

GMS94XARYK7T — A Class 1 940 nm Random-Dot DOE Structured Light Laser Module

Overview

The GMS94XARYK7T is a Class 1, 940 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 940 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 module projects 15,000 or 30,000 random dots over a $70^\circ \times 55.5^\circ$ (H $\times$ V) field of view (FOV), with DOE contrast of ≥ 10 or ≥ 3 , respectively. 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 GMS94XARYK7T is an ideal evaluation tool for 3D depth sensing, robotics and automation, and other optical sensing applications.

Features

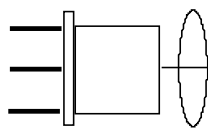
- Exchangeable DOE holder
- Adjustable focus for optimizing working distance
- TTL modulation from DC to 10 kHz
- Current-limited APC circuit for Class 1 laser safety control
- IEC 60825-1 compliant design

Applications

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

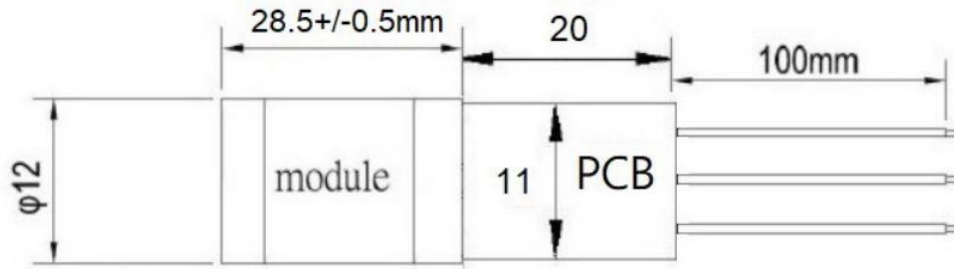
Specifications

Parameter	GMS94XAR15K7T	GMS94XAR30K7T
Wavelength at 25 °C	940nm $\pm$ 10nm	
Number of DOE Random Dots	15,000	30,000
DOE Contrast*	≥ 10	≥ 3
DOE Uniformity*	$\geq 30\%$	$\geq 30\%$
DOE Field of View (FOV)	$70^\circ \times 55.5^\circ$ (H x V)	
Area of FOV	~ 140 cm x 105 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: 0.64mW $\sim$ 0.94mW (0.88mW typ.) at 100% duty cycle X=M: 0.97mW $\sim$ 1.27mW (1.19mW typ.) at 100% duty cycle X=H: 1.22mW $\sim$ 1.52mW (1.45mW typ.) at 100% duty cycle	
Laser classification*	Class 1 calculated peak optical output power AEL: 1.178mW for CW (for X=L) 1.59mW for 30Hz 30% duty cycle (for X=M) 1.9mW for 30Hz 15% duty cycle (for X=H)	
Focus	Adjustable focus (factory-set fixed focus available upon request)	
Operation current @ 25 °C	≤ 300 mA at 100% duty cycle	
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. 24 ± 1 mm; Driver PCB: L. 20mm x W. 11mm	

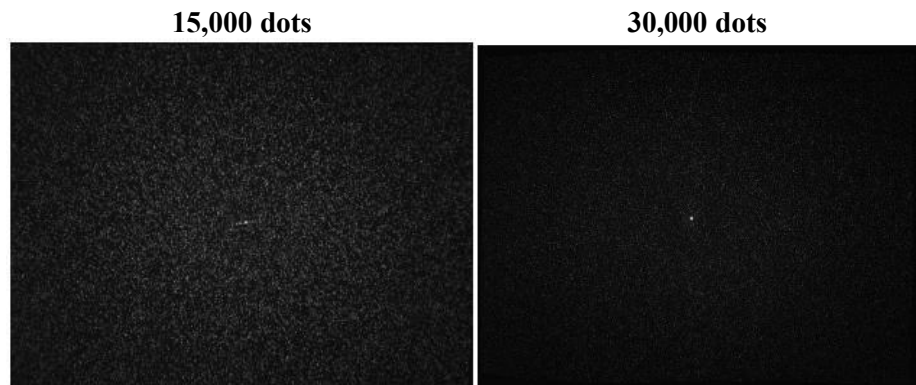


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Mechanical outline (Unit: mm)



DOE random dots pattern



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, $U = I_{each\ area} / I_{max\ of\ each\ area}$.
- * Optical output power is measured at 10 cm using a $\varnothing 7$ 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](#) for detailed information.
- * Specifications are subject to change without notice.