



## SPECIFICATIONS

CUSTOMER	:	CBE005
SAMPLE CODE	:	SH800480T024-IHC14
MASS PRODUCTION CODE	:	PH800480T024-IHC14
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	002
DRAWING NO. (Ver.)	:	LMD-PH800480T024-IHC14(Ver.002)
PACKAGING NO. (Ver.)	:	PKG-PH800480T024-IHC14(Ver.001)

**Customer Approved**

**Date:**

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

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### History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
03/05/2018	01	001	New Drawing	-	Stephen
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Total: 30 Pages

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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 5 Points Touch PMMA Thickness 3mm.
Driver IC	ILI6122M-9G / ILI5960-9G / HY4635(CTP)
Backlight Type	White LED B/L
Weight	134.0 g
Interface	HDMI Interface
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website : <a href="http://www.powertip.com.tw/news_detail.php?Key=1&amp;cID=1">http://www.powertip.com.tw/news_detail.php?Key=1&amp;cID=1</a>

### 1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	121.0(W) x 75.9 (L) x 24.85 (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	-
	VCC	GND=0	-0.3	+26.0	V	
	V <sub>Bus</sub>	GND=0	-0.3	+6.0	V	
Operating Temperature	T <sub>OP</sub>	-	-20	70	°C	
Storage Temperature	T <sub>ST</sub>	-	-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
	VCC		11.5	12.0	12.5	V
	V <sub>Bus</sub>		4.5	5.0	5.5	V
Input Signal Voltage	V <sub>IH</sub>	GND=0V	0.7*VDD	-	VDD	V
	V <sub>IL</sub>		0	-	0.3*VDD	V
Supply Current	I <sub>VCC</sub>	VCC=12.0V	-	300	450	mA

**Note: Pattern = Full Display (RGB)**

**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°C	-	-	35	55	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 & LCD & Touch Panel)	White	X	Ta = 25°C $\theta X, \theta Y = 0^\circ$	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		$\Delta B$		70	-	-	%	Note1

Note 1:

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

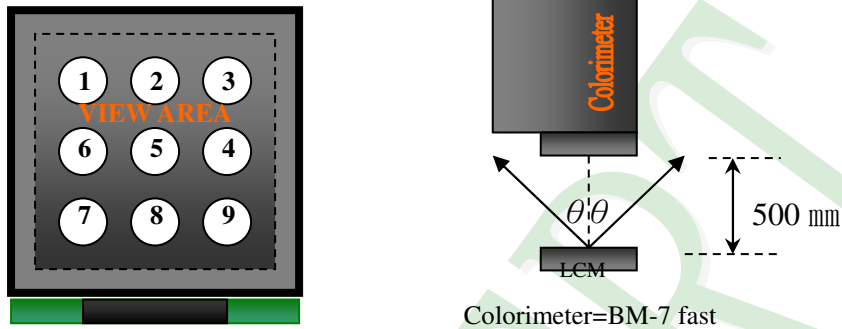
\*2 : Measurement Condition for Optical Characteristics:

a : Environment:  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  /  $60 \pm 20\% \text{R.H}$  , no wind , dark room below 10 Lux at typical lamp current and typical operating frequency.

b : Measurement Distance:  $500 \pm 50 \text{ mm}$  , ( $\theta = 0^{\circ}$ )

c : Equipment: TOPCON BM-7 fast , (field  $1^{\circ}$ ) , after 10 minutes operation.

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



To be measured at the center area of panel with a viewing cone of  $1^{\circ}$  by Topcon luminance meter BM-7, after 10 minutes operation (module)

Note2: Definition of response time:

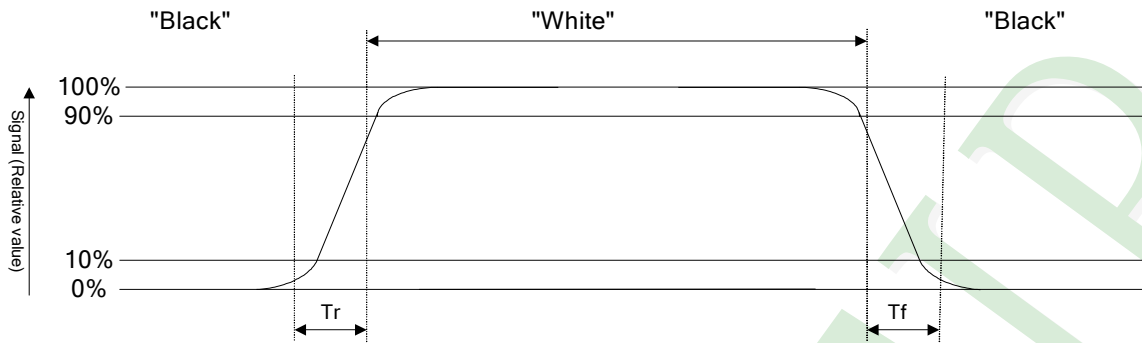
The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



### Normally Black



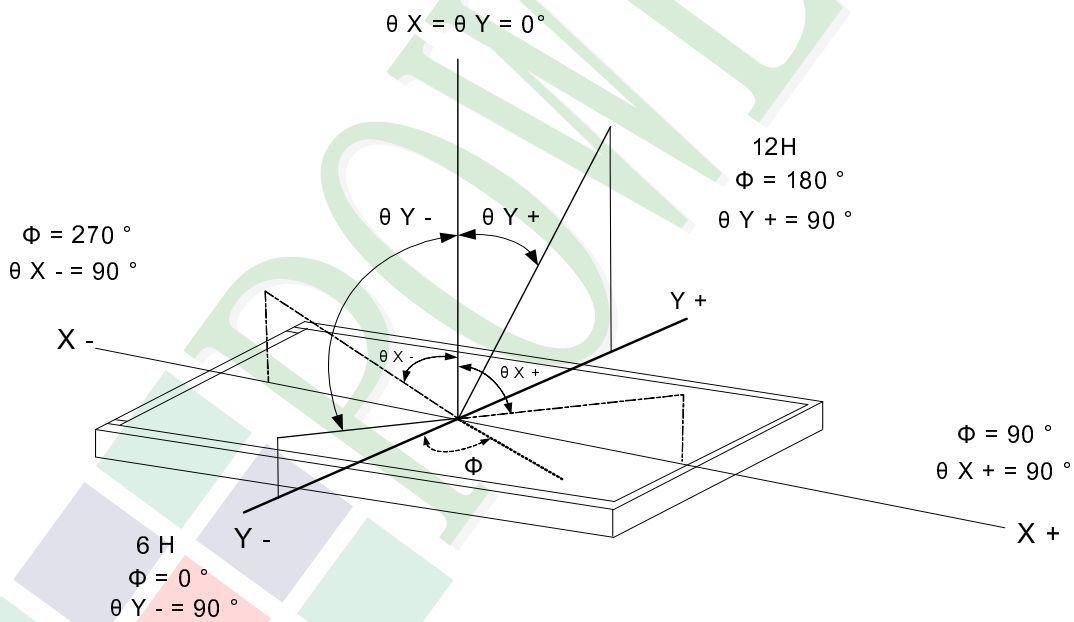
Note3: Definition of contrast ratio:

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

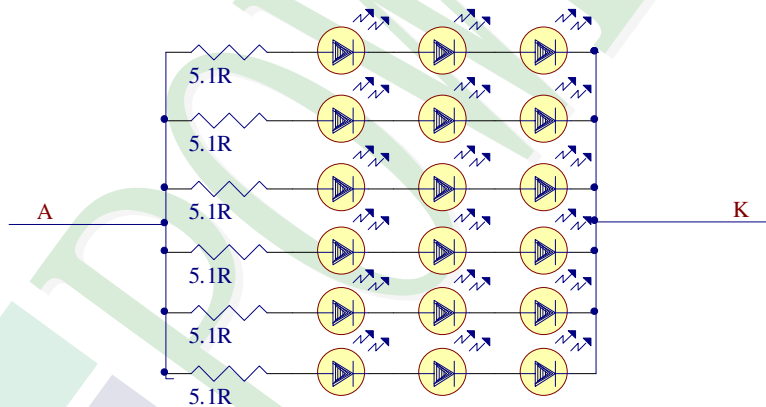
Item	Symbol	Min.	Max.	Unit	Remark
LED Forward Current	$I_F$	210		mA	One LED
LED Reverse Voltage	$V_R$	10		V	

### Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	$V_F$	$I_F=90\text{mA}$	16.2	18.0	19.2	V
CIE Color Coordinate (Without LCD)	X		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  $T_a=25^\circ\text{C}$  and  $I_L=90\text{mA}$ .

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at  $T_a=25^\circ\text{C}$  and  $I_L=90\text{mA}$ . The LED life time could be decreased if operating  $I_L$  is larger than 90 mA.



### Other Description

Item	Conditions	Description
Life Time	$T_a=25^\circ\text{C}$ $I_F=90\text{mA}$	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	I <sup>2</sup> C
IC	HYCON - HY4635
I <sup>2</sup> C Address	0x38 (7-bit)

### I<sup>2</sup>C 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	VCC	-	-0.3	+5.0	V
Operating Temperature	T <sub>OP</sub>	-	-20	+70	°C
Storage Temperature	T <sub>ST</sub>	-	-30	+80	°C

### DC Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	VCC	-	3.0	3.3	3.6	V

Touch Panel IC Read/Write description & Register Mapping

Reference : HYCON Touch Driver Porting Reference Guide.

## HYCON I<sup>2</sup>C 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	without cover lens
Register 0x92=03	Air gap 0.2mm with cover glass 1mm
Register 0x92=04	Air gap 0.2mm with cover glass 2-3mm
Register 0x92=05 (Default)	Air gap 0.2mm with cover glass 4-5mm

### Note:

Capacitive Touch Panel (CTP) sensor support air gap 0.2 mm with different thickness of cover lens, total thickness should be controlled with in 5mm. Please adjust the touch sensitivity according to your application.

### Touch Panel IC Read/Write Description & Register Mapping

Reference : HYCON Touch Driver Porting Reference Guide

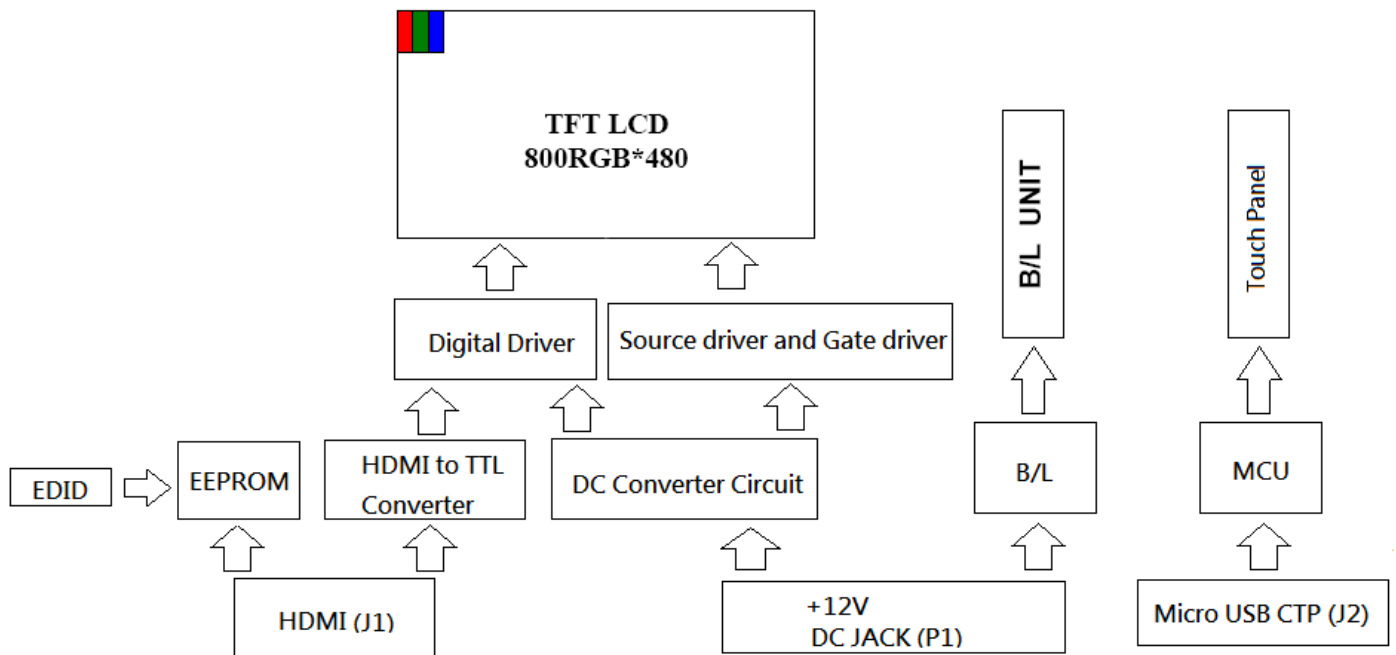
## 2. MODULE STRUCTURE

### 2.1 Counter Drawing

#### 2.1.1 LCM Mechanical Diagram

\* See Appendix

#### 2.1.2 Block Diagram



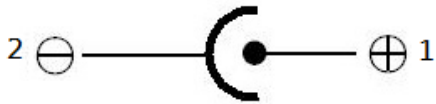
## 2.2 Interface Pin Description

### 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 (PJ1: POWER DC JACK Interface)

PJ1



Hold  $\Phi$ 6.4mm / Center Pin  $\Phi$  2.0mm

Pin#	Name	Description
1	V12V	+12V Power
2	GND	Power Ground

### 2.2.3 (J2: Micro USB Capacitive Touch Panel Interface)

Pin#	Name	Description
1	V <sub>Bus</sub>	V <sub>Bus</sub> 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 <sub>ID</sub>	Analog input differential voltage <sup>(1)</sup>	75		1200	mV
V <sub>IC</sub>	Analog input common-mode voltage <sup>(1)</sup>	AV <sub>DD</sub> - 300		AV <sub>DD</sub> - 37	mV
V <sub>I(OC)</sub>	Open-circuit analog input voltage	AV <sub>DD</sub> - 10		AV <sub>DD</sub> + 10	mV
I <sub>DD(2PIX)</sub>	Normal 2-pix/clock power supply current <sup>(2)</sup>	ODCK = 82.5 MHz, 2-pix/clock		370	mA
I <sub>PD</sub>	Power-down current <sup>(3)</sup>	$\overline{PD}$ = low		10	mA
I <sub>PDO</sub>	Output drive power-down current <sup>(3)</sup>	$\overline{PDO}$ = low		35	mA

(1) Specified as dc characteristic with no overshoot or undershoot

(2) Alternating 2-pixel black/2-pixel white pattern. ST = high, STAG = high, QE[23:0] and QO[23:0] C<sub>L</sub> = 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 <sub>ID(2)</sub>	Differential input sensitivity <sup>(1)</sup>	150		1560	mV <sub>p-p</sub>
t <sub>ps</sub>	Analog input intra-pair (+ to -) differential skew <sup>(2)</sup>			0.4	t <sub>bit</sub> <sup>(3)</sup>
t <sub>ccs</sub>	Analog input inter-pair or channel-to-channel skew <sup>(2)</sup>			1	t <sub>pix</sub> <sup>(4)</sup>
t <sub>jitter</sub>	Worst-case differential input clock jitter tolerance <sup>(2)(5)</sup>	50			ps
t <sub>f1</sub>	Fall time of data and control signals <sup>(6)(7)</sup>	ST = low, C <sub>L</sub> = 5 pF		2.4	ns
		ST = high, C <sub>L</sub> = 10 pF		1.9	
t <sub>r1</sub>	Rise time of data and control signals <sup>(6)(7)</sup>	ST = low, C <sub>L</sub> = 5 pF		2.4	ns
		ST = high, C <sub>L</sub> = 10 pF		1.9	
t <sub>r2</sub>	Rise time of ODCK clock <sup>(6)</sup>	ST = low, C <sub>L</sub> = 5 pF		2.4	ns
		ST = high, C <sub>L</sub> = 10 pF		1.9	
t <sub>f2</sub>	Fall time of ODCK clock <sup>(6)</sup>	ST = low, C <sub>L</sub> = 5 pF		2.4	ns
		ST = high, C <sub>L</sub> = 10 pF		1.9	
t <sub>su1</sub>	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, STAG = high, OCK_INV = low	3.8		
		2 pixel and STAG, PIXS = high, STAG = low, OCK_INV = low	0.7		
t <sub>h1</sub>	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, STAG = low, OCK_INV = low	2.5		
		2 pixel/clock, PIXS = high, 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<sub>bit</sub> is 1/10 the pixel time, t<sub>pix</sub>

(4) t<sub>pix</sub> is the pixel time defined as the period of the RxC input clock. The period of ODCK is equal to t<sub>pix</sub> in 1-pixel/clock mode or 2t<sub>pix</sub> 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 <sup>(8)</sup>			1e6		$t_{pix}$
$t_{t(FSC)}$	Transition time between DE transition to SCDT high <sup>(8)</sup>			1600		$t_{pix}$
$t_{d(st)}$	Delay time, ODCK latching edge to QE[23:0] data output	$\overline{STAG}$ = 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

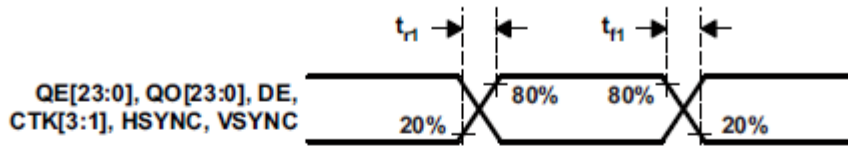


Figure 1. Rise and Fall Times of Data and Control Signals

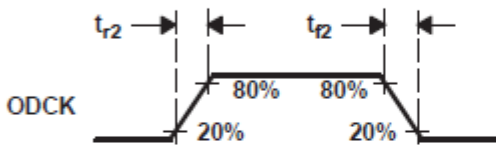


Figure 2. Rise and Fall Times of ODCK

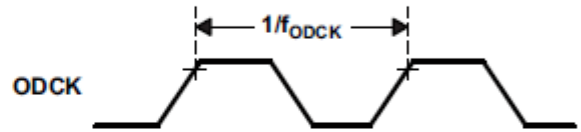


Figure 3. ODCK Frequency

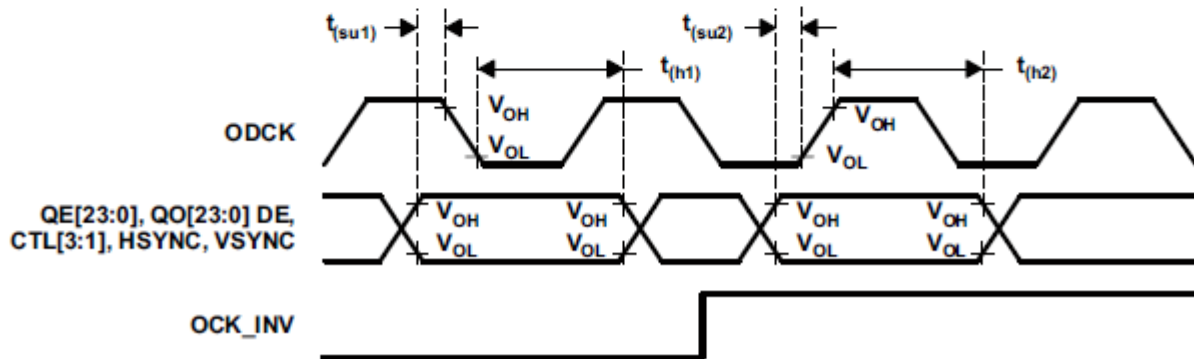


Figure 4. Data Setup and Hold Times to Rising and Falling Edges of ODCK

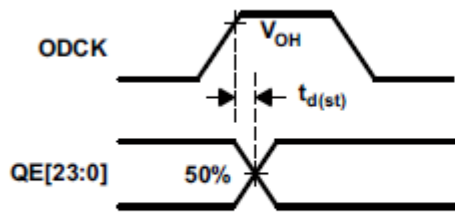


Figure 5. ODCK High to QE[23:0] Staggered Data Output

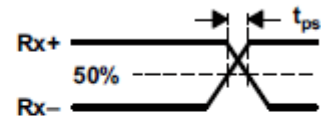


Figure 6. Analog Input Intra-Pair Differential Skew

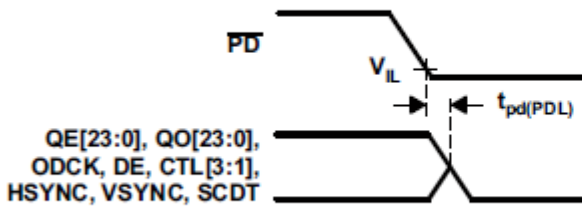


Figure 7. Delay From  $\overline{PD}$  Low to Hi-Z Outputs

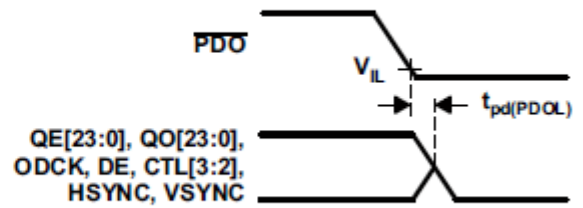


Figure 8. Delay From  $\overline{PDO}$  Low to Hi-Z Outputs

## PARAMETER MEASUREMENT INFORMATION (continued)

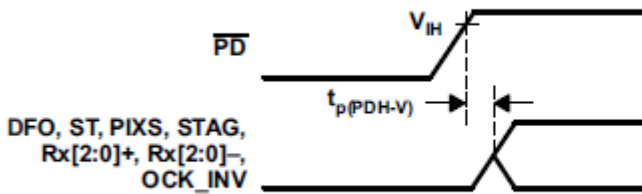


Figure 9. Delay From  $\overline{PD}$  Low to High Before Inputs Are Active

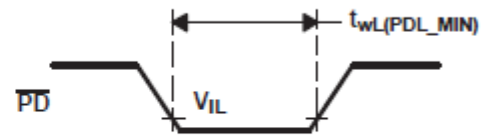


Figure 10. Minimum Time  $\overline{PD}$  Low

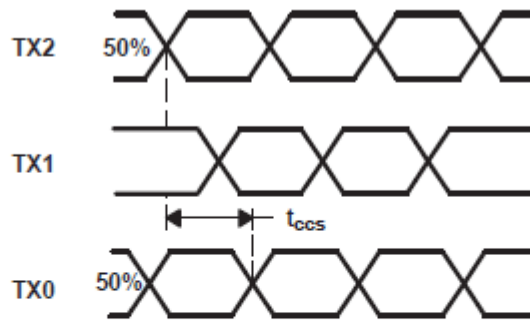


Figure 11. Analog Input Channel-to-Channel Skew

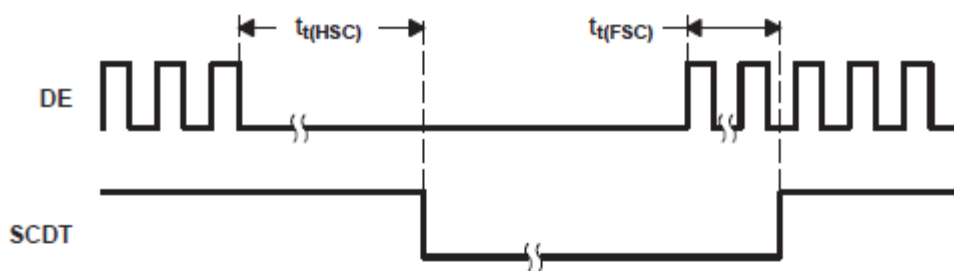


Figure 12. Time Between DE Transitions to SCDT Low and SCDT High

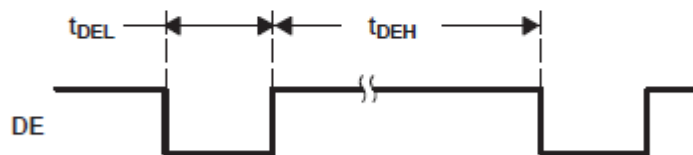


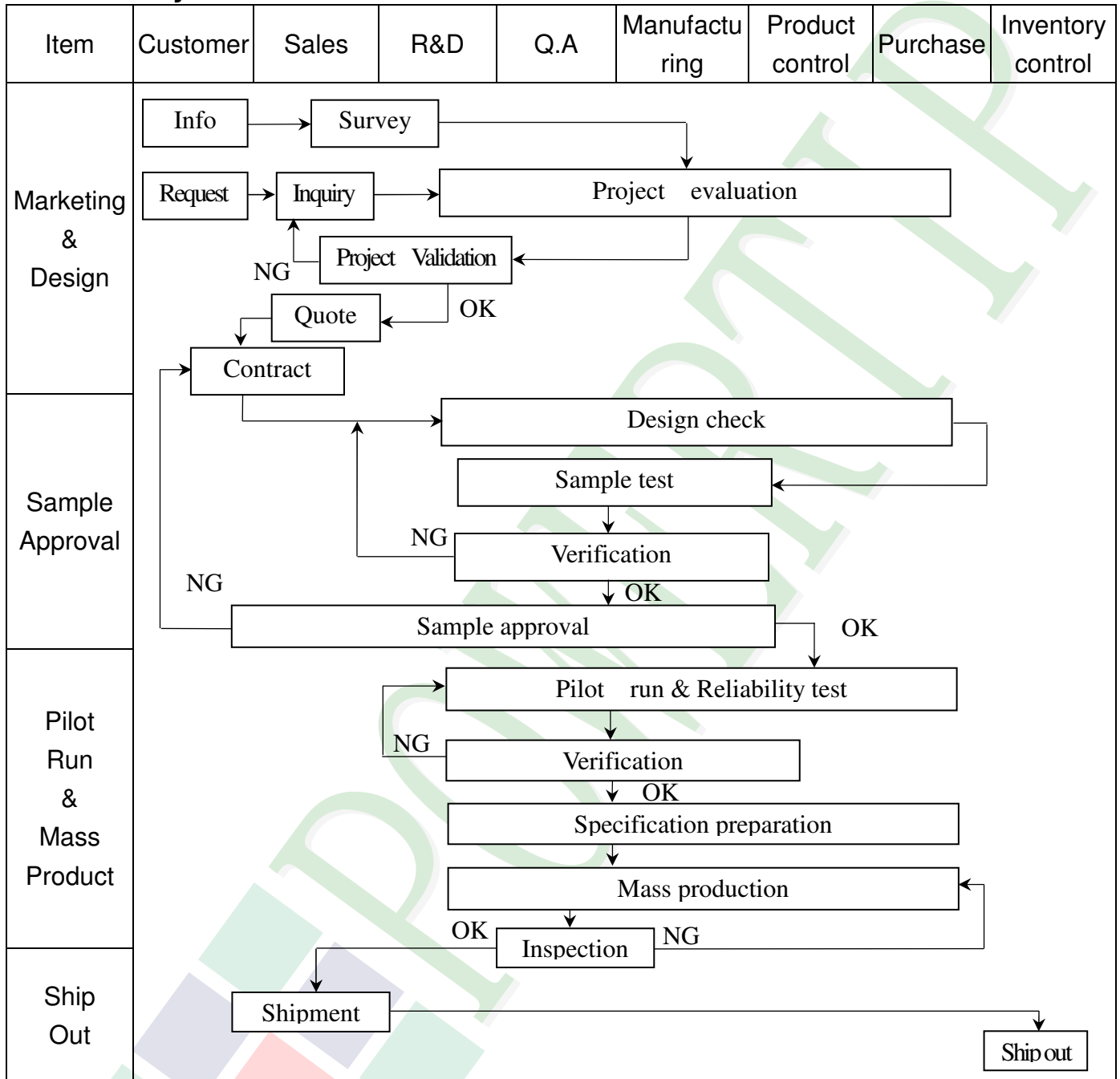
Figure 13. Minimum DE Low and Maximum DE High

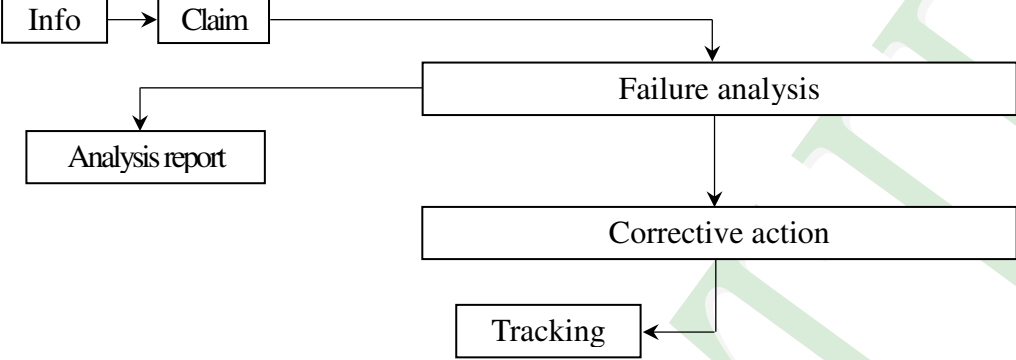
### DETAILED DESCRIPTION



### 3. QUALITY ASSURANCE SYSTEM

#### 3.1 Quality Assurance Flow Chart



Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service	 <pre> graph TD     Info[Info] --&gt; Claim[Claim]     Claim --&gt; Failure[Failure analysis]     Failure --&gt; Report[Analysis report]     Failure --&gt; Action[Corrective action]     Action --&gt; 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

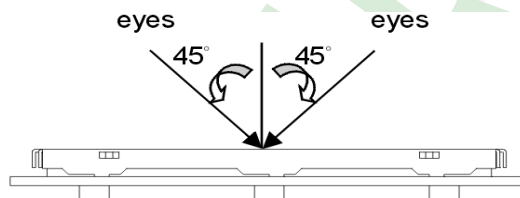
◆OUT Going Defect Level : Sampling.

◆Standard of the product appearance test :

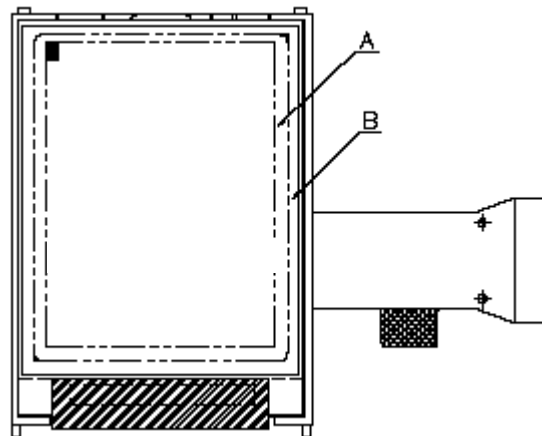
a. Manner of appearance test :

(1). The test best be under 20W×2 fluorescent light , 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)

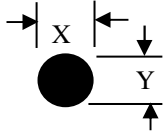
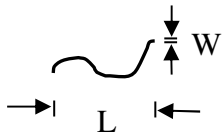
**◆Specification For TFT-LCD Module 3.5" ~15" :**

(Ver.B01)

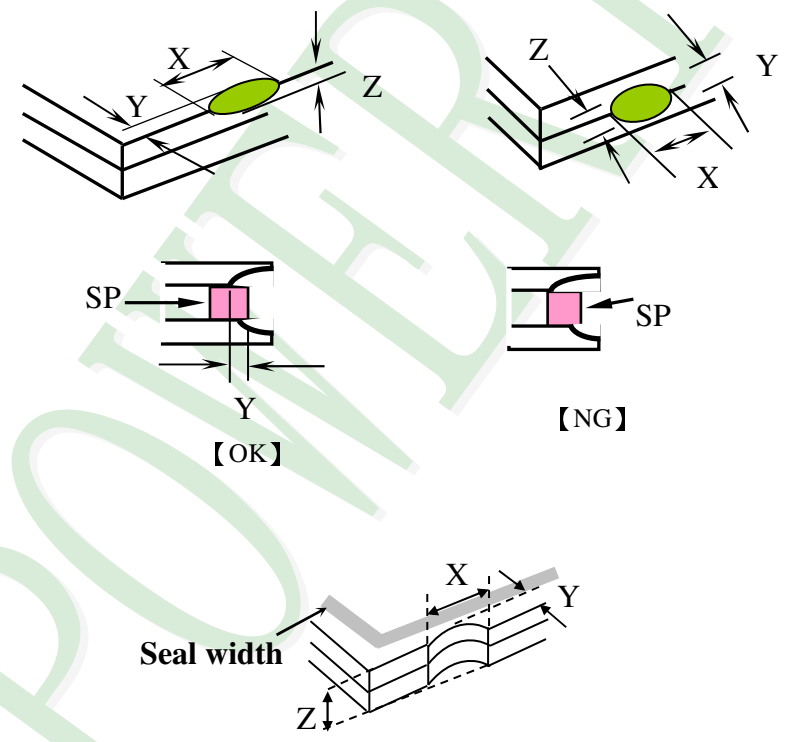
NO	Item	Criterion	Level												
01	Product condition	1. 1 The part number is inconsistent with work order of production.	Major												
		1. 2 Mixed product types.	Major												
		1. 3 Assembled in inverse direction.	Major												
02	Quantity	2. 1 The quantity is inconsistent with work 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 can not be seen through 5% ND filter. (Mura : Under the normal examination angle of view, the picture has the non-uniform phenomenon.)	Minor												
05	Dot defect (Bright dot 、 Dark dot)  On -display	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Item</th> <th>Acceptance (Q'ty)</th> </tr> </thead> <tbody> <tr> <td rowspan="4" style="text-align: center; vertical-align: middle;">Dot Defect</td> <td style="text-align: center;">Bright Dot</td> <td style="text-align: center;"><math>\leq 4</math></td> </tr> <tr> <td style="text-align: center;">Dark Dot</td> <td style="text-align: center;"><math>\leq 5</math></td> </tr> <tr> <td style="text-align: center;">Joint Dot</td> <td style="text-align: center;"><math>\leq 3</math></td> </tr> <tr> <td style="text-align: center;">Total</td> <td style="text-align: center;"><math>\leq 7</math></td> </tr> </tbody> </table>	Item		Acceptance (Q'ty)	Dot Defect	Bright Dot	$\leq 4$	Dark Dot	$\leq 5$	Joint Dot	$\leq 3$	Total	$\leq 7$	Minor
		Item		Acceptance (Q'ty)											
		Dot Defect	Bright Dot	$\leq 4$											
			Dark Dot	$\leq 5$											
			Joint Dot	$\leq 3$											
Total	$\leq 7$														
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 $\geq 5$ mm.															
5. 4 Bright dot that can not be seen through 5% ND filter.															

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

(Ver.B01)

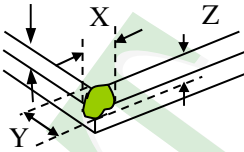
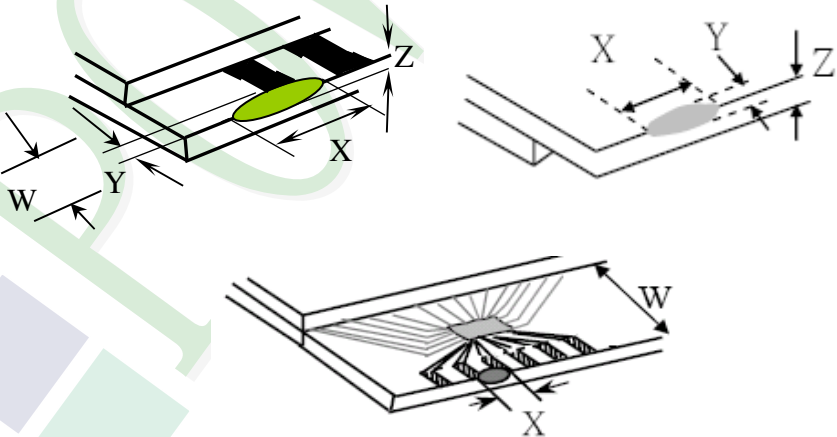
NO	Item	Criterion	Level																																											
06	Black or white dot、scratch、contamination  Round type  $\Phi = (x + y) / 2$  Line type 	<b>6.1 Round type ( Non-display or display ) :</b>  <table border="1"> <thead> <tr> <th rowspan="2">Dimension (diameter : <math>\Phi</math>)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.25</math></td> <td colspan="2">Ignore</td> </tr> <tr> <td><math>0.25 &lt; \Phi \leq 0.50</math></td> <td>5</td> <td rowspan="3">Ignore</td> </tr> <tr> <td><math>\Phi &gt; 0.50</math></td> <td>0</td> </tr> <tr> <td><b>Total</b></td> <td><b>5</b></td> </tr> </tbody> </table>	Dimension (diameter : $\Phi$ )	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.25$	Ignore		$0.25 < \Phi \leq 0.50$	5	Ignore	$\Phi > 0.50$	0	<b>Total</b>	<b>5</b>	Minor																												
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<b>6.2 Line type( Non-display or display ) :</b>  <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><math>W \leq 0.03</math></td> <td colspan="2">Ignore</td> </tr> <tr> <td><math>L \leq 10.0</math></td> <td><math>0.03 &lt; W \leq 0.05</math></td> <td>4</td> <td rowspan="4">Ignore</td> </tr> <tr> <td><math>L \leq 5.0</math></td> <td><math>0.05 &lt; W \leq 0.10</math></td> <td>2</td> </tr> <tr> <td>---</td> <td><math>W &gt; 0.10</math></td> <td colspan="2">As round type</td> </tr> <tr> <td colspan="3">Total</td> <td colspan="2">5</td> </tr> <tr> <td rowspan="4">9" to 15"</td> <td>---</td> <td><math>W \leq 0.05</math></td> <td colspan="2">Ignore</td> </tr> <tr> <td><math>L \leq 10.0</math></td> <td><math>0.05 &lt; W \leq 0.10</math></td> <td>5</td> <td rowspan="4">Ignore</td> </tr> <tr> <td>---</td> <td><math>W &gt; 0.10</math></td> <td colspan="2">As round type</td> </tr> <tr> <td colspan="3">Total</td> <td colspan="2">5</td> </tr> </tbody> </table>	module size	Length (L)	Width (W)	Acceptance (Q'ty)		A area	B area	3.5" to less 9"	---	$W \leq 0.03$	Ignore		$L \leq 10.0$	$0.03 < W \leq 0.05$	4	Ignore	$L \leq 5.0$	$0.05 < W \leq 0.10$	2	---	$W > 0.10$	As round type		Total			5		9" to 15"	---	$W \leq 0.05$	Ignore		$L \leq 10.0$	$0.05 < W \leq 0.10$	5	Ignore	---	$W > 0.10$	As round type		Total			5	
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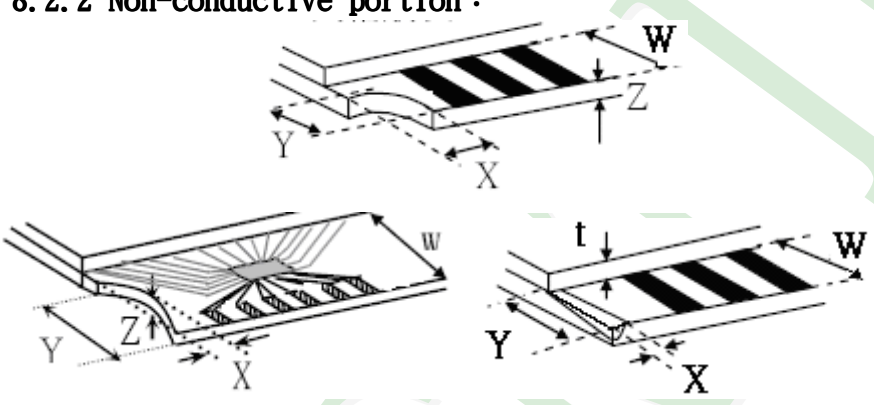
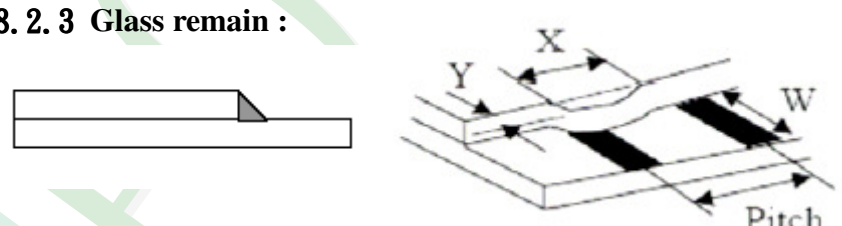
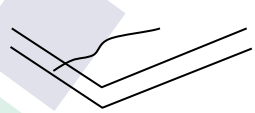


NO	Item	Criterion	Level						
08	The crack of glass	<p><b>Symbols :</b></p> <p><b>X : The length of crack</b>  <b>Z : The thickness of crack</b>  <b>t : The thickness of glass</b></p> <p><b>Y : The width of crack.</b>  <b>W : terminal length</b>  <b>a : LCD side length</b></p> <hr/> <p><b>8.1 General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

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

(Ver.B01)

NO	Item	Criterion	Level										
08	The crack of glass	<p><b>Symbols :</b></p> <p><b>X :</b> The length of crack  <b>Z :</b> The thickness of crack  <b>t :</b> The thickness of glass</p> <p><b>Y :</b> The width of crack.  <b>W :</b> terminal length  <b>a :</b> LCD side length</p> <hr/> <p><b>8.1.2 Corner crack :</b></p>  <table border="1" data-bbox="523 768 1337 1059"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td><math>\leq 1/5 a</math></td> <td>Crack can't enter viewing area</td> <td><math>Z \leq 1/2 t</math></td> </tr> <tr> <td><math>\leq 1/5 a</math></td> <td>Crack can't exceed the half of SP width.</td> <td><math>1/2 t &lt; Z \leq 2 t</math></td> </tr> </tbody> </table>	X	Y	Z	$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$	$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$		
		X	Y	Z									
$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$											
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<p><b>8.2 Protrusion over terminal :</b></p> <p><b>8.2.1 Chip on electrode pad :</b></p>  <table border="1" data-bbox="560 1697 1345 1872"> <thead> <tr> <th></th> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>Front</td> <td><math>\leq a</math></td> <td><math>\leq 1/2 W</math></td> <td><math>\leq t</math></td> </tr> <tr> <td>Back</td> <td><math>\leq a</math></td> <td><math>\leq W</math></td> <td><math>\leq 1/2 t</math></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
	X	Y	Z										
Front	$\leq a$	$\leq 1/2 W$	$\leq t$										
Back	$\leq a$	$\leq W$	$\leq 1/2 t$										

NO	Item	Criterion	Level												
08	The crack of glass	<p><b>Symbols :</b></p> <p><b>X :</b> The length of crack                      <b>Y :</b> The width of crack.  <b>Z :</b> The thickness of crack                    <b>W :</b> terminal length  <b>t :</b> The thickness of glass                    <b>a :</b> LCD side length</p> <hr/> <p><b>8.2.2 Non-conductive portion :</b></p>  <table border="1" data-bbox="622 963 1260 1097" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">X</th> <th style="text-align: center;">Y</th> <th style="text-align: center;">Z</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><math>\leq 1/3 a</math></td> <td style="text-align: center;"><math>\leq W</math></td> <td style="text-align: center;"><math>\leq t</math></td> </tr> </tbody> </table> <p>⊙ If the chipped area touches the ITO terminal, over 2/3 of</p> <ul style="list-style-type: none"> <li>● the ITO must remain and be inspected according to electrode terminal specifications.</li> </ul> <p><b>8.2.3 Glass remain :</b></p>  <table border="1" data-bbox="542 1523 1244 1646" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">X</th> <th style="text-align: center;">Y</th> <th style="text-align: center;">Z</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;"><math>\leq a</math></td> <td style="text-align: center;"><math>\leq 1/3 W</math></td> <td style="text-align: center;"><math>\leq t</math></td> </tr> </tbody> </table> <p><b>8.2.4 Cracking</b></p>  <p style="text-align: center;"><b>Not Allowed</b></p>	X	Y	Z	$\leq 1/3 a$	$\leq W$	$\leq t$	X	Y	Z	$\leq a$	$\leq 1/3 W$	$\leq t$	Minor
X	Y	Z													
$\leq 1/3 a$	$\leq W$	$\leq t$													
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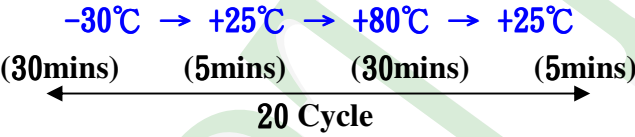
**◆Specification For TFT-LCD Module 3.5" ~15" :**
**(Ver.B01)**

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 the same as on the production characteristic chart .There should 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 $\leq 1.5$ mm.	Minor

## 4. RELIABILITY TEST

### 4.1 Reliability Test Condition

(Ver.B01)

NO.	TEST ITEM	TEST CONDITION											
1	High Temperature Storage Test	Keep in <b>+80 ±2°C</b> 240 hrs											
2	Low Temperature Storage Test	Keep in <b>-30 ±2°C</b> 240 hrs											
3	High Temperature / High Humidity Storage Test	Keep in <b>+60 °C / 90% R.H</b> duration for 240 hrs (Excluding the polarizer)											
4	Temperature Cycling Storage Test	<b>-30°C → +25°C → +80°C → +25°C</b> (30mins) (5mins) (30mins) (5mins)  <b>20 Cycle</b>											
5	ESD Test	<b>Air Discharge:</b> Apply <b>2 KV</b> with 5 times Discharge for each polarity +/-	<b>Contact Discharge:</b> Apply <b>250 V</b> with 5 times discharge for each polarity +/-										
		1. Temperature ambience : <b>15°C ~ 35°C</b> 2. Humidity relative : <b>30% ~ 60%</b> 3. Energy Storage Capacitance(Cs+Cd) : <b>150pF±10%</b> 4. Discharge Resistance(Rd) : <b>330 Ω±10%</b> 5. Discharge, mode of operation : <b>Single Discharge</b> (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication : <b>±5%</b> )											
6	Vibration Test (Packaged)	1. Sine wave <b>10~55 Hz</b> frequency (1 min/sweep) 2. The amplitude of vibration : <b>1.5 mm</b> 3. Each direction (X、Y、Z) duration for <b>2 Hrs</b>											
7	Drop Test (Packaged)	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Packing Weight (Kg)</th> <th>Drop Height (cm)</th> </tr> </thead> <tbody> <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> </tbody> </table>		Packing Weight (Kg)	Drop Height (cm)	0 ~ 45.4	122	45.4 ~ 90.8	76	90.8 ~ 454	61	Over 454	46
		Packing Weight (Kg)	Drop Height (cm)										
0 ~ 45.4	122												
45.4 ~ 90.8	76												
90.8 ~ 454	61												
Over 454	46												
		<b>Drop Direction : ※1 corner / 3 edges / 6 sides each 1time</b>											

#### ◎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

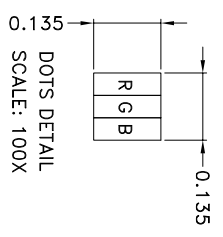
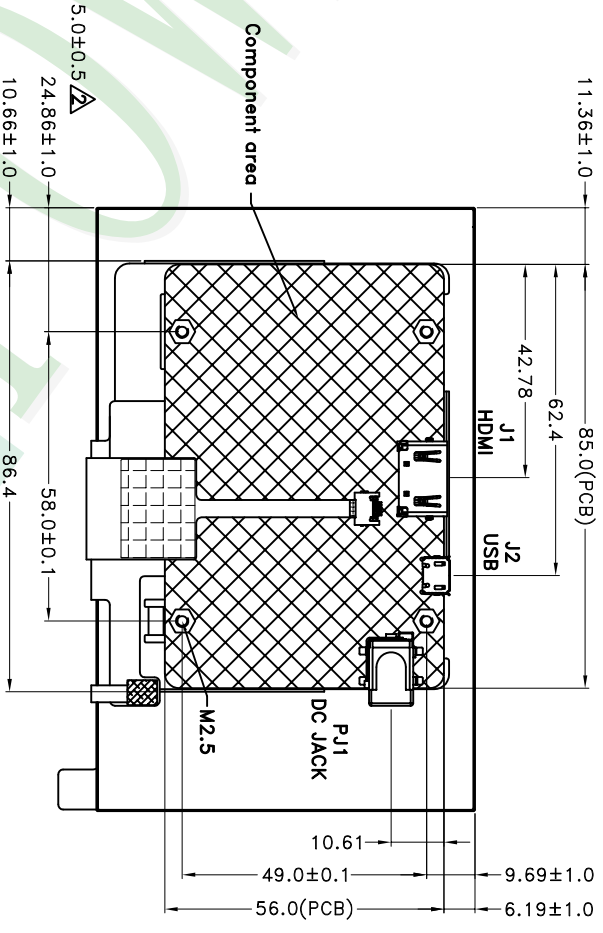
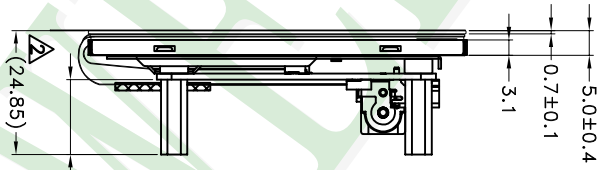
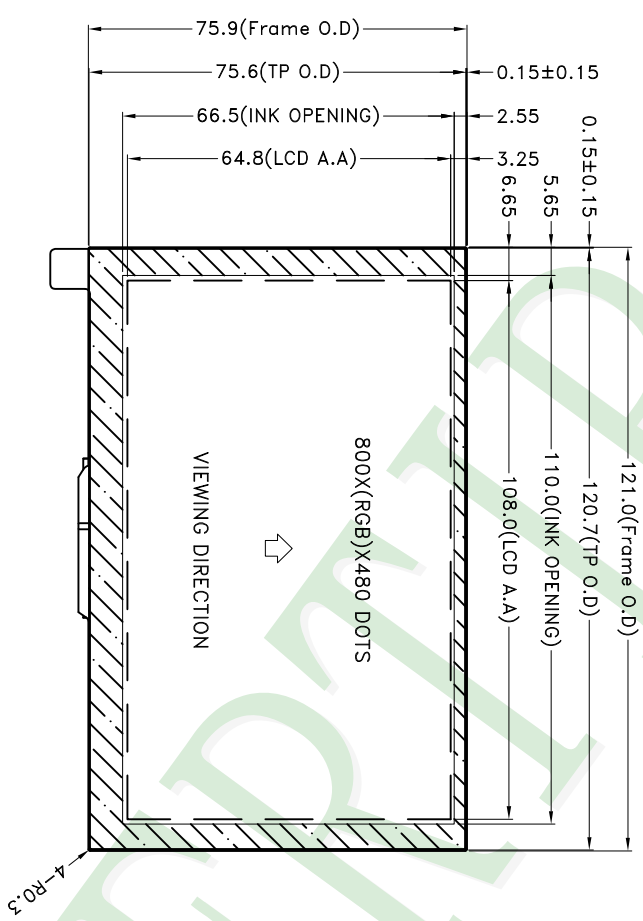
- 5.2.1 Avoid any strong mechanical shock which can break the glass.
- 5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module , be sure to ground your body and any electrical equipment you may be using.
- 5.2.3 Do not remove the panel or frame from the module.
- 5.2.4 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  $320\pm 10^{\circ}\text{C}$  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  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and the humidity is below 65% RH.
- 5.3.2 Do not place the module near organics solvents or corrosive gases.
- 5.3.3 Do not crush , shake , or jolt the module.

### 5.4 TERMS OF WARRANTY

- 5.4.1 Applicable warrant period  
The period is within thirteen months since the date of shipping out under normal using and storage conditions.
- 5.4.2 Unaccepted responsibility  
This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment , we cannot take responsibility if the product is used in nuclear power control equipment , aerospace equipment , fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required.



- 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
  - 7.PJ1:KD-014-L(DC JACK2.0mm ROHS) OR EQUIVALENT.

007					
006					
005					
004					
003					
002	MODIFY THICKNESS	Stone	2018/03/14		
001	NEW DRAWING	Stone	2018/03/01		
REV		REV BY		REVISER	DATE

PART NO:	PH800480T024-IHC14
DRAWING NAME:	LMD-PH800480T024-IHC14
TITLE:	LCD MODULE DRAWING

Design		Stone		Surface		Precision Level	
Check	Oliver	Unit	MM	Material	1 ~ 4	1 ~ 4	-
Approve	Oliver	Scale	FIT	Thickness	16 ~ 63	63 ~ 250	-
		Page	1/1	Quantity	250 ~ 1000		-

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7 (Clearance)	1 ~ 4
16 ~ 63	-
63 ~ 250	-
250 ~ 1000	-

Ver.001

Documents NO. PKG-PH800480T024-IHC14

# LCM包裝規格書

## LCM Packaging Specifications

Approve	Check	Contact
Oliver	Oliver	Stone

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

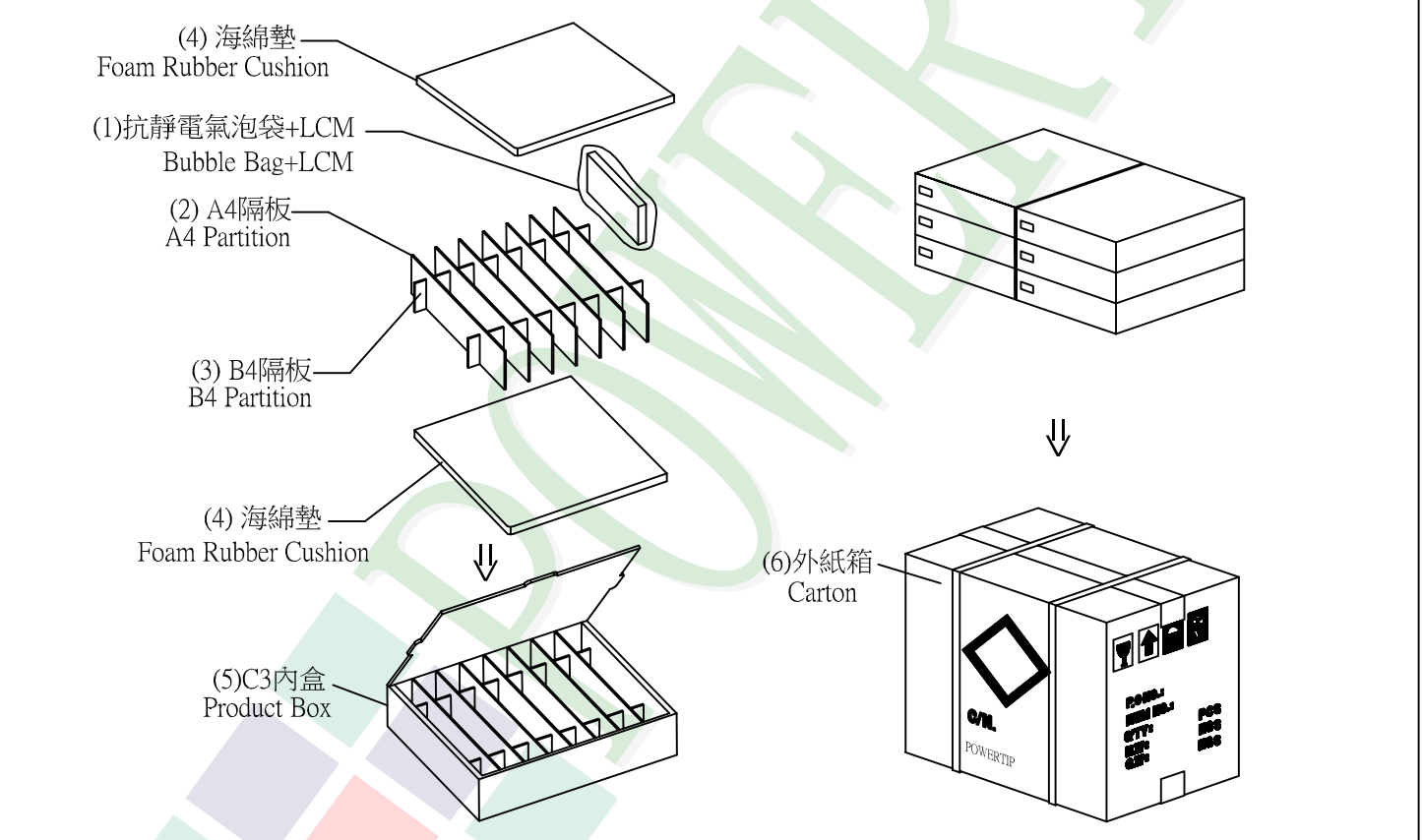
No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH800480T024-IHC14	121.0 X 75.9	0.134	36	4.824
2	抗靜電氣泡袋(1)Bubble Bag	BAG170150AWBBA	170 X 150	0.0047	36	0.1692
3	A4隔板(2)A4 Partition	BX24500070BNBA	245 X 70 X 2.5	0.014	42	0.588
4	B4隔板(3)B4 Partition	BX29300070BLBA	293 X 70 X 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) : 8.64 Kg±10%

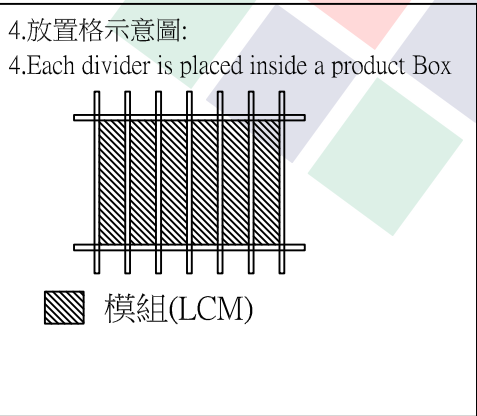
3. 單箱數量規格表 (Packaging Specifications and Quantity) :

(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



### 特 記 事 項 (REMARK)





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