

LCD MODULE

SPECIFICATION

Model:	UE035HV-RN44-A021-A
Version:	V1.0
Date:	20180810

☐ Preliminary Specification 样品规格书

☒ Final Specification 量产规格书

Customer Confirmation 客户确认

Approved by	Notes

Please return one of the copies of the specification with your signature to us within two weeks after you receive this document. If it is not returned, we will assume that you agree to the entire contents of this specification document.

请贵司在收到规格书的两周内,将签好字的规格书原件或者复印件寄回.如果没有返回,我司将会认为贵司已经默认接受产品规格书中的全部资料和规范.

VIEWE Confirmation 优奕确认

Prepared by	Reviewed by	Approved by

REVISION HISTORY

Revision 版本号	Date 日期	Contents of Revision Change 修改内容	Remark 备注
V1.0	2018.08.10	Preliminary release	

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1. GENERAL INFORMATION

1.1 Features

- 1) Pixel Arrangement: RGB Vertical Stripe
- 2) Interface Mode: 80 MCU 16bit
- 3) Driver IC: ILI9488 TP_IC:GSL1691
- 4) Operation Temperature: -20~60℃
- 5) Storage Temperature: -30~70℃
- 6) Backlight Type: White LED
- 7) Display mode: Normally Black
- 8) Pixel Density: 165 PPI
- 9) LED life time: 30,000 Hours

1.2 Mechanical Specification

Item 项目	Specification 规格	Unit 单位	Remark 备注
Pixel Driving element	a-si TFT	-	-
Screen Size	3.5	Inch	Diagonal
Resolution	320(W)*3(RGB)*480(H)	Dots	-
Interface	80 MCU 16bit	-	44PIN
Module Power Consumption	0.483	Watt	Typ.
Active Area	49.76(W)*74.24(H)	mm	-
Pixel pitch (W*H)	0.051(W)*0.153(H)	mm	-
Module Size (W*H*D)	58.62(W)*95.12(H)*3.55(D)	mm	Tolerance: ±0.1
Luminance	250	cd/m ²	Typ.
Viewing Direction	All	O'clock	-
Display Color	262K	Colors	-

2. ABSOLUTE MAXIMUM RATINGS

Item 项目	Symbol 符号	Min. 最小值	Max. 最大值	Unit 单位	Remark 备注
Power supply1 voltage	VCI(3.3V)	-0.3	3.3	V	Note1
LED forward current	I _F	-0.001	30	mA	For each led,Note1
LED Reverse Voltage	V _R	-	5	V	For each led,Note1
Operating temperature	T _{op}	-20	60	°C	Note1,2
Storage temperature	T _{st}	-30	70	°C	Note1,2
Humidity	H _{st}	10	90	%RH	Note1,3

(Ta=+25°C,GND=0V)

Note1:If the module exceeds the absolute maximum ratings, it may be damaged permanently. Also if the module operates with the absolute maximum ratings for a long time, the reliability may drop.

Note2: In case of temperature below 0°C,the response time of liquid crystal (LC) becomes slower and the color of panel darker than normal one.

Note3: Temp. ≤ 60°C , 90% RH MAX.

Temp. > 60°C , Absolute humidity shall be less than 90% RH .

3. MECHANICAL DRAWING

基本规格:		产品规格	
DISPLAY TYPE:	3.47" HVGA IPS TFT	DISPLAY TYPE:	NOMINALLY BLACK
TRANSMISSIVE:		TRANSMISSIVE:	TRANSMISSIVE
RESOLUTION:	320 (RGB) * 480	RESOLUTION:	320 (RGB) * 480
Driver IC:	ILI9488	Driver IC:	ILI9488
Viewing Angle (U/D/L/R):	80/80/80/80 Typ	Viewing Angle (U/D/L/R):	80/80/80/80 Typ
LCM-CTP BRIGHTNESS:	200 cd/m ² Min., 250 cd/m ² Typ	LCM-CTP BRIGHTNESS:	200 cd/m ² Min., 250 cd/m ² Typ
Contrast:	700 Typ	Contrast:	700 Typ
NTSC:		NTSC:	
Uniformity:	80% Min	Uniformity:	80% Min
Tc:		Tc:	
CAMMA:		CAMMA:	
CROSS-TALK:		CROSS-TALK:	
Backlight:	Specs: 6颗灯并驱动20mA (20mA/LED)	Backlight:	Specs: 6颗灯并驱动20mA (20mA/LED)
Operating Temp:	-20° C ~ 60° C	Operating Temp:	-20° C ~ 60° C
Storage Temp:	-30° C ~ 70° C	Storage Temp:	-30° C ~ 70° C
VCI:	±3.3V Typ	VCI:	±3.3V Typ
电压:		电压:	
平面度:	0.35mm Max	平面度:	0.35mm Max
寄存器地址:		寄存器地址:	
NOTE:		CTP说明:	
1. VIEWING DIRECTION: FULL view		1. 产品结构: G+G	
2. 本产品符合RoHS要求		2. 驱动IC: GS11691	
3. GENERAL TOLERANCE: ±0.2 () reference dimension		3. 未注公差: ±0.1mm, COVER LENS边缘未注导角α=0.15/0.15,	
*为重点尺寸		4. LENS使用0.7mm 旭硝子玻璃盖板, 表面强化后硬度要达到6H.	
4. 客户终端使用连接器型号:		5. 环保符合RoHS要求.	
5. 产品要求SLERP可以硬件无供电		6. VDD电压: 2.8V, 11C通信电压: 1.8V.	
6. 建议配合的TP开孔尺寸比LCD AA左右宽度尺寸单边+0.4.		7. 透过率>85%.	
		8. 工作温度-20~60° C, 存储温度-30~70° C.	
BACKLIGHT CIRCUIT DIAGRAM 20mA/LED (6LED)		CTP说明:	
LED V _F : 3.2V (TYP) I _F : 20~25mA (20mA/LED) 背光电路图 (CIRCUIT DIAGRAM)		CTP说明:	
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		8. 工作温度-20~60° C, 存储温度-30~70° C.	
		CTP说明:	
		1. 产品结构: G+G	
		2. 驱动IC: GS11691	
		3. 未注公差: ±0.1mm, COVER LENS边缘未注导角α=0.15/0.15,	
		4. LENS使用0.7mm 旭硝子玻璃盖板, 表面强化后硬度要达到6H.	
		5. 环保符合RoHS要求.	
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		4. LENS使用0.7mm 旭硝子玻璃盖板, 表面强化后硬度要达到6H.	
		5. 环保符合RoHS要求.	
		6. VDD电压: 2.8V, 11C通信电压: 1.8V.	
		7. 透过率>85%.	

4. I/O CONNECTION & BLOCK DIAGRAM

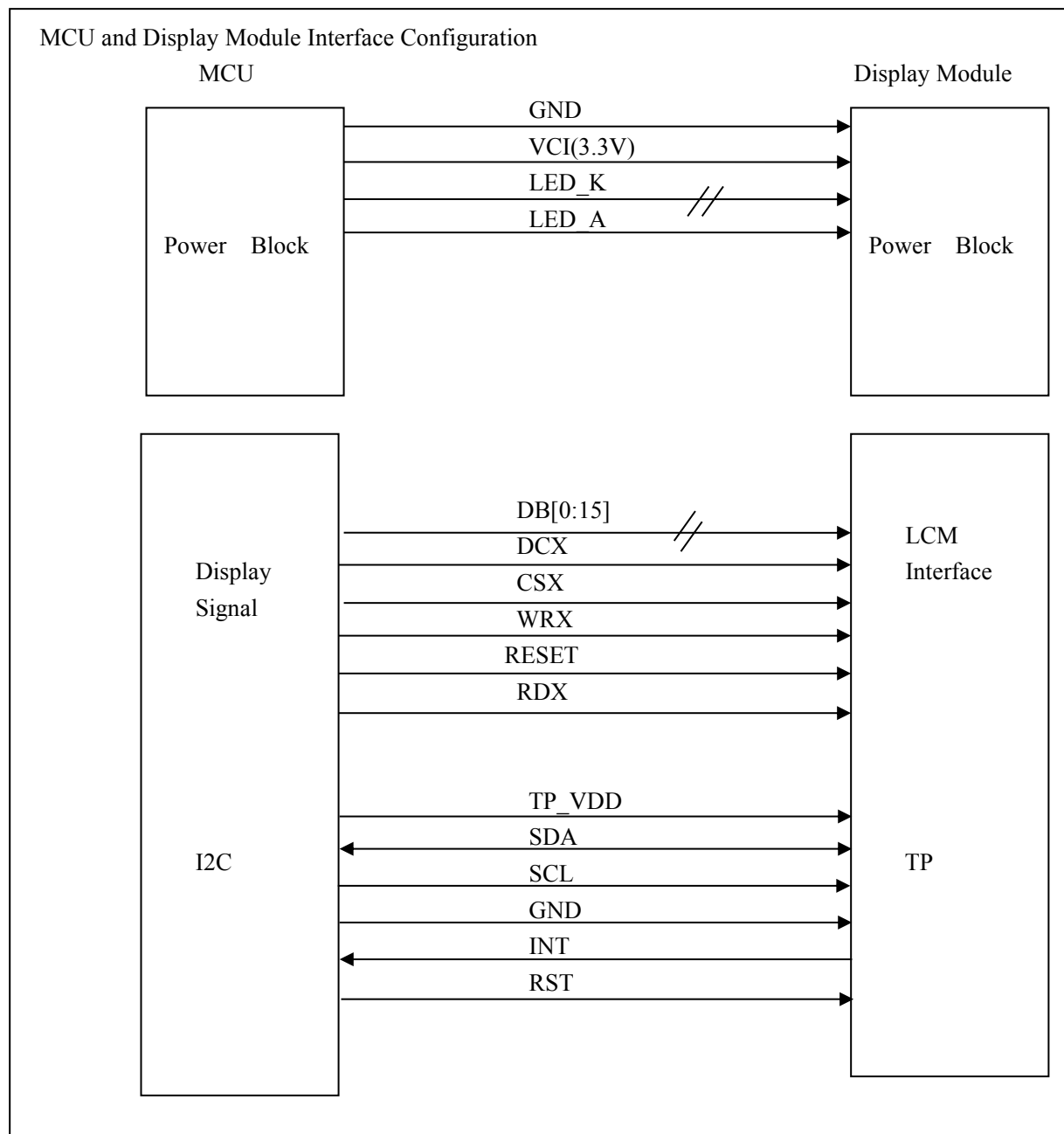
4.1 I/O Connection

Pin No. 序号	Symbol 符号	I/O	Description 描述
1	GND	P	Power Ground
2-5	VCI(3.3V)	P	Power supply for analog & digital circuit
6	IM0/ID	I	Select the interface mode
7	IM1	I	Select the interface mode
8	IM2	I	Select the interface mode
9	RESET	I	Global reset for LCM, active is low
10	VSNC	I	Frame synchronizing signal
11	HSNC	I	Line synchronizing signal
12	PCLK	I	Dot clock signal
13	DE	I	A data ENABLE input signal
14-15	NC	-	Dummy
16-31	DB15-DB0	I/O	16-Bit Parallel Bi-directional Data Bus
32	GND	P	Power Ground
33	DOUT/SDO	O	Serial data output
34	DIN/SDA	I/O	serial data input/output bi-direction pin
35	RDX	I	Read Data Signal, Active Rising Edge
36	WRX	I	Write Data Signal, Active Rising Edge
37	DCX	I	Data/Command Selection Signal
38	CSX	I	Chip Select Input Signal, Active Is Low
39-42	NC	-	Dummy
43	LED_A	P	Power for Backlight Anode
44	LED_K	P	Power for Backlight Cathode

I: Input; O: Output; P: Power

TP PIN	Symbol	I/O	Description
1	TP-VDD2.8V	P	TP_VDD(2.8V) Power Supply for TP
2	SDA	I/O	I2C data signals for TP
3	SCL	I	I2C clock signals for TP
4-5	GND	P	Ground.
6	INT	O	Interrupt signals for TP
7	RST	I	The signal will reset the TP, Signal is active low
8	TP-VDD2.8V	P	TP_VDD(2.8V) Power Supply for TP

4.2 Block Diagram



5. ELECTRICAL CHARACTERISTICS

5.1 TFT-LCD Panel Driving Section

Item 项目	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Power Supply1 Voltage	VCI(3.3V)	2.8	3.3	3.9	V	-
Power Supply Current	IvCI	-	30	-	mA	Note1
Logic Input High Voltage	V _{IH}	0.7VDD	-	VDD	V	-
Logic Input Low Voltage	V _{IL}	0	-	0.3VDD	V	-
Panel Power Consumption	P _{VDD}	-	0.099	-	Watt	Note1
Module Power Consumption	P _{LCM}	-	0.483	-	Watt	Note1,2

(Ta=+25°C,GND=0V)

Note1:Measurement Conditions (Video Mode): Full Screen Red Pattern,VDD=2.8V,60Hz Refresh.

Note2: P_{LCM}= P_{VDD}+ P_{B/L}, About P_{B/L} information, inference to 5.2 Back Light Driving Section.

5.2 Back Light Driving Section

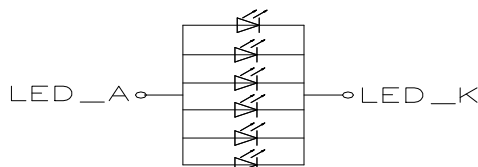
Item 项目	Symbol 符号	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Forward Voltage	V _F	-	3.2	-	V	Note1
Forward Current	I _F	-	120	-	mA	Note1
Backlight Power consumption	P _{B/L}	-	0.384	-	Watt	Note1
LED life time	-	30000	-	-	Hours	Note2
LED Quantity			6		PCS	

(Ta=+25°C,GND=0V)

Note1: The LED driving condition is defined for each LED module 1 LED Serial, 6 LED Parallel)。

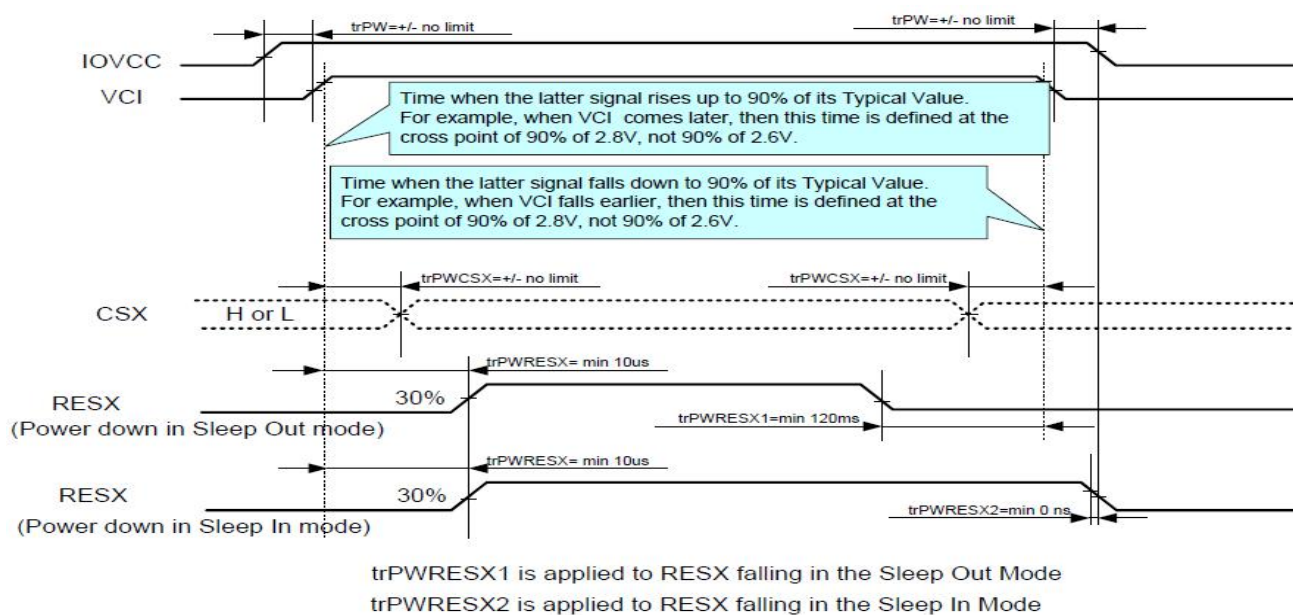
For each LED : I_F=20mA,V_F=3.2V(Typ.),Ta=25°C。

Note2:The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_{LED}=20mA(Per Led). The LED life time could be decreased if operating I_{LED} is larger than 20mA.



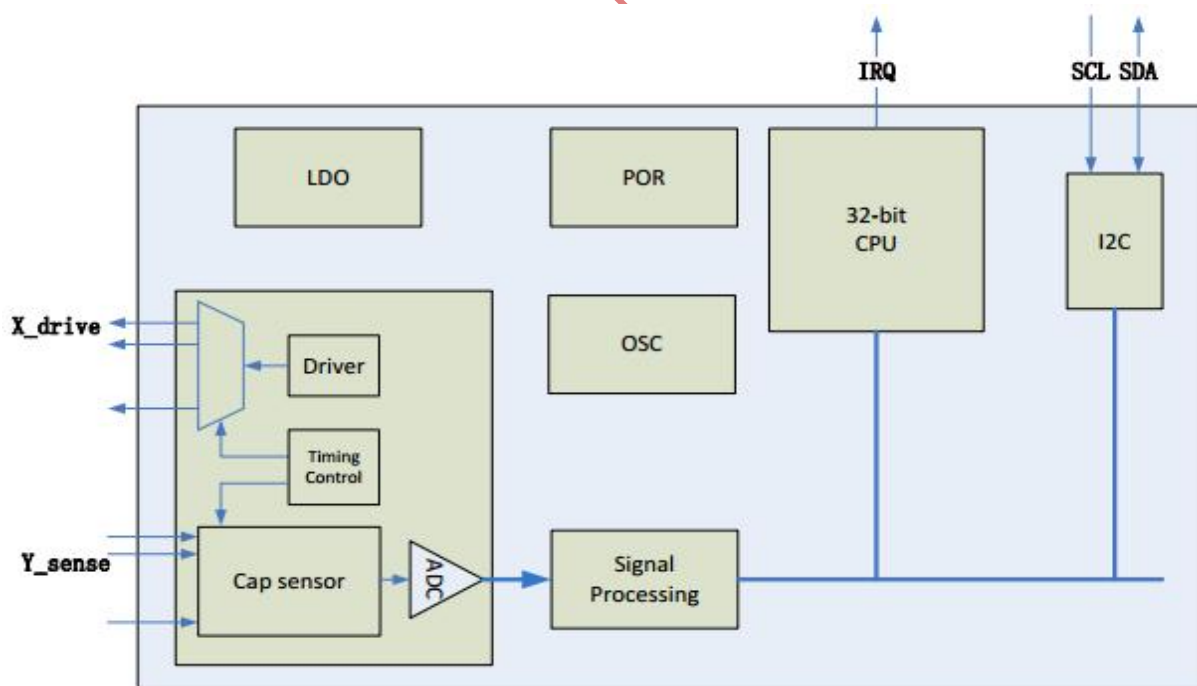
BACKLIGHT CIRCUIT DIAGRAM 20mA/LED (6LED)
 LED V_f: 3.2V (TYP)
 I_f: 6*20=120mA

5.3 Power On/Off Sequence



5.4 Timing Characteristics

5.4.0 DC Characteristics for CTP



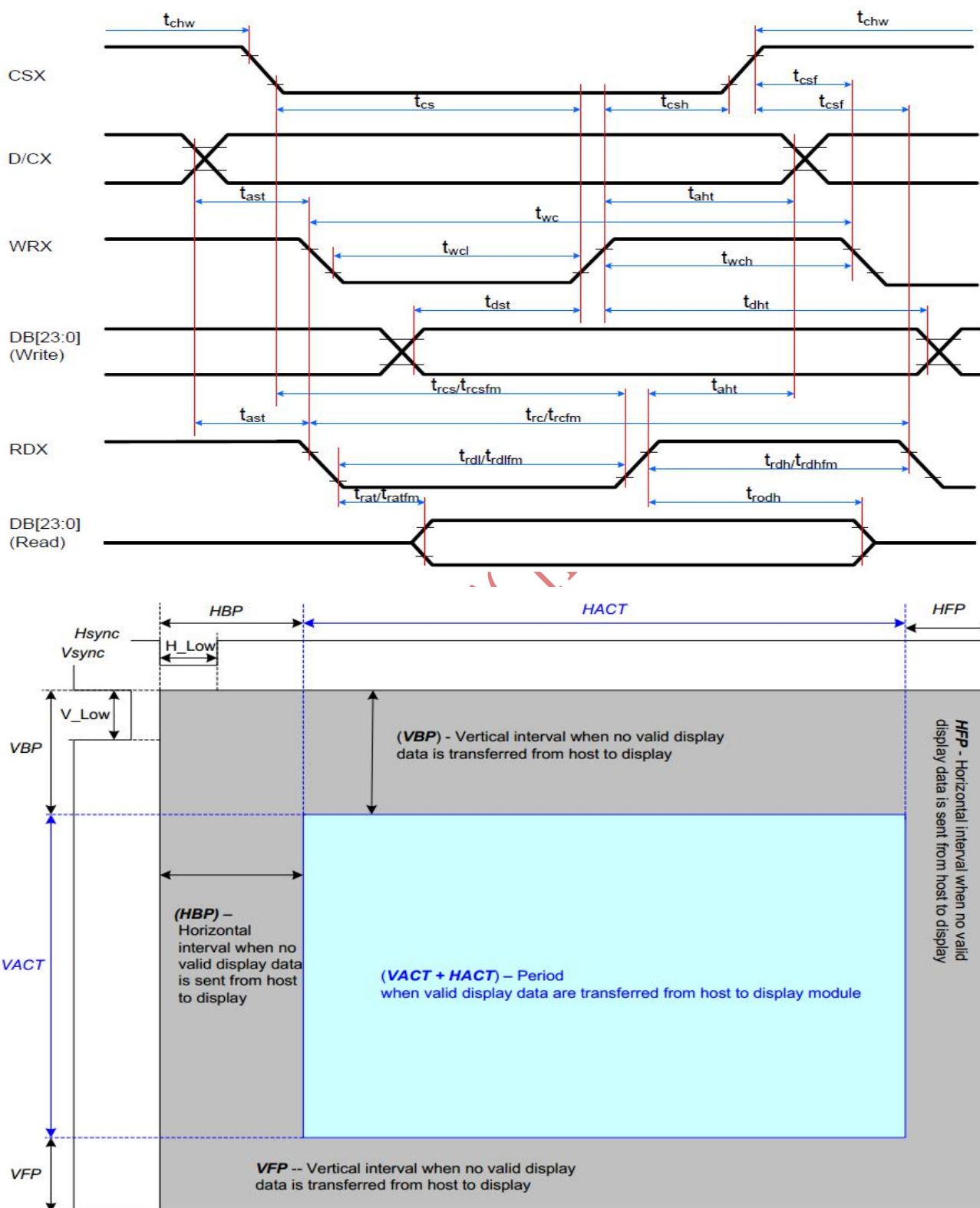
参数	描述	最小值	标准值	最大值	单位	备注
Idd	平均电源电流, 60Hz, 1个触摸点		8mA			
Vil	逻辑输入低电压	-0.5		0.3 Vdd	V	
Vih	逻辑输入高电压	0.7 Vdd		Vdd+0.5	V	
Vol	逻辑输出低电压		0.2Vdd			
Voh	逻辑输出高电压	0.8Vdd			V	
Iil	输入漏电流		<0.001	1	uA	

参数	范围
地址	0X40
最大的总线速度 (SCL)	400KHz

开启条件保持时间	<650 ns
停止条件建立时间	<650 ns
SDA / SCL/上升时间	< 200 ns

Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	-	ns	-
	taht	Address hold time (Write/Read)	0	-	ns	-
CSX	tchw	CSX "H" pulse width	0	-	ns	-
	tcs	Chip Select setup time (Write)	15	-	ns	-
	trcs	Chip Select setup time (Read ID)	45	-	ns	-
	trcsfm	Chip Select setup time (Read FM)	355	-	ns	-
	tcsf	Chip Select Wait time (Write/Read)	0	-	ns	-
WRX	twc	Write cycle	40	-	ns	-
	twrh	Write Control pulse H duration	15	-	ns	-
	twrl	Write Control pulse L duration	15	-	ns	-
RDX (FM)	trcfm	Read Cycle (FM)	450	-	ns	When read from Frame Memory
	trdhfm	Read Control H duration (FM)	90	-	ns	
	trdlfm	Read Control L duration (FM)	355	-	ns	
RDX (ID)	trc	Read cycle (ID)	160	-	ns	When read ID data
	trdh	Read Control pulse H duration	90	-	ns	
	trdl	Read Control pulse L duration	45	-	ns	
DB [23:0], DB [17:0], DB [15:0], DB [8:0], DB [7:0]	tdst	Write data setup time	10	-	ns	For maximum, CL=30pF For minimum, CL=8pF
	tdht	Write data hold time	10	-	ns	
	trat	Read access time	-	40	ns	
	tratfm	Read access time	-	340	ns	
	trod	Read output disable time	20	80	ns	

5.5 Timing Diagram



Parameters	Symbols	Min.	Typ.	Max.	Units
Horizontal Synchronization	H_Low	3	-	H_Low < HBP	DOTCLK
Horizontal Back Porch	HBP	3	-	192	DOTCLK
Horizontal Front Porch	HFP	3	-	255	DOTCLK
Horizontal Address	HACT	-	320	-	DOTCLK
Horizontal Frequency		-	-	33	KHz
Vertical Synchronization	V_Low	1	-	V_Low < VBP	Line
Vertical Back Porch	VBP	2	-	V_Low+VBP+VFP < 32	Line
Vertical Front Porch	VFP	2	-		Line
Vertical Address	VACT	-	480	-	Line
Vertical Frequency		60	-	70	Hz

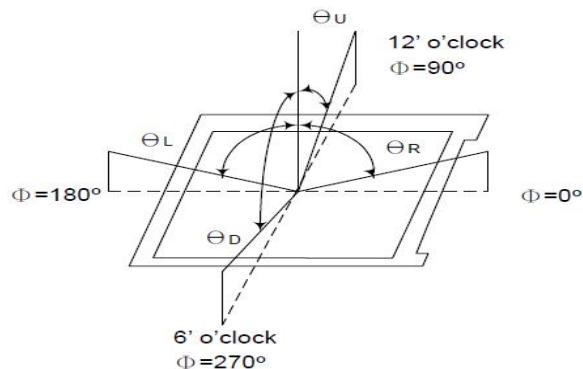
6. OPTICAL CHARACTERISTICS

Parameter 参数	Symbol 符号	Condition 条件	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
Contrast Ratio	C/R	$\theta = 0^\circ$	-	700	-	-	Note(4)
NTSC Ratio	S	$\theta = 0^\circ$	50	55	-	%	Note(7)
Luminance	L	$\theta = 0^\circ$	-	250	-	cd/m ²	Note(5)
Luminance uniformity	U _w	$\theta = 0^\circ$	75	80	-	%	Note(3)
Response Time	T _R + T _F	25 °C	-	30	-	ms	Note(2)
Color Coordination	W _x	$\theta = 0^\circ$ (Center) Normal viewing angle B/L On	-0.03	0.309	+0.03	NTSC (x,y)	Note(6)
	W _y			0.332			
	R _x			0.660			
	R _y			0.325			
	G _x			0.277			
	G _y			0.568			
	B _x			0.145			
	B _y			0.072			
Viewing Angle	θ_L	C/R>10	-	80	-	Degree	Note(1)
	θ_R		-	80	-		
	θ_U		-	80	-		
	θ_D		-	80	-		

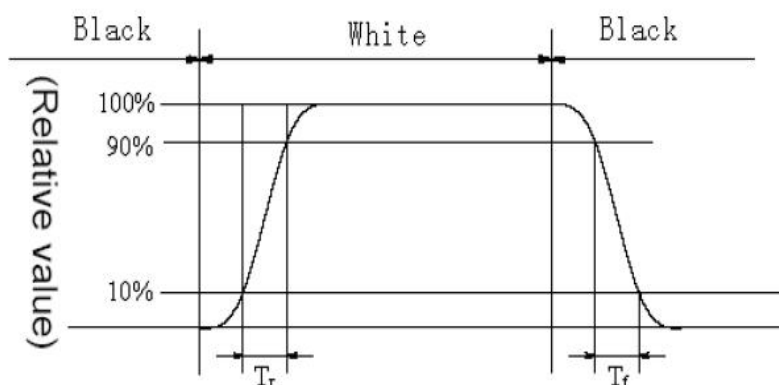
Test Conditions:

1. VDD=2.8V, I_F=120mA (Backlight current), the ambient temperature is +25°C.
2. The test systems refer to Note 8.

Note1: Definition of Viewing Angle: The viewing angle range that the CR>10

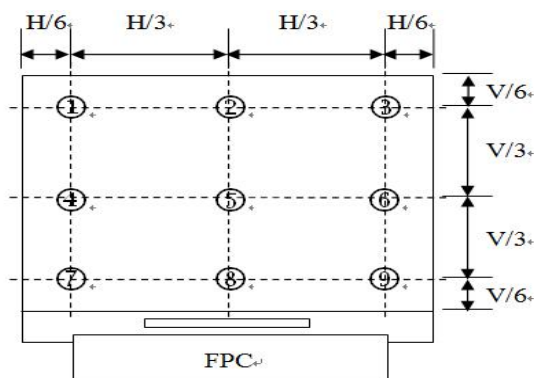


Note2: Definition of Response time: Sum of T_R and T_F



Note 3: Definition of Luminance Uniformity: Active area is divided into 9 measuring areas, every measuring point is placed at the center of each measuring area.

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



Note4: Definition of Contrast Ratio (CR): measured at the center point of panel

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

Note 5

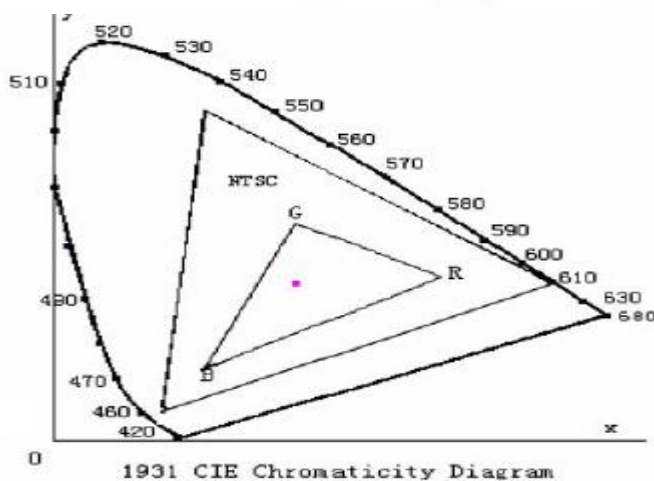
Luminance: Center Luminance of white is defined as luminance values of 1point average across the LCD surface.

Note 6: Definition of Color Chromaticity (CIE 1931)

Color coordinates of white & red, green, blue measured at center point of LCD.

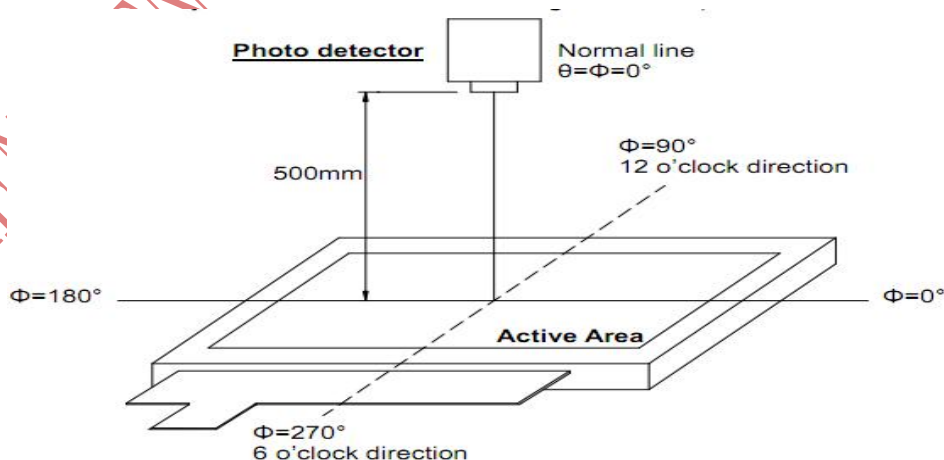
Note 7: Definition of NTSC ratio:

$$\text{NTSC ratio} = \frac{\text{Area of RGB triangle}}{\text{Area of NTSC triangle}}$$



Note 8: Definition of measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen.(Response time is measured by Photo detector TOPCON BM-7, Field of view: 1°/Height: 500mm.)



7. RELIABILITY

Item 项目	Test Condition 测试条件	Remark 备注
High Temperature Storage	Ta =+70°C / 96Hours	Note1,2,3
Low Temperature Storage	Ta =-30°C / 96Hours	Note1,2,3
High Temperature Operating	Ta =+60°C / 96Hours	Note1,2,3
Low Temperature Operating	Ta =-20°C / 96Hours	Note1,2,3
Temperature Cycle storage Test	-20°C/30min ↔ +70°C /30min for 30cycles, Transfer time less than 5min	Note2,3
Thermal humidity storage Test	60°C x 90%RH / 96Hours	Note2,3
Package Vibration Test	Frequency: 10Hz~55Hz, Amplitude: 1.5mm, 1 hrs for each direction of X, Y, Z	Note2
Packing shock test	Drop to the ground from 60cm height, 1 corner, 3 edges, 6 surfaces.	Note2

Inspection after Test:

Note1: Ta is the ambient temperature of samples.

Note 2: In the standard condition, there shall be no practical problem that may affect the display function. After the reliability test, the product only guarantees operation, but doesn't guarantee all the cosmetic specification.

Note 3: Before cosmetic and function tests, the product must have enough recovery time, at least 2 hours at room temperature.

8. PACKAGE DRAWING

