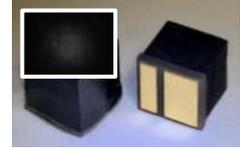




# VDOE940COB15K

## 940nm VCSEL Structured Light Projector, 15372-Dot Pattern

Data Sheet



### Description

The Lasermate VDOE940COB15K is a 940nm wavelength, VCSEL integrated with advanced 15,372-dot pattern diffractive optical element (DOE). The VCSEL is specially designed for open-space 3D structure light. With ultra-small thermally efficient COB package, its compact footprint enables economics of scale and excellent integration flexibility.

### Features

- 940nm wavelength VCSEL
- Ultra-small COB package
- Standard solder reflow-able
- Low power consumption
- IEC 60825 eye safety standards
- High uniform 15,372-dot pattern

### Applications

- Portable device
- Structured light for 3D sensing

### Electrical-Optical Characteristics of VCSEL Chip

Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
Threshold current	$I_{th}$		400	600	mA	0 to 70°C on chip backside
Operating voltage	$V_{op}$	1.80	1.95	2.1	V	2.5A, 60°C on chip backside
Operating current	$I_{op}$		2.5	2.5	A	6.8mA/e
Peak power at 25°C	$P_{op}$	2.0	2.15	2.5	W	2.5A, 25°C on chip backside
Peak power at 60°C	$P_{op}$	1.85	2.0	2.3	W	2.5A, 60°C on chip backside
PCE at 25°C	PCE	40	42	48	%	2.5A, 25°C on chip backside
PCE at 60°C	PCE	39	41	47	%	2.5A, 60°C on chip backside
Slope efficiency	$\eta$	0.85	0.9	1	W/A	2~3A, 60°C on chip backside
Center wavelength	$\lambda_c$	933	940	947	nm	

Note: PCE is power conversion efficiency =  $P_{op}/I_{op} \cdot V_{op}$  at peak of pulse.

### Thermal Characteristics

Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
Wavelength shift	$\Delta\lambda/\Delta T$		0.1		nm/°C	25°C~100°C
Output power decay	$\Delta P_o/\Delta T$		-16.81		mW/°C	25°C~100°C
Forward voltage decay	$\Delta V_f/\Delta T$		-0.0022		V/°C	25°C~100°C

Note: Please connect the projector to a modulation current source. Users are advised to start the driving condition from 600mA, 50% duty cycle, 30Hz.

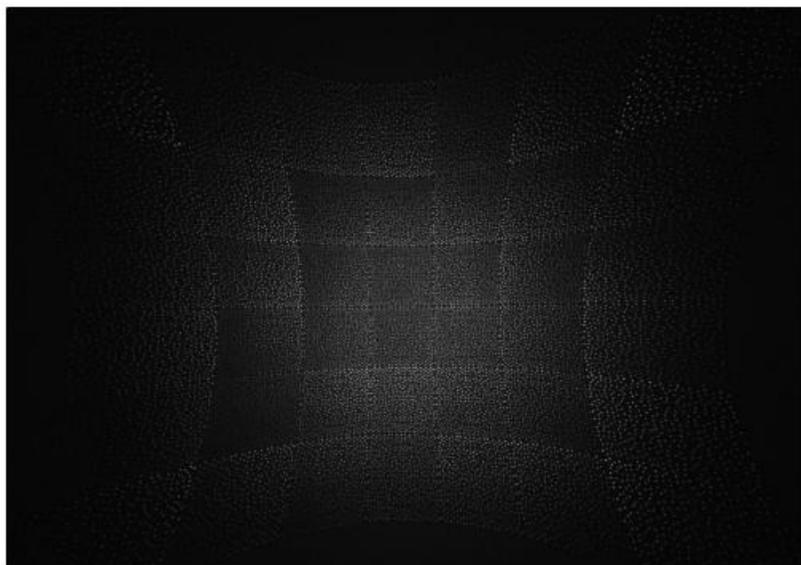
## DOE Specifications

Pattern size @ 100cm	2107.5 x 1400.4mm (HxV)
Total dots	15,372
Field of View (FOV)	93° x 70° (HxV)
Contrast <sup>1</sup>	≥4.5
Uniformity <sup>2</sup> in FOV at 1m	≥25%

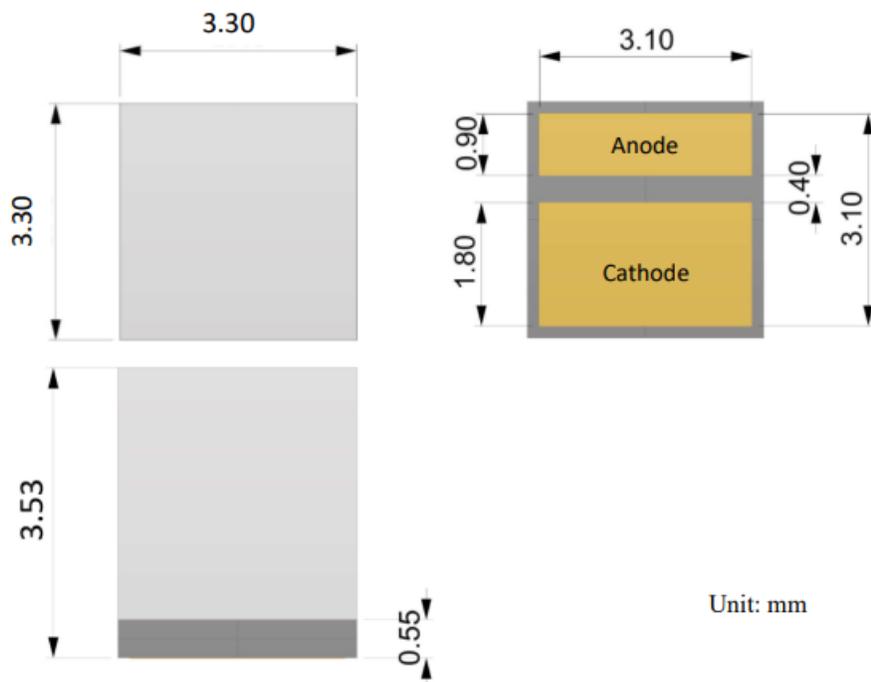
<sup>1</sup> Contrast: in the defined area, the ratio of the 95th percentile of the grayscale value over the mode grayscale value of the background,  
 $C = I_{95\%} / I_{\text{median}}$

<sup>2</sup> Uniformity: the ratio of the grayscale value of the area at a given location to the grayscale value of the area in the center of the pattern,  
 $U = I_{\text{each area}} / I_{\text{max of each area}}$

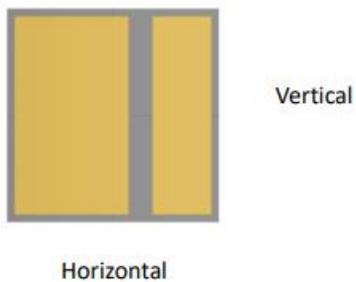
## Projection Pattern

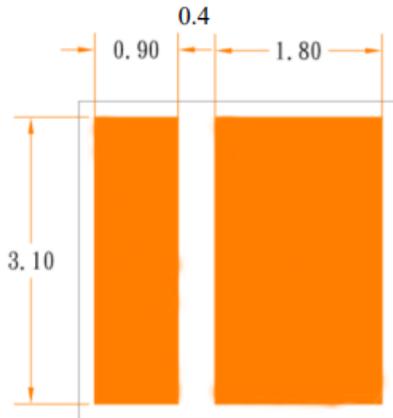


**Mechanical Dimensions**



**Orientation of Field of View**



**Recommended Solder Pad (unit: mm)****Additional Notes**

1. Treat heat dissipation before setting the module to full power
2. Avoid touching the emitting area or optical components of the module.
3. Never look directly at the light from the emitting area.
4. The VCSELs are designated solely as OEM components for incorporation into the customer's end products. Therefore, it is the customer's responsibility to comply with the appropriate requirements of FDA 21CFR, section 1040.10 and 1040.11 for complete laser products. For the code of FDA regulations, please refer to [FDA Performance Standards for Light-Emitting Products](#) for detailed information.
5. Specifications are subject to change without notice.