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MUX-DWDM Data Sheet

Contents

Product Overview	3
Product Highlights	3
Technical Specification	4
Line Type	10
High Quality DWDM Transceivers to Build a Passive DWDM System	11
Housing & Enclosure	12
Ordering Information	13

Product Overview

The customized Mux Demux, based on AAWG/TFF, is a passive DWDM device featuring high density, low loss, and long-haul transmission suitability. It supports configurable options for expansion, monitor, and 1310nm ports. The expansion and 1310nm port can be used to add additional channels, providing a cost-effective and easily expandable solution. The monitor port allows easy troubleshooting without downtime. In addition, this unit can be used as either a multiplexer or de-multiplexer (Mux/Demux). It combines 4-96 channels of DWDM wavelengths into a composite signal and separates the combined DWDM signal into 4-96 channels individual wavelengths over single-mode optical fiber. In accordance with the ITU-T G.694.2, it maximizes the capacity of the C-band range. Moreover, this product supports FMU plug-in module, FHD® plug-in module, 1U/2U rack-mount and ABS module to meet diverse requirements.

It supports 1G/10G/25G Ethernet, SDH/SONET, 16/8/4/2/1G Fiber Channel, FTTx and CATV. When deployed with FS DWDM optical transceivers, OEO, EDFA and OADM modules, the Mux Demux seamlessly enables flexible network architectures ranging from simple point-to-point connections to amplified ring configurations.

Product Highlights

- Multiplexing 4 to 96 Channels on Single or Dual Fiber to Maximize the Use of Existing Fiber
- Compatible with ITU Grid and Interconnects with Optical Networking Products
- Expansion, Monitor, and 1310nm Port are Optional for Diverse Needs
- 1U/2U Rack Mount, Plug-in and ABS Modules are Available for Various Installation Methods
- Quick Installation and Replacement to Reduce Deployment Time and Lowering Operational Costs
- Passive Transparent Multiplexing at Any Rate, Any Service, Including Ethernet, SDH/SONET, Fibre Channel, FTTx, and CATV
- Suitable for Long-distance Transmission, Including OTN, DCI and WAN Networks
- The Solution Can be [Customized](#) per Customer Application Requirements

Technical Specification

Parameter	Dual Fiber						
Number of Channels	4CH	8CH	16CH	32CH	40CH	44CH	48CH
ITU Channel	C15-C62						
Operating Wavelength	1520-1570nm						
Channel Spacing	100GHz (0.8nm)						
Channel Passband	±0.11nm						
Center Wavelength Accuracy	--				±0.05nm		
-1dB Channel Bandwidth	--				≥0.24nm		
-3dB Channel Bandwidth	--				≥0.43nm		
Insertion Loss (Passband)	≤2.4dB	≤3.0dB	≤4.6dB		≤4.3dB		
Insertion Loss (+ 1% Mon)				≤+0.3dB			
Insertion Loss (+1310nm port)				≤+0.3dB			
Adjacent Channel Isolation	≥30dB				≥25dB		
Non-adjacent Channel Isolation	40dB				≥29dB		
Technology	TFF				AAWG (Gaussian)		
Insertion Loss	--				≤1.5dB		
Return Loss	≥45dB				≥40dB		

Parameter	Dual Fiber	
Directivity	≥45dB	≥40dB
Polarization Dependent Loss	≤0.3dB	≤0.3dB
Polarization Mode Dispersion	≤0.1ps	≤0.1ps
Max Optical Power	≤500mW (27dBm)	≤300mW (24.77dBm)
Operating Temperature	-40 to 85°C (-40 to 185°F)	-5 to 65°C (23 to 149°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)	-5 to 65°C (23 to 149°F)
Fiber Type	G657 A1	
Dimensions	FHD Plug-in Module:1.38"x4.29"x4.64" (35x109x118mm)	
	FMU Plug-in Module: 1.73"x8.35"x10.04" (44x212x255mm)	
	1U 19" Rack Mount: 1.73"x18.97"x10.28" (44x481.8x261.2mm)	
	2U 19" Rack Mount: 3.47"x19"x9.84" (88.1x482.6x250mm)	
	ABS Pigtailed Module: 0.9mm/2.0mm/3.0mm cable diameter	

Parameter	Dual Fiber			
Number of Channels	64CH	80CH	88CH	94CH
ITU Channel	C13.5-C61			
Operating Wavelength	1520-1570nm			
Channel Spacing	50GHz (0.4nm)			
Channel Passband	±0.05nm			
Center Wavelength Accuracy	±0.05nm			
-1dB Channel Bandwidth	≥0.22nm			
-3dB Channel Bandwidth	≥0.27nm			
Insertion Loss (Passband)	≤7.0dB			
Insertion Loss (+ 1% Mon)	≤+0.3dB			
Insertion Loss (+1310nm port)	≤+0.3dB			
Adjacent Channel Isolation	≥22dB			

Parameter	Dual Fiber
Non-adjacent Channel Isolation	≥28dB
Technology	AAWG (Gaussian)
Insertion Loss	≤1.5dB
Return Loss	≥40dB
Directivity	≥40dB
Polarization Dependent Loss	≤0.3dB
Polarization Mode Dispersion	≤0.1ps
Max Optical Power	≤300mW (24.77dBm)
Operating Temperature	-5 to 65°C (23 to 149°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)
Fiber Type	G657 A1
Dimensions	FHD Plug-in Module:1.38"x4.29"x4.64" (35x109x118mm) FMU Plug-in Module: 1.73"x8.35"x10.04" (44x212x255mm) 1U 19" Rack Mount: 1.73"x18.97"x10.28" (44x481.8x261.2mm) 2U 19" Rack Mount: 3.47"x19"x9.84" (88.1x482.6x250mm) ABS Pigtailed Module: 0.9mm/2.0mm/3.0mm cable diameter

Parameter	Single Fiber			
Number of Channels	4CH	8CH	16CH	20CH
ITU Channel	C15-C62			
Operating Wavelength	1520-1570nm			
Channel Spacing	100GHz (0.8nm)			
Channel Passband	±0.11nm			
Center Wavelength Accuracy	--		±0.05nm	
-1dB Channel Bandwidth	--		≥0.24nm	
-3dB Channel Bandwidth	--		≥0.43nm	
Insertion Loss (Passband)	≤3.0dB	≤4.6dB	≤4.8dB	
Insertion Loss (+ 1% Mon)	≤+ 0.3dB			
Insertion Loss (+1310nm port)	≤+ 0.3dB			
Adjacent Channel Isolation	≥30dB		≥25dB	
Non-adjacent Channel Isolation	40dB		≥29dB	
Technology	TFF		AAWG (Gaussian)	
Return Loss	-		≤1.5dB	
Directivity	≥45dB		≥40dB	
Polarization Dependent Loss	≤0.3dB			
Polarization Mode Dispersion	≤0.1ps			

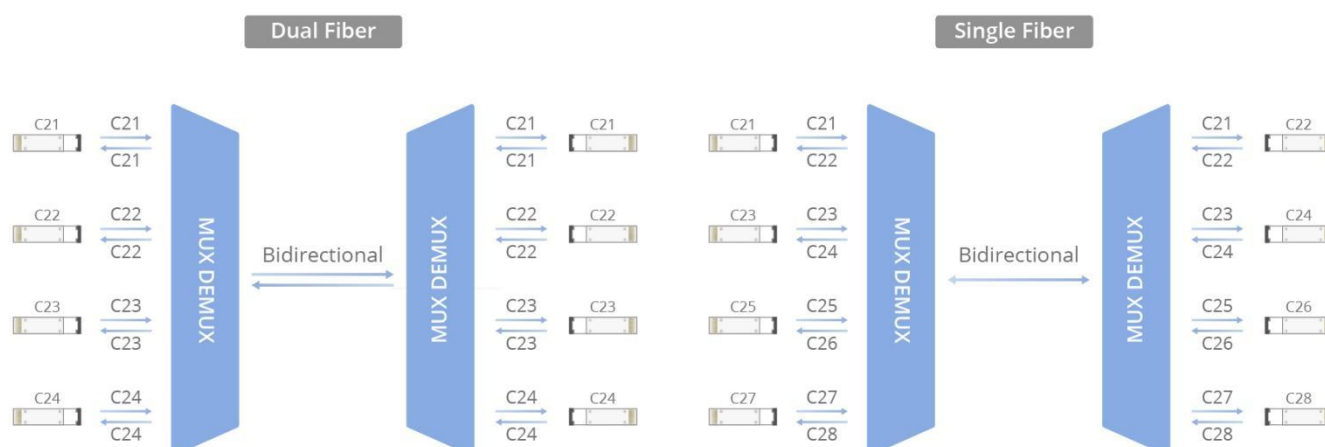
Parameter	Single Fiber	
Max Optical Power	≤500mW (27dBm)	≤300mW (24.77dBm)
Operating Temperature	-40 to 85°C (-40 to 185°F)	-5 to 65°C (23 to 149°F)
Storage Temperature	-40 to 85°C (-40 to 185°F)	-40 to 85°C (-40 to 185°F)
Fiber Type	G657 A1	
Dimensions	FHD Plug-in Module: 1.38"x4.29"x4.64" (35x109x118mm)	
	FMU Plug-in Module: 1.73"x8.35"x10.04" (44x212x255mm)	
	1U 19" Rack Mount: 1.73"x18.97"x10.28" (44x481.8x261.2mm)	
	2U 19" Rack Mount: 3.47"x19"x9.84" (88.1x482.6x250mm)	
	ABS Pigtailed Module: 0.9mm/2.0mm/3.0mm cable diameter	

Notes:

- (1) Specified without connectors. Add an additional 0.2dB loss per connector.
- (2) If any Mon/1310nm is added, passband insertion loss will increase about 0.3dB, but Exp port is added, passband insertion loss will not change.

Line Type

Dual/Single fiber bi-directional transmission



Special Service

1. Monitor Port

Monitor port is used to monitor or test the power signal, usually at a 1% ratio, 2%, 3%, 5%, etc, also available. By connecting with measurement or monitoring equipment, such as power meters, spectrum analyzer, or FMT AIU/OPD card, the signal can be inspected without interrupting the existing network.

2. Expansion Port

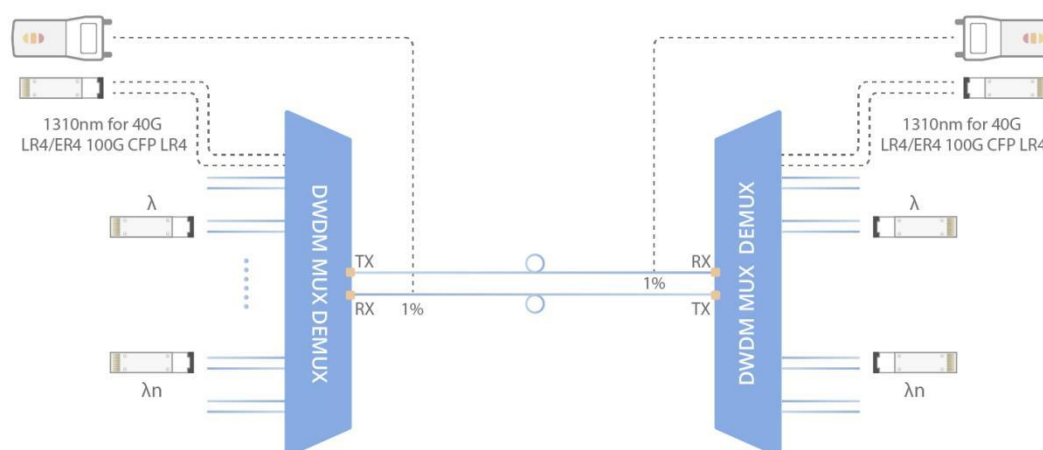
Expansion port makes it possible to increase the network capacity by connecting it to the line port of another DWDM MUX/DEMUX supporting different wavelengths, without the need of installing or leasing additional fibers.

3. 1310nm Ports

These two extra ports allow existing legacy 1310nm traffic to be added such as conventional SFP, SFP+ or other data rate conventional transceiver. And with the 1550nm port, it can be also used to cascade with another DWDM Mux for expansion.

Note:

If 1310nm port is added, the following CWDM wavelengths can't be added: 1270nm, 1290nm, 1310nm, 1330nm, 1350nm and 1370nm; DWDM Mux Demux can't add 1550nm port due to DWDM wavelength range near 1550nm wavelength



High Quality DWDM Transceivers to Build a Passive DWDM System

FS.COM offers DWDM transceiver modules in SFP, SFP+ and XFP formats. Every optics is tested in real switches and full compatible with Cisco, Juniper, Arista, Brocade, Dell, Extreme, etc.

Transmission distances range from 20-120km for Gigabit speeds, and 40-120km for 10 Gigabit speeds, without the use of optical amplifiers.



ITU Channel Guiding

ITU Channel (xx or yy)	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Wavelength (nm)	1560.61	1559.79	1558.98	1558.17	1557.36	1556.55	1555.75	1554.94	1554.13	1553.33	1552.52	1551.72	1550.92	1550.12	1549.32	1548.51	1547.72	1546.92	1546.12	1545.32

ITU Channel (xx or yy)	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
Wavelength (nm)	1544.53	1543.73	1542.94	1542.14	1541.35	1540.56	1539.77	1538.98	1538.19	1537.40	1536.61	1535.82	1535.04	1534.25	1533.47	1532.68	1531.90	1531.12	1530.33	1529.55

Housing & Enclosure

FS.COM provides 4 different package options for DWDM Mux Demux, including 1U/2U 19" rack mount, FHD&FMU plug-in module and ABS pigtailed module, as well as the matched chassis.

DWDM Mux Demux Optional Housing



1U 19" Rack Mount



2U 19" Rack Mount



FHD 4-slot 1U Rack



FMU 2-slot 1U Rack



FHD Plug-in Module



FMU Plug-in Module



ABS Pigtailed Module

0.9mm/2.0mm/3.0mm cable diameter can be customized

Ordering Information

Mux Demux & OADM

FMU Series Mux Demux	FMU-MC045561ES	4 Channels CWDM Mux or Demux, 1550-1610nm, with Expansion Port, 1.5dB Typical IL, LC/UPC, Single Fiber, FMU Plug-in Module#214979
	FMU-MC163161EMS	16 Channels CWDM Mux or Demux, 1310-1610nm, with Monitor and Expansion Port, 4.5dB Typical IL, LC/UPC, Single Fiber, FMU Plug-in Module#214981
	FMU-MC082759EMA	8 Channels CWDM Mux Demux, 1270-1590nm, with Monitor and Expansion Port, 4.5dB Typical IL, LC/UPC, Single Fiber, Side A, FMU Plug-in Module#214983
	FMU-MC082961EMB	8 Channels CWDM Mux Demux, 1290-1610nm, with Monitor and Expansion Port, 4.5dB Typical IL, LC/UPC, Single Fiber, Side B, FMU Plug-in Module#214985
	FMU-C182761M	18 Channels CWDM Mux Demux, 1270-1610nm, with Monitor Port, 5.0dB Typical IL, LC/UPC, Dual Fiber, 1U Rack Mount#33489
	FMU-MC082745	8 Channels CWDM Mux Demux, 1270-1450nm (Skip 1390, 1410nm), 2.5dB Typical IL, LC/UPC, Dual Fiber, FMU Plug-in Module#42937
	FMU-MC042733	4 Channels CWDM Mux Demux, 1270-1330nm, 1.0dB Typical IL, LC/UPC, Dual Fiber, FMU Plug-in Module#42972
	FMU-MC09B	9 Channels CWDM Mux Demux, 1290-1610nm, 2.4dB Typical IL, LC/UPC, Single Fiber, Side-B, FMU Plug-in Module#43699
	FMU-MC09A	9 Channels CWDM Mux Demux, 1270-1590nm, 2.4dB Typical IL, LC/UPC, Single Fiber, Side-A, FMU Plug-in Module#43711
	FMU-MC084761EM	8 Channels CWDM Mux Demux, 1470-1610nm, with Monitor and Expansion Port, 2.0dB Typical IL, LC/UPC, Dual Fiber, FMU Plug-in Module#78163
	FMU-C182761M	18 Channels CWDM Mux Demux, 1270-1610nm, with Monitor Port, 2.2dB Typical IL, LC/UPC, Dual Fiber, 1U Rack Mount#123533
	FMU-D60OCMW5	60 Odd Channels DWDM Mux Demux, Super C-band 100GHz 1524.50-1571.65nm, with Monitor Port, 6.0dB Typical IL, LC/UPC, Dual Fiber, 1U Rack Mount#166000
	FMU-D60ECMW5	60 Even Channels DWDM Mux Demux, Super C-band 100GHz 1524.89-1572.06nm, with Monitor Port, 6.0dB Typical IL, LC/UPC, Dual Fiber, 1U Rack Mount#166001
	FMU-D40ODMW5	40 Odd Channels Super C-band 150GHz 190.7875-196.6375THz, with Monitor Port, 5.5dB Typical IL, LC/UPC, Dual Fiber DWDM Mux Demux, 1U Rack Mount#166002
	FMU-D40_EDMW5	40 Even Channels Super C-band 150GHz 190.7125-196.5625THz, with Monitor Port, 5.5dB Typical IL, LC/UPC, Dual Fiber DWDM Mux Demux, 1U Rack Mount#166003
	FMU-D64BMW5	64 Channels DWDM Mux Demux, Super C-band 75GHz 1528.87-1566.62nm, with Monitor Port, 5.8dB Typical IL, LC/UPC, Dual Fiber, 1U Rack Mount#166004
	FMU-MD082128EMS	8 Channels DWDM Mux or Demux, 100GHz C21-C28, with Monitor and Expansion Port, 2.75dB Typical IL, LC/UPC, Single Fiber, FMU Plug-in Module#214969
	FMU-MD042124EMA	4 Channels DWDM Mux Demux, 100GHz C21-C24, with Monitor and Expansion Port, 2.75dB Typical IL, LC/UPC, Single Fiber, Side A, FMU Plug-in Module#214971
	FMU-MD045760EMB	4 Channels DWDM Mux Demux, 100GHz C57-C60, with Monitor and Expansion Port, 2.75dB Typical IL, LC/UPC, Single Fiber, Side B, FMU Plug-in Module#214973
	FMU-MD042023EMD	4 Channels DWDM Mux Demux, 100GHz C20-C23, with Monitor and Expansion Port, 1.6dB Typical IL, LC/UPC, Dual Fiber, FMU Plug-in Module#214975

Mux Demux & OADM		
FHD Series Mux Demux	FMU-D402160M3	40 Channels DWDM Mux Demux, 100GHz C21-C60, with 1310nm and Monitor Port, 3.5dB Typical IL, LC/UPC, Dual Fiber, 1U Rack Mount#35887
	FMU-D162136EM3	16 Channels DWDM Mux Demux, 100GHz C21-C36, with Monitor, Expansion and 1310nm Port, 4.4dB Typical IL, LC/UPC, Dual Fiber, 1U Rack Mount#72430
	FMU-D162136A	16 Channels DWDM Mux Demux, 100GHz C21-C36, 4.0dB Typical IL, LC/UPC, Single Fiber, Side-A, 1U Rack Mount#78535
	FMU-D164560B	16 Channels DWDM Mux Demux, 100GHz C45-C60, 4.0dB Typical IL, LC/UPC, Single Fiber, Side-B, 1U Rack Mount#78536
	FMU-FD402160M3	40 Channels DWDM Mux Demux, 100GHz C21-C60, with 1310nm Port and Monitor Port, 4.5dB Typical IL, LC/UPC, Dual Fiber, 1U Rack Mount#84492
	FMU-MD085360E	8 Channels DWDM Mux Demux, C53-C60, with Expansion Port, 2.8dB Typical IL, LC/UPC, Dual Fiber, FMU Plug-in Module, CWDM/DWDM Hybrid Solution#30568
	FMU-D402160M	40 Channels DWDM Mux Demux, 100GHz C21-C60, with Monitor Port, 3.0dB Typical IL, LC/UPC, Dual Fiber, 1U Rack Mount#33485
	FMU-MD08_EB	8 Channels DWDM Mux Demux, 100GHz C22-C36, with Expansion Port, 4.2dB Typical IL, LC/UPC, Single Fiber, Side-B, FMU Plug-in Module#50116
	FMU-MD08_EA	8 Channels DWDM Mux Demux, 100GHz C21-C35, with Expansion Port, 4.2dB Typical IL, LC/UPC, Single Fiber, Side-A, FMU Plug-in Module#50117
	FMU-MD085360EM3	8 Channels DWDM Mux Demux, 100GHz C53-C60, with Monitor, Expansion and 1310nm Port, 3.0dB Typical IL, LC/UPC, Dual Fiber, FMU Plug-in Module, CWDM/DWDM Hybrid Solution#72433
	FMU-L042728B	4 Channels 1273.55-1286.66nm, Single Fiber LAN-WDM Mux Demux, Side-B, FMU Plug-in Module, LC/UPC#244655
	FMU-L042930A	4 Channels 1295.56-1309.14nm, Single Fiber LAN-WDM Mux Demux, Side-A, FMU Plug-in Module, LC/UPC#244657
	FHD-D82128EM3	8 Channels DWDM Mux Demux, 100GHz C21-C28, with EXP & Mon and 1310nm Port, 2.4dB Typical IL, LC/UPC, Dual Fiber, High Density, FHD® Plug-in Module#126899
	FHD-D82936EM	8 Channels DWDM Mux Demux, 100GHz C29-C36, with Monitor and Expansion Port, 2.4dB Typical IL, LC/UPC, Dual Fiber, High Density, FHD Plug-in Module#126900
	FHD-D85360EM	8 Channels DWDM Mux Demux, 100GHz C53-C60, with Monitor and Expansion Port, 2.4dB Typical IL, LC/UPC, Dual Fiber, High Density, FHD Plug-in Module, CWDM/DWDM Hybrid Solution#126901
Custom Mux Demux	MUX-DWDM	Customized Dual and Single Fiber DWDM Mux Demux#322911
	MUX-CWDM	Customized Dual and Single Fiber CWDM Mux Demux#70410
	MUX-CCWDM	Customized Dual and Single Fiber Compact CWDM Mux Demux#73961
OADM	DOADM-DF	Customized Dual Fiber DWDM OADM#70427
	COADM-DF	Customized Dual Fiber CWDM OADM#70425
Chassis	FMU-1UFMX-N	FMU 2-Slot 1U 19" Rack Chassis Unloaded, Holds up to 2 Units FMU Plug-in Module#30408
	FHD-1U-CMP400	FHD® High Density 1U Rack Mount Modular Enclosure Unloaded, Rear Cable Managers, Holds up to 4 x FHD® Cassettes or Panels, 144 Fibers (LC)#704198

TRANSPONDERS & MUXPONDERS

10G	FMT4DL-OEO25GSFP28	FMT4DL-OEO25GSFP28, 4 Channels 25G WDM Transponder (Converter) for FMT Managed Chassis, 8 SFP28/SFP+ Slots#92056
	FMT4DL-OEO10GSFP	FMT4DL-OEO10GSFP, 4 Channels WDM Transponder (Converter) for FMT Managed Chassis, 8 SFP/SFP+ Slots#30515
	FMT04-CH1U	FMT04-CH1U, 4 Slots 1U Managed Chassis Unloaded Platform, Redundant AC PSUs, Support SNMP V1 Network Management#39214
Chassis	FMT-CH	FMT-CH, Customized 4/8/16 Slots 1U/2U/4U Managed Chassis Unloaded Platform, Redundant AC/DC PSUs, Support SNMP Network Management#70413

WDMTRANSCEIVERS

100G/200G CFP2	CFP2-DCO-200G-M	C14 1566.31nm CFP2-DCO 100G/200G DWDM C-band Tunable 96Chs ITU CH13-CH60 50GHz 80km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission#120128
25G SFP28	DW-SFP25G10-17	Cisco C17 DWDM-SFP25G-63.86 Compatible SFP28 25G DWDM 1563.86nm 100GHz 10km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission#87000
	CW-SFP25G30-27	Cisco CWDM-SFP25G-1270-30 Compatible SFP28 25G CWDM 1270nm 30km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission#100112
	CW-SFP25G10-27	Cisco CWDM-SFP25G-1270-10 Compatible SFP28 25G CWDM 1270nm 10km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission#76003
10G SFP+	LW-SFP25G40-86	Cisco LWDM-SFP25G-86.66 Compatible SFP28 25G LWDM 1286.66nm 40km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission#93786
	DW-SFP10G80-21-I	Cisco C21 DWDM-SFP10G-60.61-I Compatible SFP+ 10G DWDM 1560.61nm 100GHz 80km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission (Industrial)#113562
	DW-SFP10G40-21-I	Cisco C21 DWDM-SFP10G-60.61-I Compatible SFP+ 10G DWDM 1560.61nm 100GHz 40km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission (Industrial)#113511
1GSFP	CW-SFP10G80-47	Cisco CWDM-SFP10G-1470 Compatible SFP+ 10G CWDM 1470nm 80km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission#19367
	CW-SFP10G40-27-I	Cisco CWDM-SFP10G-1270-I Compatible SFP+ 10G CWDM 1270nm 40km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission (Industrial)#112392
	DWDM-SFP1G-EZX	Cisco C17 DWDM-SFP-6386 Compatible SFP 1000BASE-DWDM 1563.86nm 100GHz 100km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission#54150
	DWDM-SFP1G-ZX	Cisco C17 DWDM-SFP-6386-80 Compatible SFP 1000BASE-DWDM 1563.86nm 100GHz 80km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission#47697
	CWDM-SFP1G-ZX	Cisco CWDM-SFP-1270 Compatible SFP 1000BASE-CWDM 1270nm 80km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission#33234
	DWDM-SFP1G-ZX	Cisco C17 DWDM-SFP-6386-80 Compatible SFP 1000BASE-DWDM 1563.86nm 100GHz 80km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission#47697
	CWDM-SFP1G-ZX	Cisco CWDM-SFP-1270 Compatible SFP 1000BASE-CWDM 1270nm 80km DOM Duplex LC/UPC SMF Optical Transceiver Module for Transmission#33234

*Standard products are listed above. Customized specifications are available upon request.



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