NEC

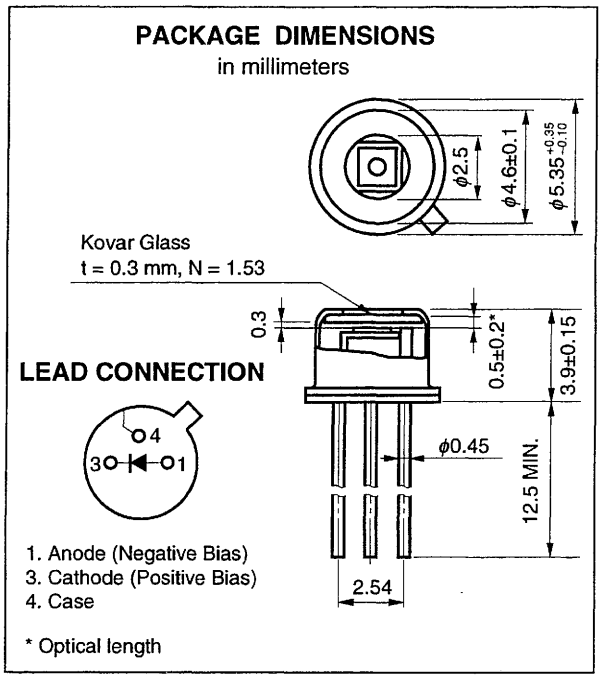
PHOTO DIODE
NDL5500

1 000 to 1 600 nm OPTICAL FIBER COMMUNICATIONS
ϕ50 μm InGaAs AVALANCHE PHOTO DIODE

DESCRIPTION

NDL5500 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.

PACKAGE DIMENSIONS
in millimeters



FEATURES

- Small dark current — I_D = 5 nA
- High sensitivity — η = 85% @1 300 nm; η = 80% @1 550 nm
- High speed response — f_c = 1.2 GHz @M = 20
- Short optical length — 0.5 mm
- Detecting area size — ϕ50 μm

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 +70	°C
Storage Temperature	T_{stg}	−55 to +100	°C

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The mark ★ shows major revised points.

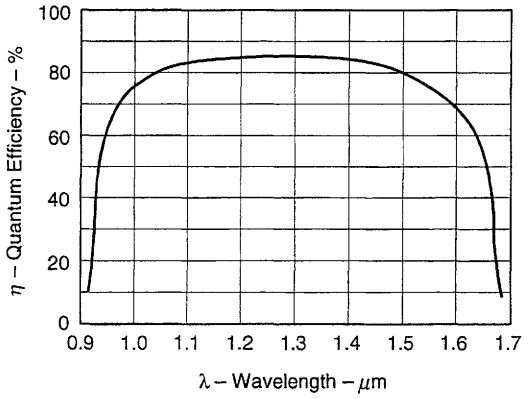
ELECTRO-OPTICAL CHARACTERISTICS (Tc = 25°C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Reverse Breakdown Voltage	$V_{(BR)R}$	50	70	100	V	I_D = 100 μA
Temperature Coefficient of Reverse Breakdown Voltage	δ *1		0.2		%/°C	
Dark Current	I_D		5	50	nA	$V_R = V_{(BR)R} \times 0.9$
Multiplied Dark Current	I_{DM}		1	5	nA	M = 2 to 10
Terminal Capacitance	C_t		0.4	0.8	pF	$V_R = V_{(BR)R} \times 0.9$, f = 1 MHz
Cut-off Frequency	f_c	1			GHz	M = 10
			1.2			M = 20
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 = 1μA)
Excess Noise Factor	x		0.7			λ = 1 300 nm, 1 550 nm, I_{PO} = 1.0 μA M = 10, f = 35 MHz, B = 1 MHz
Excess Noise Coefficient	F		5			
Effective Detecting Area Size	ϕE	30	40		μm	M = 10, 80% of Peak

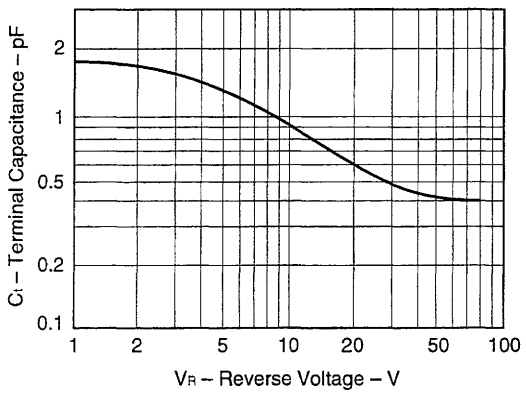
*1 $$\delta = \frac{V_{(BR)R}\,<25°C + \Delta T°C> - V_{(BR)R}\,<25°C>}{\Delta T°C \cdot V_{(BR)R}\,<25°C>}$$

TYPICAL CHARACTERISTICS (Tc = 25°C)

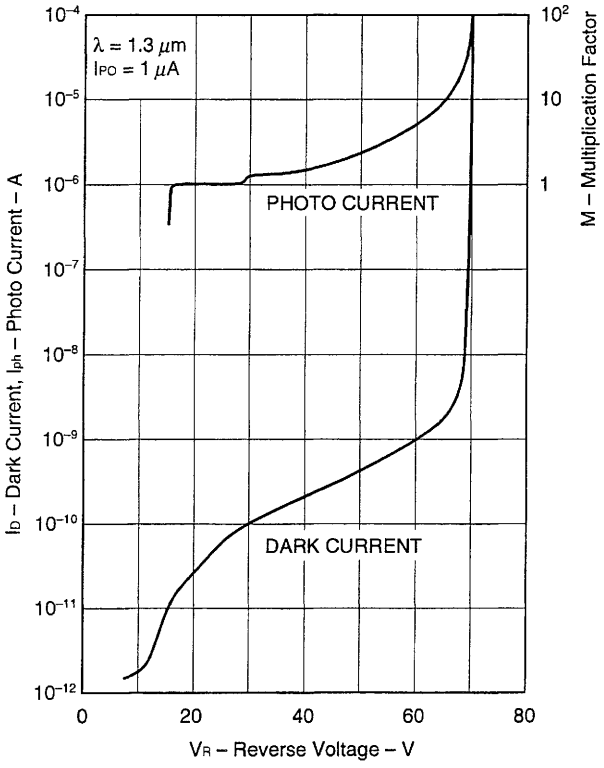
QUANTUM EFFICIENCY vs. WAVELENGTH



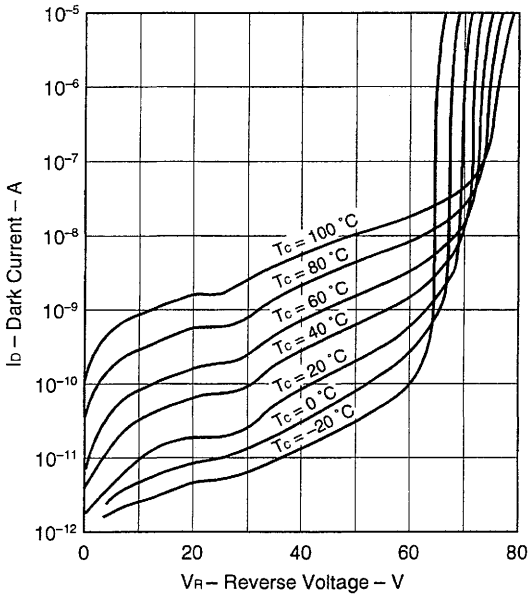
TERMINAL CAPACITANCE vs. REVERSE VOLTAGE



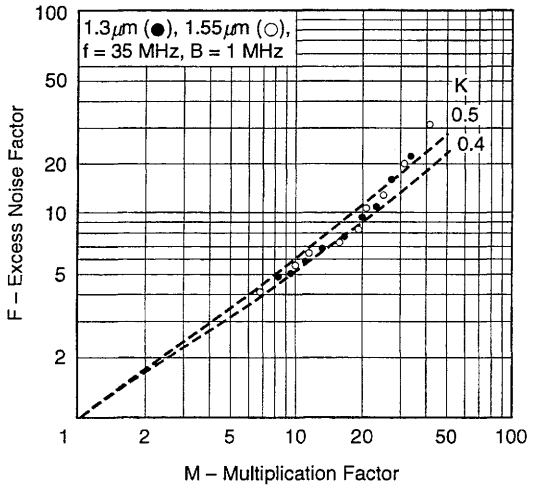
DARK CURRENT and PHOTO CURRENT vs. REVERSE VOLTAGE



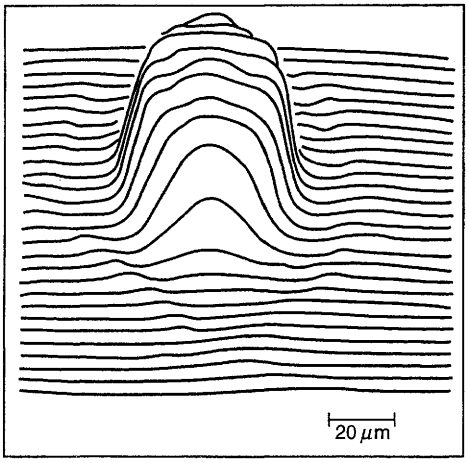
DARK CURRENT vs. REVERSE VOLTAGE



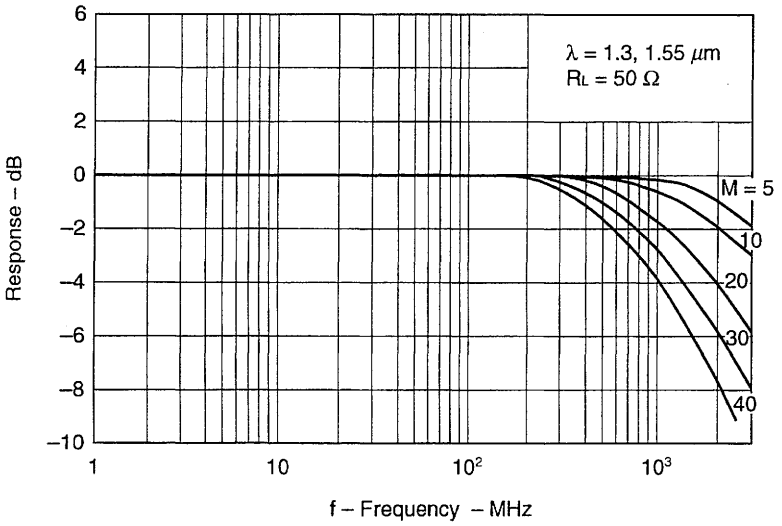
EXCESS NOISE FACTOR vs. MULTIPLICATION FACTOR



MULTIPLICATION MAP



FREQUENCY RESPONSE



★ InGaAs APD/PD FAMILY

Features / Packages	APD				PIN-PD			Remarks
	ϕ 30 μm (for 2.5 Gb/s)	ϕ 50 μm (for 2.5 Gb/s)	ϕ 50 μm	ϕ 80 μm	ϕ 50 μm (for 2.5 Gb/s)	ϕ 80 μm	ϕ 120 μm	
TO-18 type CAN	NDL5530	–	NDL5500	NDL5510	–	–	–	3 pins
Chip on Carrier	NDL5530C	NDL5520C	NDL5500C	NDL5510C	–	–	–	
Receptacle Module	–	–	–	–	–	–	NDL5471RC NDL5471RD	3 pins RC: FC receptacle RD: SC receptacle
Coaxial Module with MMF	–	NDL5521P NDL5521P1 NDL5521P2	NDL5551P NDL5551P1 NDL5551P2 NDL5553P*1 NDL5553P1*1 NDL5553P2*1 NDL5590P NDL5590P1 NDL5590P2	NDL5561P*2 NDL5561P1*2 NDL5561P2*2	NDL5421P NDL5421P1 NDL5421P2	NDL5461P NDL5461P1 NDL5461P2	–	P1, P2: With flange NDL5590P Series: With Pre-AMP
Coaxial Module with SMF	NDL5531P NDL5531P1 NDL5531P2 NDL5592P NDL5592P1 NDL5592P2	–	NDL5553PS*1 NDL5553P1S*1 NDL5553P2S*1	–	–	NDL5481P*3 NDL5481P1*3 NDL5481P2*3	–	P1, P2: With flange NDL5592P Series: With Pre-AMP
14-pin DIP Module with TEC	–	–	NDL5506P NDL5506PS	NDL5516P NDL5516PC	–	–	–	ΔT = 45 K (@ I_C = 1.1 A) PS: With SMF
6-pin BFY Module with MMF	–	NDL5522P	–	–	NDL5422P	–	–	With Pre-AMP
8-pin Mini-DIL with SMF	–	–	–	–	–	–	NDL8800P	

*1 For OTDR

*2 With GI-62.5/125

*3 For analog application (optical CATV)

Remark Modules are available FC-PC connector or optional SC-PC connector.

[MEMO]

[MEMO]

CAUTION

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

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