

PRODUCT SPECIFICATION

PRODUCT 产品规格: 4.0" TFT

MODEL NO. 模组型号: UE040WV-IH39-A011

CUSTOMER 客户: _____

SPECIFICATION

FOR

UE040WV-IH39-A011

产品规格书

版本: V 1.0

Customer Confirmation column 客户确认栏

Approved by 核准: _____ Dept. 部门: _____ Data 日期: _____

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Revision History

Version NO.	DATE	Description	Remark
V1.0	2017.11.7	Original	

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CONTENTS 内容

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1. GENERAL INFORMATION

1.1 features

- 1) Display Format: 4" WVGA Vertical Stripe (480*800)
- 2) Interface : 24Bit RGB
- 3) Driver IC :ILI9806E
- 4) Touch IC : ST1633i
- 5) Operation Temperature : -20~70°C
- 6) Storage Temperature : -30~80°C
- 7) Backlight Type: White LED
- 8) Display mode: Normally Black
- 9) CTP cover lens : Panda Glass (熊猫钢化玻璃)
- 10)CTP surface hardness : ≥7H
- 11)CTP boot or wakeup response time : 40ms
- 12 LED life time : 3~5W Hr

1.2 mechanical specification

Item of	Contents	Unit
LCD Type	TFT/TRANSMISSIVE	/
Panel Size	4.0	inch
Pixel arrangement	480*3(RGB)*800	Dots
Active Area	52.44(H)*87(V)	Mm
Pixel pitch (W*H)	0.108(H)*0.108(V)	Um
Module area (W*H*T) (LCM+TP)	57.14(H)*96.85(V)*3.395(T)	Mm
Recommended Viewing Direction	All	0 ' clock
Weight	TBD	g

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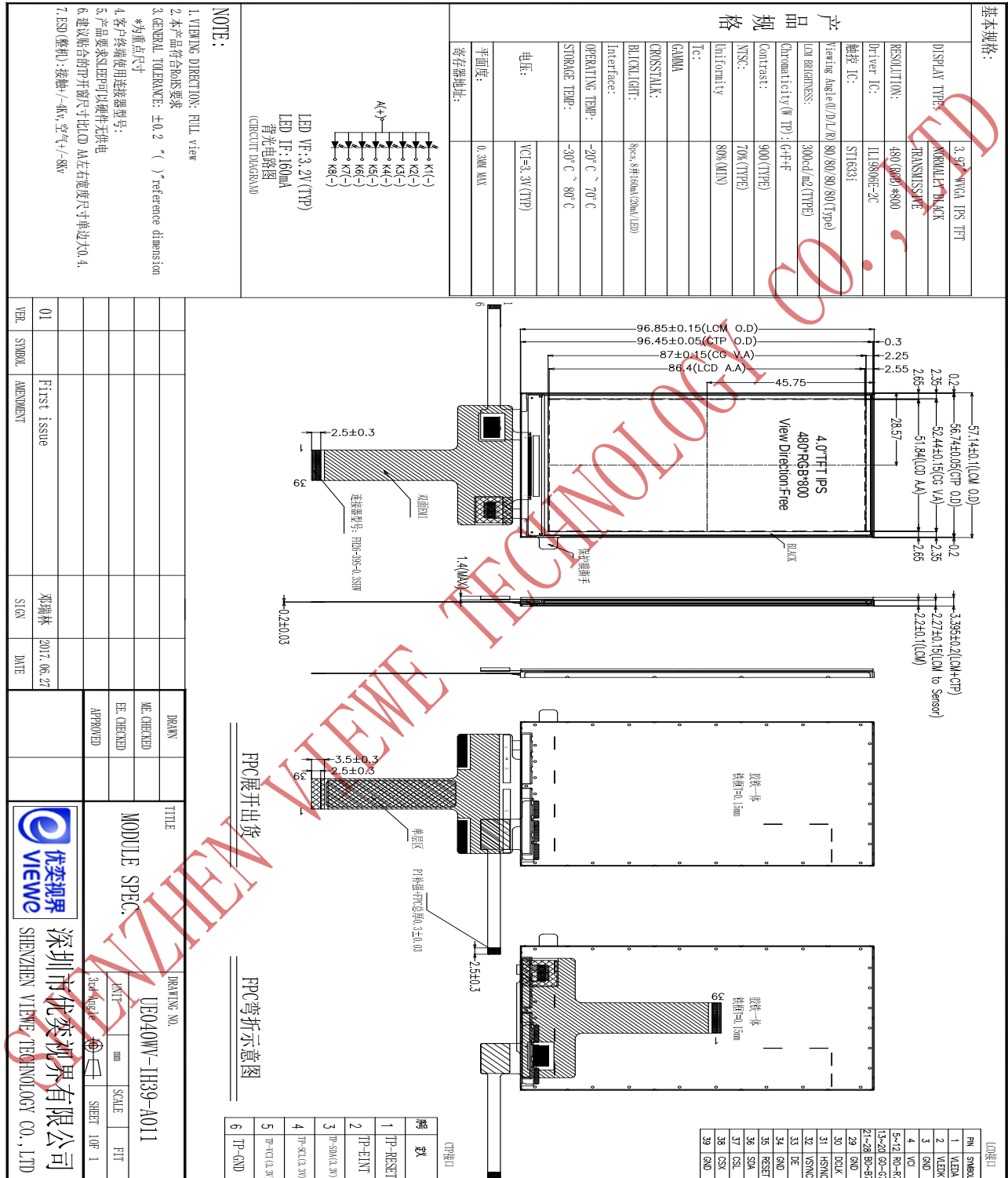
2. ABSOLUTE MAXIMUM RATINGS

(GND=AGND=0V)

Parameter of absolute maximum ratings 参数	Symbol 符号	Min 最小值	Max 最大值	Unit 单位
Power voltage supply1	VCI	-0.3	4.6	V
Power voltage supply2	TP-VCI	-0.3	4.6	V
Backlight forward current	I _{LED}	-0.001	30	mA(For each led)
Reverse Voltage	V _R	-	5	V
Operating temperature	T _{op}	-20	70	°C
Storage temperature	T _{st}	-30	80	°C
Humidity	RH	-	90%(Max)/60°C	RH

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3. DIAGRAM FOR LCM



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4. I/O CONNECTION & BLOCK DIAGRAM

4.1 I/O connection

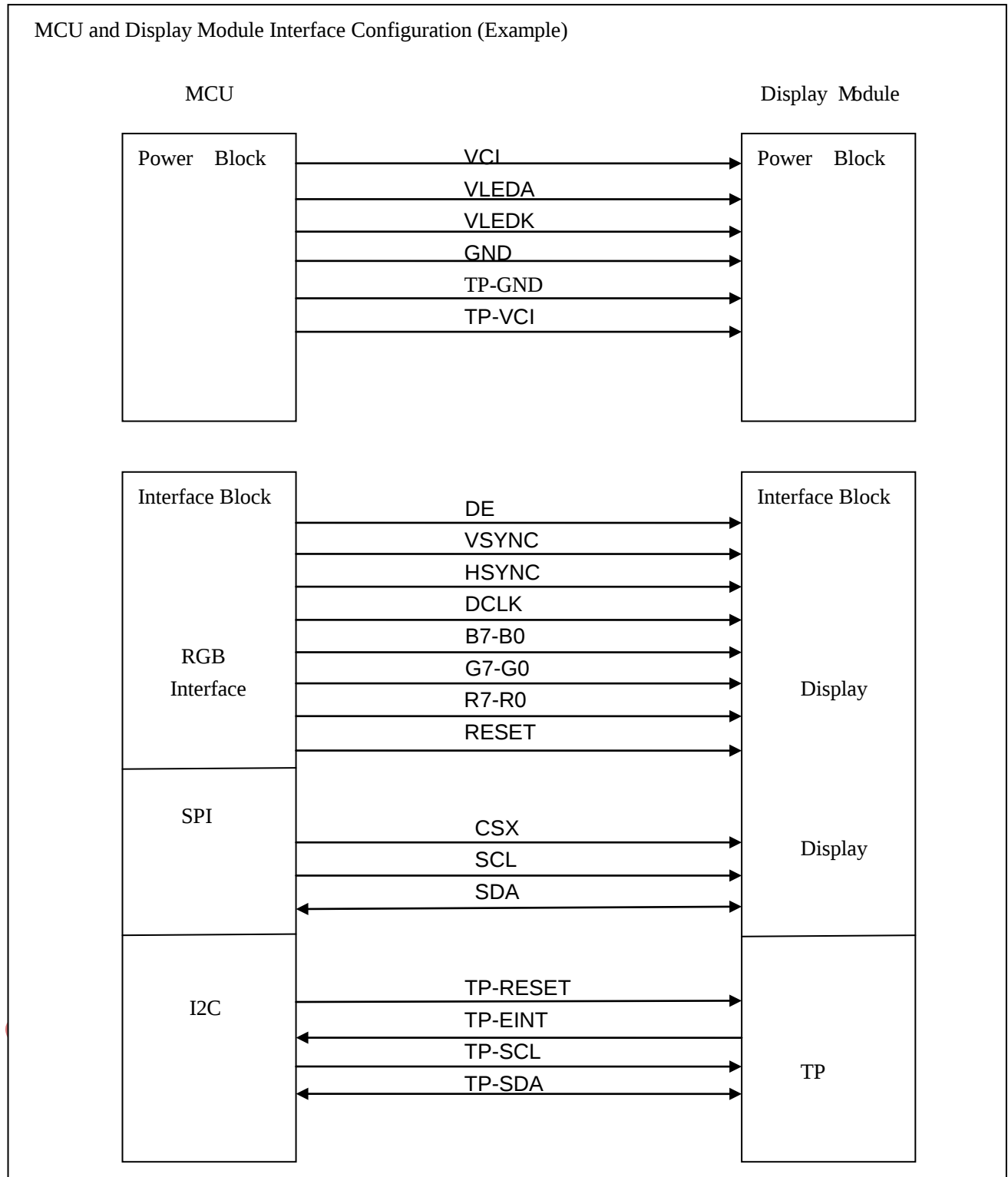
LCM Pin NO.	Symbol	I/O	Description
1	VLEDA	I	Back light anode
2	VLEDK	I	Back light cathode
3.	GND	P	Power Ground
4	VCI	P	Power Supply for LCM
5~12	R0-R7	I	Red data input.
13~20	G0-G7	I	Green data input.
21~28	B0-B7	I	Blue data input.
29	GND	P	Power Ground
30	DCLK	I	Dot clock signal for RGB interface operation.
31	HSYNC	I	Line synchronizing signal for RGB interface operation
32	VSYNC	I	Frame synchronizing signal for RGB interface operation
33	DE	I	Data enable signal for RGB interface operation.
34	GND	P	Power Ground
35	RESET	I	The signal will reset the LCM, Signal is active low.
36	SDA	I/O	Serial in/out signal, for initial RGB I/F. The data is applied on the rising edge of the SCL signal.
37	CSL	I	serial interface clock, for initial RGB I/F.
38	CSX	I	Chip select input pin ("Low" enable), for initial RGB I/F.
39	GND	P	Power Ground

TP Pin NO.	Symbol	I/O	Description
1	TP-RESET	I	The signal will reset the TP, Signal is active low.
2	TP-EINT	O	Interrupt signals for TP
3	TP-SDA	I/O	I2C data signals for TP
4	TP-SCL	I	I2C clock signals for TP
5	TP-VCI	P	Power Supply for TP
6	TP-GND	P	Power Ground

I : Input ; O : Output ; P : Power

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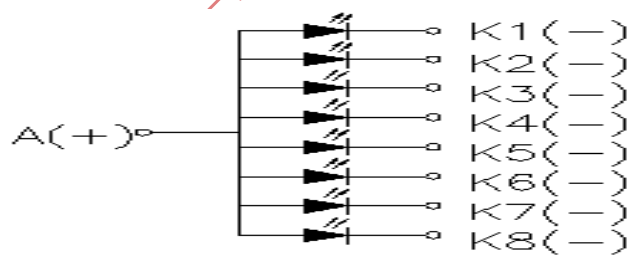
4.2 block diagram



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5. ELECTRICAL CHARACTERISTICS
5.1 Typical Operation Conditions

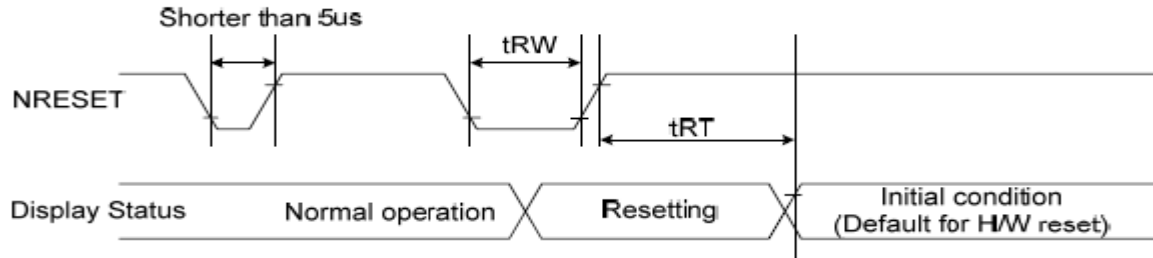
Item	Symbol	Values			Unit	Remarks
		Min.	Typ.	Max.		
Power Voltage Supply1	VCI	2.8	3.3	3.6	V	
Power Voltage Supply2	TP-VCI	2.8	3.3	3.6	V	
Luminance (LCM+TP)	Lv	-	300	-	cd/m ²	
Backlight Forward Voltage	Vf	3.0	3.2	3.4	V	
LED Forward Current	If	-	160	-	MA	Note

Note: The "LED life time" is defined as the module brightness decrease to 50% of original brightness at $I_L=20\text{Ma}$ (for each led). The LED life time could be decreased if operating I_L is larger than 20mA



LED VF: 3.2V (TYP)
LED IF: 160mA
背光电路图

背光电路

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5.2 Reset Timing

Table 1 Reset Timing

Signal	Symbol	Parameter	Min	Max	Unit
RESX	tRW	Reset pulse duration	10		us
	tRT	Reset cancel		5(note 1,5) 120 (note 1,6,7)	ms

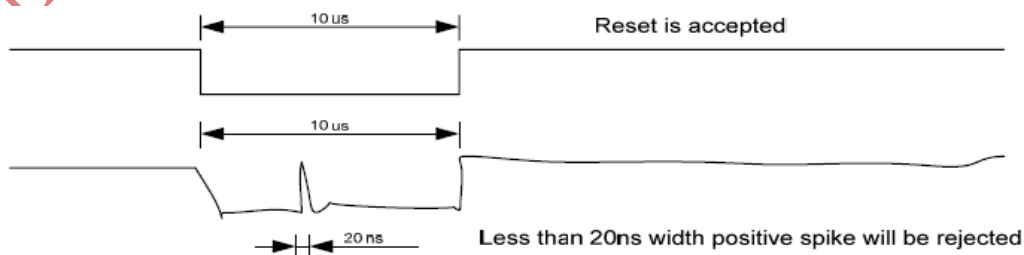
Note :

1. The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from OTP to registers. This loading is done every time when there is H/W reset cancel time (tRT) within 5 ms after a rising edge of RESX.
2. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the Table 2.

Table 2 Reset Descript

RESX Pulse	Action
Shorter than 5us	Reset Rejected
Longer than 9us	Reset
Between 5us and 9us	Reset starts

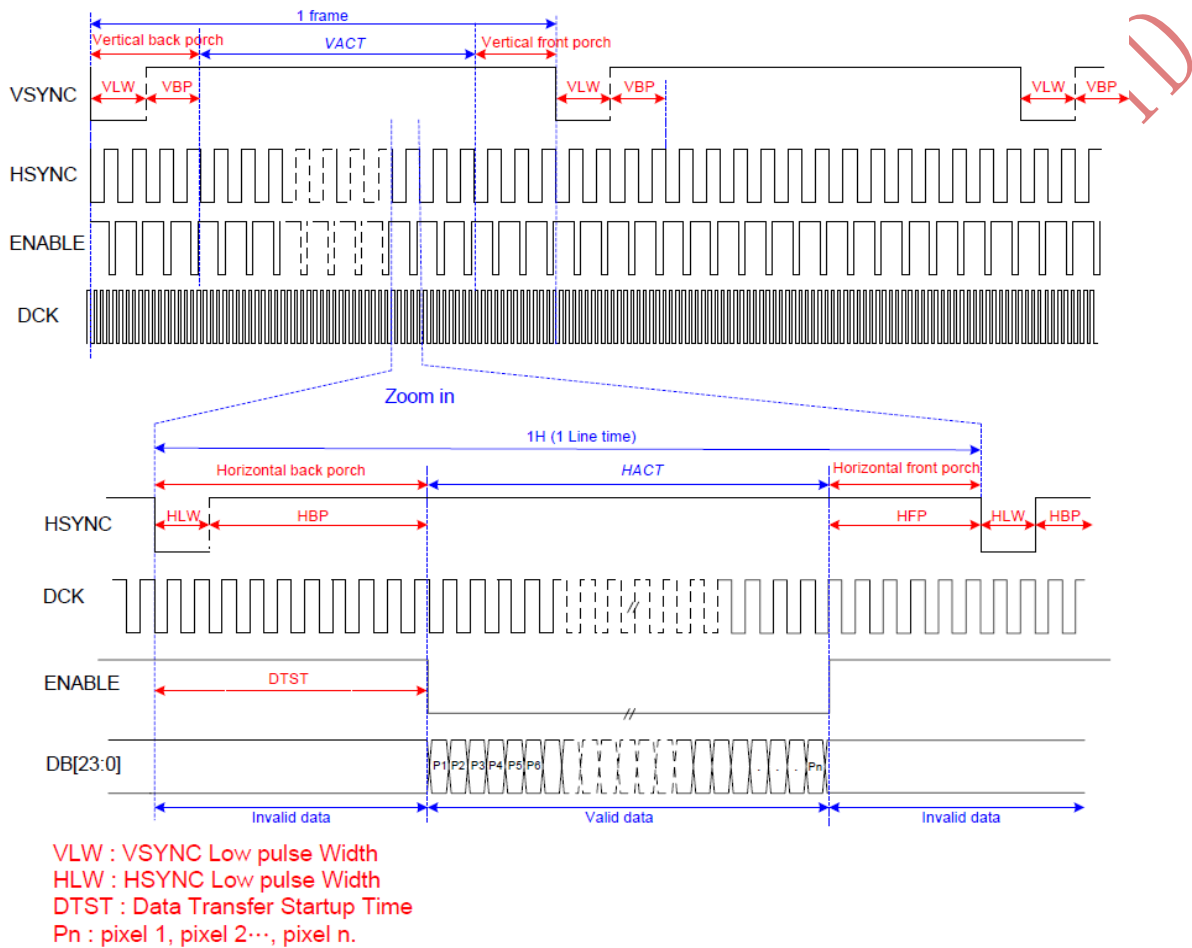
3. During the Resetting period, the display will be blanked (The display is entering blanking sequence, which maximum time is 120 ms, when Reset Starts in Sleep Out mode. The display remains the blank state in Sleep In mode.) and then return to Default condition for Hardware Reset.
4. Spike Rejection also applies during a valid reset pulse as shown below:



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5.3 DPI Interface Timing

The timing chart of 24-/18-/16-bit DPI (RGB) interface mode is illustrated in Figure 1.



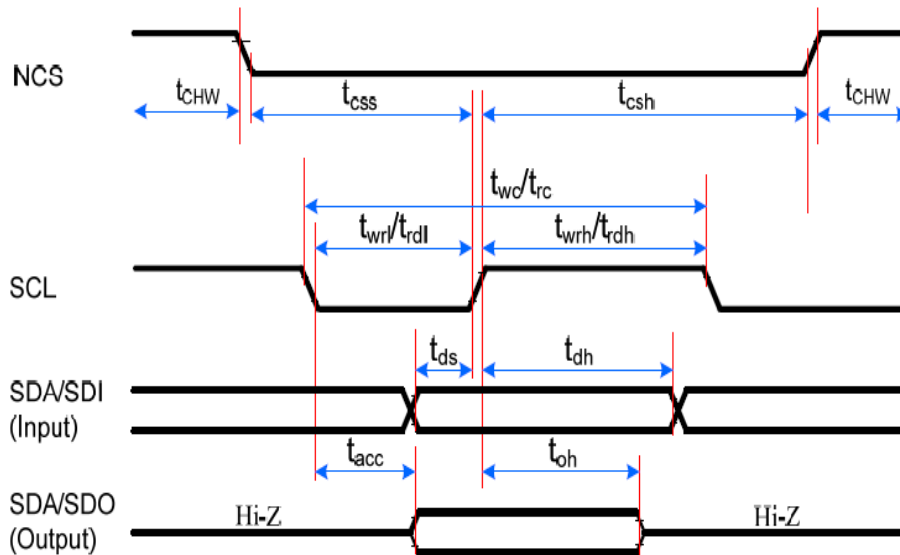
Parameter	Symbols	Condition	Min.	Typ.	Max.	Units
Frame Rate	FR		54		66	fps
Horizontal Low Pulse width	HLW		1		-	DOTCLK
Horizontal Back Porch	HBP		2		126	DOTCLK
Horizontal Address	HACT			480		DOTCLK
Horizontal Front Porch	HFP		2		-	DOTCLK
Vertical Low Pulse width	VLW		1		126	Line
Vertical Back Porch	VBP		1		126	Line
Vertical Address	VACT				864	Line
Vertical Front Porch	VFP		1		255	Line
Data Clock	DCLK		16.6		41.7	MHz

Figure 1 DPI Interface Timing diagram

NOTE:

Note1. $HLW + HBP + HFP \geq 2\mu s$.

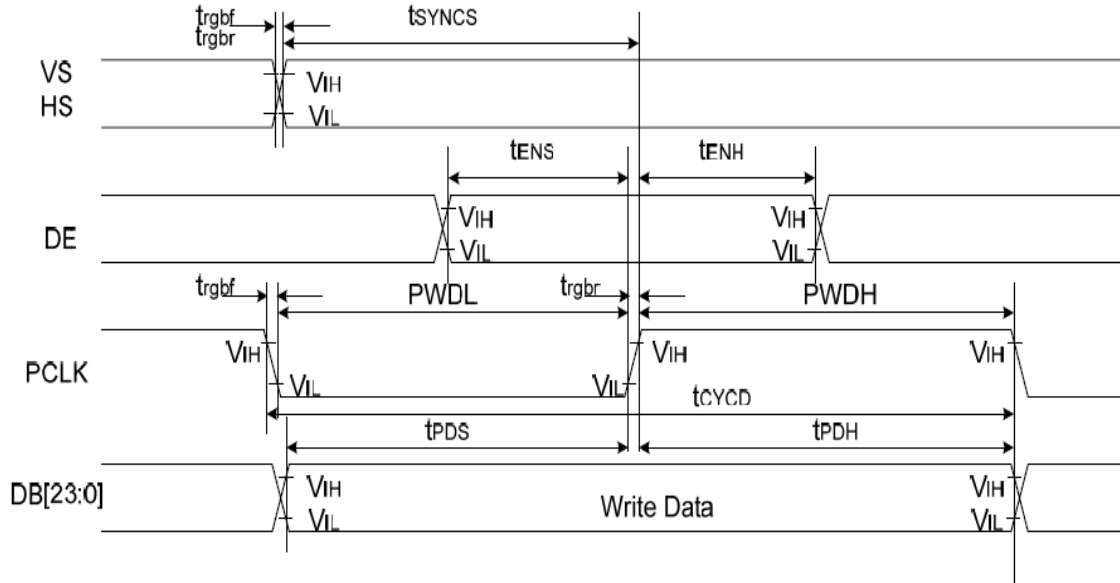
Note2. VSPL='0', HSPL='0', DPL='0' and EPL='0' of "(Interface Mode Control 21h of the Page 1)" command.

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5.4 AC Characteristics
5.4.1 Display Serial Interface Timing Characteristics (3-line SPI system)


Signal	Symbol	Parameter	min	max	Unit	Description
CSX	t _{css}	Chip select time (Write)	15	-	ns	
	t _{csH}	Chip select hold time (Read)	15	-	ns	
	t _{CHW}	CS "H" pulse width	40	-	ns	
SCL	t _{wc}	Serial clock cycle (Write)	30	-	ns	
	t _{wrh}	SCL "H" pulse width (Write)	10	-	ns	
	t _{wrl}	SCL "L" pulse width (Write)	10	-	ns	
	t _{rc}	Serial clock cycle (Read)	150	-	ns	
	t _{rdh}	SCL "H" pulse width (Read)	60	-	ns	
	t _{rdl}	SCL "L" pulse width (Read)	60	-	ns	
SDA/SDO (Output)	t _{acc}	Access time (Read)	10	100	ns	For maximum CL=30pF
	t _{oh}	Output disable time (Read)	15	100	ns	For minimum CL=8pF
SDA/SDI (Input)	t _{ds}	Data setup time (Write)	10	-	ns	
	t _{dh}	Data hold time (Write)	10	-	ns	

Note:

1. T_a = -30 to 70 °C, IOVCC=1.65V to 3.6V, VCI=2.5V to 3.6V, T=10+/-0.5ns.
2. Does not include signal rise and fall times.

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5.4.2 Parallel 24/18/16-bit RGB Interface Timing Characteristics


Signal	Symbol	Parameter	min	max	Unit	Description
VS/ HS	t_{SYNCS}	VS/HS setup time	5	-	ns	24/18/16-bit bus RGB interface mode
	t_{SYNCH}	VS/HS hold time	5	-	ns	
DE	t_{ENS}	DE setup time	5	-	ns	
	t_{ENH}	DE hold time	5	-	ns	
DB[23:0]	t_{POS}	Data setup time	5	-	ns	
	t_{PDH}	Data hold time	5	-	ns	
PCLK	PWDH	PCLK high-level period	13	-	ns	
	PWDL	PCLK low-level period	13	-	ns	
	t_{CYCD}	PCLK cycle time	28	-	ns	
	t_{RGBR}, t_{RGBF}	PCLK, HS, VS rise/fall time	-	15	ns	

Note: $T_a = -30$ to $70\text{ }^{\circ}\text{C}$, $IOVCC=1.65\text{V}$ to 3.6V , $VCI=2.5\text{V}$ to 3.6V , $DGND=0\text{V}$

5.5 DC Characteristics for LCD&CTP Driving

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply power1	VCI/	2.5	3.3	3.6	V	-
Supply power2	TP-VCI	2.5	3.3	3.6	V	Note1,2
LogicHighlevelinput voltage	V_{IH}	$0.7 \cdot VCI$	-	VCI	V	Note1
LogicLowlevel input voltage	V_{IL}	-0.3	-	$0.3 \cdot VCI$	V	Note1
LogicHighleveloutputvoltage	V_{OH}	$0.8 \cdot VCI$	-	VCI	V	Note1
LogicLowleveloutputvoltage	V_{OL}	0	-	$0.2 \cdot VCI$	V	Note1

Note:1. $T_a = -20$ to $70\text{ }^{\circ}\text{C}$, $VCC=2.5\text{V}$ to 3.6V , $VCI=2.5\text{V}$ to 3.6V .

2. Supply digital IOVCC voltage equal or less than analog VCI voltage.

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6. ELECTRO-OPTICAL CHARACTERISTICS

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio (Center point)		C/R	-	720	900	-	-	Note(1)
Luminance uniformity		U_w	$\theta = 0$. Normal viewing angle B/L On Note(1)	-	80		%	Note(2)
Response Time		$Tr + Tf$		-	35	45	ms	Note(3)
Color Chromaticity (CIE 1931)	White	W_x			0.310		-	Note(5)
		W_y			0.336			
	Red	R_x			0.647			
		R_y			0.317			
	Green	G_x		-0.02	0.275	+0.02		
		G_y			0.582			
	Blue	B_x			0.140			
		B_y			0.088			
Viewing Angle	Hor.	$\phi 3$	C/R $\geq$ 10		80	-	Deg	Note(4)
		$\phi 9$			80	-		
	Ver.	$\phi 12$			80	-		
		$\phi 6$		-	80	-		

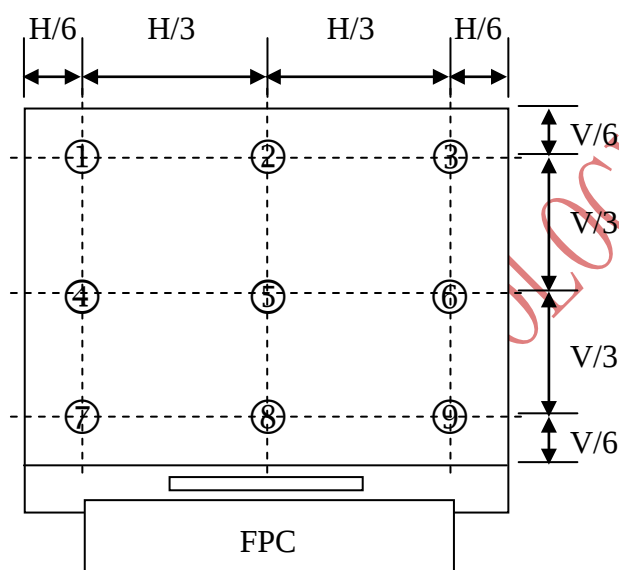
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Note1 Definition of Contrast Ratio (CR):

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD on the "White" state}}{\text{Luminance measured when LCD on the "Black" state}}$$

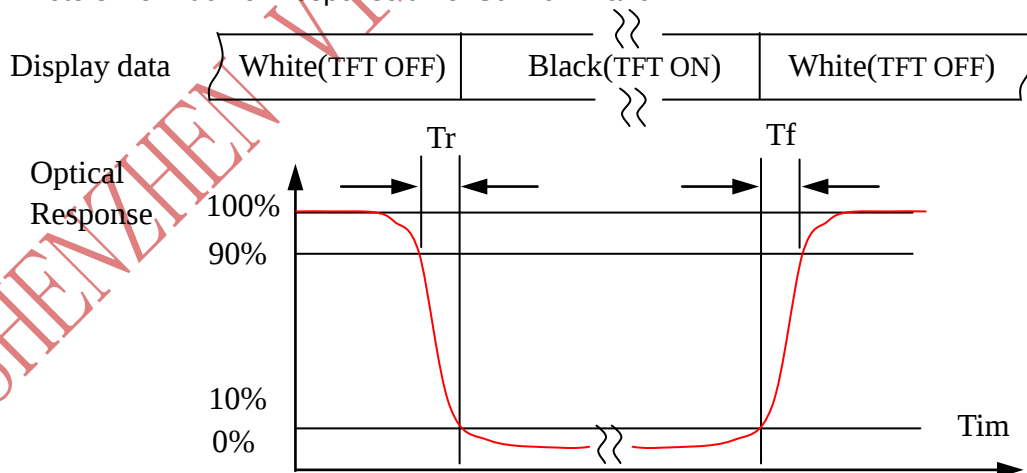
Note2: Definition of Luminance Uniformity: Active area is divided into 9 measuring areas (Shown in below), every measuring point is placed at the center of each measuring area.

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



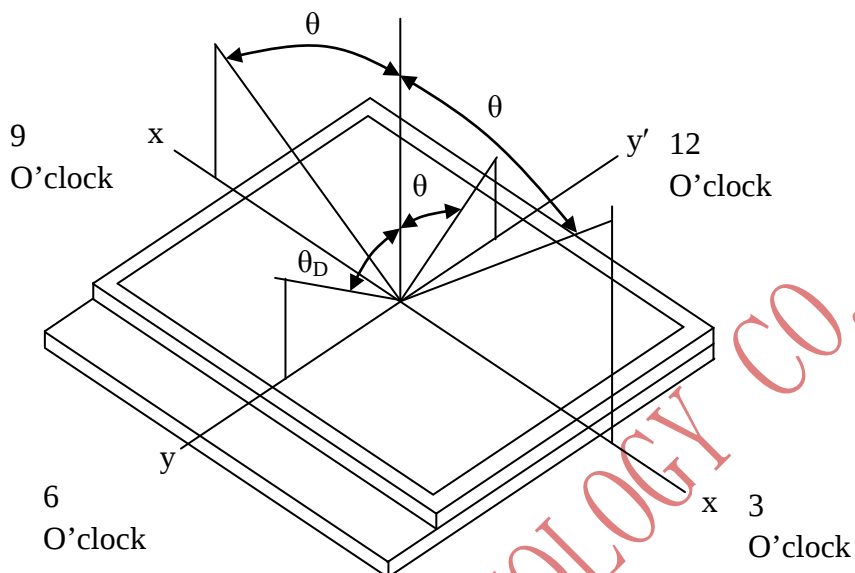
The spot locations for luminance measurement

Note 3: Definition of Response time: Sum of Tr and Tf



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Note4.Definition of Viewing Angle: The viewing angle range that the $CR \geq 10$



Note 5: Definition of Color Chromaticity (CIE 1931)
 Color coordinate of white & red, green, blue at center point.

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7. RELIABILITY TEST CONDITIONS

No 序号	Test Item	Test Condition
1	High Temperature Storage	+80°C / 24Hours
2	Low Temperature Storage	-30°C / 24Hours
3	High Temperature Operating	+70°C / 24Hours
4	Low Temperature Operating	-20°C / 24Hours
5	Temperature Cycle	-20°C $\rightarrow$ 25°C $\rightarrow$ 70°C x 10cycles (30min) (5min) (30min)
6	Damp Proof Test	60°C x 90%RH / 24H
7	Vibration Test	Frequency: 10Hz~55Hz~10Hz Amplitude:1.5mm, 2 hours for each direction of X, Y, Z
8	Dropping test	Drop to the ground from 60cm height, 1 corner, 3 edges, 6 surfaces.
9	ESD test	Contact: $\pm$ 4KV Air: $\pm$ 8KV 150PF/330 Ω ,5Points/panel,5times

Inspection after test判断标准

1. The test samples should be applied to only one test item. 每个被测试的模块只能用于其中的一个测试项目。
2. Sample size for each test item is 5~10pcs. 每个测试项目的样品数量为5~10片。
3. For Damp Proof Test, Pure water(Resistance>10M Ω) should be used. 对于防潮试验, 试验箱的用水必须是电阻大于10M 欧姆的纯水。
4. In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part. 如果由静电引起产品故障, 当放置一段时间后能够恢复正常, 则不视为产品缺陷。
5. EL evaluation should be excepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has. 带EL片的可靠性测试在高温高湿条件下, 荧光粉会发生自然化学反应而产生黑点或瑕疵, 因此不在高温高湿条件测试范围内。
6. Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic. 故障判断标准: 基本规格, 电气特性, 机械特性, 光电特性

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8. PACKAGE DRAWING

