

## DESCRIPTION

The PVC4000 series is a vacuum transducer designed for cost-effective OEM integration. It consists of a MEMS thermal conduction sensor (Pirani sensor), measuring electronics, and a microprocessor, packaged in an ultra-compact PCB assembly

The sensor element is based on Posifa's proven, second-generation MEMS thermal conduction chip that operates under the principle that the thermal conductivity of gases is proportional to its vacuum pressure.

The electronics and microprocessor amplify and digitize the sensor signal, and provide the output via an I<sup>2</sup>C interface. Because thermal conductivity of vacuum varies with the ambient temperature, a temperature compensation algorithm is implemented in the microprocessor, taking input from a built-in temperature sensor.

To prevent signal drift due to sensor chip self-heating, the microprocessor includes a pulsed excitation scheme whereby the sensor chip is heated for about 100 ms and then turned off for one second.

Output from PVC4000 is uncalibrated. As an option, users of PVC4000 can choose to input up to ten pairs of calibration points via the I<sup>2</sup>C interface into the microprocessor. A built-in piecewise linearization algorithm will leverage this data to provide calibrated output.

To further facilitate integration, PVC4000 includes a connector-terminated wire harness that is soldered onto the PCB assembly.



## FEATURES

- Range: 0.001 to 760 Torr (0.13 to 101K Pa)
- Fast Response Time < 1.2 s
- Low power consumption for battery-powered instruments
- Temperature compensation
- Pulsed sensor excitation to prevent signal drift in high vacuum
- Piecewise linearization algorithm and I<sup>2</sup>C interface for storing calibration data (optional)
- Resistant to contamination

## APPLICATIONS

- Portable digital vacuum gauges
- Vacuum pumps with built-in digital vacuum gauges

## ABSOLUTE MAXIMUM RATINGS

- Operating Temperature: -25 to 85 °C
- Storage Temperature: -40 to 90 °C
- Shock: 100 g peak (5 drops, 3 axis)
- Overpressure: 27.5 bar

## ELECTRICAL CHARACTERISTICS

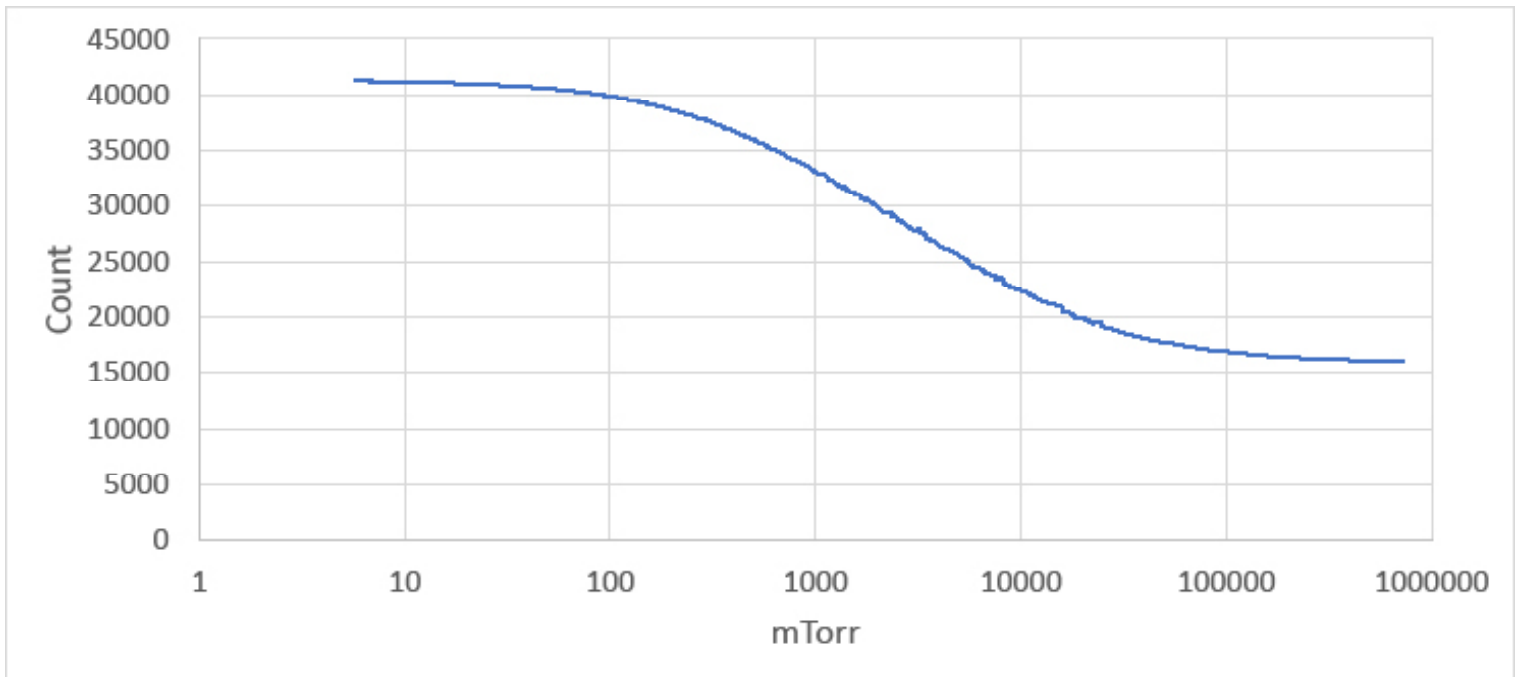
| Test Conditions: Vdd = 3.3 Vdc, Ta=21°C          |                  |       |       |       |                           |
|--|------------------|-------|-------|-------|---------------------------|
| SPECIFICATIONS                                   | MIN              | TYP   | MAX   | UNIT  | CONDITIONS                |
| Range  | 10 <sup>-3</sup> |       | 760   | Torr  |                           |
| Output at Atmosphere                             | 13500            | 17500 | 20000 | Count | 760 Torr                  |
| Output at 3 x 10 <sup>-2</sup> Torr <sup>1</sup> | 37000            | 40800 | 44000 | Count | 3 x 10 <sup>-2</sup> Torr |
| Response Time                                    |                  | 1.2   |       | s     |                           |
| Supply Voltage                                   | 2.7              |       | 5.5   | Vdc   |                           |
| Operating Current                                |                  | 11    |       | mA    | When heater is turned on  |
| Operating Temperature Range                      | -25              |       | 85    | °C    |                           |
| Storage Temperature                              | -40              |       | 90    | °C    |                           |

Note:

1. Sensor output is not calibrated.

## TYPICAL OUTPUT CURVE

Vdd = 3.3, Ta = 21°C



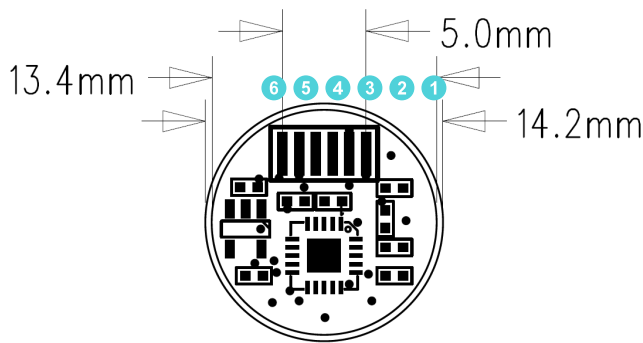
## LOW-POWER OPERATION

For battery-powered instruments that require further reduction in power consumption we recommend powering PVC4000 in an intermittent mode:

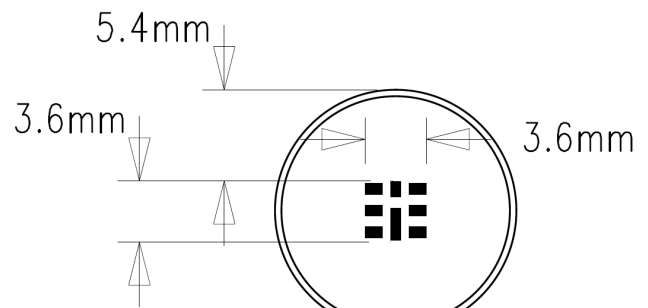
1. Turn on PVC4000
2. Wait for 150 milliseconds
3. Read from the I<sup>2</sup>C interface
4. Turn off PVC4000
5. Wait for 1 second, and repeat from Step 1

## PACKAGE DIMENSIONS

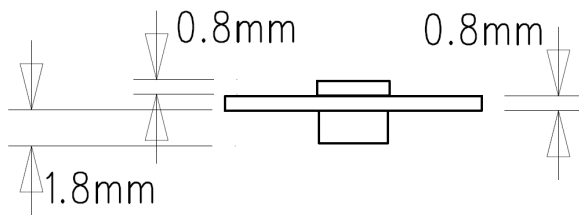
### PVC4000



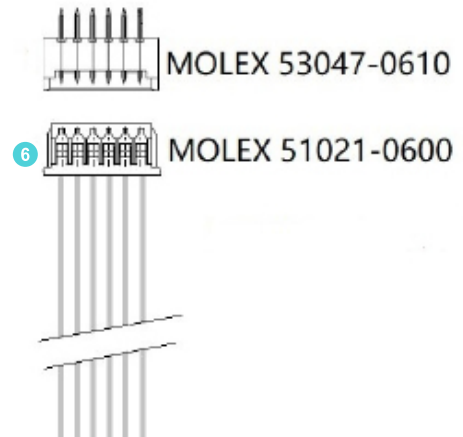
Top



Bottom



Side



| Pad/Wire# | Description (Wire Color)            |
|-----------|-------------------------------------|
| 1         | Vdd (Red)                           |
| 2         | GND (Black)                         |
| 3         | SDA (Yellow)                        |
| 4         | SCL (Green)                         |
| 5         | ICPCK (for firmware update) (Blue)  |
| 6         | ICPDA (for firmware update) (White) |

Note: PVC4000 comes with a wire harness that is soldered onto the PCB. The length is 56mm (2.2 inch). The wire harness is terminated with a Molex connector P/N 51021-0600.

## ORDERING INFORMATION

| PART NUMBER | SPECIFICATIONS                           |
|-------------|--|
| PVC4001     | 10 <sup>-3</sup> to 760 Torr, SMD sensor |

Please contact Posifa or your local distributor to place an order.

### EUROPEAN DISTRIBUTOR

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