

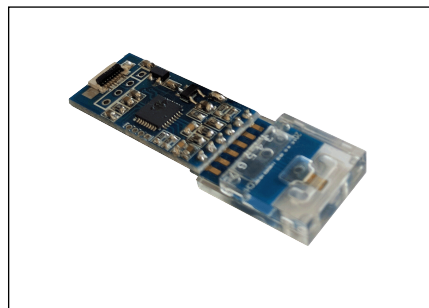
MEMS Liquid Flow Sensors

Model LF1100 Series



Features

- ✎ Low flow rate applications till 600 $\mu\text{L}/\text{min}$
- ✎ Low power consumption < 40 mW
- ✎ Small form factor
- ✎ Excellent sensor reliability
- ✎ Digital output with fast response time
- ✎ Available for disposable applications



Description

The LF1100 series liquid flow sensors are manufactured using the proprietary MEMS flow sensing and package technology. The sensors use the calorimetric thermal flow sensing principle and the circuitry employs an ASIC chip. It measures flow rate up to 600 $\mu\text{L}/\text{min}$ in water and provide bi-directional option.

The sensor is packaged in a manifold that can also be used in disposable applications. A EEPROM would be on board to store the calibration data for system level access. The communication interface between the EEPROM and the control board is I²C.

The sensor can be further customized for the range, package as well as user interfaces.

1. Sensor Performance

1.1 Specifications

All data unless otherwise noted apply for calibration with distilled water at 20°C, 101.325 kPa gague pressure.

Model	LF1100	
Full Scale Flow Rate	300, 600, or ± 300 , ± 600 , or customer specified	$\mu\text{L}/\text{min}$
Turn-down Ratio	100:1	
Accuracy	$\pm 5\%$ reading or $\pm 0.15\%$ FS whichever is greater	
Repeatability	± 0.5	%FS
Offset Stability	± 0.15	mV
Supply Voltage	5.5 ~ 28	Vdc
Power Consumption	40	mW
Current Draw	8	mA
Response Time	10	ms
Output	Digital with I ² C	
Maximum Pressure	0.5	MPa
Operating Temperature	5 ~ 50	°C



1.2 Additional Specifications

Pins Out	4 Pin, 2.54 mm centers, 0.635 mm square	
Calibration	Distilled water @ 20 °C, 101.325 kPa	
Packaging material	Polycarbonate	
Dimensions	47 x 15 x 4.8	mm ³
Weight	10	g
Storage Temperature ¹	-10 ~ +60	°C

¹ No icing inside the flow path.

2. User Interface

2.1 Pin Definition

The LF1100 series provide a 4 pin interface. The pin layout and definition are indicated in Figure 2.1 and Table 2.1 respectively.

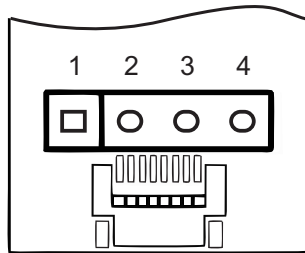


Figure 2.1 Pin configuration

Pin Num.	Definition
1	Vcc (input DC voltage)
2	SCL (I ² C clock)
3	SDA (I ² C data)
4	GND (ground)

Table 2.1 Pin definition

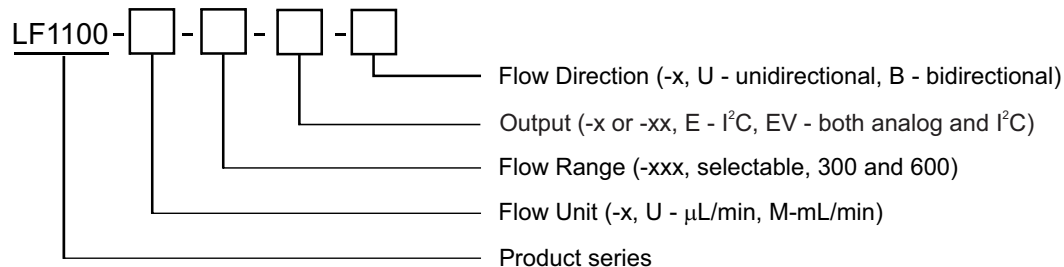
2.2 Pin Description

VCC and GND: the LF1100 requires a power supply of 5.5~28 Vdc. The voltage is internally regulated for the circuitry. Therefore, there is no special requirements for the external power supply.

SDA and SCL: I²C communication data and clock pins. For detailed description, please refer to the document, LiquidFlowSensor-I²C-CommunicationProtocol-V1.0.0.pdf.

3. Ordering Guide

The sensor part number is composed of the model number and suffix indicating the full scale flow rate, output format as well as the flow direction. Refer to the followings for details.





4. Mechanical Dimensions and Mountings

The LF1100 has a dimension of 47 x 15 x 4.8 mm³. The dimension is illustrated in Figure 3.1.

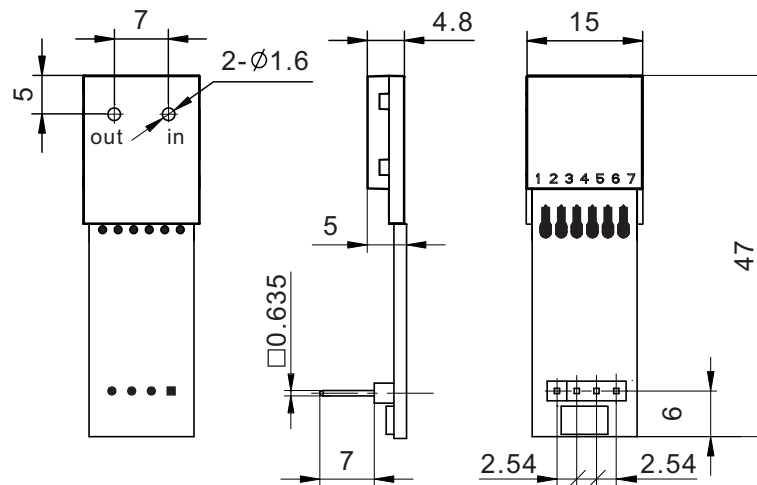


Figure 3.1: Mechanical dimensions of the LF1100.

Important Notices

Wetted Materials and Compatibility

The sensor's flow channel is made of medical compatible plastics. The sensor chip comprises of silicon, silicon nitride and silicon dioxide and the sensor chip surfaces are passivated with silicon nitride and silicon dioxide. The electronic sealing is provided by RTV (room temperature vulcanizing) silicone sealant WR-704 composed of $\text{HOCH}_3(\text{SiO})_n$, CH_3H .

Cautions for Handling and Installations

The product at the time of shipment is fully inspected for product quality and meets all safety requirements. Additional safety measures during handling and installation should be applied. To prevent ESD (electrostatic discharge) damage and /or degradation, take customary and statutory ESD precautions when handling. Do not power the product with the correct polarity, voltage and amperage. All precautions and measures for electrical voltage handling must apply. The product sealing is ensured to work under working pressure of 0.5MPa and is leakage proof before the shipment. But cautions and further leakage test are important at installation as well since any leakage may cause severe safety issues.

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