

## MINIATURIZED 4 CHANNEL THERMAL RADIATION SENSOR TS-4x200

The product TS4x200 is a multichannel MEMS-based multijunction thermopile sensor processed on silicon substrate. The sensor offers excellent detectivity by means of antimony and bismuth thin films. The operational wavelength range is adjustable by an absorption multilayer system.  $3\ \mu\text{m}$  to  $5\ \mu\text{m}$  and  $5.5\ \mu\text{m}$  to  $13\ \mu\text{m}$  are standard, while other ranges are also available upon request.

We offer the TS4x200 as a bare sensor die or as a whole wafer. The absorbing layers can be chosen as  $1 \times 3\ \mu\text{m}$  to  $5\ \mu\text{m}$  and  $3 \times 5.5\ \mu\text{m}$  to  $13\ \mu\text{m}$  or  $2 \times 3\ \mu\text{m}$  to  $5\ \mu\text{m}$  and  $2 \times 5.5\ \mu\text{m}$  to  $13\ \mu\text{m}$ . We advise customers for an application optimized sensor package compilation.

Cooling, bias voltage or current are NOT required for operation. The passive sensor can be used for DC and low frequency AC measurements.

### LEIBNIZ INSTITUTE OF PHOTONIC TECHNOLOGY

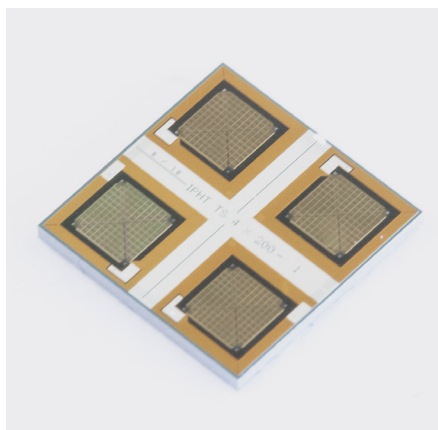
Competence Center for Micro-  
and Nanotechnologies (CMNT)

Albert-Einstein-Str. 9

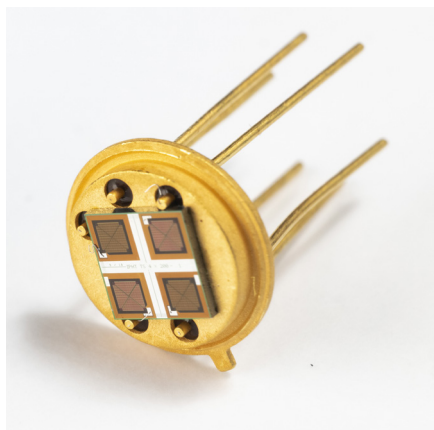
07745 Jena

Tel.: +49 (0) 3641 206 365

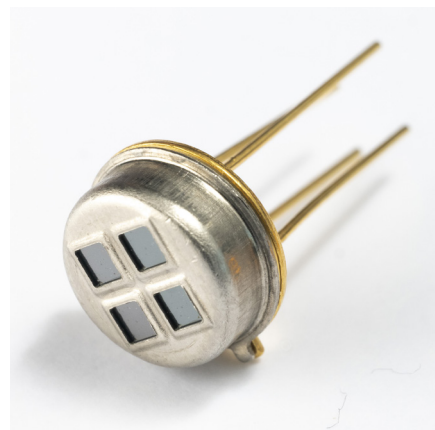
ir-sensors@leibniz-ipht.de



Chip



Mounted



Packaged

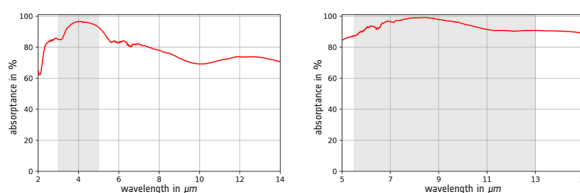
## TECHNICAL DATA TS4x200

Chip parameters	Values	Units
Active Area	1.44 (1.2x1.2) each	mm <sup>2</sup> (mmxmm)
Number of Thermocouples	200 each	
Dimension	4.5x4.5	mmxmm

Functional parameters	Values	Units
Absorbing Layer	3 ... 5      5.5 ... 13	μm
Resistance	50 ... 80	kΩ
Resistance TC	-0.06 ... -0.08	% / K
Noise Voltage (300K)	≤ 33	nV / Hz <sup>1/2</sup>
Max. Irradiance	12	mW / mm <sup>2</sup>
DC Responsivity	65 ... 94	V / W
DC Responsivity TC	-0.35 ... -0.55	% / K
DC Output @ 38 μW / mm <sup>2</sup> (N <sub>2</sub> -Filling)	3.6 ... 5.1	mV
Time Constant τ <sub>10-90</sub> (N <sub>2</sub> -Filling)	≤ 90	ms
Specific Detectivity D* (500K, DC)	2.2 ... 3.1	10 <sup>8</sup> cmHz <sup>1/2</sup> / W

Sensor Parameters	Values
Filling Gases	Ne, Kr, Xe, Ar, N <sub>2</sub>
Spectral Response	Standard: 3.0 ... 5.0 μm or 5.5 ... 13.0 μm, respectively
Window Materials	Standard: 8 ... 14 μm Filter (other materials on request)
Mounting	T0-39 Package (modified)
Thermistor	TRS-Si, 10 kΩ ± 0.5 %, 3850 ± 200 ppm / K
Operating Temperature	-20 ... +85 °C
Weight	< 1 g

Spectral Absorbance



## FEATURES

- › High Responsivity
- › Excellent Long-Term Stability
- › Broad Spectral Response in the IR
- › No cooling required
- › No bias voltage required
- › Thermal & mechanical shock resistant

## APPLICATIONS

- › Pyrometry  
(non-contact temperature measurements)
- › Radiometry
- › Multichannel NDIR spectroscopic gas detection and control in medical applications

All specifications – technical included – are subject to change without notice.