

## Razor Series

PCB Mounted Optical Transceiver,  
GbE, 1x/2x/4xFC & sFPDP  
Applications, Multimode, 850nm

### Duplex Optical Transceiver Unit

#### FEATURES

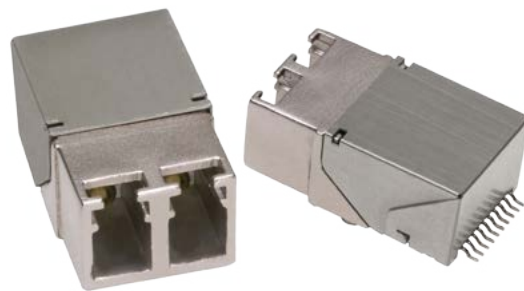
- Compliant with Gigabit Ethernet - IEEE-802.3:2005 and 1x/2x/4xFC - ANSI Fibre Channel FC-PI-2, FC-PI and FC-PH-2
- Optical fiber link distances up to 550 Meters (50/125µ 500MHz\*Km MMF)
- Maximum optical channel bit error rate less than  $1 \times 10^{-12}$
- Operating temperature range from -40°C to +85°C
- Nickel plated brass shell meets stringent corrosion performance requirements
- Die cast housings are strong, durable and light weight
- Duplex LC compliant optical fiber connector interface
- Threaded PCB retention features provide secure mounting in high shock and vibration environments

#### APPLICATIONS

Razor series printed circuit board mounted optical transceivers enable high speed network communications over long distances in harsh environments.

- Gigabit Ethernet switches and peripherals
- Fibre Channel switches and peripherals
- sFPDP data links
- Video displays

The multimode optical fiber interface supports applications where copper cable link distance, bandwidth, weight or bulk make the use of twisted pair, twinax or quadrx copper conductors unacceptable.



One TX & One RX Channel Operating from 125Mbps to 4.25Gbps

#### DESCRIPTION

Razor series optical fiber transceivers consist of optoelectronic transmitter and receiver functions integrated into a printed circuit board mounted Duplex LC compliant receptacle connector. The optical transmitters are 850nm VCSEL lasers. The transmitter input lines are driven with differential CML signals applied to the transmitter (TX+ and TX-) lines. Dual loop, temperature compensated, VCSEL drivers convert the transmitter input signals to suitable VCSEL bias and modulation currents.

Outputs from the receivers consist of differential CML data signals on the receiver (RX+ and RX-) lines. An LVTTTL signal is generated on the SD line upon receipt of a valid incoming optical signal. The receiver data lines are squelched upon SD deassertion, preventing errant data generation when an invalid incoming optical signal is presented to the transceiver.

The electrical interface to the Razor optical transceivers is a solder pin header with a 10 position SMT / PCB footprint compatible with the industry standard mounting requirements.

#### ORDERING INFORMATION

Application	Part Number
Transceiver @ 0.125 - 4.25Gbps	R25N-2S1G

# Facilitating Secure Communications in Harsh Environments

Razor Series SMT / PCB mounted Optical Transceiver,  
Fast or GbE, 1x/2x/4xFC or sFPDP Applications, Multimode, 850nm VCSELs

## ABSOLUTE MAXIMUM RATINGS

Absolute maximum limits mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided each limiting parameter is in isolation and all other parameters have values within the performance specification. It should not be assumed that limiting values of more than one parameter can be applied to the product at the same time.

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Storage Temperature	$T_s$	-55		+100	°C
Supply Voltage	$V_{cc}$	-0.5		+4.5	V
TX_DIS Input Voltage	$V_i$	-0.5		$V_{cc} + 0.5$	V

## RECOMMENDED OPERATING CONDITIONS

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Operating Temperature	$T_A$	-40		+85	°C
Power Supply Voltage	$V_{cc}$	+3.135		+3.465	V
Power Supply Noise (p-p)	$N_p$			200	mV
TX Differential Input Voltage (p-p)	$V_D$	0.25		2.2	V

## ENVIRONMENTAL OPERATING CONDITIONS

Requirement	Feature	Condition	Notes
RTCA / D0-160E	ESD	HBM	2200V
RTCA / D0-160E	Damp Heat	10 Cycles	24 Hours
EIA-455-25	Mating Durability	500 Cycles	<0.5dB Change
FDA / CDRH / IEC-825-1	Eye Safety	Class 1	No Safety Interlocks Required

## MATERIALS

Item	Detail	Notes
Razor Shell	Nickel Plated Brass	
Razor Body	Zamak 5	
Solder Pins	Brass	
Solder Pin Plating	Gold over Nickel	
Alignment Sleeves	Composite Polymer	
Printed Circuits	Polyimide / FR-4	
PCB Conformal Coating	Type AR	MIL-I-46058
Threaded Mounting Posts	Stainless Steel	

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## OPTICAL TRANSMITTERS $T_A$ = Operating Temperature Range, $V_{CC}$ = 3.135V to 3.465V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Output Power (BER<10 <sup>-12</sup> )	$P_o$	-9.5		-1.0	dBm
Optical Output Wavelength	$\lambda_{OUT}$	830	850	860	nM
Spectral Width	$\Delta\lambda_{RMS}$			0.85	nM

## OPTICAL RECEIVERS $T_A$ = Operating Temperature Range, $V_{CC}$ = 3.135V to 3.465V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Optical Sensitivity (BER<10 <sup>-12</sup> , ER=9.0) 125Mbps to 1.25Gbps 2.125Gbps 2.5Gbps to 3.19Gbps 3.2 to 4.25Gbps	$P_i$	-17.0 -15.0 -15.0 -14.0		0.0	dBm
Optical Wavelength	$\lambda_{IN}$	830		860	nM

## POWER SUPPLY CURRENT $T_A$ = Operating Temperature Range, $V_{CC}$ = 3.135V to 3.465V

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Supply Current per Port	$I_{CCT}$		175	250	mA

## OPTICAL LINK DISTANCES

Protocol	62.5/125 $\mu$ 200MHz*Km	50/125 $\mu$ 500MHz*Km
4xFibre Channel - ANSI X3.297 FC-PI-2	75M	150M
2xFibre Channel - ANSI X3.297 FC-PI	150M	300M
Gigabit Ethernet - IEEE-802.3:2005	275M	550M
1xFibre Channel - ANSI X3.297 FC-PH-2	300M	500M

Aqueous washing is permitted with the protective covers in place over the optical interface.

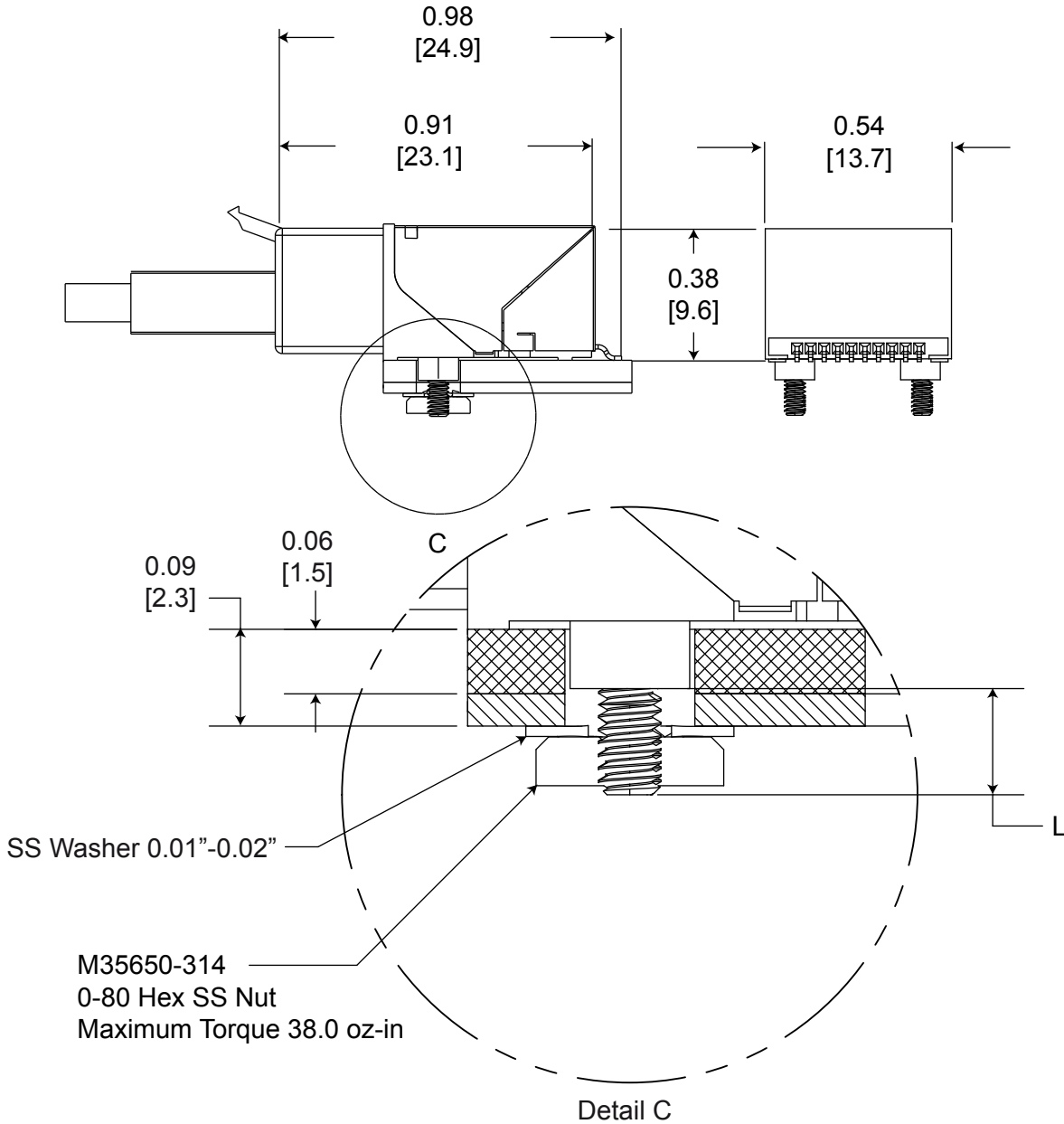
If necessary, after washing, clean the optical barrels with lint free swabs and Isopropyl alcohol

The transceivers are conformally coated but after aqueous washing the units should be baked @ 85°C for 1.0 hour to eliminate any retained moisture.

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## OUTLINE DRAWING

Dimensions are shown as reference only: inches [mm]

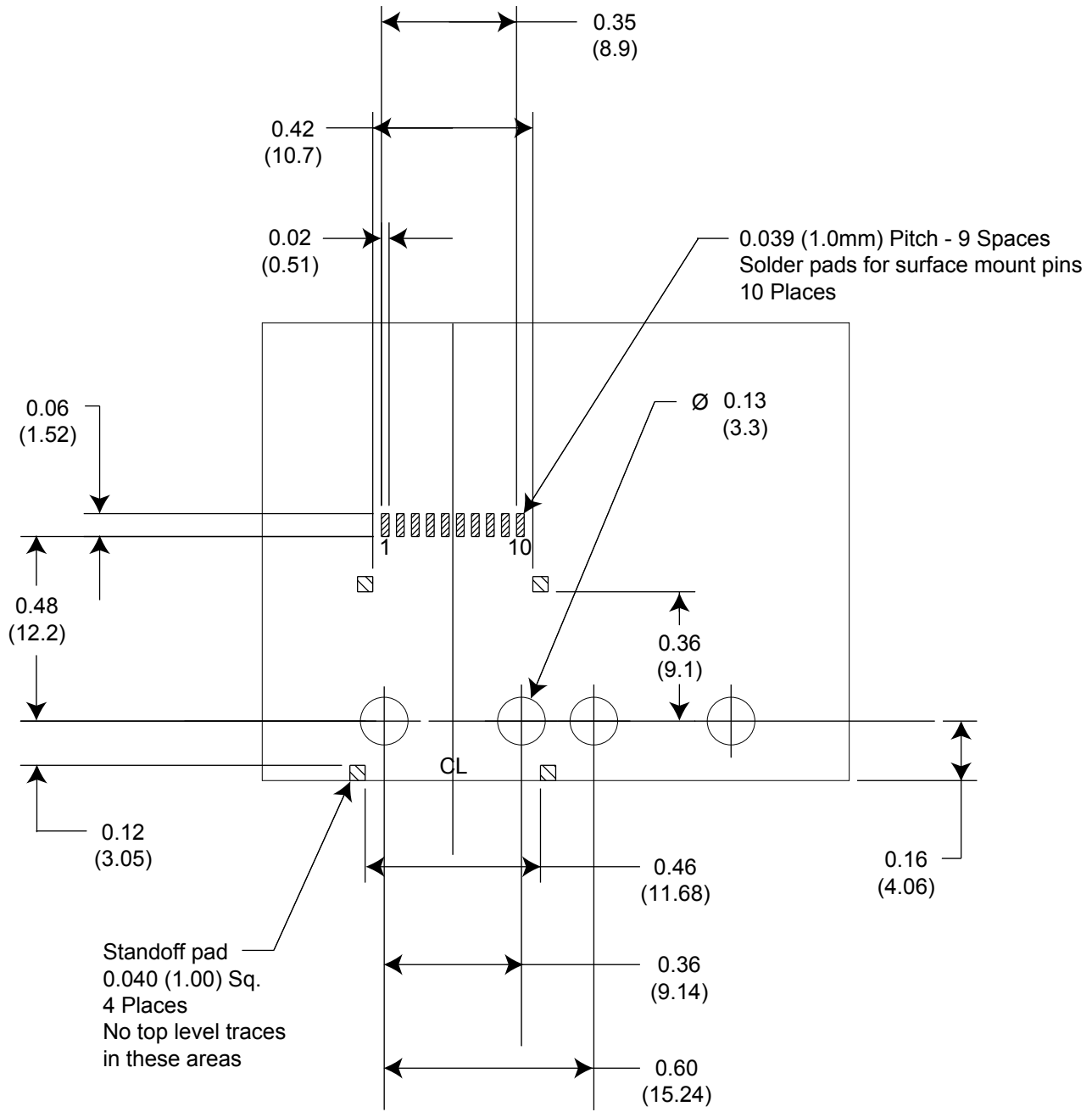


### Threaded Stud Length Options

L	ITEM #
0.10 [2.5]	R25N-2S1G
0.16 [4.1]	R25P-2S1G

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Top View Shown

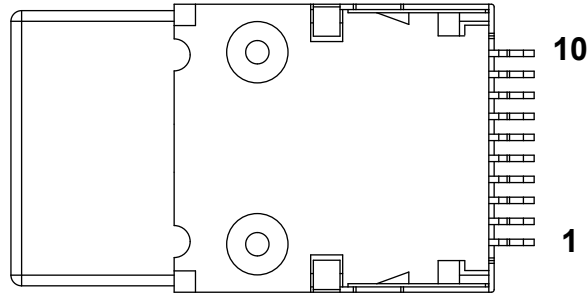


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## ELECTRICAL PIN ASSIGNMENTS

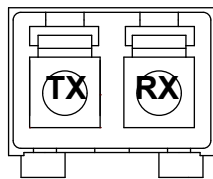
Razor Duplex Optical Transceiver  
Component Bottom View Indicated



Pin Number	Symbol	Description	Logic Family
1	TX+	Transmitter Data - Input	CML Internal 100Ω differential termination
2	GND	Ground	N/A
3	TX-	Transmitter Data - Input	CML Internal 100Ω differential termination
4	V <sub>cc</sub>	Power Supply - Input	N/A
5	SD	Signal Detect - Output Satisfactory Optical Input: Logic "1" Output Fault Condition: Logic "0" Output	LVTTL
6	TX Dis	Transmit Disable - Input Logic 1: Disable Optical Output Logic 0: Enable Optical Output	CMOS Internal 4.7KΩ pulldown
7	RX+	Receiver Data - Output	CML
8	V <sub>cc</sub>	Power Supply - Input	N/A
9	RX-	Receiver Data - Output	CML
10	GND	Ground	N/A

## INSERT ARRANGEMENT

Razor Duplex Optical Transceiver  
Optical interface of the transceiver interface shown  
Mating cable plug interface opposite



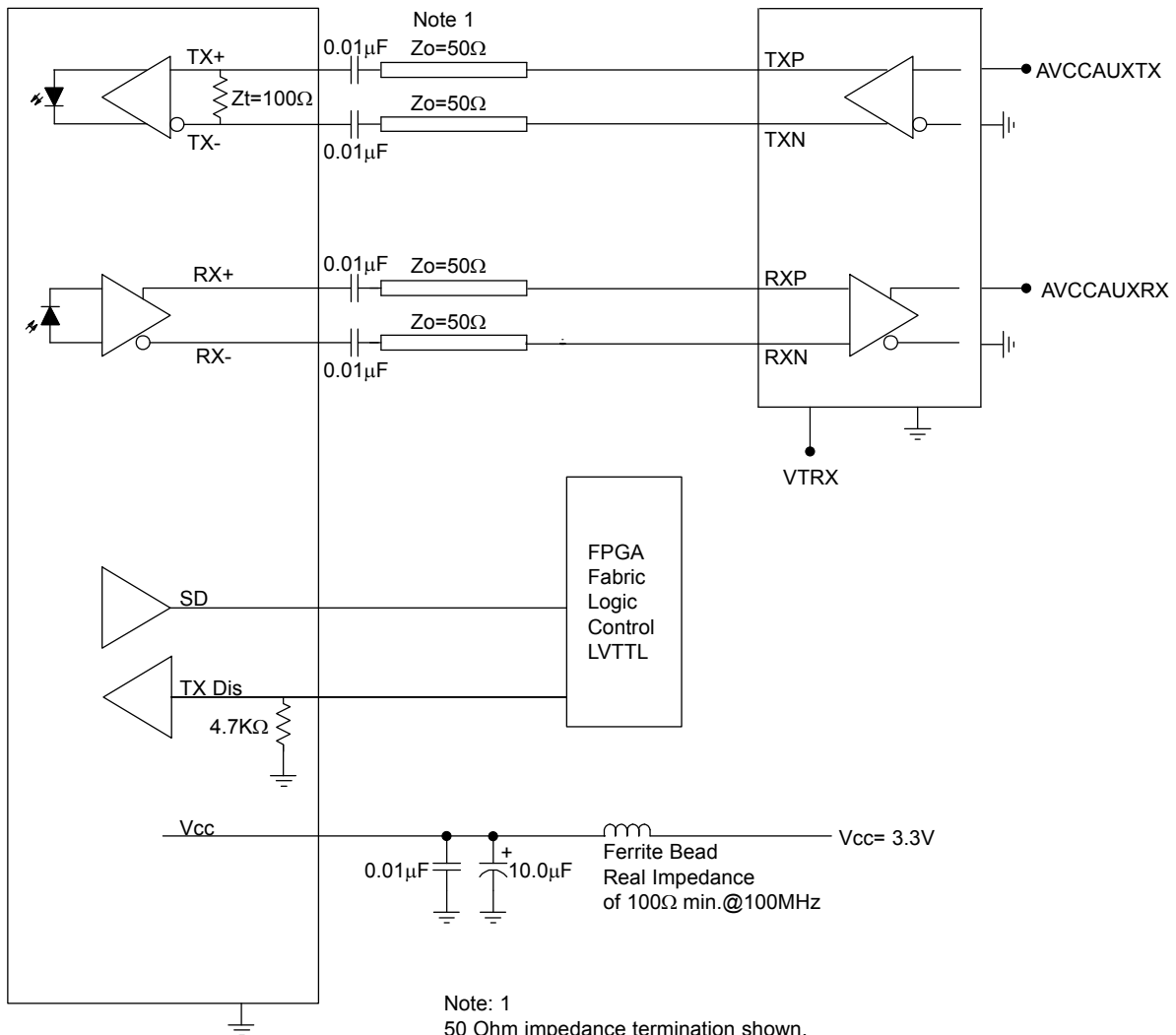
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## APPLICATION SCHEMATIC

For Xilinx Rocket I/O Interfaces

### Optical Transceiver

### Xilinx Rocket I/O



Note: 1  
50 Ohm impedance termination shown.  
For alternate impedance requirements,  
please consult the Factory.

Typical application schematic shown  
For alternate applications or termination  
techniques, please consult the Factory