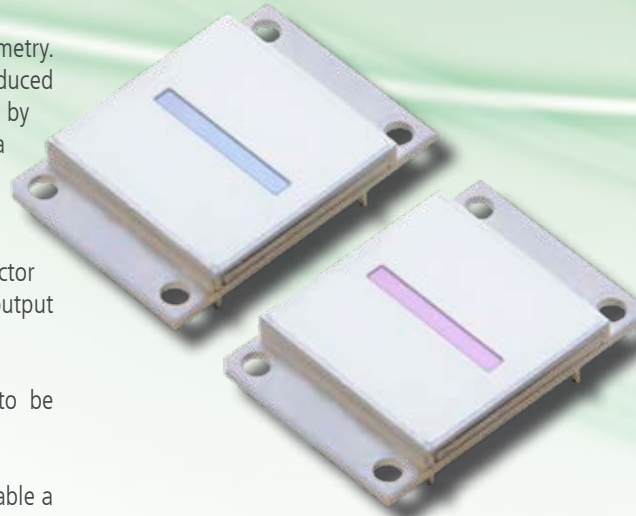


# PYROSENS

## Pyroelectric Linear Arrays 128LTMIx and 256LTMIx

### Linear Infrared Arrays for Spectroscopic Application

The LTMIx family of pyroelectric linear arrays is specifically designed for infrared spectrometry. The arrays include a lithium tantalate chip with 128 or 256 elements. The signals produced by the elements are processed in a CMOS circuit. Signal processing is carried out by the analogue circuitry, including an adapted low-noise preamplifier for each pixel, a multiplexer, and an output amplifier. The pyroelectric chip and CMOS readout circuit are located on a thick film substrate, all mounted inside a hermetic metal housing. The incident radiation passes through a window or filter, transparent to infrared wavelengths, and reaches the sensitive elements. For measurement of the detector temperature a sensor (type AD 590) is integrated into the package. It provides an output current which is proportional to the temperature.



In common with all pyroelectric detectors, the incoming infrared radiation needs to be modulated for a measurement to be made.

Ion-beam milled pyroelectric detector chips with a thickness of approximately 5 µm enable a high responsivity and a low noise equivalent power NEP. An additional metal black coating („M” in type designation) realizes a high and homogeneous spectral absorption. Detector chips with ion-beam etched thermal isolation trenches („SL” in type designation) allow low modulation frequencies up to 10 Hz with excellent signal/noise-ratio.

#### Types and features (Modulation frequency 128 Hz)

Type	128LTMI SP0.5	128LTMI SP0.5 V3	128LTMI SL SP0.5	128LTMI SLSP0.5V3	128LTMI SP1.0	256LTMI SP0.5	256LTMI SP0.5 V3	256LTMI SL SP0.5	256LTMI SLSP0.5V3	256LTMI SP 1.0	256LTMI SP1.0 V3
Pixel number	128	128	128	128	128	256	256	256	256	256	256
Pixel width in µm	90	90	90	90	90	42	42	42	42	42	42
Pixel length in µm	500	500	500	500	1000	500	500	500	500	1000	1000
Pitch in µm	100	100	100	100	100	50	50	50	50	50	50

#### Electro-optical specification<sup>1</sup>

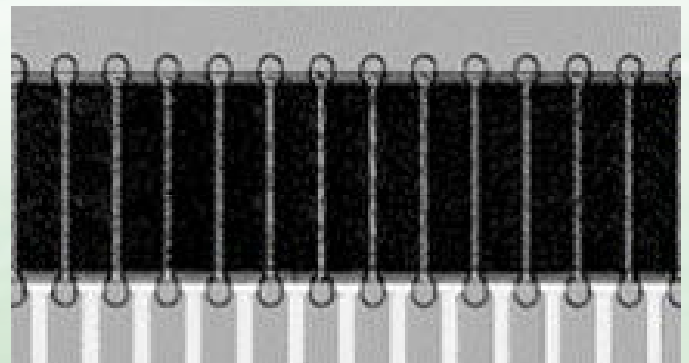
Responsivity $S_v$ in $10^3 V/W$	620	1900	620	1900	620	710	2100	710	2100	710	2100
Noise voltage $U_n$ in mV	1.2	3.2	1.2	3.2	1.9	0.9	2.2	0.9	2.2	1.1	3
NEP in nW	1.9	1.7	1.9	1.7	3.0	1.2	1.0	1.2	1.0	1.6	1.4
MTF ( $R = 3lp/mm$ )	0.6	0.6	0.8	0.8	0.6	0.6	0.6	0.8	0.8	0.6	0.6
Uniformity <sup>2</sup> of $S_v$ in %	5	5	5	5	5	5	5	5	5	5	5

#### Types and features (Modulation frequency 10 Hz)

Type	128LTMI SL SP0.5	128LTMI SLSP0.5V3	256LTMI SL SP0.5	256LTMI SLSP0.5V3
Pixel number	128	128	256	256
Pixel width in µm	90	90	42	42
Pixel length in µm	500	500	500	500
Pitch in µm	100	100	50	50

#### Electro-optical specification<sup>1</sup>

Responsivity $S_v$ in $10^3 V/W$	8000	24000	9100	27000
Noise voltage $U_n$ in mV	1.2	3.2	0.9	2.2
NEP in nW	0.15	0.13	0.10	0.08
MTF ( $R = 3lp/mm$ )	0.3	0.3	0.3	0.3
Uniformity <sup>2</sup> of $S_v$ in %	5	5	5	5



Picture detail from a pyroelectric lithium tantalate sensor chip with a metal thin film absorber and ion beam etched isolation trenches.

<sup>1</sup> Typical values, array temperature 25 °C, black body source temperature 400 °C, filter transmission 100 %. <sup>2</sup> No defective element.