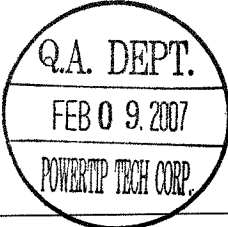# POWERTIP TECH. CORP.

SPECIFICATIONS

CUSTOMER : **PTC**

SAMPLE CODE (Ver.) :

MASS PRODUCTION CODE (Ver.) : **PPT9999-A003-04-Q (Ver.0)**

DRAWING NO. (Ver.) : **PPT-06002-005 (Ver.0)**

Customer Approved

Date:

Approved	QC Confirmed	Designer
研發 96. 2. 12 張慶源	Q.A. DEPT. FEB 0 9. 2007 POWERTIP TECH CORP. 王耀宗 2007.2.9	研發 96. 2. 9 張慶源　研發 2007-2-9 陳建成

■ Approval For Specifications Only.

　　* This specification is subject to change without notice.

　　　Please contact Powertip or it's representative before designing your product based on this specification.

☐ Approval For Specifications and Sample.

POWERTIP TECH. CORP.

History of Version

Date	Ver.	Description	Page	Design by
2007/2/8	0	New Sample.	-	Louis

Total: 26 Page

Contents

Note : For detailed information please refer to IC data sheet : Himax --- HX5051

1. SPECIFICATIONS

1.1 Features

OLED panel

Item	Standard Value
Display Type	176 * (RGB) * 220 Dots
LCD Type	OLED,Anti-reflective(3H)
Driving Mode	Active Matrix
Color Mode	Full Color (262K color)
Screen size(inch)	2.0(Diagonal)
Interface	MPU i80-system 18-/16-/9-/8-Bit bus interface
Driver IC	Himax --- HX5051

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	38.0 (W) * 49.0 (L) * 1.3 (H)	mm

OLED panel

Item	Standard Value	Unit
Active Area	31.68 (W) * 39.6 (L)	mm
Dot Pitch	0.06 (W) * 0.18 (L)	mm

Note : For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Unit	Value	Note
Power supply voltage 1	VCC, IOVCC	V	-0.3 ~ + 4.6	Note(1),(2)
Power supply voltage 2	VCI - VSSA	V	-0.3 ~ + 4.6	Note(1),(3)
Power supply voltage 3	VLCD - VSSA	V	-0.3 ~ + 6.0	Note(1),(4)
Power supply voltage 4	VSSA -VCL	V	-0.3 ~ + 4.6	Note(1),(5)
Power supply voltage 5	VLCD - VCL	V	-0.3 ~ + 9.0	Note(1),(6)
Power supply voltage 6	VGH - VSSA	V	-0.3 ~ + 18.5	Note(1),(7)
Power supply voltage 7	VSSA - VGL	V	-0.3 ~ + 16.5	Note(1),(8)
Input voltage	Vt	V	-0.3 ~ VCC + 0.3	Note(1)
Operating temperature	Topr	C	-20 ~ + 70	
Storage temperature	Tstg	C	-40~ + 85	

Notes:

(1) VCC, VSSD must be maintained

(2) (High) VCC   VSSD (Low), (High) IOVCC   VSSD (Low).

(3) Make sure (High) VCI   VSSA (Low).

(4) Make sure (High) VLCD   VSSA (Low).

(5) Make sure (High) VSSA   VCL (Low)

(6) Make sure (High) VLCD   VCL (Low).

(7) Make sure (High) VGH   VSSA (Low).

(8) Make sure (High) VSSA   0 VGL (Low).

1.4 DC Electrical Characteristics

Module   IOVCC = 1.65 ~ 3.3 V, VCC=2.4 ~ 3.3V, V_{SS} = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Input High Voltage	V_{IH}	IOVCC=1.65~3.3V, VCC= 2.4 ~ 3.3V	0.8*IOVCC			V
Input Low Voltage	V_{IL}	IOVCC=1.65~3.3V, VCC= 2.4 ~ 3.3V			0.18*IOVCC	V
Output High Voltage(1) (DB0-15 Pins)	V_{OH1}	IOH=-0.1mA	0.9*IOVCC			V
Output Low Voltage (DB0-15 Pins)	V_{OL1}	IOVCC=1.65~3.3V, VCC= 2.4 ~ 3.3V IOL = 0.1mA			0.1*IOVCC	V
I/O leakage current	ILi	Vin=0~IOVCC	-0.1		0.1	uA
Current consumption during normal operation (VCC – VSSD)	IOP	IOVCC=3.0V, VCC=3.0V , VGAM1OUT=4.93V VLCDC=5.5V (VC=3'b001,0.92*VCI), fOSC = 236KHz (160 line) , Ta=25°C, GRAM data = 0000h, REV="1", SAP="100", ON4-0="0",OP4-0="0", MP52-00="0",MN52-00="0", CP12-00="0",CN12-00="0	-	80	200	uA
Current consumption during standby mode (VCC – VSSD)	IST	IOVCC=3.0V, VCC=3.0V , Ta=25°C		1 (IOVCC, VCC)	10 (IOVCC, VCC)	mA
Output voltage deviation	-	-	-	5	-	mV
Dispersion of the Average Output Voltage	V	-	-10	-	10	mV

1.5 Optical Characteristics

Items	Symbol	Min	Typ.	Max	Unit	Remark
Operating Luminance	L	-	150	-	Cd/m2	Polarizer
Normally mode Power Consumption	Pon	-	200	-	mW	30% pixels on (1)
Sleep mode Power Consumption	Poff	-	50	-	uW	Displayoff (2)
Response Time	Tres	-	-	50	uS	(3)
CIEx (White)	Bx	-	0.30	-	-	-
CIEy(White)	By	-	0.34	-	-	-
Viewing Angle	VA	170	-	-	Degree	(4)
Contrast			10000:1			(5)
Life Time	-	10000	-	-	Hrs	50% check board

Note:

Measuring surrounding: dark room

Surrounding temperature: 25

1.Normally mode test condition:

   Driver Voltage: ARVdd=5V, ARVss=-6V

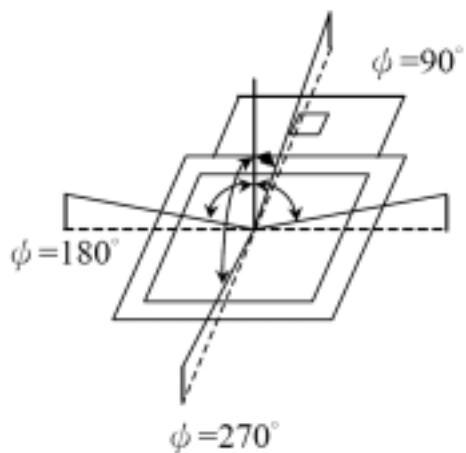   ESD Voltage: HVDDD=10V, VVDD=-10V

   Frame Rate: 60Hz

2. Sleep mode test condition:

   Register R01 bit0 set = 1

3.response Time test condition

4.Viewing angle test condition:

4.Contrast

CR = $\dfrac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$
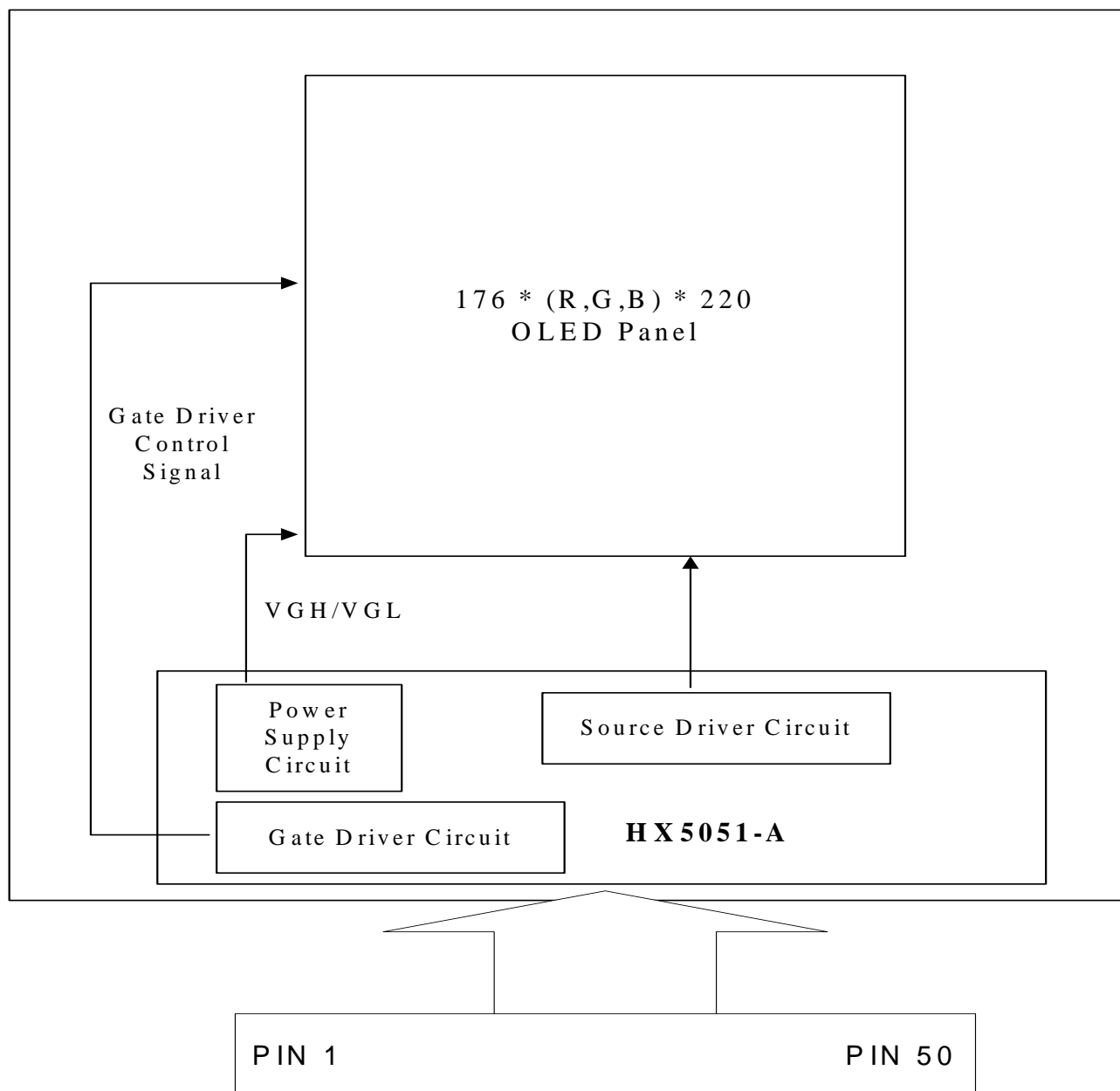
5.Optical tester: Topcon SR3

2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram

Please refer Interface pin description for detail

2.2 Interface Pin Description

Pin No.	Symbol	Function				
1	C11B	Connect a 1uF capacitor with C11A				
2	C11A	Connect a 1uF capacitor with C11B				
3	DDVDH	When internal power generated by Step up circuit1; The Amplitude of this Pin is about 2 X VCI1OUT. When Step up circuit is off, this Pin is as the external power supply Pin.				
4	VCI1OUT	Connect a capacitor for stabilization				
5	VGAM1OUT	A reference voltage for grayscale voltage.				
6	VGAMS_R	Adjust internal red color gamma reference voltage				
7	VGAMS_G	Adjust internal green color gamma reference voltage				
8	VGAMS_B	Adjust internal blue color gamma reference voltage				
9	IM3	IM3	IM0	MPU interface mode	DB pins	
		0	0	16-bit bus interface, i80-system	DB17-10, 8-1	
		0	1	8-bit bus interface, i80-system	DB17-10	
10	IM0	1	0	18-bit bus interface, i80-system	DB17-0	
		1	1	9-bit bus interface, i80-system	DB17-9	
11	NCS	Chip Select Signal				
12	NRESET	Reset pin. Must be reset after power is supplied.				
13	RS	Register index/command select.				
14	E_NWR	Serves as a write signal and writes data at the rising edge.				
15	DB17	Operates liked an 18-bit bi-directional data bus. 18-bits bus I/F: DB17-0				
16	DB16					
17	DB15					
18	DB14					
19	DB13					
20	DB12					
21	DB11					
22	DB10					
23	DB9					

Pin No.	Symbol	Function
24	DB8	Operates liked an 18-bit bi-directional data bus. 18-bits bus I/F: DB17-0
25	DB7	
26	DB6	
27	DB5	
28	DB4	
29	DB3	
30	DB2	
31	DB1	
32	DB0	
33	IOVCC	Power supply (2.7~3.3V)
34	OSC1	Connect an external resistor for generating internal clock by internal R-C oscillation. Or an external clock signal is supplied through OSC1 with OSC2 open.
35	OSC2	
36	VDDD	Internal Logic power supply. (1). VDC Enable: VCC is Regulated to 1.9V By VDC Circuit (2). VDC Disable: Logic Power is from this pin. Can be Shorted to VCC
37	VCC	For digital power supply (2.5V~3.3V)
38	GND	System ground
39	VCL	An internal power supply = (-1*VCI1OUT)
40	C12A	Connect a 1uF capacitor with C12B
41	C12B	Connect a 1uF capacitor with C12A
42	VGH	An internal power supply for the OLED's common control signals. Adjusted by BT2-0
43	VGL	An internal power supply for the OLED's common control signals. Adjusted by BT2-0
44	C22A	Connect a 1uF capacitor with C22B
45	C22B	Connect a 1uF capacitor with C22A
46	C21A	Connect a 1uF capacitor with C21B
47	C21B	Connect a 1uF capacitor with C21A
48	GND	System ground
49	AR_VDD	Power supply (5~7V)
50	AR_VSS	Power supply (-2~-8V)

2.3 Timing Characteristics

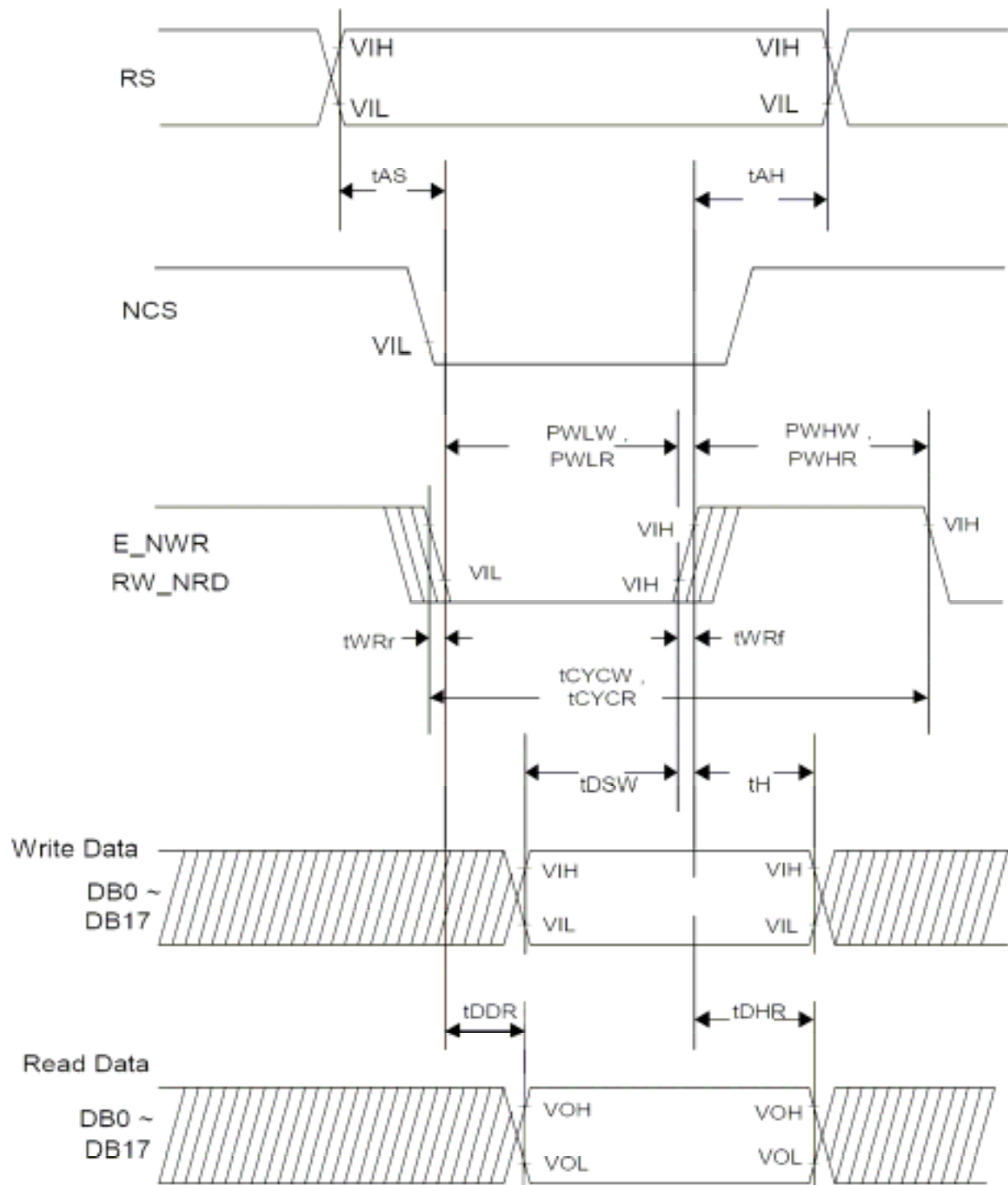**i80-system Bus Operation**

Figure 2. 1

80-System Normal Write Mode (HWM = 0) / (IOVCC = 1.65 ~ 3.3V, VCC=2.4~3.3V)

Item		Symbol	Unit	Min.	Typ.	Max.	Test Condition
Bus cycle time	Write	tCYCW	ns	200	-	-	Figure 2. 1
	Read	tCYCR	ns	500	-	-	Figure 2. 1
Write low-level pulse width		PWLW	ns	50	-	-	Figure 2. 1
Read low-level pulse width		PWLR	ns	200	-	-	Figure 2. 1
Write high-level pulse width		PWHW	ns	100	-	-	Figure 2. 1
Read high-level pulse width		PWHR	ns	200	-	-	Figure 2. 1
Write / Read rise / fall time		tWRr , tWRf	ns	-	-	25	Figure 2. 1
Setup time	Write (RS to NCS,E_NWR)	tAS	ns	10	-	-	Figure 2. 1
	Read (RS to NCS , RW_NRD)			10	-	-	Figure 2. 1
Address hold time		tAH	ns	5	-	-	Figure 2. 1
Write data set up time		tDSW	ns	60	-	-	Figure 2. 1
Write data hold time		tH	ns	15			Figure 2. 1
Read data delay time		tDDR	ns	-	-	200	Figure 2. 1
Read data hold time		tDHR	ns	5	-	-	Figure 2. 1

80-System High-Speed Write Mode (HWM = 1) /(IOVCC = 1.65 ~ 3.3V, VCC=2.4~3.3V)

Item		Symbol	Unit	Min.	Typ.	Max.	Test Condition
Bus cycle time	Write	tCYCW	ns	100	-	-	Figure 2. 1
	Read	tCYCR	ns	500	-	-	Figure 2. 1
Write low-level pulse width		PWLW	ns	40	-	-	Figure 2. 1
Read low-level pulse width		PWLR	ns	200	-	-	Figure 2. 1
Write high-level pulse width		PWHW	ns	40	-	-	Figure 2. 1
Read high-level pulse width		PWHR	ns	200	-	-	Figure 2. 1
Write / Read rise / fall time		tWRr , tWRf	ns	-	-	25	Figure 2. 1
Setup time	Write (RS to NCS,E_NWR)	tAS	ns	10	-	-	Figure 2. 1
	Read (RS to NCS , RW_NRD)			10	-	-	Figure 2. 1
Address hold time		tAH	ns	5	-	-	Figure 2. 1
Write data set up time		tDSW	ns	60	-	-	Figure 2. 1
Write data hold time		tH	ns	15			Figure 2. 1
Read data delay time		tDDR	ns	-	-	200	Figure 2. 1
Read data hold time		tDHR	ns	5	-	-	Figure 2. 1

Reset Timing Characteristics

Figure 2. 2

Item	Symbol	Unit Timing	diagram	Min.	Typ.	Max.
Reset low-level width	tRES	ms	Figure 2. 2	1	-	-
Reset rise time	trRES	µs	Figure 2. 2	-	-	10

2.4 Instruction Table
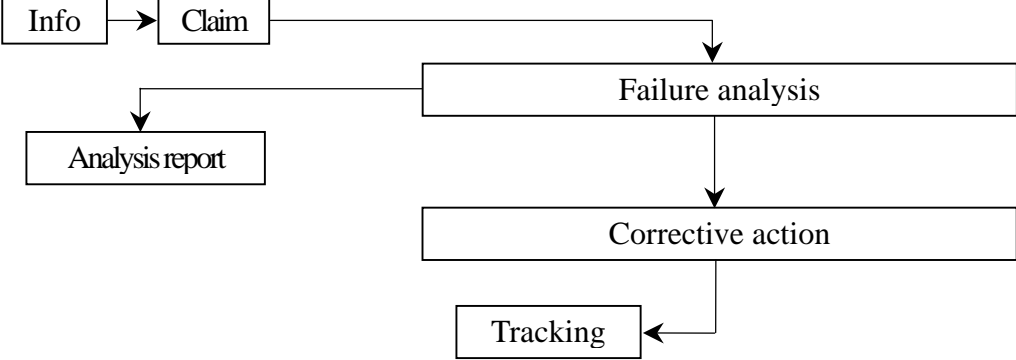
Register No.	Register	R/W	RS	Upper Code								Lower Code								Instructions
				RD15	RD14	RD13	RD12	RD11	RD10	RD9	RD8	RD7	RD6	RD5	RD4	RD3	RD2	RD1	RD0	
IR	Index	W	0	*	*	*	*	*	*	*	*	*	ID6	ID5	ID4	ID3	ID2	ID1	ID0	
SR	Status Read	R	0	L8	L7	L6	L5	L4	L3	L2	L1	L0	0	0	0	0	0	0	0	
R00h	Device Code Read	R	1	1	0	0	0	0	1	1	1	0	0	0	1	1	0	0	1	
R01h	Power Control(1)	W	1	0	SAP2	SAP1	SAP0	0	BT2	BT1	BT0	0	AP2	AP1	AP0	0	DK	SLP	STB	
R02h	Power Control(2)	W	1	0	0	0	0	0	DC12	DC11	DC10	0	DC02	DC01	DC00	0	VC2	VC1	VC0	
R03h	Power Control(3)	W	1	0	0	0	0	0	0	0	0	0	0	0	PON	VRH3	VRH2	VRH1	VRH0	
R04h	Frame Cycle Control	W	1	0	0	0	0	0	0	DIV1	DIV0	0	0	0	0	0	OSC_SEL1	OSC_SEL0	OSC_EN	
R05h	Entry Mode	W	1	TRIM	OFM1	OFM0	BGR	0	0	RAM	I/IRAM	0	0	I/D1	I/D0	AM	LG2	LG1	LG0	
R06h	Display Control(1)	W	1	0	0	0	0	0	0	0	R08	0	0	ISP	D/AM	0	0	R0N	R/M	
R07h	Display Control(2)	W	1	0	VSPL	HSPL	EPL	DPL	C8	S8	0	0	0	0	0	0	S2H1	S2B	DASK	
R08h	Display Control(3)	W	1	REV	0	0	0	0	0	0	0	0	0	0	0	ISP4	ISP3	ISP2	ISP1	ISP0	
R09h	Display Control (4)	W	1	0	0	0	PT1	PT0	VLE2	VLE1	ISPT	0	0	0	0	0	0	D1	D0	
R0Ah	Scan Line Control	W	1	0	0	0	0	0	0	0	NL8	NL7	NL6	NL5	NL4	NL3	NL2	NL1	NL0	
R11h	Panel window(1)	W	1								SS18	SS17	SS16	SS15	SS14	SS13	SS12	SS11	SS10	
R12h	Panel window(2)	W	1								SE18	SE17	SE16	SE15	SE14	SE13	SE12	SE11	SE10	
R13h	Panel window(3)	W	1								SS28	SS27	SS26	SS25	SS24	SS23	SS22	SS21	SS20	
R14h	Panel window(4)	W	1								SE28	SE27	SE26	SE25	SE24	SE23	SE22	SE21	SE20	
R15h	TCON Register(1)	W	1	0	0	0	0	0	0	0	0	0	T16	T15	T14	T13	T12	T11	T10	
R16h	TCON Register(2)	W	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
R17h	TCON Register(3)	W	1	0	0	0	0	0	0	0	0	T36	T35	T34	T33	T32	T31	T30	
R18h	TCON Register(4)	W	1	0	0	0	0	0	0	0	T46	T45	T44	T43	T42	T41	T40	
R19h	TCON Register(5)	W	1	0	0	0	0	0	0	0	0	T56	T55	T54	T53	T52	T51	T50	
R1Ah	TCON Register(6)	W	1	0	0	0	0	0	0	0	0	T66	T65	T64	T63	T62	T61	T60	
R1Bh	FRC(1)	W	1	P1	P0	O1	O0	N1	N0	M1	M0	D1	D0	C1	C0	B1	B0	A1	A0	
R1Ch	FRC(2)	W	1	FRC_EN	0	0	0	0	0	0	0	T1	T0	Y1	Y0	X1	X0	W1	W0	
R20h	RAM Address Set	W	1	AD15	AD14	AD13	AD12	AD11	AD10	AD9	AD8	AD7	AD6	AD5	AD4	AD3	AD2	AD1	AD0	
R22h	Write/Read data	R/W	1								WD(17-0)/RD(17-0)									
R23h	Horizontal RAM Address Position	W	1	HEA7	HEA6	HEA5	HEA4	HEA3	HEA2	HEA1	HEA0	HSA7	HSA6	HSA5	HSA4	HSA3	HSA2	HSA1	HSA0	
R24h	Vertical RAM Address Position	W	1	VEA7	VEA6	VEA5	VEA4	VEA3	VEA2	VEA1	VEA0	VSA7	VSA6	VSA5	VSA4	VSA3	VSA2	VSA1	VSA0	
R25h	Compare Register (1)	W	1	0	0	CP11	CP10	CP9	CP8	CP7	CP6	0	0	CP5	CP4	CP3	CP2	CP1	CP0	
R26h	Compare Register (2)	W	1	0	0	0	0	0	0	0	0	0	0	CP17	CP16	CP15	CP14	CP13	CP12	
R27h	RAM Write Data Mask(1)	W	1	0	0	WM11	WM10	WM9	WM8	WM7	WM6	0	0	WM5	WM4	WM3	WM2	WM1	WM0	
R28h	RAM Write Data Mask(2)	W	1	0	0	0	0	0	0	0	0	0	0	WM17	WM16	WM15	WM14	WM13	WM12	
R29h	Vertical Scroll control(1)	W	1	0	0	0	0	0	0	0	0	NL7	NL6	NL5	NL4	NL3	NL2	NL1	NL0	
R2Ah	Vertical Scroll Control(2)	W	1	0	0	0	0	0	0	0	0	VL7	VL6	VL5	VL4	VL3	VL2	VL1	VL0	
R2Bh	Vertical scroll control(3)	W	1	0	0	0	0	0	0	0	0	VSTEP7	VSTEP6	VSTEP5	VSTEP4	VSTEP3	VSTEP2	VSTEP1	VSTEP0	
R30h	R_Gamma(1)	W	1	0	RV42	RV41	RV40	RV02	RV01	RV00	RD022	RD021	RD020	RD023	RD021	RD020	RP018	RP016	RP018	
R31h	R_Gamma(2)	W	1	0	0	0	0	0	RV52	RV51	RV50	0	RP052	RP051	RP050	0	RP032	RP031	RP030	
R32h	R_Gamma(3)	W	1	0	0	0	0	0	0	0	0	RP037	RP036	0	RP035	RP033	RP031	RV030	
R33h	G_Gamma (1)	W	1	0	GV42	GV41	GV40	GV02	GV01	GV00	GVE02	GK031	GK030	GK032	GK031	GK030	GV102	GV101	GV100	
R34h	G_Gamma (2)	W	1	0	0	0	0	0	GV52	GV51	GV50	0	GV092	GV091	GV090	0	GV052	GV051	GV050	

R08h	0_Gamma (0)	V	1	0	0	0	0	0	0	0	0	0	GV01 (0)	GV00 (0)	0	GV06 (1)	GV02 (1)	GV01 (0)	GV00 (0)		
R08h	0_Gamma (1)	V	1	GV62 (1)	GV61 (0)	GV60 (0)	GV002 (1)	GV41 (0)	GV40 (0)	GV12 (1)	GV021 (0)	GV10 (0)	GV02 (1)	GV21 (0)	GV20 (0)	GV12 (1)	GV21 (0)	GV10 (0)		
R08h	0_Gamma (2)	V	1	0	0	0	0	GV62 (1)	GV61 (0)	GV60 (0)	0	GV62 (1)	GV61 (0)	GV60 (0)	0	GV22 (0)	GV21 (0)	GV20 (0)		
R08h	0_Gamma (3)	V	1	0	0	0	0	0	0	0	0	GV31 (0)	GV30 (0)		GV00 (1)	GV2 (1)	GV1 (0)	GV0 (0)		

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

Info → Survey

Request → Inquiry → Project evaluation

Project Validation

NG

OK

Quote

Contract

Sample Approval

Design check

Sample test

NG

Verification

OK

NG

Sample approval

OK

Pilot Run & Mass Product

Pilot run & Reliability test

NG

Verification

OK

Specification preparation

Mass production

OK　Inspection　NG

Ship Out

Shipment

Ship out

Item	Customer	Sales	R&D	Q.A	Manufactu ring	Product control	Purchase	Inventory control
Sales Service								
Q.A Activity								

Sales Service flow:

Info → Claim → Failure analysis

Failure analysis → Analysis report

Failure analysis → Corrective action

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

1.Description

These inspection standards shall be applied to OLED Module supplied.

2.Inspection provision

  MIL-STD-105E/inspection level II/normal inspection/single sample inspection

  AQL: Major 0.65; minor 1.0

3.The environmental condition of inspection

    The environmental condition and visual inspection shall be conducted as below.

(1) Ambient temperature : 15~25

(2) Humidity: 25~75 %RH

(3) External appearance inspection shall be conducted by using a single 20W fluorescent lamp or equivalent illumination.

(4) Panel visual inspection on the operation condition for cosmetic shall be conducted at the distance 30cm or more between the OLED module and eyes of inspector. And, the viewing angle shall be 90 degree to the front surface of display panel.

    Ambient Illumination: 400 ~ 500 Lux for external appearance inspection

    Ambient Illumination: 100 ~ 200 Lux for light on inspection

4.Classification of defects

    Defects are classified two types, major defect and minor defect according to the defect. And, the definition of defects is classified as below.

(1) Major defect

    Any defect may result in functional failure, or reduce the usability of product for its purpose. For example, electrical failure, deformation and etc..

(2) Minor defect

    A defect that is not to reduce the usability of product for its intended purpose and un-uniformity, dot defect and etc..

    The criteria on major and/or minor judgement will be according with the classification of defects.

5. Specification for quality check

Electrical characteristics

Level	Inspection item	Defect	Remark
Major	Displaying	Non-displaying	
		Line defects	
		Power consumption	
		Malfunction	
	Panel	Glass cracked	
	COF	COF dimension out of specification	
		Other COF function defects	
	Outline dimension	Outline dimension out of specification	
Minor	Displaying	Dim spot　Bright spot　dust	Appearance defect
		Non-uniformity	
		Mura	
	Panel	Glass scratch	
		Glass cutting NG	
		Glass chip	
	Polarizer	Polarizer scratch	
		Stains on surface	
		Polarizer bubbles	
	COF	Damage	
		Foreign material	
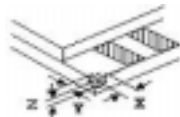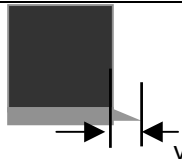
(2) Test Pattern

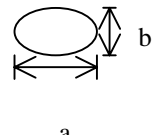| Item	Pattern
W	
R	
G	
B	
Border	

(3) Definition of dot defect induced from the panel inside

　　a) The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot.

　　b) Bright dot: Dots appear bright and unchanged in size in which module is displaying under black pattern.

　　c) Dark dot: Dots appear dark and unchanged in size in which module is displaying under pure red, green, blue picture.

Item	Description	Criterion
Panel	Glass scratch	0.05<W　0.1mm, 0.3<L　2.0mm , N　2
	Glass crack	Crack: Propagation crack is not acceptable
	Glass chip	Chip on corner <table><tr><td>x</td><td>1.5</td></tr><tr><td>y</td><td>2 0</td></tr><tr><td>z</td><td>t</td></tr></table> 1.) T=Glass thickness 2.) Chip on the corner extending into the ITO contact is not acceptable 3.) Chip on the corner is not acceptable when it extends into the seal or makes the exposure Lead & customer alignment mark can't be damaged.
	Glass burr	y　0.5mm
Polarizer	Scratch	Line type in accordance with criteria of "Glass item"
	Stains on surface	Stains which cannot be moved even when wiped lightly with a soft cloth or similar cleaning
	Polarizer bubble	<table><tr><td>Size</td><td>Number of pieces permitted</td></tr><tr><td>Q3mm</td><td>Ignore</td></tr><tr><td>Q3mm≤　Q5mm</td><td>1</td></tr><tr><td>>Q5mm</td><td>0</td></tr></table>
Displaying	Power consumption	The module operating current consumption should not go beyond the standard indicated in product specification

	Pixel size	The tolerance of display pixel dimension should be within ±25% of specification
	Non-displaying	Not allowable
	Line defect	Not allowable
	Black line/White line/Particle/Scratch	0.05≤W≤0.1 mm, 0.3≤L≤2.0 mm, N≤2
	Non-uniformity	Refer to the spec
	Color	Refer to the spec
	Luminance	Refer to the spec
	Dimming spot, Lighting spot, Dust	D=(a+b)/2 0.1<D≤0.3, N≤2
	Dot defect — Bright dot	N=0
	Dot defect — Dark dot	N≤4
	Mura	Serious mura not allowable
COF	Dimension Out of spec.	FPC dimension out of spec.
COF	Damage	Crack on the COF, deep scratch on the COF, deep fold on the COF, deep pressure mark on the COF or other damage are not acceptable
COF	Foreign material	Conductive foreign material sticking to the leads, foreign material and pin-hole between the COF and the glass are not acceptable
Dimension	Dimension out of spec	Refer to the drawing of the spec

4. RELIABILITY TEST

4.1 Reliability Test Condition

No.	Items	Specification
1	High Temp. Storage	85°C, 240hrs
2	Low Temp. Storage	-40°C, 240hrs
3	High Temp. Operation	70°C, 240hrs
4	Low Temp. Operation	-20°C, 240hrs
5	High Temp / Humidity Storage	85°C, 85%RH, 240hrs
6	High Temp / Humidity Operation	65°C, 90%RH, 240hrs
7	Thermal shock	-40°C ~85°C (-40°C /30min; transit /3min; 85°C /30min; transit /3min) 1cycle: 66min, 100 cycles
8	Peel strength	500g/cm (Speed~ 50mm/min)
9	Vibration	Frequency: 5~50HZ, 0.5G Scan rate : 1 oct/min Time : 2 hrs/axis Test axis : X, Y, Z
10	Drop	Height: 120cm Sequence : 1 angle、3 edges and 6 faces Cycles: 1
11	ESD	Air discharge model, ±8kV, 10 times

Evaluation Criteria

_ No damage to glass or encapsulation

_ No drastic change to display

_ Pixel / Line defects : no increased

_ Luminance: Within +/-50% of initial value

_ Uniformity: (Max-Min) / Min <15%

_ Current consumption: within +/-50% of initial value

5. PRECAUTION RELATING PRODUCT HANDLING

5.1 SAFETY

5.1.1   If the LCD panel breaks , be careful not to get the liquid crystal to touch your skin.

5.1.2   If the liquid crystal touches your skin or clothes , please wash it off immediately by using soap and water.

5.2 HANDLING

5.2.1   Avoid any strong mechanical shock which can break the glass.

5.2.2   Avoid static electricity which can damage the CMOS LSI—When working with the module , be sure to ground your body and any electrical equipment you may be using.

5.2.3   Do not remove the panel or frame from the module.

5.2.4   The polarizing plate of the display is very fragile. So , please handle it very carefully, do not touch , push or rub the exposed polarizing with anything harder than an HB pencil lead (glass , tweezers , etc.)

5.2.5   Do not wipe the polarizing plate with a dry cloth , as it may easily scratch the surface of plate.

5.2.6   Do not touch the display area with bare hands , this will stain the display area.

5.2.7   Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.

5.2.8   To control temperature and time of soldering is 320 ± 10°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 less 25°C and the humidity is below 50% RH.

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

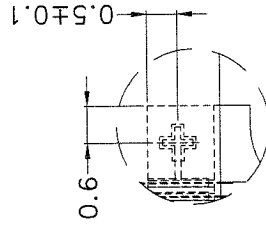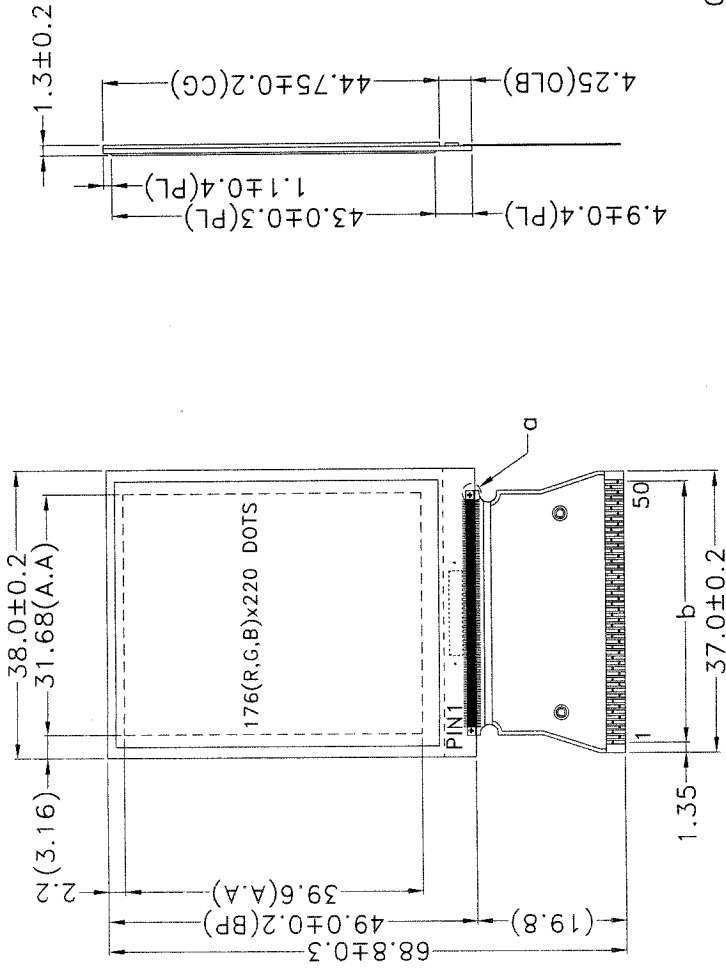5.3.3   Do not crush , shake , or jolt the module.

5.4 TERMS OF WARRANTY

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.

6. PACKING Specification

* See Appendix

No.	Symbol	No.	Symbol
1	C11B	26	DB6
2	C11A	27	DB5
3	DDVDH	28	DB4
4	VCI1OUT	29	DB3
5	VGAM1OUT	30	DB2
6	VGAMS_R	31	DB1
7	VGAMS_G	32	DB0
8	VGAMS_B	33	IOVCC
9	IM3	34	OSC1
10	IM0	35	OSC2
11	NCS	36	VDDD
12	NRESET	37	VCI,VCC
13	RS	38	GND
14	E_NWR	39	VCI
15	DB17	40	C12A
16	DB16	41	C12B
17	DB15	42	VGH
18	DB14	43	VCL
19	DB13	44	C22A
10	DB12	45	C22B
21	DB11	46	C21A
22	DB10	47	C21B
23	DB9	48	GND
24	DB8	49	ARVDD
25	DB7	50	ARVSS

DETAIL a
SCALE:8/1

0.5±0.1
0.6

1.3±0.2
(44.75±0.2(CG))
4.25(OLB)
1.1±0.4(PL)
4.9±0.4(PL)
43.0±0.3(PL)

38.0±0.2
31.68(A.A)
176(R,G,B)x220 DOTS
PIN1
2.2(3.16)
39.6(A.A)
(49.0±0.2(BP))
68.8±0.3
(19.8)

1.35
b
37.0±0.2
50
1

35.0±0.3(PL)
1.5±0.4(PL)
1.5±0.4(PL)

NOTES:
1.LCD TYPE:OLED
2.Driving Mode:Active Matrix
3.Color Mode:262K,Full Color
4.Top: -20~70°C Tst:-40~85°C
5.The tolerance unless classified ±0.3mm
6.Polarizer type: Anti-reflective(3H)
7.Diagonal Size:2.0"(Inch)
8.Driver IC:HX5051,COG Assembly
9.b=P0.7x49=34.3±0.08,W=0.45±0.03

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

SCALE:1/1	UNIT:mm	PAGE:1/1	
圖面名稱	PPT9999-A003-04-Q		
圖面編號	PPT-06002-005	EDI	0

DRAWN | CHECKER | APPROVED
郭效珍 | 李美倫 | 張慶浤

REV | DESCRIPTION | DATE

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

No.	Item	Model	Dimensions (mm)	Quantity
1	成品 (LCM)	PPT9999-A003-04-Q	38.0 X 49.0	864
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	6
3	TRAY 盤 (2)	TE-TY07020701A	352 X 260 X 10.8	60
4	內盒(3)Product Box	BX36627063ABBA	393 X 274 X 68	6
5	保力龍板(4)Polylon board	OTPLB00PL08ABA	550 X 393 X 20	2
6	外紙箱(5)Carton	BX57041027CCBA	570 X 410 X 265	1
7				
8				
9				

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

(1)LCM quantity per box : no per tray   16   x no per tray   9   =   144

(2)Total LCM quantity in carton : quantity per box   144   x no of boxes   6   =   864
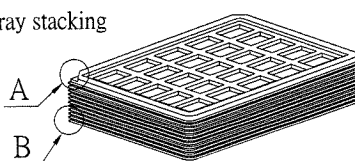
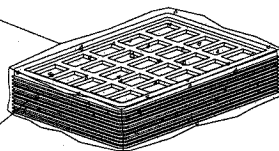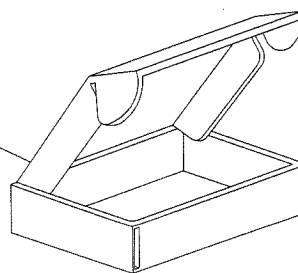Use empty tray 空 盤

\+
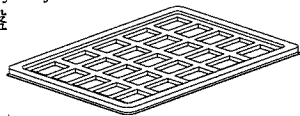
Put products into the tray

(1) POF

(2) Tray
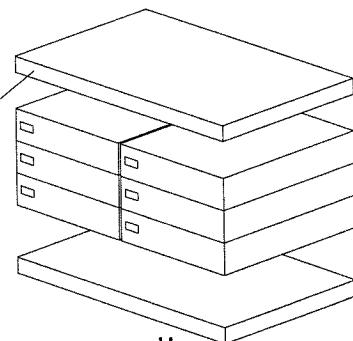
(4)Polylon board

Tray stacking

A

B

(3)Product Box

(5) Carton

C/N.

POWERTIP

P.O NO.:
ITEM NO.:
Q'TY: PCS
N.W: KGS
G.W: KGS
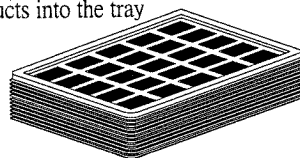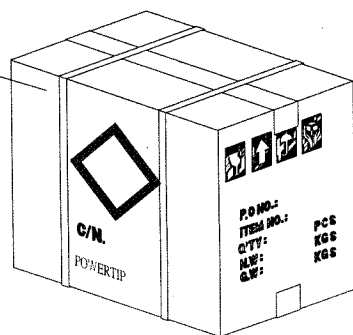
特 記 事 項 (REMARK)

1. Label Specifications :

MODEL:
LOT NO:
QUANTITY:
CHECK:

A

斜角

Detail B

Tray 2

圓角

Tray 1

3.It's also suitable to Panel
(可適用於單品包裝)

4.TRAY Number : PPT9999-A003-04
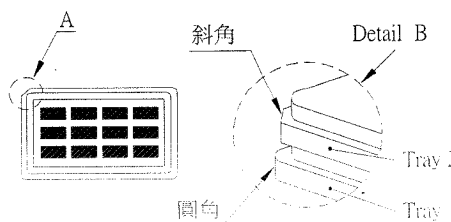
2.Rotate tray 180 degrees and place on top of stack.
Check the tray stack using Fig. B.
TRAY盤相疊時,需旋轉180度,請詳見B視圖