

INDUSTRIAL STRENGTH... Start Your Application From YOURITECH

Integration support

Obsolescence Management

PCAP

Embedded Systems

Human Machine Interface

Touch Solutions

Software

Quality Management

Open Frame Monitors

LCD Controller

Research & Development

Firmware

EMC tests

on-site service

Optical Bonding

In-house Manufacturing

Cover glass

System solutions

OEM Solutions

Custom Display

Production
Custom designs
Installation

Mechanical design



LCD MODULE
SPECIFICATION

Model:	ET035TR02-VT
Version:	V1.1
Date:	2024.12.07

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.

YOURITECH Confirmation

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	2023.12.04	Preliminary release	
V1.1	2024.12.07	微调 FPC，修改背光电路为并联	



TABLE of CONTENTS

1. GENERAL INFORMATION	4
1.1 Features	4
1.2 Mechanical Specification	4
2. ABSOLUTE MAXIMUM RATINGS	5
3. MECHANICAL DRAWING	6
4. I/O CONNECTION & BLOCK DIAGRAM	7
4.1 I/O Connection	7
4.2 Block Diagram	8
5. ELECTRICAL CHARACTERISTICS	9
5.1 TFT-LCD Panel Driving Section	9
5.2 Back Light Driving Section	9
5.3 Power On/Off	10
5.4 Timing Characteristics	12
5.5 Display Serial Interface Timing Characteristics (SPI system)	13
6. OPTICAL CHARACTERISTICS	14
6.1 Optical Specification (Reflective mode)	14
6.2 Optical Specification (Transmittance mode)	15
7. RELIABILITY	17



1. GENERAL INFORMATION

1.1 Features

- 1) Pixel Arrangement: RGB Vertical Stripe
- 2) Interface Mode: MCU 8/16BIT/SPI
- 3) Driver IC: ST7365 or Compatible
- 4) Operation Temperature: -20~70℃
- 5) Storage Temperature: -30~80℃
- 6) Backlight Type: White LED
- 7) Display mode: Transflective Normally BLACK
- 8) 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	TFT	-	-
Screen Size	3.47	Inch	Diagonal
Resolution	282(H)*3(RGB)*470(V)	Dots	-
Interface	MCU 8/16BIT/SPI	-	40PIN
Module Power Consumption	0.07	Watt	Reflective Mode
	0.476		Transmissive Mode
Luminance	12%*Surrounding illumination	cd/m ²	Reflective Mode
	150+12%*Surrounding illumination	cd/m ²	Transmissive Mode
Active Area	45.34(W)*75.58(H)	mm	-
Pixel pitch (W*H)	0.1608(W)*0.1608(H)	mm	-
Module Size (W*H*D)	51.32(W)*86.61(H)*2.15(D)	mm	Typ
Display Color	16.7M	Colors	18bits

Applicate Suggestion:

Backlight off in Reflective mode @ Surrounding illumination > 1500 cd/m²

Backlight on in Transmissive mode @ Surrounding illumination ≤ 1500 cd/m²

Please contact YOURITECH for Surrounding illumination (lx) detail information



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 supply voltage1	IOVCC	-0.3	4.6	V	Note1
Power supply voltage2	VCI	-0.3	4.6	V	Note1
LED forward current	I _F	-0.001	25	mA	For each led,Note1
LED Reverse Voltage	V _R	-	3.4	V	For each led,Note1
Operating temperature	T _{op}	-20	70	°C	Note1,2
Storage temperature	T _{st}	-30	80	°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.

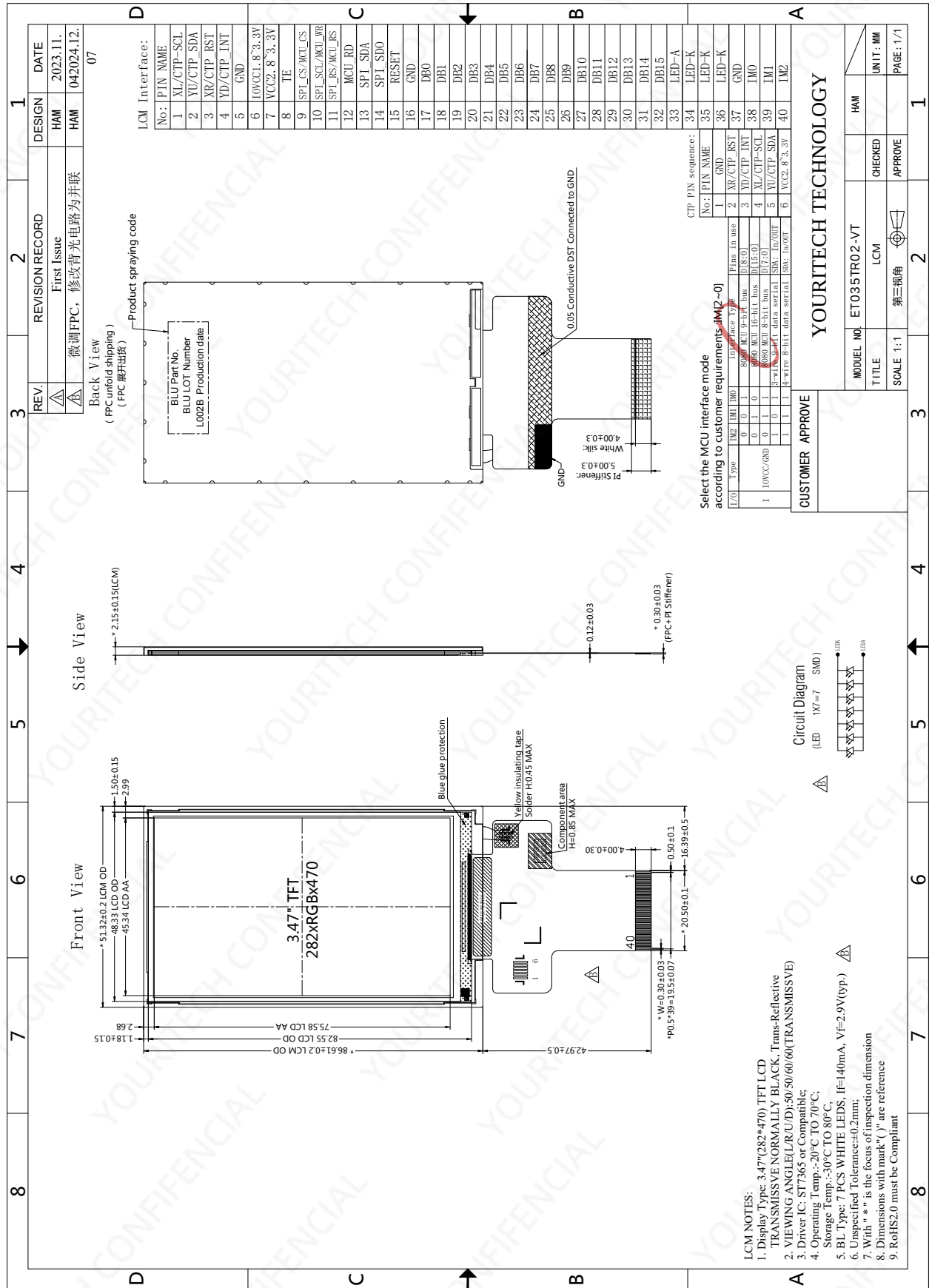
Note2: In case of temperature below 0°C,the response time of liquid crystal (LC) becomes slower and the color of panel darker than normal one.

Note3: Temp. ≤ 60°C , 90% RH MAX.

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



3. MECHANICAL DRAWING



4. I/O CONNECTION & BLOCK DIAGRAM

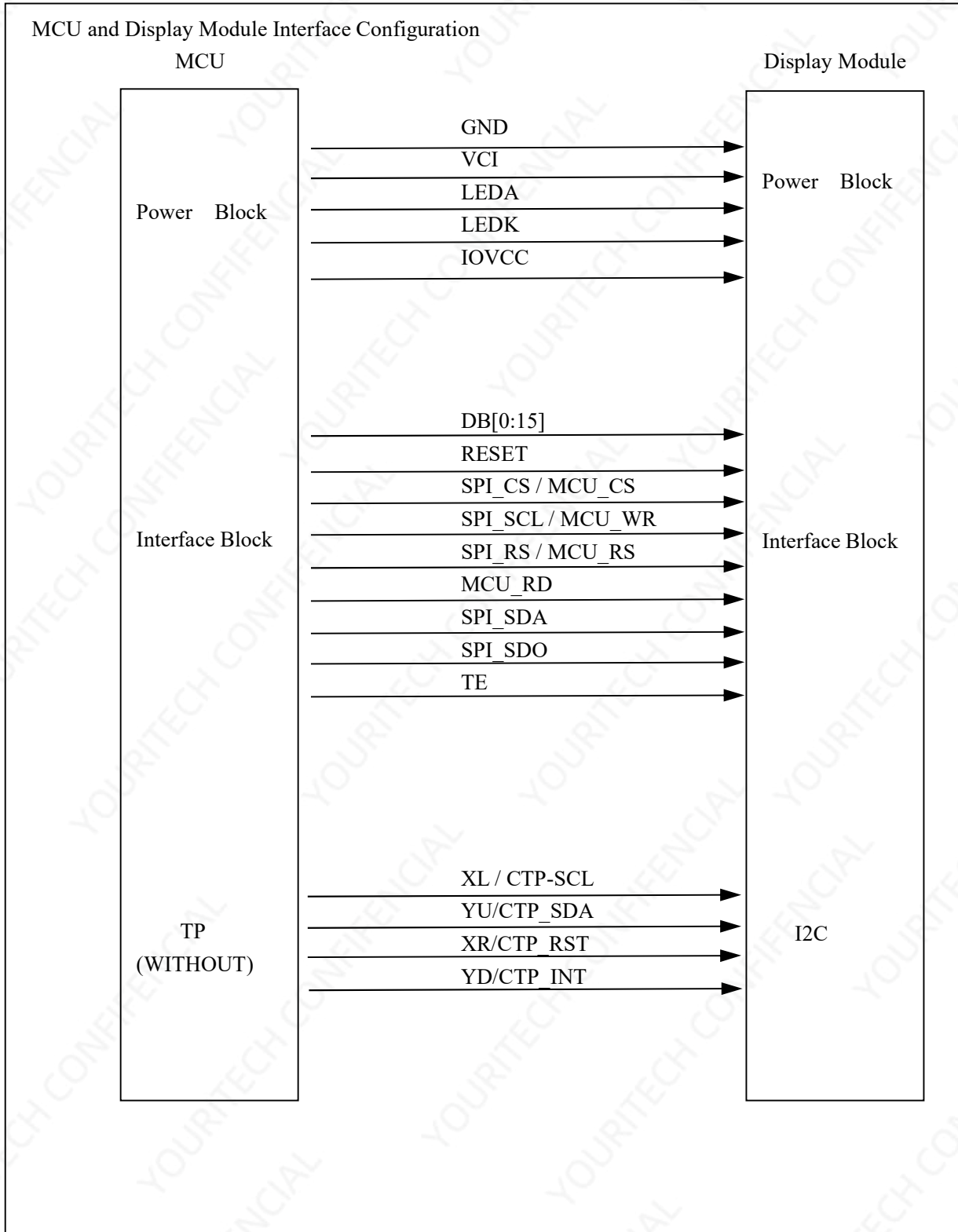
4.1 I/O Connection

Pin No.	Symbol 符号	I/O	Description 描述
1	XL /CTP-SCL	I	I2C clock signals for CTP; Option XL for RTP
2	YU /CTP-SDA	I	I2C data signal for CTP, Option YU for RTP
3	XR /CTP-RST	I	The signal will reset the CTP,Signal is active low, Option XR for RTP
4	YD /CTP-INT	I/O	Interrupt signals for CTP, Option YD for RTP
5	GND	P	Power Ground
6	IOVCC	P	Power supply for I/O system
7	VCI	P	Power supply for analog circuits
8	TE	O	Tearing effect signal is used to synchronize MCU to frame memory
9	SPI_CS /MCU_CS	I	Chip selection pin. Low-active
10	SPI_SCL /MCU_WR	I	Write enable in MCU parallel interface In SPI mode, this pin is used as SCL
11	SPI_RS /MCU_RS	I	Display data/command selection pin in MCU interface RS=1 display data or parameter;RS=0 register index / command
12	MCU_RD	I	Read enable in 8080 MCU parallel interface. Low-active.
13	SPI_SDA	I/O	Serial communication data input and output, internal pull low.
14	SPI_SDO	O	SPI interface output pin
15	RESET	I	The signal will reset the LCM, Signal is active low.
16	GND	P	Power Ground
17-32	DB0-DB15	I/O	data bus for MCU
33	LED-A	P	Power supply for backlight anode
34-36	LED-K	P	Power supply for backlight cathode
37	GND	P	Power Ground
38	IM0	I	The MCU interface mode select.
39	IM1	I	The MCU interface mode select.
40	IM2	I	The MCU interface mode select.

I: Input; O: Output; P: Power



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 Supply Voltage1	IOVCC	1.65	1.8	3.6	V	-
Power Supply Voltage2	VCC	2.5	3.3	3.6	V	-
Power Supply Current1	Iiovc	-	1	-	mA	Note1
Power Supply Current2	Ivcc	-	20	-	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}	-	0.07	-	Watt	Note1
Module Power Consumption	P _{LCM}	-	0.476	-	Watt	Note1,2

(Ta=+25°C,GND=0V)

Note1:Measurement Conditions (Video Mode): Full Screen Red Pattern,VDD=3.3V,60Hz Refresh.

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

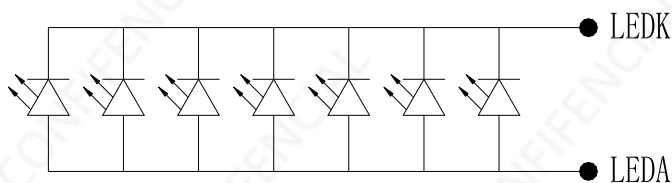
5.2 Back Light Driving Section

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	-	-	2.9	-	V	Note1
Forward Current	I _F	-	140	-	mA	Note1
Backlight Power consumption	P _{BL}	-	0.406	-	Watt	Note1
LED life time	-	30000	-	-	Hrs	Note2
LED Quantity		7			PCS	

(Ta=+25°C,GND=0V)

Note1: The LED driving condition is defined for each LED module

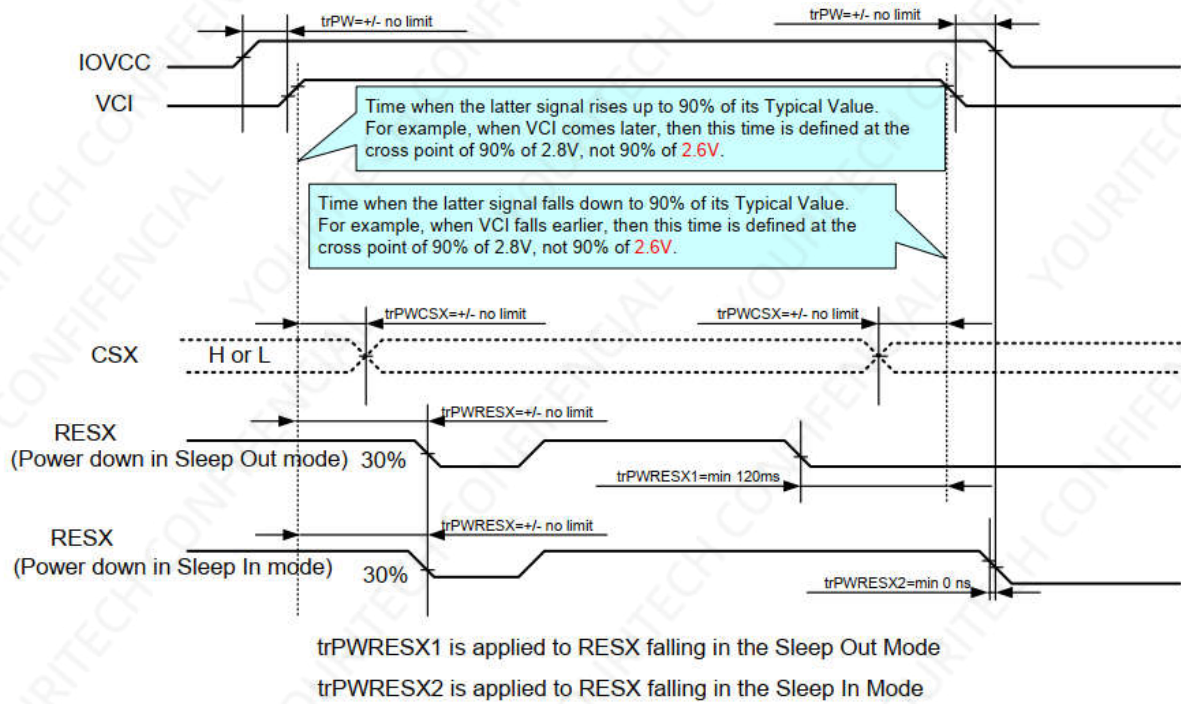
Note2:The “LED life time” is defined as the module brightness decrease to 50% of original brightness at I_{LED}=20mA(Per Led). The LED life time could be decreased if operating I_{LED} is larger than 20mA.



5.3 Power On/Off

5.3.1 Case 1 - RESX Line is Held High or Unstable by Host at Power ON

If the RESX line is held High or unstable by the host during Power On, then Hardware Reset must be applied after both VCI and IOVCC have been applied. Otherwise, the correct functionality is not guaranteed. There is no timing restriction upon this hardware reset.

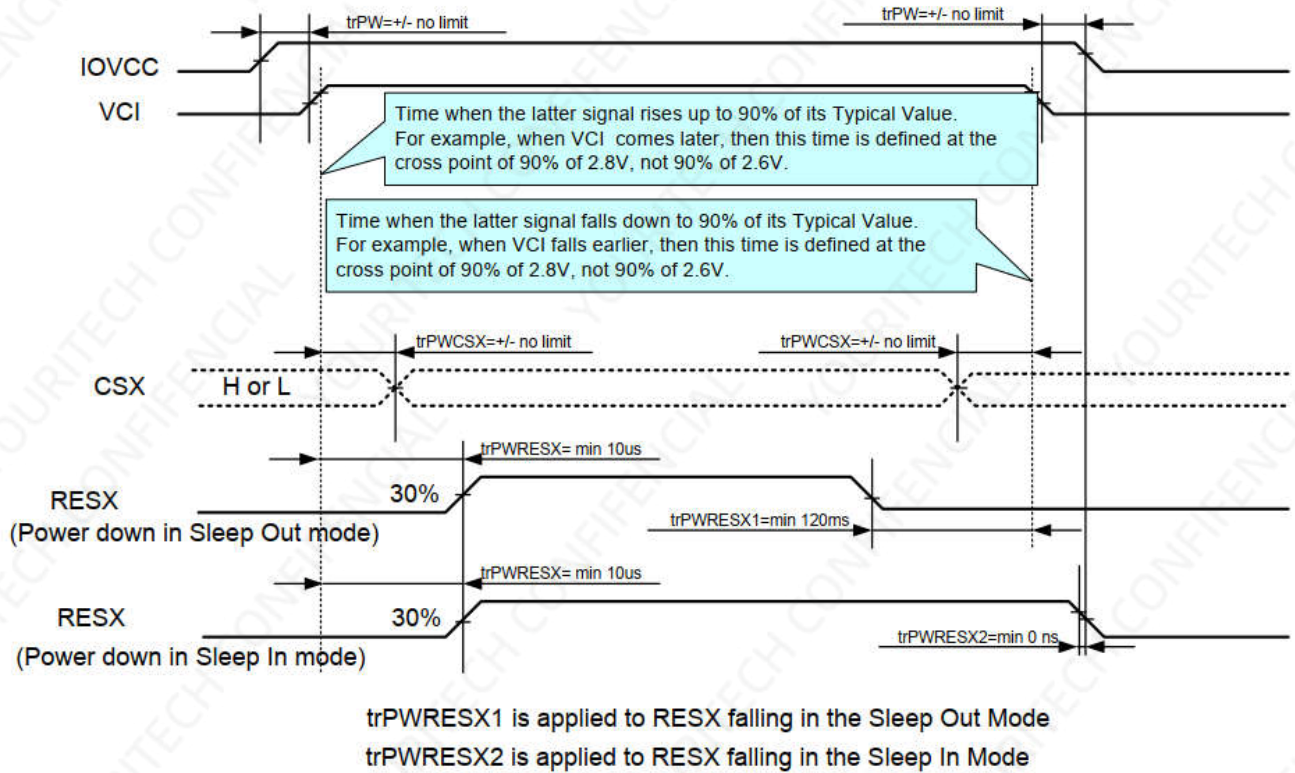


Note: Unless otherwise specified, timings herein show the cross point at 50% of the signal power level.



5.3.1.2 Case 2 - RESX Line is Held Low by Host at Power ON

If the RESX line is held Low (and stable) by the host during Power On, then the RESX must be held low for a minimum of 10μsec after both VCI and IOVCC have been applied.



5.4 Timing Characteristics

8080 Series MCU Parallel Interface Timing Characteristics: 16/8-bit Bus

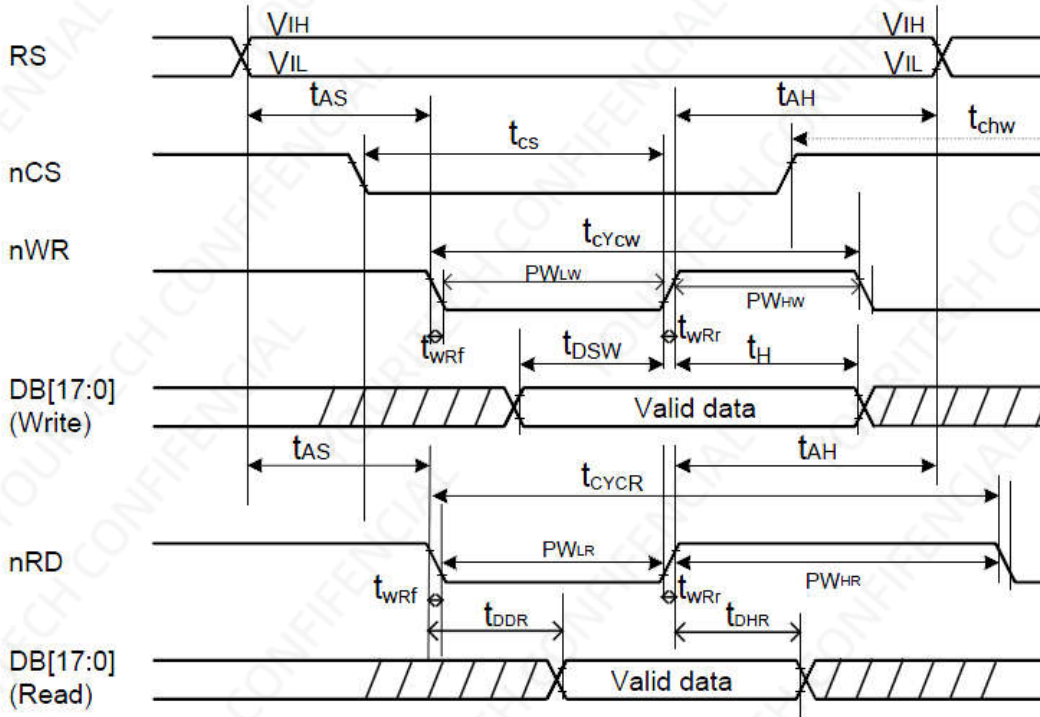


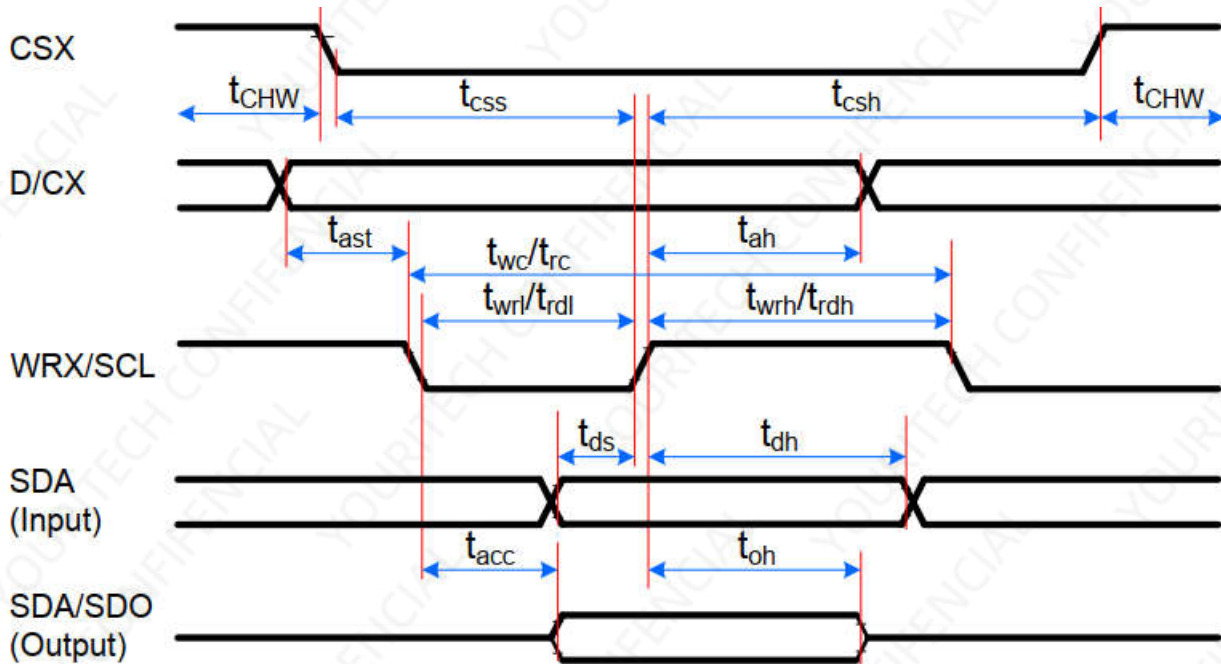
Figure 48 i80-System Bus Timing

Normal Write Mode (IOVCC = 1.65~3.3V)

Item	Symbol	Unit	Min.	Typ.	Max.	Test Condition
Bus cycle time	Write	t_{CYCW}	ns	TBD	-	-
	Read	t_{CYCR}	ns	300	-	-
Write low-level pulse width	PW_{LW}	ns	TBD	-	500	-
Write high-level pulse width	PW_{HW}	ns	TBD	-	-	-
Read low-level pulse width	PW_{LR}	ns	150	-	-	-
Read high-level pulse width	PW_{HR}	ns	150	-	-	-
Write / Read rise / fall time	t_{WRf}/t_{WRr}	ns	-	-	25	-
Setup time	Write (RS to nCS, E/nWR)	t_{AS}	ns	10	-	-
	Read (RS to nCS, RW/nRD)			5	-	-
Address hold time	t_{AH}	ns	5	-	-	-
Write data set up time	t_{DSW}	ns	10	-	-	-
Write data hold time	t_H	ns	15	-	-	-
Read data delay time	t_{DDR}	ns	-	-	100	-
Read data hold time	t_{DHR}	ns	5	-	-	-



5.5 Display Serial Interface Timing Characteristics (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)	50	-	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	
D/CX	t_{as}	D/CX setup time	10	-	ns	
	t_{ah}	D/CX hold time (Write/Read)	10	-	ns	
SDA (Input)	t_{ds}	Data setup time (Write)	10	-	ns	
	t_{dh}	Data hold time (Write)	10	-	ns	
SDA/SDO (Output)	t_{acc}	Access time (Read)	10	50	ns	For maximum CL=30pF
	t_{od}	Output disable time (Read)	15	50	ns	For minimum CL=8pF

Notes:

1. $T_a = -30$ to 70°C , $IOVCC = 1.65\text{V}$ to 3.3V , $V_{CI} = 2.5\text{V}$ to 3.3V , $AGND = DGND = 0\text{V}$, $T = 10\pm 0.5\text{ns}$.
2. Does not include signal rising and falling times.



6. OPTICAL CHARACTERISTICS

6.1 Optical Specification (Reflective mode)

Parameter 参数	Symbol 符号	Condi- on 条件	Min. 最小值	Typ. 典型值	Max. 最大值	Unit 单位	Remark 备注
White Reflectance (with Polarizer)	R _w (%)	$\theta = 0$	10	12	-	%	
Contrast Ratio	C/R	$\theta = 0^\circ$	-	10 : 1	-	-	
NTSC Ratio	S	$\theta = 0^\circ$	13	16	-	%	
Response Time	T _R + T _F	25 °C	-	-	30	ms	设备: DMS T _R +T _F W90%/B10%
Viewing Angle	θ L	C/R>2	-	60	-	Degree	设备: DMS Source pad Down CR>2
	θ R		-	60	-		
	θ U		-	60	-		
	θ D		-	60	-		



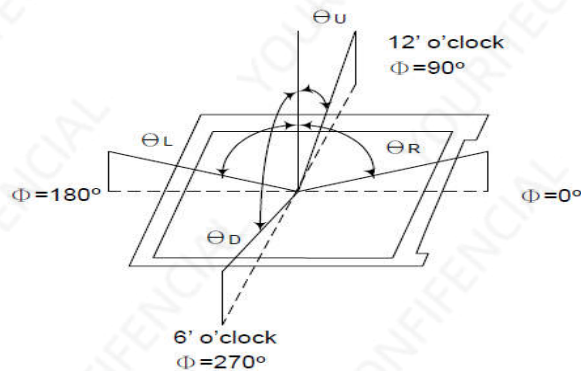
6.2 Optical Specification (Transmittance mode)

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	$\theta = 0^\circ$	30:1	45:1	-	-	SR-UL1 R
Color Gamut (NTSC)	S	$\theta = 0^\circ$	15	18		%	
Luminance	L	$\theta = 0^\circ$	125	150	-	cd/m2	
Luminance uniformity	U_W	$\theta = 0^\circ$	80	-	-	%	Note(1)
Response Time	$T_R + T_F$	25 °C	-	-	30	ms	Note(2)
White Color Coordination	W_X	$\theta = 0^\circ$	-+0.04	0.29	+0.04	(x,y)	Note(3)
	W_Y			0.28			
Viewing Angle	θ_L	-	-	50	-	Degree	设备: DMS source pad down
	θ_R		-	50	-		
	θ_U		-	60	-		
	θ_D		-	60	-		

Test Conditions:

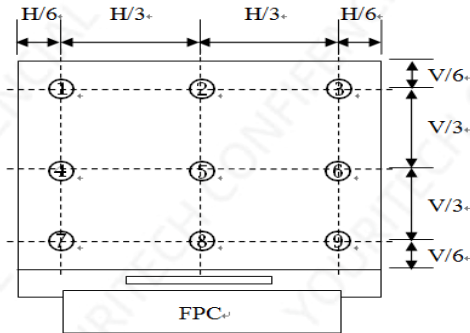
1. the ambient temperature is +25°C.
2. The test systems refer to Note 1~4.

Definition of Viewing Angle: The viewing angle range that the CR>2

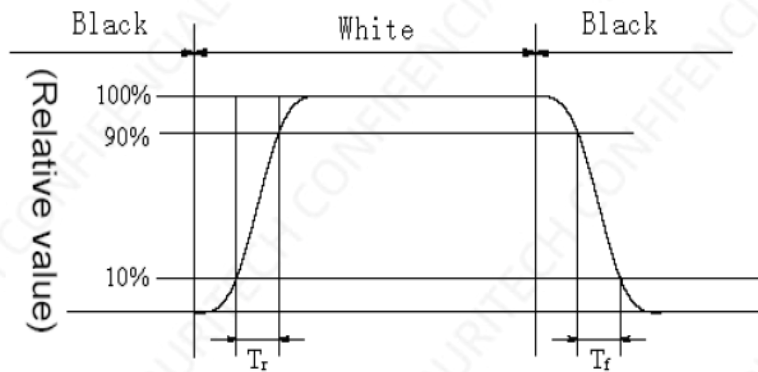


Note 1: Definition of Luminance Uniformity: Active area is divided into 9 measuring areas, every measuring point is placed at the center of each measuring area.

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



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



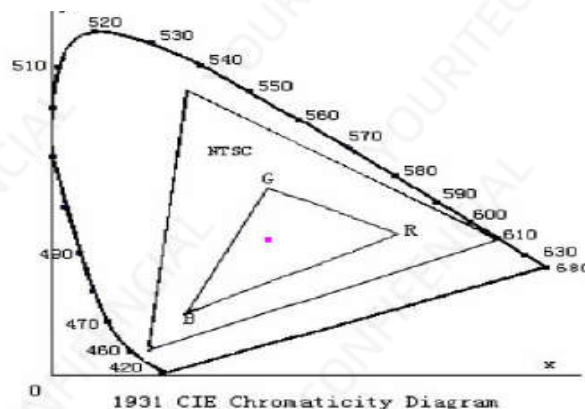
Note 3:

Definition of Color Chromaticity (CIE 1931)

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

Note 4: Definition of NTSC ratio:

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



7. RELIABILITY

Item 项目	Test Condition 测试条件	Remark 备注
High Temperature Storage	Ta = +80°C / 96Hours	Note1,2,3
Low Temperature Storage	Ta = -30°C / 96Hours	Note1,2,3
High Temperature Operating	Ta = +70°C / 96Hours	Note1,2,3
Low Temperature Operating	Ta = -20°C / 96Hours	Note1,2,3
Temperature Cycle storage Test	-30°C/30min Δ+80°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 1m 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.

