NEC

RECEIVER

NDL5590P Series

φ50 μm InGaAs AVALANCHE PHOTO DIODE WITH MULTIMODE FIBER INTERNAL PRE-AMPLIFIER

DESCRIPTION

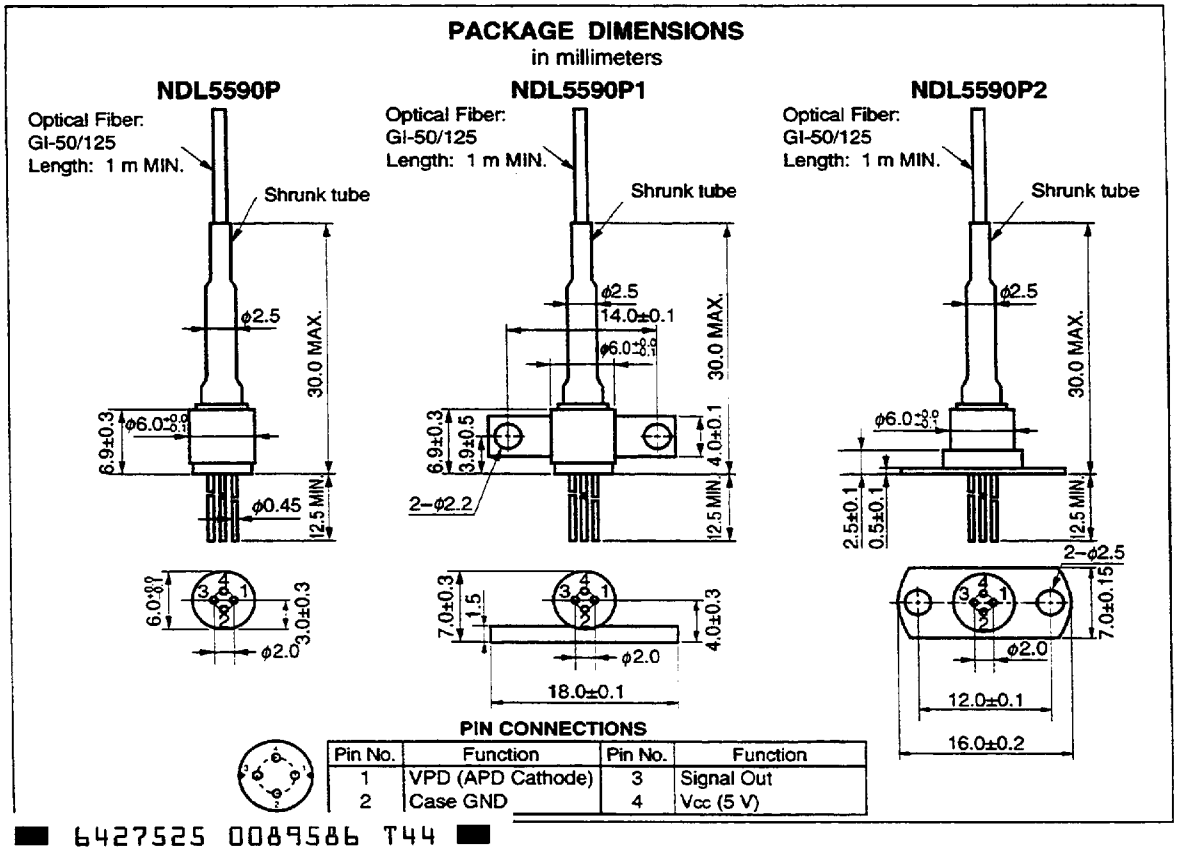
NDL5590P Series is an InGaAs avalanche photo diode module with multimode fiber incorporating silicon pre-amplifier IC. It is designed as an optical receiver for fiber optic communications systems such as SDH, SONET, digital video transmission.

FEATURES

- Internal Si pre-amplifier IC
- High sensitivity — $\overline{P}$ = −36 dBm TYP. @ 622 Mb/s. NRZ
- Wide dynamic range — D_r = 28 dB TYP. @ 622 Mb/s. NRZ
- Transimpedance — 300 Ω
- Output impedance — 50 Ω
- Detecting area size — φ50 μm
- GI-50/125 multimode fiber pigtail

PACKAGE DIMENSIONS

in millimeters



PIN CONNECTIONS

Pin No.	Function	Pin No.	Function
1	VPD (APD Cathode)	3	Signal Out
2	Case GND	4	Vcc (5 V)

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

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The mark ★ shows major revised points.

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★ ORDERING INFORMATION

Part Number	Available Connector	Description
NDL5590P	Without Connector	No Flange
NDL5590PC	With FC-PC Connector	
NDL5590PD	With SC-PC Connector	
NDL5590P1	Without Connector	Flat Mount Flange
NDL5590P1C	With FC-PC Connector	
NDL5590P1D	With SC-PC Connector	
NDL5590P2	Without Connector	Vertical Flange
NDL5590P2C	With FC-PC Connector	
NDL5590P2D	With SC-PC Connector	

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

Parameter	Symbol	Ratings	Unit
Reverse Current	I_R	0.5	mA
Supply Voltage	V_{CC}	6.0	V
Operating Case Temperature	T_C	–40 to +85	°C
Storage Temperature	T_{stg}	–40 to +85	°C
Lead SolderingTemperature (10 s)	T_{sld}	260	°C

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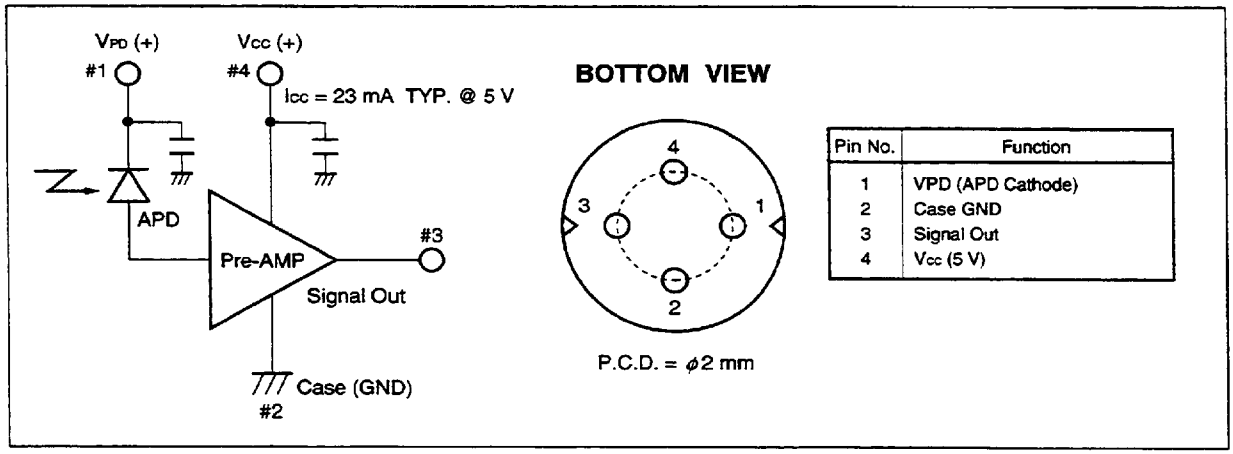
ELECTRO-OPTICAL CHARACTERISTICS (T_C = 25 °C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit	
Reverse Breakdown Voltage	$V_{(BR)R}$	I_D = 100 μA	50	70	100	V	
Temperature Coefficient of Reverse Breakdown Voltage	δ *1			0.2		%/°C	
Dark Current	I_D	$V_R = V_{(BR)R} \times 0.9$		5.0	30	nA	★
Receiver Sensitivity	$\overline{P}$	622 Mb/s, NRZ, PN $2^{15} - 1$		−36		dBm	
Dynamic range	D_r	BER = 10^{-11}, Mark: 1/2, λ = 1 310 nm		28		dB	
Quantum Efficiency	η	λ = 1 310 nm, M = 1	76	90		%	
		λ = 1 550 nm, M = 1	65	77			
Responsivity	S	λ = 1 310 nm, M = 1	0.80	0.94		A/W	
		λ = 1 550 nm, M = 1	0.81	0.96			
Cut-off Frequency	fc	M = 3 to 15	1.0			GHz	
Equivalent Input Noise Current	I_n	f = 100 MHz		9.0		$pA/\sqrt{Hz}$	
Power Supply Voltage	V_{CC}			5.0		V	
Power Supply Current	I_{CC}	V_{CC} = 5 V		23	30	mA	
Transimpedance	Z_t			300		Ω	★

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

EQUIVALENT CIRCUIT AND PIN CONNECTIONS



Pin No.	Function
1	VPD (APD Cathode)
2	Case GND
3	Signal Out
4	Vcc (5 V)

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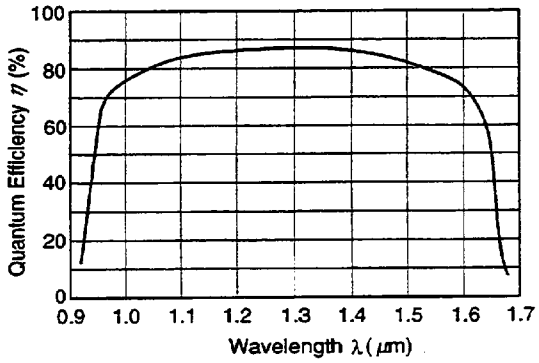
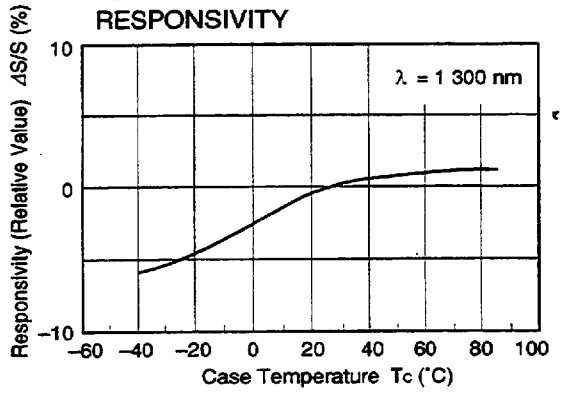
★ TYPICAL CHARACTERISTICS (T_C = 25 °C, unless otherwise specified)

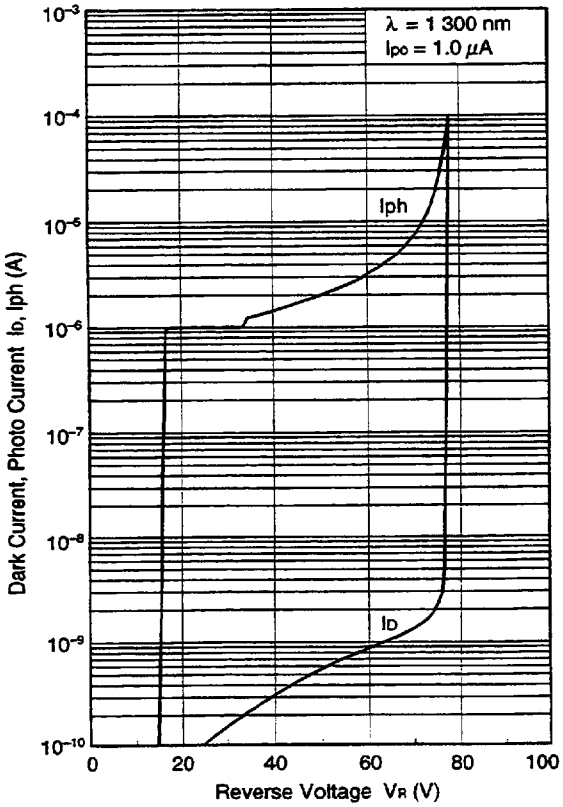
WAVELENGTH DEPENDENCE OF QUANTUM EFFICIENCY



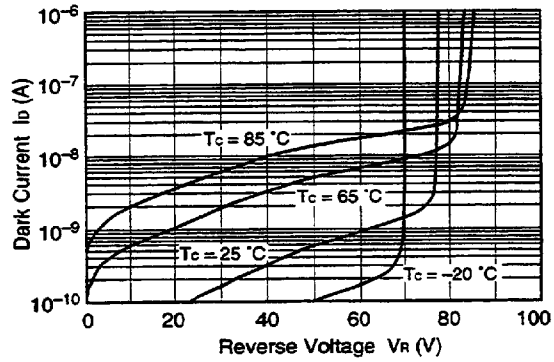
TEMPERATURE DEPENDENCE OF RESPONSIVITY



DARK CURRENT and PHOTO CURRENT vs. REVERSE VOLTAGE



DARK CURRENT vs. REVERSE VOLTAGE



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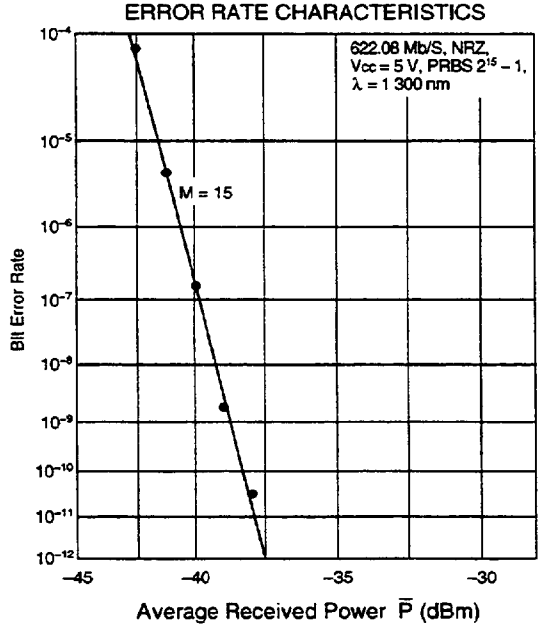
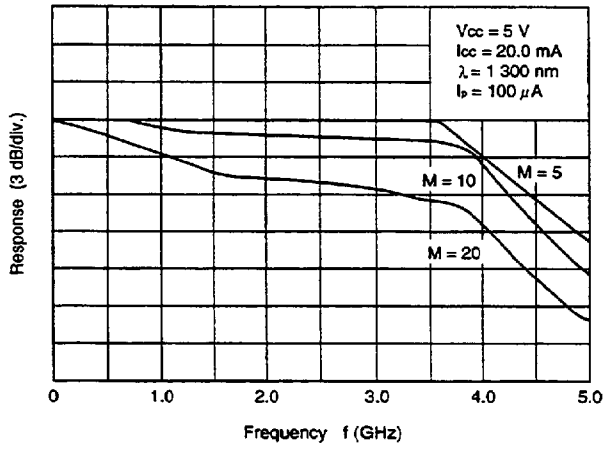
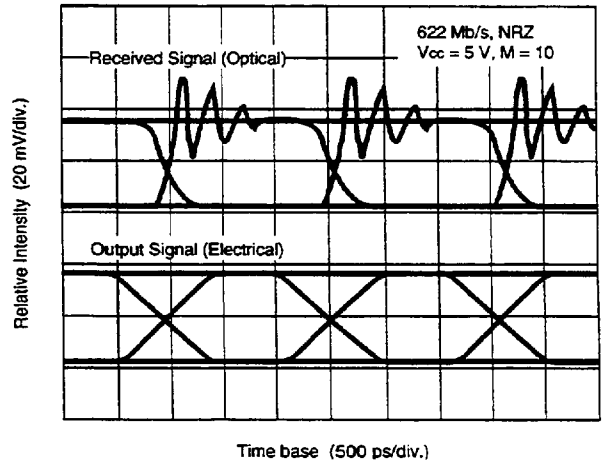
ERROR RATE CHARACTERISTICS



FREQUENCY RESPONSE



EYE DIAGRAM



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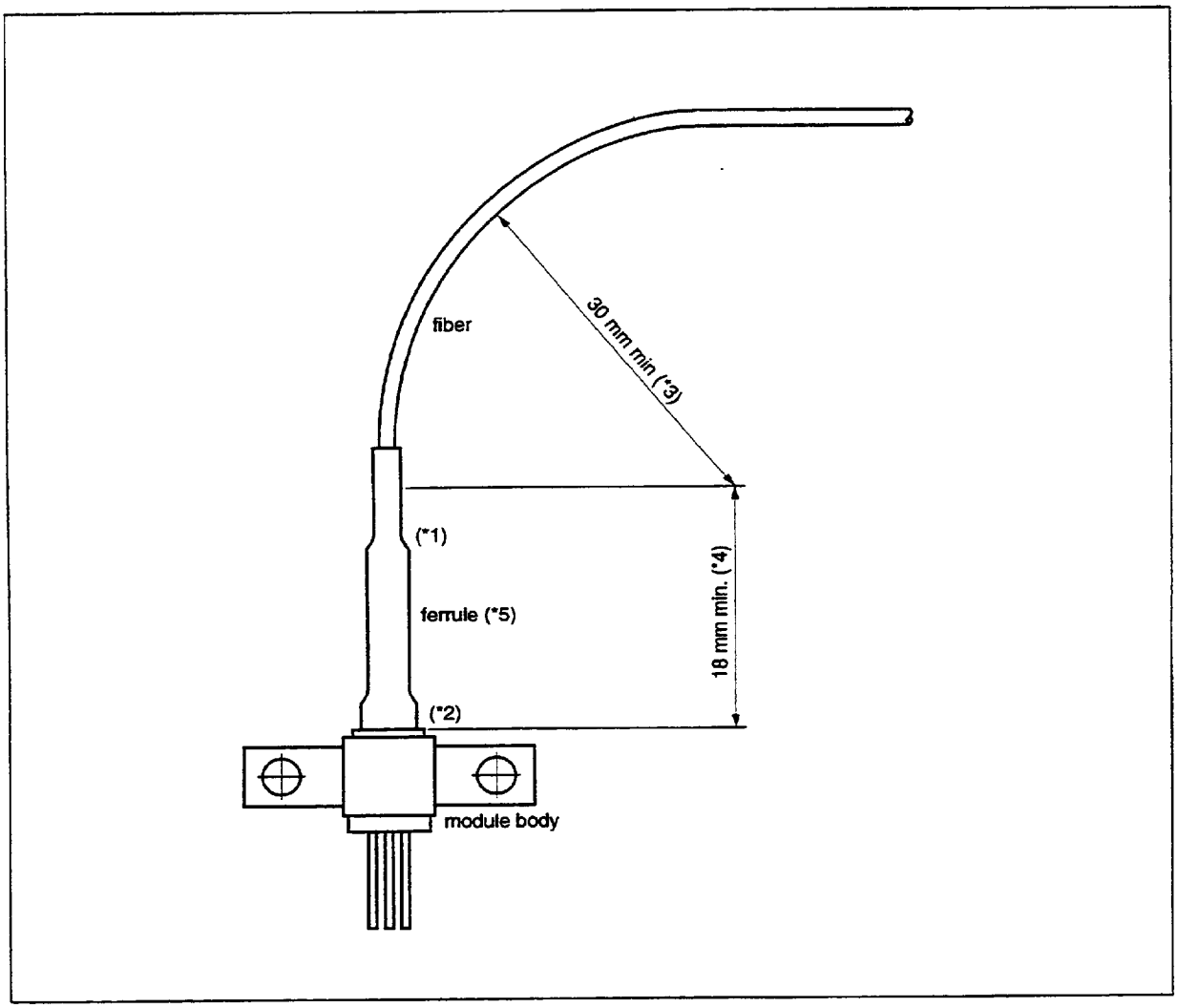
HANDLING PRECAUTION for PD/APD MODULE

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).



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