NEC
ELECTRON DEVICE

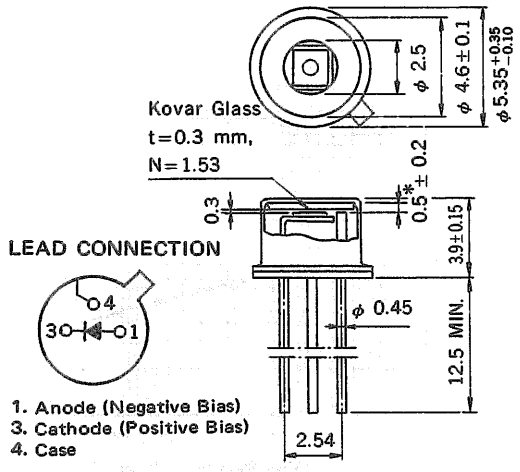
PHOTO DIODE
NDL5100

1 300 nm OPTICAL FIBER COMMUNICATIONS
ϕ 100 μm GERMANIUM AVALANCHE PHOTO DIODE

DESCRIPTION

NDL5100 is a Germanium Avalanche Photo diode especially designed for a detector of long wavelength fiber transmission systems. It features small dark current and high response speed.

PACKAGE DIMENSIONS
in millimeters



FEATURES

- Small dark current. I_D = 0.2 μA
- High sensitivity. η = 75 % @1 300 nm
- Short optical length.
- Hermetically sealed package.
- Detecting area size. ϕ 100 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	−40 to +60	°C
Storage Temperature	T_{stg}	−55 to +125	°C

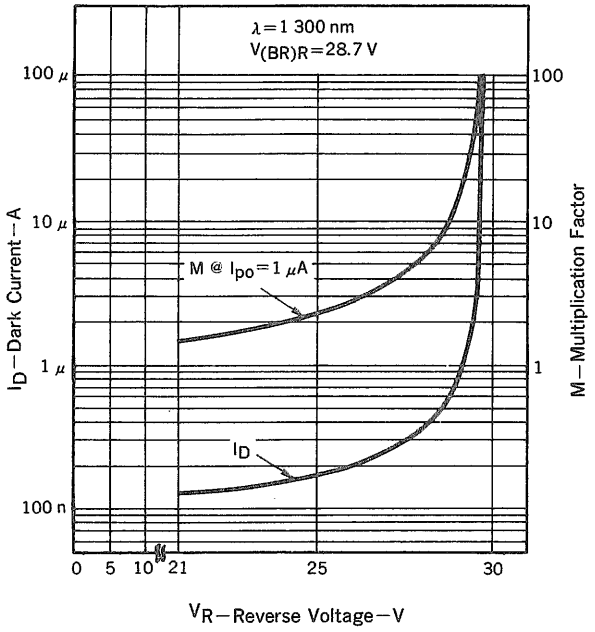
ELECTRO-OPTICAL CHARACTERISTICS (T_a = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Reverse Breakdown Voltage	$V_{(BR)R}$	25		48	V	I_D = 100 μA
Dark Current	I_D		0.2	0.5	μA	$V_R = V_{(BR)R} \times 0.9$
Terminal Capacitance	C_t		2.0	3.0	pF	V_R = 20 V, f = 1.0 MHz
Quantum Efficiency	η	70	75		%	λ = 1 300 nm
Sensitivity	S	0.73	0.78		A/W	λ = 1 300 nm
Multiplication Factor	M	20	40			λ = 1 300 nm, R_L = 100 Ω I_{po} = 1.0 μA, V_R = V (I_D = 10 μA)
Rise Time	t_r		0.5	0.8	ns	λ = 1 300 nm, M = 10 R_L = 50 Ω, I_{po} = 10 μA, 10–90 %
Fall Time	t_f		0.5	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

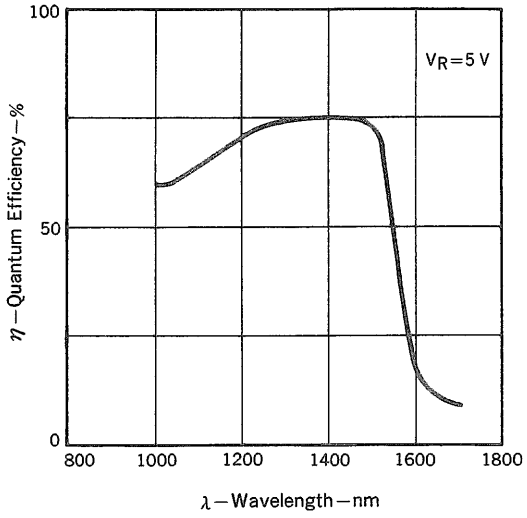
Document No.LC–1114E
(O.D.No.LC–5133C)
Date Published September 1989 M

TYPICAL CHARACTERISTICS (T_a = 25 °C)

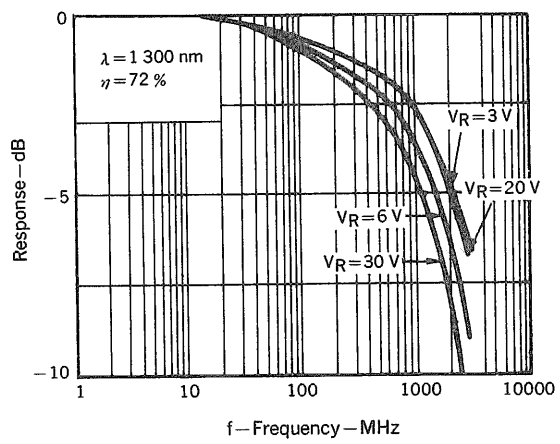
DARK CURRENT, MULTIPLICATION FACTOR vs. REVERSE VOLTAGE



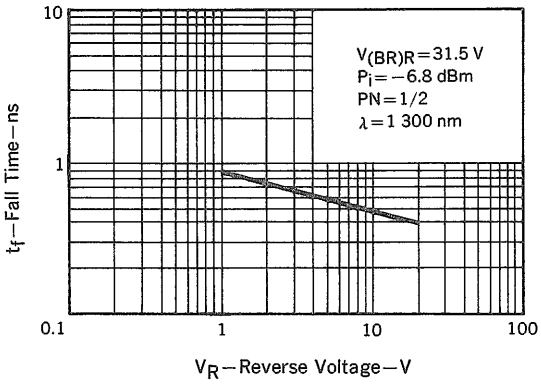
QUANTUM EFFICIENCY vs. WAVELENGTH



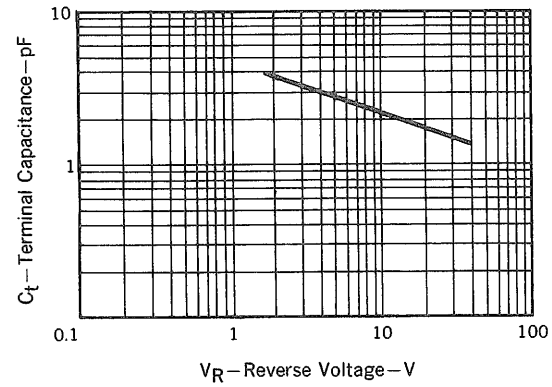
FREQUENCY RESPONSE



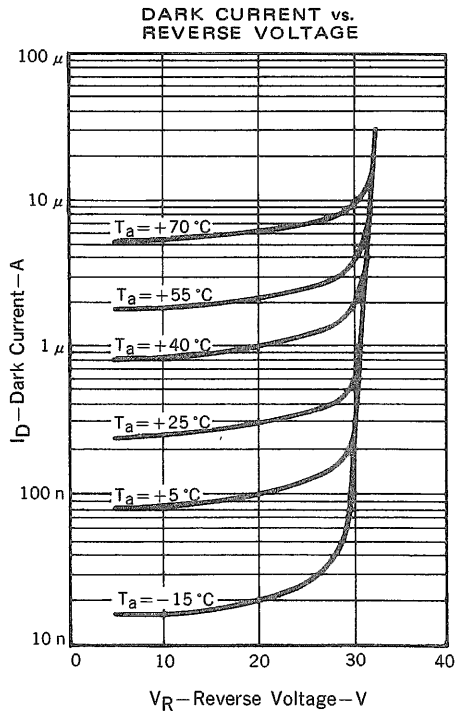
FALL TIME vs. REVERSE VOLTAGE



TERMINAL CAPACITANCE vs. REVERSE VOLTAGE



DARK CURRENT vs. REVERSE VOLTAGE



Ge APD/PD FAMILY

FEATURES / PACKAGES		APD		PIN-PD	REMARKS	
		ϕ 100 μm	ϕ 30 μm	ϕ 240 μm		
TO-18 TYPE CAN		NDL5100	NDL5102	NDL5200		
CHIP ON CARRIER		NDL5100C	NDL5102C	———		
COAXIAL MODULE WITH MULTI MODE FIBER (MMF)		NDL5100P*	———	———		
COAXIAL MODULE WITH SINGLE MODE FIBER (SMF)		———	NDL5102P*	———		
MAIN CHARACTERISTICS (T_a = 25 °C)					UNIT	CONDITIONS
BREAKDOWN VOLTAGE	$V_{(BR)R}$	29	35	———	V	I_D = 100 μA
QUANTUM EFFICIENCY	η	75	75	75	%	λ = 1300 nm
DARK CURRENT	I_D	200	80	500	nA	V = V_{op}
RISE TIME	t_r	0.5	0.3	3	ns	10–90 %
FALL TIME	t_f	0.5	0.3	5	ns	90–10 %

* A module with flange is also available.

[MEMO]