

A new class of MEMS *LC*-resonators for magnetic sensor

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A new class of *LC*-resonators for magnetic sensor was invented and fabricated using MEMS technique. The *LC*-resonator consists of a micro-inductor with ferromagnetic microwire cores and a capacitor connected in parallel to the micro inductor. The microwire was fabricated by a glass-coated melt spinning technique. The solenoid type micro-inductor is 1.5 mm in length with 10 turns. Since the permeability of ultra soft magnetic microwire is changing rapidly as a function of external magnetic field. The resonance frequency as well as the current through the circuit is changing drastically according to the external magnetic field. The measurement of impedance of the *LC*-resonator was carried out at high frequency range from 100 MHz up to 1 GHz with a network analyzer and an impedance analyzer along the microwire direction and at varying axial dc-magnetic field in range of ± 300 Oe. The impedance vs. magnetic field curve was changing abruptly at near the resonance frequency. The change of phase angle as much as 180 degree evidenced the occurrence of resonance. The resonance frequency can be tuned from 100 MHz to 1 GHz by changing. Numerical simulations as well as theoretical investigation are also discussed.

9.7 cm

13.4 cm

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