SPECIFICATIONS

CUSTOMER	:	
SAMPLE CODE	:	SH240320T069-LAA
MASS PRODUCTION CODE	:	PH240320T069-LAA
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	003
DRAWING NO. (Ver.)	:	LMD-PH240320T069-LAA (Ver:001)
PACKAGING NO. (Ver.)	:	PKG-PH240320T069-LAA (Ver:001)

Customer Approved

Date:

Approved	Checked	Designer
廖志豪 **Rex Liao**	廖志豪 **Rex Liao**	張慶源 **Yuan Chang**

POWERTIP
2018.01.22
TWRD APR
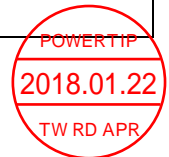
☐ Preliminary specification for design input

■ Specification for sample approval

POWERTIP TECH. CORP.

History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
11/23/2017	01	001	New Drawing	-	Yuan
01/08/2018	01	002	First Sample Modify Backlight Characteristics	- 8	Yuan
01/19/2018	01	003	Modify DC Electrical Characteristics Modify Reference Initial code	5 14	Yuan

Total: 28 Page

Contents

Note : For detailed information please refer to IC data sheet :

        Primacy(TFT LCD): ILITEK: ILI9340X

1. SPECIFICATIONS

1.1 Features

Main LCD panel

Item	Standard Value
Display Type	240(R、G、B) * 320 Dots
LCD Type	Normally white , Transmissive type
Screen size(inch)	2.8 inch
Viewing Direction	12 O'clock
Color configuration	RGB-Strip
Backlight	LED Backlight
Interface	16-bit 80-system I/F
Other(controller/driver IC)	ILITEK: ILI9340X
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website : http://www.powertip.com.tw/news_detail.php?Key=1&cID=1

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	50.0(W) * 69.2 (L) * 3.05 (H)max	mm

LCD panel

Item	Standard Value	Unit
Active Area	43.2 (W) * 57.6 (L)	mm

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit
System Power Supply Voltage	VCC	-	-0.3	+4.6	V
	VGH ~ VGL	-	-0.3	+32	V
Input Voltage	VIN	-	-0.3	VCC+0.3	V
Operating Temperature	T_{OP}	-	-20	+70	℃
Storage Temperature	T_{ST}	-	-30	+80	℃
Storage Humidity	H_D	Ta ≦ 40 ℃	20	90	%RH

1.4 DC Electrical Characteristics

Module   GND = 0V, Ta = 25℃

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage1	VCC	-	-	2.8	-	V
Input High Voltage	V_{IH}	-	0.7 VCC	-	VCC	V
Input Low Voltage	V_{IL}	-	GND	-	0.3 VCC	V
Output High Voltage	V_{OH}	IOH=-0.1mA	0.8*VDD	-	VDD	V
Output Low Voltage	V_{OL}	IOL=0.1mA	GND	-	0.2*VDD	V
Supply Current	ICC	VCC = 2.8V Pattern=full display *1	-	9	12	mA

Note1:Maximum current display

1.5 Optical Characteristics

TFT LCD Module $\qquad$ VCC = 2.8V, Ta=25℃

Item		Symbol	Condition	Min.	Typ.	Max.	unit	-
Response time		Tr+ Tf	Ta = 25℃ θX, θY = 0°	-	27	41	ms	Note2
Viewing angle	Top	θY+	-	-	60	-	Deg.	Note4
	Bottom	θY-	-	-	60	-		
	Left	θX-	-	-	60	-		
	Right	θX+	-	-	60	-		
Contrast ratio		CR	Ta = 25℃ θX , θY = 0°	500	600	-	-	Note3
Color of CIE Coordinate (With B/L)	White	X	-	0.24	0.29	0.34	-	Note1
		Y		0.26	0.31	0.36		
	Red	X		0.59	0.64	0.69		
		Y		0.29	0.34	0.39		
	Green	X		0.26	0.31	0.36		
		Y		0.54	0.59	0.64		
	Blue	X		0.09	0.14	0.19		
		Y		0.02	0.07	0.12		
Average Brightness Pattern=white display (With B/L) *1		IV	IF=80 mA	275	300	-	cd/m^2	
Uniformity (With B/L)*2		△B	IF=80 mA	70	-	-	%	

Note 1:

*1：△B=B(min) / B(max) * 100%
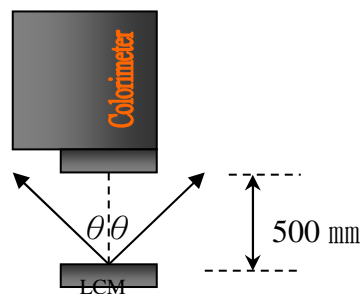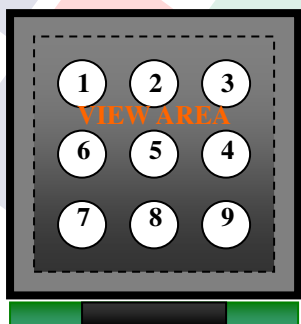
*2：Measurement Condition for Optical Characteristics:

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

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

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

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


Colorimeter=BM-7 fast

To be measured at the center area of panel with a viewing cone of 1° by Topcon

luminance meter BM-7, after 10 minutes operation (module)

Note2: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.
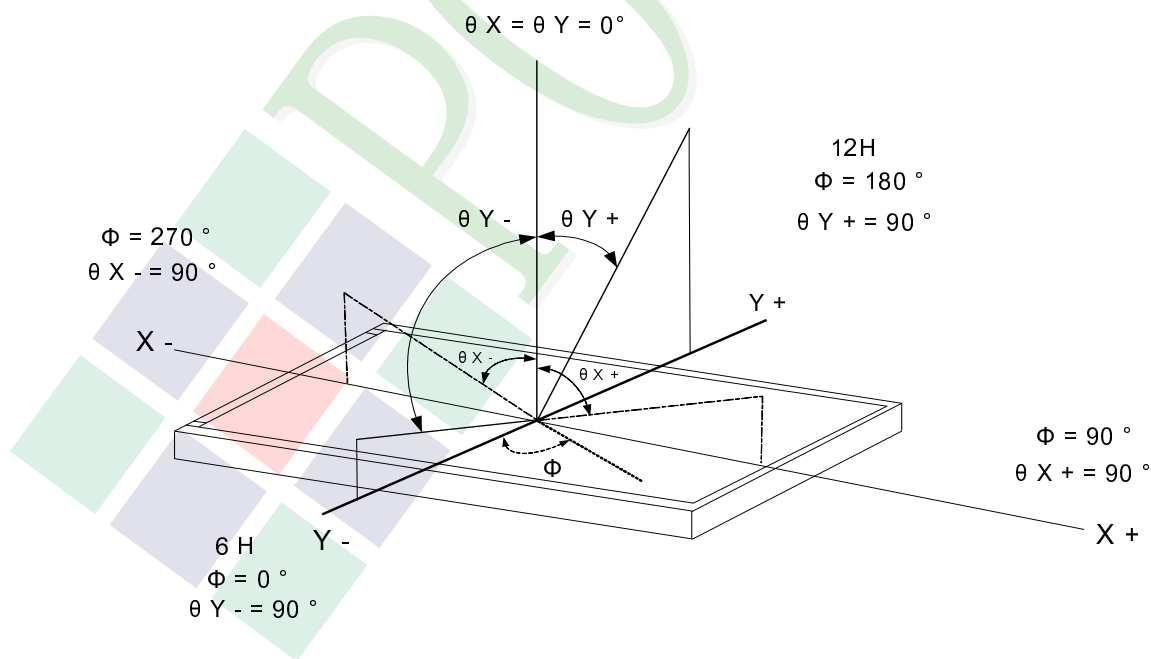
Refer to figure as below:
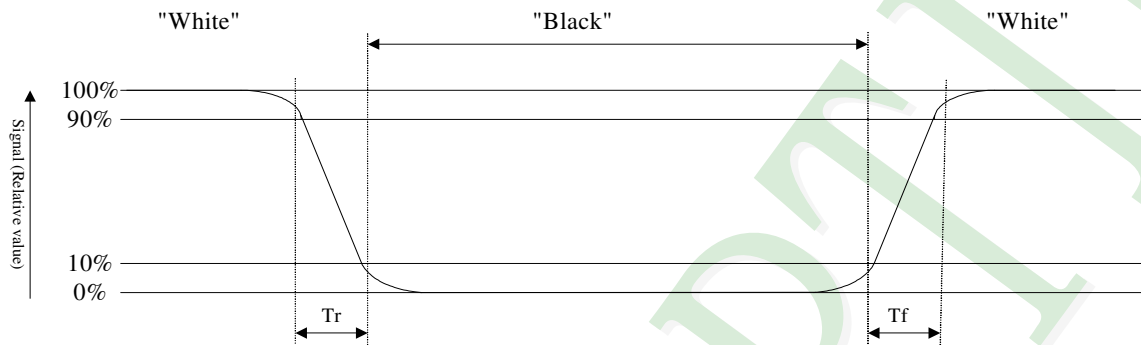
Note3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

$$\text{Contrast ratio (CR)} = \frac{\text{Photo detector output when LCD is at "White" state}}{\text{Photo detector output when LCD is at "Black" state}}$$

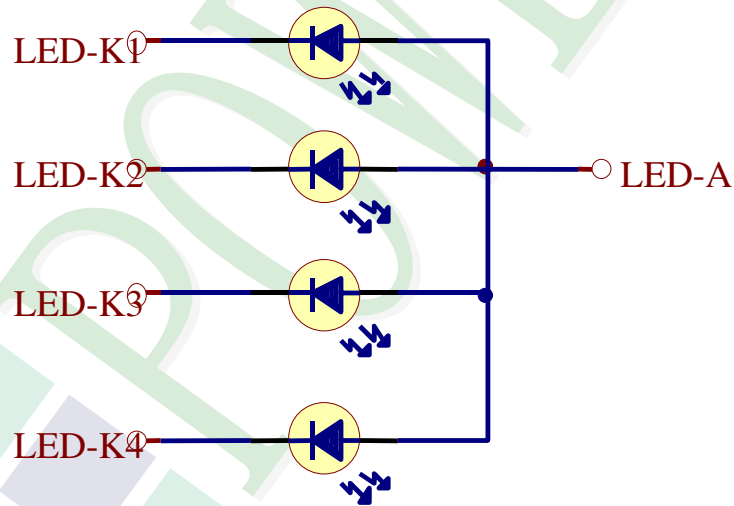Note4: Definition of viewing angle:

Refer to figure as below:

1.6 Backlight Characteristics

Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Power Dissipation	PD	Ta =25℃	─	0.288	W

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF		3.0	─	3.6	V
Average Brightness (without LCD)	IV	IF= 80 mA	5000	5500	─	cd/m²
CIE Color Coordinate (Without LCD)	X		0.26	0.28	0.33	-
	Y		0.26	0.28	0.33	
Color		White				

LED-K1

LED-K2 ○ LED-A

LED-K3

LED-K4

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram

TFT LCD PANEL

LED Backlight

Source Driver T-con

Gate Driver

LIL9340X

Detail information please refer interface description

PIN1 -- PIN 3 0
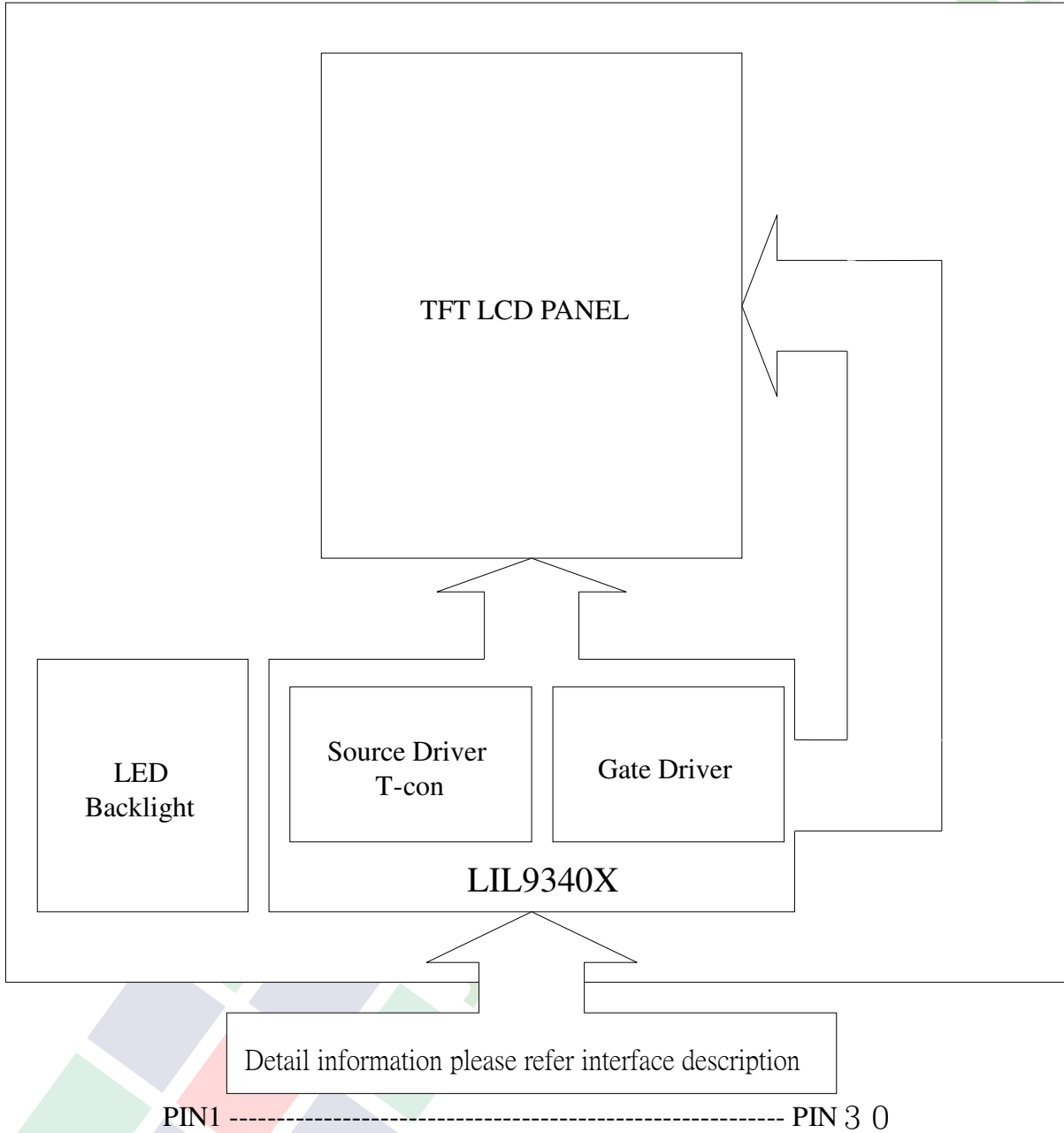
2.2 Interface Pin Description

Pin No.	Symbol	Function
1	LEDK1-4	Power supply for LED Backlight Cathode input
2	LEDA	Power supply for LED Backlight Anode input
3	GND	Signal ground.(0V)
4	RESET	Reset input pin for TFT LCD. When RESET is "L", initialization is executed.
5	DB17	
6	DB16	
7	DB15	
8	DB14	
9	DB13	
10	DB12	
11	DB11	
12	DB10	
13	DB8	Bi-directional data bus
14	DB7	
15	DB6	
16	DB5	
17	DB4	
18	DB3	
19	DB2	
20	DB1	
21	RD	Read signal input，active at Low.
22	WR/SCL	Write signal input，active at Low.
23	RS	When RS = 0: Command. When RS = 1: Display data.
24	CS	Chip select signal , Active at "L"
25	XR/X+	NC

Pin No.	Symbol	Function
26	YD/Y-	NC
27	XL/X-	
28	YU/Y+	
29	GND	Signal ground.(0V)
30	2.8 /VCC	Power supply for the internal logic circuit.

2.3 Timing Characteristics

Note: Ta = -30 to 70 ℃, VCC=1.65V to 3.3V, VCI=2.5V to 3.3V, GND=0V
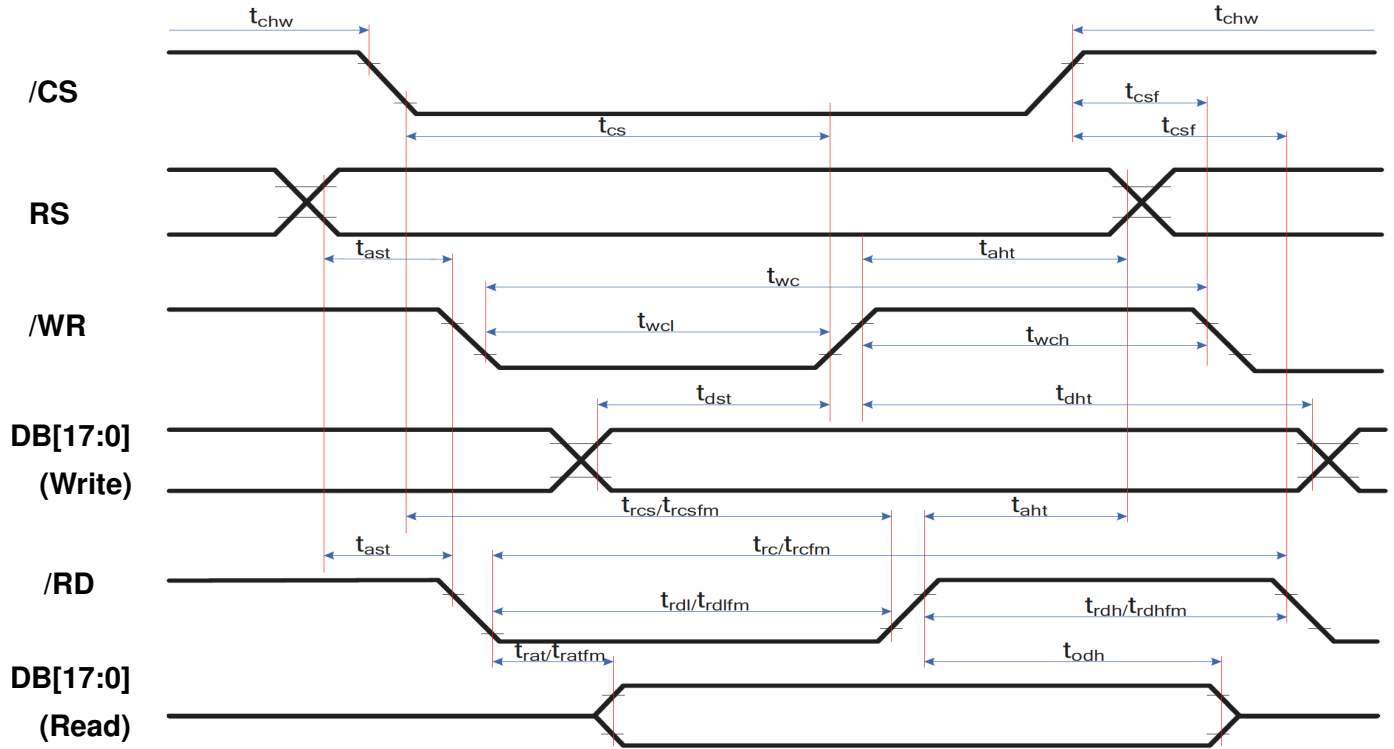
Signal	Symbol	Parameter	min	max	Unit	Description
RS	tast	Address setup time	0	-	ns	
	taht	Address hold time (Write/Read)	10	-	ns	
/CS	tchw	CSX "H" pulse width	0	-	ns	
	tcs	Chip Select setup time (Write)	15	-	ns	
	trcs	Chip Select setup time (Read ID)	45	-	ns	
	trcsfm	Chip Select setup time (Read FM)	355	-	ns	
	tcsf	Chip Select Wait time (Write/Read)	10	-	ns	
/WR	twc	Write cycle	66	-	ns	
	twrh	Write Control pulse H duration	15	-	ns	
	twrl	Write Control pulse L duration	15	-	ns	
/RD(FM)	trcfm	Read Cycle (FM)	450	-	ns	
	trdhfm	Read Control H duration (FM)	90	-	ns	
	trdlfm	Read Control L duration (FM)	355	-	ns	
/RD(ID)	trc	Read cycle (ID)	160	-	ns	
	trdh	Read Control pulse H duration	90	-	ns	
	trdl	Read Control pulse L duration	45	-	ns	
DB[17:0] DB[17:0] DB[8:0] DB[7:0]	tdst	Write data setup time	10	-	ns	For maximum CL=30pF For minimum CL=8pF
	tdht	Write data hold time	10	-	ns	
	trat	Read access time	-	40	ns	
	tratfm	Read access time	-	340	ns	
	todh	Read output disable time	20	80	ns	

Note: Ta = -30 to 80 °C, IOVCC=1.65V to 3.3V, VCI=2.5V to 3.3V, GND=0V

Reset Timing
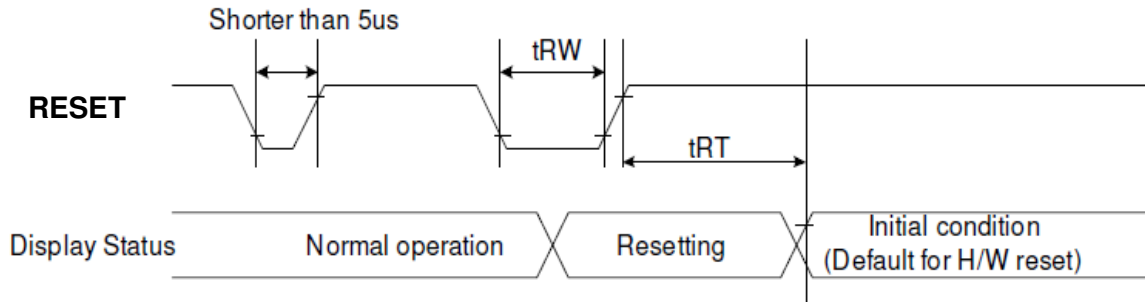
| Signal	Symbol	Parameter	Min	Max	Unit
RESX	tRW	Reset pulse duration	10		uS
	tRT	Reset cancel		5 (note 1,5)	mS
				120 (note 1,6,7)	mS

Note 1: The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NV memory to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.

Note 2: Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below: -

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 10us	Reset
Between 5us and 10us	Reset starts

Note 3: During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out –mode. The display remains the blank state in Sleep In -mode.) And then return to Default condition for Hardware Reset.

Note 4: Spike Rejection also applies during a valid reset pulse as shown below:
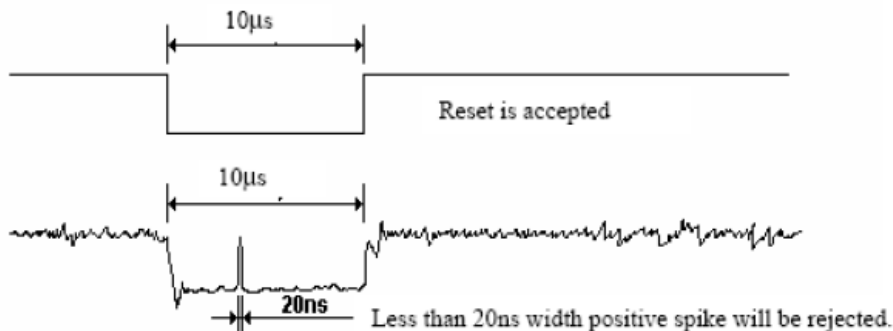
Note 5: When Reset applied during Sleep In Mode.

Note 6: When Reset applied during Sleep Out Mode.

Note 7: It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

2.4 Reference Initial code

```
        MOV     ADDRH,#00H
        MOV     ADDRL,#3AH      ;2 dot inversion
        CALL    WRITE_COMMAND
        MOV     ADDRL,#55H
        CALL    WRITE_DATA

        MOV     ADDRL,#B4H      ;2 dot inversion
        CALL    WRITE_COMMAND
        MOV     ADDRL,#80H
        CALL    WRITE_DATA

        MOV     ADDRL,#B7H      ;pump ratio 1
        CALL    WRITE_COMMAND
        MOV     ADDRL,#FFH
        CALL    WRITE_DATA
        MOV     ADDRL,#44H
        CALL    WRITE_DATA
        MOV     ADDRL,#04H
        CALL    WRITE_DATA
        MOV     ADDRL,#44H
        CALL    WRITE_DATA
        MOV     ADDRL,#04H
        CALL    WRITE_DATA
        MOV     ADDRL,#02H
        CALL    WRITE_DATA
        MOV     ADDRL,#04H
        CALL    WRITE_DATA

        MOV     ADDRL,#BAH      ;P1=VCOM P2=VRH P3=VDV
        CALL    WRITE_COMMAND
        MOV     ADDRL,#41H
        CALL    WRITE_DATA
        MOV     ADDRL,#1CH
        CALL    WRITE_DATA
        MOV     ADDRL,#21H
        CALL    WRITE_DATA

        MOV     ADDRL,#BBH      ;P1=VGH&VGL
        CALL    WRITE_COMMAND
        MOV     ADDRL,#71H
        CALL    WRITE_DATA
        MOV     ADDRL,#66H
        CALL    WRITE_DATA
        MOV     ADDRL,#33H
        CALL    WRITE_DATA

        MOV     ADDRL,#CDH      ;pump ratio 2
        CALL    WRITE_COMMAND
        MOV     ADDRL,#20H
        CALL    WRITE_DATA
        MOV     ADDRL,#20H
        CALL    WRITE_DATA
        MOV     ADDRL,#00H
        CALL    WRITE_DATA

        MOV     ADDRL,#E8H      ;
        CALL    WRITE_COMMAND
```
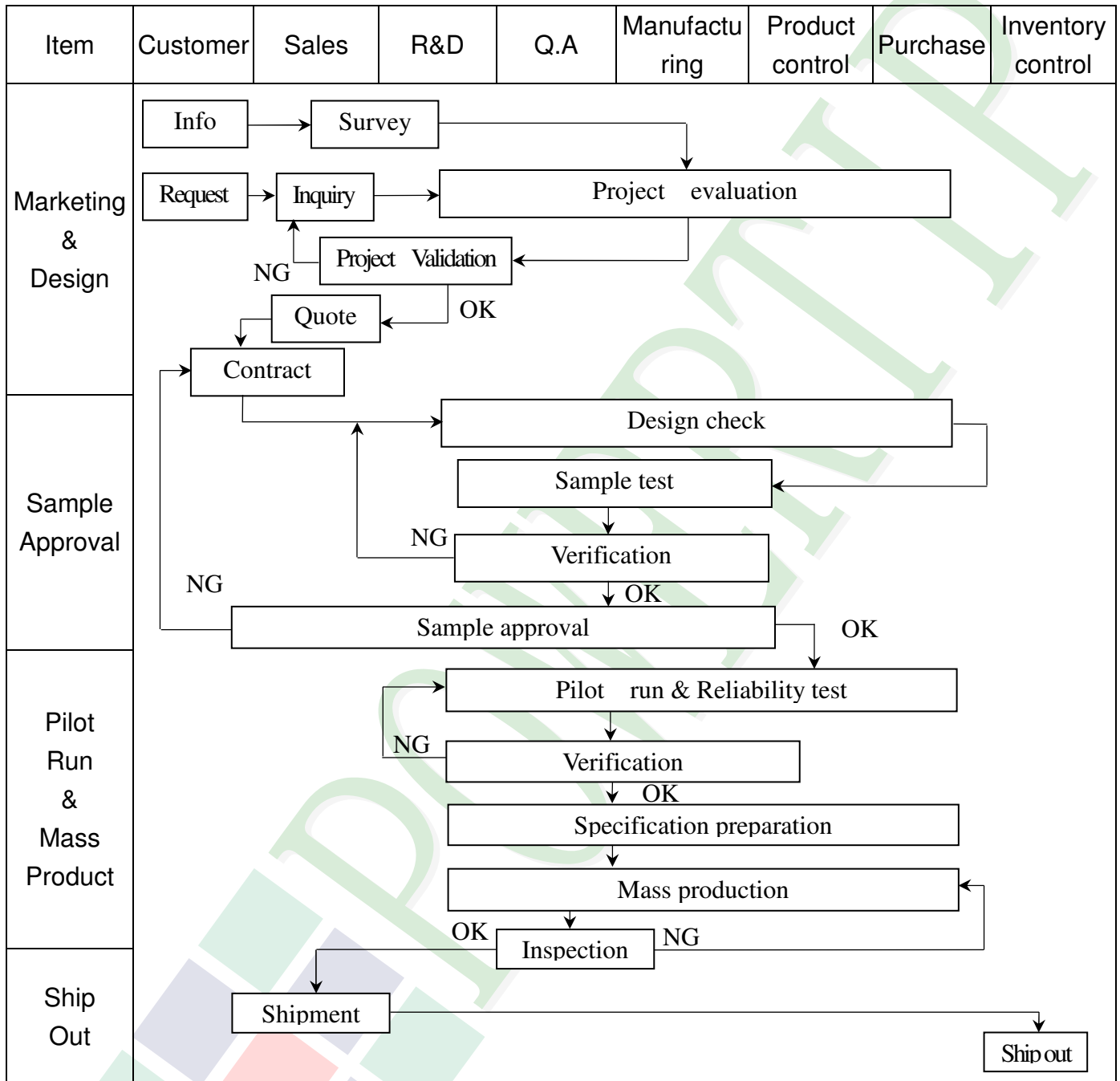
```
MOV       ADDRL,#11H
CALL      WRITE_DATA
MOV       ADDRL,#11H
CALL      WRITE_DATA
MOV       ADDRL,#33H
CALL      WRITE_DATA
MOV       ADDRL,#33H
CALL      WRITE_DATA
MOV       ADDRL,#55H
CALL      WRITE_DATA

MOV       ADDRL,#E9H          ;
CALL      WRITE_COMMAND
MOV       ADDRL,#40H
CALL      WRITE_DATA
MOV       ADDRL,#84H
CALL      WRITE_DATA
MOV       ADDRL,#65H
CALL      WRITE_DATA
MOV       ADDRL,#30H
CALL      WRITE_DATA
MOV       ADDRL,#C0H
CALL      WRITE_DATA
MOV       ADDRL,#00H
CALL      WRITE_DATA
MOV       ADDRL,#FFH
CALL      WRITE_DATA
MOV       ADDRL,#33H
CALL      WRITE_DATA
MOV       ADDRL,#88H
CALL      WRITE_DATA

MOV       ADDRL,#EAH          ;
CALL      WRITE_COMMAND
MOV       ADDRL,#02H
CALL      WRITE_DATA
MOV       ADDRL,#22H
CALL      WRITE_DATA
MOV       ADDRL,#3FH
CALL      WRITE_DATA
MOV       ADDRL,#E2H
CALL      WRITE_DATA
MOV       ADDRL,#04H
CALL      WRITE_DATA
MOV       ADDRL,#00H
CALL      WRITE_DATA
MOV       ADDRL,#11H

MOV       ADDRL,#F2H          ;
CALL      WRITE_COMMAND
MOV       ADDRL,#00H
CALL      WRITE_DATA
MOV       ADDRL,#80H
CALL      WRITE_DATA

MOV       ADDRL,#F5H          ;
CALL      WRITE_COMMAND
MOV       ADDRL,#88H
CALL      WRITE_DATA
```
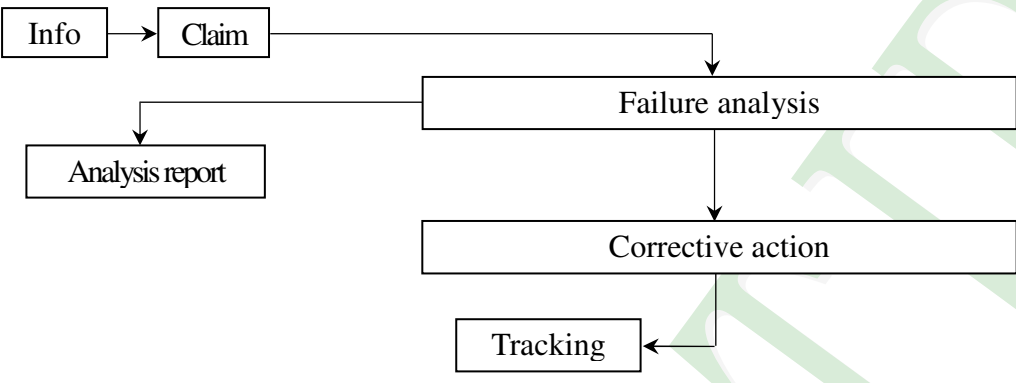
```
MOV      ADDRL,#E4H          ;
CALL     WRITE_COMMAND
MOV      ADDRL,#00H
CALL     WRITE_DATA
MOV      ADDRL,#04H
CALL     WRITE_DATA
MOV      ADDRL,#0DH
CALL     WRITE_DATA
MOV      ADDRL,#09H
CALL     WRITE_DATA
MOV      ADDRL,#16H
CALL     WRITE_DATA
MOV      ADDRL,#0AH
CALL     WRITE_DATA
MOV      ADDRL,#3CH
CALL     WRITE_DATA
MOV      ADDRL,#57H
CALL     WRITE_DATA
MOV      ADDRL,#48H
CALL     WRITE_DATA
MOV      ADDRL,#04H
CALL     WRITE_DATA
MOV      ADDRL,#0AH
CALL     WRITE_DATA
MOV      ADDRL,#08H
CALL     WRITE_DATA
MOV      ADDRL,#14H
CALL     WRITE_DATA
MOV      ADDRL,#16H
CALL     WRITE_DATA
MOV      ADDRL,#0FH
CALL     WRITE_DATA

MOV      ADDRL,#E5H          ;
CALL     WRITE_COMMAND
MOV      ADDRL,#00H
CALL     WRITE_DATA
MOV      ADDRL,#03H
CALL     WRITE_DATA
MOV      ADDRL,#0AH
CALL     WRITE_DATA
MOV      ADDRL,#06H
CALL     WRITE_DATA
MOV      ADDRL,#14H
CALL     WRITE_DATA
MOV      ADDRL,#08H
CALL     WRITE_DATA
MOV      ADDRL,#39H
CALL     WRITE_DATA
MOV      ADDRL,#69H
CALL     WRITE_DATA
MOV      ADDRL,#4CH
CALL     WRITE_DATA
MOV      ADDRL,#06H
CALL     WRITE_DATA
MOV      ADDRL,#0FH
CALL     WRITE_DATA
MOV      ADDRL,#0BH
```

```
        CALL      WRITE_DATA
        MOV       ADDRL,#23H
        CALL      WRITE_DATA
        MOV       ADDRL,#26H
        CALL      WRITE_DATA
        MOV       ADDRL,#0FH

        MOV       ADDRL,#BCH          ;pump ratio 1
        CALL      WRITE_COMMAND
        MOV       ADDRL,#00H
        CALL      WRITE_DATA
        MOV       ADDRL,#10H
        CALL      WRITE_DATA
        MOV       ADDRL,#00H
        CALL      WRITE_DATA
        MOV       ADDRL,#10H
        CALL      WRITE_DATA
        MOV       ADDRL,#0BH
        CALL      WRITE_DATA

        MOV       ADDRL,#11H          ;pump ratio 1
        CALL      WRITE_COMMAND
        CALL      DELAY
        CALL      DELAY
        CALL      DELAY
        CALL      DELAY

        MOV       ADDRH,#00H
        MOV       ADDRL,#29H
        CALL      WRITE_COMMAND
```

3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart

Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Marketing & Design								
Sample Approval								
Pilot Run & Mass Product								
Ship Out								

Marketing & Design:
Info → Survey → Project evaluation
Request → Inquiry → Project evaluation
Project Validation (NG → Inquiry, OK → Quote)
Quote → Contract

Sample Approval:
Contract → Design check
Design check → Sample test
Sample test → Verification
Verification (NG → Design check, OK → Sample approval)
Sample approval (NG → Contract, OK → Pilot run & Reliability test)

Pilot Run & Mass Product:
Pilot run & Reliability test → Verification
Verification (NG → Pilot run & Reliability test, OK → Specification preparation)
Specification preparation → Mass production
Mass production → Inspection
Inspection (OK → Shipment, NG → Mass production)

Ship Out:
Shipment → Ship out

Item	Customer	Sales	R&D	Q.A	Manufact uring	Product control	Purchase	Inventory control
Sales Service	Info → Claim ... Analysis report			Failure analysis ↓ Corrective action ↓ Tracking				
Q.A Activity	1. ISO 9001 Maintenance Activities 2. Process improvement proposal 3. Equipment calibration 4. Education And Training Activities 5. Standardization Management							

3.2   Inspection Specification

◆Scope ：The document shall be applied to TFT-LCD Module for less than 3.5″ (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.

◆Standard of the product appearance test：

   a. Manner of appearance test：

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

  （2）. The test direction is base on about around 45° of vertical line.
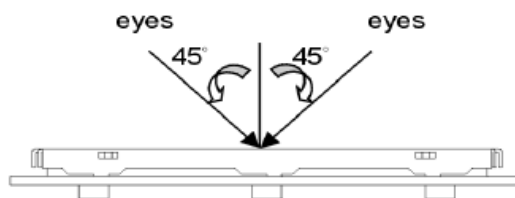
  （3）. Definition of area.
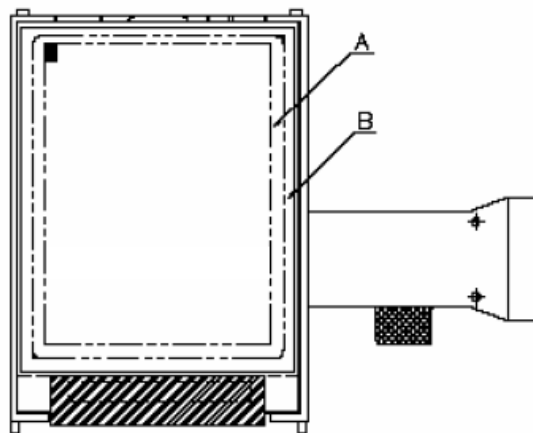
A area : viewing area
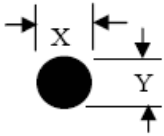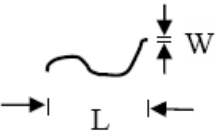
B area : Outside of viewing area
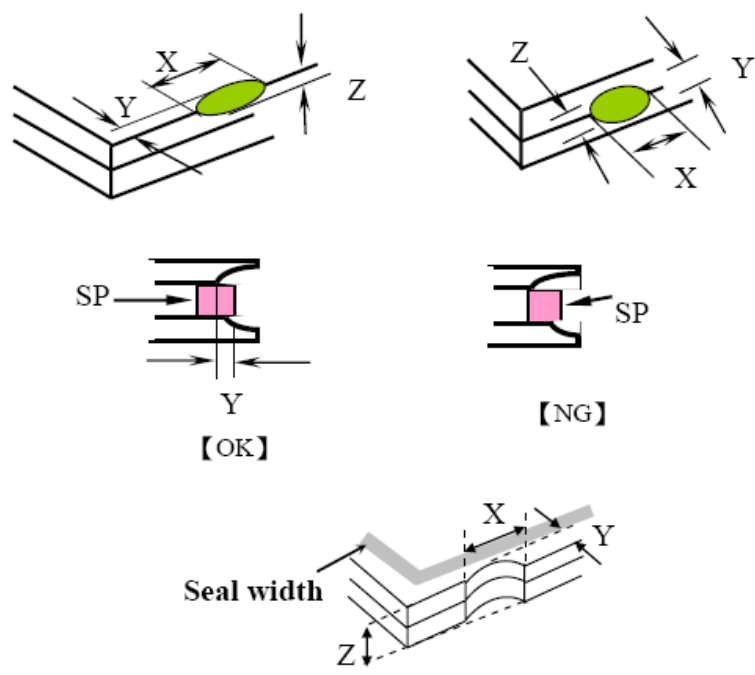
  （4）. Standard of inspection： (Unit：mm)
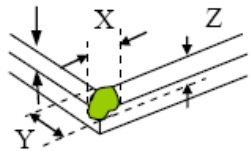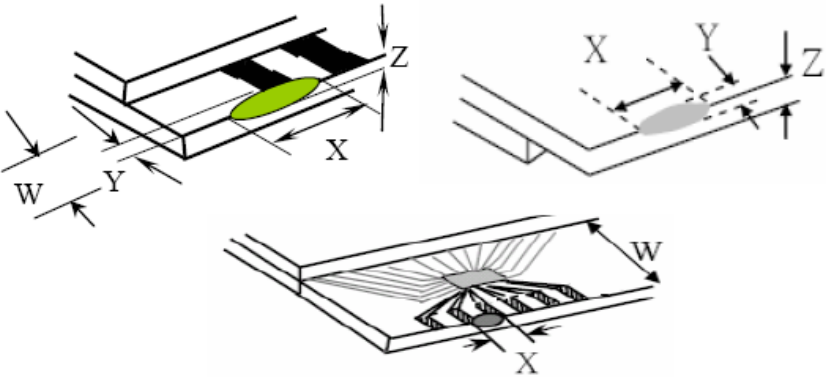
NO	Item	Criterion	Level
01	Product condition	1.1 The part number is inconsistent with work order of production.	Major
		1.2 Mixed product types.	Major
		1.3 Assembled in inverse direction.	Major
02	Quantity	2.1 The quantity is inconsistent with work order of production.	Major
03	Outline dimension	3.1 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 Display malfunction.	Major
		4.4 LCD viewing angle defect.	Major
		4.5 Current consumption exceeds product specifications.	Major
05	Dot defect (Bright dot、Dark dot) On -display	<table><tr><th colspan="2">Item</th><th>Acceptance (Q'ty)</th></tr><tr><td rowspan="4">Dot Defect</td><td>Bright Dot</td><td>≦ 2</td></tr><tr><td>Dark Dot</td><td>≦ 3</td></tr><tr><td>Joint Dot</td><td>≦ 2</td></tr><tr><td>Total</td><td>≦ 3</td></tr></table> 5.1 Inspection pattern：full white , full black , Red , Green and blue screens. 5.2 It is defined as dot defect if defect area $>1/2$ dot. 5.3 The distance between two dot defect $\geqq 5$ mm.	Minor
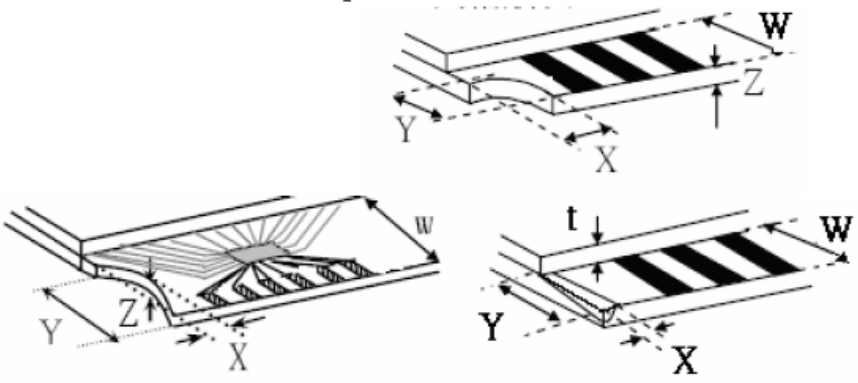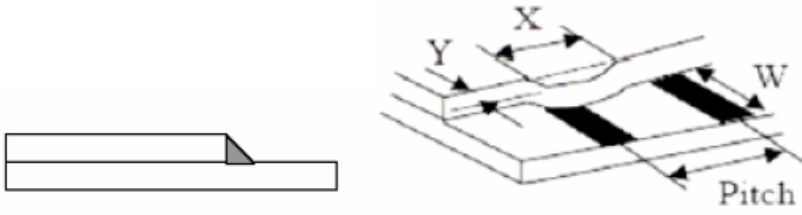
NO	Item	Criterion	Level
06	Black or white dot、scratch、contamination Round type $\Phi=(x+y)/2$ Line type	**6.1 Round type (Non-display or display)：** 6.2 Line type(Non-display or display)：	Minor
07	Polarizer Bubble		Minor

6.1 Round type (Non-display or display)：

Dimension (diameter：Φ)	Acceptance (Q'ty)	
	A area	B area
$\Phi \leqq 0.15$	Ignore	Ignore
$0.15 < \Phi \leqq 0.20$	2	
$0.20 < \Phi \leqq 0.30$	2	
$\Phi > 0.30$	0	
Total	3	

6.2 Line type(Non-display or display)：

Dimension		Acceptance (Q'ty)	
Length (L)	Width (W)	A area	B area
---	$W \leqq 0.03$	Ignore	Ignore
$L \leqq 5.0$	$0.03 < W \leqq 0.05$	3	
---	$W > 0.05$	As round type	
Total		3	

Dimension (diameter：Φ)	Acceptance (Q'ty)	
	A area	B area
$\Phi \leqq 0.20$	Ignore	Ignore
$0.20 < \Phi \leqq 0.50$	3	
$\Phi > 0.50$	0	
Total	3	

NO	Item	Criterion	Level
08	The crack of glass	Symbols： X : The length of crack　　Y : The width of crack. Z : The thickness of crack　W : terminal length t : The thickness of glass　a : LCD side length 8.1 General glass chip： 8.1.1 Chip on panel surface and crack between panels:	Minor

Symbols：

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

8.1 General glass chip：

8.1.1 Chip on panel surface and crack between panels:

SP 【OK】

SP 【NG】

Seal width

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

NO	Item	Criterion	Level
08	The crack of glass	Symbols： X : The length of crack Y : The width of crack. Z : The thickness of crack W : terminal length t : The thickness of glass a : LCD side length 8.1.2 Corner crack： *see table below* 8.2 Protrusion over terminal： 8.2.1 Chip on electrode pad： 	Minor

8.1.2 Corner crack table:

X	Y	Z
$\leqq 1/5\ a$	Crack can't enter viewing area	$Z \leqq 1/2\ t$
$\leqq 1/5\ a$	Crack can't exceed the half of SP width.	$1/2\ t < Z \leqq 2\ t$

8.2.1 table:

	X	Y	Z
Front	$\leqq a$	$\leqq 1/2\ W$	$\leqq t$
Back	$\leqq a$	$\leqq W$	$\leqq 1/2\ t$

NO	Item	Criterion	Level
08	The crack of glass	Symbols : X : The length of crack Y : The width of crack. Z : The thickness of crack W : terminal length t : The thickness of glass a : LCD side length 8.2.2 Non-conductive portion : <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≦ 1/3 a</td><td>≦W</td><td>≦t</td></tr></table> ⊙ If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications. 8.2.3 Glass remain : <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≦ a</td><td>≦ 1/3 W</td><td>≦t</td></tr></table>	Minor

NO	Item	Criterion	Level
09	Backlight elements	9.1 Backlight can't work normally.	Major
		9.2 Backlight doesn't light or color is wrong.	Major
		9.3 Illumination source flickers when lit.	Major
10	General appearance	10.1 Pin type、quantity、dimension must match type in structure diagram.	Major
		10.2 No short circuits in components on PCB or FPC .	Major
		10.3 Parts on PCB or FPC must be the same as on the production characteristic chart .There should be no wrong parts , missing parts or excess parts.	Major
		10.4 Product packaging must the same as specified on packaging specification sheet.	Minor
		10.5 The folding and peeled off in polarizer are not acceptable.	Minor
		10.6 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 ±5℃ 240 hrs**	
2	**Low Temperature Storage Test**	**Keep in -30 ±5℃ 240 hrs**	
3	**High Temperature / High Humidity Storage Test**	**Keep in 60 ℃ / 90% R.H duration for 240 hrs (Excluding the polarizer)**	
4	**Temperature Cycling Storage Test**	**-30℃ → +25℃ → +80℃ → +25℃** **(30mins) (5mins) (30mins) (5mins)** **20 Cycle**	
5	**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 ambiance : 15℃～35℃ **2. Humidity relative : 30%～60%** **3. Energy Storage Capacitance(Cs+Cd) : 150pF±10%** **4. Discharge Resistance(Rd) : 330Ω±10%** **5. Discharge, mode of operation :** **Single Discharge (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication : ±5%)**	
6	**Vibration Test (Packaged)**	**1. Sine wave 10～55 Hz frequency (1 min/sweep)** **2. The amplitude of vibration :1.5 mm** **3. Each direction (X、Y、Z) duration for 2 Hrs**	
7	**Drop Test (Packaged)**	**Packing Weight (Kg) / Drop Height (cm):** 	Packing Weight (Kg)	Drop Height (cm)	 |---|---| 	0 ～ 45.4	122	 	45.4 ～ 90.8	76	 	90.8 ～ 454	61	 	Over 454	46	 **Drop Direction :※1 corner / 3 edges / 6 sides each 1time**	

◎**Result Evaluation Criteria :**

  Under the display quality test conditions with normal operations with normal operation state.
  Do not change these conditions as such changes may affect practical display function.
  (Normal operation state)

   Temperature：+20～30℃
   Humidity：50～70%
   Atmospheric pressure：86～106Kpa

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 $320\pm10°C$ and 3-5 sec.

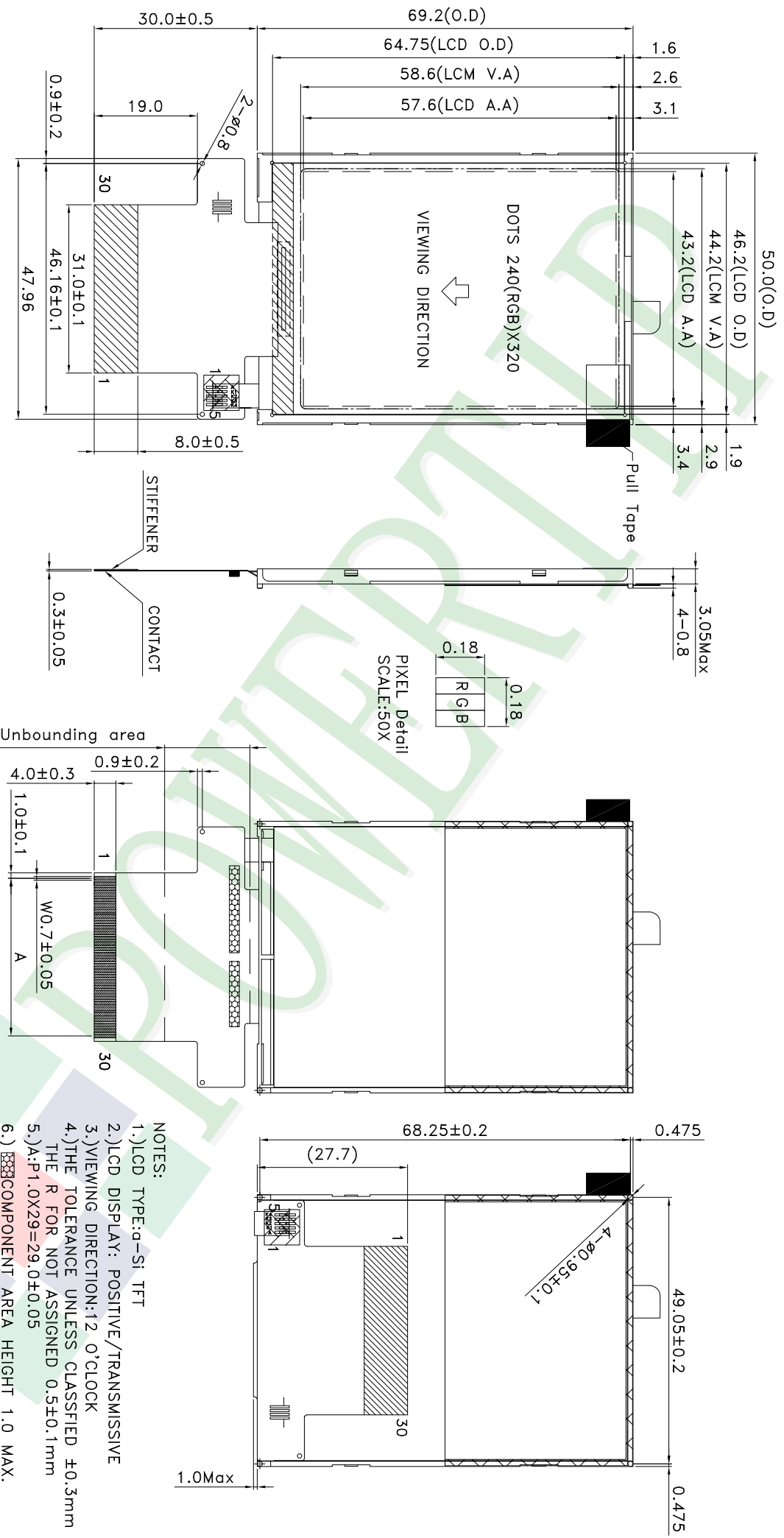5.2.9   To avoid liquid (include organic solvent) stained on LCM .

5.3 STORAGE

5.3.1   Store the panel or module in a dark place where the temperature is $25°C \pm5°C$ 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.

007					
006					
005					
004					
003					
002					
001	NEW DRAWING	Mandy		2017/11/20	
REV		REV BY	REVISER	DATE	

69.2(O.D)
64.75(LCD O.D)
58.6(LCM V.A)
57.6(LCD A.A)
30.0±0.5
19.0
2-Ø0.8
46.2(LCD O.D)
44.2(LCM V.A)
43.2(LCD A.A)
1.6
2.6
3.1
0.9±0.2
46.16±0.1
31.0±0.1
47.96
8.0±0.5
1.9
2.9
3.4
3.05Max
4-0.8

DOTS 240(RGB)X320

VIEWING DIRECTION

Pull Tape

STIFFENER
CONTACT
0.3±0.05

PIXEL Detail
SCALE:50X
0.18
0.18
R G B

Unbounding area
4.0±0.3
0.9±0.2
1.0±0.1
W0.7±0.05
A
30
1

68.25±0.2
0.475
(27.7)
1.0Max
49.05±0.2
0.475
4-Ø0.95±0.1
30
1

NOTES:
1.)LCD TYPE:a-Si TFT
2.)LCD DISPLAY: POSITIVE/TRANSMISSIVE
3.)VIEWING DIRECTION:12 O'CLOCK
4.)THE TOLERANCE UNLESS CLASSFIED ±0.3mm
THE R FOR NOT ASSIGNED 0.5±0.1mm
5.)A:P1.0X29=29.0±0.05
6.)COMPONENT AREA HEIGHT 1.0 MAX.
7.)FPC suggested connector : KYOCERA(00-6200 307 032 800) or compatible.

PART NO:
PH240320T069-LAA
DRAWING NAME:
LMD-PH240320T069-LAA
TITLE:
LCD MODULE DRAWING

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

	Design	Mandy Chang	Unit	MM	Surface	
	Check	Tina Chen	Scale	1:1	Material	
	Approve	Jimmy Chen	Page	1/1	Quantity	

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

PT-A-054-01

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

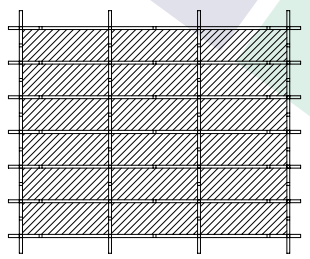| No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH240320T069-LAA	69.2 X 50 X 3.05	0.0135	432	5.832
2	抗靜電氣泡袋(1)Bubble Bag	BAG100080BWABA	100 X 80	0.0012	432	0.5184
3	A2-1隔板(2)A2-1 Partition	BX29500072BZBA	295 X 72 X 3.0	0.0109	56	0.6104
4	B2-1隔板(4)B2-1 Partition	BX24500072BZBA	245 X 72 X 3.0	0.0094	32	0.3008
5	氣泡紙(4)Bubble Sheet	BAG280240BWABA	280 X 240	0.006	16	0.096
6	C2內盒(5)Product Box	BX31025580AABA	310 X 255 X 86	0.16	8	1.28
7	外紙箱(6)Carton	BX52732536CCBA	527 X 325 X 360	0.83	1	0.83
8						
9						

2.一 整箱總重量 (Total LCD Weight in carton) : 9.47 Kg±10%

3.單箱數量規格表 (Packaging Specifications and Quantity) :
  (1)Quantity Of Spacer : A2-1隔板 X 7 , B2-1隔板 X 4
  (2)Total LCM quantity in carton : quantity per box 54 x no of boxes 8 = 432

(4) 氣泡紙 Bubble Sheet
(1)抗靜電氣泡袋+LCM Antistatic Bag+LCM
(2)(3)隔板 Partition (註 Remark 1)
(4) 氣泡紙 Bubble Sheet
(5) C2內盒 Product Box
(6)外紙箱 Carton
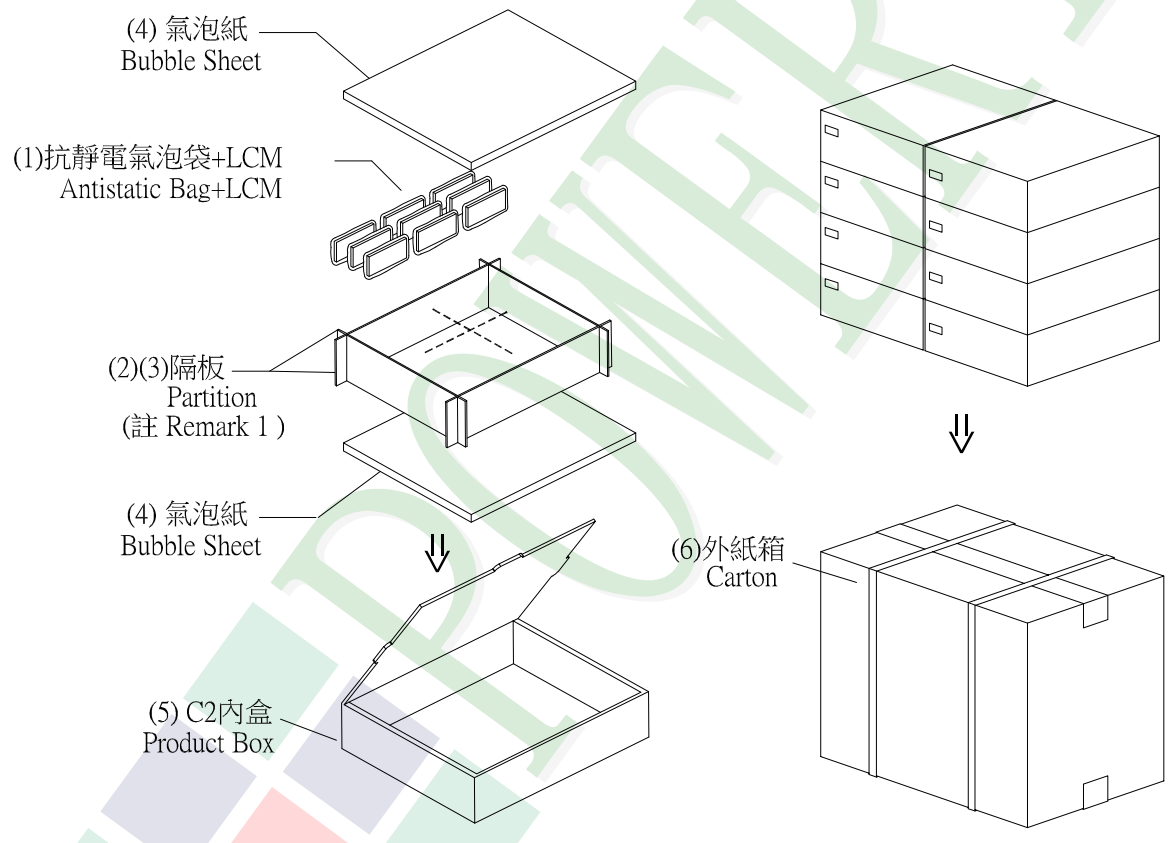
特 記 事 項 (REMARK)

4. LCM排放示意圖(前後間隔不放置):
4. LCM placed as figure showing:
  (First and last slot should be empty)

▨ 模組(LCM) X 3pcs.