

To our customers,

Old Company Name in Catalogs and Other Documents

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Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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NDL5506P Series

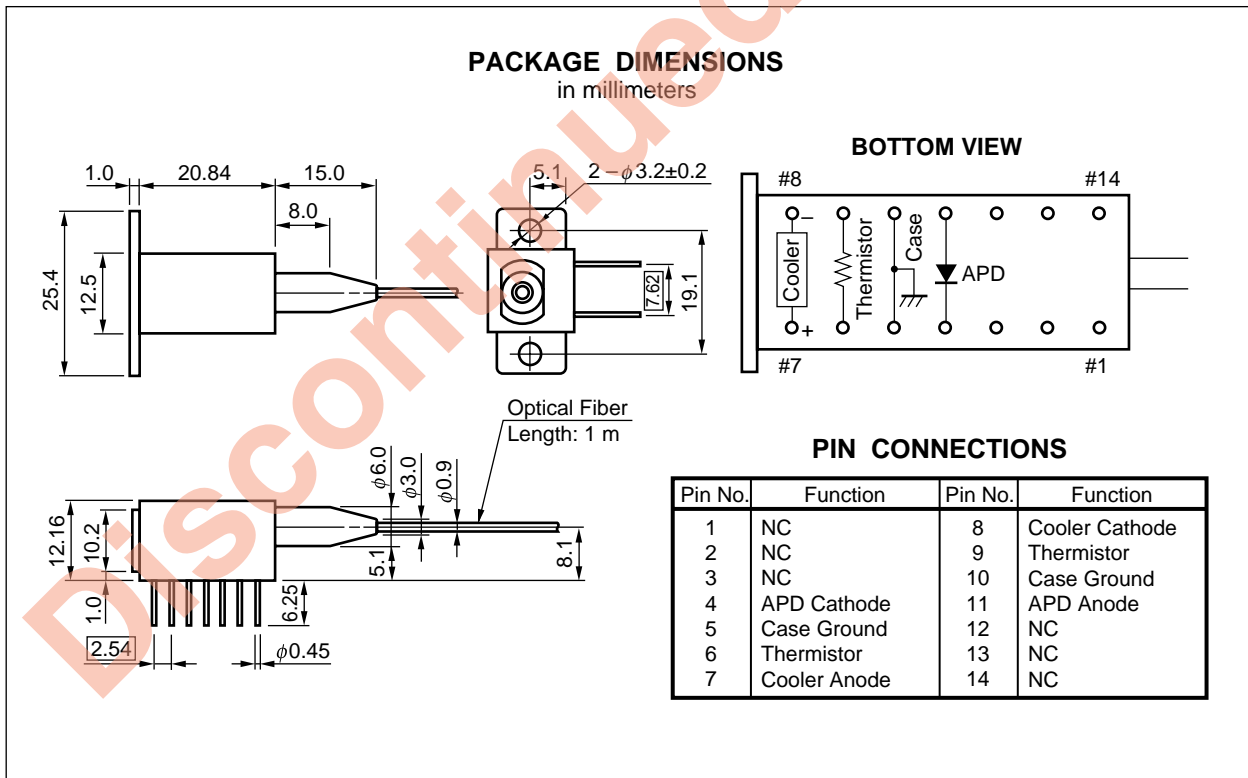
$\phi 50 \mu\text{m}$ InGaAs AVALANCHE PHOTO DIODE 14-PIN DIP MODULE WITH TEC

DESCRIPTION

The NDL5506P Series is an InGaAs avalanche photodiode module with internal thermoelectric cooler. This series is available in multimode or single mode fiber. It covers the wavelength range between 1 000 and 1 600 nm with high efficiency.

FEATURES

- High quantum efficiency $\eta = 85 \% @ \lambda = 1\ 300 \text{ nm}$
 $\eta = 80 \% @ \lambda = 1\ 550 \text{ nm}$
- Small dark current $I_D = 2 \text{ nA}$
- High-speed response $f_c = 1.2 \text{ GHz} @ M = 20$
- Internal thermoelectric cooler
- Hermetically sealed 14-pin Dual In-line Package



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

★ ORDERING INFORMATION

Part Number	Available Connector	Fiber
NDL5506P	Without Connector	GI-50/125
NDL5506PC	With FC-PC Connector	
NDL5506PS	Without Connector	SM-9/125
NDL5506PSC	With FC-PC Connector	

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

Parameter	Symbol	Ratings	Unit
Forward Current	I _F	10	mA
Reverse Current	I _R	0.5	mA
Operating Case Temperature	T _c	-20 to +55	°C
Storage Temperature	T _{stg}	-40 to +85	°C
Lead Soldering Temperature (10 s)	T _{slid}	260	°C

ELECTRO-OPTICAL CHARACTERISTICS (T_c = 25 °C, I_c = 0 A, unless otherwise specified)

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} × 0.9		5	50	nA
		V _R = V _{(BR)R} × 0.9, I _c = 1.1 A, T _c = 55 °C		2	5	
Multiplied Dark Current	I _{DM}	M = 2 to 10		1	2	nA
Terminal Capacitance	C _t	V _R = V _{(BR)R} × 0.9, f = 1 MHz		1.5	1.7	pF
Cut-off Frequency	f _c	M = 10	1			GHz
		M = 20		1.2		
Quantum Efficiency	η	λ = 1 300 nm	70	85		%
		λ = 1 550 nm		80		
Sensitivity	S	λ = 1 300 nm	0.73	0.89		A/W
		λ = 1 550 nm		1.00		
Multiplication Factor	M	λ = 1 550 nm, I _{po} = 1.0 μA, V _R = V (@ I _D = 1 μA)	20	40		
Excess Noise Factor ^{*2}	x	λ = 1 300 nm, 1 550 nm, I _{po} = 1.0 μA,		0.7		
	F	M = 10, f = 35 MHz, B = 1 MHz		5		

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

*2 $F = M^x$

ELECTRO-OPTICAL CHARACTERISTICS (Applicable to Thermistor and TEC: T_C = -20 to + 55 °C)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Thermistor Resistance	R	T _{APD} = 25 °C	9.5	10.0	10.5	kΩ
B Constant	B		3 300	3 400	3 500	K
Cooler Voltage	V _C	I _C = 1.1 A		2.6		V
Cooling Capacity	ΔT ^{*1}	I _C = 1.1 A	45			K

*1 $\Delta T = |T_C - T_{APD}|$

Discontinued Product

★ 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.

REFERENCE

Document Name	Document No.
NEC semiconductor device reliability/quality control system	C11159E
Quality grades on NEC semiconductor devices	C11531E
Semiconductor device mounting technology manual	C10535E
Guide to quality assurance for semiconductor devices	MEI-1202
Semiconductor selection guide	X10679E

Discontinued Product

[MEMO]

Discontinued Product

[MEMO]

Discontinued Product

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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"Standard", "Special", and "Specific". The Specific quality grade applies only to devices developed based on a customer designated "quality assurance program" for a specific application. The recommended applications of a device depend on its quality grade, as indicated below. Customers must check the quality grade of each device before using it in a particular application.

Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

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Anti-radioactive design is not implemented in this product.