HITACHI

Hitachi Displays,Ltd.

Date; Jun. 29, 2004

TECHNICAL DATA

TX39D80VC1GAA

CONTENTS

RECORD OF REVISION

Date	Old Sheet No. New Sheet No.	Summary

APPLICATIONS

This specification is applied to the following TFT Liquid Crystal Display Module with Back-light unit.

Note : Inverter device for Back-light is not built in and so it needs to be prepared on yourside.

・Type name	: TX39D80VC1GAA
・Display Area	: H331.2×V207.0 [mm]
・Display Pixels (Display Dots)	: H1280×V800 pixels (H(1280×3)×V800 [dots])
・Voltage of V_{DD}	: 3.3V
・Pixel Pitch	: H0.25875×V0.25875 [mm]
・Color Pixel Arrangement	: R･G･B Vertical Stripe
・Display Mode	: Transmissive & Normally White Mode
・Color Number	: 262k Colors
・Direction with Wider Viewing Angle	: Lower side of 6 o'clock (Azomuth ϕ=270°)
・Dimensions Outlines	: H344 typ×V225 typ×t7.0 max-6.5 max [mm]
・Weight	: 670 typ [g]
・Interface	: 1ch-LVDS
・Surface Polarizing Film	: Glare Polarizing Film with Antireflection Coating
・Back-light	: Two Cold Cathode Fluorescent Lamp (Lower side) Back-light inverter is not contained in Module.

1. ABSOLUTE MAXIMUM RATINGS

1.1 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		UNIT	NOTE
	MIN.	MAX.	MIN.	MAX.		
Ambient Temperature	0	40	−20	60	℃	1)
Humidity	2)		2)		%RH	1)
Vibration	−	4.9 (0.5G)	−	19.6 (2G)	m/s^2	3) ,5)
Shock	−	29.4(3G)	−	490 (50G)		4) ,5)
Corrosive Gas	NOT ACCEPTABLE		NOT ACCEPTABLE		−	
Illuminance at LCD surface	−	50,000	−	50,000	1x	

Note 1) Environmental temperature and humidity of this unit, not of system installed with this unit.
At low temperature the brightness of CFL drop and the life time of CFL become to be short.

2) Ambient temp. Ta≦40℃ : 85%RH MAX. without condensation
Ta＞40℃ : Absolute humidity must be lower than the saturated vapor of 85%RH at 40℃. without condensation

3) Vibration frequency : 20～50Hz. (Except resonance frequency)

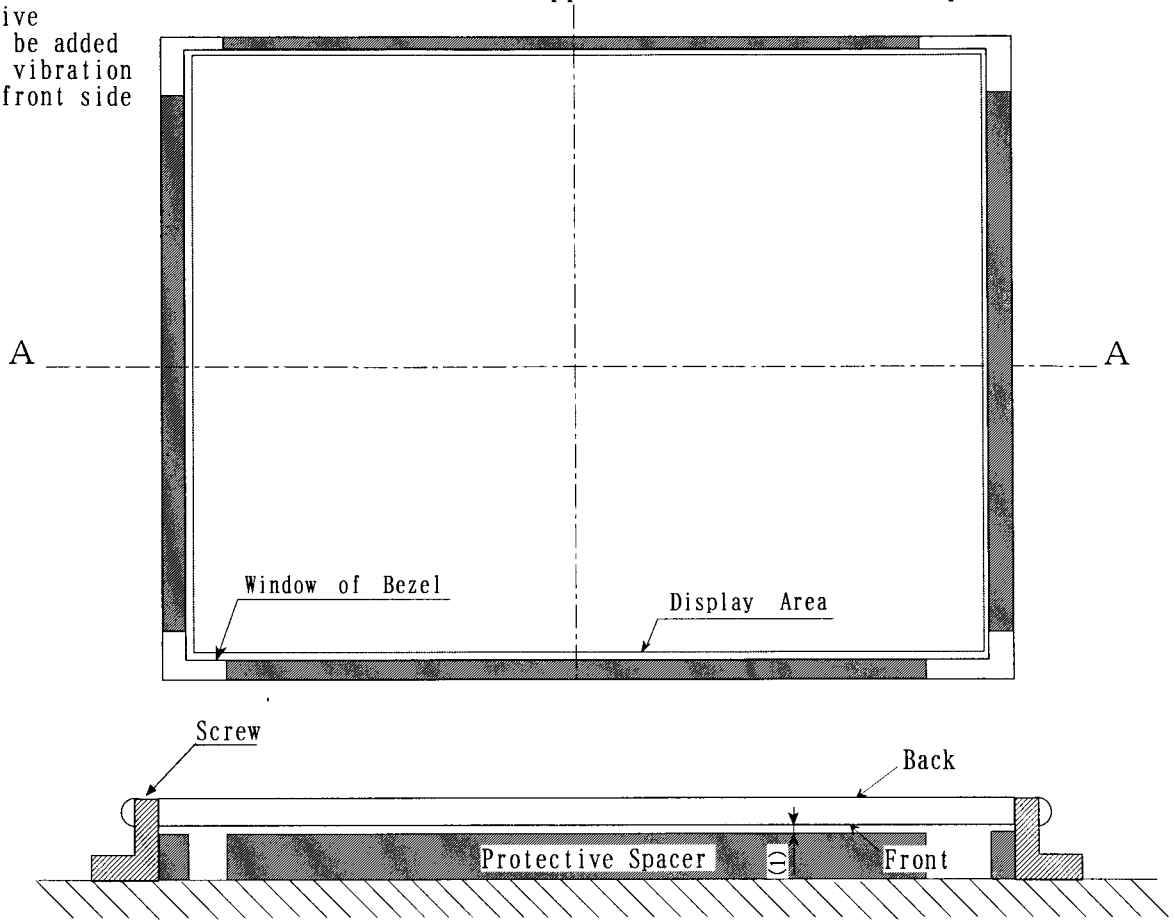
4) 7ms of pulse width.

5) With mounting protective spacer(ref.page 4-2/3)

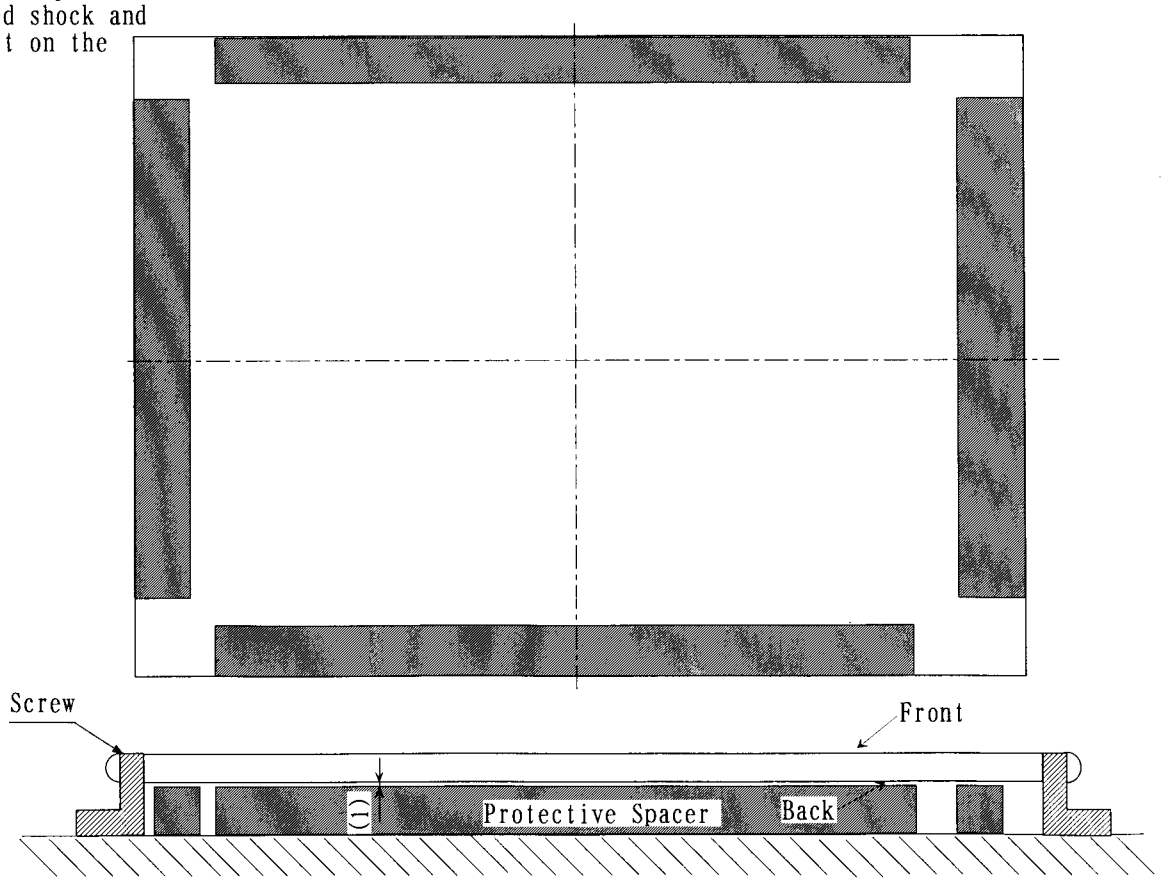
Adding protective spacer at shock & vibration test

Shaded area is to be supported with additional spacer.

(1) This protective spacer is to be added at shock and vibration test on the front side



(2) This protective spacer is to be added shock and vibration test on the other side



1.2 ELECTRICAL ABSOLUTE MAXIMUM RATINGS

(1) TFT LIQUID CRYSTAL DISPLAY MODULE

VSS=0V

ITEM	SYMBOL	MIN.	MAX.	UNIT	NOTE
Power Supply Voltage	VDD	0	4.0	V	
Electrostatic Durability	VESD0	±250		V	1)
	VESD1	± 15		kV	2), 3)

Note 1) Electric discharge constant 200pF-0Ω, 25℃-70%RH.
I/F Connector pins are subjected.
2) Electric discharge constant 200pF-250Ω, 25℃-70%RH.
3) The Surface of Metal bezel and LCD are subjected.

(2) BACK-LIGHT UNIT

GND=0V

ITEM	SYMBOL	MIN.	MAX.	UNIT
Lamp Current	I_L	0	7	mArms
Lamp Voltage	V_L	0	2000	Vrms

1.3 Connection between PC Ground and Metal frame.
Metal frame of the module shold be grounded with PC's ground in case that protection film is being peeled off while operating the module.
Unless you couned between metal frame and PC's Ground.
PC's system happen to shut down due to the influence of electrostatic discharge coused by pealing off the protection film.

2. OPTICAL CHARACTERISTICS

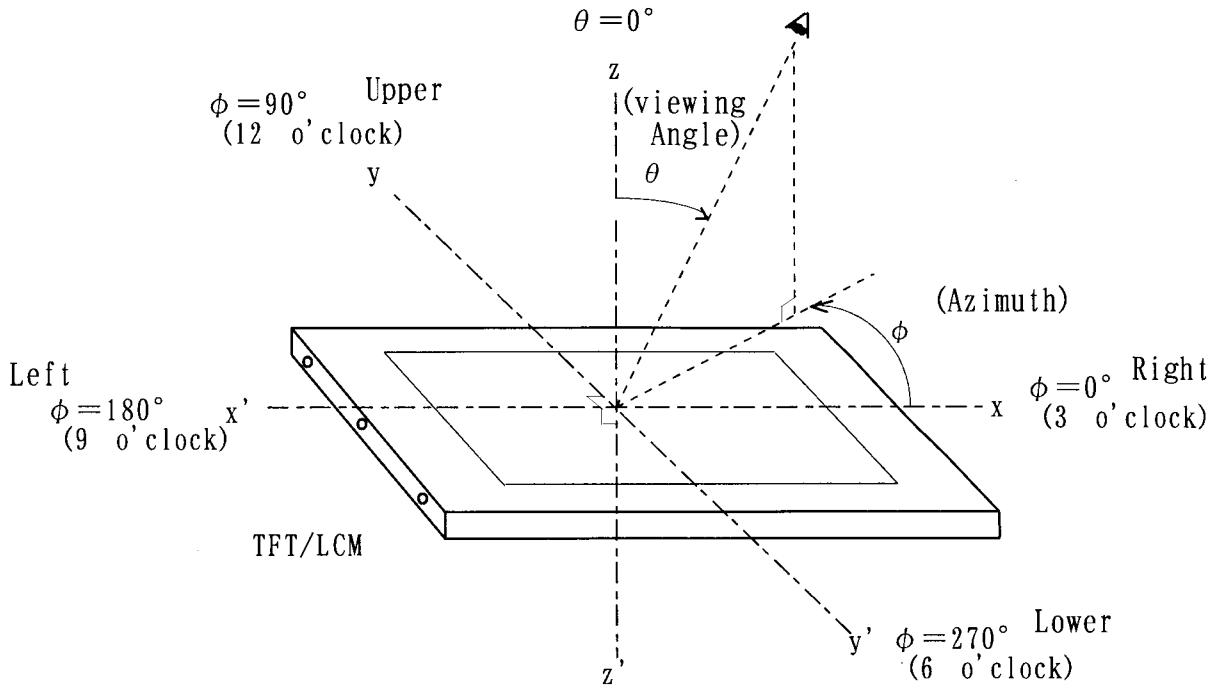
The following items are measured on the conditions that this unit operation (TFT panel and Back-light) and measuring systems are stable. (more than 30minites' operation)
The ambient light excluding The Back-light unit is nothing.

- Measuring equipment : TOPCON BM-7, Prichard 1980A, or equivalent
- Measuring point : Active area center

Temperature of LCD=25℃, V_{DD}=3.3V, f_V=60Hz, f_L=50kHz, I_L=6mA

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Contrast Ratio		CR	$\theta=0°$ Note 1)	—	600	—	—	2)
Response Time	RISE	tr		—	30	—	ms	3)
	FALL	tf		—	20	—		
Brightness(White)		Bwh		400	450	—	cd/m²	
Color of CIE	Red	x		0.54	0.57	0.60	—	
		y		0.31	0.34	0.37		
	Green	x		0.27	0.30	0.33		
		y		0.54	0.57	0.60		
	Blue	x		0.11	0.14	0.17		
		y		0.10	0.13	0.16		
	White	x		0.29	0.32	0.35		
		y		0.30	0.33	0.36		
Viewing Angle (CR≧10)	x-x	θx	$\phi=0°$	60	80	—	deg	1)
		θx'	$\phi=180°$	60	80	—		
	y-y	θy	$\phi=90°$	30	50	—		
		θy'	$\phi=270°$	40	60	—		

Note 1) Definition of Viewing Angle



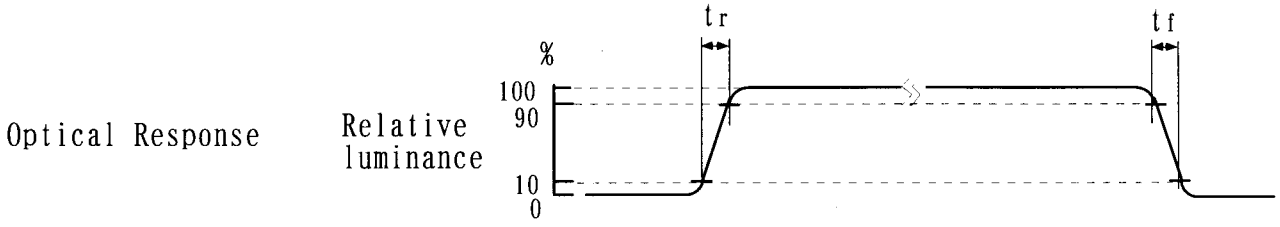
Note 2) Definition of Contrast Ratio (CR)

$$CR = \frac{\text{Brightness when displaying White raster}}{\text{Brightness when displaying Black raster}}$$

These Brightness is measured on the center of screen.

* Measurement in the darkroom.

Note 3) Definition of Response Time



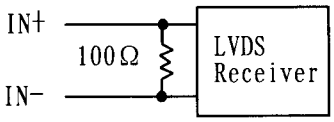
3. ELECTRICAL CHARACTERISTICS

(1) TFT LIQUID CRYSTAL DISPLAY MODULE

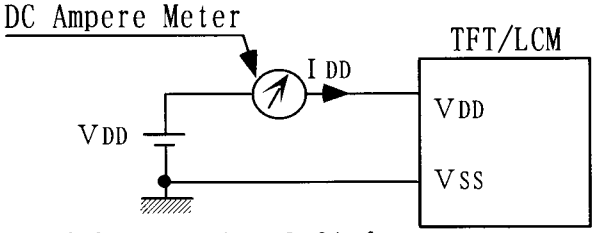
Ta=25℃, Vss=0V

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Power Supply Voltage		V_{DD}	3.0	3.3	3.6	V	
Differential Input Voltage for LVDS Receiver Threshold	Hi	V_{IH}	—	—	+100	mV	1)
	Lo	V_{IL}	-100	—	—		
Power Supply Current		I_{DD}	—	315	600	mA	2), 3)
Vsync Frequency		f_V	—	60	62	Hz	4), 5)
Hsync Frequency		f_H	—	48.7	51	kHz	4)
DCLK Frequency		f_{CLK}	58	71	73	MHz	4)

Note 1) VCM=+1.25V
VCM is common mode voltage of LVDS transmitter/receiver.
The input terminal of LVDS transmitter is terminated with 100Ω.



2) fv=60Hz, f_{CLK}=71MHz, V_{DD}=3.3V, DC Current.
Typical value is measured when displaying vertical 64 gray scale.
Maximum is measured when displaying Vertical-stripe (Black-Gray 7).



3) As this module contains 0.8A fuse, prepare current source that is enough for cutting current fuse when a truble happens. (larger than 2A.)
4) For LVDS Transmitter Input

(2) BACK-LIGHT UNIT

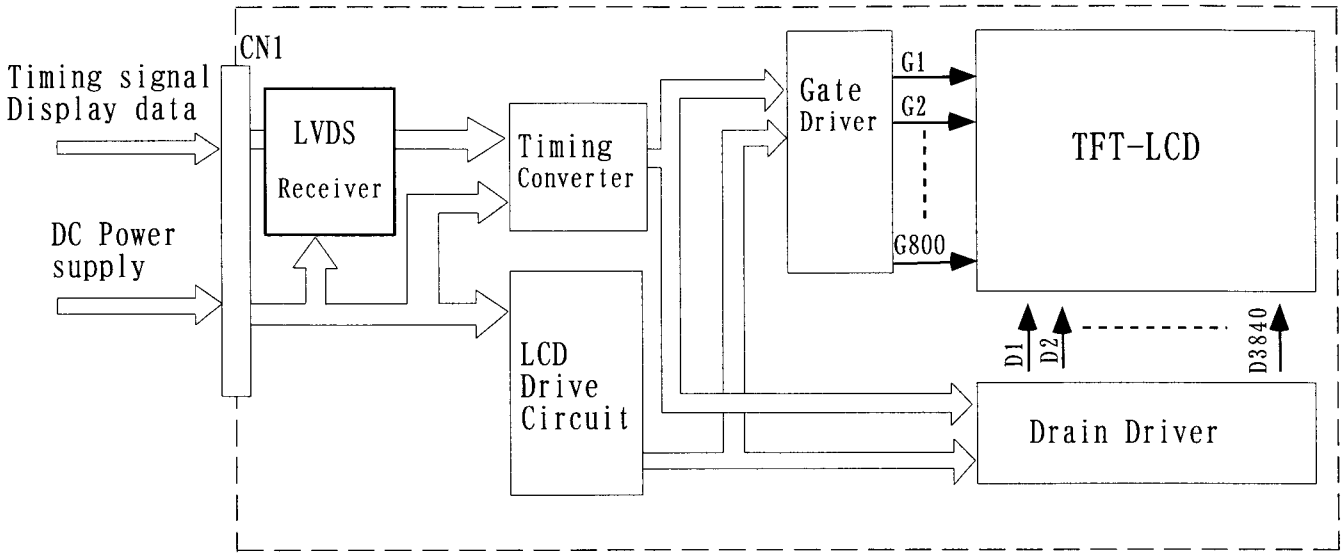
Ta=25℃, GND=0V

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Lamp Current	I_L	2.8	5.0	6.5	mArms	1), 2)
		—	—	10	mA0-peak	
Lamp Voltage	V_L	—	740	—	Vrms	
Frequency	f_L	40	—	70	kHz	3)
Starting Lamp Voltage	V_S	1150	—		Vrms	4)
		1380	—			4), 5)

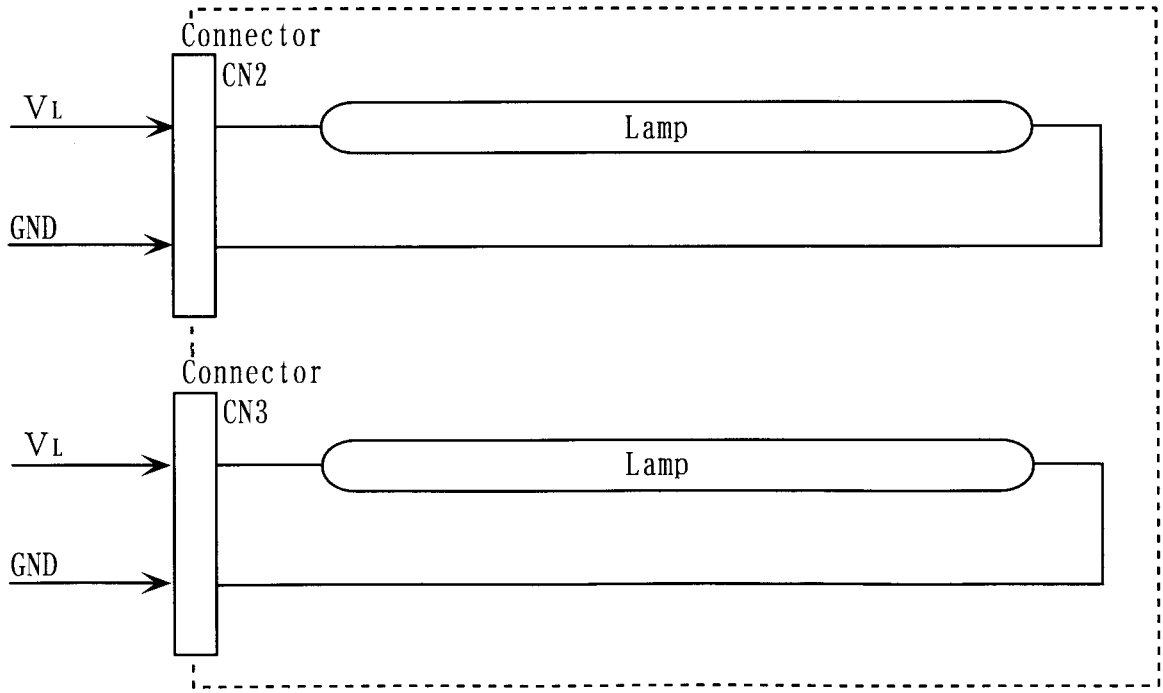
Note 1) IL is Current of GND side.
2) Higher IL cause the short life time of CFL.
3) Lamp frequency may produce interference with Hsync frequency, causing beat or flicker on the display.
4) Starting Lamp Voltage is specified to the output of inverter with ballast capacitance > 22pF.
5) Ta=0℃
6) CFL Life Time is the peried that the brightness is half as much as the initial.

4. BLOCK DIAGRAM

(1) TFT LIQUID CRYSTAL DISPLAY MODULE



(2) BACK-LIGHT UNIT



5. INTERFACE PIN CONNECTION

(1) TFT LIQUID CRYSTAL DISPLAY MODULE

CN1 《JAE FI-XB30SL-HF10》

Pin No	SYMBOL	FUNCTION
–	VSS	Ground
1		
2	VDD	Power Suply 3.3V (typical)
3		
4	VSS	Ground
5	VSS	Ground
6	VSS	Ground
7	VSS	Ground
8	ROin0-	LVDS Receiver Signal(-)
9	ROin0+	LVDS Receiver Signal(+)
10	VSS	Ground
11	ROin1-	LVDS Receiver Signal(-)
12	ROin1+	LVDS Receiver Signal(+)
13	VSS	Ground
14	ROin2-	LVDS Receiver Signal(-)
15	ROin2+	LVDS Receiver Signal(+)
16	VSS	Ground
17	CLK0-	LVDS Clock Signal(-)
18	CLK0+	LVDS Clock Signal(+)
19	VSS	Ground
20	NC	NC
21	NC	NC
22	VSS	Ground
23	NC	NC
24	NC	NC
25	VSS	Ground
26	NC	NC
27	NC	NC
28	VSS	Ground
29	NC	NC
30	NC	NC
–	VSS	Ground

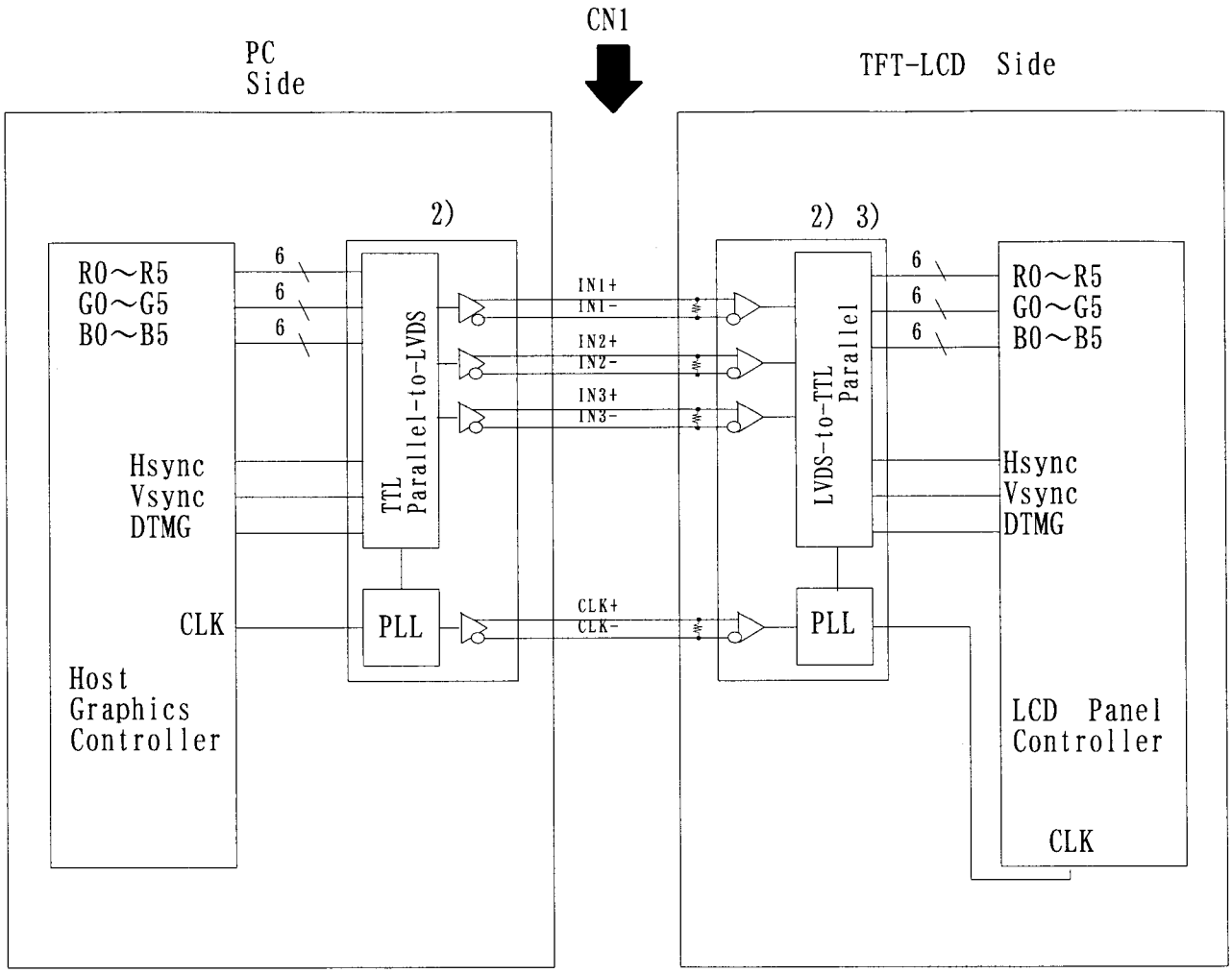
Note 1) All VSS pins should be connected to GND(0V).
Metal bezel is connected internaly to VSS.
2) All VDD pins should be connected to +3.3V.
3) All NC pins should be keeped Open.

(2) BACK-LIGHT UNIT

CN2, CN3 《JST BHSR-02VS-1》

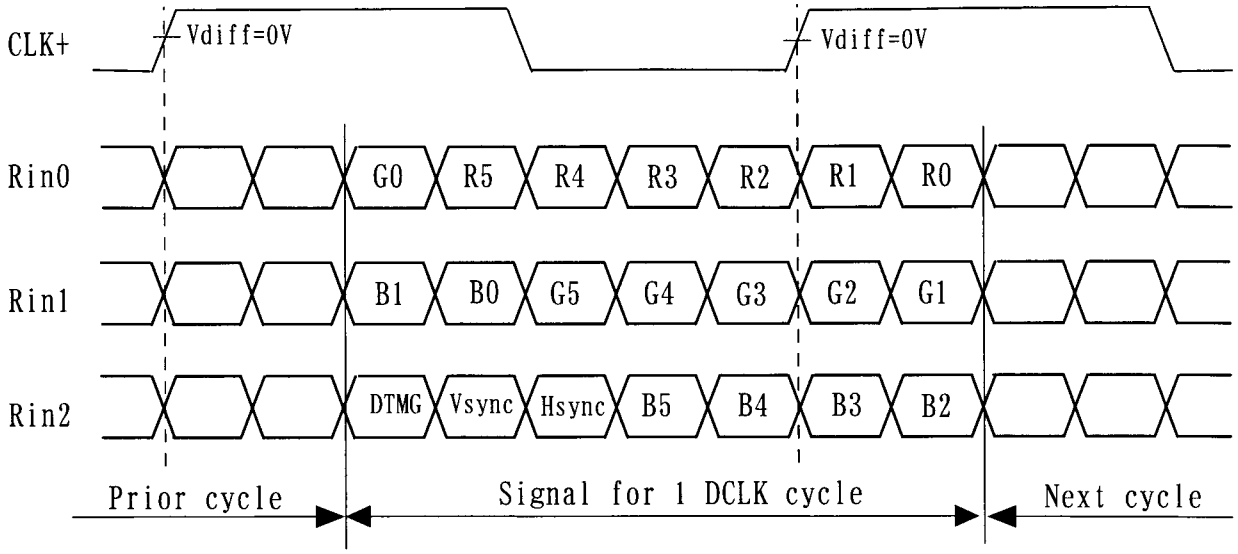
Pin No	SYMBOL	DESCRIPTION	Refelence
1	VL	Power Supply	
2	GND	GND (0V)	

LVDS INTERFACE



NOTE: 1) LVDS cable impedance should be 100 ohms per signal line when each 2-lines(+,-) is used in differential mode.
2) LVDS transmitter is using LVDS input signal (page 8-3/4).

LVDS Input Signal



CLK=(CLK+)-(CLK-)
RinX=(RinX+)-(RinX-) (X=0, 1, 2)

Pin connection in case of using SN75LVDS84

	INPUT SIGNAL	Transmitter
LVDS	R0	IN0(44)
	R1	IN1(45)
	R2	IN2(47)
	R3	IN3(48)
	R4	IN4(1)
	R5	IN5(3)
	G0	IN6(4)
	G1	IN7(6)
	G2	IN8(7)
	G3	IN9(9)
	G4	IN10(10)
	G5	IN11(12)
	B0	IN12(13)
	B1	IN13(15)
	B2	IN14(16)
	B3	IN15(18)
	B4	IN16(19)
	B5	IN17(20)
	HSYNC	IN18(22)
	VSYNC	IN19(23)
	DTMG	IN20(25)
	DCLK	CLK IN(26)

1) ( ) indicate pin NO (IC).

RELATIONSHIP BETWEEN DISPLAYED COLOR AND INPUT DATA

COLOR \ INPUT DATA		R DATA						G DATA						B DATA					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	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
	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	BLACK	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	1	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	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	BLACK	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	1	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
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	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	BLACK	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	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
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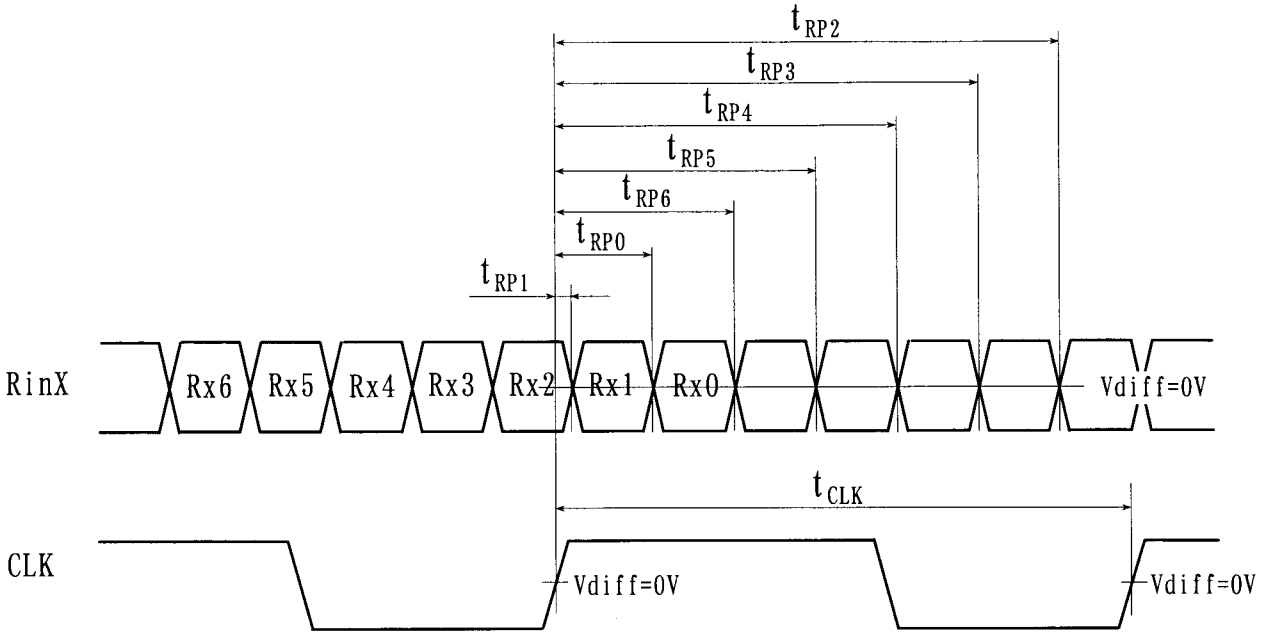
	BLUE(61)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1
	BLUE(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

Note 1) Definition of gray scale :
Color(n) --- number in parenthesis indicates gray scale level.
Larger number corresponds to brighter level.
2) Data Signal : 1:High, 0:Low

6. Interface timing

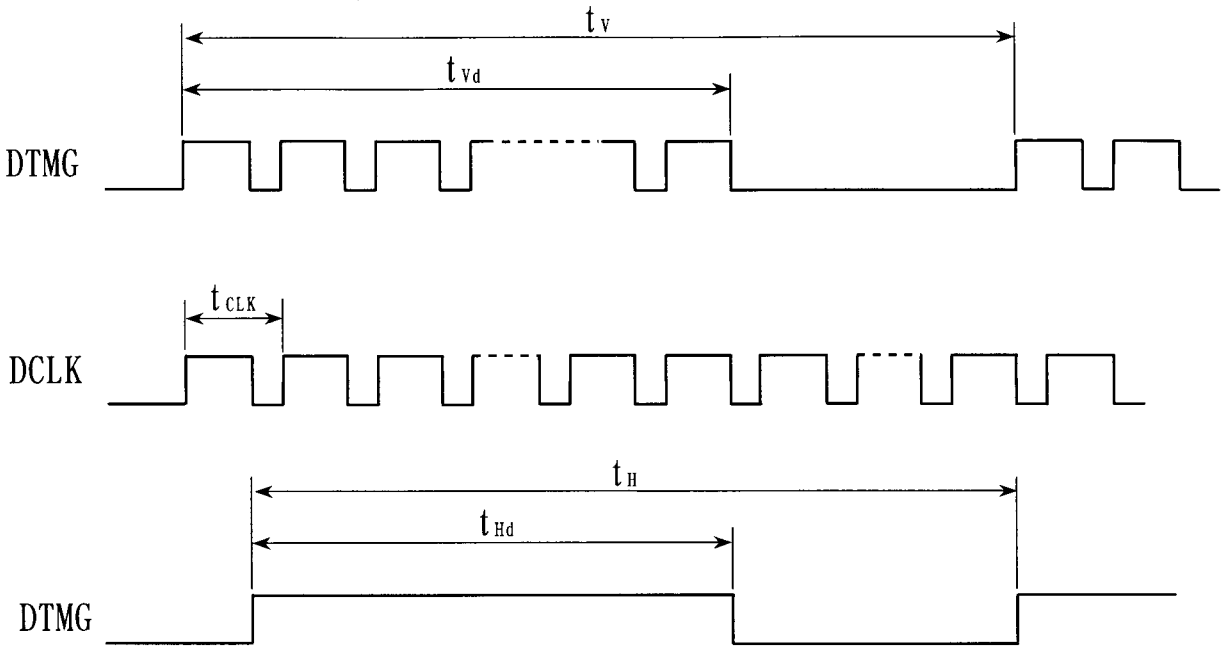
(1) LVDS receiver timing
(Interface of TFT module)



RinX=(RinX+)-(RinX-) (X=0, 1, 2)
CLK=(CLK+)-(CLK-)

ITEM		SIMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
DCLK	FREQUENCY	$1/t_{CLK}$	58	71	73	MHz	
RinX (X=0, 1, 2)	0 data position	t_{RP0}	$\frac{1}{7}t_{CLK}-0.49$	$\frac{1}{7}t_{CLK}$	$\frac{1}{7}t_{CLK}+0.49$	ns	
	1st data position	t_{RP1}	-0.49	0	+0.49		
	2nd data position	t_{RP2}	$\frac{6}{7}t_{CLK}-0.49$	$\frac{6}{7}t_{CLK}$	$\frac{6}{7}t_{CLK}+0.49$		
	3rd data position	t_{RP3}	$\frac{5}{7}t_{CLK}-0.49$	$\frac{5}{7}t_{CLK}$	$\frac{5}{7}t_{CLK}+0.49$		
	4th data position	t_{RP4}	$\frac{4}{7}t_{CLK}-0.49$	$\frac{4}{7}t_{CLK}$	$\frac{4}{7}t_{CLK}+0.49$		
	5th data position	t_{RP5}	$\frac{3}{7}t_{CLK}-0.49$	$\frac{3}{7}t_{CLK}$	$\frac{3}{7}t_{CLK}+0.49$		
	6th data position	t_{RP6}	$\frac{2}{7}t_{CLK}-0.49$	$\frac{2}{7}t_{CLK}$	$\frac{2}{7}t_{CLK}+0.49$		

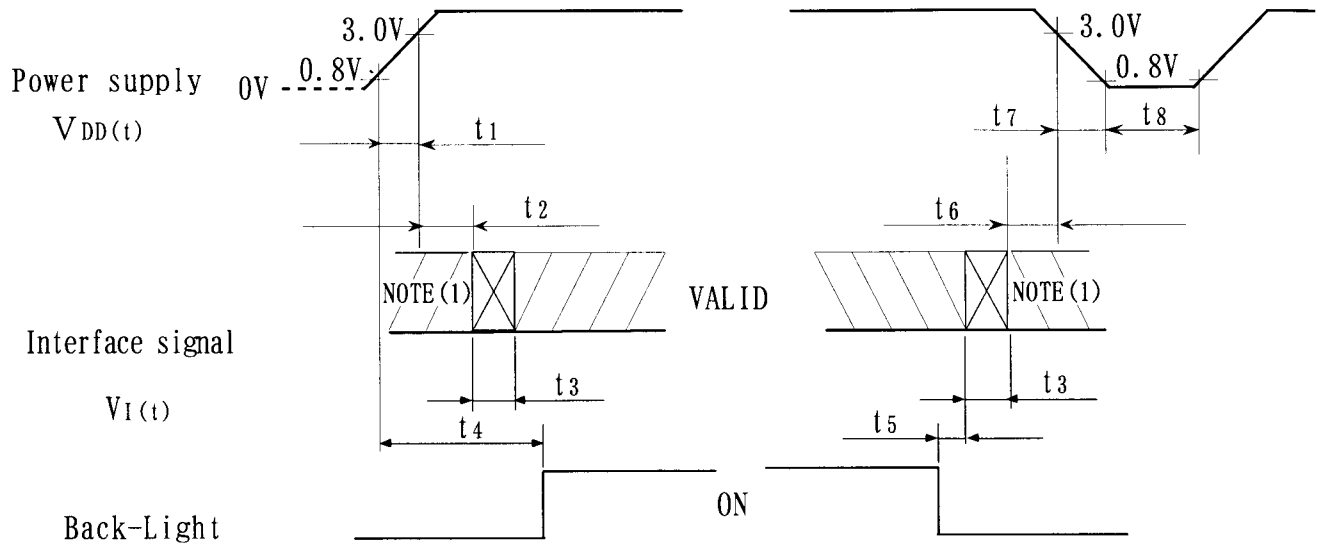
(2) timing converter timing
(Input timing for transmitter)



The timings except mentiond above are referd to the specifications of your transmitter..

Item		Symbol	Min.	Typ.	Max.	Unit
DCLK	Cycle time	t_{CLK}	13.7	14.1	17.3	ns
DTMG	Line cycle time	t_H	1440	1456	1560	t_{CLK}
	Line width-Active	t_{Hd}	1280	1280	1280	
	Frame cycle time	t_V	802	812	850	l_{ine}
	V width-Active	t_{Vd}	800	800	800	

(3) TIMING BETWEEN INTERFACE SIGNAL AND POWER SUPPLY



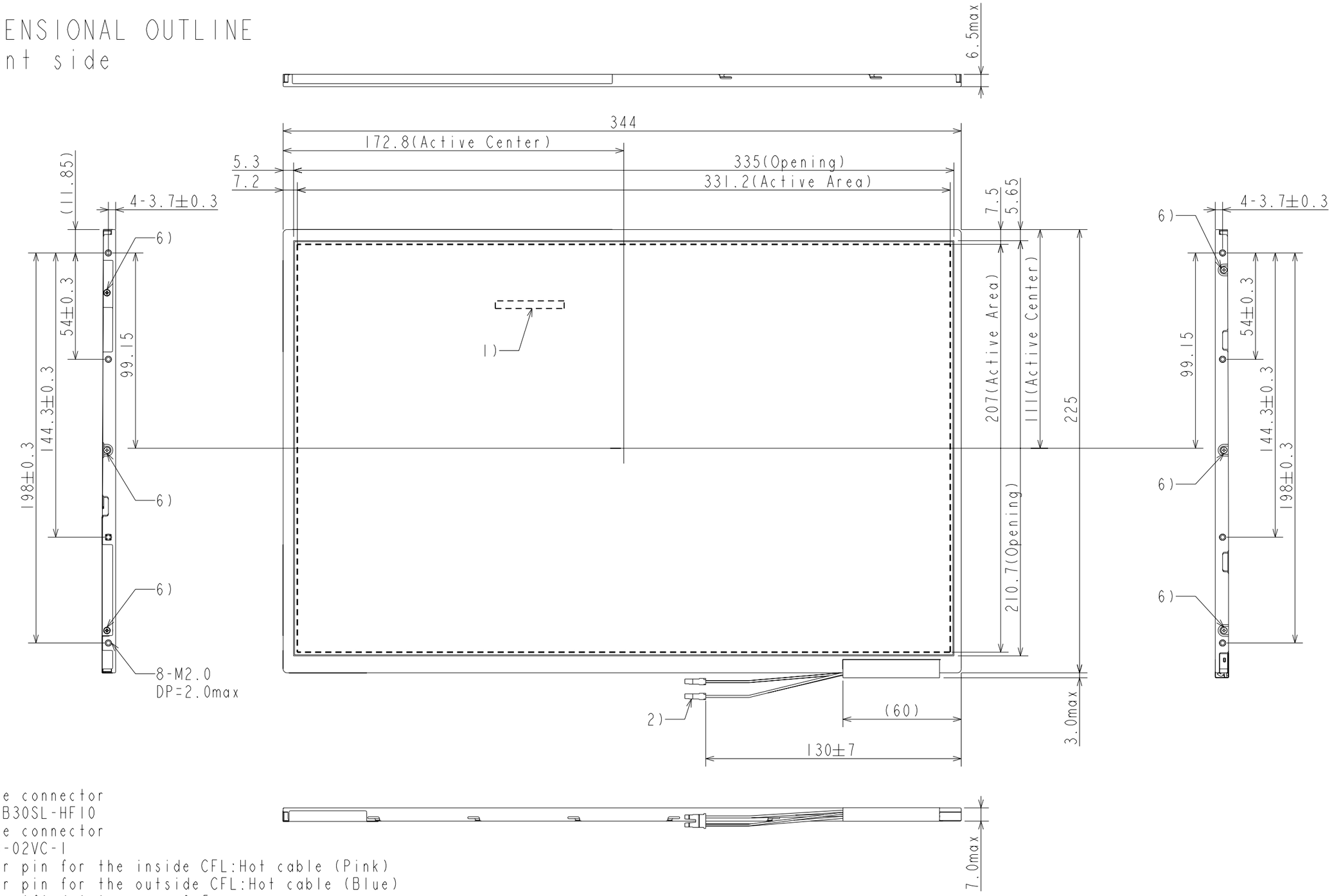
POWER ON	POWER OFF
$t_1 \leqq 15ms$	$5ms \leqq t_5$
$0 < t_2 \leqq 45ms$	$0 \leqq t_6 \leqq 45ms$
$0 \leqq t_3 \leqq 5ms$	$0 \leqq t_7 \leqq 20ms$
$0.1s \leqq t_4$ NOTE(3)	$0.4s \leqq t_8$

NOTE(1) t2:Hi-Z(Hi-impedance)state

(2) t3:Signal transition time from Hi-Z state to Valid state specified by 3(1), 6(1)and(2).

(3) Recommended value

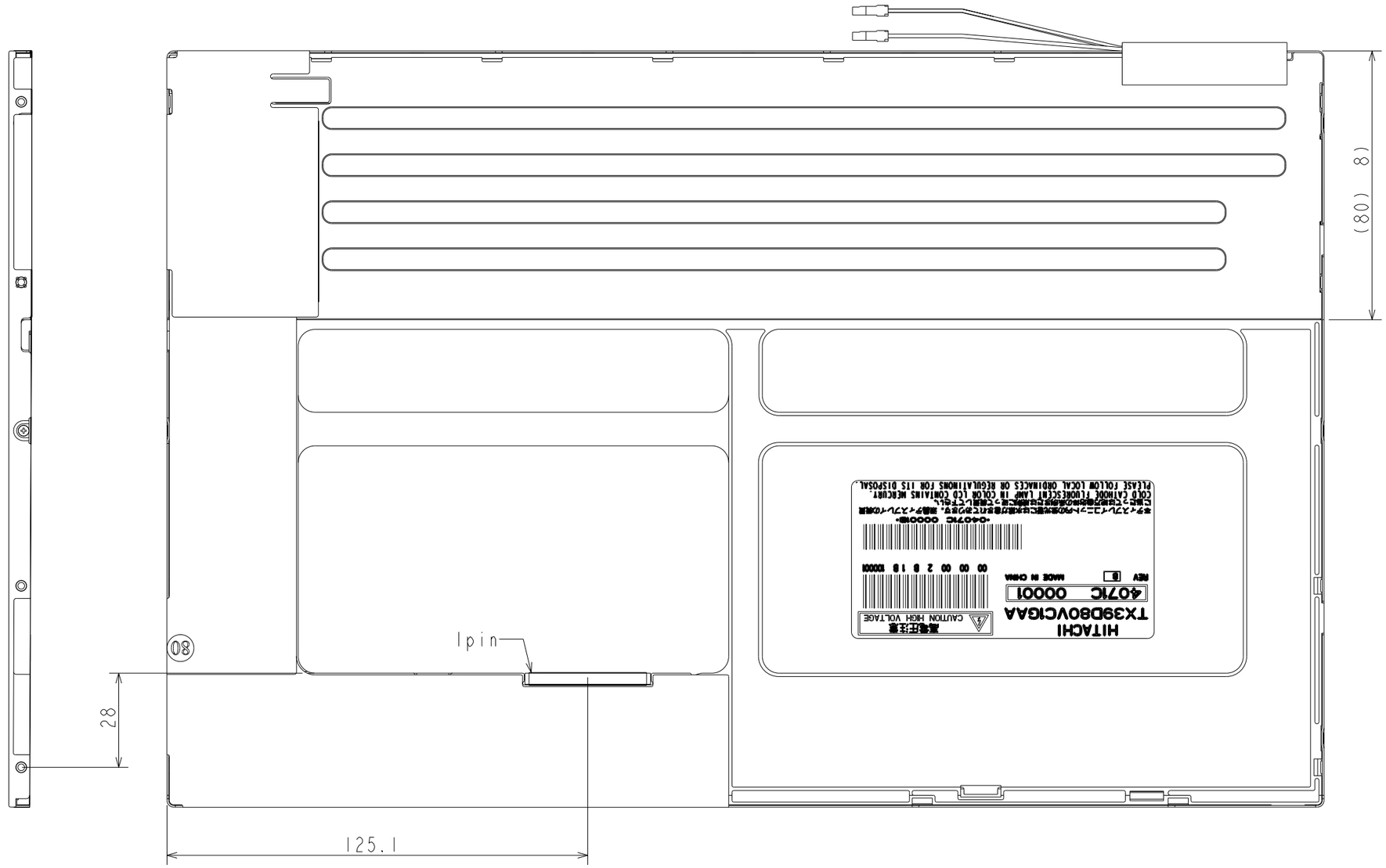
7. DIMENSIONAL OUTLINE
Front side



NOTE
1) Interface connector
   JAE:FI-XB30SL-HF10
2) CFL cable connector
   JST:BHSR-02VC-1
   Connector pin for the inside CFL:Hot cable (Pink)
   Connector pin for the outside CFL:Hot cable (Blue)
3) The unspecified tolerance:±0.5
4) Hole in mounting panel:8 holes
5) Maximum torque for the screw in mounting panel:0.196N·m(2.0kgf·cm)
6) There are 6 screws that was attched to the module.
7) Dimension measurement should be done with
   adding pressure of 9.8x10000[Pa](1kgf/cm2)

UNIT:mm

Back side



NOTE
8)Starting point of the slant on the module back side.

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