

Particulate Matter Sensor

World's smallest PM sensor – BMV080

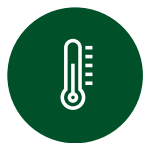
The BMV080 is the world's smallest particulate matter sensor (sensing element only $4.4 \times 3.0 \times 3.0 \text{ mm}^3$), tracking PM1, PM2.5, PM10 mass concentration directly in free space, in real-time, in complete silence (noiseless) and maintenance-free as there is no fan-induced dust build-up. The novel measurement principle based on fanless design and minimized form factor facilitate integration into ultra-compact Internet of Things (IoT) devices such as air quality monitors, smart thermostats, HVAC & air ventilation systems, smart air purifiers, and wearables to monitor local PM concentration in real-time to provide actionable data.



Target applications



Air quality monitors



Smart thermostats



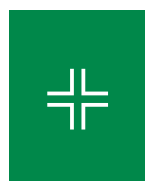
HVAC & air ventilation systems



Cooking

Activate ventilation & managing the stages.

Benefits



>450 times smaller in volume than alternatives

Enabling use in ultra-compact IoT devices.



Innovative fanless design

Allows noiseless, non-disturbing operation and makes the sensor maintenance-free for more reliability.



Precise PM measurement

Provides actionable data for improving well-being.



Fireplace

Trigger air purifiers in the right mode.



Subway station

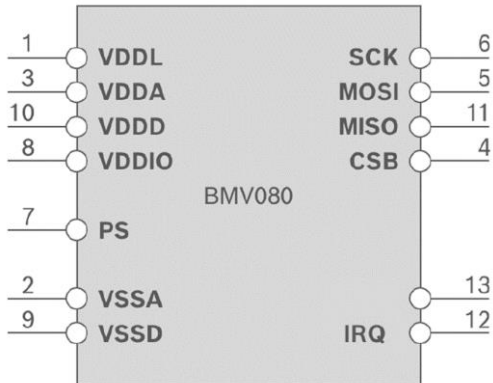
Assists on when to use a mask for health protection.

Technical features

BMV080 technical data	
Sensor dimensions	4.4 x 3.0 x 20 mm ³ including flex PCB based connector
PM2.5 measurement range ¹	0 – 1000 µg/m ³
PM2.5 output resolution ¹	1 µg/m ³
Precision (minimum detectable particle size ¹ 0.5 µm)	±10 µg/m ³ @ 0 – 100 µg/m ³ ±10% of measured value @ 101 – 1000 µg/m ³
Measurement modes	Continuous measurement mode Duty cycling measurement mode
Max ODR (output data rate)	0.97 Hz in continuous measurement mode Lower ODR rates configurable with duty cycling measurement mode
Interface	SPI, I ² C
Average total current ²	<68mA @ 0.97 Hz ODR
Sleep current	<30 µA
Supply voltage	1.2 – 3.3 V
Laser class	Class 1, according to IEC 60825-1
Weight	0.092 g

* Data and descriptions in this document are subject to change without notice.
¹ Specified under the standard test conditions (25°C ± 2 for ARD as particle source under laminar air flow conditions with 10 sec integration time using LAP322 as reference instrument). For more details, please refer to BMV080 datasheet.
² During active measurement.

Pin configuration



Pin	Name	Description
1	VDDL	Laser supply voltage (3.3V)
3	VDDA	ADC supply (2.5 – 3.3V)
10	VDDD	Digital supply voltage (2.5 – 3.3V)
8	VDDIO	Interface power supply (1.2 – 3.3V)
7	PS	Interface protocol select
2	VSSA	Analog ground
9	VSSD	Digital ground
6	SCK	Interface serial clock
5	MOSI	SPI: Master Out Slave In I ² C: Serial data line (SDA)
11	MISO	SPI: Master in Slave Out I ² C: I ² C address bit 0 (IAB0)
4	CSB	SPI: Slave select (nSS) I ² C: I ² C address bit 1 (IAB1)
12	IRQ	Interrupt (digital out). Active low
13	Do not connect	Keep pin floating



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