



SPECIFICATIONS

CUSTOMER : PTC

SAMPLE CODE : SC1202LRS-AWT-B-Q

MASS PRODUCTION CODE : PC1202LRS-AWT-B-Q

SAMPLE VERSION : 01

SPECIFICATIONS EDITION : 002

DRAWING NO. (Ver.) : JLMD- PC1202LRS-AWT-B-Q_001

PACKAGING NO. (Ver.) : JPKG- PC1202LRS-AWT-B-Q_002

Customer Approved

Date:



Approved	Checked	Designer
閔偉	劉進	徐明菲

- Preliminary specification for design input
- Specification for sample approval

POWERTIP TECH. CORP.

Headquarters: No.8, 6th 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
[Http://www.powertip.com.tw](http://www.powertip.com.tw)

RECORDS OF REVISION

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
11/17/2017	01	001	New Sample	-	徐明菲
01/09/2018	01	002	Modify Specification(Modify LCM Packaging)	Appendix	徐明菲

Total : 28 Pages

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 Display Command
- 2.5 Character Pattern
- 2.6 JUMPER

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

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	12*2 Characters
LCD Type	STN, Gray, Positive, Transflective
Driver Condition	LCD Module : 1/16 Duty,1/4 Bias
Viewing Direction	6 O'clock
Weight	21.7g
Interface	4-bit or 8-bit MPU interface
Other(controller / driver IC)	ST7066U-OT
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website : http://www.powertip.com.tw/news.php?area_id_view=1085560481/

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	55.7(L)*32.0(W)*13.3(H)(Max)	mm
Viewing Area	46.7(L)*17.5(W)	mm
Active Area	37.85(L)*11.7(W)	mm
Dot Size	0.45(L)*0.6(W)	mm
Dot Pitch	0.55(L)*0.7(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	7.0	V
LCD Driver Supply Voltage	V _{LCD}	-	V _{DD} -10.0	V _{DD} +0.3	V
Input Voltage	V _{IN}	-	-0.3	V _{DD} +0.3	V
Operating Temperature	T _{OP}	-	0	50	°C
Storage Temperature	T _{ST}	-	-20	70	°C
Storage Humidity	H _D	T _a < 40 °C	-	90	%RH

1.4 DC Electrical Characteristics

VDD=5.0V±10% , VSS=0V , Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	V _{DD}	-	4.5	5.0	5.5	V
“H” Input Voltage	V _{IH}	-	0.7 V _{DD}	-	V _{DD}	V
“L” Input Voltage	V _{IL}	-	-0.3	-	0.6	V
“H” Output Voltage	V _{OH}	I _{OH} =-0.1mA	3.9	-	V _{DD}	V
“L” Output Voltage	V _{OL}	I _{OL} =0.1mA	-	-	0.4	V
Supply Current	I _{DD}	V _{DD} = 5.0 V; V _{OP} = 4.0V;	-	2.8	4.5	mA
LCM Driver Voltage	V _{OP} *1	0°C	4.0	4.2	4.4	V
		25°C	3.8	4.0	4.2	
		50°C	4.0	4.2	4.4	

NOTE: *1 The VOP test point is VDD-VO.

1.5 Optical Characteristics

LCD Panel : 1/16Duty , 1/4 Bias , $V_{LCD} = 4.0V$, $T_a = 25^{\circ}C$

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Reference
Response Time	Rise	tr	-	-	150	225	ms	Note2
	Fall	tf		-	200	300		
Viewing angle range	Top	$\theta Y+$	$C \geq 2.0$	-	40	-	Deg.	Notes 1
	Bottom	$\theta Y-$		-	40	-		
	Left	$\theta X-$		-	45	-		
	Right	$\theta X+$		-	45	-		
Contrast Ratio		C	IF=80mA	-	7	-		Note 3
Average Brightness (LCD & BL) *2		IV	IF=80mA	(15)	(25)	-	cd/m ²	
Wavelength (LCD & BL) *2		Hue		(572)	(575)	(578)	nm	Note 4
Uniformity (LCD & BL) *1		ΔB		70	-	-	%	

Note 4 :

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

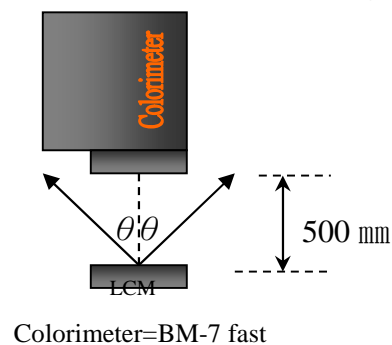
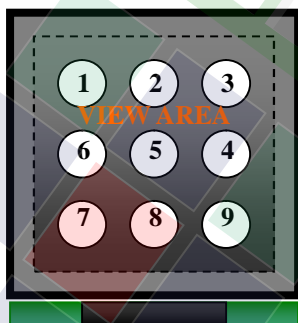
2 : Measurement Condition for Optical Characteristics:

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 ± 50 mm , ($\theta = 0^{\circ}$)

c : Equipment: TOPCON BM-7 fast , (field 1 $^{\circ}$) , after 10 minutes operation.

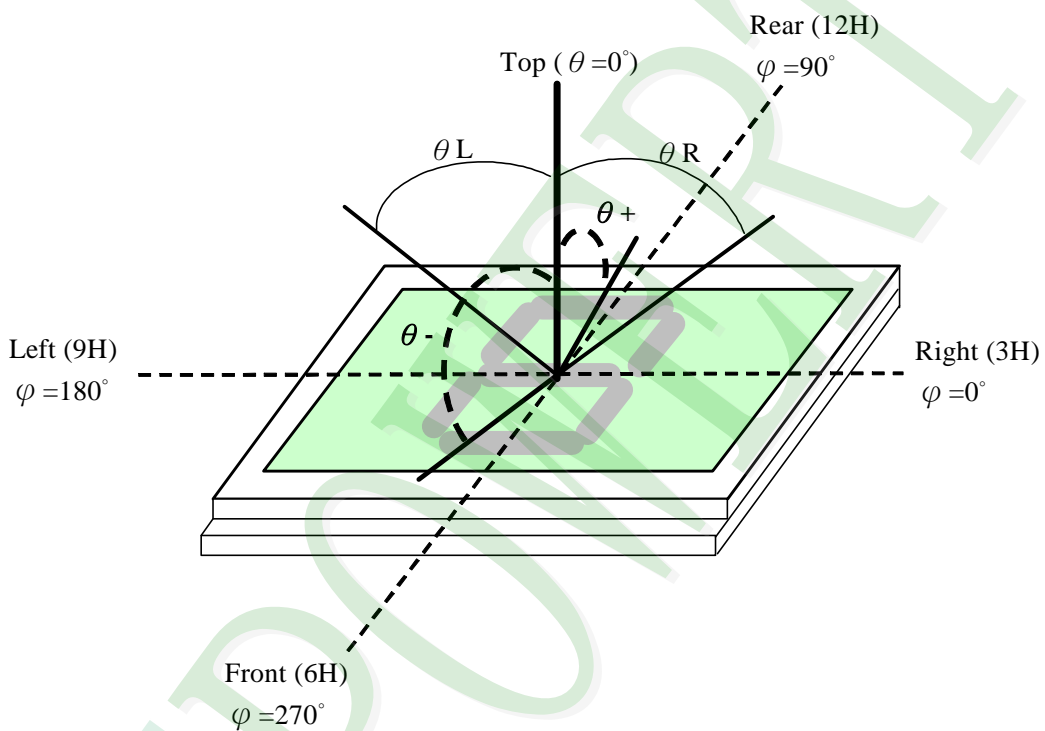
d : The uncertainty of the C.I.E coordinate measurement ± 0.01 , Average Brightness $\pm 4\%$



Note 1.

Optical characteristics-2

Viewing angle

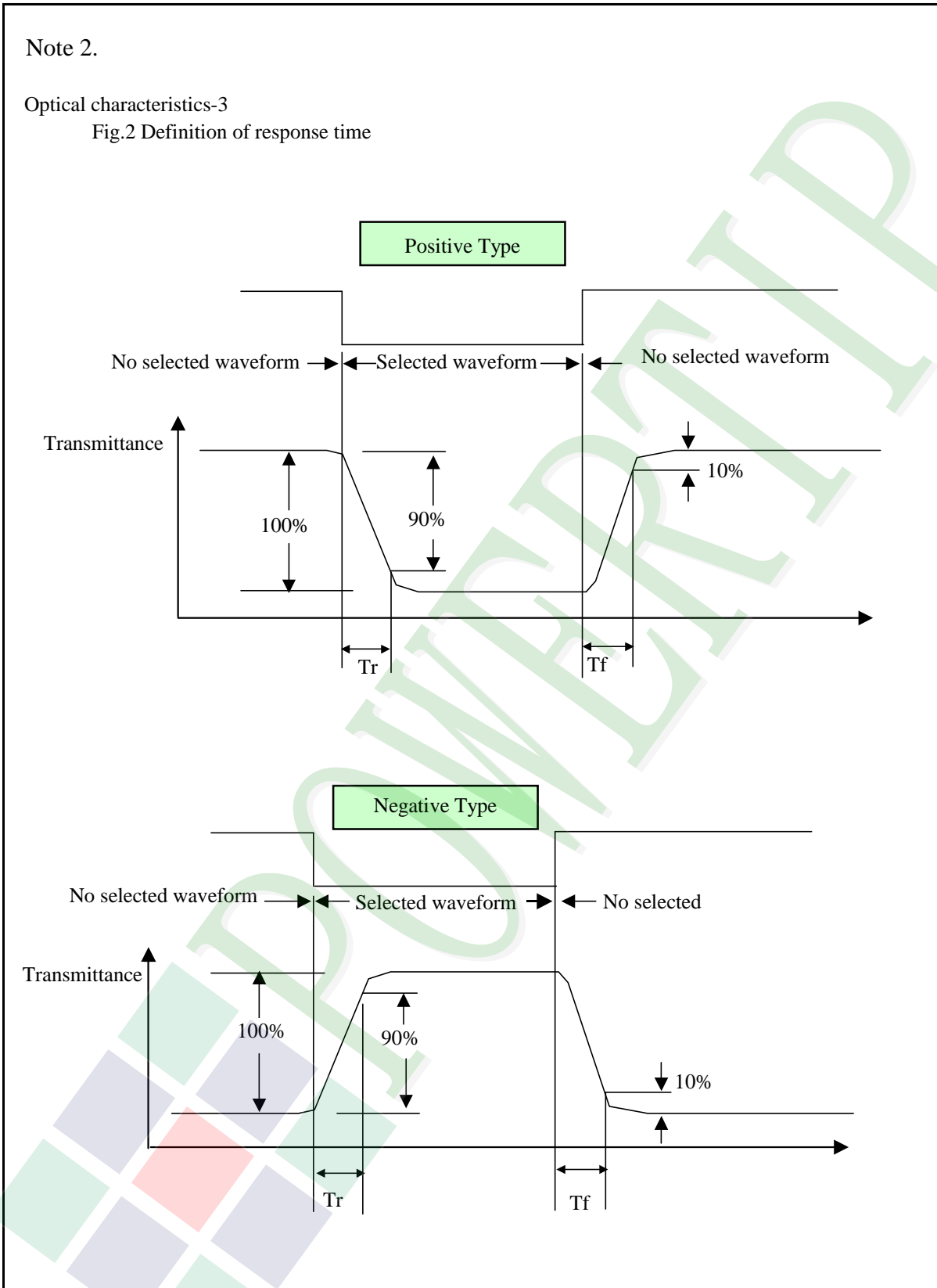


Viewing angle

Note 2.

Optical characteristics-3

Fig.2 Definition of response time



Electrical characteristics-2

※2 Drive waveform

Vop: Drive voltage

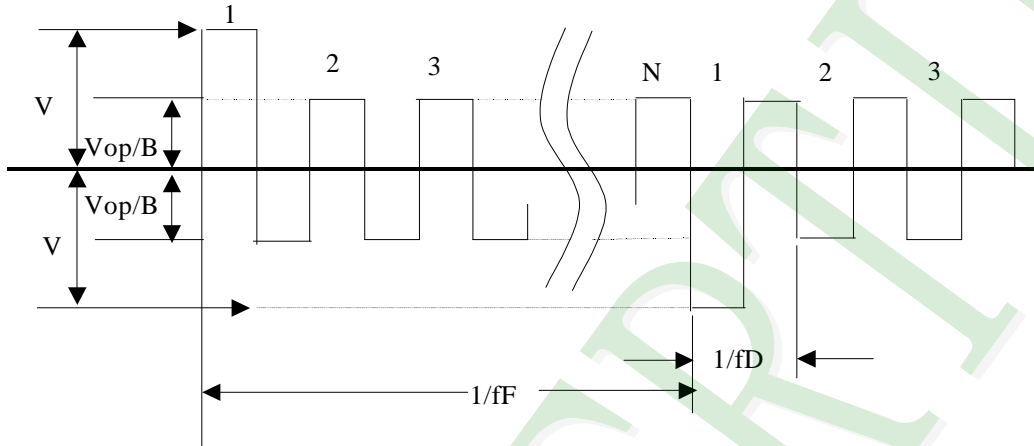
1/B: Bias

N: Duty

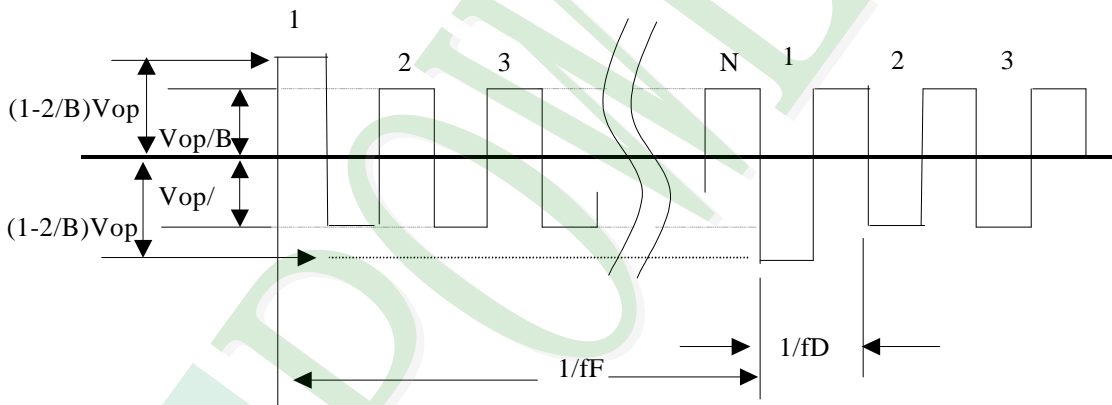
fF: Frame frequency

fD: Drive frequency

(1) Selected waveform



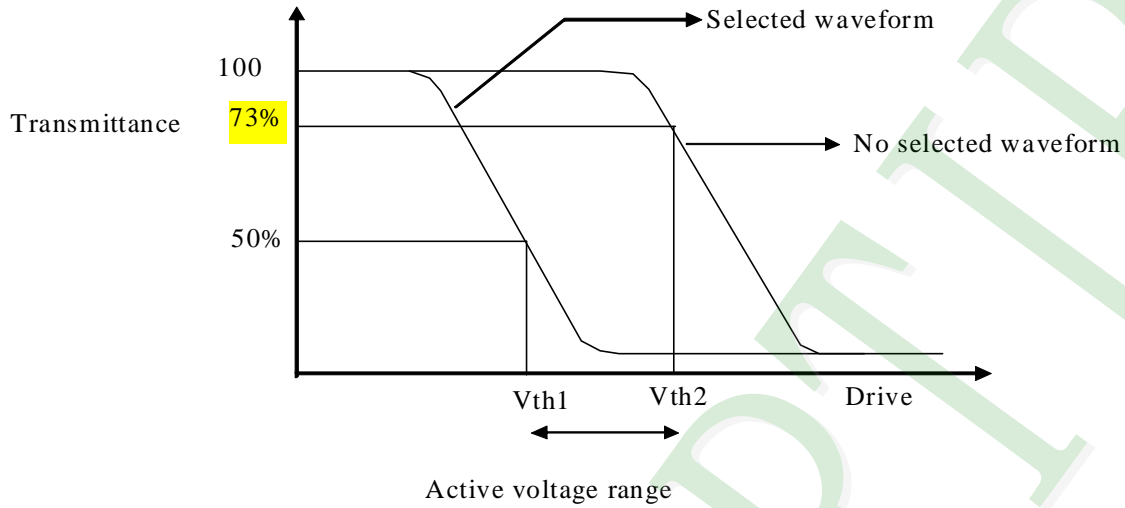
(2) Non- Selected wave form



Note:

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

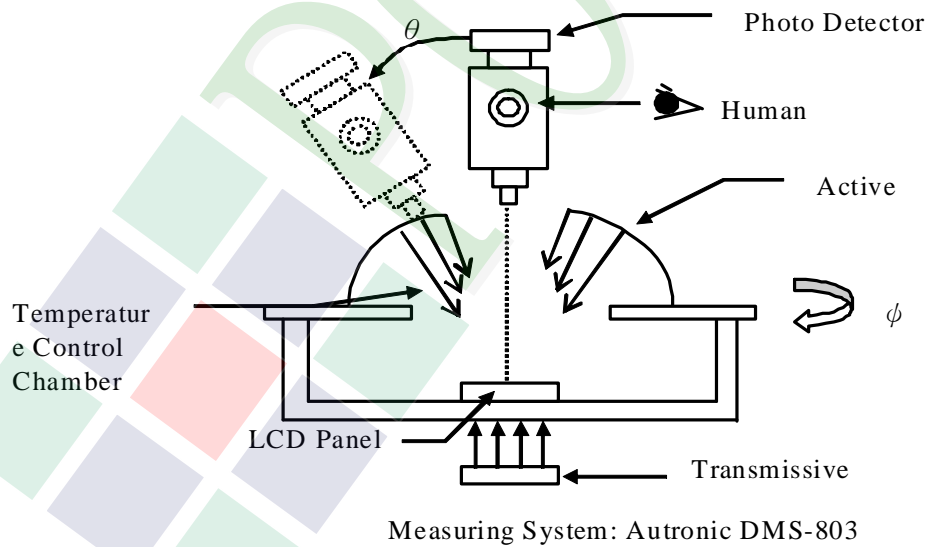
Note 3. : Definition of V_{th}



	V_{th1}	V_{th2}
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

Maximum Ratings

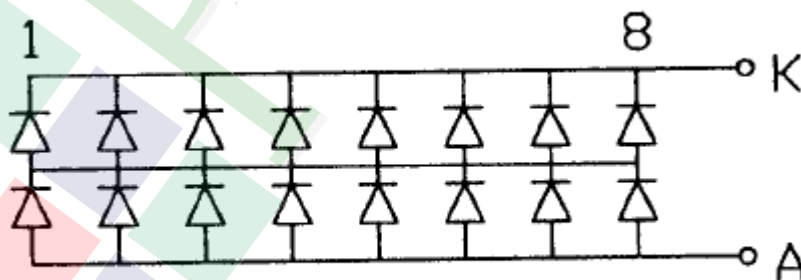
Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25°C	-	200	mA
Reverse Voltage	VR	Ta =25°C	-	8	V
Power Dissipation	PO	Ta =25°C	-	0.92	W

Electrical / Optical Characteristics

Ta =25°C

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 80mA	-	4.2	4.6	V
Reverse Current	IR	VR=8 V	-	-	0.08	mA
Average Brightness (without LCD)	IV	IF= 80mA	190	250	-	cd/m ²
Wavelength	λ_p		569	572	576	nm
Color	Yellow-green					

Internal Circuit Diagram:



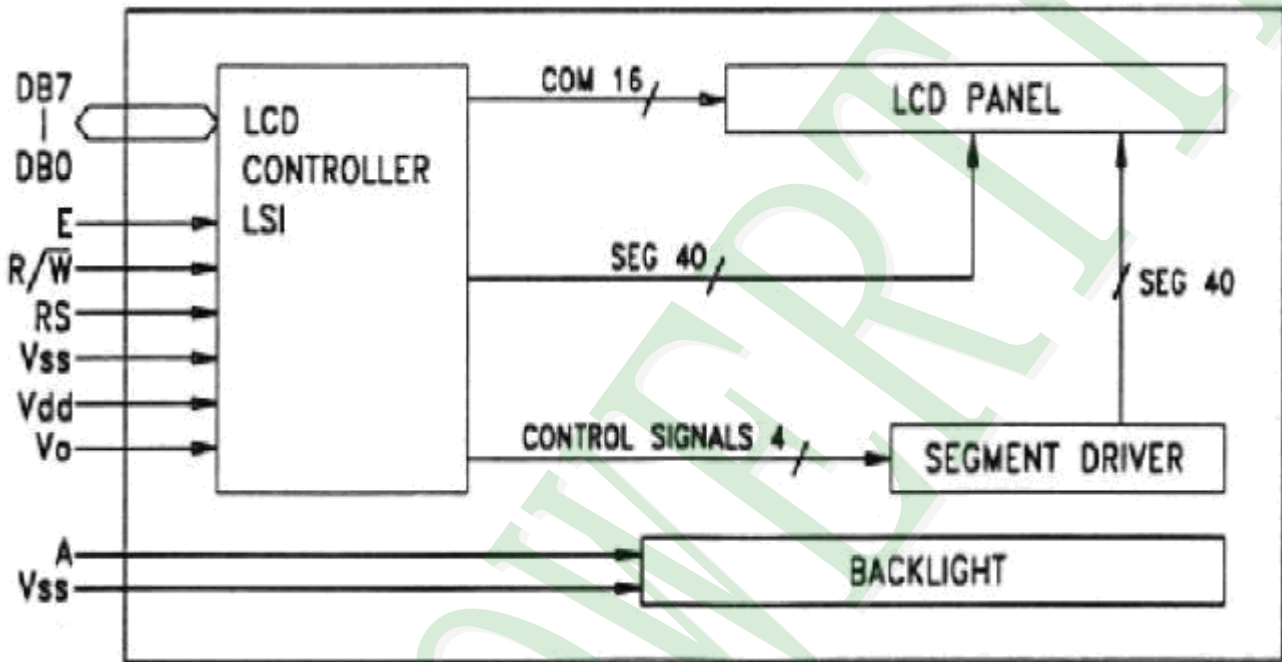
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram

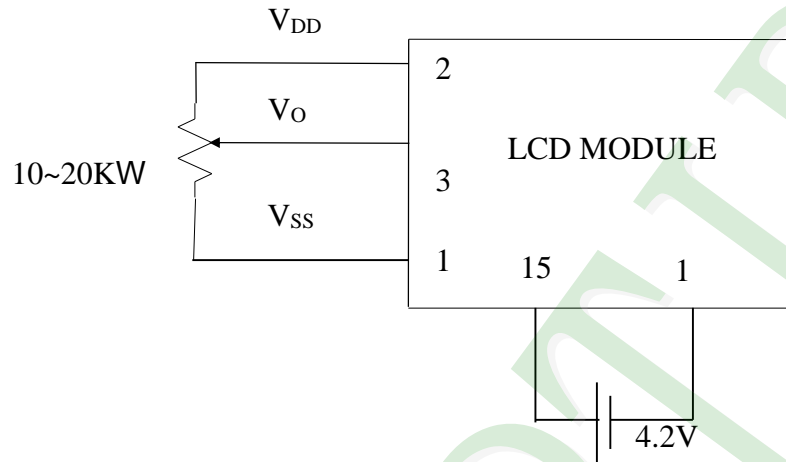


2.2 Interface Pin Description

Pin No.	Symbol	Signal Description
1	V _{SS} /K	Power Supply (V _{SS} =0)
2	V _{DD}	Power Supply (V _{DD} >V _{SS})
3	V _O	Operating voltage for LCD(variable).
4	RS	Register selection input. High= Date register Low=Instruction register (for write) Busy flag address counter (for read)
5	R/W	Read/Write signal input is used to select the read/write mode High=Read Mode, Low=Write Mode
6	E	Start enable signal to read or write the data
7~10	DB0~DB3	Four low order bi-directional three-state data bus lines. Used for data transfer between the MPU and the LCD module. These four are not used during 4-bit operation.
11~14	DB4~DB7	Four high order bi-directional three-state data bus lines. Used for data transfer between the MPU and the LCD module. DB7 can be used as a busy flag.
15	A	Power supply for LED backlight anode,LED backlight cathode is fixed to VSS.

2.2.1 Application Notes

Contrast Adjust



2.2.2 Refer Initial code

```
void initial()
```

```
{
```

```
    delay(40);
```

```
    write_com(0x01);
```

```
    delay(5);
```

```
    write_com(0x38);
```

```
    delay(5);
```

```
    write_com(0x0c);
```

```
    delay(5);
```

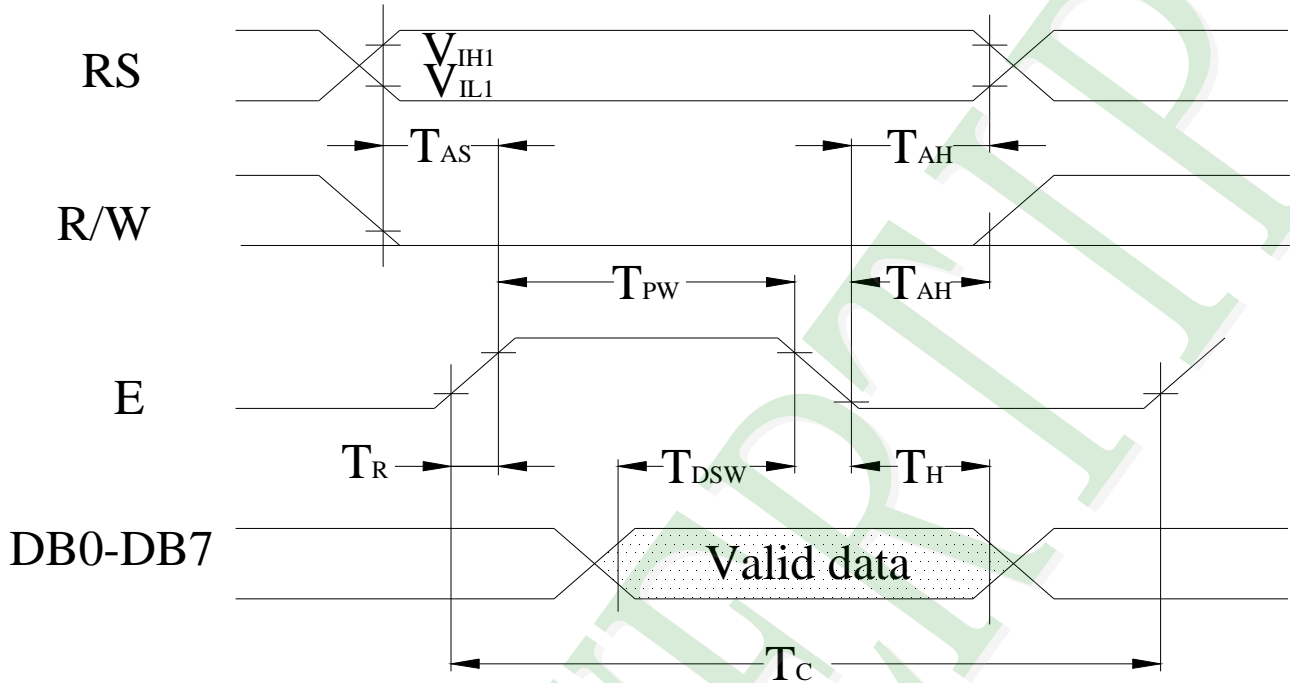
```
    write_com(0x06)
```

```
    delay(5);
```

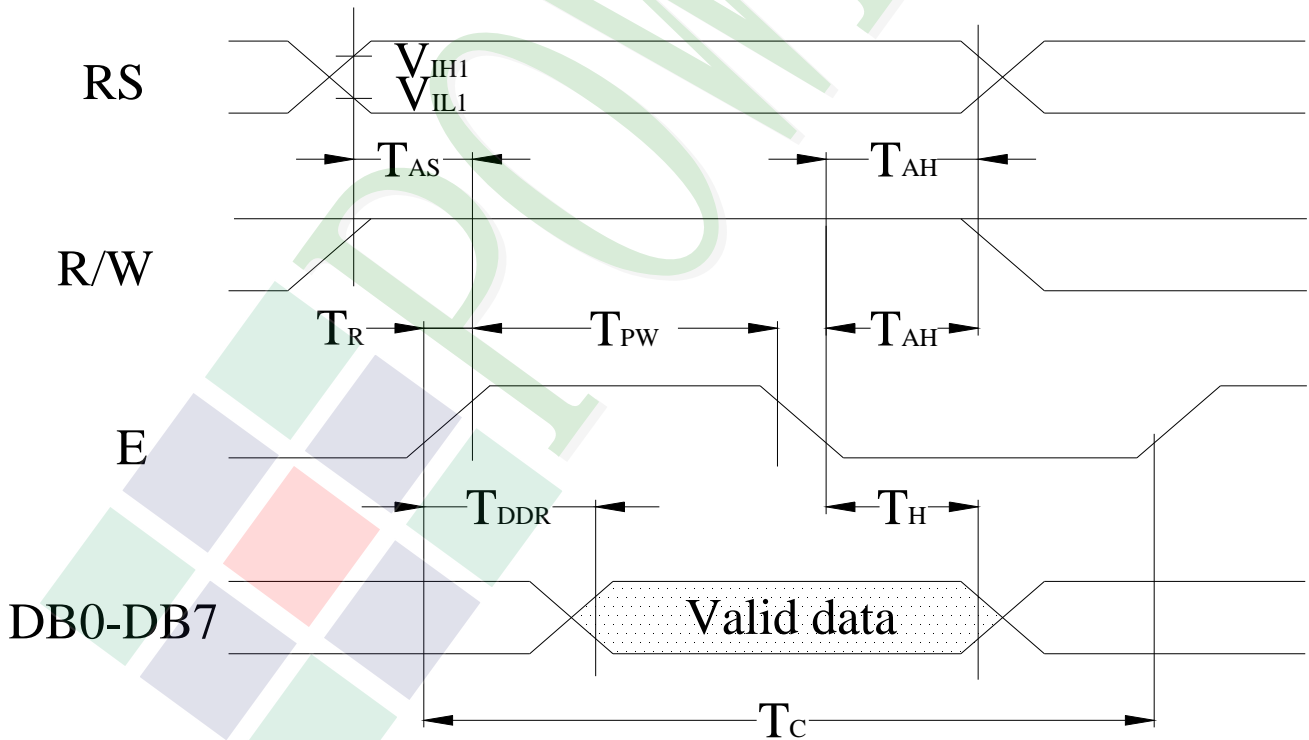
```
}
```

2.3 Timing Characteristics

- Writing data from MPU to ST7066U



I Reading data from ST7066U to MPU



· Write Mode (Writing data from MPU to ST7066U)

(VDD = +5V, Ta=25°C)

Symbol	Characteristics	Test Condition	Min.	Typ.	Max.	Unit
T _C	Enable Cycle Time	Pin E	1200	-	-	ns
T _{PW}	Enable Pulse Width	Pin E	140	-	-	ns
T _R , T _F	Enable Rise / Fall Time	Pin E	-	-	25	ns
T _{AS}	Address Setup Time	Pins: RS , RW,E	0	-	-	ns
T _{AH}	Address Hold Time	Pins :RS,RW,E	10	-	-	ns
T _{DSW}	Data Setup Time	Pins:DB0~DB7	40	-	-	ns
T _H	Data Hold Time	Pins:DB0~DB7	10	-	-	ns

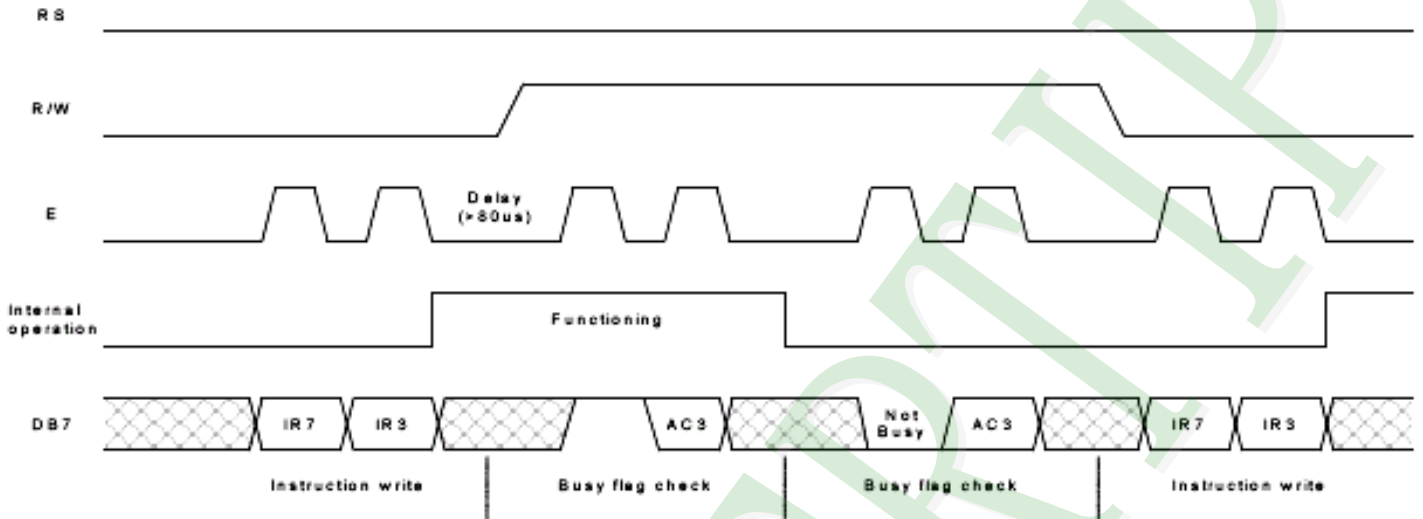
· Read Mode (Reading data from ST7066U to MPU)

(VDD= +5V, Ta=25°C)

Symbol	Characteristics	Test Condition	Min.	Typ.	Max.	Unit
T _C	Enable Cycle Time	Pin E	1200	-	-	ns
T _{PW}	Enable Pulse Width	Pin E	140	-	-	ns
T _R , T _F	Enable Rise / Fall Time	Pin E	-	-	25	ns
T _{AS}	Address Setup Time	Pins: RS , RW,E	0	-	-	ns
T _{AH}	Address Hold Time	Pins :RS,RW,E	10	-	-	ns
T _{DDR}	Data Setup Time	Pins:DB0~DB7	-	-	100	ns
T _H	Data Hold Time	Pins:DB0~DB7	10	-	-	ns

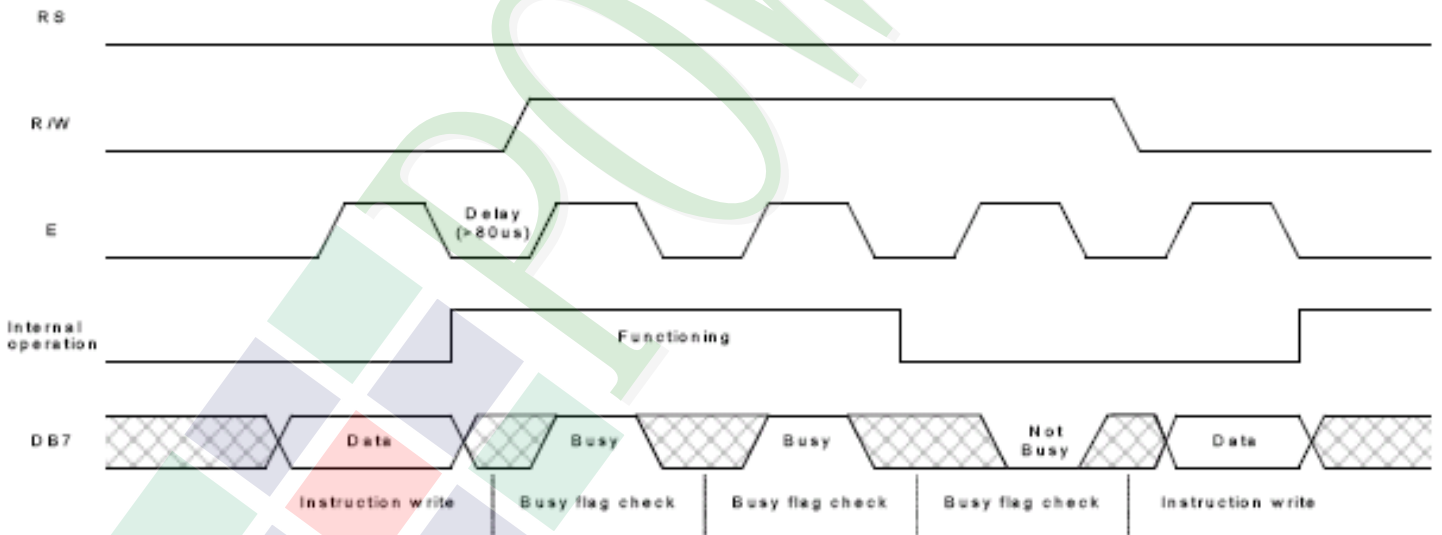
For 4-bit interface date, only four bus lines (DB4 to DB7) are used for transfer.

Example of busy flag check timing sequence



For 8-bit interface date, all eight bus lines (DB0 to DB7) are used .

Example of busy flag check timing sequence



2.4 Character Pattern

ST7066-0T

b7-b4 b3-b0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
0000	CG FAM (1)			0	1	2	3	4			5	6	7	8	9	0
0001	(2)	.	1	2	3	4	5	6			7	8	9	0	1	2
0010	(3)		"	2	3	4	5	6			7	8	9	0	1	2
0011	(4)		#	3	4	5	6	7			8	9	0	1	2	3
0100	(5)		\$	4	5	6	7	8			9	0	1	2	3	4
0101	(6)		%	5	6	7	8	9			0	1	2	3	4	5
0110	(7)		&	6	7	8	9	0			1	2	3	4	5	6
0111	(8)		*	7	8	9	0	1			2	3	4	5	6	7
1000	(1)		(8	9	0	1	2			3	4	5	6	7	8
1001	(2))	9	0	1	2	3			4	5	6	7	8	9
1010	(3)		*	0	1	2	3	4			5	6	7	8	9	0
1011	(4)		+	1	2	3	4	5			6	7	8	9	0	1
1100	(5)		=	2	3	4	5	6			7	8	9	0	1	2
1101	(6)		-	3	4	5	6	7			8	9	0	1	2	3
1110	(7)		_	4	5	6	7	8			9	0	1	2	3	4
1111	(8)		/	5	6	7	8	9			0	1	2	3	4	5

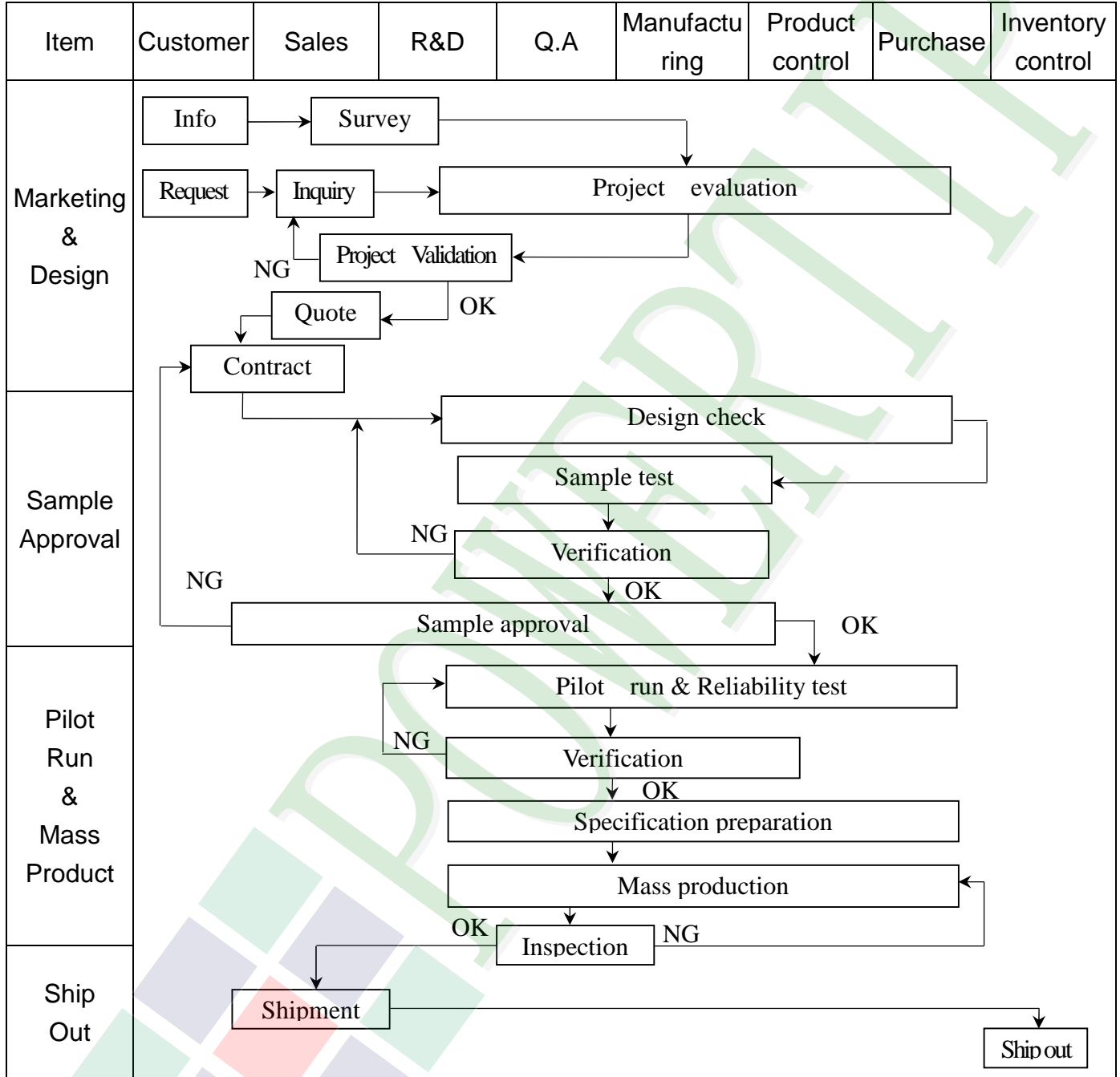
2.5 JUMPER

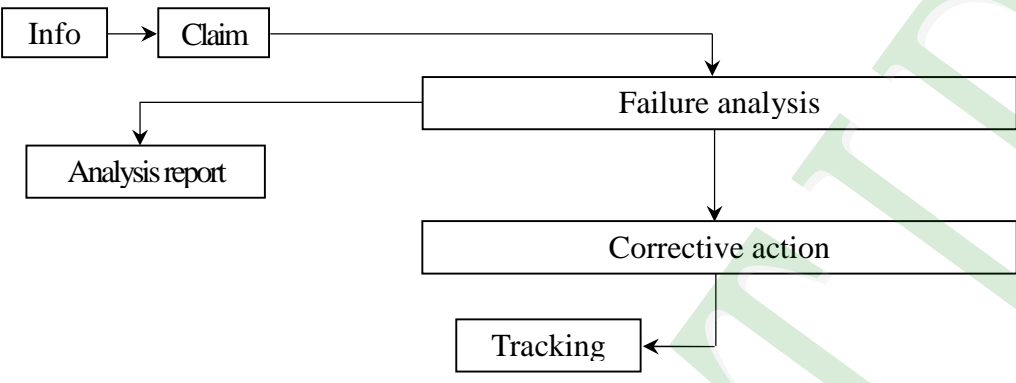
J1/J3/J4(右)/JF : SHORT;

Others : open

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] --> Claim[Claim] Claim --> FA[Failure analysis] Claim --> AR[Analysis report] FA --> CA[Corrective action] CA --> 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. 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)

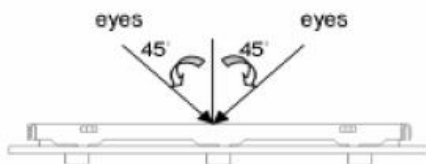


Fig.1

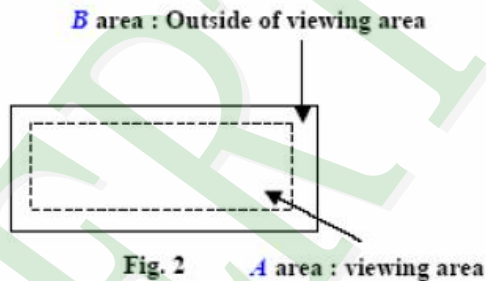
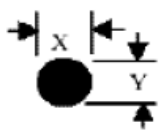
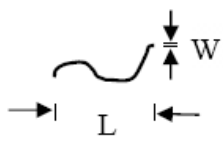
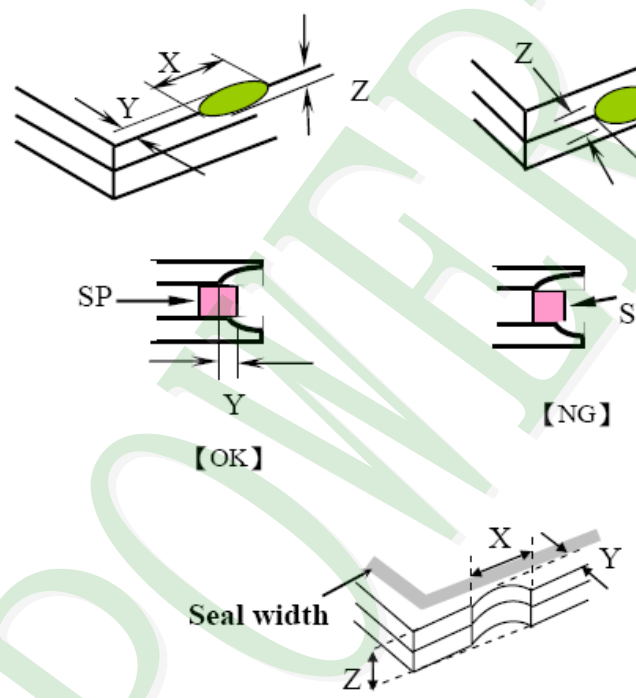


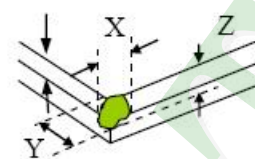
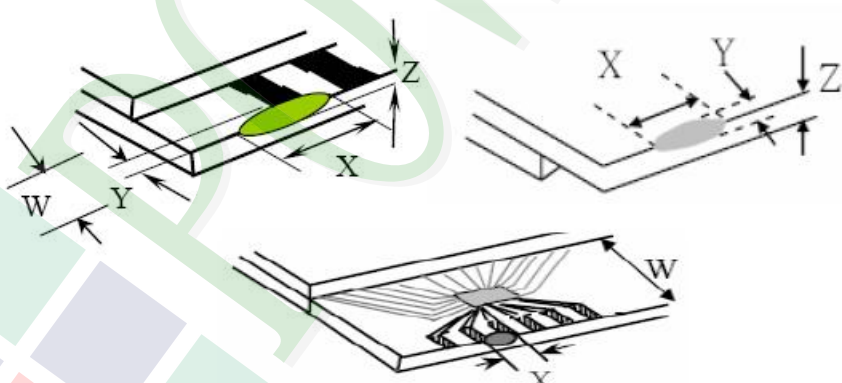
Fig. 2

◆ **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

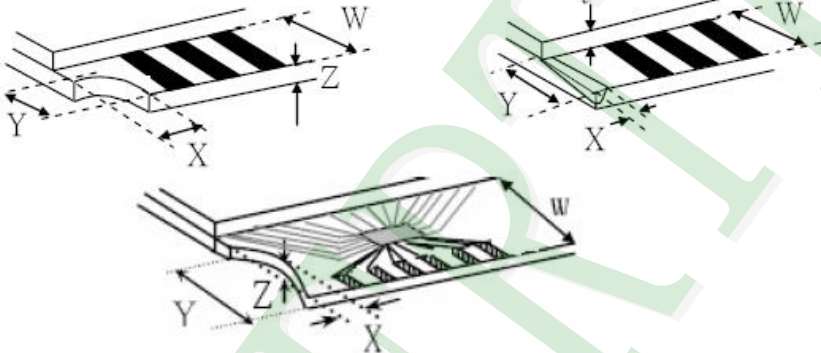
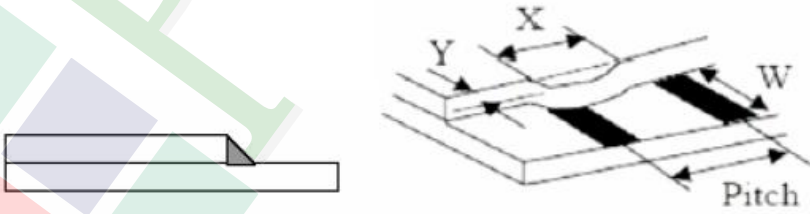
NO	Item	Criterion	Level																																				
05	<p>Black or white dot 、 scratch 、 contamination</p> <p>Round type</p>  <p>$\Phi = (x+y)/2$</p> <p>Line type</p> 	<p>5. 1 Round type:</p> <p>5. 1. 1 display only :</p> <ul style="list-style-type: none"> • White and black spots on display ≤ 0.30 mm , no more than 4 white or black spots present. • Densely spaced : NO more than two spots or lines within 3 mm. <p>5. 1. 2 Non-display :</p> <table border="1"> <thead> <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> </thead> <tbody> <tr> <td>$\Phi \leq 0.10$</td> <td colspan="2">Accept no dense</td> </tr> <tr> <td>$0.10 < \Phi \leq 0.20$</td> <td>3</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.30$</td> <td>2</td> </tr> <tr> <td>Total quantity</td> <td>4</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>$W \leq 0.03$</td> <td>Accept no dense</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$0.03 < W \leq 0.05$</td> <td rowspan="2">4</td> </tr> <tr> <td>$L \leq 2.5$</td> <td>$0.05 < W \leq 0.075$</td> </tr> <tr> <td>---</td> <td>$W > 0.075$</td> <td colspan="2">As round type</td> </tr> </tbody> </table>	Dimension (diameter : Φ)	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
Dimension (diameter : Φ)	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																																					
06	<p>Polarizer Bubble</p>	<table border="1"> <thead> <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> </thead> <tbody> <tr> <td>$\Phi \leq 0.20$</td> <td colspan="2">Accept no dense</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.50$</td> <td>3</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$0.50 < \Phi \leq 1.00$</td> <td>2</td> </tr> <tr> <td>$\Phi > 1.00$</td> <td>0</td> </tr> <tr> <td>Total quantity</td> <td>4</td> <td></td> </tr> </tbody> </table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.20$	Accept no dense		$0.20 < \Phi \leq 0.50$	3	Ignore	$0.50 < \Phi \leq 1.00$	2	$\Phi > 1.00$	0	Total quantity	4		Minor																		
Dimension (diameter : Φ)	Acceptance (Q'ty)																																						
	A area	B area																																					
$\Phi \leq 0.20$	Accept no dense																																						
$0.20 < \Phi \leq 0.50$	3	Ignore																																					
$0.50 < \Phi \leq 1.00$	2																																						
$\Phi > 1.00$	0																																						
Total quantity	4																																						

NO	Item	Criterion	Level						
07	The crack of glass	<p>Symbols :</p> <p>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</p>	Minor						
		<p>7.1 General glass chip :</p> <p>7.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="502 1489 1300 1780"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq a$</td> <td>Crack can't enter viewing area</td> <td>$\leq 1/2 t$</td> </tr> <tr> <td>$\leq a$</td> <td>Crack can't exceed the half of SP width.</td> <td>$1/2 t < Z \leq 2 t$</td> </tr> </tbody> </table>		X	Y	Z	$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$
X	Y	Z							
$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$							
$\leq a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$							

NO	Item	Criterion	Level										
07	The crack of glass	<p>Symbols :</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> <hr/> <p>7.1.2 Corner crack :</p>  <table border="1" data-bbox="494 795 1316 1097"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq 1/5 a$</td> <td>Crack can't enter viewing area</td> <td>$Z \leq 1/2 t$</td> </tr> <tr> <td>$\leq 1/5 a$</td> <td>Crack can't exceed the half of SP width.</td> <td>$1/2 t < Z \leq 2 t$</td> </tr> </tbody> </table>	X	Y	Z	$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$	$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$	Minor	
		X	Y	Z									
$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$											
$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$											
<p>7.2 Protrusion over terminal :</p> <p>7.2.1 Chip on electrode pad :</p>  <table border="1" data-bbox="462 1668 1252 1848"> <thead> <tr> <th></th> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>Front</td> <td>$\leq a$</td> <td>$\leq 1/2 W$</td> <td>$\leq t$</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. B01)

NO	Item	Criterion	Level									
07	The crack of glass	<p>Symbols :</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>7.2.2 Non-conductive portion :</p>  <table border="1" data-bbox="579 1037 1206 1189"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq 1/3 a$</td> <td>$\leq W$</td> <td>$\leq t$</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="499 1715 1189 1856"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq a$</td> <td>$\leq 1/3 W$</td> <td>$\leq t$</td> </tr> </tbody> </table>		X	Y	Z	$\leq 1/3 a$	$\leq W$	$\leq t$	X	Y	Z
X	Y	Z										
$\leq 1/3 a$	$\leq W$	$\leq t$										
X	Y	Z										
$\leq a$	$\leq 1/3 W$	$\leq t$										

◆ 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)

NO.	TEST ITEM	TEST CONDITION										
1	High Temperature Storage Test	Keep in +70 ±2°C 240 hrs Surrounding temperature, then storage at normal condition 4hrs.										
2	Low Temperature Storage Test	Keep in -20 ±2°C 240 hrs Surrounding temperature, then storage at normal condition 4hrs.										
3	High Temperature / High Humidity Storage Test	Keep in +40 °C / 90% R.H duration for 240 hrs Surrounding temperature, then storage at normal condition 4hrs. (Excluding the polarizer)										
4	Temperature Cycling Storage Test	$\begin{array}{ccccccc} & -20^{\circ}\text{C} & \rightarrow & +25^{\circ}\text{C} & \rightarrow & +70^{\circ}\text{C} & \rightarrow & +25^{\circ}\text{C} \\ & (30\text{mins}) & & (5\text{mins}) & & (30\text{mins}) & & (5\text{mins}) \\ & \longleftarrow & & & & & & \longrightarrow \\ & & & & & & & 10 \text{ Cycle} \end{array}$ 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 +/-										
		<ol style="list-style-type: none"> Temperature ambience : 15°C ~ 35°C Humidity relative : 30% ~ 60% Energy Storage Capacitance(Cs+Cd) : 150pF±10% Discharge Resistance(Rd) : 330Ω±10% 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)	<ol style="list-style-type: none"> Sine wave 10~55 Hz frequency (1 min/sweep) The amplitude of vibration : 1.5 mm 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>	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											
		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

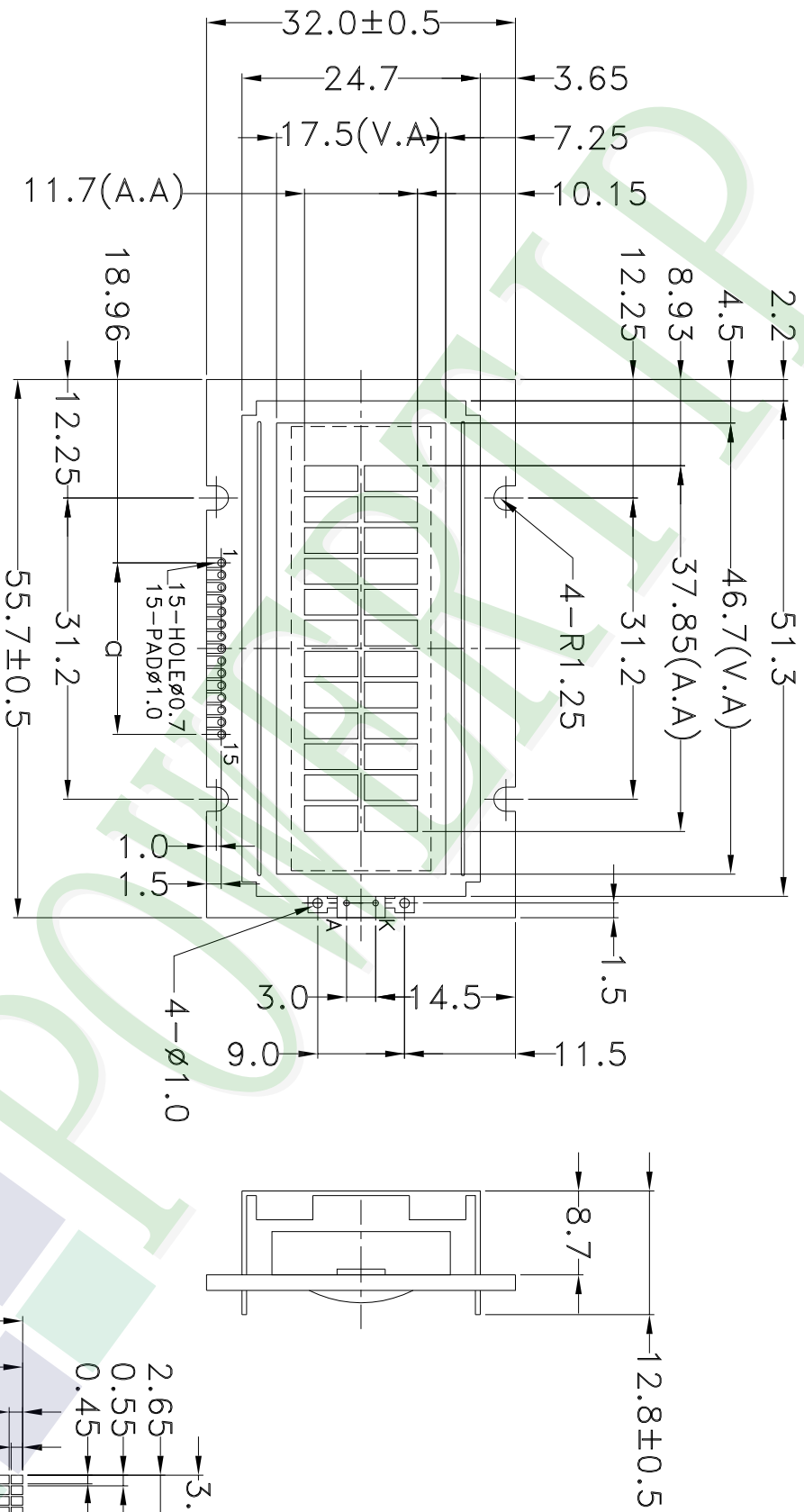
- 5.2.1 Avoid any strong mechanical shock which can break the glass.
- 5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module , be sure to ground your body and any electrical equipment you may be using.
- 5.2.3 Do not remove the panel or frame from the module.
- 5.2.4 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 $320\pm 10^{\circ}\text{C}$ 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.



- NOTES:
- 1.LCD TYPE: STN Gray
 - 2.LCD DISPLAY: POSITIVE /Transflective
 - 3.VIEW DIRECTION: 6 O'CLOCK
 - 4.The tolerance unless classified $\pm 0.3\text{mm}$
 - 5.α:PITCH1.27X14=17.78±0.1

007		PART NO:	PC1202LRS-AWT-B-Q	 久正光电股份有限公司 POWER TIP TECHNOLOGY CORPORATION	Design	Sally	 Surface	Material		Tolerances (mm) Length (Mkn) Precision Level	
006		DRAWING NAME :	JLMD-PC1202LRS-AWT-B-Q		Check	Terry		Unit	MM		1 ~ 4
005		TITLE:	LCD MODULE DRAWING		Approve	Ryan	Scale	FIT	4 ~ 16	-	
004							Page	1/1	63 ~ 260	-	
003							Quantity		250 ~ 1000	-	
002											
001	NEW DRAWING	REV BY	Sally		DATE	2017/1/01					
REV											

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

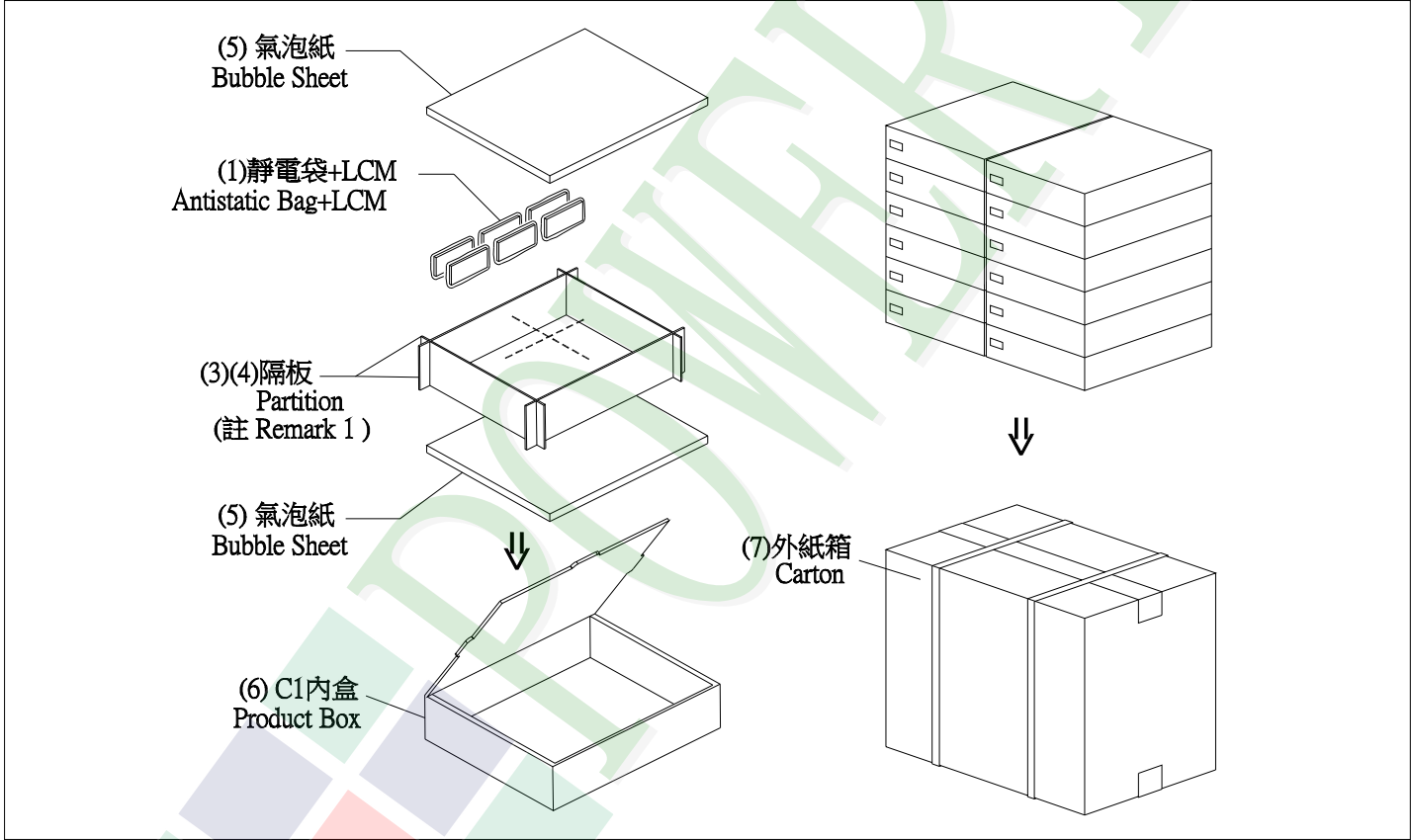
No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PC1202LRS-AWT-B-Q	55.7 X 32.0 X 12.8	0.022	432	10.296
2	靜電袋(1)Antistatic Bag	BAG100100ARABA	100 X 100	0.0011	432	0.5148
3	A1-1隔板(3)A1-1 Partition	BX29500047BZBA	295 X 47 X 3	0.0078	168	1.3104
4	B1-1隔板(4)B1-1 Partition	BX24500047BZBA	245 X 47 X 3	0.0065	48	0.312
5	氣泡紙(5)Bubble Sheet	BAG280240BWABA	280 X 240	0.006	24	0.144
6	C1內盒(6)Product Box	BX31025555AABA	310 X 255 X 55	0.13	12	1.56
7	外紙箱(7)Carton	BX52732536CCBA	527 X 325 X 360	0.83	1	0.83
8						
9						

2. 一整箱總重量 (Total LCD Weight in carton) : 14.97 Kg±10%

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

(1)Quantity Of Spacer : A1-1隔板 X 14 , B1-1隔板 X 4

(2)Total LCM quantity in carton : quantity per box 36 x no of boxes 12 = 432



特 記 事 項 (REMARK)

1. LCM排放示意圖(前後間隔不放置):
 1. LCM placed as figure showing:
 (First and last slot should be empty)

▨ 模組(LCM) X 1pcs.

