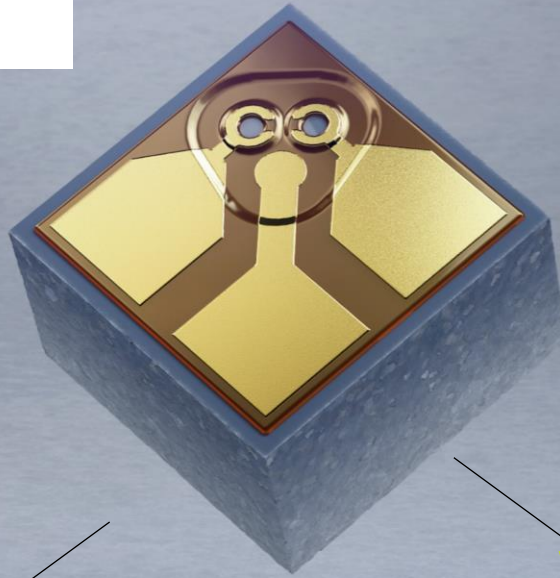


VCSEL

VCSEL with
integrated
Photodiode
850 nm



Two Individual
Addressable Lasers

Integrated
Photodiode

Single-Mode
Polarization Stable

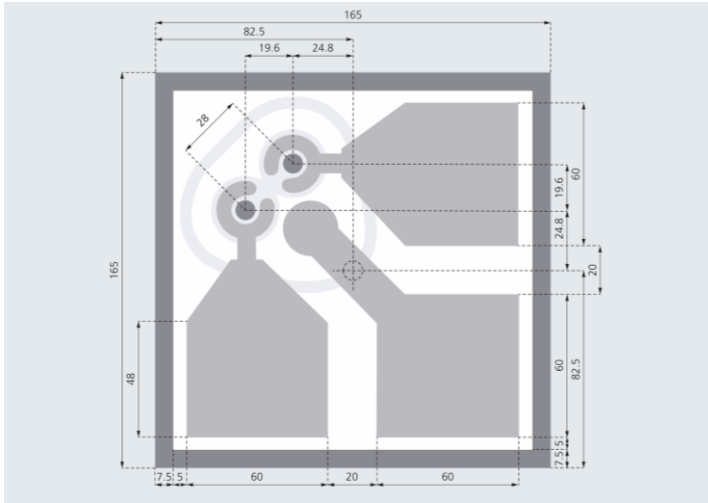
Optimized for
Self-Mixing
Interferometry
Sensing

Datasheet: 850 nm VCSEL with integrated Photodiode (ViP)

Electro-Optical Characteristics (T = 50°C, photodiode reverse bias voltage = 1.0 V, unless otherwise stated)

Parameter	Units	Min.	Typ.	Max.	Notes
Laser emission wavelength	nm	840		865	1.5 mA laser current
Laser wavelength shift	nm/mA	0.3		0.8	2.0 mA laser current
Laser output power	mW	0.3		0.75	2.0 mA laser current
Laser side mode suppression ration	dB	10			2.0 mA laser current
Laser far-field-angle	°	13		20	2.0 mA laser current
Laser threshold current	mA	0.2		1.0	
Laser voltage	V	1.7		2.4	2.0 mA laser current
Laser differential resistance	kΩ	0.1		0.4	2.0 mA laser current
Photodiode current	mA	0.5		1.0	2.0 mA laser current
Photodiode current slope with laser current	mA/mA	0.3		0.6	
Photodiode capacitance	pF			5	Cp
Photodiode impedance	kΩ		100		Rp
Photodiode noise at 10 kHz	pA/√Hz			35	T = 25°C, 2.0 mA laser current

Dimensions of ViP:



Units: μm

Type	Single chip
Part number	TVP-001-850-A
Ordering number	ULMVIP-81-TT-S0101U
Dimensions	165 x 165 x 130 μm

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

Safety information:

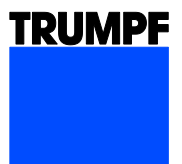
- Invisible laser radiation / avoid beam exposure / class 3B laser product
- Electrostatic sensitive devices / observe precautions for handling

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
Industrial Sensing

Single-Mode
VCSEL Solutions



Innovative single-mode VCSEL light sources for sensor applications

Single-mode VCSELs are the perfect choice for demanding sensor applications due to their improved optical characteristics. Higher-order longitudinal and transversal modes are suppressed by the innovative chip design. At the same time, the polarization is linearly stable.

Which application fields?

In the field of automotive, consumer electronics or industrial sensing there are various applications. Some examples for the single-mode VCSEL solutions are oxygen spectroscopy sensing, high precision depth sensing or optical encoder for high precision positioning.

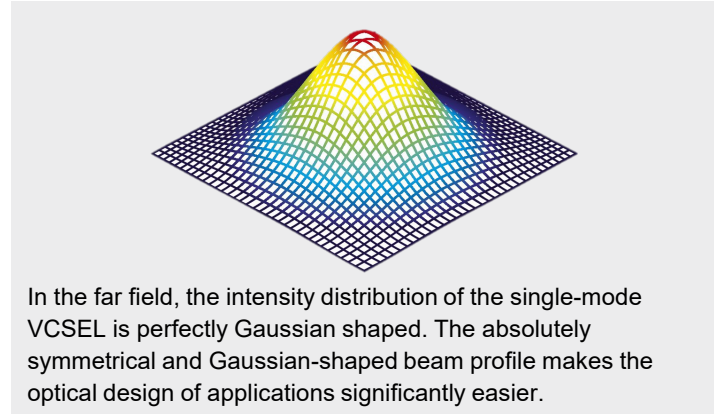
Why TRUMPF?

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 application. 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.

Single-mode VCSEL light sources offer excellent and reliable performance over a wide range of conditions

Features:

- TRUMPF proprietary VCSEL technology
- Wavelengths: 760 - 764 nm, 850 nm, 940 nm
- Narrow 2 nm spectral width
- Precise wavelength tunability
- High frequency modulation up to 100 MHz
- Sub ns single pulses
- Wide range of duty cycles
- Gaussian beam profile
- Hermetically sealed package
- Integrated TEC and thermistor
- Easy application to system
- Small footprint
- High reliability

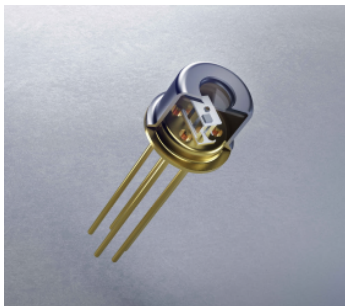


Product Specifications					
Product	Part number*	Dimensions (l x w x h)	CW optical output power	Emission wavelength	Number of VCSEL
TO7 with TEC and thermistor	TTO-007-760-A	5.84 Ø x 6 mm	0.3 mW	760 nm	1
TO8 with TEC and thermistor	TTO-008-763-A	5.84 Ø x 6 mm	0.3 mW	763 nm	1
VCSEL Chip 850 nm	TVT-006-850-A	200 x 200 x 99 µm	2 mW	850 nm	1
VCSEL Chip 940 nm	TVT-007-940-B	187 x 187 x 99 µm	18 mW	940 nm	12
VCSEL with integrated photodiode	TVP-001-850-A	165 x 165 x 130 µm	0.5 mW	850 nm	1

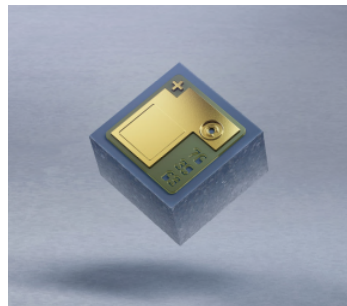
Product specifications in this overview are typical values under defined operating conditions. Table shows a selection of products, information on other products on request.

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

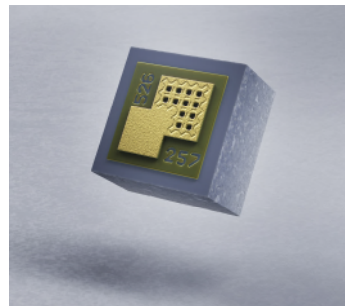
Product variants of single-mode VCSEL



TO7 - VCSELs in a hermetically sealed TO7 housing, also available without TEC





Chip die - 2 mW 850 nm VCSEL for high-volume applications and highly integrated sensors





Chip die - 18 mW 940 nm VCSEL array for high-volume time-of-flight proximity sensing in camera auto-focus sensors with short distance linearity



Chip die – two 850 nm VCSELs with single integrated photodiode for high-volume self-mixing interferometry sensing applications and integrated speed sensors


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


Safety information:

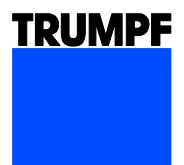
-  Invisible laser radiation / avoid beam exposure / class 3B laser product
-  Electrostatic sensitive devices / observe precautions for handling

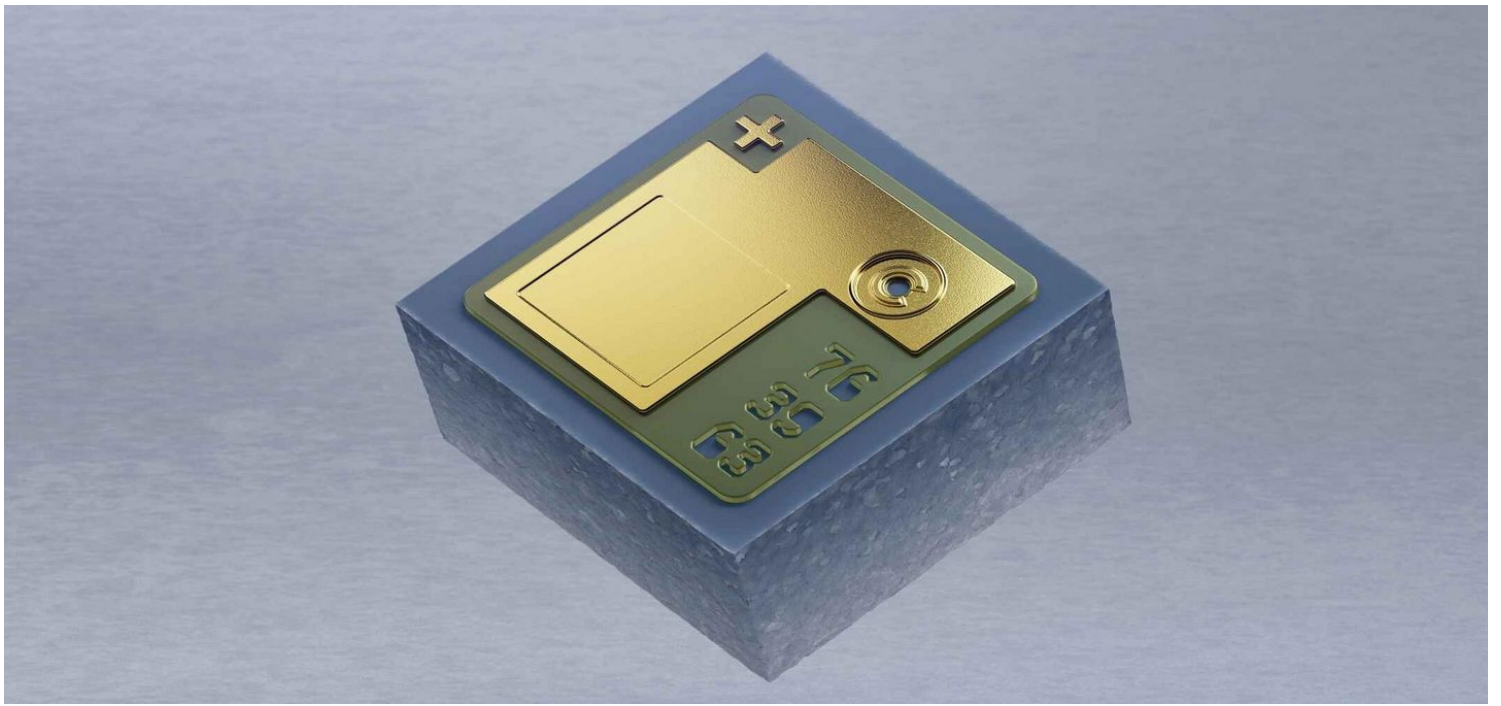
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December 2022





シングルモードVCSEL

技術仕様

TVT-006-850-A (850 nm チップ)**TVT-007-940-B (ガウシアンビーム形状を有する VCSELアレイ)****TVP-001-850-A (ViP)**

レーザーパラメータ			
レーザータイプ	シングルモード	シングルモード	シングルモード
典型的波長	850 nm	940 nm	850 nm
出力 (最小)	2 mW	13.5 mW	0.3 mW
出力 (最大)	2.5 mW	25 mW	0.75 mW
発光体の個数	1 個	12 個	2 個
ピッチ効率 (室温の場合)	0.5 - 1 ワット/アンペア	0.9 ワット/アンペア	-
レーザー保護等級	3B	3B	3B

OPTIK

光学エレメント	-	-	偏光制御つき
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電流

電流電圧 (25 MAで室温の場合)	2.6 V	2.6 V	1.7 - 2.4 V
閾値電流 (室温の場合)	2 ミリアンペア	3.6 ミリアンペア	0.2 - 1.0 ミリアンペア

サイズ

寸法 幅	200 μm	187 μm	165 μm
寸法 高さ	200 μm	187 μm	165 μm
寸法 奥行	99 μm	99 μm	130 μm

TTO-002-xxx-A (TO パッケージ)

レーザーパラメータ	
レーザータイプ	シングルモード
典型的波長	760, 763, 850 nm
出力 (最小)	-
出力 (最大)	-
発光体の個数	1 個
ピッチ効率 (室温の場合)	-
レーザー保護等級	3B

OPTIK

光学エレメント	光学系統合型の TO パッケージ
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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	-

予告なく変更される場合があります。見積書及び受注確認書の記載事項が決定的な意味を持ちます。