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2.4 μm GaInAsSb Mesa Photodiode Detectors: Leakage Currents and Ultimate Performance JOHN PRINEAS, JEFF YAGER, Dept. Physics and Astronomy, University of Iowa, JON OLESBERG, Optical Science and Technology Center, University of Iowa, SHAHRAM SEYDMOHAMADI, Dept. Physics and Astronomy, University of Iowa — Short-wave infrared photodiodes play an important role in areas such as molecular sensing, thermophotovoltaics, and astronomical study of galaxy, star, and planetary formation. Here we present results and analysis of uncoated, unpassivated, GaInAsSb mesa photodiodes. We have currently achieved room temperature peak specific detectivity D*=6x10^{10} Jones, dynamic resistance of 25 Ω-cm^2, and quantum efficiency of 50%. Devices are limited primarily by sidewall leakage currents, initially due to generation-recombination, and over time due to Ohmic leakage from buildup of sidewall oxides. Based on material parameters obtained in this as well as other studies, ultimate diode performance is predicted, and compared to extended-wave InGaAs/InP and HgCdTe detectors.

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