CEL

PHOTO DIODE

NR8300FP-CC

ϕ30 μm InGaAs APD IN COAXIAL PACKAGE FOR FIBER OPTIC COMMUNICATION AND OTDR APPLICATIONS

FEATURES

- **SMALL DARK CURRENT:**
  I_D = 5 nA
- **SMALL TERMINAL CAPACITANCE:**
  C_T = 0.35 pF at 0.9 V_{BR}
- **HIGH QUANTUM EFFICIENCY:**
  η = 90% at λ = 1310 nm, M = 1
  η = 77% at λ = 1550 nm, M = 1
- **HIGH SPEED RESPONSE:**
  f_C = 2.5 GHz at M = 10
- **DETECTING AREA SIZE:**
  ϕ30 μm
- **COAXIAL MODULE WITH SINGLE MODE FIBER (SM-9/125)**

DESCRIPTION

The NR8300FP-CC is an InGaAs avalanche photo diode module with single mode fiber. It is designed for optical test instruments, especially OTDR systems.

ELECTRO-OPTICAL CHARACTERISTICS (T_C = 25°C, unless otherwise specified)

PART NUMBER			NR8300FP-CC		
SYMBOLS	**PARAMETERS AND CONDITIONS**	**UNITS**	**MIN**	**TYP**	**MAX**
V_{BR}	Reverse Breakdown Voltage, I_D = 100 μA	V	50	70	100
δ	Temperature Coefficient of Reverse Breakdown Voltage[1]	%/°C		0.2	
I_D	Dark Current, V_R = V_{BR} x 0.9	nA		5	25
I_{DM}	Multiplied Dark Current, M = 2 to 10	nA		1	5
C_t	Terminal Capacitance, V_R = V_{BR} x 0.9, f = 1 MHz	pF		0.35	0.60
f_C	Cut-off Frequency, M = 10	GHz	2.5		
η	Quantum Efficiency, λ = 1310 nm, M = 1	%	76	90	
	λ = 1550 nm, M = 1		65	77	
S	Responsivity, λ = 1310 nm, M = 1	A/W	0.80	0.94	
	λ = 1550 nm, M = 1		0.81	0.96	
M	Multiplication Factor, λ = 1310 nm, I_{PO} = 1.0 μA, V_R = V (at I_D = 1 μA)	M	30	40	
X	Excess Noise Factor[2], λ = 1310 nm, 1 550 nm,			0.7	
F	I_{PO} = 1.0 μA, M = 10, f = 35 MHz, B = 1 MHz			5	
ORL	Optical Return Loss, SMF	dB	30		

Note: 1. $$\delta = \frac{V_{BR} < 25°C + \Delta T°C > - V_{BR} < 25°C>}{\Delta T°C > - V_{BR} < 25°C>}$$

2. $F = M^X$

ABSOLUTE MAXIMUM RATINGS[1]

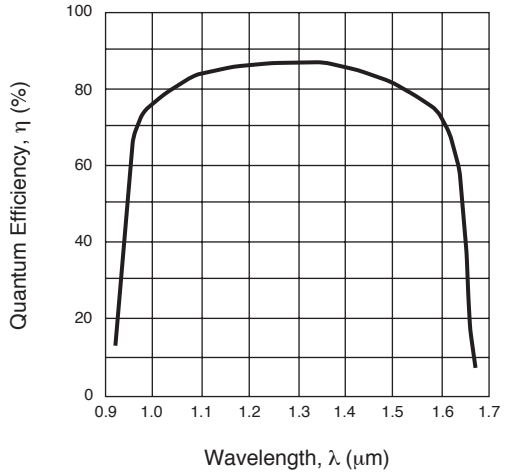
(T_C = 25°C, unless otherwise specified)

SYMBOLS	PARAMETERS	UNITS	RATINGS
I_F	Forward Current	mA	10
I_R	Reverse Current	mA	0.5
T_C	Operating Case Temp.	°C	-40 to +85
T_{STG}	Storage Temperature	°C	-40 to +85
T_{SOL}	Lead Soldering Temp.	°C	260 (10 sec.)
RH	Relative Humidity (noncondensing)	%	85

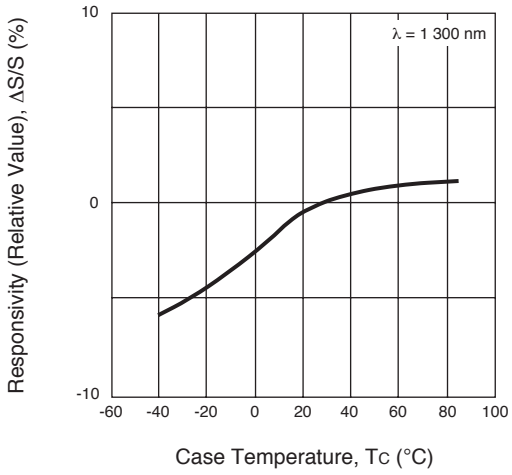
Note:
1. Operation in excess of any one of these parameters may result in permanent damage.

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

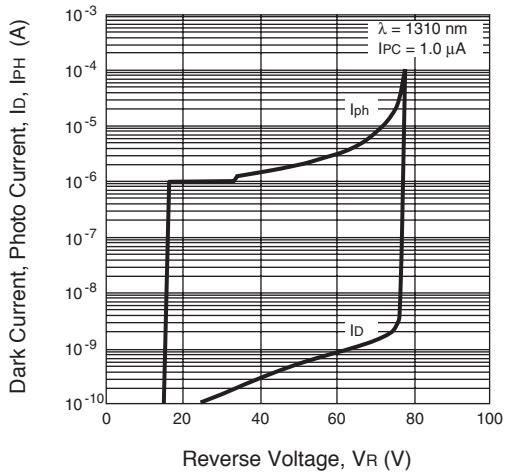
WAVELENGTH DEPENDENCE OF QUANTUM EFFICIENCY



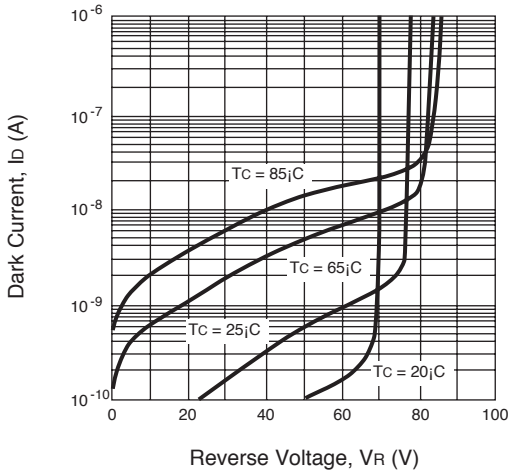
TEMPERATURE DEPENDENCE OF RESPONSIVITY



DARK CURRENT AND PHOTO CURRENT vs. REVERSE VOLTAGE

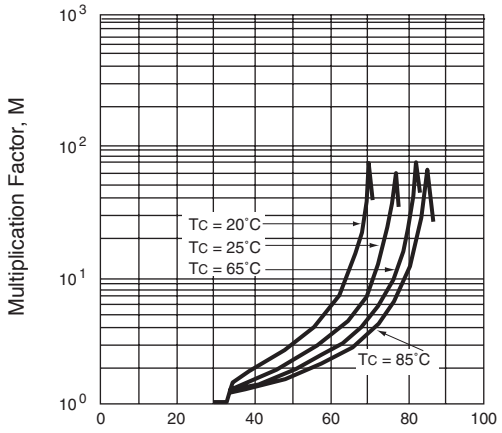


DARK CURRENT vs. REVERSE VOLTAGE

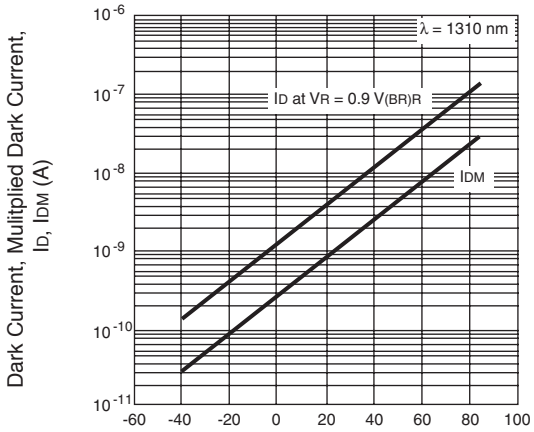


TYPICAL PERFORMANCE CURVES (T_C = 25°C)

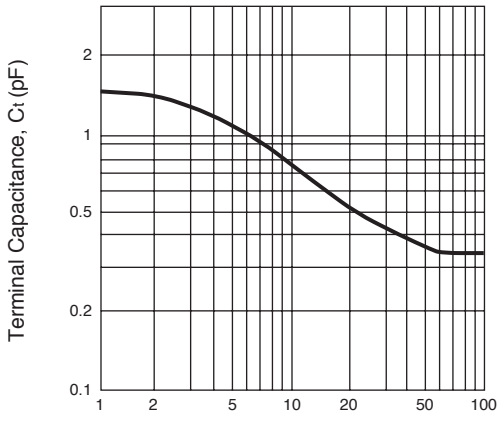
MULTIPLICATION FACTOR vs. REVERSE VOLTAGE



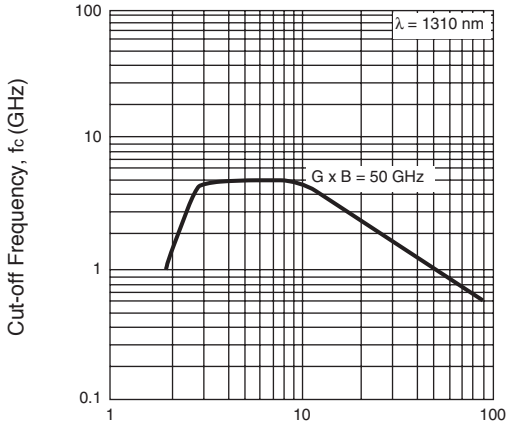
TEMPERATURE DEPENDENCE OF DARK CURRENT vs. MULTIPLIED DARK CURRENT



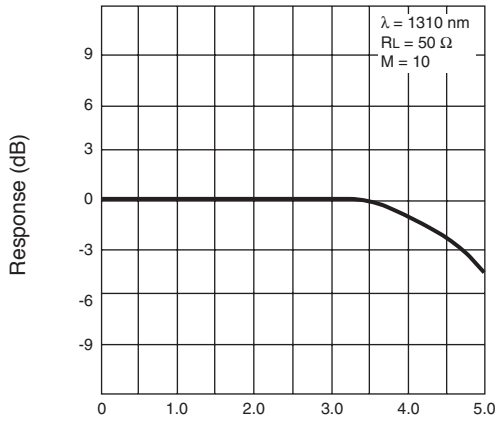
TERMINAL CAPACITANCE vs. REVERSE VOLTAGE



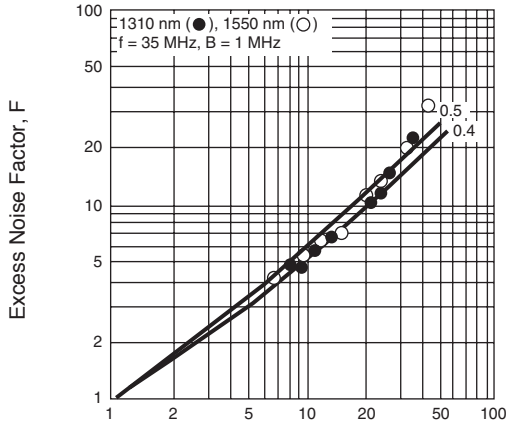
CUT-OFF FREQUENCY vs. MULTIPLICATION FACTOR



FREQUENCY RESPONSE



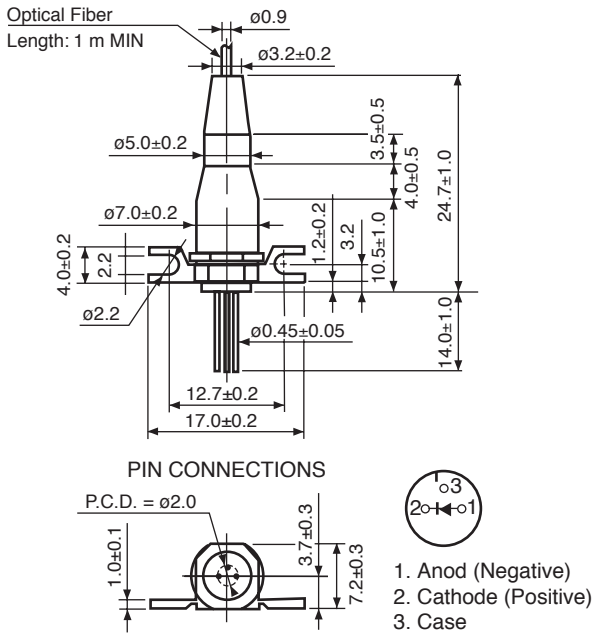
EXCESS NOISE FACTOR vs. MULTIPLICATION FACTOR



Remark: The graphs indicate nominal characteristics.

OUTLINE DIMENSIONS (Units in mm)

NR8300FP-CC



PIN CONNECTIONS

1. Anod (Negative)
2. Cathode (Positive)
3. Case

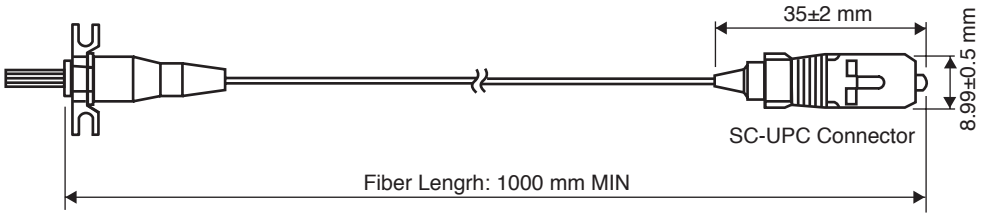
ORDERING INFORMATION

Part Number	Flange Type	Fiber Type	Available Connector
NR8300FP-CC-AZ*	Flat Mount Flange	SMF	With SC-UPC Connector

***NOTE:**
Please refer to the last page of this data sheet, “Compliance with EU Directives” for Pb-Free RoHS Compliance Infomation.

OPTICAL FIBER CHARACTERISTICS

PARAMETER	SPECIFICATION	UNIT
Mode Field Diameter	9.5±1	μm
Core Diameter	—	μm
Cladding Diameter	125±2	μm
Maximum Cladding Noncircularity	2	%
Maximum Core/Cladding Concentricity	1.6	%
Outer Diameter	0.9±0.1	mm
Cut-off Wavelength	1100 to 1270	nm
Minimum Fiber Bending Radius	30	mm
Fiber Length	1000 Min.	mm
Flammability	UL1581 VW-1	



NOTICE

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. California Eastern Laboratories and Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
2. California Eastern Laboratories has used reasonable care in preparing the information included in this document, but California Eastern Laboratories does not warrant that such information is error free. California Eastern Laboratories and Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
3. California Eastern Laboratories and Renesas Electronics do not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of California Eastern Laboratories or Renesas Electronics or others.
4. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part. California Eastern Laboratories and Renesas Electronics assume no responsibility for any losses incurred by you or third parties arising from such alteration, modification, copy or otherwise misappropriation of Renesas Electronics product.
5. Renesas Electronics products are classified according to the following two quality grades: “Standard” and “High Quality”. The recommended applications for each Renesas Electronics product depends on the product’s quality grade, as indicated below. “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 etc. “High Quality”: Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; and safety equipment etc. Renesas Electronics products are neither intended nor authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems, surgical implantations etc.), or may cause serious property damages (nuclear reactor control systems, military equipment etc.). You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application for which it is not intended. California Eastern Laboratories and Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for which the product is not intended by California Eastern Laboratories or Renesas Electronics.
6. You should use the Renesas Electronics products described in this document within the range specified by California Eastern Laboratories, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. California Eastern Laboratories shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
7. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or systems manufactured by you.
8. Please contact a California Eastern Laboratories sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. California Eastern Laboratories and Renesas Electronics assume no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
9. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You should not use Renesas Electronics products or technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. When exporting the Renesas Electronics products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations.
10. It is the responsibility of the buyer or distributor of California Eastern Laboratories, who distributes, disposes of, or otherwise places the Renesas Electronics product with a third party, to notify such third party in advance of the contents and conditions set forth in this document, California Eastern Laboratories and Renesas Electronics assume no responsibility for any losses incurred by you or third parties as a result of unauthorized use of Renesas Electronics products.
11. This document may not be reproduced or duplicated in any form, in whole or in part, without prior written consent of California Eastern Laboratories.
12. Please contact a California Eastern Laboratories sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

NOTE 1: “Renesas Electronics” as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.
NOTE 2: “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.
NOTE 3: Products and product information are subject to change without notice.

CEL Headquarters • 4590 Patrick Henry Drive, Santa Clara, CA 95054 • Phone (408) 919-2500 • www.cel.com

For a complete list of sales offices, representatives and distributors,
Please visit our website: **www.cel.com/contactus**

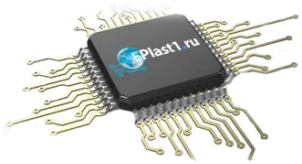
Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)
Факс: 8 (812) 320-02-42
Электронная почта: org@eplast1.ru
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.