Abstract

Acquiring temperature measurements using conventional methods can be costly and technically challenging. These active temperature sensors limit the environmental conditions in which they can be deployed. Most of them cannot tolerate wide temperature ranges and they are susceptible to failure in high radiation environments. This paper presents an energy autonomous wireless temperature sensing system without requiring physical contact or active elements. The environmental friendly device is made up of a planar capacitor integrated into passive filter. As the temperature changes, the capacitance is modified and consequently alters the resonant frequency of the circuit. The sensor can be integrated with an antenna and interrogated at distance by a reader. To prove this concept, a wireless sensing system is designed and simulated using a variable capacitor. Simulations were performed in order to optimize the device design and to verify the frequency shift with sensitivity of 2.85 MHz/°C. This design allows wireless temperature sensing, thus making it an effective solution for distant temperature monitoring applications. However, this developed technique is general enough to be implemented to high temperature application by using other capacitors made of high temperature ceramics sensitive materials.
Green Passive Temperature Sensing Technology using Sensitive Ceramic Capacitor

References

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Index Terms

Computer Science

Electronic Devices
Keywords
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