

深圳市金逸晨电子有限公司

ShenZhen GoldenMorning Electronic Co.,Ltd

PRODUCT SPECIFICATION

Model No	E208QU-W-H24-01
Product Name	2.08 OLED Module
Version	V1.0
Date	2025-08-09

- ☐ Preliminary Specification
- ☒ Final Specification

PREPARED BY	CHECKED BY	APPROVED BY

Revision History

Version	Date	Page	Revise record	Remarks
1.0	2025.08.09	-	First issued	-

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1.General Parameter

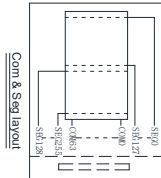
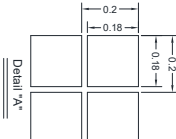
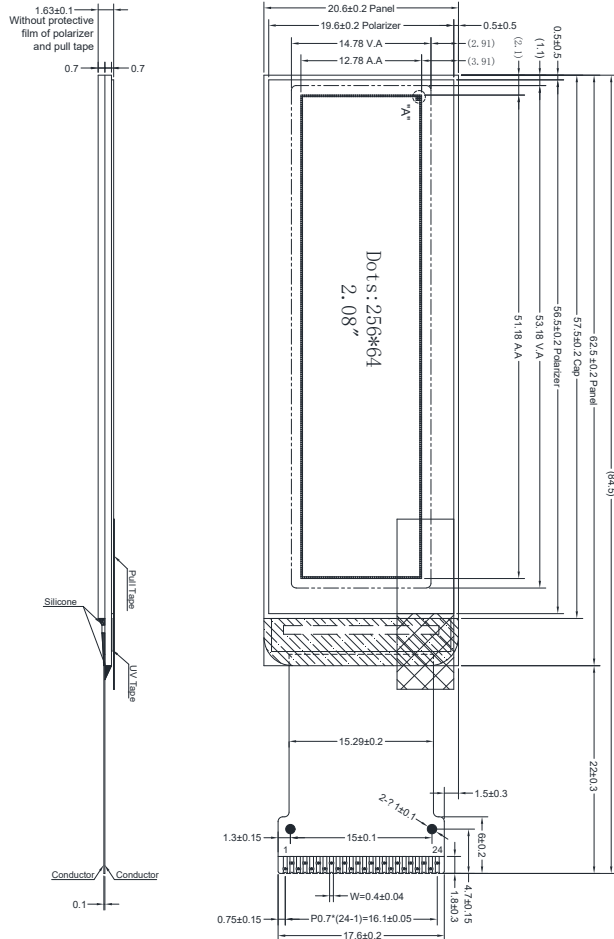
NO.	Features	Details	Unit
1	Display Size(Diagonal)	2.08"	Inch
2	LCD type	OLED	-
3	View Direction	ALL	-
4	Resolution	256 x 64	Pixels
5	Module size	62.5(W) x 20.6(H) x 1.63(T)	mm
6	Active Area	51.18(W) x 12.78(H)	mm
7	Pixel Pitch	0.2(W) x 0.2(H)	mm
8	Pixel Size	0.18(W) x 0.18(H)	mm
9	Interface	I ² C, 3/4-Wire SPI, MCU 8bit	-
10	Display Colors	White	-
11	Driver IC	SH1122G	-
12	IC package type	COG	-
13	Operating Temperature	-20℃~70℃	℃
14	Storage Temperature	-30℃~80℃	℃
15	Weight	-	g

Note 1 : Please refer to the mechanical drawing.

2.Physical drawing



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NO.	SYMBOL
1	V/P
2	V/EGM
3	V/COMH
4	VSL
5	I/REF
6	VSS
7	V/L
8	V/D
9	I/M
10	I/M1
11	I/M2
12	C/S
13	F/E/S
14	A/O
15	W/R
16	R/D
17	D/O
18	D1
19	D2
20	D3
21	D4
22	D5
23	D6
24	D7

NOTES:

1. Display Type (显示类型) : 2.08"OLED
2. Resolution (分辨率) : 256*64
3. Color (颜色) : White
4. Drive IC (驱动IC) : SH1122G
5. Interface (接口) : I²C, 3/4-Wire SPI, MCU 8bit
6. Operating temperature (工作温度) : -20°C +70°C
7. Storage temperature (存储温度) : -30°C +80°C
8. RoHS (欧盟标准) : YES
9. Unspecified Tolerance (未定义公差) : ±0.2

REV	REVISION RECORD	SIGN	DATA
V1	First edition	ZY	20250808

  UNIT: MM DATE		SCALE: FIT DESIGNED BY:		CHECKED BY: APPROVED BY:	
UNIT:MM SHEET: 1 OF 1		E208QU-W-H24-01 VERSION V1		LCM NO: SHENZHEN GOLDENMORNING ELECTRONIC CO.,LTD 深圳市金逸晨电子有限公司	

4.Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Logic Supply Voltage	VDD1	-0.3	+3.6	V
Charge Pump Regulator Supply Voltage	VDD2	-0.3	+3.6	V
Operating Voltage	VPP	-0.3	+14.5	V
Operating temperature	Top	-20	70	°C
Storage temperature	Tst	-30	80	°C

Note 1 : All the above voltages are on the basis of “VSS = 0V” .

Note 2 : When this module is used beyond the above absolute maximum ratings, permanent breakage of the module may occur. Also, for normal operations, it is desirable to use this module under the conditions according “Optics & Electrical Characteristics” . If this module is used beyond these conditions, malfunctioning of the module can occur and the reliability of the module may deteriorate.

Note 3 : The defined temperature ranges do not include the polarizer. The maximum withstood temperature of the polarizer should be 80°C.

Note 4 : 50% Checkerboard.End of lifetime is specified as 50% of initial brightness reached. The average operating lifetime at room temperature is estimated by the accelerated operation at high temperature conditions.

5.DC Characteristics

5.1 DC Electrical Characteristics

ITEM	SYMBOL	TEST CONDITION	MIN	TYPE	MAX	UNIT
Power supply of logic device	VDD	22±5°C, 55±25%R.H	1.65	-	3.5	V
OLED Driver Supply Voltage	VPP	22±5°C, 55±25%R.H	7	12	13.5	V
High-level Input Voltage	V _{IHC}	-	0.8×VDD	-	VDD	V
Low-level Input Voltage	V _{ILC}		VSS	-	0.2×VDD	V
High-level Output Voltage	V _{OHC}	-	0.8×VDD	-	VDD	V
Low-level Output Voltage	V _{OLC}	-	VSS	-	0.2×VDD	V

Note: The VPP, VDD input must be kept in a stable value; ripple and noise are not allowed.

5.2 Electro-optical Characteristics

ITEM	SYMBOL	TEST CONDITION	MIN	TYPE	MAX	UNIT
Normal Mode Brightness	L _{br}	All pixels ON ⁽¹⁾	60	80	-	cd/m ²
Normal Mode Power Consumption	P _t	All pixels ON ⁽¹⁾	-	228	276	mW
Sleep mode current consumption in VDD	ISP	sleep, TA = +25°C, VDD=3V	-	0.02	10	uA
Sleep mode current consumption in VPP		sleep, TA = +25°C, VPP = 12V	-	0.02	10	uA
C.I.E (White)	(X)	x,y(CIE1931)	0.28	0.30	0.32	-
	(Y)		0.29	0.33	0.37	-
Dark Room Contrast	CR	-	10000:1	-	-	-
Response Time	-	-	-	10	-	μs
View Angle	-	-	>160	-	-	Degree

Note(1): Normal Mode test conditions are as follows:

- Driving voltage: 12V
- Contrast setting: 0x20
- Frame rate: 125Hz
- Duty setting: 1/64

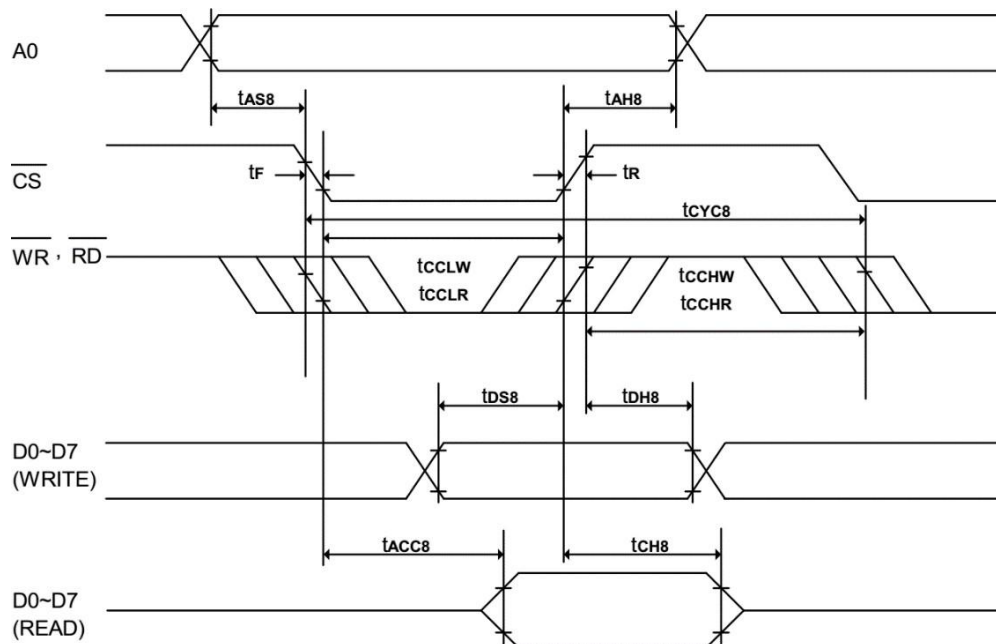
6.Pins Definitions.

Pin.No	Symbol	Description										
1	VPP	This is the most positive voltage supply pad of the chip It should be supplied externally										
2	VSEGM	This is a pad for the voltage output level for segment pre-charge. A capacitor should be connected between this pad and VSS.										
3	VCOMH	This is a pad for the voltage output high level for common signals A capacitor should be connected between this pad and VSS										
4	VSL	This is a segment voltage reference pad A capacitor should be connected between this pad and VSS										
5	IREF	This is a segment current reference pad A resistor should be connected between this pad and VSS. Set the current at 15.625μA										
6	VSS	Ground for analog, logic&buffer respectively.										
7	VCL	This is a common voltage reference pad This pad should be connected to VSS externally										
8	VDD	1.65 - 3.5V Power supply input pad										
9	IM0	These are the MPU interface mode select pads.										
10	IM1	<table><tr><th>Name</th><th>8-bit 8080</th><th>I²C</th><th>4-wire SPI</th><th>3-wire SPI</th></tr><tr><td>BS0</td><td>0</td><td>0</td><td>0</td><td>1</td></tr></table>	Name	8-bit 8080	I ² C	4-wire SPI	3-wire SPI	BS0	0	0	0	1
Name	8-bit 8080	I ² C	4-wire SPI	3-wire SPI								
BS0	0	0	0	1								
11	IM2	<table><tr><td>BS1</td><td>1</td><td>1</td><td>0</td><td>0</td></tr><tr><td>BS2</td><td>1</td><td>0</td><td>0</td><td>0</td></tr></table>	BS1	1	1	0	0	BS2	1	0	0	0
BS1	1	1	0	0								
BS2	1	0	0	0								
12	CS	This pad is the chip select input. When CS = “L”, then the chip select becomes active, and data/command I/O is enabled.										
13	RES	This is a reset signal input pad. When RES is set to “L”, the settings are initialized. The reset operation is performed by the RES signal level.										
14	A0 (SA0)	This is the Data/Command control pad that determines whether the data bits are data or a command. A0 = “H”: the inputs at D0 to D7 are treated as display data. A0 = “L”: the inputs at D0 to D7 are transferred to the command registers. In I2C interface, this pad serves as SA0 to distinguish the different address of OLED driver.										
15	WR (R/W)	This is a MPU interface input pad. When connected to an 8080 MPU, this is active LOW. This pad connects to the 8080 MPU WR signal. The signals on the data bus are latched at the rising edge of the WR signal. When R/W = “H”: Read. When R/W = “L”: Write.										
16	RD	This is a MPU interface input pad. When connected to an 8080 series MPU, it is active LOW. This pad is connected to the RD signal of the 8080 series MPU, and the SH1122 data bus is in an output status when this signal is “L”.										
17-24	D0 - D7 (SCL) (SI /SDA)	This is an 8-bit bi-directional data bus that connects to an 8-bit or 16-bit standard MPU data bus. When the serial interface is selected, then D0 serves as the serial clock input pad (SCL) and D1serves as the serial data input pad (SI). At this time, D2 to D7 are set to high impedance. When the I ² C interface is selected, then D0 serves as the serial clock input pad (SCL) and D1 serves as the serial data input pad (SDA). At this time, D2 to D7 are set to high impedance. When the chip select is inactive, D0 to D7 are set to high impedance.										

Note 1 : See the IC Specification manual for details.

8. Timing Characteristics.

(1)System buses Read/Write characteristics1 (For the 8080 Series Interface MPU)



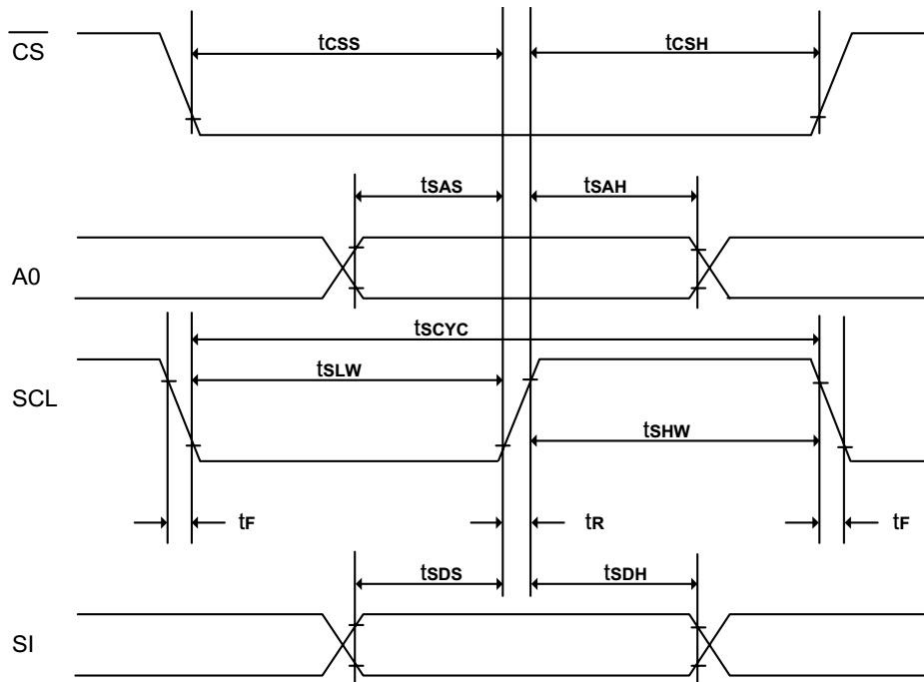
(VDD = 1.65 - 3.5V, TA = +25°C)

Symbol	Parameter	Min	Typ	Max	Unit	Condition
t_{CYC8}	System cycle time	600	-	-	ns	
t_{AS8}	Address setup time	0	-	-	ns	
t_{AH8}	Address hold time	0	-	-	ns	
t_{DS8}	Data setup time	80	-	-	ns	
t_{DH8}	Data hold time	30	-	-	ns	
t_{CH8}	Output disable time	20	-	140	ns	$C_L = 100pF$
t_{ACC8}	$\overline{RD}$ access time	-	-	280	ns	$C_L = 100pF$
t_{CCLW}	Control L pulse width (WR)	200	-	-	ns	
t_{CCLR}	Control L pulse width (RD)	240	-	-	ns	
t_{CCHW}	Control H pulse width (WR)	200	-	-	ns	
t_{CCHR}	Control H pulse width (RD)	200	-	-	ns	
t_R	Rise time	-	-	30	ns	
t_F	Fall time	-	-	30	ns	

(VDD = 2.4 - 3.5V, T_A = +25°C)

Symbol	Parameter	Min	Typ	Max	Unit	Condition
t _{CYC8}	System cycle time	300	-	-	ns	
t _{AS8}	Address setup time	0	-	-	ns	
t _{AH8}	Address hold time	0	-	-	ns	
t _{DS8}	Data setup time	40	-	-	ns	
t _{DH8}	Data hold time	15	-	-	ns	
t _{CH8}	Output disable time	10	-	70	ns	C _L = 100pF
t _{ACC8}	$\overline{RD}$ access time	-	-	140	ns	C _L = 100pF
t _{CCLW}	Control L pulse width (WR)	100	-	-	ns	
t _{CCLR}	Control L pulse width (RD)	120	-	-	ns	
t _{CCHW}	Control H pulse width (WR)	100	-	-	ns	
t _{CCHR}	Control H pulse width (RD)	100	-	-	ns	
t _R	Rise time	-	-	15	ns	
t _F	Fall time	-	-	15	ns	

(2) System buses Write characteristics (For 4-wire SPI)



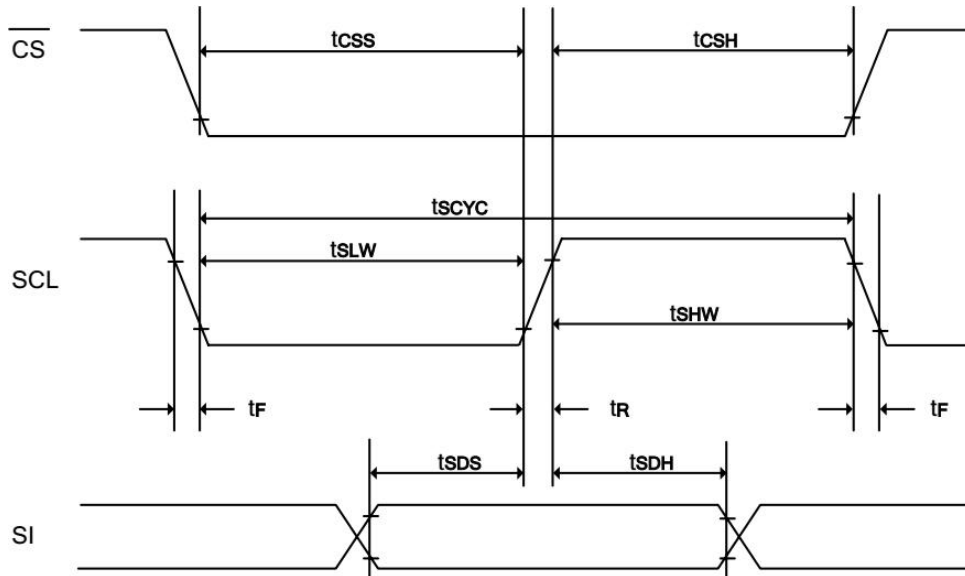
(VDD = 1.65 - 3.5V, TA = +25°C)

Symbol	Parameter	Min	Typ	Max	Unit	Condition
tscyc	Serial clock cycle	500	-	-	ns	
tsas	Address setup time	300	-	-	ns	
tsah	Address hold time	300	-	-	ns	
tsds	Data setup time	200	-	-	ns	
tsdh	Data hold time	200	-	-	ns	
tcSS	$\overline{CS}$ setup time	240	-	-	ns	
tCSH	$\overline{CS}$ hold time time	120	-	-	ns	
tSHW	Serial clock H pulse width	200	-	-	ns	
tSLW	Serial clock L pulse width	200	-	-	ns	
tr	Rise time	-	-	30	ns	
tf	Fall time	-	-	30	ns	

(VDD = 2.4 - 3.5V, TA = +25°C)

Symbol	Parameter	Min	Typ	Max	Unit	Condition
tscyc	Serial clock cycle	250	-	-	ns	
tsas	Address setup time	150	-	-	ns	
tsah	Address hold time	150	-	-	ns	
tsds	Data setup time	100	-	-	ns	
tsdh	Data hold time	100	-	-	ns	
tcSS	$\overline{CS}$ setup time	120	-	-	ns	
tCSH	$\overline{CS}$ hold time time	60	-	-	ns	
tSHW	Serial clock H pulse	100	-	-	ns	
tSLW	Serial clock L pulse	100	-	-	ns	
tr	Rise time	-	-	15	ns	
tf	Fall time	-	-	15	ns	

(3) System buses Write characteristics (For 3-wire SPI)



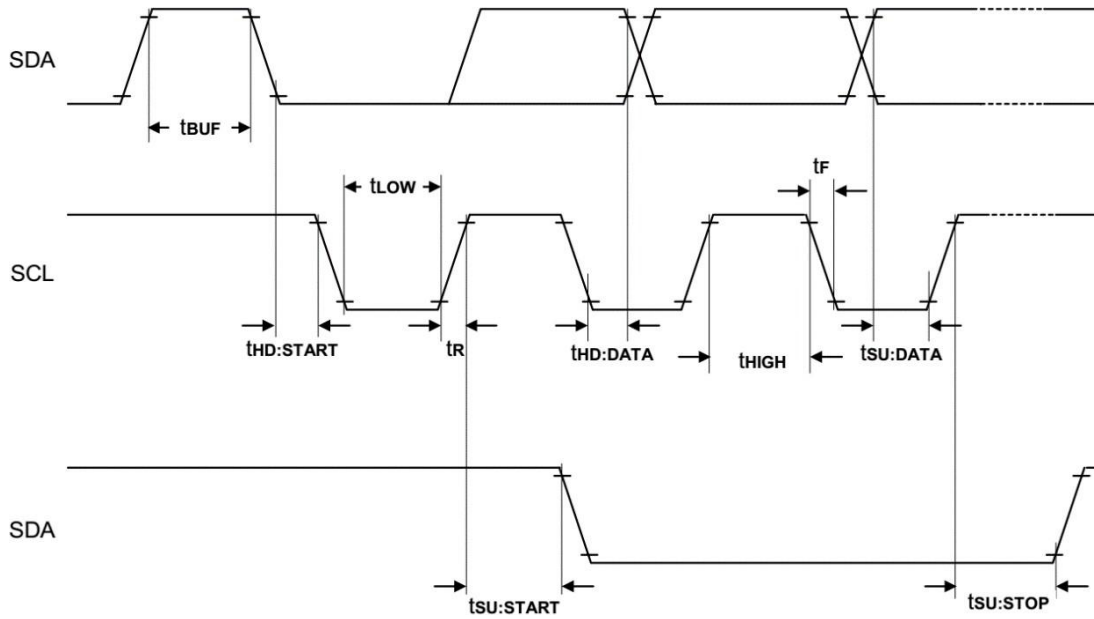
(VDD = 1.65 - 3.5V, TA = +25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
tscyc	Serial clock cycle	500	-	-	ns	
tsds	Data setup time	200	-	-	ns	
tsdh	Data hold time	200	-	-	ns	
tcss	$\overline{CS}$ setup time	240	-	-	ns	
tcsH	$\overline{CS}$ hold time time	120	-	-	ns	
tshw	Serial clock H pulse width	200	-	-	ns	
tslw	Serial clock L pulse width	200	-	-	ns	
tr	Rise time	-	-	30	ns	
tF	Fall time	-	-	30	ns	

(VDD = 2.4 - 3.5V, TA = +25°C)

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
tscyc	Serial clock cycle	250	-	-	ns	
tsds	Data setup time	100	-	-	ns	
tsdh	Data hold time	100	-	-	ns	
tcss	$\overline{CS}$ setup time	120	-	-	ns	
tcsH	$\overline{CS}$ hold time time	60	-	-	ns	
tshw	Serial clock H pulse	100	-	-	ns	
tslw	Serial clock L pulse	100	-	-	ns	
tr	Rise time	-	-	15	ns	
tF	Fall time	-	-	15	ns	

(4) I²C interface characteristics



(VDD = 1.65 - 3.5V, TA = +25°C)

Symbol	Parameter	Min	Typ	Max	Unit	Condition
f_{SCL}	SCL clock frequency	DC	-	400	kHz	
T_{LOW}	SCL clock Low pulse width	1.3	-	-	uS	
T_{HIGH}	SCL clock H pulse width	0.6	-	-	uS	
$T_{SU:DATA}$	data setup time	100	-	-	nS	
$T_{HD:DATA}$	data hold time	0	-	0.9	uS	
T_R	SCL, SDA rise time	$20+0.1C_b$	-	300	nS	
T_F	SCL, SDA fall time	$20+0.1C_b$	-	300	nS	
C_b	Capacity load on each bus line	-	-	400	pF	
$T_{SU:START}$	Setup time for re-START	0.6	-	-	uS	
$T_{HD:START}$	START Hold time	0.6	-	-	uS	
$T_{SU:STOP}$	Setup time for STOP	0.6	-	-	uS	
T_{BUF}	Bus free times between STOP and START condition	1.3	-	-	uS	

9.Optical Characteristics.

ITEM	SYMBOL	TEST CONDITION	MIN	TYPE	MAX	UNIT
Normal Mode Brightness	Lbr	All pixels ON ⁽¹⁾	60	80	-	cd/m ²
Normal Mode Power Consumption	Pt	All pixels ON ⁽¹⁾	-	228	276	mW
Sleep mode current consumption in VDD	ISP	During sleep, TA = +25℃, VDD= 3V	-	0.02	10	uA
Sleep mode current consumption in VPP		During sleep, TA = +25℃, VPP = 12V	-	0.02	10	uA
C.I.E (White)	(X)	x,y(CIE1931)	0.28	0.30	0.32	-
	(Y)		0.29	0.33	0.37	-
Dark Room Contrast	CR	-	10000:1	-	-	-
Response Time	-	-	-	10	-	μs
View Angle	-	-	>160	-	-	Degree

Note(1): Normal Mode test conditions are as follows:

- Driving voltage: 12V
- Contrast setting: 0x20
- Frame rate: 125Hz
- Duty setting: 1/64

10.Reliability

10.1.MTBF

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal.

10.2.Test Condition

No	Item	Condition	Criteria
1	High Temperature Operating	70℃*24Hrs	1. No Defect Of Operational Function In Room Temperature Are Allowable. 2. IDD of LCM in Pre-and Post-Test Should Follow Specification.
2	Low Temperature Operating	-20℃*24Hrs	
3	High Humidity Storage	50℃*90%RH*24Hrs	
4	High Temperature Storage	80℃*24Hrs	
5	Low Temperature Storage	-30℃*24Hrs	
6	Thermal Cycling Test Storage	-	
7	Packing vibration	-	
8	Electrical Static Discharge	-	
		-	
9	Drop Test (Packaged)	-	

Note 1 : The test samples should be applied to only one test item.

Note 2 : Sample size for each test item is 2pcs.

Note 3 : No defective function allowable.

11.Precautions

11.1.Storage Conditions

- 11.1.1.Store the panel or module in a dark place where the temperature is $23\pm5^{\circ}\text{C}$ and the humidity is below $45\pm20\%\text{RH}$.
- 11.1.2.Store in anti-static electricity container.
- 11.1.3.Store in clean environment, free from dust, active gas, and solvent.
- 11.1.4.Do not place the module near organics solvents or corrosive gases.
- 11.1.5.Do not crush, shake, or jolt the module.
- 11.1.6.Strong light exposure causes degradation of polarizer and color filter.

11.2.Handling Precautions

- 11.2.1.Avoid static electricity, which can damage the CMOS LSI.
- 11.2.2.The polarizing plate of the display is very fragile, please handle if very carefully.
- 11.2.3.Do not give external shock.
- 11.2.4.Do not apply excessive force on the surface.
- 11.2.5.Do not wipe the polarizer with dry cloth, as it might cause scratch. If the surface of the LCD needs to be cleaned, wipe it swiftly with cotton or other soft cloth soaked with petroleum IPA, do not use other chemicals.
- 11.2.6.Reverse and use within ratings in order to keep performance and prevent damage
- 11.2.7.Do not remove the panel or frame from the module.
- 11.2.8.Except for soldering the interface, do not make any alterations or modifications with a soldering iron; Ensure welding temperature at 320°C to 350°C , the welding time control within the 10 s, welding note don't stay too long in the same place to avoid scald FPC.

11.3.Limited Warranty

- 11.3.1.Our warranty liability is limited to repair and/or replacement. We will not be responsible for any consequential loss. (我们的保证责任仅限于修理和/或更换。我们将不负任何责任相应的损失。)
- 11.3.2.If possible, we suggest customer to use up all modules in six months. If the module storage time over twelve months, we suggest that recheck it before the module be used. (如果可能, 我们建议客户在 6 个月内用完所有模块。如果模块存放时间超过 12 个月, 我们建议在使用模块前重新检查。)
- 11.3.3.The warranty period is twelve months from the date of delivery. Buyer shall complete the assembly of all processes within twelve months of validity. During the warranty period, if the product quality problems, our company will be responsible for repair and replacement. All products must be stored and handled in accordance with regulations. Under warranty. When the goods do not comply with the above terms, we do not provide warranty services. (保修期为交货之日起十二个月。买方应在 12 个月内完成所有流程的组装。在保修期内, 如果产品出现质量问题, 我公司将负责维修和更换。所有产品必须按照规定储存和处理。在保修期内。当货物不符合上述条款时, 我们不提供保修服务。)