FS2

Thermal Mass Flow Sensor

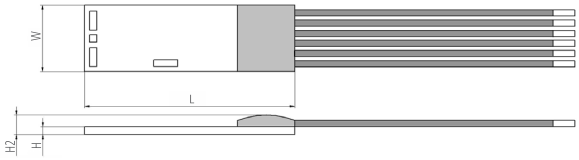
Optimal for measuring gas flow and direction

INNOVATIVE SENSOR TECHNOLOGY

Benefits & Characteristics

- Detection of flow direction
- Simple signal processing
- Outstanding sensitivity
- Stable platinum technology
- No moving mechanical parts
- Excellent long-term stability
- Simple calibration
- Bare sensor element resists up to +450 °C (customer specific)
- Excellent reproducibility
- Customer specific sensor available upon request

Illustration[1)]



1) For actual size, see dimensions

Technical Data

Dimensions (L x W x H / H2 in mm):*	5 x 3.5 x 0.20 / 0.60
Operating measuring range:	0 ml/min to 50 ml/min (half bridge mode) 0 m/s to 1 m/s (half bridge mode) 0 m/s to 100 m/s (CTA mode) 0 l/min to 5 l/min (CTA mode)
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)
Connection:*	Cu-wire, enamelled, Ø 0.2 mm
Heater:*	R_H (25 °C) = 34 Ω ±10 %
Measuring element:*	R_{s_i} (25 °C) = 425 Ω ±10 %
Reference element:*	R_R (25 °C) = 710 Ω ±10 %
Voltage range (nominal):*	2 V to 5 V (dependent on flow rate)

* Customer specific alternatives available

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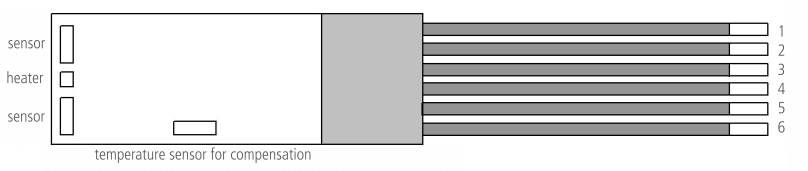
Pin Assignment



1	2	3	4	5	6
GND	temperature sensor 1	heater	heater	temperature sensor 2	temperature sensor for compensation

Order Information - Cu-wire, enamelled, Ø 0.2 mm

Wire length	25 mm	300 mm
	FS2T.0.1E.025	FS2T.0.1E.300
Order code	050.00130	350.00053

INNOVATIVE SENSOR TECHNOLOGY
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Application Note
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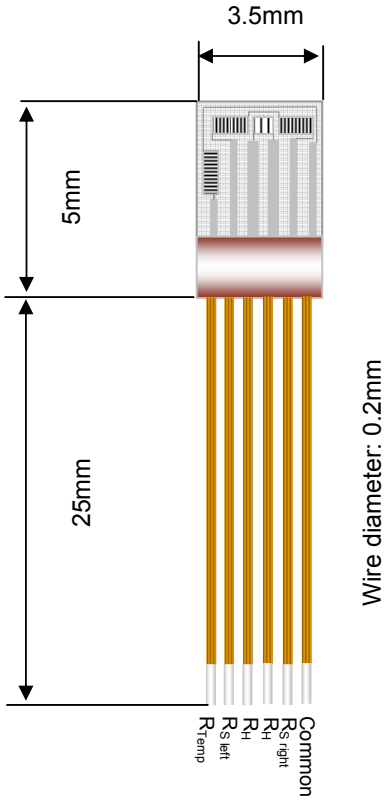
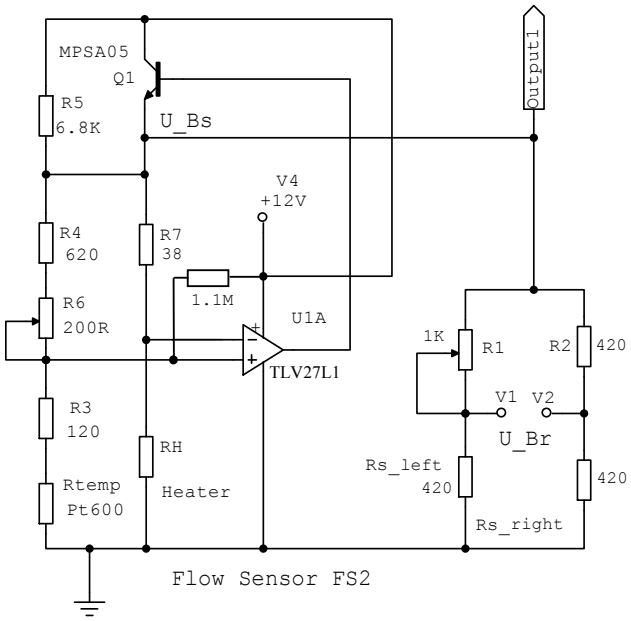
Terminal connection of sensor chip



Circuit recommendation

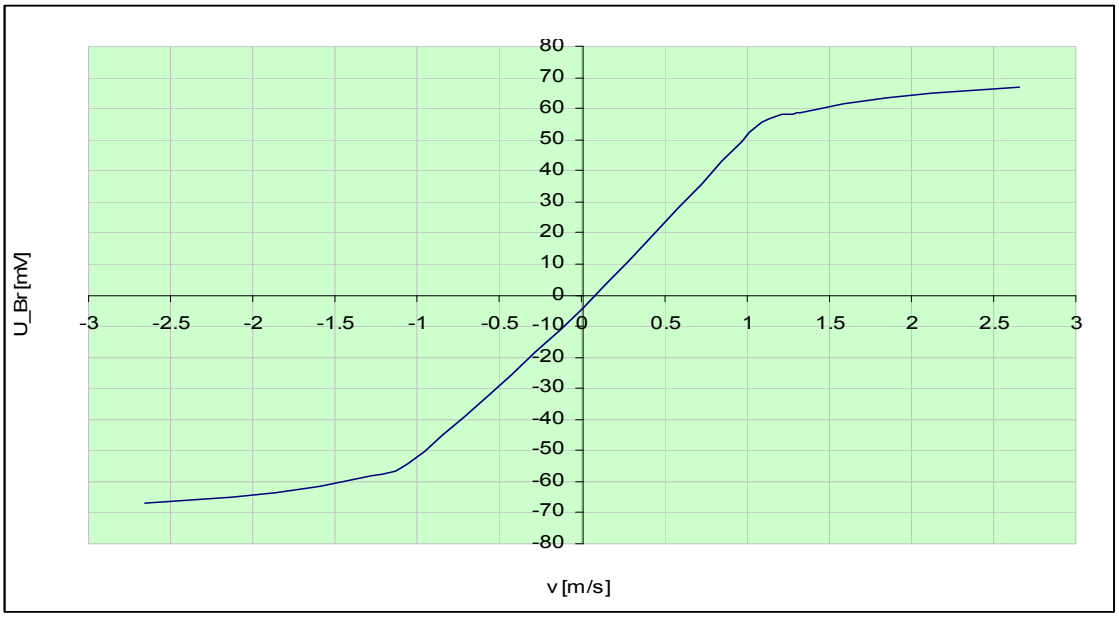


Application Note
Measuring small and high flows and its direction

FS2

Example – 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 ($R_{S\ left}$ and $R_{S\ right}$) can be connected in a bridge circuit.
With a corresponding supply VCC, the bridge balance V_Br = V1-V2 is depending of the mass-flow. If the bridge balance is adjusted at flow = 0 to V_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 ... 2.5 m/s

Flow range from 2.5m/s to 50m/s

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 can be taken in order to measure larger flow ranges than 2.5m/s. The signal U_Br can be further used to detect flow direction.

Application Note
Measuring small and high flows and its direction
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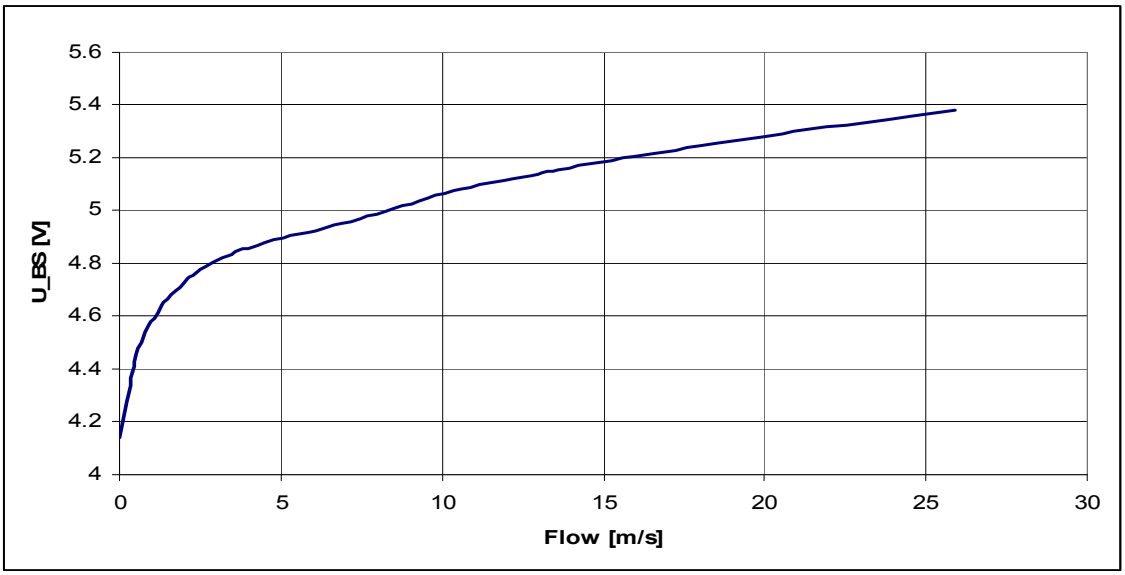
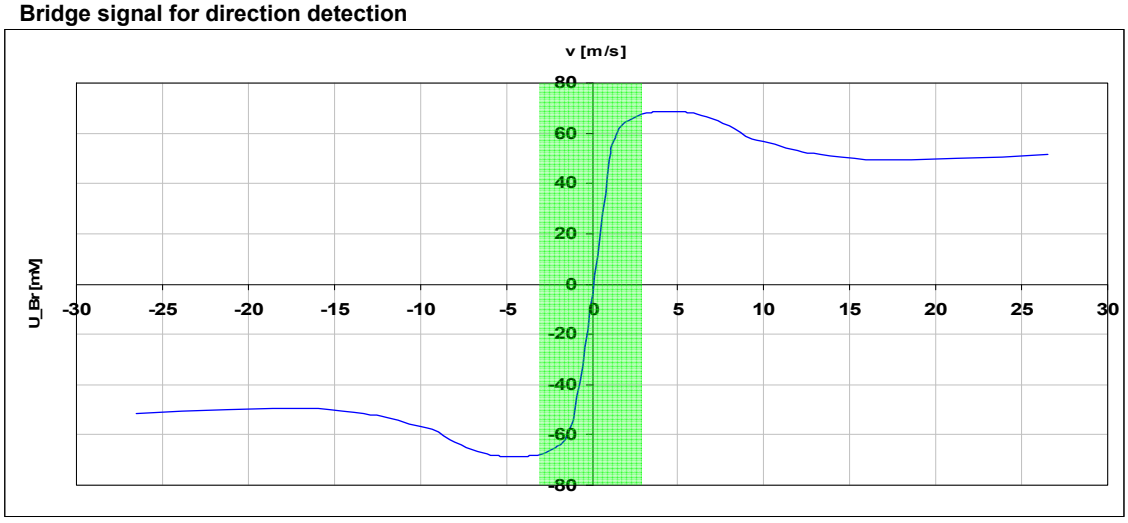
INNOVATIVE SENSOR TECHNOLOGY

Example – Characteristic for high flow measurement with direction output



Bridge signal for direction detection



Custom specific solutions

The electrical connections can be fabricated custom specific.
Custom specific chip design on request.

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