

The Role of the Coupling System in Pigtailling of Semiconductor Optical Amplifiers

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Abstract:

In this some analysis on three different coupling systems, i.e., butt, single ball lens, and two ball lenses between the tips of two coupled single mode fiber in semiconductor optical amplifier (SOA) module are presented. The coupling components inside the module are aligned carefully in an active alimnet process and attached using Nd:YAG laser welding with dual laser beams. The tips of the coupled fiber are ferruled inside metallic tubes to enable the attachment to the substrates through saddle-shaped welding clips. Investigations of the variations of coupling efficiency are reduced into 40%. Single ball lens provides 100% coupling efficiency at a tolerant working distance around 0.3mm between the two coupled fibers. But a difficulty arises in its positioning before or after the semiconductor chip. The two ball lenses scheme is found to be more efficient and longitudinally tolerant for this application. Moreover, it has been found that there is an optimum range around 1 mm for the separation between the two lenses at which the coupling efficiency is maximum with tolerant misalignments.