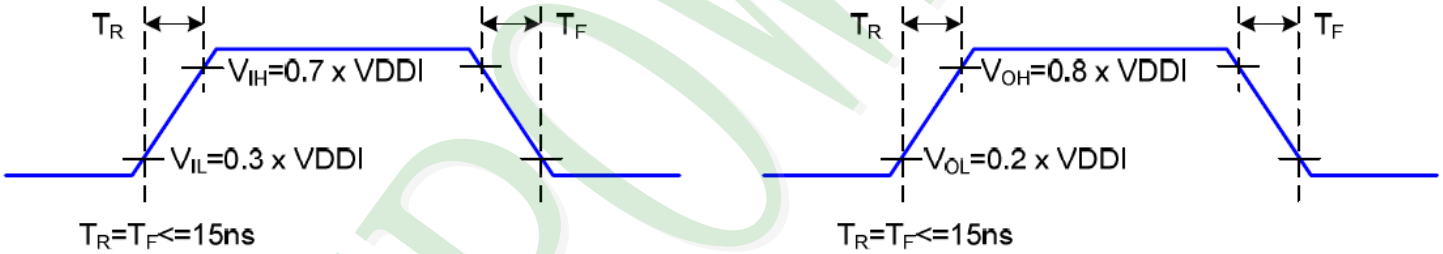
```
        write_dat(0x00,0x55);
        write_dat(0x00,0x53);
        write_dat(0x00,0x0C);
        write_dat(0x00,0x17);
        write_dat(0x00,0x14);
        write_dat(0x00,0x23);
        write_dat(0x00,0x20);
        write_com(0x00,0xe2);
        write_com(0x00,0xe3);
//-----------------------------------------
        write_com(0x00,0x11);       //Sleep out
        delay(120);
        write_com(0x00,0x29);       //Display on
}
void write_postion(uint xs,uint xe,uint ys,uint ye)
{       write_com(0x00,0x2A);
        write_dat(0x00,(xs/256));
        write_dat(0x00,(xs%256));
        write_dat(0x00,(xe/256));
        write_dat(0x00,(xe%256));
        write_com(0x00,0x2B);
        write_dat(0x00,(ys/256));
        write_dat(0x00,(ys%256));
        write_dat(0x00,(ye/256));
        write_dat(0x00,(ye%256));
        write_com(0x00,0x2c);
}
```

2.3 Timing Characteristics

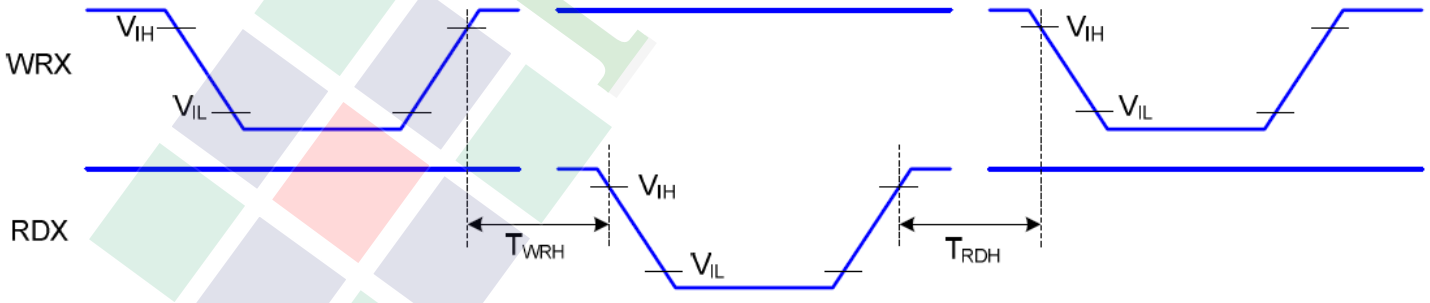
2.3.1 8080 Series MCU Parallel Interface Characteristics：18/16/9/8-bit Bus.



Parallel Interface Timing Characteristics (8080-Series MCU Interface)



Rising and Falling Timing for I/O Signal



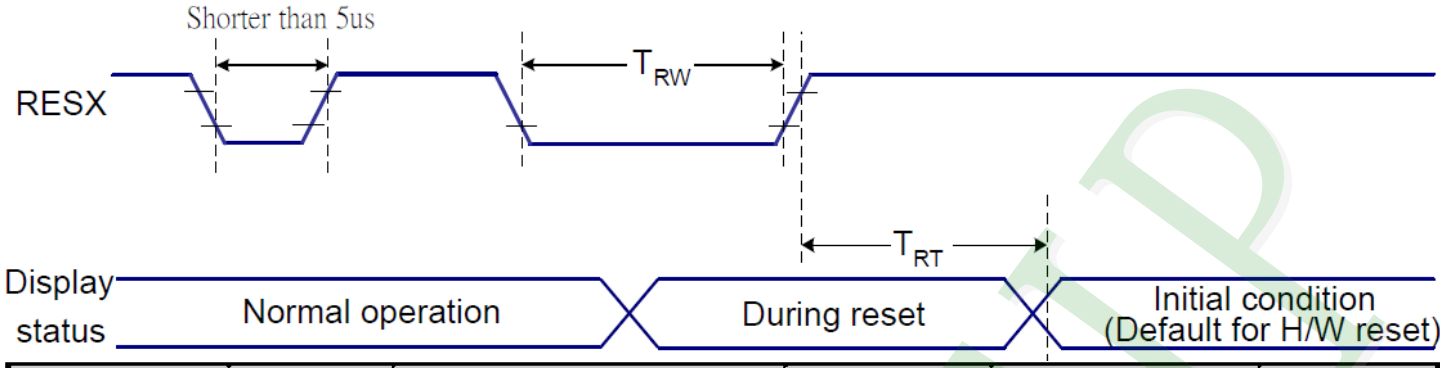
Write-to-Read and Read-to-Write Timing

Note: The rising time and falling time (Tr, Tf) of input signal and fall time are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of IOVDD for Input signals.

Signal	Symbol	Parameter	Min	Max	Unit	Description
D/CX	T_{AST}	Address setup time	0		ns	-
	T_{AHT}	Address hold time (Write/Read)	10		ns	
CSX	T_{CHW}	Chip select "H" pulse width	0		ns	-
	T_{CS}	Chip select setup time (Write)	15		ns	
	T_{RCS}	Chip select setup time (Read ID)	45		ns	
	T_{RCSFM}	Chip select setup time (Read FM)	355		ns	
	T_{CSF}	Chip select wait time (Write/Read)	10		ns	
	T_{CSH}	Chip select hold time	10		ns	
WRX	T_{WC}	Write cycle	66		ns	
	T_{WRH}	Control pulse "H" duration	15		ns	
	T_{WRL}	Control pulse "L" duration	15		ns	
RDX (ID)	T_{RC}	Read cycle (ID)	160		ns	When read ID data
	T_{RDH}	Control pulse "H" duration (ID)	90		ns	
	T_{RDL}	Control pulse "L" duration (ID)	45		ns	
RDX (FM)	T_{RCFM}	Read cycle (FM)	450		ns	When read from frame memory
	T_{RDHFM}	Control pulse "H" duration (FM)	90		ns	
	T_{RDLFM}	Control pulse "L" duration (FM)	355		ns	
D[17:0]	T_{DST}	Data setup time	10		ns	For CL=30pF
	T_{DHT}	Data hold time	10		ns	
	T_{RAT}	Read access time (ID)		40	ns	
	T_{RATFM}	Read access time (FM)		340	ns	
	T_{ODH}	Output disable time	20	80	ns	

8080 Parallel Interface Characteristics

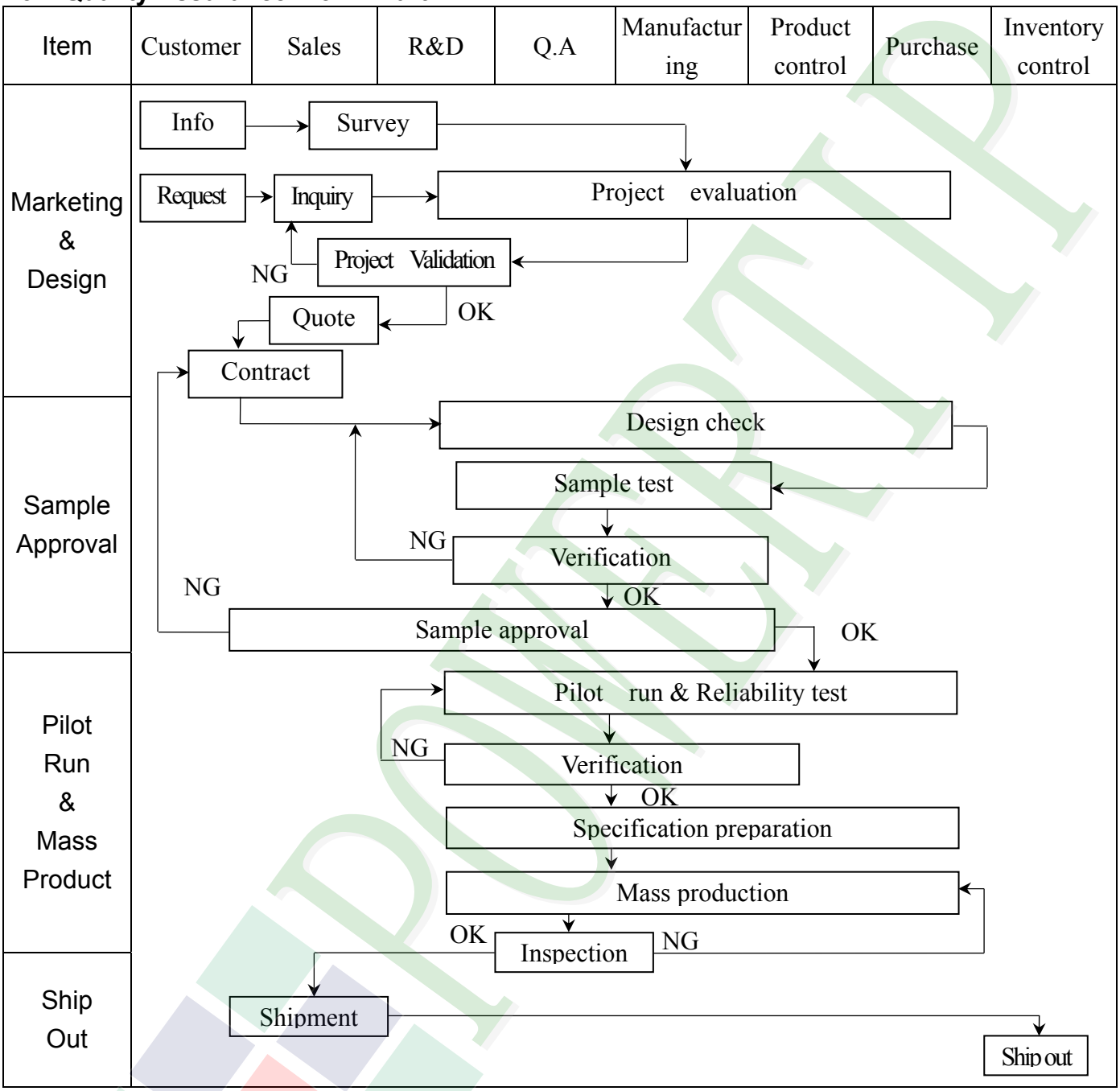
2.3.2 Reset Timing

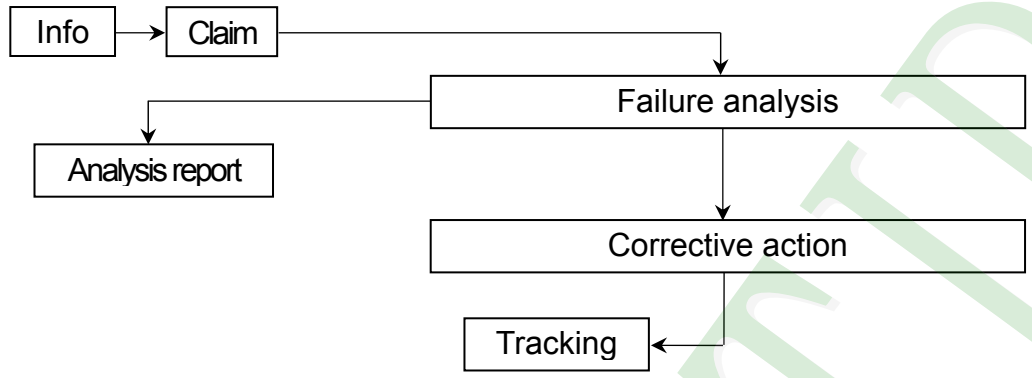


Related Pins	Symbol	Parameter	MIN	MAX	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1, 5)	ms
				120 (Note 1, 6, 7)	ms

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

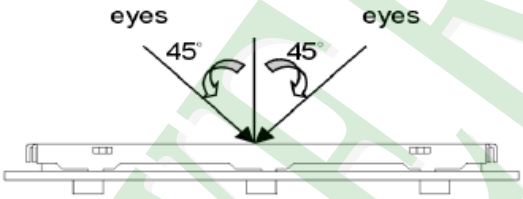
◆OUT Going Defect Level：Sampling.

◆Standard of the product appearance test：

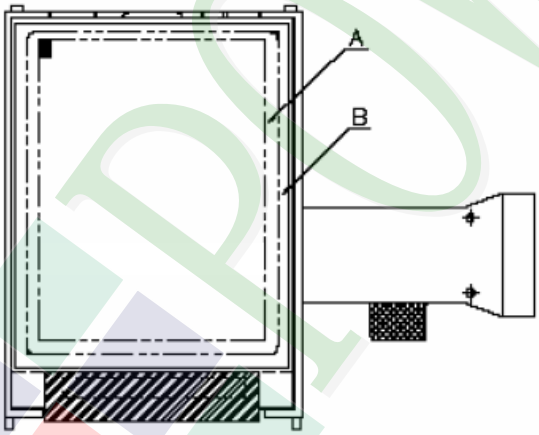
a. Manner of appearance test：

(1). The test best be under 20W×2 fluorescent light，and distance of view must be at 30 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)

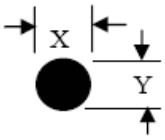
<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td rowspan="3">01</td><td rowspan="3">Product condition</td><td>1.1 The part number is inconsistent with work order of production.</td><td>Major</td></tr>
<tr><td>1.2 Mixed product types.</td><td>Major</td></tr>
<tr><td>1.3 Assembled in inverse direction.</td><td>Major</td></tr>
<tr><td>02</td><td>Quantity</td><td>2.1 The 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="5">04</td><td rowspan="5">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>05</td><td>Dot defect

(Bright dot、Dark dot)

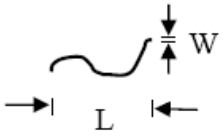
On -display</td><td>
<table>
<tr><th colspan="2">Item</th><th>Acceptance (Q'ty)</th></tr>
<tr><td rowspan="4">Dot Defect</td><td>Bright Dot</td><td>≦ 2</td></tr>
<tr><td>Dark Dot</td><td>≦ 3</td></tr>
<tr><td>Joint Dot</td><td>≦ 2</td></tr>
<tr><td>Total</td><td>≦ 3</td></tr>
</table>
5.1 Inspection 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.
</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

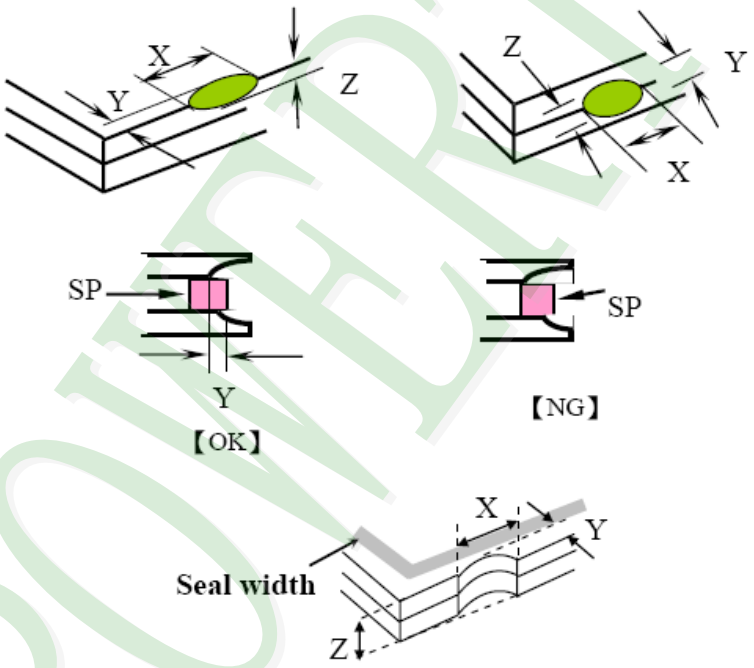
Round type
 

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></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)

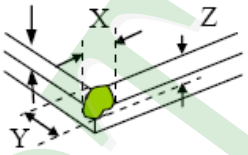
NO	Item	Criterion	Level
08	The crack of glass	Symbols : X : The length of crack Y : The width of crack. Z : The thickness of crack W : terminal length t : The thickness of glass a : LCD side length 8.1 General glass chip : 8.1.1 Chip on panel surface and crack between panels:	Minor

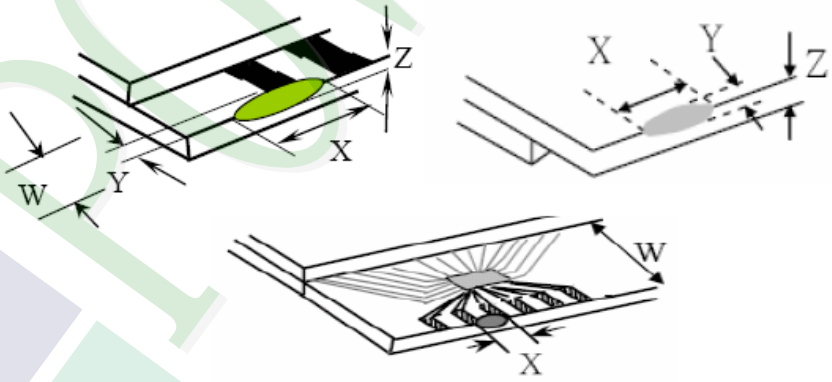


X	Y	Z
≦ a	Crack can't enter viewing area	≦1/2 t
≦ a	Crack can't exceed the half of SP width.	1/2 t < Z ≦2 t

◆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 :
 

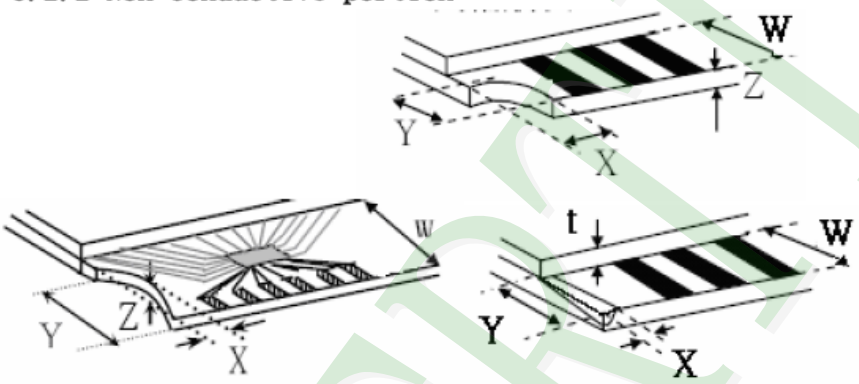
<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦1/5 a</td><td>Crack can’t enter viewing area</td><td>Z ≦ 1/2 t</td></tr>
<tr><td>≦1/5 a</td><td>Crack can’t exceed the half of SP width.</td><td>1/2 t < Z ≦ 2 t</td></tr>
</table></td></tr>
<tr><td>8.2 Protrusion over terminal :
8.2.1 Chip on electrode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

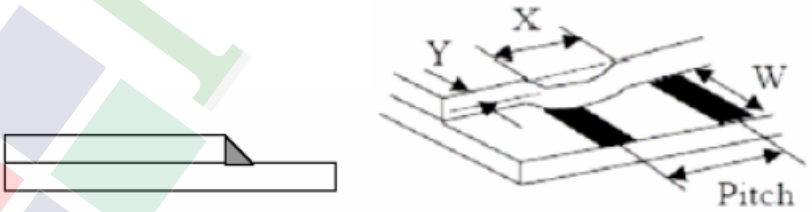
◆Specification For TFT-LCD Module Less Than 3.5″ : (Ver.B01)

<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 the same as on the production characteristic chart .There should 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 +85℃ ±2℃ 96 hrs
Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td>2</td><td>Low Temperature Storage Test</td><td>Keep in -40℃ ±2℃ 96 hrs
Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td>3</td><td>High Temperature / High Humidity Storage Test</td><td>Keep in +60 ℃ / 90% R.H duration for 96 hrs
Surrounding temperature, then storage at normal condition 4hrs.
(Excluding the polarizer)</td></tr>
<tr><td>4</td><td>Temperature Cycling Storage Test</td><td>-40℃ → +25℃ → +85℃ → +25℃
(30mins) (5mins) (30mins) (5mins)
10 Cycle
Surrounding temperature, then storage at normal condition 4hrs.</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>

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

5.3 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.

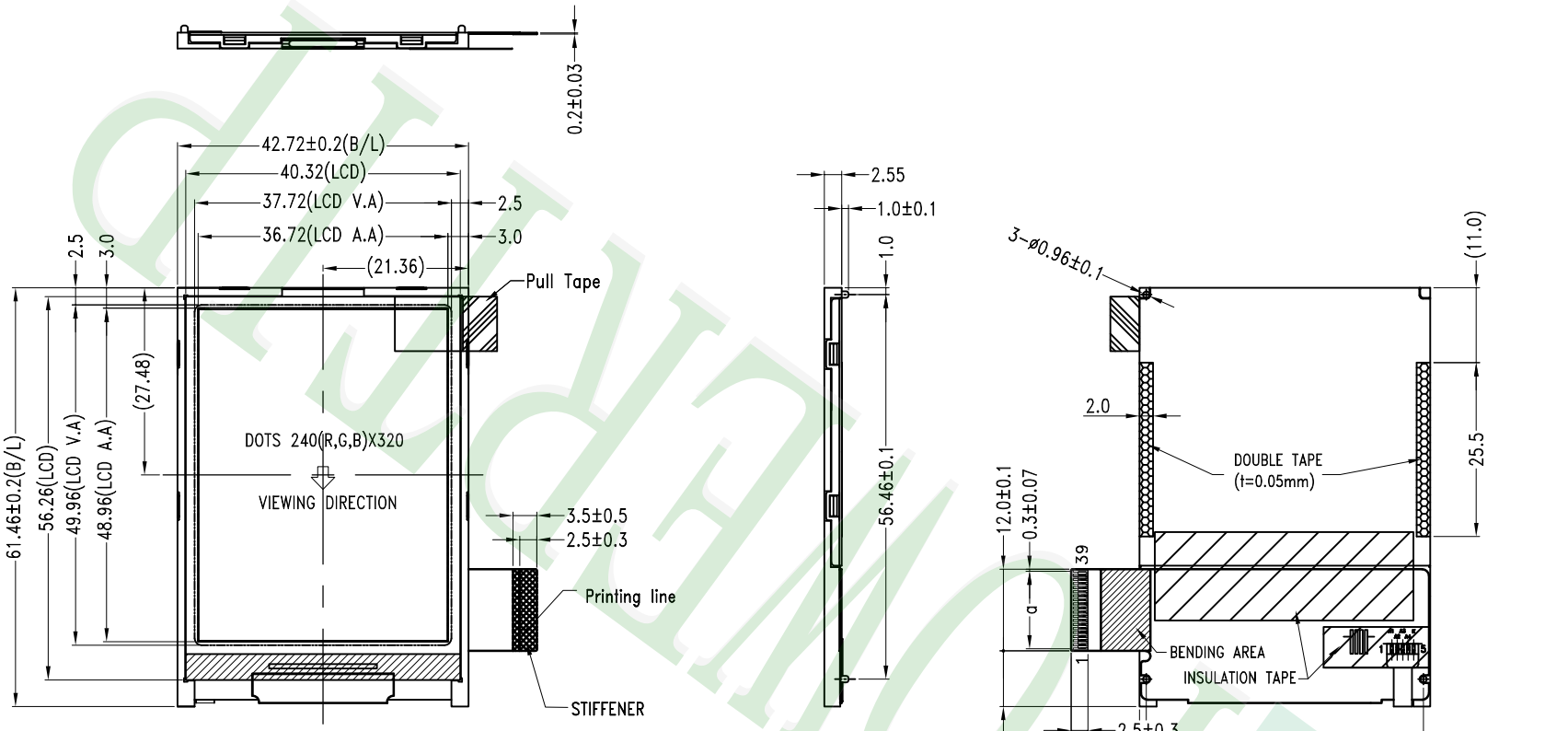
5.4 TERMS OF WARRANTY

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. THE TOLERANCE UNLESS CLASSIFIED±0.3mm
2. R=0.5±0.1mm FOR NOT ASSIGNED
3. OPERATING TEMP:−30°C~80°C
4. STORAGE TEMP:−30°C~85°C
5. VIEWING DIRECTION:12 O'CLOCK
6. a:P0.3x38=11.4±0.03

REV	REV BY	REVISER	DATE
007			
006			
005			
004			
003			
002			
001	NEW DRAWING	Endless	2017/07/25

PART NO: PH240320T062-LAA07

DRAWING NAME : JLMD-PH240320T062-LAA07

TITLE: LCD MODULE DRAWING

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

Design	Endless	(3)	Surface		
Check	Terry	Unit	MM	Material	
Approve	Ryan	Scale	1:1	Thickness	
		Page	1/1	Quantity	

公差精度等級 / 最小長度 (mm)	精級
1 ~ 4	-
4 ~ 16	-
16 ~ 63	-
63 ~ 250	-
250 ~ 1000	-

Ver.002

Documents NO.	JPKG-PH240320T062-LAA07

LCM包裝規格書
LCM Packaging Specifications
(For Tray)

Approve	Check	Contact
Ryan	Terry	Endless

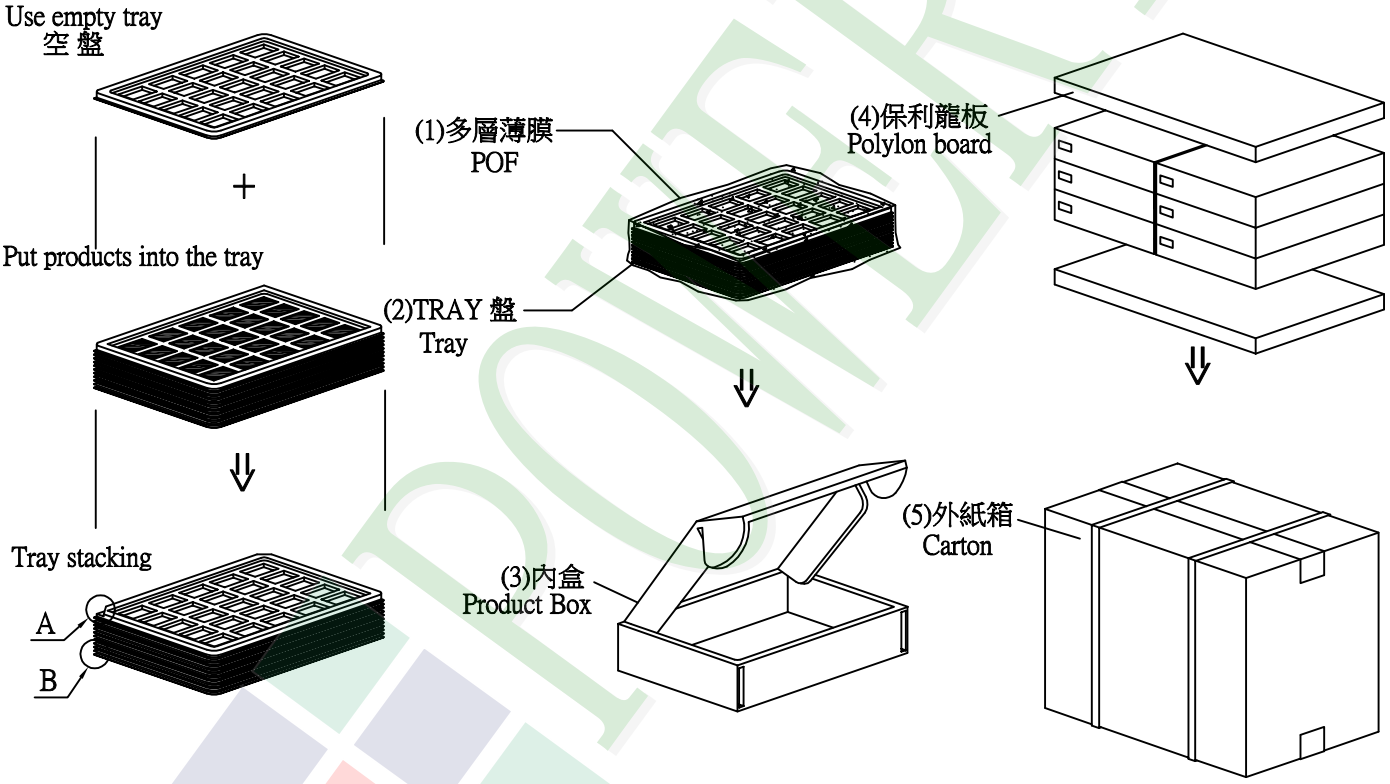
1.包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH240320T062-LAA07	42.72X61.46X2.55	0.012	576	6.912
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	——	6	——
3	TRAY 盤 (2)Tray	TYSG000000077	352 X 260 X 12.8	0.1	54	5.4
4	內盒(3)Product Box	BX36627063ABBA	393 X 274 X 68	0.2692	6	1.6152
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	1.4208	1	1.4208
7						
8						
9						

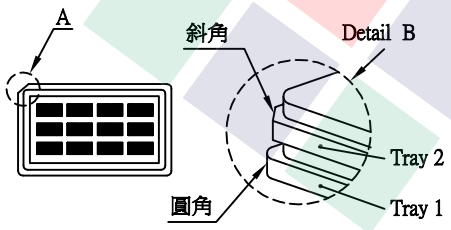
2.一 整箱總重量 (Total LCD Weight in carton) : 15.4 Kg±10%

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

(1)LCM quantity per box : no per tray	12	x no of tray	8	=	96
(2)Total LCM quantity in carton : quantity per box	96	x no of boxes	6	=	576



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.