N E C ELECTRONICS INC

PHOTO DIODE

NDL5102P

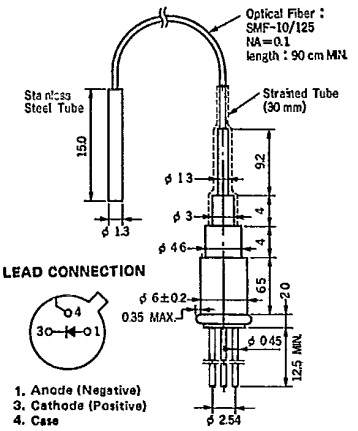
1 300 nm OPTICAL FIBER COMMUNICATIONS
ϕ30 μm GERMANIUM AVALANCHE PHOTO DIODE MODULE

DESCRIPTION

NDL5102P is a Germanium Avalanche Photo diode with singlemode fiber, especially designed for a detector of long wavelength fiber transmission systems. It features small dark current and high speed response due to small detecting area size.

PACKAGE DIMENSIONS

in millimeters



LEAD CONNECTION

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

FEATURES

- Small dark current. I_D = 80 nA
- High sensitivity. η = 75 % @1 300 nm
- Singlemode fiber pagtail.
- Detecting area size ϕ 30 μm

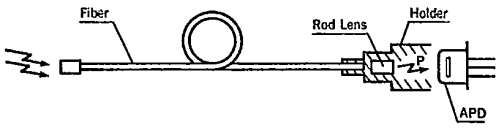
ABSOLUTE MAXIMUM RATINGS (T_a = 25 °C)

Forward Current	I_F	50	mA
Reverse Current	I_R	0.5	mA
Operating Case Temperature	T_c	−30 to +60	°C
Storage Temperature	T_{stg}	−40 to +70	°C

ELECTRO-OPTICAL CHARACTERISTICS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Reverse Breakdown Voltage	$V_{(BR)R}$	30	35	45	V	I_D = 100 μA
Dark Current	I_D		80	200	nA	$V_R = V_{(BR)R} \times 0.9$
Terminal Capacitance	C_t		0.9	1.5	pF	V_R = 20 V, f = 1.0 MHz
Quantum Efficiency	η *1	70	75		%	λ = 1 300 nm
Sensitivity	S *1	0.73	0.78		A/W	λ = 1 300 nm
Multiplication Factor	M	30	50			λ = 1 300 nm, R_L = 100 Ω I_{po} = 1.0 μA, $V_R = V(@I_D = 5\ \mu A)$
Rise Time	t_r		0.3	0.8	ns	λ = 1 300 nm, M = 10 R_L = 50 Ω, I_{po} = 10 μA, 10–90 %
Fall Time	t_f		0.3	0.8	ns	λ = 1 300 nm, M = 10 R_L = 50 Ω, I_{po} = 10 μA, 90–10 %
Excess Noise Factor	x		0.95			λ = 1 300 nm, M = 10, I_{po} = 1.0 μA f = 30 MHz, B = 1.0 MHz

*1



"η = 70 % MIN. @1 300 nm" is guaranteed with the optical output power from a rod lens (P) in the holder.

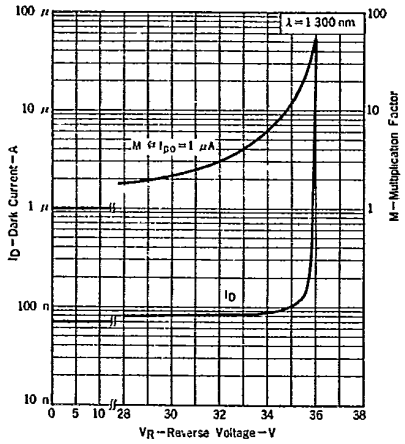
$$\eta = \frac{h\nu}{q} \cdot \frac{I_P}{P} = \frac{h\nu}{q} \cdot S$$

I_P : Photo Current

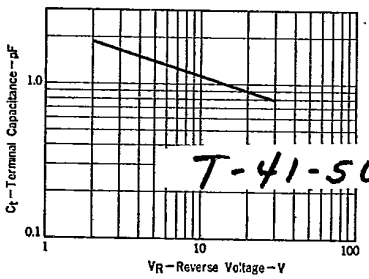
P : Optical Output Power from internal rod lens

TYPICAL CHARACTERISTICS (T_a = 25 °C)

DARK CURRENT vs. REVERSE VOLTAGE



TERMINAL CAPACITANCE vs. REVERSE VOLTAGE



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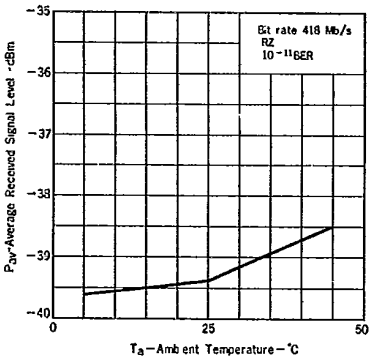
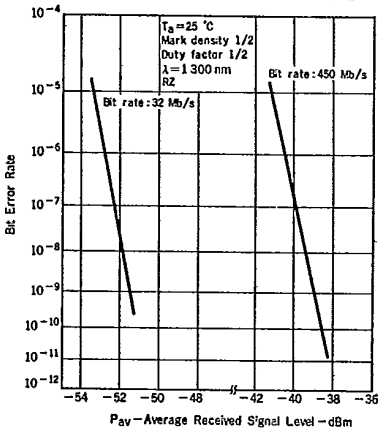
AVERAGE RECEIVED SIGNAL LEVEL vs. AMBIENT TEMPERATURE



BIT ERROR RATE vs. AVERAGE RECEIVED SIGNAL LEVEL



QUANTUM EFFICIENCY vs. WAVELENGTH