



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

## NDL5521P SERIES

### FEATURES

- **SMALL DARK CURRENT:**  
 $I_D = 5 \text{ nA}$
- **HIGH QUANTUM EFFICIENCY:**  
 $\eta = 90\%$  at  $\lambda = 1300 \text{ nm}$ ,  $M = 1$   
 $\eta = 77\%$  at  $\lambda = 1550 \text{ nm}$ ,  $M = 1$
- **HIGH SPEED RESPONSE:**  
 $f_c = 2.5 \text{ GHz}$  at  $M = 10$
- **DETECTING AREA SIZE:**  
 $\phi 50 \mu\text{m}$
- **COAXIAL MODULE WITH MULTIMODE FIBER**  
(GI-50/125)
- **NDL5521P1 AND NDL5521P2 HAVE A FLANGE**

### DESCRIPTION

The 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 1000 and 1600 nm with high efficiency. These modules are also available with FC-PC connector and SC-PC connector.

### ELECTRO-OPTICAL CHARACTERISTICS ( $T_C = 25^\circ\text{C}$ )

PART NUMBER PACKAGE OUTLINE			NDL5521P Series		
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
$V_{(BR)R}$	Reverse Breakdown Voltage, $I_D = 100 \mu\text{A}$	V	40	55	80
$\delta$	Temperature Coefficient of Reverse Breakdown Voltage <sup>1</sup>	%/ $^\circ\text{C}$		0.20	
$I_D$	Dark Current, $V_R = V_{(BR)R} \times 0.9$	nA		5	30
$I_{DM}$	Multiplied Dark Current, $M = 2$ to $10$	nA		0.50	5
$C_t$	Terminal Capacitance, $V_R = V_{(BR)R} \times 0.9$ , $f = 1 \text{ MHz}$	pF		0.40	0.75
$f_c$	Cut-off Frequency, $M = 5$ $M = 10$ $M = 30$	GHz	2.5 2.5 1.0	3.0	
$\eta$	Quantum Efficiency, $\lambda = 1300 \text{ nm}$ , $M = 1$ $\lambda = 1550 \text{ nm}$ , $M = 1$	%	76 65	90 77	
$S$	Responsivity, $\lambda = 1300 \text{ nm}$ , $M = 1$ $\lambda = 1550 \text{ nm}$ , $M = 1$	A/W	0.80 0.81	0.94 0.96	
$M$	Multiplication Factor, $\lambda = 1550 \text{ nm}$ , $I_{PO} = 1.0 \mu\text{A}$ , $V_R = V$ (at $I_D = 1 \mu\text{A}$ )	M	30	40	
$X$	Excess Noise Factor, $\lambda = 1300 \text{ nm}$ , $1550 \text{ nm}$ , $I_{PO} = 1.0 \mu\text{A}$ , $M = 10$ , $f = 35 \text{ MHz}$ , $B = 1 \text{ MHz}$			0.7	
$F$				5	
ORL	Optical Return Loss	dB		30	

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

# NDL5521P SERIES

## ABSOLUTE MAXIMUM RATINGS<sup>1</sup>

(T<sub>c</sub> = 25°C, unless otherwise specified)

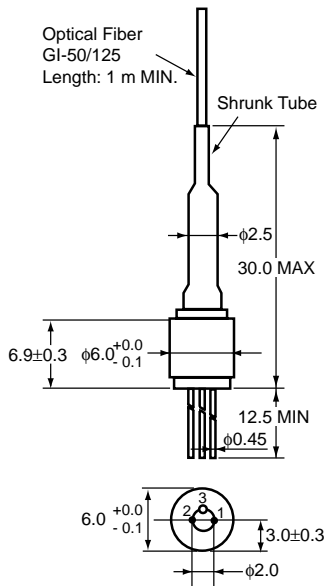
SYMBOLS	PARAMETERS	UNITS	RATINGS
I <sub>F</sub>	Forward Current	mA	10
I <sub>R</sub>	Reverse Current	mA	0.5
T <sub>c</sub>	Operating Case Temp.	°C	-40 to +85
T <sub>STG</sub>	Storage Temperature	°C	-40 to +85

Note:

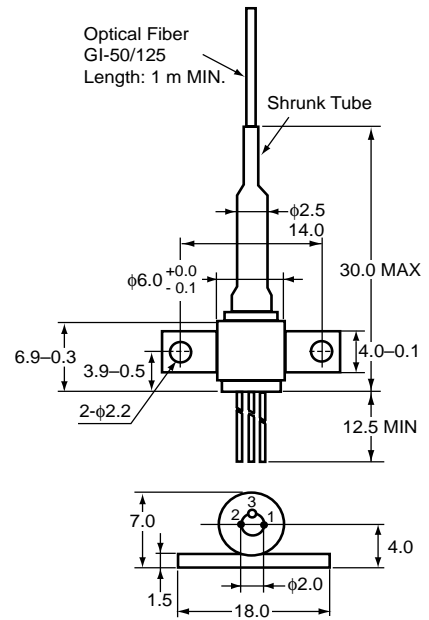
- Operation in excess of any one of these parameters may result in permanent damage.

## OUTLINE DIMENSIONS (Units in mm)

**NDL5521P**



**NDL5521P1**

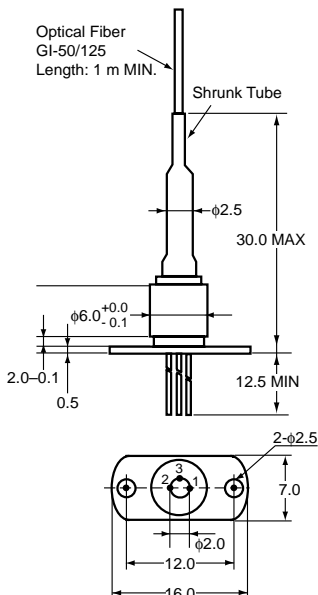


**LEAD CONNECTION**

- Anode (Negative)
- Cathode (Positive)
- Case



**NDL5521P2**



## ORDERING INFORMATION

PART NUMBER	AVAILABLE CONNECTOR	DESCRIPTION
NDL5521P	Without Connector	No Flange
NDL5521PC	With FC-PC Connector	
NDL5521PD	With SC-PC Connector	
NDL5521P1	Without Connector	Flat Mount Flange
NDL5521P1C	With FC-PC Connector	
NDL5521P1D	With SC-PC Connector	
NDL5521P2	Without Connector	Vertical Flange
NDL5521P2C	With FC-PC Connector	
NDL5521P2D	With SC-PC Connector	

## HANDLING PRECAUTION FOR PD/APD MODULE

The NEC PD/APD module has heat shrink tubing to protect the ferrule edge (\*1) and the junction between the ferrule and the module body (\*2). In order to avoid breaking the fiber and/or optical coupling degradation, NEC recommends the following handling precautions:

1. Do not make the fiber bend radius less than 30 mm (\*3).
2. Do not bend the fiber within the 18 mm section from the module body (\*4).
3. Do not stress the ferrule with a lateral force exceeding 500 g (\*5).

