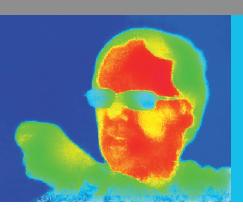


FRAUNHOFER INSTITUTE FOR MICROELECTRONIC CIRCUITS AND SYSTEMS IMS



- 1 IR-Photo.
- 2 Bolometer Readout IC.
- 3 SEM Image of a Microbolometer.

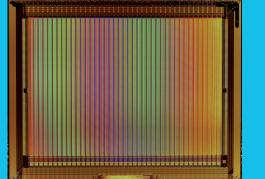
Fraunhofer Institute for Microelectronic Circuits and Systems IMS

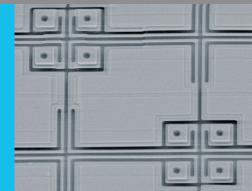
Finkenstr. 61 D - 47057 Duisburg phone +49 203 37 83-0 fax +49 203 37 83-266 www.ims.fraunhofer.de

Contact

Michael Bollerott phone +49 203 37 83-227 vertrieb@ims.fraunhofer.de







FAR INFRARED DETECTOR FOR THERMAL IMAGING

Fraunhofer IMS has fabricated the first uncooled infrared focal plane array (IRFPA) throughout Germany. IRFPAs measure the emitted radiation of warm bodies in the long-wave infrared band (8 μ m - 14 μ m) and provide the IR-image in an IR-camera system. Examples for applications of IRFPAs are thermography, pedestrian detection for automotive, firefighting, and infrared spectroscopy. IRFPAs consist of an array of microbolometers located on top of a CMOS substrate which comprehends the readout circuit. The microbolomters are located in a vacuum package to achieve a higher sensitivity due to thermal isolation.

IRFPA

The IRFPA based on uncooled microbolometer with a pixel pitch of 25µm and is realized with a VGA resolution of 640 x 480 pixel. The IRFGA is designed for a high sensitivity (noise equivalent temperature difference NETD) of NETD < 100 mK at a frame frequency of 30Hz. 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 temperature sensor for measuring the temperature of the IRFPA.

Parameters of Fraunhofer VGA-IRFPA

Parameter	Value
Image format	640 x 480
Frame frequency	30 Hz
Output Signal	16 bit (digital)
Temperature range	-40°C bis 80°C
NETD	< 100 mK

Since packaging is a significant part of IRFPA's price Fraunhofer-IMS uses a chip-scaled package consisting of an IR-transparent window with double-sided antireflection coating and a soldering frame for maintaining the vacuum resulting in reduced production costs. The IRFPAs are completely fabricated at Fraunhofer-IMS on 8" CMOS wafers with an additional surface micromachining process.