Detectors

MICRO-HYBRID

LASER COMPONENTS

PRODUCT DATA SHEET

MTS4 SENS multi gas

Thermal IR detectors for gas analysis

EXCLUSIVELY AVAILABLE AT MICRO-HYBRID

The thermo-electric IR detectors of the MTS series (Micro-Hybrid thermopile sensors) are characterized by a particularly high detectivity and longevity.

The base of each thermopile detector is formed by the so-called thermocouple. Due to thermal diffusion currents of two different metals (Seebeck effect), it generates an electrical voltage – the measurement signal. These serially connected thermocouples, called thermopiles, achieve a higher output voltage.
The sensitive component of Micro-Hybrid thermopile detectors is a MEMS-based thin-layer system on a silicon substrate. We offer sensor chips with either 80 (TS 80) thermocouples for non contact temperature measurement or 200 (TS 200) thermocouples for NDIR gas analysis. Depending on the application, both basic types are provided with different spectral absorber layers.

FEATURES

- Multi-gas solution
- Backfilling with different gases to adapt performance
- Customization feasible

APPLICATIONS

- **Medical technology:** Anesthesia equipment, patient monitoring
- **Environmental engineering:** Monitoring CH_4 in biogas plants
- **Laboratory technology / bioengineering:** Measurement of CO_2 and H_2O in cell and tissue growth, C_2H_5OH-detection
- **Industrial process control:** Detecting SO_2, NO, CO and other process relevant gases
- **Safety technology / explosion protection:** CO_2-, CO-, CH_4-detection

BENEFITS

- **Excellent performance** due to best materials like BiSb / Sb for thermoelectrical effect
- Best detectivity
- High sensitivity

INFRARED COMPONENTS AND SYSTEMS

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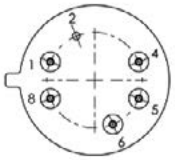
Technical data

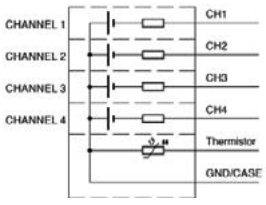
Technical parameter		Unit
Active area	4 x (1.2 x 1.2)	mm²
Aperture	4 x (1.5 x 1.5)	mm²
Number of thermocouples	200	
Time constant $_{(0\text{-}63\ \%)}$ [1,3]	typ. 30	ms
DC output voltage[1,3]	typ. 5.5	mV
DC sensitivity[1,3]	typ. 100	V/W
Temperature coefficient of sensitivity[2]	typ. -0.4	%/K
Noise voltage[3]	typ. 33	nV/Hz$^{1/2}$
Noise equivalent power NEP[1]	typ. 0.33	nW/Hz$^{1/2}$
Specific dectivity D*[1,3]	typ. 3.6*10^{8}	cmHz$^{1/2}$/W
Resistance of thermopile[3]	65 ± 15	kΩ
Temperature coefficient of resistance[2]	typ. -0.03	%/K
Thermistor	1 – PTC Ni1000 2 – NTC 30k 3 – NTC 100k Technical specifications see document „Thermistors".	
Filling gas[4]	N_2/ Kr/ other	
Filters	see document „Infrared filters", customized filters possible on request.	
Operation temperature	-20 ... +85	°C
Housing	TO39 (modified)	

Pin out



Bottom view

- Pin 1 – TP4+
- Pin 2 – GND/CASE
- Pin 4 – TP3+
- Pin 5 – TP2+
- Pin 6 – Thermistor
- Pin 8 – TP1+



[1] T=500 K; E=38 W/m²; on air without cap
[2] in temperature range from +25 to +70 °C
[3] at T_{amb} = 25 °C
[4] in case of Kr-filling increase of DC output voltage, DC sensitivity, specific detectivity and time constant by the factor 1.7. Decrease of NEP by the same factor. Other gases on customer's request.

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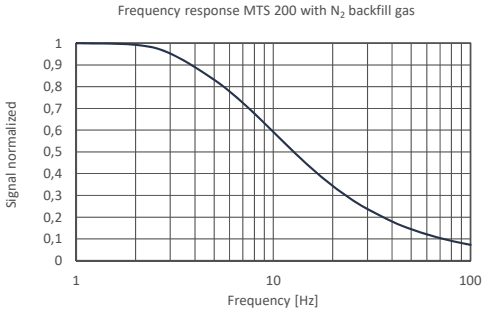
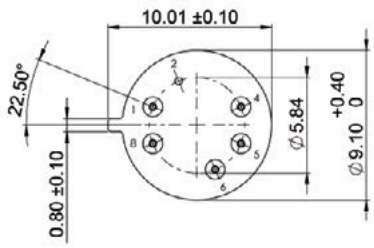
Typical operating characteristics of IR detectors › MTS4 SENS multi gas

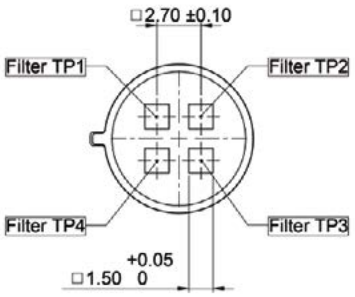


Mechanical drawings

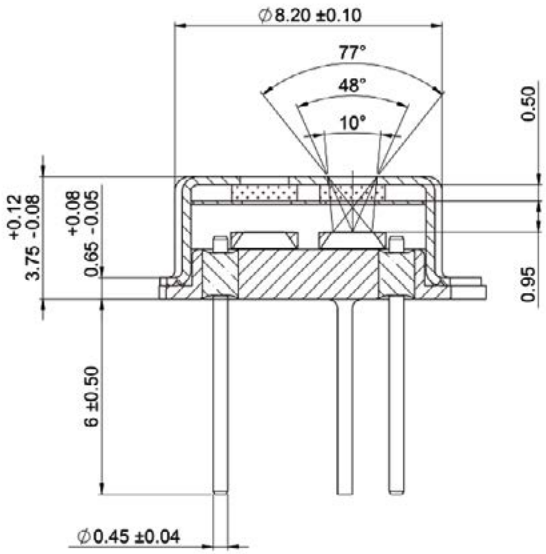
Bottom view



Top view



Side view



all geometrical dimensions in mm

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Product overview

Article		Temp. min	Temp. max	Aperture	Channel	Application
TS4x200B-A-S1.5-1-Kr-XX	on request	-20 °C	85 °C	1.5 mm	4	NDIR gas analysis

NOVA IR and CMOSIR are companies of Micro-Hybrid Electronic GmbH.

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