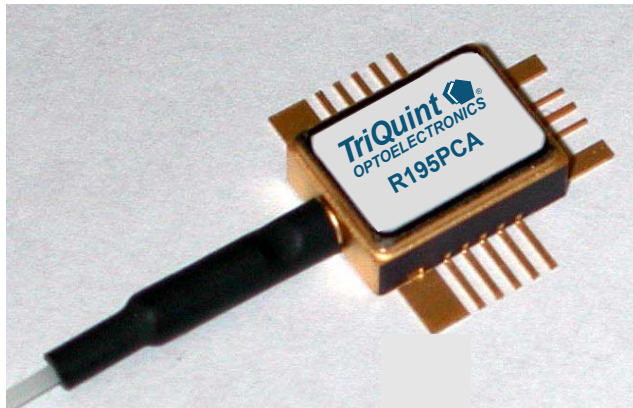


R195P 10 Gb/s Surface-Mount PIN-TIA Receiver



Description

The R195P receiver integrates a 10 Gb/s PIN and TIA into a true surface-mount package. It is part of the industry's first multisource agreement (MSA) to standardize surface-mount 10 Gb/s receivers. These compact receivers can be mounted directly to a printed-circuit board, thus avoiding the space, routing, and EMI problems of a mechanical cut-out.

The R195P provides features optimized for WDM applications, most notably, linearity and flat group delay.

Features

- Up to 10.7 Gb/s data-rate capability
- -19 dBm typical sensitivity
- 3 dBm overload typical
- 2000 Ω typical differential gain
- Flat group delay
- Very small, surface-mount form factor

Applications

- WDM
- SONET transponders
- Very dense line cards

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 operational sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Min	Max	Unit
Storage Case Temperature Range	T _{stg}	−40	85	°C
TIA Supply Voltage	V _{EE}	−5.75	0.5	V
Photodiode Bias Voltage	V _{PD}	GND	12	V
Optical Input Power	P _{IN}	—	6	dBm
ESD-susceptibility, All Pins ¹	—	—	500	V

1. Based on human-body model of R = 1500 Ω and C = 100 pF. In general, ESD precautions should be taken to avoid damage to the device.

Recommended Operating Conditions

Table 1. Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Optical Wavelength	λ	1280	—	1610	nm
Photodiode Bias Voltage	V _{PD}	3.1	3.3	3.5	V
Operating Case Temperature Range	T _{OP}	−5	25	85	°C
TIA Supply Voltage	V _{EE}	−5.5	−5.2	−4.95	V

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 JEDEC Publication No. 108-A (Dec. 1988).

TriQuint 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 k Ω , capacitance = 100 pF) is widely used and can be used for comparison purposes.

Electrical/Optical Characteristics

Specified characteristics apply for the recommended operating conditions at beginning of life, unless noted otherwise. Temperatures are case temperature.

Table 2. Electrical/Optical Characteristics

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Sensitivity ¹	—	OC-192, PRBS 2 ³¹ – 1 NRZ, BER = 10 ⁻¹² , 25 °C	—	-19.0	-18.0	dBm
Overload ¹	—	OC-192, PRBS 2 ³¹ – 1 NRZ, BER = 10 ⁻¹² , 25 °C	1	3	—	dBm
Responsivity, $\lambda = 1550$ nm	R	25 °C Case -5 °C to +85 °C Case	0.75 0.7	0.85 0.8	— —	A/W
Dark Current	I _D	25 °C Case	—	—	1	nA
Thermistor Resistance ²	R _{TH}	25 °C	9.5	10.0	10.5	k Ω
Thermistor Temperature Coefficient	—	—	—	-4.3	—	%/°C
Transimpedance ³	Z _T	Small Signal, Differential	1.6	2.0	2.4	k Ω
Small Signal Bandwidth ³	S ₂₁	—	7.5	9.5	—	GHz
Low-frequency cutoff	—	P _{IN} = -20 dBm -3 dB relative to 1 MHz	—	25	40	KHz
Output Return Loss ³	S ₂₂	50 Ω on each output 0.2 GHz—8 GHz	—	—	-8	dB
Group Delay ²	GD	0.5 GHz—5 GHz 5 GHz—8 GHz	— —	— —	± 25 ± 40	ps,p-p ps,p-p
TIA Supply Current	I _{EE}	-5 °C to +85 °C	—	130	155	mA
Output Voltage	V _{out}	Single-ended, 50 Ω load	—	700	1000	mVp-p
Optical Return Loss	RL	1300 nm—1610 nm; without connector	27	—	—	dB

1. External modulator Tx, BW > 10 GHz, $\lambda = 1550$ nm \pm 10 nm, extinction ratio > 12 dB, NRZ (e.g., Agilent® Model 83433).

2. The resistance of the thermistor is inversely proportional to the temperature. The temperature, in degree-Kelvin (T_K), can be calculated from the resistance value using the Steinhart-Hart equation: $1/T_K = A + B \ln(R) + C [\ln(R)]^3$, where R is the resistance and A, B, and C are constants: A = 1.0267 x 10⁻³; B = 2.565 x 10⁻⁴; C = -4.5421 x 10⁻⁸. The temperature, in degree-Celsius, is T_C = T_K - 273.15.

3. For 25 °C, nominal bias voltage and optical input = -20 dBm \pm 0.2 dB.

Note: Accuracy of optical powers in test condition column is \pm 0.2 dB.

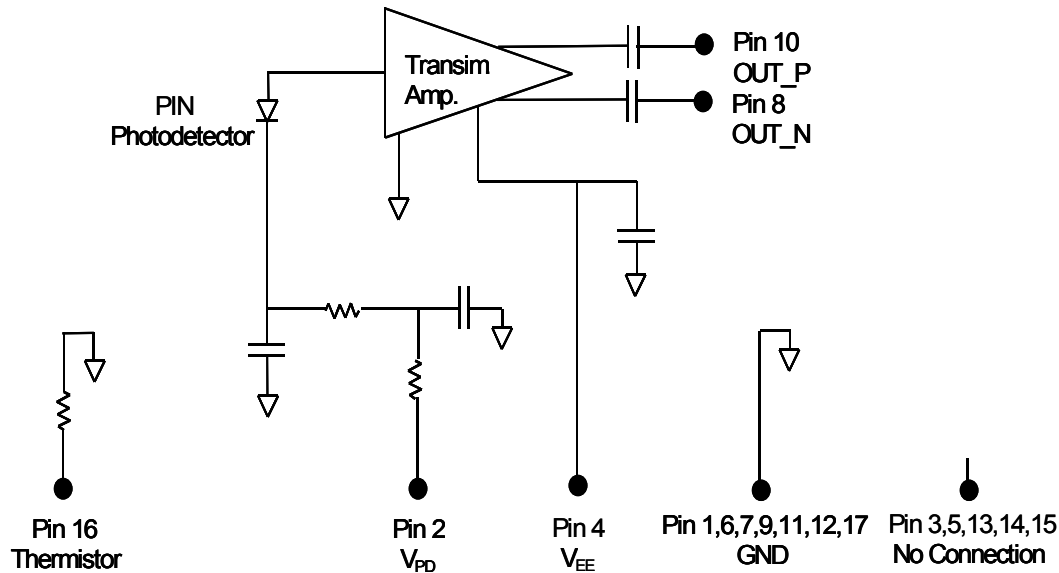
R195P 10 Gb/s Surface-Mount PIN-TIA Receiver

Pin Information

Table 3. Pin Information

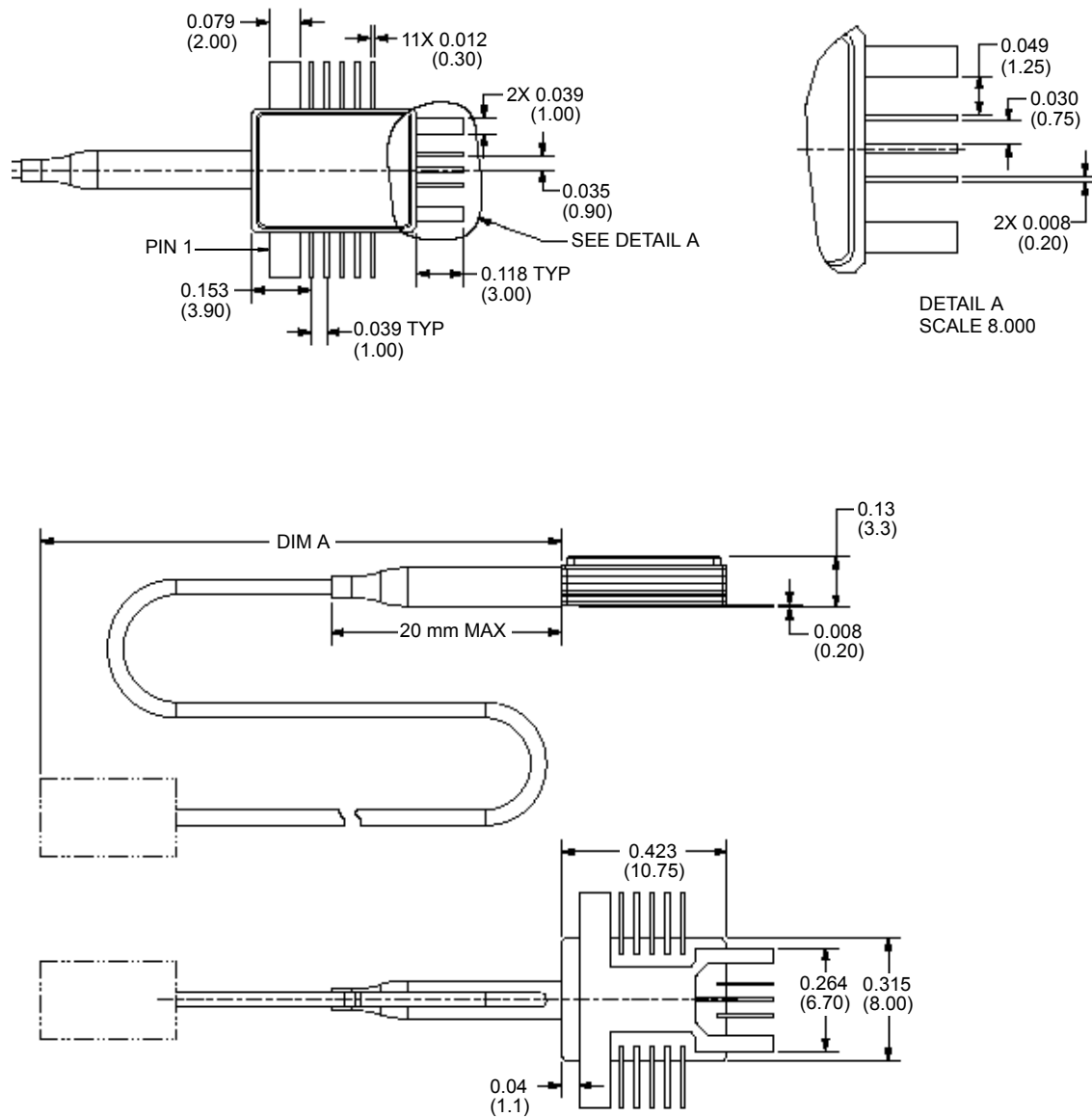
Pin	Symbol	Function
1	GND	Case Ground
2	VPD	Photodiode Bias
3	NC	No Connection
4	VEE	TIA Bias (–5.2 V)
5	NC	No Connection
6	GND	Case Ground
7	GND	Case Ground
8	Out_N	Data Output
9	GND	Case Ground
10	Out_P	Data Output
11	GND	Case Ground
12	GND	Case Ground
13	NC	No Connection
14	NC	No Connection
15	NC	No Connection
16	RTH	Thermistor
17	GND	Case Ground

Block Diagram



Outline Diagram

Dimensions are in inches and (millimeters).



Ordering Information

Table 4. R195P-Type Receiver Ordering Information

Product Code	Detector Type	Connector type	Fiber type
R195PCA	PIN	SC/PC	SMF
R195PCF	PIN	FC/PC	SMF
R195PCS	PIN	LC	SMF
R195PCJ	PIN	MU	SMF
R195PCJJ	PIN	MU-J	SMF

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Additional Information

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