



*Version* : <u>0.1</u>

**Preliminary** 

## TECHNICAL SPECIFICATION

MODEL NO.: PD080SL2

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Customer's Confirmation
Customer
Date
By
☐PVI's Confirmation

Dep	FAE	Panel	Electronic	Mechanical	Product	Prepared
		Design	Design	Design	Verification	by
SIGN						



# Revision History

Rev.	Eng.	<b>Issued Date</b>	Revised Content
0.1	黄秀晶	Oct 24,2007	Preliminary

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## 1.Application

This data sheet applies to a color TFT LCD module. The module applies to notebook PC, sub-note-book PC and other OA product, which require high quality flat panel display.

Prime View assumes no responsibility for any damage resulting from the use of the device which dose not complies with the instructions and the precautions in these specification sheets.

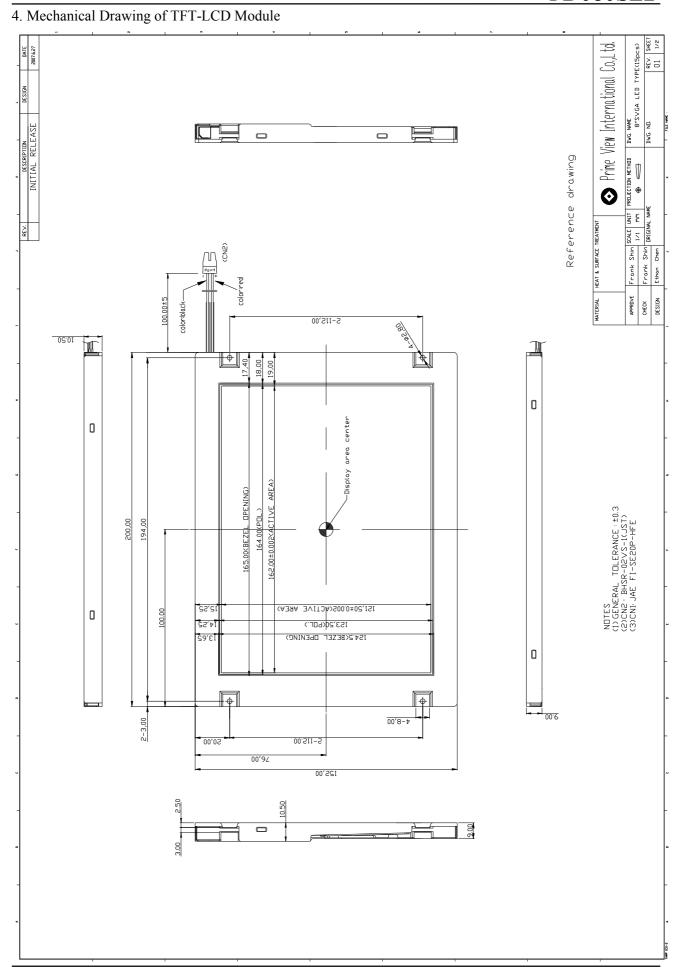
#### 2. Features

- . Amorphous silicon TFT LCD panel with LED backlight unit
- . Pixel in stripe configuration
- . Slim and compact, designed for O/A application
- . Display Colors: 262,144 colors or 16,777,216 colors
- . High Brightness project

## 3. Mechanical Specifications

Parameter	Specifications	Unit
Screen Size	8 (diagonal)	inch
Display Format	800×(RGB)×600	dot
Display Colors	262,144	
Active Area	162(H)×121.5 (V)	mm
Pixel Pitch	0.2025 (H)×0.2025 (V)	mm
Pixel Configuration	Stripe	
Outline Dimension	200(W)×152(H)×10.5(D) (typ.)	mm
Weight	343 <u>+</u> 15	g
Back-light	Middle power LED 15pcs	
Surface treatment	Anti-Glare	
Display mode	Normally white	
Gray scale inversion direction	6 ( Note 13-1 )	o'clock

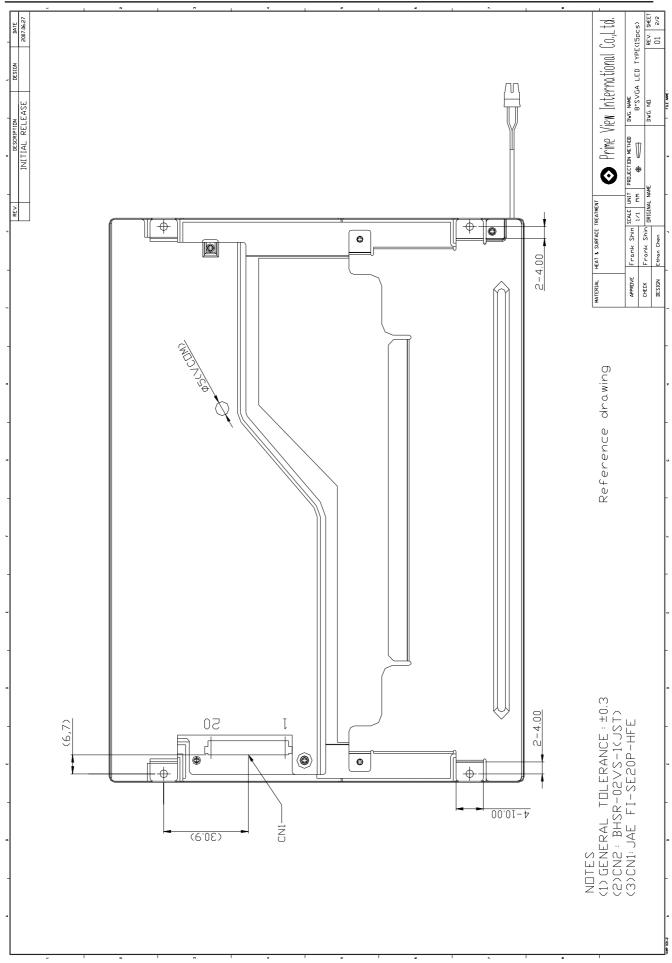




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## 5 CONNECTIONS AND FUNCTIONS FOR INTERFACE PINS

## 5-1) LCD panel signal processing board

CN1 socket (LCD module side): FI-SE20P-HFE(Japan Aviation Electronics Industry Limited(JAE))

Pin	No.	Symbol	Signal	Remarks			
,	A D3+		Pixel data	Note 5 -1, 5 -3			
1	B G		Ground	Note 5 - 4			
2	A D3-		Pixel data	Note 5 -1, 5 -3			
	В	GND	Ground	Note 5 - 4			
	3	DPS	Selection of scan direction	High: Reverse scan Low or Open: Normal scan Note 5 - 2			
4	4	FRC	Selection of the number of colors	High: 16,777,216 colors Low or Open: 262,144 colors Note 5 -1			
	5	GND	Ground	Note 5 - 4			
(	6	CK+	Pixel clock	Note 5 - 3			
	7	CK-	1 Inci clock	note y 3			
	8	GND	Ground	Note 5 - 4			
9	9	D2+	Pixel data	Note 5 - 3			
1	0	D2-	1 Incl data	Note 5 5			
1	1	GND	Ground	Note 5 - 4			
1	2	D1+	Pixel data	Note 5 - 3			
1	3	D1-	2 2202 0000	1100 9 9			
1	4	GND	Ground	Note 5 - 4			
1	5	D0+	Pixel data	Note 5 - 3			
1	6	D0-	1 Inc unit	Title 3 3			
1	7	GND	Ground	Note 5 - 4			
1	8	GND	Cround	11010 ) 4			
19 VDD		VDD	Power supply	Note 5 - 4			
2	0	VDD	1 ower suppry	21000 / 4			

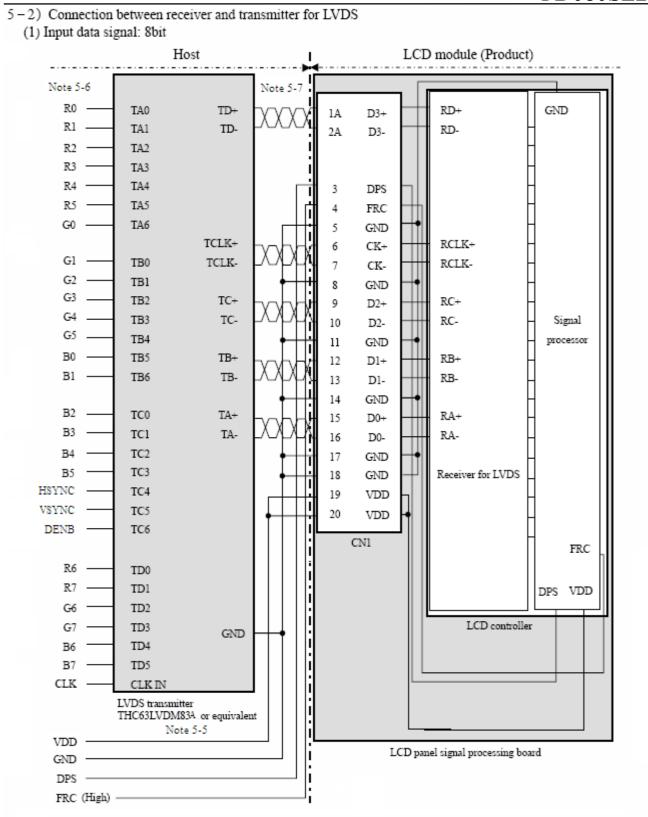
Note 5-1: See DISPLAY COLORS AND INPUT DATA SIGNALS.

Note 5 - 2 : See SCANNING DIRECTIONS .

Note 5 -3: Twist pair wires with 100Ω (Characteristic impedance) should be connected between LCD panel signal processing board and LVDS transmitter.

Note 5 - 4: All GND and VDD terminals should be used without any non-connected lines.

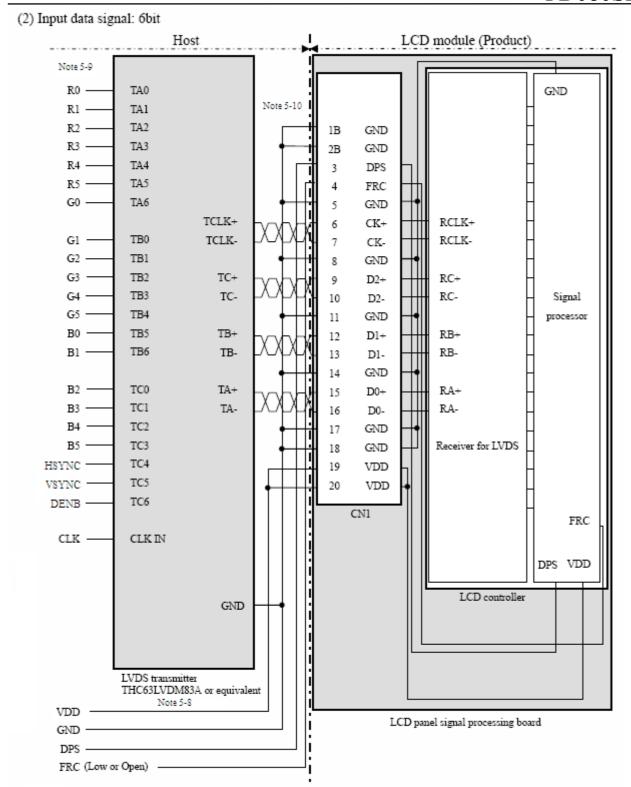




Note 5-5: Recommended transmitter THC63LVDM83A (THine Electronics Inc.) or equivalent Note 5-6: LSB (Least Significant Bit) - R0, G0, B0 MSB (Most Significant Bit) - R7, G7, B7

Note 5-7: Twist pair wires with 100Ω (Characteristic impedance) should be connected between LCD panel signal processing board and LVDS transmitter.





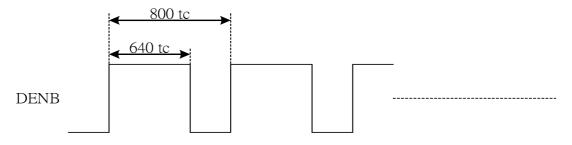
Note 5-8 : Recommended transmitter THC63LVDM83A (THine Electronics Inc.) or equivalent Note 5-9 : LSB (Least Significant Bit) – R0, G0, B0 MSB (Most Significant Bit) – R5, G5, B5

Note 5-10: Twist pair wires with 100Ω (Characteristic impedance) should be connected between LCD panel signal processing board and LVDS transmitter.



DENB input signal.

If customer wanted to off the DENB mode, you must keep the DENB always High or Low.



(tc: the period of sampling clock)

## 6. Absolute Maximum Ratings:

GND=0V, Ta=25°C

Parameters	Symbol	MIN.	MAX.	Unit	Remark
Supply Voltage	$ m V_{DD}$	-0.3	+4.0	V	
Input Signals Voltage	$V_{IN}$	-0.3	VDD+0.3	V	Note 6-1

Note 6-1: LVDS signal.

#### 7. Electrical Characteristics

7-1) Recommended Operating Conditions:

GND = 0V,  $Ta = 25^{\circ}C$ 

Item	Symbol	Min.	Тур.	Max.	Unit	Remark	
Supply Voltage		$V_{DD}$	3.0	3.3	3.6	V	
Current Dissipation		$I_{DD}$	-	153	-	mA	Note 7-1
Total power consumption		Pdd	0.46	0.51	0.56	W	
LVDS Differential input high threshold		VTH	-	-	100	mV	Note 7-2
LVDS Differential input low threshold		VTL	-100	-	-	-	Note 7-2
Input voltage for DPS & FPC	High	VIH	0.7VCC	-	VCC	V	
signal	Low	VIL	0	-	0.2VCC	V	

Note 7-1: To test the current dissipation of V<sub>DD</sub>, using the "color bars" testing pattern shown as below.

1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---

- 1 White
- 2. Yellow
- 3. Cyan
- 4. Green
- 5. Magenta
- 6. Red
- 7. Blue
- 8. Black

 $I_{\text{DD}}$  current dissipation testing pattern

Note7-2 : Please refers to THC63LVDM83A specification by Thin Corporation. This LCD module conforms to LVDS standard.



## 7-2) Recommended driving condition for LED backlight: ( )- reference only data

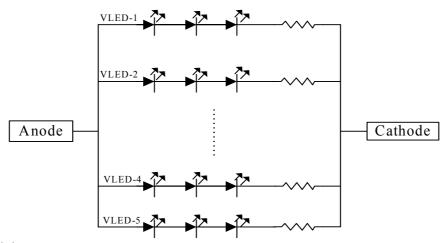
 $Ta = 25^{\circ}C$ 

Parameter	Symbol	Min	TYP	MAX	Unit	Remark
Supply voltage of LED backlight	V <sub>LED1~5</sub>	-	(9.9)	-	V	Note 7-3
Supply current of LED backlight	I <sub>LED1~5</sub>	-	150	-	mA	Note 7-4
Backlight Power Consumption	$P_{\mathrm{LED}}$	-	(7.425)	ı	W	Note 7-5

Note 7-3 :  $I_{LED} = 150 \text{mA}(Constant Current)$ .

Note 7-4: The LED driving condition is defined for each LED module. (3 LED Serial) Input current = 150mA \* 5 = 750mA

Note 7-5: 
$$P_{LED} = V_{LED1} * I_{LED1} + V_{LED2} * I_{LED2} .... + V_{LED4} * I_{LED4} + V_{LED5} * I_{LED5}$$



## 7-3) Backlight driving

Connector type: JST BHSR-02VS-1, PIN No 2 pin

Pin No	Symbol	Description	Remark
1	+	Input terminal (Anode)	Wire color : Red
2	-	Input terminal (Cathode)	Wire Color : Black

## 8. Pixel Arrangement

The LCD module pixel arrangement is the stripe.

R G B R G B R G B 1 st Line	R G B
R G B R G B 2 nd Line	R G B
R G B 3 rd Line	R G B
l st Pixel	800 th Pixel
1 Pixel = R G B	
R G B 598 th Line	R G B
R G B R G B 599 th Line	R G B
R G B R G B R G B 600 th Line	R G B

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- 9. Display Colors and Input Data Signals
- 9-1) Combinations between input data signals and FRC signal

This product can display in equivalent to 16,777,216 colors in 256 gray scales and 262,144 colors in 64 gray scales by combination between input data signals and FRC signal. See following table.

Combination	Input data signals	CN1-Pin No.1 and 2	FRC terminal	Display colors	Remarks		
①	8-bit	D3+/-	High	16,777,216	Note 9-1		
2	6-bit	GND	Low or Open	262,144	Note: 9-2		

Note 9-1 : See " 9-2) 16,777,216 colors". Note 9-2 : See " 9-3) 262,144 colors".

## 9-2) 16,777,216 colors

This product can display equivalent of 16,777,216 colors in 256 gray scales by combination ①

Display	z colors								Data									vel)							
Display	COIOIS	R7	R6	<b>R</b> 5	R4	R3	R2	R1	R0	G	7 G6	G5	G4	G3	G2	G1	G0	B7	В6	<b>B</b> 5	B4	<b>B</b> 3	<b>B</b> 2	B1	B0
	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
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
lors	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Basic Colors	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
sic	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Ba	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
	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
	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
e		0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
scal	dark	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ay :	1				:	:								:											
Red gray scale	$\downarrow$				:	:								:								-			
Rec	bright	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		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	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	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
ale		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
SS	dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
угау	Î					:								:								:			
Green gray scale	<b>↓</b>					:								:								:			
jre	bright	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	_	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	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	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
e		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
sca	dark	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 gray scale	1					:								:								:			
90 90	<b>\</b>		_			:	_	_			_			:		_	_					: .			
Blu	bright	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	<b>D</b> 1	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

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9-3) 262,144 colors

This product can display equivalent of 262,144 colors in 64 gray scales by combination ②

Display	r colors						Data	sign	al (0:	Low	leve1	, 1: H	Iigh le	vel)					
Display	COIOIS	R5	R4	R3	R2	R 1	R0	G5	G4	G3	G2	G1	G0	В5	В4	В3	<b>B</b> 2	В1	В0
	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
OUS	Red	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Basic colors	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
tsic	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
B	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	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
	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<u>ə</u>		0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
sca	dark	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Red gray scale	1				:						:						:		
ط 20	<b>\</b>				:						:						:		
Re	bright	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
		1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ale		0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
y sc	dark ↑	0	0	0	0	0	0	0	U	0	. 0	1	U	0	U	U	. 0	U	U
Green gray scale	↑ 																		
sen		0	0	0	. 0	0	0	1	1	1	. 1	0	1	0	0	0	. 0	0	0
Ğre	bright	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diack	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
ale	dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
S	† ↑	Ŭ					ŭ	Ů					ŭ	ľ		·		•	Ū
gra	j										:						:		
Blue gray scale	bright	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
B	53.6	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1



## 9-4) DISPLAY POSITIONS

The following table is the coordinates per pixel (See " 9-5) SCANNING DIRECTIONS".).

C (0,	0)					
R G	В					
	- 1 <del>-1-1</del> 0					
C( 0 0)	C( 1 0)		C( ¥ 0)		C(709 0)	C(700 0)
C( 0, 0)	C( 1, 0)	22 32 53	C( X, 0)	81 MHZ	C(798, 0)	C(799, 0)
C( 0, 1)	C( 1, 1)	• • •	C( X, 1)	• • •	C(798, 1)	C(799, 1)
:•				•		5.53
			•		9.00	
				•		3.€1
C( 0, Y)	C( 1, Y)		C( X, Y)		C(798, Y)	C(799, Y)
		•		•		
				• • •		•
		•		•		
C( 0, 598)	C( 1, 598)	• • •	C( X, 598)		C(798, 598)	C(799, 598)
C( 0, 599)	C( 1, 599)		C( X, 599)		C(798, 599)	C(799, 599)

#### 9-5) SCANNING DIRECTIONS

The following figures are seen from a front view. Also the arrow shows the direction of scan.

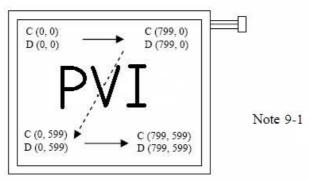


Figure 1. Normal scan (DPS: Low or Open)

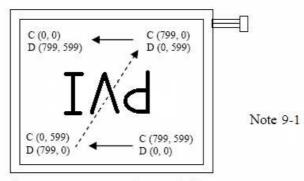


Figure 2. Reverse scan (DPS: High)

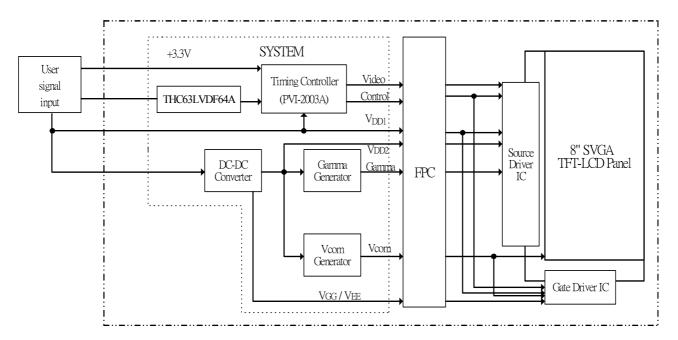
Note1: Meaning of C (X, Y) and D (X, Y)

C (X, Y): The coordinates of the display position (See " 9-4) DISPLAY POSITIONS".)

D (X, Y): The data number of input signal for LCD panel signal processing board



## 10. TFT-module Block Diagram





## 11. Input signal timing:

DENB pin have high priority than SYNC mode(HSVC+VSYNC). When IC only use SYNC pin, DENB pin have to connect to ground.

## (A) Timing Specifications (DENB Mode):

Item	Symbol	Min.	Тур.	Max.	Unit	Remark
Eromo Cyaling Daried	+1	604 X t3	628X t3	800 X t3	-	
Frame Cycling Period	t1	14	16.58	20	ms	
Vertical Display Period	t2	600 X t3	600 X t3	600 X t3	-	
Harimantal Comming Time	42	920 X t5	1056 X t5	1064 X t5	-	
Horizontal Scanning Time	t3	24	26.4	33	$\mu$ s	
Horizontal Display Period	t4	800 X t5	800 X t5	800 X t5	-	
Clock Cycle	t5	20	25.0	31.25	ns	
Clock High Level Time	t6	9.0	-	-	ns	
Clock Low Level Time	t7	9.0	-	-	ns	
Hold time	t8	4.0	-	-	ns	
Set-up time	t9	5.0	-	-	ns	

## (B) Timing Specifications (SYNC Mode)

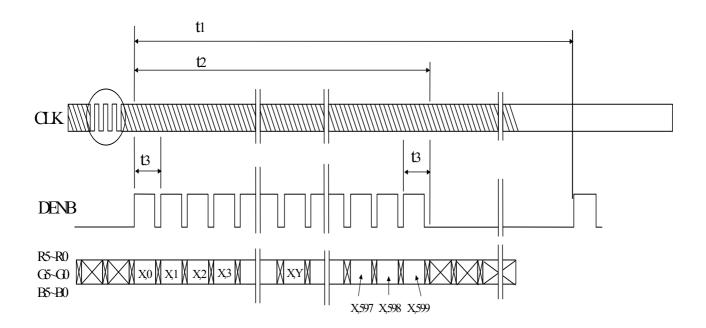
	Item		Min.	Тур.	Max.	Unit	Remark
HSYNC	Period	Нр	24	26.4	33	us	
			920	1056	1064	tc	
	Display period	Hdp	800	800	800	tc	
	Pulse width	Hpw	12	128	202	tc	
	Back-porch	Hbp	12	86	202	tc	
	Front-porch	Hfp	42	42	42	tc	
	Hpw+Hbp		214	214	214	tc	
	Hsync-CLK	Hhc	10	-	Tc-10	ns	
	Vsync-Hsync	Hvh	0	0	200	tc	
VSYNC	Period	Vp	14	16.58	20	ms	Note 1
	(Frame cycling period)		604	628	800	Нр	Note 1
	Display period	Vdp	600	600	600	Нр	
	Pulse width	Vpw	2	4	27	Нр	
	Back-porch	Vbp	0	23	25	Нр	
	Front-porch	Vfp	1	1	1	Нр	
	Vpw+Vbp		27	27	27	Нр	

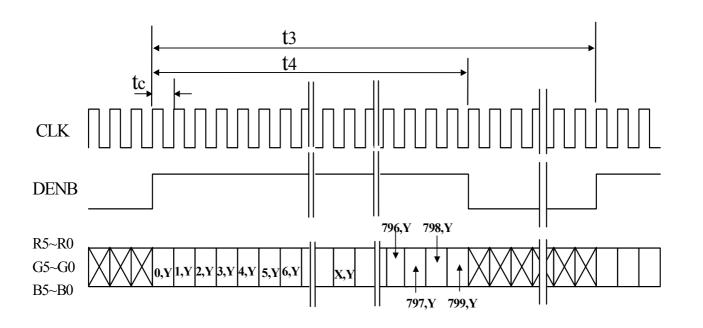
Note 1: Frame cycling period is optimum in 16.58ms.(60HZ)

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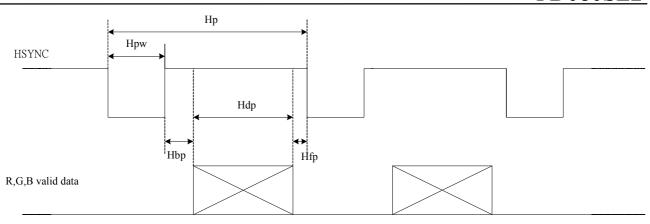


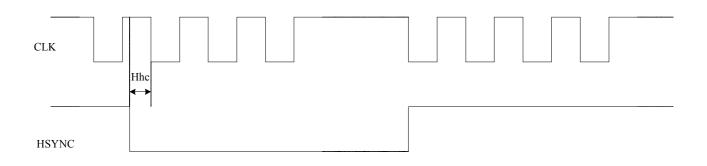
(C)Timing Chart:

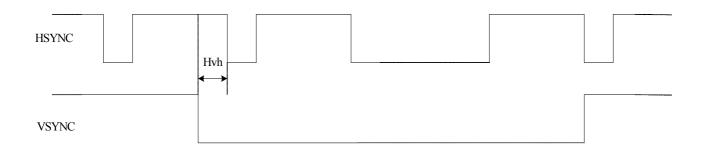




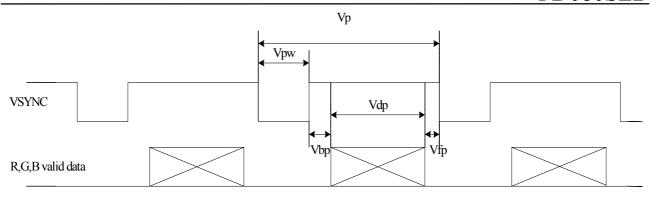


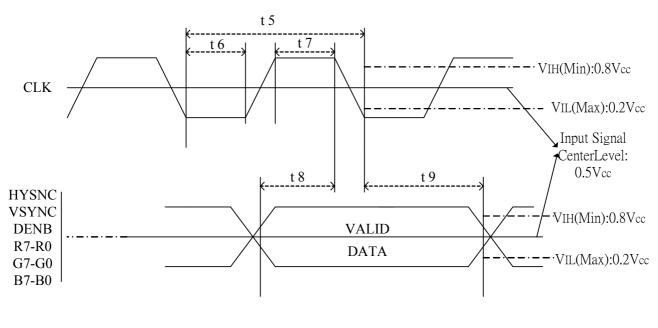


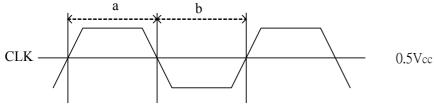








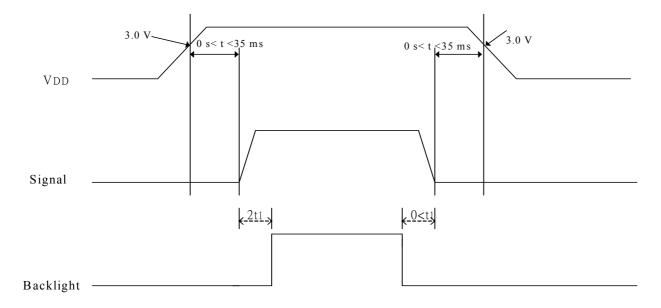




Duty (a,b):  $50 \pm 10\%$ 



## 12. Power On Sequence



- 1. The supply voltage for input signals should be same as  $V_{DD}$
- 2. When the power is off, please keep whole signals (Hsync, Vsync, DENB, CLK, Data) low level or high impedance.

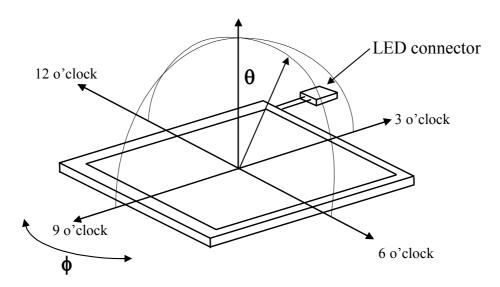
## 13. Optical Characteristics

13-1) Specification:

 $Ta = 25^{\circ}C$ 

Para	meter	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks		
Viewing	Horizontal	θ		55	60	-	deg			
Viewing Angle	Vertical	$\theta$ (to 6 'clock)	CR≥10	45	50	-	deg	Note 13-1		
Aligic	Vertical	$\theta$ (to 12 o'clock)		30	35	-	deg			
Contrast Ratio		CR	Optimum direction	TBD	TBD	-	-	Note 13-2		
Response	Rise	Tr	$\theta = 0^{\circ}$	-	15	30	ms	Note 13-4		
time	Fall	Tf	$\varphi = 0^{\circ}$	-	25	50	ms	11016 13-4		
Luminance		L	$\theta = 0^{\circ}/\varphi = 0^{\circ}$	-	(1200)	-	cd/m²	Note 13-3		
Uniformity		U	-	(75)	(80)	-	%	Note 13-6		
White Chro	motioity	X	$\theta = 0^{\circ}/\varphi = 0^{\circ}$	TBD	TBD	TBD	-	Note 13-3		
Willie Cillo	illaticity	у	$\theta = 0^{\circ}/\varphi = 0^{\circ}$	TBD	TBD	TBD	-	Note 13-3		
LED Life Time		-	25℃	TBD	-	-	hrs	Note 13-5		
Cross Talk l	Ratio	CTK	-	-	-	3.5	%	Note 13-7		

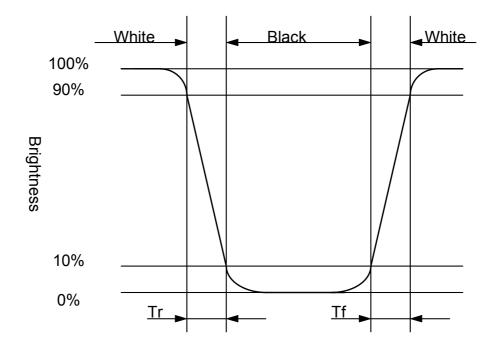
Note 13-1: The definitions of viewing angles are as follows.



Note 13-2: The definition of contrast ratio  $CR = \frac{Luminance at gray level 63}{Luminance at gray level 0}$ 

Note 13-3: Topcon BM-7 (fast) luminance meter 1° field of view is used in the testing (after 20~30 minutes operation).

Note 13-4: Definition of Response Time Tr and Tf:



Note 13-5: The "LED Life time" is defined as the module brightness decrease to 50% original Brightness that the ambient temperature is  $25^{\circ}$ C and  $I_{LED}$  =150mA.

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Note 13-6: The uniformity of LCD is defined as

The Minimum Brightness of the 9 testing Points

The Maximum Brightness of the 9 testing Points

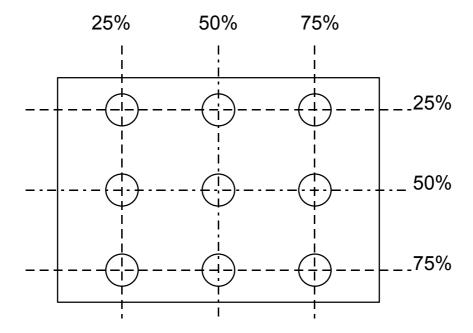
Luminance meter: BM-5A or BM-7 fast(TOPCON)

Measurement distance: 500 mm +/- 50 mm

Ambient illumination : < 1 Lux

Measuring direction: Perpendicular to the surface of module

The test pattern is white (Gray Level 63).



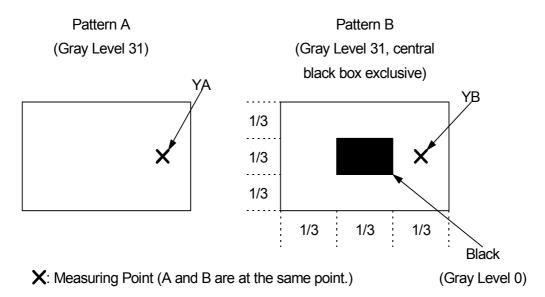
Note 13-7: Cross Talk (CTK) = 
$$\frac{|YA-YB|}{YA} \times 100\%$$

YA: Brightness of Pattern A YB: Brightness of Pattern B

Luminance meter : BM 5A (TOPCON) Measurement distance : 500 mm +/- 50 mm

Ambient illumination : < 1 Lux

Measuring direction: Perpendicular to the surface of module







#### 14. Handling Cautions

## 14-1) Mounting of module

- a) Please power off the module when you connect the input/output connector.
- b) Polarizer which is made of soft material and susceptible to flaw must be handled carefully.
- c) Protective film (Laminator) is applied on surface to protect it against scratches and diets. It is recommended to peel off the laminator before use and taking care of static electricity.

## 14-2) Precautions in mounting

- a) When metal part of the TFT-LCD module (shielding lid and rear case) is soiled, wipe it with soft dry cloth.
- b) Wipe off water drops or finger grease immediately. Long contact with water may cause discoloration or spots.
- c) TFT-LCD module uses glass which breaks or cracks easily if dropped or bumped on hard surface. Please handle with care.
- d) Since CMOS LSI is used in the module. So take care of static electricity and earth yourself when handling.

#### 14-3) Adjusting module

- a) Adjusting volumes on the rear face of the module have been set optimally before shipment.
- b) Therefore, do not change any adjusted values. If adjusted values are changed, the specifications described may not be satisfied.

#### 14-4) Others

- a) Do not expose the module to direct sunlight or intensive ultraviolet rays for many hours.
- b) Store the module at a room temperature place.
- c) The voltage of beginning electric discharge may over the normal voltage because of leakage current from approach conductor by to draw lump read lead line around.
- d) If LCD panel breaks, it is possibly that the liquid crystal escapes from the panel.

  Avoid putting it into eyes or mouth. When liquid crystal sticks on hands, clothes or feet. Wash it out immediately with soap.
- e) Observe all other precautionary requirements in handling general electronic components.
- f) Please adjust the voltage of common electrode as material of attachment by 1 module.



## 15. Reliability Test

No	Test Item	Test Condition
1	High Temperature Storage Test	$Ta = +80^{\circ}C$ , 240 hrs
2	Low Temperature Storage Test	$Ta = -25^{\circ}C$ , 240 hrs
3	High Temperature Operation Test	$(Ta = +70^{\circ}C, 240 \text{ hrs})$
4	Low Temperature Operation Test	$Ta = -25^{\circ}C$ , 240 hrs
5	High Temperature & High Humidity	$Ta = +60^{\circ}C$ , 90%RH, 240 hrs
3	Operation Test	(No Condensation)
6	Thermal Cycling Test	-20°C ← →+80°C, 100 Cycles
0	(non-operating)	30 min 30 min
		Frequency : $10 \sim 57 \text{ H}_{Z}$
7	Vibration Test	Amplitude: 0.15 mm 58~500Hz, 1G
/	(non-operating)	Sweep time: 11 min; Test Period: 3 hrs
		(1 hr for each direction of X, Y, Z)
8	Shock Test	80G, 6ms, X,Y, Z
0	(non-operating)	1 times for each direction
		C=150pF,R=330Ω
9	Electron Static Discharge	Contact=±8KV, Air=±15KV
		10 times/terminal

Ta: ambient temperature

Note: The protective film must be removed before temperature test

## [Criteria]

In the standard conditions, there is not display function NG issue occurred. (Including: line defect, no image). All the cosmetic specification is judged before the reliability stress.





## 16. Packing

