

LA LM56UXSH1

Near ultraviolet (406 nm) Multimode Laser Diode



Light Avenue laser series is designed for high performance consumer applications and offers an efficient radiation source for cw and pulsed laser operation. The TO 56 packaged near ultraviolet multimode laser diode has a typical wavelength of 406 nm.



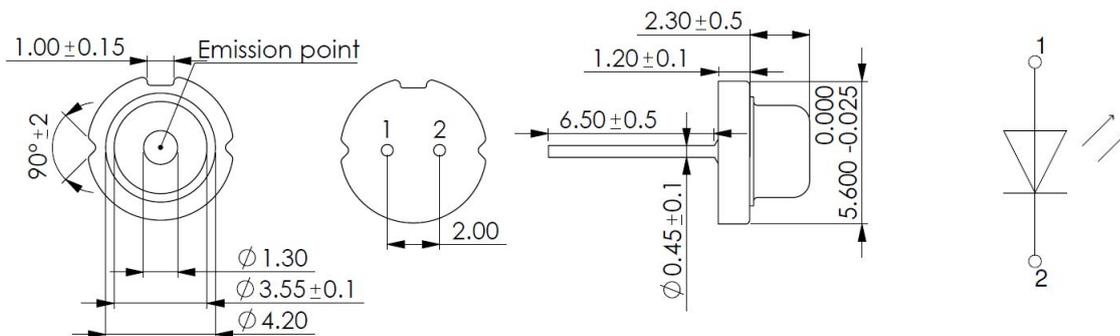
Features

- Multimode
- 5.6 mm TO package

Applications

- Consumer
- Medical
- Sensors
- Spectroscopy
- Industry

Delineation



All dimensions in mm.

Material data

| DESCRIPTION | MATERIAL | FINISH |
|------------------|---------------------|-----------|
| Laser diode chip | InAlGaN | |
| Stem | Cu/Fe | Au plated |
| Cap | Kovar | Ni plated |
| Lead pins | Kovar | Au plated |
| Window | Borosilicated glass | |

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Electro-optical characteristics ($T_A = 25\text{ °C}$)²

| PARAMETER | SYMBOL | CONDITION | MIN. | TYP. ¹ | MAX. | UNIT |
|-------------------------------------|------------------------|--------------------------|------|-------------------|------|------|
| Threshold current | I_{th} | | | 140 | 220 | mA |
| Forward voltage | V_F | $\Phi_e = 300\text{ mW}$ | | 4.5 | 5.5 | V |
| Forward current | I_F | $\Phi_e = 300\text{ mW}$ | 250 | 325 | 400 | mA |
| Peak wavelength | λ_{peak} | $\Phi_e = 300\text{ mW}$ | 400 | 406 | 414 | nm |
| FWHM parallel ^{Note1} | $\Theta_{ }$ | $\Phi_e = 300\text{ mW}$ | 8 | 14 | 20 | ° |
| FWHM perpendicular ^{Note1} | Θ_{\perp} | $\Phi_e = 300\text{ mW}$ | 36 | 41 | 48 | ° |
| Tilt Angle parallel | $\Delta\Theta_{ }$ | $\Phi_e = 300\text{ mW}$ | -3 | | 3 | ° |
| Tilt Angle perpendicular | $\Delta\Theta_{\perp}$ | $\Phi_e = 300\text{ mW}$ | -4 | | 4 | ° |
| Differential efficiency | η_d | | 1.4 | 1.8 | 2.2 | W/A |

Note1: Parallel to the junction plane, perpendicular to the junction plane.

Maximum ratings ($T_A = 25\text{ °C}$)

| PARAMETER | SYMBOL | CONDITION | MINIMUM | MAXIMUM | UNIT |
|-----------------------|----------------|-----------|---------|---------|------|
| Optical power | $\Phi_{e,max}$ | | | 350 | W |
| Reverse voltage | V_R | | 2 | | V |
| Operating temperature | T_{op} | | 0 | 50 | °C |
| Storage temperature | T_{st} | | -40 | 85 | °C |

Thermal characteristics

| PARAMETER | SYMBOL | VALUE | UNIT |
|--|------------|-------|------|
| Soldering temperature ^{Note2} | T_{sold} | 350 | °C |

Note2: Soldering temperature refers to an iron tip temperature (max. 30 W power) during the solder process. Soldering positions should be 1.6 mm away from the bottom edge of the case. The immersion time must be less than 3 s.

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Caution – Laser radiation!

Depending on the mode of operation, these devices emit highly concentrated visible and/or invisible (IR) light which can be very hazardous to the human eyes and skin. Avoid eye or skin exposure to direct, scattered radiation or through optical lenses. When operating the lasers wear protective glasses with the appropriate level of protection and ensure compliance with the necessary technical, organizational and personal protective measures in accordance with the currently valid safety regulations of laser products. To ensure safe laser operation please contact your laser protection officer. Products which incorporate these devices have to follow the safety precautions given in IEC 60825-1.

Important usage and application information

Lead free product - RoHS compliant.

All products, product specifications and data to improve reliability, function, design or otherwise are subject to change without notice. The information describes the type of component and shall not be considered as assured characteristics.

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact our Sales Organization.

These laser diodes are designed as consumer goods in production and quality, especially in the application areas of computers, measuring equipment, tooling machines, audio visual equipment and home appliances. Please do not use this product for equipment, which needs extremely high reliability and safety in function and precision. Operating the laser diode above the maximum rating even for very short periods of time can damage the laser diode or reduce its lifetime. The laser diode must be operated with a suitable power supply with minimized electrical noise. When using this product, please stay within the maximum ratings, pay attention to the other instructions, conditions and precautions described in this datasheet. We will assume no responsibility for any damages resulting from improper use of this product. During operation, heat is generated in the laser chip. Because of this, the case temperature increases. A rising case temperature can shorten the lifetime of the product. Due to this, a sufficient heat sink should be attached to this product when operating.

Handling and storage conditions

The laser diode is very sensitive to electrostatic discharge (ESD). Proper precautions must be taken.

Every person and other equipment (tool, machines) must be continuously ESD protected. Workers should always wear an antistatic wrist strap.

In order not to damage the hermetic seal of the laser, mechanical stress on the window should be avoided. The cap should not be stressed e.g. by tightening hard, or fixing to the application. Moreover, mechanical stress (bending) on the pins can negatively affect the hermetic seal which also influence the long-term stability.

The laser diodes are preferably stored in trays and encased in an antistatic bag under ambient conditions that are dry at normal temperature. Please refer to the "Storage temperature" range in

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the data sheet for more information.

Since dust on the window might influence the optical properties of the products, the work area must be kept clean. For information please contact our nearest sales office.

Packing

Laser diodes are arranged in trays. A cover is put on the top of the tray. For shipment the trays are arranged to stacks and placed into an ESD bag and packaging box. Please use the recycling operators familiar to you. If required you can ask for our help. Please get in touch with your nearest sales office. By agreement we will take packing material back, if sorted. Transport costs of any kind must be paid by customers. For packing material that is returned to us unsorted or which we are not obliged to accept, any costs incurred will be invoiced to you.

Returns and complaints

For complaints and returns of material a RMA-number is necessary. Samples for analysis purposes can be send to us without credit.

Shipping conditions

If not otherwise arranged, the "General Terms of Business of Light Avenue GmbH" apply for any shipment. If this document is not familiar to you, please request it at our nearest sales office.

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Disclaimer

Attention please! Components used in life-support devices or systems must be expressly authorized for such purpose!

Critical components³ may only be used in life-support devices⁴ or systems with the express written approval by us.

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Changes

| VERSION | DATE | CONTENT |
|---------|------------|--|
| 1.0 | 11.03.2018 | First publication. |
| 1.1 | 25.09.2018 | Adjustment of logo. |
| 1.2 | 17.06.2019 | Adjustment of product picture. |
| 2.0 | 11.08.2021 | Adjustment of handling and storage conditions. |
| 3.0 | 10.01.2022 | New address. |

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¹Due to the special conditions of the manufacturing processes of lasers, the typical data or calculated correlations of technical parameters can only reflect statistical figures. These do not necessarily correspond to the actual parameters of each single product, which could differ from the typical data and calculated correlations or the typical characteristic line. If requested, e.g. because of technical improvements, these typ. data will be changed without any further notice.

²Light Measurements are done with an accuracy of $\pm 15\%$. Voltage and wavelength are measured with an accuracy of ± 0.1 V and ± 1 nm. Correlation to customer's equipment and products is required.

³A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or the effectiveness of that device or system.

⁴Life support devices or systems are intended(a) to be implanted in the human body, or(b) to support and/or maintain and sustain human life. If they fail, it is reasonable to assume that the health and the life of the user may be endangered..