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TFT | OLED | CHARACTER | GRAPHIC | UWVD | SEGMENT | CUSTOM

Graphic Display Module

Part Number

G12232A-FTW-XW65

Overview:

- 122x32 Graphic LCD
- FSTN Gray Positive
- 84.0x44.0mm Module
- Parallel Interface
- White LED Backlight
- Transflective
- Wide Temp Range
- 5V
- LCD IC: SBN1661G-M18 * 2
- RoHS Compliant

Graphic LCD Features

Resolution: 122x32 Dots

Interface(s): 8-bit Parallel (6800-Series MPU)

RoHS Compliant.

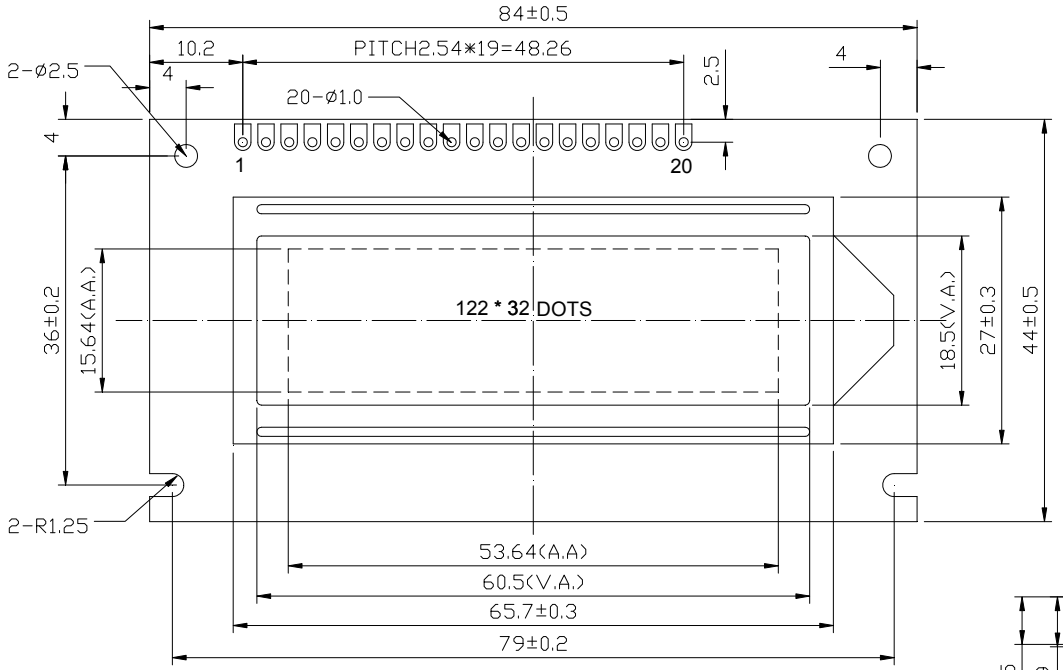
General Information Items	Specification	Unit	Note
	Main Panel		
Viewing Area (VA)	60.5(H) x 18.5(V)	mm	--
LCD Type	FSTN Positive	--	--
Viewing Angle	6:00	O'Clock	--
Polarizer	Transflective	--	--
Backlight Type	LED	--	--
Backlight Color	White	--	--
LCD IC	SBN1661G-M18*2	--	--
Drive Mode	1/32 Duty, 1/6 Bias	--	--
Operating Temperature	-20 to +70	°C	--
Storage Temperature	-30 to +80	°C	--

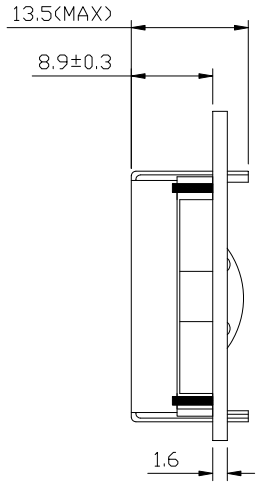
Mechanical Information

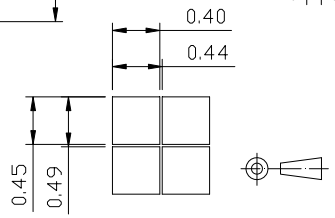
Item		Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal (H)	--	84.0	--	mm	--
	Vertical (V)	--	44.0	--	mm	--
	Depth (D)	--	13.5	--	mm	--
Weight		--	37.44	--	g	Approximate

1. Outline Dimensions

Rev.	Description	Date
1.0	First	01/22/2024

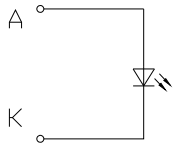






NO	PIN
1	VSS
2	VDD
3	V0
4	A0
5	E1
6	E2
7	NC
8	NC
9	R/W
10	D0
11	D1
12	D2
13	D3
14	D4
15	D5
16	D6
17	D7
18	RESET
19	LED+
20	LED-

Backlight Circuit Diagarm

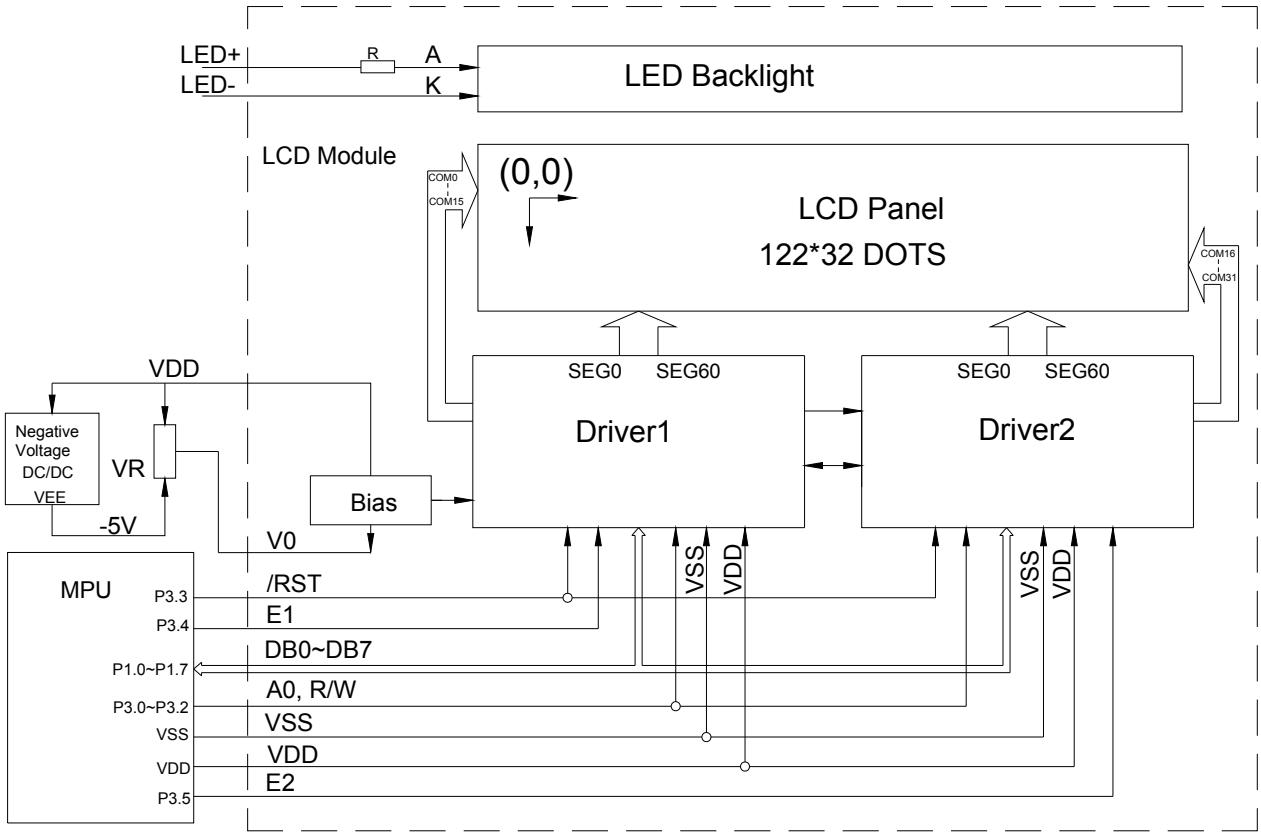


Notes:

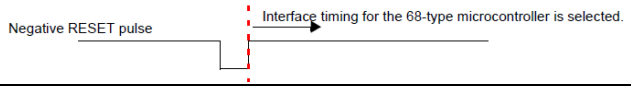
1.) Driver Method: 1/32 duty, 1/6 bias, VDD 5.0V VLCD 5.9V
2). Display Type: FSTN/Positive/Transflective
3). Viewing Angle: 6:00
4). Operating Temp: -20°C-70°C
5). Storage Temp: -30°C-80°C
6). Driver: SBN1661G-M18 * 2
7). Backlight Type: White LED Vf=2.9V/If=13A
8). RoHS Compliant

Model Name: G12232A-FTW-XW65			
General Tol: 0.2			
Approvals	Date	Drawing No.:	Scale:
DWN:			
CHK:		Size:	Unit: mm / Page: 1/1
APP:			

2. Block Diagram



3. Input Terminal Pin Assignment

NO.	Symbol	Description	I/O
1	VSS	Signal ground for LCM.	P
2	VDD	VDD: +5V.	P
3	V0	V_{LCD} adjustment.	P
4	A0	Register select input: "0": Instruction register (when writing). Busy flag address counter (when reading). "1": Data Register (when writing & reading).	I
5	E1	Chip enable active "H", SEG(1~61).	I
6	E2	Chip enable active "H", SEG(62~122).	I
7	NC	Not connected.	--
8	NC	Not connected.	--
9	R/W	Read/write signal. "0" for writing, "1" for reading.	I
10	DB0-DB7	Data bus [0~7], bi-directional data bus.	I/O
18	RESET	Hardware reset and interface type selection. 	I
19	LED+	Power supply for backlight (+5.0V).	P
20	LED-	Power supply for backlight (GND).	P

I: Input, O: Output, P: Power

4. LCD Optical Characteristics

Item		Symbol	Condition	Min	Typ.	Max	Unit
Contrast Ratio		CR		--	6	--	
Response Time	On	T_R		--	200	250	ms
	Off	T_F		--	300	350	ms
Viewing Angle $C_1 \geq 3$, 25°C	Hor.	Θ_L	Φ=270°, 9H	--	35	--	degree
		Θ_R	Φ=90°, 3H	--	35	--	
	Ver.	Θ_T	Φ=180°, 12H	--	20	--	
		Θ_B	Φ=0°, 6H	--	40	--	

5. Electrical Characteristics

5.1 Absolute Maximum Rating

Characteristics	Symbol	Min	Max	Unit
Power Supply for Logic	V_{DD}-V_{SS}	-0.3	6.5	V
Power Supply for LCD	V_{DD}-V_0	3	10	V
Input Voltage	V_{IN}	-0.3	V_{DD}	V
Supply Vurrent for LED backlight	I_{LED}	--	20	mA
Operating Temperature	T_{OP}	-20	+70	°C
Storage Temperature	T_{ST}	-30	+80	°C

NOTE: If the absolute maximum rating of the above parameters is exceeded, even momentarily, the quality of the product may be degraded. Absolute maximum ratings specify the values which the product may be physically damaged if exceeded. Be sure to use the product within the range of the absolute maximum ratings.

5.2 DC Electrical Characteristics

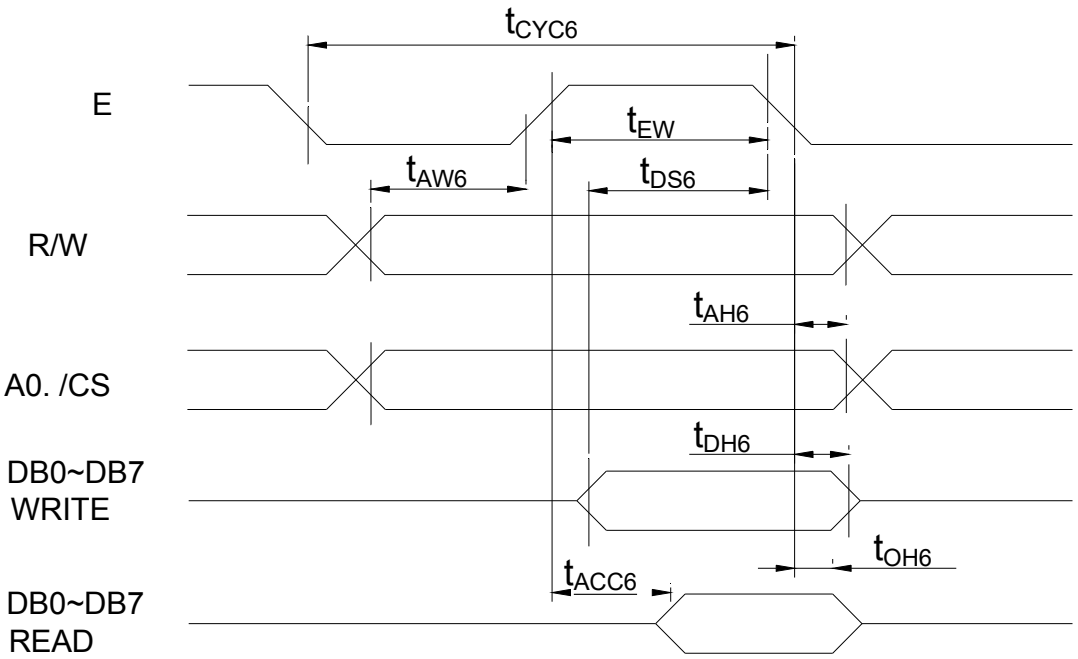
Characteristics		Symbol	Condition	Min	Typ.	Max	Unit
Supply Voltage for LCD		V_{DD}-V_0	Ta = 25°C	--	5.9	--	V
Input Voltage		V_{DD}		4.8	5.0	5.3	V
Backlight Supply Voltage		V_F		--	--	5.0	V
Supply Current		I_{DD}	Ta = 25°C, VDD=5.0V	--	1.5	2.5	mA
Backlight Supply Current		I_F	V=5.0V, R=150 ohm	--	13	--	mA
Input Leakage Current		I_{LKG}		--	--	1.0	uA
Input Voltage	H Level	V_{IH}		V_{DD} - 2.2	--	V_{DD}	V
	L Level	V_{IL}		0	--	0.8	V
Output Voltage	H Level	V_{OH}		V_{DD} - 0.3	--	V_{DD}	V
	L Level	V_{OL}		--	--	0.3	V

Condition:

1. VDD = 5.0V
2. 1/32 Duty, 1/6 Bias

6. Timing Characteristics

6.1 System Buses Read/Write Characteristics for 6800-series MPU



Item		Symbol	Conditions	Min.	Max.	Unit
System cycle time		t_{CYC6}	—	1000	—	ns
Address setup time		t_{AW6}	—	20	—	ns
Address hold time		t_{AH6}	—	10	—	ns
Data setup time		t_{DS6}	—	80	—	ns
Data hold time		t_{DH6}	—	10	—	ns
Access time		t_{ACC6}	CL=100pf	—	90	ns
Output disable time		t_{OH6}		10	60	ns
Enable pulse width	Read	t_{EW}	—	100	—	ns
	Write		—	80	—	ns

6.2 Display Command Table

Parameter	A0	E	RW	D7	D6	D5	D4	D3	D2	D1	D0	Note
Display ON /OFF	0	1	0	1	0	1	0	1	1	1	0/1	Turns display on or off 1: ON ; 0 : OFF
Display start line	0	1	0	1	1	0	Display start address (0 to 31)					Specifies RAM line corresponding to top line of display
Set page address	0	1	0	1	0	1	1	1	0	Page (0 to 3)		Sets display RAM page in page address register
Set column (segment) address	0	1	0	0	Column address (0 to 79)							Sets display RAM column address in column address register
Read status	0	0	1	Bu sy	AD C	ON/ OFF	RE SE T	0	0	0	0	Reads the following status: BUSY 1: Busy 0: Ready ADC 1: CW output 0: CCW output ON/OFF 1: Display off 0: Display on RESET 1: Being reset 0: Normal
Write display data	1	1	0	Write data								Write data from data bus into display RAM
Read Display data	1	0	1	Read data								Read data from display RAM onto data bus
Select ADC	0	1	0	1	0	1	0	0	0	0	0/1	0: CW output 1: CCW output
Static driver ON/OFF	0	1	0	1	0	1	0	0	1	0	0/1	Selects static driving operation. 1: static driver, 0: Normal driving
Select duty	0	1	0	1	0	1	0	1	0	0	0/1	Select LCD duty cycle 1: 1/32, 0: 1/16
Read-modify write	0	1	0	1	1	1	0	0	0	0	0	Read-modify-write ON
End	0	1	0	1	1	1	0	1	1	1	0	Read-modify-write OFF
Reset	0	1	0	1	1	1	0	0	0	1	0	Software reset

7. Cautions and Handling Precautions

7.1 Handling and Operating the Module

1. When the module is assembled, it should be attached to the system firmly. Do not warp or twist the module during assembly work.
2. Protect the module from physical shock or any force. In addition to damage, this may cause improper operation or damage to the module and back-light unit.
3. Note that polarizer is very fragile and could be easily damaged. Do not press or scratch the surface.
4. Do not allow drops of water or chemicals to remain on the display surface. If you have the droplets for a long time, staining and discoloration may occur.
5. If the surface of the polarizer is dirty, clean it using some absorbent cotton or soft cloth.
6. The desirable cleaners are water, IPA (Isopropyl Alcohol) or Hexane. Do not use ketene type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanent damage to the polarizer due to chemical reaction.
7. If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, legs, or clothes, it must be washed away thoroughly with soap.
8. Protect the module from static; it may cause damage to the CMOS ICs.
9. Use fingerstalls with soft gloves in order to keep display clean during the incoming inspection and assembly process.
10. Do not disassemble the module.
11. Protection film for polarizer on the module shall be slowly peeled off just before use so that the electrostatic charge can be minimized.
12. Pins of I/F connector shall not be touched directly with bare hands.
13. Do not connect, disconnect the module in the “Power ON” condition.
14. Power supply should always be turned on/off by the item Power On Sequence & Power Off Sequence.

7.2 Storage and Transportation

1. Do not leave the panel in high temperature, and high humidity for a long time. It is highly recommended to store the module with temperature from 0 to 35 ℃ and relative humidity of less than 70%
2. Do not store the TFT-LCD module in direct sunlight.
3. The module shall be stored in a dark place. When storing the modules for a long time, be sure to adopt effective measures for protecting the modules from strong ultraviolet radiation, sunlight, or fluorescent light.
4. It is recommended that the modules should be stored under a condition where no condensation is allowed. Formation of dewdrops may cause an abnormal operation or a failure of the module. In particular, the greatest possible care should be taken to prevent any module from being operated where condensation has occurred inside.
5. This panel has its circuitry FPC on the bottom side and should be handled carefully in order not to be stressed.