

# OCM240128 图形点阵液晶显示模块 使用说明书

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**上海思先电子有限公司**

**Shanghai Sixian Electronics Co; Ltd.**

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## 1 Display Specification

### 1.1 Display type: STN

### 1.2 Display color

Display color: Blue-Black

Background color: Yellow-Green

### 1.3 Polarizer mode: Positive

Reflective

### 1.4 Viewing Angle: 6:00

### 1.5 Driving Duty: 1/128

### 1.6 Backlight: LED Or CCFL

- Color tone is slightly changed by temperature and driving voltage。

## 2 Mechanical Specifications

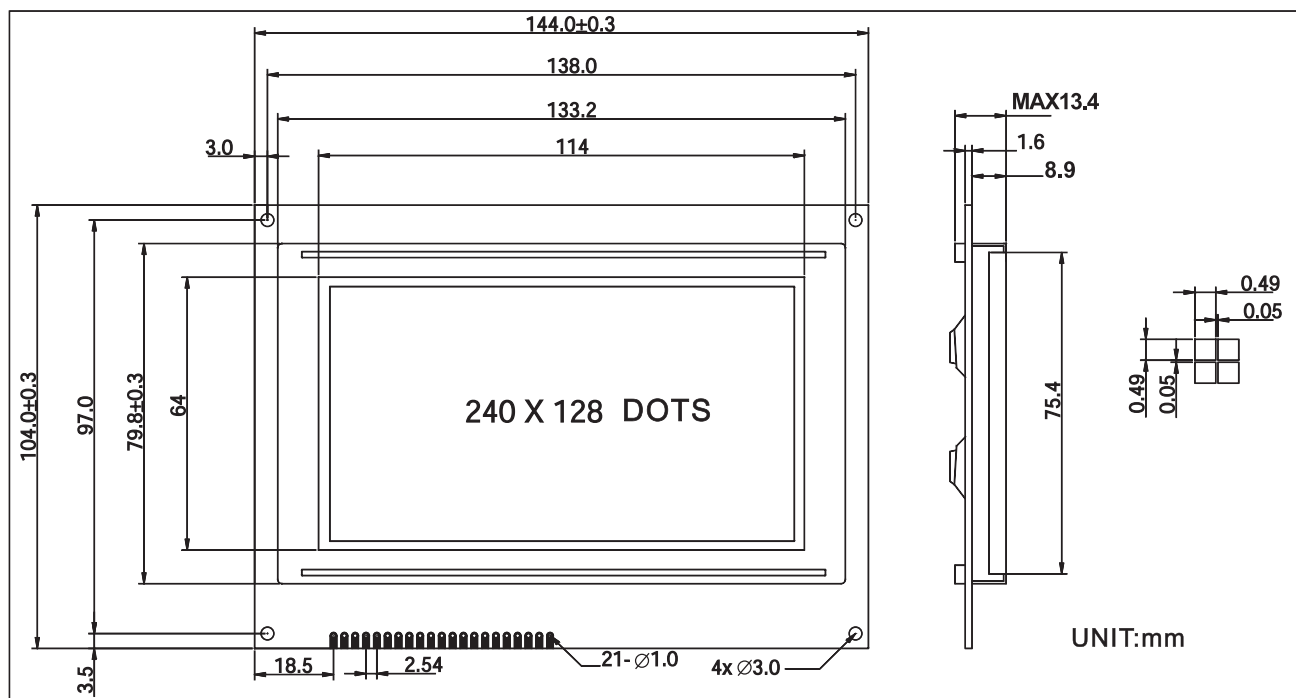
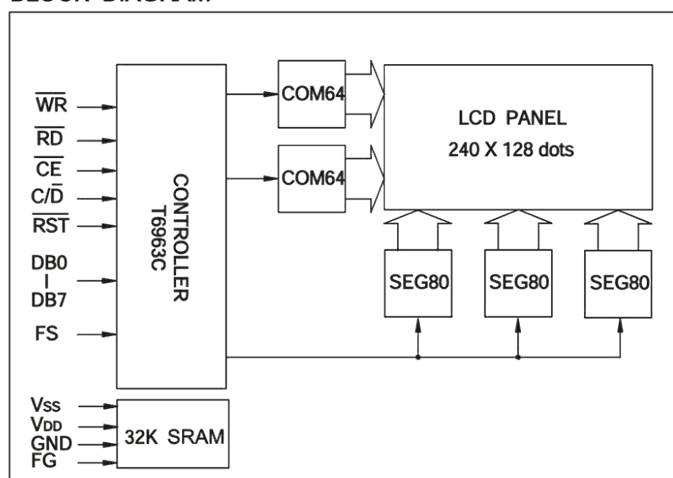


图 1: OCM240128-1/-2 模块尺寸图

## BLOCK DIAGRAM



## 4 Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Remark
<b>Power Supply Voltage</b>	VDD-VSS	0	7.0	V	
<b>LCD Driving Voltage</b>	VDD-VEE	---	18.0		
<b>Operating Temperature Range</b>	Top	-20	70	°C	NO Condensation
<b>Storage Temperature Range</b>	Tst	-30	80		

## 5 Electrical Specifications and Instruction Code

### 5.1 Electrical Characteristics

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Supply Voltage(logic)	VDD-VSS	4.5	5.0	5.5	V	
Supply Voltage(LCD Drive)	VSS-VEE	---	6.0	---	V	
Input Signal Voltage	“H” Level	VZH	VDD-2.2	---	VDD	V
	“L” Level	VIL	0	---	0.8	V
Supply current(logic)	IDD	---	24	---	mA	
Supply current (LCD Drive)	IEE	---	2.0	---	mA	

### 5.2 Interface Signals

OCM240128\_1:

Pin NO.	Symbol	Description(Function)	Remark
1	FG	Module Frame Ground	
2	VSS	Ground(0V)	
3	VDD	Supply voltage for logic (+5V)	
4	V0	Operating voltage for LCD	variable
5	/WR	Data Write into T6963C	
6	/RD	Data Read from T6963C	

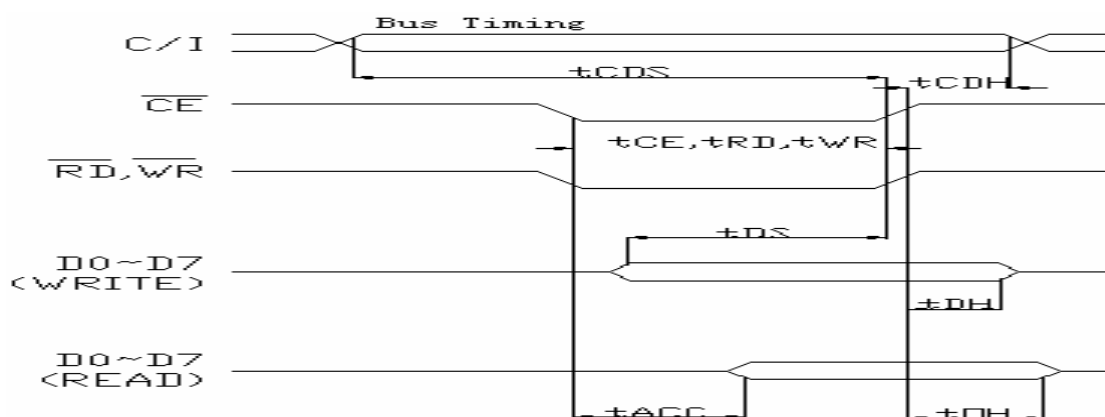
7	/CE	Chip enable Signal	
8	C/D	Command/Data Selection	
9	/Reset	Reset signal	
10	DB0	Data bit 0	
11	DB1	Data bit 1	
12	DB2	Data bit 2	
13	DB3	Data bit 3	
14	DB4	Data bit 4	
15	DB5	Data bit 5	
16	DB6	Data bit 6	
17	DB7	Data bit 7	
18	FS	Font Selection	
19	VEE	Negative voltage for LCD driving	
20	LED+	Power supply for LED(+5V)	
21	LED-	Power supply for LED(0V)	

## OCM240128\_2:

Pin NO.	Symbol	Description(Function)	Remark
1	FG	Module Frame Ground	
2	VSS	Ground	
3	VDD	Supply voltage for logic and LCD(+5V)	
4	V0	Operating voltage for LCD	variable
5	/WR	Data Write into T6963C	
6	/RD	Data Read from T6963C	
7	/CE	Chip enable Signal	
8	C/D	Command/Data Selection	
9	/Reset	Reset signal	
10	DB0	Data bit 0	
11	DB1	Data bit 1	
12	DB2	Data bit 2	
13	DB3	Data bit 3	
14	DB4	Data bit 4	
15	DB5	Data bit 5	
16	DB6	Data bit 6	
17	DB7	Data bit 7	
18	FS	Font Selection	
19	LED+	Power supply for LED(+5V)	
20	LED-	Power supply for LED(0V)	

### 5.3 Interface Timing Chart:

Unless otherwise specified,  $V_{DD}=5.0 \pm 10\%$ ,  $V_{SS}=0V$ ,  $T_a=-10\sim 70^{\circ}C$



Item	Symbol	Test Condition	MIN	MAX	UNIT
C/D Set up Time	$t_{CDS}$		100	--	ns
C/D Hold Time	$t_{CDH}$		10	--	ns
CE, RD, WR Width	$t_{CE}, t_{RD}, t_{WR}$		80	--	ns
Data Set up Time	$t_{DS}$		80	--	ns
Data Hold Time	$t_{DH}$		40	--	ns
Access Time	$t_{ACC}$		--	150	ns
Output Hold Time	$t_{OH}$		10	50	ns

### 5.4 Instruction Code

COMMAND	CODE	D1	D2	FUNCTION
<b>REGISTERS</b>	00100001	X address	Y address	Set Cursor Pointer
	00100010	Data	00H	Set Offset Register
<b>SETTING</b>	00100100	Low address	High address	Set Address Pointer
	01000000	Low address	High address	Set Text Home Address
<b>SET CONTROL WORD</b>	01000001	Columns	00H	Set Text Area
	01000010	Low address	High address	Set Graphic Home Address
	01000011	Columns	00H	Set Graphic Area
	1000x000	--	--	OR mode
<b>MODE SET</b>	1000x001	--	--	EXOR mode
	1000x011	--	--	AND mode
	1000x100	--	--	Text Attribute mode
	10000xxx	--	--	Internal CG ROM mode
	10001xxx	--	--	External CG RAM mode
	<b>DISPLAY MODE</b>	10010000	--	--
1001xx10		--	--	Cursor on, blink off
1001xx11		--	--	Cursor on, blink on
100101xx		--	--	Text on, graphic off
100110xx		--	--	Text off, graphic on
100111xx		--	--	Text on, graphic on
<b>CURSOR PATTERN ELECT</b>	10100000	--	--	1-line cursor
	10100001	--	--	2-line cursor
	10100010	--	--	3-line cursor
	10100011	--	--	4-line cursor
	10100100	--	--	5-line cursor
	10100101	--	--	6-line cursor
	10100110	--	--	7-line cursor

LSB MSB	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0			"	#	\$	%	&	'	(	)	*	+	,	-	.	/
1		1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
2		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
3		P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	_
4		'	a	b	c	d	e	f	g	h	i	j	k	l	m	n
5		p	q	r	s	t	u	v	w	x	y	z	{		}	~
6		ç	ü	é	à	á	â	ã	ä	å	æ	è	é	ê	ë	ä
7		ë	æ	à	á	â	ã	ä	å	æ	ç	ü	é	à	á	â

	10100111	--	--	8-line cursor
<b>DATA AUTO</b>	10110000	--	--	Set Data Auto Write
	10110001	--	--	Set Data Auto Read
<b>READ/WRITE</b>	10110010	--	--	Auto Reset
	11000000	--	--	Data Write and Increment
	11000001	--	--	Data Read and Increment
<b>DATA</b>	11000010	--	--	Data Write and Decrement
<b>READ/WRITE</b>	11000011	--	--	Data Read and Decrement
	11000100	--	--	Data Write and Non variable
	11000101	--	--	Data Read and Non variable
<b>SCREEN PEEK</b>	11100000	--	--	Screen Peek
<b>SCREEN COPY</b>	11101000	--	--	Screen Copy
	11110xxx	--	--	Bit reset
	11111xxx	--	--	Bit set
<b>BIT SET/RESET</b>	1111x000	--	--	Bit0 (LSB)
	1111x001	--	--	Bit1
	1111x010	--	--	Bit2
	1111x011	--	--	Bit3
	1111x100	--	--	Bit4
	1111x101	--	--	Bit5
	1111x110	--	--	Bit6
	1111x111	--	--	Bit7 (MSB)

## 5.5 Character Code Map

### 6 Optical Characteristics

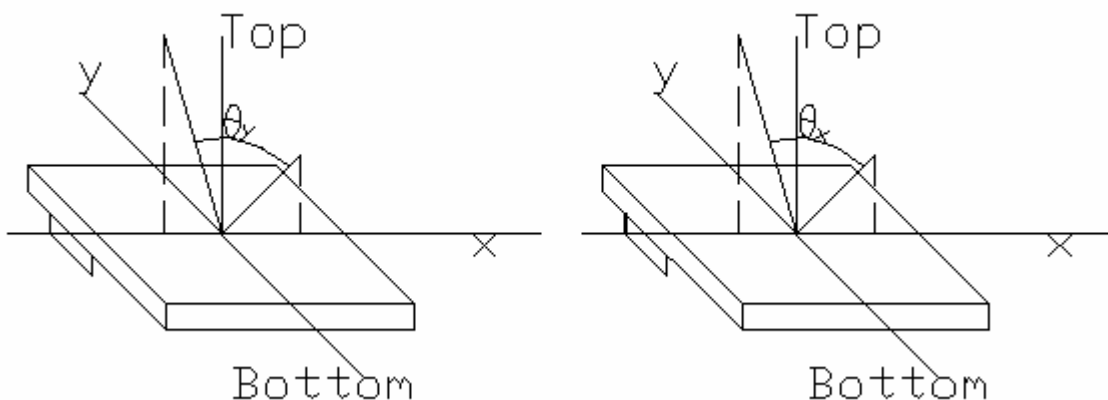
#### 6.1 Optical Characteristics Ta=25°C

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angle	$\theta_x$	Cr>3	$\theta_y=0$	-20	----	20	deg
	$\theta_y$			$\theta_x=0$	-25	----	
Contrast Ratio	Cr	$\theta_x=0^\circ$ $\theta_y=15^\circ$	3				

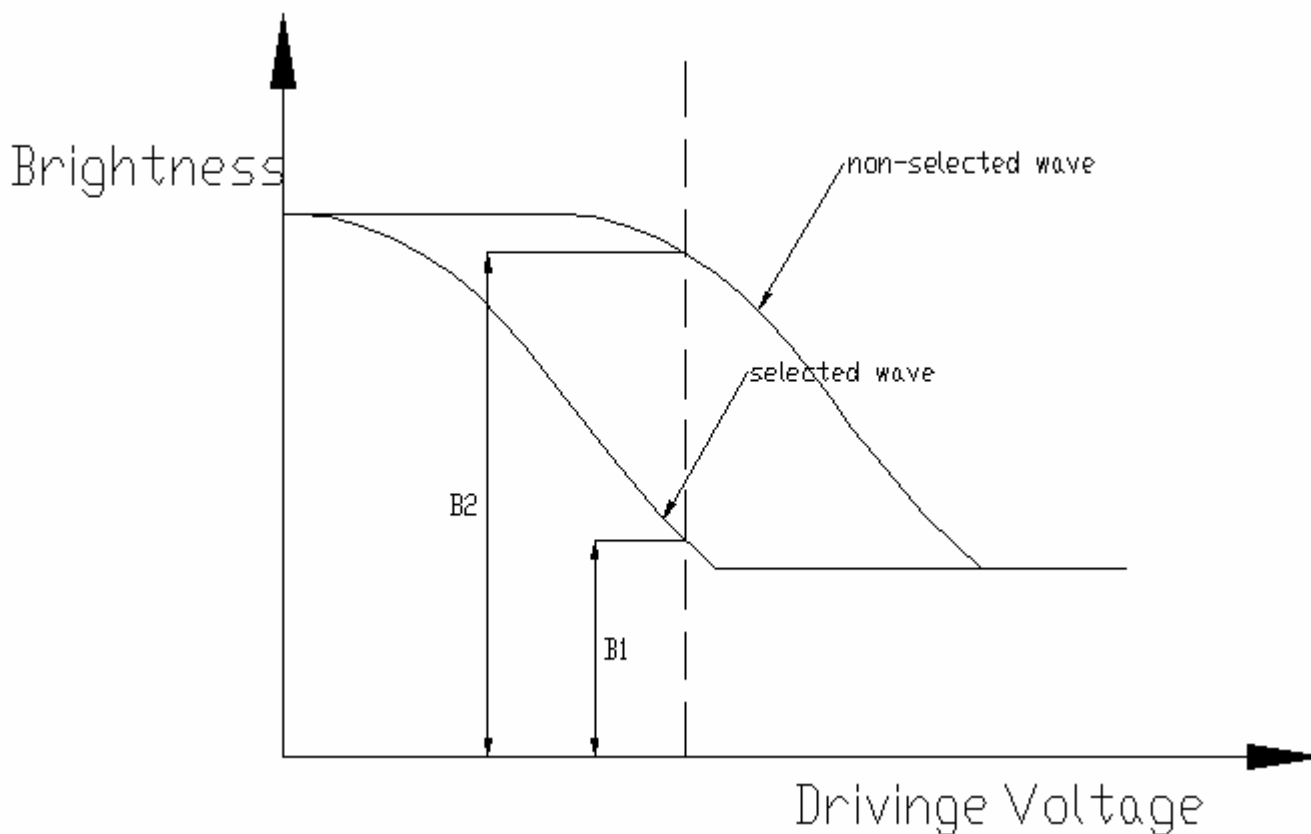
Response Time	Turn on	Ton	$\theta_{x=0^\circ}$			200	ms	
	Turn off	Toff	$\theta_{y=0^\circ}$			360		

## 6.2 Definition of optical characteristics

### 6.2.1 Definition of viewing Angle(see fig.as follow)



### 6.2.2 Definition of Contrast Ratio(see fig.as follow)



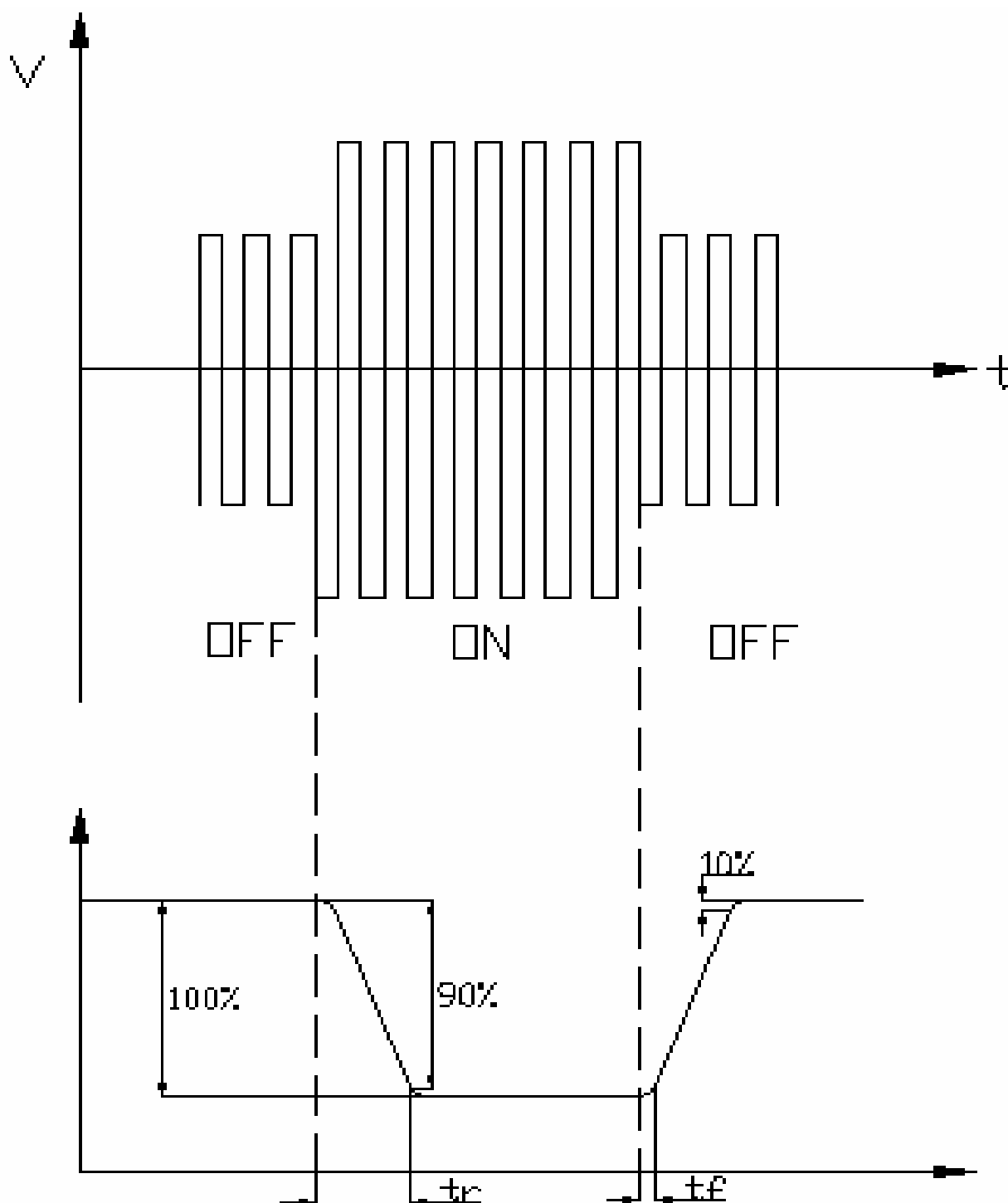
$$\text{Contrast Ratio}(K) = \frac{B2}{B1} \text{————— selected state brightness}$$

Measuring Conditions:

- 1) Ambient Temperature: 25°C; 2) Frame frequency : 32Hz

### 6.2.3 Definition of Response time (see fig.as follow)





## 7 Reliability

### 7.1 Content of Reliability Test

NO.	Test Item	Content of Test	Test condition
1	High Temperature Storage	Endurance test applying the high storage temperature for a long time	60°C 96H
2	Low Temperature	Endurance test applying the low	50°C

	Storage	storage temperature for a long time	96H
3	High Temperature Operation	Endurance test applying the Temperature electric stress (voltage & current) and the thermal stress to the element for a long time	50°C 96H
4	High Temperature Operation	Endurance test applying the Temperature electric stress (voltage & current) and the thermal stress to the element for a long time	0°C 96H
5	High Temperature /Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time	40°C 90%RH 96H
6	Temperature Cycle	Endurance test applying the low and high temperature cycle 10 cycle -20°C--25°C--60°C--25°C 30min 5min 30min 5min 1cycle	-20°C/60°C
7	Vibration Test (package state)	Endurance test applying the vibration during transportation	10Hz~55Hz ~10Hz 1.5mmP-P,1.5gX. Y.-5mm
8	Shock Test (package state)	Endurance test applying the shock during transportation	Drop a product form a height of 79cm to a solid unbending and horizontal plane
9	Atmospheric Pressure Test	Endurance test applying the atmospheric prssure during transportation by air	40kPa 24H

## 7.2 Failure Judgment Criterion

Criterion Item	Test Item NO.								Failure Judgement Criterion
Basic Specification									Out of the basic Specification
Electrical Specification									Out of the electrical specification
Mechanical Specification									Out of the mechanical specification
Optical Characteristic									Out of the optical specification
Remark	Basic specification = Display specification + Mechanical specification								

## 8. Precautions for use of LCD Modules

## 8.1 Handling Precautions

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

8.1.2 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.

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

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

8.1.5 If the display surface become 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, see the following:

-----Water

-----Ketone

-----Aromatic solvents

8.1.6 Do not attempt to disassemble the LCD Module

8.1.7 NC terminal should be open. do not connect anything

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

8.1.9 To prevent destruction of the elements by 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

c. irons, must be properly ground.

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

e. 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.