RENESAS

DATA SHEET

Phase-out/Discontinued

PHOTO DIODE

NR7800 Series

ϕ80 μm InGaAs PIN-PD COAXIAL MODULE FOR 622 Mb/s, 156 Mb/s FIBEROPTIC COMMUNICATIONS AND EDFA MONITOR

DESCRIPTION

The NR7800 Series is an InGaAs PIN photo diode (PIN-PD) coaxial module with optical fiber pigtail. This module is designed for long wavelength optical communication systems and ideal as a receiver for Synchronous Digital Hierarchy (SDH) system, STM-4 and STM-1, ITU-T recommendations.

FEATURES

- Small dark current I_D = 0.1 nA
- High sensitivity S = 0.89 A/W @ λ = 1 310 nm
  S = 0.94 A/W @ λ = 1 550 nm
- Low operating voltage V_R = 5 V
- Coaxial module with SMF or GI-50 fiber
- With SC connector : standard, FC connector : option
  (Refer to **ORDERING INFORMATION**)

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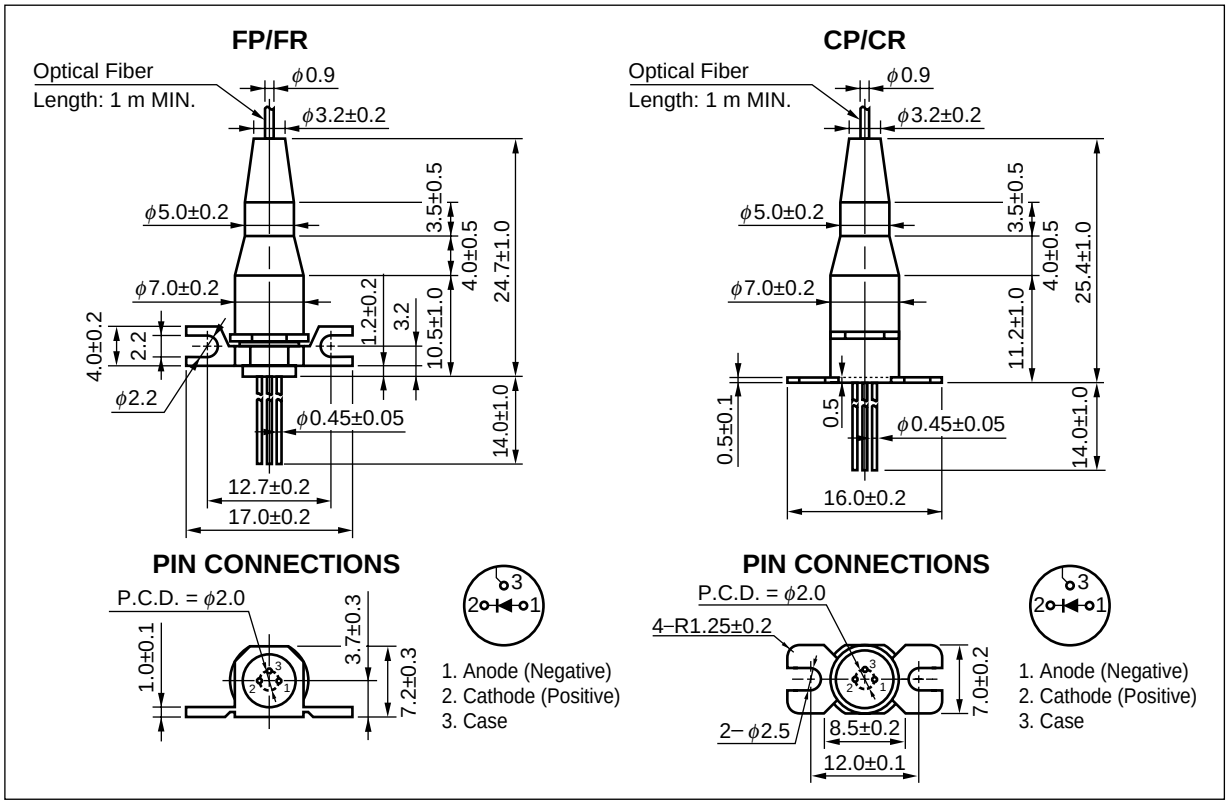
Printed in Japan

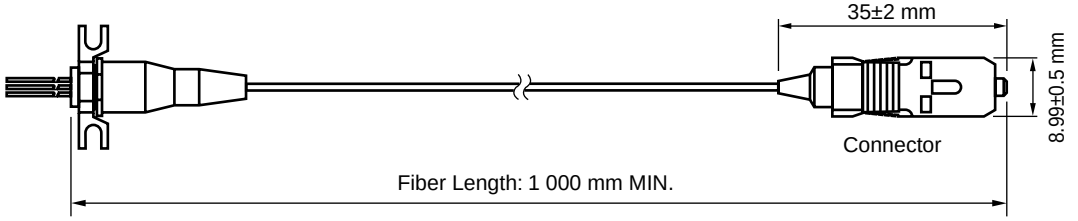
The mark ★ shows major revised points.

★ **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*1
★	NR7800FP-BC	Flat Mount Flange	SMF	With FC-UPC Connector
★	NR7800FP-CC			With SC-UPC Connector
★	NR7800FR-BB		GI-50 Fiber	With FC-SPC Connector
★	NR7800FR-CB			With SC-SPC Connector
	NR7800CP-BC	Vertical Mount Flange	SMF	With FC-UPC Connector
	NR7800CP-CC			With SC-UPC Connector
	NR7800CR-BB		GI-50 Fiber	With FC-SPC Connector
	NR7800CR-CB			With SC-SPC Connector

***1** SC Connector : standard
FC Connector : option

ABSOLUTE MAXIMUM RATINGS

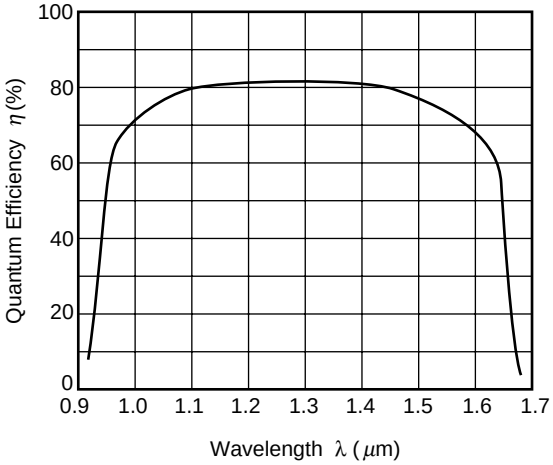
Parameter	Symbol	Ratings	Unit
Reverse Voltage	V_R	20	V
Forward Current	I_F	10	mA
Optical Input Power	P_{in}	8	mW
Operating Case Temperature	T_C	–40 to +85	°C
Storage Temperature	T_{stg}	–40 to +85	°C
Lead Soldering Temperature	T_{sld}	260 (10 sec.)	°C
Relative Humidity (noncondensing)	RH	85	%

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

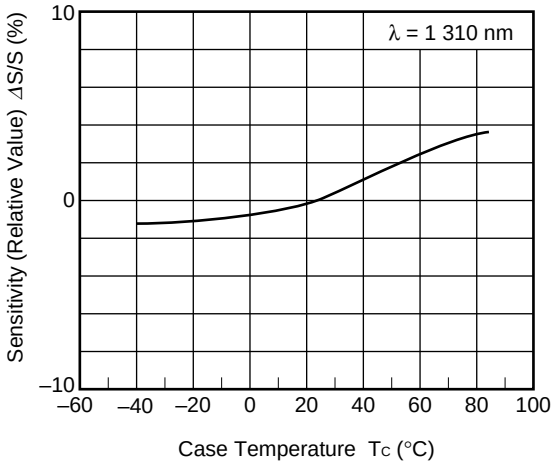
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Dark Current	I_D	V_R = 5 V, T_C = 25°C		0.1	1.0	nA
		V_R = 5 V			20	
Terminal Capacitance	C_t	V_R = 5 V, f = 1 MHz, T_C = 25°C		1.0	1.5	pF
Sensitivity	S	V_R = 5 V, λ = 1 310 nm	0.78	0.89		A/W
		V_R = 5 V, λ = 1 550 nm	0.80	0.94		
Temperature Dependence of Sensitivity	ΔS_t	V_R = 5 V, λ = 1 550 nm	–5		5	%
Polarization Dependence of Sensitivity	ΔS_p	V_R = 5 V, λ = 1 550 nm, T_C = 25°C	–2.5		2.5	%
Wavelength Dependence of Sensitivity	ΔS_w	V_R = 5 V, λ = 1 520 to 1 560 nm, T_C = 25°C	–2.5		2.5	%
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			

TYPICAL CHARACTERISTICS (T_C = 25°C, unless otherwise specified)

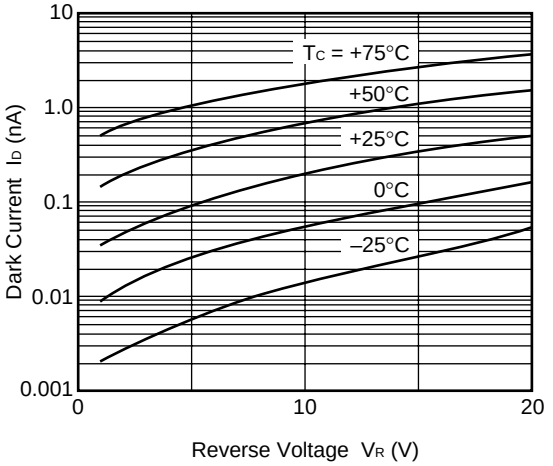
WAVELENGTH DEPENDENCE OF QUANTUM EFFICIENCY



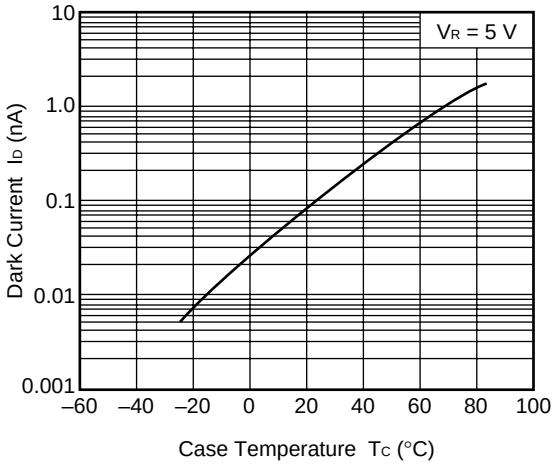
TEMPERATURE DEPENDENCE OF SENSITIVITY



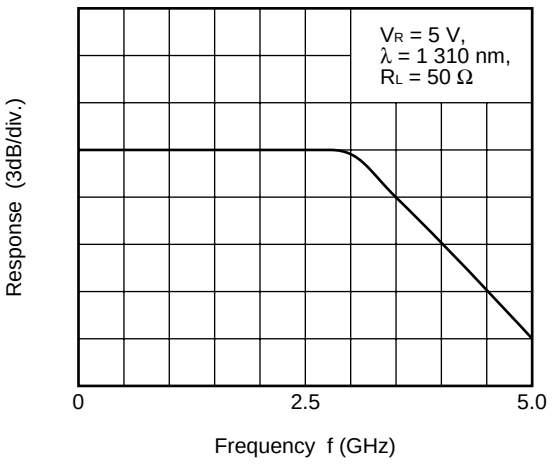
REVERSE VOLTAGE DEPENDENCE OF DARK CURRENT



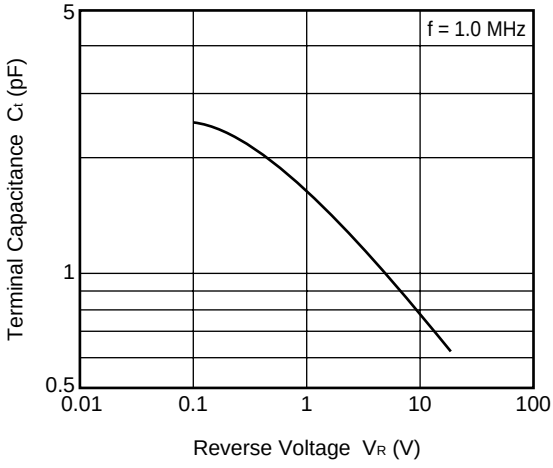
TEMPERATURE DEPENDENCE OF DARK CURRENT



FREQUENCY RESPONSE



REVERSE VOLTAGE DEPENDENCE OF TERMINAL CAPACITANCE



Remark The graphs indicate nominal characteristics.

InGaAs APD/PD FAMILY

Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics (T_C = 25°C)						Applications	Package
	T_C (°C)	T_{stg} (°C)	Detecting Area Size (μm)	I_D (nA)	f_C (GHz)	S (A/W)	@λ (nm)	V_R (V)		
				TYP.	MIN.	TYP.				
★ NR4500BP-CC	0 to +85	–40 to +85	ϕ50	–	2.5*1	0.94	1 310	0.9V_{BR}	2.5 Gb/s: STM-16	Coaxial APD with an Internal pre-amp
NR4500CP-CC						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_{BR}	≤ 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_{BR}	2.5 Gb/s: STM-16	Coaxial APD
						0.96	1 550			

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

REFERENCE

Document Name	Document No.
Optical semiconducrtor 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[*1]	C11159E
Quality grades on NEC semiconductor devices[*1]	C11531E
SEMICONDUCTOR SELECTION GUIDE –Products and Packages–[*1]	X13769E

***1** Published by NEC Corporation

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Caution Optical Fiber	A glass-fiber is attached on the product. Handle with care. • When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.

▶**Business issue**

NEC Compound Semiconductor Devices, Ltd.
5th Sales Group, Sales Division TEL: +81-3-3798-6372 FAX: +81-3-3798-6783 E-mail: salesinfo@csd-nec.com

NEC Compound Semiconductor Devices Hong Kong Limited
Hong Kong Head Office TEL: +852-3107-7303 FAX: +852-3107-7309
Taipei Branch Office TEL: +886-2-8712-0478 FAX: +886-2-2545-3859
Korea Branch Office TEL: +82-2-528-0301 FAX: +82-2-528-0302

NEC Electron Devices European Operations http://www.nec.de/
TEL: +49-211-6503-101 FAX: +49-211-6503-487

California Eastern Laboratories, Inc. http://www.cel.com/
TEL: +1-408-988-3500 FAX: +1-408-988-0279

▶**Technical issue**

NEC Compound Semiconductor Devices, Ltd. http://www.csd-nec.com/
Sales Engineering Group, Sales Division
E-mail: techinfo@csd-nec.com FAX: +81-44-435-1918

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