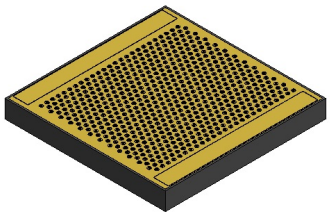
LA LM40MIV3

VCSEL Chip Middle infrared (940 nm) 40 mil

Light Avenue VCSEL chip series is designed for high performance consumer applications. Remarkable light extraction is reached by a particular chip design with vertical chip structure. As this die can be driven at very high currents compared to the chip size, an outstanding cost vs. performance ratio can be obtained.



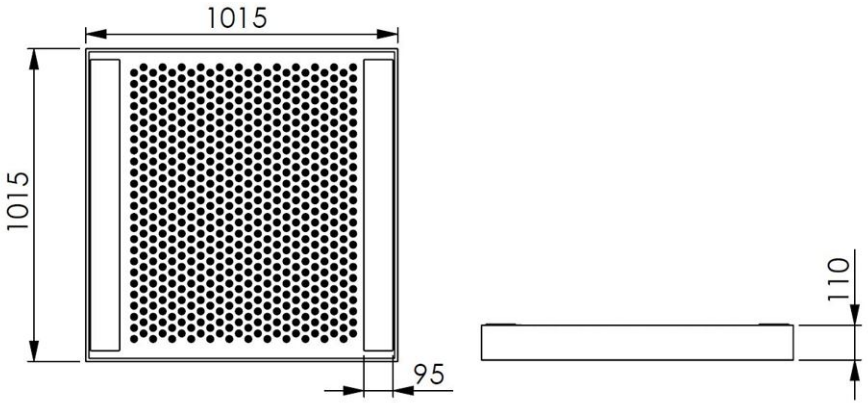
Features

- GaAs infrared chip
- 2400 mW VCSEL (@ 3000 mA)
- Multi-mode beam profile

Applications

- Photoelectric sensors
- Optical encoders
- 3D sensing

Delineation



All dimensions in µm.

Mechanical characteristics

Description		Minimum	Typical[1]	Maximum
Chip size	(µm)	1000x1000	1015x1015	1030
Chip height	(µm)	85	100	115
Bond pad diameter	(µm)		90	
Top contact		Anode (p), gold alloy		
Bottom contact		Cathode (n), gold alloy		

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Electro-optical characteristics ($T_A = 25°C$)[2]

Parameter	Symbol	Condition	Min.	Typ.[1]	Max.	Unit
Threshold current	I_{TH}			500		mA
Forward voltage	V_F	$I_F = 3000$ mA		2.0		V
Peak wavelength	λ_{peak}	$I_F = 3000$ mA	930	940	950	nm
Radiant power	Φ_e	$I_F = 3000$ mA		2400		mW
Slope efficiency	η_s	$I_F = 3000$ mA	0.9	1.0		W/A
Wavelength shift	$\Delta\lambda/\Delta T$	$I_F = 3000$ mA		0.07		nm/℃
Beam divergence	Θ	$I_F = 3000$ mA, Full Width $1/e^2$		23		°

Maximum ratings ($T_A = 25°C$)

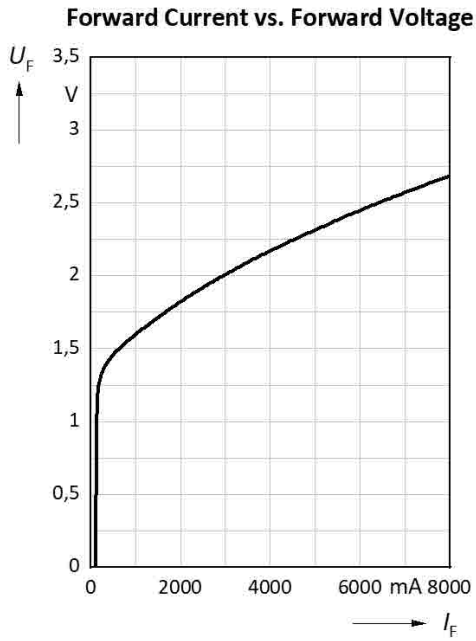
Parameter	Symbol	Condition	Value	Unit
Operating temperature	T_{op}	1% duty cycle of T=100ms	-20...85	°C
Storage temperature	T_{stg}		-40...150	°C

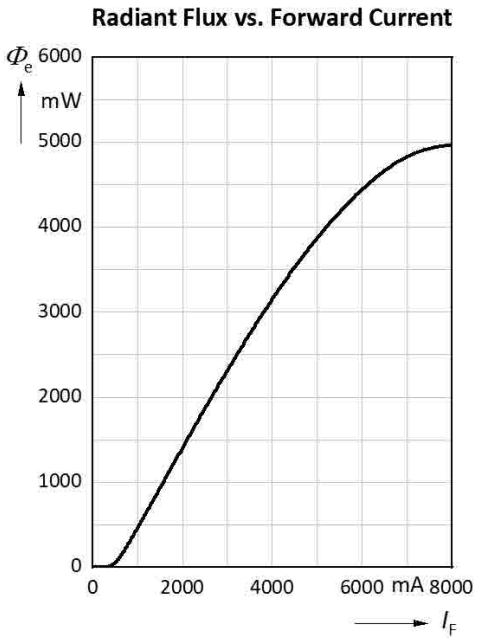
Thermal characteristics

Parameter	Symbol	Value	Unit
Soldering temperature	T_{sold}	260	℃

Note: Soldering time must not exceed 10 seconds

Typical characteristics graphs





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 Informationn

Lead free product - RoHS compliant. All products, product specifications and data to improve reliability, function, design or otherwise are subjectto change without notice. The information describes the type of component and shall not be considered asassured 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 applicationareas of computers, measuring equipment, tooling machines, audio visual equipment and home applicances. Please do not use this product for equipment, which needs extremely high reliability and safety infunction and precision. Operating the laser diode above the maximum rating even for very short periods oftime 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.

Handling and storage conditions

Storage time for wafers in sealed condition is not limited by the die itself, but may be limited by the adhesion of the blue foil (storage ambient conditions: $T_a = 15 \ldots 30^\circ C$; relative humidity: < 60%, vertical storage). Customer has to make sure that there is no glue from the adhesive foil on the backside either by a die shear test or by visual inspection of the backside before production. The hermetically sealed shipment lot shall be opened under temperature and moisture controlled cleanroom environment only. Customers have to follow the according rules for desposition as the material can be hazardous for humans and the environment. Chips are placed on a blue foil, which may contain the following substance in a concentration of circ.18% wt: Bis (2-ethyl(hexyl)phthalate) (DEHP) [CAS #: 117-81-7; EC # 204-211-0]. Dice have to be handled ESD sensitive.

Packing

Chips are placed on a blue foil inside a 6 inch ring or alternatively on a blue foil (mylar). For shipment the wafers of a shipment lot are arranged to stacks. 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.

Visual Inspection

The quality level of the final visual inspection shall comply to an AQL of 1.0 (according to MIL-STD-105E,level II), if the customer performes an incoming visual inspection of a shipment. All products are checked according to the producer's specification of the visual inspection. If this documentis not familiar to you, please request it at our nearest sales office.

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.

Disclaimer

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

Critical components[3] may only be used in life-support devices[4] or systems with the express written approvalby us. Light Avenue GmbH, its affiliates, agents, and employees, and all persons acting on its or their behalf, disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheetor in any other disclosure relating to any product. Light Avenue makes no arranty, representation orguarantee regarding the suitability of the products for any particular purpose or the continuing productionof any product. To the maximum extent permitted by applicable law, Light Avenue disclaims (i) any and allliability arising out of the application or use of any product, (ii) any and all liability, including without limitationspecial, consequential or incidental damages, and (iii) any and all implied warranties, including warrantiesof fitness for particular purpose, non-infringement and merchantability. Statements regarding the suitabilityof products for certain types of applications are based on Light Avenue ’s knowledge of typical requirementsthat are often placed on Light Avenue’s products in generic applications. Such statements are not bindingstatements about the suitability of products for a particular application. It is the customer’s responsibility tovalidate that a particular product with the properties described in the product specification is suitable for usein a particular application. Parameters provided in datasheets and/or specifications may vary in differentapplications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts. Product specificationsdo not expand or otherwise modify Light Avenue ’s terms and conditions of business, including but notlimited to the warranty expressed therein. Except as expressly indicated in writing, Light Avenue ’s productsare not designed for use in medical, life-saving, or life-sustaining applications or for any other applicationin which the failure of the Light Avenue product could result in personal injury or death. Customers usingor selling Light Avenue products not expressly indicated for use in such applications do so at their ownrisk. Please contact authorized Light Avenue personnel to obtain written terms and conditions regardingproducts designed for such applications. No license, express or implied, by estoppel or otherwise, to anyintellectual property rights is granted by this document or by any conduct of Light Avenue. Product namesand markings noted herein may be trademarks of their respective owners.

Changes

VERSION	DATE	CONTENT
1.0	20.11.2020	Change management has started, technical graphs have been added (page 3).
2.0	21.01.2022	New address.

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[1]Due 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.

[2]Light Measurements are done with an accuracy of ± 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.

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

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