DRAWING NO.

(Ver.)

SPEC	IFIC	CATIONS
CUSTOMER	:	
SAMPLE CODE	:	SH800480T033-IFC03
MASS PRODUCTION CODE	:	PH800480T033-IFC03
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION		001

LMD-PH800480T033-IFC03(Ver.001)

Date:

PACKAGING NO. PKG-PH800480T033-IFC03(Ver.001) (Ver.)

Customer Approved

Approved Checked Designer 廖志豪 張慶源 陳宗淇 **Rex Liao Howard Chen** Yuan Chang

Preliminary specification for design input

Specification for sample approval

2020.06.18

POWERTIP TECH. CORP.

Headquarters: No.8, 6th Road, Taichung Industrial Park,

Taichung, Taiwan

台中市 407 工業區六路 8號

TEL: 886-4-2355-8168

FAX: 886-4-2355-8166

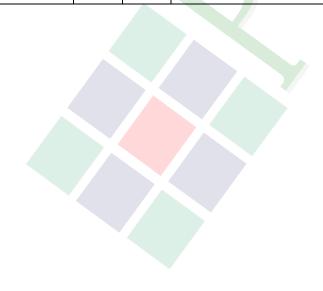
E-mail: sales@powertip.com.tw

Http://www.powertip.com.tw



History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
06/17/2020	01	001	New Sample.	-	Howard
				<i>></i>	





Contents

1. SPECIFICATIONS

- 1.1 Features
- 1.2 Mechanical Specifications
- 1.3 Absolute Maximum Ratings
- 1.4 DC Electrical Characteristics
- 1.5 Optical Characteristics

2. MODULE STRUCTURE

- 2.1 Counter Drawing
- 2.2 Interface Pin Description
- 2.3 Timing Characteristics

3. QUALITY ASSURANCE SYSTEM

- 3.1 Quality Assurance Flow Chart
- 3.2 Inspection Specification

4. RELIABILITY TEST

Reliability Test Condition

5. PRECAUTION RELATING PRODUCT HANDLING

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

Appendix: 1.LCM Drawing

2. Packing Specification

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
Viewing Direction	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&cID=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	Top (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.	Тур.	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	VIH	GND=0V	2.0	-	VDD	
TFT Panel	VIL	GND=0V	0	-	8.0	V
Supply Current for TFT Panel	IDD	IDD@VDD=3.3V	1	130	160	mA
Supply Current for Backlight Unit	ICC	ICC@VCC=5V	1	400	600	IIIA



1.5 Optical Characteristics

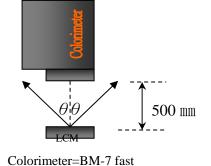
VDD= 3.3 V, Ta=25°C

Item		Symbol	Condition	Min.	Тур.	Max.	unit	-
Response time	Tr+Tf	25 ℃	-	-	30	45	ms	-
	Тор	θΥ+			60	-		
Viewing angle	Bottom	θΥ-	CD > 10		60	-	Dog	Note 4
	Left	θX-	CR ≥ 10		60	-	Deg.	Note 4
	Right	θX+			60	-		
Contrast rati	0	CR		500	600	-	1	Note 3
	White	Х		0.24	0.29	0.34		
	vviile	Υ	Ta = 25°C	0.26	0.31	0.36		Note 1
Calar of OIF	Red	Х		0.51	0.56	0.61		
Color of CIE		Y		0.28	0.33	0.38		
Coordinate (With B/L & T/P)	Green	Х	θX , $\theta Y = 0^{\circ}$	0.29	0.34	0.39	-	Note1
(WILLI DIL & TIF)		Y		0.55	0.59	0.64		
	D.	Х		0.08	0.13	0.18		
	Blue	Υ	A	0.03	0.08	0.13		
Average Brightness Pattern=white display (With T/P)*1		IV	VCC=12V (Duty Setting:128)	650	800	-	cd/m2	Note1
Uniformity (With T/P)*2	2	∆В	VCC=12V (Duty Setting:128)	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: $500 \pm 50 \text{ mm}$ \rightarrow ($\theta = 0^{\circ}$)
 - 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:

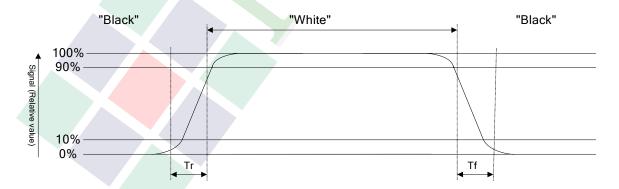
The output signals of photo detector are measured when the input signals are changed from "black" to "white" (falling time) and from "white" to "black" (rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



Normally Black





Note3: Definition of contrast ratio:

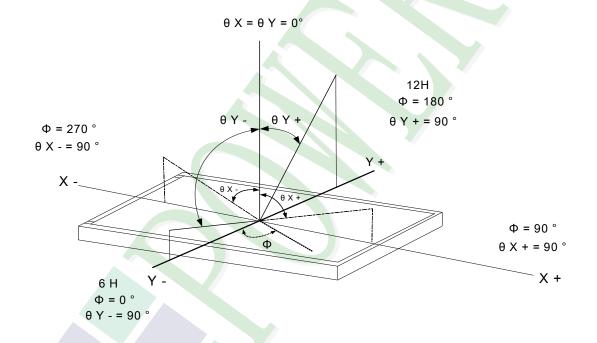
Contrast ratio is calculated with the following formula

Photo detector output when LCD is at "White" state

Contrast ratio (CR) =

Photo detector output when LCD is at "Black" state

Note4: Definition of viewing angle: Refer to figure as below:





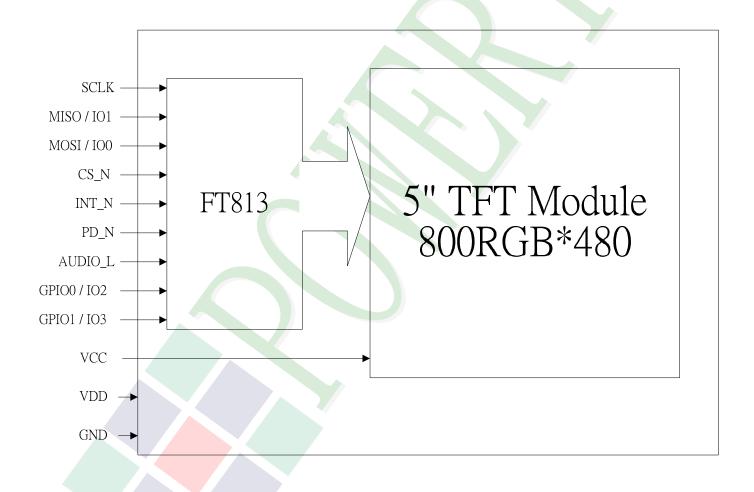
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram





2.2 Interface Pin Description

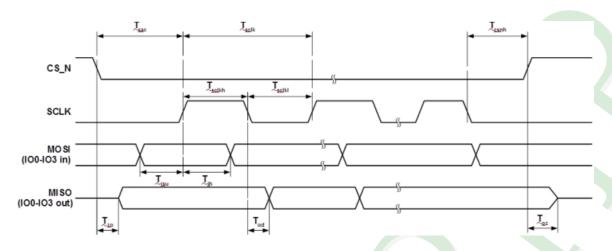
Pin#	Name	DESCRIPTION
1	GND	Ground.
2	VCC	Power Supply for Backlight Unit.
3	VCC	Power Supply for Backlight Unit.
4	NC	Not Used.
5	VDD	Power Supply.
6	GND	Ground.
7	NC	Not Used.
8	AUDIO_L	Audio PWM out
9	NC	Not Used.
10	SCLK	SPI SCK Signal.
11	MISO / IO1	SPI Single mode: SPI MISO output SPI Dual/Quad 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

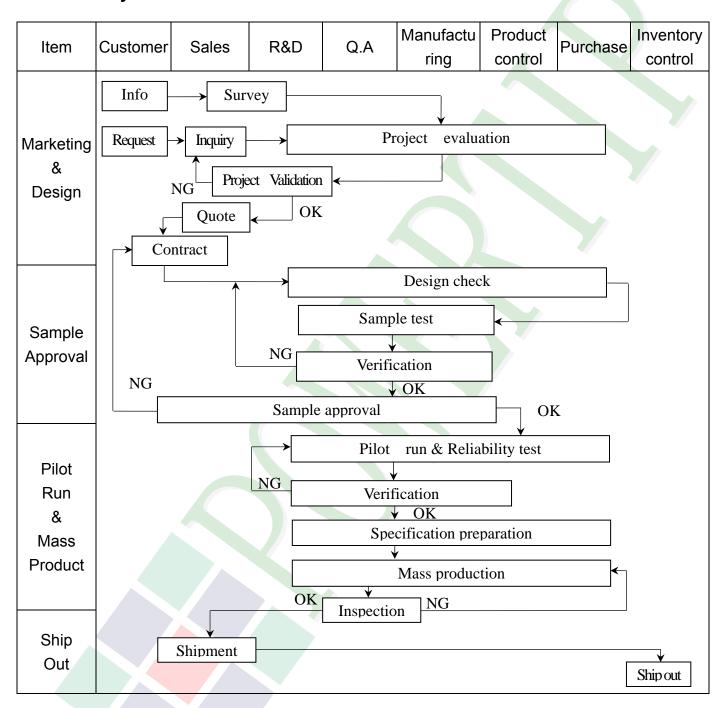


Parameter	Description	Min	Max	Units
Tsclk	SPI clock period (SINGLE/DUAL mode)	33.3		ns
Tsclk	SPI clock period (QUAD mode)	40		ns
Tsclkl	SPI clock low duration	13		ns
Tsclkh	SPI clock high duration	13		ns
Tsac	SPI access time	4		ns
Tisu	Input Setup	4		ns
Tih	Input Hold	0		ns
Tzo	Output enable delay		16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

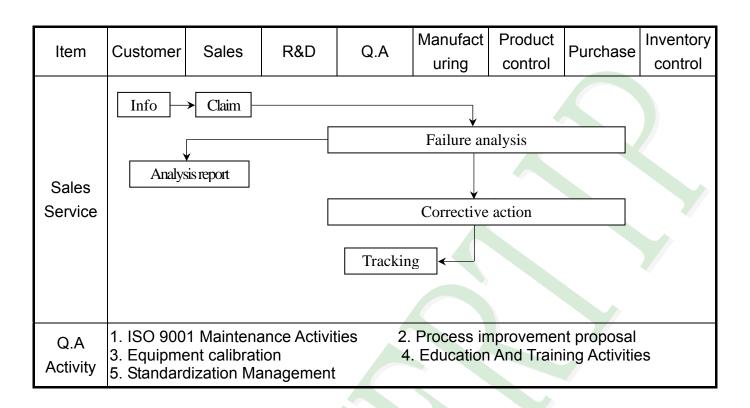


3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart









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

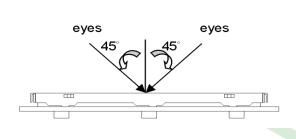
◆Defect Level: Major Defect AQL: 0. 4; Minor Defect AQL: 1. 5

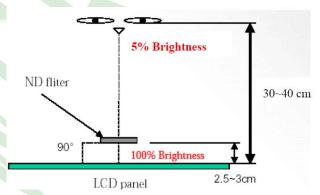
OUT Going Defect Level: Sampling.

♦Standard of the product appearance test:

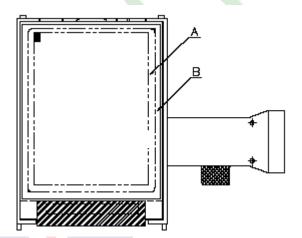
a. Manner of appearance test:

- (1). The test best be under 20W×2 fluorescent light(about 300lux \sim 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":

NO	Item	Criterion	Level
		1. 1The part number is inconsistent with work order of production.	Major
01	Product condition	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
		4. 1 Missing line character and icon.	Major
		4. 2 No function or no display.	Major
0.4		4. 3 Display malfunction.	Major
04	Electrical Testing	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
		Item Acceptance (Q'ty)	
		Bright Dot ≤ 4	
	Dot defect	$\begin{array}{ c c c c }\hline \textbf{Dot} & \textbf{Dark Dot} & \leq 5 \\ \hline \textbf{Defect} & \textbf{Loint Dot} & \leq 3 \\ \hline \end{array}$	
	(Bright dot,	Joint Dot = 5	
05	Dark dot)	Total ≤ 7	Minor
	On -display	 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″:

NO	Item	Criterion				
06	Black or white Dot, scratch, contamination Round type A Y A Y T A W L L	6. 1 Round type (Non-display or display): Dimension (diameter : Φ) Acceptance (Q'ty) A area B area $\Phi \le 0.25$ Ignore $0.25 < \Phi \le 0.50$ 5 Ignore $\Phi > 0.50$ 0 Total 5	Minor			
07	Polarizer Bubble	$ \begin{array}{ c c c c c c }\hline \textbf{Dimension (diameter: }\Phi) & & & & & & & & & & & & & & & & & & &$	Minor			
07		$0.50 < \Phi \leq 0.80$ 1 Ignore				



◆Specification For TFT-LCD Module 3. 5″~15″:

NO	Item	Criterion		
		Z: The thickness of crack V	Y: The width of crack. V: terminal length n: LCD side length	
		8.1 General glass chip: 8.1.1 Chip on panel surface and cra	nck between panels:	
08	The crack of glass	SP Z Y [OK]	Z X Y SP [NG]	Minor
		Seal width Z	Y	
		X Y	Z	
		≤ a Crack can't enter viewing area	≤1/2 t	
		≤ a Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$	



◆Specification For TFT-LCD Module 3. 5″ ~15″:

NO	Item	Criterion L			Level	
		Z: The thi	gth of crack ckness of crack ckness of glass	W: tern	width of crack. ninal length) side length	
		8. 1. 2 Cor	ner crack:	X	Z	
		X	Y		Z	
		≤1/5 a	Crack can't e viewing are		$Z \leq 1/2 t$	
		≤1/5 a	Crack can't exce half of SP wid		$t < Z \le 2 t$	
00	T) 1 6 1					
08	The crack of glass		sion over termin			Minor
		8. 2. 1 Chi	p on electrode y		X Y Z	
				X	W	
	X		X	Y	Z	
		Front	≦ a	≤ 1/2 W	≦ t	
		Back	≤ a	≦ W	≤ 1/2 t	



◆Specification For TFT-LCD Module 3. 5″ ~15″:

Symbols: X: The length of crack Z: The thickness of crack T: The thickness of glass 8. 2. 2 Non-conductive portion: X X X Y Z X X Y Z Side length X X X X Y Z Side length X X Y X X Y Side length X X X Y Side length X X X Y Side length X X X Y Side length X X X Y Side length X X X X Y Side length X X X Y Side length X X X X Y Side length X X X Y Side length X X X X Y Side length X X X X Side length X X X X Side length X X X X Side length X X X X Side length X X X X Side length X X X X Side length X X X Side length X Side length X X Side length X Side length X Side length X X Side length X Side length	NO	Item	Criterion	Level
8. 2. 3 Glass remain: X Y Y Y Y Y Y Y		Item The crack of	Symbols: X: The length of crack Z: The thickness of crack t: The thickness of glass 8. 2. 2 Non-conductive portion: X X Y Z X Y Z If the chipped area touches the ITO terminal, over 2/3 of 1. the ITO must remain and be inspected according to electrode terminal specifications. 8. 2. 3 Glass remain:	



♦Specification For TFT-LCD Module 3. 5″ ~15″:

NO	Item	Criterion	Level
		9. 1 Backlight can't work normally.	Major
09	Backlight elements	9. 2 Backlight doesn't light or color is wrong.	Major
		9. 3 Illumination source flickers when lit.	Major
10	General	10. 1Pin type \quantity \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

Reliability Test Condition

(Ver.B01)

	(VCI.DOT)				
NO.	TEST ITEM	TEST CONDITION			
1	High Temperature Storage Test	Keep in +80 ±2°C 240 hrs			
2	Low Temperature Storage Test	Keep in −30 ±2°C 240 hrs			
3	High Temperature / High Humidity Storage Test	Keep in +60°C / 90% R.H duration for 240 hrs (Excluding the polarizer)			
		$-30^{\circ}\text{C} \rightarrow +25^{\circ}\text{C} \rightarrow +80^{\circ}\text{C} \rightarrow +25^{\circ}\text{C}$			
4	Temperature Cycling Storage Test	(30mins) (5mins) (30mins) (5mins)			
		20 Cycle			
	ESD Test	Air Discharge: Contact Discharge:			
		Apply 2 KV with 5 times Apply 250 V with 5 times	nes		
		Discharge for each polarity +/- discharge for each polarity	arity +/-		
		1. Temperature ambiance : 15°C ~35°C			
5		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 se			
		(Tolerance if the output voltage indication: ±5%)			
		1. Sine wave 10~55 Hz frequency (1 min/sweep)			
6	Vibration Test	2. The amplitude of vibration :1.5 mm			
	(Packaged)	3. Each direction (X \ Y \ Z) duration for 2 Hrs			
	Drop Test (Packaged)	Packing Weight (Kg) Drop Height (cm)			
		0 ~ 45.4 122			
		45.4 ~ 90.8 76			
7		90.8 ~ 454 61			
		Over 454 46			
		Drop Direction: **1 corner / 3 edges / 6 sides each 1time			

OResult Evaluation Criteria:

Under the display quality test conditions with normal operations with normal operation state. Do not change these conditions as such changes may affect practical display function. (Normal operation state)

Temperature: +20~30°C **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

- Avoid any strong mechanical shock which can break the glass. 5.2.1
- 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.
- Do not remove the panel or frame from the module. 5.2.3
- The polarizing plate of the display is very fragile. So, please handle it very carefully, 5.2.4 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
- 5.2.6 Do not touch the display area with bare hands, this will stain the display area.
- Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a 5.2.7 cleaning naphtha solvent.
- 5.2.8 To control temperature and time of soldering is 320 ± 10°C and 3-5 sec.
- To avoid liquid (include organic solvent) stained on LCM 5.2.9
- 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

- Store the panel or module in a dark place where the temperature is 25°C ± 5°C 5.3.1 and the humidity is below 65% RH.
- 5.3.2 Do not place the module near organics solvents or corrosive gases.
- Do not crush, shake, or jolt the module. 5.3.3

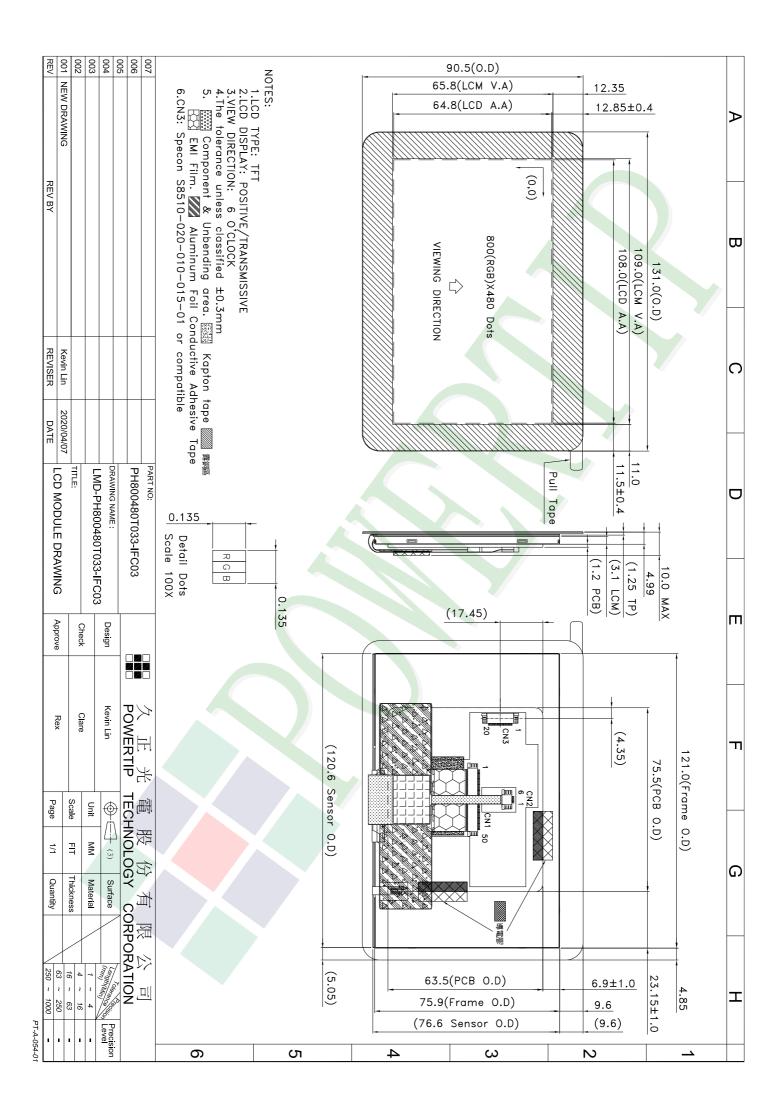
5.4 TERMS OF WARRANTY

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



Approve Check Contact Ver.001 LCM包裝規格書 Documents NO. PKG-PH800480T033-IFC03 Clare Kevin Lin Rex LCM Packaging Specifications 1.包裝材料規格表 (Packaging Material): (per carton) 1Pcs Weight No. Item Model Dimensions (mm) Quantity Total Weight 1 成品 (LCM) PH800480T033-IFC03 131.0X 90.5 0.108 72 7.776 2 150 X 120 0.0018 72 靜電袋(1)Antistatic Bag BAG150120ARABA 0.1296 3 170 X 150 0.0045 氣泡袋(2)Bubble Bag BAG170150BRABA 72 0.324 4 A7隔板(3)A7 Partition BX29500010BZBA 295 X 105 X 3 0.0169 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 1.02 C3-3内盒(6)Product Box BX31025511AABA 310 X 255 X 116 0.17 6 8 527 X 325 X 360 0.83 外紙箱(7)Carton BX52732536CCBA 1 0.83 9 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 x no of boxes 6 72 (5) 氣泡紙 **Bubble Sheet** (1)靜電袋+(2)氣泡袋+LCM Antistatic Bag+Bubble Bag+LCM (3)(4)隔板 Partition (註 Remark 1) (5) 氣泡紙 **Bubble Sheet** (7)外紙箱 Carton (6) C3-3内盒 **Product Box** 項 (REMARK) 特 記 事 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)

Ø 模組(LCM) X 1pcs.

POWERTIP TECH. CORP.