

HIGH SPEED LOW POWER MAGNETIC DEVICES BASED ON CURRENT INDUCED SPIN-MOMENTUM TRANSFER

A high speed and low power method to control and switch the magnetization direction and/or helicity of a magnetic region in a magnetic device for memory cells using spin polarized electrical current. The magnetic device comprises a reference magnetic layer with a fixed magnetic helicity and/or magnetization direction and a free magnetic layer with a changeable magnetic helicity. The fixed magnetic layer and the free magnetic layer are preferably separated by a non-magnetic layer, and the reference layer includes an easy axis perpendicular to the reference layer. A current can be applied to the device to induce a torque that alters the magnetic state of the device so that it can act as a magnetic memory for writing information. The resistance, which depends on the magnetic state of the device, is measured to thereby read out the information stored in the device.

Fig. 1