

## C-Band, L-Band, Pass Band Low Leakage PIN Photodiodes EPM 6xx Series



### Key Features

- **Electro-optical**
  - Low back reflection
  - High responsivity in L-band at 1625 nm (EPM 606)
- **Packaging**
  - Single mode 900  $\mu\text{m}$  fiber with or without a connector
  - Single mode 250  $\mu\text{m}$  fiber without a connector
  - Small form factor (SFF) package available

### Applications

- C- and L-Band monitoring
- High sensitivity monitoring
- EDFA and DWDM
- 40 and 10 Gb/s line monitoring
- 980 forward pump
- 1310 and 1550 PONs

The JDSU EPM 6xx Series PIN photodiodes are designed for optical network monitoring applications. The photodiode die is fabricated with a proprietary InGaAs process in our wafer fab and assembled into an hermetically-sealed package with antireflective-coated lens. A stainless steel bushing is used to actively couple the fiber to the package.

The fiber is reinforced with a rubber boot, which relieves fiber bending stresses. EPM 6xx Series photodiodes can be produced with or without a variety of industry standard connectors. They are also available with mounting brackets, allowing both vertical panel and horizontal flush-to-board mounting.

Low leakage versions (EPM 605LL and EPM 606LL) of the EPM 605 and EPM 606 are available with the same features, connectors, and brackets.

Besides, we also offer the small form factor (SFF) packages (EPM635 and EPM635-75) that are designed for the SFF applications.

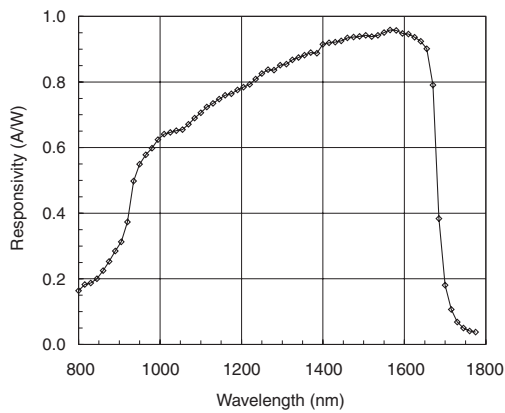
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### Application Preference

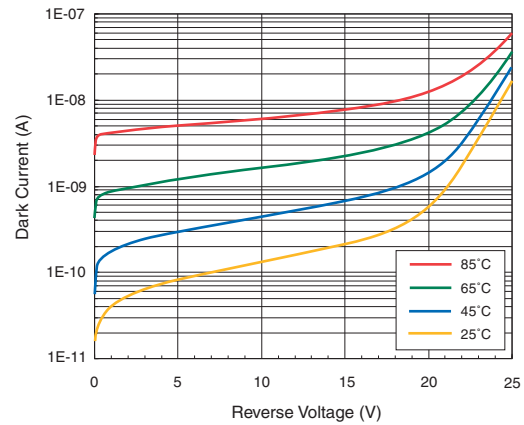
Application/Product	EPM 605	EPM 605LL	EPM 606	EPM 606LL	EPM 613	EPM 650
C-band	••	••	•	•		•
C-band, high sensitivity		••		•		
L-band			••	••		
L-band, low sensitivity				••		
1310 band	•	•			••	••
EDFA	••	••	••	••		•
DWDM	••	••	••	••		•
40 Gb and 10 Gb line monitors	••	••	••	••		•
980 forward pump		•	•	•	••	
1310/1550 PON networks	•	•	•	•	••	•
1480 pump monitors	•	•	•	•		•

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### Typical Spectral Response (23°C)

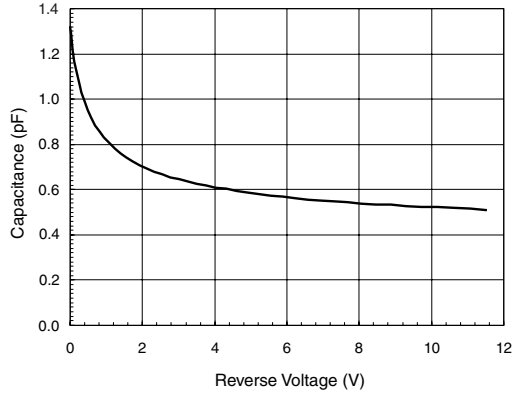


### Dark Current vs. Reverse Bias

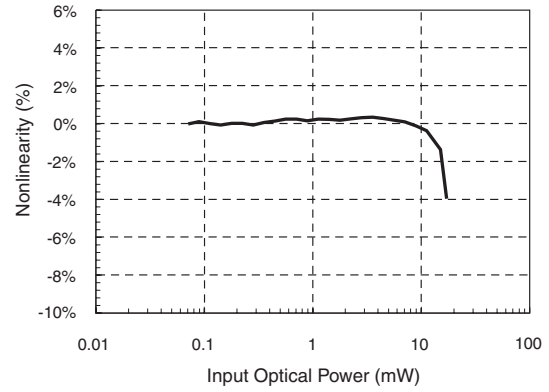


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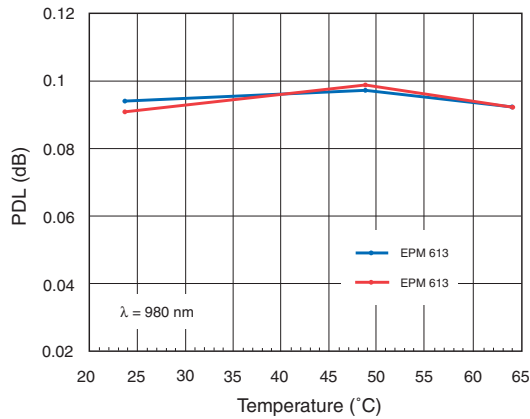
Capacitance vs. Reverse Bias (23 °C) (EPM 605/606)



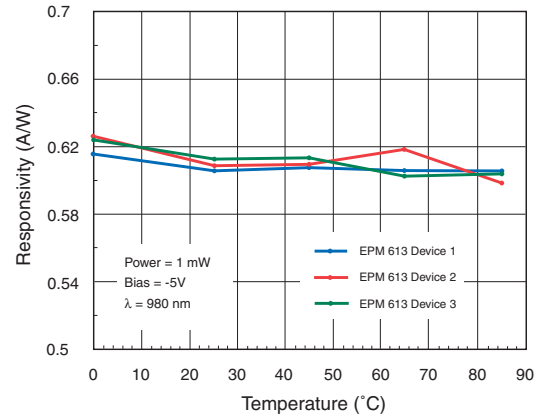
Optical Response Nonlinearity (Typical, -5 V bias)



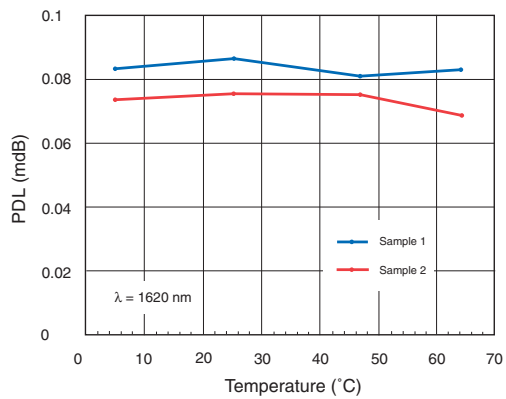
PDL vs. Temperature (EPM 613)



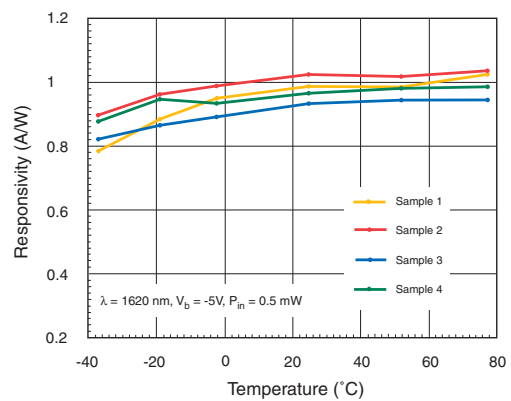
Responsivity vs. Temperature (EPM 613)



PDL vs. Temperature (EPM 606)

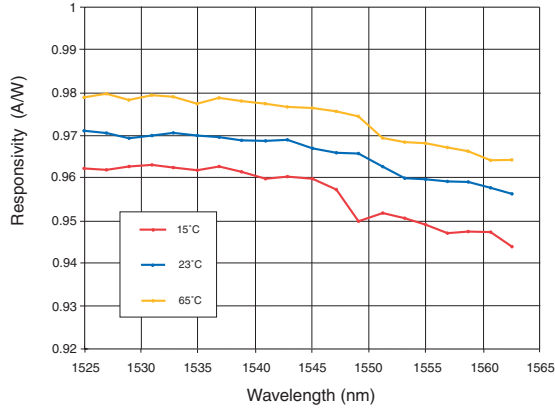


Responsivity vs. Temperature (EPM 606)

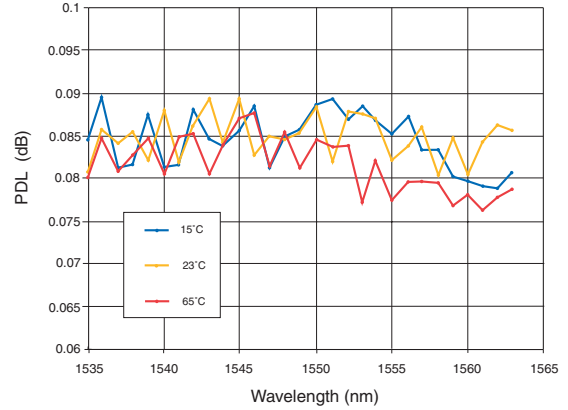


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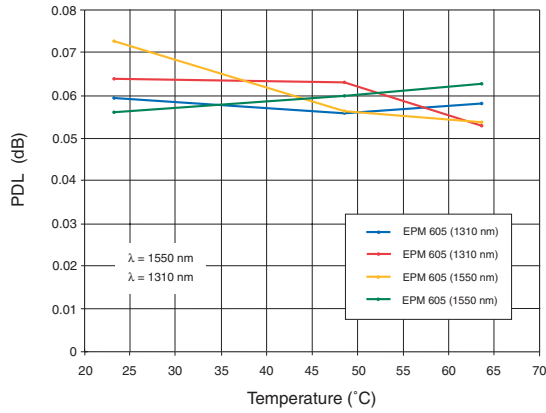
Responsivity vs. Wavelength, Temperature (EPM 605)



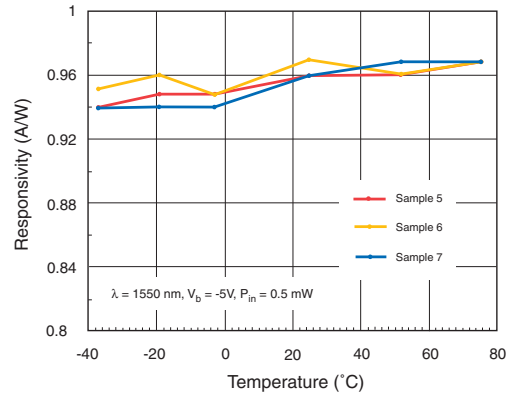
PDL vs. Wavelength, Temperature (EPM 605)



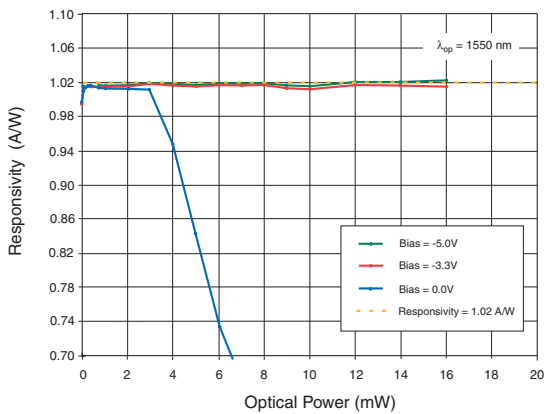
PDL vs. Temperature (EPM 605)



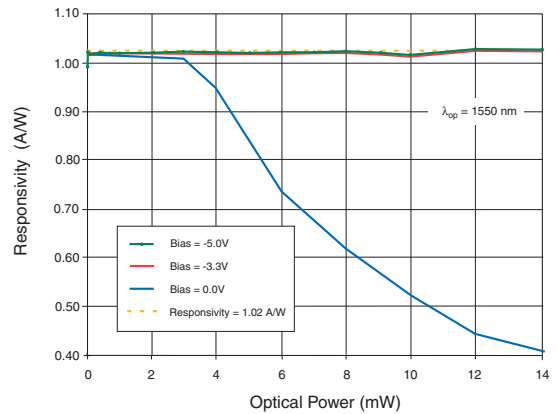
Responsivity vs. Temperature (EPM 605)



Optical Power Linearity (EPM 605)

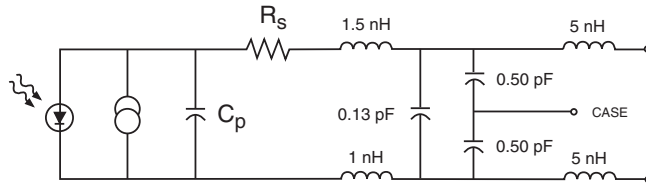


Optical Power Linearity (EPM 650)



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Equivalent Circuit for EPM 6xx Series

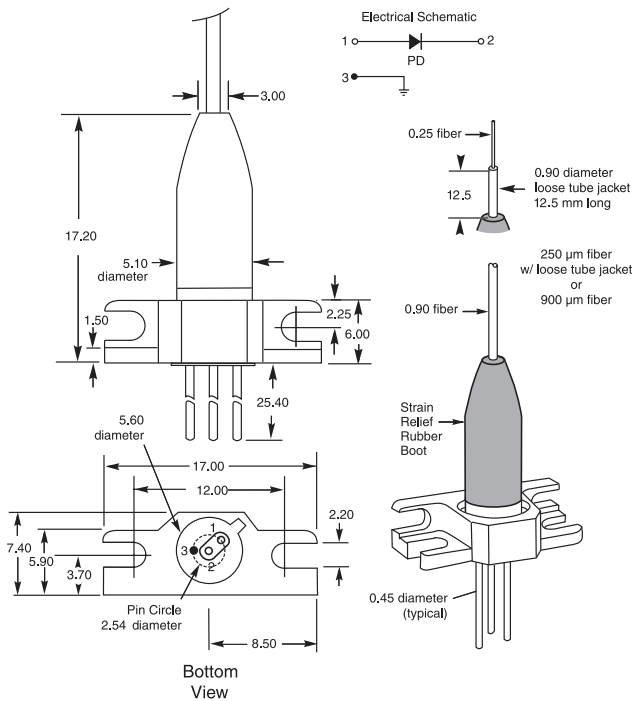


Model	Rs	Cp
EPM 605	5 Ω	0.55 pF
EPM 606	5 Ω	0.55 pF
EPM 613	5 Ω	0.75 pF
EPM 650	6 Ω	1.00 pF
EPM 635	5 Ω	6.00 pF
EPM 635-75	5 Ω	0.90 pF

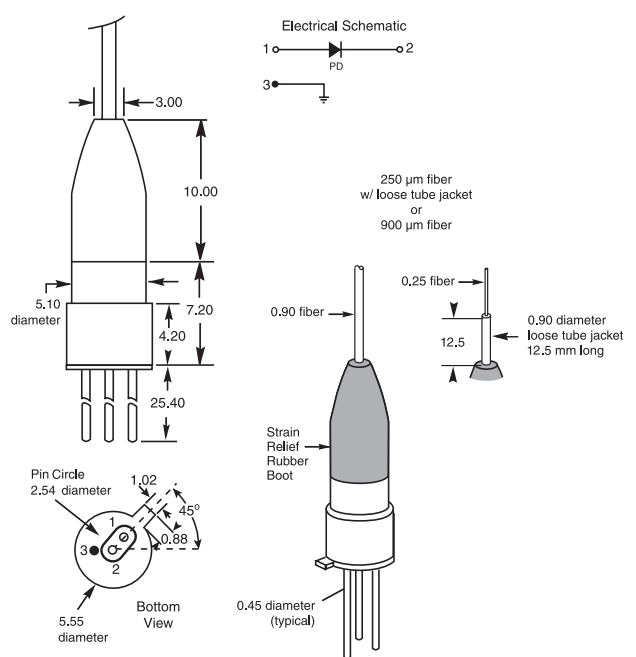
Dimensions Diagram

(Specifications in mm unless otherwise noted.)

EPM 6xx with Dual Mount Bracket



EPM 6xx without Dual Mount Bracket

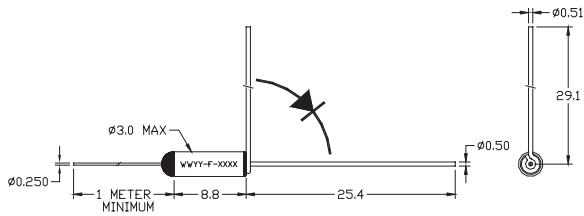


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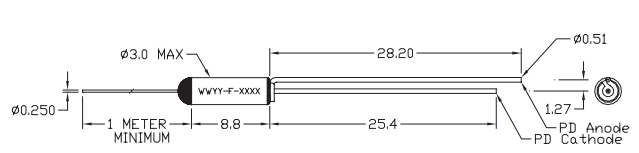
## Dimensions Diagram

(Specifications in mm unless otherwise noted.)

EPM 635



EPM 635-75



## Specifications

(Temperature = 25°C, V PD = -5 V and wavelength = 1550 nm, unless otherwise noted.)

Parameter		EPM 635	EPM 635-75
Active diameter	Typical	300 $\mu\text{m}$	75 $\mu\text{m}$
Responsivity	Minimum	0.85 A/W	0.85 A/W
Back reflection	Minimum	-40 dB	-40 dB
Dark current	Maximum	0.6 nA	0.08 nA
Capacitance <sup>1</sup>	Typical	6.0 pF	0.9 pF
	Maximum	7.0 pF	1.4 pF
Bandwidth <sup>1,2</sup>	Typical	300 MHz	2000 MHz
<b>Maximum Ratings</b>			
Forward current	Maximum		10 mA
Reverse current	Maximum		10 mA
Reverse voltage	Maximum		25 V
Power dissipation	Maximum		100 mW
Operating temperature			-40 to 85 °C
Storage temperature			-40 to 85 °C

1. Measured with leads trimmed or referenced to 3 mm length maximum.

2. -3 dB point into a 50  $\Omega$  load.

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## Specifications

Parameter		EPM 605	EPM 606	EPM 613	EPM 650
Active diameter	Typical	75 $\mu\text{m}$	75 $\mu\text{m}$	75 $\mu\text{m}$	100 $\mu\text{m}$
Responsivity					
$\lambda = 980 \text{ nm}$	Minimum	-	-	0.30 A/W	-
$\lambda = 1310 \text{ nm}$	Minimum	0.80 A/W	-	0.85 A/W	0.80 A/W
$\lambda = 1550 \text{ nm}$	Minimum	0.85 A/W	0.85 A/W	0.0004 A/W	0.85 A/W
$\lambda = 1625 \text{ nm}$	Minimum	-	0.80 A/W	-	-
Back reflection					
$\lambda = 980 \text{ nm}$	Minimum	-	-	-30 dB	-
$\lambda = 1310 \text{ nm}$	Minimum	-	-	-40 dB	-27 dB
$\lambda = 1550 \text{ nm}$	Minimum	-40 dB	-	-	-
$\lambda = 1625 \text{ nm}$	Minimum	-	-40 dB	-	-
Dark current					
Standard leakage	Maximum	0.6 nA	0.6 nA	1.0 nA	1.0 nA
Low leakage	Maximum	0.08 nA	0.08 nA	-	-
Capacitance <sup>1</sup>	Maximum	0.75 pF	0.75 pF	0.9 pF	1.25 pF
Bandwidth <sup>2</sup>	Typical	2.0 GHz	2.0 GHz	1.5 GHz	1.5 GHz
PDL					
$\lambda = 980 \text{ nm}$	Typical	-	-	0.2 dB	-
$\lambda = 1310 \text{ nm}$	Typical	0.1 dB	-	-	0.1 dB
$\lambda = 1550 \text{ nm}$	Typical	0.1 dB	0.1 dB	-	-
$\lambda = 1625 \text{ nm}$	Typical	-	0.1 dB	-	-
Isolation between bands					
1310 and 1550 nm	Typical	-	-	33 dB	-
980 and 1550 nm	Typical	-	-	29 dB	-
<b>Maximum Ratings</b>					
Forward current <sup>3</sup>	Maximum	10 mA			
Reverse current <sup>4</sup>	Maximum	10 mA			
Reverse voltage	Maximum	25 V			
Power dissipation	Maximum	100 mW			
Operating case temperature		-40 to 85 °C			
Soldering temperature	Maximum	250 °C			
Storage temperature		-40 to 85 °C			

1. Measured with case grounded.

2. -3 dB point into a 50  $\Omega$  load.

3. Under forward bias, current at which device may be damaged.

4. Under reverse bias, current at which device may be damaged.

**Ordering Information**

For more information on this or other products and their availability, please contact your local JDSU account manager or JDSU directly at 1-800-498-JDSU (5378) in North America and +800-5378-JDSU worldwide or via e-mail at customer.service@jdsu.com.

**Sample: EPM 606LL-250**

<b>EPM 6</b> + <span style="border: 1px solid black; display: inline-block; width: 15px; height: 15px;"></span>	+	<span style="border: 1px solid black; display: inline-block; width: 15px; height: 15px;"></span>	+	<span style="border: 1px solid black; display: inline-block; width: 15px; height: 15px;"></span>	+	<span style="border: 1px solid black; display: inline-block; width: 15px; height: 15px;"></span>																												
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**Precautions for Use**

Electrostatic discharge protection is imperative. Use of grounding straps, anti-static mats, and other standard ESD protective equipment is required when handling or testing an InGaAs PIN or any other junction photodiode. The flexible 250 μm fiber coating can be mechanically stripped and provides protection for the optical fiber, under normal handling characteristics. Soldering temperature of the leads should not exceed 260 °C for more than 10 seconds. Fiber pigtailed should be handled with less than 10 N pull and with a bending radius greater than 1 inch.

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