To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (http://www.renesas.com)

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PHOTO DIODE

NR8300FP-CC

1 000 to 1 600 nm OPTICAL FIBER COMMUNICATIONS
ϕ 30 μm InGaAs AVALANCHE PHOTO DIODE MODULE

DESCRIPTION

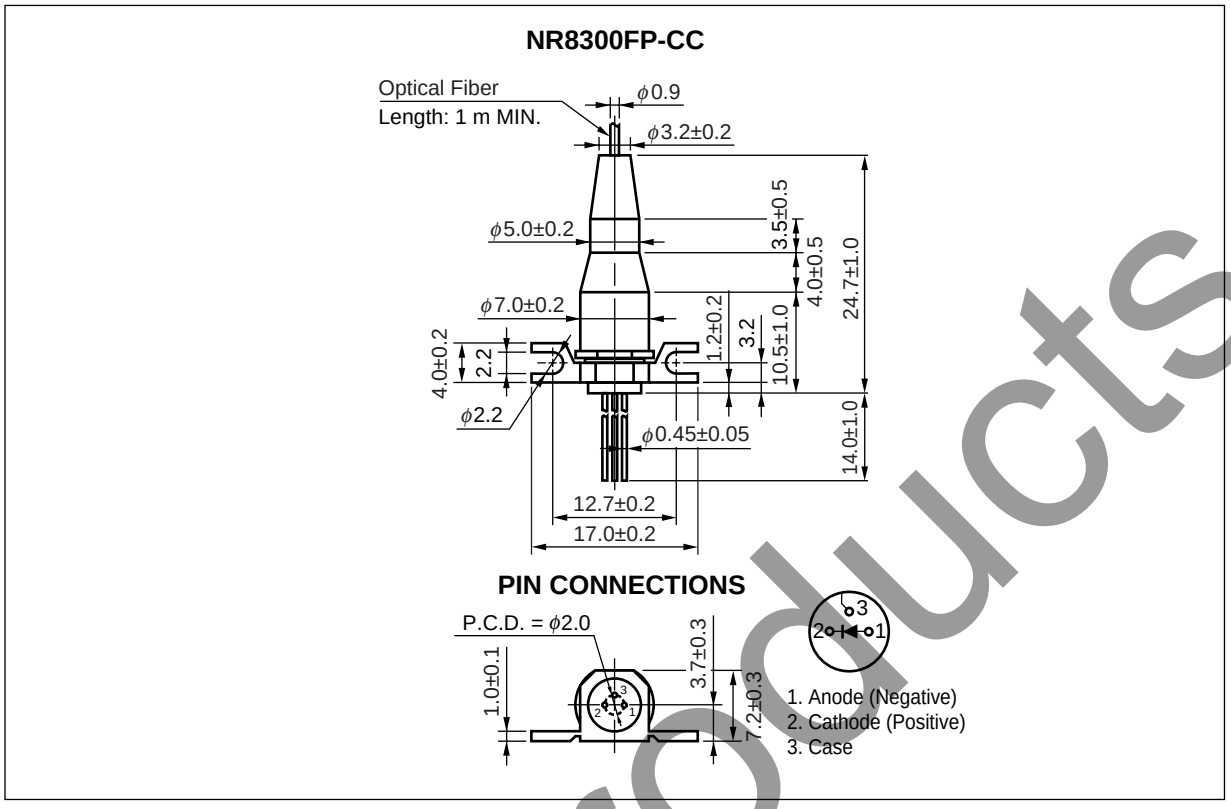
The NR8300FP-CC is an InGaAs avalanche photo diode module with single mode fiber, and can be used in OTDR systems.

FEATURES

- Small dark current I_D = 5 nA
- Small terminal capacitance C_t = 0.35 pF @ 0.9 $V_{(BR)R}$
- High quantum efficiency η = 90% @ λ = 1 310 nm, M = 1
  η = 77% @ λ = 1 550 nm, M = 1
- High speed response f_C = 2.5 GHz @ M = 10
- Detecting area size ϕ 30 μm
- Coaxial module with single mode fiber (SM-9/125)

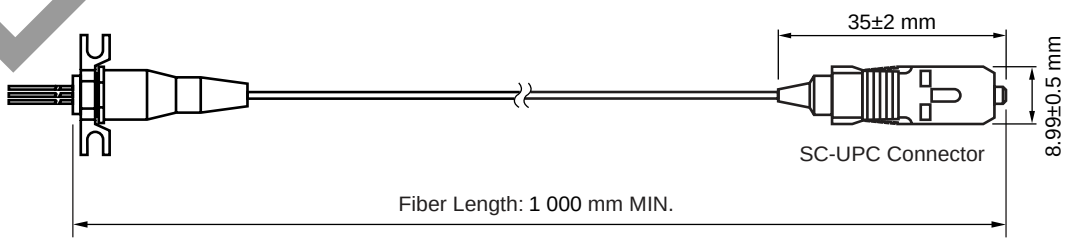
Document No. PL10116EJ01V0DS (1st edition)
Date Published March 2002 CP(K)
Printed in Japan

PACKAGE DIMENSIONS (UNIT: mm)



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	1 100 to 1 270	nm
Minimum Fiber Bending Radius	30	mm
Fiber Length	1 000 MIN.	mm
Flammability	UL1581 VW-1	



ORDERING INFORMATION

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

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Forward Current	I_F	10	mA
Reverse Current	I_R	0.5	mA
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 = 25°C, unless otherwise specified)

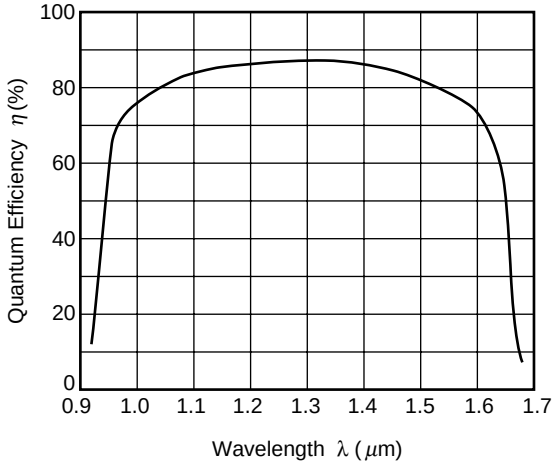
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Reverse Breakdown Voltage	V_{BR}	I_D = 100 μA	50	70	100	V
Temperature Coefficient of Reverse Breakdown Voltage	δ *1			0.2		%/°C
Dark Current	I_D	$V_R = V_{BR} \times 0.9$		5	25	nA
Multiplied Dark Current	I_{DM}	M = 2 to 10		1	5	nA
Terminal Capacitance	C_t	$V_R = V_{BR} \times 0.9$, f = 1 MHz		0.35	0.60	pF
Cut-off Frequency	f_C	M = 10	2.5			GHz
Sensitivity	S	λ = 1 310 nm, M = 1	0.8	0.94		A/W
		λ = 1 550 nm, M = 1	0.81	0.96		
Multiplication Factor	M	λ = 1 310 nm, I_{po} = 1.0 μA, V_R = V (@ I_D = 1 μA)	30	40		
Excess Noise Factor*2	x	λ = 1 310 nm, 1 550 nm, I_{po} = 1.0 μA,		0.7		
	F	M = 10, f = 35 MHz, B = 1 MHz		5		
Optical Return Loss	ORL	SMF	30			dB

***1** $\delta = \dfrac{V_{BR}(25°C + \Delta T°C) - V_{BR}(25°C)}{\Delta T°C \cdot V_{BR}(25°C)}$

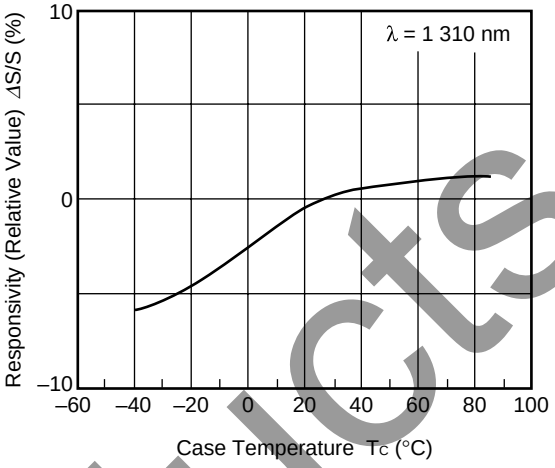
***2** $F = M^x$

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

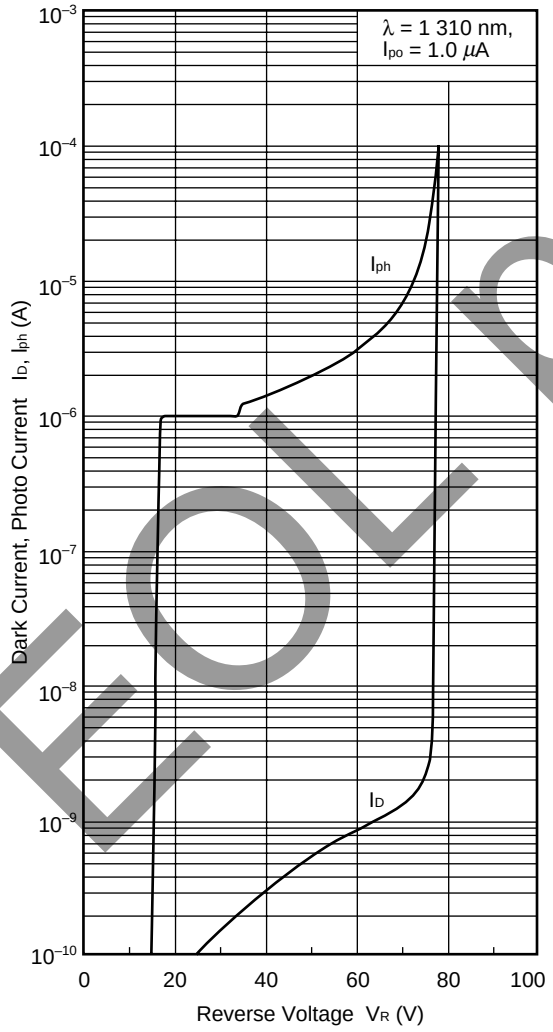
WAVELENGTH DEPENDENCE OF QUANTUM EFFICIENCY



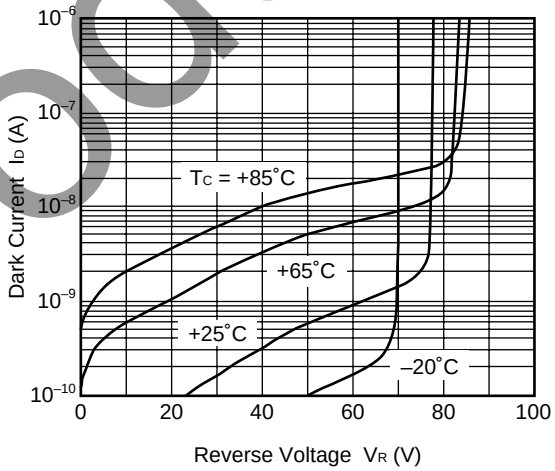
TEMPERATURE DEPENDENCE OF RESPONSIVITY



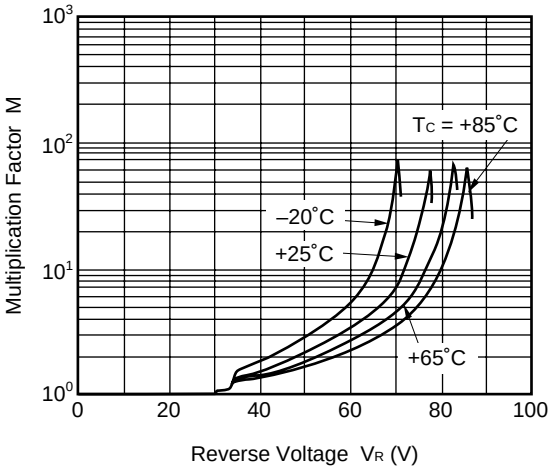
DARK CURRENT AND PHOTO CURRENT vs. REVERSE VOLTAGE



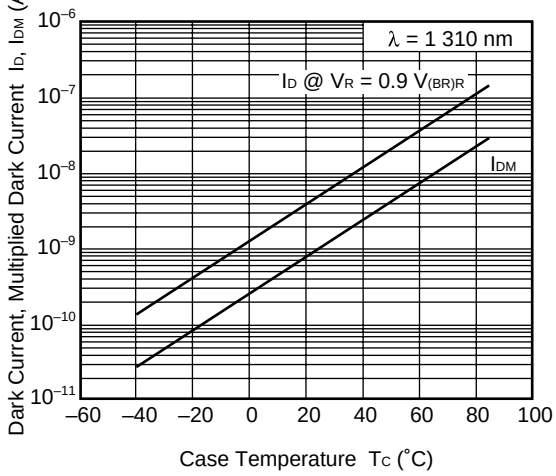
DARK CURRENT vs. REVERSE VOLTAGE



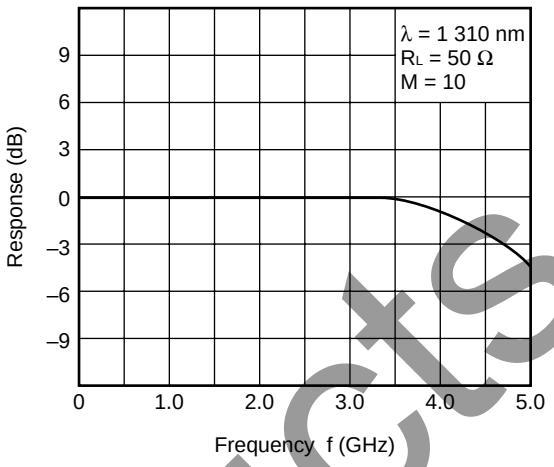
MULTIPLICATION FACTOR vs. REVERSE VOLTAGE



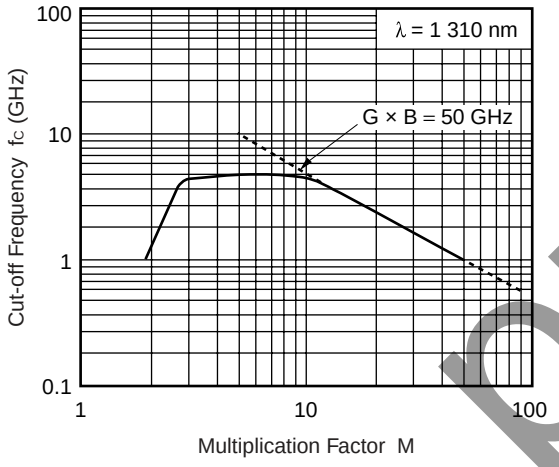
TEMPERATURE DEPENDENCE OF DARK CURRENT AND MULTIPLIED DARK CURRENT



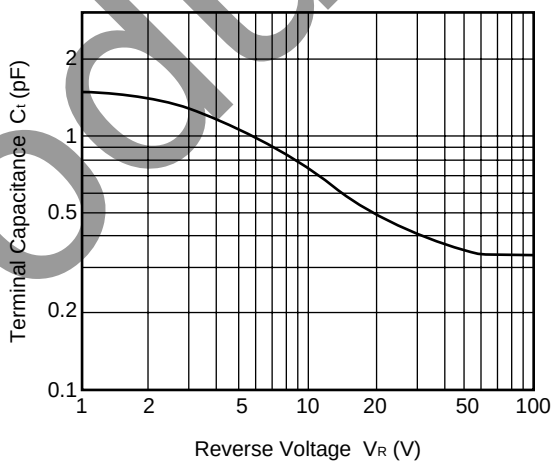
FREQUENCY RESPONSE



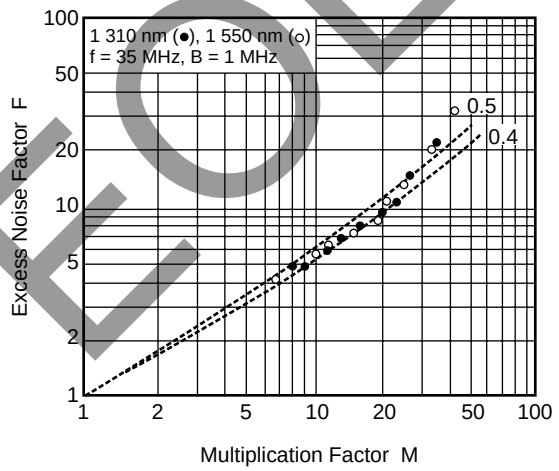
CUT-OFF FREQUENCY vs. MULTIPLICATION FACTOR



TERMINAL CAPACITANCE vs. REVERSE VOLTAGE



EXCESS NOISE FACTOR vs. MULTIPLICATION FACTOR



Remark The graphs indicate nominal characteristics.

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

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M8E 00.4-0110

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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**

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