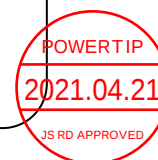


SPECIFICATIONS

CUSTOMER	:	PTC
SAMPLE CODE	:	SH240320T068-LAC10
MASS PRODUCTION CODE	:	PH240320T068-LAC10
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	003
DRAWING NO. (Ver.)	:	JLMD-PH240320T068-LAC10_003
PACKAGING NO. (Ver.)	:	JPKG-PH240320T068-LAC10_001

Customer Approved

Date:



Approved	Checked	Designer
劉進	劉進	陳璐

- ☐ Preliminary specification for design input
- ☒ Specification for sample approval

POWERTIP TECH. CORP.

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History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
12/22/2020	01	001	New Drawing	-	陳璐
03/16/2021	01	002	New Sample	-	陳璐
04/20/2021	01	003	Add CTP FW resolution Add CTP Origin position	9, Appendix	陳璐

Total: 29 Page

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- 1.2 Mechanical Specifications
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2. MODULE STRUCTURE

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- 2.2 Interface Pin Description
- 2.3 Timing Characteristics

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- 3.1 Quality Assurance Flow Chart
- 3.2 Inspection Specification

4. RELIABILITY TEST

- 4.1 Reliability Test Condition

5. PRECAUTION RELATING PRODUCT HANDLING

- 5.1 Safety
- 5.2 Handling
- 5.3 Storage
- 5.4 Terms of Warranty

Appendix : LCM Drawing
LCM Packaging

Note : For detailed information please refer to IC data sheet :
Primacy(TFT LCD): Sitronix : ST7789VI

1. SPECIFICATIONS

1.1 Features

Main LCD panel

Item	Standard Value
Display Type	240(R、G、B) * 320 Dots
LCD Type	Normally white , Transmissive type
Screen size(inch)	2.8 inch
Viewing Direction	12 O'clock
Color configuration	RGB-Strip
Interface	8/16-bit 80-system I/F
Other(controller/driver IC)	Sitronix: ST7789VI
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website : http://www.powertip.com.tw/news.php?area_id_view=1085560481/

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	55.8(W) * 75.0 (L) * 5.15 (H)	mm

LCD panel

Item	Standard Value	Unit
Active Area	43.2 (W) * 57.6 (L)	mm

Touch panel

Item	Standard Value	Unit
View Area	44.2 (W) * 58.6 (L)	mm
Active Area	45.2 (W) * 59.6 (L)	mm

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit
System Power Supply Voltage	VCC	-	-0.3	+4.6	V
	VGH ~ VGL	-	-0.3	+30	V
Input Voltage	VIN	-	-0.3	VCC+0.5	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

Module

GND = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage ¹	VCC	-	2.4	2.8	3.6	V
Input High Voltage	V _{IH}	-	0.7 VCC	-	VCC	V
Input Low Voltage	V _{IL}	-	GND	-	0.3 VCC	V
Output High Voltage	V _{OH}	I _{OH} =-0.1mA	0.8*VCC	-	VCC	V
Output Low Voltage	V _{OL}	I _{OL} =0.1mA	GND	-	0.2*VCC	V
Supply Current	ICC	VCC = 2.8V	-	8	12	mA

1.5 Optical Characteristics

TFT LCD Module

VCC = 2.8V, Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	unit	-
Response time		Tr+ Tf	-	-	30	45	ms	Note2
Viewing angle	Top	θY+	CR ≥ 10	-	60	-	Deg.	Note4
	Bottom	θY-		-	60	-		
	Left	θX-		-	60	-		
	Right	θX+		-	60	-		
Contrast ratio		CR	-	500	600	-	-	Note3
Color of CIE Coordinate (With B/L)	White	X	IF=80 mA	0.25	0.30	0.35	-	Note1
		Y		0.26	0.31	0.36		
	Red	X		0.57	0.62	0.67		
		Y		0.30	0.35	0.40		
	Green	X		0.28	0.33	0.38		
		Y		0.55	0.60	0.65		
	Blue	X		0.10	0.15	0.20		
		Y		0.03	0.08	0.13		
Average Brightness Pattern=white display (With B/L) *1		IV	IF=80 mA	220	300	-	cd/m ²	
Uniformity (With B/L)*2		△B	IF=80 mA	70	-	-	%	

Note 1:

*1 : $\Delta B = B(\min) / B(\max) * 100\%$

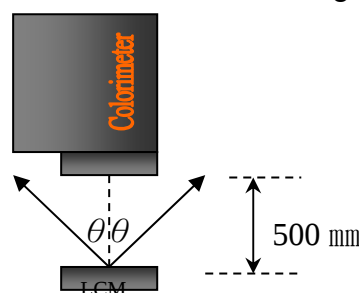
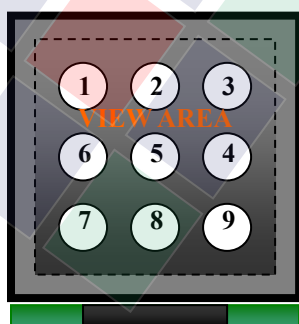
*2 : Measurement Condition for Optical Characteristics:

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

b : Measurement Distance: 500 ± 50 mm , (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%



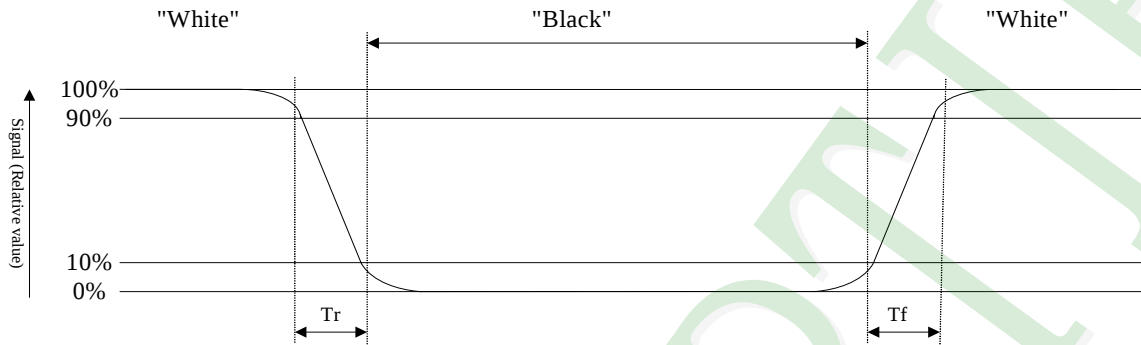
Colorimeter=BM-7 fast

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:



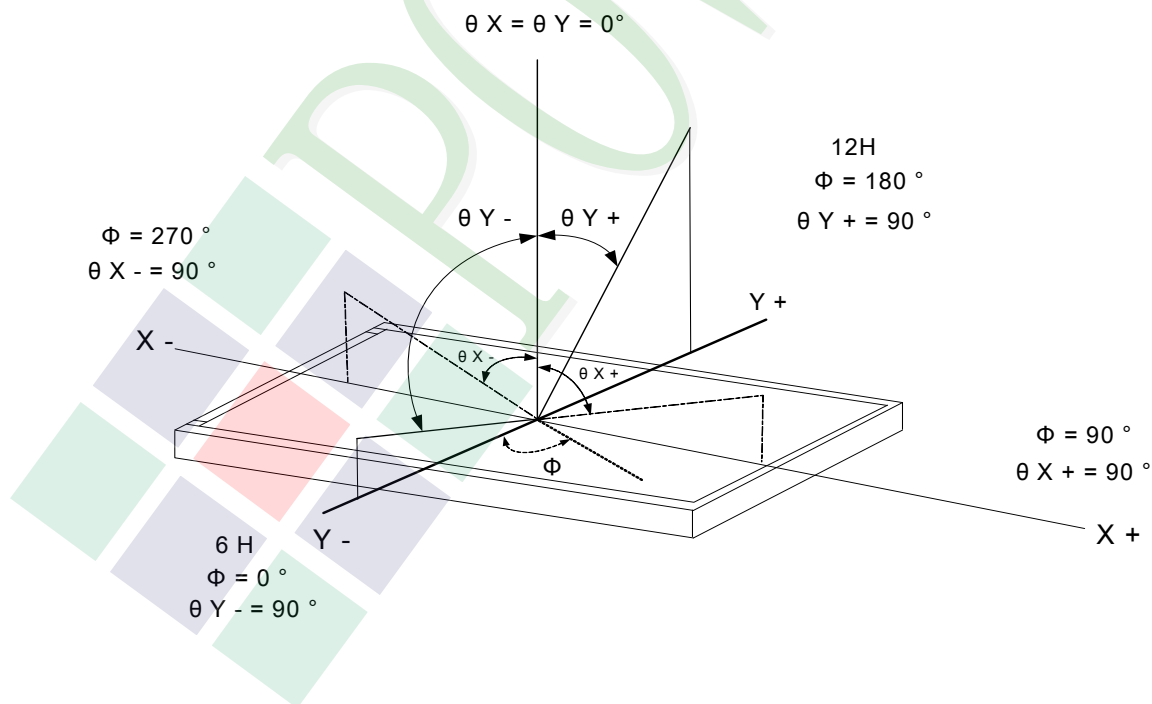
Note3: Definition of contrast ratio:

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

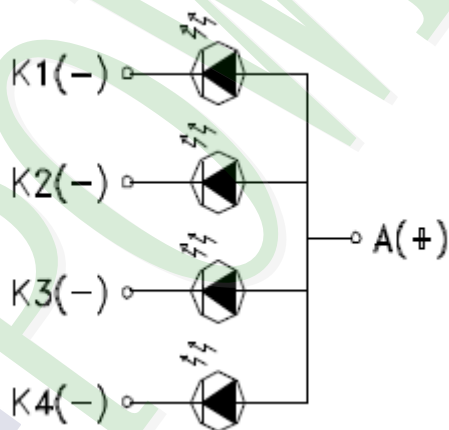
Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25℃	-	30*4	mA
Reverse Voltage	VR	Ta =25℃	-	5	V
Power Dissipation	PD	Ta =25℃	-	90*4	mW

Electrical / Optical Characteristics

Electrical / Optical Characteristics						
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 80 mA	3.0	-	3.6	V
Average Brightness (without LCD)	IV		5000	5500	-	cd/m ²
CIE Color Coordinate (Without LCD)	X		0.26	0.28	0.33	-
	Y		0.26	0.28	0.33	
Color	White					

Internal Circuit



Other Description

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

1.7 Touch Panel Characteristics

Features

Item	Standard Value
Touch Panel Size	2.8"
Touch type	Capacitive Touch Panel
Input Method	True Multi-Touch Capacitive Touch Panel True Multi-touch with up to 5 Points of Absolution
Output Interface	I ² C
IC	ST1624
FW resolution	240*320

I²C Address

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	1	1	1	0	0	0	R/W

Bit 0: 0 for Write / 1 for Read

Mechanical Specifications

Item	Standard Value	Unit
Active Area	45.2 (W) x 59.6 (L)	mm

Absolute Maximum Ratings

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

DC Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	TPVDD	-	2.8	3.3	3.6	V
Input High Voltage	VIH	-	0.85 TPVDD	-	-	V
Input Low Voltage	VIL	-	-	-	0.15 TPVDD	V

Optical Characteristics

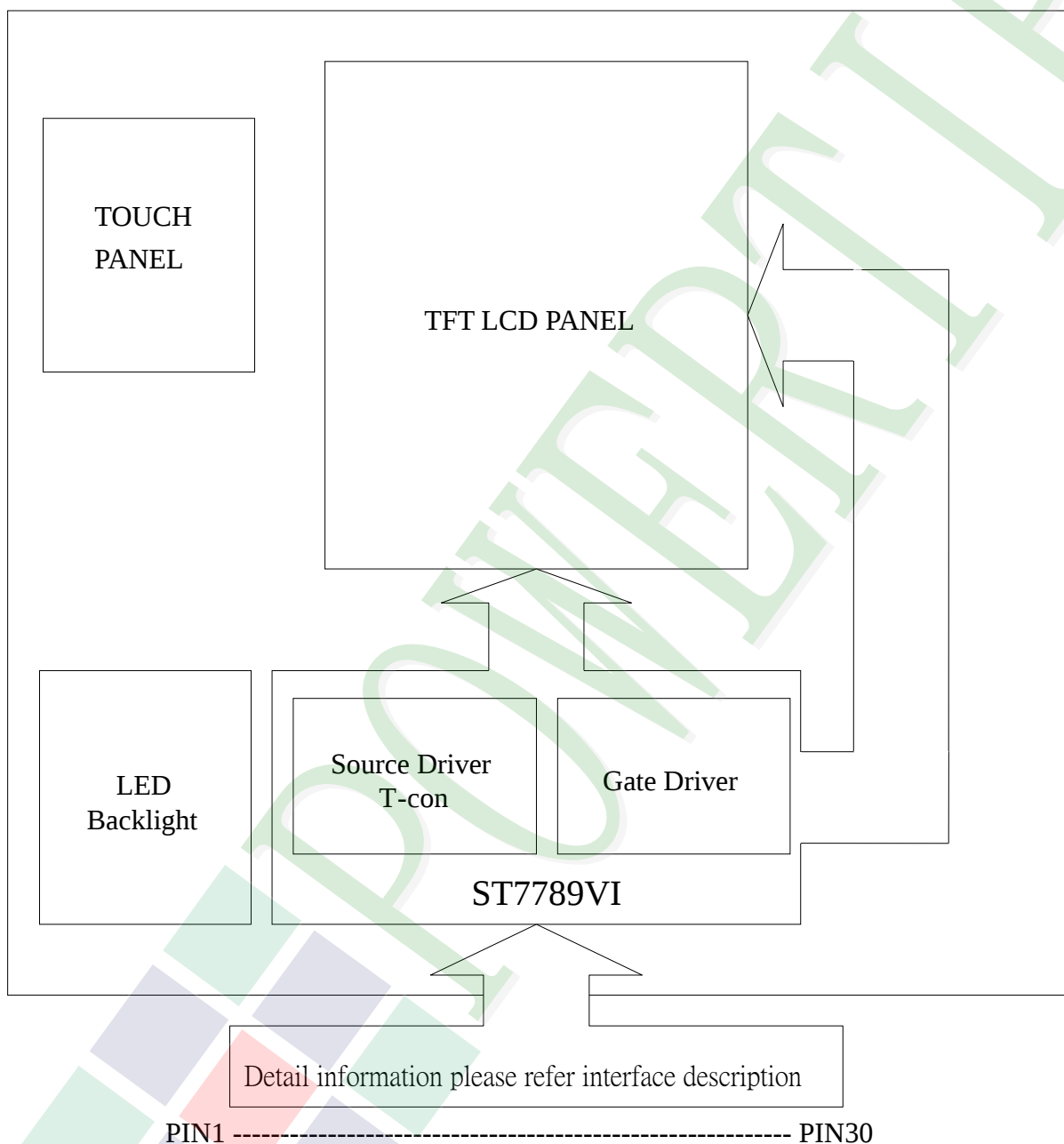
Item	Standard Value	Unit
Response Time	≤25ms	
Total light transmittance	85% or more	-
Surface Hardness	≥6H	-

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	LEDK1-4	Power supply for LED Backlight Cathode input
2	LEDA	Power supply for LED Backlight Anode input
3	GND	Signal ground.(0V)
4	IM0	MCU interface mode select , When IM0=0:16bit , When IM0=1: 8bit
5	RESET	Reset input pin for TFT LCD. When RESET is "L", initialization is executed.
6	CS	Chip select signal , Active at "L"
7	RS	When RS = 0: Command. When RS = 1: Display data.
8	WR	Write signal input , active at Low.
9	RD	Read signal input , active at Low.
10	GND	Signal ground.(0V)
11	DB1	Bi-directional data bus
12	DB2	
13	DB3	
14	DB4	
15	DB5	
16	DB6	
17	DB7	
18	DB8	
19	DB10	
20	DB11	
21	DB12	
22	DB13	
23	DB14	
24	DB15	
25	DB16	
26	DB17	

Pin No.	Symbol	Function
27	GND	Signal ground.(0V)
28	2.8 /VCC	Power supply for the internal logic circuit.
29	2.8 /VCC	Power supply for the internal logic circuit.
30	2.8 /VCC	Power supply for the internal logic circuit.

Touch Panel

Pin No.	Symbol	Function
1	Shield	ESD Ground.
2	SCL	I2C serial clock.
3	SDA	I2C serial data.
4	TPVDD	TP Power supply.
5	RESET	System reset signal input, active low.
6	INT	Indicate coordinate data ready.
7	IOVDD	TP I/O power supply.
8	NC	No connection.

2.2.1 Reference Initial code

```
void LCD_Init(void)
```

```
{
```

```
    lcddev.width=240;
```

```
    lcddev.height=320;
```

```
    LCD_WR_REG(0x01);
```

```
    delay_ms(100);
```

```
    LCD_WR_REG(0x11);
```

```
    delay_ms(120);
```

```
    LCD_WR_REG(0x36);
```

```
    LCD_WR_DATA(0x00);
```

```
    LCD_WR_REG(0x3a);
```

```
    LCD_WR_DATA(0x55);
```

```
    LCD_WR_REG(0xb2);
```

```
    LCD_WR_DATA(0x0C);
```

```
    LCD_WR_DATA(0x0C);
```

```
    LCD_WR_DATA(0x00);
```

```
    LCD_WR_DATA(0x33);
```

```
    LCD_WR_DATA(0x33);
```

```
    LCD_WR_REG(0xb7);
```

```
    LCD_WR_DATA(0x35);
```

```
    LCD_WR_REG(0xbb);
```

```
    LCD_WR_DATA(0x19);
```

```
    LCD_WR_REG(0xc0);
```

```
    LCD_WR_DATA(0x2c);
```

```
    LCD_WR_REG(0xc2);
```

```
    LCD_WR_DATA(0x01);
```

```
LCD_WR_REG(0xc3);  
LCD_WR_DATA(0x12);
```

```
LCD_WR_REG(0xc4);  
LCD_WR_DATA(0x20);
```

```
LCD_WR_REG(0xc6);  
LCD_WR_DATA(0x0f);
```

```
LCD_WR_REG(0xd0);  
LCD_WR_DATA(0xa4);  
LCD_WR_DATA(0xa1);
```

```
/*-----Gamma Set-----*/
```

```
LCD_WR_REG(0xe0);  
LCD_WR_DATA(0xd0);  
LCD_WR_DATA(0x04);  
LCD_WR_DATA(0x0d);  
LCD_WR_DATA(0x11);  
LCD_WR_DATA(0x13);  
LCD_WR_DATA(0x2b);  
LCD_WR_DATA(0x3f);  
LCD_WR_DATA(0x54);  
LCD_WR_DATA(0x4c);  
LCD_WR_DATA(0x18);  
LCD_WR_DATA(0x0d);  
LCD_WR_DATA(0x0b);  
LCD_WR_DATA(0x1f);  
LCD_WR_DATA(0x23);
```

```
LCD_WR_REG(0xe1);  
LCD_WR_DATA(0xd0);  
LCD_WR_DATA(0x04);  
LCD_WR_DATA(0x0c);  
LCD_WR_DATA(0x11);  
LCD_WR_DATA(0x13);  
LCD_WR_DATA(0x2c);  
LCD_WR_DATA(0x3f);  
LCD_WR_DATA(0x44);
```

```
LCD_WR_DATA(0x51);  
LCD_WR_DATA(0x2f);  
LCD_WR_DATA(0x1f);  
LCD_WR_DATA(0x1f);  
LCD_WR_DATA(0x20);  
LCD_WR_DATA(0x23);  
/*-----Gamma Set End-----*/  
  
LCD_WR_REG(0x29);    //Display on  
}
```

2.3 Timing Characteristics

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

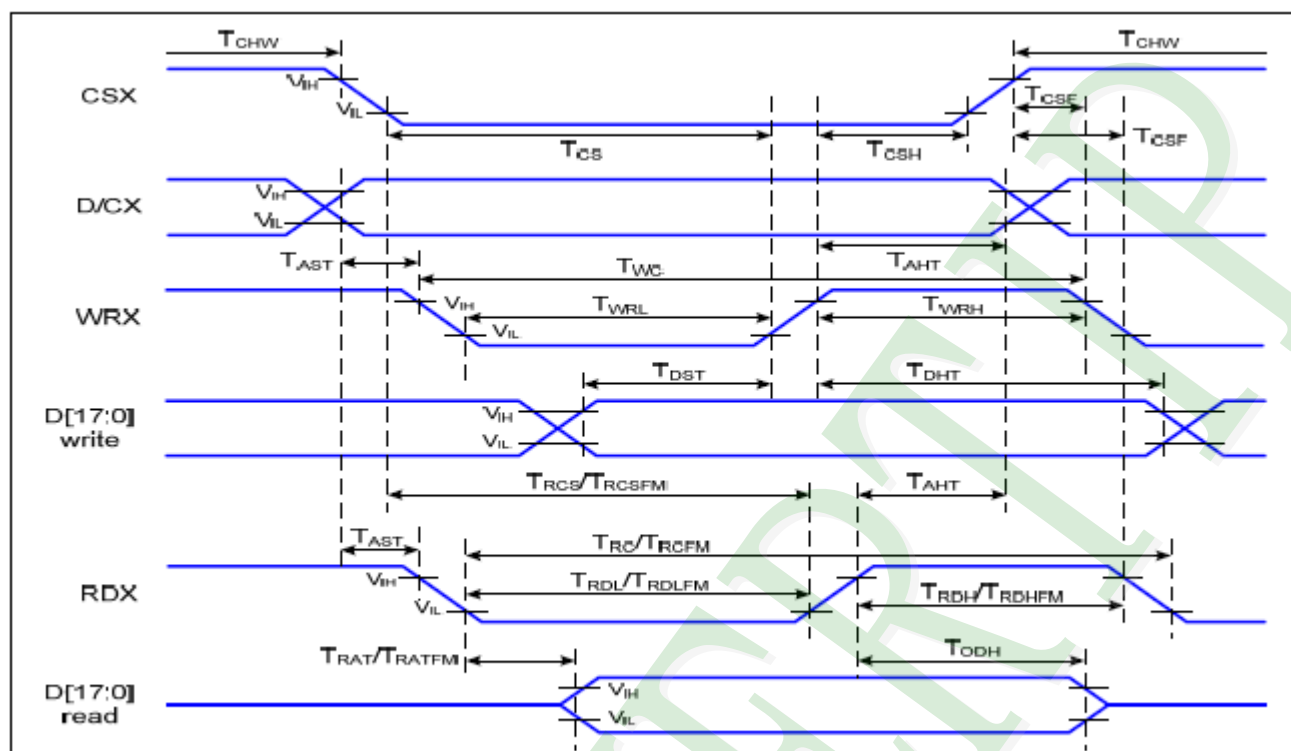
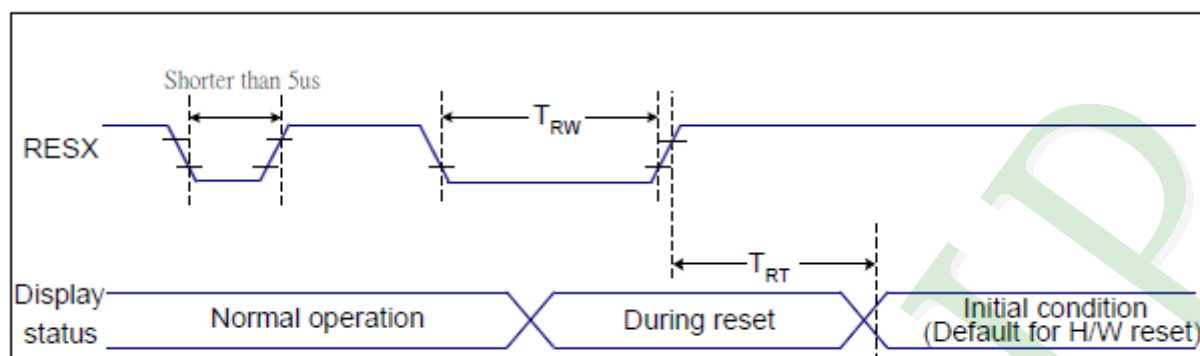


Figure 1 Parallel Interface Timing Characteristics (8080-Series MCU Interface)

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

Reset Timing:



Reset Timing

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

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

Reset Timing

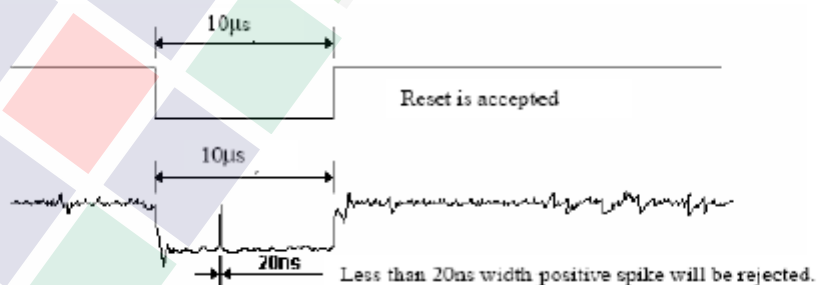
Notes:

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:

RESX 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.

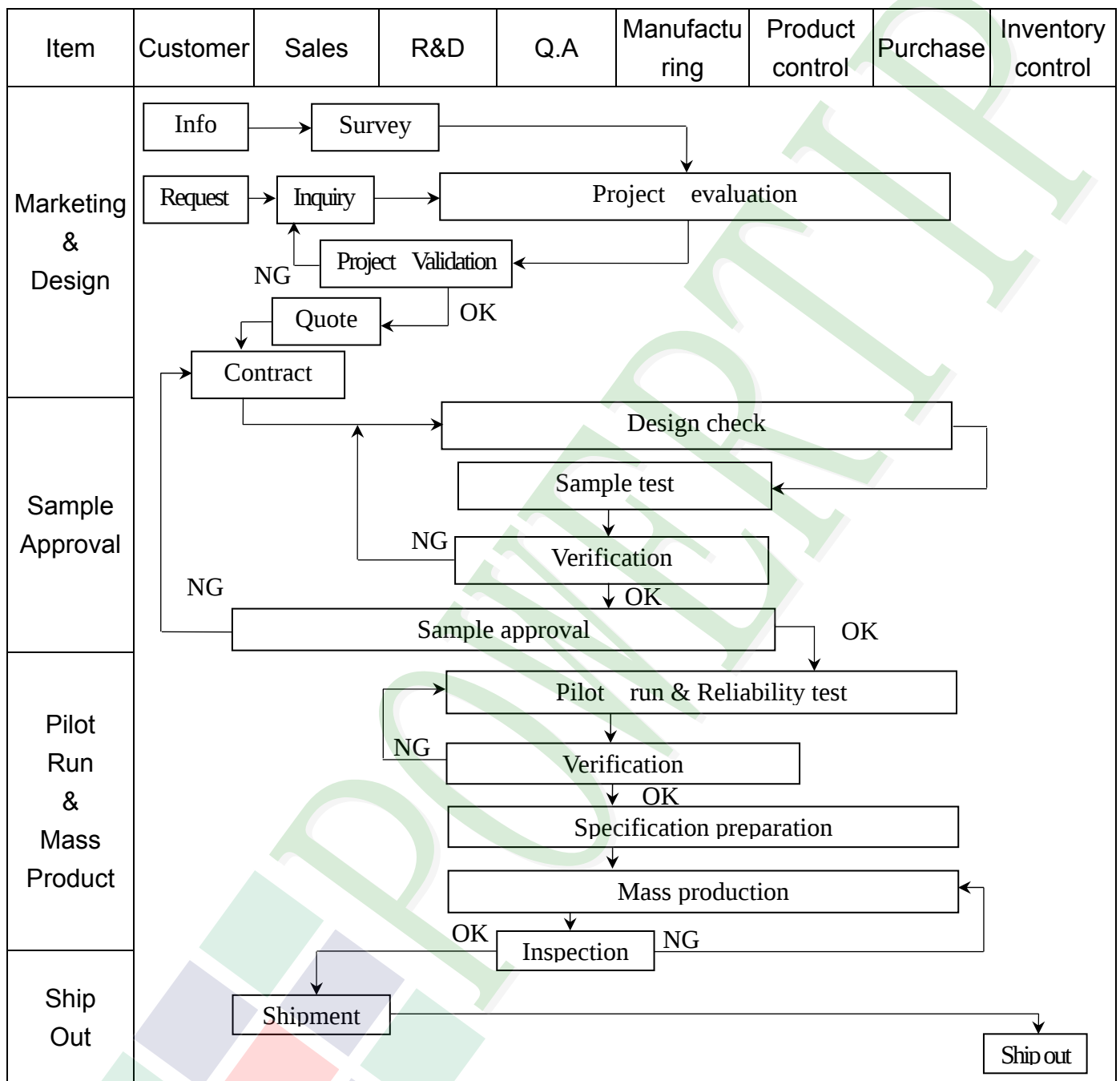
4. Spike Rejection also applies during a valid reset pulse as shown below:

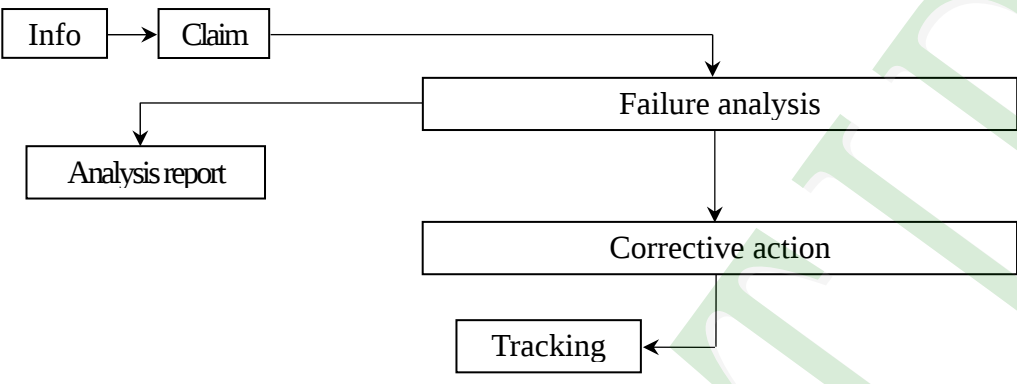


5. When Reset applied during Sleep In Mode.
6. When Reset applied during Sleep Out Mode.
7. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

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	 <pre> graph TD Info[Info] --> Claim[Claim] Claim --> Failure[Failure analysis] Failure --> Analysis[Analysis report] Failure --> Corrective[Corrective action] Corrective --> Tracking[Tracking] </pre>							
Q.A Activity	1. ISO 9001 Maintenance Activities 3. Equipment calibration 5. Standardization Management				2. Process improvement proposal 4. Education And Training Activities			

3.2. Inspection Specification

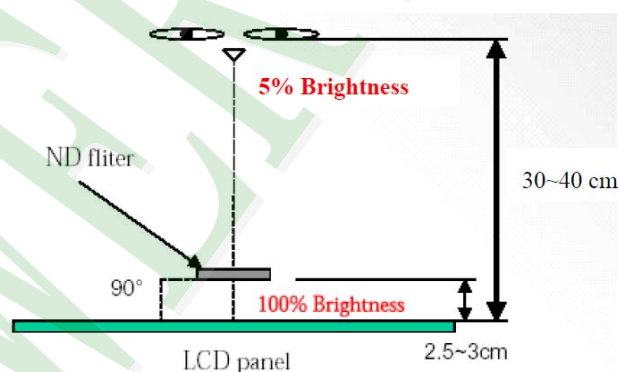
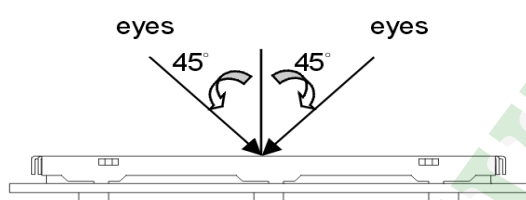
- ◆Scope : The document shall be applied to TFT-LCD Module for less than 3.5" (Ver.B01).
- ◆Inspection Standard : MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆Equipment : Gauge 、MIL-STD 、Powertip Tester 、Sample
- ◆Defect Level : Major Defect AQL : 0.4 ; Minor Defect AQL : 1.5
- ◆OUT Going Defect Level: Sampling.
- ◆Standard of the product appearance test :

a. Manner of appearance test :

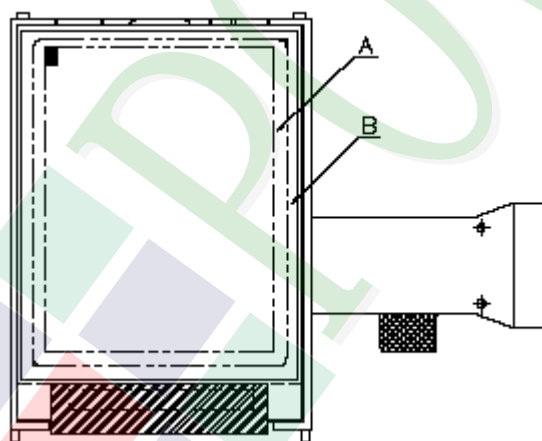
(1). The test best be under 20W×2 fluorescent light (about 300lux ~500lux)

， 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

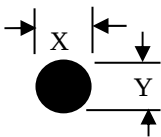
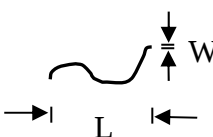
B area : Outside of viewing area

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

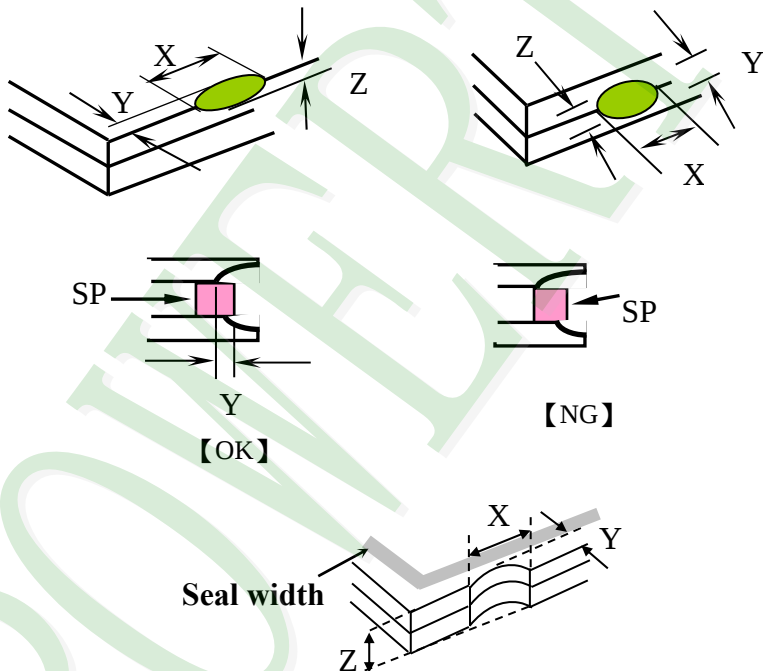
◆Specification For TFT-LCD Module Less Than 3.5" :
(Ver.B01)

NO	Item	Criterion	Level												
01	Product condition	1. 1The part number is inconsistent with work order of production.	Major												
		1. 2 Mixed product types.	Major												
		1. 3 Assembled in inverse direction.	Major												
02	Quantity	2. 1The quantity is inconsistent with work order of production.	Major												
03	Outline dimension	3. 1 Product dimension and structure must conform to structure diagram.	Major												
04	Electrical Testing	4. 1 Missing line character and icon.	Major												
		4. 2 No function or no display.	Major												
		4. 3 Display malfunction.	Major												
		4. 4 LCD viewing angle defect.	Major												
		4. 5 Current consumption exceeds product specifications.	Major												
		4.6 Mura cannot be seen through 5% ND filter at 50% Gray , should be judged by the viewing angle of 90 degree.	Minor												
05	Dot defect (Bright dot 、 Dark dot) On -display	<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>	Item		Acceptance (Q'ty)	Dot Defect	Bright Dot	≤ 2	Dark Dot	≤ 3	Joint Dot	≤ 2	Total	≤ 3	Minor
		Item		Acceptance (Q'ty)											
Dot Defect	Bright Dot	≤ 2													
	Dark Dot	≤ 3													
	Joint Dot	≤ 2													
	Total	≤ 3													
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 that can not be seen through 5% ND filter.															

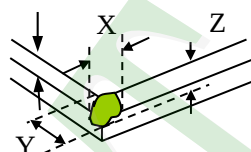
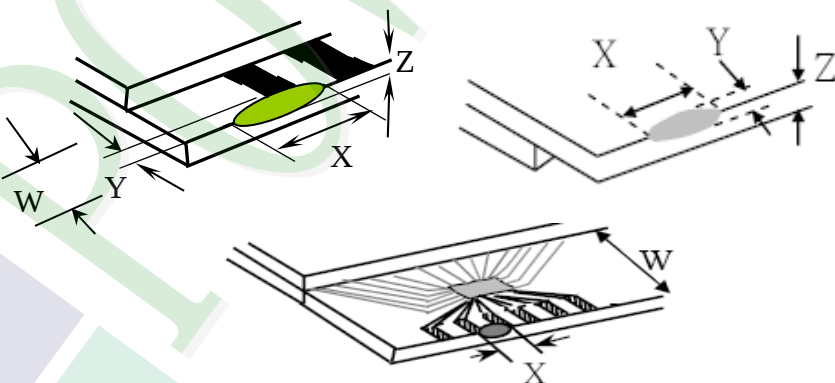
◆ Specification For TFT-LCD Module Less Than 3.5" :
(Ver.B01)

NO	Item	Criterion	Level																																						
06	Black or white dot 、 scratch 、 contamination Round type  $\Phi=(x+y) / 2$ Line type 	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>$\Phi \leq 0.15$</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.15 < \Phi \leq 0.20$</td><td>2</td></tr><tr><td>$0.20 < \Phi \leq 0.30$</td><td>2</td></tr><tr><td>$\Phi > 0.30$</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>$W \leq 0.03$</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$L \leq 5.0$</td><td>$0.03 < W \leq 0.05$</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>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.15$	Ignore	Ignore	$0.15 < \Phi \leq 0.20$	2	$0.20 < \Phi \leq 0.30$	2	$\Phi > 0.30$	0	Total	3		Dimension		Acceptance (Q'ty)		Length (L)	Width (W)	A area	B area	---	$W \leq 0.03$	Ignore	Ignore	$L \leq 5.0$	$0.03 < W \leq 0.05$	3	---	$W > 0.05$	As round type	Total		3	Minor
Dimension (diameter : Φ)	Acceptance (Q'ty)																																								
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07	Polarizer Bubble	<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>$\Phi \leq 0.20$</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.20 < \Phi \leq 0.50$</td><td>3</td></tr><tr><td>$\Phi > 0.50$</td><td>0</td></tr><tr><td>Total</td><td>3</td></tr></table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.20$	Ignore	Ignore	$0.20 < \Phi \leq 0.50$	3	$\Phi > 0.50$	0	Total	3	Minor																								
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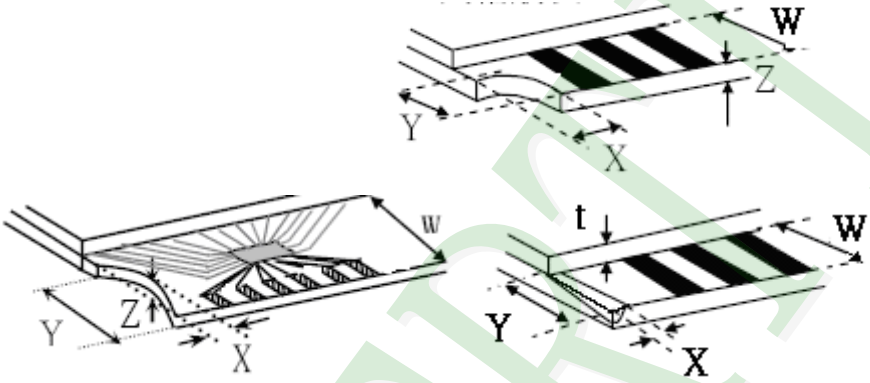
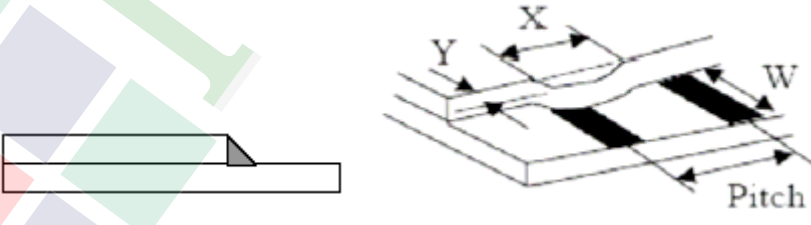
◆Specification For TFT-LCD Module Less Than 3.5" :
(Ver.B01)

NO	Item	Criterion	Level									
08	The crack of glass	Symbols : X : The length of crack Z : The thickness of crack t : The thickness of glass Y : The width of crack. W : terminal length a : LCD side length 8.1 General glass chip : 8.1.1 Chip on panel surface and crack between panels:  【OK】 【NG】 <table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>$\leq a$</td><td>Crack can't enter viewing area</td><td>$\leq 1/2 t$</td></tr><tr><td>$\leq a$</td><td>Crack can't exceed the half of SP width.</td><td>$1/2 t < Z \leq 2 t$</td></tr></table>	X	Y	Z	$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$	$\leq a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$	Minor
X	Y	Z										
$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$										
$\leq a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$										

◆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 Z : The thickness of crack t : The thickness of glass Y : The width of crack. W : terminal length a : LCD side length	Minor									
		8.1.2 Corner crack :  <table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>$\leq 1/5 a$</td><td>Crack can't enter viewing area</td><td>$Z \leq 1/2 t$</td></tr><tr><td>$\leq 1/5 a$</td><td>Crack can't exceed the half of SP width.</td><td>$1/2 t < Z \leq 2 t$</td></tr></table>		X	Y	Z	$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$	$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$
		X		Y	Z							
$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$										
$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$										
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>$\leq a$</td><td>$\leq 1/2 W$</td><td>$\leq t$</td></tr><tr><td>Back</td><td>$\leq a$</td><td>$\leq W$</td><td>$\leq 1/2 t$</td></tr></table>		X	Y	Z	Front	$\leq a$	$\leq 1/2 W$	$\leq t$	Back	$\leq a$	$\leq W$	$\leq 1/2 t$
	X	Y	Z									
Front	$\leq a$	$\leq 1/2 W$	$\leq t$									
Back	$\leq a$	$\leq W$	$\leq 1/2 t$									

◆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 Z : The thickness of crack t : The thickness of glass Y : The width of crack. W : terminal length a : LCD side length	Minor												
		8.2.2 Non-conductive portion :  <table border="1"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </tr> <tr> <td>$\leq 1/3 a$</td> <td>$\leq W$</td> <td>$\leq t$</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 border="1"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </tr> <tr> <td>$\leq a$</td> <td>$\leq 1/3 W$</td> <td>$\leq t$</td> </tr> </table>		X	Y	Z	$\leq 1/3 a$	$\leq W$	$\leq t$	X	Y	Z	$\leq a$	$\leq 1/3 W$	$\leq t$
		X		Y	Z										
$\leq 1/3 a$	$\leq W$	$\leq t$													
X	Y	Z													
$\leq a$	$\leq 1/3 W$	$\leq t$													

◆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

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 $320 \pm 10^{\circ}\text{C}$ 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 $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ 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.

Ver.001	LCM包裝規格書		Approve	Check	Contact
Documents NO.	JPKG-PH240320T068-LAC10	LCM Packaging Specifications (For Tray)	Liu Jin	Air	Bob

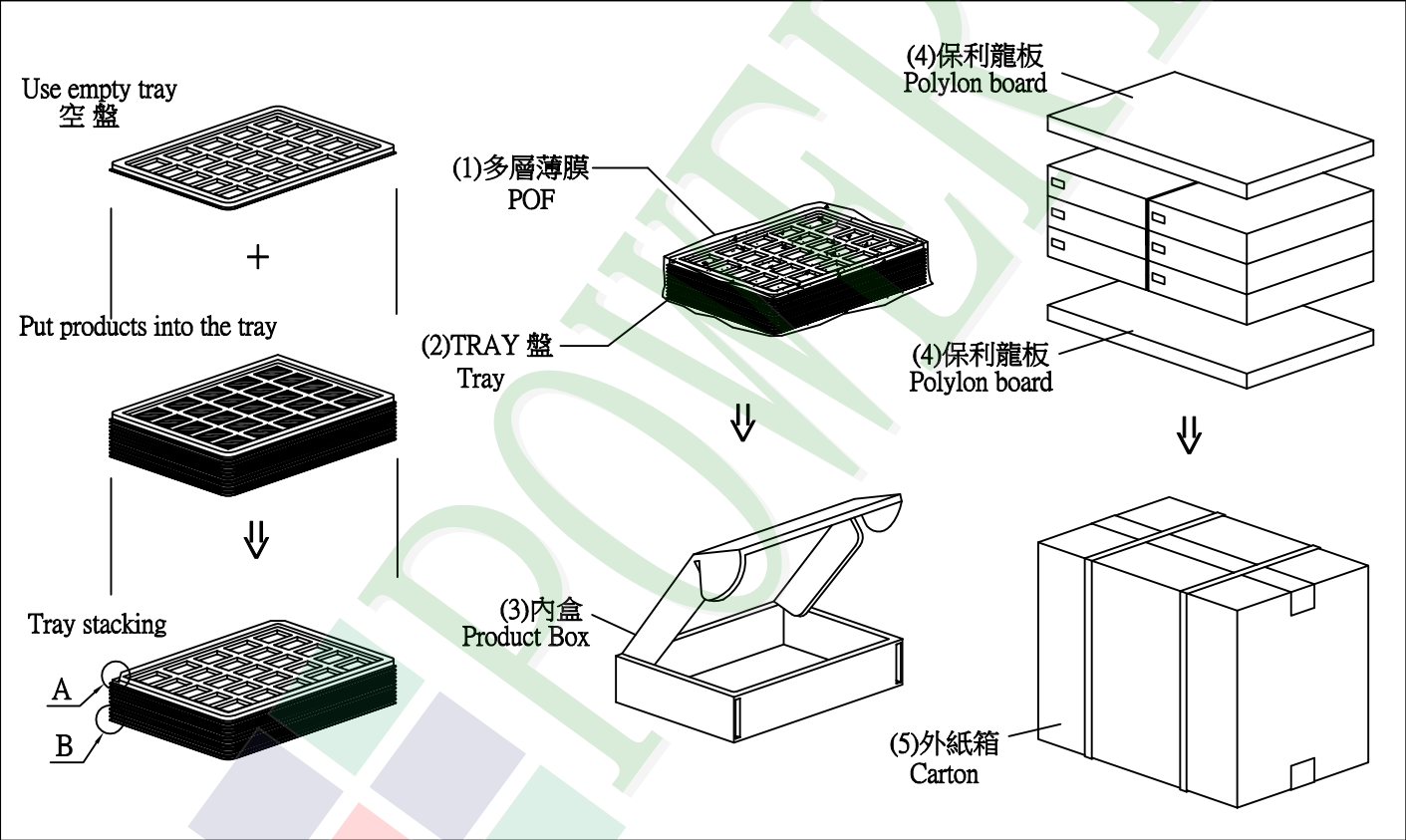
1.包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH240320T068-LAC10	75.0 X 55.8 X 5.15	0.028	240	6.72
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	——	6	——
3	TRAY 盤 (2)Tray	TYSG000000549	352 X 260 X 13.95	0.1	36	3.6
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) : 12.47 Kg±10%

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

(1)LCM quantity per box : no per tray	8	x no of tray	5	=	40
(2)Total LCM quantity in carton : quantity per box	40	x no of boxes	6	=	240



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.		
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