

## Description

The FS1025 MEMS Liquid Flow Sensor Module measures the flow rate using the thermo-transfer (calorimetric) principle. The FS1025 is designed to measure liquids.

The FS1025 offers key advantages over resistor-based flow solutions. The sensor utilizes thermopile sensing, which provides an excellent signal-to-noise ratio. The sensor comprises a “solid” thermal isolation technology and silicon-carbide coating, which protects it from abrasive wear and provides robustness and long-term reliability. In comparison, other sensors typically contain a fragile membrane above an etched cavity for the thermal isolation base.

There are no moving mechanical parts that can break in contrast to other flow meter types, such as a turbine-type meter. The FS1025 has minimal flow resistance, making it highly suitable for gravity-feed applications or for replacing a high-power pump with a lower power device.

The FS1025 complies with the *NSF/ANSI 61: Drinking Water System Components – Health Effects* standard.

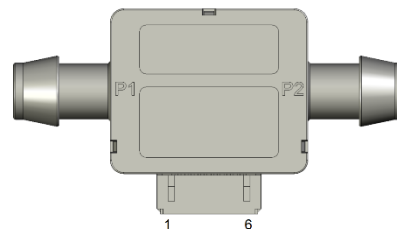
## Typical Applications

- Beverage equipment
- Liquid-dispensing system
- Process controls and monitoring
- Fluid leak detection

## Features

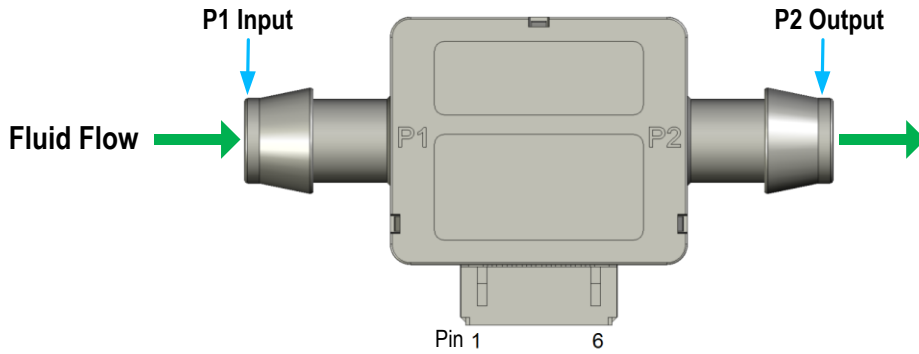
- Liquid flow: 0 to 7 liters/min
- Robust “solid” isolation technology
- Resistant to surface contamination
- No cavity to cause clogging
- Resistant to vibration and pressure shock
- Low-power application
- Minimal flow resistance
- Fast response: < 5ms
- Flow voltage output: 0V to 4.5V (uncalibrated)
- Thermistor voltage output: 1V to 4.5V
- Supply voltage: 5V
- Module operating temperature range: 5°C to +75°C

## FS1025 Flow Sensor Module



## Pin Assignments

**Figure 1. Pin Assignments for Module – Top View**



## Pin Descriptions

**Table 1. Pin Descriptions**

| Pin Number | Pad Name | Type | Description                   |
|------------|----------|------|-------------------------------|
| 1          | VDD      | In   | Supply voltage                |
| 2          | GND      | In   | Ground                        |
| 3          | OUTPUT   | Out  | Flow analog output            |
| 4          | NC       | —    | Do not connect <sup>[a]</sup> |
| 5          | HE       | In   | Heater enable, +5V            |
| 6          | TEMP     | Out  | Thermistor analog output      |

[a] “NC” stands for not connected / no connection required / not bonded.

## Absolute Maximum Ratings

The absolute maximum ratings are stress ratings only. Stresses greater than those listed below can cause permanent damage to the device. Functional operation of the FS1025 at absolute maximum ratings is not implied. Exposure to absolute maximum rating conditions might affect device reliability.

**Table 2. Absolute Maximum Ratings**

| Symbol     | Parameter           | Conditions | Minimum | Maximum | Units |
|------------|---------------------|------------|---------|---------|-------|
| $V_{IN}$   | Supply Voltage      |            |         | 5.5     | V     |
| $T_{STOR}$ | Storage Temperature |            | 0       | 80      | °C    |

## Operating Conditions

**Table 3. Recommended Operating Conditions**

| Symbol    | Parameter                     | Minimum | Typical | Maximum | Units |
|-----------|-------------------------------|---------|---------|---------|-------|
| $V_{IN}$  | Supply Voltage                | 5.0     |         | 5.5     | V     |
| $T_{AMB}$ | Ambient Operating Temperature | 5       |         | 75      | °C    |
| $P_{CM}$  | Common-Mode Pressure          |         |         | 30      | PSI   |

## Electrical Characteristics

**Table 4. Electrical Characteristics**

| Symbol     | Parameter              | Conditions   | Minimum | Typical | Maximum | Units     |
|------------|------------------------|--------------|---------|---------|---------|-----------|
| $I_{VIN}$  | Current Consumption    |              |         | 15      |         | mA        |
| $FLQ$      | Liquid Flow Range      |              | 0       |         | 7       | Liter/min |
| $V_{OUT}$  | Analog Voltage Output  | Uncalibrated | 0       |         | 4.5     | V         |
| $V_{NULL}$ | Flow Null Voltage      |              | 0       | 0.1     | 0.3     | V         |
| $\tau_H$   | Flow Response Time [a] |              |         | 5       |         | msec      |
| $V_{TEMP}$ | Temperature Output     | At 5°C       |         | 4.25    |         | V         |
|            |                        | At 80°C      |         | 1.0     |         | V         |

[a] The flow response time includes a 10% to 90% rise time for the flow sensor to electrically respond to any liquid flow change. Measurements might be affected by the pneumatic interface.

## Mechanical Drawings

The module dimensional drawing is located at the end of this document. The package information is the most current data available and is subject to change without notice or revision of this document.

## Ordering Information

Note: The part code depends on the application. In the part code, NG refers to “non-corrosive gas” and LQ refers to “liquid.”

| Orderable Part Number | Description and Package   | Shipping Packaging | Temperature  |
|-----------------------|---|--------------------|--------------|
| FS1025                | FS1025: 0 to 7 liter/min liquid flow sensor module with amplified analog output | Box                | 5°C to +75°C |

## Revision History

| Revision Date     | Description of Change |
|-------------------|-----------------------|
| December 14, 2017 | Initial release.      |



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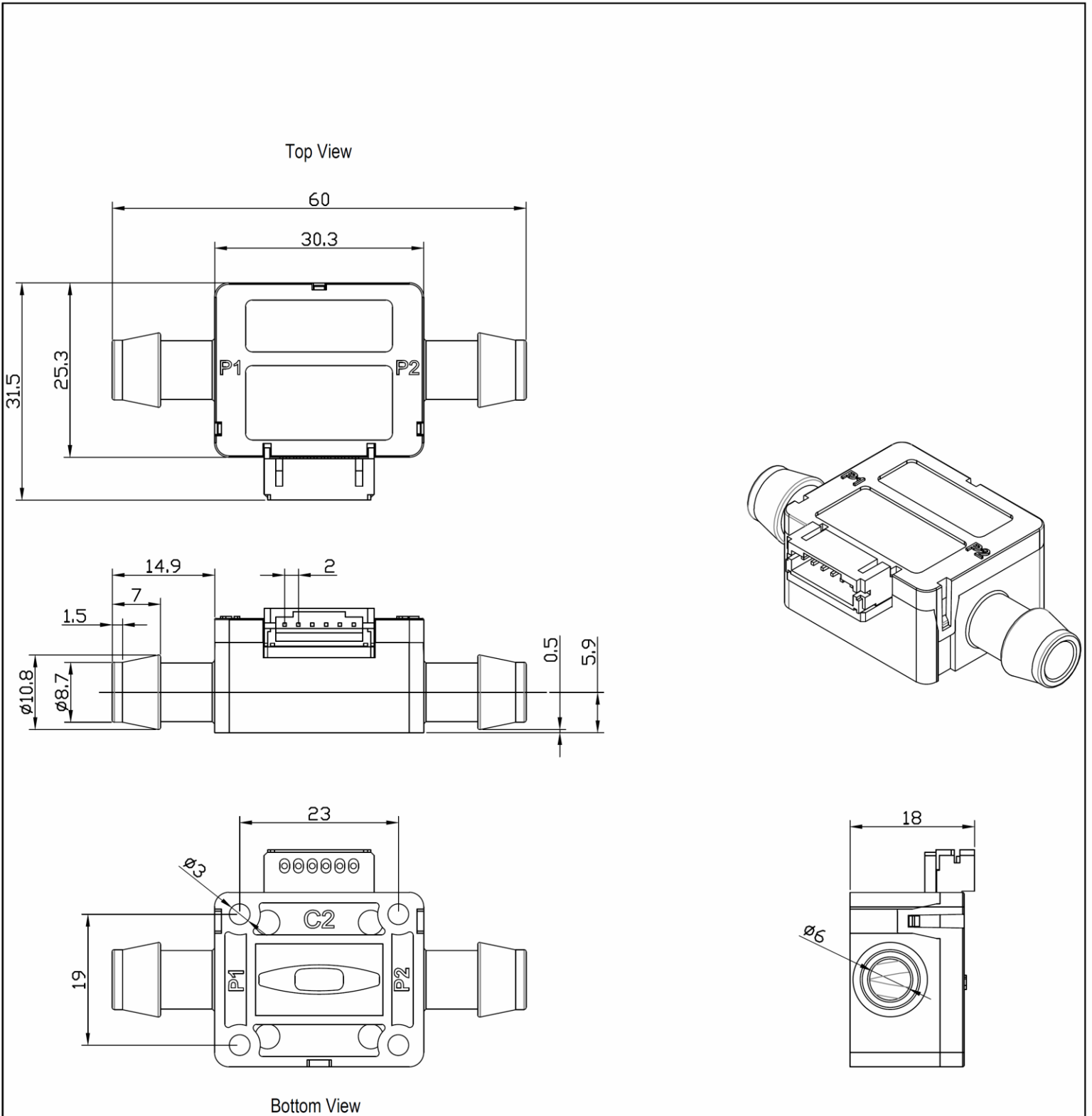
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| Package Revision History |         |                 |
|--------------------------|---------|-----------------|
| Date Created             | Rev No. | Description     |
| Nov 28, 2017             | Rev 00  | Initial Release |