SPECIFICATIONS

CUSTOMER	:	CKR001
SAMPLE CODE	:	SE12864WRF-022-H-Q
MASS PRODUCTION CODE	:	PE12864WRF-022-H-Q
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	002
DRAWING NO. (Ver.)	:	JLMD- PE12864WRF-022-H-Q_001
PACKAGING NO. (Ver.)	:	JPKG- PE12864WRF-022-H-Q_001

Customer Approved

Date:

POWERTIP
2018.04.26
JS RD APPROVED
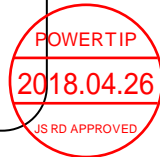
Approved	Checked	Designer
閆偉	劉進	陳璐

☐ Preliminary specification for design input

■ Specification for sample approval

POWERTIP TECH. CORP.

NO.PT-A-005-8

History of Version

Date	Ver.	Edi.	Description	Page	Design by
03/06/2018	01	001	New Drawing	-	陳璐
04/18/2018	01	002	New Sample	-	陳璐

Total：32 Page

Contents

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	128 * 64 Dots
LCD Type	FSTN, Positive, Transflective
Driver Condition	LCD Module : 1/65 Duty, 1/9 Bias
Viewing Direction	6 O'clock
Weight	27.3g
Interface	8 bits parallel data input
Controller / Driver IC	ST7565S-G
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web site : http://www.powertip.com.tw/news.php?area_id_view=1085560481/

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	93.7 (W) * 53.0 (L) * 4.5(H)MAX	mm
Viewing Area	70.7 (L) * 38.8 (W)	mm
Active Area	66.52 (L) * 33.24 (W)	mm
Dot Size	0.48 (L) * 0.48 (W)	mm
Dot Pitch	0.52 (L) * 0.52 (W)	mm

Note : For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Power Supply Voltage	V_{DD}	-	-0.3	+5.0	V
LCD Driver Supply Voltage	V_{DD}-V_5	-	-0.3	+18.0	V
Input Voltage	V_{IN}	-	-0.3	V_{DD}+0.3	
Operating Temperature	T_{OP}	-	-20	+70	°C
Storage Temperature	T_{ST}	-	-30	+80	°C
Storage Humidity	H_D	Ta < 40 °C	20	90	%RH

1.4 DC Electrical Characteristics

VDD = 3.3V, VSS = 0V, Ta = 25℃

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	V_{DD}	-	3.0	3.3	3.6	V
"H" Input Voltage	V_{IH}	-	$0.8V_{DD}$	-	V_{DD}	V
"L" Input Voltage	V_{IL}	-	V_{SS}	-	$0.2V_{DD}$	V
"H" Output Voltage	V_{OH}	-	$0.8V_{DD}$	-	V_{DD}	V
"L" Output Voltage	V_{OL}	-	V_{SS}	-	$0.2V_{DD}$	V
Supply Current	IDD	VDD= 3.3V; V_{OP}= 10.0 V; *1	-	0.6	1.5	mA
LCM Driver Voltage	V_{OP}	-20°C	10.0	10.2	10.4	V
		+25°C	9.8	10.0	10.2	
		+70°C	9.5	9.7	9.9	

Note : *1. The Maximum current display.

*2. The V_{OP} test point is V_{DD}-V_5.

1.5 Optical Characteristics

LCD Panel: 1/65 Duty, 1/9 Bias, VLCD = 10.0V, Ta = 25°C

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Reference
Response Time	Rise	tr	-	-	110	165	ms	Note 2
	Fall	tf		-	226	339		
Viewing angle range	Rear	Θ+	C≥2.0	-	40	-	-	Notes 1
	Front	Θ-		-	40	-		
	Left	ΘL		-	45	-		
	Right	ΘR		-	45	-		
Contrast Ratio		CR	-	-	7.7	-	-	Note 3
Average Brightness (With LCD&B/L) *2		IV	If=40mA	100	140	-	cd/m²	Note 4
CIE Color Coordinate (with LCD) *2	X	X		0.25	0.30	0.35	-	
	Y	Y		0.26	0.31	0.36		
Uniformity *1		△B	-	70	-	-	%	-

Note 4：

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 0.2°)，after 10 minutes operation.

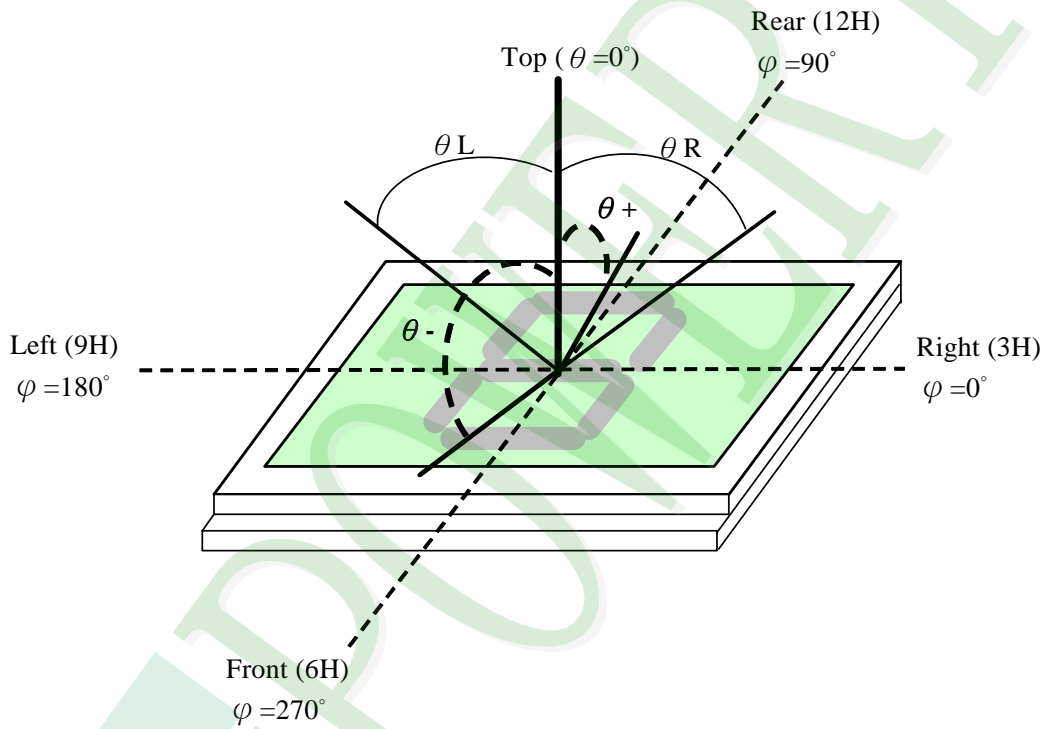   d：The uncertainty of the C.I.E coordinate measurement ±0.01，Average Brightness ± 4%

Colorimeter=BM-7 fast
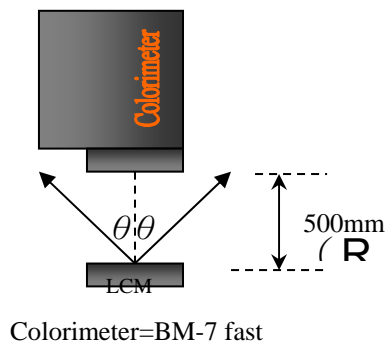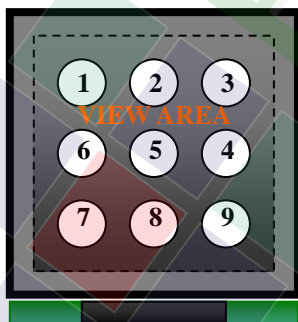
3： This value will be changed while mass production.

Note 1.

Optical characteristics-2

Viewing angle

Rear (12H)
φ =90°

Top (θ =0°)

θ L

θ R

θ +

Left (9H)
φ =180°

θ -

Right (3H)
φ =0°

Front (6H)
φ =270°

Viewing angle

Note 2.

Optical characteristics-3
    Fig.2 Definition of response time

Positive Type

No selected waveform → ← Selected waveform → ← No selected waveform

Transmittance

100%   90%   10%

Tr   Tf

Negative Type

No selected waveform → ← Selected waveform → ← No selected

Transmittance

100%   90%   10%

Tr   Tf
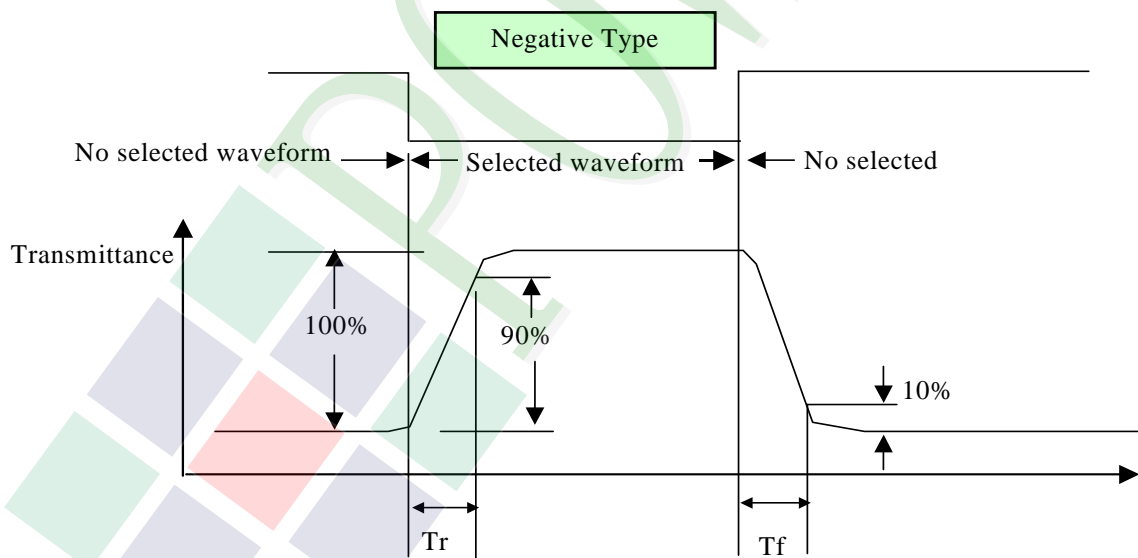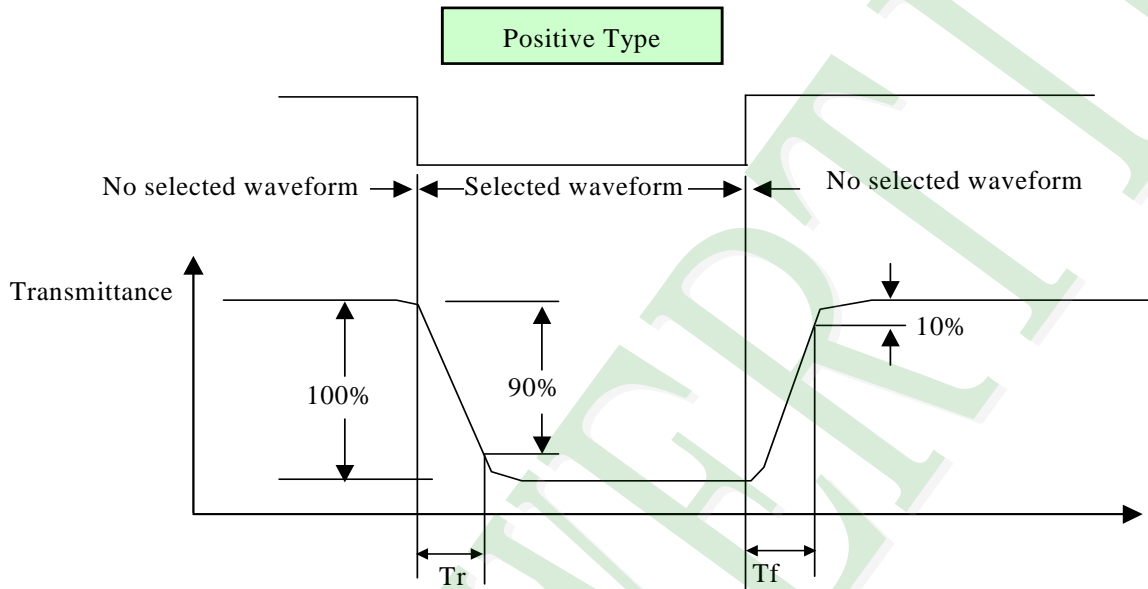
Electrical characteristics-2

　※2 Drive waveform

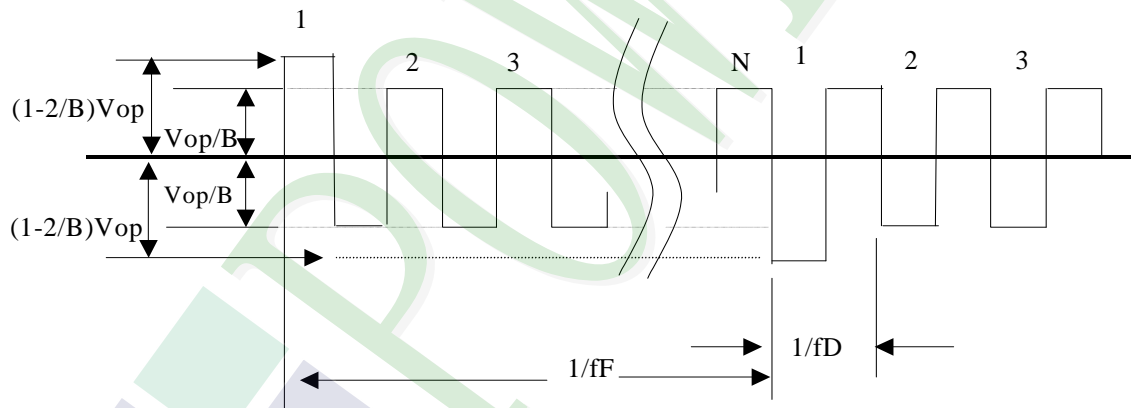Vop: Drive voltage　　fF: Frame frequency

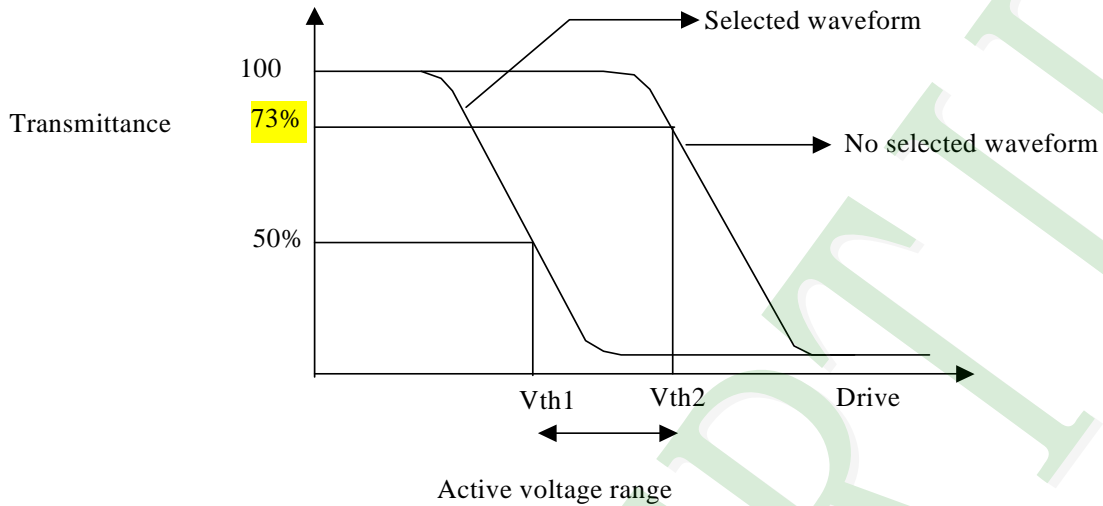1/B: Bias　　　　　　fD: Drive frequency

N: Duty

(1) Selected waveform
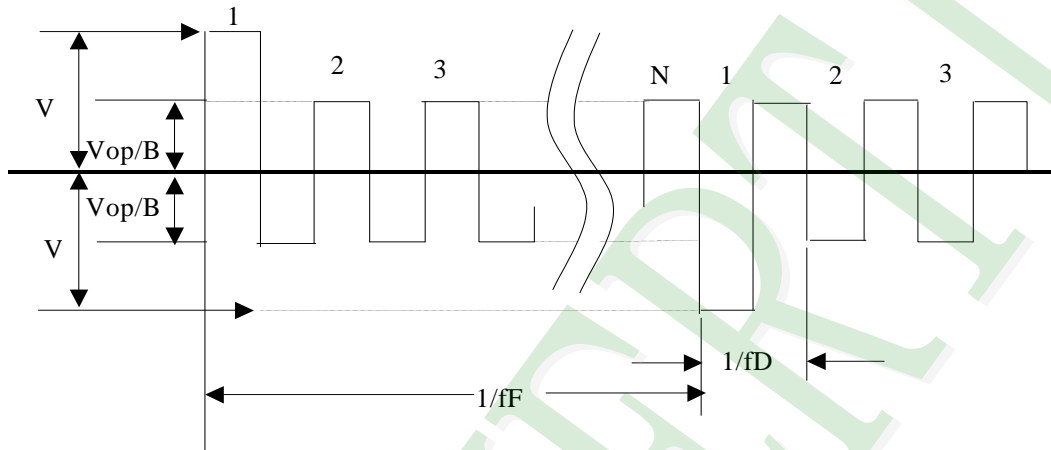
(2) Non- Selected wave form

Note:
Frame frequency is defined as follows: Common side supply
voltage peak - to - peak /2 = 1 period
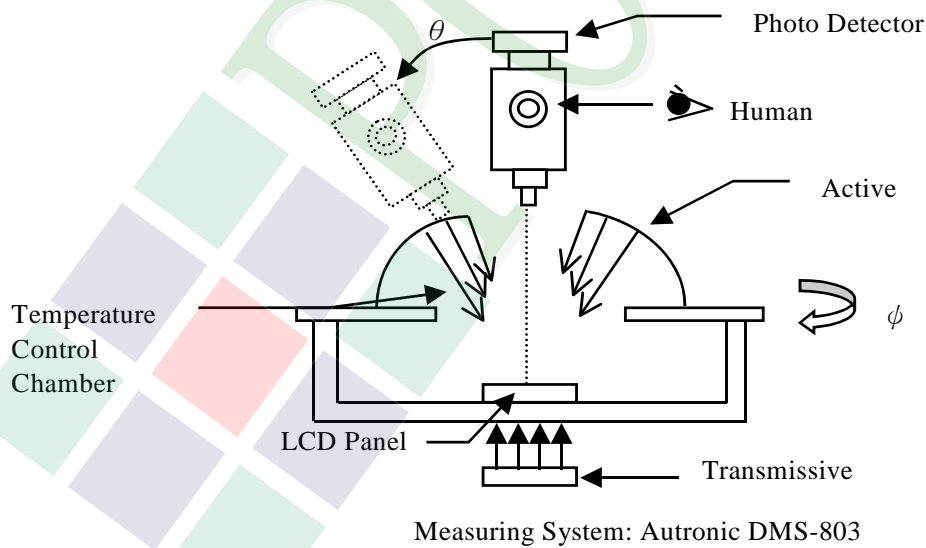
Note 3. : Definition of Vth

Active voltage range

	Vth1	Vth2
View direction	10°	40°
Drive waveform	(Selected waveform)	(No selected waveform)
Transmittance	50%	73%

※1 Contrast ratio
= (Brightness in OFF state) / (Brightness in ON state)

Outline of Electro-Optical Characteristics Measuring System

Measuring System: Autronic DMS-803

1.6   Backlight Characteristics

Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Peak forward current	IF		-	100	mA
Reverse Voltage	VR	Ta =25℃	-	5	V
Power dissipation	Pd		-	380	mW

Electrical / Optical Characteristics

Ta =25℃

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF		3.0	3.3	3.8	V
Average Brightness (Without LCD) *1	IV		600	720	-	cd/m^2
CIE Color Coordinate (without LCD)	X	IF= 40 mA	0.25	-	0.32	-
	Y		0.25	-	0.32	
Uniformity *2	△B		70	-	-	
Color	White					

*1 This value will be changed while mass production.
*2：△B=B(min) / B(max)*100%
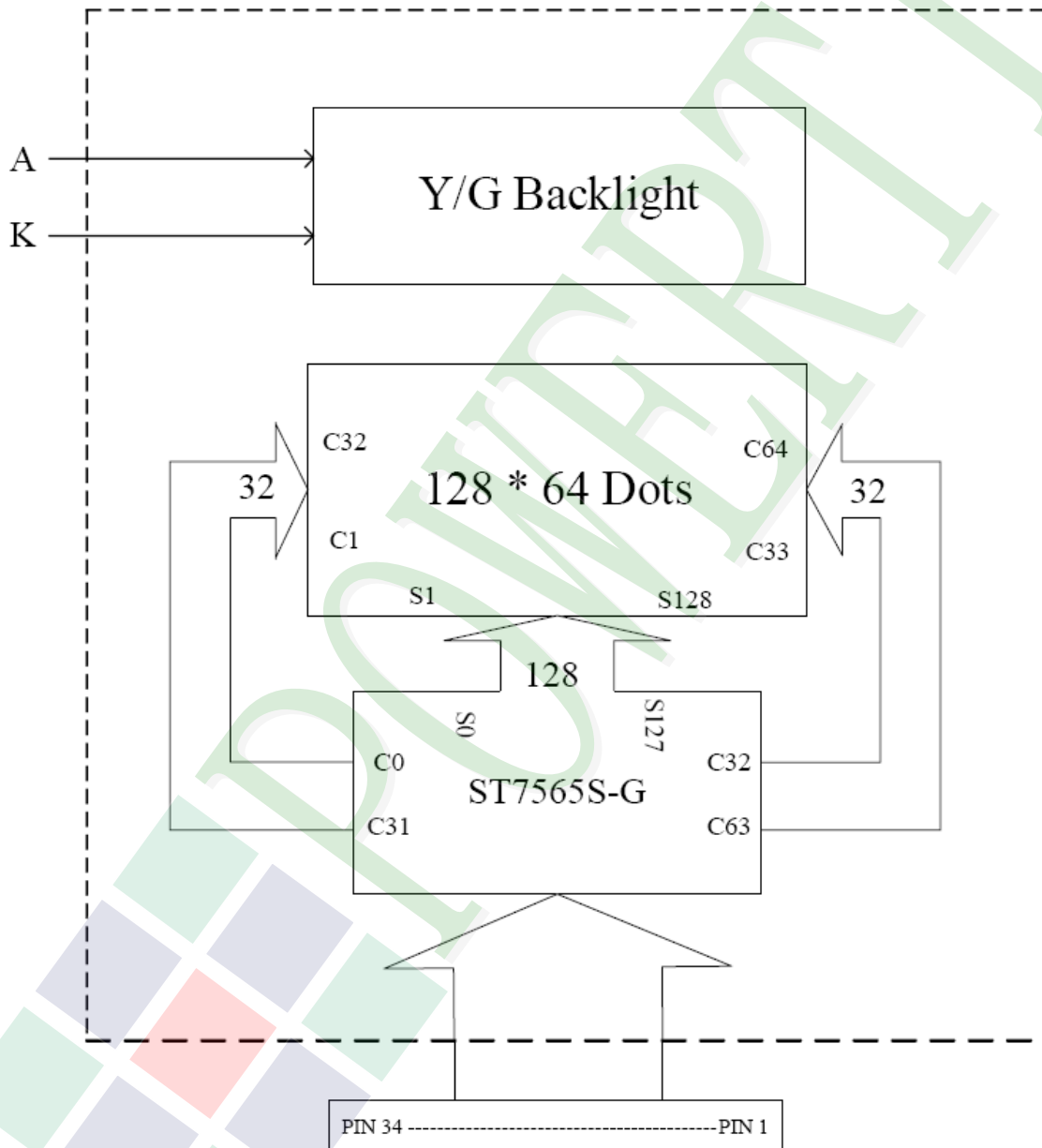
Circuit diagram
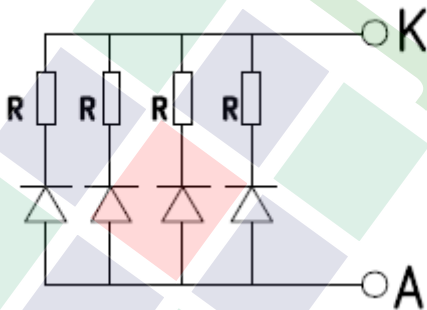
2. MODULE STRUCTURE
2.1 Counter Drawing

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	/CS1	This is the chip select signal. When /CS1="L", then the chip select becomes active, and data/command I/O is enable.
2	/RES	When /RES is set to "L", the setting are initialized.
3	A0	This is connect to the least significant bit of the normal MPU address bus, and it determines whether the data bits are data or a command. A0="H": Indicates that D0 to D7 are display data. A0="L": Indicates that D0 to D7 are control data.
4	/WR (R/W)	When connected to an 8080 MPU, this is active LOW. (R/W) This terminal connects to the 8080 MPU /WR signal. The signals on the data bus are latched at the rising edge of the /WR signal. When connected to a 6800 Series MPU: This is the read/write control signal input terminal. When R/W = "H": Read. When R/W = "L": Write.
5	/RD (E)	When connected to an 8080 MPU, this is active LOW. (E) This pin is connected to the /RD signal of the 8080 MPU, and the ST7565S series data bus is in an output status when this signal is "L". When connected to a 6800 Series MPU, this is active HIGH. This is the 6800 Series MPU enable clock input terminal.
6	D0	This is an 8-bit bi-directional data bus that connects to an 8-bit or 16-bit standard MPU data bus. When the serial interface is selected (P/S="L"): D7:serial data input (SI);D6:the serial clock input(SCL). D0 to D5 are set to high impedance. When the chip select is not active, D0 to D7 are set to high impedance.
7	D1	
8	D2	
9	D3	
10	D4	
11	D5	
12	D6	
13	D7	
14	VDD	Shared with the MPU power supply terminal VDD.(3.3V).
15	VSS	This is a 0V terminal connected to the system GND
16	VOUT	DC/DC voltage converter. Connect a capacitor between this terminal and VSS.

17	CAP5-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1+ terminal.
18	CAP3-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1+ terminal.
19	CAP1+	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1- terminal.
20	CAP1-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1+ terminal.
21	CAP2+	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP2- terminal.
22	CAP2-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP2+ terminal.
23	CAP4-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP2+ terminal.
24	VRS	This is the internal-output VREG power supply for the LCD power supply voltage regulator.
25	V1	This is a multi-level power supply for the liquid crystal drive. The voltage Supply applied is determined by the liquid crystal cell, and is changed through the use of a resistive voltage divided or through changing the impedance using an op. amp. Voltage levels are determined based on VDD, and must maintain the relative magnitudes shown below. VDD (= V0) $\geqq$ V1 $\geqq$ V2 $\geqq$ V3 $\geqq$ V4 $\geqq$ V5 When the power supply turns ON, the internal power supply circuits produce the V1 to V4 voltages shown below. The voltage settings are selected using the LCD bias set command.
26	V2	
27	V3	
28	V4	
29	V5	
30	VR	Output voltage regulator terminal. Provides the voltage between VDD and V5 through a resistive voltage divider. IRS = "L" : the V5 voltage regulator internal resistors are not used . IRS = "H" : the V5 voltage regulator internal resistors are used .
31	C86	This is the MPU interface switch terminal. C86 = "H": 6800 Series MPU interface. C86 = "L": 8080 MPU interface.

32	P/S	This is the parallel data input/serial data input switch terminal. P/S = "H": Parallel data input. P/S = "L": Serial data input. The following applies depending on the P/S status: <table><tr><td>P/S</td><td>Data/Command</td><td>Data</td><td>Read/Write</td><td>Serial Clock</td></tr><tr><td>"H"</td><td>A0</td><td>D0 to D7</td><td>/RD, /WR</td><td>X</td></tr><tr><td>"L"</td><td>A0</td><td>SI (D7)</td><td>Write only</td><td>SCL (D6)</td></tr></table> When P/S = "L", D0 to D5 fixed "H". /RD (E) and /WR (R/W) are fixed to either "H" or "L". With serial data input, It is impossible read data from RAM.
33	/HPM	This is the power control terminal for the power supply circuit for liquid crystal drive. /HPM = "H": Normal mode /HPM = "L": High power mode
34	IRS	This terminal selects the resistors for the V5 voltage level adjustment. IRS = "H": Use the internal resistors IRS = "L": Do not use the internal resistors. The V5 voltage level is regulated by an external resistive voltage divider attached to the VR terminal

BL Pin No.	Symbol	Function
	A	Power supply for LED Backlight Anode input(VF=2.2V,IF=100mA)
	K	Power supply for LED Backlight Cathode input(0V)

2.2.1 Refer Initial Code

White_com(0xe2); Internal Reset

White_com(0xa2); LCD BIAS SET (0:1/9)

White_com(0xa0); ADC SELECT (0:NORMAL)

White_com(0xc8); COMMON OUTPUT MODE SELECT (0:NORMAL)

White_com(0xa6); DISPLAY NORMAL/REVERSE (0:NORMAL)

White_com(0xa4); DISPLAY ALL POINTS (0:NORMAL)

White_com(0x2f); POWER CONTROL SET

White_com(0x25); V5 VOLTAGE REGULATOR INTERNAL

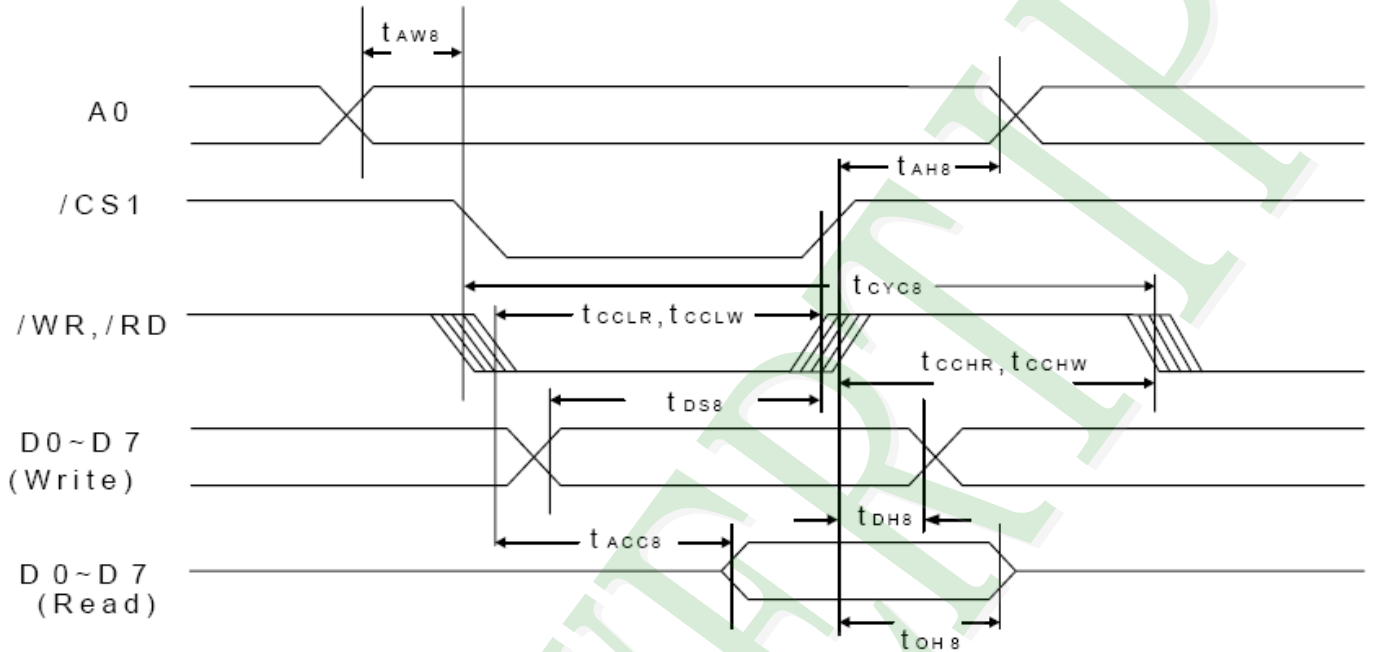White_com(0x81); ELECTRONIC VOLUME MODE SET

White_com(0xf8); BOOSTER RATIO SET

White_com(0x00); 4X

White_com(0x5f); LCD DISPLAY ON

2.3 Timing Characteristics

FOR 8080 Series MPU

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	t_{AH8}		0	-	
Address setup time		t_{AW8}		0	-	
System cycle time		t_{CYC8}		240	-	
Enable L pulse width (WRITE)	WR	t_{CCLW8}		80	-	
Enable H pulse width (WRITE)		t_{CCHW8}		80	-	
Enable L pulse width (READ)	RD	t_{CCLR8}		140	-	ns
Enable H pulse width (READ)		t_{CCHR8}		80	-	
WRITE Data setup time	D0	t_{DS8}		40	-	
WRITE Address hold time	to	t_{DH8}		0	-	
READ access time	D7	t_{ACC8}	$C_L=100pF$	-	70	
READ Output disable time		t_{OH8}	$C_L=100pF$	5	50	

FOR 6800 Series MPU
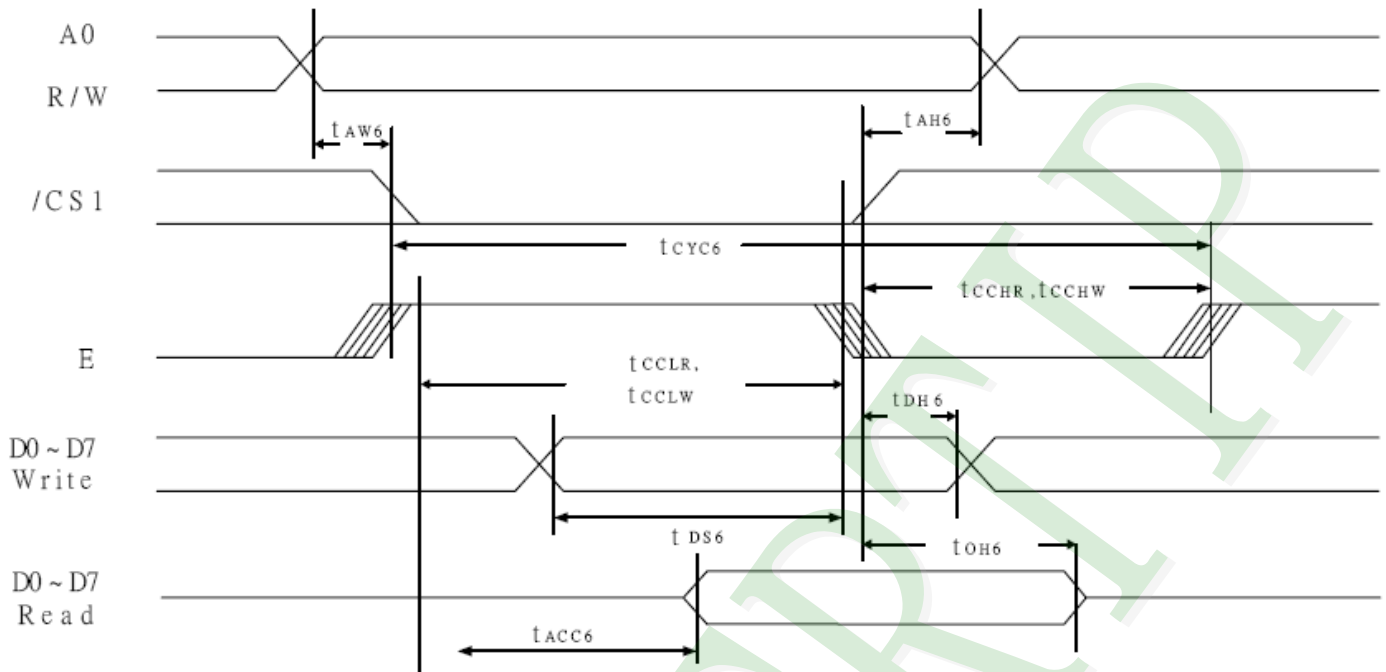
Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	t_{AH6}		0	-	
Address setup time		t_{AW6}		0	-	
System cycle time		t_{CYC6}		240	-	
Enable L pulse width (WRITE)	WR	t_{EWLW}		80	-	
Enable H pulse width (WRITE)		t_{EWHW8}		80	-	
Enable L pulse width (READ)	RD	t_{EWLR8}		80	-	ns
Enable H pulse width (READ)		t_{EWHR}		140		
WRITE Data setup time	D0	t_{DS6}		40	-	
WRITE Address hold time	to	t_{DH6}		0	-	
READ access time	D7	t_{ACC6}	C_L=100pF	-	70	
READ Output disable time		t_{OH6}	C_L=100pF	5	50	

Serial Interface
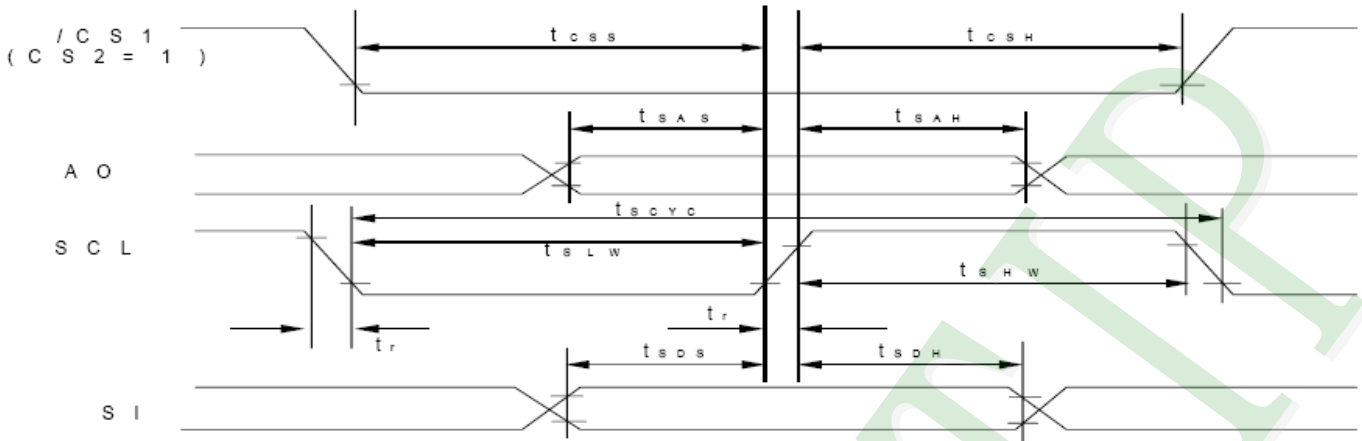
Item	Signal	Symbol	Condition	Rating Min	Rating Max	Units
Serial Clock Period	SCL	T_{SCYC}	-	100	-	ns
SCL"H" pulse with	SCL	T_{SHW}	-	50	-	ns
SCL"L" pulse with		T_{SLW}	-	50	-	ns
Address setup time	A0	T_{SAS}	-	20	-	ns
Address hold time		T_{SAH}	-	10	-	ns
Data setup time	SI	T_{SDS}	-	20	-	ns
Data hold time		T_{SDH}	-	10	-	ns
CS-SCL time	CS	T_{CSS}	-	40	-	ns
CS-SCL time		T_{CSH}	-	40	-	ns

Reset Timing
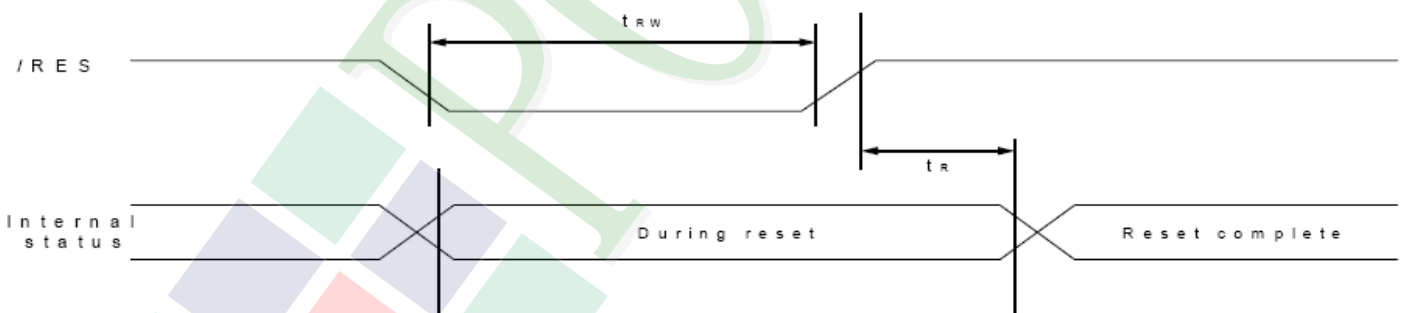
Item	Signal	Symbol	Condition	Rating Min	Rating Typ	Rating Max	Units
Reset time	-	t_R	-	-	-	1.0	μs
Reset "L" pulse width	RES	t_{RW}		1.0	-	-	μs

2.4 Display Command
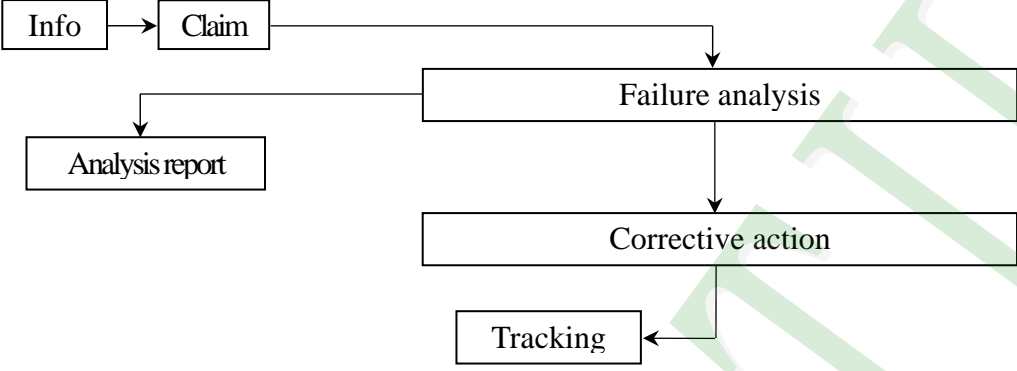
Instruction	RS	RW	D7	D6	D5	D4	D3	D2	D1	D0	Description
Display ON/OFF	0	0	1	0	1	0	1	1	1	0/1	Turn on/off LCD panel.
Display start line set	0	0	0	1	Display start address						Specify DDRAM line for COM0
Page address set	0	0	1	0	1	1	Page address				Set page address
Set column address MSB	0	0	0	0	0	1	Y7	Y6	Y5	Y4	Set column address MSB
Set column address LSB	0	0	0	0	0	0	Y3	Y2	Y1	Y0	Set column address LSB
Read status	0	1	BUSY	ADC	ON/OFF	RESET	0	0	0	0	Read the internal status
Write display data	1	0	Write data								Write data into DDRAM
Read display data	1	1	Read data								Read data from DDRAM
ADC select	0	0	1	0	1	0	0	0	0	0/1	Select SEG output directional
Display normal/reverse	0	0	1	0	1	0	0	1	1	0/1	Select normal/reverse display
Display all points ON/OFF	0	0	1	0	1	0	0	1	0	0/1	Select normal/entire display ON
LCD bias select	0	0	1	0	1	0	0	0	1	0/1	Select LCD bias
Read/modify/write	0	0	1	1	1	0	0	0	0	0	Column address Increment
End	0	0	1	1	1	0	1	1	1	0	Clear read/modify/write
Reset	0	0	1	1	1	0	0	0	1	0	Initialize the internal functions
Common output Mode select	0	0	1	1	0	0	0/1	x	x	x	Select COM output scan direction
Power control	0	0	0	0	1	0	1	0/1	0/1	0/1	Control power circuit operation
V5 voltage regulator internal resistor ratio set	0	0	0	0	1	0	0	Resistor ratio			Select internal resistance ratio of the regulator resistor

Instruction	RS	RW	D7	D6	D5	D4	D3	D2	D1	D0	Description
Electronic volume mode set	0	0	1	0	0	0	0	0	0	1	Set reference voltage mode
Electronic volume regulator set	0	0	x	x	Electronic volume value						Set reference voltage register
Static indicator ON/OFF	0	0	1	0	1	0	1	1	0	0/1	Set static indicator mode
Static indicator register set	0	0	x	x	x	x	x	x	Mode		Set the flashing mode
Boosting ratio set	0	0	1	1	1	1	1	0	0	0	Select boosting ratio
	0	0	*	*	*	*	*	*	Mode		
Power save	-	-	-	-	-	-	-	-	-	-	Display OFF and Display all point ON compound command
NOP	0	0	1	1	1	0	0	0	1	1	N0n operation command

3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart

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

Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service								
Q.A Activity	1. ISO 9001 Maintenance Activities 2. Process improvement proposal 3. Equipment calibration 4. Education And Training Activities 5. Standardization Management							

Sales Service flow:

Info → Claim → Failure analysis

Failure analysis → Analysis report

Failure analysis → Corrective action

Corrective action → Tracking

3.2. Inspection Specification

◆**Scope : The document shall be applied to LCD Module for Monotype and Color STN(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 .**

◆**Manner of appearance test :**

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

　　（2）．**Standard of inspection： (Unit：mm)**

　　（3）．**The test direction is base on about around 45°of vertical line. (Fig. 1)**

　　（4）．**Definition of area . (Fig. 2)**

Fig.1

Fig. 2

B area : Outside of viewing area

A area : viewing area
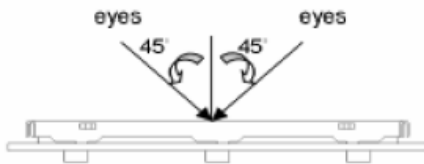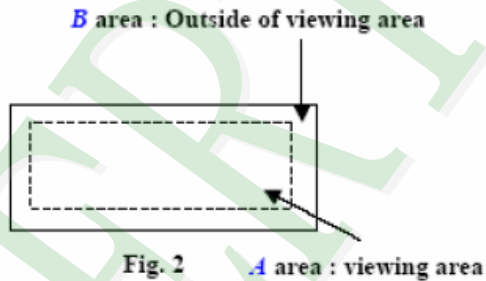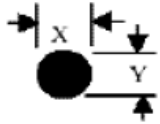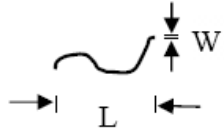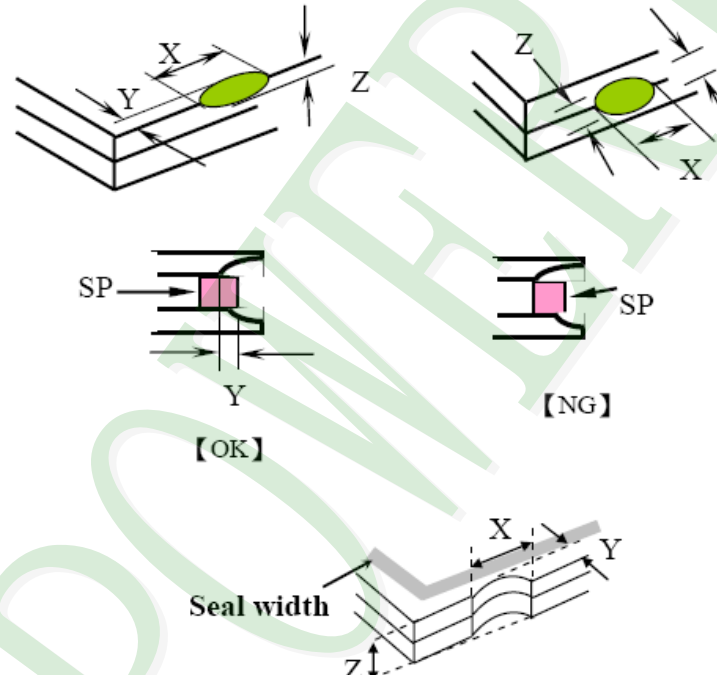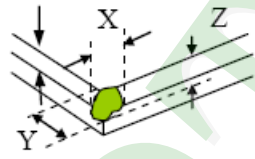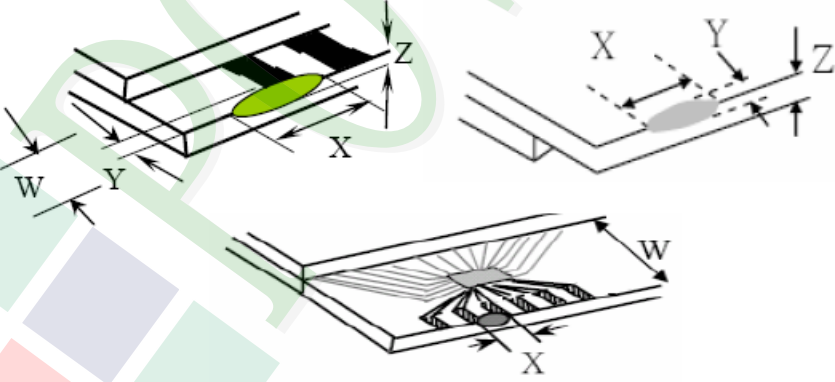
◆ **Specification:**

NO	Item	Criterion	Level
01	Product condition	1.1 The part number is inconsistent with work order of Production.	Major
		1.2 Mixed production 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 Output data is error.	Major
		4.4 LCD viewing angle defect.	Major
		4.5 Current consumption exceeds product specifications.	Major
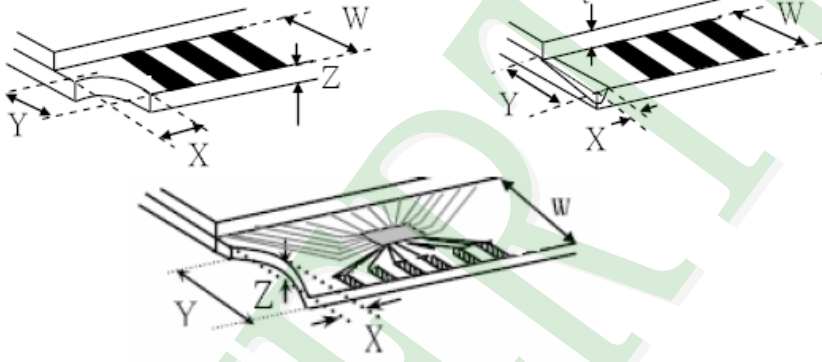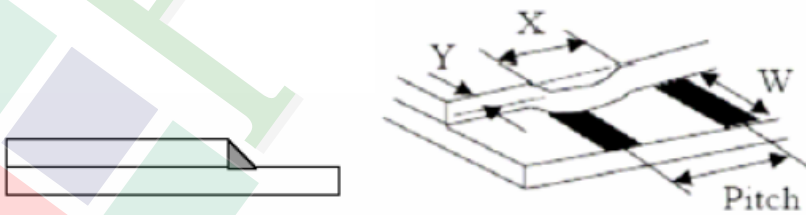
NO	Item	Criterion	Level

05	**Black or white dot、scratch、contamination**
	
	Round type
	
	$\Phi=(x+y)/2$
	
	Line type
		5.1 Round type:
		  5.1.1 display only :
		    • White and black spots on display $\leqq 0.30$ mm , no more than 4 white or black spots present.
		    • Densely spaced : NO more than two spots or lines within 3 mm.
		
		5.1.2 Non-display :
		
		(table below)
		
		5.1.3 Line type:
		
		(table below)
			Minor

5.1.2 Non-display :

Dimension (diameter : Φ)	Acceptance (Q'ty)	
	A area	B area
$\Phi \leqq 0.10$	Accept no dense	Ignore
$0.10 < \Phi \leqq 0.20$	3	
$0.20 < \Phi \leqq 0.30$	2	
Total quantity	4	

5.1.3 Line type:

Dimension		Acceptance (Q'ty)	
Length (L)	Width (W)	A area	B area
---	$W \leqq 0.03$	Accept no dense	Ignore
$L \leqq 3.0$	$0.03 < W \leqq 0.05$	4	
$L \leqq 2.5$	$0.05 < W \leqq 0.075$		
---	$W > 0.075$	As round type	

NO	Item	Criterion	Level
06	**Polarizer Bubble**	(table below)	Minor

Dimension (diameter : Φ)	Acceptance (Q'ty)	
	A area	B area
$\Phi \leqq 0.20$	Accept no dense	Ignore
$0.20 < \Phi \leqq 0.50$	3	
$0.50 < \Phi \leqq 1.00$	2	
$\Phi > 1.00$	0	
Total quantity	4	

NO	Item	Criterion	Level
07	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 7.1 General glass chip： 7.1.1 Chip on panel surface and crack between panels: 【OK】　　　　　　【NG】 Seal width 	Minor

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

NO	Item	Criterion	Level
07	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 7.1.2 Corner crack： 7.2 Protrusion over terminal： 7.2.1 Chip on electrode pad： 	Minor

7.1.2 Corner crack table:

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

7.2.1 Chip on electrode pad table:

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

NO	Item	Criterion	Level
07	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 7.2.2 Non-conductive portion： <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≦1/3 a</td><td>≦W</td><td>≦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. 7.2.3 Glass remain： <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≦ a</td><td>≦ 1/3 W</td><td>≦ t</td></tr></table>	Minor

NO	Item	Criterion	Level
08	Backlight elements	8. 1 Backlight can't work normally.	Major
		8. 2 Backlight doesn't light or color is wrong.	Major
		8. 3 Illumination source flickers when lit.	Major
09	General appearance	9. 1 Pin type must match type in specification sheet.	Major
		9. 2 No short circuits in components on PCB or FPC.	Major
		9. 3 Product packaging must the same as specified on packaging specification sheet.	Minor
		9. 4 The folding and peeled off in polarizer are not acceptable.	Minor
		9. 5 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℃ 240hrs Surrounding temperature, then storage at normal condition 4hrs.	
2	Low Temperature Storage Test	Keep in −30℃ ±2℃ 240hrs Surrounding temperature, then storage at normal condition 4hrs.	
3	High Temperature / High Humidity Storage Test	Keep in +60℃ / 90% R.H duration for 240hrs Surrounding temperature, then storage at normal condition 4hrs. (Excluding the polarizer)	
4	Temperature Cycling Storage Test	−30℃ → +25℃ → +80℃ → +25℃ (30mins) (5mins) (30mins) (5mins) ← 20 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)	<table><tr><td>Packing Weight (Kg)</td><td>Drop Height (cm)</td></tr><tr><td>0 ~ 45.4</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table> Drop Direction :※1 corner / 3 edges / 6 sides each 1time	

5. PRECAUTION RELATING PRODUCT HANDLING

5.1 SAFETY

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

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

5.2 HANDLING

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

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

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

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

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

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

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

5.2.8   To control temperature and time of soldering is 320±10℃ and 3-5 sec.

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

5.2.10   Caution!(LCM products with Capacitive Touch Panel)

Strong EMI-sources such as switch-mode power supplies (SMPS) can lead to touch malfunction (e.g. ghost-touches).

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

5.3 STORAGE

5.3.1   Store the panel or module in a dark place where the temperature is 25℃　±5℃ and the humidity is below 65% RH.

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

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

5.4 TERMS OF WARRANTY

5.4.1   Applicable warrant period

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

5.4.2   Unaccepted responsibility

This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment , we cannot take responsibility if the product is used in

nuclear power control equipment , aerospace equipment , fire and security
systems or any other applications in which there is a direct risk to human life
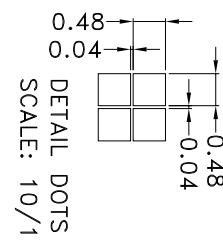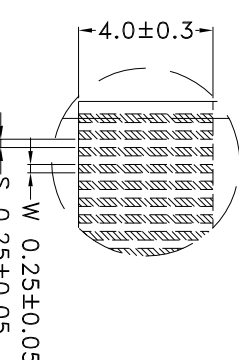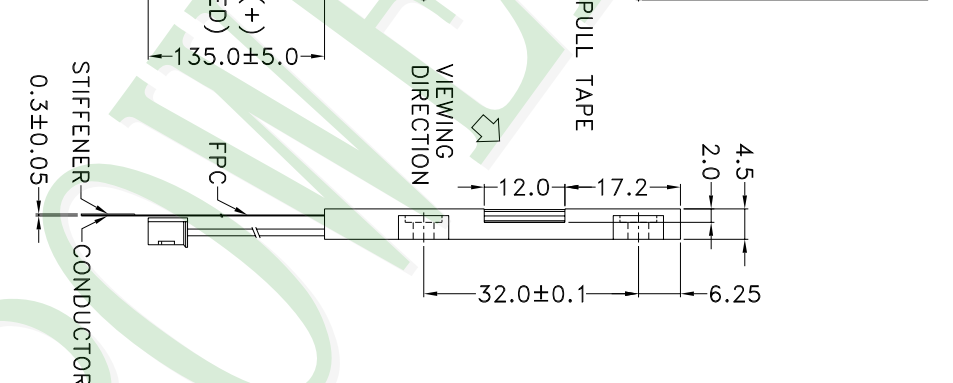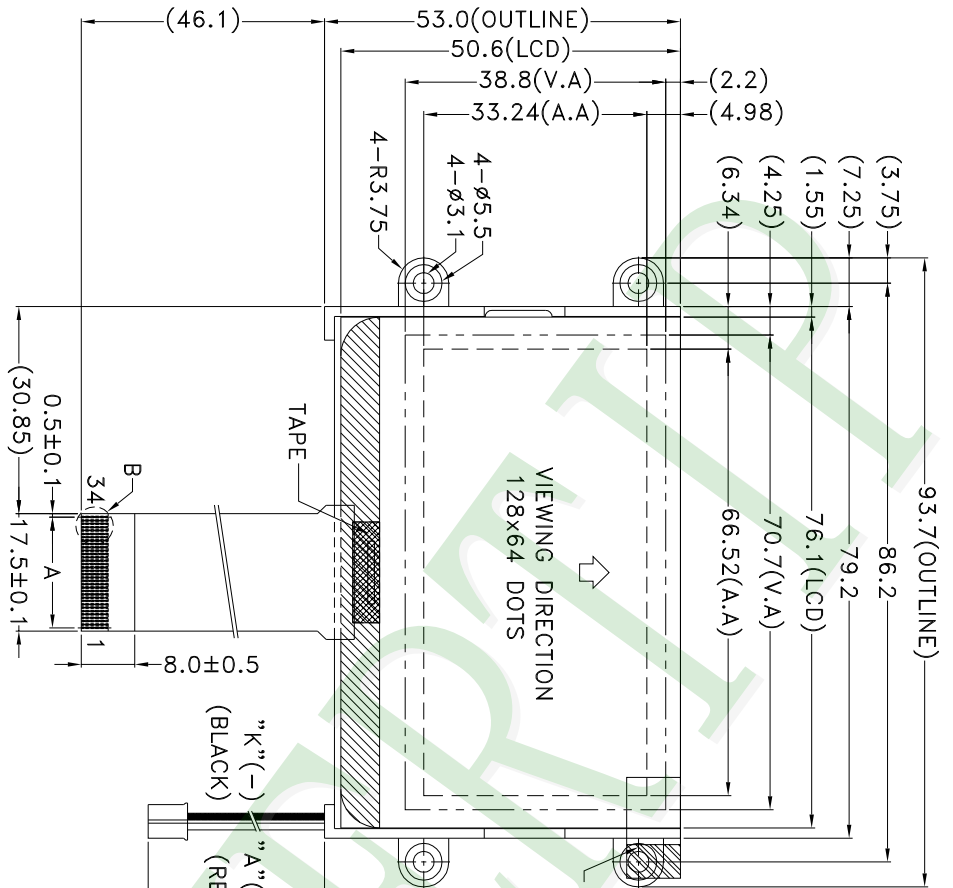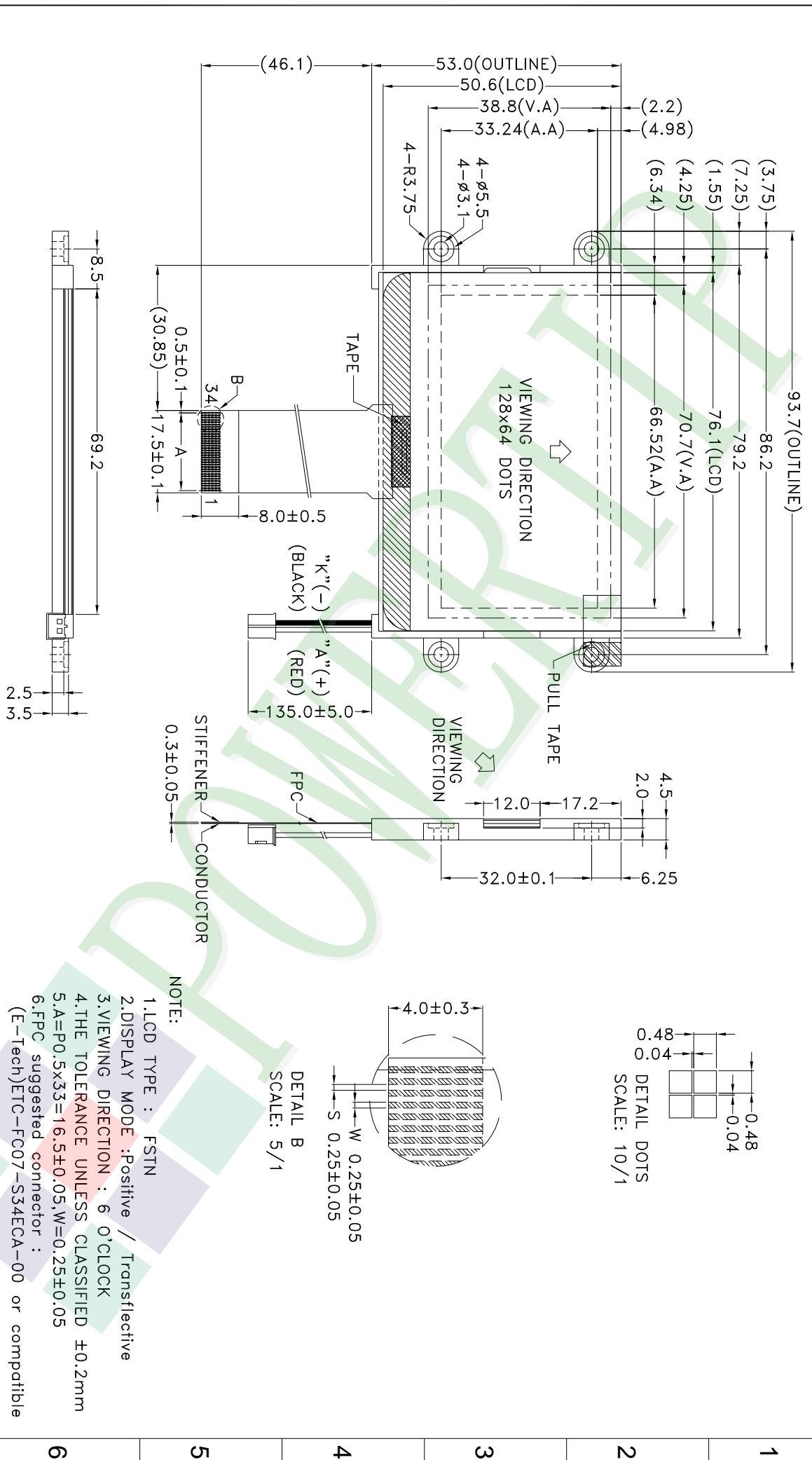
NOTE:
1. LCD TYPE : FSTN
2. DISPLAY MODE :Positive / Transflective
3. VIEWING DIRECTION : 6 O'CLOCK
4. THE TOLERANCE UNLESS CLASSIFIED ±0.2mm
5. A=P0.5x33=16.5±0.05,W=0.25±0.05
6. FPC suggested connector :
   (E-Tech)ETC-FC07-S34ECA-00 or compatible

VIEWING DIRECTION
128x64 DOTS

53.0(OUTLINE)
50.6(LCD)
38.8(V.A)
33.24(A.A)
(2.2)
(4.98)
(46.1)
93.7(OUTLINE)
86.2
79.2
76.1(LCD)
70.7(V.A)
66.52(A.A)
(3.75)
(7.25)
(1.55)
(4.25)
(6.34)

4-R3.75
4-ø5.5
4-ø3.1

TAPE
PULL TAPE
VIEWING DIRECTION

0.5±0.1
(30.85)
17.5±0.1
34
B
1
8.0±0.5

"K"(–) (BLACK)
"A"(+) (RED)
135.0±5.0

STIFFENER 0.3±0.05
CONDUCTOR
FPC

12.0
17.2
4.5
2.0
32.0±0.1
6.25

8.5
69.2
2.5
3.5

DETAIL B
SCALE: 5/1
4.0±0.3
S 0.25±0.05
W 0.25±0.05

DETAIL DOTS
SCALE: 10/1
0.48
0.04
0.48
0.04

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

PART NO: PE12864WRF-022-H-Q
DRAWING NAME: JLMD-PE12864WRF-022-H-Q
TITLE: LCD Module Drawing

	Design	Check	Approve
	Sally	Terry	Ryan

Unit	Scale	Page	Quantity
MM	1:1	1/1	

Surface	Material	Thickness	

最小長度 (mm)	精級
1 ~ 4	-
4 ~ 16	-
16 ~ 63	-
63 ~ 250	-
250 ~ 1000	-

REV		REV BY	REVISER	DATE
007				
006				
005				
004				
003			Sally	
002				
001	NEW DRAWING			2018/03/07

PT-A-054-01

LCM包裝規格書
LCM Packaging Specifications
(For Tray)

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

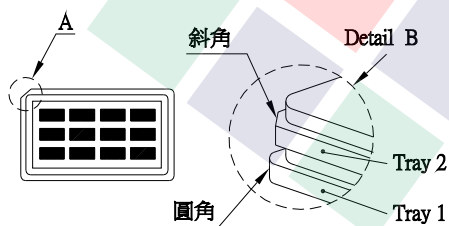| No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PE12864WRF-022-H-Q	93.7 X 53.0	0.027	144	3.888
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	——	6	——
3	TRAY 盤 (2)Tray	TY12806422TZBA	352 X 260 X 16.8	0.1	24	2.4
4	內盒(3)Product Box	BX36627063ABBA	366 X 270 X 66	0.2692	6	1.6152
5	保利龍板(4)Polylon board	OTPLB00PL08ABA	550 X 393 X 20	0.0284	2	0.0568
6	外紙箱(5)Carton	BX57041027CCBA	570 X 410 X 265	1.4208	1	1.4208
7						
8						
9						

2.一 整箱總重量 (Total LCD Weight in carton) :　　9.38　　Kg±10%

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

(1)LCM quantity per box : no per tray　　　　8　　　x no of tray　　3　　=　　24

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

Use empty tray
空 盤

+

Put products into the tray

⇓

Tray stacking

A

B

(1) POF

(2) Tray

⇓

(3)Product Box

=

(4)Polylon board

⇓

(5) Carton

P.O NO.:
ITEM NO.:　　PCS
Q'TY:　　KGS
N.W.:　　KGS
G.W.:

C/N.

POWERTIP

特 記 事 項 (REMARK)

A

斜角

Detail B

圓角

Tray 2
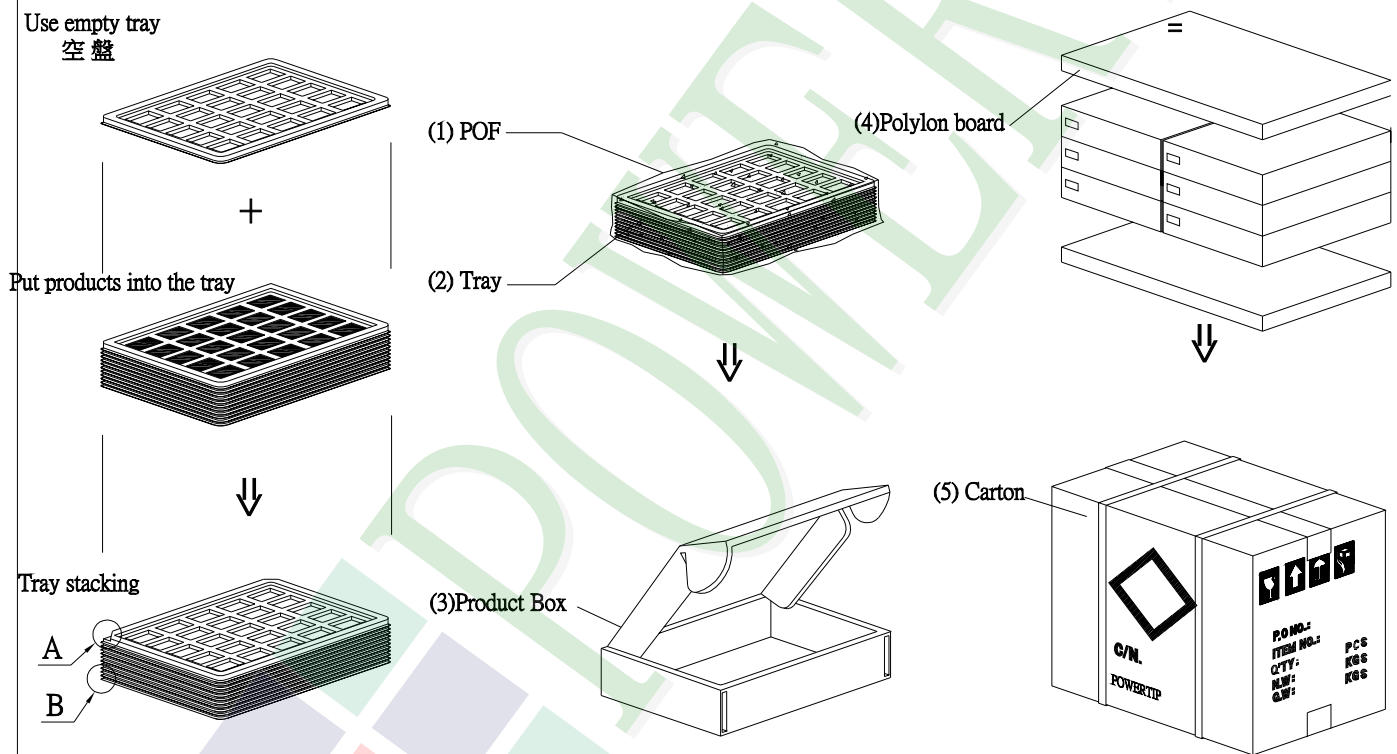
Tray 1

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

POWERTIP TECH. CORP.