



Robust design of Si/Si₃N₄ high contrast grating mirror for mid-infrared VCSEL application

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(Submitted on 3 May 2012)

A Si/Si₃N₄ high contrast grating mirror has been designed for a VCSEL integration in mid-infrared ($\lambda = 2.65 \mu\text{m}$). The use of an optimization algorithm which maximizes a VCSEL mirror quality factor allowed the adjustment of the grating parameters while keeping large and shallow grating pattern. The robustness with respect to fabrication error has been enhanced thanks to a precise study of the grating dimension tolerances. The final mirror exhibits large high reflectivity bandwidth with a polarization selectivity and several percent of tolerance on the grating dimensions.

Comments: The final publication is available at [this http URL](#), Optical and Quantum Electronics (2012) Online First

Subjects: **Optics (physics.optics)**

DOI: [10.1007/s11082-012-9578-8](https://doi.org/10.1007/s11082-012-9578-8)

Cite as: [arXiv:1205.0630](#) [physics.optics]

(or [arXiv:1205.0630v1](#) [physics.optics] for this version)

Submission history

From: Christyves Chevallier [[view email](#)]

[v1] Thu, 3 May 2012 06:55:01 GMT (217kb)

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