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PHOTO DIODE
NR8360JP-BC

**φ 30 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 $\eta = 85\% @ \lambda = 1\ 310\ \text{nm}$
 $\eta = 80\% @ \lambda = 1\ 550\ \text{nm}$
- Small dark current $I_D = 2\ \text{nA}$
- High-speed response $f_c = 1.2\ \text{GHz} @ M = 20$
- Internal thermoelectric cooler
- Hermetically sealed 14-pin Dual In-line Package

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

Heat dissipation Flange

**Optical Fiber (SMF)
Length: 1 m MIN.**

BOTTOM VIEW

PIN CONNECTIONS

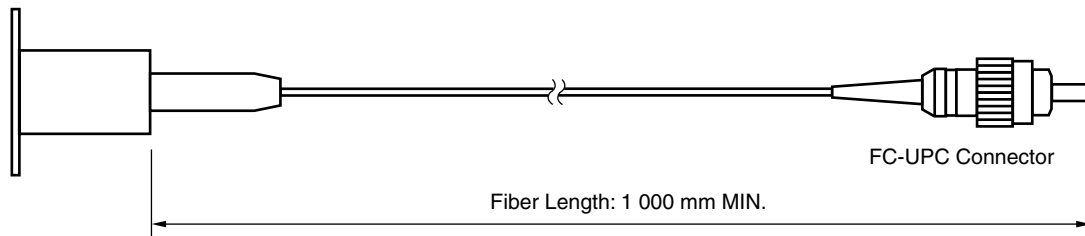
Pin No.	Function	Pin No.	Function
1	NC	8	Cooler Cathode
2	NC	9	Thermistor
3	NC	10	Case Ground
4	APD Cathode	11	APD Anode
5	Case Ground	12	NC
6	Thermistor	13	NC
7	Cooler Anode	14	NC

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.

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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 _{slid}	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} × 0.9		5	10	nA
		V _R = V _{BR} × 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} × 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 $\delta = \frac{V_{BR}(25^{\circ}\text{C} + \Delta T^{\circ}\text{C}) - V_{BR}(25^{\circ}\text{C})}{\Delta T^{\circ}\text{C} \cdot V_{BR}(25^{\circ}\text{C})}$

*2 $F = M^x$

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 $\Delta T = |T_C - T_{APD}|$

<R> **REFERENCE**

Document Name	Document No.
Opto-Electronics Devices Pamphlet	PX10160E

SAFETY INFORMATION ON THIS PRODUCT

<p>Caution 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"> • 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"> 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. 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. • Do not burn, destroy, cut, crush, or chemically dissolve the product. • Do not lick the product or in any way allow it to enter the mouth.
<p>Caution Optical Fiber</p>	<p>A glass-fiber is attached on the product. Handle with care.</p> <ul style="list-style-type: none"> • When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.

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