POWERTIP TECH. CORP.

SPECIFICATIONS

CUSTOMER	:	CDE016
SAMPLE CODE	:	SE240160WRT001IY1Q
MASS PRODUCTION CODE	:	PE240160WRT001IY1Q
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	002
DRAWING NO. (Ver.)	:	LMD-PE240160WRT001IY1Q (Ver.001)
PACKAGING NO. (Ver.)	:	PKG-PE240160WRT001IY1Q (Ver.001)

Customer Approved

Date:

POWERTIP
2015.10.28
JS RD APPROVED

Approved	Checked	Designer
閆偉	劉進	張斌

□ 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

History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
05/26/2010	01	001	Modify cross talk. Modify 1.4 DC Electrical Characteristics. Modify 1.5 Optical Characteristics.	- 5~10 11	Louis
10/21/2015	01	002	Modify The LED	6,11	張斌

Total : 29 Page

Contents

Note：For detailed information please refer to IC data sheet：SITRONIX –ST7529-G

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	240 * 160 Dots
LCD Type	FSTN, Negative, Transmissive
Driver Condition	LCD Module :1/160 Duty, 1/12 Bias
Viewing Direction	6 O'clock
Weight	50.4 g
Interface	8-bit parallel bi-directional interface with 6800-series or 8080-series
Driver IC	SITRONIX – ST7529-G
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web side : http://www.powertip.com.tw/news/LatestNews.asp

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	96.2 (W) * 67.2 (L) * 5 (H)	mm
Viewing Area	80.78 (W) * 54.18 (L)	mm
Active Area	76.785 (W) * 51.185 (L)	mm
Dot Size	0.305 (W) * 0.305(H)	mm
Dot Pitch	0.32 (W) * 0.32 (H)	mm

Note：For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Power Supply Voltage	V_{DD}	-	-0.5	4.0	V
LCD Driver Supply Voltage	V_{OP}	V0–VSS	-0.5	20	V
Operating Temperature	T_{OP}	-	-20	70	°C
Storage Temperature.	T_{ST}	-	-30	80	°C
Storage Humidity	H_D	Ta＜60 ℃	-	90	%RH

1.4 DC Electrical Characteristics

Ta = 25℃

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	V_{dd}	-	2.7	3.0	3.3	V
“H” Input Voltage	V_{IH}	-	0.7V_{DD}	-	V_{DD}	V
“L” Input Voltage	V_{IL}	-	V_{SS}	-	0.3V_{DD}	V
High-level Output Current	IOH	VDD=2.7V,VOH=2.2V	0.5	-	-	V
Low-level Output Current	IOL	VDD=2.7V,VOL=0.5V	-	-	-0.5	V
Supply Current	I_{dd}	V_{DD}= 3.0V;V_{OP}= 15.0V;	-	0.2	0.5	mA
LCM Driver Voltage	V_{OP}*1	-20℃	17.4	17.5	17.6	V
		25℃	14.8	15.0	15.2	
		70℃	14.0	14.2	14.4	

NOTE: *1 The VOP test point is V0~VSS.

1.5 Optical Characteristics

LCD Panel: 1/160 Duty, 1/12 Bias, V_{LCD} = 15.0V, Ta = 25°C

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Reference
Response Time	Rise	tr	25℃	-	150	225	ms	Note2
	Fall	tf	25℃	-	450	675		
Viewing angle range	Top	ΘY+	CR≥2.0, Æ=270°	-	25	-	degree	Note 1
	Bottom	ΘY-		-	40	-		
	Left	ΘX-		-	45	-		
	Right	ΘX+		-	45	-		
Contrast Ratio		CR	θ = 0°, Æ=270°	-	30	-	-	Note 3
Average Brightness (With LED B/L)		IV	IF= 40 mA	180	310	-	cd/m²	-
CIE Color Coordinate (With LED B/L)		X	IF= 40 mA	0.23	0.28	0.33	-	Note 4
		Y		0.20	0.25	0.30	-	
Uniformity		△B		70	-	-	%	

Note 4:

1：△B=B(min) / B(max) * 100%

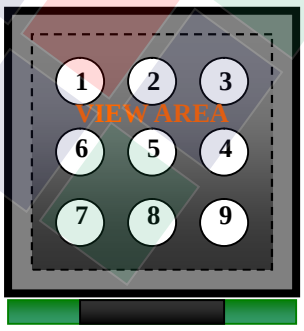
2：Measurement Condition for Optical Characteristics:

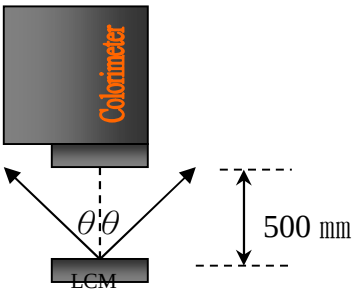
a：Environment: 25℃±5℃ / 60±20%R.H，no wind，dark room below 10 Lux at typical lamp current and typical operating frequency.

b：Measurement Distance: 500 ± 50 ㎜ ，(θ= 0°)

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

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



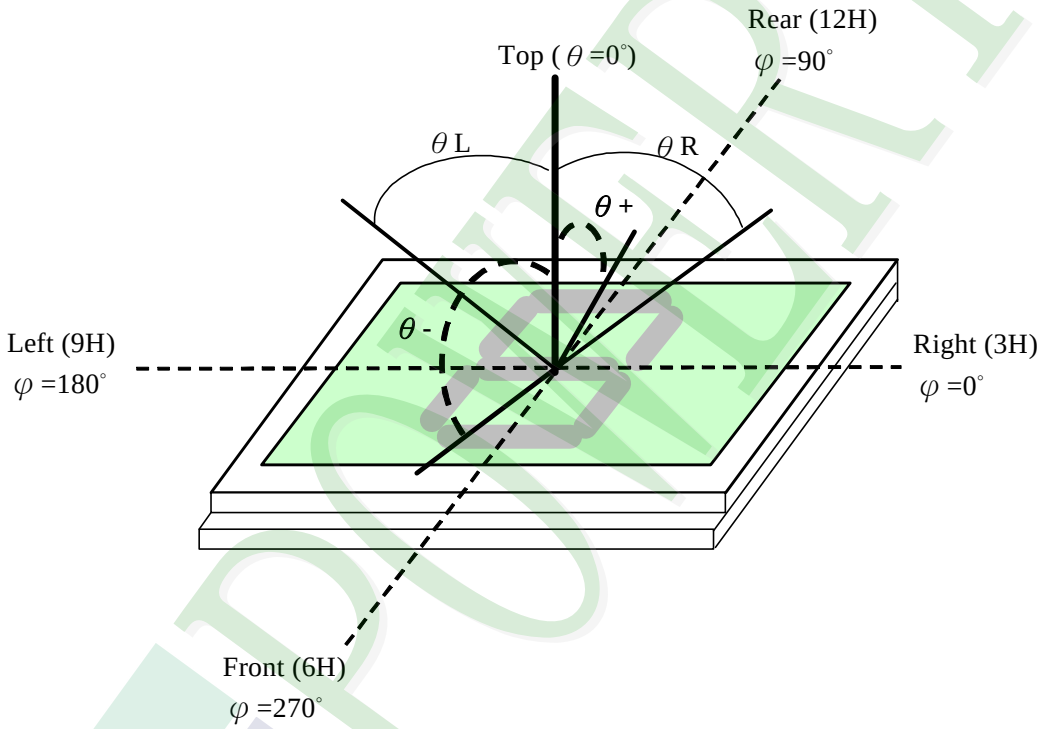


Colorimeter=BM-7 fast

Note 1.

Optical characteristics-2

Viewing angle

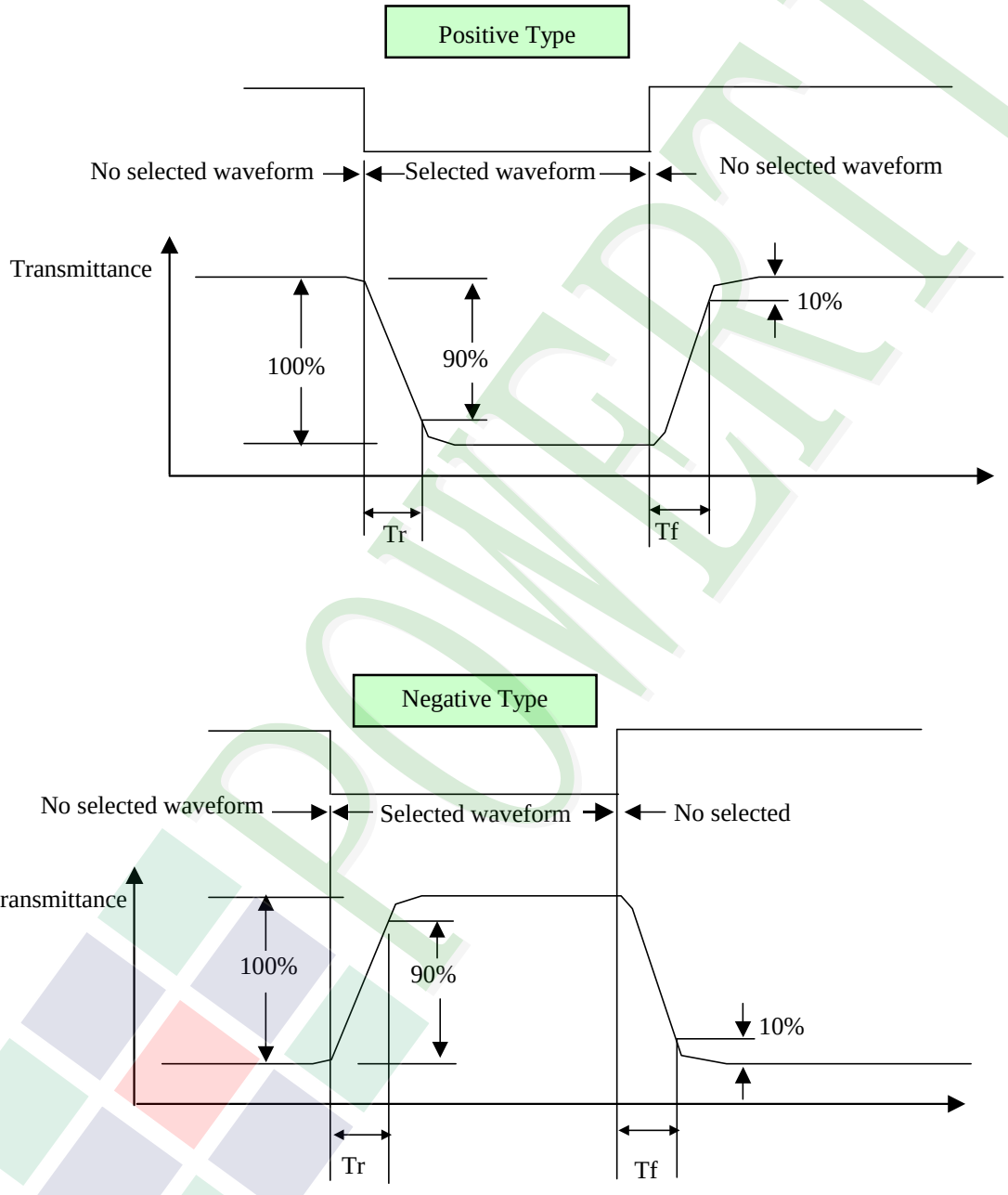


Viewing angle

Note 2.

Optical characteristics-3

Fig.2 Definition of response time



Electrical characteristics-2

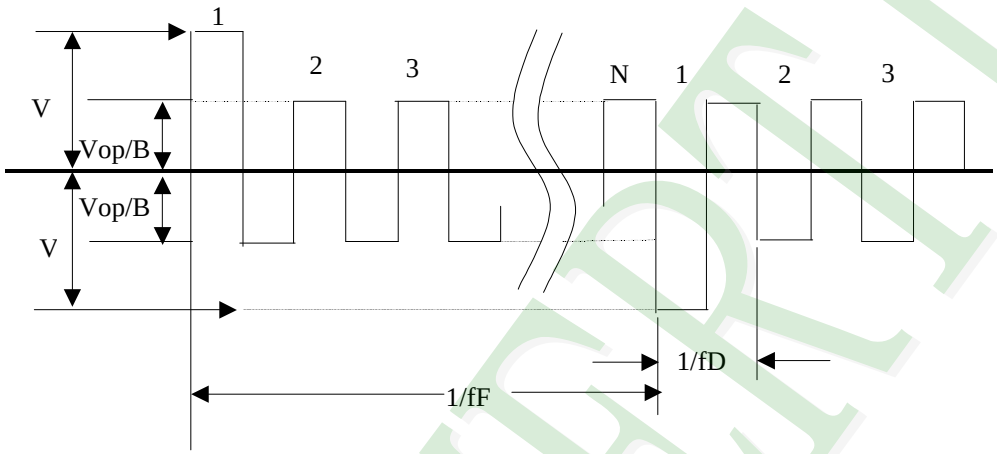
※2 Drive waveform

Vop: Drive voltage fF: Frame frequency

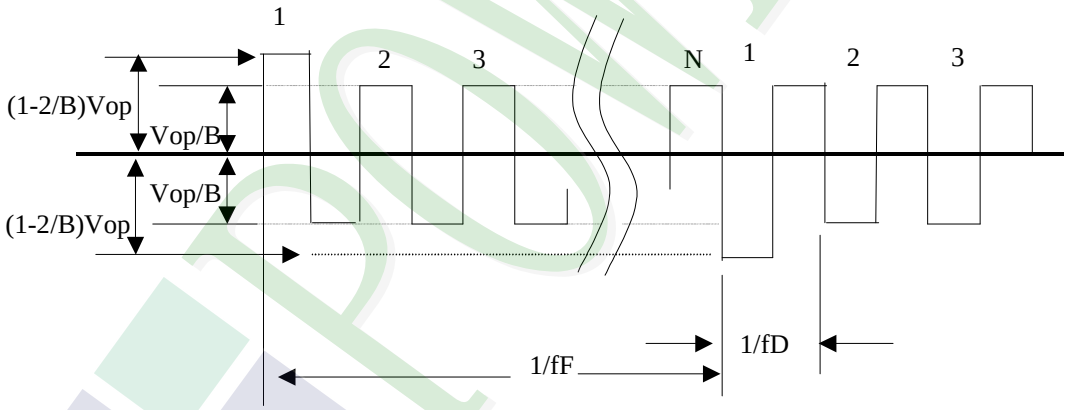
1/B: Bias fD: Drive frequency

N: Duty

(1) Selected waveform



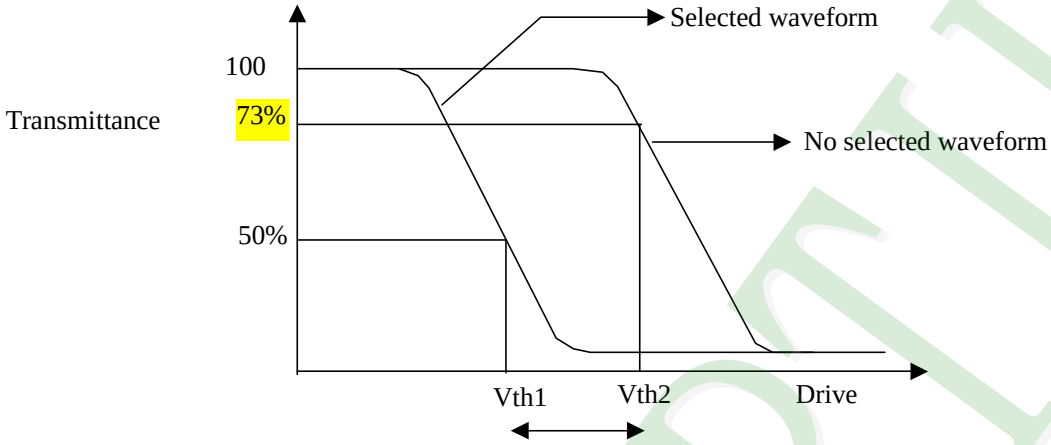
(2) Non- Selected wave form



Note:

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

Note 3. : Definition of Vth

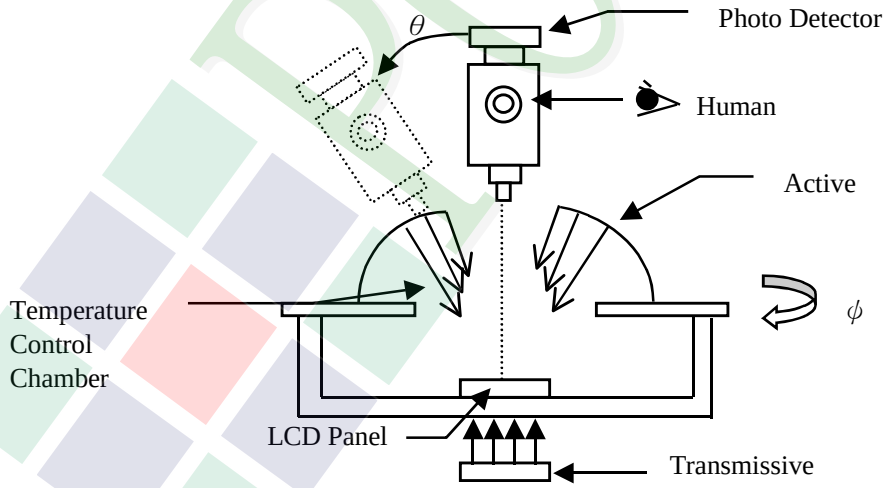


Active voltage range

	Vth1	Vth2
View direction	10°	40°
Drive waveform	(Selected waveform)	(No selected waveform)
Transmittance	50%	73%

※1 Contrast ratio
= (Brightness in OFF state) / (Brightness in ON state)

Outline of Electro-Optical Characteristics Measuring System



Measuring System: Autronic DMS-803

1.6 Backlight Characteristics

Maximum Ratings

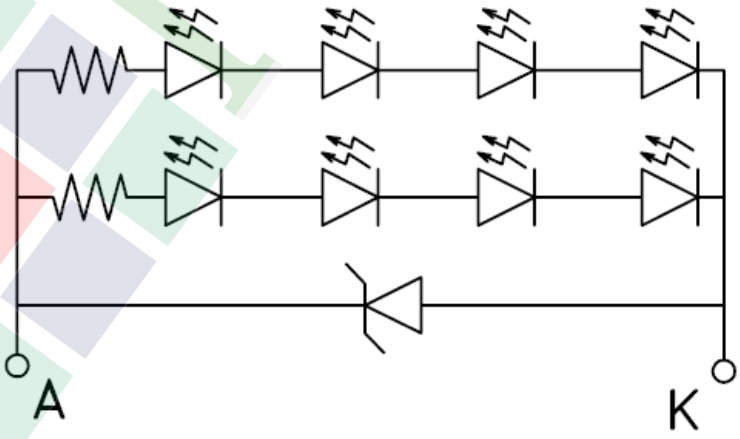
Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	I_F	Ta =25°C	-	60	mA
Reverse Voltage	V_R		-	20	V
Power Dissipation	PD		-	0.876	W
Operating Temperature	T_{OP}	-	-20	70	°C
Storage Temperature.	T_{ST}	-	-30	80	°C

Electrical / Optical Characteristics

Ta =25℃

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 40mA	10	12.8	14.6	V
Reverse Current	IR		-	-	0.1	mA
Average Brightness (Without LCD)	IV		1300	1560	-	cd/m^2
CIE Color Coordinate (Without LCD)	X		0.27	0.30	0.33	-
	Y		0.26	0.30	0.34	-
Uniformity	△B		70	-	-	%
Color	WHITE					

Internal Circuit Diagram:



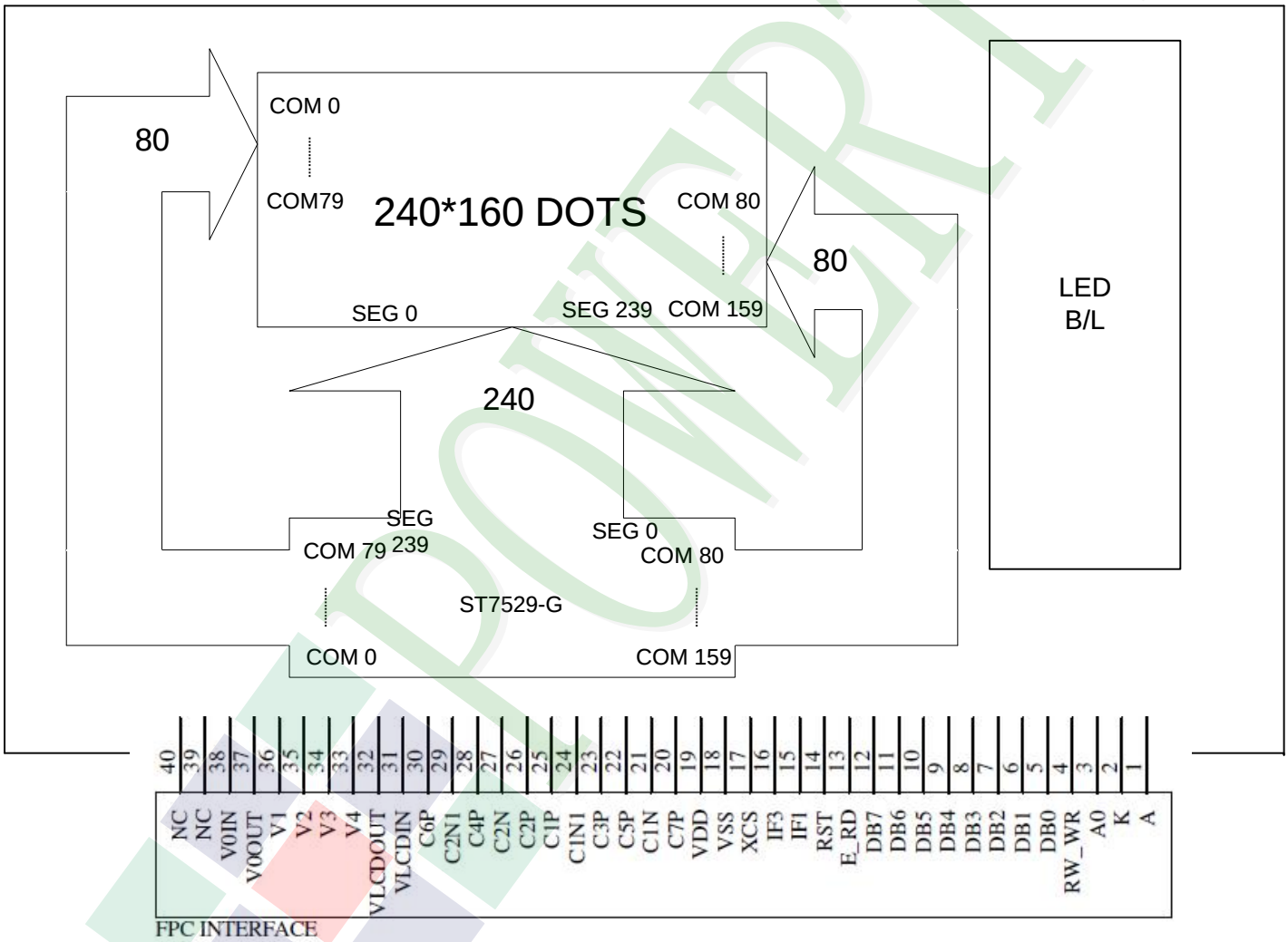
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Function</th></tr>
<tr><td>1</td><td>A</td><td>Power supply for LED Backlight Anode input.</td></tr>
<tr><td>2</td><td>K</td><td>Power supply for LED Backlight Cathode input.</td></tr>
<tr><td>3</td><td>A0</td><td>Register select input pin.
☐ A0 = "H":DB0 to DB7 are display data.
☐ A0 = "L":DB0 to DB7 are control data.</td></tr>
<tr><td>4</td><td>RW_WR</td><td>Read / Write execution control pin
<table>
<tr><th>MPU type</th><th>RW_WR</th><th>Description</th></tr>
<tr><td>8080-series</td><td>/WR</td><td>Write enable clock input pin.
The data on D0 to D15 are latched at the rising edge of the /WR signal.</td></tr>
<tr><td>6800-series</td><td>RW</td><td>Read / Write control input pin
RW = “H” : read
RW = “L” : write</td></tr>
</table></td></tr>
<tr><td>5</td><td>DB0</td><td rowspan="8">They connect to the standard 8-bit MPU bus via the 8-bit bi-directional bus. When the following interface is selected and the XCS pin is high, the following pins become high impedance, which should be fixed to VDD or VSS.</td></tr>
<tr><td>6</td><td>DB1</td></tr>
<tr><td>7</td><td>DB2</td></tr>
<tr><td>8</td><td>DB3</td></tr>
<tr><td>9</td><td>DB4</td></tr>
<tr><td>10</td><td>DB5</td></tr>
<tr><td>11</td><td>DB6</td></tr>
<tr><td>12</td><td>DB7</td></tr>
</table>

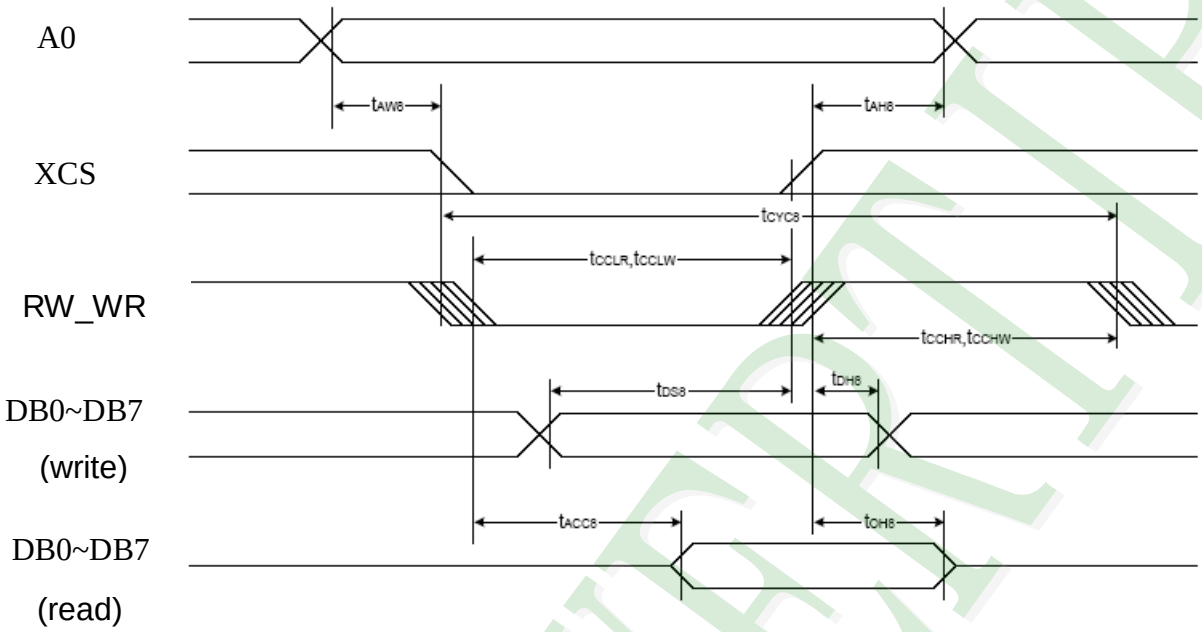
<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Function</th></tr>
<tr><td>13</td><td>E_RD</td><td>Read / Write execution control pin.
<table>
<tr><th>MPU Type</th><th>E_RD</th><th>Description</th></tr>
<tr><td>8080-series</td><td>/RD</td><td>Read enable clock input pin.
When /RD is ”L”, D0 to D15 are in an output status.</td></tr>
<tr><td>6800-series</td><td>E</td><td>Read / Write control input pin
-RW = “H”: When E is “H”, DB0 to DB15 are in an output status.
-RW = “L”: The data on DB0 to DB15 are latched at the falling edge of the E signal.</td></tr>
</table></td></tr>
<tr><td>14</td><td>RST</td><td>Reset input pin.
When RST is “L”, initialization is executed.</td></tr>
<tr><td>15</td><td>IF1</td><td rowspan="2">Parallel / Serial data input select input.
<table>
<tr><th>IF1</th><th>IF3</th><th>MPU interface type</th></tr>
<tr><td>H</td><td>L</td><td>80 series 8-bit parallel.</td></tr>
<tr><td>L</td><td>H</td><td>68 series 8-bit parallel.</td></tr>
</table></td></tr>
<tr><td>16</td><td>IF3</td></tr>
<tr><td>17</td><td>XCS</td><td>Chip select input pins.
Data/instruction I/O is enabled only when XCS is "L". When chip select is non-active, DB0 to DB7 may be high impedance.</td></tr>
<tr><td>18</td><td>VSS</td><td>System Ground.</td></tr>
<tr><td>19</td><td>VDD</td><td>Power Supply.</td></tr>
<tr><td>20</td><td>C7P</td><td>DC / DC voltage converter. Connect a capacitor between this terminal and the VSS terminal.</td></tr>
</table>

Pin No.	Symbol	Function
21	C1N	DC / DC voltage converter. Connect a capacitor between this terminal and the C5P terminal.
22	C5P	DC / DC voltage converter. Connect a capacitor between this terminal and the C1N terminal.
23	C3P	DC / DC voltage converter. Connect a capacitor between this terminal and the C1N1 terminal.
24	C1N1	DC / DC voltage converter. Connect a capacitor between this terminal and the C3P and C1P terminal.
25	C1P	DC / DC voltage converter. Connect a capacitor between this terminal and the C1N1 terminal.
26	C2P	DC / DC voltage converter. Connect a capacitor between this terminal and the C2N terminal.
27	C2N	DC / DC voltage converter. Connect a capacitor between this terminal and the C2P and C4P terminal.
28	C4P	DC / DC voltage converter. Connect a capacitor between this terminal and the C2N terminal.
29	C2N1	DC / DC voltage converter. Connect a capacitor between this terminal and the C6P terminal.
30	C6P	DC / DC voltage converter. Connect a capacitor between this terminal and the C2N terminal.
31	VLCDIN	An external LCD supply voltage can be supplied using the VLCDIN pad. In this case, VLCDOUT has to be left open, and the internal voltage generator has to be programmed to zero. (SET register V B=0)
32	VLCDOUT	If the internal voltage generator is used, the V LCDIN & VLCDOUT must be connected together. If an external supply is used, this pin must be left open.

<table>
<tr><th>Pin No.</th><th>Symbol</th><th>Function</th></tr>
<tr><td>33</td><td>V4</td><td rowspan="6">LCD driver supply voltages
V0In & V0out should be connected together in FPC area.
Voltages should have the following relationship:
V0 ³ V1 ³ V2 ³ V3 ³ V4 ³ VSS
When the internal power circuit is active, these voltages are generated as the following table according to the state of LCD bias.
<table><tr><td>LCD bias</td><td>V1</td><td>V2</td><td>V3</td><td>V4</td></tr><tr><td>1/N bias</td><td>(N-1)/N * V0</td><td>(N-2)/N * V0</td><td>(2/N) * V0</td><td>(1/N) * V0</td></tr></table>NOTE:N=5 to 14.</td></tr>
<tr><td>34</td><td>V3</td></tr>
<tr><td>35</td><td>V2</td></tr>
<tr><td>36</td><td>V1</td></tr>
<tr><td>37</td><td>V0OUT</td></tr>
<tr><td>38</td><td>V0IN</td></tr>
<tr><td>39</td><td>NC</td><td>Not Connection.</td></tr>
<tr><td>40</td><td>NC</td><td>Not Connection.</td></tr>
</table>

2.3 Timing Characteristics

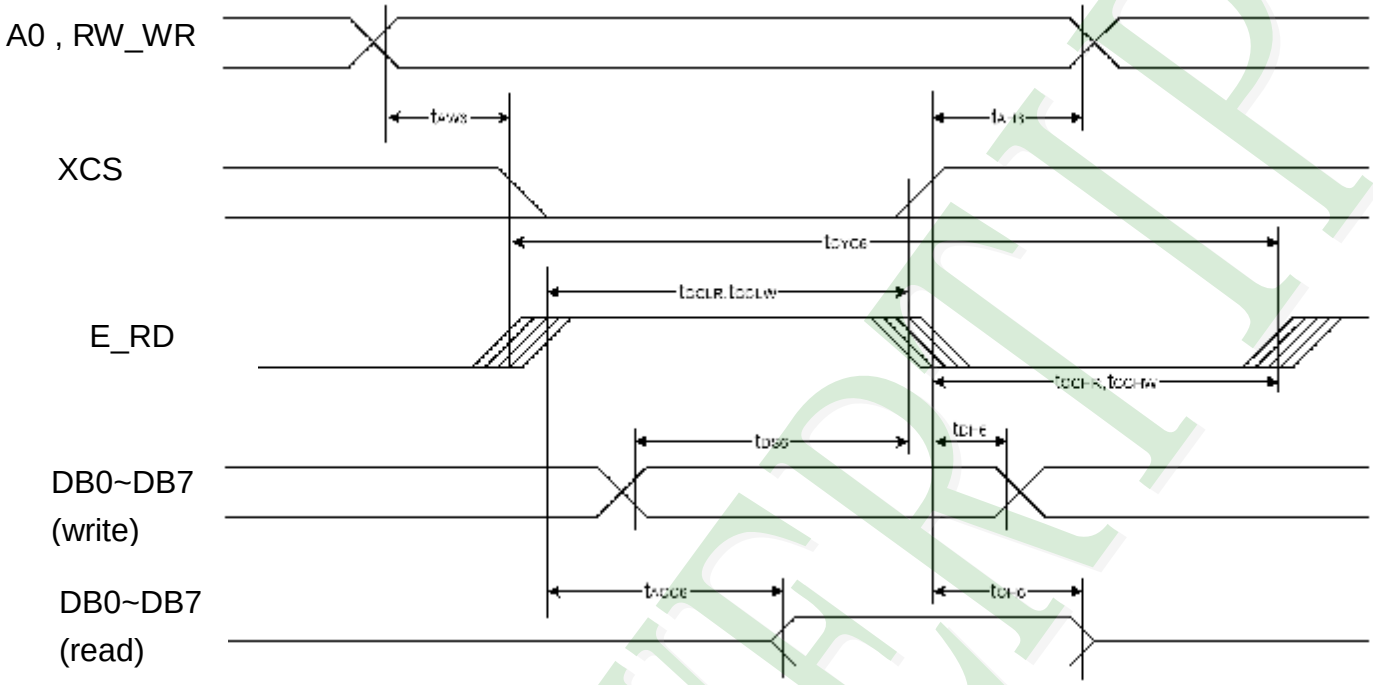
System Bus Read/Write Characteristics (For the 8080 Series MPU)



(VDD = 3.3 V, Ta = -20 ~ 85˚C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	tAH8	-	20	-	ns
Address setup time		tAW8	-	20	-	
System cycle time		tCYC8	-	200	-	
Enable L pulse width(WRITE)	RW_WR	tCCLW	-	100	-	
Enable H pulse width(WRITE)		tCCHW	-	100	-	
Enable L pulse width(READ)	RW_WR	tCCLR	-	100	-	
Enable H pulse width(READ)		tCCHR	-	100	-	
WRITE Data setup time	D0 TO D15	tDS8	-	150	-	
WRITE Address hold time		tDH8	-	20	-	
READ access time		tACC8	CL=100pF	-	40	
READ Output disable time		tOH8	CL=100pF	-	30	

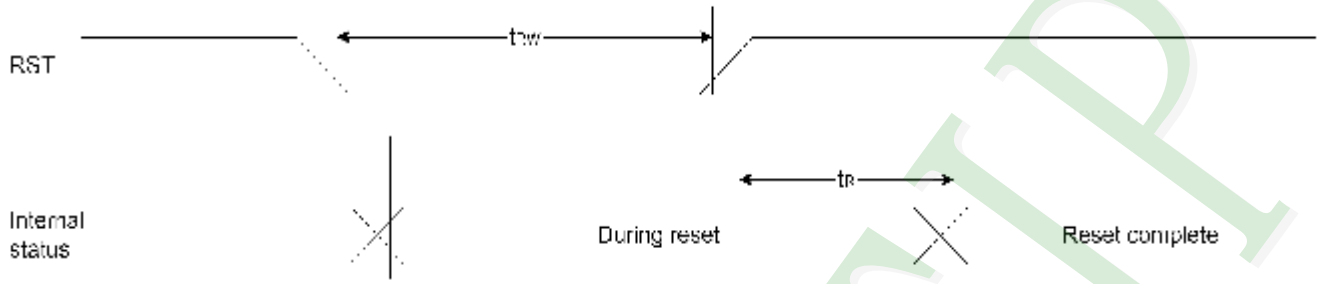
System Bus Read/Write Characteristics (For the 6800 Series MPU)



(VDD = 3.3 V, Ta = -20 ~ 85˚C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	TAH6	-	20	-	ns
Address setup time		TAW6	-	20	-	
System cycle time		TCYC6	-	200	-	
Enable L pulse width(WRITE)	E_RD	tEWLW	-	100	-	
Enable H pulse width(WRITE)		tEWHW	-	100	-	
Enable L pulse width(READ)	E_RD	tEWLR	-	100	-	
Enable H pulse width(READ)		tEWHR	-	100	-	
WRITE Data setup time	D0 TO D15	tDS6	-	150	-	
WRITE Address hold time		tDH6	-	20	-	
READ access time		tACC6	CL=100pF	-	40	
READ Output disable time		tOH6	CL=100pF	-	30	

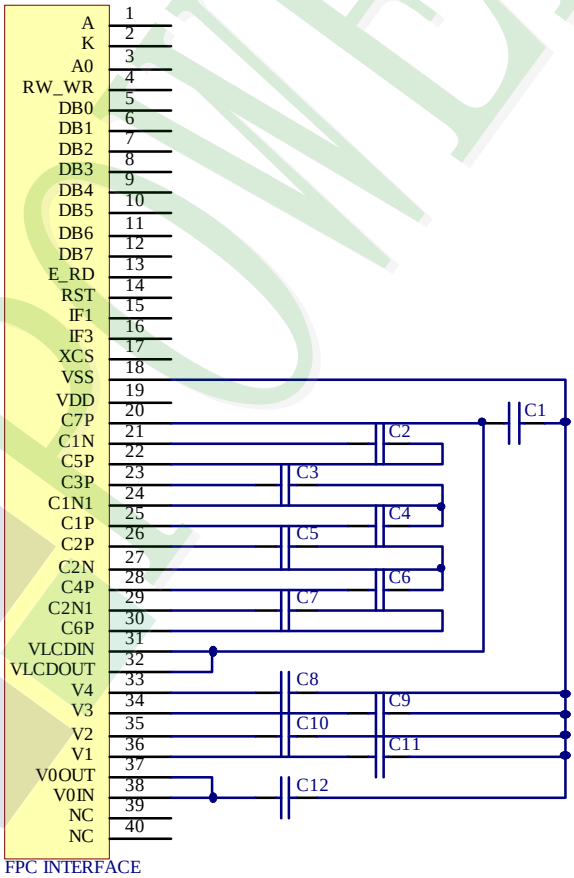
Reset timing



(VDD = 3.3 V, Ta = -20 ~ 85°C)

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

2.4 Power circuit

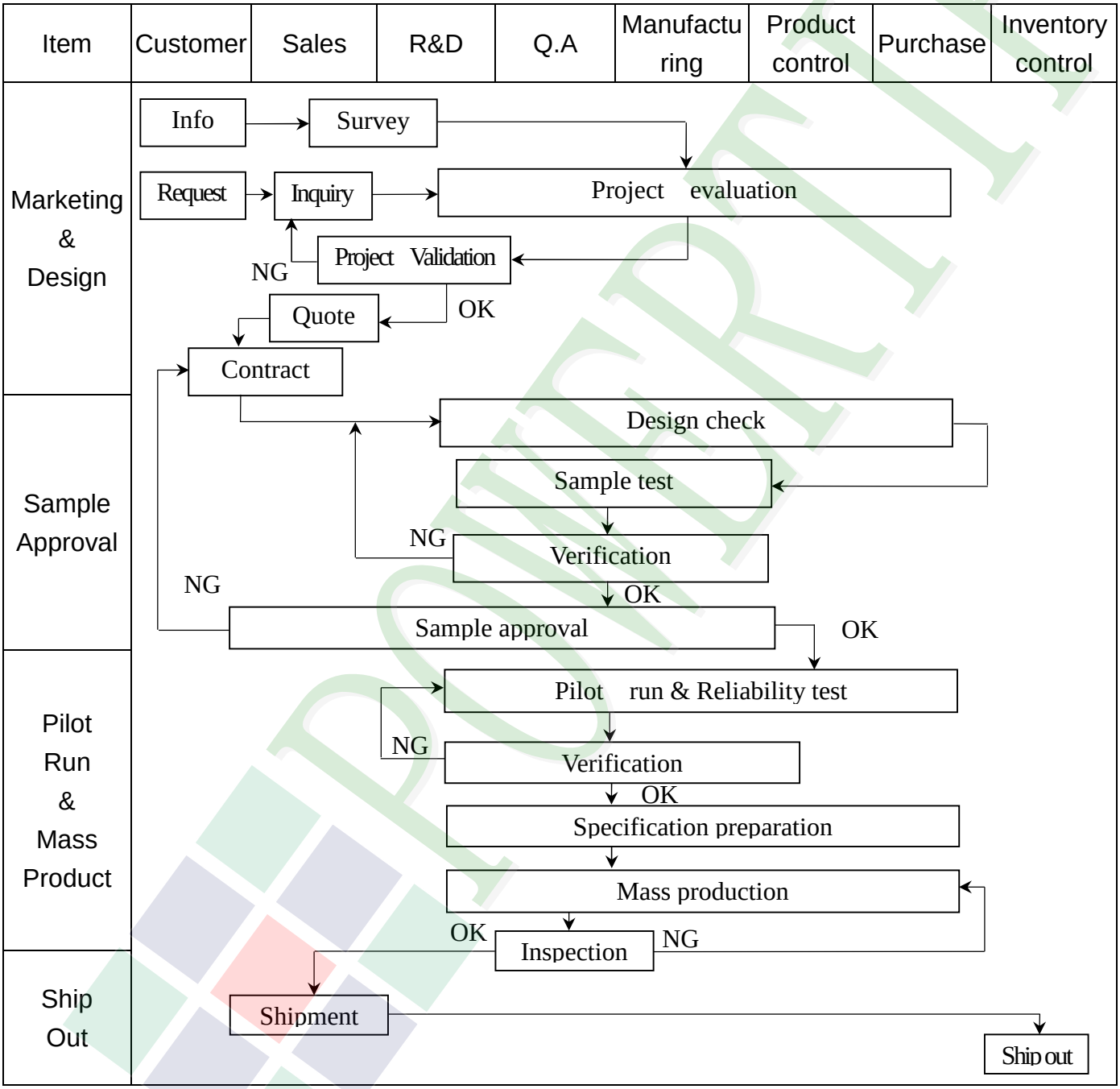


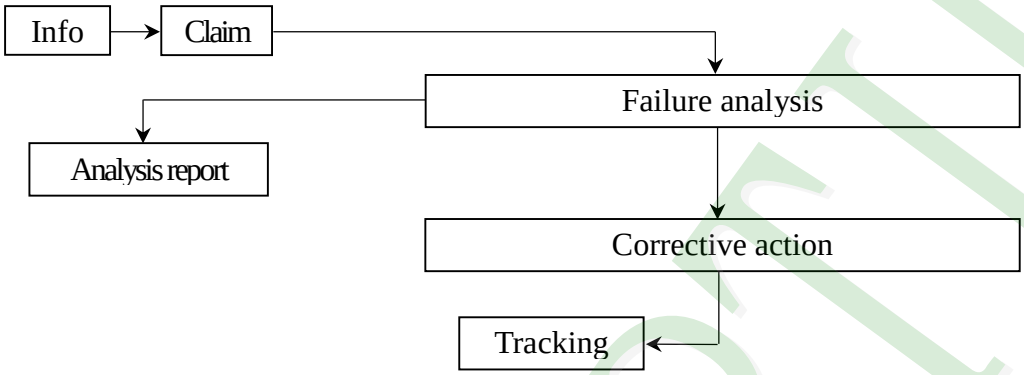
NOTE:Booste:7X(internal)

C1~C12=1~2.2uF/25V

3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



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

3.2 Inspection Specification

◆Scope : The document shall be applied to LCD Module for Monotype and Color STN(Ver. B01).

◆Inspection Standard : MIL-STD-105E Table Normal Inspection Single Sampling Level Ⅱ .

◆Equipment : Gauge、MIL-STD、Powertip Tester、Sample

◆Defect Level : Major Defect AQL：0.4 ; Minor Defect：AQL： 1.5 .

◆OUT Going Defect Level : Sampling .

◆Manner of appearance test :

(1). The test be under 20W×2 fluorescent light ' and distance of view must be at 30 cm.

(2). Standard of inspection： (Unit：mm)

(3). The test direction is base on about around 45°of vertical line. (Fig. 1)

(4). Definition of area . (Fig. 2)

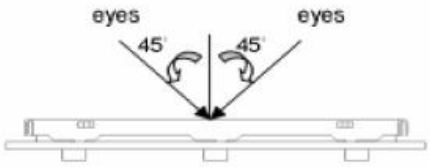


Fig.1

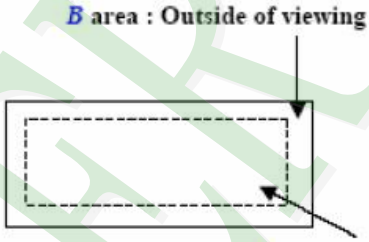


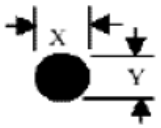
Fig. 2 A area : viewing area

◆ Specification:

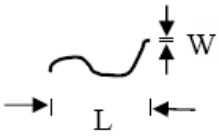
NO	Item	Criterion	Level
01	Product condition	1.1 The part number is inconsistent with work order of Production.	Major
		1.2 Mixed production types.	Major
		1.3 Assembled in inverse direction.	Major
02	Quantity	2.1 The quantity is inconsistent with work order of production.	Major
03	Outline dimension	3.1 Product dimension and structure must conform to Structure diagram.	Major
04	Electrical Testing	4.1 Missing line character and icon.	Major
		4.2 No function or no display.	Major
		4.3 Output data is error.	Major
		4.4 LCD viewing angle defect.	Major
		4.5 Current consumption exceeds product specifications.	Major

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

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

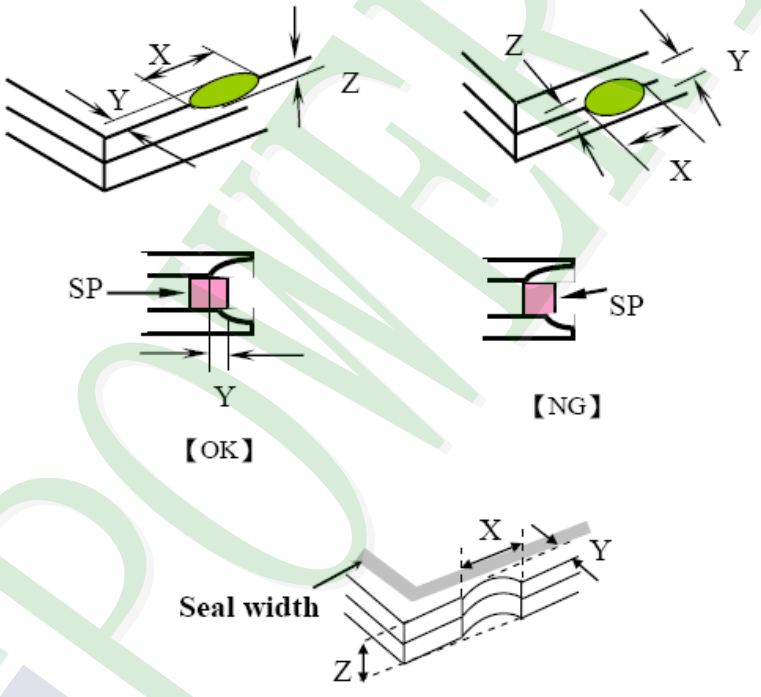
Round type
 

Φ=(x+y)/2

Line type
 
</td><td>5. 1 Round type:
5. 1. 1 display only :
• White and black spots on display ≦ 0. 30 mm , no more than 4 white or black spots present.
• Densely spaced : NO more than two spots or lines within 3 mm.

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

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

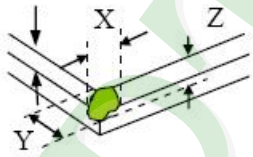
NO	Item	Criterion	Level
07	The crack of glass	Symbols： X : The length of crack　Y : The width of crack. Z : The thickness of crack　W : terminal length t : The thickness of glass　a : LCD side length 7.1 General glass chip： 7.1.1 Chip on panel surface and crack between panels: 	Minor

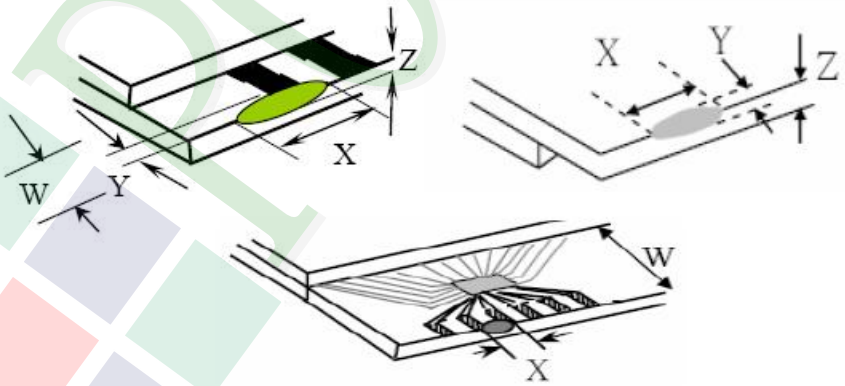
X	Y	Z
≦ a	Crack can't enter viewing area	≦1/2 t
≦ a	Crack can't exceed the half of SP width.	1/2 t < Z ≦2 t

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

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

X : The length of crack　　Y : The width of crack.
Z : The thickness of crack　　W : terminal length
t : The thickness of glass　　a : LCD side length

7.1.2 Corner crack：


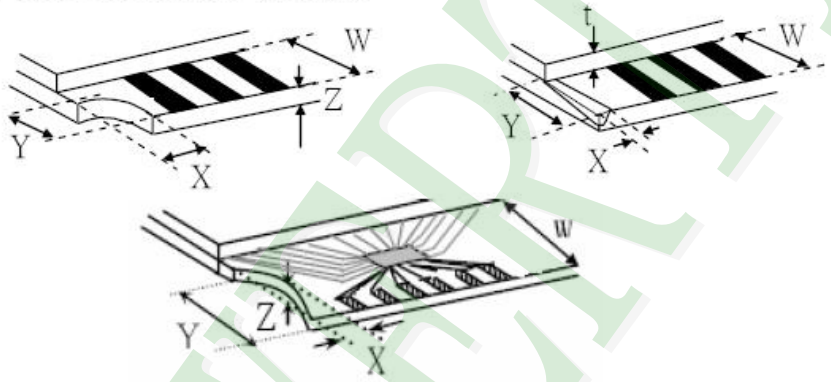
<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦1/5 a</td><td>Crack can’t enter viewing area</td><td>Z ≦ 1/2 t</td></tr>
<tr><td>≦1/5 a</td><td>Crack can’t exceed the half of SP width.</td><td>1/2 t < Z ≦ 2 t</td></tr>
</table>
7.2 Protrusion over terminal：
7.2.1 Chip on electrode pad：


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

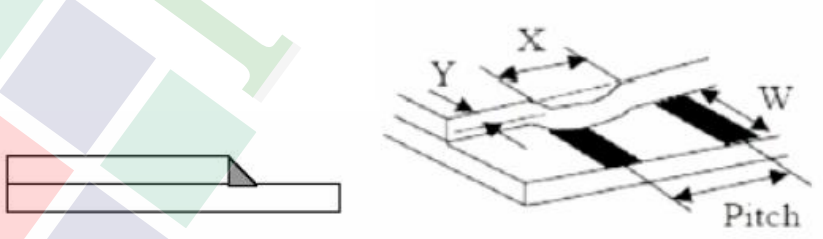
◆Specification For Monotype and Color STN：　(Ver. B01)

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

X : The length of crack　　Y : The width of crack.
Z : The thickness of crack　　W : terminal length
t : The thickness of glass　　a : LCD side length

7.2.2 Non-conductive portion：


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦1/3 a</td><td>≦W</td><td>≦t</td></tr>
</table>
⊙ If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.

7.2.3 Glass remain：


<table>
<tr><th>X</th><th>Y</th><th>Z</th></tr>
<tr><td>≦ a</td><td>≦ 1/3 W</td><td>≦ t</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

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

NO	Item	Criterion	Level
08	Backlight elements	8. 1 Backlight can't work normally.	Major
		8. 2 Backlight doesn't light or color is wrong.	Major
		8. 3 Illumination source flickers when lit.	Major
09	General appearance	9. 1 Pin type must match type in specification sheet.	Major
		9. 2 No short circuits in components on PCB or FPC.	Major
		9. 3 Product packaging must the same as specified on packaging specification sheet.	Minor
		9. 4 The folding and peeled off in polarizer are not acceptable.	Minor
		9. 5 The PCB or FPC between B/L assembled distance (PCB or FPC) is ≦1. 5 mm.	Minor

4. RELIABILITY TEST

4.1 Reliability Test Condition (Ver.B01)

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

5. PRECAUTION RELATING PRODUCT HANDLING

5.1 SAFETY

5.1.1 If the LCD panel breaks , be careful not to get the liquid crystal to touch your skin.

5.1.2 If the liquid crystal touches your skin or clothes , please wash it off immediately by using soap and water.

5.2 HANDLING

5.2.1 Avoid any strong mechanical shock which can break the glass.

5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module , be sure to ground your body and any electrical equipment you may be using.

5.2.3 Do not remove the panel or frame from the module.

5.2.4 The polarizing plate of the display is very fragile. So , please handle it very carefully, do not touch , push or rub the exposed polarizing with anything harder than an HB pencil lead (glass , tweezers , etc.)

5.2.5 Do not wipe the polarizing plate with a dry cloth , as it may easily scratch the surface of plate.

5.2.6 Do not touch the display area with bare hands , this will stain the display area.

5.2.7 Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.

5.2.8 To control temperature and time of soldering is 320 ± 10°C and 3-5 sec.

5.2.9 To avoid liquid (include organic solvent) stained on LCM

5.3 STORAGE

5.3.1 Store the panel or module in a dark place where the temperature is 25°C ± 5°C and the humidity is below 65% RH.

5.3.2 Do not place the module near organics solvents or corrosive gases.

5.3.3 Do not crush , shake , or jolt the module.

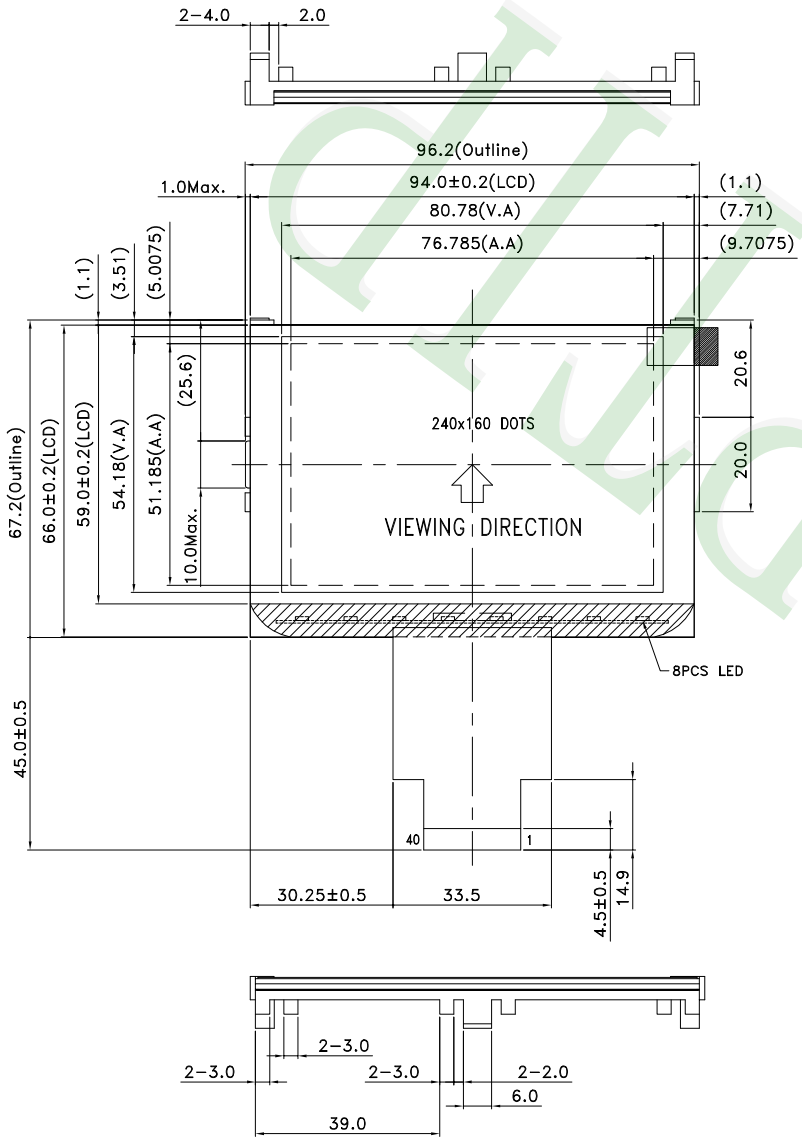
5.4 TERMS OF WARRANTY

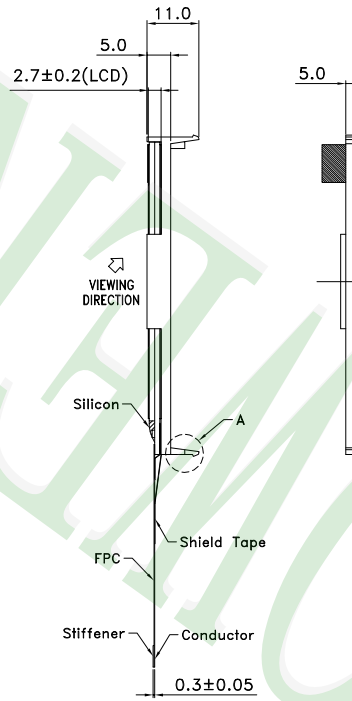
5.4.1 Applicable warrant period

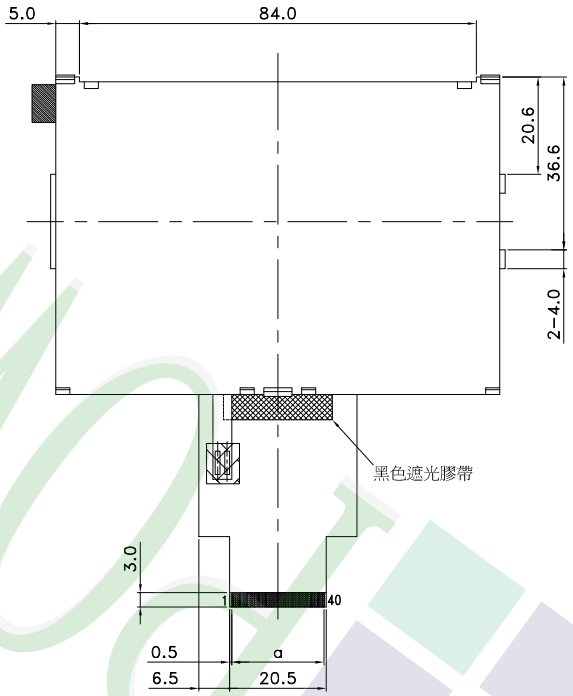
The period is within thirteen months since the date of shipping out under normal using and storage conditions.

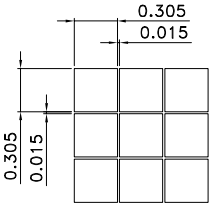
5.4.2 Unaccepted responsibility

This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in nuclear power control equipment, aerospace equipment , fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required. and where extremely high levels of reliability are required.

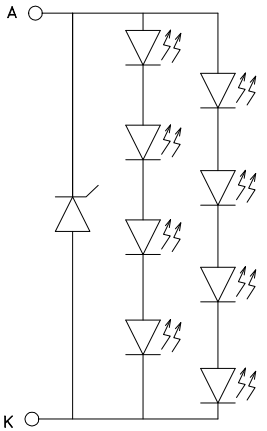




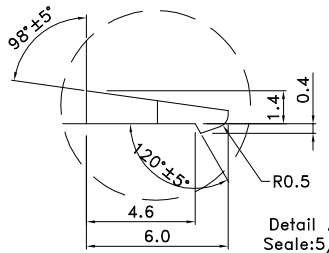




Dots Detail
Seale:30/1



BL Circuit



Detail A
Seale:5/1

NOTES:
1.LCD TYPE:FSTN
2.LCD DISPLAY:Negative/Transmissive
3.VIEW DIRECTION: 6 O'CLOCK
4.Top: -20~70°C Tst:-30~80°C
5.The tolerance unless classified ±0.3mm
6.IC NO.:ST7529
7.a=P0.5x39=19.5±0.05,W=0.3±0.05
8.LED:NICHIA,NESW008CT OR EQUIVALENT

REV	REV BY	REVISER	DATE
007			
006			
005			
004			
003			
002			
001	NEW DRAWING	Eva	2010/05/25

PART NO: PE240160WRT001IY1Q

DRAWING NAME : LMD-PE240160WRT001IY1Q

TITLE: LCD MODULE DRAWING

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

Design	Eva	(3)	Surface
Check	Stone	Unit	MM
Approve	Linda	Scale	1:1
		Page	1/1
		Material	
		Thickness	
		Quantity	

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

Ver.001

Documents NO.	PKG-PE240160WRT001IY1Q

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

Approve	Check	Contact
Linda	Stone	Eva

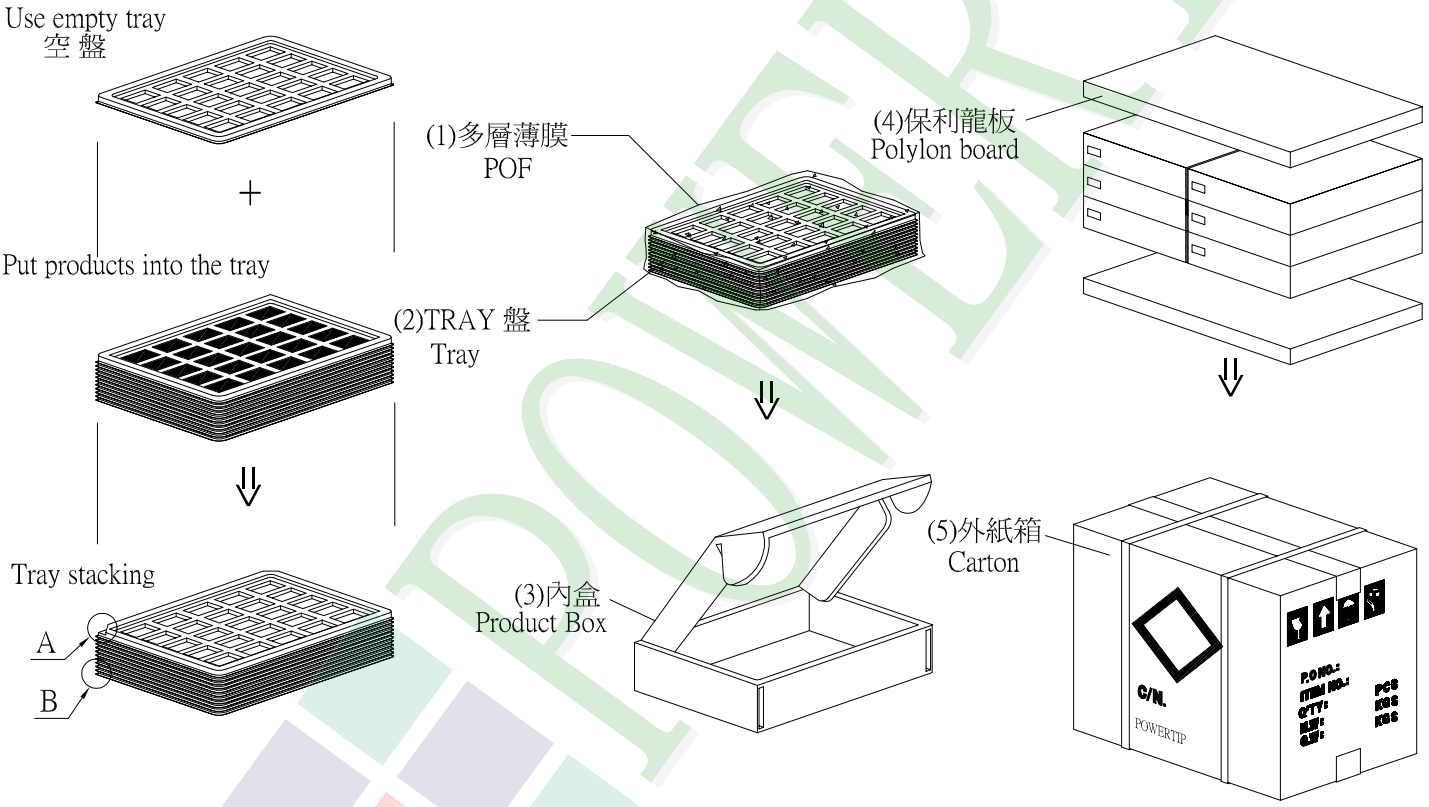
1.包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PE240160WRT001IY1Q	96.2 X 67.2	0.0504	108	5.4432
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	——	6	——
3	TRAY 盤 (2)Tray	TYPE24016001BB	352 X 260 X 17.8	0.1	24	2.4
4	內盒(3)Product Box	BX36627063ABBA	383 X 270 X 66	0.2692	6	1.6152
5	保利龍板(4)Polylon board	OTPLB00PL08ABA	550 X 393 X 20	0.0284	2	0.0568
6	外紙箱(5)Carton	BX57041027CCBA	570 X 410 X 265	1.4208	1	1.4208
7						
8						
9						

2.一 整箱總重量 (Total LCD Weight in carton) : 10.94 Kg±10%

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

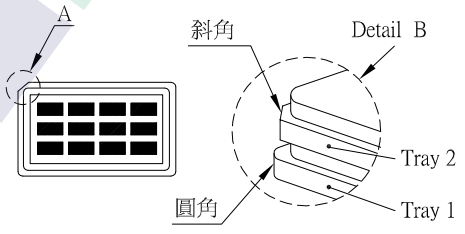
(1)LCM quantity per box : no per tray	6	x no of tray	3	=	18
(2)Total LCM quantity in carton : quantity per box	18	x no of boxes	6	=	108



特 記 事 項 (REMARK)

1. Label Specifications :

TYPE			
ID.NO		S/O	
Q'TY	Pcs	Date	
Lot.NO			
Note			



2.TRAY盤相疊時,需旋轉180度,請詳見B視圖
Rotate tray 180 degrees and place on top of stack.
Check the tray stack using Fig. B.

3.Tray料號:
Tray Number:TYPE24016001BB

POWERTIP