



Fig. 13. Calculated results by ray trace simulation (a) Output intensity from the launched core. (b) Output intensity from the whole cladding. (c) Crosstalk value (XT) to the left-edge core. (d) Crosstalk value to the third core from the left edge.

4. Conclusion

We successfully fabricated W-shaped PPOWs with desired refractive index profiles. This is a reliable solution that can simultaneously realize low propagation loss (0.027 dB/cm) and low inter-channel crosstalk (-40.3 dB). In the case of higher concentration of BzMA in the cladding material, it realizes an unexpectedly higher crosstalk value which could result from the higher refractive index of cladding (outermost layer) than that of the cores.

It is theoretically confirmed that the larger the depth of index valley, the lower inter-channel crosstalk. Furthermore, for centimeter scale optical interconnections, we apply the ray tracing method to confirm the advantages of W-shaped profile PPOW visually and numerically. We conclude that W-shaped refractive index profiles perform as low propagation loss as GI waveguides with the additional characteristic of inter-channel crosstalk suppression for the application of high dense aligned optical interconnections.