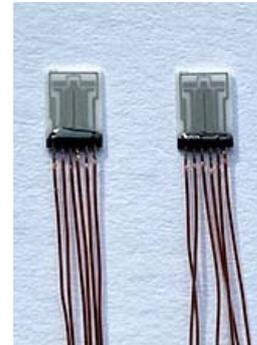


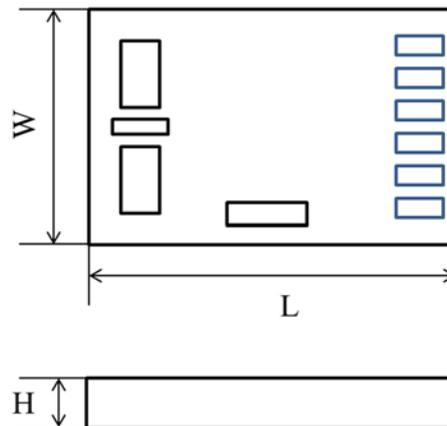
Thermal Mass Flow Sensor SXBW FA04

Benefits & Characteristics

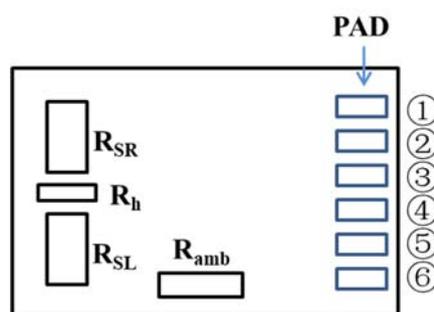
- Detection of flow direction
- Excellent long-term stability
- Simple signal processing
- Simple calibration
- Outstanding sensitivity
- Excellent reproducibility
- No moving mechanical parts



Illustration



Pin Assignment



1	2	3	4	5	6
GND	R _{SR}	R _H	R _H	R _{SL}	R _{amb}

Technical Data

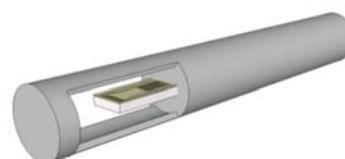
Dimensions (L × W × H)	5.05 mm × 3.55 mm × 0.20 mm
Operating measuring range	0 m/s to 1 m/s (half bridge mode) 0 ml/min to 50 ml/min (half bridge mode), tube ID about 1 mm 0 m/s to 100 m/s (CTA mode) 0 l/min to 5 l/min (CTA mode), tube ID about 1 mm
Minimum operating range	0 ml/min to 2.5 ml/min
Response sensitivity	0.001 m/s (50 µl/min)
Accuracy	< 2 % of the measured value (dependent on the electronics and calibration)
Response time t_{63}	< 0.5 s
Operating temperature range	-20 °C to +150 °C
Temperature sensitivity	< 0.1 %/K (dependent on the electronics)
Heater	$R_H(25\text{ °C}) = 34\ \Omega \pm 10\ %$
Measuring element	$R_{SL}(25\text{ °C}) = 425\ \Omega \pm 10\ %$ $R_{SR}(25\text{ °C}) = 425\ \Omega \pm 10\ %$
Reference element	$R_{amb}(25\text{ °C}) = 710\ \Omega \pm 10\ %$
Voltage range (nominal)	2 V to 5 V (dependent on flow rate)
Connection	Cu-wire, enameled, Ø 0.2 mm

Mounting

The following mounting possibilities serve as inspiration, only. If you have any questions regarding specific mounting possibilities, please contact us to find the best possible solution for your application.

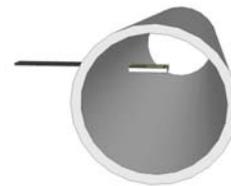
1. Duct mounting flow probe

Sensor mounted in a duct flow probe. The direction of the air flow must be across the sensor meaning an air flow flowing over the active sensor surface.



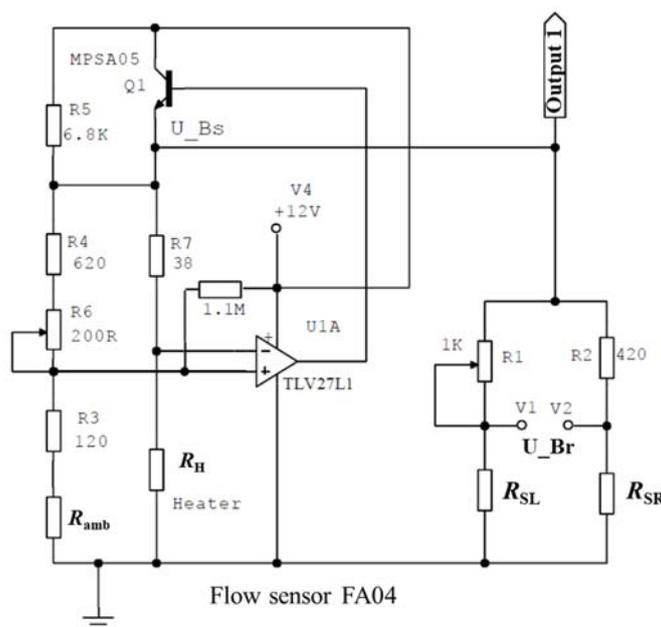
2. Customized channel / pipe with flow sensor

Sensor mounted in an air flow channel. The direction of the air flow must be across the sensor meaning an air flow flowing over the active sensor surface.



Circuit recommendation

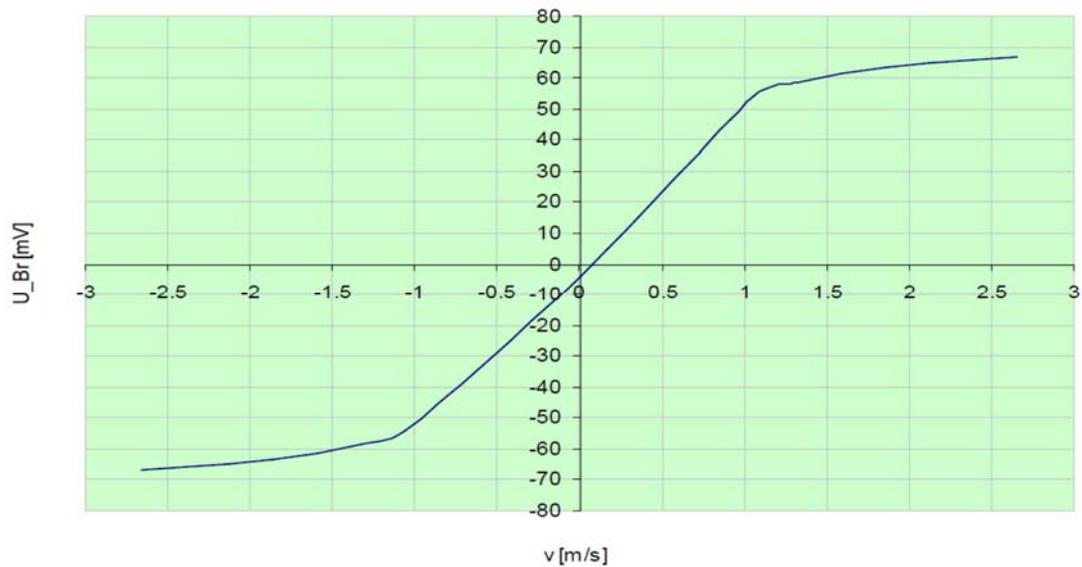
The following figure is the reference design circuit. Op amps, transistors and other circuits can be selected according to the needs. The resistor elements R1, R2, R3, R4, and R7 need to use low temperature coefficient resistors, with $TCR \leq 20\text{ppm}$; R6 with $TCR \leq 100\text{ppm}$.



1. Characteristic for small flow measurement with direction output

The heater R_H is fed by a constant voltage or a constant temperature.

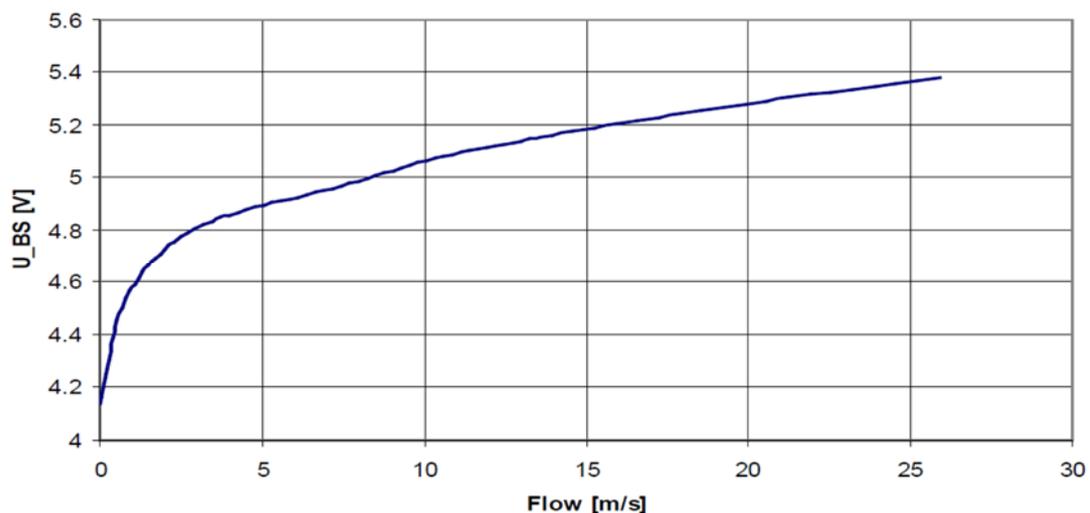
As shown in the scheme above, the two sensor-elements (R_{SL} and R_{SR}) need to be connected in a bridge circuit. With a corresponding supply VCC , the bridge balance $U_{Br} = V1 - V2$ is dependent of the mass-flow. If the bridge balance is aligned at flow = 0 to $U_{Br} = 0$, the sign gives the information about the direction of the flow. For this the resistor R1 has to be adjustable.



Typical signal – curve between 0 m/s to 2.5 m/s

2. Characteristic for high flow measurement with direction output

A flow direction-independent signal output 1 and/or U_{Bs} is available likewise and represents the flow dependent entire heat transfer of the sensor into the medium. This is taken with larger measuring ranges than 2.5m/s. The signal U_{Br} to application can further be used for direction detection.



Typical signal – curve between 0 m/s to 25 m/s