

**InGaAs PIN-PD RECEIVER WITH INTERNAL PRE-AMPLIFIER
FOR 10 Gb/s APPLICATIONS****DESCRIPTION**

The NR3315TA Series consists of InGaAs PIN coaxial module with internal pre-amplifiers designed for 10 Gb/s optical transceivers such as a 300-pin transponder. These modules are ideal as receivers for SONET OC-192 systems.

FEATURES

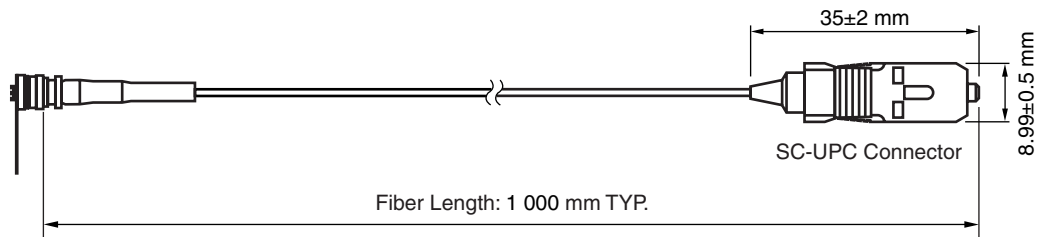
- XMD-MSA compliant
- 10 Gb/s high sensitivity InGaAs PIN-PD
- +3.3 V InP transimpedance pre-amplifier
- Minimum receiver sensitivity $\bar{P}_r = -20$ dBm
- Operating case temperature $T_c = -5$ to $+85^\circ\text{C}$
- Transimpedance $Z_t = 6\,000\ \Omega$ (Single-ended)
- Cut-off frequency $f_c = 8$ GHz
- With flexible printed circuit



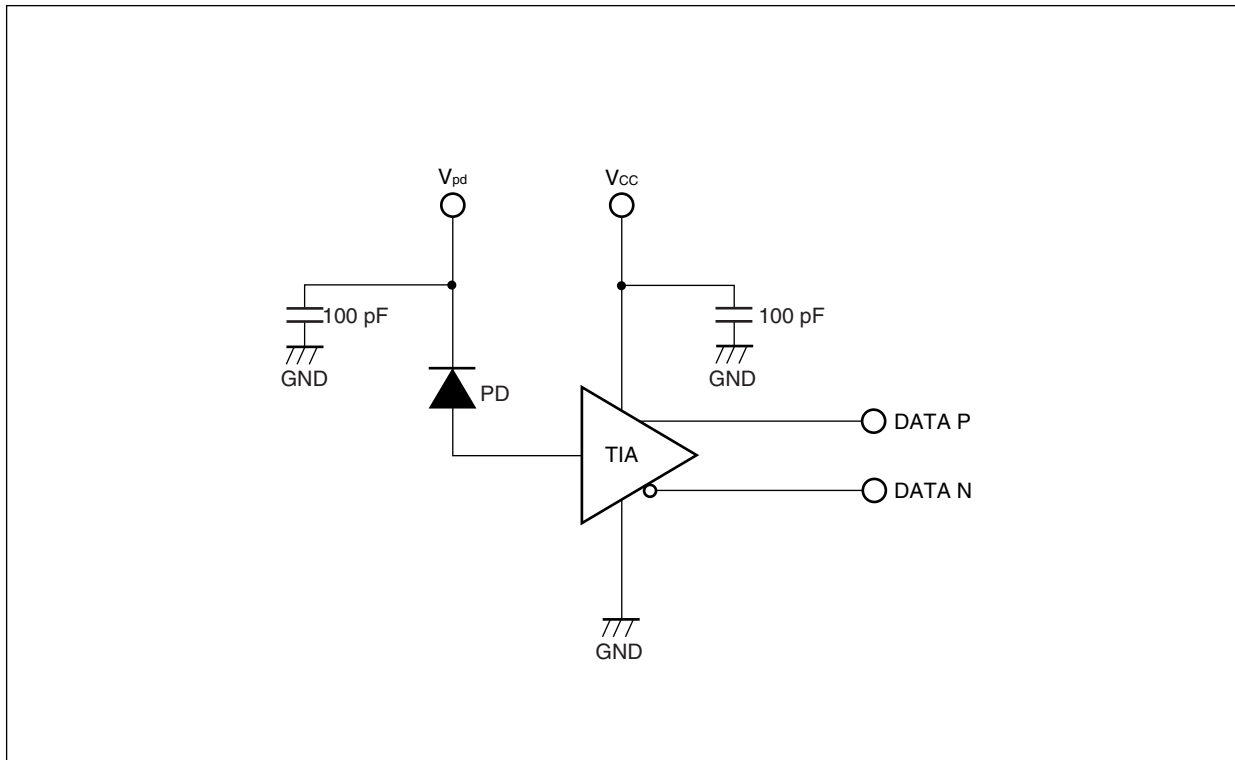
The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.

OPTICAL FIBER CHARACTERISTICS

Parameter	Specification	Unit
Mode Field Diameter	9.5±1	μm
Core Diameter	—	μm
Cladding Diameter	125±2	μm
Maximum Cladding Noncircularity	2	%
Maximum Core/Cladding Concentricity	1.6	%
Outer Diameter	0.9±0.1	mm
Cut-off Wavelength	1 100 to 1 270	nm
Minimum Fiber Bending Radius	30	mm
Fiber Length	1 000 TYP.	mm
Flammability	UL1581 VW-1	



BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Connector Type	Note
NR3315TA-CC	SC-UPC	Differential output with flexible PCB
NR3315TA-EC	LC-UPC	

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
PIN-PD Reverse Voltage	V_R	10	V
PIN-PD Reverse Current	I_R	10	mA
IC Supply Voltage	V_{CC}	-0.7 to +5.0	V
Operating Case Temperature	T_C	-5 to +85	°C
Storage Temperature	T_{stg}	-40 to +85	°C
Maximum AOP Input (ER < 5.4 dB (1.1 A/W))	P_{in}	+5	dBm
Lead Soldering Temperature (Flexible Printed Circuit)	T_{sld}	260 (10 sec.)	°C

RECOMMENDED OPERATING CONDITION

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
PIN-PD Reverse Voltage	V_R	3.1	3.3	3.5	V
IC Supply Voltage	V_{CC}	+3.1	+3.3	+3.5	V
Operating Case Temperature	T_C	-5	+25	+85	°C

ELECTRO-OPTICAL CHARACTERISTICS ($\lambda = 1\ 310\ \text{nm}/1\ 550\ \text{nm}$, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Sensitivity	S		0.7	0.9		A/W
Transimpedance	Z_t	$R_L = 50\ \Omega$, $P_{in} = -20\ \text{dBm}$, Single-ended	3 000	6 000		Ω
Maximum Output Voltage Swing	V_{clip}	Single-ended	100		350	mV _{pp}
Cut-off Frequency	f_c	$R_L = 50\ \Omega$, $P_{in} = -17\ \text{dBm}$, -3 dB from 1 GHz	6.5	8		GHz
Minimum Receiver Sensitivity	\bar{P}_r	9.95 Gb/s, BER = 10^{-12} , PRBS = $2^{31}-1$, ER > 10 dB, NRZ, $\lambda = 1\ 550\ \text{nm}$		-20	-17	dBm
Overload	P_o		+0.5	+2		dBm
IC Supply Current	I_{CC}				50	mA
Optical Return Loss	ORL				-27	dB

REFERENCE

Document Name	Document No.
Opto-Electronics Devices Pamphlet	PX10160E

- **The information in this document is current as of September, 2009. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC Electronics data sheets, etc., for the most up-to-date specifications of NEC Electronics products. Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.**

- No part of this document may be copied or reproduced in any form or by any means without the prior written consent of NEC Electronics. NEC Electronics assumes no responsibility for any errors that may appear in this document.
- NEC Electronics does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from the use of NEC Electronics products listed in this document or any other liability arising from the use of such products. No license, express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of NEC Electronics or others.
- Descriptions of circuits, software and other related information in this document are provided for illustrative purposes in semiconductor product operation and application examples. The incorporation of these circuits, software and information in the design of a customer's equipment shall be done under the full responsibility of the customer. NEC Electronics assumes no responsibility for any losses incurred by customers or third parties arising from the use of these circuits, software and information.
- While NEC Electronics endeavors to enhance the quality and safety of NEC Electronics products, customers agree and acknowledge that the possibility of defects thereof cannot be eliminated entirely. In addition, NEC Electronics products are not taken measures to prevent radioactive rays in the product design. When customers use NEC Electronics products with their products, customers shall, on their own responsibility, incorporate sufficient safety measures such as redundancy, fire-containment and anti-failure features to their products in order to avoid risks of the damages to property (including public or social property) or injury (including death) to persons, as the result of defects of NEC Electronics products.
- NEC Electronics products are classified into the following three quality grades: "Standard", "Special" and "Specific".

The "Specific" quality grade applies only to NEC Electronics products developed based on a customer-designated "quality assurance program" for a specific application. The recommended applications of an NEC Electronics product depend on its quality grade, as indicated below. Customers must check the quality grade of each NEC Electronics product 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": Aircraft, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems and medical equipment for life support, etc.

The quality grade of NEC Electronics products is "Standard" unless otherwise expressly specified in NEC Electronics data sheets or data books, etc. If customers wish to use NEC Electronics products in applications not intended by NEC Electronics, they must contact an NEC Electronics sales representative in advance to determine NEC Electronics' willingness to support a given application.

(Note)

- (1) "NEC Electronics" as used in this statement means NEC Electronics Corporation and also includes its majority-owned subsidiaries.
- (2) "NEC Electronics products" means any product developed or manufactured by or for NEC Electronics (as defined above).

M8E0904E

<p>Caution GaAs Products</p>	<p>This product uses gallium arsenide (GaAs). GaAs vapor and powder are hazardous to human health if inhaled or ingested, so please observe the following points.</p> <ul style="list-style-type: none">• Follow related laws and ordinances when disposing of the product. If there are no applicable laws and/or ordinances, dispose of the product as recommended below.<ol style="list-style-type: none">1. Commission a disposal company able to (with a license to) collect, transport and dispose of materials that contain arsenic and other such industrial waste materials.2. Exclude the product from general industrial waste and household garbage, and ensure that the product is controlled (as industrial waste subject to special control) up until final disposal.• Do not burn, destroy, cut, crush, or chemically dissolve the product.• Do not lick the product or in any way allow it to enter the mouth.
<p>Caution Optical Fiber</p>	<p>A glass-fiber is attached on the product. Handle with care.</p> <ul style="list-style-type: none">• When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.