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SPECIFICATION

VXT570GEA-03

☐ Preliminary Specification

☐ Final Specification



CUSTOMER:

Made By:

Checked By:

Approved By:

Quality:

Date:

Note:

Approved By:

Date:

Note:

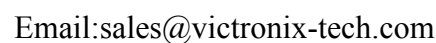
2. Revision Record

Date	Rev.No.	Page	Revision Items	Prepared
2023.05.31	V00		The first release	solon

3. General Specifications

VXT565GEA-03 is a TFT-LCD module. It is composed of a TFT-LCD panel, driver IC, FPC,a back light unit. The 5.65'' display area contains 640x480 pixels and can display up to 16.7M colors. This product accords with RoHS environmental criterion.

Item	Contents	Unit	Note
LCD Type	TFT	-	
Display color	16.7M		
Viewing Direction	ALL	O'Clock	
Operating temperature	-20~+70	℃	
Storage temperature	-30~+80	℃	
Module size	Refer to outline drawing	mm	
Active Area(W×H)	115.20X86.40	mm	
Number of Dots	640×480	dots	
Driver IC	JD9168S	-	
Power Supply Voltage	3.3	V	
Outline Dimensions	Refer to outline drawing	-	
Interface	RGB888(HV MODE)	-	



5. Absolute Maximum Ratings(Ta=25°C)

5.1 Electrical Absolute Maximum Ratings.(Vss=0V ,Ta=25°C)

Item	Symbol	Min.	Max.	Unit	Note
Power Supply Voltage	V _{DD}	-0.3	3.6	V	1, 2

Notes:

1. If the module is above these absolute maximum ratings. It may become permanently damaged. Using the module within the following electrical characteristic conditions are also exceeded, the module will malfunction and cause poor reliability.
2. V_{DD} > V_{SS} must be maintained.
3. Please be sure users are grounded when handing LCD Module.

5.2 Environmental Absolute Maximum Ratings.

Item	Storage		Operating	
	MIN.	MAX.	MIN.	MAX.
Ambient Temperature	-30°C	80°C	-20°C	70°C
Humidity	-	-	-	-

1. The response time will become lower when operated at low temperature.
2. Background color changes slightly depending on ambient temperature.
The phenomenon is reversible.
3. Ta<=40°C:85%RH MAX.

Ta>=40°C:Absolute humidity must be lower than the humidity of 85%RH at 40°C.

6. Electrical Specifications and Instruction Code

6.1 Electrical characteristics(V_{ss}=0V ,T_a=25°C)

Parameter		Symbol	Condition	Min	Typ	Max	Unit	Note
Power supply		VDD	T _a =25°C	2.5	-	3.6	V	
Input voltage	‘H’	V _{IH}	V _{DD} =3.3V	0.7V _{DD}	-	V _{DD}	V	
	‘L’	V _{IL}	V _{DD} =3.3V	0	-	0.3V _{DD}	V	

Note: If one of the above items is exceeded its maximum limitation momentarily, the quality of the product may be degraded. Absolute maximum limitation, therefore, specify the values exceeding which the product may be physically damaged. Be sure to use the product within the recommend range.

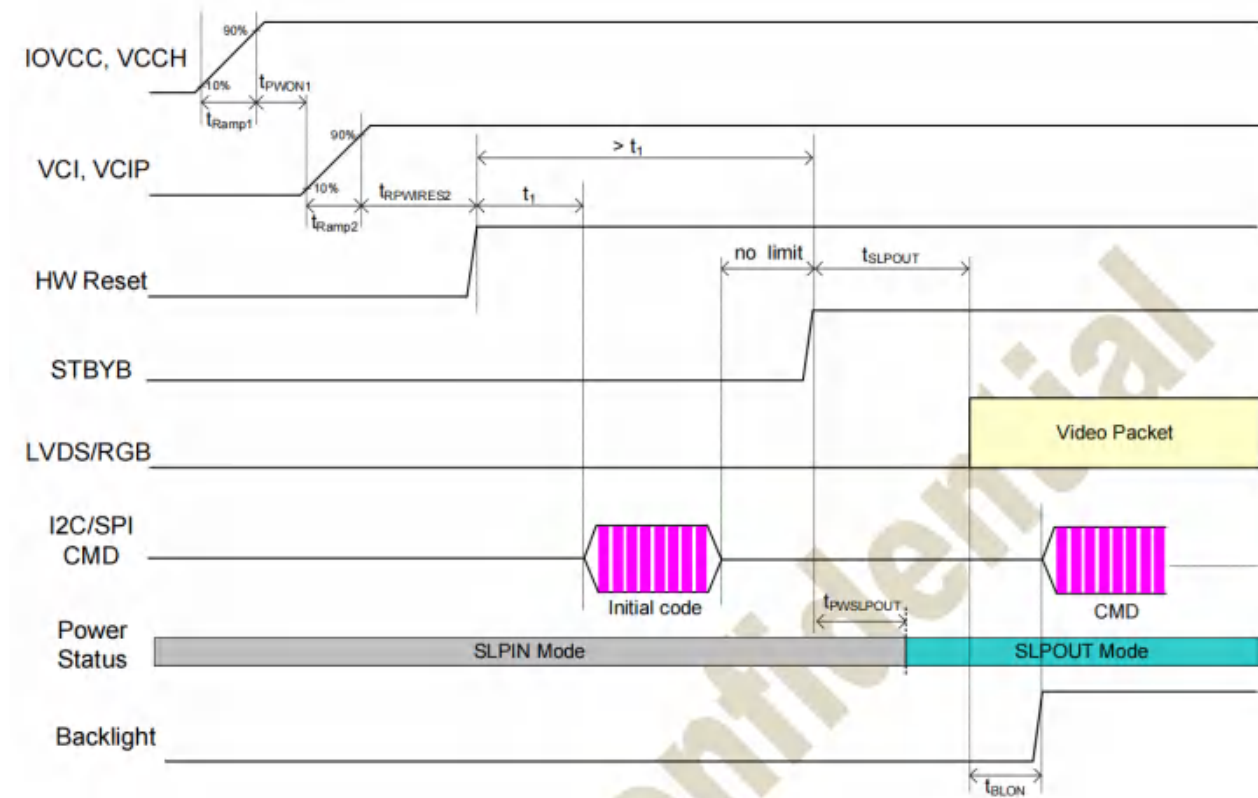
6.2 Interface signals

6.2.1 LCM PIN

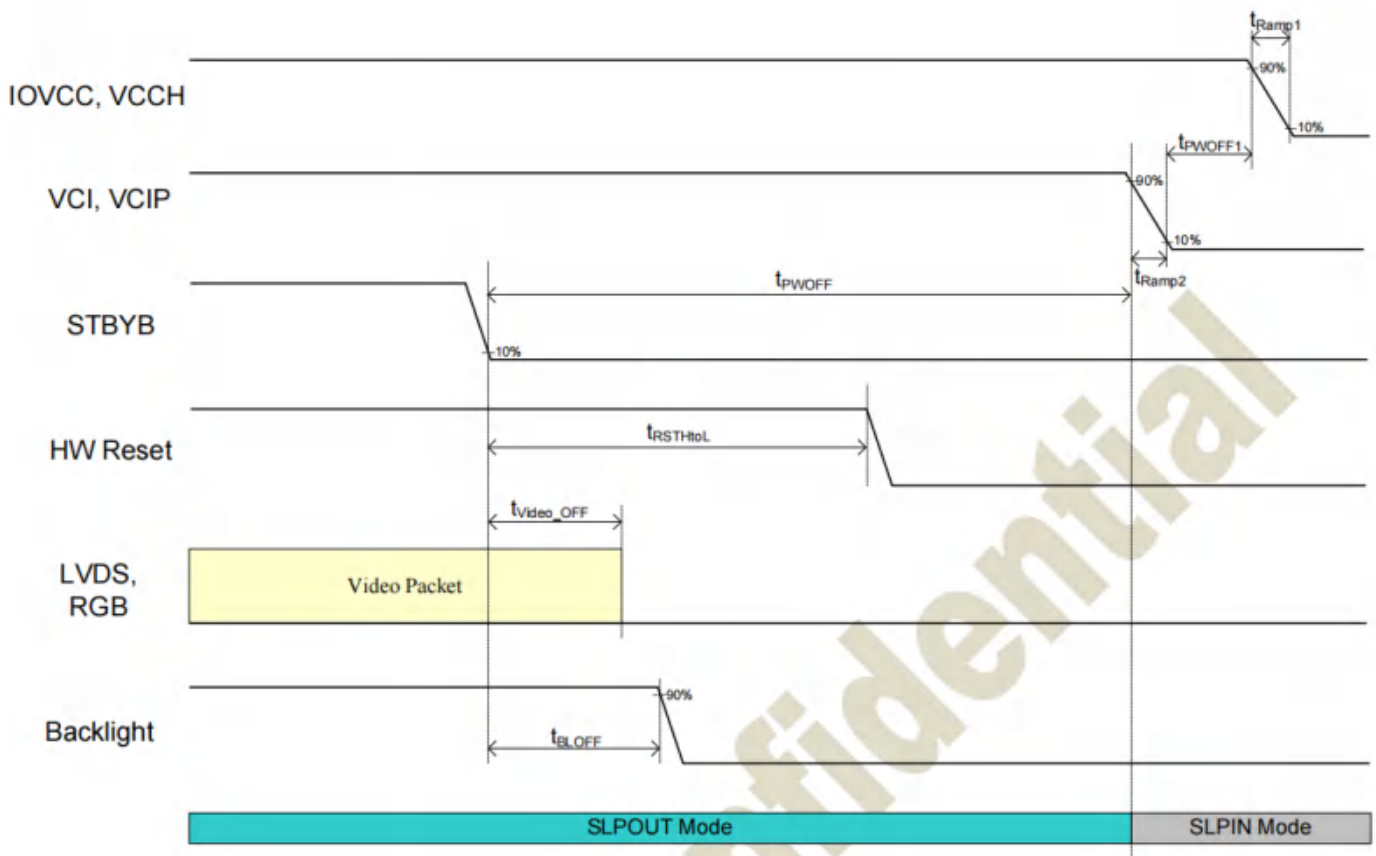
Pin No.	Symbol	I/O	Function
1-2	VLED	P	LED Power Supply Voltage.
3	ADJ	I	Brightness control for Backlight.
4-5	GLED	P	LED Ground.
6-7	VCC	P	Digital Power Supply Voltage.
8	STBYB	I	STBYB=1 Normal Mode. STBYB=0 Standby Mode
9	DE	I	Data enable pin.
10	VS	I	Frame sync signal.
11	HS	I	Line sync signal.
12	GND	P	Ground.
13-15	B5-B3	I	Blue data bus.
16	SCL	I	Serial interface clock pin
17-19	B2-B0	I	Blue data bus.
20	SDA	I	Serial in/out signal pin
21-23	G5-G3	I	Green data bus .
24	CS	I	Chip select input pin
25-27	G2-G0	I	Green data bus .
28	GND	P	Ground.
29-31	R5-R3	I	Red data bus.
32	GND	P	Ground.
33-35	R2-R0	I	Red data bus.
36	GND	P	Ground.
37	DCLK	I	Dot clock signal
38	GND	P	Ground.
39	L/R	I	Left/right scan direction on panel module.
40	U/D	I	Up/down scan direction on panel module.

6.3 Power Sequence

Power on:



Power off:



6.4 Timing Characteristics

6.4.1 Reset input timings

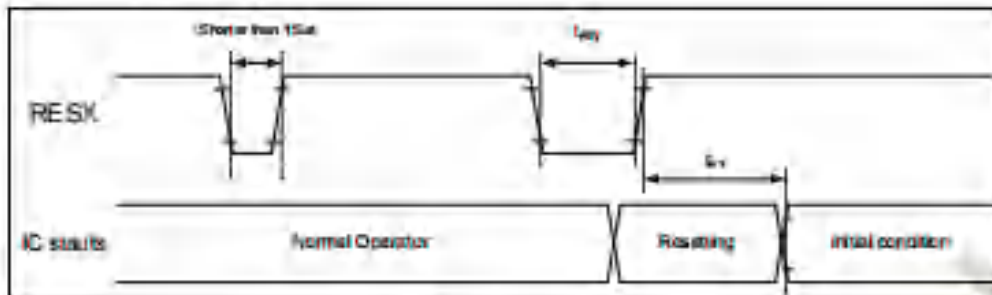


Figure 11.2: Reset input timings

Symbol	Parameter	Related pins	Min.	Max.	Unit
t_{rw}	Reset "L" pulse width ⁽¹⁾	RESX	20	—	µs
t_{rt}	Reset complete time ⁽²⁾	—	—	5 ⁽³⁾	ms
		—	—	120 ⁽⁵⁾ (7) (8)	ms

Note:

(1) The reset complete time also required time for loading ID bytes from OTP to registers. This loading is done every time when there is HW reset complete time (t_{rt}) within 5 ms after a rising edge of RESX.

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

RESX Pulse	Action
Shorter than 15 µs	Reset Rejected
Longer than 20 µs	Reset
Between 15 µs and 20 µs	Reset Start

(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 returns to Default condition for HW reset.

(4) Spike Rejection also applies during a valid reset pulse as shown below.

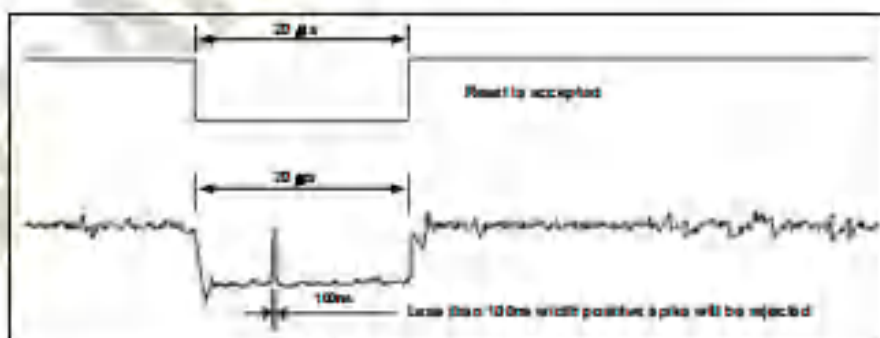


Table 11.4: Reset timings

(5) When Reset is applied during Sleep In Mode.

(6) When Reset is 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.

(8) After Sleep Out command, it is necessary to wait 120msec then send RESX.

7. Optical Characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Brightness	Bp	$\theta=0^\circ$	-	350	-	Cd/m ²	1
Uniformity	ΔBp	$\Phi=0^\circ$	75	-	-	%	1,2
Viewing Angle	3:00	$Cr \geq 10$	75	80	-	Deg	3
	6:00		75	80	-		
	9:00		75	80	-		
	12:00		75	80	-		
Contrast Ratio	Cr	$\theta=0^\circ$ $\Phi=0^\circ$	1000	1200	-	-	4
Response Time	T _r		-	10	10	ms	5
	T _f		-	20	25	ms	
Color of CIE Coordinate	W	x	Typ-0 .05	0.312	Typ+0. 05	-	1,6
		y		0.347		-	
	R	x		-		-	
		y		-		-	
	G	x		-		-	
		y		-		-	
	B	x		-		-	
		y		-		-	
NTSC Ratio	S		55	60	-	%	

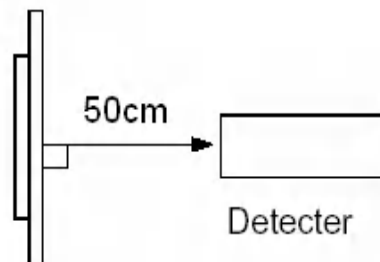
Note: The parameter is slightly changed by temperature, driving voltage and materiel

Note 1: The data are measured after LEDs are turned on for 5 minutes. LCM displays full white. The brightness is the average value of 9 measured spots. Measurement equipment BM-7 (Φ5mm)

Measuring condition:

- Measuring surroundings: Dark room.
- Measuring temperature: Ta=25°C.
- Adjust operating voltage to get optimum contrast at the center of the display.

Measured value at the center point of LCD panel after more than 5 minutes while backlight turning on.

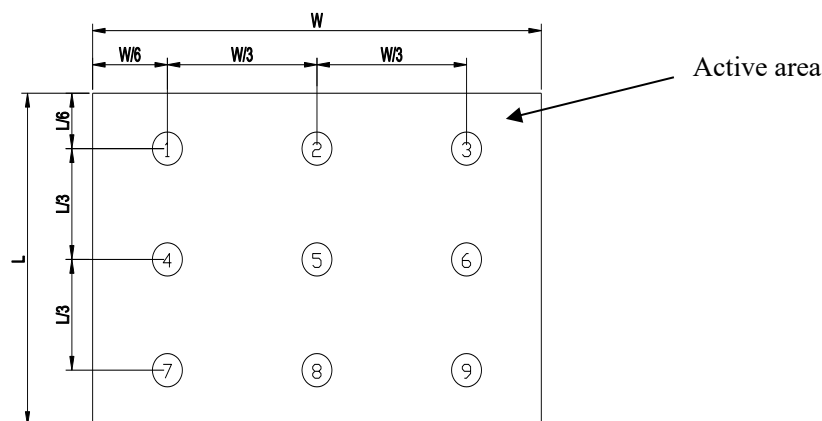


Note 2: The luminance uniformity is calculated by using following formula.

$$\Delta Bp = Bp (\text{Min.}) / Bp (\text{Max.}) \times 100 (\%)$$

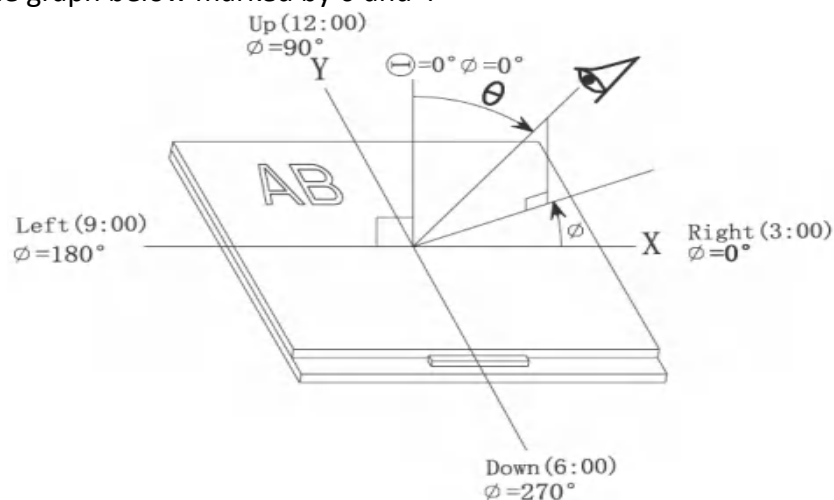
Bp (Max.) = Maximum brightness in 9 measured spots

Bp (Min.) = Minimum brightness in 9 measured spots.

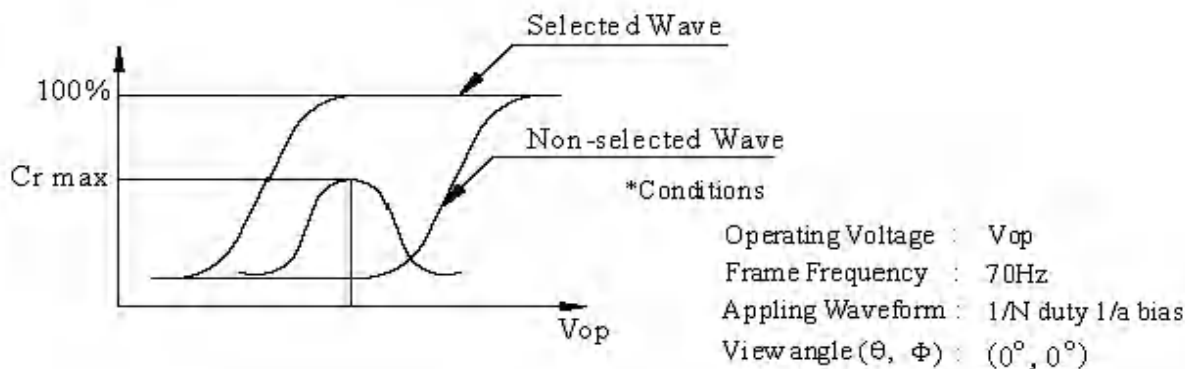


Note 3: The definition of viewing angle:

Refer to the graph below marked by θ and ϕ



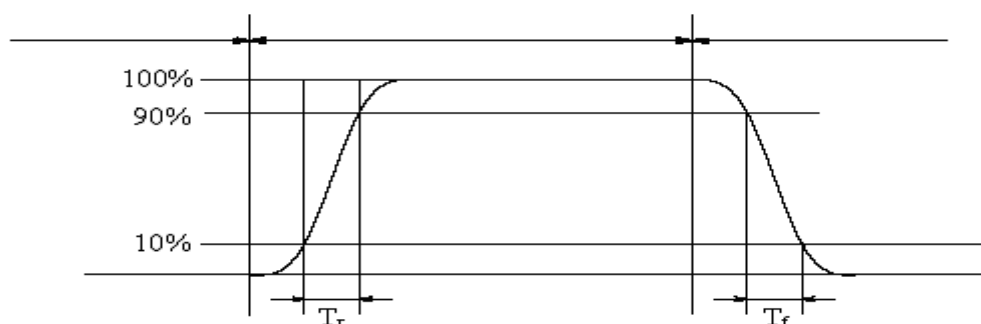
Note 4: Definition of contrast ratio.(Test LCD using DMS501)



$$\text{Contrast ratio}(Cr) = \frac{\text{Brightness of selected dots}}{\text{Brightness of non-selected dots}}$$

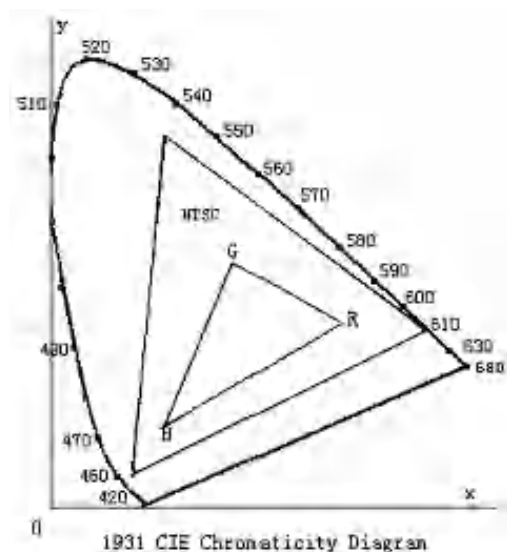
Note 5: Definition of Response time. (Test LCD using DMS501):

The output signals of photo detector are measured when the input signals are changed from “black” to “white”(falling time) and from “white” to “black”(rising time), respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



The definition of response time

Note 6: Definition of Color of CIE Coordinate and NTSC Ratio.

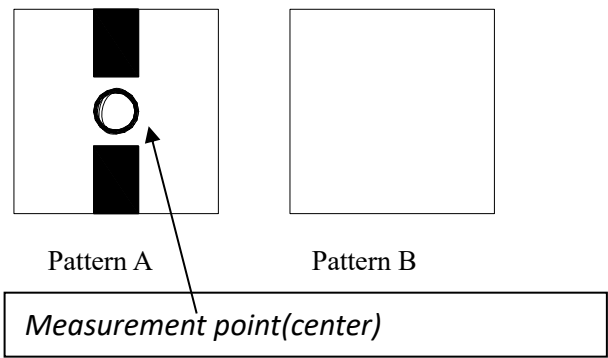


Color gamut:

$$S = \frac{\text{area of RGB triangle}}{\text{area of NTSC triangle}} \times 100\%$$

Note 7: Definition of cross talk.

Cross talk ratio(%)=|pattern A Brightness-pattern B Brightness|/pattern A Brightness*100



Electric volume value=3F+/-3Hex

8. Reliability Test Items and Criteria

No	Test Item	Test condition	Criterion
1	High Temperature Storage	80°C±2°C 96H Restore 2H at 25°C Power off	1. After testing, cosmetic and electrical defects should not happen. 2. Total current consumption should not be more than twice of initial value.
2	Low Temperature Storage	-30°C±2°C 96H Restore 2H at 25°C Power off	
3	High Temperature Operation	70°C±2°C 96H Restore 2H at 25°C Power on	
4	Low Temperature Operation	-20°C±2°C 96H Restore 4H at 25°C Power on	
5	High Temperature/Humidity Operation	60°C±2°C 90%RH 96H Power on	
6	Temperature Cycle	-30°C → 80°C 30min 5min 30min after 5 cycle, Restore 2H at 25°C Power off	

Note: Operation: Supply 3.3V for logic system.

The inspection terms after reliability test, as below

ITEM	Inspection
Contrast	CR>50%
IDD	IDD<200%
Brightness	Brightness>60%
Color Tone	Color Tone+/-0,05

9. Precautions for Use of LCD Modules

9.1 Handling Precautions

9.1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

9.1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

9.1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

9.1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

9.1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

— Isopropyl alcohol — Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

— Water — Ketone — Aromatic solvents

9.1.6 Do not attempt to disassemble the LCD Module.

9.1.7 If the logic circuit power is off, do not apply the input signals.

9.1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

a. Be sure to ground the body when handling the LCD Modules.

b. Tools required for assembly, such as soldering irons, must be properly ground.

c. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

d. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

9.2 Storage precautions

9.2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

9.2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : $0^{\circ}\text{C} \sim 40^{\circ}\text{C}$

Relatively humidity: $\leq 80\%$

9.2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

9.3 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

END