

Figure 1: Illustration of the photonic integrated circuit cross-section on a silicon-on-insulator wafer. The III-V laser stack is grown adjacent to the passive components and light is butt-coupled into the waveguides.



Figure 2: Illustration of the growth process of the quantum dot laser stack. A thick GaAs buffer is grown selectively in a pocket etched in a photonic integrated circuit chip. The lower cladding, active region, and upper cladding of the laser stack are then grown under conventional growth conditions.

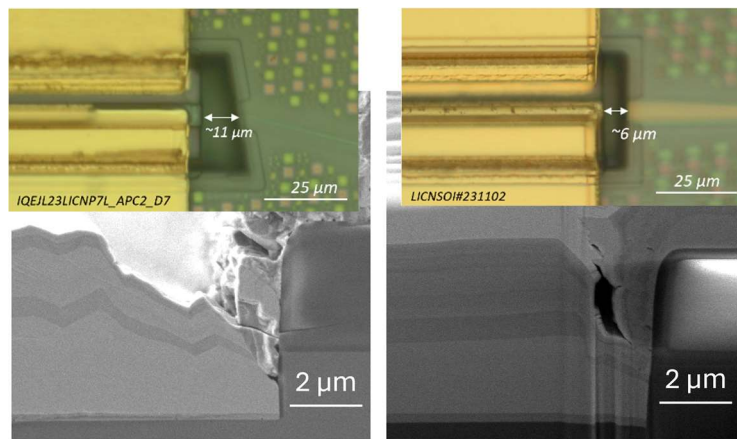


Figure 3: Cross-sectional scanning electron microscope (SEM) images and planview microscope images of a laser stack grown without a selective area growth buffer (a) and with a selective area growth buffer (b).

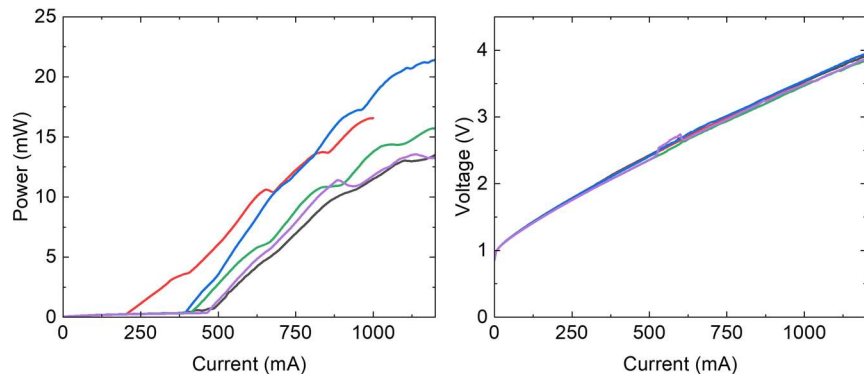


Figure 4: Representative LIV curves of fabricated lasers. Output power above 20 mW and threshold currents as low as 205 mA (2280 kA/cm^2) were achieved.