



## SPECIFICATIONS

CUSTOMER : CIT008  
SAMPLE CODE : SE128128WRF-005-HQ  
MASS PRODUCTION CODE : PE128128WRF-005-HQ  
SAMPLE VERSION : 02  
SPECIFICATIONS EDITION : 010  
DRAWING NO. (Ver.) : LMD-PE128128WRF-005-HQ\_002  
PACKAGING NO. (Ver.) : JPKG- PE128128WRF-005-HQ\_004

**Customer Approved**

Date:



Approved	Checked	Designer
閔偉	劉進	陳璐

- Preliminary specification for design input  
 Specification for sample approval

### POWERTIP TECH. CORP.

**Headquarters:**

No.8, 6<sup>th</sup> Road, Taichung Industrial Park,  
Taichung, Taiwan  
台中市 407 工業區六路 8 號

TEL: 886-4-2355-8168  
FAX: 886-4-2355-8166

E-mail: [sales@powertip.com.tw](mailto:sales@powertip.com.tw)  
[Http://www.powertip.com.tw](http://www.powertip.com.tw)

## History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
02/22/2008	01	001	New drawing	-	Timter
03/27/2008	01	002	Modify pin Assignment	P.15	Timter
05/07/2008	01	003	Modify DC Electrical Characteristics Modify Optical Characteristics Modify Backlight Characteristics	P.5 P.6 P.11	Timter
08/13/2009	01	004	First Sample	-	Timter
10/05/2009	01	005	Modify 1.3 Absolute Maximum Ratings Modify 1.5 Optical Characteristics Modify 1.6 Backlight Characteristics Modify 2.4 Reference Power supply circuit Modify Packing Specification	P.4 P.6 P.11 P.17 Appendix	Timter
10/18/2010	01	006	Modify 1.1 Features (ROHS Web) Modify 1.6 Backlight Characteristics (Maximum Ratings, IF)	P.4 P.11	Timter
09/13/2011	01	007	Modify Packing Specification	Appendix	Lori
09/28/2011	01	008	Update The Full Novatek Ordering Code	P.3 P.4 Appendix	Lori
01/31/2013	01	009	Change BIAS from 1/9 to 1/8 Change Vop and Idd Modify Optical Characteristics	P.4 P.5 P.6	譚超敏
02/20/2017	02	010	Change BL	-	陳璐

Total : 30

## Contents

### 1. SPECIFICATIONS

- 1.1 Features
- 1.2 Mechanical Specifications
- 1.3 Absolute Maximum Ratings
- 1.4 DC Electrical Characteristics
- 1.5 Optical Characteristics
- 1.6 Backlight Characteristics

### 2. MODULE STRUCTURE

- 2.1 Counter Drawing
- 2.2 Interface Pin Description
- 2.3 Timing Characteristics
- 2.4 Reference Power supply circuit

### 3. QUALITY ASSURANCE SYSTEM

- 3.1 Quality Assurance Flow Chart
- 3.2 Inspection Specification

### 4. RELIABILITY TEST

- 4.1 Reliability Test Condition

### 5. PRECAUTION RELATING PRODUCT HANDLING

- 5.1 Safety
- 5.2 Handling
- 5.3 Storage
- 5.4 Terms of Warranty

- Appendix: 1. LCM Drawing  
2. Packing Specification

Note: For detailed information please refer to IC data sheet: NOVATEK—NT7508H-D01/3E

## 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, 1/8 Bias,
Viewing Direction	6 O'clock
Backlight	LED
Weight	65 g
Interface	Parallel
Other (controller / driver IC)	NOVATEK – NT7508H-D01/3E
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web side : <a href="http://www.powertip.com.tw/news.php?area_id_view=1085560481/">http://www.powertip.com.tw/news.php?area_id_view=1085560481/</a>

### 1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	75.0 (W) * 85.0(L) * 6.0 (H)	mm
Viewing Area	69.0 (W) * 69.0 (L)	mm
Active Area	63.345 (W) * 63.345 (L)	mm
Dot Size	0.48 (W) * 0.48 (H)	mm
Dot Pitch	0.495 (W) * 0.495 (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 <sub>DD</sub>	—	-0.3	4.0	V
LCD Driver Supply Voltage	V <sub>LCD</sub>	—	-0.3	15.0	V
Input Voltage	V <sub>IN</sub>	—	-0.3	V <sub>dd</sub> +0.3	V
Operating Temperature	T <sub>OP</sub>	—	-20	70	°C
Storage Temperature	T <sub>ST</sub>	—	-30	80	°C

Note: Temperature coefficient : -0,05%/°C and firmware code must use " 0xF1, 0x01".

## 1.4 DC Electrical Characteristics

### Module

 $V_{DD} = 3.0 \pm 0.3V, V_{SS} = 0V, T_a = 25^\circ C$ 

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	$V_{DD}$	—	2.7	3.0	3.3	V
Input High Voltage	$V_{IH}$	—	$0.8V_{DD}$	—	$V_{DD}$	V
Input Low Voltage	$V_{IL}$	—	$V_{SS}$	—	$0.2V_{DD}$	V
Output High Voltage	$V_{OH}$	$I_{OH} = -0.5mA$	$0.8V_{DD}$	—	$V_{DD}$	V
Output Low Voltage	$V_{OL}$	$I_{OL} = -0.5mA$	$V_{SS}$	—	$0.2V_{DD}$	V
Supply Current	$I_{DD}$	$V_{DD}=3.0 V ; V_{OP}=13.8 V$ Pattern= Full Display	—	2	3	mA
LCM Driver Voltage	$V_{OP}$  *2	-20°C	13.8	14.0	14.2	V
		25°C	13.6	13.8	14.0	
		70°C	13.2	13.4	13.6	

NOTE : \*1 The Maximum current display.

\*2 The  $V_{OP}$  test point is  $V_0-V_{SS}$ .

## 1.5 Optical Characteristics

LCD Panel : Duty=1/128 , Bias=1/8 ,  $V_{OP}=13.8V$  ,  $T_a =25^{\circ}C$

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit	Reference
Response Time	Rise	Tr(60°C)	—	65	—	ms	Note 2
		Tr(25°C)	—	142	213		
		Tr(-10°C)	—	970	—		
	Fall	Tf(60°C)	—	150	—		
		Tf(25°C)	—	422	633		
		Tf(-10°C)	—	3620	—		
Viewing angle range	Top	$\Theta Y+$	—	45	—	Deg.	Note 1
	Bottom	$\Theta Y-$	—	45	—		
	Left	$\Theta X-$	—	45	—		
	Right	$\Theta X+$	—	45	—		
Contrast Ratio (With BL)	CR	-	4	6	—	—	Note 3
Average Brightness (With BL) *2	IV	IF=2 x 30 mA	40	80	—	cd/m <sup>2</sup>	—
CIE Color Coordinate (With BL) *2	X		0.28	0.33	0.38	—	—
	Y	0.29	0.34	0.39	—	—	
Uniformity *1	$\Delta B$	—	70	—	—	%	—

Note :

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

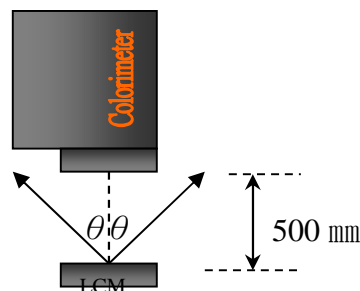
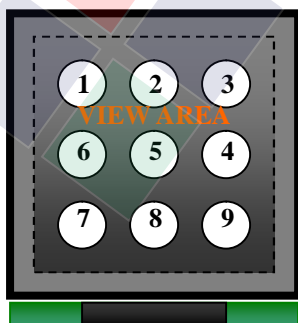
\*2 : Measurement Condition for Optical Characteristics:

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

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

c : Equipment: TOPCON BM-7 fast , (field 1°) , after 10 minutes operation.

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

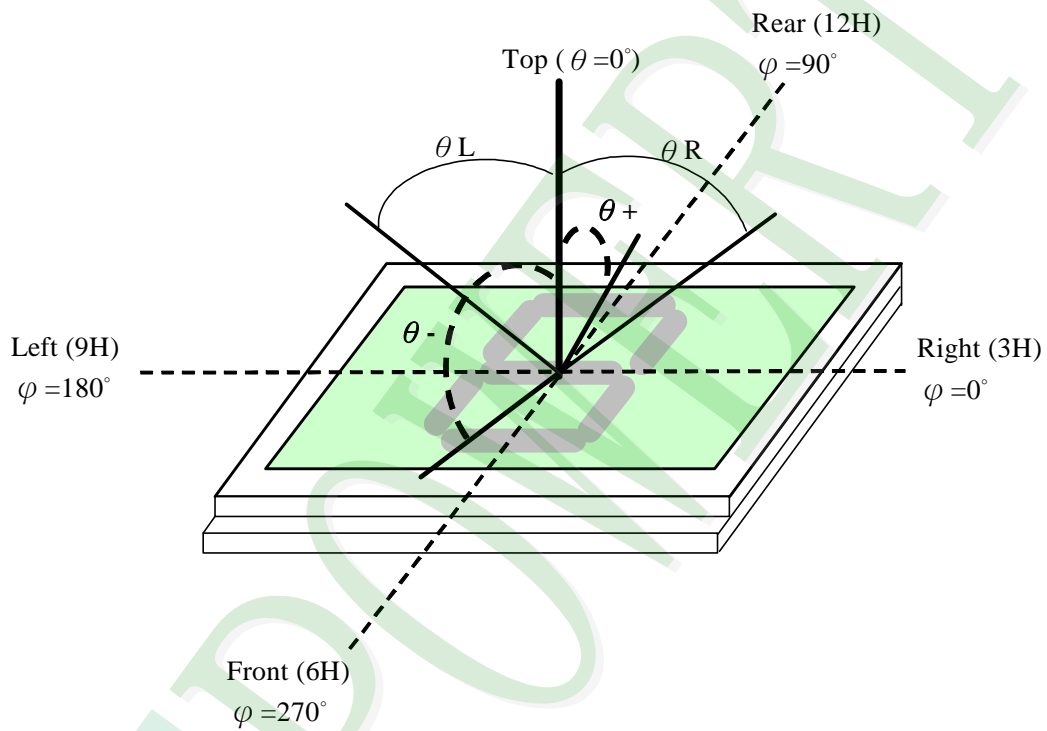


Colorimeter=BM-7 fast

Note 1.

Optical characteristics-2

Viewing angle

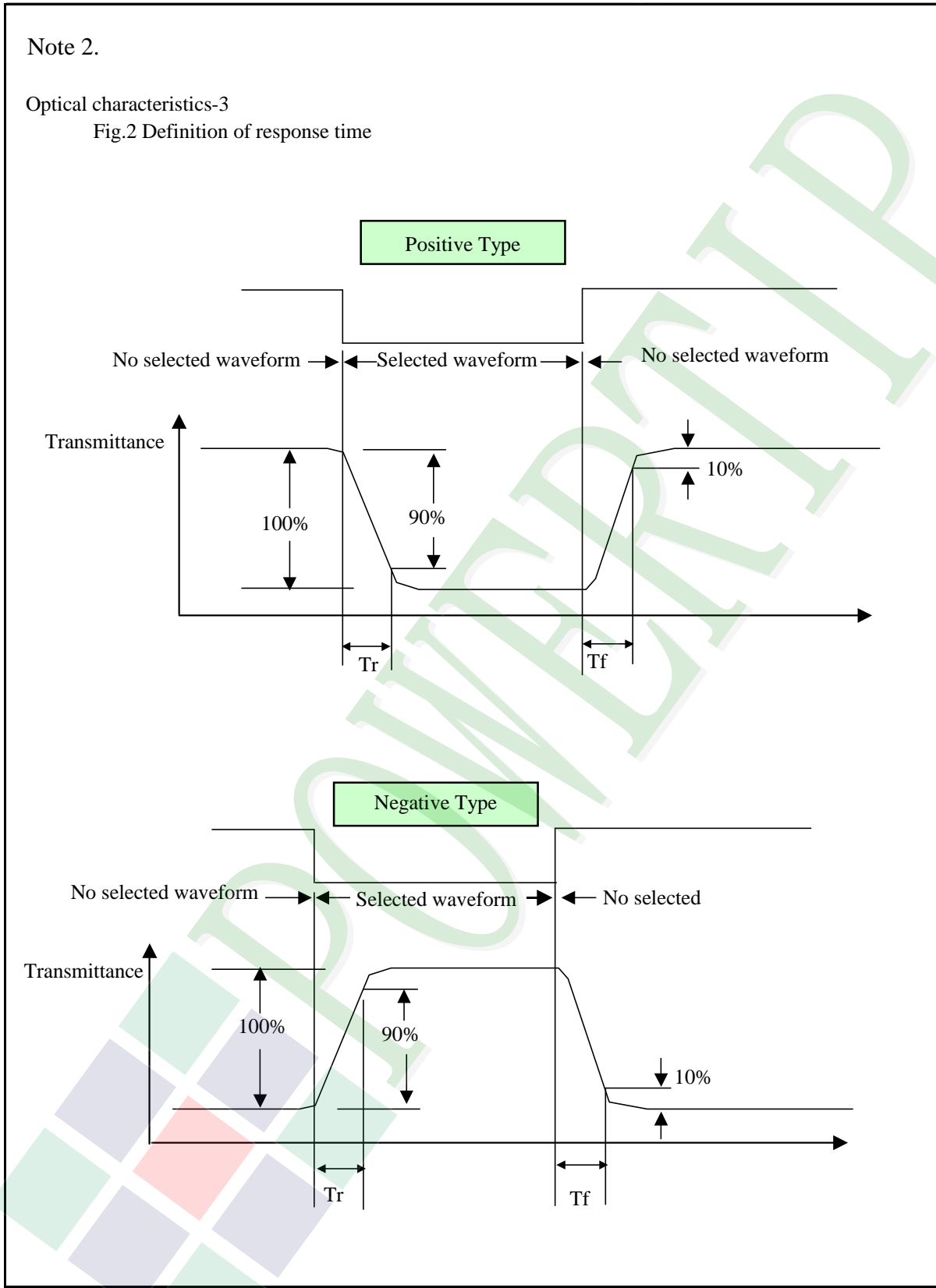


Viewing angle

Note 2.

Optical characteristics-3

Fig.2 Definition of response time







## Electrical characteristics-2

※2 Drive waveform

$V_{op}$ : Drive voltage

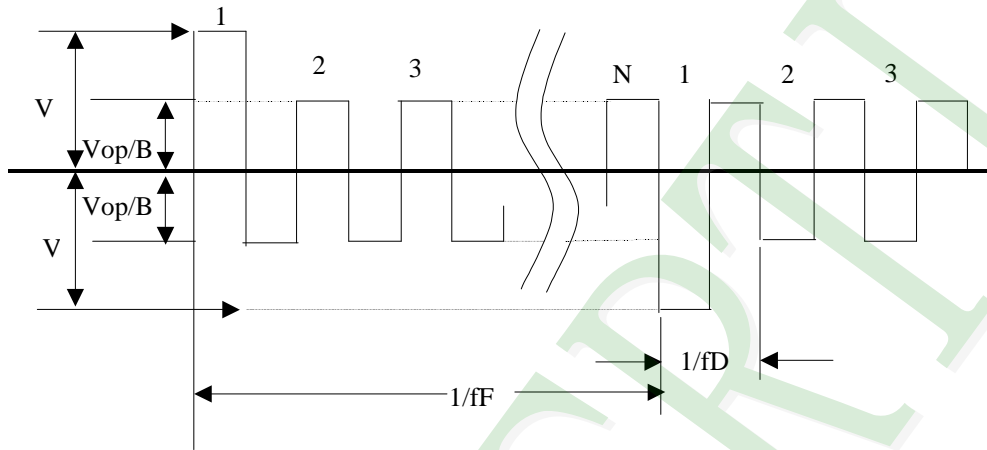
$f_F$ : Frame frequency

$1/B$ : Bias

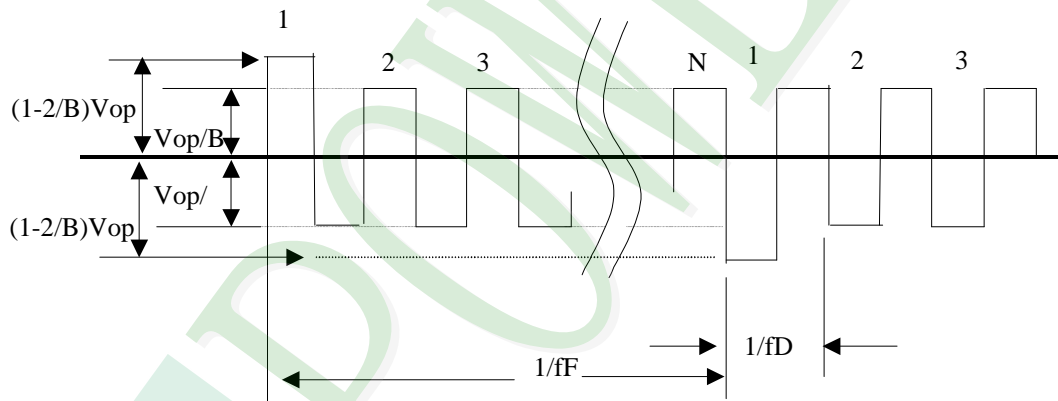
$f_D$ : Drive frequency

$N$ : Duty

### (1) Selected waveform



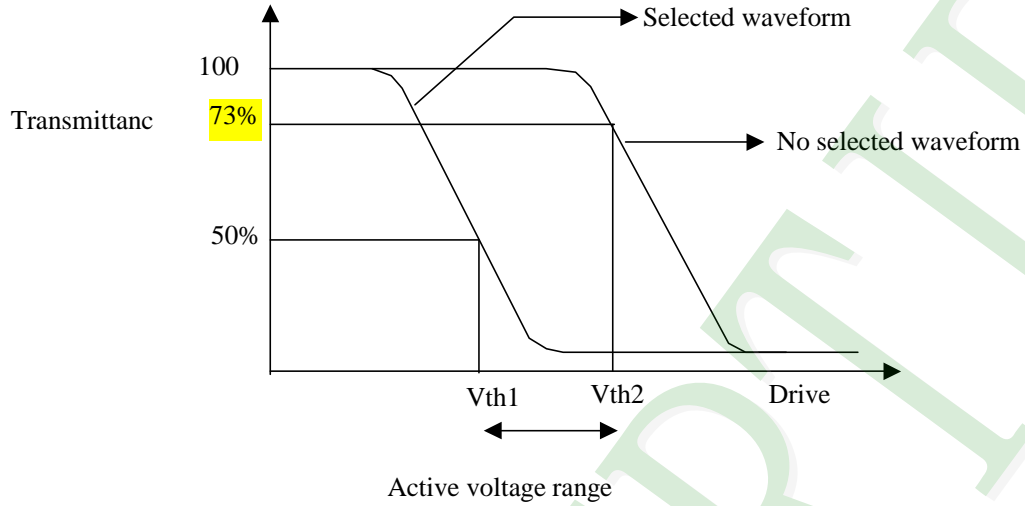
### (2) Non- Selected wave form



Note:

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

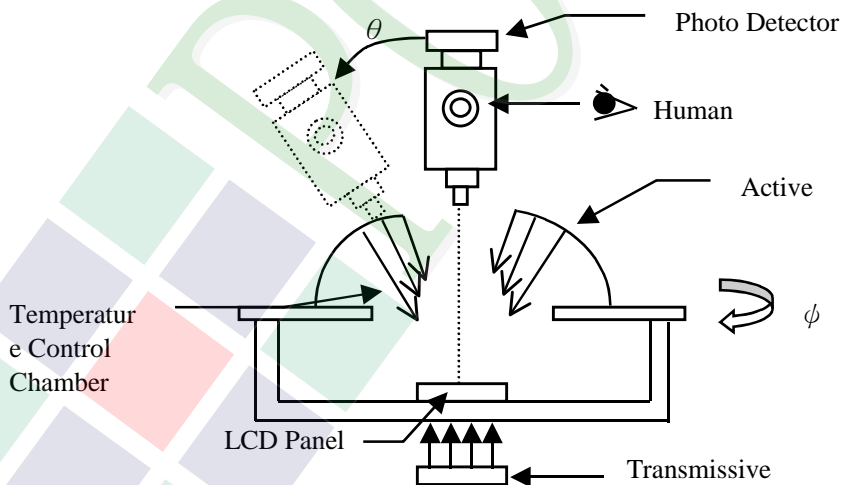
Note 3. : Definition of Vth



	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



## 1.6 Backlight Characteristics

LCD Module with LED Backlight

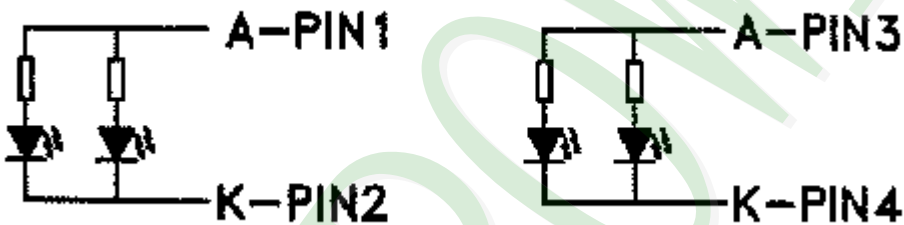
Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25°C	—	2 x 40	mA
Reverse Voltage	VR	Ta =25°C	—	5	V
Power Dissipation	PD	Ta =25°C	—	2 x 105	mW

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF=2 x 30 mA	3.1	3.3	3.5	V
CIE Color Coordinate (Without LCD)	X	IF=2 x 30 mA	0.27	0.30	0.33	—
	Y		0.28	0.31	0.34	
Color	White					

Internal Circuit Diagram:



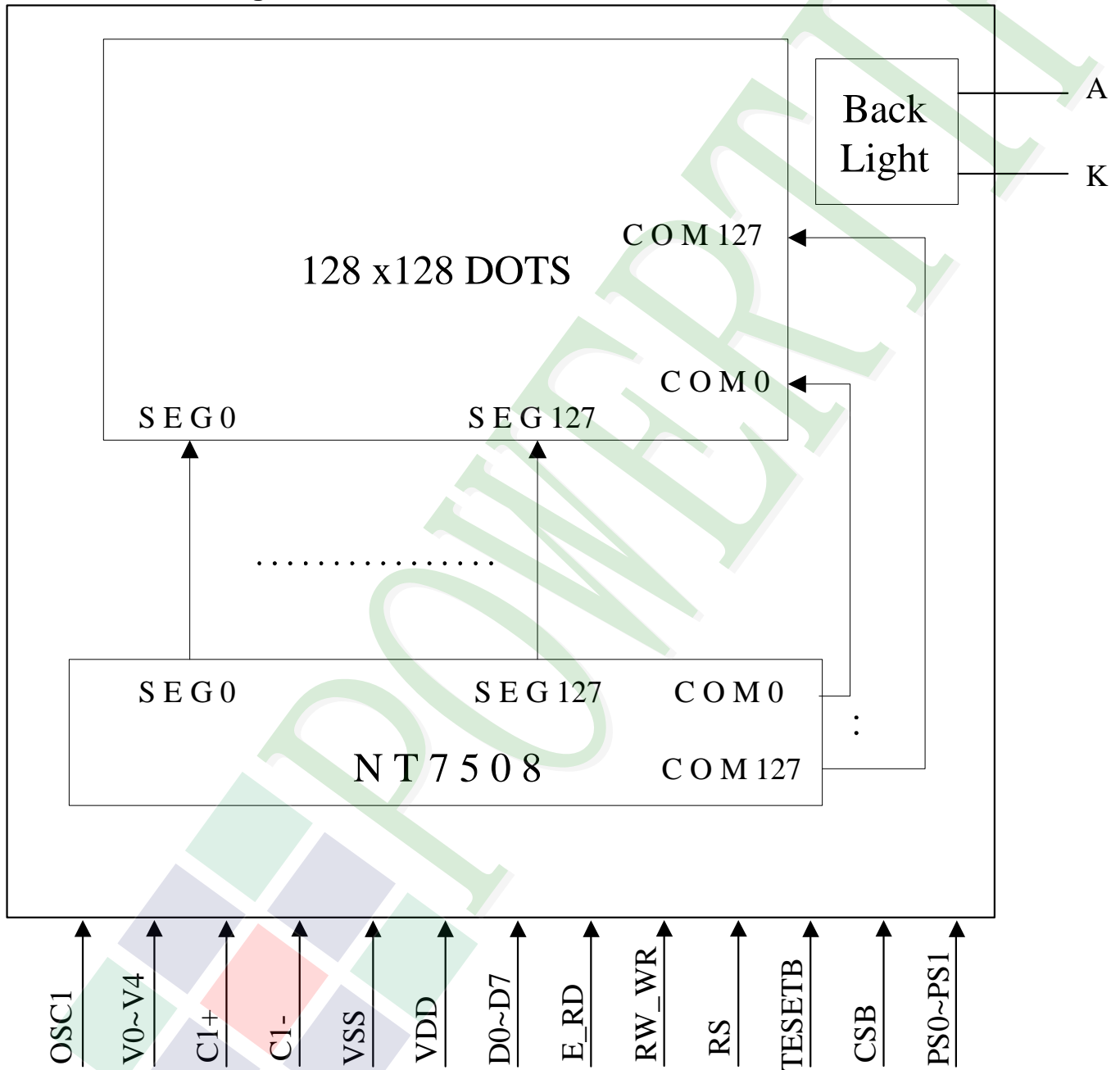
## 2. MODULE STRUCTURE

### 2.1 Counter Drawing

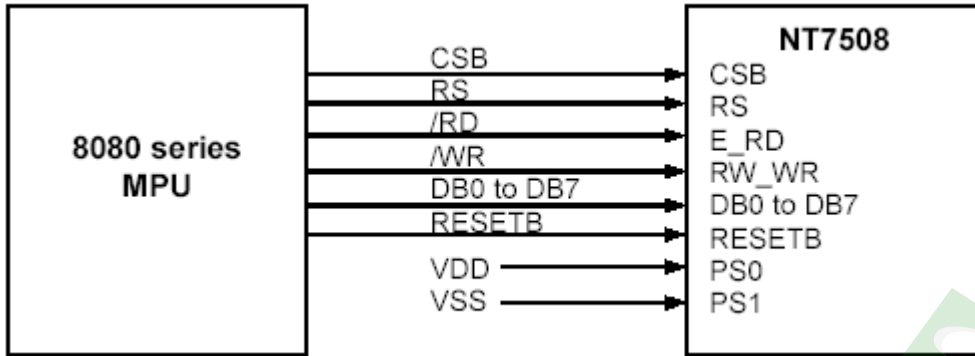
#### 2.1.1 LCM Mechanical Diagram

\* See Appendix

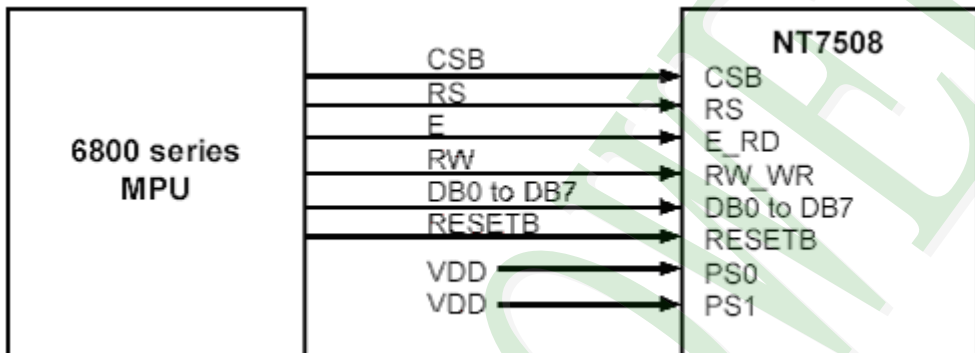
#### 2.1.2 Block Diagram



### 2.1.3 Interface for 8080-series(PS0 =“H”,PS1= “L”)



### 2.1.4 Interface for 6800-series(PS0 =“H”,PS1= “H”)



## 2.2 Interface Pin Description (Please see , 2.4 Reference Power supply circuit)

Pin	Symbol	Description
01	A	LED anode supply
02	K	LED cathode supply
03	A	LED anode supply
04	K	LED cathode supply
05	OSC1	When using internal clock Oscillator, open this pin. When using external clock Oscillator, external OSC input pin.
06	V0	LCD driver supply voltage. Connecting 1uF/ 25V capacitor between this pin and Vss.
07	V1	LCD driver supply voltage. Connecting 1uF/ 25V capacitor between this pin and Vss.
08	V2	LCD driver supply voltage. Connecting 1uF/ 25V capacitor between this pin and Vss.
09	V3	LCD driver supply voltage. Connecting 1uF/ 25V capacitor between this pin and Vss.
10	V4	LCD driver supply voltage. Connecting 1uF/ 25V capacitor between this pin and Vss.
11	NC	No connecting.
12	NC	No connecting.
13	NC	Not used, Must be open.
14	C1+	C1+ connected to C1- with stabilization capacitor. (DC/DC voltage converter) 1.0uF~2.2uF/ (max rating) 6V
15	C1-	
16	NC	Not used, Must be open.
17	NC	Not used, Must be open.
18	VPC1 (VOUT)	This pin is connected to VSS with stabilization capacitor. 1.0uF ~2.2uF / (max rating) 10V
19	VSS	Ground
20	VDD	Power supply
21	DB7	Data Bus
22	DB6	Data Bus
23	DB5	Data Bus
24	DB4	Data Bus
25	DB3	Data Bus
26	DB2	Data Bus

27	DB1	Data Bus												
28	DB0	Data Bus												
29	E_RD	Read / Write execution control pin												
		<table border="1"> <thead> <tr> <th>PS1</th> <th>MPU Type</th> <th>E_RD</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>6800 series</td> <td>E</td> <td>Read / Write control input pin -RW="H" : When E is "H",DB0 to DB7 are in an output status. -RW="L" : The data on DB0 to DB7 are latched at the falling edge of the E signal</td> </tr> <tr> <td>L</td> <td>8080 series</td> <td>/ RD</td> <td>Read enable clock input pin When /RD is "L",DB0 to DB7 are in an output status.</td> </tr> </tbody> </table>	PS1	MPU Type	E_RD	Description	H	6800 series	E	Read / Write control input pin -RW="H" : When E is "H",DB0 to DB7 are in an output status. -RW="L" : The data on DB0 to DB7 are latched at the falling edge of the E signal	L	8080 series	/ RD	Read enable clock input pin When /RD is "L",DB0 to DB7 are in an output status.
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.														
30	RW_WR	Read / Write execution control pin												
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.														
31	RS	Register select input pin "H" : DB[7:0] are display data. "L" : DB[7:0] are control data.												
32	RESETB	Hardware reset pin												
33	CSB	Chip select input pin "H" : DB[7:0] are control data. "L" : Data/Instruction I/O is enable.												
		Interface select input pin. "H" : 6800 series. "L" : 8080 series.												
34	PS1	Data select input pin. "H" : Parallel ; "L" : Serial.												
35	PS0	Data select input pin. "H" : Parallel ; "L" : Serial.												

## 2.2.2 Refer Initial code:

```
void Initial_(void)
{
    /* Reset display */
    WriteCOM_( 0xE2 );
    WriteCOM_( 0x20 );
    /* display off */
    WriteCOM_( 0xAE );
    /* duty ratio */
    WriteCOM_( 0x48 );
    WriteCOM_( 0x80 );
    /* power save */
    //WriteCOM_( 0xa9 );
    /* Select ADC */
    WriteCOM_( 0xA1 );
    /* SHL Select Common output mode */
    WriteCOM_( 0xC0 );
    /* Initial COM0 register */
    WriteCOM_( 0x44 );
    WriteCOM_( 0x00 );
    WriteCOM_( 0xAB );
    /* Write command to set page */
    WriteCOM_( 0xB0 );
    /* Write command that set column to start (0x00h) */
    WriteCOM_( 0x10 );
    WriteCOM_( 0x00 );
}
```



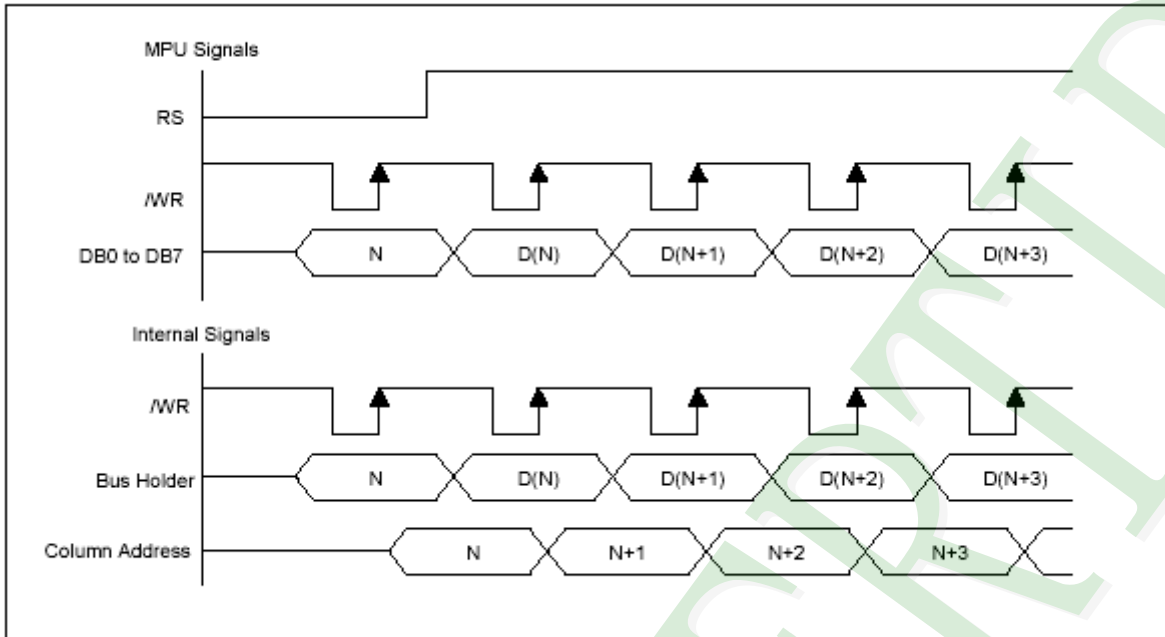
```
/* normal mode */
//vLCD_WriteCmd( 0x98 ); // HTB
/* Release power save mode */
WriteCOM_( 0xE1 );
/* Release n-line inversion */
WriteCOM_( 0xE4 );
/*Select DC-DC step-up*/
WriteCOM_( dcdc );
/* Select internal resistor ratio mode*/
WriteCOM_( res );
/* Set electronic volume mode */
WriteCOM_( 0x81 );
/* Set electronic volume register */
WriteCOM_( volume );
/* LCD Bias */
/* 51=1/6 53=1/8 54=1/9 55=1/10 57=1/12 */
//WriteCOM_( 0x54 ); //Bias 1/12 -> 1/9
WriteCOM_( 0x53 ); //SET 1/8 Bias 2013/1/
/* n-line inversion */
// WriteCOM_( 0x4F );
// WriteCOM_( 0x0A ); //customer code 0x05
/* FRC & PWM */
WriteCOM_( 0x93 );
/* Set gray scale mode and register */
WriteCOM_( 0x88 );
WriteCOM_( 0x00 );
```



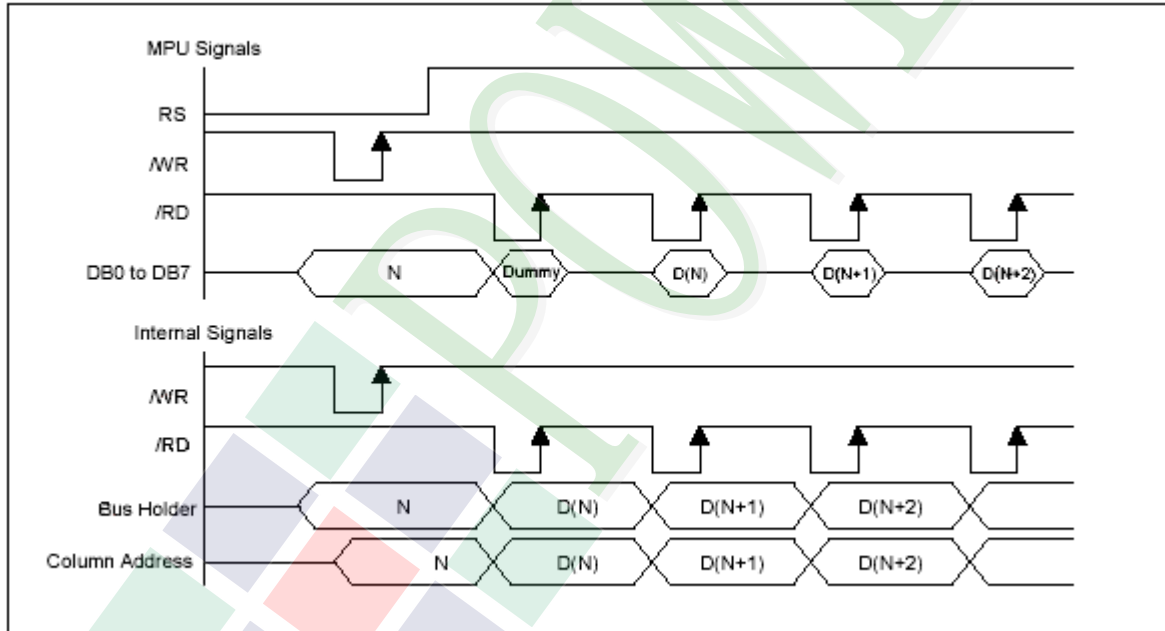
```
WriteCOM_( 0x89 );  
WriteCOM_( 0x00 );  
WriteCOM_( 0x8A );  
WriteCOM_( 0x00 );  
WriteCOM_( 0x8B );  
WriteCOM_( 0x00 );  
WriteCOM_( 0x8C );  
WriteCOM_( 0xFF );  
WriteCOM_( 0x8D );  
WriteCOM_( 0xFF );  
WriteCOM_( 0x8E );  
WriteCOM_( 0xFF );  
WriteCOM_( 0x8F );  
WriteCOM_( 0xFF );  
  
/* Set power control */  
WriteCOM_( 0x2F );  
  
/*Set Temperature Compensation*/  
WriteCOM_( 0xF1 );  
WriteCOM_( 0x01 ); //0 -0.125%// //1 -0.05%/□  
  
/* Lcd display ON */  
WriteCOM_( 0xAF );  
  
}
```

## 2.3 Timing Characteristics

### 2.3.1 Write Timing

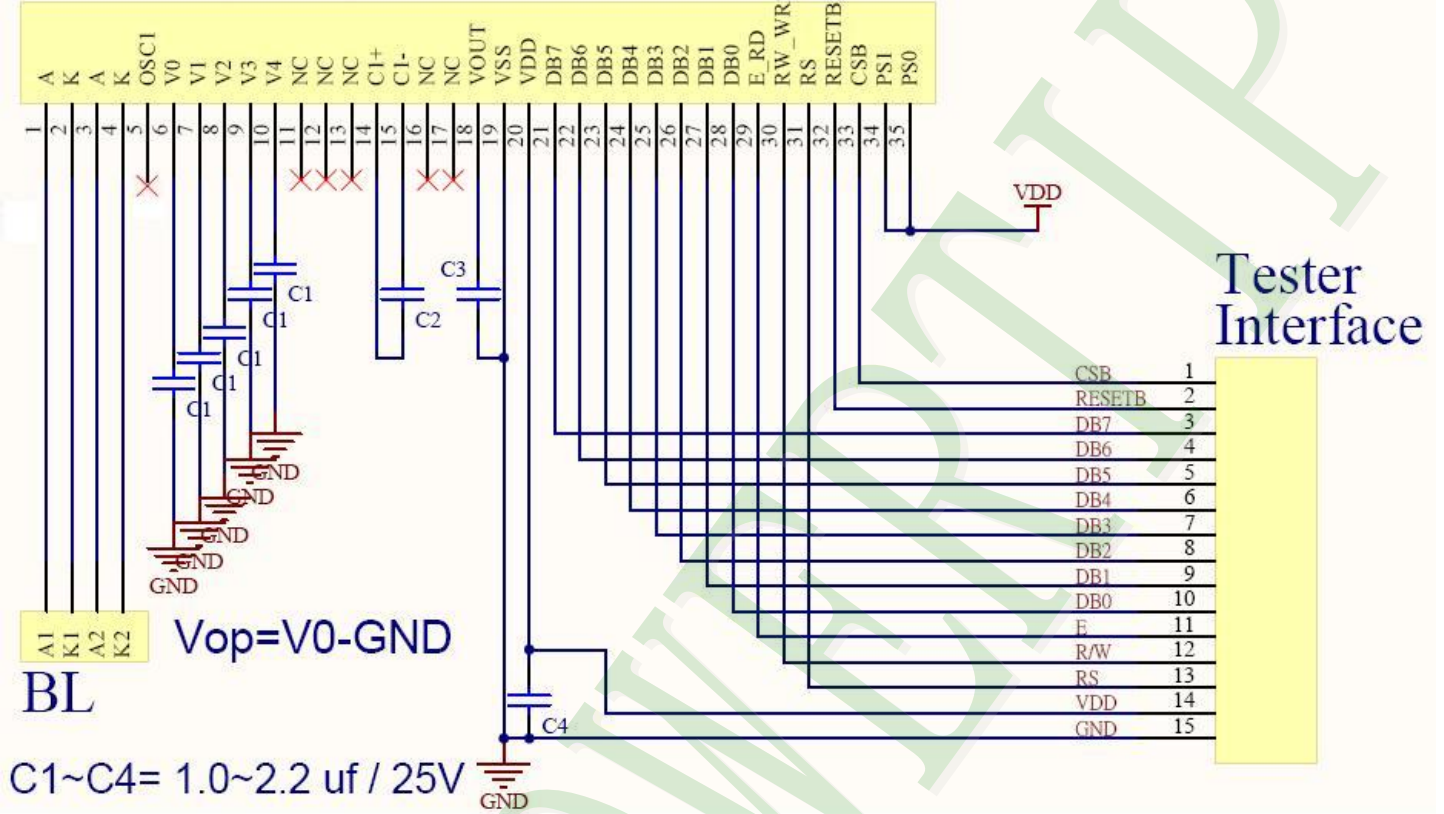


### 2.3.2 Read Timing



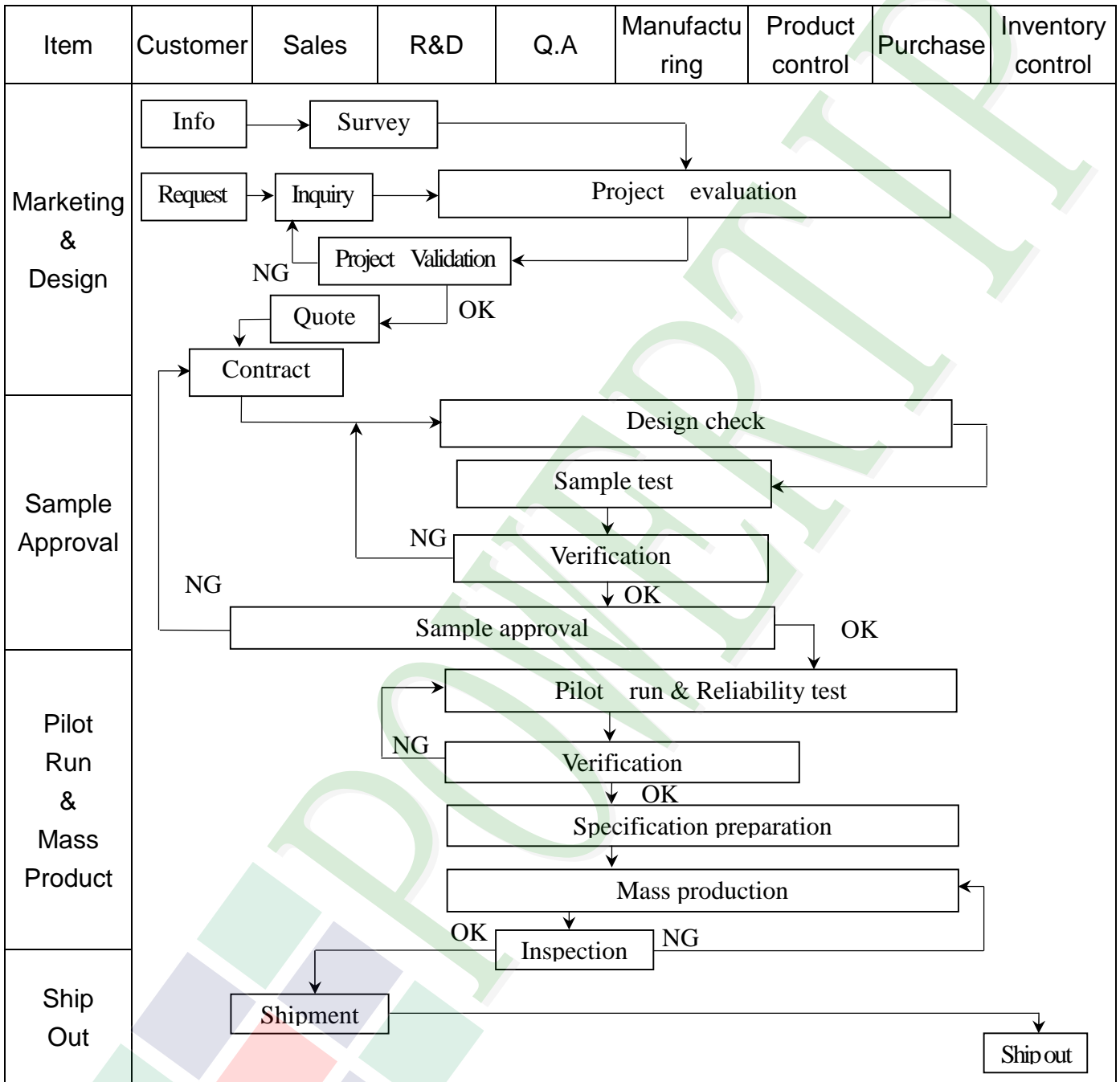
## 2.4 Reference Power supply circuit

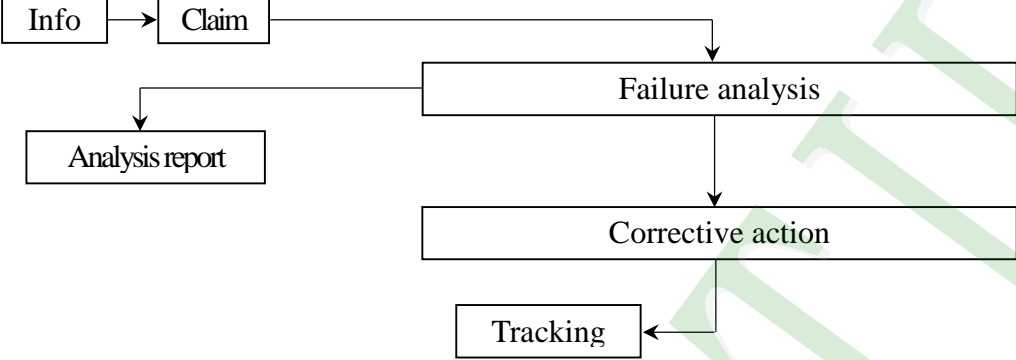
### LCM Interface



### 3. QUALITY ASSURANCE SYSTEM

#### 3.1 Quality Assurance Flow Chart



Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service	 <pre> graph TD     Info[Info] --&gt; Claim[Claim]     Claim --&gt; Failure[Failure analysis]     Failure --&gt; Report[Analysis report]     Failure --&gt; Action[Corrective action]     Action --&gt; Tracking[Tracking]           </pre>							
Q.A Activity	1. ISO 9001 Maintenance Activities 3. Equipment calibration 5. Standardization Management				2. Process improvement proposal 4. Education And Training Activities			

### 3.2 Inspection Specification

- ◆ Scope : The document shall be applied to LCD Module for Monotype and Color STN (Ver. 03).
- ◆ 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)

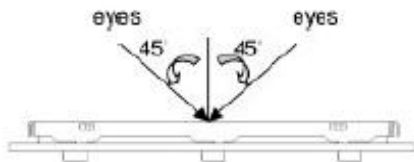


Fig.1

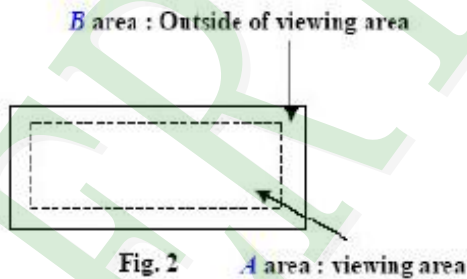


Fig. 2

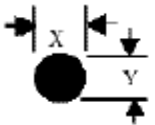
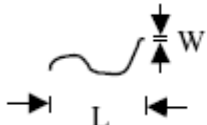
A area : viewing area

#### ◆ 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

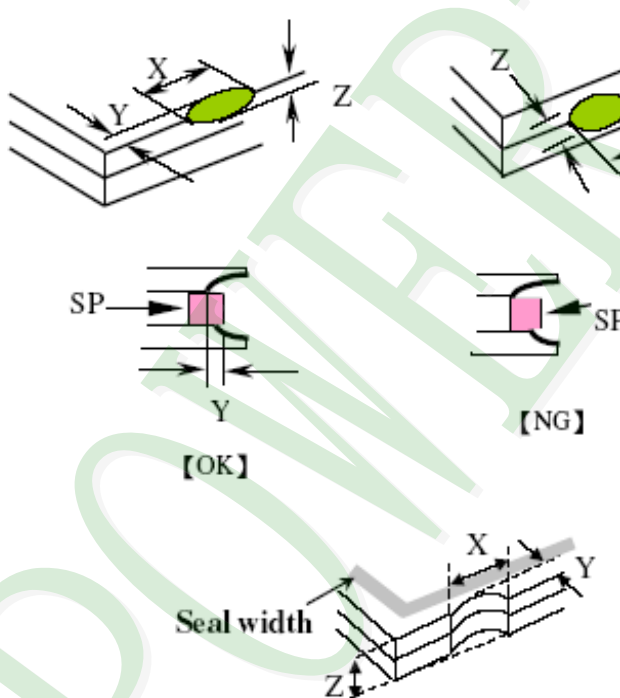


**◆ Specification For Monotype and Color STN :**
**(Ver. 03)**

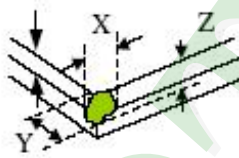
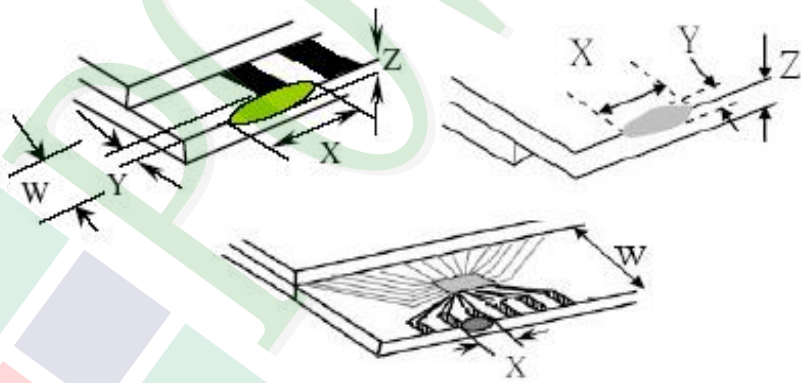
NO	Item	Criterion	level																																					
05	<p>Black or white dot , scratch , contamination</p> <p>Round type</p>  <p><math>\Phi = (x+y)/2</math></p> <p>Line type</p> 	<p>5. 1 Round type:</p> <p>5. 1. 1 display only :</p> <ul style="list-style-type: none"> <li>• White and black spots on display <math>\leq 0.30</math> mm , no more than 4 white or black spots present.</li> <li>• Densely spaced : NO more than two spots or lines within 3 mm.</li> </ul> <p>5. 1. 2 Non-display :</p> <table border="1"> <thead> <tr> <th rowspan="2">Dimension (diameter : <math>\Phi</math>)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.10</math></td> <td colspan="2">Accept no dense</td> </tr> <tr> <td><math>0.10 &lt; \Phi \leq 0.20</math></td> <td>3</td> <td rowspan="2">Ignore</td> </tr> <tr> <td><math>0.20 &lt; \Phi \leq 0.30</math></td> <td>2</td> </tr> <tr> <td>Total quantity</td> <td>4</td> <td></td> </tr> </tbody> </table> <p>5. 1. 3 Line type:</p> <table border="1"> <thead> <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> </thead> <tbody> <tr> <td>---</td> <td><math>W \leq 0.03</math></td> <td>Accept no dense</td> <td rowspan="3">Ignore</td> </tr> <tr> <td><math>L \leq 3.0</math></td> <td><math>0.03 &lt; W \leq 0.05</math></td> <td rowspan="2">4</td> </tr> <tr> <td><math>L \leq 2.5</math></td> <td><math>0.05 &lt; W \leq 0.075</math></td> </tr> <tr> <td>---</td> <td><math>W &gt; 0.075</math></td> <td colspan="2">As round type</td> </tr> </tbody> </table>	Dimension (diameter : $\Phi$ )	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.10$	Accept no dense		$0.10 < \Phi \leq 0.20$	3	Ignore	$0.20 < \Phi \leq 0.30$	2	Total quantity	4		Dimension		Acceptance (Q'ty)		Length (L)	Width (W)	A area	B area	---	$W \leq 0.03$	Accept no dense	Ignore	$L \leq 3.0$	$0.03 < W \leq 0.05$	4	$L \leq 2.5$	$0.05 < W \leq 0.075$	---	$W > 0.075$	As round type		Minor
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**◆Specification For Monotype and Color STN :**
**(Ver. 03)**

NO	Item	Criterion	Level						
07	The crack of glass	<p><b>Symbols :</b></p> <p>X : The length of crack            Z : The thickness of crack            t : The thickness of glass</p> <p>Y : The width of crack.            W : terminal length            a : LCD side length</p>	Minor						
		<p><b>7.1 General glass chip :</b></p> <p><b>7.1.1 Chip on panel surface and crack between panels:</b></p>  <table border="1" data-bbox="510 1500 1276 1792"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td><math>\leq a</math></td> <td>Crack can't enter viewing area</td> <td><math>\leq 1/2 t</math></td> </tr> <tr> <td><math>\leq a</math></td> <td>Crack can't exceed the half of SP width.</td> <td><math>1/2 t &lt; Z \leq 2 t</math></td> </tr> </tbody> </table>		X	Y	Z	$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$
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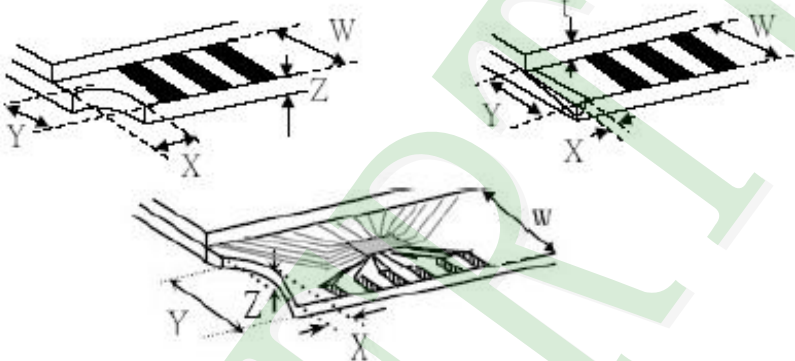
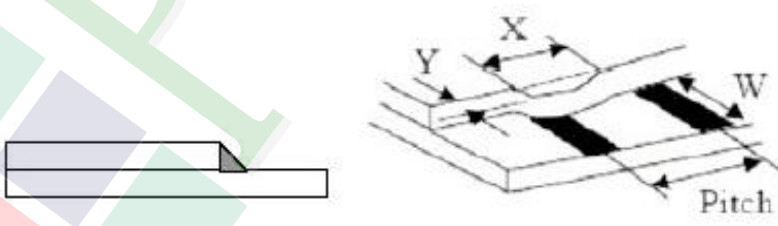
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**(Ver. 03)**

NO	Item	Criterion	Level									
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<p>7.2 Protrusion over terminal :</p> <p>7.2.1 Chip on electrode pad :</p>  <table border="1" data-bbox="478 1668 1228 1848"> <thead> <tr> <th></th> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>Front</td> <td><math>\leq a</math></td> <td><math>\leq 1/2 W</math></td> <td><math>\leq t</math></td> </tr> <tr> <td>Back</td> <td colspan="3">Neglect</td> </tr> </tbody> </table>		X	Y	Z	Front	$\leq a$	$\leq 1/2 W$	$\leq t$	Back	Neglect		
	X	Y	Z									
Front	$\leq a$	$\leq 1/2 W$	$\leq t$									
Back	Neglect											



◆ Specification For Monotype and Color STN :

(Ver. 03)

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		<p>7.2.2 Non-conductive portion :</p>  <table border="1" data-bbox="587 1041 1193 1191"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td><math>\leq 1/3 a</math></td> <td><math>\leq W</math></td> <td><math>\leq t</math></td> </tr> </tbody> </table> <p>⊙ If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.</p> <p>7.2.3 Glass remain :</p>  <table border="1" data-bbox="510 1713 1177 1854"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td><math>\leq a</math></td> <td><math>\leq 1/3 W</math></td> <td><math>\leq t</math></td> </tr> </tbody> </table>		X	Y	Z	$\leq 1/3 a$	$\leq W$	$\leq t$	X	Y	Z
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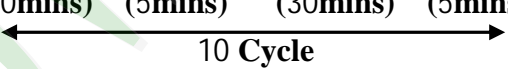
## ◆ Specification For Monotype and Color STN :

(Ver. 03)

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 $\leq 1.5$ mm.	Minor

## 4. RELIABILITY TEST

### 4.1 Reliability Test Condition

NO.	TEST ITEM	TEST CONDITION										
1	High Temperature Storage Test	Keep in $+80 \pm 2^\circ\text{C}$ 96 hrs Surrounding temperature, then storage at normal condition 4hrs.										
2	Low Temperature Storage Test	Keep in $-30 \pm 2^\circ\text{C}$ 96 hrs Surrounding temperature, then storage at normal condition 4hrs.										
3	High Temperature / High Humidity Storage Test	Keep in $+60^\circ\text{C}$ / 90% R.H duration for 96 hrs Surrounding temperature, then storage at normal condition 4hrs. (Excluding the polarizer)										
4	ESD Test	<b>Air Discharge:</b> Apply 2 KV with 5 times Discharge for each polarity +/-	<b>Contact Discharge:</b> Apply 250 V with 5 times discharge for each polarity +/-									
		1. Temperature ambience : $15^\circ\text{C} \sim 35^\circ\text{C}$ 2. Humidity relative : 30%~60% 3. Energy Storage Capacitance(Cs+Cd) : $150\text{pF} \pm 10\%$ 4. Discharge Resistance(Rd) : $330\Omega \pm 10\%$ 5. Discharge, mode of operation : Single Discharge (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication : $\pm 5\%$ )										
5	Temperature Cycling Storage Test	$-20^\circ\text{C} \rightarrow +25^\circ\text{C} \rightarrow +70^\circ\text{C} \rightarrow +25^\circ\text{C}$ (30mins) (5mins) (30mins) (5mins)  Surrounding temperature, then storage at normal condition 4hrs.										
6	Vibration Test (Packaged)	1. Sine wave 10~55 Hz frequency (1 min) 2. The amplitude of vibration : 1.5 mm 3. Each direction (X、Y、Z) duration for 2 Hrs										
7	Drop Test (Packaged)	<table border="1"> <thead> <tr> <th>Packing Weight (Kg)</th> <th>Drop Height (cm)</th> </tr> </thead> <tbody> <tr> <td>0 ~ 45.4</td> <td>122</td> </tr> <tr> <td>45.4 ~ 90.8</td> <td>76</td> </tr> <tr> <td>90.8 ~ 454</td> <td>61</td> </tr> <tr> <td>Over 454</td> <td>46</td> </tr> </tbody> </table> Drop direction : ※1 corner / 3 edges / 6 sides each 1times	Packing Weight (Kg)	Drop Height (cm)	0 ~ 45.4	122	45.4 ~ 90.8	76	90.8 ~ 454	61	Over 454	46
Packing Weight (Kg)	Drop Height (cm)											
0 ~ 45.4	122											
45.4 ~ 90.8	76											
90.8 ~ 454	61											
Over 454	46											

## 5. PRECAUTION RELATING PRODUCT HANDLING

### 5.1 SAFETY

- 5.1.1 If the LCD panel breaks, be careful not to get the liquid crystal to touch your skin.
- 5.1.2 If the liquid crystal touches your skin or clothes, please wash it off immediately by using soap and water.

### 5.2 HANDLING

- 5.2.1 Avoid any strong mechanical shock which can break the glass.
- 5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module , be sure to ground your body and any electrical equipment you may be using.
- 5.2.3 Do not remove the panel or frame from the module.
- 5.2.4 The polarizing plate of the display is very fragile. So, please handle it very carefully, do not touch , push or rub the exposed polarizing with anything harder than an HB pencil lead (glass , tweezers , etc.)
- 5.2.5 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- 5.2.6 Do not touch the display area with bare hands, this will stain the display area.
- 5.2.7 Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.
- 5.2.8 To control temperature and time of soldering is  $320 \pm 10^{\circ}\text{C}$  and 3-5 sec.
- 5.2.9 To avoid liquid (include organic solvent) stained on LCM

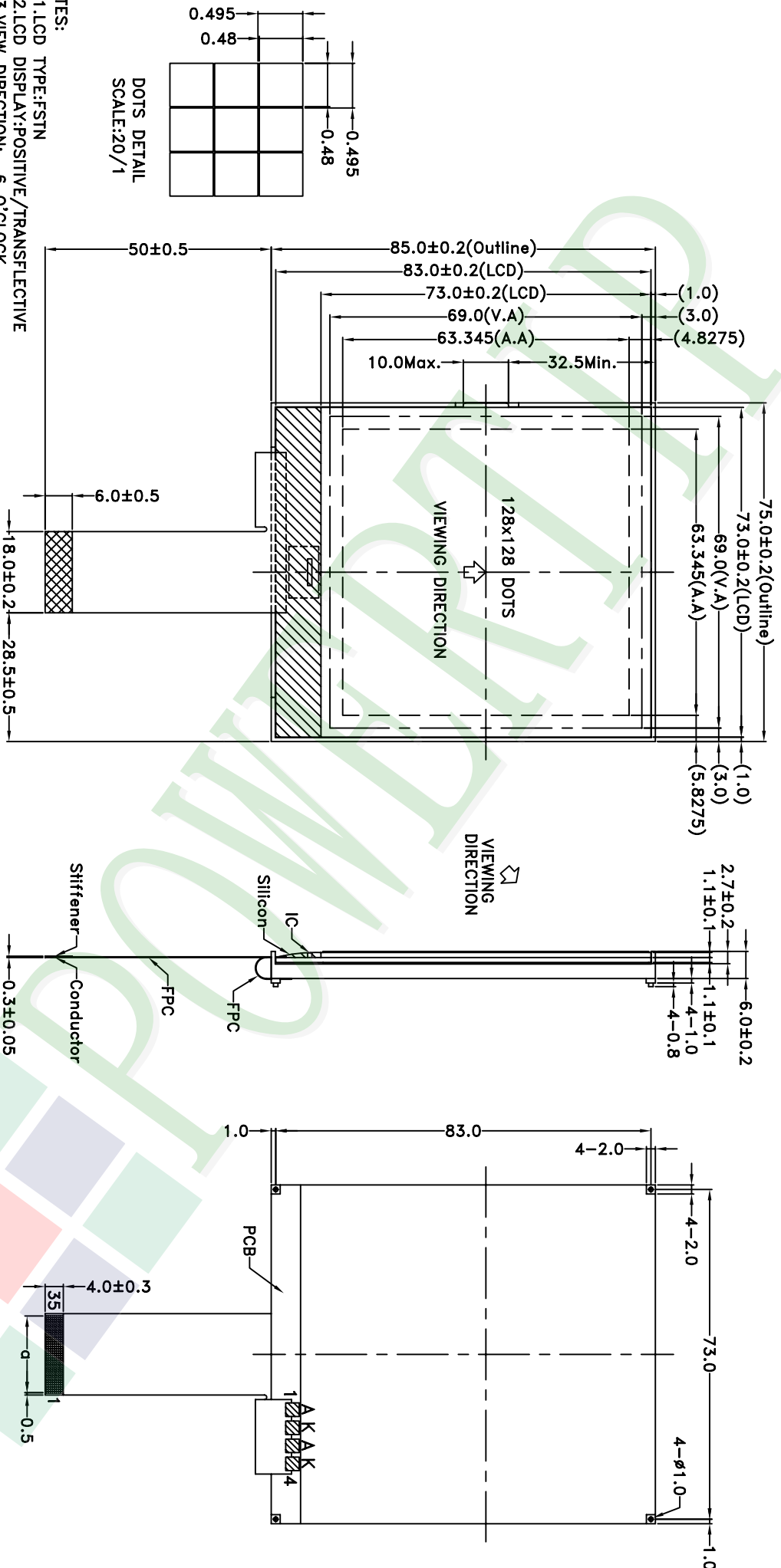
### 5.3 STORAGE

- 5.3.1 Store the panel or module in a dark place where the temperature is  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and the humidity is below 65% RH.
- 5.3.2 Do not place the module near organics solvents or corrosive gases.
- 5.3.3 Do not crush, shake, or jolt the module.

### 5.4 TERMS OF WARRANTY

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





DOTS DETAIL  
SCALE:20/1

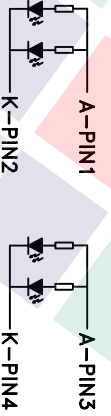
NOTES:

- 1.LCD TYPE:FSTN
- 2.LCD DISPLAY:POSITIVE/TRANSPARENT
- 3.VIEW DIRECTION: 6 O'CLOCK
- 4.Top: -20~70°C Tst:-30~80°C
- 5.The tolerance unless classified ±0.3mm
- 6.IC NO.:NT7508H-D01/3E
- 7.This product conforms ROHS
- 8.α=PO.5x34=17.0±0.05,W=0.3±0.05

007																				
006																				
005																				
004																				
003																				
002	MODIFY IC model				Sally															
001	NEW DRAWING				Jupel															
REV		REV BY		REVISER		DATE		TITLE:	LCD Module Drawing	Design	Sally	Check	Terry	Approve	Ryan	Page	1/1	Quantity		
								PART NO.:	PE128128WRF-005-HQ	DRAWING NAME:	LMD-PE128128WRF-005-HQ									

久正光电股份有限公司  
POWER TIP TECHNOLOGY CORPORATION

BACKLIGHT CIRCUIT DESIGN



精度	公差	精度
1 ~ 4	1 ~ 4	1 ~ 4
4 ~ 16	4 ~ 16	4 ~ 16
16 ~ 63	16 ~ 63	16 ~ 63
63 ~ 250	63 ~ 250	63 ~ 250
250 ~ 1000	250 ~ 1000	250 ~ 1000

# LCM包裝規格書

## LCM Packaging Specifications

(For Tray)

Approve	Check	Contact
Ryan	Terry	Air

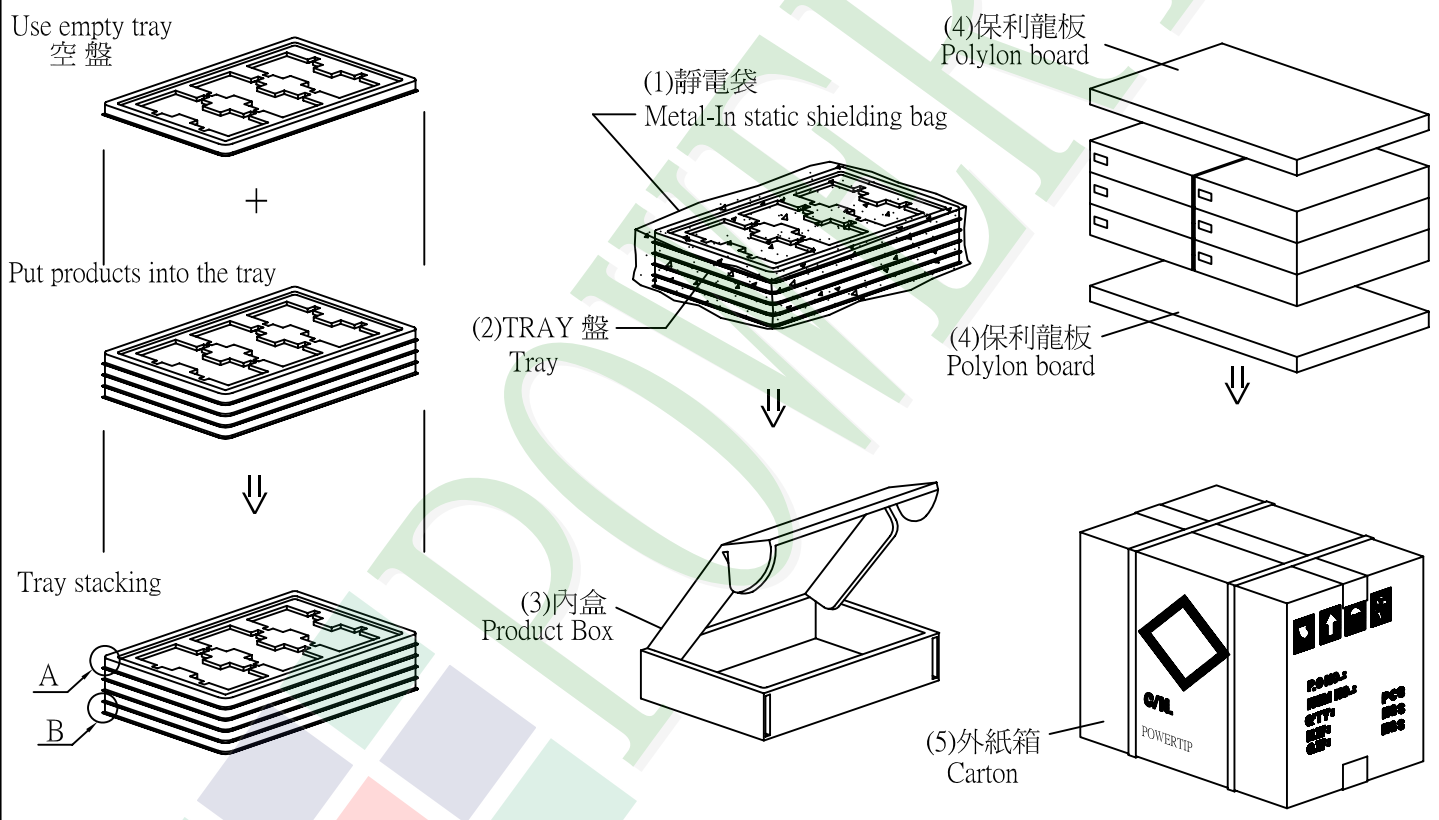
### 1. 包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PE128128WRF-005-HQ	75.0 X 85.0	0.065	144	9.36
2	靜電袋(1)Metal-In static shielding bag	BAG0000000027	510 X 430 X 0.075	0.03	6	0.18
3	TRAY 盤 (2)Tray	TY00000000254	352 X 260 X 15.5	0.1	30	3.0
4	內盒(3)Product Box	BX36627063ABBA	383 X 270 X 66	0.182	6	1.092
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	1.0	1	1.0
7						
8						
9						

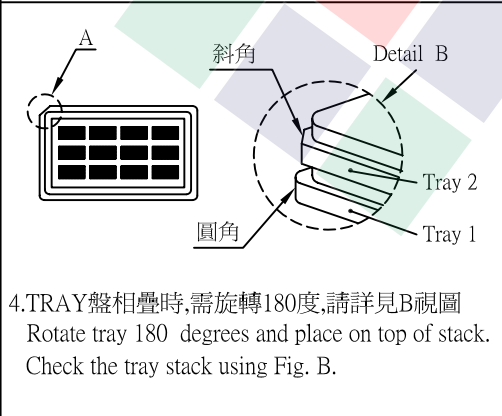
2. 一整箱總重量 (Total LCD Weight in carton) : 14.69 Kg±10%

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

(1) LCM quantity per box : no per tray	6	x no of tray	4	=	24
(2) Total LCM quantity in carton : quantity per box	24	x no of boxes	6	=	144



### 特 記 事 項 (REMARK)



5. Tray 及 BAG 為抗靜電材質。  
 Tray and BAG must be static dissipative material