

## HPD-70901-yy-xx

# 10Gbps DWDM 80km SFP+ Transceiver

## Product Description

The 70901-yy-xx is a 10Gbps enhanced small form factor pluggable SFP+ DWDM transceiver compatible with relevant standards. The 24dB Power Budget allows long reach in single-mode duplex fiber at rated transmission speed.

## Features

- Up to 11.3Gbps datalinks
- Up to 80km reach
- EML laser
- APD receiver
- Hot-pluggable
- CDR
- Single 3.3V power supply
- Digital Diagnostic Monitor (DDM)
- Power Consumption: 2.5W



## Applications

- 10GBase-ZR
- 10G FC
- SDH/SONET OC192/ STM64

## Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage	V <sub>cc</sub>	-0.5	4	V
Storage Temperature	T <sub>s</sub>	-40	85	°C
Operating Case Temperature	T <sub>c</sub>	0	70	°C

## Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Power Supply Voltage	V <sub>cc</sub>	3.15	3.3	3.45	V
Power Supply Current	I <sub>cc</sub>			450	mA
Data Rate			10		GBps
Max Link Length	L <sub>max</sub>			80	km

## Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
<b>Transmitter</b>					
CentreWavelength *1	$\lambda_c$	X-100	X	X+100	pm
Centre Wavelength Spacing			0.8		nm
Spectral Width (-20dB)	$\sigma$			0.3	nm
Average Output Power	P <sub>o</sub>	0		5	dBm
Extinction Ratio	ER	9			dB
Average Launch Power of Off Transmitter	P <sub>off</sub>			-30	dBm
Relative Intensity Noise	RIN			-130	dB/Hz
<b>Receiver</b>					
Centre Wavelength	$\lambda_c$	1200		1600	nm
Receiver Sensitivity	P <sub>IN</sub>			-24	dBm
Receiver Overload	P <sub>ma</sub>	-7			dBm
LOS De-Assert	LOS			-30	dBm
LOS Assert	LOS	-31			dBm
LOS Hysteresis		0.5		4.5	dB

\*1. X= Center Wavelength. Wavelength stability is reached within 60 seconds after power up.

## Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
<b>Transmitter</b>					
Input Differential Impedance	Z <sub>in</sub>	9	100	110	Ω
Data Input Swing Differential	V <sub>in</sub>	250		1200	mV
Tx-Dis Disable	V <sub>d</sub>	2.0		V <sub>cc</sub>	V
Tx-Dis Enable	V <sub>en</sub>	0		0.8	V
<b>Receiver</b>					
Data Output Swing Differential	V <sub>out</sub>	250		800	mV
Rx-Los Fault	V <sub>lf</sub>	2.0		V <sub>ccHOST</sub>	V
Rx-Los Normal	V <sub>ln</sub>	0		0+0.8	V
Output rise and fall time	T <sub>r</sub> , T <sub>f</sub>	3			ps

## Part Number and Channel guide -yy\*

Channel	Part Number	Frequency (THz)	Center Wave (nm)
C21	HPD-70901-C21-xx	192.1	1560.6
C22	HPD-70901-C22-xx	192.2	1559.7
C23	HPD-70901-C23-xx	192.3	1558.9
C24	HPD-70901-C24-xx	192.4	1558.1
C25	HPD-70901-C25-xx	192.5	1557.3
C26	HPD-70901-C26-xx	192.6	1556.5
C27	HPD-70901-C27-xx	192.7	1555.7
C28	HPD-70901-C28-xx	192.8	1554.9
C29	HPD-70901-C29-xx	192.9	1554.1
C30	HPD-70901-C30-xx	193.0	1553.3
C31	HPD-70901-C31-xx	193.1	1552.5
C32	HPD-70901-C32-xx	193.2	1551.7
C33	HPD-70901-C33-xx	193.3	1550.9
C34	HPD-70901-C34-xx	193.4	1550.1
C35	HPD-70901-C35-xx	193.5	1549.3
C36	HPD-70901-C36-xx	193.6	1548.5
C37	HPD-70901-C37-xx	193.7	1547.7
C38	HPD-70901-C38-xx	193.8	1546.9
C39	HPD-70901-C39-xx	193.9	1546.1
C40	HPD-70901-C40-xx	194.0	1545.3
C41	HPD-70901-C41-xx	194.1	1544.5
C42	HPD-70901-C42-xx	194.2	1543.7
C43	HPD-70901-C43-xx	194.3	1542.9
C44	HPD-70901-C44-xx	194.4	1542.1
C45	HPD-70901-C45-xx	194.5	1541.3
C46	HPD-70901-C46-xx	194.6	1540.5
C47	HPD-70901-C47-xx	194.7	1539.7
C48	HPD-70901-C48-xx	194.8	1538.9
C49	HPD-70901-C49-xx	194.9	1538.1
C50	HPD-70901-C50-xx	195.0	1537.4
C51	HPD-70901-C51-xx	195.1	1536.6
C52	HPD-70901-C52-xx	195.2	1535.8
C53	HPD-70901-C53-xx	195.3	1535.04
C54	HPD-70901-C54-xx	195.4	1534.2
C55	HPD-70901-C55-xx	195.5	1533.4
C56	HPD-70901-C56-xx	195.6	1532.6
C57	HPD-70901-C57-xx	195.7	1531.9
C58	HPD-70901-C58-xx	195.8	1531.1
C59	HPD-70901-C59-xx	195.9	1530.3
C60	HPD-70901-C60-xx	196.0	1529.5

## DDM Thresholds

	Low Alarm	Low Warn	High Warn	High Alarm
Temperature	-5°C	-0°C	70°C	75°C
Voltage	2.9V	3V	3.6V	3.7V
Tx Bias	15mA	20mA	90mA	100mA
Tx Power	-3dBm	-2dBm	5dBm	7dBm
Rx Power	-26dBm	-24dBm	-7dBm	-6dBm

For safety and reliability reasons, please read the following information carefully.

Light Budget is one of the key items for designing fiber optic network. In order to create a product that will meet application requirements. To adequately characterize the budget loss, the following key parameters are generally considered:

- Transmitter: Output power, temperature and aging
- Fiber connections: Active connection and splices
- Fiber Cable: fiber attenuation and temperature effect
- Receiver: Detector sensitivity
- Others: Safety margin and repairs

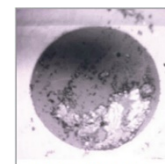
When one of the above-listed variables fails to meet specifications, the performance of the network can be greatly affected or worse, the degradation can lead to network failure. Unfortunately, not all the variables can be controlled with ease during the deployment of the network or the maintenance stage; however, there exists one component—the connector—that is too-often overlooked, sometimes overused (test jumpers) but that can be controlled using the proper procedure.



This is a Class 1 Laser Product according to IEC 60825-1:2014 compatible with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).



This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



Dirt / debris

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination. In a study by NTT-Advanced Technology, 98% of installers and 80% of network owners reported that issues with connector contamination were the greatest cause of network failures.

## EU declaration of conformity

The CE marking is mandatory for this category of products. It is the manufacturer's declaration that the product meets the requirements of the applicable EU directives required to allow free movement and sale of the product throughout the European Economic Area.

### Equipment Specific part number extension

-51	Cisco	-59	Alcatel (Nokia)
-52	Ericsson	-60	Combo code
-53	Huawei	-61	H3C (HP)
-54	Juniper	-62	Brocade
-55	Generic (MSA)	-63	AristaNetworks
-56	HP	-64	Adva
-57	Extreme	-65	Microsens
-58	3COM (HP)	-66	DELL
		-67	Intel