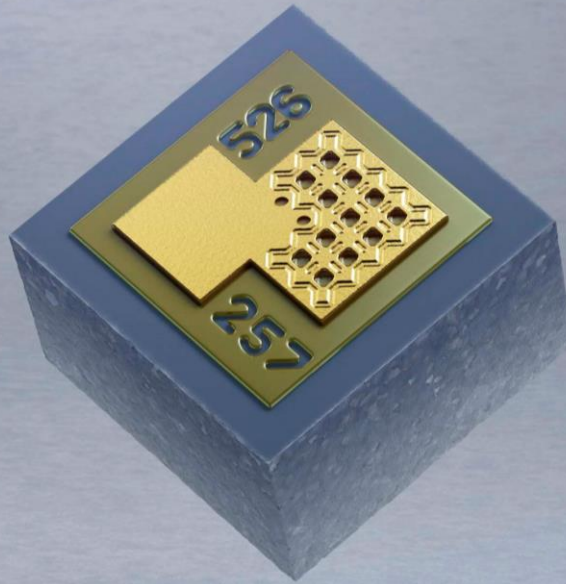


VCSEL

Single-Mode  
18 mW  
940 nm



> Gaussian Beam Profile

> Time of Flight Proximity Sensing

> 12 Single-Mode Emitters

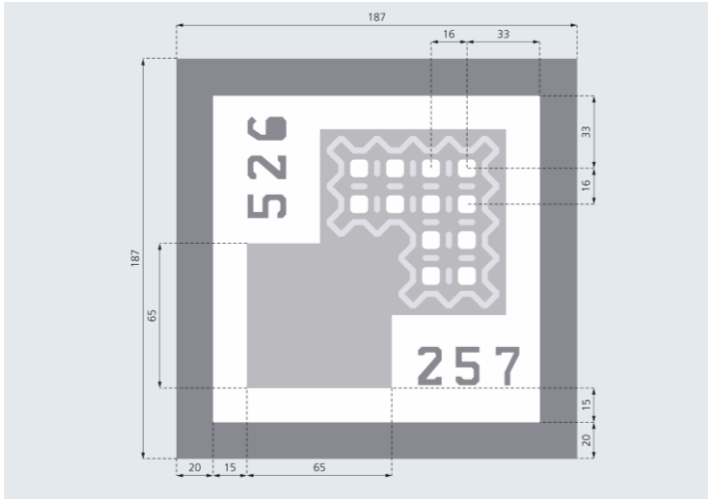
> Camera Auto-Focus

# Datasheet: 18 mW 940 nm Single-Mode VCSEL Array

**Electro-Optical Characteristics (T = 50°C, pulse width 200 µs, duty cycle 10%, I = 25 mA, unless otherwise stated)**

Parameter	Units	Min.	Typ.	Max.	Notes
Operating current	mA		25		pulse width <3 ns duty cycle <20%
Threshold current	mA		3.6	8	T = -10...70°C
Forward voltage	V			2.6	T = -10°C
Peak optical output power	mW	13.5	18	25	T = -10...70°C
Slope efficiency	W/A		0.9		
Peak wavelength	nm	930	940	949	T = -10...70°C
Sidemode suppression ratio	dB	2.5			
Spectral linewidth	nm		0.5	1.75	Full width 1/e <sup>2</sup> , T = -10°C...70°C
Beam divergence	deg	12	15	22	Full width 1/e <sup>2</sup> , T = -10°C...70°C
Power through 7 mm aperture at 100 mm	mW		2	4.2	T = -10°C...70°C
Rise time (10% to 90%)	ps			100	
Fall time (90% to 10%)	ps			300	

## Dimensions



Units: µm

Type	Single chip
Part number	TVT-007-940-B
Ordering number	
Dimensions	187 x 187 x 99 µm

For more information visit  
[www.trumpf.com/s/VCSEL-solutions](http://www.trumpf.com/s/VCSEL-solutions)

### Safety information:

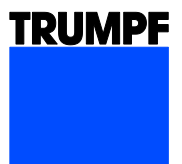
- Invisible laser radiation / avoid beam exposure / class 3B laser product
- Electrostatic sensitive devices / observe precautions for handling

TRUMPF Photonic Components GmbH

Lise-Meitner-Straße 13 · 89081 Ulm · Germany

E-mail: [photonic.components@trumpf.com](mailto:photonic.components@trumpf.com) · Homepage: [www.trumpf.com/s/VCSEL-solutions](http://www.trumpf.com/s/VCSEL-solutions)

January 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?

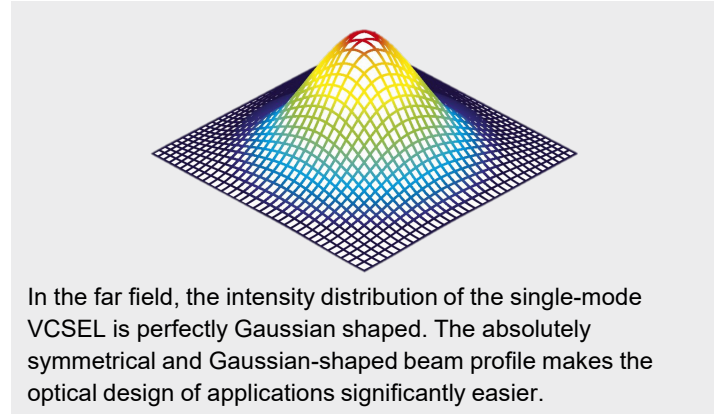
TRUMPF Photonic Components is a family-owned global leader in VCSEL technology. We design, manufacture and sell VCSEL-based light sources. Our solutions support the growing demand of 3D sensing application. With over 20 years of VCSEL technology development and offering VCSEL products to the market, 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

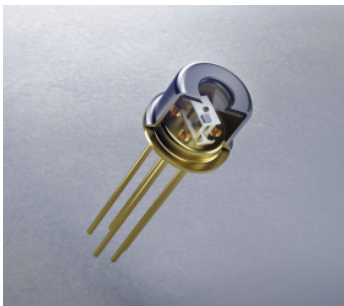


Product Specifications					
Product	Part number*	Dimensions (l x w x h)	CW optical output power	Emission wavelength	Number of VCSEL
TO7 with TEC and thermistor	TTO-007-760-A	5.84 Ø x 6 mm	0.3 mW	760 nm	1
TO8 with TEC and thermistor	TTO-008-763-A	5.84 Ø x 6 mm	0.3 mW	763 nm	1
VCSEL Chip 850 nm	TVT-006-850-A	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

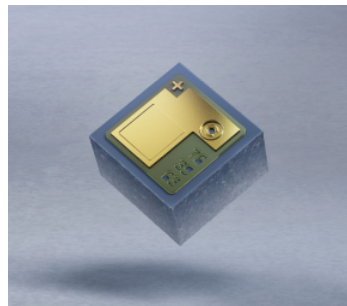
Product specifications in this overview are typical values under defined operating conditions. Table shows a selection of products, information on other products on request.

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

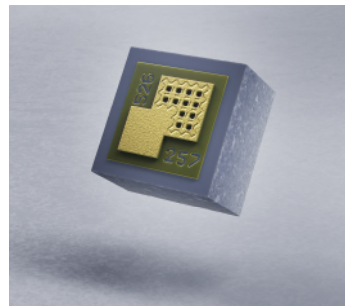
## Product variants of single-mode VCSEL



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](http://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

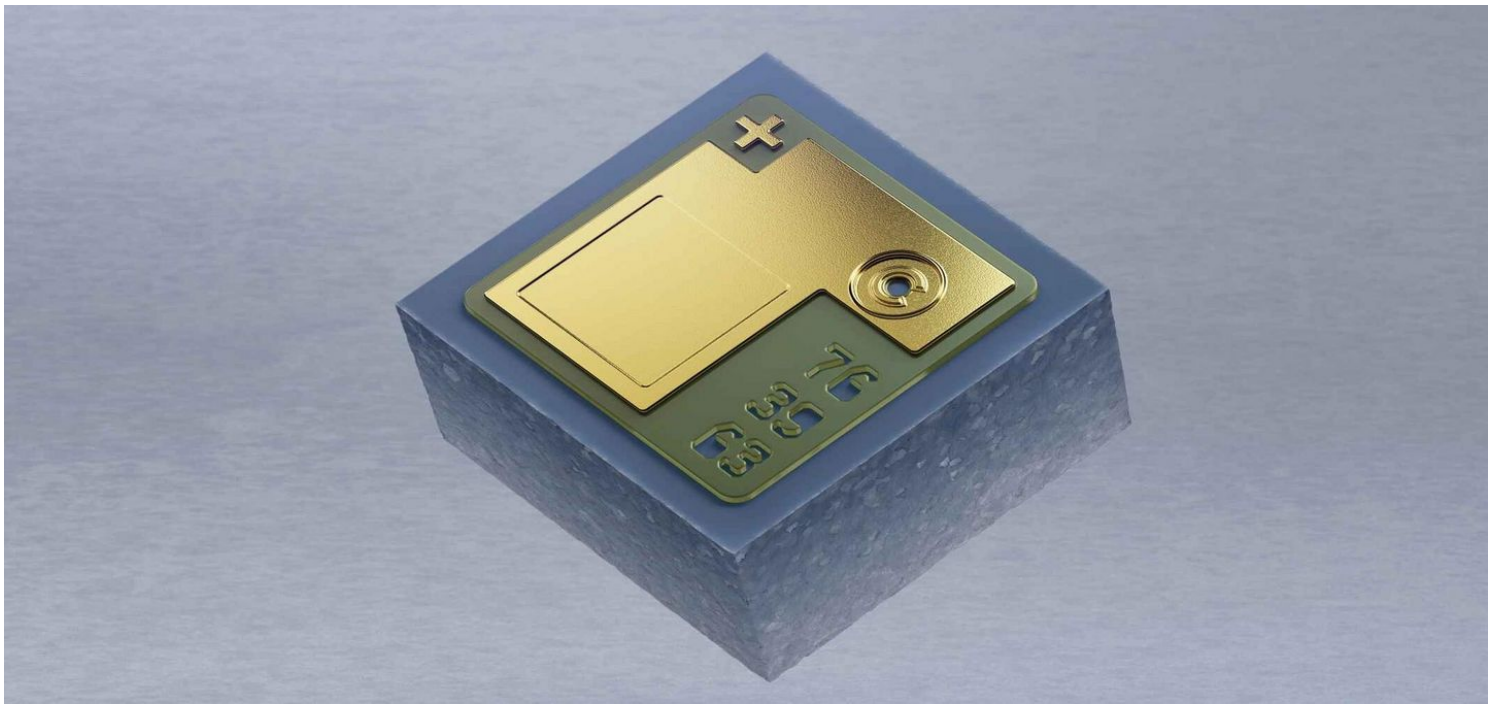
TRUMPF Photonic Components GmbH

Lise-Meitner-Straße 13 · 89081 Ulm · Germany

E-mail: [photonic.components@trumpf.com](mailto:photonic.components@trumpf.com) · Homepage: [www.trumpf.com/s/VCSEL-solutions](http://www.trumpf.com/s/VCSEL-solutions)

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 $\mu$ m	187 $\mu$ m	165 $\mu$ m
寸法 高さ	200 $\mu$ m	187 $\mu$ m	165 $\mu$ m
寸法 奥行	99 $\mu$ m	99 $\mu$ m	130 $\mu$ m

**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。