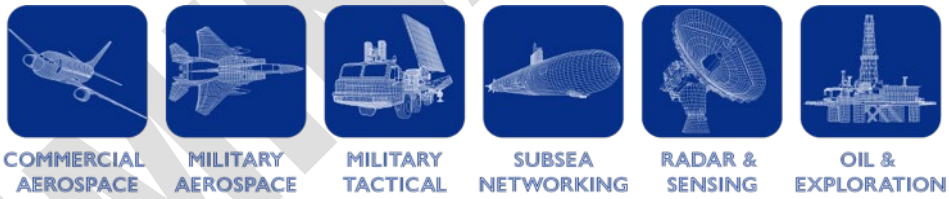
104-00056
125Mbps to 10Gbps
850nm 5-Pin VCSEL With Heater

Features:

- 850nm multimode oxide isolated VCSEL
- Operates from 125 Mbps to 10.3125 Gbps
- TO-46 tilt window metal can component prealigned into LC sleeve
- Packaged with a back monitor
- Attenuated window can

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



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Notes
Storage Temperature	T_{sto}	–55	105	°C	
Case Operating Temperature	T_{OP}	–55	100	°C	
Laser Reverse Voltage	V_R	-	5	V	
Laser Forward Current	I_F	-	12	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.

749 Miner Road, Highland Heights, OH 44143
440.446.8800 | **sales@cotsworks.com**

Opto-Electronic Specifications

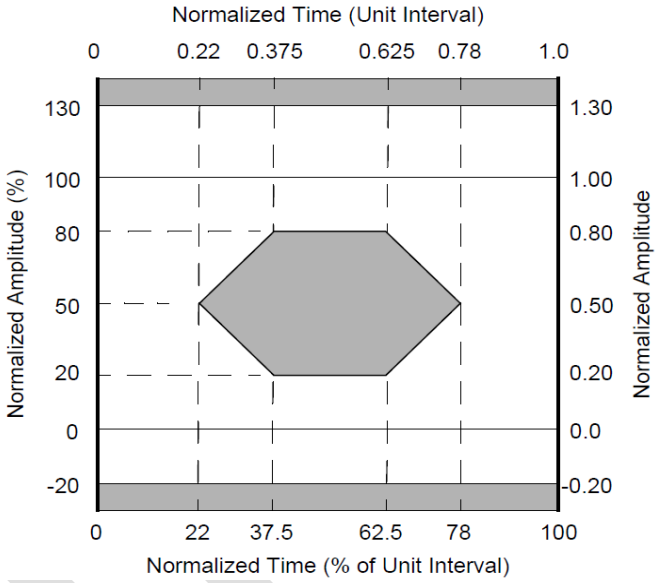
(For 0.125 ≤ DR ≤ 5.0 Gbps, unless otherwise noted, –55°C ≤ T_C ≤ 100°C. Use of heater is not permitted during operation.)
(For 5.0 < DR ≤ 10.3125 Gbps, unless otherwise noted, –20°C ≤ T_C ≤ 95°C. For –55°C ≤ T_C < –20°C operation the heater should be driven so performance mimics 25°C specifications.)

Parameter	Test Condition	Symbol	Min.	Typ.	Max.	Unit	Notes
VCSEL							
Data Rate	-	DR	0.125	-	10.3125	Gbps	(9)
Optical Output Power	I_F = 7.5mA 50/125µm MMF 62.5/125µm MMF T_C = 25°C	P_F	–4.5	-	–1.5	dBm	
Coupling Efficiency	I_F = 7.5mA T_C = 25°C	PO_PCT	70	-	-	%	(2)
Threshold Current	T_C = 25°C	I_{TH}	-	1	1.2	mA	
Threshold Current Temperature Variation	-	ΔI_{TH}	-	-	1.2	mA	(3)
Slope Efficiency Temperature Variation	I_F = 7.5mA	$\Delta\eta$ / ΔT	-	–0.5	-	% / °C	
Center Wavelength	-	λ_C	830	850	860	nm	(1)
Center Wavelength Temperature Variation	-	$\Delta\lambda_C$ / ΔT	-	0.06	-	nm / °C	
RMS Spectral Width	-	$\Delta\lambda$	-	-	0.65	nm	(1)
Laser Forward Voltage	I_F = 7.5mA T_C = 25°C	V_F	1.6	1.8	2.4	V	
Laser Reverse Voltage	I_R = 10µA	V_R	5	10	-	V	
Relative Intensity Noise	I_F = 7.5mA	RIN12OMA	-	-	–128	dB / Hz	(4)
Series Resistance	-	R	25	50	65	Ω	(1)
Series Resistance Temperature Variation	I_F = 7.5mA	ΔR / ΔT	-	–0.2	-	% / °C	
Optical Return Loss	-	ORL	12	-	-	dB	
Encircled Flux Diameter	-	EF 4.5µm	-	-	30	%	(5)
		EF 19µm	86	-	-		
Bias Current Range	-	I_F	6	-	10.9	mA	
Open Bore Rollover Current	-	I_{MAX}	13	-	-	mA	
High Temperature Power Droop	-	P_{DROOP}	–0.8	-	0	dB	(7)
Transmitter Dispersion Penalty	-	TDP	-	-	3.8	dB	(1)
Monitor Photodiode							
MPD Current	V_R = 3V	I_{PD}	175	-	600	µA	(1)
MPD Power Tracking	-	ΔP / ΔT	0.8	-	1.2	dB	
MPD Dark Current	P_F = 0mW V_R = 3V	I_{DARK}	-	-	20	nA	
MPD Reverse Voltage	P_F = 0mW I_R = 10µA	BVR_{PD}	30	115	-	V	(6)
Monitor Capacitance	V_R = 0V Freq = 1MHz	C_{PD}	-	75	100	pF	
	V_R = 3V Freq = 1Mhz		-	40	55		
Heater							
Resistance	T_C = 25°C	R_{HEATER}	12	15	18	Ω	
Settling Time	T_C = –40°	T_{HEATER}	-	-	90	s	(8)
Heater Thermal Impedance	-	-	-	180	-	°C / W	
Heater Maximum Current	T_C = –40°	$I_{H,max}$	-	150	-	mA	
	T_C = 95°C		-	0	-		

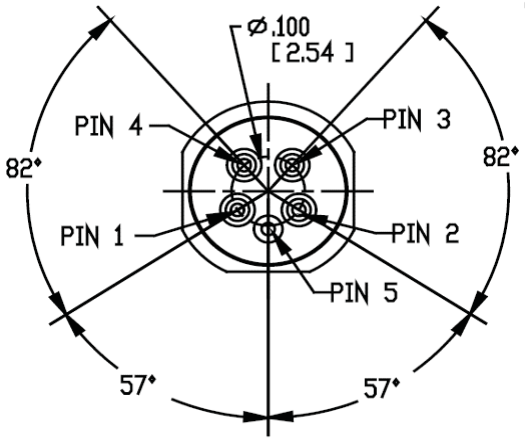
Notes:

1) Test condition is over all operating condition temperatures with tracked back monitor current found at 7.5 mA at 25C with a 10.9 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



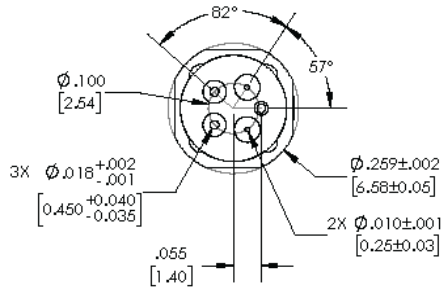
PIN #	Description	Pin Diameter
1	VCSEL Anode	9 mil
2	VCSEL Cathode	9 mil
3	Heater Terminal 2	18 mil
4	PD Cathode	18 mil
5	PD Anode, Heater Terminal 1, CASE	18 mil

Notes:

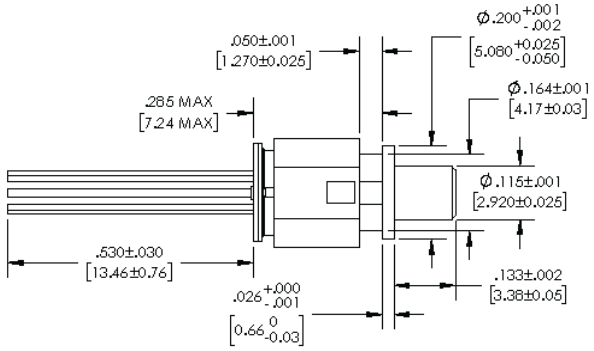
1) Mechanical dimensions shown here are in units of mm [inches].

749 Miner Road, Highland Heights, OH 44143
440.446.8800 | **sales@cotsworks.com**

Standard Mechanical Dimensions



Front View, dimensions in inches [mm]



Side View, dimensions in inches [mm]

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.

749 Miner Road, Highland Heights, OH 44143
440.446.8800 | **sales@cotsworks.com**