

## NiMnGa Thin Film Microactuators

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Microactuators of ferromagnetic shape memory alloys make use of the thermoelastic, ferromagnetic and magnetomechanical material properties, which enables a new level of multifunctionality and, as a consequence, particularly compact designs. However, designing the functional parts of such microactuators becomes rather complicated due to the complex coupling of the different physical properties. In the presence of a magnetic field, in particular, several magnetomechanical effects may be of importance such as ferromagnetic forces, Lorentz forces, the conventional magnetostriction and magnetic field-induced reorientation of martensite variants. The paper addresses the design, simulation and fabrication technology of selected NiMnGa thin film microactuators being representative for a number of typical applications. A method for coupled finite element simulation is presented, which is used as a design tool. The technologies of thin film deposition, micromachining and integration in a microsystem environment are discussed.