

micropower gas sensing



ULTRA-LOW POWER INFRARED GAS SENSOR MIPEX-04-X-RX-3.5



Features

- 🌐 Target application: clip combustible gas detectors for industrial safety.
- 🌐 Allows designing clip gas detector lasting no less than 24 months without charge.
- 🌐 Sensors with FW version 13.08 and above operate in continuous mode not less than 5 years without external repeated zeroing or calibration.
- 🌐 Lowest available power consumption among combustible gas sensors. Average operating current is less than 35 microAmps.
- 🌐 Smart sensor with embedded microcontroller returns linearized, temperature-compensated output data.
- 🌐 Measurement range up to 100% vol. for methane (CH₄) or up to 2.5% vol. for propane (C₃H₈).
- 🌐 Provides intrinsically safe explosion protection level “ia” which does not need metal-ceramic filters (sinters).

Description

MIPEX-04 is intended for automatic continuous measurement of hydrocarbons concentration in atmosphere of hazardous areas.

Sensor operating principle is based on NDIR technology, i.e. on selective absorption of LED produced infrared radiation by gas molecules.

Differential dual wavelength method allows eliminating of water vapor, optical elements contamination and other non-selective hindrances influence.

Lifetime: more than 10 years of continuous operation (24h a day).

Communication interface – UART.

Technical specification

General specification		
Gas sampling method:		Diffusion
Operating principle:		Non-Dispersive Infra-Red (NDIR)
Target gas		CH ₄
		C ₃ H ₈
Operating, storage and transportation conditions:	Relative humidity, %	up to 98
	Atmospheric pressure, kPa	80...120
	Temperature*, °C	-40...+60
Warm-up time, sec		≤ 120
Lifetime, years		> 10
Overall dimensions, mm		52×24×18
Housing material		Polycarbonate Lexan™
Weight, g		11.0...13.5

Measurement specification	
Measurement range, % vol.	0...1.5
	0...2.5
	0...5
	0...100
Variability (+20...+25 °C)**	± 0.1% vol. or ± 5% of readings (whichever is greater) for CH ₄
	± 0.05% vol. or ± 5% of readings (whichever is greater) for C ₃ H ₈
Response time t(90), sec***	≤ 22 (for CH ₄ sensors)
	≤ 30 (for C ₃ H ₈ sensors)

Electrical specification	
Operating supply voltage, VDC	+2.5...+5.0
Maximum supply voltage, VDC	+5.4
Communication interface	UART
Average current, µA	25...35 max at normal conditions
	40 max at -40...+60 °C
Peak current, mA	2 max

* Term **operating temperature** refers to ambient temperature at which sensor operates and its intrinsic safety is ensured, but sensor readings variability is provided only in specified **temperature range**.

** Variability in whole operating temperature range for any sensor modification is presented below.

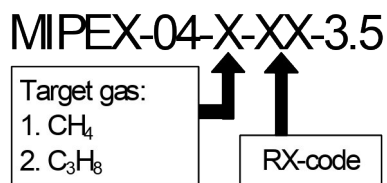
*** To protect the sensor optical cell against dust, contaminants and liquids the standard IP67 filters with 110-140 µm thickness, filter average pore size 0.45 µm, bulk porosity 75-85% can be provided. The response time specified in this DS does not include delays caused by filter.

Readings variability

Calibration gas	Readings variability within a temperature range	Additional variability due to pressure	Additional variability due to humidity
CH ₄	±0.1% vol. or ±5% of indication (whichever is greater) within the range of +20...+25 °C	±0.2% vol. or ±30% of indication (whichever is greater) at 100 kPa (tested at: 80 kPa, 100 kPa, 120 kPa)	±0.2% vol. or ±15% of indication at 40 °C and 0% RH (tested at: 20% RH, 50% RH, 90% RH)
	±0.2% vol. or ±10% of indication (whichever is greater) within the range of -10...+20 °C and +25...+40 °C		
	±0.4% vol. or ±20% of indication (whichever is greater) within the range of -40...-10 °C and +40...+60 °C		
C ₃ H ₈	±0.05% vol. or ±5% of indication (whichever is greater) within the range of +20...+25 °C	±0.1% vol. or ±30% of indication (whichever is greater) at 100 kPa (tested at: 80 kPa, 100 kPa, 120 kPa)	±0.1% vol. or ±15% of indication (whichever is greater) at 40 °C and 0% RH (tested at: 20% RH, 50% RH, 90% RH)
	±0.1% vol. or ±10% of indication (whichever is greater) within the range of -10...+20 °C and +25...+40 °C		
	±0.2% vol. or ±20% of indication (whichever is greater) within the range of -40...-10 °C and +40...+60 °C		

Ordering info

Part number structure:

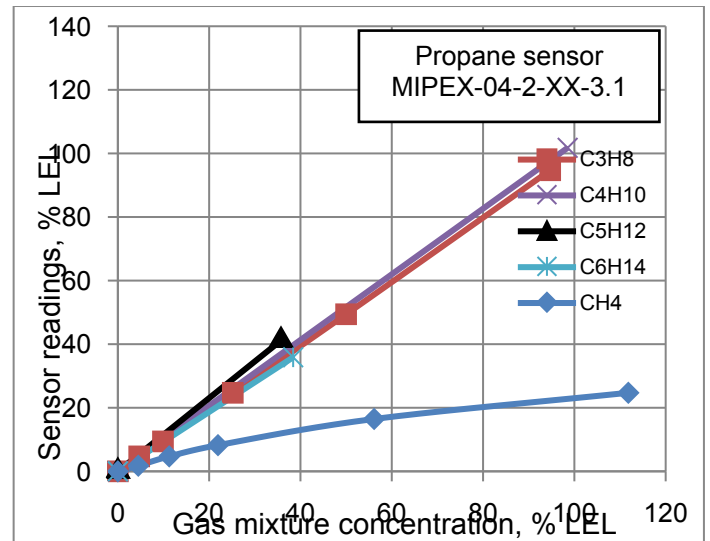
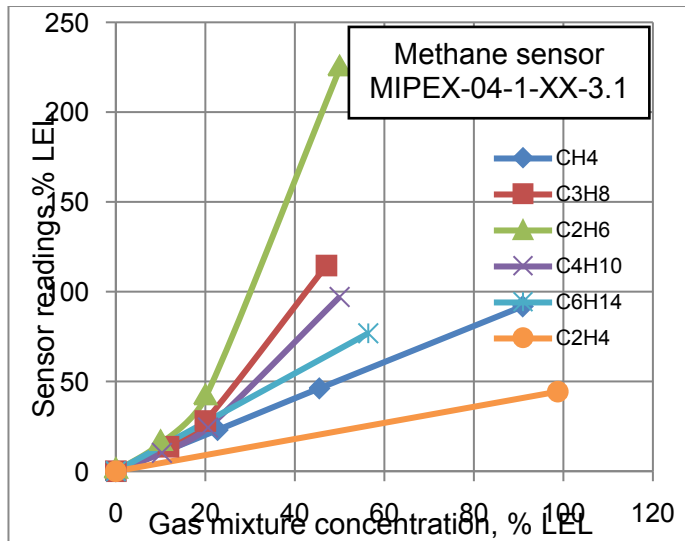


Term **target gas** refers to LED and photodiode spectral range which is adjusted for best detection of a certain gas, while term **calibration gas** refers to gas mixture used for sensor calibration.

RX-code refers to measurement range, calibration gas and temperature range.

Part number	Target gas	Calibration gas	Measurement range, % vol.	Temperature range, °C	RX-code
MIPEX-04-1-00-3.5	CH ₄	CH ₄	0...2.5	-10...+40	00
MIPEX-04-1-10-3.5			0...5		10
MIPEX-04-1-20-3.5			0...100		20
MIPEX-04-1-01-3.5			0...2.5	-40...+60	01
MIPEX-04-1-11-3.5			0...5		11
MIPEX-04-1-21-3.5			0...100		21
MIPEX-04-1-02-3.5			0...2.5	-20...+50	02
MIPEX-04-1-12-3.5			0...5		12
MIPEX-04-1-22-3.5			0...100		22
MIPEX-04-1-61-3.5		C ₃ H ₈	0...1.5	-40...+60	61
MIPEX-04-1-71-3.5			0...2.5		71
MIPEX-04-1-62-3.5			0...1.5	-20...+50	62
MIPEX-04-1-72-3.5			0...2.5		72
MIPEX-04-2-61-3.5	C ₃ H ₈	C ₃ H ₈	0...1.5	-40...+60	61
MIPEX-04-2-71-3.5			0...2.5		71
MIPEX-04-2-62-3.5			0...1.5	-20...+50	62
MIPEX-04-2-72-3.5			0...2.5		72

Typical sensor cross-sensitivity to hydrocarbons and accuracy



Current consumption

Average current consumption is not more than 35 μ A when request rate is less than 1 Hz.

Intrinsic safety

Sensor complies with **IEC 60079-0** and **IEC 60079-11**:

- Explosion protection level – “ia”;
- Hazardous area class (Electrical equipment group) – “I” and “IIC”;
- Intrinsic safety parameters: $P_i = 0.13$ W, $U_i = 5.4$ V, $I_i = 200$ mA, $C_i = 58.1$ μ F, $L_i = 0$ mH.

Sensor is suitable for use within end equipment with temperature classes T1-T4 at maximum ambient temperature of +60 °C.

Marking and cert. numbers

MIPEX-04 has certification when the certificate number is present on the sensor.

The details of IECEx certification are specified in Appendix B of User Manual (Fig. 8. Intrinsic safety control drawing).

Handling precautions

Maximum pressure load to sensor top surface must not exceed 0.27 N/mm².

It is not allowed to apply pressure to side surface.

Sensor is not intended to measure hydrocarbons contained in water or other fluids.

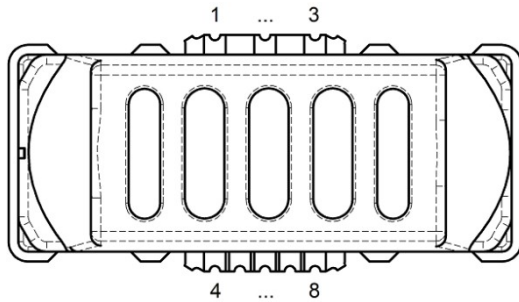
Gas holes of sensor should be protected against ingress of dust and sprayed materials.

There is no risk of pollution and negative impact on human health. Sensor does not contain any harmful substances that may be released during its normal operation.

Schedule of limitations

MIPEX-04-X-RX-3.5 having a special marking “U/C” is to be used only in the Model BW Clip4 gas detector manufactured by Honeywell Analytics.

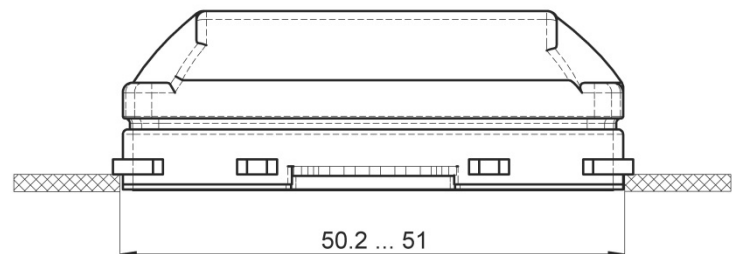
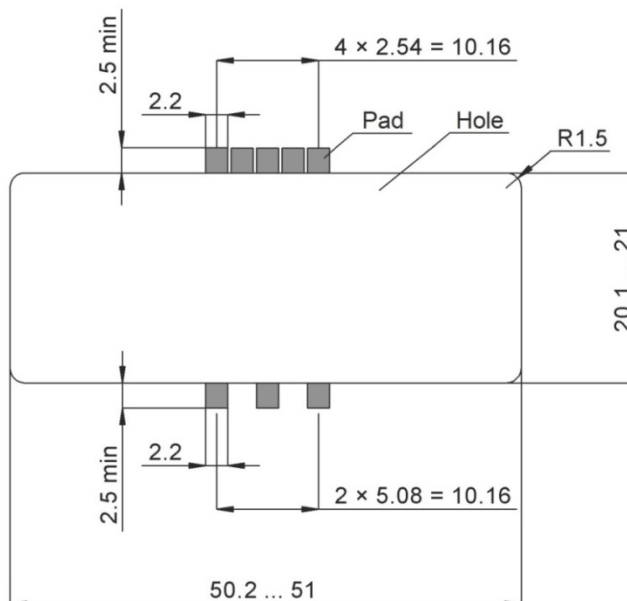
Sensor pinout



Pin	Purpose
1-3, 7	GND
4	UART Tx out
5	UART Rx in
6	Empty
8	+2.5...+5.0 VDC

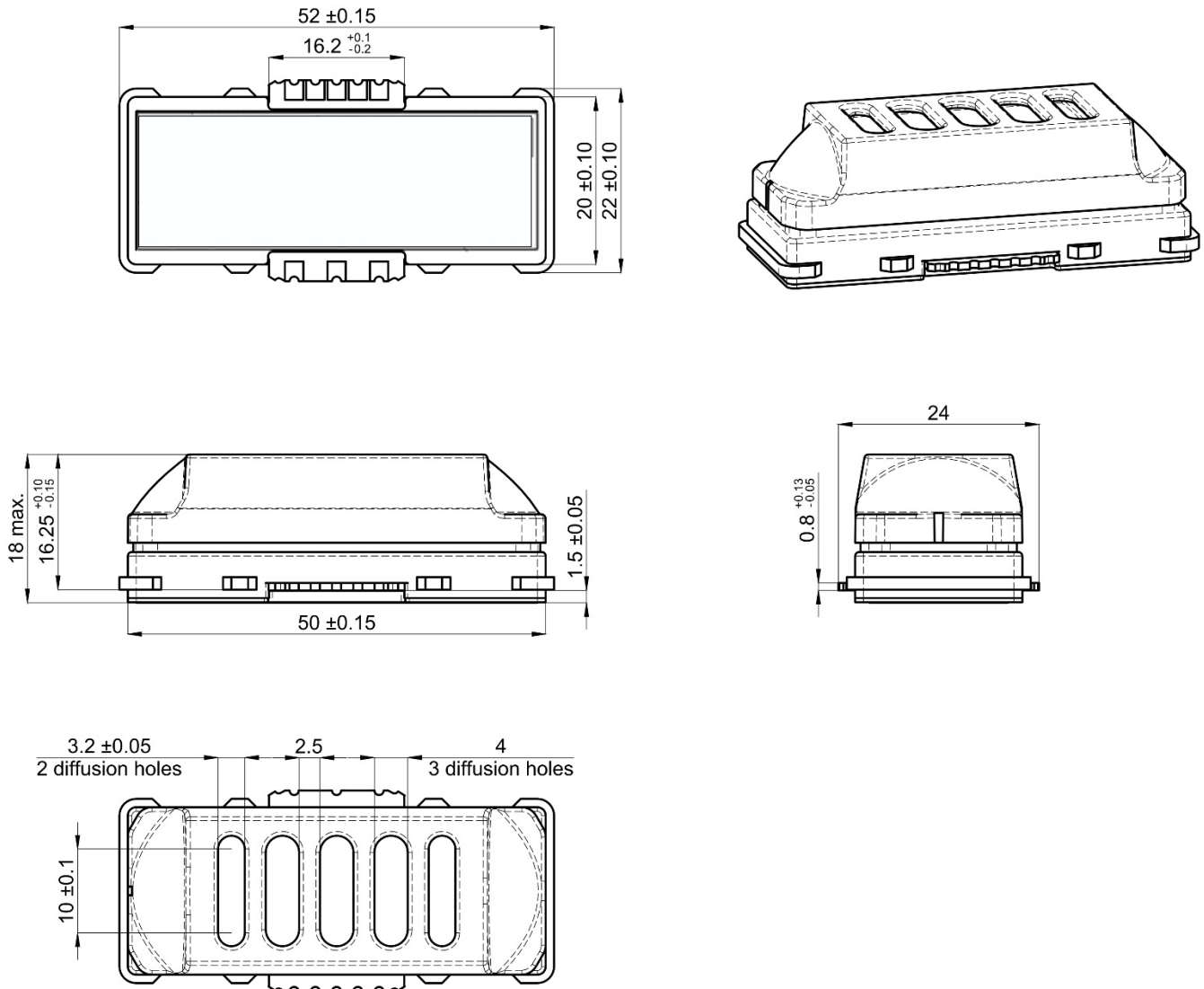
Recommended mating board configuration (sensor side shown)

All dimensions are in millimeters.



Outline

All dimensions are in millimeters.



Contacts

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