

Dual & Single Fiber DWDM OADM

Data Center & Cloud Computing Infrastructure Solutions



Overview

DWDM Optical Add/Drop multiplexer (OADM) is a passive optical device used in WDM networks for adding and dropping one/multiple 100 GHz DWDM channels in the C-band into one or two fibers, while letting the rest of the wavelengths bypass to the needed destination. Using the DWDM technology can add effectively WDM capability to their existing and new networks, and extend the optical signals transmission distance.

DWDM OADM modules are available in single-sided (East or West) and dual-sided (East and West) configurations. With matching MUX/DEMUX units placed at each end of an optical link, multiple data channels can be combined and transmitted over a single-mode fiber trunk. The passive OADM modules can add or drop up to 4 data channels at any point along the trunk.

Highlights

- Low insertion loss
- Add/drop channels at remote sites
- Protocol transparent (support 1G, 10G etc.)
- Based on thin film optics with epoxy free optical path
- Fully compliant with CE, FCC, ISO, ITU-T G.694.2, RoHS, Telcordia GR1209 and GR1221
- Completely passive, no power or maintenance required
- Ideal for DWDM ring structures or daisy chain applications
- Various connectors are available - LC/SC/FC/ST, UPC/APC polish
- Optional monitor/1310nm port for external functions

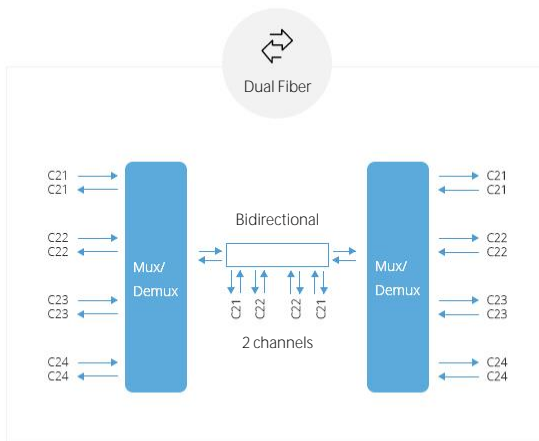
Line Type

Dual Fiber

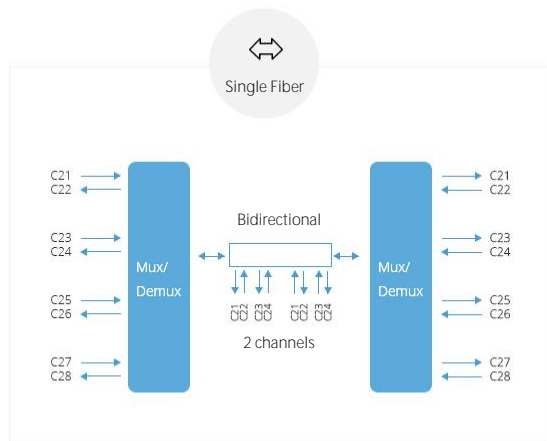
Single Fiber

Dual fiber DWDM OADM adds and drops optical signals of same wavelengths into two fibers, while letting the rest of the wavelengths bypass to the needed destination. The DWDM transceiver connected to DWDM OADM should have the same wavelength as the client port.

In single fiber applications, DWDM OADM adds and drops optical signals of different wavelengths into a fiber in the opposite direction. It utilizes a single fiber for both adding and dropping, which reduces overall costs, and increases the capacity of the fiber.



Wavelengths for Add/Drop are the same



Wavelengths for Add/Drop are different

Technical Data

| Parameter | Dual Fiber | | | | | | |
|--------------------------------|--|---------------------|---------------------|---------------------|----------------------|---------------------|---------------------|
| Transmission Direction | West and East | | | | West or East | | |
| Number of Channels | 1ch | 2ch | 4ch | 8ch | 16ch | 1ch | 2ch |
| Operating Wavelength | 1520nm - 1570nm | | | | | | |
| Channel Spacing | 100GHz(0.8nm) | | | | | | |
| Channel Passband | $\pm 0.11\text{nm}$ | | | | | | |
| Insertion Loss (Add/Drop) | $\leq 1.0\text{dB}$ | $\leq 1.3\text{dB}$ | $\leq 2.0\text{dB}$ | $\leq 3.0\text{dB}$ | $\leq 4.75\text{dB}$ | $\leq 1.0\text{dB}$ | $\leq 1.5\text{dB}$ |
| Insertion Loss (Pass-through) | $\leq 1.1\text{dB}$ | $\leq 1.5\text{dB}$ | $\leq 2.6\text{dB}$ | $\leq 4.0\text{dB}$ | $\leq 10.0\text{dB}$ | $\leq 1.0\text{dB}$ | $\leq 1.5\text{dB}$ |
| Insertion Loss (+ 1% Mon) | $\leq +0.6\text{dB}$ | | | | $\leq +0.3\text{dB}$ | | |
| Insertion Loss (+ 1310nm port) | $\leq +0.6\text{dB}$ | | | | $\leq +0.3\text{dB}$ | | |
| Adjacent Channel Isolation | $\geq 30\text{dB}$ | | | | | | |
| Non-adjacent Channel Isolation | $\geq 35\text{dB}$ | | | | | | |
| Output Channel Isolation | $\geq 20\text{dB}$ | | | | $\geq 13\text{dB}$ | | |
| Technology | TFF | | | | | | |
| Passband Ripple | $\leq 0.50\text{dB}$ | | | | | | |
| Polarization Dependent Loss | $\leq 0.20\text{dB}$ | | | | | | |
| Return Loss | $\geq 45\text{dB}$ | | | | | | |
| Directivity | $\geq 50\text{dB}$ | | | | | | |
| Polarization Mode Dispersion | $\leq 0.10\text{ps}$ | | | | | | |
| Power Handling | $\leq 300\text{mW}$ | | | | | | |
| Operating Temperature | $-40 \sim 85^\circ \text{C}$ | | | | | | |
| Storage Temperature | $-40 \sim 85^\circ \text{C}$ | | | | | | |
| Fiber Type | G657 A1 | | | | | | |
| Compliance | CE, FCC, ISO, ITU-T G.694.1, RoHS, Telcordia GR1209 and GR1221 | | | | | | |

Notes:

- Specified without connectors. Add an additional 0.2dB loss per connector.
- If any Mon/1310nm/1550nm port is added, passband insertion loss will increase about 0.3dB (West or East) / 0.6dB (West and East).

| Parameter | Single Fiber | | | | | |
|--------------------------------|--|---------------------|---------------------|----------------------|---------------------|---------------------|
| Transmission Direction | West and East | | | West or East | | |
| Number of Channels | 1ch | 2ch | 4ch | 8ch | 1ch | 2ch |
| Operating Wavelength | 1520nm - 1570nm | | | | | |
| Channel Spacing | 100GHz(0.8nm) | | | | | |
| Channel Passband | $\pm 0.11\text{nm}$ | | | | | |
| Insertion Loss (Add/Drop) | $\leq 1.3\text{dB}$ | $\leq 2.0\text{dB}$ | $\leq 3.0\text{dB}$ | $\leq 5.5\text{dB}$ | $\leq 1.3\text{dB}$ | $\leq 1.9\text{dB}$ |
| Insertion Loss (Pass-through) | $\leq 1.5\text{dB}$ | $\leq 2.6\text{dB}$ | $\leq 4.0\text{dB}$ | $\leq 8.0\text{dB}$ | $\leq 1.3\text{dB}$ | $\leq 1.9\text{dB}$ |
| Insertion Loss (+ 1% Mon) | $\leq +0.6\text{dB}$ | | | $\leq +0.3\text{dB}$ | | |
| Insertion Loss (+ 1310nm port) | $\leq +0.6\text{dB}$ | | | $\leq +0.3\text{dB}$ | | |
| Adjacent Channel Isolation | $\geq 30\text{dB}$ | | | | | |
| Non-adjacent Channel Isolation | $\geq 35\text{dB}$ | | | | | |
| Output Channel Isolation | $\geq 20\text{dB}$ | | | $\geq 13\text{dB}$ | | |
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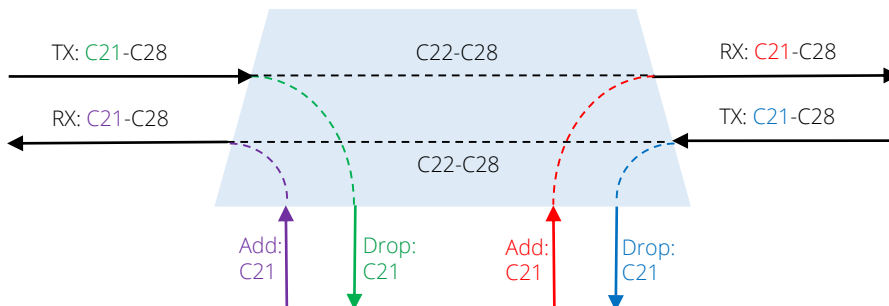
Transmission Direction

For adding/dropping DWDM channels across sites, we categorize our DWDM OADM in two groups: single-sided (East or West) and dual-sided (East and West).

If DWDM OADM adds/drops the wavelengths in one side on fiber network, it is the East or West module; On the contrary, it is the East and West module.

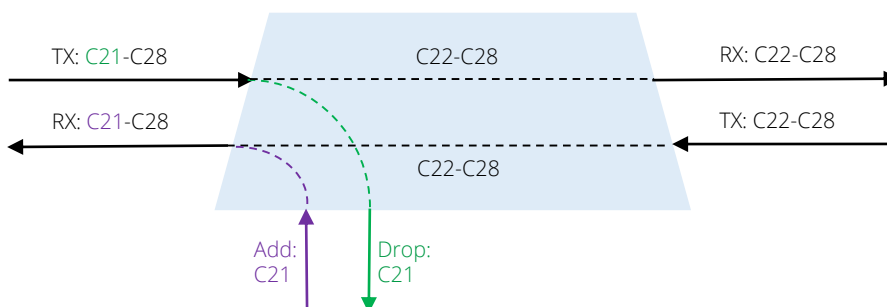
■ East and West

The dual-sided OADM removes one channel from the network in one direction and sends it to a local interface in one direction. It also allows a second local port to add the same channel back onto the network fiber in the opposite direction.



■ East or West

The single-sided OADM removes one channel from the network in one direction and sends it to a local interface. The remaining channels are passed straight through to other nodes along the network.



Housing & Enclosure

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

DWDM OADM Optional Housing

| | |
|---|--|
| <p style="text-align: center;">FMU 2-slot 1U Rack</p> <p style="text-align: center;">FMU Plug-in module</p> | <p style="text-align: center;">FUD 4-slot 1U Rack</p> <p style="text-align: center;">FUD Plug-in module</p> |
| <p style="text-align: center;">1U 19" Rack Mount</p> | <p style="text-align: center;">ABS Pigtailed module</p> <p style="text-align: center;">0.9mm/2.0mm/3.0mm cable diameter can be customized.</p> |

Ordering Information

| Mux Demux & OADM | | |
|---------------------------|---------------------------------|---|
| | FMU-D402160M3 | 40 Channels 100GHz C21-C60, with 1310nm and Monitor Port, 3.5dB Typical IL, LC/UPC, Dual Fiber DWDM Mux Demux, 1U Rack Mount #35887 |
| DWDM MUX DEMUX | M6200-D2160M | 40 Channels 100GHz C21-C60 Dual Fiber DWDM Mux and Demux with Monitor Port, Pluggable Module, LC/UPC, Integrated with M6200 Series Managed Chassis #120424 |
| | FMU-D162136EM3 | 16 Channels 100GHz C21-C36, with Monitor, Expansion and 1310nm Port, LC/UPC, Dual Fiber DWDM Mux Demux, 1U Rack Mount #72430 |
| | FMU-MD085360EM3 | CWDM/DWDM Hybrid Solution, 8 Channels 100GHz C53-C60, with Monitor, Expansion and 1310nm Port, LC/UPC, Dual Fiber DWDM Mux Demux, FMU Plug-in Module #72433 |
| CWDM MUX DEMUX | FMU-C182761M | 18 Channels 1270-1610nm, with Monitor Port, LC/UPC, Dual Fiber CWDM Mux Demux, 1U Rack Mount #33489 |
| | FMU-MC084761EM | 8 Channels 1470-1610nm, with Monitor and Expansion Port, LC/UPC, Dual Fiber, Low Insertion Loss CWDM Mux Demux, FMU Plug-in Module #78163 |
| LWDM MUX DEMUX | ABS-L042930A | 4 Channels 1295.56-1309.14nm, Single Fiber LAN-WDM Mux Demux, Side-A, ABS Pigtailed Module, LC/UPC #97782 |
| | ABS-C062737A | 6 Channels 1271-1371nm, Single Fiber CWDM Mux Demux, Side-A, ABS Pigtailed Module, LC/UPC #97784 |
| OADM | DOADM-DF | Customized Dual Fiber & Single Fiber DWDM OADM #70427 |
| | COADM-DF | Customized Dual Fiber & Single 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 |
| | FUD-1UFMX-N | FUD 4-Slot 1U 19" Rack Chassis Unloaded, holds up to 4 Units FUD Plug-in Module #106578 |
| TRANSPONDERS & MUXPONDERS | | |
| 8x 200G | M6800-TSP16 | 16x 100G QSFP28 to 8x 200G CFP2 OTN Managed Transport Platform#111053 |
| 100G/200G | M6500-TMXP5 | 2x 100G QSFP28/4x 40G QSFP+ to 1x 200G CFP2 Transponder/Muxponder#111049 |
| 10G | M6200-OEO10G | 5 Channels WDM Transponder (Converter), 10 SFP/SFP+ Slots#107365 |
| | M6500-CH2U | 2U Managed Chassis Unloaded Platform, Supports 2x 200G Transponder/Muxponder #96454 |
| | M6500-CH5U | 5U Managed Chassis Unloaded Platform, Supports 6x 200G Transponder/Muxponder #111050 |
| | M6200-CH2U | 2U Managed Chassis Unloaded Platform, Supports 7x Mux/DEMUX/EDFA/OEO/OLP/DCM Cards #107371 |
| | M6200-CH5U | 5U Managed Chassis Unloaded Platform, Supports 15x MUX/DEMUX/EDFA/OEO/OLP/DCM Cards #111052 |
| Chassis | | |

OPEN LINE SYSTEM

| | | |
|-------------------------|------------------------------|---|
| Amplifiers | M6200-25PA | 25dB Gain DWDM EDFA Pre-Amplifier, 16dBm Output#107367 |
| | M6200-20BA | 20dBm Output DWDM EDFA Booster Amplifier, 16dB Gain#107366 |
| Dispersion Compensation | M6200-DCM40 | 40KM DCF-based Passive Dispersion Compensation Module#107370 |
| | M6200-DCM80 | 80KM DCF-based Passive Dispersion Compensation Module#119071 |
| Line Protection | M6200-OLP2 | 1+1 Optical Line Protection Switch (OLP)#107368 |
| Red/Blue Filter | M6200-RB | 1x2 Single Fiber DWDM Red/Blue Filter#107369 |
| VOA Units | M6200-SFPVOA | SFP Variable Optical Attenuator Module#107373 |
| | AT-M-LCU | Fixed Fiber Optic Attenuators #70009 |
| Chassis | M6200-CH2U | 2U Managed Chassis Unloaded Platform, Supports 7x Mux/DEMUX/EDFA/OEO/OLP/DCM Cards #107371 |
| | M6200-CH5U | 5U Managed Chassis Unloaded Platform, Supports 15x MUX/DEMUX/EDFA/OEO/OLP/DCM Cards #111052 |

WDM TRANSCEIVERS

| | | |
|----------------|----------------------------------|--|
| 100G/200G CFP2 | M-CFP2-DCO | C14 1566.31nm 100G/200G Tunable CFP2-DCO Coherent Transceiver, up to 1000km #120128 |
| | DWDM-SFP25G-10 | 25G DWDM SFP28 100GHz 1563.86nm 10km DOM LC SMF Optical Transceiver Module #87000 |
| 25G SFP28 | CWDM-SFP25G-40S | 25G 1270nm CWDM SFP28 40km DOM LC SMF Optical Transceiver Module #100112 |
| | CWDM-SFP25G-10SP | 25G 1270nm CWDM SFP28 10km DOM LC SMF Optical Transceiver Module #76003 |
| | LWDM-SFP25G-40 | 25G LWDM SFP28 1286.66nm 40km DOM LC SMF Optical Transceiver Module #93786 |
| 16G/8G FC | DWDM-SFP16G-40 | Customized 16G DWDM SFP+ C20-C61 100GHz 40km DDM LC SMF Transceiver Module#73084 |
| | DWDM-SFP16GH-40 | Customized 16G DWDM SFP+ 50GHz 40km DDM LC SMF Transceiver Module #73085 |
| | CWDM-SFP16G-40 | Customized 16G Fiber Channel CWDM SFP+ 1470-1610nm 40km DDM LC SMF Transceiver Module #80765 |

| | | |
|----------|---------------------------------|---|
| | DWDM-SFP10G-80 | 10G DWDM SFP+ 1559.79nm 80km DOM LC SMF Transceiver Module, Commercial Temperature#31237, Industrial Temperature#113562 |
| | DWDM-SFP10G-40 | 10G DWDM SFP+ 1560.61nm 40km DOM LC SMF Transceiver Module, Commercial Temperature#38731, Industrial Temperature#113511 |
| 10G SFP+ | DWDM-SFP10G-C | 10G DWDM C-band Tunable SFP+ 50GHz 80km DOM LC SMF Transceiver Module #69267 |
| | CWDM-SFP10G-80L | 10G CWDM SFP+ 1470nm 80km DOM LC SMF Transceiver Module #19367 |
| | CWDM-SFP10G-40S | 10G CWDM SFP+ 1270nm 40km DOM LC SMF Transceiver Module, Commercial Temperature#22168, Industrial Temperature#112392 |
| | DWDM-SFP1G-EZX | 1000BASE-DWDM SFP 100GHz 1563.86nm 100km DOM LC SMF Transceiver Module #54150 |
| 1G SFP | DWDM-SFP1G-ZX | 1000BASE-DWDM SFP 1563.86nm 80km DOM LC SMF Transceiver Module #47697 |
| | CWDM-SFP1G-EZX | 1000BASE-CWDM SFP 1270nm 120km DOM LC SMF Transceiver Module #102776 |
| | CWDM-SFP1G-ZX | 1000BASE-CWDM SFP 1270nm 80km DOM LC SMF Transceiver Module #33234 |

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



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