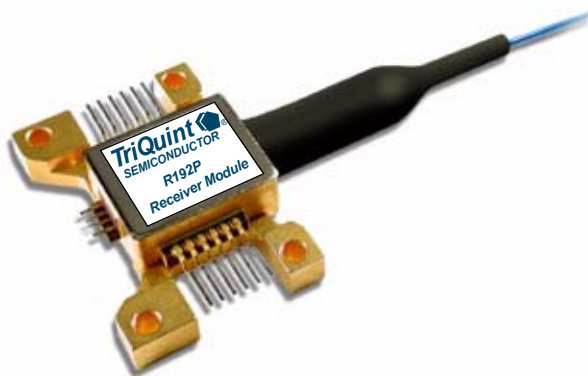


TriQuint Optoelectronics

R192P OC-192/STM-64 Lightwave Receiver with Improved Sensitivity (–18 dBm)



Featuring improved sensitivity for optimum performance in noisy, amplified systems, the R192P Receiver is manufactured in a compact, 16-pin surface-mount package (above), and is also available with a convenient mounting bracket (below).



Features

- High data rate capability, 10.7 Gb/s
- PIN photodetector
- Fully operational through the 1.3 μm to 1.6 μm wavelength range
- Improved typical sensitivity of –18 dBm
- Single-mode fiber pigtail with ST, SC, LC, or FC/PC optical connectors
- Operating case temperature range: 0 $^{\circ}\text{C}$ to 70 $^{\circ}\text{C}$
- 50 Ω differential data output, with offset control
- Package options:
 - Space-sensitive package without mounting bracket (ideal for transponder and transceiver applications)
 - With mounting bracket

Applications

- Line terminal equipment
- High-speed networks up to 10.7 Gb/s
- SONET/SDH OC-192/STM-64 telecommunications applications
- Extended-reach datacom and telecom applications

Description

Receiver Operation

The R192P 10.7 Gb/s fiber-optic receiver consists of a high-speed PIN photodetector and a wide-band linear preamp in a pigtailed, surface-mount metal package. It is designed for use in single-mode, high-speed telecommunication applications at the SONET OC-192 and the ITU-T SDH STM-64 data rate of 9.95328 Gb/s.

At 10.7 Gb/s, the typical room temperature sensitivity measured at a BER of 1×10^{-10} is –18 dBm. The operating case temperature range for the receiver is 0 °C to 70 °C.

The receiver is manufactured in a compact, 16-pin surface-mount package with a single-mode optical fiber pigtail. The fiber pigtail is internally beveled for low return loss and is available with ST, SC, LC, or FC-PC optical connectors.

The dc levels of the differential outputs can be adjusted relative to each other for optimum sensitivity in noisy, amplified systems. These outputs are centered around a dc level of typically –0.45 V. The TIA requires only a –5 V power supply for operation. The PIN photodiode requires a nominal bias voltage of 5 V to 10 V at less than 1 mA.

Pin Information

Table 1. Pin Descriptions

Pin Number	Name
1	PIN Bias
2	GND
3	VEE
4	NC
5	NC
6	NC
7	GND
8	DATAN
9	DATA
10	GND
11	NC
12	–OFF
13	+OFF
14	Feedback Input Threshold Control
15	GND
16	Thermistor

Electrostatic Discharge

CAUTION: This device is susceptible to damage as a result of electrostatic discharge. Take proper precautions during both handling and testing. Follow guidelines such as EIA[®] Standard EIA-625.

TriQuint Semiconductor employs a human-body model (HBM) for ESD-susceptibility testing and protection-design evaluation. ESD voltage thresholds are dependent on the critical parameters used to define the model. A standard HBM (resistance = 1.5 kΩ, capacitance = 100 pF) is widely used and can be used for comparison purposes.

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only. Functional operation of the device is not implied at these or any other conditions in excess of those given in the operations section of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Min	Max	Unit
Supply Voltages: Negative Supply	VEE	–4.7	–5.7	V
Photodiode Supply Current: Forward*	—	—	20	mA
Reverse	—	—	2	mA
Optical Input Power	P _{MAX}	—	8	dBm
Operating Case Temperature	T _C	0	70	°C
Storage Temperature	T _C	–40	85	°C
Lead Soldering Temperature	—	—	250	°C
Lead Soldering Time	—	—	10	s

* Device is normally reverse biased. Forward biasing the photodiode can compromise device performance and reliability.

Optical Characteristics

Table 2. Optical Characteristics (T_A = 25 °C)

Parameter	Symbol	Min	Typ	Max	Unit
Optical Wavelength	λ	1.250	—	1.615	μm
Sensitivity (10.7 Gb/s, 2 ³¹ – 1 PRBS, 1 x 10 ^{–10} BER, 1310 nm < λ < 1550 nm)	P _{LOW}	—	–18	–17	dBm
Maximum Optical Input Power (10.7 Gb/s, 2 ³¹ – 1 PRBS, 1 x 10 ^{–10} BER), V _{PIN} = 5 V	P _{HIGH}	0	1	—	dBm
Optical Return Loss	—	—	–30	–27	dB
Responsivity of PIN, λ = 1.55 μm	R _{PIN}	0.7	0.8	—	A/W
Total Dark Current	I _D	—	0.3	—	nA

Electrical Characteristics

Table 3. Electrical Characteristics (TA = 25 °C)

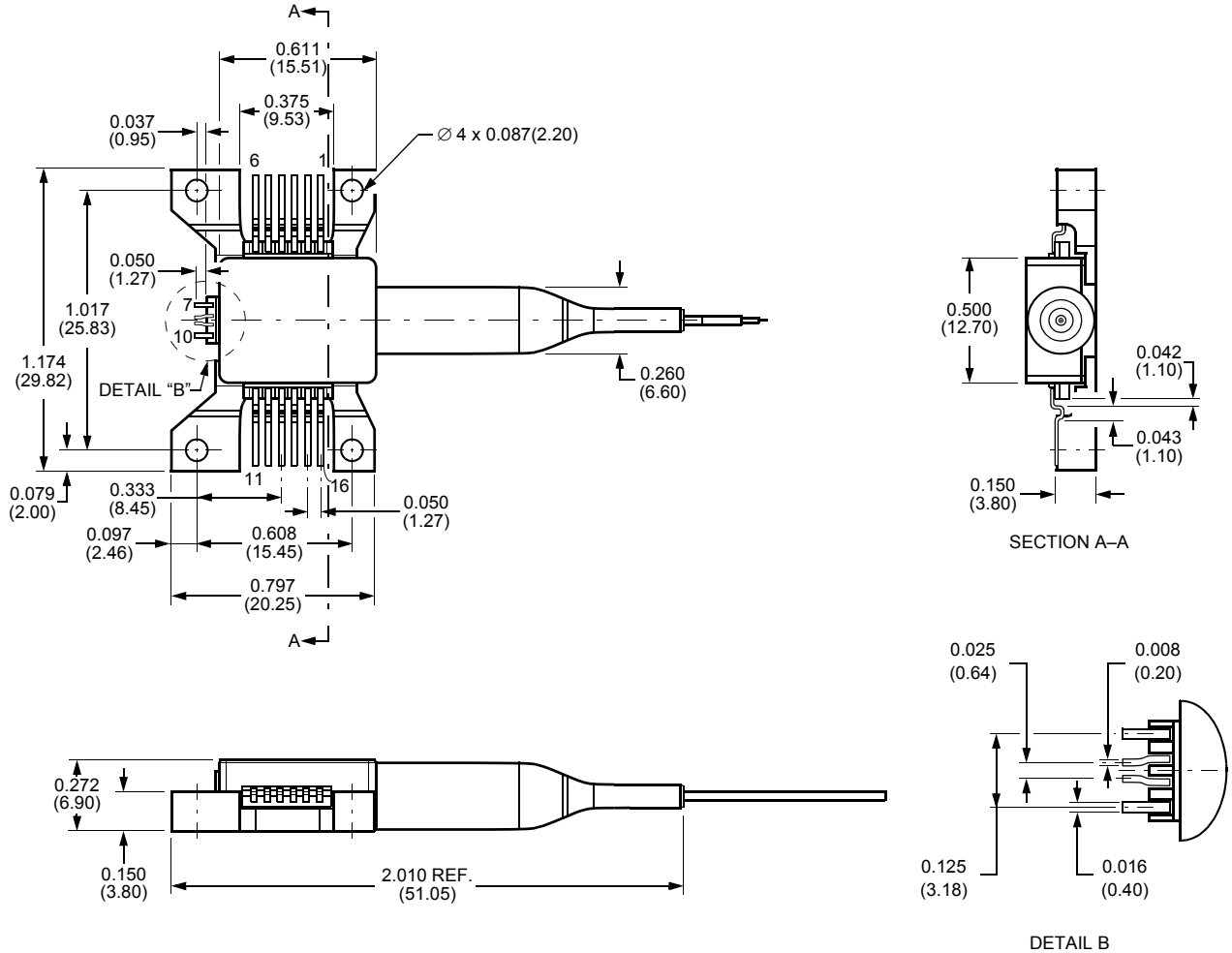
Parameter	Symbol	Min	Typ	Max	Unit
dc Power Supply Voltages:					
Negative Supply	VEE	–4.94	–5.2	–5.46	V
PIN Bias	VPIN	5	9	13	V
dc Power Supply Currents:					
Negative Supply	IEE	—	80	110	mA
PIN Bias	IPIN	—	—	2	mA
Power Dissipation	PDISS	—	—	0.6	W
Transimpedance:* IPH ≤ 500 μA	TZ	550	700	900	Ω
Note: The output voltage increases linearly up to 750 μAp-p of input current and is operational up to 2.2 mAp-p of input current. Conditions: single-ended, 50 Ω load, low frequency.					
Average Equivalent Input Noise Spectral Density (Bandwidth 100 KHz to 15 GHz)	—	—	14	—	pA/√Hz
Summed Equivalent Noise Power	—	—	1400	—	nArms
Low Frequency Cutoff	fL	—	25	—	kHz
Bandwidth	BW	8.5	10	—	GHz
Rolloff (F3 dB to F3 dB + 5 GHz)	—	—	–20	—	dB
Peaking	—	—	2	—	dB
Group Delay:	—				
0.2 GHz—5 GHz		—	±15	—	ps
0.2 GHz—8 GHz		—	±20	—	ps
Output Return Loss:	S22				
0 GHz—6 GHz		—	>10	—	dB
0 GHz—8 GHz		—	>8	—	dB

*Transimpedance, $T_Z = \frac{V_{PP}}{I_{PH(AVG)}}$, where $I_{PH(AVG)}$ = the average photodiode current.

Outline Diagrams

Outline Drawing, Package Style A

Dimensions are in inches and (millimeters).

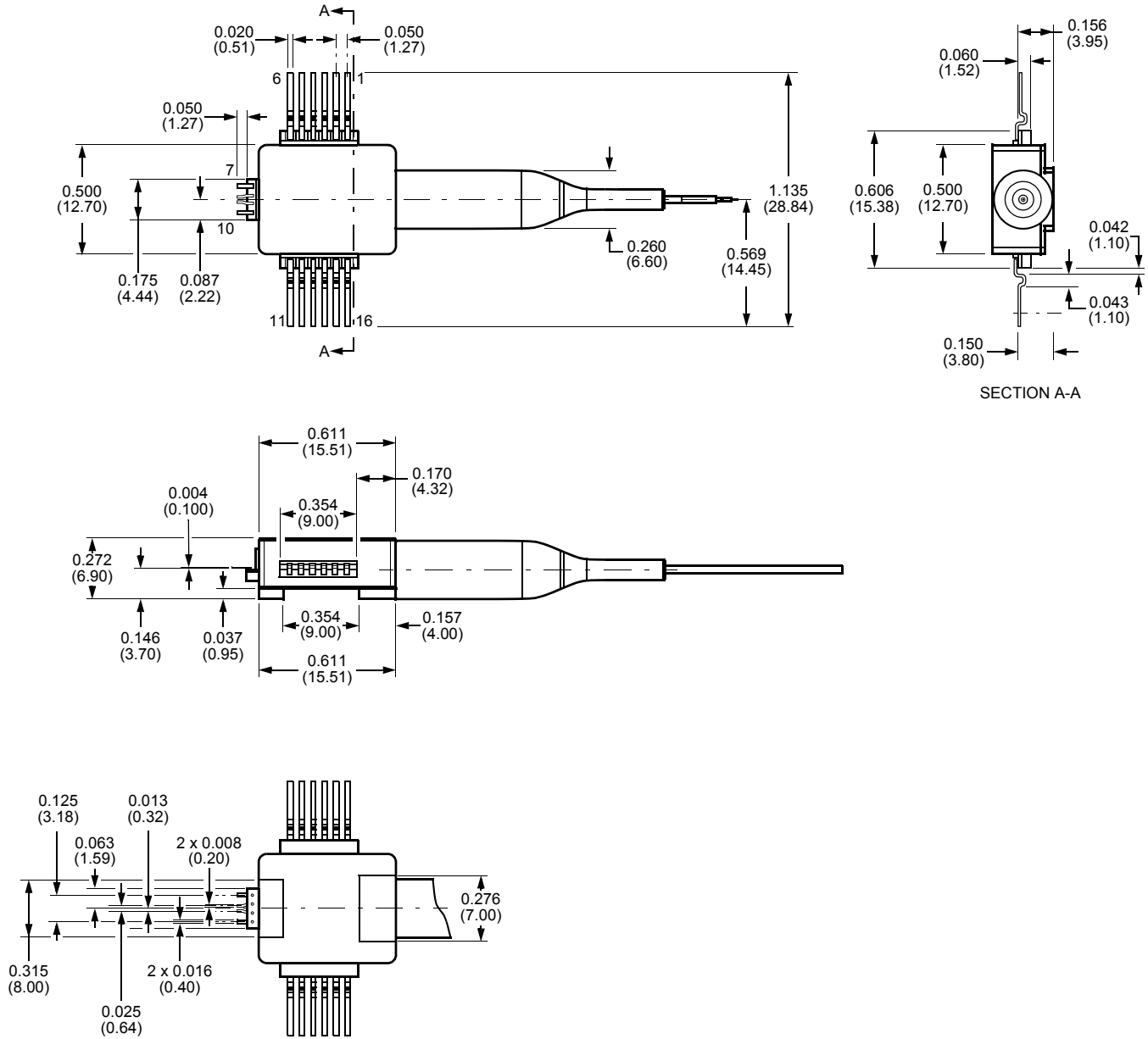


1-1237(F)

Outline Diagrams (continued)

Outline Drawing, Package Style N

Dimensions are in inches and (millimeters).



1-1236(F)

Ordering Information

Table 4. Ordering Information¹

Description	Product Code	Package Style	Connector	Comcode
R192P-Type OC-192/STM-64 Lightwave Receiver	R192PDAA	A	SC	108668815
	R192PGAA	A	FC	108668849
	R192PSAA	A	LC	108989435
	R192PDAN	N	SC	108940412
	R192PGAN	N	FC	700020049
	R192PSAN	N	LC	108989443

1. For additional ordering information, please contact a TriQuint account manager.

EIA is a registered trademark of the Electronic Industries Association.

Additional Information

For the latest specifications, additional product information, worldwide sales and distribution locations, and information about TriQuint:

Web: www.triquint.com

Tel: (503) 615-9000

E-mail: info_opto@tqs.com

Fax: (503) 615-8902

For technical questions and additional information on specific applications:

E-mail: info_opto@tqs.com

The information provided herein is believed to be reliable; TriQuint assumes no liability for inaccuracies or omissions. TriQuint assumes no responsibility for the use of this information, and all such information shall be entirely at the user's own risk. Prices and specifications are subject to change without notice. No patent rights or licenses to any of the circuits described herein are implied or granted to any third party.

TriQuint does not authorize or warranty any TriQuint product for use in life-support devices and/or systems.