产品规格承认书
Product Specifications for Approval

日欣型号(NISIN Model):NS165RN1903AZ01

客户名称(Customer) :_____

客户型号(Customer Model)：		
Approved by Customer		
结构(Mechanica)	电子(Electronic)	项目 (PM)

日欣光电（NISIN Optoelectronics）		
Designed	Checked	Approved

修改记录

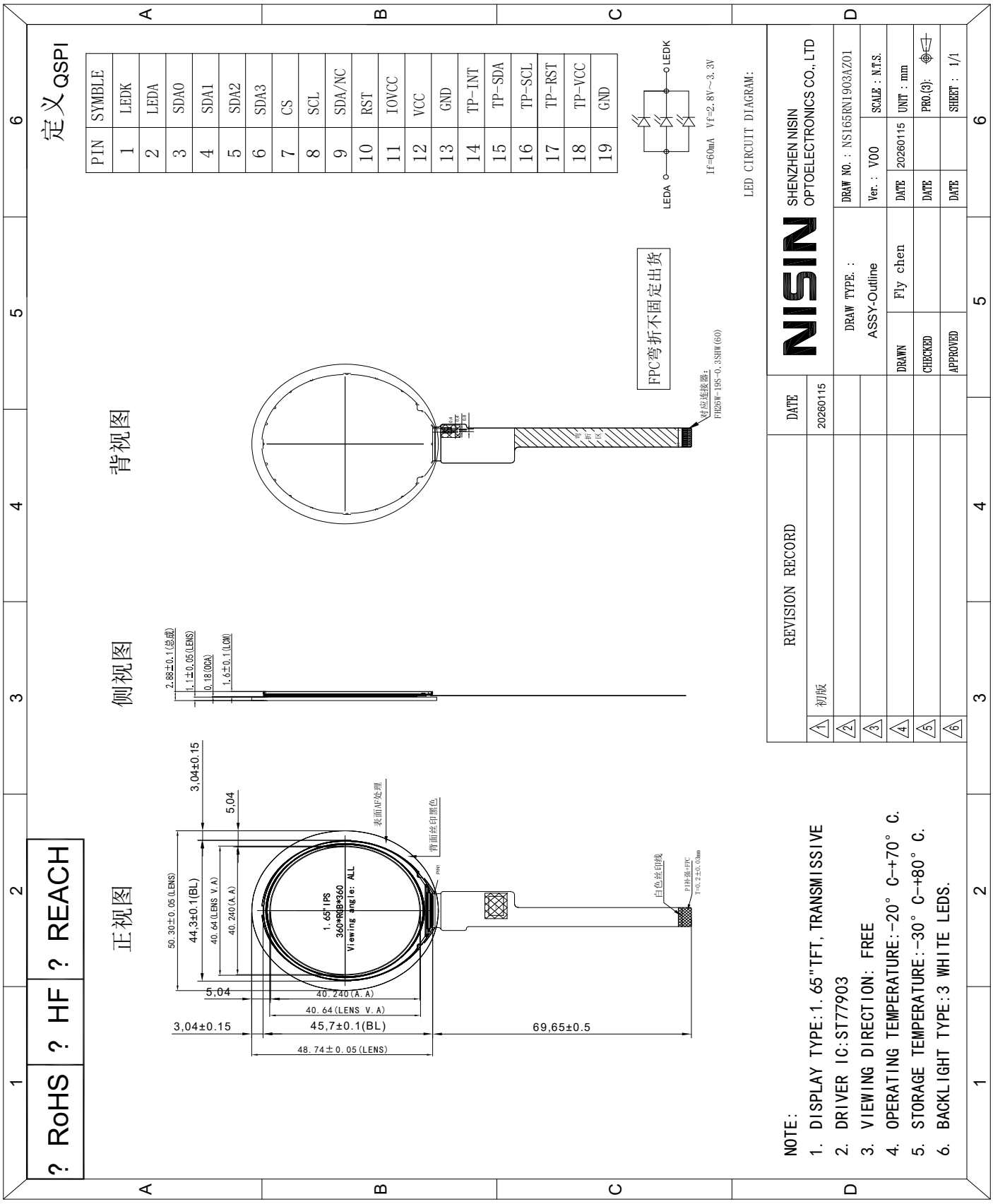
日期	版本	修改内容	页数	拟制
2026-1-20	V00	初版发行	所有	Fly Chen

目录

1.产品规格（Product Specifications）

面板类型（Panel Type）	TFT LCD
面板尺寸(Panel Size)	1.65 inch
显示类型（Display Type）	Normally White
分辨率（Resolution）	360(RGB) x 360 (dot)
显示点间距（Dot Pitch）	0.1164mm(H) X 0.1164mm(V)
显示色彩（color）	262K
视角（View Angle）	Typ. 85/85/85/85 Min, 80/80/80/80
显示驱动 IC（Display Driver IC）	**ST77916**
接口类型（Interface Type）	**QSPI**
触摸类型（TP Type）	
触摸 IC （TP IC）	
触摸接口类型（TP Interface）	
外形尺寸（Dimensions）	50.3*48.74*2.88(mm)
显示区尺寸（Display area）	40.24*40.24(mm)
背光（Back Light）	350cd/m2(min)
触摸点数 Touch points	
触摸按键 Touch Key Number	

2. 产品图纸（Product Drawings）



3.接口定义（The Interface Definition）

见 CAD 图纸

4.电性特性（Electrical Characteristics）

Absolute Operation Range

Item	Symbol	Range	Unit
Supply Voltage (Analog)	VDD	- 0.3 ~ +4.6	V
Supply Voltage (I/O)	VDDI	- 0.3 ~ +4.6	V
Supply Voltage (Logic)	VCC	-0.3 ~ +2	V
Driver Supply Voltage	VGH-VGL	-0.3 ~ +30.0	V
Logic Input Voltage Range	VIN	0.5 ~ VDDI + 0.5	V
Logic Output Voltage Range	VO	0.5 ~ VDDI + 0.5	V

DC Characteristics

Parameter	Symbol	Condition	Specification			Unit	Related Pins
			MIN.	TYP.	MAX.		
Power & Operation Voltage							
System Voltage	VDD	Operating voltage	2.65	2.8	3.3	V	-
Interface Operation Voltage	VDDI	I/O Supply Voltage	1.65	1.8	3.3	V	-
Gate Driver High Voltage	VGH	-	11.0	-	15.5	V	-
Gate Driver Low Voltage	VGL	-	-11.7	-	-8.4	V	-
Gate Driver Supply Voltage	-	| VGH-VGL |	-	-	27.2	V	-
Input / Output							
Logic-High Input Voltage	VIH	-	0.7VDDI	-	VDDI	V	Note 1
Logic-Low Input Voltage	VIL	-	GND	-	0.3VDDI	V	Note 1
Logic-High Output Voltage	VOH	IOH = -1.0mA	0.8VDDI	-	VDDI	V	Note 1
Logic-Low Output Voltage	VOL	IOL = +1.0mA	GND	-	0.2VDDI	V	Note 1
Logic-High Input Current	IIH	VIN = VDDI	-	-	1	uA	Note 1
Logic-Low Input Current	IIL	VIN = GND	-1	-	-	uA	Note 1
Input Leakage Current	IIL	IOH = -1.0mA	-0.1	-	+0.1	uA	Note 1
VCOM Voltage							
VCOM Voltage	VCOM	-	-	GND	-	V	-
Source Driver							
Gamma Reference Voltage(Positive)	VAP	-	3.65	-	6.2	V	-
Gamma Reference Voltage(Negative)	VAN	-	-4.2	-	-1.875	-	-
Source Output Settling Time	Tr	Below with 99% precision	-	-	20	us	Note 2
Output Offset Voltage	VOFFSET	-	-	-	35	mV	Note 3

Basic DC Characteristics

Notes:

1. TA= -30 to 85℃.

2. The max. value is between measured point of source output and gamma setting value.

3. The Max. Value is between measured point of source output and gamma setting value.

7.3 Power Consumption

Ta=25℃, Frame rate = 60Hz, Registers setting are IC default setting.

Operation Mode	Image	Current Consumption			
		Typical		Maximum	
		IDDI (mA)	IDD (mA)	IDDI (mA)	IDD (mA)
Normal Mode	Note	0.001	8	0.005	10
Sleep-in Mode	Note	0.001	0.030	0.005	0.150
Deep Standby Mode	Note	0.001	0.001	0.005	0.005

Notes:

1. Color Picture.

2. The Current Consumption is DC characteristics of ST77916.

3. Condition: VDDI=1.8V, VDD=2.8V.

7.4.1 8080 Series MCU Parallel Interface Characteristics: 8-bit Bus

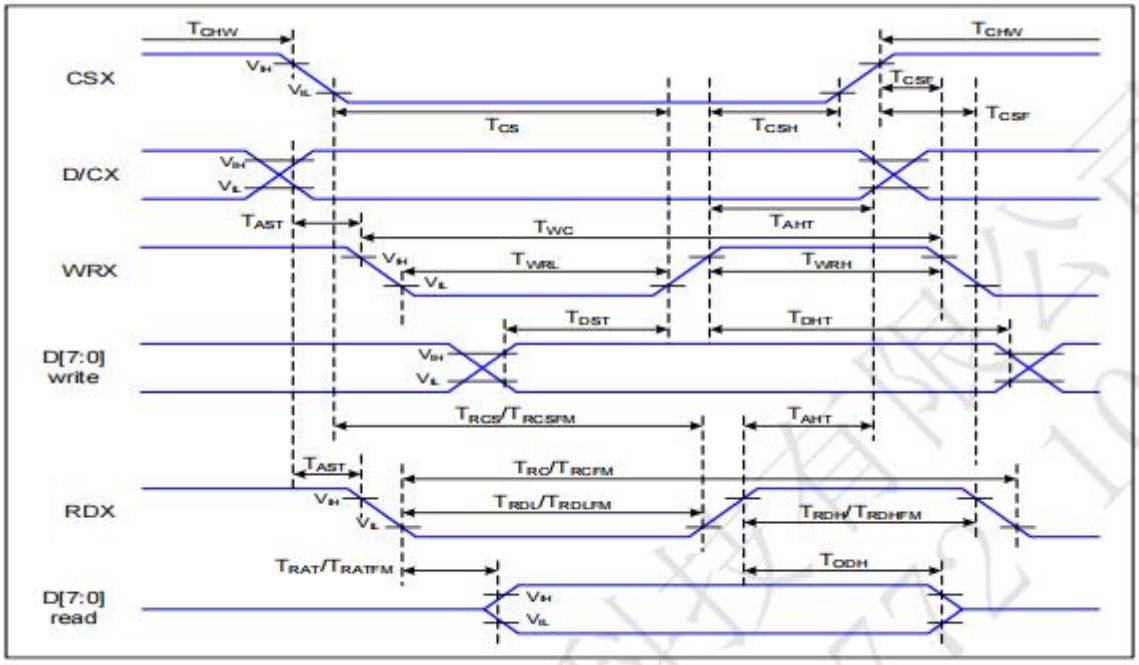


Figure 1 Parallel Interface Timing Characteristics (8080-Series MCU Interface)

VDDI=1.65 to 3.3V, VDD=2.65 to 3.3V, GND=RGND=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		30		ns	
	T_{WRH}	Control pulse "H" duration		14		ns	
	T_{WRL}	Control pulse "L" duration		14		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	

Table 1 8080 Parallel Interface Characteristics

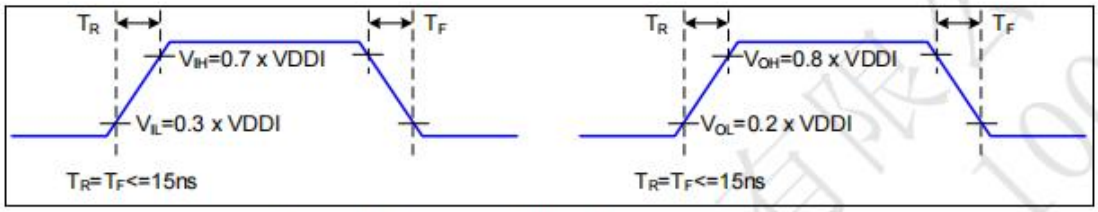


Figure 2 Rising and Falling Timing for I/O Signal

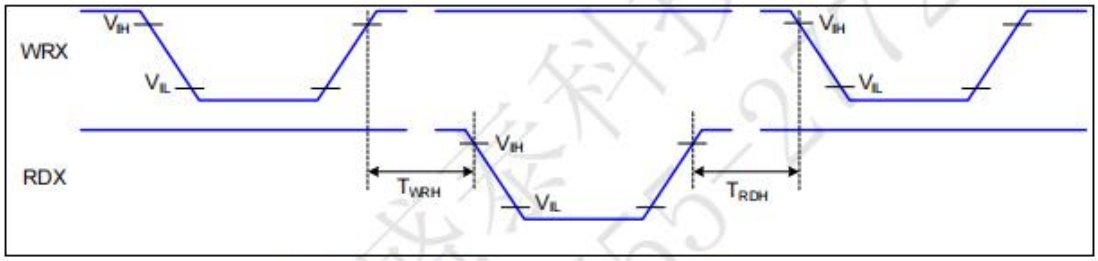


Figure 3 Write-to-Read and Read-to-Write Timing

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.

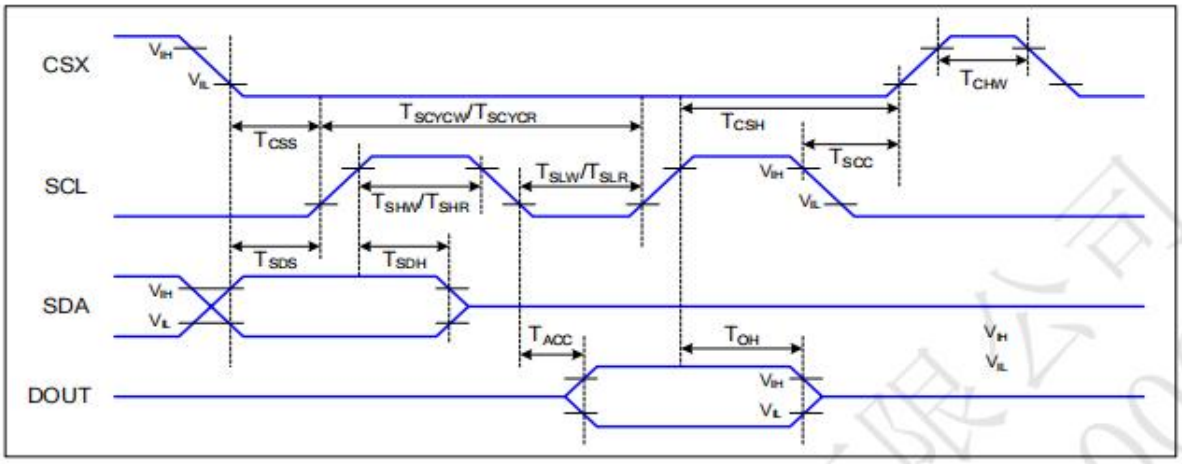


Figure 4 3-line serial Interface Timing Characteristics

VDDI=1.65 to 3.3V, VDD=2.65 to 3.3V, GND=RGND=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	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

Table 2 3-line serial Interface Characteristics

Note : 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.

7.4.3 Serial Interface Characteristics (4-line serial):

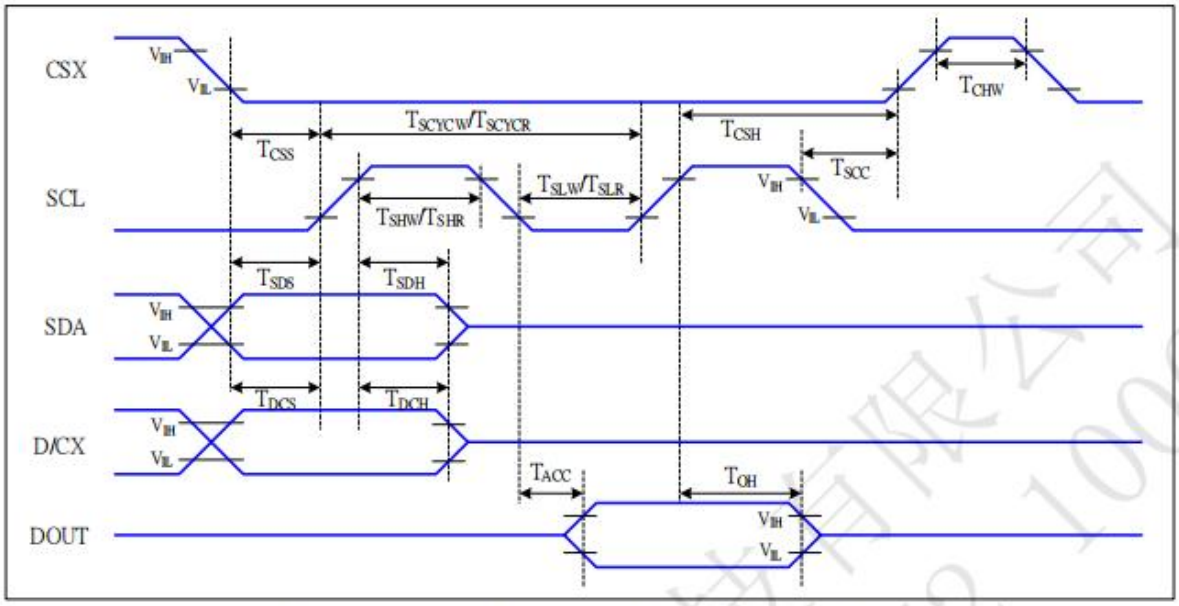


Figure 5 4-line serial Interface Timing Characteristics

VDDI=1.65 to 3.3V, VDD=2.65 to 3.3V, GND=RGND=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	7		ns	
	T_{DCH}	D/CX hold time	7		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

Table 3 4-line serial Interface Characteristics

7.4.5 QSPI Interface Characteristics:

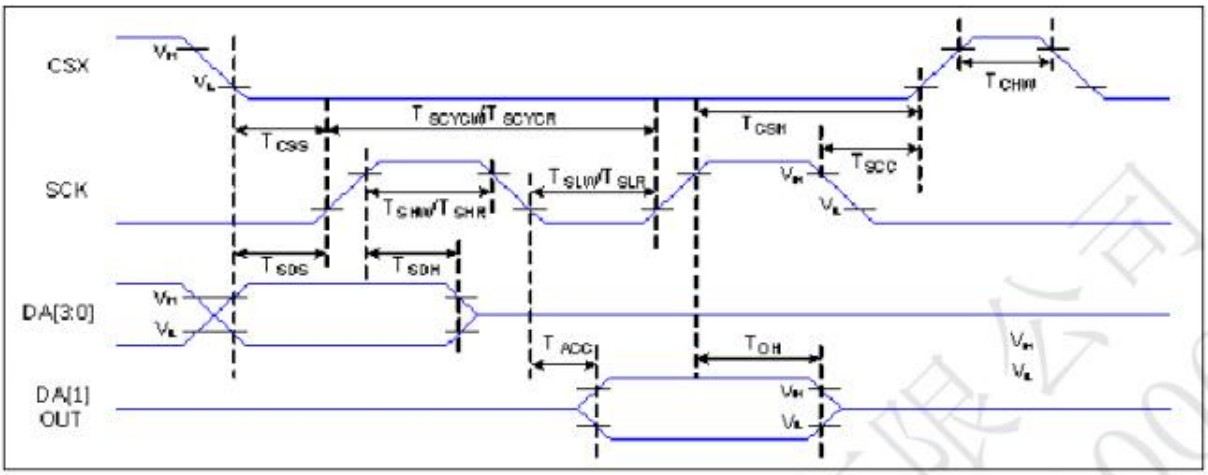


Figure 7 QSPI Interface Timing Characteristics

VDDI=1.65 to 3.3V, VDD=2.65 to 3.3V, GND=RGND=0V, Ta=25℃

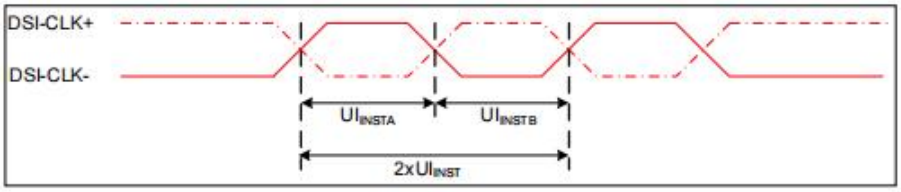
Signal	Symbol	Parameter	Min	Max	Unit	Description
CSX	Tcss	Chip select setup time (write)	15		ns	
	Tcsh	Chip select hold time (write)	15		ns	
	Tcss	Chip select setup time (read)	60		ns	
	Tscc	Chip select hold time (read)	65		ns	
	Tchw	Chip select "H" pulse width	40		ns	
			200		ns	*Note1*
SCL	Tscycw	Serial clock cycle (Write)	16		ns	
	Tshw	SCL "H" pulse width (Write)	7		ns	
	Tslw	SCL "L" pulse width (Write)	7		ns	
	Tscycr	Serial clock cycle (Read)	150		ns	
	Tshr	SCL "H" pulse width (Read)	60		ns	
	Tslr	SCL "L" pulse width (Read)	60		ns	
SDA (DIN)	Tsds	Data setup time	7		ns	
	Tsdh	Data hold time	7		ns	
DOUT	Tacc	Access time	10	50	ns	For maximum CL=30pF
	Toh	Output disable time	15	50	ns	For minimum CL=8pF

Table 5 QSPI Interface Characteristics

Note : 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.

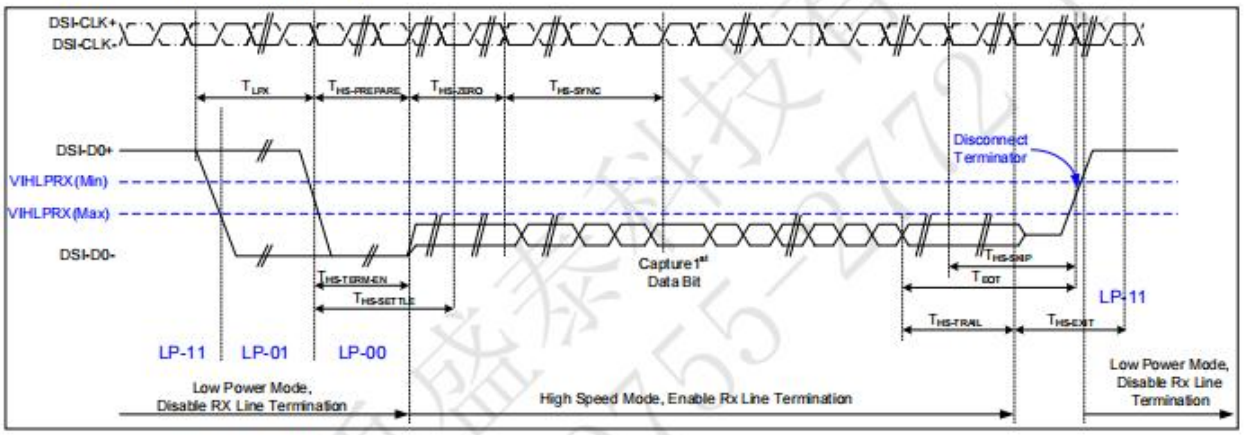
7.4.6 MIPI Interface Characteristics

High Speed Mode – Clock Channel Timing



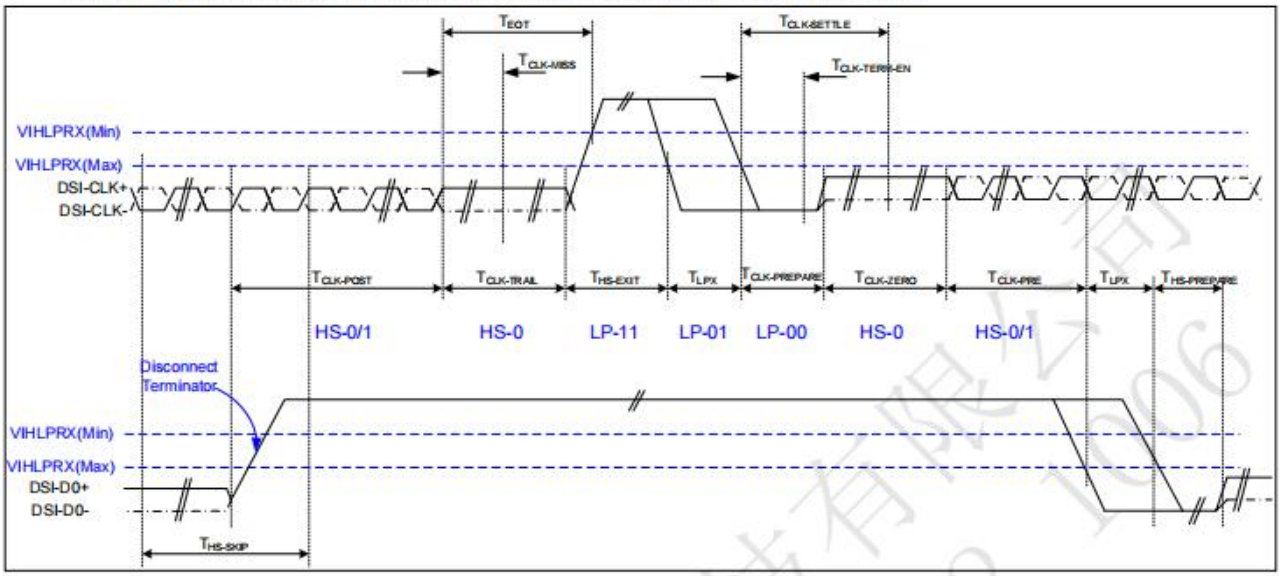
Signal	Symbol	Parameter	MIN	MAX	Unit	Description
DSI-DATA_P/N	2xUI INST	Double UI instantaneous	8	25	ns	
DSI-DATA_P/N	UI INSTA ,UI INSTB	UI instantaneous Half	4	12.5	ns	

High-Speed Data Transmission



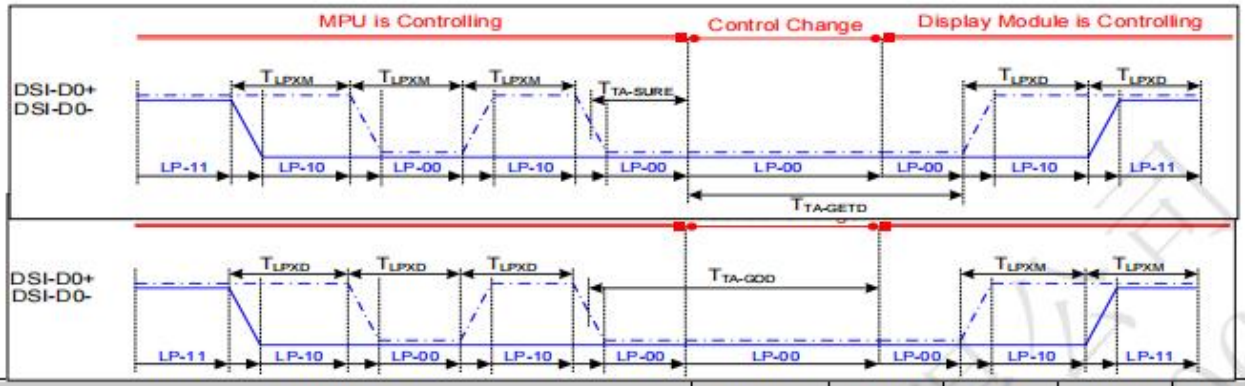
Parameter	Symbol	MIN	TYP	MAX	Unit
Time to drive LP-00 to prepare for HS transmission	$T_{HS-PREPARE}$	40+4UI		85+6UI	ns
Time from start of t HS-TRAIL or t CLK-TRAIL period to start of LP-11 state	T_{EOT}			105+12UI	ns
Time to enable data receiver line termination measured from when Dn crosses VILMAX	$T_{HS-TERM-EN}$			35+4UI	ns
Time to drive flipped differential state after last payload data bit of a HS transmission	$T_{HS-TRAIL}$	60+4UI			ns
Time-out at RX to ignore transition period of EoT	$T_{HS-SKIP}$	40		55+4UI	ns
Time to drive LP-11 after HS burst	$T_{HS-EXIT}$	100			ns
Length of any Low-Power state period	T_{LPX}	50			ns
Sync sequence period	$T_{HS-SYNC}$		8UI		ns
Minimum lead HS-0 drive period before the Sync sequence	$T_{HS-ZERO}$	105+6UI			ns

Switching the Clock Lane between Clock Transmission and Low-Power Mode



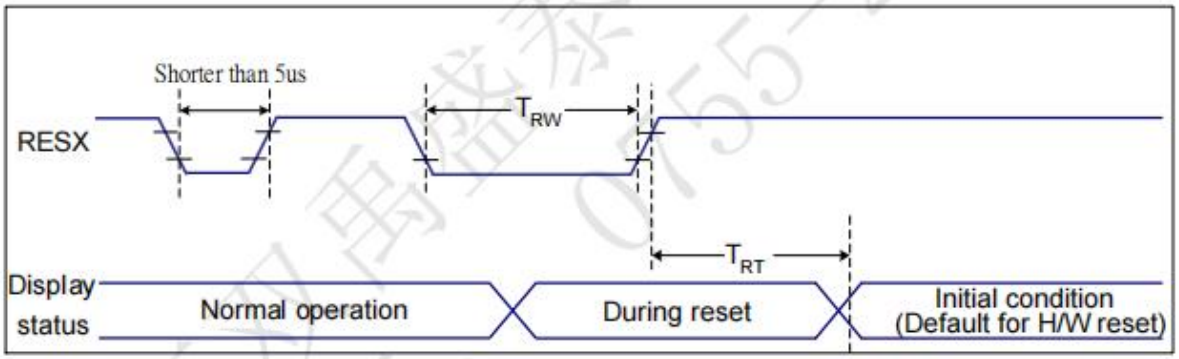
Parameter	Symbol	MIN	TYP	MAX	Unit
Time that the transmitter shall continue sending HS clock after the last associated Data Lane has transitioned to LP mode	$T_{CLK-POST}$	60+52UI			ns
Detection time that the clock has stopped toggling	$T_{CLK-MISS}$			60	ns
Time to drive LP-00 to prepare for HS clock transmission	$T_{CLK-PREPARE}$	38		95	ns
Minimum lead HS-0 drive period before starting Clock	$T_{CLK-PREPARE}$ +$T_{CLK-ZERO}$	300			ns
Time to enable Clock Lane receiver line termination measured from when Dn cross VIL,MAX	$T_{HS-TERM-EN}$			38	ns
Minimum time that the HS clock must be set prior to any associated date lane beginning the transmission from LP to HS mode	$T_{CLK-PRE}$	8			UI
Time to drive HS differential state after last payload clock bit of a HS transmission burst	$T_{CLK-TRAIL}$	60			ns

Bus Turnaround Procedure



Parameter	Symbol	MIN	TYP	MAX	Unit
Length of any Low-Power state period : Master side	T_{LPX}	50		75	ns
Length of any Low-Power state period : Slave side	T_{LPX}	47.5	50	52.5	ns
Ratio of T_{LPX} (MASTER)/ T_{LPX} (SLAVE) between Master and Slave side	Ratio T_{LPX}	2/3		3/2	
Time-out before new TX side start driving	$T_{TA-SURE}$	T_{LPX}		2 T_{LPX}	ns
Time to drive LP-00 by new TX	T_{TA-GET}		5 T_{LPX}		ns
Time to drive LP-00 after Turnaround Request	T_{TA-GO}		4 T_{LPX}		ns

7.4.7 Reset Timing



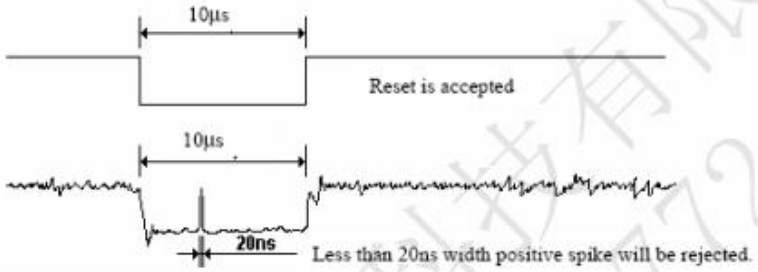
VDDI=1.8V,VDD=2.8V, GND=RGND=0V, Ta=25℃

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

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:



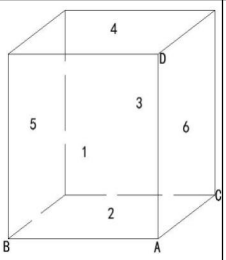
5. When Reset applied during Sleep In Mode.

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.

5.可靠性实验测试(Reliability Test Conditions And Methods)

序号	试验项目	试验条件及方法	试验设备	检验项目	检验工具
1	高温高湿(静、动态)试验	温度 60℃±3℃, 湿度 90%±3%, 要求选择时间分别为 96 小时, 静、动态（产品点亮）在室温下恢复 2 小时后进行外观, 显示功能检查。	恒温恒湿试验机	检验外观、功能、抗腐蚀性	目视/测试架/客户样机/显微镜

<table>
<tr><td>2</td><td>高、低温冲击试验</td><td>静态-30℃（30 分钟）∽ 80℃（30 分钟）∽ -30℃（30 分钟），24 个循环，在室温下恢复 2 小时后进行外观,显示功能检查。</td><td>冷热冲击试验机</td><td>检验外观、功能</td><td></td></tr>
<tr><td>3</td><td>高温存贮试验</td><td>常温70℃+-3℃、宽温80℃+/-3℃、96小时后在室温状态下恢复1 小时在2 小时内完成外观、显示功能检查。</td><td>烤箱</td><td>检验外观、功能</td><td rowspan="2">目视/测试架/客户样机</td></tr>
<tr><td>4</td><td>低温存贮试验</td><td>常温-20℃+/-3℃、宽温-30℃+/-3℃、条件的试验箱内保存96小时后在室温状态下恢复1 小时，在2 小时完成外观、显示功能检查，特别注意检查是否有漏液、断线、腐蚀、偏光片不良现象。</td><td>低温冰箱</td><td>检验外观、功能</td></tr>
<tr><td>5</td><td>低温存贮试验（动态）</td><td>常温-20℃+/-3℃、宽温-30℃+/-3℃条件的试验箱内点亮刷屏，过程中每1小时观察一次，检查显示功能，如：异常，卡机，花屏等。特别注意检查是否有漏液、断线、腐蚀、偏光片不良现象。</td><td>低温冰箱</td><td>检验外观、功能</td><td>目视/测试架/客户样机</td></tr>
<tr><td>6</td><td>包装模组跌落试验</td><td>1、跌落重量及自由落体高度：（图二）
 

2、自由落体角度如下：
<table><tr><th>总重量</th><th>自由落体高度</th></tr><tr><td>0-9kg</td><td>92cm</td></tr><tr><td>9-25kg</td><td>76cm</td></tr><tr><td>25-45kg</td><td>53cm</td></tr><tr><td>45-68kg</td><td>46cm</td></tr><tr><td>大于 68kg</td><td>41cm</td></tr><tr><td></td><td></td></tr></table>1） 一角：A 角
2） 三菱：A-B,A-D,A-C
3） 六面：面 1，面 2，面 3，面 4，面 5，面 6；</td><td>包装模组跌落架</td><td>测试电性能无异常、外观检验无破损，无脱离现象</td><td>目视/测试架/客户样机</td></tr>
<tr><td>7</td><td>盐雾试验</td><td>标准条件:中性盐雾试验（NSS 试验）：5%的氯化钠盐水溶液,溶液 PH 值中性（6.5～7.2），试验温度 35±2℃，盐雾的沉降率在 1～2ml/80cm².h 之间,时间 24h。2.其它特殊要求条件:醋酸盐雾试验(ASS 试验)：5%氯化钠溶液中配入冰醋酸,溶液 PH 值为 3 左右，试验温度 35±2℃,盐雾的沉降率在 1～2ml/80cm².h 之间，时间 24h。</td><td>盐雾试验设备</td><td>检验外观、功能，盐雾试验结果的判定方法，腐蚀物出现判定法：定性判定，试验后功能测试应 OK,外观观察产品无腐蚀现象产生。</td><td>目视/测试架/客户样机/显微镜</td></tr>
<tr><td>8</td><td>ESD 抗静电试验</td><td>测试架测试状态下试验：接触 4KV,非接触(空气) 8KV 放电测试</td><td>抗静电枪（尖头接触放电，圆头空气放电）</td><td>检验外观、功能</td><td>目视/测试架</td></tr>
</table>

6. 光电参数（Optical Characteristics）

The test of optical specifications shall be measured in a dark room (ambient luminance <1lux and temperature=25±2℃) with the equipment of luminance meter system (Goniometer system and TOPCON BM-5) and test unit shall be located at an approximate distance 50cm from the LCD surface at a viewing angle of θ and Φ equal to 0°. We refer to Ø=0 (=θ3) as the 3 o'clock direction (the "right"), Ø=90 (=θ12) as the 12 o'clock direction ("upward"), Ø=180 (=θ9) as the 9 o'clock direction ("left") and Ø=270(=θ6) as the 6 o'clock direction ("bottom"). While scanning θ and/or Ø, the center of the measuring spot on the Display surface shall stay fixed.

The backlight should be operating for 30 minutes prior to measurement.

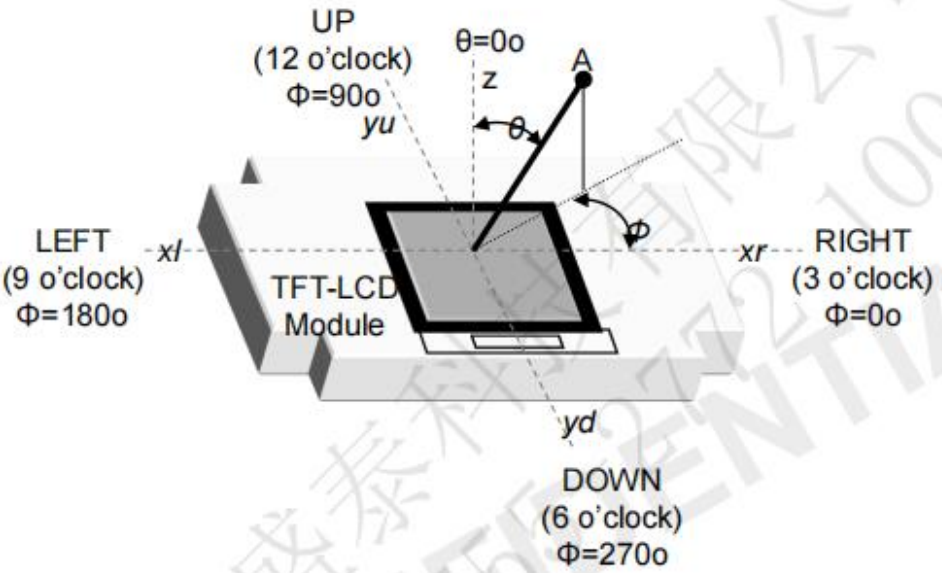
4.2 Optical Specifications

<Table 5. Optical Specifications> [Ta=25±2℃]

Parameter		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing Angle Range	Horizontal	Θ_3	CR > 10	80	85	-	Deg.	Note 4.1
		Θ_9		80	85	-	Deg.	
	Vertical	Θ_{12}		80	85	-	Deg.	
		Θ_6		80	85	-	Deg.	
Contrast Ratio		CR	Θ = 0°	1000	1500	-		W/o APF Note 4.2/4.3
Cell Transmittance		Tr		3.9	4.6	-	%	
Reproduction of color		Rx	Θ = 0°	-0.03	0.655	+0.03		With BLU @C Light Note 4.4
		Ry			0.339			
		Gx			0.286			
		Gy			0.611			
		Bx			0.138			
		By			0.098			
		Wx			0.307			
		Wy			0.318			
Color Gamut			Θ = 0°	67	72	-	%	
Response Time		Tr+Toff	Ta= 25°C Θ = 0°	-	25	35	ms	Note 4.5

Note 4.1: Viewing angle is the angle at which the contrast ratio is greater than 10. The viewing angles are determined for the horizontal or 3, 9 o'clock direction and the vertical or 6, 12 o'clock direction with respect to the optical axis which is normal to the LCD surface (see Figure 8).

<Figure 8. Viewing Angle Range Is Defined As Follows>



Note 4.2: Contrast measurements shall be made at viewing angle of Θ=0° and at the center of the LCD surface. Luminance shall be measured with all pixels in the view field set first to white, then to the dark (black) state. Luminance Contrast Ratio (CR) is defined mathematically.

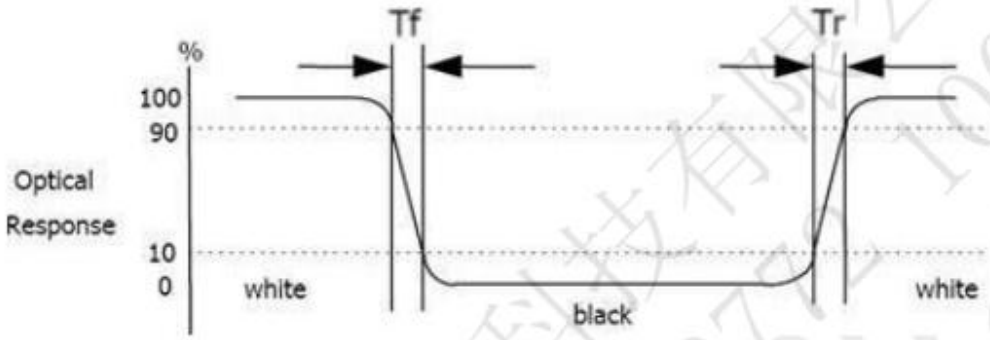
$$CR = \frac{\text{Luminance when displaying a white raster}}{\text{Luminance when displaying a black raster}}$$

Note 4.3: Transmittance is the Value with Polarizer.

Note 4.4: The color chromaticity coordinates specified in Table 16 shall be calculated from the spectral data measured with all pixels first in red, green, blue and white. Measurements shall be made at the center of the panel.

Note 4.5: The electro-optical response time measurements shall be made as Figure 9 by switching the "data" input signal ON and OFF. The times needed for the luminance to change from 10% to 90% is Tr, and 90% to 10% is Tf.

<Figure 9. Response Time Testing>



7.检验标准（Inspection standard）

8.1 Inspection conditions is as follows

1) Viewing angle is within +-30° from vertical direction, as fig 1

2) Viewing angle is the angle defined in the drawing

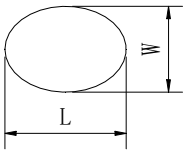
3) Ambient temperature is approximately 25+-5° C

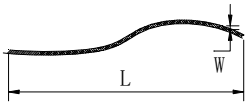
4) Ambient luminance is about 300~500 Lux.

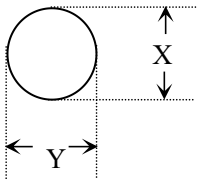
fig1

8.3 Routine inspection standards

项目	不良定义	不良现象	判定标准	检验方法	
11.3.1	外观尺寸	与图纸尺寸不相符	NG	卡尺	
11.3.2	功能	显示少线	NG	目视	
		无显示	NG	目视	
		显示异常	NG	目视	主
		TP 功能不良，无触摸	NG	目视/用手触摸	主

<table>
<tr><td rowspan="8">11.3.3</td><td rowspan="8">点亮产品可见及在LCD或T/P上有擦拭不掉的点状物</td><td rowspan="8">偏光片刺伤、脏点、圆形物、黑点
 

Φ=(L+W)/2</td><td colspan="3">LCM/总成 0.95 寸—2.4 寸</td><td rowspan="4">目 视
(用菲淋卡比对)</td><td rowspan="8">次</td></tr>
<tr><td>Φ≦0.10mm</td><td></td><td>1、距产品30mm目视不见忽略。
2、5mm间距内只允许3个点。
3、显示区只允许10个点，超过以上第2第3项则NG 。</td></tr>
<tr><td>0.10mm<Φ≦0.15mm</td><td></td><td>1</td></tr>
<tr><td>Φ>0.15mm</td><td></td><td>NG</td></tr>
<tr><td colspan="4">0.15mm<Φ≦0.2mm 按照 A-品入库</td></tr>
<tr><td colspan="3">LCM/总成>2.4 寸——6.0 寸</td><td rowspan="4">目 视
(用菲淋卡比对)</td></tr>
<tr><td>Φ≦0.10mm</td><td></td><td>1、10mm间距内只允许3个
2、显示区只允许10个点，超过以上任意一项则NG</td></tr>
<tr><td>0.1mm<Φ≦0.15mm</td><td></td><td>4（TP、屏各允许2个）</td></tr>
<tr><td>0.15mm<Φ≦0.2mm</td><td></td><td>2（TP、屏各允许1个）</td></tr>
<tr><td>11.3.4</td><td>点亮产品可见及在LCD或T/P上有擦拭不掉的线状物/刮伤</td><td> 
</td><td colspan="3">LCM/总成 0.95 寸——6.0 寸
长(L) | 宽(W) | 允许个数
≦1mm | ≦0.03mm | 2
≦2mm | 0.03<W≦0.05mm | 1
>2mm | >0.05mm | NG
两条线毛之间必须距离5mm以上（0.95寸—3.0寸）.
两条线毛之间必须距离10mm以上（3.1寸—6.0寸）.</td><td>目视(用菲淋卡比对)</td><td>次</td></tr>
</table>

<table>
<tr><td rowspan="5">11.3.5</td><td rowspan="5">偏光片气泡</td><td rowspan="5">Φ=（X+Y）/2
 
</td><td>尺寸</td><td>允许个数</td><td rowspan="5">在日光台灯下撕起保护膜,距待测物30cm 目视</td><td rowspan="5">次</td></tr>
<tr><td>1、Φ≦0.1mm
2、不超过边框 1/3</td><td>不计（密集不可）</td></tr>
<tr><td>0.10＜Φ≦0.2mm</td><td>1</td></tr>
<tr><td>Φ＞0.2mm</td><td>NG</td></tr>
<tr><td>0.2＜Φ≦1.5mm,（边框以外）</td><td>3</td></tr>
<tr><td colspan="3">0.95 寸-2.4 寸气泡间距大于 5mm 以上
＞2.4 寸-6.0 寸气泡间距大于 10mm 以上</td></tr>
<tr><td>11.3.6</td><td>T/P 及偏光片凹凸点</td><td>T/P：LCD 偏光片上有凹凸点</td><td colspan="3">可视区有水纹（擦拭不掉）拒收
未进入可视区允收,客户装机后不见允收</td><td>在同一视角下用样品比对</td><td>次</td></tr>
</table>

Caution

Handling of Display Module

Be sure to ground the body when handling the LCM.

Don’t give external shock.

Don’t apply excessive force on the surface.

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.

Don’t operate it above the absolute maximum rating.

Don’t disassemble the LCM.

Storage

Store in an ambient temperature of 5℃ to 45℃,and in a relative humidity of 40% to 60%. Don’t expose to sunlight or intensive ultraviolet rays.

Storage in a clean environment, free from dust, active gas, and solvent.

Store in anti-static electricity container.

Store without any physical load.

Notes：

11.1 The reliability items will be fully performed in new sample qualification,

11.2 The reliability status will be tested as monitor during mass production. Individual reliability test shall be performed by lot , Moreover, the individual reliability item shall be decided according to reliability plan.

11.3 All samples are inspected after keeping in the room with normal temperature and humidity for 2 hours or above.

11.4 Vibration test: It is not necessary to test for those products without assembly frame , back light ,PCB and so on.

11.5 Dropping test：It is necessary for affirming new package.

11.6 For the high temperature and high humidity test, pure water of over 10 MΩ.cm should be used.

11.7 Each test item applies for test LCM only once .Then tested LCM cannot be used again in any other test item.

11.8 The quantity of LCM examination for each test item is 5pcs to 10pcs.

12. Precautions for Using Display Modules

12.1 Safety instructions

12.1.1 If the LCD panel breaks, be careful not to get any liquid crystal substance in your mouth.

12. 1.2 If the liquid crystal substance touches your skin or clothes, please wash it off immediately by using soap and water.

12.2 Handling Precautions

12.2.1 Avoid static electricity damaging the LSI.

12.2.2 Do not remove the panel or frame from the module .

12.2.3 The polarizing plate of the display is very fragile . So, please handle it very carefully.

12.2.4 Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of the plate.

12.2.5 The color tone of display and background of LCM has the possibility to be changed in the storage temperature range.

12.2.6 Pay attention to the working environment, as the element may be destroyed by static

electricity. --Be sure to ground human body and electric appliance during work.

--Avoid working in a dry environment to minimize the generations of static electricity.

--Static electricity may be generated when the protective film is fast peeled off.

12.2.7 When soldering the terminal of LCM, make certain the AC power source of soldering iron does not leak.

12.2.8 If the display surface becomes contaminated ,breathe on the surface and gently wipe it with a soft-dry- clean cloth .If it is heavily contaminated ,moisten cloth with the following solvent(ex:Ethyl alcohol).Solvents other than those above-mentioned may damage the polarizer.

12.3 Operation Instructions

12.3.1 It is recommended to drive the LCD within the specified voltage limits, try to adjust the operating voltage for the optimal contrast, the color and contrast of LCD panel will varies at different temperature.

12.3.2 Response time is greatly delayed at low operating temperature range. However, this does not mean the LCD will be out of the order, It will recover when it returns to the specified temperature range.

12.3.3 If the display area is pushed hard during operation, the display will become abnormal.

12.3.4 Do not operate the LCD at the environments over the specified conditions, this may cause damage on the LCD and shorten the lifetime.

12.4 Storage Instructions:

12.4.1 Store display module in a sealed polyethylene bag.

12.4.2 Store display module in a dark place, Do not expose to sunlight or fluorescent light. Keep the temperature between 0℃and 35℃.

12.4.3 Avoid the polarizer touch any other object, (It is recommended to store them in the container in which they were shipped.)

12.5 Limited Warranty

12.5.1 LEAD will replace or repair any of its LCD modules, which are found to be defective, when inspected in accordance with LEAD LCM acceptance standards (copies available upon request) for a period of 12 months from ink- print date on product

12.5.2 Any defects must be returned to LEAD within 60 days since ship-out. Confirmation of such date shall be based on freight documents. The warranty liability of LEAD limited to repair and/or replacement on defects above (7.1,7.2)

12.5.3 No warranty can be granted if the precautions stated above have been disregarded. The typical samples are as below:

-- LCD glass crack/break

--PCB outlet is damaged or modified.

--PCB conductors damaged.

--Circuit modified with by grinding, engraving or painting varnish.

--FPC crack

12.5.4 Modules must be returned with sufficient description of the failures of defects. Any connectors or cable

installed by the customer must be removed completely without damaging the PCB outlet, conductors and terminals. Modules must be packed with the container in which they were shipped.

Packing Specification

-TBD-