

RESETTABLE SYMMETRIC SPIN VALVE

ABSTRACT

A read sensor includes first and second symmetric spin valves (102, 104) with resettable magnetization directions is described. The first spin valve (102) includes an antiferromagnetic layer (106), a ferromagnetic pinned layer (107), a non-magnetic conductor layer (108), then a ferromagnetic free layer (109). The ferromagnetic free layer (109) is shared by the first and second spin valves (102, 104). Upon the ferromagnetic free layer (109) lies a non-magnetic conductor layer (108), then an inner ferromagnetic pinned layer (111) and an outer ferromagnetic pinned layer (113) sandwiching an exchange coupling layer (112). The exchange coupling layer (112) exhibits sufficient exchange coupling with the sandwiching ferromagnetic pinned layers to pin these layers' magnetisation directions in antiparallel directions. A second antiferromagnetic layer (114) may be provided adjacent the second spin valve's outer ferromagnetic pinned layer (113). Directing a current pulse of suitable duration and magnitude through the conductors heats the antiferromagnetic layers beyond their blocking temperatures, providing the antiferromagnetic layers with a magnetization direction in accordance with the pulse's magnetic field.

Fig. 1