

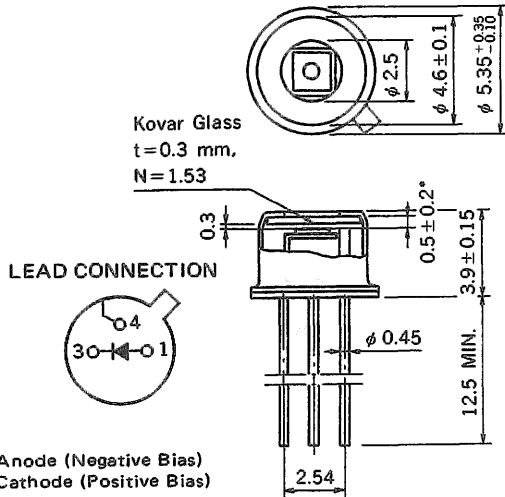
# PHOTO DIODE NDL5405

## 1 000 to 1 600 nm OPTICAL FIBER COMMUNICATIONS $\phi 80 \mu\text{m}$ InGaAs PIN PHOTO DIODE

### DESCRIPTION

NDL5405 is an InGaAs PIN photo diode for a light detector of long wavelength transmission systems. It covers the wavelength range between 1 000 and 1 600 nm with high sensitivity.

### PACKAGE DIMENSIONS in millimeters



1. Anode (Negative Bias)
3. Cathode (Positive Bias)
4. Case

\* Optical length

### FEATURES

- High quantum efficiency.  $\eta = 85\%$  @1 300 nm  
 $\eta = 80\%$  @1 550 nm
- Small dark current.  $I_D = 0.1 \text{ nA}$
- High speed response.  $t_r, t_f = 0.3 \text{ ns}$
- Low operating voltage.
- Detecting area size.  $\phi 80 \mu\text{m}$

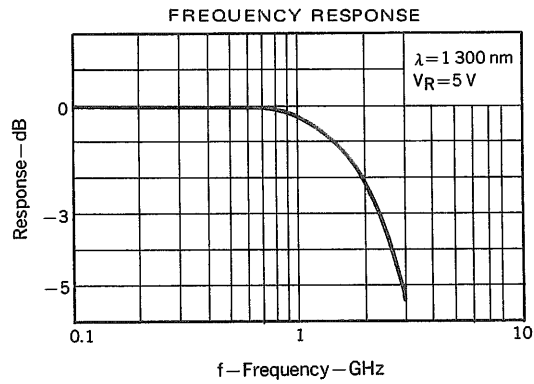
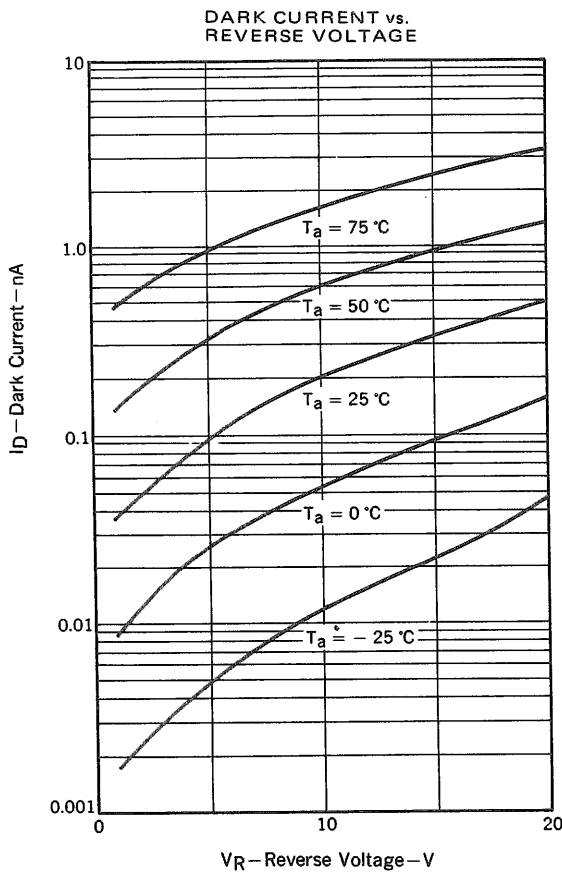
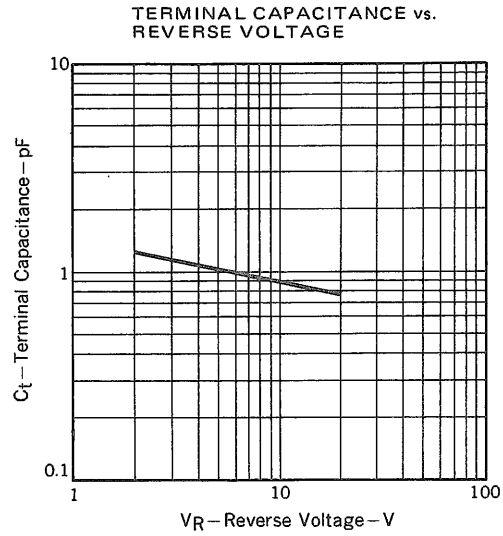
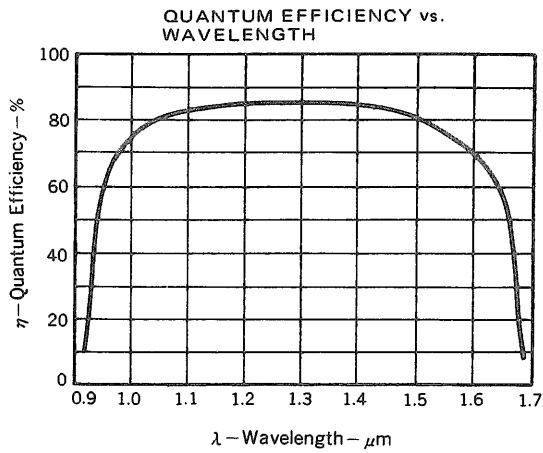
### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25^\circ\text{C}$ )

Reverse Voltage	$V_R$	20	V
Forward Current	$I_F$	10	mA
Reverse Current	$I_R$	0.5	mA
Operating Temperature	$T_C$	-40 to +85	$^\circ\text{C}$
Storage Temperature	$T_{\text{stg}}$	-55 to +150	$^\circ\text{C}$

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

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Dark Current	$I_D$		0.1	5.0	nA	$V_R = 5 \text{ V}$
Terminal Capacitance	$C_t$		1.0	1.5	pF	$V_R = 5 \text{ V}, f = 1.0 \text{ MHz}$
Quantum Efficiency	$\eta$	70	85		%	$\lambda = 1 300 \text{ nm}$
			80			$\lambda = 1 550 \text{ nm}$
Sensitivity	S	0.73	0.89		A/W	$\lambda = 1 300 \text{ nm}$
			1.00			$\lambda = 1 550 \text{ nm}$
Rise, Fall Time	$t_r, t_f$		0.3	1.0	ns	$V_R = 5 \text{ V}, \lambda = 1 300 \text{ nm}, R_L = 50 \Omega, 10\text{--}90\%$

TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )



InGaAs APD/PD FAMILY

FEATURES		APD		PIN-PD		REMARKS		
		$\phi$ 50 $\mu$ m	$\phi$ 80 $\mu$ m	$\phi$ 80 $\mu$ m	270 $\mu$ m x 330 $\mu$ m			
PACKAGES								
TO-18 TYPE CAN		NDL5500	NDL5510	NDL5405	NDL5406	3 PIN		
TO-18 TYPE CAN WITH MICRO LENS		—————	—————	NDL5405L	—————	3 PIN		
CHIP ON CARRIER		NDL5500C	NDL5510C	NDL5405C	NDL5406C			
COAXIAL MODULE WITH MULTI MODE FIBER (MMF)		NDL5500P*	—————	NDL5405P*	—————	3 PIN		
MAIN CHARACTERISTICS (T <sub>a</sub> = 25 °C)							UNIT	CONDITIONS
BREAKDOWN VOLTAGE	V <sub>(BR)R</sub>	70	75	—————	—————	V	I <sub>D</sub> = 100 $\mu$ A	
QUANTUM EFFICIENCY	$\eta$	85	85	85	85	%	$\lambda$ = 1 300 nm	
		80	80	80	80		$\lambda$ = 1 550 nm	
DARK CURRENT	I <sub>D</sub>	20	60	0.1	0.5	nA	V = V <sub>op</sub>	
RISE TIME	t <sub>r</sub>	f <sub>c</sub> = 1.0 GHz MIN.	f <sub>c</sub> = 700 MHz MIN.	0.3	4.0	ns	10–90 %	
FALL TIME	t <sub>f</sub>			0.3	4.0	ns	90–10 %	

\* A module with flange is also available.

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