DATA SHEET

NEC

RECEIVER

NR4500BP-CC,NR4500CP-CC

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

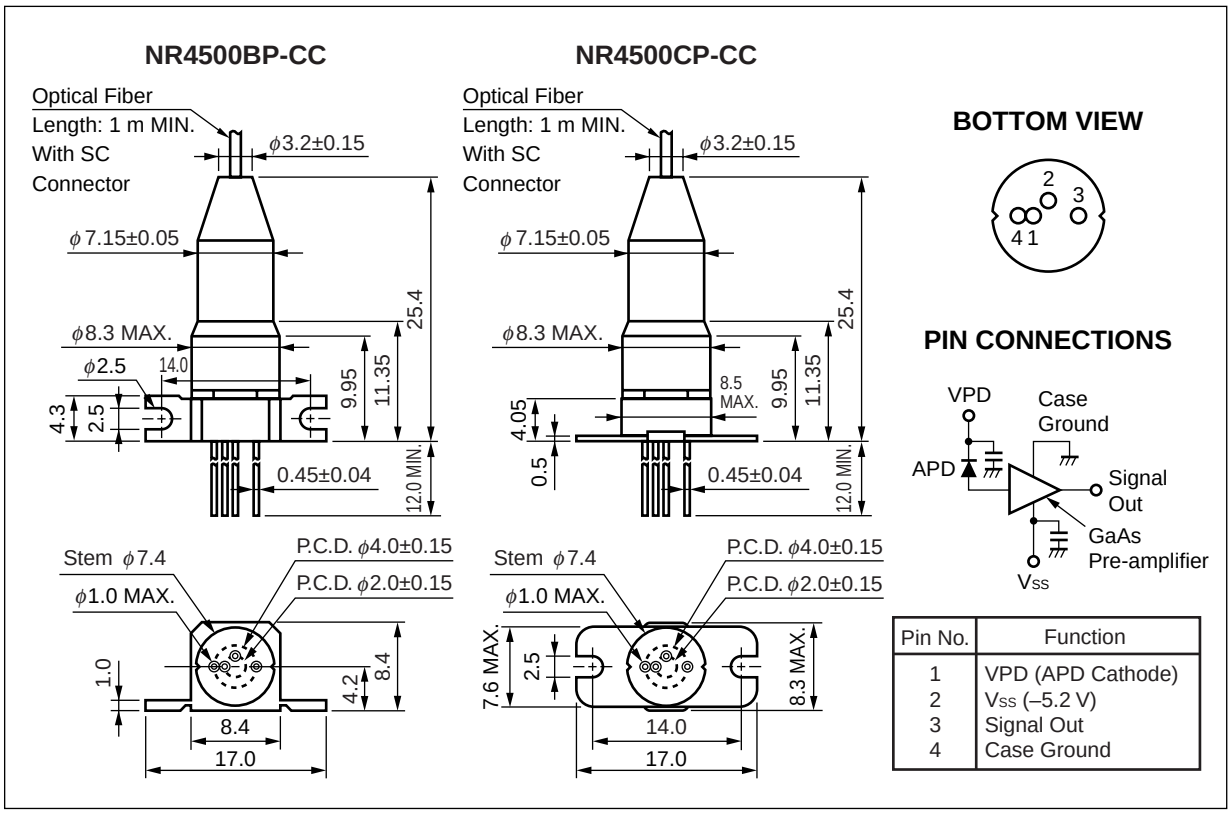
DESCRIPTION

The NR4500BP-CC and NR4500CP-CC are 2.5 Gb/s APD receiver in a coaxial module with an internal pre-amplifier. These modules are ideal as a receiver for Synchronous Digital Hierarchy (SDH) system, STM-16, ITU-T recommendations.

FEATURES

- APD with high performance GaAs pre-amplifier
- High data rate capability 2.5 Gb/s
- Receiver sensitivity $\overline{P}_{Low}$ = –32 dBm
- ★ Operating case temperature range T_C = 0 to +85°C
- Single-end output
- Coaxial module with SC-UPC connector

PACKAGE DIMENSIONS (UNIT: mm)



Pin No.	Function
1	VPD (APD Cathode)
2	V_{SS} (–5.2 V)
3	Signal Out
4	Case Ground

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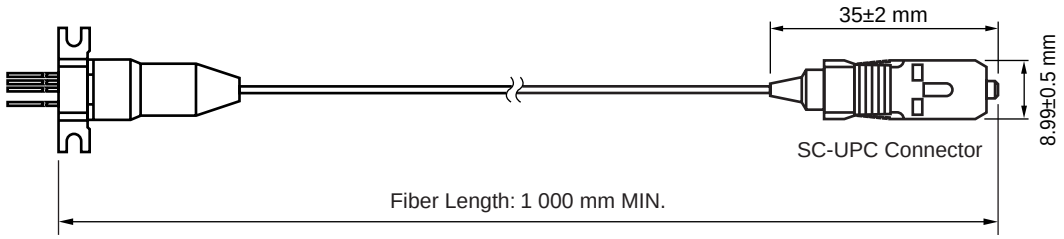
Document No. P14849EJ4V0DS00 (4th edition)
Date Published August 2001 NS CP(K)
Printed in Japan

The mark ★ shows major revised points.

OPTICAL FIBER CHARACTERISTICS

Parameter	Specification	Unit
Mode Field Doameter	9.5±1	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 MIN.	mm
Flammability	UL1581 VW-1	



ORDERING INFORMATION

Part Number	Flange Type	Available Connector
NR4500BP-CC	Flat Mount Flange	With SC-UPC Connector
NR4500CP-CC	Vertical Mount Flange	

ABSOLUTE MAXIMUM RATINGS

	Parameter	Symbol	Ratings	Unit
	Forward Current	I_F	10	mA
	Reverse Current	I_R	1.0	mA
	Supply Voltage	V_{SS}	–6.0	V
★	Operating Case Temperature	T_C	0 to +85	°C
	Storage Temperature	T_{stg}	–40 to +85	°C
	Lead Soldering Temperature	T_{sld}	260 (10 sec.)	°C
	Relative Humidity (noncondensing)	RH	85	%

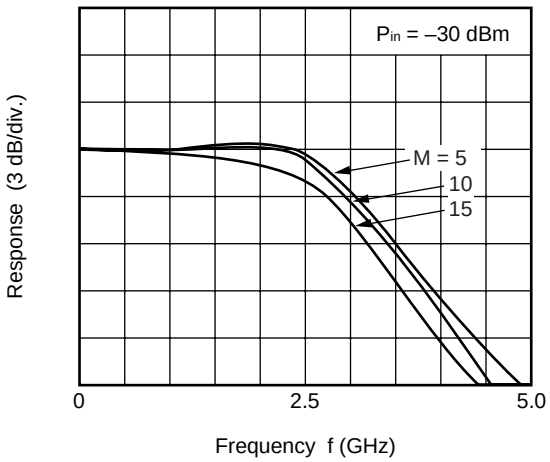
ELECTRO-OPTICAL CHARACTERISTICS

(T_C = 25°C, V_{SS} = – 5.2 V, λ = 1 310/1 550 nm, unless otherwise specified)

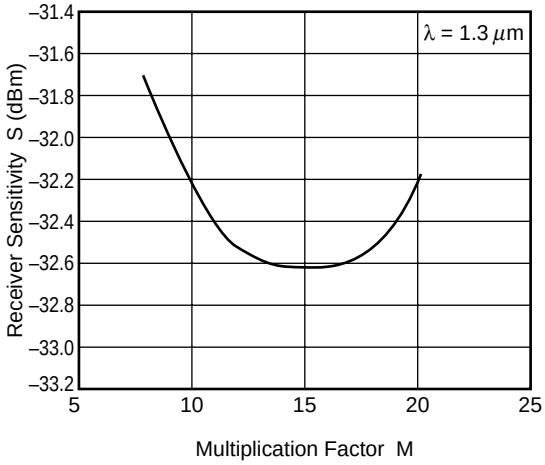
	Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
	Reverse Break Down Voltage	V_{BR}	I_D = 100 μA	40	60	80	V
★	Temperature Coefficient of Reverse Breakdown Voltage	δ	T_C = 0 to +85°C	0.15		0.22	%/°C
★	Receiver Sensitivity	$\overline{P}_{Low}$	2.48832 Gb/s, BER = 10^{-10}, PRBS = 2^{23}–1, Mark = 1/2, NRZ, M (V_R) is set at optimum value		–32	–31	dBm
			T_C = 0 to +85°C		–31	–30	
★	Maximum Optical Input Power	$\overline{P}_{High}$	2.48832 Gb/s, BER = 10^{-10}, PRBS = 2^{23}–1, Mark = 1/2, NRZ, M (V_R) is set at optimum value	–7			dBm
			T_C = 0 to +85°C	–8			
	Sensitivity	S	M = 1, λ = 1 310 nm	0.80	0.94		A/W
			M = 1, λ = 1 550 nm	0.81	0.96		
	Cut-off Frequency	f_C	AC coupling, R_L = 50 Ω, P_{in} = –30 dBm, M = 10, –3 dB from 3 MHz	1.8			GHz
	Optical Return Loss	ORL		30			dB
	Trans Impedance	Z_t	AC coupling, R_L = 50 Ω, f = 100 MHz, P_{in} ≤ –20 dBm	400	600		Ω
	Supply Voltage	V_{SS}		–5.46	–5.20	–4.96	V
	Supply Current	I_{SS}				45	mA

★ TYPICAL CHARACTERISTICS (T_C = 25°C)

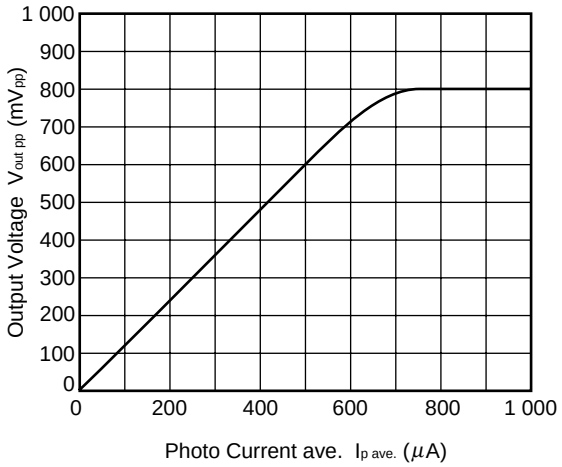
FREQUENCY RESPONSE



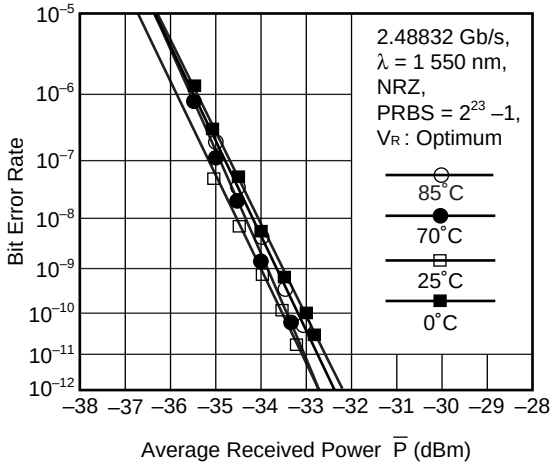
RECEIVER SENSITIVITY vs.
MULTIPLICATION FACTOR



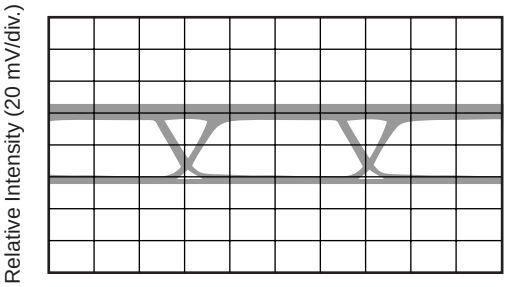
OUTPUT VOLTAGE vs.
PHOTO CURRENT AVERAGE



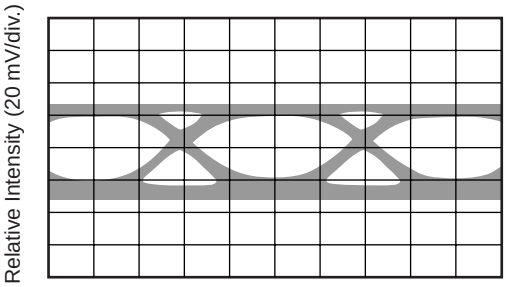
ERROR RATE CHARACTERISTICS



EYE DIAGRAM



Input Wave Form (100 ps/div.)



P_{in} = –32 dBm Output Wave Form (100 ps/div.)

Remark The graphs indicate nominal characteristics.

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)	f_C (GHz)	S (A/W)	@λ (nm)	V_R (V)		
				TYP.	MIN.	TYP.				
★ NR4500BP-CC	0 to +85	−40 to +85	ϕ50	−	2.5*1	0.94	1 310	0.9V_{BR}	2.5 Gb/s:	Coaxial APD with
NR4500CP-CC						0.96	1 550		STM-16	an Internal pre-amp
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	0.9V_{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	0.9V_{BR}	2.5 Gb/s:	Coaxial APD
						0.96	1 550		STM-16	

***1** $\overline{P}_{Low}$ and $\overline{P}_{High}$ are specified at 2.5 Gb/s

REFERENCE

Document Name	Document No.
Optical semiconducrtor devices for fiberoptic communications Selection Guide	P12480E
Opto-Electronics Devices Pamphlet	P13623E
Opto-Electronics Devices (CD-ROM)	P12944X
NEC semiconductor device reliability/quality control system	C11159E
Quality grades on NEC semiconductor devices	C11531E
SEMICONDUCTOR SELECTION GUIDE −Products and Packages−	X13769E

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Caution Optical Fiber	A glass-fiber is attached on the product. Handle with care. • When the fiber is broken or damaged, handle carefully to avoid injury from the damaged part or fragments.

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