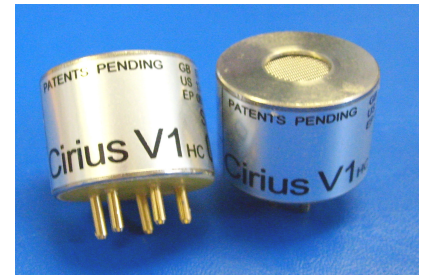


# Cirius V1

Gas

Voltage output Infrared  
Sensor for Hydrocarbons



Patented GB2449433

## Features

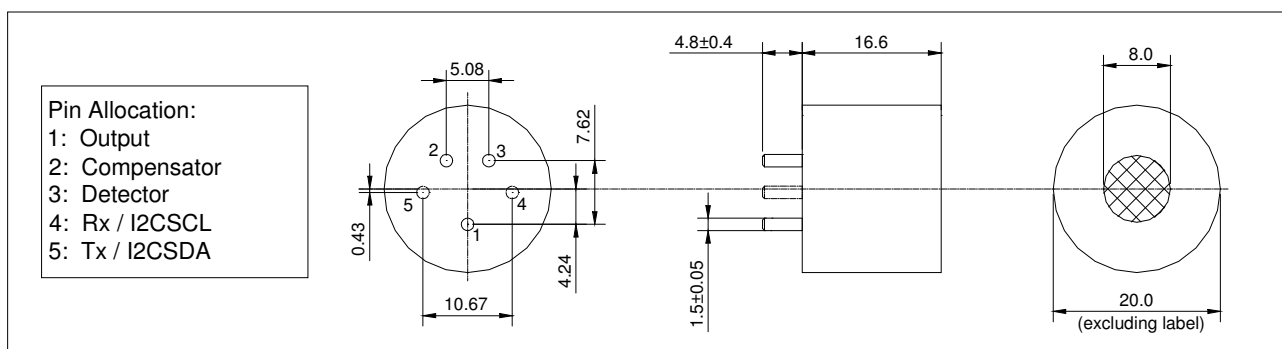
- Operates independent of supply polarity
- Temperature compensated detectors
- Integrated electronics produce a linear or a pellistor format voltage output
- Operating voltage range 3.0V – 5.0V
- Designed to comply with the SIL specification
- Sensing ranges: 0-100% LFL Methane, 0-100% LFL Hydrocarbons and 0-100% volume Methane
- All metal construction
- Small internal volume
- 'Lightlocked': not affected by external illumination
- Low power
- Flexible electronic configuration access
- User calibration also enabled by hardware connections
- Wide operating temperature range
- Fast response
- Immunity from 'poisoning'
- Electrically isolated housing

## Description and Operation

The Cirius V range of sensors use the non-dispersive infrared method to detect the presence of gases. The sensors contain an infrared radiation source, a dual element infrared detector, a unique optical waveguide into which gas diffuses and integrated ARM7 cored microprocessor based electronics to provide a voltage output which is independent of the power supply polarity. The sensors can be configured to provide a linear voltage output, typically 0.4V – 2.0V over range with respect to the negative supply pin, or a pellistor format output, typically mid supply at zero with the voltage output increasing with respect to the detector pin by 100mV at range. In addition, the output can be read and the internal configuration can be accessed by a UART or I<sup>2</sup>C serial communications link. The integrated electronics perform all the functions of driving the optical parts of the sensor, extracting the detector signals, converting the signals to a concentration, applying temperature compensation and scaling the output. When in a pellistor configuration, the Cirius V sensor can replace catalytic sensors in existing circuitry subject to the power supply requirements. External components will be required to meet the power supply requirement when Cirius V sensors are used in constant current pellistor circuitry. Technical support on implementation and application notes are available from Clairair Limited.

## Outline Details

All dimensions in millimetres ( $\pm 0.1$ mm unless noted)



# Absolute Maximum Ratings

Ambient temperature range: -40°C to +80°C

Supply voltage (measured between pins 2 and 3): 5.5V

## Handling Precautions



### Electrostatic Sensitive Devices

The Cirius range of sensors contain electrostatic sensitive components. Anti-static handling precautions should be observed when handling these products.

### Soldering to pins may seriously damage the sensor

Connections should be made via PCB sockets only.

## Performance

Unless otherwise stated all data was taken using:

Supply voltage of 3.5V. Ambient temperature (between 20°C and 25°C). Ambient pressure (between 995 hPa and 1020 hPa). Gases diluted in nitrogen. Gas Flowrate 1litre/min across sensor face.

|                              |                                                                               |
|------------------------------|-------------------------------------------------------------------------------|
| Power consumption:           | 280mW typical                                                                 |
| Default output range:        |                                                                               |
| Voltage mode:                | 0.4V – 2.0V                                                                   |
| Pellistor mode:              | 0 – 100mV from mid supply relative to detector pin                            |
| Response time ( $T_{90}$ )   | < 30s                                                                         |
| Warm up time:                |                                                                               |
| To operation                 | < 60s                                                                         |
| To specification             | < 30 minutes                                                                  |
| Nominal ranges:              | 0 – 5% volume methane<br>0 – 100% LFL hydrocarbons<br>0 – 100% volume methane |
| Minimum resolution:          |                                                                               |
| At zero                      | < 0.5% of range                                                               |
| At range                     | < 2% of range                                                                 |
| Zero repeatability:          | ± 1% of range                                                                 |
| MTBF                         | > 5 years                                                                     |
| Weight:                      | 18.0 grams                                                                    |
| Vibration:                   | Complies with EN61779-1                                                       |
| Relative humidity:           | 0 – 95% RH non-condensing                                                     |
| Operating temperature range: | -30°C to +55°C                                                                |
| Operating pressure range:    | 700 – 1300 hPa                                                                |
| Storage temperature range:   | -40°C to +80°C                                                                |
| Supply voltage range:        | 3.0V – 5.0V                                                                   |