RENESAS

PHOTO DIODE

NDL5521P Series

2.5 Gb/s OPTICAL FIBER COMMUNICATIONS
ϕ50 μm InGaAs AVALANCHE PHOTO DIODE WITH MMF

DESCRIPTION

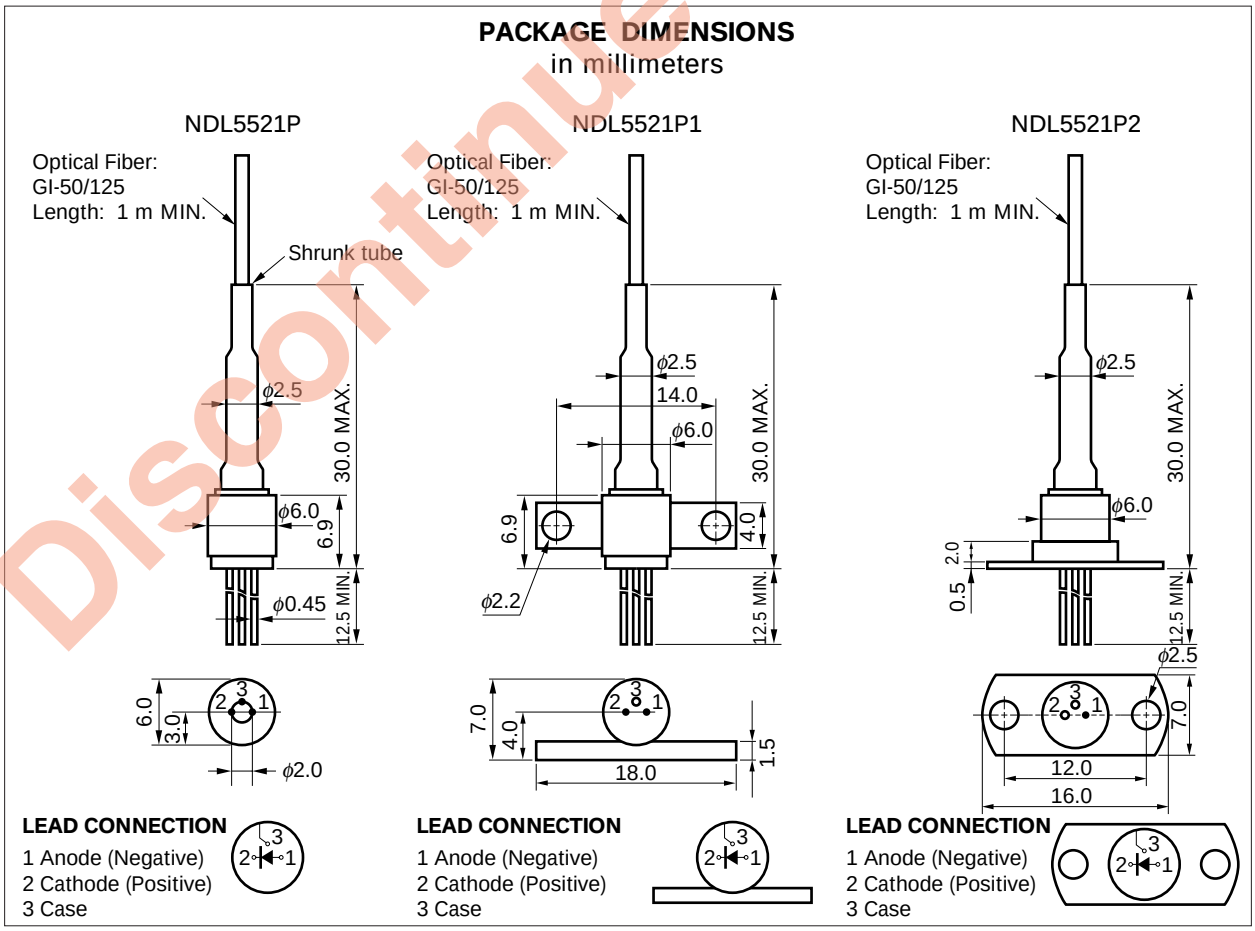
NDL5521P Series are InGaAs avalanche photo diode modules with multimode fiber. They are designed for 2.5 Gb/s optical fiber communication systems and cover the wavelength range between 1 000 and 1 600 nm with high efficiency.

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

FEATURES

- Small dark current I_D = 5 nA
- High quantum efficiency η = 90 % @ λ = 1 300 nm, M = 1
  η = 77 % @ λ = 1 550 nm, M = 1
- High speed response f_C = 2.5 GHz MIN. @M = 10
- Detecting area size ϕ50 μm
- Coaxial module with multimode fiber (GI-50/125)
- NDL5521P1 and NDL5521P2 have a flange.

PACKAGE DIMENSIONS
in millimeters



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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)

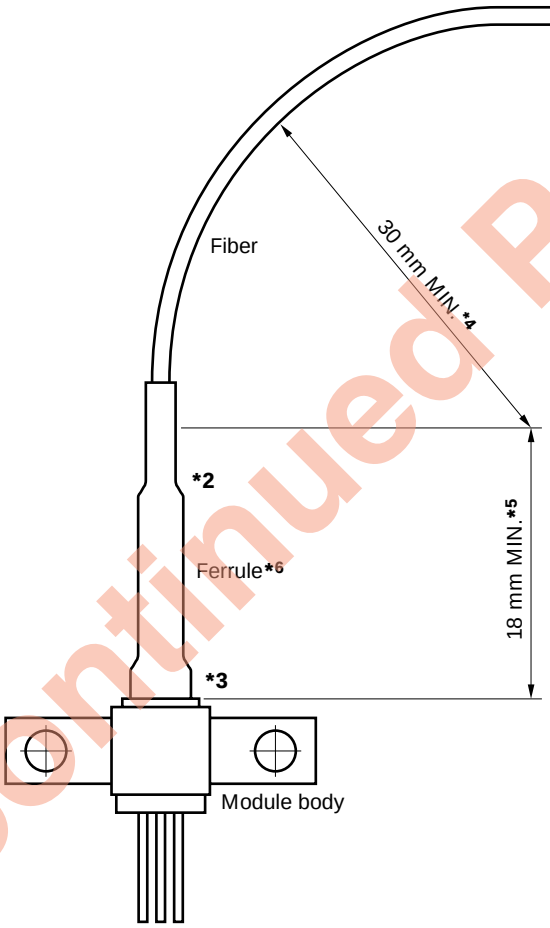
CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Reverse Breakdown Voltage	$V_{(BR)R}$	40	55	80	V	I_D = 100 μA
Temperature Coefficient of Reverse Breakdown Voltage	δ*1		0.2		%/°C	
Dark Current	I_D		5	30	nA	$V_R = V_{(BR)R} \times 0.9$
Multiplied Dark Current	I_{DM}		0.5	5	nA	M = 2 to 10
Terminal Capacitance	C_t		0.4	0.75	pF	$V_R = V_{(BR)R} \times 0.9$, 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 : $$\delta = \frac{V_{(BR)R} <25\ ^\circ C + \Delta T\ ^\circ C> - V_{(BR)R} <25\ ^\circ C>}{\Delta T\ ^\circ C \cdot V_{(BR)R} <25\ ^\circ C>}$$

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
	ϕ30 μm	ϕ50 μm (for 2.5G)	ϕ50 μm	ϕ80 μm	
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	ΔT = 45 K (@Ic = 1.1 A) PS: WITH SMF
			NDL5507P NDL5507PS	NDL5517P*7	ΔT = 65 K (@Ic = 1.3 A) PS: WITH SMF
6 PIN BFY MODULE WITH MMF		NDL5522P*9			

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

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

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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