


SPECIFICATIONS

CUSTOMER	:	CTW1199
SAMPLE CODE	:	PS9664WRF-003-L-01
MASS PRODUCTION CODE	:	PE9664WRF-003-L-Q
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	001
DRAWING NO. (Ver.)	:	LMD-PE9664WRF-003-L-Q (Ver.001)
PACKAGING NO. (Ver.)	:	PKG-PE9664WRF-003-L-Q (Ver.001)

Customer Approved

Date:

Approved	Checked	Designer
黃秋源 Oliver Huang	 2008/7/7	林榮鍾 Timter Lin



- 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
11/15/2006	0	—	Mass Production	—	Ken
12/13/2006	A	—	Modify B/L FPC length & Add UV glue area	Appendix	Ken
04/02/2007	B	—	1.Modify B/L & Modify VOP 2. Modify Inspection Specification	P5, P18-P23 Appendix	Ken
05/21/2007	C	—	Modify Optical Characteristics	P.6	Ken
07/03/2008	01	001	Modify VDD MAX	P.5	Timter

Total : 25

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Appendix 1 : LCM Drawing

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Note : For detailed information please refer to IC data sheet : NOVATEK-NT7533

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	96 * 64 Dots
LCD Type	FSTN 、 Positive 、 Transmissive
Driver Condition	LCD Module : 1/64 Duty , 1/9 Bias
Viewing Direction	12 O'clock
Backlight Type	WHITE-LED B/L
Weight	12g
Interface	8-bit parallel bus interface for both 8080 and 6800 series, 4-wire Serial Peripheral Interface (SPI)
Driver IC	Driver IC : Novatek --- NT7533
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	28.56 (W) * 28.68(L) * 3.0 (H)	mm
Viewing Area	22.96 (W) * 16.48 (L)	mm
Active Area	20.145 (W) * 13.425 (L)	mm
Dot Size	0.195 (W) * 0.195 (L)	mm
Dot Pitch	0.21 (W) * 0.21 (L)	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	4.0	V
LCD Driver Supply Voltage	V_0, V_{OUT}	-	-0.3	14	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	$T_a < 40\text{ °C}$	20	90	%RH

1.4 DC Electrical Characteristics

$V_{DD} = 3.0\text{ V} \pm 0.2\text{V}$, $V_{SS} = 0\text{ V}$, $T_a = 25\text{ °C}$

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	V_{dd}	-	2.8	3.0	3.5	V
“H” Input Voltage	V_{IH}	-	$0.8 V_{DD}$	-	V_{DD}	V
“L” Input Voltage	V_{IL}	-	V_{SS}	-	$0.2 V_{DD}$	V
“H” Output Voltage	V_{OH}	-	$0.8 V_{DD}$	-	V_{DD}	V
“L” Output Voltage	V_{OL}	-	V_{SS}	-	$0.2 V_{DD}$	V
Supply Current	I_{dd}	$V_{DD} = 3.0\text{ V}$; $V_{OP} = 8.7\text{ V}$; Pattern= Full display	-	0.2	-	mA
		$V_{DD} = 3.0\text{ V}$; $V_{OP} = 8.7\text{ V}$; Pattern= Horizontal line*1	-	0.5	1	
LCM Driver Voltage	V_{OP}	-20°C	8.7	8.9	9.1	V
		25°C *2	8.5	8.7	8.9	
		70°C	7.9	8.2	8.5	

NOTE: *1 The Maximum current display;

*2 The VOP test point is $V_0 - V_{SS}$

1.5 Optical Characteristics

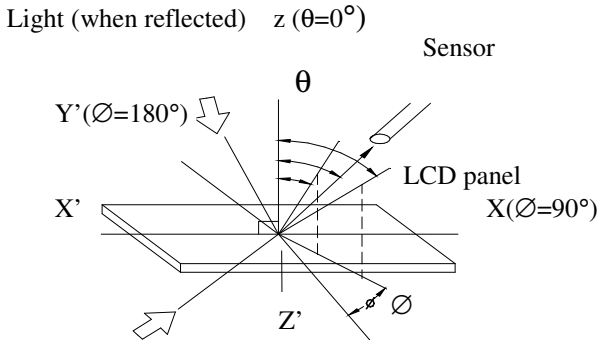
LCD Panel : 1/65 Duty , 1/9 Bias , Vop = 9.0 V , Ta = 25 °C

Item	Symbol	Conditions	Min.	Typ.	Max.	Reference
View Angle	θ	$C \geq 2.0$, $\varnothing = 180^\circ$	-40°	-	40°	Note 1 ,2
Contrast Ratio *A	CR	$\theta = 5^\circ$, $\varnothing = 180^\circ$	2	3	-	Note 3
Response Time(rise)	Tr	$\theta = 5^\circ$, $\varnothing = 180^\circ$	-	140 ms	210 ms	Note 4
Response Time(fall)	Tf	$\theta = 5^\circ$, $\varnothing = 180^\circ$	-	220 ms	330 ms	

Note:

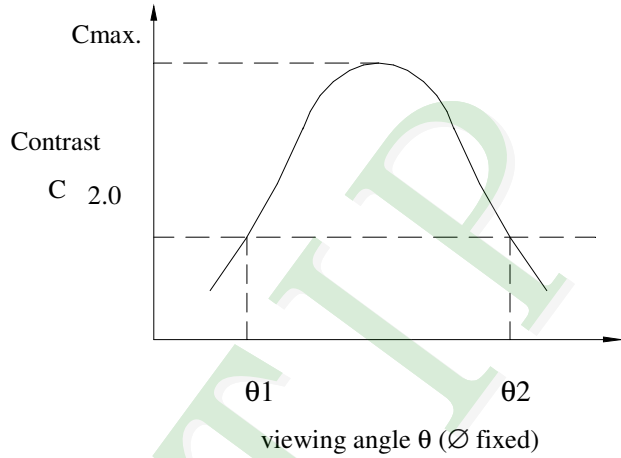
*A. Based on the golden sample approved by PC HOME / Calcomp / Powertip

Note 1: Definition of angles θ and \varnothing



Light (when transmitted) Y ($\varnothing=0^\circ$)
($\theta=90^\circ$)

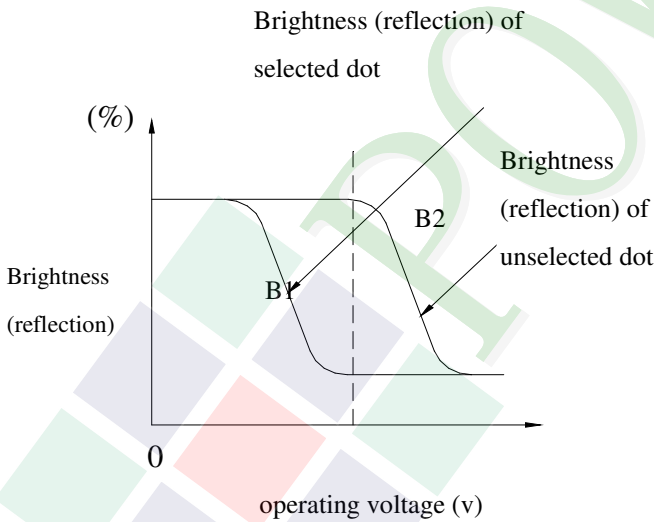
Note 2: Definition of viewing angles θ_1 and θ_2



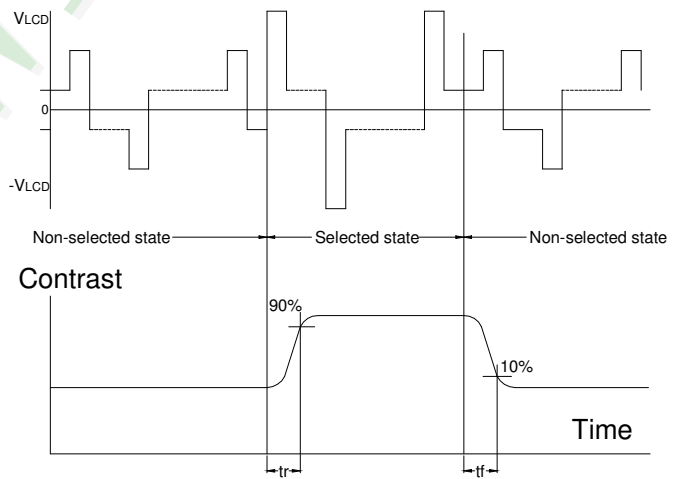
Note : Optimum viewing angle with the naked eye and viewing angle θ at Cmax. Above are not always the same

Note 3: Definition of contrast C

$$C = \frac{\text{Brightness (reflection) of unselected dot (B2)}}{\text{Brightness (reflection) of selected dot (B1)}}$$



Note 4: Definition of response time



Note: Measured with a transmissive LCD panel which is displayed 1 cm^2

V_{LCD} : Operating voltage f_{FRM} : Frame frequency
 t_r : Response time (rise) t_f : Response time (fall)

1.6 Backlight Characteristics

LCD Module with LED Backlight

Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25°C	-	30	mA
Reverse Voltage	VR	Ta =25°C	-	5	V
Power Dissipation	PO	Ta =25°C	-	0.15	W

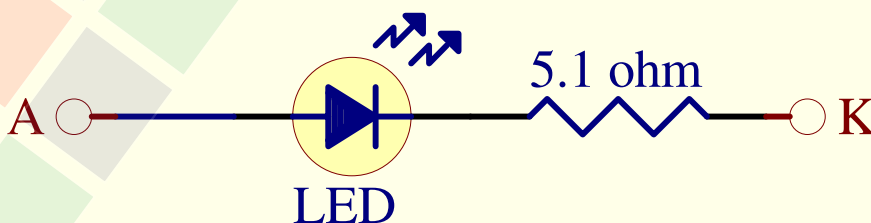
Electrical / Optical Characteristics

Ta =25°C

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 20mA	-	-	3.5	V
Reverse Current	IR	VR= 5V	-	-	0.05	mA
Average Brightness (with LCD) *1	IV	IF= 20mA	400	450	-	cd/m ²
CIE Color Coordinate (With LCD) *1	X	IF= 20mA	0.21	0.27	0.33	-
	Y		0.22	0.28	0.34	
Uniformity *2 (with LCD) *1	△B	IF= 20mA	70	-	-	%
Color	White					

*1 This value will be changed while mass production.

*2 $\Delta B = B(\text{min}) / B(\text{max}) * 100\%$



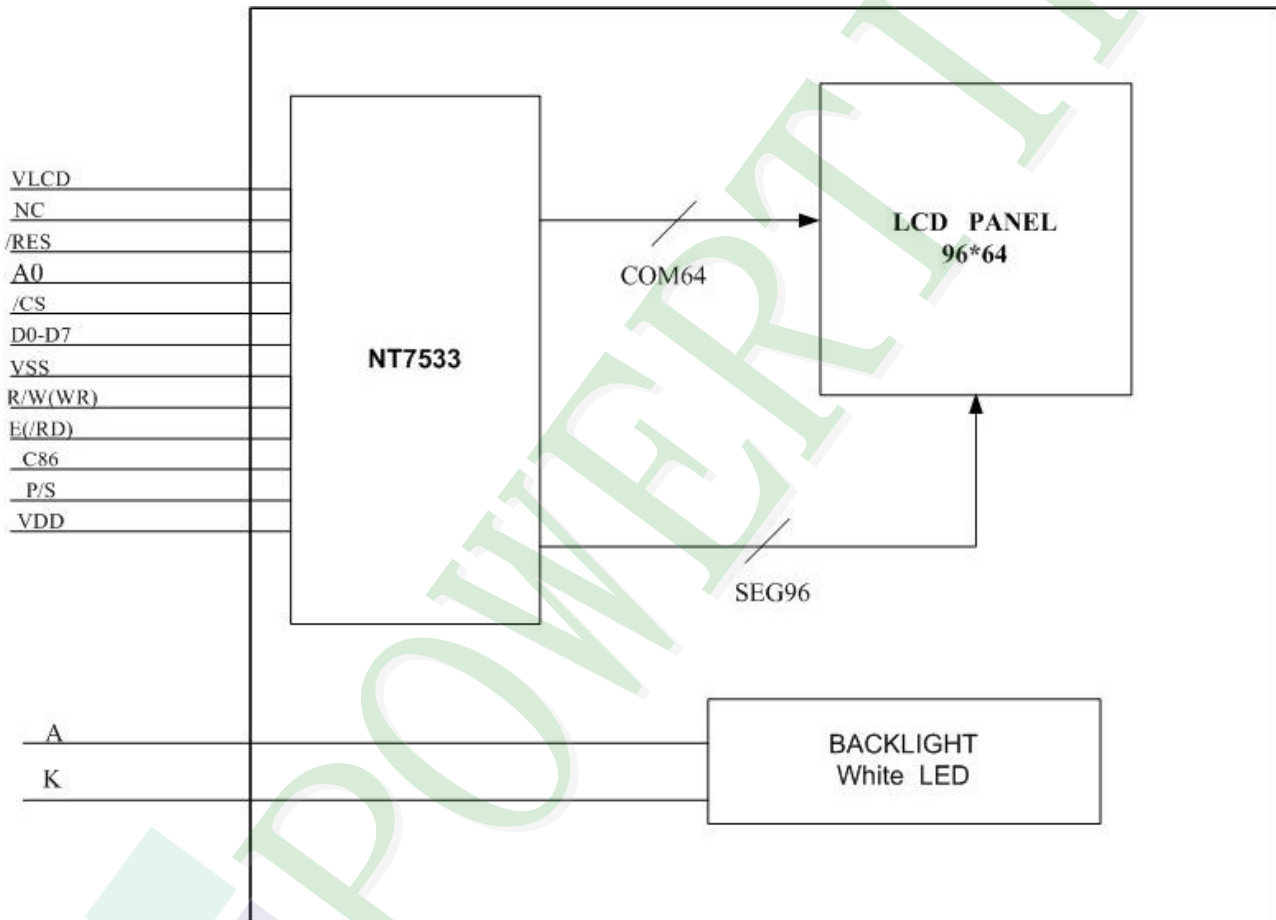
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

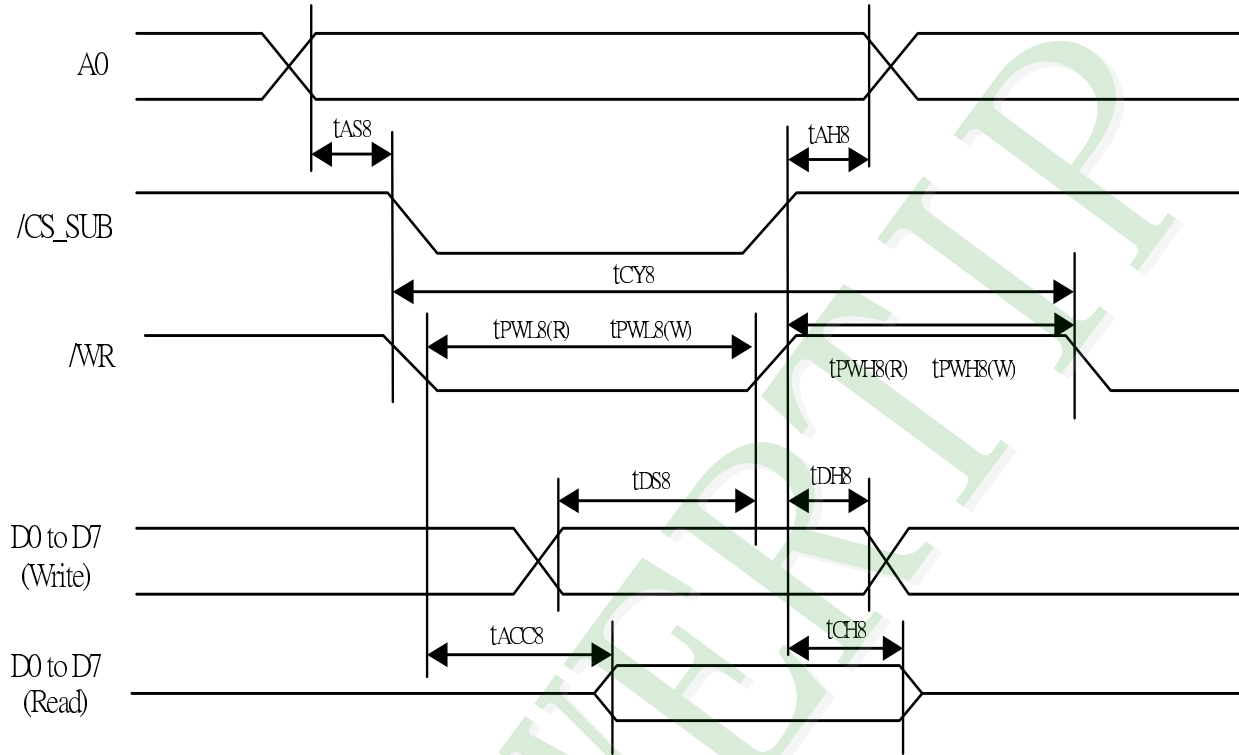
Pin No.	Symbol	Function
1	A	Power supply for LED backlight Anode input
2	K	Power supply for LED backlight Cathode input
3	VLCD	Voltage converter I/O pin
4	VLCD	Voltage converter I/O pin
5	VDD	Power supply input for driver IC.
6	VDD	Power supply input for driver IC.
7	P/S	Parallel/Serial data input select pin P/S = "H" : Parallel data input. P/S = "L" : Serial data input.
8	C86	This is the MPU interface switch terminal. C86 = "H" : 6800 Series MPU interface. C86 = "L" : 8080 MPU interface.
9	E(/RD)	When connected to a 6800 Series MPU, this is active HIGH. This is used as an enable clock input of the 6800 series MPU. When connected to an 8080 MPU, it is active LOW. This pad is connected to the /WR signal of the 8080 MPU, and writes data at the low level. When use serial interface, this pad must be connected to VDD or VSS.
10	R/W (W/R)	When connected to a 6800 Series MPU, this is the read/write control signal input terminal. When connected to an 8080 MPU, this is active LOW. This terminal connects to the 8080 MPU /RD signal and the NT7533 data bus is in an output status when this signal is LOW. When the serial interface is selected, fix this pad to VDD or VSS.
11	/CS	Chip select for LCD, active "L" .
12	VSS	Ground
13	VSS	Ground
14	A0	Command / Data select.. "H" : Display Data, "L" :Control Data.
15	D7	8-bit bi-directional data bus
16	D6	
17	D5 (SCL)	



Pin No.	Symbol	Function
18	D4(SI)	8-bit bi-directional data bus
19	D3	
20	D2	
21	D1	
22	D0	
23	/RES	Reset input pin
24	NC	NC

2.3 Timing Characteristics

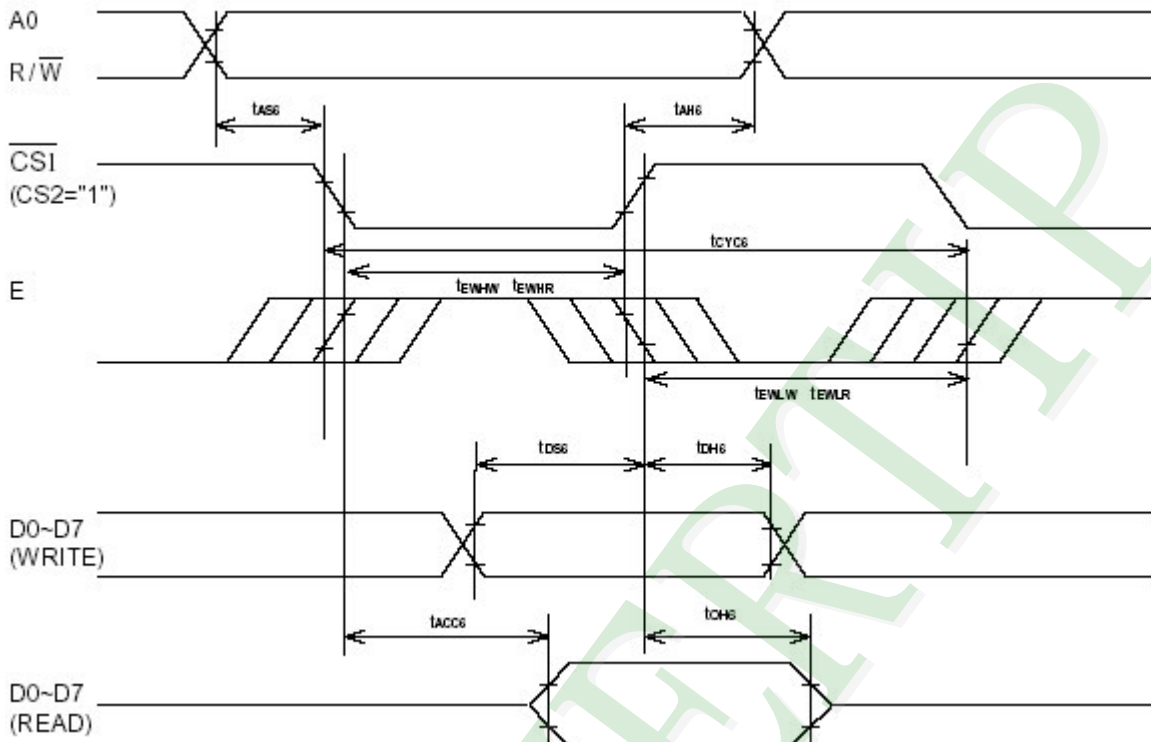
System Bus Read/Write Timing (8080 Family MPU)



(VDD = 2.8 ~ 3.5V, Ta = -40 ~ 85°C)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
tAH8	Address hold time		40	-	-	ns
tAS8	Address setup time		40	-	-	ns
tCY8	System cycle time		1000	-	-	ns
tCCLW	Control H pulse width(/WR)		200	-	-	ns
tCCLR	Control H pulse width(/RD)		200	-	-	ns
tCCHW	Control H pulse width (/WR)		200	-	-	ns
tCCHR	Control H pulse width (/RD)		200	-	-	ns
tDS8	Data setup time		160	-	-	ns
tDH8	Data hold time		40	-	-	ns
tACC8	/RD access time -	CL=15pF	-	-	250	ns
tCH8	Output disable time		10	-	120	ns

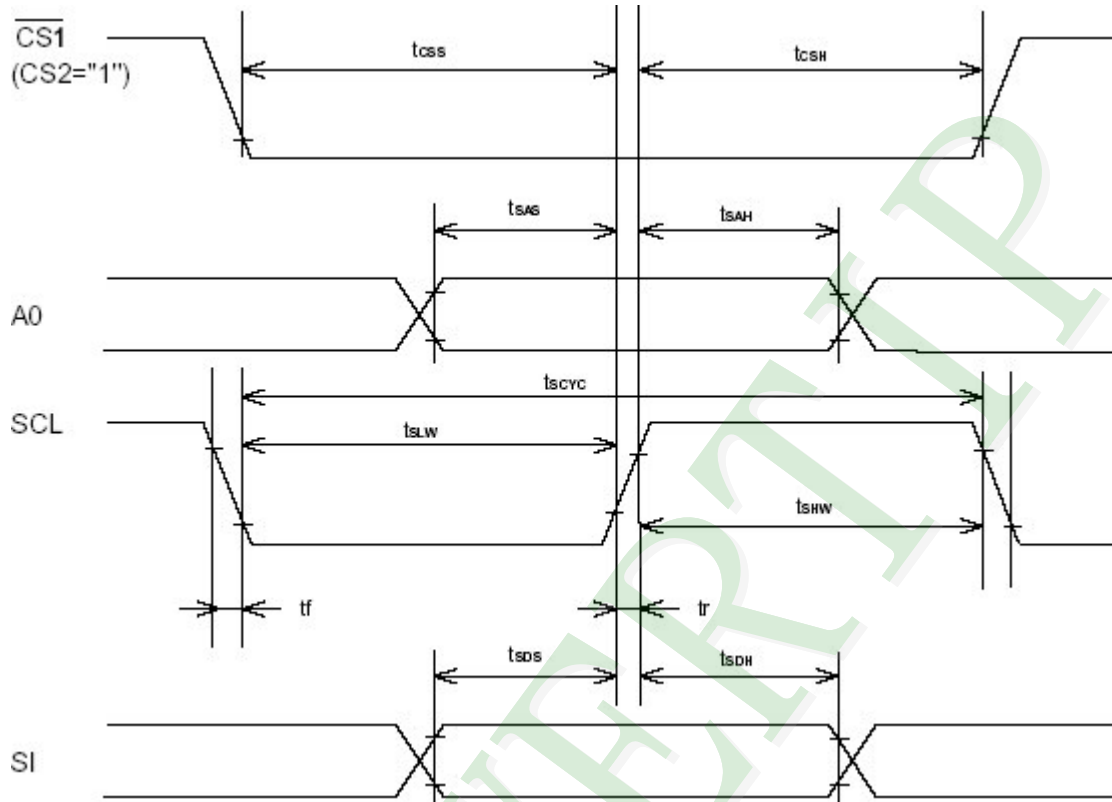
System Bus Read/Write Timing (6800 Family MPU)



(VDD = 2.8 ~ 3.5V, Ta = -40 ~ 85° C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
tCYC6	System cycle time	1000	-	-	ns	
tAH6	Address hold time	40	-	-	ns	
tAW6	Address setup time	40	-	-	ns	
tDS6	Data setup time	160	-	-	ns	
tDH6	Data hold time	40	-	-	ns	
tACC6	Access time	-	-	250	ns	CL=15pF
tOH6	Output disable time	10	-	120	ns	CL=15pF
tEWHR	Enable H pulse width (/RD)	200	-	-	ns	
tEWHW	Enable H pulse width (/WR)	160	-	-	ns	
tEWLR	Enable L pulse width (/RD)	200	-	-	ns	
tEWLW	Enable pulse width (/WR)	160	-	-	ns	

Serial Interface Timing



(VDD = 2.8 ~ 3.5V, Ta = -40 ~ 85° C)

Symbol	Parameter	Min	Typ	Max	Unit	Condition
t_{CYC}	SCL clock cycle	150	-	-	ns	
t_{PWH}	SCL pulse width H	60	-	-	ns	
t_{PWL}	SCL pulse width L	60	-	-	ns	
t_R	SCL pulse rise time		-	20	ns	Clod=10pF
t_{WS}	Write, Reg. Serial setup time	60	-	-	ns	
t_{CSS}	/CS setup time	60	-	-	ns	
t_{CSH}	/CS hold time	60	-	-	ns	
t_{SIS}	SI setup time	60	-	-	ns	
t_{SIH}	SI hold time	60	-	-	ns	

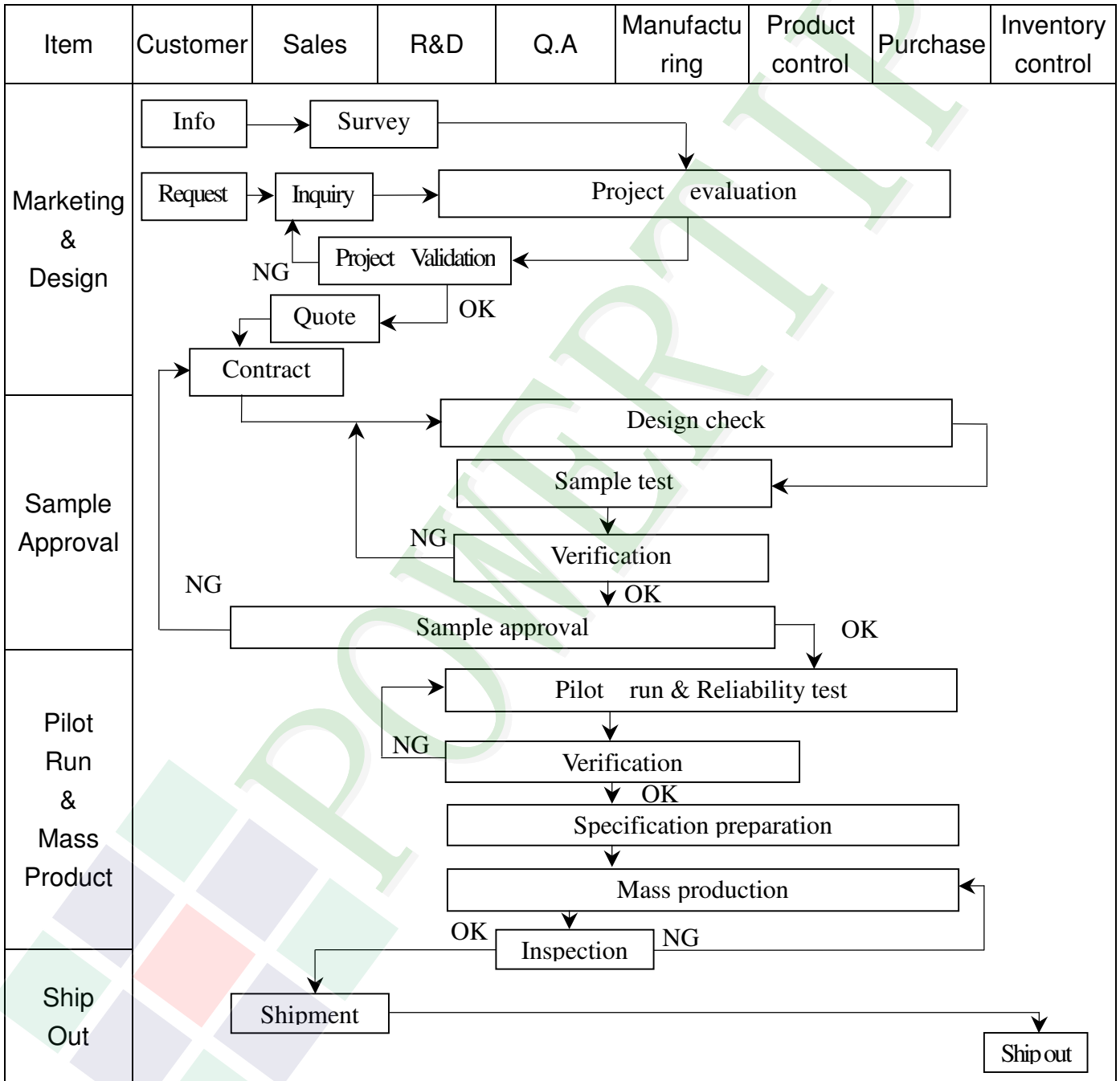
2.4 Display Command

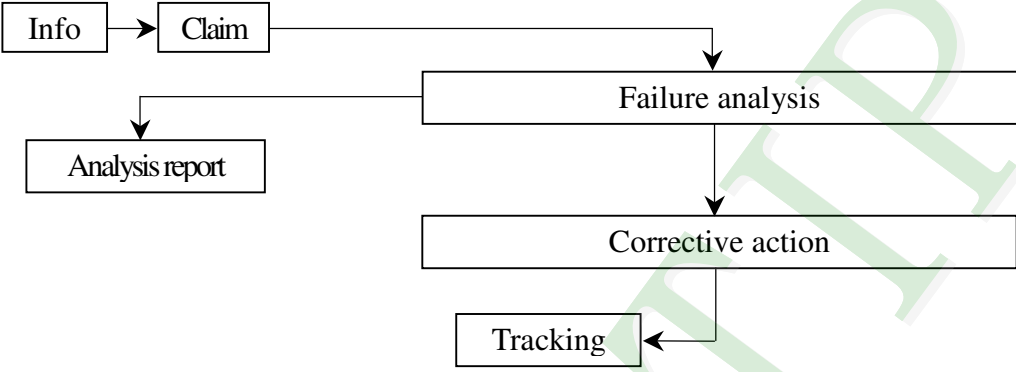
	A0	/RW	Code								Function
			D7	D6	D5	D4	D3	D2	D1	D0	
Instruction (H = 0 or 1)											
NOP	0	0	0	0	0	0	0	0	0	0	No operation
Reset	0	0	0	0	0	0	0	0	0	1	
Function Set	0	0	0	0	1	MX	MY	PD	V	H	Power down control (PD) Entry mode (V) Extended Instruction Set control (H)
Read Status	0	1	PD	-	-	D	E	MX	MY	DO	
Write Display Data	1	0	Write Data								Write data to display RAM

Instruction (H = 0)											Function & Remark
Set VLCD range (* 1.)	0	0	0	0	0	0	0	1	0	PRS	
Display Control	0	0	0	0	0	0	1	D	PDIS	E	
Set HV-gen. Stages	0	0	0	0	0	1	0	0	S1	S0	
Set Partial display line	0	0	0	0	0	1	1	0	0	0	Partial display command and set Start line of display area.
	0	0	0	L6	L5	L4	L3	L2	L1	L0	
Set Y address of RAM	0	0	0	1	0	0	Y3	Y2	Y1	Y0	Set the Y-address of RAM $0 \leq Y \leq 8$
Set X address of RAM	0	0	1	X6	X5	X4	X3	X2	X1	X0	Set the X-address of RAM $0 \leq X \leq 101$
Instruction (H = 1)											Function
Temperature Control	0	0	0	0	0	0	0	1	TC1	TC0	Set temperature coefficient (TCn)
Display configuration	0	0	0	0	0	0	1	DO	0	0	Determine the order of every byte stored in RAM
Bias system	0	0	0	0	0	1	0	BS2	BS1	BS0	Set the bias of LCD driving signal
Set V _{OP}	0	0	1	V _{OP6}	V _{OP5}	V _{OP4}	V _{OP3}	V _{OP2}	V _{OP1}	V _{OP0}	Set VLCD output voltage electronic volume register

3. QUALITY ASSURANCE SYSTEM

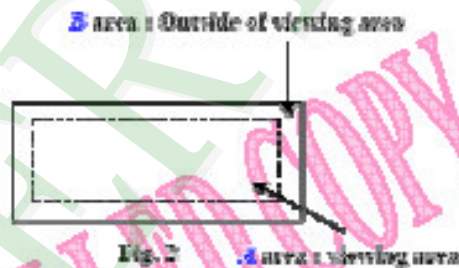
3.1 Quality Assurance Flow Chart



Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service	 <pre> graph TD Info[Info] --> Claim[Claim] Claim --> Failure[Failure analysis] Claim --> Report[Analysis report] Failure --> Action[Corrective action] Action --> 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(070328-01).
- ◆ **Inspection Standard** : MIL-STD-105E Table Normal Inspection Single Sampling Level II .
- ◆ **Equipment** : Gauge 、 MIL-STD 、 Powertip Tester 、 Sample
- ◆ **Defect Level** : Major Defect AQL : **0.15** ; Minor Defect : AQL : **0.65**
- ◆ **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)



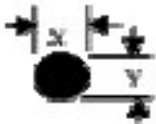
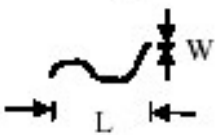
◆ Specification:

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 :

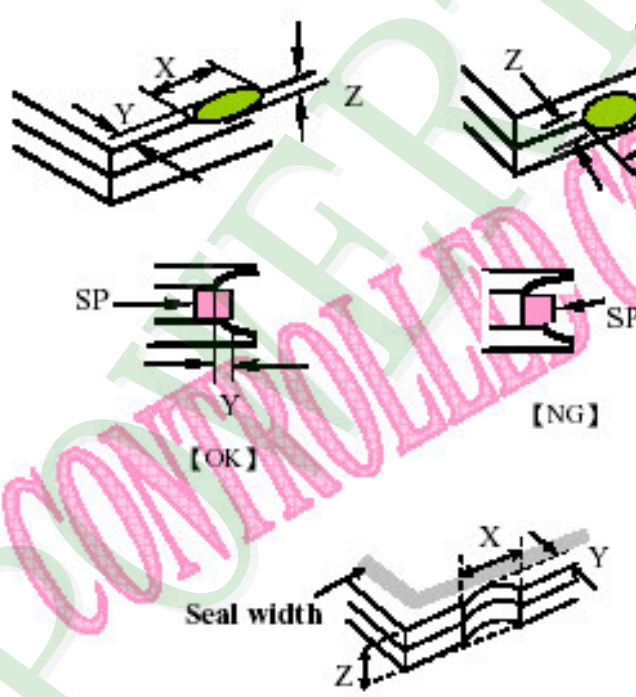
(070328-01)


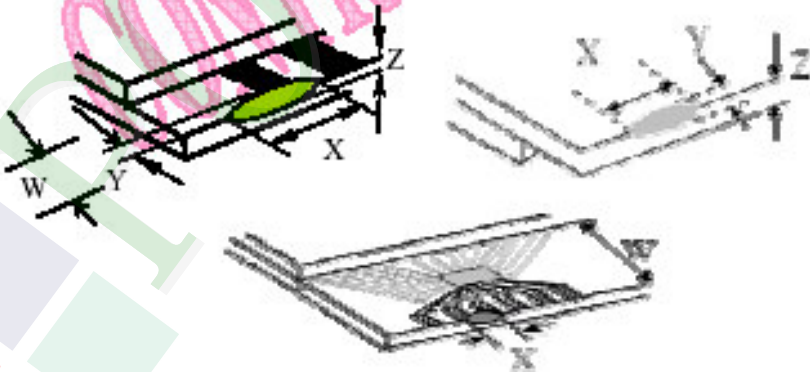
NO	Item	Criterion	level																																		
05	<p>Black or white dot 、 scratch 、 contamination</p> <p>Round type</p>  <p>$\Phi = (x+y)/2$</p> <p>Line type</p> 	<p>5. 1 Round type:</p> <p>5. 1. 1 display only :</p> <ul style="list-style-type: none"> • White and black spots on display ≤ 0.20 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>Dimension (diameter : Φ)</th> <th>Acceptance (Q'ty)</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.10$</td> <td>Accept no dense</td> </tr> <tr> <td>$0.10 < \Phi \leq 0.15$</td> <td>2</td> </tr> <tr> <td>$0.15 < \Phi \leq 0.20$</td> <td>2</td> </tr> <tr> <td>Total quantity</td> <td>4</td> </tr> </tbody> </table> <p>※Dot and Dot distance over 5mm</p> <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>$W \leq 0.01$</td> <td>Accept no dense</td> <td>Don't count</td> </tr> <tr> <td>$L \leq 2.0$</td> <td>$0.02 < W \leq 0.03$</td> <td>1</td> <td>Don't count</td> </tr> <tr> <td>$L \leq 1.0$</td> <td>$0.02 < W \leq 0.03$</td> <td>2</td> <td>Don't count</td> </tr> <tr> <td>--</td> <td>$W > 0.03$</td> <td colspan="2">As round type</td> </tr> </tbody> </table>	Dimension (diameter : Φ)	Acceptance (Q'ty)	$\Phi \leq 0.10$	Accept no dense	$0.10 < \Phi \leq 0.15$	2	$0.15 < \Phi \leq 0.20$	2	Total quantity	4	Dimension		Acceptance (Q'ty)		Length (L)	Width (W)	A area	B area	--	$W \leq 0.01$	Accept no dense	Don't count	$L \leq 2.0$	$0.02 < W \leq 0.03$	1	Don't count	$L \leq 1.0$	$0.02 < W \leq 0.03$	2	Don't count	--	$W > 0.03$	As round type		Minor
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--	$W > 0.03$	As round type																																			
06	<p>Polarizer Bubble</p>	<table border="1"> <thead> <tr> <th rowspan="2">Dimension (diameter : Φ)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td>$\Phi \leq 0.20$</td> <td>Accept no dense</td> <td>Don't count</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.50$</td> <td>3</td> <td>Don't count</td> </tr> <tr> <td>$0.50 < \Phi \leq 1.00$</td> <td>2</td> <td>Don't count</td> </tr> <tr> <td>$\Phi > 1.00$</td> <td>0</td> <td>Don't count</td> </tr> <tr> <td>Total quantity</td> <td>4</td> <td>Don't count</td> </tr> </tbody> </table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.20$	Accept no dense	Don't count	$0.20 < \Phi \leq 0.50$	3	Don't count	$0.50 < \Phi \leq 1.00$	2	Don't count	$\Phi > 1.00$	0	Don't count	Total quantity	4	Don't count	Minor														
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$0.50 < \Phi \leq 1.00$	2	Don't count																																			
$\Phi > 1.00$	0	Don't count																																			
Total quantity	4	Don't count																																			



◆ Specification For Monotype and Color STN :

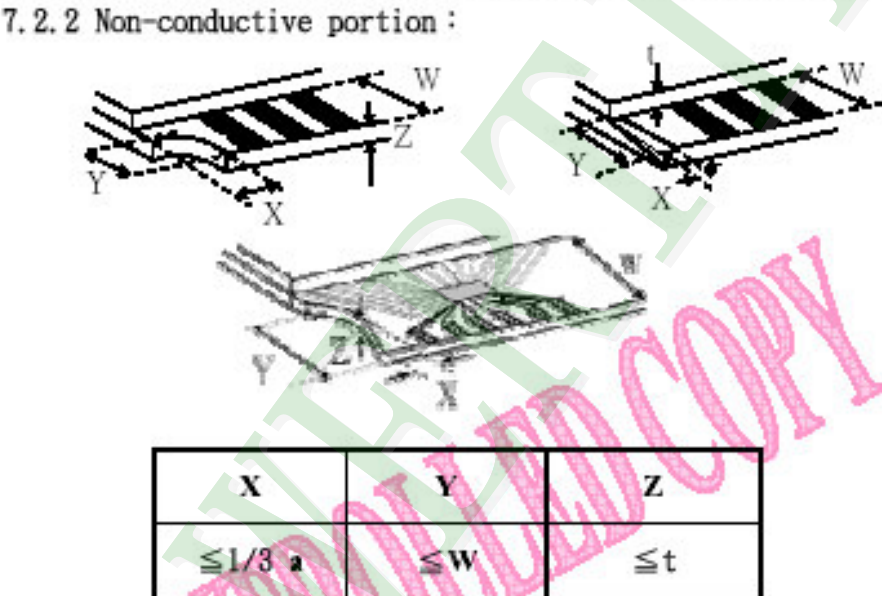
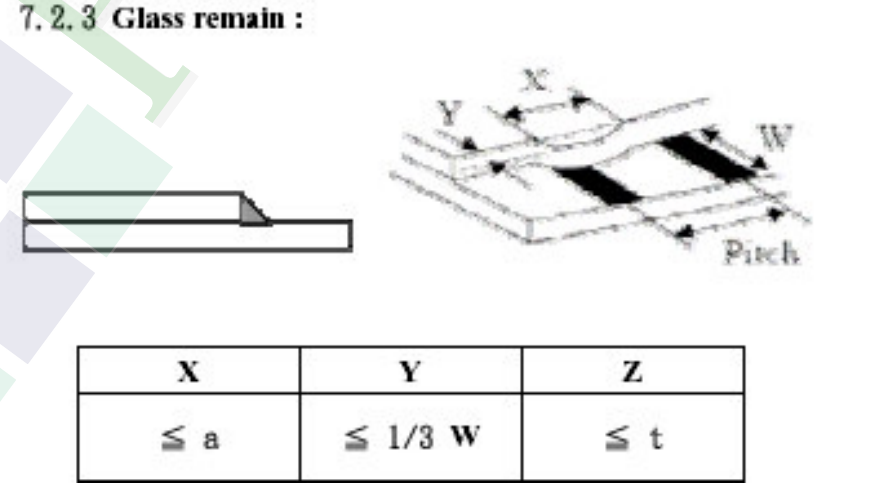
(070328-01)

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> <hr/> <p>7.1 General glass chip : 7.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="494 1568 1276 1859"> <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	$\leq 1/2 t$	$\leq a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$	Minor
		X	Y	Z								
$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$										
$\leq a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$										

NO	Item	Criterion	Level										
07	The crack of glass	<p>Symbols :</p> <p>X : The length of crack Z : The thickness of crack t : The thickness of glass</p> <p>Y : The width of crack. W : terminal length a : LCD side length</p> <hr/> <p>7.1.2 Corner crack :</p>  <table border="1" data-bbox="496 842 1286 1126"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq 1/5 a$</td> <td>Crack can't enter viewing area</td> <td>$Z \leq 1/2 t$</td> </tr> <tr> <td>$\leq 1/5 a$</td> <td>Crack can't exceed the half of SP width.</td> <td>$1/2 t < Z \leq 2 t$</td> </tr> </tbody> </table>	X	Y	Z	$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$	$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$	Minor	
		X	Y	Z									
$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$											
$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$											
<p>7.2 Protrusion over terminal :</p> <p>7.2.1 Chip on electrode pad :</p>  <table border="1" data-bbox="464 1688 1225 1861"> <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 :

(070328-01)

NO	Item	Criterion	Level
07	The crack of glass	<p>Symbols :</p> <p>X : The length of crack Z : The thickness of crack t : The thickness of glass</p> <p>Y : The width of crack. W : terminal length a : LCD side length</p>	Minor
		<p>7.2.2 Non-conductive portion :</p>  <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> 	

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

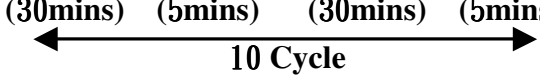
(070328-01)

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

Ver.02

4.1 Reliability Test Condition

NO.	TEST ITEM	TEST CONDITION										
1	High Temperature Storage Test	Keep in +80 ±2°C 96 hrs Surrounding temperature, then storage at normal condition 4hrs.										
2	Low Temperature Storage Test	Keep in -30 ±2°C 96 hrs Surrounding temperature, then storage at normal condition 4hrs.										
3	High Temperature / High Humidity Storage Test	Keep in +60°C / 90% R.H duration for 96 hrs Surrounding temperature, then storage at normal condition 4hrs. (Excluding the polarizer)										
4	ESD Test	Air Discharge: Apply 2 KV with 5 times Discharge for each polarity +/-	Contact Discharge: Apply 250 V with 5 times discharge for each polarity +/-									
		1. Temperature ambience : 15°C ~ 35°C 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%)										
5	Temperature Cycling Storage Test	-20°C → +25°C → +70°C → +25°C (30mins) (5mins) (30mins) (5mins)  Surrounding temperature, then storage at normal condition 4hrs.										
6	Vibration Test (Packaged)	1. Sine wave 10~55 Hz frequency (1 min) 2. The amplitude of vibration : 1.5 mm 3. Each direction (X、Y、Z) duration for 2 Hrs										
7	Drop Test (Packaged)	<table border="1"> <thead> <tr> <th>Packing Weight (Kg)</th> <th>Drop Height (cm)</th> </tr> </thead> <tbody> <tr> <td>0 ~ 45.4</td> <td>122</td> </tr> <tr> <td>45.4 ~ 90.8</td> <td>76</td> </tr> <tr> <td>90.8 ~ 454</td> <td>61</td> </tr> <tr> <td>Over 454</td> <td>46</td> </tr> </tbody> </table> Drop direction : ※1 corner / 3 edges / 6 sides each 1times	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											

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 .

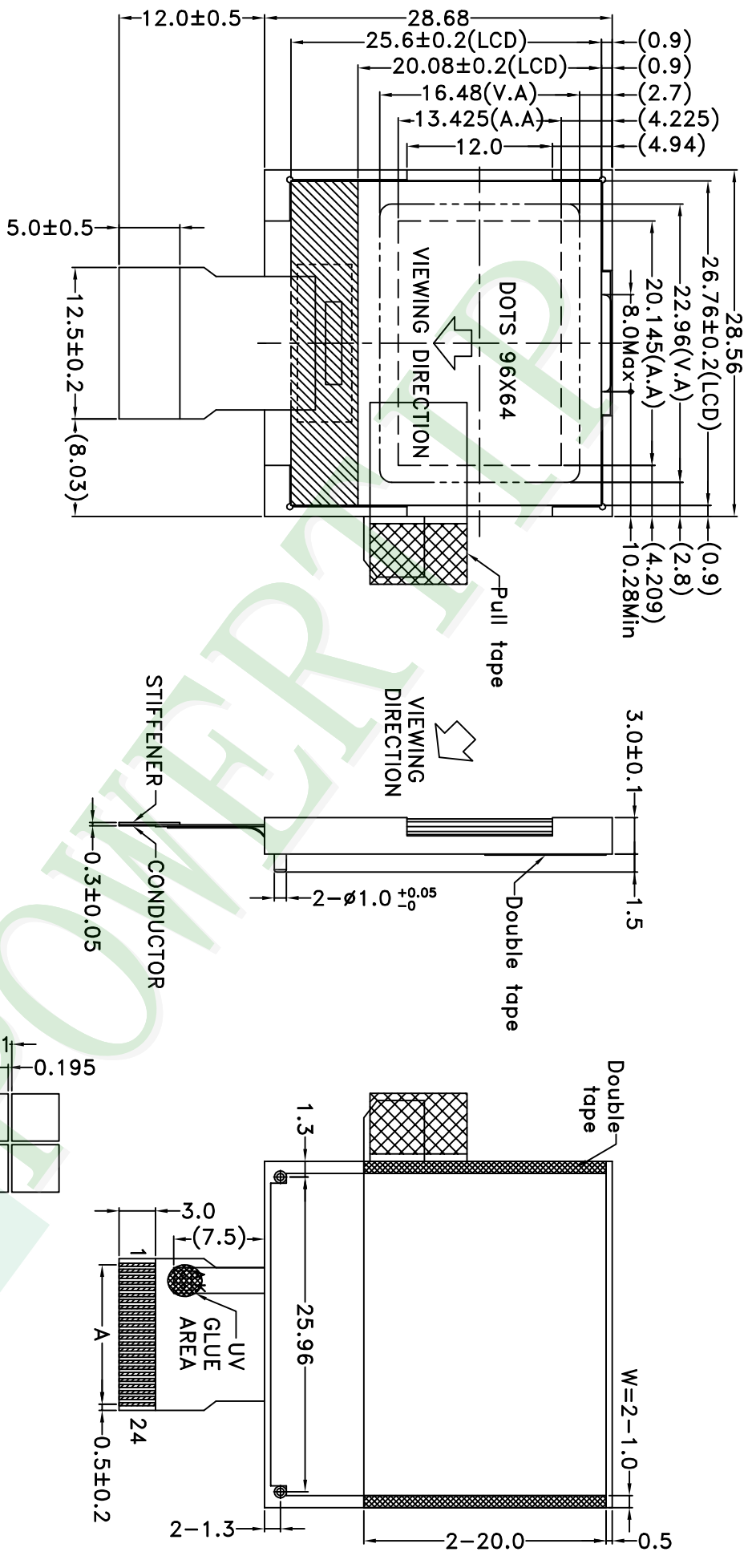
5.3 STORAGE

- 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

A B C D E F G H



NOTES:
 1.LCD TYPE:FSTN
 2.LCD DISPLAY:POSITIVE/TRANSMISSIVE
 3.VIEW DIRECTION: 12 O'CLOCK
 4.Top: -20~70°C Tst:-30~80°C
 5.The tolerance unless classified ±0.3mm
 6.A:P.O.5X23=11.5±0.1,W=0.25±0.05

003											
002	Modify LCD VDD	Mag	2008/07/01	PART NO.:	PE9664WRF-003-L-Q	Design	Mag	 久正光電股份有限公司 POWER TIP TECHNOLOGY CORPORATION	 (3) Surface Material Thickness Quantity	公差等級 最大長度 (mm) 1 ~ 4 4 ~ 16 16 ~ 63 63 ~ 250 250 ~ 1000	
001	Modify Optical Characteristics	Mag	2007/05/21	DRAWING NAME:	LMD-PE9664WRF-003-L-Q	Check	Stone				
B	Modify B/L & Vop & Inspection Specification	Mag	2007/04/02	TITLE:	LCD MODULE DRAWING	Approve	Oliver				
A	Modify B/L FPC length & Add UV glue area	Mag	2006/12/12								
0	NEW DRAWING	Mag	2006/11/15								
REV	REV BY	REVISER	DATE								

LCM包裝規格書

LCM Packaging Specifications

(For Tray)

Approve	Check	Contact
Oliver	Stone	Mag

Documents NO. PKG-PE9664WRF-003-L-Q

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)	PE9664WRF-003-L-Q	28.56 X 28.68	0.012	1764	21.168
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	—	6	—
3	TRAY 盤 (2)Tray	TYPE09606403BA	352 X 260 X 10.8	0.1	48	4.8
4	內盒(3)Product Box	BX36627063ABBA	393 X 274 X 68	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						

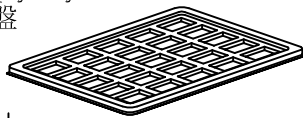
2. 一整箱總重量 (Total LCD Weight in carton) : 29.06 Kg±10%

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

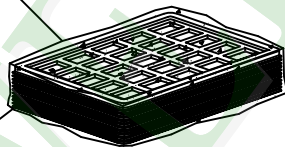
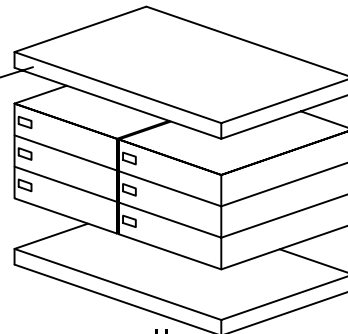
(1) LCM quantity per box : no per tray	42	x no of tray	7	=	294
(2) Total LCM quantity in carton : quantity per box	294	x no of boxes	6	=	1764

Use empty tray

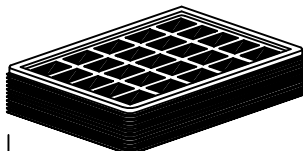
空盤



+

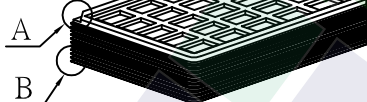
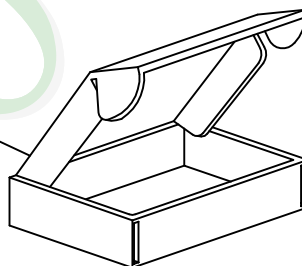
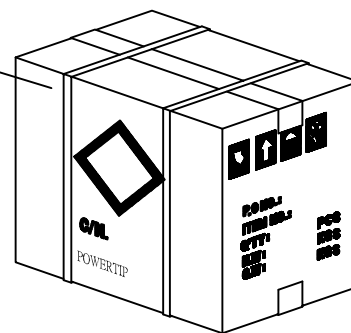
(1) 多層薄膜
POF(4) 保利龍板
Polylon board

Put products into the tray

(2) TRAY 盤
Tray

↓

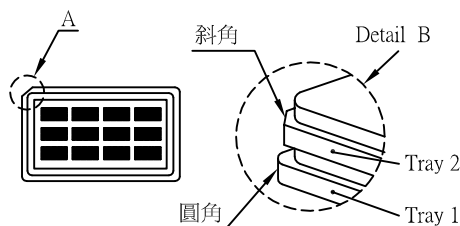
Tray stacking

(3) 內盒
Product Box(5) 外紙箱
Carton

特 記 事 項 (REMARK)

1. Label Specifications :

MODEL:
LOT NO:
QUANTITY:
CHECK:



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. 可適用於單品包裝
It's also suitable to Panel

4. Tray料號:
Tray Number:PT-PE9664-003