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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RECEIVER

NR4510UR

ϕ50 μm InGaAs APD RECEIVER FOR 2.5 Gb/s ROSA WITH INTERNAL PRE-AMPLIFIER

DESCRIPTION

The NR4510UR is a InGaAs APD ROSA with an internal pre-amplifier in a receptacle type package designed for SFF/SFP transceiver with LC duplex receptacle. This device is ideal as a receiver for Synchronous Digital Hierarchy (SDH) system, STM-16, ITU-T recommendations.

FEATURES

- Internal pre-amplifier
- Minimum receiver sensitivity $\overline{P}_r$ = –33 dBm
- Wide operating temperature range T_C = –40 to +85°C
- 50 Ω differential output
- Small package ϕ4.6 mm ROSA (Total length 12.0 mm MAX.)
- Based on Telcordia reliability

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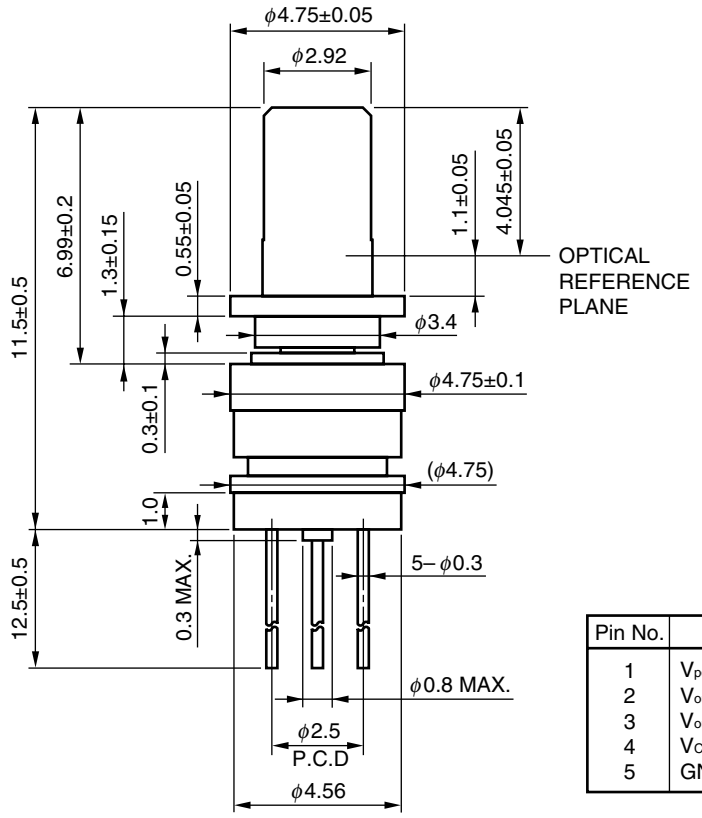
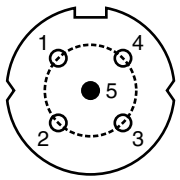
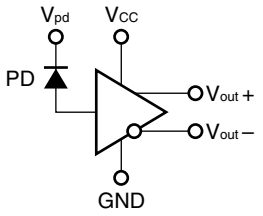
PACKAGE DIMENSIONS (UNIT: mm)



BOTTOM VIEW



PIN CONNECTIONS



Pin No.	Function
1	V_{pd} : PD cathode
2	$V_{out}+$: Data output (+)
3	$V_{out}-$: Data output (–)
4	V_{CC} : Pre-amplifer power supply (+3.3 V)
5	GND : Case ground

ORDERING INFORMATION

Part Number	Package
NR4510UR	ϕ4.6 mm ROSA

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Ratings	Unit
Forward Current	I_F	10	mA
Reverse Current	I_R	1.5	mA
Supply Voltage	V_{CC}	4.5	V
Operating Case Temperature	T_C	–40 to +85	°C
Storage Temperature	T_{stg}	–40 to +85	°C
Lead Soldering Temperature	T_{sld}	350 (3 sec.)	°C
Relative Humidity (noncondensing)	RH	85	%

ELECTRO-OPTICAL CHARACTERISTICS

(T_C = –40 to +85°C, V_{CC} = 3.3 V, λ = 1.31 μm, 1.55 μm, unless otherwise specified)

Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Reverse Break Down Voltage	V_{BR}	I_D = 100 μA	40	60	70	V
Temperature Coefficient of Reverse Breakdown Voltage	δ		0.09		0.15	%/°C
Dark Current	I_D	V_R = 0.9 V_{BR}, T_C = 85°C			500	nA
Minimum Receiver Sensitivity	$\overline{P_r}$	2.48832 Gb/s, BER = 10^{-10}, PRBS = 2^{23}–1, ER = 10 dB, λ = 1.31 μm, NRZ, AC-coupled, Mopt		–33	–30	dBm
Maximum Optical Input Power	P_{ovl}	2.48832 Gb/s, BER = 10^{-10}, PRBS = 2^{23}–1, ER = 10 dB, λ = 1.31 μm, NRZ, AC-coupled, M = 3	–6	–5		dBm
Sensitivity	S	M = 1, λ = 1.31 μm	0.80			A/W
		M = 1, λ = 1.55 μm	0.88			
Cut-off Frequency	f_C	AC-coupled, R_L = 50 Ω, M = 10, –3 dB Ref to 100 MHz	1.6	1.9		GHz
Optical Return Loss	ORL	SMF	27			dB
Transimpedance	Z_t	f = 100 MHz, 50 Ω single-ended, AC-coupled 50 Ω load	1.05	1.4		kΩ
Supply Voltage	V_{CC}		3.15	3.3	3.45	V
Supply Current	I_{CC}				45	mA

InGaAs APD/PD FAMILY

Part Number	Absolute Maximum Ratings		Electro-Optical Characteristics (T_C = 25°C)						Applications	Package
	T_C (°C)	T_{stg} (°C)	Detecting Area Size (μm)	I_D (nA) TYP.	f_C (GHz) MIN.	S (A/W) TYP.	@λ (nm)	V_R (V)		
NR3470MU-CC	0 to +75	−40 to +85	ϕ40	5	7.5	1.00	1 550	5	10 Gb/s: STM-64	17-pin mini-butterfly PD with an Internal pre-amplifer
NR3510UR	−40 to +85	−40 to +85	ϕ50	0.1	1.8	0.80	1 310	3.3	2.5 Gb/s:	PIN ROSA with an
						0.85	1 550		STM-16	Internal pre-amplifer
NR4270MU-CC	0 to +70	−40 to +85	ϕ20	1.2 μA[*1]	7.0	0.63 [*2]	1 550	0.9 V_{BR}	10 Gb/s: STM-64	17-pin mini-butterfly APD with an Internal pre-amplifer
NR4500BP-CC	0 to +85	−40 to +85	ϕ50	−	2.5	0.94	1 310	0.9 V_{BR}	2.5 Gb/s:	Coaxial APD with an
NR4500CP-CC						0.96	1 550		STM-16	Internal pre-amplifer
NR4510UR	−40 to +85	−40 to +85	ϕ50	−	1.6	0.80	1 310	0.9 V_{BR}	2.5 Gb/s:	APD ROSA with an
						0.88	1 550		STM-16	Internal pre-amplifer
NR7500 Series	−40 to +85	−40 to +85	ϕ50	0.1	2.5	0.89	1 310	5	2.5 Gb/s:	Coaxial PD
						0.94	1 550		STM-16	
NR7800 Series	−40 to +85	−40 to +85	ϕ80	0.1	2.5	0.89	1 310	5	≤ 622 Mb/s:	Coaxial PD
						0.94	1 550		STM-4, STM-1	
NR8500 Series	−40 to +85	−40 to +85	ϕ50	7	1	0.94	1 310	0.9 V_{BR}	≤ 622 Mb/s:	Coaxial APD
						0.96	1 550		STM-4, STM-1	
NR8501 Series	−40 to +85	−40 to +85	ϕ50	7	2.5	0.94	1 310	0.9 V_{BR}	2.5 Gb/s:	Coaxial APD
						0.96	1 550		STM-16	

***1** MAX.

***2** MIN.

REFERENCE

Document Name	Document No.
OPTICAL SEMICONDUCTOR DEVICES FOR FIBEROPTIC COMMUNICATIONS SELECTION GUIDE	PL10161E
Opto-Electronics Devices Pamphlet	PX10160E

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