MSM PHOTODIODE AS THE SWITCHING ELEMENT IN A PHOTOSWITCH-BASED CLASS E MICROWAVE POWER AMPLIFIER

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ABSTRACT

A photoswitch is designed for use as the switching element in a 2 GHz class E amplifier. The application of this amplifier is as the final-stage amplifier in the transmit-receive module of a phased-array radar system. The goal of the photonic design, the use of a photoswitch in place of the typical transistor, is increased efficiency, leading to lower heat removal and power requirements. The size and weight of required heatsinks are thus reduced. A metal-semiconductor-metal (MSM) photodiode is chosen as the switch type and a microstrip implementation of the class E amplifier is used. Complete experimental verification is attempted, but because of limited resources a final working model is not entirely achieved. Methods are outlined, however, to implement the design successfully.