Abstracts

Integrated electro-thermal probe

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A method to simultaneously measure electric and thermal fields with a single probe is presented. The probe material is gallium arsenide with the Pockels effect employed to measure electric fields and the effect of photon absorption due to bandtail states used to determine temperature. Measured optical power versus temperature is inversely related and is shown to agree with theory. Experimental results demonstrate a sensitivity of 0.31 /spl mu/W//spl deg/C at 25/spl deg/C and an accuracy of /spl plusmn/0.5/spl deg/C between 20/spl deg/C and 60/spl deg/C. The magnitude of the electric field is obtained with a normalized standard deviation of 1.3%. The technique is applied to the combined electro-thermal examination of an MMIC in a quasi-optical power-combining array and the calibration of electric field data that was corrupted by temperature dependent effects inherent to the electro-optic probe.

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