INFRARED SYSTEM FOR THERMAL RESISTANCE MEASUREMENT OF MICROOBJECTS

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The original measuring system and method of temperature fields measuring of integrated circuits chips for controlling of thermal resistance between a chip and its case under production conditions is presented. The developed system based on infrared microbolometric matrix and allows integrated circuits chips temperature fields controlling with the high spatial resolution up to 15 microns. The infrared system allows temperature measuring over the range (40 – 200) $^{\circ}C$, and also allows to spot small gains of IC chips temperature around (1 – 2) $^{\circ}C$ at various operating modes. The instrumental error of temperature measuring does not exceed $\pm$ 0.5 $^{\circ}C$ for a blackbody model. For determination of thermal resistance in the system included special bulk copper heat load that provides IC case temperature stabilization in range (40 – 170) $^{\circ}C$ at drift less than $\pm$ 0.1 $^{\circ}C$.

The system consists of the opto-electronic block with a microbolometric matrix, the infra-red objective with fluid-flow temperature stabilization of the case at level (18 $\pm$ 0.01) $^{\circ}C$, the heat load with adjustable temperature, a precision fluid-flow thermostat with the solid-state cooling medium.

Approach of the method novelty consists in application of self-correction of the measured temperature on effective emissivity of the object that allows without special black coating of IC chips controls thermal resistance between an IC chip and its case under manufacturing conditions.

This work is supported by RFBR (grant No. 18-08-00923).