



中显液晶
技术资料



型号ZX240128A

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目 录

(一) 显示特性	(1)
(二) 机械特性	(1)
(三) 模块图	(2)
(四) 限定参数	(2)
(五) 电气特性及使用说明	(2)
(六) 光学特性	(5)
(七) 可靠性	(8)
(八) 注意事项	(9)

4 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

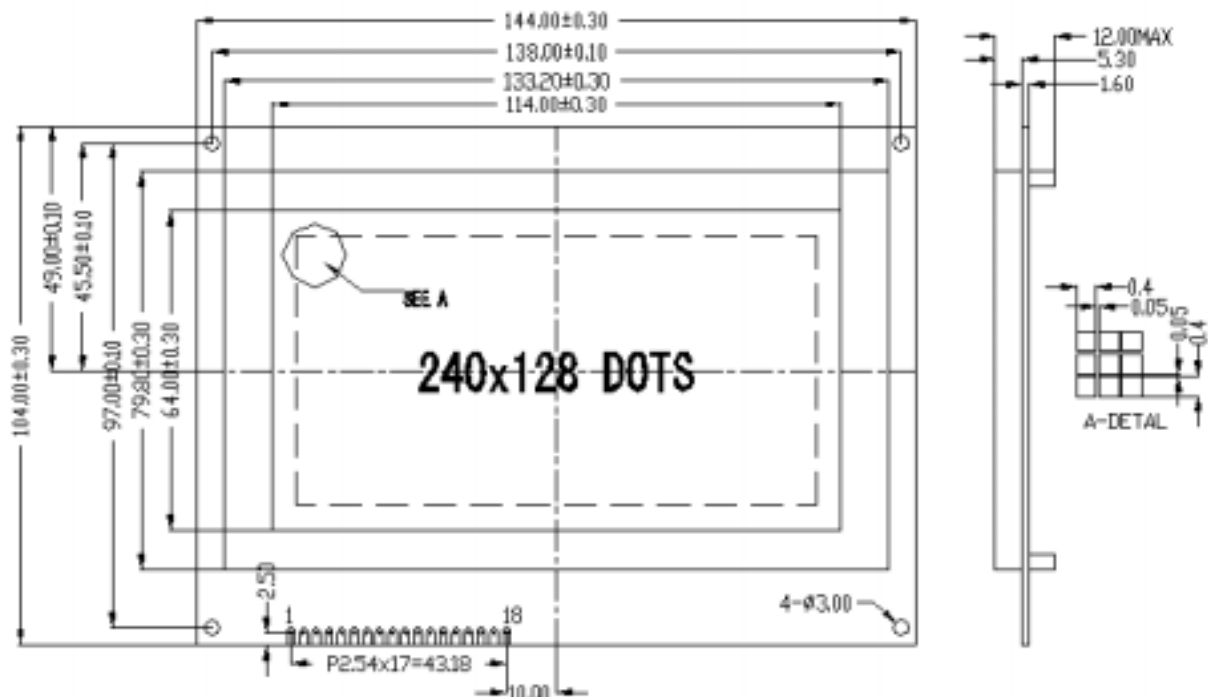
1.4 Viewing Angle : 6:00

1.5 Driving Duty : 1/128

1.6 Backlight : LED

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

2 Mechanical Specifications



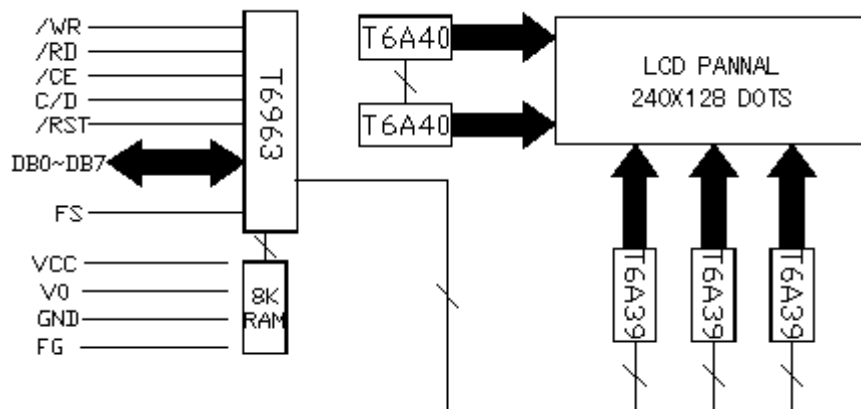
2.1 Outline Dimensions

2.2 Dot Matrix : 240×128

2.3 Dot size : 0.40×0.40(mm)

2.4 Dot pitch: 0.45×0.45(mm)

3 Circuit Block Diagram



4 Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Remark
Power Supply Voltage	VDD-VSS	0	7.0	V	
LCD Driving Voltage	VDD-VEE	---	18.0		
Operating Temperature Range	Top	0	50		NO Condensation
Storage Temperature Range	Tst	-20	60		

5 Electrical Specifications and Instruction Code

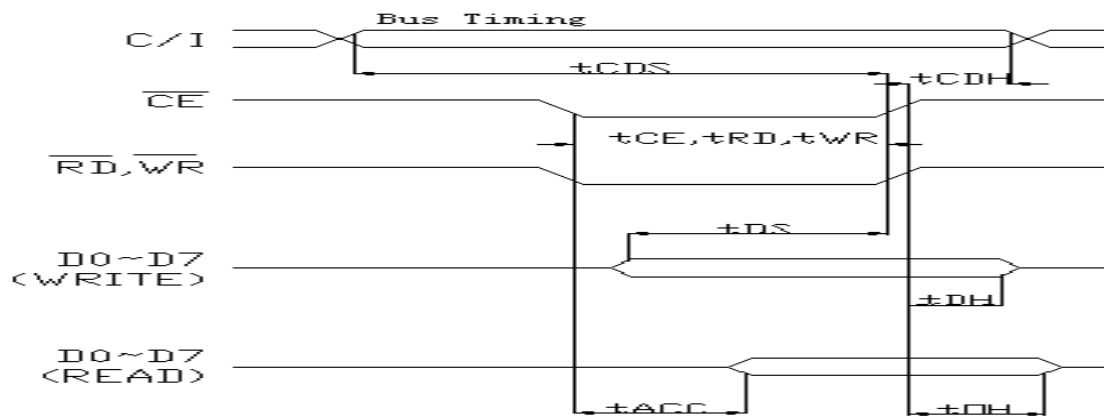
5.1 Electrical Characteristics

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	VIN	VDD-2.2	---	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

Pin NO.	Symbol	Description(Function)	Remark
1	FG	Module Frame Ground	
2	VSS	Ground	
3	VDD	Supply voltage for logic and LCD(+)	
4	V0	Operating voltage for LCD	variable
5	WR	Data Write into T6963C	
6	RD	Data Read F 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(+)	LED or EL Backlight	
20	LED(-)	LED or EL Backlight	

5.3 Interface Timing Chart:



Unless otherwise specified, VDD=5.0 ± 10%, VSS=0V, Ta=-10~70

Item	Symbol	Test Condition	MIN	MAX	UNIT
C/D Set up Time	tCDS		100	--	ns
C/D Hold Time	tCDH		10	--	ns
CE, RD, WR Width	tCE, tRD, tWR		80	--	ns
Data Set up Time	tDS		80	--	ns
Data Hold Time	tDH		40	--	ns
Access Time	tACC		--	150	ns
Output Hold Time	tOH		10	50	ns

5.4 Instruction Code

COMMAND	CODE	D1	D2	FUNCTION
REGISTERS	00100001	X address	Y address	Set Cursor Pointer
	00100010	Data	00H	Set Offset Register
SETTING	00100100	Low address	High address	Set Address Pointer
SET CONONTROL WORD	01000000	Low address	High address	Set Text Home Address
	01000001	Columns	00H	Set Text Area
	01000010	Low address	High address	Set Graphic Home Address
	01000011	Columns	00H	Set Graphic Area
MODE SET	1000x000	--	--	OR mode
	1000x001	--	--	EXOR mode
	1000x011	--	--	AND mode
	1000x100	--	--	Text Attribute mode
	10000xxx	--	--	Internal CG ROM mode
	10001xxx	--	--	External CG RAM mode
DISPLAY MODE	10010000	--	--	Display off
	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
CURSOR PATTERN ELECT	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
	10100111	--	--	8-line cursor
DATA AUTO	10110000	--	--	Set Data Auto Write
READ/WRITE	10110001	--	--	Set Data Auto Read
	10110010	--	--	Auto Reset
DATA READ/WRITE	11000000	--	--	Data Write and Increment
	11000001	--	--	Data Read and Increment
	11000010	--	--	Data Write and Decrement
	11000011	--	--	Data Read and Decrement
	11000100	--	--	Data Write and Non variable
	11000101	--	--	Data Read and Non variable
SCREEN PEEK	11100000	--	--	Screen Peek
SCREEN COPY	11101000	--	--	Screen Copy
BIT SET/RESET	11110xxx	--	--	Bit reset
	11111xxx	--	--	Bit set
	1111x000	--	--	Bit0(LSB)
	1111x001	--	--	Bit1
	1111x010	--	--	Bit2
	1111x011	--	--	Bit3
	1111x100	--	--	Bit4
	1111x101	--	--	Bit5
	1111x110	--	--	Bit6
	1111x111	--	--	Bit7(MSB)

5.5 Character Code Map

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

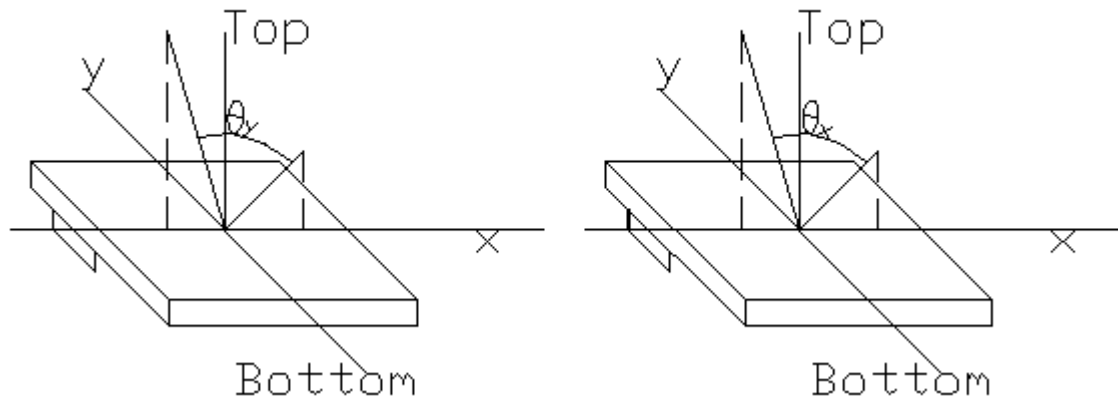
6 Optical Characteristics

6.1 Optical Characteristics Ta=25

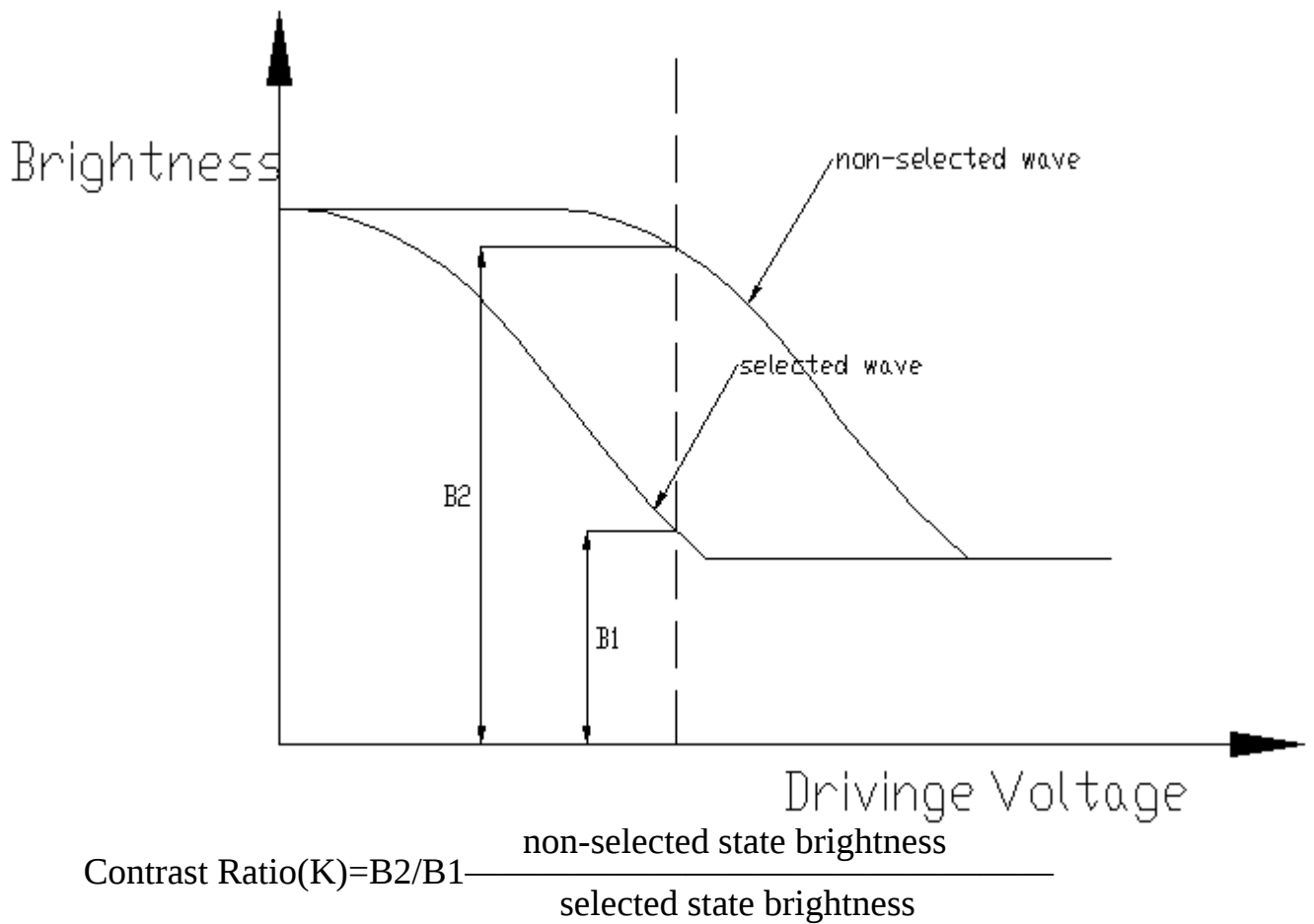
Item		Symbol	Condition		Min.	Typ.	Max.	Unit	Remark
Viewing angle		θ x	Cr	θ y=0	-20	----	20	deg	
		θ y		>3	θ x=0	-25	----		-25
Contrast Ratio		Cr	θ x=0 ° θ y=15 °		3				
Response	Turn on	Ton	θ x=0 °				200	ms	
Time	Turn off	Toff	θ y=0 °				360		

6.2 Definition of optical characteristics

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



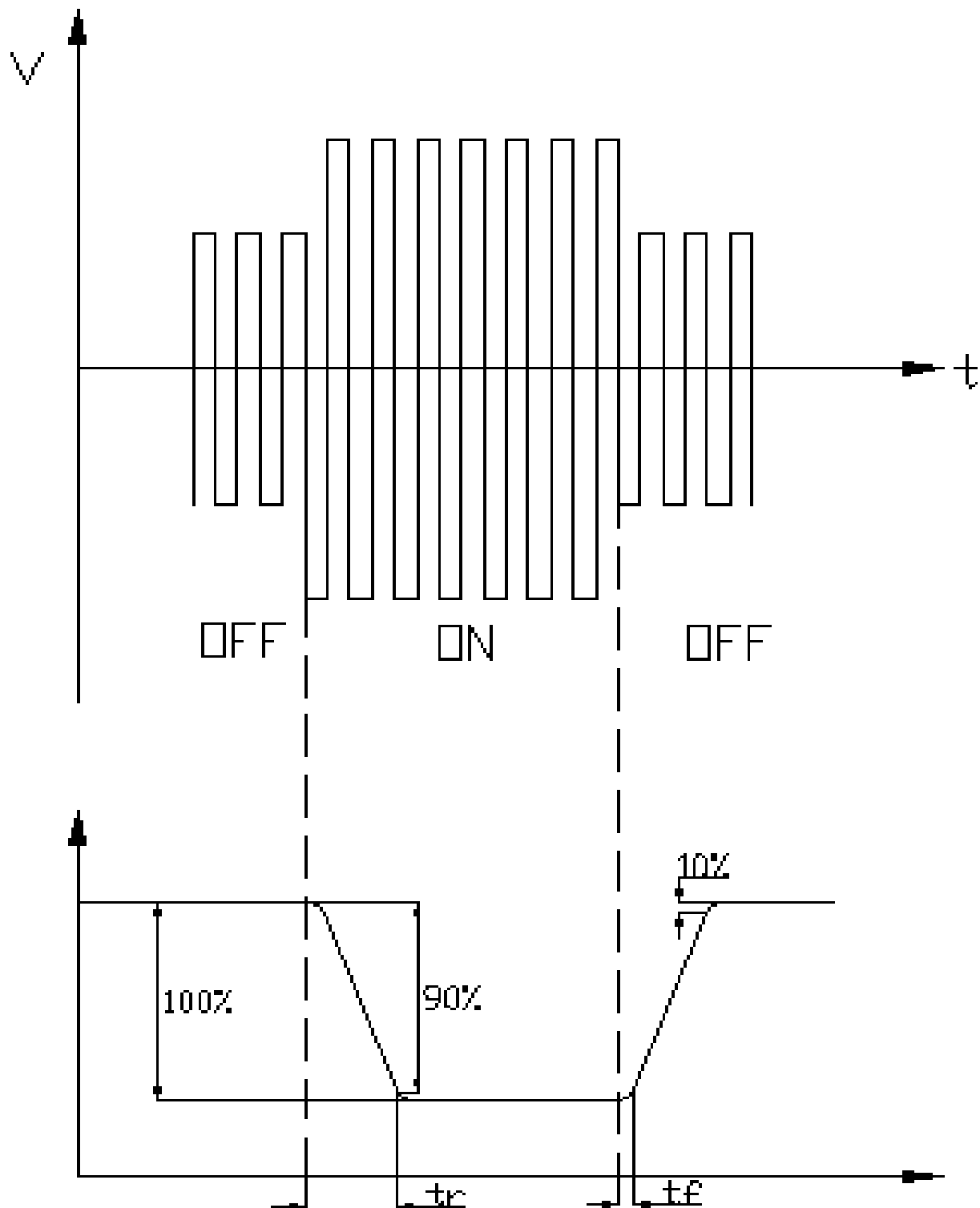
6.2.2 Definition of Contrast Ratio(see fig.as follow)



Measuring Conditions:

- 1) Ambient Temperature: 25 ; 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 96H
2	Low Temperature Storage	Endurance test applying the low storage temperature for a long time	50 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 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 96H
5	High Temperature /Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time	40 90%RH 96H
6	Temperature Cycle	Endurance test applying the low and high temperature cycle 10 cycle -20 30min --25 5min --60 30min --25 5min 1cycle	-20 /60
7	Vibration Test (package state)	Endurance test applying the vibration during transportation	10Hz~55Hz ~10Hz 1.5mmP-P,1.5g X.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
	1	2	3	4	5	6	7	8	9	
Basic Specification	0	0	0	0	0	0	0	0	0	Out of the basic Specification
Electrical Specification	0	0	0	0	0					Out of the electrical specification
Mechanical Specification						0	0	0		Out of the mechanical specification
Optical Characteristic	0	0	0	0	0	0				Out of the optical specification
Remark	Basic specification = Display specification + Mechanical specification									

8. Precautions for use of LCD Modules

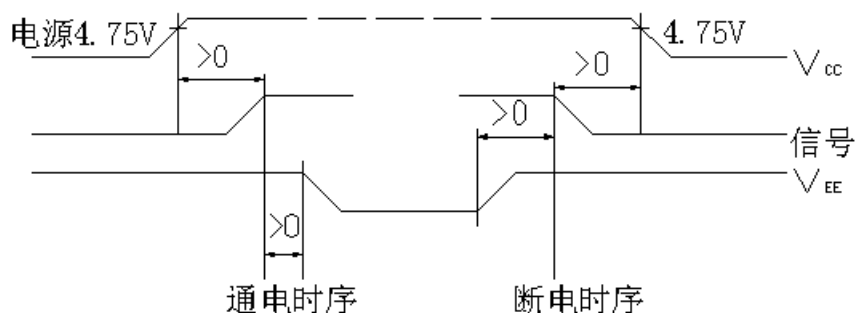
8.1 Handling Precautions

- 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 alcoholSolvents 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

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- 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.

液晶显示模块使用注意事项

1. 请勿随意自行加工、整修、拆卸。
2. 避免对液晶屏表面施加压力。
3. 不要用手随意去摸外引线、电路板上的电路及金属框。
4. 如必须直接接触时，应使人体与模块保持同一电位，或将人体良好接地。
5. 焊接使用的烙铁、操作用的电动改锥等工具必须良好接地，没漏电。
6. 严防各种静电。
7. 模块使用接入电源及断开电源时，必须按图时序进行。即必须在正电源（ $5 \pm 0.25V$ ）稳定接入后，才能输入信号电平。如在电源稳定接入前，或断开后就输入信号电平，将会损坏模块中的集成电路，使模块损坏。



8. 点阵模块在调节时，应调整 VEE 至最佳对比度、视角时为止。如果 VEE 调整过高，不仅会影响显示，还会缩短液晶的寿命。
9. 模块表面结雾时，不要通电工作，因为这将引起电极化学反应，产生断线。
10. 模块要存储在暗处（避阳光），温度在 $-10^{\circ}\text{C} \sim +35^{\circ}\text{C}$ ，湿度在 RH60%以上的地方。如能装入聚乙烯口袋（最好有防静电涂层）并将口封住最好。

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