Panasonic Liquid Crystal Display Co.,Ltd.

Apr.8.2014

TECHNICAL DATA

VVX10F034N00

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DESCRIPTION

The following specifications are applied to the following IPS-Pro-TFT LCD module.

Product Name : VVX10F034N00

General Specifications

Effective display area	: (H)216.576×(V)135.36	(mm)
Number of pixels	: (H) 1,920 × (V) 1,200	(pixels)
Pixel pitch	: (H)0.03760(×3)×(V)0.11280	(mm)
Pixel density	: 225	(ppi)
Color pixel arrangement	: R+G+B vertical stripe	
Display mode	: Transmissive mode Normally black mode	
Top polarizer type	: Hard Coat (w/o Retardation Film)	
Number of colors	: 16,777,216	(colors)
Input signal	: MIPI-DSI (w/o RAM 4line)	
Backlight	: 48 pieces of LED (LED : Light-emitting diode)	
External dimensions	: Typ. (H)227.65×(V)147.5 × (t) 2.227 (PCB side 4.482)	(mm)
Weight	: Typ.120.0 (Max.128)	(g)

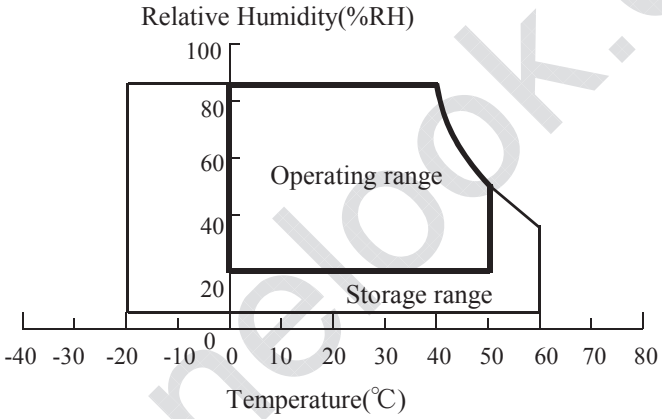
1. ABSOLUTE MAXIMUM RATINGS

1. 1 Environmental Absolute Maximum Ratings

ITEM	Operating		Storage		UNIT	NOTE
	Min.	Max.	Min.	Max.		
Temperature	0	50	-20	60	℃	1),2),6)
Humidity	2)		2)		%RH	1)
Vibration	-	-	-	1.0	Grms	3)
Shock	-	-	-	1764(180G)	m/s^2	4),5)
Corrosive Gas	Not Acceptable		Not Acceptable		-	
Illumination at LCD Surface	-	50,000	-	50,000	1x	

Note 1) Temperature and Humidity should be applied to the glass surface of a IPS-Pro TFT LCD module, not to the system installed with a module.

2) Ta≦40 ℃ · · · · · · Relative humidity should be less than 85 %RH max. Dew is prohibited.
Ta＞40 ℃ · · · · · · Relative humidity should be lower than the moisture of the 85 %RH at 40 ℃.



3) Random vibration. 1 hour for each direction.

4) Direction : ±X, ±Y, ±Z (Half sine wave. One shock for each direction)

5) Pulse width of the shock is 2 ms.

6) The temperature of LCD front surface would be 65 ℃ in operating, it may affect the optical characteristics however it does not damage the function of the module.

1. 2 Electrical Absolute Maximum Ratings

(1)TFT-LCD module Ta = 25 ℃ , Vss = 0 V

ITEM	SYMBOL	Min.	Max.	UNIT	NOTE
Power Supply Voltage	VDD	0	4.5	V	
LED forward voltage	VfLED	0	26.4	V	2)
LED forward current	IfLED	0	35	mA/strings	3)
Electrostatic Durability	VESD	2		kV	4),5)

Note 1) It is applied to the displayed data of signal terminal and the timing signal terminal.
2) It is applied to LED anode terminal.
3) The specification shall be applied at connector pins for LED at start-up.
4) Discharge Coefficient : 250 pF - 100 Ω, Environmental : 25 ℃ - 70%RH
5) It is applied to the surface of a LCD panel.

2. INITIAL OPTICAL CHARACTERISTICS

The following optical characteristics are measured under stable conditions. It takes about 30 minutes to reach stable conditions. The measuring point is the center of display area unless otherwise noted.

The optical characteristics should be measured in a dark room or equivalent state.

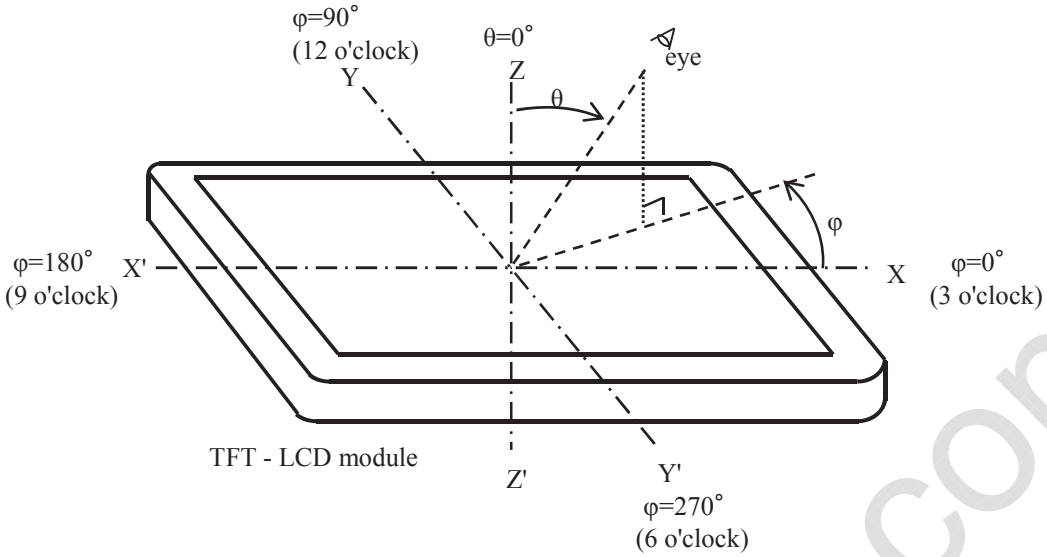
Measuring equipment : CS-1000A, or equivalent

Ambient Temperature =25 ℃ , V_{DD}=3.7 V , f V=60 Hz

Ifc = 20mA/string (On-duty=100%)

ITEM		SYMBOL	CONDITION	Min.	Typ.	Max.	UNIT	NOTE
Contrast ratio		CR	θ= 0 ° 1)	600	800	-	-	2)
Response time (Rise + Fall)		Tr + Tf		-	-	30	ms	3)
Brightness of white		Bwh		300	400	-	cd/m^2	20.0mA,Duty100%
Brightness uniformity		Buni		-	80	-	%	4)
Color chromaticity (CIE)	Red	x		0.644	0.674	0.704	-	【Gray scale =255】
		y		0.277	0.307	0.337		
		u'		0.512	0.505	0.500		
		v'		0.495	0.518	0.538		
	Green	x		0.261	0.291	0.321		
		y		0.623	0.653	0.683		
		u'		0.105	0.114	0.122		
		v'		0.563	0.573	0.582		
	Blue	x		0.123	0.153	0.183		
		y		0.010	0.040	0.070		
		u'		0.171	0.193	0.211		
		v'		0.031	0.113	0.181		
	White	x		0.275	0.313	0.335		
		y		0.283	0.329	0.343		
		u'		0.188	0.198	0.208		
		v'		0.436	0.468	0.479		
View Angle (Contrast ratio)	Right	-	θ=80 °,φ=0°	100	-	-	-	1)
	Left	-	θ=80 °,φ=180°	100	-	-		
	Top	-	θ=80 °,φ=90°	100	-	-		
	Bottom	-	θ=80 °,φ=270°	100	-	-		
NTSC (u', v')		-	θ = 0 ° 1)	-	118	-	%	
W,R,G,B Gamma		-	θ = 0 ° 1)	-	2.2	-	-	
Cross talk		CT	θ = 0 ° 1)	-	-	4	%	5)
Leakage light		-	θ = 60 ° 1)	No Light leakage			-	

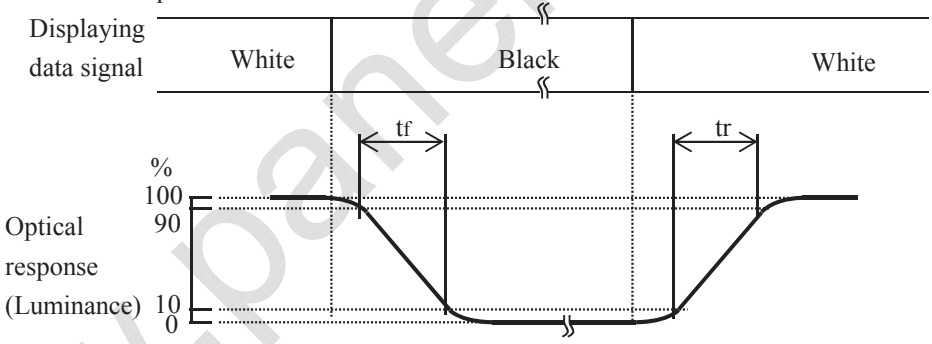
Note 1) Definition of viewing angle



Note 2) Definition of contrast ratio (CR)

$$CR = \frac{\text{(Luminance at displaying WHITE)}}{\text{(Luminance at displaying BLACK)}}$$

3) Definition of response time



4) Definition of brightness uniformity

Display pattern is white (255 level) . The brightness uniformity is defined as the following equation.

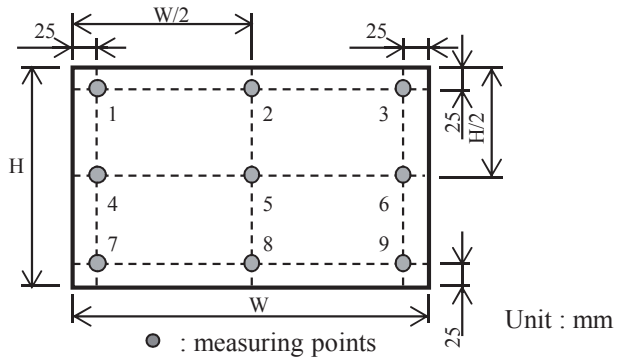
$$B_{uni} = \frac{B_{min}}{B_{ave}} \times 100$$

where, Bmin = Minimum brightness

Bave = Average brightness

$$B_{ave} = \frac{\sum_{k=1}^{9}(B(k))}{9}$$

B(k) = Brightness of measuring point k



Unit : mm

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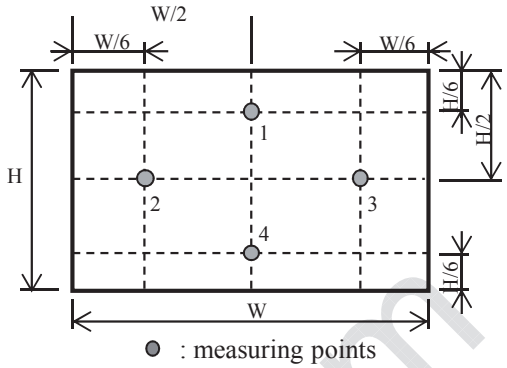
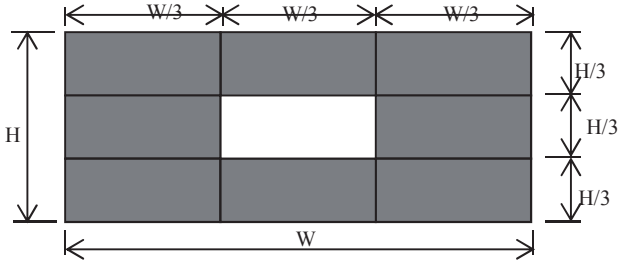
5) Definition of Cross talk

Display pattern is gray raster, white window and black window which shown as following drawings.
Gray scale level of gray raster and around white and black window is 127 level.
The cross talk is defined as the following equation.

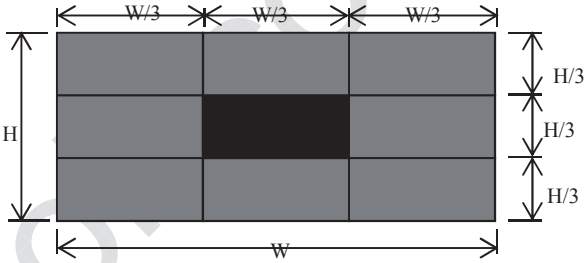
$$CT = \frac{|B_w(k) - B_r(k)|}{B_r(k)} \times 100\%$$

where, Bw(k) = Brightness of measuring point k
with white or black window pattern
Br(k) = Brightness of measuring point k
with gray raster pattern
This value is measured at CABC-OFF.





White window



Black window

3. ELECTRICAL CHARACTERISTICS

3. 1 TFT-LCD module

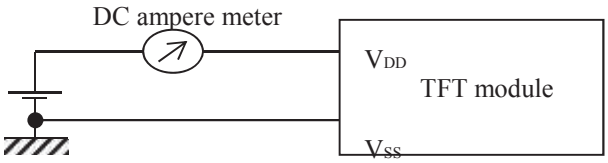
Ta = 25 ℃ , Vss = 0 V

ITEM	SYMBOL	Min.	Typ.	Max.	UNIT	NOTE
Power supply voltage	V_{DD}	3.0	3.7	4.3	V	
Power supply current	I_{DD}	-	0.155	0.4	A	1) 2)
Ripple voltage of power supply	V_{DDR}	-	-	100	mV	
LED forward voltage	VfLED	0	24	26.4	A	
LED forward current	IfLED	0	20	-	mA/strings	

Note 1) Power supply voltage is 3.7V

2) Typ. : display pattern is white raster.

Max. : display pattern is pixel checker pattern. (white and black)



3. 2 Backlight unit

ITEM	SYMBOL	Min.	Typ.	Max.	UNIT	NOTE
Power Consumption	Pbl	0	2.88	3.17	W	

One Backlight Unit : 1 LED Array

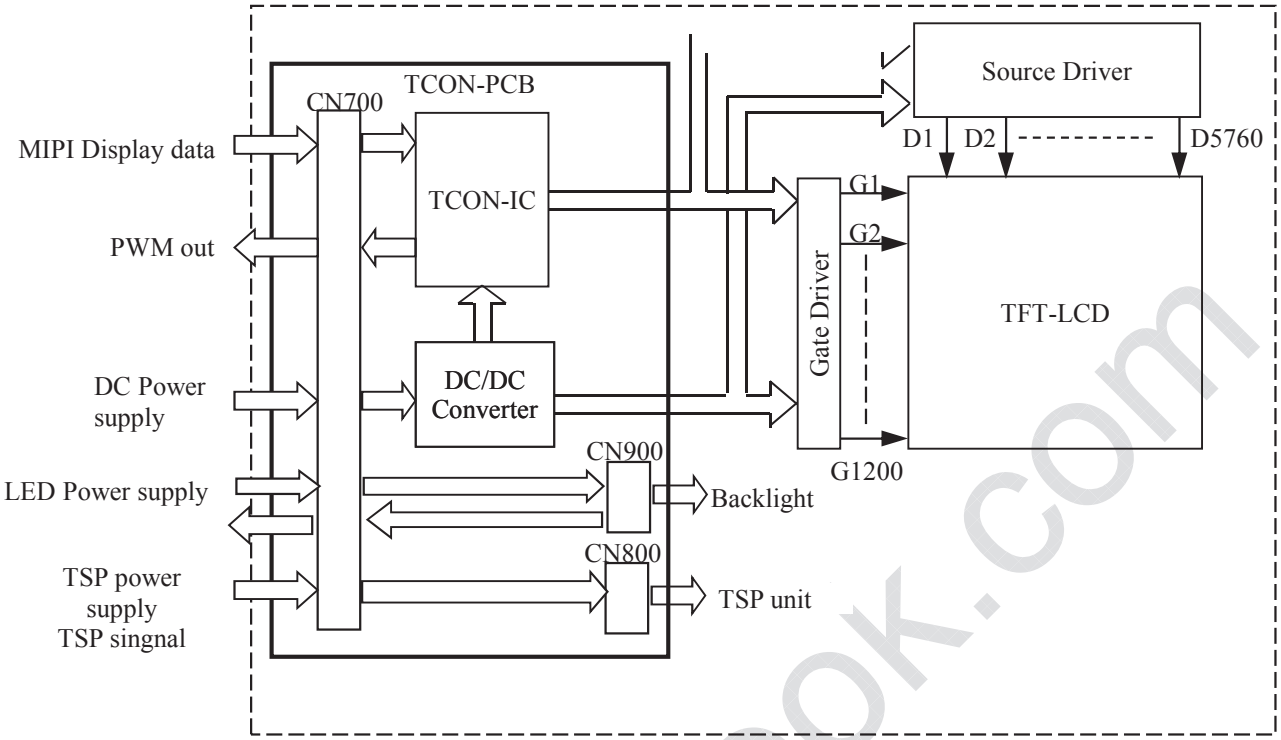
One LED Array : 6 LED String

One LED String : 8 LED package

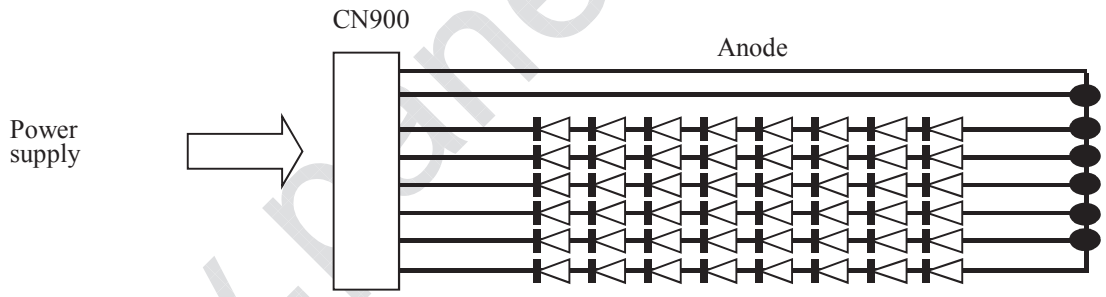
Note 1) This characteristics should be applied putting on the LED about 60 minutes later with ambient temperature. (Ta = 25 ℃ ± 2 ℃)

4. BLOCK DIAGRAM

4. 1 TFT-LCD module



4. 2 Backlight unit



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5. INTERFACE PIN ASSIGNMENT

5. 1 TFT-LCD module

CN700:AYF335165FV1

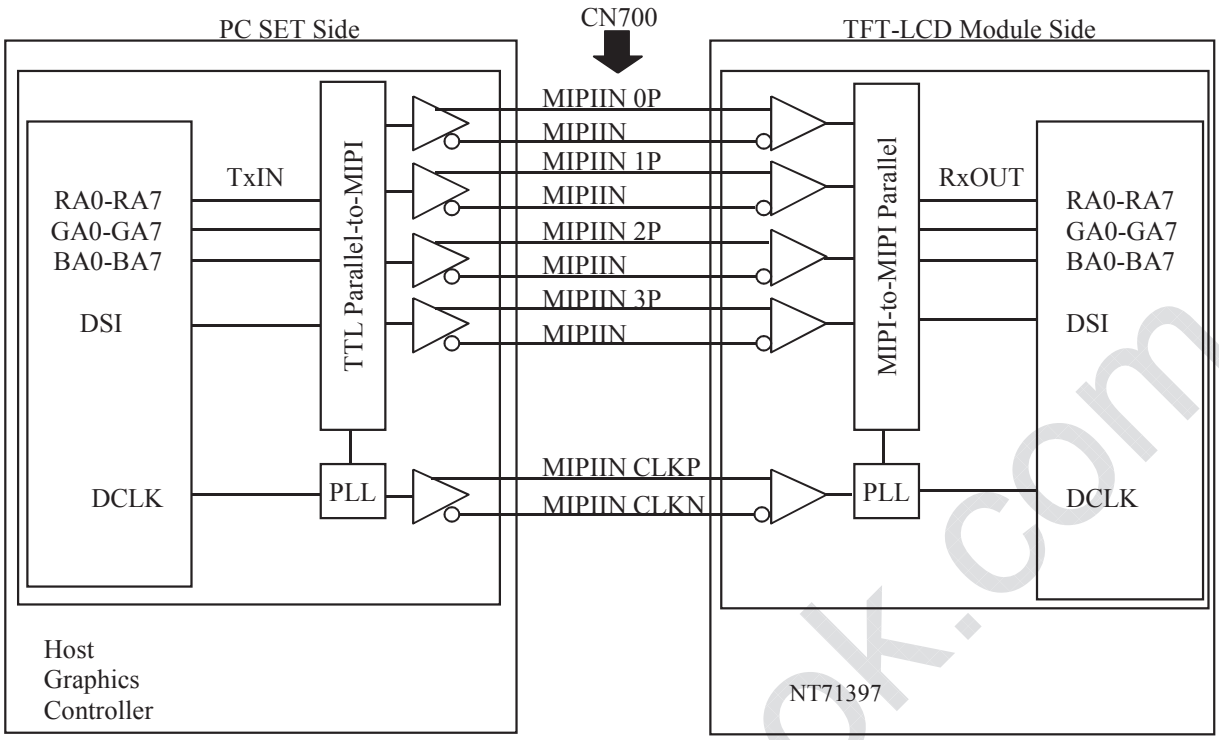
PIN No.	SYMBOL	DESCRIPTION	Note
1	T_GND	GND(0V)	
2	TS_INT	-	
3	TS_I2C_SDA	-	
4	TS_I2C_SCL	-	
5	T_GND	GND(0V)	
6	TP_VDD/TP_VBUS(1.8V)	-	
7	TP-VDDTX(3.05V)	-	
8	T_GND	GND(0V)	
9	LMU_DCDC_OUT	LED Anode Power Supply	1)
10	LMU_DCDC_OUT	LED Anode Power Supply	1)
11	LCDBL_CA1	LED 1 Cathode	
12	LCDBL_CA2	LED 2 Cathode	
13	LCDBL_CA3	LED 3 Cathode	
14	LCDBL_CA4	LED 4 Cathode	
15	LCDBL_CA5	LED 5 Cathode	
16	LCDBL_CA6	LED 6 Cathode	
17	GND	GND(0V)	
18	GND	GND(0V)	
19	MIPI_LN3_N	MIPI data pair 3 negative signal	
20	NC	No connection	
21	MIPI_LN3_P	MIPI data pair 3 positive signal	
22	GND	GND(0V)	
23	MIPI_LN0_N	MIPI data pair 0 negative signal	
24	NC	No connection	
25	MIPI_LN0_P	MIPI data pair 0 positive signal	

PIN No.	SYMBOL	DESCRIPTION	Note
26	GND	GND(0V)	
27	MIPI_CLK_N	MIPI Clock negative signal	
28	NC	No connection	
29	MIPI_CLK_P	MIPI Clock positive signal	
30	GND	GND(0V)	
31	MIPI_LN1_N	MIPI data pair 1 negative signal	
32	NC	No connection	
33	MIPI_LN1_P	MIPI data pair 1 positive signal	
34	GND	GND(0V)	
35	MIPI_LN2_N	MIPI data pair 2 negative signal	
36	NC	No connection	
37	MIPI_LN2_P	MIPI data pair 2 positive signal	
38	GND	GND(0V)	
39	GND	GND(0V)	
40	VCC	Power Supply (+3.0 ～ 4.3V)	2)
41	VCC	Power Supply (+3.0 ～ 4.3V)	2)
42	VCC	Power Supply (+3.0 ～ 4.3V)	2)
43	VCC	Power Supply (+3.0 ～ 4.3V)	2)
44	BIST	Keep open or connect to GND	
45	PWMO	PWM output	
46	LCD_ID_ADC	-	
47	BL_THERM	-	
48	GND	GND(0V)	
49	I2C_SCL	Factory use only , keep open	
50	I2C_SDA	Factory use only , keep open	
51	GND	GND(0V)	

Note 1) All LMU_DCDC_OUT pins shall be connected to +24V(typ).

2) All VCC pins shall be connected to +3.0~4.3V(typ).

5. 2 Block diagram of interface



RA0～RA7, RB0～RB7 : Pixel R Data (7; MSB, 0; LSB)
GA0～GA7, GB0～GB7 : Pixel G Data (7; MSB, 0; LSB)
BA0～BA7, BB0～BB7 : Pixel B Data (7; MSB, 0; LSB)

Note 1) The system must have the transmitter to drive the module.

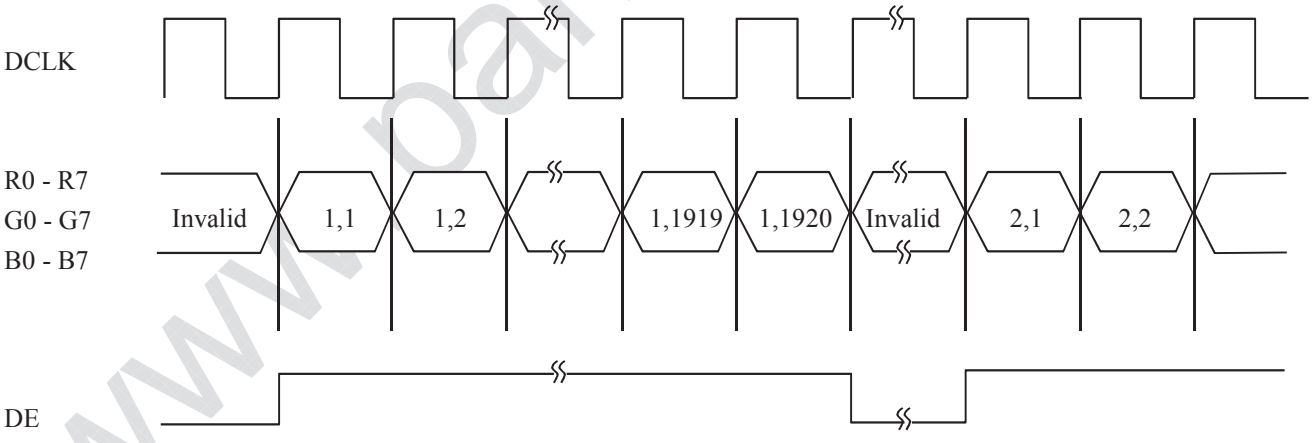
5. 4 Correspondence between input data and display image

Display data of adjacent one pixel is latched during one cycle of DCLK.

R (1,1)	G (1,1)	B (1,1)

Pixel : R0 - R7 : R (x,y)
G0 - G7 : G (x,y)
B0 - B7 : B (x,y)

1 , 1	1 , 2	1 , 3	- -	1 , 1920
2 , 1	2 , 2	2 , 3	- -	2 , 1920
3 , 1	3 , 2	3 , 3	- -	3 , 1920
⋮	⋮	⋮		⋮
1200 , 1	1200 , 2	1200 , 3		1200 , 1920



5. 5 Relationship between display colors and input signals

Color \ Input		Red Data								Green Data								Blue 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	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 (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
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
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	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	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
	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
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	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	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 (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
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	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) • • • • Number in parenthesis indicates gray scale level.

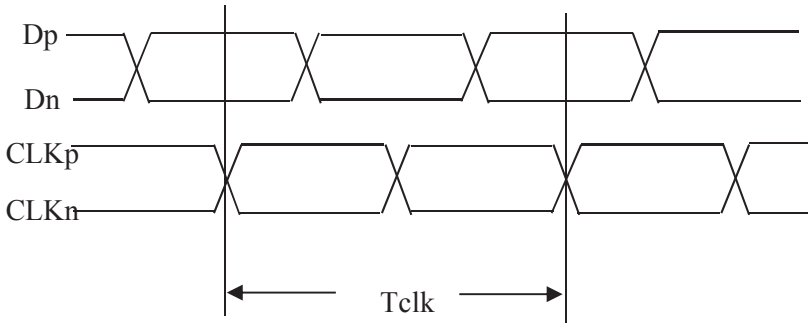
Larger n corresponds to brighter level.

2) Data : 1 : High, 0 : Low

6. INTERFACE TIMING

6. 1 MIPI receiver timing

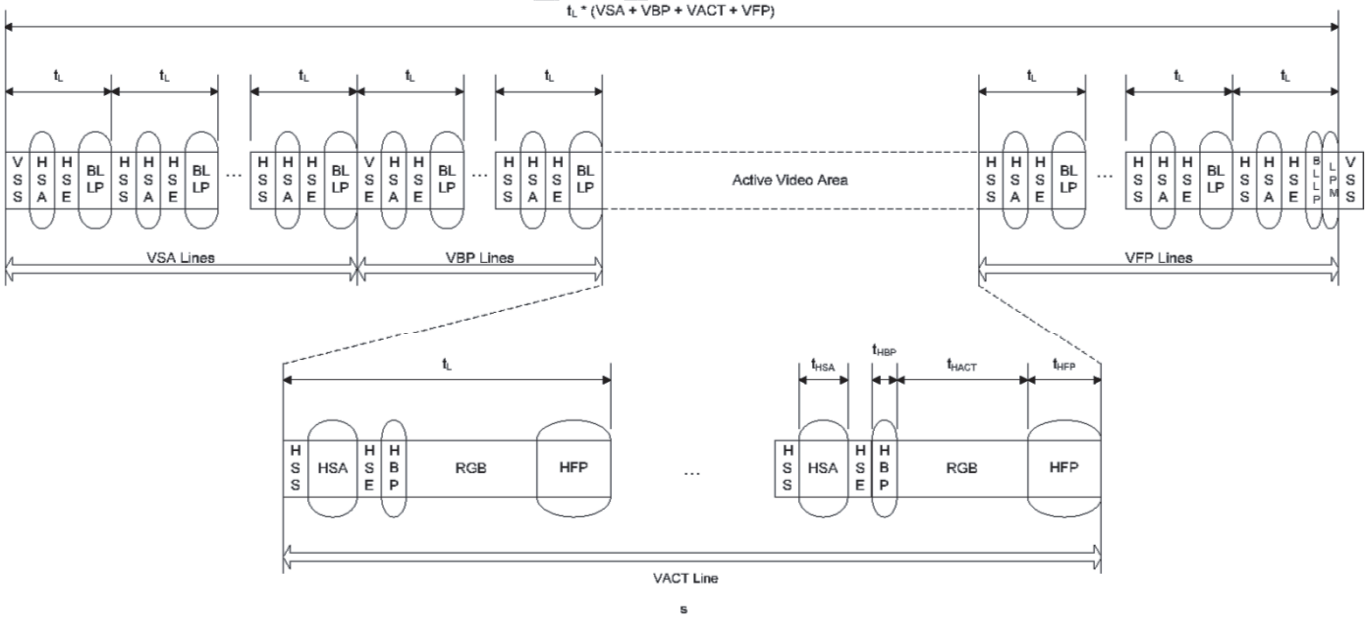
6.1.1 High Speed CLK Timing



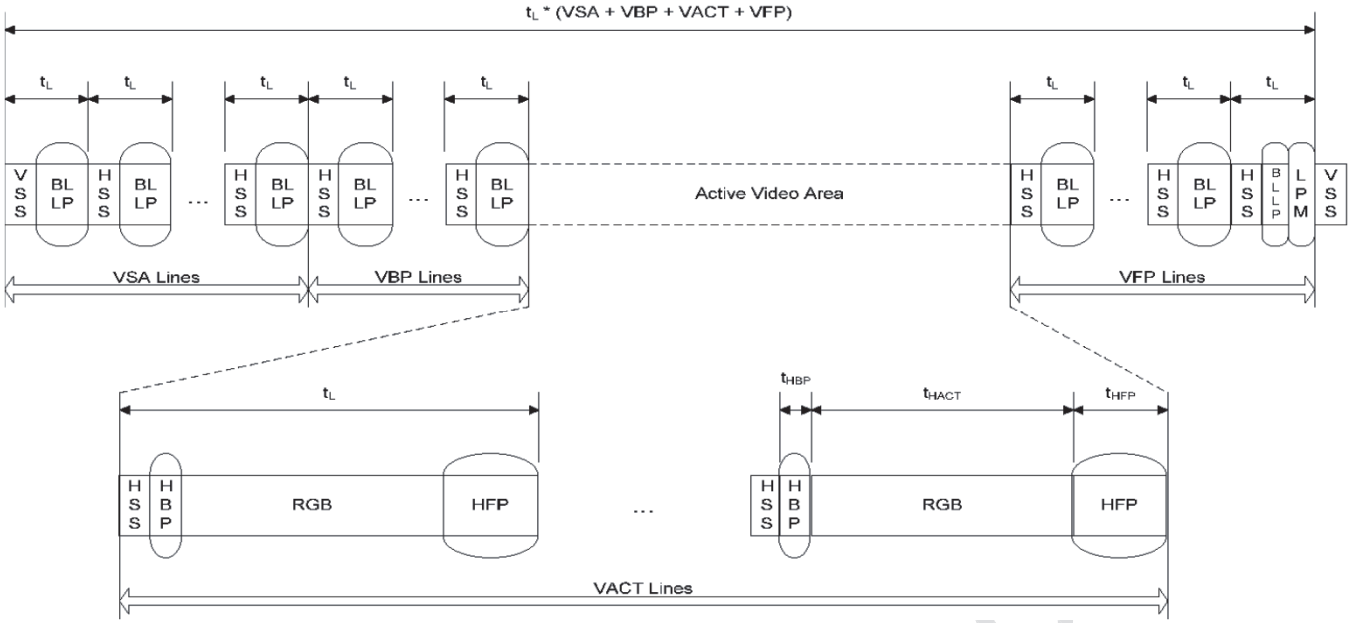
	Min	Max
Tclk	2ns(500MHz)	10ns(100MHz)

6.1.1 Data Transmission Timing

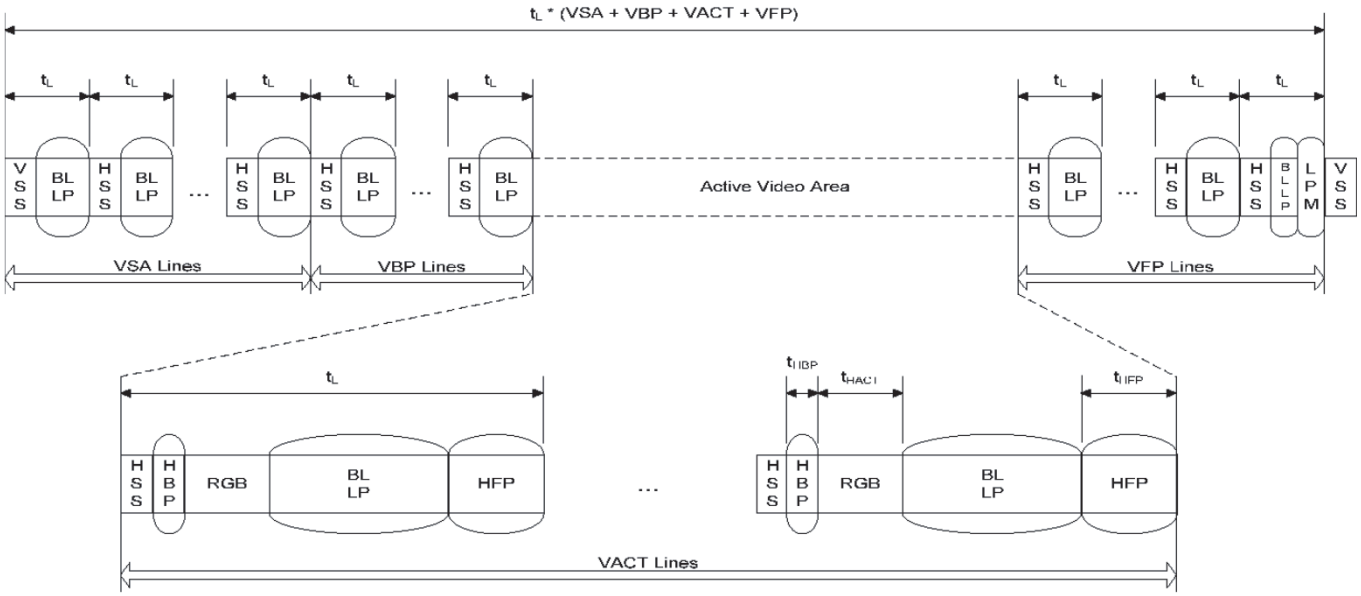
(i) Non-Burst Transmission with Sync Start and End (Pulse Mode)



(ii) Non-Burst Transmission with Sync Events (Event Mode)



(iii) Burst Mode



(iv) Supplemental Information

(1) HFP in any above three modes can be replaced with LP-11 state (Idle mode). Length of LP-11 state and transition period from LP-11 state to HS (THS-SETTLE) and the period from HS to LP-11 (THS-TRAIL+THS-EXIT) shall meet the specification of the timing specified in the D-PHY standard of the MIPI interface.

(2) Data can be transferred in any mode of above three without telling the panel which mode is used.

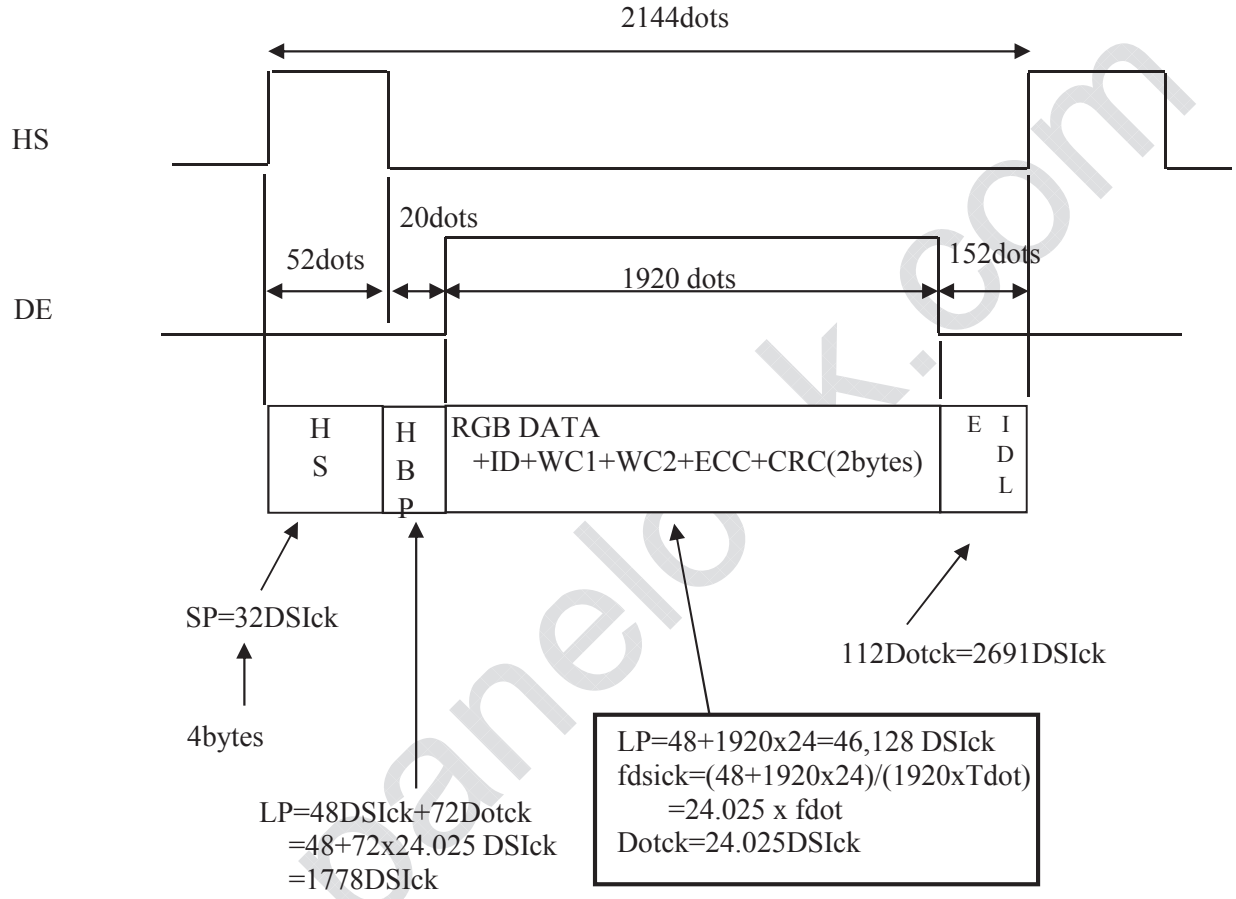
(3) No EoT packet(not EoT protocol) is required.

(4) The line frequency (fH) and frame frequency (fV) of the timing in any above three modes shall fall in the range between Min and Max value specified in the table in the section 6.2.

(5) Turn on command is needed to be issued to light on the panel.

(v) An Example of Non-Burst Event Mode DSI Timing (Line Period)

fdot=2144x1278x60=164.4MHz
Tdot=1/164MHz=6.083ns
fH=1278x60=76.68kHz
TH=13.041us

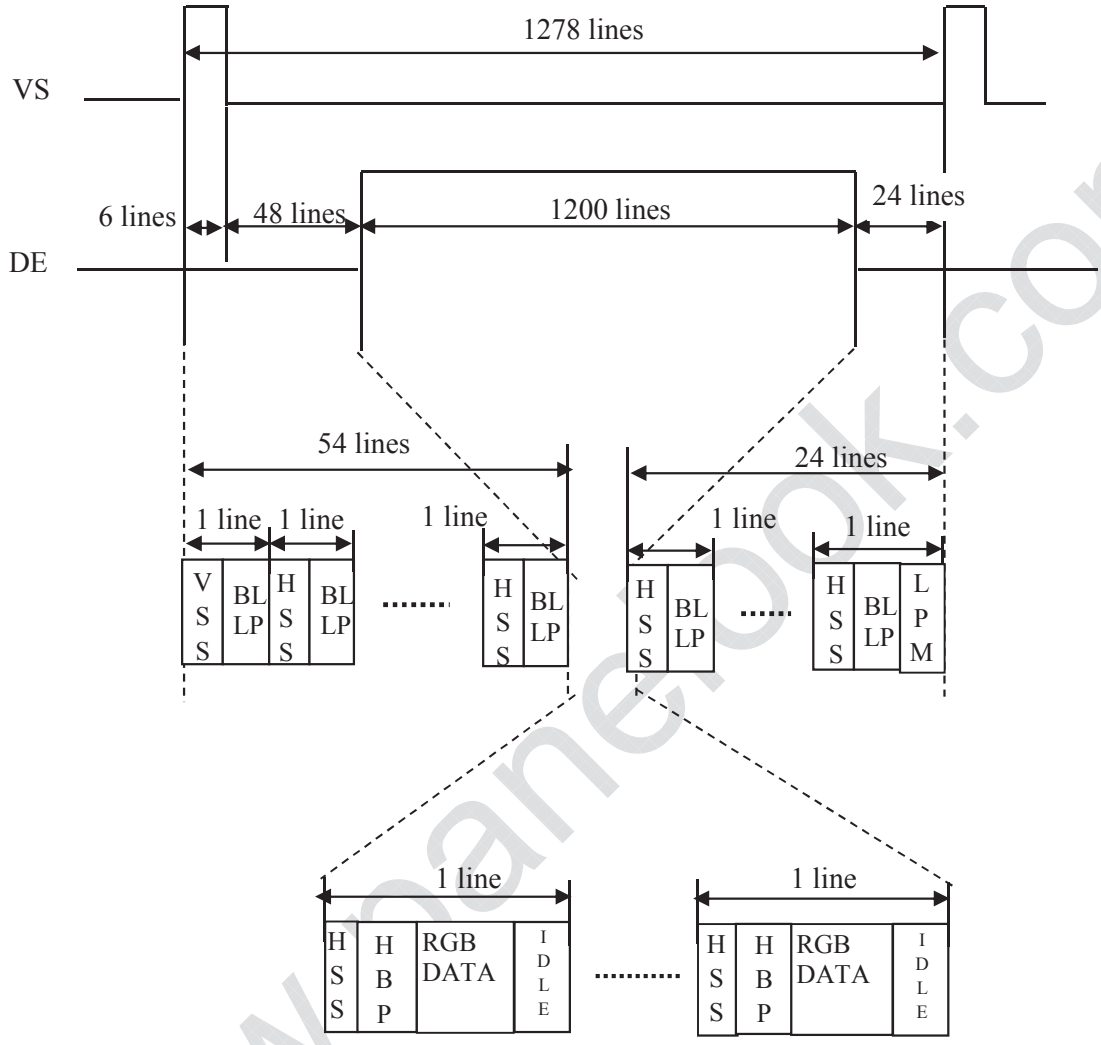


fdsick=24.025x164.4MHz=3.9497GHz
Data Transfer Rate/Lane=fdsick/4 = 987.4MHz

SP:Short Packet
LP:Long Packet

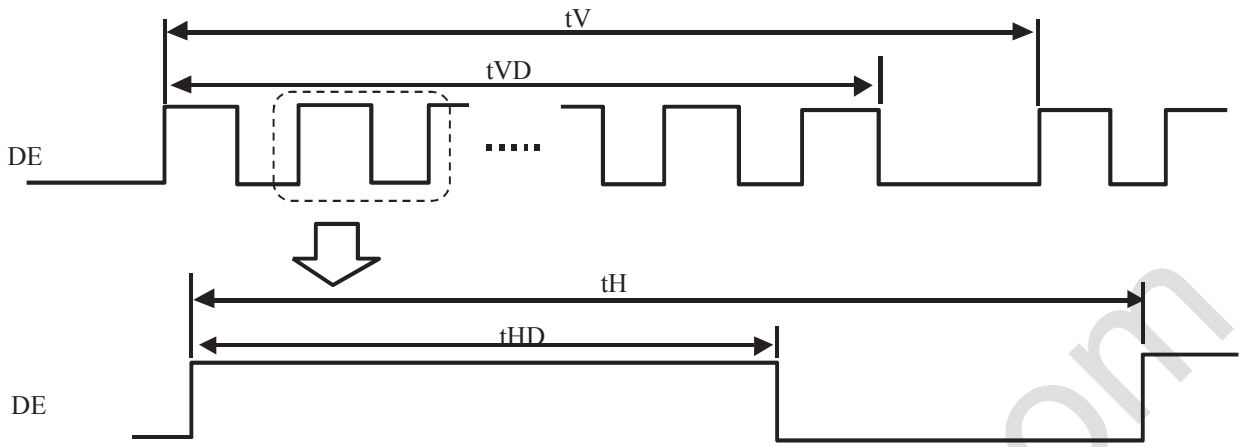
DSIck: Hypothetical DSI clock assuming one lane data transmission and single edge data latch

(vi) An Example of Non-Burst Event Mode DSI Timing (Frame Period)



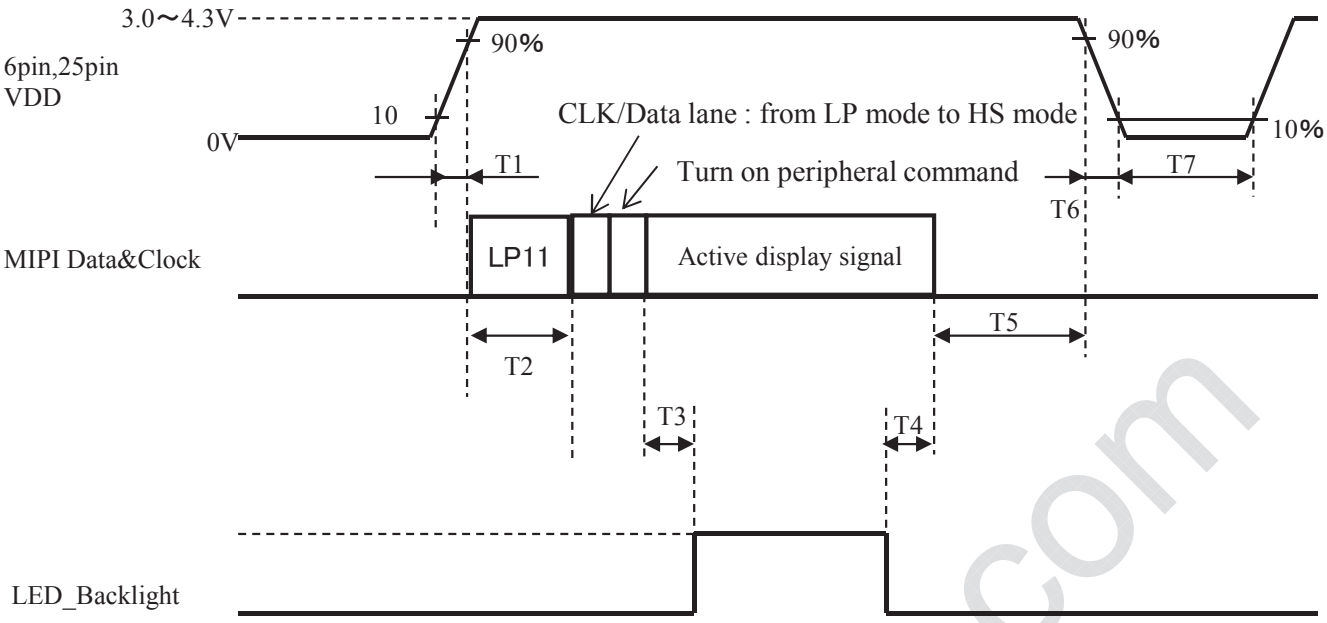
1 Line =51,510 DSIck
TH=51,510/3.9497GHz=13.04us
TV=1278xTH
=1278 x 51,510/3.6999GHZ
=16.7ms
fV=1/TV=60Hz

6. 2 Syncronization signal timing



ITEM		SYMBOL	Min.	Typ.	Max.	UNIT	NOTE
DE	Vertical Frequency	fV	50	60	62	Hz	
	Vertical Period	tV	1258	1278	1394	tH	
	Vertical Valid	tVD		1200		tH	
	Horizontal Frequency	fH	69.66	76.68	78	kHz	
	Horizontal Period	tH	2108	2144	2360	tCLK	
	Horizontal Valid	tHD		1920		tCLK	
	Dot clock	fdot		164.4		MHz	

6. 3 Power timing



Turn on peripheral command

Data Type, hex	Data Type, hex	Description	Packet Size
32h	11 0010	Turn On Peripheral Command 1)	Short

Symbol	Min.	Typ.	Max.	Unit	Note
T1	0.01	-	10	ms	2)
T2	250	-	-	ms	
T3	90	-	-	ms	
T4	50	-	-	ms	
T5	85	-	-	ms	
T6	0.05	-	1000	ms	
T7	500	-	-	ms	

Note

1) the sequence can switch from:

1. CLK/Data lane: from LP mode to HS mode
2. Turn on peripheral command (HS mode)

to :

1. Turn on peripheral command (LP mode)
2. CLK/Data lane: from LP mode to HS mode

2) Inrush current < 2A

9. PRECAUTION

Please pay attention to the followings when a TFT module with a backlight unit is used, handled and mounted.

9.1 Precaution to handling and mounting

(1) Applying strong force to a part of the module may cause partial deformation of frame or mold, and cause damage to the display.

(2) The module should gently and firmly be held by both hands. Never hold by just one hand in order to avoid any internal damage. Never drop or hit the module.

(3) Uneven force such as twisted stress should not be applied to a module when a module is mounted on the cover case. The cover case must have sufficient strength so that external force can not be transmitted directly to a module.

(4) It is recommended to leave a space between a module and a holding board of a module so that partial force is not applied to a module.

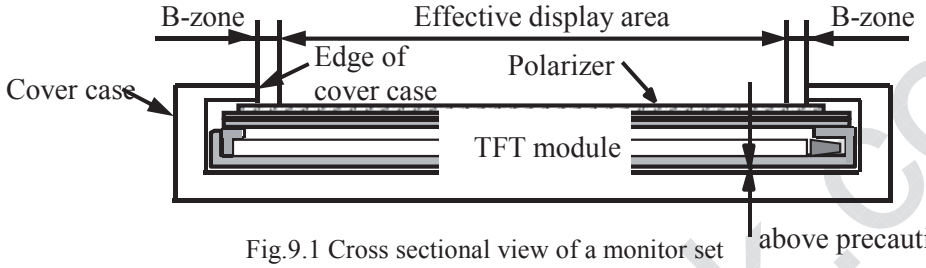


Fig.9.1 Cross sectional view of a monitor set

(5) The edge of a cover case should be located inside more than 1mm from the edge of a polarizer edge.

(6) A transparent protective plate should be added on the display area of a module in order to protect a polarizer and TFT cell.The transparent protective plate should have sufficient strength so that the plate can not touch a module by external force.

(7) Materials included acetic acid and chlorine should not be used for a cover case as well as other parts and boards near a module. Acetic acid attacks a polarizer. Chlorine attacks electric circuits due to electro-chemical reaction.

(8) The polarizer on a TFT cell should carefully be handled due to its softness, and should not be touched, pushed or rubbed with glass, tweezers or anything harder than HB pencil lead. The surface of a polarizer should not be touched and rubbed with bare hand, greasy clothes or dusty clothes.

(9) The surface of a polarizer should be gently wiped with absorbent cotton, chamois or other soft materials slightly contained petroleum benzene when the surface becomes dirty. Normal-hexane or Isopropyl alcohol as cleaning chemicals is recommended in order to clean adhesives which fix front/rear polarizers on a TFT cell. Other cleaning chemicals such as acetone, toluen and alcohol should not be used to clean adhesives because they cause chemical damage to a polarizer.

(10) Saliva or water drops should be immediately wiped off. Otherwise, the portion of a polarizer may be deformed and its color may be faded.

(11) The module should not be opened or modified. It may cause not to operate properly.

(12) A module should not be handled with bare hand or dirty gloves. Otherwise, color of a module fixed sheet and metal frame may become dirty during its storage. It is recommended to use clean soft gloves and clean finger stalls when a module is handled at incoming inspection process and production (assembly) process.

(13) Printed circuits board part should not be held and touched. It may cause not to operate properly.

9.2 Precaution to operation

(1) The ambient temperature near the operated module should be satisfied with the absolute maximum ratings. Unless it meets the specifications, sufficient cooling system should be adopted to system.

(2) The spike noise causes the mis-operation of a module. The level of spike noise should be as follows:

$-100mV \leqq$ over- and under- shoot of VDD $\leqq +100mV$

VDD including over- and under- shoot should be satisfied with the absolute maximum ratings.

(3) Optical response time, luminance and chromaticity depend on the temperature of a TFT module.
(4) Sudden temperature change may cause dew on and/or in the a module. Dew makes damage to a polarizer and/or electrical contacting portion. Dew causes fading of displayed quality.
(5) Fixed patterns displayed on a module for a long time may cause after-image. It will be recovered soon.
(6) A module has high frequency circuits. Sufficient suppression to electromagnetic interference should be done by system manufacturers. Grounding and shielding methods may be effective to minimize the interference.
(7) Noise may be heard when a backlight is operated. If necessary, sufficient suppression should be done by system manufacturers.
(8) The module should not be connected or removed while a main system works.
(9) Inserting or pulling I/F connectors causes any trouble when power supply and signal data are on-state. I/F connectors should be inserted and pulled after power supply and signal data are turned off.

9.3 Electrostatic discharge control

(1) Since a module consists of a TFT cell and electronic circuits with CMOS-ICs, which are very weak to electrostatic discharge, persons who are handling a module should be grounded through adequate methods such as a list band. I/F connector pins should not be touched directly with bare hands.
(2) Protection film for a polarizer on a module should be slowly peeled off so that the electrostatic charge can be minimized.

9.4 Precaution to strong light exposure

(1) A module should not be exposed under strong light. Otherwise, characteristics of a polarizer and color filter in a module may be degraded.

9.5 Precaution to storage

When modules for replacement are stored for a long time, following precautions should be taken care of:
(1) Modules should be stored in a dark place. It is prohibited to apply sunlight or fluorescent light during storage. Modules should be stored at 0 to 35℃ at normal humidity (60%RH or less).
(2) The surface of polarizers should not come in contact with any other object. It is recommended that modules should be stored in the Panasonic Liquid Crystal Display's shipping box.

9.6 Precaution to handling protection film

(1) The protection film for polarizers should be peeled off slowly and carefully by persons who are electrically grounded with adequate methods such as a list band. Besides, ionized air should be blown over during peeling action. Dusts on a polarizer should be blown off by an ionized nitrogen gun and so on.
(2) The protection film should be peeling off without rubbing it to the polarizer. Because, if the film is rubbed together with the polarizer, since the film is attached to the polarizer with a small amount of adhesive, the adhesive may remain on a polarizer.
(3) The module with protection film should be stored on the conditions explained in 9.5 (1). However, in case that the storage time is too long, adhesive may remain on a polarizer even after a protection film is peeled off. Besides, in case that a module is stored at higher temperature and/or higher humidity, adhesive may remain on a polarizer. The remained adhesive may cause non-uniformity of display image.
(4) The adhesive can be removed easily with Normal-Hexane or Isopropyl alcohol. The remained adhesive or its vestige on the polarizer should be wiped off with absorbent cotton or other soft materials such as chamois slightly contained Normal-Hexane or Isopropyl alcohol.

9.7 Safety

(1) Since a TFT cell is made of glass, handling to the broken module should be taken care sufficiently in order not to be injured. Hands touched liquid crystal from a broken cell should be washed sufficiently.

(2) The module should not be taken apart during operation so that backlight drives by high voltage.

9.8 Environmental protection

Flexible printed circuits and printed circuits board used in a module contain small amount of lead. Please follow local ordinance or regulations for its disposal.

9.9 Use restrictions and limitations

(1) This product is not authorized for use in life support devices or systems, military applications or other applications which pose a significant risk of personal injury.

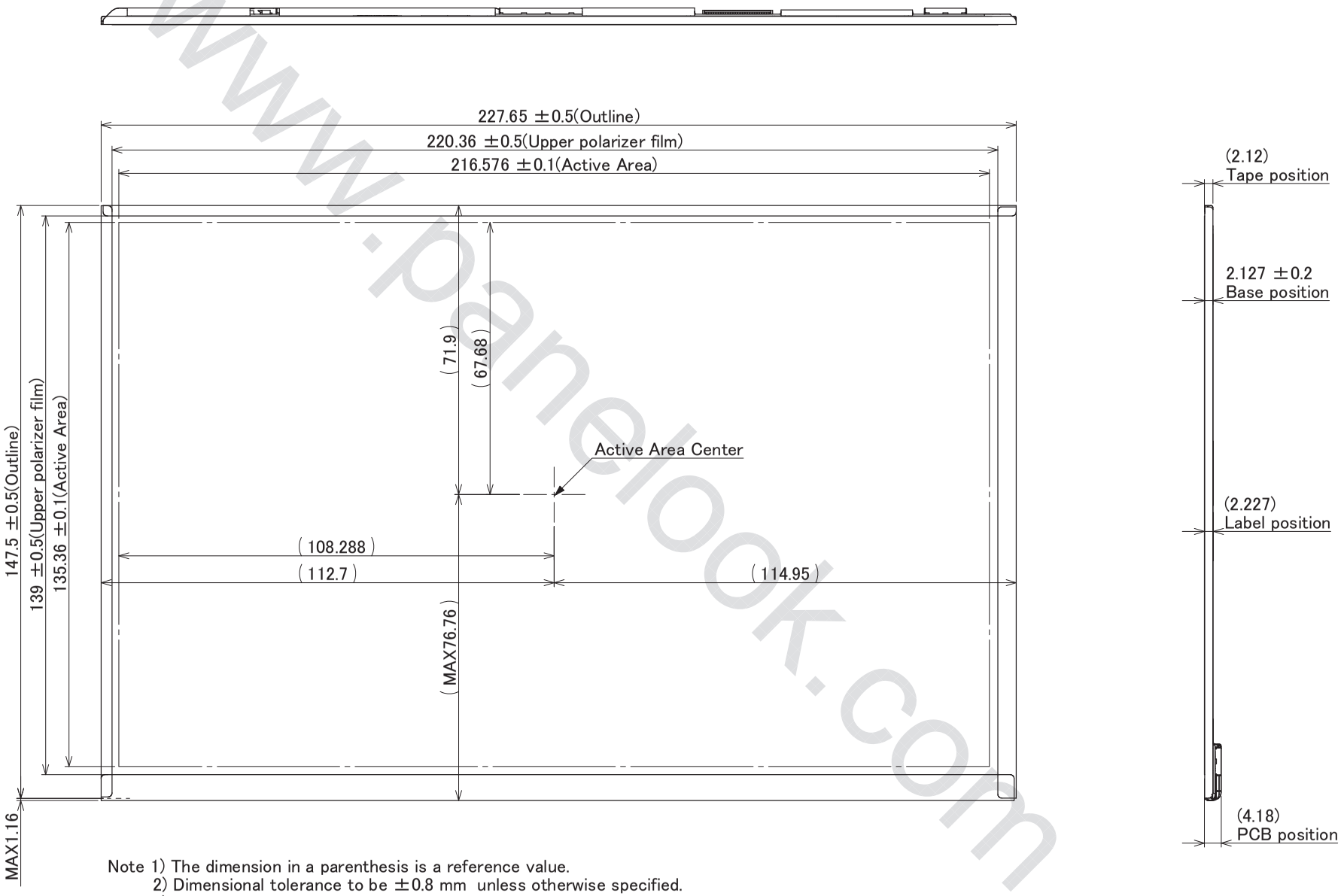
(2) In no event shall Panasonic Liquid Crystal Display Co.,Ltd., be liable for any incidental, indirect or consequential damages in connection with the installation or use of this product, even if informed of the possibility thereof in advance. These limitations apply to all causes of action in the aggregate, including without limitation breach of contact, breach of warranty, negligence, strict liability, misrepresentation and other torts.

9.10 Others

Electrical components which may not affect electrical performance are subjective to change without notice because of their availability.

13. Dimensional Outline

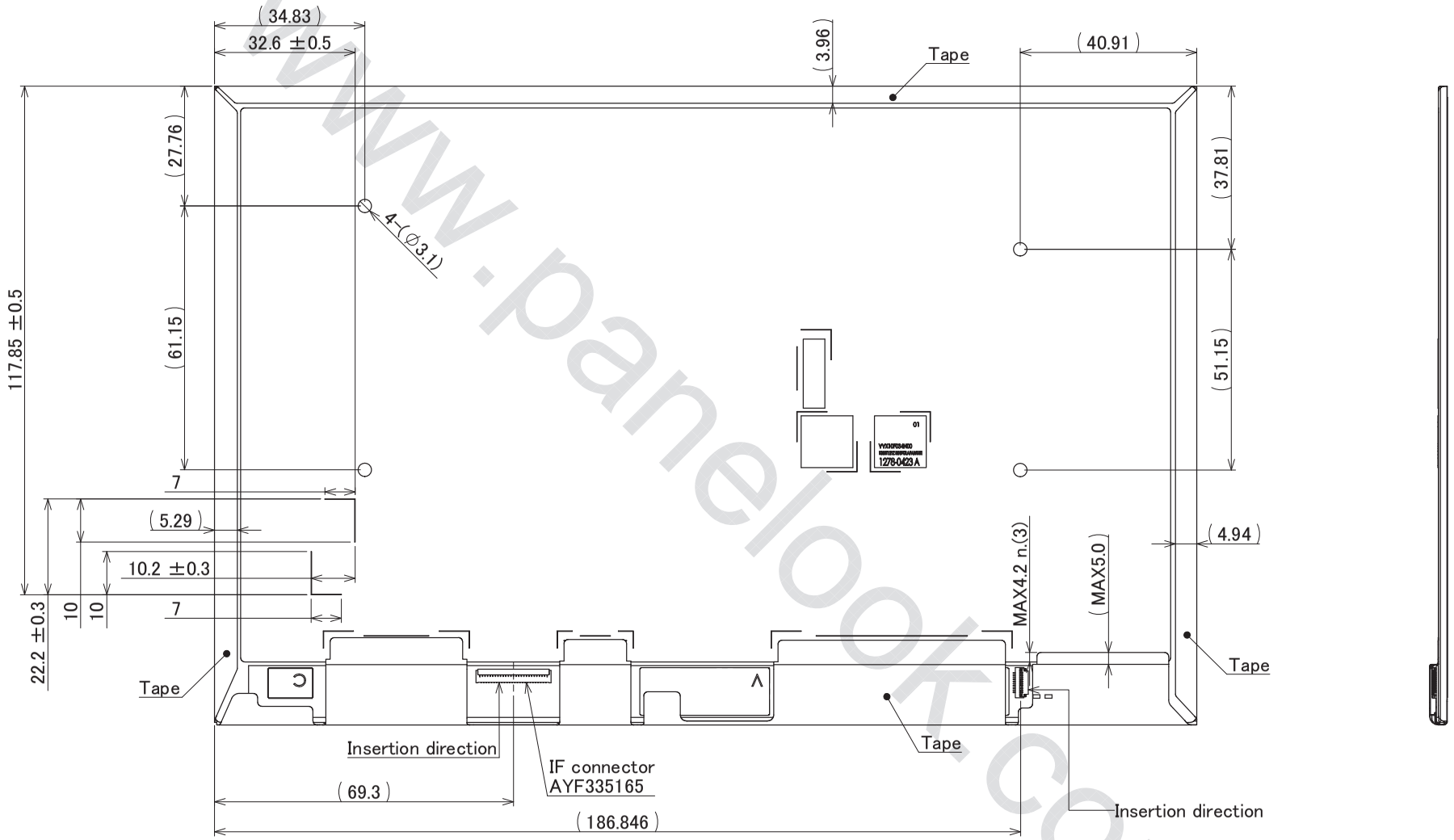
(1) Front view



Note 1) The dimension in a parenthesis is a reference value.
2) Dimensional tolerance to be ±0.8 mm unless otherwise specified.
3) Measurement of outline dimensions are measured in the range of 10±5mm from each corner.

(2) Back view

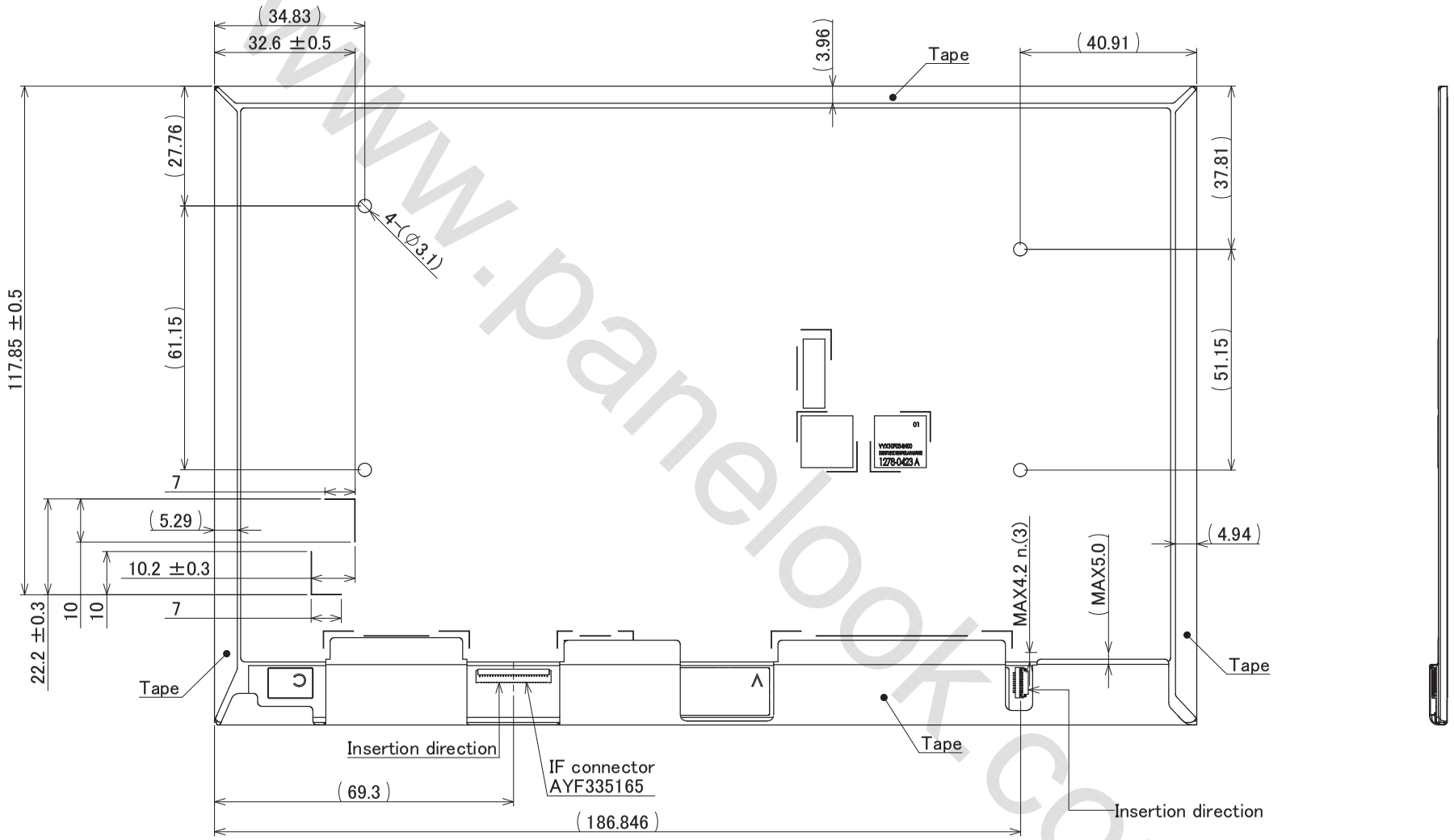
Revsion A



Note 1) The dimension in a parenthesis is a reference value.
2) Dimensional tolerance to be ±0.8 mm unless otherwise specified.
3) It shows the distance to the edge of tape from the edge of drawing.

(2) Back view

Revsion B
Revsion C



Note 1) The dimension in a parenthesis is a reference value.
2) Dimensional tolerance to be ±0.8 mm unless otherwise specified.
3) It shows the distance to the edge of tape from the edge of drawing.