PRODUCT SPECIFICATION

TFT-LCD MODULE

Model No：FRD280C40063-A-CT2K

For Customer's Acceptance	
Approved by	**Comment**

	Signature	Date
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Checked by	罗　永	**2026.07.13**
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1. Document Revision History :

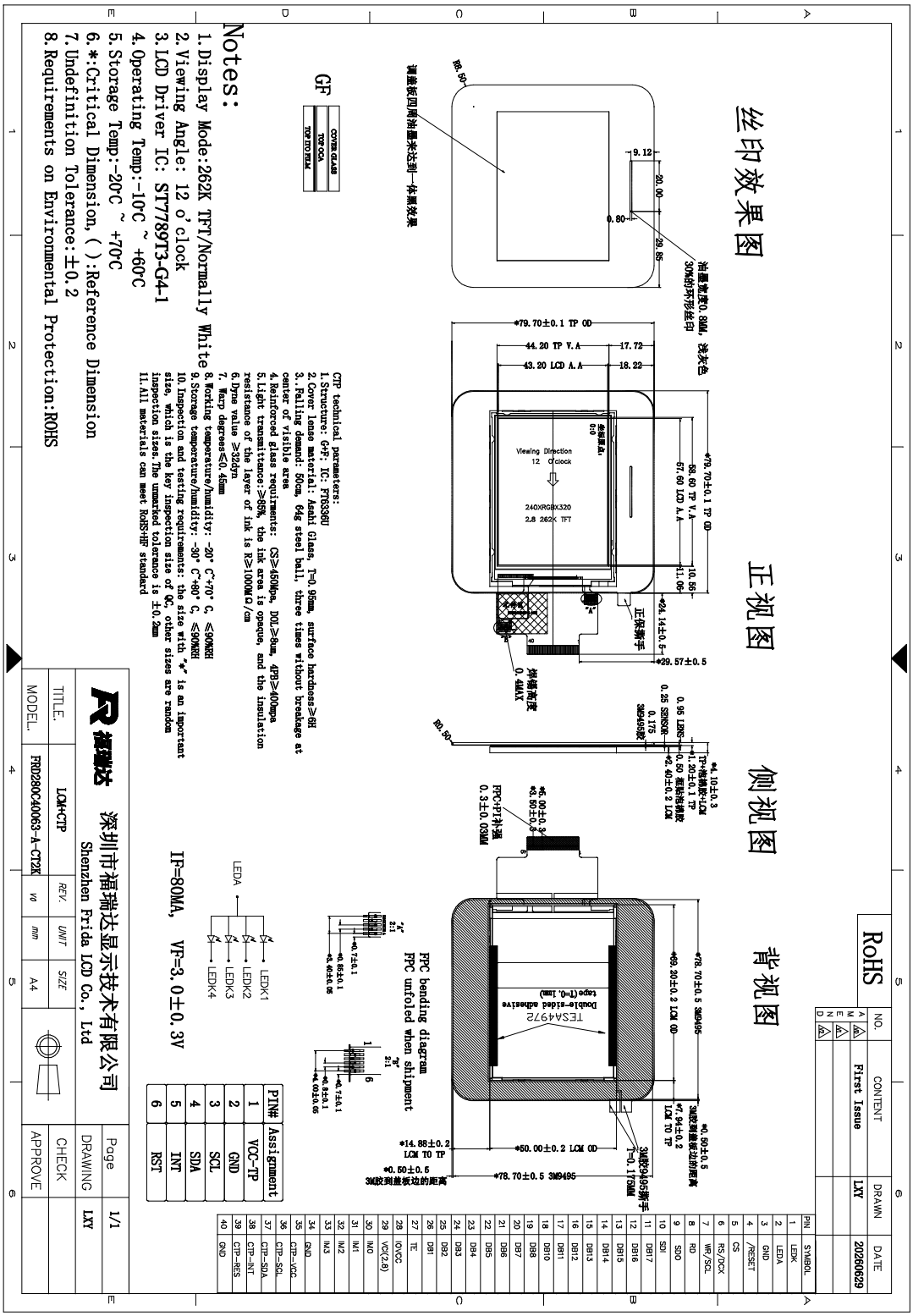
DOCUMENT REVISION	DATE	DESCRIPTION	PREPARED BY
A	2026-07-13	First Release.	LXY

2. General Description

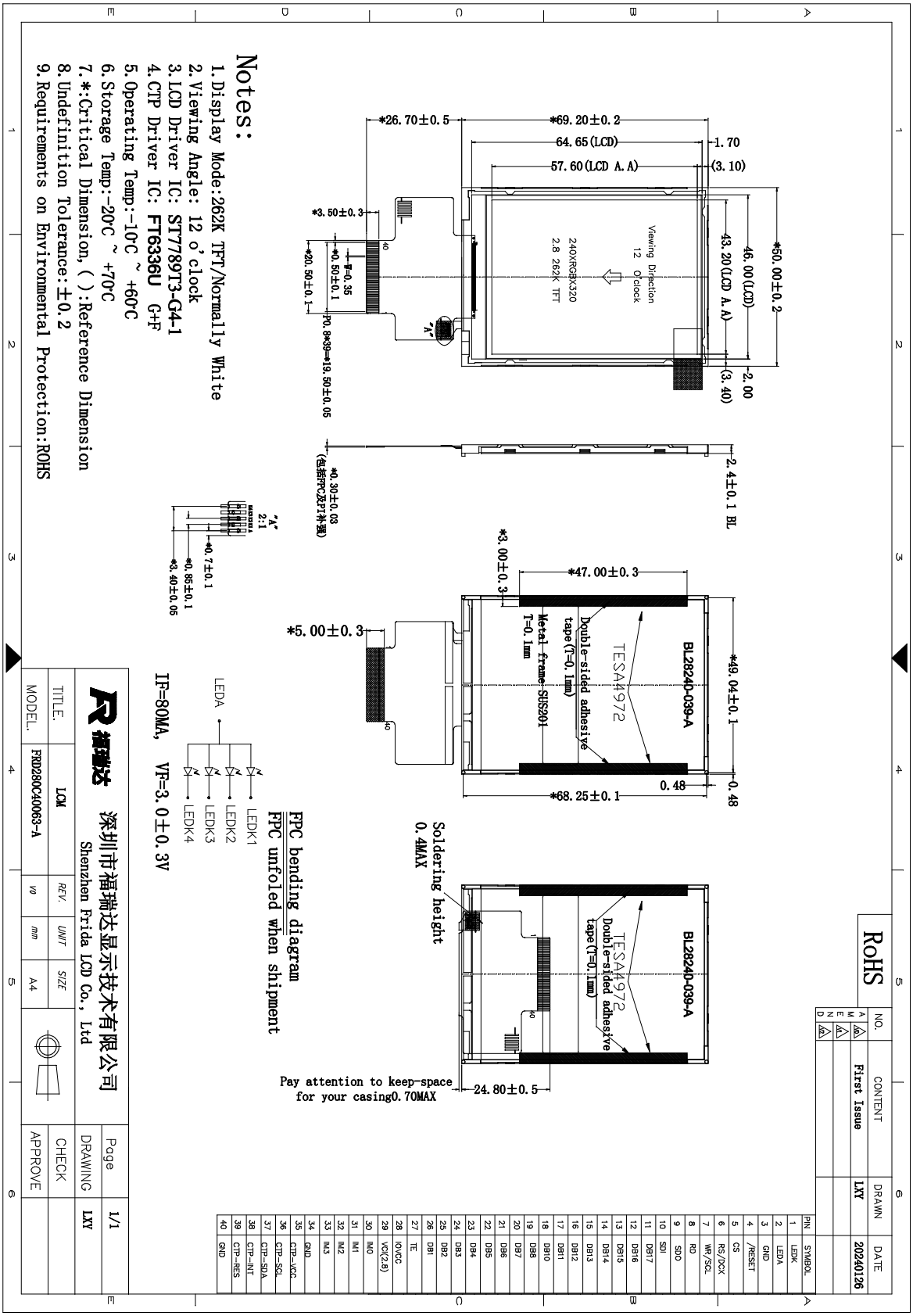
No	Item	Specification	Remark
1	Screen Size	2.8 inch	
2	Display Mode	Normally White	
3	Resolution	240 × RGB × 320	
4	Active Area	43.2*57.6	mm
5	Outline Dimension	79.7*79.7*4.1	mm
6	Viewing Direction	12 O'CLOCK	
7	Driver IC	ST7789T3-G4-1	
8	Interface	SPI/MCU 兼容	
9	Back Light	White Led*4	
11	Touch Panel	CTP	

3. Outline Dimension

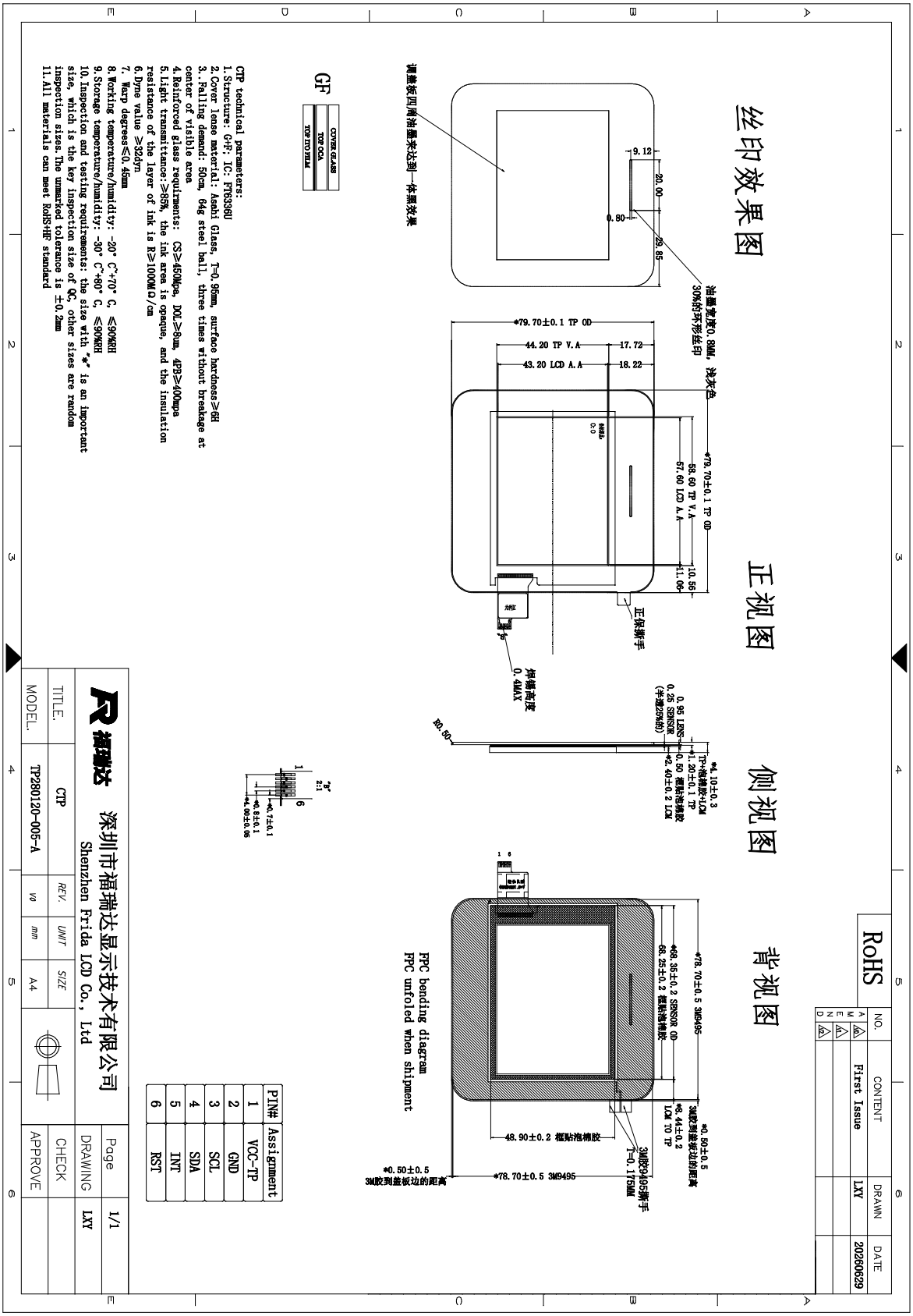
LCM+CTP



LCM


Notes:
1.Display Mode:262K TFT/Normally White
2.Viewing Angle: 12 o'clock
3.LCD Driver IC: ST7789T3-G4-1
4.CTP Driver IC: FT6336U G+F
5.Operating Temp:-10℃ ~ +60℃
6.Storage Temp:-20℃ ~ +70℃
7.*:Critical Dimension,( ):Reference Dimension
8.Undefinition Tolerance:±0.2
9.Requirements on Environmental Protection:ROHS
*26.70±0.5
*69.20±0.2
64.65(LCD)
57.60(LCD A.A)
1.70
(3.10)
43.20(LCD A.A)
46.00(LCD)
*50.00±0.2
2.00
(3.40)
*3.50±0.3
*20.50±0.1
*0.50±0.1
P=0.35
P0.8*39=19.50±0.05
240XRGBX320
2.8 262K TFT
Viewing Direction
12 O'clock
2.4±0.1 EL
*0.30±0.03
(包括FPC及PI补强)
*47.00±0.3
*3.00±0.3
*5.00±0.3
BL2824D-039-A
TESA4972
Double-sided adhesive tape(T=0.1mm)
Metal frame SUS201 T=0.1mm
*49.04±0.1
0.48
*68.25±0.1
Soldering height 0.4MAX
Pay attention to keep-space for your casing0.70MAX
24.80±0.5
FPC bending diagram
FPC unfolded when shipment
LEDA
LEDK1
LEDK2
LEDK3
LEDK4
IF=80MA, VF=3.0±0.3V
*0.7±0.1
*0.85±0.1
*3.40±0.05
RoHS
NO.
CONTENT
DRAWN
DATE
First Issue
LXY
20240126
PIN SYMBOL
1 LEDK
2 LEDA
3 GND
4 /RESET
5 CS
6 RS/DCX
7 WR/SCL
8 RD
9 SDO
10 SDI
11 DB17
12 DB16
13 DB15
14 DB14
15 DB13
16 DB12
17 DB11
18 DB10
19 DB8
20 DB7
21 DB6
22 DB5
23 DB4
24 DB3
25 DB2
26 DB1
27 TE
28 IOVCC
29 VCI(2.8)
30 IM0
31 IM1
32 IM2
33 IM3
34 GND
35 CTP_VCC
36 CTP_SCL
37 CTP_SDA
38 CTP_INT
39 CTP_RES
40 GND
深圳市福瑞达显示技术有限公司
Shenzhen Frida LCD Co., Ltd
TITLE: LCM
MODEL: FRD280C40063-A
REV. V0
UNIT mm
SIZE A4
Page 1/1
DRAWING LXY
CHECK
APPROVE

CTP


丝印效果图
正视图
侧视图
背视图
GF
COVER GLASS
TOP OCA
TOP ITO FILM
调整板四周油墨夹边到一体黑效果
油墨宽度0.8MM，浅灰色
30%的环形丝印
*79.70±0.1 TP OD
44.20 TP V.A
43.20 LCD A.A
17.72
18.22
58.60 TP V.A
57.60 LCD A.A
9.12
20.00
29.85
0.80
10.50
11.06
正保护手
焊锡高度
0.4MAX
R0.50
0.95 LENS
0.25 SENSOR
(半透25%的)
*4.10±0.3
TP+框贴胶+LCM
*1.20±0.1 TP
*0.50 框贴泡棉胶
*2.40±0.2 LCM
*78.70±0.5 3M9495
*68.35±0.2 SENSOR OD
68.25±0.2 框贴泡棉胶
*0.50±0.5
3M胶到盖板边的距离
*8.44±0.2
LCM TO TP
48.90±0.2 框贴泡棉胶
3M胶到盖板边的距离
*0.50±0.5
3M胶到盖板边的距离
*78.70±0.5 3M9495
3M胶贴A95撕手
T=0.1mm
FPC bending diagram
FPC unfolded when shipment
"B"
2:1
*0.7±0.1
*0.8±0.1
*4.00±0.06
RoHS
NO.
CONTENT
DRAWN
DATE
A
First Issue
LXY
20260629
CTP technical parameters:
1.Structure: G+F; IC: FT6336U
2.Cover lense material: Asahi Glass, T=0.95mm, surface hardness≥6H
3.Falling demand: 50cm, 64g steel ball, three times without breakage at center of visible area
4.Reinforced glass requirments: CS≥450Mpa, DOL≥8um, 4PB≥400mpa
5.Light transmittance:≥85%, the ink area is opaque, and the insulation resistance of the layer of ink is R≥1000MΩ/cm
6.Dyne value ≥32dyn
7. Warp degrees≤0.45mm
8.Working temperature/humidity: -20° C~+70° C, ≤90%RH
9.Storage temperature/humidity: -30° C~+80° C, ≤90%RH
10.Inspection and testing requirements: the size with "*" is an important size, which is the key inspection size of QC, other sizes are random inspection sizes.The unmarked tolerance is ±0.2mm
11.All materials can meet RoHS+HF standard
PIN# Assignment
1 VCC-TP
2 GND
3 SCL
4 SDA
5 INT
6 RST
深圳市福瑞达显示技术有限公司
Shenzhen Frida LCD Co., Ltd
TITLE. CTP
MODEL. TF280120-005-A
REV. V0
UNIT mm
SIZE A4
Page 1/1
DRAWING LXY
CHECK
APPROVE

4. Interface Specification

4.1 LCM Interface Specificatio

Pin No	Symbol	Description	Note
1	LEDK	Power Supply For LED Backlight Cathode Input.	
2	LEDA	Power Supply For LED Backlight Anode Input.	
3	GND	Ground.	
4	/RESET	Reset Signal input pin.	
5	CS	Chip selection signal.	
6	RS/DCX	Display data/command selection pin in parallel interface. This pin is used to be serial interface clock.	
7	WR/SCL	Write enable in MCU parallel interface. Display data/command selection pin in 4-line serial interface.	
8	RD	Read strobe signal.	
9	SDO	Serial data output pin.	
10	SDI	When IM3: Low, SPI interface input/output pin. When IM3: High, SPI interface input pin.	
11~18	DB17~DB10	MCU parallel interface data bus.	**1**
19~26	DB8~DB1	MCU parallel interface data bus.	**1**
27	TE	Frame head pulse for tearing effect.	
28	IOVCC	Power Supply For I/O.	
29	VCI(2.8)	Power Supply For LCD.	
30~33	IM0~IM3	The MCU interface mode select.	**1**
34	GND	Ground.	
35	CTP_VCC	Power Supply For CTP	
36	CTP_SCL	Serial clock signal pin For CTP	
37	CTP_SDA	Serial data input/output pin For CTP	
38	CTP_INT	CTP interrupt request	
39	CTP_RES	Reset Signal input pin For CTP	
40	GND	Ground.	

4.2 TP Interface Specification

Pin No	Symbol	Description	Note
1	VCC_TP	Power Supply For CTP	
2	GND	Ground.	
3	SCL	Serial clock signal pin For CTP	
4	SDA	Serial data input/output pin For CTP	
5	INT	CTP interrupt request	
6	RST	Reset Signal input pin For CTP	

NOTE 1:

-The MCU interface mode select.

IM3	IM2	IM1	IM0	MPU Interface Mode	Data pin
0	1	0	1	3-line 9bit serial I/F	SDA: in/out
				2 data lane serial I/F	SDA: in/out WRX: in
0	1	1	0	4-line 8bit serial I/F	SDA: in/out
1	0	0	0	80-16bit parallel I/F Ⅱ	DB[17:10], DB[8:1]
1	0	0	1	80-8bit parallel I/F Ⅱ	DB[17:10]
1	1	0	1	3-line 9bit serial I/F Ⅱ	SDA: in/ SDO: out
1	1	1	0	4-line 8bit serial I/F Ⅱ	SDA:in/ SDO: out

5.Absolute Maximum Ratings

Electrical Maximum Ratings – for IC Only

Parameter	Symbol	Min.	Max.	Unit	Note
Power supply voltage	VCI(2.8)	-0.3	+4.6	V	
Power supply voltage	IOVCC	-0.3	+4.6	V	

Note: If one of the above items is exceeded its maximum limitation momentarily, the quality of the product may be degraded.

Absolute maximum limitation, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the recommend range.

6. Electrical Specifications

At Ta = 25 ℃, VCI(2.8)= 2.4V to 3.3V, IOVCC = 1.65V to 3.3V, GND=0V.

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage (analog)	VCI(2.8)-GND		2.4	2.75	3.3	V
Supply voltage (Logic)	IOVCC-GND		1.65	1.8	3.3	V
Supply voltage of white LED backlight	VLED	Forward current =80mA Number of LED =4	2.7	3	3.3	V

7.Timing Characteristics

8080 Series MCU Parallel Interface Characteristics: 18/16/9/8-bit Bus

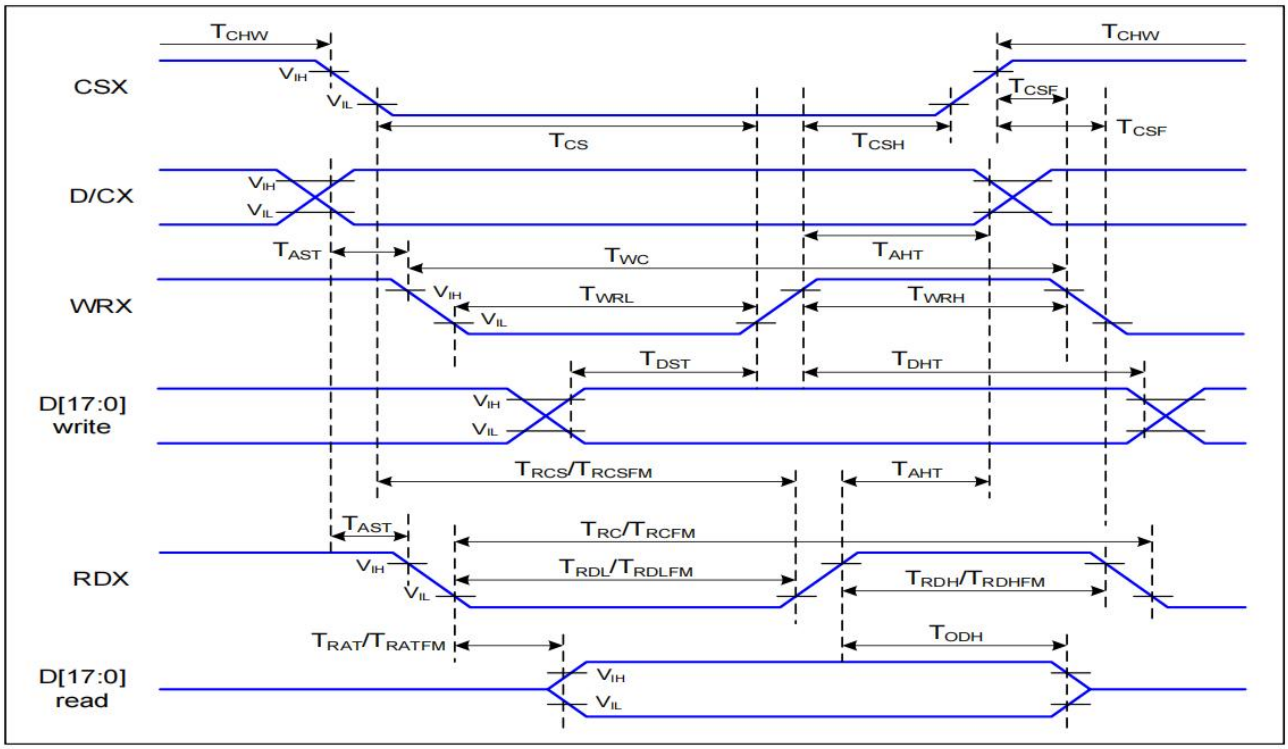


Figure 1 Parallel Interface Timing Characteristics (8080-Series MCU Interface)

VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=25℃

Signal	Symbol	Parameter	Min	Max	Unit	Description
D/CX	T_{AST}	Address setup time	0		ns	-
	T_{AHT}	Address hold time (Write/Read)	10		ns	
CSX	T_{CHW}	Chip select “H” pulse width	0		ns	-
	T_{CS}	Chip select setup time (Write)	15		ns	
	T_{RCS}	Chip select setup time (Read ID)	45		ns	
	T_{RCSFM}	Chip select setup time (Read FM)	355		ns	
	T_{CSF}	Chip select wait time (Write/Read)	10		ns	
	T_{CSH}	Chip select hold time	10		ns	
WRX	T_{WC}	Write cycle	66		ns	
	T_{WRH}	Control pulse “H” duration	15		ns	
	T_{WRL}	Control pulse “L” duration	15		ns	
RDX (ID)	T_{RC}	Read cycle (ID)	160		ns	When read ID data
	T_{RDH}	Control pulse “H” duration (ID)	90		ns	
	T_{RDL}	Control pulse “L” duration (ID)	45		ns	
RDX (FM)	T_{RCFM}	Read cycle (FM)	450		ns	When read from frame memory
	T_{RDHFM}	Control pulse “H” duration (FM)	90		ns	
	T_{RDLFM}	Control pulse “L” duration (FM)	355		ns	
D[17:0]	T_{DST}	Data setup time	10		ns	For CL=30pF

	T_{DHT}	Data hold time	10		ns	
	T_{RAT}	Read access time (ID)		40	ns	
	T_{RATFM}	Read access time (FM)		340	ns	
	T_{ODH}	Output disable time	20	80	ns	

Table 4 8080 Parallel Interface Characteristics

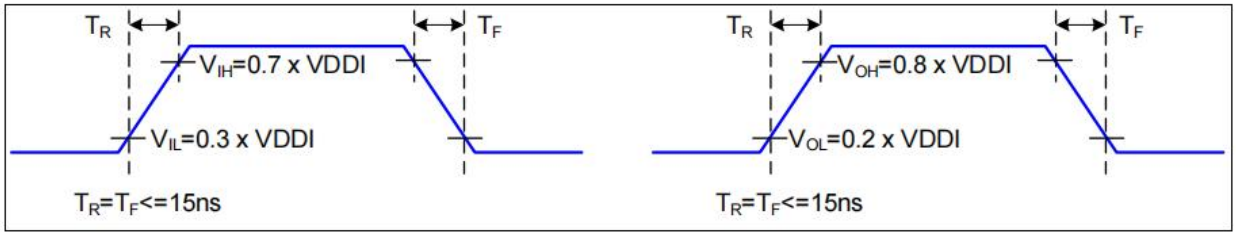


Figure 2 Rising and Falling Timing for I/O Signal

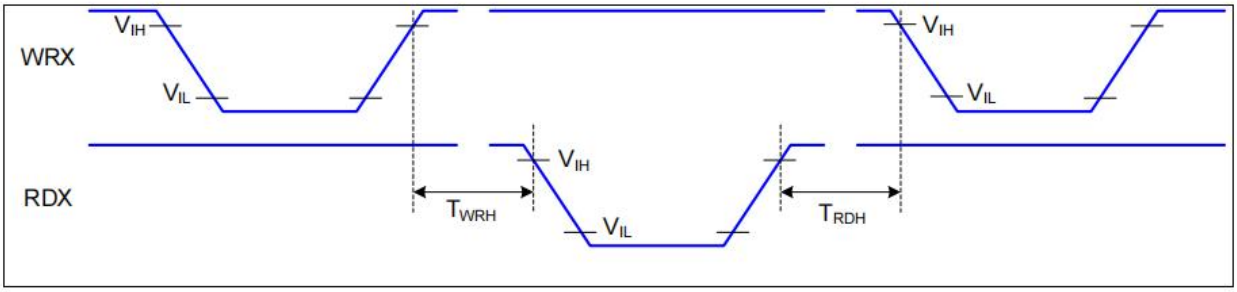


Figure 3 Write-to-Read and Read-to-Write Timing

Note: The rising time and falling time (Tr, Tf) of input signal and fall time are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of VDDI for Input signals.

Serial Interface Characteristics (3-line serial):

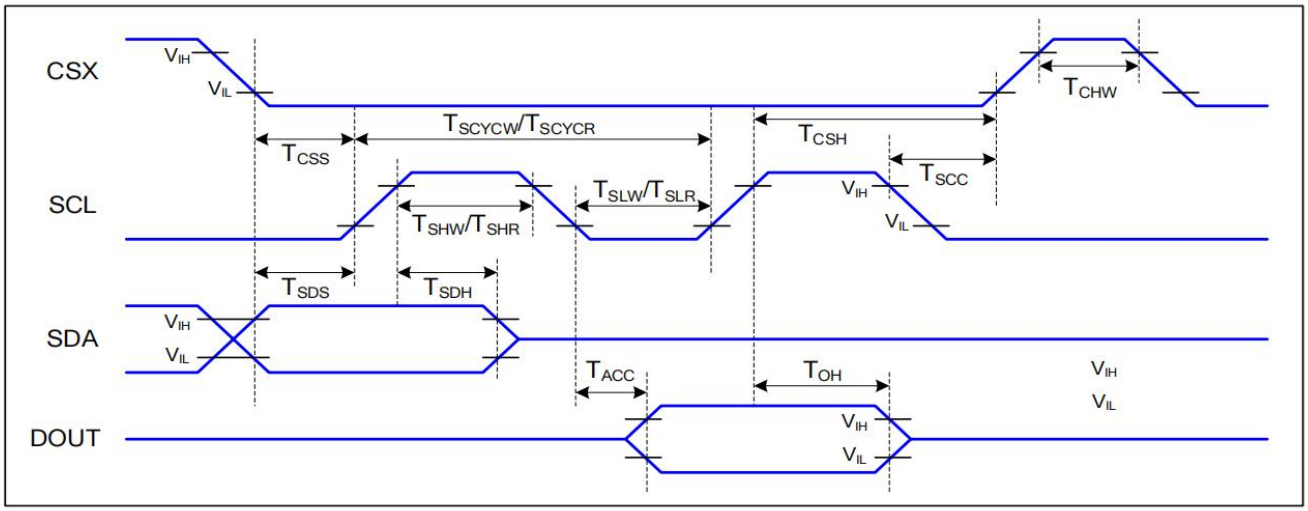


Figure 4 3-line serial Interface Timing Characteristics

VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=25℃

Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	15		ns	
	T_{CSH}	Chip select hold time (write)	15		ns	
	T_{CSS}	Chip select setup time (read)	60		ns	
	T_{SCC}	Chip select hold time (read)	65		ns	
	T_{CHW}	Chip select “H” pulse width	40		ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	16		ns	
	T_{SHW}	SCL “H” pulse width (Write)	7		ns	
	T_{SLW}	SCL “L” pulse width (Write)	7		ns	
	T_{SCYCR}	Serial clock cycle (Read)	150		ns	
	T_{SHR}	SCL “H” pulse width (Read)	60		ns	
	T_{SLR}	SCL “L” pulse width (Read)	60		ns	
SDA (DIN)	T_{SDS}	Data setup time	7		ns	
	T_{SDH}	Data hold time	7		ns	
DOUT	T_{ACC}	Access time	10	50	ns	For maximum CL=30pF
	T_{OH}	Output disable time	15	50	ns	For minimum CL=8pF

Table 5 3-line serial Interface Characteristics

Note1 : The rising time and falling time (Tr, Tf) of input signal are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of VDDI for Input signals

Note2: In the read sequence of serial interface, the 500nsec delay time is needed between read command and first read clock..

Serial Interface Characteristics (4-line serial):

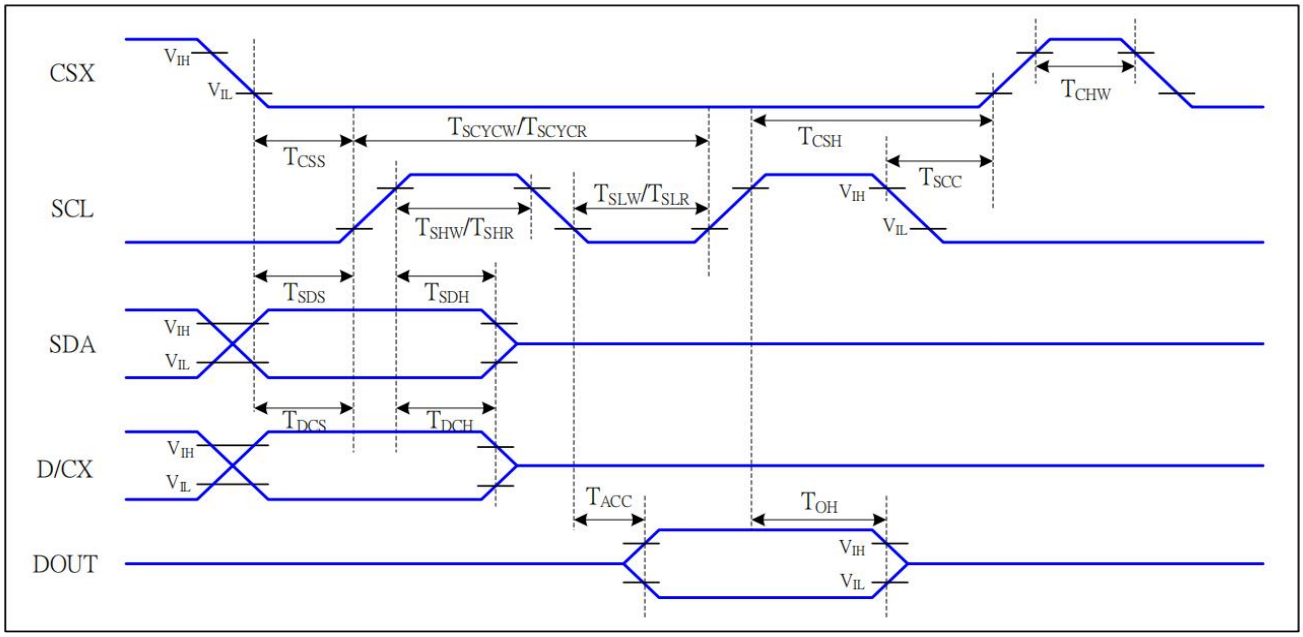


Figure 5 4-line serial Interface Timing Characteristics

VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=25℃

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	15		ns	
	T_{CSH}	Chip select hold time (write)	15		ns	
	T_{CSS}	Chip select setup time (read)	60		ns	
	T_{SCC}	Chip select hold time (read)	65		ns	
	T_{CHW}	Chip select "H" pulse width	40		ns	
SCL	T_{SCYCW}	Serial clock cycle (Write)	16		ns	-write command & data ram
	T_{SHW}	SCL "H" pulse width (Write)	7		ns	
	T_{SLW}	SCL "L" pulse width (Write)	7		ns	
	T_{SCYCR}	Serial clock cycle (Read)	150		ns	-read command & data ram
	T_{SHR}	SCL "H" pulse width (Read)	60		ns	
	T_{SLR}	SCL "L" pulse width (Read)	60		ns	
D/CX	T_{DCS}	D/CX setup time	10		ns	
	T_{DCH}	D/CX hold time	10		ns	
SDA (DIN)	T_{SDS}	Data setup time	7		ns	
	T_{SDH}	Data hold time	7		ns	
DOUT	T_{ACC}	Access time	10	50	ns	For maximum CL=30pF For minimum CL=8pF
	T_{OH}	Output disable time	15	50	ns	

Table 6 4-line serial Interface Characteristics

Note1 : The rising time and falling time (Tr, Tf) of input signal are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of VDDI for Input signals

Note2: In the read sequence of serial interface, the 500nsec delay time is needed between read command and first read clock.

8. Power Supply Configuration

VDDI and VDD can be applied in any order.

In CABC function application, VDDI power on need delay 5ms after VDD has been supplied.

VDD and VDDI can be power down in any order.

During power off, if LCD is in the Sleep Out mode, VDD and VDDI must be powered down minimum 120msec after RESX has been released.

During power off, if LCD is in the Sleep In mode, VDDI or VDD can be powered down minimum 0msec after RESX has been released.

CSX can be applied at any timing or can be permanently grounded. RESX has priority over CSX.

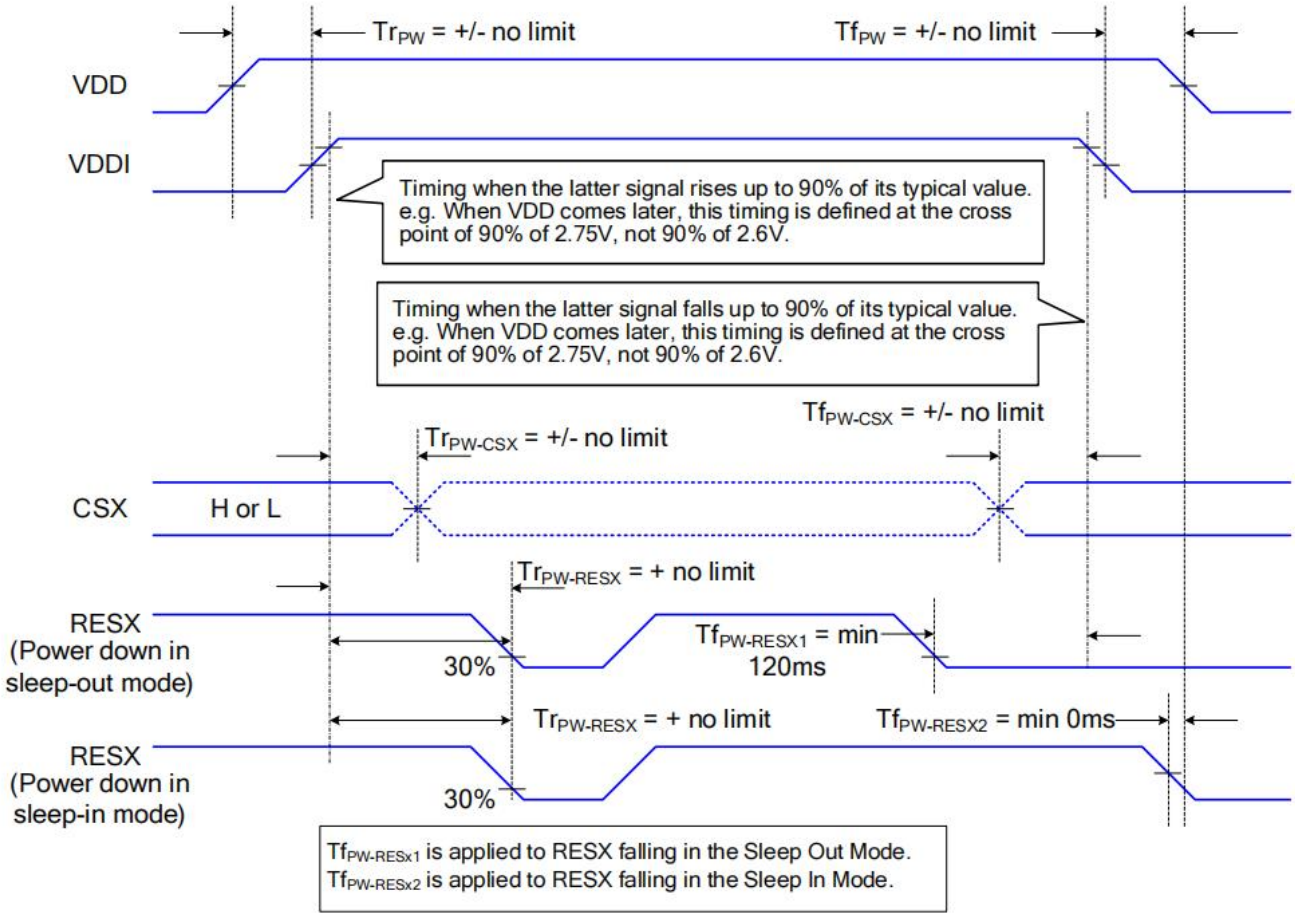
Note 1: There will be no damage to the display module if the power sequences are not met.

Note 2: There will be no abnormal visible effects on the display panel during the Power On/Off Sequences.

Note 3: There will be no abnormal visible effects on the display between end of Power On Sequence and before receiving Sleep Out command. Also between receiving Sleep In command and Power Off Sequence.

Note 4: If RESX line is not held stable by host during Power On Sequence as defined in the sequence below, then it will be necessary to apply a Hardware Reset (RESX) after Host Power On Sequence is complete to ensure correct operation. Otherwise function is not guaranteed.

The power on/off sequence is illustrated below



Uncontrolled Power Off

The uncontrolled power-off means a situation which removed a battery without the controlled power off sequence. It will neither damage the module or the host interface.

If uncontrolled power-off happened, the display will go blank and there will not any visible effect on the display (blank display) and remains blank until “Power On Sequence” powers it up.

9.Optical Specification

Item 项目	Symbol 符号	Condition 条件	Min 最小值	Typ 典型值	Max 最大值	Unit 单位	Note 备注
Response time 响应时间	Tr+Tf	Θ=0° Ø=0° Ta=25°C	-	16	–	ms	1
Contrast ratio 对比度	Cr		-	500	-	-	2
Color gamut 饱和度	S(%)		-	55	-	%	-
Luminance uniformity 均匀度	δWHITE		80	-	-	%	3
Viewing angle range 视角范围	Θx+	CR≧10 Ta=25°C	-	65	-	deg	4
	Θx-		-	65	-	deg	
	Θy+		-	70	-	deg	
	Θy-		-	40	-	deg	
LCM Luminance LCM 亮度	Lv	Θ=0° Ø=0° Ta=25°C	-	TBD	-	Cd/m^2	5

Note1.Response time is the time required for the display to transition from White to black(Rise Time,Tr)and from black to white(Decay Time,Tf).For additional information see FIG1...

Note2.contrast Ratio(CR) is defined mathematically by the following formula ,For more information see FIG2.

Contrast Ratio(CR)=Average Surface Luminance with all white pixels/ Average Surface Luminance with all black pixels

Note3.The uniformity in surface luminance(WHITE) is determined by measuring luminance at eath test position,and then dividing the maximum luminance of all white pixels by minimum luminance of all white pixels,For more information seeFIG2.

WHITE=Minimum Surface Luminance with all white pixels(P1,P2,.....)/Maximum Surface Luminance with all white pixels(P1,P2,.....)

Note4.Viewing angle is the angel at which contrast ratio is greater than a specific value.For TET module,the specific value of contrast ratio is 10.For monochrome and color stn module,the specific value of contrast ratio is2.The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.For more information see FIG3

Note5. Surface luminance is the LCD surface luminance with all white pixels,For more information see

FIG2.

LV=Average Surface Luminance with all white pixels(P1,P2,.....)

Note6.CIE(X,Y)chromaticity is the Center point value.For more information see FIG2.

Note7.For Viewing angle and response time testing,the testing date is base on Autronic-Melchers’s ConScope.Series instruments.For contrast ratio,Surface Luminance,Luminance uniformity and CIE,the testing date is base on CS-2000 photo detector.

FIG1. The definition of Response time

响应时间定义

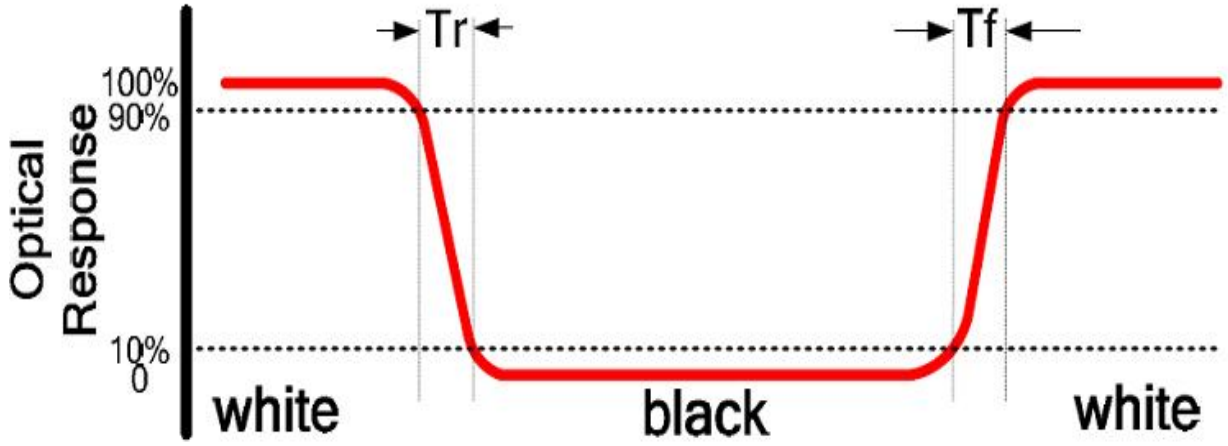


FIG2. Measuring method for Contrast ratio,surface luminance,Luminance uniformity,CIE(X,Y)chromaticity.

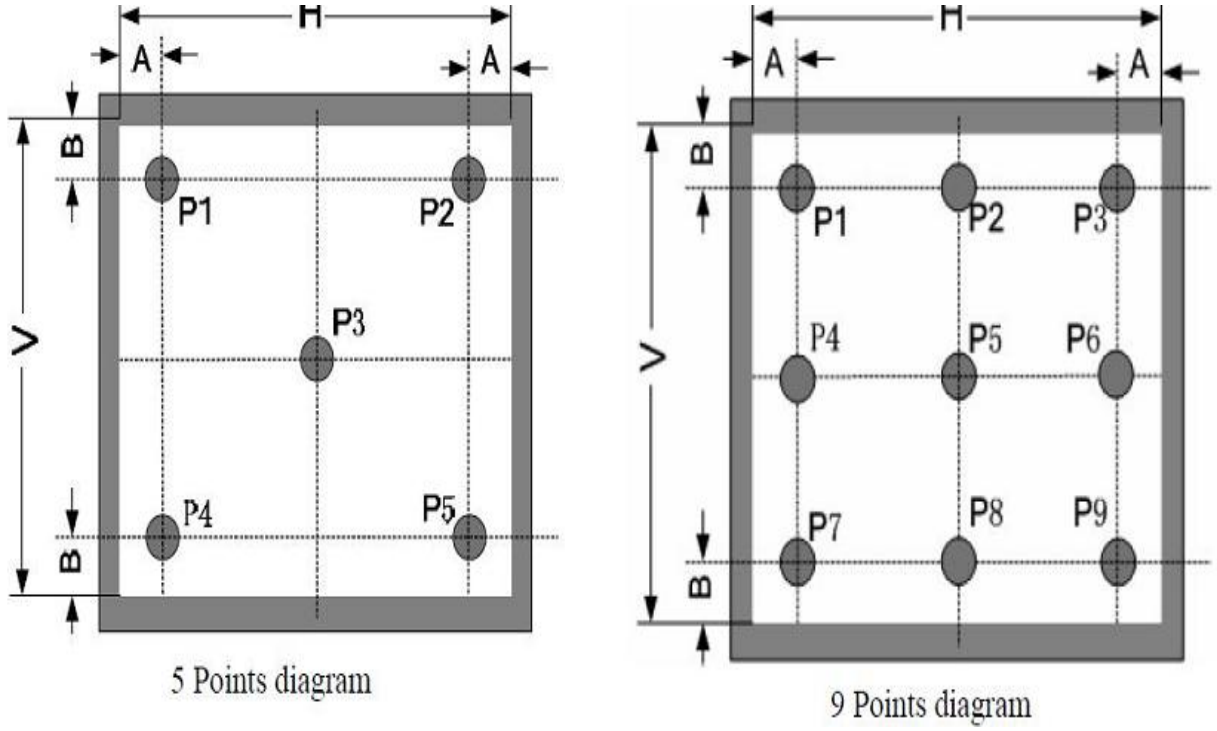
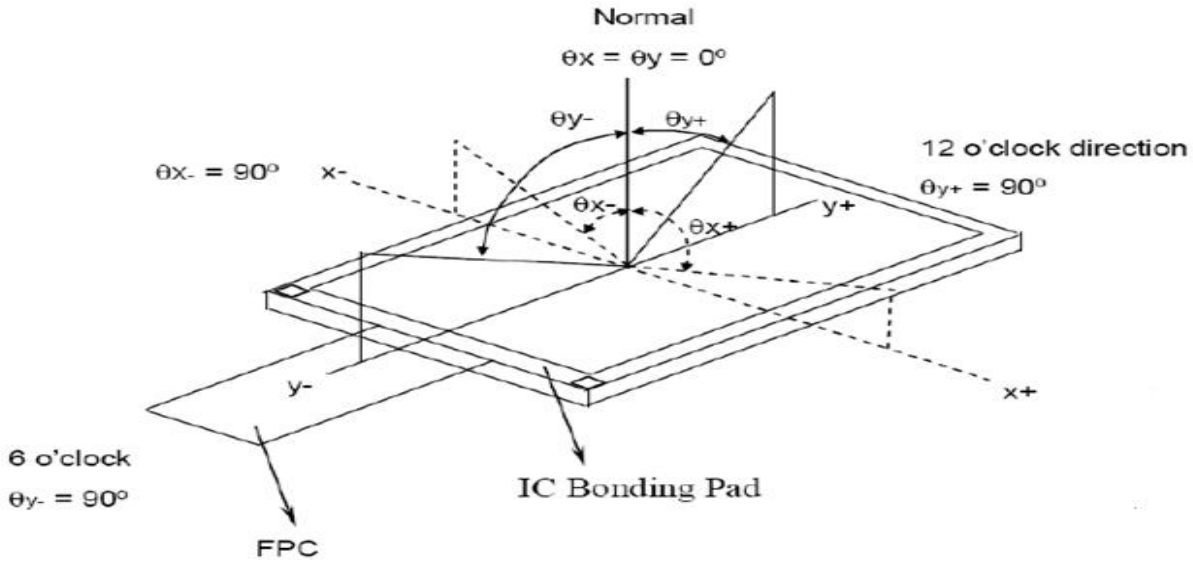


FIG3 The definition of viewing angle 视角定义



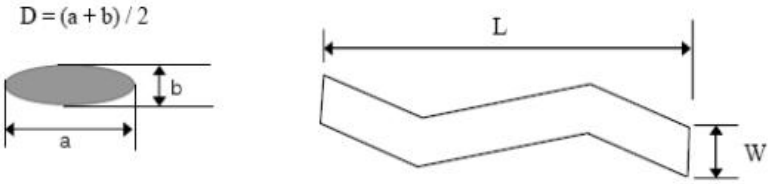
10.Inspection Specifications

10.1 **Appearance inspection**

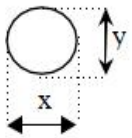
Item	Acceptable standards for defects	Defect level
Broken	Not allowed	critical defects
Cracks	Not allowed	critical defects
Insufficient UV glue entering	Not allowed	critical defects
Liquid crystal seal leakage	Not allowed	critical defects
Liquid crystal bubbles	Not allowed	critical defects
Surface scratch(mm)	W ≤0.02,ignored	minor defects
	0.02＜ W ≤0.03 L ≤2, N ≤2	
	0.03＜ W ≤0.05 L ≤1, N ≤1	
	0.05＜ W Not allowed	
Black/white spot(mm)	D≤ 0.1, ignored; 0.1＜D≤ 0.15, N ≤4	minor defects
	0.15＜D≤ 0.2, N ≤2; 0.2＜ D,Not allowed	
The seal pollution	Not allowed	minor defects
Liquid crystal residues	Not allowed	minor defects
Surface stains	Stains that cannot be cleaned or erased are not allowed	minor defects
size	Refer to the product specification corresponding to each product, overall size(including length,Width, thickness) or partial size exceeding the drawing size is not allowed	major defects

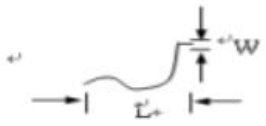
Remarks：1)Surface scratches within 1.5mm of the glass edge are ignored;

2) D = diameter, L = length, W = width, N = qty;



10.2 Functional test criteria

<table>
<tr><th>Item</th><th>Judgment</th><th>Level</th></tr>
<tr><td rowspan="3">Display status</td><td>No Display、Incomplete image、line defect、wrong viewing angle、flickering、abnormal image，are not allowed.</td><td>major defects</td></tr>
<tr><td>Display color, judged by approved samples, Or by limited samples</td><td>minor defects</td></tr>
<tr><td>MURA or the phenomenon that is unable to describe in words, judged by ND 5% or limited samples</td><td>minor defects</td></tr>
<tr><td>Spot(bright/dark)defect</td><td>Definition of spot defect:
Φ=（x+y）/2


<table><tr><th rowspan="2">Size(mm)</th><th colspan="2">acceptable qty</th></tr><tr><th>Active area</th><th>View area</th></tr><tr><td>Φ≤0.1</td><td>ignored</td><td rowspan="4">ignored</td></tr><tr><td>0.1＜Φ≤0.15</td><td>2（gap≥5）</td></tr><tr><td>0.15＜Φ≤0.2</td><td>1</td></tr><tr><td>0.2＜Φ</td><td>Not allowed</td></tr></table></td><td>minor defects</td></tr>
<tr><td>Black/white line</td><td>Definition of line defect:
L: length, W: width


<table><tr><th colspan="2">Size(mm)</th><th colspan="2">Acceptable qty</th></tr><tr><th>W(width)</th><th>L(length)</th><th>Active area</th><th>View area</th></tr><tr><td>W≤0.03</td><td>ignored</td><td>ignored</td><td rowspan="3">ignored</td></tr><tr><td>0.03＜W≤0.05</td><td>L≤2.0</td><td>3</td></tr><tr><td>W>0.05</td><td>-</td><td>Not allowed</td></tr></table></td><td>minor defects</td></tr>
</table>

11.Reliability Test Items

Item	Test Condition	Criterion
High Temperature Storage	70 ℃, 48 hrs	Note1,Note2
Low Temperature Storage	-20 ℃, 48 hrs	
High Temp. & High Humidity Storage	40 ℃, 80％ RH, 48hrs	
Thermal Shock (Static)	-20℃, 30 min /70℃, 30 min, 20 cycles	
High Temperature Operation	60 ℃, 48 hrs	
Low temperature Operation	-10 ℃, 48 hrs	

Note1:Evaluation should be tested after storage at room temperature for two hours.
Note2:
Pass: Normal display image no line defect.
Fail: No display image, or line defects.
Partial transformation of the module parts should be ignored.

12.Precautions

Please pay attentions to the followings as using the LCD module.

Handling

(a) Do not apply strong mechanical stress like drop, shock or any force to LCD module. It may cause improper operation, even damage.

(b) Because the polarizer is very fragile and easy to be damaged, do not hit, press or rub the display surface with hard materials.

(c) Do not put heavy or hard material on the display surface, and do not stack LCD modules.

(d) If the display surface is dirty, please wipe the surface softly with cotton swab or clean cloth.

(e) Avoid using Ketone type materials (e.g. Acetone), Toluene, Ethyl acid or Methyl chloride to clean the display surface. It might damage the touch panel surface permanently. The recommended solvents are water and Isopropyl alcohol.

(f) Wipe off water droplets or oil immediately.

(g) Protect the LCD module from ESD. It will damage the LSI and the electronic circuit.

(h) Do not touch the output pins directly with bare hands.

(i) Do not disassemble the LCD module.

(j) Do not lift the FPC of Touch Panel.

Storage

(a) Do not leave the LCD modules in high temperature, especially in high humidity for a long time.

(b) Do not expose the LCD modules to sunlight directly.

(c) The liquid crystal is deteriorated by ultraviolet. Do not leave it in strong ultraviolet ray for a long time.

(d) Avoid condensation of water. It may cause improper operation.

(e) Please stack only up to the number stated on carton box for storage and transportation. Excessive weight will cause deformation and damage of carton box.

Operation

(a) When mounting or dismounting the LCD modules, turn the power off.

(b) Protect the LCD modules from electric shock.

(c) The Driver IC control algorithms stated above should always obeyed to avoid damaging the LSI and electronic circuit.

(d) Be careful to avoid mixing up the polarity of power supply for backlight.

(e) Absolute maximum rating specified above has to be always kept in any case. Exceeding it may cause non-recoverable damage of electronic components or, nevertheless, burning.

(f) When a static image is displayed for a long time, remnant image is likely to occur.

(g) Be sure to avoid bending the FPC to an acute shape, it might break FPC.

(h) Most of the touch screens have air vent to equalize the inside air pressure to the outside one. The air vent must be open and liquid contact must be avoided as the liquid may be absorbed if the liquid is accumulated near the air vent.

(i) For the fragility of ITO film, it should avoid to use too tapering pen as the input material.

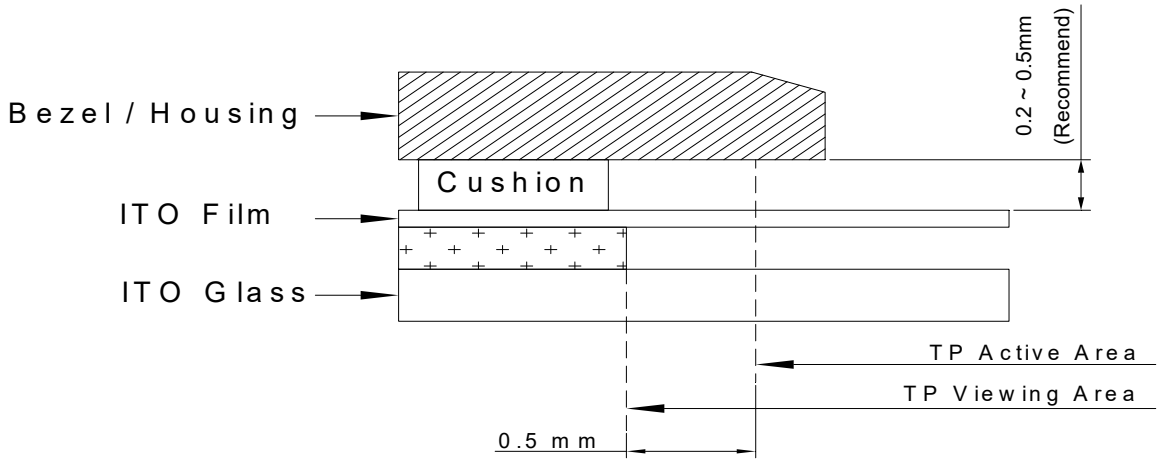
Touch Panel Mounting Notes

(a) If a cushion is used between bezel/housing and film must be choose as free as enough to absorb the expansion and contraction to avoid the distortion of film.

(b) The cushion must be placed out of the Viewing Area.

(c) Bezel/Housing edge must be posited between Key Area and Viewing Area. The edge enters the Key Area may cause unexpected input if the gap is too narrow or foreign particles like dusts exist between Bezel/Housing and ITO film.

(d) Mounting example:



The corner part has conductivity. Do not touch any metal part after mounting.

Others

a) If the liquid crystal leaks from the panel, it should be kept away from the eyes or mouth.

b) For the fragility of polarizer, it is recommended to attach a transparent protective plate over the display surface.

c) It is recommended to peel off the protection film on the polarizer slowly so that the electrostatic charge can be minimized.