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Vanadium Dioxide Phase Change Switches¹ MARK FIELD, CHRISTOPHER HILLMAN, PHILIP STUPAR, JONATHAN HACKER, ZACHARY GRIFFITH, KANG-JIN LEE, Teledyne Scientific & Imaging LLC — We have built RF switches using vanadium dioxide thin films fabricated within a section of inverted transmission line with integrated on chip heaters to provide local thermal control. On heating the films above the metal insulator transition we obtain record low switch insertion loss of -0.13 dB at 50 GHz and -0.5 dB at 110 GHz. We investigate the device physics of these switches including the effect of a deposited insulator on the VO₂ switching characteristics, the self-latching of the devices under high RF powers and the effect of resistance change with temperature on the device linearity. Finally we show how these devices can be integrated with silicon germanium RF circuits to produce a field programmable device where the RF signal routing can be selected under external control.

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