micropower gas sensing

MGS TECHNOLOGY

DATA SHEET

ULTRA-LOW POWER INFRARED GAS SENSOR MIPEX-06-3-RX-3.3

Ex version



Features

- ☑ Ultra-low power consumption. Average current consumption at constant measurement of concentration is less than 60 µA.
- ☑ Smart sensor with embedded microcontroller returns linearized, temperature-compensated output data.
- ☑ LED based dual wavelength technology.
- ☑ Response time (T90) without dust filter 20 sec for carbon dioxide.
- ☑ Measurement range:
  - up to 10% vol. for carbon dioxide (CO_2).
- ☑ Provides intrinsically safe explosion protection level “ia”.
- ☑ Industry standard size (⌀20.1×16.6 mm).

Description

MIPEX-06 is intended for automatic continuous measurement of the concentration of CO_2 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.

Available part numbers

Part number	Sensor type	Calibration gas	Measurement range, % vol.	Temperature range, °C	RX-code
MIPEX-06-3-40-3.3	CO_2	CO_2	0…5	- 10 … + 40	40
MIPEX-06-3-50-3.3			0…10		50
MIPEX-06-3-42-3.3			0…5	- 20 … + 50	42
MIPEX-06-3-52-3.3			0…10		52

Technical specification

General specification		
Gas sampling method:		Diffusion
Operating principle:		Non-Dispersive Infra-Red (NDIR)
Sensor type		CO_2
Storage and transportation conditions:	**Relative humidity, %**	up to 98
	Atmospheric pressure, kPa	80…120
	Temperature*, °C	-60...+75
Warm-up time, sec		≤ 120
MTBF, years		≥ 5
Level IP		without filter 20
		using filter 54
Housing material		Polycarbonate Lexan™
Overall dimensions, mm		⌀20.1×16.6 (w/o pins)
Max weight, g		7.5

Measurement specification	
Measurement range, % Vol **	0…5
	0…10
Accuracy (+20…+25 ºC)***	± 0.05% vol. or ± 5% of readings (whichever is greater)
Resolution, ppm	100
Response time (T90), sec	≤ 20

Electrical specification	
Operating supply voltage, VDC	+ 2.7…+ 5.0
Maximum supply voltage, VDC	+ 5.4
Communication interface	UART
Average current, µA (at UART baud rate 57600)	60****
Peak current, mA	4 max

Preliminary

***** Term operating temperature refers to ambient temperature at which sensor operates, 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.

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

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

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Readings variability

Gas	Readings variability within a temperature range	Additional variability due to pressure	Additional variability due to humidity
CO_2	± 0.05% vol. or ± 5% of readings (whichever is greater) within the range of +20…+25 °C;	± 0.1% vol. or ± 40% 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)
	± 0.1% vol. or ± 10% of readings (whichever is greater) within the range of -10…+20 °C and +25…+40 °C;		
	± 0.2% vol. or ± 20% of readings (whichever is greater) within the range of -20…-10°C and +40…+50 °C.		

Part number structure

MIPEX-06-B-RX-D.E

Interface:
3. UART, 4 pins; Uop = +2.7 … +5.0 V

Housing type:
3. plastic

RX-code:
R- calibration gas and measurement range
X – temperature range and variability

Sensor type:
3. CO_2

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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 W, U_i = 5.4 V, I_i = 450 mA, C_i = 60.1 µF, L_i = 0 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 W, U_{max} = 5.4 V, I_{max} = 450 mA, C_i = 60.1 µF, L_i = 0 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 must be protected against ingress of dust and sprayed materials.

Covering diffusion holes of sensor increases its response time.

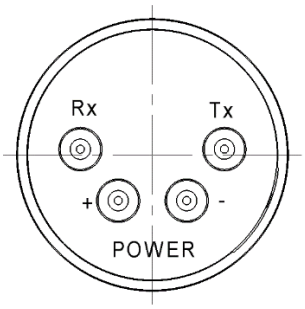
Sensor must be mounted using sockets only, as soldering the pins may damage sensor.

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.

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Sensor pinout (bottom side)



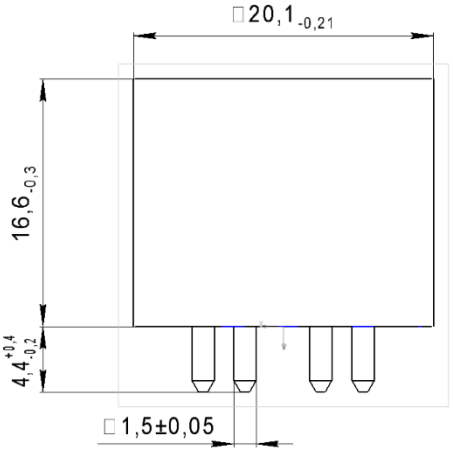
Pin	Purpose
TxD	UART, TxD output
RxD	UART, RxD input
+	V_{dd}
–	GND

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

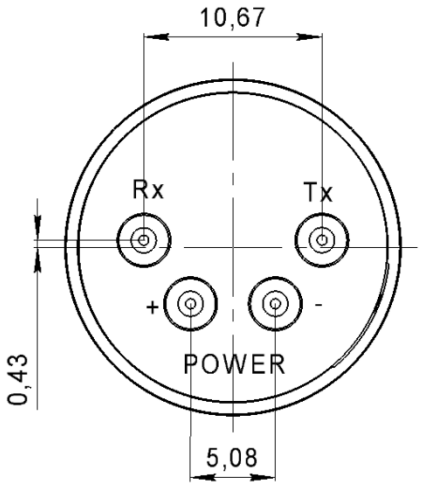
Outline

All dimensions are in millimeters.

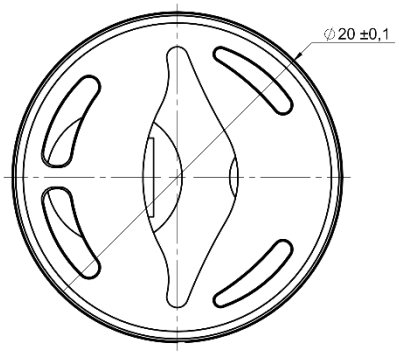
Side view



Bottom view



Upper view



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Contacts

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