DATA SHEET

NEC

PHOTO DIODE

NDL5131P Series

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

DESCRIPTION

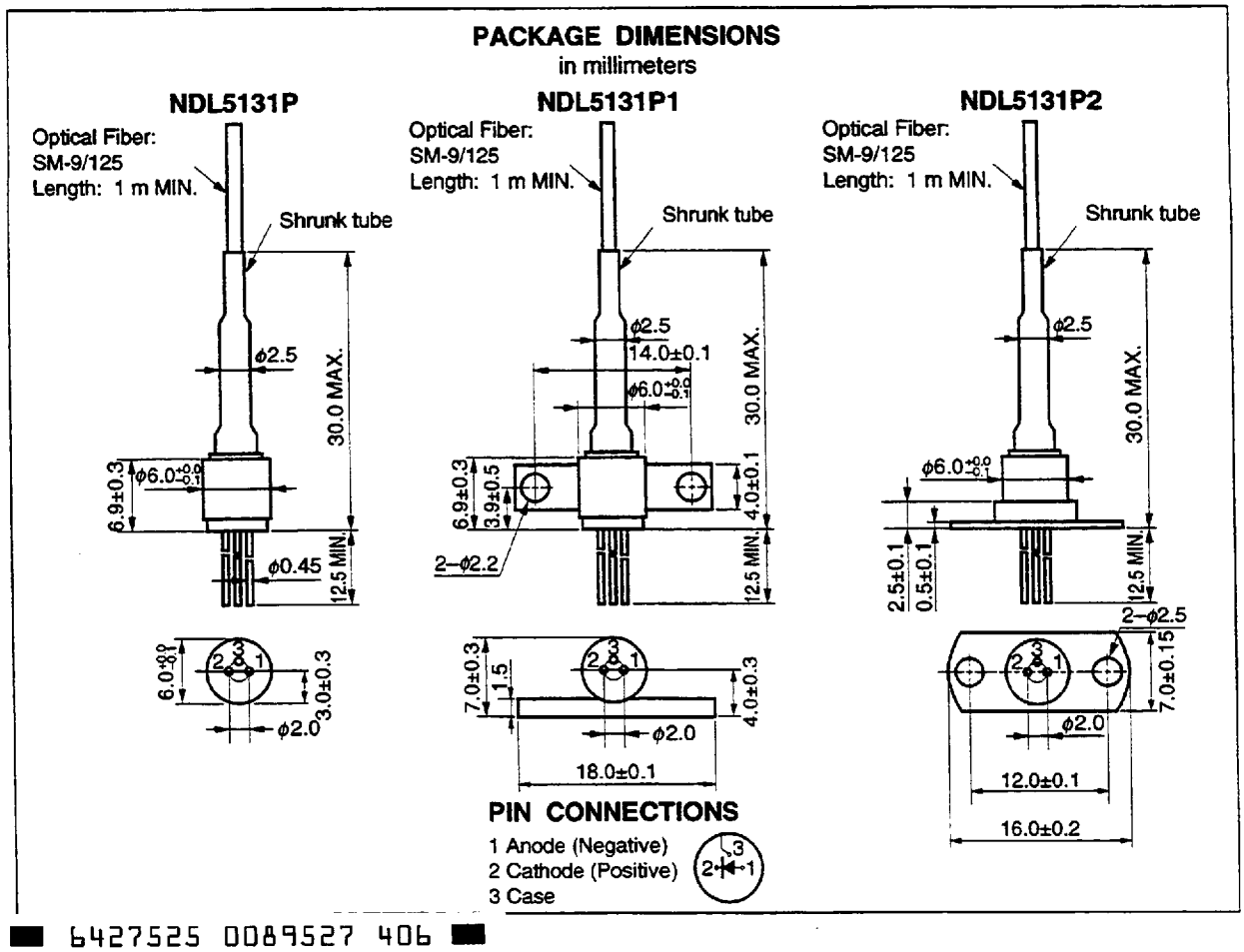
NDL5131P Series is a Germanium avalanche photo diode module with singlemode fiber. It is designed for long wavelength transmission systems, and features small dark current and high speed response due to 30 μm detecting diameter.

FEATURES

- Small dark current — I_D = 80 nA
- High quantum efficiency — η = 80 % @ λ = 1 300 nm, M = 1
- Detecting area size — ϕ30 μm
- Coaxial module with singlemode fiber (SM-9/125)

★

PACKAGE DIMENSIONS
in millimeters



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The information in this document is subject to change without notice.

Document No. P10307EJ3V0DS00 (3rd edition)
Date Published June 1996 P
Printed in Japan

The mark ★ shows major revised points.

ORDERING INFORMATION

Part Number	Available Connector	Description
NDL5131P	Without Connector	No Flange
NDL5131PC	With FC-PC Connector	
NDL5131PD	With SC-PC Connector	
NDL5131P1	Without Connector	Flat Mount Flange
NDL5131P1C	With FC-PC Connector	
NDL5131P1D	With SC-PC Connector	
NDL5131P2	Without Connector	Vertical Flange
NDL5131P2C	With FC-PC Connector	
NDL5131P2D	With SC-PC Connector	

★ ABSOLUTE MAXIMUM RATINGS (T_C = 25 °C, unless otherwise specified)

Parameter	Symbol	Ratings	Unit
Forward Current	I_F	50	mA
Reverse Current	I_R	0.5	mA
Operating Case Temperature	T_C	–40 to +85	°C
Storage Temperature	T_{stg}	–40 to +85	°C

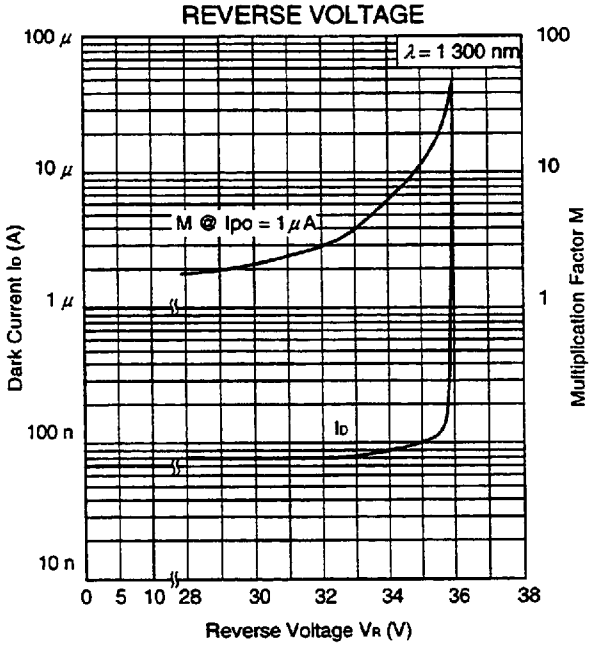
ELECTRO-OPTICAL CHARACTERISTICS (T_C = 25 °C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Reverse Breakdown Voltage	$V_{(BR)R}$	I_D = 100 μA	30	35	45	V
Dark Current	I_D	$V_R = V_{(BR)R} \times 0.9$		80	200	nA
Terminal Capacitance	C_t	V_R = 20 V, f = 1.0 MHz		0.9	1.5	pF
Quantum Efficiency	η	λ = 1300 nm, M = 1	75	80		%
Responsivity	S		0.78	0.84		A/W
Multiplication Factor	M	λ = 1 300 nm, R_L = 100 Ω I_{po} = 1.0 μA, V_R = V (@ I_D = 5 μA)	30	50		
Rise Time	t_r	λ = 1 300 nm, M = 10 R_L = 50 Ω, 10 to 90 %, I_{po} = 10 μA		0.3	0.8	ns
Fall Time	t_f	λ = 1 300 nm, M = 10 R_L = 50 Ω, 90 to 10 %, I_{po} = 10 μA		0.3	0.8	ns
Excess Noise Factor *1	x	λ = 1 300 nm, M = 10, I_{po} = 1.0 μA		0.95		
	F	f = 30 MHz, B = 1.0 MHz		9		

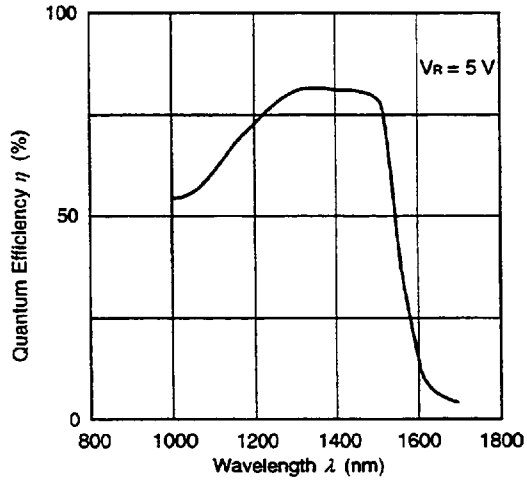
*1: $F = M^X$

TYPICAL CHARACTERISTICS (T_C = 25 °C) ★

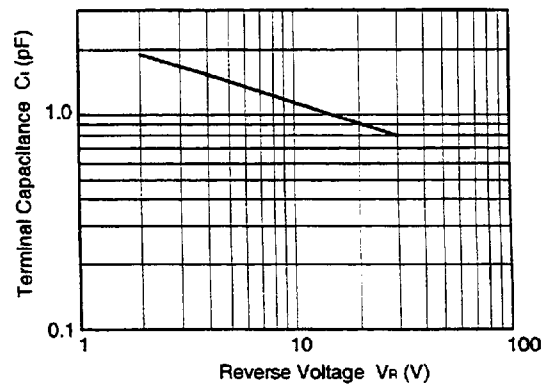
DARK CURRENT vs. REVERSE VOLTAGE



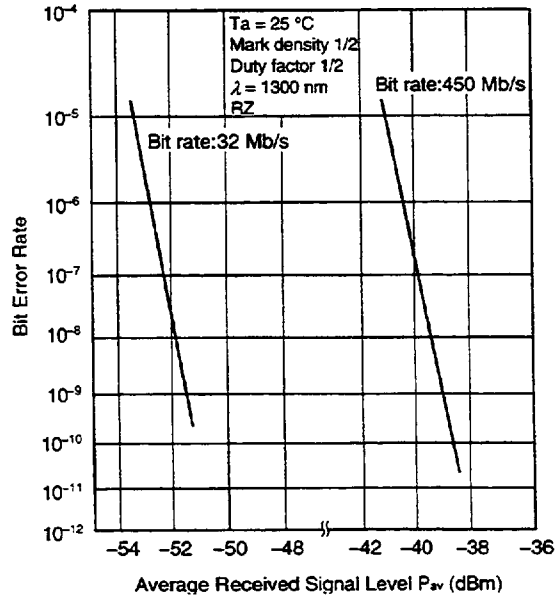
QUANTUM EFFICIENCY vs. WAVELENGTH



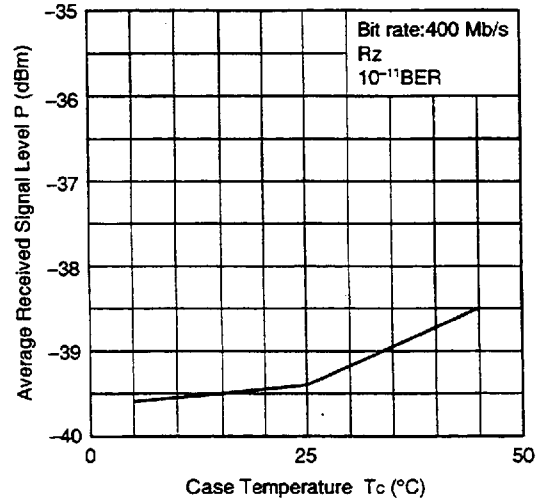
TERMINAL CAPACITANCE vs. REVERSE VOLTAGE



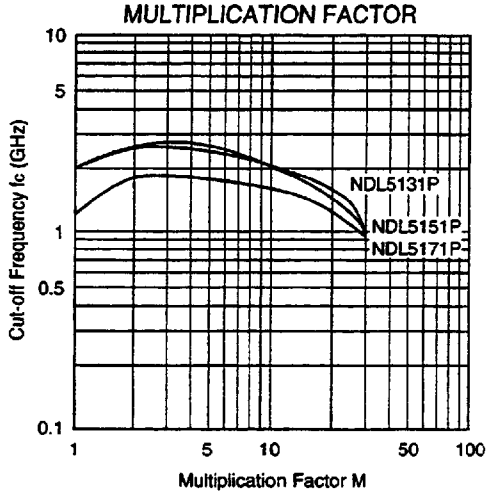
BIT ERROR RATE vs. AVERAGE RECEIVED SIGNAL LEVEL



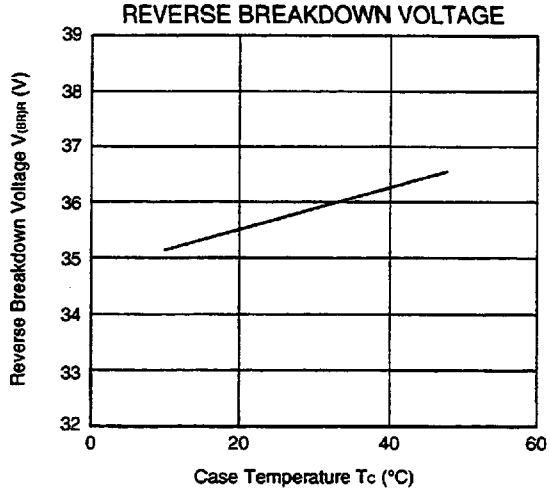
AVERAGE RECEIVED SIGNAL LEVEL vs. CASE TEMPERATURE



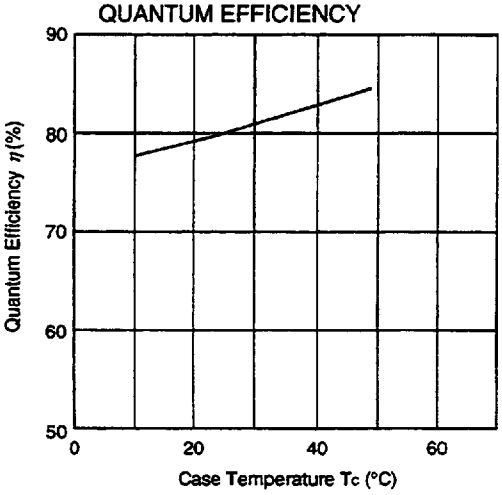
CUT-OFF FREQUENCY vs. MULTIPLICATION FACTOR



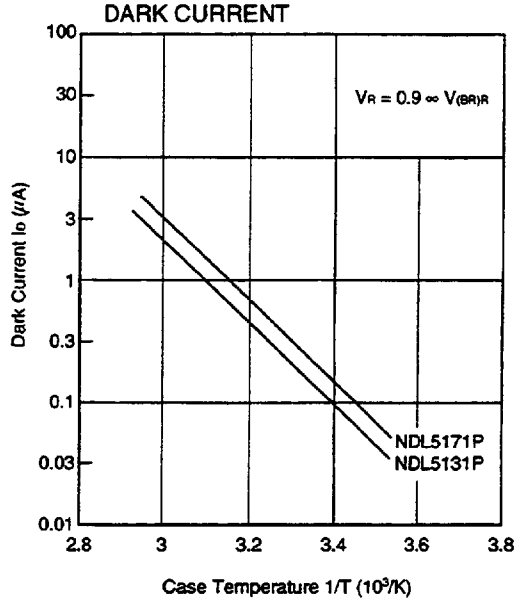
TEMPERATURE DEPENDENCE OF REVERSE BREAKDOWN VOLTAGE



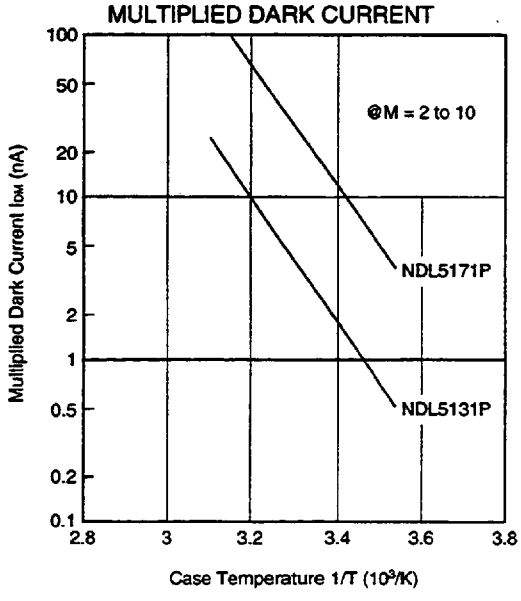
TEMPERATURE DEPENDENCE OF QUANTUM EFFICIENCY



TEMPERATURE DEPENDENCE OF DARK CURRENT



TEMPERATURE DEPENDENCE OF MULTIPLIED DARK CURRENT



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).