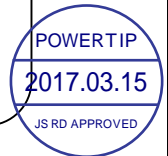


SPECIFICATIONS

CUSTOMER	:	PTC
SAMPLE CODE	:	SH320240T023-IHC01
MASS PRODUCTION CODE	:	PH320240T023-IHC01
SAMPLE VERSION	:	01
SPECIFICATIONS EDITION	:	004
DRAWING NO. (Ver.)	:	JLMD-PH320240T023-IHC01_003
PACKAGING NO. (Ver.)	:	JPKG-PH320240T023-IHC01_001

Customer Approved

Date:



Approved	Checked	Designer
閔偉	張久慧	劉進

- Preliminary specification for design input
- Specification for sample approval

POWERTIP TECH. CORP.

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Taichung, Taiwan
台中市 407 工業區六路 8 號

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E-mail: sales@powertip.com.tw
[Http://www.powertip.com.tw](http://www.powertip.com.tw)

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Appendix : 1. LCM Drawing
2. Packaging

Note : For detailed information please refer to IC data sheet :
Primacy(TFT LCD): Himax: HX8238-D

1. SPECIFICATIONS

1.1 Features

Main LCD Panel

Item	Standard Value
Display Type	320* (R、G、B) * 240 Dots
LCD Type	Normally white , Transmissive type
Screen size(inch)	3.5(Diagonal)
Viewing Direction	6 O'clock
Color configuration	R.G.B. vertical stripe
Interface	Digital 24-bits RGB/3 wire SPI
Other (controller / driver IC)	Himax: HX8238-D
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	84.02(W) * 75.36 (L) * 4.55 (H)	mm

LCD panel

Item	Standard Value	Unit
Active Area	70.08 (W) * 52.56 (L)	mm

Touch panel

Item	Standard Value	Unit
Viewing Area	71.68 (W) * 54.16 (L)	mm

Note : For detailed information please refer to LCM drawing.

1.3 Absolute Maximum Ratings

Module

Item	Symbol	Condition	Min.	Max.	Unit
System Power Supply Voltage	DV _{DD}	GND=0	-0.3	3.96	V
Operating Temperature	T _{OP}	-	-20	70	°C
Storage Temperature	T _{ST}	-	-30	80	°C
Storage Humidity	HD	Ta < 60 °C	20	90	%RH

1.4 DC Electrical Characteristics

Module

GND = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
System Power Supply Voltage	DV _{DD}	-	3.0	3.3	3.6	V
Input H/L Level Voltage	V _{IH}	-	0.8*D _V _{DD}	-	D _V _{DD}	V
	V _{IL}	-	0	-	0.2*D _V _{DD}	V
Output H/L Level Voltage	V _{OH}	-	0.9*D _V _{DD}	-	D _V _{DD}	V
	V _{OL}	-	-	-	0.1*D _V _{DD}	V
Supply Current	I _{DD}	DV _{DD} =3.3V	-	13	20	mA

1.5 Optical Characteristics

TFT LCD Panel

DV_{DD}=3.3V, Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	unit	-
Response time	Tr+Tf	25°C	-	-	40	60	ms	Note 2
Viewing angle	Top	Θ+	CR ≥ 10	-	60	-	Deg.	Note 1
	Bottom	Θ-		-	60	-		
	Left	ΘL		-	60	-		
	Right	ΘR		-	60	-		
Contrast ratio		CR	-	500	600	-	-	Note3
Color of CIE Coordinate (With LCD & TP)	White	X	IF= 20 mA	0.27	0.32	0.37	-	Note4
		Y		0.30	0.35	0.40		
	Red	X		0.59	0.64	0.69		
		Y		0.29	0.34	0.39		
	Green	X		0.29	0.34	0.39		
		Y		0.56	0.61	0.66		
	Blue	X		0.09	0.14	0.19		
		Y		0.03	0.08	0.13		
Average Brightness Pattern=white display (With LCD & TP)*1		IV	IF= 20 mA	680	850	-	cd/m ²	
Uniformity (With LCD & TP)*2		ΔB	IF= 20 mA	70	-	-	%	

Note 4 :

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

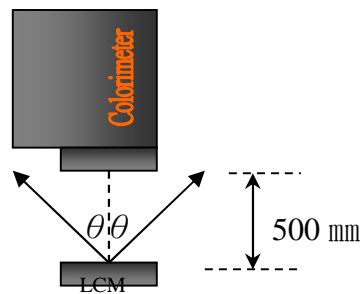
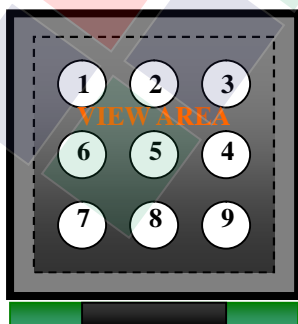
2 : Measurement Condition for Optical Characteristics:

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%

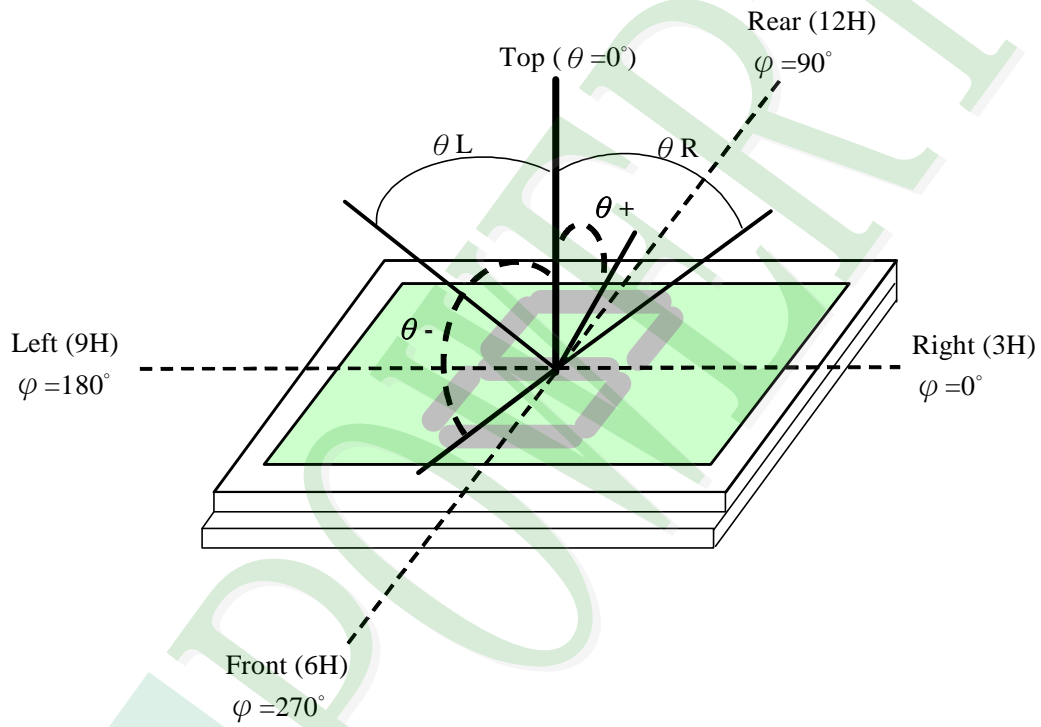


Colorimeter=BM-7 fast

Note 1.

Optical characteristics-2

Viewing angle

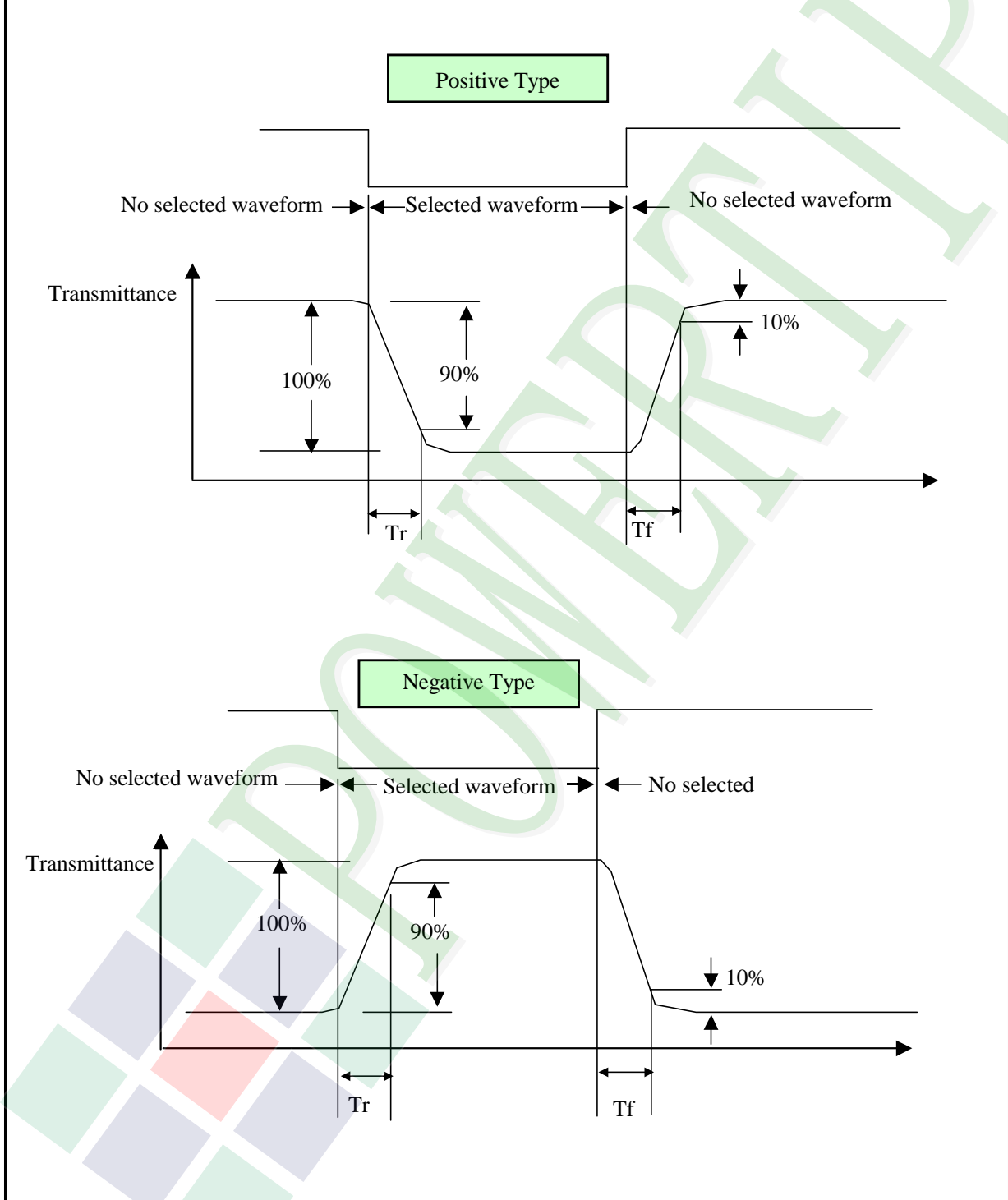


Viewing angle

Note 2.

Optical characteristics-3

Fig.2 Definition of response time



Electrical characteristics-2

※2 Drive waveform

V_{op} : Drive voltage

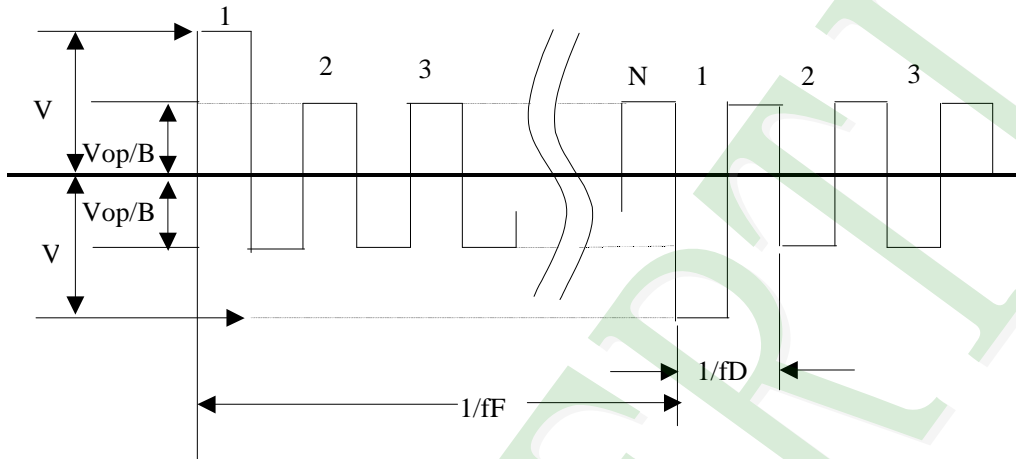
$1/B$: Bias

N : Duty

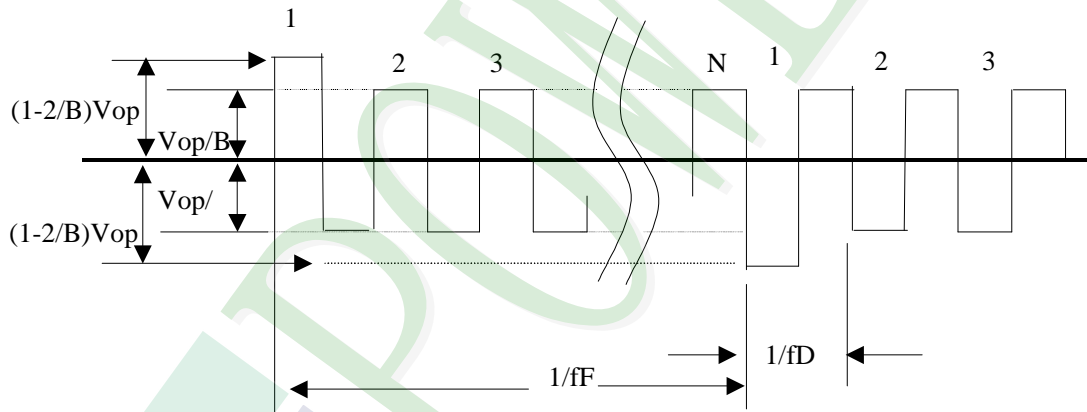
f_F : Frame frequency

f_D : Drive frequency

(1) Selected waveform



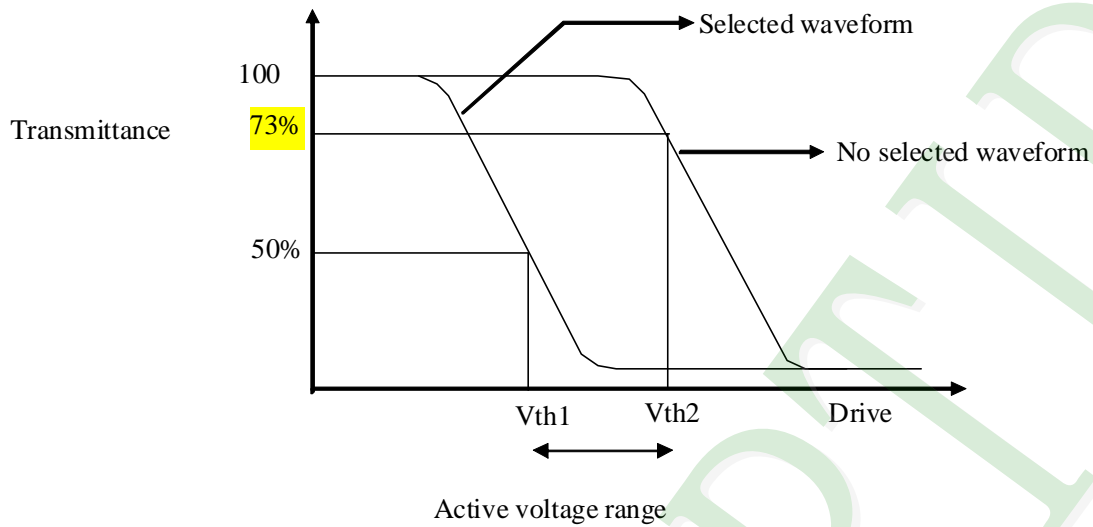
(2) Non- Selected wave form



Note:

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

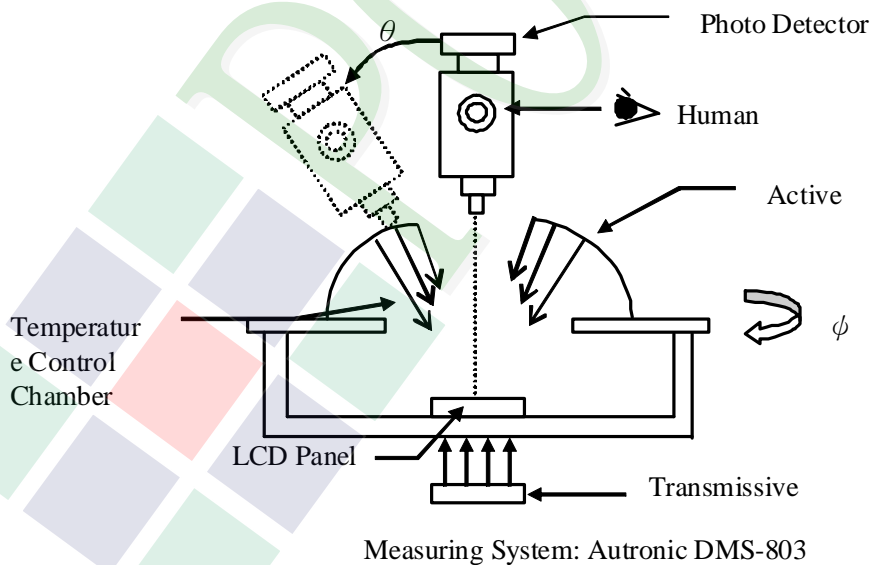
Note 3. : Definition of Vth



	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

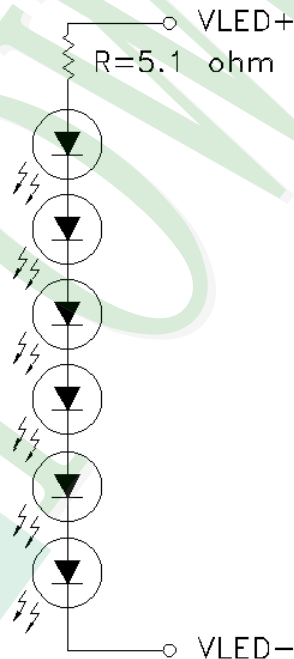
Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit	Remark
Reverse Voltage	IF	Ta=25°C	-	30	mA	Each LED
Forward Current	VR	Ta=25°C	-	5	V	Each LED
Power dissipation	PD	Ta=25°C	-	396	mW	-

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 20 mA	18	19	19.8	V
Average Brightness (Without LCD)	IV		7000	8000	-	cd/m ²
CIE Color Coordinate (Without LCD)	X		0.28	0.31	0.33	-
	Y		0.30	0.325	0.35	
Color	White					

Circuit diagram:



Other Description

Item	Conditions	Description
Life Time	Ta =25°C IF= 20 mA	50000 hrs

1.7 Touch Panel Characteristics

Features

Item	Standard Value
Touch Panel Size	3.5"
Touch type	Projective capacitive touch panel
Input Method	Finger / 5 Points touch
Output Interface	I ² C
IC	ST1633

Mechanical Specifications

Item	Standard Value	Unit
Viewing Area	71.68 mm (W) x 54.16 mm (H)	mm
Number of sensing channel	12 (W) x 10 (H)	mm

Absolute Maximum Ratings

Item	Symbol	Condition	Min.	Max.	Unit
Supply voltage	TPVDD	-	-0.3	+6.0	V
Operating Temperature	T _{OP}	-	-20	+70	°C
Storage Temperature	T _{ST}	-	-30	+80	°C

DC Electrical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	TPVDD	-	2.8	3.3	3.6	V
Input High Voltage	TPVIH	-	0.85 TPVDD	-	-	V
Input Low Voltage	TPVIL	-	-	-	0.15 TPVDD	V

Touch Panel IC Read/Write description & Register Mapping

Reference : Sitronix Touch Driver Porting Reference Guide.

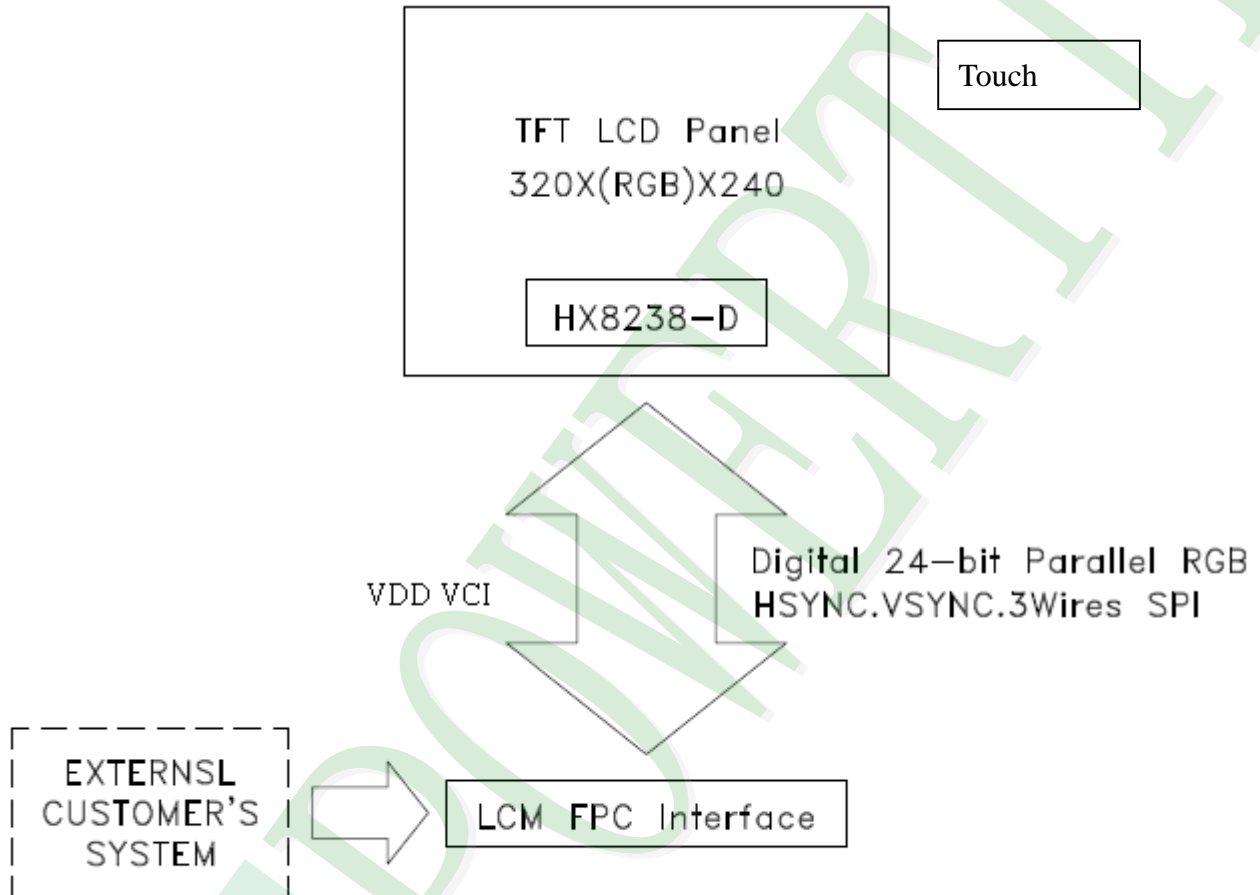
2. MODULE STRUCTURE

2.1 Counter Drawing

2.1.1 LCM Mechanical Diagram

* See Appendix

2.1.2 Block Diagram



2.2 Interface Pin Description

FOG Interface

Pin No.	Symbol	Function
1	V _{LED+}	Power For LED backlight (+).
2	V _{LED+}	Power For LED backlight (+).
3	V _{LED-}	Power For LED backlight (-).
4	V _{LED-}	Power For LED backlight (-).
5	GND	Power ground.
6	NC	No connection.
7	DV _{DD}	Power for Digital Circuit, analog circuits & logic I/O.(Power Supply for FOG)
8	NC	No connection.
9	DEN	Display enable pin from controller. Internal pull high. Connect to DVDD or floating if not used.
10	VS	Frame synchronization signal. Internal pull high. Fixed to DVDD or floating if not used.
11	HS	Line synchronization signal. Internal pull high. Fixed to DVDD or floating if not used.
12	B7	Blue Data (MSB).
13	B6	Blue Data.
14	B5	Blue Data.
15	B4	Blue Data.
16	B3	Blue Data.
17	B2	Blue Data.
18	B1	Blue Data.
19	B0	Blue Data (LSB).
20	G7	Green Data (MSB).
21	G6	Green Data.
22	G5	Green Data.
23	G4	Green Data.
24	G3	Green Data.
25	G2	Green Data.
26	G1	Green Data.
27	G0	Green Data (LSB).
28	R7	Red Data (MSB).

Pin No.	Symbol	Function
29	R6	Red Data.
30	R5	Red Data.
31	R4	Red Data.
32	R3	Red Data.
33	R2	Red Data.
34	R1	Red Data.
35	R0	Red Data (LSB).
36	GND	Power Ground
37	DCLK	Dot-clock signal and oscillator source. A non-stop external clock must be provided to that pin even at front or black porch non-display period.
38	GND	Power Ground.
39	NC	No connection.
40	NC	No connection.
41	NC	No connection.
42	NC	No connection.
43	NC	No connection.
44	RESETB	Active low global reset signal input.
45	CSB	Chip select pin of serial interface. Internal pull high.
46	NC	No connection.
47	NC	No connection.
48	GND	Power Ground.
49	SCK	Clock pin of serial interface. Internal pull high.
50	SDI	Data input pin in serial mode. Internal pull high.

Capacitive Touch Panel (CTP) Interface

Pin No.	Symbol	Function
1	GND	Ground.
2	TPVDD	Power.
3	SCL	I ² C Clock.
4	SDA	I ² C Data.
5	INT	The interrupt from the CTP to the Host.
6	RESET	RESET.

2.2.1 Refer Initial Code

HX8238-D register configuration is recommended to use the default value(HSP=0, VSP=0, CKP=0, DEP=0). The logic stage of the hardware pin SEL[2:0] is “000B”

Note:

HSP: When HSP=0, HS(HSYNC) is negative polarity. When HSP=1, HS(HSYNC) is positive polarity.

VSP: When VSP=0, VS(VSYNC) is negative polarity. When VSP=1, VS(VSYNC) is positive polarity.

CKP: When CKP=0, data is latched in DCLK falling edge. When CKP=1, data is latched in DCLK rising edge.

DEP: When DEP=0, DE is negative polarity active. When DEP=1, DE is positive polarity active.

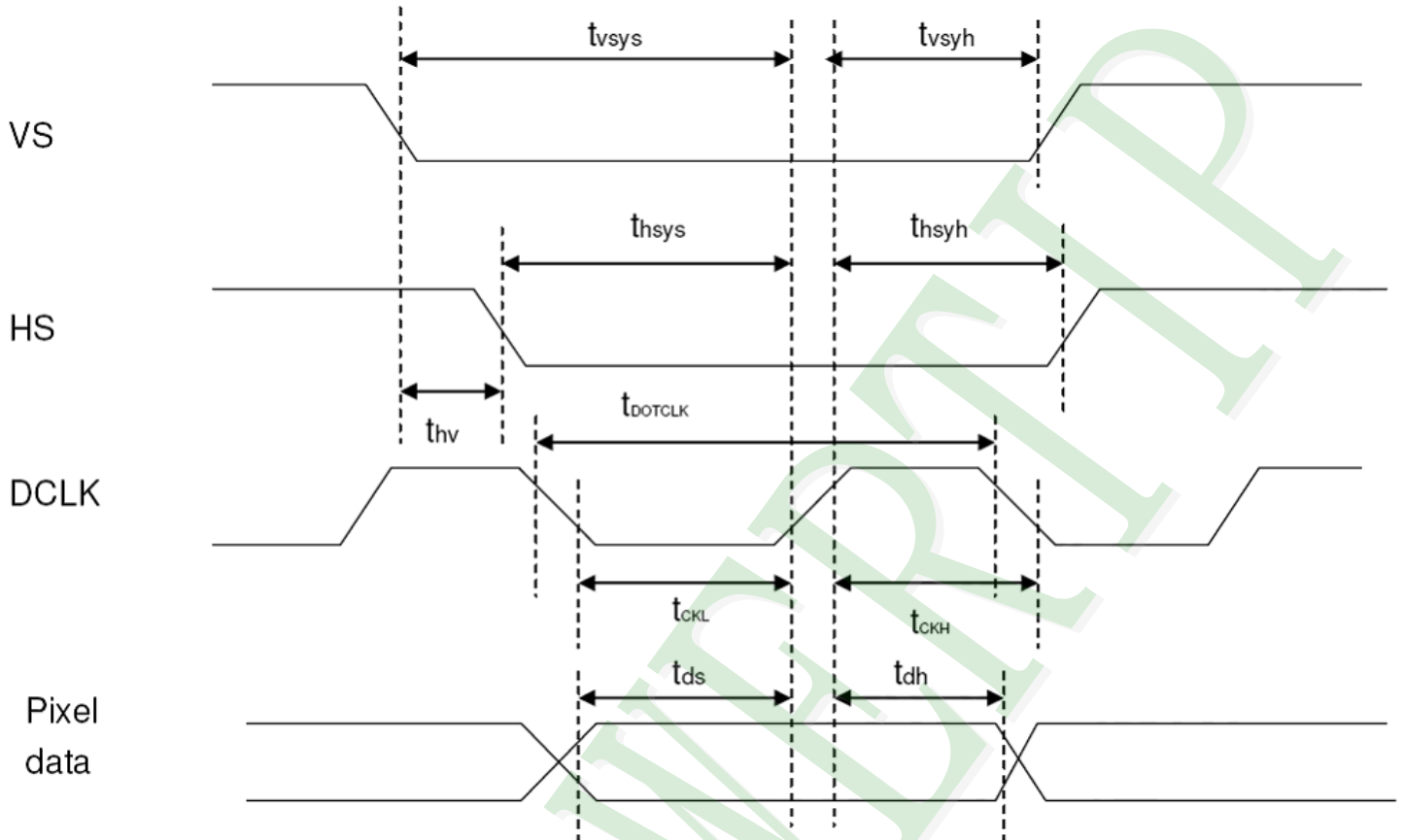
Note:

The operating mode of the HX8238 is determined by DEO & the received signal from controller, relationships are as follows

HX8238 received signal from controller	DEO (Reg05 bit7)	HX8238 MODE	processing method for HX8238 unused pin (HS/VS/DE)
HS+VS+DCLK	0	SYNC mode	Connect to DVDD or floating
HS+VS+DE+DCLK	0	DE mode	Connect to DVDD or floating
DE+DCLK	1	DE only mode	Connect to DVDD or floating

2.3 Timing Characteristics

2.3.1 Pixel timing for HX8238-D

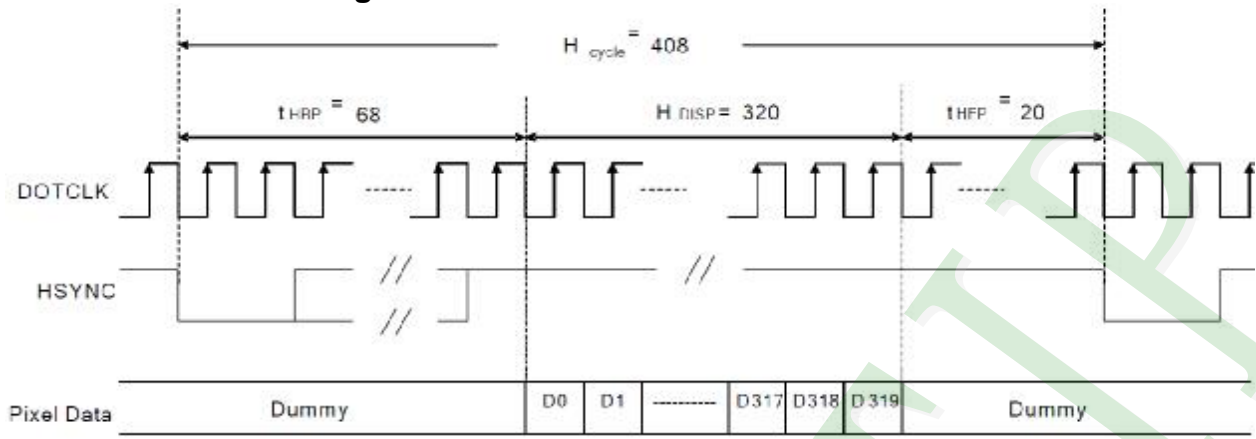


Characteristics	Symbol	Min	Typ	Max	Unit
DCLK Frequency	f _{DCLK}	-	6.5	10	MHz
DCLK Period	t _{DCLK}	100	154	-	ns
Vertical Sync Setup Time	t _{vsys}	20	-	-	ns
Vertical Sync Hold Time	t _{vsyh}	20	-	-	ns
Horizontal Sync Setup Time	t _{hsys}	20	-	-	ns
Horizontal Sync Hold Time	t _{hsyh}	20	-	-	ns
Phase difference of Sync Signal Falling Edge	t _{hv}	1	-	240	t _{DCLK}
DCLK Low Period	t _{CKL}	50	-	-	ns
DCLK High Period	t _{CKH}	50	-	-	ns
Data Setup Time	t _{ds}	12	-	-	ns
Data hold Time	t _{dh}	12	-	-	ns
Reset pulse width	t _{RES}	10	-	-	μs

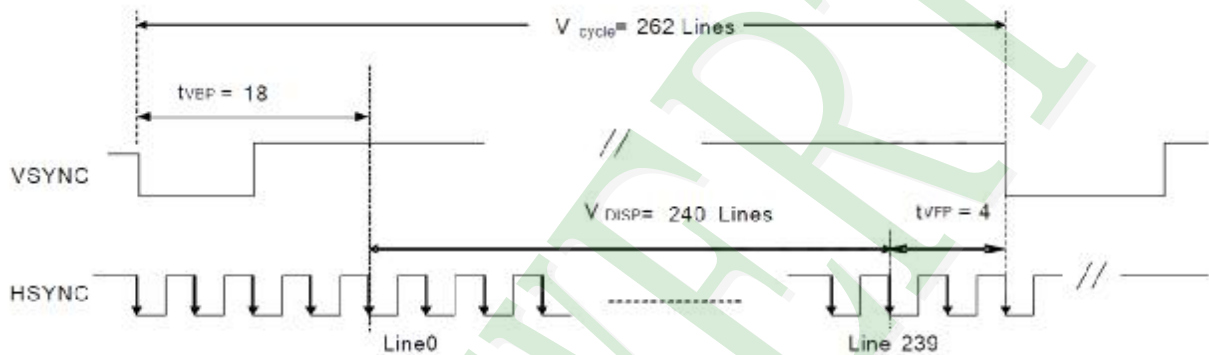
Note: External clock source must be provided to DOTCLK pin of HX8238-A. The driver will not operate if absent of the clocking signal.

Pixel timing

2.3.2 Data transaction timing for HX8238-D



(a) Horizontal Data Transaction Timing



(b) Vertical Data Transaction Timing

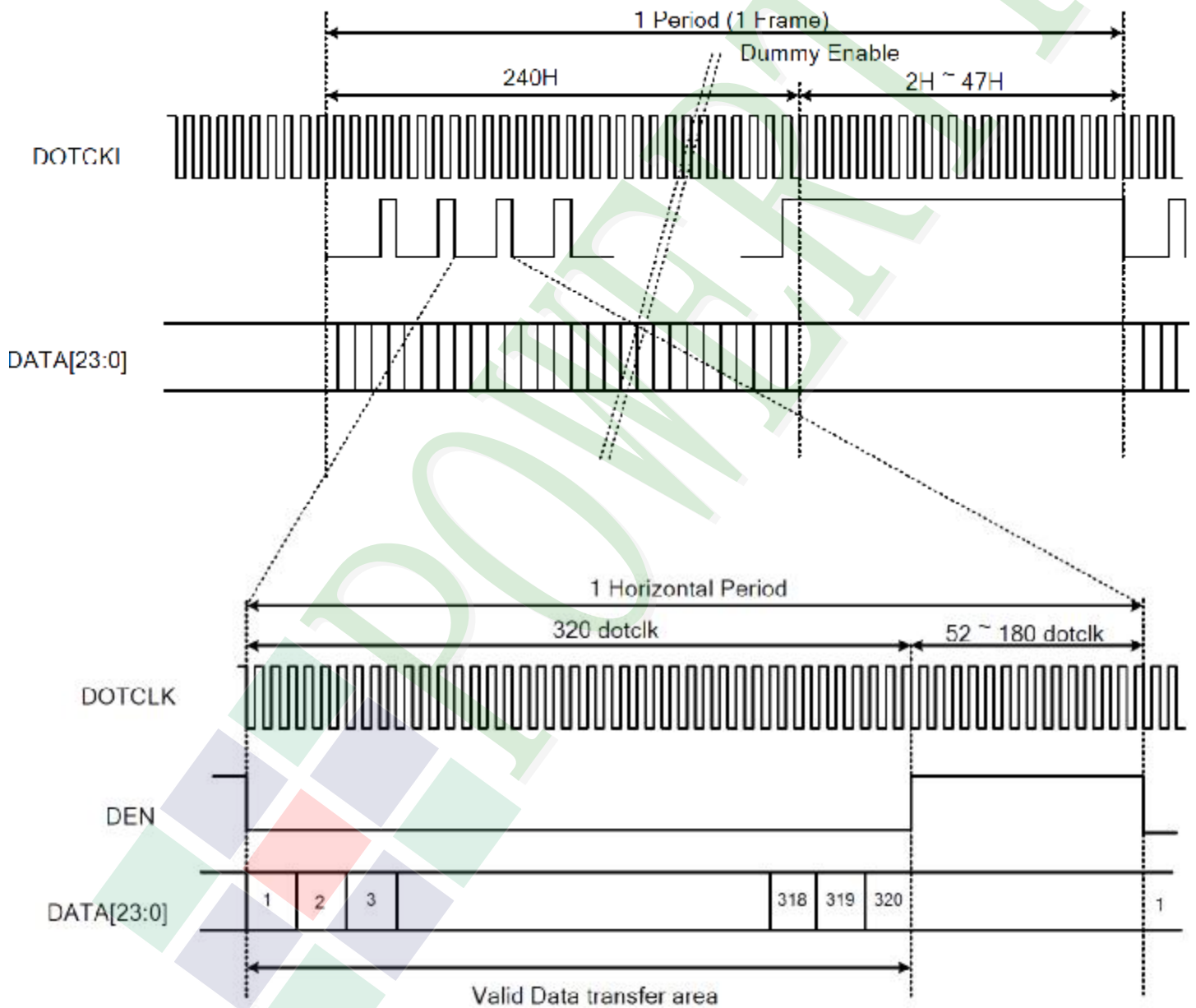
Data transaction timing in parallel RGB (24 bit) interface (SYNC mode)

Characteristics	Symbol	Min	Typ	Max	Unit
DOTCLK Frequency	f _{DOTCLK}	-	6.5	10	MHz
DOTCLK Period	t _{DOTCLK}	100	154	-	ns
Horizontal Frequency (Line)	f _H	-	15.75	22.35	KHz
Vertical Frequency (Refresh)	f _V	-	60	90	Hz
Horizontal Back Porch	t _{HBP}	-	68	-	t _{DOTCLK}
Horizontal Front Porch	t _{HFP}	-	20	-	t _{DOTCLK}
Hsync LOW Pulse Width	t _{WH}	2	32	-	t _{DOTCLK}
Horizontal Data Start Point	t _{HBP}	9	68	127	t _{DOTCLK}
Horizontal Blanking Period	t _{HBP} + t _{HFP}	52	88	180	t _{DOTCLK}
Horizontal Display Area	H _{DISP}	-	320	-	t _{DOTCLK}
Horizontal Cycle	H _{cycle}	350	408	500	t _{DOTCLK}
VSYNC LOW Pulse Width	t _{VW}	2	4	-	Lines
Vertical Back Porch	t _{VBP}	2	18	127	Lines
Vertical Front Porch	t _{VFP}	-	4	-	Lines
Vertical Data Start Point	t _{VBP}	-	18	-	Lines
Vertical Blanking Period	t _{VBP} + t _{VFP}	10	22	47	Lines
Vertical Display Area	V _{DISP}	-	240	-	Lines
Vertical Cycle	V _{cycle}	250	262	287	Lines

Data transaction timing in normal operating mode (SYNC mode)

Characteristics	Symbol	Min.	Typ.	Max.	Unit
DOTCLK Frequency	fDOTCLK	-	6.5	10	MHz
DOTCLK Period	tDOTCLK	100	154	-	ns
Horizontal Blanking Period	tHBP + tHFP	52	88	180	tDOTCLK
Horizontal Display Area	HDISP	-	320	-	tDOTCLK
Horizontal Cycle	Hcycle	372	408	500	tDOTCLK
Vertical Blanking Period	tVBP + tVFP	2	-	47	Lines
Vertical Display Area	VDISP	-	240	-	Lines
Vertical Cycle	Vcycle	242	-	287	Lines

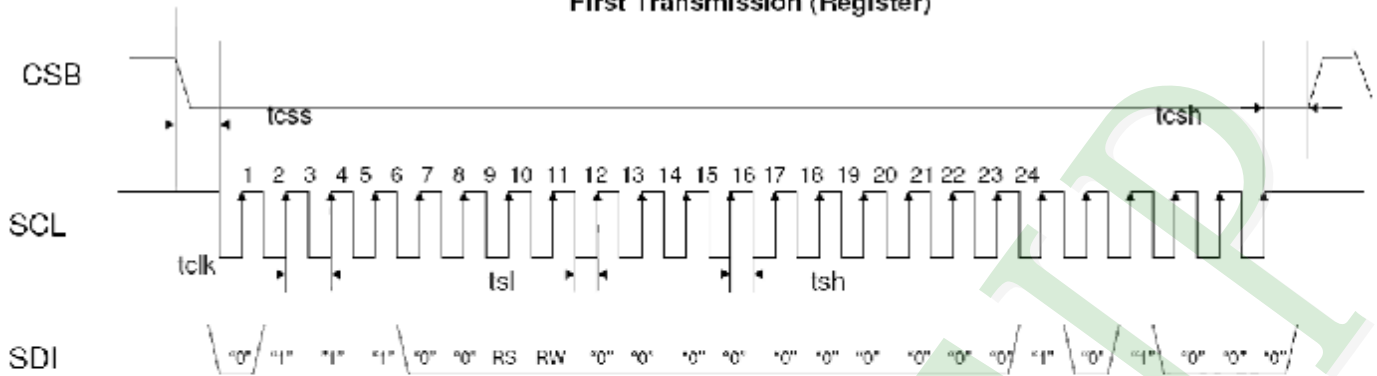
Data transaction timing in DE only operating mode



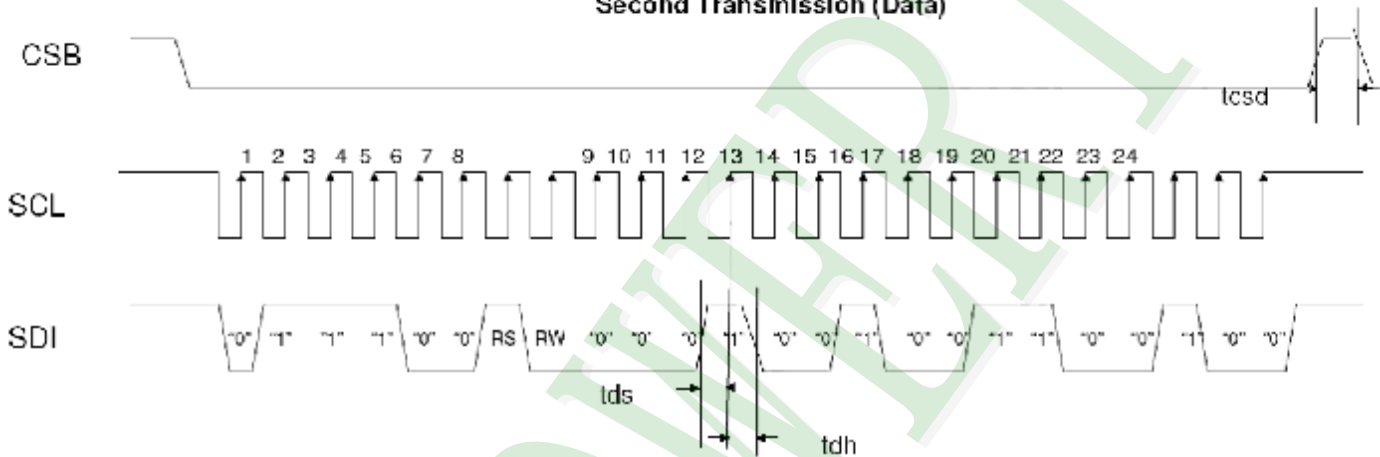
Signal timing in DE only mode

2.3.3 SPI Timing Characteristics for HX8238-D

First Transmission (Register)



Second Transmission (Data)



Note: The example transmit "0x1264h" to register R28h.
SPID connected to VSS.

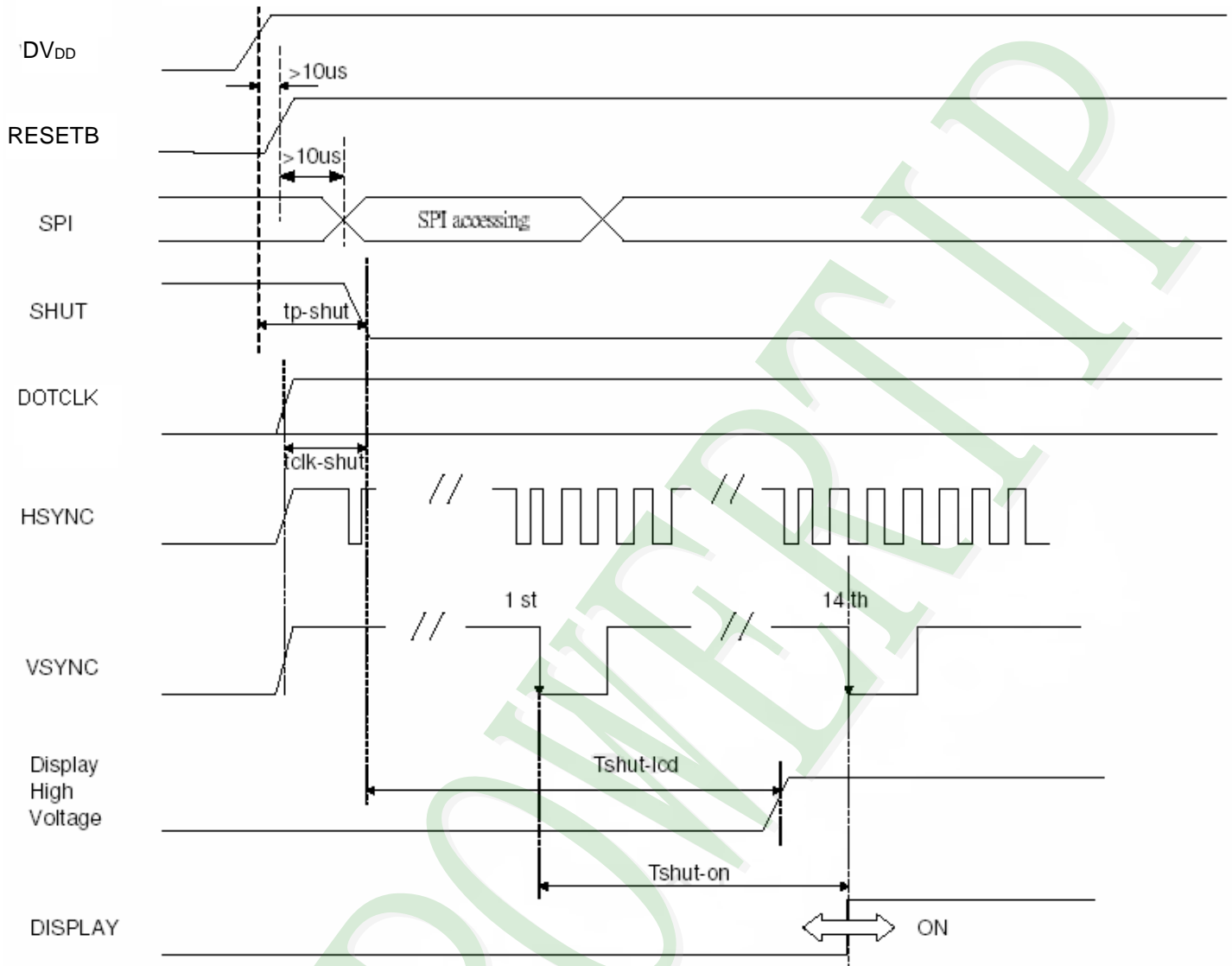
SPI interface timing diagram & transaction example

Characteristics	Symbol	Min	Typ	Max	Unit
Serial Clock Frequency	fcclk	-	-	20	MHz
Serial Clock Cycle Time	tclk	50	-	-	ns
Clock Low Width	tsl	25	-	-	ns
Clock High Width	tsh	25	-	-	ns
Chip Select Setup Time	tcss	0	-	-	ns
Chip Select Hold Time	tcsh	10	-	-	ns
Chip Select High Delay Time	icsd	20	-	-	ns
Data Setup Time	tds	5	-	-	ns
Data Hold Time	tdh	10	-	-	ns

SPI timing

2.4 Power Sequence

2.4.1 Power up sequence

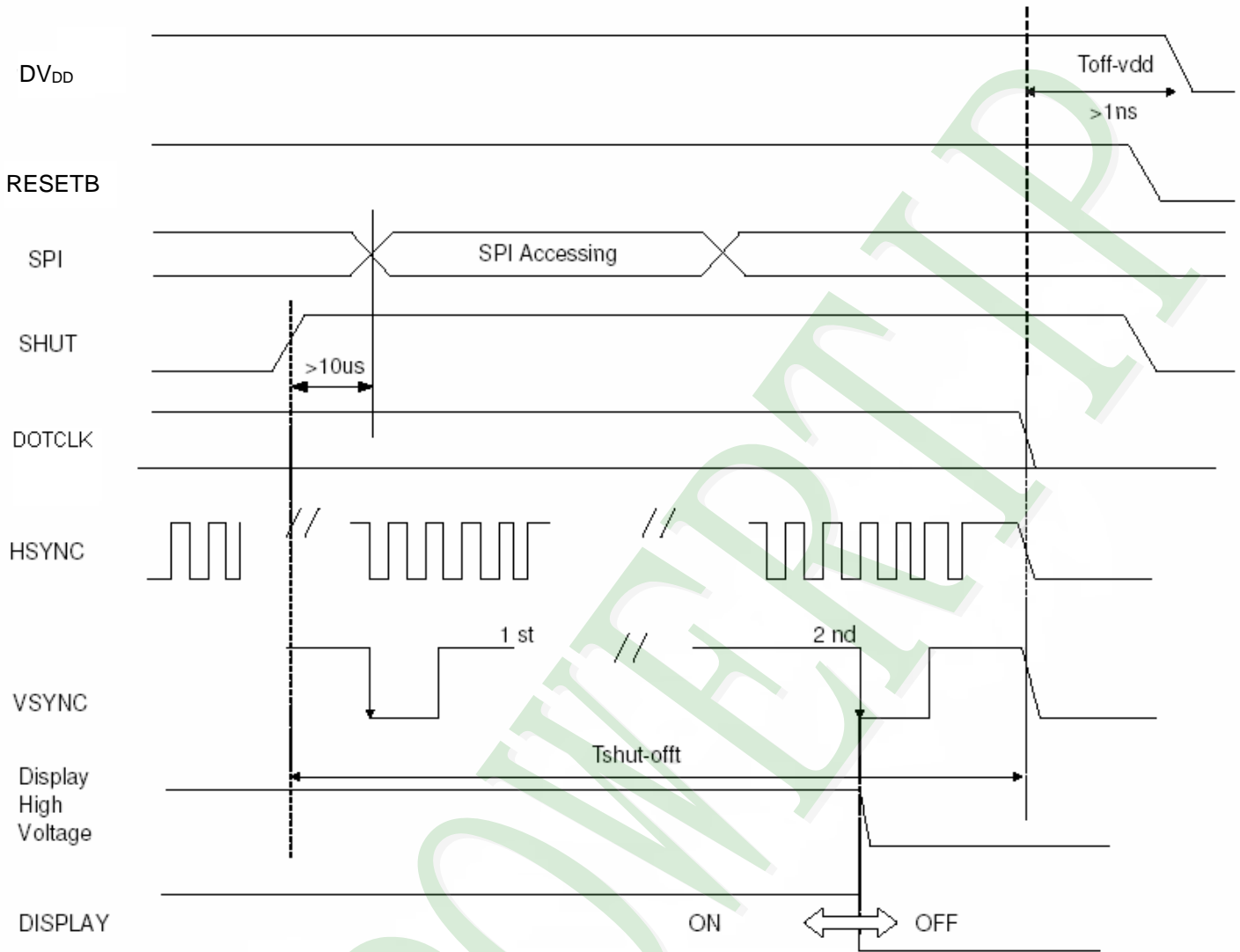


Characteristics	Symbol	Min	Typ	Max	Units
VDD on to falling edge of SHUT	tp-shut	1	-	-	us
DOTCLK	tclk-shut	1	-	-	clk
Falling edge of SHUT to LCD power on	tshut-lcd	-	-	128	ms
Falling edge of SHUT to display start	tshut-on	-	-	14	frame
- 1 line: 408 clk		-	166	232.4	ms
- 1 frame: 262 line - DOTCLK = 6.5MHz		-	-	-	-

Note: It is necessary to input DOTCLK before the falling edge of SHUT.
Display starts at 10th falling edge of VSYNC after the falling edge of SHUT.

Interface PIN No. 48 "Display control" have connected Inverters logic gates to the "SHUT" pin.

2.4.2 Power down sequence



Characteristics	Symbol	Min	Typ	Max	Uni
Rising edge of SHUT to display off		2	-	-	frame
- 1 line: 408 clk	tshut-off	33.4	-	-	ms
- 1 frame: 262 line					
- DOTCLK = 6.5MHz					
Input-signal-off to VDD off	toff-vdd	1	-	-	us

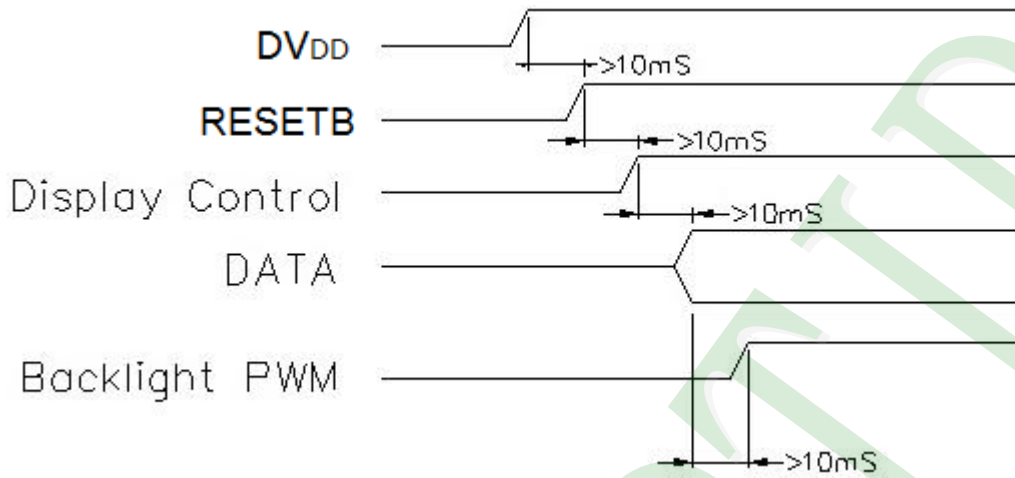
Note: DOTCLK must be maintained at least 2 frames after the rising edge of SHUT.

Display become off at the 2nd falling edge of VSYNC after the falling edge of SHUT.

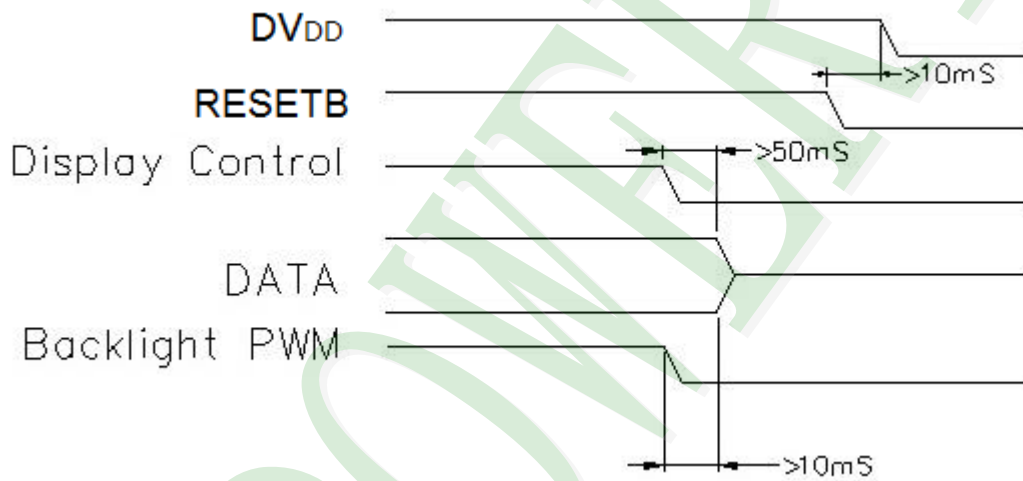
If RESET signal is necessary for power down, provide it after the 2-frames-cycle of the SHUT period.

2.4.3 Power Timing Characteristics of Backlight

POWER ON

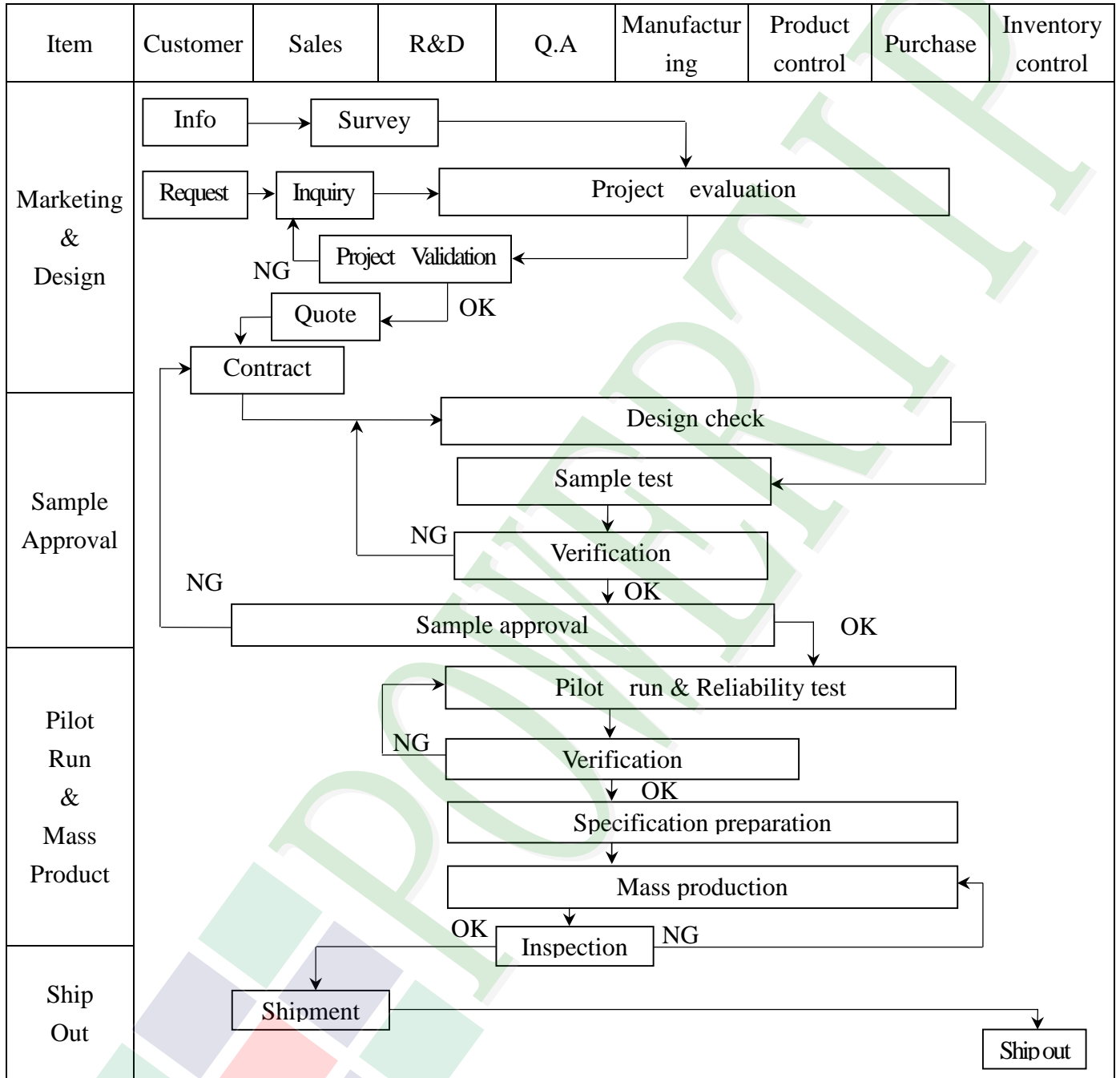


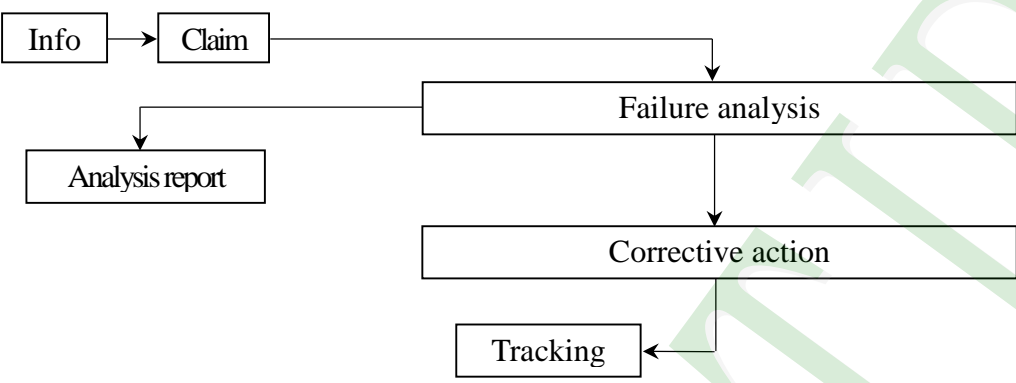
POWER OFF



3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



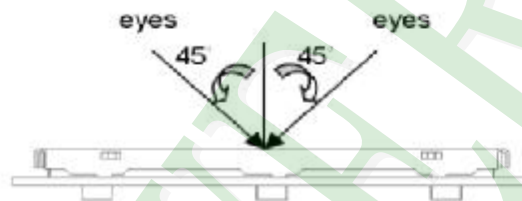
Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service	 <pre> graph TD Info[Info] --> Claim[Claim] Claim --> Failure[Failure analysis] Failure --> Report[Analysis report] Failure --> Action[Corrective action] Action --> Tracking[Tracking] </pre>							
Q.A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

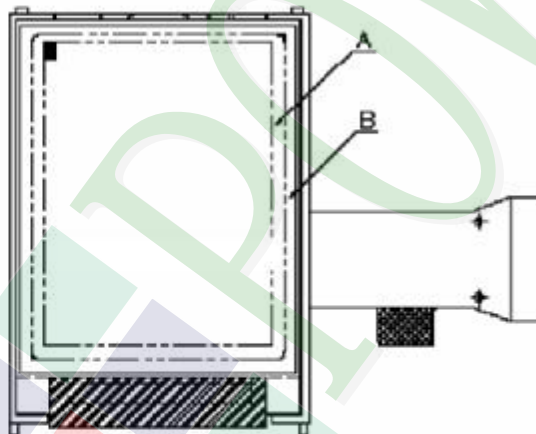
- ◆ Scope : The document shall be applied to TFT-LCD Module for 3.5" ~10" (Ver.B01).
- ◆ Inspection Standard : MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆ Equipment : Gauge 、 MIL-STD 、 Powertip Tester 、 Sample
- ◆ Defect Level : Major Defect AQL : 0.4 ; Minor Defect AQL : 1.5
-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

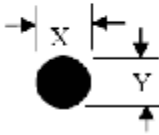
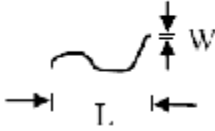
◆ Specification For TFT-LCD Module 3.5" ~10" :

(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										
		4. 1 Missing line character and icon.	Major										
04	Electrical Testing	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 border="1"> <thead> <tr> <th>Item</th> <th>Acceptance (Q'ty)</th> </tr> </thead> <tbody> <tr> <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> </tbody> </table>	Item	Acceptance (Q'ty)	Bright Dot	≤ 4	Dark Dot	≤ 5	Joint Dot	≤ 3	Total	≤ 7	Minor
		Item	Acceptance (Q'ty)										
		Bright Dot	≤ 4										
		Dark Dot	≤ 5										
		Joint Dot	≤ 3										
Total	≤ 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 ≥ 5 mm.													

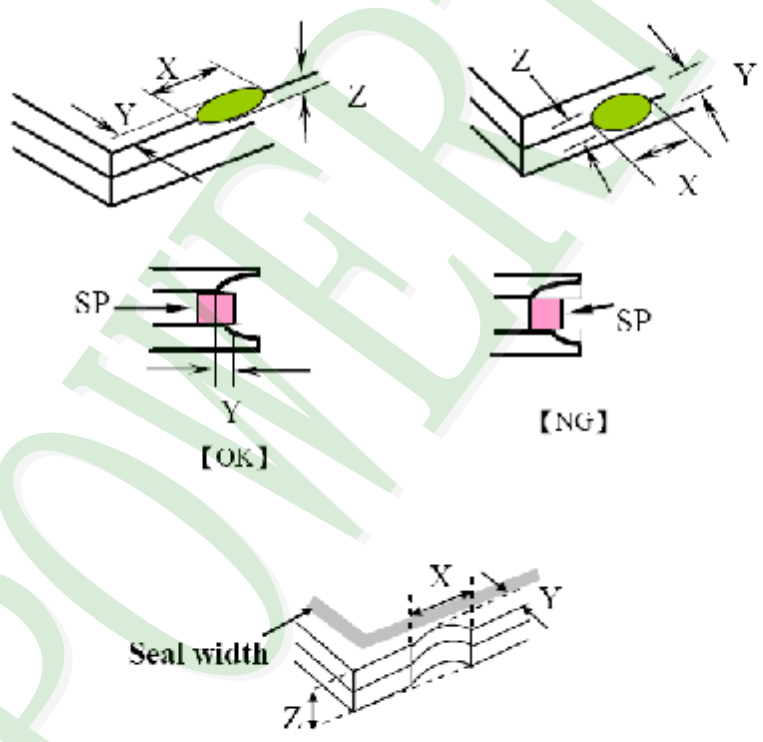
◆ Specification For TFT-LCD Module 3.5" ~10" :

(Ver.B01)

NO	Item	Level																																									
06	<p data-bbox="470 342 1043 383">6.1 Round type (Non-display or display) :</p> <div data-bbox="225 524 430 633"> Black or white dot · scratch · contamination </div> <div data-bbox="245 669 411 707"> Round type </div> <div data-bbox="225 730 384 864">  </div> <div data-bbox="225 904 411 943"> $\Phi = (x + y) / 2$ </div> <div data-bbox="245 1014 384 1052"> Line type </div> <div data-bbox="209 1066 424 1196">  </div> <table border="1" data-bbox="541 418 1303 826"> <thead> <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> </thead> <tbody> <tr> <td>$\Phi \leq 0.25$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.50$</td> <td>5</td> <td rowspan="2">Ignore</td> </tr> <tr> <td>$\Phi > 0.50$</td> <td>0</td> </tr> <tr> <td>Total</td> <td colspan="2">5</td> </tr> </tbody> </table> <p data-bbox="470 869 1007 909">6.2 Line type(Non-display or display) :</p> <table border="1" data-bbox="513 943 1331 1400"> <thead> <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> </thead> <tbody> <tr> <td>---</td> <td>$W \leq 0.03$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$L \leq 10.0$</td> <td>$0.03 < W \leq 0.05$</td> <td>4</td> <td rowspan="2">Ignore</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 colspan="2">As round type</td> </tr> <tr> <td>Total</td> <td></td> <td colspan="2">5</td> </tr> </tbody> </table>	Dimension (diameter : Φ)	Acceptance (Q'ty)		A area	B area	$\Phi \leq 0.25$	Ignore		$0.25 < \Phi \leq 0.50$	5	Ignore	$\Phi > 0.50$	0	Total	5		Length (L)	Width (W)	Acceptance (Q'ty)		A area	B area	---	$W \leq 0.03$	Ignore		$L \leq 10.0$	$0.03 < W \leq 0.05$	4	Ignore	$L \leq 5.0$	$0.05 < W \leq 0.10$	2	---	$W > 0.10$	As round type		Total		5		Minor
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07	<div data-bbox="264 1626 395 1702"> Polarizer Bubble </div> <table border="1" data-bbox="507 1467 1339 1879"> <thead> <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> </thead> <tbody> <tr> <td>$\Phi \leq 0.25$</td> <td colspan="2">Ignore</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.50$</td> <td>4</td> <td rowspan="2">Ignore</td> </tr> <tr> <td>$0.50 < \Phi \leq 0.80$</td> <td>1</td> </tr> <tr> <td>$\Phi > 0.80$</td> <td>0</td> <td></td> </tr> <tr> <td>Total</td> <td colspan="2">5</td> </tr> </tbody> </table>	Dimension (diameter : Φ)	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		Total	5		Minor																						
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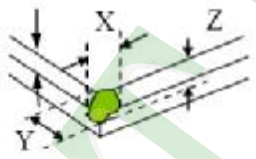
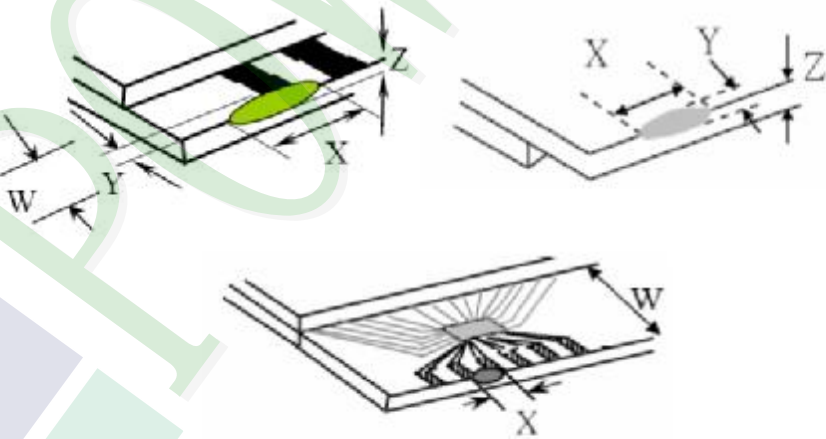
◆Specification For TFT-LCD Module 3.5" ~10" :

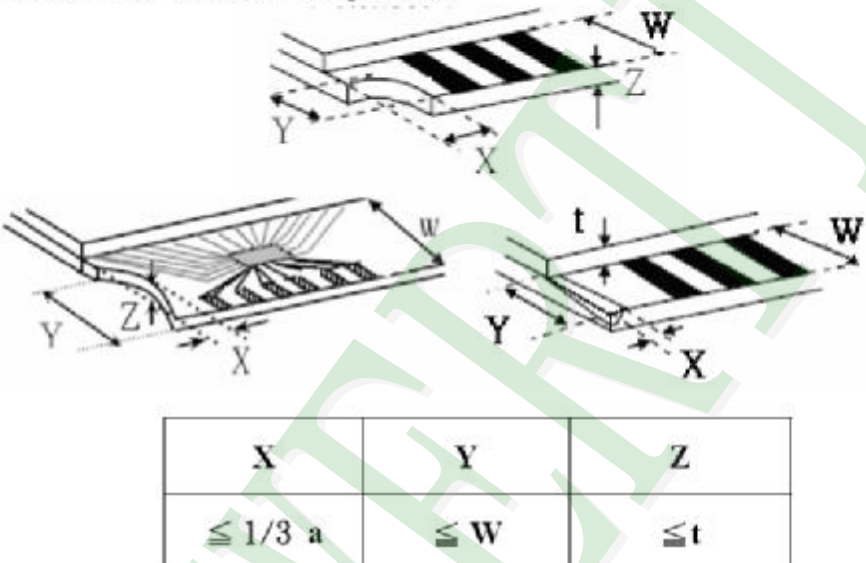
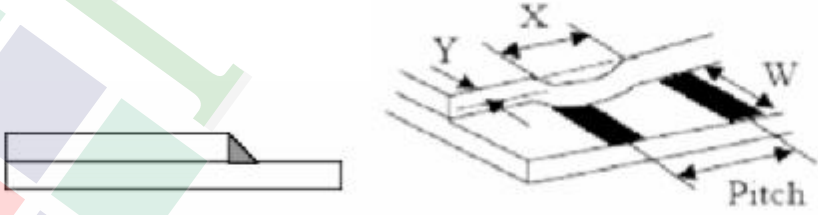
(Ver.B01)

NO	Item	Criterion	Level						
08	The crack of glass	<p>Symbols :</p> <p>X : The length of crack Z : The thickness of crack t : The thickness of glass</p> <p>Y : The width of crack. W : terminal length a : LCD side length</p>	Minor						
		<p>8.1 General glass chip :</p> <p>8.1.1 Chip on panel surface and crack between panels:</p>  <table border="1" data-bbox="542 1545 1340 1836"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <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> </tbody> </table>		X	Y	Z	$\leq a$	Crack can't enter viewing area	$\leq 1/2 t$
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◆ Specification For TFT-LCD Module 3.5" ~10" :

(Ver.B01)

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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="561 1675 1343 1848"> <thead> <tr> <th></th> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <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> </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	$\leq a$	$\leq 1/2 W$	$\leq t$										
Back	$\leq a$	$\leq W$	$\leq 1/2 t$										

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									
		8.2.2 Non-conductive portion :  <p style="text-align: center;"> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq 1/3 a$</td> <td>$\leq W$</td> <td>$\leq t$</td> </tr> </tbody> </table> </p> <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> 8.2.3 Glass remain :  <p style="text-align: center;"> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>X</th> <th>Y</th> <th>Z</th> </tr> </thead> <tbody> <tr> <td>$\leq a$</td> <td>$\leq 1/3 W$</td> <td>$\leq t$</td> </tr> </tbody> </table> </p>		X	Y	Z	$\leq 1/3 a$	$\leq W$	$\leq t$	X	Y	Z
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◆Specification For TFT-LCD Module 3.5" ~10" :

(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

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.

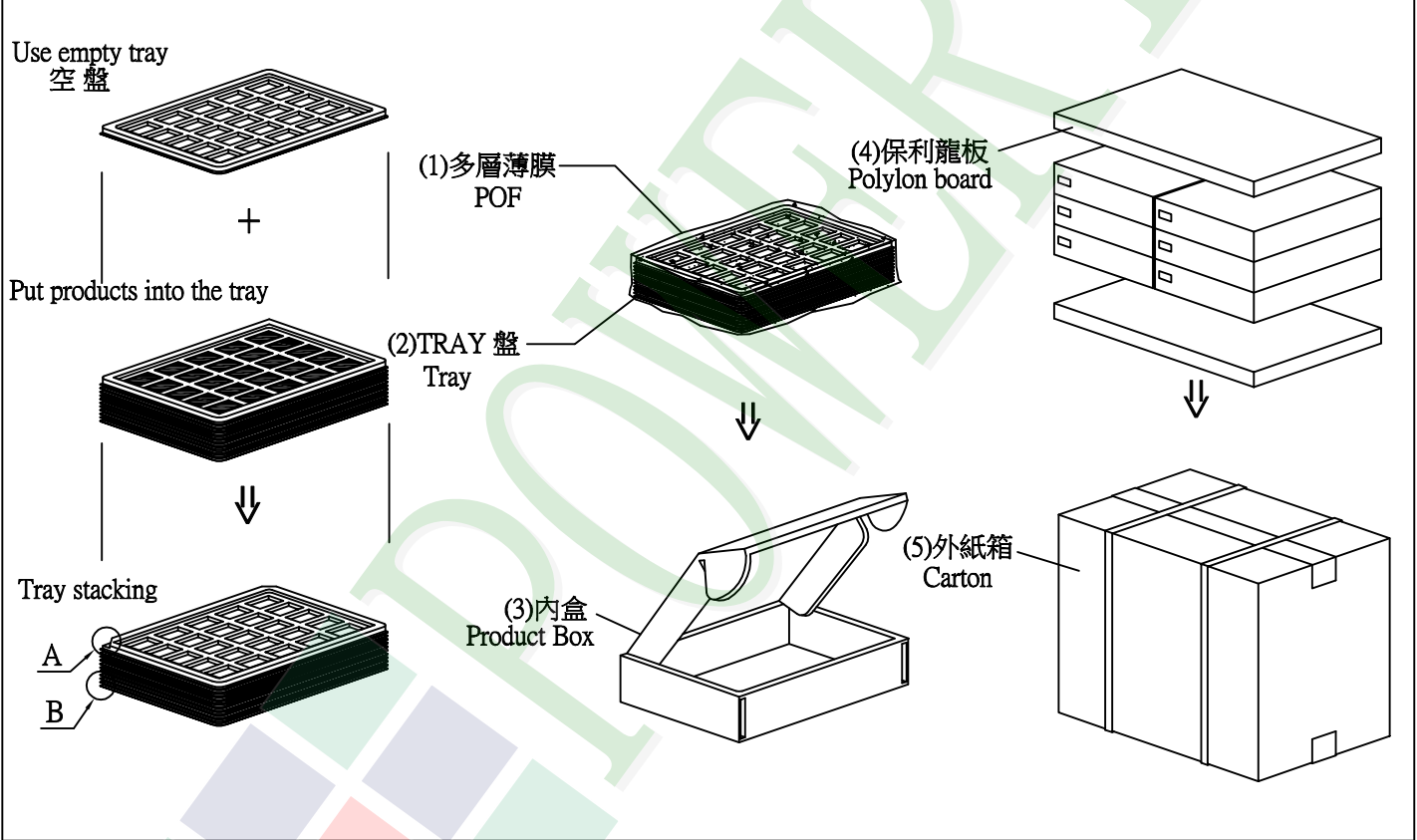
1. 包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH320240T023-IHC01	84.02X75.3X4.55	0.0448	252	11.2896
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	—	6	—
3	TRAY 盤 (2)Tray	TY00000000408	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) : 18.24 Kg±10%

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

(1) LCM quantity per box : no per tray	6	x no of tray	7	=	42
(2) Total LCM quantity in carton : quantity per box	42	x no of boxes	6	=	252



特 記 事 項 (REMARK)

<p>4. 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.</p>	
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