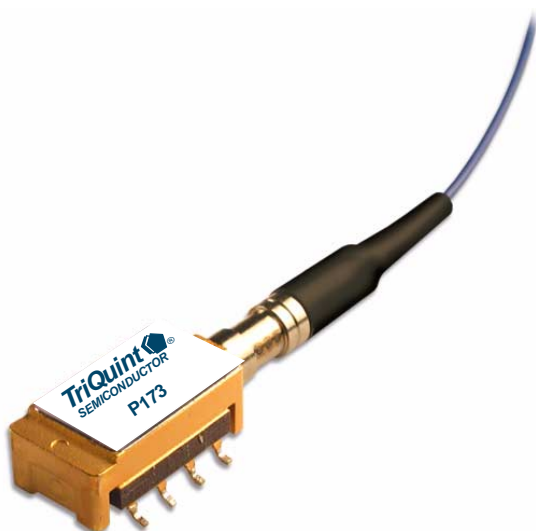
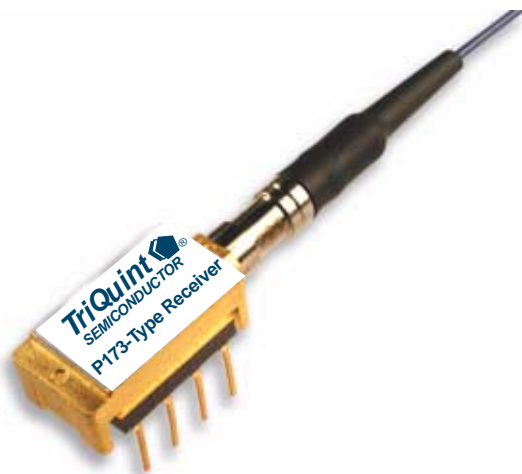


P173A OC-48/STM-16 MiniDIL APD Receiver with Improved Sensitivity (–34 dBm)



The P173-Type APD/Preamplifier receivers are available in a mini-DIL package (top) or a gull-wing package (bottom).

Features

- Low-profile, 8-lead mini-DIL or gull-wing style package:
 - Suitable for SONET/SDH applications
- Metal package:
 - Offers superior shielding for high noise immunity
- Planar structure for high reliability
- Operating wavelength range:
 - 1.25 μm to 1.6 μm
- Wide operating temperature range:
 - -40°C to $+85^{\circ}\text{C}$
- Scheduled to be qualified according to *Telcordia Technologies*[™] GR-468-CORE
- Single 3.3 V or 5 V power supply
- Typical sensitivity: -34 dBm
- Typical overload: -3 dBm
- Built-in thermistor

Applications

- Long-reach or metro SONET OC-48 and SDH STM-16, or multirate telecommunications applications
- SONET/SDH receivers and transponders
- Line terminal equipment

Benefits

- Compact size
- Easily board mounted

Description

The P173-type receiver consists of an APD coupled to a single-mode fiber pigtail and a linear preamplifier. The APD is a rear-illuminated planar diode structure with a low-capacitance active area for maximum responsivity and speed.

This device incorporates the new Laser 2000 manufacturing process from the Optoelectronics Products unit of TriQuint Semiconductor. Laser 2000 is a low-cost platform that targets high-volume manufacturing and tight product distributions on all optical subassemblies. This platform incorporates an advanced optical design that is produced on TriQuint’s highly automated production lines. The Laser 2000 platform is qualified for central office and uncontrolled environments, and can be used for applications requiring high performance and low cost.

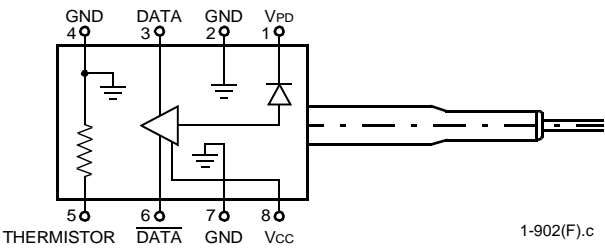


Figure 1. P173A APD/Preamp (Top View)

Table 1. P173-Type APD/Preamp Pin Descriptions

Pin Number	Description
1	Photodiode Bias
2	Case Ground
3	DATA*
4	Case Ground
5	Thermistor
6	DATA†
7	Case Ground
8	Vcc

* Logic high when light is on.
† Logic low when light is on.

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
Positive Supply Voltage	Vcc	–0.5	6.0	V
Optical Input Power	PIN	—	0	dBm
Operating Case Temperature Range	Tc	–40	85	°C
Storage Temperature Range	Tstg	–40	85	°C
Lead Soldering Temperature	—	—	250	°C
Lead Soldering Time	—	—	10	s

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.

Electrical Characteristics

Minimum and maximum values specified over operating case temperature range and end of life (EOL), and typical values are for 25 °C and beginning of life (BOL), unless otherwise specified

Table 2. Electrical Characteristic

Parameter	Symbol	Min	Typ	Max	Unit
dc Power Supply Voltages:					
Positive Supply	V _{CC}	3.15	3.3 or 5.0	5.25	V
APD Operating Bias Voltage	V _{OP}	25	—	40	V
APD Operating Voltage Temperature Coefficient	—	—	0.05	—	V/°C
dc Power Supply Currents:					
Positive Supply (at V _{CC} = 3.3 V)	I _{CC3.3}	—	45	60	mA
Positive Supply (at V _{CC} = 5 V)	I _{CC5}	—	60	80	mA
APD Bias Supply at V _{OP}	I _{APD}	—	—	1	mA
dc Power Dissipation (at V _{CC} = 3.3 V)	P _{DISS3.3}	—	150	200	mW
dc Power Dissipation (at V _{CC} = 5 V)	P _{DISS5}	—	300	420	mW
Single-ended, Small Signal (<10 µA) Transimpedance	T _z	—	4	—	kΩ
Input Noise Current (100 kHz—2 GHz)	N _{rms}	—	130	—	nArms
Output Return Loss (130 MHz—5 GHz)	S ₂₂	—	–15	–9	dB
3 dB Bandwidth @ -30 dBm input	f _c	1.6	2.6	—	GHz
Thermistor resistance at 25 °C*	R _{TH}	9.5	10	10.5	kΩ

* The resistance of the thermistor is inversely proportional to the temperature. The temperature in degree-Kelvin 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.

Optical Characteristics

Minimum and maximum values specified over operating case temperature range and end of life (EOL), and typical values are for 25 °C and beginning of life (BOL), unless otherwise specified.

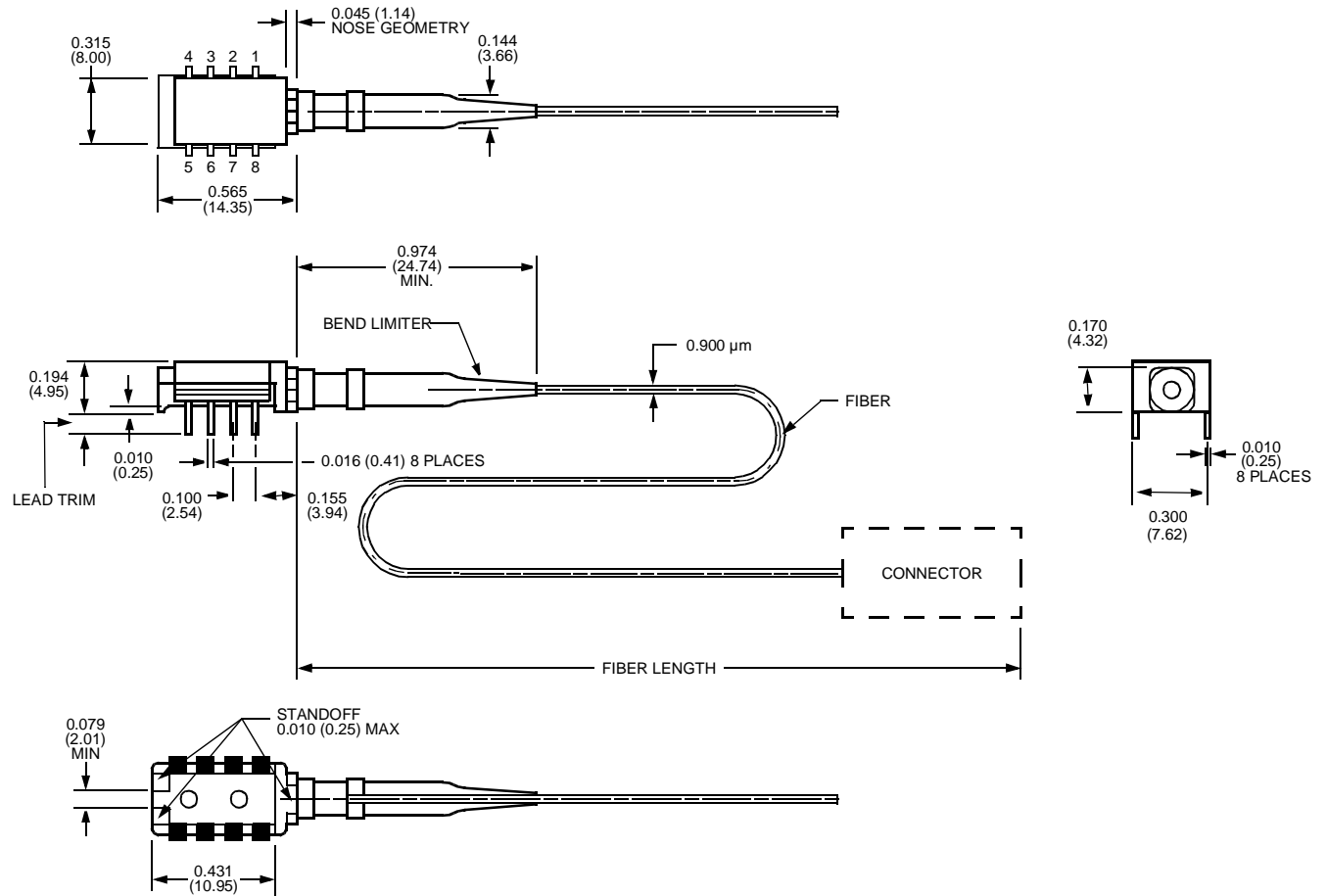
Table 3. Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Optical Wavelength for Rated Sensitivity	λ	1250	—	1610	nm
Responsivity (1310 nm, -30 dBm, M = 1): At 25 °C At –40 °C to +85 °C	R	0.75 0.72	— —	— —	A/W A/W
Sensitivity (2.5 Gb/s, $2^{23} - 1$ PRBS, 1×10^{-10} BER, 1310 nm, 12 dB Extinction Ratio, VBIAS = VOP): At 25 °C At –40 °C to +85 °C	P _{RMIN}	— —	–34 –33	–33 –32	dBm dBm
Overload (2.5 Gb/s, $2^{23} - 1$ PRBS, 1×10^{-10} BER, 1550 nm, 12 dB Extinction Ratio, VBIAS = VOP)	P _{RMAX}	–6	–3	—	dBm
Optical Return Loss	ORL	—	—	–27	dB

Outline Diagrams

P173-Type Through-Hole Package

Dimensions are in inches and (millimeters).

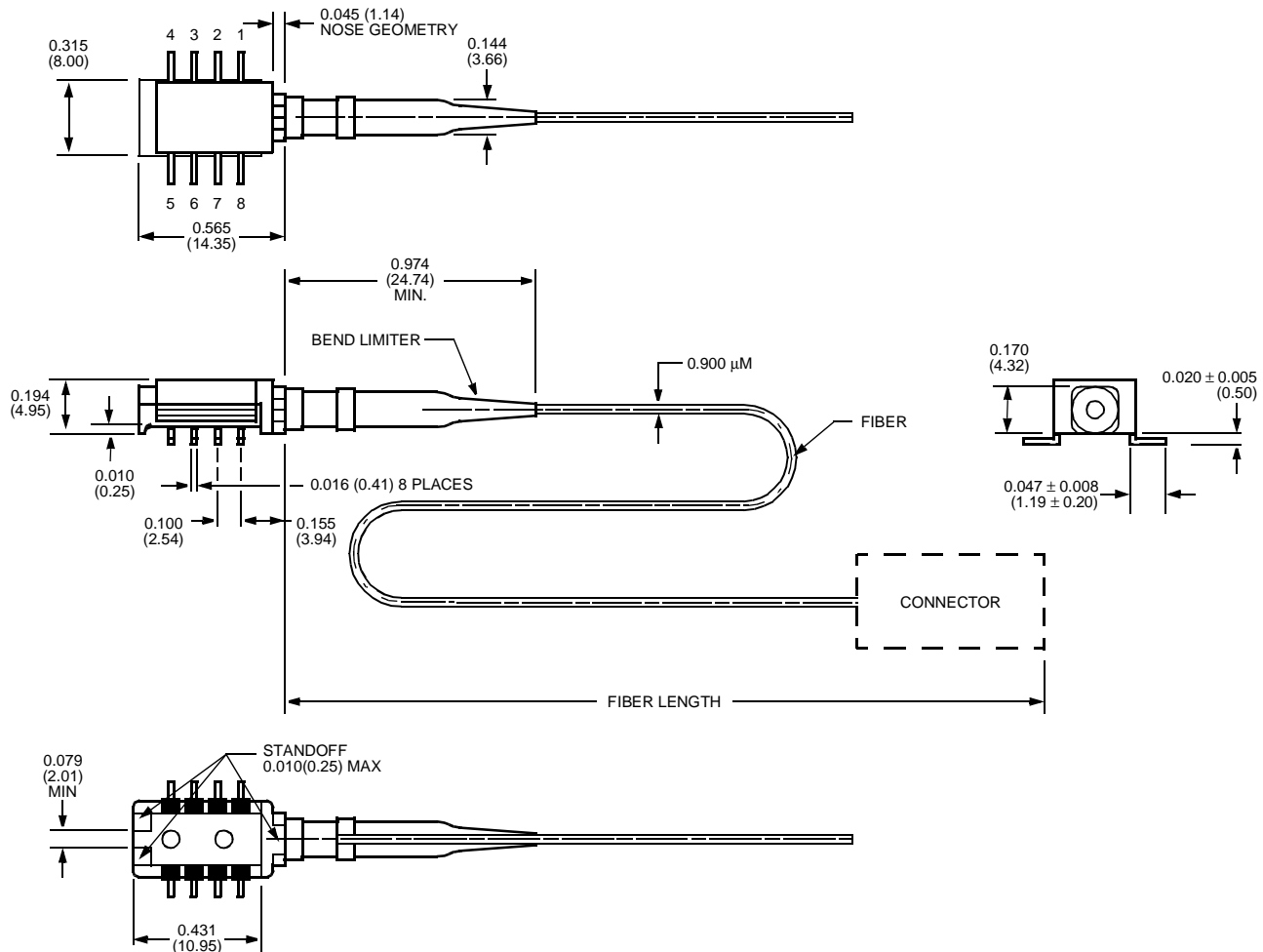


1-1057F

Outline Diagrams (continued)

P173-Type Gull-Wing Package

Dimensions are in inches and (millimeters).



1-1057F.a

Qualification Information

The P173-type receiver is scheduled to complete the following qualification tests and meet the intent of *Telcordia Technologies* GR-468-CORE.

Table 4. P173-Type Qualification Information

Test	Reference	Conditions	Sample Size	Pass/Fail Criteria
Mechanical Shock	MIL-STD-883 Method 2002	Condition B 5 times/axis 500 G, 1 ms	11	10% Responsivity Change After Test
Vibration	MIL-STD-883 Method 2007	Condition A 20 G, 20 Hz—2000 Hz 4 min./cycle 4 cycles/axis	11	10% Responsivity Change After Test
Thermal Shock	MIL-STD-883 Method 1011	0° C to 100 °C, 20 cycles	Reference to P172	Physical Attributes and Leak Check
Lead Integrity	MIL-STD-883 Method 2004	Condition A	To Be Provided by the Supplier	—
Solderability	MIL-STD-883 Method 2003	—	To Be Provided by the Supplier	—
Fiber Pull	—	1 kg; 3 times; 5 s	Reference to P172	10% Responsivity Change After Test
Accelerating Aging (HTOB)	MIL-STD-883 Method 1005	85 °C under bias, 2000 hours	Reference to P172	10% Responsivity Change After Test
Low-temperature Storage	—	–40 °C storage 2000 hours	Reference to P172	10% Responsivity Change After Test
High-temperature Storage	—	85 °C storage 2000 hours	11	10% Responsivity Change After Test
Temperature Cycling	<i>Telcordia Technologies</i> GR-468-CORE, Section 5.20	–40 °C to +85 °C, 100 cycles	11	10% Responsivity Change After Test
Damp Heat	MIL-STD-883 Method 103	85 °C/85% RH 1000 hours	Reference to P172	10% Responsivity Change After Test
Cyclic Moisture Resistance	<i>Telcordia Technologies</i> GR-468-CORE, Section 5.23	—	Reference to P172	10% Responsivity Change After Test
ESD Threshold	<i>Telcordia Technologies</i> GR-468-CORE, Section 5.22	Human Body Model	6	Threshold maximum 500 V
Internal Moisture	MIL-STD-883 Method 1018	5000 ppm water vapor	Reference to P172	10% Responsivity Change After Test
Flammability	UL94	V0	Reference to P172	—

Ordering Information

Table 5. P173-Type Receiver Ordering Information

Product Code	Detector Type	Connector type	Lead type	Fiber type	Comcode
P173ABCA	APD	SC/PC	Through Hole	SMF	700022216
P173ABCF	APD	FC/PC	Through Hole	SMF	700022217
P173ABCJ	APD	MU	Through Hole	SMF	700022218
P173ABCS	APD	LC	Through Hole	SMF	700022219
P173ACCA	APD	SC/PC	Gull Wing	SMF	700022220
P173ACCF	APD	FC/PC	Gull Wing	SMF	700022222
P173ACCJ	APD	MU	Gull Wing	SMF	700022226
P173ACCS	APD	LC	Gull Wing	SMF	700022229

Table 6. Related Product Information

Product Code	Description	Document Number
P172	2.5 Gb/s miniDIL Receiver	DS01-283OPTO-1
R485	2.5 Gb/s Receiver with Clock Recovery	DS01-005OPTO-1
R480	2.5 Gb/s Receiver with CML Data Output	DS01-011OPTO-1

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Additional Information

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

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