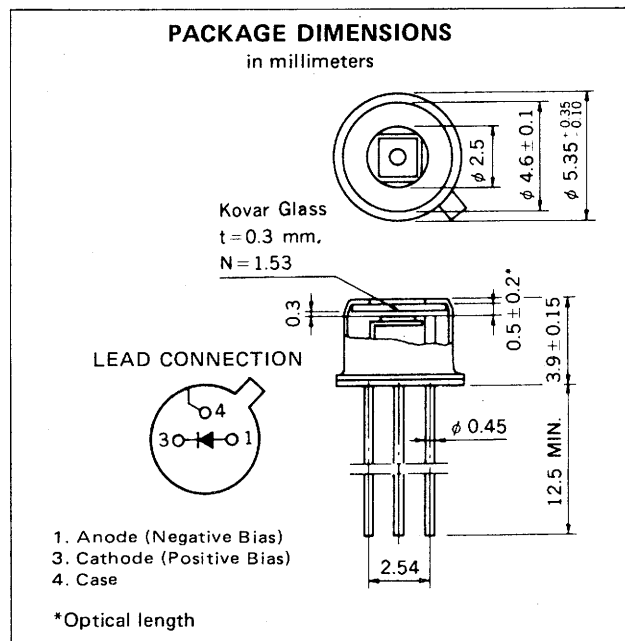


1 000 to 1 600 nm OPTICAL FIBER COMMUNICATIONS
 $\phi 80 \mu\text{m}$ InGaAs AVALANCHE PHOTO DIODE

DESCRIPTION

NDL5510 is an InGaAs Avalanche Photodiode especially designed for a detector of long wavelength optical fiber communications systems. It covers the wavelength range between 1 000 and 1 600 nm with high sensitivity.



FEATURES

- High sensitivity. $\eta = 85 \% @ 1\ 300 \text{ nm}$
 $\eta = 80 \% @ 1\ 550 \text{ nm}$
- Small dark current. $I_D = 8 \text{ nA}$
- High speed response. $f_c = 700 \text{ MHz MIN.}$
- Short optical length. 0.5 mm
- Detecting area size. $\phi 80 \mu\text{m}$

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

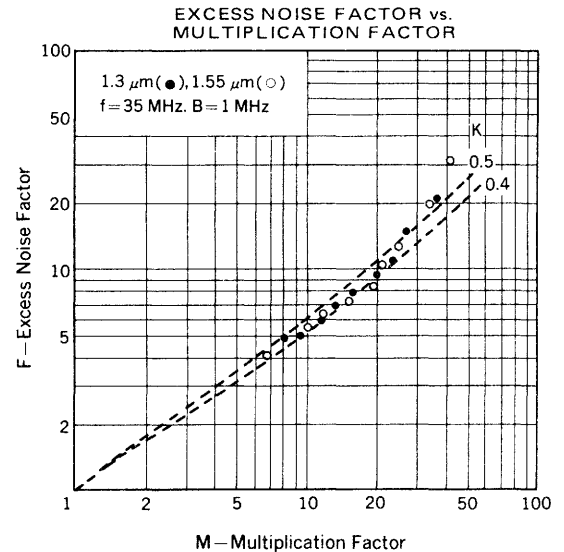
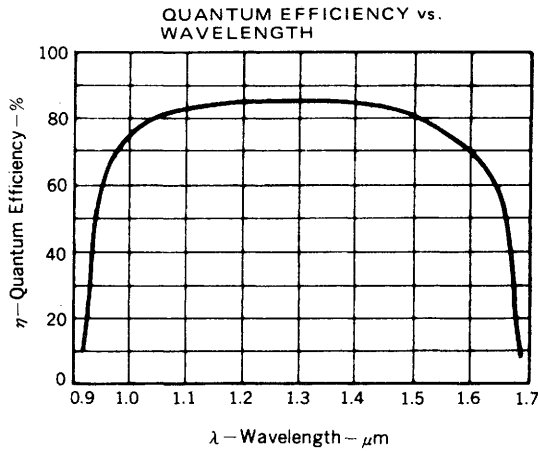
Forward Current	I_F	10	mA
Reverse Current	I_R	0.5	mA
Operating Case Temperature	T_C	-40 to +70	$^\circ\text{C}$
Storage Temperature	T_{stg}	-55 to +100	$^\circ\text{C}$

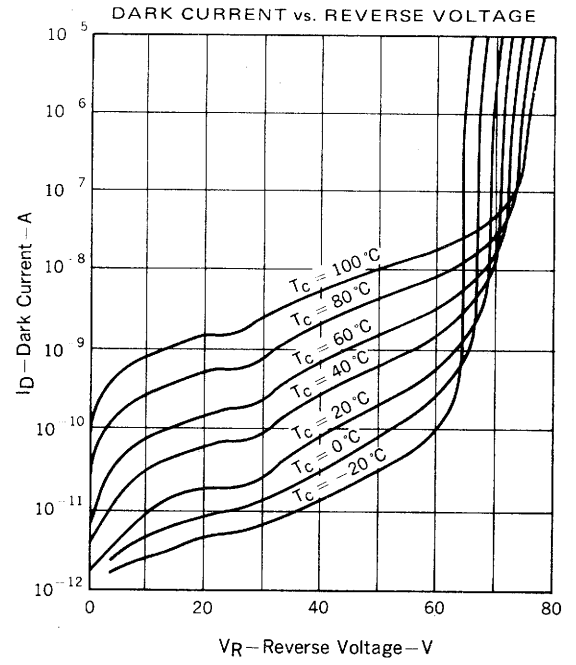
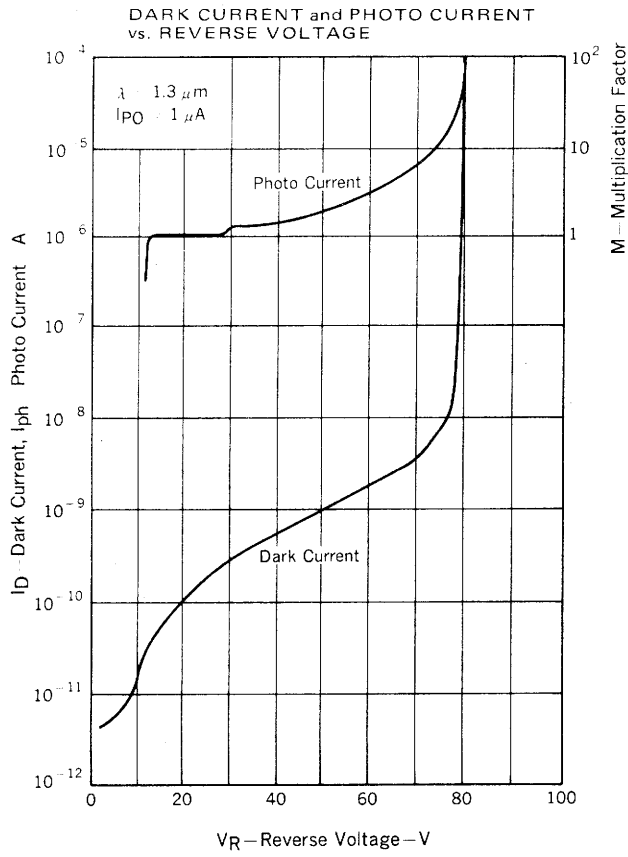
ELECTRO-OPTICAL CHARACTERISTICS (T_c = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Reverse Breakdown Voltage	V _{(BR)R}	50	75	100	V	I _D = 100 μA
Temperature Coefficient of Reverse Breakdown Voltage	δ *1		0.2		%/°C	
Dark Current	I _D		8	50	nA	V _R = V _{(BR)R} x0.9
Multiplied Dark Current	I _{DM}		2	5	nA	M = 2 ~ 10
Terminal Capacitance	C _t		1.0	2.0	pF	V _R = V _{(BR)R} x0.9, f = 1 MHz
Cut-off Frequency	f _c	700			MHz	M = 10
Quantum Efficiency	η	70	85		%	λ = 1 300 nm
			80		%	λ = 1 550 nm
Sensitivity	S	0.73	0.89		A/W	λ = 1 300 nm
			1.00			λ = 1 550 nm
Multiplication Factor	M	20	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
Effective Detecting Area Size	φE	60	70		μm	M = 10, 80 % of Peak

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

TYPICAL CHARACTERISTICS (T_c = 25 °C)





InGaAs APD/PD FAMILY

FEATURES PACKAGES		APD			PIN-PD		REMARKS	
		$\phi 50 \mu\text{m}$	$\phi 50 \mu\text{m}$	$\phi 80 \mu\text{m}$	$\phi 80 \mu\text{m}$	$270 \times 330 \mu\text{m}^2$		
TO-18 TYPE CAN		NDL5520	NDL5500	NDL5510	NDL5405	NDL5406	3 PIN	
TO-18 TYPE CAN WITH MICRO LENS		—	—	—	NDL5405L	—	3 PIN	
CHIP ON CARRIER		NDL5520C	NDL5500C	NDL5510C	NDL5405C	NDL5406C		
FC-RECEPTACLE MODULE		—	—	—	NDL5405RA1 NDL5405RA2 NDL5405RA3	—	3 PIN	
COAXIAL MODULE WITH MMF		NDL5520P NDL5520P1	NDL5501P NDL5501P1	—	NDL5407P NDL5407P1	—	P1: WITH FLANGE	
COAXIAL MODULE WITH SMF		—	—	—	NDL5408P NDL5408P1	—	ANALOG APPLICATION (CATV)	
14 PIN DIP MODULE WITH MULTI-MODE FIBER		—	NDL5506P	NDL5516P	—	—	WITH TEC NDL5506P: WITH GI-50 NDL5516P: WITH GI-62.5	
6-PIN BFY MODULE WITH MMF		NDL5522P	—	—	NDL5422P*	—	WITH PRE-AMP	
MAIN CHARACTERISTICS ($T_C = 25^\circ\text{C}$)							UNIT	CONDITIONS
BREAKDOWN-VOLTAGE	$V_{(BR)R}$	70	70	75	—	—	V	$I_D = 100 \mu\text{A}$
QUANTUM EFFICIENCY	η	85	85	85	85	85	%	$\lambda = 1300 \text{ nm}$
		80	80	80	80	80		$\lambda = 1550 \text{ nm}$
DARK CURRENT	I_D	10	20	60	0.1	0.5	nA	$V = V_{op}$
RISE TIME	t_r	$f_c=2.5 \text{ GHz}$ MIN.	$f_c=1 \text{ GHz}$ MIN.	$f_c=700 \text{ MHz}$ MIN.	0.3	4.0	ns	10–90 %
FALL TIME	t_f				0.3	4.0		90–10 %

* NDL5422P: $\phi 50 \mu\text{m}$, $f_c = 2.5 \text{ GHz}$ MIN.

[MEMO]

[MEMO]

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