SPECIFICATIONS

CUSTOMER	:	**PTC**
SAMPLE CODE	:	**SH320240T023-IBC**
MASS PRODUCTION CODE	:	**PH320240T023-IBC**
SAMPLE VERSION	:	**01**
SPECIFICATIONS EDITION	:	**004**
DRAWING NO. (Ver.)	:	**LMD-PH320240T023-IBC (Ver.003)**
PACKAGING NO. (Ver.)	:	**PKG-PH320240T023-IBC (Ver.001)**

Customer Approved

Date:

Approved	Checked	Designer
黃秋源 **Oliver Huang**	李健弘 **Lambert Lee**	黃俊清 **Ackey Huang**

POWERTIP
2014.04.07
TWRD APR

☐ Preliminary specification for design input

■ Specification for sample approval

POWERTIP TECH. CORP.

History of Version

Date	Ver.	Edi.	Description	Page	Design by
08/23/2013	01	001	New Drawing.	-	Ackey
09/12/2013	01	002	New Sample	-	Ackey
09/24/2013	01	003	Update Data.	-	Ackey
04/03/2014	01	004	Modify TP content. Add CN & Initcode.	8,13, Appendix	Ackey

Total: 29 Page

Contents

Note : For detailed information please refer to IC data sheet :
Primacy(TFT LCD): Himax: HX8238-D

1. SPECIFICATIONS

1.1 Features

Main LCD Panel

Item	Standard Value
Display Type	320* (R、G、B) * 240 Dots
LCD Type	Normally white , Transmissive type
Touch panel	Projective capacitive touch panel True Multi-touch with up to 5 Points of Absolution
Screen size(inch)	3.5(Diagonal)
Viewing Direction	6 O'clock
Color configuration	R.G.B. vertical stripe
Backlight	White LED
Interface	Digital 24-bits Parallel RGB HSYNC,VSYNC,3Wires SPI
Other (controller / driver IC)	Himax:HX8238-D
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website : http://www.powertip.com.tw/news.php?area_id_view=1085560481/

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension(T/P)	84.02(W) x 75.36 (L) x 5.2(H)(MAX)	mm

LCD panel

Item	Standard Value	Unit
Active Area	70.08 (W) x 52.56 (L)	mm

Touch panel

Item	Standard Value	Unit
Viewing Area	71.68 (W) * 54.16 (L)	mm

Note : For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit
System Power Supply Voltage	VDD	GND=0	-0.3	4.0	V
Booster Reference Supply Voltage	VCI	GND=0	GND-0.3	3.96	V
Operating Temperature	T_{OP}	Excluded T/P	-20	70	°C
Storage Temperature	T_{ST}	Excluded T/P	-30	80	°C

1.4 DC Electrical Characteristics

Module   GND = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	VDD	-	3.0	3.3	3.6	V
Booster Reference Supply Voltage	VCI	-	3.0	3.3	3.6	V
V_{COM} High Voltage	V_{COMH}	-	-	-	5.54	V
V_{COM} Low Voltage	V_{COML}	-	-2.8	-	-	V
Input H/L Level Voltage	VIH	-	0.8VDD	-	VDD	V
	VIL	-	0	-	0.2VDD	V
Output H/L Level Voltage	VOH	-	0.9VDD	-	VDD	V
	VOL	-	-	-	0.1VDD	V
Supply Current	IDD	VDD=VCI=3.3V Pattern= black*1	-	9	14	mA

Note1: Maximum current display.

1.5 Optical Characteristics

TFT LCD Panel   VDD=VCI=3.3V, Ta=25°C

| Item		Symbol	Condition	Min.	Typ.	Max.	unit	-
Response time		Tr + Tf	Ta = 25°C θX, θY = 0°	-	40	60	ms	Note2
Viewing angle	Top	θY+	CR ≥ 10	-	60	-	Deg.	Note4
	Bottom	θY-		-	60	-		
	Left	θX-		-	60	-		
	Right	θX+		-	60	-		
Contrast ratio		CR		500	600	-	-	Note3
Color of CIE Coordinate (With B/L & T/P)	White	X	Ta = 25°C θX , θY = 0°	0.25	0.30	0.35	-	Note1
		Y		0.28	0.33	0.38		
	Red	X		0.58	0.63	0.68		
		Y		0.30	0.35	0.40		
	Green	X		0.28	0.33	0.38		
		Y		0.55	0.60	0.65		
	Blue	X		0.09	0.14	0.19		
		Y		0.03	0.08	0.13		
Average Brightness Pattern=white display		IV	IF= 20 mA	350	400	-	cd/m^2	Note1
Uniformity		B		80	-	-	%	Note1

Note1:

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
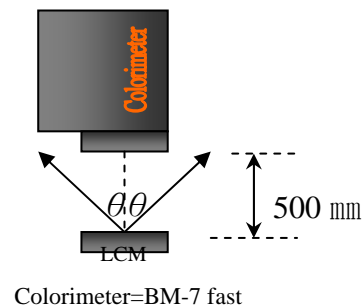
Note2: Definition of response time:
  The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.
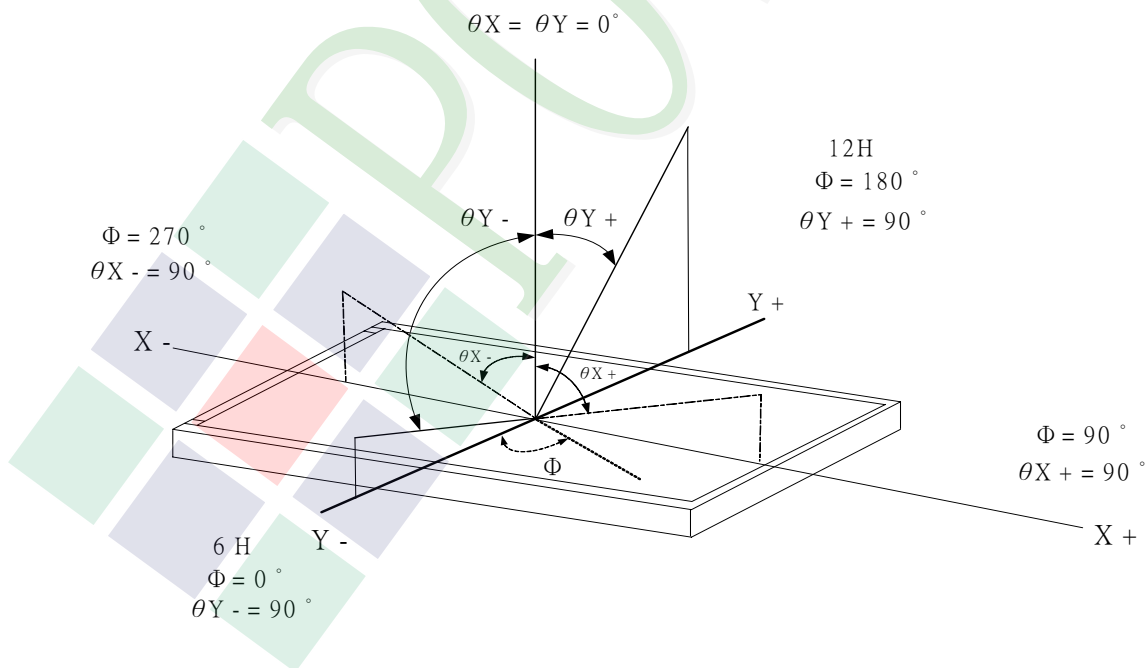 Refer to figure as below:
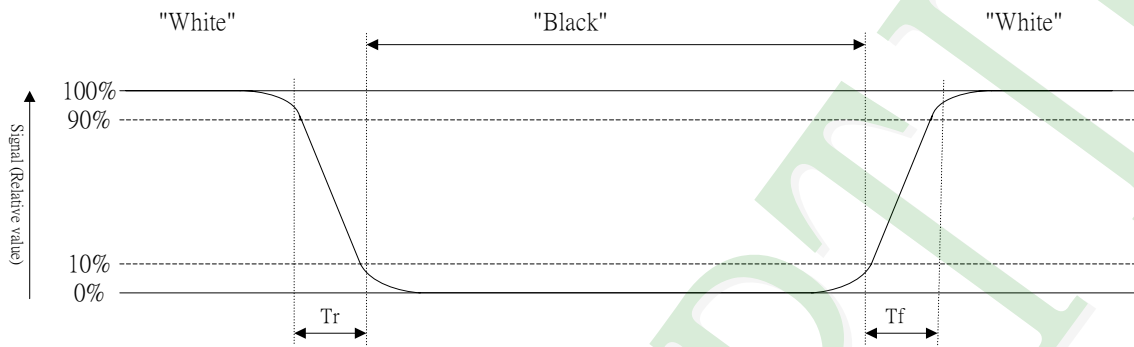
Note3: Definition of contrast ratio:
  Contrast ratio is calculated with the following formula

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

Note4: Definition of viewing angle:
  Refer to figure as below:
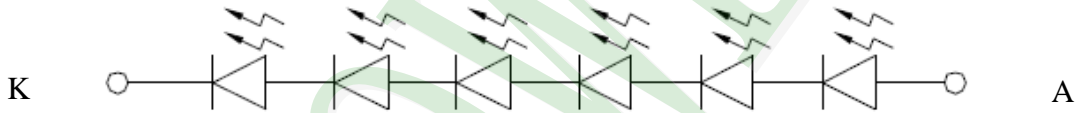
1.6 Backlight Characteristics

Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25℃	-	48	mA
Power Dissipation	PD	Ta =25℃	-	540	mW

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 20 mA	-	19.2	21	V
Color of CIE Coordinate	X		0.28	0.30	0.32	-
(Without LCD & TP)	Y		0.28	0.30	0.32	
Color			White			

Internal Circuit Diagram

K   A

1.7 Touch Panel Characteristics

Features

Item	Standard Value
Touch Panel Size	3.5"
Touch type	Projected Capacitive Touch True Multi-Touch Capacitive Touch Panel
Input Method	True Multi-touch with up to 5 Points of Absolution X and Y Coordinates
Output Interface	I^2C
IC	FT5216

Mechanical Specifications

Item	Standard Value	Unit
Viewing Area	71.68 mm (W) x 54.16 mm (H)	mm
Number of sensing channel	16 (W) x 10 (H)	mm

Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Supply voltage	VDD	-	-0.3	3.6V	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	VDD	-	3.0	3.3	3.6	V

I²C Read/Write Interface description

Write N bytes to I2C slave
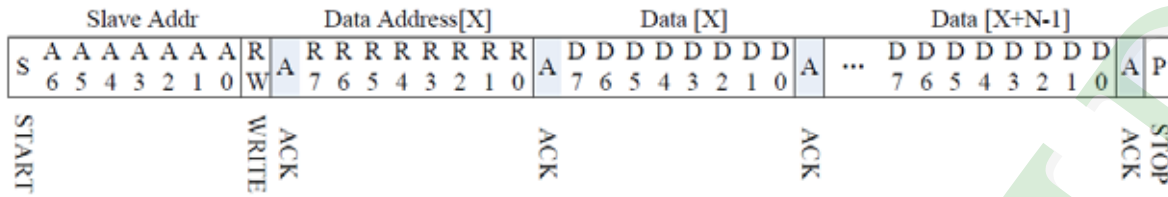
Set Data Address
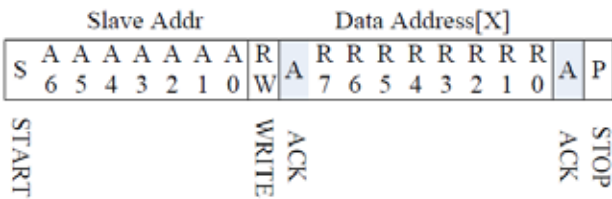
Read X bytes from I2C Slave
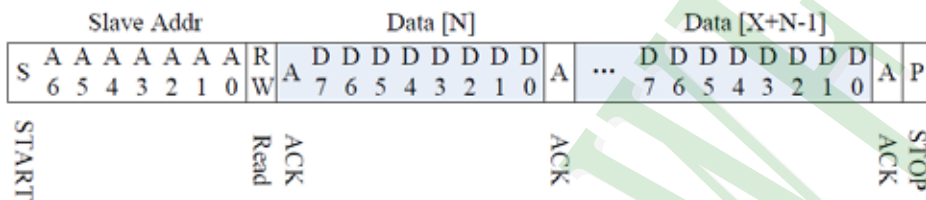
Mnemonics Description

Mnemonics	Description
S	I2C Start or I2C Restart
A[6:0]	Slave address A[6:0]:0111000b
R/ W	'1' for read, '0'for write
A(N)	ACK(NACK)
P	STOP: the indication of the end of a packet (if this bit is missing, S will indicate the end of the current packet and the beginning of the next packet)

Timing Characteristics

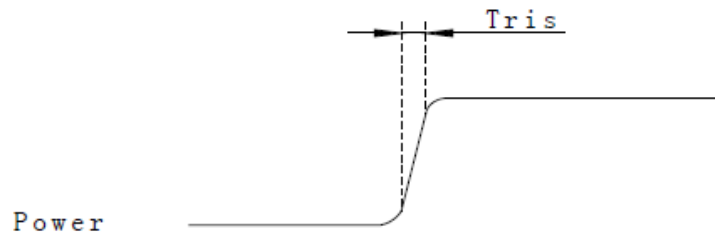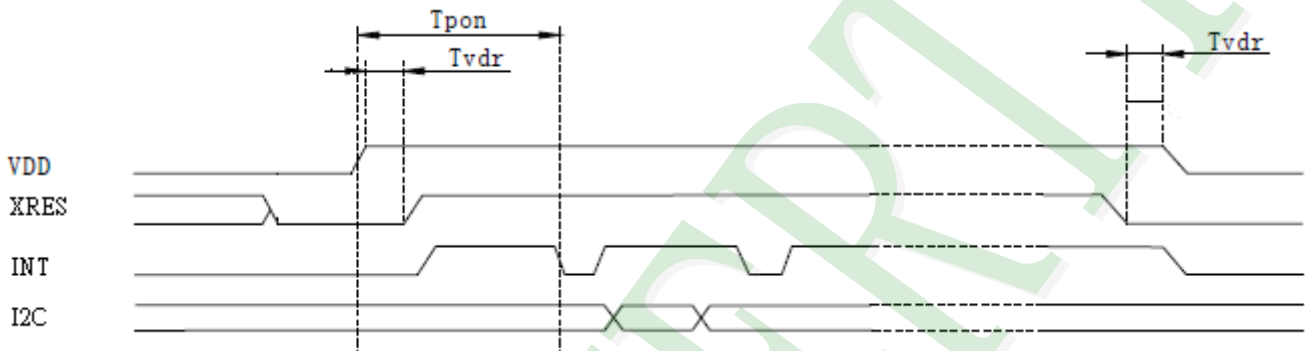| Parameter	Unit	Min	Max
SCL frequency	KHz	0	400
Bus free time between a STOP and START condition	us	4.7	\
Hold time (repeated) START condition	us	4.0	\
Data setup time	ns	250	\
Setup time for a repeated START condition	us	4.7	\
Setup Time for STOP condition	us	4.0	\

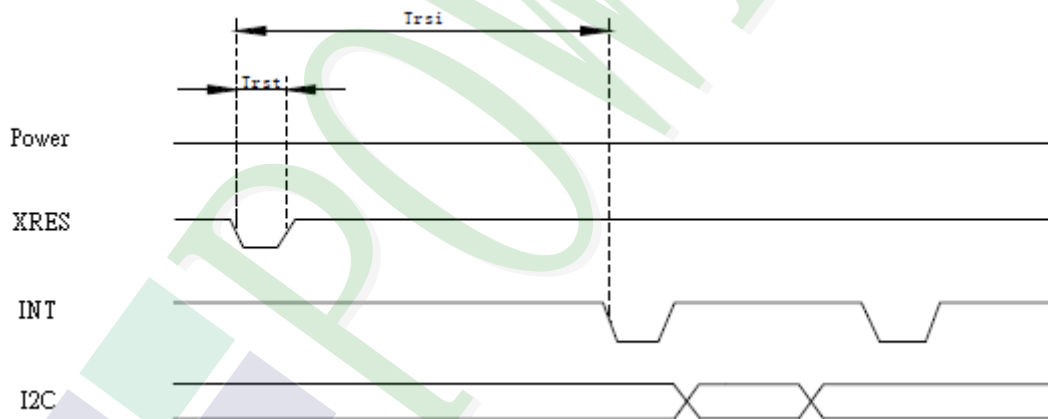Figure 2-6-1: Power on time

Figure 2-6-2: Power on Sequence

Figure 2-6-3: Reset Sequence

Power on / Reset Sequence Parameters

Parameter	Description	Min	Max	Units
Tris	Rise time from 0.1VDD to 0.9VDD	--	5	ms
Tpon	Time of starting to report point after powering on	200	--	ms
Tvdr	Reset time after VDD powering on	1	--	ms
Trsi	Time of starting to report point after resetting	200	--	ms
Trst	Reset time	1	--	ms

Interrupt signal from CTP to Host

As for standard CTP, host need to use both interrupt control signal and serial data interface to get the touch data. There are two kind of method to use interrupt: interrupt trigger and interrupt query.
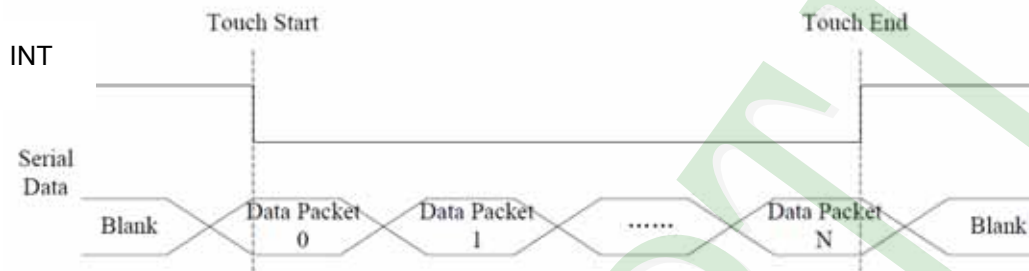
Here is the timing to get touch data.

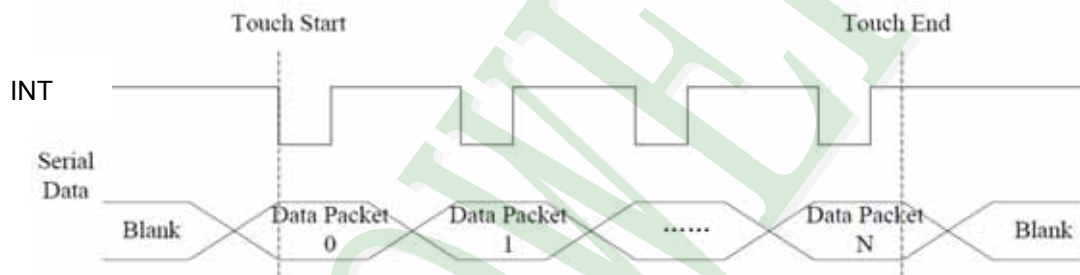Figure 2-6-4: Interrupt query mode

Figure 2-6-5: Interrupt trigger mode

Host use general I2C protocol to read the touch data or the information from CTP . CTP will send host a interrupt signal when there is a valid touch. Then host can use the serial data interface to get the touch data. If there is no valid touch detected, the INT will not be pulled up, the host do not need to read the touch data.

NOTE: "valid touch" may have different definition in various systems. For example, in some systems, the valid touch is defined as there is one more valid touch point. But in some other systems, the valid touch is defined as one more valid touch with valid gestures. In usual, INT will be pulled up when there is a valid touch point, and to be low when a touch finishes.

As for interrupt trigger mode, INT signal will be low if there is a touch detected. But for per update of valid touch data, CTP will produce a valid pulse for INT signal, host can read the touch data periodically according to the frequency of this pulse. In this mode, the pulse frequency is the touch data update frequency.

2.6.1.3 CTP Register Mapping

Address	Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Host Access
00h	DEVIDE_MODE	-	Device Mode[2:0]			-	-	-	-	WR
01h	TD_STATUS	-	-	-	-	Number of touch points[3:0]				R
02h	TOUCH1_XH	1st Event Flag		-	-	1st Touch X Position[11:8]				R
03h	TOUCH1_XL	1st Touch X Position[7:0]								R
04h	TOUCH1_YH	1st Touch ID[3:0]				1st Touch Y Position[11:8]				R
05h	TOUCH1_YL	1st Touch Y Position[7:0]								R
06h	-	-								R
07h	-	-								R
08h	TOUCH2_XH	2st Event Flag		-	-	2st Touch X Position[11:8]				R
09h	TOUCH2_XL	2st Touch X Position[7:0]								R
0Ah	TOUCH2_YH	2st Touch ID[3:0]				2st Touch Y Position[11:8]				R
0Bh	TOUCH2_YL	2st Touch Y Position[7:0]								R
0Ch	-	-								R
0Dh		-								R
0Eh	TOUCH3_XH	3st Event Flag		-	-	3st Touch X Position[11:8]				R
0Fh	TOUCH3_XL	3st Touch X Position[7:0]								R
10h	TOUCH3_YH	3st Touch ID[3:0]				3st Touch Y Position[11:8]				R
11h	TOUCH3_YL	3st Touch Y Position[7:0]								R
12h	-	-								R
13h	-	-								R
14h	TOUCH4_XH	4st Event Flag		-	-	4st Touch X Position[11:8]				R
15h	TOUCH4_XL	4st Touch X Position[7:0]								R
16h	TOUCH4_YH	4st Touch ID[3:0]				4st Touch Y Position[11:8]				R
17h	TOUCH4_YL	4st Touch Y Position[7:0]								R
18h	-	-								R
19h	-	-								R
1Ah	TOUCH5_XH	5st Event Flag		-	-	5st Touch X Position[11:8]				R
1Bh	TOUCH5_XL	5st Touch X Position[7:0]								R
1Ch	TOUCH5_YH	5st Touch ID[3:0]				5st Touch Y Position[11:8]				R
1Dh	TOUCH5_YL	5st Touch Y Position[7:0]								R
1Eh	-	-								R
1Fh	-	-								R

DEVICE_MODE

This register is the device mode register, configure it to determine the current mode of the chip.

Address	Bit Address	Register Name	Description
00h	6 : 4	Device Mode [2:0]	000b Work Mode 100b Factory Mode – read raw data

TD_STATUS

This register is the Touch Data status register.

Address	Bit Address	Register Name	Description
01h	7 : 4	Reserved	
	3 : 0	Number of touch points[3:0]	How many points detected. 1-5 is valid.

TOUCHn_XH

This register describes MSB of the X coordinate of the nth touch point and the corresponding event flag.

Address	Bit Address	Register Name	Description
02h	7 : 6	Event Flag	00b: Put Down 01b: Put Up 10b: Contact 11b: Reserved
	5 : 4		Reserved
	3 : 0	Touch X Position [11:8]	MSB of Touch X Position in pixels

TOUCHn_XL

This register describes LSB of the X coordinate of the nth touch point

Address	Bit Address	Register Name	Description
03h	7 : 0	Touch X Position [7:0]	LSB of the Touch X Position in pixels

TOUCHn_YH

This register describes MSB of the Y coordinate of the nth touch point and corresponding touch ID.

Address	Bit Address	Register Name	Description
04h	7 : 4	Touch ID[3:0]	Touch ID of Touch Point
	3 : 0	Touch Y Position [11:8]	MSB of Touch Y Position in pixels

TOUCHn_YL

This register describes LSB of the Y coordinate of the nth touch point.

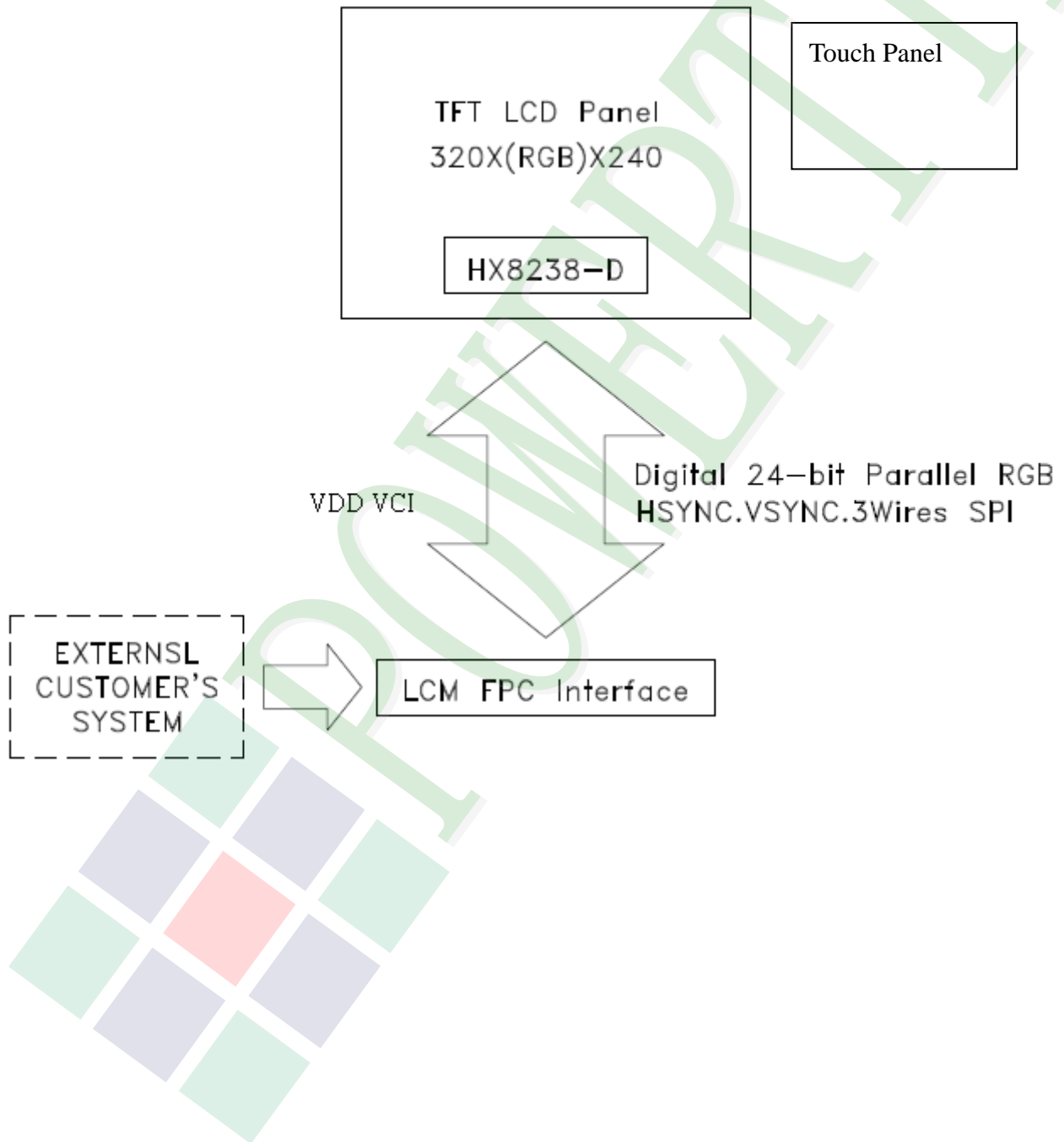| Address	Bit Address	Register Name	Description
05h~	7:0	Touch Y Position[7:0]	LSB of The Touch Y Position in pixels

2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1　LCM Mechanical Diagram

* See Appendix

2.1.2　Block Diagram

2.2 Interface Pin Description

Pin No.	Symbol	Function
1	A	LED Anode.
2	K	LED Cathode.
3	GND	Ground.
4	VCI	Booster Reference Supply Voltage.
5	ID	Note1.
6	VDD	Power Supply Voltage.
7	GND	Ground.
8	RESB	Reset.
9	CSB	Chip select Input: CSB = L - selected and accessible. CSB = H - is not selected and not accessible.
10	SCK	SPI Clock Input.
11	SDO	SPI Data Output. The data is valid on the falling edge of the SCK signal.
12	SDI	SPI Data Input. The data is latched on the rising edge of the SCK signal.
13	GND	Ground.
14	B0	
15	B1	
16	B2	
17	B3	Graphic display Blue data.
18	B4	
19	B5	
20	B6	

Pin No.	Symbol	Function
21	B7	Graphic display Blue data.
22	G0	Graphic display Green data.
23	G1	
24	G2	
25	G3	
26	G4	
27	G5	
28	G6	
29	G7	
30	R0	Graphic display Red data.
31	R1	
32	R2	
33	R3	
34	R4	
35	R5	
36	R6	
37	R7	
38	GND	Ground.
39	DCLK	Video Clock Input. The data is latched on the rising edge of DCLK.
40	HSYNC	Horizontal Sync Input.
41	VSYNC	Vertical Sync Input.

Pin No.	Symbol	Function
42	DEN	Video Data Enable Input. VSYNC+HSYNC mode - This pin is shorted to GND normally and the back/front porch is determined by the control register. VSYNC+HSYNC+DE mode - The valid data is determined by the VSYNC+HSYNC+DEN pin. DE mode - VSYNC and HSYNC are unused and shorted to GND. The valid input. data is determined by DEN pin.
43	GND	Ground.
44	SEL0	
45	SEL1	Note2.
46	SEL2	
47	NC	Not use.
48	NC	Not use.
49	NC	Not use.
50	NC	Not use.

T/P PIN

Pin No.	Symbol	Function
1	GND	Ground.(T/P)
2	SDA	I^2C Data.(T/P)
3	SCL	I^2C Clock. (T/P)
4	VDD	Power.(T/P)
5	INT	The interrupt from the CTP to the Host. H:CTP interrupt not requested. L:CTP request interrupt.
6	XRES	XRES. (T/P)

Note1: ID code Circuit

Vendor ID (On FPC, ID resistor as specified in vendor table shall be connected to this pin, and other side of the resistor shall be connected to GND)
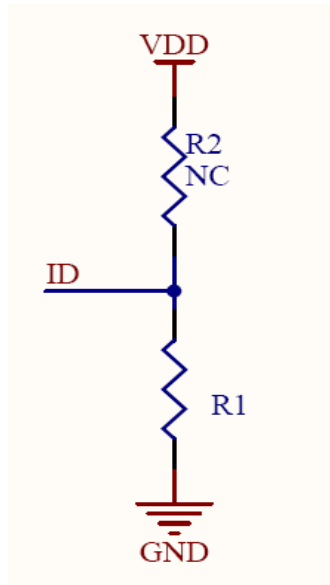
R1=44.2KΩ

Note2: Define the input interface mode

SEL2	SEL1	SEL0	Format	Operating frequency
0	0	0	Parallel-RGB data format (only support stripe type color filter)	6.5MHz
0	0	1	Serial-RGB data format	19.5MHz
0	1	0	CCIR 656 data format (640RGB)	24.54MHz
0	1	1	CCIR 656 data format (720RGB)	27MHz
1	0	0	YUV mode A data format (Cr-Y-Cb-Y)	24.54MHz
1	0	1	YUV mode A data format (Cr-Y-Cb-Y)	27MHz
1	1	0	YUV mode B data format (Cb-Y-Cr-Y)	27MHz
1	1	1	YUV mode B data format (Cb-Y-Cr-Y)	24.54MHz

Input format	DOTCLK Freq (MHz)	Display data	Active area (DOTCLK)
YUV mode	24.54	640	1280
	27	720	1440

2.2.1 Refer Initial code:

```
//Initial---------------------------------------------------------
\void Initial_Main(void)                          // For ILI9341
{
    MOV     DPH,#00H                  ;Register 0001

    MOV     DPL,#01H

    CALL    COM_SER

    MOV     DPH,#63H

    MOV     DPL,#00H

    CALL    DATA_SER


    MOV     DPH,#00H                  ;Register 0002

    MOV     DPL,#02H

    CALL    COM_SER

    MOV     DPH,#02H

    MOV     DPL,#00H

    CALL    DATA_SER


    MOV     DPH,#00H                  ;Register 0003

    MOV     DPL,#03H

    CALL    COM_SER

    MOV     DPH,#01100100B            ;DB3 ~ DB0

    MOV     DPL,#01100100B

    CALL    DATA_SER
```

```
MOV     DPH,#00H              ;Register 0004

MOV     DPL,#04H

CALL    COM_SER

MOV     DPH,#04H

MOV     DPL,#C7H              ;Parallel 24 bits

CALL    DATA_SER


MOV     DPH,#00H              ;Register 0005

MOV     DPL,#05H

CALL    COM_SER

MOV     DPH,#FCH

MOV     DPL,#80H

CALL    DATA_SER


MOV     DPH,#00H              ;Register 000A

MOV     DPL,#0AH

CALL    COM_SER

MOV     DPH,#40H

MOV     DPL,#08H

CALL    DATA_SER


MOV     DPH,#00H              ;Register 000D

MOV     DPL,#0DH

CALL    COM_SER

MOV     DPH,#00000010B
```

```
MOV      DPL,#00110001B          ;DB5 ~ DB0   VLCD63

CALL     DATA_SER


MOV      DPH,#00H                ;Register 000E

MOV      DPL,#0EH

CALL     COM_SER

MOV      DPH,#00101110B          ;DB4 ~ DB0 VCOM

MOV      DPL,#10000000B          ;DB7 ~ DB6

CALL     DATA_SER


CALL     DELAY2

}
```

2.3 Timing Characteristics

Pixel timing
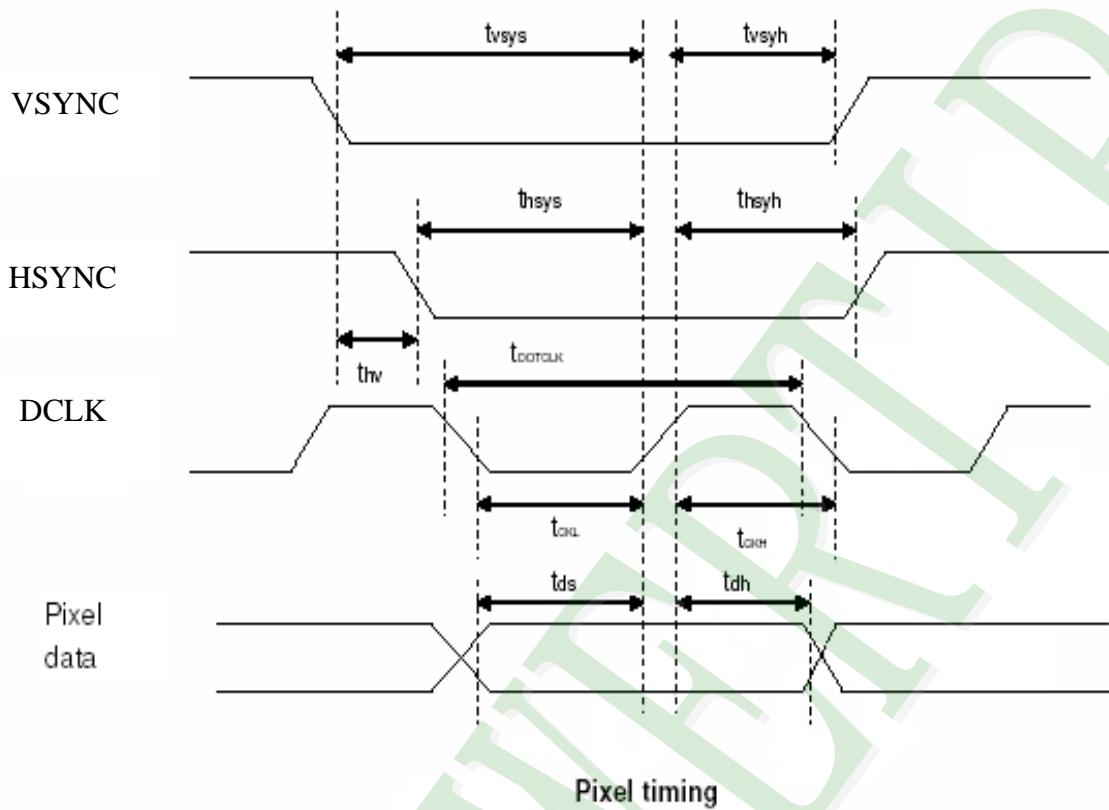
Characteristics	Symbol	Min		Typ		Max		Unit
		24 bit	8 bit	24 bit	8 bit	24 bit	8 bit	
DOTCLK Frequency	fDOTCLK	-		6.5	19.5	10	30	MHz
DOTCLK Period	tDOTCLK	100	33.3	154	51.3	-		ns
Vertical Sync Setup Time	tvsys	20	10	-		-		ns
Vertical Sync Hold Time	tvsyh	20	10	-		-		ns
Horizontal Sync Setup Time	thsys	20	10	-		-		ns
Horizontal Sync Hold Time	thsyh	20	10	-		-		ns
Phase difference of Sync Signal Falling Edge	thv	1		-		240		tDOTCLK
DOTCLK Low Period	tCKL	50	15	-		-		ns
DOTCLK High Period	tCKH	50	15	-		-		ns
Data Setup Time	tds	12	10	-		-		ns
Data hold Time	tdh	12	10	-		-		ns
Reset pulse width	tRES	10		-		-		us

Note: External clock source must be provided to DOTCLK pin of HX8238-A. The driver will not operate if absent of the clocking signal.

Pixel timing

Note：The interface of this module can drive by digital 24-bit data.
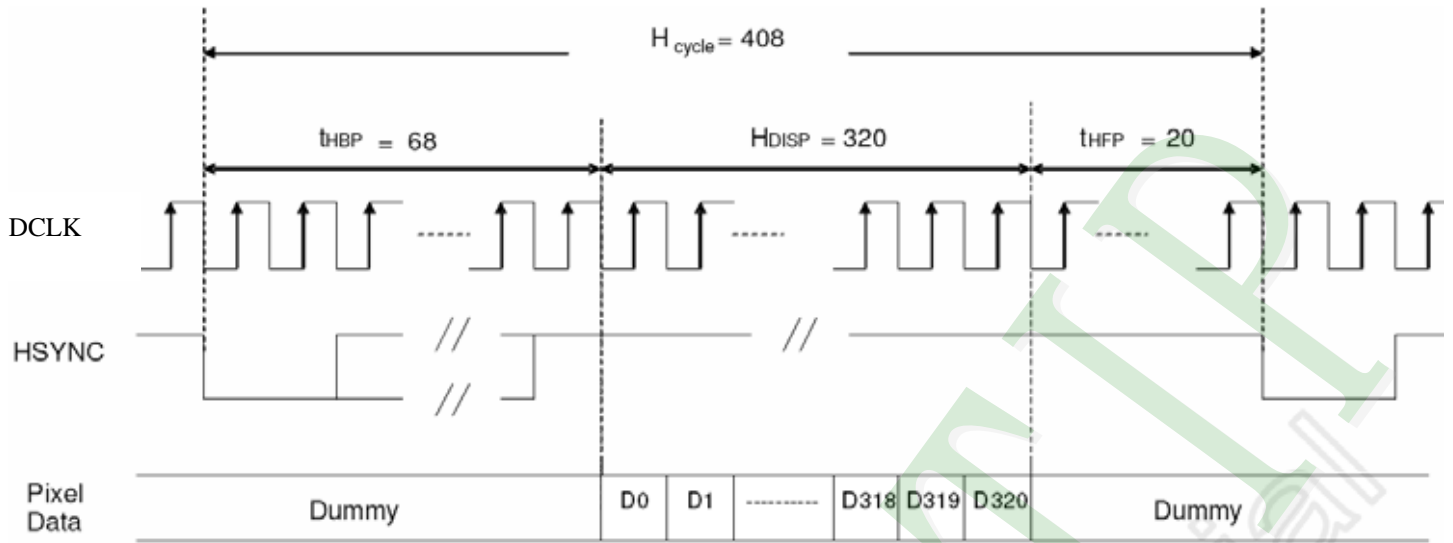
a) Horizontal Data Transaction Timing
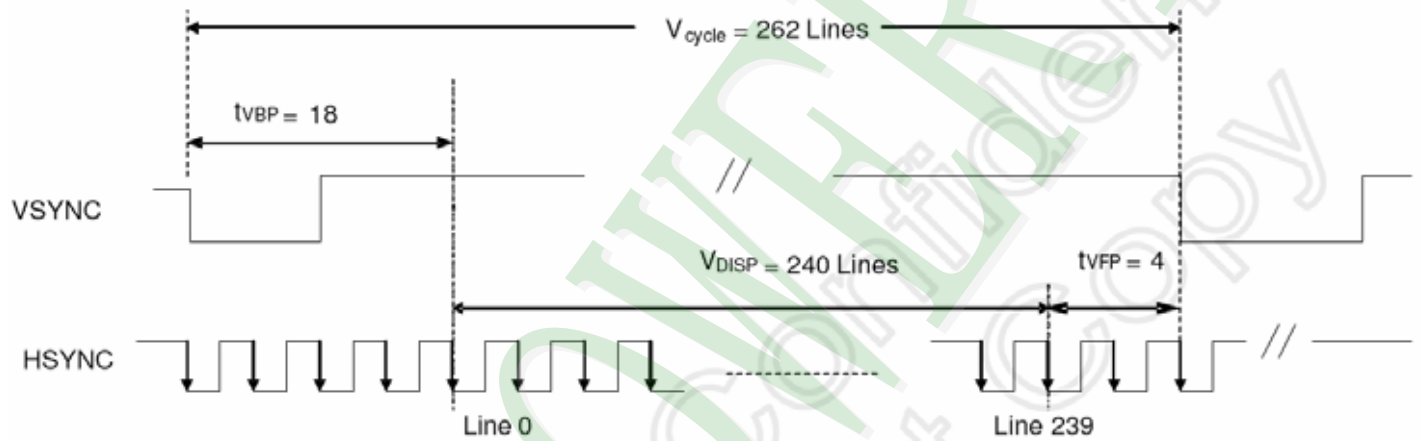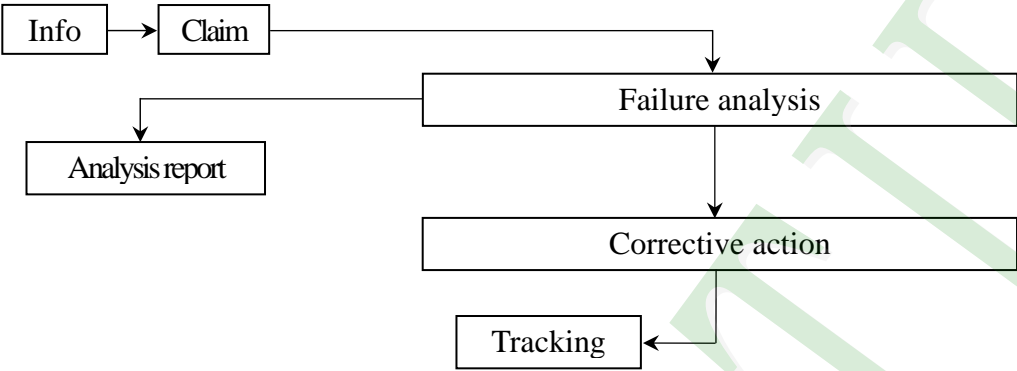
b) Vertical Data Transaction Timing

Data transaction timing in parallel RGB(24 bit)interface (SYNC mode)

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

Sample approval → OK

NG

Pilot run & Reliability test

NG → Verification

OK

Specification preparation

Mass production

OK → Inspection → NG

Shipment

Ship out

Item	Customer	Sales	R&D	Q.A	Manufactu ring	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

Analysis report ← Failure analysis

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.
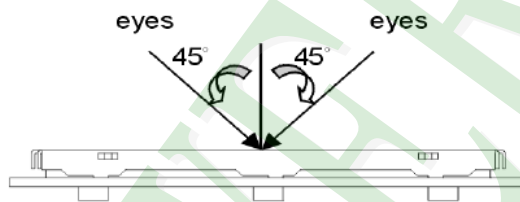
　　（3）. Definition of area.
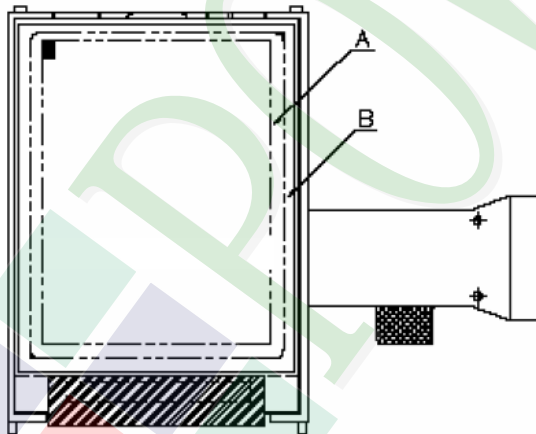
A area : viewing area

B area : Outside of viewing area

　　（4）. Standard of inspection： (Unit：mm)
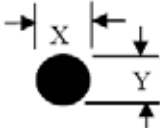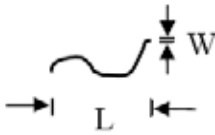
NO	Item	Criterion	Level
01	Product condition	1.1 The part number is inconsistent with work order of production.	Major
		1.2 Mixed product types.	Major
		1.3 Assembled in inverse direction.	Major
02	Quantity	2.1 The quantity is inconsistent with work order of production.	Major
03	Outline dimension	3.1 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><th colspan="2">Item</th><th>Acceptance (Q'ty)</th></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
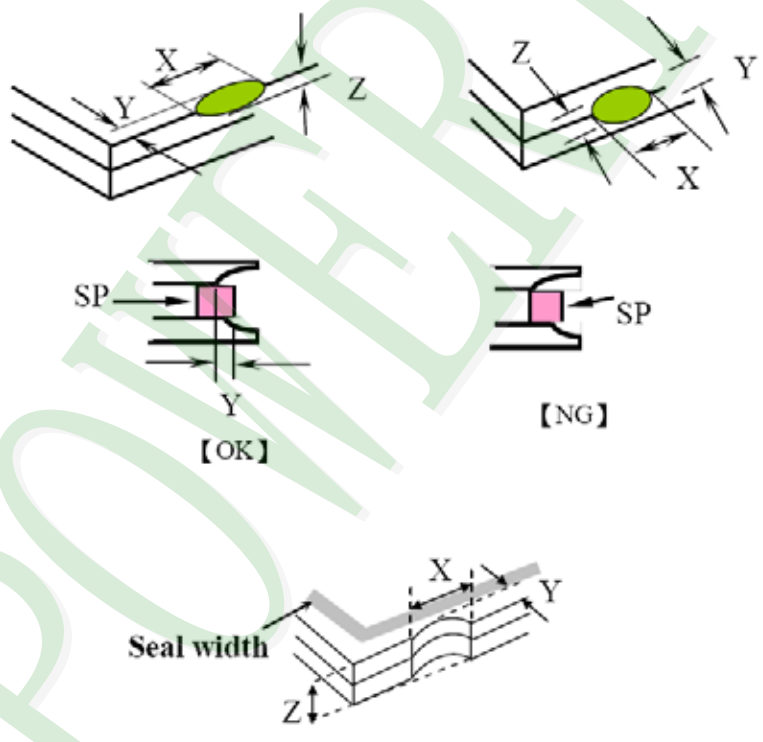
NO	Item	Criterion	Level
06	Black or white dot、scratch、contamination Round type X Y $\Phi = (x+y)/2$ Line type W L	**6.1 Round type (Non-display or display) :** 	Dimension (diameter : Φ)	Acceptance (Q'ty)	
	A area	B area
Φ ≦ 0.25	Ignore	
0.25 < Φ ≦ 0.50	5	Ignore
Φ > 0.50	0	
Total	5	| **6.2 Line type(Non-display or display) :** | Length (L)	Width (W)	Acceptance (Q'ty)	
		A area	B area
---	W ≦ 0.03	Ignore	
L ≦10.0	0.03 < W ≦ 0.05	4	
L ≦5.0	0.05 < W ≦ 0.10	2	Ignore
---	W > 0.10	As round type	
Total		5			Minor
07	Polarizer Bubble		Dimension (diameter : Φ)	Acceptance (Q'ty)	
	A area	B area
Φ ≦ 0.25	Ignore	
0.25 < Φ ≦ 0.50	4	
0.50 < Φ ≦ 0.80	1	Ignore
Φ > 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: 	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
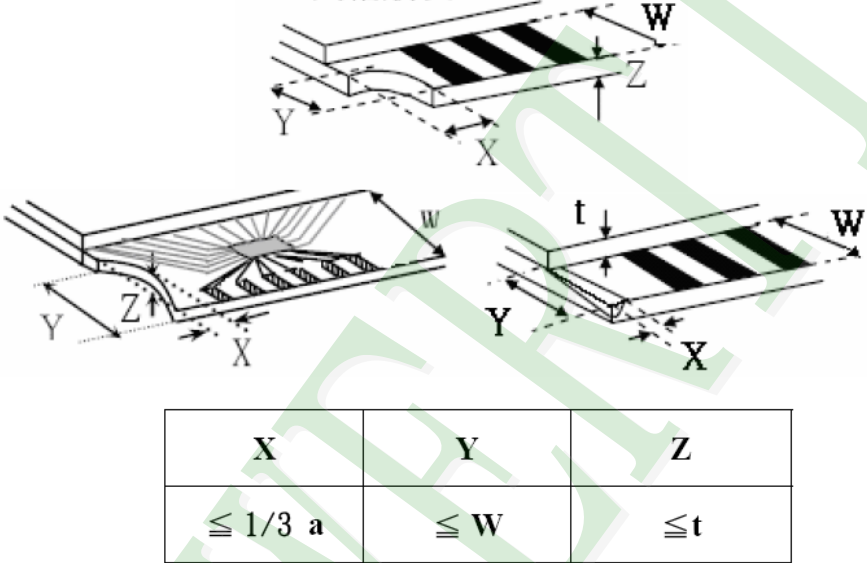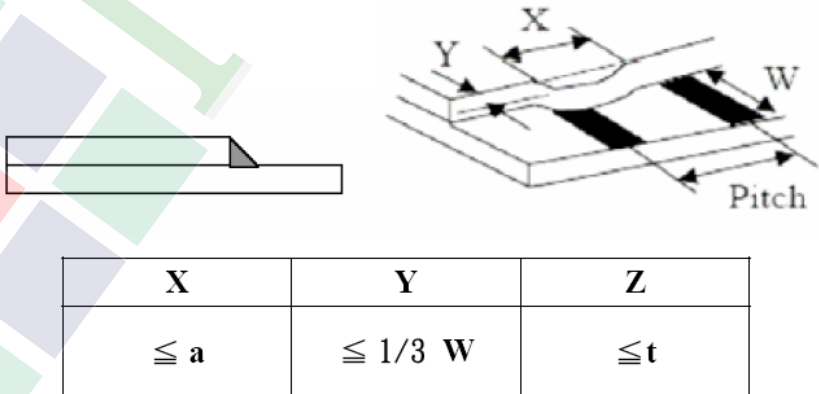
NO	Item	Criterion	Level
08	The crack of glass	Symbols : X : The length of crack　　　　Y : The width of crack. Z : The thickness of crack　　W : terminal length t : The thickness of glass　　　a : LCD side length 8.1.2 Corner crack : 8.2 Protrusion over terminal : 8.2.1 Chip on electrode pad : 	Minor

Table for 8.1.2 Corner crack:

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

Table for 8.2.1 Chip on electrode pad:

	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 : <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$\leq 1/3$ a</td><td>$\leq$ W</td><td>$\leq$ t</td></tr></table> ⊙ **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><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>$\leq$ a</td><td>$\leq 1/3$ W</td><td>$\leq$ t</td></tr></table>	Minor

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 ≦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 ±2℃ 96 hrs** **Surrounding temperature, then storage at normal condition 4hrs.**
2	**Low Temperature Storage Test**	**Keep in -30 ±2℃ 96 hrs** **Surrounding temperature, then storage at normal condition 4hrs.**
3	**High Temperature / High Humidity Storage Test**	**Keep in +60℃ / 90% R.H duration for 96 hrs** **Surrounding temperature, then storage at normal condition 4hrs.** **(Excluding the polarizer)**
4	**Temperature Cycling Storage Test**	**-30℃ → +25℃ → +80℃ → +25℃** **(30mins) (5mins) (30mins) (5mins)** **10 Cycle** **Surrounding temperature, then storage at normal condition 4hrs.**
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)**	**Packing Weight (Kg) / Drop Height (cm)** table below **Drop Direction :※1 corner / 3 edges / 6 sides each 1time**

Packing Weight (Kg)	Drop Height (cm)
0 ~ 45.4	122
45.4 ~ 90.8	76
90.8 ~ 454	61
Over 454	46

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 $320 \pm 10°C$ and 3-5 sec.

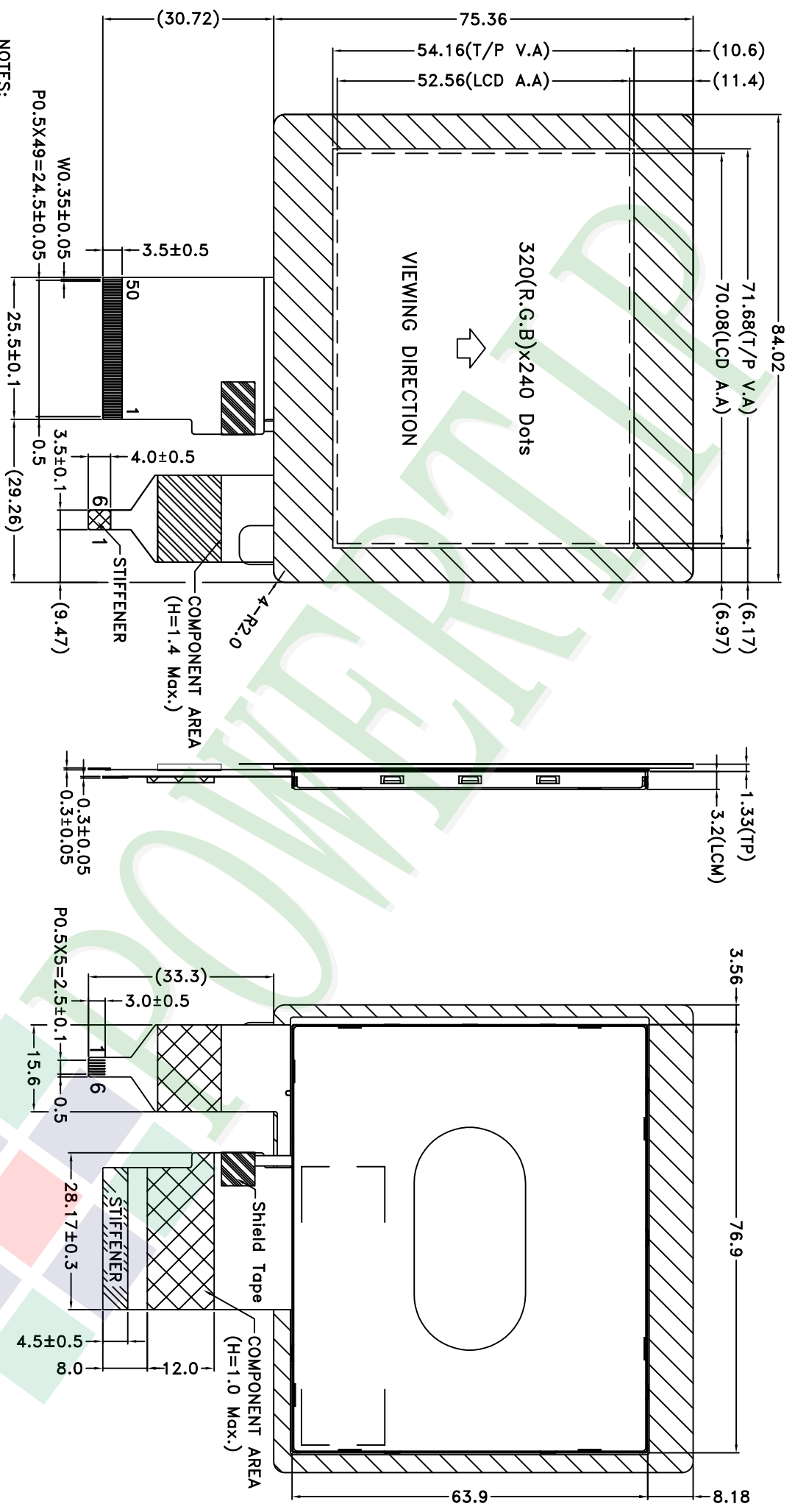5.2.9   To avoid liquid (include organic solvent) stained on LCM

5.3 STORAGE

5.3.1   Store the panel or module in a dark place where the temperature is $25°C \pm 5°C$ 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.

Drawing Information

PART NO:	PH320240T023-IBC
DRAWING NAME:	LMD-PH320240T023-IBC
TITLE:	LCD MODULE DRAWING

Design	Check	Approve	
Stone	Sam	Oliver	

Unit	Scale	Page	Surface	Material	Thickness	Quantity
MM	FIT	1/2				

	Length(Min) (mm)	Precision	
	1 ~ 4	-	-
	4 ~ 16	-	-
	16 ~ 63	-	-
	63 ~ 250	-	-
	250 ~ 1000	-	-

Revision Table

007			
006			
005			
004	MODIFY NOTE	Stone	2014/03/31
003	MODIFY NOTE	Stone	2013/09/13
002	MODIFY DIMENSION	Stone	
001	NEW DRAWING	Stone	2013/07/15
REV	REV BY	REVISER	DATE

NOTES:

1. LCD TYPE: a-Si TFT
2. LCD DISPLAY: POSITIVE / TRANSMISSIVE
3. The tolerance unless classified ±0.2mm

⚠4. LCD FPC Matching Connector: Kyocera 08 6282 050 340 829+ or EQUIVALENT

⚠5. CTP FPC Matching Connector: Kyocera 08 6260 006 340 829+ or EQUIVALENT

Dimensions (labels)

- 84.02
- 75.36
- (30.72)
- 54.16(T/P V.A)
- 52.56(LCD A.A)
- (10.6)
- (11.4)
- 71.68(T/P V.A)
- 70.08(LCD A.A)
- 320(R.G.B)×240 Dots
- VIEWING DIRECTION
- (6.17)
- (6.97)
- W0.35±0.05
- P0.5X49=24.5±0.05
- 3.5±0.5
- 50
- 1
- 25.5±0.1
- 3.5±0.1
- 0.5
- (29.26)
- (9.47)
- 4.0±0.5
- 6
- 1
- STIFFENER
- COMPONENT AREA (H=1.4 Max.)
- 4-R2.0
- 0.3±0.05
- 0.3±0.05
- 1.33(TP)
- 3.2(LCM)
- 3.56
- P0.5X5=2.5±0.1
- 3.0±0.5
- (33.3)
- 15.6
- 6
- 1
- 0.5
- 28.17±0.3
- STIFFENER
- Shield Tape
- COMPONENT AREA (H=1.0 Max.)
- 4.5±0.5
- 8.0
- 12.0
- 63.9
- 8.18
- 76.9

PT-A-054-01

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)	PH320240T023-IBC	84.02 X 75.36	0.045	144	6.48
2	抗靜電氣泡袋(1)Bubble Bag	BAG0000000005	150 X 120	0.002	144	0.288
3	A2隔板(2)A2 Partition	BX29300070BMBA	293 X 70 X 2.5	0.011	66	0.726
4	B2隔板(3)B2 Partition	BX24500070BLBA	245 X 70 X 2.5	0.01	18	0.18
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) :   10.59   Kg±10%

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

(1)Quantity Of Spacer : A2隔板 X 11 , B2隔板 X 3

(2)Total LCM quantity in carton : quantity per box   24   x no of boxes   6   =   144

(4) 海綿墊
Foam Rubber Cushion

(1)抗靜電氣泡袋+LCM
Bubble Bag+LCM

(3) B2隔板
B2 Partition

(2) A2隔板
A2 Partition

(4) 海綿墊
Foam Rubber Cushion

(5)C3內盒
Product Box

(6)外紙箱
Carton

特 記 事 項 (REMARK)

POWERTIP TECH. CORP.