

# D4mm 650nm Red Laser Module

## Application

Portable Applications / Laser Sight / Industry / Biomedical

## Property

Wavelength Range = 650nm

## Introduction

The standard small laser module with its size of D4mm x 18mm is compacted smaller than some laser diodes making it perfect solution for applications where dimensions and size are priority. 650nm red laser module usually is considered most cost effect solution in the visible laser.



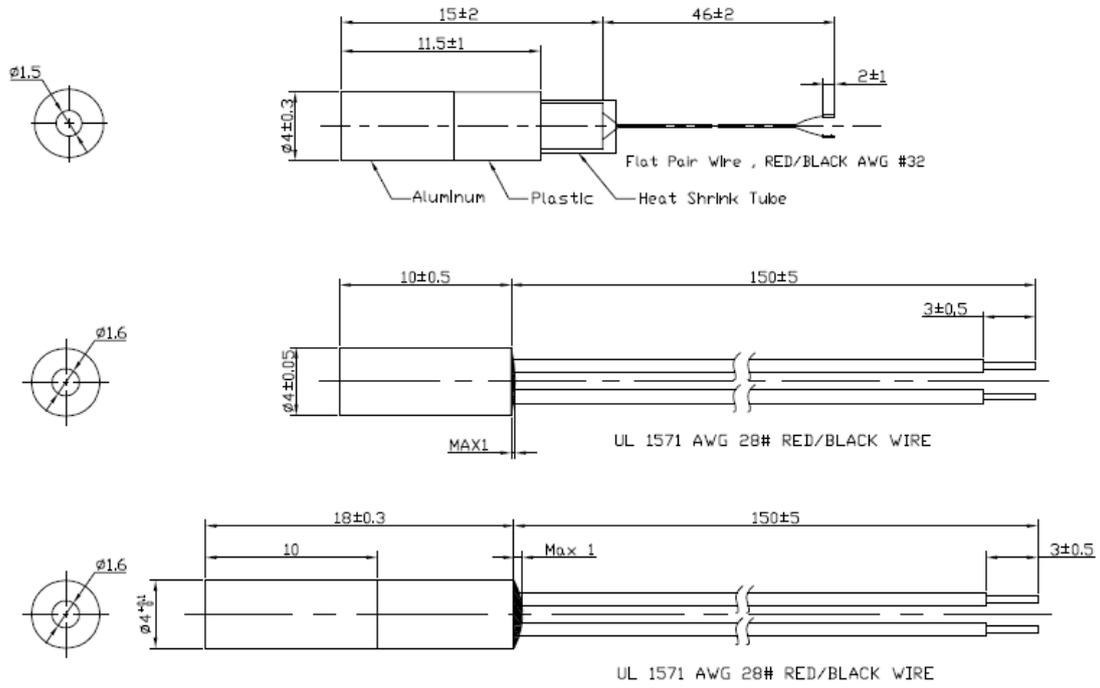
## Specifications(T=25°C)

Items	Symbols	LM4R650L1D	LM4R650S1D LM4R650S5D	LM4R650H1D/R LM4R650H5D/R
Mode		CW	CW	CW
Wavelength	$\lambda$	650nm	650nm	650nm
Lens		PMMA	PMMA	Glass
Spot	D/R	Dot	Dot	Dot/Round
Spot Size	D R	<14x20mm at 10m	<10x20mm at 10m	<10x18mm at 10m <10mm round at 3m
Diameter x Length	$\Phi$ x L	D4x15mm	D4x18mm	D4x10mm or D4x18mm
Output Power	Po	<1mW	<1mW, <5mW	<1mW, <5mW
Power Stability		<10%	<10%	<5%
Divergence Angle	mrad	<2	<1	<0.7
Operating Voltage(DC)	Vo	3V	3V	3V
CW Operating Current	Io	25~30mA, 40mA max.	25~30mA, 40mA max.	25~30mA, 40mA max.
Operating Temperature	To	-10°C ~ +40°C	-10°C ~ +50°C	-10°C ~ +50°C
Storage Temperature	Ts	-20°C ~ +70°C	-40°C ~ +85°C	-40°C ~ +85°C
Housing Material		Aluminum & Plastic	Aluminum	Brass/Aluminum
Mean time to failure		>3,000 hrs	>6,000 hrs	>8,000 hrs



ATTENTION – Observe Precautions For Handling – Electrostatic Sensitive Device

Outline Dimensions



Spot size Define

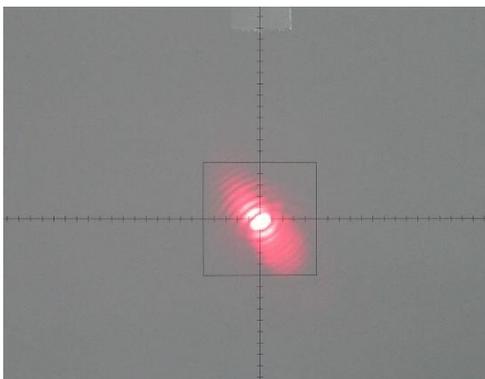
LM4 L-series Dot Shape at 10m



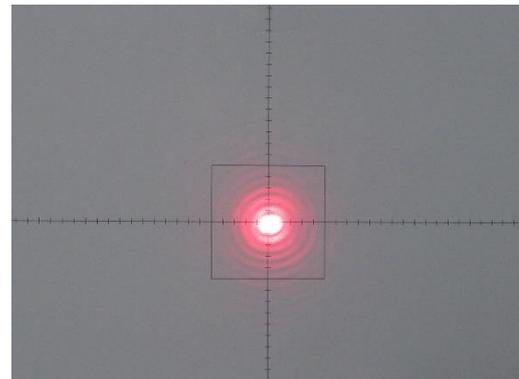
LM4 S-series Dot Shape at 10m



H series Dot Shape at 10m



H series Round Shape at 3m



### Power Stability

The actual output power will be between the range 2.5mW to 3.5mW, but once you make sure the value, for example,  $3\text{mW} \pm 0.15\text{mW}$  or  $3.2\text{mW} \pm 0.16\text{mW}$  in the  $25\text{ }^{\circ}\text{C}$  temperature. Then the power stability represents 5%.

### Spot size

The spot size is defined as a Gaussian beam. In optics, a Gaussian beam is a beam of electromagnetic radiation whose transverse electric field and intensity (irradiance) distributions are well approximated by Gaussian functions. Many lasers emit beams that approximate a Gaussian profile, in which case the laser is said to be operating on the fundamental transverse mode, or "TEM00 mode" of the laser's optical resonator. When refracted by a diffraction-limited lens, a Gaussian beam is transformed into another Gaussian beam (characterized by a different set of parameters), which explains why it is a convenient, widespread model in laser optics.

### Mean time to failure (MTTF)

Mean time to failure (MTTF) is the length of time a device or other product is expected to last in operation. MTTF is one of many ways to evaluate the reliability of pieces of hardware or other technology. It's important to note, however, that the mean time to failure metrics provided by companies regarding specific products or components may not have been collected by running one unit continuously until failure. Instead, MTTF data is often collected by running many units, even many thousands of units, for a specific number of hours.

## Laser Safety

The light emitted from these devices has been set in accordance with IEC60825. However, staring into the beam, whether directly or indirectly, must be avoided.

### Class I

The maximum permissible exposure(MPE) cannot be exceeded, it includes High-power lasers within an enclosure that prevents exposure to the radiation and that cannot be opened without shutting down the laser. For example, a continuous laser at 600nm can emit up to 0.39mW, but for shorter wavelengths, the maximum emission is lower.

### Class II

“Caution”, visible laser light less than 1.0mW. Considered eye safe, normal exposure to this type of beam will not cause permanent damage to the retina.

### Class IIIA

“Danger”, visible laser light between 1.0mW and 5.0mW. Considered eye safe with caution. Focusing of this light into the eye could cause some damage.

### Class IIIB

“Danger”, infrared(IR), and high power visible lasers considered dangerous to the retina if exposed. NB: it is important to note that while complying with the above classifications, unless otherwise stated. Our laser diode products are not certified and are designed solely for use in OEM products. The way in which device is used in the final product may alter its original design classification, and it is the responsibility of the OEM to ensure compliance with the relevant standards.

Specifications are subject to change without notice.

