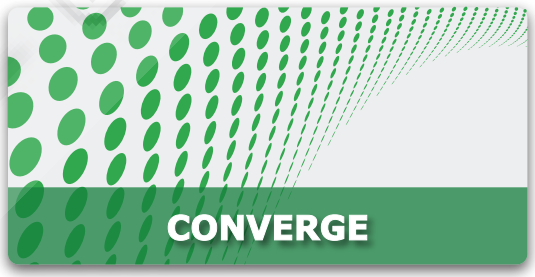
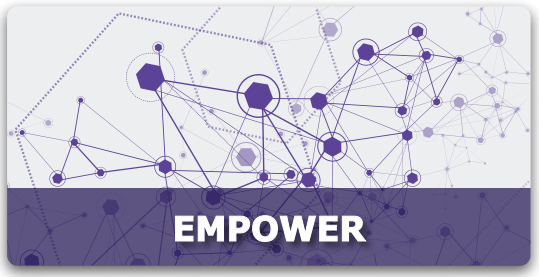
Pluggable Transceivers

MRV EMPOWERS THE OPTICAL EDGE. WE DELIVER PACKET AND OPTICAL SOLUTIONS ORCHESTRATED WITH INTELLIGENT SOFTWARE TO MAKE SERVICE PROVIDER NETWORKS SMARTER.





MRV Pluggable Optics

Today's network engineer is faced with a unique set of challenges when designing an optical network. Legacy protocols must be supported on the same network as emerging optical standards, customers demand service upgrades that create ripple effects throughout the network, and optical technology is constantly moving towards faster speeds. Protecting today's investment against tomorrow's demands is increasingly difficult.

For optical network implementations, pluggable transceivers (SFP, SFP+, and XFP) provide a modular approach to future-safe network design. Pluggable technology replaces fixed ports or optics and increases the flexibility and longevity of network devices. Interchangeable transceivers allow a single device to operate with a wide selection of media, protocols and functions. The same host module may function as a simple optical device, a distance extension solution, a repeater or a WDM transponder. Upgrading a port takes only seconds - snap in a new pluggable option at both ends of the media and the upgrade is complete.

Standards-based with vertical integration

MRV offers a full line of pluggable transceiver options fully integrated with our optical and packet networking solutions. The MRV pluggable transceivers operate in MRV devices or most other devices that comply with industry standards. MRV's pluggable transceiver line includes:

- SFP — offering a wide range of protocols and rates (Fast and Gigabit Ethernet, Fibre Channel, SONET/SDH and many more), for dual and bidirectional fiber as well as copper media support, Digital Video, and others
- SFP+ — supporting 8 and 10 Gbps Fibre Channel and a variety of 10Gbps Protocols (Ethernet, SONET/SDH, OTN, etc.)
- XFP — designed for 10 Gbps Ethernet and Fibre Channel, OC192/STM64, and Copper 10 Gbps services
- CFP — 100 Gbps interfaces supporting Ethernet and OTN standards over a variety of distances

Most of MRV's pluggable transceivers support Digital Diagnostics (SFF-8472) to monitor real-time statistics including input power, output power, temperature, and supply voltage.

Future-proof and economical network design

MRV's line of pluggable transceivers gives you the option to implement today's technology while offering the ability to protect your investment for what lies ahead. Combined with flexible transponders supporting a wide variety of protocols and speeds in the same hardware, MRV's pluggable transceiver options provide unprecedented network flexibility. Implement Gigabit Ethernet to a customer today and upgrade to 10 Gigabit Ethernet tomorrow through a simple transceiver change-out. Provide Ethernet services initially and add SAN services later by adding a new transceiver. Unique pluggable transceivers allow off-the-shelf devices to operate like custom-built equipment at a fraction of the price. Pluggable transceiver technology is the answer to today's ever-changing network needs.

Optical SFP Transceivers

Transceiver Specifications

Part Number	Description	Wavelength (nm)	Tx Power (dBm)		Rx Power (dBm)		Dispersion Penalty (dB)	Dispersion Tolerance (ps/nm/km)	Span Distance (km)	Operating Temp. (°C)	Digital Diagnost.	Power (W)	Conn. Type	OSNR
			Min	Max	Min	Max						Max		Min
Single Fiber Bidirectional, Fast Ethernet/OC-3 STM-1														
SFP-FD-BX35	100Base-BX and OC3, SM Single Fiber, 20 km	1310 / 1550	-14	-8	-28	-8	N/A	N/A	0 - 28	-5 - 70	Yes	1	LC	N/A
SFP-FD-BX53	100Base-BX and OC3, SM Single Fiber, 20 km	1550 / 1310	-14	-8	-28	-8	N/A	N/A	0 - 28	-5 - 70	Yes	1	LC	N/A
SFP-FD-BX35TH	100Base-BX and OC3, SM Single Fiber, 20 km, Industrial Temperature	1310 / 1550	-14	-8	-28	-8	N/A	N/A	0 - 28	-40 - 85	Yes	1	LC	N/A
SFP-FD-BX53TH	100Base-BX and OC3, SM Single Fiber, 20 km, Industrial Temperature	1550 / 1310	-14	-8	-28	-8	N/A	N/A	0 - 28	-40 - 85	Yes	1	LC	N/A
SFP-FD-BD35	100Base-BX and OC3, SM Single Fiber, 40 km	1310 / 1550	-5	0	-28	-8	N/A	N/A	16 - 46	-5 - 70	Yes	1	LC	N/A
SFP-FD-BD53	100Base-BX and OC3, SM Single Fiber, 40 km	1550 / 1310	-5	0	-28	-8	N/A	N/A	16 - 46	-5 - 70	Yes	1	LC	N/A
SFP-FD-BD35TH	100Base-BX and OC3, SM Single Fiber, 40 km, Industrial Temperature	1310 / 1550	-5	0	-28	-8	N/A	N/A	16 - 46	-40 - 85	Yes	1	LC	N/A
SFP-FD-BD53TH	100Base-BX and OC3, SM Single Fiber, 40 km, Industrial Temperature	1550 / 1310	-5	0	-28	-8	N/A	N/A	16 - 46	-40 - 85	Yes	1	LC	N/A
SFP-FD-BZ45	100Base-BX SM Single Fiber, 100 km	1490 / 1570	0	5	-28	-8	N/A	N/A	52 - 112	-5 - 70	Yes	1	LC	N/A
SFP-FD-BZ54	100Base-BX SM Single Fiber, 100 km	1570 / 1490	0	5	-28	-8	N/A	N/A	52 - 112	-5 - 70	Yes	1	LC	N/A
Single Fiber Bidirectional, Gigabit Ethernet/Fibre Channel														
SFP-GD-BX34	1000Base-BX, SM Single Fiber, 20 km	1310 / 1490	-9	-3	-22	-3	N/A	N/A	0 - 26	-5 - 70	Yes	1	LC	N/A
SFP-GD-BX43	1000Base-BX, SM Single Fiber, 20 km	1490 / 1310	-9	-3	-22	-3	N/A	N/A	0 - 26	-5 - 70	Yes	1	LC	N/A
SFP-GD-BD35	1000Base-BX, SM Single Fiber, 40 km	1310 / 1550	-5	0	-24	-3	N/A	N/A	12 - 38	-5 - 70	Yes	1	LC	N/A
SFP-GD-BD53	1000Base-BX, SM Single Fiber, 40 km	1550 / 1310	-5	0	-24	-3	N/A	N/A	12 - 38	-5 - 70	Yes	1	LC	N/A

Network Optical Equipment

Optical SFP Transceivers

Transceiver Specifications

Part Number	Description	Wavelength (nm)	Tx Power (dBm)		Rx Power (dBm)		Dispersion Penalty (dB)	Dispersion Tolerance (ps/nm/km)	Span Distance (km)	Operating Temp. (°C)	Digital Diagnost.	Power (W)	Conn. Type	OSNR
			Min	Max	Min	Max						Max		Min
Single Fiber Bidirectional, Gigabit Ethernet/Fibre Channel (Continued)														
SFP-GD-BD34	1000Base-BX, SM Single Fiber, 40 km	1310 / 1490	-5	0	-24	-3	N/A	N/A	12 - 38	-5 - 70	Yes	1	LC	N/A
SFP-GD-BD43	1000Base-BX, SM Single Fiber, 40 km	1490 / 1310	-5	0	-24	-3	N/A	N/A	12 - 38	-5 - 70	Yes	1	LC	N/A
SFP-GD-BZ45	1000Base-BX, SM Single Fiber, 80 km	1490 / 1570	0	5	-24	-3	N/A	N/A	32 - 96	-5 - 70	Yes	1	LC	N/A
SFP-GD-BZ54	1000Base-BX, SM Single Fiber, 80 km	1570 / 1490	0	5	-24	-3	N/A	N/A	32 - 96	-5 - 70	Yes	1	LC	N/A
Single Fiber Bidirectional, Multirate 100-2700 Mbps														
SFP-MR-35IR1	Multirate, SM Single Fiber, 15 km	1310 / 1550	-5	0	-18	-8	N/A	N/A	0 - 24	-5 - 70	Yes	1	LC	N/A
SFP-MR-53IR1	SFP, Multirate, SM Single Fiber, 15 km	1550 / 1310	-5	0	-18	-8	N/A	N/A	0 - 24	-5 - 70	Yes	1	LC	N/A
SFP-MR-45IR2	SFP, Multirate, SM Single Fiber, 40 km	1490 / 1570	-2	3	-18	0	N/A	N/A	12- 60	-5 - 70	Yes	1	LC	N/A
SFP-MR-54IR2	SFP, Multirate, SM Single Fiber, 40 km	1570 / 1490	-2	3	-18	0	N/A	N/A	12- 60	-5 - 70	Yes	1	LC	N/A
SFP-MR-45LR2	SFP, Multirate, SM Single Fiber, 80 km	1490 / 1570	-2	3	-28	-10	N/A	N/A	52 - 100	-5 - 70	Yes	1	LC	N/A
SFP-MR-54LR2	SFP, Multirate, SM Single Fiber, 80 km	1570 / 1490	-2	3	-28	-10	N/A	N/A	52 - 100	-5 - 70	Yes	1	LC	N/A
Dual Fiber, Fast Ethernet/OC-3 STM-1														
SFP-O3D-M	Fast Ethernet and OC-3, MM, 2 km	1310	-20	-14	-30	-10	N/A	N/A	0 - 2	0 - 70	Yes	1	LC	N/A
SFP-O3-M	Fast Ethernet and OC-3, MM, 2 km	1310	-20	-14	-30	-8	N/A	N/A	0 - 2	0 - 70	No	1	LC	N/A
SFP-O3D-XLR-51	Fast Ethernet EZX or OC-3 LR2, SM, up to 155 Mbps, CWDM wavelength 1510 nm, 120 km	1510	1	5	-42	-10	2	N/A	60 - 120	-5 - 70	Yes	1	LC	N/A
SFP-FDSGMII-M	Fast Ethernet SGMII, MM, 2 km	1310	-20	-14	-31	-8	N/A	N/A	0 - 2	-5 - 70	No	1	LC	N/A
SFP-FDSGMII-LR	Fast Ethernet SGMII, SM, 10 km	1310	-15	-8	-31	-8	N/A	N/A	0 - 10	-5 - 70	No	1	LC	N/A
SFP-O3D-IR1	Fast Ethernet or OC-3 IR1, SM, 15 km	1310	-15	-8	-28	-8	1	N/A	0 - 24	0 - 70	Yes	1	LC	N/A
SFP-O3D-LR1	Fast Ethernet XD or OC-3 LR1, SM, 40 km	1310	-3	2	-34	-8	1	N/A	20 - 60	0 - 70	Yes	1	LC	N/A
SFP-O3D-LR2	Fast Ethernet EZX or OC-3 LR2, SM, 80 km	1550	-5	0	-34	-10	1	N/A	40 - 112	0 - 70	Yes	1	LC	N/A

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Optical SFP Transceivers

Transceiver Specifications

Part Number	Description	Wavelength (nm)	Tx Power (dBm)		Rx Power (dBm)		Dispersion Penalty (dB)	Dispersion Tolerance (ps/nm/km)	Span Distance (km)	Operating Temp. (°C)	Digital Diagnost.	Power (W)	Conn. Type	OSNR
			Min	Max	Min	Max						Max		Min
Dual Fiber, Gigabit Ethernet/Fibre Channel														
SFP-GD-MX	1000Base-SX, Extended MM, 2 km	1310	-9	-3	-17	-3	N/A	N/A	0 - 2	-5 - 70	Yes	1	LC	N/A
SFP-GD-MMX	1000Base-SX, Extended MM, 2 km	1310	-9	-3	-20	-3	N/A	N/A	0 - 2	0 - 70	Yes	1	LC	N/A
SFP-GD-LX	1000Base-LX, SM, 10 km	1310	-10	-3	-20	-3	N/A	N/A	0 - 20	0 - 70	Yes	1	LC	N/A
SFP-GD-ELX	1000Base-ELX, SM, 20 km	1310	-7	0	-24	-3	2	N/A	6 - 30	0 - 70	Yes	1	LC	N/A
SFP-GD-XD	1000Base-XD, SM, 50 km	1550	-5	0	-24	-3	2	N/A	12 - 70	0 - 70	Yes	1	LC	N/A
SFP-GD-ZX	1000Base-ZX, SM, 80 km	1550	0	5	-24	-3	2	N/A	35 - 88	0 - 70	Yes	1	LC	N/A
SFP-GD-EZX	1000Base-EZX, SM, 120 km	1550	0	5	-32	-6	2	N/A	44 - 120	0 - 70	Yes	1	LC	N/A
Dual Fiber, CWDM Gigabit Ethernet/Fibre Channel														
SFP-GDCWXD-XX	1000Base-XD, SM CWDM, 50 km	1310 / 1610	-5	0	-24	-3	1	N/A	10 - 70	0 - 70	Yes	1	LC	N/A
SFP-GDCWZX-XX	1000Base-ZX, SM CWDM, 80 km	1310 / 1610	0	5	-24	-3	1	N/A	30 - 90	0 - 70	Yes	1	LC	N/A
SFP-GDCWEZX-XX	1000Base-ZX, SM CWDM, 120 km	1310 / 1610	0	5	-32	-6	2	N/A	40- 120	0 - 70	Yes	1	LC	N/A
Dual Fiber, Fibre Channel Dual Rate (1 and 2 Gbps)														
SFP-DGD-SX	Dual Rate 1/2.1 Gbps SX or 1000Base-SX GigE, MM, 550 m	850	-10	-2	-18	0	N/A	N/A	0 - 0.55	-20 - 85	Yes	1	LC	N/A
SFP-DGD-LX	Dual Rate 1/2.1 Gbps SX or 1000Base-LX GigE, SM, 10 km	1310	-10	-3	-21	0	N/A	N/A	0 - 10	-40 - 85	Yes	1	LC	N/A
Dual Fiber, Fibre Channel Triple Rate (1, 2 and 4 Gbps)														
SFP-TGD-SX	Triple Rate 1/2.1/4.2 Gbps SX or 1000Base-SX GigE, MM, 550 km	850	-10	-2	-15	0	N/A	N/A	0 - 0.55	-20 - 85	Yes	1	LC	N/A
SFP-TGD-SR4	1/2/4-GFC, SM, 4 km @ 4 GFC and 10 km @ 2GFC	1310	-10	-3	-18	0	N/A	N/A	0 - 4	-20 - 85	Yes	1	LC	N/A
SFPFC408	1/2/4 GFC, SM, 80 km	1550	0	4	-24	-6	3	N/A	40 - 84	-5 - 70	Yes	1	LC	N/A
Dual Fiber, Fibre Channel Triple Rate (1, 2 and 4 Gbps) CWDM														
SFPFC4CW08-XX	1/2/4 GFC CWDM, SM, 80 km	1270 / 1610	0	5	-24	-6	3	N/A	30 - 84	-5 - 70	Yes	1	LC	N/A
Dual Fiber, Fibre Channel Triple Rate (1, 2 and 4 Gbps) DWDM														
SFPFC4DW08-XX	1/2/4 GFC DWDM (XX=ITU C-Band Ch. 17-60 for 100 GHZ), 80 km	1528 / 1565	0	4	-24	-6	3	1600	40 - 80	-5 - 70	Yes	1	LC	30 dB @ BER=1e-12

Network Optical Equipment

Optical SFP Transceivers

Transceiver Specifications

Part Number	Description	Wavelength (nm)	Tx Power (dBm)		Rx Power (dBm)		Dispersion Penalty (dB)	Dispersion Tolerance (ps/nm/km)	Span Distance (km)	Operating Temp. (°C)	Digital Diagnost.	Power (W)	Conn. Type	OSNR
			Min	Max	Min	Max						Max		Min
Dual Fiber, Multi-rate 100-2700 Mbps														
SFP-MR27D-MMX	Multi-rate Ext. MM, 1 km	1310	-10	-3	-20	-3	N/A	N/A	0 - 1	0 - 70	Yes	1	LC	N/A
SFP-MR27D-SR1	Multi-rate SR1, SM, 2 km	1310	-10	-3	-20	-3	N/A	N/A	0 - 20	0 - 70	Yes	1	LC	N/A
SFP-MR27D-IR1	Multi-rate IR1, SM, 20 km	1310	-5	0	-20	0	1	N/A	0 - 28	0 - 70	Yes	1	LC	N/A
SFP-MR27D-IR2	Multi-rate IR2, SM, 40 km	1550	-5	0	-20	0	1	N/A	0 - 56	0 - 70	Yes	1	LC	N/A
SFP-MR27D-LR1	Multi-rate LR1, SM, 40 km	1310	-2	3	-27	-9	N/A	N/A	20 - 48	0 - 70	Yes	1	LC	N/A
SFP-MR27D-LR1	Multi-rate LR2, SM, 80 km	1550	-2	3	-28	-9	2	N/A	40 - 96	0 - 70	Yes	1	LC	N/A
Dual Fiber, Multi-rate 100-2700 Mbps CWDM														
SFP27DCWEIR-XX	Multi-rate EIR CWDM, SM, 60 km	1310 / 1610	0	5	-20	0	1	N/A	20 - 70	0 - 70	Yes	1	LC	N/A
SFP-27DCWLR-XX	Multi-rate LR CWDM, SM, 80 km	1310 / 1610	-2	3	-28	-6	2	N/A	40 - 96	0 - 70	Yes	1	LC	N/A
Dual Fiber, Multi-rate 100-2700 Mbps 100GHz DWDM														
SFP27DWLR08-XX	Multi-rate LR, SM DWDM (XX=ITU C-Band Ch. 17-60 for 100 GHZ), 80 km	1529 / 1563	0	4	28	-6	2	1450	40 - 80	-5 - 70	Yes	1.3	LC	28dB @ BER=1e-12
SFP27DWLR12-XX	Multi-rate LR, SM DWDM (XX=ITU C-Band Ch. 17-60 for 100 GHZ), Dispersion spec'd for 120 km, 80 km.	1529 / 1563	0	4	28	-6	2	2200	40 - 120	-5 - 70	Yes	1.3	LC	28dB @ BER=1e-12

NetworkOpticalEquipment

Electrical SFP Transceivers

Transceiver Specifications

Part Number	Description	Rate (Mbps)	Autonegotiation	Span Distance (m)	Operating Temp. (°C)	Max Power (W)	Connector Type
Copper (RJ45), Ethernet for Layer 0/1 Products							
SFP-GA-R	1000Base-T for Layer 2 and higher devices	10/100/1000	Yes	0 - 100	0 - 70	1.5	RJ-45
SFP-GC-R	1000Base-T for Layer 1 devices	1000	N/A	0 - 100	0 - 70	1.5	RJ-45
SFP-SW10/100-R	10/100Base-TX	10/100	Yes	0 - 100	0 - 70	1.5	RJ-45

Transceiver Specifications

Part Number	Description	Rate (Mbps)	Supported Frame and Refresh Rates	Span Distance (m)	Operating Temp. (°C)	Max Power (W)	Connector Type
Copper, Digital Video							
SFP3MRHDSDI-RX	Unidirectional Digital Video, Dual Speed SDI (270 Mbps) / HD-SDI (1.485 Gbps/ 1.001 Gbps) NTSC RX Only Processes pathological patterns	270 Mbps 1.485 Gbps/1.001 Gbps	720 x 486i 720 x 576i 1280 x 720p (60hz) 1920 x 1035i (60hz) 1920 x 1080sF (24hz) 1920 x 1080p (24hz) 1920 x 1080i (60hz) 1920 x 1080p (30hz)	300 @ 270 Mbps 140 @ 1.485 Gbps	-5 - 70	1	BNC
SFP3MRHDSDI-TX	Unidirectional Digital Video, Dual Speed SDI (270 Mbps) / HD-SDI (1.485 Gbps/ 1.001 Gbps) NTSC TX Only Processes pathological patterns	270 Mbps 1.485 Gbps/1.001 Gbps	720 x 486i 720 x 576i 1280 x 720p (60hz) 1920 x 1035i (60hz) 1920 x 1080sF (24hz) 1920 x 1080p (24hz) 1920 x 1080i (60hz) 1920 x 1080p (30hz)	300 @ 270 Mbps 140 @ 1.485 Gbps	-5 - 70	1	BNC
SFP5MRHDSDI-RX	Unidirectional Digital Video, Dual Speed SDI (270 Mbps) / HD-SDI(1.485 Gbps) PAL/SECAM RX Only Processes pathological patterns	270 Mbps 1.485 Gbps	720 x 486i 720 x 576i 1280 x 720p (60hz) 1920 x 1035i (60hz) 1920 x 1080sF (24hz) 1920 x 1080p (24hz) 1920 x 1080i (50hz) 1920 x 1080p (25hz) 1920 x 1080i (60hz) 1920 x 1080p (30hz)	300 @ 270 Mbps 140 @ 1.485 Gbps	-5 - 70	1	BNC
SFP5MRHDSDI-TX	Unidirectional Digital Video, Dual Speed SDI (270 Mbps) / HD-SDI(1.485 Gbps) PAL/SECAM TX Only Processes pathological patterns	270 Mbps 1.485 Gbps	720 x 486i 720 x 576i 1280 x 720p (60hz) 1920 x 1035i (60hz) 1920 x 1080sF (24hz) 1920 x 1080p (24hz) 1920 x 1080i (50hz) 1920 x 1080p (25hz) 1920 x 1080i (60hz) 1920 x 1080p (30hz)	300 @ 270 Mbps 140 @ 1.485 Gbps	-5 - 70	1	BNC

Electrical SFP Transceivers

Transceiver Specifications

Part Number	Description	Rate (Mbps)	Supported Frame and Refresh Rates	Span Distance (m)	Operating Temp. (°C)	Max Power (W)	Connector Type
Copper, Digital Video							
SFP-TMDV3G-TX	Unidirectional Transparent Digital Video SDI/HD-SDI/3G-SDI, TX Only	270 Mbps (SDI and DVB-ASI) 1.485 Gbps 2.97 Gbps	720 x 486i 720 x 576i 1280 x 720p (60hz) 1920 x 1035i (60hz) 1920 x 1080sF (24hz) 1920 x 1080p (24hz) 1920 x 1080i (50hz) 1920 x 1080p (25hz) 1920 x 1080i (60hz) 1920 x 1080p (30hz)	350 @ 270 Mbps 140 @ 1.485 Gbps 100 @ 2.97 Gbps	-5 - 50	1.3	BNC
SFP-TMDV3G-RX	Unidirectional Transparent Digital Video SDI/HD-SDI/3G-SDI, RX Only	N/A	720 x 486i 720 x 576i 1280 x 720p (60hz) 1920 x 1035i (60hz) 1920 x 1080sF (24hz) 1920 x 1080p (24hz) 1920 x 1080i (50hz) 1920 x 1080p (25hz) 1920 x 1080i (60hz) 1920 x 1080p (30hz)	350 @ 270 Mbps 140 @ 1.485 Gbps 100 @ 2.97 Gbps	-5 - 50	1.3	BNC

S-Fiber Network Optical Equipment

Optical SFP+ Transceivers

Transceiver Specifications

Part Number	Description	Wavelength (nm)	Tx Power (dBm)		Rx Power (dBm)		Dispersion Penalty (dB)	Dispersion Tolerance (ps/nm/km)	Span Distance (km)	Operating Temp. (°C)	Digital Diagnost.	Power (W)	Conn. Type	OSNR
			Min	Max	Min	Max						Max		Min
Dual Fiber, 8 Gbps														
SFP-8GD-SX	2.125/4.25/8.5 Gbps, MM, 300 m rate select	850	-9	-2	-11.2	0	4.2	N/A	0 - 0.3	-5 - 70	Yes	1	LC	N/A
SFP-8GD-LR	2.125/4.25/8.5 Gbps, SM, 10 km rate select	1310	-8.4	-0.5	-13.8	0	3.2	N/A	0 - 10	-5 - 85	Yes	1	LC	N/A
Dual Fiber, 10 Gbps														
SFP-10GD-SX	8 to 10.3 Gbps, MM, 300 m	850	-7	-1	-11	0.5	3.9	N/A	0 - 0.3	0 - 70	Yes	1	LC	N/A
SFP-10GD-LRM	8 to 10.3 Gbps, MM, 220 m	1310	-5	2	-6	2	5	N/A	0 - 0.22	-5 - 70	Yes	1	LC	N/A
SFP-10GD-LR	8 to 10.3 Gbps, SM, 10 km	1310	-5	0.5	-14	0.5	3.2	N/A	0 - 11.6	-5 - 70	Yes	1	LC	N/A
SFP-10GD-ER	8 to 10.3 Gbps, SM, 40 km	1550	-4.7	4	-15.8	-1	3	800	0 - 40	0 - 70	Yes	1.5	LC	N/A
SFP-10GD-ZR	8 to 10.3 Gbps, SM, 80 km	1550	0	5	-23	-8	3	1600	40 - 80	-5 - 70	Yes	1.2	LC	N/A
Single Fiber Bidirectional, 10 Gbps														
SFP-10GD-BX32	8 to 10.3 Gbps, SM Single Fiber, 10 km	1330 / 1270	-8.2	0.5	-14.4	0.5	3.2	N/A	0 - 10	-5 - 70	Yes	1	LC	N/A
SFP-10GD-BX23	8 to 10.3 Gbps, SM Single Fiber, 10 km	1270 / 1330	-8.2	0.5	-14.4	0.5	3.2	N/A	0 - 10	-5 - 70	Yes	1	LC	N/A
Dual Fiber, 10 Gbps CWDM														
SFP-10GCWER-XX	8 to 10.5 Gbps, OC192/STM-64, 10GE and 10GFC, SM CWDM (XX=Ch. 1470-1610 nm), 40 km	1470 / 1610	-1	3	-14.1	-1	N/A	800	10 - 40	-5 - 70	Yes	1.5	LC	N/A
SFP-10GCWZR-XX	8 to 10.5 Gbps, OC192/STM-64, 10GE and 10GFC, SM CWDM (XX=Ch. 1470-1610 nm), 70 km	1470 / 1610	0	4	-22	-8	N/A	1470-1570 nm: 1600 1590-1610 nm: 1400	40 - 70	-5 - 70	Yes	2	LC	N/A
Dual Fiber, 100 GHz and 50 GHz DWDM														
SFP-10GDWER-XX	8 to 11.3 Gbps, SM, XX=ITU Grid, DWDM C-Band 100 GHz, 40 km	1528.77-1563.86	-1	4	-16	-1	2	800	0 - 40	-5 - 70	Yes	1	LC	24 dB @ BER=1e-12 19 dB @ BER=1e-3
SFP-10GDWER-YXX	8 to 11.3 Gbps, SM, Y=C or H, XX=ITU Grid, DWDM C-Band, 50 GHz, 40 km	1528.38-1563.86	-1	4	-16	-1	2	800	0 - 40	-5 - 70	Yes	1	LC	24 dB @ BER=1e-12 19 dB @ BER=1e-3
SFP-10GDWZR-XX	8 to 11.3 Gbps, SM, XX=ITU Grid, DWDM C-Band 100 GHz, 80 km	1528.77-1563.86	0	4	-23	-8	3	1600	40 - 80	-5 - 70	Yes	1.12	LC	27dB @ BER=1e-12 19dB @ BER=1e-3

Network Optical Equipment

Optical SFP+ Transceivers

Transceiver Specifications

Part Number	Description	Wavelength (nm)	Tx Power (dBm)		Rx Power (dBm)		Dispersion Penalty (dB)	Dispersion Tolerance (ps/nm/km)	Span Distance (km)	Operating Temp. (°C)	Digital Diagnost.	Power (W)	Conn. Type	OSNR
			Min	Max	Min	Max						Max		Min
Dual Fiber, 100 GHz and 50 GHz DWDM (Continued)														
SFP-10GDWZR-YXX	8 to 11.3 Gbps, SM, Y=C or H, XX=ITU Grid, DWDM C-Band 50 GHz, 80km	1528.38-1563.86	0	4	-23	-8	3	1600	40 - 80	-5 - 70	Yes	1.12	LC	27dB @ BER=1e-12 19dB @ BER=1e-3
Dual Fiber, 10 Gbps Tunable DWDM														
SFP-10GDWZR-TC	8 to 11.3 Gbps SM, DWDM Tunable, C-Band, Ch. 11C - 61H, 80km	1528.38-1563.86	-1	3	-24	-7	3	1600	40 - 80	-5 - 70	Yes	2	LC	26 dB @ BER=1e-12 19.5 dB @ BER=1e-3
Dual Fiber, 10Gbps Multirate Tunable SFP+ DWDM														
SFP-10GDWZR-TCME	622MBps to 11.3 Gb/s Multirate, Extended Temperature DWDM Tunable, C-Band, ITU Ch C13 - H60, 80km, SM, with Digital Diagnostics	1529.16 to 1567.13	-1	3	-24	-6	3	1600	40 - 80	-5 - 85	Yes	2	LC	26 dB @ BER=1e-12 19.5 dB @ BER=1e-3

Network Optical Equipment

Optical XFP Transceivers

Transceiver Specifications

Part Number	Description	Wavelength (nm)	Tx Power (dBm)		Rx Power (dBm)		Dispersion Penalty (dB)	Dispersion Tolerance (ps/nm/km)	Span Distance (km)	Operating Temp. (°C)	Digital Diagnost.	Power (W)	Conn. Type	OSNR
			Min	Max	Min	Max						Max		Min
Dual Fiber, 10 Gbps (no protocol-specific ref. clock required)														
XFP-10GD-SX	10GbE, or 10GFC, MM, 300 m	850	-7	-1	-11	-1	N/A	N/A	0 - 0.3	-5 - 70	Yes	2.5	LC	N/A
XFP-10GD-MMX	10 GbE, or 10 GFC, Extended MM, 500 m	1310	-6	-1	-13	0.5	N/A	N/A	0 - 0.5	-5 - 70	Yes	2.5	SC	N/A
XFP-10GD-LR	OC192/STM-64, 10 GbE or 10 GFC, SM, 10 km	1310	-8	0	-14	0.5	N/A	N/A	0 - 14	-5 - 70	Yes	2.5	LC	N/A
XFP-10GD-IR2	OC192/STM-64, 10 GbE or 10 GFC, SM, 40 km	1550	-1	2	-16	-1	2	800	12 - 52	-5 - 70	Yes	2.5	LC	N/A
XFP-10GD-LR2	OC192/STM-64, 10 GbE or 10 GFC, SM, 80 km	1550	0	4	-24	-7	3	1600	44 - 84	-5 - 70	Yes	2.5	LC	N/A
Dual Fiber, 10 Gbps CWDM														
XFP-10GCWER-XX	8 to 10.3 Gbps, MM, 300 m	1470 - 1610	-1	2	-16	-1	2	800	10 - 40	-5 - 70	Yes	3.5	LC	N/A
XFP-10GCWZR-XX	8 to 10.3 Gbps, MM, 220 m	1470 - 1610	0	4	-24	-7	2	1400	40 - 70	-5 - 70	Yes	3.5	LC	N/A
Dual Fiber, 10 Gbps DWDM (no protocol-specific ref. clock required)														
XFP-DWLR08-XX	OC192/STM-64, 10 GbE or 10 GFC, SM DWDM (XX + ITU C-Band Ch. 17-61 for 100 GHZ), 80 km	1529 / 1563	-1	3	-23	-7	2.5	1450	40 - 80	-5 - 70	Yes	3.5	LC	24dB @ BER=1e-12 16dB @ BER=1e-4
Dual Fiber, 10 Gbps Tunable DWDM														
XFP-DWLR08TC	OC192/STM-64, 10GbE or 10 GFC, SM DWDM Tunable, C-Band, Ch. 11C - 61H, 80 km	1528.38-1568.77	-1	3	-24	-7	2	1600	40 - 80	-5 - 70	Yes	3.5	LC	27dB @ BER=1e-12 19.5dB @ BER=1e-4
XFP-DWLR08TCMR	8GFC, OC192/STM-64, 10GbE or 10GFC, SM DWDM 50 GHz Tunable, C-Band, Ch11C - Ch61H, 80 km	1528.38-1568.77	-1	3	-23	-6	3	1600	40 - 80	-5 - 70	Yes	3.5	LC	24dB @ BER=1e-12 16dB @ BER=1e-4

Network Optical Equipment

Optical XFP Transceivers

Transceiver Specifications														
Part Number	Description	Wavelength (nm)	Tx Power (dBm)		Rx Power (dBm)		Dispersion Penalty (dB)	Dispersion Tolerance (ps/nm/km)	Span Distance (km)	Operating Temp. (°C)	Digital Diagnost.	Power (W)	Conn. Type	OSNR
			Min	Max	Min	Max						Max		Min
Dual Fiber, Multi-rate 16 Gbps XFPs DWDM - No protocol-specific ref clock required														
XFP-16GDWER-XX	XFP, 16/8/4 G FC and 10G FCoE, SM DWDM (XX + ITU C-Band Channels 20-60 for 100 GHZ), 10-40km, with Digital Diagnostics.	1529.55-1561.42	0	4	-14	0	3	800	10 - 40	0 - 70	Yes	3.5	LC	N/A
Dual Fiber, Multi-rate 16 Gbps XFPs - No protocol-specific ref clock required														
XFP-16GD-SX	XFP 16/8/4 G FC and 10G FCoE, MM, 850nm, 125m with Digital Diagnostics	850	-7.8	-1	-7.7	0	N/A	N/A	0 - 0.125	0-70	Yes	1.2	LC	N/A
XFP-16GD-LR	XFP 16/8/4 G FC and 10G FCoE, SM, 1310nm, 10km, with Digital Diagnostics.	1310	-4	2	-10.9	2	N/A	N/A	0 - 10	0-70	Yes	2	LC	N/A
XFP-16GD-ER	XFP 16/8/4 G FC and 10G FCoE, SM, 1550nm, 40km, with Digital Diagnostics.	1550	-1	3	-14	1	3	800	10 - 40	0-70	Yes	3.5	LC	N/A

Optical QSFP Transceivers

Transceiver Specifications														
Part Number	Description	Wavelength (nm)	Tx Power (dBm)		Rx Power (dBm)		Dispersion Penalty (dB)	Dispersion Tolerance (ps/nm/km)	Span Distance (km)	Operating Temp. (°C)	Digital Diagnost.	Power (W)	Conn. Type	OSNR
			Min	Max	Min	Max						Max		Min
QSFP 40G														
QSFP-40G-SX	40G SR4 MM, 100 m	840 - 860	-7.6	2.4	-12	2.4	3.5	N/A	0 - 0.1	0 - 70	Yes	1.5	MPO	N/A
QSFP-40G-LR	40G LR4 SM, 10 km	1271 - 1331	-7	2.3	-13.7	2.3	2.3	N/A	1 - 10	0 - 70	Yes	3.5	LC	N/A
QSFP-40G-IR	40G IR4 SM, 10 km	1271- 1331	-7	2	-11.5	2.3	2.3	N/A	0 - 2	20 - 65	Yes	3.5	LC	N/A

Network Optical Equipment

Optical CFP Transceivers

Transceiver Specifications

Part Number	Description	Wavelength (nm)	Tx Power (dBm)		Rx Power (dBm)		Dispersion Penalty (dB)	Dispersion Tolerance (ps/nm/km)	Span Distance (km)	Operating Temp. (°C)	Digital Diagnost.	Power (W)	Conn. Type	OSNR
			Min	Max	Min	Max						Max		Min
CFP 100G														
CFP-100G-LR4	4x25G, 100GE/OTU4, SM, 10 km	1294.53– 1296.59 1299.02 – 1301.09 1303.54 – 1305.63 1308.09 – 1310.19	-4.3	4.5	-10.6	4.5	2.2	N/A	0 - 10	-5 - 70	Yes	14	LC	N/A
CFP100GDWER4-xx	4x28G MLSE DWDM CFP for Metro 20km,100Ghz spacing. Requires on-board FEC with minimum 8dB OSNR gain. xx per ITU grid 21 ,25, 29, 33, 37, 41, 45, 49, 53, 57	1529.55-1560.61	0	4	-20	-5	2	400	0-20 km	0-70 C	Yes	28	LC	>35dB @ BER=2x10e-3
CFP-100G-SR10	10x10G, 100GE/OTU4, MM, 300 m	850	-6.5	1	-9.5	2.4	N/A	N/A	0 - 0.3	0 - 70	Yes	8	MPO	N/A
CFP-100G-ER4	4x25G / 4x28G 100Gbase-ER4 and OTN OTU-4	1294.53 – 1296.59 1299.02 – 1301.09 1303.54 – 1305.63 1308.09 – 1310.19	-2.7	2.9	-20.9	4.5	2.2	N/A	0-40	-5 - 70	Yes	14	LC	N/A
CFP-100G-DWCHT	CFP 100G SM DWDM Coherent Single Wavelength Tunable 50Ghz spacing. Reach beyond 1200 km over SMF without inline chromatic dispersion compensation	1528.38 - 1563.05 tunable	set-table*	5	set-table*	-25	0	0.5	0 - 1200	-5 - 70	Yes	30	LC	> 30dB @ post FEC BER<1e-15

*Coherent CFP power setting may require a system software upgrade. Nominal transmit power is 0dBm.

Optical CFP2 Transceivers

Transceiver Specifications

Part Number	Description	Wavelength (nm)	Tx Power (dBm)		Rx Power (dBm)		Dispersion Penalty (dB)	Dispersion Tolerance (ps/nm/km)	Span Distance (km)	Operating Temp. (°C)	Digital Diagnost.	Power (W)	Conn. Type	OSNR
			Min	Max	Min	Max						Max		Min
CFP2 Form-Factor Pluggable														
CFP2-100G-LR4	4x25G CFP2, 100GE/ OTU4, SM, 10Km, dual LC connector	1294.53– 1296.59 1299.02 – 1301.09 1303.54 – 1305.63 1308.09 – 1310.19	-4.3	4.5	-10.6	4.5	2.2	N/A	0 - 10	0 - 70	Yes	8	LC	N/A
CFP2-100G-SR10	10x10G CFP2, 100GE/ OTU4, MM, 100m, MPO connector	850	-7.6	2.4	-9.5	2.4	N/A	N/A	100 m	0 - 70	Yes	6	MPO	N/A

S-F-P Network Optical Equipment

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S-F-P.RU Network Optical Equipment

NOTES

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