

# Product Guide

## Optical Components

**FINISAR<sup>®</sup>**

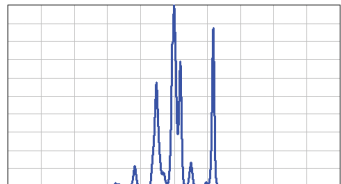
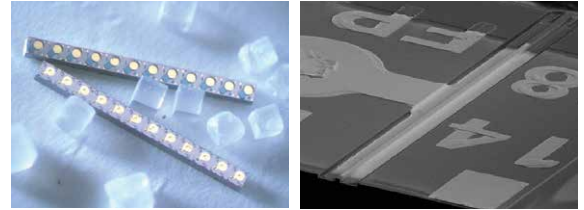


# Optical Components

With over 200 million optical products operating in the world today, Finisar® is the leading supplier of active devices for data and telecommunications systems. The unique vertically integrated infrastructure, which incorporates both on- and off-shore design and manufacturing sites, enables Finisar to provide the best value with the lowest total cost for the optical sensing markets.

## Finisar has an unmatched reputation in the industry for:

- ▶ Field Proven Reliability
- ▶ Excellent On Time Delivery
- ▶ Custom and Standard Products
- ▶ Globally Integrated Design and Manufacturing
- ▶ High Volume Manufacturing
- ▶ RoHS Compliance for all Products
- ▶ Global Sales Team
- ▶ Extensive Patent Protection



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## Multi Mode VCSELs

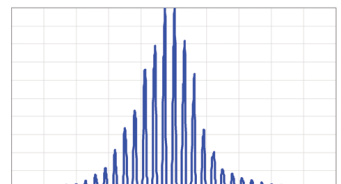
Multi mode VCSELs are the workhorse of most short reach optical communication networks today. This VCSEL is preferred in applications concerned with optical power, high efficiency and narrow beam divergence. This is arguably the most reliable laser ever produced.



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## Single Mode VCSELs

Single mode VCSELs are the ideal source when perfect Gaussian beam shape is required. The emission is at a single optical wavelength, making it well suited for applications in gas and chemical sensing and coherent encoders. Specific wavelengths can be targeted from 700nm to 1000nm.



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## Fabry-Perot Edge Emitting Lasers

FP lasers are a popular choice for medium distance optical interconnects on single mode optical fiber. The proprietary InGaAlAs ridge waveguide structure offers both, high optical power and a broad operating temperature range.



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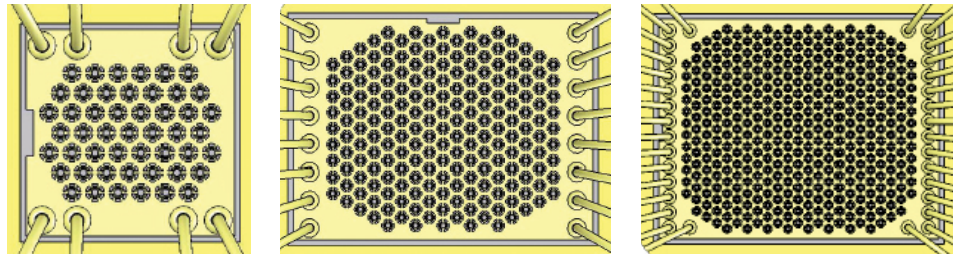
## Distributed Feedback Lasers

DFB lasers offer the combination of single optical emission wavelength and high optical power. The lasers can be targeted at wavelengths ranging from 1200nm to 1600nm.

Finisar manufactures GaAs based devices in its own state-of-the-art facility in Allen, TX, while InP based devices are manufactured in its own world class facility in Fremont, CA. In addition to capabilities in the U.S., Finisar maintains a vertically integrated global presence with packaging of its optical components at internal factories in Malaysia and China.

## High Power VCSELS

- ▶ Dense 2D arrays of emitters
- ▶ High wall-plug efficiency at 50 °C
- ▶ >1G modulation rate capable
- ▶ Narrow beam divergence – FMHM ~15 deg
- ▶ Operating case temperature: 0 to 60 °C; (backside chip temperature)
- ▶ Class 3B laser – eye safety requirements



## Single Mode VCSELS

- ▶ >1mW of CW power
- ▶ Single mode VCSEL with stable polarization
- ▶ Intended for pulsed or CW applications
- ▶ Gaussian beam profile
- ▶ Narrow beam divergence (~12-15 deg, FW)
- ▶ Stable wavelength over temperature



## Multi Mode VCSELS

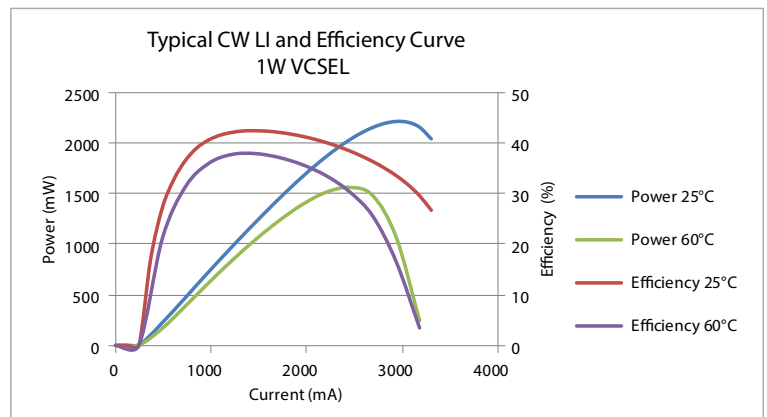
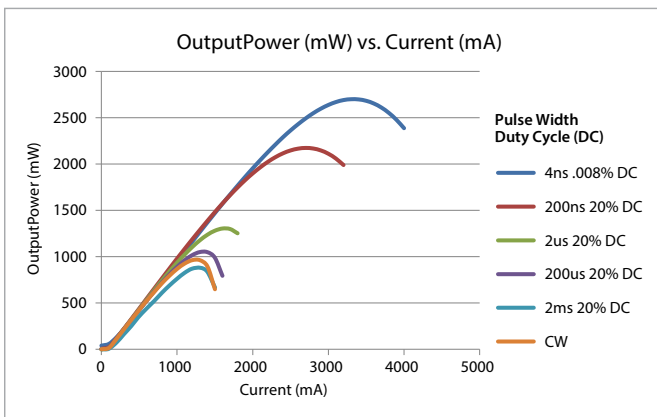
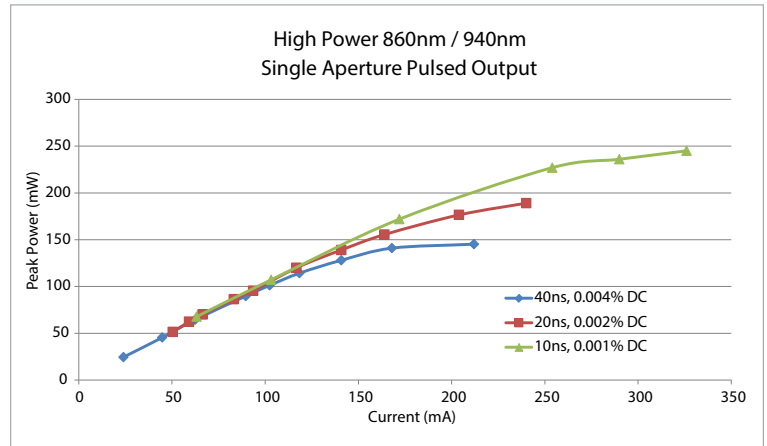
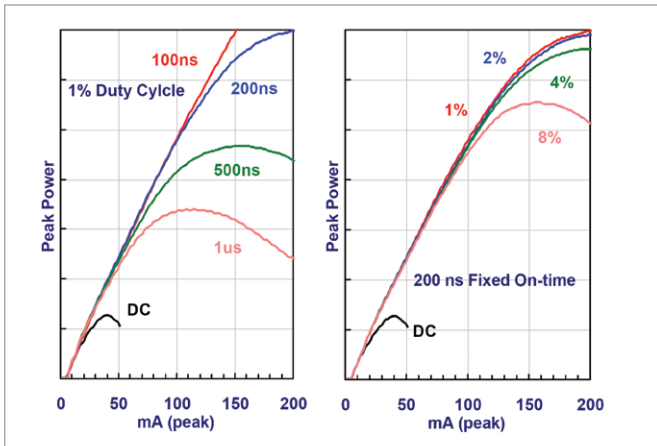
- ▶ High power single aperture emitters
- ▶ High wall-plug efficiency at 50 °C
- ▶ >5mW of CW power
- ▶ >1G modulation rate capable
- ▶ Narrow beam divergence – FMHM ~15 deg
- ▶ Operating case temperature: 0 to 60 °C; (backside chip temperature)
- ▶ Class 1 laser – eye safe
- ▶ 860nm and 940nm available



# Optical Components

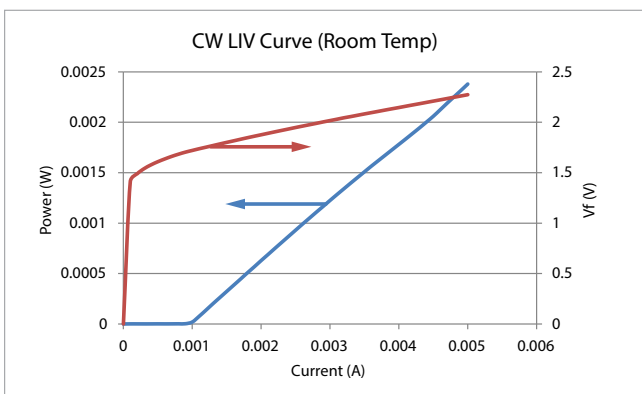
## High Power VCSELs

Densely packed VCSEL arrays can be made to emit extremely high optical powers (10mW-10W) at very high efficiencies. Pulsing a VCSEL with short electrical pulses allows for much higher optical power emission, up to 10 times the DC limits. 860nm and 940nm available now, contact us for additional wavelengths.



## Single Mode VCSELs

Reliable single mode VCSELs with narrow line widths, stable polarization, capable for use in atomic clocks, magnetometers, optical encoders etc. Wavelengths from 780 to 895nm available. Contact factory for other wavelength needs. With excellent reliability, these devices are suitable for operation in environments needing high operating temperatures of 75 to 95 °C.

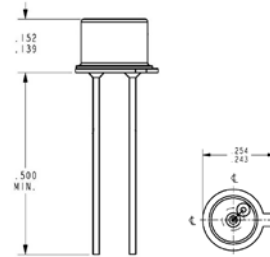


## Available Standard Components Solutions

### TO Can

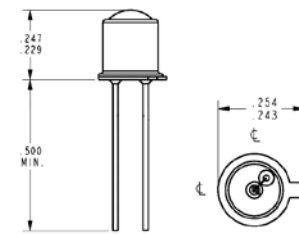
The base component option for multimode VCSELs is the hermetic can which offers superb environmental protection and can be easily mounted in a coaxial lensing system.

For single mode applications the TO Can is fitted with an ultra-flat sapphire glass window to prevent wave front aberrations.



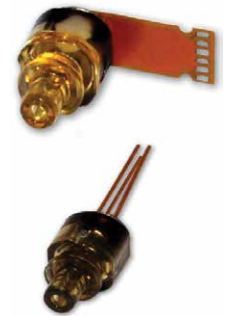
### Lensed TO Can

The glass drop-formed lens collimates the VCSEL beam to have a typical divergence of <math><2</math> degrees, increasing the distance of operation and providing pseudo collimated light in such applications where collimation may be a requirement.



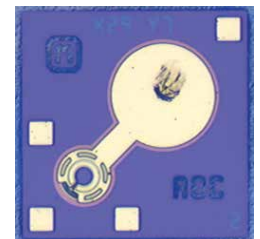
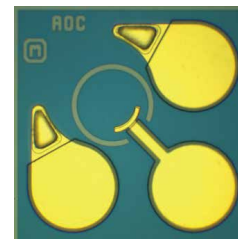
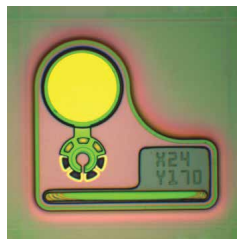
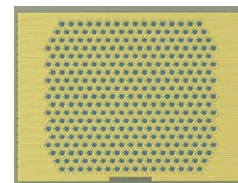
### TOSA and ROSA

Finisar has sold over 200M VCSEL components in the datacom market and continues to deliver excellent reliability and performance. TOSA and ROSA products range from 1G to 10G operation and span VCSELs and GaAs PDs for SW communication and FP and DFB and InP PDs for LW data links. Contact us for higher speed components.



### Bare VCSEL and SW PD Die

Generally shipped on 6 inch hoop ring. Contact us for other package options.



## Single Emitter LASERs – VCSELs and Edge Emitters

Parameter	Multi Mode VCSELs	Single Mode VCSELs	FP TOSA	DFB TOSA
Wavelength	850nm, 880nm, 910nm, 940nm, 980nm	795nm, 850nm, 895nm	1310nm	1310nm
Output Power	~2mW	~0.5mW	~0.75mW	~0.9mW
Package Type	Die, TO, TOSA	Die only	TOSA only	TOSA only
Typical Operating Current	~6mA	~2-3mA	~32mA	~38mA
Threshold Current	~1.5mA	~0.5mA	10mA	8mA
Forward Voltage	~2.1V	~2.1V	~1.2V	~1.6V
Resistance	~60Ω	~150Ω	~7Ω	~9Ω
Storage Temperature	-40 to +85 °C			
Operating Temperature	0 to +85 °C	0 to 95 °C	-5 to +85 °C	-5 to +85 °C

## High Power VCSELs

Parameter	Single Emitter	~50 Emitter VCSEL Array	~200 Emitter VCSEL Array	~400 Emitter VCSEL Array
Wavelength	860nm, 940 nm	860nm, 940nm upon request	860nm, 940nm upon request	860nm, 940nm upon request
Output Power	>5mW	>300mW	>1W	>2W
Package Type	Bare Die			
Typical Operating Current	8mA	~400mA	~1.4A	~2.5A
Wall-plug Efficiency at 50 °C	>35%	>35%	>35%	>35%
Threshold Current	~1.5mA	~70mA	~250mA	~500mA
Forward Voltage	2V			
Resistance	60Ω	~1Ω	Ω	Ω
Storage Temperature	-40 to +85 °C			
Operating Temperature	0 to 60 °C			

Our portfolio is complemented with Free Space, Receptacle and Pigtail Isolators and Chirp Managed Lasers in Butterfly Box packages. Finisar's Isolators are generally used in various lasers that require isolation to prevent feedback into lasers.

## FREE SPACE ISOLATOR

### APPLICATIONS

Transmitter Optical Sub-Assembly (TOSA)

### FEATURES

- ▶ Low insertion loss and high isolation
- ▶ Single, dual stage, or other stage
- ▶ Optimized for different wavelengths
- ▶ High reliability
- ▶ Customization design available (CA, housing and marking)
- ▶ RoHS compliant



## RECEPTACLE ISOLATOR

### APPLICATIONS

Transmitter Optical Sub-Assembly (TOSA)

### FEATURES

- ▶ Low insertion loss and high isolation
- ▶ Optimized for different wavelengths
- ▶ Customized sizes available
- ▶ High reliability
- ▶ RoHS compliant



## PIGTAIL ISOLATOR

### APPLICATIONS

Coaxial and butterfly packaged transmitter

### FEATURES

- ▶ Low insertion loss and high isolation
- ▶ Optimized for different wavelengths
- ▶ Wide operating temperature range
- ▶ High reliability
- ▶ PM fiber type available
- ▶ RoHS compliant



Technology Innovator.  
Broad Product Portfolio.  
Trusted Partner.

**FINISAR**<sup>®</sup>

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