



Microvalve

Model 4425

## Gas Microvalve Normally Closed Low Cost

Preliminary

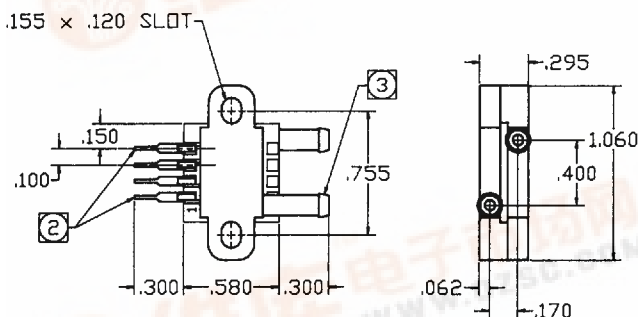
### Features

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

### Typical Applications

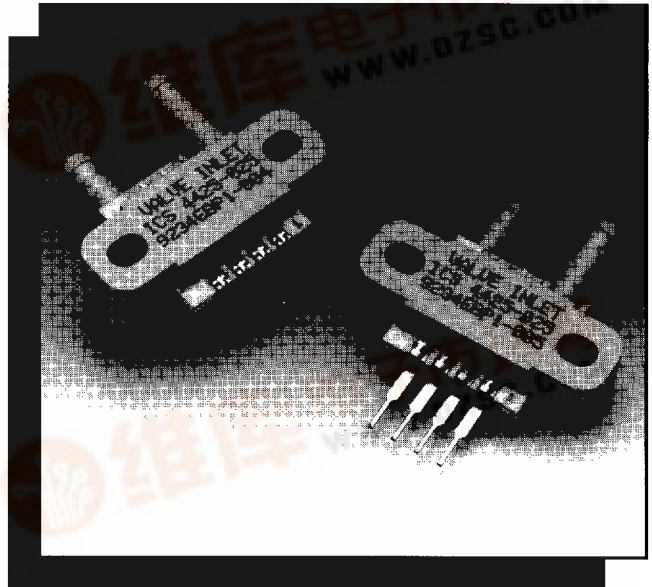
- I/P Converters
- Pneumatic Controls
- Respirators/Ventilators
- Medical Instrumentation
- Pressure Regulators
- Flow Controls
- Analytical Instruments

### Connections/Dimensions



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS ARE FOR REFERENCE ONLY.
2. 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.



### 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.



# Model 4425

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## Performance Specifications

Ambient Temperature = 25°C (Unless otherwise specified)

PARAMETER	MIN	TYP	MAX	UNITS	NOTES
Operating Pressure	3		25	psi	1
Flow Rate		100	150	sccm	1
Leak Rate		0.02		sccm	2
Power Required		300	500	mW	3
Response Time (10 to 90% flow)		100		msec	
Internal Volume		0.12		cc	
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	5
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

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

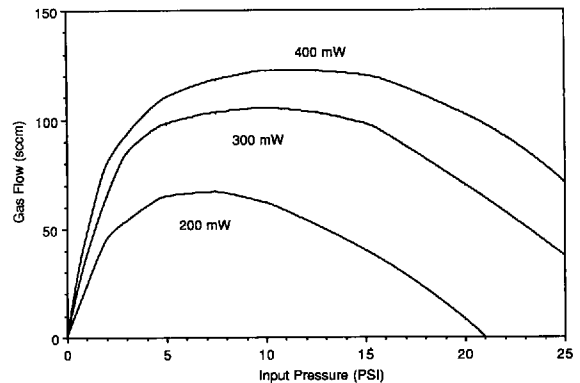


Figure 1. Typical Flow vs. Pressure Characteristics

### Ordering Information

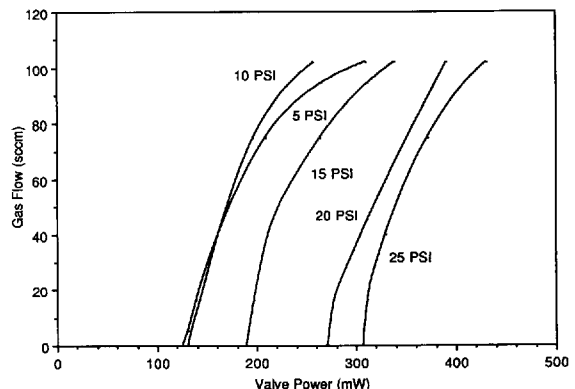
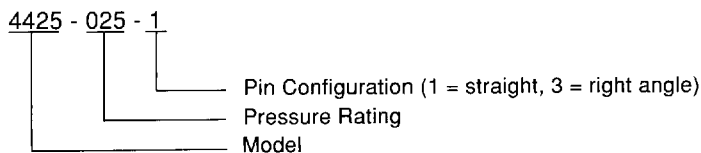


Figure 2. Typical Flow vs. Power Characteristics