

**φ50 μm InGaAs PIN-PD COAXIAL MODULE  
FOR 2.5 Gb/s FIBEROPTIC COMMUNICATIONS**

**DESCRIPTION**

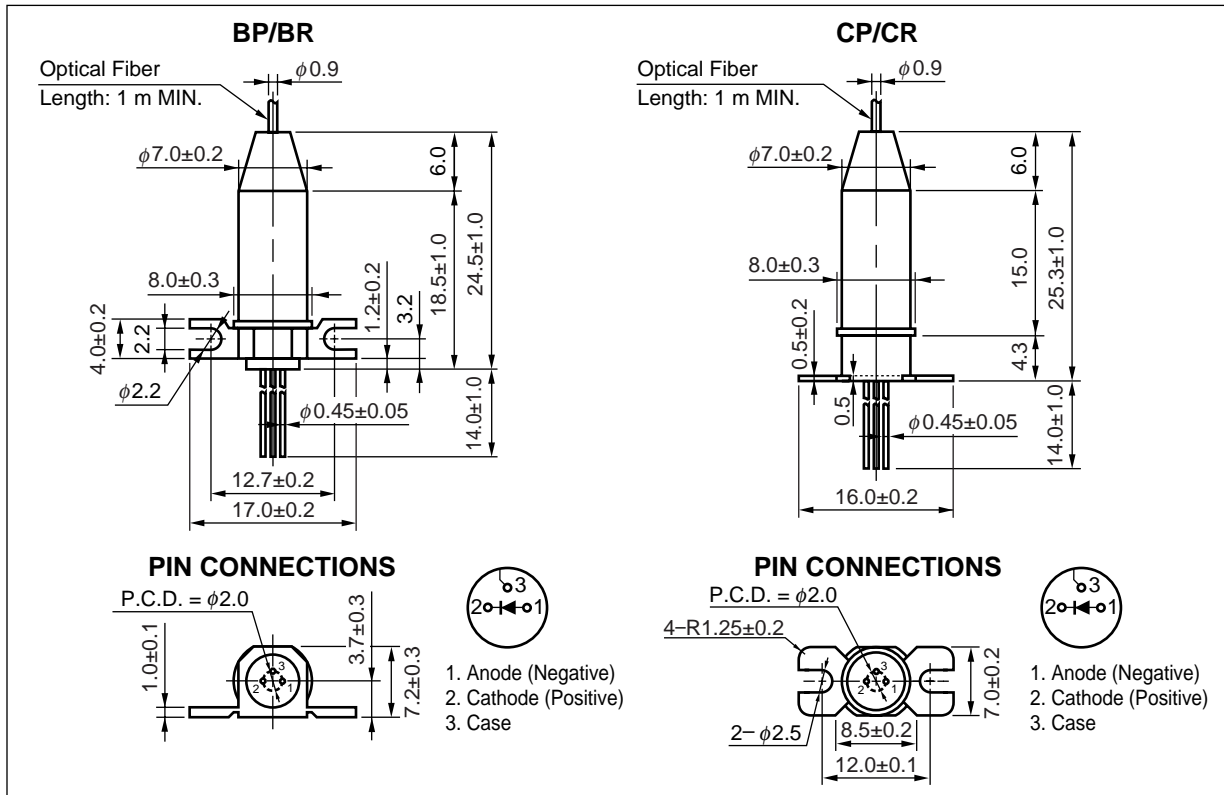
The NR7500 Series is an InGaAs PIN photo diode (PIN-PD) coaxial module with optical fiber pigtail. This module is designed for long wavelength 2.5 Gb/s optical communication systems and ideal as a receiver for Synchronous Digital Hierarchy (SDH) system, STM-16, ITU-T recommendations.

**FEATURES**

- Small dark current  $I_D = 0.1 \text{ nA}$
  - High speed response  $f_C = 2.5 \text{ GHz MIN.}$
  - High sensitivity  $S = 0.89 \text{ A/W @ } \lambda = 1310 \text{ nm}$   
 $S = 0.94 \text{ A/W @ } \lambda = 1550 \text{ nm}$
  - Low operating voltage  $V_R = 5 \text{ V}$
  - ★ • Coaxial module with SMF or GI-50 fiber
  - ★ • With SC connector : standard, FC connector : option
- (Refer to **ORDERING INFORMATION**)

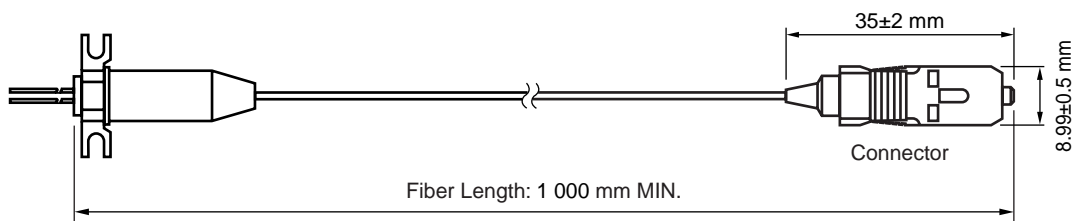
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 Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

★ PACKAGE DIMENSIONS (UNIT: mm)



★ OPTICAL FIBER CHARACTERISTICS

Parameter	Specification		Unit
	SMF	GI-50 Fiber	
Mode Field Diameter	9.5±1	—	μm
Core Diameter	—	50±3	μm
Cladding Diameter	125±2	125±2	μm
Maximum Cladding Noncircularity	2	2	%
Maximum Core/Cladding Concentricity	1.6	4.0	%
Outer Diameter	0.9±0.1	0.9±0.1	mm
Cut-off Wavelength	1 100 to 1 270	—	nm
Minimum Fiber Bending Radius	30	30	mm
Fiber Length	1 000 MIN.	1 000 MIN.	mm
Flammability	UL1581 VW-1		



★ ORDERING INFORMATION

Part Number	Flange Type	Fiber Type	Available Connector <sup>*1</sup>
NR7500BP-BC	Flat Mount Flange	SMF	With FC-UPC Connector
NR7500BP-CC			With SC-UPC Connector
NR7500BR-BB		GI-50 Fiber	With FC-SPC Connector
NR7500BR-CB			With SC-SPC Connector
NR7500CP-BC	Vertical Mount Flange	SMF	With FC-UPC Connector
NR7500CP-CC			With SC-UPC Connector
NR7500CR-BB		GI-50 Fiber	With FC-SPC Connector
NR7500CR-CB			With SC-SPC Connector

\*1 SC Connector : standard  
 FC Connector : option

ABSOLUTE MAXIMUM RATINGS

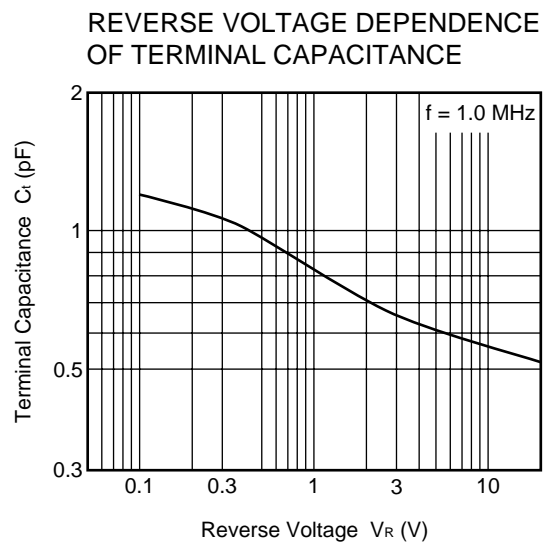
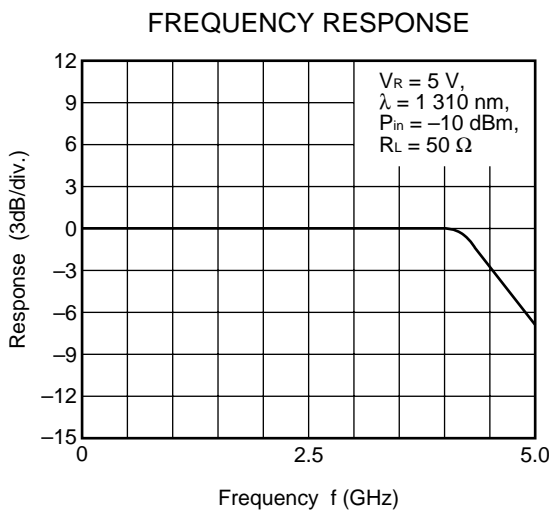
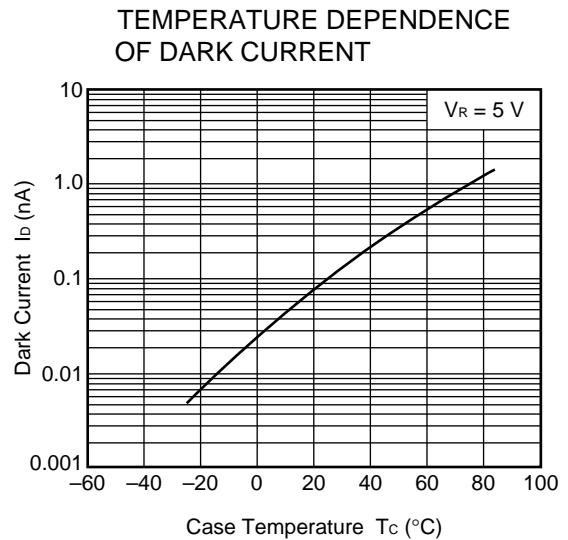
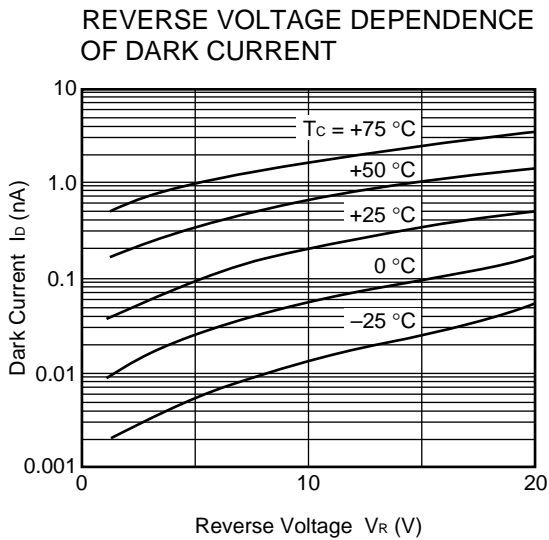
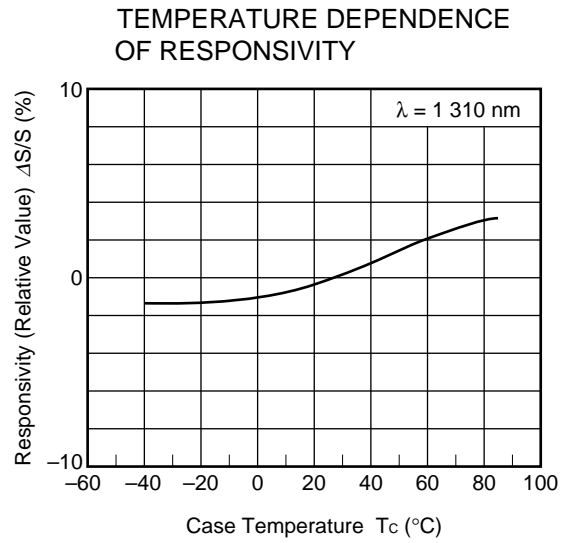
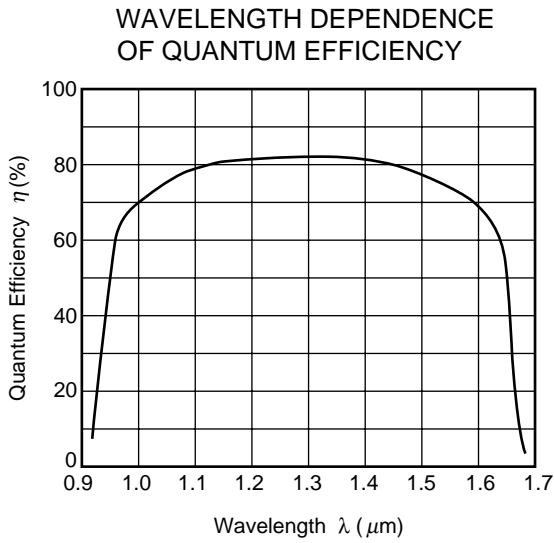
Parameter	Symbol	Ratings	Unit
Reverse Voltage	$V_R$	20	V
Forward Current	$I_F$	10	mA
Optical Input Power	$P_{in}$	8	mW
Operating Case Temperature	$T_C$	-40 to +85	°C
Storage Temperature	$T_{stg}$	-40 to +85	°C
Lead Soldering Temperature	$T_{sld}$	260 (10 sec.)	°C
Relative Humidity (noncondensing)	RH	85	%

ELECTRO-OPTICAL CHARACTERISTICS ( $T_C = -40$  to  $+85$  °C, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Dark Current	$I_D$	$V_R = 5$ V, $T_C = 25$ °C		0.1	1.0	nA
		$V_R = 5$ V			20	
Terminal Capacitance	$C_t$	$V_R = 5$ V, $f = 1$ MHz, $T_C = 25$ °C		0.7	0.9	pF
Sensitivity	S	$V_R = 5$ V, $\lambda = 1$ 310 nm	0.78	0.89		A/W
		$V_R = 5$ V, $\lambda = 1$ 550 nm	0.80	0.94		
Cut-off Frequency	$f_c$	$V_R = 5$ V, $T_C = 25$ °C	2.5			GHz
Optical Return Loss	ORL	SMF	30			dB
		GI-50 Fiber	28			

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TYPICAL CHARACTERISTICS (T<sub>c</sub> = 25 °C, unless otherwise specified)



**Remark** The graphs indicate nominal characteristics.

★ InGaAs APD/PD FAMILY

Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics (T <sub>c</sub> = 25 °C)						Applications	Package
	T <sub>c</sub> (°C)	T <sub>stg</sub> (°C)	Detect- ing Area Size (μm)	I <sub>b</sub> (nA)	f <sub>c</sub> (GHz)	S (A/W)		V <sub>R</sub> (V)		
				TYP.	MIN.	TYP.	@λ (nm)			
NR4500BP-CC NR4500CP-CC	0 to +70	-40 to +85	φ50	-	2.5 <sup>*1</sup>	0.94	1 310	0.9V <sub>BR</sub>	2.5 Gb/s: STM-16	Coaxial APD with an Internal pre-amp
						0.96	1 550			
NR7500 Series	-40 to +85	-40 to +85	φ50	0.1	2.5	0.89	1 310	5	2.5 Gb/s: STM-16	Coaxial PD
						0.94	1 550			
NR7800 Series	-40 to +85	-40 to +85	φ80	0.1	2.5	0.89	1 310	5	≤ 622 Mb/s: STM-4, STM-1	Coaxial PD
						0.94	1 550			
NR8500 Series	-40 to +85	-40 to +85	φ50	7	1	0.94	1 310	0.9V <sub>BR</sub>	≤ 622 Mb/s: STM-4, STM-1	Coaxial APD
						0.96	1 550			
NR8501 Series	-40 to +85	-40 to +85	φ50	7	2.5	0.94	1 310	0.9V <sub>BR</sub>	2.5 Gb/s: STM-16	Coaxial APD
						0.96	1 550			

\*1  $\bar{P}_{Low}$  and  $\bar{P}_{High}$  are specified at 2.5 Gb/s

★ **REFERENCE**

Document Name	Document No.
Optical semiconductor devices for fiberoptic communications Selection Guide	P12480E
Opto-Electronics Devices Pamphlet	P13623E
Opto-Electronics Devices (CD-ROM)	P12944X
NEC semiconductor device reliability/quality control system	C11159E
Quality grades on NEC semiconductor devices	C11531E
SEMICONDUCTOR SELECTION GUIDE –Products and Packages–	X13769E

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<p><b>Caution</b> GaAs Products</p>	<p>The product contains gallium arsenide, GaAs. GaAs vapor and powder are hazardous to human health if inhaled or ingested.</p> <ul style="list-style-type: none"> <li>• Do not destroy or burn the product.</li> <li>• Do not cut or cleave off any part of the product.</li> <li>• Do not crush or chemically dissolve the product.</li> <li>• Do not put the product in the mouth.</li> </ul> <p>Follow related laws and ordinances for disposal. The product should be excluded from general industrial waste or household garbage.</p>
<p><b>Caution</b> Optical Fiber</p>	<p>A glass-fiber is attached on the product. Handle with care.</p> <ul style="list-style-type: none"> <li>• When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.</li> </ul>

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