



RECEIVER NR4210 Series

InAIAs APD RECEIVER WITH INTERNAL PRE-AMPLIFIER FOR 10 Gb/s APPLICATIONS

DESCRIPTION

The NR4210 Series products consist of InAIAs-APD (avalanche photo diode) ROSAs (Receiver Optical Sub-Assembly) with internal pre-amplifiers designed for 10 Gb/s long-reach optical transceivers such as the XENPAK/X2/XFP. These modules are ideal as receivers for IEEE 10G BASE and SONET OC-192 systems.

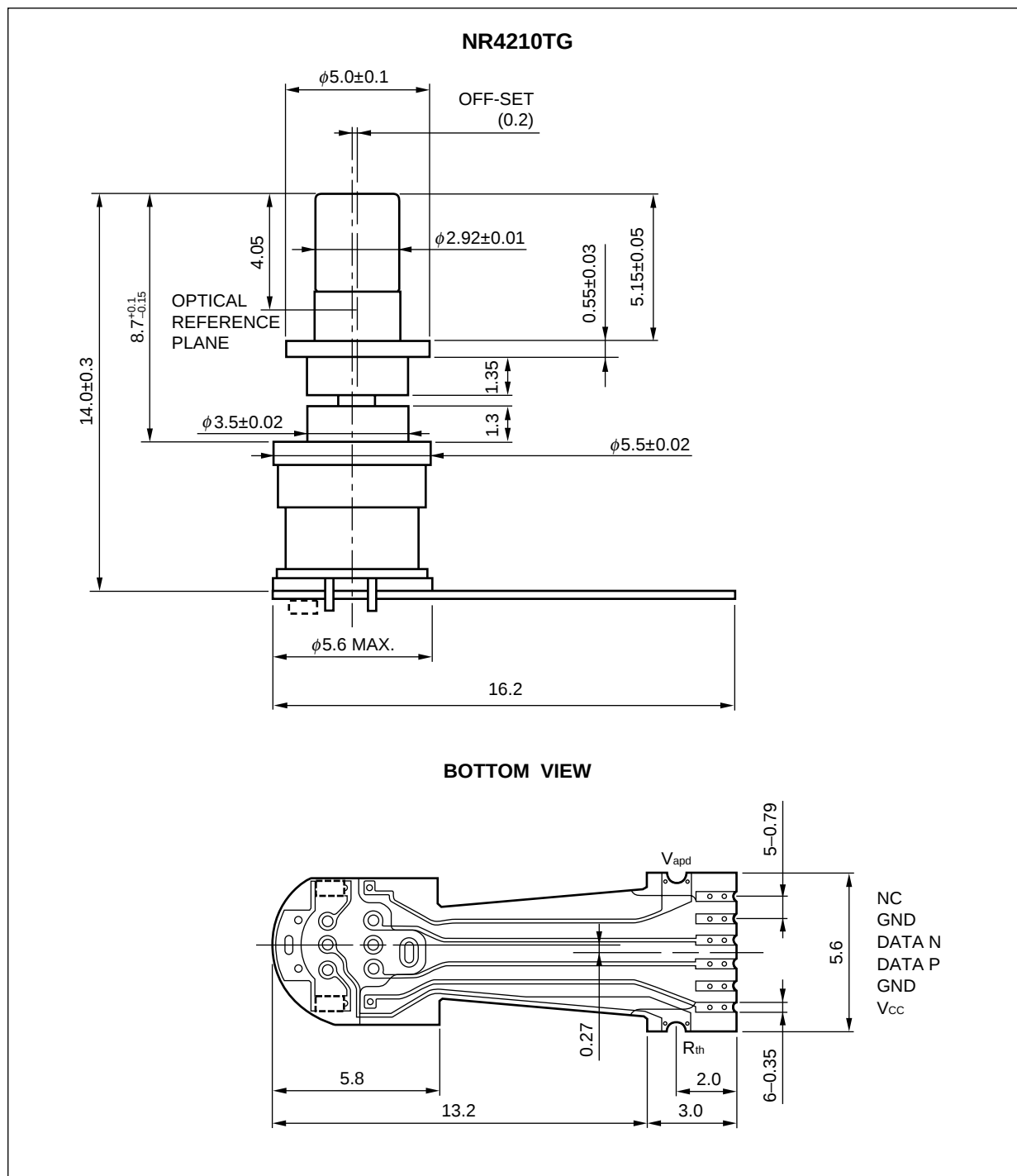
FEATURES

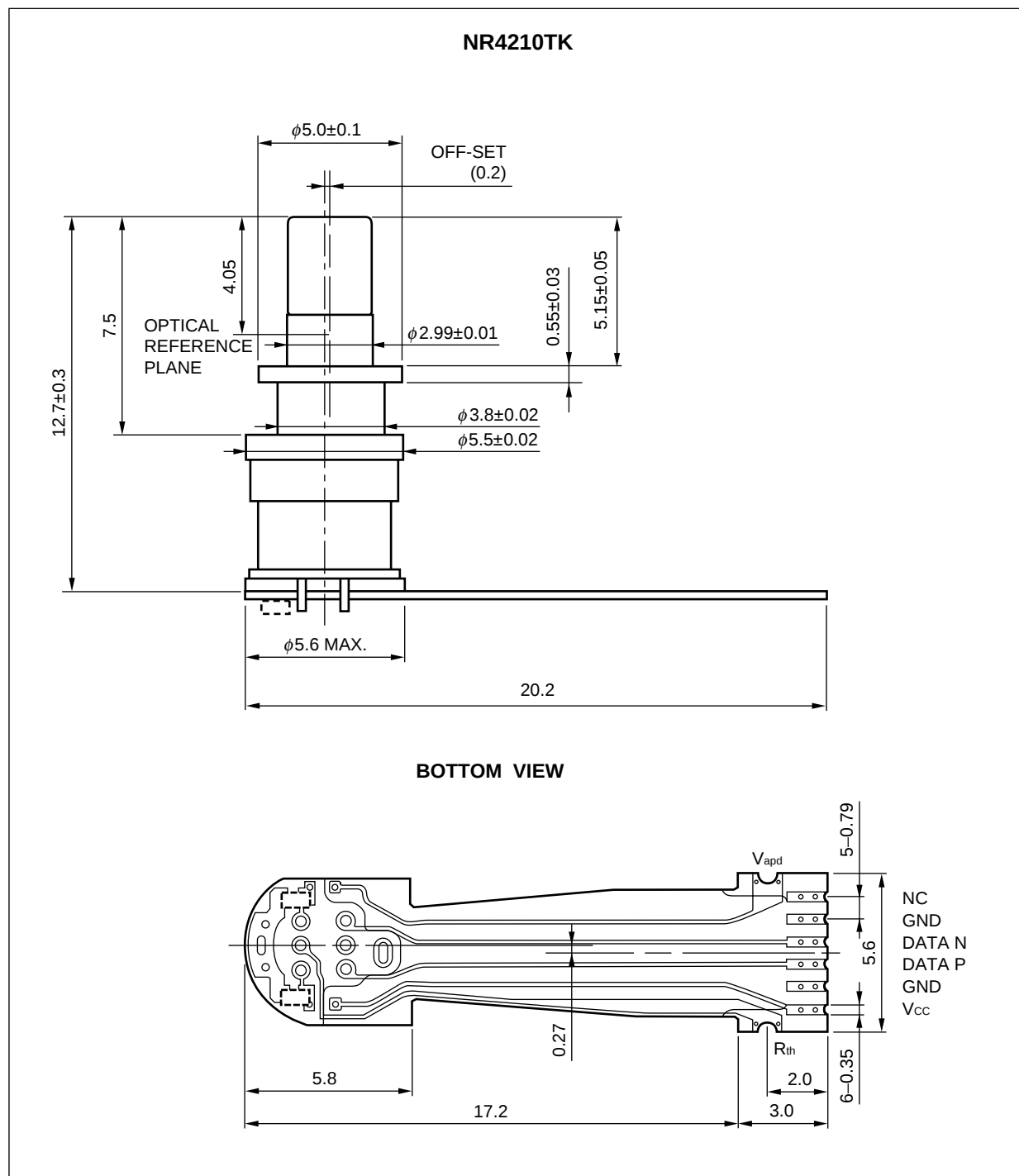
- XMD-MSA compliant ROSA
- 10 Gb/s high sensitivity InAIAs-APD
- +3.3 V SiGe transimpedance pre-amplifier
- Minimum receiver sensitivity $\bar{P}_r = -28 \text{ dBm}$
- Operating case temperature $T_c = -5 \text{ to } +85^\circ\text{C}$
- Transimpedance $Z_t = 2\,000 \, \Omega$ (Single-ended)
- Cut-off frequency $f_c = 8 \text{ GHz}$
- With flexible printed circuit



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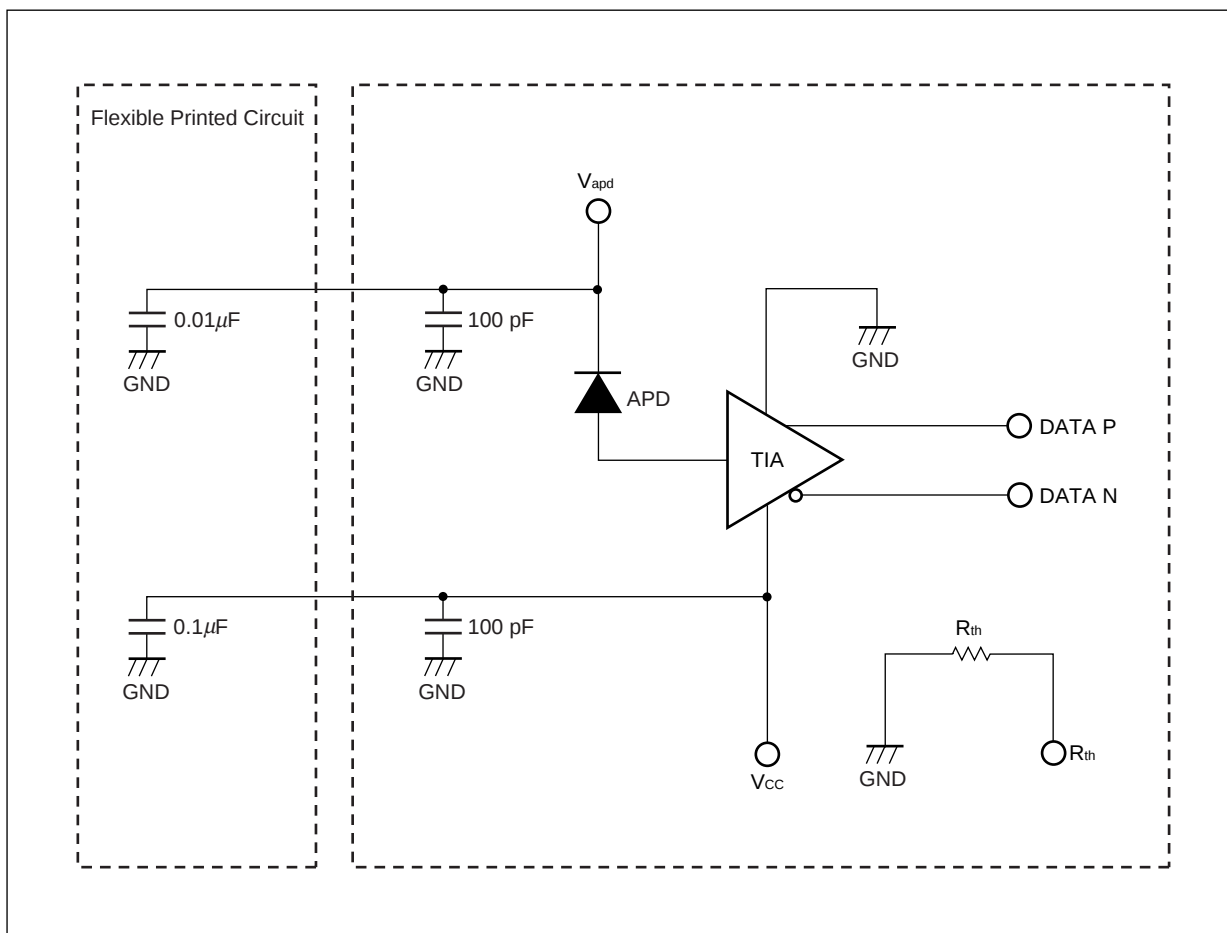








BLOCK DIAGRAM



ORDERING INFORMATION

Part Number	Receptacle Type	Flexible PCB Type
NR4210TF-AZ	SC, Zirconia	Standard
NR4210TG-AZ	LC, Electrically Isolated	Standard
NR4210TK-AZ	LC, Zirconia	Long
NR4210TL-AZ	LC, Electrically Isolated	Long
NR4210TP-AZ	LC, Zirconia	Standard
NR4210TX-AZ	SC, Metal	Standard

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
APD Reverse Voltage	V_R	V_{BR}	V
APD Reverse Current	I_R (peak)	4	mA
IC Supply Voltage	V_{CC}	0 to +4	V
Operating Case Temperature	T_C	-5 to +85	°C
Storage Temperature	T_{stg}	-40 to +85	°C
Lead Soldering Temperature (Flexible Printed Circuit)	T_{sld}	350 (3 sec.)	°C

ELECTRO-OPTICAL CHARACTERISTICS ($T_C = -5$ to $+85^\circ\text{C}$, $V_{CC} = +3.3$ V, $\lambda = 1\,550$ nm, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
APD Sensitivity	S	$\lambda = 1\,310$ nm, $M = 1$	0.75	0.9		A/W
		$\lambda = 1\,550$ nm, $M = 1$	0.75	0.9		
APD Breakdown Voltage	V_{BR}	$I_D = 10\ \mu\text{A}$	25	30	35	V
Temperature Coefficient of APD Breakdown Voltage	δ^{*1}	$T_C = +25$ to $+85^\circ\text{C}$	0	0.02	0.05	V/ $^\circ\text{C}$
APD Dark Current	I_D	$V_R = V_{BR} \times 0.9$, $T_C = +25^\circ\text{C}$			0.7	μA
Transimpedance	Z_t	Single-ended	800	2 000	3 000	Ω
Maximum Output Voltage Swing	V_{clip}	Single-ended	100	125	200	mV _{pp}
Cut-off Frequency	f_c	$M = 3$, $P_{in} = -24$ dBm		9		GHz
		$M = 9$, $P_{in} = -24$ dBm	7	8		
Lower Cut-off Frequency	f_{cl}				100	kHz
Peaking	D_{PK}	1G–BW, $M = 9$, $P_{in} = -24$ dBm			2	dB
Group Delay	GD	1G–6G, $M = 9$, $P_{in} = -24$ dBm	–50		+50	ps
Minimum Receiver Sensitivity	$\overline{P_r}$	9.95 Gb/s, BER = 10^{-12} , M_{opt} , PRBS = $2^{31}-1$, ER = 13 dB, NRZ		–28	–26.5	dBm
Overload	P_O	9.95 Gb/s, BER = 10^{-12} , $M = 3$, PRBS = $2^{31}-1$, ER = 13 dB, NRZ	–5			dBm
RF Output Return Loss	S_{22}	1G–6G, $M = 9$, Single-ended			–6	dB
IC Supply Current	I_{CC}		40	55	75	mA
IC Supply Voltage	V_{CC}		+3.1	+3.3	+3.5	V
Optical Return Loss	ORL	$\lambda = 1\,310$ nm			–27	dB
		$\lambda = 1\,550$ nm			–27	
Thermistor Resistance	R_{th}		9.5	10	10.5	k Ω
Thermistor B Constant	B		3 350	3 450	3 550	K

$$^{*1} \delta = \frac{\Delta V_{BR}}{\Delta T_C}$$

REFERENCE

Document Name	Document No.
Opto-Electronics Devices Pamphlet ^{*1}	PX10160E

^{*1} Published by the former NEC Compound Semiconductor Devices, Ltd.

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M8E 02.11-1

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Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
		-A	-AZ
Lead (Pb)	< 1000 PPM	Not Detected	(*)
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Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

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