

MEMS Flow Sensor

Model SFD COB Form

FEATURES

- MEMS Thermopiles & Heater
- Excellent wetted parts compatibility
- No offset and Drift
- Pressure Resistant, >15 bar
- Simple Signal Conditioning



APPLICATIONS

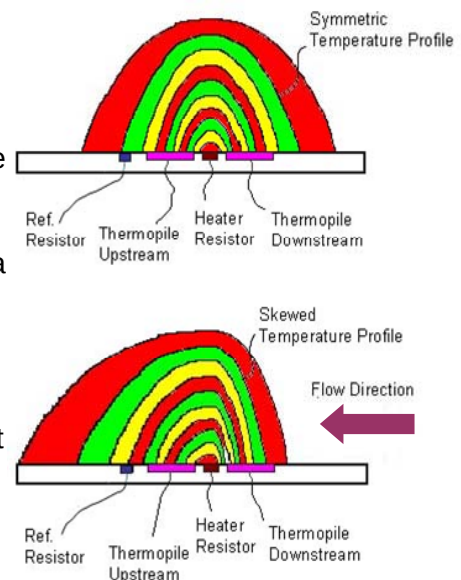
- Medical respirators and ventilators
- HVAC
- Process Control

DESCRIPTION

The SFD flow sensing die consists of two thermopiles symmetrically positioned upstream and downstream from a heater element which heats up the hot junctions. The thermopile generates an output voltage proportional to the temperature gradient between its hot and cold junctions (the Seebeck effect). The hot junctions of the thermopiles and the heater reside on a thermal isolation base.

In case the medium is static, the temperature profile upstream and downstream from the heater is symmetric; In case the medium flows, the temperature profile skews in the flow direction due to heat transport of the flowing medium, causing changes in thermopile output. Heat transport is proportional to mass flow and heat capacity of the medium. Therefore the sensor measures the mass flow of the medium

A reference resistor is placed next to the cold junction of the upstream thermopile to provide input for temperature compensation.



ADVANTAGE

The thermopile generates voltage output without biasing. As a result, there is no offset as well as offset drift. Excellent noise immunity to power supply is also gained.

Each thermopile consists of 20 thermocouples in series to reveal the highest level of sensitivity.

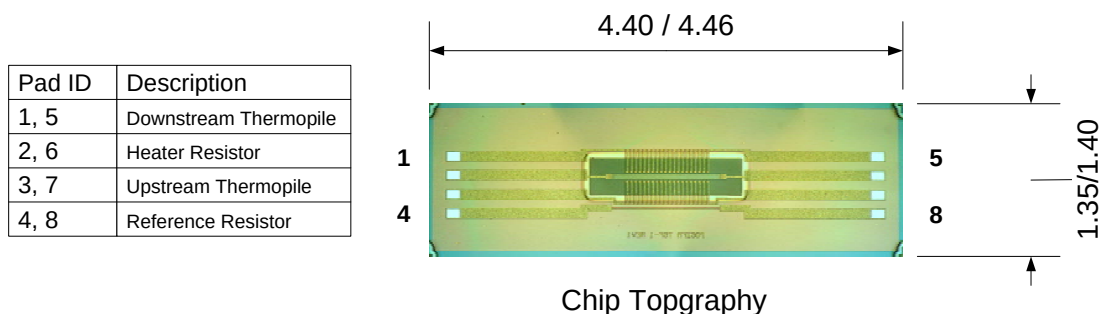
The unique thermal isolation design does not require thin membrane or surface cavity. As a result, the die can withstand pressure shock, and optional ceramic film is applicable to protect the sensor from corrosive gases/liquids and abrasive wear.

Free of surface cavity also allows the sensor to be used for liquid flow measurement.

CHARACTERISTICS

PARAMETERS	MIN	TYP	MAX	UNIT
Resistance – Heater	2.8	3.0	3.25	
Resistance – Reference	7209	7398	7722	
Resistance – Thermopile @25°C	60	62	65	k
TCR – Reference		- 578		ppm / °C
Exciting Current – Heater		6.5		mA
Output – Upstream @25°C, Air	157	165	177	mV
Output – Downstream @25°C, Air	157	165	177	mV
Response Time		< 10		mS
Null Drift		0.2		%FS/Yr
Temperature – Operating	- 20		105	°C
Temperature - Storage	- 40		125	°C
Over Pressure	15			bar

DIMENSION



Note:

The flow sensor is being sold and shipped in chip-on-board.

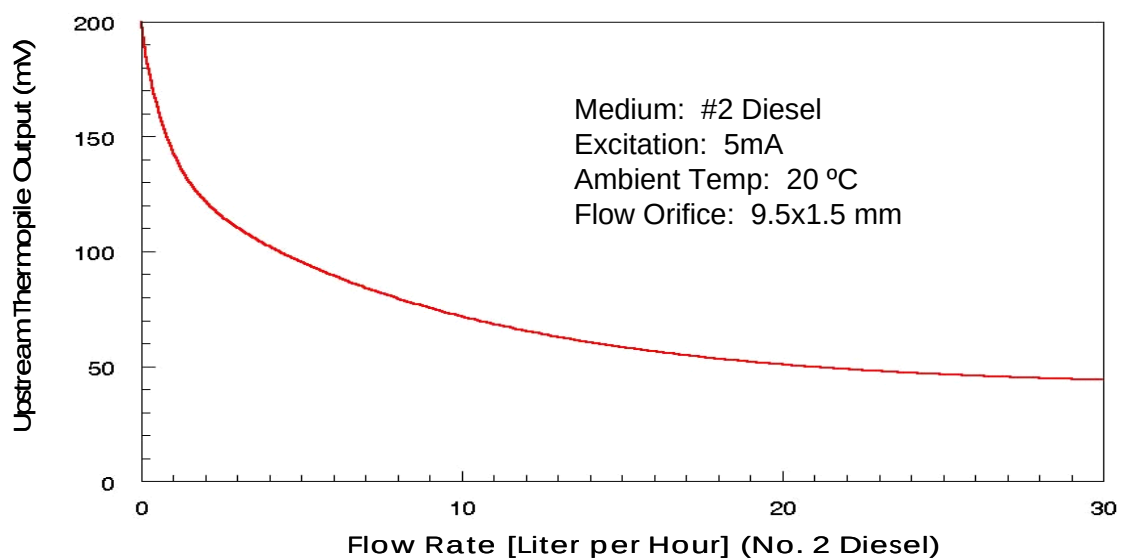
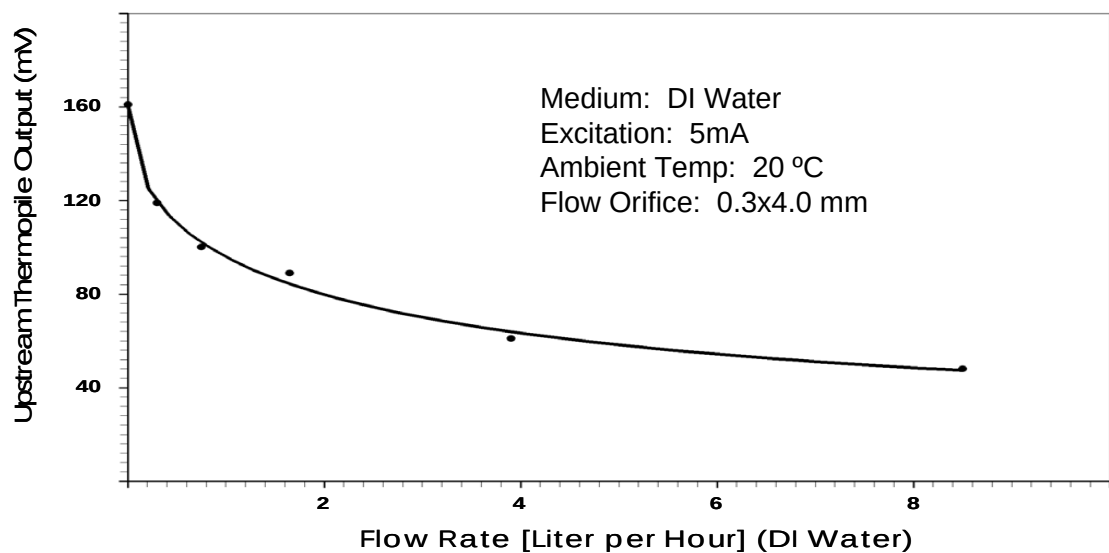
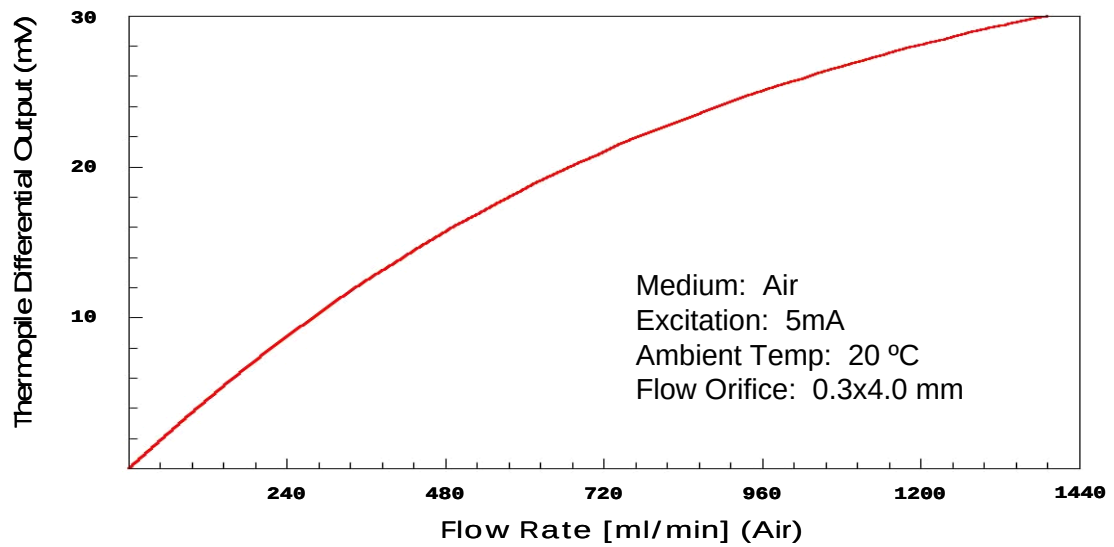
Customized thin film ceramic substrate is available upon request.

Please contact factory for the design guideline.

2/3

08-12 V2

TYPICAL OUTPUT



NOTES:

NG is dedicated to clean air. However NG can resist water condensation, dust particles, and corrosive chemical traces in the air. It can also be cleaned with DI water and IPA. What it cannot do is to operate (with heating current) while being immersed in DI water for an extended period of time.



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