

VICTRONIX	Add:	Room 1405A, Building 1B, Hua qiang Idea Park, Guang Ming District, ShenZhen,China		
	Tel:	+86-755-33265935	Fax:	+86-755-33265935

SPECIFICATION

VXT280HQS-14F

☐ Preliminary Specification

☐ Final Specification



Customer:

Made By:

Checked By:

Approved By:

Quality:

Date:

Note:

Approved By:

Date:

Note:

Records of Revision

[illegible]

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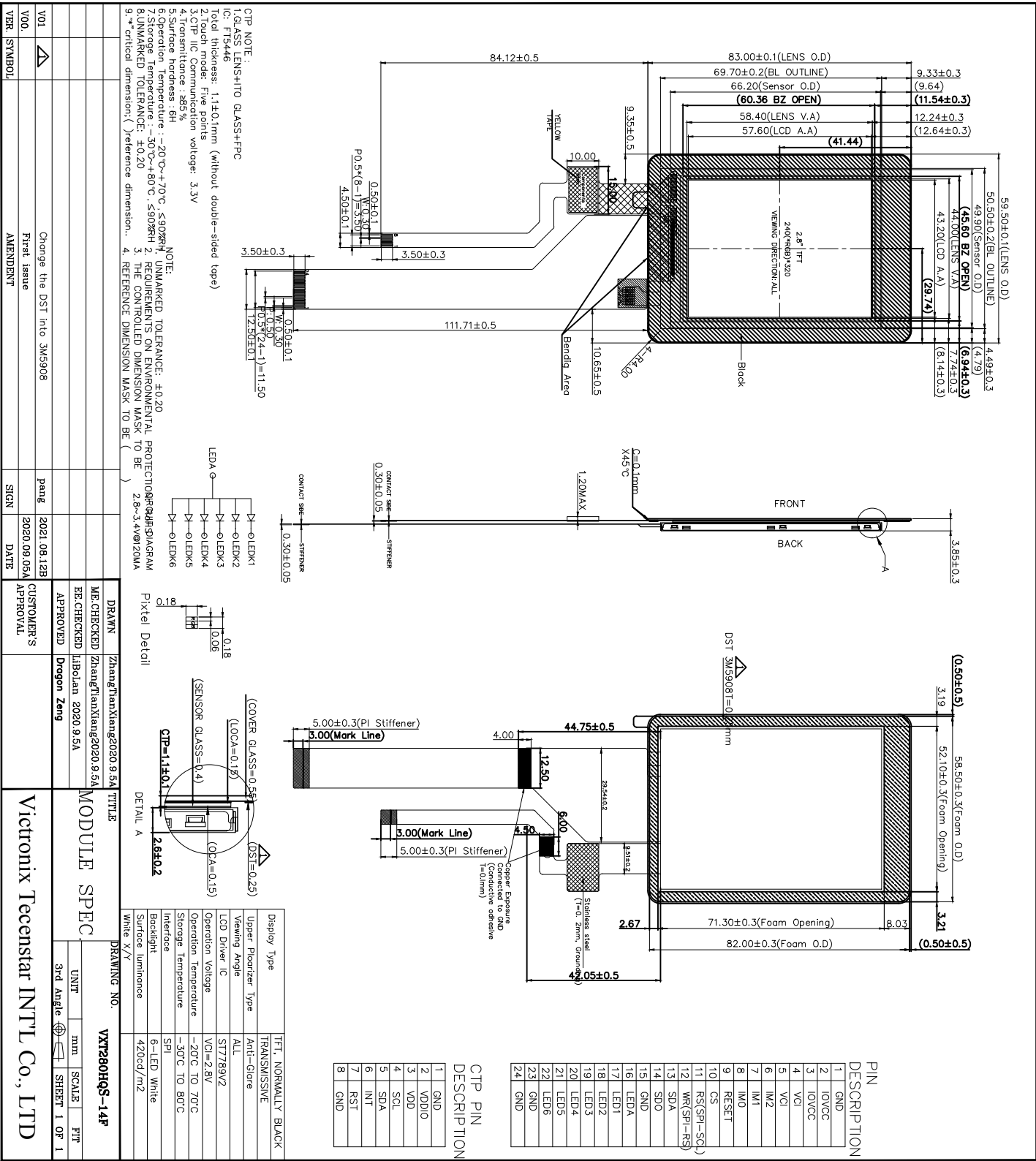
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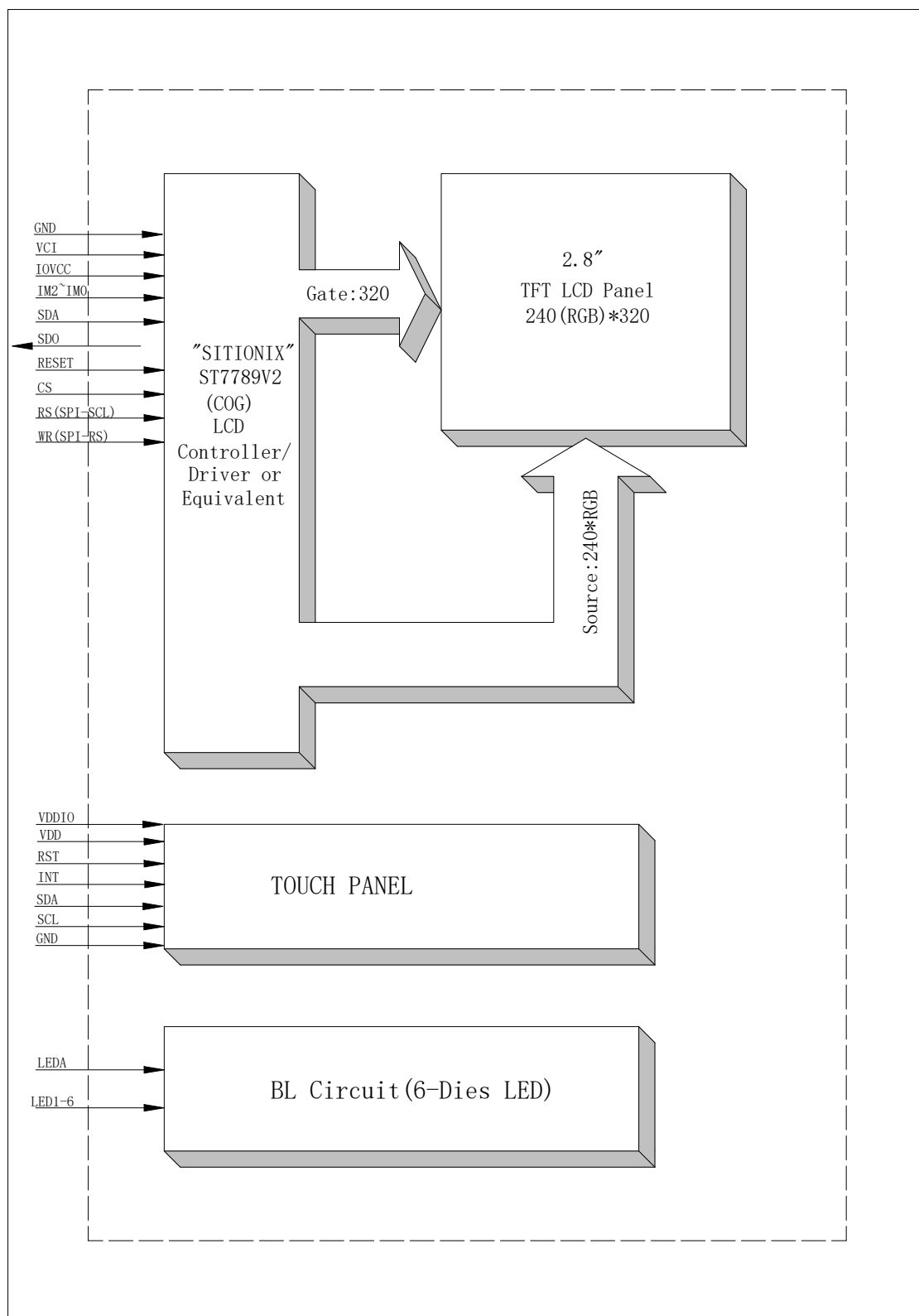
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1. General Specification

Item	Contents	Unit
LCD TYPE	TFT/TRANSMISSIVE	
MODULE SIZE (W*H*T)	59.50*83*3.85	MM
ACTIVE SIZE (W*H)	43.20*57.60	MM
PIXEL PITCH (W*H)	0.180*0.180	MM
NUMBER OF DOTS	240*320	
DIVER IC	ST7789V2	
INTERFACE TYPE	SPI	
TOP POLARIZER TYPE	GLARE	
RECOMMEND VIEWING DIRECTION	ALL	O'CLOCK
GRAY SCALE INVERSION DIRECTION	--	O'CLOCK
BACKLIGHT TYPE	6-DIES WHITE LED	
TOUCH PANEL TYPE	CAPACITIVE	



3. Block Diagram



4. Interface Pin Function

Pin No.	Symbol	Description
1	GND	Power ground
2	IOVCC	Supply voltage for logic
3	IOVCC	Supply voltage for logic
4	VCI	Supply voltage for analog
5	VCI	Supply voltage for analog
6	IM2	Interface select,note1
7	IM1	
8	IM0	
9	RESET	This signal will reset the device and it must be applied to properly initialize the chip. Signal is active low.
10	CS	Chip selection pin Low enable. High disable.
11	RS(SPI-SCL)	This pin is used to be serial interface clock.
12	WR(SPI-RS)	Display data/command selection pin in 4-line serial interface.
13	SDA	SPI interface input pin
14	SDO	SPI interface output pin. The data is output on the falling edge of the SCL signal. If not used, let this pin open
15	GND	Power ground.
16	LEDA	Anode of LED backlight
17	LED1	Cathode of LED backlight
18	LED2	Cathode of LED backlight
19	LED3	Cathode of LED backlight
20	LED4	Cathode of LED backlight
21	LED5	Cathode of LED backlight
22	LED6	Cathode of LED backlight
23	GND	Power ground.
24	GND	Power ground.

Note1

IM2 IM1 IM0

1	0	1	3-line 9bit serial I/F II	SDA: in/ SDO: out
1	1	0	4-line 8bit serial I/F II	SDA:in/ SDO: out

CTP PIN

Pin No.	Symbol	Description
1	GND	Power ground
2	VDDIO	Power supply
3	VDD	Power supply
4	SCL	I2C clock input.
5	SDA	I2C data input and output.
6	INT	Interrupt request to the host, or Wakeup request from the host.
7	RST	External Reset, Low is active.
8	GND	Power ground

5. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply voltage for analog	VCI	-0.3	4.6	V
Supply voltage for logic	IOVCC	-0.3	4.6	V
Supply current (One LED)	I _{LED}		30	mA
Operating temperature	T _{OP}	-20	+70	°C
Storage temperature	T _{ST}	-30	+80	°C

6. Electrical Characteristics

6.1 Input Power

Item	Symbol	Min	Typ.	Max	Unit	Applicable terminal
Supply Voltage for Analog	VCI	2.4	2.8	3.3	V	
Supply Voltage for Logic	IOVCC	1.65	1.8	3.3	V	
Input Voltage	V _{IL}	GND	-	0.3VCI	V	
	V _{IH}	0.8 VCI	-	VCI		
Input leakage Current	I _{LKG}	-1		1	μA	

6.2 Backlight Driving Conditions

Item	Symbol	Value			Unit	Remark
		Min.	Typ.	Max.		
Voltage for LED Backlight	V _F	2.8	3.2	3.4	V	I _L =120mA
Current for LED Backlight	I _L		120		mA	
Power Consumption	P		0.384		W	
LED Life Time		30,000	50,000		Hr	Note

Note: Brightness to be decreased to 50% of the initial value at ambient temperature TA=25°C

6.3 CTP Electrical characteristics

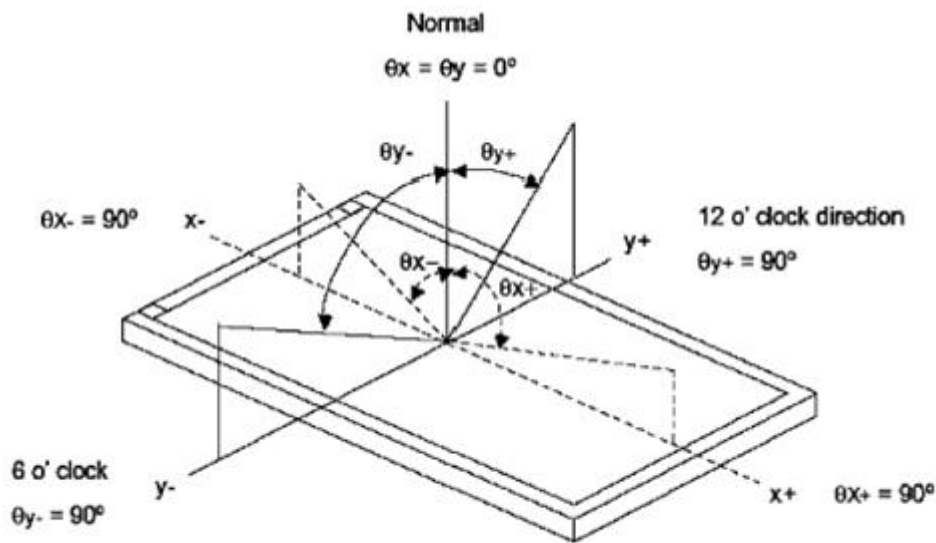
Item	Contents	Unit
Structure	G+G	
Outline dimension	59.5±0.1*83±0.1	mm
Outline dimension of sensor	49.9±0.2*66.2±0.2	mm
View area	44±0.2*58.4±0.2	mm
Drive IC	FT5446	
Interface type	IIC	
IIC Address	0x70	
Supply voltage	2.7-3.6	V
Number of touch point	5	point
Connector type	ZIF	
Transmittance of view area	≧ 85%	
Hardness	≧ 6H	

Item	Symbol	Value	Unit
Power supply voltage	VDD	2.7~3.6	V
Operating temperature	Topr	-20 ~ +70	°C
Storage temperature	Tstg	-30 ~ +80	°C

7. Optical Characteristics

ITEM		SYMBOL	CONDITIONS	SPECIFICATIONS			UNIT	NOTE
				MIN	TYP.	MAX		
Luminance		L	$I_L = 120\text{mA}$	330	420	600	Cd/m^2	
Contrast Ratio		CR	$\theta = 0^\circ$	600	800			
Response Time		T_{ON}	25°C		30	40	ms	
		T_{OFF}						
CIE Color Coordinate	Red	X_R	Viewing normal angle	0.584	0.624	0.664		
		Y_R		0.298	0.338	0.378		
	Green	X_G		0.275	0.315	0.355		
		Y_G		0.558	0.598	0.638		
	Blue	X_B		0.102	0.142	0.182		
		Y_B		0.024	0.064	0.104		
	White	X_W		0.250	0.290	0.330		
		Y_W		0.271	0.311	0.351		
Viewing Angle	Hor.	θ_{X+}	$CR \geq 10$		80		Degree	
		θ_{X-}			80			
	Ver.	θ_{Y+}			80			
		θ_{Y-}			80			
Uniformity	Un			80			%	
NTSC				-			%	

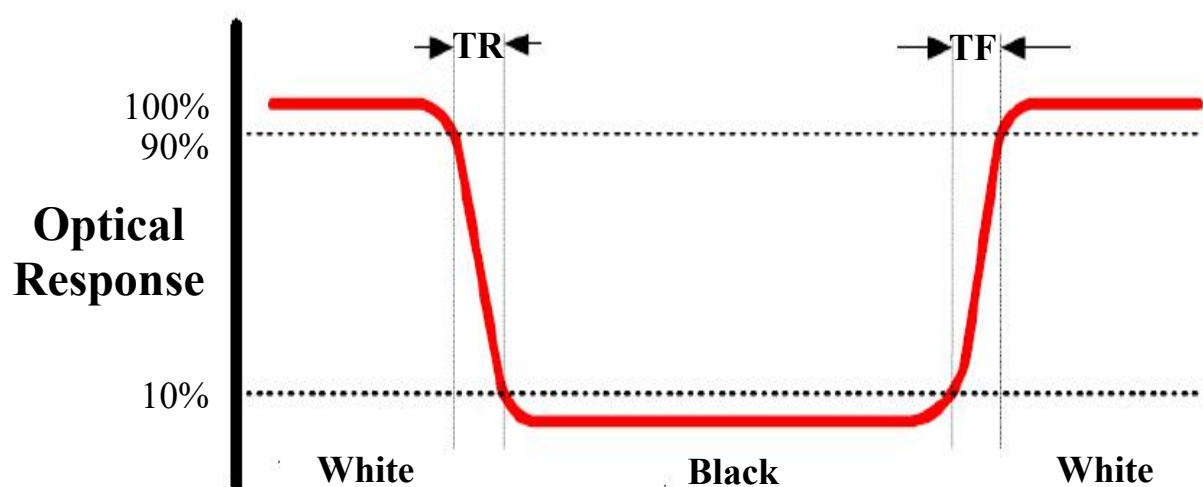
Note 1: Definition of Viewing Angle θ_x and θ_y :



Note 2: Definition of contrast ratio CR:

$$CR = \frac{\text{Luminance of white state}}{\text{Luminance of black state}}$$

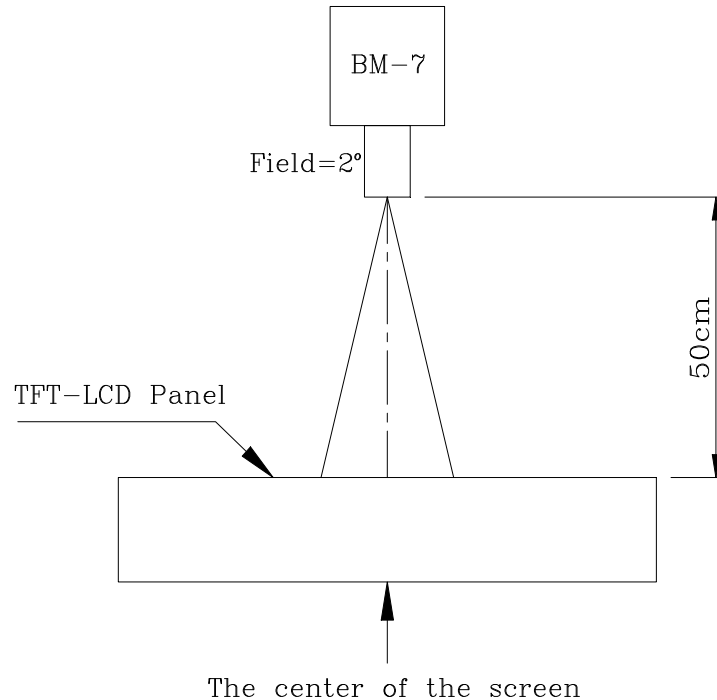
Note 3: Definition of Response Time(T_r , T_f)



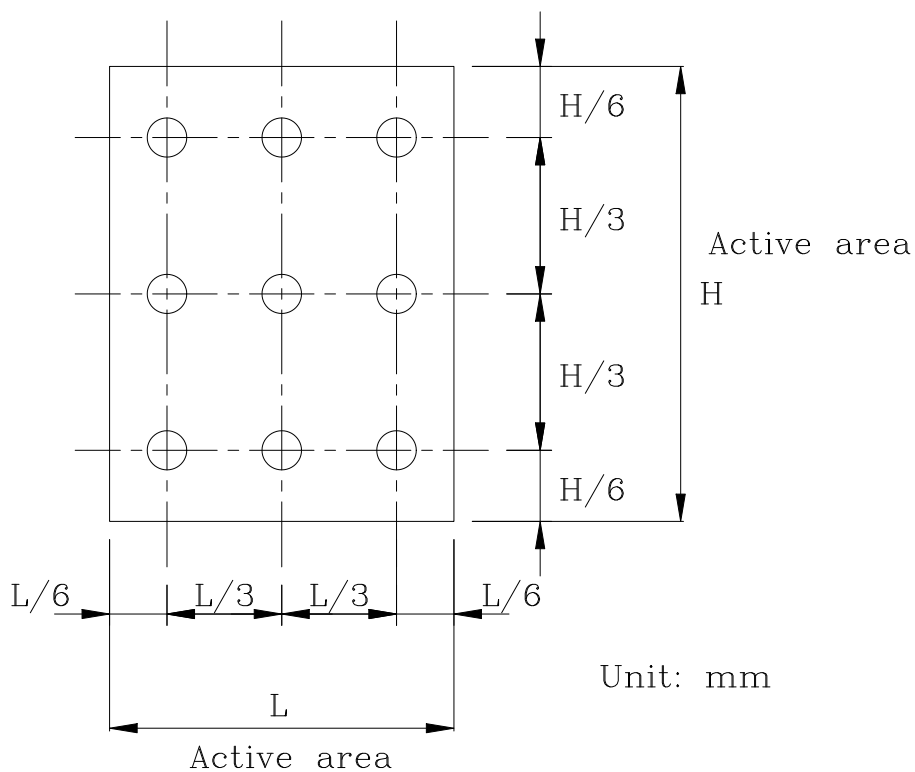
Note 4: Definition of Luminance

①The Brightness Test Equipment Setup

Field=2°(As measuring “black” image, field=2°is the best testing condition)



②The Brightness Test Point Setup



8. Timing Characteristics

8.1 Serial Interface Characteristics(3-line serial):

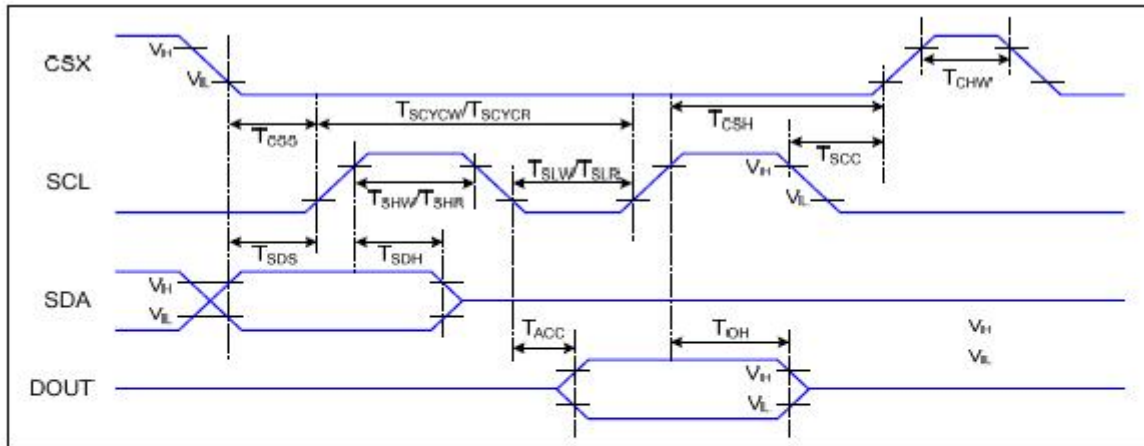


Figure 4 3-line serial Interface Timing Characteristics

$V_{DDI}=1.65$ to $3.3V$, $V_{DD}=2.4$ to $3.3V$, $AGND=DGND=0V$, $T_a=25^{\circ}C$

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

Note : The rising time and falling time (T_r , T_f) of input signal are specified at 15 ns or less. Logic high and low levels are specified as 30% and 70% of V_{DDI} for input signals.

8.2 Serial Interface Characteristics(4-line serial):

7.4.3 Serial Interface Characteristics (4-line serial):

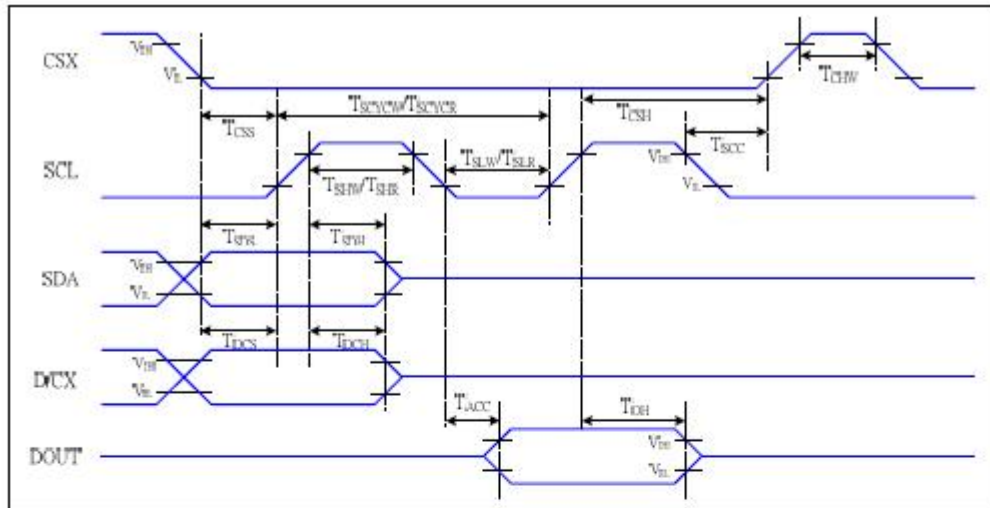


Figure 5 4-line serial Interface Timing Characteristics

VDD=1.05 to 3.3V, VDD=2.4 to 3.3V, AGND=DGND=0V, Ta=25°C

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 _{CC}	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 _{DS}	Data setup time	7		ns	
	T _{DH}	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 6 4-line serial Interface Characteristics

Note : The rising time and falling time (Tr, Tf) of input signal are specified at 1.5 ns or less. Logic high and low levels are specified as

8.3 Power ON/OFF Sequence

VDDI and VDD can be applied in any order.

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.

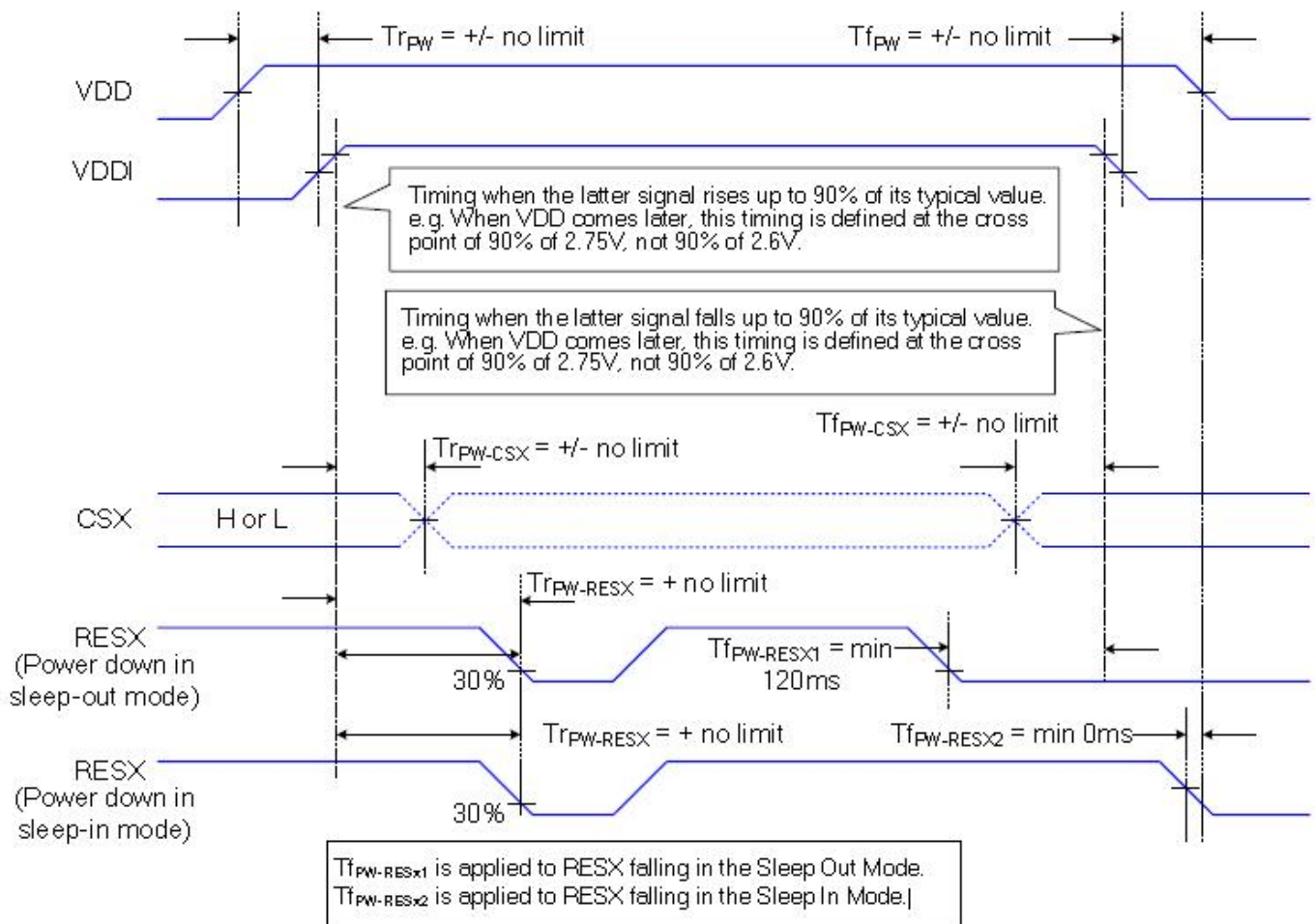
Note 1: There will be no damage to the display module if the power sequences are not met.

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



8.4 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. Standard Specification for Reliability

9.1 Standard Specification for Reliability of LCD Module

No	Test Item	Condition	Remarks
1	High Temperature Operation	Ts = +70°C, 240 hours	IEC60068-21:2007 GB2423.2-2008
2	Low Temperature Operation	Ta = -20°C, 240 hours	IEC60068-2-1:2007 GB/2423.1-2008
3	High Temperature Storage	Ta = +80°C, 240 hours	IEC60068-21:2007 GB/2423.2-2008
4	Low Temperature Storage	Ta = -30°C, 240 hours	IEC60068-21:2007 GB/2423.1-2008
5	Storage at High Temperature and Humidity	Ta = +60°C, 90% RH max,240hours	IEC60068-2-78 :2001 GB/T2423.3—2006
6	Thermal Shock (non-operation)	-30°C 30 min~+80°C30 min, Change time:5min, 20 Cycle	Start with cold temperature, End with high temperature, IEC60068-214:1984, GB/2423.22-2002
7	ESD	C=150pF,R=330Ω,5point/panel Air:±8Kv,5times; Contact:±4Kv,5times (Environment:15°C~35°C, 30%~60%.86Kpa~106Kpa)	IEC61000-42:2001 GB/T17626.2-2006
10	Package Drop Test	Height:80cm, 1corner,3 edges,6 surfaces	IEC60068-2-32:1990 GB/T2423.8—1995

Note1: Ts is the temperature of panel's surface.

Note2: Ta is the ambient temperature of sample.

9.2 Testing Conditions and Inspection Criteria

For the final test, the testing sample must be stored at room temperature for 24 hours. After the tests listed in Table 9.2, standard specifications for reliability will be executed in order to ensure stability.

No.	Item	Test Model	In section Criteria
01	Current Consumption	Refer To Specification	The current consumption should conform to the product specification.
02	Contrast	Refer To Specification	After the tests have been executed, the contrast must be larger than half of its initial value prior to the tests.
03	Appearance	Visual inspection	Defect free.

9.3 MTBF

MTBF	Functions, performance, appearance, etc. shall be free from remarkable deterioration within 50,000 hours under ordinary operating and storage conditions room temperature ($25\pm5^{\circ}\text{C}$), normal humidity ($50\pm10\%$ RH), and in area not exposed to direct sun light.
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10. Specification of Quality Assurance

This standard of Quality Assurance confirms to the quality of LCD module products supplied by Victronix.

10.1 Quality Test

Before delivering, the supplier should conduct the following tests to confirm the quality of products.

- Electrical-Optical Characteristics: According to the individual specification to test the product.
- Appearance Characteristics: According to the individual specification to test the product.
- Reliability Characteristics: According to the definition of reliability on the specification for testing products.

10.2 Delivery Test

Before delivering, the supplier should conduct the delivery test.

- Test method: According to MIL-STD105E.General Inspection Level II take a single Time.
- The defects classify of AQL as following:
Major defect: AQL = 0.65
Minor defect: AQL = 1.5
Total defects: AQL = 1.5

10.3 Non-conforming Analysis & Deal With Manners

10.3.1 Non-conforming Analysis

- Purchaser should provide the data detail of non-conforming sample and the non-conforming.
- After receiving the data detail from purchaser, the analysis of non-conforming should be finished within two weeks.
- If the analysis can't be finished on time, supplier must notice purchaser 3 days in advance.

10.3.2 Disposition of non-conforming

- If any product defect be found during assembling, supplier must change the good for every defect after confirmation.
- Both supplier and customer should analyze the reason and discuss the disposition of non-conforming when the reason of nonconforming is not sure.

10.4 Agreement items

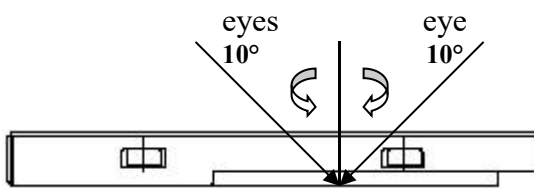
Both parties should negotiate together when the following problems happen.

- There is any problem of standard of quality assurance, and both sides should agree that it must be modified.
- There is any argument item which does not record in the standard of quality assurance.
- Any other special problem.

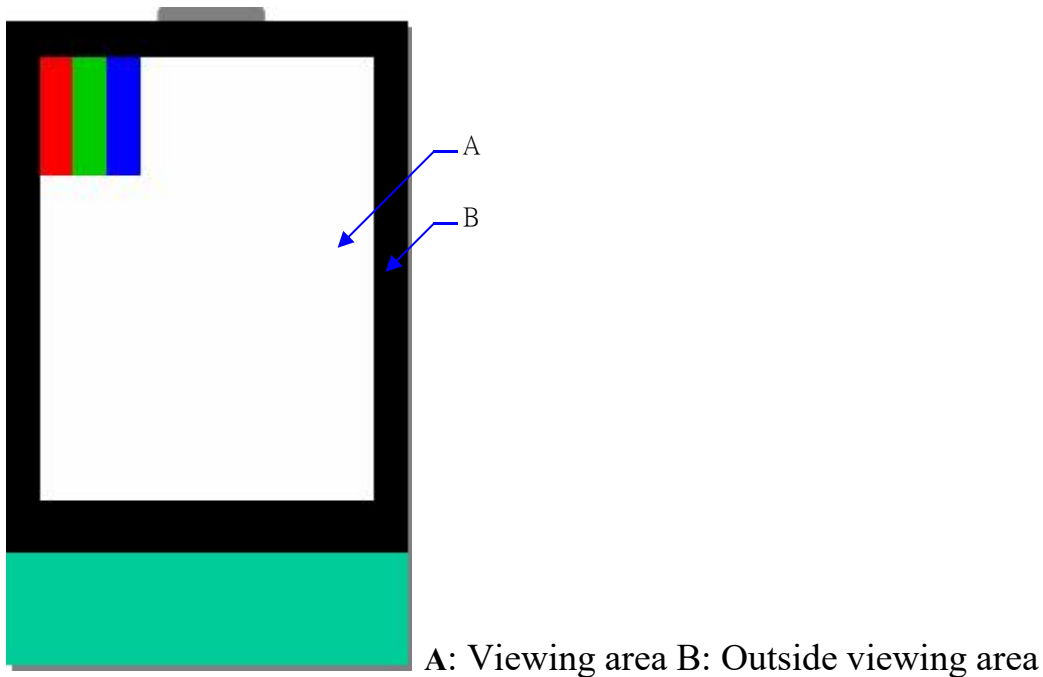
10.5 Standard of The Product Appearance Test

10.5.1 Manner of appearance test

- The test must be under 20W × 2 or 40W fluorescent light, and the distance of view must be at 30±5cm.
- When test the model of transmissive product must add the reflective plate.
- The test direction is base on around 10° of vertical line.
- Temperature: 25±5°C Humidity: 60±10%RH



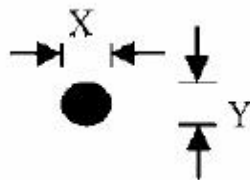
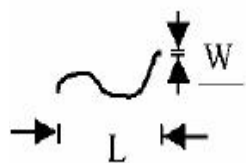
- Definition of area:

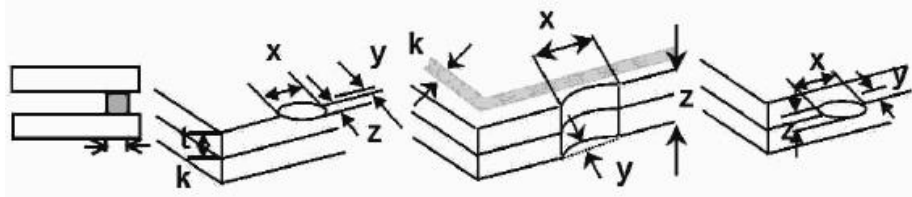
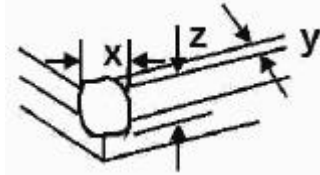


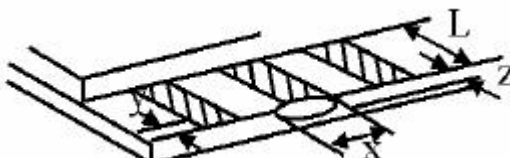
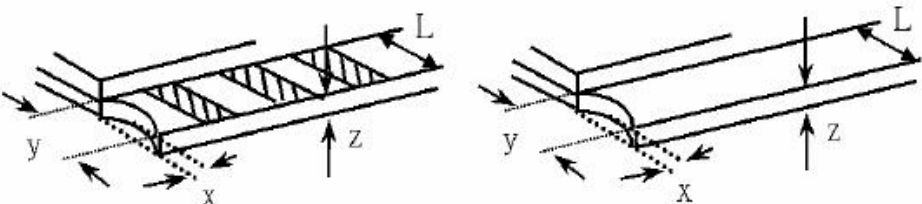
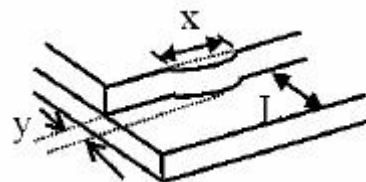
10.5.2 Basic principle

- When the standard can not be described, AQL will be applied.
- The sample of the lowest acceptable quality level must be negotiated by both supplier and customer when any dispute happened.
- New item must be added on time when it is necessary.

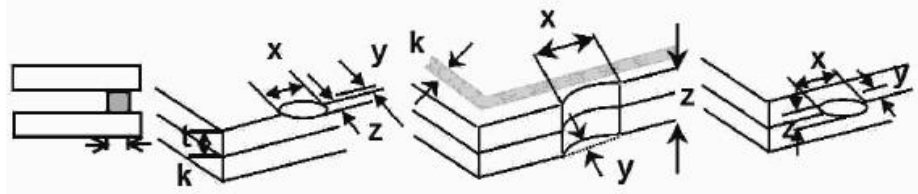
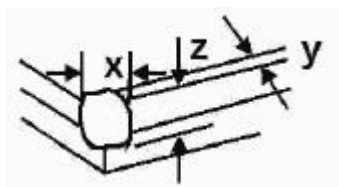
10.6 Inspection Specification

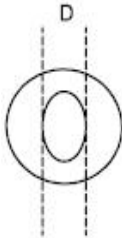
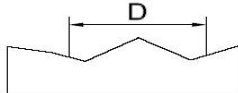
NO.	Item	Criterion	AQL																										
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 1.7 Mixed product types. 1.8 Flicker	0.65																										
02	Black or White spots or Bright spots or Color spots on LCD (Display only)	2.1 White and black or color spots on display $\leq 0.25\text{mm}$, no more than Five spots. 2.2 Densely spaced: No more than three spots within 3mm.	1.5																										
03	LCD and Touch Panel black spots, white spots, contamination (non – display)	3.1 Round type: As following drawing $\Phi = (X+Y) / 2$  <table> <tr> <th>Size(mm)</th> <th>Acceptable Q'ty</th> </tr> <tr> <td>$\Phi \leq 0.10$</td> <td>Accept no dense</td> </tr> <tr> <td>$0.10 < \Phi \leq 0.20$</td> <td>2</td> </tr> <tr> <td>$0.20 < \Phi \leq 0.25$</td> <td>2</td> </tr> <tr> <td>$0.25 < \Phi \leq 0.30$</td> <td>1</td> </tr> <tr> <td>$0.30 < \Phi$</td> <td>0</td> </tr> </table> * Densely spaced: No more than two spots within 3mm. 3.2 Line type: (As following drawing)  <table> <tr> <th>Length(mm)</th> <th>Width(mm)</th> <th>Acceptable Q'ty</th> </tr> <tr> <td>---</td> <td>$W \leq 0.02$</td> <td>Accept no dense</td> </tr> <tr> <td>$L \leq 3.0$</td> <td>$0.02 < W \leq 0.05$</td> <td rowspan="2">2</td> </tr> <tr> <td>$L \leq 2.5$</td> <td>$0.03 < W \leq 0.08$</td> </tr> <tr> <td>---</td> <td>$0.08 < W$</td> <td>Rejection</td> </tr> </table> * Densely spaced: No more than two lines within 3mm.	Size(mm)	Acceptable Q'ty	$\Phi \leq 0.10$	Accept no dense	$0.10 < \Phi \leq 0.20$	2	$0.20 < \Phi \leq 0.25$	2	$0.25 < \Phi \leq 0.30$	1	$0.30 < \Phi$	0	Length(mm)	Width(mm)	Acceptable Q'ty	---	$W \leq 0.02$	Accept no dense	$L \leq 3.0$	$0.02 < W \leq 0.05$	2	$L \leq 2.5$	$0.03 < W \leq 0.08$	---	$0.08 < W$	Rejection	1.5
Size(mm)	Acceptable Q'ty																												
$\Phi \leq 0.10$	Accept no dense																												
$0.10 < \Phi \leq 0.20$	2																												
$0.20 < \Phi \leq 0.25$	2																												
$0.25 < \Phi \leq 0.30$	1																												
$0.30 < \Phi$	0																												
Length(mm)	Width(mm)	Acceptable Q'ty																											
---	$W \leq 0.02$	Accept no dense																											
$L \leq 3.0$	$0.02 < W \leq 0.05$	2																											
$L \leq 2.5$	$0.03 < W \leq 0.08$																												
---	$0.08 < W$	Rejection																											

NO.	Item	Criterion			AQL
04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction	Size Φ (mm)	Acceptable Q'ty	1.5
			$\Phi \leq 0.20$	Accept no dense	
			$0.20 < \Phi \leq 0.50$	3	
			$0.50 < \Phi \leq 1.00$	2	
			$1.00 < \Phi$	0	
			Total Q'ty	3	
05	Scratches	Follow NO.3 -2 Line Type.			
06	Chipped glass	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 6.1 General glass chip: 6.1.1 Chip on panel surface and crack between panels:			1.5
					
		z: Chip thickness	y: Chip width	x: Chip length	
		$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	
		$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	
		⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 6.1.2 Corner crack:			
					
		z: Chip thickness	y: Chip width	x: Chip length	
		$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$	
		$1/2t < z \leq 2t$	Not exceed 1/3k	$x \leq 1/8a$	
		⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip			

NO.	Item	Criterion	AQL																
07	Glass crack	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 7.2 Protrusion over terminal: 7.2.1 Chip on electrode pad:  <table> <tr> <td>y: Chip width</td> <td>x: Chip length</td> <td>z: Chip thickness</td> </tr> <tr> <td>$y \leq 0.5\text{mm}$</td> <td>$x \leq 1/8a$</td> <td>$0 < z \leq t$</td> </tr> </table> 7.2.2 Non-conductive portion:  <table> <tr> <td>y: Chip width</td> <td>x: Chip length</td> <td>z: Chip thickness</td> </tr> <tr> <td>$y \leq L$</td> <td>$x \leq 1/8a$</td> <td>$0 < z \leq t$</td> </tr> </table> ⊙ If there chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications. ⊙ If the product will be heat sealed by the customer, the alignment mark must not be damaged. 7.2.3 Substrate protuberance and internal crack  <table> <tr> <td>y: width</td> <td>x: length</td> </tr> <tr> <td>$y \leq 1/3L$</td> <td>$X \leq a$</td> </tr> </table>	y: Chip width	x: Chip length	z: Chip thickness	$y \leq 0.5\text{mm}$	$x \leq 1/8a$	$0 < z \leq t$	y: Chip width	x: Chip length	z: Chip thickness	$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$	y: width	x: length	$y \leq 1/3L$	$X \leq a$	1.5
y: Chip width	x: Chip length	z: Chip thickness																	
$y \leq 0.5\text{mm}$	$x \leq 1/8a$	$0 < z \leq t$																	
y: Chip width	x: Chip length	z: Chip thickness																	
$y \leq L$	$x \leq 1/8a$	$0 < z \leq t$																	
y: width	x: length																		
$y \leq 1/3L$	$X \leq a$																		

NO.	Item	Criterion	AQL
08	Cracked glass	The LCD with extensive crack is not acceptable.	1.5
09	Backlight elements	9.1 Illumination source flickers when lit. 9.2 Spots or scratches that appear when lit must be judged. Using LCD spot, lines and contamination standards. 9.3 Backlight doesn't light or color is wrong.	1.5 1.5 0.65
10	Bezel	Bezel must comply with product specifications.	1.5
11	PCB、COB	11.1 COB seal may not have pinholes larger than 0.2mm or contamination. 11.2 COB seal surface may not have pinholes through to the IC. 11.3 The height of the COB should not exceed the height indicated in the assembly diagram. 11.4 There may not be more than 2mm of sealant outside the seal area on PCB. And there should be no more than three places. 11.5 Parts on PCB must be the same as on the production characteristic chart, There should be no wrong parts, missing parts or excess parts. 11.6 The jumper on the PCB should conform to the product characteristic chart.	1.5 1.5 1.5 1.5 0.65 0.65
12	FPC	12.1 FPC terminal damage $\leq$ 1/2 FPC terminal width and can not affect the function , we judge accept. 12.2 FPC alignment hole damage $\leq$ 1/2 alignment area and can not affect the function , we judge accept.	1.5 1.5
13	Soldering	13.1 No cold solder joints, missing solder connections, oxidation or icicle. 13.2 No short circuits in components on PCB or FPC.	1.5 0.65

NO.	Item	Criterion	AQL												
14	Touch Panel Chipped glass	Symbols: x: Chip length y: Chip width z: Chip thickness k: Seal width t: Touch Panel Total thickness a: LCD side length L: Electrode pad length 14.1 General glass chip: 14.1.1 Chip on panel surface and crack between panels:  <table> <tr> <td>z: Chip thickness</td> <td>y: Chip width</td> <td>x: Chip length</td> </tr> <tr> <td>$Z \leq t$</td> <td>$\leq 1/2 k$ and not over viewing area</td> <td>$x \leq 1/8a$</td> </tr> </table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip 14.1.2 Corner crack:  <table> <tr> <td>z: Chip thickness</td> <td>y: Chip width</td> <td>x: Chip length</td> </tr> <tr> <td>$z \leq t$</td> <td>$\leq 1/2 k$ and not over viewing area</td> <td>$x \leq 1/8a$</td> </tr> </table> ⊙ Unit: mm ⊙ If there are 2 or more chips, x is the total length of each chip	z: Chip thickness	y: Chip width	x: Chip length	$Z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$	z: Chip thickness	y: Chip width	x: Chip length	$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$	1.5
z: Chip thickness	y: Chip width	x: Chip length													
$Z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$													
z: Chip thickness	y: Chip width	x: Chip length													
$z \leq t$	$\leq 1/2 k$ and not over viewing area	$x \leq 1/8a$													

NO.	Item	Criterion	AQL										
15	Touch Panel(Fish eye、dent and bubble on film)	<table><tr><th>SIZE(mm)</th><th>Acceptable Q'ty</th></tr><tr><td>$\Phi \leq 0.2$</td><td>Accept no dense</td></tr><tr><td>$0.2 < D \leq 0.4$</td><td>5</td></tr><tr><td>$0.4 < D \leq 0.5$</td><td>2</td></tr><tr><td>$0.5 < D$</td><td>0</td></tr></table> 	SIZE(mm)	Acceptable Q'ty	$\Phi \leq 0.2$	Accept no dense	$0.2 < D \leq 0.4$	5	$0.4 < D \leq 0.5$	2	$0.5 < D$	0	1.5
SIZE(mm)	Acceptable Q'ty												
$\Phi \leq 0.2$	Accept no dense												
$0.2 < D \leq 0.4$	5												
$0.4 < D \leq 0.5$	2												
$0.5 < D$	0												
16	Touch Panel Newton ring	Newton ring dimension $\leq 1/2$ touch panel area and not affect font and line distortion($\leq 2.5\%$) , it is acceptable.	1.5										
17	Touch Panel Linearity	Less than 2.5% is acceptable.	1.5										
18	LCD Ripple	Touch the touch panel , can not see the LCD ripple. Pen: R 1.0mm silicon rubber. Operation Force: 80g	1.5										
19	General appearance	19.1 Pin type must match type in specification sheet. 19.2 LCD pin loose or missing pins. 19.3 Product packaging must the same as specified on packaging specification sheet. 19.4 Product dimension and structure must conform to product specification sheet.	0.65 0.65 0.65 0.65										
20	MURA	Test with 5% ND film card, No MURA will be judged as OK,otherwise judged as NG;	1.5										

11. Handling Precaution

11.1 Handling of LCM

- Avoid external shock.
- Don't apply excessive force on the surface.
- Liquid in LCD is hazardous substance, do not lick or swallow. When the liquid is attaching to your hand, skin, cloth, etc., wash it thoroughly and immediately.
- Don't operate it above the absolute maximum rating.
- Don't disassemble the LCM.
- The operators should wear protections whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.
- The modules should be kept in antistatic bags or other containers resistant to static for storage.
- The module is coated with a film to protect the display surface, be careful when peeling off this protective film since static electricity may be generated.

11.2 Storage

- Store it in an ambient temperature of $25\pm10^{\circ}\text{C}$, and in a relative humidity of $50\pm10\%\text{RH}$. Don't expose to sunlight or fluorescent light.
- Store it in a clean environment, free from dust, active gas, and solvent.
- Store it in anti-static electricity container.
- Store it without any physical load.

11.3 Soldering

- Use only soldering irons with proper grounding and no leakage.
- Iron: no higher than $280\pm10^{\circ}\text{C}$ and less than 3 sec during hand soldering.
- Rewiring: no more than 2 times.

12. Packing Method

No.	Item	Dimensions(mm)	Quantity	Remark
1	LCM Module	59.5*83*3.85	144PCS	
2	TRAY	375*330*17 (include 8pcs products/on TRAY)	19PCS	
3	Outer box	430*380*270 (include 144pcs products/one Outer box)	1PCS	