

NDL5521P Series

2.5 Gb/s OPTICAL FIBER COMMUNICATIONS $\phi 50 \mu\text{m}$ InGaAs AVALANCHE PHOTO DIODE WITH MMF

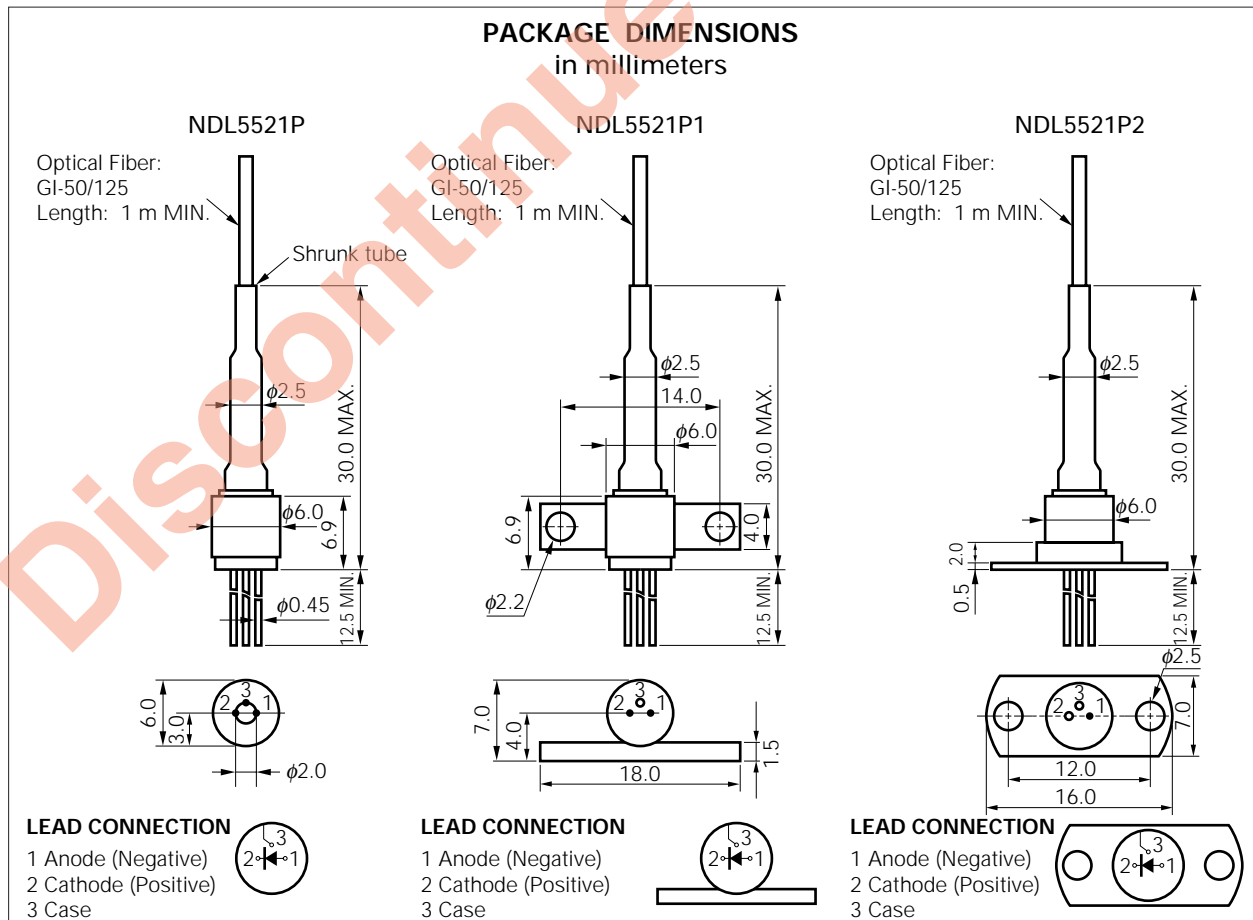
DESCRIPTION

NDL5521P Series are InGaAs avalanche photo diode modules with multimode fiber. They are designed for 2.5 Gb/s optical fiber communication systems and cover the wavelength range between 1 000 and 1 600 nm with high efficiency.

These modules are also available with FC-PC connector and SC-PC connector.

FEATURES

- Small dark current $I_D = 5 \text{ nA}$
- High quantum efficiency $\eta = 90 \% @ \lambda = 1\,300 \text{ nm}, M = 1$
 $\eta = 77 \% @ \lambda = 1\,550 \text{ nm}, M = 1$
- High speed response $f_c = 2.5 \text{ GHz MIN. @ } M = 10$
- Detecting area size $\phi 50 \mu\text{m}$
- Coaxial module with multimode fiber (GI-50/125)
- NDL5521P1 and NDL5521P2 have a flange.



ORDERING INFORMATION

PART NUMBER	AVAILABLE CONNECTOR
NDL5521P	Without Connector
NDL5521PC	With FC-PC Connector
NDL5521PD	With SC-PC Connector
NDL5521P1	Without Connector
NDL5521P1C	With FC-PC Connector
NDL5521P1D	With SC-PC Connector
NDL5521P2	Without Connector
NDL5521P2C	With FC-PC Connector
NDL5521P2D	With SC-PC Connector

ABSOLUTE MAXIMUM RATINGS (T_c = 25 °C)

Forward Current	I _F	10	mA
Reverse Current	I _R	0.5	mA
Operating Case Temperature	T _c	-40 to +85	°C
Storage Temperature	T _{stg}	-40 to +85	°C

ELECTRO-OPTICAL CHARACTERISTICS (T_c = 25 °C)

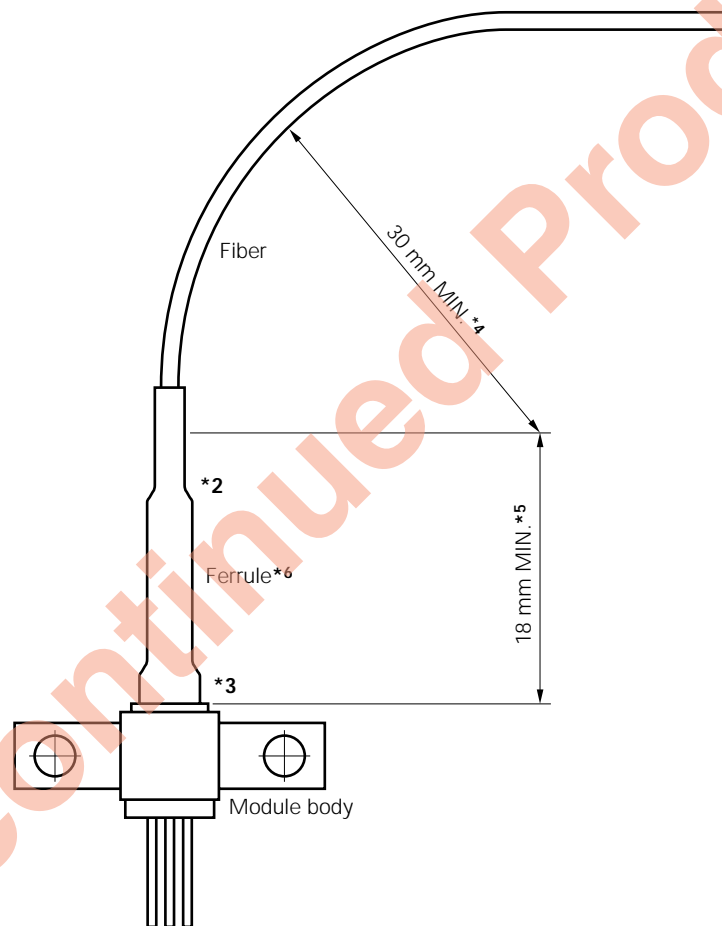
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Reverse Breakdown Voltage	V _{(BR)R}	40	55	80	V	I _D = 100 μA
Temperature Coefficient of Reverse Breakdown Voltage	δ*1		0.2		%/°C	
Dark Current	I _D		5	30	nA	V _R = V _{(BR)R} × 0.9
Multiplied Dark Current	I _{DM}		0.5	5	nA	M = 2 to 10
Terminal Capacitance	C _t		0.4	0.75	pF	V _R = V _{(BR)R} × 0.9, f = 1 MHz
Cut-off Frequency	f _c	2.5			GHz	M = 5
		2.5	3.0			M = 10
		1.0				M = 30
Quantum Efficiency	η	76	90		%	λ = 1 300 nm, M = 1
		65	77			λ = 1 550 nm, M = 1
Responsivity	S	0.8	0.94		A/W	λ = 1 300 nm, M = 1
		0.81	0.96			λ = 1 550 nm, M = 1
Multiplication Factor	M	30	40			λ = 1 550 nm, I _{po} = 1.0 μA V _R = V (@ I _D = 1 μA)
Excess Noise Factor	x		0.7			λ = 1 300 nm, 1 550 nm, I _{po} = 1.0 μA
Excess Noise Coefficient	F		5			M = 10, f = 35 MHz, B = 1 MHz
Optical Return Loss	ORL		30		dB	

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

HANDLING PRECAUTION for NEW TYPE PD/APD MODULE

The NEC's new type PD/APD module has the shrunk tube to guard the ferrule edge*² and the junction between the ferrule and the module body*³. If adequate care is not taken with the shrunk tube module, there is possibility of fiber-break and/or optical coupling degradation. In order to protect this module, NEC recommends following condition for handling.

1. Keep the minimum fiber bend radius (30 mm min.*⁴).
2. Do not bend the fiber within the 18 mm region*⁵ from the module body.
3. Do not stress the ferrule*⁶, lateral force < 500 g.



InGaAs APD FAMILY

FEATURES PACKAGES	APD				REMARKS
	$\phi 30 \mu\text{m}$	$\phi 50 \mu\text{m}$ (for 2.5G)	$\phi 50 \mu\text{m}$	$\phi 80 \mu\text{m}$	
TO-18 CAN	NDL5530		NDL5500	NDL5510	3PIN
CHIP ON CARRIER	NDL5530C	NDL5520C	NDL5500C	NDL5510C	
COAXIAL MODULE WITH MMF		NDL5521P NDL5521P1 NDL5521P2	NDL5551P NDL5551P1 NDL5551P2 NDL5553P*8 NDL5553P1*8 NDL5553P2*8 NDL5590P*9 NDL5590P1*9 NDL5590P2*9	NDL5561P*7 NDL5561P1*7 NDL5561P2*7	P1, P2: WITH FLANGE
COAXIAL MODULE WITH SMF	NDL5531P NDL5531P1 NDL5531P2				
14 PIN DIP MODULE WITH TEC, MMF*8			NDL5506P NDL5506PS	NDL5516P*7	$\Delta T = 45 \text{ K} (@I_c = 1.1 \text{ A})$ PS: WITH SMF
			NDL5507P NDL5507PS	NDL5517P*7	$\Delta T = 65 \text{ K} (@I_c = 1.3 \text{ A})$ PS: WITH SMF
6 PIN BFY MODULE WITH MMF		NDL5522P*9			

*7 WITH GI62.5 *8 FOR OTDR APPLICATION *9 WITH PRE-AMP

Discontinued Product

REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system	IEI-1205
Quality grade on NEC semiconductor devices	IEI-1209
Semiconductor device mounting technology manual	IEI-1207
Semiconductor device package manual	IEI-1213
Guide to quality assurance for semiconductor devices	IEI-1202
Semiconductor selection guide	MF-1134

Discontinued Product

CAUTION

Within this module there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstance break the hermetic seal.

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NEC devices are classified into the following three quality grades:

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Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

The quality grade of NEC devices in "Standard" unless otherwise specified in NEC's Data Sheets or Data Books. If customers intend to use NEC devices for applications other than those specified for Standard quality grade, they should contact NEC Sales Representative in advance.

Anti-radioactive design is not implemented in this product.