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ABSTRACT

ON-CHIP COMPENSATION OF SELF-HEATING EFFECTS IN MICROBOLOMETER INFRARED DETECTORS

The self-heating during read-out of uncooled microbolometer arrays is much larger than the heating due to incident IR radiation to be detected. This results in a degradation of the performance by requiring a large dynamic range of the preamplifier to be allocated for the signal due to self-heating. To compensate for this self-heating effect while maintaining a large dynamic range, a reference bolometer having a larger thermal conductance than a sensing bolometer is utilized. A Wheatstone bridge read-out circuit compares the reference bolometer resistance against the sensing bolometer resistance and two known resistances. This concept is also extended to focal plane arrays having an array of sensing bolometers that are self-heating compensated by an adjacent row or reference bolometers having a larger thermal conductance. Readout circuitry multiplexes the outputs from a selected reference and a selected sensing bolometers to momentarily complete a bridge circuit and thereby determine the resistance change due to the incident infrared radiation.

Figure 4 is to be published



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