

Why a Thin Film Tunable Filter?

Thin film filters have been widely used to multiplex and demultiplex wavelength channels for years because they

- transmit and reflect signals without distorting signals or affecting the bit error rate
- are very stable over a wide temperature range
- have low insertion loss
- have high isolation

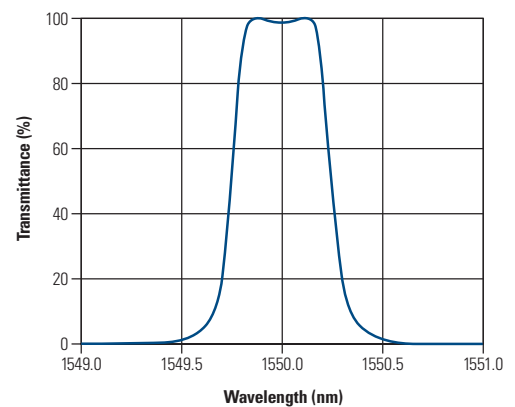
Fixed thin film filters represent a well-understood and established technology. The single channel devices provide flexibility and low upfront cost when compared to multiple channel devices.

Standard thin-film filters are limited to one fixed wavelength, requiring service providers to inventory as many filters as channel wavelengths necessary for a network. This increases inventory costs, and requires manual reconfiguration for any necessary network changes.

Through innovative thin-film and device architecture design, the Micron Optics Chameleon Thin Film Tunable Filter (CTF-TF) enables continuous tuning over the S-, C- or L- band to simultaneously select a designated channel and capture the express (reflected) channels with very low insertion loss and high adjacent channel isolation. The CTF-TF enables dynamic network reconfiguration and embedded network monitoring.

Figure 1

Typical Thin-Film Filter Passband Plot



Advantages of Chameleon Tunable Filter Technology

The CTF offers many advantages to optical designers:

• Flat-topped bandpass with steep band-edges

The CTF exhibits a flat-topped bandpass and steep band-edges, allowing the selection of a channel without distorting the signal or degrading the bit error rate.

As the entire signal is selected, peak power measurements are independent of modulation formats. In optical performance monitor applications, the sharp adjacent channel rejection allows more accurate optical signal to noise ratio measurements without the need for deconvolution measurement.

Advantages of Thin Film Tunable Filters

- **Polarization insensitive angle-tuned thin film filters**

The CTF is a break-through technology that exhibits polarization-insensitive angle tuning properties across S-, C- and L- band. Conventional angle-tuned thin film filters use expensive and complex diversity optics to overcome the divergence of S- and P-polarization bandpasses. Micron Optics has designed thin film filters where the S- and P-polarization bandpasses track one another across the band. Conventional designs, materials and manufacturing processes are used, resulting in rugged, reliable, and inexpensive filters.

Figure 2

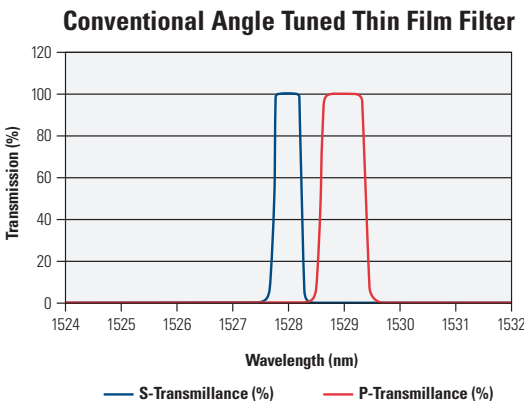
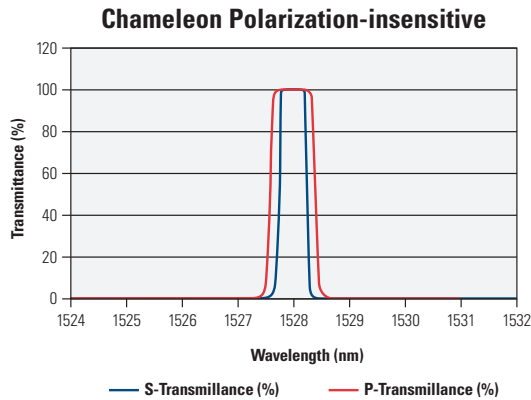


Figure 3



- **Self-calibration**

The CTF can tune to a specific wavelength very accurately and with high repeatability without using a wavelength reference. The filters can be rapidly tuned as quickly as 100 ms across the C- band.

- **Able to capture reflected wavelengths**

Conventional tunable thin film filters could not capture the express wavelengths that are reflected by the filters, thus limiting their use for dynamic re-configuration and test and measurement. The CTF uses innovative architecture, enabling the realization of tunable 3-port add or drop filters, and 4-port add and drop filters.

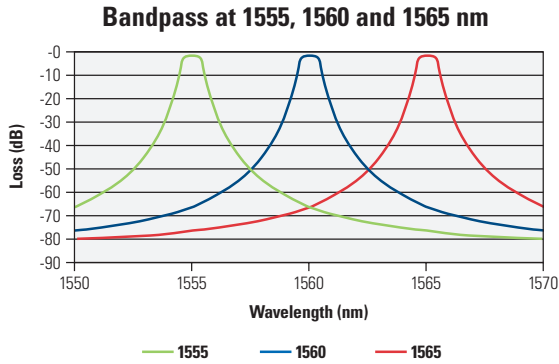
- **Flat-topped bandpass allows any channel to be selected without degrading the signal**

The CTF can tune any channel in the C or L-band without degrading the bit error rate.

- **Customization and adaptability**

The CTF is customizable and adaptable to a wide range of products, from tunable add/drops to performance monitors. The CTF can be customized engineered to meet a wide range of specifications and uses.

Figure 4



The bandpass shape does not change as the Chameleon Thin Tunable Filter is tuned from 1520 to 1570 as Figure 4 shows.

Figure 5

