

## DATA SHEET

# VCSEL SENSOR FLAT WINDOW TO CAN

**SV3638-001**

### FEATURES:

- Designed for low drive currents between 5 and 12mA
- Flat Window TO-46 style package
- High speed  $\geq 1$  Ghz
- Advanced Technology VCSEL Chip

The SV3638 combines many of the desired features of an LED and the advantages of a laser diode. The VCSEL provides increased power output at low drive currents. As the current increases above its threshold, the light intensity increases proportionally. Custom packaging designs are also available. The different packages are for different applications both in the datacom market as well as in the sensor market.

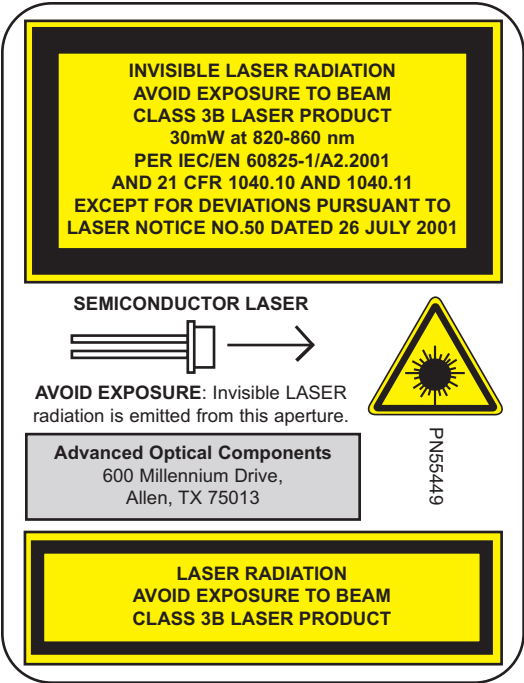


Part Number	Description
SV3638-001	Flat window TO can VCSEL sensor

***Finisar***

Advanced Optical Components Division

ABSOLUTE MAXIMUM RATINGS



Parameter	Rating
Storage temperature	-40°C to +100°C
Operating temperature	0°C to +70°C
Lead solder temperature	260°C, 10 seconds
Laser continuous average current	12mA
Laser reverse voltage	5V

**NOTICE:** Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operations section for extended periods of time may affect reliability.

**NOTICE:** The inherent design of this component causes it to be sensitive to electrostatic discharge (ESD). To prevent ESD-induced damage and/or degradation to equipment, take normal ESD precautions when handling this product

## VCSEL ELECTRO-OPTICAL CHARACTERISTICS

VCSEL Parameters	Test Condition	Symbol	Min.	Typ.	Max.	Units	Notes
Peak Operating Current	Adjustable to establish operating power	$I_{\text{peak}}$		9	20	mA	2
Optical Power Output	$I_F=9\text{mA}$	$P_o$		2.4		mW	3
Threshold Current		$I_{\text{TH}}$		2	3	mA	
Threshold Current Temperature Variation	$T_A = 0^{\circ}\text{C}$ to $70^{\circ}\text{C}$	$\Delta I_{\text{TH}}$	-1.5		1.5	mA	4
Slope Efficiency		$\eta$	0.225	0.4	0.6	mW/mA	5
Slope Efficiency Temperature variation	$T_A = 0^{\circ}\text{C}$ to $70^{\circ}\text{C}$	$\Delta \eta / \Delta T$		-6000		PPM/ $^{\circ}\text{C}$	
Peak Wavelength	$I_F=9\text{ mA}$	$\lambda_p$	830	850	860	nm	
$\lambda_p$ Temperature Variation	$I_F=9\text{ mA}$	$\Delta \lambda_p / \Delta T$		0.06		nm/ $^{\circ}\text{C}$	
Spectral Bandwidth, RMS	$I_F=9\text{ mA}$	$\Delta \lambda$			0.85	nm	
Laser Forward Voltage	$I_F=9\text{ mA}$	$V_F$		1.8	2.2	V	
Laser Reverse Voltage	$I_R=10\mu\text{A}$	$BVR_{LD}$		-10		V	
Relative Intensity Noise	1 GHz BW, $I_F=9\text{ mA}$	RIN		-130	-122	dB/Hz	
Series Resistance	$I_F=9\text{ mA}$	$R_S$	22	35	50	Ohms	
Series Resistance Temperature Coefficient	$I_F=9\text{ mA}$ , $0^{\circ}\text{C}$ to $70^{\circ}\text{C}$	$dR_S/dT$		-3000		PPM/ $^{\circ}\text{C}$	
Beam Divergence		$\theta$	15		30	Degrees	6

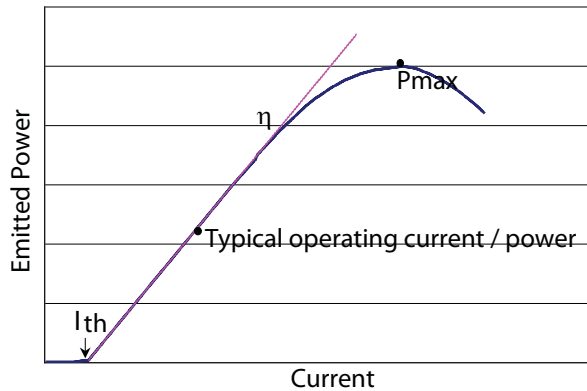
VCSEL ELECTRO-OPTICAL CHARACTERISTICS ( $T_A=25^{\circ}\text{C}$  unless otherwise stated)

## NOTES

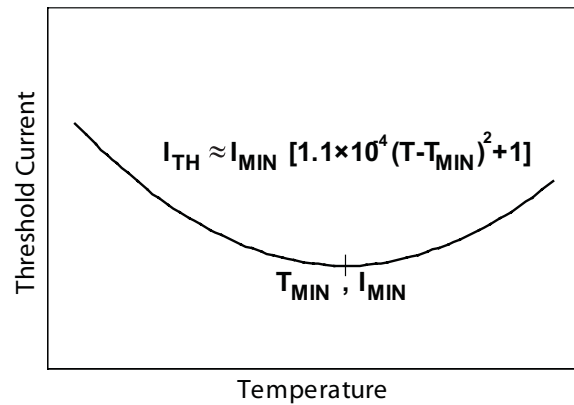
1. Reliability is a function of temperature, see [www.finisar.com/aoc.php](http://www.finisar.com/aoc.php) for details.
2. Operating power is set by the peak operating current  
 $I_{PEAK} = I_{BIAS} + I_{MODULATION}$
3. For the purpose of these tests,  $I_F$  is DC current.
4. Threshold current varies as  $(T_A - T_O)^2$ . It may either increase or decrease with temperature, depending upon relationship of  $T_A$  to  $T_O$ . The magnitude of the change is proportional to the threshold at  $T_O$ .
5. Slope efficiency is defined as  $\Delta P_O / \Delta I_F$ .
6. Beam divergence is defined as the total included angle between the  $1/e^2$  intensity points.

## TYPICAL PERFORMANCE CURVES

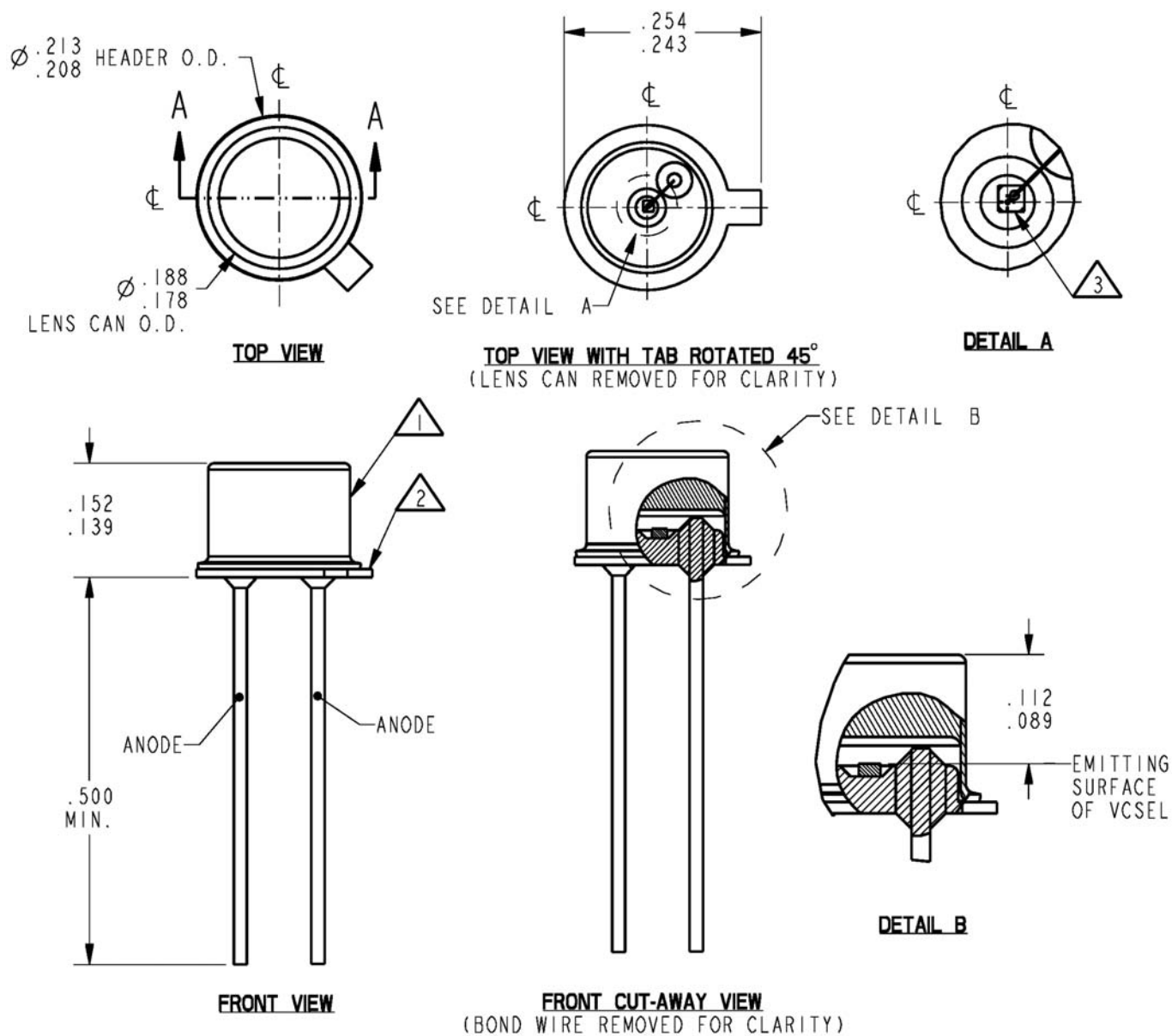
**Emitted Power vs. Current:** Power varies approximately linearly with current above threshold.



**Threshold Current vs. Temperature:** Threshold current varies parabolically with temperature; thus it can be nearly constant for a limited temperature range.



## MOUNTING DIMENSIONS



MOUNTING DIMENSIONS (for reference only): All dimensions are in inches. [mm]

## PINOUT

SV3638-001	
Number	Function
1	Anode VCSEL (isolated)
2	Cathode VCSEL (case)

## ADVANCED OPTICAL COMPONENTS

Finisar's ADVANCED OPTICAL COMPONENTS division was formed through strategic acquisition of key optical component suppliers. The company has led the industry in high volume Vertical Cavity Surface Emitting Laser (VCSEL) and associated detector technology since 1996. VCSELs have become the primary laser source for optical data communication, and are rapidly expanding into a wide variety of sensor applications. VCSELs' superior reliability, low drive current, high coupled power, narrow and circularly symmetric beam and versatile packaging options (including arrays) are enabling solutions not possible with other optical technologies. ADVANCED OPTICAL COMPONENTS is also a key supplier of Fabrey-Perot (FP) and Distributed Feedback (DFB) Lasers, and Optical Isolators (OI) for use in single mode fiber data and telecommunications networks

## LOCATION

- Allen, TX - Business unit headquarters, VCSEL wafer growth, wafer fabrication and TO package assembly.
- Fremont, CA – Wafer growth and fabrication of 1310 to 1550nm FP and DFB lasers.
- Shanghai, PRC – Optical passives assembly, including optical isolators and splitters.

## SALES AND SERVICE

Finisar's ADVANCED OPTICAL COMPONENTS division serves its customers through a worldwide network of sales offices and distributors. For application assistance, current specifications, pricing or name of the nearest Authorized Distributor, contact a nearby sales office or call the number listed below.

## AOC CAPABILITIES

ADVANCED OPTICAL COMPONENTS' advanced capabilities include:

- 1, 2, 4, 8, and 10Gbps serial VCSEL solutions
- 1, 2, 4, 8, and 10Gbps serial SW DETECTOR solutions
- VCSEL and detector arrays
- 1, 2, 4, 8, and 10Gbps FP and DFB solutions at 1310 and 1550nm
- 1, 2, 4, 8, and 10Gbps serial LW DETECTOR solutions
- Optical Isolators from 1260 to 1600nm range
- Laser packaging in TO46, TO56, and Optical subassemblies with SC, LC, and MU interfaces for communication networks
- VCSELs operating at 670nm, 780nm, 980nm, and 1310nm in development
- Sensor packages include surface mount, various plastics, chip on board, chipscale packages, etc.
- Custom packaging options

# Finisar

Advanced Optical Components Division

**Phone:** 1-866-MY-VCSEL USA (toll free)  
1-214-509-2700 USA (Direct dial)  
44 (0) 174 336 5533 Europe  
886-935-409898 China & Taiwan  
81-90-4437-1130 Japan  
82-11-220-6153 Asia Pacific & Korea

**Fax:** 1-214-509-3709 USA

Email: [support@adopco.com](mailto:support@adopco.com)  
WEB: [www.finisar.com/aoc.php](http://www.finisar.com/aoc.php)