SPECIFICATIONS

CUSTOMER	:	
SAMPLE CODE	:	SH480272T005-IHC03
MASS PRODUCTION CODE	:	PH480272T005-IHC03
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	001
DRAWING NO. (Ver.)	:	LMD-PH480272T005-IHC03 (Ver.001)
PACKAGING NO. (Ver.)	:	

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
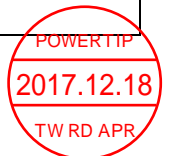
POWERTIP
2017.12.18
TWRD APR

POWERTIP TECH. CORP.

NO.PT-A-005-8

History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
12/18/2017	01	001	New Drawing	-	Stephen

Total: 29 Page

Contents

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Resolution	480 *3 (RGB) * 272 Dots
LCD Type	a-Si TFT , Normally white , Transmissive type
Screen size(inch)	4.3 inch
Viewing Direction	6 O'clock
Color configuration	RGB - Strip
Weight	TBD g
Backlight Type	White LED B/L
Interface	HDMI Interface
Controller/Driver IC	HYCON 4635
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	105.5 (W) * 67.2 (L) * 15.76 (H)	mm

LCD panel

Item	Standard Value	Unit
Active Area	95.04 (W) * 53.856 (L)	mm

Touch Panel

Item	Standard Value	Unit
Viewing Area	97.9 (W) * 56.2 (L)	mm

Note : For detailed information please refer to LCM drawing.

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit
Power Supply for Digital Circuit	V_{Bus}	GND=0V	-0.3	+6.0	V
Operating Temperature	T_{OP}	-	-20	+70	℃
Storage Temperature	T_{ST}	-	-30	+80	℃

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.

1.4 DC Electrical Characteristics

Module   GND = 0V, Ta = 25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Input Signal Voltage	V_{Bus}	4.5	5.0	5.5	V	Note
Supply Current	I_{VBus}	TBD	TBD	TBD	mA	Pattern = Full Display

Note: Confirm the input current is greater than 1A.

## 1.5 Optical Characteristics

TFT LCD Module Ta=25℃

Item		Symbol	Condition	Min.	Typ.	Max.	unit	
Response Time	Rise	Tr	Ta = 25℃ θX, θY = 0°	-	10	20	ms	Note 2
	Fall	Tf		-	15	30		
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)	White	X	Ta = 25℃ θX , θY = 0°	0.24	0.29	0.34	-	Note1
		Y		0.26	0.31	0.36		
	Red	X		0.52	0.57	0.62		
		Y		0.28	0.33	0.38		
	Green	X		0.30	0.35	0.40		
		Y		0.56	0.61	0.66		
	Blue	X		0.10	0.15	0.20		
		Y		0.00	0.07	0.12		
Average Brightness Pattern=White Display (With LCD) *1		IV	V_{Bus}=5.0V PWM="High" (Duty=100%)	(680)	(850)	-	cd/m^2	Note1
Uniformity (With LCD) *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
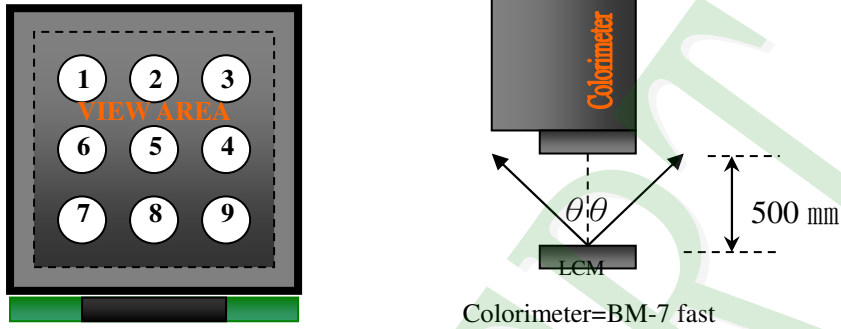
　　To be measured at the center area of panel with a viewing cone of 1° by Topcon
luminance meter BM-7, after 10 minutes operation (module)

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

"Black" | "White" | "Black"

100%
90%

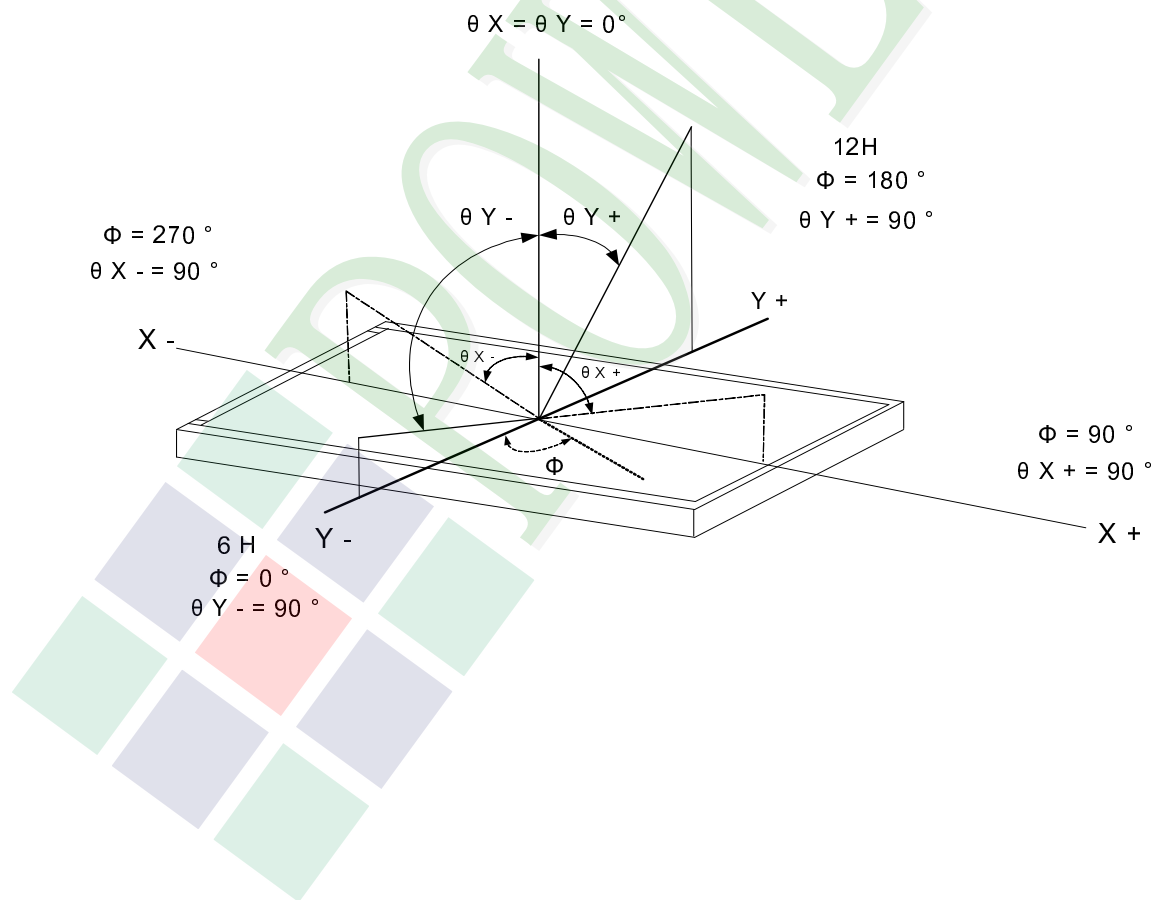10%
0%

Signal (Relative value)

Tr | Tf
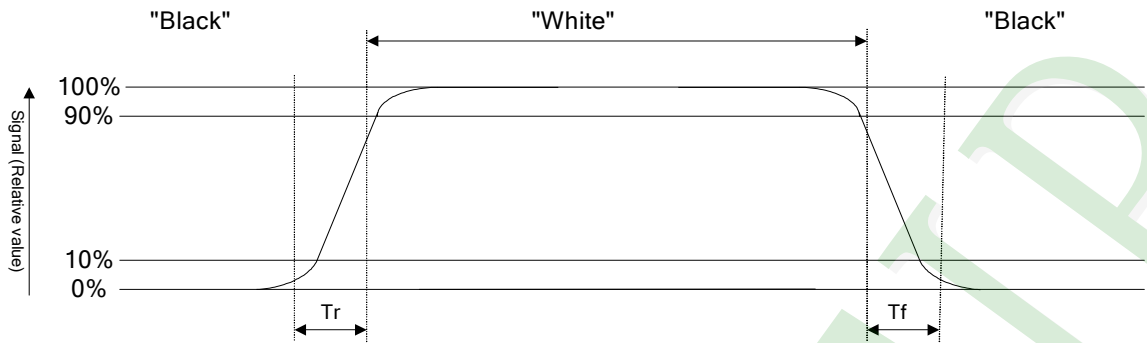
Note3: Definition of contrast ratio:

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:

θ X = θ Y = 0°

12H
Φ = 180°
θ Y + = 90°

Φ = 270°
θ X - = 90°

θ Y -   θ Y +

Y +

X -

θ X -   θ X +

Φ = 90°
θ X + = 90°

Φ

6 H
Φ = 0°
θ Y - = 90°

Y -

X +

1.6 Backlight Characteristics

Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Remark
LED Forward Current	I$_F$	30		mA	
LED Reverse Voltage	V$_R$	5		V	One LED
Power Dissipation	P$_D$	1224		mW	

Electrical / Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Forward Voltage	VF	IF=40mA	17.6	19.2	20.4	V	Note1
LED Life Time	-		50000	-	-	hr	Note2
Color	White						

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

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at Ta=25 ℃ and I$_L$=40 mA. The LED life time could be decreased if operating I$_L$ is larger than 40 mA.

1.7 Touch Panel Characteristics

Features

Item	Standard Value
Touch Panel Size	4.3"
Touch type	Projective Capacitive Touch Panel
Input Method	Finger / 5 Points Touch
Interface	I²C
IC	HYCON4635
I²C Address	0x38

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	98.1 (W) * 56.9 (L)	mm
Number of Sensing Channel	18 * 10	

Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Supply Voltage	TPVDD	-	-0.3	+6.0	V
Operating Temperature	T_{OP}	-	-20	+70	℃
Storage Temperature	T_{ST}	-	-30	+80	℃

DC Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	TPVDD	-	-	3.3	-	V

Touch Panel IC Read/Write description & Register Mapping

Reference : HYCON Touch Driver Porting Reference Guide.

2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram
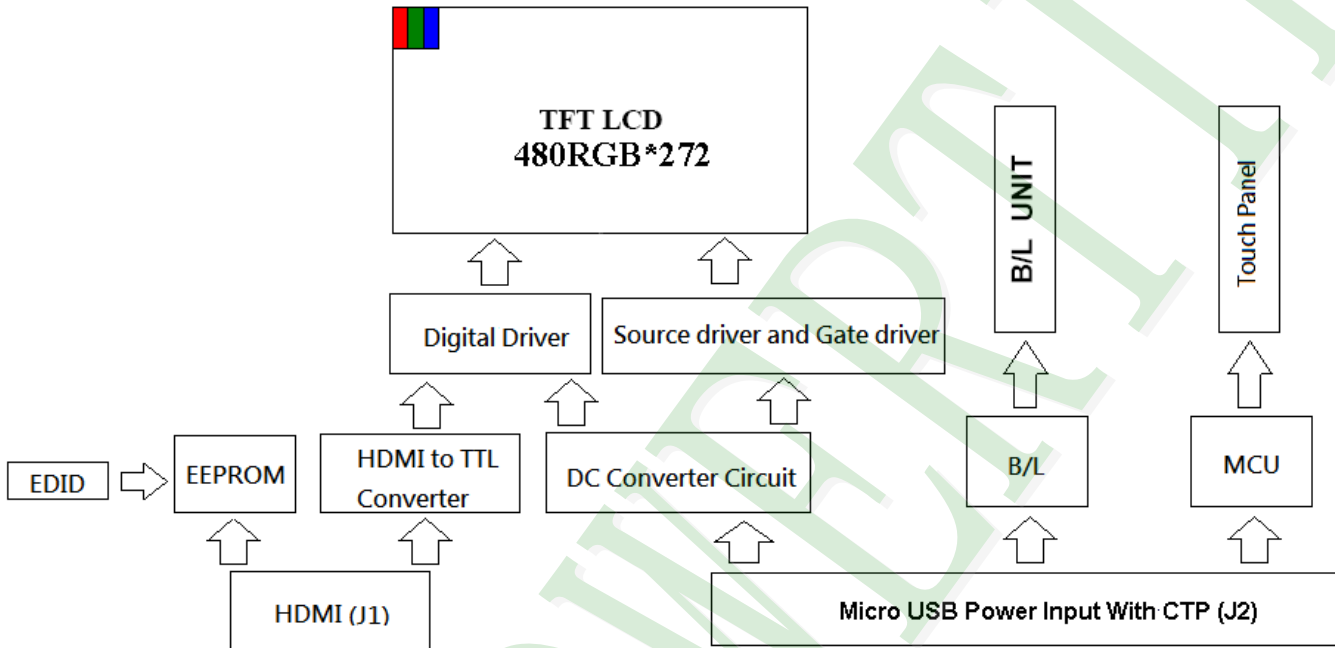
2.2 Interface Pin Description

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} 4.4V-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 $\overline{PD}$ low to Hi-Z outputs				9	ns
$t_{pd(PDOL)}$	Propagation delay time from $\overline{PDO}$ 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
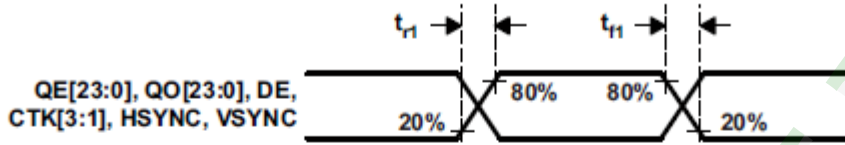
Figure 1. Rise and Fall Times of Data and Control Signals
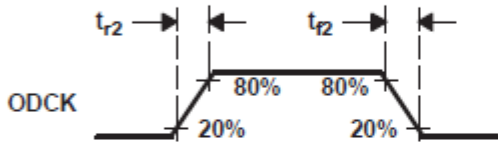
Figure 2. Rise and Fall Times of ODCK
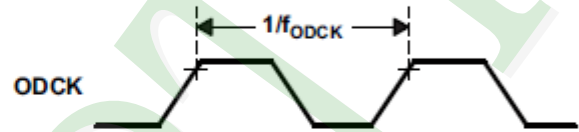
Figure 3. ODCK Frequency
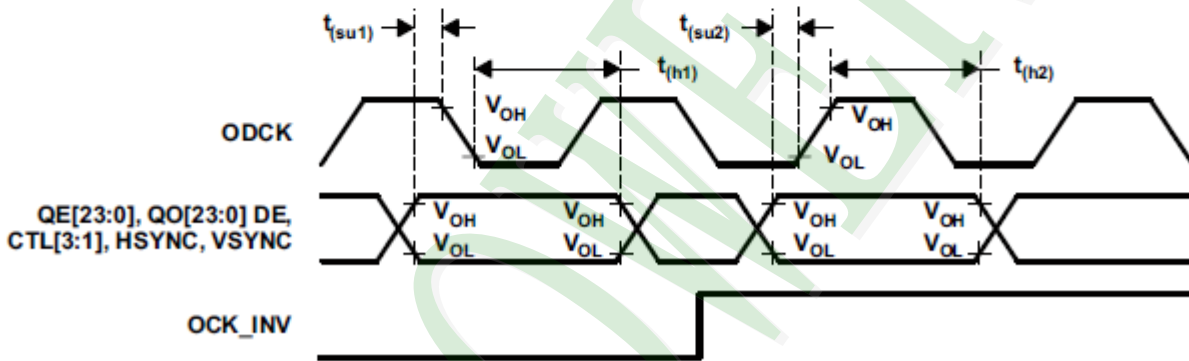
Figure 4. Data Setup and Hold Times to Rising and Falling Edges of ODCK
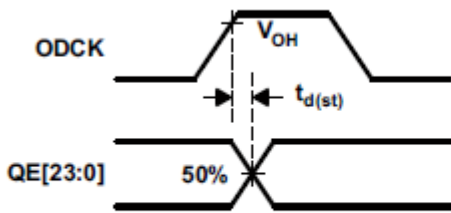
Figure 5. ODCK High to QE[23:0] Staggered Data Output

ODCK, V_{OH}, $t_{d(st)}$, QE[23:0], 50%
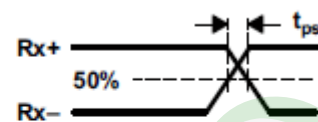
Figure 6. Analog Input Intra-Pair Differential Skew

Rx+, Rx−, 50%, t_{ps}
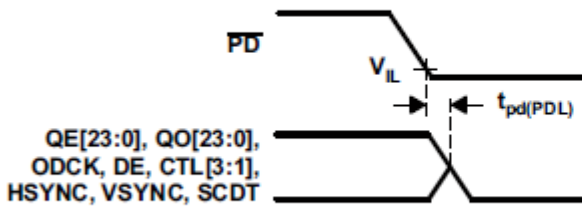
Figure 7. Delay From $\overline{PD}$ Low to Hi-Z Outputs

$\overline{PD}$, V_{IL}, $t_{pd(PDL)}$, QE[23:0], QO[23:0], ODCK, DE, CTL[3:1], HSYNC, VSYNC, SCDT
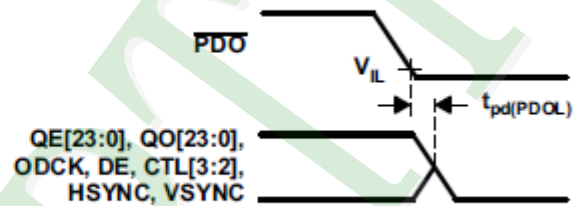
Figure 8. Delay From $\overline{PDO}$ Low to Hi-Z Outputs

$\overline{PDO}$, V_{IL}, $t_{pd(PDOL)}$, QE[23:0], QO[23:0], ODCK, DE, CTL[3:2], HSYNC, VSYNC

PARAMETER MEASUREMENT INFORMATION (continued)
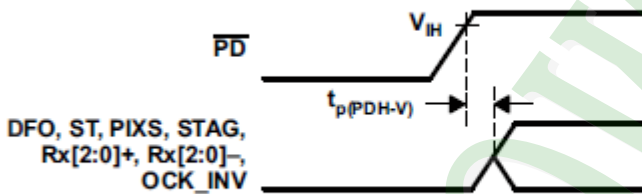
Figure 9. Delay From $\overline{PD}$ Low to High Before Inputs Are Active

$\overline{PD}$, V_{IH}, $t_{p(PDH-V)}$, DFO, ST, PIXS, STAG, Rx[2:0]+, Rx[2:0]−, OCK_INV
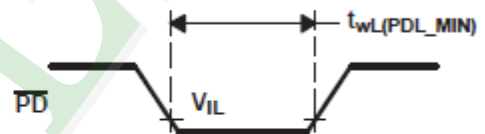
Figure 10. Minimum Time $\overline{PD}$ Low

$\overline{PD}$, V_{IL}, $t_{wL(PDL\_MIN)}$
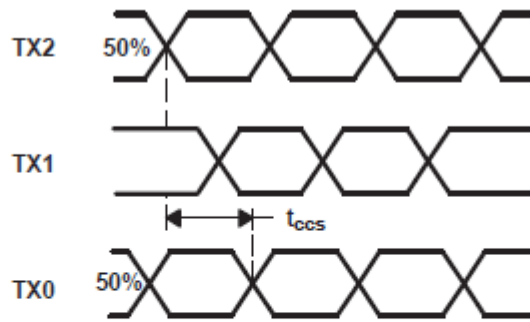
Figure 11. Analog Input Channel-to-Channel Skew
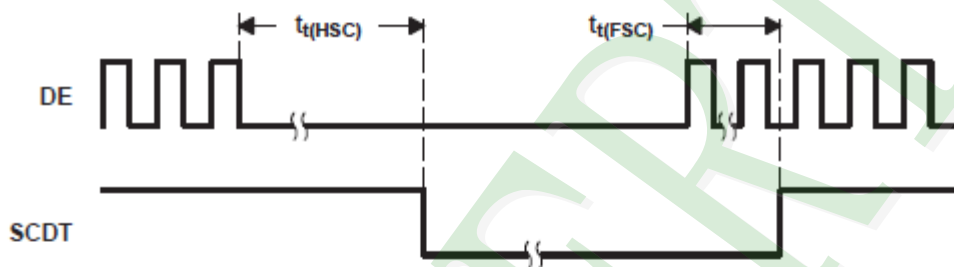
Figure 12. Time Between DE Transitions to SCDT Low and SCDT High
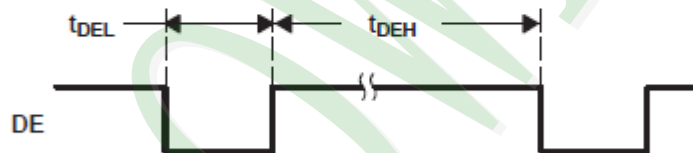
Figure 13. Minimum DE Low and Maximum DE High

DETAILED DESCRIPTION

2.3.3 Power Sequence

POWER ON

a. Power on:

V5V →Data→B/L
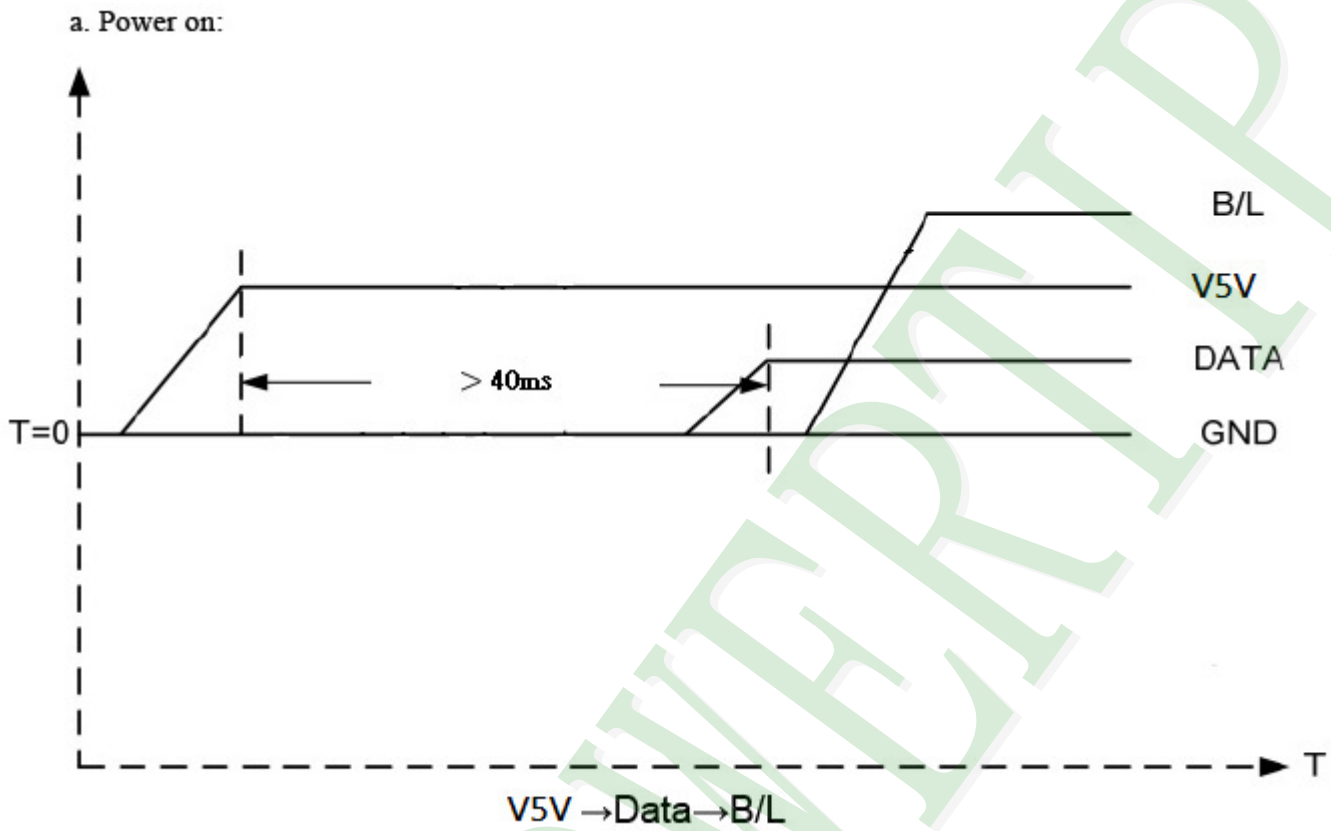
POWER OFF

b. Power off:

B/L→Data→ V5V
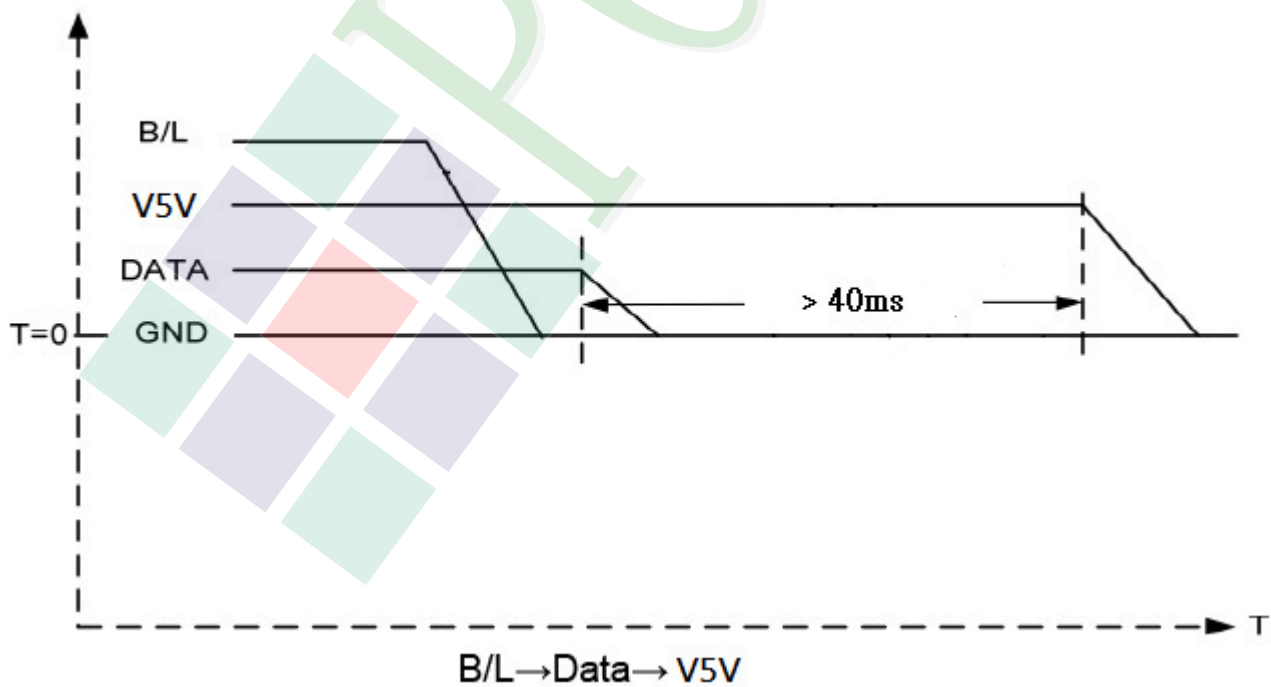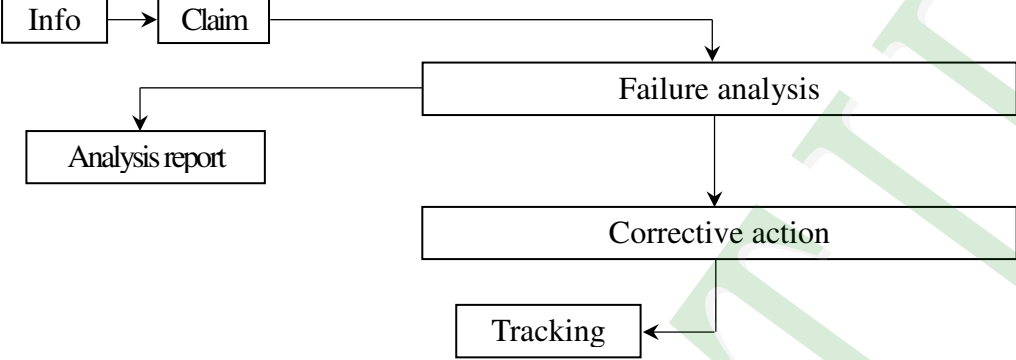
3. QUALITY ASSURANCE SYSTEM

3.1   Quality Assurance Flow Chart

Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Marketing & Design								
Sample Approval								
Pilot Run & Mass Product								
Ship Out								

Info → Survey

Request → Inquiry → Project   evaluation

Project   Validation

NG

OK

Quote

Contract

Design check

Sample test

NG

Verification

OK

NG

Sample approval   OK

Pilot   run & Reliability test

NG

Verification

OK

Specification preparation

Mass production

OK   Inspection   NG

Shipment

Ship out

Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service	Info → Claim Analysis report		Failure analysis Corrective action Tracking					
Q.A Activity	1. ISO 9001 Maintenance Activities 2. Process improvement proposal 3. Equipment calibration 4. Education And Training Activities 5. Standardization Management							

3.2. Inspection Specification

◆Scope：The document shall be applied to TFT-LCD Module for 3.5″ ~10″ (Ver.B01).

◆Inspection Standard：MIL-STD-105E Table Normal Inspection Single Sampling Level Ⅱ.

◆Equipment：Gauge、MIL-STD、Powertip Tester、Sample

◆Defect Level：Major Defect　AQL：0.4　;　Minor Defect　AQL：1.5

◆OUT Going Defect Level：Sampling.

◆Standard of the product appearance test：

　a. Manner of appearance test：

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

　(2). The test direction is base on about around 45° of vertical line.
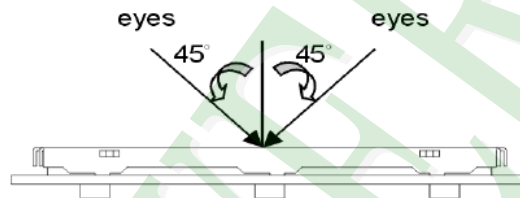
　(3). Definition of area.
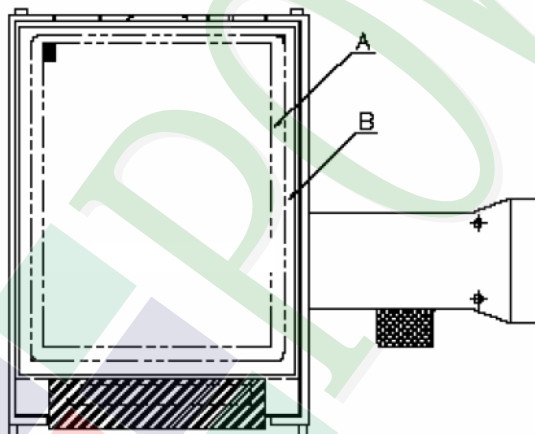
A area : viewing area

B area : Outside of viewing area

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

◆**Specification For TFT-LCD Module 3.5″ ~10″ :**

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
05	Dot defect (Bright dot、Dark dot) On -display	<table><tr><td colspan="2">Item</td><td>Acceptance (Q'ty)</td></tr><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></table> 5.1 Inspection pattern：full white , full black , Red , Green and blue screens. 5.2 It is defined as dot defect if defect area ＞1/2 dot. 5.3 The distance between two dot defect ≧5 mm.	Minor
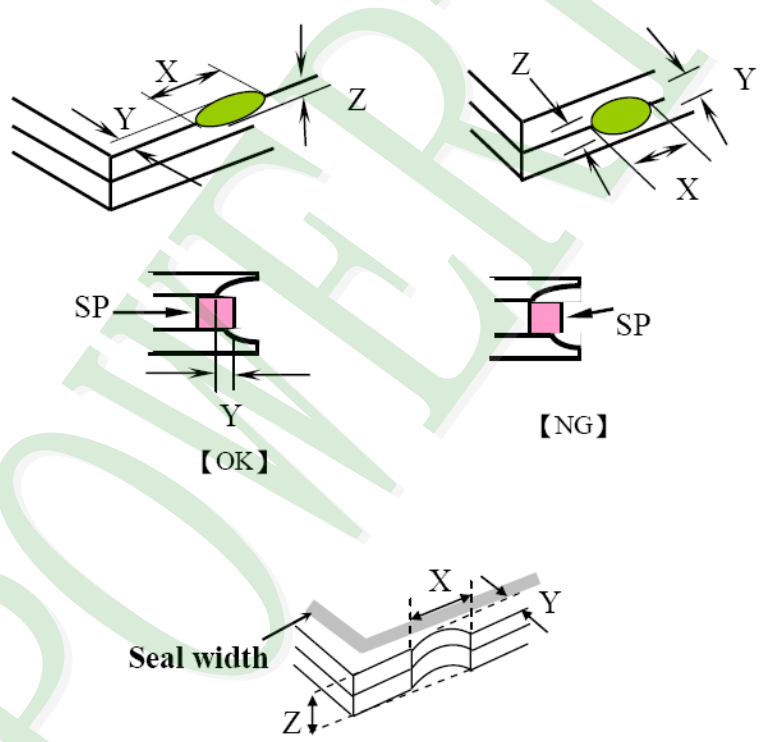
◆**Specification For TFT-LCD Module 3.5″~10″:**　　　　　　　　　　　　　　　　　　(Ver.B01)

NO	Item	Criterion	Level
06	**Black or white dot、scratch、contamination** **Round type** X Y ● $\Phi=(x+y)/2$ **Line type** W L	**6.1 Round type (Non-display or display):** 	Dimension (diameter:Φ)	Acceptance (Q'ty)	
	A area	B area
$\Phi \leqq 0.25$	Ignore	Ignore
$0.25 < \Phi \leqq 0.50$	5	
$\Phi > 0.50$	0	
Total	5	| **6.2 Line type(Non-display or display):** | Length (L)	Width (W)	Acceptance (Q'ty)	
		A area	B area
---	$W \leqq 0.03$	Ignore	Ignore
$L \leqq 10.0$	$0.03 < W \leqq 0.05$	4	
$L \leqq 5.0$	$0.05 < W \leqq 0.10$	2	
---	$W > 0.10$	As round type	
Total		5			Minor
07	**Polarizer Bubble**		Dimension (diameter:Φ)	Acceptance (Q'ty)	
	A area	B area
$\Phi \leqq 0.25$	Ignore	Ignore
$0.25 < \Phi \leqq 0.50$	4	
$0.50 < \Phi \leqq 0.80$	1	
$\Phi > 0.80$	0	
Total	5			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 General glass chip： 8.1.1 **Chip on panel surface and crack between panels:** 【OK】　　　　【NG】 Seal width 	Minor

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

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： 8.2 Protrusion over terminal： 8.2.1 Chip on electrode pad：	Minor

8.1.2 Corner crack table:

X	Y	Z
≦1/5 a	Crack can't enter viewing area	Z ≦1/2 t
≦1/5 a	Crack can't exceed the half of SP width.	1/2 t < Z ≦2 t

8.2.1 Chip on electrode pad table:

	X	Y	Z
Front	≦ a	≦ 1/2 W	≦ t
Back	≦ a	≦ W	≦ 1/2 t

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： | X	Y	Z
---	---	---
≦ 1/3 a	≦ W	≦ t | ⊙ 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： | X	Y	Z
---	---	---
≦ a	≦ 1/3 W	≦ t		Minor

4. RELIABILITY TEST

4.1 Reliability Test Condition   (Ver.B01)

NO.	TEST ITEM	TEST CONDITION
1	High Temperature Storage Test	Keep in +80 ±2℃ 240 hrs
2	Low Temperature Storage Test	Keep in −30 ±2℃ 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
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 +/- 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%)
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
7	Drop Test (Packaged)	<table><tr><th>Packing Weight (Kg)</th><th>Drop Height (cm)</th></tr><tr><td>0 ~ 45.4</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table> Drop Direction :※1 corner / 3 edges / 6 sides each 1time

◎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℃

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 $320\pm10°C$ and 3-5 sec.

5.2.9   To avoid liquid (include organic solvent) stained on LCM .

5.3 STORAGE

5.3.1   Store the panel or module in a dark place where the temperature is $25°C$ $\pm5°C$ and the humidity is below 65% RH.

5.3.2   Do not place the module near organics solvents or corrosive gases.

5.3.3   Do not crush , shake , or jolt the module.

5.4 TERMS OF WARRANTY

5.4.1   Applicable warrant period

The period is within thirteen months since the date of shipping out under normal using and storage conditions.

5.4.2   Unaccepted responsibility

This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment , we cannot take responsibility if the product is used in nuclear power control equipment , aerospace equipment , fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required.
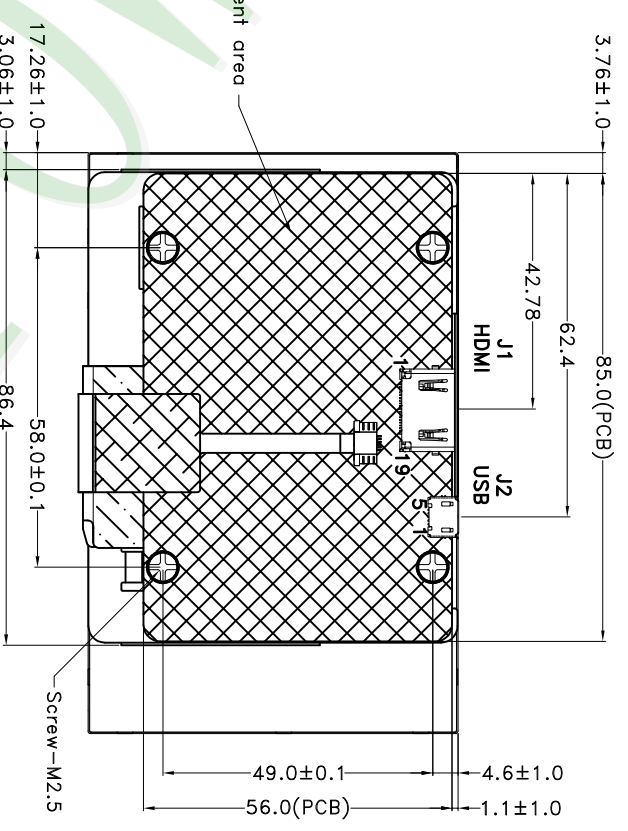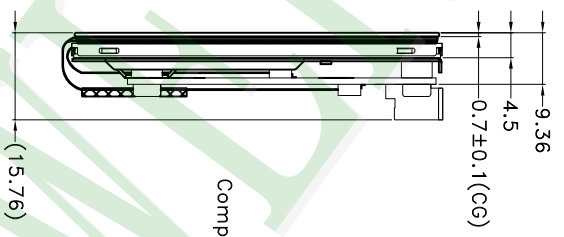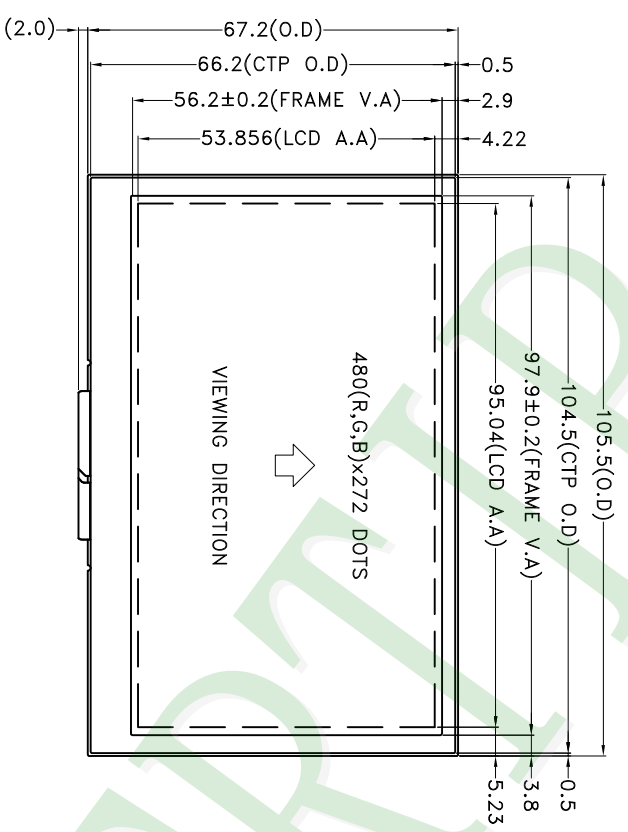
NOTES:

1. 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-HMAR51610U0019S-3440N-7RM4-GP OR EQUIVALENT
6. J2 :ETC-MUSR231F205-GT17266S-RH OR EQUIVALENT

VIEWING DIRECTION

480(R.G.B)x272 DOTS

(2.0)
67.2(O.D)
66.2(CTP O.D)
56.2±0.2(FRAME V.A)
53.856(LCD A.A)
0.5
2.9
4.22
105.5(O.D)
104.5(CTP O.D)
97.9±0.2(FRAME V.A)
95.04(LCD A.A)
5.23
3.8
0.5

(15.76)
9.36
4.5
0.7±0.1(CG)

Component area

3.76±1.0
17.26±1.0
3.06±1.0
42.78
62.4
85.0(PCB)
58.0±0.1
86.4

J1 HDMI
J2 USB

49.0±0.1
56.0(PCB)
4.6±1.0
1.1±1.0

Screw—M2.5

DETAIL DOTS
SCALE: 30X

0.198
0.198
RGB RGB
RGB

	REV	REV BY	REVISER	DATE		Design	Check	Approve	
007									
006									
005									
004									
003									
002									
001	NEW DRAWING		Stone	2017/12/14		Stone	Oliver	Oliver	

PART NO.: PH480272T005-IHC03

DRAWING NAME:: LMD-PH480272T005-IHC03

TITLE: LCD Module Drawing

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

Surface	Unit	Scale	Page	Quantity
(3)	MM	FIT	1/1	

	Material	Thickness	
Length(Min)	Tolerance(mm) Precision Level	Precision Level
1 ~ 4	4	-
4 ~ 16	16	-
16 ~ 63	63	-
63 ~ 250	250	-
250 ~ 1000	-	-

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