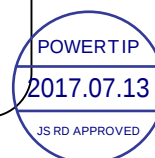


SPECIFICATIONS

CUSTOMER	:	CES008
SAMPLE CODE	:	SH240320T063-LZG01
MASS PRODUCTION CODE	:	PH240320T063-LZG01
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	004
DRAWING NO. (Ver.)	:	JLMD- PH240320T063-LZG01_001
PACKAGING NO. (Ver.)	:	JPKG- PH240320T063-LZG01_001

Customer Approved

Date:



Approved	Checked	Designer
閻偉	李昀	劉進

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

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History of Version

[illegible]

Total: 30 Page

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Appendix : 1.LCM Drawing
2.Packaging

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	8/16-bit 80-system I/F
Other(controller/driver IC)	ILITEK: ILI9341
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web site : http://www.powertip.com.tw/news.php?area_id_view=1085560481/

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	50.0(W) * 69.2 (L) * 3.4 (H)	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	°C
Storage Temperature	T _{ST}	-	-30	+80	°C
Storage Humidity	H _D	T _a ≤ 60 °C	20	90	%RH

1.4 DC Electrical Characteristics

Module

GND = 0V, T_a = 25°C

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}	I _{OH} =-0.1mA	0.8*VDD	-	VDD	V
Output Low Voltage	V _{OL}	I _{OL} =0.1mA	GND	-	0.2*VDD	V
Supply Current	ICC	VCC = 2.8V	-	8.5	12	mA

1.5 Optical Characteristics

TFT LCD Module

VCC = 2.8V, Ta=25°C

Item	Symbol	Condition	Min.	Typ.	Max.	unit	-
Response time	Tr+ Tf	-	-	30	45	ms	Note2
Viewing angle	Top	$\theta+$	-	60	-	Deg.	Note1
	Bottom	$\theta-$	-	60	-		
	Left	θ_L	-	60	-		
	Right	θ_R	-	60	-		
Contrast ratio	CR	-	500	600	-	-	Note3
Color of CIE Coordinate (With B/L)	White	X	0.25	0.30	0.35	-	Note4
		Y	0.28	0.33	0.38		
	Red	X	0.58	0.63	0.68		
		Y	0.3	0.35	0.4		
	Green	X	0.29	0.34	0.39		
		Y	0.56	0.61	0.66		
	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	500	700	-	cd/m ²	
Uniformity (With B/L)*2	ΔB	IF=80 mA	80	-	-	%	

Note 4:

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

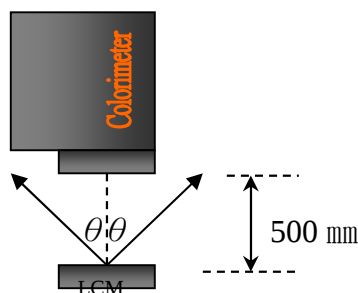
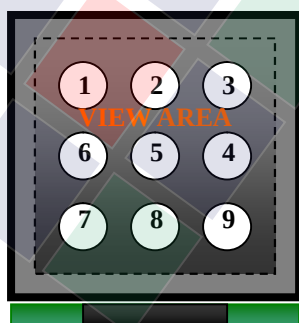
*2 : Measurement Condition for Optical Characteristics:

a : Environment: 25°C±5°C / 60±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 ± 4%



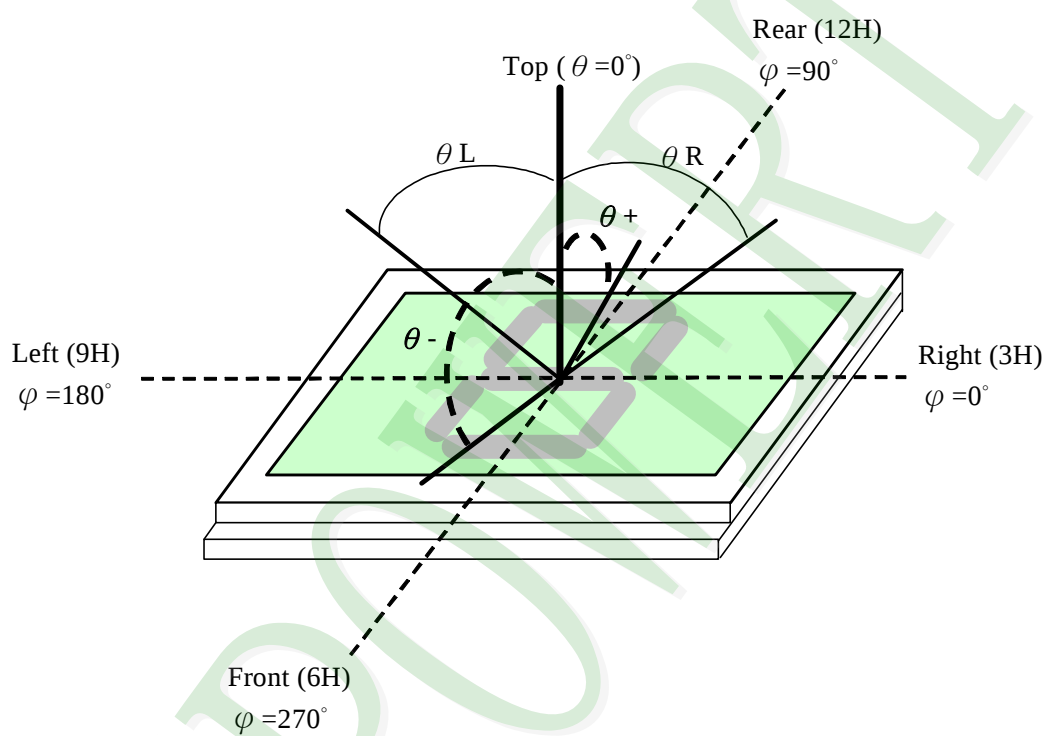
Colorimeter=BM-7 fast

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)

Note 1.

Optical characteristics-2

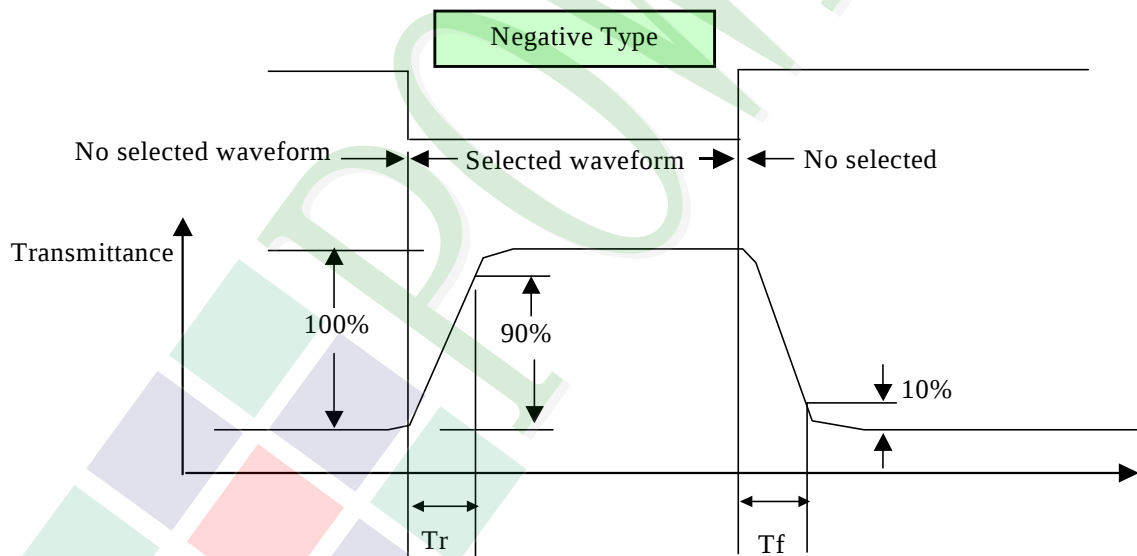
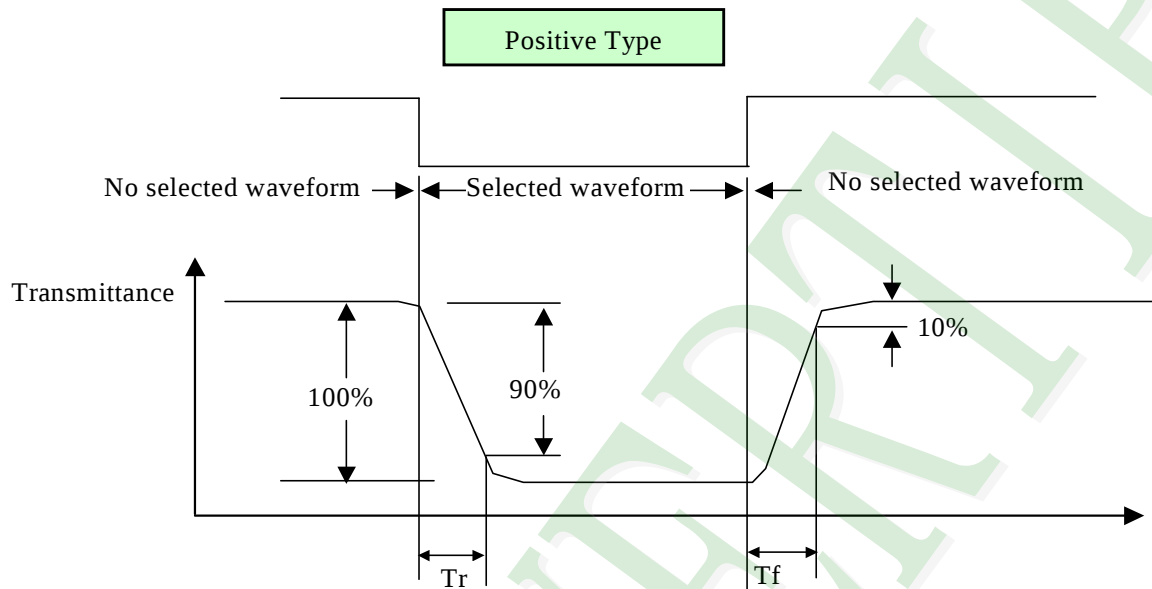
Viewing angle



Note 2.

Optical characteristics-3

Fig.2 Definition of response time



Electrical characteristics-2

※ 2 Drive waveform

V_{op} : Drive voltage

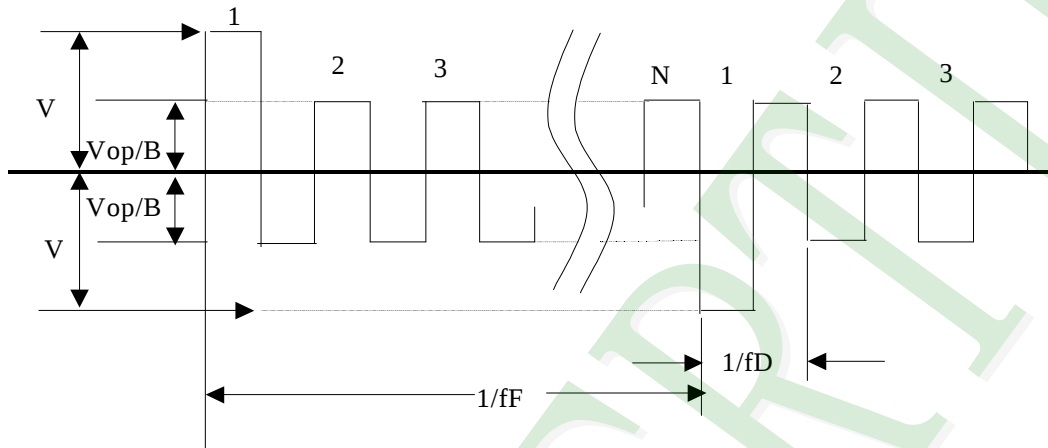
$1/B$: Bias

N : Duty

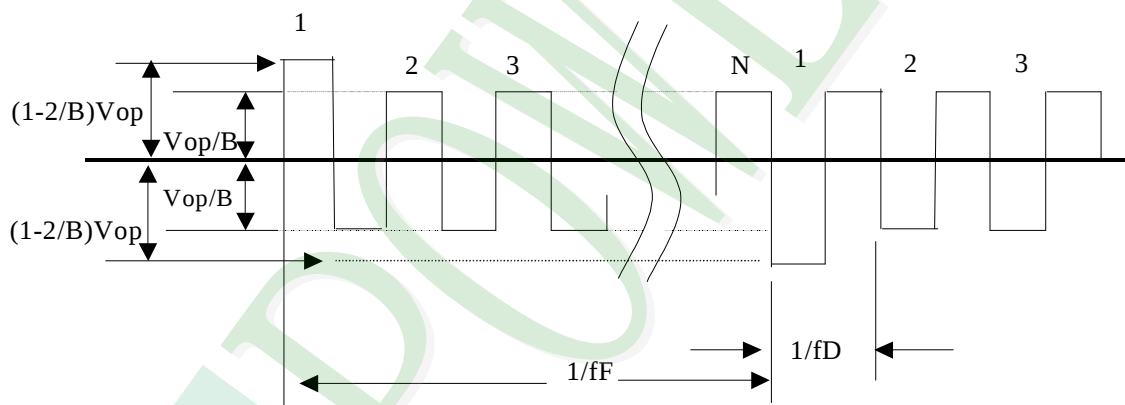
f_F : Frame frequency

f_D : Drive frequency

(1) Selected waveform



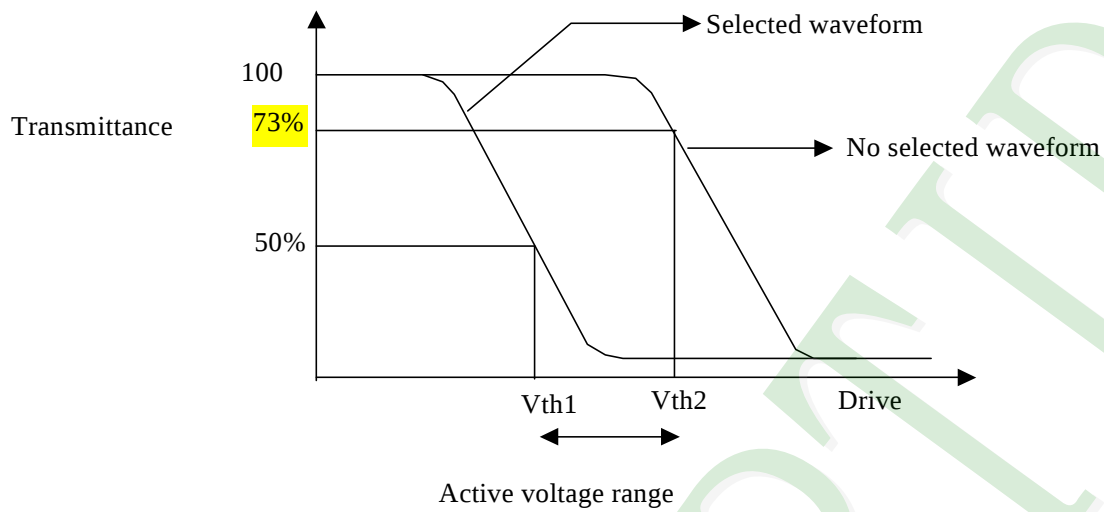
(2) Non- Selected wave form



Note:

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

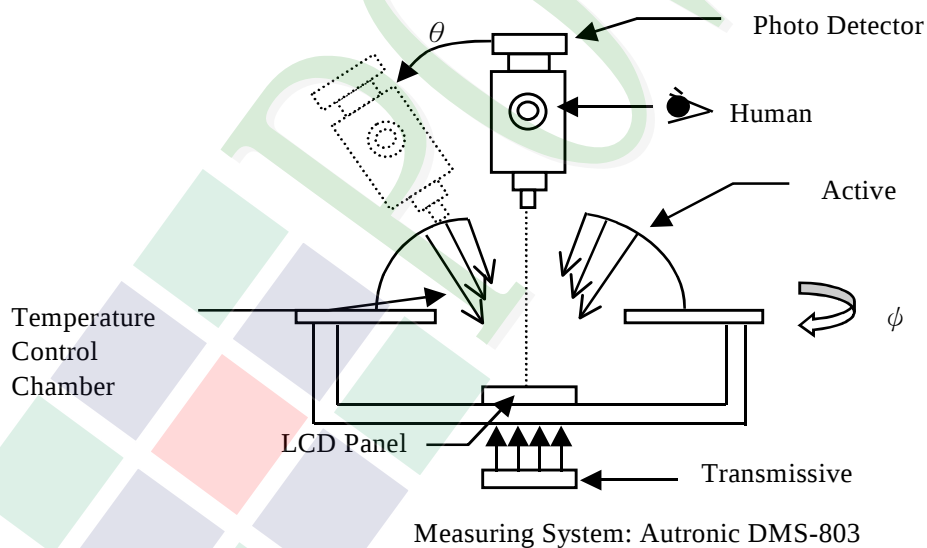
Note 3. : Definition of Vth



	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



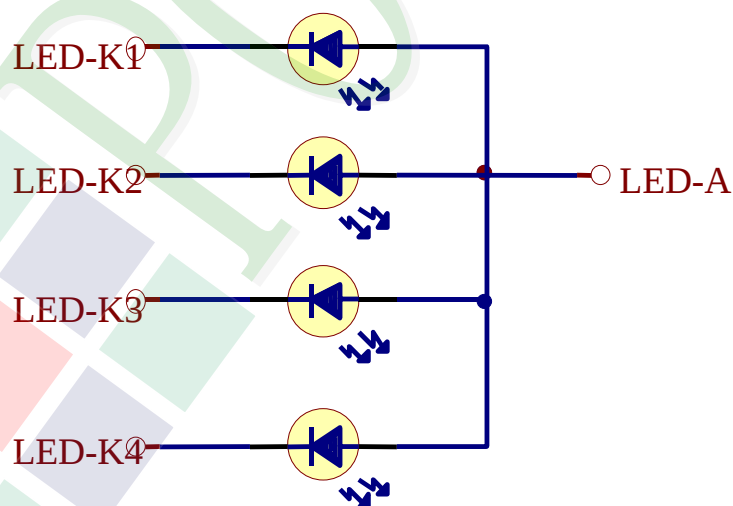
1.6 Backlight Characteristics

Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
Forward Current	IF	Ta =25℃	-	120	mA
Reverse Current	IR	Vr = 5V	-	20	uA
Power Dissipation	PD	Ta =25℃	-	360	mW

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 80 mA	3.0	3.3	3.6	V
Average Brightness (without LCD)	IV		8000	10000	12000	cd/m ²
CIE Color Coordinate (Without LCD)	X		0.26	0.28	0.33	-
	Y		0.26	0.28	0.33	
Mean Time Between Failure	MTBF	Ta=25℃	-	50000	-	Hours
Color	White					

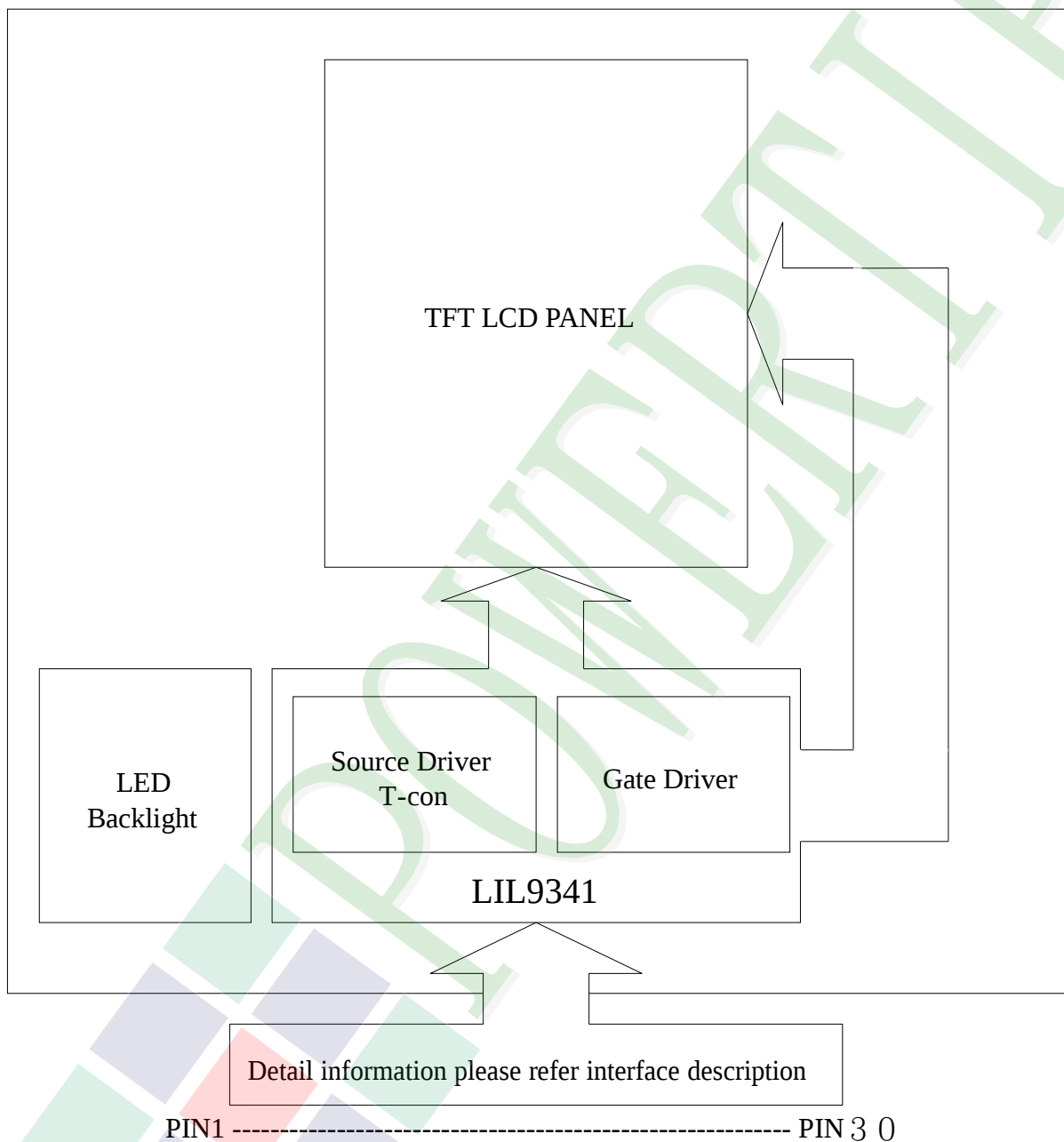


2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

Pin No.	Symbol	Function
1	LEDK1-4	Power supply for LED Backlight Cathode input
2	LED A	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	Bi-directional data bus
6	DB16	
7	DB15	
8	DB14	
9	DB13	
10	DB12	
11	DB11	
12	DB10	
13	DB8	
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.

2.2.1 Reference Initial Code

```
void LCD_Init(void)
```

```
{
```

```
    lcddev.width=240;
```

```
    lcddev.height=320;
```

```
    LCD_WR_REG(0xCF);
```

```
    LCD_WR_DATA(0x00);
```

```
    LCD_WR_DATA(0xD9);
```

```
    LCD_WR_DATA(0x30);
```

```
    LCD_WR_REG(0xED);
```

```
    LCD_WR_DATA(0x64);
```

```
    LCD_WR_DATA(0x03);
```

```
    LCD_WR_DATA(0x12);
```

```
    LCD_WR_DATA(0x81);
```

```
    LCD_WR_REG(0xE8);
```

```
    LCD_WR_DATA(0x85);
```

```
    LCD_WR_DATA(0x00);
```

```
    LCD_WR_DATA(0x78);
```

```
    LCD_WR_REG(0xCB);
```

```
    LCD_WR_DATA(0x39);
```

```
    LCD_WR_DATA(0x2C);
```

```
    LCD_WR_DATA(0x00);
```

```
    LCD_WR_DATA(0x34);
```

```
    LCD_WR_DATA(0x02);
```

```
    LCD_WR_REG(0xF7);
```

```
    LCD_WR_DATA(0x20);
```

```
    LCD_WR_REG(0xEA);
```

```
    LCD_WR_DATA(0x00);
```

```
    LCD_WR_DATA(0x00);
```

```
    LCD_WR_REG(0xC0); //Power control
```

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

```
LCD_WR_REG(0xC1); //Power control
LCD_WR_DATA(0x12); //SAP[2:0];BT[3:0]
```

```
LCD_WR_REG(0xC5); //VCOM Control
LCD_WR_DATA(0x32);
LCD_WR_DATA(0x3C);
```

```
LCD_WR_REG(0xC7); //VCOM Control2
LCD_WR_DATA(0xa3); //0x9D
```

```
LCD_WR_REG(0x36); //Memory access Control
LCD_WR_DATA(0x08);
```

```
LCD_WR_REG(0x3A); //Memory access Control
LCD_WR_DATA(0x55);
```

```
LCD_WR_REG(0xB1);
LCD_WR_DATA(0x00);
LCD_WR_DATA(0x1B);
```

```
LCD_WR_REG(0xB6); //Display Function
LCD_WR_DATA(0x0a);
LCD_WR_DATA(0xa2);
```

```
LCD_WR_REG(0xF6);
LCD_WR_DATA(0x01);
LCD_WR_DATA(0x30);
```

```
LCD_WR_REG(0xF2); //3Gamma Function Disable
LCD_WR_DATA(0x00);
```

```
LCD_WR_REG(0x26); //Gamma Curve select
LCD_WR_DATA(0x01);
```

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

```
LCD_WR_REG(0xe0); //set gamma
LCD_WR_DATA(0x0f);
LCD_WR_DATA(0x1c);
LCD_WR_DATA(0x19);
LCD_WR_DATA(0x08);
```

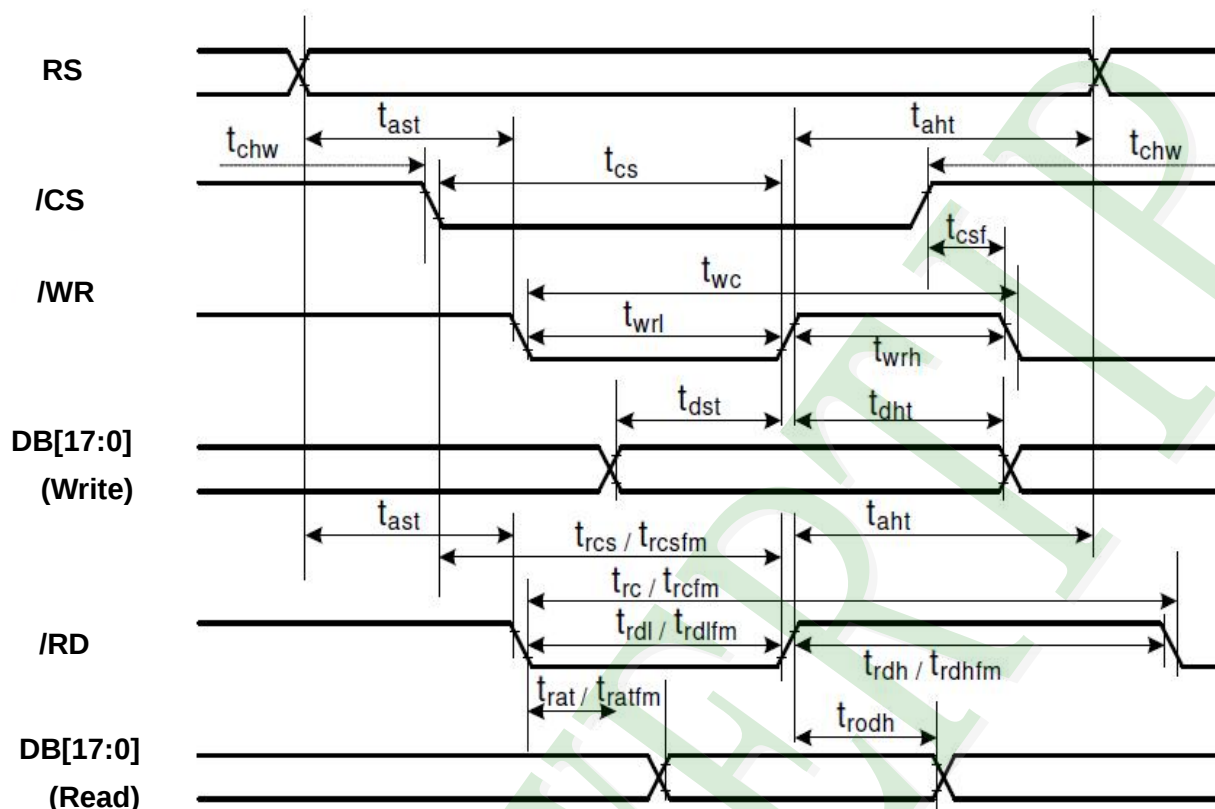
```
LCD_WR_DATA(0x0b);  
LCD_WR_DATA(0x04);  
LCD_WR_DATA(0x4b);  
LCD_WR_DATA(0x64);  
LCD_WR_DATA(0x3e);  
LCD_WR_DATA(0x09);  
LCD_WR_DATA(0x15);  
LCD_WR_DATA(0x08);  
LCD_WR_DATA(0x16);  
LCD_WR_DATA(0x0D);  
LCD_WR_DATA(0x04);
```

```
LCD_WR_REG(0xe1); //set gamma  
LCD_WR_DATA(0x00);  
LCD_WR_DATA(0x1a);  
LCD_WR_DATA(0x1e);  
LCD_WR_DATA(0x03);  
LCD_WR_DATA(0x0f);  
LCD_WR_DATA(0x03);  
LCD_WR_DATA(0x35);  
LCD_WR_DATA(0x23);  
LCD_WR_DATA(0x45);  
LCD_WR_DATA(0x04);  
LCD_WR_DATA(0x0c);  
LCD_WR_DATA(0x0b);  
LCD_WR_DATA(0x2b);  
LCD_WR_DATA(0x2e);  
LCD_WR_DATA(0x05);
```

```
LCD_WR_REG(0x11); //exit sleep  
delay_ms(120);  
LCD_WR_REG(0x29); //Display on
```

```
}
```

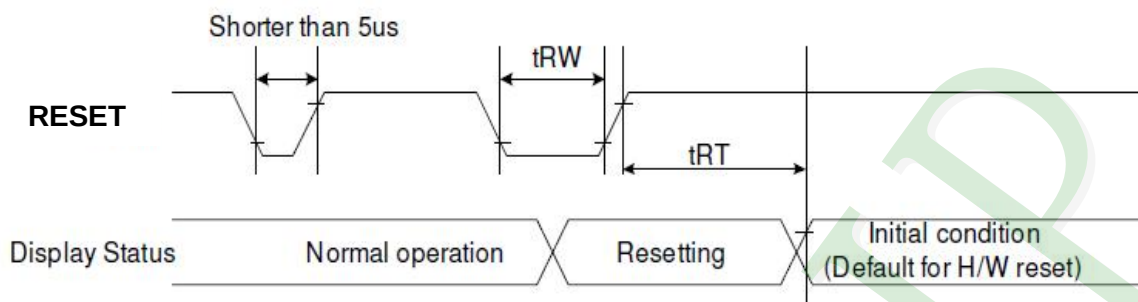
2.3 Timing Characteristics



Signal	Symbol	Parameter	min	max	Unit	Description
RS	t_{ast}	Address setup time	0	-	ns	
	t_{aht}	Address hold time (Write/Read)	0	-	ns	
/CS	t_{chw}	CSX "H" pulse width	0	-	ns	
	t_{cs}	Chip Select setup time (Write)	15	-	ns	
	t_{rcs}	Chip Select setup time (Read ID)	45	-	ns	
	t_{rcsfm}	Chip Select setup time (Read FM)	355	-	ns	
/WR	t_{csf}	Chip Select Wait time (Write/Read)	10	-	ns	
	t_{wc}	Write cycle	66	-	ns	
	t_{wrh}	Write Control pulse H duration	15	-	ns	
/RD(FM)	t_{wrl}	Write Control pulse L duration	15	-	ns	
	t_{rcfm}	Read Cycle (FM)	450	-	ns	
	t_{rdhfm}	Read Control H duration (FM)	90	-	ns	
/RD(ID)	t_{rdlfm}	Read Control L duration (FM)	355	-	ns	
	t_{rc}	Read cycle (ID)	160	-	ns	
	t_{rdh}	Read Control pulse H duration	90	-	ns	
DB[17:0] DB[17:0] DB[8:0] DB[7:0]	t_{rdl}	Read Control pulse L duration	45	-	ns	
	t_{dst}	Write data setup time	10	-	ns	
	t_{dht}	Write data hold time	10	-	ns	
	t_{rat}	Read access time	-	40	ns	For maximum CL=30pF For minimum CL=8pF
	t_{ratfm}	Read access time	-	340	ns	
	t_{rod}	Read output disable time	20	80	ns	

Note: $T_a = -30$ to $70\text{ }^{\circ}\text{C}$, $V_{CC}=1.65\text{V}$ to 3.3V , $V_{CI}=2.5\text{V}$ to 3.3V , $GND=0\text{V}$

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

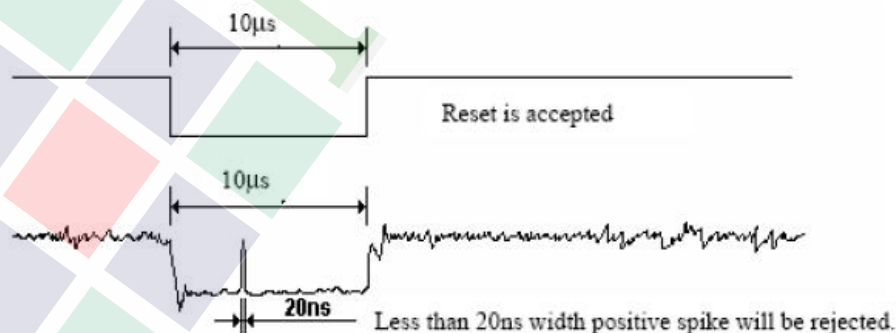
Note 1: The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NV memory to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.

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.

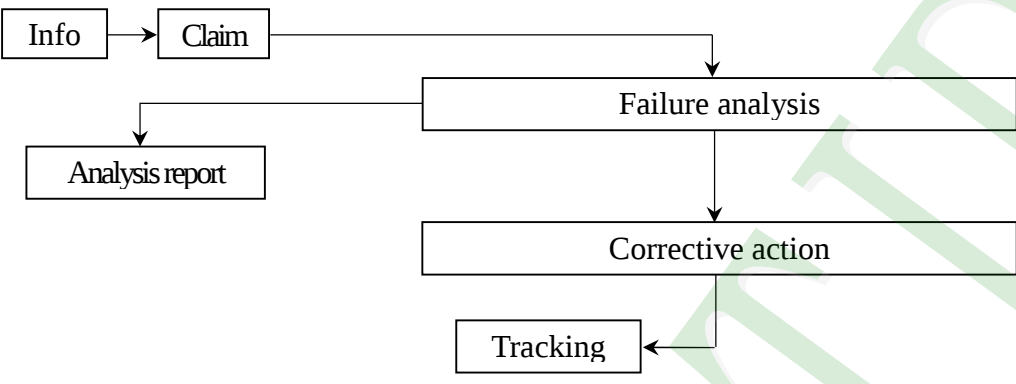
Note 4: Spike Rejection also applies during a valid reset pulse as shown below:



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.

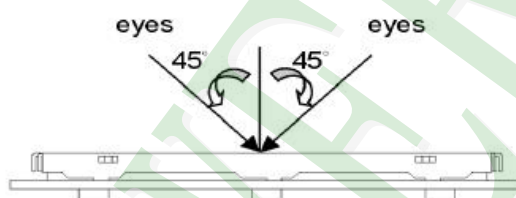
Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service	 <pre> graph TD Info[Info] --> Claim[Claim] Claim --> Failure[Failure analysis] Claim --> Report[Analysis report] Failure --> Corrective[Corrective action] Corrective --> Tracking[Tracking] </pre>							
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

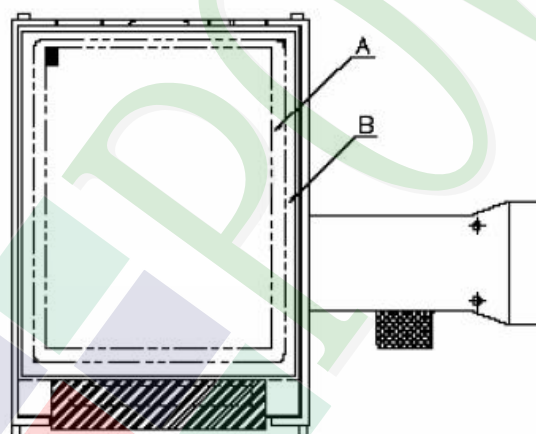
- ◆ **Scope** : The document shall be applied to TFT-LCD Module for less than 3.5" (Ver.B01).
- ◆ **Inspection Standard** : MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆ **Equipment** : Gauge 、 MIL-STD 、 Powertip Tester 、 Sample
- ◆ **Defect Level** : Major Defect AQL : 0.4 ; Minor 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)

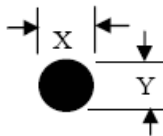
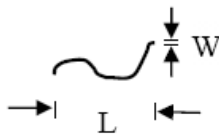
◆ Specification For TFT-LCD Module Less Than 3.5" :

(Ver.B01)

NO	Item	Criterion	Level												
01	Product condition	1. 1The 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. 1The 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><thead><tr><th colspan="2">Item</th><th>Acceptance (Q'ty)</th></tr></thead><tbody><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></tbody></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.	Item		Acceptance (Q'ty)	Dot Defect	Bright Dot	≤ 2	Dark Dot	≤ 3	Joint Dot	≤ 2	Total	≤ 3	Minor
Item		Acceptance (Q'ty)													
Dot Defect	Bright Dot	≤ 2													
	Dark Dot	≤ 3													
	Joint Dot	≤ 2													
	Total	≤ 3													

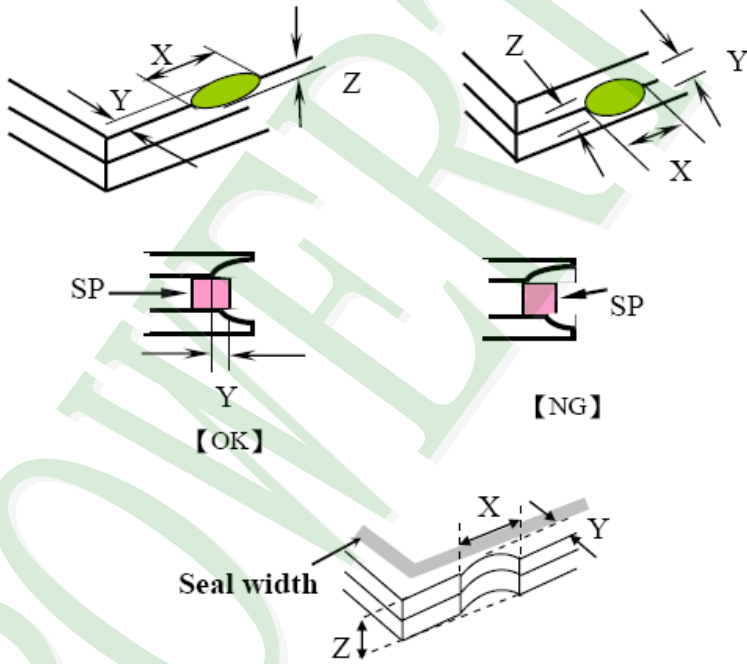
◆ Specification For TFT-LCD Module Less Than 3.5" :

(Ver.B01)

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) : <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>$\Phi \leq 0.15$</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.15 < \Phi \leq 0.20$</td><td>2</td></tr><tr><td>$0.20 < \Phi \leq 0.30$</td><td>2</td></tr><tr><td>$\Phi > 0.30$</td><td>0</td></tr><tr><td>Total</td><td>3</td><td></td></tr></table> 6. 2 Line type(Non-display or display) : <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>Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>$L \leq 5.0$</td><td>$0.03 < W \leq 0.05$</td><td>3</td></tr><tr><td>---</td><td>$W > 0.05$</td><td>As round type</td></tr><tr><td colspan="2">Total</td><td>3</td><td></td></tr></table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	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		Dimension		Acceptance (Q'ty)		Length (L)	Width (W)	A area	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
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07	Polarizer Bubble	<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>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.20 < \Phi \leq 0.50$</td><td>3</td></tr><tr><td>$\Phi > 0.50$</td><td>0</td></tr><tr><td>Total</td><td>3</td></tr></table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.20$	Ignore	Ignore	$0.20 < \Phi \leq 0.50$	3	$\Phi > 0.50$	0	Total	3	Minor																									
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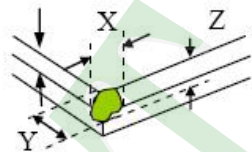
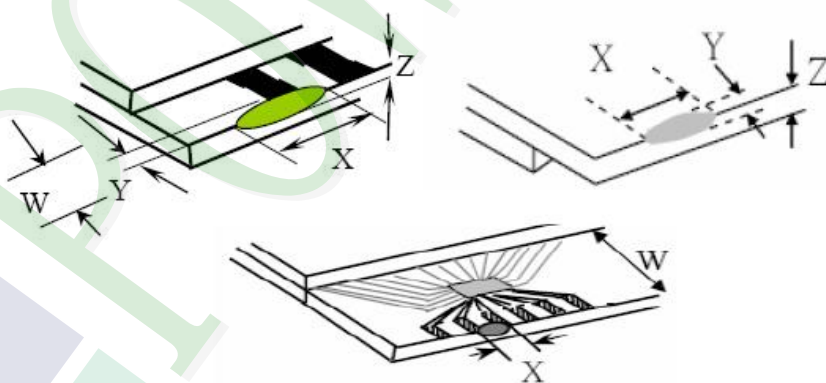
◆ Specification For TFT-LCD Module Less Than 3.5" :

(Ver.B01)

NO	Item	Criterion	Level						
08	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 8.1 General glass chip : 8.1.1 Chip on panel surface and crack between panels: 	Minor						
		<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.	$1/2 t < Z \leq 2 t$							

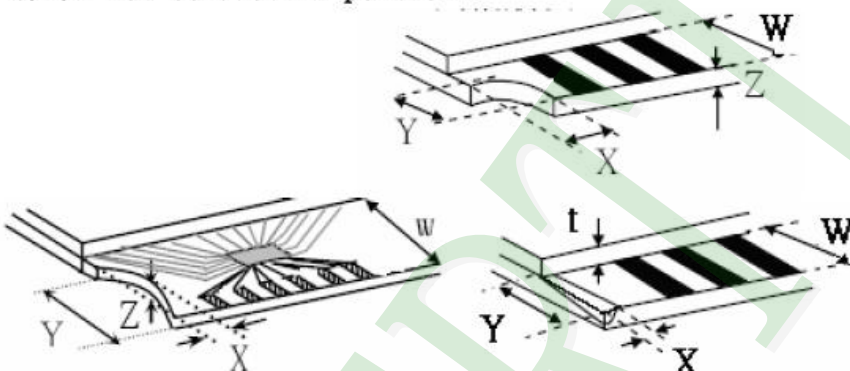
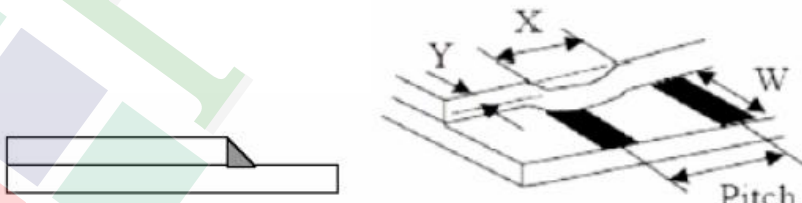
◆ Specification For TFT-LCD Module Less Than 3.5" :

(Ver.B01)

NO	Item	Criterion	Level									
08	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 8.1.2 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.	$1/2 t < Z \leq 2 t$	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.	$1/2 t < Z \leq 2 t$										
8.2 Protrusion over terminal : 8.2.1 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>$\leq a$</td><td>$\leq W$</td><td>$\leq 1/2 t$</td></tr></table>		X	Y	Z	Front	$\leq a$	$\leq 1/2 W$	$\leq t$	Back	$\leq a$	$\leq W$	$\leq 1/2 t$
	X	Y	Z									
Front	$\leq a$	$\leq 1/2 W$	$\leq t$									
Back	$\leq a$	$\leq W$	$\leq 1/2 t$									

◆ Specification For TFT-LCD Module Less Than 3.5" :

(Ver.B01)

NO	Item	Criterion	Level												
08	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 8.2.2 Non-conductive portion :  <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> ☉ 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> <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	$\leq a$	$\leq 1/3 W$	$\leq t$	Minor
		X	Y	Z											
$\leq 1/3 a$	$\leq W$	$\leq t$													
X	Y	Z													
$\leq a$	$\leq 1/3 W$	$\leq t$													

◆Specification For TFT-LCD Module Less Than 3.5" :

(Ver.B01)

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 °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) ← 10 Cycle → Surrounding temperature, then storage at normal condition 4hrs.											
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 ambience : 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)	<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> Drop Direction :※1 corner / 3 edges / 6 sides each 1time		Packing Weight (Kg)	Drop Height (cm)	0 ~ 45.4	122	45.4 ~ 90.8	76	90.8 ~ 454	61	Over 454	46
Packing Weight (Kg)	Drop Height (cm)												
0 ~ 45.4	122												
45.4 ~ 90.8	76												
90.8 ~ 454	61												
Over 454	46												

5. PRECAUTION RELATING PRODUCT HANDLING

5.1 SAFETY

- 5.1.1 If the LCD panel breaks , be careful not to get the liquid crystal to touch your skin.
- 5.1.2 If the liquid crystal touches your skin or clothes , please wash it off immediately by using soap and water.

5.2 HANDLING

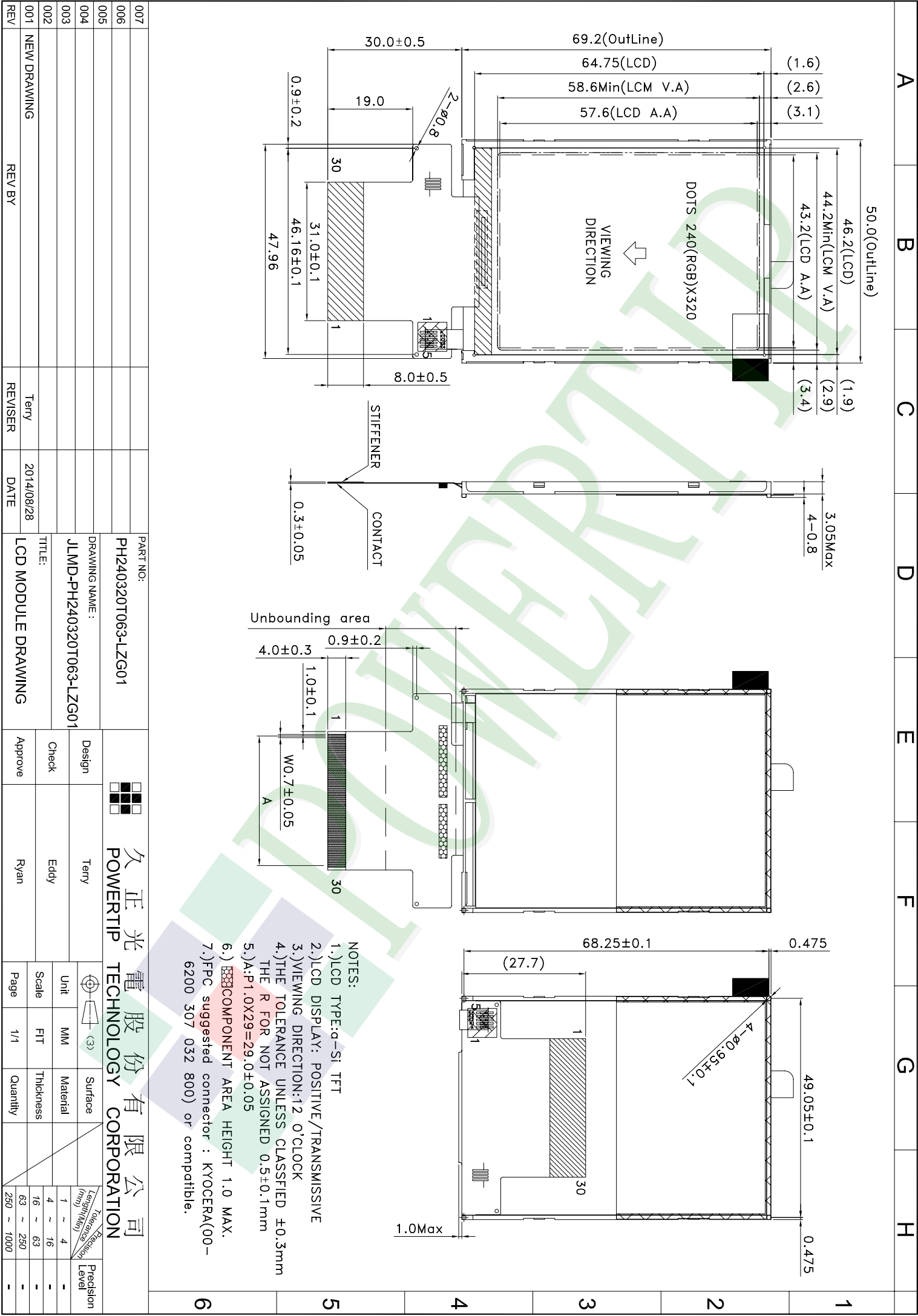
- 5.2.1 Avoid any strong mechanical shock which can break the glass.
- 5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module , be sure to ground your body and any electrical equipment you may be using.
- 5.2.3 Do not remove the panel or frame from the module.
- 5.2.4 The polarizing plate of the display is very fragile. So , please handle it very carefully ,do not touch , push or rub the exposed polarizing with anything harder than an HB pencil lead (glass , tweezers , etc.)
- 5.2.5 Do not wipe the polarizing plate with a dry cloth , as it may easily scratch the surface of plate.
- 5.2.6 Do not touch the display area with bare hands , this will stain the display area.
- 5.2.7 Do not use ketonics solvent & aromatic solvent. Use with a soft cloth soaked with a cleaning naphtha solvent.
- 5.2.8 To control temperature and time of soldering is $320\pm 10^{\circ}\text{C}$ and 3-5 sec.
- 5.2.9 To avoid liquid (include organic solvent) stained on LCM .

5.3 STORAGE

- 5.3.1 Store the panel or module in a dark place where the temperature is $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ and the humidity is below 65% RH.
- 5.3.2 Do not place the module near organics solvents or corrosive gases.
- 5.3.3 Do not crush , shake , or jolt the module.

5.4 TERMS OF WARRANTY

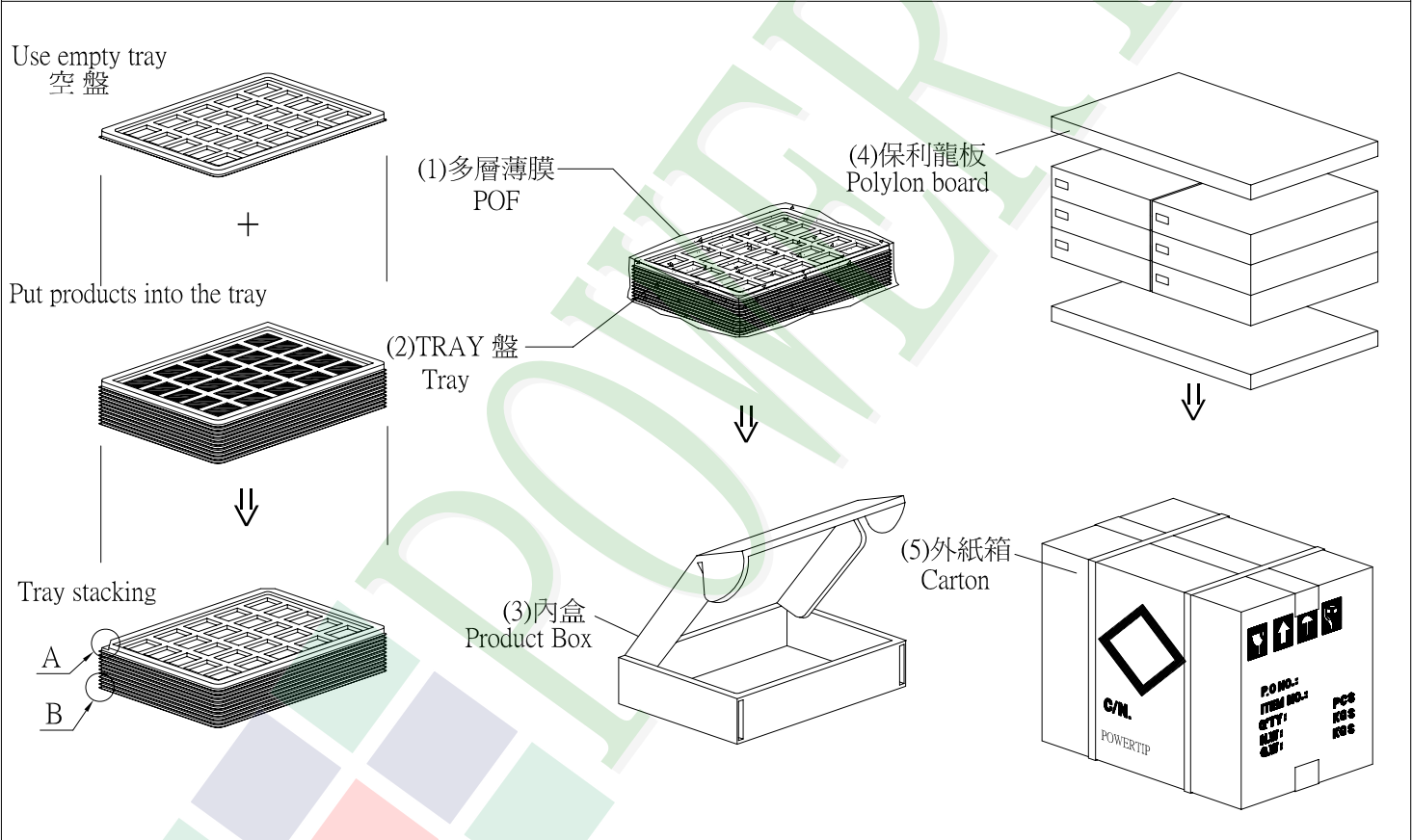
- 5.4.1 Applicable warrant period
The period is within thirteen months since the date of shipping out under normal using and storage conditions.
- 5.4.2 Unaccepted responsibility
This product has been manufactured to your company's specification as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment , we cannot take responsibility if the product is used in nuclear power control equipment , aerospace equipment , fire and security systems or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required.



Ver.001		LCM包裝規格書 LCM Packaging Specifications (For Tray)	Approve	Check	Contact
Documents NO.	JPKG-PH240320T063-LZG01		Ryan	Eddy	Terry

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)	PH240320T063-LZG01	50.0 X 69.2X3.05	0.0138	504	6.9552
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	——	6	——
3	TRAY 盤 (2)Tray	TY000000000275	352 X 260 X 12.3	0.1	48	4.8
4	內盒(3)Product Box	BX36627063ABBA	393 X 274 X 68	0.182	6	1.092
5	保利龍板(4)Polylon board	OTPLB00PL08ABA	550 X 393 X 20	0.0284	2	0.0568
6	外紙箱(5)Carton	BX57041027CCBA	570 X 410 X 265	1.0	1	1.0
7						
8						
9						

2.一 整箱總重量 (Total LCD Weight in carton) : 13.9 Kg±10%						
3.單箱數量規格表 (Packaging Specifications and Quantity) :						
(1)LCM quantity per box : no per tray	12	x no of tray	7	=	84	
(2)Total LCM quantity in carton : quantity per box	84	x no of boxes	6	=	504	



特 記 事 項 (REMARK)		
1. Label Specifications : 依廠內標準作業		2. TRAY盤相疊時,需旋轉180度,請詳見B視圖 Rotate tray 180 degrees and place on top of stack. Check the tray stack using Fig. B.