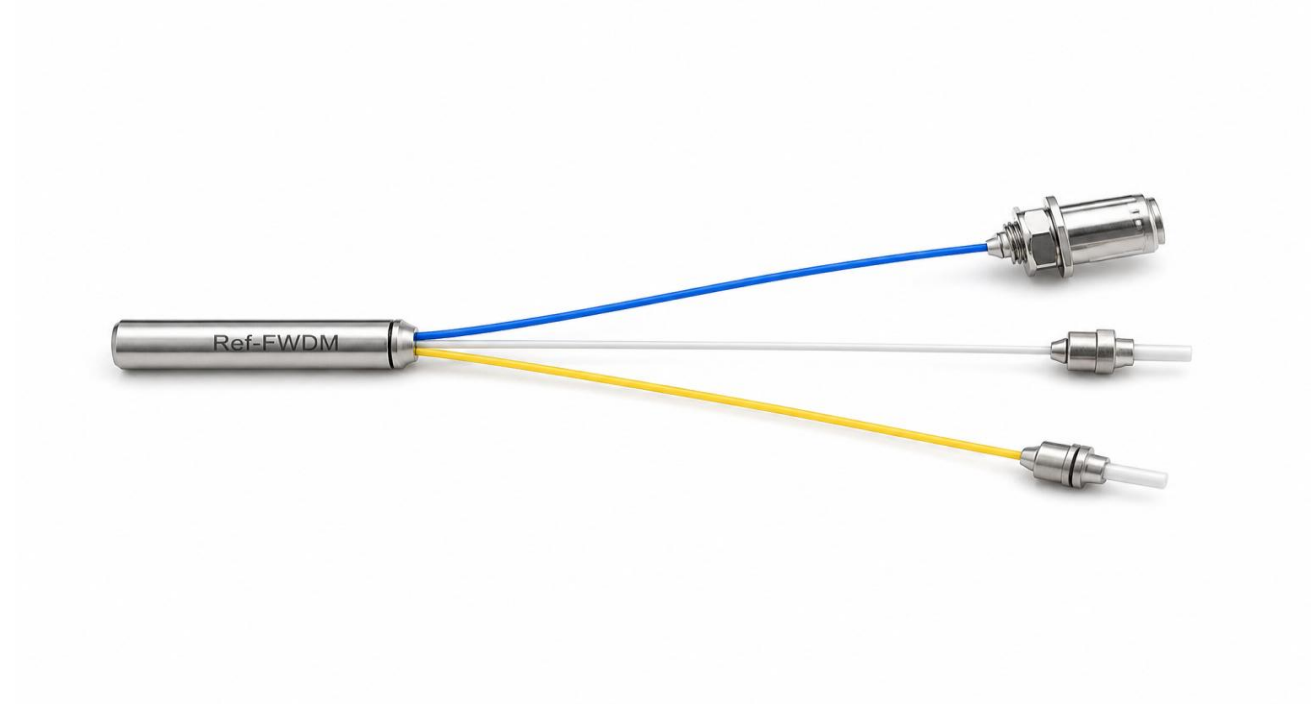
PRODUCT NEWS

Gracyfiber Introduces Reflective High-Isolation 1310/1550 nm FWDM

Compact Ref-FWDM for optical transceivers and space-constrained wavelength-routing assemblies



Gracyfiber Ref-FWDM: one optical receptacle and two LC ferrule interfaces in a compact three-port assembly.

Designed for applications where conventional FWDM isolation is not enough. The reflective optical architecture combines low insertion loss, ≥50 dB isolation at the reflect band and integration-friendly same-direction fiber routing.

A More Demanding FWDM Architecture

Gracyfiber has introduced a compact Reflective High-Isolation FWDM (Ref-FWDM) developed for optical transceivers and other fiber-optic systems that require reliable separation of the 1310 nm and 1550 nm wavelength bands.

Unlike a conventional three-port FWDM, the Ref-FWDM uses a carefully controlled reflective optical path. Achieving high isolation in the reflected direction depends on the complete optical assembly—not only the thin-film filter. Filter spectral performance, reflected beam position, collimator alignment, coupling efficiency and package stability must all work together.

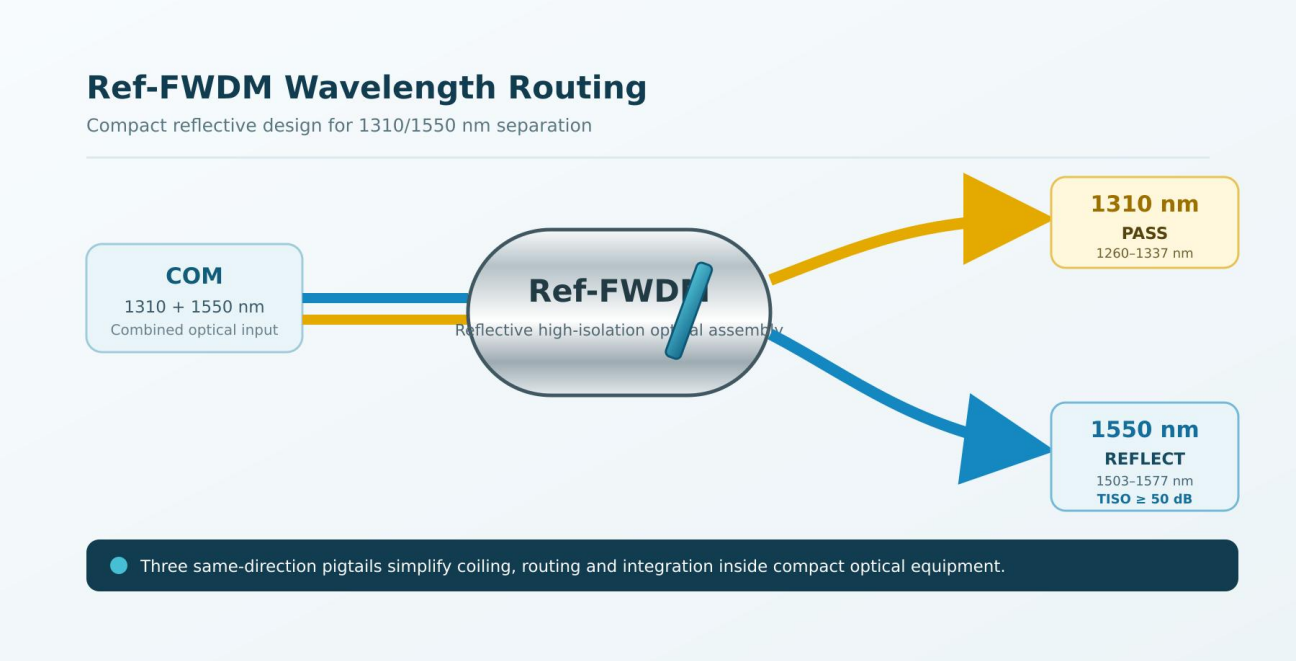


Figure 1. Standard configuration: 1310 nm passes through the device, while 1550 nm is reflected with transmitted isolation at the reflect band of at least 50 dB.

High Isolation with Low Optical Loss

The standard configuration passes the 1310 nm band and reflects the 1550 nm band. A reverse configuration—with 1550 nm as the pass band and 1310 nm as the reflect band—is also available.

Parameter	1310 Pass / 1550 Reflect	1550 Pass / 1310 Reflect
Pass band	1310 nm (1260–1337 nm)	1550 nm (1503–1577 nm)
Reflect band	1550 nm (1503–1577 nm)	1310 nm (1260–1337 nm)
Pass-band insertion loss	≤1.1 dB	≤1.1 dB
Reflect-band insertion loss	≤0.7 dB	≤0.7 dB
TISO at reflect band	≥50 dB	≥50 dB
RISO at pass band	≥15 dB	≥15 dB
Ripple	≤0.5 dB	≤0.5 dB
Polarization-dependent loss	≤0.15 dB	≤0.15 dB
Return loss / Directivity	≥45 dB / ≥50 dB	≥45 dB / ≥50 dB

Same-Direction Fiber Routing for Easier Integration

All three fiber leads exit from the same side of the Φ3.0 × 15 mm stainless-steel package. This same-direction pigtail design simplifies fiber coiling and internal routing, reduces fiber crossing and helps equipment manufacturers organize optical paths within limited assembly space.

Combined with G657B3 bend-insensitive fiber and 0.6 mm loose-tube protection, the Ref-FWDM is particularly suitable for compact optical transceiver assemblies, wavelength-monitoring modules and other space-constrained optical equipment.

Why Reflective High Isolation Matters

In optical transceivers, wavelength-monitoring assemblies and bidirectional transmission systems, insufficient wavelength isolation can allow unwanted optical power to enter the wrong path. The result may be increased crosstalk, receiver interference and reduced system margin.

A high-isolation reflective FWDM provides more effective wavelength separation while retaining a compact passive structure. Production consistency depends on controlling the reflected beam angle, focal position, coupling alignment and post-packaging spectral response—not simply selecting a nominally suitable filter.

Figure 2. Measured spectral response of the Ref-FWDM sample (August 19, 2026). With the broadband source at approximately −30 dBm and the OSA measurement floor at approximately −80 dBm, the available system dynamic range is about 50 dB. The rejected-band signal reaches the measurement floor; therefore the result confirms isolation of at least 50 dB, while the exact higher isolation value cannot be resolved by this setup.

Manufacturing and Test Control

Gracyfiber combines thin-film filter selection, micro-optical alignment, precision assembly and full optical testing to manufacture Ref-FWDM devices with controlled reflected-band isolation and insertion-loss performance.

- Spectral verification of pass and reflect wavelength bands
- Insertion-loss and isolation testing for both optical paths
- Return-loss, directivity and polarization-dependent-loss evaluation
- Mechanical inspection of the receptacle, LC ferrules, pigtails and compact package
- Customized test criteria according to the equipment-level application

Customization Options

In addition to the standard 1310/1550 nm design, Gracyfiber can support customized Ref-FWDM configurations, including:

- Alternative pass and reflect wavelength bands
- Customized passband width and isolation requirements
- Receptacle, LC ferrule or fiber-pigtail interfaces
- G657, SMF-28 or other application-specific fiber types
- Customized pigtail length, protection tube and same-direction routing layout
- Compact stainless-steel or equipment-specific mechanical packages
- Commercial or extended operating-temperature requirements

A Production-Ready Option for Equipment Manufacturers

For optical transceiver manufacturers, passive optical component suppliers and system integrators seeking compact wavelength separation with enhanced reflected-band isolation, Gracyfiber's Ref-FWDM provides a configurable, production-oriented solution.

Contact Gracyfiber to discuss your wavelength plan, optical interface, package dimensions, fiber-routing requirements and target isolation performance.