POWERTIP *POWERTIP* TECH. CORP.

SPECIFICATIONS

CUSTOMER	:	
SAMPLE CODE	:	SH800480T024-IHC13
MASS PRODUCTION CODE	:	PH800480T024-IHC13
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	005
DRAWING NO. (Ver.)	:	LMD-PH800480T024-IHC13(Ver.002)
PACKAGING NO. (Ver.)	:	PKG-PH800480T024-IHC13(Ver.001)

Customer Approved

Date:

Approved	Checked	Designer
黃秋源 **Oliver Huang**	石建莊 **Stone Shin**	王聖硯 **Stephen Wang**

☐ Preliminary specification for design input

■ Specification for sample approval

POWERTIP
2019.11.22
TWRD APR

POWERTIP TECH. CORP.

NO.PT-A-005-8

History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
12/27/2017	01	001	New Drawing	-	Stephen
03/21/2018	01	002	New Sample	-	Stephen
08/30/2019	01	003	Added 1.8 items	11	Stephen
11/07/2019	01	004	Create the MOSFET for BL circuit	-	Stephen
11/15/2019	01	005	Update Spec	29-30	Stephen

Total: 28 Pages

Contents

Note : For detailed information please refer to IC Datasheet :
       Primacy(TFT LCD): ILITEK: ILI6122M-9G / ILI5960-9G

1. SPECIFICATIONS

1.1　Features

Item	Standard Value
Display Resolution	800 * 3 (RGB) * 480 Dots
LCD Type	a-Si TFT , Normally white, Transmissive type
Screen Size(inch)	5.0 inch
Viewing Direction	6 O'clock
Surface Treatment	Anti-Glare
Color Configuration	RGB Vertical Strip
Touch Panel	Projective Capacitive Touch Panel USB HID Touch
Driver IC	ILI6122M-9G / ILI5960-9G / HY4635(CTP)
Backlight Type	White LED B/L
Weight	126 g
Interface	HDMI
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

1.2　Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	121.0(W) x 75.9 (L) x 15.4 (H)	mm

LCD panel

Item	Standard Value	Unit
Viewing Area	110.0 (W) * 66.5 (L)	mm

Note : For detailed information please refer to LCM drawing.

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Power Supply Voltage	VDD	GND=0	-0.3	+4.5	V	-
	V_{Bus}	GND=0	-0.3	+6.0	V	
Operating Temperature	T_{OP}	-	-20	70	°C	
Storage Temperature	T_{ST}	-	-30	80	°C	

1.4 DC Electrical Characteristics

Module   GND = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply Voltage	VDD	GND=0V	3.0	3.3	3.6	V
	V_{Bus}		4.75	5.0	5.25	V
Input Signal Voltage	V_{IH}		0.7*VDD	-	VDD	V
	V_{IL}		0	-	0.3*VDD	V
Supply Current	I_{VBus}	V_{Bus}=5.0V	-	700	1000	mA

Note1: The customer has to check the input current is greater than 1.0A.

Note2: Supply voltage which is included backlight drive.

Note3: Maximum current for RGB screen is 710~720mA (Full Display).

Note4: We use advised USB 2.0/3.0 Y-cable to power supply.

1.5 Optical Characteristics

TFT LCD Module   VCC= 3.3 V, Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	unit	-
Response Time		Tr+Tf	25℃	-	-	35	55	ms	-
Viewing Angle	Top	θY+	CR ≥ 10		60	-	Deg.	Note 4
	Bottom	θY-			60	-		
	Left	θX-			60	-		
	Right	θX+			60	-		
Contrast Ratio		CR		500	600	-	-	Note 3
Color of CIE Coordinate （With B/L & LCD & Touch Panel）	White	X	Ta = 25°C θX , θY = 0°	0.24	0.29	0.34	-	Note1
		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		0.54	0.59	0.64		
	Blue	X		0.09	0.14	0.19		
		Y		0.04	0.09	0.14		
Average Brightness Pattern=White Display （With B/L & LCD & Touch Panel）*1		IV	IF=90mA	800	1000	-	cd/m2	Note1
Uniformity （With B/L & LCD & Touch Panel）*2		△B		70	-	-	%	Note1

Note 1:

*1：△B=B(min) / B(max) * 100%

*2：Measurement Condition for Optical Characteristics:

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

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

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

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

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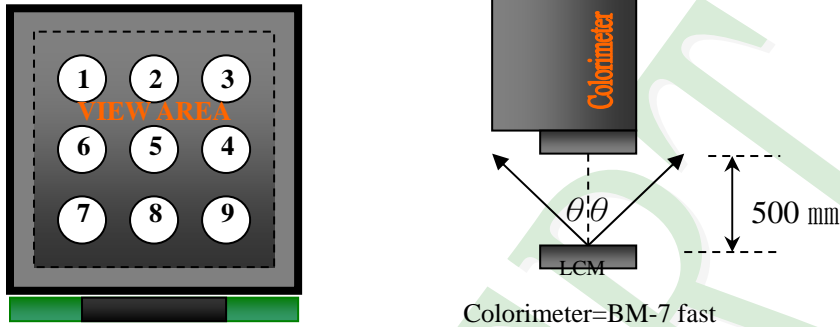
To be measured at the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-7, after 10 minutes operation (module)

Note2: Definition of response time:

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

    Refer to figure as below:
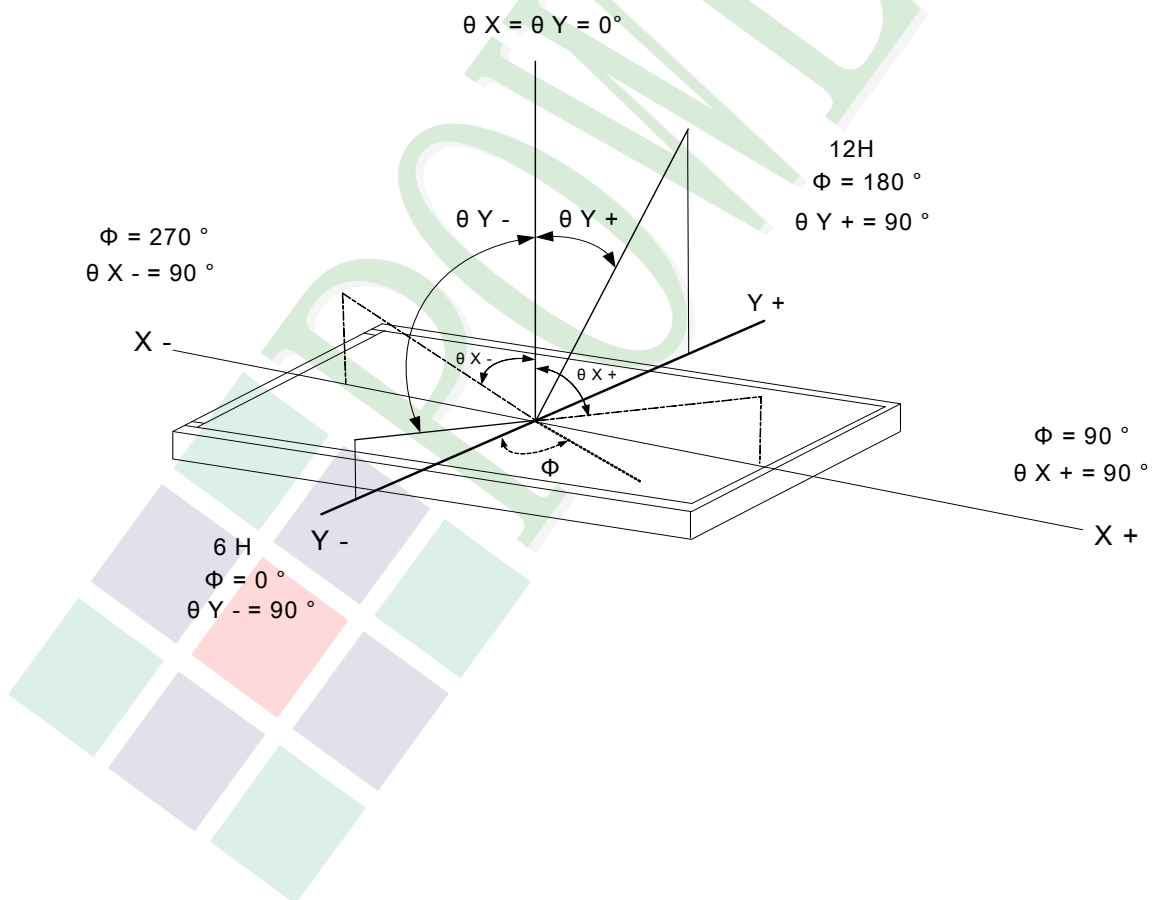   Normally White

Normally Black
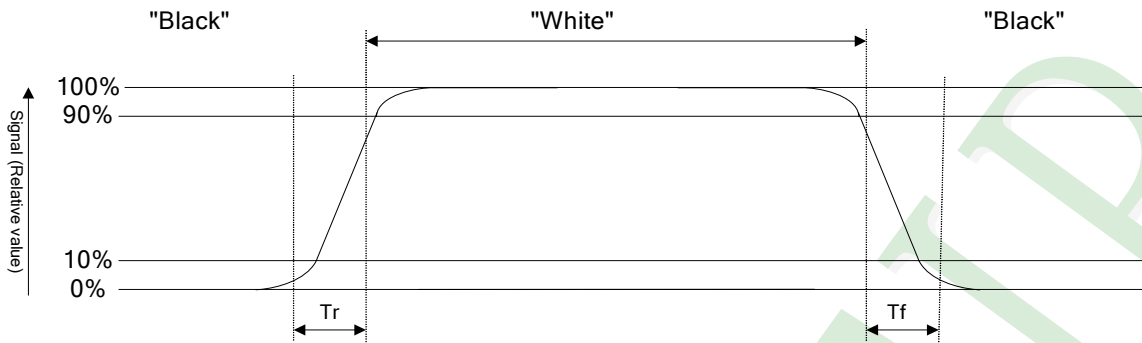
Note3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

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

Note4: Definition of viewing angle:

Refer to figure as below:

1.6 Backlight Characteristics

Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Remark
LED Forward Current	I_F		210	mA	One LED
LED Reverse Voltage	V_R		10	V	

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF		16.2	18.0	19.2	V
CIE Color Coordinate (Without LCD)	X	IF=90mA	0.25	0.28	0.31	-
	Y		0.25	0.28	0.31	
Color		White				

Note 1: The LED Supply Voltage is defined by the number of LED at Ta=25℃ and I_L =90 mA.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25℃ and I_L =90 mA. The LED life time could be decreased if operating I_L is larger than 90 mA.
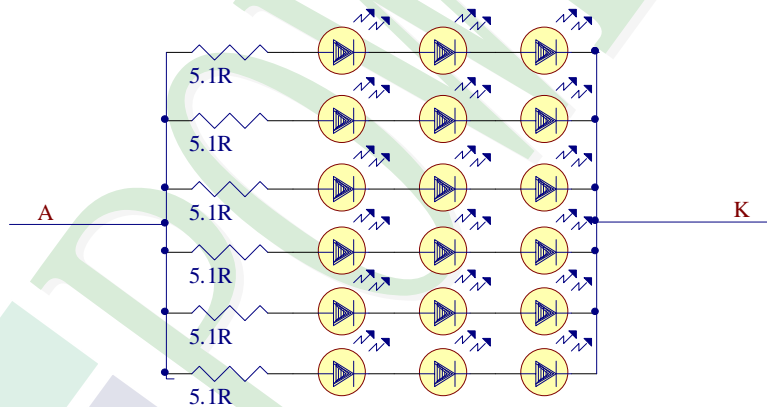
Other Description

Item	Conditions	Description
Life Time	Ta =25℃ IF= 90mA	50,000 hrs

1.7 Touch Panel Characteristics

Features

Item	Standard Value
Touch Panel Size	5"
Touch Type	Projective Capacitive Touch Panel
Input Method	Finger / 5 Points Touch
Output Interface	I²C
IC	HYCON - HY4635
I²C Address	0x38 (7-bit)

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
Viewing Area	110.0 (W) * 66.5 (L)	mm
Number of Sensing Channel	12 * 20	

Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Supply Voltage	TPVDD	-	-0.3	+5.0	V
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	-	3.0	3.3	3.6	V

Touch Panel IC Read/Write description & Register Mapping

Reference: HYCON Touch Driver Porting Reference Guide.

1.8 HYCON I²C Sensitivity command:

Address	Register description	R/W	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0x92	GAIN	R/W	Sensitivity setting, setting range：0--5

Application reference:

Register 0x92=02(Default)   without cover lens

Caution!

    At different cover lens thickness can lead to touch Sensitivity changed (e.g. ghost-touches).

    Therefore, the touch needs to be thoroughly tested in the target application.

    PTC application design suggestion is only for reference, please adjust based on your final design.

2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram
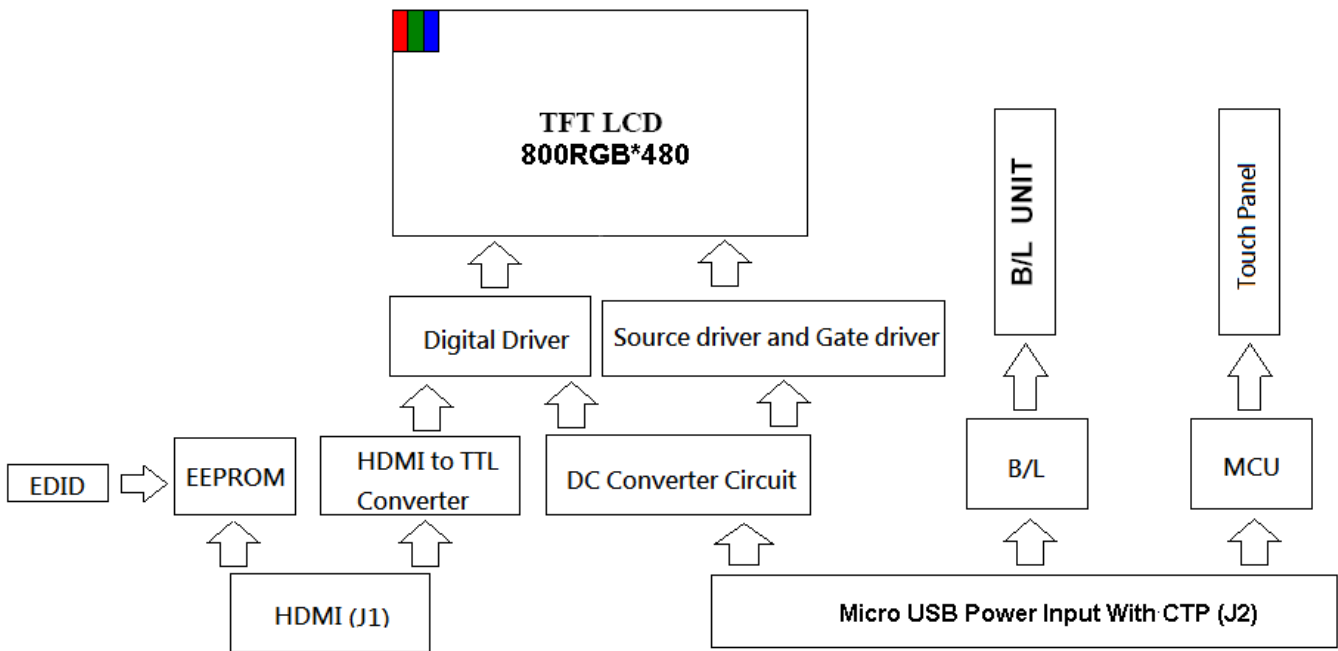
2.2 Interface Pin Description

2.2.1 (J1:HDMI 1.3 A type Interface)

Pin#	Name	Description
1	TX2+	TMDS Data 2+
2	TX2 Shield	TMDS Data 2 Shield
3	TX2–	TMDS Data 2-
4	TX1+	TMDS Data 1+
5	TX1 Shield	TMDS Data 1 Shield
6	TX1–	TMDS Data 1-
7	TX0+	TMDS Data 0+
8	TX0 Shield	TMDS Data 0 Shield
9	TX0–	TMDS Data 0-
10	TXC+	TMDS Clock+
11	TXC Shield	TMDS Clock Shield
12	TXC–	TMDS Clock-
13	CEC	CEC
14	NC	No connection
15	SCL	Serial Clock for DDC
16	SDA	Serial Data for DDC
17	GND	Power ground
18	V5V	+5V Power
19	Hot Plug Detect	Hot Plug Detect

2.2.2 (J2:Micro USB Power Input & Capacitive Touch Panel Interface)

Pin#	Name	Description
1	V_{Bus}	V_{Bus} 4.75V-5.25V
2	D-	Data-
3	D+	Data+
4	ID	No connection
5	GND	Power ground.

2.3 HDMI Characteristics

2.3.1 Signal DC&AC Characteristics

DC ELECTRICAL CHARACTERISTICS

over operating free-air temperature range (unless otherwise noted)

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
V_{ID}	Analog input differential voltage [1]		75		1200	mV
V_{IC}	Analog input common-mode voltage [1]		$AV_{DD} - 300$		$AV_{DD} - 37$	mV
$V_{I(OC)}$	Open-circuit analog input voltage		$AV_{DD} - 10$		$AV_{DD} + 10$	mV
$I_{DD(2PIX)}$	Normal 2-pix/clock power supply current [2]	ODCK = 82.5 MHz, 2-pix/clock			370	mA
I_{PD}	Power-down current [3]	$\overline{PD}$ = low			10	mA
I_{PDO}	Output drive power-down current [3]	$\overline{PDO}$ = low		35		mA

(1) Specified as dc characteristic with no overshoot or undershoot
(2) Alternating 2-pixel black/2-pixel white pattern. ST = high, $\overline{STAG}$ = high, QE[23:0] and QO[23:0] C_L = 10 pF.
(3) Analog inputs are open circuit (transmitter is disconnected from TFP401/401A).

AC ELECTRICAL CHARACTERISTICS

over recommended operating free-air temperature range (unless otherwise noted)

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$V_{ID(2)}$	Differential input sensitivity [1]		150		1560	mV_{p-p}
t_{ps}	Analog input intra-pair (+ to –) differential skew [2]				0.4	t_{bit} [3]
t_{ccs}	Analog input inter-pair or channel-to-channel skew [2]				1	t_{pix} [4]
t_{jit}	Worst-case differential input clock jitter tolerance [2][5]		50			ps
t_{f1}	Fall time of data and control signals [6][7]	ST = low, C_L = 5 pF			2.4	ns
		ST = high, C_L = 10 pF			1.9	
t_{r1}	Rise time of data and control signals [6][7]	ST = low, C_L = 5 pF			2.4	ns
		ST = high, C_L = 10 pF			1.9	
t_{r2}	Rise time of ODCK clock [6]	ST = low, C_L = 5 pF			2.4	ns
		ST = high, C_L = 10 pF			1.9	
t_{f2}	Fall time of ODCK clock [6]	ST = low, C_L = 5 pF			2.4	ns
		ST = high, C_L = 10 pF			1.9	
t_{su1}	Setup time, data and control signal to falling edge of ODCK	1 pixel/clock, PIXS = low, OCK_INV = low	1.8			ns
		2 pixel/clock, PIXS = high, $\overline{STAG}$ = high, OCK_INV = low	3.8			
		2 pixel and STAG, PIXS = high, $\overline{STAG}$ = low, OCK_INV = low	0.7			
t_{h1}	Hold time, data and control signal to falling edge of ODCK	1 pixel/clock, PIXS = low, OCK_INV = low	0.6			ns
		2 pixel and STAG, PIXS = high, $\overline{STAG}$ = low, OCK_INV = low	2.5			
		2 pixel/clock, PIXS = high, $\overline{STAG}$ = high, OCK_INV = low	2.9			

(1) Specified as ac parameter to include sensitivity to overshoot, undershoot and reflection.
(2) By characterization
(3) t_{bit} is 1/10 the pixel time, t_{pix}
(4) t_{pix} is the pixel time defined as the period of the RxC input clock. The period of ODCK is equal to t_{pix} in 1-pixel/clock mode or $2t_{pix}$ when in 2-pixel/clock mode.
(5) Measured differentially at 50% crossing using ODCK output clock as trigger
(6) Rise and fall times measured as time between 20% and 80% of signal amplitude.
(7) Data and control signals are QE[23:0], QO[23:0], DE, HSYNC, VSYNC. and CTL[3:1].

AC ELECTRICAL CHARACTERISTICS (continued)

over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{su2}	Setup time, data and control signal to rising edge of ODCK	1 pixel/clock, PIXS = low, OCK_INV = high	2.1			ns
		2 pixel/clock, PIXS = high, STAG = high, OCK_INV = high	4			
		2 pixel and STAG, PIXS = high, STAG = low, OCK_INV = high	1.5			
t_{h2}	Hold time, data and control signal to rising edge of ODCK	1 pixel/clock, PIXS = low, OCK_INV = high	0.5			ns
		2 pixel and STAG, PIXS = high, STAG = low, OCK_INV = high	2.4			
		2 pixel/clock, PIXS = high, STAG = high, OCK_INV = high	2.1			
f_{ODCK}	ODCK frequency	PIX = low (1-PIX/CLK)	25		165	MHz
		PIX = high (2-PIX/CLK)	12.5		82.5	
	ODCK duty-cycle		40%	50%	60%	
$t_{pd(PDL)}$	Propagation delay time from PD low to Hi-Z outputs				9	ns
$t_{pd(PDOL)}$	Propagation delay time from PDO low to Hi-Z outputs				9	ns
$t_{t(HSC)}$	Transition time between DE transition to SCDT low[8]			1e6		t_{pix}
$t_{t(FSC)}$	Transition time between DE transition to SCDT high[8]			1600		t_{pix}
$t_{d(st)}$	Delay time, ODCK latching edge to QE[23:0] data output	STAG = low, PIXS = high		0.25		t_{pix}

(8) Link active or inactive is determined by amount of time detected between DE transitions. SCDT indicates link activity.

2.3.2 Parameter Measurement Information

PARAMETER MEASUREMENT INFORMATION
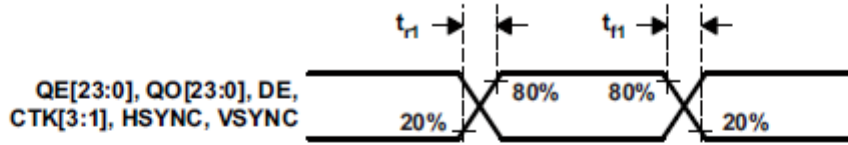
Figure 1. Rise and Fall Times of Data and Control Signals
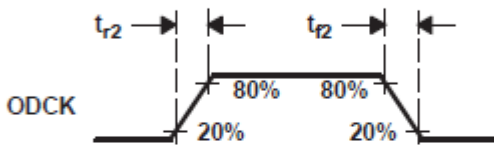
Figure 2. Rise and Fall Times of ODCK
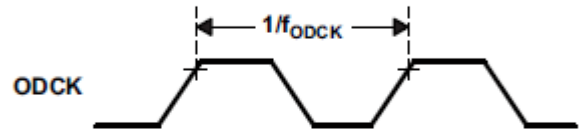
Figure 3. ODCK Frequency
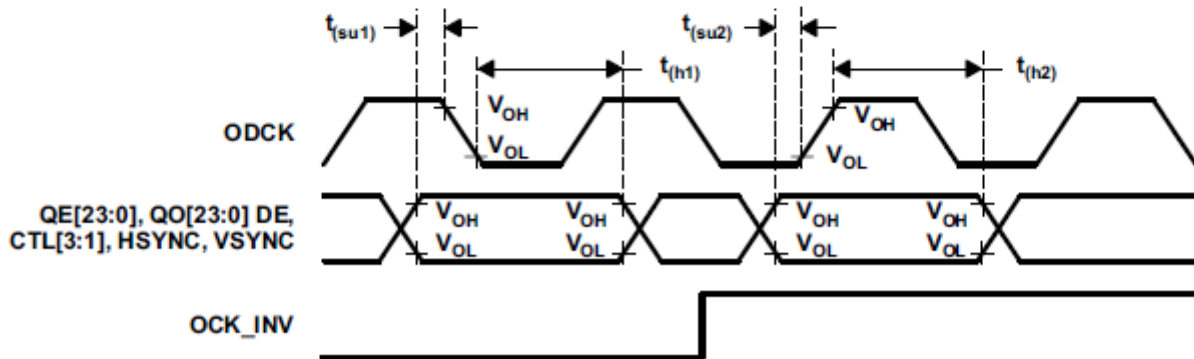
Figure 4. Data Setup and Hold Times to Rising and Falling Edges of ODCK
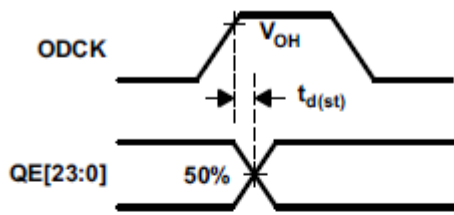
Figure 5. ODCK High to QE[23:0] Staggered Data Output
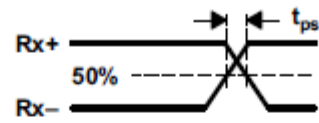
Figure 6. Analog Input Intra-Pair Differential Skew
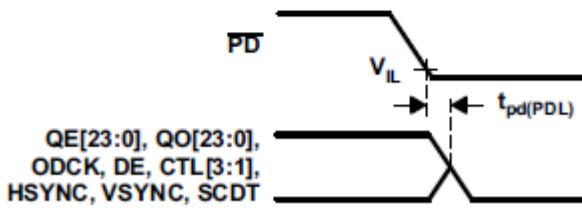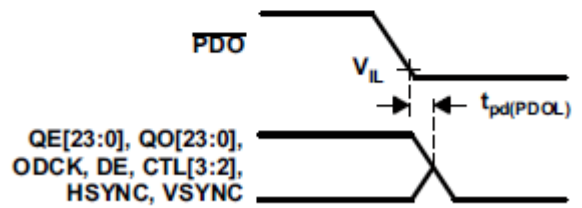

Figure 7. Delay From $\overline{PD}$ Low to Hi-Z Outputs

Figure 8. Delay From $\overline{PDO}$ Low to Hi-Z Outputs

PARAMETER MEASUREMENT INFORMATION (continued)
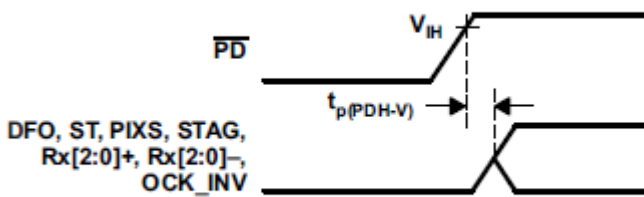
Figure 9. Delay From $\overline{PD}$ Low to High Before Inputs Are Active
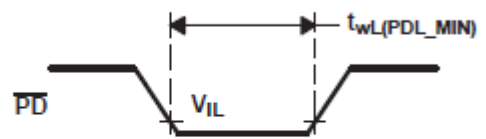
Figure 10. Minimum Time $\overline{PD}$ Low
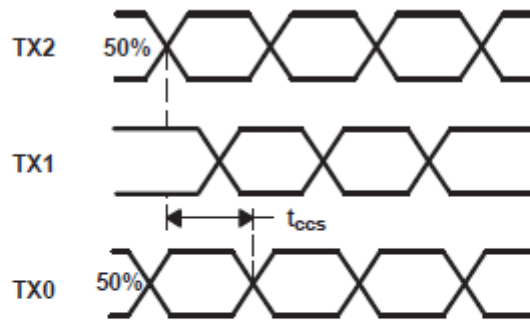
Figure 11. Analog Input Channel-to-Channel Skew
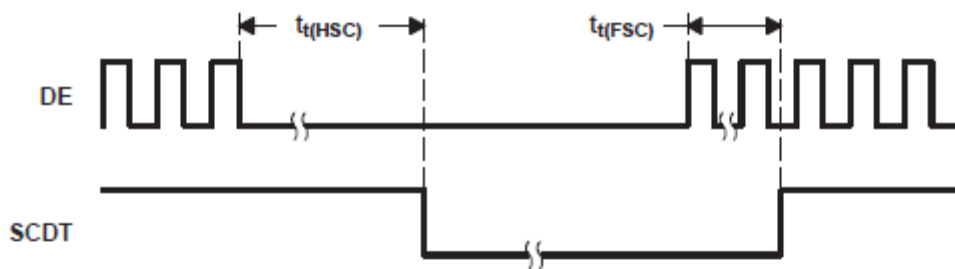
Figure 12. Time Between DE Transitions to SCDT Low and SCDT High
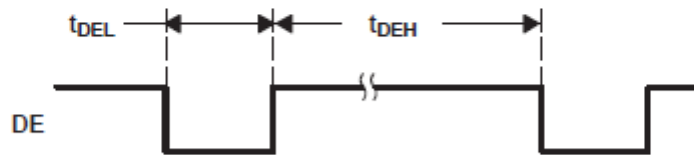
Figure 13. Minimum DE Low and Maximum DE High
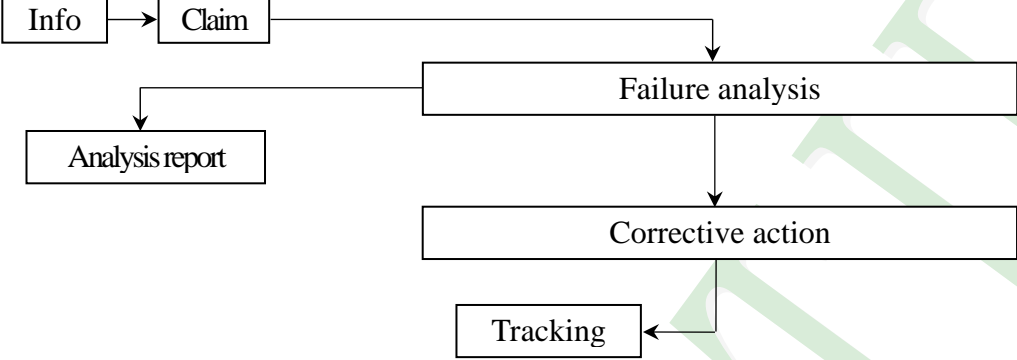
DETAILED DESCRIPTION
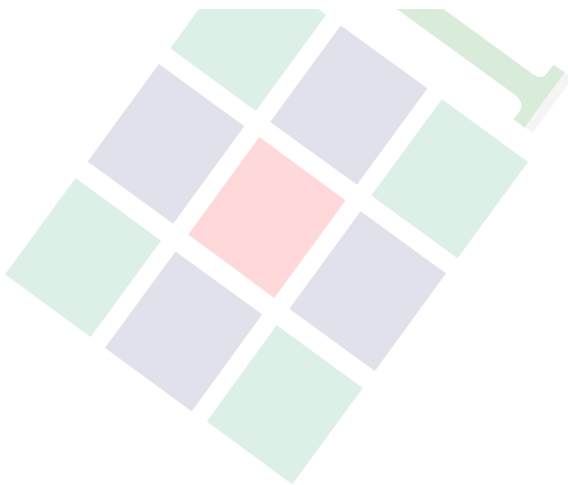
3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart

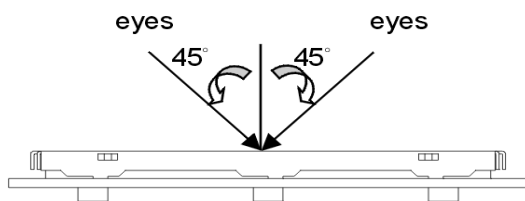| Item	Customer	Sales	R&D	Q.A	Manufactu ring	Product control	Purchase	Inventory control
Marketing & Design	Info → Survey; Request → Inquiry; Project Validation; Quote; Contract		Project evaluation					
Sample Approval			Design check; Sample test; Verification; Sample approval					
Pilot Run & Mass Product			Pilot run & Reliability test; Verification; Specification preparation; Mass production; Inspection					
Ship Out	Shipment							Ship out

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							

Sales Service flow:

Info → Claim → Failure analysis → Corrective action → Tracking; Failure analysis → Analysis report

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.**

eyes　　　　　eyes

45°　45°

5% Brightness

ND fliter

30~40 cm

90°

100% Brightness

LCD panel

2.5~3cm
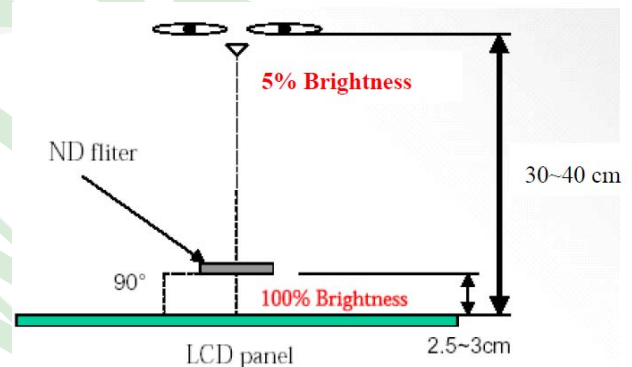
　（3）**. Definition of area.**

A

B
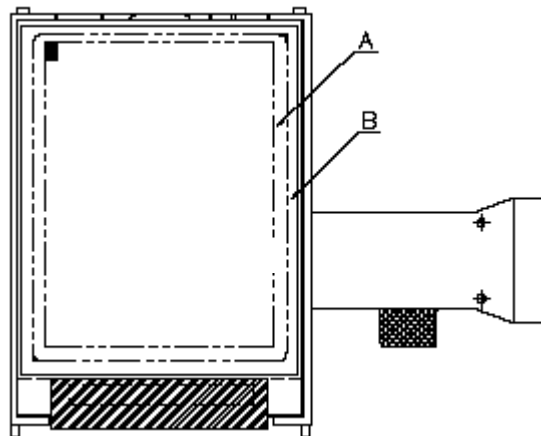
A area: viewing area

B area: Outside of viewing area

　（4）**. Standard of inspection： (Unit：mm)**
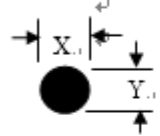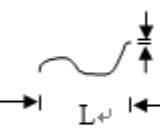
◆Specification For TFT-LCD Module 3. 5" ~15" : (Ver.B01)
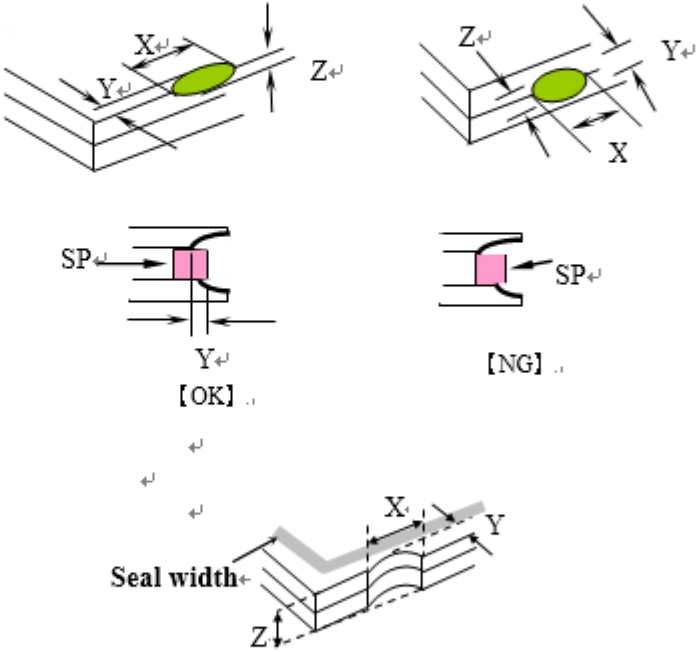
NO	Item	Criterion	Level
01	Product condition	1. 1 The part number is inconsistent with work order of production.	Major
		1. 2 Mixed product types.	Major
		1. 3 Assembled in inverse direction.	Major
02	Quantity	2. 1 The quantity is inconsistent with work order of production.	Major
03	Outline dimension	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		Minor

Dot Defect	Item	Acceptance (Q'ty)
	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.
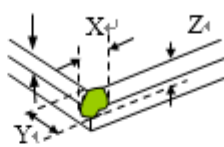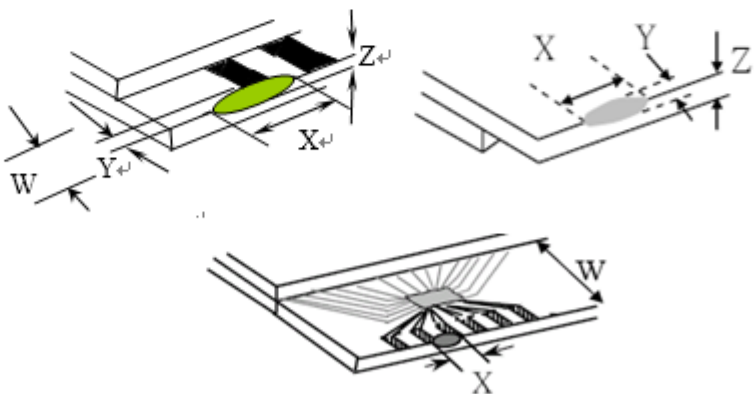
5. 4 Bright dot that can not be seen through 5% ND filter.
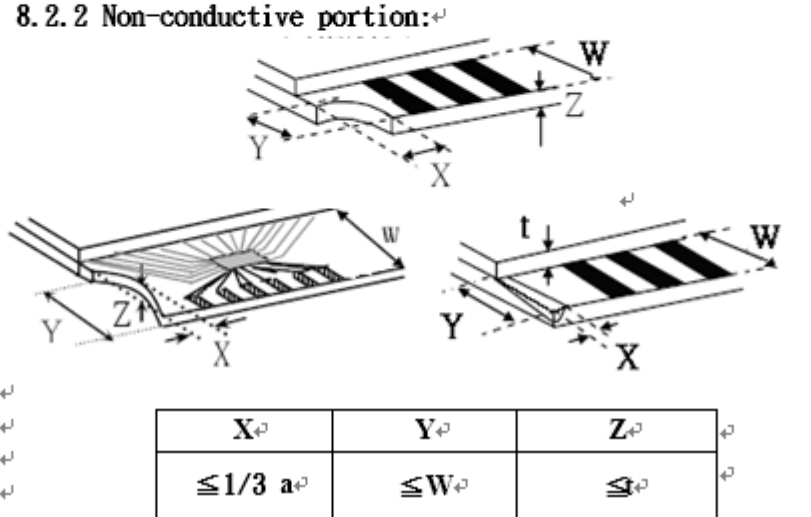
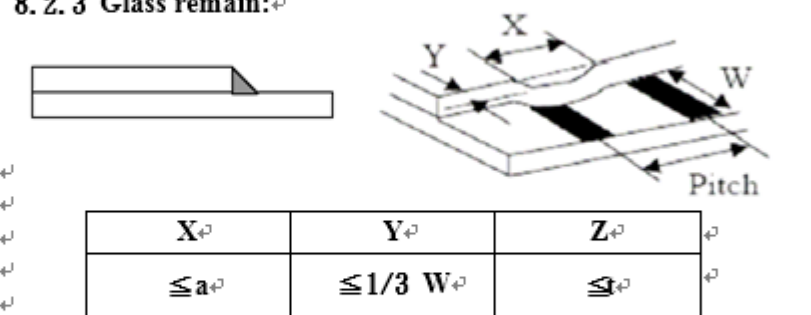| NO	Item	Criterion	Level
06	Black or white Dot, scratch, contamination Round type $\Phi = (x+y)/2$ Line type 	**6.1 Round type (Non-display or display):** 	Dimension (diameter : Φ)	Acceptance (Q'ty)	
	A area	B area
$\Phi \leq 0.25$	Ignore	Ignore
$0.25 < \Phi \leq 0.50$	5	
$\Phi > 0.50$	0	
Total	5	| **6.2 Line type(Non-display or display):** | 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
07	Polarizer Bubble		Dimension (diameter: Φ)	Acceptance (Q'ty)	
	A area	B area
$\Phi \leq 0.25$	Ignore	Ignore
$0.25 < \Phi \leq 0.50$	4	
$0.50 < \Phi \leq 0.80$	1	
$\Phi > 0.80$	0	
Total	5			Minor

◆Specification For TFT-LCD Module 3.5″~15″ :   (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: 【OK】 【NG】 Seal width | 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		Minor

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 8.1.2 Corner crack: <table><tr><td>X.</td><td>Y.</td><td>Z.</td></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> 8.2 Protrusion over terminal: 8.2.1 Chip on electrode pad: <table><tr><td></td><td>X</td><td>Y</td><td>Z</td></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>	Minor

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 8.2.2 Non-conductive portion: (table below) ⊙ 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 below) 8.2.4 Cracking: Not Allowed	Minor

8.2.2 Non-conductive portion:

X	Y	Z
≦1/3 a	≦W	≦$\frac{t}{2}$

8.2.3 Glass remain:

X	Y	Z
≦a	≦1/3 W	≦$\frac{t}{2}$

8.2.4 Cracking:

Not Allowed

◆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

4. RELIABILITY TEST

4.1 Reliability Test Condition   (Ver.B01)

NO.	TEST ITEM	TEST CONDITION
1	High Temperature Storage Test	Keep in +80 ±5℃ 240 hrs
2	Low Temperature Storage Test	Keep in −30 ±5℃ 240 hrs
3	High Temperature / High Humidity Storage Test	Keep in +60 ℃ / 90% R.H duration for 240 hrs (Excluding the polarizer)
4	Temperature Cycling Storage Test	−30℃ → +25℃ → +80℃ → +25℃ (30mins) (5mins) (30mins) (5mins) 20 Cycle

NO.	TEST ITEM	TEST CONDITION	
5	ESD Test	Air Discharge: Apply 2 KV with 5 times Discharge for each polarity +/-	Contact Discharge: Apply 250 V with 5 times discharge for each polarity +/-

ESD Test (continued):

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%)

NO.	TEST ITEM	TEST CONDITION
6	Vibration Test (Packaged)	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

NO.	TEST ITEM	Packing Weight (Kg)	Drop Height (cm)
7	Drop Test (Packaged)	0 ~ 45.4	122
		45.4 ~ 90.8	76
		90.8 ~ 454	61
		Over 454	46

Drop Direction :※1 corner / 3 edges / 6 sides each 1time

◎Result 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.
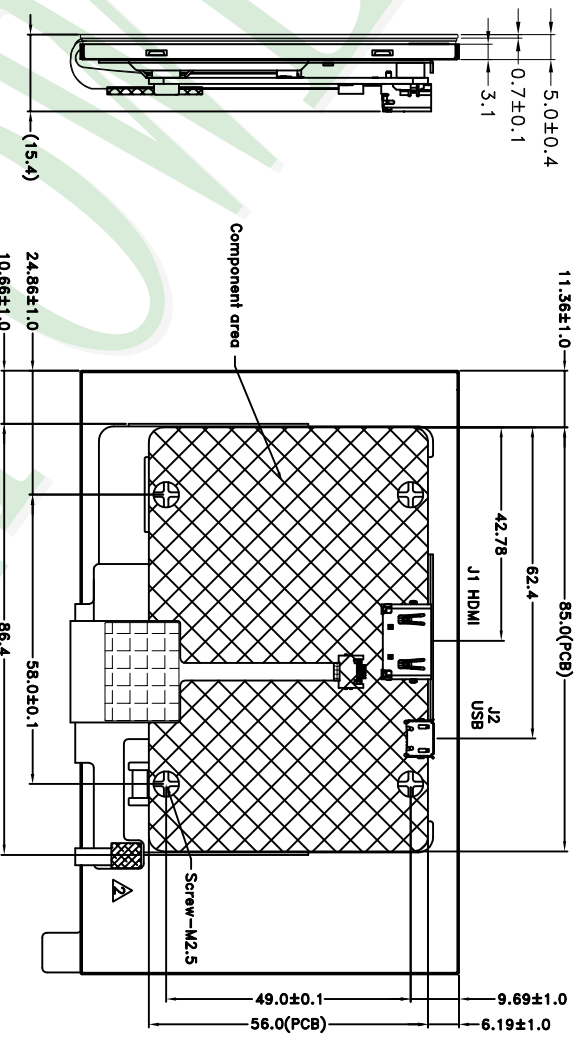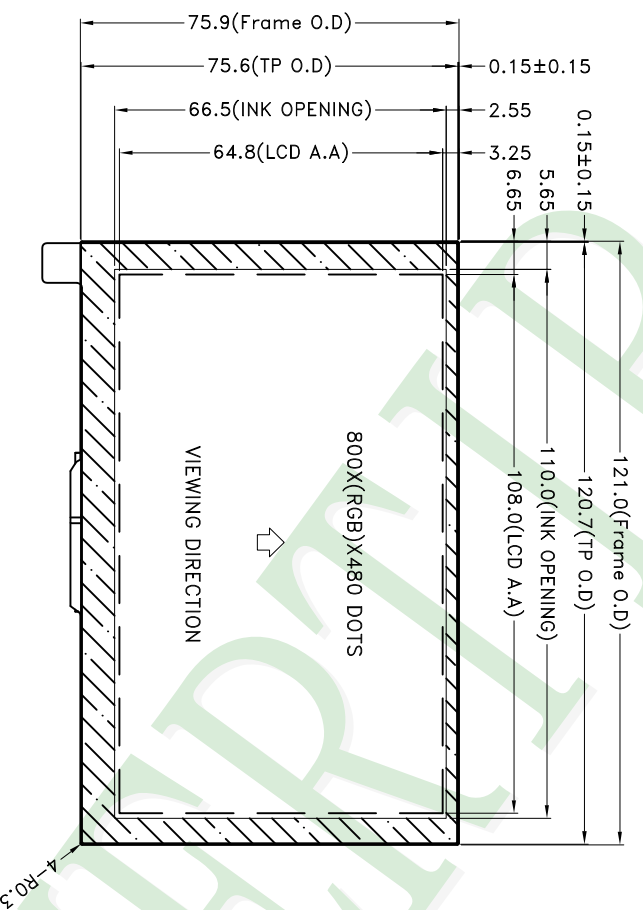
5.2 HANDLING

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℃ 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℃ ±5℃ 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.

LCD MODULE DRAWING

75.9(Frame O.D)
75.6(TP O.D)
66.5(INK OPENING)
64.8(LCD A.A)
0.15±0.15
2.55
3.25
5.65
6.65
0.15±0.15
121.0(Frame O.D)
120.7(TP O.D)
110.0(INK OPENING)
108.0(LCD A.A)

800X(RGB)X480 DOTS

VIEWING DIRECTION

4-R0.3

5.0±0.4
0.7±0.1
3.1

(15.4)

DOTS DETAIL
SCALE: 100X
0.135
0.135
R G B

Component area

11.36±1.0
42.78
62.4
J1 HDMI
85.0(PCB)
J2 USB

24.86±1.0
10.66±1.0
86.4
58.0±0.1

Screw-M2.5

49.0±0.1
56.0(PCB)
9.69±1.0
6.19±1.0

NOTES:
1.LCD TYPE: a-Si TFT
2.LCD DISPLAY: POSITIVE/TRANSMISSIVE
3.VIEW DIRECTION: 6 O'CLOCK
4.The tolerance unless classified ±0.3mm
5.J1 :ETC-HMAR51610U019S-3440N-7RM4-GP OR EQUIVALENT
6.J2 :ETC-MUSR231F205-GT17266S-RH OR EQUIVALENT

PART NO:	PH800480T024-IHC13
DRAWING NAME :	LMD-PH800480T024-IHC13
TITLE:	LCD MODULE DRAWING

		Design	Check	Approve
		Stone	Oliver	Oliver

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

Unit	Scale	Page	Surface	Material	Thickness	Quantity
MM	FIT	1/1				

Length(Min) (mm)		Tolerance Precision
1 ~ 4		Precision Level
4 ~ 16		-
16 ~ 63		-
63 ~ 250		-
250 ~ 1000		-
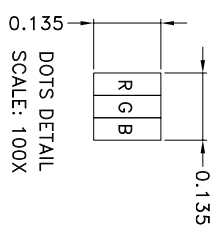
007			
006			
005			
004			
003			
002	MODIFY FPC	Stone	2018/01/05
001	NEW DRAWING	Stone	2017/12/26
REV		REV BY	DATE
		REVISER	

PT-A-054-01

LCM包裝規格書
LCM Packaging Specifications

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)	PH800480T024-IHC13	121.0 X 75.9	0.126	36	4.536
2	抗靜電氣泡袋(1)Bubble Bag	BAG170150AWBBA	170 X 150	0.0047	36	0.1692
3	A4隔板(2)A4 Partition	BX24500070BNBA	245 X 70 X 2.5	0.014	42	0.588
4	B4隔板(3)B4 Partition	BX29300070BLBA	293 X 70 X 2.5	0.012	12	0.144
5	海綿墊(4)Foam Rubber Cushion	OTFOAM00006ABA	290 X 240 X 10	0.02	12	0.24
6	C3內盒(5)Product Box	BX31025510AABA	310 X 255 X 100	0.263	6	1.578
7	外紙箱(6)Carton	BX52732536CCBA	527 X 325 X 360	1.092	1	1.092
8						
9						

2.一 整箱總重量 (Total LCD Weight in carton) :　8.35　Kg±10%

3.單箱數量規格表 (Packaging Specifications and Quantity) :
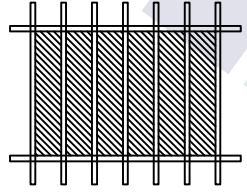
(1)Quantity Of Spacer :　A4隔板　X　7　, B4隔板　X　2

(2)Total LCM quantity in carton : quantity per box　　6　　x no of boxes　　6　　=　　36

(4) 海綿墊
Foam Rubber Cushion

(1)抗靜電氣泡袋+LCM
Bubble Bag+LCM

(2) A4隔板
A4 Partition

(3) B4隔板
B4 Partition

(4) 海綿墊
Foam Rubber Cushion

(5)C3內盒
Product Box

(6)外紙箱
Carton
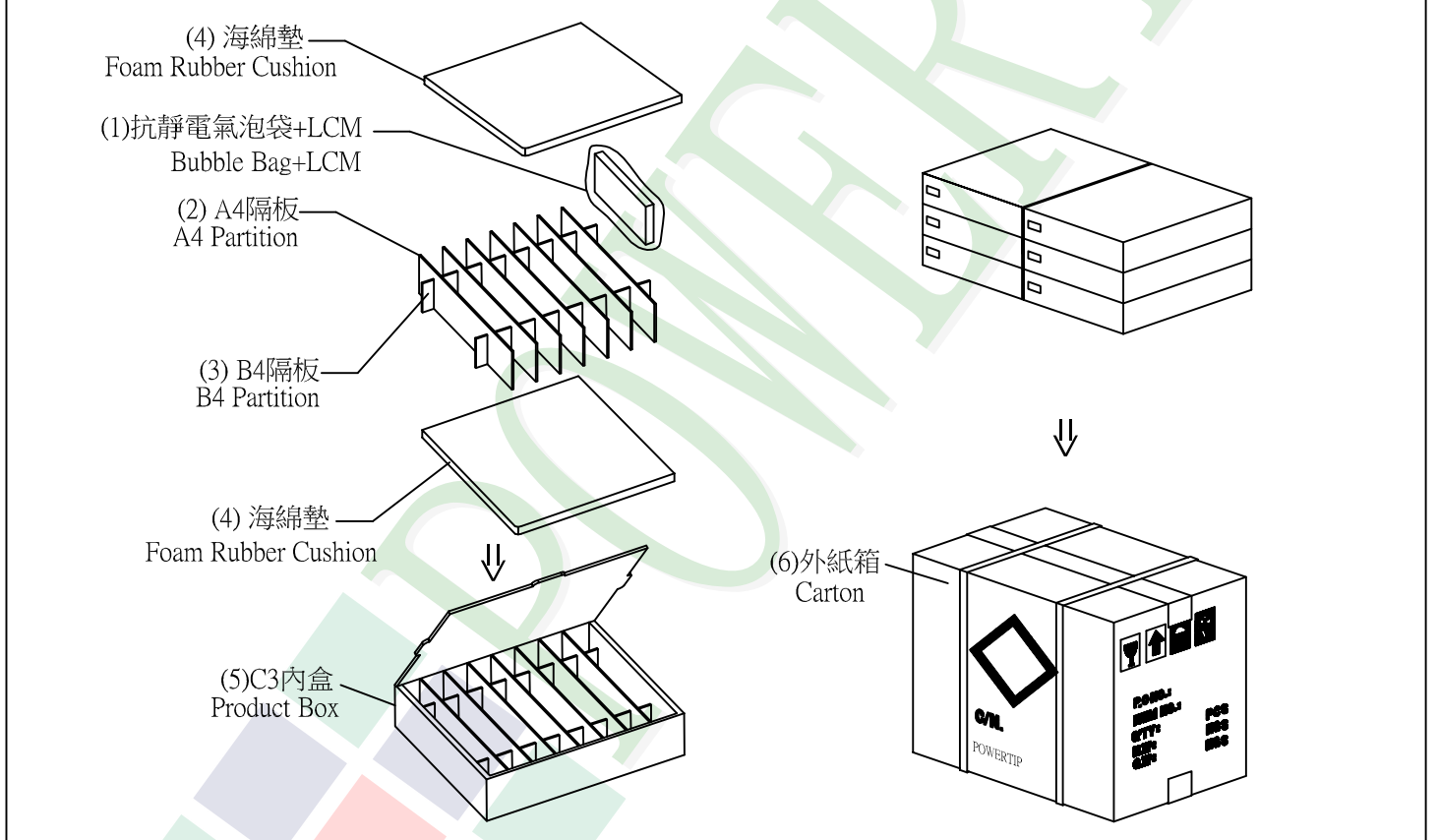
特　記　事　項 (REMARK)

4.放置格示意圖:

4.Each divider is placed inside a product Box

▨ 模組(LCM)

POWERTIP TECH. CORP.