

SPECIFICATIONS

CUSTOMER	:	_____
SAMPLE CODE	:	SH800480T033-IFC03
MASS PRODUCTION CODE	:	PH800480T033-IFC03
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	001
DRAWING NO. (Ver.)	:	LMD-PH800480T033-IFC03(Ver.001)
PACKAGING NO. (Ver.)	:	PKG-PH800480T033-IFC03(Ver.001)

Customer Approved
Date:

Approved	Checked	Designer
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- Preliminary specification for design input
- Specification for sample approval

POWERTIP TECH. CORP.

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Note : For detailed information please refer to IC data sheet :
FTDI -- FT813

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Resolution	800 * 3 (RGB) * 480 Dots
LCD Type	a-Si TFT , Normally white, Transmissive type
Touch Panel	True Multi-Touch Capacitive Touch Panel True Multi-touch with up to 5 Points of Absolution
Screen size(inch)	5.0 inch
Viewing Direction	6 O'clock (Gray scale Inversion) *1
	12 O'clock (*2)
Color configuration	RGB Vertical Strip
Backlight Type	White LED B/L
Weight	110g
Interface	SPI
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website : http://www.powertip.com.tw/news_detail.php?Key=1&clD=1

Note:

- *1. For saturated color display content (eg. pure-red, pure-green, pure-blue or pure-colors -combinations).
- *2. "For display content based upon multicolor images eg. photos, RGB defined user interfaces"

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	131.0(W) x 90.5 (L) x 10.0 (max) (H)	mm
Active Area	108.0 (W) * 64.8 (L)	mm

Note : For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Power Supply for TFT Panel	VDD	GND=0	-0.3	+4.0	V	-
Power Supply for Backlight Unit	VCC	GND=0	-0.3	+20.0	V	
Operating Temperature	T _{OP} (Ts)	Note 1	-20	70	°C	
Storage Temperature	T _{ST} (Ta)	Note 2	-30	80	°C	

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 for TFT Panel	VDD	GND=0V	3.0	3.3	3.6	V
Power Supply for Backlight Unit	VCC	GND=0V	5	12	15	V
Input Voltage for TFT Panel	V _{IH}	GND=0V	2.0	-	VDD	V
	V _{IL}	GND=0V	0	-	0.8	
Supply Current for TFT Panel	IDD	IDD@VDD=3.3V	-	130	160	mA
Supply Current for Backlight Unit	ICC	ICC@VCC=5V	-	400	600	

1.5 Optical Characteristics

VDD= 3.3 V, Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	unit	-	
Response time	Tr+Tf	25°C	-	-	30	45	ms	-	
Viewing angle	Top	$\theta Y+$	CR \geq 10		60	-	Deg.	Note 4	
	Bottom	$\theta Y-$			60	-			
	Left	$\theta X-$			60	-			
	Right	$\theta X+$			60	-			
Contrast ratio		CR		500	600	-	-	Note 3	
Color of CIE Coordinate (With B/L & T/P)	White	X	Ta = 25°C $\theta X, \theta Y = 0^\circ$		0.24	0.29	0.34	-	Note 1
		Y			0.26	0.31	0.36		
	Red	X			0.51	0.56	0.61		
		Y			0.28	0.33	0.38		
	Green	X			0.29	0.34	0.39		
		Y			0.55	0.59	0.64		
	Blue	X			0.08	0.13	0.18		
		Y			0.03	0.08	0.13		
Average Brightness Pattern=white display (With T/P)*1		IV	VCC=12V (Duty Setting:128)	650	800	-	cd/m ²	Note 1	
Uniformity (With T/P)*2		ΔB	VCC=12V (Duty Setting:128)	70	-	-	%	Note 1	

Note 1:

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

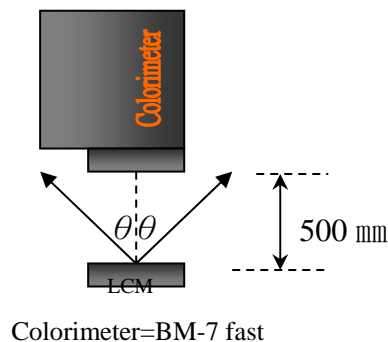
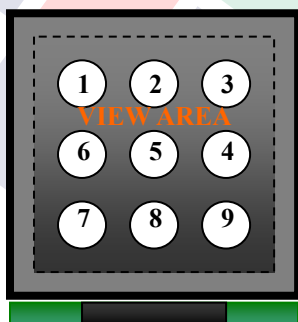
*2 : Measurement Condition for Optical Characteristics:

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 , ($\theta = 0^\circ$)

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%



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



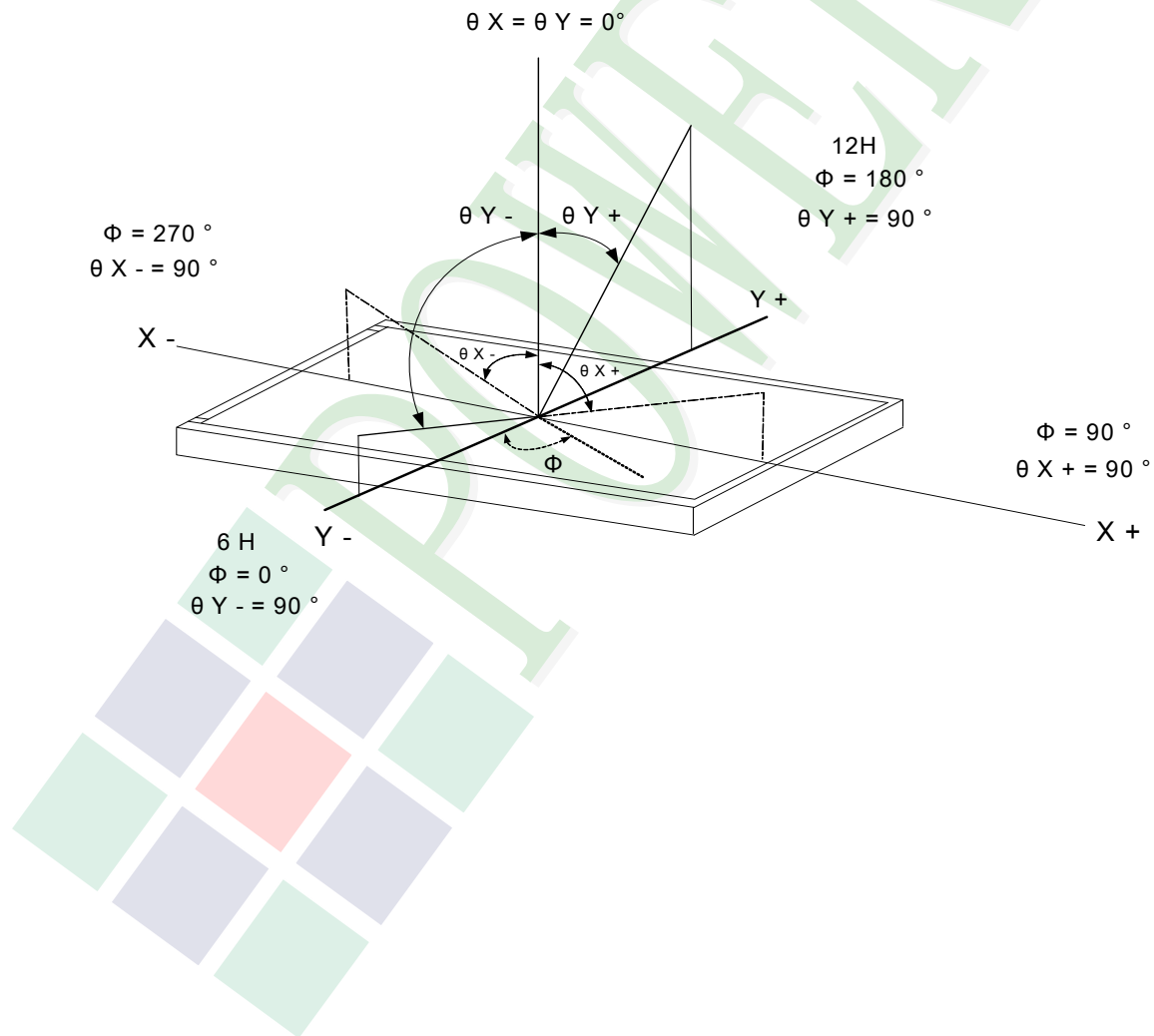
Note3: Definition of contrast ratio:

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:



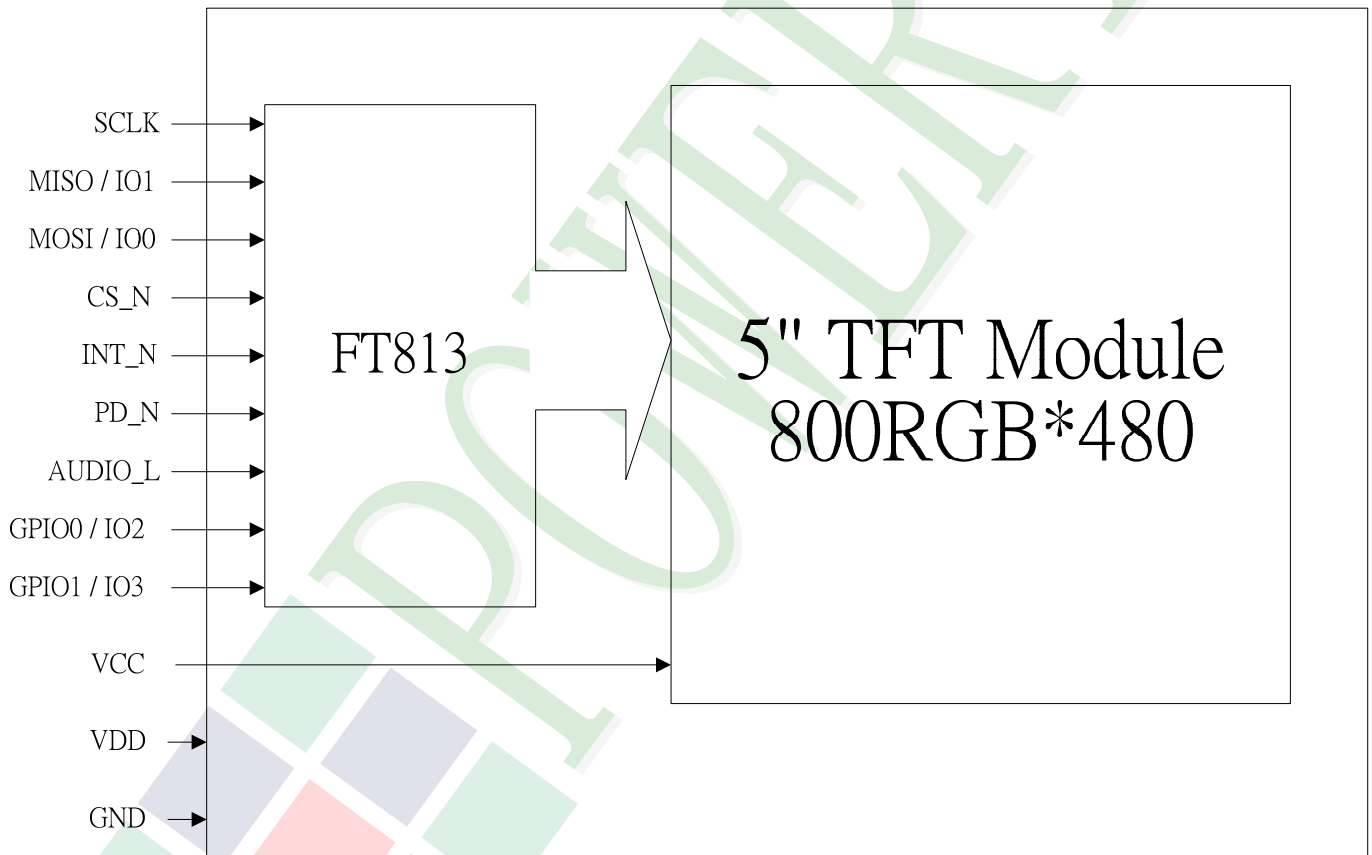
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



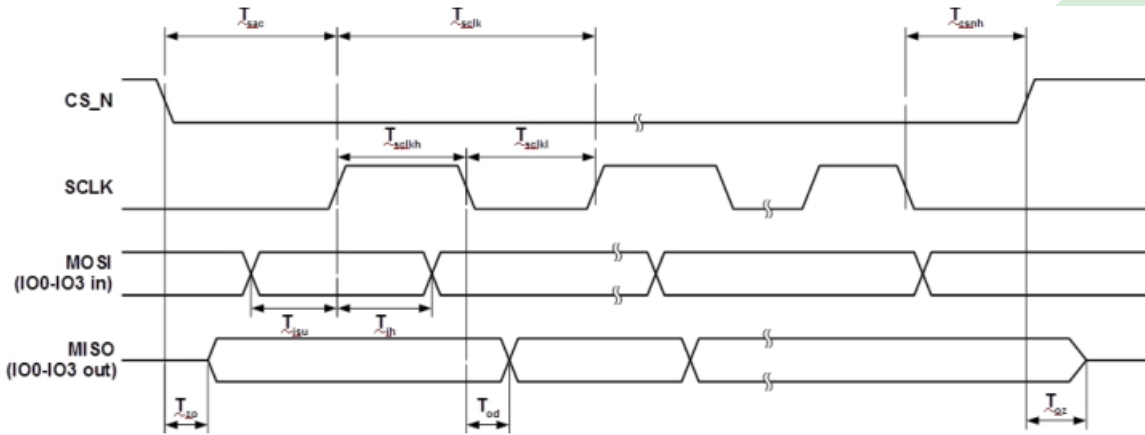
2.2 Interface Pin Description

Pin#	Name	DESCRIPTION
1	GND	Ground.
2	VCC	Power Supply for Backlight Unit.
3	VCC	Power Supply for Backlight Unit.
4	NC	Not Used.
5	VDD	Power Supply.
6	GND	Ground.
7	NC	Not Used.
8	AUDIO_L	Audio PWM out
9	NC	Not Used.
10	SCLK	SPI SCK Signal.
11	MISO / IO1	SPI Single mode: SPI MISO output SPI Dual/Quad mode: SPI data line 1
12	MOSI / IO0	SPI Single mode: SPI MOSI input SPI Dual/Quad mode: SPI data line 0
13	CS_N	SPI slave select input
14	INT_N	Interrupt to host, open drain output(default) or push-pull output, active low
15	PD_N	Chip power down mode control input, active low.
16	GPIO0 / IO2	SPI Single/Dual mode: General purpose IO 0. SPI Quad mode: SPI data line 2.
17	GPIO1 / IO3	SPI Single/Dual mode: General purpose IO 1. SPI Quad mode: SPI data line 3.
18	FT813_GPIO2	Connect with FT813 GPIO 2 (pin 12)
19	FT813_GPIO3	Connect with FT813 GPIO 3 (pin 15)
20	GND	Ground.

REG_SPI_WIDTH[1:0]	Channel Mode	Data pins	Max bus speed
00	SINGLE – default mode	MISO, MOSI	30 MHz
01	DUAL	IO0, IO1	30 MHz
10	QUAD	IO0, IO1, IO2, IO3	25 MHz
11	Reserved	-	-

2.3 Timing Characteristics

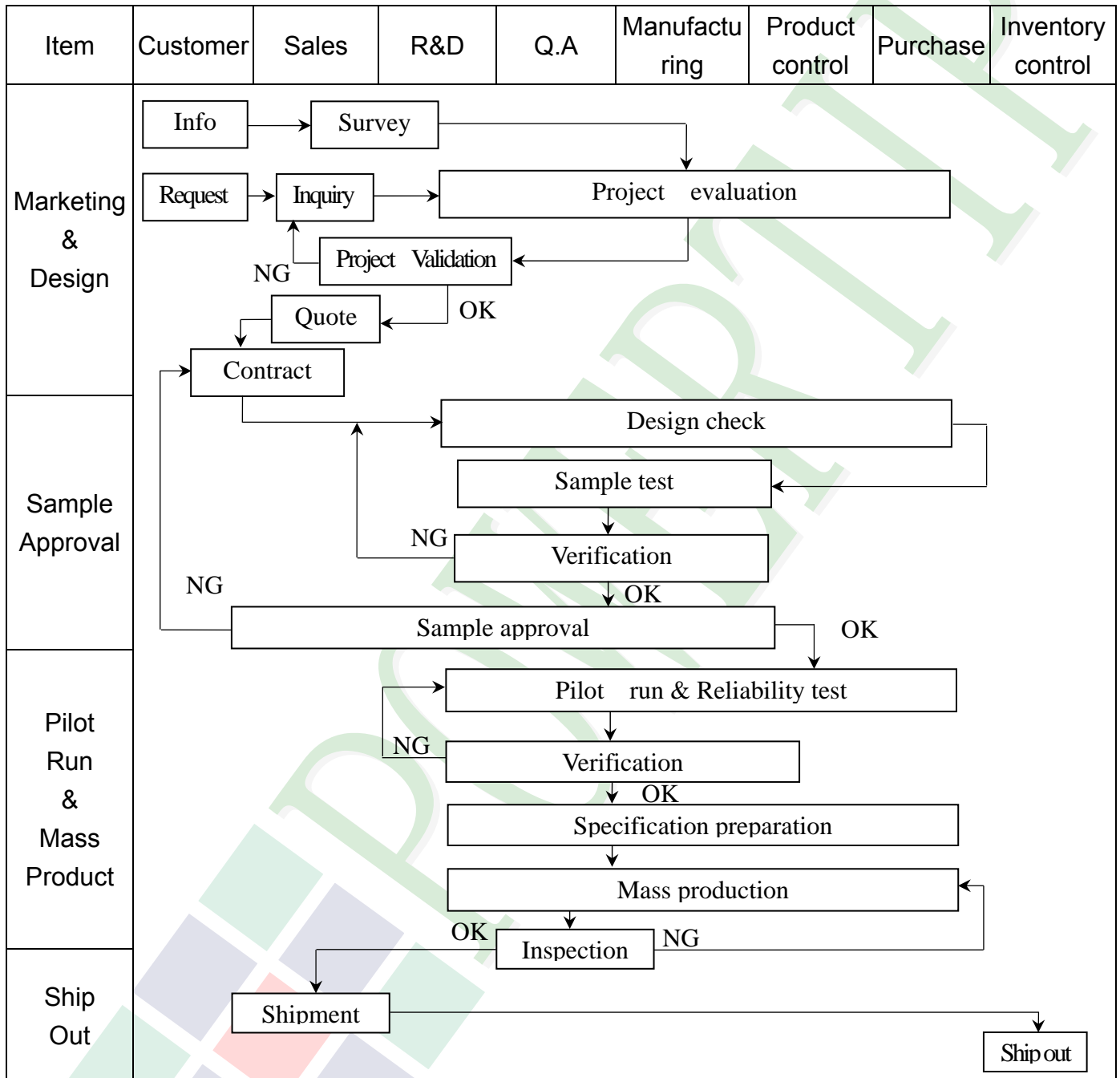
2.3.1 SPI Host interface

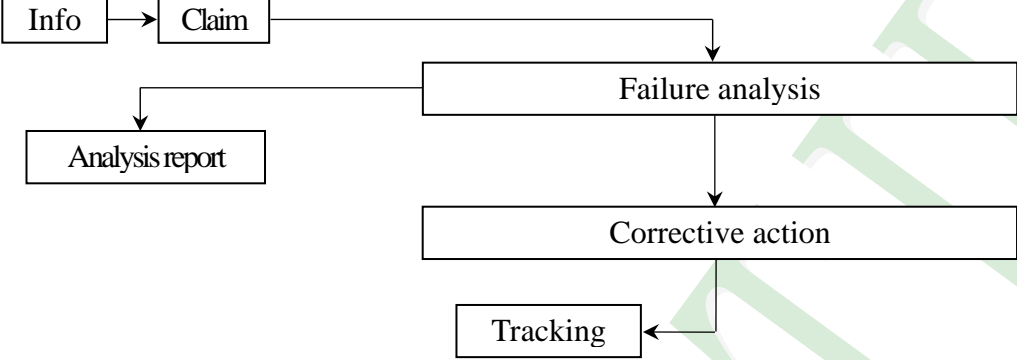


Parameter	Description	Min	Max	Units
Tsclk	SPI clock period (SINGLE/DUAL mode)	33.3		ns
Tsclk	SPI clock period (QUAD mode)	40		ns
Tsckl	SPI clock low duration	13		ns
Tsclkh	SPI clock high duration	13		ns
Tsac	SPI access time	4		ns
Tisu	Input Setup	4		ns
Tih	Input Hold	0		ns
Tzo	Output enable delay		16	ns
Toz	Output disable delay		13	ns
Tod	Output data delay		15	ns
Tcsnh	CSN hold time	0		ns

3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



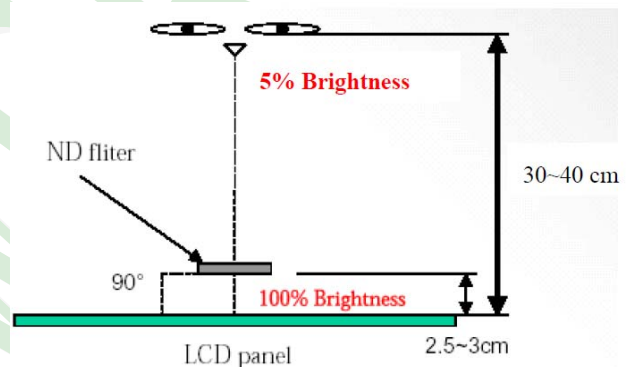
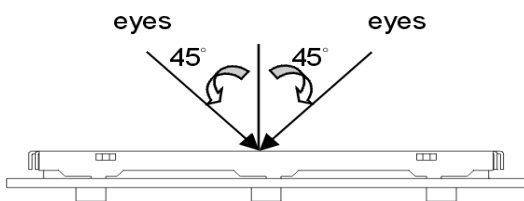
Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service	 <pre> graph TD Info[Info] --> Claim[Claim] Claim --> FA[Failure analysis] Claim --> AR[Analysis report] FA --> CA[Corrective action] CA --> Tracking[Tracking] </pre>							
Q.A Activity	1. ISO 9001 Maintenance Activities 3. Equipment calibration 5. Standardization Management				2. Process improvement proposal 4. Education And Training Activities			

3.2. Inspection Specification

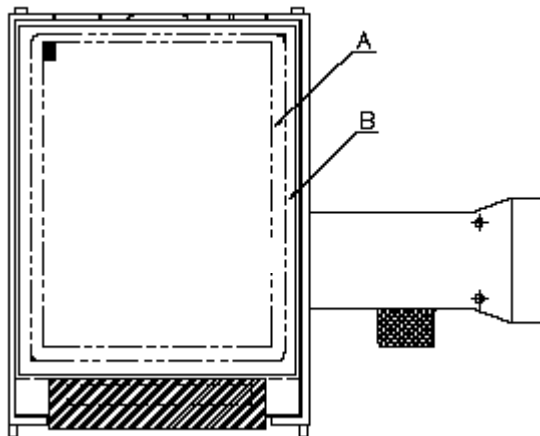
- ◆Scope: The document shall be applied to TFT-LCD Module for 3.5" -15" (Ver.B01).
- ◆Inspection Standard: MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆Equipment: Gauge, MIL-STD, Powertip Tester, Sample
- ◆Defect Level: Major Defect AQL: 0. 4; Minor Defect AQL: 1. 5
- ◆OUT Going 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

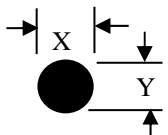
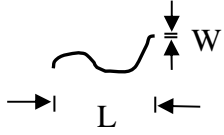
(4). Standard of inspection : (Unit : mm)

◆Specification For TFT-LCD Module 3.5" ~15" :
(Ver.B01)

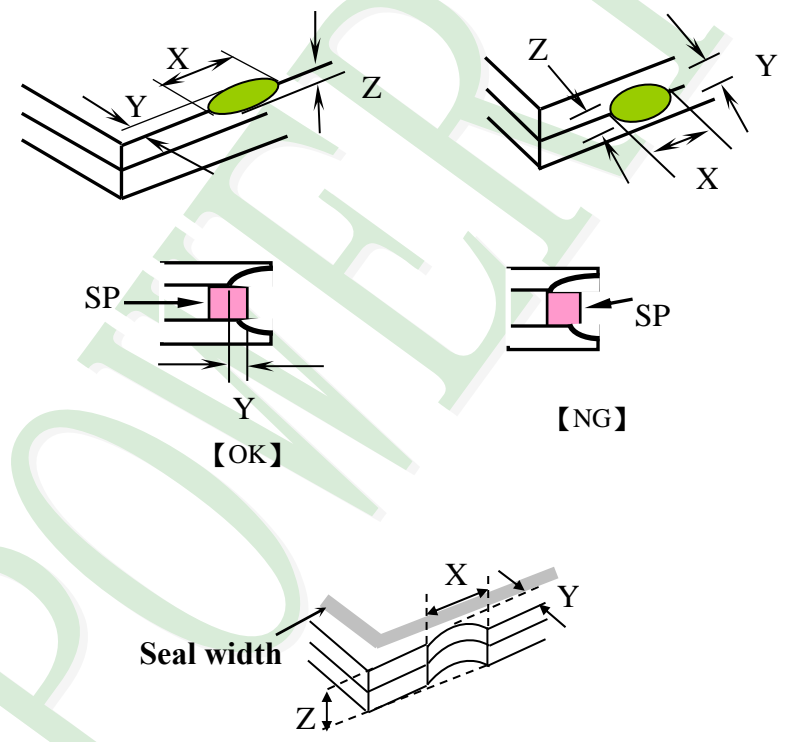
NO	Item	Criterion	Level												
01	Product condition	1. 1The part number is inconsistent with work order of production.	Major												
		1. 2 Mixed product types.	Major												
		1. 3 Assembled in inverse direction.	Major												
02	Quantity	2. 1The quantity is inconsistent with work order of production.	Major												
03	Outline dimension	3. 1Product 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. 6Mura 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 border="1"> <thead> <tr> <th></th> <th>Item</th> <th>Acceptance (Q'ty)</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Dot Defect</td> <td>Bright Dot</td> <td>≤ 4</td> </tr> <tr> <td>Dark Dot</td> <td>≤ 5</td> </tr> <tr> <td>Joint Dot</td> <td>≤ 3</td> </tr> <tr> <td>Total</td> <td>≤ 7</td> </tr> </tbody> </table>		Item	Acceptance (Q'ty)	Dot Defect	Bright Dot	≤ 4	Dark Dot	≤ 5	Joint Dot	≤ 3	Total	≤ 7	Minor
			Item	Acceptance (Q'ty)											
Dot Defect	Bright Dot	≤ 4													
	Dark Dot	≤ 5													
	Joint Dot	≤ 3													
	Total	≤ 7													
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.															

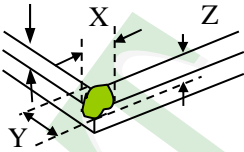
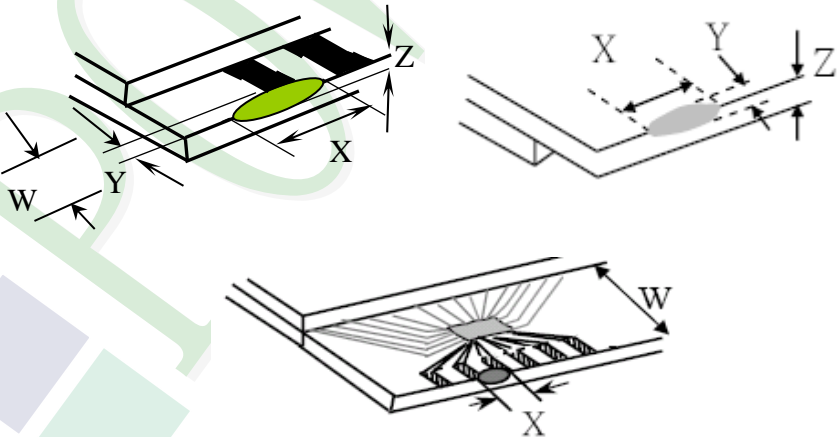
◆Specification For TFT-LCD Module 3.5" ~15" :

(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 border="1"> <thead> <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> </thead> <tbody> <tr> <td>$\Phi \leq 0.25$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.50$</td> <td>5</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$\Phi > 0.50$</td> <td>0</td> </tr> <tr> <td>Total</td> <td>5</td> </tr> </tbody> </table> 6. 2 Line type(Non-display or display): <table border="1"> <thead> <tr> <th rowspan="2">module size</th> <th rowspan="2">Length (L)</th> <th rowspan="2">Width (W)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td rowspan="4">3.5" to less 9"</td> <td>---</td> <td>$W \leq 0.03$</td> <td>Ignore</td> <td rowspan="4">Ignore</td> </tr> <tr> <td>$L \leq 10.0$</td> <td>$0.03 < W \leq 0.05$</td> <td>4</td> </tr> <tr> <td>$L \leq 5.0$</td> <td>$0.05 < W \leq 0.10$</td> <td>2</td> </tr> <tr> <td>---</td> <td>$W > 0.10$</td> <td>As round type</td> </tr> <tr> <td colspan="3">Total</td> <td>5</td> <td></td> </tr> <tr> <td rowspan="4">9" to 15"</td> <td>---</td> <td>$W \leq 0.05$</td> <td>Ignore</td> <td rowspan="4">Ignore</td> </tr> <tr> <td>$L \leq 10.0$</td> <td>$0.05 < W \leq 0.10$</td> <td>5</td> </tr> <tr> <td>---</td> <td>$W > 0.10$</td> <td>As round type</td> </tr> <tr> <td colspan="3">Total</td> <td>5</td> </tr> </tbody> </table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.25$	Ignore		$0.25 < \Phi \leq 0.50$	5	Ignore	$\Phi > 0.50$	0	Total	5	module size	Length (L)	Width (W)	Acceptance (Q'ty)		A area	B area	3.5" to less 9"	---	$W \leq 0.03$	Ignore	Ignore	$L \leq 10.0$	$0.03 < W \leq 0.05$	4	$L \leq 5.0$	$0.05 < W \leq 0.10$	2	---	$W > 0.10$	As round type	Total			5		9" to 15"	---	$W \leq 0.05$	Ignore	Ignore	$L \leq 10.0$	$0.05 < W \leq 0.10$	5	---	$W > 0.10$	As round type	Total			5	Minor
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07	Polarizer Bubble	<table border="1"> <thead> <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> </thead> <tbody> <tr> <td>$\Phi \leq 0.25$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.50$</td> <td>4</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$0.50 < \Phi \leq 0.80$</td> <td>1</td> </tr> <tr> <td>$\Phi > 0.80$</td> <td>0</td> </tr> <tr> <td>Total</td> <td>5</td> <td></td> </tr> </tbody> </table>	Dimension (diameter: Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.25$	Ignore		$0.25 < \Phi \leq 0.50$	4	Ignore	$0.50 < \Phi \leq 0.80$	1	$\Phi > 0.80$	0	Total	5		Minor																																						
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◆Specification For TFT-LCD Module 3.5" ~15" :
(Ver.B01)

NO	Item	Criterion	Level						
08	The crack of glass	<p>Symbols :</p> <p>X: The length of crack Z: The thickness of crack t: The thickness of glass</p> <p>Y: The width of crack. W: terminal length a: LCD side length</p> <hr/> <p>8.1 General glass chip: 8.1.1 Chip on panel surface and crack between panels:</p> 	Minor						
		<table border="1" data-bbox="539 1579 1353 1870"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <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> </tbody> </table>		X	Y	Z	$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$
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		<p>8.2 Protrusion over terminal:</p> <p>8.2.1 Chip on electrode pad:</p>  <table border="1" data-bbox="560 1697 1347 1872"> <thead> <tr> <th></th> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <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> </tbody> </table>		X	Y	Z	Front	$\leq a$	$\leq 1/2 W$	$\leq t$	Back	$\leq a$	$\leq W$	$\leq 1/2 t$	Minor
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Front	$\leq a$	$\leq 1/2 W$	$\leq t$												
Back	$\leq a$	$\leq W$	$\leq 1/2 t$												

◆Specification For TFT-LCD Module 3.5" ~15" :
(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.

5.3 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

Ver.001	Documents NO. PKG-PH800480T033-IFC03	<h2 style="text-align: center;">LCM包裝規格書</h2> <h3 style="text-align: center;">LCM Packaging Specifications</h3>	Approve	Check	Contact
			Rex	Clare	Kevin Lin

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

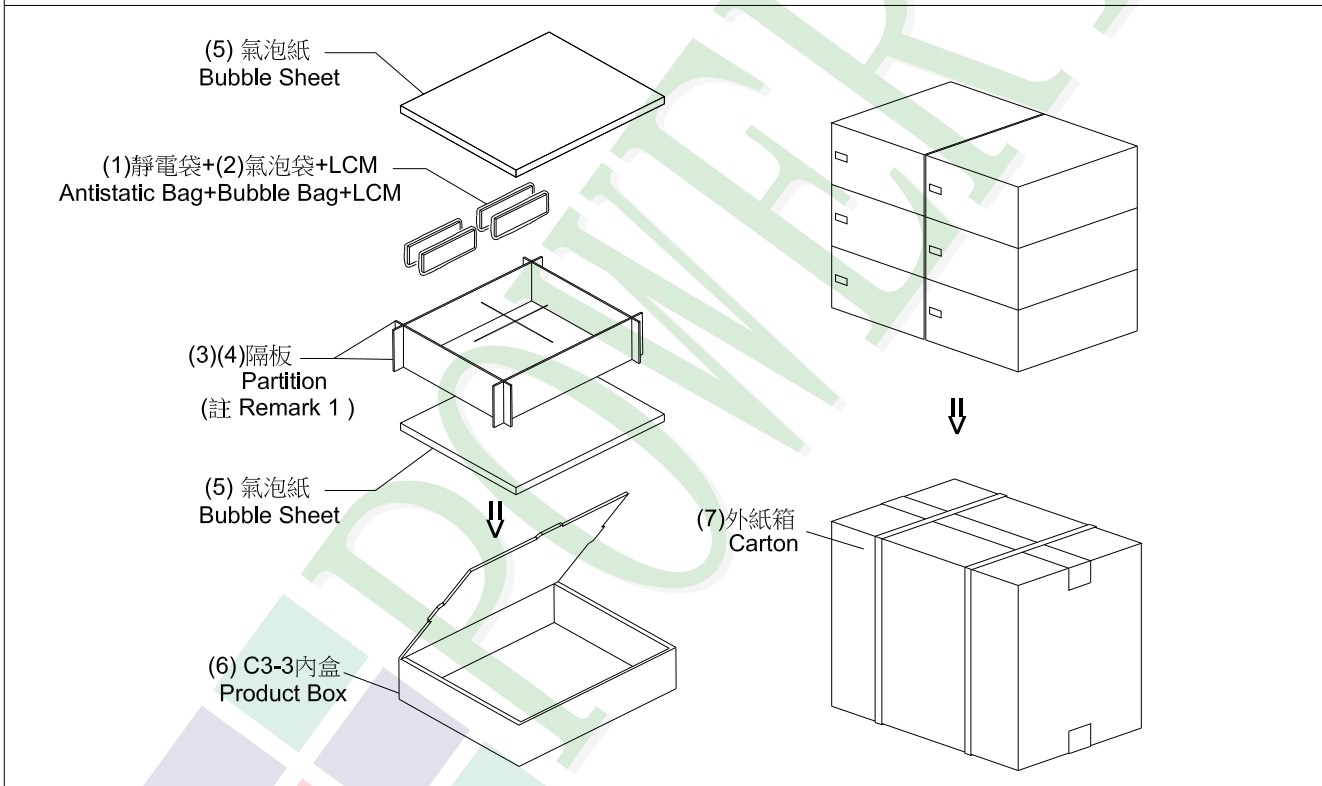
No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH800480T033-IFC03	131.0X 90.5	0.108	72	7.776
2	靜電袋(1)Antistatic Bag	BAG150120ARABA	150 X 120	0.0018	72	0.1296
3	氣泡袋(2)Bubble Bag	BAG170150BRABA	170 X 150	0.0045	72	0.324
4	A7隔板(3)A7 Partition	BX29500010BZBA	295 X 105 X 3	0.0169	42	0.7098
5	B7隔板(4)B7 Partition	BX24500010BZBA	245 X 105 X 3	0.0137	18	0.2466
6	氣泡紙(5)Bubble Sheet	BAG280240BWABA	280 X 240	0.006	12	0.072
7	C3-3內盒(6)Product Box	BX31025511AABA	310 X 255 X 116	0.17	6	1.02
8	外紙箱(7)Carton	BX52732536CCBA	527 X 325 X 360	0.83	1	0.83
9						

2. 一整箱總重量 (Total LCD Weight in carton) : 11.11 Kg±10%

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

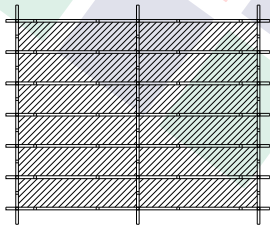
(1) Quantity Of Spacer : A7隔板 X 7 , B7隔板 X 3

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



特 記 事 項 (REMARK)

1. LCM排放示意圖(前後間隔不放置):
1. LCM placed as figure showing:
(First and last slot should be empty)



▨ 模組(LCM) X 1pcs.

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