DATA SHEET

NEC

PHOTO DIODE

NDL5471R Series

1 000 to 1 600 nm OPTICAL FIBER COMMUNICATIONS
ϕ120 μm InGaAs PIN PHOTO DIODE RECEPTACLE MODULE

DESCRIPTION

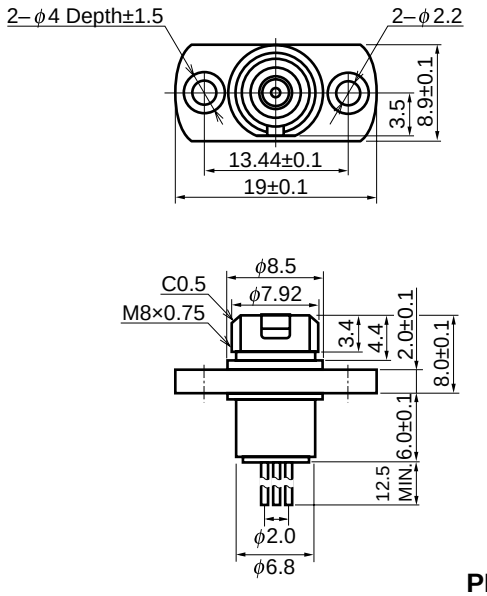
The NDL5471R Series is an InGaAs PIN photo diode receptacle module especially designed for a detector of long wavelength optical fiber communications systems. It covers the wavelength range between 1 000 and 1 600 nm with high efficiency.

FEATURES

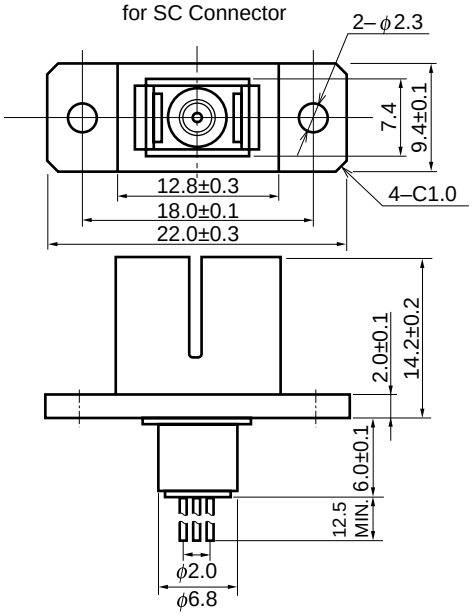
- Small dark current I_D = 0.1 nA
- High quantum efficiency η = 86 % @ λ = 1 300 nm
  η = 80 % @ λ = 1 550 nm
- Cut-off frequency f_C = 1.5 GHz MIN.
- Detecting area size ϕ120 μm
- Low operating voltage

PACKAGE DIMENSIONS
in millimeters

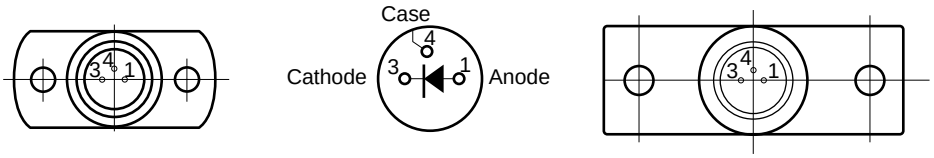
NDL5471RC
for FC Connector



NDL5471RD
for SC Connector



PIN CONNECTIONS



The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all devices/types available in every country. Please check with local NEC representative for availability and additional information.

Document No. P10263EJ4V0DS00 (4th edition)
Date Published April 1999 NS CP(K)
Printed in Japan

The mark ★ shows major revised points.

ORDERING INFORMATION

Part Number	Device Type
NDL5471RC	FC type receptacle module
NDL5471RD	SC type receptacle module

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C, unless otherwise specified)

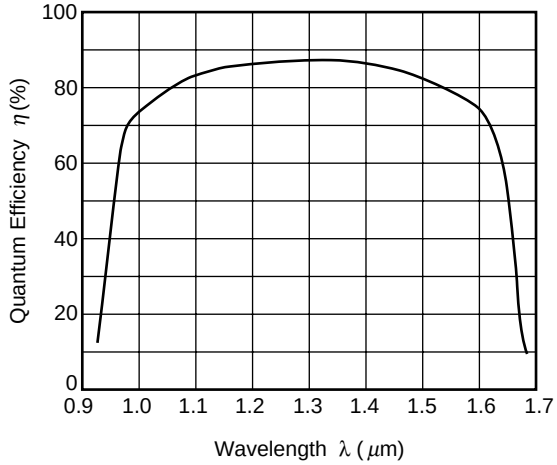
Parameter	Symbol	Ratings	Unit
Reverse Voltage	V_R	20	V
Forward Current	I_F	10	mA
Reverse Current	I_R	0.5	mA
Optical Input Power	P_{in}	8	mW
Operating Case Temperature	T_C	–40 to +85	°C
Storage Temperature	T_{stg}	–40 to +85	°C

ELECTRO-OPTICAL CHARACTERISTICS (T_C = 25 °C)

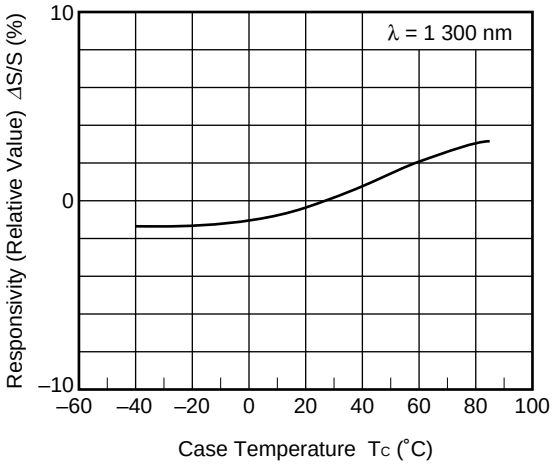
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Dark Current	I_D	V_R = 5 V		0.1	1.0	nA
Terminal Capacitance	C_t	V_R = 5 V, f = 1.0 MHz		1.1	1.5	pF
Quantum Efficiency	η	λ = 1 300 nm, V_R = 5 V	75	86		%
		λ = 1 550 nm, V_R = 5 V		80		
Responsivity	S	λ = 1 300 nm, V_R = 5 V	0.78	0.89		A/W
		λ = 1 550 nm, V_R = 5 V		1.0		
Cut-off Frequency	f_C	V_R = 5 V, R_L = 50 Ω, –3dB	1.5			GHz

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

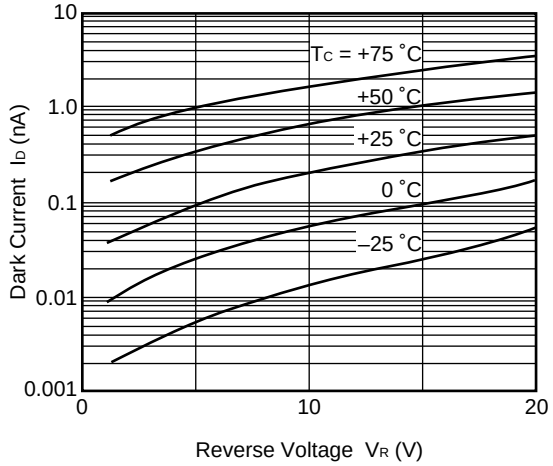
WAVELENGTH DEPENDENCE OF QUANTUM EFFICIENCY



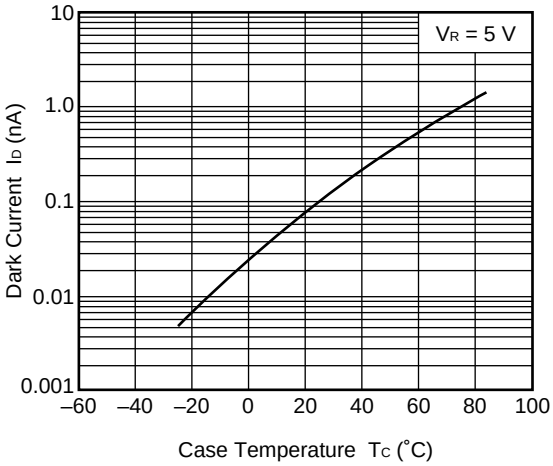
TEMPERATURE DEPENDENCE OF RESPONSIVITY



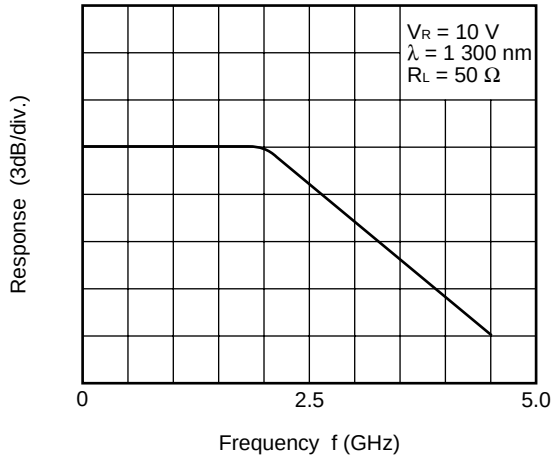
REVERSE VOLTAGE DEPENDENCE OF DARK CURRENT



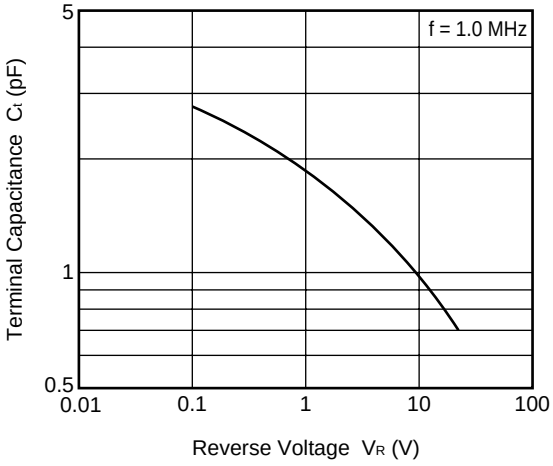
TEMPERATURE DEPENDENCE OF DARK CURRENT



FREQUENCY RESPONSE



REVERSE VOLTAGE DEPENDENCE OF TERMINAL CAPACITANCE



Remark The graphs indicate nominal characteristics.

★ InGaAs PIN-PD

Part number	Absolute maximum ratings			Typical characteristics (T_C = 25°C)								Package
	P_{in} (mW)	T_C (°C)	T_{stg} (°C)	Detecting area size (μm)	I_D (nA) VR (V)	I_D (nA) TYP.	C_t (pF) VR (V)	C_t (pF) TYP.	S (A/W) λ (nm)	S (A/W) TYP.	f_C (GHz) MIN.	
NDL5421P/P1/P2	8	–40 to +85	–40 to +85	ϕ 50	5	0.1	5	0.7	1300	0.89	2.5	Coaxial
									1550	0.94		
NDL5422P	–	–40 to +70	–40 to +85	ϕ 50	5	0.1	–	–	1300	0.89	2.5	Butterfly with AMP
									1550	1.00		
NDL5461P/P1/P2	8	–40 to +85	–40 to +85	ϕ 80	5	0.1	5	1.0	1300	0.89	2.5	Coaxial
									1550	0.94		
NDL5471RC/RD	8	–40 to +85	–40 to +85	ϕ 120	5	0.1	5	1.1	1300	0.89	1.5	Receptacle
									1550	1.00		
NDL5481P/P1/P2	8	–40 to +85	–40 to +85	ϕ 80	10	0.1	10	0.7	1300	0.85	2.5	Coaxial

★ REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system	C11159E
Quality grades on NEC semiconductor devices	C11531E
Semiconductor device mounting technology manual	C10535E
Semiconductor selection guide	X10679E

[MEMO]

[MEMO]

CAUTION

Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.

The export of this product from Japan is prohibited without governmental license. To export or re-export this product from a country other than Japan may also be prohibited without a license from that country. Please call an NEC sales representative.

- **The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.**
- No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Corporation. NEC Corporation assumes no responsibility for any errors which may appear in this document.
- NEC Corporation does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a device described herein or any other liability arising from use of such device. No license, either express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Corporation or others.
- Descriptions of circuits, software, and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software, and information in the design of the customer's equipment shall be done under the full responsibility of the customer. NEC Corporation assumes no responsibility for any losses incurred by the customer or third parties arising from the use of these circuits, software, and information.
- While NEC Corporation has been making continuous effort to enhance the reliability of its semiconductor devices, the possibility of defects cannot be eliminated entirely. To minimize risks of damage or injury to persons or property arising from a defect in an NEC semiconductor device, customers must incorporate sufficient safety measures in its design, such as redundancy, fire-containment, and anti-failure features.
- NEC devices are classified into the following three quality grades:
  "Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.
  - Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots
  - Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)
  - Specific: Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

  The quality grade of NEC devices is "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact an NEC sales representative in advance.