



Specification

10.9cm (4.3") TFT

PH480272T-005-I-01-Q (high brightness)

Version: 2.5
March 2009

History of Version

Date (mm / dd / yyyy)	Ver.	Edi.	Description	Page	Design by
2008/10/6	01	001	New Drawing	—	Jared
12/26/2008	01	002	First Sample	—	Lambert
01/16/2009	01	003	Modify Appendix	—	Lambert
01/21/2009	01	004	Modify Average Brightness	6	Lambert
03/17/2009	02	005	Modify Backlight	6 · 9 Drawing	Lambert

Total: 33 Page

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Appendix : LCM Drawing
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Note : For detailed information please refer to IC data sheet :
Primacy(TFT LCD): Himax: HX8257-A

1. SPECIFICATIONS

1.1 Features

Item	Standard Value
Display Type	480 * 3 (RGB) * 272 Dots
LCD Type	a-Si TFT , Normally white , Transmissive type
Screen size(inch)	4.3 inch
Viewing Direction	6 O'clock
Color configuration	RGB-Strip
Backlight Type	LED B/L
Interface	Digital 24-bits RGB
Other(controller/driver IC)	HX8257-A (Or Compatible IC)
ROHS	THIS PRODUCT CONFORMS THE ROHS OF PTC Detail information please refer web side : http://www.powertip.com.tw/news/LatestNews.asp

1.2 Mechanical Specifications

Item	Standard Value	Unit
Outline Dimension	105.5(W) x 67.2 (L) x 3.5(H)	mm

LCD panel

Item	Standard Value	Unit
Viewing Area	96.64 (W) x 55.456 (H)	mm
Active Area	95.04 (W) x 53.856 (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	VDDIO	GND=0	-0.3	4.0	V
	VGH-VGL	GND=0	-0.3	45.0	
Input Voltage*1	VI	-	-0.3	VDDIO+0.3	V
Operating Temperature	T _{OP}	-	-20	70	°C
Storage Temperature	T _{ST}	-	-30	80	°C

*1: PCLK, R0 ~ R7, G0 ~ G7, B0 ~ B7, Hsync, Vsync, DISP

1.4 DC Electrical Characteristics

Module

GND = 0V, Ta = 25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply Voltage	VDDIO	-	3.0	3.3	3.6	V
Input H/L Level Voltage	VIH	-	0.8VDDIO	-	VDDIO	V
	VIL	-	0	-	0.2VDDIO	V
Supply Current	I _{DDIO}	VDDIO = 3.3 V Pattern= Pattern display	-	14	-	mA
		VDDIO = 3.3 V Pattern= black *1	-	16	24	mA

Note1:Maximum current display

1.5 Optical Characteristics

TFT LCD Module

VDDIO= 3.3 V, Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	unit	
Response time	Tr+Tf	25	-		36	54	ms	
Viewing angle	Top	$\theta Y+$	CR \geq 10	-	45	-	Deg.	Note 4
	Bottom	$\theta Y-$		-	50	-		
	Left	$\theta X-$		-	50	-		
	Right	$\theta X+$		-	50	-		
Contrast ratio		CR		200	250	-		Note 3
Color of CIE Coordinate (With B/L)	White	X	Ta = 25°C $\theta X, \theta Y = 0^\circ$	0.27	0.32	0.37	-	Note1
		Y		0.30	0.35	0.40		
	Red	X		0.57	0.62	0.67		
		Y		0.30	0.35	0.40		
	Green	X		0.30	0.35	0.40		
		Y		0.53	0.58	0.63		
	Blue	X		0.09	0.14	0.19		
		Y		0.07	0.12	0.17		
Average Brightness Pattern=white display (With LCD)*1		IV	IF= 40 mA	340	420	-	cd/m ²	Note1
Uniformity (With LCD)*2		ΔB	IF= 40 mA	70	-	-	%	Note1

Note 1:

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

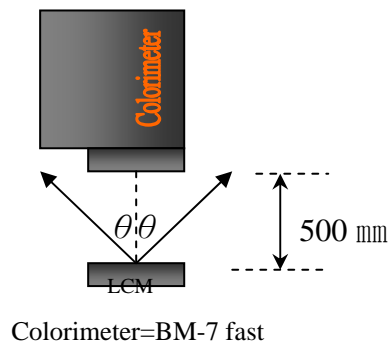
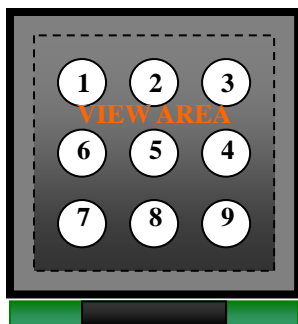
*2 : Measurement Condition for Optical Characteristics:

a : Environment: **25 ±5** / **60±20%**R.H , no wind , dark room below **10** Lux at typical lamp current and typical operating frequency.

b : Measurement Distance: **500 ± 50** mm , ($\theta = 0^\circ$)

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

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



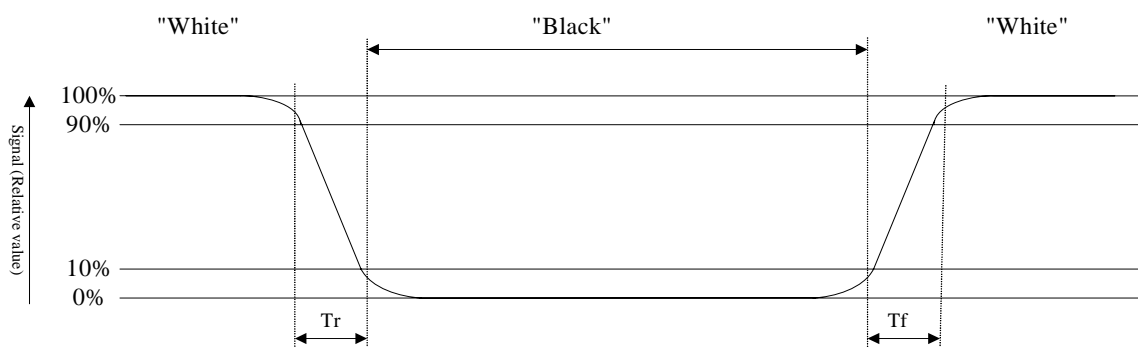
To be measured at the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-7, after 10 minutes operation (module)

Note2: Definition of response time:

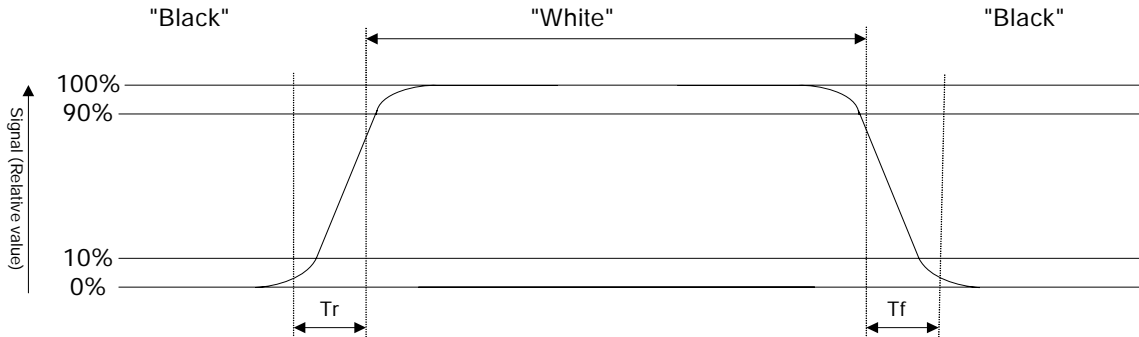
The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of Amplitudes.

Refer to figure as below:

Normally White



Normally Black



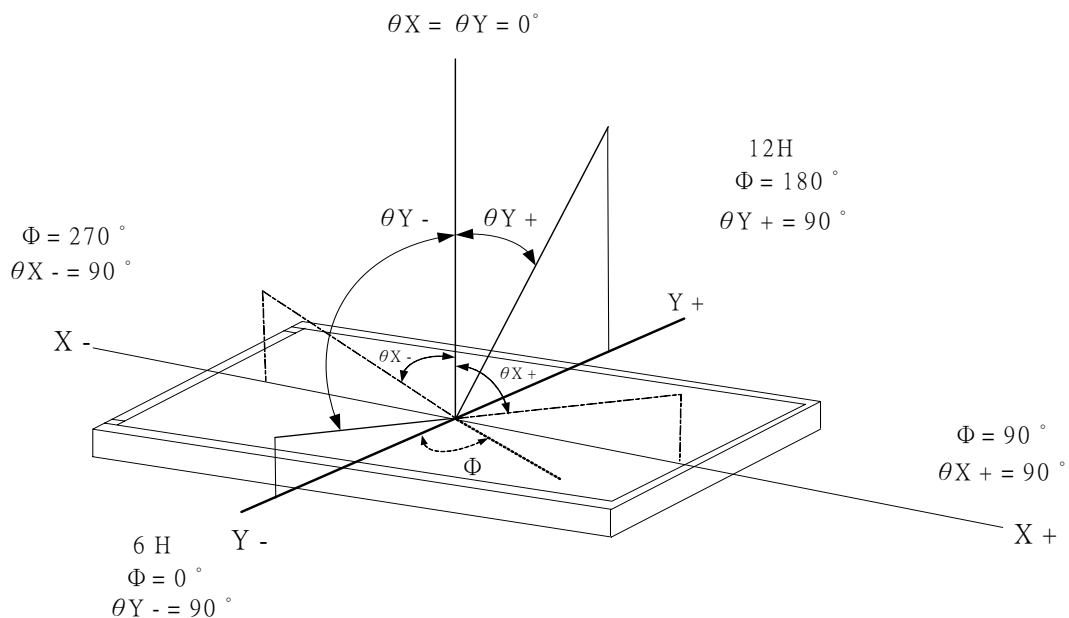
Note3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula

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

Note4: Definition of viewing angle:

Refer to figure as below:



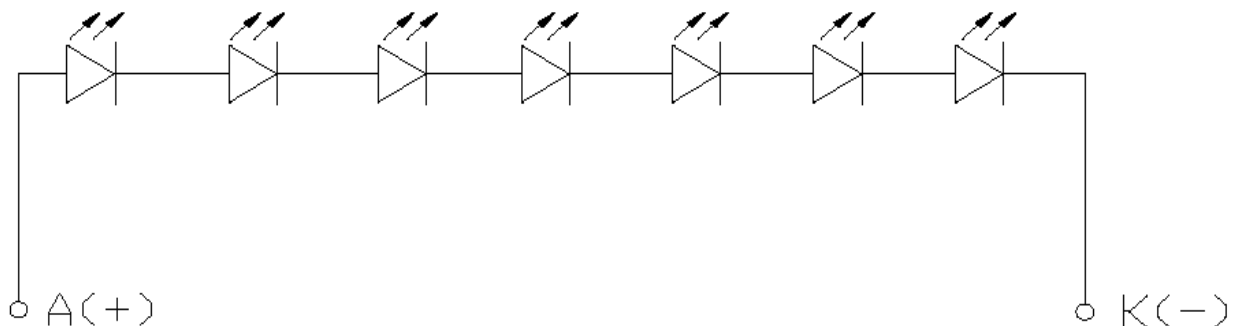
1.6 Backlight Characteristics

Maximum Ratings

Item	Symbol	Conditions	Min.	Max.	Unit
LED Forward Current	IF	Ta =25°C	—	25	mA
LED Reverse Voltage	VR	Ta =25°C	—	5	V
Power Dissipation	PD	Ta =25°C	—	525	mW

Electrical / Optical Characteristics

Item	Symbol	Conditions	Min.	Typ.	Max.	Unit
Forward Voltage	VF	IF= 20 mA	—	22.8	—	V
Average Brightness (Without LCD &T/P)	IV		3850	4250	—	cd/m ²
CIE Color Coordinate (Without LCD &T/P)	X		—	0.315	—	—
	Y		—	0.312	—	
Color	White					



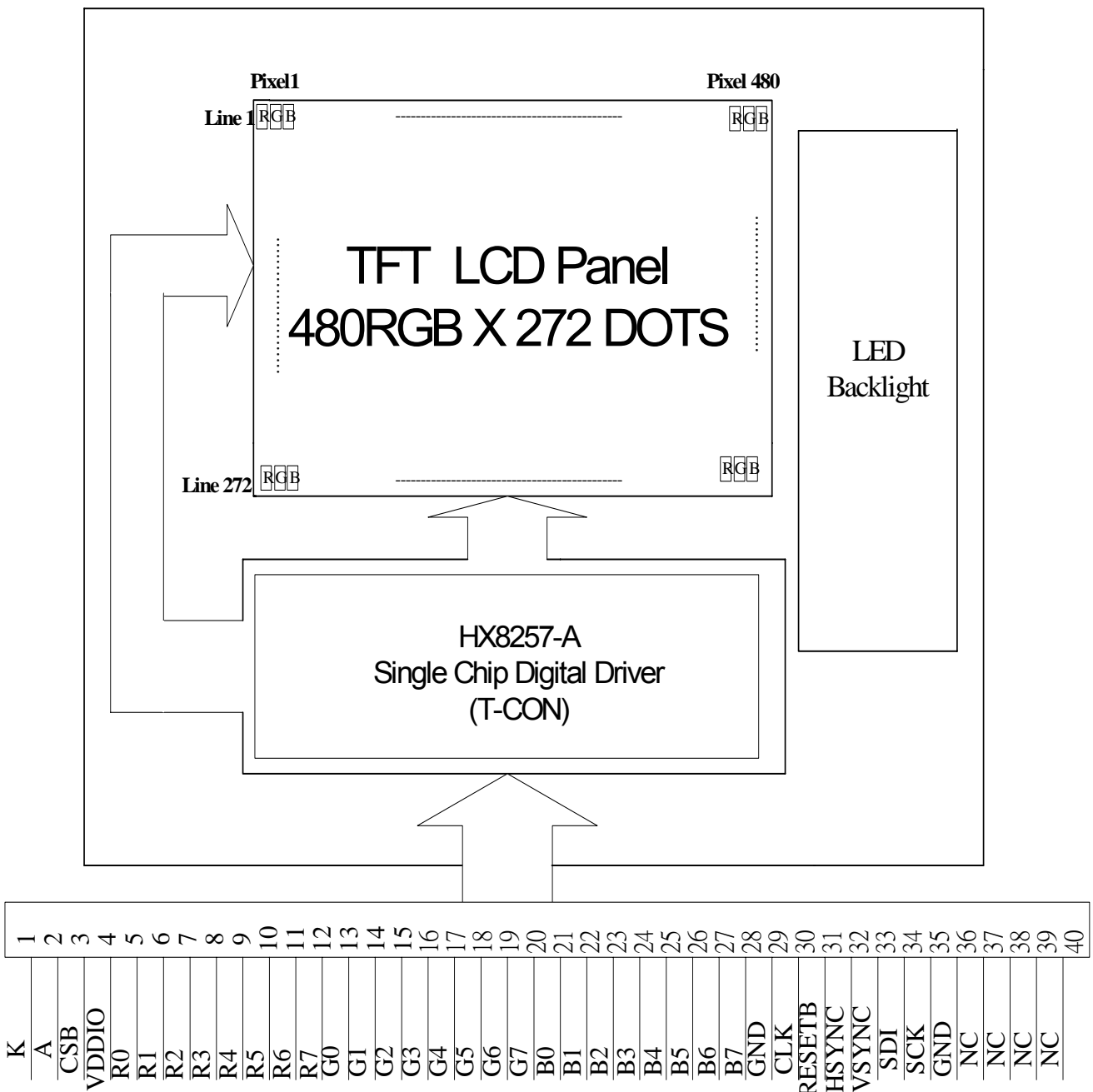
2. MODULE STRUCTURE

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	K	Power supply for LED Backlight cathode input
2	A	Power supply for LED Backlight anode input
3	CSB	Chip select pin of serial interface.
4	VDDIO	Digital power
5	R0	Red data bit 0
6	R1	Red data bit 1
7	R2	Red data bit 2
8	R3	Red data bit 3
9	R4	Red data bit 4
10	R5	Red data bit 5
11	R6	Red data bit 6
12	R7	Red data bit 7
13	G0	Green data bit 0
14	G1	Green data bit 1
15	G2	Green data bit 2
16	G3	Green data bit 3
17	G4	Green data bit 4
18	G5	Green data bit 5
19	G6	Green data bit 6
20	G7	Green data bit 7

Pin No.	Symbol	Function
21	B0	Blue data bit 0
22	B1	Blue data bit 1
23	B2	Blue data bit 2
24	B3	Blue data bit 3
25	B4	Blue data bit 4
26	B5	Blue data bit 5
27	B6	Blue data bit 6
28	B7	Blue data bit 7
29	GND	Ground
30	CLK	Dot data clock
31	RESETB	Active low global reset signal input.
32	HSYNC	Horizontal sync input
33	VSYNC	Vertical sync input
34	SDI	Data input pin in serial interface.
35	SCL	Clock input pin in serial interface.
36	GND	Ground
37	NC	(XR) Right side of touch panel.
38	NC	(YD) Bottom side of touch panel.
39	NC	(XL) Left side of touch panel.
40	NC	(YU) Up side of touch panel.

2.3 Timing Characteristics

Timing Parameters 1

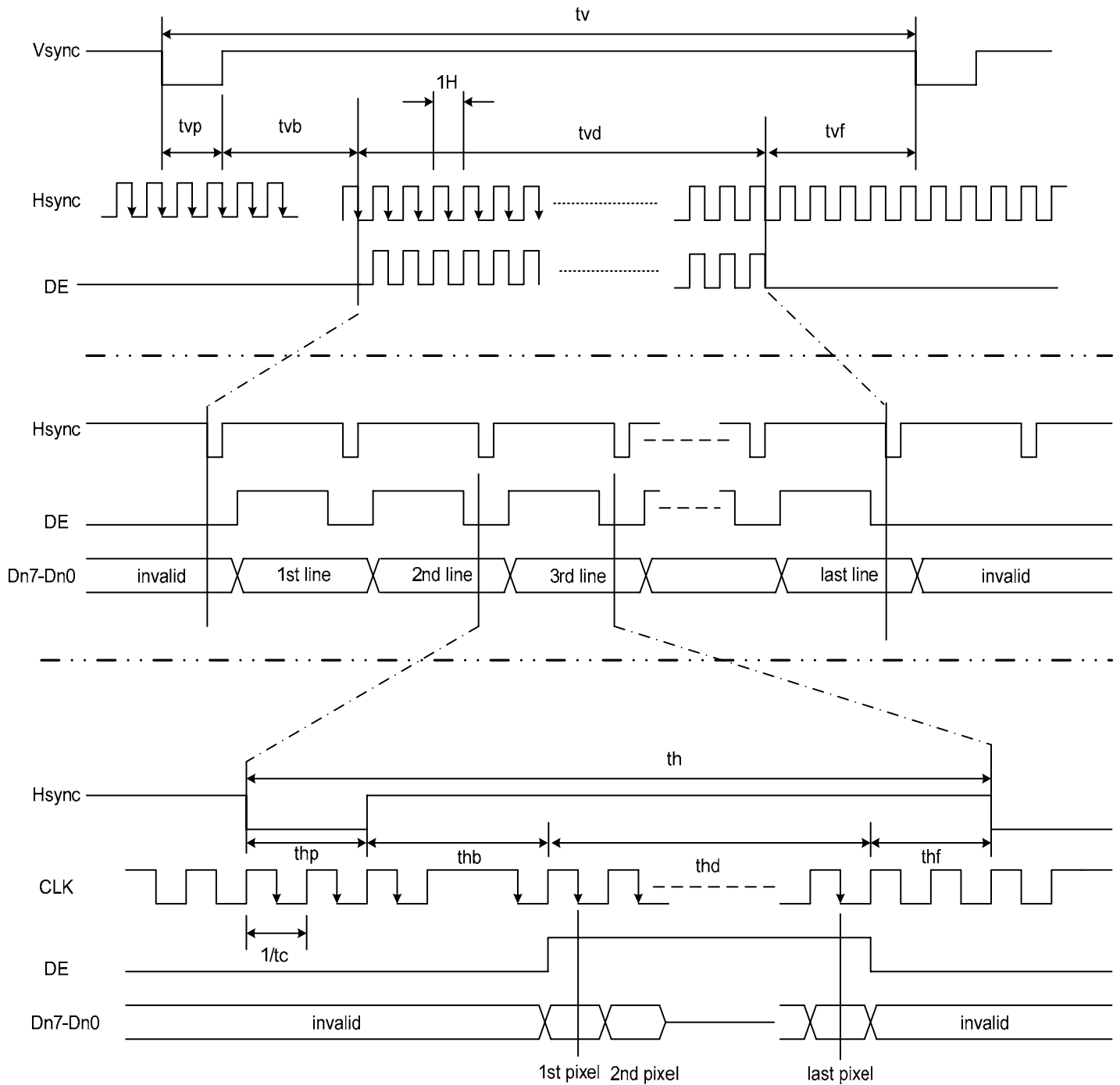
(480RGBx272, T_A=25°C, VDDIO=1.8V to 3.6V, GND= 0V)

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Clock cycle	f _{CLK} ⁽¹⁾	-	9	15	MHz
Hsync cycle	1/th	-	17.14	-	KHz
Vsync cycle	1/tv	-	59.94	-	Hz
Horizontal Signal					
Horizontal cycle	th	525	525	605	CLK
Horizontal display period	thd	480	480	480	CLK
Horizontal front porch	thf	2	2	82	CLK
Horizontal pulse width	thp ⁽²⁾	2	41	41	CLK
Horizontal back porch	thb ⁽²⁾	2	2	41	CLK
Vertical Signal					
Vertical cycle	tv	285	286	511	H ⁽¹⁾
Vertical display period	tvd	272	272	272	H ⁽¹⁾
Vertical front porch	tvf	1	2	227	H ⁽¹⁾
Vertical pulse width	tvp ⁽²⁾	1	10	11	H ⁽¹⁾
Vertical back porch	tvb ⁽²⁾	1	2	11	H ⁽¹⁾

Note: (1) Unit: CLK=1/ f_{CLK}, H=th,

(2)It is necessary to keep tvp+tvb=12 and thp+thb=43 in sync mode. DE mode is unnecessary to keep it.

Timing Chart 1



Timing Parameters 2

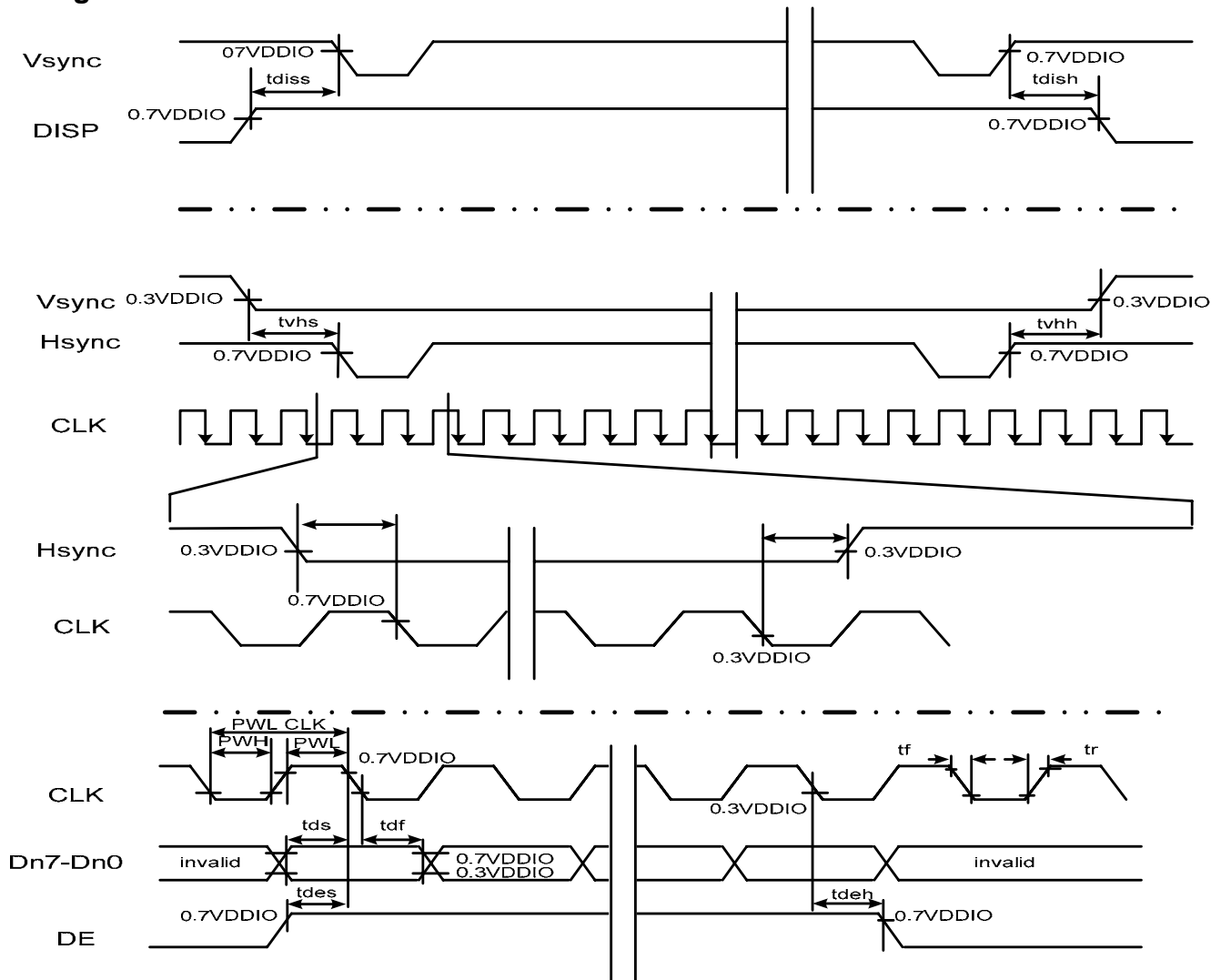
($T_A=25^{\circ}\text{C}$, $V_{DDIO}=1.8\text{V}$ to 3.6V , $t_r^{(1)}=t_f^{(1)}=2\text{ns}$)

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
DISP setup time	t_{diss}	10	-	-	ns
DISP hold time	t_{dish}	10	-	-	ns
Clock period	$PW_{CLK}^{(2)}$	66.7	-	-	ns
Clock pulse high period	$PWH^{(2)}$	26.7	-	-	ns
Clock pulse low period	$PWL^{(2)}$	26.7	-	-	ns
Hsync setup time	t_{hs}	10	-	-	ns
Hsync hold time	t_{hh}	10	-	-	ns
Data setup time	t_{ds}	10	-	-	ns
Data hold time	t_{dh}	10	-	-	ns
DE setup time	t_{des}	10	-	-	ns
DE hold time	t_{deh}	10	-	-	ns
Vsync setup time	t_{vhs}	10	-	-	ns
Vsync hold time	t_{vhh}	10	-	-	ns

Note: (1) t_r , t_f is defined 10% to 90% of signal amplitude.

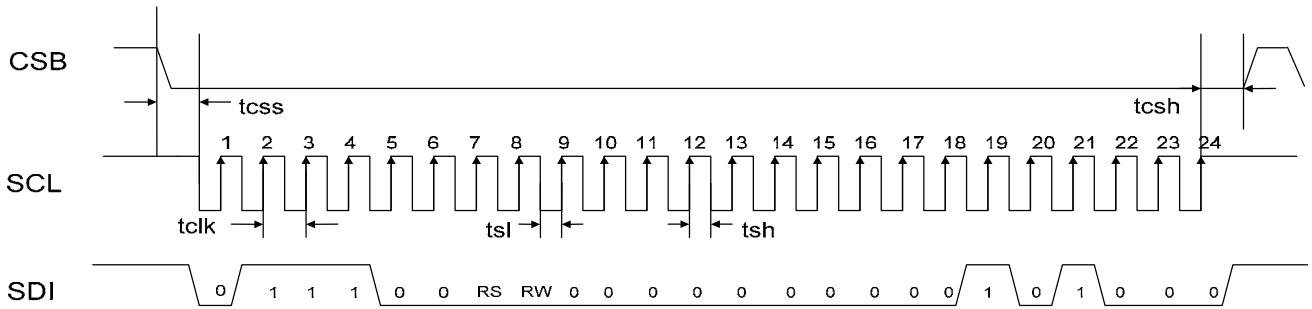
(2) For parallel interface, maximum clock frequency is 15MHz.

Timing Chart 2

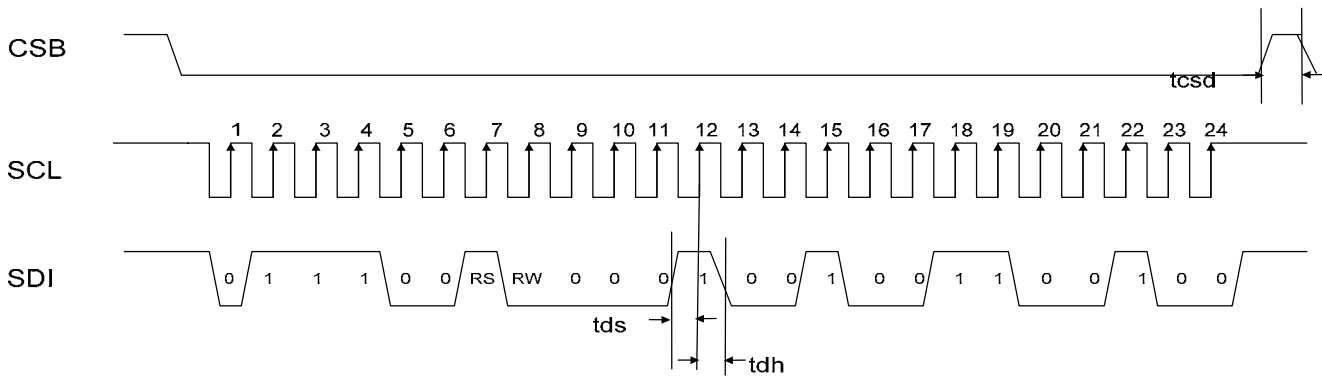


2.3.1 SPI Write

First Transmission (Register)



Second Transmission (Data)



Note: The example writes "0x1264h" to register R28h.

2.3.2 SPI Timing Table

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Serial Clock Frequency	fclk	-	-	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	tcsh	20	-	-	ns
Data Setup Time	tds	5	-	-	ns
Data Hold Time	tdh	10	-	-	ns

2.4 Color Data Assignment

COLOR	INPUT DATA	R DATA								G DATA								B DATA							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
		MSB				LSB				MSB				LSB				MSB				LSB			
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(254)	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	GREEN(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
BLUE	BLUE(0)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

[Note]

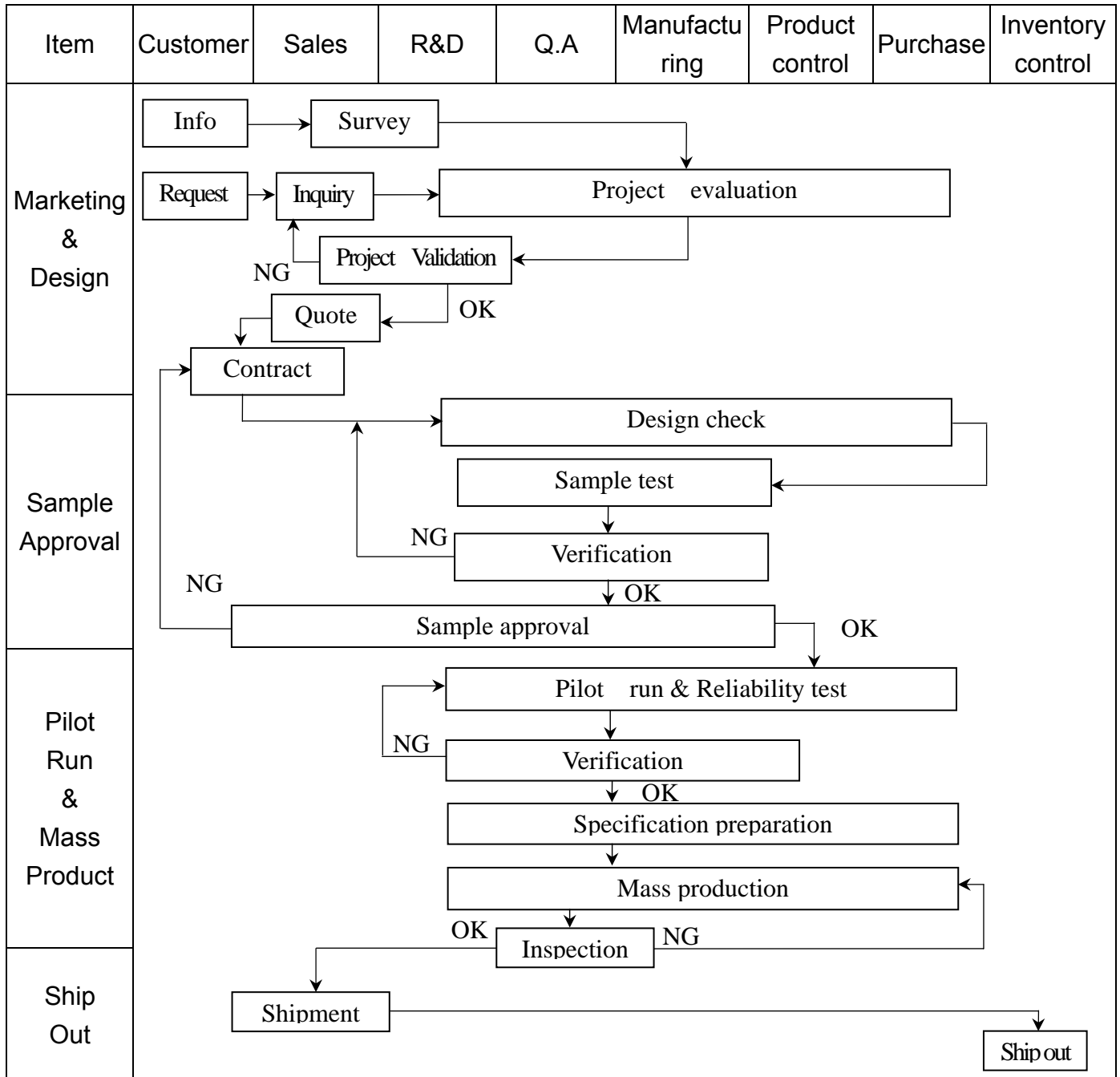
- (1) Definition of gray scale
Color (n) : n means level of gray scale
Larger n means brighter level
- (2) Data: 1-High, 0-Low

2.5 Reference Initial code

Register(0x0006);
Data(0x2020);

3. QUALITY ASSURANCE SYSTEM

3.1 Quality Assurance Flow Chart



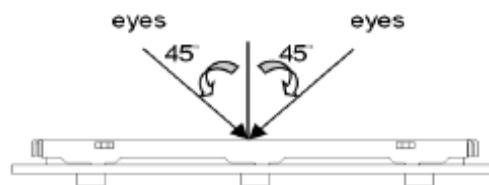
Item	Customer	Sales	R&D	Q.A	Manufacturing	Product control	Purchase	Inventory control
Sales Service	<pre> graph TD Info[Info] --> Claim[Claim] Claim --> Failure[Failure analysis] Failure --> Report[Analysis report] Failure --> Action[Corrective action] Action --> Tracking[Tracking] </pre>							
Q.A Activity	1. ISO 9001 Maintenance Activities 3. Equipment calibration 5. Standardization Management				2. Process improvement proposal 4. Education And Training Activities			

3.2 Inspection Specification

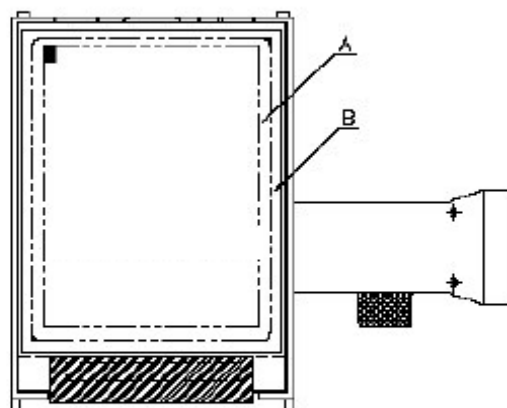
- ◆Scope : The document shall be applied to TFT-LCD Module for 3.5" ~10" (Ver. 03).
- ◆Inspection Standard : MIL-STD-105E Table Normal Inspection Single Sampling Level II.
- ◆Equipment : Gauge 、MIL-STD 、Powertip Tester 、Sample
- ◆Defect Level : Major Defect AQL : 0.4 ; Minor Defect AQL : 1.5
- ◆OUT Going 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)

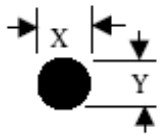
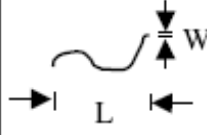
◆ Specification For TFT-LCD Module 3.5" ~10" :

(Ver. 03)

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 border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 10%;"></th> <th style="width: 40%;">Item</th> <th style="width: 50%;">Acceptance (Q'ty)</th> </tr> </thead> <tbody> <tr> <td rowspan="4" style="text-align: center; vertical-align: middle;">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> </tbody> </table> <p>5. 1 Inspection pattern : full white , full black , Red , Green and blue screens.</p> <p>5. 2 It is defined as dot defect if defect area $> 1/2$ dot.</p> <p>5. 3 The distance between two dot defect ≥ 5 mm.</p>		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													

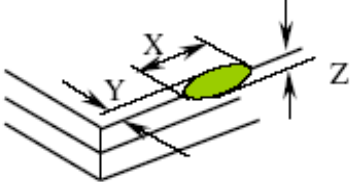
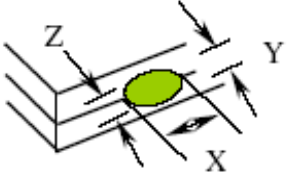
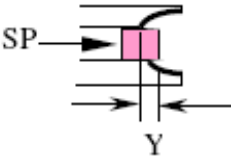
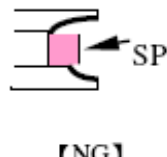
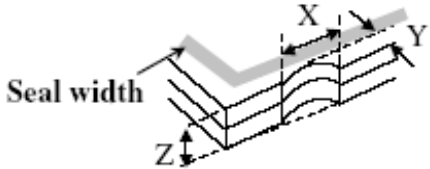
◆Specification For TFT-LCD Module 3.5" ~10" :

(Ver. 03)

NO	Item	Criterion	Level																																							
06	<p>Black or white dot、scratch、contamination</p> <p>Round type</p>  <p>$\Phi = (x + y) / 2$</p> <p>Line type</p> 	<p>6. 1 Round type (Non-display or display) :</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <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 style="text-align: center;">$\Phi \leq 0.25$</td> <td colspan="2" style="text-align: center;">Ignore</td> </tr> <tr> <td style="text-align: center;">$0.25 < \Phi \leq 0.50$</td> <td style="text-align: center;">5</td> <td rowspan="3" style="text-align: center; vertical-align: middle;">Ignore</td> </tr> <tr> <td style="text-align: center;">$\Phi > 0.50$</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">Total</td> <td style="text-align: center;">5</td> </tr> </tbody> </table> <p>6. 2 Line type(Non-display or display) :</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Dimension</th> <th colspan="2">Acceptance (Q'ty)</th> </tr> <tr> <th>Length (L)</th> <th>Width (W)</th> <th>A area</th> <th>B area</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">---</td> <td style="text-align: center;">$W \leq 0.03$</td> <td style="text-align: center;">Ignore</td> <td rowspan="5" style="text-align: center; vertical-align: middle;">Ignore</td> </tr> <tr> <td style="text-align: center;">$L \leq 10.0$</td> <td style="text-align: center;">$0.03 < W \leq 0.05$</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">$L \leq 5.0$</td> <td style="text-align: center;">$0.05 < W \leq 0.10$</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">---</td> <td style="text-align: center;">$W > 0.10$</td> <td style="text-align: center;">As round type</td> </tr> <tr> <td colspan="2" style="text-align: center;">Total</td> <td style="text-align: center;">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	Dimension		Acceptance (Q'ty)		Length (L)	Width (W)	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
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07	<p>Polarizer Bubble</p>	<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <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 style="text-align: center;">$\Phi \leq 0.25$</td> <td colspan="2" style="text-align: center;">Ignore</td> </tr> <tr> <td style="text-align: center;">$0.25 < \Phi \leq 0.50$</td> <td style="text-align: center;">4</td> <td rowspan="4" style="text-align: center; vertical-align: middle;">Ignore</td> </tr> <tr> <td style="text-align: center;">$0.50 < \Phi \leq 0.80$</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">$\Phi > 0.80$</td> <td style="text-align: center;">0</td> </tr> <tr> <td style="text-align: center;">Total</td> <td style="text-align: center;">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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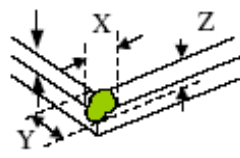
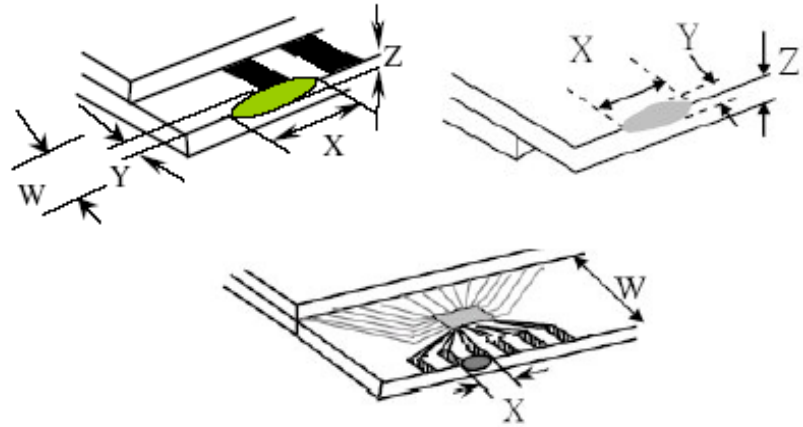
◆Specification For TFT-LCD Module 3.5" ~10" :

(Ver. 03)

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 style="text-align: right;">Y : The width of crack. W : terminal length a : LCD side length</p> <hr style="border-top: 1px dashed black;"/> <p>8.1 General glass chip :</p> <p>8.1.1 Chip on panel surface and crack between panels:</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div> <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <div style="text-align: center;">  <p>【OK】</p> </div> <div style="text-align: center;">  <p>【NG】</p> </div> </div> <div style="text-align: center; margin-top: 20px;">  </div> <table border="1" style="margin-top: 20px; width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="width: 25%;">X</th> <th style="width: 50%;">Y</th> <th style="width: 25%;">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	$\leq 1/2 t$	$\leq a$	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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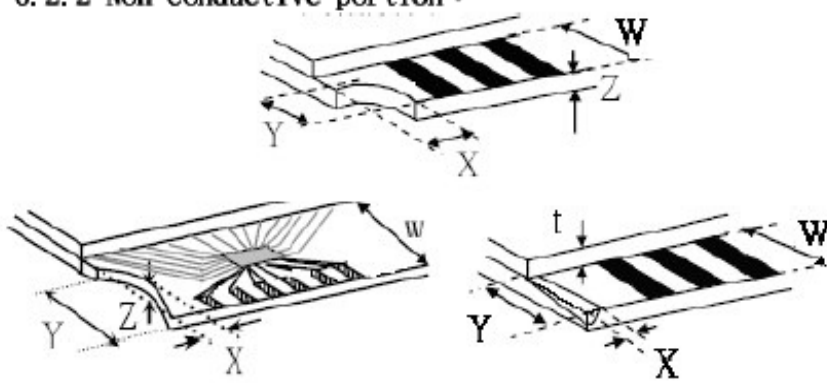
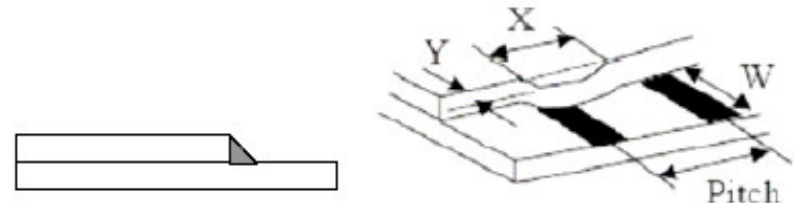
◆Specification For TFT-LCD Module 3.5" ~10" :

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NO	Item	Criterion	Level									
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		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.	$1/2 t < Z \leq 2 t$										
<p>8.2 Protrusion over terminal :</p> <p>8.2.1 Chip on electrode pad :</p> <div style="text-align: center;">  </div> <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th></th> <th style="width: 25%;">X</th> <th style="width: 25%;">Y</th> <th style="width: 25%;">Z</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Front</td> <td style="text-align: center;">$\leq a$</td> <td style="text-align: center;">$\leq 1/2 W$</td> <td style="text-align: center;">$\leq t$</td> </tr> <tr> <td style="text-align: center;">Back</td> <td style="text-align: center;">$\leq a$</td> <td style="text-align: center;">$\leq W$</td> <td style="text-align: center;">$\leq 1/2 t$</td> </tr> </tbody> </table>		X	Y	Z	Front	$\leq a$	$\leq 1/2 W$	$\leq t$	Back	$\leq a$	$\leq W$	$\leq 1/2 t$
	X	Y	Z									
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Back	$\leq a$	$\leq W$	$\leq 1/2 t$									

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

(Ver. 03)

NO	Item	Criterion	Level												
08	The crack of glass	<p>Symbols :</p> <p>X : The length of crack Y : The width of crack. Z : The thickness of crack W : terminal length t : The thickness of glass a : LCD side length</p> <hr style="border-top: 1px dashed black;"/> <p>8.2.2 Non-conductive portion :</p>  <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">X</th> <th style="width: 30%;">Y</th> <th style="width: 30%;">Z</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">$\leq 1/3 a$</td> <td style="text-align: center;">$\leq W$</td> <td style="text-align: center;">$\leq t$</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>8.2.3 Glass remain :</p>  <table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">X</th> <th style="width: 30%;">Y</th> <th style="width: 30%;">Z</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">$\leq a$</td> <td style="text-align: center;">$\leq 1/3 W$</td> <td style="text-align: center;">$\leq t$</td> </tr> </tbody> </table>	X	Y	Z	$\leq 1/3 a$	$\leq W$	$\leq t$	X	Y	Z	$\leq a$	$\leq 1/3 W$	$\leq t$	Minor
X	Y	Z													
$\leq 1/3 a$	$\leq W$	$\leq t$													
X	Y	Z													
$\leq a$	$\leq 1/3 W$	$\leq t$													

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

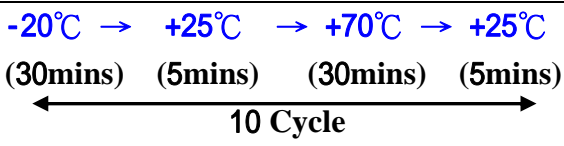
(Ver. 03)

NO	Item	Criterion	Level
09	Backlight elements	9. 1 Backlight can't work normally.	Major
		9. 2 Backlight doesn't light or color is wrong.	Major
		9. 3 Illumination source flickers when lit.	Major
10	General appearance	10. 1 Pin type , quantity , dimension must match type in structure diagram.	Major
		10. 2 No short circuits in components on PCB or FPC .	Major
		10. 3 Parts on PCB or FPC must be the same as on the production characteristic chart .There should be no wrong parts , missing parts or excess parts.	Major
		10. 4 Product packaging must the same as specified on packaging specification sheet.	Minor
		10. 5 The folding and peeled off in polarizer are not acceptable.	Minor
		10. 6 The PCB or FPC between B/L assembled distance(PCB or FPC) is ≤ 1.5 mm.	Minor

4. RELIABILITY TEST

4.1 Reliability Test Condition

Ver.03

NO.	TEST ITEM	TEST CONDITION											
1	High Temperature Storage Test	Keep in +80 ±2°C 96 hrs Surrounding temperature, then storage at normal condition 4hrs.											
2	Low Temperature Storage Test	Keep in -30 ±2°C 96 hrs Surrounding temperature, then storage at normal condition 4hrs.											
3	High Temperature / High Humidity Storage Test	Keep in +60°C / 90% R.H duration for 96 hrs Surrounding temperature, then storage at normal condition 4hrs. (Excluding the polarizer)											
4	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°C ~ 35°C 2. Humidity relative : 30% ~ 60% 3. Energy Storage Capacitance(Cs+Cd) : 150pF±10% 4. Discharge Resistance(Rd) : 330Ω±10% 5. Discharge, mode of operation : Single Discharge (time between successive discharges at least 1 sec) (Tolerance if the output voltage indication : ±5%)											
5	Temperature Cycling Storage Test	-20°C → +25°C → +70°C → +25°C (30mins) (5mins) (30mins) (5mins) 											
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 border="1" style="margin: 0 auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Packing Weight (Kg)</th> <th style="width: 50%;">Drop Height (cm)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0 ~ 45.4</td> <td style="text-align: center;">122</td> </tr> <tr> <td style="text-align: center;">45.4 ~ 90.8</td> <td style="text-align: center;">76</td> </tr> <tr> <td style="text-align: center;">90.8 ~ 454</td> <td style="text-align: center;">61</td> </tr> <tr> <td style="text-align: center;">Over 454</td> <td style="text-align: center;">46</td> </tr> </tbody> </table> <p>Drop direction : ※1 corner / 3 edges / 6 sides each 1times</p>		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

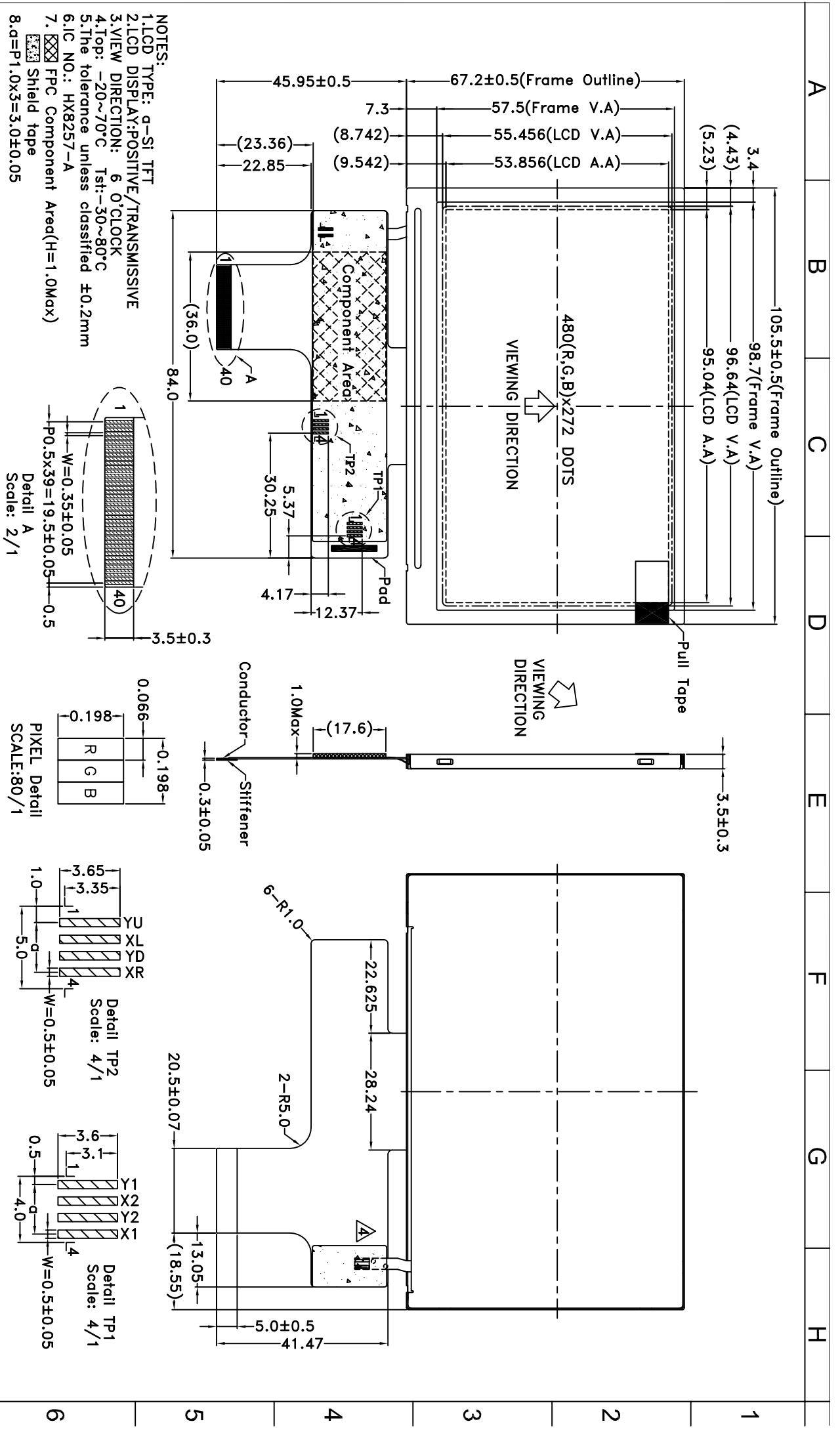
- 5.2.1 Avoid any strong mechanical shock which can break the glass.
- 5.2.2 Avoid static electricity which can damage the CMOS LSI—When working with the module , be sure to ground your body and any electrical equipment you may be using.
- 5.2.3 Do not remove the panel or frame from the module.
- 5.2.4 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.



REV	NEW DRAWING	REV BY	REVISER	DATE
007				
006				
005				
004	Modify Backlight	Mag		2009/03/13
003	Add LCD V.A dim	Mag		2009/01/16
002	Modify dim of FPC	Mag		2008/12/30
001	NEW DRAWING	Mag		2008/10/06

PART NO:	PH480272T-005-101Q
DRAWING NAME:	LMD-PH480272T-005-101Q
TITLE:	LCD Module Drawing

Design	Mag	Unit	MM	Surface		Precision Level
Check	Stone	Scale	1:1.2	Material		
Approve	Linda	Page	1/1	Thickness		
				Quantity		

DATA MODUL

Precision Level	Tolerance (mm)
1	~ 4
4	~ 16
16	~ 63
63	~ 250
250	~ 1000

LCM包裝規格書

LCM Packaging Specifications (For Tray)

Approve	Check	Contact
Rex	Stone	Mag

Documents NO.	PKG-PH480272T-005-I01Q
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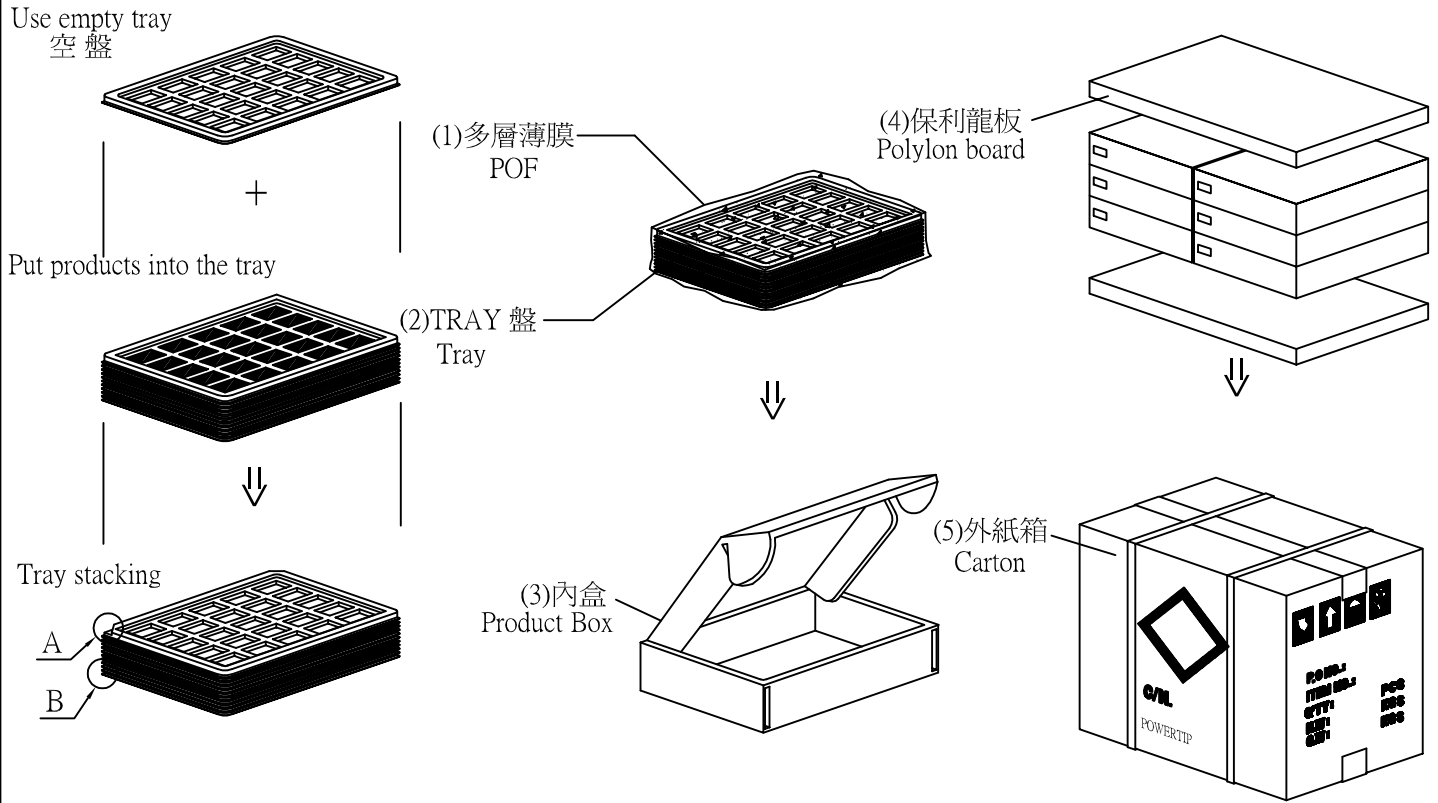
1. 包裝材料規格表 (Packaging Material) : (per carton)

No.	Item	Model	Dimensions (mm)	1Pcs Weight	Quantity	Total Weight
1	成品 (LCM)	PH480272T-005-I01Q	105.5 X 67.2	0.042	168	7.056
2	多層薄膜(1)POF	OTFILM0BA03ABA	19"X350X0.015	—	6	—
3	TRAY 盤 (2)Tray	TY00000000030	352 X 260 X 11.8	0.1	48	4.8
4	內盒(3)Product Box	BX36627063ABBA	393 X 274 X 68	0.2692	6	1.6152
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	1.4208	1	1.4208
7						
8						
9						

2. 一整箱總重量 (Total LCD Weight in carton) : 14.95 Kg±10%

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

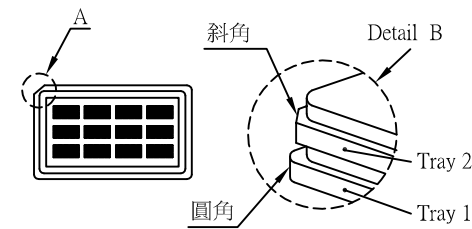
(1) LCM quantity per box : no per tray	4	x no of tray	7	=	28
(2) Total LCM quantity in carton : quantity per box	28	x no of boxes	6	=	168



特 記 事 項 (REMARK)

1. Label Specifications :

MODEL: LOT NO: QUANTITY: CHECK:
--



2. TRAY 盤相疊時, 需旋轉180度, 請詳見B視圖
 Rotate tray 180 degrees and place on top of stack.
 Check the tray stack using Fig. B.

3. 可適用於單品包裝
 It's also suitable to Panel

4. Tray料號:
 Tray Number: TY00000000030



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