

SPECIFICATIONS

CUSTOMER	:	MIE
SAMPLE CODE	:	SE12864WRF-004HC1Q
MASS PRODUCTION CODE	:	PE12864WRF-004HC1Q
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	002
DRAWING NO. (Ver.)	:	JLMD- PE12864WRF-004HC1Q_001
PACKAGING NO. (Ver.)	:	JPKG- PE12864WRF-004HC1Q_001

Customer Approved

Date:

POWERTIP
2013.08.23
JS RD APPROVED

Approved	Checked	Designer
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- 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
01/18/2006	0	0	New Sample	-	劉傳德
07/29/2013	01	001	Change Stiffener	-	李誠
08/23/2013	01	002	Update Specification	-	李誠

Total : 30Page

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Note : For detailed information please refer to IC data sheet : Sitronix –ST7565S-G

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	128 * 64 Dots
LCD Type	FSTN White , Positive , Transflective,Extended Temp
Driver Condition	LCD Module : 1/65 Duty , 1/9 Bias
Viewing Direction	6 O'clock
Backlight	White LED B/L
Weight	25g
Interface	8-bit parallel data input and serial data input
Other(controller/driver IC)	ST7565S-G
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web site : http://www.powertip.com.tw/news.php?area_id_view=1085560481/

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	80.0 (L) * 54.0 (w) *10.3max (H)	mm
Viewing Area	70.7 (L) *38.8 (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_{dd}	—	-0.3	5.0	V
LCD Driver Supply Voltage	V_{LCD}	—	-18	0.3	V
Input Voltage	V_{IN}	—	-0.3	$V_{DD}+0.3$	V
Operating Temperature	T_{OP}	—	-20	70	°C
Storage Temperature	T_{ST}	—	-30	80	°C
Storage Humidity	H_D	$T_a < 60\text{ °C}$	-	90	%RH

1.4 DC Electrical Characteristics

$T_a = 25\text{ °C}$

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	V_{dd}	-	3.0	3.3	3.6	V
“H” Input Voltage	V_{IH}	-	$0.8V_{DD}$	-	VDD	V
“L” Input Voltage	V_{IL}	-	VSS	-	$0.2V_{DD}$	V
“H” Output Voltage	V_{OH}	-	$0.8V_{DD}$	-	VDD	V
“L” Output Voltage	V_{OL}	-	VSS	-	$0.2V_{DD}$	V
Supply Current	I_{dd}^{*1}	$V_{DD} = 3.3V$	-	0.2	1.0	mA
LCM Driver Voltage	V_{OP}^{*2}	25 °C	9.4	9.7	10	V

NOTE: *1 The Maximum current display

*2 The VOP test point is VDD-V5

1.5 Optical Characteristics

LCD Panel: 1/65Duty, 1/9Bias, $V_{LCD} = 9.7V$, $T_a = 25^{\circ}C$

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Reference
Response Time	Rise	tr	-	-	150	300	ms	Notes 2
	Fall	tf		-	150	300		
Viewing angle range	Top	$\Theta+$	$C \geq 2.0$,	-	40	-	Deg.	Notes 1
	Bottom	$\Theta-$		-	40	-		
	Left	ΘL		-	45	-		
	Right	ΘR		-	45	-		
Contrast Ratio (With LCD, Without B/L)		CR	$\theta = 0^{\circ}$	-	5	-		Note 3
CIE Color Coordinate (With LCD)	X	Y	IF=30 mA	0.27	0.32	0.37		Notes 4
	Y			0.30	0.35	0.40		
Average Brightness (with LCD) *1		IV			50	70	-	cd/m ²
Uniformity *2		ΔB		70	-	-	%	Notes 4

Note 4 :

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

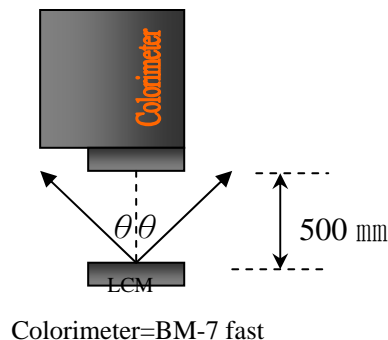
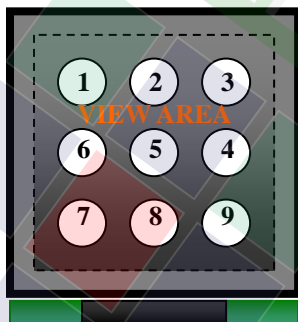
2 : Measurement Condition for Optical Characteristics:

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

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

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

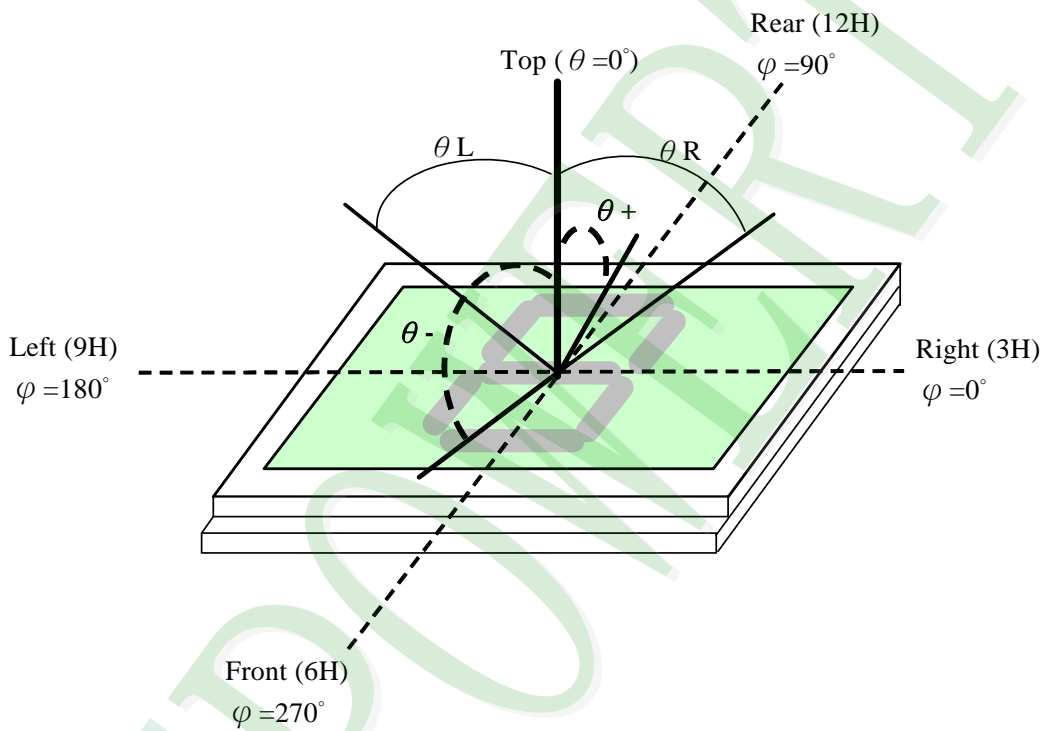
d : The uncertainty of the C.I.E coordinate measurement ± 0.01 , Average Brightness $\pm 4\%$



Note 1.

Optical characteristics-2

Viewing angle

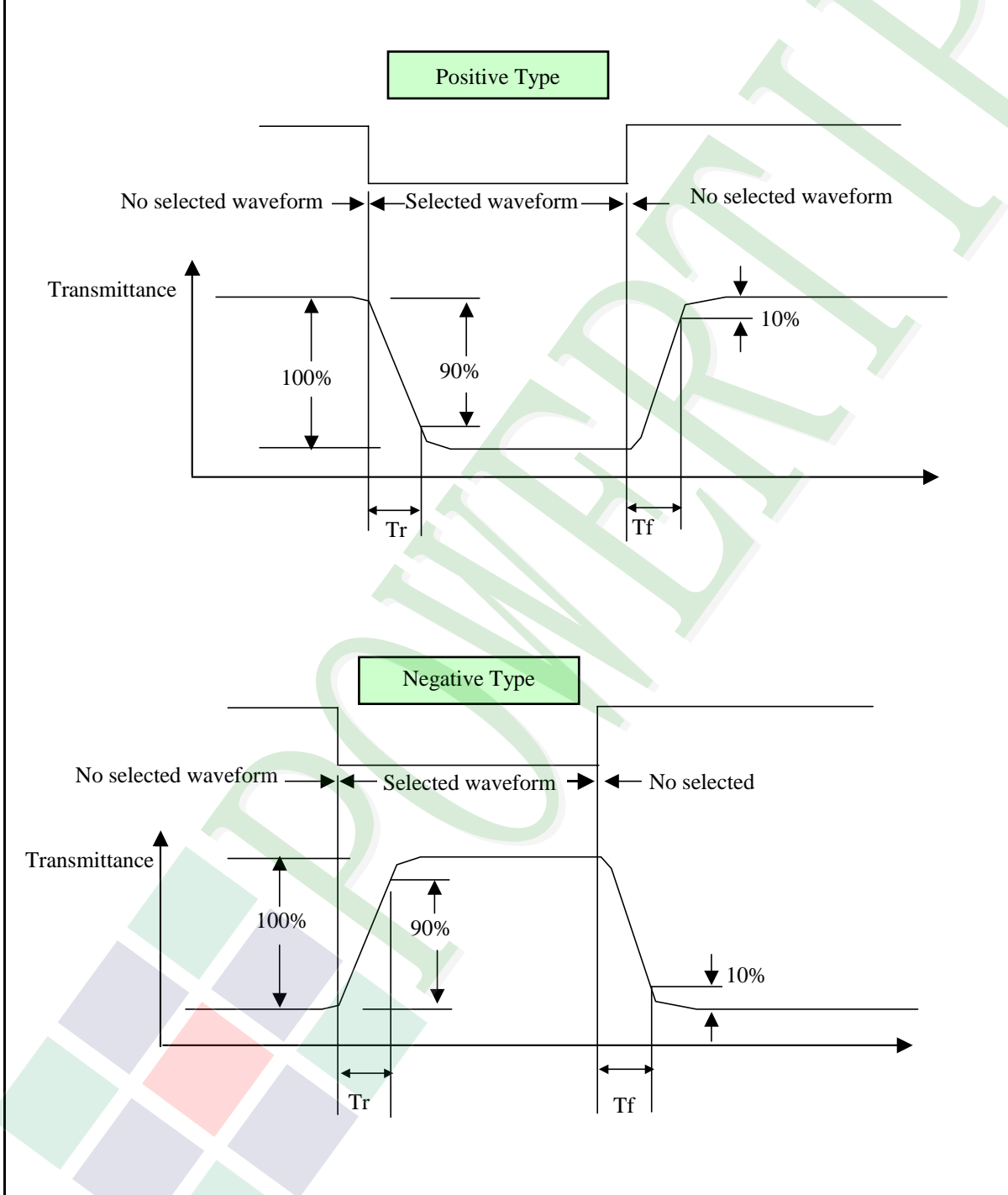


Viewing angle

Note 2.

Optical characteristics-3

Fig.2 Definition of response time



Electrical characteristics-2

※2 Drive waveform

V_{op} : Drive voltage

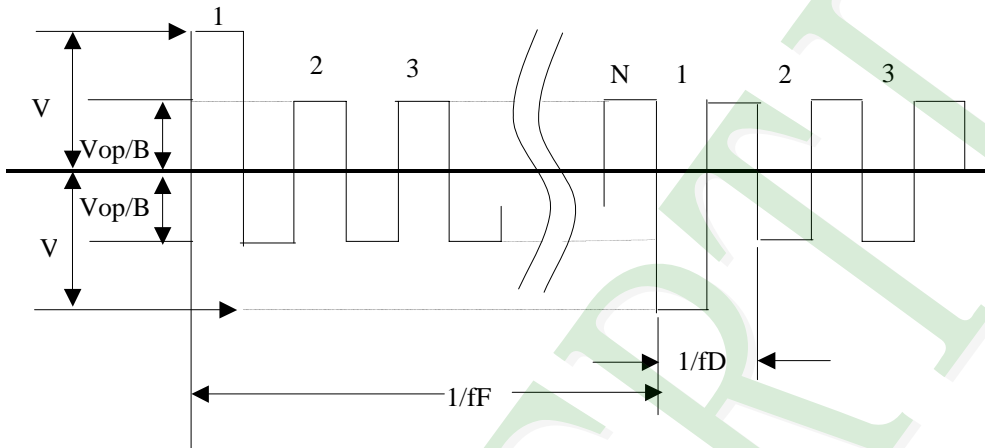
f_F : Frame frequency

$1/B$: Bias

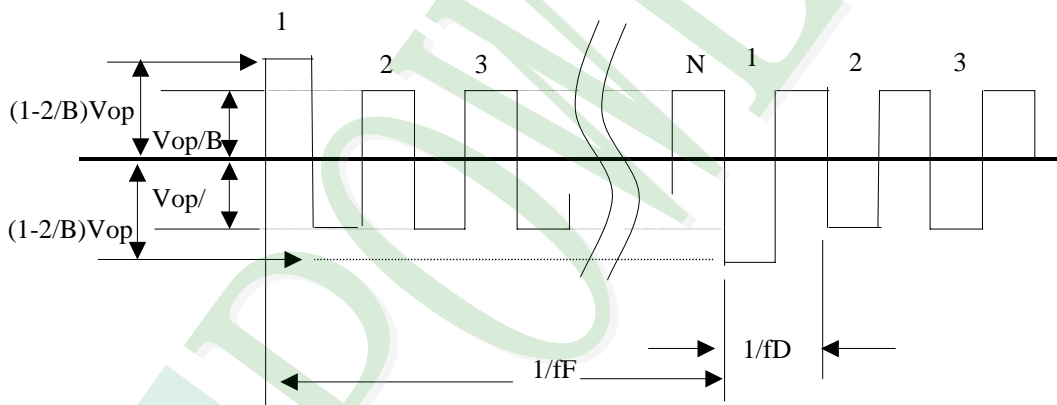
f_D : Drive frequency

N : Duty

(1) Selected waveform



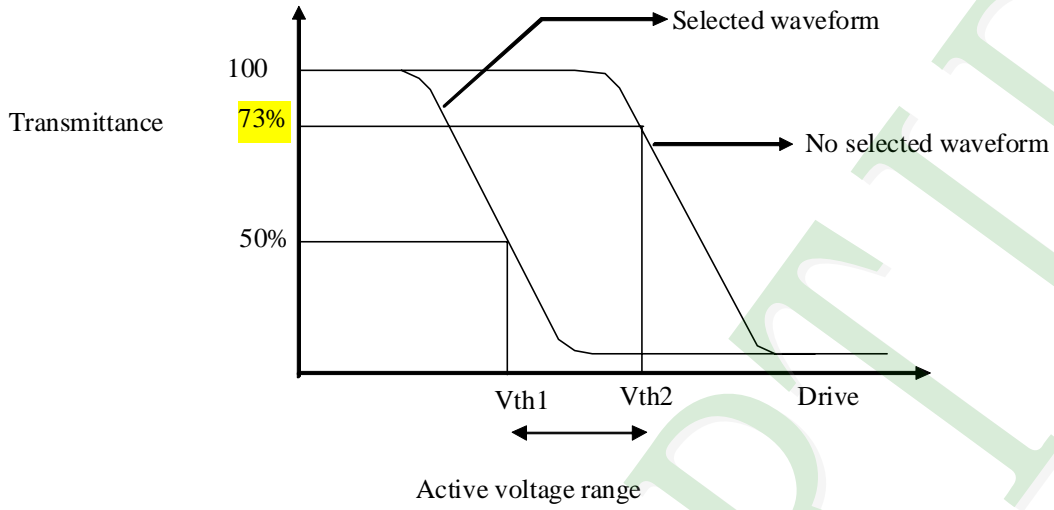
(2) Non- Selected wave form



Note:

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

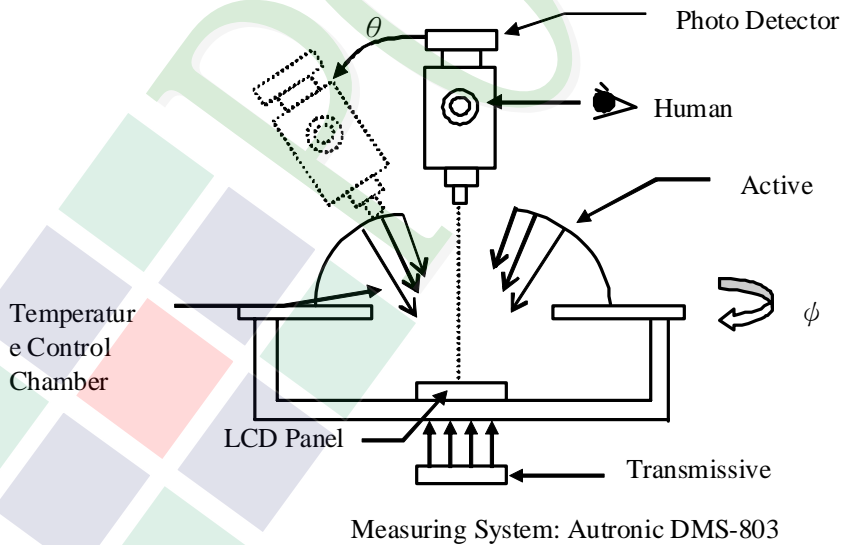
Note 3. : Definition of Vth



	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

LED Backlight

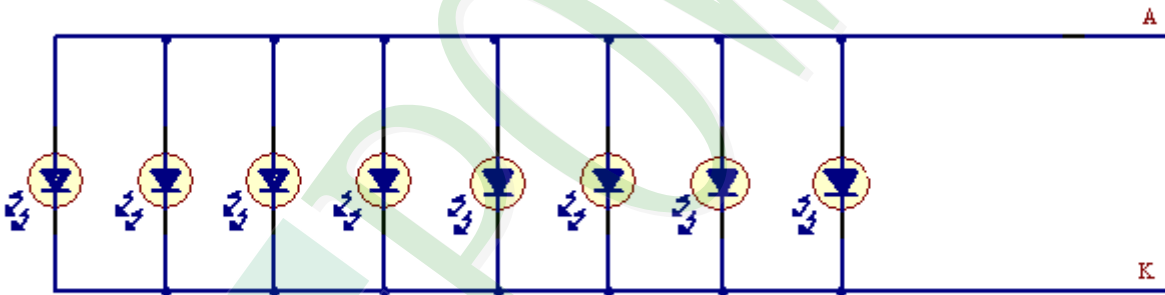
Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25°C	-	240	mA
Reverse Voltage	VR	Ta =25°C	-	10.4	V
Power Dissipation	PD	Ta =25°C	-	1.248	W

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF=160 mA	-	5.0	5.2	V
Average Brightness (without LCD)	IV		300	370	-	cd/m ²
CIE Color Coordinate (Without LCD)	X		0.255	-	0.34	-
	Y		0.265	-	0.35	
Color		White				

Internal Circuit Diagram:



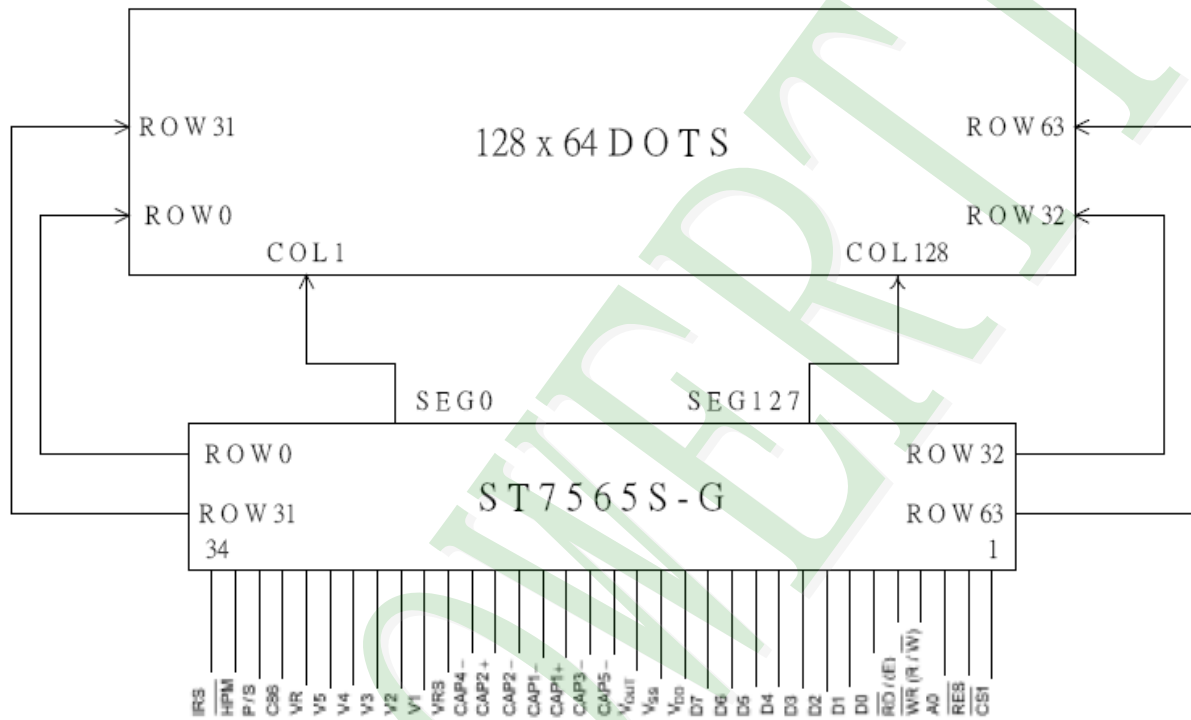
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram

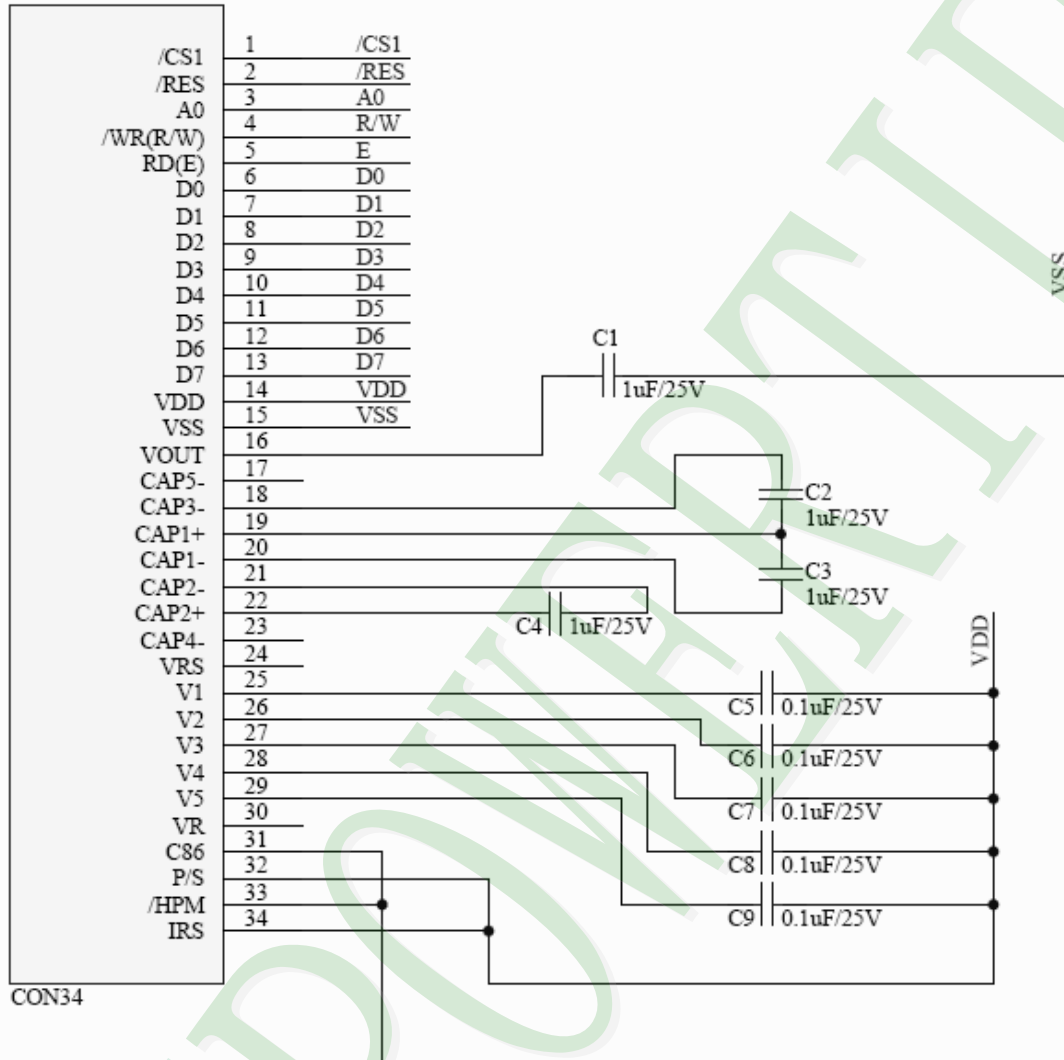


2.2 Interface Pin Description

Pin No.	Symbol	Function
1	/CS1	This is the chip select single. When /CS1= L and /CS2 = H then the chip select becomes active, and data/command I/O is enabled.
2	/RES	When /RES is set to L the settings are initialized. The reset operation is perform by the /RES single level.
3	A0	This is connected to the least significant bit of the normal MPU address bus, and it determines whether the data bits are data or a command. A0 = H : Indicates that D0 to D7 are display data. A0 = L : Indicates that D0 to D7 are control data.
4	/WR (R/W)	<ul style="list-style-type: none"> When connected to an 8080 MPU, this is active LOW. (R/ W) This terminal connects to the 8080 MPU WR single. The signals on the data bus are latched at the rising edge of the WR signal. When connected to a 6800 Series MPU: This is the read/write control signal input terminal. When R/W = H : Read. When R/W = L : Write.
5	/RD (E)	<ul style="list-style-type: none"> When connected to an 8080 MPU, this is active LOW. (E) This pin is connected to the RD signal of the 8080 MPU, and the ST7565S series data bus is in an output status when this signal is L . When connected to an 8080 MPU, this is active HIGH. This is the 6800 Series MPU enable clock input terminal.
6	D0	This is an 8-bit bi-directional data bus that connects to an 8-bit or 16 bit standard MPU data bus. When the serial interface is selected (P/S = L) : D7 : serial data input (SI) ; D6 : the serial clock input (SCL) D0 to D5 are set to high impedance. When the chip select is not active, D0 to D7 are set to high impedance.
7	D1	
8	D2	
9	D3	
10	D4	
11	D5	
12	D6	
13	D7	
14	VDD	Shared with the MPU power supply terminal VCC.
15	VSS	This is a 0V terminal connected to the system GND.
16	VOUT	DC/DC voltage converter. Connect a capacitor between this terminal and VSS.

Pin No.	Symbol	Function
17	CAP5-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1+ terminal.
18	CAP3-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1+ terminal.
19	CAP1+	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1- terminal.
20	CAP1-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP1+ terminal.
21	CAP2-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP2+ terminal.
22	CAP2+	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP2- terminal.
23	CAP4-	DC/DC voltage converter. Connect a capacitor between this terminal and the CAP2+ terminal.
24	VRS	This is the internal-output VREG power supply for the LCD power supply voltage regulator.
25	V1	This is a multi-level power supply for the liquid crystal drive. The voltage supply applied is determined by the liquid crystal cell, and is changed through the use of a resistive voltage divider or through changing the impedance using an op.amp. Voltage levels are determined based on VDD, and must maintain the relative magnitudes shown below.
26	V2	
27	V3	
28	V4	
29	V5	
30	VR	Output voltage regulator terminal. Provides the voltage between VDD and V5 through a resistive voltage divider. IRS = L : the V5 voltage regulator internal resistors are not used. IRS = H : the V5 voltage regulator internal resistors are used.
31	C86	This is the MPU interface switch terminal. C86 = H : 6800 Series MPU interface. C86 = L : 8080 MPU interface.
32	P/S	This is the parallel data input/serial data input switch terminal. P/S = H : Parallel data input. P/S = L : Serial data input.
33	/HPM	This is the power control terminal for the power supply circuit for liquid crystal drive. HPM = H : Normal mode. HPM = L : High power mode.
34	IRS	This terminal selects the resistors for the V5 voltage level adjustment. IRS = H : Use the internal resistors. IRS = L : Do not use the internal resistors. The V5 voltage level is regulated by external resistive voltage divider attached to the VR terminal

2.2.1 Application Notes:



2.2.2 Refer Initial code:

```

void Initial_Main(void)
{
    WriteCOM_Main(0xE2);    //Reset Function

    WriteCOM_Main(0x2F);    // Power controller set

    WriteCOM_Main(0xA2);    //SET LCD BIAS=1/9 ,BS=0=1/9 BS=1=1/7

    WriteCOM_Main(0x26);    //V5 voltage regulator internal resistor ratio set

                                // SET 6.0

    WriteCOM_Main(0x81);    //SET REFERENCE VOLTAGE

    WriteCOM_Main(0x24);    // 24=36 (1+ra/rb)*(1-a/162)VREG=9.8V

    WriteCOM_Main(0xC0);    //Commom output mode

    WriteCOM_Main(0xA1);    // ADC Select 0xa1

    WriteCOM_Main(0xA6);    //Display normal

    WriteCOM_Main(0x40);    //Display start line

    WriteCOM_Main(0xF8);    //Booster set

    WriteCOM_Main(0x00);    // 0:4X 1:5X

    WriteCOM_Main(0xA4);    // Display All Points ON/OFF

                                // 0:Normal display mode

                                // 1:Display all points ON

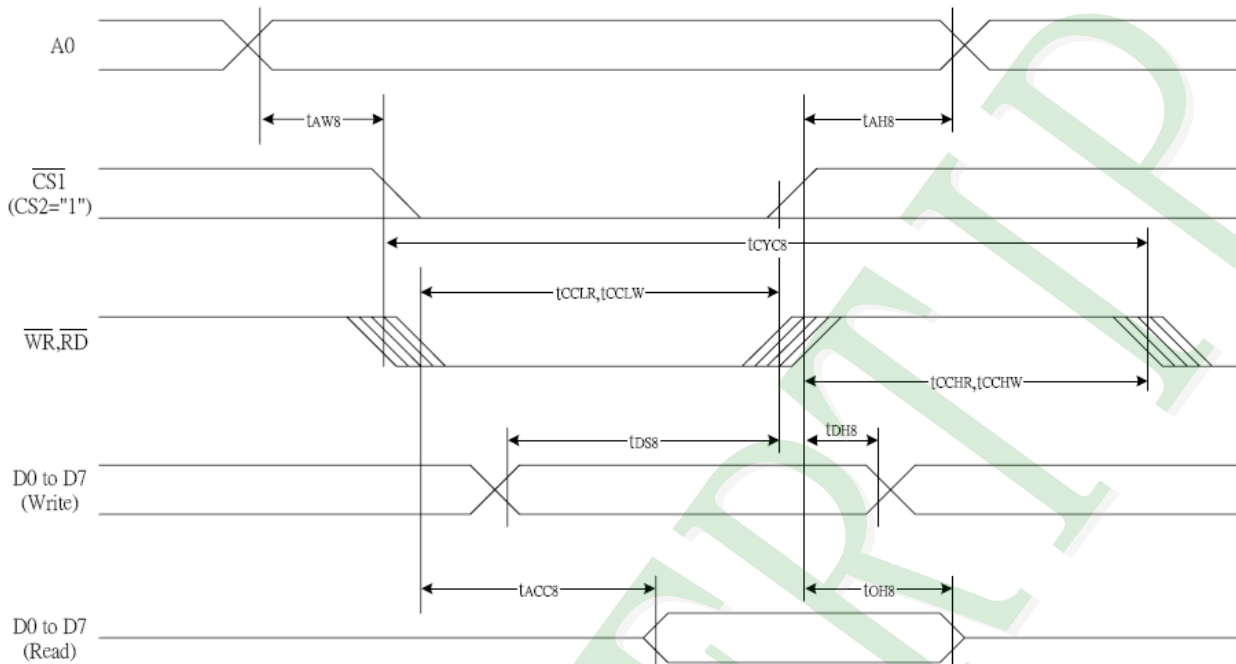
//-----Display On-----

    WriteCOM_Main(0xAF);
}

```


2.3 Timing Characteristics

System Bus Read/Write Characteristics 1 (For the 8080 Series MPU)



(V_{DD} = 3.3V, T_a = 25°C)

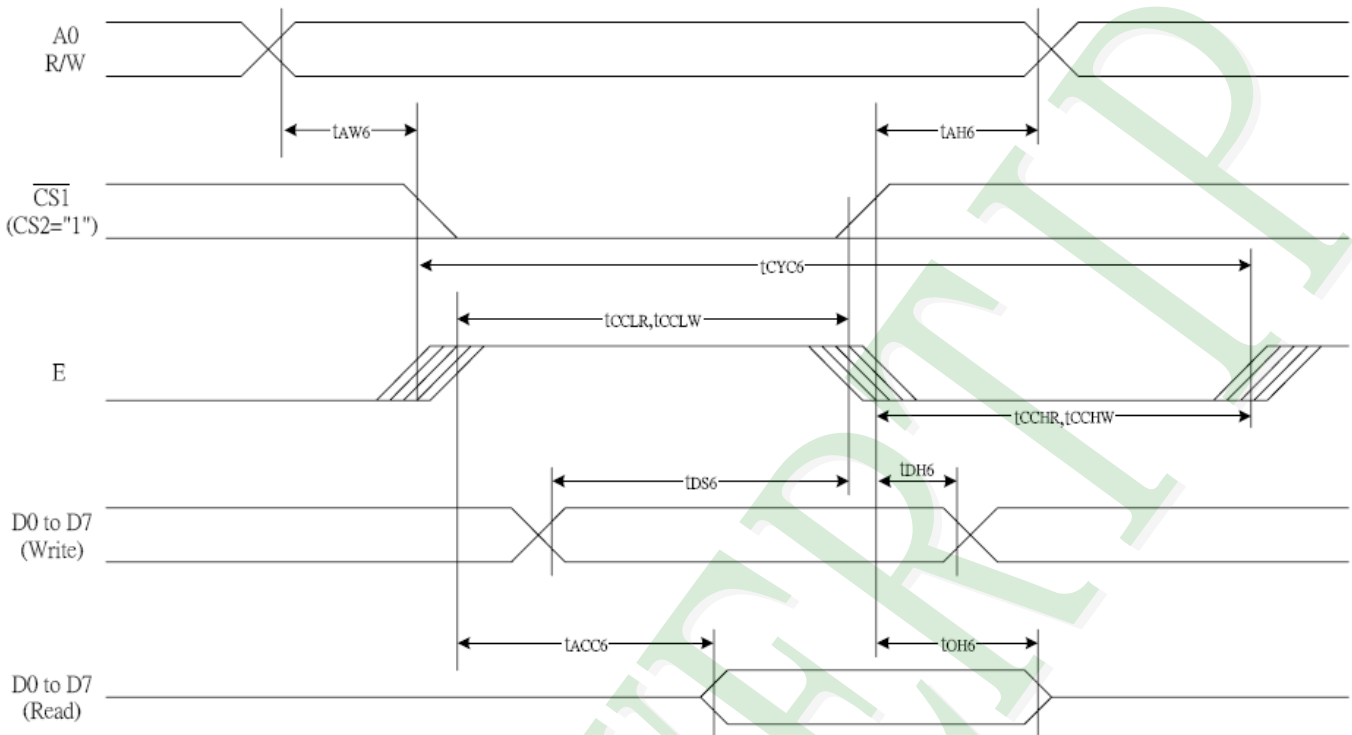
Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	t _{AH8}		0	—	Ns
Address setup time		t _{AW8}		0	—	
System cycle time		t _{CYC8}		240	—	
Enable L pulse width (WRITE)	WR	t _{CCLW}		80	—	
Enable H pulse width (WRITE)		t _{CCHW}		80	—	
Enable L pulse width (READ)	RD	t _{CCLR}		140	—	
Enable H pulse width (READ)		t _{CCHR}		80	—	
WRITE Data setup time	D0 to D7	t _{DS8}		40	—	
WRITE Address hold time		t _{DH8}		10	—	
READ access time		t _{ACC8}	CL = 100 pF	—	70	
READ Output disable time		t _{OH8}	CL = 100 pF	5	50	

*1 The input signal rise time and fall time (t_r , t_f) is specified at 15 ns or less. When the system cycle time is extremely fast, $(t_r + t_f) \leq (t_{CYC8} - t_{CCLW} - t_{CCHW})$ for $(t_r + t_f) \leq (t_{CYC8} - t_{CCLR} - t_{CCHR})$ are specified.

*2 All timing is specified using 20% and 80% of V_{DD} as the reference.

*3 t_{CCLW} and t_{CCLR} are specified as the overlap between /CS1 being "L" (CS2 = "H") and /WR and /RD being at the "L" level.

System Bus Read/Write Characteristics 2 (For the 6800 Series MPU)



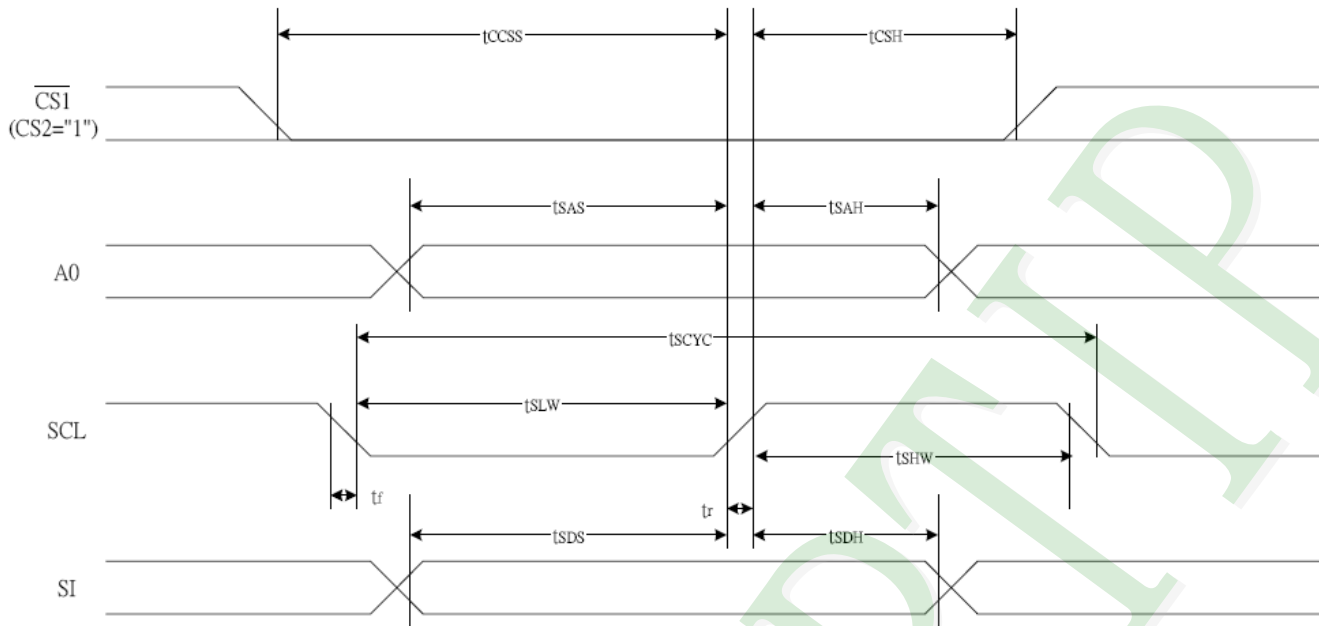
(V_{DD} = 3.3 V, T_a = 25°C)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Address hold time	A0	t _{AH6}		0	—	ns
Address setup time		t _{AW6}		0	—	
System cycle time		t _{CYC6}		240	—	
Enable L pulse width (WRITE)	WR	t _{EWLW}		80	—	
Enable H pulse width (WRITE)		t _{EWHW}		80	—	
Enable L pulse width (READ)	RD	t _{EWLR}		80	—	
Enable H pulse width (READ)		t _{EWHR}		140	—	
WRITE Data setup time	D0 to D7	t _{DS6}		40	—	
WRITE Address hold time		t _{DH6}		10	—	
READ access time		t _{ACC6}	CL = 100 pF	—	70	
READ Output disable time		t _{OH6}	CL = 100 pF	5	50	

*1 The input signal rise time and fall time (tr, tr) is specified at 15 ns or less. When the system cycle time is extremely fast, (tr + tr) ≤ (t_{CYC6} – t_{EWLW} – t_{EWHW}) for (tr + tr) ≤ (t_{CYC6} – t_{EWLR} – t_{EWHR}) are specified.

*2 All timing is specified using 20% and 80% of V_{DD} as the reference.

*3 t_{EWLW} and t_{EWLR} are specified as the overlap between CS1 being "L" (CS2 = "H") and E.

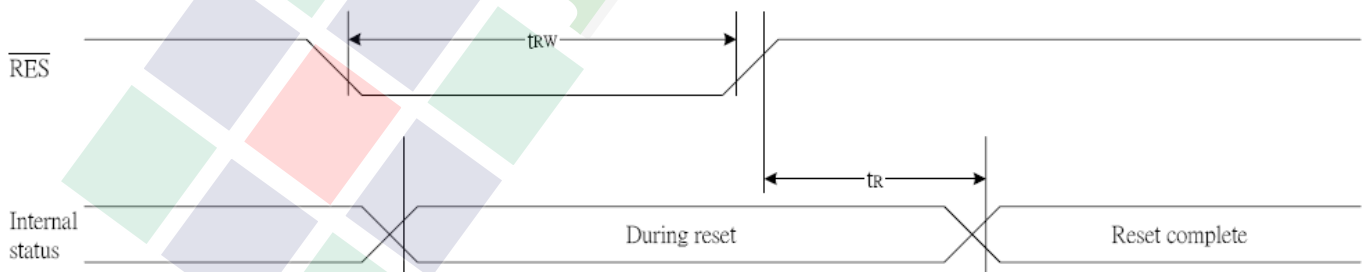
The Serial Interface


($V_{DD} = 3.3V, T_a = 25^\circ C$)

Item	Signal	Symbol	Condition	Rating		Units
				Min.	Max.	
Serial Clock Period		T_{scyc}		50	—	ns
SCL "H" pulse width	SCL	T_{shw}		25	—	
SCL "L" pulse width	SCL	T_{slw}		25	—	
Address setup time	A0	T_{sas}		20	—	
Address hold time	A0	T_{sah}		10	—	
Data setup time	SI	T_{sds}		20	—	
Data hold time	SI	T_{sdh}		10	—	
CS-SCL time	CS	T_{css}		20	—	
CS-SCL time	CS	T_{csh}		40	—	

*1 The input signal rise and fall time (t_r, t_f) are specified at 15 ns or less.

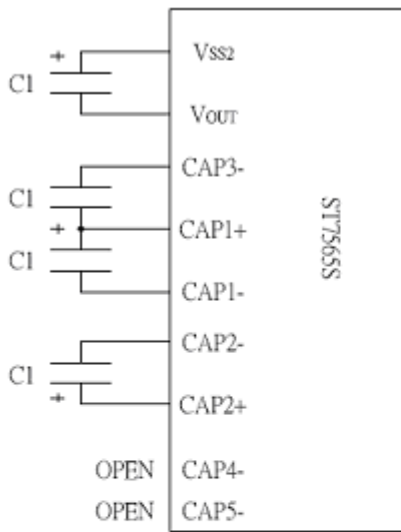
*2 All timing is specified using 20% and 80% of V_{DD} as the standard.

Reset Timing


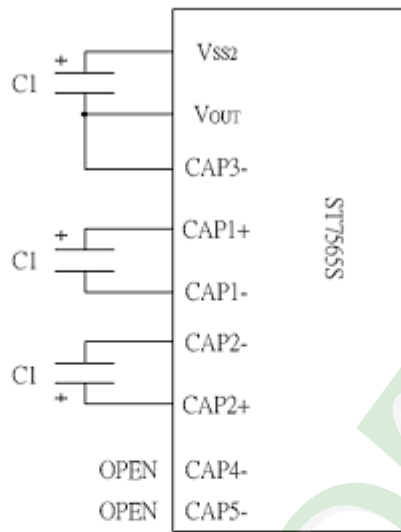
($V_{DD} = 3.3V, T_a = -40 \text{ to } 85^\circ C$)

Item	Signal	Symbol	Condition	Rating			Units
				Min.	Typ.	Max.	
Reset time		t_r		—	—	0.5	us
Reset "L" pulse width	/RES	t_{rw}		0.5	—	—	us

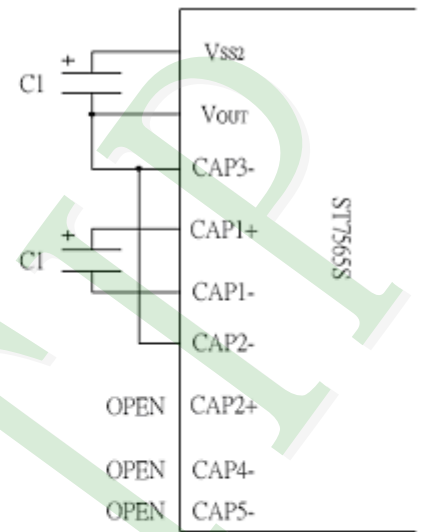
2.4 Power supply for LCD module



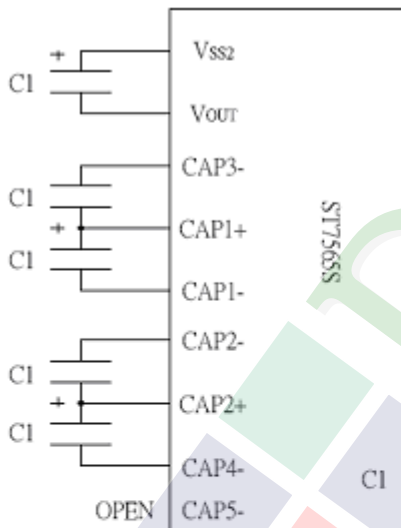
4x step-up voltage circuit
 $V_{DD}=0V$
 $V_{SS2}=-3V$
 $V_{OUT}=4 \times V_{SS2}=-12V$
 4x step-up voltage relationships



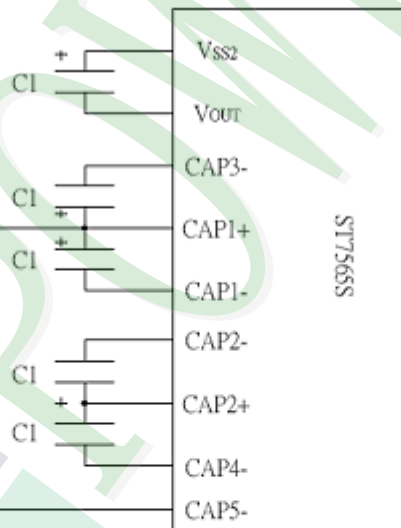
3x step-up voltage circuit
 $V_{DD}=0V$
 $V_{SS2}=-3V$
 $V_{OUT}=3 \times V_{SS2}=-9V$
 3x step-up voltage relationships



2x step-up voltage circuit
 $V_{DD}=0V$
 $V_{SS2}=-3V$
 $V_{OUT}=2 \times V_{SS2}=-6V$
 2x step-up voltage relationships



5x step-up voltage circuit
 $V_{DD}=0V$
 $V_{SS2}=-2V$
 $V_{OUT}=5 \times V_{SS2}=-10V$
 5x step-up voltage relationships

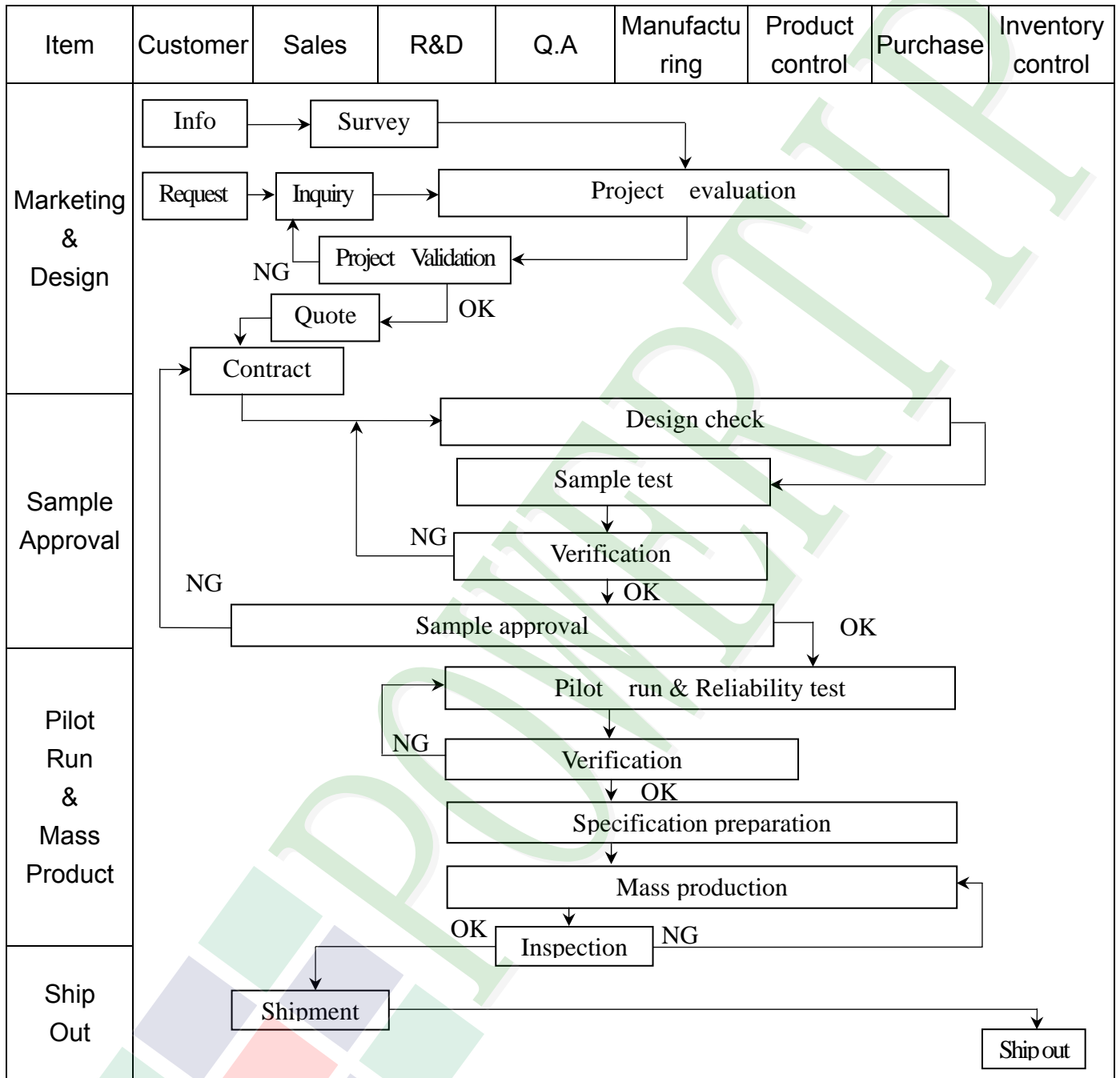


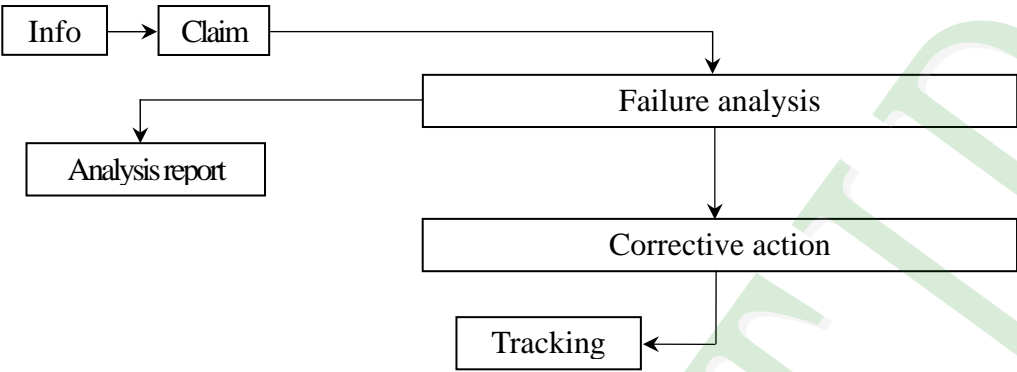
6x step-up voltage circuit
 $V_{DD}=0V$
 $V_{SS2}=-2V$
 $V_{OUT}=6 \times V_{SS2}=-12V$
 6x step-up voltage relationships

Item	Set value	Units
C1	1.0 to 4.7	μF
C2	0.1 to 4.7	μF

3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



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

3.2 Inspection Specification

- ◆ Scope : The document shall be applied to LCD Module for Monotype and Color STN(Ver. B01).
- ◆ Inspection Standard : MIL-STD-105E Table Normal Inspection Single Sampling Level II .
- ◆ Equipment : Gauge 、 MIL-STD 、 Powertip Tester 、 Sample
- ◆ Defect Level : Major Defect AQL : 0.4 ; Minor Defect : AQL : 1.5 .
- ◆ OUT Going Defect Level : Sampling .
- ◆ Manner of appearance test :
 - (1). The test be under 20W×2 fluorescent light ' and distance of view must be at 30 cm.
 - (2). Standard of inspection : (Unit : mm)
 - (3). The test direction is base on about around 45° of vertical line. (Fig. 1)
 - (4). Definition of area . (Fig. 2)

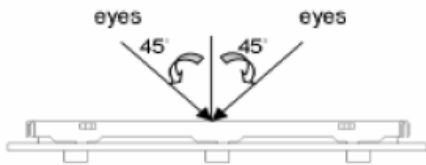


Fig.1

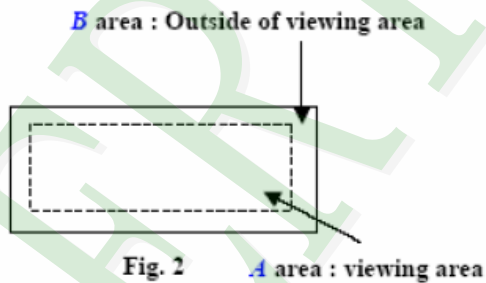
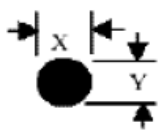
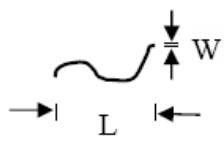
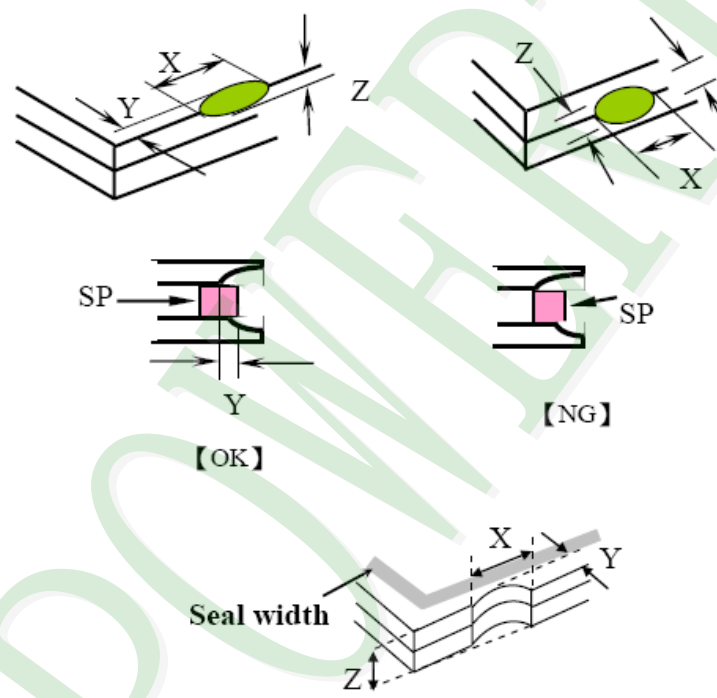


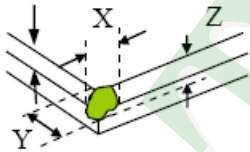
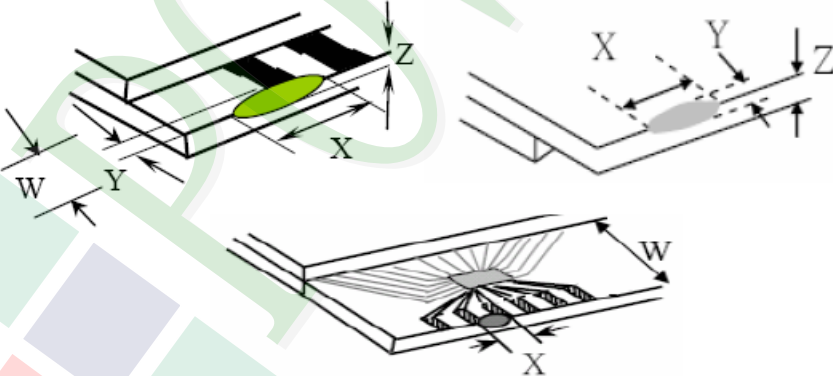
Fig. 2

◆ Specification:

NO	Item	Criterion	Level
01	Product condition	1. 1 The part number is inconsistent with work order of Production.	Major
		1. 2 Mixed production types.	Major
		1. 3 Assembled in inverse direction.	Major
02	Quantity	2. 1 The quantity is inconsistent with work order of production.	Major
03	Outline dimension	3. 1 Product dimension and structure must conform to Structure diagram.	Major
04	Electrical Testing	4. 1 Missing line character and icon.	Major
		4. 2 No function or no display.	Major
		4. 3 Output data is error.	Major
		4. 4 LCD viewing angle defect.	Major
		4. 5 Current consumption exceeds product specifications.	Major

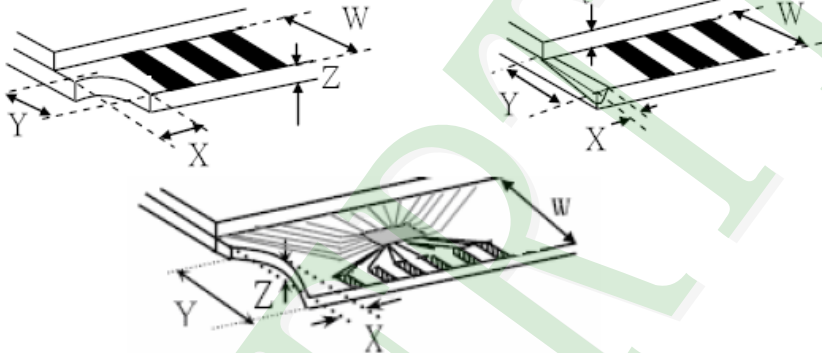
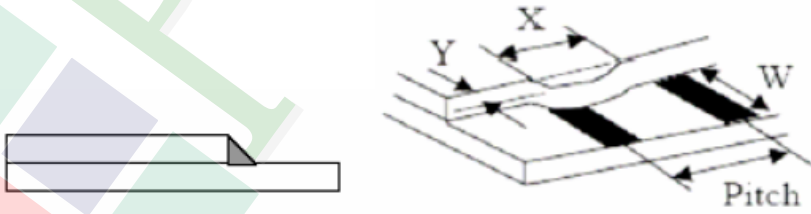
NO	Item	Criterion	Level																																				
05	<p>Black or white dot、scratch、contamination</p> <p>Round type</p>  <p>$\Phi = (x+y)/2$</p> <p>Line type</p> 	<p>5. 1 Round type:</p> <p>5. 1. 1 display only :</p> <ul style="list-style-type: none"> • White and black spots on display ≤ 0.30 mm , no more than 4 white or black spots present. • Densely spaced : NO more than two spots or lines within 3 mm. <p>5. 1. 2 Non-display :</p> <table border="1"> <thead> <tr> <th rowspan="2">Dimension (diameter : Φ)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.10$</td> <td colspan="2">Accept no dense</td> </tr> <tr> <td>$0.10 < \Phi \leq 0.20$</td> <td>3</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.30$</td> <td>2</td> </tr> <tr> <td>Total quantity</td> <td>4</td> </tr> </tbody> </table> <p>5. 1. 3 Line type:</p> <table border="1"> <thead> <tr> <th colspan="2">Dimension</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>Length (L)</th> <th>Width (W)</th> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td>---</td> <td>$W \leq 0.03$</td> <td>Accept no dense</td> <td rowspan="3">Ignore</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$0.03 < W \leq 0.05$</td> <td rowspan="2">4</td> </tr> <tr> <td>$L \leq 2.5$</td> <td>$0.05 < W \leq 0.075$</td> </tr> <tr> <td>---</td> <td>$W > 0.075$</td> <td colspan="2">As round type</td> </tr> </tbody> </table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.10$	Accept no dense		$0.10 < \Phi \leq 0.20$	3	Ignore	$0.20 < \Phi \leq 0.30$	2	Total quantity	4	Dimension		Acceptance (Q'ty)		Length (L)	Width (W)	A area	B area	---	$W \leq 0.03$	Accept no dense	Ignore	$L \leq 3.0$	$0.03 < W \leq 0.05$	4	$L \leq 2.5$	$0.05 < W \leq 0.075$	---	$W > 0.075$	As round type		Minor
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NO	Item	Criterion	Level						
07	The crack of glass	<p>Symbols :</p> <p>X : The length of crack Y : The width of crack. Z : The thickness of crack W : terminal length t : The thickness of glass a : LCD side length</p>	Minor						
		<p>7.1 General glass chip :</p> <p>7.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="502 1489 1300 1780"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq a$</td> <td>Crack can't enter viewing area</td> <td>$\leq 1/2 t$</td> </tr> <tr> <td>$\leq a$</td> <td>Crack can't exceed the half of SP width.</td> <td>$1/2 t < Z \leq 2 t$</td> </tr> </tbody> </table>		X	Y	Z	$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$
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		X	Y	Z									
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$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$											
<p>7.2 Protrusion over terminal :</p> <p>7.2.1 Chip on electrode pad :</p>  <table border="1" data-bbox="469 1675 1252 1848"> <thead> <tr> <th></th> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>Front</td> <td>$\leq a$</td> <td>$\leq 1/2 W$</td> <td>$\leq t$</td> </tr> <tr> <td>Back</td> <td colspan="3">Neglect</td> </tr> </tbody> </table>		X	Y	Z	Front	$\leq a$	$\leq 1/2 W$	$\leq t$	Back	Neglect			
	X	Y	Z										
Front	$\leq a$	$\leq 1/2 W$	$\leq t$										
Back	Neglect												

◆ Specification For Monotype and Color STN :

(Ver. B01)

NO	Item	Criterion	Level									
07	The crack of glass	Symbols : X : The length of crack Z : The thickness of crack t : The thickness of glass Y : The width of crack. W : terminal length a : LCD side length	Minor									
		7.2.2 Non-conductive portion :  <table border="1" data-bbox="580 1039 1206 1191"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq 1/3 a$</td> <td>$\leq W$</td> <td>$\leq t$</td> </tr> </tbody> </table> <p>⊙ If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.</p> 7.2.3 Glass remain :  <table border="1" data-bbox="501 1715 1190 1859"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq a$</td> <td>$\leq 1/3 W$</td> <td>$\leq t$</td> </tr> </tbody> </table>		X	Y	Z	$\leq 1/3 a$	$\leq W$	$\leq t$	X	Y	Z
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$\leq 1/3 a$	$\leq W$	$\leq t$										
X	Y	Z										
$\leq a$	$\leq 1/3 W$	$\leq t$										

◆ Specification For Monotype and Color STN :

(Ver. B01)

NO	Item	Criterion	Level
08	Backlight elements	8. 1 Backlight can't work normally.	Major
		8. 2 Backlight doesn't light or color is wrong.	Major
		8. 3 Illumination source flickers when lit.	Major
09	General appearance	9. 1 Pin type must match type in specification sheet.	Major
		9. 2 No short circuits in components on PCB or FPC.	Major
		9. 3 Product packaging must the same as specified on packaging specification sheet.	Minor
		9. 4 The folding and peeled off in polarizer are not acceptable.	Minor
		9. 5 The PCB or FPC between B/L assembled distance (PCB or FPC) is ≤ 1.5 mm.	Minor

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.

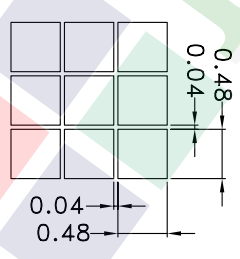
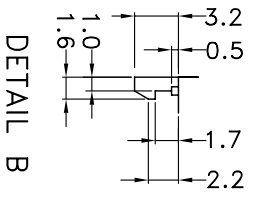
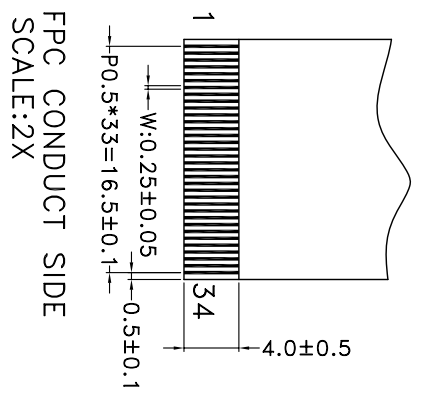
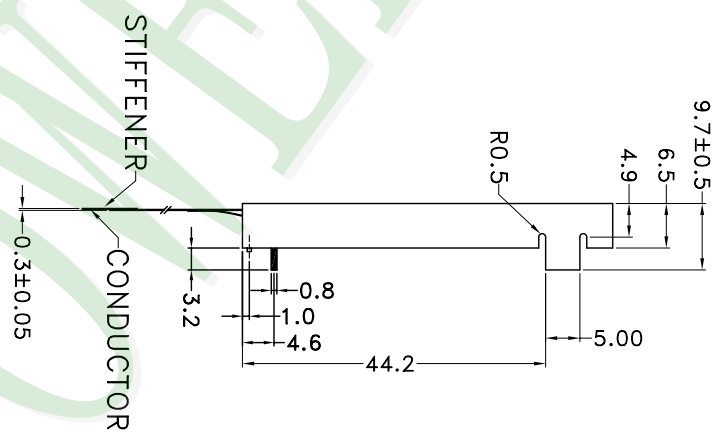
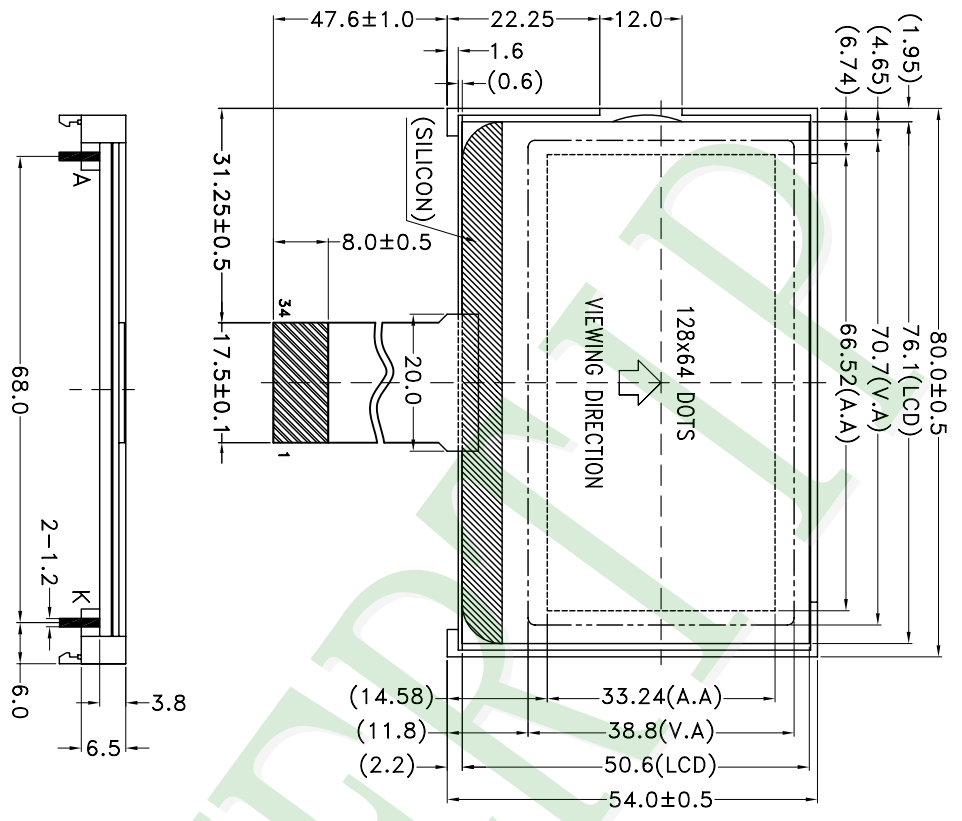
5.4 TERMS OF WARRANTY

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.



- NOTE:
1. LCD TYPE: FSTN, Transflective, Positive.
 2. Viewing Direction: 6 O'clock.
 3. Top: -20 TO 70°C, Tst: -30 TO 80°C.
 4. The tolerance unless classified: ±0.3mm
 5. This product conforms ROHS.

007		PART NO:	PE12864WRF-004HC1Q	 久正光电股份有限公司 POWER TIP TECHNOLOGY CORPORATION	Design	Sally	 表面粗糙度 公差等级 精 緻
006		DRAWING NAME:	JLMD-PE12864WRF-004HC1Q		Check	Terry	
005		TITLE:	LCD Module Drawing		Approve	Ryan	
004					Unit	MM	
003					Scale	1:1	
002					Page	1/1	
001	NEW DRAWING	REV BY	Sally		Quantity		
REV		REVISER	DATE	2013/07/04			

LCM包裝規格書

LCM Packaging Specifications (For Tray)

Approve	Check	Contact
Ryan	Terry	Sally

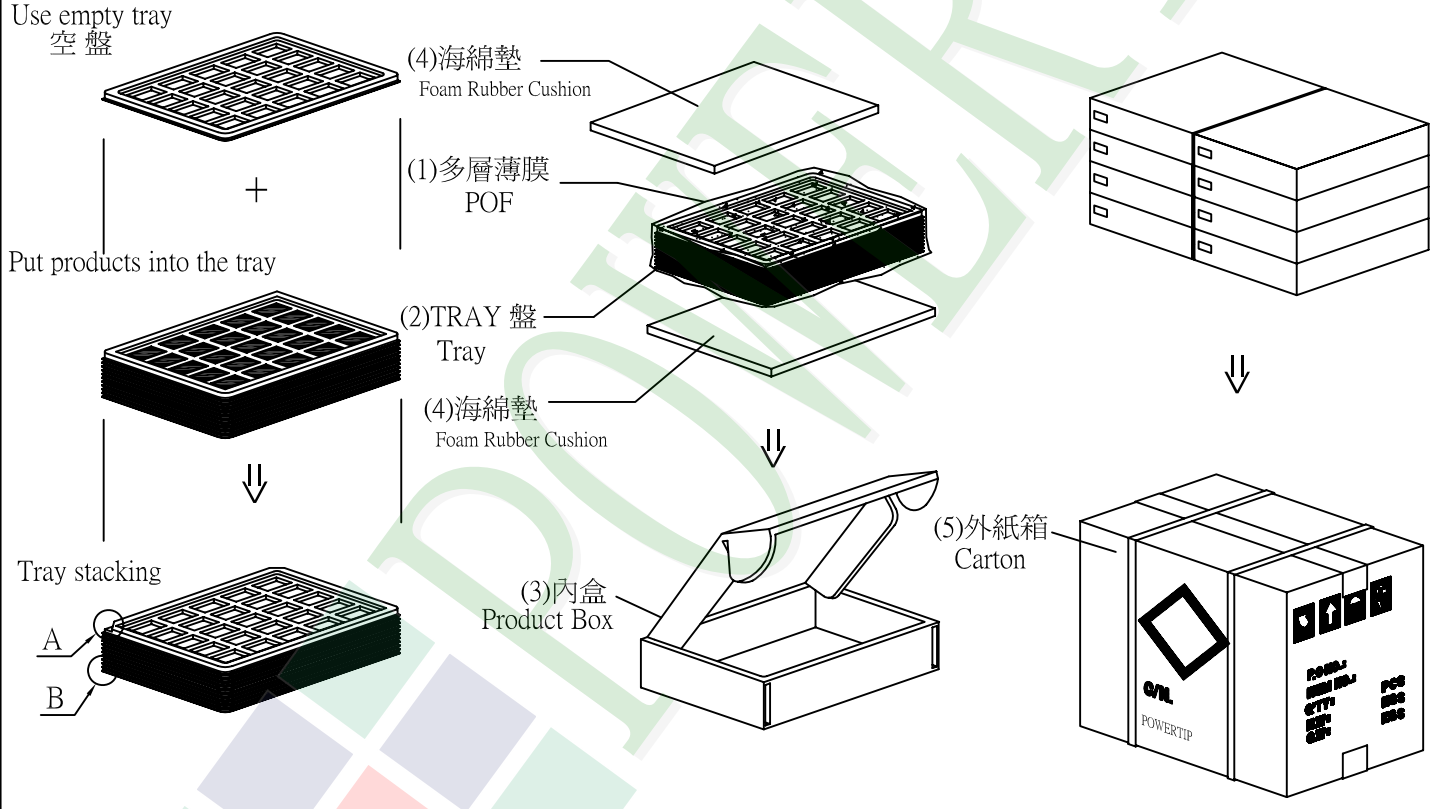
1. 包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PE12864WRF-004HC1Q	80.0 X 54.0	0.025	144	3.6
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	—	6	—
3	TRAY 盤 (2)Tray	TY12806404TZBA	295 X 245 X 18.8	0.08	32	2.56
4	內盒(3)Product Box	BX31025580AABA	310 X 255 X 86	0.2	8	1.6
5	海綿墊(4)Foam Rubber Cushion	OTFOAM00006ABA	290 X 240 X 10	0.02	16	0.32
6	外紙箱(5)Carton	BX52732536CCBA	527 X 325 X 360	0.83	1	0.83
7						
8						
9						

2. 一整箱總重量 (Total LCD Weight in carton) : 8.91 Kg±10%

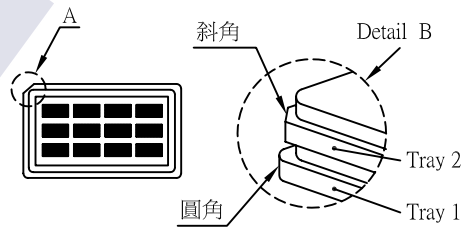
3. 單箱數量規格表 (Packaging Specifications and Quantity) :

(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	8	=	144



特記事項 (REMARK)

1. Label Specifications :
參照"成品包裝點檢作業標準書"內容



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.