

MAGNETIC TUNNEL JUNCTION MAGNETORESISTIVE READ HEAD WITH SENSING LAYER AS FLUX GUIDE

ABSTRACT

A magnetic tunnel junction (MTJ) magnetoresistive read head for a recording system has the MTJ sensing or free ferromagnetic layer (132) functioning as a flux guide to direct magnetic flux from the magnetic recording medium to the tunnel junction. The MTJ fixed ferromagnetic layer (118) has its front edge (206) recessed from the sensing surface (200) of the head. Both the fixed (118) and free (132) layers are in contact with opposite surfaces of the MTJ tunnel barrier layer (210) but the free ferromagnetic layer (132) extends beyond the back edge of either the tunnel barrier layer (210) or the fixed ferromagnetic layer (118), whichever back edge is closer to the sensing surface. Thus the magnetic flux is non-zero in the tunnel junction region. The magnetization direction of the fixed ferromagnetic layer (118) is fixed in a direction perpendicular to the sensing surface and thus to the magnetic recording medium, preferably by interfacial exchange coupling with an antiferromagnetic layer (116).

Fig 5