

$\phi 30 \mu\text{m}$ InGaAs AVALANCHE PHOTO DIODE

14-PIN DIP MODULE WITH TEC

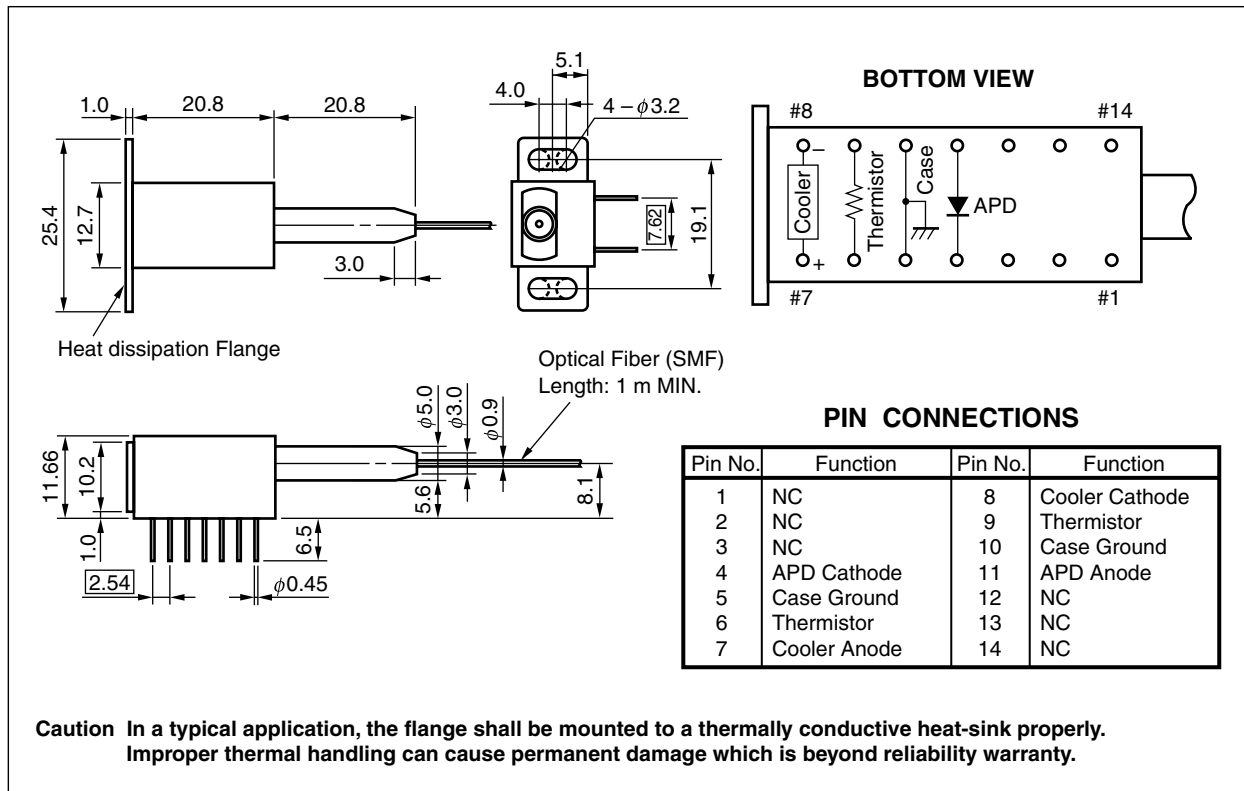
DESCRIPTION

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 $\eta = 85\% @ \lambda = 1310 \text{ nm}$
 $\eta = 80\% @ \lambda = 1550 \text{ nm}$
- 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

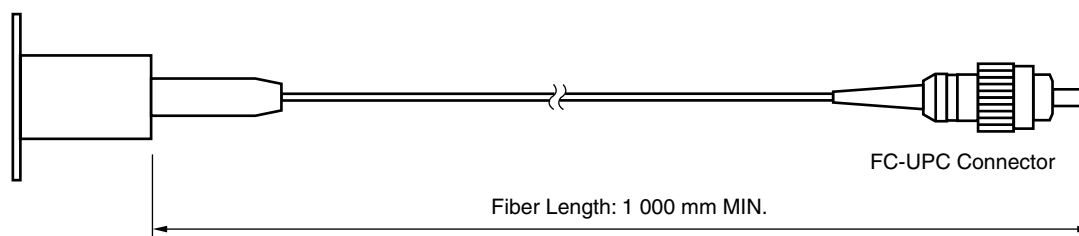
<R> PACKAGE DIMENSIONS (UNIT: mm)



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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	$^{\circ}C$
Storage Temperature	T_{stg}	-40 to +85	$^{\circ}C$
Lead Soldering Temperature	T_{sld}	260 (10 sec.)	$^{\circ}C$
Cooler Current	I_C	1.0	A
Cooler Voltage	V_C	2.0	V

ELECTRO-OPTICAL CHARACTERISTICS ($T_{APD} = 25^{\circ}C$, $T_C = -20$ to $+55^{\circ}C$, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Reverse Breakdown Voltage	V_{BR}	$I_D = 100 \mu A$	50	70	100	V
Temperature Coefficient of Reverse Breakdown Voltage	δ^1			0.2		%/ $^{\circ}C$
Dark Current	I_D	$V_R = V_{BR} \times 0.9$		5	10	nA
		$V_R = V_{BR} \times 0.9$, $T_C = 55^{\circ}C$, $I_C = 0.8 A$		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	$\lambda = 1310 nm$	70	85		%
		$\lambda = 1550 nm$	65	80		
Sensitivity	S	$\lambda = 1310 nm$	0.73	0.89		A/W
		$\lambda = 1550 nm$		1.00		
Multiplication Factor	M	$\lambda = 1310 nm$, $I_{op} = 1.0 \mu A$, $V_R = V$ (@ $I_D = 1 \mu A$)	20	40		
Excess Noise Factor ²	x	$\lambda = 1310 nm$, $1550 nm$, $I_{op} = 1.0 \mu A$,		0.7		
	F	$M = 10$, $f = 35 MHz$, $B = 1 MHz$		5		

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

$$*2 F = M^x$$

ELECTRO-OPTICAL CHARACTERISTICS ($T_{APD} = 25^{\circ}\text{C}$, $T_C = -20$ to $+55^{\circ}\text{C}$, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Thermistor Resistance	R		9.5	10.0	10.5	k Ω
B Constant	B		3 350	3 450	3 550	K
Cooler Current	I _c	$\Delta T = 45^{\circ}\text{C}$		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			$^{\circ}\text{C}$

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

<R> **REFERENCE**

Document Name	Document No.
Opto-Electronics Devices Pamphlet	PX10160E

SAFETY INFORMATION ON THIS PRODUCT

Caution	GaAs Products	<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.
Caution	Optical Fiber	<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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