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CERT. No.: 282Q19070712006



CERT. No.: 282E19070712007

Product Specification

Model: TTX102XVT-03C

10.25" TFT Display Module (720*1920)

This module uses RoHS material

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1. GENERAL DESCRIPTION

1.1 DESCRIPTION

TTX102XVT-03C is a transmissive type color active matrix TFT (Thin Film Transistor) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT-LCD module (TFT-LCD panel, driver IC and FPC), a back-light unit and. The resolution of 720*1920 pixels.

1.2 GENERAL INFORMATION

Items	Specification	Unit	Note
Display mode	TFT Transmissive, Positive, NW,	-	-
LCM outline size	98.73(H) x 258.61(V) x 4.91(T)	mm	Note (1)(2)
Active area	91.37(H)x243.65(V)	mm	-
Number of pixels	720x1920	pixels	-
Pixel arrangement	RGB stripe	-	-
Pixel size	0.1905(H)x0.1905(V)	mm	-
Display color	16.7M	color	-
Viewing direction	ALL	-	-
Data interface	MIPI+TP(In-Cell)	-	-
Backlight	8 White LEDs In Series 3 Parallels	-	-
Weight	TBD	g	-

Notes:

- (1) Touch panel and back-light unit are included.
- (2) FPC no included. (Refer to the module outline dimension for further information). Please see module specification drawing in Page14 for more details.

2. ELECTRICAL CHARACTERISTICS

2.1 LCM DC CHARACTERISTICS

(Ta=25±2°C)

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Power Supply Voltage 1	VDD	-	1.8	-	V	
Power Supply Voltage 2	AVDD	9	9.6	12	V	
Power Supply Voltage 3	VGH	-	-	-	V	
Power Supply Voltage 4	VGL	-	-	-	V	
Power Supply Voltage 5	VCOM	-	-	-	V	Note 1
Current Consumption	I _{DD}	-	40	-	mA	Normal mode
	I _{DD-SLEEP}		2		mA	Sleep mode
Input voltage "L" Level	V _{IL}	GND	-	0.3VDD1	V	DVDD=3.0~3.6
Input voltage "H" Level	V _{IH}	0.7VDD1	-	VDD1	V	
Output voltage "L" Level	V _{oL}	0	-	0.2VDD1	V	I _{oL} =1mA
Output voltage "H" Level	V _{oH}	0.8VDD1	-	VDD1	V	I _{oH} =-1mA

Note:

(1) vcom must be adjusted to optimize display quality_flicker pattern.

2.2 BACK-LIGHT UNIT CHARACTERISTICS

The back-light system is an edge-lighting type with 27 white LEDs. The characteristics of the back-light are shown in the following tables.

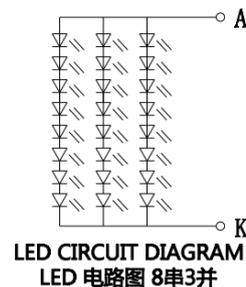
(Ta=25±2°C)

Characteristics	Symbol	Condition	Min.	Type	Max.	Unit	Notes
Forward Voltage	V _f	I _L =210mA	22.4	24	26.4	V	-
Forward current	I _L		--	140	--	mA	-
LED life time	--	I _L =210mA	20,000	30,000	--	Hr	Note 1
LCM luminance	--	I _L =210mA	400	500	--	Cd/m ²	

Note:

 (1) The "LED life time" is defined as the module brightness decrease to 50% of original brightness at I_L=210mA. The LED life time could be decreased if operating I_L is larger than 210mA.

Backlight circuit diagram shown in below:



3. OPTICAL CHARACTERISTICS

The following items are measured under stable conditions. The optical characteristics should be measured in a dark room.

Measuring equipment: BM-5AS, BM-7, EZ-Contrast.

(Ta=25±2°C)

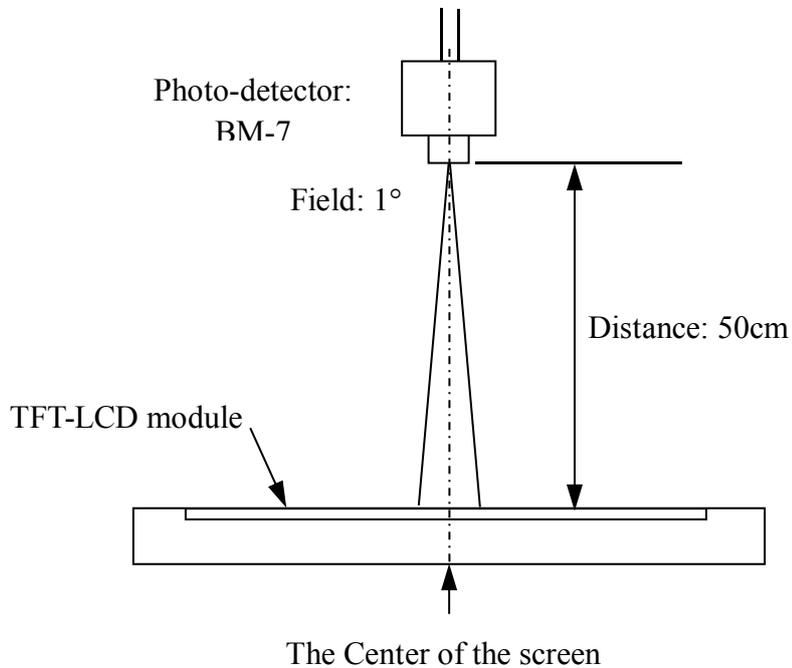
Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit	Note	
Contrast Ratio (Center point)	C/R	-	800	1000	-	-	BM-7 Note(2)	
Luminance uniformity	U _w	$\theta = 0$. Normal viewing angle B/L On Note(1)	80	-	-	%	BM-7 Note(3)	
Response Time	Tr + Tf		-	30	40	ms	BM-5AS Note(4)	
Color Chromaticity (CIE 1931)	White		W _x	-	-	-	-	BM-7 Note(5)
			W _y	-	-	-		
	Red		R _x	-0.04	0.652	+0.04		
			R _y	-0.04	0.326	+0.04		
	Green		G _x	-0.04	0.284	+0.04		
			G _y	-0.04	0.579	+0.04		
	Blue		B _x	-0.04	0.137	+0.04		
			B _y	-0.04	0.085	+0.04		
Viewing Angle	Hor.	θ_L	-	85	-	Deg	EZ Contrast Note(6)	
		θ_R	-	85	-			
	Ver.	θ_u	-	85	-			
		θ_D	-	85	-			
Optima View Direction			ALL				Note(7)	

* This condition will be changed by the evaluation circumstance. If product is exposed to high temperatures for extended time, there is a possibility of the polarizer film damage which could degrade the optical characteristics.

Notes:

- (1) Test Equipment Setup: After stabilizing and leaving the panel alone at a given temperature for 30min, the measurement should be executed. Measurement should be executed in a stable, windless, and dark room 30min after lighting the back-light. This should be measured in the

center of screen.

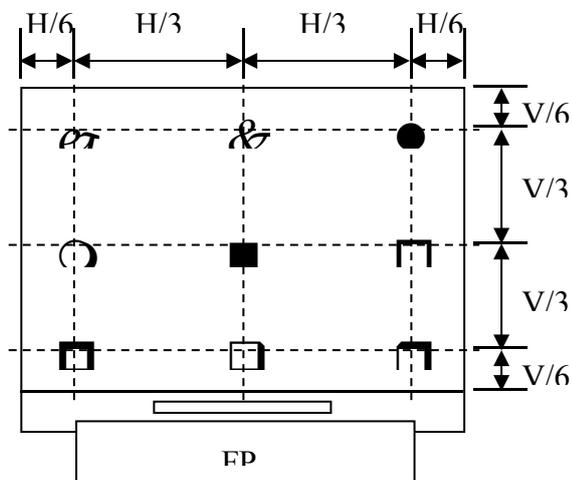


(2) Definition of Contrast Ratio (CR):

$$\text{Contrast Ratio (CR)} = \frac{\text{Luminance measured when LCD on the "white" state}}{\text{Luminance measured when LCD on the "black" state}}$$

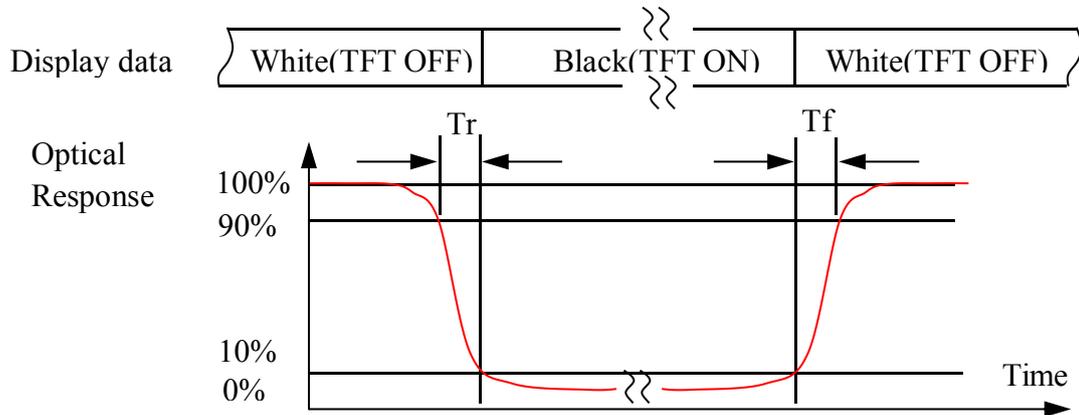
(3) Definition of Luminance Uniformity: Active area is divided into 9 measuring areas (Shown in below), every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity} = \frac{\text{Min Luminance of white among 9-points}}{\text{Max Luminance of white among 9-points}} \times 100\%$$

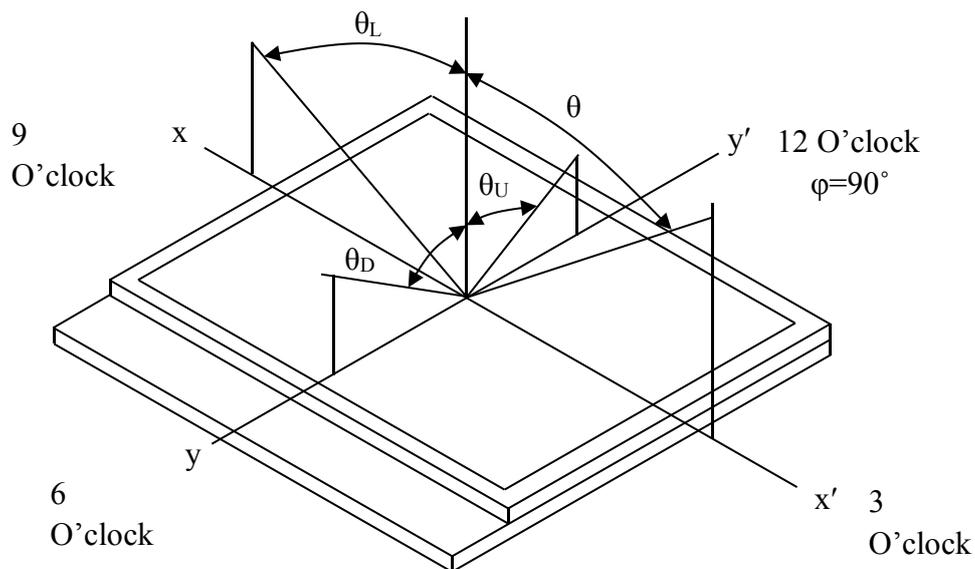


The spot locations for luminance measurement

(4) Definition of Response time: Sum of T_r and T_f .



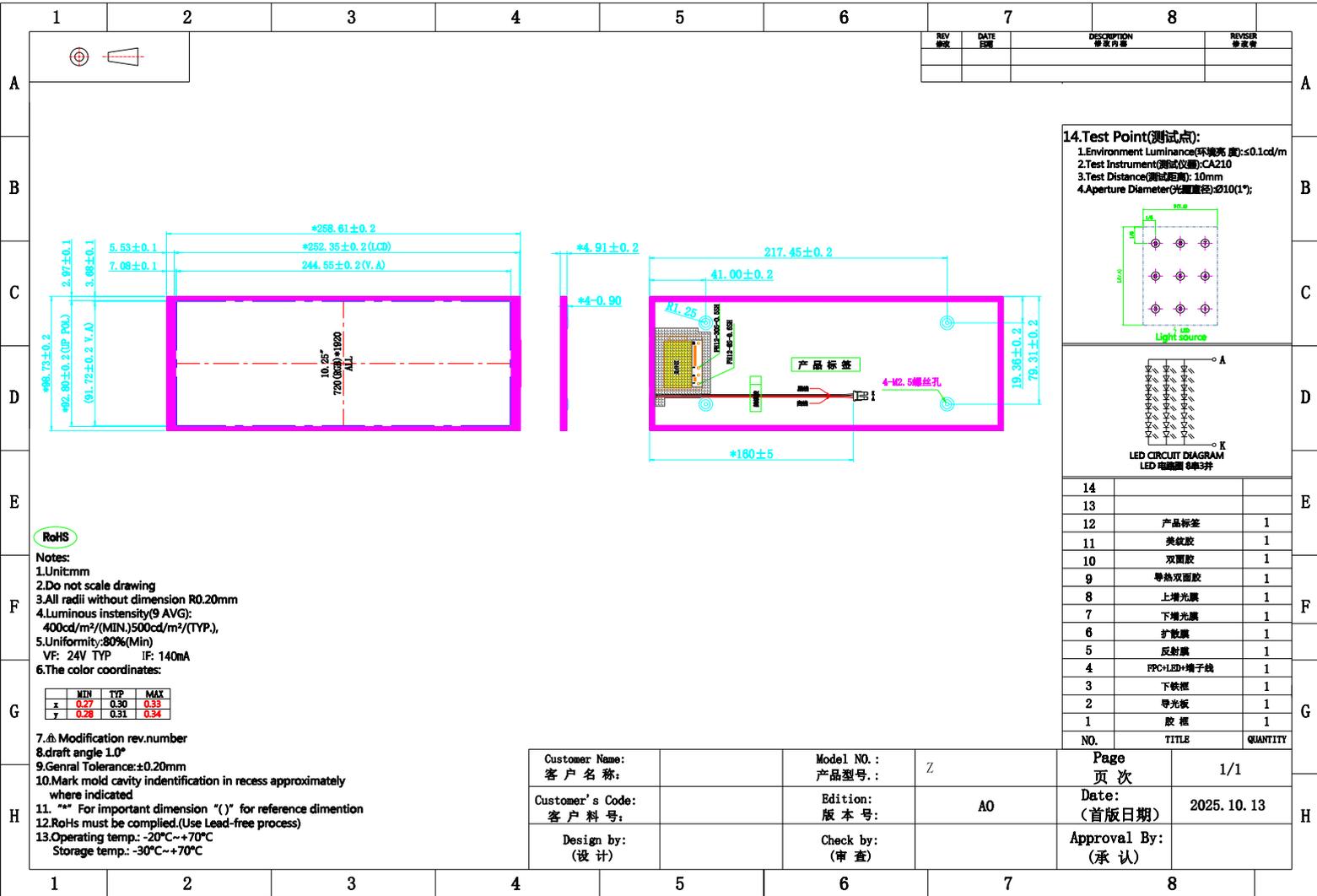
(5) Definition of Viewing Angle: The viewing angle range that the $CR \geq 10$.



(6) Definition of Color Chromaticity (CIE 1931)

Color coordinate of white & red, green, blue at center point.

(7) The different Rubbing Direction will cause the different optima view direction.



5. MODULE INTERFACE DESCRIPTION

5.1 LCM

No.	Symbol	I/O	Function
1	VCOM	P	VCOM buffer in(NC)
2	VDD	P	Power supply for digital circuits(1.8V)
3	VDD	P	Power supply for digital circuits(1.8V)
4	NC	-	No Connection
5	RESET	I	Device reset signal
6	STBYB	I	Standby mode.
7	GND	P	Ground
8	D0N	I/O	High speed interface data differential signal input/output pins.
9	D0P	I/O	High speed interface data differential signal input/output pins.
10	GND	P	Ground
11	D1N	I	High speed interface data differential signal input pins
12	D1P	I	High speed interface data differential signal input pins
13	GND	P	Ground
14	CLKN	I	High speed interface CLOCK differential signal input pins.
15	CLKP	I	High speed interface CLOCK differential signal input pins.
16	GND	P	Ground
17	D2N	I	High speed interface data differential signal input pins
18	D2P	I	High speed interface data differential signal input pins
19	GND	P	Ground
20	D3N	I	High speed interface data differential signal input pins
21	D3P	I	High speed interface data differential signal input pins
22	GND	P	Ground
23	NC	-	No Connection
24	AVDD	P	Power supply for analog circuits(9.6V)
25	NC	-	No Connection
26	VGL	P	Negative power for TFT(NC)
27	NC	-	No Connection
28	VGH	P	Positive power fot TFT(NC)
29	NC	-	No Connection
30	GND	P	Ground

5.2 TP

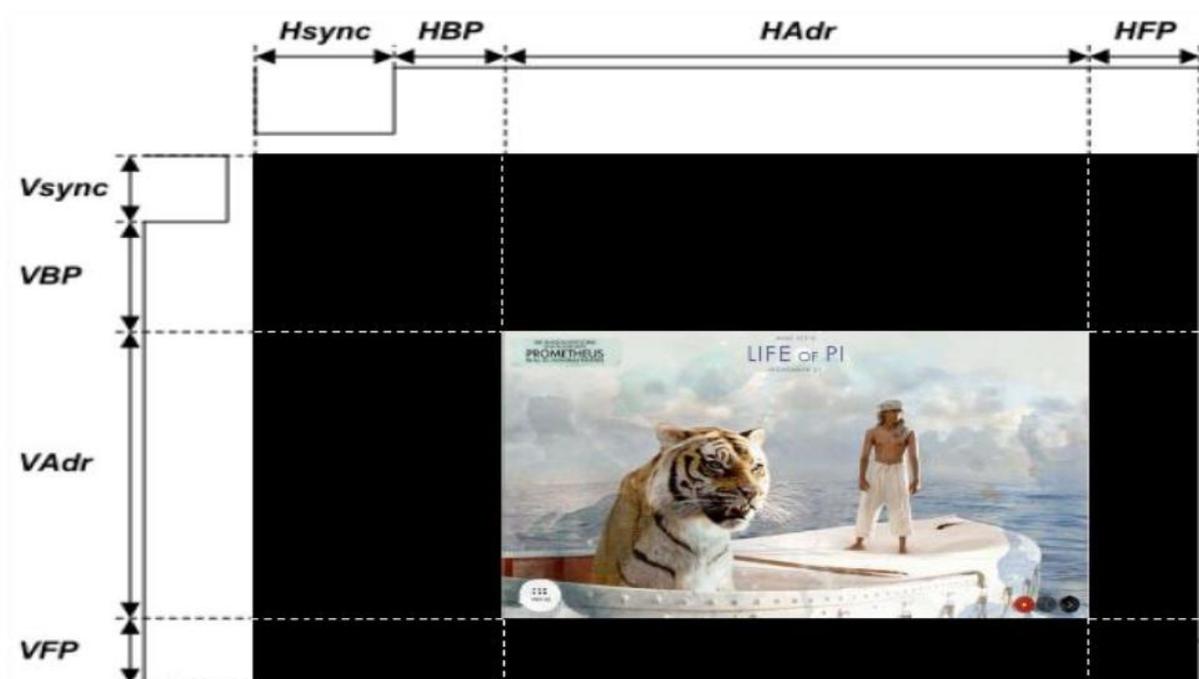
NO.	PIN
1	TP_RESET
2	TP_VDD
3	GND
4	TP_INT
5	TP_SDA
6	TP_SCL

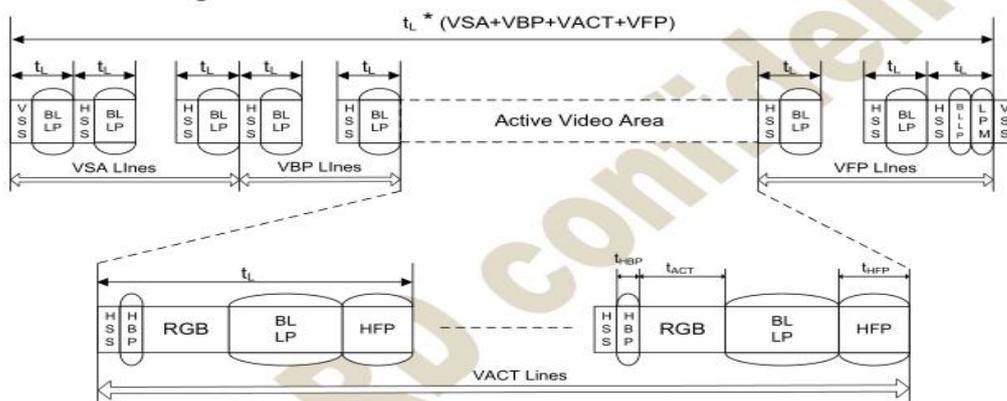
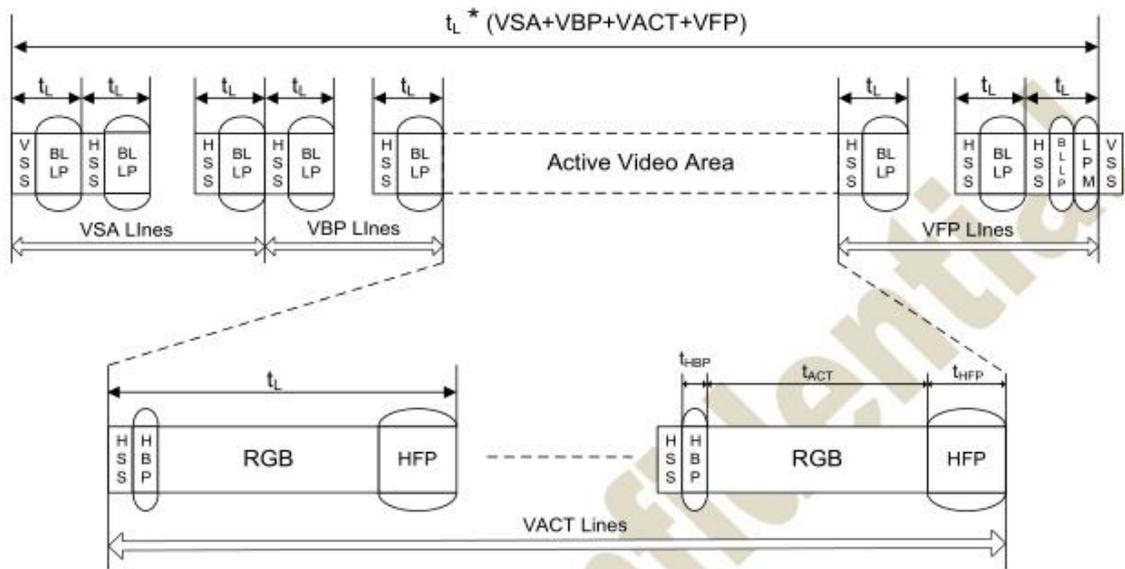
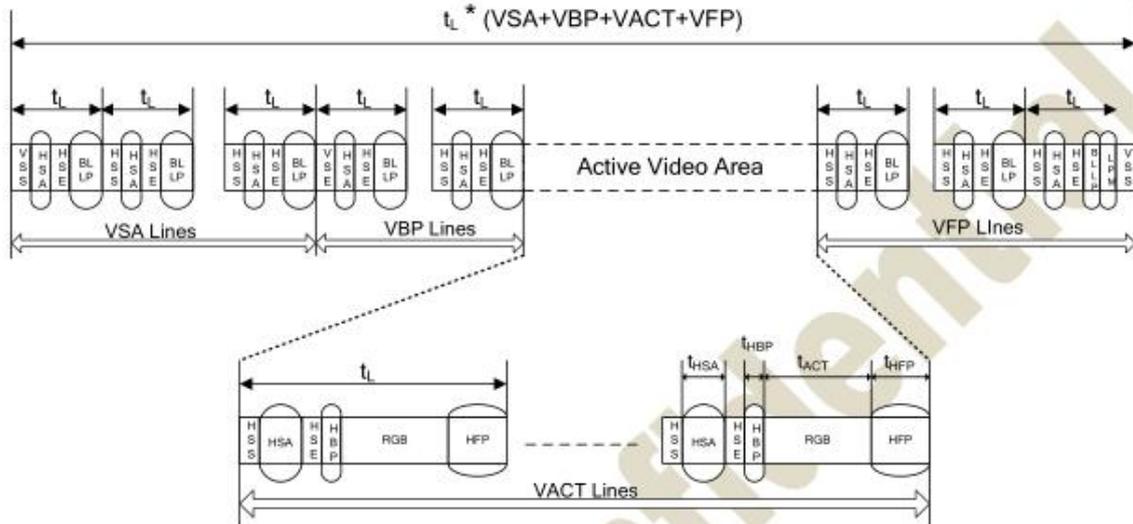
6. REFERENCE APPLICATION CIRCUIT

Please consult our technical department for detail information.

7. TIMINGS FOR MIPI Interface

7.1 Timing Waveform





7.2 Power on/off

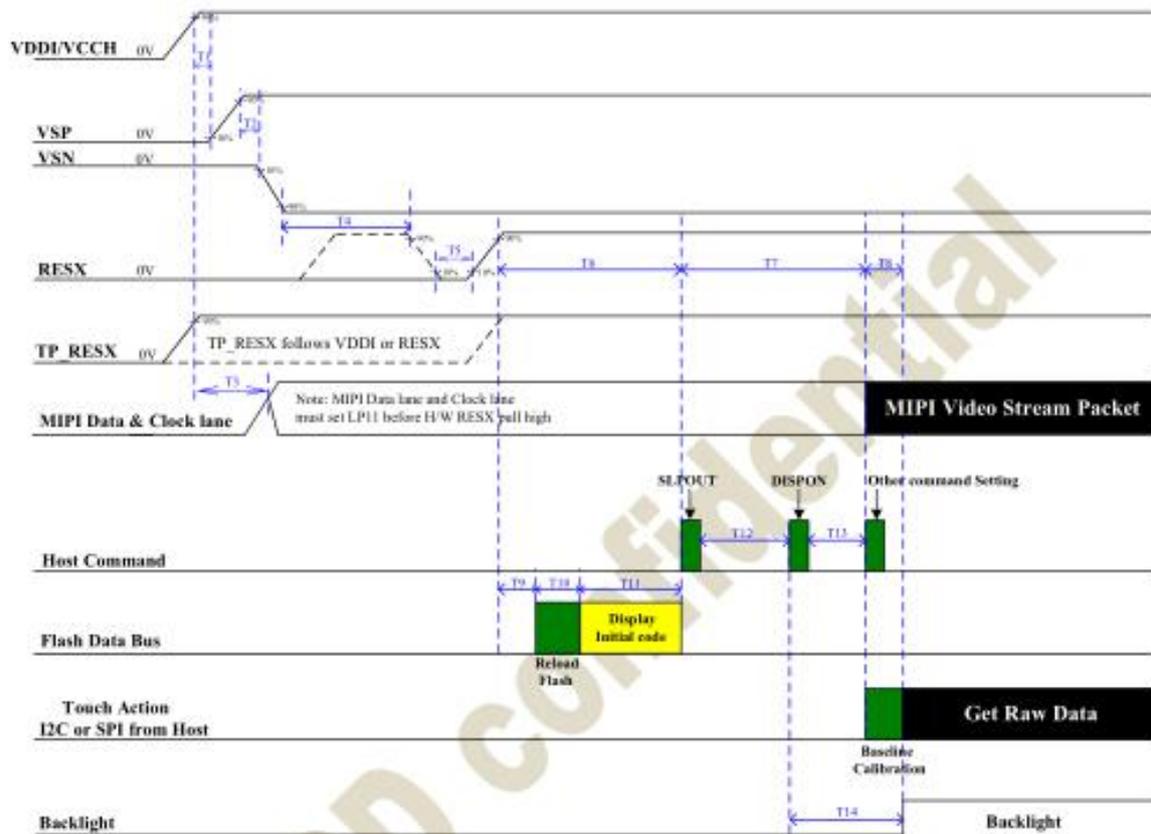


Figure 8.1: Power on sequence by FW

Symbol	Description	Min	Max	Unit	Note
T1	VDD1 to VSP	1	-	ms	
T2	VSP to VSN	1	-	ms	
T3	VDD1 to MIPI Lane	1	-	ms	
T4	Power Ready to Global Reset	1	-	ms	
T5	Global Reset Keep Low	15	-	us	TP Reset is the same
T6	Global Reset to Sleep Out	155	-	ms	
T7	Video Stream Start and Host TP Data Bus Active	140	-	ms	
T8	AP Start to Get Raw Data	30	-	ms	
T9	Reset to Flash Reload	-	5	ms	
T10	Flash Reload Time	-	50	ms	Default: 6MHz
T11	Display initial code by FW	-	100	ms	
T12	Sleep Out to Display On	10	-	ms	
T13	Display On to IC Ready	20	-	ms	
T14	Display On Command to BL On time	40	-	ms	

8. RELIABILITY TEST CONDITIONS

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta=+70°C, 240hrs	-
2	Low Temperature Storage	Ta=-30°C, 240hrs	-
3	High Temperature Operation	Ta=+70°C, 240hrs	-
4	Low Temperature Operation	Ta=-20°C, 240hrs	-
5	High Temperature and High Humidity (Operating)	Ta=+60°C, 90%RH, 240hrs	-

Note: (1) All tests above are practiced at module type.

(2) There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.