

# IRcel<sup>®</sup> CH4

Methane (CH<sub>4</sub>) Gas Sensor  
Part Number: IRCEL-CH4



## Key Features & Benefits:

- Integrated thermistor for accurate temperature compensation
- EEPROM programmed with sensor specific performance characteristics
- Compact Size

## Technical Specifications

### MEASUREMENT

<b>Operating Principle</b>	Non-Dispersive Infra-Red (NDIR)
<b>Measurement Range</b>	0-5% vol. Methane
<b>Accuracy (-20°C to +50°C)</b>	Within ± (0.1% vol CH <sub>4</sub> + 4% of concentration)
<b>Response Time (T<sub>90</sub>)</b>	< 35 Seconds
<b>Repeatability:</b>	Zero
5% CH <sub>4</sub>	< ±0.015% CH <sub>4</sub>
<b>Linearity</b>	< ±0.05% CH <sub>4</sub>
	See Operating Principles OP17

### ELECTRICAL

<b>Supply Voltage</b>	3-5 VDC, 3.3 V to utilise EEPROM calibration
<b>Power Consumption</b>	<100 mW at 3.3 V
<b>Recommended Lamp Frequency</b>	2 Hz, 50% duty cycle
<b>Minimum Resolution</b>	0.03% CH <sub>4</sub> at zero 0.1% CH <sub>4</sub> at range
<b>Warm-up Time</b>	< 10 Seconds

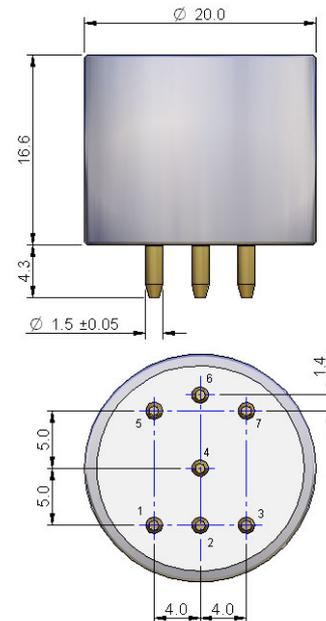
### MECHANICAL

<b>Housing Material</b>	Stainless Steel (see back page)
<b>Weight</b>	23 g
<b>Orientation</b>	Any
<b>Typical Applications</b>	General Purpose Portable Fixed Methane Detection
<b>Operating Temperature Range</b>	-20°C to +50°C
<b>Operating Humidity Range</b>	0 to 99% RH (non-condensing)
<b>Operating Pressure Range</b>	700 to 1300 mBar with compensation

### LIFETIME

<b>Long Term Zero Drift</b>	< ±0.05% CH <sub>4</sub> per month
<b>Recommended Storage Temp</b>	-20°C to +50°C
<b>MTBF</b>	> 5 years
<b>Standard Warranty</b>	12 months from date of despatch

## Product Dimensions



Pin	Function
1	Lamp return
2	Lamp +5V
3	+5V pyro supply
4	Detector output
5	Reference output
6	Thermistor output
7	0V pyro supply

All dimensions in mm  
All tolerances ±0.15mm  
unless otherwise stated

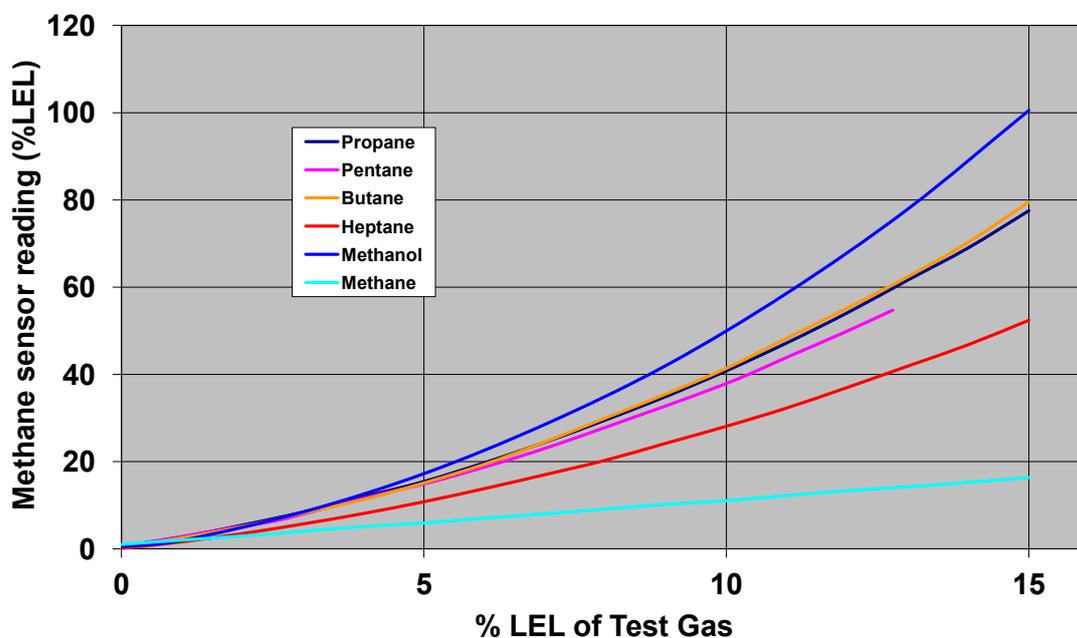
### IMPORTANT NOTE:

Connection should be made via PCB sockets only. Soldering to the pins will seriously damage your sensor.

All performance data is based on conditions at 20°C, 50%RH and 1013mBar, using City Technology recommended circuitry. For sensor performance data under other conditions, refer to the Characterisation Note and Operating Principles.

## IRceL Cross Sensitivity

### Methane sensor cross sensitivity



Typical Response of IRceL CH<sub>4</sub> to common Alkanes and Methanol. Note that cross sensitivity is device to device variable and temperature dependant.

## Product Approval



**Approval Body:** UNDERWRITERS LABORATORIES INC®

**Test Standard:** UL913  
CSA.C22.2 No 157

**Product Categories:** Class 1, Division 1, Groups A, B, C, D

**File Number:** E180262



**Approval Body:** SIRA CERTIFICATION SERVICE

**Test Standard:** EN 60079-0:2009 General Requirements  
EN 60079-1:2007 Flameproof Enclosures "d"  
EN 60079-31:2009 Explosive atmospheres. Equipment dust ignition protection by enclosure "t"

**Product Categories:** Exd/IIC T4 (T<sub>amb</sub> -20°C to +55°C),  
P<sub>max</sub> = 1.4W MbGb  
ExtIIC T135°CIP6xDb  
II2GD/IM2 0518

**Certificate Number:** Sira 04ATEX1084X

### **Instructions specific to hazardous area installations (reference European ATEX Directive 94 / 9/ EC, Annex II, 1.0.6.)**

The following instructions apply to equipment covered by certificate number Sira 04ATEX1084X;

1. The equipment may be used with flammable gases and vapours with apparatus groups IIA, IIB and IIC and with temperature classifications T1, T2, T3 and T4.
2. The equipment is certified for use in ambient temperatures of -20°C to +55°C.
3. The equipment has not been assessed as a safety related device (as referred to by Directive 94 / 9 / EC Annex II, clause 1.5).
4. Installation of the equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (e.g. EN 60079-14)
5. Inspection and maintenance of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (e.g. EN 60079-17).
6. Repair of this equipment shall be carried out by suitably trained personnel in accordance with the applicable code of practice (e.g. EN 60079-19).
7. Special conditions for safe use
  - 7.1. The IRceL is designed to be connected to a gas detector which shall provide an intrinsically safe supply and having a maximum output power (P<sub>max</sub>) not greater than 1.4 watt.
  - 7.2. Because the IRceL has not been proven to withstand the impact and drop tests prescribed in EN 60079-0:2009, clauses 26.4.2 and 26.4.3, additional protection shall be provided to ensure that it cannot be subjected to such mechanical stresses.

8. The certification of this equipment relies upon the following materials used in its construction;  
 Enclosure material: either 303 stainless steel, which contains less than 6% magnesium

or 304 stainless steel, which contains less than 6% magnesium

Flame arrester: 316 stainless steel mesh

Cement: CW2248/HY956EN

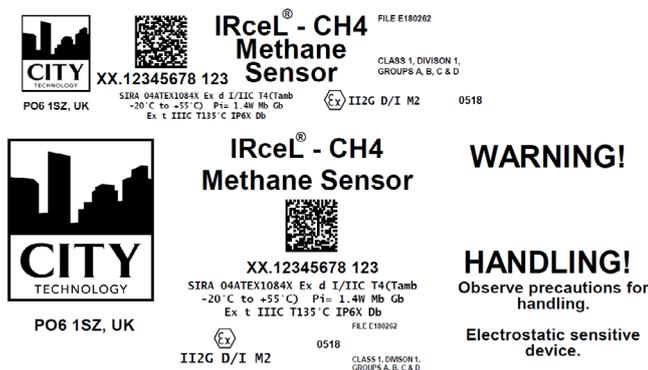
Manufacturer	Ciba-Geigy
Type of compound	Epoxy resin
Colour	Beige (natural)
Filler type and %	55.2% trihydrated Al <sub>2</sub> O <sub>3</sub>
Other additives	8.3%
Surface treatments	None
Temperature index	170°C
City Tech reference	RM 497

If the equipment is likely to come into contact with aggressive substances, then it is the responsibility of the user to take suitable precautions that prevent it from being adversely affected, thus ensuring that the type of protection is not compromised.

Aggressive substances: e.g. acidic liquids or gases that may attack metals, or solvents that may affect polymeric materials.

Suitable precautions: regular checks as part of routine inspections or establishing from the material's data sheet that it is resistant to specific chemicals.

9. The IRceL is available in several formats depending upon the optical filter and components employed. The Certification marking is shown below using the IRceL CH4 label as an example:



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Performance characteristics on this data sheet outline the performance of newly supplied sensors. Output signal can drift below the lower limit over time.