

### SPECIFICATIONS

CUSTOMER	:	CJP083
SAMPLE CODE	:	SG12032LRS-DGB-H-Q
MASS PRODUCTION CODE	:	PG12032LRS-DGB-H-Q
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	001
DRAWING NO. (Ver.)	:	JLMD- PG12032LRS-DGB-H-Q_001
PACKAGING NO. (Ver.)	:	JPKG- PG12032LRS-DGB-H-Q_001

**Customer Approved**

**Date:**



Approved	Checked	Designer
閻偉	劉進	徐明菲

- Preliminary specification for design input
- Specification for sample approval

**POWERTIP TECH. CORP.**

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Note: for detailed information please refer to IC data sheet: [SBN1661G-M18-D](#)

## 1. SPECIFICATIONS

### 1.1 Features

Item	Standard Value
Display Type	120*32 Dots
LCD Type	STN, Gray, Transflective, Positive, Extended Temp.
Driver Condition	LCD Module : 1/32 Duty , 1/5 Bias
Viewing Direction	6 O'clock
Weight	25.6 g
Interface	8-bits parallel data bus
Other (controller / driver IC)	SBN1661G-M18-D
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web site : <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	68.1 (L) *38.9 (w) * 7.6(H)	mm
Viewing Area	62.0(L) * 22.5(w)	mm
Active Area	56.35(L) * 20.75 (w)	mm
Dot Size	0.42 (L) * 0.60(w)	mm
Dot Pitch	0.47 (L) * 0.65 (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 <sub>DD</sub>	-	-0.3	7.0	V
LCD Driver Supply Voltage	V <sub>LCD</sub>	-	0	13	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
Storage Humidity	H <sub>D</sub>	T <sub>a</sub> < 60 °C	-	90	%RH

## 1.4 DC Electrical Characteristics

$V_{DD} = 5.0\text{ V} \pm 0.5\text{ V}$ ,  $V_{SS} = 0\text{ V}$ ,  $T_a = 25^\circ\text{C}$

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	$V_{DD}$	-	4.5	5.0	5.5	V
“H” Input Voltage	$V_{IH}$	-	$V_{DD}-2.2$	-	$V_{DD}$	V
“L” Input Voltage	$V_{IL}$	-	0	-	0.8	V
“H” Output Voltage	$V_{OH}$	$I_{OH}=-2.0\text{mA}$	$V_{DD}-0.3$	-	$V_{DD}$	V
“L” Output Voltage	$V_{OL}$	$I_{OL}=2.0\text{mA}$	0	-	0.3	V
Supply Current	$I_{DD}$	$V_{DD}=5.0\text{V}; V_{OP}=6.0\text{V};$	-	80	120	mA
LCM Driver Voltage	$V_{OP}^*1$	$-20^\circ\text{C}$	-	-	-	V
		$25^\circ\text{C}$	5.8	6.0	6.2	
		$70^\circ\text{C}$	-	-	-	

NOTE: \*1 The VOP test point is  $V_{DD}-V_{O}$ .

## 1.5 Optical Characteristics

LCD Panel : 1/32Duty , 1/5Bias ,  $V_{OP} = 5.8V$  ,  $T_a = 25^{\circ}C$

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Reference
Response Time	Rise	tr	-	-	90	135	ms	Note2
	Fall	tf		-	180	270		
Viewing angle range	Top	$\theta Y+$	C>2.0	30	-	-	Deg.	Notes 1
	Bottom	$\theta Y-$		30	-	-		
	Left	$\theta X-$		35	-	-		
	Right	$\theta X+$		35	-	-		
Contrast Ratio		C	$\theta = 0^{\circ}$	-	3	-	-	Note 3
Average Brightness (LCD & BL) *2		IV	IF=100mA	5	9	-	cd/m2	Note 4
Wavelength (without LCD) *2		$\lambda p$		569	572	576	nm	
Uniformity *1		$\Delta B$		70	-	-	%	

Note 4 :

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

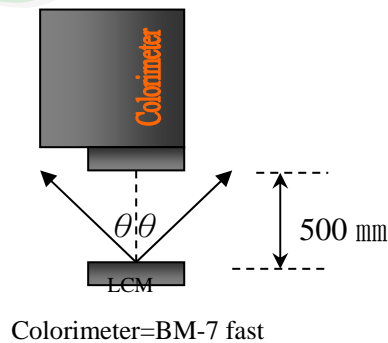
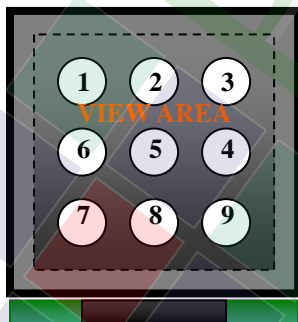
2 : Measurement Condition for Optical Characteristics:

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

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

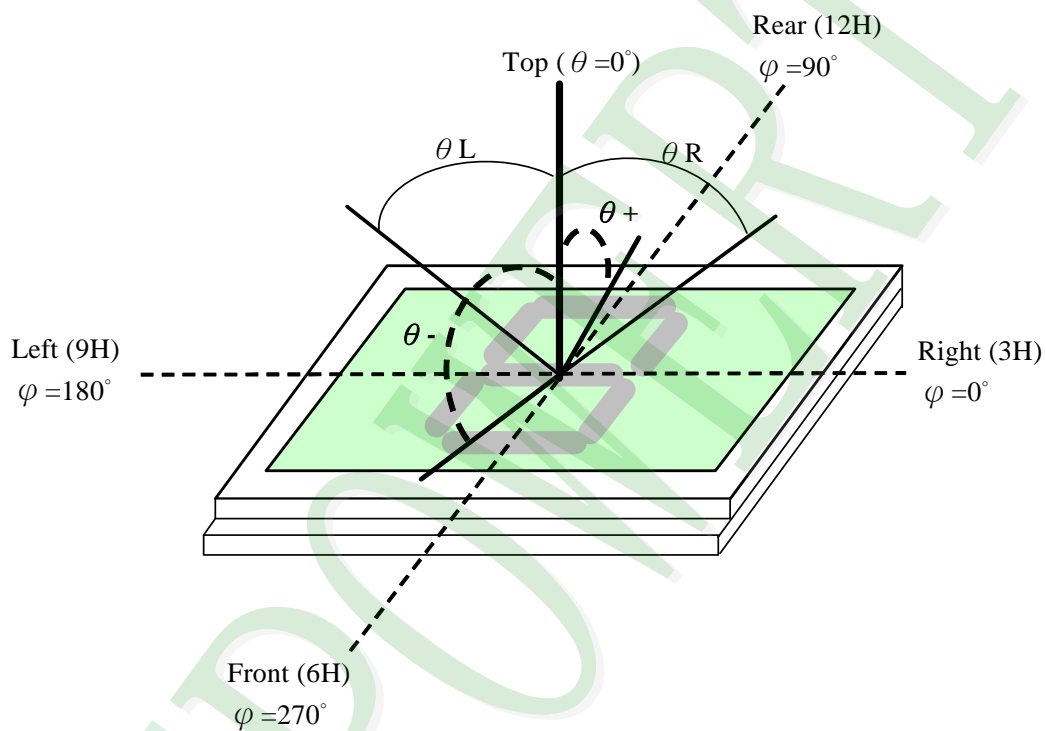
d : The uncertainty of the C.I.E coordinate measurement  $\pm 0.01$  , Average Brightness  $\pm 4\%$



Note 1.

Optical characteristics-2

Viewing angle

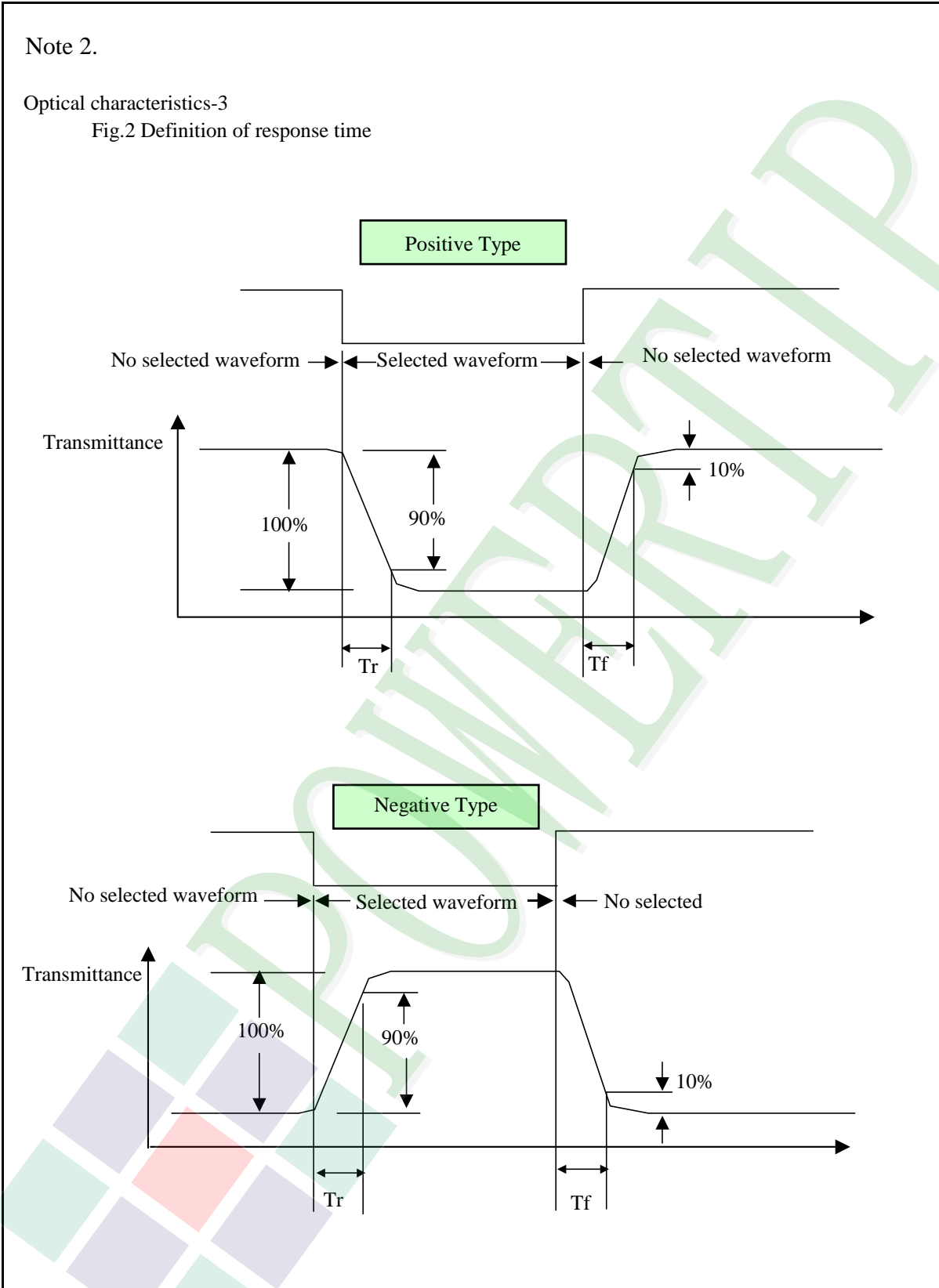


**Viewing angle**

Note 2.

Optical characteristics-3

Fig.2 Definition of response time





Electrical characteristics-2

※2 Drive waveform

$V_{op}$ : Drive voltage

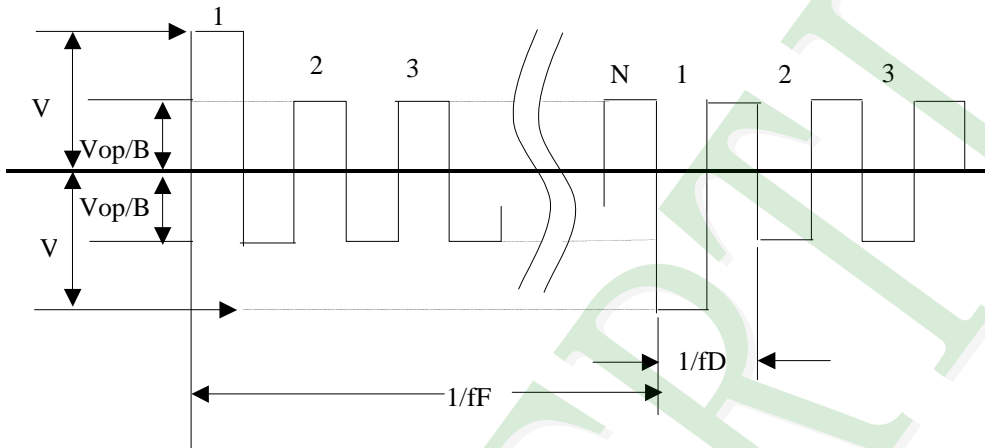
$f_F$ : Frame frequency

$1/B$ : Bias

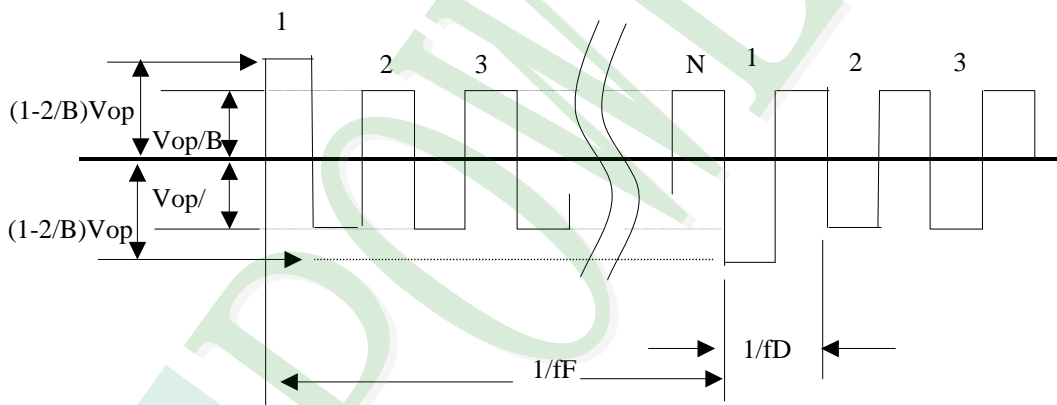
$f_D$ : Drive frequency

$N$ : Duty

(1) Selected waveform



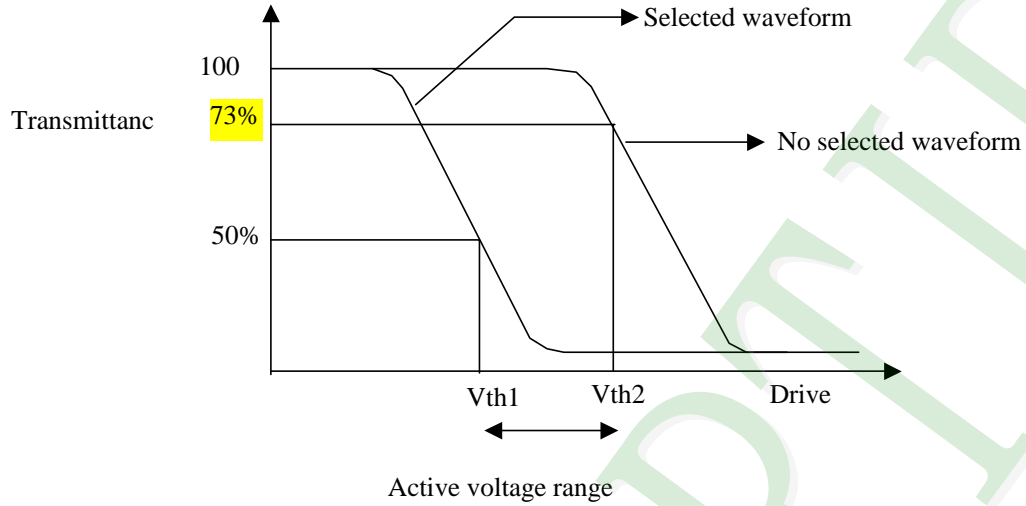
(2) Non- Selected wave form



Note:

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

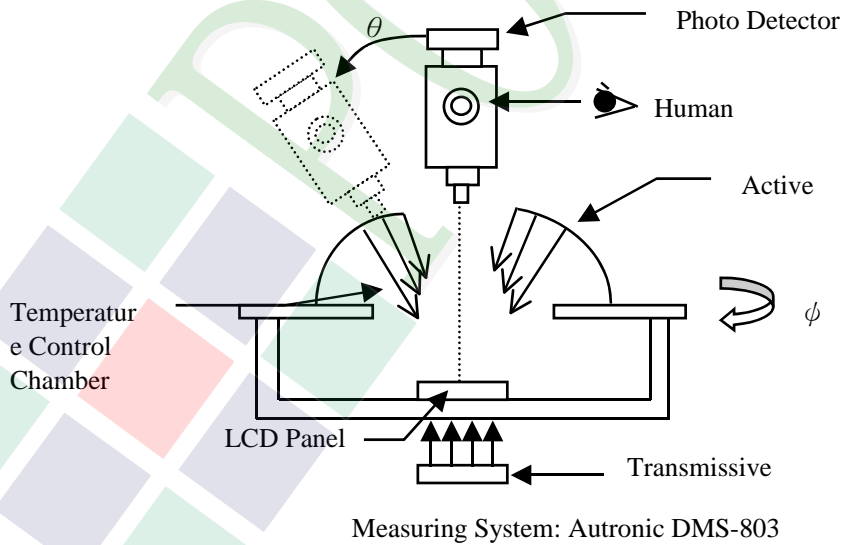
Note 3. : Definition of Vth



	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

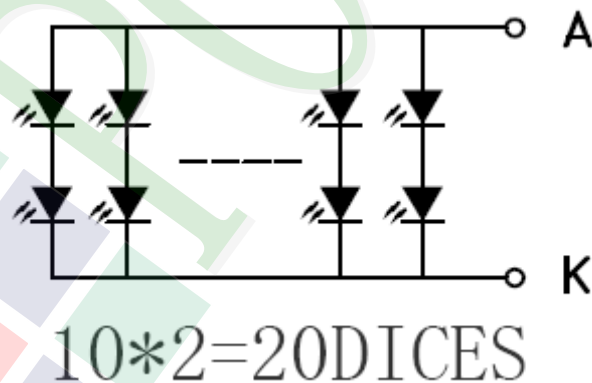
Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25°C	-	150	mA
Reverse Voltage	VR	Ta =25°C	-	5	V
Power Dissipation	PD	Ta =25°C	-	690	mW

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF=100mA	-	4.2	4.6	V
Reverse Current	IR	VR=10V	-	-	200	uA
Average Brightness (without LCD)	IV	IF=100mA	38	57	-	cd/m <sup>2</sup>
Average Brightness (without LCD)	λp	IF=100mA	569	572	576	-
Color			white			

Circuit Diagram:



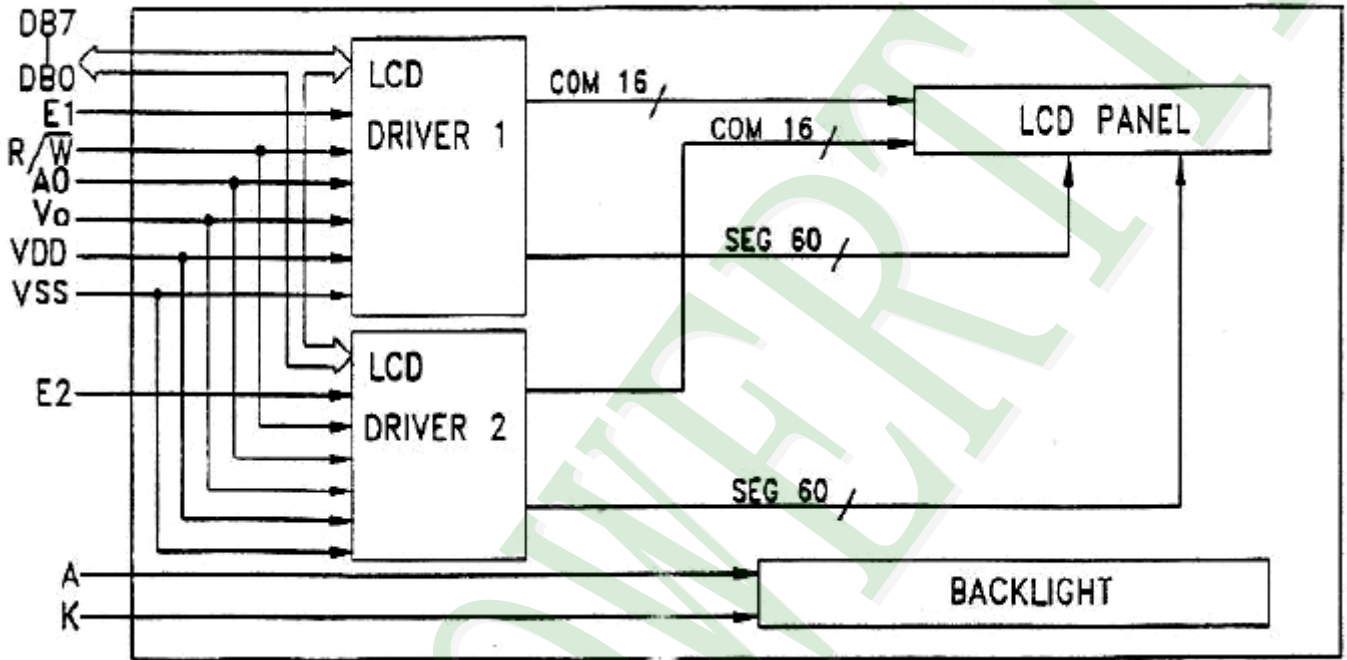
## 2. MODULE STRUCTURE

### 2.1 Counter Drawing

#### 2.1.1 LCM Mechanical Diagram

\* See Appendix

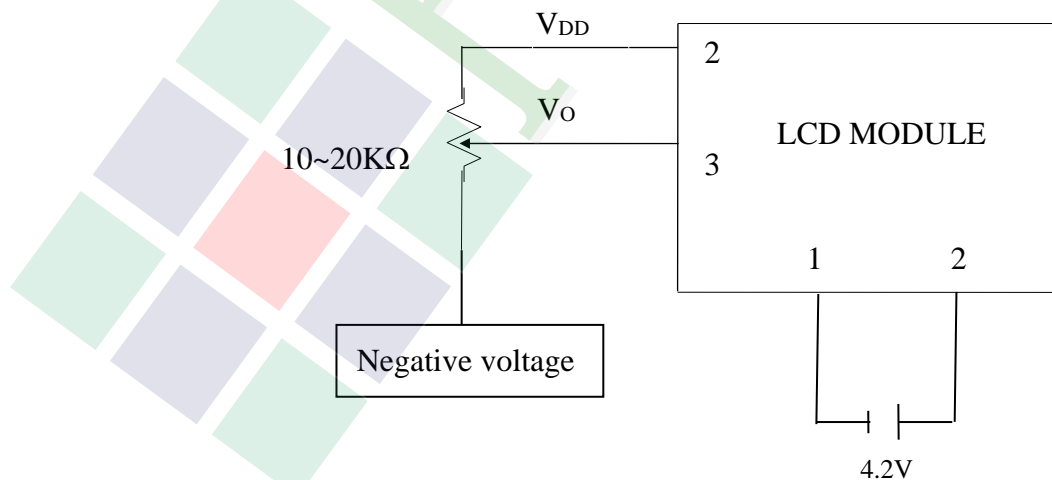
#### 2.1.2 Block Diagram



## 2.2 Interface Pin Description

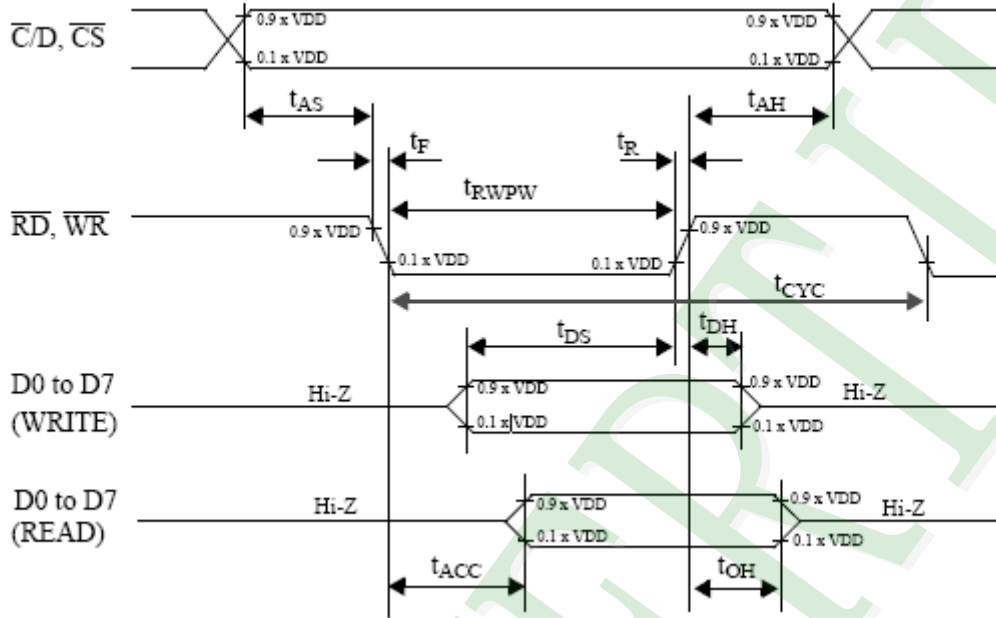
Pin No	Symbol	Function
1	VSS	Signal ground for LCM and Power supply for LED B/L(-)
2	VDD	Power supply for LCM and Power supply for LED B/L(+)
3	Vo	Contrast adjust
4	A0	Register selection input High =Data register Low =Instruction register (for write) Busy flag address counter (for read)
5	R/ $\overline{W}$	R/ $\overline{W}$ signal input is used to select the read/write mode High =Read mode, Low =Write mode
6	E1	Enable Chip IC1
7	E2	Enable Chip IC2
8	NC	No connection.
9	DB0	Data bus line
10	DB1	Data bus line
11	DB2	Data bus line
12	DB3	Data bus line
13	DB4	Data bus line
14	DB5	Data bus line
15	DB6	Data bus line
16	DB7	Data bus line

### Contrast Adjust



## 2.3 Timing Characteristics

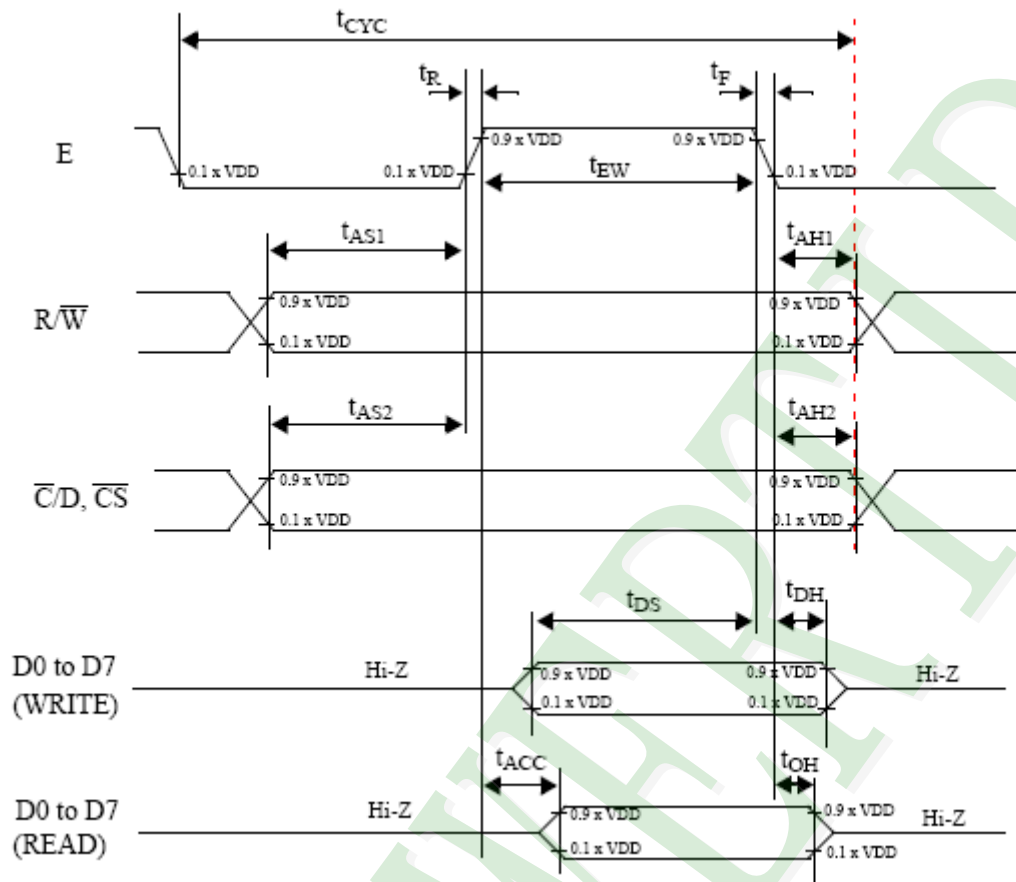
### MPU Bus Read/Write I (80-family MPU)



$V_{DD} = 5 V \pm 10\%$ ;  $V_{SS} = 0 V$ ;  $T_{amb} = -20\text{ }^{\circ}\text{C}$  to  $+75\text{ }^{\circ}\text{C}$ .

symbol	parameter	min.	max.	test conditons	unit
$t_{AS}$	Address set-up time	20			ns
$t_{AH}$	Address hold time	10			ns
$t_F, t_R$	Read/Write pulse falling/rising time		15		ns
$t_{RWPW}$	Read/Write pulse width	200			ns
$t_{CYC}$	System cycle time	1000			ns
$t_{DS}$	Data setup time	80			ns
$t_{DH}$	Data hold time	10			ns
$t_{ACC}$	Data READ access time		90	CL= 100 pF.	ns
$t_{OH}$	Data READ output hold time	10	60		ns

## MPU Bus Read/Write II (68-family MPU)


 $V_{DD} = 5\text{ V} \pm 10\%$ ;  $V_{SS} = 0\text{ V}$ ;  $T_{amb} = -20\text{ }^{\circ}\text{C}$  to  $+75\text{ }^{\circ}\text{C}$ .

symbol	parameter	min.	max.	test conditons	unit
$t_{AS1}$	Address set-up time with respect to $R/\bar{W}$	20			ns
$t_{AS2}$	Address set-up time with respect to $\bar{C}/D, \bar{CS}$	20			ns
$t_{AH1}$	Address hold time with respect to $R/\bar{W}$	10			ns
$t_{AH2}$	Address hold time respect with to $\bar{C}/D, \bar{CS}$	10			ns
$t_F, t_R$	Enable (E) pulse falling/rising time		15		ns
$t_{CYC}$	System cycle time	1000		Note 1	ns
$t_{EWR}$	Enable pulse width for READ	100			ns
$t_{EWW}$	Enable pulse width for WRITE	80			ns
$t_{DS}$	Data setup time	80			ns
$t_{DH}$	Data hold time	10			ns
$t_{ACC}$	Data access time		90	CL= 100 pF.	ns
$t_{OH}$	Data output hold time	10	60		ns

## 2.4 Display Command

COMMAND	COMMAND CODE								FUNCTION
	D7	D6	D5	D4	D3	D2	D1	D0	
Write Display Data	Data to be written into the Display Data Memory.								Write a byte of data to the Display Data Memory.
Read Display Data	Data read from the Display Data Memory.								Read a byte of data from the Display Data Memory.
Read-Modify-Write	1	1	1	0	0	0	0	0	Start Read-Modify-Write operation.
END	1	1	1	0	1	1	1	0	Stop Read-Modify-Write operation.
Software Reset	1	1	1	0	0	0	1	0	Software Reset.

### 2.4.1 Write Display Data

The Write Display Data command writes a byte (8 bits) of data to the Display Data Memory. Data is put on the data bus by the host microcontroller. The location which accepts this byte of data is pointed to by the Page Address Register and the Column Address Register. At the end of the command operation, the content of the Column Address Register is automatically incremented by 1. For page address and column address of the Display Data Memory.



Page/Column allocation of the Display Data Memory

The setting of the control bus for issuing Write Display Data command

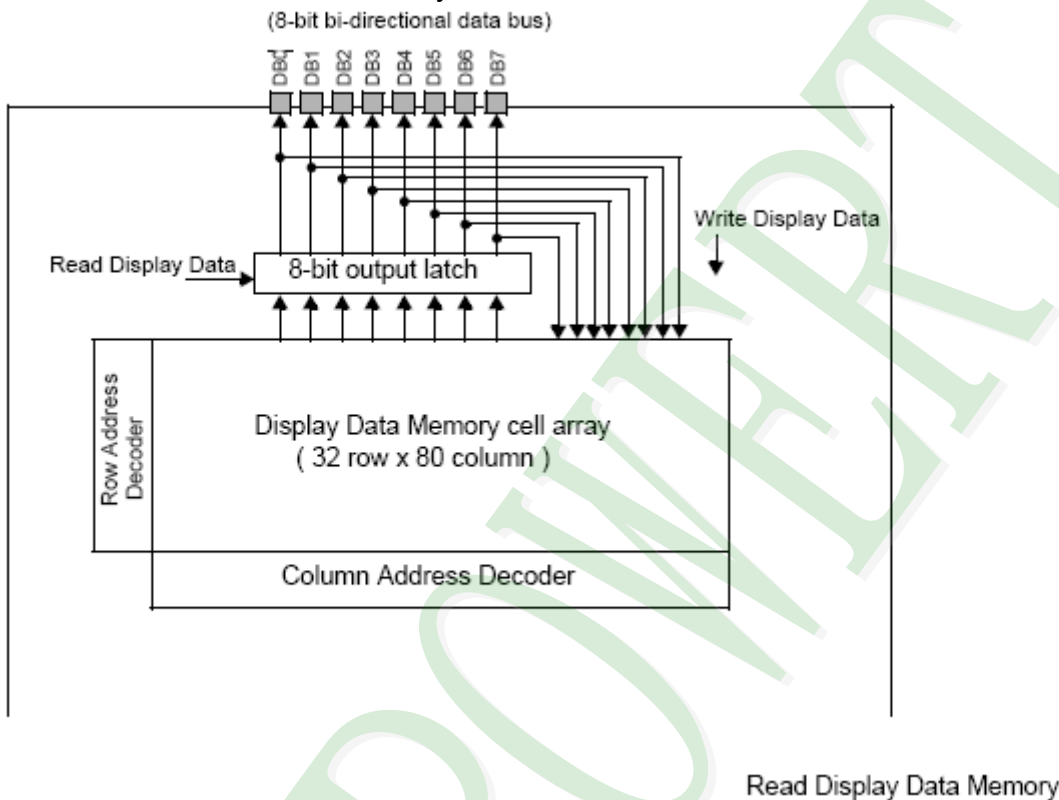
$\overline{C/D}$	$E/(\overline{RD})$	$R/\overline{W}(\overline{WR})$
1	1	0



## 2.4.2 Read Display Data

The Read Display Data command starts a 3-step operation.

1. First, the current data of the internal 8-bit output latch of the Display Data Memory is read by the microcontroller, via the 8-bit data bus DB0~DB7.
  2. Then, a byte of data of the Display Data Memory is transferred to the 8-bit output latch from a location specified by the Page Address Register and the Column Address Register,
  3. Finally, the content of the Column Address Register is automatically incremented by one.
- For Display Data Write operation, a dummy write is not needed, because data can be directly written from the data bus to internal memory cells.



The setting of the control bus for issuing Read Display Data command

$\overline{C}/D$	$E/(\overline{RD})$	$\overline{R}/\overline{W}(\overline{WR})$
1	0	1

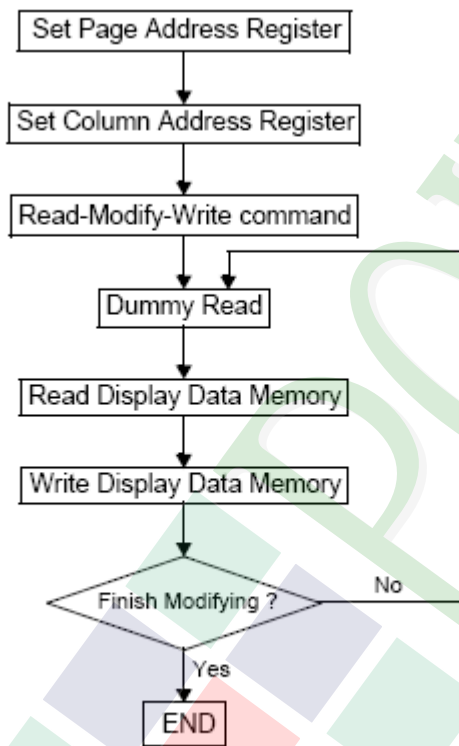
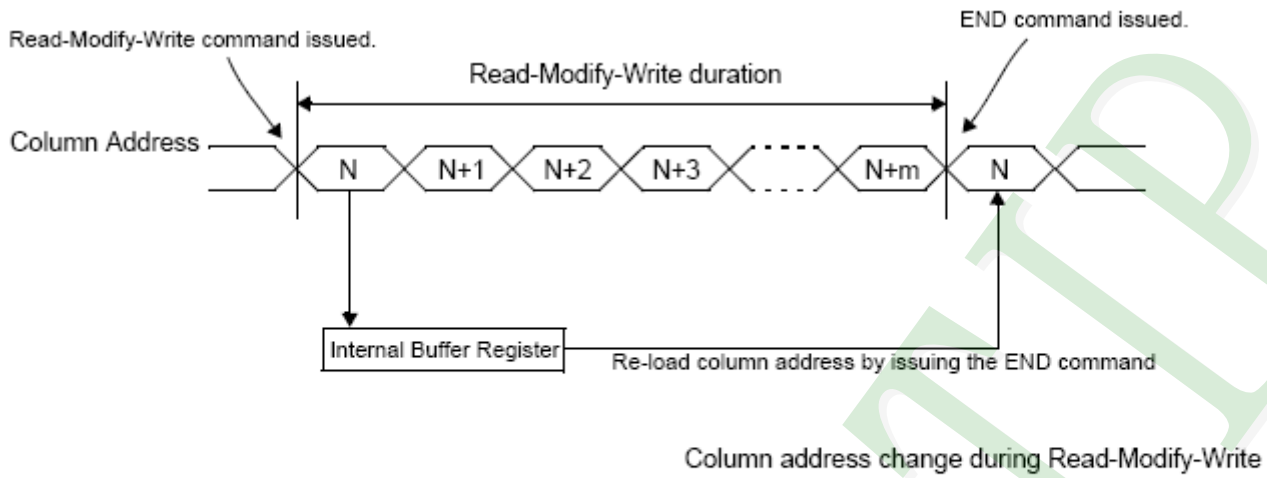
## 2.4.3 Read-Modify-Write

When the Read-Modify-Write command is issued, the SBN1661G\_X enters into Read-Modify-Write mode.

In normal operation, when a Read Display Data command or a Write Display Data command is issued, the content of the Column Address Register is automatically incremented by one after the command operation is finished. However, during Read-Modify-Write mode, the content of the Column Address Register is not incremented by one after a Read Display Data command is finished; only the Write Display Data command can make the content of the Column Address Register automatically incremented by one after the command operation is finished.

During Read-Modify-Write mode, any other bus registers, except the Column Address Register, can be

modified. This command is useful when a block of the Display Data Memory needs to be repeatedly read and updated.



The flowchart for Read-Modify-Write

The setting of the control bus for the Read-Modify-Write command

$\overline{C/D}$	$E/(\overline{RD})$	$R/\overline{W}(\overline{WR})$
0	1	0

The setting of the data bus for the Read-Modify-Write command

D7(MSB)	D6	D5	D4	D3	D2	D1	D0(LSB)
1	1	1	0	0	0	0	0

The command code is E0 Hex.

#### 2.4.4 The END command

The END command releases the Read-Modify-Write mode and re-loads the Column Address Register with the value previously stored in the internal buffer (refer to Fig. 17) when the Read-Modify-Write command was issued.

The setting of the control bus for the END command

$\overline{C}/D$	$E/(\overline{RD})$	$R/\overline{W}(\overline{WR})$
0	1	0

The setting of the data bus for the END command

D7(MSB)	D6	D5	D4	D3	D2	D1	D0(LSB)
1	1	1	0	1	1	1	0

The command code is EE Hex.

#### 2.4.5 Software RESET command

The Software Reset command is different from the hardware reset and can not be used to replace hardware reset.

When Software Reset is issued by the host microcontroller,

- the content of the Display Start Line Register is cleared to zero(A4~A0=00000),
- the Page Address Register is set to 3 (A1 A0 = 11),
- the content of the Display Data Memory remains unchanged, and
- the content of all other registers remains unchanged.

The setting of the control bus for Software RESET

$\overline{C}/D$	$E/(\overline{RD})$	$R/\overline{W}(\overline{WR})$
0	1	0

The setting of the data bus for Software RESET

D7(MSB)	D6	D5	D4	D3	D2	D1	D0(LSB)
1	1	1	0	0	0	1	0

The command code is E2 Hex.

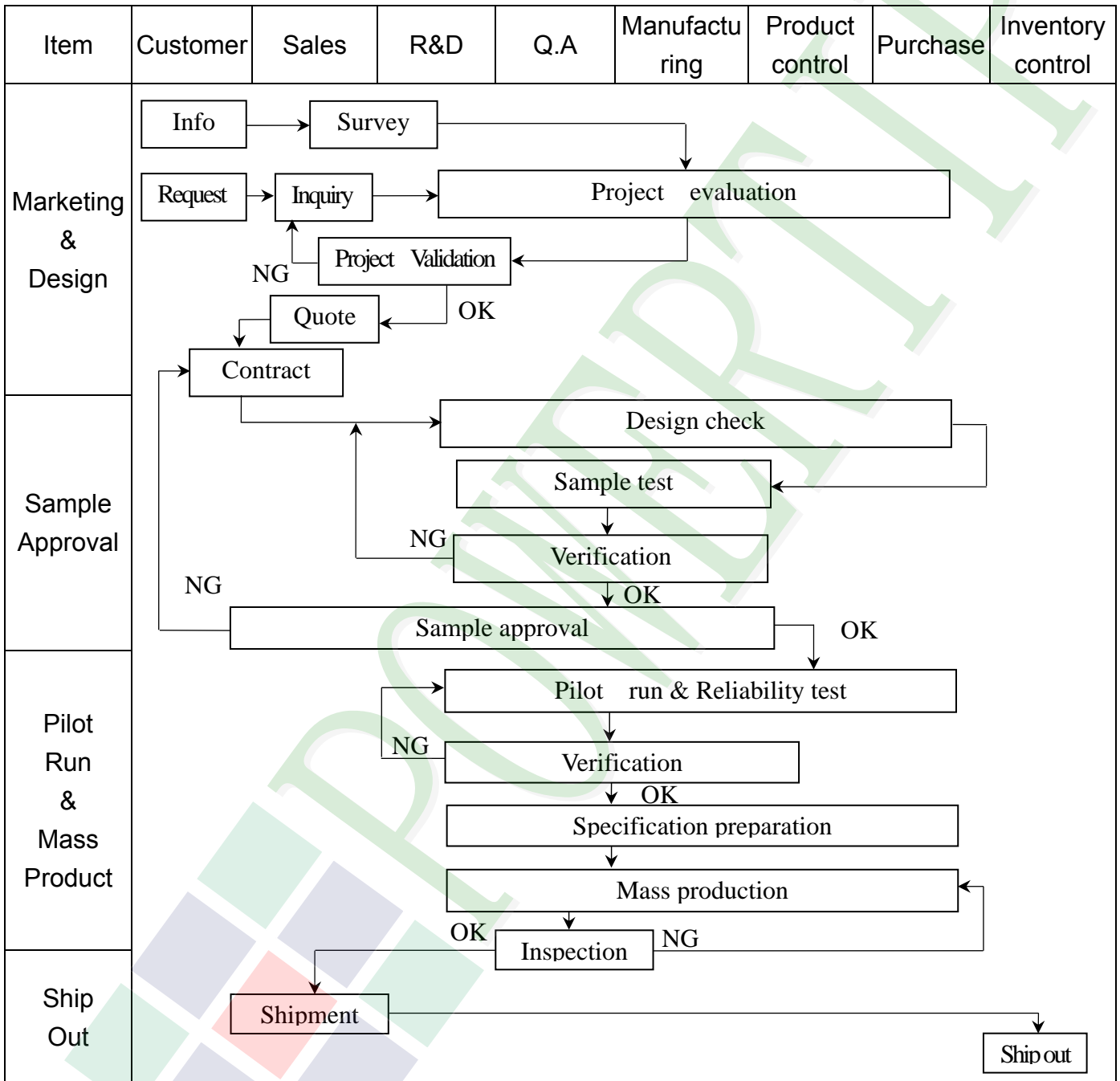
## 2.5 JUMPER

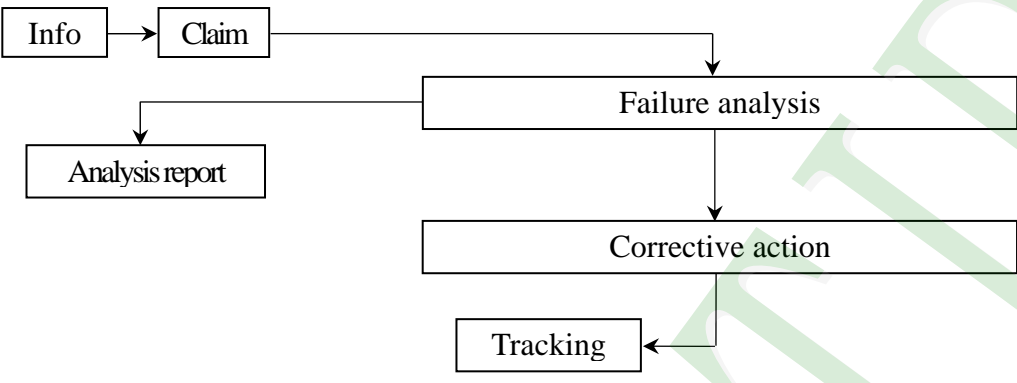
**SHORT: J5**

**OPEN: all the jumper unnoted.**

### 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; Corrective[Corrective action]     Failure --&gt; Report[Analysis report]     Corrective --&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. 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)

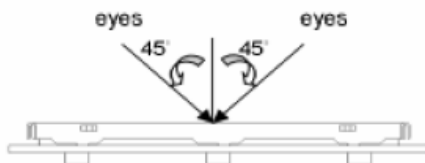


Fig.1

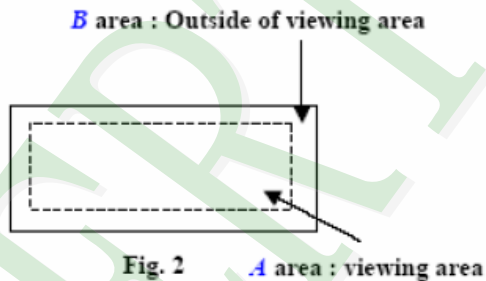
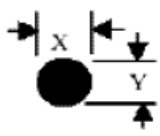
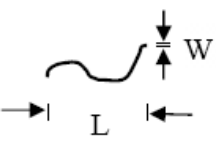
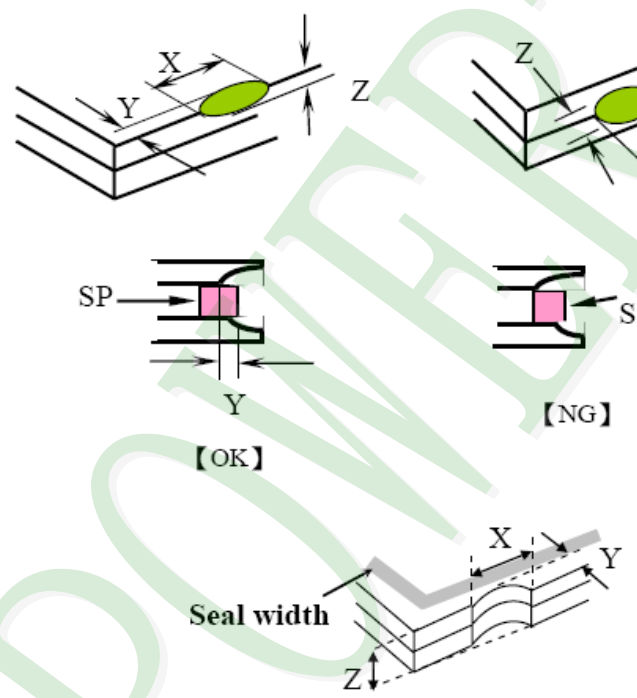


Fig. 2

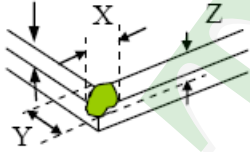
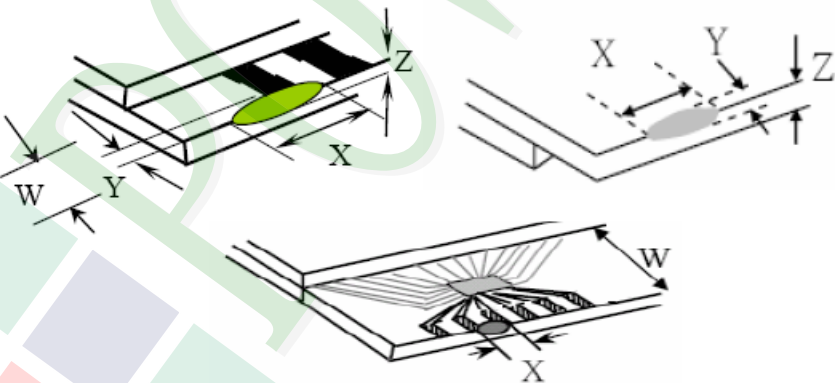
◆ Specification:

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	Black or white dot、scratch、contamination  Round type  $\Phi = (x+y)/2$  Line type 	5. 1 Round type: 5. 1. 1 display only : <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> 5. 1. 2 Non-display : <table border="1" data-bbox="486 660 1332 996"> <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="3">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> </tr> </tbody> </table> 5. 1. 3 Line type: <table border="1" data-bbox="438 1075 1380 1411"> <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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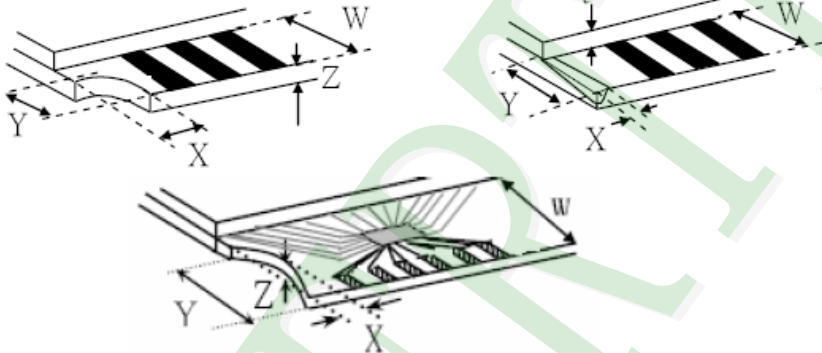
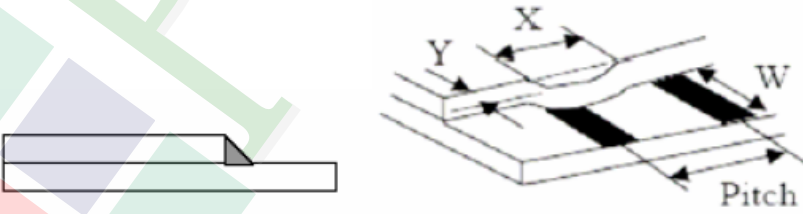
NO	Item	Criterion	Level						
07	The crack of glass	<p><b>Symbols :</b></p> <p><b>X :</b> The length of crack  <b>Z :</b> The thickness of crack  <b>t :</b> The thickness of glass</p> <p><b>Y :</b> The width of crack.  <b>W :</b> terminal length  <b>a :</b> LCD side length</p>	Minor						
		<p>7.1 General 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><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	$\leq 1/2 t$
X	Y	Z							
$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$							
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NO	Item	Criterion	Level									
07	The crack of glass	<p><b>Symbols :</b></p> <p><b>X :</b> The length of crack  <b>Z :</b> The thickness of crack  <b>t :</b> The thickness of glass</p> <p><b>Y :</b> The width of crack.  <b>W :</b> terminal length  <b>a :</b> LCD side length</p> <hr/> <p>7.1.2 Corner crack :</p>  <table border="1" data-bbox="501 801 1316 1093"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td><math>\leq 1/5 a</math></td> <td>Crack can't enter viewing area</td> <td><math>Z \leq 1/2 t</math></td> </tr> <tr> <td><math>\leq 1/5 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	$\leq 1/5 a$	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
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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="466 1675 1254 1850"> <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. B01)

NO	Item	Criterion	Level									
07	The crack of glass	Symbols :  <b>X : The length of crack</b> <b>Z : The thickness of crack</b> <b>t : The thickness of glass</b>  <b>Y : The width of crack.</b> <b>W : terminal length</b> <b>a : LCD side length</b>	Minor									
		7.2.2 Non-conductive portion :   <table border="1" data-bbox="582 1041 1209 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> 7.2.3 Glass remain :   <table border="1" data-bbox="502 1720 1189 1859"> <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
X	Y	Z										
$\leq 1/3 a$	$\leq W$	$\leq t$										
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$\leq a$	$\leq 1/3 W$	$\leq t$										

**◆ 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 $\leq 1.5$ mm.	Minor



## 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 .
- 5.2.10 Caution!( LCM products with Capacitive Touch Panel)  
Strong EMI-sources such as switch-mode power supplies (SMPS) can lead to touch malfunction (e.g. ghost-touches).  
Therefore, the touch needs to be thoroughly tested inside the target application.

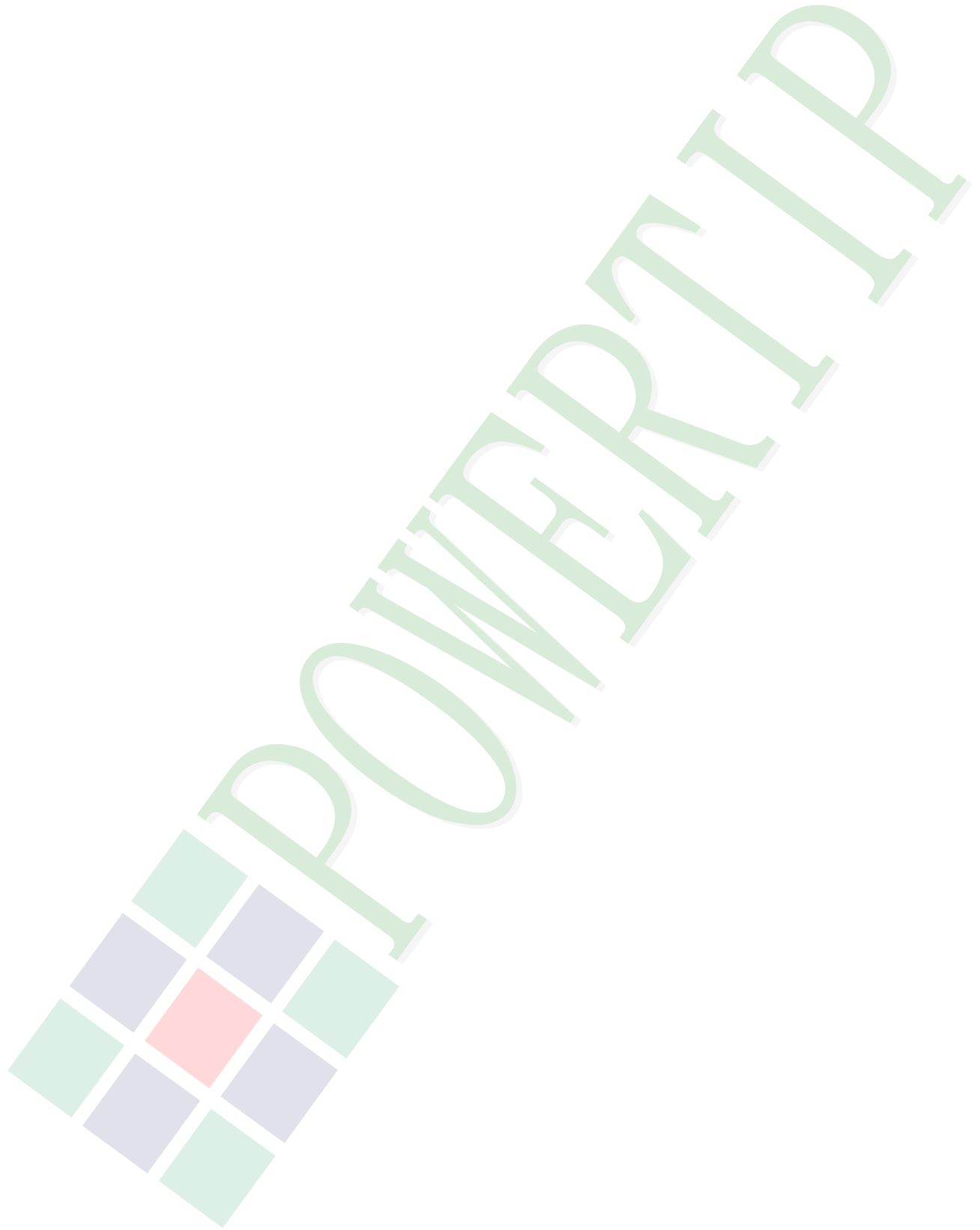
### 5.3 STORAGE

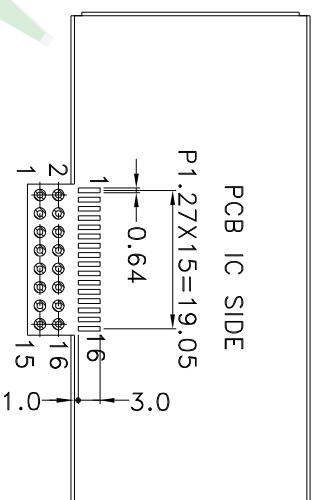
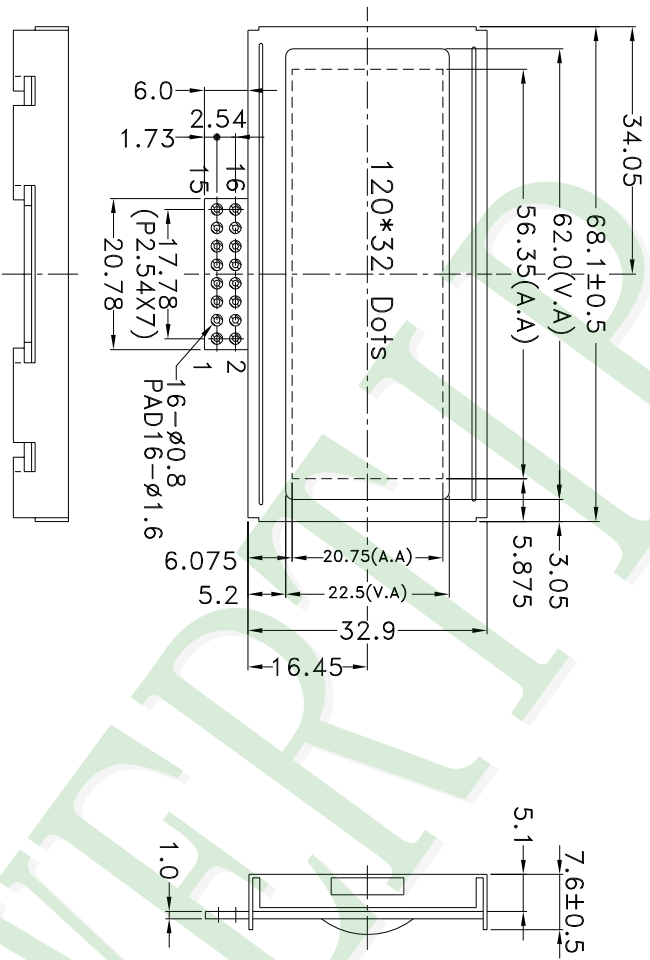
- 5.3.1 Store the panel or module in a dark place where the temperature is  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  and the humidity is below 65% RH.
- 5.3.2 Do not place the module near organics solvents or corrosive gases.
- 5.3.3 Do not crush , shake , or jolt the module.

### 5.4 TERMS OF WARRANTY

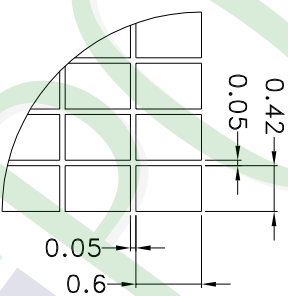
- 5.4.1 Applicable warrant period  
The period is within thirteen months since the date of shipping out under normal using and storage conditions.
- 5.4.2 Unaccepted responsibility  
This product has been manufactured to your company's specification as a part for use in your company's general electronic 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.





PIN NO.	SIGNAL
1	GND
2	Vcc
3	V <sub>0</sub>
4	A0
5	R/W
6	E1
7	E2
8	NC
9	DB0
10	DB1
11	DB2
12	DB3
13	DB4
14	DB5
15	DB6
16	DB7



SCALE: 15/1

- NOTES:
- 1.LCD TYPE: STN,GRAY
  - 2.LCD DISPLAY: POSITIVE/TRANSFLECTIVE
  - 3.VIEW DIRECTION: 6 O'CLOCK
  - 4.The tolerance unless classified ±0.3mm

007		PART NO:	PG12032LRS-DGB-H-Q	<p>久正光电股份有限公司 POWER TIP TECHNOLOGY CORPORATION</p>	Design	Air	<p>Unit: MM Scale: FIT Page: 1/1</p>	Surface		<p>Division Length (mm) Tolerance (mm)</p> <table border="1"> <tr><td>1 ~ 4</td></tr> <tr><td>4 ~ 16</td></tr> <tr><td>16 ~ 63</td></tr> <tr><td>63 ~ 250</td></tr> <tr><td>250 ~ 1000</td></tr> </table>	1 ~ 4	4 ~ 16	16 ~ 63	63 ~ 250	250 ~ 1000	Precision Level	
1 ~ 4																	
4 ~ 16																	
16 ~ 63																	
63 ~ 250																	
250 ~ 1000																	
006		DRAWING NAME:	JLMD-PG12032LRS-DGB-H-Q	Check	Terry	Material											
005		TITLE:	LCD MODULE DRAWING	Approve	Ryan	Thickness											
004						Quantity											
003																	
002																	
001	NEW DRAWING	REV BY	Air	DATE	2018/07/11												
REV		REVISER															

Ver.001	Documents NO. JPKG-PG12032LRS-DGB-H-Q	<h1 style="text-align: center;">LCM包裝規格書</h1> <h2 style="text-align: center;">LCM Packaging Specifications</h2>	Approve	Check	Contact
			Ryan	Terry	Air

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

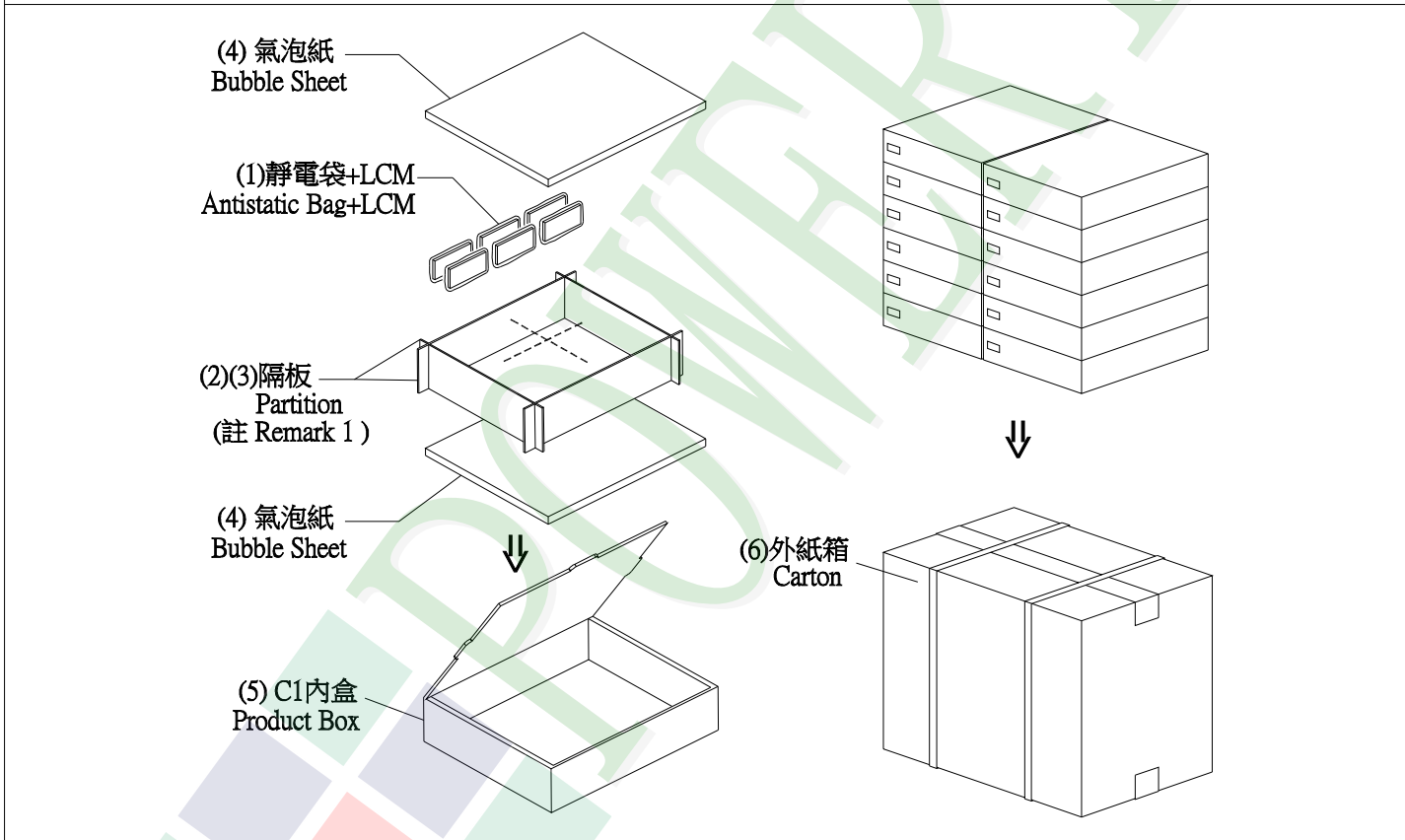
No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PG12032LRS-DGB-H-Q	68.1 X 32.9 X 7.6	0.0256	468	11.9808
2	靜電袋(1)Antistatic Bag	BAG100100ARABA	100 X 100	0.0011	468	0.5148
3	A1-1隔板(2)A1-1 Partition	BX29500047BZBA	295 X 47 X 3	0.0078	168	1.3104
4	B1-1隔板(3)B1-1 Partition	BX24500047BZBA	245 X 47 X 3	0.0065	48	0.312
5	氣泡紙(4)Bubble Sheet	BAG280240BWABA	280 X 240	0.006	24	0.144
6	C1內盒(5)Product Box	BX31025555AABA	310 X 255 X 55	0.13	12	1.56
7	外紙箱(6)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) : 16.65 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 39 x no of boxes 12 = 468



**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.

