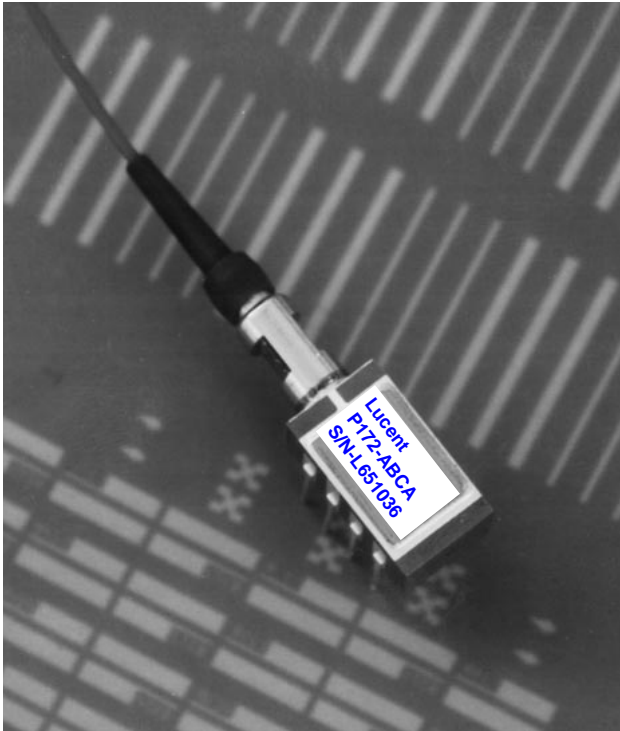




P172-Type *FastLight*™ Receiver



The P172-Type PIN/Preamp and APD/Preamp features a rear-illuminated planar diode structure with low capacitance.

Features

- Low-profile, 8-lead mini-DIL style package
 - Suitable for SONET applications
- Metal package
 - Offers superior shielding for high noise immunity
- High performance
 - High speed (<0.15 ns typical rise and fall time)
 - High responsivity (0.85 A/W typical)
 - APD and PIN versions
- Planar structure for high reliability
- Wavelength: 1.1 μm —1.6 μm
- 8 μm core single-mode fiber
- Wide operating temperature range:
 - APD, 0 °C to 65 °C
 - PIN, 0 °C to +85 °C
- Wide bandwidth
- Qualification program: *Telcordia Technologies** TA-NWT-983
- Typical sensitivity:
 - APD, -32 dBm
 - PIN, -23 dBm

* *Telcordia Technologies* is a trademark of Bell Communications Research, Inc.

Applications

- Long-reach SONET OC-48 and SDH STM-16 telecommunications applications
- Secure digital data systems
- Line terminal equipment

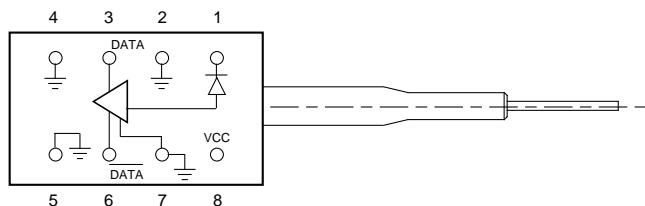
Benefits

- Compact size
- Easily board mounted

Description

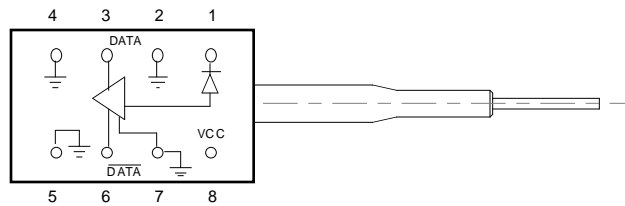
The P172-type Receiver consists of a PIN or APD coupled to a single-mode fiber pigtail and a wideband linear preamplifier. Both the PIN and APD are rear-illuminated planar diode structures with a low-capacitance active area for maximum responsivity and speed.

This device incorporates the new Laser 2000 manufacturing process from the Optoelectronics Products unit of Lucent Technologies Microelectronics Group. 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 Lucent'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.



1-902(C).b

Figure 1. P172P PIN/Preamp Schematic (Top View)



1-902(C).c

Figure 2. P172A APD/Preamp (Top View)

Table 1. P172-Type PIN/Preamp and APD/Preamp Pin Descriptions

Pin Number	Description
1	Photodiode Bias
2	Case Ground
3	DATA
4	Case Ground
5	Case Ground
6	$\overline{\text{DATA}}$
7	Case Ground
8	Vcc

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	V _{CC}	0	5.0	V
Optical Input Power:				
APD	P _{IN}	—	0	dBm
PIN	P _{IN}	—	8.0	dBm
Operating Case Temperature Range:				
APD	T _C	0	65	°C
PIN	T _C	0	85	°C
Storage Temperature Range	T _{stg}	-40	85	°C
Lead Soldering Temperature	—	—	250	°C
Lead Soldering Time	—	—	10	s

Electrical Characteristics

T_C = 25 °C.

Table 2. Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
dc Power Supply Voltages:					
Positive Supply	V _{CC}	3.15	3.3	3.45	V
APD Bias Supply	V _{APD}	35	—	85	V
PIN Bias Supply	V _{PIN}	0	5.0	10	V
dc Power Supply Currents:					
Positive Supply	I _{CC}	—	—	70	mA
APD Bias Supply (G = 12)	I _{APD}	—	—	1	mA
PIN Bias Supply	I _{PIN}	—	—	4	mA
Power Dissipation	P _{DISS}	—	0.3	—	W
Small Signal (<10 μA) Transimpedance	T _z	2	10	—	kΩ
Input Noise Current (100 kHz—1.8 GHz)	—	—	300	350	nArms
Output Return Loss (10 kHz—3.0 GHz)	—	-10	-15	—	dB
3 dB Bandwidth	f _c	1.8	—	2.3	GHz

Optical Characteristics

T_C = 25 °C.

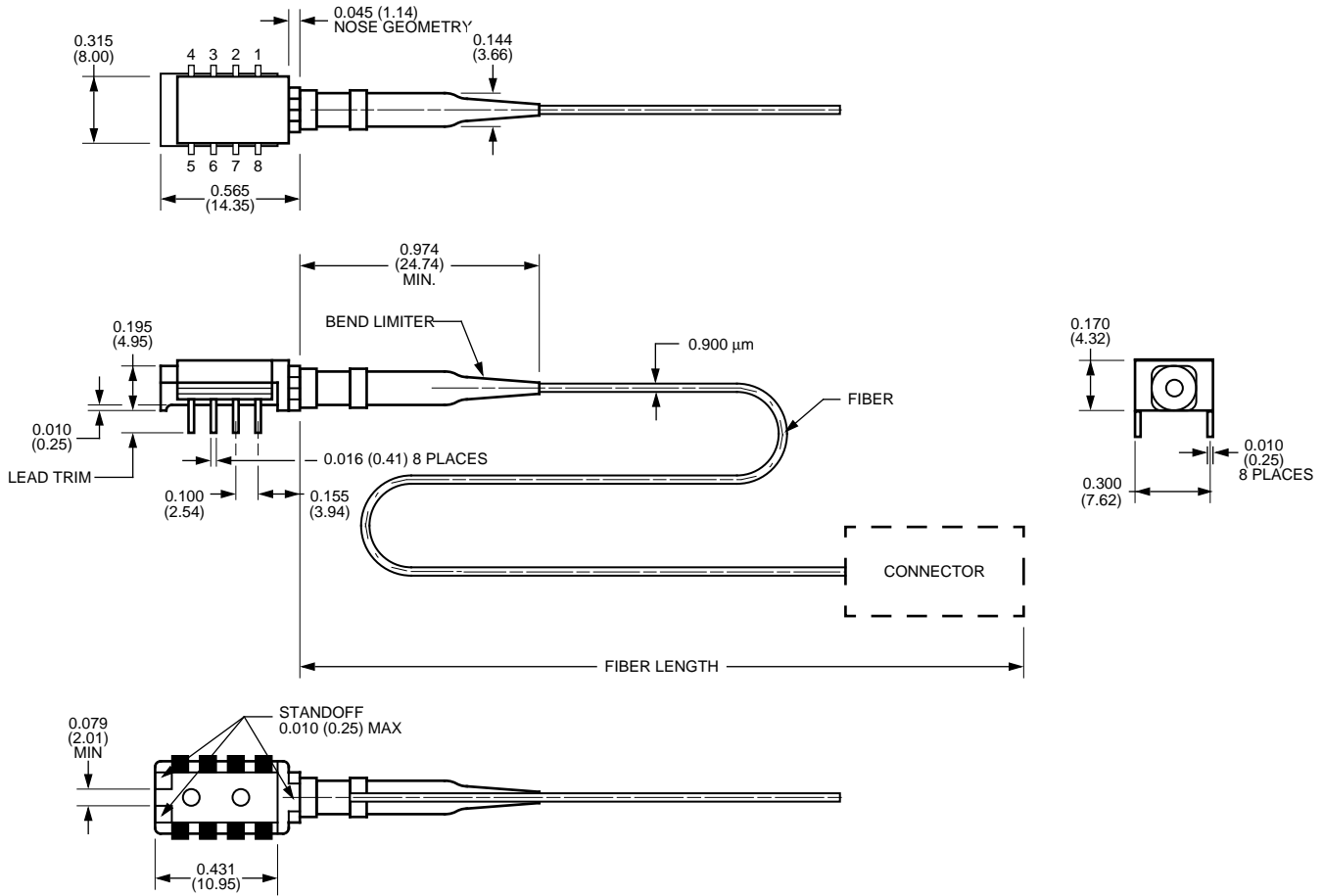
Table 3. Optical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit
Optical Wavelength for Rated Sensitivity	λ	1.25	—	1.6	μm
Sensitivity (2.5 Gbits/s, 2 ²³ - 1 PRBS, 3 x 10 ⁻¹¹ BER):					
APD Version (APD gain = 10)	—	—	-32	-30	dBm
PIN Version	—	—	-23	-21	dBm
Maximum Optical Input Power (2.5 Gbits/s, 2 ²³ - 1 PRBS, 3 x 10 ⁻¹¹ BER):					
APD Version (APD gain = 10)	P _{HIGH}	-9	—	—	dBm
PIN Version	P _{HIGH}	-1.5	-0.5	—	dBm
Optical Return Loss, Pigtailed Version	—	-27	—	—	dBm

Outline Diagrams

P172-Type

Dimensions are in inches and (millimeters).



1-1057 (F)

Qualification Information

The P172-Type PIN/Preamp is scheduled to complete the following qualification tests and meets the intent of *Telcordia Technologies* TR-NWT-000468 for interoffice environments and TA-NWT-000983 for outside plant environments.

Table 4. P172-Type PIN/Preamp Qualification Test Plan

Test	Conditions	Sample Size	Reference
Mechanical Shock	500 g	11	MIL-STD-883 Method 2002
Vibration	20 g, 20 Hz—2000 Hz	11	MIL-STD-883 Method 2007
Solderability	—	11	MIL-STD-883 Method 2003
Thermal Shock	$\Delta T = 100\text{ }^{\circ}\text{C}$	11	MIL-STD-883 Method 1011
Fiber Pull	1 kg; 3 times	11	Bellcore 983
High-temperature Storage	85 $^{\circ}\text{C}$, 2000 hr.	11	Bellcore 983
Temperature Cycling	500 cycles	11	Bellcore 983 Section 5.20
Cyclic Moisture Resistance	10 cycles -40 $^{\circ}\text{C}$ to +85 $^{\circ}\text{C}$	11	Bellcore 983 Section 5.23
Damp Heat	85 $^{\circ}\text{C}$, 85% RH, 1000 hr.	11	MIL-STD-202 Method 103
Internal Moisture	<5000 ppm water vapor	11	MIL-STD-883 Method 1018
Flammability	—	—	TR357 Sec. 4.4.2.5
ESD Threshold	—	6	Bellcore 983 Section 5.22

Ordering Information

Table 5. Ordering Information

Device Code	Description	Comcode
P172PBCA	2.5 Gbits/s PIN Digital Preamp, SC Connector	108566100
P172ABCA	2.5 Gbits/s APD Digital Preamp, SC Connector	108566076
P172PBCF	2.5 Gbits/s PIN Digital Preamp, FC Connector	108566118
P172ABCF	2.5 Gbits/s APD Digital Preamp, FC Connector	108566084

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