

(S7) Abstract: An arrangement for actively controlling, in two dimensions, the manipulation of light within an SOI-based optical structure utilizes doped regions formed within the SOI layer and a polysilicon layer of a silicon-insulator-silicon capacitive (SISCAP) structure. The regions are oppositely doped so as to form an active device, where the application of a voltage potential between the oppositely doped regions functions to modify the refractive index in the affected area and alter the properties of an optical signal propagating through the region. The doped regions may be advantageously formed to exhibit any desired "shaped" (such as, for example, lenses, prisms, Bragg gratings, etc.), so as to manipulate the propagating beam as a function of the known properties of these devices. One or more active devices of the present invention may be included within a SISCAP formed, SOI-based optical element (such as, for example, a Mach-Zehnder interferometer, ring resonator, optical switch, etc.) so as to form an active, tunable element.



(84) **Designated States** (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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