Microvalve

Model 4425

Gas Microvalve Normally Closed Low Cost

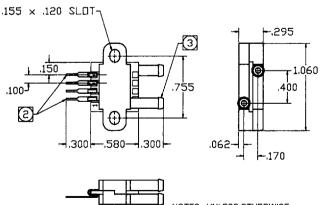
Features

- Proportional Response
- Low Power
- Fast Response
- Miniature Size
- 25 psig Operating Pressure
- PC Board Mountable

Typical Applications

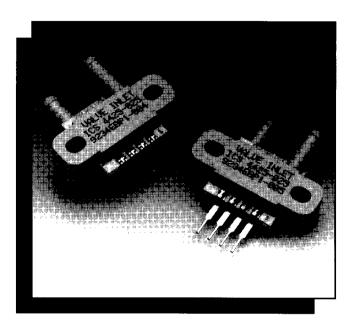
- I/P Converters
- Pneumatic Controls
- Respirators/Ventilators
- Medical Instrumentation
- Pressure Regulators
- Flow Controls
- Analytical Instruments

Connections/Dimensions



- NOTES: UNLESS OTHERWISE SPECIFIED
- 1. ALL DIMENSIONS ARE FOR REFERENCE ONLY.
- APPLY DC VOLTAGE TO PINS 1 AND 4. POLARITY NOT SPECIFIED.
- 3. HOSE BARBS FOR 125 I.D. HOSE.
 GAS INLET AS LABELED OR ON
 SUBSTRATE SIDE WITH CIRCUIT
 TRACES LEADING UNDER CAP.

Preliminary



Description

The Model 4425 is the world's first commercially available silicon microvalve. This normally closed microvalve offers proportional control of gas flows in the range of 0-150 cc/min with an operating pressure range of 25 psig.

Batch fabricated using state-of-the-art silicon micromachining technology, these microvalves consist of a centrally bossed silicon diaphragm mated to an etched silicon valve body. An aluminum film is deposited on the diaphragm to form the bimetallic actuator. By varying the electrical power dissipated in resistors implanted in the diaphragm, and thus the temperature of the actuator, the thermal expansion difference between silicon and metal results in the controlled displacement of the central boss away from the valve seat.

The valve chip is then attached to a ceramic substrate, electrical connections are made, and plastic caps are bonded to each side of the ceramic to provide the gas connections. Filters are included inside the package to keep particles from entering the valve chip, though filtered, clean gas is recommended for use with the microvalves. The package can be mounted to a PC board, panel mounted, or stacked for multi-valve applications.

In addition to a family of standard products, IC Sensors can provide customized solutions including multi-valve packages and valves with different characteristics. Please contact IC Sensors to discuss your specific requirements.

Performance Specifcations

Ambient Temperature = 25°C (Unless otherwise specified)

| PARAMETER | MIN | TYP | MAX | UNITS | NOTES |
|--------------------------------|---|------|-----|-------|-------|
| Operating Pressure | | | 25 | psi | |
| Flow Rate | | 100 | 150 | sccm | 1 |
| Leak Rate | | 0.02 | | sccm | 200 |
| Power Required | | 300 | 500 | mW | 3 |
| Response Time (10 to 90% flow) | Madd | 100 | | msec | |
| Internal Volume | | 0.12 | | сс | |
| Operating Voltage | | 3.5 | 5 | VDC | |
| Operating Current | | 85 | 100 | mA | |
| Actuator Resistance | | 40 | | ohm - | |
| Burst Pressure Limit | | | 50 | psi | 4 |
| Back Pressure Limit | | | 25 | psi | |
| Operating Temperature | -20°C to + 70°C | | | | |
| Storage Temperature | -40°C to +125°C | | | | |
| Weight | 0.3 Grams | | | | |
| Supply Filtration Recommended | 25 micron | | | | |
| Exposed Materials | Silicon, alumina ceramic, acrylic copolymer membrane filter, Ultem™ plastic, epoxy (Ablebond™ 789-3), aluminum, gold, RTV | | | | |

Notes

- Refer to Figure 1 for graph of typical flow vs. pressure characteristics at constant input power.
- Without power applied (valve OFF or closed), the flow through the valve is typically less than the specified rate.
- Refer to Figure 2 for graph of typical flow vs. power (voltage x current) characteristics at constant input pressure.
- Burst pressure limit applies to maximum inlet pressure without damage to valve.
- Back pressure limit applies to maximum inlet pressure applied to outlet without damage to valve.

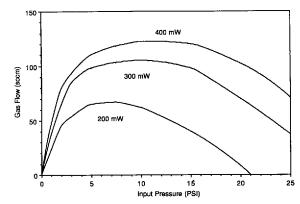


Figure 1. Typical Flow vs. Pressure Characteristics

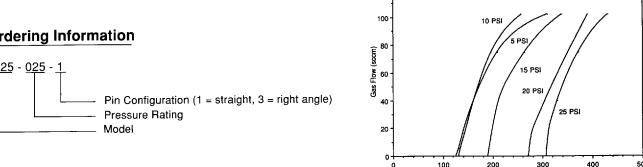
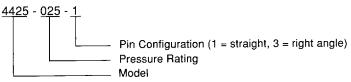


Figure 2. Typical Flow vs. Power Characteristics

Ordering Information



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