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

NR8360JP-BC

ϕ30 μm InGaAs AVALANCHE PHOTO DIODE 14-PIN DIP MODULE WITH TEC

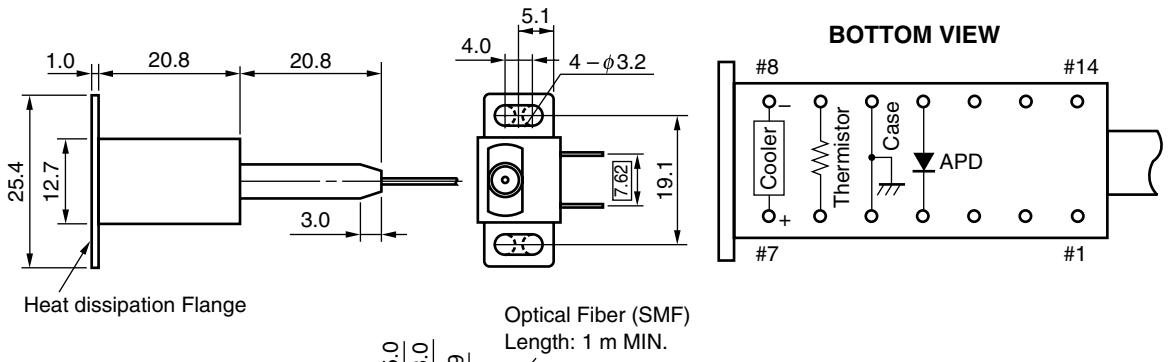
DESCRIPTION

The NR8360JP-BC is an InGaAs avalanche photodiode module with single mode fiber. A thermoelectric cooler is integrated enabling the temperature control of the APD chip. It is designed for long-reach optical communications and optical test instruments, especially OTDR.

FEATURES

- High quantum efficiency η = 85% @ λ = 1 310 nm
  η = 80% @ λ = 1 550 nm
- Small dark current I_D = 2 nA
- High-speed response f_C = 1.2 GHz @ M = 20
- Internal thermoelectric cooler
- Hermetically sealed 14-pin Dual In-line Package

<R> **PACKAGE DIMENSIONS (UNIT: mm)**



PIN CONNECTIONS

Pin No.	Function	Pin No.	Function
1	NC	8	Cooler Cathode
2	NC	9	Thermistor
3	NC	10	Case Ground
4	APD Cathode	11	APD Anode
5	Case Ground	12	NC
6	Thermistor	13	NC
7	Cooler Anode	14	NC

Caution In a typical application, the flange shall be mounted to a thermally conductive heat-sink properly. Improper thermal handling can cause permanent damage which is beyond reliability warranty.

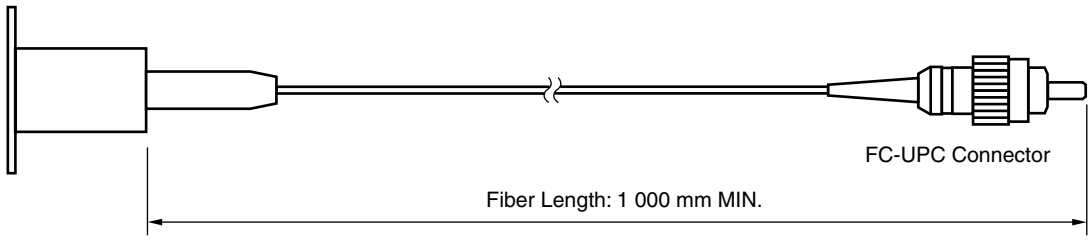
Document No. PL10724EJ01V0DS (1st edition)
(Previous No. P15453EJ1V0DS00)
Date Published August 2008 NS
Printed in Japan

The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

OPTICAL FIBER CHARACTERISTICS

Parameter	Specification	Unit
Mode Field Diameter	9.5±1	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	Available Connector
NR8360JP-BC	With FC-UPC Connector

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Forward Current	I_F	10	mA
Reverse Current	I_R	500	μA
Operating Case Temperature	T_C	–20 to +55	°C
Storage Temperature	T_{stg}	–40 to +85	°C
Lead Soldering Temperature	T_{sld}	260 (10 sec.)	°C
Cooler Current	I_C	1.0	A
Cooler Voltage	V_C	2.0	V

ELECTRO-OPTICAL CHARACTERISTICS (T_{APD} = 25°C, T_C = –20 to +55°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	10	nA
		$V_R = V_{BR} \times 0.9$, T_C = 55°C, I_C = 0.8 A		2	5	
Multiplied Dark Current	I_{DM}	M = 2 to 10		0.2	2.0	nA
Terminal Capacitance	C_t	$V_R = V_{BR} \times 0.9$, f = 1 MHz		1.0	1.7	pF
Cut-off Frequency	f_C	M = 10	1.0			GHz
		M = 20		1.2		
Quantum Efficiency	η	λ = 1 310 nm	70	85		%
		λ = 1 550 nm	65	80		
Sensitivity	S	λ = 1 310 nm	0.73	0.89		A/W
		λ = 1 550 nm		1.00		
Multiplication Factor	M	λ = 1 310 nm, I_{op} = 1.0 μA, V_R = V (@ I_D = 1 μA)	20	40		
Excess Noise Factor*2	x	λ = 1 310 nm, 1 550 nm, I_{op} = 1.0 μA,		0.7		
	F	M = 10, f = 35 MHz, B = 1 MHz		5		

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

***2** $F = M^X$

ELECTRO-OPTICAL CHARACTERISTICS (T_{APD} = 25°C, T_C = –20 to +55°C, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Thermistor Resistance	R		9.5	10.0	10.5	kΩ
B Constant	B		3 350	3 450	3 550	K
Cooler Current	I_C	ΔT = 45°C		0.6	0.8	A
Cooler Voltage	V_C	I_C = 0.8 A		1.1	1.5	V
Cooling Capacity	ΔT*1	I_C = 0.8 A	45			°C

***1** $\Delta T = \left| T_C - T_{APD} \right|$

<R> **REFERENCE**

Document Name	Document No.
Opto-Electronics Devices Pamphlet	PX10160E

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M8E 02. 11-1

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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.