

SPECIFICATIONS

CUSTOMER	:	CDE021
SAMPLE CODE	:	SG12864LRU-KCN-H-Q
MASS PRODUCTION CODE	:	PG12864LRU-KCN-H-Q
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	002
DRAWING NO. (Ver.)	:	HLMD-PG12864LRU-KCN-H-Q (Ver.001)
PACKAGING NO. (Ver.)	:	DPK-06786(Ver.001)

Customer Approved

Date:

Approved	Checked	Designer
王剛 2009/03/24	魏永超 2009/03/24	楊清龍 2009/03/24



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

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NO.PT-A-005-8

RECORDS OF REVISION

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Total : 27 page

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1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	128*64 dots
LCD Type	STN,Y/G, Transflective, Positive, Extended Temp.
Driver Condition	LCD Module : 1/64 Duty , 1/9 Bias
Viewing Direction	6 O'clock
Backlight	Yellow-Green LED B/L
Weight	64.0g
Interface	8 bit parallel data input
Other(controller / driver IC)	NT7107/NT7108
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	93.0 (L) *70.0 (w) * 12.5(H)(Max)	mm
Viewing Area	72.0(L) *40.0(w)	mm
Active Area	66.52 (L) * 33.24(w)	mm
Dot Size	0.48 (L) * 0.48 (w)	mm
Dot Pitch	0.52 (L) *0.52 (w)	mm

Note : For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

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

1.4 DC Electrical Characteristics

$V_{DD}=5.0\text{ V} \pm 10\%$, $V_{SS} = 0\text{V}$, $T_a = 25^\circ\text{C}$

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Logic Supply Voltage	V_{DD}	-	4.5	5.0	5.5	V
“H” Input Voltage	V_{IH}	-	$0.7V_{DD}$	-	V_{DD}	V
“L” Input Voltage	V_{IL}	-	V_{SS}	-	$0.3V_{DD}$	V
“H” Output Voltage	V_{OH}	-	$V_{DD}-0.4$	-	-	V
“L” Output Voltage	V_{OL}	-	-	-	0.4	V
Supply Current	I_{DD}	$V_{DD}=5.0\text{V}; V_{OP}=12.5\text{ V};$ Pattern= Full display	-	4.2	-	mA
		$V_{DD}=5.0\text{V}; V_{OP}=12.5\text{ V};$ Pattern= Horizontal line*1	-	4.2	6.5	
LCM Driver Voltage	V_{OP}^{*2}	-20°C	12.5	12.7	12.9	V
		25°C	12.3	12.5	12.7	
		70°C	12.1	12.3	12.5	

NOTE: *1 The Maximum current display;

*2 The VOP test point is $V_{DD}-V_O$.

1.5 Optical Characteristics

LCD Panel : 1/64Duty , 1/9Bias , $V_{LCD}=12.4V$, $T_a=25^{\circ}C$

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Reference
Response Time	Rise	tr	$C \geq 2.0$, $\varnothing = 270^{\circ}$	-	200	-	ms	Note2
	Fall	tf		-	150	-		
Viewing angle range	Top	$\Theta Y+$		0	-	40	Deg.	Notes 1
	Bottom	$\Theta Y-$		0	-	40		
	Left	$\Theta X-$		0	-	45		
	Right	$\Theta X+$		0	-	45		
Contrast Ratio		CR	$25^{\circ}C$	5	7	-	-	Note 3
Average Brightness (with LCD) *2		IV	IF=120 mA	20	30	-	cd/m^2	Note 4
Uniformity *1		ΔB		70	-	-	%	

Note 4 :

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

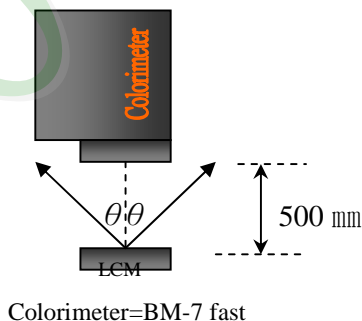
2 : Measurement Condition for Optical Characteristics:

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.

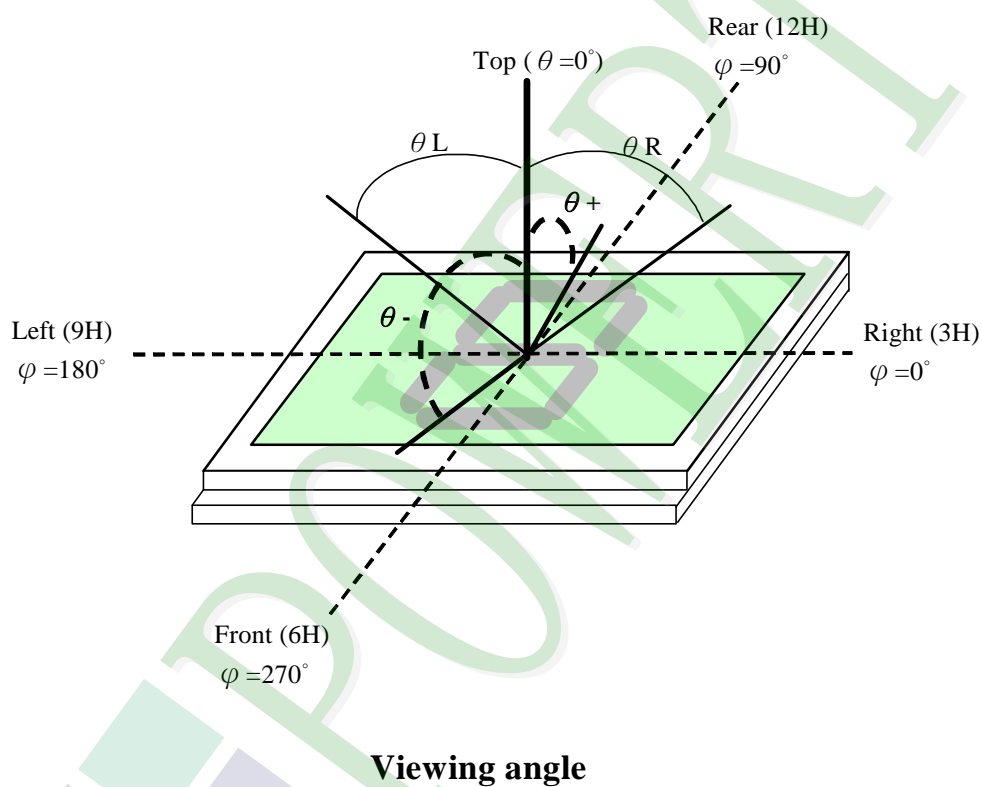
d : The uncertainty of the C.I.E coordinate measurement ± 0.01 , Average Brightness $\pm 4\%$



Note 1.

Optical characteristics-2

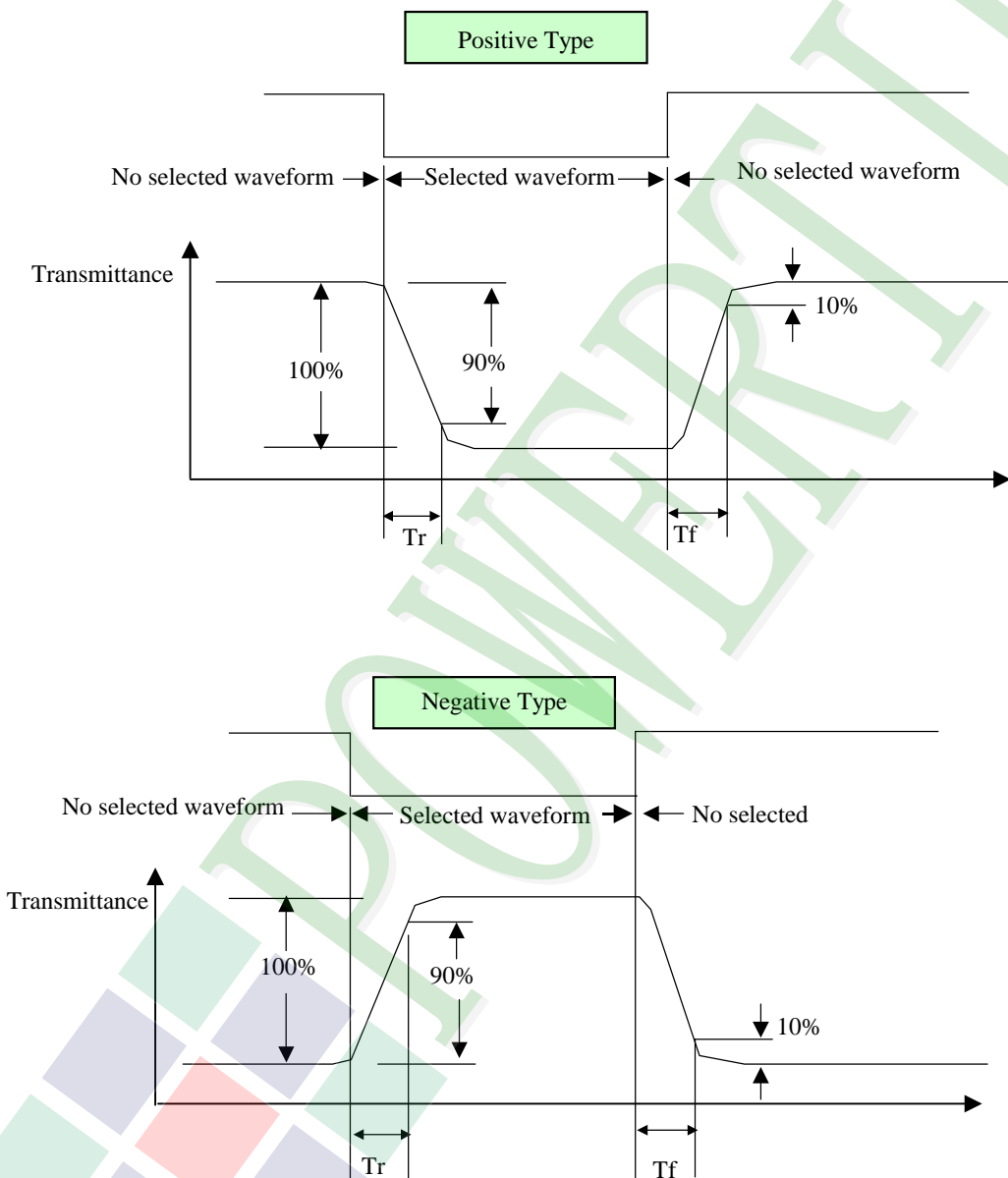
Viewing angle



Note 2.

Optical characteristics-3

Fig.2 Definition of response time



Electrical characteristics-2

※2 Drive waveform

V_{op} : Drive voltage

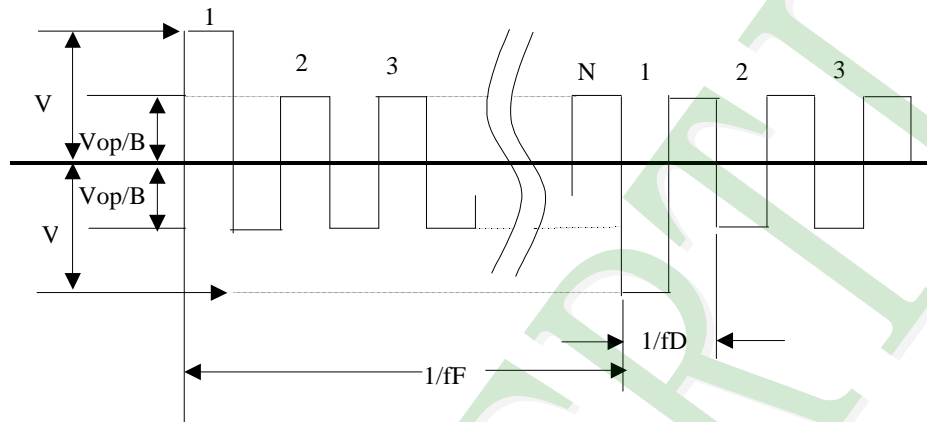
f_F : Frame frequency

$1/B$: Bias

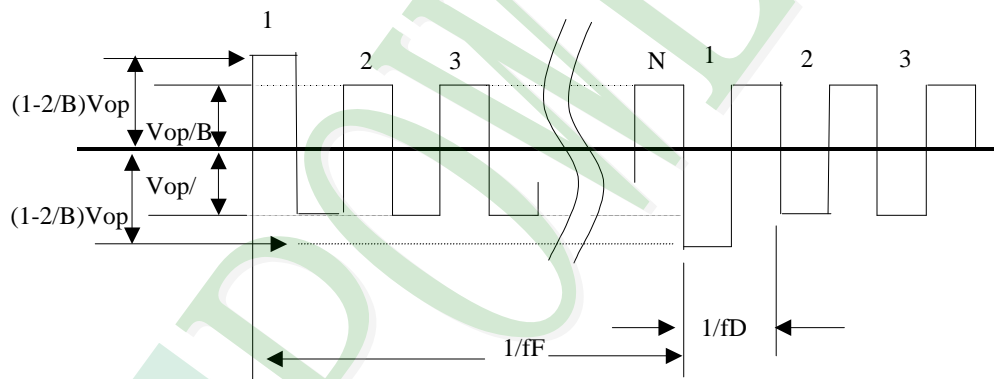
f_D : Drive frequency

N : Duty

(1) Selected waveform



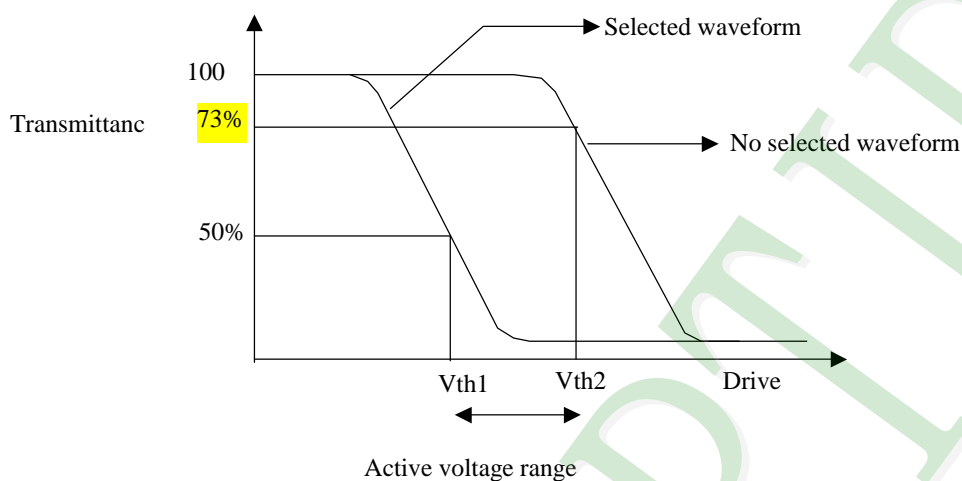
(2) Non- Selected wave form



Note:

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

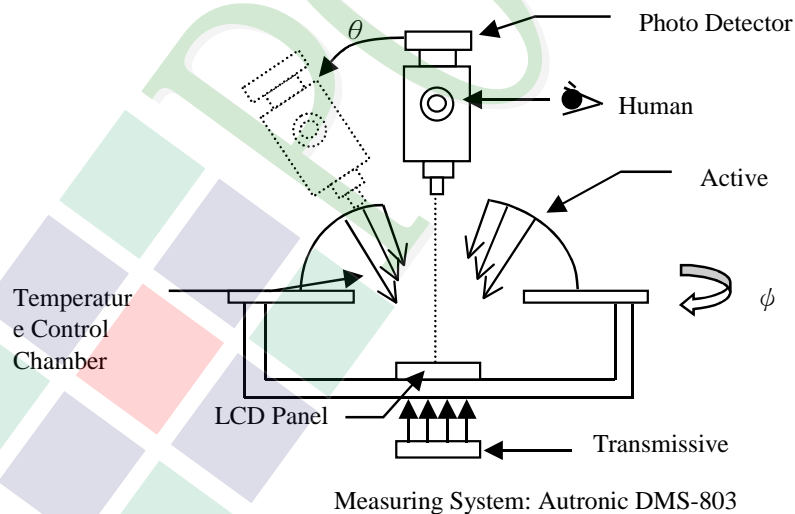
Note 3. : Definition of Vth



	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

LCD Module with LED Backlight

Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25°C	-	975	mA
Reverse Voltage	VR	Ta =25°C	-	8	V
Reverse Current	IR	VR= 8V	-	0.39	mA
Power Dissipation	PD	Ta =25°C	-	4.48	W

Electrical / Optical Characteristics

Electrical / Optical Characteristics						
Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 390mA	-	4.2	4.6	V
Average Brightness (without LCD)	IV		184	230	-	cd/m ²
Wavelength (without LCD)	λ p		569	-	576	nm
Color	Yellow-Green					

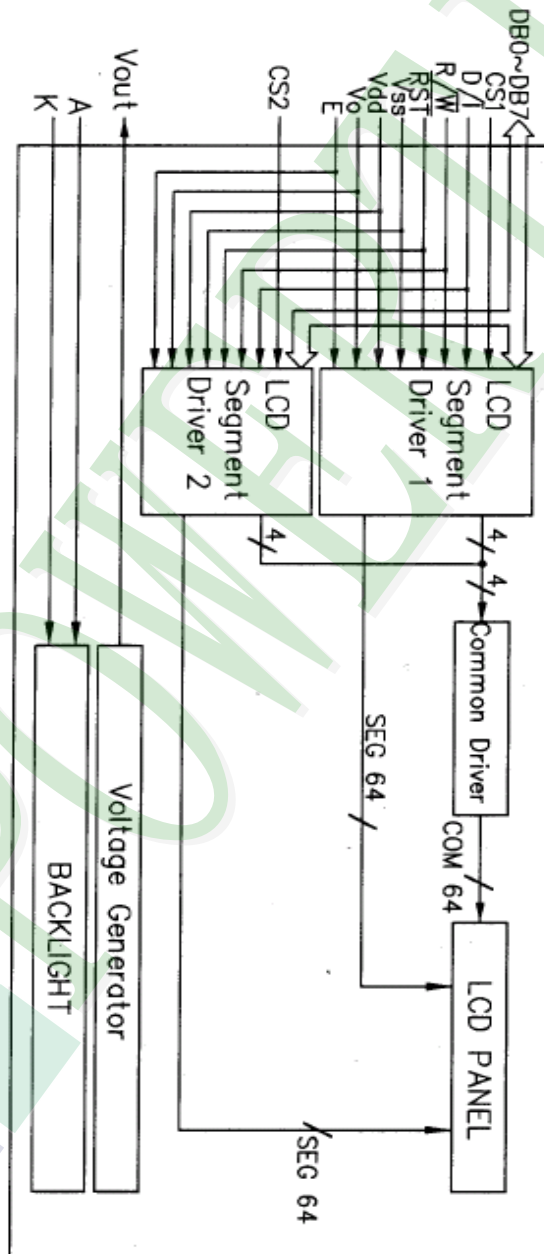
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

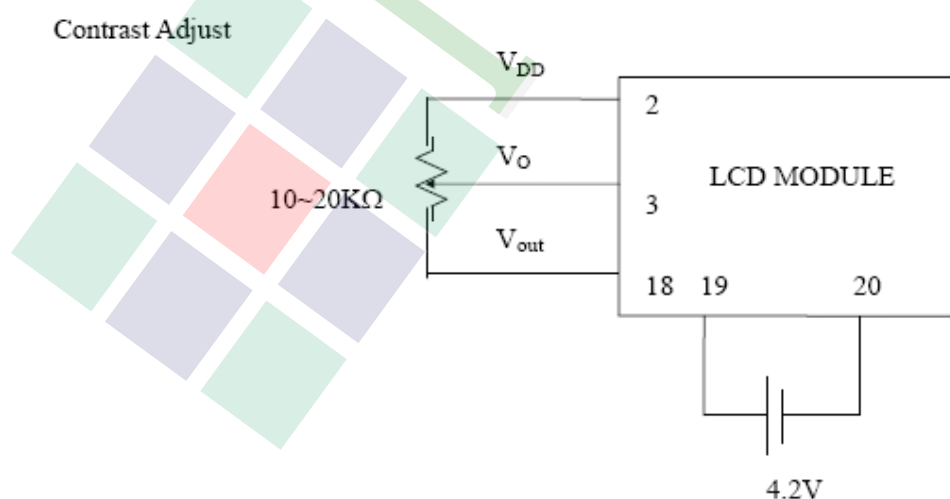
* See Appendix

2.1.2 Block Diagram

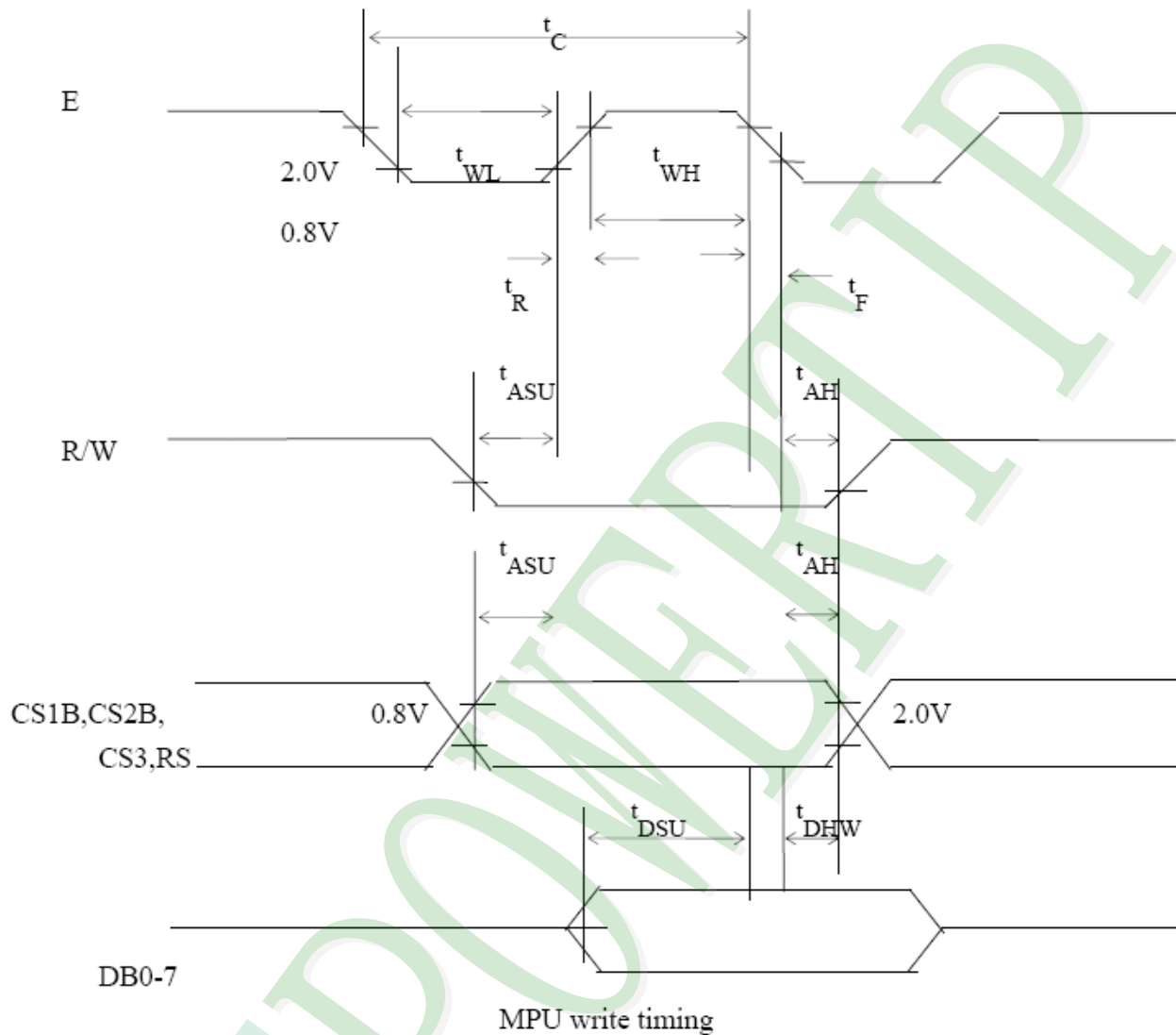


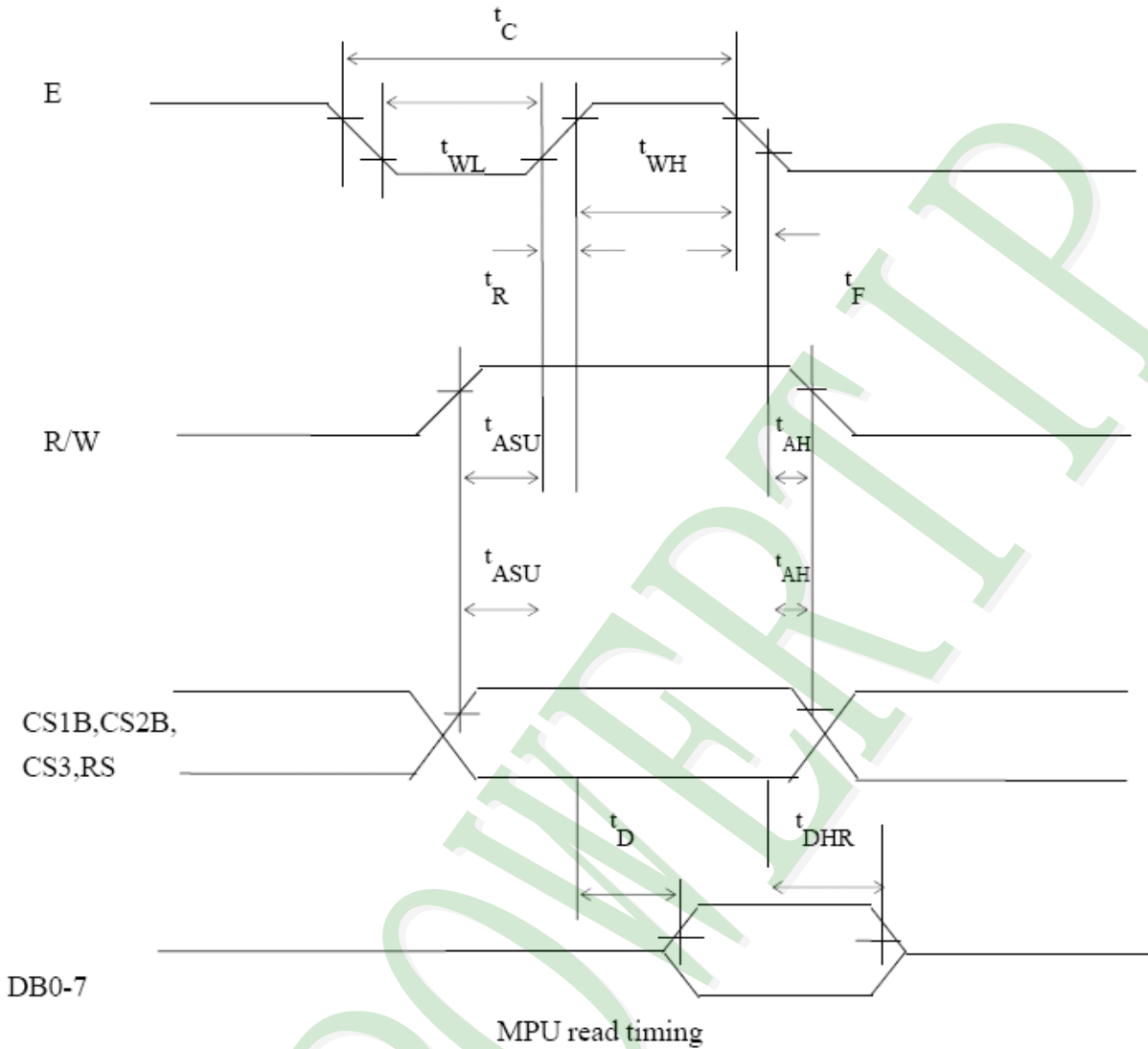
2.2 Interface Pin Description

Pin No	Symbol	Function
1	V _{SS}	Signal ground (GND)
2	V _{DD}	Power supply for logic(V _{DD} >V _{SS})
3	VO	Operating voltage for LCD (variable)
4	D/ \overline{I}	Register selection input High=Data register Low=Instruction register (for write) Busy flag address counter (for read)
5	R/ \overline{W}	R/ \overline{W} Signal input is used to select the read/write mode High=Read mode , Low=Write mode
6	E	Start enable signal to read or write the data
7	DB0	Data bus
8	DB1	Data bus
9	DB2	Data bus
10	DB3	Data bus
11	DB4	Data bus
12	DB5	Data bus
13	DB6	Data bus
14	DB7	Data bus
15	CS1	Chip enable for D2 (segment 1 to segment 64)
16	CS2	Chip enable for D3 (segment 65 to segment 128)
17	\overline{RST}	Rest signal
18	V _{out}	Negative voltage power supply.
19	A	Power supply for LED B/L. (+)
20	K	Power supply for LED B/L. (-)



2.3 Timing Characteristics





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

2.4 Display command

Instructions	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Functions
Display on/off	0	0	0	0	1	1	1	1	1	0/1	Controls the display on or Off. Internal status and display RAM data is not affected. 0: OFF , 1: ON
Set address (Y address)	0	0	0	1	Y address (0~63)						Sets the Y address in the Y address counter.
Set Page (X address)	0	0	1	0	1	1	1	Page (0-7)			Sets the X address at the X register.
Display Start Line (Z address)	0	0	1	1	Display start line (0~63)						Indicates the display data RAM displayed at the top of the screen.
Status Read	0	1	B U S Y	0	O N / O F F	R E S E T	0	0	0	0	Reads status. BUSY 1 : In operation 0 : Ready ON/OFF 1 : Display OFF 0 : Display ON RESET 1 : Reset 0 : Normal
Write Display Data	1	0	Write Data								Writes data (DB0:7) into display data RAM. After writing instruction, Y address is increased by 1 automatically.
Read Display Data	1	1	Read Data								Reads data (DB0:7) from display data RAM to the data bus.

Detailed Explanation

Display On/Off

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

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

into D=1.

Display Start Line (Z Address)

	RS	R/W	DB7.....	DB0
Code	0	0	1 1 AC5 AC4 AC3 AC2 AC1 AC0	

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

See figure 1.

Set page (X address)

	RS	R/W	DB7.....	DB0
Code	0	0	1 0 1 1 1 AC2 AC1 AC0	

X address (AC0-AC2) of the display data RAM is set in the X address register. Writing or reading to or from MPU is executed in this specified page until the next page is set. See figure 2.

Set Address (Y Address)

	RS	R/W	DB7.....	DB0
Code	0	0	0 1 AC5 AC4 AC3 AC2 AC1 AC0	

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

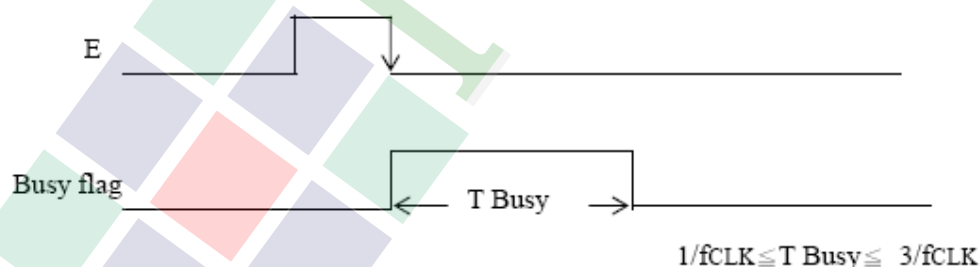
Status Read

	RS	R/W	DB7.....	DB0
Code	0	1	BUSY 0 ON/OFF REST 0 0 0 0	

• Busy

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

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



- ON/OFF

When on/off is 1, the display is OFF.

When on/off is 0, the display is ON.

- RESET

When RESET is 1, the system is being initialized.

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

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

Write Display Data

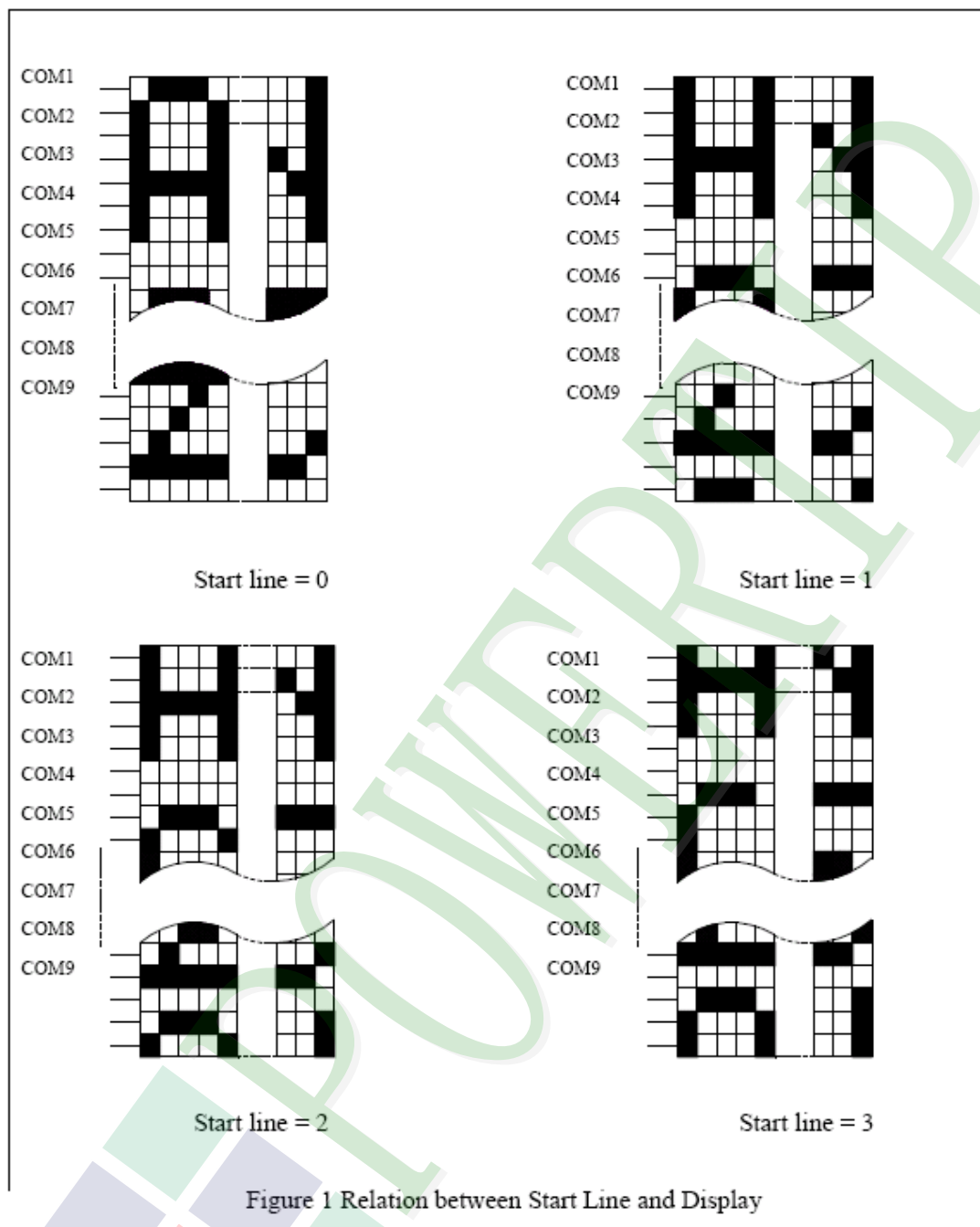
	RS	R/W DB7.....DB0								
Code	0	1	D7	D6	D5	D4	D3	D2	D1	D0

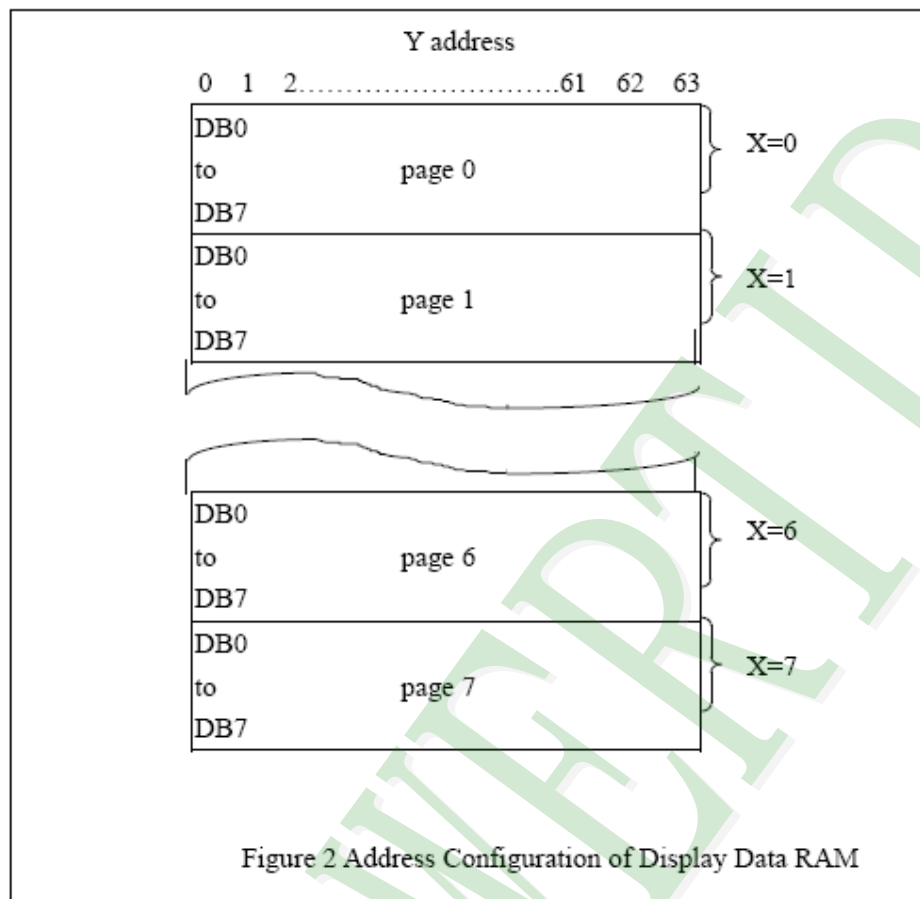
Write data(D0-D7) into the display data RAM. After writing instruction, Y address is increased by 1 automatically.

Read Display Data

	R/W	D/I	DB7.....DB0							
Code	1	1	D7	D6	D5	D4	D3	D2	D1	D0

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





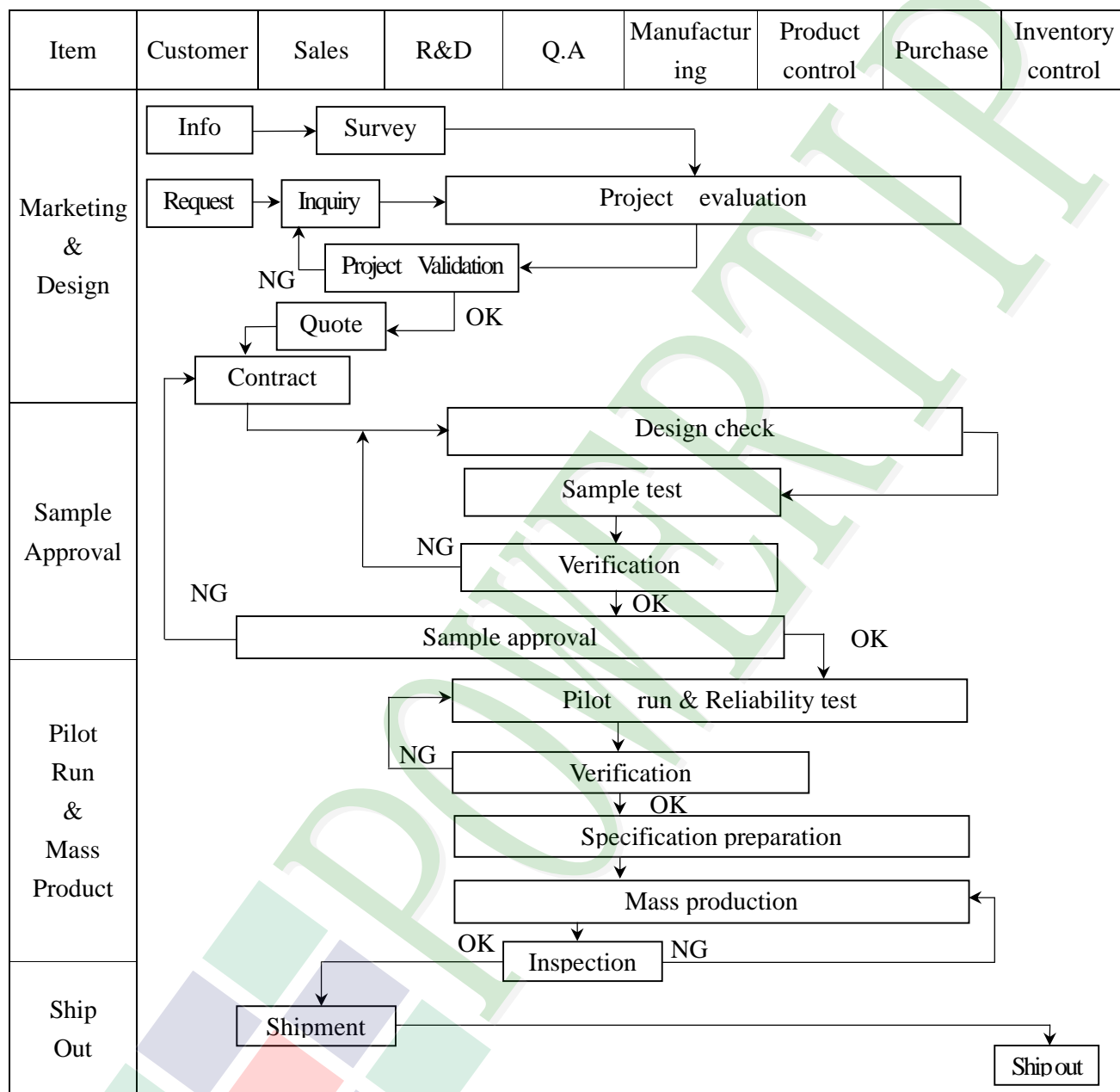
Note: "128*64" consist of 2 "64*64"

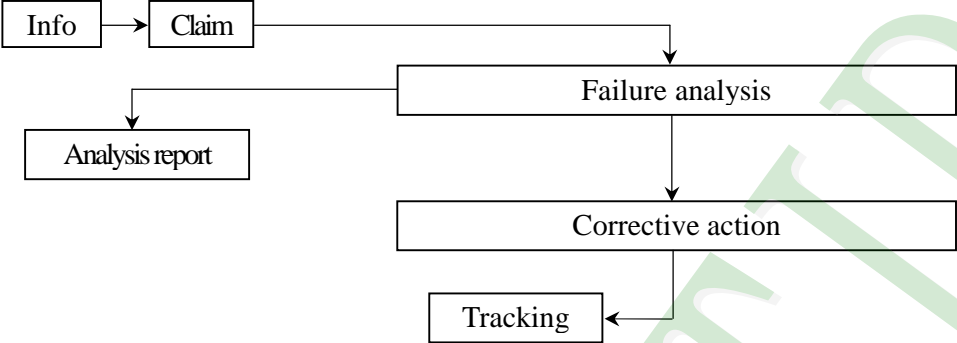
CS1⇒ Chip enable for left 64*64 (segment1 to segment 64)

CS2⇒ Chip enable for right 64*64 (segment 65 to segment 128)

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 (Ver. 03).

◆ **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)

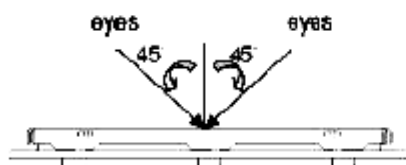


Fig. 1

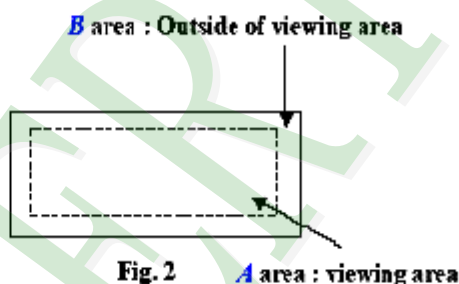


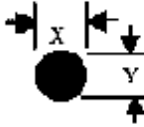

Fig. 2

◆ Specification:

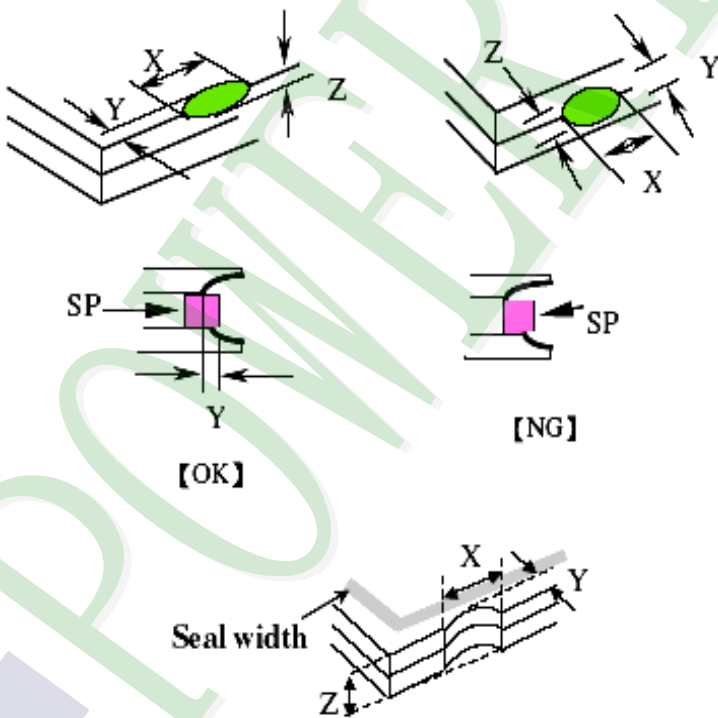
NO	Item	Criterion	level
01	Product condition	1. 1 The part number is inconsistent with work order of Production.	Major
		1. 2 Mixed production types.	Major
		1. 3 Assembled in inverse direction.	Major
02	Quantity	2. 1 The quantity is inconsistent with work order of production.	Major
03	Outline dimension	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. 03)

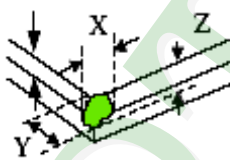
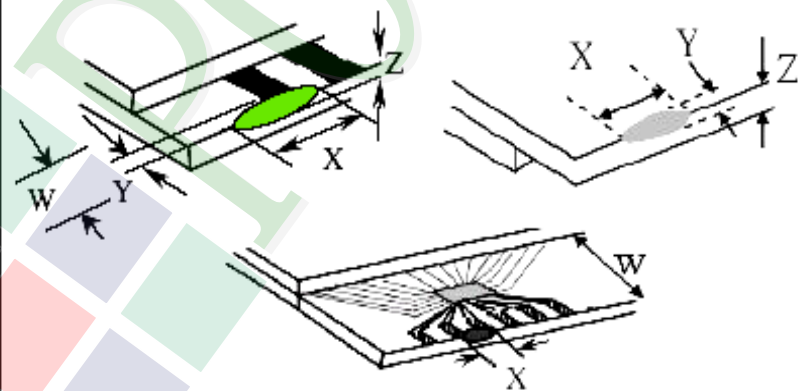
NO	Item	Criterion	level																																						
05	<p>Black or white dot 、 scratch 、 contamination</p> <p>Round type</p>  <p>$\Phi=(x+y)/2$</p> <p>Line type</p> 	<p>5. 1 Round type:</p> <p>5. 1. 1 display only :</p> <ul style="list-style-type: none">• White and black spots on display ≤ 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><tr><th rowspan="2">Dimension (diameter : Φ)</th><th colspan="2">Acceptance (Q'ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td>$\Phi \leq 0.10$</td><td colspan="2">Accept no dense</td></tr><tr><td>$0.10 < \Phi \leq 0.20$</td><td>3</td><td rowspan="2">Ignore</td></tr><tr><td>$0.20 < \Phi \leq 0.30$</td><td>2</td></tr><tr><td>Total quantity</td><td>4</td><td></td></tr></table> <p>5. 1. 3 Line type:</p> <table><tr><th colspan="2">Dimension</th><th colspan="2">Acceptance (Q'ty)</th></tr><tr><th>Length (L)</th><th>Width (W)</th><th>A area</th><th>B area</th></tr><tr><td>---</td><td>$W \leq 0.03$</td><td colspan="2">Accept no dense</td></tr><tr><td>$L \leq 3.0$</td><td>$0.03 < W \leq 0.05$</td><td rowspan="2">4</td><td rowspan="2">Ignore</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></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		$L \leq 3.0$	$0.03 < W \leq 0.05$	4	Ignore	$L \leq 2.5$	$0.05 < W \leq 0.075$	---	$W > 0.075$	As round type		Minor
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06	<p>Polarizer Bubble</p>	<table><tr><th rowspan="2">Dimension (diameter : Φ)</th><th colspan="2">Acceptance (Q'ty)</th></tr><tr><th>A area</th><th>B area</th></tr><tr><td>$\Phi \leq 0.20$</td><td colspan="2">Accept no dense</td></tr><tr><td>$0.20 < \Phi \leq 0.50$</td><td>3</td><td rowspan="3">Ignore</td></tr><tr><td>$0.50 < \Phi \leq 1.00$</td><td>2</td></tr><tr><td>$\Phi > 1.00$</td><td>0</td></tr><tr><td>Total quantity</td><td>4</td><td></td></tr></table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.20$	Accept no dense		$0.20 < \Phi \leq 0.50$	3	Ignore	$0.50 < \Phi \leq 1.00$	2	$\Phi > 1.00$	0	Total quantity	4		Minor																				
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◆Specification For Monotype and Color STN :
(Ver. 03)

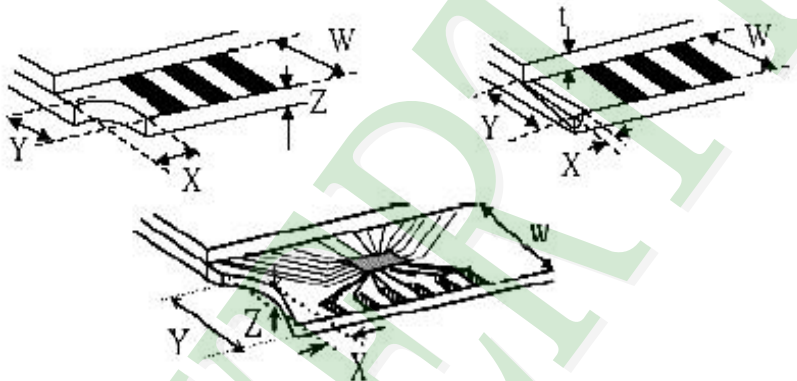
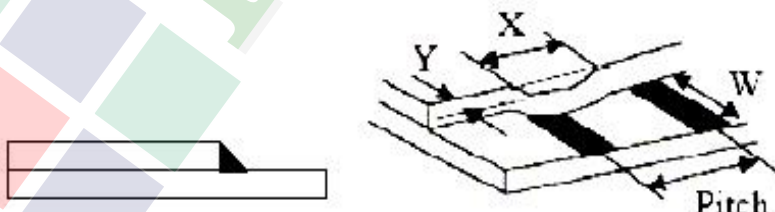
NO	Item	Criterion	Level									
07	The crack of glass	<p>Symbols :</p> <p>X : The length of crack Z : The thickness of crack t : The thickness of glass</p> <p>Y : The width of crack. W : terminal length a : LCD side length</p> <p>7.1 General glass chip :</p> <p>7.1.1 Chip on panel surface and crack between panels:</p>  <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	$\leq 1/2 t$	$\leq a$	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.	$1/2 t < Z \leq 2 t$										

◆ Specification For Monotype and Color STN :

(Ver. 03)

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> <p>7.1.2 Corner crack :</p>  <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.	$1/2 t < Z \leq 2 t$	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><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. 03)

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>  <table><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> <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>  <table><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
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. 03)

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

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 Humidity Storage	Keep in +60℃/90%RH duration for 96 hrs Surrounding temperature, then storage at normal condition 4hrs (Excluding the polarizer)											
4	ESD Test	Air Discharge: Apply 6 KV with 5 times Discharge for each polarity +/-	Contact Discharge: Apply 250V with 5 times discharge for each polarity +/-										
		1. Temperature Ambient:15℃ ~ 35℃ 2. Humidity relative:30% ~ 60% 3. Energy Storage Capacitance(Cs+Cd):150pF±10% 4. Discharge Resistance(Rd):330Ω ±10% 5. Discharge, mode of operation: Single Discharge (time between successive discharges at least 1 s) (Tolerance If the output voltage indication: ±5%)											
5	Temperature Cycling Test	<div>-20℃ → 25℃ → 70℃ → 25℃</div> <div>(30mins) (5mins) (30mins) (5mins)</div> <div>↔</div> <div>10 Cycle</div> <div>Surrounding temperature, then storage at normal condition 4hrs</div>											
6	Vibration Test (Packaged)	1. Sine wave 10~55HZ frequency (1 min) 2. The amplitude of vibration :1.5 mm 3. Each direction (XYZ) duration for 2 Hrs											
7	Drop Test (Packaged)	<table><tr><th>Packing Weight (Kg)</th><th>Drop Height (cm)</th></tr><tr><td>0 ~ 45.4</td><td>122</td></tr><tr><td>45.4 ~ 90.8</td><td>76</td></tr><tr><td>90.8 ~ 454</td><td>61</td></tr><tr><td>Over 454</td><td>46</td></tr></table>		Packing Weight (Kg)	Drop Height (cm)	0 ~ 45.4	122	45.4 ~ 90.8	76	90.8 ~ 454	61	Over 454	46
		Packing Weight (Kg)	Drop Height (cm)										
		0 ~ 45.4	122										
		45.4 ~ 90.8	76										
		90.8 ~ 454	61										
Over 454	46												
Drop direction :※3 corner /1 edges /6 sides each 1times													

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.

LCM Model PG12864LRU-KCN-H-Q		LCM包裝規格書 LCM Packaging Specifications		Approve	Check	Contact
Drawing NO. DPK-06786				ZHOUJIMEI	TUQUXIA	GUOXIANGRONG
				DATE	初版	版次Ver
				06'11'15	06'11'15	0

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

No.	Item	Model	Dimensions (mm)	Quantity
1	成品(1) (LCM)	PG12864LRU-KCN-H-Q	(93*70*14)	224
2	靜電袋 (2)BAG	BAG150100ARABA	150*120*0.05	224
3	氣泡墊(3)BAG	BAG290240BRBBA	240*290*5	16
4	刀卡A2(4)BX	BX29500072BZBA	295*72*3	104
5	刀卡B2(5)BX	BX24500072BZBA	245*72*3	24
6	C2內盒(6)Product Box	BX31025580AABA	310*255*86	8
7	外紙箱(7)Carton	BX52532536CCBA	525 * 325 *360	1
8				
9				

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

(1)LCM quantity per box : no per box	14	x no of box	2	=	28
(2)Total LCM quantity in carton : quantity per box	28	x no of boxes	8	=	224

特 記 事 項 (REMARK)

<p>1. Label Specifications :</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> MODEL: LOT NO: QUANTITY: CHECK: </div>		<p>每啤盒裝28PCS</p>
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