# **EPIC Online Meeting on VCSEL Technology and Applications**

**VCSEL Illumination for 3D sensing** 

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Mary 29, 2020



# Increasing number of applications for 3D Sensing

### Consumer



## Industrial



## **Automotive interior**



## **Key performance requirements:**

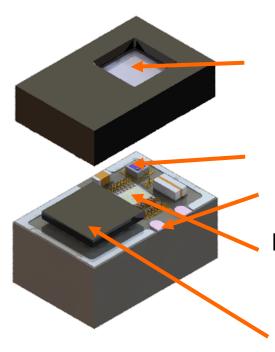
- Consumer
  - Resolution (rise time)
  - Power consumption
  - Size
- LIDAR (Industrial/ exterior automotive)
  - Resolution (pulse width/rise time)
  - Peak power
  - Minimum current drive

#### **Automotive exterior** Environment Environment Mapping Mapping Surround Traffic Sign **Blind** spot view recognition detection Cross traffic **Emergengy braking** alert Pedestrian Environment detection Mapping Collision avoidance Environment Rear mapping collision Surround Lane Surround warning departure view warning Environment Environment Mapping Mapping



# Customer applications driving technology development

## Integrated illumination module



Diffuser in lid for generating desired field of view

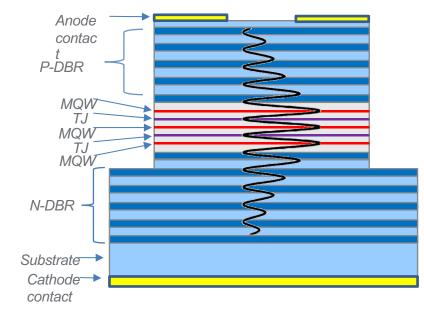
Eye safety:

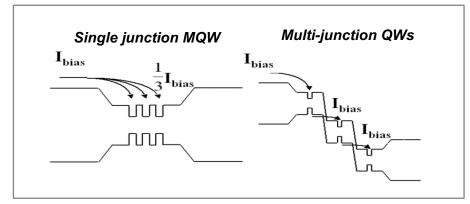
- Monitor photodiode
  - MLA Interlock

High efficiency 3W 940nm VCSEL chip

Driver I.C. with <500psec rise time

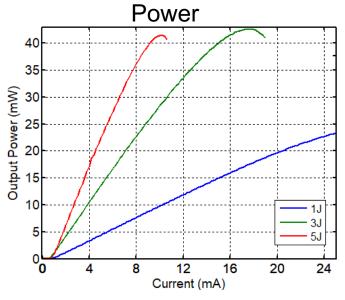
## Multijunction VCSEL

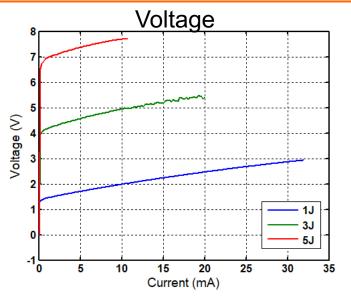




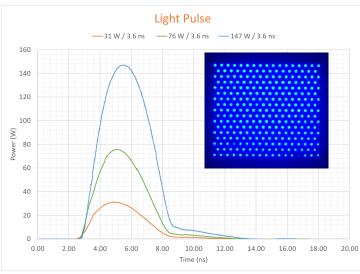


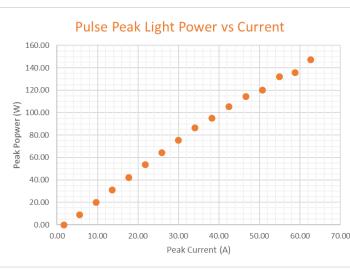
# Performance results: Single, triple and 5-junction VCSEL (940nm)

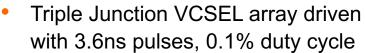












- Peak pulse power of 147W recorded for 64 A peak current
- Equivalent irradiance: 281W/mm<sup>2</sup>
  - Emission area: 0.77 x 0.68 mm<sup>2</sup>

