Invented for life

Particulate Matter Sensor

World’s smallest PM sensor – BMV080

The BMV080 is the world’s smallest particulate matter sensor (sensing element only 4.2 x 3.5 x 3.1 mm³) and measures PM2.5 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.

Fireplace
Trigger air purifiers in the right mode.

Subway station
Assists on when to use a mask for health protection.

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 PM2.5 measurement
Provides actionable data for improving well-being.

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Preliminary* technical features

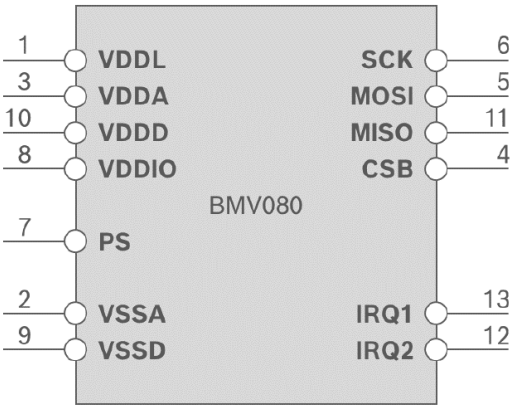
BMV080 preliminary* technical data	
Sensor dimensions (typ.)	4.2 x 3.1 x 20 mm³ including flex PCB based connector
PM mass concentration range	0 – 1000 µg/m³
PM mass concentration resolution	1 µg/m³
Precision (typ.)	±10 µg/m³ @ 0 – 100 µg/m³ ±10% of measured value @ 101 – 1000 µg/m³
Measurement modes	Continuous measurement mode Duty cycling measurement mode
Max ODR (output data rate)	1 Hz in continuous measurement mode *Lower ODR rates configurable in* duty cycling measurement mode
Power modes	Power mode #1, for indoor use-case Power mode #2, for outdoor use-case
Interface	SPI, I²C
Typical peak current[2] at 1 Hz ODR	<68 mA
Sleep current	<30 µA
Supply voltage	1.8 – 3.3 V
Start-up time	1.2 sec
Laser class	Class 1, according to IEC 60825-1
Operating temperature range	-10 to +40° C
Storage temperature range	-10 to +80°C
Weight	0.092 g

* Technical specs and data preliminary and subject to change without notice

[1] Specified at 25°C ±2 for ARD particles under laminar air flow conditions, 10 s integration time using LAP322 as reference.

[2] Specified for power mode #1

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 I²C: Serial data line (SDA)
11	MISO	SPI: Master in Slave Out I²C: I²C address bit 0 (IAB0)
4	CSB	SPI: Slave select (nSS) I²C: I²C address bit 1 (IAB1)
12	IRQ2	Interrupt 2 (digital out), Active low
13	IRQ1	Interrupt 1 (digital out), Active low

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