AWARD WINNING LASERWAVE® WIDEBAND (OM5) MULTIMODE FIBER

LaserWave WideBand (OM5) Multimode Fiber supports the latest high speed datacenter networks. Designed for multi-wavelength Vertical-Cavity Surface-Emitting Laser (VCSEL) based applications that utilize multimode Wavelength Division Multiplexing (WDM) technology, LaserWave WideBand fiber meets and exceeds TIA, IEC, and ISO/IEC OM5 requirements. LaserWave WideBand (OM5) fiber is the first multimode fiber with an optimized operating range extending from 850nm to 940nm, providing up to four transmission windows.

Why LaserWave WideBand (OM5) Fiber

LaserWave WideBand (OM5) Multimode Fiber is designed to support up to four operating wavelength windows, compared with OM3 and OM4 multimode fibers which are optimized only for 850nm applications. Fully backward compatible with OM4 fiber, LaserWave WideBand (OM5) fiber is designed for WDM applications. By supporting multiple lanes of traffic over a single fiber, OM5 fiber decreases the number of fibers needed in a link over a legacy, single wavelength solution.

There are two different multimode WDM solutions currently on the market. Short Wavelength Division Multiplexing (SWDM) modules send traffic in one direction over multiple wavelengths in a fiber, so a duplex (2-fiber) link, for example, has a transmit fiber and a receive fiber. Bi-directional (BiDi) modules transmit and receive signals travel on the same fiber, using different wavelengths.

Multi-wavelength duplex 100Gb/s links enables four-pair, two wavelength BiDi transmission for 400GBASE-SR4.2, rather than the 8-pair, single wavelength links in 400GBASE-SR8. Both of these 400 Gb/s solutions were standardized in IEEE Std 802.3cm™-2020. It is expected that next generation standards and MSAs will be developed for a variety of speeds using BiDi and SWDM technologies, over two and four wavelength windows.

The figure below shows the evolution of duplex 10 Gb/s to higher speed 400 Gb/s and even 1.6 Tb/s links, and the corresponding increase in lane rates. Breakout applications are the most common “first use” of the highest multimode transmission speeds but today’s high-speed breakout quickly becomes tomorrow’s server interface. In server applications, duplex interfaces are strongly preferred over multifiber options.

There are many advantages to duplex links, including:

1. Craft familiarity
2. Easier cleaning
3. Fewer polarity issues than MPO/MTP® connections
4. Lower cable density

In the future, 400 Gb/s duplex links utilizing WDM is potentially feasible.

Data Rate (Gb/s)	Single Wavelength Options	Options using WDM Technology and LaserWave WideBand (OM5) Multimode Fiber
10	 10GBASE-SR (2002)	N/A
25	 25GBASE-SR (2016)	N/A
40	 10G x 4 fibers each direction 40GBASE-SR4 (2015)	 10G x 4λ SWDM4 (2015)[1]  20G x 2λ BiDi (2015)[2]
50	 50GBASE-SR (2016)	N/A
100	 25G x 4 fibers each direction 100GBASE-SR4 (2015)	 25G x 4λ SWDM4 (2018)[1]
	 100GBASE-SR (2022)[3]	 50G x 2λ BiDi (2018)[2]
400	 50G x 8 fibers each direction 400GBASE-SR8 (2020)	 50G x 2λ x 8 fibers (BiDi) 400GBASE-SR4.2 (2020)
	 100G x 4 fibers each direction 400GBASE-VR4/SR4 (2022)[3]	
800	 100G x 8 fibers each direction 800GBASE-VR8/SR8[4]	 100G x 2λ x 8 fibers (BiDi)[5]
1600		 100G x 2λ - x 16 fibers (BiDi)[5]

[1] Multisource Agreement (MSA)

[2] Proprietary Solution

[3] IEEE P802.3db 100 Gb/s, 200 Gb/s, and 400 Gb/s Short Reach Fiber Task Force (draft standard)

[4] IEEE P802.3df 200 Gb/s, 400 Gb/s, 800 Gb/s, and 1.6 Tb/s Ethernet Task Force (initiated Dec-2021)

[5] MSA in development

Optical Components

Transceiver suppliers have been supplying multiple wavelength products for several years. 40 Gb/s and 100 Gb/s BiDi and SWDM4 transceivers have been tremendously popular since their introduction in 2014. IEEE 802.3cm's 400GBASE-SR4.2 was the first Ethernet multi-wavelength VCSEL-MMF standard, published in 2020. Development continues on higher speed 800 Gb/s and 1.6Tb/s BiDi and SWDM transceivers.

Awards

LaserWave WideBand Multimode fiber was recognized by Lightwave Magazine with a 2016 Lightwave Innovation Review Award for providing, "the opportunity to achieve high-speed communications in an acceptable footprint for a large number of enterprise data centers."

It has also received Cabling Installation and Maintenance Magazine's 2016 Silver Innovators Award.

Conclusion

OFS LaserWave WideBand (OM5) fiber supports the highest multimode data rates and longest link lengths using the latest multimode WDM technologies. Designed for operation over a wide window of wavelengths, WideBand fiber is optimized for both BiDi and SWDM4 transceivers.