

Clairair Ltd
Sensor People

Prime IR

Pellistor Replacement Infrared MEMS Element Detection



Patented GB2449433

Voltage Output Infrared Gas Sensors

Features

- Operates independent of supply polarity
- Latest technology MEMS detectors
- Digital Interfacing
- Integrated electronics produce a linear voltage or a pellistor mimic output
- Operating voltage range 3.0V – 5.0V
- All metal construction
- Small internal volume
- 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

Sensing Ranges:

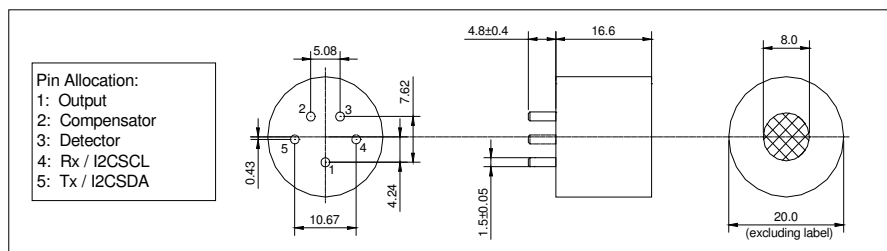
Prime IR Sensor Type	Sensing Ranges
Prime 1	0-100% Lel Methane, 0-100% Lel Hydrocarbons, 0-100% Volume Methane
Prime 2	0-2000ppm Carbon Dioxide to 0-10% Volume Carbon Dioxide
Prime 3	10-100% Volume Carbon Dioxide
Prime 4	0-100% Lel Acetylene
Prime PELL	True Pellistor replacement, 0-100% Lel, 3 Pins

Description and Operation

The Prime IR range of sensors use the NDIR (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 core 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 I²C 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 Prime IR 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 Prime IR Sensors are used in constant current pellistor circuitry. Technical support on implementation and application notes is available from Clairair Limited.

Outline Details

All dimensions in millimetres (±0.1mm unless noted)



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DES7, Issue 2, Dec 2012

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 Prime IR 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.
Suggested socket: Wearnes Cambion reference 450-3326-01-06-00

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.

Supply voltage range:	3.0V – 5.0V
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	< 3 minutes
Minimum resolution:	
At zero	< 0.5% of range
At range	<2% of range
Zero repeatability:	± 1% of range
Accuracy:	± 3% of range up to 50% of range ± 5% of range above 50% of range
MTBF	> 5 years
Digital interface format:	8 data bits, 1 stop bit, no parity
Digital Interface Baud Rate:	38400 (default), 19200, 9600
Digital Interface Logic Levels:	VINL Input low voltage: <0.8V VINH Input high voltage: >2.0V VOL Output low voltage: <0.4V VOH Output high voltage: >2.4V
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

In the interest of continued product improvement Clairair Ltd reserves the right to change the design features and specifications without prior notification. The data contained in this document is for guidance only. Whilst Clairair Ltd has taken care to ensure the accuracy of the information in this document it accepts no responsibility for the consequences of any use of this document or the information contained within it.

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