Abstracts

Cordless batteryless wheel mouse application utilizing radio requestable SAW devices in combination with the giant magneto-impedance effect

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Surface acoustic wave devices for wireless identification (ID) systems, the so-called ID tags, can be turned into novel sensor elements (transponders) for impedance sensors by making use of magnetic-field variations caused by the wheel rotation and key-click functionality of a personal computer (PC) mouse. This kind of sensor does not need any power supply and may be interrogated wirelessly. Interdigital transducers are used as loadable reflectors, while another fixed reflector is used as reference to compensate cross sensitivity for temperature, mechanical stress, etc. The load of the reflectors influences amplitude and phase of the reflected wave. The load's impedance is changed utilizing the giant magneto-impedance (GMI) effect in a 30-/spl mu/m-diameter amorphous FeCoSiNd wire of zero magnetostriction. The measurand, represented by the PC-mouse key clicks and wheel rotation, influences a magnetic field, which varies the impedance of the GMI wire. Consequently, the load of the reflector influences the reflected acoustic wave and the response signal of the radio sensor. The operating principle of such a magnetic-field sensor is discussed, and the tuning for an application in a passive and cordless PC mouse is presented.

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