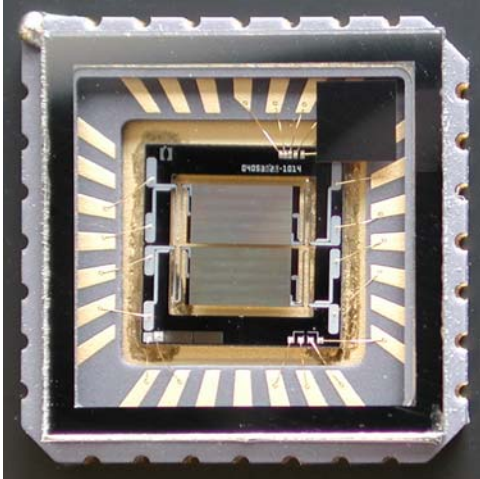


SensorChip™ CO₂ sensor

A Single Component NDIR Sensor



BENEFITS:

- A highly integrated single component MEMS device
- Contains source, detector, and filter in one
- Low power consumption, <120 mW
- Large inband optical power
- High wall plug efficiency ~10%
- Low system cost
- Fast response time (100 msec)
- Capable of analog thermal compensation

Description:

The **SensorChip CO₂** sensor is a highly integrated single component IR sensor containing all elements of an NDIR optical bench on a single discrete silicon chip. The device generates tuned narrowband infrared radiation eliminating the need for optical filters. This is achieved through Ion Optics' patented PCE (photonic crystal enhanced) emitter technology. When designed into a retroreflecting optical cell the hot filament source also acts as a narrowband infrared bolometer detector. The device has two elements for use in thermal compensation algorithms.

The **SensorChip CO₂ sensor** device performance is described in the fractional attenuation verses concentration plots shown below. This data is presented for various path lengths in order to demonstrate the broad application space this technology can fulfill. By varying the optical path the system can be customized to align with the specific requirements of the application.

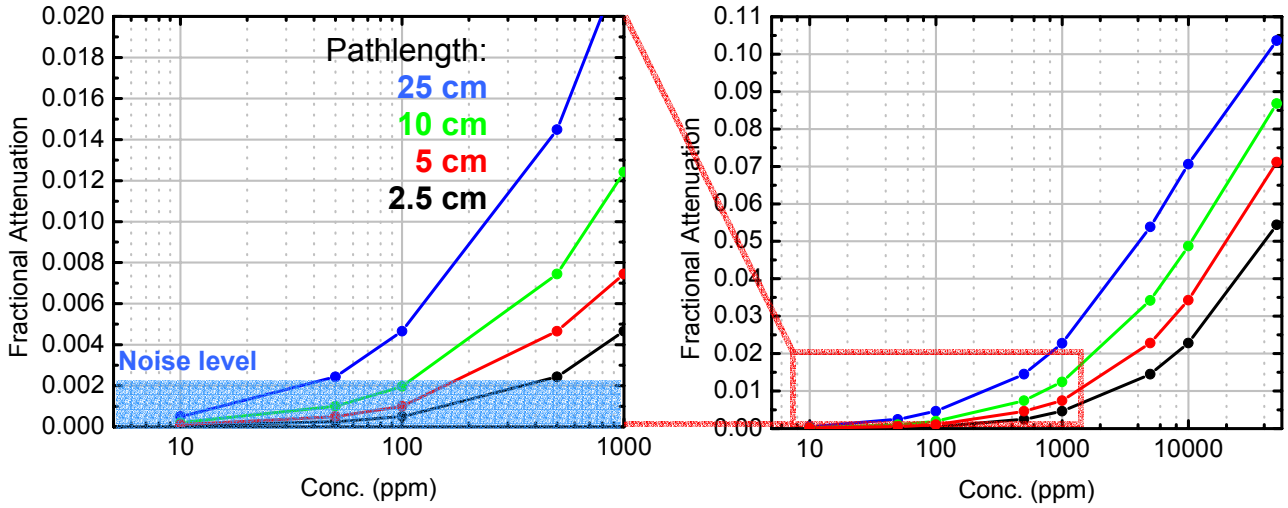
Applications:

The low power highly integrated **SensorChip CO₂ sensor** system is ideal for many carbon dioxide sensing applications including:

- | | | |
|---------------------------|----------------------------|-----------------|
| ➤ HVAC indoor air quality | low power | small footprint |
| ➤ Medical Capnometry | flow through or sidestream | battery powered |
| ➤ Industrial Safety | small footprint | battery powered |
| ➤ Incubators | | |

SensorChip CO₂ sensor units can also be operated in intermittent mode for drift compensation and to extend the operational life of battery powered systems.

Preliminary Data Sheet



The device can be used as a transmit receive module in conjunction with a spherical mirror as shown in the schematic diagram below. When one of the filaments of the device is aligned to the center of the spherical mirror a gas cell is generated with optical pathlength of twice the radius of the mirror as shown. The device sensitivity is described in the graphs shown above for different pathlengths. The noise equivalent fractional attenuation @ 1 Hz update rate = 0.002 (shown in light blue).

Schematic of optical cell configuration and reference drive circuit:

