POWERTIP TECH. CORP.

SPECIFICATIONS

CUSTOMER	:	CUS999
SAMPLE CODE	:	SE128128WRF-003-HQ
MASS PRODUCTION CODE	:	PE128128WRF-003-HQ
SAMPLE VERSION	:	02
SPECIFICATIONS EDITION	:	002
DRAWING NO. (Ver.)	:	LMD-PE128128WRF-003-HQ_001
PACKAGING NO. (Ver.)	:	PKG-PE128128WRF-003-HQ_001

Customer Approved

Date:

POWERTIP
2013.07.05
JS RD APPROVED

Approved	Checked	Designer
閆偉 Ryan	劉進 Lori	李誠 Bruce

☐ Preliminary specification for design input

■ Specification for sample approval

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History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
10/24/2007	0		New Sample	-	Ackey
09/19/2008	01	001	Mass Production	-	Ackey
06/26/2013	02	002	FPC second source	-	Bruce

Total：29page

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Appendix: 1. LCM Drawing
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Note: For detailed information please refer to IC data sheet: Sitronix --- ST7541

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	128 * 128 Dots
LCD Type	FSTN, Positive, Transflective
Driver Condition	LCD Module：1/128 Duty, 1/10 Bias
Viewing Direction	6 O'clock
Backlight	White LED
Interface	8-bit parallel bi-directional interface with 8080-series or 6800-series.
Other (controller / driver IC)	Sitronix --- ST7541
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	60.0 (W) * 62.0(L) * 12.2 (H)	mm
Viewing Area	50.0 (W) * 50.0 (L)	mm
Active Area	46.05 (W) * 46.05 (L)	mm
Dot Size	0.33 (W) * 0.33(H)	mm
Dot Pitch	0.36 (W) * 0.36(H)	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}	—	-0.5	+5.0	V
Input Voltage	V_{IN}	—	-0.5	VDD+0.5	V
Operating Temperature	T_{OP}	—	0	70	℃
Storage Temperature	T_{ST}	—	-30	80	℃
Storage Humidity	HD	Ta < 40 °C	20	90	%RH

1.4 DC Electrical Characteristics

Module V_{DD} = 3.0±0.3V, V_{SS} = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	V_{DD}	—	2.8	3.0	3.2	V
Input High Voltage	V_{IH}	—	0.7VDD	—	VDD	V
Input Low Voltage	V_{IL}	—	VSS	—	0.3VDD	V
Output High Voltage	V_{OH}	IOH = -0.5mA	0.7VDD	—	VDD	V
Output Low Voltage	V_{OL}	IOL = -0.5mA	VSS	—	0.3VDD	V
Supply Current	I_{DD}	VDD=3.0 V；VOP=13.8 V Pattern= Full Display	—	1	—	mA
		VDD=3.0 V；VOP=13.8 V Pattern= ABB menu*1	—	1	1.5	
LCM Driver Voltage	V_{OP} *2	-20℃	12.5	12.7	12.9	V
		25℃	12.0	12.2	12.4	
		70℃	11.05	11.2	11.35	

NOTE：*1 The Maximum current display.

*2 The V_{OP} test point is V0-VSS.

1.5 Optical Characteristics

LCD Panel：Duty=1/128，Bias=1/10，V_{OP}=12.2V，Ta =25℃

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Reference
Response Time	Rise	Tr		-	260	390	ms	Note2
	Fall	Tf		-	130	195		
Viewing angle range	Top	ΘY+		-	40	-	Deg.	Note 1
	Bottom	ΘY-		-	40	-		
	Left	ΘX-		-	45	-		
	Right	ΘX+		-	45	-		
Contrast Ratio (With BL)		CR	θ = 0°, ∅ = 270°	-	3	-	-	Note 3
Average Brightness (With BL) *2		IV	IF=2 x 30 mA	60	65	-	cd/m^2	-
CIE Color Coordinate (With BL) *2		X		0.26	0.31	0.36	-	Note 4
		Y		0.27	0.32	0.37		
Uniformity *1		△B	-	70	-	-	%	Note 4

Note：

*1：△B=B(min) / B(max) * 100%

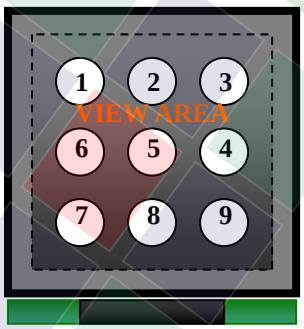
*2：Measurement Condition for Optical Characteristics:

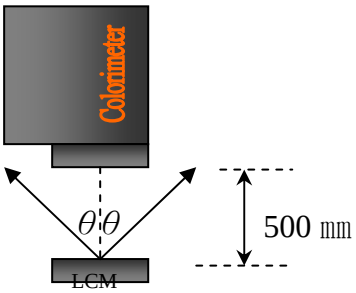
a：Environment: 25℃±5℃ / 60±20%R.H，no wind，dark room below 10 Lux at typical lamp current and typical operating frequency.

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%



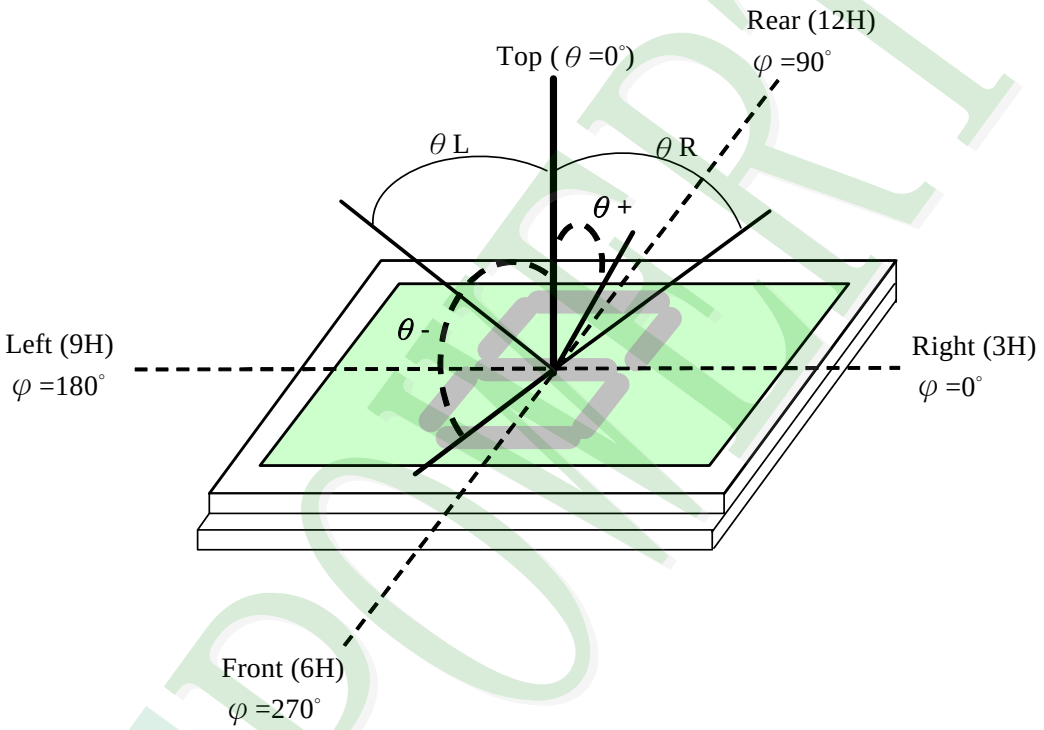


Colorimeter=BM-7 fast

Note 1.

Optical characteristics-2

Viewing angle

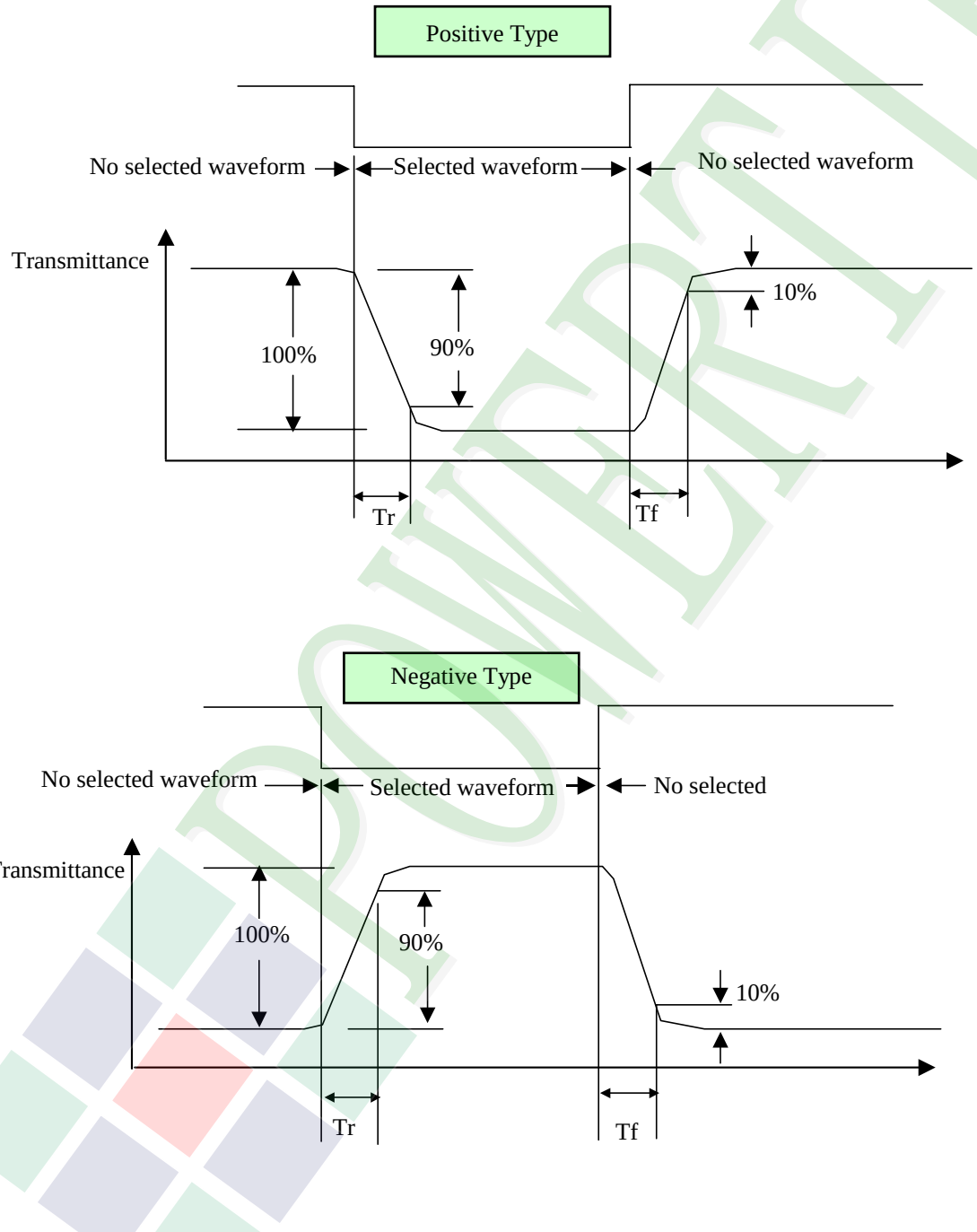


Viewing angle

Note 2.

Optical characteristics-3

Fig.2 Definition of response time



Electrical characteristics-2

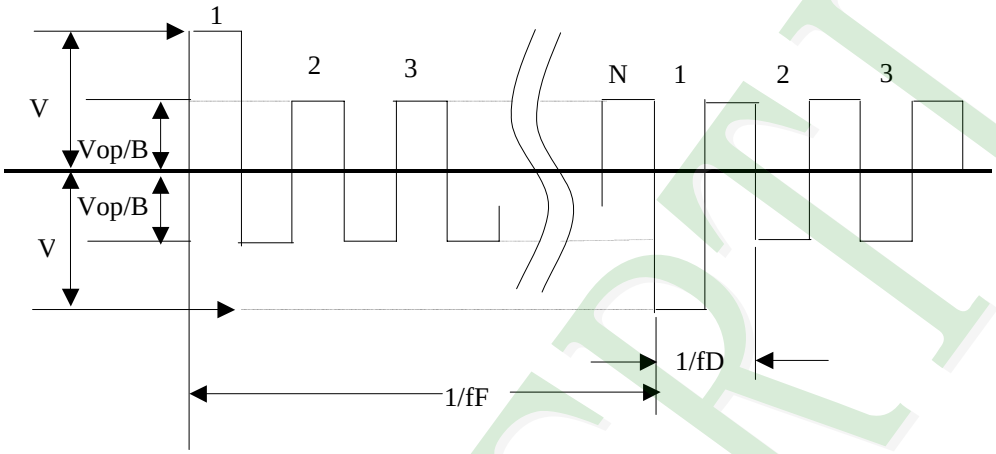
※2 Drive waveform

Vop: Drive voltage fF: Frame frequency

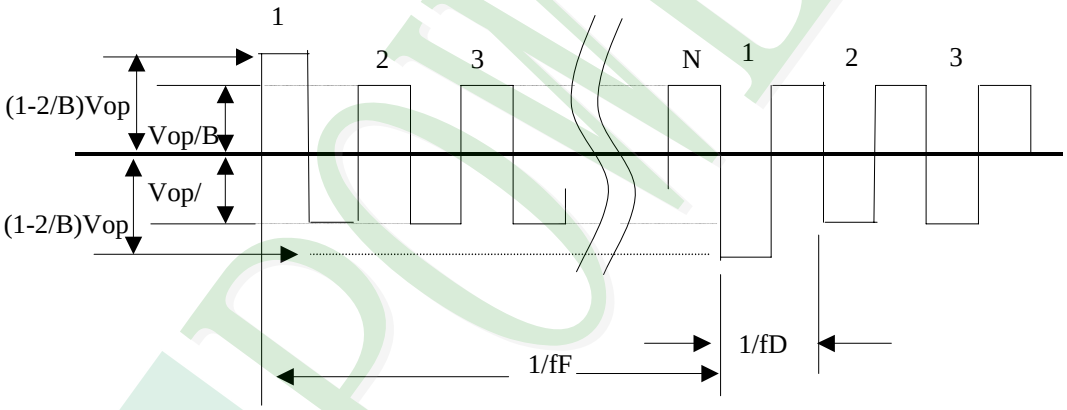
1/B: Bias fD: Drive frequency

N: Duty

(1) Selected waveform



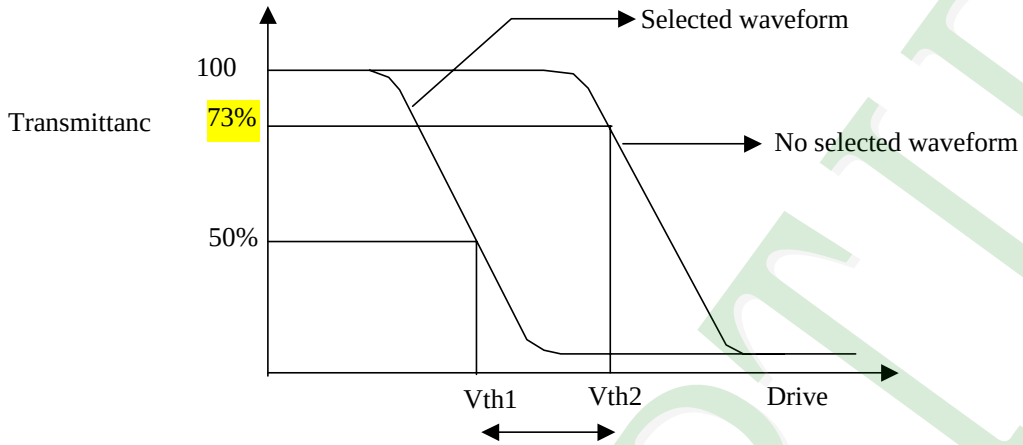
(2) Non- Selected wave form



Note:

Frame frequency is defined as follows: Common side supply voltage peak - to - peak /2 = 1 period

Note 3. : Definition of Vth

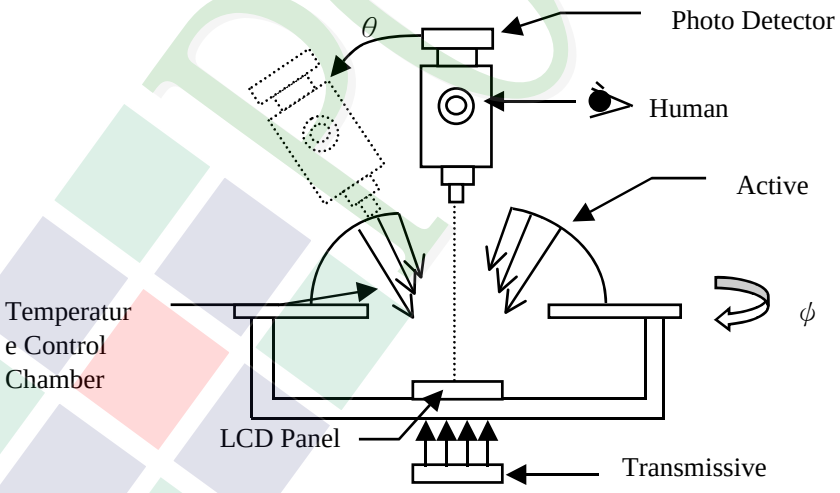


Active voltage range

	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

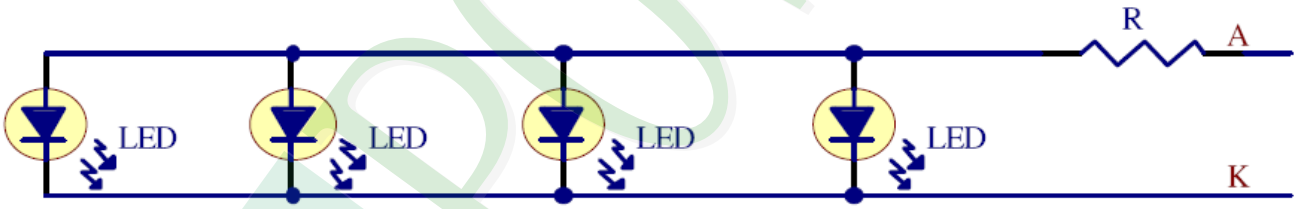
Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25℃	—	100	mA
Reverse Voltage	VR	Ta =25℃	—	1.0	V
Power Dissipation	PD	Ta =25℃	—	300	mW

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF=60 mA	3.0	3.3	3.6	V
Reverse Current	IR	VR=0.8V	-	15	-	
CIE Color Coordinate (Without LCD)	X	IF=60 mA	0.26	0.29	0.32	—
	Y		0.26	0.29	0.32	
Average Brightness (without LCD)	IV		300	450	-	
Color	White					

Internal Circuit Diagram



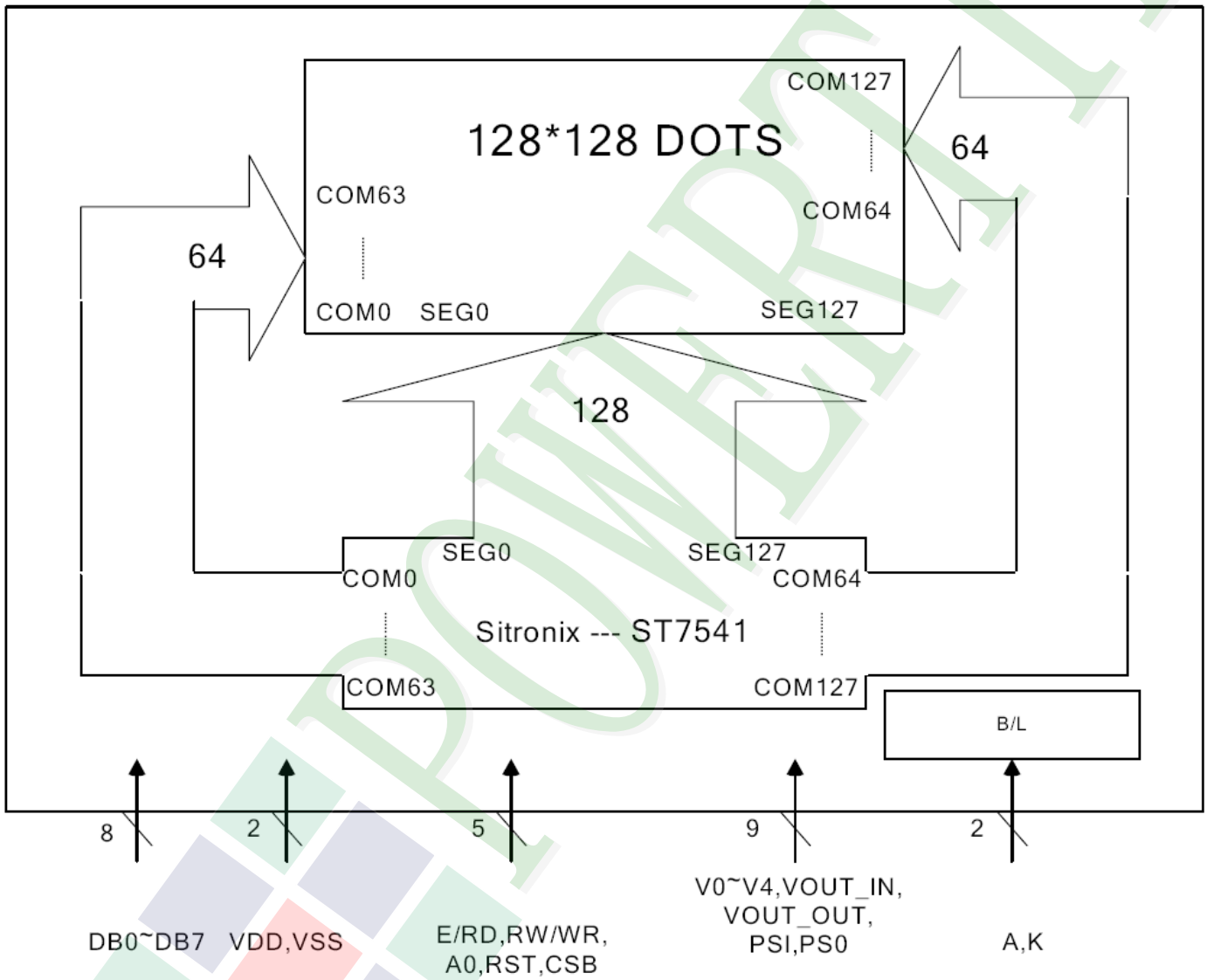
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



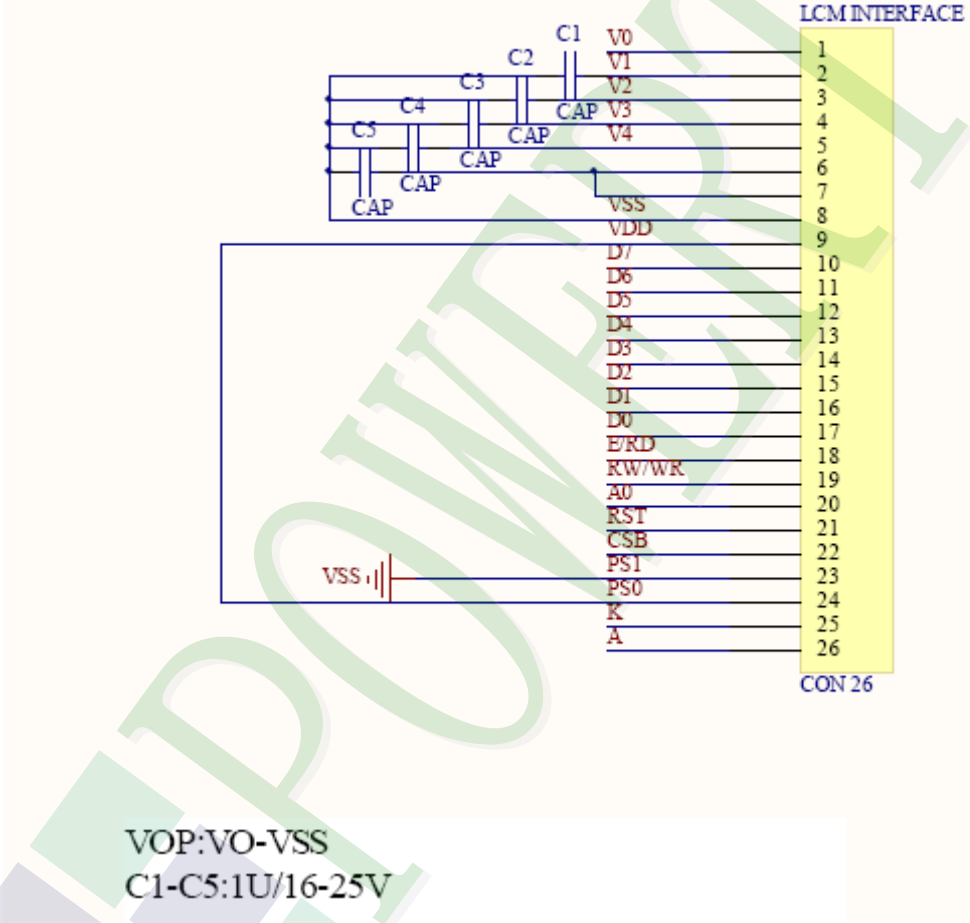
2.2 Interface Pin Description

<table>
<tr><th>Pin</th><th>Symbol</th><th>Description</th></tr>
<tr><td>01</td><td>V0</td><td rowspan="5">LCD driver supply voltage.
To connect capacitors as shown below.
V0 ≥ V1 ≥ V2 ≥ V3 ≥ V4 ≥ VSS
When the internal power circuit is active, these voltages are generated as following table according to the state of LCD bias.
<table>
<tr><td>LCD bias</td><td>V1</td><td>V2</td><td>V3</td><td>V4</td></tr>
<tr><td>1/N bias</td><td>(N-1) / N x V0</td><td>(N-2) / N x V0</td><td>(2/N) x V0</td><td>(1/N) x V0</td></tr>
</table>
NOTE: N = 5 to 12</td></tr>
<tr><td>02</td><td>V1</td></tr>
<tr><td>03</td><td>V2</td></tr>
<tr><td>04</td><td>V3</td></tr>
<tr><td>05</td><td>V4</td></tr>
<tr><td>06</td><td>VOUT_IN</td><td rowspan="2">Vout voltage to be internally generator.</td></tr>
<tr><td>07</td><td>VOUT_OUT</td></tr>
<tr><td>08</td><td>VSS</td><td>Ground.</td></tr>
<tr><td>09</td><td>VDD</td><td>Power supply.</td></tr>
<tr><td>10</td><td>D7</td><td rowspan="8">8-bit parallel bi-direction data bus.</td></tr>
<tr><td>11</td><td>D6</td></tr>
<tr><td>12</td><td>D5</td></tr>
<tr><td>13</td><td>D4</td></tr>
<tr><td>14</td><td>D3</td></tr>
<tr><td>15</td><td>D2</td></tr>
<tr><td>16</td><td>D1</td></tr>
<tr><td>17</td><td>D0</td></tr>
<tr><td>18</td><td>E/RD</td><td>Voltage converter input voltage pin.
Read/Write execution control pin.
6800 series:E=”H”:Read.
Data on DB7~DB0 are latched on falling edge of E Signal.
8080 series:/RD=”L”:Read enable.</td></tr>
<tr><td>19</td><td>RW/WR</td><td>Read/Write execution control pin.
6800 series:RW=”H”:Read enable.
RW=”L”:Write enable.
8080 series:/WR=”L”:Write enable.</td></tr>
<tr><td>20</td><td>A0</td><td>RS=”L”:DB7~DB0 are control data.
RS=”H”:DB7~DB0 are display data.</td></tr>
<tr><td>21</td><td>RST</td><td>Reset input pin. Initialization is executed when RST=”L”.</td></tr>
</table>

Pin	Symbol	Description

22	CSB	Chip select input pins. Data/instruction transfer enable only when CSB=”L”.
23	PS1	PS0=”H” PS1=”H”:6800 series parallel. PS0=”H” PS1=”L”:8080 series parallel.
24	PS0	
25	K	LED Backlight Cathode input.
26	A	LED Backlight Anode input.

2.2.1 Application Notes:



2.2.2 Refer Initial code:

void Initial_(void)

```
{
        WriteCOM_(0xe2);          // Set Reset
        WriteCOM_(0x38);          //mode set
        WriteCOM_(0x04);
        WriteCOM_(0x48);          // Set duty(1/128)
        WriteCOM_(0x80);          //
        WriteCOM_(0x44);
        WriteCOM_(0x00);
        WriteCOM_(0x40);
        WriteCOM_(0x00);
        WriteCOM_(0xa0);          // ADC Select
        WriteCOM_(0xc8);          // SHL Select
        WriteCOM_(0xab);          // Set Osc
        WriteCOM_(0x67);          // Set DC-DC Setup(6x)
        WriteCOM_(0x27);          // Set Regulator resistor
        WriteCOM_(0x81);          // Set Electronic Volumn
        WriteCOM_(ael);
        WriteCOM_(0x55);          // Set Bias(1/10)



        WriteCOM_(0x88);          //Gray-Scale Setting
        WriteCOM_(0x00);
        WriteCOM_(0x89);
        WriteCOM_(0x00);
        WriteCOM_(0x8a);
        WriteCOM_(0x99);
        WriteCOM_(0x8b);
        WriteCOM_(0x99);
        WriteCOM_(0x8c);
        WriteCOM_(0x99);
        WriteCOM_(0x8d);
        WriteCOM_(0x99);
        WriteCOM_(0x8e);
        WriteCOM_(0xff);
        WriteCOM_(0x8f);
        WriteCOM_(0xff);
        WriteCOM_(0x97);          // Set PWM & FRC mode ON/OFF
        WriteCOM_(0x38);          //mode set
```

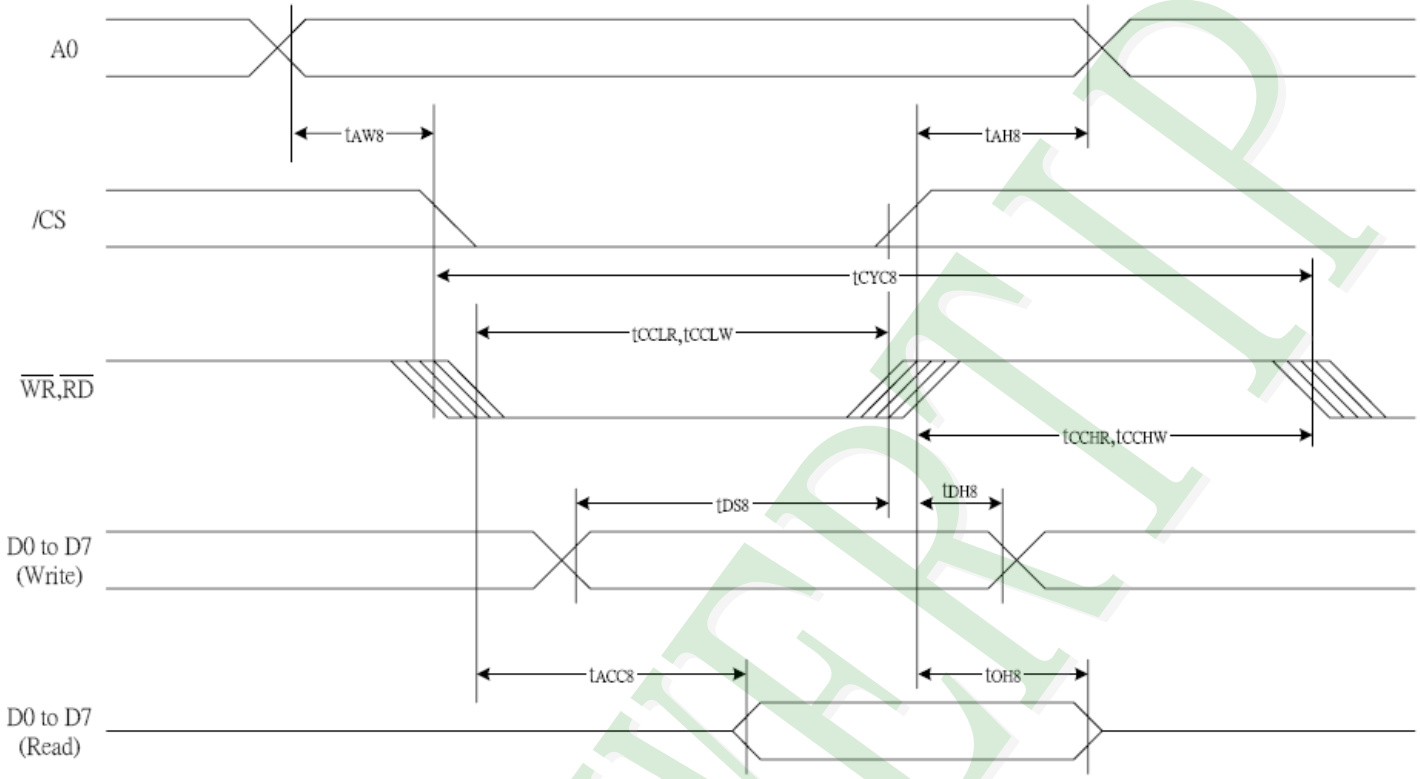
```
        WriteCOM_(0x04);

        WriteCOM_(0x2f);        // Set Power Control
        WriteCOM_(0x2f);        // Set Power Control
        WriteCOM_(0x2f);        // Set Power Control
        WriteCOM_(0xa6);
        WriteCOM_(0xaf);        // Set Display ON/OFF

}
```

2.3 Timing Characteristics

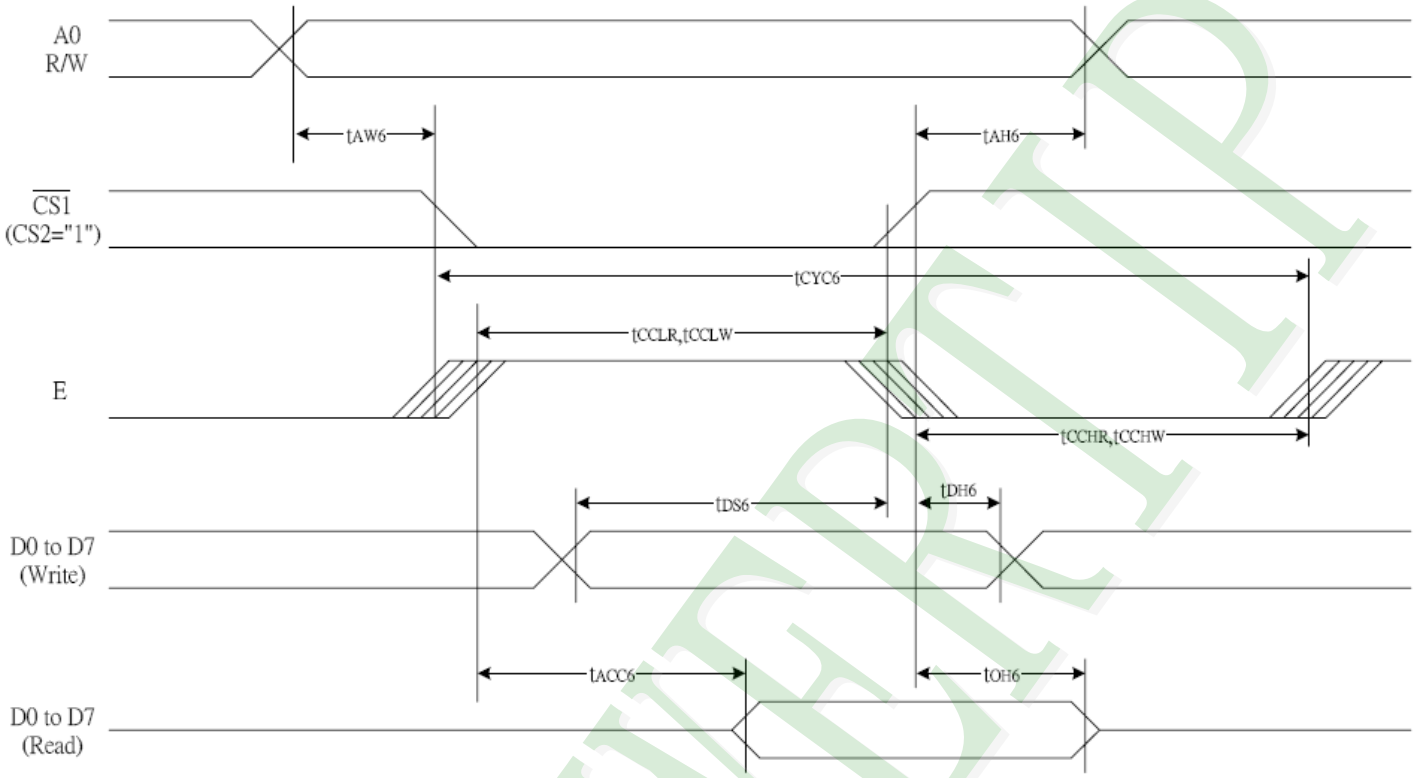
System Bus Read/Write Characteristics (For the 8080 Series MPU)



(VDD = 3.3V , Ta =25°C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	tAH8		0	—	ns
Address setup time		tAW8		0	—	
System cycle time		tCYC8		240	—	
Enable L pulse width (WRITE)	WR	tCCLW		80	—	
Enable H pulse width (WRITE)		tCCHW		80	—	
Enable L pulse width (READ)	RD	tCCLR		140	—	
Enable H pulse width (READ)		tCCHR		80		
WRITE Data setup time	D0 to D7	tDS8		40	—	
WRITE Data hold time		tDH8		10	—	
READ access time		tACC8	CL = 100 pF	—	70	
READ Output disable time		tOH8	CL = 100 pF	5	50	

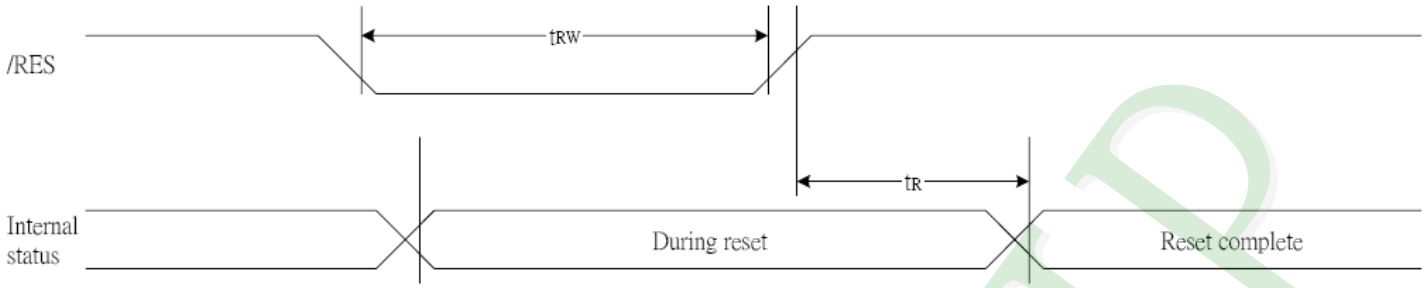
System Bus Read/Write Characteristics (For the 6800 Series MPU)



(V_{DD} = 3.3 V , Ta = 25°C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	tAH6		0	—	ns
Address setup time		tAW6		0	—	
System cycle time		tCYC6		240	—	
Enable L pulse width (WRITE)	WR	tEWLW		80	—	
Enable H pulse width (WRITE)		tEWHW		80	—	
Enable L pulse width (READ)	RD	tEWLR		80	—	
Enable H pulse width (READ)		tEWHR		140		
WRITE Data setup time	D0 to D7	tDS6		40	—	
WRITE Data hold time		tDH6		10	—	
READ access time		tACC6	CL = 100 pF	—	70	
READ Output disable time		tOH6	CL = 100 pF	5	50	

RESET TIMING

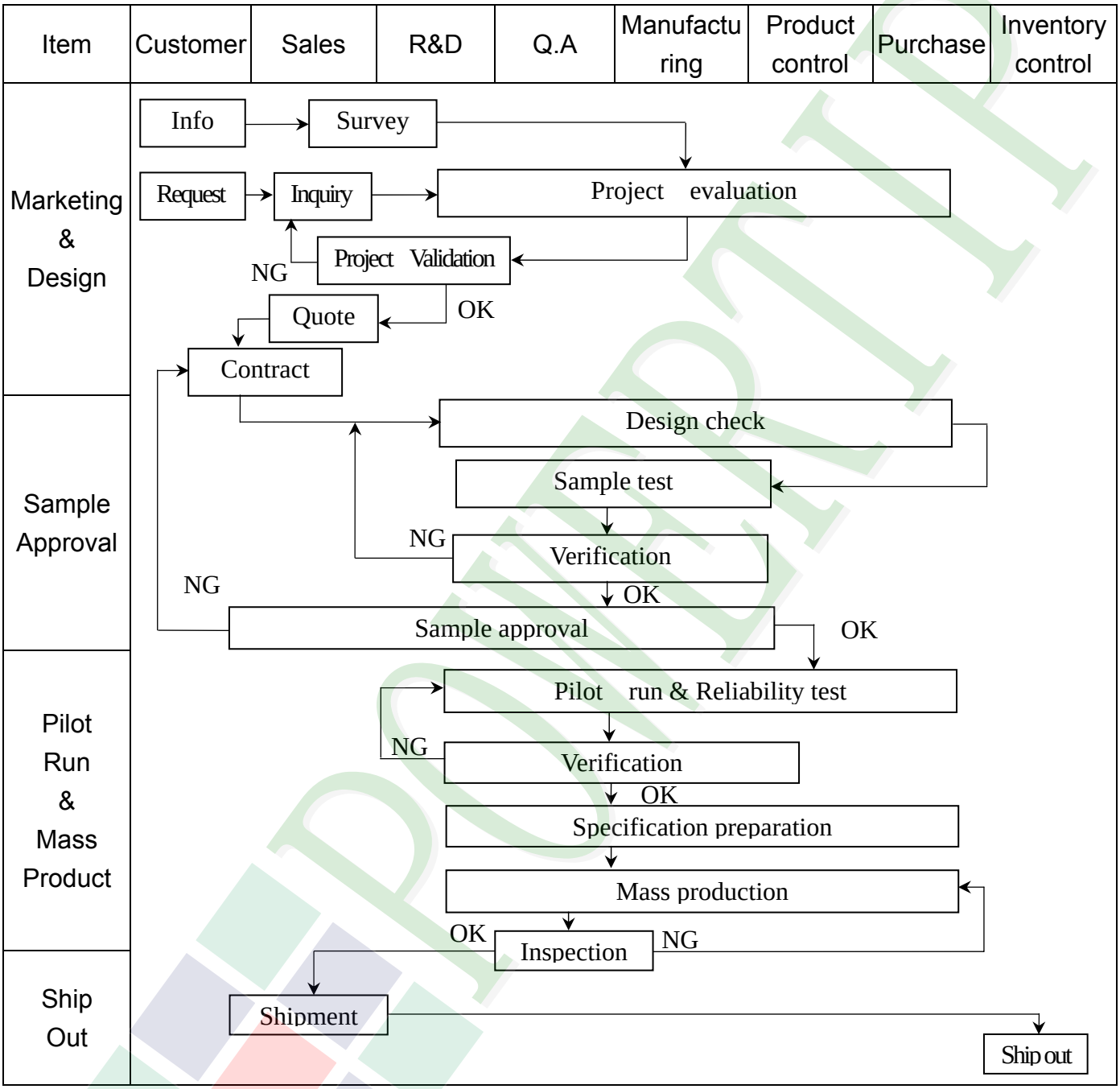


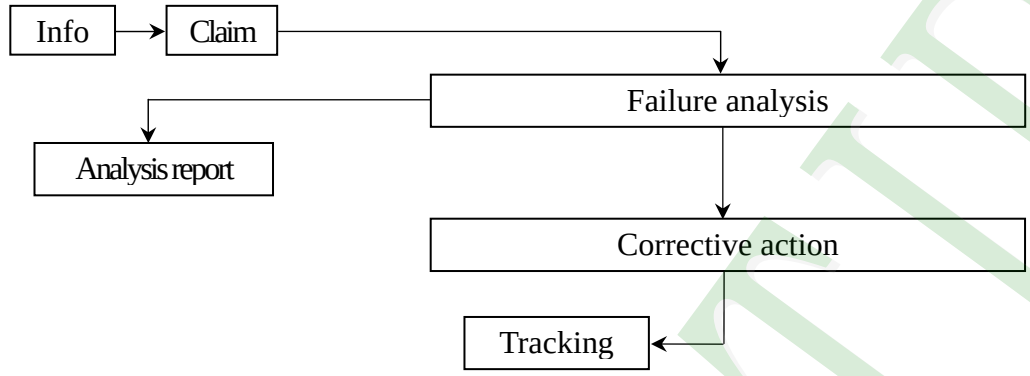
(VDD = 3.3V , Ta = –40 to 85°C)

Item	Signal	Symbol	Condition	Rating			Units
				Min.	Typ.	Max.	
Reset time		tR		—	—	1	us
Reset “L” pulse width	RESB	tRW		1	—	—	us

3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



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

3.2 Inspection Specification

◆Scope : The document shall be applied to 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)

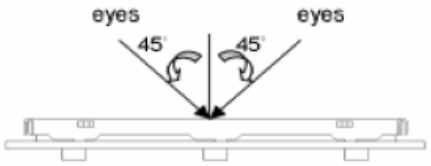


Fig.1

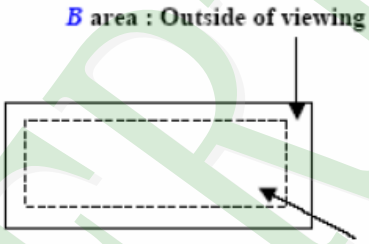


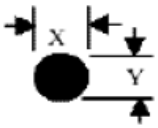
Fig. 2 A area : viewing area

◆ Specification:

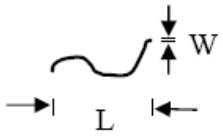
NO	Item	Criterion	Level
01	Product condition	1.1 The part number is inconsistent with work order of Production.	Major
		1.2 Mixed production types.	Major
		1.3 Assembled in inverse direction.	Major
02	Quantity	2.1 The quantity is inconsistent with work order of production.	Major
03	Outline dimension	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

◆Specification For Monotype and Color STN：　　(Ver. B01)

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>05</td><td>Black or white dot、scratch、contamination

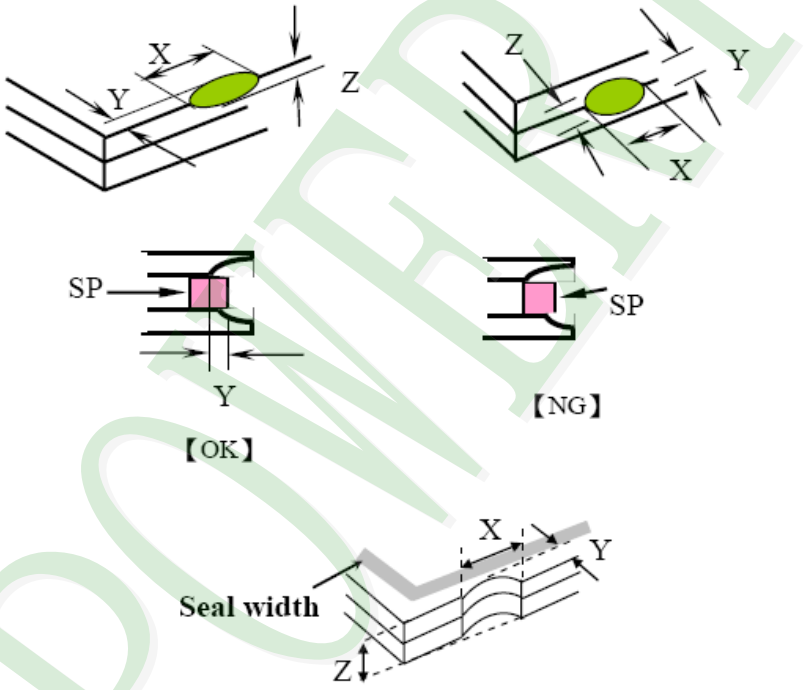
Round type
 

Φ=(x+y)/2

Line type
 
</td><td>5. 1 Round type:
5. 1. 1 display only :
• White and black spots on display ≦ 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>
<tr><th rowspan="2">Dimension (diameter : Φ)</th><th colspan="2">Acceptance (Q'ty)</th></tr>
<tr><th>A area</th><th>B area</th></tr>
<tr><td>Φ ≦ 0. 10</td><td>Accept no dense</td><td rowspan="4">Ignore</td></tr>
<tr><td>0. 10 ＜ Φ ≦ 0. 20</td><td>3</td></tr>
<tr><td>0. 20 ＜ Φ ≦ 0. 30</td><td>2</td></tr>
<tr><td>Total quantity</td><td>4</td></tr>
</table>
5. 1. 3 Line type:
<table>
<tr><th colspan="2">Dimension</th><th colspan="2">Acceptance (Q'ty)</th></tr>
<tr><th>Length (L)</th><th>Width (W)</th><th>A area</th><th>B area</th></tr>
<tr><td>---</td><td>W ≦ 0. 03</td><td>Accept no dense</td><td rowspan="3">Ignore</td></tr>
<tr><td>L ≦ 3. 0</td><td>0. 03 ＜ W ≦ 0. 05</td><td rowspan="2">4</td></tr>
<tr><td>L ≦ 2. 5</td><td>0. 05 ＜W ≦ 0. 075</td></tr>
<tr><td>---</td><td>W ＞0. 075</td><td colspan="2">As round type</td></tr>
</table></td><td>Minor</td></tr>
<tr><td>06</td><td>Polarizer Bubble</td><td>
<table>
<tr><th rowspan="2">Dimension (diameter : Φ)</th><th colspan="2">Acceptance (Q'ty)</th></tr>
<tr><th>A area</th><th>B area</th></tr>
<tr><td>Φ ≦ 0. 20</td><td>Accept no dense</td><td rowspan="5">Ignore</td></tr>
<tr><td>0. 20 ＜Φ ≦ 0. 50</td><td>3</td></tr>
<tr><td>0. 50 ＜Φ ≦ 1. 00</td><td>2</td></tr>
<tr><td>Φ ＞ 1. 00</td><td>0</td></tr>
<tr><td>Total quantity</td><td>4</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

◆Specification For Monotype and Color STN：　(Ver. B01)

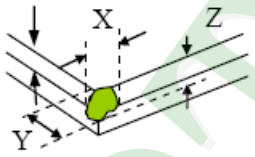
NO	Item	Criterion	Level
07	The crack of glass	Symbols： X : The length of crack　Y : The width of crack. Z : The thickness of crack　W : terminal length t : The thickness of glass　a : LCD side length 7.1 General glass chip： 7.1.1 Chip on panel surface and crack between panels:  	Minor

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

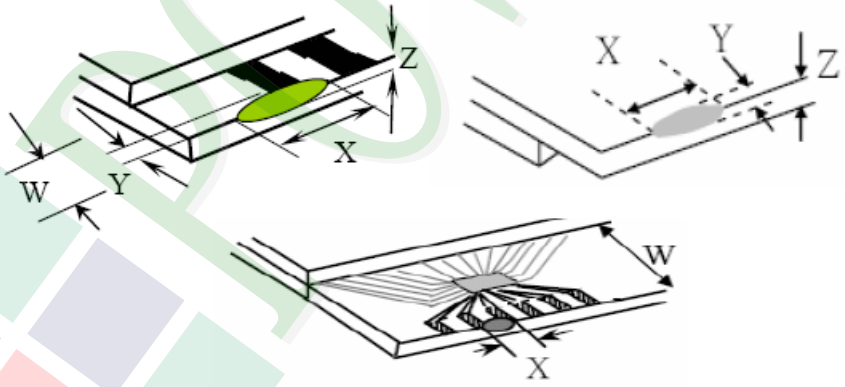
◆Specification For Monotype and Color STN：　(Ver. B01)

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>07</td><td>The crack of glass</td><td>
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：


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦1/5 a</td><td>Crack can’t enter viewing area</td><td>Z ≦ 1/2 t</td></tr>
<tr><td>≦1/5 a</td><td>Crack can’t exceed the half of SP width.</td><td>1/2 t < Z ≦ 2 t</td></tr>
</table>

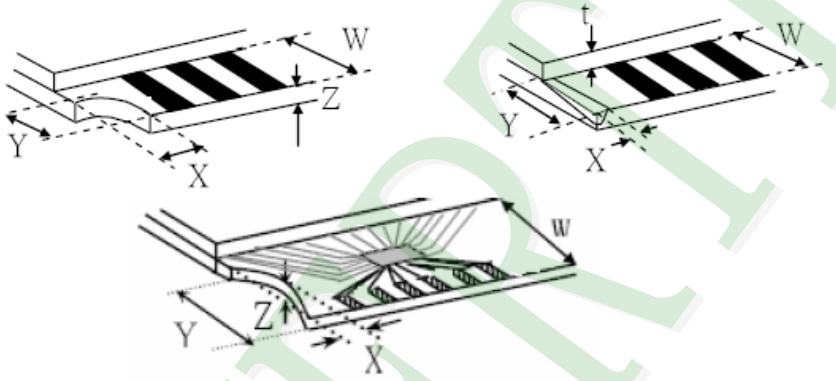
7.2 Protrusion over terminal：
7.2.1 Chip on electrode pad：


<table>
<tr><th></th><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>Front</td><td>≦ a</td><td>≦ 1/2 W</td><td>≦ t</td></tr>
<tr><td>Back</td><td colspan="3">Neglect</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

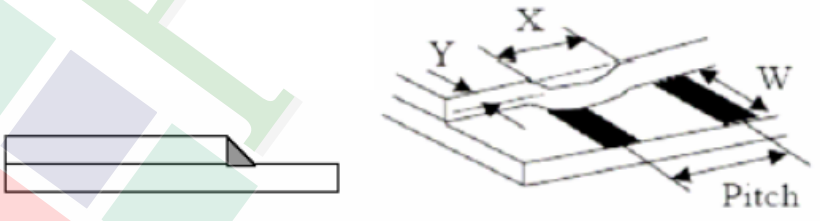
◆Specification For Monotype and Color STN：　(Ver. B01)

<table>
<tr><th>NO</th><th>Item</th><th>Criterion</th><th>Level</th></tr>
<tr><td>07</td><td>The crack of glass</td><td>
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><th>X</th><th>Y</th><th>Z</th></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><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦ a</td><td>≦ 1/3 W</td><td>≦ t</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

◆Specification For Monotype and Color STN：　(Ver. B01)

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)

<table>
<tr><th>NO.</th><th>TEST ITEM</th><th>TEST CONDITION</th></tr>
<tr><td>1</td><td>High Temperature Storage Test</td><td>Keep in 80 ±2℃ 96 hrs
Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td>2</td><td>Low Temperature Storage Test</td><td>Keep in -30 ±2℃ 96 hrs
Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td>3</td><td>High Temperature / High Humidity Storage Test</td><td>Keep in +60 ℃ / 90% R.H duration for 96 hrs
Surrounding temperature, then storage at normal condition 4hrs.
(Excluding the polarizer)</td></tr>
<tr><td>4</td><td>Temperature Cycling Storage Test</td><td>-30℃→ +25℃ → 80℃ → +25℃
(30mins) (5mins) (30mins) (5mins)
10 Cycle
Surrounding temperature, then storage at normal condition 4hrs.</td></tr>
<tr><td rowspan="2">5</td><td rowspan="2">ESD Test</td><td>Air Discharge:
Apply 2 KV with 5 times
Discharge for each polarity +/-
Contact Discharge:
Apply 250 V with 5 times
discharge for each polarity +/-</td></tr>
<tr><td>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%)</td></tr>
<tr><td>6</td><td>Vibration Test (Packaged)</td><td>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</td></tr>
<tr><td>7</td><td>Drop Test (Packaged)</td><td><table><tr><th>Packing Weight (Kg)</th><th>Drop Height (cm)</th></tr><tr><td>0 ~ 45.4</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table>Drop Direction :※1 corner / 3 edges / 6 sides each 1time</td></tr>
</table>

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 25°C ± 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.

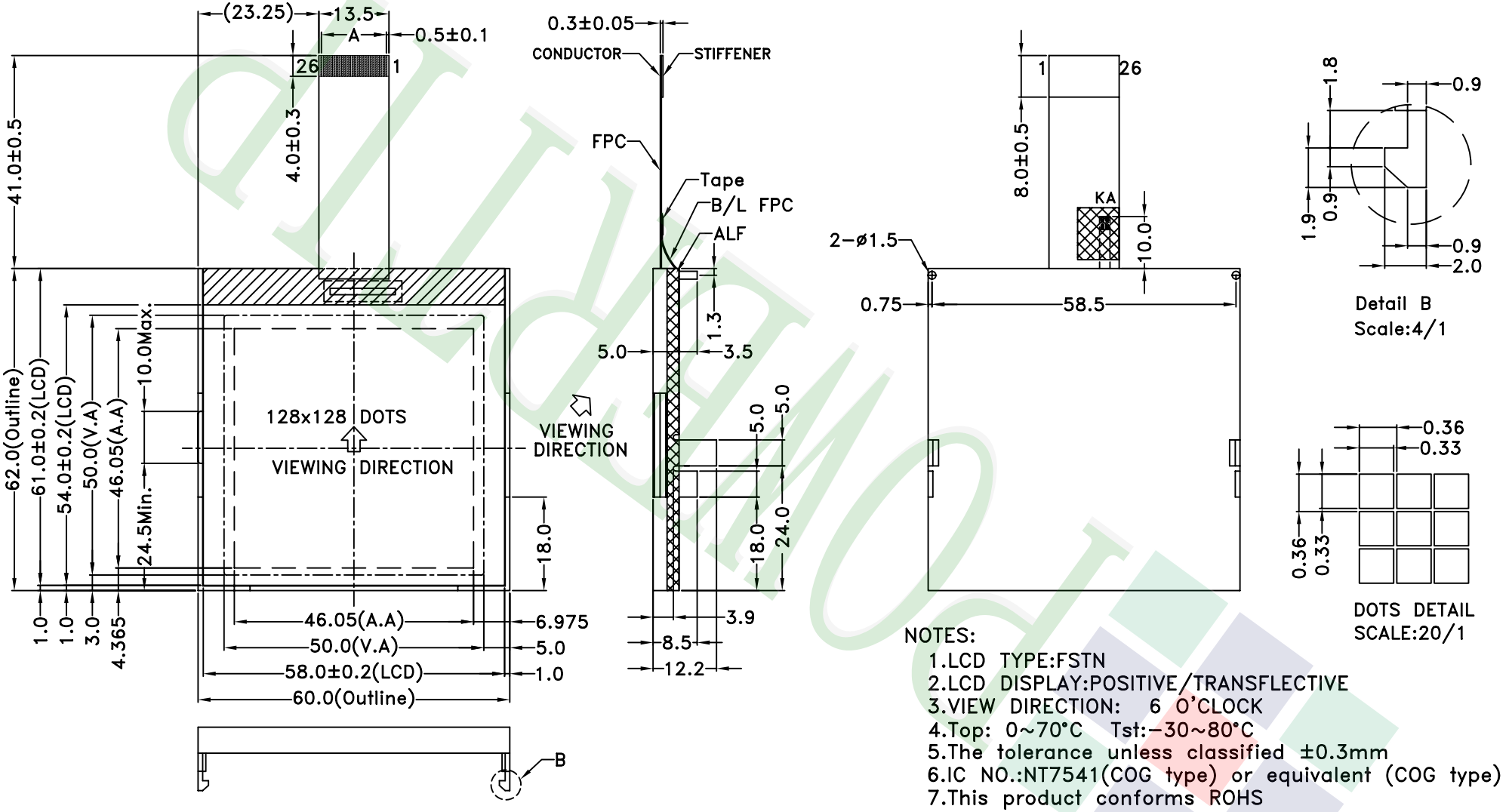
5.4 TERMS OF WARRANTY

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.



NOTES:

1. LCD TYPE:FSTN
2. LCD DISPLAY:POSITIVE/TRANSFLECTIVE
3. VIEW DIRECTION: 6 O'CLOCK
4. Top: 0~70°C Tst:-30~80°C
5. The tolerance unless classified ±0.3mm
6. IC NO.:NT7541(COG type) or equivalent (COG type)
7. This product conforms ROHS
8. A=P0.5x25=12.5±0.05,W=0.25±0.05

REV	REV BY	REVISER	DATE
006			
005			
004			
003			
002			
001	Modify drawing frame	Jupei	2008/09/18
0	New Drawing	Jupei	2007/11/08

PART NO: PE128128WRF-003-HQ

DRAWING NAME : LMD-PE128128WRF-003-HQ

TITLE: LCD MODULE DRAWING

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

Design	Jupei	⟨3⟩	Surface		
Check	Stone	Unit	MM	Material	
Approve	Rex	Scale	1:1	Thickness	
		Page	1/1	Quantity	

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

PT-A-054-01

Ver.001	
Documents NO.	PKG-PE128128WRF-003-HQ

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

Approve	Check	Contact
Rex	Stone	Jupei

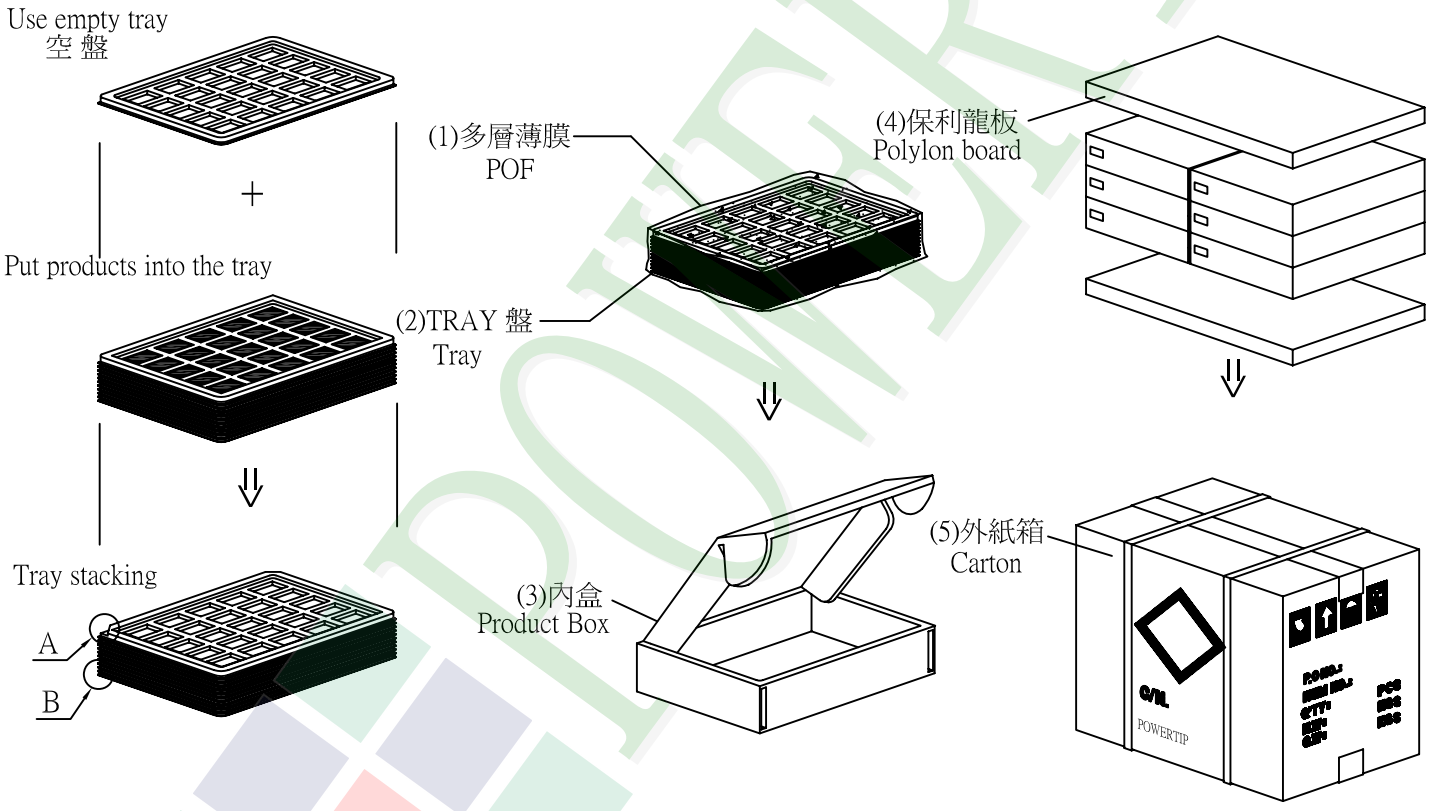
1.包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PE128128WRF-003-HQ	60.0 X 62.0	0.0288	144	4.1472
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	——	6	——
3	TRAY 盤 (2)Tray	TY00000000052	352 X 260 X 18.8	0.0959	24	2.3016
4	內盒(3)Product Box	BX36627063ABBA	393 X 274 X 68	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) : 9.54 Kg±10%

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

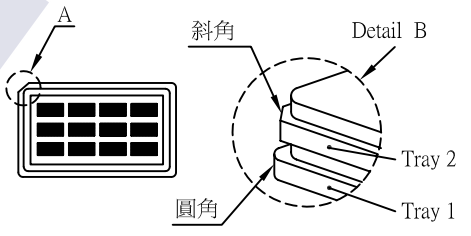
(1)LCM quantity per box : no per tray	8	x no of tray	3	=	24
(2)Total LCM quantity in carton : quantity per box	24	x no of boxes	6	=	144



特 記 事 項 (REMARK)

1. Label Specifications :

MODEL:
LOT NO:
QUANTITY:
CHECK:



2.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.

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

4.Tray料號:
Tray Number:PT-PE128128-001