POWERTIP TECH. CORP.

SPECIFICATIONS

CUSTOMER	:	
SAMPLE CODE	:	SH240320T-062-L-Q
MASS PRODUCTION CODE	:	PH240320T-062-L-Q
SAMPLE VERSION	:	02
SPECIFICATIONS EDITION	:	004
DRAWING NO. (Ver.)	:	LMD-PH240320T-062-L-Q (Ver.003)
PACKAGING NO. (Ver.)	:	PKG-PH240320T-062-L-Q (Ver:001)

Customer Approved

Date:

Approved	Checked	Designer
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POWERTIP
2012.12.14
TWRD APR

☐ Preliminary specification for design input

■ Specification for sample approval

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NO.PT-A-005-8

History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
08/03/2012	01	001	**New Drawing**	-	**Howard**
08/20/2012	01	002	**Modify TFT Size**	**Appendix**	**Howard**
09/14/2012	01	003	**New Sample** **Modify Interface Pin Description**	**-** **11,12**	**Howard**
12/12/2012	02	004	**Second Sample** **Modify Optical Characteristics** **Modify Drawing**	**-** **6** **Appendix**	**Howard**

Total: 32 Page

Contents

Note：For detailed information please refer to IC data sheet：ILITEK – ILI9341

1. SPECIFICATIONS

1.1 Features

Main LCD Panel

Item	Standard Value
Display Type	240 * (R、G、B) * 320 Dots
LCD Type	a-Si TFT , Normally White TN , Transmissive
Screen size(inch)	2.4 (Diagonal)
Viewing Direction	12 O'clock
Color configuration	R.G.B. vertical stripe
Backlight	White LED
Interface	8 Bit Interface for i80system
Driver IC	ILI9341
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web side : http://www.powertip.com.tw/news.php?area_id_view=1085560481/

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	42.32 (W) * 60.06 (L) * 2.4 (H)	mm

LCD Panel

Item	Standard Value	Unit
Viewing Area	37.72 (W) * 49.96(L)	mm
Active Area	36.72(W) * 48.96(L)	mm

Note : For detailed information please refer to LCM drawing

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit
System Power Supply Voltage	VDD	-	-0.3	4.6	V
	VGH-VGL	GND	0	+32	
Logic Input Voltage	V$_{IN}$	-	-0.3	VDD+0.3	V
Operating Temperature	TOP	-	-20	70	°C
Storage Temperature	TST	-	-30	80	°C

1.4 DC Electrical Characteristics

Module   GND = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	VDD	-	-	2.8	-	V
Input High Voltage	V$_{IH}$	-	0.7*VDD	-	VDD	V
Input Low Voltage	V$_{IL}$	-	GND	-	0.3*VDD	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	IDD	VDD = 2.8V Pattern= black *1	-	8	15	mA

Note 1: Maximum current display

1.5 Optical Characteristics

TFT LCD panel   VDD= 2.8 V, Ta=25°C

| Item		Symbol	Condition	Min.	Typ.	Max.	unit	
Response time	Rise	Tr+Tf	Ta = 25°C θX, θY = 0°	-	25	38	ms	Note2
	Fall							
Viewing angle	Top	θY+	CR ≥ 10	-	60	-	Deg.	Note4
	Bottom	θY-		-	60	-		
	Left	θX-		-	60	-		
	Right	θX+		-	60	-		
Contrast ratio		CR	Ta = 25°C θX , θY = 0°	200	250	-	-	Note3
Color of CIE Coordinate (With B/L & T/P)	White	X	Ta = 25°C θX , θY = 0°	0.22	0.27	0.32	-	Note1
		Y		0.23	0.28	0.33		
	Red	X		0.51	0.56	0.61		
		Y		0.29	0.34	0.39		
	Green	X		0.27	0.32	0.37		
		Y		0.54	0.59	0.64		
	Blue	X		0.09	0.14	0.19		
		Y		0.01	0.06	0.11		
Average Brightness Pattern=white display (With B/L)		IV	IF=60 mA	110	120	-	cd/m^2	Note1
Uniformity (With B/L)		△B	IF=60 mA	80	-	-	%	Note1

Note1:

*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
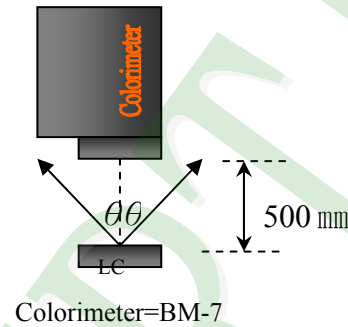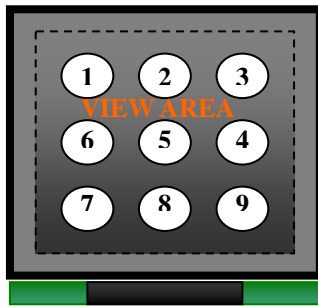
  To be measured at the center area of panel with a viewing cone of 1° by Topcon
  luminance meter BM-7, after 10 minutes operation (module)

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:

Normally White

Normally Black

"Black" | "White" | "Black"

100%
90%

Signal (Relative value)
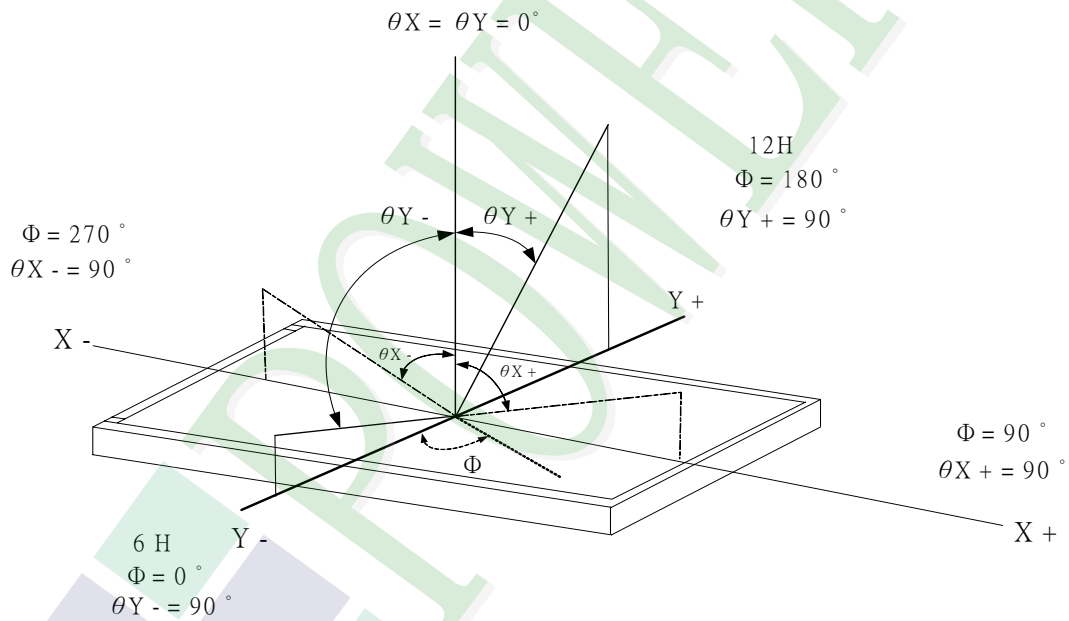
10%
0%

Tr   Tf
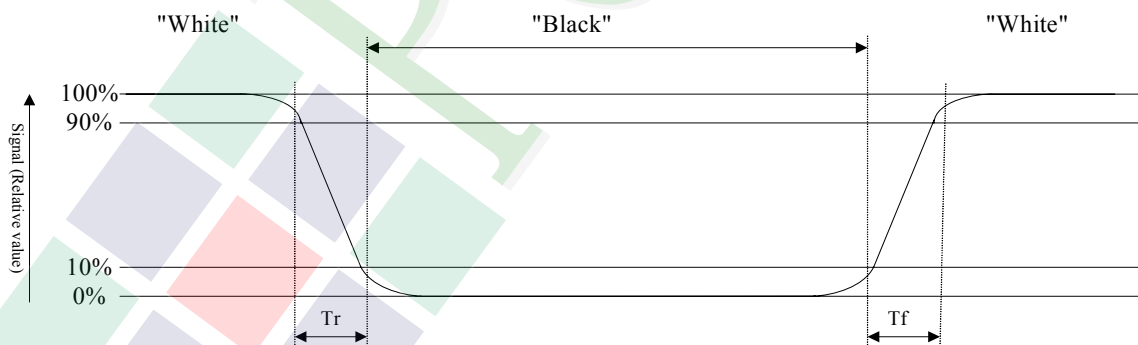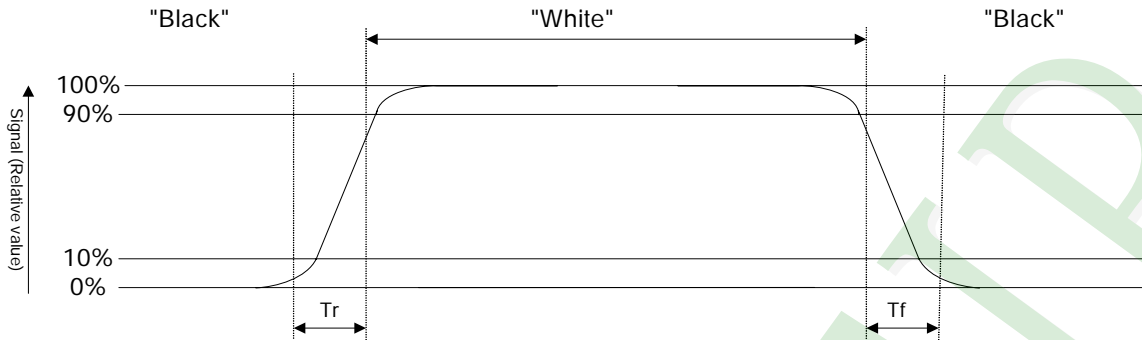
Note3: Definition of contrast ratio:
Contrast ratio is calculated with the following formula

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

Note4: Definition of viewing angle:
Refer to figure as below:

$\theta X = \theta Y = 0°$

$\Phi = 270°$
$\theta X - = 90°$

$12H$
$\Phi = 180°$
$\theta Y + = 90°$

$\theta Y -$ $\theta Y +$

Y +

$\theta X -$ $\theta X +$

X -

Φ

$\Phi = 90°$
$\theta X + = 90°$

$6 H$
$\Phi = 0°$
$\theta Y - = 90°$

Y -

X +

1.6 Backlight & LED Characteristics

LCD Module with LED Backlight

Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25	-	75	mA
Reverse Voltage	VR	Ta =25	-	4	V

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF		-	3.2	3.5	V
Average Brightness (without LCD)	IV	IF= 60 mA	2500	2800	-	cd/m^2
Color of CIE Coordinate*1 (Without LCD)	X		-	0.27	-	*2
	Y		-	0.27	-	
Color		White				

*1：This value will be changed while mass production.

*2：$\triangle$B=B(min) / B(max) *100%

B/L Internal Circuit Diagram
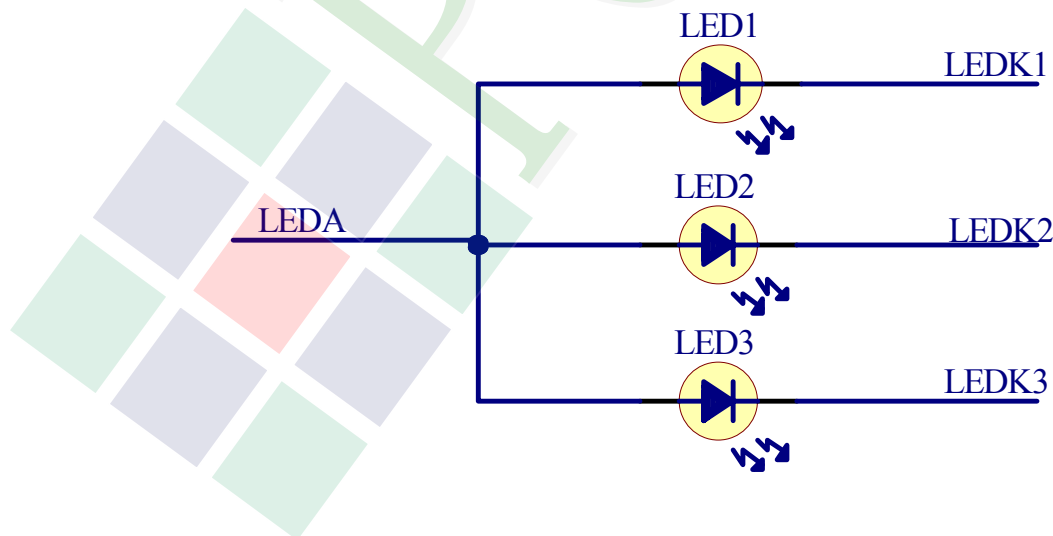
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram
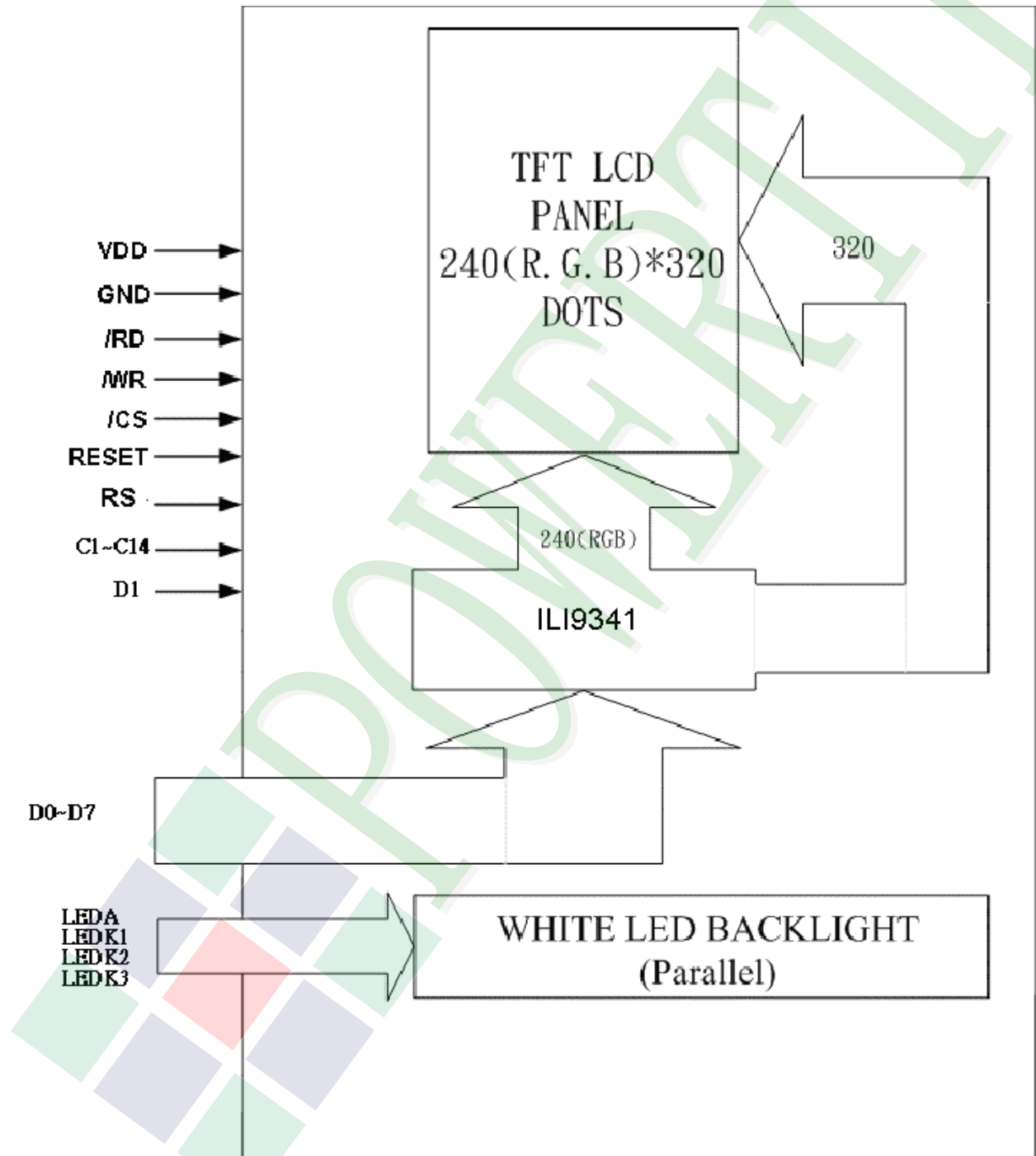
2.2 Interface Pin Description

Pin No.	Symbol	Function
1	GND	System Ground.(0V)
2	RESET	This signal will reset the device and must be applied to properly initialize the chip. Signal is active low.
3	DB7	Bi-directional data bus.
4	DB6	Bi-directional data bus.
5	DB5	Bi-directional data bus.
6	DB4	Bi-directional data bus.
7	DB3	Bi-directional data bus.
8	DB2	Bi-directional data bus.
9	DB1	Bi-directional data bus.
10	DB0	Bi-directional data bus.
11	RD	Serves as a read signal and MCU read data at the rising edge.
12	/WR	Serves as a write signal and writes data at the rising edge.
13	RS	When RS = '1', data is selected. When RS = '0', command is selected.
14	/CS	Chip select input pin ("Low" enable).
15	VDD_C1	Not Connect.
16	VCOMH_C2	Not Connect.
17	VCOML_C3	Not Connect.
18	GVDD_C4	Not Connect.
19	VCL_C5	VCL pad. Place a 1uF/10V capacitor to GND.
20	AVDD_C6	AVDD pad. Place a 1uF/10V capacitor to GND.
21	VCI1_C7	VCI1 pad. Place a 1uF/10V capacitor to GND.
22	C12N	Place a 1uF/10V capacitor between C12N and C12P.

Pin No.	Symbol	Function
23	C12P	Place a 1uF/10V capacitor between C12P and C12N.
24	C11N	Place a 1uF/10V capacitor between C11N and C11P.
25	C11P	Place a 1uF/10V capacitor between C11P and C11N.
26	VGL_C10_D1	VGH pad. Place a 1uF/25V capacitor to GND.
27	VGH_C11	VGL pad. Place a 1uF/25V capacitor to GND.
28	C21N	Place a 1uF/10V capacitor between C21N and C21P.
29	C21P	Place a 1uF/10V capacitor between C21P and C21N.
30	C22N	Place a 1uF/25V capacitor between C22N and C22P.
31	C22P	Place a 1uF/25V capacitor between C22P and C22N.
32	C31N	Place a 1uF/25V capacitor between C31N and C31P.
33	C31P	Place a 1uF/25V capacitor between C31P and C31N.
34	LEDA	Power supply for LED Backlight Anode input.
35	LEDK1	Power supply for LED Backlight Cathode input.
36	LEDK2	Power supply for LED Backlight Cathode input.
37	LEDK3	Power supply for LED Backlight Cathode input.
38	VDD	Power supply.(2.8V) .

2.2.1 Application Notes:

CON

Pin	Signal
1	GND
2	RESET
3	DB7
4	DB6
5	DB5
6	DB4
7	DB3
8	DB2
9	DB1
10	DB0
11	RD
12	WR
13	RS
14	CS
15	
16	✕
17	✕
18	✕
19	✕
20	VCL_C5 C1 1uF
21	AVDD_C6 C2 1uF
22	VCI1_C7 C3 1uF
23	C12N C4 1uF
24	C12P
25	C11N C5 1uF
26	C11P
27	VGL_C10_D1 C6 1uF/25V
28	VGH_C11 C7 1uF/25V
29	C21N C8 1uF
30	C21P
31	C22N C9 1uF
32	C22P
33	C31N C10 1uF
34	C31P
35	LEDA
36	LEDK1
37	LEDK2
38	LEDK3
	VDD

GND

CON37
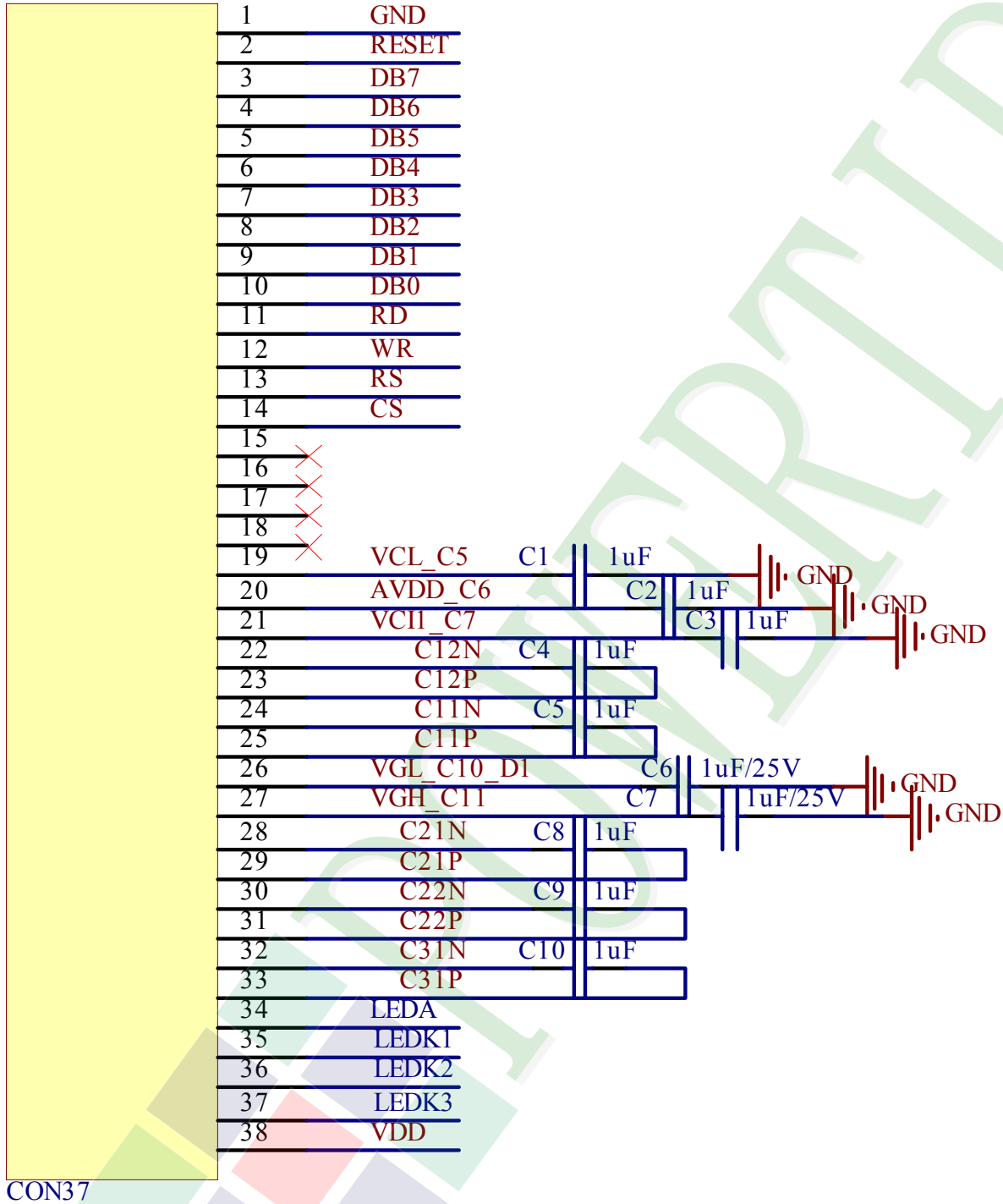
2.2.2 Refer Initial code:

```
//Initial-------------------------------------------------------

void Initial_Main(void)                          // For   ILI9341

{

        WriteCOM_Main(0xCF);

        WriteDAT_Main(0x00);

        WriteDAT_Main(0xD9);

        WriteDAT_Main(0x30);


        WriteCOM_Main(0xED);

        WriteDAT_Main(0x64);

        WriteDAT_Main(0x03);

        WriteDAT_Main(0x12);

        WriteDAT_Main(0x81);


        WriteCOM_Main(0xE8);

        WriteDAT_Main(0x85);

        WriteDAT_Main(0x00);

        WriteDAT_Main(0x78);


        WriteCOM_Main(0xCB);

        WriteDAT_Main(0x39);

        WriteDAT_Main(0x2C);

        WriteDAT_Main(0x00);

        WriteDAT_Main(0x34);

        WriteDAT_Main(0x02);
```

WriteCOM_Main(0xF7);

WriteDAT_Main(0x20);

WriteCOM_Main(0xEA);

WriteDAT_Main(0x00);

WriteDAT_Main(0x00);

WriteCOM_Main(0xC0);//Power control

WriteDAT_Main(0x21);//VRH[5:0] //0x1B

WriteCOM_Main(0xC1);//Power control

WriteDAT_Main(0x12);//SAP[2:0];BT[3:0]

WriteCOM_Main(0xC5); //VCOM Control

WriteDAT_Main(0x32);

WriteDAT_Main(0x3C);

WriteCOM_Main(0xC7); //VCOM Control2

WriteDAT_Main(0xa3); //0x9D

WriteCOM_Main(0x36); //Memory access Control

WriteDAT_Main(0x08);

WriteCOM_Main(0x3A); //Memory access Control

WriteDAT_Main(0x55);

WriteCOM_Main(0xB1);

WriteDAT_Main(0x00);

WriteDAT_Main(0x1B);

WriteCOM_Main(0xB6); //Display Function

WriteDAT_Main(0x0a);

WriteDAT_Main(0xa2);

WriteCOM_Main(0xF6);

WriteDAT_Main(0x01);

WriteDAT_Main(0x30);

WriteCOM_Main(0xF2); //3Gamma Function Disable

WriteDAT_Main(0x00);

WriteCOM_Main(0x26); //Gamma Curve select

WriteDAT_Main(0x01);

//-----------set gamma----------------

WriteCOM_Main(0xe0); //set gamma

WriteDAT_Main(0x0f);

WriteDAT_Main(0x1c);

WriteDAT_Main(0x19);

WriteDAT_Main(0x08);

WriteDAT_Main(0x0b);

WriteDAT_Main(0x04);

WriteDAT_Main(0x4b);

WriteDAT_Main(0x64);

WriteDAT_Main(0x3e);

WriteDAT_Main(0x09);

WriteDAT_Main(0x15);

WriteDAT_Main(0x08);

WriteDAT_Main(0x16);

WriteDAT_Main(0x0D);

WriteDAT_Main(0x04);

WriteCOM_Main(0xe1); //set gamma

WriteDAT_Main(0x00);

WriteDAT_Main(0x1a);

WriteDAT_Main(0x1e);

WriteDAT_Main(0x03);

WriteDAT_Main(0x0f);

WriteDAT_Main(0x03);

WriteDAT_Main(0x35);

WriteDAT_Main(0x23);

```
    WriteDAT_Main(0x45);

    WriteDAT_Main(0x04);

    WriteDAT_Main(0x0c);

    WriteDAT_Main(0x0b);

    WriteDAT_Main(0x2b);

    WriteDAT_Main(0x2e);

    WriteDAT_Main(0x05);


    WriteCOM_Main(0x11); //exit sleep

    Delay(120);

    WriteCOM_Main(0x29);//Display on



}
```

2.3 Timing Characteristics

80-Sysyem Bus Operation
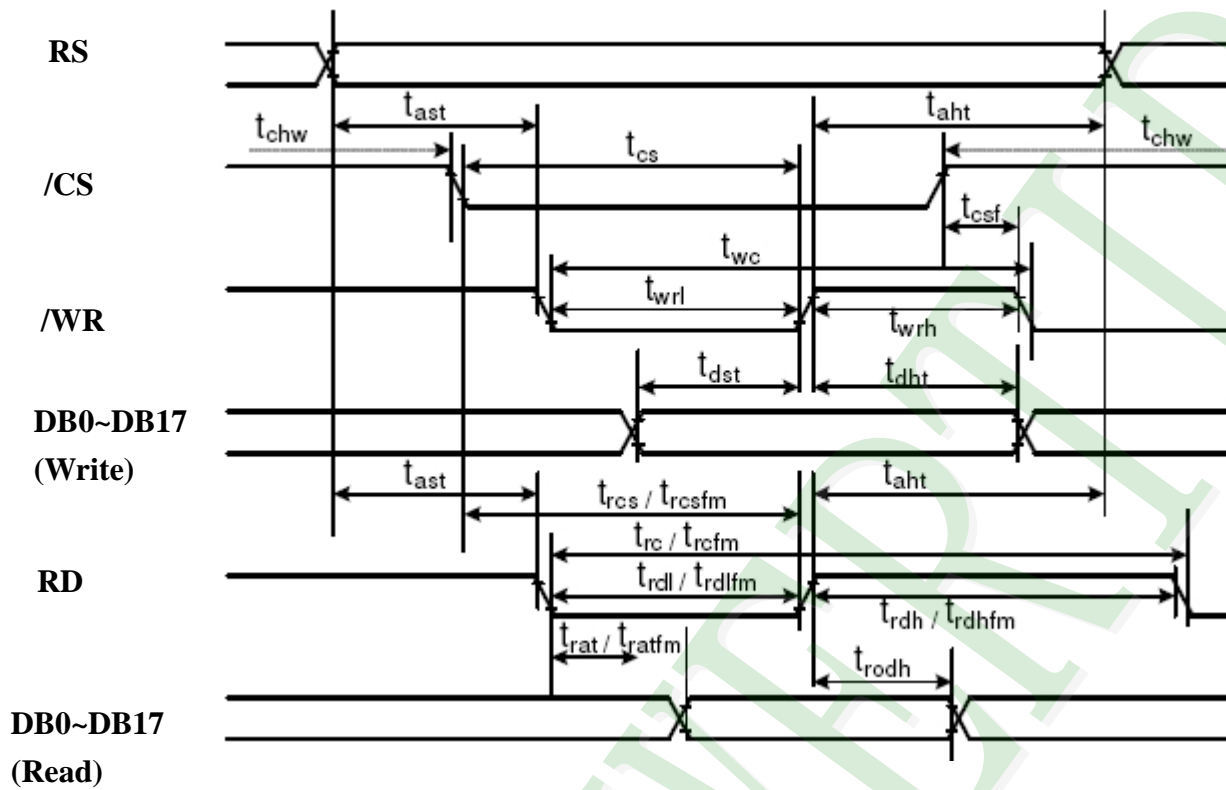
VDD= 2.8V, Ta=25℃

Signal	Symbol	Parameter	Min	Max	Unit
RS	tast	Address Setup time	0	-	ns
	taht	Address Hold time(Write/Read)	0	-	ns
/CS	tCHW	CS "H" pulse width	0	-	ns
	tCS	Chip select Setup time (Write)	15	-	
	trcs	Chip Select setup time (Read ID)	45		
	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	Control pulse "H" duration	15	-	ns
	tWRL	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
DB0~DB17	tDST	Write Data setup time	10		ns
	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

LCD Reset
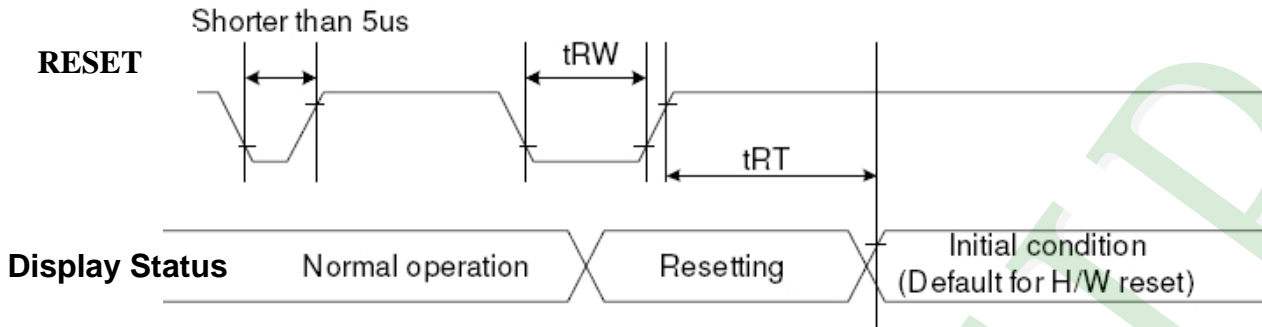
Signal	Symbol	Parameter	Min.	Max.	Unit
	tRW	Reset pulse duration	10	-	us
	tRT	Reset cancel	-	5 (Note1,5)	ms
			-	120 (Note1,6,7)	ms

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:
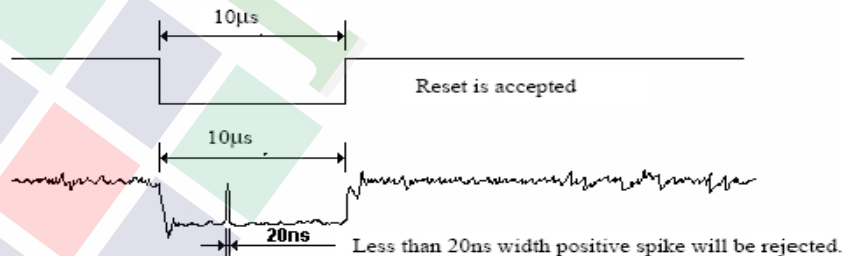
Note 5: When Reset applied during Sleep In Mode.
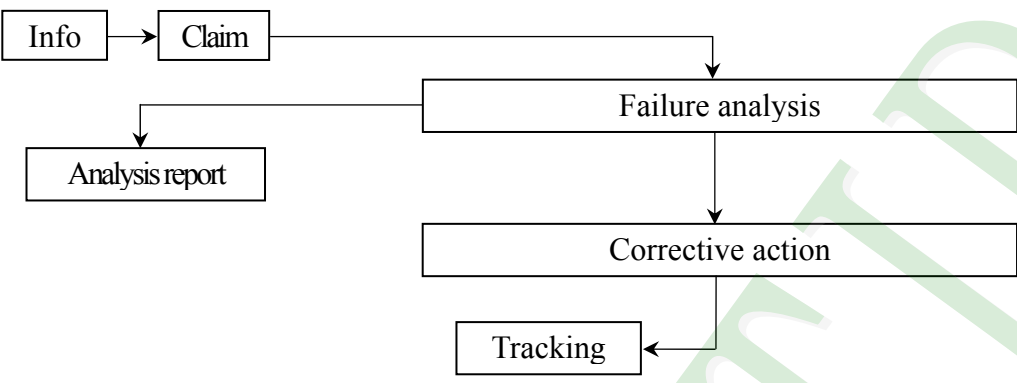
Note 6: When Reset applied during Sleep Out Mode.

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

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								

Info → Survey

Request → Inquiry → Project evaluation

Project Validation → NG / OK

Quote

Contract

Design check

Sample test

Verification — NG / OK

Sample approval — NG / OK

Pilot run & Reliability test

Verification — NG / OK

Specification preparation

Mass production

Inspection — OK / NG

Shipment

Ship out

Item	Customer	Sales	R&D	Q.A	Manufactu ring	Product control	Purchase	Inventory control
Sales Service								

Flowchart (Sales Service):

Info → Claim → Failure analysis → Corrective action → Tracking

Failure analysis → Analysis report

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.
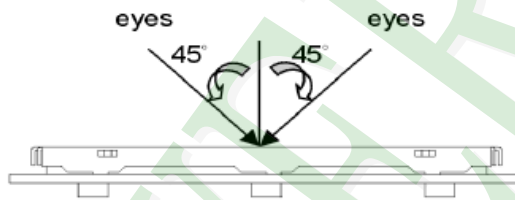
   （3）. Definition of area.
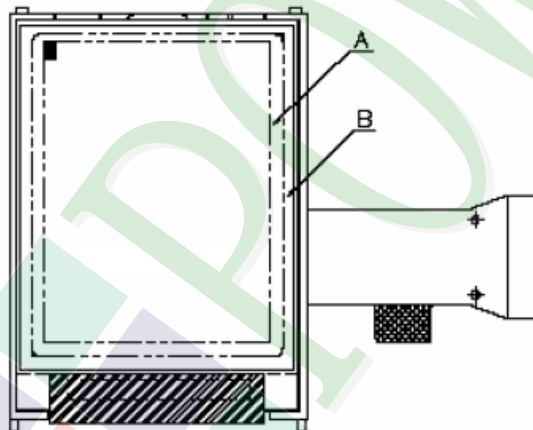
A area : viewing area

B area : Outside of viewing area

   （4）. Standard of inspection： (Unit：mm)
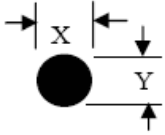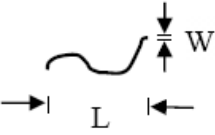
◆**Specification For TFT-LCD Module Less Than 3.5″:**　　　　　　　　　　　　　(Ver.B01)
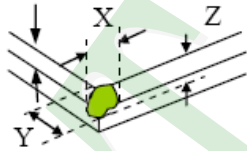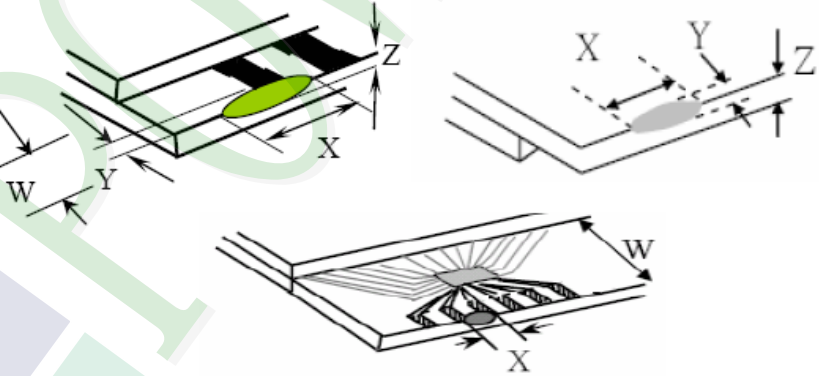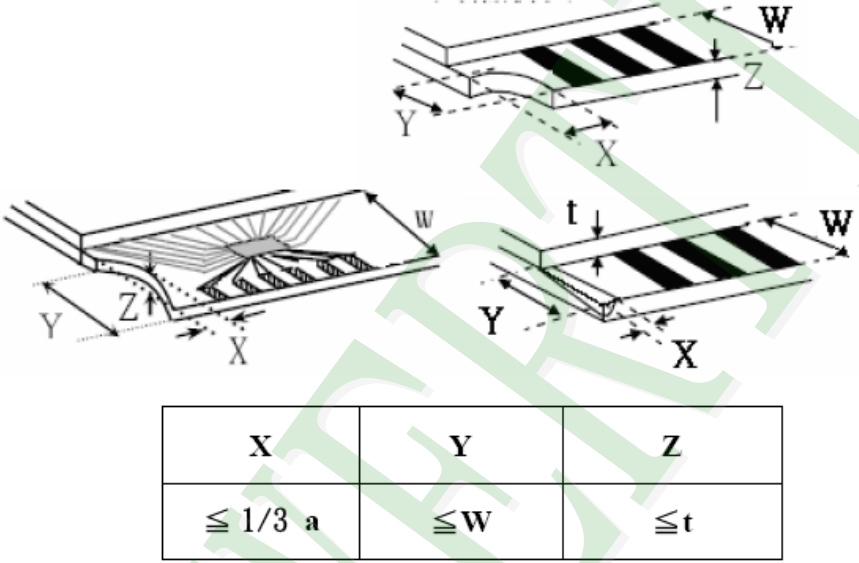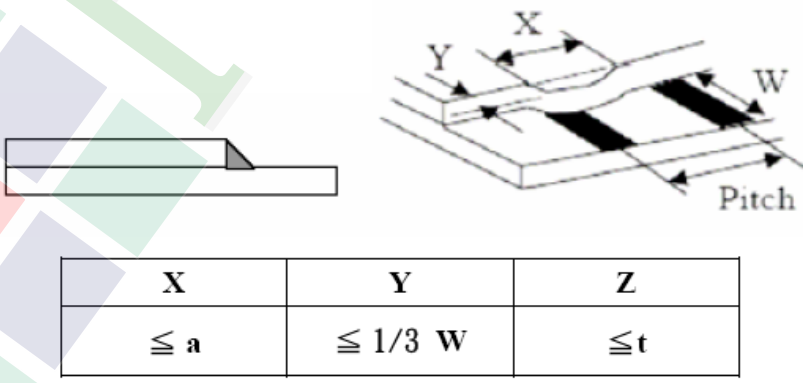
NO	Item	Criterion	Level
01	Product condition	1.1 The part number is inconsistent with work order of production.	Major
		1.2 Mixed product types.	Major
		1.3 Assembled in inverse direction.	Major
02	Quantity	2.1 The quantity is inconsistent with work order of production.	Major
03	Outline dimension	3.1 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><td colspan="2">Item</td><td>Acceptance (Q'ty)</td></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 ≧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）：** 	Dimension (diameter：Φ)	Acceptance (Q'ty) A area	Acceptance (Q'ty) B area
---	---	---
$\Phi \leq 0.15$	Ignore	Ignore
$0.15 < \Phi \leq 0.20$	2	
$0.20 < \Phi \leq 0.30$	2	
$\Phi > 0.30$	0	
Total	3	| **6.2 Line type(Non-display or display）：** | Dimension Length (L)	Dimension Width (W)	Acceptance (Q'ty) A area	Acceptance (Q'ty) B area
---	$W \leq 0.03$	Ignore	Ignore
$L \leq 5.0$	$0.03 < W \leq 0.05$	3	
---	$W > 0.05$	As round type	
Total		3			Minor
07	Polarizer Bubble		Dimension (diameter：Φ)	Acceptance (Q'ty) A area	Acceptance (Q'ty) B area
---	---	---
$\Phi \leq 0.20$	Ignore	Ignore
$0.20 < \Phi \leq 0.50$	3	
$\Phi > 0.50$	0	
Total	3			Minor

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

【OK】　　　　【NG】

Seal width

X	Y	Z
≦ a	Crack can't enter viewing area	≦1/2 t
≦ a	Crack can't exceed the half of SP width.	1/2 t < Z ≦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 : 8.2 Protrusion over terminal : 8.2.1 Chip on electrode pad :	Minor

8.1.2 Corner crack table:

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

8.2.1 Chip on electrode pad table:

	X	Y	Z
Front	≦ a	≦ 1/2 W	≦ t
Back	≦ a	≦ W	≦ 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 ±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℃ / 90% R.H duration for 96 hrs** **Surrounding temperature, then storage at normal condition 4hrs.** **(Excluding the polarizer)**
4	**ESD Test**	**Air Discharge:** / **Contact Discharge:** **Apply 2 KV with 5 times** / **Apply 250V with 5 times** **Discharge for each polarity +/-** / **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 s)** **(Tolerance if the output voltage indication: ±5%)**
5	**Temperature Cycling Storage Test**	**-30℃ → +25℃ → +80℃ → +25℃** **(30mins) (5mins) (30mins) (5mins)** **10 Cycle** **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)**	(see table below) **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

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±10℃ 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℃ ±5℃ 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 Twenty-four 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.
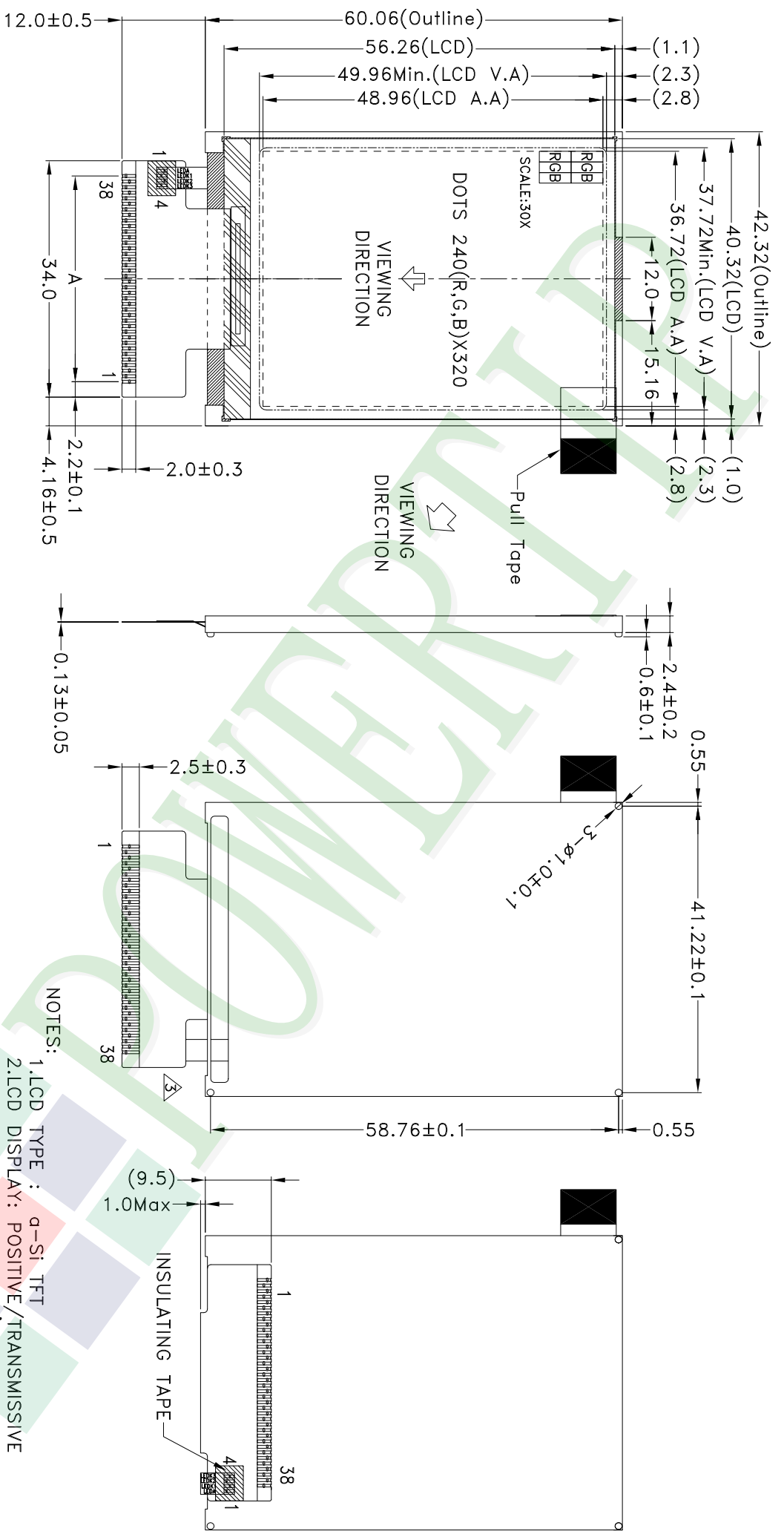
NOTES:
1. LCD TYPE : a-Si TFT
2. LCD DISPLAY: POSITIVE/TRANSMISSIVE
3. VIEW DIRECTION: 12 O'CLOCK
4. The tolerance unless classified ±0.3mm
   The R for not assigned 0.5±0.1mm
5. IC No.: ILI9341 OR COMPATIBLE DRIVER IC
6. A:P0.8*37=29.6±0.05;W=0.4±0.05

DOTS 240(R,G,B)X320
SCALE:30X

VIEWING DIRECTION

VIEWING DIRECTION

Pull Tape

INSULATING TAPE

60.06(Outline)
56.26(LCD)
49.96Min.(LCD V.A)
48.96(LCD A.A)
42.32(Outline)
40.32(LCD)
37.72Min.(LCD V.A)
36.72(LCD A.A)
12.0
15.16
(1.1)
(2.3)
(2.8)
(1.0)
(2.3)
(2.8)

12.0±0.5
2.0±0.3
38
4
1
34.0
A
A
2.2±0.1
4.16±0.5
1

0.13±0.05
2.4±0.2
0.6±0.1
0.55
2.5±0.3
3-ϕ1.0±0.1
41.22±0.1
1
38
58.76±0.1
0.55

(9.5)
1.0Max
1
38
1
4
1
38

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

LCM包裝規格書
LCM Packaging Specifications

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)	PH240320T-062-L-Q	42.32 X 60.06	0.0089	468	4.1652
2	氣泡袋(1)Bubble Bag	BAG100065BRABA	100 X 65	0.0008	468	0.3744
3	A1-1隔板(2)A1-1 Partition	BX29500047BZBA	295 X 47 X 3	0.0078	96	0.7488
4	B1-1隔板(3)B1-1 Partition	BX24500047BZBA	245 X 47 X 3	0.0065	48	0.312
5	氣泡紙(4)Bubble Sheet	BAG280240BWABA	280 X 240	0.006	24	0.144
6	C1內盒(5)Product Box	BX31025555AABA	310 X 255 X 55	0.13	12	1.56
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) : 8.13 Kg±10%

3.單箱數量規格表 (Packaging Specifications and Quantity) :
  (1)Quantity Of Spacer : A1-1隔板 X 8 , B1-1隔板 X 4
 (2)Total LCM quantity in carton : quantity per box 39 x no of boxes 12 = 468

(5) 氣泡紙 Bubble Sheet

(1)氣泡袋+LCM Bubble Bag+LCM

(3) B1-1隔板 B1-1 Partition

(2) A1-1隔板 A1-1 Partition

(4) 氣泡紙 Bubble Sheet

(5) C1內盒 Product Box

(6)外紙箱 Carton
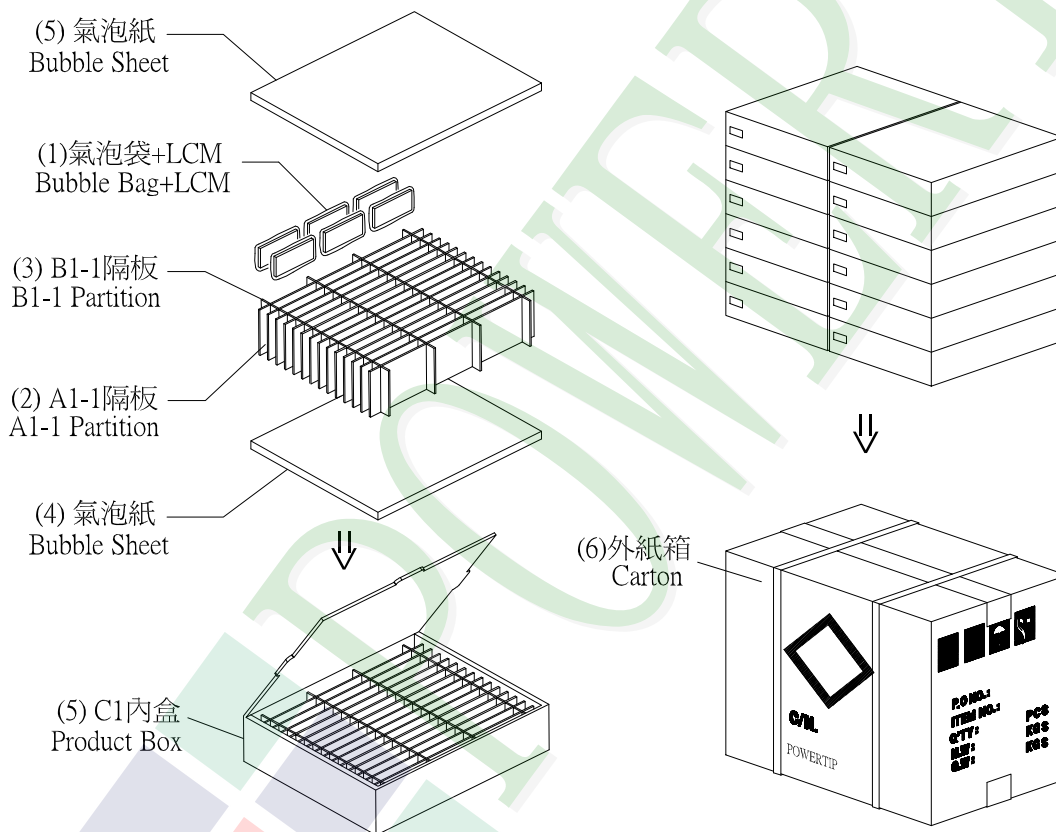
特 記 事 項 (REMARK)

4. Label Specifications :

TYPE	
ID.NO	S/O
Q'TY	Pcs Date
Lot.NO	
Note	

參照"成品包裝點檢作業標準書"內容

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

▨ 模組(LCM) X 2pcs.   ▧ 模組(LCM) X 1pcs.
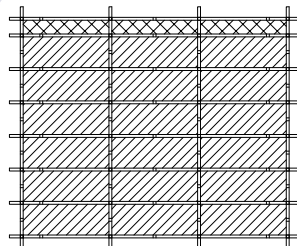
6. 最外格所放之產品,玻璃面要朝向內側.
6. Put in the outermost cell products, glass surface toward the inside.

POWERTIP TECH. CORP.