

Abstract Submitted
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Temperature dependence of TCR and 1/f Noise in p-type a-Si:H¹ VINCE LOPES, ERIC HANSON, KIRAN SHRESTHA, CHRIS LITTLER, ATHANASIOS SYLLAIOS, University of North Texas Department of Physics — The amorphous semiconductor a-Si:H is used for infrared detection applications. Key figures of merit are the temperature coefficient of resistance (TCR) and 1/f noise. We report on the temperature dependence of the electrical resistivity and noise of devices fabricated on as grown boron-doped p-type a-Si:H. The 1/f noise was found to be proportional to the bias voltage and inversely proportional to the square root of the device area. As a result, it can be described by Hooge's empirical expression. However, the 1/f noise was found to be constant in the temperature range investigated, even though the resistance changes by a factor of 2.5. We conclude that the carrier concentration is nearly constant in the temperature range studied; thus, the resistance change is due to the temperature dependence of the hole mobility. This interpretation is consistent with temperature dependent hole mobility measurements of others and suggest that the TCR for p-type a-Si:H material near room temperature is determined by changes in the hole mobility.

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