

### SPECIFICATIONS

<b>CUSTOMER</b>	:	<b>CUS999</b>
<b>SAMPLE CODE</b>	:	<b>SH800480T024-IFC05</b>
<b>MASS PRODUCTION CODE</b>	:	<b>PH800480T024-IFC05</b>
<b>SAMPLE VERSION</b>	:	<b>01</b>
<b>SPECIFICATIONS EDITION</b>	:	<b>002</b>
<b>DRAWING NO. (Ver.)</b>	:	<b>JLMD-PH800480T024-IFC05_001</b>
<b>PACKAGING NO. (Ver.)</b>	:	

**Customer Approved**

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**Date:**

<b>Approved</b>	<b>Checked</b>	<b>Designer</b>
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- Preliminary specification for design input
- Specification for sample approval

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

SOLOMON—SSD1963  
ILITEK— ILI6122 / ILI5960

## 1. SPECIFICATIONS

### 1.1 Features

Item	Standard Value
Display Type	800 * 3 (RGB) * 480 Dots
LCD Type	a-Si TFT , Normally white, Transmissive type
Touch Panel	True Multi-Touch Capacitive Touch Panel True Multi-touch with up to 5 Points of Absolution
Screen size(inch)	5.0 inch
Viewing Direction	6 O'clock
Color configuration	RGB-Strip
Interface	8-bit parallel MCU
Other(controller/driver IC)	Controller : SSD1963 Source Driver : ILI6122 Gate Driver : ILI5960
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer website : <a href="http://www.powertip.com.tw/news.php?area_id_view=1085560481/">http://www.powertip.com.tw/news.php?area_id_view=1085560481/</a>

### 1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	137.0(W) x 96.5 (L) x 5.0(H)(Max)	mm

#### LCD panel

Item	Standard Value	Unit
Active Area	108.0 (W) x 64.8 (L)	mm
Pixel Size	0.135 (W) * 0.135 (H)	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	VDDIO	GND=0	-0.3	4.5	V
Operating Temperature	T <sub>OP</sub>	Note 1	-20	70	°C
Storage Temperature	T <sub>ST</sub>	Note 2	-30	80	°C
Storage Humidity	H <sub>D</sub>	T <sub>a</sub> ≤ 60 °C	10	90	%RH

The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

Note 1 : T<sub>s</sub> is the temperature of panel's surface.

Note 2 : T<sub>a</sub> is the ambient temperature of samples.

### 1.4 DC Electrical Characteristics

#### Module

VSS = 0V, T<sub>a</sub> = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	VDD	-	3.0	3.3	3.6	V
Input H/L Level Voltage	V <sub>IH</sub>	-	0.7VDD	-	VDD	V
	V <sub>IL</sub>	-	GND	-	0.3VDD	V
Output H/L Level Voltage	V <sub>OH</sub>	-	VDD-0.4	-	VDD	V
	V <sub>OL</sub>	-	GND	-	GND+0.4	V
Supply Current	I <sub>DD</sub>	VDD= 3.3 V	-	(120)	(180)	mA

## 1.5 Optical Characteristics

### TFT LCD Module

VDD= 3.3 V, Ta=25°C

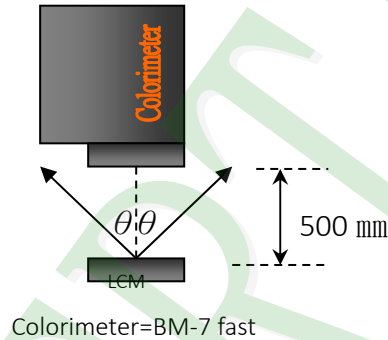
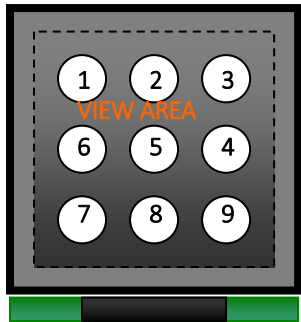
Item		Symbol	Condition	Min.	Typ.	Max.	unit	-	
Response time	Tr+Tf	25°C	-	-	35	55	ms	-	
Viewing angle	Top	$\theta Y+$	CR $\geq$ 10		60	-	Deg.	Note 4	
	Bottom	$\theta Y-$			60	-			
	Left	$\theta X-$			60	-			
	Right	$\theta X+$			60	-			
Contrast ratio		CR		500	600	-	-	Note 3	
Color of CIE Coordinate (With B/L & T/P)	White	X	IF= 40 mA		(0.26)	(0.31)	(0.36)	-	Note1
		Y			(0.29)	(0.34)	(0.39)		
	Red	X			(0.50)	(0.55)	(0.60)		
		Y			(0.27)	(0.32)	(0.37)		
	Green	X			(0.29)	(0.34)	(0.39)		
		Y			(0.55)	(0.60)	(0.65)		
	Blue	X			(0.09)	(0.14)	(0.19)		
		Y			(0.03)	(0.08)	(0.13)		
Average Brightness Pattern=white display (With LCD & T/P)*1		IV	IF= 40 mA	(400)	(500)	-	cd/m <sup>2</sup>	Note1	
Uniformity (With LCD & T/P)*2		$\Delta B$	IF= 40 mA	70	-	-	%	Note1	

Note 1:

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

\*2 : Measurement Condition for Optical Characteristics:

- a : Environment:  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$  /  $60 \pm 20\%$  R.H , no wind , dark room below 10 Lux at typical lamp current and typical operating frequency.
- b : Measurement Distance:  $500 \pm 50$  mm , ( $\theta = 0^{\circ}$ )
- c : Equipment: TOPCON BM-7 fast , (field  $1^{\circ}$ ) , after 10 minutes operation.
- d : The uncertainty of the C.I.E coordinate measurement  $\pm 0.01$  , Average Brightness  $\pm 4\%$



To be measured at the center area of panel with a viewing cone of  $1^{\circ}$  by Topcon luminance meter BM-7, after 10 minutes operation (module)

Note2: Definition of response time:

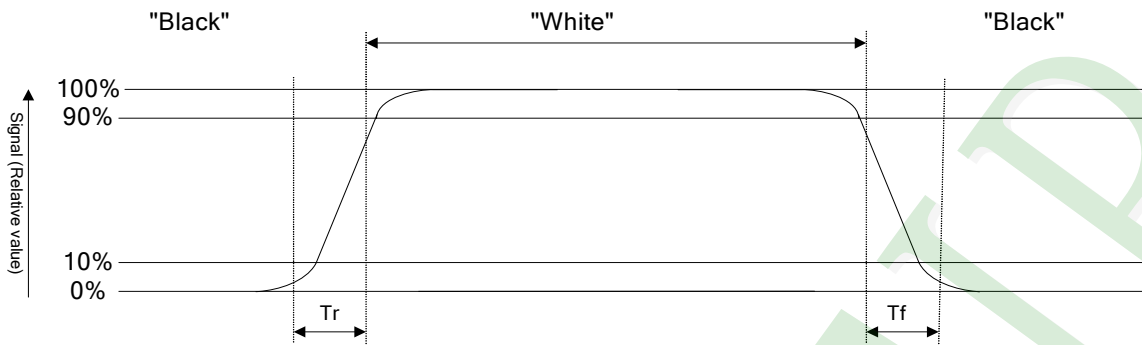
The output signals of photo detector are measured when the input signals are changed from "black" to "white"(falling time) and from "white" to "black"(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



### Normally Black



Note3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

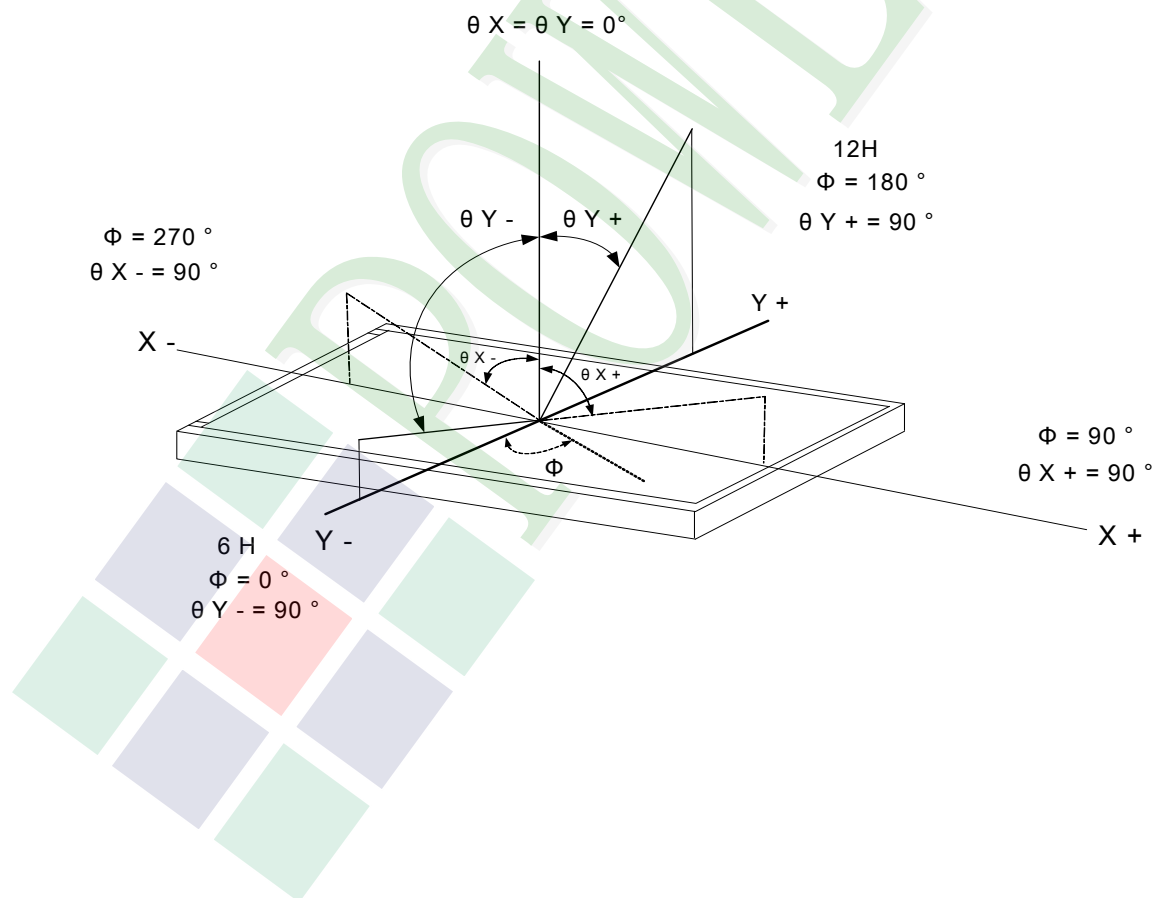
Photo detector output when LCD is at "White" state

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

Photo detector output when LCD is at "Black" state

Note4: Definition of viewing angle:

Refer to figure as below:





## 1.6 Backlight Characteristics

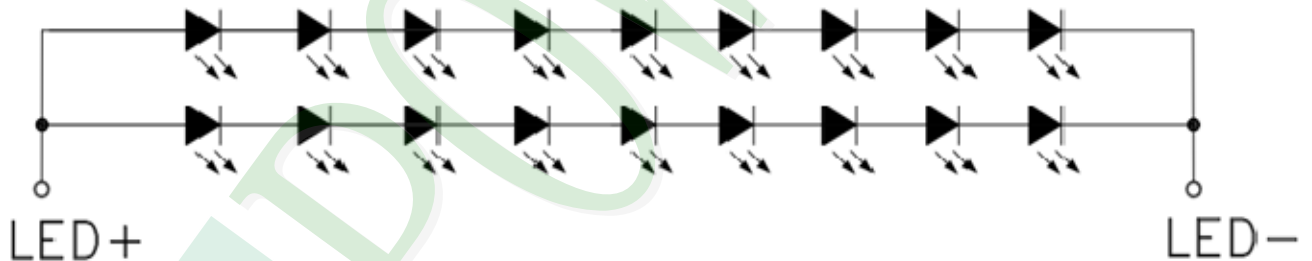
### Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
LED Forward Current	IF	Ta =25°C	-	60	mA
LED Reverse Voltage	VR	Ta =25°C	-	5	V
Power Dissipation	PD	Ta =25°C	-	1836	mW

### Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF=40mA	21.6	27.9	29.7	V
Average Brightness (Without LCD )	IV		13500	15500	-	cd/m <sup>2</sup>
CIE Color Coordinate (Without LCD )	X		0.25	0.28	0.31	-
	Y		0.25	0.28	0.31	
Color	White					

Circuit diagram:



### Other Description

Item	Conditions	Description
Life Time	Ta =25°C IF= 40mA	50,000 hrs

## 1.7 Touch Panel Characteristics

### Features

Item	Standard Value
Touch Panel Size	5.0"
Touch type	True Multi-Touch Capacitive Touch Panel
Input Method	True Multi-touch with up to 5 Points of Absolution X and Y Coordinates
Output Interface	I <sup>2</sup> C
IC	FT5426

### I<sup>2</sup>C Address

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
0	1	1	1	0	0	0	R/W

Bit 0: 0 for Write / 1 for Read

### Mechanical Specifications

Item	Standard Value	Unit
Viewing Area	110 mm (W) x 66.8 mm (H)	mm
Number of sensing channel	20 (W) x 12 (H)	mm

### Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Supply voltage	VDD	-	-0.3	3.6	V
Operating Temperature	T <sub>OP</sub>	-	-20	70	°C
Storage Temperature	T <sub>ST</sub>	-	-30	80	°C

### DC Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	VDD	-	3.0	3.3	3.6	V

### Optical Characteristics

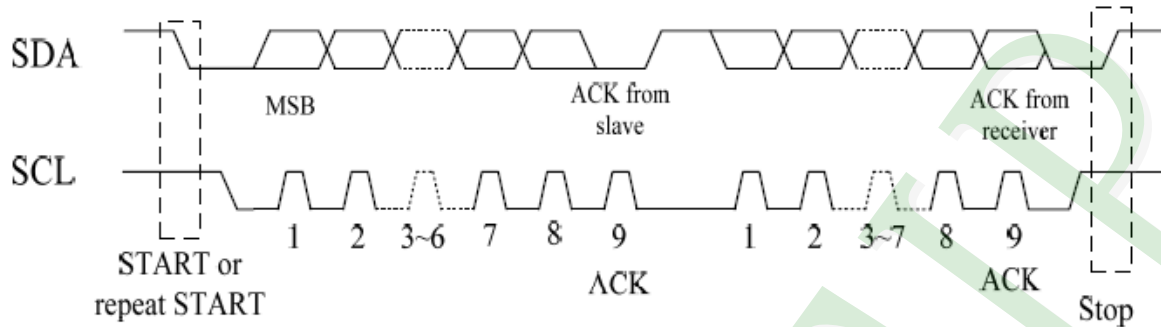
Item	Standard Value	Unit
Total light transmittance	85% or more	-
Hardness	≥6H	-

## Touch Panel Driving

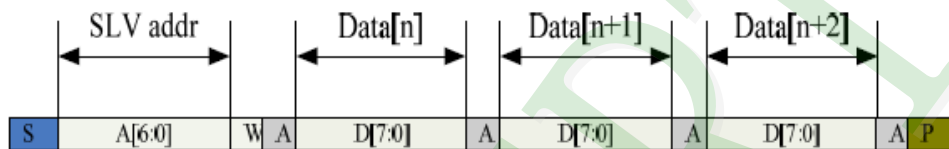
Pin No.	Symbol	Function
1	GND	Touch Panel output pin.
2	VDD	Power Supply Voltage (3.3V)
3	SCL	I2C Clock
4	SDA	I2C Data
5	INT	Active Low
6	XRES	Active low global reset signal input.

## 1.7.1 I2C Serial Data Transfer Format

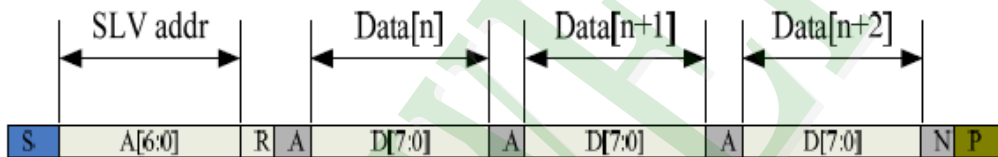
### I2C Serial Data Transfer Format



#### I2C master write, slave read



#### I2C master read, slave write

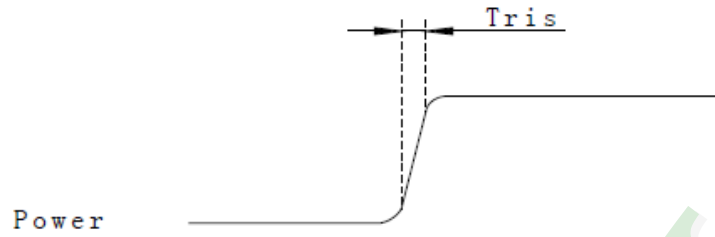


Mnemonics	Description
S	I2C Start or I2C Restart
A[6:0]	Slave address A[6:4]: 3'b011 A[3:0]: data bits are identical to those of I2CCON[7:4] register.
W	1'b0: Write
R	1'b1: Read
A(N)	ACK(NACK)
P	STOP: the indication of the end of a packet (if this bit is missing, S will indicate the end of the current packet and the beginning of the next packet)

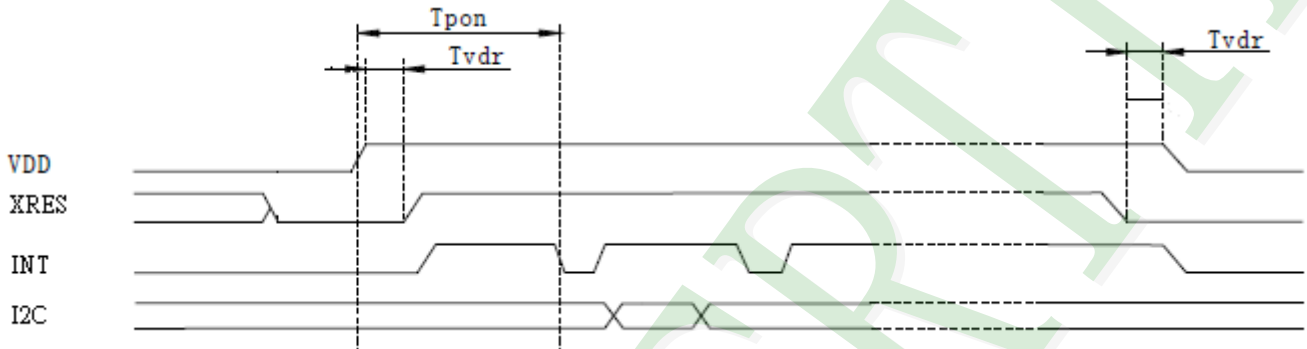
#### Timing Characteristics

Parameter	Unit	Min	Max
SCL frequency	KHz	0	400
Bus free time between a STOP and START condition	us	4.7	\
Hold time (repeated) START condition	us	4.0	\
Data setup time	ns	250	\
Setup time for a repeated START condition	us	4.7	\
Setup Time for STOP condition	us	4.0	\

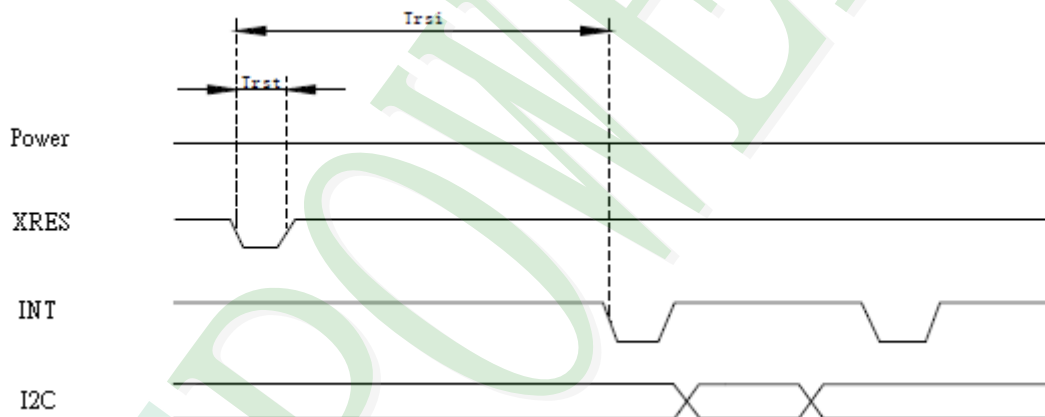
## Power on time



## Power on Sequence



## Reset Sequence



## Power on / Reset Sequence Parameters

Parameter	Description	Min	Max	Units
Tris	Rise time from 0.1VDD to 0.9VDD	--	10	ms
Tpon	Time of starting to report point after powering on	300	--	ms
Trsi	Time of starting to report point after resetting	300	--	ms
Trst	Reset time	5	--	ms
Twai	Time of starting to report point after waking	300	--	ms
Twak	Wake up time	5	--	ms

### 1.7.2 CTP Register Address

Address	Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Host Access	
00h	DEVIDE_MODE	Device Mode[2:0]									RW
01h	GEST_ID	Gesture ID[7:0]								R	
02h	ID_STATUS							Number of touch points[3:0]		R	
03h	TOUCH1_XH	1 <sup>st</sup> Event Flag					1 <sup>st</sup> Touch X Position[11:8]		R		
04h	TOUCH1_XL	1 <sup>st</sup> Touch X Position[7:0]								R	
05h	TOUCH1_YH	1 <sup>st</sup> Touch ID[3:0]			1 <sup>st</sup> Touch Y Position[11:8]					R	
06h	TOUCH1_YL	1 <sup>st</sup> Touch Y Position[7:0]								R	
07h											
08h											
09h	TOUCH2_XH	2 <sup>nd</sup> Event Flag					2 <sup>nd</sup> Touch X Position[11:8]		R		
0Ah	TOUCH2_XL	2 <sup>nd</sup> touch X Position[7:0]								R	
0Bh	TOUCH2_YH	2 <sup>nd</sup> Touch ID[3:0]			2 <sup>nd</sup> Touch Y Position[11:8]					R	
0Ch	TOUCH2_YL	2 <sup>nd</sup> Touch Y Position[7:0]								R	
0Dh										R	
0Eh										R	
0Fh	TOUCH3_XH	3 <sup>rd</sup> Event Flag					3 <sup>rd</sup> Touch X Position[11:8]		R		
10h	TOUCH3_XL	3 <sup>rd</sup> Touch X Position[7:0]								R	
11h	TOUCH3_YH	3 <sup>rd</sup> Touch ID[3:0]			3 <sup>rd</sup> Touch Y Position[11:8]					R	
12h	TOUCH3_YL	3 <sup>rd</sup> Touch Y Position[7:0]								R	
13h										R	
14h										R	



15h	TOUCH4_XH	4 <sup>th</sup> Event Flag		4 <sup>th</sup> Touch X Position[11:8]	R
16h	TOUCH4_XL	4 <sup>th</sup> Touch X Position[7:0]			R
17h	TOUCH4_YH	4 <sup>th</sup> Touch ID[3:0]		4 <sup>th</sup> Touch Y Position[11:8]	R
18h	TOUCH4_YL	4 <sup>th</sup> Touch Y Position[7:0]			R
19h					R
1Ah					R
1Bh	TOUCH5_XH	5 <sup>th</sup> Event Flag		5 <sup>th</sup> Touch X Position[11:8]	R
1Ch	TOUCH5_XL	5 <sup>th</sup> Touch X Position[7:0]			R
1Dh	TOUCH5_YH	5 <sup>th</sup> Touch ID[3:0]		5 <sup>th</sup> Touch Y Position[11:8]	R
1Eh	TOUCH5_YL	5 <sup>th</sup> Touch Y Position[7:0]			R
1Fh					R
20h					R
21h	TOUCH6_XH	6 <sup>th</sup> Event Flag		6 <sup>th</sup> Touch X Position[11:8]	
22h	TOUCH6_XL	6 <sup>th</sup> Touch X Position[7:0]			
23h	TOUCH6_YH	6 <sup>th</sup> Touch ID[3:0]		6 <sup>th</sup> Touch Y Position[11:8]	
24h	TOUCH6_YL	6 <sup>th</sup> Touch Y Position[7:0]			
25h					
26h					
27h	TOUCH7_XH	7 <sup>th</sup> Event Flag		7 <sup>th</sup> Touch X Position[11:8]	
28h	TOUCH7_XL	7 <sup>th</sup> Touch X Position[7:0]			
29h	TOUCH7_YH	7 <sup>th</sup> Touch ID[3:0]		7 <sup>th</sup> Touch Y Position[11:8]	
2Ah	TOUCH7_YL	7 <sup>th</sup> Touch Y Position[7:0]			
2Bh					
2Ch					
2Dh	TOUCH8_XH	8 <sup>th</sup> Event Flag		8 <sup>th</sup> Touch X Position[11:8]	
2Eh	TOUCH8_XL	8 <sup>th</sup> Touch X Position[7:0]			
2Fh	TOUCH8_YH	8 <sup>th</sup> Touch ID[3:0]		8 <sup>th</sup> Touch Y Position[11:8]	
30h	TOUCH8_YL	8 <sup>th</sup> Touch Y Position[7:0]			
31h					
32h					



33h	TOUCH9_XH	9 <sup>th</sup> Event Flag		9 <sup>th</sup> Touch X Position[11:8]	
34h	TOUCH9_XL	9 <sup>th</sup> Touch X Position[7:0]			
35h	TOUCH9_YH	9 <sup>th</sup> Touch ID[3:0]		9 <sup>th</sup> Touch Y Position[11:8]	
36h	TOUCH9_YL	9 <sup>th</sup> Touch Y Position[7:0]			
37h					
38h					
39h	TOUCH10_XH	10 <sup>th</sup> Event Flag		10 <sup>th</sup> Touch X Position[11:8]	
3Ah	TOUCH10_XL	10 <sup>th</sup> Touch X Position[7:0]			
3Bh	TOUCH10_YH	10 <sup>th</sup> Touch ID[3:0]		10 <sup>th</sup> Touch Y Position[11:8]	
3Ch	TOUCH10_YL	10 <sup>th</sup> Touch Y Position[7:0]			
3Dh					
3Eh					
3Fh	Reserved				
...	...				
7Fh	Reserved				
80h	ID_G_THGROUP	valid touching detect threshold.			R/W
81h	ID_G_THPEAK	valid touching peak detect threshold.			R/W
82h	ID_G_THCAL	the threshold when calculating the focus of touching.			R/W
83h	ID_G_THWATER	the threshold when there is surface water.			R/W
84h	ID_G_THTEMP	the threshold of temperature compensation.			R/W
85h					R/W
86h	ID_G_CTRL			Power control mode[1:0]	R/W
87h	ID_G_TIME_ENTER_MONITOR	The timer of entering monitor status			R/W
88h	ID_G_PERIODACTIVE			Period Active[3:0]	R/W
89h	ID_G_PERIODMONITOR	The timer of entering idle while in monitor status			R/W
8Ah					R/W
8Bh					R/W
8Ch					R/W
8Dh					R/W
8Eh					R/W
8Fh					R/W
90h					R/W





91h			R/W
92h			R/W
93h			R/W
94h			R/W
95h			R/W
96h			R/W
97h			R/W
98h			R/W
99h			R/W
9Ah			R/W
9Bh			R/W
9Ch			R/W
9Dh			R/W
9Eh			R/W
9Fh			R/W
A0h	ID_G_AUTO_CLB_MODE	auto calibration mode	R/W
A1h	ID_G_LIB_VERSION_H	Firmware Library Version H byte	R
A2h	ID_G_LIB_VERSION_L	Firmware Library Version L byte	R
A3h	ID_G_CIPHER	Chip vendor ID	R
A4h	ID_G_MODE	the interrupt status to host	R
A5h	ID_G_PMODE	Power Consume Mode	
A6h	ID_G_FIRMID	Firmware ID	R
A7h	ID_G_STATE	Running State	
A8h	ID_G_FT5201ID	CTPM Vendor ID	R
A9h	ID_G_ERR	Error Code	R
AAh	ID_G_CLB	Configure TP module during calibration in Test Mode	R/W
ABh			R/W
ACH			R/W
ADh			R/W
AEh	ID_G_B_AREA_TH	The threshold of big area	R/W
AFh			R/W
...	...		
FDh	Reserved		
FEh	LOG_MSG_CNT	The log MSG count	R
FFh	LOG_CUR_CHA	Current character of log message, will point to the next character when one character is read.	R

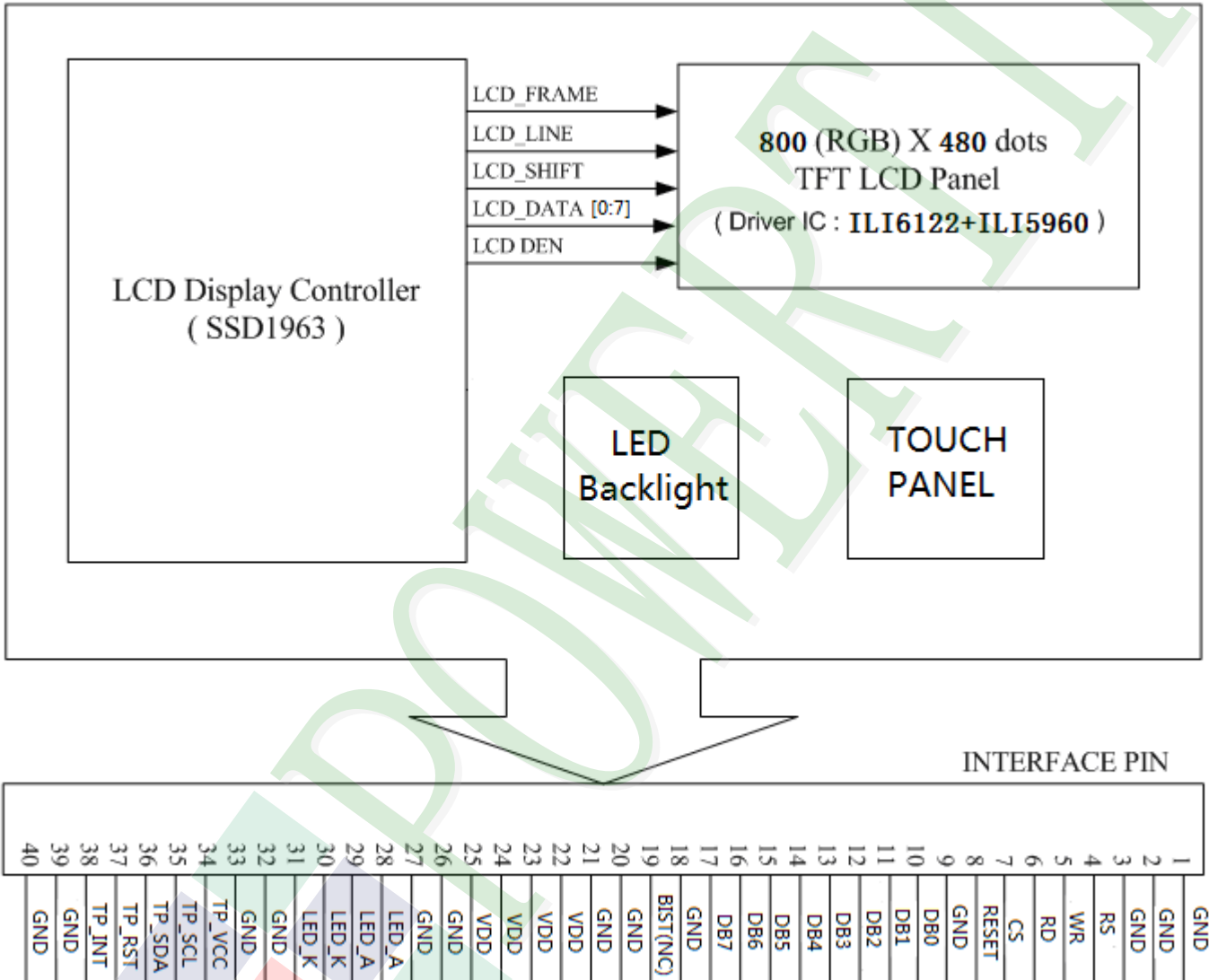
## 2. MODULE STRUCTURE

### 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	Ground
2	GND	Ground
3	GND	Ground
4	RS	Reset signal
5	WR	8080 mode: WR#(write strobe signal)
6	RD	8080 mode: RD#(read strobe signal)
7	CS	Chip select.
8	RESET	Master synchronize reset.
9	GND	Ground
10	DB0	Data bus.
11	DB1	Data bus.
12	DB2	Data bus.
13	DB3	Data bus.
14	DB4	Data bus.
15	DB5	Data bus.
16	DB6	Data bus.
17	DB7	Data bus.
18	GND	Ground
19	BIST(NC)	Normal operation/BIST pattern select. Normal pull low. BIST="1": BIST (DCLK input is not needed.) BIST="0": Normal operation. (Default) When BIST="1", CABC function will turn off, CABC_PWM keep high
20	GND	Ground

Pin No.	Symbol	Function
21	GND	Ground
22	VDD	Power supply
23	VDD	Power supply
24	VDD	Power supply
25	VDD	Power supply
26	GND	Ground
27	GND	Ground
28	LED_A	LED anode
29	LED_A	LED anode
30	LED_K	LED cathode
31	LED_K	LED cathode
32	GND	Ground
33	GND	Ground
34	TP_VCC	TP Power supply
35	TP_SCL	TP Serial clock
36	TP_SDA	TP I2C SDA
37	TP_RST	TP Reset signal
38	TP_INT	TP External interrupt to the host
39	GND	Ground
40	GND	Ground

Note : When access SSD1963 registers, only D[7:0] will be used regardless the width of the pixel data is. Therefore, D[23:8] will only be used to address the display data only. This provided the possibility that the pixel data format as shown below can be configured by command 0xF0.

Interface	Cycle	D[23]	D[22]	D[21]	D[20]	D[19]	D[18]	D[17]	D[16]	D[15]	D[14]	D[13]	D[12]	D[11]	D[10]	D[9]	D[8]	D[7]	D[6]	D[5]	D[4]	D[3]	D[2]	D[1]	D[0]
24 bits	1 <sup>st</sup>	R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
18 bits	1 <sup>st</sup>							R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
16 bits (565 format)	1 <sup>st</sup>									R5	R4	R3	R2	R1	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1
16 bits	1 <sup>st</sup>									R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0
	2 <sup>nd</sup>									B7	B6	B5	B4	B3	B2	B1	B0	R7	R6	R5	R4	R3	R2	R1	R0
	3 <sup>rd</sup>									G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
12 bits	1 <sup>st</sup>													R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4
	2 <sup>nd</sup>													G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
9 bits	1 <sup>st</sup>																R5	R4	R3	R2	R1	R0	G5	G4	G3
	2 <sup>nd</sup>																G2	G1	G0	B5	B4	B3	B2	B1	B0
8 bits	1 <sup>st</sup>																	R7	R6	R5	R4	R3	R2	R1	R0
	2 <sup>nd</sup>																	G7	G6	G5	G4	G3	G2	G1	G0
	3 <sup>rd</sup>																	B7	B6	B5	B4	B3	B2	B1	B0

### Pixel Data Format

**Command** 0xF0  
**Parameters** 1

	D/C	D7	D6	D5	D4	D3	D2	D1	D0	Hex
Command	0	1	1	1	1	0	0	0	0	F0
Parameter 1	1	0	0	0	0	0	A <sub>2</sub>	A <sub>1</sub>	A <sub>0</sub>	xx

### Description

Set the pixel data format to 8-bit / 9-bit / 12-bit / 16-bit / 16-bit(565) / 18-bit / 24-bit in the parallel host processor interface. This command is used for display data only, the command format is always 8 bit.

A[2:0] : Pixel Data Interface Format (POR = 101)

000 :8-bit

001 :12-bit

010 :16-bit packed

011 :16-bit (565 format)

100 :18-bit

101 :24-bit

110 :9-bit

Others Reserved

The un-used data bus will be driven to ground by SSD1963, so don't connect the un-used data bus to MCU.

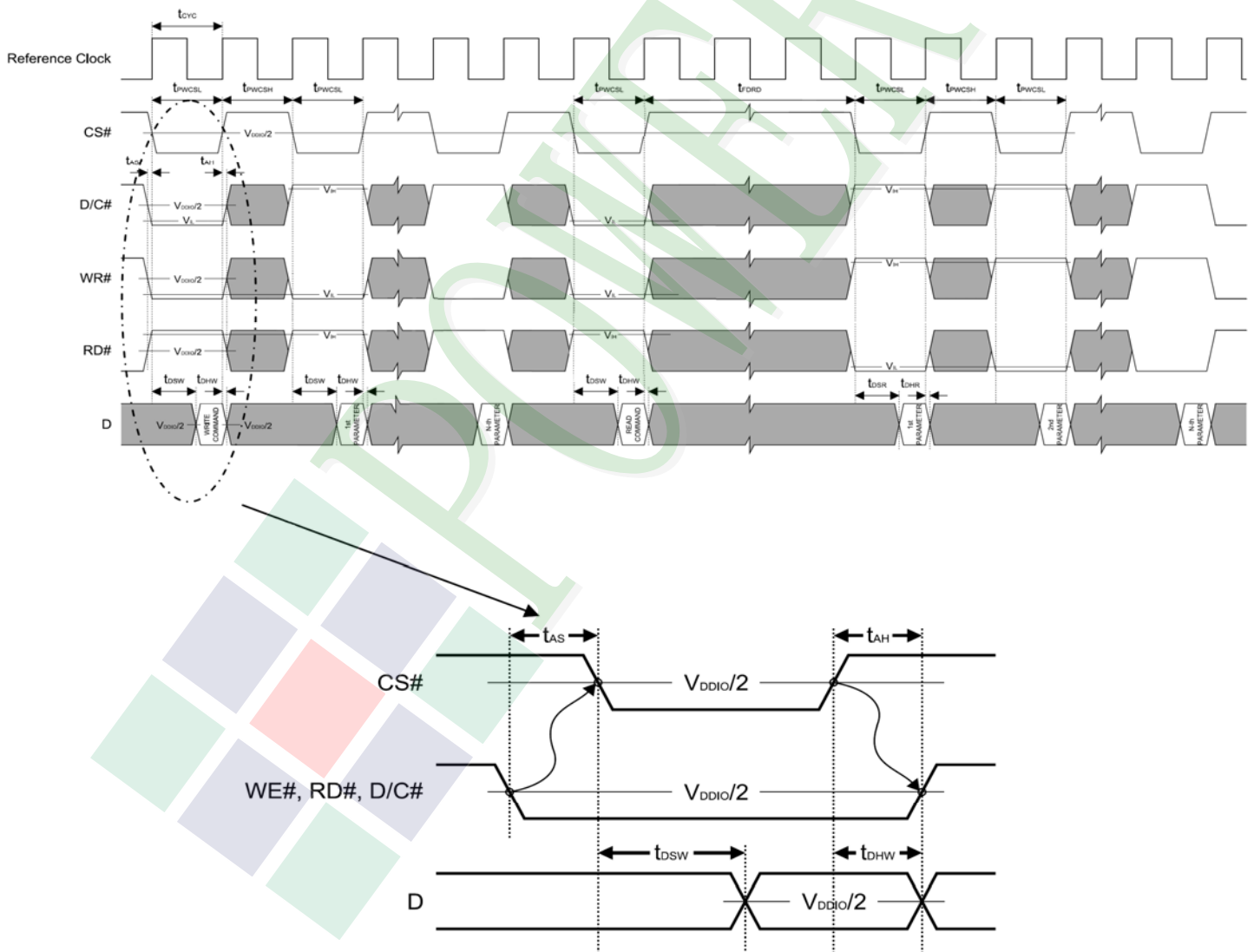
## 2.3 Timing Characteristics

### 2.3.1 8080 Mode

#### 8080 Mode Timing

Symbol	Parameter	Min	Typ	Max	Unit
$t_{cyc}$	Reference Clock Cycle Time	9	-	-	ns
$t_{PWCSL}$	Pulse width CS# low	1	-	-	$t_{cyc}$
$t_{PWCSH}$	Pulse width CS# high	1	-	-	$t_{cyc}$
$t_{FDRD}$	First Read Data Delay	5	-	-	$t_{cyc}$
$t_{AS}$	Address Setup Time	1	-	-	ns
$t_{AH}$	Address Hold Time	1	-	-	ns
$t_{DSW}$	Data Setup Time	4	-	-	ns
$t_{DHW}$	Data Hold Time	1	-	-	ns
$t_{DSR}$	Data Access Time	-	-	5	ns
$t_{DHR}$	Output Hold time	1	-	-	ns

#### 8080 Mode Timing Diagram

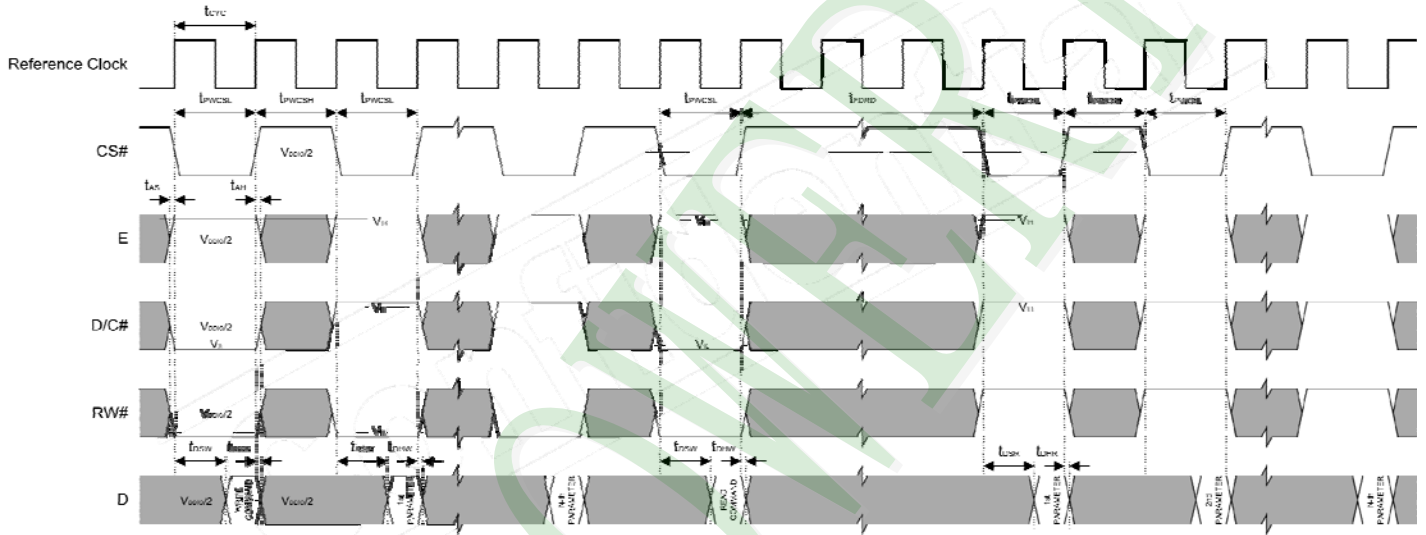


### 2.3.2 6800 Mode

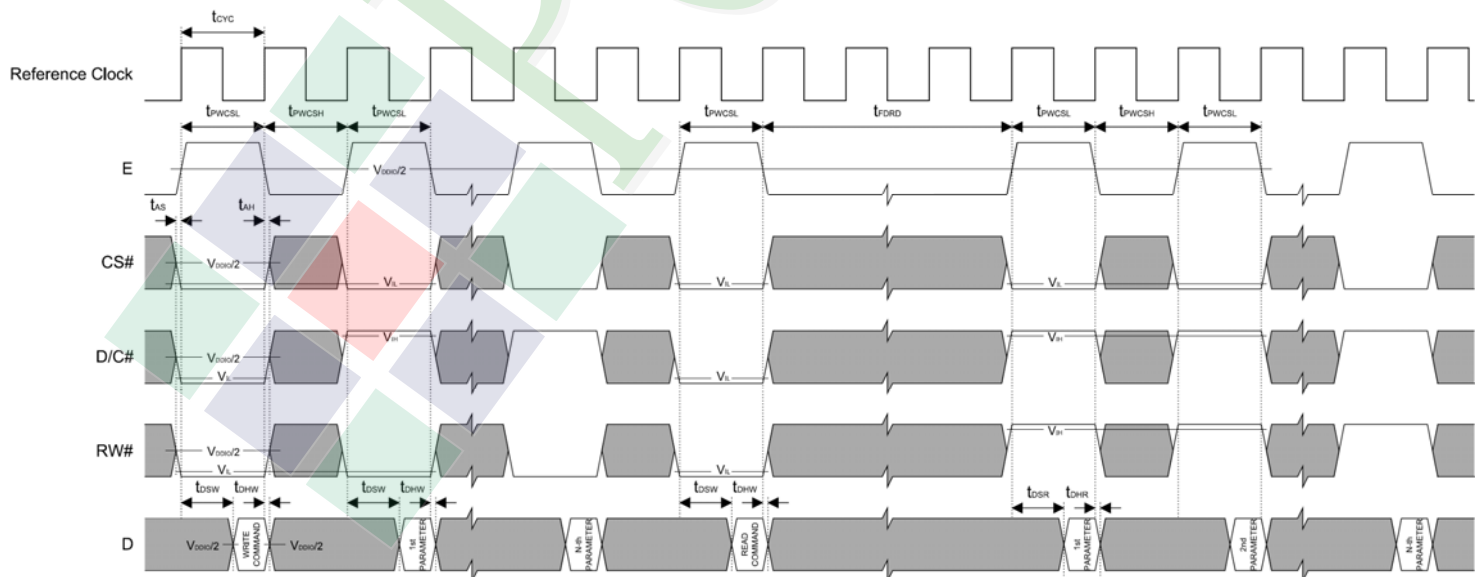
#### 6800 Mode Timing

Symbol	Parameter	Min	Typ	Max	Unit
$t_{CYC}$	Reference Clock Cycle Time	9	-	-	ns
$t_{PWCSL}$	Pulse width CS# or E low	1	-	-	$t_{CYC}$
$t_{PWCSH}$	Pulse width CS# or E high	1	-	-	$t_{CYC}$
$t_{FDRD}$	First Data Read Delay	5	-	-	$t_{CYC}$
$t_{AS}$	Address Setup Time	1	-	-	ns
$t_{AH}$	Address Hold Time	1	-	-	ns
$t_{DSW}$	Data Setup Time	4	-	-	ns
$t_{DHW}$	Data Hold Time	1	-	-	ns
$t_{DSR}$	Data Access Time	-	-	5	ns
$t_{DHR}$	Output Hold time	1	-	-	ns

6800 Mode Timing Diagram (Use CS# as Clock)

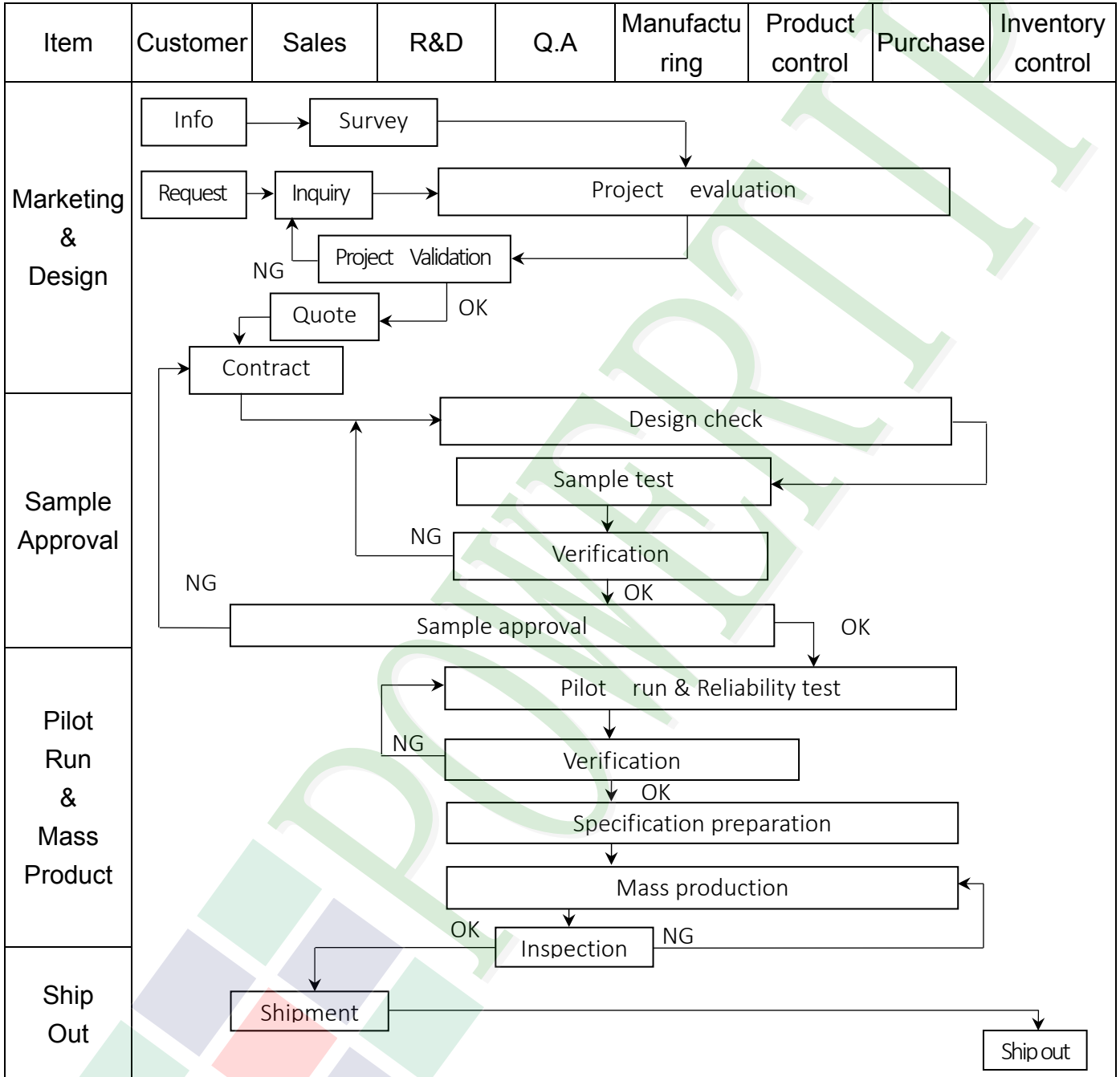


6800 Mode Timing Diagram (Use E as Clock)

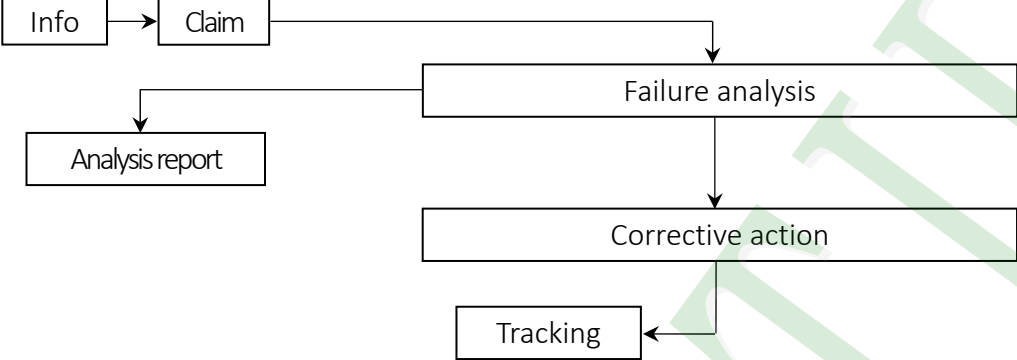


### 3. QUALITY ASSURANCE SYSTEM

#### 3.1 Quality Assurance Flow Chart





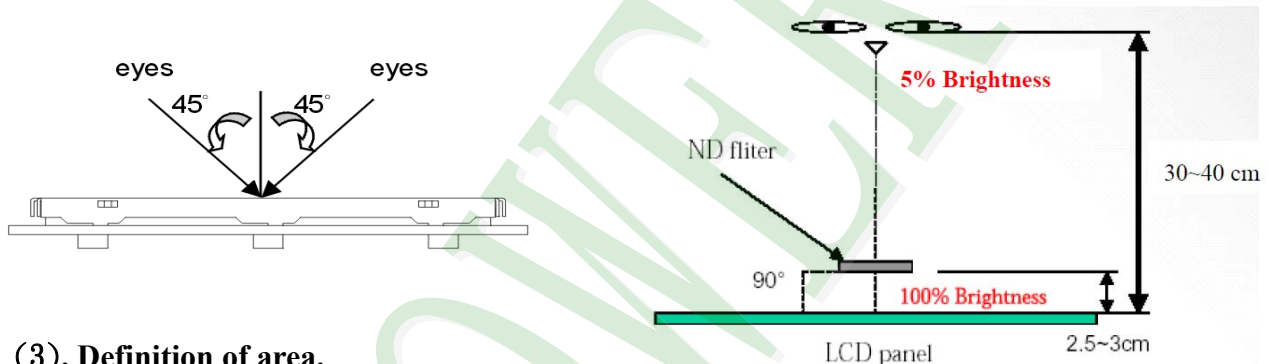
Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service	 <pre> graph TD     Info[Info] --&gt; Claim[Claim]     Claim --&gt; Failure[Failure analysis]     Failure --&gt; Report[Analysis report]     Failure --&gt; Action[Corrective action]     Action --&gt; Tracking[Tracking]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

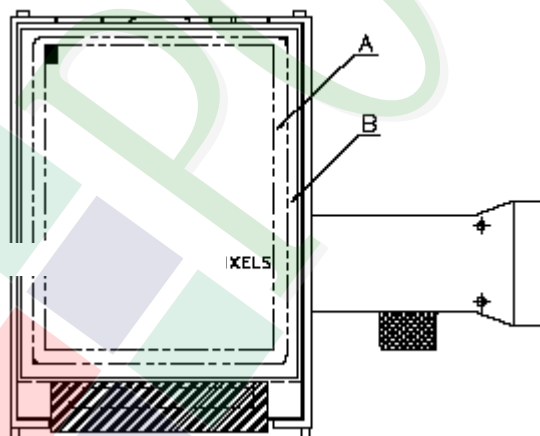
- ◆Scope: The document shall be applied to TFT-LCD Module for 3.5" -15" (Ver.B01).
- ◆Inspection Standard: MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆Equipment: Gauge, MIL-STD, Powertip Tester, Sample
- ◆Defect Level: Major Defect AQL: 0.4; Minor Defect AQL: 1.5
- ◆OUT Going Defect Level: Sampling.
- ◆Standard of the product appearance test:

#### a. Manner of appearance test:

- (1). The test best be under 20W×2 fluorescent light(about 300lux ~500lux)  
, and distance of view must be at 30~40 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

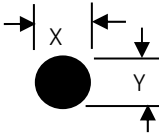
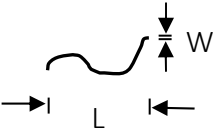

#### (4). Standard of inspection : (Unit : mm)

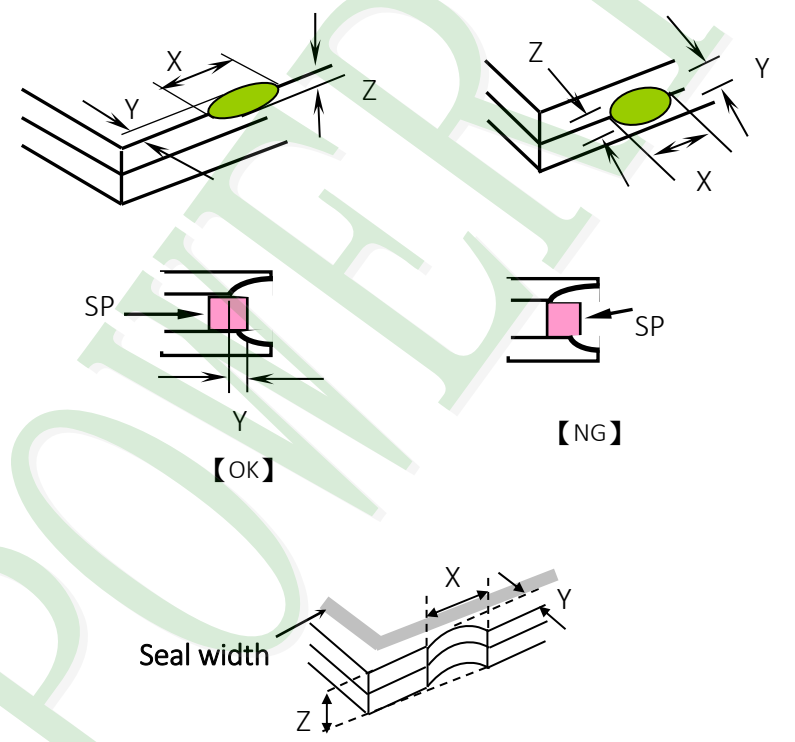
**◆Specification For TFT-LCD Module 3.5" ~15" :**
**(Ver.B01)**

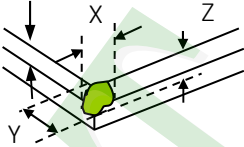
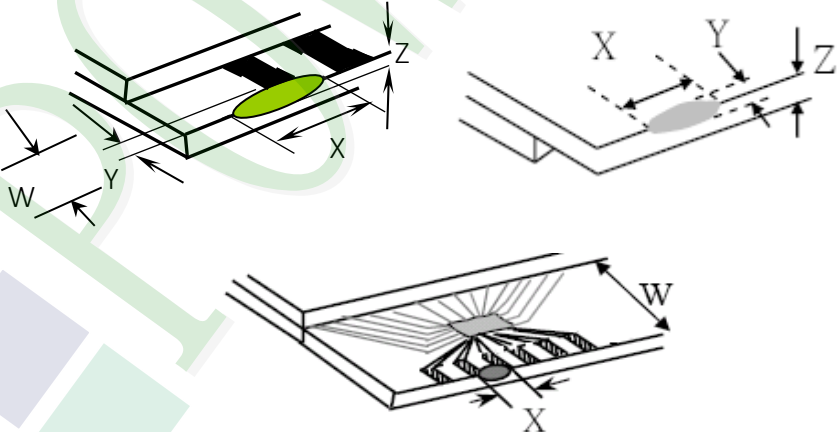
NO	Item	Criterion	Level												
01	Product condition	1. 1The part number is inconsistent with work order of production.	Major												
		1. 2 Mixed product types.	Major												
		1. 3 Assembled in inverse direction.	Major												
02	Quantity	2. 1The quantity is inconsistent with work order of production.	Major												
03	Outline dimension	3. 1Product 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												
		4. 6Mura cannot be seen through 5% ND filter at 50% Gray , should be judged by the viewing angle of 90 degree.	Minor												
05	Dot defect (Bright dot, Dark dot)  On -display	<table border="1"> <thead> <tr> <th></th> <th>Item</th> <th>Acceptance (Q'ty)</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Dot Defect</td> <td>Bright Dot</td> <td><math>\leq 4</math></td> </tr> <tr> <td>Dark Dot</td> <td><math>\leq 5</math></td> </tr> <tr> <td>Joint Dot</td> <td><math>\leq 3</math></td> </tr> <tr> <td>Total</td> <td><math>\leq 7</math></td> </tr> </tbody> </table>		Item	Acceptance (Q'ty)	Dot Defect	Bright Dot	$\leq 4$	Dark Dot	$\leq 5$	Joint Dot	$\leq 3$	Total	$\leq 7$	Minor
			Item	Acceptance (Q'ty)											
Dot Defect	Bright Dot	$\leq 4$													
	Dark Dot	$\leq 5$													
	Joint Dot	$\leq 3$													
	Total	$\leq 7$													
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 $\geq 5$ mm. 5. 4 Bright dot that can not be seen through 5% ND filter.															

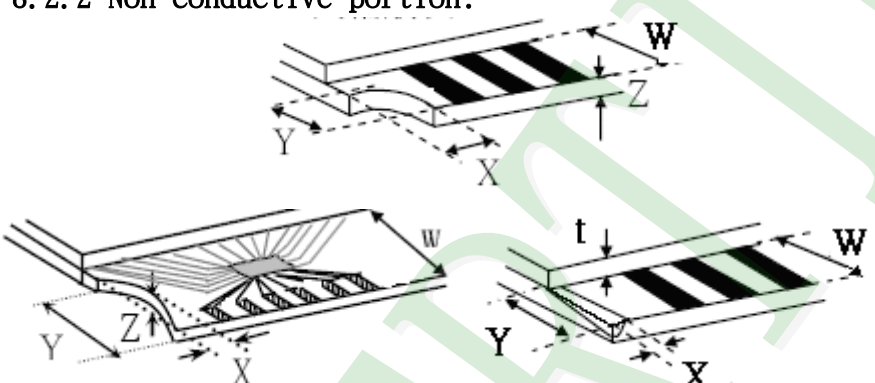
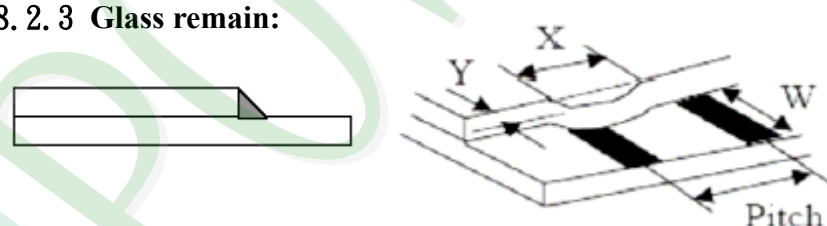
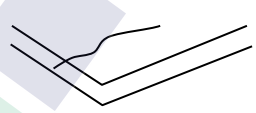
**◆Specification For TFT-LCD Module 3.5" ~15" :**

(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 border="1"> <thead> <tr> <th rowspan="2">Dimension (diameter : <math>\Phi</math>)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.25</math></td> <td colspan="2">Ignore</td> </tr> <tr> <td><math>0.25 &lt; \Phi \leq 0.50</math></td> <td>5</td> <td rowspan="3">Ignore</td> </tr> <tr> <td><math>\Phi &gt; 0.50</math></td> <td>0</td> </tr> <tr> <td><b>Total</b></td> <td>5</td> </tr> </tbody> </table>	Dimension (diameter : $\Phi$ )	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.25$	Ignore		$0.25 < \Phi \leq 0.50$	5	Ignore	$\Phi > 0.50$	0	<b>Total</b>	5	Minor																														
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$\Phi > 0.50$	0																																															
<b>Total</b>	5																																															
6. 2 Line type(Non-display or display):  <table border="1"> <thead> <tr> <th rowspan="2">module size</th> <th rowspan="2">Length (L)</th> <th rowspan="2">Width (W)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td rowspan="5">3.5" to less 9"</td> <td>---</td> <td><math>W \leq 0.03</math></td> <td colspan="2">Ignore</td> </tr> <tr> <td><math>L \leq 10.0</math></td> <td><math>0.03 &lt; W \leq 0.05</math></td> <td colspan="2">4</td> </tr> <tr> <td><math>L \leq 5.0</math></td> <td><math>0.05 &lt; W \leq 0.10</math></td> <td colspan="2">2</td> </tr> <tr> <td>---</td> <td><math>W &gt; 0.10</math></td> <td colspan="2">As round type</td> </tr> <tr> <td colspan="3"><b>Total</b></td> <td colspan="2">5</td> </tr> <tr> <td rowspan="4">9" to 15"</td> <td>---</td> <td><math>W \leq 0.05</math></td> <td colspan="2">Ignore</td> </tr> <tr> <td><math>L \leq 10.0</math></td> <td><math>0.05 &lt; W \leq 0.10</math></td> <td colspan="2">5</td> </tr> <tr> <td>---</td> <td><math>W &gt; 0.10</math></td> <td colspan="2">As round type</td> </tr> <tr> <td colspan="3"><b>Total</b></td> <td colspan="2">5</td> </tr> </tbody> </table>	module size	Length (L)	Width (W)	Acceptance (Q'ty)		A area	B area	3.5" to less 9"	---	$W \leq 0.03$	Ignore		$L \leq 10.0$	$0.03 < W \leq 0.05$	4		$L \leq 5.0$	$0.05 < W \leq 0.10$	2		---	$W > 0.10$	As round type		<b>Total</b>			5		9" to 15"	---	$W \leq 0.05$	Ignore		$L \leq 10.0$	$0.05 < W \leq 0.10$	5		---	$W > 0.10$	As round type		<b>Total</b>			5		Minor
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07	Polarizer Bubble  	<table border="1"> <thead> <tr> <th rowspan="2">Dimension (diameter: <math>\Phi</math>)</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td><math>\Phi \leq 0.25</math></td> <td colspan="2">Ignore</td> </tr> <tr> <td><math>0.25 &lt; \Phi \leq 0.50</math></td> <td>4</td> <td rowspan="4">Ignore</td> </tr> <tr> <td><math>0.50 &lt; \Phi \leq 0.80</math></td> <td>1</td> </tr> <tr> <td><math>\Phi &gt; 0.80</math></td> <td>0</td> </tr> <tr> <td><b>Total</b></td> <td>5</td> </tr> </tbody> </table>	Dimension (diameter: $\Phi$ )	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.25$	Ignore		$0.25 < \Phi \leq 0.50$	4	Ignore	$0.50 < \Phi \leq 0.80$	1	$\Phi > 0.80$	0	<b>Total</b>	5	Minor																												
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NO	Item	Criterion	Level									
08	The crack of glass	<p><b>Symbols :</b></p> <p><b>X:</b> The length of crack  <b>Z:</b> The thickness of crack  <b>t:</b> The thickness of glass</p> <p><b>Y:</b> The width of crack.  <b>W:</b> terminal length  <b>a:</b> LCD side length</p> <hr/> <p>8.1 General glass chip:              8.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="539 1579 1353 1870"> <thead> <tr> <th>x</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td><math>\leq a</math></td> <td>Crack can't enter viewing area</td> <td><math>\leq 1/2 t</math></td> </tr> <tr> <td><math>\leq a</math></td> <td>Crack can't exceed the half of SP width.</td> <td><math>1/2 t &lt; Z \leq 2 t</math></td> </tr> </tbody> </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	$\leq 1/2 t$										
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$\leq 1/5 a$	Crack can't exceed the half of SP width.	$1/2 t < Z \leq 2 t$													
		<p>8.2 Protrusion over terminal:</p> <p>8.2.1 Chip on electrode pad:</p>  <table border="1" data-bbox="560 1697 1347 1872"> <thead> <tr> <th></th> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>Front</td> <td><math>\leq a</math></td> <td><math>\leq 1/2 W</math></td> <td><math>\leq t</math></td> </tr> <tr> <td>Back</td> <td><math>\leq a</math></td> <td><math>\leq W</math></td> <td><math>\leq 1/2 t</math></td> </tr> </tbody> </table>		X	Y	Z	Front	$\leq a$	$\leq 1/2 W$	$\leq t$	Back	$\leq a$	$\leq W$	$\leq 1/2 t$	Minor
	X	Y	Z												
Front	$\leq a$	$\leq 1/2 W$	$\leq t$												
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08	The crack of glass	<p><b>Symbols:</b></p> <p><b>X:</b> The length of crack  <b>Z:</b> The thickness of crack  <b>t:</b> The thickness of glass</p> <p><b>Y:</b> The width of crack.  <b>W:</b> terminal length  <b>a:</b> LCD side length</p> <hr/> <p><b>8.2.2 Non-conductive portion:</b></p>  <table border="1" data-bbox="622 963 1244 1086"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td><math>\leq 1/3 a</math></td> <td><math>\leq W</math></td> <td><math>\leq t</math></td> </tr> </tbody> </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><b>8.2.3 Glass remain:</b></p>  <table border="1" data-bbox="542 1512 1228 1635"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td><math>\leq a</math></td> <td><math>\leq 1/3 W</math></td> <td><math>\leq t</math></td> </tr> </tbody> </table> <p><b>8.2.4 Cracking:</b></p>  <p>Not Allowed</p>	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 3.5" ~15" :**
**(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: 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 $\leq 1.5$ mm.	Minor





## 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 .
- 5.2.10 Caution!( LCM products with Capacitive Touch Panel)  
Strong EMI-sources such as switch-mode power supplies (SMPS) can lead to touch malfunction (e.g. ghost-touches).  
Therefore, the touch needs to be thoroughly tested inside the target application.

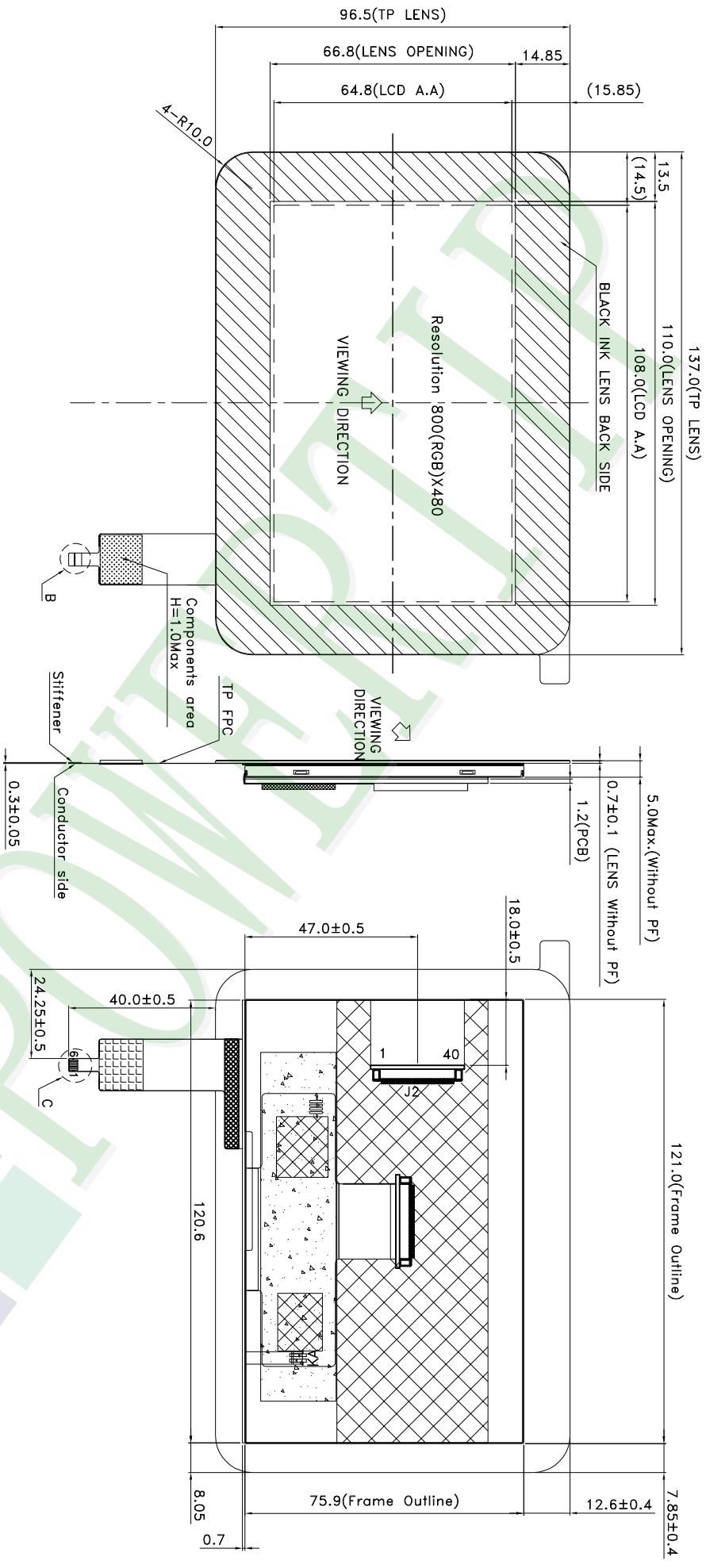
### 5.3 STORAGE

- 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

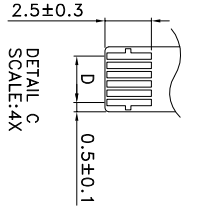
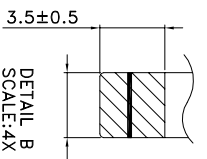
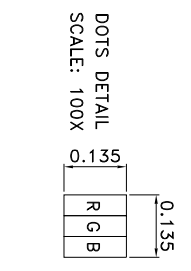
- 5.4.1 Applicable warrant period  
The period is within thirteen months since the date of shipping out under normal using and storage conditions.
- 5.4.2 Unaccepted responsibility  
This product has been manufactured to your company's specification as a part for use in your company's general electronic 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.

A B C D E F G H



TP Description

Pin	Name
1	GND
2	VD
3	SCL
4	SDA
5	INT
6	RESET



NOTES:

- 1.LCD TYPE: o-si TFT
- 2.LCD DISPLAY: POSITIVE/TRANSMISSIVE
- 3.VIEW DIRECTION: 6 O'CLOCK
- 4.The tolerance unless classified ±0.3mm
- 5.J2:IMSA-9637S-401923(PTC:CNJ400540DRABA)
- 6.T/P FPC suggested connector :FH34SRJ-6S-0.55H(Hirose) or compatible

PART NO:  
PH800480T024-IFC05

久正光电股份有限公司  
POWER TIP TECHNOLOGY CORPORATION

DRAWING NAME:  
JLMD-PH800480T024-IFC05

Design: Bob  
Check: Terry

Surface	Material	Thickness	Quantity
(3)	MM	FT	1/1
1 ~ 4	4 ~ 16	63 ~ 280	250 ~ 1000

TITLE:  
LCD MODULE DRAWING

Approve: Ryan

Unit	Scale	Page
MM	1/1	1/1

REV: NEW DRAWING

REVISER: Bob  
DATE: 2019/10/22

Rev	Rev By	Date
001	Bob	2019/10/22

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