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(54) Title: INTEGRATED, ON-BOARD DEVICE AND METHOD FOR THE PROTECTION OF MAGNETORESISTIVE HEADS FROM ELECTROSTATIC DISCHARGE

(57) Abstract: This invention discloses a circuit including a magnetoresistive sensor and a tunnel junction device coupled to the MR sensor to dissipate the energy associated with an electrical signal exceeding operational voltages for the sensor. The tunnel junction can include a first conducting layer, a second conducting layer, and a barrier material positioned between the first and the second conducting layer. The barrier material can be positioned so that the first conducting layer and the second conducting layer do not make contact. The MR sensor can be connected in parallel to the first and second conducting layer. The tunnel junction can be made of a material with a resistance more than the MR sensor's resistance at operational voltages and a resistance below the MR sensor's resistance at larger voltages. In another aspect of the invention, a method for fabricating the protected circuit including integrating a MR sensor on the circuit and coupling a tunnel junction to the MR sensor to dissipate an electrical signal exceeding operational voltages for the MR sensor is presented. The tunnel junction device can be fabricated during the fabrication of the circuit. The method can include fabricating the tunnel junction on the MR sensor.