



## **650nm Diffractive Optical Element (DOE) Laser Module with 30,000-Random Dot Pattern, 3V PCB Driver**

**MDOE650A10R303**



### **Overview**

The Lasermate MDOE650A10R303 is a 650nm red laser module integrated with a 30,000-random dot pattern diffractive optical element (DOE), designed for structured light applications. It includes a 3V PCB driver and offers an adjustable focusing lens for precise pattern projection. With a compact design and stable performance, the module is ideal for R&D, 3D sensing, gesture control, and machine vision applications.

### **Features**

- 650nm diffractive optical element (DOE) laser module
- 30,000-random dot pattern
- Field of View (FOV): 80° x 64° (H x V)
- Low distortion high uniform pattern
- Flexible package for R&D evaluation
- Distance tunable projection
- PWM drivable
- IEC 60825 eye safety standards

### **Applications**

- Structured light for 3D sensing
- Machine vision

**Specifications**

Electrical-Optical Characteristics						
Parameter	Symbol	Min.	Typ.	Max	Unit	Conditions
Threshold current	$I_{th}$	-	14	17	mA	25 °C
Operating current	$I_{op}$	-	24	29	mA	
Operating voltage	$V_{op}$	-	2.15	2.3	V	
Center wavelength	$\lambda_c$	640	650	660	nm	
Power input with PCB			3	3	V	25 °C

Laser Diode Power Ratings							
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions	
CW output power (max)			10	12	mW		
Operating temperature	$T_{op}$	-10	-	60	°C		
Storage temperature	$T_{stg}$	-40	-	85	°C		

Mechanical Characteristics	
Diameter	8mm
Length	14~15mm
PCB driver	9(W) x 12(L) x 3(H)mm

Notes:

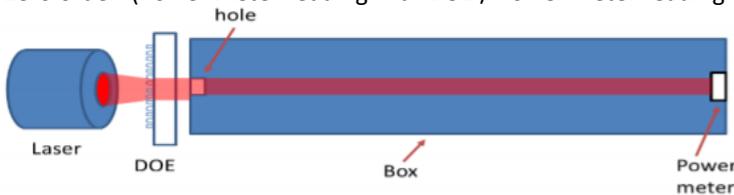
- Length varies as the position of the collimating lens varies case by case.
- Total module length varies with the length of metal pins left after welding.

Optical Specifications	
Total dots	30,000
Field of View (FOV)	80° x 64° (HxV)
Contrast <sup>1</sup>	$\geq 2$
Uniformity <sup>2</sup> in FOV at 1m	$\geq 35\%$
Zero order	$\leq 0.2\%$

<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,  $C=I_{95\%}/I_{median}$

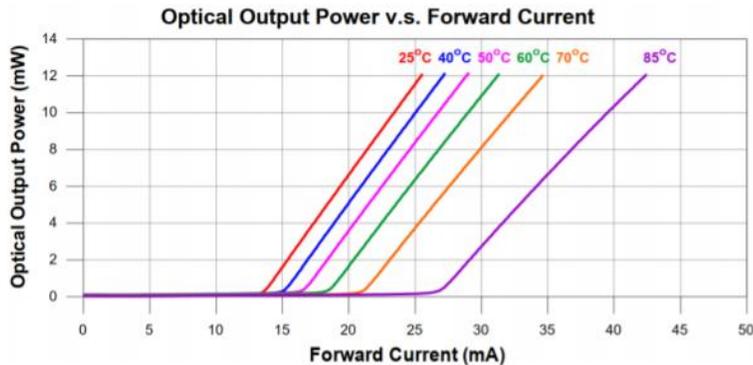
<sup>2</sup> Uniformity: the ratio of the grayscale value of the area at a given location to the grayscale value of the area in the center of the pattern,  $U=I_{each\ area}/I_{max\ of\ each\ area}$

<sup>3</sup> Zero order: (Power meter reading with DOE / Power meter reading without DOE) x 100%



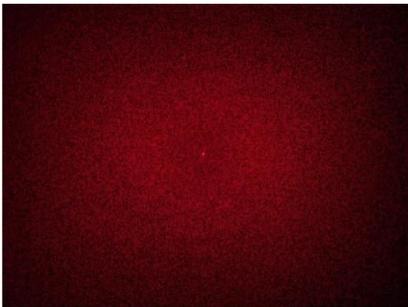
## Typical Characteristics

### I-P Curve of Chip



Note: Module optical power output is lower.

### Projection Pattern



### Additional Notes

- Treat heat dissipation before setting the module to full power
- Avoid touching the emitting area or optical components of the module.
- Never look directly at the light from the emitting area.
- The laser modules 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.
- Specifications are subject to change without notice.



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