

SPECIFICATIONS

CUSTOMER	:	PTC
SAMPLE CODE	:	SH800480T013-IBC
MASS PRODUCTION CODE	:	PH800480T013-IBC
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	003
DRAWING NO. (Ver.)	:	JLMD- PH800480T013-IBC _002
PACKAGING NO. (Ver.)	:	JPKG- PH800480T013-IBC _002

Customer Approved

Date:



Approved	Checked	Designer
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- ☐ Preliminary specification for design input
☒ Specification for sample approval

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History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
07/18/2013	01	001	New Drawing	-	譚超敏
11/08/2013	01	002	New Sample	-	譚超敏
03/04/2013	01	003	Add description of TP	4	譚超敏

Total: 30 Page

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1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	800 * (RGB) * 480
LCD Type	a-Si TFT , Normally white , Transmissive type
Touch panel	True Multi-Touch "Projected "capacitive touch panel True Multi-Touch with up to 10 Points of Absolution
Screen size(inch)	7.0 inch
Viewing Direction	6 O'clock
Backlight Type	LED B/L
Weight	213g
Interface	RGB Interface
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	192.96(L)*108.76(W)*7.725(H)	mm

LCD panel& Touch Panel

Item	Standard Value	Unit
Viewing Area (TP)	154.88 (W) * 86.72 (L)	mm
Active Area (TP)	155.58 (W) * 87.42 (L)	mm
Active Area (LCD)	154.08 (W) * 85.92 (L)	mm

Note : For detailed information please refer to LCM drawing.

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Power Supply Voltage	DV _{DD}	GND=0	-0.3	5.0	V	-
	AV _{DD}		6.5	13.5	V	
	V _{GH}		-0.3	40	V	
	V _{GL}	AGND=0	-20	0.3	V	
	V _{GH} - V _{GL}	-	0	40	V	
Operating Temperature	T _{OP}	-	-20	70	°C	
Storage Temperature	T _{ST}	-	-30	80	°C	

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.

1.4 DC Electrical Characteristics

Module

GND = 0V, Ta = 25°C

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Voltage	DV _{DD}	3.0	3.3	3.6	V	-
	V _{GH}	15.3	16.0	16.7		
	V _{GL}	-7.7	-7.0	-6.3		
	AV _{DD}	10.2	10.4	10.6		
VCOM	V _{COM}	3.6	3.8	4.0	V	
Input signal Voltage	V _{IH}	0.7DV _{DD}	-	DV _{DD}	V	
	V _{IL}	0	-	0.3DV _{DD}		
Supply Current	IDD	-	130	250	mA	Pattern= Black *1

Note1: Maximum current display.

1.5 Optical Characteristics

TFT LCD Module

DV_{DD} = 3.3 V, Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	unit	
Response time	Rise	Tr	-	-	10	20	ms	Note 2
	Fall	Tf		-	15	30		
Viewing angle	Top	θ+	CR ≥ 10	-	60	-	Deg.	Note 1
	Bottom	θ-		-	60	-		
	Left	θL		-	60	-		
	Right	θR		-	60	-		
Contrast ratio		CR	-	500	600	-		Note 3
Color of CIE Coordinate (With B/L&TP)	White	X		0.25	0.30	0.35	-	Note4
		Y		0.27	0.32	0.37		
	Red	X		0.52	0.57	0.62		
		Y		0.29	0.34	0.39		
	Green	X		0.27	0.32	0.37		
		Y		0.56	0.61	0.66		
	Blue	X		0.10	0.15	0.20		
		Y		0.02	0.07	0.12		
Average Brightness Pattern=white display (With B/L&TP)*1		IV		-	340	425	-	cd/m ²
Uniformity (With B/L &TP)*2		△B	-	80	-	-	%	Note1

Note 4 :

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

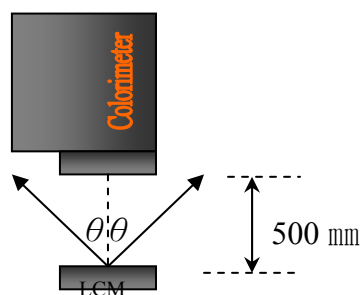
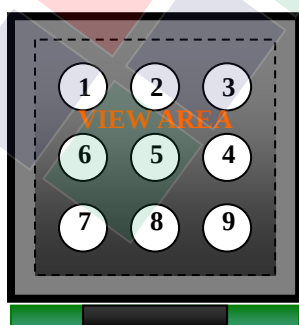
2 : Measurement Condition for Optical Characteristics:

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 , (θ = 0°)

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

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

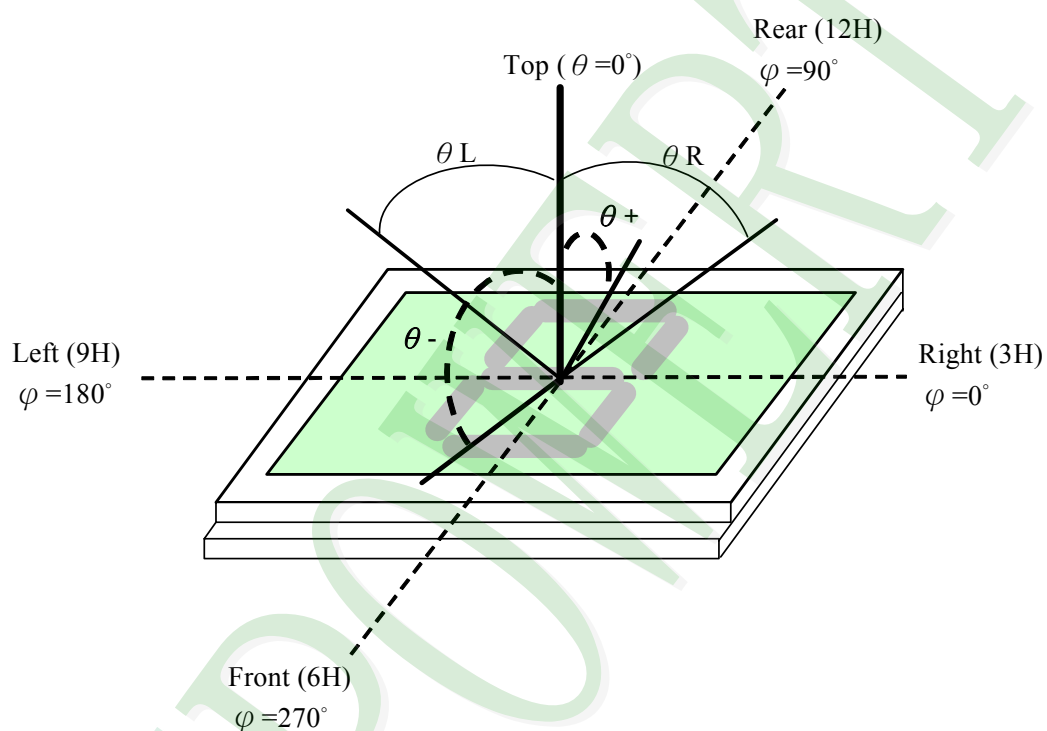


Colorimeter=BM-7 fast

Note 1.

Optical characteristics-2

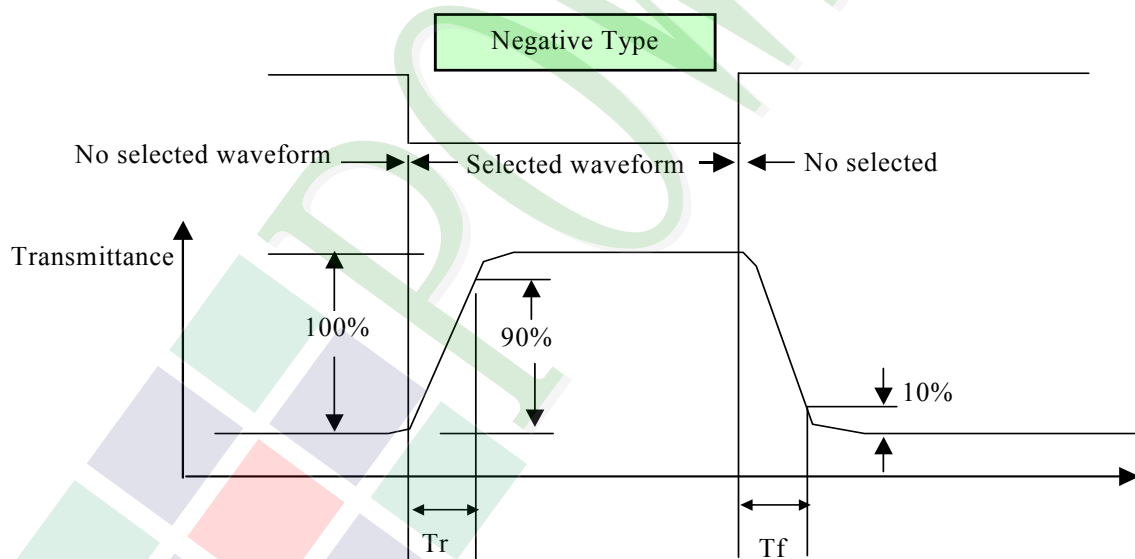
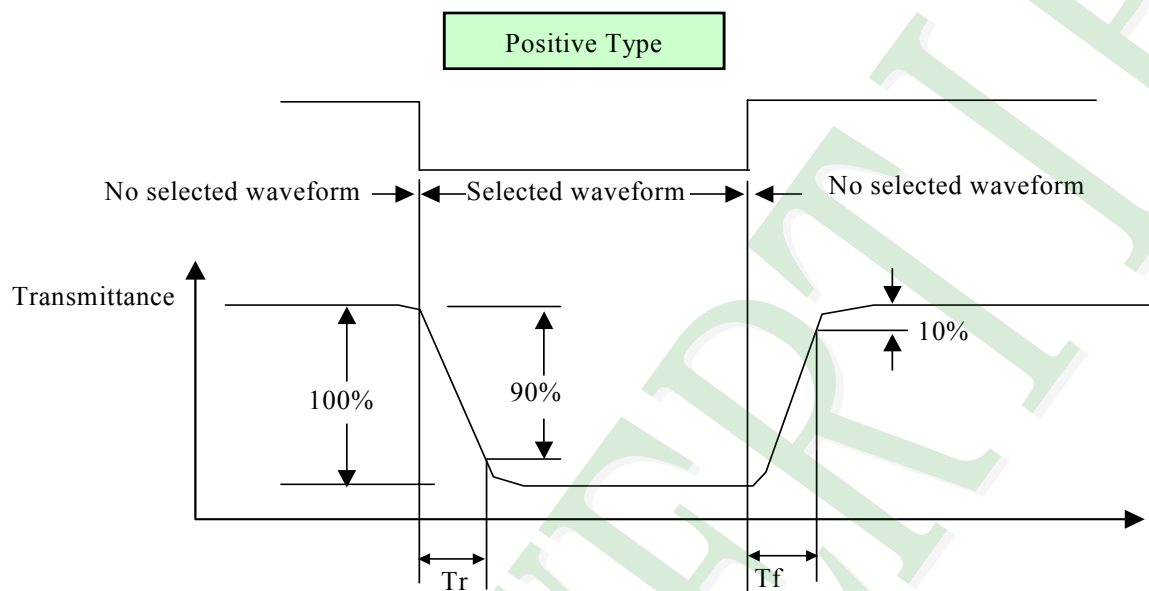
Viewing angle



Note 2.

Optical characteristics-3

Fig.2 Definition of response time



Electrical characteristics-2

※2 Drive waveform

V_{op} : Drive voltage

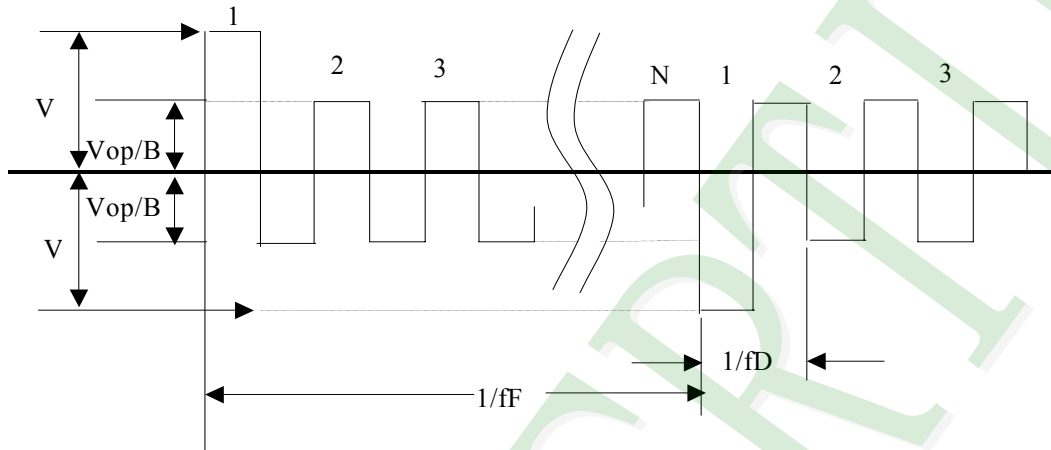
$1/B$: Bias

N : Duty

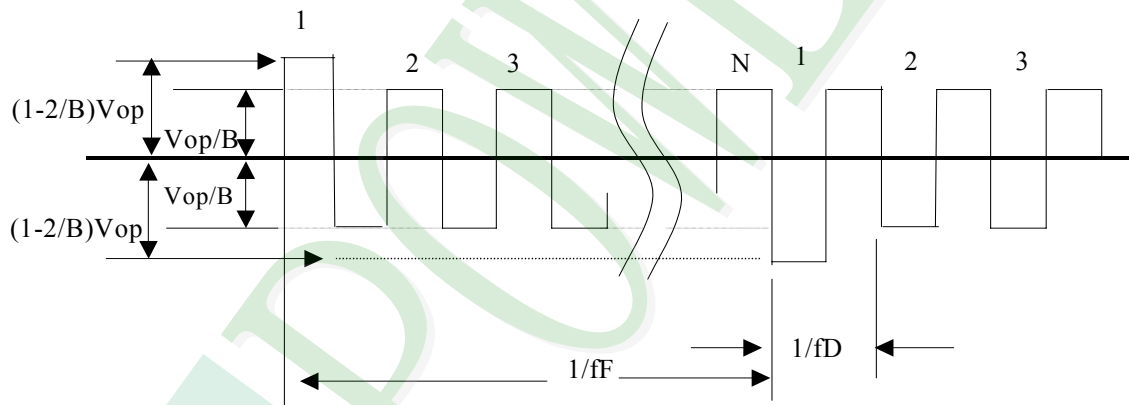
f_F : Frame frequency

f_D : Drive frequency

(1) Selected waveform



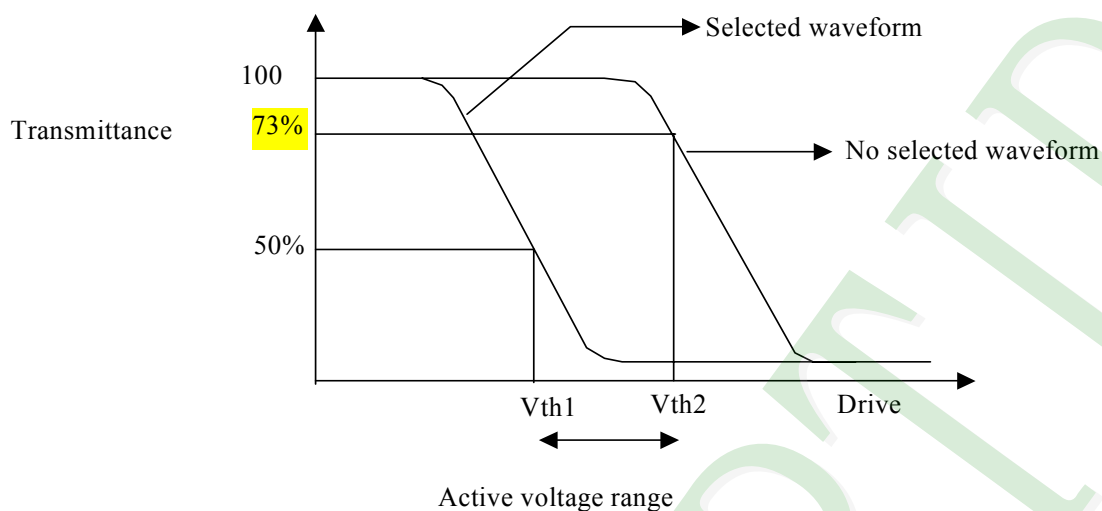
(2) Non- Selected wave form



Note:

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

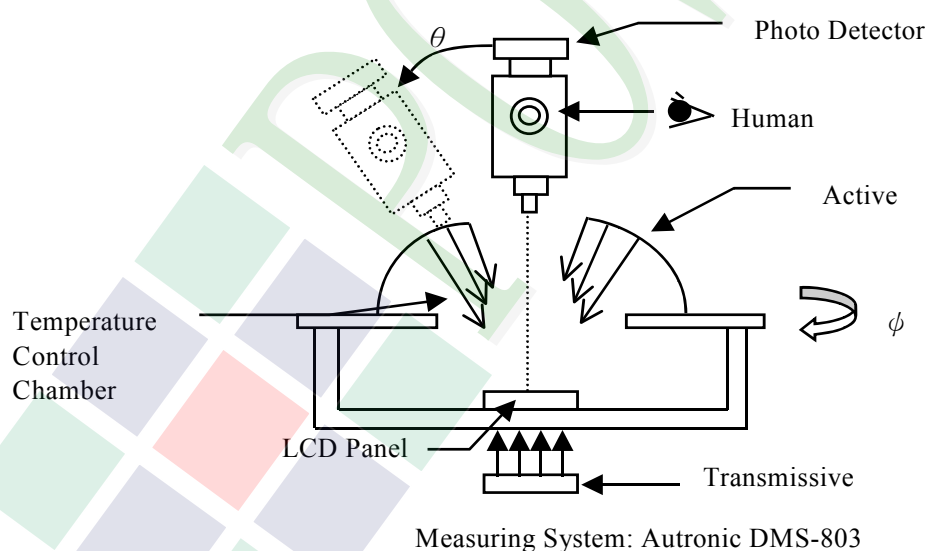
Note 3. : Definition of Vth



	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

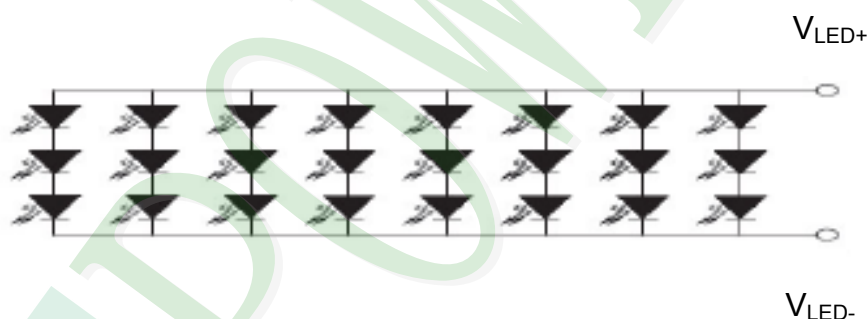
Item	Symbol	Min.	Max.	Unit	Remark
LED Forward Current	I_F	-	25	mA	One LED
LED Reverse Voltage	V_R	-	1.2	V	

Electrical / Optical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
LED Voltage	V_L	9.0	9.9	10.5	V	Note1
LED Current	I_L	-	240	-	mA	-
LED life time	-	-	30000	-	H _r	Note2

Note 1: The LED Supply Voltage is defined by the number of LED at $T_a=25^{\circ}\text{C}$ and $I_L=240\text{mA}$.

Note 2: The "LED life time" is defined as the module brightness decrease to 50% original brightness at $T_a=25^{\circ}\text{C}$ and $I_L=160\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 240mA.



1.7 Touch Panel Characteristics

1.7.1 Product Features

Item	Spec.
Size	7"
Outline Dimension	L: 192.96±0.15 mm; W: 108.76±0.15 mm
View Area	L: 154.88±0.15 mm; W: 86.72±0.15 mm
Number of Channels	26* 15
Cover Lens	0.7±0.05 mm
ITO GLASS	0.55±0.03 mm
OCA	0.175 mm
Total Thickness	1.425±0.1mm

1.7.2 Environmental Characteristic

Item	Temperature	Humidity
Operating Temperature	-20~70℃	-20~40℃, 90%RH↓ 41~70℃, 60%RH↓
Storage Temperature	-25~80℃	-25~40℃, 90%RH↓ 41~80℃, 60%RH↓

1.7.3 Optical Characteristics

Item	Spec.
Transparency	≥85%
Haze	≤3%

1.7.4 Electric Characteristics

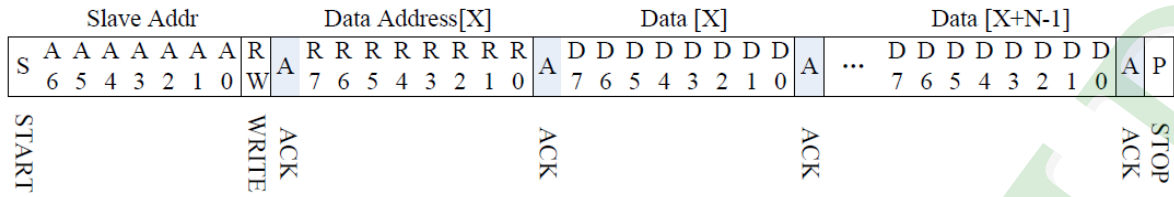
Item	Spec.														
Chipset	FT5406														
Interface type	I ² C														
Activation method	True Multi-touch														
Pin Assignment	<table border="1"> <thead> <tr> <th>PIN</th><th>定义</th></tr> </thead> <tbody> <tr> <td>1</td><td>GND</td></tr> <tr> <td>2</td><td>VDD</td></tr> <tr> <td>3</td><td>SCL</td></tr> <tr> <td>4</td><td>SDA</td></tr> <tr> <td>5</td><td>INT</td></tr> <tr> <td>6</td><td>RESET</td></tr> </tbody> </table>	PIN	定义	1	GND	2	VDD	3	SCL	4	SDA	5	INT	6	RESET
PIN	定义														
1	GND														
2	VDD														
3	SCL														
4	SDA														
5	INT														
6	RESET														

1.7.5 Temperature test condition

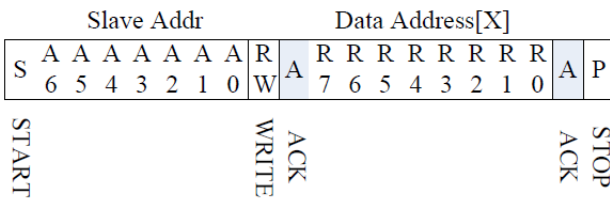
Item	Condition
High Temperature and High Humidity Test	60°C/90%RH, 240hrs
High Temperature Storage Test	70°C/240 hrs
Low Temperature Storage Test	-30±2°C/240hrs
Thermal Shock Test	-30°C/30min ,70°C/30min, 30 cycles

1.7.6 I²C Read/Write Interface description

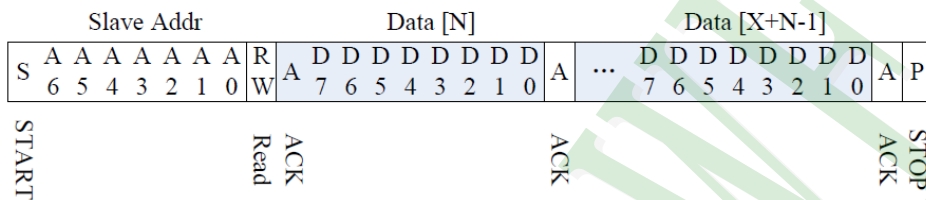
Write N bytes to I2C slave



Set Data Address



Read X bytes from I2C Slave

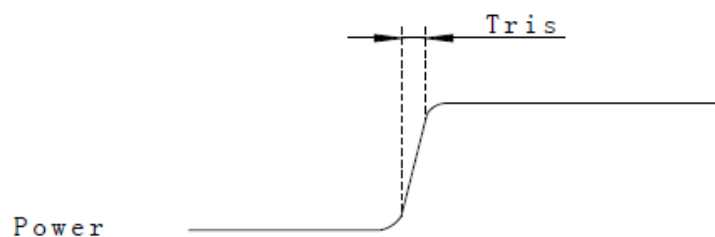


Mnemonics Description

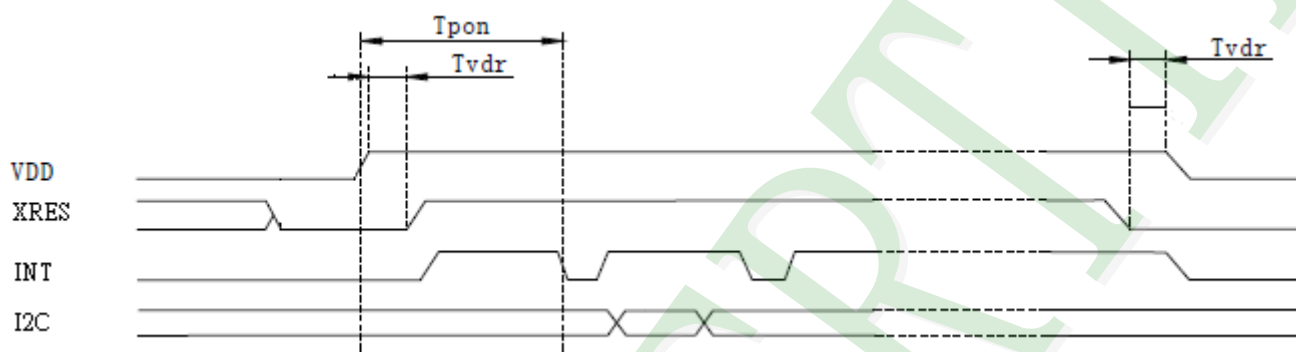
Mnemonics	Description
S	I2C Start or I2C Restart
A[6:0]	Slave address A[6:0]:0111000b
R/ W	'1' for read, '0' for write
A(N)	ACK(NACK)
P	STOP: the indication of the end of a packet (if this bit is missing, S will indicate the end of the current packet and the beginning of the next packet)

Timing Characteristics

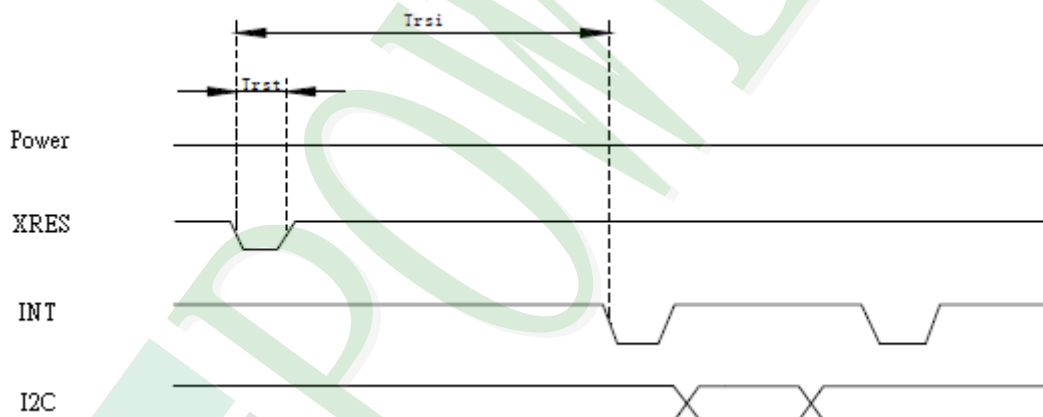
Parameter	Unit	Min	Max
SCL frequency	KHz	0	400
Bus free time between a STOP and START condition	us	4.7	\
Hold time (repeated) START condition	us	4.0	\
Data setup time	ns	250	\
Setup time for a repeated START condition	us	4.7	\
Setup Time for STOP condition	us	4.0	\



Power on time



Power on Sequence



Reset Sequence

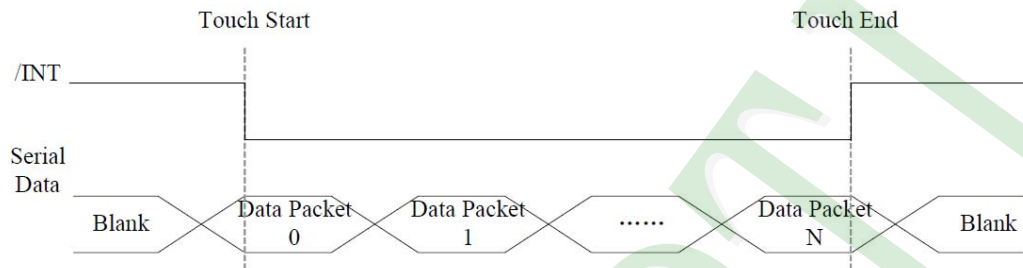
Power on / Reset Sequence Parameters

Parameter	Description	Min	Max	Units
Tris	Rise time from 0.1VDD to 0.9VDD	--	5	ms
Tpon	Time of starting to report point after powering on	200	--	ms
Tvdr	Reset time after VDD powering on	1	--	ms
Trsi	Time of starting to report point after resetting	200	--	ms
Trst	Reset time	1	--	ms

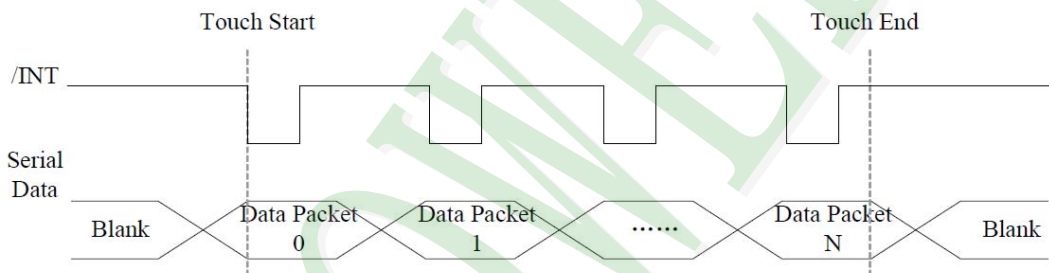
Interrupt signal from CTP to Host

As for standard CTP, host need to use both interrupt control signal and serial data interface to get the touch data. There are two kind of method to use interrupt: interrupt trigger and interrupt query.

Here is the timing to get touch data.



Interrupt query mode



Interrupt trigger mode

Host use general I2C protocol to read the touch data or the information from CTP . CTP will send host a interrupt signal when there is a valid touch. Then host can use the serial data interface to get the touch data. If there is no valid touch detected, the /INT will not be pulled up, the host do not need to read the touch data.

NOTE: “valid touch” may have different definition in various systems. For example, in some systems, the valid touch is defined as there is one more valid touch point. But in some other systems, the valid touch is defined as one more valid touch with valid gestures. In usual, /INT will be pulled up when there is a valid touch point, and to be low when a touch finishes.

As for interrupt trigger mode, /INT signal will be low if there is a touch detected. But for per update of valid touch data, CTP will produce a valid pulse for /INT signal, host can read the touch data periodically according to the frequency of this pulse. In this mode, the pulse frequency is the touch data update frequency.

CTP Register Mapping

Address	Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Host Access
00h	DEVIDE_MODE	-	Device Mode[2:0]			-	-	-	-	WR
01h	GEST_ID	Gesture ID[7:0]								R
02h	TD_STATUS	-	-	-	-	Number of touch points[3:0]				R
03h	TOUCH1_XH	1st Event Flag		-	-	1st Touch X Position[11:8]				R
04h	TOUCH1_XL	1st Touch X Position[7:0]								R
05h	TOUCH1_YH	1st Touch ID[3:0]				1st Touch Y Position[11:8]				R
06h	TOUCH1_YL	1st Touch Y Position[7:0]								R
07h	-	-								R
08h	-	-								R
09h	TOUCH2_XH	2st Event Flag		-	-	2st Touch X Position[11:8]				R
0Ah	TOUCH2_XL	2st Touch X Position[7:0]								R
0Bh	TOUCH2_YH	2st Touch ID[3:0]				2st Touch Y Position[11:8]				R
0Ch	TOUCH2_YL	2st Touch Y Position[7:0]								R
0Dh	-	-								R
0Eh	-	-								R
0Fh	TOUCH3_XH	3st Event Flag		-	-	3st Touch X Position[11:8]				R
10h	TOUCH3_XL	3st Touch X Position[7:0]								R
11h	TOUCH3_YH	3st Touch ID[3:0]				3st Touch Y Position[11:8]				R
12h	TOUCH3_YL	3st Touch Y Position[7:0]								R
13h	-	-								R
14h	-	-								R
15h	TOUCH4_XH	4st Event Flag		-	-	4st Touch X Position[11:8]				R
16h	TOUCH4_XL	4st Touch X Position[7:0]								R
17h	TOUCH4_YH	4st Touch ID[3:0]				4st Touch Y Position[11:8]				R
18h	TOUCH4_YL	4st Touch Y Position[7:0]								R
19h	-	-								R
1Ah	-	-								R
1Bh	TOUCH5_XH	5st Event Flag		-		5st Touch X Position[11:8]				R
1Ch	TOUCH5_XL	5st Touch X Position[7:0]								R
1Dh	TOUCH5_YH	5st Touch ID[3:0]				5st Touch Y Position[11:8]				R
1Eh	TOUCH5_YL	5st Touch Y Position[7:0]								R
1Fh	-	-								R
20h	-	-								R

Address	Name	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0	Host Access
21h	TOUCH6_XH	6st Event Flag		-		-		6st Touch X Position[11:8]		R
22h	TOUCH6_XL	6st Touch X Position[7:0]								R
23h	TOUCH6_YH	6st Touch ID[3:0]				6st Touch Y Position[11:8]				R
24h	TOUCH6_YL	6st Touch Y Position[7:0]								R
25h	-	-								R
26h	-	-								R
27h	TOUCH7_XH	7st Event Flag		-		-		7st Touch X Position[11:8]		R
28h	TOUCH7_XL	7st Touch X Position[7:0]								R
29h	TOUCH7_YH	7st Touch ID[3:0]				7st Touch Y Position[11:8]				R
2ah	TOUCH7_YL	7st Touch Y Position[7:0]								R
2bh	-	-								R
2ch	-	-								R
2dh	TOUCH8_XH	8st Event Flag		-		-		8st Touch X Position[11:8]		R
2eh	TOUCH8_XL	8st Touch X Position[7:0]								R
2fh	TOUCH8_YH	8st Touch ID[3:0]				8st Touch Y Position[11:8]				R
30h	TOUCH8_YL	8st Touch Y Position[7:0]								R
31h	-	-								R
32h	-	-								R
33h	TOUCH9_XH	9st Event Flag		-		-		9st Touch X Position[11:8]		R
34h	TOUCH9_XL	9st Touch X Position[7:0]								R
35h	TOUCH9_YH	9st Touch ID[3:0]				9st Touch Y Position[11:8]				R
36h	TOUCH9_YL	9st Touch Y Position[7:0]								R
37h	-	-								R
38h	-	-								R
39h	TOUCH10_XH	10st Event Flag		-		-		10st Touch X Position[11:8]		R
3ah	TOUCH10_XL	10st Touch X Position[7:0]								R
3bh	TOUCH10_YH	10st Touch ID[3:0]				10st Touch Y Position[11:8]				R
3ch	TOUCH10_YL	10st Touch Y Position[7:0]								R
3dh	-	-								R
3eh	-	-								R
3fh	-	-								R

DEVICE_MODE

This register is the device mode register, configure it to determine the current mode of the chip.

Address	Bit Address	Register Name	Description
00h	6 : 4	Device Mode [2:0]	000b Work Mode 100b Factory Mode – read raw data

GEST_ID

This register describes the gesture of a valid touch.

Address	Bit Address	Register Name	Description
01h	7 : 0	Gesture ID [7:0]	0x10 Move UP 0x14 Move Left 0x18 Move Down 0x1C Move Right 0x48 Zoom In 0x49 Zoom Out

TD_STATUS

This register is the Touch Data status register.

Address	Bit Address	Register Name	Description
02h	7 : 4	Reserved	
	3 : 0	Number of touch points[3:0]	How many points detected. 1-5 is valid.

TOUCHn_XH

This register describes MSB of the X coordinate of the nth touch point and the corresponding event flag.

Address	Bit Address	Register Name	Description
03h ~ 39h	7 : 6	Event Flag	00b: Put Down 01b: Put Up 10b: Contact 11b: Reserved
	5 : 4		Reserved
	3 : 0	Touch X Position [11:8]	MSB of Touch X Position in pixels

TOUCHn_XL

This register describes LSB of the X coordinate of the nth touch point

Address	Bit Address	Register Name	Description
04h ~ 3Ah	7 : 0	Touch X Position [7:0]	LSB of the Touch X Position in pixels

TOUCHn_YH

This register describes MSB of the Y coordinate of the nth touch point and corresponding touch ID.

Address	Bit Address	Register Name	Description
05h ~ 3Bh	7 : 4	Touch ID[3:0]	Touch ID of Touch Point
	3 : 0	Touch Y Position [11:8]	MSB of Touch Y Position in pixels

TOUCHn_YL

This register describes LSB of the Y coordinate of the nth touch point.

Address	Bit Address	Register Name	Description
06h ~ 3Ch	7:0	Touch Y Position[7:0]	LSB of The Touch Y Position in pixels

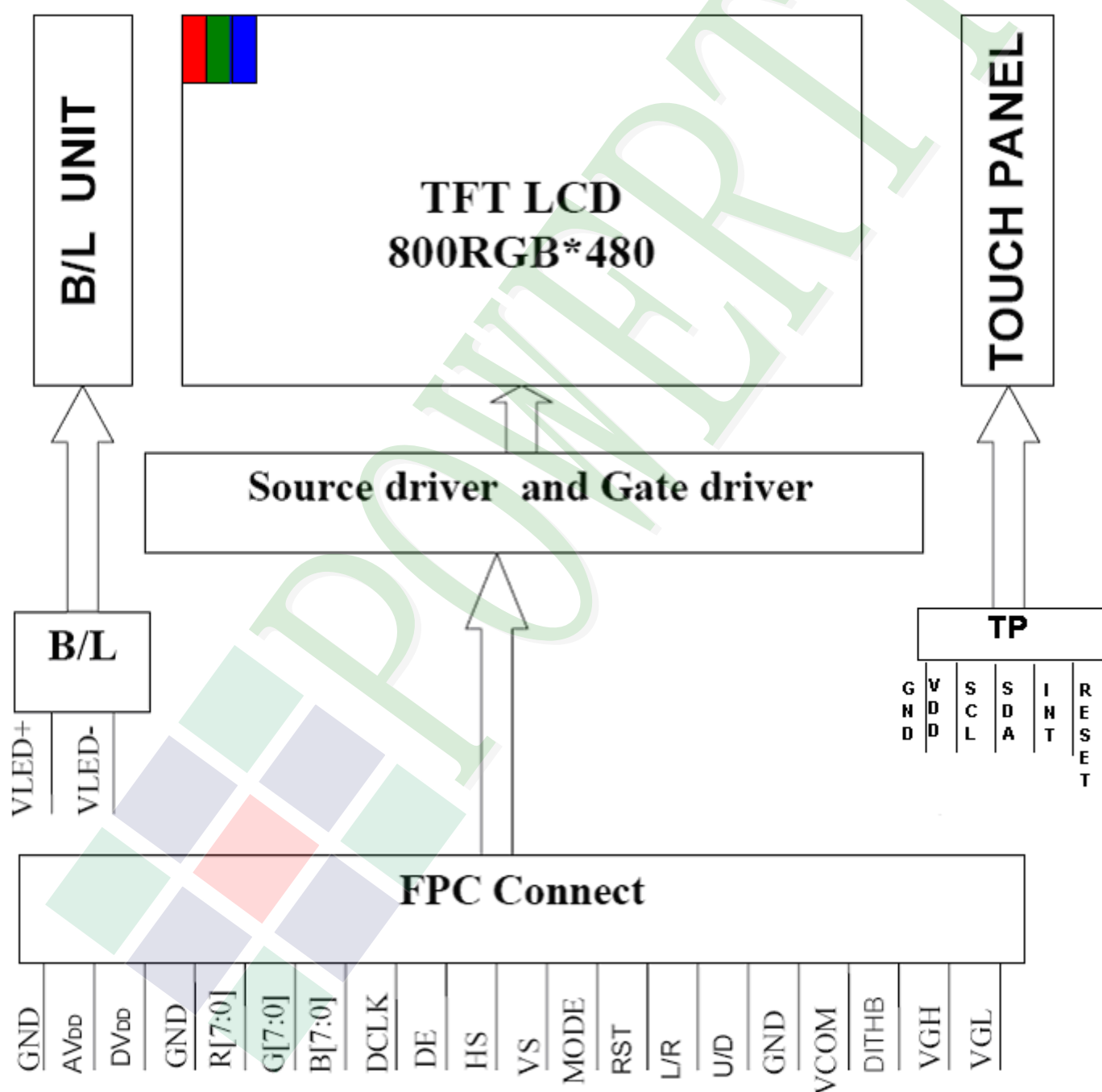
2. MODULE STRUCTURE

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	DESCRIPTION	Type:Remark
1	V _{LED+}	Power For LED backlight (+).	Power
2	V _{LED+}	Power For LED backlight (+).	Power
3	V _{LED-}	Power For LED backlight (-).	Power
4	V _{LED-}	Power For LED backlight (-).	Power
5	GND	Power ground.	Power
6	V _{com}	Common voltage.	I
7	DV _{DD}	Power for Digital Circuit.	I
8	MODE	DE/SYNC mode select.	I,Note 1
9	DE	Data Input Enable.	I
10	VS	Vertical Sync Input.	I
11	HS	Horizontal Sync Input.	I
12	B7	Blue Data(MSB).	I
13	B6	Blue Data.	I
14	B5	Blue Data.	I
15	B4	Blue Data.	I
16	B3	Blue Data.	I
17	B2	Blue Data.	I
18	B1	Blue Data.	I:Note 2
19	B0	Blue Data(LSB).	I:Note 2
20	G7	Green Data(MSB).	I
21	G6	Green Data.	I
22	G5	Green Data.	I
23	G4	Green Data.	I
24	G3	Green Data.	I
25	G2	Green Data.	I
26	G1	Green Data.	I:Note 2
27	G0	Green Data(LSB).	I:Note 2
28	R7	Red Data(MSB).	I
29	R6	Red Data.	I
30	R5	Red Data.	I
31	R4	Red Data.	I
32	R3	Red Data.	I
33	R2	Red Data.	I
34	R1	Red Data.	I:Note 2
35	R0	Red Data(LSB).	I:Note 2
36	GND	Power Ground	Power
37	DCLK	Sample clock	I:Note 3

Pin NO.	SYMBOL	DESCRIPTION	Type:Remark
38	GND	Power Ground.	Power
39	L/R	Left / right selection.	I:Note 4
40	U/D	Left / right selection.	I:Note 4
41	V _{GH}	Gate On Voltage.	Power
42	V _{GL}	Gate OFF Voltage.	Power
43	AV _{DD}	Power for Analog Circuit.	Power
44	RESET	Global reset pin.	I:Note 5
45	NC	No connection.	-
46	V _{COM}	Common Voltage.	I
47	DITHB	Dithering Function.	I:Note 6
48	GND	Power Ground.	Power
49	NC	No connection.	-
50	NC	No connection.	-

I:input

Note 1: DE/SYNC mode select. Normally pull high.

When select DE mode, MODE="1", VS and HS must pull high.

When select SYNC mode, MODE= "0", DE must be grounded.

Note 2: When input 18 bits RGB data, the two low bits of R,G and B data must be grounded.

Note 3: Data shall be latched at the falling edge of DCLK.

Note 4: Selection of scanning mode.

Setting of scan control input		Scanning direction
U/D	L/R	
GND	DV _{DD}	Up to down, left to right
DV _{DD}	GND	Down to up, right to left
GND	GND	Up to down, right to left
DV _{DD}	DV _{DD}	Down to up, left to right

Note 5: Global reset pin. Active low to enter reset state. Suggest to connect with an RC reset circuit for stability. Normally pull high.

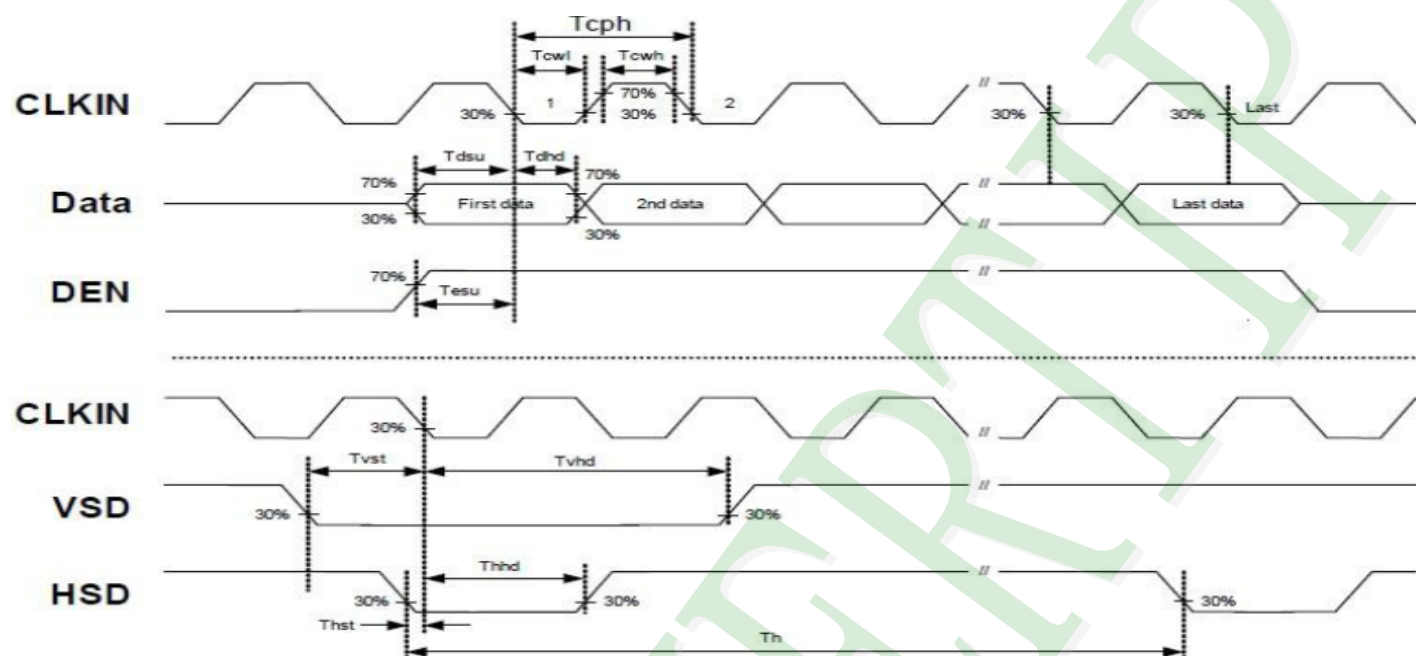
Note 6: Dithering function enable control, normally pull high.

When DITHB="1",Disable internal dithering function.

When DITHB="0",Enable internal dithering function.

2.3 Timing Characteristics

2.3.1 Signal AC Characteristics



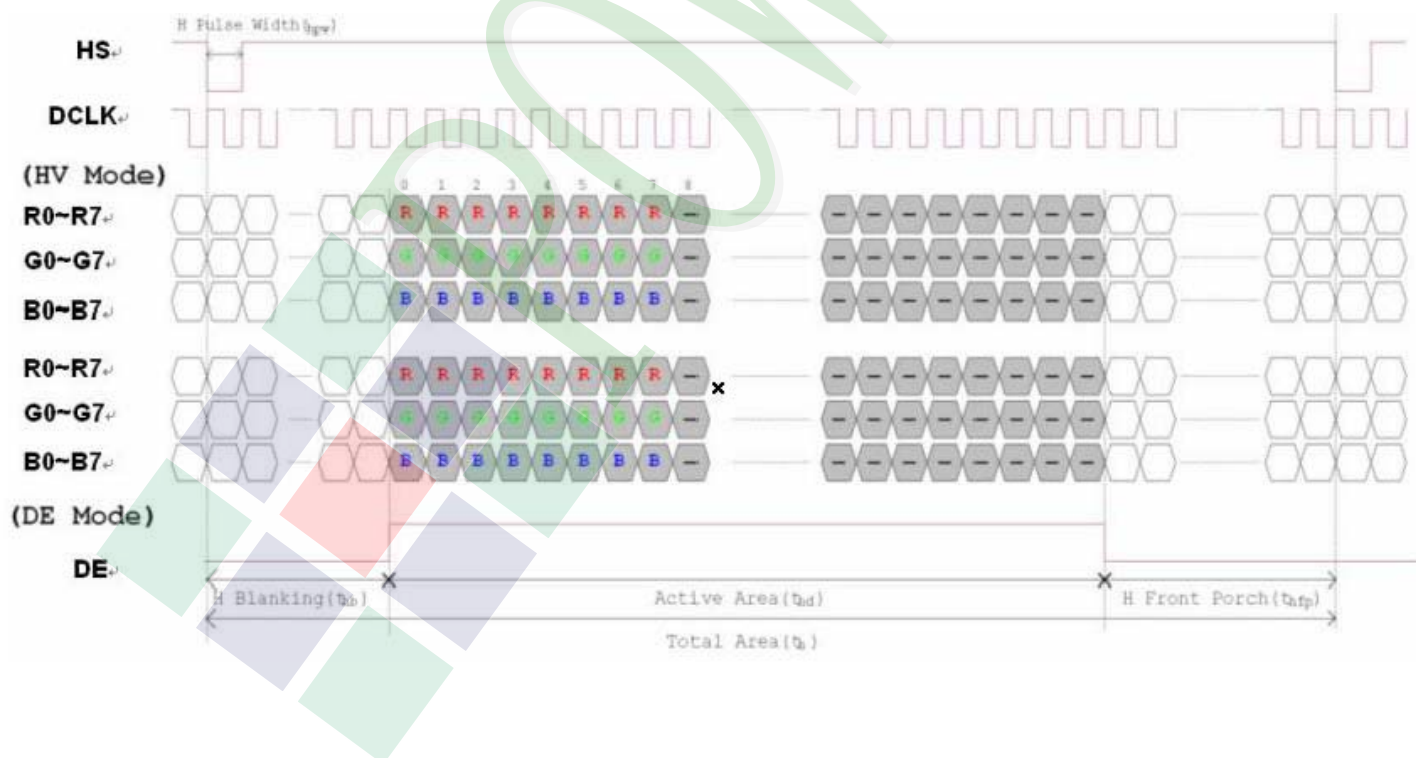
Item	Symbol	Values			Unit	Remark
		Min	Typ	Max.		
HS setup time	T_{hst}	8	-	-	ns	
HS hold time	T_{hhd}	8	-	-	ns	
VS setup time	T_{vst}	8	-	-	ns	
VS setup time	T_{vhd}	8	-	-	ns	
VS setup time	T_{dsu}	8	-	-	ns	
VS setup time	T_{dhd}	8	-	-	ns	
DE setup time	T_{esu}	8	-	-	ns	
DE hole time	T_{ehd}	8	-	-	ns	
DV _{DD} Power On Slew rate	T_{POR}	-	-	20	ms	From 0 to 90%DV _{DD}
RESET pulse width	T_{Rst}	1	-	-	ms	
DCLK cycle time	T_{coh}	20	-	-	ns	
DCLK pulse duty	T_{cwh}	40	50	60	%	

2.3.2 Input Timing Setting

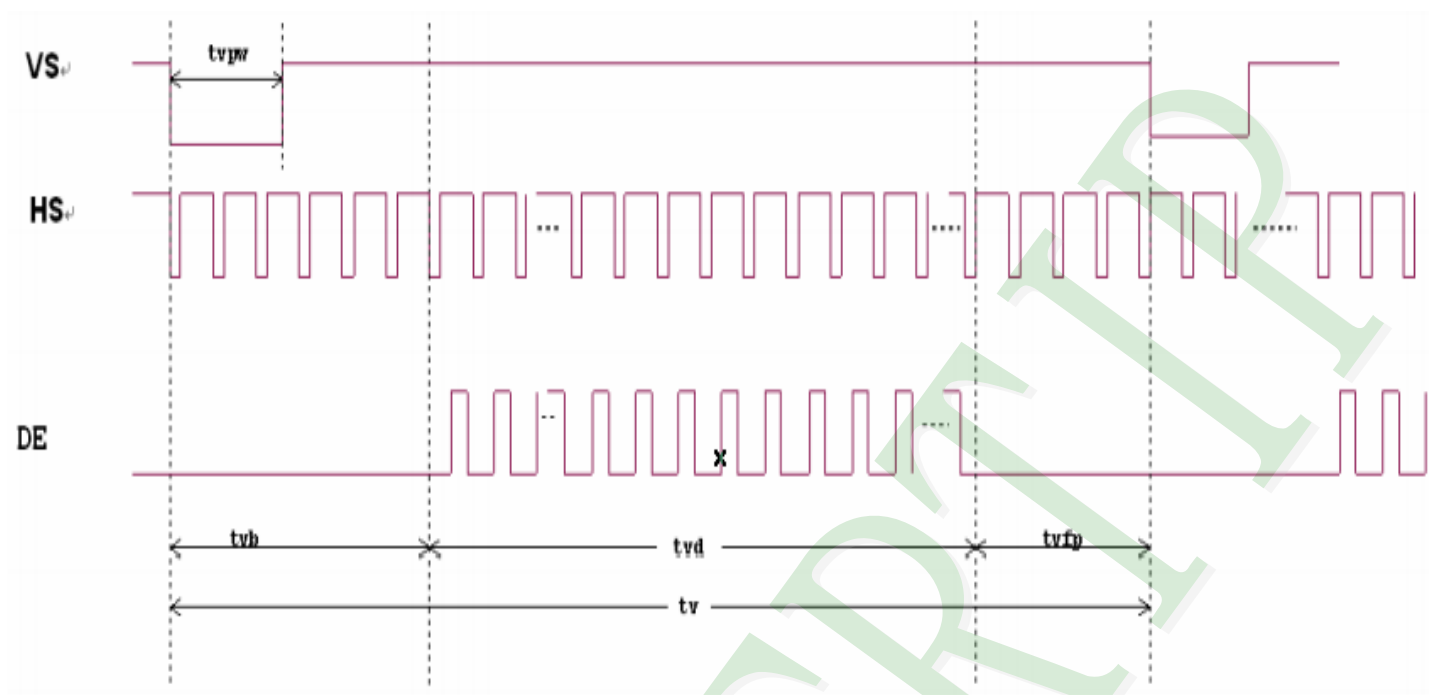
Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Horizontal Display Area	Thd		800		DCLK	
DCLK Frequency	Fclk	26.4	33.3	46.8	MHz	
One Horizontal Line	Th	862	1056	1200	DCLK	
HS pulse width	Thpw	1		40	DCLK	
HS Blanking	Thb	46	46	46	DCLK	
HS Front Porch	Thfp	16	210	354	DCLK	

Item	Symbol	Values			Unit	Remark
		Min.	Typ.	Max.		
Vertical Display Area	Tvd		480		TH	
VS period time	Tv	510	525	650	TH	
VS pulse width	Tvpw	1		20	TH	
VS Blanking	Tvb	23	23	23	TH	
VS Front Porch	Tvfp	7	22	147	TH	

Horizontal input timing diagram

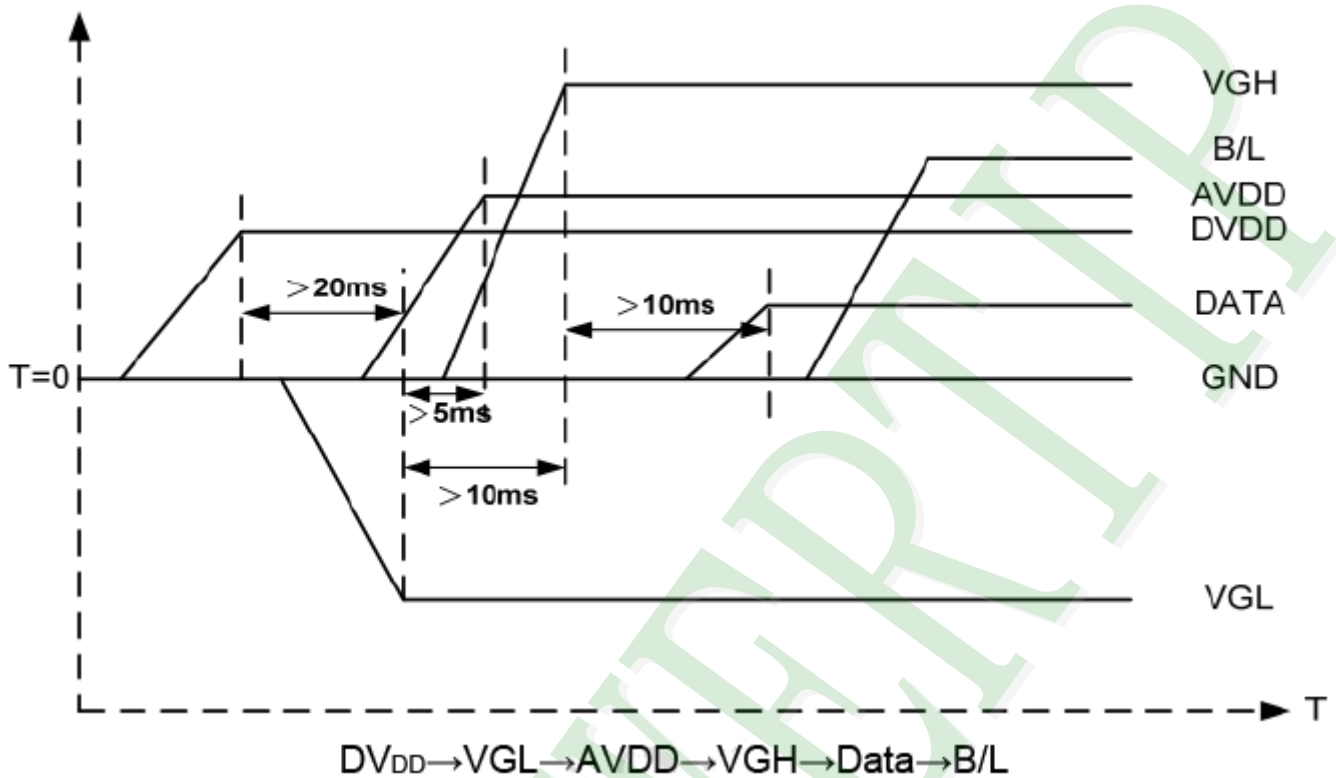


Vertical input timing diagram

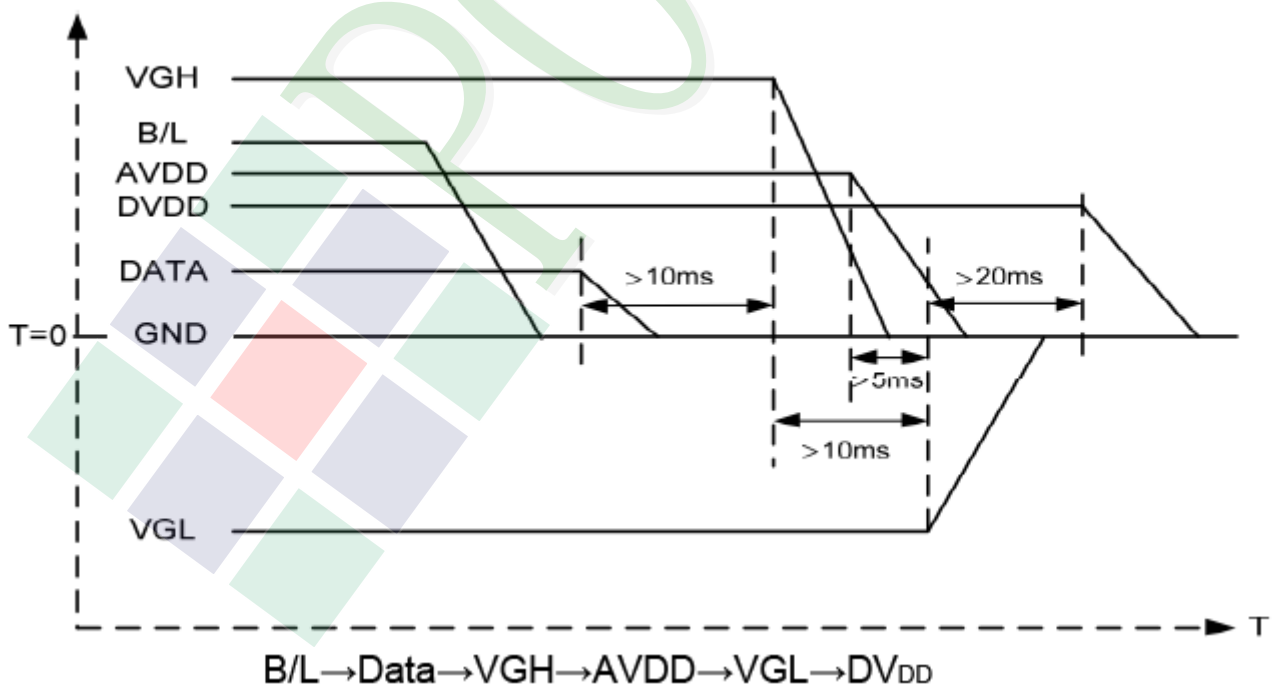


2.3.3 Power On/Off Characteristics

a. Power on:

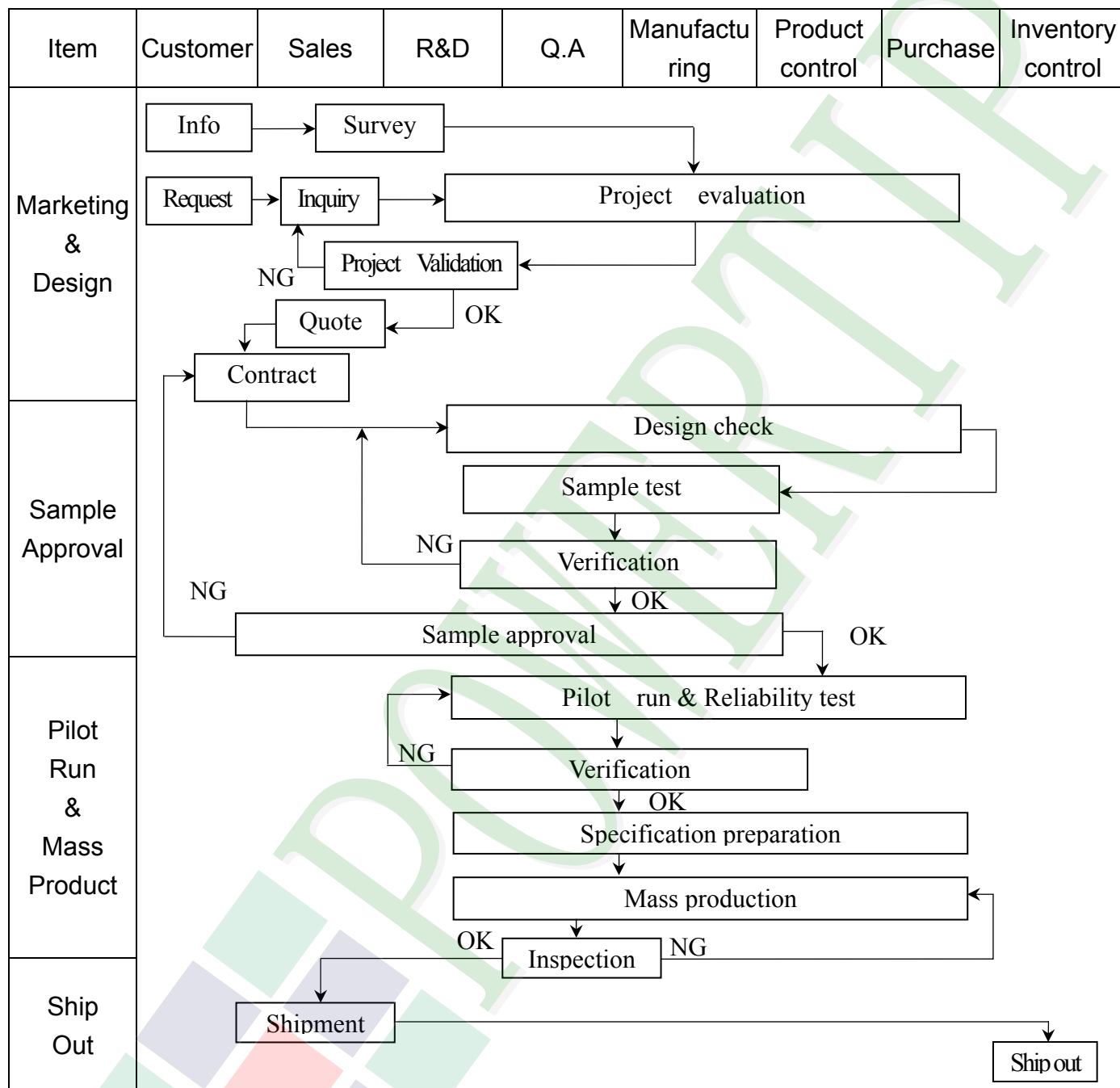


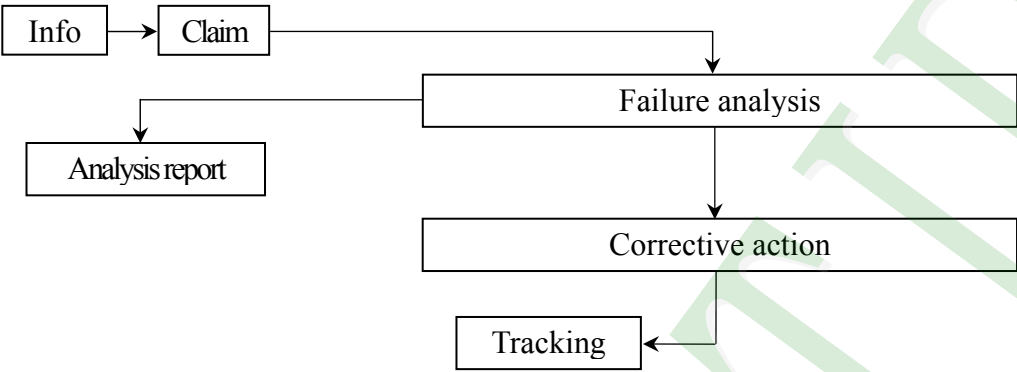
b. Power off:



3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



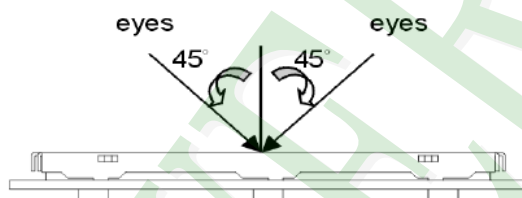
Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service	 <pre> graph TD Info[Info] --> Claim[Claim] Claim --> Analysis[Analysis report] Claim --> Failure[Failure analysis] Failure --> Corrective[Corrective action] Corrective --> Tracking[Tracking] </pre>			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

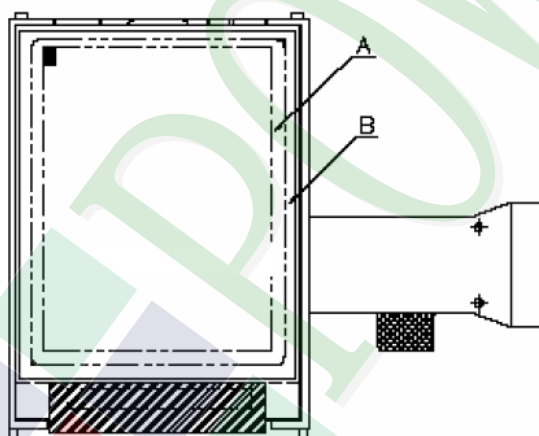
- ◆Scope : The document shall be applied to TFT-LCD Module for 3.5" ~10" (Ver.B01).
- ◆Inspection Standard : MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆Equipment : Gauge 、MIL-STD 、Powertip Tester 、Sample
- ◆Defect Level : Major Defect AQL : 0.4 ; Minor Defect AQL : 1.5
- ◆OUT Going 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)

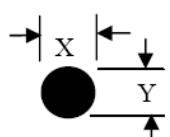
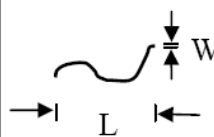
◆Specification For TFT-LCD Module 3.5" ~10" :

(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><th colspan="2">Item</th><th>Acceptance (Q'ty)</th></tr><tr><td rowspan="4">Dot Defect</td><td>Bright Dot</td><td>≤ 4</td></tr><tr><td>Dark Dot</td><td>≤ 5</td></tr><tr><td>Joint Dot</td><td>≤ 3</td></tr><tr><td>Total</td><td>≤ 7</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.	Item		Acceptance (Q'ty)	Dot Defect	Bright Dot	≤ 4	Dark Dot	≤ 5	Joint Dot	≤ 3	Total	≤ 7	Minor
Item		Acceptance (Q'ty)													
Dot Defect	Bright Dot	≤ 4													
	Dark Dot	≤ 5													
	Joint Dot	≤ 3													
	Total	≤ 7													

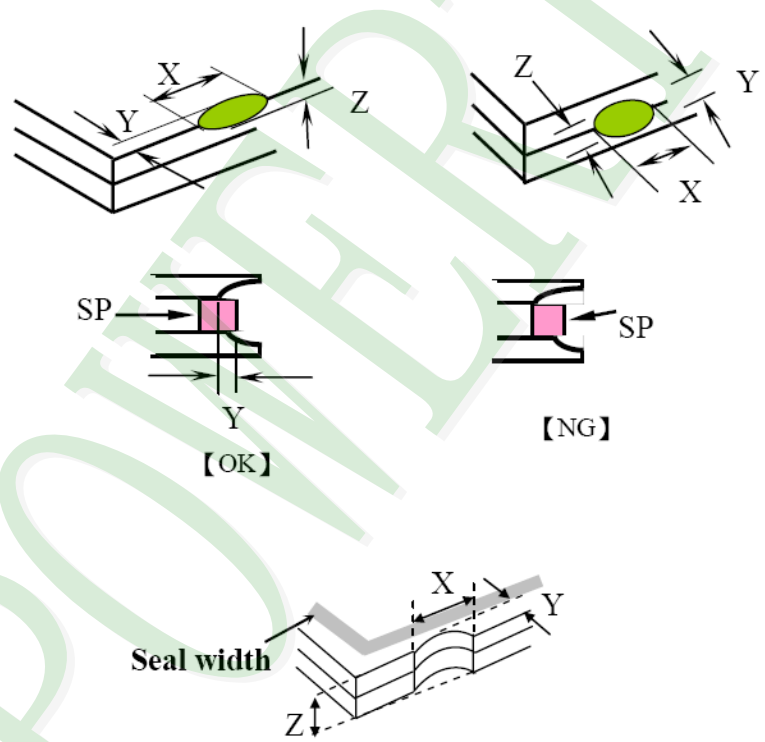
◆Specification For TFT-LCD Module 3, 5" ~10" :

(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>$\Phi \leq 0.25$</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.25 < \Phi \leq 0.50$</td><td>5</td></tr><tr><td>$\Phi > 0.50$</td><td>0</td></tr><tr><td>Total</td><td>5</td></tr></table> 6. 2 Line type(Non-display or display) : <table><tr><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><tr><td>---</td><td>$W \leq 0.03$</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$L \leq 10.0$</td><td>$0.03 < W \leq 0.05$</td><td>4</td></tr><tr><td>$L \leq 5.0$</td><td>$0.05 < W \leq 0.10$</td><td>2</td></tr><tr><td>---</td><td>$W > 0.10$</td><td>As round type</td></tr><tr><td colspan="2">Total</td><td>5</td><td></td></tr></table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.25$	Ignore	Ignore	$0.25 < \Phi \leq 0.50$	5	$\Phi > 0.50$	0	Total	5	Length (L)	Width (W)	Acceptance (Q'ty)		A area	B area	---	$W \leq 0.03$	Ignore	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	Total		5		Minor
Dimension (diameter : Φ)	Acceptance (Q'ty)																																							
	A area	B area																																						
$\Phi \leq 0.25$	Ignore	Ignore																																						
$0.25 < \Phi \leq 0.50$	5																																							
$\Phi > 0.50$	0																																							
Total	5																																							
Length (L)	Width (W)	Acceptance (Q'ty)																																						
		A area	B area																																					
---	$W \leq 0.03$	Ignore	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																																						
Total		5																																						
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>$\Phi \leq 0.25$</td><td>Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>$0.25 < \Phi \leq 0.50$</td><td>4</td></tr><tr><td>$0.50 < \Phi \leq 0.80$</td><td>1</td></tr><tr><td>$\Phi > 0.80$</td><td>0</td></tr><tr><td>Total</td><td>5</td><td></td></tr></table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.25$	Ignore	Ignore	$0.25 < \Phi \leq 0.50$	4	$0.50 < \Phi \leq 0.80$	1	$\Phi > 0.80$	0	Total	5		Minor																				
Dimension (diameter : Φ)	Acceptance (Q'ty)																																							
	A area	B area																																						
$\Phi \leq 0.25$	Ignore	Ignore																																						
$0.25 < \Phi \leq 0.50$	4																																							
$0.50 < \Phi \leq 0.80$	1																																							
$\Phi > 0.80$	0																																							
Total	5																																							

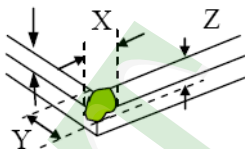
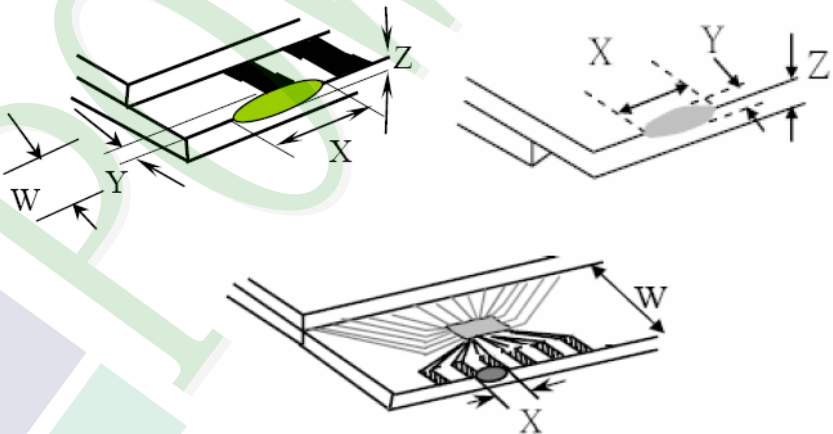
◆Specification For TFT-LCD Module 3.5" ~10" :

(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	Minor						
		8.1 General glass chip : 8.1.1 Chip on panel surface and crack between panels:  <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.	$1/2 t < Z \leq 2 t$							

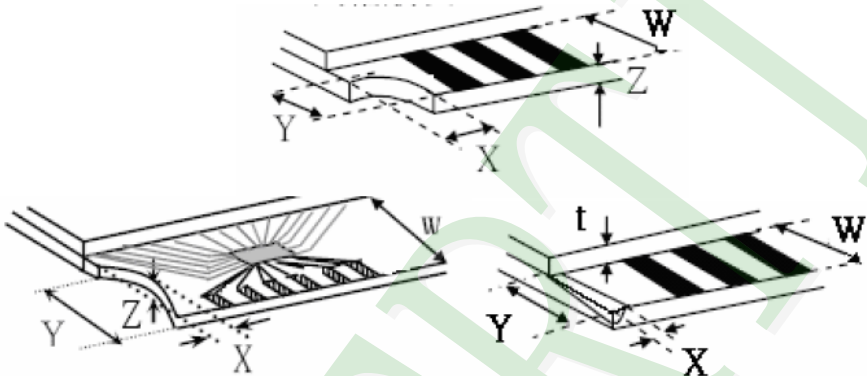
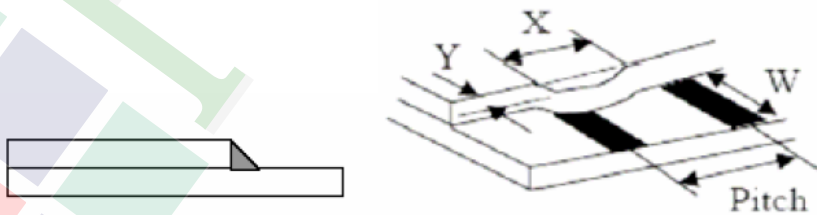
◆Specification For TFT-LCD Module 3.5" ~10" :

(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 3.5" ~10" :

(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 border="1"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </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 border="1"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </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													
$\leq a$	$\leq 1/3 W$	$\leq t$													

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	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) : 330 Ω±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) 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 1times		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.

[illegible]

Ver.002		LCM包裝規格書 LCM Packaging Specifications	Approve	Check	Contact
Documents NO.	JPKG-PH800480T013-IBC		Ryan	Terry	Sally

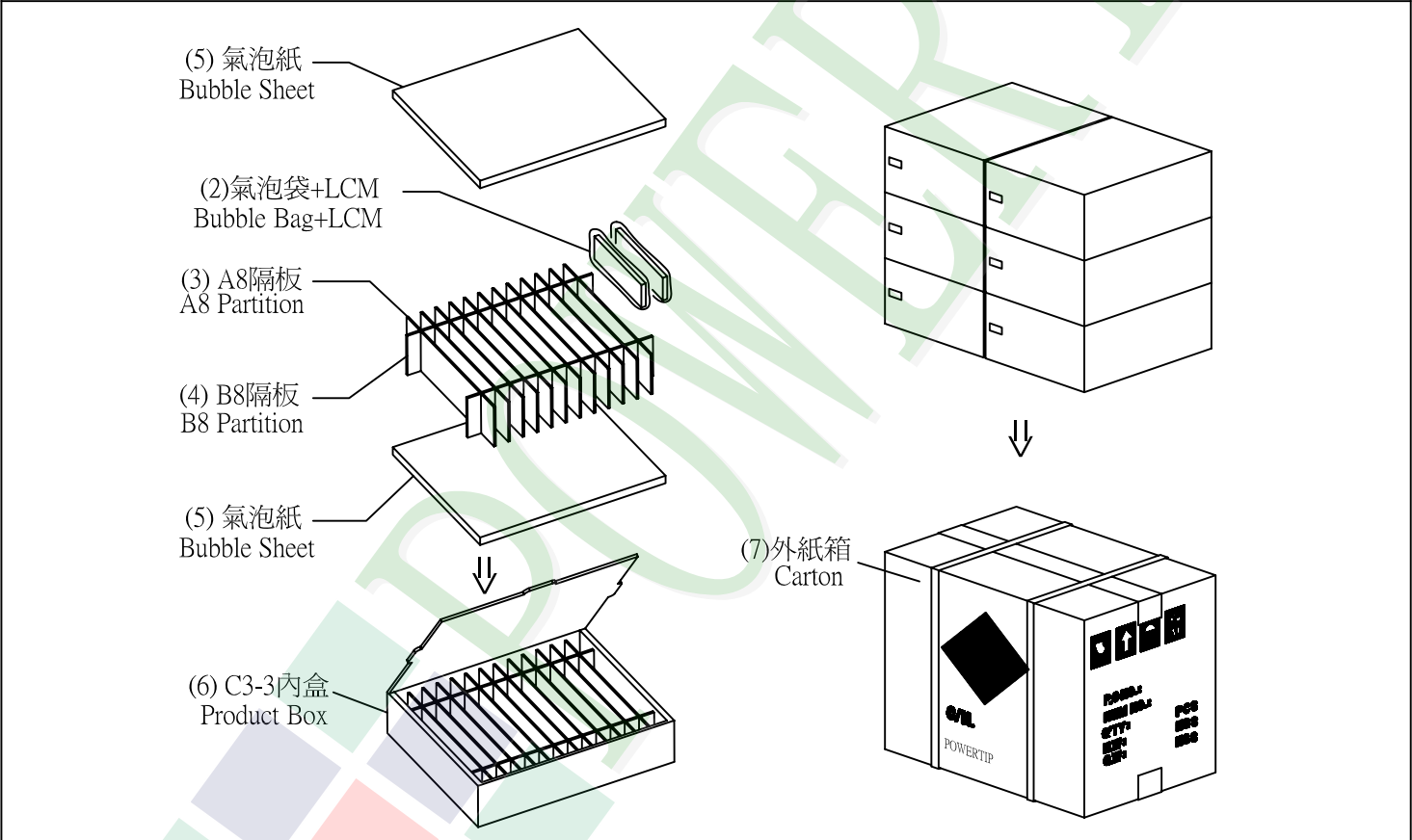
1.包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH800480T013-IBC	192.96 X 108.76 X 7.725	0.213	48	10.224
2	氣泡袋(2)Bubble Bag	BAG300190BRABA	300 X (130+60)	0.008	48	3.84
3	A8隔板(3)A8 Partition	BX000000000051	245 X 105 X 3	0.0135	72	0.972
4	B8隔板(4)B8 Partition	BX000000000050	295 X 105 X 3	0.0168	12	0.2016
5	氣泡紙(5)Bubble Sheet	BAG280240BWABA	280 X 240	0.006	24	0.144
6	C3-3內盒(6)Product Box	BX31025511AABA	310 X 255 X 116	0.17	6	1.02
7	外紙箱(7)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) : 17.23 Kg±10%

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

- (1)Quantity Of Spacer : A8隔板 X 12 , B8隔板 X 2
- (2)Total LCM quantity in carton : quantity per box 8 x no of boxes 6 = 48



特 記 事 項 (REMARK)

4. Label Specifications : 依廠內標準作業	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 1pcs.	
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