755

Accession Number

12287983

Author

Hongyu Zhou. Xi Chen. Espinoza DS. Mickelson A. Filipovic DS.

Author Unabbreviated

Espinoza David S.; Mickelson A.; Filipovic D. S.

Author/Editor Affiliation

Hongyu Zhou. Xi Chen. Espinoza DS. Mickelson A. Filipovic DS. : Department of Electrical, Computer, and Energy Engineering, University of Colorado, Boulder, CO 80309-0425, USA

Title

Nanoscale Optical Dielectric Rod Antenna for On-Chip Interconnecting Networks

Source

IEEE Transactions on Microwave Theory and Techniques, vol.59, no.10, pt.2, Oct. 2011, 2624-32. Publisher: IEEE, USA.

Abstract

A nanoscale on-chip optical dielectric rod antenna is demonstrated in this paper. The antenna is designed and fabricated on a 200-mm silicon-on-insulator platform, using IMEC 193-nm-deep UV lithography. A 500-nm-thick polymer layer is designed and deposited to act as an asymmetric slab waveguide, confining the radiated wave within the layer. Full-wave analysis predicts antenna return loss above 25 dB, and end-fire gain greater than 9 dBi from 172 to 222 THz. Six antenna pairs with 1-, 3-, 5-, 7-, 12-, and 17- m separations are fabricated. Corresponding transmissions are measured from 190 to 200 THz. Two on-chip optical signal hubs composed of 16 and 32 antennas designed for core-to-core interconnection for the next-generation multicore microprocessors are also demonstrated. Good agreement between the modeling and measurement is obtained. (21 References).