MAGNETIC TUNNEL JUNCTION DEVICE WITH LONGITUDINAL BIASING

ABSTRACT

A magnetic tunnel junction device (100) for use as a magnetic memory cell or a magnetic field sensor has one fixed ferromagnetic layer (118) and one sensing ferromagnetic layer (132) formed on opposite sides of the insulating tunnel barrier layer (120), and a hard biasing ferromagnetic layer (150) that is electrically insulated from but yet magnetostatically coupled with the sensing ferromagnetic layer (118). The layer of hard biasing ferromagnetic material (150) is located near to but spaced from the side edges of a sensing ferromagnetic layer (132) to longitudinally bias the magnetic moment of the sensing ferromagnetic layer (132) in a preferred direction. A layer of electrically insulating material (160) isolates the hard biasing material (150) from the electrical leads (102, 104) and the sensing ferromagnetic layer (132) so that sense current is not shunted to the hard biasing material (150).

Fig. 5