PRIME VIEW

PM100WX1

Version : ***0.1***

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TECHNICAL SPECIFICATION

MODEL NO. : PM100WX1

☐Customer's Confirmation

Customer _____

By _____

☐PVI's Confirmation

Confirmed By _____

Prepared By _____

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Date: Nov. 21,2003

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TECHNICAL SPECIFICATION

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1.Application

This data sheet applies to a color TFT LCD module, PM100WX1.

PM100WX1 module applies to OA product, car TV(must use Analog to Digital drive board), which require high quality flat panel display. If you must use in high reliability environment can't over reliability test condition

If you use PM100WX1, Prime View advises your system sides must use PVI-2002A which one generates signal to control PM100WX1.

2. Features

. Wide VGA (800*480 pixels) resolution
. Amorphous silicon TFT LCD panel with back-light unit
. Pixel in stripe configuration
. Thin and light weight
. Display Colors：262,144 colors
. Optimum Viewing Direction：6 o'clock
. +3.3V DC supply voltage for TFT LCD panel driving
. TTL transmission interface
. Wide viewing angle
. DE (Data enable) mode 60 Hz

3.Mechanical Specifications

Parameter	Specifications	Unit
Screen Size	10 (diagonal)	inch
Display Format	800×(R, G, B)×480	dot
Display Colors	262,144	
Active Area	216.0(H)×129.6(V)	mm
Pixel Pitch	0.270(H)×0.270(V)	mm
Pixel Configuration	Stripe	
Outline Dimension	232.0(w)×144.3 (H)×6.2 (typ.) (D)	mm
Weight	TBD	g
Back-light	CCFL, 1 tube	
Surface treatment	Anti-glare and hard-coating	
Display mode	Normally white	

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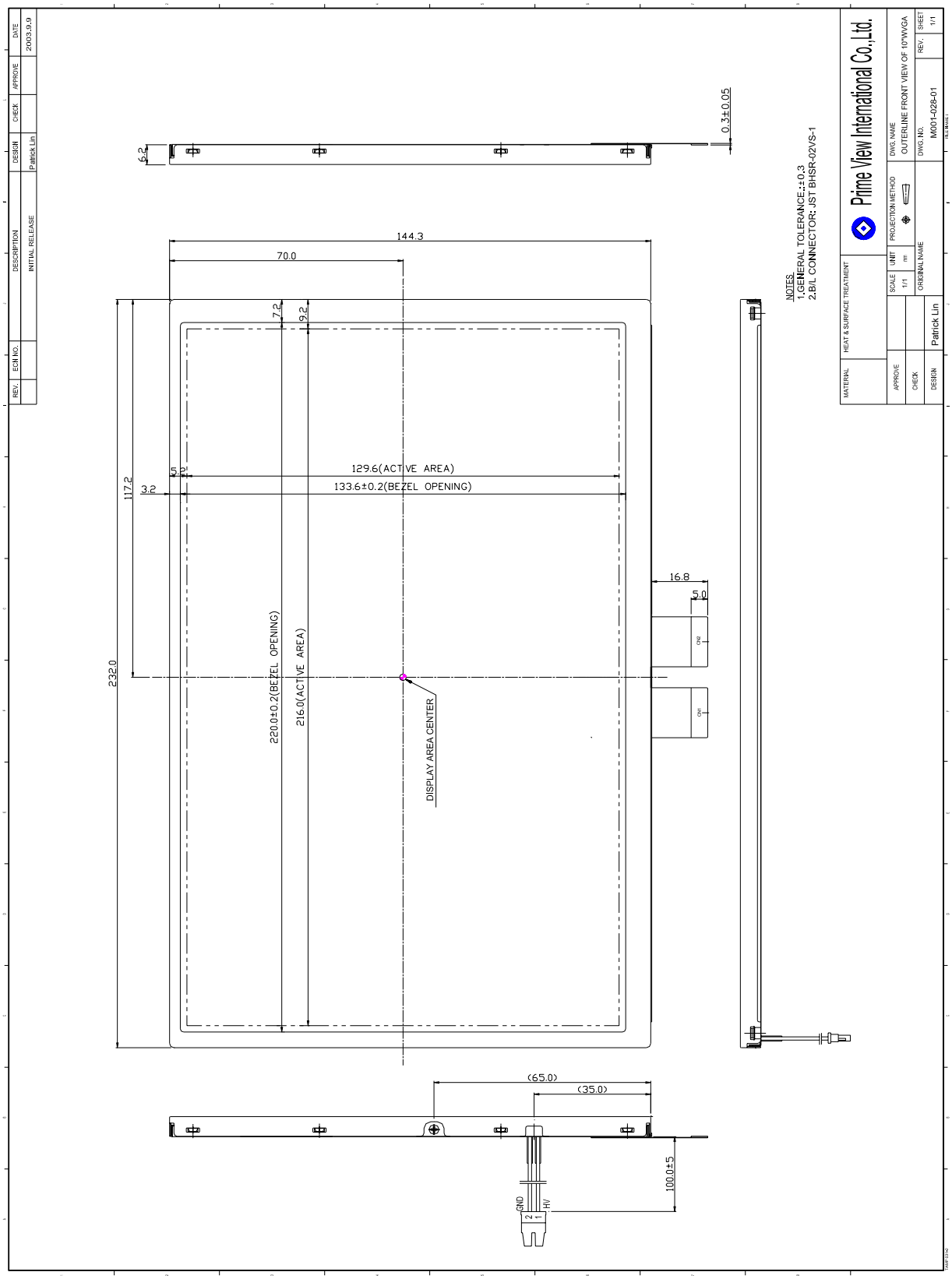
4.Mechanical Drawing of TFT-LCD Module

Outline Drawing : Front View (unit mm)



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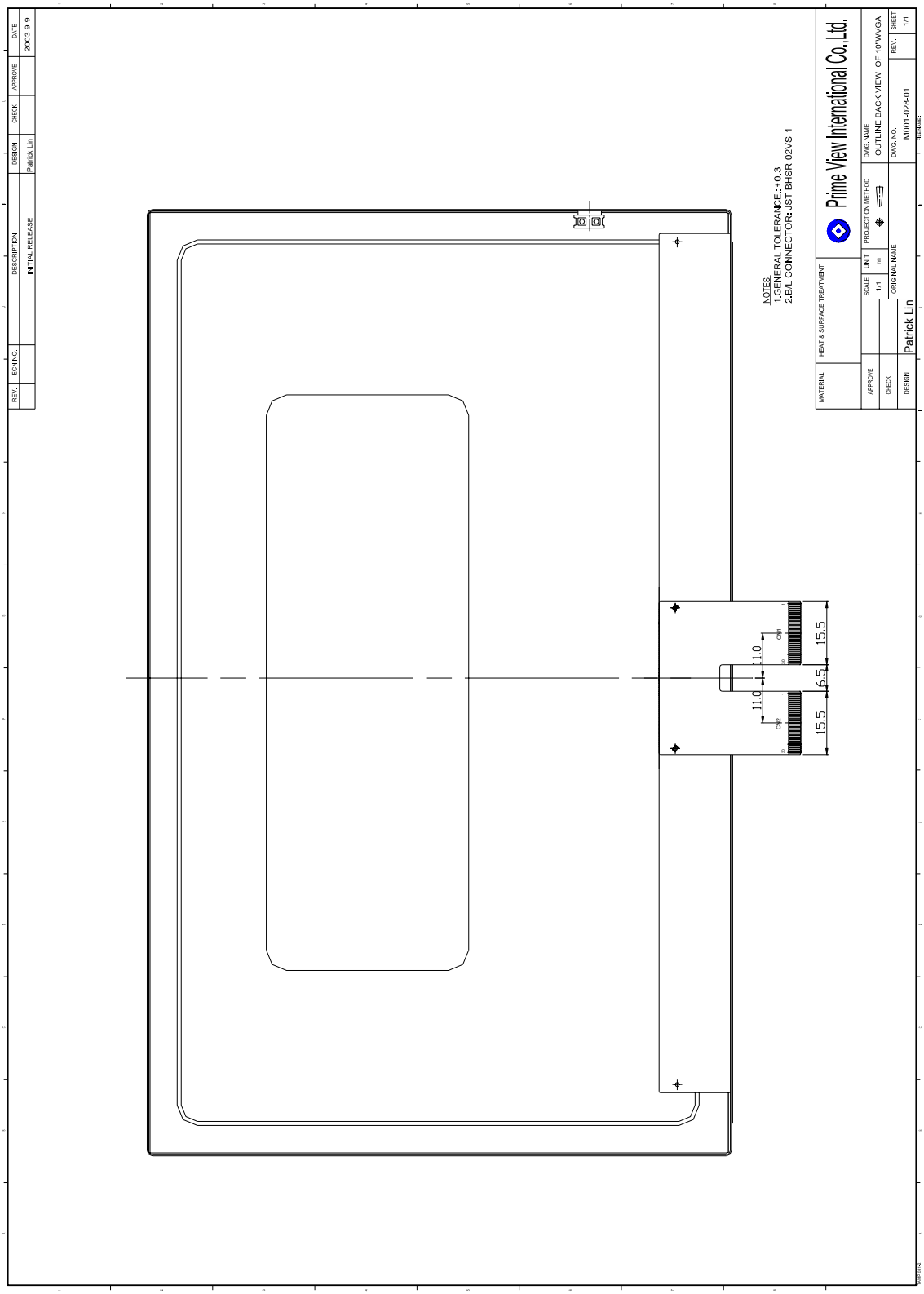
Outline Drawing : Rear View (unit mm)

Note1:Con 1 mode ELCO , 6210-30PIN



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5.Input / Output Terminals

5-1) TFT-LCD Panel Driving

Connector type : ELCO , 6210-30PIN , PIN No 30 pin, pitch=0.5mm

CN 1

Pin No.	Symbol	Function	Remark
1	DIO1	Horizontal Start Pulse 1	Note 5-1
2	VSS1	Ground	
3	VDD1	Power Supply(3.3V)	
4	CLK	Horizontal Shift Clock	
5	VSS1	Ground	
6	SHL	DIO selection	Note 5-1
7	R0	Red Data (LSB)	
8	R1	Red Data	
9	R2	Red Data	
10	R3	Red Data	
11	R4	Red Data	
12	R5	Red Data (MSB)	
13	VSS1	Ground	
14	G0	Green Data (LSB)	
15	G1	Green Data	
16	G2	Green Data	
17	G3	Green Data	
18	G4	Green Data	
19	G5	Green Data (MSB)	
20	VSS1	Ground	
21	B0	Blue Data (LSB)	
22	B1	Blue Data	
23	B2	Blue Data	
24	B3	Blue Data	
25	B4	Blue Data	
26	B5	Blue Data (MSB)	
27	LD	Load output signal	Note 5-2
28	REV	Data invert control	Note 5-3
29	POL	Polarity selection	Note 5-4
30	DIO2	Horizontal Start Pulse2	Note 5-1

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CN 2

Pin No.	Symbol	Function	Remark
1	VSS2	Ground	
2	V1	Gamma Voltage 1	Note 5-10
3	V2	Gamma Voltage 2	Note 5-10
4	V3	Gamma Voltage 3	Note 5-10
5	V4	Gamma Voltage 4	Note 5-10
6	V5	Gamma Voltage 5	Note 5-10
7	V6	Gamma Voltage 6	Note 5-10
8	V7	Gamma Voltage 7	Note 5-10
9	VSS2	Ground	
10	V8	Gamma Voltage 8	Note 5-10
11	V9	Gamma Voltage 9	Note 5-10
12	V10	Gamma Voltage 10	Note 5-10
13	V11	Gamma Voltage 11	Note 5-10
14	V12	Gamma Voltage 12	Note 5-10
15	V13	Gamma Voltage 13	Note 5-10
16	V14	Gamma Voltage 14	Note 5-10
17	VSS2	Ground	
18	VDD2	Analog Voltage (10V)	Note 5-10
19	VCOM	Common Voltage	
20	XON	NC	
21	OE	Output Enable	Note 5-5
22	U/D	STV Selection	Note 5-6
23	CKV	Vertical Shift Clock	Note 5-7
24	STVU	Vertical Shift Pulse1	Note 5-6
25	STVD	Vertical Shift Pulse2	Note 5-6
26	VGG	Gate On Voltage	Note 5-8
27	GND	Ground	
28	VCC	Logic Voltage (3.3V)	
29	GND	Ground	
30	VEE	Gate Off Voltage	Note 5-9

Note 5-1: Select left or right shift

SHL	DIO1	DIO2	Shift
1	Input	Hi-Z	Left to right
0	Hi-Z	Input	Right to left

Note 5-2: Latch the polarity of outputs and switch the new data to outputs
At the rising edge (CLK) , latch the “POL” signal to control the polarity of the outputs.

Note 5-3: Control whether the Data R0~G5 are inverted or not.
When “REV=1”, these data will be inverted.
EX: “00”→”3F”, “07”→”38”, “15”→”2A”

Note 5-4: Polarity selector for dot-inversion control. Available at the rising edge of LD.
When POL=1: Even outputs range from V1~V7, and Odd outputs range from V8~V14;
When POL=0: Even outputs range from V8~V14, and Odd outputs range from V1~V7.

Note 5-5: If gate voltage output off, active high.

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Note 5-6: Select up or down shift

U/D	STVU	STVD	Shift
H	Hi-Z	Input	Down to Up
L	Input	Hi-Z	Up to Down

Note 5-7: Gate driver shift clock

Note 5-8: Gate on voltage, V_{GG}=27V.

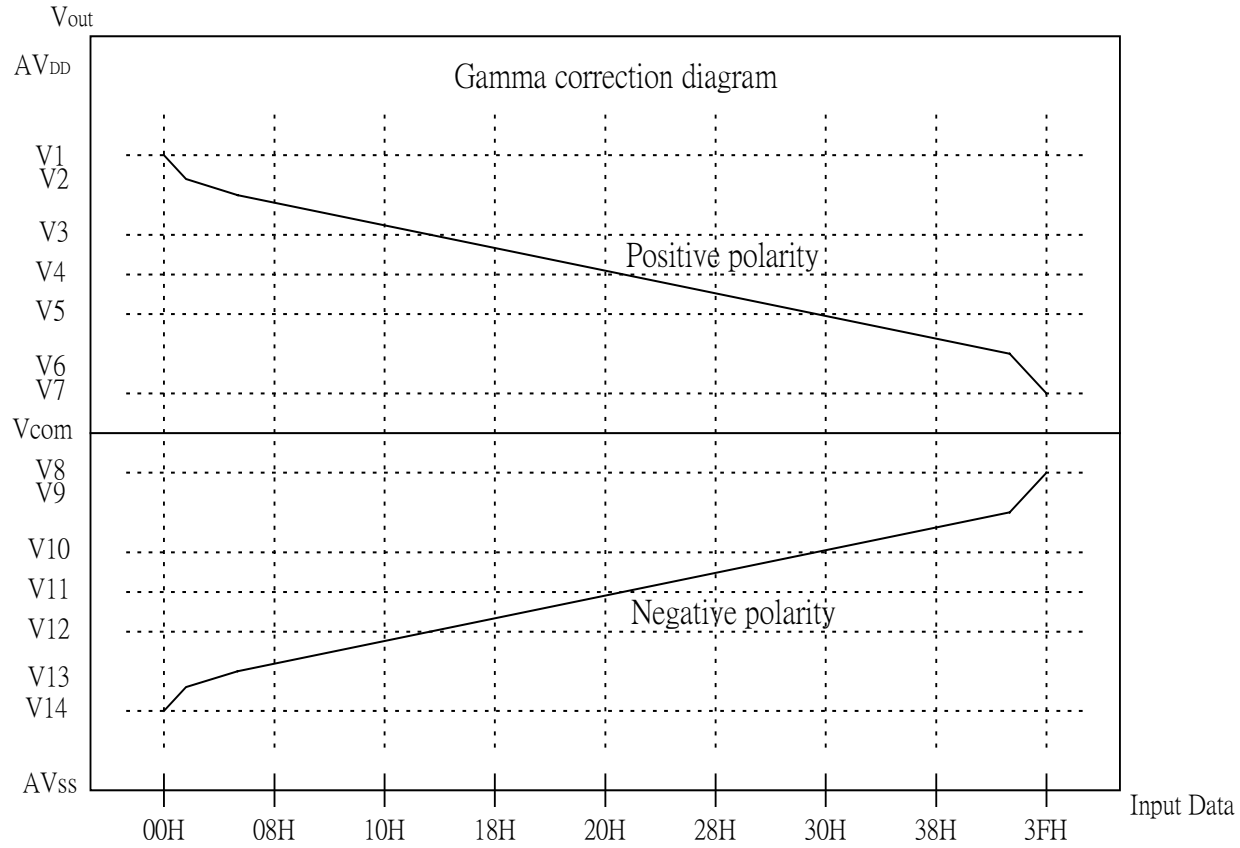
Note 5-9: Gate off voltage, V_{EE}=-10V.

Note 5-10:

1) Relationship between input data and output voltage

Relationship between input data and output voltage

The figure below shows the relationship between the input data and the output voltage with the polarity. The range of V1~V7 is for positive polarity, and V8~V14 for negative polarity. Please refer to the following page to get the relative resister value and voltage calculation method.



Remark: V_{DD2}-0.1≧V1≧V2≧V3≧V4≧V5≧V6≧V7; V8≧V9≧V10≧V11≧V12≧V13≧V14≧ AV_{SS}+0.1V.

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2) Output voltage and input data

Output Voltage VS Input Data

Data	Positive polarity Output Voltage	Negative polarity Output Voltage
00H	V1	V14
01H	V2=V3+(V1-V3) × 58 / 64.4	V13=V14+(V12-V14) × 6.4 / 64.4
02H	V3+(V1-V3) × 52 / 64.4	V14+(V12-V14) × 12.4 / 64.4
03H	V3+(V1-V3) × 46.4 / 64.4	V14+(V12-V14) × 18 / 64.4
04H	V3+(V1-V3) × 41.2 / 64.4	V14+(V12-V14) × 23.2 / 64.4
05H	V3+(V1-V3) × 36.4 / 64.4	V14+(V12-V14) × 28 / 64.4
06H	V3+(V1-V3) × 32 / 64.4	V14+(V12-V14) × 32.4 / 64.4
07H	V3+(V1-V3) × 27.6 / 64.4	V14+(V12-V14) × 36.8 / 64.4
08H	V3+(V1-V3) × 23.6 / 64.4	V14+(V12-V14) × 40.8 / 64.4
09H	V3+(V1-V3) × 19.6 / 64.4	V14+(V12-V14) × 44.8 / 64.4
0AH	V3+(V1-V3) × 16.4 / 64.4	V14+(V12-V14) × 48 / 64.4
0BH	V3+(V1-V3) × 13.2 / 64.4	V14+(V12-V14) × 51.2 / 64.4
0CH	V3+(V1-V3) × 10.4 / 64.4	V14+(V12-V14) × 54 / 64.4
0DH	V3+(V1-V3) × 7.6 / 64.4	V14+(V12-V14) × 56.8 / 64.4
0EH	V3+(V1-V3) × 4.8 / 64.4	V14+(V12-V14) × 59.6 / 64.4
0FH	V3+(V1-V3) × 2.4 / 64.4	V14+(V12-V14) × 62 / 64.4
10H	V3	V12
11H	V4+(V3-V4) × 19.6 / 22	V12+(V11-V12) × 2.4 / 22
12H	V4+(V3-V4) × 17.6 / 22	V12+(V11-V12) × 4.4 / 22
13H	V4+(V3-V4) × 15.6 / 22	V12+(V11-V12) × 6.4 / 22
14H	V4+(V3-V4) × 13.6 / 22	V12+(V11-V12) × 8.4 / 22
15H	V4+(V3-V4) × 12 / 22	V12+(V11-V12) × 10 / 22
16H	V4+(V3-V4) × 10.4 / 22	V12+(V11-V12) × 11.6 / 22
17H	V4+(V3-V4) × 8.8 / 22	V12+(V11-V12) × 13.2 / 22
18H	V4+(V3-V4) × 7.6 / 22	V12+(V11-V12) × 14.4 / 22
19H	V4+(V3-V4) × 6.4 / 22	V12+(V11-V12) × 15.6 / 22
1AH	V4+(V3-V4) × 5.2 / 22	V12+(V11-V12) × 16.8 / 22
1BH	V4+(V3-V4) × 4 / 22	V12+(V11-V12) × 18 / 22
1CH	V4+(V3-V4) × 3.2 / 22	V12+(V11-V12) × 18.8 / 22
1DH	V4+(V3-V4) × 2.4 / 22	V12+(V11-V12) × 19.6 / 22
1EH	V4+(V3-V4) × 1.6 / 22	V12+(V11-V12) × 20.4 / 22
1FH	V4+(V3-V4) × 0.8 / 22	V12+(V11-V12) × 21.2 / 22

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Output Voltage VS Input Data(continued)

Data	Positive polarity Output Voltage	Negative polarity Output Voltage
20H	V4	V11
21H	V5+(V4-V5) × 12 / 12.8	V11+(V10-V11) × 0.8 / 12.8
22H	V5+(V4-V5) × 11.2 / 12.8	V11+(V10-V11) × 1.6 / 12.8
23H	V5+(V4-V5) × 10.4 / 12.8	V11+(V10-V11) × 2.4 / 12.8
24H	V5+(V4-V5) × 9.6 / 12.8	V11+(V10-V11) × 3.2 / 12.8
25H	V5+(V4-V5) × 8.8 / 12.8	V11+(V10-V11) × 4 / 12.8
26H	V5+(V4-V5) × 8 / 12.8	V11+(V10-V11) × 4.8 / 12.8
27H	V5+(V4-V5) × 7.2 / 12.8	V11+(V10-V11) × 5.6 / 12.8
28H	V5+(V4-V5) × 6.4 / 12.8	V11+(V10-V11) × 6.4 / 12.8
29H	V5+(V4-V5) × 5.6 / 12.8	V11+(V10-V11) × 7.2 / 12.8
2AH	V5+(V4-V5) × 4.8 / 12.8	V11+(V10-V11) × 8 / 12.8
2BH	V5+(V4-V5) × 4 / 12.8	V11+(V10-V11) × 8.8 / 12.8
2CH	V5+(V4-V5) × 3.2 / 12.8	V11+(V10-V11) × 9.6 / 12.8
2DH	V5+(V4-V5) × 2.4 / 12.8	V11+(V10-V11) × 10.4 / 12.8
2EH	V5+(V4-V5) × 1.6 / 12.8	V11+(V10-V11) × 11.2 / 12.8
2FH	V5+(V4-V5) × 0.8 / 12.8	V11+(V10-V11) × 12 / 12.8
30H	V5	V10
31H	V7+(V5-V7) × 26.8 / 27.6	V10+(V8-V10) × 0.8 / 27.6
32H	V7+(V5-V7) × 26 / 27.6	V10+(V8-V10) × 1.6 / 27.6
33H	V7+(V5-V7) × 25.2 / 27.6	V10+(V8-V10) × 2.4 / 27.6
34H	V7+(V5-V7) × 24.4 / 27.6	V10+(V8-V10) × 3.2 / 27.6
35H	V7+(V5-V7) × 23.6 / 27.6	V10+(V8-V10) × 4 / 27.6
36H	V7+(V5-V7) × 22.4 / 27.6	V10+(V8-V10) × 5.2 / 27.6
37H	V7+(V5-V7) × 21.2 / 27.6	V10+(V8-V10) × 6.4 / 27.6
38H	V7+(V5-V7) × 20 / 27.6	V10+(V8-V10) × 7.6 / 27.6
39H	V7+(V5-V7) × 18.4 / 27.6	V10+(V8-V10) × 9.2 / 27.6
3AH	V7+(V5-V7) × 16.8 / 27.6	V10+(V8-V10) × 10.8 / 27.6
3BH	V7+(V5-V7) × 14.8 / 27.6	V10+(V8-V10) × 12.8 / 27.6
3CH	V7+(V5-V7) × 12.8 / 27.6	V10+(V8-V10) × 14.8 / 27.6
3DH	V7+(V5-V7) × 10.4 / 27.6	V10+(V8-V10) × 17.2 / 27.6
3EH	V7+(V5-V7) × 6.4 / 27.6	V10+(V8-V10) × 21.2 / 27.6
3FH	V7	V8

5-2) Backlight driving

Connector type: JST BHR-02VS-1, PIN No 2 pin, pitch=4mm

Pin No	Symbol	Description	Remark
1	VL1	Input terminal (Hi voltage side)	Wire color : Pink
2	VL2	Input terminal (Low voltage side)	Wire Color : White Note 5-2

Note 5-2 : Low voltage side of backlight inverter connects with ground of inverter circuits.

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6.Absolute Maximum Ratings:

GND=0V, Ta=25℃

Parameters	Symbol	MIN.	MAX.	Unit	Remark
Supply Voltage	V_{DD1}	-0.5	5.0	V	
	V_{CC}	-0.3	7.0	V	
	V_{DD2}	-0.5	12.0	V	
	V_{GG}	-0.3	41.0	V	
	V_{EE}	V_{GG}-41	0.3	V	
Digital Input	V_{IN}	-0.5	V_{DD}+0.5	V	
Backlight Driving Voltage	V_L	-	2000	V	
Backlight Driving Frequency	F_L	0	100	KHz	
Storage Temperature	T_{ST}	-30	90	℃	
Operating Temperature	T_{OP}	-20	80	℃	

7.Electrical Characteristics

7-1) Recommended Operating Conditions:

GND = 0V，Ta = 25℃

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Voltage for Source Driver	V_{DD1}	2.7	3.3	3.6	V	
	V_{DD2}	6.5	8.4	10	V	
Supply Voltage for Gate Driver	V_{GG}	-	27	-	V	
	V_{EE}	-	-10	-	V	
	V_{CC}	2.7	3.3	3.6	V	
Digital Input Voltage	V_{IH}	$0.7V_{DD1}$	-	V_{DD1}	V	
	V_{IL}	-0.3	-	$0.3V_{DD1}$	V	
Digital Input Voltage	V_{OH}	$0.7V_{DD1}$	-	V_{DD1}	V	
	V_{OL}	-0.3	-	$0.3V_{DD1}$	V	
Common Voltage	Vcom	TBD	TBD	TBD	V	

7-2) Recommended Driving Condition for Back Light

Ta=25℃

Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Lamp Voltage	V_L		TBD		V	I_L=6mA
Lamp Current	I_L	TBD	TBD	TBD	mA	Note 7-1
Lamp Frequency	P_L	TBD	TBD	TBD	KHz	Note 7-2
Starting Voltage (25℃) (Reference Value)	Vs	TBD	TBD	TBD	Vrms	Note 7-3
Starting Voltage (0℃) (Reference Value)	Vs	TBD	TBD	TBD	Vrms	Note 7-3
Starting Voltage (-20℃) (Reference Value)	Vs	TBD	TBD	TBD	Vrms	Note 7-3

Note 7-1: In order to satisfy the quality of B/L, no matter use what kind of inverter, the output lamp current must between Min. and Max. to avoid the abnormal display image caused by B/L.

Note 7-2: The waveform of lamp driving voltage should be as closed to a perfect sine wave as possible.

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Note 7-3: This value is not output voltage of inverter.
The voltage of inverter must larger than the starting voltage.

7-3) Power Consumption

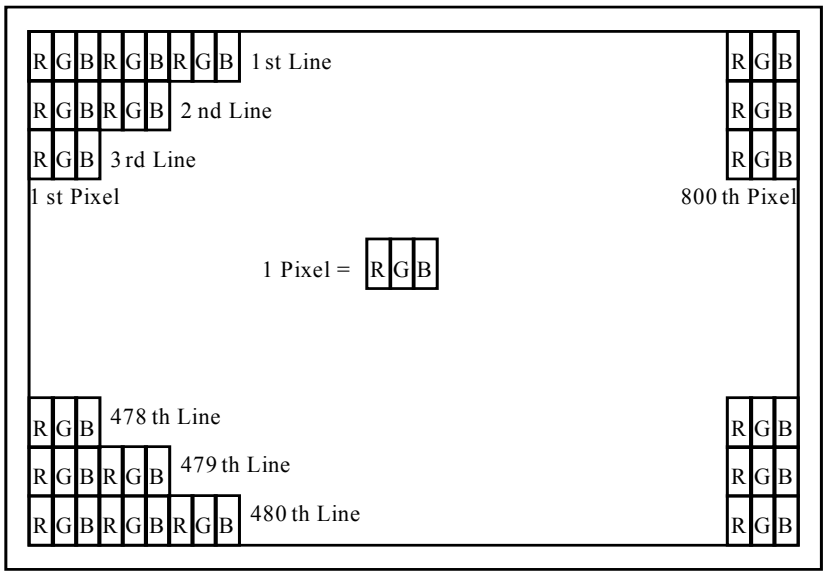
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Current for Gate Driver (Hi level)	I_{GG}	V_{GH}=+27V	TBD	TBD	mA	
Supply Current for Gate Driver (Low level)	I_{EE}	V_{EE}=-15V	TBD	TBD	mA	
Supply Current for Source Driver (Digital)	I_{DD1}	V_{DD1}=+3.3V	TBD	TBD	mA	
Supply Current for Source Driver (Analog)	I_{DD2}	V_{DD2}=+10V	TBD	TBD	mA	
Supply Current for Gate Driver (Digital)	I_{CC}	V_{CC}=+3.3V	TBD	TBD	mA	
LCD Panel Power Consumption			TBD	TBD	W	Note 7-4
Back Light Lamp Power Consumption			TBD		W	Note 7-5

Note 7-4: The power consumption for back light is not included.

Note 7-5: Back light lamp power consumption is calculated by $I_L \times V_L$.

8. Pixel Arrangement

The LCD module pixel arrangement is the stripe.



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9. Display Color and Gray Scale Reference

Color		Input Color Data																	
		Red						Green						Blue					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	Green (63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue (63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	0	0	0	0	0	0	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
Red	Red (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (01)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red (02)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Darker																		
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Brighter																		
	Red (61)	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	Red (62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red (63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
Green	Green (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green (01)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	Green (02)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	Darker																		
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Brighter																		
	Green (61)	0	0	0	0	0	0	1	1	1	1	0	1	0	0	0	0	0	0
	Green (62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	Green (63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
Blue	Blue (00)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue (01)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue (02)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	Darker																		
	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
	Brighter																		
	Blue (61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
	Blue (62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	Blue (63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

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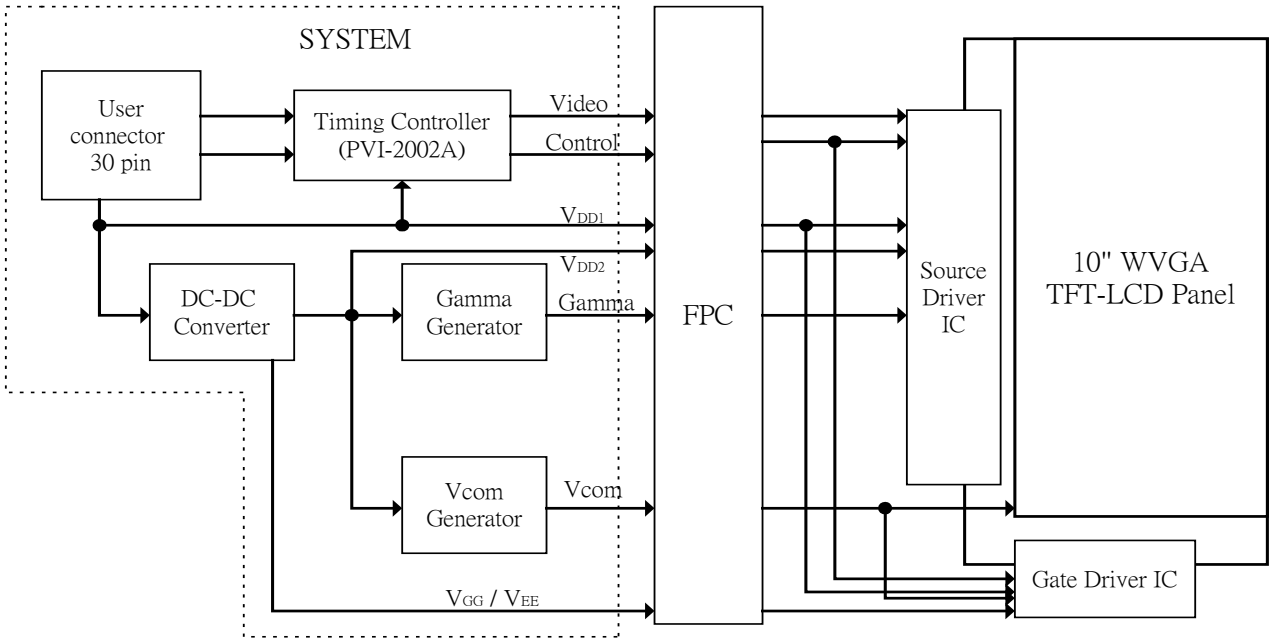
10. Block Diagram

10-1) TFT-module Block Diagram



If you use PM100WX1, you must apply PVI-2002A(Timing controller) which one can control signal to support PM100WX1.

11. Interface Timing

11.1) Timing Parameters

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Clock	Frequency	1 / Tc	-	32	40	MHz	
	High Time	T_{CH}	4	-	-	nsec	
	Low Time	T_{CL}	4	-	-	nsec	
Data	Setup Time	T_{DS}	2	-	-	nsec	
	Hold Time	T_{DH}	2	-	-	nsec	
Data Enable	Setup Time	T_{ES}	4	-	-	nsec	Note 11-1
Frame Frequency	Cycle	Tv	484	508	740	lines	
Vertical Active Display Term	Display Period	T_{VD}	-	480	-	lines	
One Line Scanning Time	Cycle	T_H	992	1056	1350	lines	
Horizontal Active Display Term	Display Period	T_{HD}	-	800	-	clocks	

Note11-1: The duration of DE (DTMG) signal must be larger than 1 clock period at every horizontal sync period.

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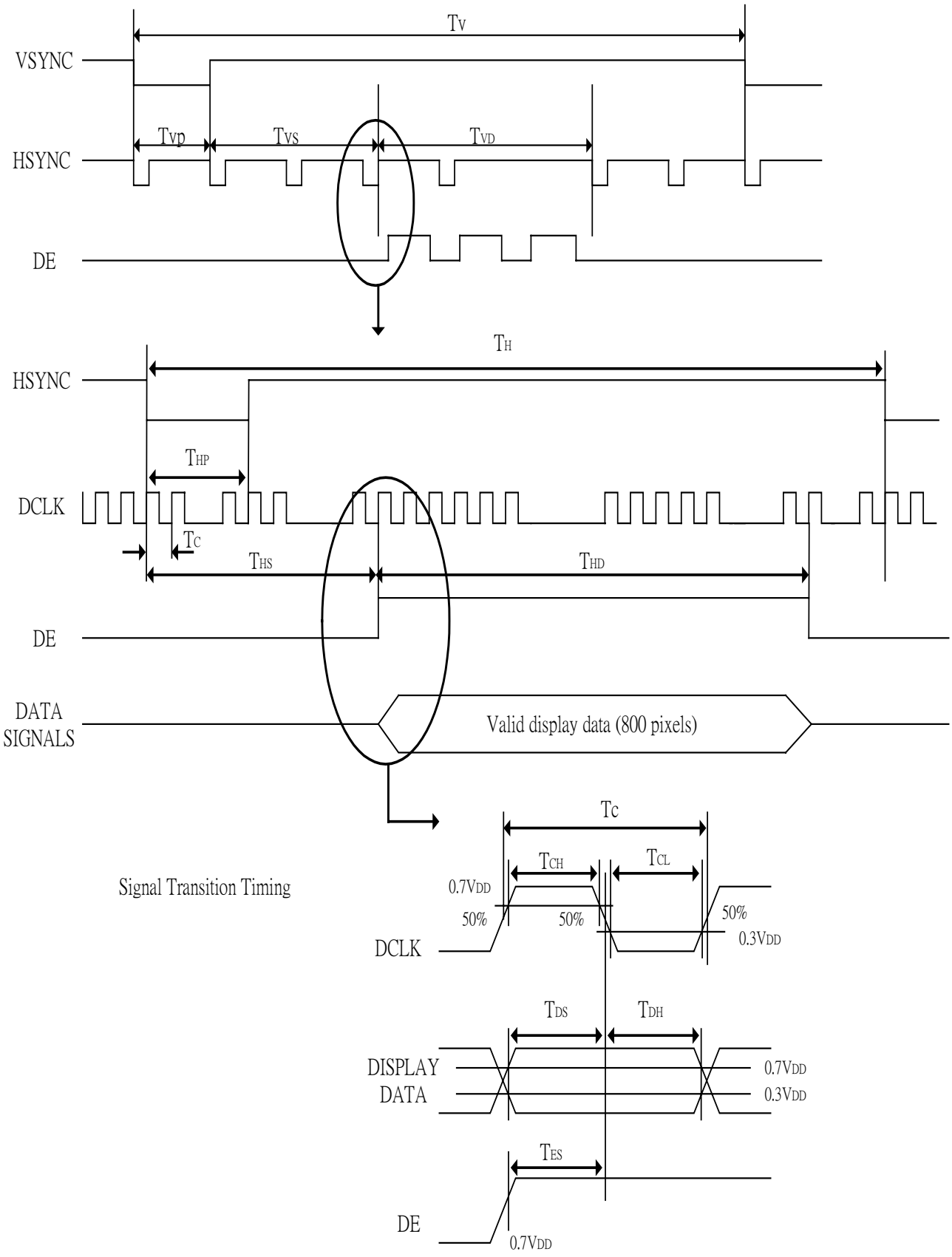
11.2) Timing Diagram of Interface Signal (SYNC & DE mode)



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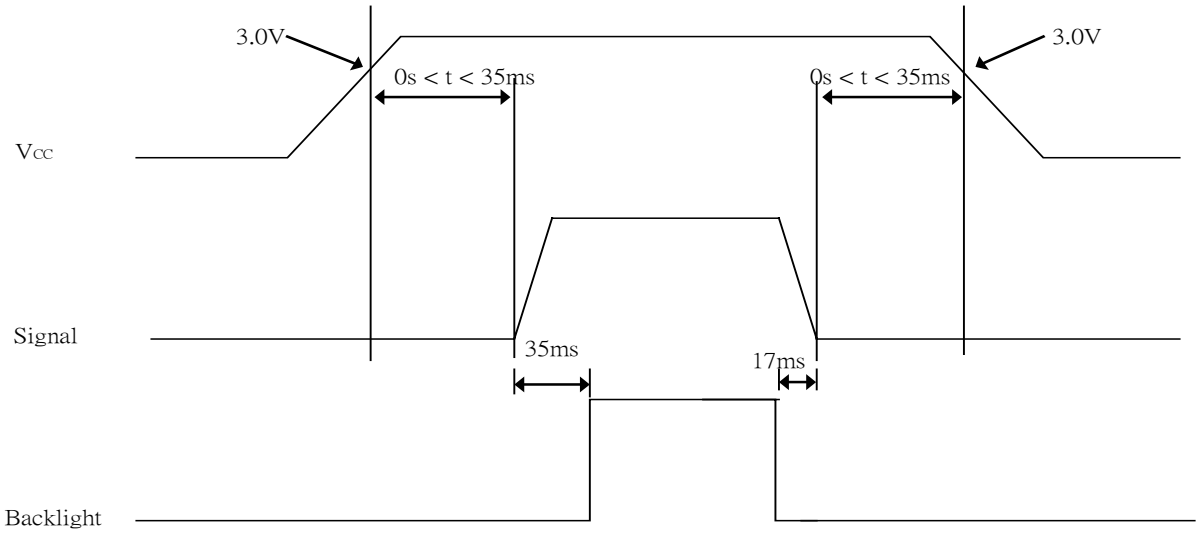
12. Power On Sequence



1. The supply voltage for input signals should be same V_{CC}.

2. When the power is off, please keep whole signals (Hsync, Vsync, CLK, Data) low level or high impedance.

13. Optical Characteristics

13-1) Specification:

Ta=25℃

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit	Remarks
Viewing Angle	Horizontal	θ	CR＞10	±55	±60		deg	Note 9-3
	Vertical	θ (to 12 o'clock)		50	55	-	deg	
		θ (to 6 o'clock)		35	40	-	deg	
Contrast Ratio		CR	At optimized viewing angle	200	400	-	-	Note 9-1
Response time	Rise	Tr	θ =0°	-	15		ms	Note 9-4
	Fall	Tf		-	25		ms	
Brightness			θ =0°/ φ =0	300	350		cd/㎡	Note 9-2
Luminance Uniformity		U		55	80	-	%	Note 9-6
Lamp Life Time				TBD	-	-	hr	
White Chromaticity		x		TBD	TBD	TBD	-	
		y		TBD	TBD	TBD	-	
Cross Talk			θ =0°	-	-	3.5	%	Note 9-5

All the optical measurement shall be executed 30 minutes after backlight being turn-on. The optical characteristics shall be measured in dark room (ambient illumination on panel surface less than 1 Lux). The measuring configuration shows as following figure.

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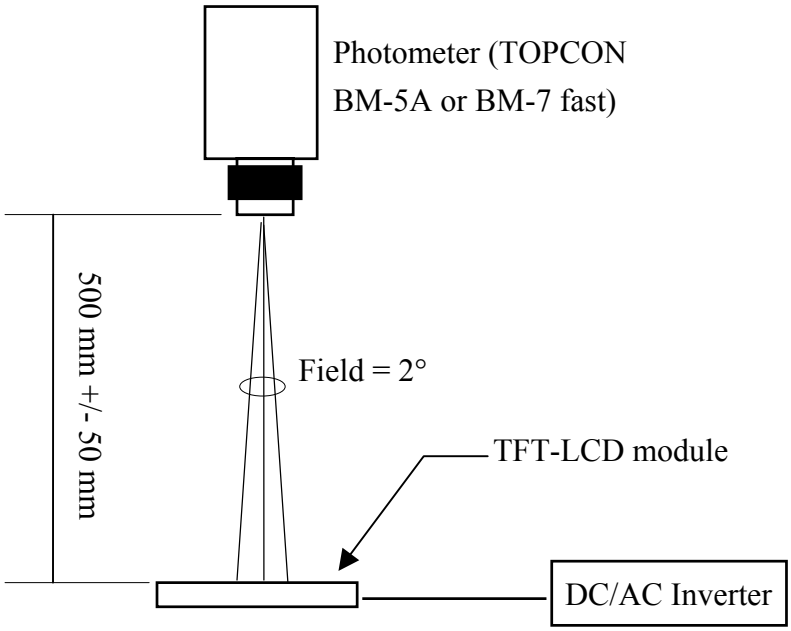
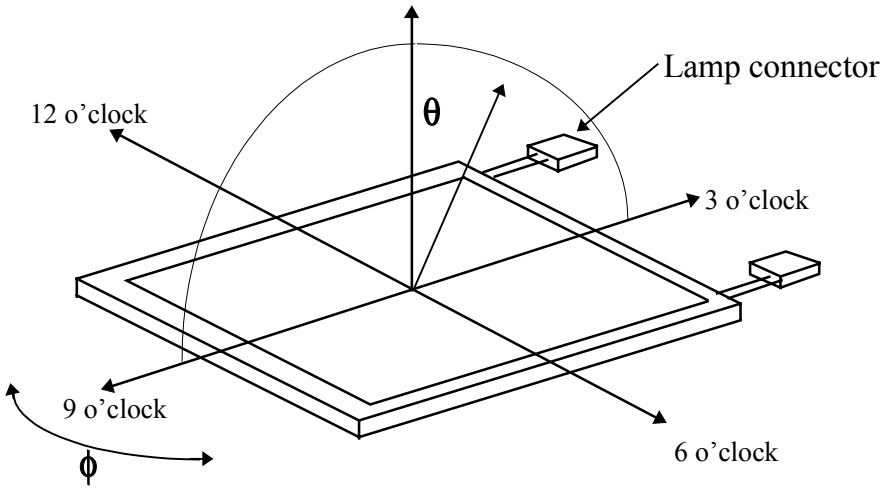


Optical characteristics measuring configuration

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



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

Note 13-3: Topcon BM-5A luminance meter 2°field of view is used in the testing (after 30 minutes' operation). The typical luminance value is measured at lamp current 12.0 mA.

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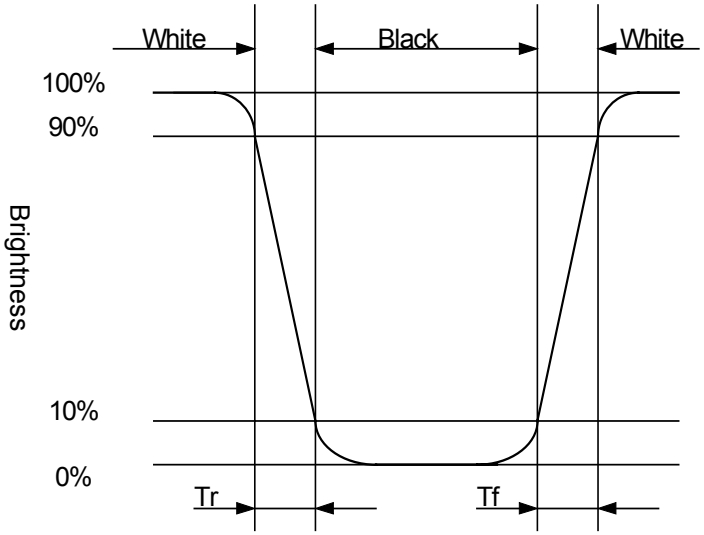
Note 13-4: Definition of Response Time T_r and T_f:



Note 13-5: The uniformity of LCD is defined as

$$U = \frac{\text{The Minimum Brightness of the 9 testing Points}}{\text{The Maximum Brightness of the 9 testing Points}}$$

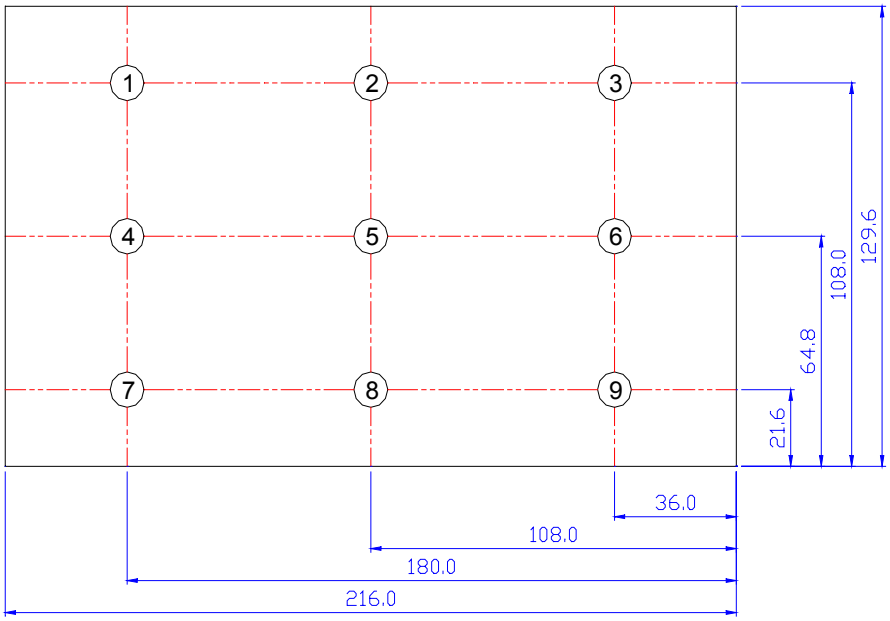
Luminance meter : BM-5A or BM-7 fast(TOPCON)

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).



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Note 13-6: Cross Talk (CTK) = $\frac{|YA-YB|}{YA} \times 100\%$

YA: Brightness of Pattern A

YB: Brightness of Pattern B

Luminance meter : BM 5A (TOPCON)

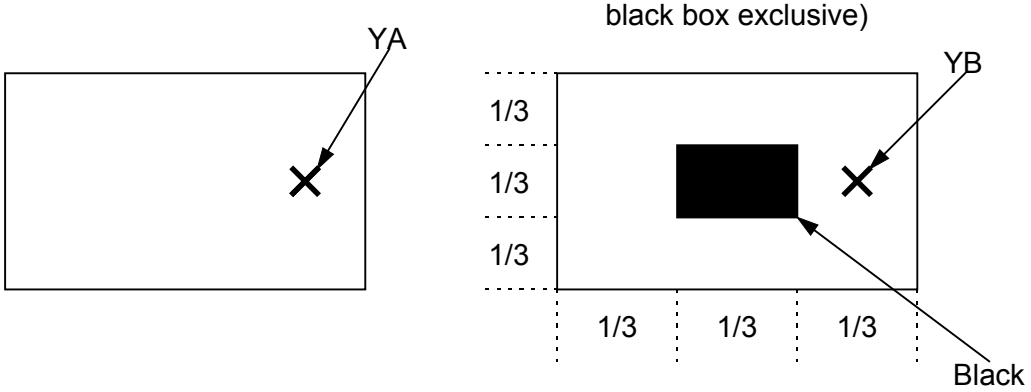
Measurement distance : 500 mm +/- 50 mm

Ambient illumination : < 1 Lux

Measuring direction : Perpendicular to the surface of module

Pattern A
(Gray Level 31)

Pattern B
(Gray Level 31, central
black box exclusive)



✕: Measuring Point (A and B are at the same point.)

(Gray Level 0)

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14. Handling Cautions

14-1) Mounting of module

a) Please power off the module when you connect the input/output connector.
b) Please connect the ground pattern of the inverter circuit surely. If the connection is not perfect, some following problems may happen possibly.
1.The noise from the backlight unit will increase.
2.The output from inverter circuit will be unstable.
3.In some cases a part of module will heat.
c) Polarizer which is made of soft material and susceptible to flaw must be handled carefully.
d) Protective film (Laminator) is applied on surface to protect it against scratches and dirts. 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.

14-5) Polorizer mark

The polorizer mark is to describe the direction of wide view angle film how to mach up with the rubbing direction.

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15. Reliability Test

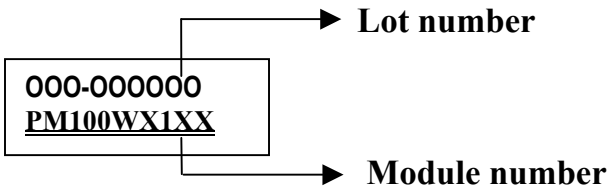
No	Test Item	Test Condition	Remark
1	High Temperature Storage Test	Ta = +80℃, 240 hrs	
2	Low Temperature Storage Test	Ta = -30℃, 240 hrs	
3	High Temperature Operation Test	Ta = +80℃, 240 hrs	
4	Low Temperature Operation Test	Ta = -20℃, 240 hrs	
5	High Temperature & High Humidity Operation Test	Ta = +60℃, 90%RH, 240 hrs (No Condensation)	
6	Thermal Cycling Test (non-operating)	0℃→+60℃, 50 Cycles 1Hr 1Hr	
7	Vibration Test (non-operating)	Frequency：10 ~ 57 H_Z, Amplitude：0.5 mm 58~500Hz, 1G Sweep time: 11 min Test Period: 3 hrs (1 hr for each direction of X, Y, Z)	
8	Shock Test (non-operating)	80G, 6ms, X,Y, Z 1 times for each direction	
9	Electrostatic Discharge Test (non-operating)	150pF, 330Ω Air: ±15KV; Contact: ±8KV 10 times/point, 9 points/panel face	

Ta: ambient temperature

[Judgement Criteria]
Under the display quality test conditions with normal operation state , there should be no change which may affect practical display function.

16. Indication of Lot Number Label

Indicated contents of the label



Contents of lot number : 1_{st}~3_{rd}—The OEM product
5_{th}—Production year : 1999⇒9, 2000⇒A, 2001⇒B……..
6_{th}—Production month : 1, 2, 3,….9, A, B, C
7_{th}~8_{th}—Production size : 10” ⇒A0
9_{th}~10_{th}— Serial numbers : 01~99

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17. Packing Diagram

TBD

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Revision History

Rev.	Issued Date	Revised Contents
0.1	Nov. 21,2003	New

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