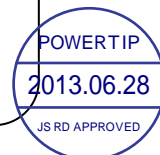


## SPECIFICATIONS

<b>CUSTOMER</b>	:	<b>HJP032</b>
<b>SAMPLE CODE</b>	:	<b>SG12864LRS-KCN-H-Q</b>
<b>MASS PRODUCTION CODE</b>	:	<b>PG12864LRS-KCN-H-Q</b>
<b>SAMPLE VERSION</b>	:	<b>01</b>
<b>SPECIFICATIONS EDITION</b>	:	<b>001</b>
<b>DRAWING NO. (Ver.)</b>	:	<b>JLMD- PG12864LRS-KCN-H-Q _001</b>
<b>PACKAGING NO. (Ver.)</b>	:	<b>JPKG- PG12864LRS-KCN-H-Q _001</b>

**Customer Approved**

**Date:**



Approved	Checked	Designer
閻偉	劉進	周志仙

- ☐ Preliminary specification for design input
- ☒ Specification for sample approval

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## History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
07/27/2005	0	-	New Sample	-	-
06/27/2013	01	001	Update Sample Specification	-	周志仙

Total : 28 Page

## **Contents**

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- 1.4 DC Electrical Characteristics**
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### **2. MODULE STRUCTURE**

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- 2.2 Interface Pin Description**
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## 1. SPECIFICATIONS

### 1.1 Features

Item	Standard Value
Display Type	128 * 64 Dots
LCD Type	STN ,GRAY , Positive ,Transflective ,Extended Temp
Driver Condition	LCD Module : 1/64 Duty, 1/9 Bias
Viewing Direction	6 O'clock
Weight	69g
Interface	-
Other(controller / driver IC)	-
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	93.0(L) * 70.0(w) * 14.0 (H) (Max)	mm
Viewing Area	72.0(L) * 40.0(w)	mm
Active Area	66.52(L) * 33.24 (w)	mm
Dot Size	0.48(L) * 0.48(w)	mm
Dot Pitch	0.52(L) * 0.52(w)	mm

Note : For detailed information please refer to LCM drawing

### 1.3 Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Power Supply Voltage	V <sub>DD</sub>	-	-0.3	7.0	V
LCD Driver Supply Voltage	V <sub>LCD</sub>	-	V <sub>DD</sub> -19.0	V <sub>DD</sub> +0.3	V
Input Voltage	V <sub>IN</sub>	-	-0.3	V <sub>DD</sub> +0.3	V
Operating Temperature	T <sub>OP</sub>	Excluded B/L	-20	+70	°C
Storage Temperature	T <sub>ST</sub>	Excluded B/L	-30	+80	°C
Storage Humidity	H <sub>D</sub>	Ta < 60 °C	-	90	%RH

## 1.4 DC Electrical Characteristics

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

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	$V_{DD}$	-	4.5	5.0	5.5	V
“H” Input Voltage	$V_{IH}$	-	$0.7V_{DD}$	-	$V_{DD}$	V
“L” Input Voltage	$V_{IL}$	-	$V_{SS}$	-	$0.3V_{DD}$	V
“H” Output Voltage	$V_{OH}$	-	$V_{DD}-0.4$	-	-	V
“L” Output Voltage	$V_{OL}$	-	-	-	0.4	V
Supply Current	$I_{DD}$	$V_{DD} = 5.0V$	-	5	-	mA
LCM Driver Voltage	$V_{OP}$	-20°C	-	-	-	V
		+25°C*1	12.2	12.4	12.6	
		+70°C	-	-	-	

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

## 1.5 Optical Characteristics

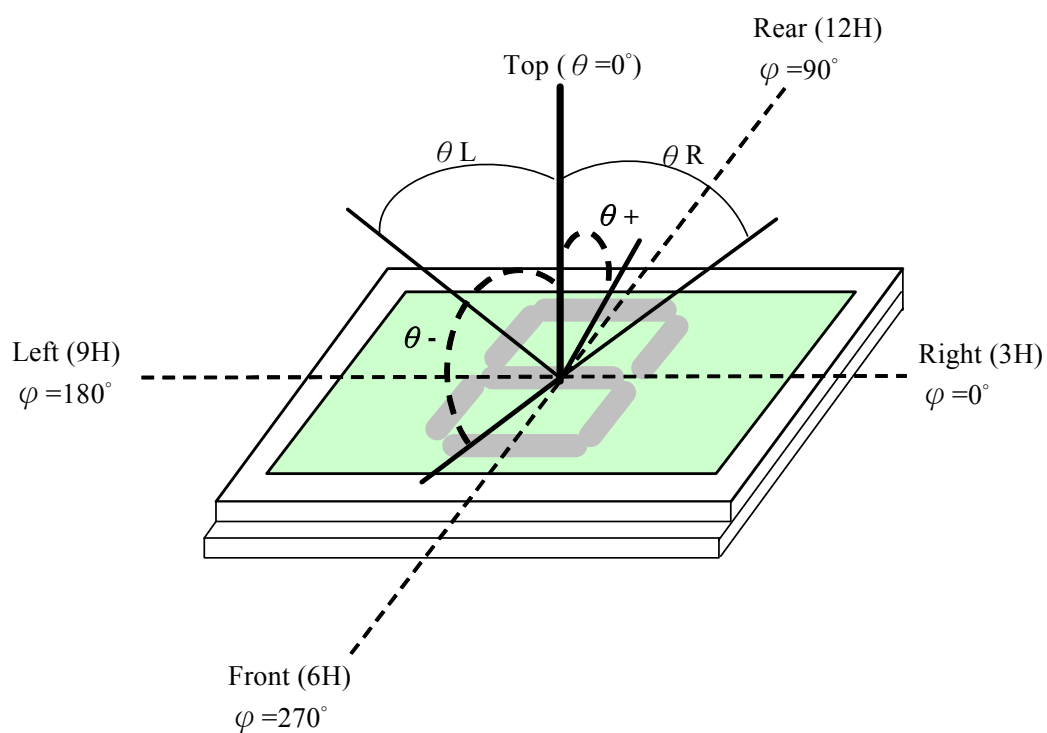
LCD Panel : 1/64Duty , 1/9Bias,  $V_{LCD}=14V$  ,  $T_a=25^{\circ}C$

Item		Symbol	Conditions	Min.	Typ.	Max.	Reference
Response Time	Rise	tr	$\theta = 5^{\circ}$ , $\varnothing = 0^{\circ}$	-	150ms	-	Note 2
	Fall	tf		-	300ms	-	
Viewing angle range	Top	$\Theta Y+$	$C \geq 2.0$ , $\varnothing = 0^{\circ}$	$45^{\circ}$	-	-	Note 1
	Bottom	$\Theta Y-$		$45^{\circ}$	-	-	
	Left	$\Theta X-$		$45^{\circ}$	-	-	
	Right	$\Theta X+$		$45^{\circ}$	-	-	
Contrast Ratio		C	$\theta = 5^{\circ}$ , $\varnothing = 0^{\circ}$	3	7	-	Note 3

Note 1.

Optical characteristics-2

Viewing angle

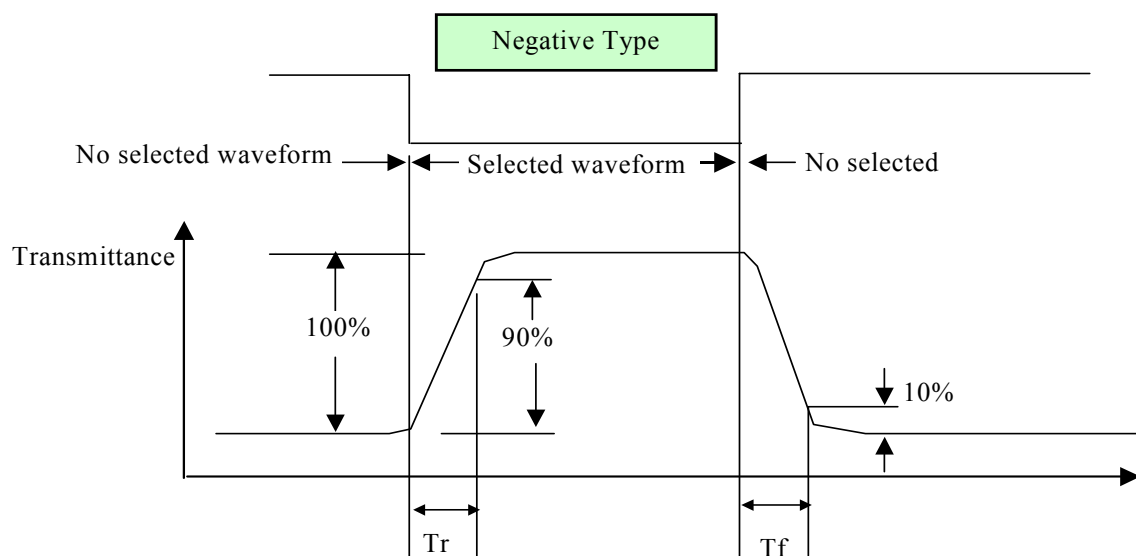
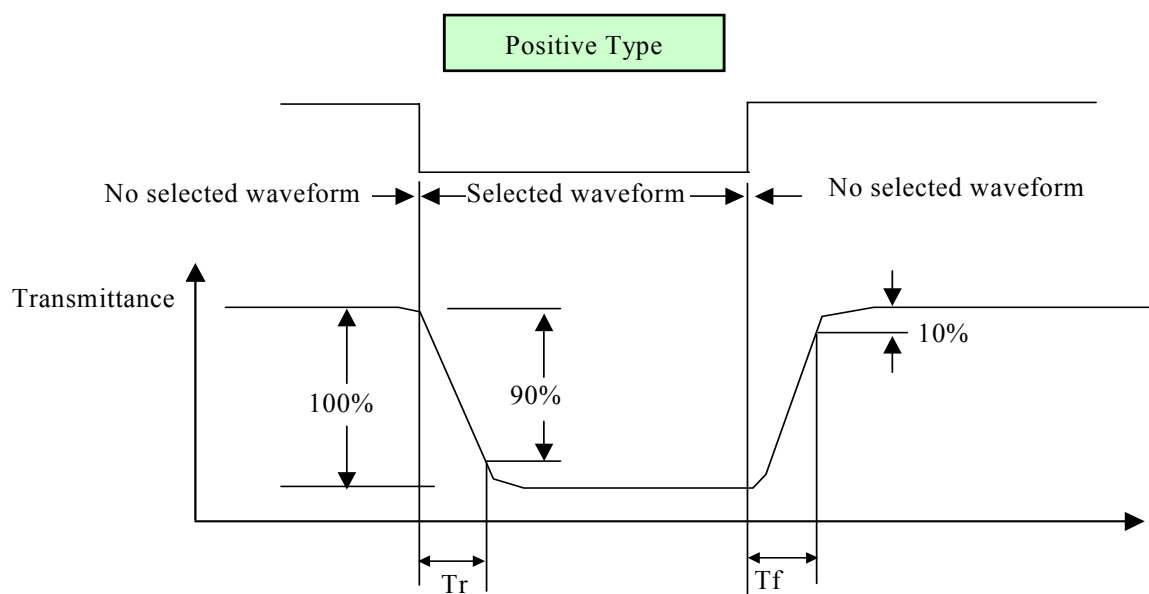


**Viewing angle**

Note 2.

Optical characteristics-3

Fig.2 Definition of response time





## Electrical characteristics-2

※2 Drive waveform

$V_{op}$ : Drive voltage

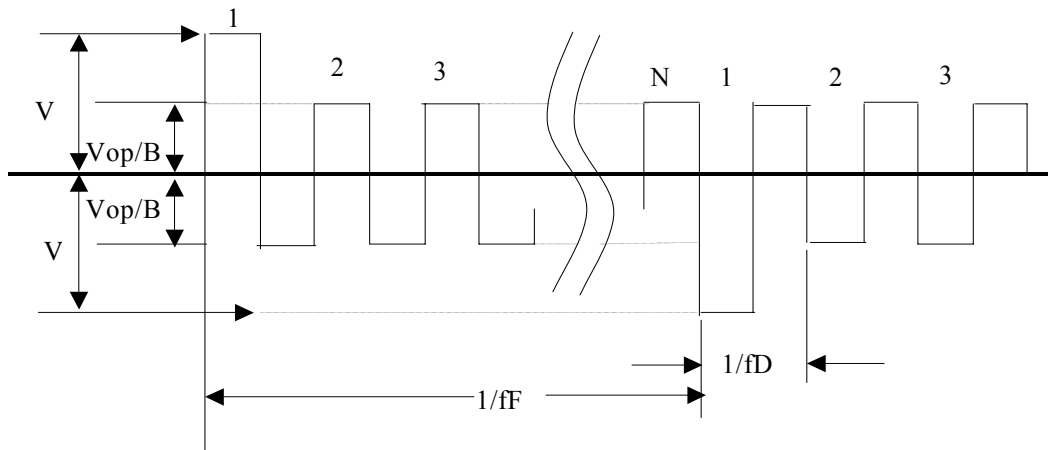
$f_F$ : Frame frequency

$1/B$ : Bias

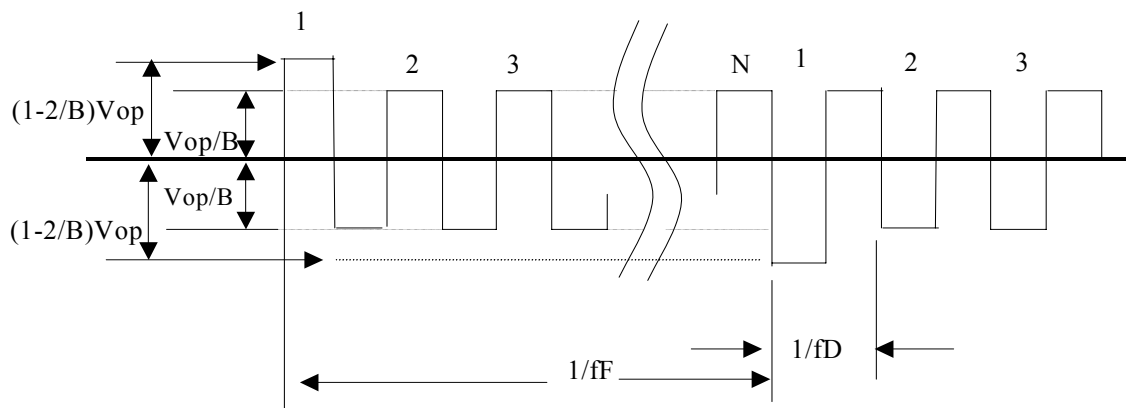
$f_D$ : Drive frequency

$N$ : Duty

### (1) Selected waveform



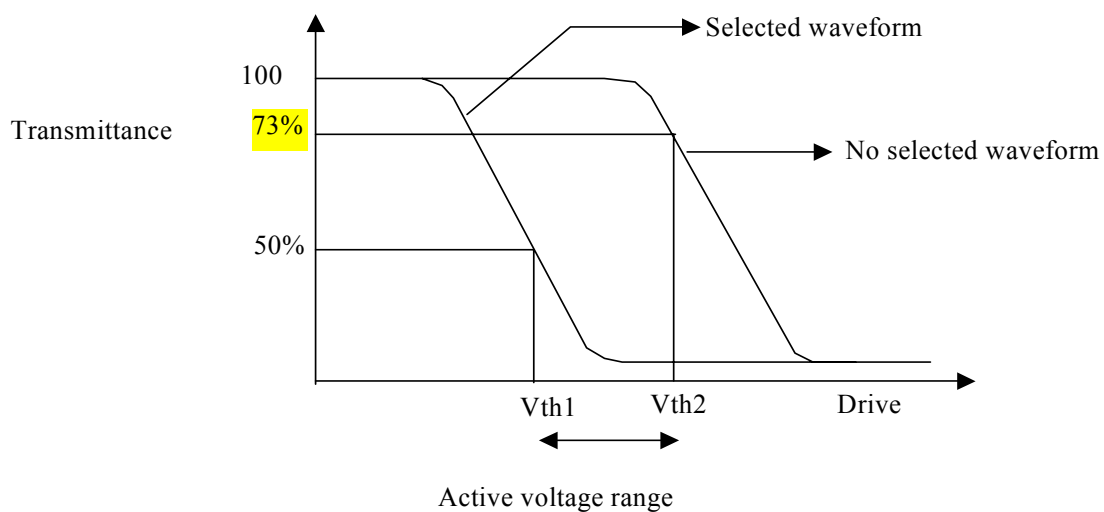
### (2) Non- Selected wave form



Note:

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

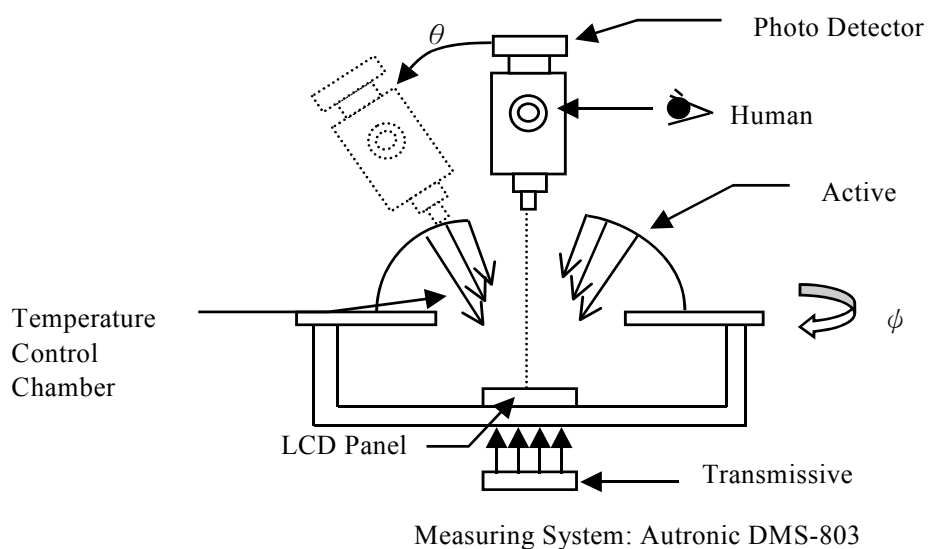
Note 3. : Definition of Vth



	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

### Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25℃	-	975	mA
Reverse Voltage	VR	Ta =25℃	-	8	V
Power Dissipation	PD	Ta =25℃	-	4.5	W
Operating Temperature	T <sub>OP</sub>	-	-20	70	℃
Storage Temperature	T <sub>ST</sub>	-	-40	80	℃
Solder Temp. for 3 Second	-	-	-	260	℃

### Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 390 mA	-	4.2	4.8	V
Reverse Current	IR	VR=8V	-	-	0.98	mA
Wavelength	λ p	IF=390mA	-	570	-	nm
Luminous Intensity (without LCD)	Iv	IF=390mA	70	130	-	cd/m <sup>2</sup>
Color	Yellow-green					

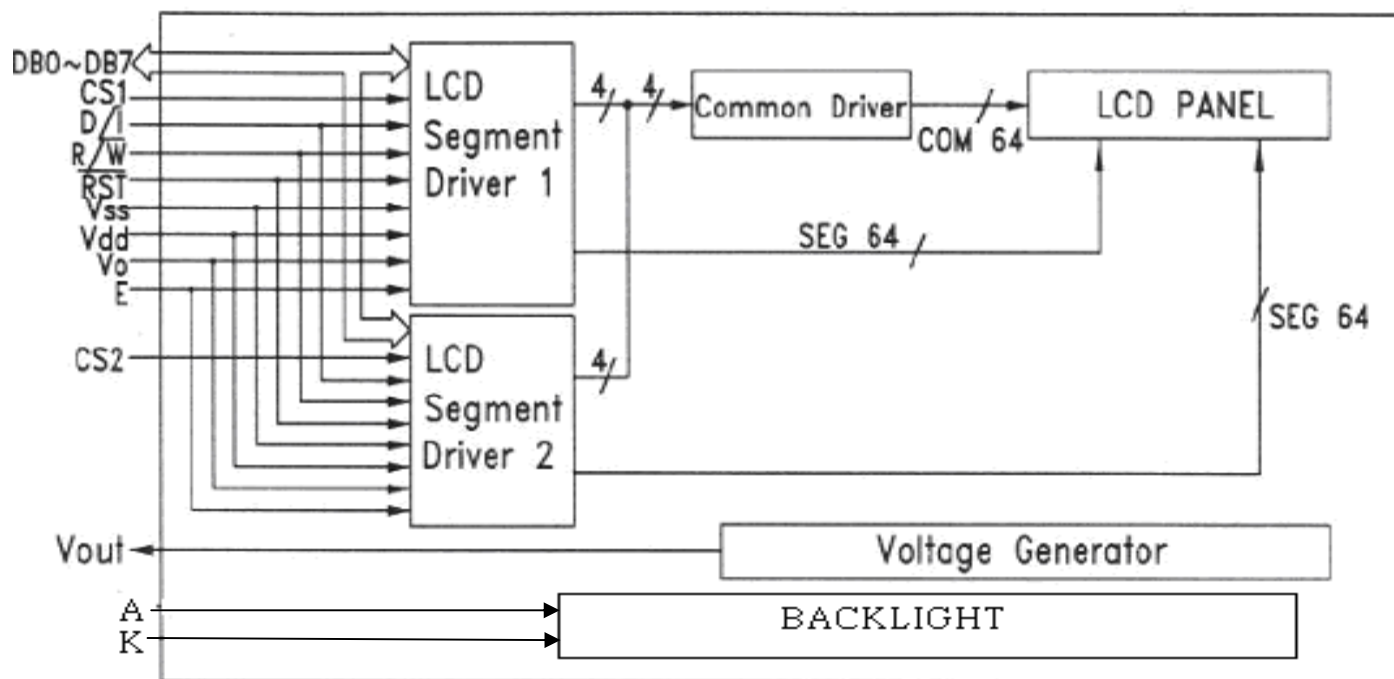
## 2. MODULE STRUCTURE

### 2.1 Counter Drawing

#### 2.1.1 LCM Mechanical Diagram

\* See Appendix

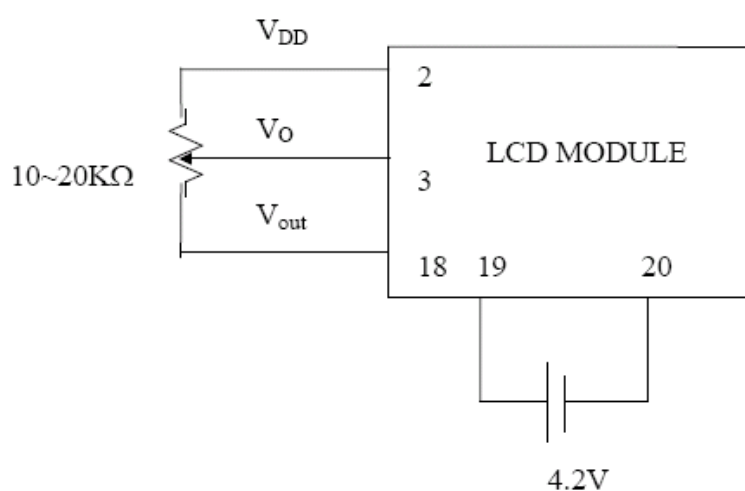
#### 2.1.2 Block Diagram



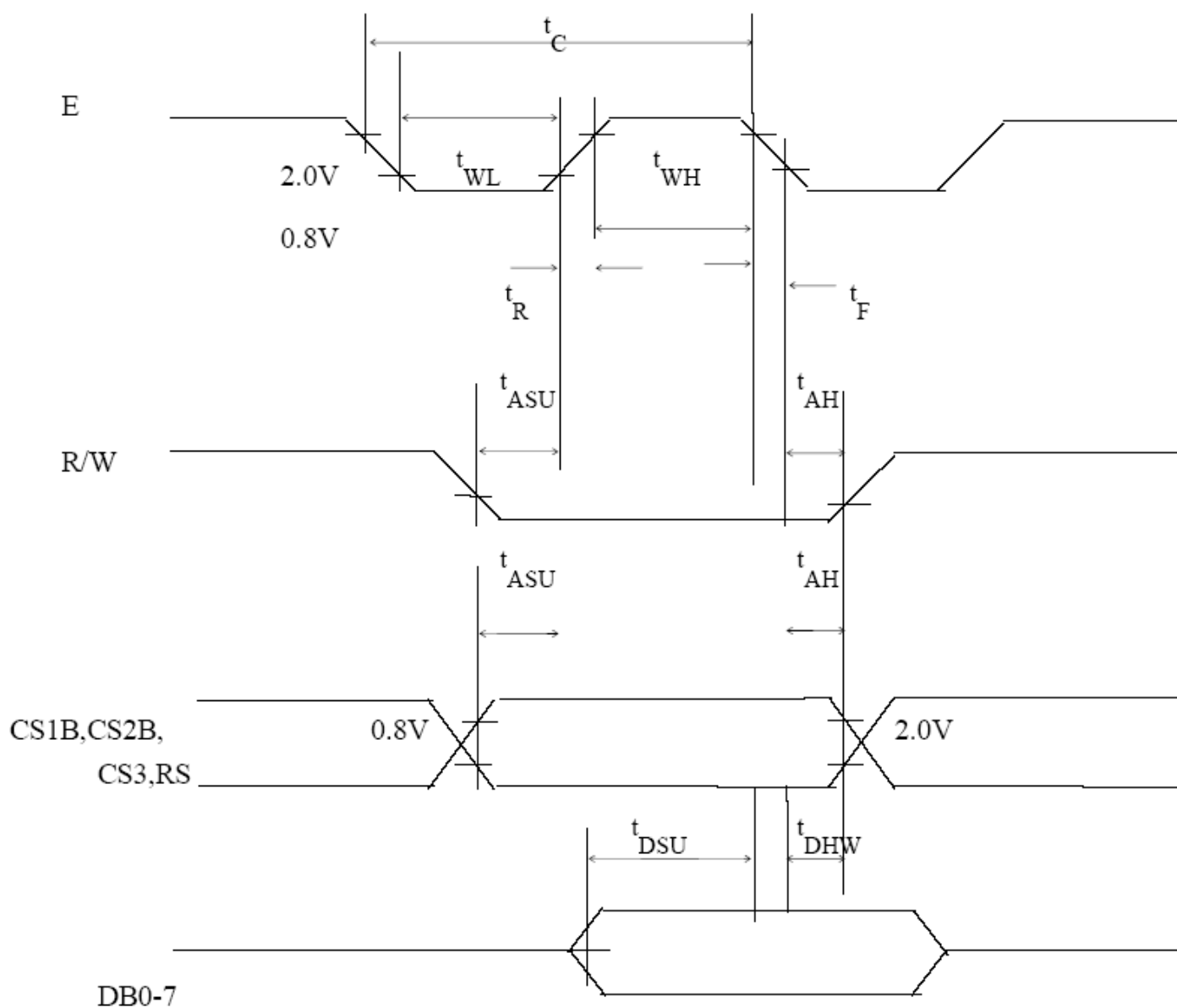
## 2.2 Interface Pin Description

Pin No.	Symbol	Function
1	VSS	Signal ground (GND)
2	VDD	Power supply for logic (VDD> VSS)
3	Vo	Operating voltage for LCD (variable)
4	D/ $\overline{\text{I}}$	Register selection input High =Data register Low =Instruction register (for write) Busy flag address counter (for read)
5	R/ $\overline{\text{W}}$	R/ $\overline{\text{W}}$ 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
7-14	DB0-DB7	Data bus
15	CS1	Chip enable for D2 (segment 1 to segment 64)
16	CS2	Chip enable for D3 (segment 65 to segment 128)
17	$\overline{\text{RST}}$	Reset signal
18	Vout	Negative voltage power supply
19	A	Power supply for LED B/L(+)
20	K	Power supply for LED B/L(-)

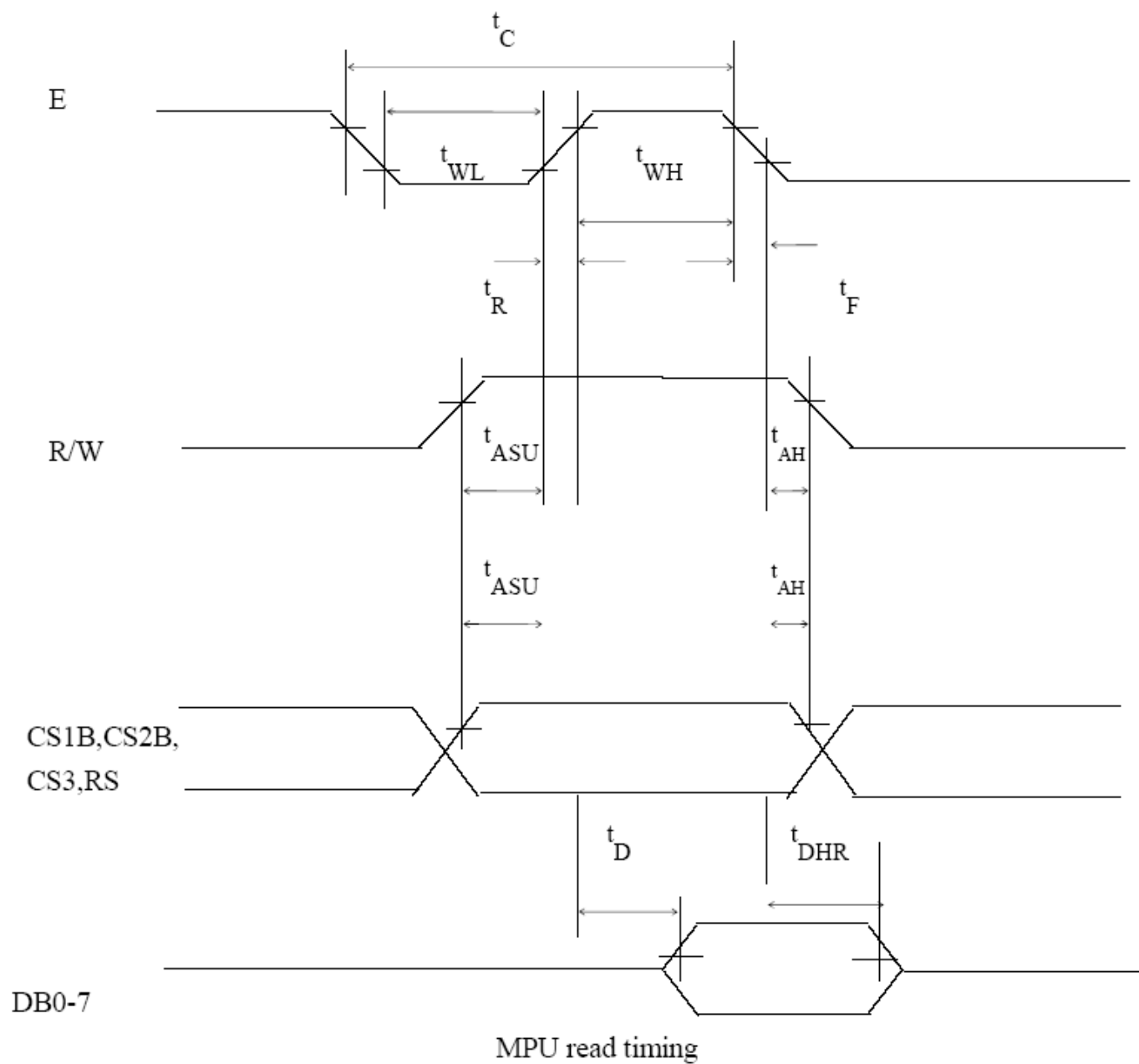
Contrast Adjust



## 2.3 Timing Characteristics



MPU write timing



Characteristic	Symbol	Min.	Typ	Max	Unit
E Cycle	tc	1000	-	-	ns
E High Level Width	tWH	450	-	-	ns
E Low Level Width	tWL	450	-	-	ns
E Rise Time	tR	-	-	25	ns
E Fall Time	tF	-	-	25	ns
Address Set-Up time	tASU	140	-	-	ns
Address Hold Time	tAH	10	-	-	ns
Data Set-Up Time	tDSU	200		-	ns
Data Delay Time	tD	-	-	320	ns
Data Hold Time (Write)	tDHW	10	-	-	ns
Data Hold Time (Read)	tDHR	20	-	-	ns



## 2.4 Display command

Instruction	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Function
Display on/off	L	L	L	L	H	H	H	H	H	L/H	Controls the display on or off. Internal status and display RAM data is not affected. L:OFF, H:ON
Set address (Y address)	L	L	L	H	Y address (0-63)						Sets the Y address in the Y address counter.
Set page (X address)	L	L	H	L	H	H	H	Page (0-7)			Sets the X address at the X address register.
Display Start line (Z address)	L	L	H	H	Display start line (0-63)						Indicates the display data RAM displayed at the top of the screen.
Status read	L	H	Busy	L	On/Off	Reset	L	L	L	L	Read status. BUSY L: Ready H: In operation ON/OFF L: Display ON H: Display OFF RESET L: Normal H: Reset
Write display data	H	L	Write data								Writes data (DB0: 7) into display data RAM. After writing instruction, Y address is increased by 1 automatically.
Read display data	H	H	Read data								Reads data (DB0: 7) from display data RAM to the data bus.

### DISPLAY ON/OFF

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	0	1	1	1	1	1	D

The display data appears when D is 1 and disappears when D is 0. Though the data is not on the screen with D=0, it remains in the display data RAM. Therefore, you can make it appear by changing D=0 into D=1.

### SET ADDRESS (Y ADDRESS)

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	0	1	AC5	AC4	AC3	AC2	AC1	AC0

Y address (AC0-AC5) of the display data RAM is set in the Y address counter. An address is set by instruction and increased by 1 automatically by read or write operations of display data.

### SET PAGE (X ADDRESS)

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	1	0	1	1	1	AC2	AC1	AC0

X address (AC0-AC2) of the display data RAM is set in the X address register. Writing or reading to or from MPU is executed in this specified page until the next page is set.

## DISPLAY START LINE (Z ADDRESS)

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	0	1	1	AC5	AC4	AC3	AC2	AC1	AC0

Z address (AC0-AC5) of the display data RAM is set in the display start line register and displayed at the top of the screen. When the display duty cycle is 1/64 or others (1/32-1/64), the data of total line number of LCD screen, from the line specified by display start line instruction, is displayed.

## STATUS READ

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
0	1	BUSY	0	ON/OFF	RESET	0	0	0	0

- BUSY

When BUSY is 1, the Chip is executing internal operation and no instructions are accepted.

When BUSY is 0, the Chip is ready to accept any instructions.

- ON/OFF

When ON/OFF is 1, the display is OFF.

When ON/OFF is 0, the display is ON.

- RESET

When RESET is 1, the system is being initialized.

In this condition, no instructions except status read can be accepted.

When RESET is 0, initializing has finished and the system is in usual operation condition.

## WRITE DISPLAY DATA

RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
1	0	D7	D6	D5	D4	D3	D2	D1	D0

Writes data (D0-D7) into the display data RAM. After writing instruction, Y address is increased by 1 automatically.

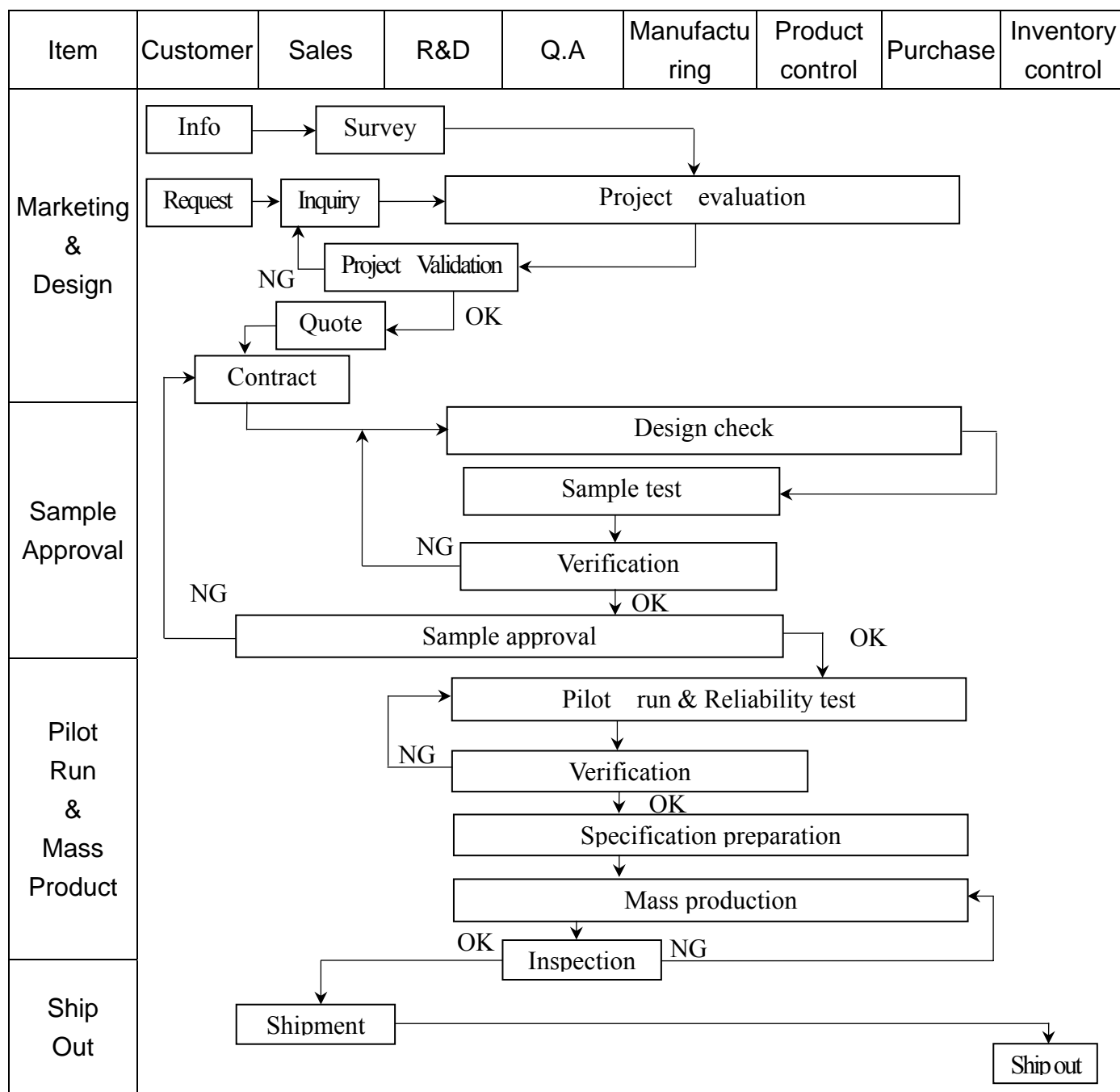
## READ DISPLAY DATA

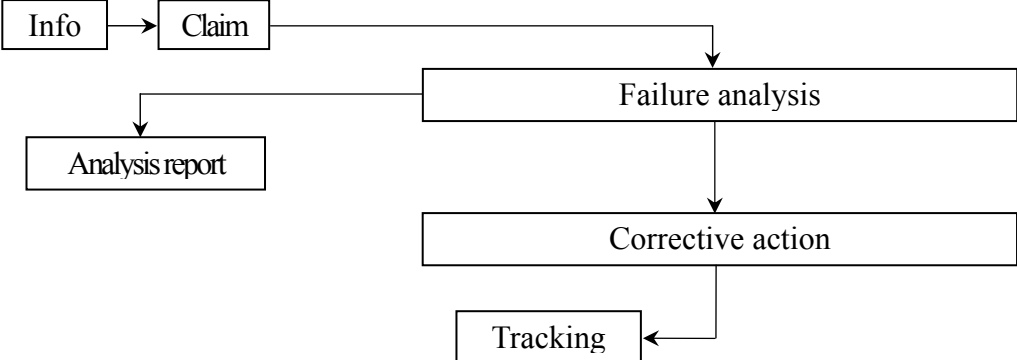
RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0
1	1	D7	D6	D5	D4	D3	D2	D1	D0

Reads data (D0-D7) from the display data RAM. After reading instruction, Y address is increased by 1 automatically.

### 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; FA[Failure analysis]     Claim --&gt; AR[Analysis report]     FA --&gt; CA[Corrective action]     CA --&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)

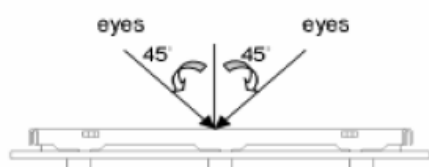


Fig.1

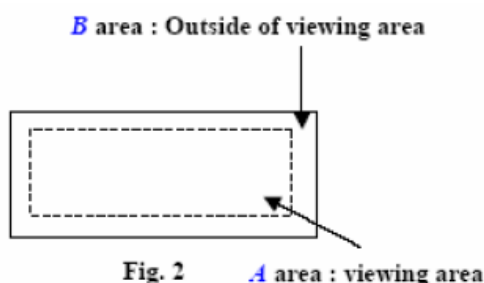


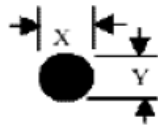
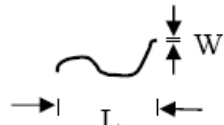
Fig. 2

◆ 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

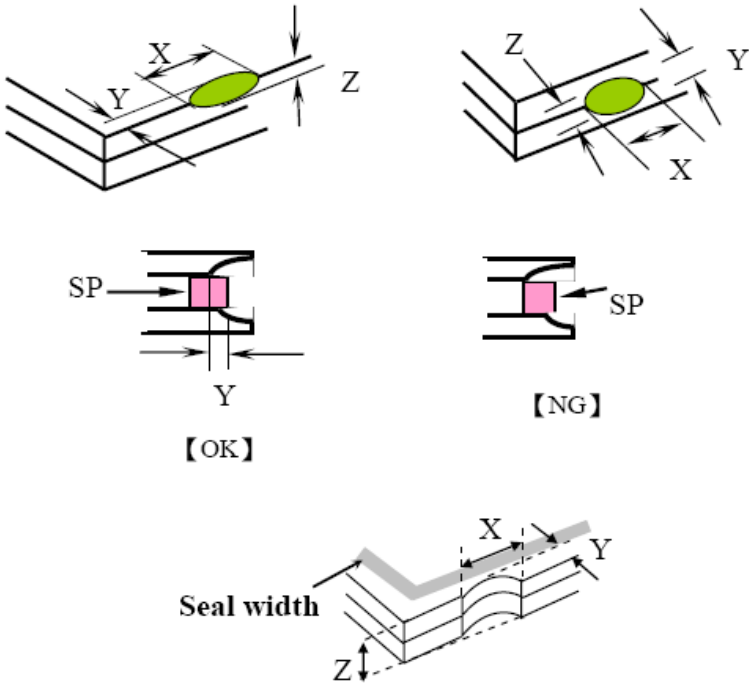
**◆ Specification For Monotype and Color STN :**

(Ver. B01)

NO	Item	Criterion	Level																																			
05	Black or white dot 、 scratch 、 contamination	<div>5. 1 Round type:</div> <div>5. 1. 1 display only :</div> <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> <div>5. 1. 2 Non-display :</div> <table> <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> <tr> <td><math>\Phi \leq 0.10</math></td> <td>Accept no dense</td> <td rowspan="4">Ignore</td> </tr> <tr> <td><math>0.10 &lt; \Phi \leq 0.20</math></td> <td>3</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> </table> <div>5. 1. 3 Line type:</div> <table> <tr> <th colspan="2">Dimension</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>Length (L)</th> <th>Width (W)</th> <th>A area</th> <th>B area</th> </tr> <tr> <td>---</td> <td><math>W \leq 0.03</math></td> <td>Accept no dense</td> <td rowspan="4">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> </table>	Dimension (diameter : $\Phi$ )	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.10$	Accept no dense	Ignore	$0.10 < \Phi \leq 0.20$	3	$0.20 < \Phi \leq 0.30$	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 : $\Phi$ )	Acceptance (Q'ty)																																				
		A area	B area																																			
	$\Phi \leq 0.10$	Accept no dense	Ignore																																			
$0.10 < \Phi \leq 0.20$	3																																					
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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																																				
	<div>Round type</div>  <div><math>\Phi=(x+y)/2</math></div>																																					
	<div>Line type</div> 																																					
06	Polarizer Bubble	<table> <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> <tr> <td><math>\Phi \leq 0.20</math></td> <td>Accept no dense</td> <td rowspan="5">Ignore</td> </tr> <tr> <td><math>0.20 &lt; \Phi \leq 0.50</math></td> <td>3</td> </tr> <tr> <td><math>0.50 &lt; \Phi \leq 1.00</math></td> <td>2</td> </tr> <tr> <td><math>\Phi &gt; 1.00</math></td> <td>0</td> </tr> <tr> <td>Total quantity</td> <td>4</td> </tr> </table>	Dimension (diameter : $\Phi$ )	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.20$	Accept no dense	Ignore	$0.20 < \Phi \leq 0.50$	3	$0.50 < \Phi \leq 1.00$	2	$\Phi > 1.00$	0	Total quantity	4	Minor																			
		Dimension (diameter : $\Phi$ )		Acceptance (Q'ty)																																		
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		$\Phi > 1.00$	0																																			
Total quantity	4																																					

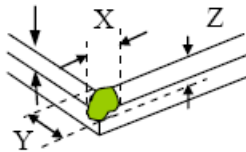
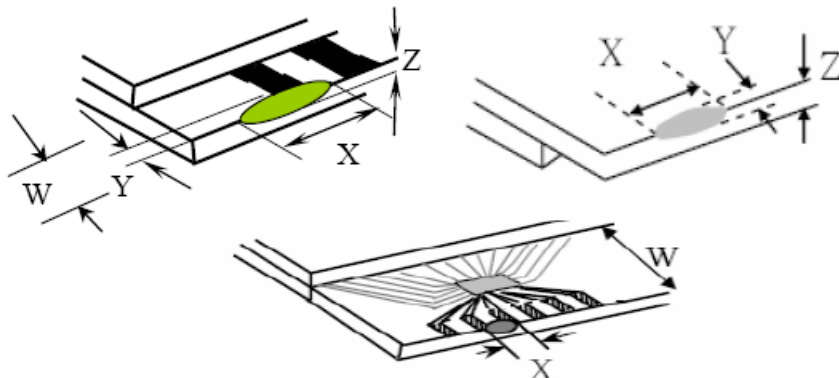
**◆ Specification For Monotype and Color STN :**

(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>7.1 General glass chip :</p> <p>7.1.1 Chip on panel surface and crack between panels:</p> <div></div> <table><tr><th>X</th><th>Y</th><th>Z</th></tr><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></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.	$1/2 t < Z \leq 2 t$							

**◆Specification For Monotype and Color STN :**

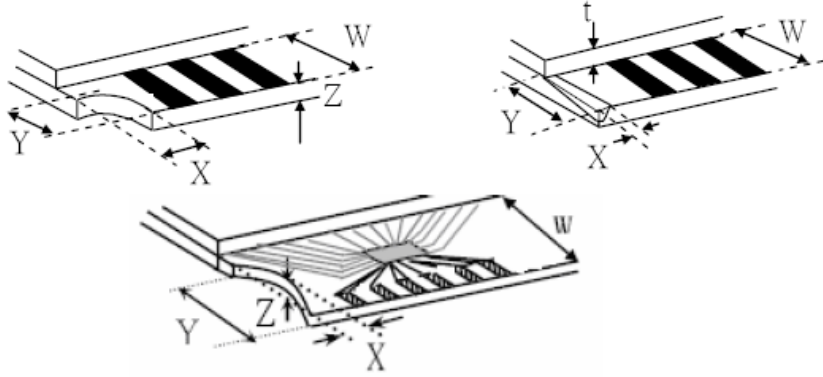
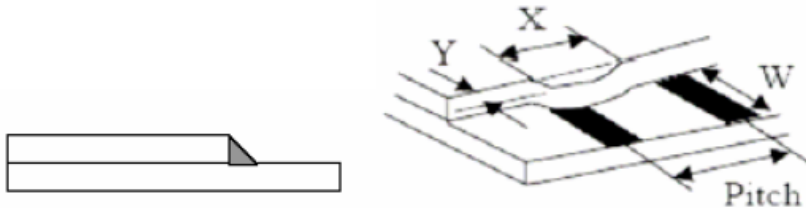
(Ver. B01)

NO	Item	Criterion	Level												
07	The crack of glass	<p>Symbols :</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/>	Minor												
		<p>7.1.2 Corner crack :</p>  <table><tr><th>X</th><th>Y</th><th>Z</th></tr><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></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.	$1/2 t < Z \leq 2 t$			
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><tr><th></th><th>X</th><th>Y</th><th>Z</th></tr><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></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><b>X</b> : The length of crack                      <b>Y</b> : The width of crack. <b>Z</b> : The thickness of crack                <b>W</b> : terminal length <b>t</b> : The thickness of glass                <b>a</b> : LCD side length</p>	Minor									
		<p>7.2.2 Non-conductive portion :</p> <div></div> <table border="1" data-bbox="579 1050 1206 1202"><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td><math>\leq 1/3 a</math></td><td><math>\leq W</math></td><td><math>\leq t</math></td></tr></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> <div></div> <table border="1" data-bbox="499 1729 1189 1868"><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td><math>\leq a</math></td><td><math>\leq 1/3 W</math></td><td><math>\leq t</math></td></tr></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 $\leq 1.5$ mm.	Minor

## 4. RELIABILITY TEST

### 4.1 Reliability Test Condition

(Ver.B01)

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

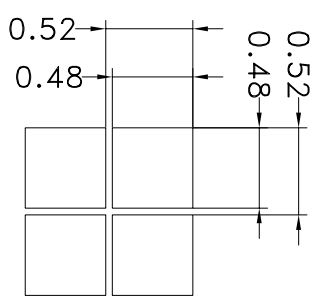
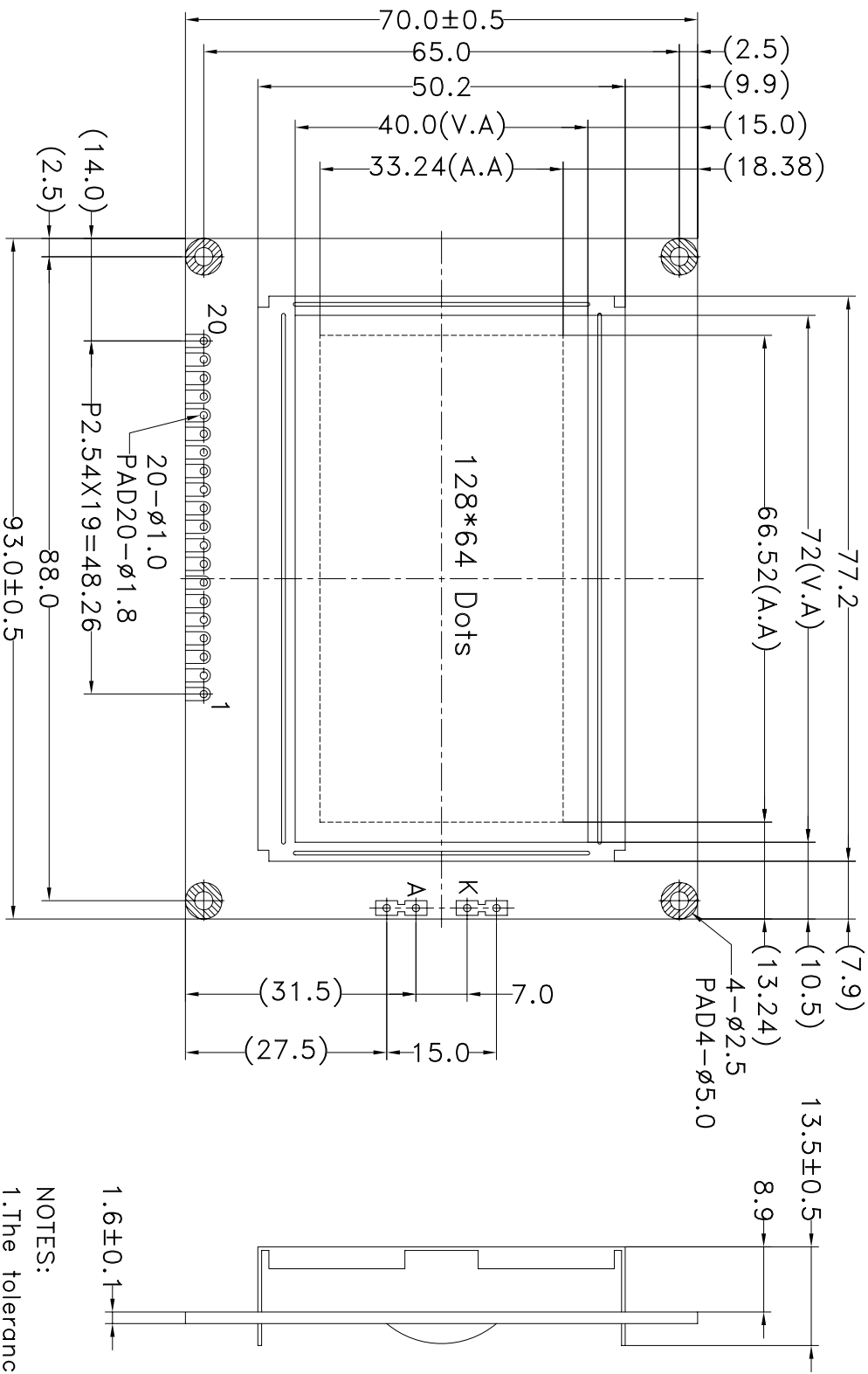
- 5.2.1 Avoid any strong mechanical shock which can break the glass.
- 5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module , be sure to ground your body and any electrical equipment you may be using.
- 5.2.3 Do not remove the panel or frame from the module.
- 5.2.4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



SCALE:20X

1.6±0.1

NOTES:

- 1.The tolerance unless classified ±0.3mm
- 2.LCD type:STN
- 3.LCD mode: Positive/Transflective
- 4.View direction: 6 o'clock
- 5.T<sub>op</sub>=-20°C~70°C , T<sub>st</sub>=-30°C~80°C

007			PART NO:				
006			PG12864LRS-KCN-H-Q				
005			DRAWING NAME:				
004			JLMD-PG12864LRS-KCN-H-Q				
003			TITLE:				
002			LCD Module Drawing				
001	NEW DRAWING	Sally	2013/06/27				
REV	REV BY	REVISER	DATE				

久正光電股份有限公司		POWER TIP TECHNOLOGY CORPORATION	
Design	Sally		(3)
Check	Terry		
Approve	Ryan	Unit	MM
		Scale	1:1
		Page	1/1
		Material	Thickness
		Quantity	
		公差 (mm)	精度
		1 ~ 4	4
		4 ~ 16	16
		16 ~ 63	63
		63 ~ 250	250
		250 ~ 1000	1000

Ver.001		<div>LCM包裝規格書</div> <div>LCM Packaging Specifications</div>	Approve	Check	Contact
Documents NO.	JPKG-PG12864LRS-KCN-H-Q		Ryan	Terry	Sally

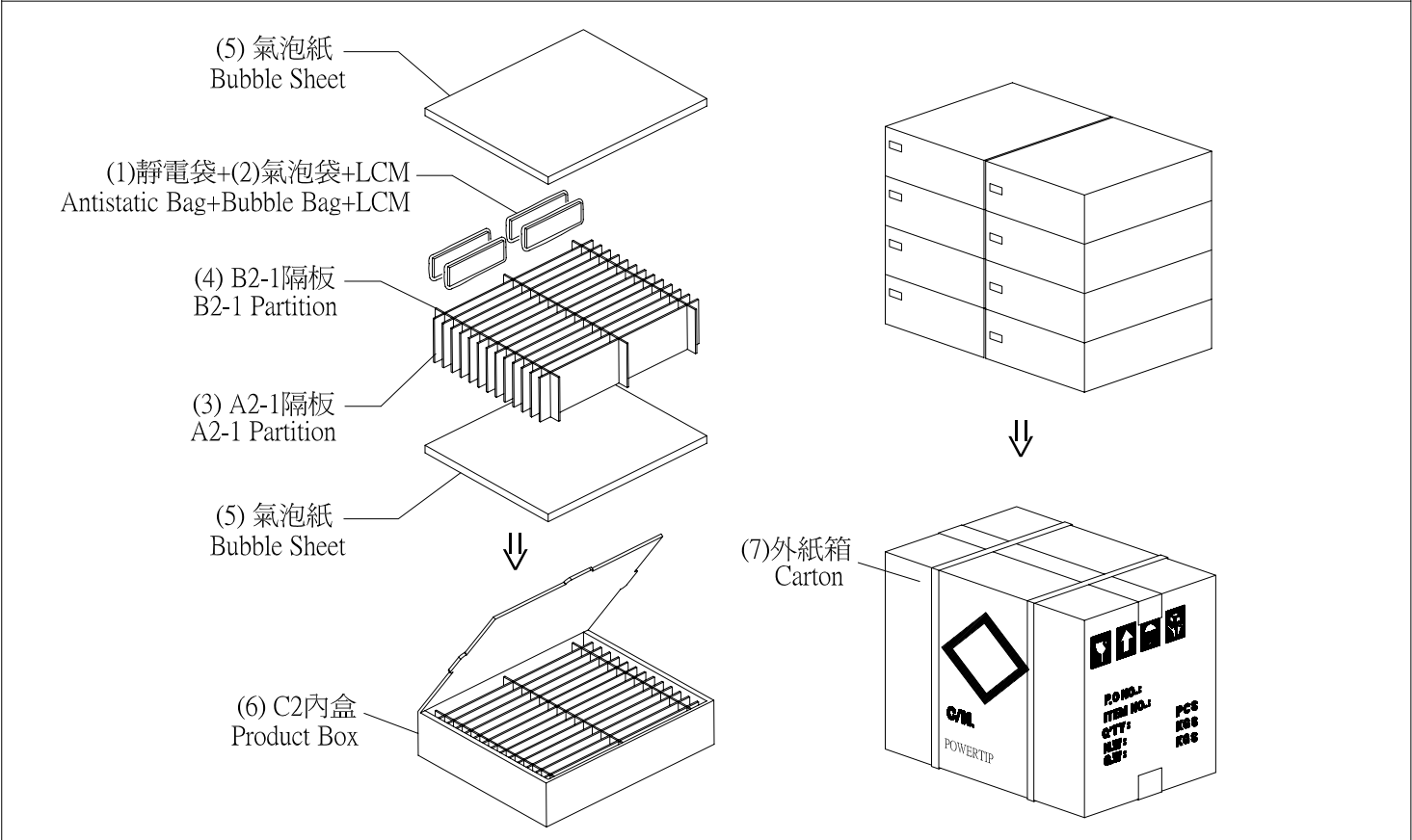
1.包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PG12864LRS-KCN-H-Q	93.0 X 70.0 X 13.5	0.069	192	13.248
2	靜電袋(1)Antistatic Bag	BAG150100ARABA	150 X 120	0.0018	192	0.3456
3	A2-1隔板(3)A2-1 Partition	BX29500072BZBA	295 X 72 X 3.0	0.0109	104	1.1336
4	B2-1隔板(4)B2-1 Partition	BX24500072BZBA	245 X 72 X 3.0	0.0094	24	0.2256
5	氣泡紙(5)Bubble Sheet	BAG280240BWABA	280 X 240	0.006	16	0.096
6	C2內盒(6)Product Box	BX31025580AABA	310 X 255 X 86	0.16	8	1.28
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 ) : 17.16 Kg±10%

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

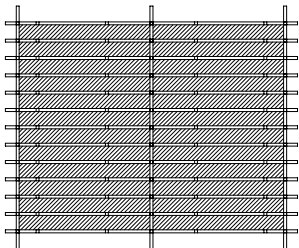
- (1)Quantity Of Spacer : A2-1隔板 X 13 , B2-1隔板 X 3
- (2)Total LCM quantity in carton : quantity per box 24 x no of boxes 8 = 192



特 記 事 項 (REMARK)

4. Label Specifications :  
依產內標準作業

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



模組(LCM) X 1pcs.