SPECIFICATION
FOR TFT MODULE

Doc.Version:1.0

Module No: JR-TFT0128I03A

中山市锦润电子有限公司 Prepare: WYH Verify: Approval:	CUSTOMER: Check: Verify: Approval:

REVISION RECORD

REV NO.	REV DATE	CONTENTS	REMARKS
1.0	2025-6-24	First release	/

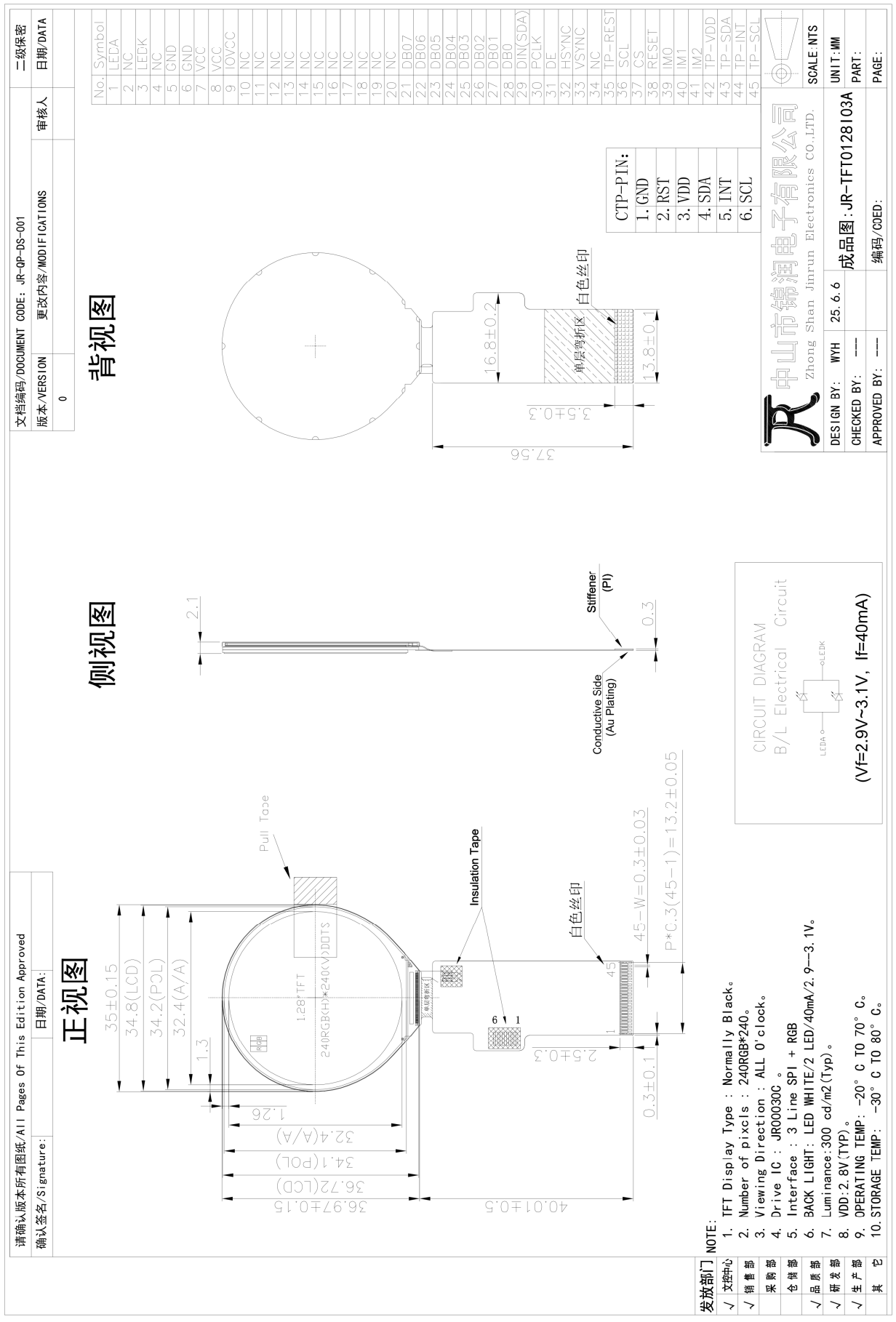
CONTENTS

■ GENERAL INFORMATION

ITEM	STANDARD VALUES	UNITS
LCD type	1.28” TFT	--
Dot arrangement	240 (RGB)×240	dots
Color filter array	RGB vertical stripe	--
Display mode	Normally Black	-
Gray Scale Inversion Direction	/	--
Eyes Viewing Direction	Full View	--
Driver IC	JR00030C	
Module size	35(W)×36.97(H)×2.1(T)	mm
Active area	32.4(W)×32.4(H)	mm
Interface	SPI、RGB、QSPI、MCU	--
Operating temperature	-20～+70	℃
Storage temperature	-30～+80	℃
Back Light	2 White LED	--
Weight	TBD	g

Note: Differences in ambient temperature and drive voltage will cause slight color changes

■ PRODUCT DRAWING



■ INTERFACE DESCRIPTION

NO	Symbol	Function
1	LEDA	Power for LED backlight (Anode)
2	NC	No connection
3	LEDK	Power for LED backlight (Cathode)
4	NC	No connection
5	GND	Power Ground
6	GND	Power Ground
7	VCC	Power supply for analog circuit
8	VCC	Power supply for analog circuit
9	IOVCC	Power supply for digital I/O system
10~20	NC	No connection
21	DB07	-DB[7:0] are used as SPI interface data bus. 8-bit serial I/F: DB0 is used. (SDA) 9-bit serial I/F: DB0 is used. (SDA) 2 data lane serial I/F: DB[1:0] are used. (SDA1、SDA2) -DB[7:0] are used as QSPI interface data bus. Single: DB0 is used. (SDA0) Dual: DB[1:0] are used. (SDA0、SDA1) Quad: DB[3:0] are used. (SDA0、SDA1、SDA2、SDA3) - DB[7:0] are used as RGB interface data bus. 6-bit RGB I/F: DB[7:2] are used.；DB01 is used. (DE) -If not used, please fix this pin at VDDI or GND
22	DB06	
23	DB05	
24	DB04	
25	DB03	
26	DB02	
27	DB01	
28	DB00	
29	DIN(SDA)	SPI interface input pin.
30	PCLK	Dot clock signal in RGB interface.
31	DE	Data enable signal for RGB interface operation.
32	HSYNC	Horizontal (Line) synchronizing input signal in RGB interface If not used, please fix to the VDDI or GND.
33	VSYNC	Vertical (Frame) synchronizing input signal in RGB interface If not used, please fix to the VDDI or GND.
34	NC	No connection
35	TP-REST	CTP Reset Pin
36	SCL	Clock in SPI interface，Read enable in MCU parallel interface

<table>
<tr><th>NO</th><th>Symbol</th><th>Function</th></tr>
<tr><td>37</td><td>CS</td><td>Chip select pin
Low enable</td></tr>
<tr><td>38</td><td>RESET</td><td>This signal will reset the device and it must be applied to properly initialize</td></tr>
<tr><td rowspan="6">39
40
41</td><td rowspan="6">IM0
IM1
IM2</td><td>
<table>
<tr><th>IM2</th><th>IM1</th><th>IM0</th><th>Interface Mode</th><th>Data Pin</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>3-line 9bit serial I/F</td><td>SDA: in/out</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>2 data lane serial I/F</td><td>SDA1: in/out
SDA2: in</td></tr>
<tr><td>0</td><td>1</td><td>1</td><td>QSPI I/F</td><td>SDA[3:0]:
in/out</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>RGB_3-line 9bit serial I/F</td><td>SDA: in/out
DB[5:0]: out</td></tr>
<tr><td>1</td><td>0</td><td>1</td><td>RGB_4-line 8bit serial I/F</td><td>SDA: in/out
DB[5:0]: out</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>4-line 8bit serial I/F</td><td>SDA: in/out</td></tr>
<tr><td>1</td><td>1</td><td>1</td><td>80-8bit parallel I/F</td><td>DB[7:0]</td></tr>
</table>
</td></tr>
<tr><td>42</td><td>TP-VDD</td><td>Power supply</td></tr>
<tr><td>43</td><td>TP-SDA</td><td>I²C Serial Data</td></tr>
<tr><td>44</td><td>TP-INT</td><td>Interrupt signal</td></tr>
<tr><td>45</td><td>TP-SCL</td><td>I²C Serial Clock</td></tr>
</table>

■ ELECTRICAL SPECIFICATION

Absolute Maximum Ratings

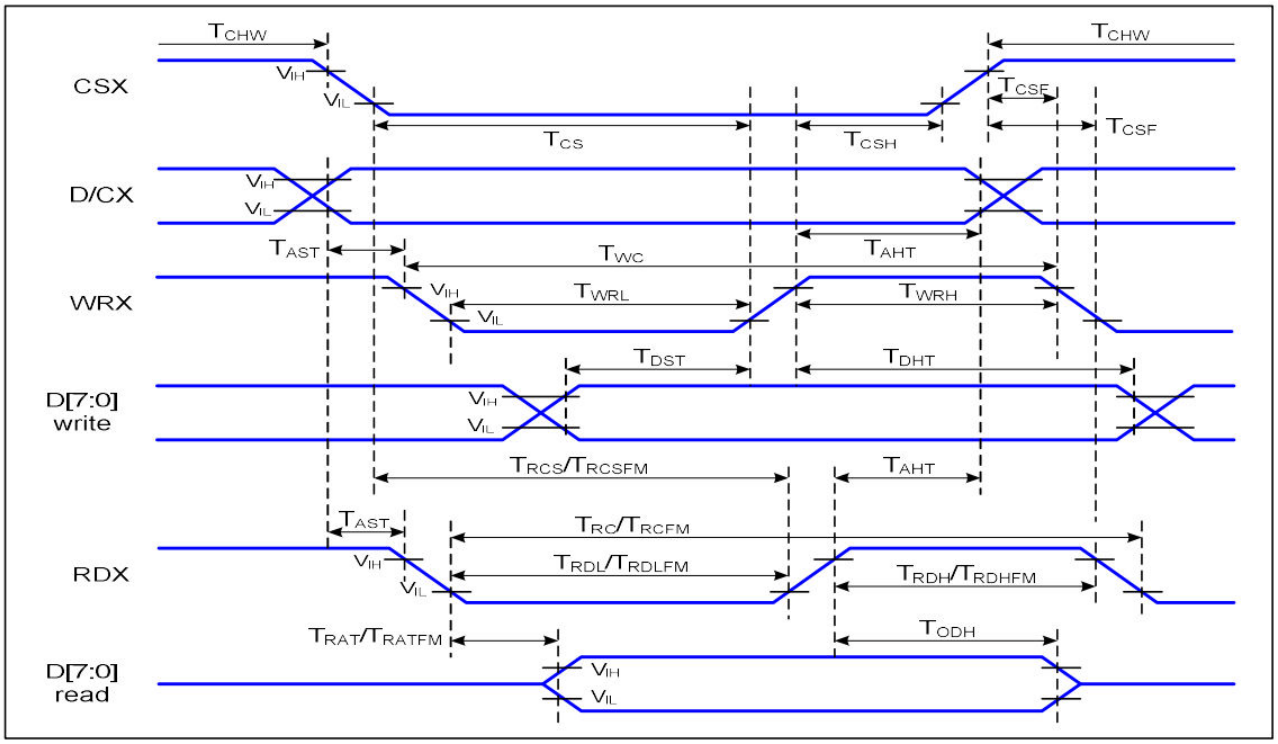
Item	Symbol	Min.	Max.	Unit
Supply Voltage(Analog)	VCC	-0.3	4.6	V
Supply Voltage (I/O)	IOVCC	-0.3	4.6	V
Logic input Voltage Range	VIN	0.5	VCC+0.5	V
Logic output Voltage Range	VOUT	0.5	VCC+0.5	V
Operating Temperature Range	TOPR	-20	70	°C
Storage Temperature Range	TSTR	-30	80	°C

DC Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Power Supply voltage	VCC	Operating voltage	2.65	2.8	3.3	V
Interface Operation Voltage	IOVCC	I/O Supply Voltage	1.65	1.8	3.3	V
Logic-High Input Voltage	V_{IH}	-	0.7 * IOVCC	-	IOVCC	V
	V_{IL}	-	GND	-	0.3 * IOVCC	V
Logic-High Output Voltage	V_{OH}	-	0.8 *IOVCC		IOVCC	V
	V_{OL}	-	GND		0.2 *IOVCC	V
Power Supply Current for LCM	I_{DD}	VCC=2.8V	-	-	-	mA

■ TIMING CHARACTERISTICS

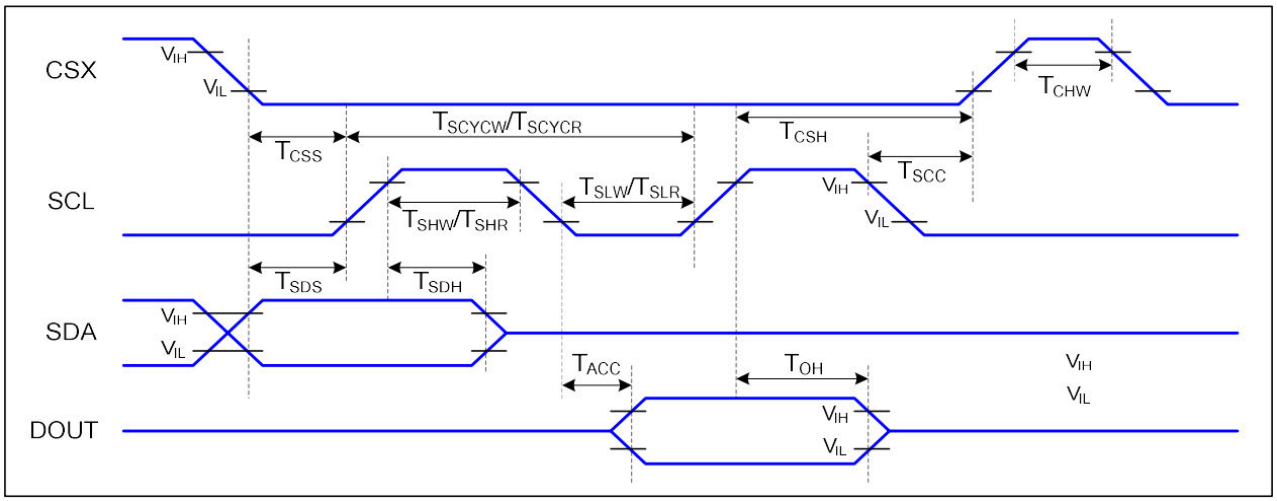
8080 Series MCU Parallel Interface Characteristics: 8-bit Bus



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	30		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	

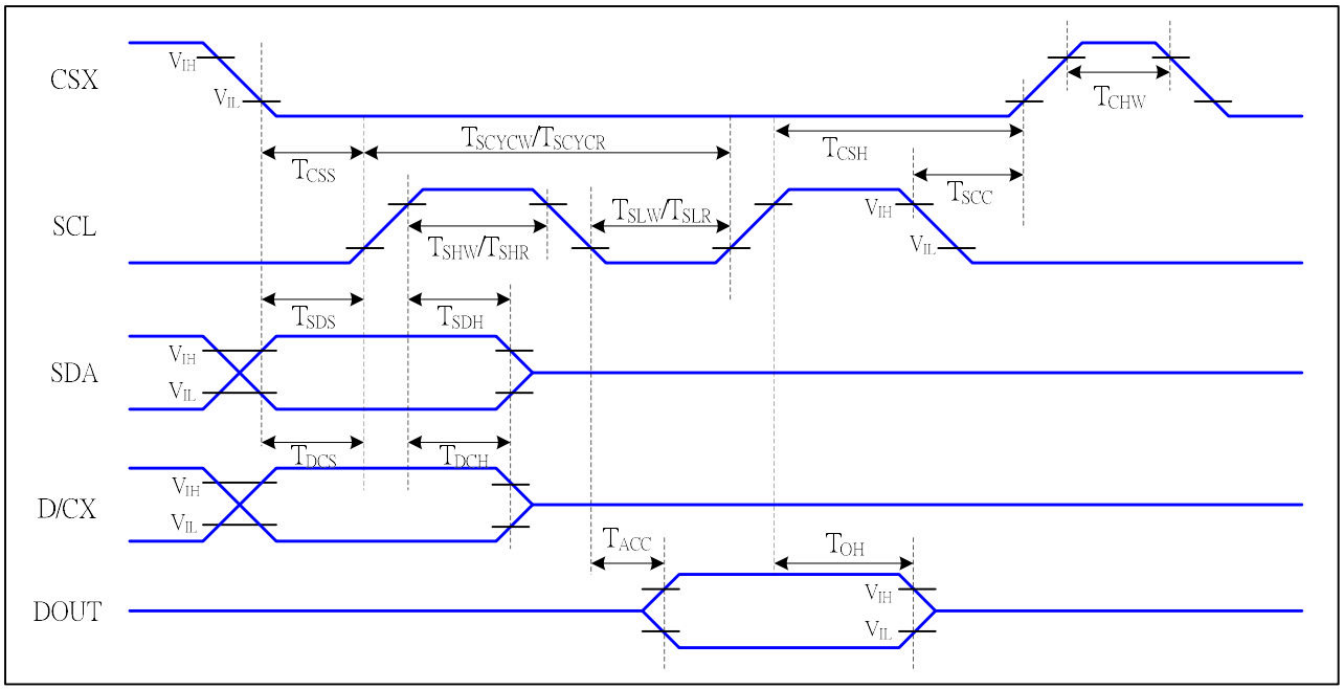
	T_{RDLFM}	Control pulse “L” duration (FM)	355		ns	
D[7:0]	T_{DST}	Data setup time	10		ns	For CL=30pF
	T_{DHT}	Data hold time	10		ns	
	T_{RAT}	Read access time (ID)		40	ns	
	T_{RATFM}	Read access time (FM)		340	ns	
	T_{ODH}	Output disable time	20	80	ns	

Serial Interface Characteristics (3-line serial):



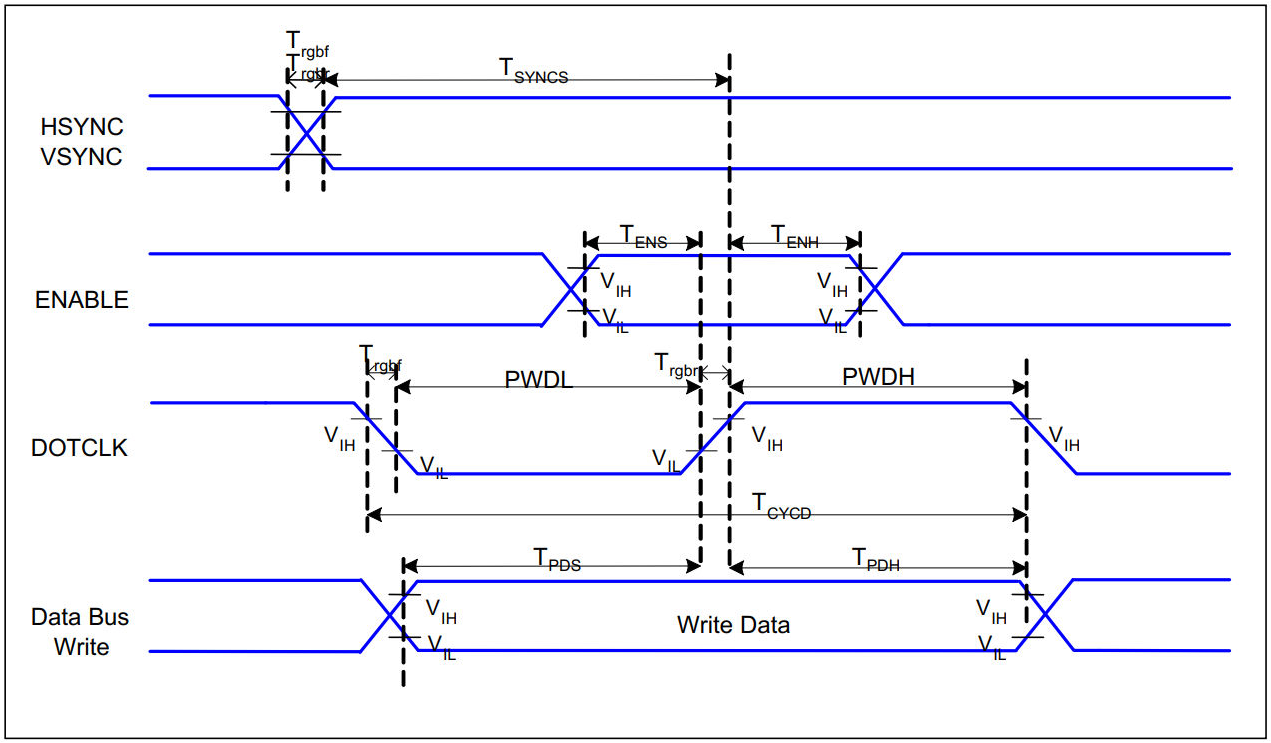
Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	15		ns	
	T_{CSH}	Chip select hold time (write)	15		ns	
	T_{CSS}	Chip select setup time (read)	60		ns	
	T_{SCC}	Chip select hold time (read)	65		ns	
	T_{CHW}	Chip select “H” pulse width	40		ns	
SCL	T_{SCYCW}	Serial 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

Serial Interface Characteristics (4-line serial):



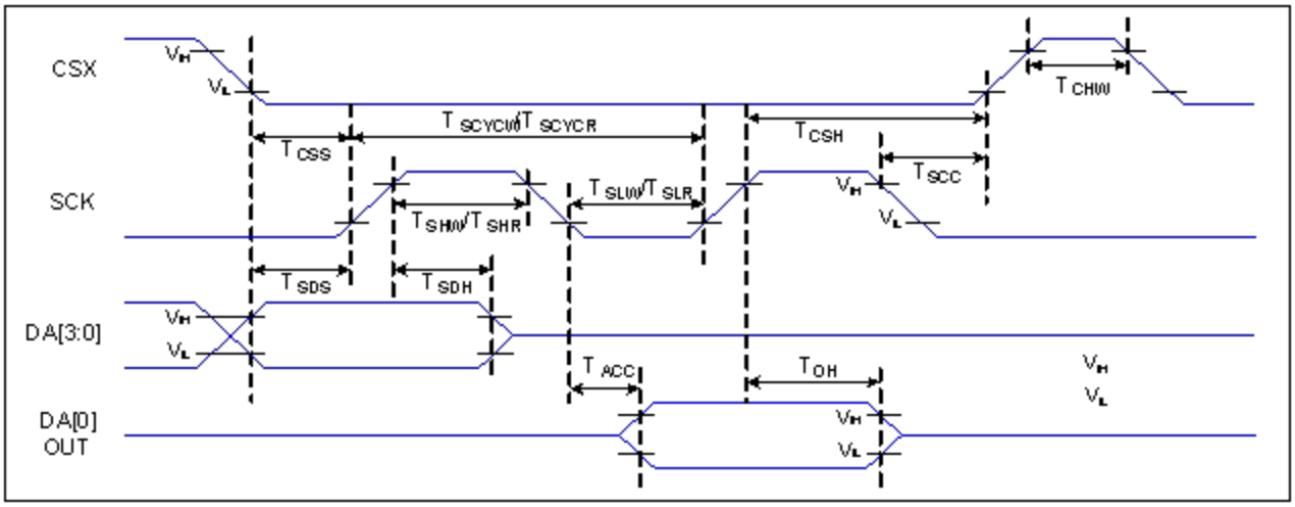
Signal	Symbol	Parameter	MIN	MAX	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	15		ns	
	T_{CSH}	Chip select hold time (write)	15		ns	
	T_{CSS}	Chip select setup time (read)	60		ns	
	T_{SCC}	Chip select hold time (read)	65		ns	
	T_{CHW}	Chip select “H” pulse width	40		ns	
SCL	T_{SCYCW}	Serial 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
	T_{OH}	Output disable time	15	50	ns	For minimum CL=8pF

RGB Interface Characteristics:



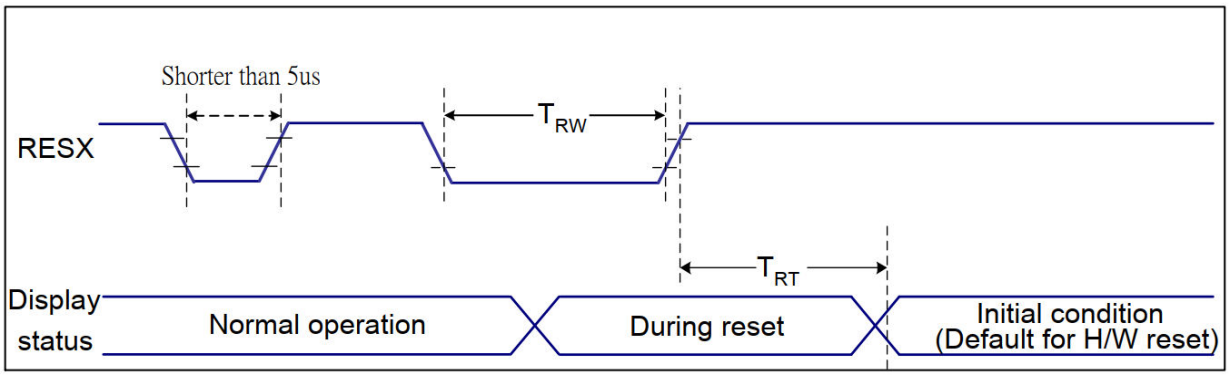
Signal	Symbol	Parameter	MIN	MAX	Unit	Description
HSYNC, VSYNC	T_{SYNCS}	VSYNC, HSYNC Setup Time	25	-	ns	
ENABLE	T_{ENS}	Enable Setup Time	25	-	ns	
	T_{ENH}	Enable Hold Time	25	-	ns	
DOTCLK	PWDH	DOTCLK High-level Pulse Width	25	-	ns	
	PWDL	DOTCLK Low-level Pulse Width	25	-	ns	
	T_{CYCD}	DOTCLK Cycle Time	55	-	ns	
	Trghr, Trghf	DOTCLK Rise/Fall time	-	10	ns	
DB	T_{PDS}	PD Data Setup Time	25	-	ns	
	T_{PDH}	PD Data Hold Time	25	-	ns	

QSPI Interface Characteristics:



Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	T_{CSS}	Chip select setup time (write)	19		ns	
	T_{CSH}	Chip select hold time (write)	19		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	
			200		ns	*Note1*
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	TBD	TBD	ns	For minimum CL=8pF

Reset Timing



IOVCC=1.8V,VCI=2.8V, AGND=DGND=0V, Ta=25℃

Related Pins	Symbol	Parameter	MIN	MAX	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1, 5)	ms
				120 (Note 1, 6, 7)	ms

Notes:

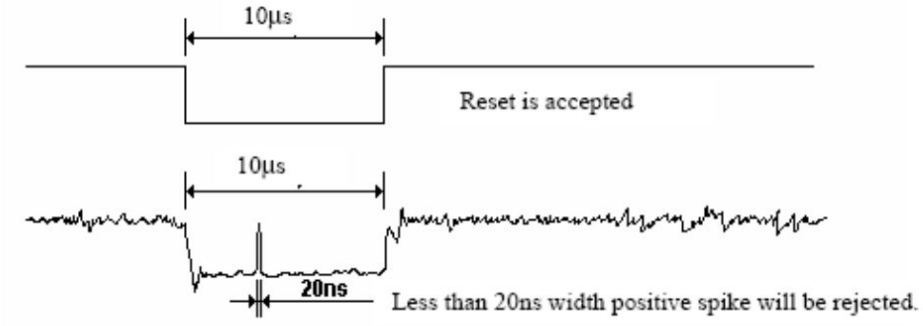
1. The reset cancel includes also required time for loading ID bytes, VCOM setting and other settings from NVM (or similar device) to registers. This loading is done every time when there is HW reset cancel time (tRT) within 5 ms after a rising edge of RESX.

2. Spike due to an electrostatic discharge on RESX line does not cause irregular system reset according to the table below:

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:



5. When Reset applied during Sleep In Mode.

6. When Reset applied during Sleep Out Mode.

7. It is necessary to wait 5msec after releasing RESX before sending commands. Also Sleep Out command cannot be sent for 120msec.

■ OPTICAL CHARACTERISTICS

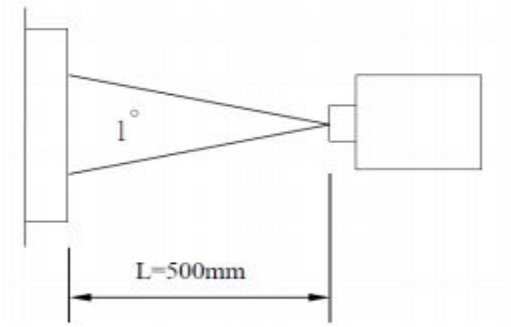
Item	Symbol	Condition	Values			Unit	Remark
			Min.	Typ.	Max.		
Viewing angle (CR≥ 10)	θ_L	Φ=180°(9 o'clock)	80	-	-	degree	
	θ_R	Φ=0°(3 o'clock)	80	-	-		
	θ_T	Φ=90°(12 o'clock)	80	-	-		
	θ_B	Φ=270°(6 o'clock)	80	-	-		
Response time (Rising+Falling)	T_{RT}	Normal θ=Φ=0°	-	30	40	msec	
Contrast ratio	CR		600	800	-	-	
Color chromaticity	White X		-	-	-	-	
	White Y		-	-	-	-	
	Red X		-	-	-	-	
	Red Y		-	-	-	-	
	Green X		-	-	-	-	
	Green Y		-	-	-	-	
	Blue X		-	-	-	-	
	Blue Y		-	-	-	-	
Luminance	L		-	300	-	cd/m²	
Luminance uniformity	Y_U		70	-	-	%	
Transmittance	Tr		3.0	3.8	-	%	

Note 1. Ambient conditions:

25℃±2℃, 60±10%RH, darkroom brightness below 10cd/m2.

Note 2. Measuring equipment:

BM-5A (TOPCON), viewing cone=1° , IL=20mA.

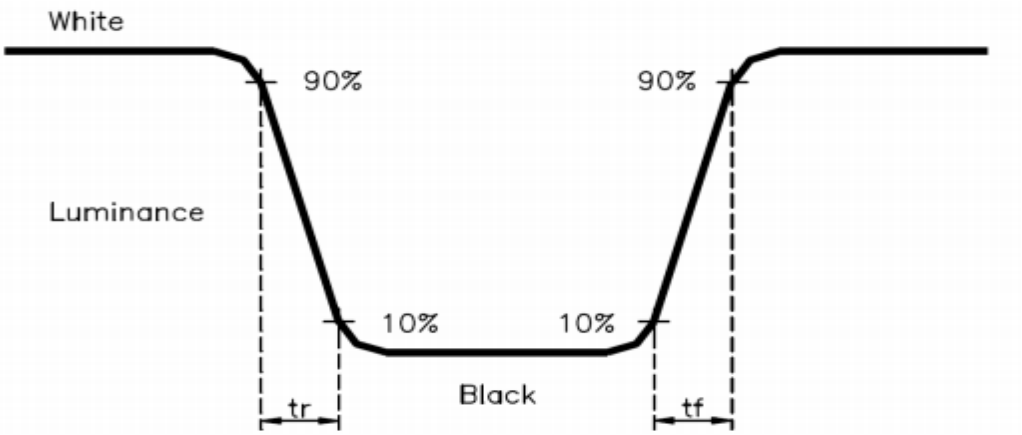


Note 3. Contrast ratio definition:

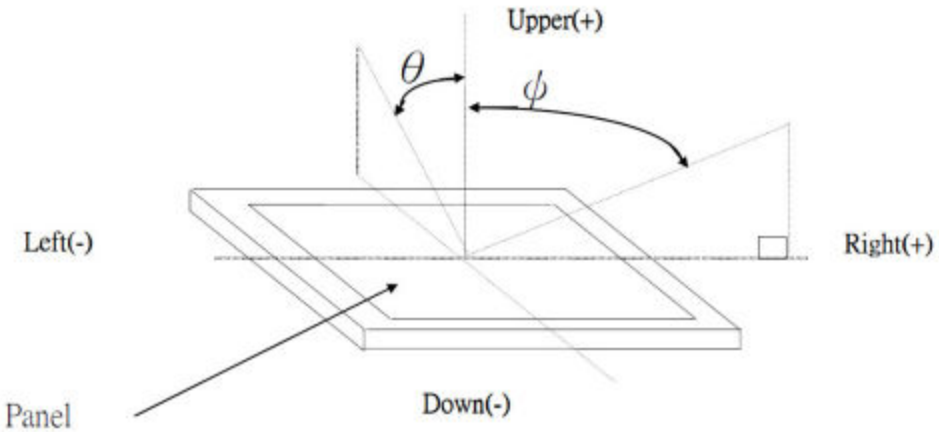
Contrast ratio = White brightness (full display)/Black brightness (all out)

Note 4. Response time definition:

Response time refers to the time interval between 10% and 90% of the amplitude.



Note 5. Viewing Angle Definition (θ, Φ):



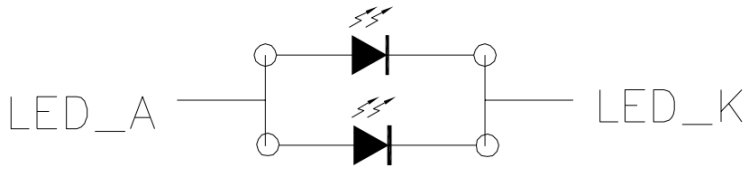
Note 6.Light source: C

■ BACKLIGHT CHARACTERISTICS

Item of backlight characteristics	Symbol	Min.	Typ.	Max.	Unit	Condition
Forward voltage	Vf	2.9	-	3.1	V	If=40mA
Number of LED	-	-	2	-	Piece	
Blacklight Colour	-	-	WHITE	-	-	-

NOTE:

1. Operating temperature 25℃, Unless otherwise specified
2. Products operated according to the above recommendations are guaranteed, but not if they are operated out of range, although the absolute maximum is not exceeded
3. LED life time defined as follows: The final brightness is at 50% of original brightness,If the LED lights work in large current, high temperature and high humidity conditions, the life of the LED lights will decrease.



(Vf=2.9V~3.1V, If=40mA)

■ RELIABILITY TEST CONDITIONS

No	Item	Description	remark
1	High temperature storage	The sample should be allowed to stand at 80℃ for 120 hours under no-load condition, and then returning it to normal temperature condition, and allowing it stand for 2 hours.	
2	Low temperature storage	The sample should be allowed to stand at -30℃ for 120 hours under no-load condition, then returning it to normal temperature condition, and allowing it stand for 2 hours.	
3	High temperature operation	The sample should be allowed to stand at 70℃ for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.	
4	Low temperature operation	The sample should be allowed to stand at -20℃ for 120 hours under driving condition and then returning it to normal temperature condition, and allowing it stand for 2 hours.	
5	Moisture storage	The sample should be allowed to stand at 60℃, 90%RH MAX for 240 hours under no-load condition, then taking it out and drying it at normal temperature for 2 hours.	
6	Electrical Static Discharge	NC	
7	Vibration test	Vibration rating: 100G Waveform: half string wave Vibration time: 6ms Vibration period :±X, ±Y, ±Z direction 3 times each	
8	Packing vibration	Frequency range: 10Hz ~ 550Hz Stoke:1.3mm Sweep: 1.5G, 33.3~400Hz Waveform: Sinusoidal wave Vibration period : X,Y, Z, 1 hours for each direction.	
9	Thermal shock storage	The sample should be allowed to stand the following 20 cycles : -30℃ for 30 minutes → normal temperature for 5 minutes → +80℃ for 30 minutes → normal temperature for 5 minutes, as one cycle.	

NOTE:

1. Under the standard test conditions, no poor functional display can occur.
2. Reliability Ensure the appearance of the product is good before testing

■ QUALITY STANDARDS

1.Detection condition

Function test:

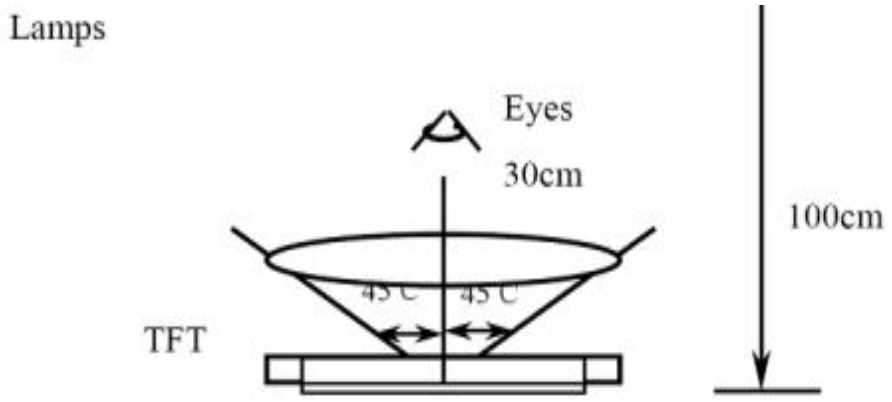
Under fluorescent lighting, the illumination of the inspection desktop is below 300Lux, and the inspector's eyes are 30±5cm away from the LCD surface to be tested.

Appearance inspection:

Under fluorescent lighting, the illumination of the inspection table is 750±150Lux, and the inspector's eyes are 30±5cm away from the LCD surface to be tested.

Inspection Angle:

Up and down left-right Angle: The eye official Defect Up-down Angle 0 ~ 45° , left-right Angle 0 ~ 45°

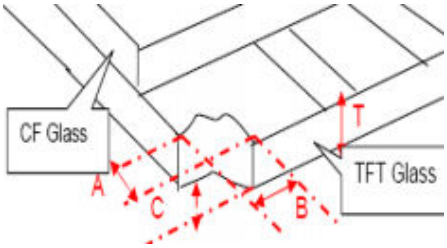
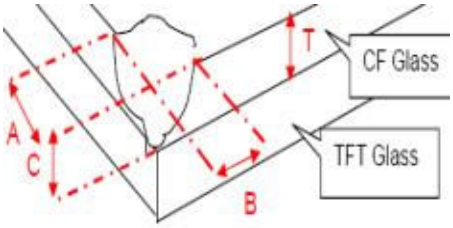
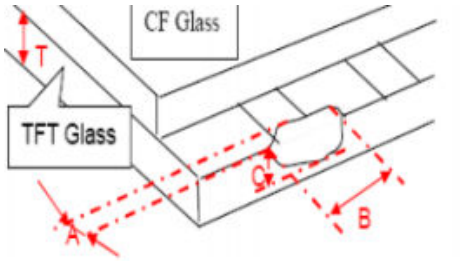
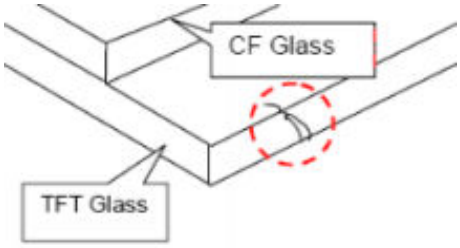


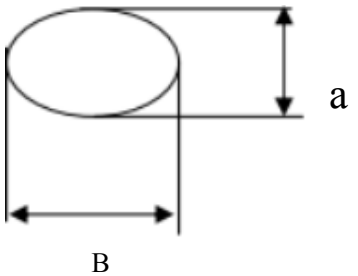
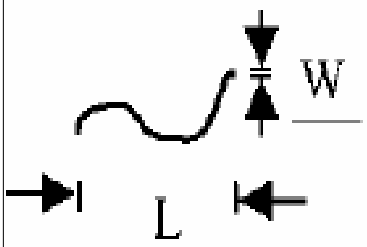
2.Quality

the AQL and defect classification see the table below

defects classify	Defect description	AQL
Major defect	Affect the normal LCM display function, use, reliability, or causing bad assembly defects;	0.25
Minor defect	Less influence of LCM display, only in terms of appearance defects;	0.65

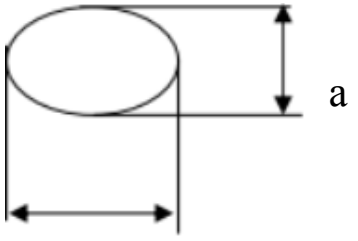
3.Visual inspection specification

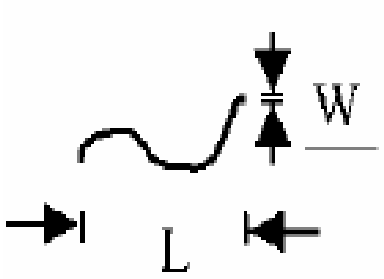
Item	Inspection item	Criterion
No ITO region LCD edge damage		1. A≤2.0mm , B≤2.0mm , C≤T ignore 2. A>2.0mm , B>2.0 mm Rejection 3. Defects on both sides of the steps must not damage the alignment marks.
No ITO area LCD edge corner damage		1. A≤1.5 mm , B≤1.5 mm , C≤T ignore 2. A>1.5 mm , B>1.5 mm Rejection 3. Defects shall not reach along lines or borders
ITO area damage		1. A≤0.8 mm, C≤T B length is ignored 2. A>0.8 mm, ignore 3. Defects shall not damage the contraption mark
Glass crack		The LCD with crack is not acceptable

Polarizer bubbles		Size(mm) / Acceptable Q'ty Φ≤0.1mm / Accept no dense 0.1mm<Φ≤0.2mm / 2 0.2mm<Φ / 0 Densely spaced: No more than two spots within 5mm Φ=Maximum value of a or b
linear defects	Line type: (As following drawing)  1、Scratches and other linear defects 2、Fiber, foreign body and other linear defects	Size(mm) / Acceptable Q'ty W≤0.03mm / Accept no dense L≤2.5 mm 0.03mm<W≤0.05mm / 2 L>2.5 mm或0.05mm<W / 0 Densely spaced: No more than two lines within 5mm

Material Attachment	1. The protective film do not attach to the polarizer. 2. The Tear tape and pull tape cannot lift the protective film. 3. The Tear tape and pull tape has the wrong color. 4. The light-blocking tape and Protect Tape do not cover the components.	not acceptable
Sealing	1. The ITO is not protected by silicone gel. 2. The sealing does not cover the entire ITO. 3. The sealing thickness exceeds the polarizer on the LCD, and the sealing width exceeds the LCD edge.	not acceptable
Components	IC/ FPC: 1. Obvious scratches or broken lines. 2. Oxidation, breakage, or sharp-angle folding of the pins. 3. The FPC reinforcement plate is improperly attached, uneven, or protrudes beyond the specifications shown in the design drawings.	not acceptable
Backlight	1. The size and specifications do not match the design drawings. 2. Dirt, fingerprints, or deformation exceed the specifications.	not acceptable

4.Operation display inspection specifications:

<table>
<tr><th>Item</th><th>Inspection item</th><th>Criterion</th></tr>
<tr><td rowspan="2">LCD and Touch Panel black spots, white spots, contamination</td><td>Round type: (As following drawing)
 

Densely spaced:
No more than two spots within 5mm
Φ=Maximum value of a or b</td><td><table><tr><th>Size(mm)</th><th>Acceptable Q'ty</th></tr><tr><td>Φ≤0.1mm</td><td>Accept no dense</td></tr><tr><td>0.1mm<Φ≤0.2mm</td><td>2</td></tr><tr><td>0.2mm<Φ</td><td>0</td></tr></table></td></tr>
<tr><td>Line type: (As following drawing)
 

1、Scratches and other linear defects
2、Fiber, foreign body and other linear defects
Densely spaced:
No more than two lines within 5mm</td><td><table><tr><th>Size(mm)</th><th>Acceptable Q'ty</th></tr><tr><td>W≤0.03mm</td><td>Accept no dense</td></tr><tr><td>L≤2.5 mm
0.03mm<W≤0.05mm</td><td>2</td></tr><tr><td>L>2.5 mm或0.05mm<W</td><td>0</td></tr></table></td></tr>
<tr><td>Electrical Testing</td><td>1.Missing vertical, horizontal segment, segment contrast defect.
2.Missing character, dot or icon.
3.Display malfunction.
4.No function or no display.
5.LCD viewing angle defect.
6.Flicker
7.Current consumption exceeds product specifications.</td><td>not acceptable</td></tr>
<tr><td>Black or White spots or Bright spots or Color spots on LCD (Display only)</td><td colspan="2">White and black or color spots on display ≦ 0.20mm, no more than 1 spots.</td></tr>
<tr><td>Mura</td><td colspan="2">1.Not visible through 5% ND filter
2.Limit sample or according to customer requirements</td></tr>
</table>

Backlight elements	1. Backlight doesn’ t light or color is wrong 2. Spots or scratches that appear when lit must be judged. Using LCD spot, lines and contamination standards. 3. unevenness luminescence 4. Brightness out of specification 5. light leakage	unevenness luminescence and light leakage in accordance with the limit of the sample, other defects are not acceptable

Announcements:

1. Customers receive our products, if found the product outer packing has obvious damage, or other quality problems, please keep the original state, contact the company directly.
2. Our company is responsible for replacing or repairing the unqualified products found in the process of customer inspection and use (the unqualified products need to be confirmed by our quality department as our quality problem), and it is stipulated that the warranty will be replaced within one year after delivery; Non-conforming products caused by human damage, polarizer scratches, mechanical damage and improper storage are not covered by the warranty.
3. If the customer requests to return the products in batches due to quality problems of our products when using our products, please return the products to our company within three months after receiving them and maintain or restore the products in their original condition.
4. LCM is a fragile product. Please handle and place it carefully to avoid applying large force to the surface of the display。
5. Keep the storage environment dust-free, clean and draft-free to avoid direct exposure to sunlight or ultraviolet light.
6. Liquid in LCD is hazardous substance. Must not lick and swallow. when the liquid is attach to your hand, skin, cloth etc. Wash it out thoroughly and immediately.
7. LCM must be stored under specified conditions, too high temperature and humidity will cause the LCD polarizer color change, fall off or blister, long-term storage should be maintained at 40℃ and 60%RH below.
8. Do not scratch or stain the LCD polarizer
9. To avoid damage to the product caused by static electricity, take precautions against static electricity during storage and use

■ PACKING SPECIFICATION

(indeterminate)