

SPECIFICATIONS

CUSTOMER : FindLCD

SAMPLE CODE : SGE12864FRW-55HQ

MASS PRODUCTION CODE : GE12864FRW-55HQ

SAMPLE VERSION : 03

SPECIFICATIONS EDITION : 005

DRAWING NO. (Ver.) : LMD-GE12864FRW-55HQ_001

PACKAGING NO. (Ver.) : JPKG-GE12864FRW-55HQ_002

Customer Approved

Date:

Approved	Checked	Designer
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- ☐ Preliminary specification for design input
- ☒ Specification for sample approval

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History of Version

Date	Ver.	Edi.	Description	Page	Design by
03/15/2010	01	001	New Drawing.	-	Louis
04/23/2010	01	002	New Sample. Modify 1.5 Optical Characteristics.	- 6	Louis
09/09/2010	02	003	Modify B/L. Modify 1.1 Features. Modify 1.4 DC Electrical Characteristics. Modify 1.5 Optical Characteristics. Modify 1.6 Backlight Characteristics.	- 4 6 7 12	Louis
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03/27/2012	03	005	Modify Packaging	Appendix	劉進

Total : 32 Page

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Note : For detailed information please refer to IC data sheet : Sitronix ST7567-G4

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	128 * 64 Dots
LCD Type	FSTN, Positive, Transflective
Driver Condition	LCD Module : 1/65 Duty, 1/9 Bias
Viewing Direction	6 O'clock
Backlight Type	LED (White)
Weight	11 g
Interface	Support 8 bits Parallel interface for 8080 or 6800 series MPU & Serial (4-Line SPI) interface
Controller / Driver IC	Sitronix ST7567-G4
ROHS	THIS PRODUCT CONFORMS THE ROHS

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	55.2 (W) * 39.8 (L) * 5.0 (H)	mm
Viewing Area	45.2 (W) * 27.0 (L)	mm
Active Area	40.95 (W) * 24.31 (L)	mm
Dot Size	0.31 (W) * 0.37 (H)	mm
Dot Pitch	0.32 (W) * 0.38 (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	VDD	-	-0.3	+3.6	V
LCD Power Supply Voltage	VLCD	V0-XV0	-0.3	+16	V
LCD Power Driving Voltage	VG, VM	-	-0.3	VDD	V
Operating Temperature	T _{OP}	-	-20	+70	°C
Storage Temperature	T _{ST}	-	-30	+80	°C
Storage Humidity	H _D	Ta < 40 °C	20	90	%RH

1.4 DC Electrical Characteristics

VDD = 3.0V, VSS = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	VDD	-	2.7	3.0	3.3	V
“H” Input Voltage	V _{IH}	-	0.7*VDD	-	VDD	V
“L” Input Voltage	V _{IL}	-	VSS	-	0.3*VDD	V
“H” Output Voltage	V _{OH}	IOUT=1mA, VDD=3.0V	0.8*VDD	-	VDD	V
“L” Output Voltage	V _{OL}	IOUT=-1mA, VDD=3.0V	VSS	-	0.2*VDD	V
Supply Current	IDD	VDD= 3.0V; V _{OP} = 9.8V; Pattern= Full display	-	0.3	-	mA
		VDD= 3.0V; V _{OP} = 9.8V; Pattern= Horizontal line *1	-	0.4	0.6	
LCM Driver Voltage	V _{op} *2	-20°C	9.7	10.0	10.3	V
		+25°C	9.5	9.8	10.1	
		+70°C	8.6	8.9	9.2	

Note : *1. The Maximum current display.

*2. The V_{OP} test point is V0 – XV0.

*3. Initial code

```

MOV    A,#10101110B    ;Display OFF
CALL   WIR
MOV    A,#10100010B    ;Set 1/9 Bias
CALL   WIR
MOV    A,#10100000B    ;SEG DIRECTION
CALL   WIR
MOV    A,#11001000B    ;COM DIRECTION
CALL   WIR
MOV    A,#10100110B    ;INVERSE DISPLAY(NORMAL DISPLAY)
CALL   WIR
MOV    A,#10100100B    ;ALL PIXEL ON(NORMAL DISPLAY)
CALL   WIR
MOV    A,#01000000B    ;SET START LINE (SEG 0)
CALL   WIR
MOV    A,#00100101B    ;Regulation Ratio(RR=5.5)
CALL   WIR
MOV    A,#10000001B    ;Set EV ( $V_0 = RR \times [(99 + EV) / 162] \times 2.1$ )
CALL   WIR
MOV    A,#00101000B    ;40
CALL   WIR
MOV    A,#00101100B    ;Set Power Control
CALL   WIR
NOP
MOV    A,#00101110B    ;Set Power Control
CALL   WIR
NOP
MOV    A,#00101111B    ;Set Power Control
CALL   WIR
NOP
MOV    A,#11111000B    ;SET Booster
CALL   WIR
MOV    A,#00000000B    ;Booster 4X
CALL   WIR
MOV    A,#10101111B    ;Display ON
CALL   WIR

```

1.5 Optical Characteristics

LCD Panel: 1/65 Duty, 1/9 Bias, VLCD = 9.8V, Ta = 25°C

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Reference
Response Time	Rise	tr	CR $\geq$ 2.0, $\varnothing = 270^\circ$	-	85	128	ms	Note 2
	Fall	tf		-	215	323		
Viewing angle range	Top	$\theta Y+$		-	40	-	-	Notes 1
	Bottom	$\theta Y-$		-	40	-		
	Left	$\theta X-$		-	40	-		
	Right	$\theta X+$		-	40	-		
Contrast Ratio		CR	$\theta = 0^\circ$, $\varnothing = 270^\circ$	-	5	-	-	Note 3
Average Brightness (With B/L)		IV	IF=80mA	35	50	-	cd/m ²	-
CIE Color Coordinate (With B/L)	X			0.23	0.28	0.33	-	Note 4
	Y			0.25	0.30	0.35	-	
Uniformity		ΔB	-	70	-	-	%	

Note 4:

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

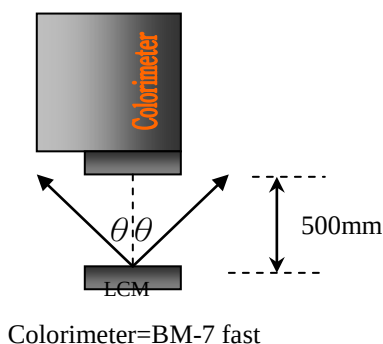
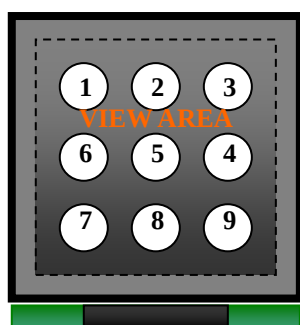
2 : Measurement Condition for Optical Characteristics:

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

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

c : Equipment: TOPCON BM-7 fast , (field 0.2°) , after 10 minutes operation.

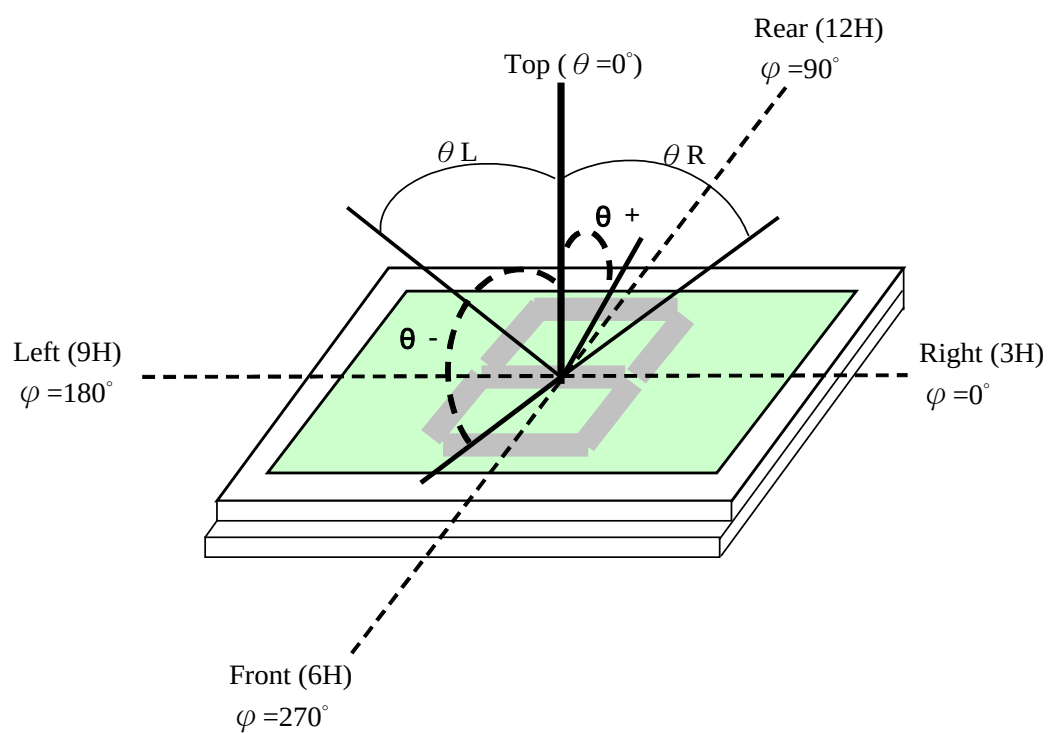
d : The uncertainty of the C.I.E coordinate measurement ± 0.01 , Average Brightness $\pm 4\%$



Note 1.

Optical characteristics-2

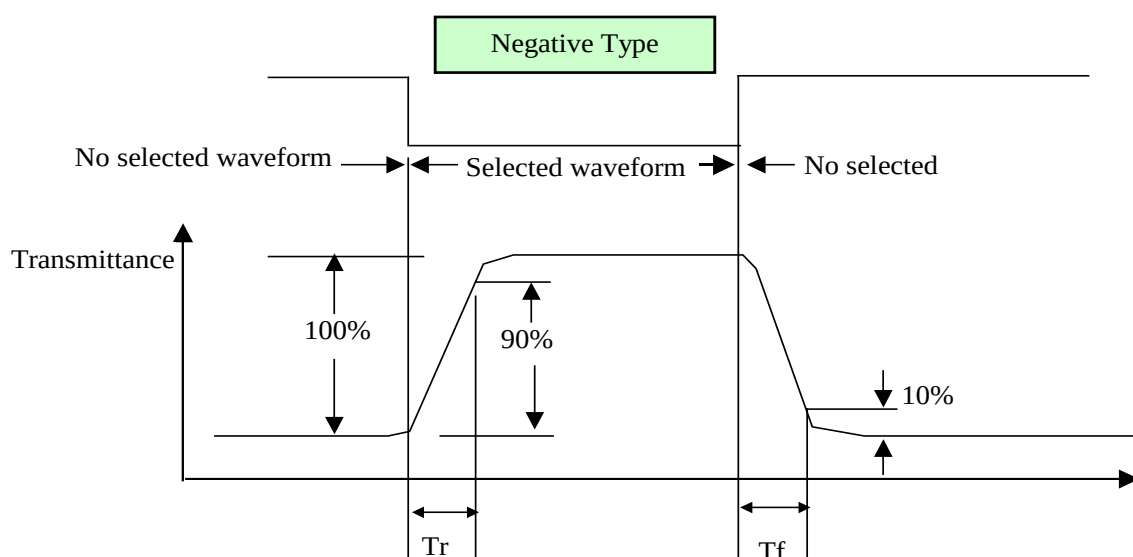
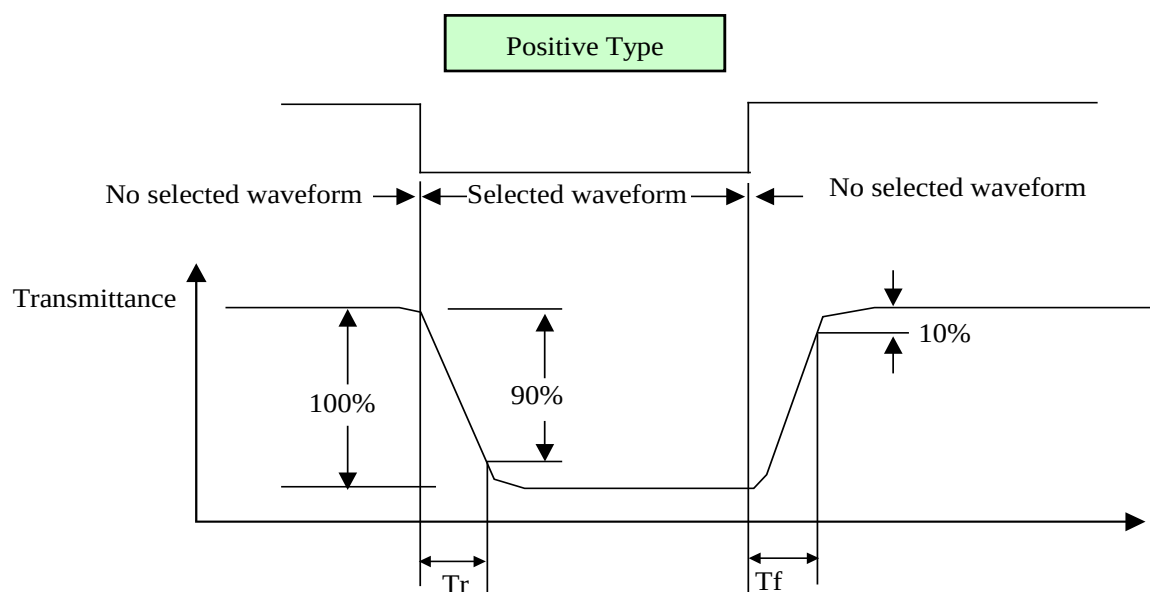
Viewing angle



Note 2.

Optical characteristics-3

Fig.2 Definition of response time



Electrical characteristics-2

※2 Drive waveform

V_{op} : Drive voltage

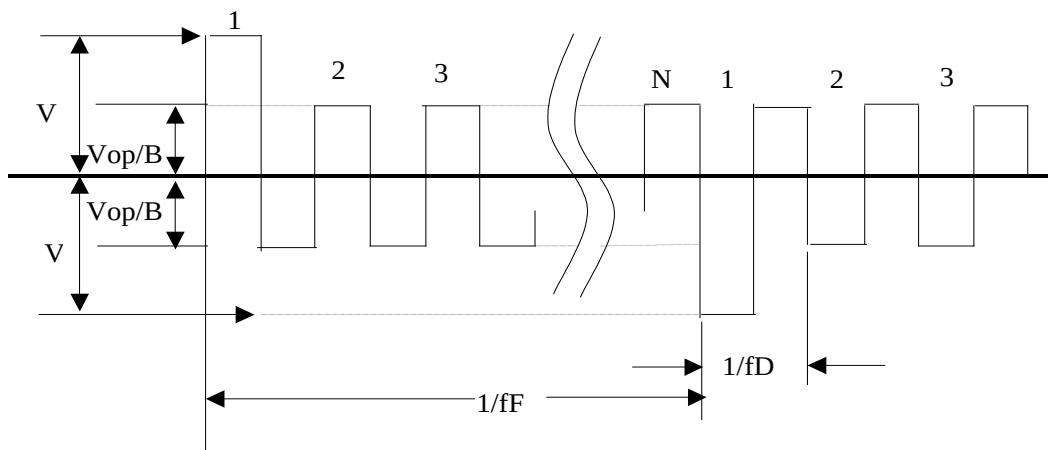
f_F : Frame frequency

$1/B$: Bias

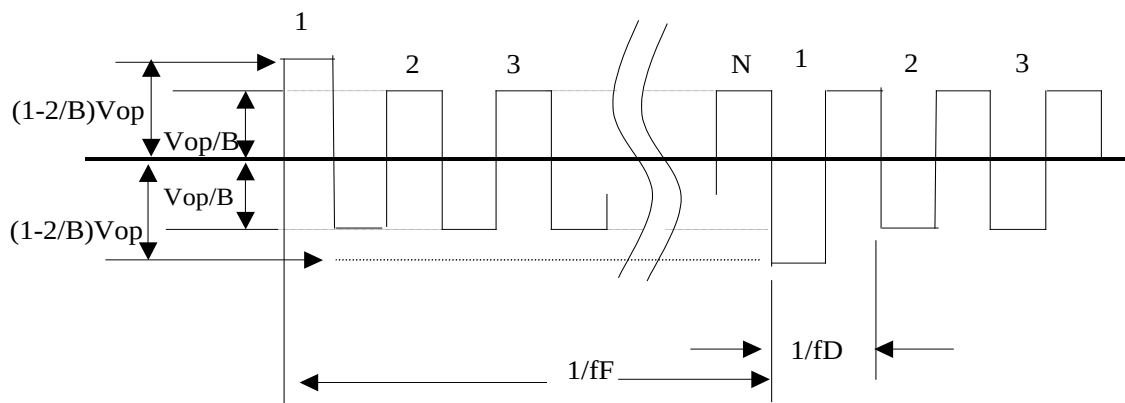
f_D : Drive frequency

N : Duty

(1) Selected waveform



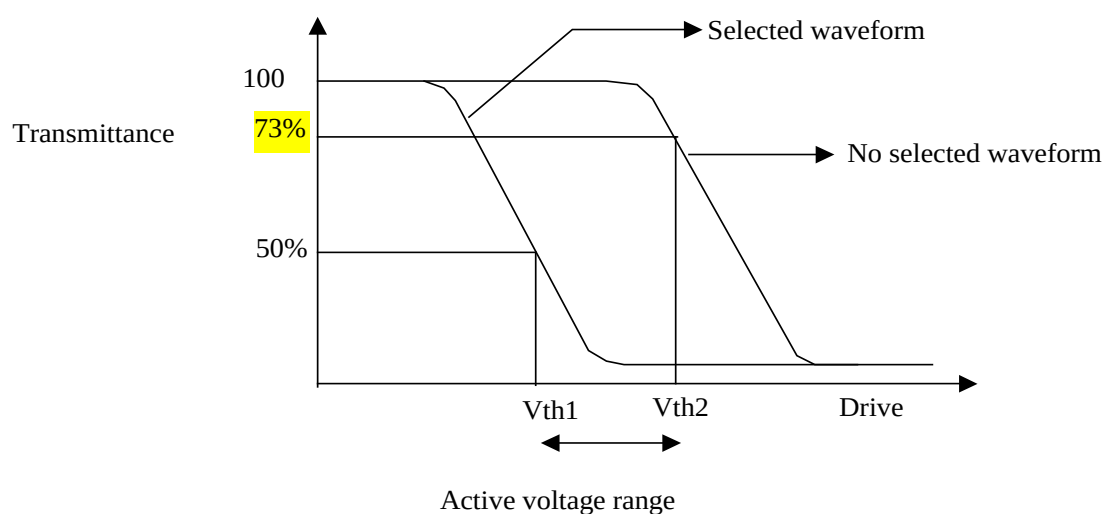
(2) Non- Selected wave form



Note:

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

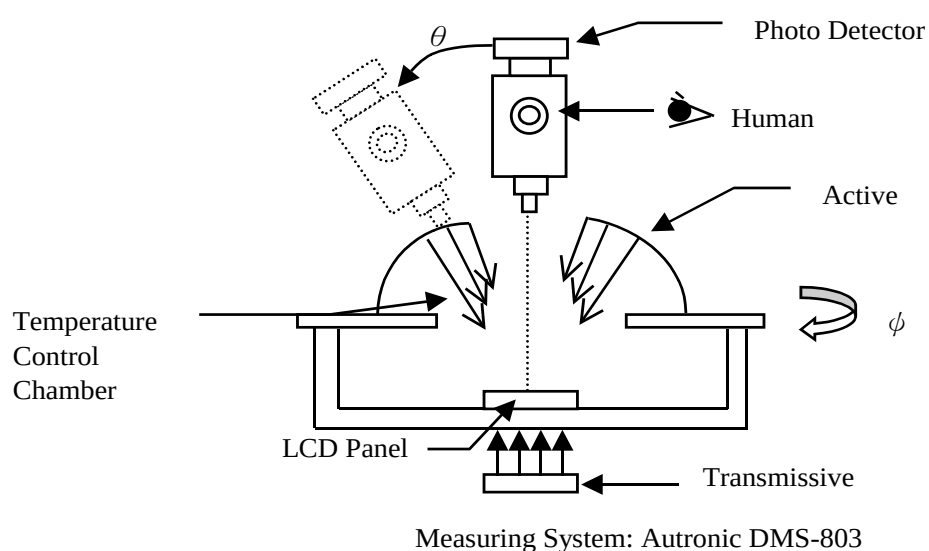
Note 3. : Definition of Vth



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

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

Outline of Electro-Optical Characteristics Measuring System



1.6 Backlight Characteristics

Maximum Ratings

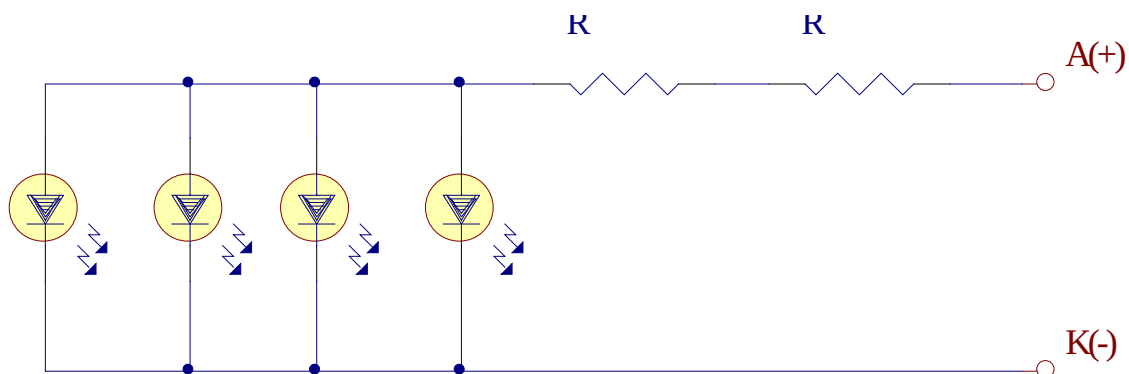
Item	Symbol	Conditions	Min.	Max.	Unit
Peak Forward current	IF	Ta=25°C	-	100	mA
Power dissipation	Pd		-	0.24	W
Reverse Voltage	VR		-	5	V

Electrical / Optical Characteristics

Ta =25°C

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF=80mA	3.9	4.2	4.5	V
Reverse Current (Per LED)	IR	VR= 3V	-	-	10	uA
Average Brightness (Without LCD)	IV	IF=80mA	200	300	-	cd/m ²
CIE Color Coordinate (Without LCD)	X		0.24	0.27	0.30	-
	Y		0.24	0.27	0.31	-
Uniformity	△B		70	-	-	%
Color	White					

Internal Circuit Diagram:



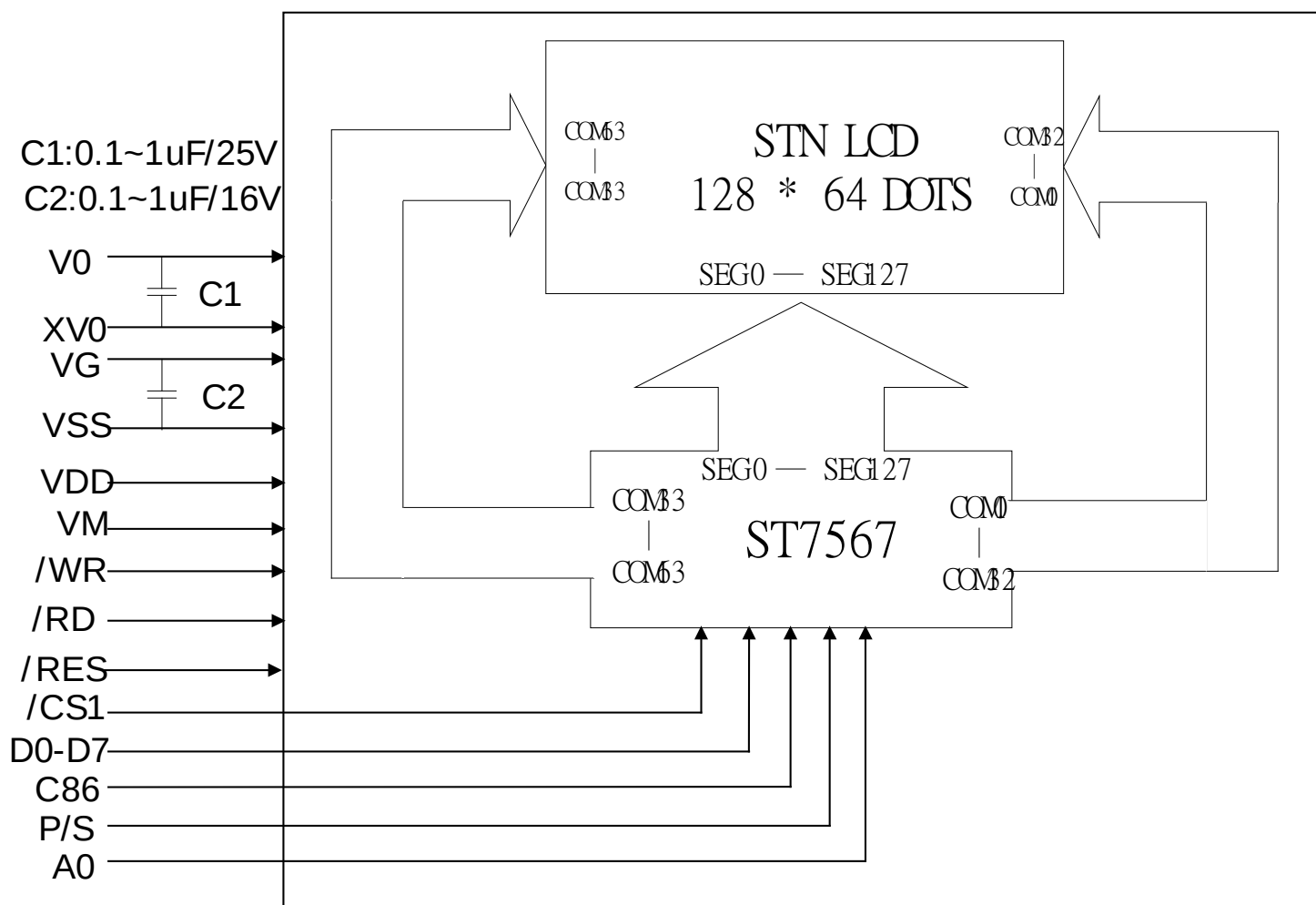
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



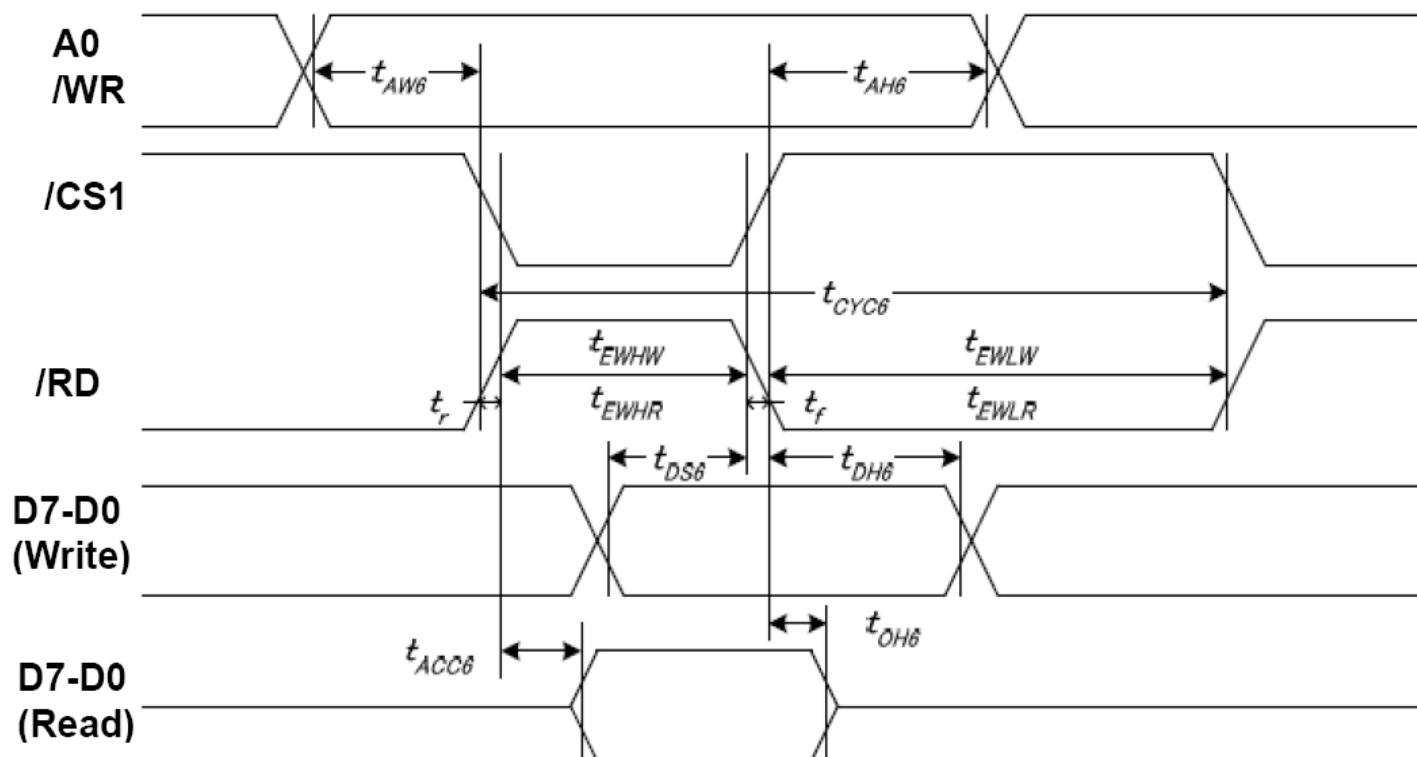
2.2 Interface Pin Description

Pin No.	Symbol	Function
1	/CS1	Chip select signal, Active "L".
2	/RES	Reset input pin. When /RES is "L", initialization is executed.
3	A0	It determines whether the access is related to data or command. A0= "H" : display data. A0=" L" : control data.
4	/WR	Write signal input, Active "L".
5	/RD	Read signal input, Active "L".
6	D0	8-bit bi-directional data bus.
7	D1	8-bit bi-directional data bus.
8	D2	8-bit bi-directional data bus.
9	D3	8-bit bi-directional data bus.
10	D4	8-bit bi-directional data bus.
11	D5	8-bit bi-directional data bus.
12	D6	8-bit bi-directional data bus.
13	D7	8-bit bi-directional data bus.
14	VDD	Power supply. (+3.0V)
15	VSS	System ground. (0V)
16	NC	Not connection. (Must be open)
17	NC	Not connection. (Must be open)
18	NC	Not connection. (Must be open)
19	V0	LCD driving voltage for commons at negative frame.
20	XV0	LCD driving voltage for commons at positive frame.
21	NC	Not connection. (Must be open)
22	NC	Not connection. (Must be open)
23	NC	Not connection. (Must be open)
24	NC	Not connection. (Must be open)
25	VM	LCD driving voltage for commons.

Pin No.	Symbol	Function												
26	NC	Not connection. (Must be open)												
27	NC	Not connection. (Must be open)												
28	NC	Not connection. (Must be open)												
29	VG	LCD driving voltage for segments.												
30	NC	Not connection. (Must be open)												
31	C86	Select the MPU system interface mode. <table><tr><th>P/S</th><th>C86</th><th>Interface</th></tr><tr><td>1</td><td>1</td><td>Parallel 68000 Series MPU Interface</td></tr><tr><td>1</td><td>0</td><td>Parallel 8080 Series MPU Interface</td></tr><tr><td>0</td><td>X</td><td>Serial 4-Line SPI Interface</td></tr></table>	P/S	C86	Interface	1	1	Parallel 68000 Series MPU Interface	1	0	Parallel 8080 Series MPU Interface	0	X	Serial 4-Line SPI Interface
P/S	C86	Interface												
1	1	Parallel 68000 Series MPU Interface												
1	0	Parallel 8080 Series MPU Interface												
0	X	Serial 4-Line SPI Interface												
32	P/S													
33	NC	Not connection. (Must be open)												
34	NC	Not connection. (Must be open)												

2.3 Timing Characteristic

System Bus Timing For 6800 Series MPU



VDD = 3.3V, Ta = 25 °C

Item	Signal	Symbol	Condition	Min.	Max.	Unit
Address setup time	A0	tAW6		0	—	ns
Address hold time		tAH6		10	—	
System cycle time	/RD	tCYC6		240	—	
Enable L pulse width (WRITE)		tEHLW		80	—	
Enable H pulse width (WRITE)		tEHLW		80	—	
Enable L pulse width (READ)		tEHLR		80	—	
Enable H pulse width (READ)		tEHLR		140	—	
Write data setup time	D7-D0	tDS6		40	—	
Write data hold time		tDH6		10	—	
Read data access time		tACC6	CL = 16 pF	—	70	
Read data output disable time		tOH6	CL = 16 pF	5	50	

VDD = 2.8V, Ta = 25 °C

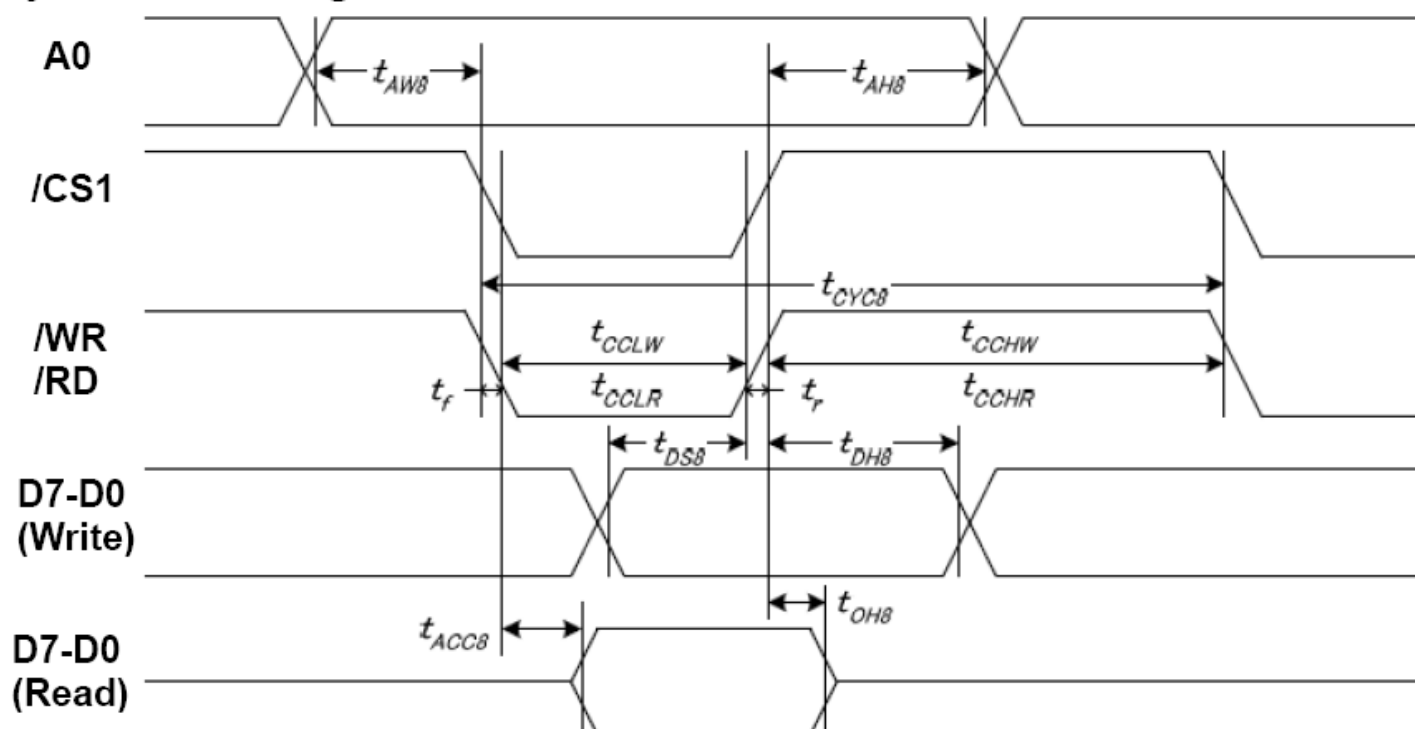
Item	Signal	Symbol	Condition	Min.	Max.	Unit
Address setup time	A0	tAW6		0	—	ns
Address hold time		tAH6		0	—	
System cycle time	/RD	tCYC6		400	—	
Enable L pulse width (WRITE)		tEWLW		220	—	
Enable H pulse width (WRITE)		tEWHW		180	—	
Enable L pulse width (READ)		tEWLR		220	—	
Enable H pulse width (READ)		tEWHR		180	—	
Write data setup time	D7-D0	tDS6		40	—	
Write data hold time		tDH6		20	—	
Read data access time		tACC6	CL = 16 pF	—	140	
Read data output disable time		tOH6	CL = 16 pF	10	100	

Note 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, $(t_r + t_f) \leq (t_{CYC6} - t_{EWLW} - t_{EWHW})$ for $(t_r + t_f) \leq (t_{CYC6} - t_{EWLR} - t_{EWHR})$ are specified.

Note 2. All timing is specified using 20% and 80% of VDD1 as the reference.

Note 3. tEWLW and tEWLR are specified as the overlap between CSB being “L” and E.

System Bus Timing For 8080 Series MPU



VDD = 3.3V, Ta = 25 °C

Item	Signal	Symbol	Condition	Min.	Max.	Unit
Address setup time	A0	tAW8		0	—	ns
Address hold time		tAH8		10	—	
System cycle time	/WR	tCYC8		240	—	
Enable L pulse width (WRITE)		tCCLW		80	—	
Enable H pulse width (WRITE)		tCCHW		80	—	
Enable L pulse width (READ)	/RD	tCCLR		140	—	
Enable H pulse width (READ)		tCCHR		80	—	
WRITE Data setup time	D7-D0	tDS8		40	—	
WRITE Data hold time		tDH8		20	—	
READ access time		tACC8	CL = 16 pF	—	70	
READ Output disable time		tOH8	CL = 16 pF	5	50	

VDD = 2.8V, Ta = 25 °C

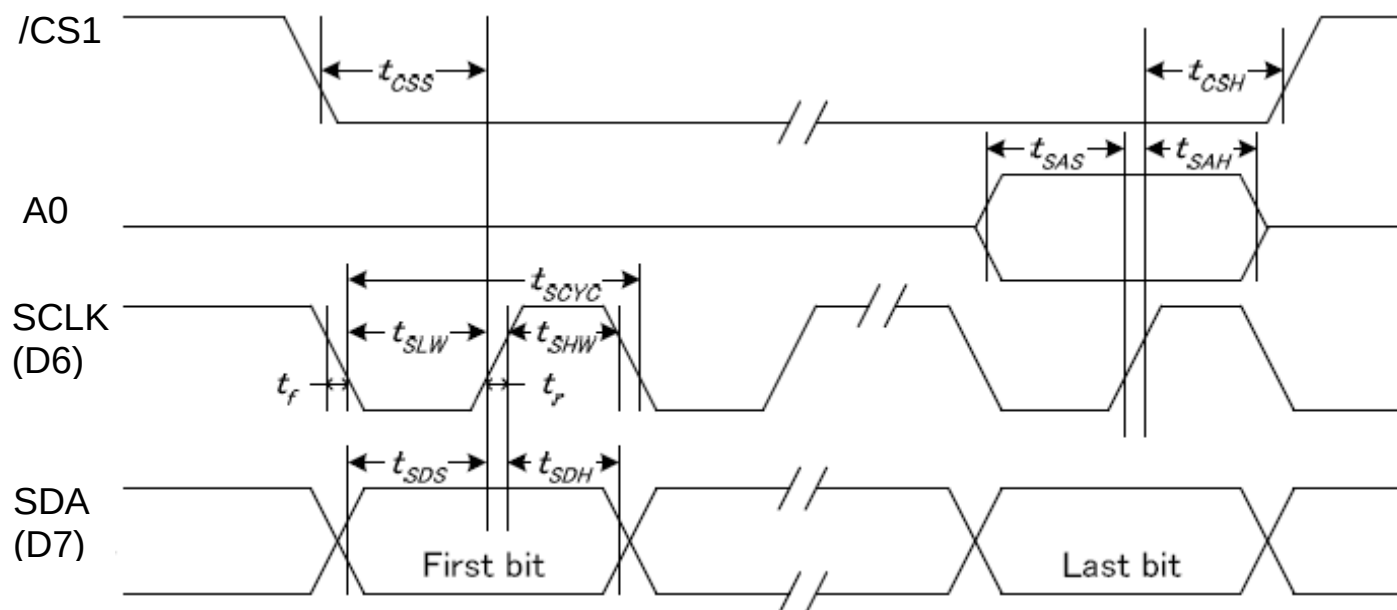
Item	Signal	Symbol	Condition	Min.	Max.	Unit
Address setup time	A0	tAW8		0	—	ns
Address hold time		tAH8		0	—	
System cycle time	/WR	tCYC8		400	—	
/WR L pulse width (WRITE)		tCCLW		220	—	
/WR H pulse width (WRITE)		tCCHW		180	—	
/RD L pulse width (READ)	RD	tCCLR		220	—	
/RD H pulse width (READ)		tCCHR		180	—	
WRITE Data setup time	D[7:0]	tDS8		40	—	
WRITE Data hold time		tDH8		20	—	
READ access time		tACC8	CL = 16 pF	—	140	
READ Output disable time		tOH8	CL = 16 pF	10	100	

Note 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.

Note 2. All timing is specified using 20% and 80% of VDD1 as the reference.

Note 3. tCCLW and tCCLR are specified as the overlap between CSB being “L” and WR and RD being at the “L” level.

System Bus Timing For 4-Line Serial Interface



VDD = 3.3V, Ta = 25 °C

Item	Signal	Symbol	Condition	Min.	Max.	Unit
Serial clock period	SCLK	tSCYC		50	—	ns
SCLK "H" pulse width		tSHW		25	—	
SCLK "L" pulse width		tSLW		25	—	
Address setup time	A0	tSAS		20	—	
Address hold time		tSAH		10	—	
Data setup time	SDA	tSDS		20	—	
Data hold time		tSDH		10	—	
CSB-SCLK time	/CS1	tCSS		20	—	
CSB-SCLK time		tCSH		40	—	

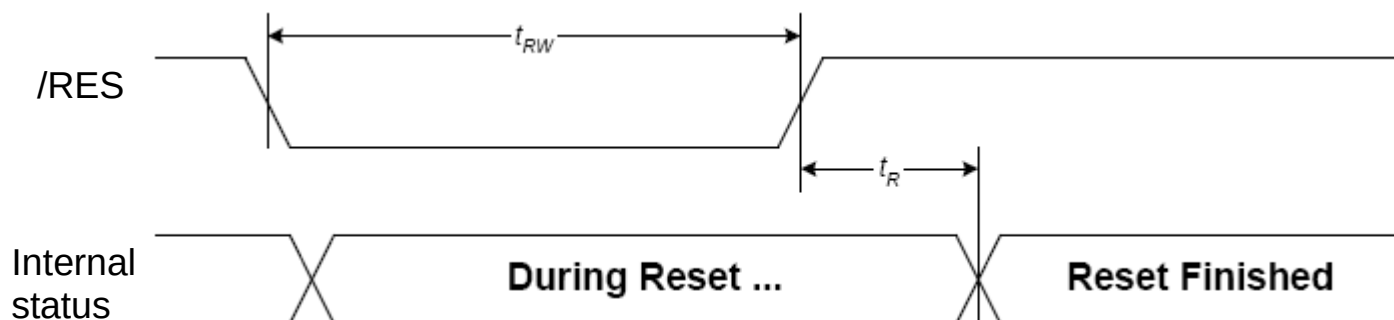
VDD = 2.8V, Ta = 25 °C

Item	Signal	Symbol	Condition	Min.	Max.	Unit
Serial clock period	SCLK	tSCYC		100	—	ns
SCLK "H" pulse width		tSHW		50	—	
SCLK "L" pulse width		tSLW		50	—	
Address setup time	A0	tSAS		30	—	
Address hold time		tSAH		20	—	
Data setup time	SDA	tSDS		30	—	
Data hold time		tSDH		20	—	
CSB-SCLK time	/CS1	tCSS		30	—	
CSB-SCLK time		tCSH		60	—	

Note 1. The input signal rise and fall time (tr, tf) are specified at 15 ns or less.

Note 2. All timing is specified using 20% and 80% of VDD as the standard.

Reset Timing



VDD = 3.3V, Ta = 25 °C

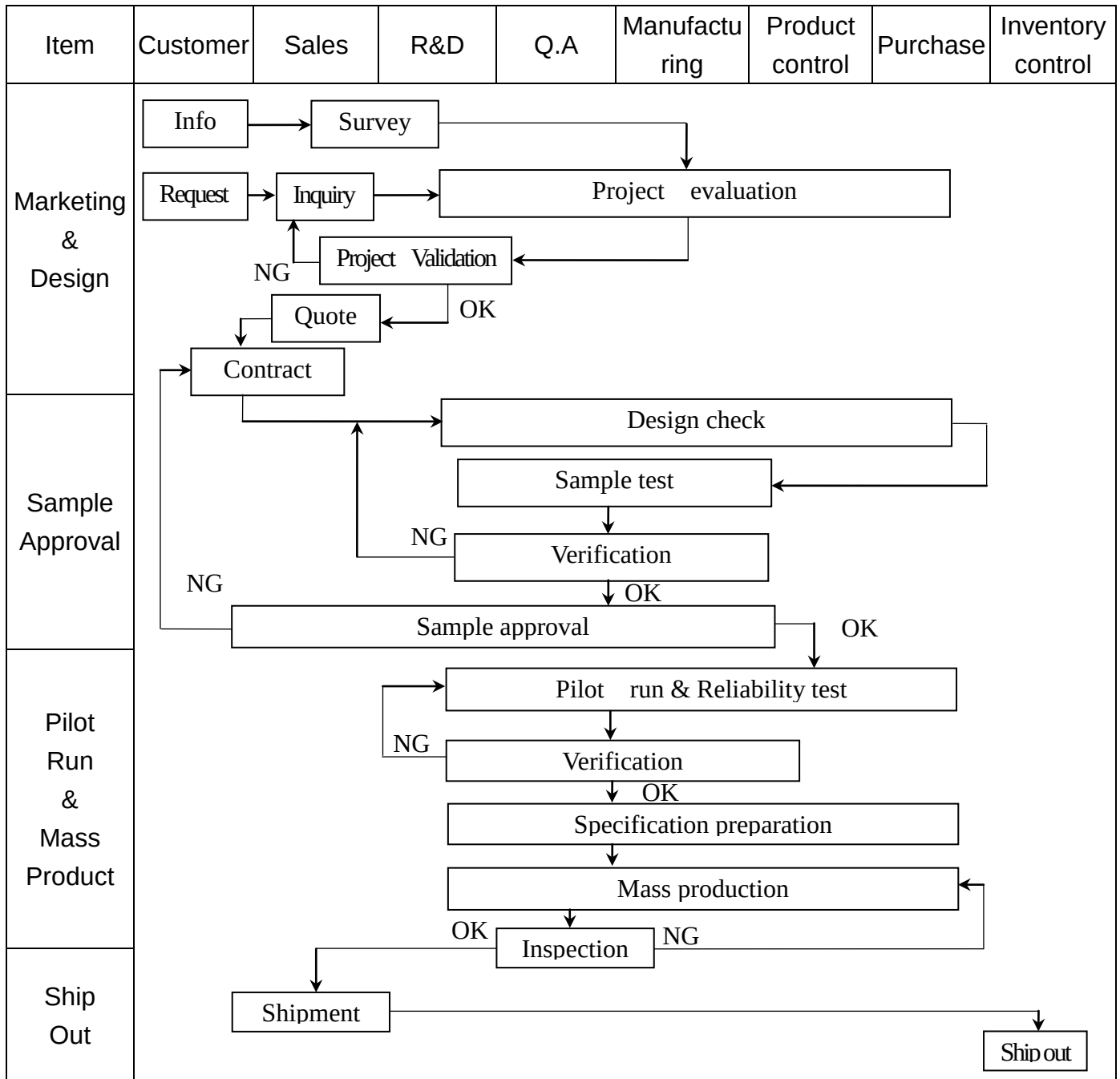
Item	Symbol	Condition	Min.	Max.	Unit
Reset time	tR		—	1.0	us
Reset "L" pulse width	tRW		1.0	—	

VDD = 2.8V, Ta = 25 °C

Item	Symbol	Condition	Min.	Max.	Unit
Reset time	tR		—	2.0	us
Reset "L" pulse width	tRW		2.0	—	

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] Failure --> Analysis[Analysis report] Failure --> Corrective[Corrective action] Corrective --> Tracking[Tracking] </pre>							
Q.A Activity	1. ISO 9001 Maintenance Activities 3. Equipment calibration 5. Standardization Management				2. Process improvement proposal 4. Education And Training Activities			

3.2. Inspection Specification

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

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

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

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

◆OUT Going Defect Level : Sampling .

◆Manner of appearance test :

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

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

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

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

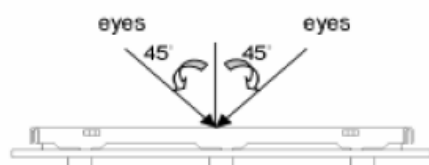


Fig.1

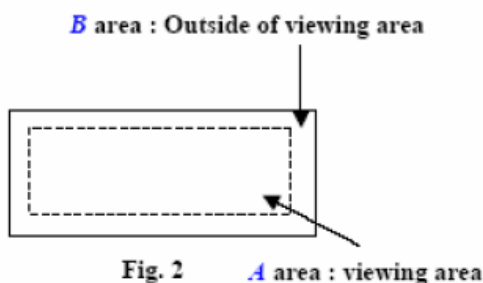


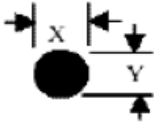
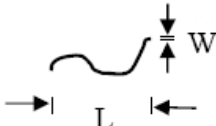
Fig. 2

◆ Specification:

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

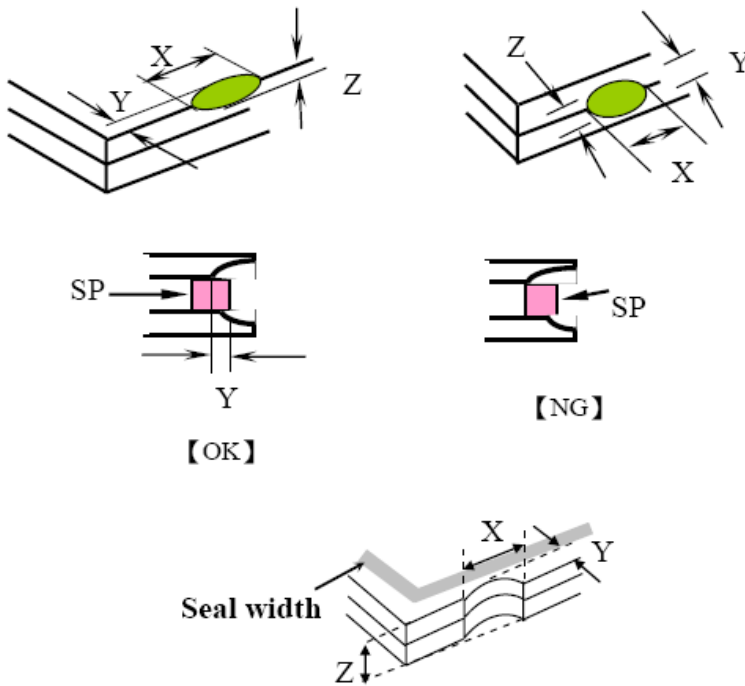
◆Specification For Monotype and Color STN :

(Ver. B01)

NO	Item	Criterion	Level																																			
05	Black or white dot 、 scratch 、 contamination Round type  Φ=(x+y)/2 Line type 	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><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>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></tbody></table> 5. 1. 3 Line type: <table><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 ≤ 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></tbody></table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	Φ ≤ 0.10	Accept no dense	Ignore	0.10 < Φ ≤ 0.20	3	0.20 < Φ ≤ 0.30	2	Total quantity	4	Dimension		Acceptance (Q'ty)		Length (L)	Width (W)	A area	B area	---	W ≤ 0.03	Accept no dense	Ignore	L ≤ 3.0	0.03 < W ≤ 0.05	4	L ≤ 2.5	0.05 < W ≤ 0.075	---	W > 0.075	As round type		Minor
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06	Polarizer Bubble	<table><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>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></tbody></table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	Φ ≤ 0.20	Accept no dense	Ignore	0.20 < Φ ≤ 0.50	3	0.50 < Φ ≤ 1.00	2	Φ > 1.00	0	Total quantity	4	Minor																			
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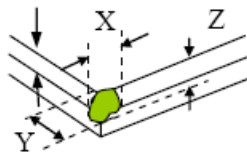
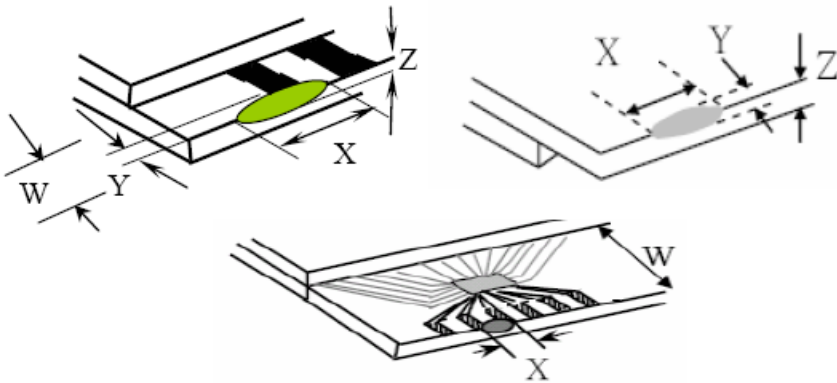
◆ Specification For Monotype and Color STN :

(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						
		7.1 General glass chip : 7.1.1 Chip on panel surface and crack between panels:  <table><tr><th>X</th><th>Y</th><th>Z</th></tr><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></table>		X	Y	Z	$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$
X	Y	Z							
$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$							
$\leq a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$							

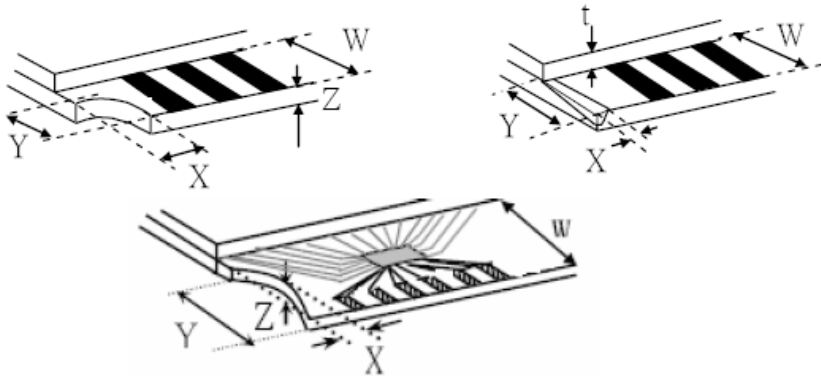
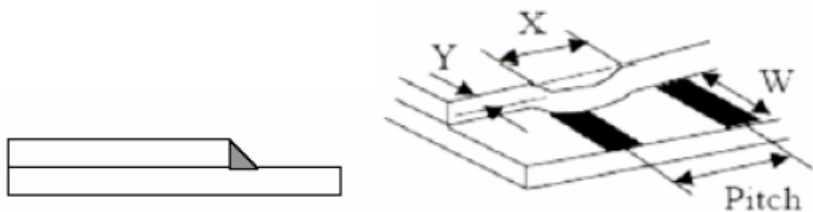
◆Specification For Monotype and Color STN :

(Ver. B01)

NO	Item	Criterion	Level												
07	The crack of glass	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												
		7.1.2 Corner crack :  <table><tr><th>X</th><th>Y</th><th>Z</th></tr><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></table>		X	Y	Z	$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$	$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$			
X	Y	Z													
$\leq 1/5 a$	Crack can't enter viewing area	$Z \leq 1/2 t$													
$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$													
		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>$\leq a$</td><td>$\leq 1/2 W$</td><td>$\leq t$</td></tr><tr><td>Back</td><td colspan="3">Neglect</td></tr></table>		X	Y	Z	Front	$\leq a$	$\leq 1/2 W$	$\leq t$	Back	Neglect			
	X	Y	Z												
Front	$\leq a$	$\leq 1/2 W$	$\leq t$												
Back	Neglect														

◆ Specification For Monotype and Color STN :

(Ver. B01)

NO	Item	Criterion	Level										
07	The crack of glass	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="577 1059 1204 1214"><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>$\leq 1/3 a$</td><td>$\leq W$</td><td>$\leq t$</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 border="1" data-bbox="496 1740 1185 1881"><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>$\leq a$</td><td>$\leq 1/3 W$</td><td>$\leq t$</td></tr></table>		X	Y	Z	$\leq 1/3 a$	$\leq W$	$\leq t$	X	Y	Z	$\leq a$
X	Y	Z											
$\leq 1/3 a$	$\leq W$	$\leq t$											
X	Y	Z											
$\leq a$	$\leq 1/3 W$	$\leq t$											

◆Specification For Monotype and Color STN :

(Ver. B01)

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

4. RELIABILITY TEST

4.1 Reliability Test Condition

(Ver.B01)

NO.	TEST ITEM	TEST CONDITION	
1	High Temperature Storage Test	Keep in +80 ±2℃ 96 hrs Surrounding temperature, then storage at normal condition 4hrs.	
2	Low Temperature Storage Test	Keep in -30 ±2℃ 96 hrs Surrounding temperature, then storage at normal condition 4hrs.	
3	High Temperature / High Humidity Storage Test	Keep in +60 °C / 90% R.H duration for 96 hrs Surrounding temperature, then storage at normal condition 4hrs. (Excluding the polarizer)	
4	Temperature Cycling Storage Test	-30℃ → +25℃ → +80℃ → +25℃ (30mins) (5mins) (30mins) (5mins) ←──	

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. and where extremely high levels of reliability are required.

LCM包裝規格書
LCM Packaging Specifications

Approve	Check	Contact
Linda	Mag	Stone

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

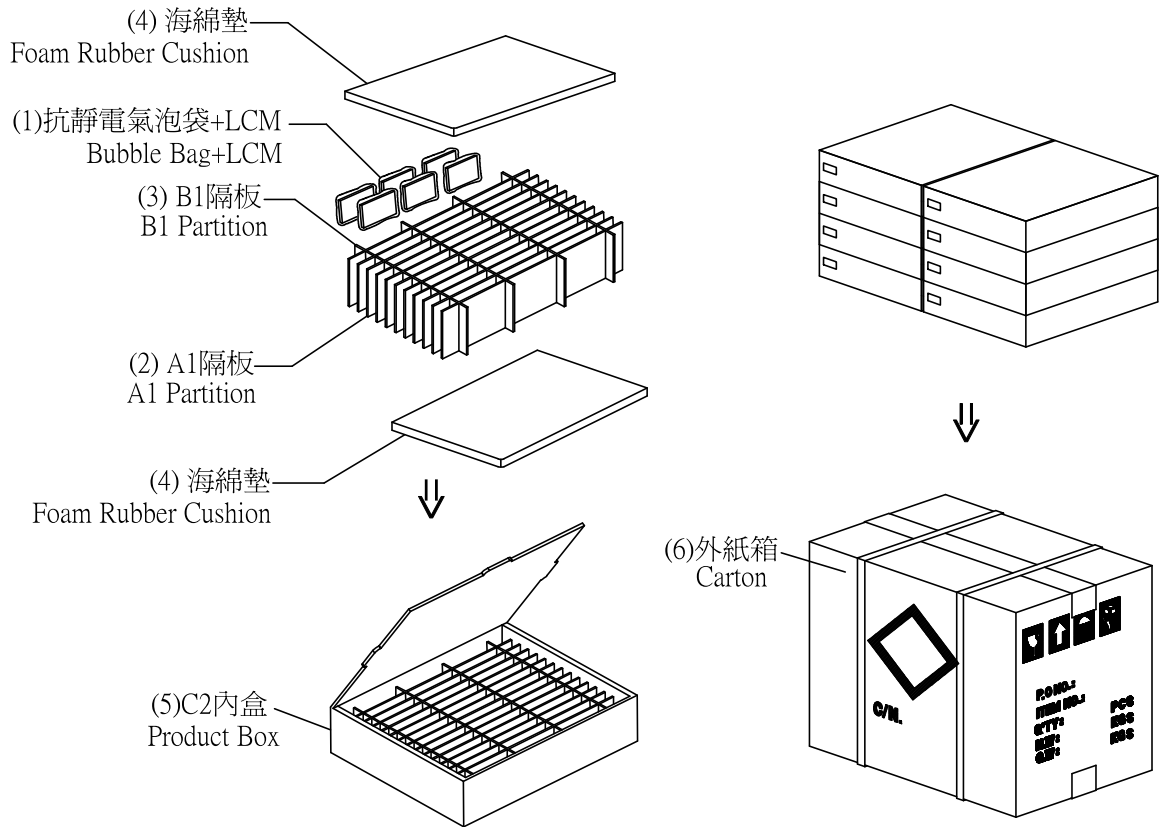
No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	GE12864FRW-55HQ	55.2 X 39.8	0.0115	360	4.14
2	抗靜電氣泡袋(1)Bubble Bag	BAG100065BRABA	100 X 65	0.0008	360	0.288
3	A1隔板(2)A1 Partition	BX29300045BMBA	293 X 45 X 2.5	0.01	112	1.12
4	B1隔板(3)B1 Partition	BX24500045BKBA	245 X 45 X 2.5	0.008	32	0.256
5	海綿墊(4)Foam Rubber Cushion	OTFOAM00006ABA	290 X 240 X 10	0.02	16	0.32
6	C2內盒(5)Product Box	BX31025580AABA	310 X 255 X 80	0.221	8	1.768
7	外紙箱(6)Carton	BX52732536CCBA	527 X 325 X 360	1.092	1	1.092
8						
9						

2.一整箱總重量 (Total LCD Weight in carton) : 8.98 Kg±10%

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

(1)Quantity Of Spacer : A1隔板 X 14 , B1隔板 X 4

(2)Total LCM quantity in carton : quantity per box 45 x no of boxes 8 = 360



特 記 事 項 (REMARK)

1. Label Specifications :

MODEL:
LOT NO:
QUANTITY:
CHECK: