

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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

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**$\phi$  80  $\mu$ m InGaAs AVALANCHE PHOTO DIODE MODULE  
FOR OTDR APPLICATIONS**

**DESCRIPTION**

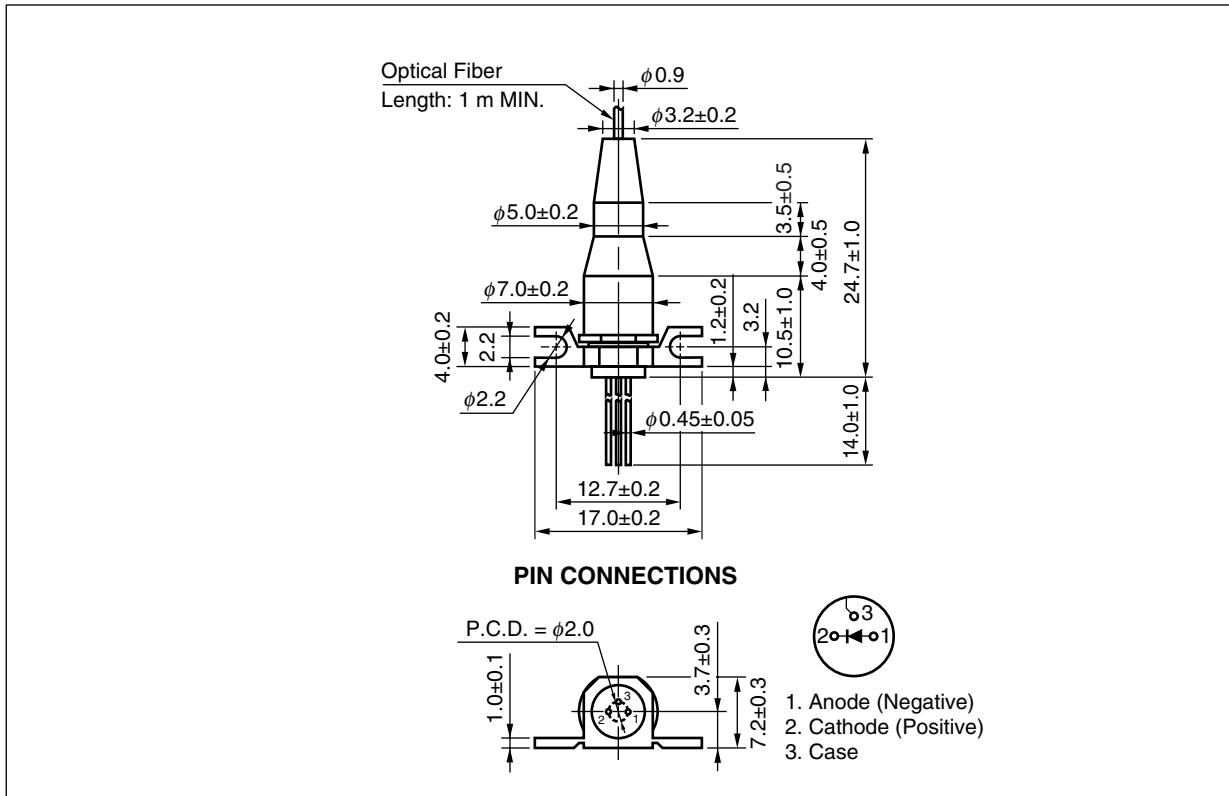
The NR8800FS-CB is an InGaAs avalanche photo diode module with multi mode fiber, and can be used in OTDR systems.

**FEATURES**

- Small dark current  $I_D = 7$  nA
- Small terminal capacitance  $C_t = 0.5$  pF @ 0.9 V<sub>(BR)R</sub>
- High sensitivity  $S = 0.94$  A/W @  $\lambda = 1310$  nm, M = 1
- Detecting area size  $\phi$  80  $\mu$ m
- Coaxial module with multi mode fiber (GI-62.5)

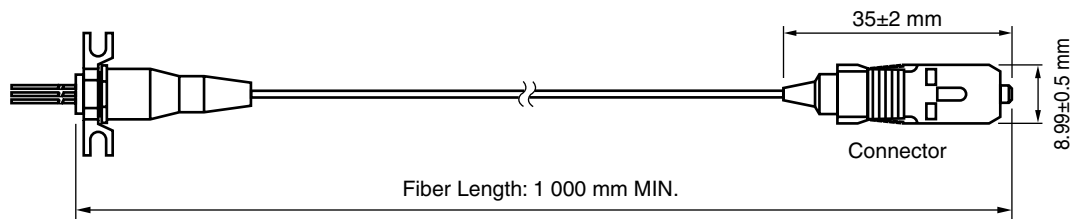
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PACKAGE DIMENSIONS (UNIT: mm)



OPTICAL FIBER CHARACTERISTICS

Parameter	Specification	Unit
	GI-62.5 Fiber	
Core Diameter	62.5 $\pm$ 3	$\mu$ m
Cladding Diameter	125 $\pm$ 2	$\mu$ m
Maximum Cladding Noncircularity	2	%
Maximum Core/Cladding Concentricity	4.0	%
Outer Diameter	0.9 $\pm$ 0.1	mm
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
NR8800FS-CB	Flat Mount Flange	GI-62.5 Fiber	With SC-SPC Connector

**ABSOLUTE MAXIMUM RATINGS**

Parameter	Symbol	Ratings	Unit
Forward Current	$I_F$	10	mA
Reverse Current	$I_R$	1.0	mA
Operating Case Temperature	$T_C$	-40 to +85	°C
Storage Temperature	$T_{stg}$	-40 to +85	°C
Lead Soldering Temperature	$T_{sld}$	350 (3 sec.)	°C
Relative Humidity (noncondensing)	RH	85	%

**ELECTRO-OPTICAL CHARACTERISTICS (T<sub>c</sub> = 25°C, unless otherwise specified)**

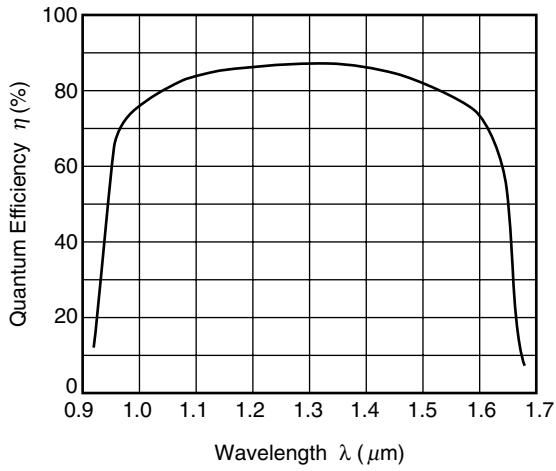
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Reverse Breakdown Voltage	V <sub>BR</sub>	I <sub>D</sub> = 100 μA	50	70	100	V
Temperature Coefficient of Reverse Breakdown Voltage	δ <sup>*1</sup>			0.2		%/°C
Dark Current	I <sub>D</sub>	V <sub>R</sub> = V <sub>BR</sub> × 0.9		7	30	nA
Multiplied Dark Current	I <sub>DM</sub>	M = 2 to 10		1	5	nA
Terminal Capacitance	C <sub>t</sub>	V <sub>R</sub> = V <sub>BR</sub> × 0.9, f = 1 MHz		0.5	0.75	pF
Sensitivity	S	λ = 1 310 nm, M = 1	0.8	0.94		A/W
Multiplication Factor	M	λ = 1 310 nm, I <sub>po</sub> = 1.0 μA, V <sub>R</sub> = V (@ I <sub>D</sub> = 1 μA)	30	70		
Excess Noise Factor <sup>*2</sup>	x	λ = 1 310 nm, I <sub>po</sub> = 1.0 μA,		0.7		
	F	M = 10, f = 35 MHz, B = 1 MHz		5		
Optical Return Loss	ORL	GI-62.5, λ = 1 310 nm	28			dB

\*1 
$$\delta = \frac{V_{BR}(25^{\circ}\text{C} + \Delta T^{\circ}\text{C}) - V_{BR}(25^{\circ}\text{C})}{\Delta T^{\circ}\text{C} \cdot V_{BR}(25^{\circ}\text{C})}$$

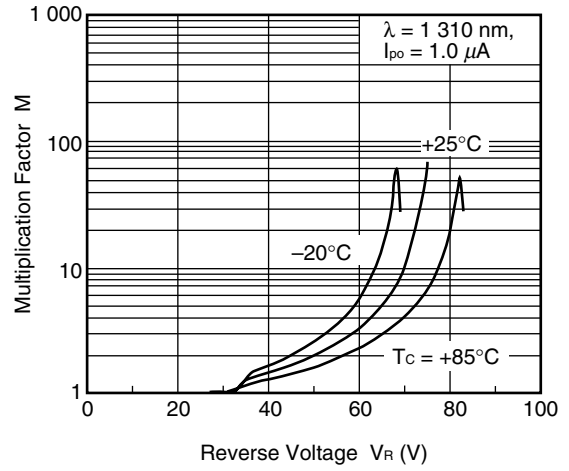
\*2  $F = M^x$

<R> TYPICAL CHARACTERISTICS ( $T_c = 25^\circ\text{C}$ , unless otherwise specified)

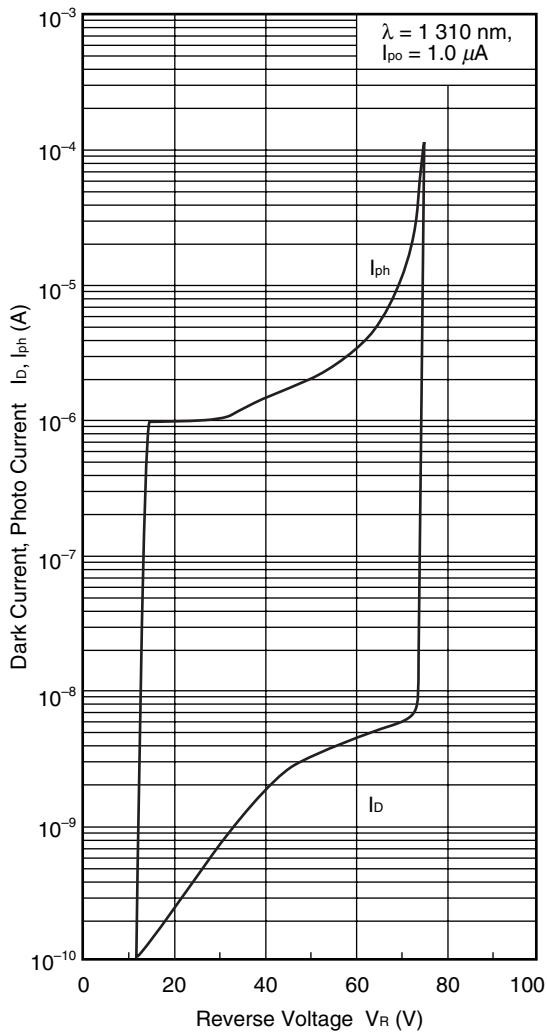
WAVELENGTH DEPENDENCE OF QUANTUM EFFICIENCY



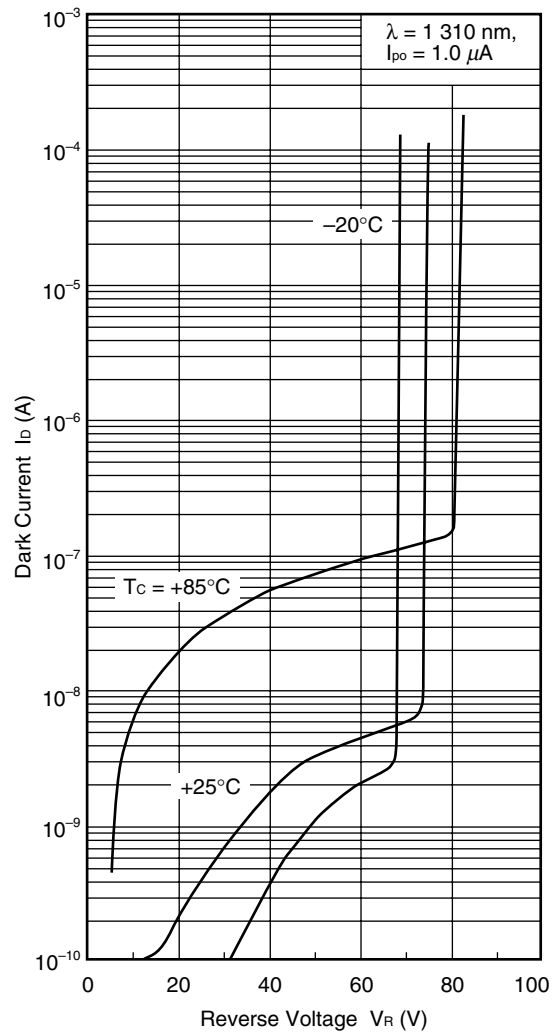
MULTIPLICATION FACTOR vs. REVERSE VOLTAGE



DARK CURRENT, PHOTO CURRENT vs. REVERSE VOLTAGE



DARK CURRENT vs. REVERSE VOLTAGE



**Remark** The graphs indicate nominal characteristics.

**REFERENCE**

Document Name	Document No.
Opto-Electronics Devices Pamphlet	PX10160E



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<p><b>Caution</b> GaAs Products</p>	<p>This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points.</p> <ul style="list-style-type: none"> <li>• Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below.               <ol style="list-style-type: none"> <li>1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials.</li> <li>2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal.</li> </ol> </li> <li>• Do not burn, destroy, cut, crush, or chemically dissolve the product.</li> <li>• Do not lick the product or in any way allow it to enter the mouth.</li> </ul>
<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>