

LCM MODULE SPECIFICATION

MODULE NO.
HTM25632A
NSBH6MLWR

(HTM25632A-6)

Customer Approval

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Designed	Checked	Approved

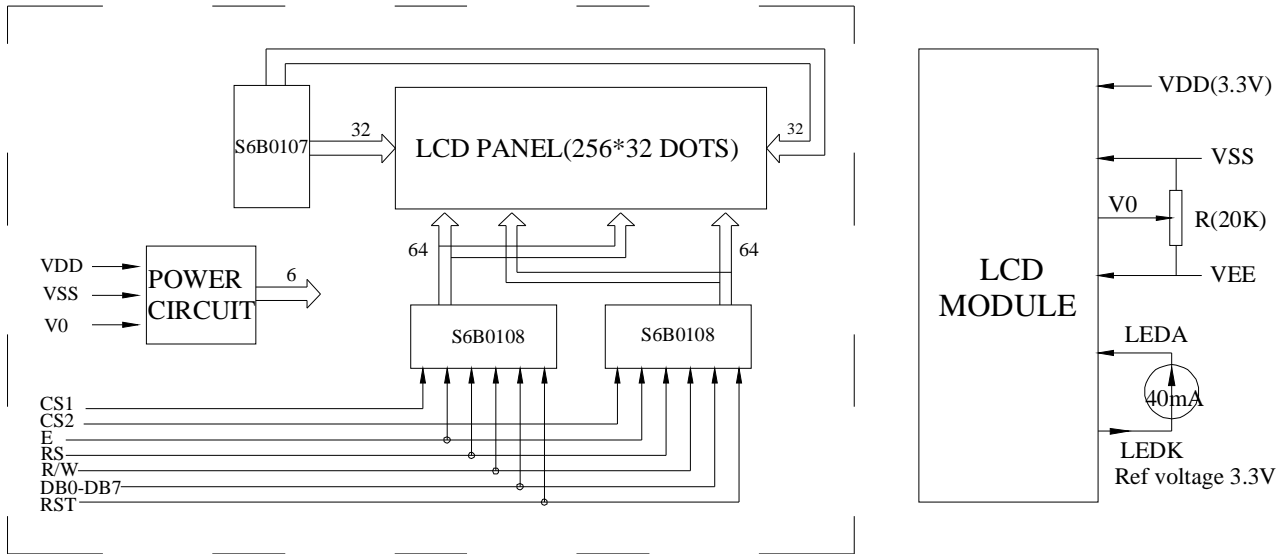
Revision history

revision	date	description	remark
A00	2007-12-08	First release	

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3. Block Diagram & Power supply/电路原理图



4. Pin description/PIN 脚描述

Pin No.	Pin Name	Function
1	VSS	Ground for logic
2	VDD	Power supply for logic
3	V0	Power supply for LCD driver
4	RS	Register selection (H : data register ; L : instruction register)
5	R/W	Read/write signal (H :read ; L : write)
6	E	Enable signal
7~14	DB0~DB7	Data bus
15	CS1	Chip enable signal for ic1
16	CS2	Chip enable signal for ic2
17	RST	Reset signal (Low effective)
18	VEE	Negative voltage input
19	A	Power supply for backlight+
20	K	Power supply for backlight-

5. Absolute Maximum Ratings/限定参数

Items	Symbol	MIN.	MAX.	Unit	Condition
Supply Voltage/供电电压	V _{DD}	-0.3	+7.0	V	V _{SS} = 0V
	V _{lcd}	-0.3	+18.0	V	V _{SS} = 0V
Input Voltage/输入电压	V _{IN}	-0.3	V _{DD} +0.3	V	V _{SS} = 0V
LED forward current/背光电流	I _f	0	50	mA	---
Operating Temp./工作温度	T _{OP}	-20	+70	°C	---
Storage Temp./储存温度	T _{st}	-30	+80	°C	---

6. Electrical Characteristics/电气特性

6.1 DC Characteristics/直流特性

(V_{SS} = 0V, V_{DD} = 3.3V ± 10%, T_a = -20~75°C)

Items	Symbol	MIN.	TYP.	MAX.	Unit
Operating Voltage/工作电压	V _{DD}	3.0	3.3	3.6	V
Input High Voltage/输入高电压	V _{IH}	0.7 V _{DD}	-	V _{DD}	V
Input Low Voltage 输入低电压	V _{IL}	0	-	0.3 V _{DD}	V
Output High Voltage 输出高电压	V _{OH}	2.4	-	V _{DD}	V
Output Low Voltage 输出低电压	V _{OL}	0	-	0.4	V
Supply Current/供电电流	I _{DD}	---	2	8	mA

6.2 AC Characteristics/交流特性

Characteristic	Symbol	Min	Typ	Max	Unit
F cycle	t _C	1000	-	-	ns
E high level width	t _{WH}	450	-	-	ns
F low level width	t _{WL}	450	-	-	ns
E rise time	t _R	-	-	25	ns
E fall time	t _F	-	-	25	ns
Address set-up time	t _{ASU}	140	-	-	ns
Address hold time	t _{AH}	10	-	-	ns
Data set-up time	t _{DSU}	200	-	-	ns
Data delay time	t _D	-	-	320	ns
Data hold time (write)	t _{DHW}	10	-	-	ns
Data hold time (read)	t _{DHR}	20	-	-	ns

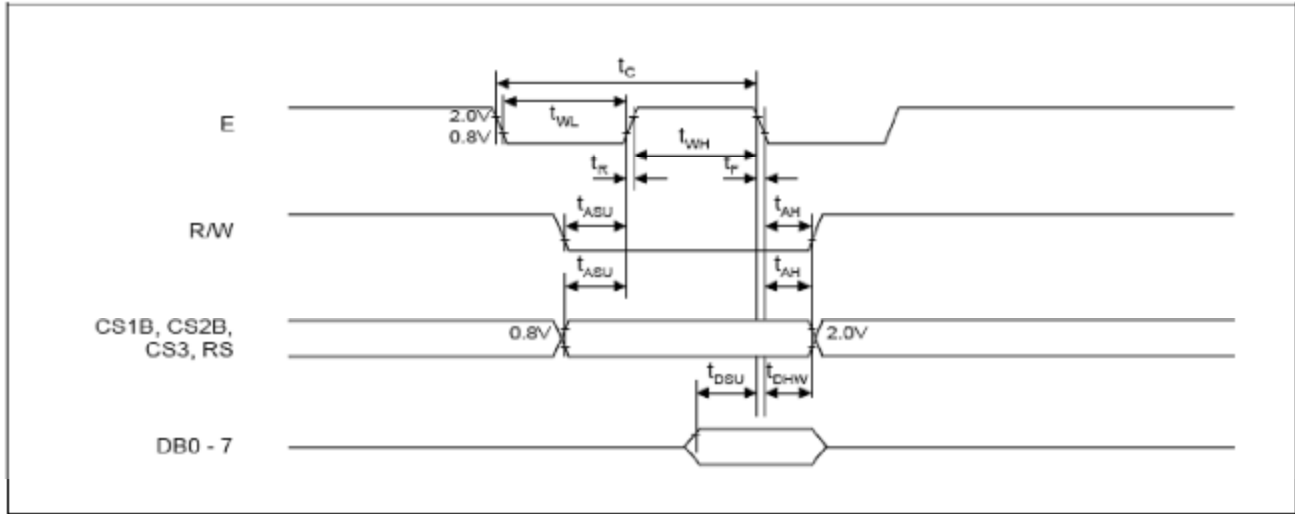


Figure 3. MPU Write Timing

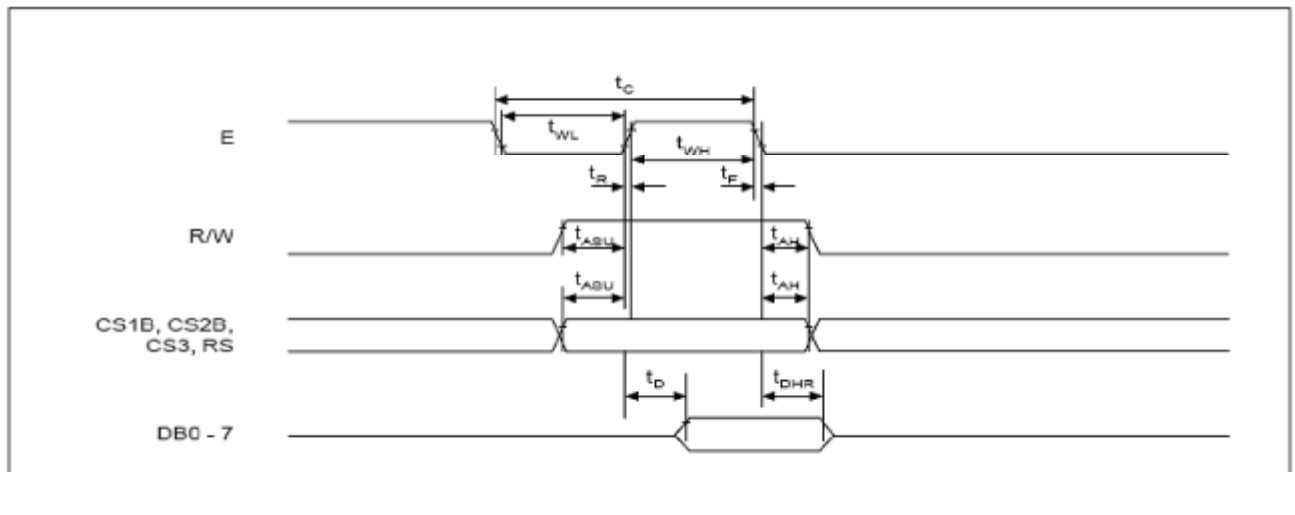


Figure 4. MPU Read Timing

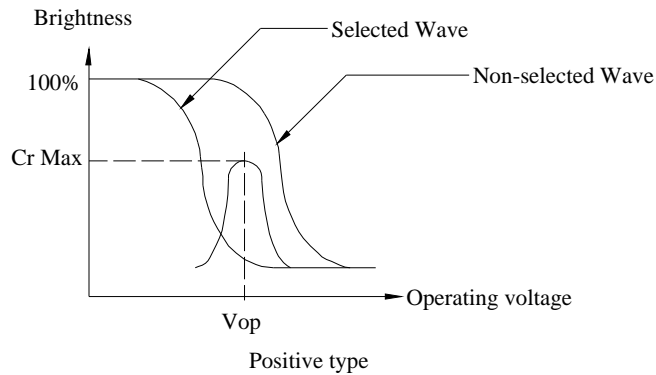
7. Backlight Characteristics/背光特性

Items	Symbol	MIN.	TYP.	MAX.	Unit	Condition
Forward Voltage/电压	V _f	2.8	3.0	3.2	V	I _f =40mA
Reverse current/电流	I _r	---	---	100	uA	V _r =5V
Peak wave length/波长	λ	---	---	---	nM	I _f =40mA
Luminance/亮度	L _v	---	---	---	Cd/m ²	I _f =40mA
Color /颜色	White					

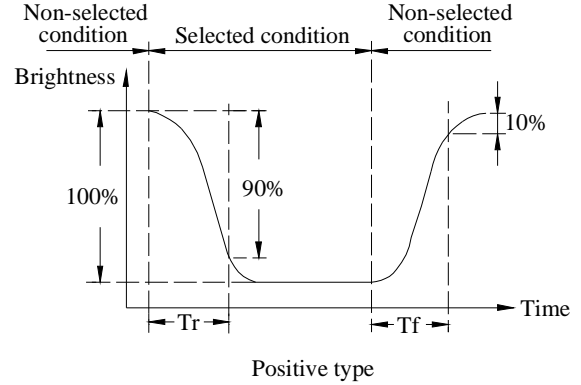
8. Electrical-Optical Characteristics/光学特性

Items	Symbol	Condition	MIN.	TYP.	MAX.	Unit	NOTE
Operation Voltage/工作电压	Vop	Ta= -20℃	9.2	9.5	9.8	V	1
		Ta= 25℃	8.7	9.0	9.3		
		Ta= 70℃	8.2	8.5	8.8		
Response time/反应时间	Tr	Ta= 25℃	---	185	---	ms	2
	Tf		---	200	---		
Contrast ratio/对比度	Cr	Ta= 25℃	---	5	---		3
Viewing angle range/视角范围	θ	$Cr \geq 2$	-40	---	40	degree	

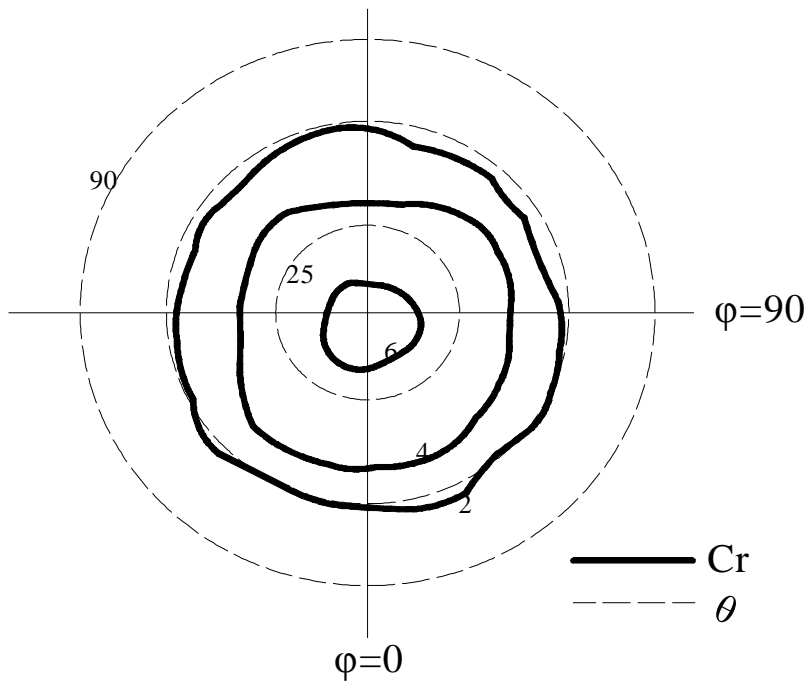
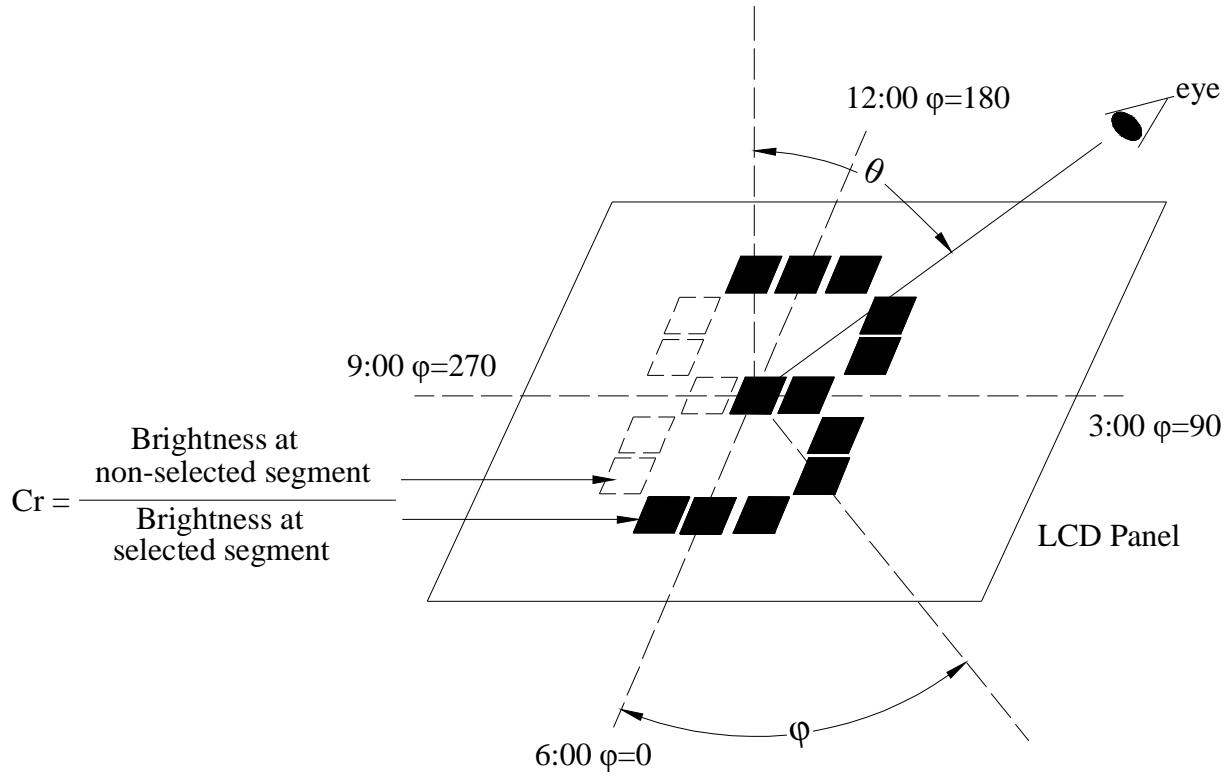
Note1 Definition of Operation voltage



Note2 Definition of Response time



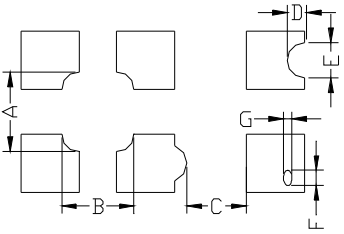
Note3 Definition of Contrast ratio、 Viewing angle and direction



9. Control and display commands/指令描述

Instruction	RS	R/W	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Function	
Display on/off	L	L	L	L	H	H	H	H	H	L/H	Controls the display on or off. Internal status and display RAM data is not affected. L: OFF, H: ON	
Set address (Y address)	L	L	L	H	Y address (0 - 63)						Sets the Y address in the Y address counter.	
Set page (X address)	L	L	H	L	H	H	H	Page (0 - 7)			Sets the X address at the X address register.	
Display start line (Z address)	L	L	H	H	Display start line (0 - 63)						Indicates the display data RAM displayed at the top of the screen.	
Status read	L	H	Busy	L	On / Off	Reset	L	L	L	L	Read status. BUSY L: Ready H: In operation ON/OFF L: Display ON H: Display OFF RESET L: Normal H: Reset	
Write display data	H	L	Write data									Writes data (DB0:7) into display data RAM. After writing instruction, Y address is increased by 1 automatically.
Read display data	H	H	Read data									Reads data (DB0: 7) from display data RAM to the data bus.

10. Inspection Standards/检验标准

Item	Criterion for defects	Defect type
1) Display on inspection/显示效果	(1) Non display (2) Vertical line is deficient (3) Horizontal line is deficient (4) Cross line is deficient	Major
2) Black / White spot/黑点或白点	Size Φ (mm) Acceptable number $\Phi \leq 0.3$ Ignore (note) $0.3 < \Phi \leq 0.45$ 3 $0.45 < \Phi \leq 0.6$ 1 $0.6 < \Phi$ 0	Minor
3) Black / White line/黑线或白线	Length (mm) Width (mm) Acceptable number $L \leq 10$ $W \leq 0.03$ Ignore $5.0 \leq L \leq 10$ $0.03 < W \leq 0.04$ 3 $5.0 \leq L \leq 10$ $0.04 < W \leq 0.05$ 2 $1.0 \leq L \leq 10$ $0.05 < W \leq 0.06$ 2 $1.0 \leq L \leq 10$ $0.06 < W \leq 0.08$ 1 $L \leq 10$ $0.08 < W$ follows 2) point defect Defects separate with each other at an interval of more than 20mm	Minor
4) Display pattern/显示模式	 $\frac{A+B \leq 0.28}{2}$ $0 < C$ $\frac{D+E \leq 0.25}{2}$ $\frac{F+G \leq 0.25}{2}$ Note: 1) Up to 3 damages acceptable 2) Not allowed if there are two or more pinholes every three-fourth inch.	Minor
5) Spot-like contrast irregularity/均匀度	Size Φ (mm) Acceptable Number $\Phi \leq 0.7$ Ignore (note) $0.7 < \Phi \leq 1.0$ 3 $1.0 < \Phi \leq 1.5$ 1 $1.5 < \Phi$ 0 Note: 1) Conformed to limit samples. 2) Intervals of defects are more than 30mm.	Minor
6) Bubbles in polarizer/玻璃内有气泡	Size Φ (mm) Acceptable Number $\Phi \leq 0.4$ Ignore (note) $0.4 < \Phi \leq 0.65$ 2 $0.65 < \Phi \leq 1.2$ 1 $1.2 < \Phi$ 0	Minor
7) Scratches and dent on the polarizer/玻璃刮痕/凹痕	Scratches and dent on the polarizer shall be in the accordance with "2) Black/white spot", and "3) Black/White line".	Minor
8) Stains on the surface of LCD panel/玻璃上有污点	Stains which cannot be removed even when wiped lightly with a soft cloth or similar cleaning.	Minor
9) Rainbow color/杂色	No rainbow color is allowed in the optimum contrast on state within the active area.	Minor
10) Viewing-area encroachment/玻璃边线出现在视域	Polarizer edge or line is visible in the opening viewing area due to polarizer shortness or sealing line.	Minor
11) Bezel appearance/铁筐外观	Rust and deep damages that are visible in the bezel are rejected.	Minor
12) Defect of land surface 表面缺陷	Evident crevices that are visible are rejected.	Minor
13) Parts mounting/部件安装	(1) Failure to mount parts (2) Parts not in the specifications are mounted (3) For example: Polarity is reversed, HSC or TCP falls off.	Minor
14) Part alignment/部件结合度	(1) LSI, IC lead width is more than 50% beyond pad outline. (2) More than 50% of LSI, IC leads is off the pad outline.	Minor
15) Conductive foreign matter (solder ball, solder hips)/杂质 (焊接遗留物)	(1) $0.45 < \Phi, N \geq 1$ (2) $0.3 < \Phi \leq 0.45, N \geq 1, \Phi$: Average diameter of solder ball (unit: mm) (3) $0.5 < L, N \geq 1, L$: Average length of solder chip (unit: mm)	Minor
16) Bezel flaw/铁筐缺陷	Bezel claw missing or not bent	Minor
17) Indication on name plate (sampling indication label)/标志	(1) Failure to stamp or label error, or not legible.(all acceptable if legible) (2) The separation is more than 1/3 for indication discoloration, in which the characters can be checked.	Minor

11. Reliability test/可靠性测试

item	condition	criterion
High temp. operation/高温工作	80°C 24hrs	No abnormality in function and appearance
High temp. storage/高温储存	70°C 24hrs	
Low temp. operation/低温工作	-20°C 24hrs	
Low temp. storage/低温储存	-30°C 24hrs	
Humidity /潮湿	40°C 90%RH 24hrs	
Thermal shock/热震	0°C(30min) \rightarrow 50°C(30min) 10cycles	
Vibration /震动	Frequency :10~55HZ Duration : 3times , 3min/time Amplitude : 0.75mm	-

12. Handling precautions

- Refrain from strong mechanical shock and forces to the module. It may cause improper operating or damage to the module.
防止震动和压迫模组，以免造成模组损坏和运行正常。
- The polarizer used on the display surface is easily scratched and damaged. Extreme care should be taken when handling. When cleaning the display surface, use soft cloth with a solvent recommended : ethyl alcohol , isopropyl or hexane) and wipe gently, do not use the following solvents : water, ketone or aromatics .
模组表面的偏光极易被刮伤和损坏，所以操作是要非常小心。请用蘸有乙醇，丙酮等溶剂的湿软布轻轻擦拭，不要使用水，乙酮等溶剂。
- Wipe off water or oil drop immediately If you leave drop for a long time, stain and discoloration may occur.
要立即擦拭掉屏幕上的油滴和水滴，否则会出现污点和杂质。
- Do not touch pads or pins of interface directly with bare hands. When handling the LCD module, put on a soft glover like finger-glover.
不要直接用手去触碰接口处的金属管脚。当操作模组的时候，请配带软指套。
- Protect the module from static electricity, it may cause damage to CMOS LSI.
模组需要有防静电保护，否则会损坏CMOS LSI。
- To prevent LCD panels from degradation, do not operate or store them exposed directly to sunlight or high temperature/humidity.
不要直接在太阳,高温或潮湿环境下操作和储存LCD模组，以免影响模组的质量。
- If the liquid crystal leaks from the panel it should be kept away from the eyes and mouths. In case of contact with skins, wash away thoroughly with soap and water.
若有液晶漏出，务必避免其入眼入口。若沾到皮肤上了，马上用肥皂和水冲洗干净。
- Soldering should be only performed on the I/O terminals within the temperature of $280 \pm 20^\circ\text{C}$ and soldering time should be less than 4 seconds.
要在 $280 \pm 20^\circ\text{C}$ 的条件下在I/O终端实现焊接，并且保证焊接时间短于4秒。
- Supply voltage within the specified voltage limit, the maximum rating, higher voltage cause the shorter LCD life or damaged.
绝对要在指定的电压范围内驱动模组， 因为如果在高于指定电压的情况下驱动模组，会使模组寿命变短

10. Do not input any signals before power is turned on. Do not connect or disconnect the module on the state of Power-ON.

供电之前不要输入任何信号，不要在通电时连接和段开 LCD 模组。