

EPIC Online Meeting on VCSEL Technology and Applications

VCSEL Illumination for 3D sensing

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Increasing number of applications for 3D Sensing

Consumer



Industrial



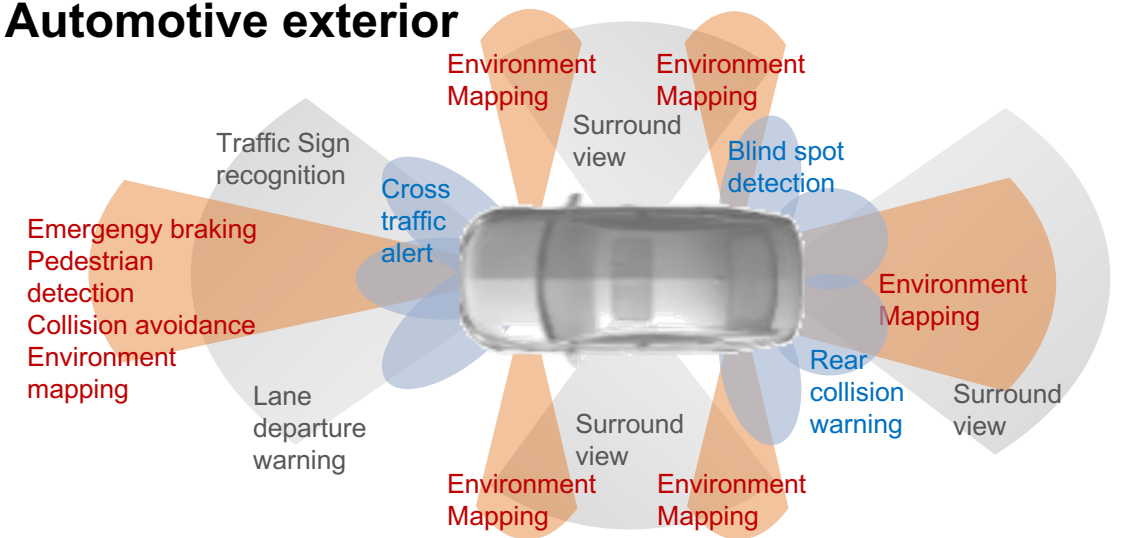
Automotive interior



Key performance requirements:

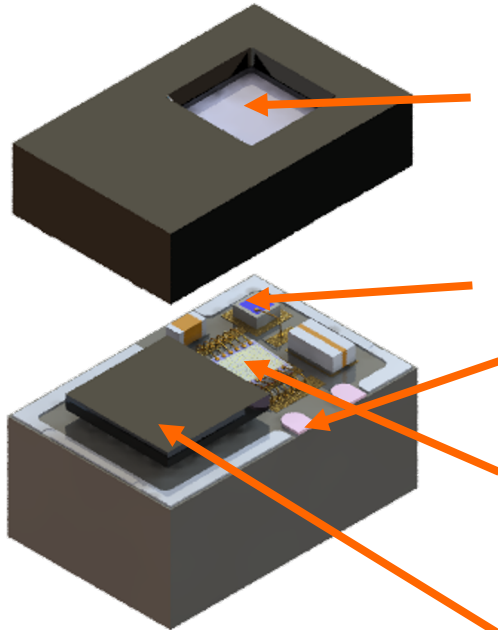
- **Consumer**
 - Resolution (rise time)
 - Power consumption
 - Size
- **LIDAR (Industrial/ exterior automotive)**
 - Resolution (pulse width/rise time)
 - Peak power
 - Minimum current drive

Automotive exterior



Customer applications driving technology development

Integrated illumination module



Diffuser in lid for generating desired field of view

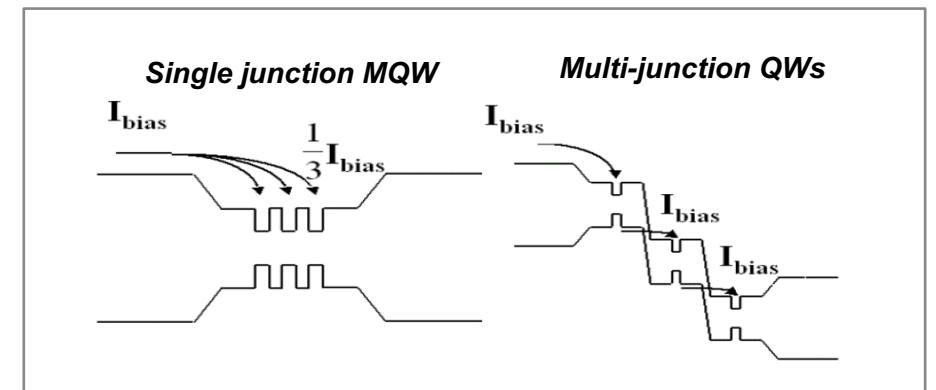
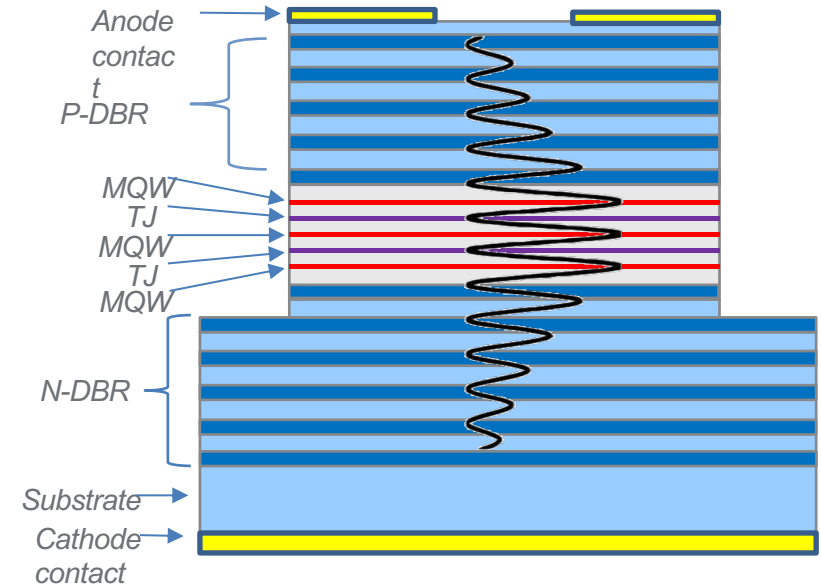
Eye safety:

- Monitor photodiode
- MLA Interlock

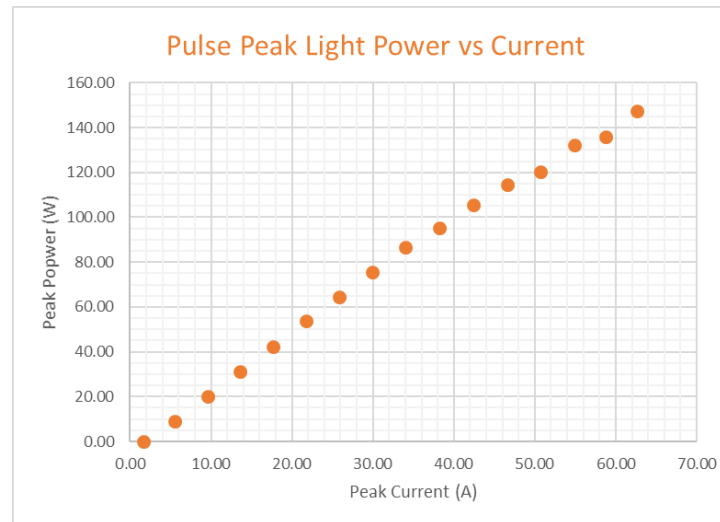
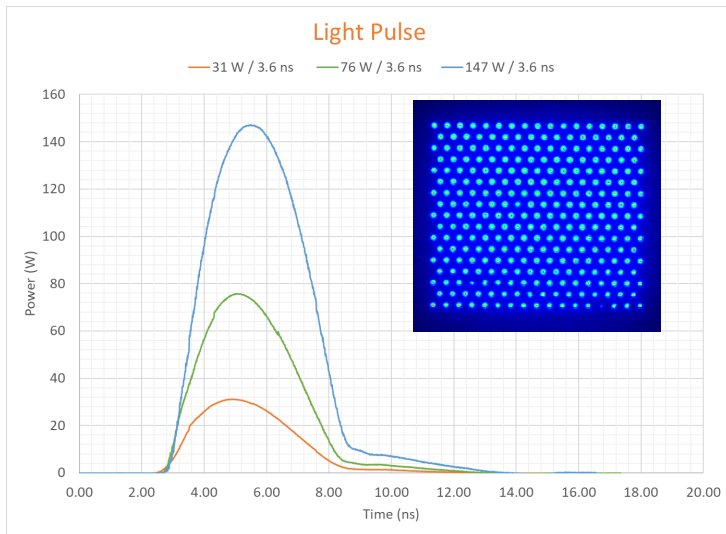
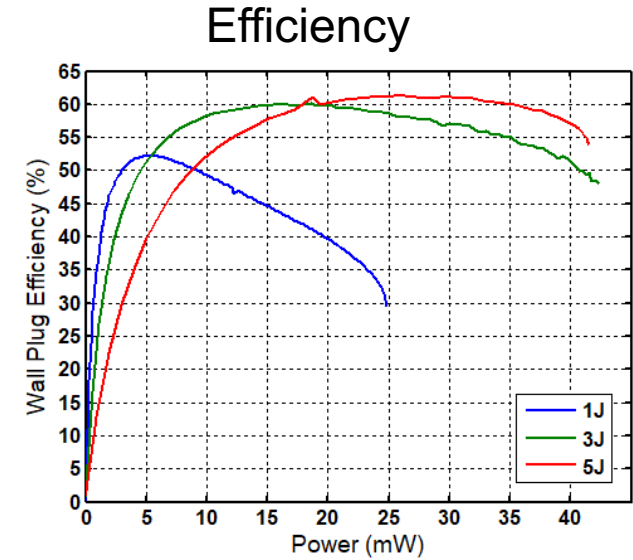
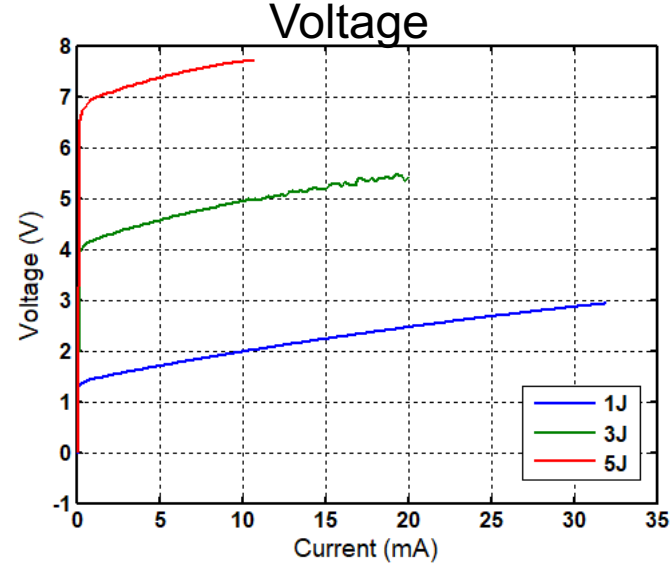
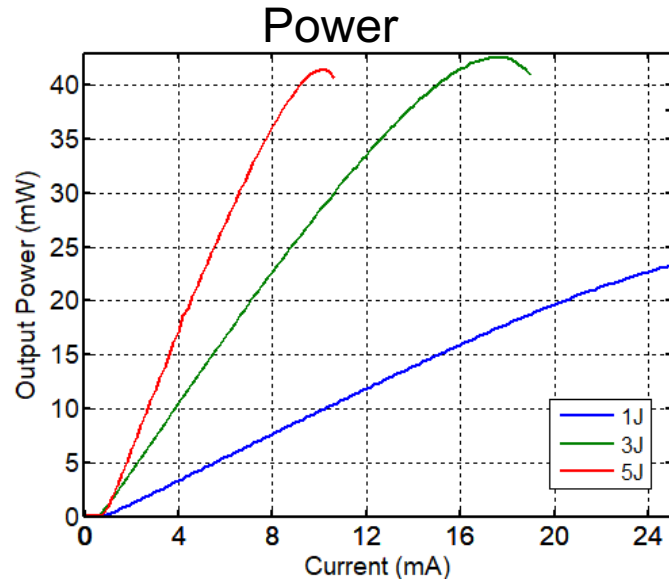
High efficiency 3W 940nm VCSEL chip

Driver I.C. with <500psec rise time

Multijunction VCSEL



Performance results: Single, triple and 5-junction VCSEL (940nm)



- Triple Junction VCSEL array driven with 3.6ns pulses, 0.1% duty cycle
 - Peak pulse power of **147W** recorded for 64 A peak current
- Equivalent irradiance: **281W/mm²**
 - Emission area: 0.77 x 0.68 mm²