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## NEW UNCOOLED LONG-WAVE INFRARED DETECTOR

Fraunhofer IMS presents a new generation of uncooled infrared focal plane arrays (IRFPA) with a pixel pitch of 17  $\mu\text{m}$  and a resolution of 320 x 240 pixel (QVGA). The detector allows the measurement of the emitted radiation of warm bodies in the long-wave infrared band (8  $\mu\text{m}$  – 14  $\mu\text{m}$ ) for thermal imaging applications.

Examples for applications of IRFPAs are thermography, pedestrian detection for automotive (night vision), firefighting, or surveillance and security.

### IRFPA

The IRFPA based on uncooled microbolometer with a pixel pitch of 17  $\mu\text{m}$  and is realized with a QVGA resolution. The IRFGA is designed for a high sensitivity with a noise equivalent temperature difference NETD of < 80 mK at a frame frequency of 30 Hz. A novel readout architecture which utilizes massively parallel on-chip Sigma-Delta-ADCs located under the microbolometer array results in a high performance digital readout. In addition to several thousand Sigma-Delta-ADCs the readout circuit consists

of a configurable sequencer for controlling the readout clocking signals and a sensor for measuring the temperature of the IRFPA.

### Parameters of Fraunhofer QVGA-IRFPA

Parameter	Value
Image format	320 x 240
Pixel pitch	17 $\mu\text{m}$
Frame frequency	30 Hz
Output Signal	16 bit (digital)
Temperature range	-40 $^{\circ}\text{C}$ – +70 $^{\circ}\text{C}$
NETD	< 80 mK

The microbolometers are located in a vacuum package to achieve a higher sensitivity due to thermal isolation. Since packaging is a significant part of the IRFPA's price Fraunhofer IMS uses a chip-scaled package (CSP) to reduce the production costs. The CSP consists of an IR-transparent window with double-sided antireflection coating and a soldering frame for maintaining the vacuum. The IRFPAs are completely fabricated at Fraunhofer-IMS on 200 mm CMOS wafers with an additional surface micromachining process.

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