

#### Features:

- 850nm multimode oxide isolated VCSEL
- Operates up to 10.3125 Gbps
- TO-46 tilt window TO-CAN prealigned into LC sleeve
- Packaged with a monitor photodiode
- Packaged with integrated heater for low-temperature operation
- 6dB attenuated receptacle



**COTSWORKS 850nm 10G VCSEL TOSA is suited to a wide variety of multimode fiber applications.**



COMMERCIAL  
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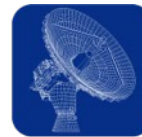
MILITARY  
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RADAR &  
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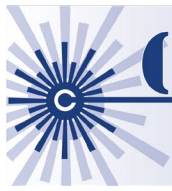
OIL &  
EXPLORATION

#### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Notes
Storage Temperature	T <sub>sto</sub>	-55	105	°C	
Case Operating Temperature	T <sub>OP</sub>	-55	100	°C	
Laser Reverse Voltage	V <sub>R</sub>	-	5	V	
Laser Forward Current	I <sub>F</sub>	-	15	mA	
Hand Lead Soldering Temperature	-	-	260	°C	(1)
ESD Exposure (Human Body Model)	-	-	225	V	(2)

#### Notes:

- 1) Hand solder for 10 seconds.
- 2) Proper ESD conditions should be employed while attaching to host board.



## Opto-Electronic Specifications

(For DR ≤ 5.0 Gbps, unless otherwise noted, -55°C ≤ T<sub>C</sub> ≤ 100°C. Use of heater is not permitted during operation.)

(For 5.0 < DR ≤ 10.3125 Gbps, unless otherwise noted, -20°C ≤ T<sub>C</sub> ≤ 95°C. For -55°C ≤ T<sub>C</sub> < -20°C operation the heater should be driven so performance mimics 25°C specifications.)

Parameter	Test Condition	Symbol	Min.	Typ.	Max.	Unit	Notes
<b>VCSEL</b>							
Data Rate	-	DR	-	-	10.3125	Gbps	(9)
Optical Output Power	I <sub>F</sub> = 7.5mA 50/125μm MMF 62.5/125μm MMF T <sub>C</sub> = 25°C	P <sub>F</sub>	0.45	-	0.7	mW	
Coupling Efficiency	I <sub>F</sub> = 7.5mA T <sub>C</sub> = 25°C	PO_PCT	70	-	-	%	(2)
Threshold Current	T <sub>C</sub> = 25°C	I <sub>TH</sub>	-	0.75	1.5	mA	
Threshold Current Temperature Variation	-	ΔI <sub>TH</sub>	-	-	1.2	mA	(3)
Slope Efficiency	T <sub>C</sub> = 25°C	η	0.06	0.09	0.1	W / A	
Center Wavelength	-	λ <sub>C</sub>	830	850	860	nm	(1)
Center Wavelength Temperature Variation	-	Δλ <sub>C</sub> / ΔT	-	0.06	-	nm / °C	
RMS Spectral Width	-	Δλ	-	-	0.65	nm	(1)
Laser Forward Voltage	I <sub>F</sub> = 7.5mA T <sub>C</sub> = 25°C	V <sub>F</sub>	-	2.1	2.4	V	
Laser Reverse Voltage	I <sub>R</sub> = 10μA	V <sub>R</sub>	5	10	-	V	
Relative Intensity Noise	I <sub>F</sub> = 7.5mA	RIN120MA	-	-	-128	dB / Hz	(4)
Series Resistance	-	R	45	70	85	Ω	(1)
Optical Return Loss	-	ORL	12	-	-	dB	
Encircled Flux Diameter	-	EF 4.5μm	-	-	30	%	(5)
		EF 19μm	86	-	-		
Bias Current Range	-	I <sub>F</sub>	6	-	12	mA	
High Temperature Power Droop	-	P <sub>DRROOP</sub>	-0.8	-	0	dB	(7)
Transmitter Dispersion Penalty	-	TDP	-	-	3.8	dB	(1)
<b>Monitor Photodiode</b>							
MPD Current	V <sub>R</sub> = 3V	I <sub>PD</sub>	135	-	215	μA	(1)
MPD Power Tracking	-	ΔP / ΔT	0.8	-	1.2	dB	
MPD Dark Current	P <sub>F</sub> = 0mW V <sub>R</sub> = 3V	I <sub>DARK</sub>	-	-	20	nA	
MPD Reverse Voltage	P <sub>F</sub> = 0mW I <sub>R</sub> = 10μA	BVR <sub>PD</sub>	30	115	-	V	(6)
Monitor Capacitance	V <sub>R</sub> = 0V Freq = 1MHz	C <sub>PD</sub>	-	75	100	pF	
	V <sub>R</sub> = 3V Freq = 1Mhz		-	40	55		
<b>Heater</b>							
Resistance	T <sub>C</sub> = 25°C	R <sub>HEATER</sub>	12	15	18	Ω	
Settling Time	T <sub>C</sub> = -40°	T <sub>HEATER</sub>	-	-	90	s	(8)
Heater Thermal Impedance	-	-	-	180	-	°C / W	
Heater Maximum Current	T <sub>C</sub> = -40°	I <sub>H,max</sub>	-	150	-	mA	
	T <sub>C</sub> = 95°C		-	0	-		

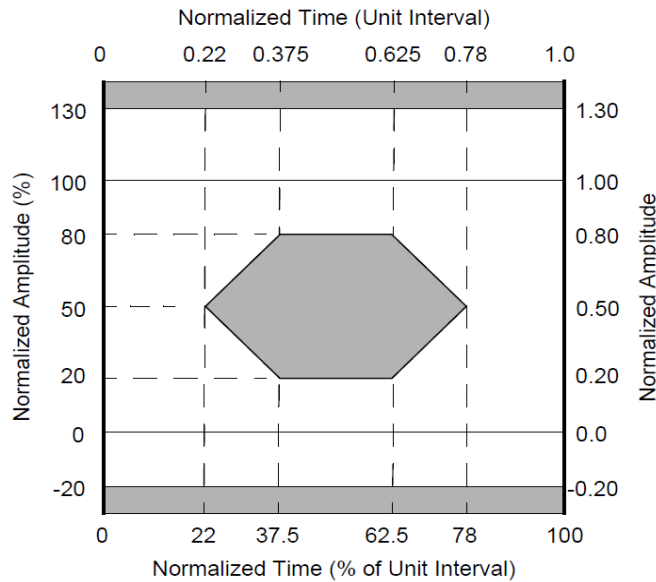




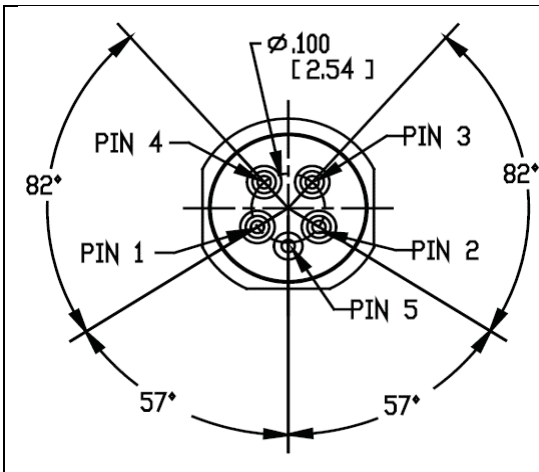
**Notes:**

- 1) Test condition is over all operating condition temperatures with tracked back monitor current found at 7.5 mA at 25C with a 12 mA clamp.
- 2) PO\_PCT is defined as the ratio of the coupled power into a 50/125µm fiber to the total power output from the optical front end as measured on a large area detector.
- 3) Operation outside of the specified range may result in the threshold current exceeding the maximums defined in the electro-optical characteristics table. ΔITH is the maximum deviation from the 25°C value.
- 4) RIN12 is measured using the OMA technique with 12dB return.
- 5) Encircled flux is measured per TIA-455-203 at 7.5 mA average current.
- 6) To prevent VCSEL damage, short the VCSEL anode and cathode during BVR testing of the photodiode.
- 7) Droop is the fiber coupled power difference in dB from a tracked condition to the clamped condition.
- 8) Settling time is tracked by center wavelength stabilizing to within 5% of the final value.
- 9) For 0.125 to 5.0Gbps operation, the heater shall not be required to achieve compliance with the eye mask detailed in **Figure 1** when measured with a fourth order Bessel-Thomson filter having a 3dB bandwidth of 0.75 times the signaling rate.

**Figure 1: 0.125 to 5.0 Gbps Eye Mask**



## Pin Identification



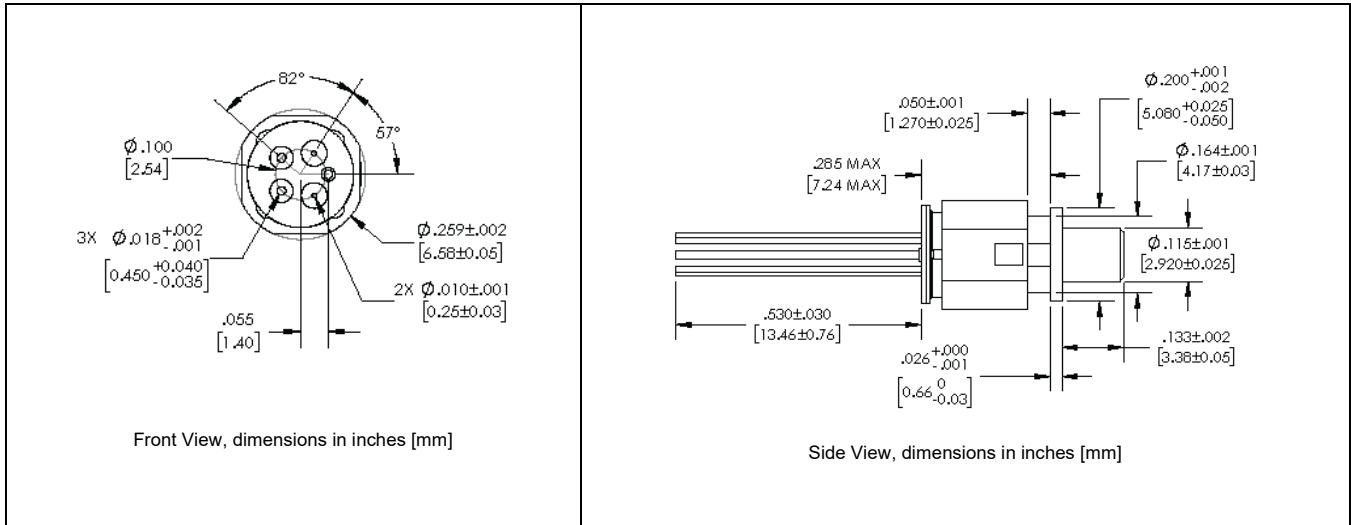
PIN #	Description	Pin Diameter
1	VCSEL Anode	9 mil
2	VCSEL Cathode	9 mil
3	Heater Terminal 2	18 mil
4	PD Cathode	18 mil
5	PD Anode, Heater Terminal 1, CASE	18 mil

**Notes:**

- 1) Mechanical dimensions shown here are in units of mm [inches].



## Standard Mechanical Dimensions



## Warnings:

**Handling Precautions:** This device is susceptible to damage as a result of electrostatic discharge (ESD). A static free environment is highly recommended.

**Laser Safety:** Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation

## Ordering Information

Contact COTSWORKS Sales for information and pricing.

Contact COTSWORKS for mechanical dimensional information, lead times and configuration options.