

LASERMATE GROUP, INC.

THE FRIEND OF LASERS

GMS83XAR15K6T — A Class 1 830 nm Random-Dot DOE Structured Light Laser Module

Overview

The GMS83XAR15K6T is a Class 1, 830 nm structured-light laser module designed as a flexible R&D and evaluation platform for DOE projector development, pattern evaluation, pre-production testing, and scalable volume production. It integrates a precision Diffractive Optical Element (DOE) within an exchangeable holder, a plastic aspherical lens, an adjustable focus optical design, a single-mode 830 nm laser diode, and a current-limited Automatic Power Control (APC) designed to support IEC 60825-1 Class 1 operation, with TTL modulation from DC to 10 kHz.

The laser module projects 15,000 random dots over a $60^\circ \times 46.8^\circ$ (H x V) field of view (FOV), with a DOE contrast ≥ 10 . Its exchangeable DOE holder facilitates the rapid testing of alternative patterns, while the adjustable focus allows for precise optimization at specific working distances. Furthermore, TTL modulation enables higher peak optical output powers while maintaining compliance with Class 1 Accessible Emission Limits (AEL). Backed by stable, APC-controlled optical output, the GMS83XAR15K6T is an ideal evaluation tool for indoor Active stereo 3D sensing, 3D depth sensing, and other optical sensing applications.

Features

- Exchangeable DOE holder
- Adjustable focus for optimizing working distance
- TTL modulation from DC to 10 kHz
- Current-limited APC circuit for Class 1 laser safety control
- IEC 60825-1 compliant design

Applications

- Active stereo 3D sensing
- 3D depth sensing
- Machine vision and 3D imaging
- Robotics and automation
- Industrial inspection & measurement

Specifications

Parameter	GMS83XAR15K6T
Wavelength at 25 °C	830nm $\pm$ 10nm
Number of DOE Random Dots	15,000
DOE Contrast*	≥ 10
DOE Uniformity*	$\geq 45\%$
DOE Field of View (FOV)	$60^\circ \times 46.8^\circ$ (H x V)
Area of FOV	~ 115 cm x 86 cm at 100 cm
Laser driver circuit design	Current-limited APC circuit with TTL modulation from DC to 10 kHz
Control input voltage	0 to 5 VDC
Operating voltage	3.3 to 5 VDC
Optical output power* measured by a $\varnothing 7$ mm aperture sensor at 10cm	X=L: 0.36mW $\sim$ 0.56mW (0.5mW typ.) at 100% duty cycle X=M: 0.56mW $\sim$ 0.76mW (0.68mW typ.) at 100% duty cycle X=H: 0.70mW $\sim$ 0.90mW (0.8mW typ.) at 100% duty cycle
Laser classification	Class 1 calculated peak optical output power AEL: 0.71mW for CW (for X=L) 0.96mW for 30Hz 30% duty cycle (for X=M) 1.14mW for 30Hz 15% duty cycle (for X=H)
Focus	Adjustable focus (factory-set fixed focus available upon request)
Operating current at 25 °C	≤ 260 mA
Wire connection	Black: GND; Red: VCC; Yellow: TTL
Housing	Brass housing: connected to VCC / Case Positive
Operating temperature	-10°C to 60°C
Storage temperature	-40°C to 85°C
Dimensions	Housing: $\varnothing 12$ mm x L. 28.5 ± 0.5 mm; Driver PCB: L. 20mm x W. 11mm

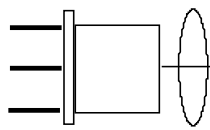
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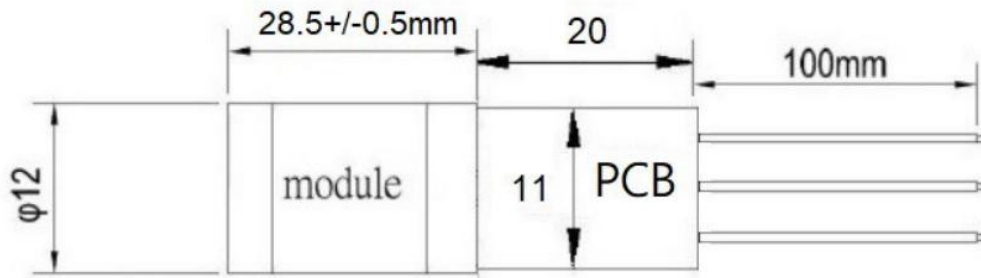
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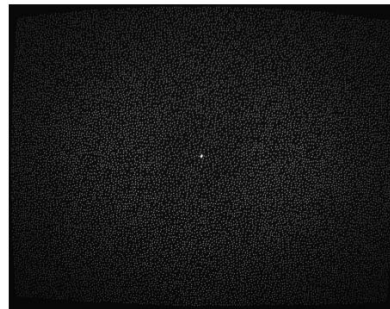
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Mechanical outline (Unit: mm)



DOE random dots pattern

15,000 dots



Notes:

- * DOE Contrast is defined as the ratio of the 95th percentile of the grayscale value over the median grayscale value of the background.
- * DOE Uniformity is the ratio of the grayscale value of the dots at a given location to the grayscale value of the dots in the center of the pattern, $U = I_{\text{each area}} / I_{\text{max of each area}}$.
- * Optical output power is measured at 10 cm using a Ø7 mm aperture sensor, including the zero-order spot.
- * To maintain Class 1 eye-safety compliance, the X=M and X=H versions must not be operated in continuous-wave (CW) mode. Both the X=M and X=H modules must be modulated via TTL at or below a 30% duty cycle to remain within Class 1 limits.
- * Additional cooling device may be needed if the laser module is operated continuously for a long period of time.
- * The GMS- series DOE 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](http://www.fda.gov/oc/ohrt/21CFR1040.10and1040.11.pdf) for detailed information.
- * Specifications are subject to change without notice.