HITACHI

Displays, Hitachi, Ltd.

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TECHNICAL DATA

TX36D81VC1CAB

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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 and LVDS (Low Voltage Differential Signaling) Interface.

Note : Inverter device for Back-light is not built in so it should be prepared by yourself.

・Type name	: TX36D81VC1CAB
・Display Area	: H285.7×V214.3 [mm]
・Display Pixels	: H1024×V768 [pixels]
(Display Dots)	(H(1024×3)×V768 dots)
・Pixel Pitch	: H 0.279×V 0.279 [mm]
・Color Pixel Arrangement	: R･G･B Vertical Stripe
・Display Mode	: Transmissive Mode Normally White Mode
・Color Number	: 262k Colors
・Interface	: LVDS
・Front side Polarizer	: Polarizer with Antiglare Coating.
・Back-Light	: A Cold Cathode Fluorescent Lamp. (Inverter is not included.)
・Dimensions Outlines	: H298.5×V225.5×t6.0MAX [mm]
・Weight	: (520g)
・Power Supply	: 3.3V

1. ABSOLUTE MAXIMUM RATINGS

1.1 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		UNIT	NOTE
	MIN.	MAX.	MIN.	MAX.		
Ambient Temperature	0	45	−20	60	℃	1)
Humidity	2)		2)		%RH	1)
Vibration	—	4.9 (0.5G)	—	19.6 (2G)	m／s2	3)
Shock	—	29.4(3G)	—	490 (50G)		4)
Corrosive Gas	NOT ACCEPTABLE		NOT ACCEPTABLE		—	
Illuminance of 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 condeusation.
Ta＞40℃ : Absolute humidity must be lower than the humidity of 85%RH at 40℃.

3) 20～50Hz, (Except resonance frequency)

4) 7ms

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	±100		V	1), 2)
	VESD1	± 8		kV	1), 3)

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

(2) BACK-LIGHT UNIT GND=0V

ITEM	SYMBOL	MIN.	MAX.	UNIT
Lamp Current	IL	0	7	mArms
Lamp Voltage	VL	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 pealed off white 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

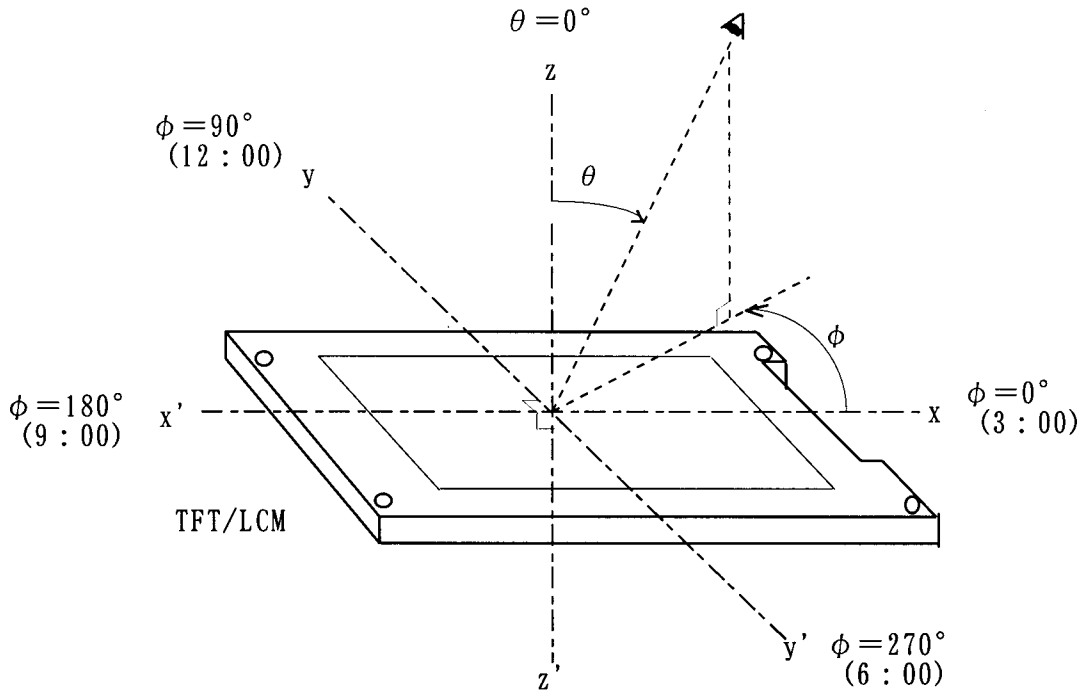
The following items are measured when the conditions of this unit (TFT panel and Back-light) and measuring systems are stable.
The ambient light excluding Back-light is nothing.
The measurement point is center of display area.

・ Measuring equipment : TOPCON BM-7, Pritchard 1980B, or equivalent.

Temperature of LCD=25℃, VDD=3.3V, fV=60Hz, I_L=5.0mA

ITEM		SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	NOTE
Contrast Ratio		CR		—	(150)	—	—	2) , 3)
Brightness(White)		Bwh		—	(130)	—	cd/m²	3)
Color of CIE	Red	x	θ=0° Note 1)	—	0.58	—	—	
		y		—	0.33	—		
	Green	x		—	0.30	—		
		y		—	0.56	—		
	Blue	x		—	0.14	—		
		y		—	0.13	—		
	White	x		—	0.33	—		
		y		—	0.34	—		

Note 1) Definition of Viewing Angle



Note 2) Definition of Contrast Ratio (CR)

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

Note 3) For Reference Value.

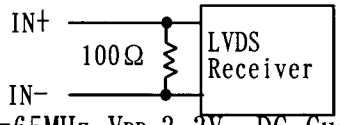
3. ELECTRICAL CHARACTERISTICS

(1) TFT LIQUID CRYSTAL DISPLAY MODULE

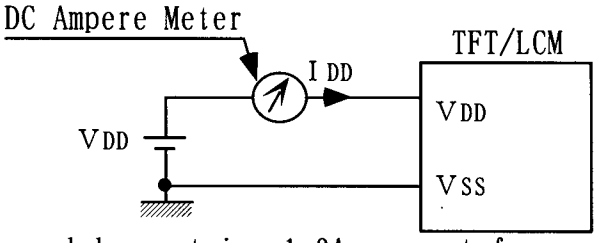
Ta=25℃, Vss=0V

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}	—	300	600	mA	2), 3)
Vsync Frequency		fv	—	60	65	Hz	4)
Hsync Frequency		f_H	—	48.5	52.4	kHz	4)
DCLK Frequency		f_{CLK}	—	65	68	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}=65MHz, V_{DD}=3.3V, DC Current.
Typ. value is measured when displaying Vertical-stripe (Black-Gray 7).



3) As this module contains 1.0A current fuse, prepare current source that is enough for cutting current fuse when a truble happens.
4) For LVDS Transmitter Input

(2) BACK-LIGHT UNIT

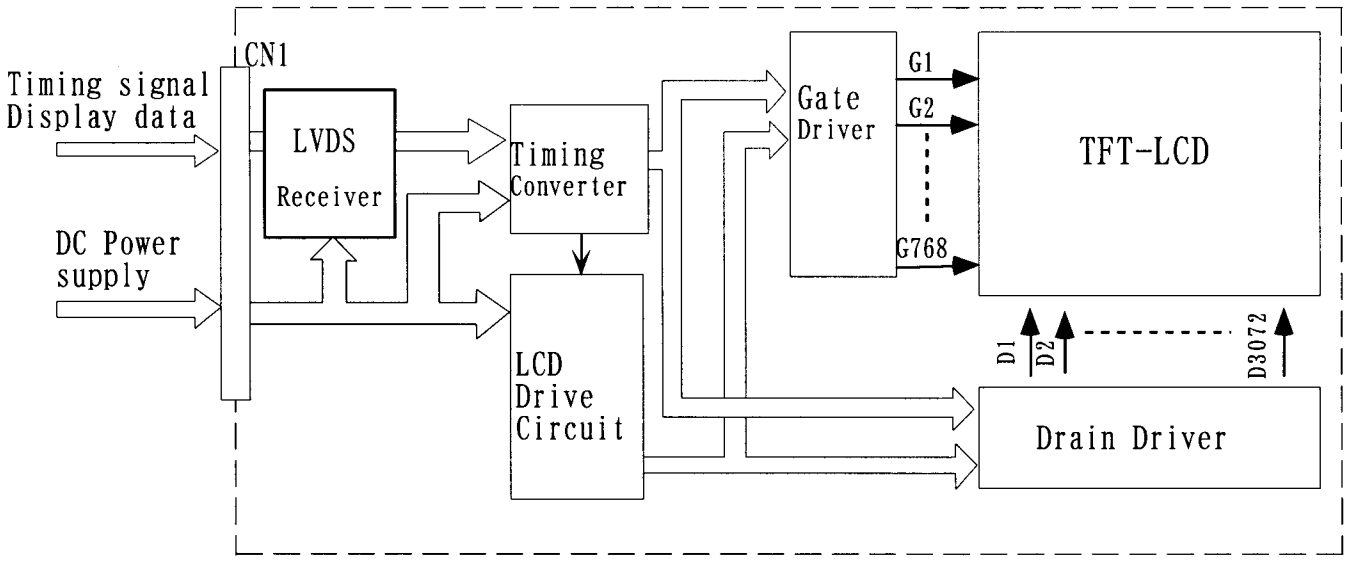
Ta=25℃, GND=0V

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Lamp Current	I_L	3.5	5.0	6.0	mArms	1), 2)
Lamp Voltage	V_L	—	650	—	Vrms	
Frequency	f_L	50	—	70	kHz	3)
Starting Lamp Voltage	Vs	1100	—		Vrms	4)
		1600	—			4), 5)

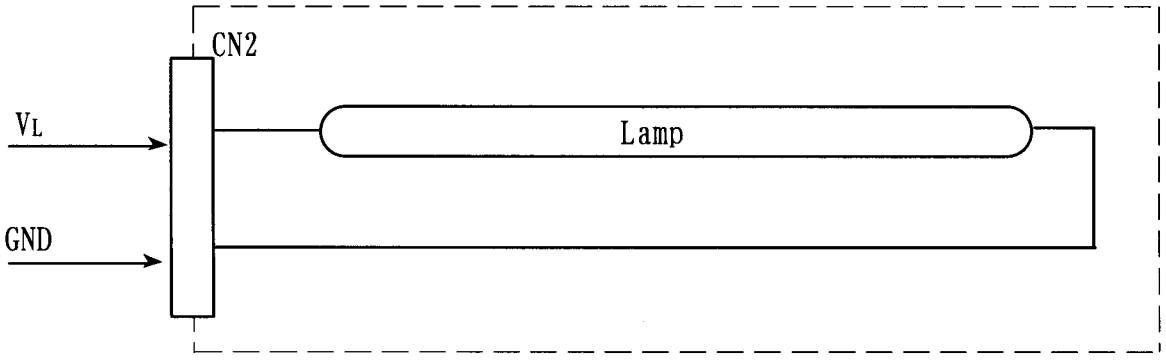
Note 1) I_L is Current of GND side.
2) Higher I_L cause the short life time of CFL.
3) Lamp frequency may produce interference with Hsync frequency, causing beat or flicker on the display.
4) Starting Lamp Voltage is applied more than Vs(min).
5) Ta=10℃

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-SEB20P-HF or equivalent》

Pin No	SYMBOL	FUNCTION	NOTE
1	VDD	Power Supply 3.3V nominal	2)
2	VDD	Power Supply 3.3V nominal	2)
3	VSS	Ground	1)
4	VSS	Ground	1)
5	RinO-	Receiver Signal(-)	
6	RinO+	Receiver Signal(+)	
7	VSS	Ground	1)
8	Rin1-	Receiver Signal(-)	
9	Rin1+	Receiver Signal(+)	
10	VSS	Ground	1)
11	Rin2-	Receiver Signal(-)	
12	Rin2+	Receiver Signal(+)	
13	VSS	Ground	1)
14	CLK-	Clock Signal(-)	
15	CLK+	Clock Signal(+)	
16	VSS	Ground	1)
17	—	—	3)
18	—	—	3)
19	VSS	Ground	1)
20	VSS	Ground	1)

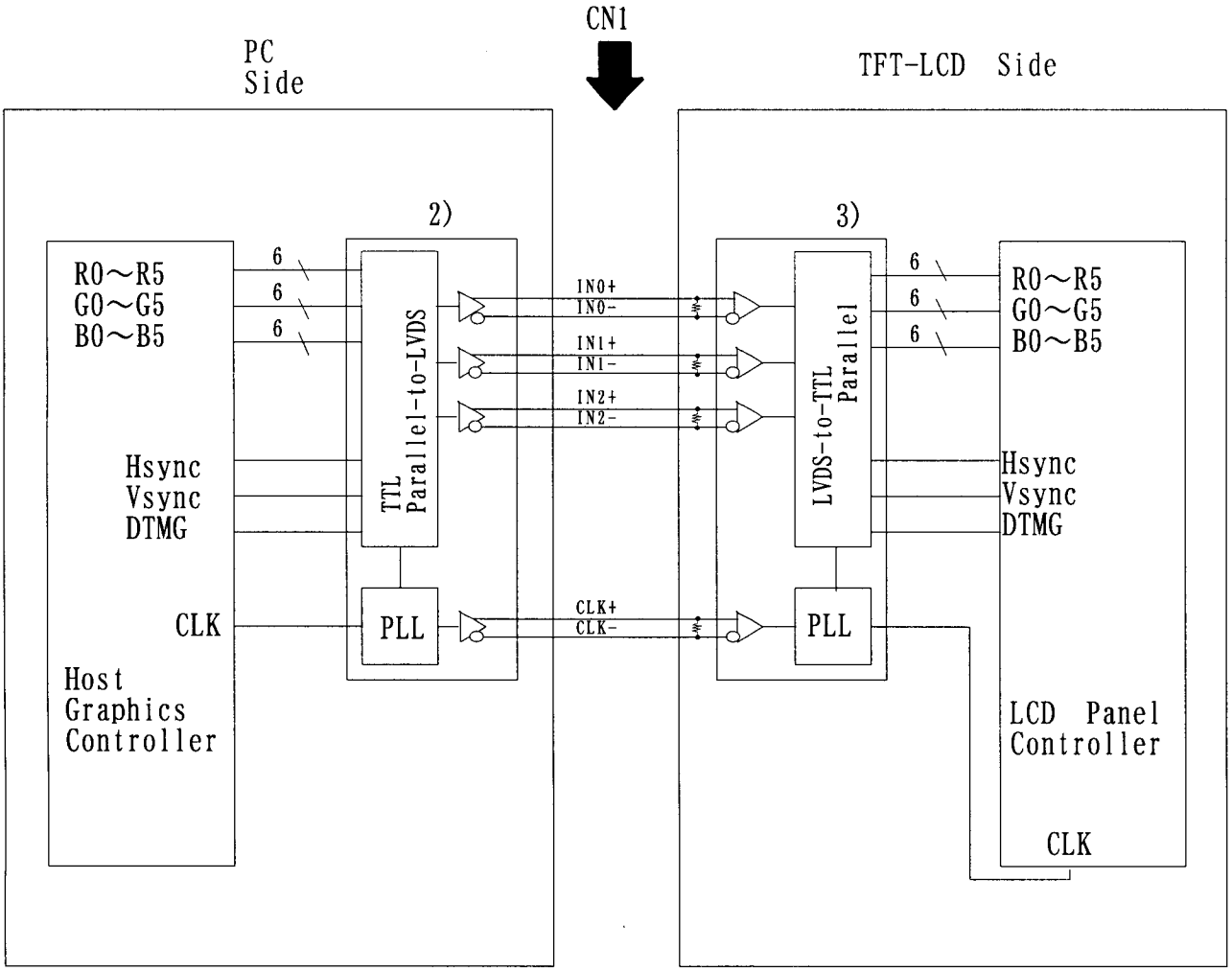
Note 1) All Vss pins should be connected to GND(0V).
Metal bezel is connected internaly to Vss.
2) All V_{DD} pins should be connected to +3.3V.
3) Keep Open. Using these pins is prohobited.

(2) BACK-LIGHT UNIT

CN2 《JST : BHSR-02VS-1》

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

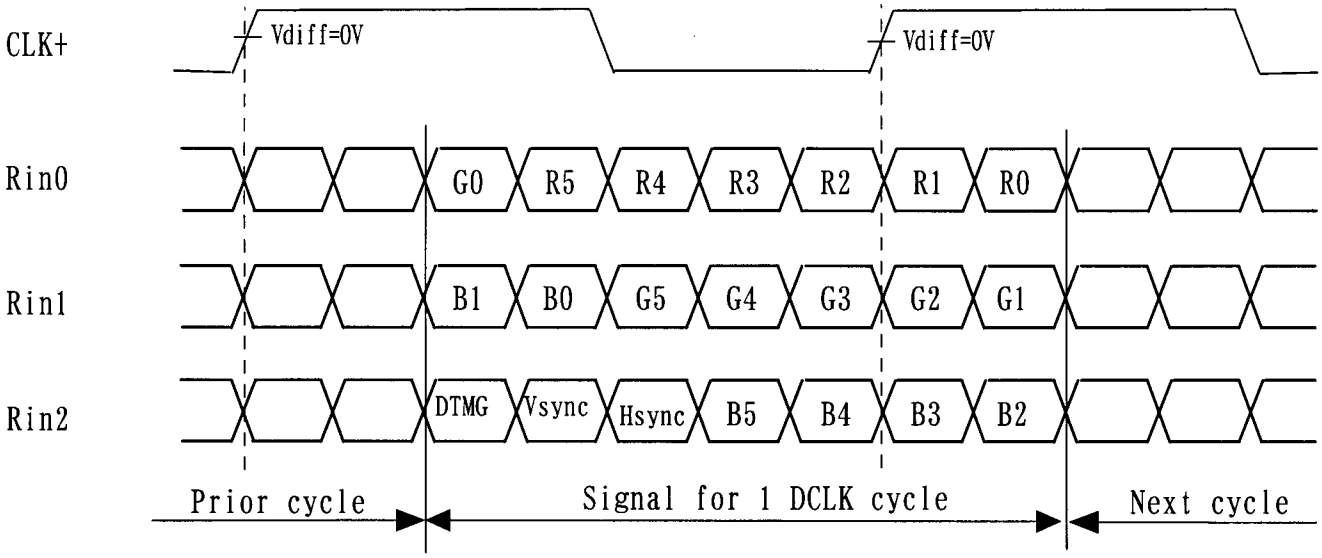
LVDS INTERFACE



NOTE: 1) LVDS cable impedance is 100 ohms per signal line when two are used differentially...

2) Transmitter : TI SN75LVDS84, or equivalent. Transmitter is not contained in Module.

LVDS Input Signal



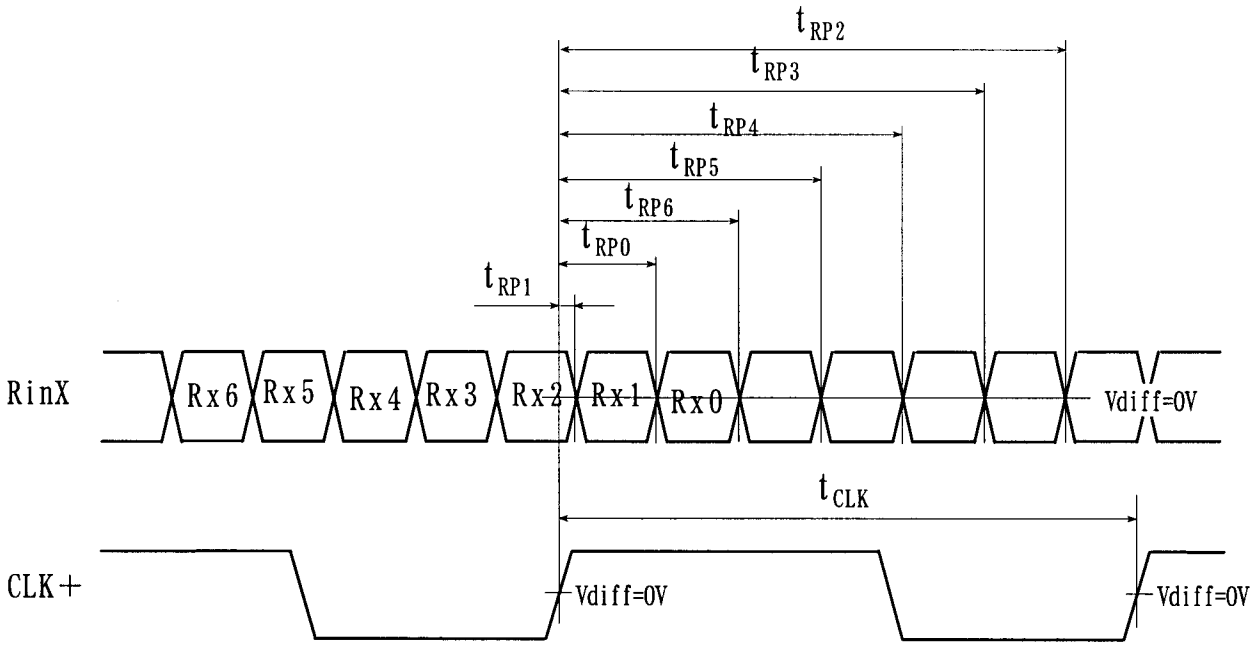
Pin connection in case of using
TI SN75LVDS84

Input signal	Transmitter
DCLK	CLK IN(26)
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)

1) ( ) indicate pin NO (IC).

6. Interface timing

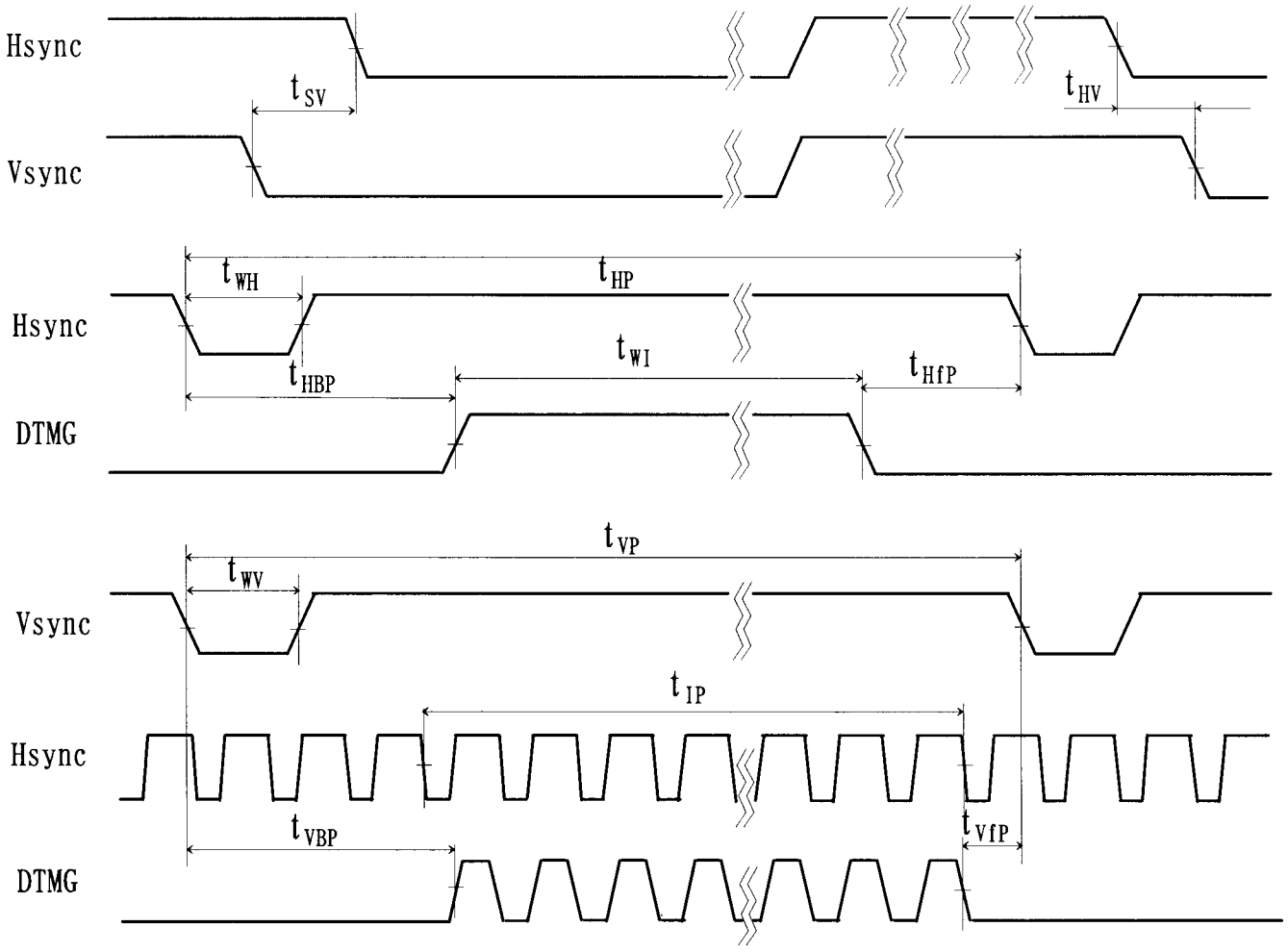
(1) LVDS receiver timing
(Interface of TFT module)



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

ITEM		SIMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
DCLK	FREQUENCY	$1/t_{CLK}$	60	65	68	MHz	
RinX (X=0, 1, 2)	0 data position	t_{RP1}	-0.49	0	+0.49	ns	
	1st data position	t_{RP0}	$\frac{1}{7}t_{CLK}$-0.49	$\frac{1}{7}t_{CLK}$	$\frac{1}{7}t_{CLK}$+0.49		
	2nd data position	t_{RP6}	$\frac{2}{7}t_{CLK}$-0.49	$\frac{2}{7}t_{CLK}$	$\frac{2}{7}t_{CLK}$+0.49		
	3rd data position	t_{RP5}	$\frac{3}{7}t_{CLK}$-0.49	$\frac{3}{7}t_{CLK}$	$\frac{3}{7}t_{CLK}$+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_{RP3}	$\frac{5}{7}t_{CLK}$-0.49	$\frac{5}{7}t_{CLK}$	$\frac{5}{7}t_{CLK}$+0.49		
	6th data position	t_{RP2}	$\frac{6}{7}t_{CLK}$-0.49	$\frac{6}{7}t_{CLK}$	$\frac{6}{7}t_{CLK}$+0.49		

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

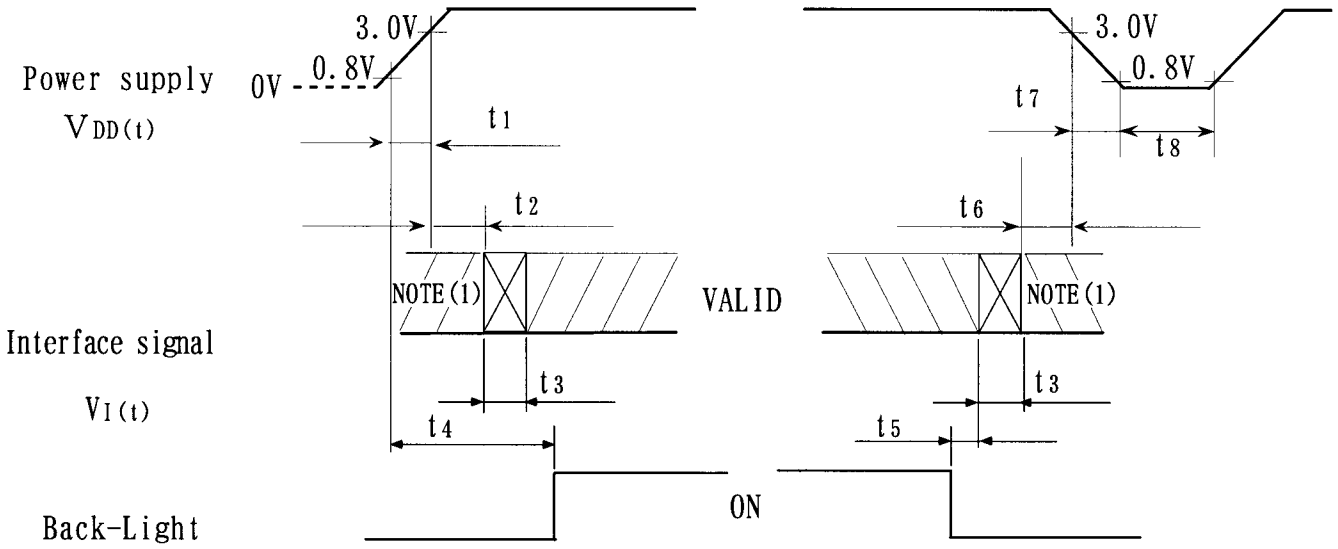


※Timing and Signal level of imput signals for LVDS transmitter should be within LVDS transmitter's specification.

Item		SYMBOL	MIN.	TYP.	MAX.	UNIT	NOTE
Hsync	Period	t_{HP}	1142	1344	2400	t_{CLK}	
	Width-Active	t_{WH}	8	136	160		
Vsync	Set up Time	t_{SV}	-2	—	—	t_{CLK}	for Hsync
	Hold time	t_{HV}	0	—	—		
	period	t_{VP}	771	806	1000	t_{HP}	
	Width-Active	t_{WV}	1	6	120		
DTMG	Width-Active	t_{WI}	1024	1024	1024	t_{CLK}	
	Period	t_{IP}	768	768	768	t_{HP}	
	Horizontal Back Portch	t_{HBP}	32	—	416	t_{CLK}	
	Horizontal Front Porch	t_{HFP}	4	—	—		
	Vertical Back Porch	t_{VBP}	0	—	—	t_{HP}	1)
	Vertical Front Porch	t_{VFP}	1	—	—		

NOTE1) $t_{VBP} + t_{VFP} \geqq 3\ t_{HP}$

(3) TIMING BETWEEN INTERFACE SIGNAL AND POWER SUPPLY

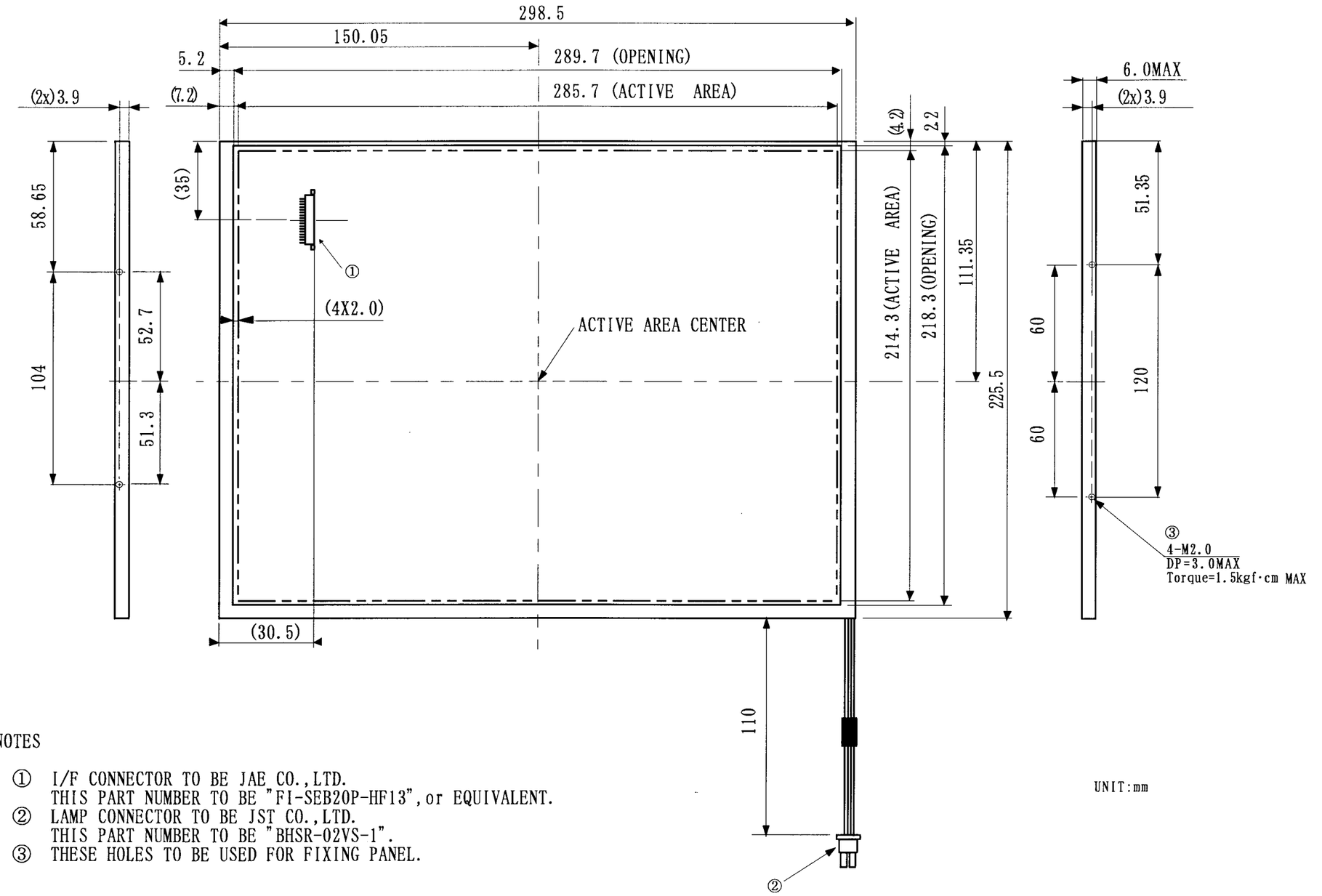


POWER ON	POWER OFF
$t_1 \leqq 15ms$	$5ms \leqq t_5$
$0 < t_2 \leqq 45ms$	$0 \leqq t_6 \leqq 45ms$
$0 \leqq t_3 \leqq 5ms$	$0 \leqq t_7 \leqq 20ms$
$0.1s \leqq t_4$	$0.4s \leqq t_8$

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).

7. DIMENSIONAL OUTLINE



NOTES

① I/F CONNECTOR TO BE JAE CO.,LTD.
THIS PART NUMBER TO BE "FI-SEB20P-HF13",or EQUIVALENT.
② LAMP CONNECTOR TO BE JST CO.,LTD.
THIS PART NUMBER TO BE "BHSR-02VS-1".
③ THESE HOLES TO BE USED FOR FIXING PANEL.

UNIT:mm

TX36D81VC1CAB Dimensional Outline

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