
BOE LCD Module Specification

Module P/N: S078FN-C00

Version: 1.0

Description : 7.82inch TFT 1080*1920 Pixels
120HZ/Wide temperature range

1. Features 产品概要

This module is a color active matrix TFT-LCD (Thin Film Transistor Liquid Crystal Display) module that uses amorphous silicon TFT as a switching device. This module is composed of LCD panel, driver IC, LED backlight and Cover glass.

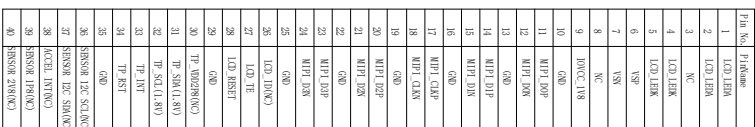
2. General Specifications 主要规格

No. 序号	Item 项目	Specification 规格
1	LCD size 模组尺寸	7.82 inch
2	Resolution 分辨率	1080X1920 (RGB)
3	Display mode 显示模式	Normally Black
4	Pixel pitch 像素尺寸	0.03 (H) X0.09 (V) mm
5	Active area 显示区	97.2 (H) X172.8 (V) mm
6	Module size for TPM 模组尺寸	115.8 (H) X195.8 (V) X3.55 (D) mm
7	Pixel arrangement 像素排列	RGB Vertical stripe
8	Interface 接口	MIPI & IIC
9	Color depth 色彩深度	16.7M
10	Luminance for LCM 模组亮度	400 cd/m ² (typ.)
11	Construction 结构	INCELL
12	Cover Glass 玻璃盖板	0.7mm
13	Surface Hardness 表面硬度	≥6H
14	Transmittance 透过率	≥85%

3

背面图

REV.	DRG DATE	DESCRIPTION	DRAWN BY
1.0	20251025	更新盖板和背胶	MANSHUAL
2.0	20251108	更新盖板和背胶	MANSHUAL



DRG DATE	20250928	TITLE	鼓式OUTLINE
CHECK	WANGSHUAI	MODEL	
CHECK		DWG No.	
APPROVE		PAGE	1 OF 1
		REV.	
		UNIT	mm
		SIZE	A4
			 (3)

4. LCM Description LCM 描述

4.1 Interface Definition 接口定义

Item	Terminal	Functions
1-2	LEDA	B/L Power input PIN anode
3	NC	NC
4-5	LEDK	B/L Power input PIN negative
6	VSP	Power supply +5.5V
7	VSN	Power supply -5.5V
8	NC	NC
9	IOVCC	Interface power supply: 1.8V
10	GND	Ground
11	D0P	Differential data pairs for MIPI interface(+).
12	D0N	Differential data pairs for MIPI interface(-).
13	GND	Ground
14	D1P	Differential data pairs for MIPI interface(+).
15	D1N	Differential data pairs for MIPI interface(-).
16	GND	Ground
17	CLKP	Differential clock or strobe pair for MIPI interfaces(+).
18	CLKN	Differential clock or strobe pair for MIPI interfaces(-).
19	GND	Ground
20	D2P	Differential data pairs for MIPI interface(+).
21	D2N	Differential data pairs for MIPI interface(-).
22	GND	Ground
23	D3P	Differential data pairs for MIPI interface(+).
24	D3N	Differential data pairs for MIPI interface(-).
25	GND	Ground
26	LCD_ID	NC
27	LCD_TE	Tearing effect output pin to synchronize MCU to frame writing, activated by S/W command
28	LCD_RESET	LCD Reset pin
29	GND	Ground
30	TP-VDD	NC
31	TP_SDA(1.8V)	TP PIN
32	TP_SCL(1.8V)	TP PIN
33	TP_INT	TP PIN
34	TP_RESET	TP PIN
35	GND	Ground
36	SENSOR_I2C_SCL	NC
37	SENSOR_I2C_SDA	NC
38	ACCEL_INT	NC
39	SENSOR_1P8	NC
40	SENSOR_2P8	NC

4.3 Absolute Max. Rating 极限值

Item 项目	Symbol 符号	Values			Unit 单位
		Min. 最小	Typ. 典型	Max. 最大	
Supply power voltage 接口电压	IOVCC	-0.3	-	1.95	V
	VDD	-0.3	-	1.35	V
	AVDD	-0.3	-	6.5	V
	AVEE	-0.3	-	-6.5	V
	VGH-VGL	-0.3	-	32	V
Operation Temperature 操作温度	T _{OP}	-30	-	80	°C
Storage Temperature 储存温度	T _{ST}	-30	-	80	°C

Note: The absolute maximum rating values of this product not allowed to be exceeded at any times. Should be module be used with any of absolute maximum ratings exceeded. The characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

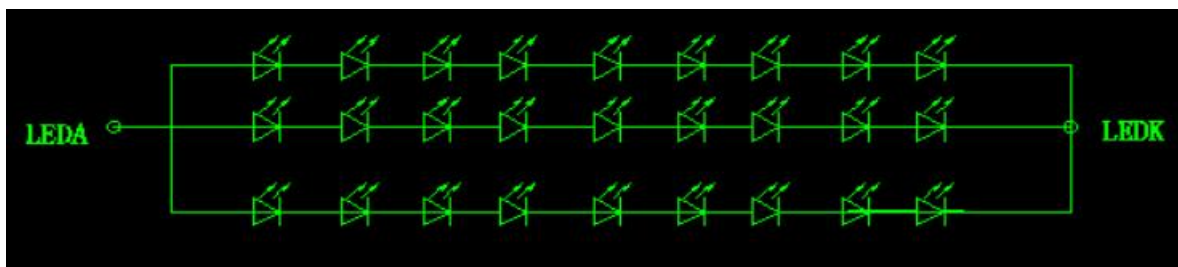
4.4 Typical Operation Conditions 典型操作条件

Item 项目	Symbol 符号	Values			Unit 单位	Remark 备注
		Min. 最小	Typ. 典型	Max. 最大		
Supply power voltage 接口电压	IOVCC	1.65	1.8	1.95	V	
	VSP	4.5	5.5	6.5	V	
	VSN	-6.5	-5.5	-4.5	V	

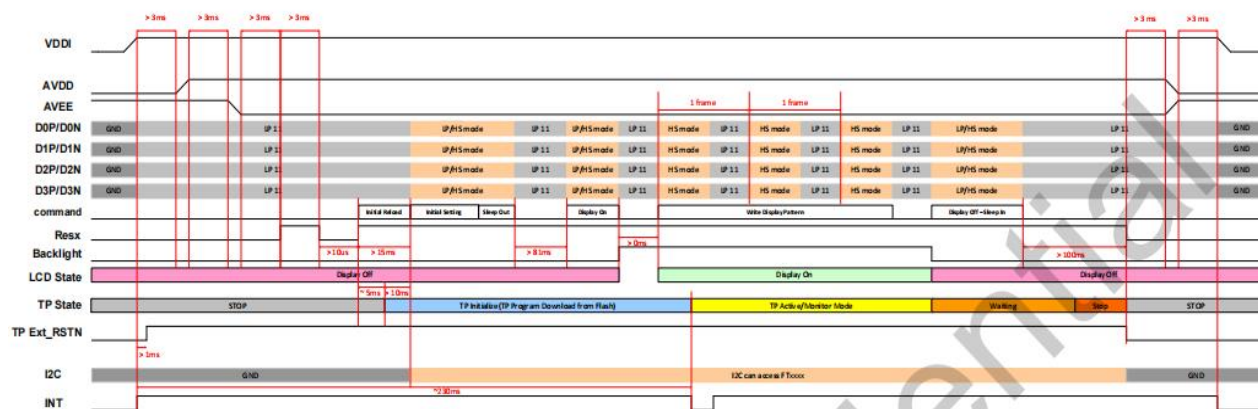
4.5 LED Backlight Specification LED 背光规范

Item 项目	Symbol 符号	Condition 条件	Min 最小	Typ 典型	Max 最大	Unit 单位
Forward Voltage 正向电压	Vf	1f=60mA	25.5	—	28.8	V
Uniformity (with L/G) 均匀性	ΔBp	1f=60mA	80	—	—	%
Power Consumption 功耗	PLED	1f=60mA	—	—	1.8	W
Life Time 寿命	—	T=25℃, RH=50%±10 1f=20mA/LED	10000	20000	—	H

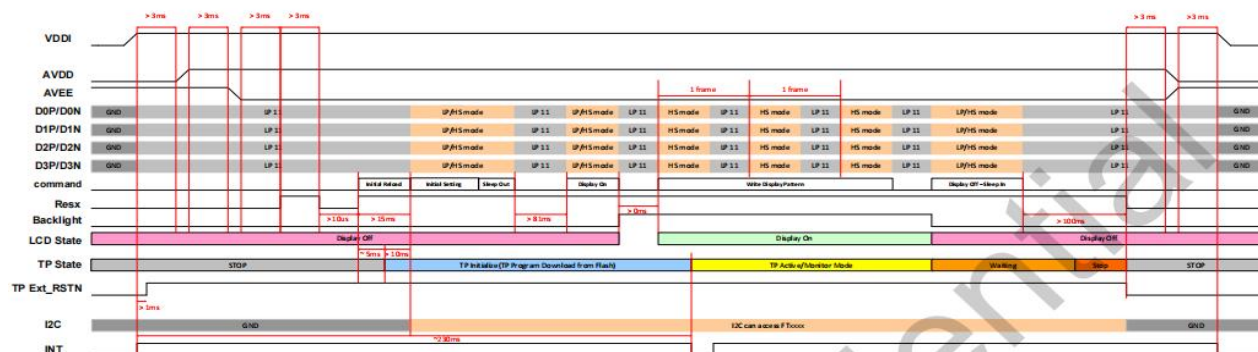
LED circuit:9S3P



4.6 Power On Sequence 上电时序



4.6 Power Off Sequence 下电时序



4.7 TTL DC Characteristics TTL DC特性

(AVDD = 4.5V~6.5V, AVEE = -4.5V~-6.5V, VDDI = 1.65V~1.95V, VDD_EXT = 1.2V~1.35V, Ta = -30°C ~ 85°C)

Parameter	Symbol	Conditions	Specification			Unit	Notes
			MIN	TYP	MAX		
Power & Operation Voltage							
Analog Operating voltage	AVDD	Operating Voltage	4.5	5.5	6.5	V	
Analog Operating voltage	AVEE	Operating Voltage	-6.5	-5.5	-4.5	V	
Logic Operating voltage	VDDI	I/O supply voltage	1.65	1.8	1.95	V	
Digital Operating voltage (4 power mode)	VDD_EXT	External Digital voltage	-	1.3	1.35	V	
Input / Output							
Logic High level input voltage	VIH	-	0.7VDDI	-	VDDI	V	
Logic Low level input voltage	VIL	-	VSS	-	0.3VDDI	V	
Logic High level output voltage	VOH	IOH = -1.0mA	0.8VDDI	-	VDDI	V	
Logic Low level output voltage	VOL	IOL = +1.0mA	VSS	-	0.2VDDI	V	
Logic High level input current	IIH	Vin = VDDI	-	-	1	uA	
Logic Low level input current	IIL	Vin = VDDI	-1	-	-	uA	
VCOM Operation							
VCOMDC output voltage	VCOM	AVDD=AVEE=+/-5V	-3.85	-	0.3	V	
Source Driver							
Gamma positive reference voltage	VGMP	VGMP<AVDD+0.2V	3.75	-	6.3	V	
Gamma negative reference voltage	VGMN	VGMN>AVEE+0.2V	-6.3	-	-3.75	V	
Source output voltage	VSD	-	VGMN	-	VGMP	-	
Output deviation voltage (Source positive output channel)	V _{dev}	Sout >= +4.2V, Sout <= +0.8V	-	-	20	mV	
		+4.2V>Sout>+0.8V	-	-	10	mV	
Output deviation voltage (Source negative output channel)	V _{dev}	Sout <= -4.2V, Sout >= -0.8V	-	-	20	mV	
		-4.2V<Sout<-0.8V	-	-	10	mV	
Output offset voltage	V _{offset}	-	-	-	100	mv	
Reference Voltage							
Internal reference voltage	VREF_TP	-	3	3.5	4.4	V	
Internal reference voltage	VDD5	-	1	2	3	V	
Booster operation							
Pump output voltage	VGH	Range=(AVDD-AVEE) ~(2AVDD-2AVEE)	6.0	-	22.2	V	
Pump output voltage	VGL	Range=(AVEE-AVDD) ~(2AVEE-AVDD)	-18.0	-	-5.3	V	
Regulator output voltage	VCL	-	-5	-4.5	-3.5	V	

7.2.4 SPI DC characteristics

DC characteristics for SPI

Parameter	Symbol	Conditions	Specification			Unit
			MIN	TYP	MAX	
Input terminal : CS, SCL, MOSI						
Input High Voltage	VIH	-	0.9*VDDI	-	-	V
Input Low Voltage	VIL	-	-	-	0.1*VDDI	V
Input Capacitance	Cin	-	-	10	-	pF
Output terminal : MISO						
Output High Voltage	VOH		-	0.9*VDDI*	-	V
Output Low Voltage	VOL		-	0.1*VDDI*	-	V

*VDDI=1.8V

5. Optical Specifications 光学参数

Item 项目	Symbol 符号		Condition 条件	Min 最小值	Typ 典型值	Max 最大值	Unit 单位	Remark 注释
Contrast ratio 对比度	CR		$\theta =0^{\circ}$ $\psi =0^{\circ}$ $I_f=20mA$ /LED	800	1200	—	—	Note 1
Luminance for LCM 模组亮度	Lv			350	400	—	cd/m ²	Note 2
Luminance uniformity 亮度均匀性	δ (WHITE)			80	—	—	%	Note 3
Response time 响应时间	Tr+Tf			—	30	40	ms	Note 4
Viewing angle range 视角范围	θ (CR ≥ 10)		6o’ clock	—	80	—	degree	Note 5
			12o’ clock	—	80	—		
			3o’ clock	—	80	—		
			9o’ clock	—	80	—		
Color chromaticity 色坐标	White	x	$\theta =0^0$ $\psi =0^0$ Ta=25℃		0.29		—	Note6
		y			0.32			
	Red	x		(0.625)	(0.645)	(0.665)		
		y		(0.299)	(0.319)	(0.339)		
	Green	x		(0.229)	(0.249)	(0.269)		
		y		(0.537)	(0.557)	(0.577)		
	Blue	x		(0.119)	(0.139)	(0.159)		
		y		(0.100)	(0.120)	(0.140)		
NTSC Ratio 色域	S		—	55	60	—	%	Note7

Note1. Contrast Ratio(CR) is defined mathematically by the following formula. For more information see FIG2.:

$$\text{Contrast Ratio(CR)} = \frac{\text{Average Surface Luminance with all white pixels (P1, P2, \dots)}}{\text{Average Surface Luminance with all black pixels (P1, P2, \dots)}}$$

备注 1. 对比度是由以下公式计算所得。详见 FIG 2.。

对比度= 显示白色画面时平均表面亮度(P 1,P2,……)/显示黑色画面时平均表面亮度(P1,P2,……)

Note2. Surface luminance is the LCD surface luminance with all white pixels. For more information see FIG 2.

L_v = Average Surface Luminance with all white pixels (P1, P2,)

备注 2. 表面亮度是在显示白色画面时, 测试的亮度值, 详见 FIG 2.。

L_v =平均的表面亮度(P1, P2,)

Note3. The uniformity in surface luminance (WHITE) is determined by measuring luminance at each test position, and then dividing the maximum luminance of all white pixels by minimum luminance of all white pixels. For more information see FIG 2.

$$\delta \text{ (WHITE)} = \frac{\text{Minimum Surface Luminance with all white pixels (P1, P2,)}}{\text{Maximum Surface Luminance with all white pixels (P1, P2,)}}$$

备注 3. 均匀度是在显示白色画面时,测试P1到P9的亮度,然后再用9个点亮度的最小值除以最大值。详见FIG2.。
均匀度 =白色画面下表面亮度最小值(P1, P2,)/白色画面下表面高度最大值(P1, P2,)

Note4. Response time is the time required for the display to transition from White to black(Rise Time, T_r) and from black to white(Decay Time, T_f). For additional information see FIG 1..

备注 4. 响应时间是 T_r (上升时间)与 T_f (下降时间)的和; T_r 指显示白色画面转为显示黑色画面需要时间, T_f 指显示黑色画面转为显示白色画面需要时间。详见 FIG 1.。

Note5. Viewing angle is the angle at which the contrast ratio is greater than a specific value. For TFT module, the specific value of contrast ratio is 10; For monochrome and color stn module, the specific value of contrast ratio is 2.The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface. For more information see FIG 3.

备注 5. 视角指对比度大于等于一个特定值时的可视范围, 对 TFT 屏, 对比度特定值为 10, 对黑白屏, CSTN 屏, 对比度特定值为 2。视角由横轴 (x 轴), 竖轴 (y 轴) 同 Z 轴 (垂直于 LCD 表面) 之间的夹角来定义。详见 FIG3.。

Note6. CIE(x, y) chromaticity is the Center point value. For more information see FIG 2.

备注 6. 选择中心点 分别测试 x,y 值。详见 FIG 2.。

Note7. For viewing angle and response time testing, the testing data is base on Autronic-Melchers' s ConoScope. Series Instruments. For contrast ratio, Surface Luminance, Luminance uniformity and CIE, the testing data is base on CA-210 photo detector.

备注 7. 视角和响应时间, 测试数据基于 Autronic-Melchers' s ConoScope. 系列。而对比度, 表面亮度, 均匀度, CIE 坐标,测试数据基于 CA-210 photo detector。

FIG. 1.The definition of Response Time

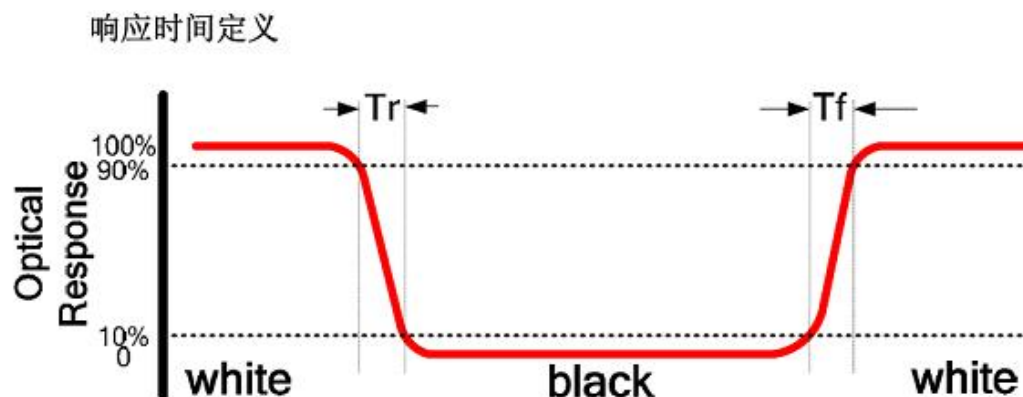
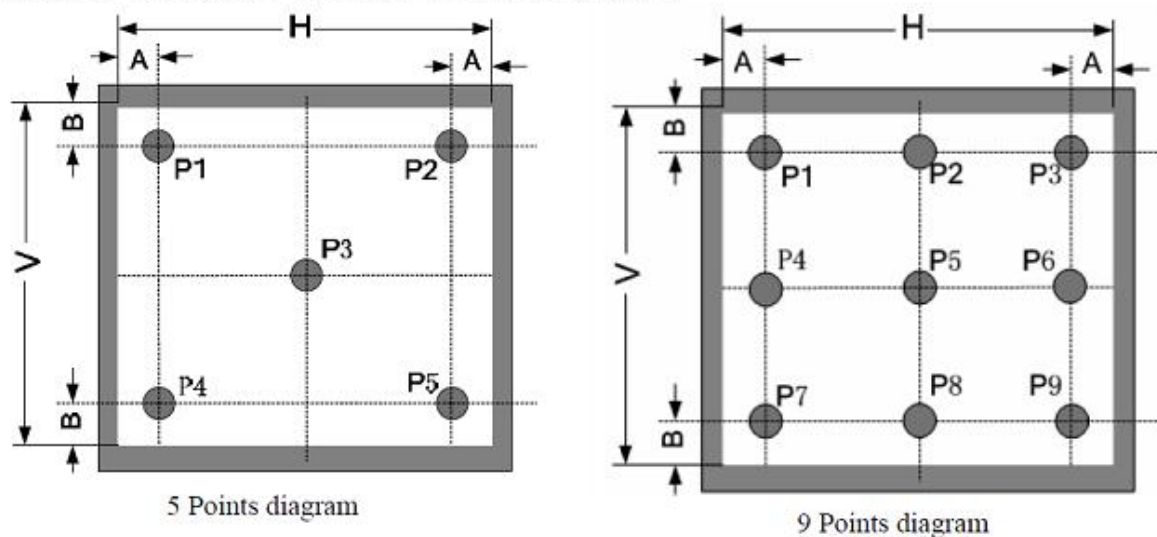


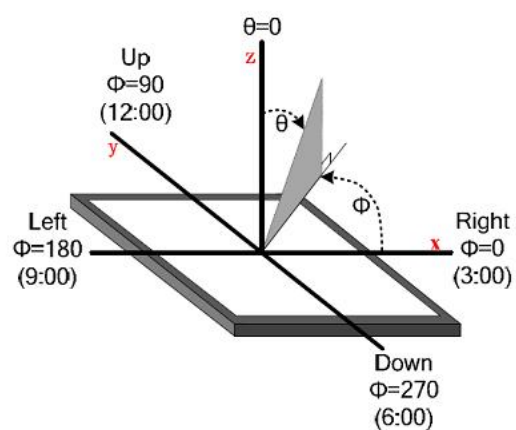
FIG. 2.Measuring method for Contrast ratio,surface luminance, Luminance uniformity, CIE (x, y) chromaticity

对比度，表面亮度，均匀度，CIE坐标测试方法



Measurement instrument: CA-210;
测量仪器: CA - 210

FIG. 3. The definition of viewing angle
视角定义



6. Reliability Test 可靠性测试

No. 序号	Item 项目	Test Conditions 测试条件	Remark 备注
1	High Temperature Storage 高温存放	T _a = 80℃, 96hrs	Inspection after 2~4hours Storage at room temperature, the sample shall be free from defects: 试验结束后, 已测试的 LCD 样品必须在室内正常温湿 度环境下放置 2~4 个小时以上 才能进行功能和外观检查, 样品 不允许有以下缺陷: 1.Air bubble in the LCD; 模块中有气泡; 2.Sealleak; 封口松脱; 3.Non-display; 不显示; 4.missing segments; 漏笔 5.Glass crack; 玻璃破碎; 6.Current Idd is twice higher than initial value. 电 流 Idd 大于初时值的 2 倍
2	Low Temperature Storage 低温存放	T _a = -30℃, 96hrs	
3	High Temperature Operation 高温操作	T _s =80℃, 96hrs	
4	Low Temperature Operation 低温操作	T _a = -30℃, 96hrs	
5	High Temperature and Humidity(No condensation) 高温高湿存放	T _a = 60℃, 90%RH max. 96hrs	
7	Vibration Test 振荡试验	Frequency: 10Hz~55Hz~10Hz Amplitude: 1.5mm, X, Y, Z direction for total 3hours (Packing condition)	
8	Dropping test 跌落试验	Drop to the ground from 50cm height, one time, every side of carton. (Packing condition)	
Remark: 注意: 1.The test samples should be applied to only one test item. 每个被测试的模块只能用于其中的一个测试项目。 2.Sample size for each test item is 5~10pcs. 每个测试项目的样品数量为 5~10 片。 3.For Damp Proof Test, Pure water(Resistance>10MΩ) should be used. 对于防潮试验, 试验箱的用水必须是电阻大于 10M 欧姆的纯水。 4. In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part. 如果由静电引起产品故障, 当放置一段时间后能够恢复正常, 则不视为产品缺陷。 5.EL evaluation should be excepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has. 带 EL 片的可靠性测试在高温高湿条件下, 荧光粉会发生自然化学反应而产生黑点或瑕疵, 因此不在高温高湿条件测试范围内。 6.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic. 故障判断标准:基本规格, 电气特性, 机械特性, 光电特性。			

7. Handling Precautions 注意事项

Handling Precautions

- (1) The display panel is made of glass and polarizer. As glass is fragile, it tends to become or chipped during handling especially on the edges. Please avoid dropping or jarring. Do not subject it to a mechanical shock by dropping it or impact.
- (2) If the display panel is damaged and the liquid crystal substance leaks out, be sure not to get any in your mouth. If the substance contacts your skin or clothes, wash it off using soap and water.
- (3) Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary. Do not touch the display with bare hands. This will stain the display area and degraded insulation between terminals (some cosmetics are determined to the polarizer).
- (4) The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully. Do not touch, push or rub the exposed polarizers with anything harder than an HB pencil lead (glass, tweezers, etc.). Do not put or attach anything on the display area to avoid leaving marks on. Condensation on the surface and contact with terminals due to cold will damage, stain or dirty the polarizer. After products are tested at low temperature they must be warmed up in a container before coming is contacting with room temperature air.

(5) If the display surface becomes contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If it is heavily contaminated, moisten cloth with one of the following solvents

- Isopropyl alcohol
- Ethyl alcohol

Do not scrub hard to avoid damaging the display surface.

(6) Solvents other than those above-mentioned may damage the polarizer. Especially, do not use the following.

- Water
- Ketone
- Aromatic solvents

Wipe off saliva or water drops immediately, contact with water over a long period of time may cause deformation or color fading. Avoid contacting oil and fats.

(7) Exercise care to minimize corrosion of the electrode. Corrosion of the electrodes is accelerated by water droplets, moisture condensation or a current flow in a high-humidity environment.

(8) Install the LCD Module by using the mounting holes. When mounting the LCD module make sure it is free of twisting, warping and distortion. In particular, do not forcibly pull or bend the I/O cable or the backlight cable.

(9) Do not attempt to disassemble or process the LCD module.

(10) NC terminal should be open. Do not connect anything.

(11) If the logic circuit power is off, do not apply the input signals.

(12) Since LCM has been assembled and adjusted with a high degree of precision, avoid applying excessive shocks to the module or making any alterations or modifications to it.

- Do not alter, modify or change the shape of the tab on the metal frame.
- Do not make extra holes on the printed circuit board, modify its shape or change the positions of components to be attached.
- Do not damage or modify the pattern writing on the printed circuit board.
- Absolutely do not modify the zebra rubber strip (conductive rubber) or heat seal connector.
- Except for soldering the interface, do not make any alterations or modifications with a soldering iron.
- Do not drop, bend or twist LCM.

Storage Precautions

When storing the LCD modules, the following precaution is necessary.

(1) Store them in a sealed polyethylene bag. If properly sealed, there is no need for the dessicant.

(2) Store them in a dark place. Do not expose to sunlight or fluorescent light, keep the temperature between 0° C and 35° C.

(3) The polarizer surface should not come in contact with any other objects. (We advise you to store them in the container in which they were shipped).

Others

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles (black or white). Air bubbles may also be generated if the module is subject to a low temperature.

If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

- Exposed area of the printed circuit board.
- Terminal electrode sections.