

## *PowerBoost VCSELs*

Spring 2020  
Light is OSRAM

# PowerBoost spotlight

## Features

Compact footprint with leading-edge VCSEL multi-junction technology.

## Applications

AR/VR  
Face recognition  
Home Automation  
Industrial Automation  
3D Sensing  
LiDAR

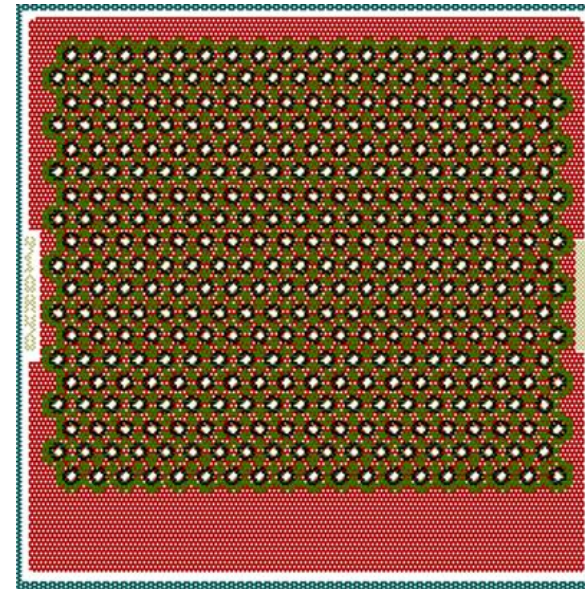
## Benefits

### Exceptional Efficiency

- Power conversion >%50
- Slope efficiency of 2 W/A for dual junction
- Slope efficiency of 3 W/A for triple junction

### High Optical Power

- Less current required to achieve the same optical performance as a single junction VCSEL.
- Faster switching speed of the driver possible due to greatly reducing required current.



# PowerBoost – 2J - Dual Junction VCSEL

## Characteristics

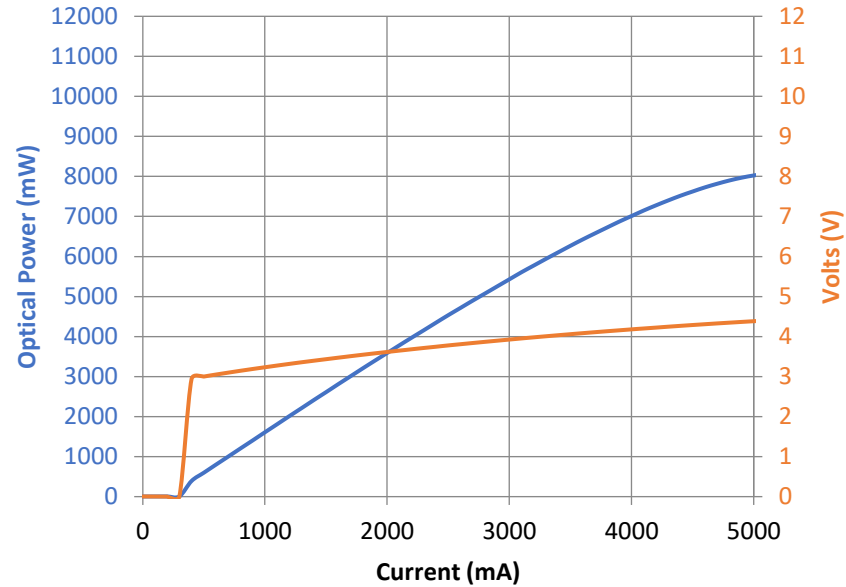
$T_a = 20^\circ\text{C}$ ,  $I_f = 2\text{ A}$ ;  $t_p = 100\ \mu\text{s}$ ; DC = 1%

Forward Voltage	3.6 V
Output Power	3.6 W
Threshold Current	0.2 A
Slope Efficiency	2.0 W/A
Power Conversion Efficiency	50%
Peak Wavelength	940nm
Field of View at 50% FWHM	23°

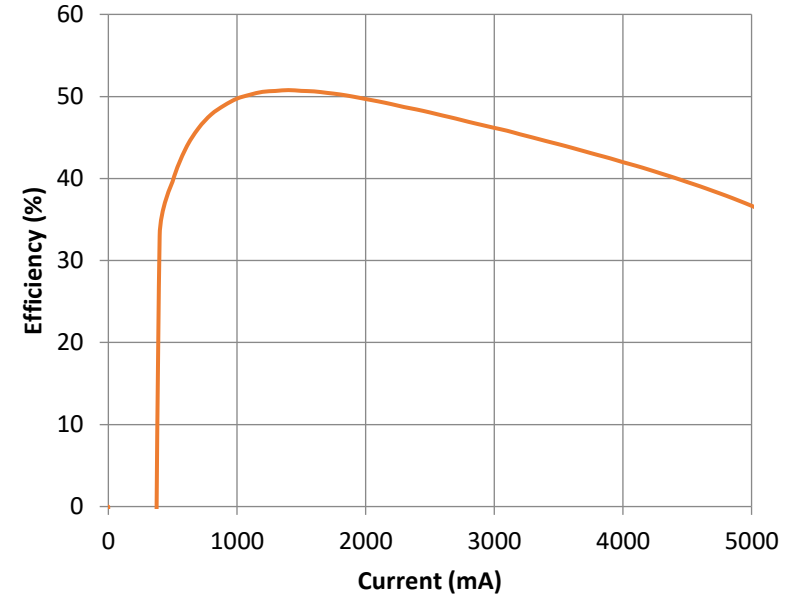
## Die Specifications

Dimensions	0.87mm x 0.87mm x 0.10mm
Apertures	361
Aperture Size	10 $\mu\text{m}$
Emission Area	0.768mm x 0.680mm
Chip Technology	GaAs VCSEL

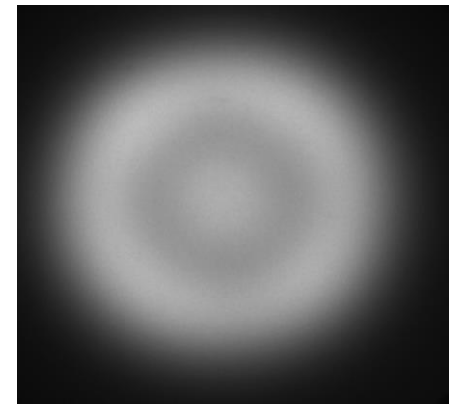
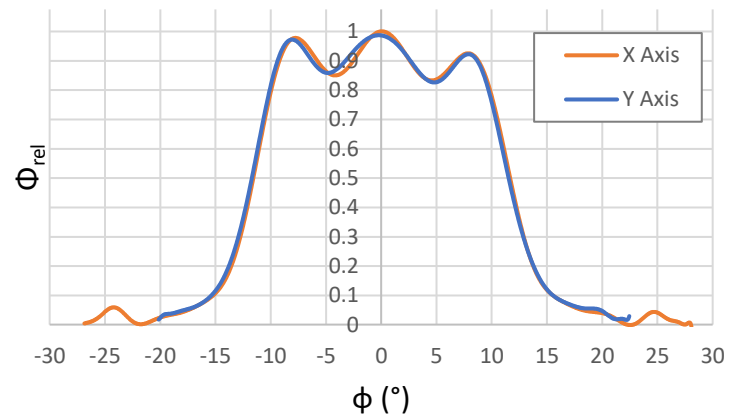
## LIV Performance



## Efficiency



## Beam Profile



# PowerBoost – 3J - Triple Junction VCSEL

## Characteristics

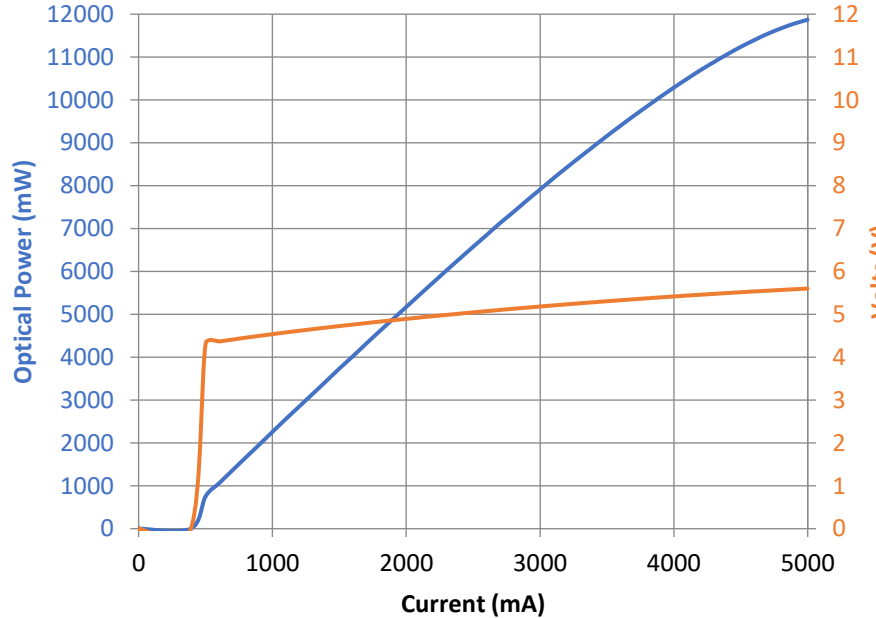
$T_a = 20^\circ\text{C}$ ,  $I_f = 2\text{ A}$ ;  $t_p = 100\ \mu\text{s}$ ; DC = 1%

Forward Voltage	4.9 V
Output Power	5.2 W
Threshold Current	0.25 A
Slope Efficiency	3.0 W/A
Power Conversion Efficiency	53%
Peak Wavelength	940nm
Field of View at 50% FWHM	26°

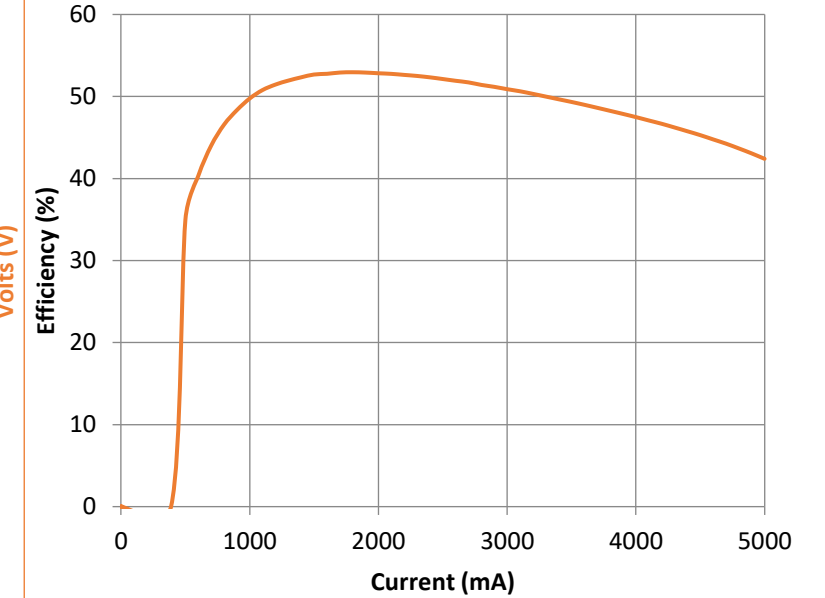
## Die Specifications

Dimensions	0.87mm x 0.87mm x 0.10mm
Apertures	361
Aperture Size	10 $\mu\text{m}$
Emission Area	0.768mm x 0.680mm
Chip Technology	GaAs VCSEL

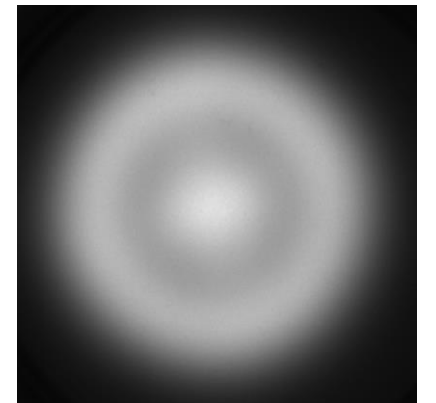
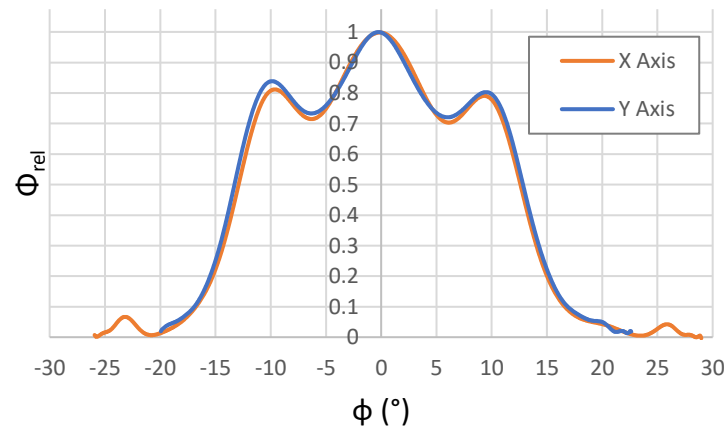
## LIV Performance



## Efficiency



## Beam Profile



# PowerBoost – 5J - Five Junction VCSEL

## Characteristics

$T_a = 20^\circ\text{C}$ ,  $I_F = 2\text{ A}$ ;  $t_p = 100\ \mu\text{s}$ ; DC = 1%

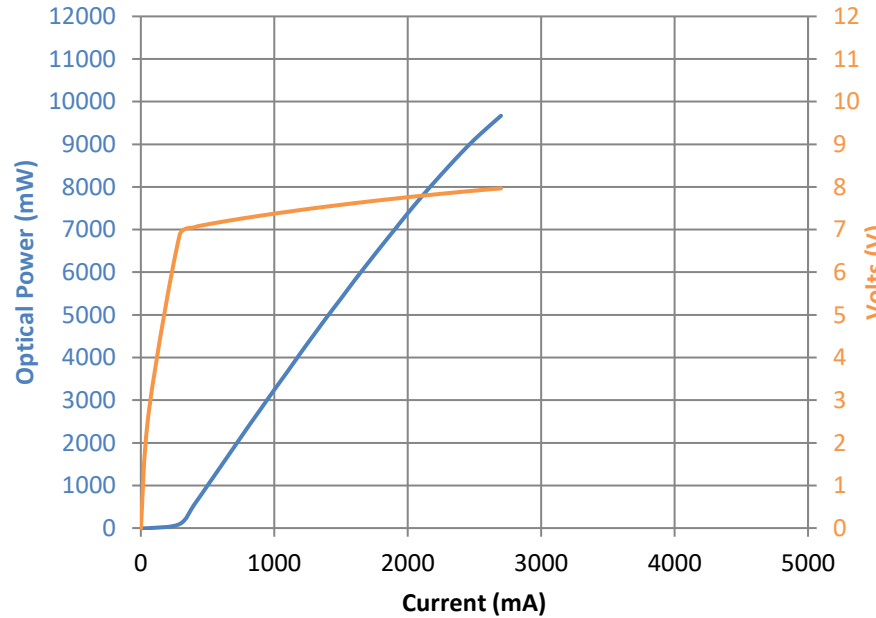
Forward Voltage	7.8 V
Output Power	7.4 W
Threshold Current	0.28 A
Slope Efficiency	3.8* W/A
Slope Efficiency (Single Aperture, $I_F = 5\text{ mA}$ )	4.6 W/A
Power Conversion Efficiency	48%
Peak Wavelength	940nm
Field of View at 50% FWHM	27°

\*Slope Efficiency up to 5 W/A for shorter pulses

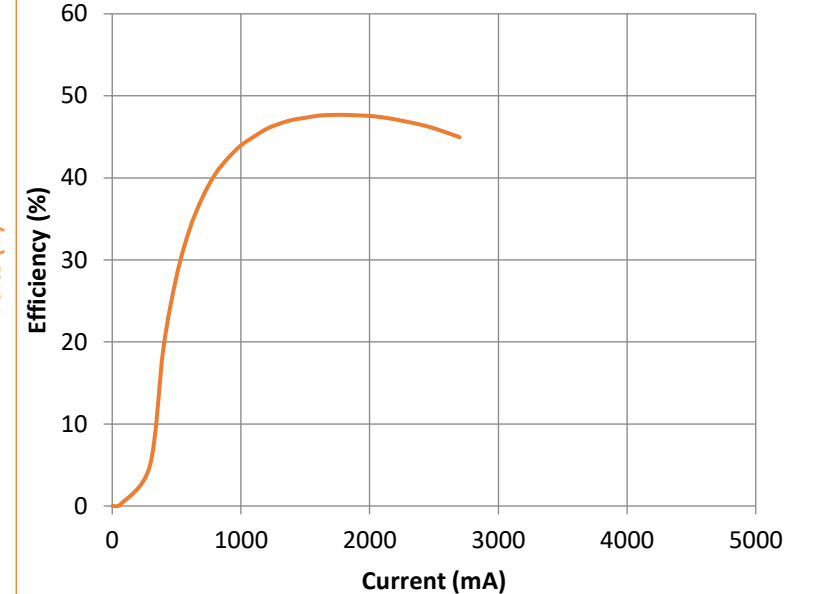
## Die Specifications

Dimensions	0.87mm x 0.87mm x 0.10mm
Apertures	361
Aperture Size	10 $\mu\text{m}$
Emission Area	0.768mm x 0.680mm
Chip Technology	GaAs VCSEL

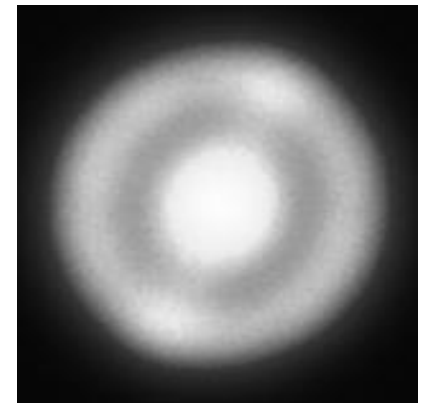
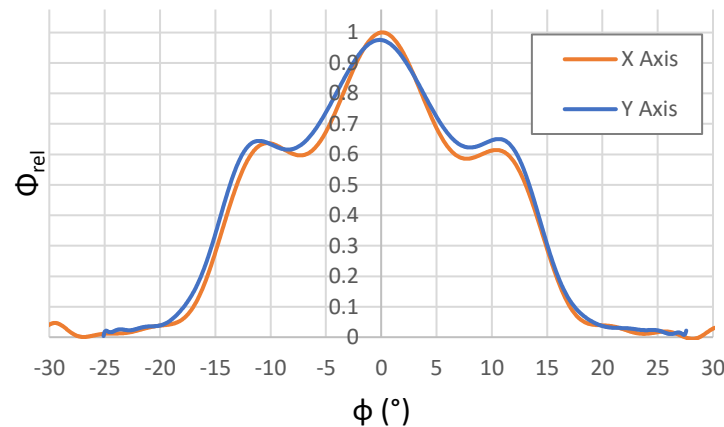
## LIV Performance



## Efficiency



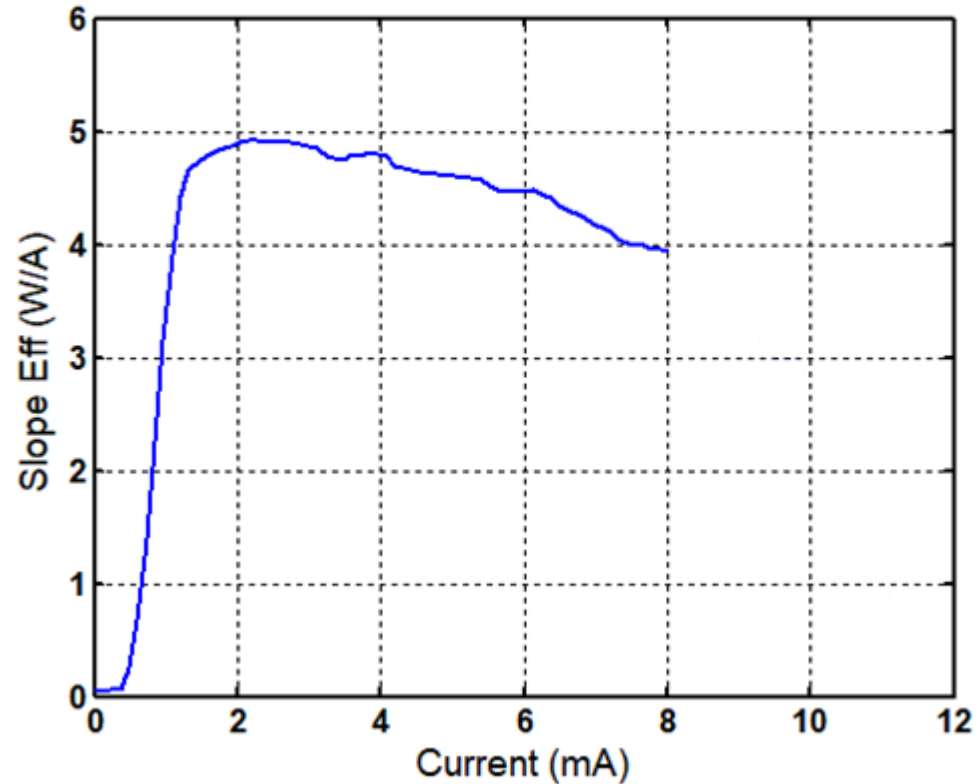
## Beam Profile ( $I = 1.8\text{ A}$ )



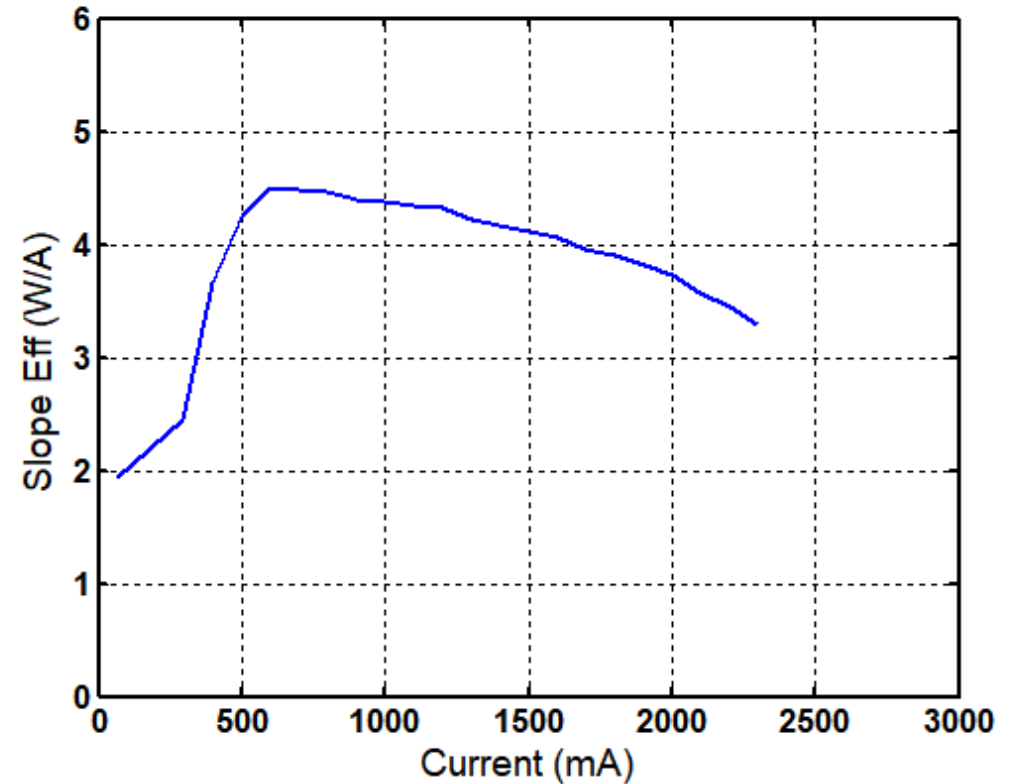
# PowerBoost – 5J - Five Junction VCSEL Slope Efficiency

$T_a = 20^\circ\text{C}$ ,  $t_p = 100 \mu\text{s}$ ; DC = 1%

### Single Aperture



### Power Array



**Note:** With shorter pulses the chip will be close to a SLE of 5W/A.