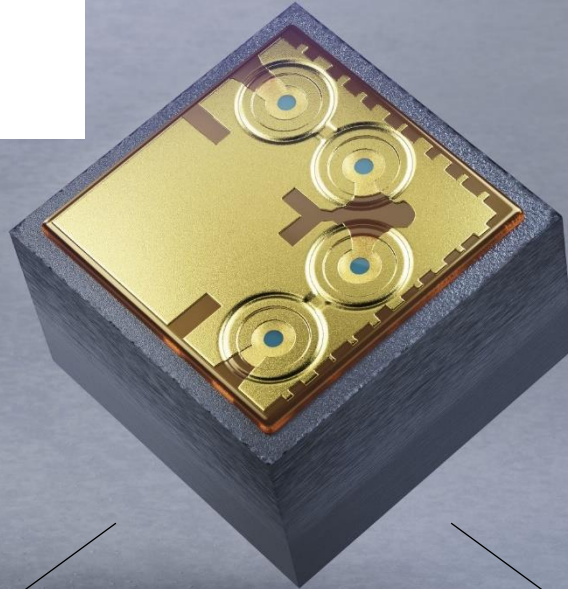


VCSEL

Multi-Mode
10 mW
940 nm



> Parallel Infrared
Light Source

> Time of Flight
Proximity Sensing

> 4 Multi-Mode
Emitters

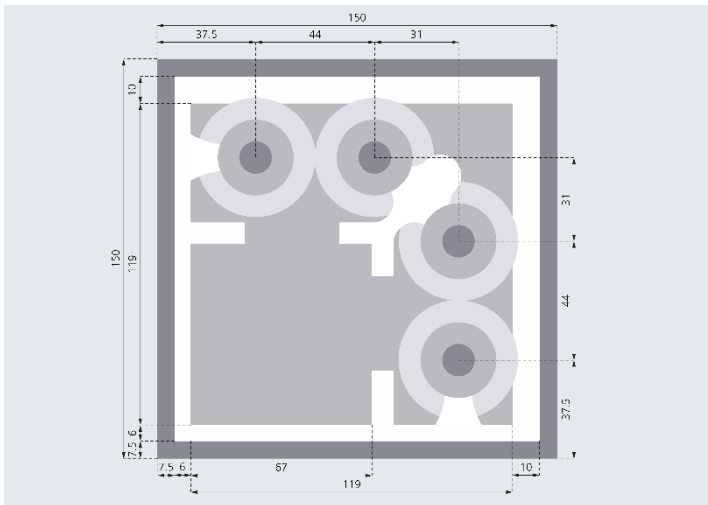
> Camera
Auto-Focus

Datasheet: 10 mW 940 nm Multi-Mode VCSEL Array

Electro-Optical Characteristics (T = 45°C, 3 ns pulse width, 30% duty cycle, I = 25 mA unless otherwise stated)

Parameter	Units	Min.	Typ.	Max.	Notes
Operating current	mA		25		
Threshold current	mA	1.45	3.5	8	T = 10...80°C
Forward voltage	V	1.5		2.3	T = 10...80°C
Optical output power	mW	8		17	T = 10...80°C
Beam divergence (full width, 1/e ²)	°	22	27	32	T = 10...80°C
Rise time (10% to 90%)	ps		100	500	
Fall time (90% to 10%)	ps		100	500	

Dimensions





Units: μm

Type	Single chip
Part number	TVT-011-940-A
Ordering number	ULM940-01-TN-H0101L_S
Dimensions	150 x 150 x 150 μm

For more information visit
www.trumpf.com/s/VCSEL-solutions

Safety information:

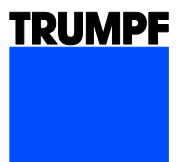
-  Invisible laser radiation / avoid beam exposure / class 3B laser product
-  Electrostatic sensitive devices / observe precautions for handling

TRUMPF Photonic Components GmbH

Lise-Meitner-Straße 13 · 89081 Ulm · Germany

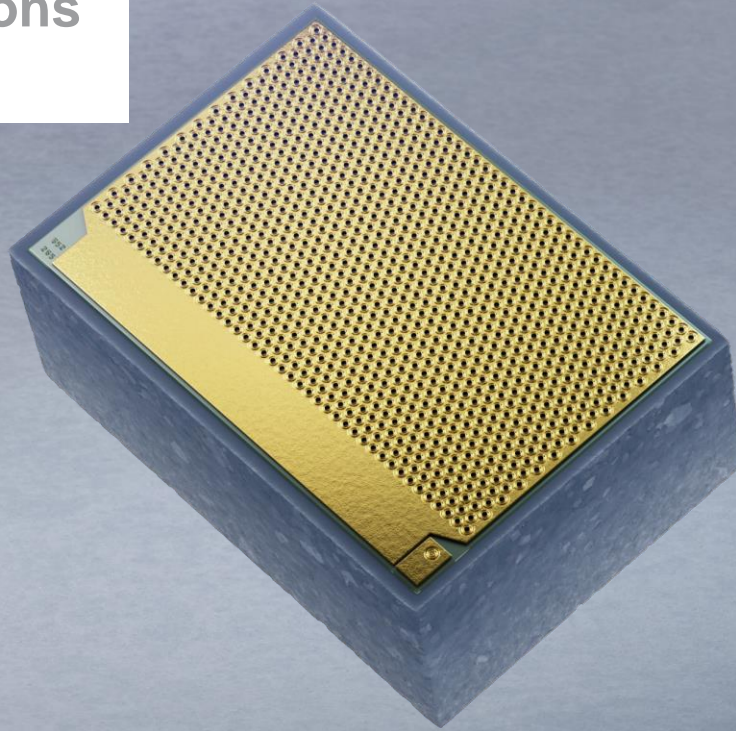
E-mail: photonic.components@trumpf.com · Homepage: www.trumpf.com/s/VCSEL-solutions

June 2022



3D sensing

Multimode VCSEL Solutions



>1.5 billion
multimode
VCSELs in the
field without any
failure

Innovative multimode VCSEL light sources for consumer electronics

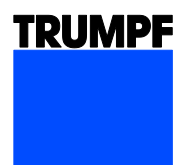
Multimode VCSEL is an infrared light source for various optical 3D sensing technologies used in applications like consumer mobile, industrial cameras and automotive interior sensing. Its compact dimensions allow use of the VCSEL in highly integrated sensors. This laser diode is ideally suited for time-of-flight distance sensors due to its power class and radiation characteristics.

Which application fields?

In advanced mobile consumer applications, the multimode VCSEL support distance sensing, structured light or flash illumination. Also in automotive and autonomous driving scenarios these VCSEL solutions support LiDAR applications or in-cabin sensing and driver monitoring.

Why TRUMPF?

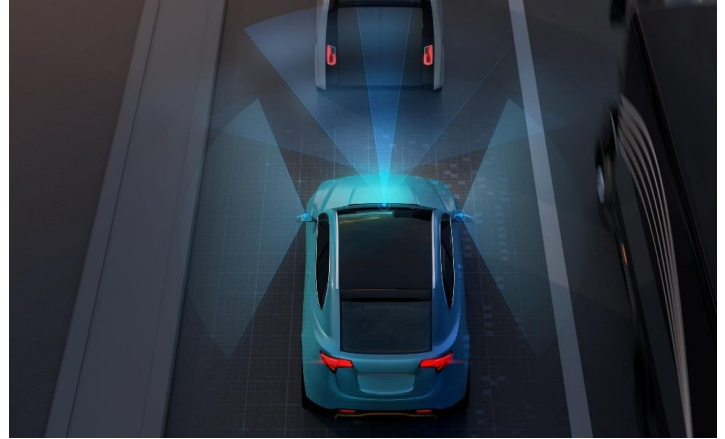
TRUMPF Photonic Components is a family-owned global leader in VCSEL technology. We design, manufacture and sell VCSEL-based light sources. Our solutions support the growing demand of 3D sensing applications. With over 20 years of VCSEL technology development and offering VCSEL products to the market, being the leading VCSEL supplier to smartphone customers, TRUMPF has proven to be your VCSEL partner for 3D sensing applications.



Multimode VCSEL light sources offer excellent and reliable performance over a wide range of conditions

Features:

- TRUMPF proprietary VCSEL technology
- Wavelength: 850nm, 940 nm, others available upon request
- Narrow 2 nm spectral width
- High frequency modulation up to 100 MHz
- Sub ns single pulses
- Wide range of duty cycles
- Integrated optics to support customized field-of-view
- Random dot pattern
- High conversion efficiency
- High reliability
- Easy application to system



Product Specifications

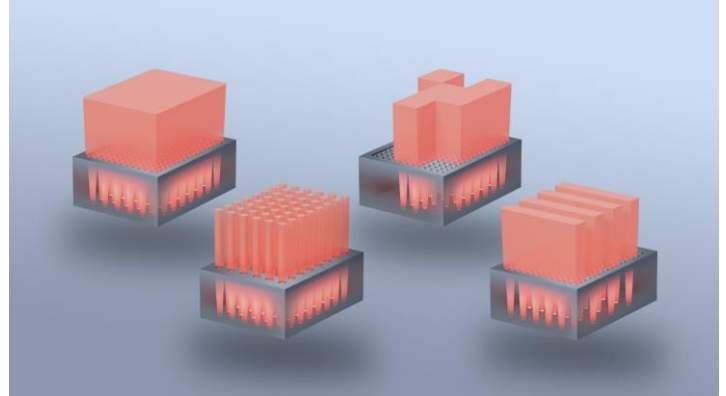
Product	Part number*	Dimensions (l x w x h)	Optical output power	Emission wavelength	Beam profile
VCSEL array with random dot pattern	TVT-001-940-B	784 x 704 x 100 μm	2 W @200 μs 10%	940 nm	Radom dot pattern
Multimode VCSEL array	TVT-003-940-B	1775 x 1225 x 100 μm	6.5 W @200 μs 1%	940 nm	Parallel light source
Multimode VCSEL array	TVT-005-980-B	1971 x 1888 x 104 μm	4 W CW	980 nm	Parallel light source
Multimode VCSEL array	TVT-008-940-A	150 x 150 x 150 μm	10 mW CW	940 nm	Parallel light source
ViBO	TVB-001-940-B	1241 x 938 x 190 μm	9 W @200 μs 10%	940 nm	Flat hat irradiance 80° x 60°
ViBO	TVB-002-940-B	1241 x 938 x 190 μm	9 W @200 μs 10%	940 nm	Cos ⁴ irradiance 60° x 45°

Product specifications in this overview are typical values under defined operating conditions. Table shows a selection of products, information on other products on request.

*Some of these are new part numbers for existing parts, check with your local sales

New product platform ViBO

ViBO stands for **VCSEL integrated Backside Optics**. The new VCSEL array technology is based on TRUMPF high-performance VCSELs but comes with unique, patented lens forms that are directly etched into the GaAs-substrate. 3D sensing solution providers get unprecedented benefits in creating tailored illumination profiles needed in advanced 3D sensing applications, as micro-optical elements are monolithically integrated in ViBO. Furthermore, the new design of ViBO reduces the form factor over present hybrid VCSEL package solutions and supports for instance easier integration under smartphone displays.



ViBO can create various illumination profiles from flood, to spot to individual field of interest illumination or addressable lines.

For more information visit
www.trumpf.com/s/VCSEL-solutions



Safety information:

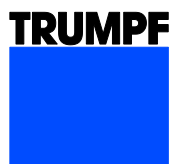
- ⚠ Invisible laser radiation / avoid beam exposure / class 3B laser product
- ⚠ Electrostatic sensitive devices / observe precautions for handling

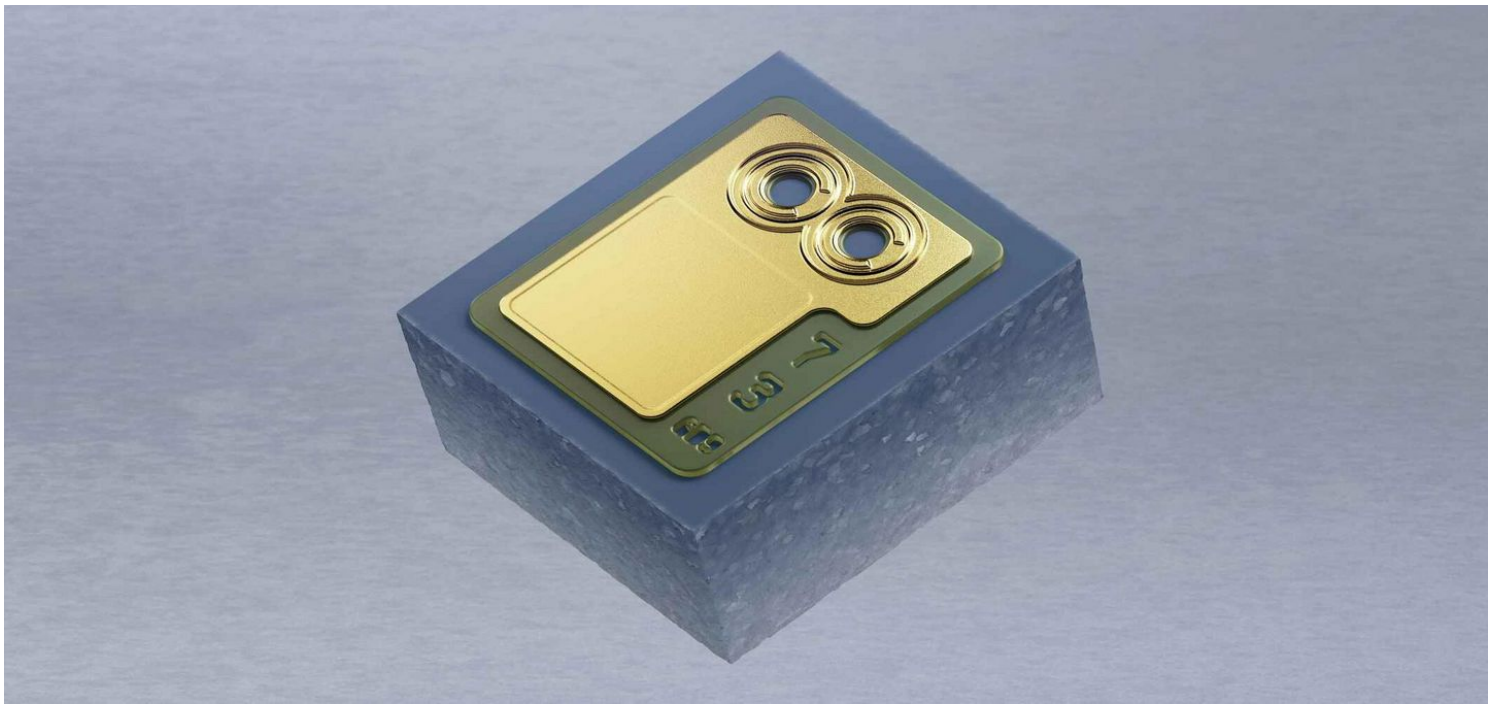
TRUMPF Photonic Components GmbH

Lise-Meitner-Straße 13 · 89081 Ulm · Germany

E-mail: photonic.components@trumpf.com · Homepage: www.trumpf.com/s/VCSEL-solutions

January 2022





マルチモードVCSEL

技術仕様

TVT-011-940-A (マルチモード VCSEL Chip)**TVT-001-940-B (ランダムドットパターン付き VCSELアレイ)****大きな 850 nm / 940 nm VCSEL**

レーザーパラメータ			
レーザータイプ	Multi Mode	Multi Mode	Multi Mode
典型的な波長	940 nm	940 nm	850 / 940 nm
レーザーパワー (25MA で室内気温の場合)	-	1.8 W	-
出力 (最小)	8 mW	2 mW	-
出力 (最大)	17 mW	2.25 mW	-
発光体の個数	4 個	1121 個	-
ピッチ効率 (室温の場合)	-	1 ワット/アンペア	-
レーザー保護等級	3B	3B	3B
電流			
電流電圧 (25 MAで室温の場合)	25 V	2.5 V	-
閾値電流 (室温の場合)	3.5 ミリアンペア	200 ミリアンペア	-
サイズ			
寸法 幅	150 μm	784 μm	-
寸法 高さ	150 μm	704 μm	-
寸法 奥行	150 μm	100 μm	-

小さな 940 nm マルチモード VCSEL

レーザーパラメータ	
レーザータイプ	Multi Mode
典型的な波長	940 nm
レーザーパワー (25MA で室内気温の場合)	-
出力 (最小)	-
出力 (最大)	-
発光体の個数	-
ピッチ効率 (室温の場合)	-
レーザー保護等級	3B
電流	
電流電圧 (25 MAで室温の場合)	-
閾値電流 (室温の場合)	-
サイズ	
寸法 幅	-
寸法 高さ	-
寸法 奥行	-