



SPECIFICATION
FOR
LCD Module
KD018QQTBN009-RT

MODULE:	KD018QQTBN009-RT
CUSTOMER:	

REV	DESCRIPTION	DATE
1.0	FIRST ISSUE	2017.03.13

STARTEK	INITIAL	DATE
PREPARED BY		
CHECKED BY		
APPROVED BY		

CUSTOMER	INITIAL	DATE
APPROVED BY		

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常备库存
Stock For Sale

长期供货
Long Time supply

支持小量
NO MOQ

品种齐全
In Full Range

[illegible]

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11. Packing..... 31

* Description

This is a color active matrix TFT (Thin Film Transistor) LCD (liquid crystal display) that uses amorphous silicon TFT as a switching device. This model is composed of a Transmissive type TFT-LCD Panel, driver circuit, back-light unit. The resolution of a 1.77" TFT-LCD contains 128x168 pixels, and can display up to 65K/262K colors.

* Features

- Low Input Voltage: 3.3V(TYP)
- Display Colors of TFT LCD: 65K colors
- Interface: 8/16Bit MCU Interface
3-line/4-line Serial Interface

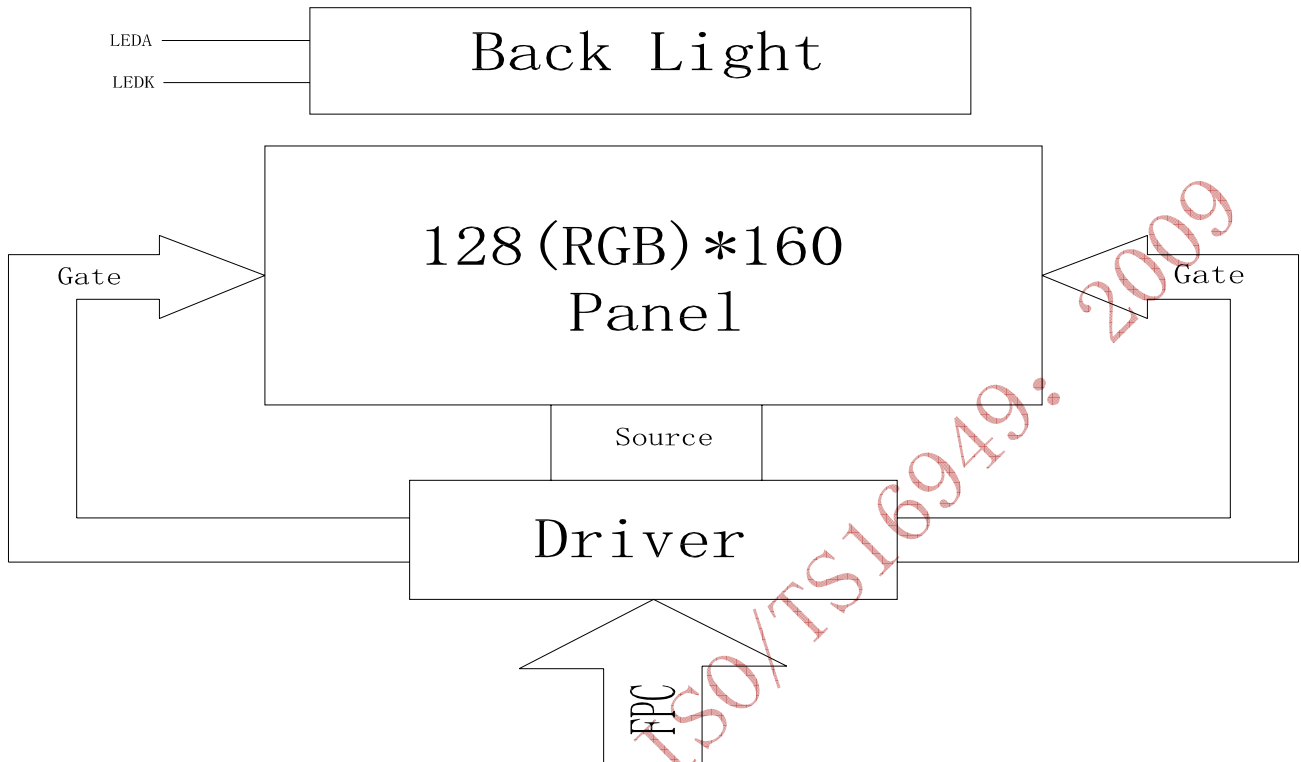
General Information Items	Specification	Unit	Note
	Main Panel		
Display area(AA)	28.03(H)*35.04(V) (1.77inch)	mm	-
Driver element	TFT active matrix	-	-
Display colors	65K	colors	-
Number of pixels	128(RGB)*160	dots	-
Pixel arrangement	RGB vertical stripe	-	-
Pixel pitch	0.219(H)*0.219(V)	mm	-
Viewing angle	12:00	o'clock	-
Controller IC	ST7735S	-	-
Display mode	Transmissive/Normally White	-	-
Operating temperature	-20~+70	°C	-
Storage temperature	-30~+80	°C	-

* Mechanical Information

Item		Min.	Typ.	Max.	Unit	Note
Module size	Horizontal(H)		34.7		mm	-
	Vertical(V)		46.7		mm	-
	Depth(D)		2.5		mm	-
Weight			TBD	TBD	g	-



1. Block Diagram



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3. Input terminal Pin Assignment

NO.	SYMBOL	DISCRIPTION	I/O
1	LEDA	Anode pin of backlight	P
2	LEDK1	Cathode pin OF backlight	P
3	LEDK2	Cathode pin OF backlight	P
4	NC	NC	
5	GND	Ground.	P
6	VCI/VCC	Supply voltage(3.3V).	P
7	IOVCC	Supply voltage(1.65-3.3V).	P
8	IM0	MCU Parallel Interface Bus select IM0='0', 8-bit Parallel IM0='1', 16-bit Parallel	I
9	IM2	MCU Parallel Interface Bus and Serial Interface select IM2='1', Parallel Interface IM2='0', Serial Interface	
10	SPI4W	- SPI4W='0', 3-line SPI Enable. - SPI4W='1', 4-line SPI Enable. -If Not Used, Please fix this Pin at DGND Level.	I
11-26	DB15-DB0	DB[15:0] are used as MCU parallel interface data bus. DB0 is the serial input/output signal in serial interface mode. Fix to GND level when not in use	I/O
27	RD	Serves as a read signal and MCU read data at the rising edge. fix this pin at VCI or GND when not in use.	I
28	RS(SPI-SCL)	-Display data/command selection pin in parallel interface. -This pin is used to be serial interface clock. DC='1': display data or parameter. DC='0': command data. -If not used, please fix this pin at VDDI or DGND.	I
29	RESET	This signal will reset the device and must be applied to properly initialize the chip.	I
30	CS	Chip select input pin ("Low" enable). fix this pin at VCI or GND when not in use.	I

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31	WR(SPI-RS)	-Write enable in MCU parallel interface. - Display data/command selection pin in 4-line serial interface. - Second Data lane in 2 data lane serial interface. -If not used, please fix this pin at VDDI or DGND.	I
32	YU	Touch panel Top Film Terminal	A/D
33	XL	Touch panel LIFT Glass Terminal	A/D
34	YD	Touch panel Bottom Film Terminal	A/D
35	XR	Touch panel Right Glass Terminal	A/D

ISO9001: 2008

ISO/TS16949: 2009

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4. LCD Optical Characteristics

4.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit.	Note
Contrast Ratio		CR	$\Theta=0$ Normal viewing angle	400	500			
Response time	Rising	T _R		--	2	4	msec	
	Falling	T _F		--	6	12		
Color gamut		S(%)		--	60	--	%	
Color Filter Chromaticity	White	W _X		0.283	0.303	0.323		
		W _Y		0.305	0.325	0.345		
	Red	R _X		0.606	0.626	0.646		
		R _Y		0.314	0.334	0.354		
	Green	G _X		0.257	0.277	0.297		
		G _Y		0.529	0.549	0.569		
	Blue	B _X		0.122	0.142	0.162		
		B _Y		0.102	0.122	0.142		
Viewing angle	Hor.	Θ_L	CR>10	35	45	--		
		Θ_R		35	45	--		
	Ver.	Θ_U		35	45	--		
		Θ_D		10	20	--		
		Option View Direction		12 O'clock				

4.2 Measuring Condition

- Measuring surrounding: dark room
- Ambient temperature: $25\pm 2^\circ\text{C}$
- 15min. warm-up time.

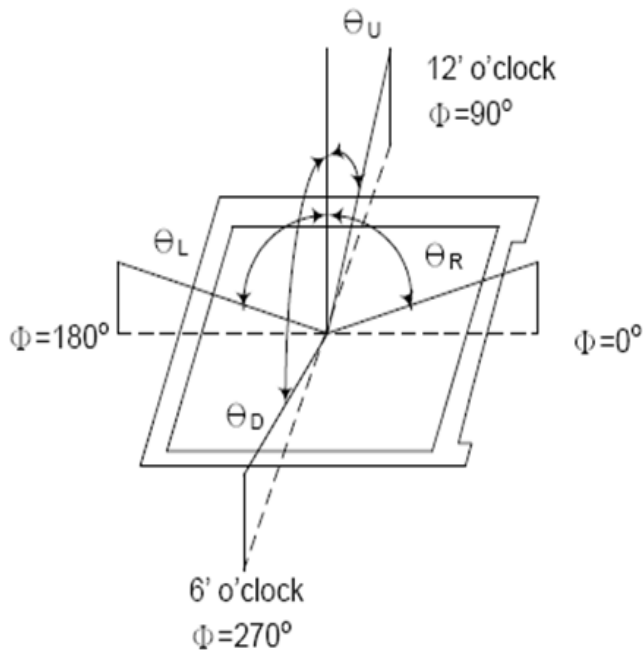
4.3 Measuring Equipment

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- FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

Note (1) Definition of Viewing Angle:



Note (2) Definition of Contrast Ratio (CR) :
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

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5. Electrical Characteristics

5.1 Absolute Maximum Rating (Ta=25 VSS=0V)

Characteristics	Symbol	Min.	Max.	Unit
Digital Supply Voltage	VCC	-0.3	4.6	V
Digital interface supply Voltage	IOVCC	-0.3	4.6	V
Operating temperature	T _{OP}	-20	+70	°C
Storage temperature	T _{ST}	-30	+80	°C

NOTE: If the absolute maximum rating of even is one of the above parameters is exceeded even momentarily, the quality of the product may be degraded. Absolute maximum ratings, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the range of the absolute maximum ratings.

5.2 DC Electrical Characteristics

Characteristics	Symbol	Min.	Typ.	Max.	Unit	Note
Digital Supply Voltage	VCC	2.4	2.8	3.3	V	
Digital interface supply Voltage	IOVCC	1.65	1.8	3.3	V	
Normal mode Current consumption	IDD	--	2	--	mA	
Level input voltage	V _{IH}	0.7IOVCC		IOVCC	V	
	V _{IL}	GND		0.3IOVCC	V	
Level output voltage	V _{OH}	0.8IOVCC		IOVCC	V	
	V _{OL}	GND		0.2IOVCC	V	

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5.3 LED Backlight Characteristics

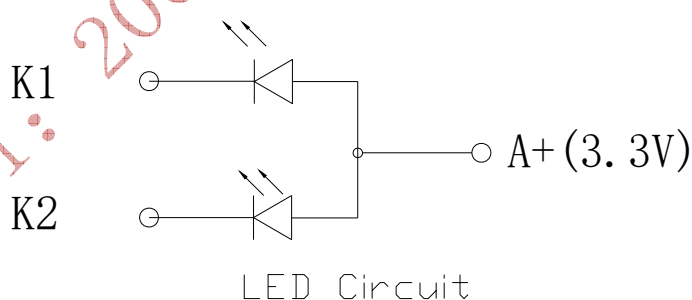
The back-light system is edge-lighting type with 2 chips White LED

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Forward Current	I_F	35	40	--	mA	
Forward Voltage	V_F	--	3.2	--	V	
LCM Luminance	L_v	400	--	--	cd/m ²	Note3
LED life time	Hr	50000	--	--	Hour	Note1,2
Uniformity	AVg	80	--	--	%	Note3

Note (1) LED life time (Hr) can be defined as the time in which it continues to operate under the condition:

$T_a=25\pm3\text{ }^{\circ}\text{C}$, typical IL value indicated in the above table until the brightness becomes less than 50%.

Note (2) The “LED life time” is defined as the module brightness decrease to 50% original brightness at $T_a=25^{\circ}\text{C}$ and $I_L=80\text{mA}$. The LED lifetime could be decreased if operating I_L is larger than 80mA. The constant current driving method is suggested.



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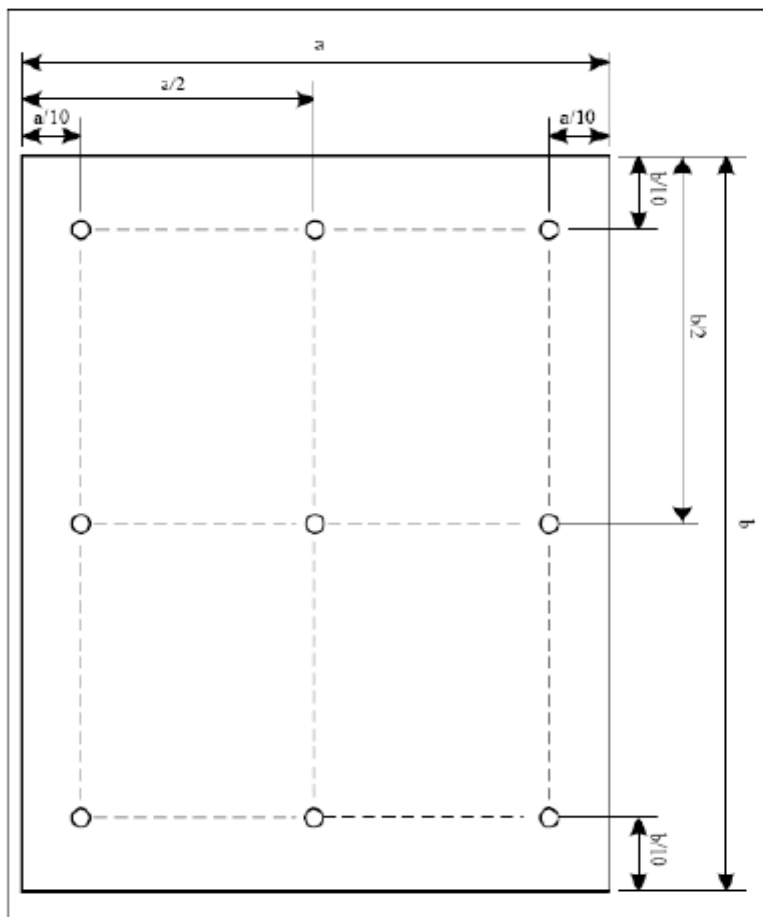
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支持小量
NO MOQ

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In Full Range



NOTE 3: Luminance Uniformity of these 9 points is defined as below:



$$\text{Uniformity} = \frac{\text{minimum luminance in 9 points (1-9)}}{\text{maximum luminance in 9 points (1-9)}}$$

$$\text{Luminance} = \frac{\text{Total Luminance of 9 points}}{9}$$

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常备库存
Stock For Sale

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Long Time supply

支持小量
NO MOQ

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In Full Range

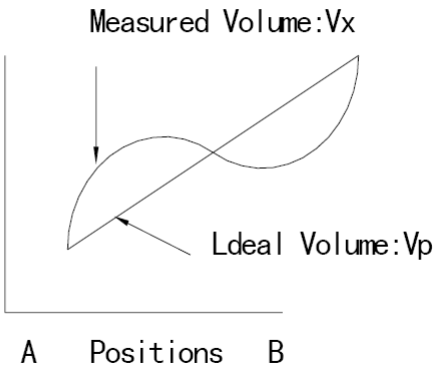
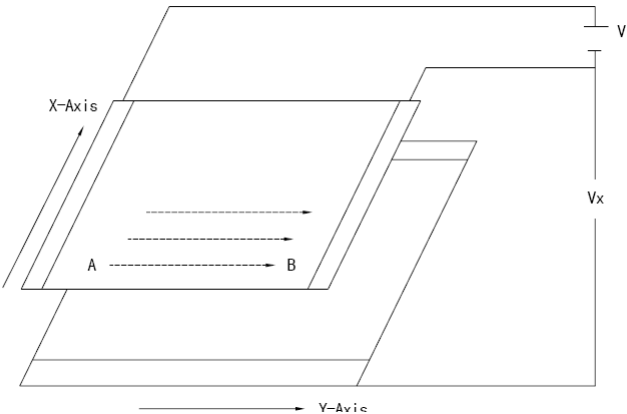
6. TP Feature

6.1 Conditions of use and storage

Item	Value(condition)	Note
Temperature range upon operation	Humidity: 20%~90% non dew, condensation -20℃~70℃	In a simple substance
Temperature range upon storage	Humidity: 20%~90% non dew, condensation -30℃~80℃	In a simple substance

6.2 Electrical property

Item	Value	Note
Maximum voltage	DC5V	
Resistance between terminals	X direction[Film side]:200-600Ω	
	Y direction [Glass side]:300-900Ω	
Insulation resistance	DC 25V 20MΩor above	Connect X + ~X- and Y+ ~Y-, apply 25VDC Between X and Y for perform measurements
Chattering	10 msec or below	
Rating	Voltage is DC 5V	



6.3 Mechanical property

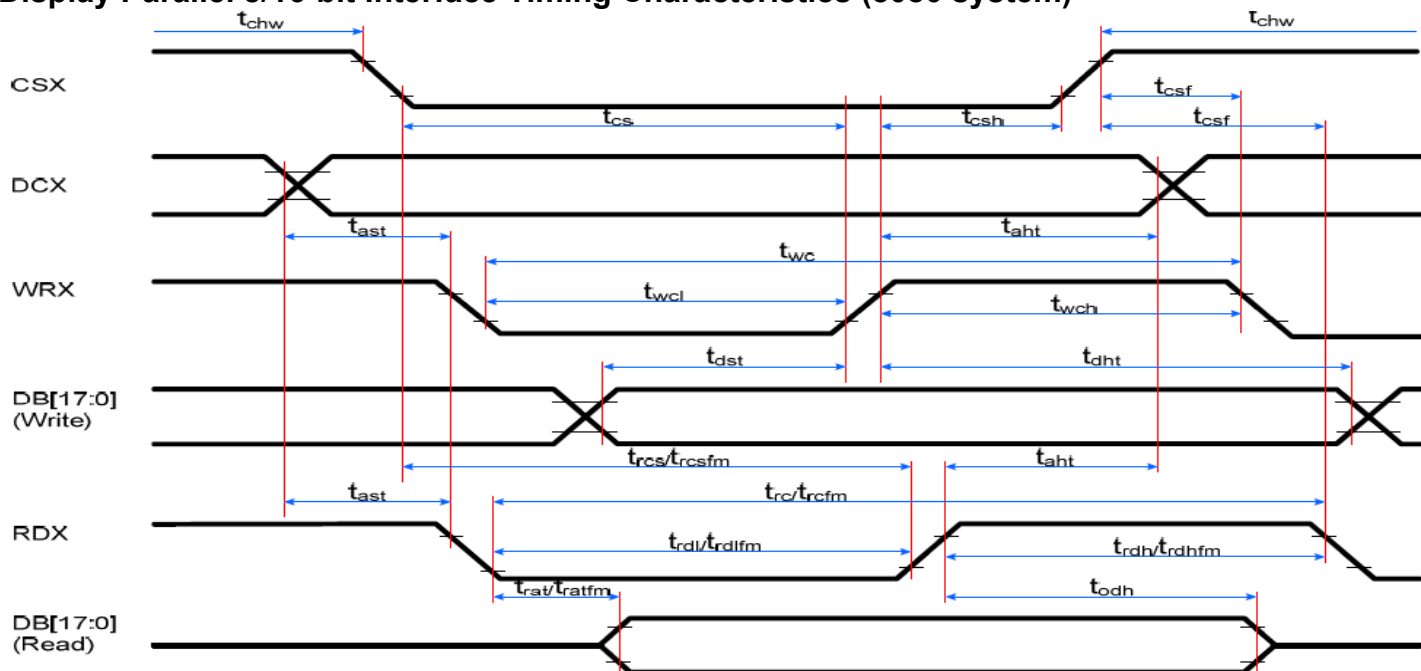
Item	Performance		Note
Input method	Used of an exclusive pen or finger		
Load upon operation	Exclusive pen	60-100g or below	Operation and measurement with a pen must be carried out under the following tip conditions: Stylus pen material : POM(ployacetal) . Tip : Diameter 3.0mm, SR 0.8 mm
	Finger	60-100g or below	Operations and measurement methods simulated for a finger must be carried out under the following tip conditions. Material :Silicon rubber (Hardness : 30°Hs) Tip : Diameter 12.0 mm, SR 12.5mm
Surface hardness	Pencil hardness : 3H or above		It complies with the way of test method JIS K5400.

6.4 Optical property

Item	Performance	Note
Total light transmittance	80% or above	JIS K7105
Haze	5% or below	JIS K7136
Film specification	Polished type with hard coated surface	

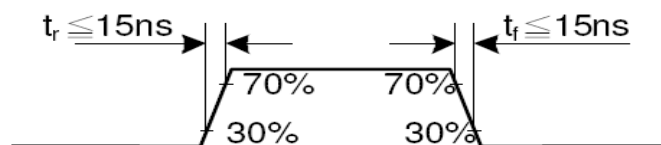
7. AC Characteristic

7.1 Display Parallel 8/16-bit Interface Timing Characteristics (8080 system)

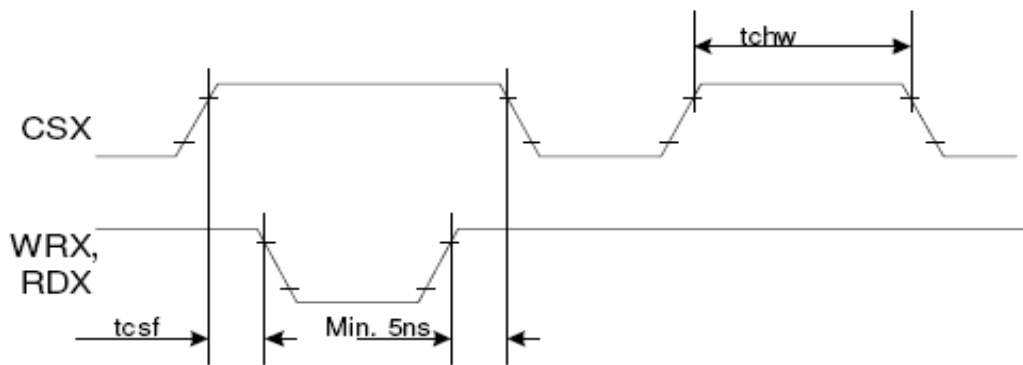


Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	-	ns	
	taht	Address hold time (Write/Read)	10	-	ns	
CSX	tchw	CSX “H” pulse width	0	-	ns	
	tcs	Chip Select setup time (Write)	15	-	ns	
	trcs	Chip Select setup time (Read ID)	45	-	ns	
	trcsfm	Chip Select setup time (Read FM)	355	-	ns	
	tcsf	Chip Select Wait time (Write/Read)	10	-	ns	
WRX	twc	Write cycle	66	-	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	
	trdhfm	Read Control H duration (FM)	90	-	ns	
	trdlfm	Read Control L duration (FM)	355	-	ns	
RDX (ID)	trc	Read cycle (ID)	160	-	ns	
	trdh	Read Control pulse H duration	90	-	ns	
	trdl	Read Control pulse L duration	45	-	ns	
D[17:0], D[15:0], D[8:0], D[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	

Note: $T_a = -30$ to $70\text{ }^{\circ}\text{C}$, $IOVCC=1.65\text{V}$ to 2.8V , $V_{CI}=2.6\text{V}$ to 3.3V , $GND=0\text{V}$

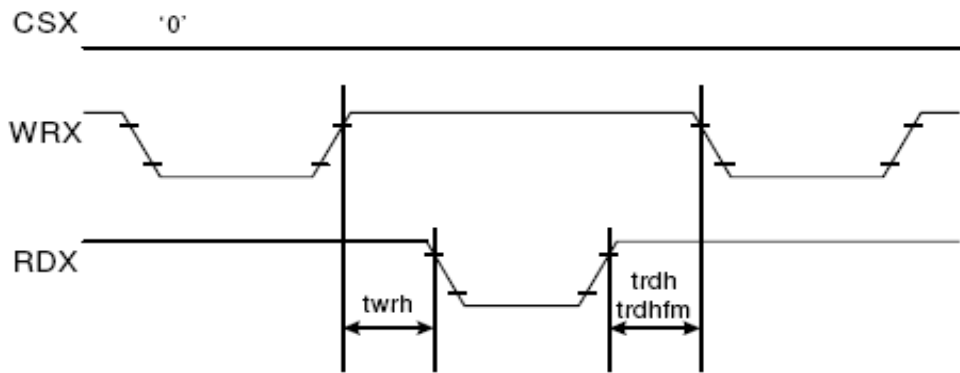


CSX timings :



Note: Logic high and low levels are specified as 30% and 70% of IOVCC for Input signals.

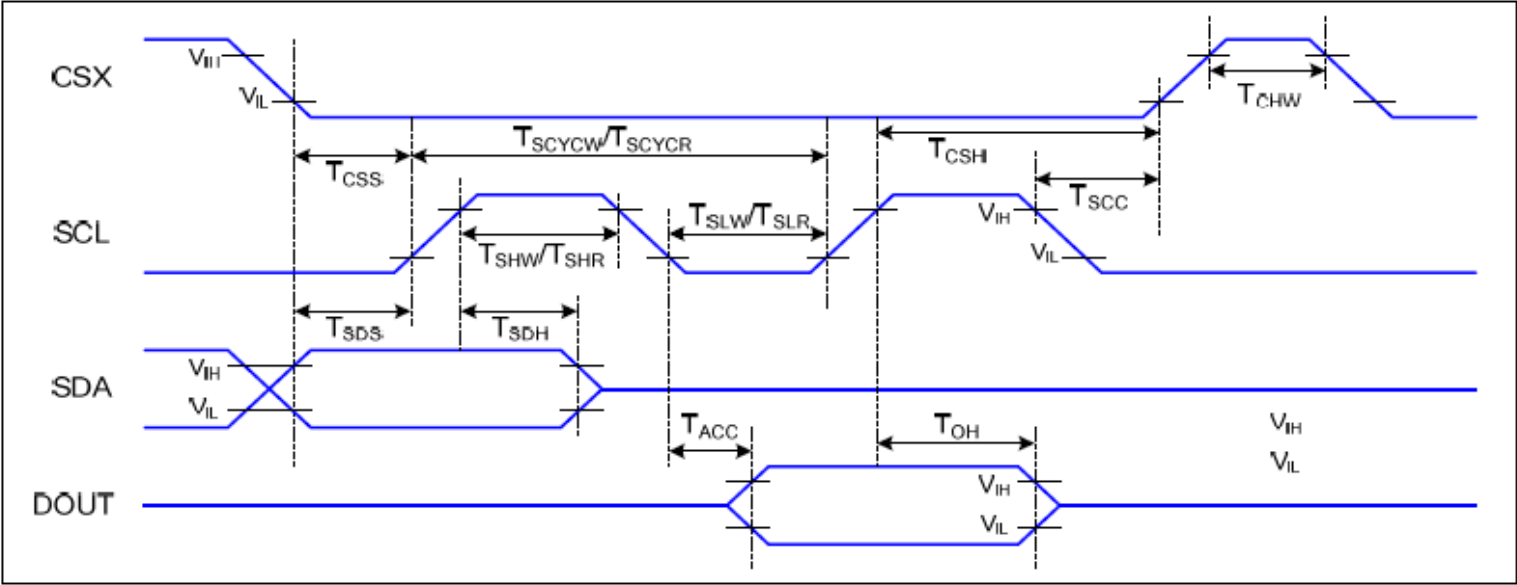
Write to read or read to write timings:



Note: Logic high and low levels are specified as 30% and 70% of IOVCC for Input signals.

ISO9001

7.2 Display Serial Interface Timing Characteristics (3-line SPI system)

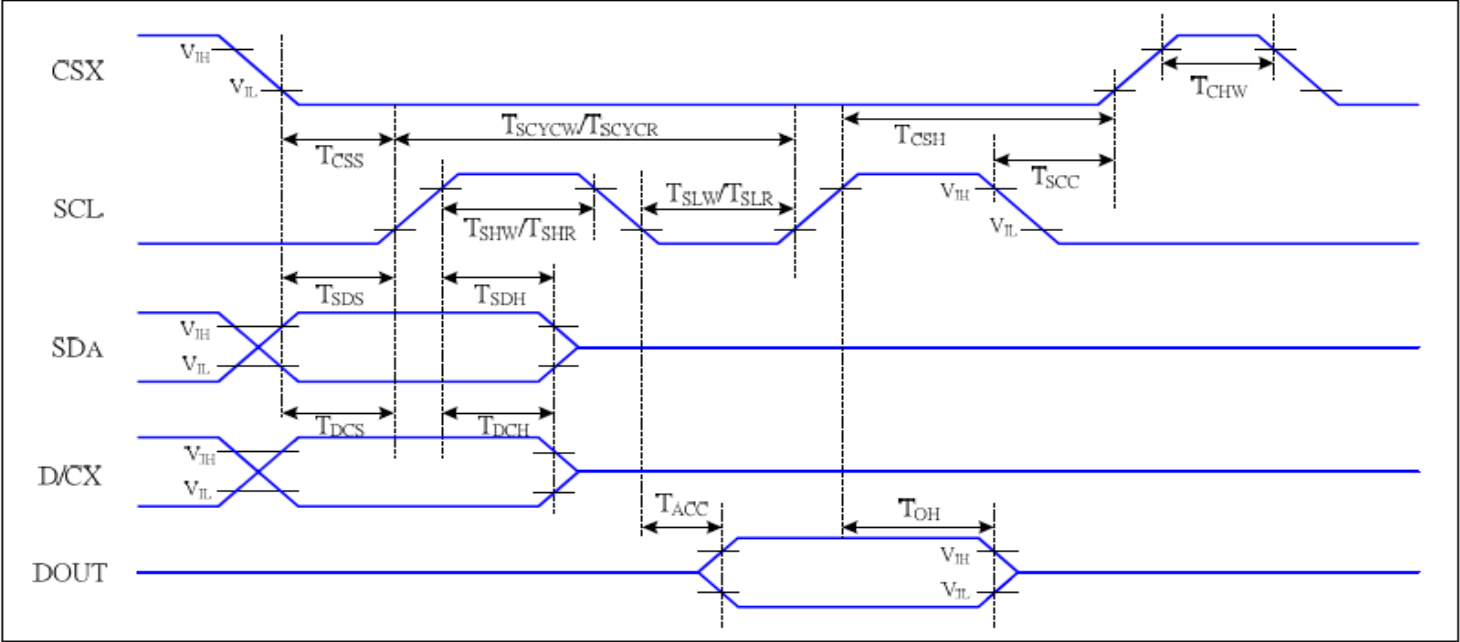


2/TS

VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=-30 to 70 ℃

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)	66		ns	
	T _{SHW}	SCL "H" pulse width (Write)	15		ns	
	T _{SLW}	SCL "L" pulse width (Write)	15		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	10		ns	
	T _{SDH}	Data hold time	10		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

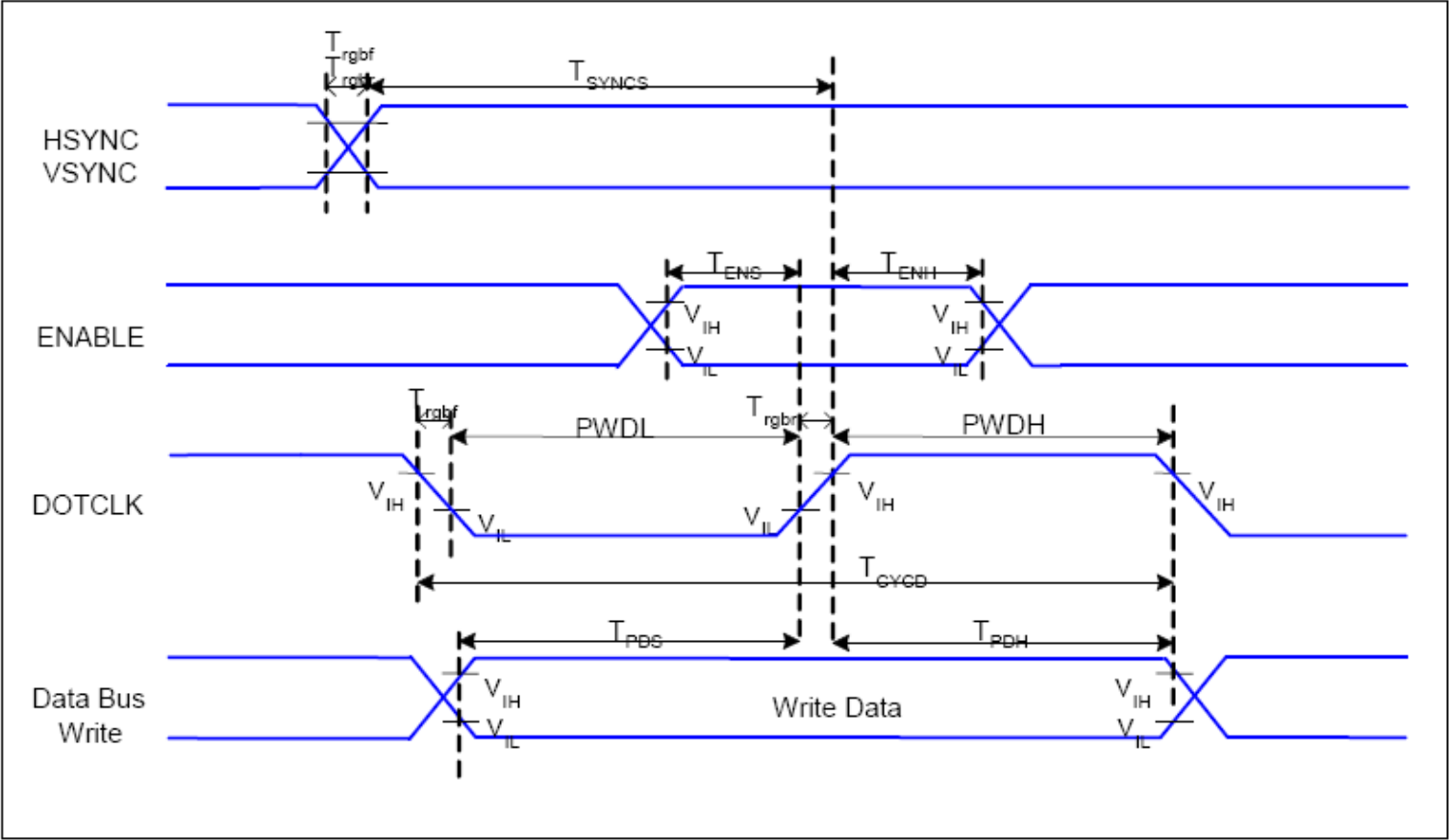
7.3Display Serial Interface Timing Characteristics (4-line SPI system)



VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=-30 to 70 ℃

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)	66		ns	-write command & data ram
	T _{SHW}	SCL "H" pulse width (Write)	15		ns	
	T _{SLW}	SCL "L" pulse width (Write)	15		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	10		ns	
	T _{SDH}	Data hold time	10		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

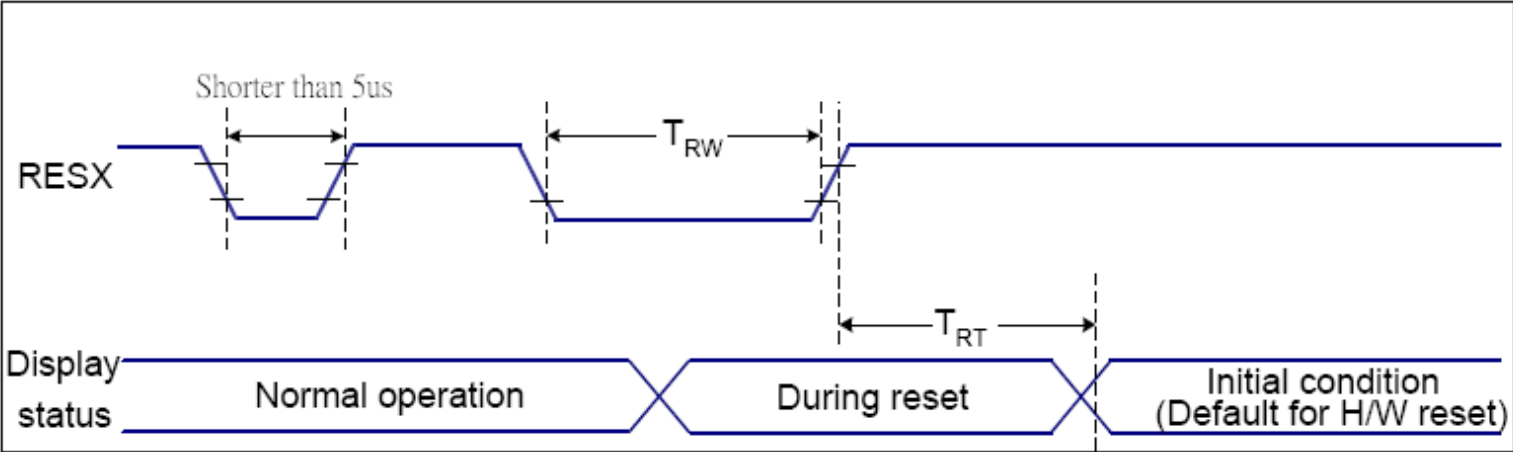
7.4 Parallel RGB Interface Timing Characteristics



VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=-30 ~ 70 ℃

Signal	Symbol	Parameter	MIN	MAX	Unit	Description
HSYNC, VSYNC	T_{SYNC}	VSYNC, HSYNC Setup Time	30	-	ns	
ENABLE	T_{ENS}	Enable Setup Time	25	-	ns	
	T_{ENH}	Enable Hold Time	25	-	ns	
DOTCLK	PWDH	DOTCLK High-level Pulse Width	60	-	ns	
	PWDL	DOTCLK Low-level Pulse Width	60	-	ns	
	T_{CycD}	DOTCLK Cycle Time	120	-	ns	
	T_{trghr}, T_{trghf}	DOTCLK Rise/Fall time	-	20	ns	
DB	T_{PDS}	PD Data Setup Time	50	-	ns	
	T_{PDH}	PD Data Hold Time	50	-	ns	

7.5 Reset Timing Characteristics



VDDI=1.65 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=-30 ~ 70 ℃

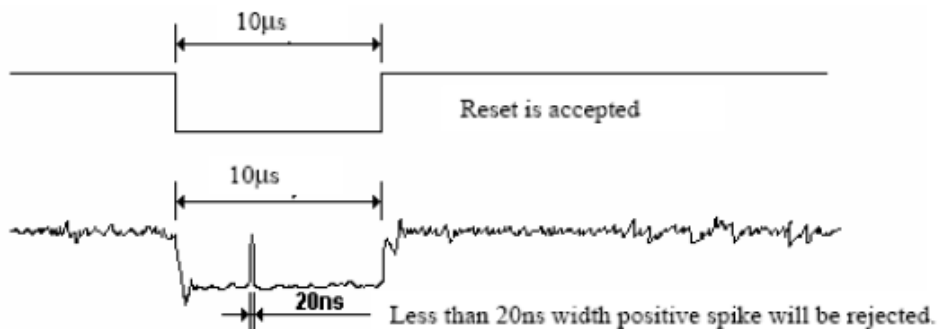
Related Pins	Symbol	Parameter	MIN	MAX	Unit
RESX	TRW	Reset pulse duration	10	-	us
	TRT	Reset cancel	-	5 (Note 1, 5)	ms
				120 (Note 1, 6, 7)	ms

Notes:

- 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.
- 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

- 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.
- 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.

ISO/TS16949

ISO9001: 2008

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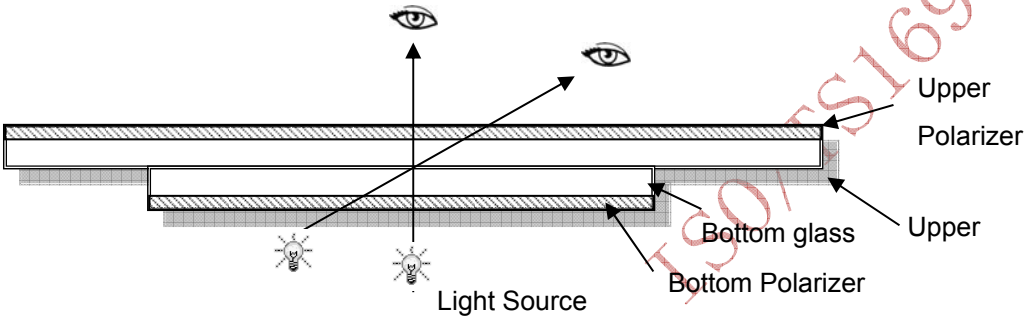
8. LCD Module Out-Going Quality Level

8.1 VISUAL & FUNCTION INSPECTION STANDARD

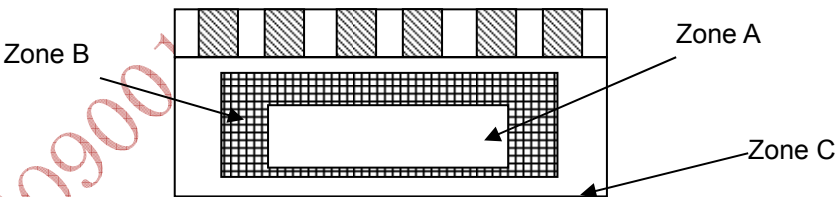
8.1.1 Inspection conditions

Inspection performed under the following conditions is recommended.

- Temperature : 25±5℃
- Humidity : 65%±10%RH
- Viewing Angle : Normal viewing Angle.
- Illumination: Single fluorescent lamp (300 to 700Lux)
- Viewing distance:30-50cm



8.1.2 Definition



- Zone A : Effective Viewing Area(Character or Digit can be seen)
- Zone B : Viewing Area except Zone A
- Zone C : Outside (Zone A+Zone B) which can not be seen after assembly by customer .)

Note:

As a general rule ,visual defects in Zone C can be ignored when it doesn't effect product function or appearance after assembly by customer.

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常备库存 Stock For Sale		长期供货 Long Time supply		支持少量 NO MOQ
				品种齐全 In Full Range

8.1.3 Sampling Plan

According to GB/T 2828-2003 ; , normal inspection, Class II

AQL:

Major defect	Minor defect
0.65	1.5

LCD: Liquid Crystal Display , TP: Touch Panel , LCM: Liquid Crystal Module

No	Items to be inspected	Criteria	Classification of defects
1	Functional defects	1) No display, Open or miss line 2) Display abnormally, Short 3) Backlight no lighting, abnormal lighting. 4) TP no function	Major
2	Missing	Missing component	
3	Outline dimension	Overall outline dimension beyond the drawing is not allowed	
4	Color tone	Color unevenness, refer to limited sample	Minor
5	Soldering appearance	Good soldering , Peeling off is not allowed.	
6	LCD/Polarizer/TP	Black/White spot/line, scratch, crack, etc.	

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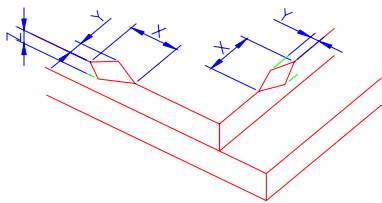
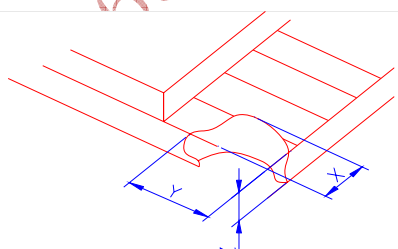
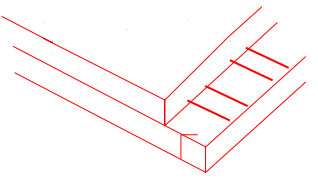
常备库存
Stock For Sale

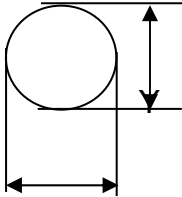
长期供货
Long Time supply

支持小量
NO MOQ

品种齐全
In Full Range

8.1.4 Criteria (Visual)

Number	Items	Criteria(mm)						
1.0 LCD Crack/Broken	(1) The edge of LCD broken	<div></div> <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0mm</td><td><Inner border line of the seal</td><td>≤T</td></tr></table>	X	Y	Z	≤3.0mm	<Inner border line of the seal	≤T
	X	Y	Z					
	≤3.0mm	<Inner border line of the seal	≤T					
(2)LCD corner broken	<div></div> <table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>≤3.0mm</td><td>≤L</td><td>≤T</td></tr></table>	X	Y	Z	≤3.0mm	≤L	≤T	
X	Y	Z						
≤3.0mm	≤L	≤T						
(3) LCD crack	<div></div> <div>Crack Not allowed</div>							

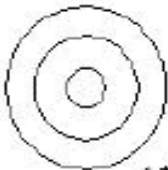


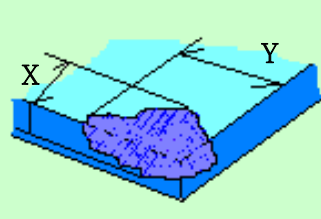
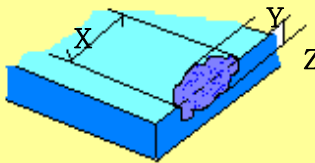
Number	Items	Criteria (mm)																											
2.0	<div>Spot defect</div> <div></div> <div>X</div> <div>Φ=(X+Y)/2</div>	① light dot (LCD/TP/Polarizer black/white spot , light dot, pinhole, dent, stain)																											
		<table><tr><th rowspan="2">Zone Size (mm)</th><th colspan="3">Accep able Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>Φ≤0.10</td><td colspan="2">Ignore</td><td rowspan="4">Ignor</td></tr><tr><td>0.10<Φ≤0.20</td><td colspan="2">3(distance ≥ 10mm)</td></tr><tr><td>0.20<Φ≤0.25</td><td colspan="2">2</td></tr><tr><td>Φ > 0.25</td><td colspan="2">0</td></tr></table>	Zone Size (mm)	Accep able Qty			A	B	C	Φ≤0.10	Ignore		Ignor	0.10<Φ≤0.20	3(distance ≥ 10mm)		0.20<Φ≤0.25	2		Φ > 0.25	0								
		Zone Size (mm)		Accep able Qty																									
			A	B	C																								
		Φ≤0.10	Ignore		Ignor																								
		0.10<Φ≤0.20	3(distance ≥ 10mm)																										
		0.20<Φ≤0.25	2																										
		Φ > 0.25	0																										
		②Dim spot (LCD/TP/Polarizer dim dot, light leakage、 dark spot)																											
		<table><tr><th rowspan="2">Zone Size (mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>Φ≤0.1</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.10<Φ≤0.20</td><td colspan="2">3(distance ≥ 10mm)</td></tr><tr><td>0.20<Φ≤0.30</td><td colspan="2">2</td></tr><tr><td>Φ > 0.30</td><td colspan="2">0</td></tr></table>	Zone Size (mm)	Acceptable Qty			A	B	C	Φ≤0.1	Ignore		Ignore	0.10<Φ≤0.20	3(distance ≥ 10mm)		0.20<Φ≤0.30	2		Φ > 0.30	0								
		Zone Size (mm)		Acceptable Qty																									
			A	B	C																								
		Φ≤0.1	Ignore		Ignore																								
		0.10<Φ≤0.20	3(distance ≥ 10mm)																										
		0.20<Φ≤0.30	2																										
		Φ > 0.30	0																										
	③ Polarizer accidented spot																												
	<table><tr><th rowspan="2">Zone Size (mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>Φ≤0.2</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr><tr><td>0.3<Φ≤0.5</td><td colspan="2">2(distance ≥ 10mm)</td></tr><tr><td>Φ>0.5</td><td colspan="2">0</td></tr></table>	Zone Size (mm)	Acceptable Qty			A	B	C	Φ≤0.2	Ignore		Ignore	0.3<Φ≤0.5	2(distance ≥ 10mm)		Φ>0.5	0												
	Zone Size (mm)		Acceptable Qty																										
		A	B	C																									
	Φ≤0.2	Ignore		Ignore																									
0.3<Φ≤0.5	2(distance ≥ 10mm)																												
Φ>0.5	0																												
<div>Line defect (LCD/TP /Polarizer black/white line, scratch, stain)</div>	<table><tr><th rowspan="2">Width(mm)</th><th rowspan="2">Length(mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>Φ≤0.03</td><td>Igno e</td><td colspan="2">Ignore</td><td rowspan="3">Ignore</td></tr><tr><td>0.03<W≤0.05</td><td>L≤3.0</td><td colspan="2">N≤2</td></tr><tr><td>0.05<W≤0.08</td><td>L≤2.0</td><td colspan="2">N≤2</td></tr><tr><td>0.08<W</td><td colspan="4">Define as spot defect</td></tr></table>				Width(mm)	Length(mm)	Acceptable Qty			A	B	C	Φ≤0.03	Igno e	Ignore		Ignore	0.03<W≤0.05	L≤3.0	N≤2		0.05<W≤0.08	L≤2.0	N≤2		0.08<W	Define as spot defect		
	Width(mm)	Length(mm)	Acceptable Qty																										
			A	B	C																								
	Φ≤0.03	Igno e	Ignore		Ignore																								
	0.03<W≤0.05	L≤3.0	N≤2																										
	0.05<W≤0.08	L≤2.0	N≤2																										
0.08<W	Define as spot defect																												



3.0	Polarizer Bubble				
		<div>Zone Size (mm)</div>	Acceptable Qty		
			A	B	C
		$\Phi \leq 0.2$	Ignore		Ignore
		$0.2 < \Phi \leq 0.4$	3(distance ≥ 10 m)		
		$0.4 < \Phi \leq 0.6$	2		
		$0.6 < \Phi$	0		
4.0	SMT	According to IPC-A-610C class II standard . Function defect and missing part are major defect ,the others are minor defect.			

		TP bubble/ accidented spot	<table><tr><th rowspan="2">Size Φ(mm)</th><th colspan="3">Acceptable Qty</th></tr><tr><th>A</th><th>B</th><th>C</th></tr><tr><td>$\Phi \leq 0.1$</td><td colspan="3">Ignore</td></tr><tr><td>$0.1 < \Phi \leq 0.25$</td><td colspan="3">3 (distance \geq</td></tr><tr><td>$0.25 < \Phi \leq 0.3$</td><td colspan="3">2</td></tr><tr><td>$0.3 < \Phi$</td><td colspan="3">0</td></tr></table>			Size Φ (mm)	Acceptable Qty			A	B	C	$\Phi \leq 0.1$	Ignore			$0.1 < \Phi \leq 0.25$	3 (distance \geq			$0.25 < \Phi \leq 0.3$	2			$0.3 < \Phi$	0		
Size Φ (mm)	Acceptable Qty																											
	A		B	C																								
$\Phi \leq 0.1$	Ignore																											
$0.1 < \Phi \leq 0.25$	3 (distance \geq																											
$0.25 < \Phi \leq 0.3$	2																											
$0.3 < \Phi$	0																											
Assembly deflection			beyond the edge of backlight $\leq 0.15\text{mm}$																									



5.0	TP Related	Newton Ring	Newton Ring area>1/3 TP area NG			 1 规律性				
			Newton Ring area≤1/3 TP area OK			 2 非规律性				
						 似牛顿环				
		TP corner broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤3.0mm</td><td>Y≤3.0mm</td><td>Z<LCD thicknes</td></tr></table>	X	Y	Z	X≤3.0mm	Y≤3.0mm	Z<LCD thicknes	
X	Y	Z								
X≤3.0mm	Y≤3.0mm	Z<LCD thicknes								
		TP edge broken X : length Y : width Z : height	<table><tr><td>X</td><td>Y</td><td>Z</td></tr><tr><td>X≤6.0mm</td><td>Y≤2.0mm</td><td>Z<LCD thicknes</td></tr></table>	X	Y	Z	X≤6.0mm	Y≤2.0mm	Z<LCD thicknes	
X	Y	Z								
X≤6.0mm	Y≤2.0mm	Z<LCD thicknes								

Criteria (functional items)

Number	Items	Criteria (mm)
1	No display	Not allowed
2	Missing segment	Not allowed
3	Short	Not allowed
4	Backlight no lighting	Not allowed
5	TP no function	Not allowed

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常备库存
Stock For Sale长期供货
Long Time supply支持小量
NO MOQ品种齐全
In Full Range

9. Reliability Test Result

9.1 Condition

Item	Condition	Sample Size	Test Result	Note
Low Temperature Operating Life test	-20℃, 96HR	3ea	pass	-
Thermal Humidity Operating Life test	70℃90%RH, 96HR	3ea	pass	-
Temperature Cycle ON/OFF test	-20℃ ↔ 70℃, ON/OFF, 20CYC	3ea	pass	(1)
High Temperature Storage test	80℃, 96HR	3ea	pass	-
Low Temperature Storage test	-30℃, 96HR	3ea	pass	-
ESD test	150pF, 330Ω, ±6KV(Contact)/± 8KV(Air), 5 points/panel, 10 times/point	3ea	pass	
Thermal Shock Resistance	The sample should be allowed to stand the following 5 cycles of operation: TSTL for 30 minutes -> normal temperature for 5 minutes -> TSTH for 30 minutes -> normal temperature for 5 minutes, as one cycle, then taking it out and drying it at normal temperature, and allowing it stand for 24 hours	3ea	pass	
Box Drop Test	1 Corner 3 Edges 6 faces, 66cm(MEDIUM BOX)	1box	pass	-

Note (1) ON Time over 10 seconds, OFF Time under 10 seconds

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常备库存 Stock For Sale		长期供货 Long Time supply		支持小量 NO MOQ
				品种齐全 In Full Range

10. Cautions and Handling Precautions

10.1 Handling and Operating the Module

(1) When the module is assembled, it should be attached to the system firmly.

Do not warp or twist the module during assembly work.

(2) Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.

(3) Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.

(4) Do not allow drops of water or chemicals to remain on the display surface.

If you have the droplets for a long time, staining and discoloration may occur.

(5) If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.

(6) The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane.

Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.

(7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.

(8) Protect the module from static; it may cause damage to the CMOS ICs.

(9) Use finger-stalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.

(10) Do not disassemble the module.

(11) Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.

(12) Pins of I/F connector shall not be touched directly with bare hands.

(13) Do not connect, disconnect the module in the "Power ON" condition.

(14) Power supply should always be turned on/off by the item 6.1 Power On Sequence & 6.2 Power Off Sequence

10.2 Storage and Transportation.

(1) Do not leave the panel in high temperature, and high humidity for a long time.

It is highly recommended to store the module with temperature from 0 to 35 °C and relative humidity of less than 70%

(2) Do not store the TFT-LCD module in direct sunlight.

(3) The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.

(4) It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module.

In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.

(5) This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.

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常备库存
Stock For Sale

长期供货
Long Time supply

支持小量
NO MOQ

品种齐全
In Full Range



11. Packing

---TBD-----

ISO9001: 2008

ISO/TS16949: 2009

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				品 种 齐 全 In Full Range