Abstracts

New wireless thermometer for RF and microwave thermal therapy using an MMIC in an Si BJT VCO type

Y. Kotsuka, K. Orii, H. Kojima and M. Tanaka. "New wireless thermometer for RF and microwave thermal therapy using an MMIC in an Si BJT VCO type." 1999 Transactions on Microwave Theory and Techniques 47.12 (Dec. 1999 [T-MTT] (Special Issue on 1999 International Microwave Symposium)): 2630-2635.

A new wireless thermometer is proposed for thermal therapy that uses a silicon bipolar transistor voltage-controlled oscillator (Si VCO), based on three-dimensional monolithic-microwave integrated-circuit (MMIC) technology. A theoretical analysis of heating characteristics was conducted using the finite-element method. The result suggests the MMIC thermometer may be used for RF/microwave thermal therapy in a strong electromagnetic wave circumstances. The fundamental characteristics of an Si VCO MMIC are examined experimentally. As a result, the VCO's oscillation frequency (around 4.35 GHz) is extremely linear against temperature in the range from 30/spl deg/C to 50/spl deg/. Tests using a phantom material show that a prototype thermometer can be detected at depths of more than 8 cm of soft tissue.

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