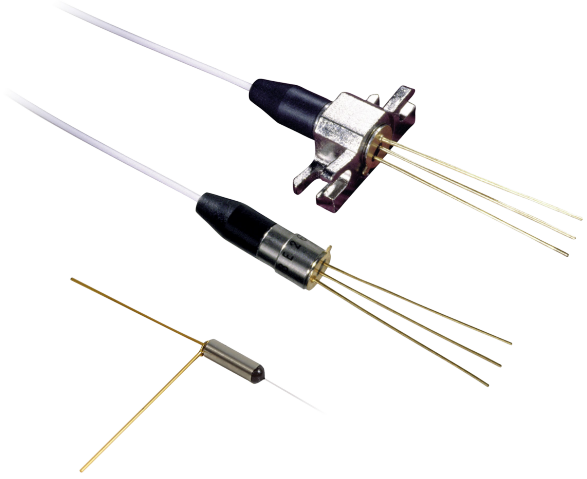
LUMENTUM

C-Band, L-Band, Pass-Band Low-Leakage PIN Photodiodes

EPM 6xx Series



Lumentum 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 a hermetically-sealed package with antireflective-coated lens. A stainless steel bushing actively couples the fiber to the package.

The fiber is reinforced with a rubber boot to relieve fiber-bending stresses. EPM 6xx-Series photodiodes can be produced with a variety of industry-standard connectors or no connector at all. They are also available with mounting brackets for 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.

Small form-factor (SFF) packages EPM635 and EPM635-75 are designed for SFF applications.

Key Features

- Electro-optical
  - Low back reflection
  - High responsivity in L-band at 1625 nm (EPM 606)
- Packaging
  - Single-mode 900 μm fiber with or without a connector
  - Single-mode 250 μm fiber without a connector
  - SFF package also available

Applications

- C- and L-Band monitoring
- High-sensitivity monitoring
- EDFA and DWDM
- 40 and 10 G line monitoring
- 980 forward pump
- 1310 and 1550 nm PONs

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 nm band	•	•			••	••
EDFA	••	••	••	••		•
DWDM	••	••	••	••		•
40 G and 10 G line monitors	••	••	••	••		•
980 forward pump	•	•	•	•	••	
1310/1550 nm PON networks	•	•	•	•	••	•
1480 nm pump monitors	•	•	•	•		•

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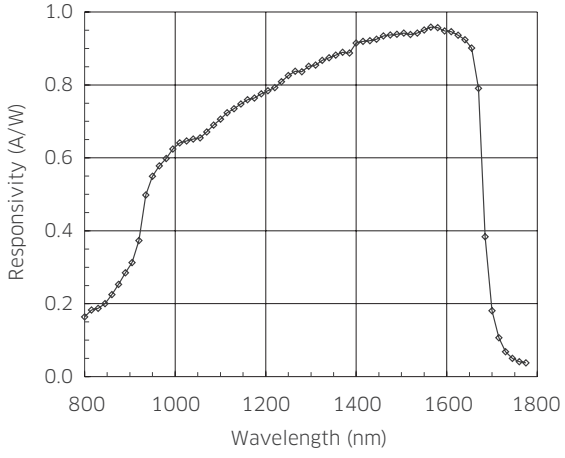
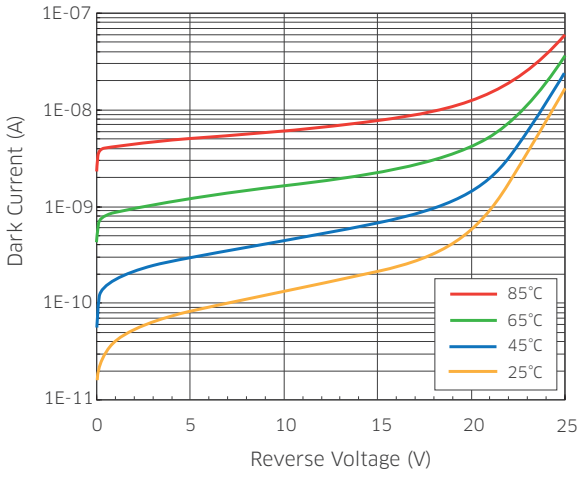
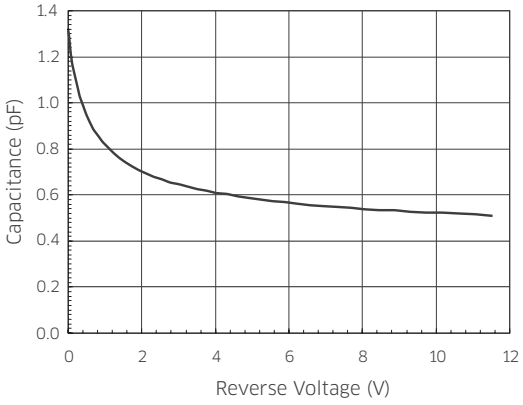
Typical Spectral Response (23°C)



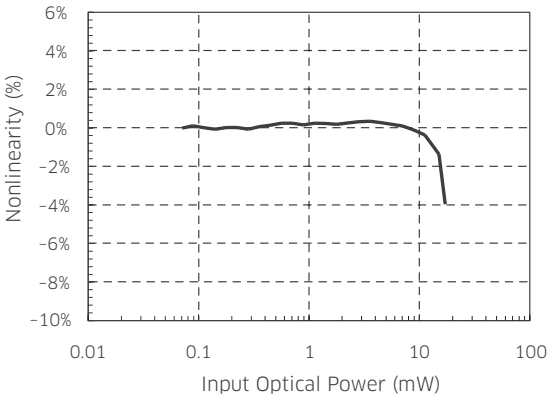
Dark Current vs. Reverse Bias



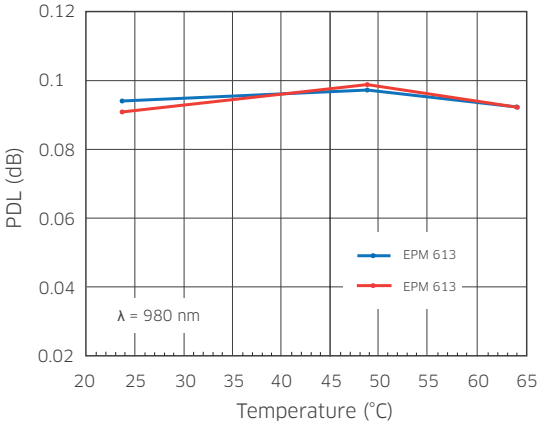
Capacitance vs. Reverse Bias (23°C)(EPM 605/606)



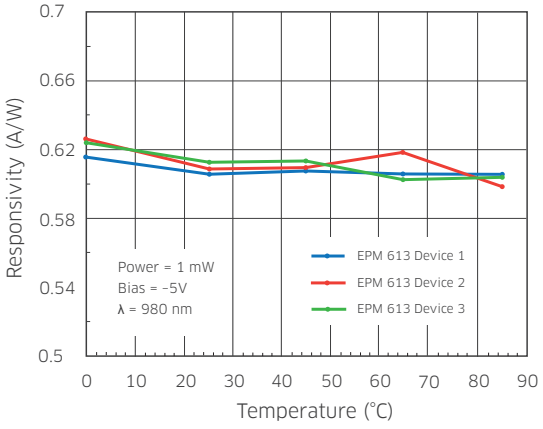
Optical Response Nonlinearity (typical, –5 V bias)



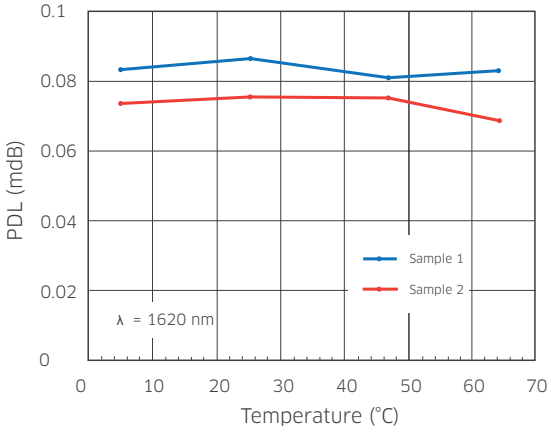
PDL vs. Temperature (EPM 613)



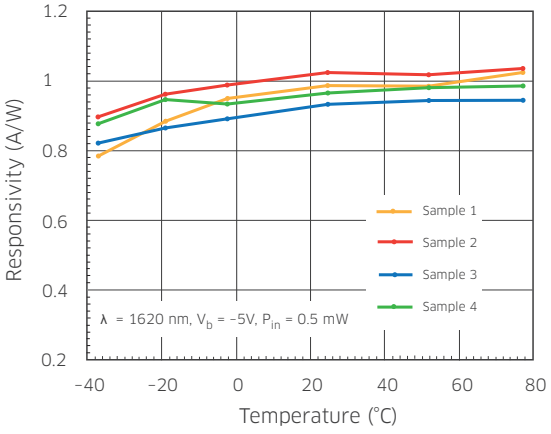
Responsivity vs. Temperature (EPM 613)



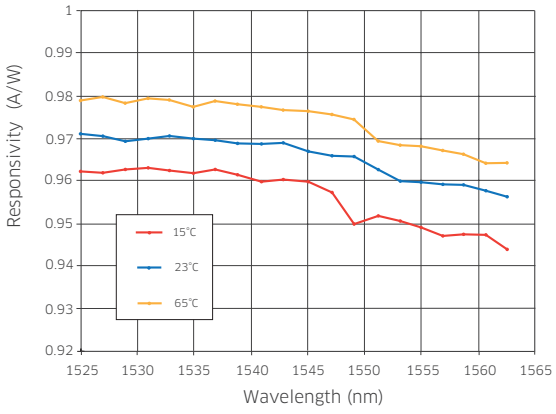
PDL vs. Temperature (EPM 606)



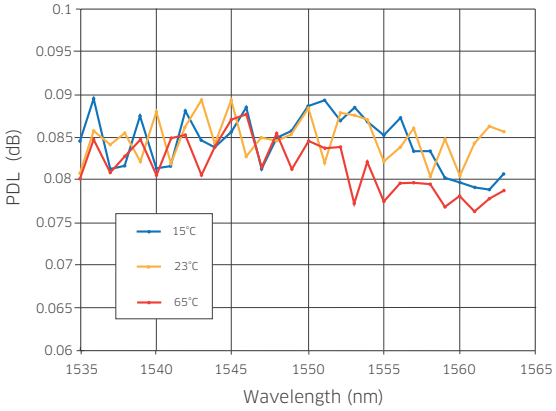
Responsivity vs. Temperature (EPM 606)



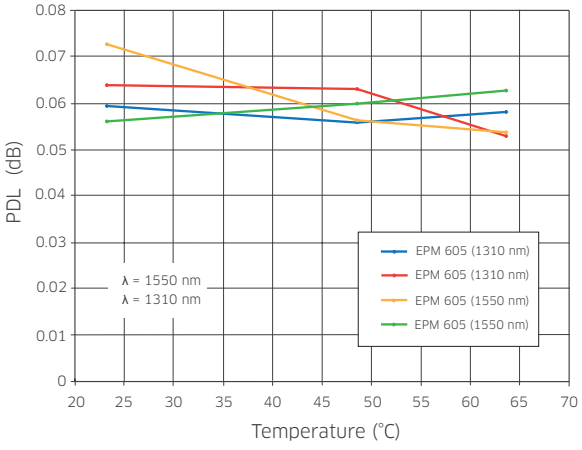
Responsivity vs. Wavelength, Temperature (EPM 605)



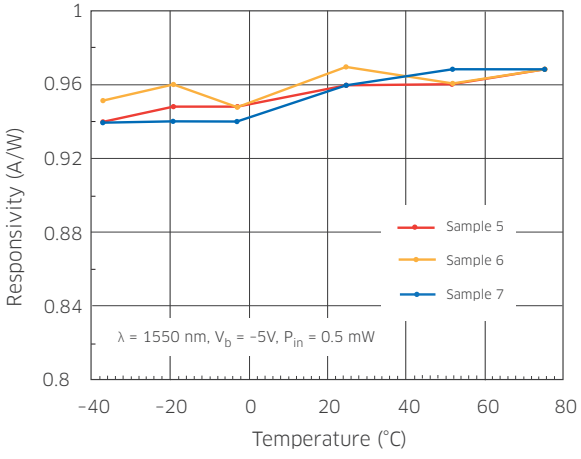
PDL vs. Wavelength, Temperature (EPM 605)



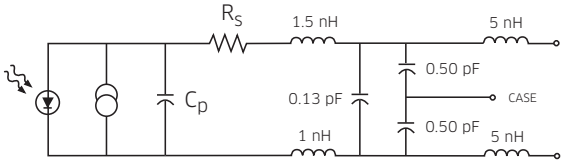
PDL vs. Temperature (EPM 605)



Responsivity vs. Temperature (EPM 605)



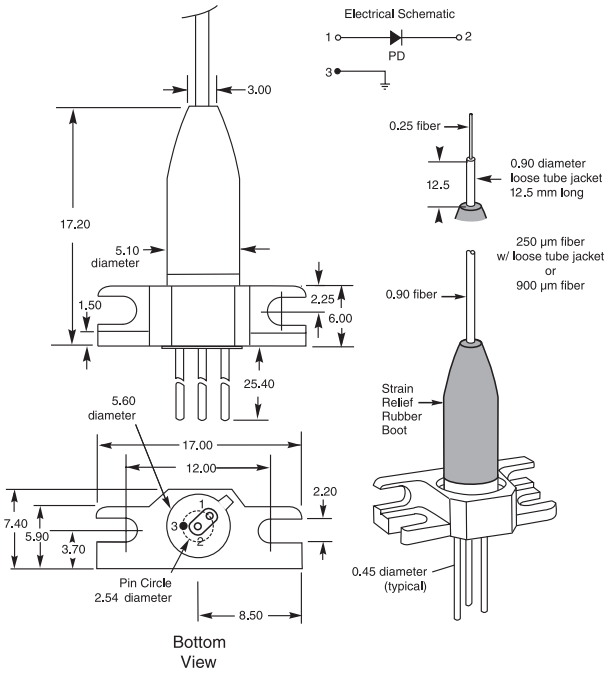
Equivalent Circuit for EPM 6xx-Series



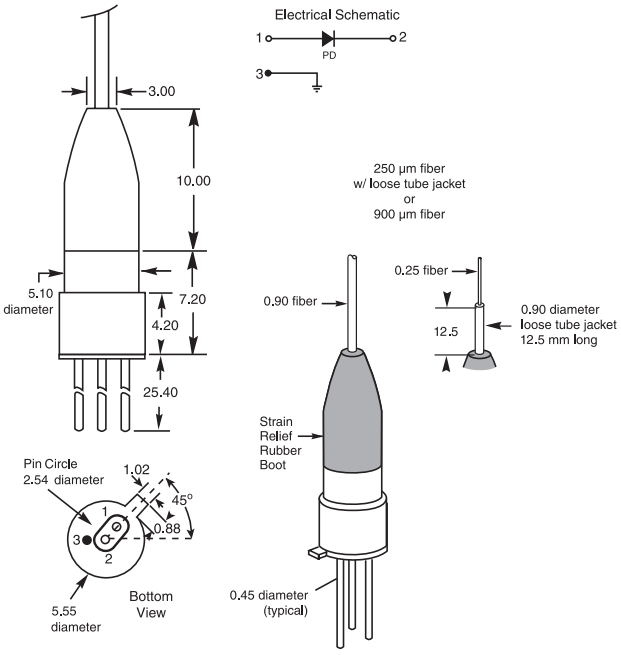
Model	Rs	Cp
EPM 605	5 Ω	0.55 pF
EPM 606	5 Ω	0.55 pF
EPM 613	5 Ω	0.75 pF
EPM 650	6 Ω	1.00 pF

Dimensions Diagram
(Specifications in mm unless otherwise noted.)

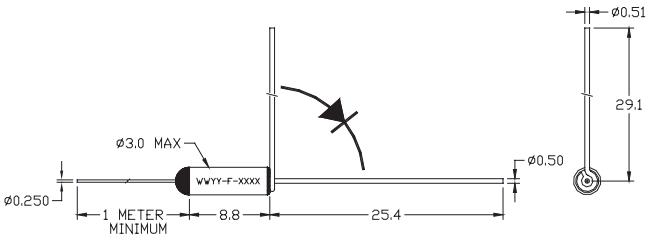
EPM 6xx with Dual-Mount Bracket



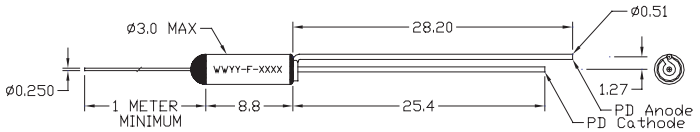
EPM 6xx without Dual-Mount Bracket



EPM 635/EPM 635LL



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 µm	60 µm
Responsivity	Minimum	0.85 A/W	0.85 A/W
Back reflection	Minimum	–40 dB	–40 dB
Dark current Standard leakage Low leakage	 Maximum Maximum	 0.6 nA 0.09 nA	 — 0.08 nA
Capacitance[1]	Typical Maximum	6.0 pF 7.0 pF	0.9 pF 1.4 pF
Bandwidth[1,2]	Typical	300 MHz	2000 MHz
Maximum Ratings			
Forward current	Maximum	10 mA	10 mA
Reverse current	Maximum	10 mA	10 mA
Reverse voltage	Maximum	25 V	25 V
Power dissipation	Maximum	100 mW	100 mW
Operating temperature		–40 to 85°C	–40 to 85°C
Storage temperature		–40 to 85°C	–40 to 85°C

1. Measured with leads trimmed or referenced to 3 mm length maximum.
2. –3 dB point into a 50 Ω load.

Specifications

Parameter		EPM 605	EPM 606	EPM 613	EPM 650
Active diameter	Typical	60 µm	60 µm	75 µm	100 µm
Responsivity					
λ = 980 nm	Minimum	—	—	0.30 A/W	—
λ = 1310 nm	Minimum	0.80 A/W	—	0.85 A/W	0.80 A/W
λ = 1550 nm	Minimum	0.85 A/W	0.85 A/W	0.0004 A/W	0.85 A/W
λ = 1625 nm	Minimum	—	0.80 A/W	—	—
Back reflection					
λ = 980 nm	Minimum	—	—	–30 dB	—
λ = 1310 nm	Minimum	—	—	–40 dB	–27 dB
λ = 1550 nm	Minimum	–40 dB	—	—	—
λ = 1625 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[1]	Maximum	0.75 pF	0.75 pF	0.9 pF	1.25 pF
Bandwidth[2]	Typical	2.0 GHz	2.0 GHz	1.5 GHz	1.5 GHz
PDL					
λ = 980 nm	Typical	—	—	0.2 dB	—
λ = 1310 nm	Typical	0.1 dB	—	—	0.1 dB
λ = 1550 nm	Typical	0.1 dB	0.1 dB	—	—
λ = 1625 nm	Typical	—	0.1 dB	—	—
Isolation between bands					
1310 and 1550 nm	Typical	—	—	33 dB	—
980 and 1550 nm	Typical	—	—	29 dB	—
Maximum Ratings					
Forward current[3]	Maximum	10 mA	10 mA	10 mA	10 mA
Reverse current[4]	Maximum	10 mA	10 mA	10 mA	10 mA
Reverse voltage	Maximum	25 V	25 V	25 V	25 V
Power dissipation	Maximum	100 mW	100 mW	100 mW	100 mW
Operating case temperature		–40 to 85°C	–40 to 85°C	–40 to 85°C	–40 to 85°C
Soldering temperature	Maximum	250°C	250°C	250°C	250°C
Storage temperature		–40 to 85°C	–40 to 85°C	–40 to 85°C	–40 to 85°C

1. Measured with case grounded.
2. –3 dB point into a 50 Ω load.
3. Current that may damage device under forward bias.
4. Current that may damage device under reverse bias.

Ordering Information

For more information on this or other products and their availability, please contact your local Lumentum account manager or Lumentum directly at customer.service@lumentum.com.

EPM 6 + □ + □ + □ + □

Code	Model
05	Low back reflection, C-band PIN photodiode
05LL	Low back reflection, low-leakage, C-band PIN photodiode
06	Low back reflection, L-band PIN photodiode
06LL	Low back reflection, low-leakage, L-band PIN photodiode
13	Low back reflection, pass-band PIN photodiode
50	General purpose, high-responsivity PIN photodiode
35	SFF package with 300 µm detection window
35LL	SFF package with 300 µm detection window, low-leakage
35-75	SFF package with 60 µm detection window

Code	Buffer
-250	250 µm buffer
	900 µm buffer

Code	Connector
	No connector
FC/APC	FC/APC connector
FC/SPC	FC/SPC connector
SC/SPC	SC/SPC connector
SC/APC	SC/APC connector
LC/SPC	LC/SPC connector

Code	Bracket
	No bracket
W/DM BKT	With dual-mount bracket

Precautions for Use

Protection against electrostatic discharge (ESD) is imperative, requiring the use of grounding straps, anti-static mats, and other standard ESD protective equipment when handling or testing an InGaAs PIN or other junction photodiode. The flexible 250 µm fiber coating can be mechanically stripped and provides protection for the optical fiber under normal handling conditions. Soldering temperature of the leads should not exceed 260°C for longer than 10 seconds. Handle fiber pigtails with less than 10 N pull and with a bending radius greater than 1 inch.

LUMENTUM

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