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# Analog Pigtailed PIN Photodiodes

## Technical Data

### Features

- **Variety of Flange/Pinout Options**
- **Compact Package**
- **High Reliability Planar InGaAs PIN Photodiode**
- **High Responsivity**
- **High Linearity**
- **Low Back Reflection**
- **High Bandwidth >1.5 GHz**
- **-40°C to +85°C Operating Temperature Range**

### Applications

- **CATV/CCTV**
- **Fiber in the Loop (FITL)**

### Description

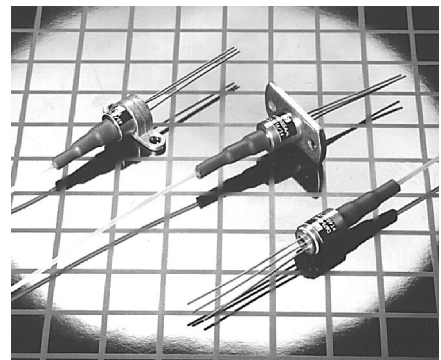
The PDA range of products includes a variety of compact fiber pigtailed devices designed for wide operating temperature, low cost applications such as fiber in the loop. The planar InGaAs photodiodes are manufactured using MOVPE growth technology and give low leakage and high responsivity performance with excellent reliability.

The construction of the devices includes a hermetically sealed photodiode and an actively aligned fiber pigtail and is designed to be compatible with the environmental requirements of the Bellcore TA-NWT-000983 document.

The product range includes a variety of pinout, fiber type, and package mounting bracket

### PDA2446

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options, designed to match the majority of offerings in the marketplace. If the specific arrangement or performance you require is not listed, please contact Hewlett-Packard. High flexible design and manufacturing processes allow both physical and electro-optic customization to suit your needs.

## PDA Pigtailed Photodiode Specifications

### 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 that 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	Maximum	Units
Reverse Voltage	Vr	-	20	V
Reverse Current	Ir	-	1	mA
Forward Voltage	Vf	-	1	V
Forward Current	If	-	5	mA
Power Dissipation	-	-	50	mW
Operating Temperature	Tc	-40	+85	°C
Storage Temperature	Ts	-40	+85	°C
Soldering – 10 seconds	-	-	+260	°C
Fiber Pull	-	-	10	N

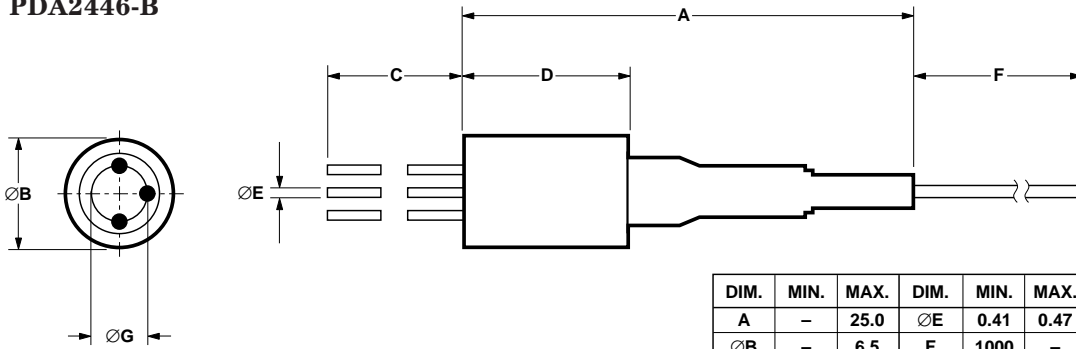
### Performance Specifications

Parameter	Symbol	Test Conditions: Unless Otherwise Stated Vr = 5 V, Tc = +25°C	PDA2446		Units
			Min.	Max.	
Dark Current	Id		-	1	nA
		Tc = +85°C	-	50	nA
Reverse Breakdown Voltage	Vbr	Ir = 10 µA	35	-	V
Capacitance	C	1 MHz	-	1.7	pF
Responsivity	R	λ = 1300 nm	0.7	-	A/W
Operating Wavelength	λ	80% points	1200	1650	nM
Small Signal Bandwidth	Bw		1.5	-	GHz
<b>Linearity</b>	<b>X1</b>				
Second Order	-	Vr = 15 V f1 = 135 MHz f2 = 190 MHz 70% Modulation 0 dBm Optical Power		-70	dBc
Third Order	-	As above		-85	dBc

**Fiber Pigtail:** Tight jacketed, self-mode stripping, singlemode fiber

Parameter	Minimum	Maximum	Units
Length	1.0	-	m
Core Diameter	8	10	µm
Cladding Diameter	122	128	µm
Concentricity Error	-	8	%
Secondary Jacket Diameter	0.8	1.0	mm

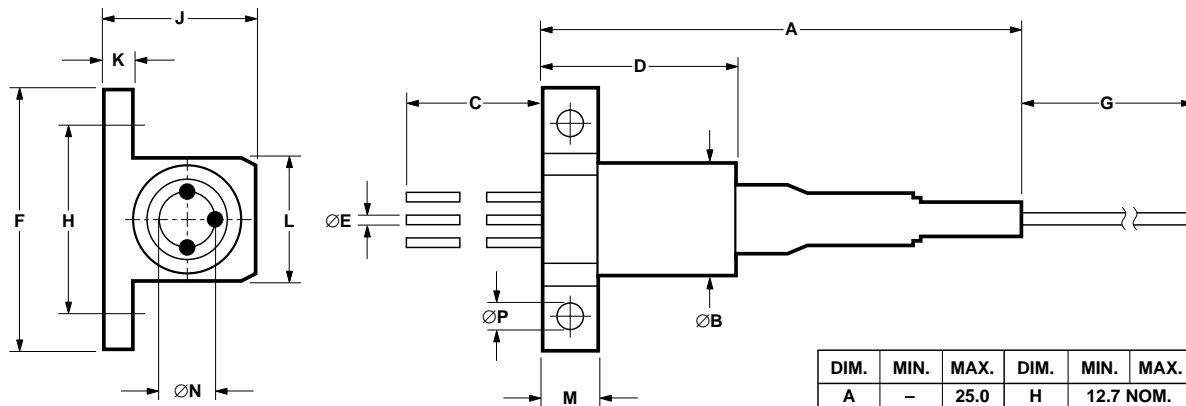
## PDA Mechanical Outline Options PDA2446-B



DIM.	MIN.	MAX.	DIM.	MIN.	MAX.
A	-	25.0	$\varnothing E$	0.41	0.47
$\varnothing B$	-	6.5	F	1000	-
C	12.0	-	$\varnothing G$	2.54 NOM.	
D	-	8.5			

ALL DIMENSIONS IN MILLIMETERS

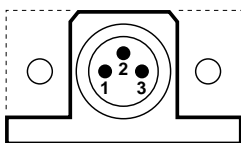
## PDA2446-D



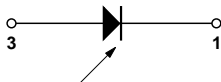
DIM.	MIN.	MAX.	DIM.	MIN.	MAX.
A	-	25.0	H	12.7 NOM.	
$\varnothing B$	-	6.5	J	-	7.5
C	12.0	-	K	0.9	1.1
D	-	8.5	L	-	7.5
$\varnothing E$	0.41	0.47	M	3.8	4.2
F	-	18.0	$\varnothing N$	2.54 NOM.	
G	1000	-	$\varnothing P$	2.1	2.4

ALL DIMENSIONS IN MILLIMETERS

## PDA2446 Electrical Pin-Outs



PIN 1: CATHODE +VE  
PIN 2: CASE  
PIN 3: ANODE -VE



## Ordering Information

PDA2446 - XI - XX

Connector Type:

AP = Angle Polished FC/PC

AS = Angle Polished SC/PC

US = Ultra Polished SC/PC

SF = Super Polished FC/PC

Flange Type:

B = Barrel

D = 2 hole PCB mount, 12.7 mm between centers

Additional options are available to meet your specific needs. Please contact your local representative for details.

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# Discrete Pin-Preamplifiers

## Preliminary Technical Data

**PPA0052, PPA1052  
PPA0155, PPA1155**

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### Features

- **Integrated InGaAs PIN and GaAs Preamplifier**
- **FC or SC Receptacle or Fiber Pigtailed**
- **Compact Package**
- **High Reliability Planar InGaAs PIN Photodiode**
- **High Responsivity**

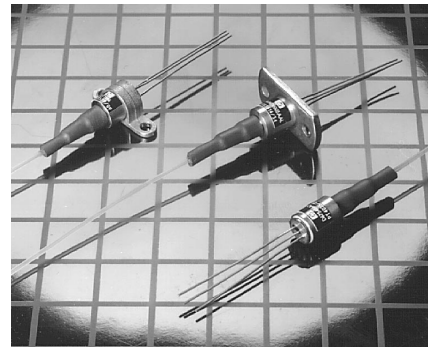
### Applications

- **SONET/SDH**
- **Instrumentation**
- **O-E Converters**
- **Single and Multimode Fiber Communications Systems**
- **Data Communication Receivers**
- **FDDI**

### Description

The PPA\*052 and PPA\*155 are compact connectorized or pigtailed InGaAs photodiodes with preamplifier designed for wide operating temperature range, low cost applications such as SONET/SDH and Fiber in the Loop. The planar InGaAs photodiodes are manufactured using MOVPE growth technology which gives low leakage and high responsivity performance with excellent reliability. The wide dynamic range GaAs IC preamplifier ensures compliance with SONET/SDH standards.

The construction of the devices includes a hermetically sealed photodiode and amplifier actively aligned within a receptacle housing or to a fiber pigtail and is designed to be compliant with Bellcore TA-TSY-000983.



#### Preliminary Product Disclaimer

This preliminary data sheet is provided to assist you in the evaluation of engineering samples of the product which is under development and targeted for release during 1997. Until Hewlett-Packard releases this product for general sales, HP reserves the right to alter prices, specifications, features, capabilities, function, manufacturing release dates, and even general availability of the product at any time.

## Performance Specifications

### Absolute Limiting Ratings

Absolute (limiting) ratings mean that no catastrophic damage will occur if the product is subjected to these ratings for short periods, provided that 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	Maximum	Units
Supply Voltage	V <sub>DD</sub>	-	5.5	V
Photodiode Voltage (Negative)	V pin	-	-7	V
Power Dissipation	-	-	350	mW
Operating Temperature	T <sub>c</sub>	-40	+85	°C
Storage Temperature	T <sub>s</sub>	-40	+85	°C
Soldering – 10 seconds	-	-	+260	°C
Fiber Pull	-	-	10	N

### Performance Specifications<sup>[1]</sup>

Parameter	Minimum	Maximum	Units
Responsivity	0.75	-	A/W
Sensitivity <sup>[2]</sup>	52 Mb/s 155 Mb/s	-39 -36	dBm
Overload <sup>[2,3]</sup>	-7	-	dBm
Bandwidth	52 Mb/s 155 Mb/s	35 90	MHz
Output Impedance	30	60	ohms
V <sub>DD</sub> Supply Voltage	4.75	5.25	V
V <sub>DD</sub> Supply Current	-	50	mA
Photodiode Supply	-7	-4.5	V

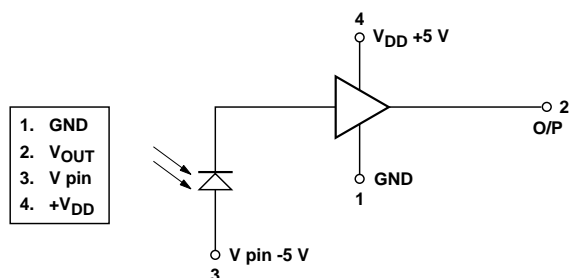
#### Notes:

1. Measured over the operating temperature range and power supply tolerance.
2. Measured at the data rate specified for  $1 \times 10^{-10}$  using an infinite extinction ratio laser source modulated with a  $2^{23-1}$  PRBS pattern.
3. Higher overload performance available. Contact your local Hewlett-Packard Components representative for details.

**Fiber Pigtail:** Tight jacketed, self-mode stripping, multimode

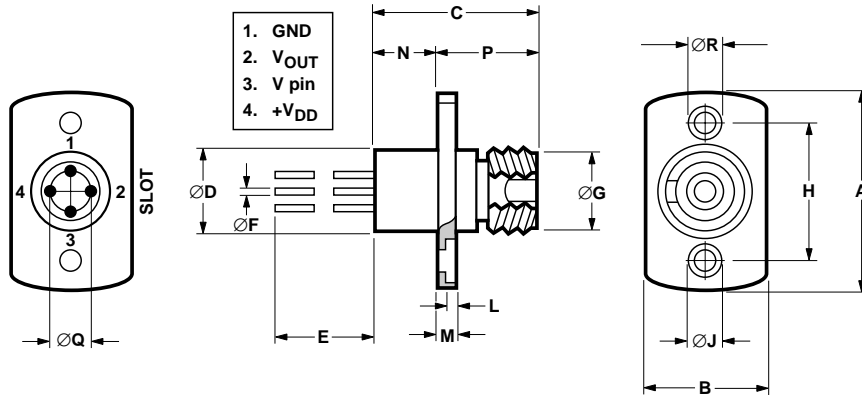
Parameter	Minimum	Maximum	Units
Length	0.4	1.2	m
Core Diameter	47	53	μm
Cladding Diameter	122	128	μm
Concentricity Error	-	8	%
Secondary Jacket Diameter	0.8	1.0	mm

### Schematic Diagram



## Drawing Dimensions

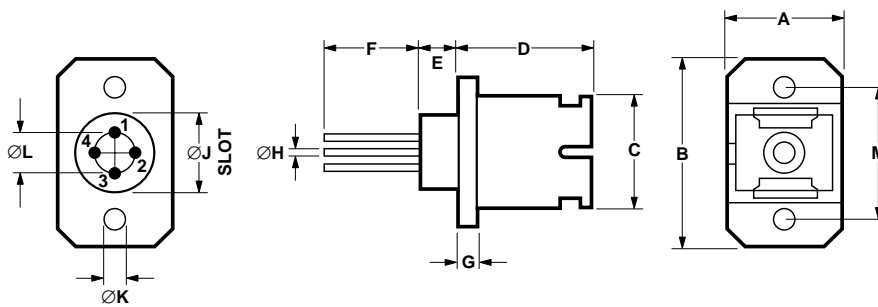
PPA0052-FC-A  
PPA0155-FC-A



DIM.	MIN.	MAX.	DIM.	MIN.	MAX.
A	-	19.5	∅J	2.08	2.32
B	-	9.5	L	-	1.65
C	-	15.0	M	-	2.2
∅D	-	9.1	N	-	6.8
E	12.0	-	P	-	8.2
∅F	0.27	0.33	∅Q	2.54 NOM.	
∅G	M8 x 0.75		∅R	-	4.2
H	13.35	13.55			

ALL DIMENSIONS IN MILLIMETERS

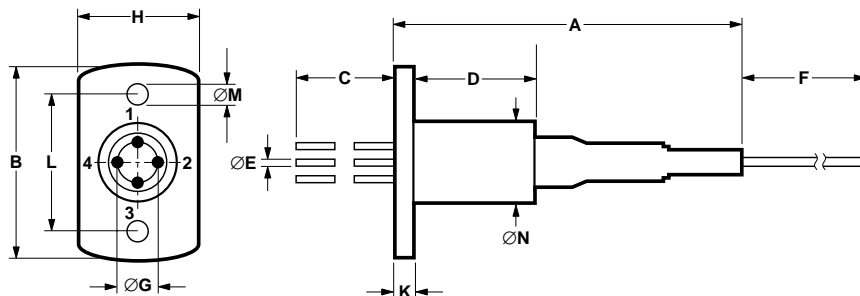
PPA0052-SC-A  
PPA0155-SC-A



DIM.	MIN.	MAX.	DIM.	MIN.	MAX.
A	-	9.5	G	2.0	3.0
B	-	23.0	∅H	0.27	0.33
C	-	13.5	∅J	-	7.5
D	-	15.5	∅K	2.08	2.5
E	-	8.0	∅L	2.54 NOM.	
F	12.0	-	M	17.8	18.2

ALL DIMENSIONS IN MILLIMETERS

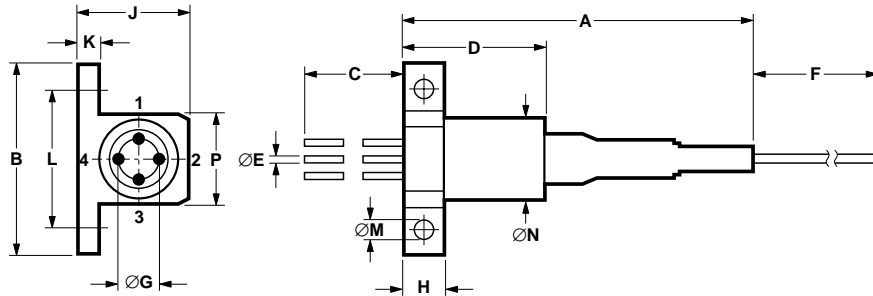
PPA1052-A  
PPA1155-A



DIM.	MIN.	MAX.	DIM.	MIN.	MAX.
A	-	25.0	∅G	2.54 NOM.	
B	-	19.5	H	-	9.5
C	12.0	-	K	-	2.0
D	-	9.5	L	13.35	13.55
∅E	0.27	0.33	∅M	2.1	2.4
F	400	1200	∅N	-	6.25

ALL DIMENSIONS IN MILLIMETERS

PPA1052-D  
PPA1155-D



DIM.	MIN.	MAX.	DIM.	MIN.	MAX.
A	-	25.0	H	3.8	4.2
B	-	18.0	J	-	7.5
C	12.0	-	K	0.9	1.1
D	-	9.5	L	12.7	NOM.
ØE	0.27	0.33	ØM	2.1	2.4
F	400	1200	ØN	-	6.25
ØG	2.54	NOM.	P	-	7.5

ALL DIMENSIONS IN MILLIMETERS

## Ordering Information

Allowable Part Numbers:

PPA0052 - FC - A  
PPA0052 - SC - A  
PPA1052 - A - FP  
PPA1052 - A - ST  
PPA1052 - A - DN  
PPA1052 - A - SC  
PPA1052 - D - FP  
PPA1052 - D - ST  
PPA1052 - D - DN  
PPA1052 - D - SC

PPA0155 - FC - A  
PPA0155 - SC - A  
PPA1155 - A - FP  
PPA1155 - A - ST  
PPA1155 - A - DN  
PPA1155 - A - SC  
PPA1155 - D - FP  
PPA1155 - D - ST  
PPA1155 - D - DN  
PPA1155 - D - SC

**PPA0052 - XX - A**  
**PPA0155 - XX - A**

Receptacle Type:  
FC = FC  
SC = SC

**PPA1052 - X - XX**  
**PPA1155 - X - XX**

Connector Type:  
FP = FC/PC  
ST\* = ST  
DN = DIN  
SC = SC

Flange Type:

A = 2 hole Panel mount, 13.4 mm between centers  
D = 2 hole PCB mount, 12.7 mm between centers

\*ST is a registered trademark of AT&T.