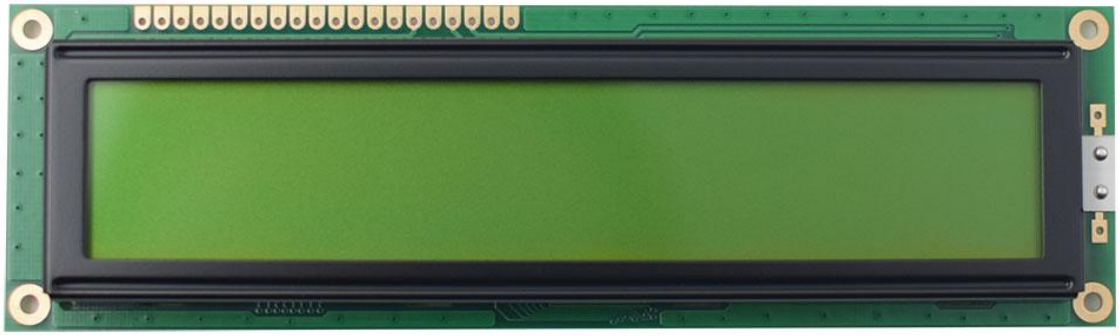
DisplayModule



DM-LCD20232-480

4.9″ 202 x 32 INDUSTRIAL Yellow Green GRAPHIC LCD - MCU

Contents

1 Revision History

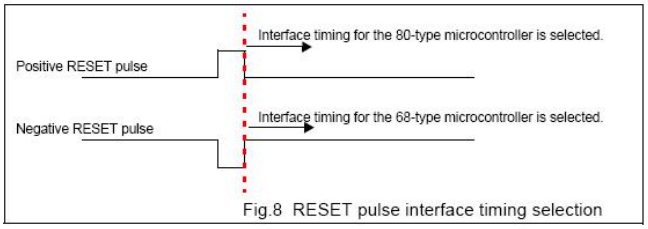
Date	Changes
2020-06-10	First release

2 Main Features

Item	Specification	Unit
Resolution	202 x 32	dots
Display Mode	STN Positive, Yellow Green, Transflective	-
Controller IC	SBN1661G	-
Interface	Parallel MPU Interface	-
Active area	119.16 x 18.86	mm
Module dimension	146.0 x 43.0 x 13.7(MAX)	mm
Pixel Pitch	0.59 x 0.59	mm
View Direction	6	o'clock
Duty	1/32	
Backlight	LED,Yellow Green	-
Weight	TBD	g

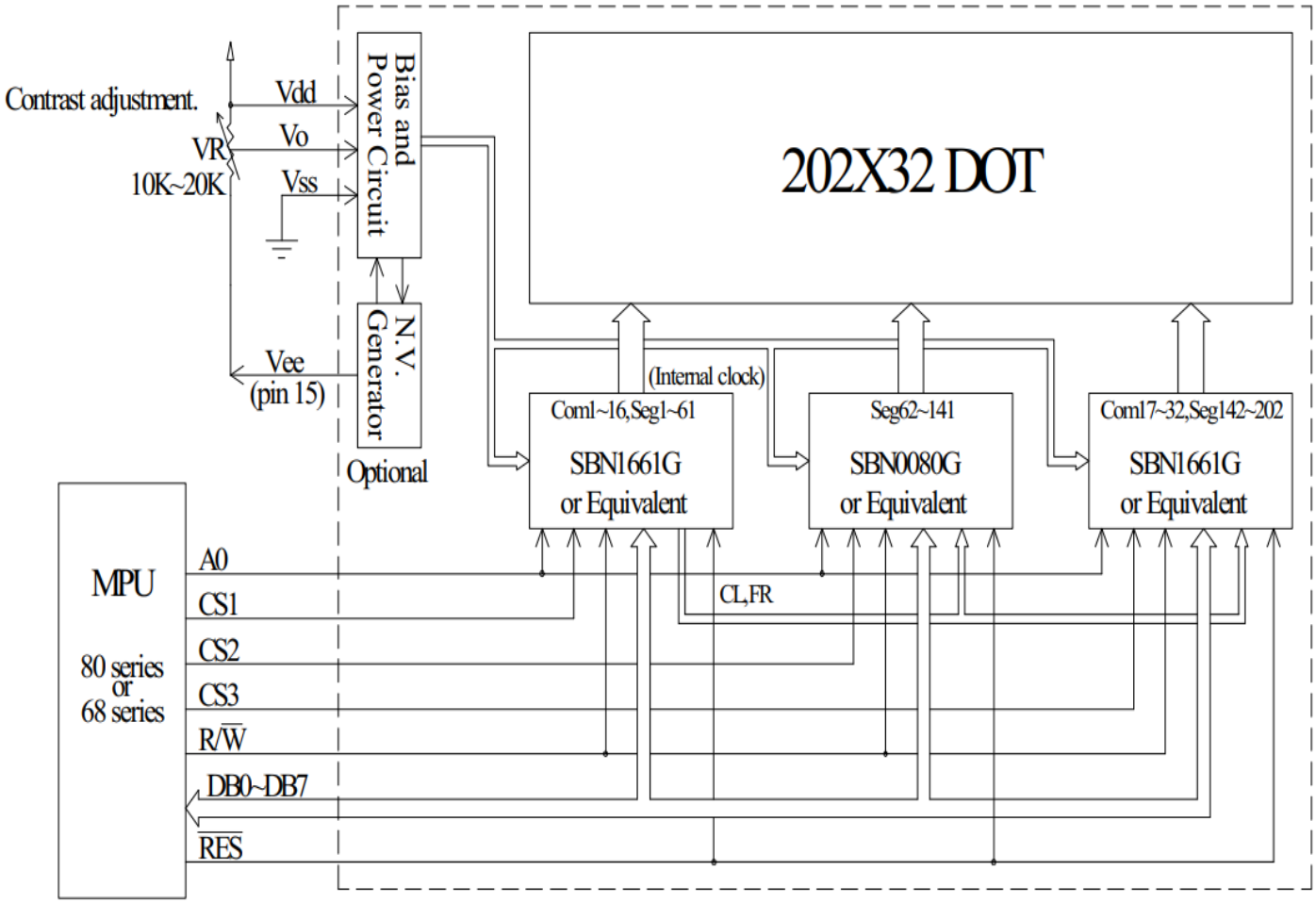
3 Pin Description

Pin No.	Symbol	Level	Description
1	VSS	0V	Ground
2	VDD	5.0V	Power Supply
3	VO	(Variable)	Operating voltage for LCD
4	A0	H/L	H : Data L : Instruction
5	R/W	H/L	Read/Write (R/W) signal for the 68-type microcontroller, or WRITE(WR) signal for the 80-type microcontroller. If a 68-type microcotroller is selected as the host microcontroller, this pin should be connected to the R/W output of the microcontroller. A HIGH level on this pin indicates that the microcontroller intends to read from the SBN1661G_X series. A LOW level on this pin indicates that the microcontroller intends to write to the SBN1661G_X series. If a 80-type microcontroller is selected as the host microcontroller, this pin should be connected to the WR output of the microcontroller. A LOW level on this pin indicates that the microcontroller intends to write to the SBN1661G_X series.
6	CS1	H/L	Enable signal (E) for the 68-type microcontroller, or READ (RD) signal for the 80-type microcontroller. If a 68-type microcotroller is selected as the host microcontroller, this pin should be connected to the ENABLE output of the microcontroller. A HIGH level on this pin indicates that the microcontroller intends to select the SBN1661G_X series. If a 80-type microcontroller is selected as the host microcontroller, this pin should be connected to the RD output of the microcontroller. A LOW level on this pin indicates that the microcontroller intends to read from the SBN1661G_X series..
7	DB0	H/L	Bi-direction, tri-state 8-bit parallel data bus for interface with a host microcontroller. This data bus is for data transfer between the host microcontroller and the SBN1661G_X.
8	DB1	H/L	Bi-direction, tri-state 8-bit parallel data bus for interface with a host microcontroller.

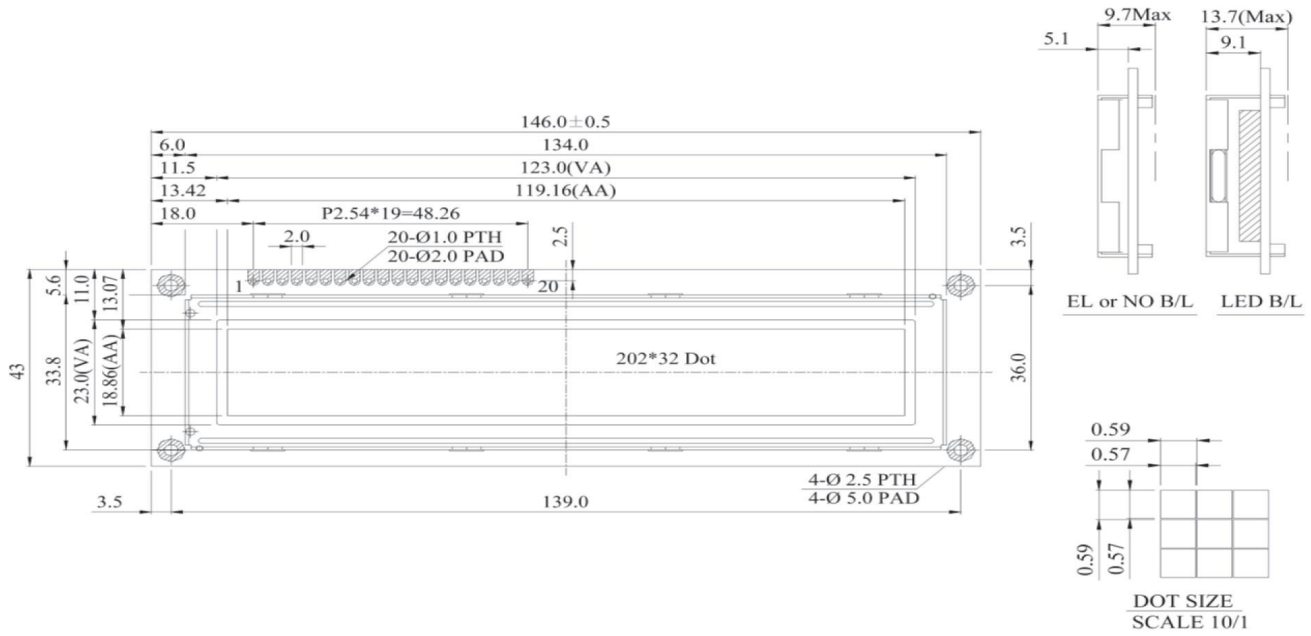
9	DB2	H/L	This data bus is for data transfer between the host microcontroller and the SBN1661G_X.
10	DB3	H/L	Bi-direction, tri-state 8-bit parallel data bus for interface with a host microcontroller.
11	DB4	H/L	This data bus is for data transfer between the host microcontroller and the SBN1661G_X.
12	DB5	H/L	Bi-direction, tri-state 8-bit parallel data bus for interface with a host microcontroller.
13	DB6	H/L	This data bus is for data transfer between the host microcontroller and the SBN1661G_X.
14	DB7	H/L	Bi-direction, tri-state 8-bit parallel data bus for interface with a host microcontroller.
15	VEE	-	Negative Voltage Output
16	RES	H/L	Hardware RESET and interface type selection. This pin is a dual function pin. It can be used to reset the SBN1661G_X and select the type of interface timing. The hardware RESET is edge-sensitive. It is not level-sensitive. That is, either a falling edge or a rising edge on this pin can reset the chip. The voltage level after the reset pulse selects the type of interface timing. If the voltage level after the reset pulse stays at HIGH, interface timing for the 68-type microcontroller is selected. If the voltage level after the reset pulse stays at LOW, then interface timing for the 80-type microcontroller is selected. Therefore, a positive RESET pulse selects the 80-type microcontroller for interface and a negative RESET pulse selects the 68-type microcontroller for interface. The following diagram illustrates the reset pulse and the selected type of microcontroller.  Fig.8 RESET pulse interface timing selection
17	A	—	Power Supply for LED backlight (+)
18	K	—	Power Supply for LED backlight (-)

19	CS2	H/L	Enable signal (E) for the 68-type microcontroller, or READ (RD) signal for the 80-type microcontroller. If a 68-type microcotroller is selected as the host microcontroller, this pin should be connected to the ENABLE output of the microcontroller. A HIGH level on this pin indicates that the microcontroller intends to select the SBN1661G_X series. If a 80-type microcontroller is selected as the host microcontroller, this pin should be connected to the RD output of the microcontroller. A LOW level on this pin indicates that the microcontroller intends to read from the SBN1661G_X series..
20	CS3	H/L	Enable signal (E) for the 68-type microcontroller, or READ (RD) signal for the 80-type microcontroller. If a 68-type microcotroller is selected as the host microcontroller, this pin should be connected to the ENABLE output of the microcontroller. A HIGH level on this pin indicates that the microcontroller intends to select the SBN1661G_X series. If a 80-type microcontroller is selected as the host microcontroller, this pin should be connected to the RD output of the microcontroller. A LOW level on this pin indicates that the microcontroller intends to read from the SBN1661G_X series..

4 Block diagram



5 Mechanical Drawing



Feature

1. Built-in oscillation
2. Built-in controller Avant (SBN1661G or equivalent)
3. 1/32 duty cycle
4. 2.85~5V power supply

Pin No.	Symbol	Description
1	V_{SS}	Ground
2	V_{DD}	Power supply for logic
3	V_O	Contrast Adjustment
4	A0	Data/ Instruction select signal
5	R/W	Read/Write select signal
6	CS1	Chip Select Signal for IC1
7	DB0	Data bus line
8	DB1	Data bus line
9	DB2	Data bus line
10	DB3	Data bus line
11	DB4	Data bus line
12	DB5	Data bus line
13	DB6	Data bus line
14	DB7	Data bus line
15	V_{EE}	Negative Voltage Output
16	RES	Controller reset signal, Active Low
17	A	Power supply for B/L +
18	K	Power supply for B/L -
19	CS2	Chip Select Signal for IC2
20	CS3	Chip Select Signal for IC3

Mechanical Data

Item	Standard Value	Unit
Module Dimension	146.0 x 43.0	mm
Viewing Area	123.0 x 23.0	mm
Mounting Hole	139.0 x 36.0	mm
Dot Pitch	0.59 x 0.59	mm
Dot Size	0.57 x 0.57	mm

Electrical Characteristics

Item	Symbol	Standard Value typ.	Unit
Input Voltage	VDD	5.0	V
Recommended LCD Driving Voltage for Normal Temp. Version module @25ºC	VDD-VO	5.0	V

Graphic 202 x 32 dots

6 Optics & Electrical Characteristics

6.1 Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
View Angles Top	Θ U	CR≧2	0	—	20	ψ = 180°
View Angles Bottom	Θ D	CR≧2	0	—	40	ψ = 0°
View Angles Left	Θ L	CR≧2	0	—	30	ψ = 90°
View Angles Right	Θ R	CR≧2	0	—	30	ψ = 270°
Response Time	T rise	-	-	200	300	ms
	T fall	-	-	250	350	ms
Contrast Ratio	CR	-	-	3	-	-
Luminance (Without LCD)	IV	I_{LED}=300 mA	200	260	-	cd/m²

6.2 Absolute Maximum Ratings

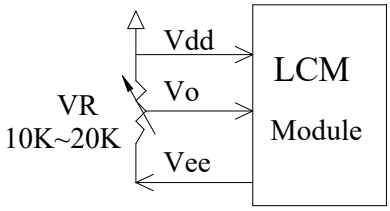
Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T_{OP}	-20	—	+70	℃
Storage Temperature	T_{ST}	-30	—	+80	℃
Input Voltage	V_{IN}	-0.3	—	V_{DD}+0.3	V
Supply Voltage For Logic	V_{DD}-V_{SS}	-0.3	—	6.0	V
Bios Voltage For LCD	V_{LCD}	3.5	—	13	V

6.3 Electrical Characteristics

Item	Symbol	Condition	Min	Typ.	Max	Unit
Supply Voltage For Logic	V_{DD}-V_{SS}	-	4.5	5.0	5.5	V
Supply Voltage For LCD *Note1	V_{DD}-V_0	Ta=-20℃ Ta=25℃ Ta=70℃	— 4.8 —	— 5.0 —	— 5.2 —	V V V
Supply Current	I_{DD}	V_{DD}=5.0V	-	10.0	-	mA
Low Level Input Voltage	V_{IL}	-	0	0.7	1.1	V
High Level Input Voltage	V_{IH}	V_{DD}=5.0V	3	5	V_{DD}+0.5	V
Low Level Output Voltage	V_{OL}	-	0	-	0.3	V
High Level Output Voltage	V_{OH}	-	V_{DD}-0.3	-	V_{DD}	V
Backlight Supply Voltage	V	-	3.9	4.2	4.5	V
Backlight Supply Current *Note2	I_{LED}	V=4.2V	240	300	360	mA

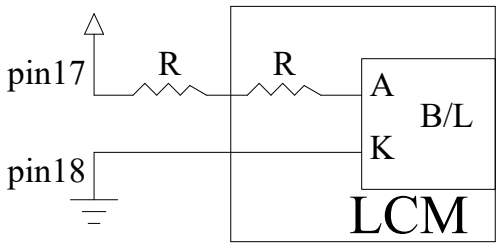
Please avoid the voltage difference between the VDD voltage level of the IC and the external unit such as MCU.

* Note1: Please design the VOP adjustment circuit on customer's main board

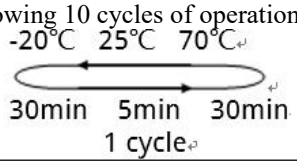


* Note2: 1 The LED of B/L is drive by current only, drive voltage is for reference only.Drive voltage can make driving current under safety area (current between minimum and maximum).

2.Drive from pin17,pin18



7 Reliability

Test Item	Content of Test	Test Condition	Note
High Temperature Storage	Endurance test applying the high storage temperature for a long time.	80℃ 200hrs	2
Low Temperature Storage	Endurance test applying the high storage temperature for a long time.	-30℃ 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70℃ 200hrs	-
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20 ℃ 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60℃,90%RH max, for 96hrs under no-load condition excluding the polarizer. Then taking it out and drying it at normal temperature.	60℃,90%RH 96hrs	1,2
Thermal Shock Resistance	The sample should be allowed stand the following 10 cycles of operation. 	-20℃/70℃ 10 cycles	-
Vibration Test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude: 15mm; Vibration:10~55Hz; One cycle 60 seconds to 3 directions of X, Y, Z, for each 15 minutes.	3
Static Electricity Test	Endurance test apply the electric stress to the terminal.	VS=± 600V(contact), ±800v(air), RS=330Ω CS=150pF 10 times	-

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal. Temperature and humidity after remove from the rest chamber.

Note3: Test performed on product itself, not inside a container

8 Recommendable Storage

1. Place the panel or module in the temperature 25℃ ±5℃ and the humidity below 65% RH.
2. Do not place the module near organics solvents or corrosive gases.
3. Do not crush, shake, or jolt the module.

9 Warranty and Conditions

http://www.displaymodule.com/pages/faq