



PHOTO DIODE NR8360JP-BC

$\phi 30 \mu\text{m}$ InGaAs AVALANCHE PHOTO DIODE 14-PIN DIP MODULE WITH TEC

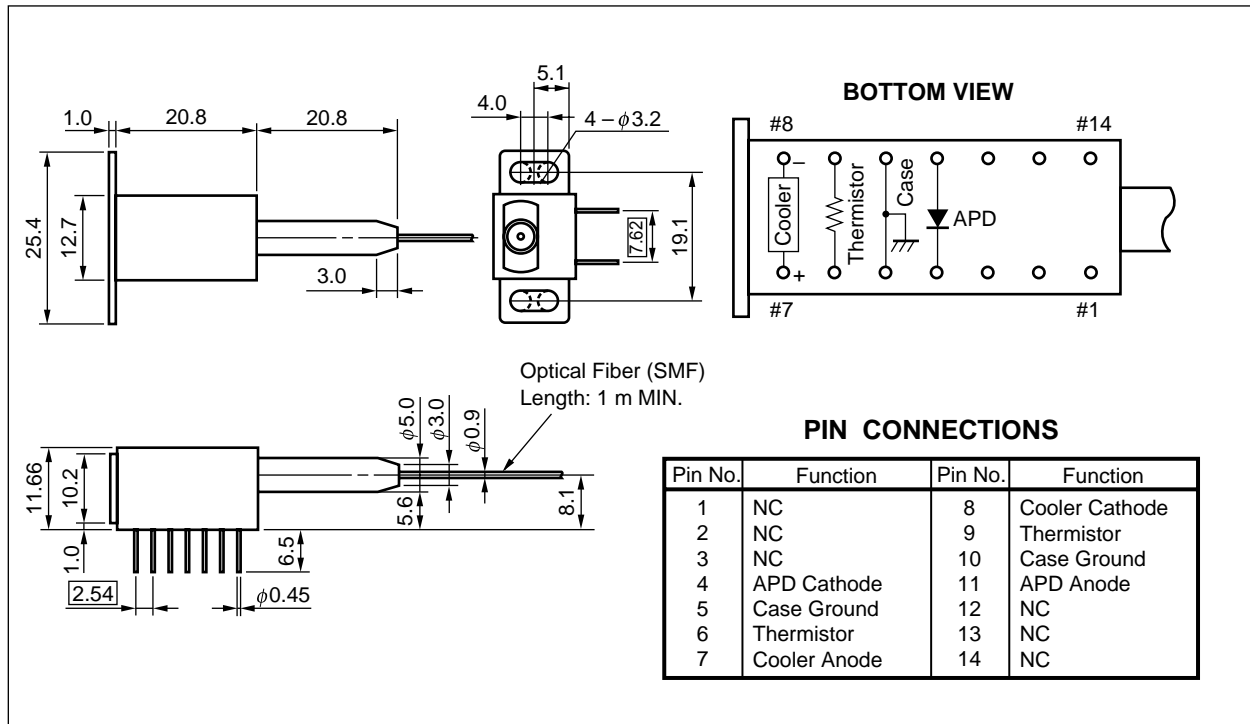
DESCRIPTION

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

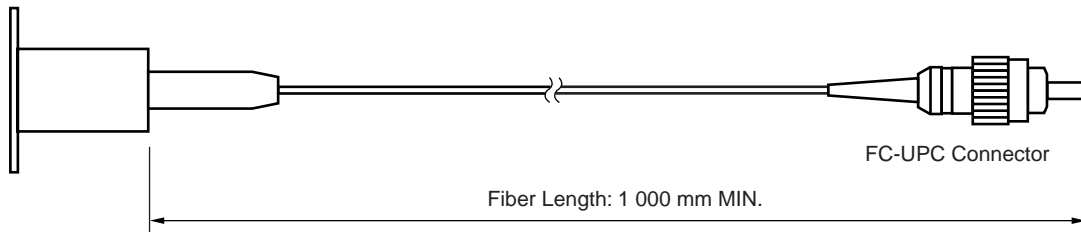
PACKAGE DIMENSIONS (UNIT: mm)



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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-AZ*	With FC-UPC Connector

***Note** Please refer to the last page of this data sheet. "Compliance with EU Directives" for Pb-Free RoHS Compliance Information.

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 550nm, I _{op} = 1.0 μA,		0.7		
	F	M = 10, f = 35 MHz, B = 1 MHz		5		

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

$$*2 F = M^X$$

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

REFERENCE

Document Name	Document No.
Semiconductor device reliability/quality control system	C11159E
Quality grades on semiconductor devices	C11531E
Semiconductor device mounting technology manual	C10535E
SEMICONDUCTOR SELECTION GUIDE Products & Packages (CD-ROM)	X13769X