

DATA SHEET

**ULTRA-LOW POWER
INFRARED GAS SENSOR
MIPEX-06-B-RX-3.3**

Ex version



Features

- ☑ Ultra-low power consumption. Average current consumption at constant measurement of concentration is less than 60 μ A.
- ☑ Smart sensor with embedded microcontroller returns linearized, temperature-compensated output data.
- ☑ LED based dual wavelength technology.
- ☑ Response time (T90) without dust filter 15 sec for methane, ethane and 25 sec for propane.
- ☑ Measurement range:
 - up to 100% vol. for methane (CH_4)
 - up to 20% vol. for propane (C_3H_8)
- ☑ Provides intrinsically safe explosion protection level "ia".
- ☑ Industry standard size ($\varnothing 20.1 \times 16.6$ mm).

Description

MIPEX-06 is intended for automatic continuous measurement of the concentration of hydrocarbons in atmosphere of hazardous areas.

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

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

Communication interface – UART.

Application

MIPEX-06 sensor is intended for using in a hazardous areas. Sensor is used as a OEM component for portable and fixed gas detectors for industrial safety.

Technical specification

General specification			Measurement specification	
Gas sampling method:		Diffusion	Measurement range, % Vol **	0...2.5 (C ₃ H ₈)
Operating principle:		Non-Dispersive Infra-Red (NDIR)		0...5 (CH ₄)
Sensor type		CH ₄		0...100 (CH ₄)
		C ₃ H ₈	Accuracy (+20...+25 °C)***	± 0.1% vol. or ± 5% of readings (whichever is greater) for CH ₄
		CH ₄ *****		± 0.05% vol. or ± 5% of readings (whichever is greater) for C ₃ H ₈
Storage and transportation conditions:	Relative humidity, %	up to 98	Response time (T ₉₀), sec	15 - CH ₄ , 25 - C ₃ H ₈
	Atmospheric pressure, kPa	80...120		
	Temperature*, °C	-60...+75		
Warm-up time, sec		≤ 120	Electrical specification	
MTBF, years		≥5		
Level IP	without filter 20			
	with dust filter 54		Maximum supply voltage, VDC	+5.4
Housing material		Polycarbonate Lexan™	Communication interface	UART
Overall dimensions, mm		ø20.1×16.6 (w/o pins)	Average current, µA (at UART baud rate 57600)	60****
Max weight, g		7.5	Peak current, mA	4 max

* Term operating temperature refers to ambient temperature at which sensor operates and its intrinsic safety is ensured, but sensor accuracy is provided only in specified temperature range determined by RX-code (see Ordering info).

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

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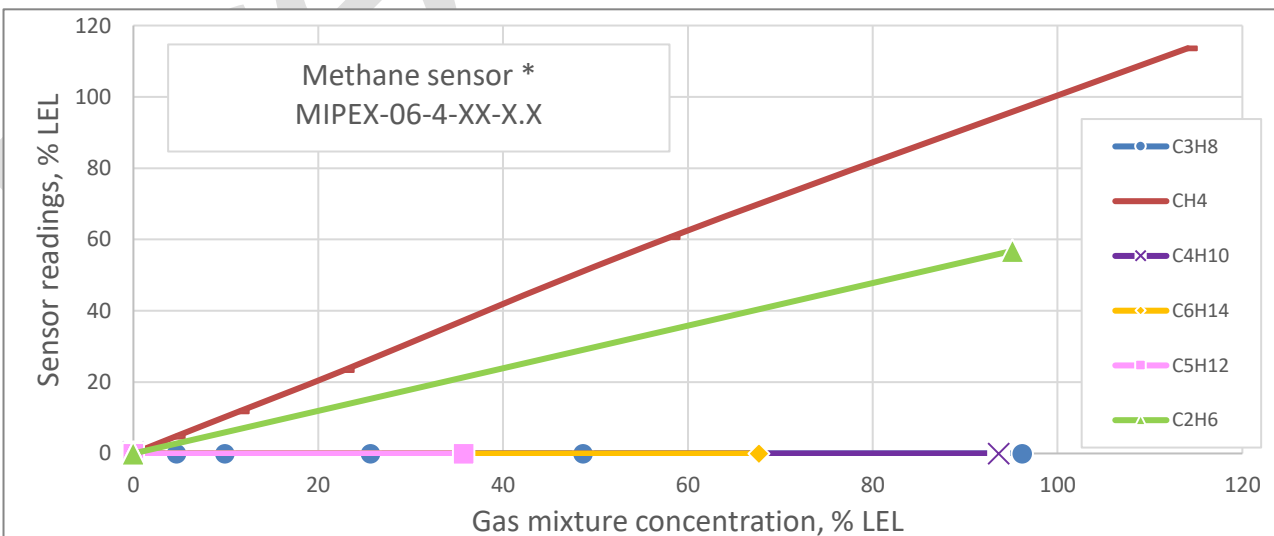
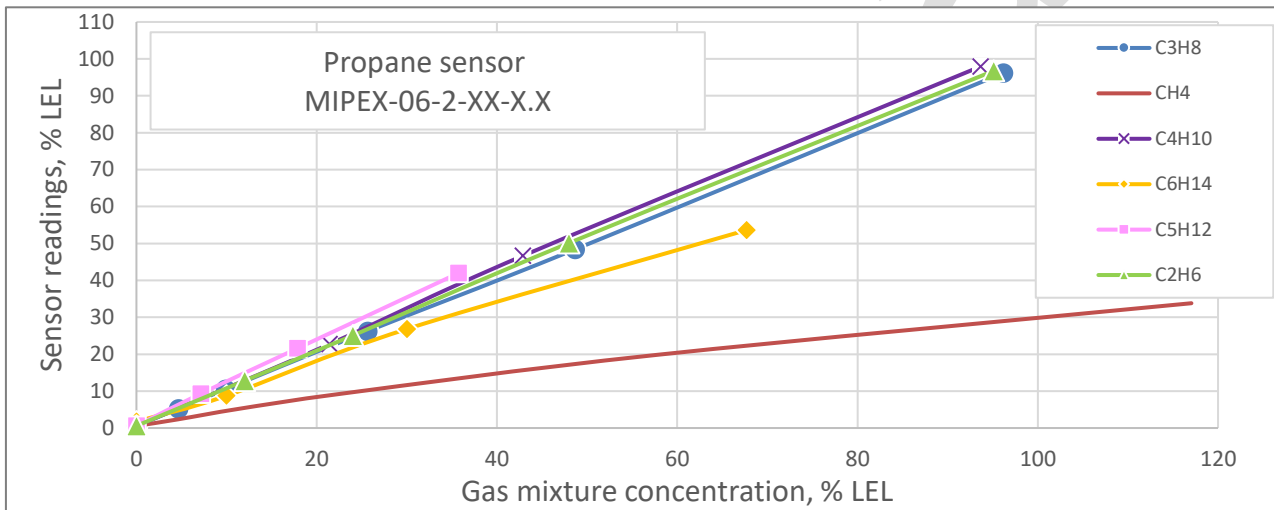
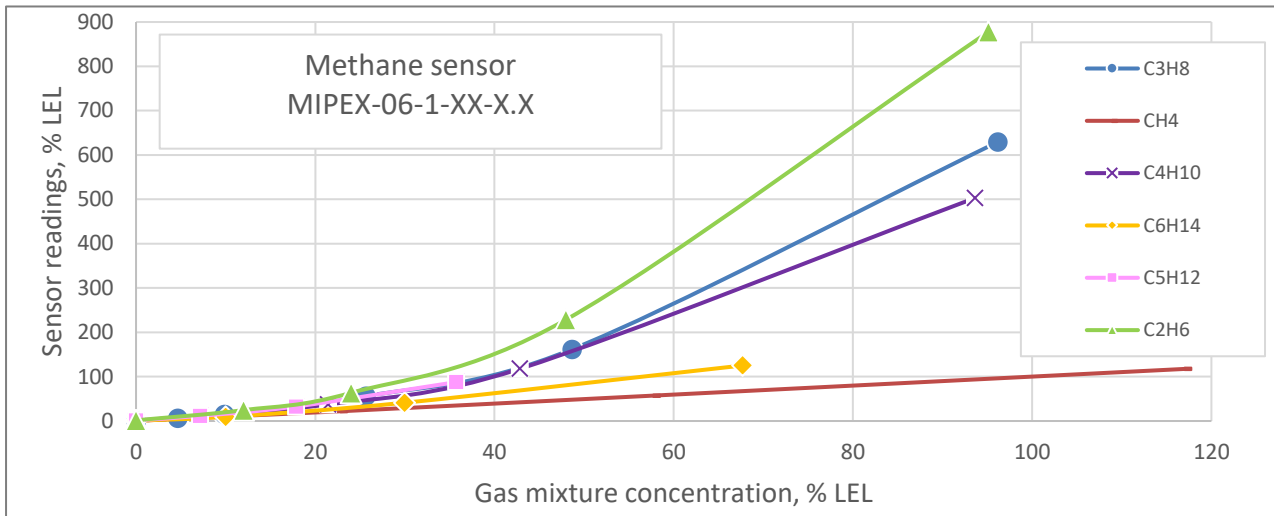
**** Average current consumption at constant measurement of concentration is less than 60 µA, when sending the command <@> (ESAT.100600.00 CP) no more than 1.32 ± 0.04 seconds.

***** The atmosphere of objects of group I in accordance with IEC 60079-29-1 section 5.4.24.2.

Readings variability

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 readings (whichever is greater) within the range of +20...+25 °C;	± 0.2% vol. or ± 30% of readings (whichever is greater) at 100 kPa (test: 80 kPa, 100 kPa, 120 kPa)	± 0.2% vol. or ± 15% of readings (whichever is greater) at 40 °C (test: 20% RH, 50% RH, 90% RH)
	± 0.15% vol. or ± 10% of readings (whichever is greater) within the range of -10...+20 °C and +25...+40 °C;		
	± 0.3% vol. or ± 20% of readings (whichever is greater) within the range of -40...-10 °C and +40...+60 °C.		
C ₃ H ₈	± 0.05% vol. or ± 5% of readings (whichever is greater) within the range of +20...+25 °C;	± 0.1% vol. or ± 30% of readings (whichever is greater) at 100 kPa (test: 80 kPa, 100 kPa, 120 kPa)	± 0.1% vol. or ± 15% of readings (whichever is greater) at 40 °C (test: 20% RH, 50% RH, 90% RH)
	± 0.075% vol. or ± 10% of readings (whichever is greater) within the range of -10...+20 °C and +25...+40 °C;		
	± 0.15% vol. or ± 20% of readings (whichever is greater) within the range of -40...-10 °C and +40...+60 °C.		

Typical sensor cross-sensitivity to hydrocarbons and accuracy



Available part numbers

Part number	Sensor type	Calibration gas	Measurement range, % vol.	Temperature range, °C	RX-code
MIPEX-06-1-10-3.3	CH ₄	CH ₄	0...5	-10...+40	10
MIPEX-06-1-20-3.3			0...100		20
MIPEX-06-1-11-3.3			0...5	-40...+60	11
MIPEX-06-1-21-3.3			0...100		21
MIPEX-06-1-12-3.3			0...5	-20...+50	12
MIPEX-06-1-22-3.3			0...100		22
MIPEX-06-2-71-3.3	C ₃ H ₈	C ₃ H ₈	0...2.5	-40...+60	71
MIPEX-06-2-72-3.3			0...2.5	-20...+50	72
MIPEX-06-4-10-3.3	CH ₄ *	CH ₄	0...5	-10...+40	10
MIPEX-06-4-20-3.3			0...100		20
MIPEX-06-4-11-3.3			0...5	-40...+60	11
MIPEX-06-4-21-3.3			0...100		21
MIPEX-06-4-12-3.3			0...5	-20...+50	12
MIPEX-06-4-22-3.3			0...100		22

* The atmosphere of objects of group I in accordance with IEC 60079-29-1 section 5.4.24.2.

Intrinsic safety

Sensor is designed in accordance with standards:

IEC/EN IEC 60079-0 and IEC/EN 60079-11:

- Explosion protection level – “ia”;
- Hazardous area class (Electrical equipment group) – “I” and “IIC”;
- Intrinsic safety parameters: $P_i = 0.25 \text{ W}$, $U_i = 5.4 \text{ V}$, $I_i = 450 \text{ mA}$, $C_i = 60.1 \text{ }\mu\text{F}$, $L_i = 0 \text{ mH}$.

UL913, UL 60079-0, UL 60079-11, CSA C22.2 No. 60079-0, CSA C22.2 No. 60079-11:

- Class I, Division 1, Group A, B, C, D.
- Intrinsic safety parameters: $P_{\max} = 0.25 \text{ W}$, $U_{\max} = 5.4 \text{ V}$, $I_{\max} = 450 \text{ mA}$, $C_i = 60.1 \text{ }\mu\text{F}$, $L_i = 0 \text{ mH}$.

IEC/EN 60079-28:

- MIPEX-05's optical radiation power is less than 7 mW.

Certificates / Declarations of conformity

Certificates / declarations are planned to be received:

- IEC / EN IEC 60079-0
- IEC / EN 60079-11
- IEC / EN 60079-28
- UL 913
- UL 60079-0
- UL 60079-11
- UL 60079-28
- CSA C22.2 No. 60079-0
- CSA C22.2 No. 60079-11
- RoHS 2 Compliant – Directive 2011/65/EU;
- RoHS 3 Compliant – EU Directive 2015/863.

Handling precautions

Maximum allowable pressure on the central part of sensor reflecting cover and on side surface sensor – 4 N.

Sensor is not intended to measure carbon dioxide contained in fluids.

Keep sensor out of contact with aggressive substances e.g. acidic environments, which can react with metals, as well as solvents, which may affect polymeric materials.

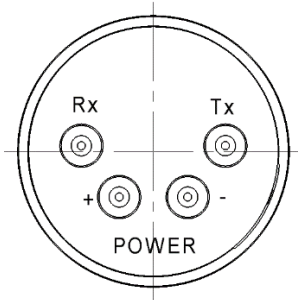
Diffusion holes of sensor should be protected against ingress of dust and sprayed materials.

Covering diffusion holes of sensor increases its response time.

Sensor must be mounted using sockets only, as soldering the pins may damage sensor.

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.

Sensor pinout (bottom side)

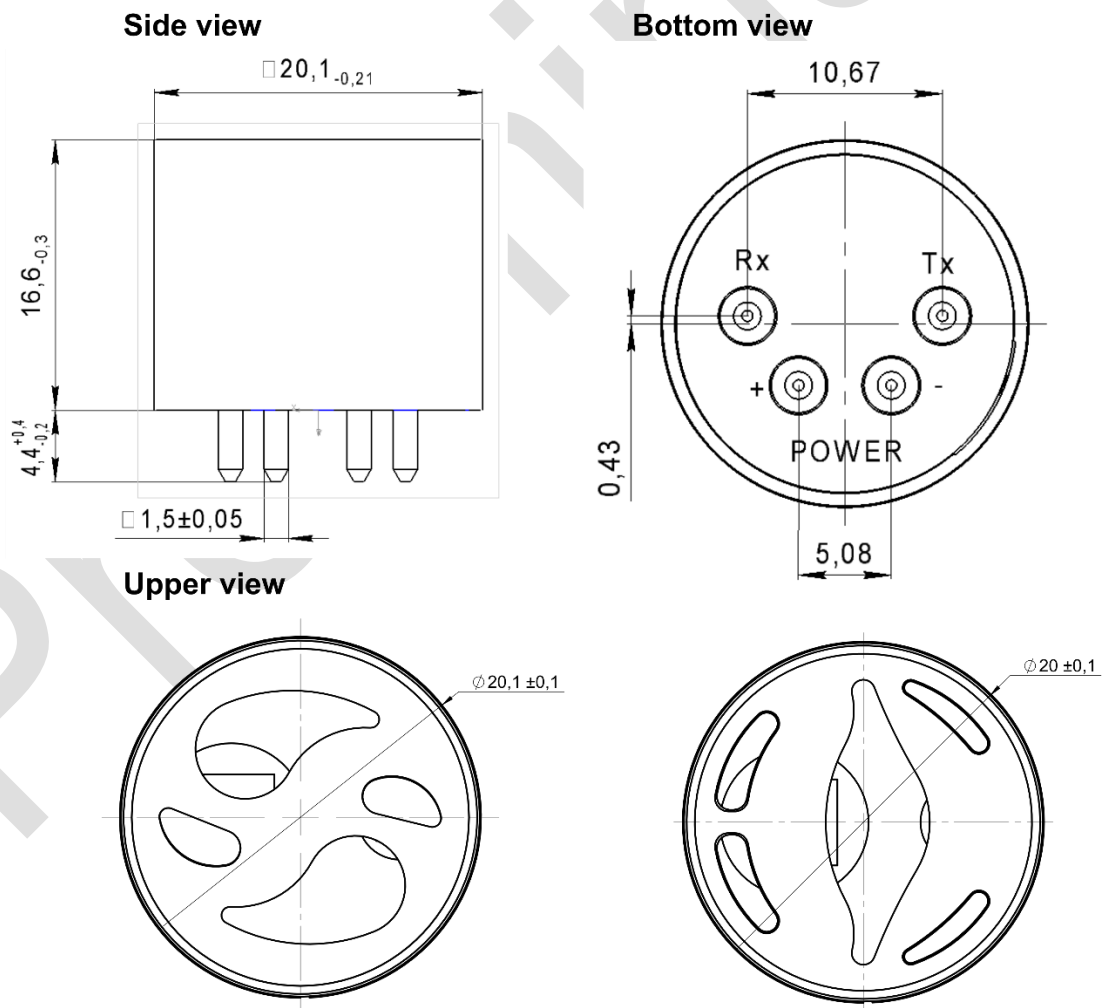


Pin	Purpose
TxD	UART, TxD output
RxD	UART, RxD input
+	V _{dd}
-	GND

- V_{dd} – +2.7 ... 5.0 VDC;
- High logic level for transmitting line TxD and receiving line RxD corresponds to V_{dd}.

Outline

All dimensions are in millimeters.



Contacts

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