

Flat-Top Comb Filters

Optoplex provides customized **flat-top optical comb filter** based on its **optical interleaver** technology. In contrast with traditional Fabry-Perot cavity-based comb filter, Optoplex's **comb filter** is capable of transmitting modulated DWDM signals with its passband width available anywhere down to a few GHz. Both the filter channel spacing (FSR) and filter duty cycle (3-dB bandwidth to FSR ratio) can be specified by customers. Based on Optoplex's patented technologies of micro-optics and phase modulation through thin-film coating, the flat-top comb filter is a purely passive device characterized by minimal temperature dependence, flat-top passband, high channel isolation, low PDL, and uniform insertion loss. The product is Telcordia GR-1221 qualified.

Features

- Wide and Flat Passband
- Minimal PDL
- High Isolation
- Minimal Thermal Drift
- Low and Customizable Dispersion
- Dual C- and L-Band Coverage
- Telcordia GR-1221/63 Qualified

Applications

- Noise Suppression in DWDM System
- Reshape Signal Passband
- Optical Ruler in DWDM System
- Passband Reduction of Signals with High Modulation Rate

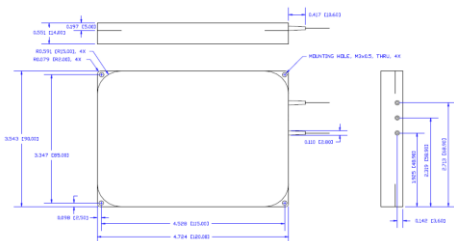
Parameter	Symbol	Unit	Type-S: Standard					Type-D: Dual-Stage Design				
			200GHz	100GHz	50GHz	25GHz	12.5GHz	200GHz	100GHz	50GHz	25GHz	12.5GHz
Operating Wavelength Range		nm	C-B, L, C+L, or O-Band					C-B, L, C+L, or O-Band				
Free-Spectral Range	FSR	GHz	200	100	50	25	12.5	200	100	50	25	12.5
Passband Width @0.5dB	BW ₁	GHz	76	36	18	9	4.5	75	35	17	8	4
Passband Width @ 1.0 dB	BW ₁	GHz	82	42	22	11	5	80	40	20	10	4.5
Passband Width @ 3.0 dB	BW ₃	GHz	95	47	23	11.5	5.5	93	45	22	11	5
Passband Width @ 10 dB	BW ₁₀	GHz	120	60	30	15	7.5	105	50	27	13	6.5
Passband Width @ 20 dB	BW ₂₀	GHz	140	70	35	20	10	120	60	30	15	8
Passband Width @ 30 dB	BW ₃₀	GHz	N/A	N/A	N/A	N/A	N/A	135	65	33	17	10
Passband Width @ 40 dB	BW ₄₀	GHz	N/A	N/A	N/A	N/A	N/A	145	70	35	20	12
Spectral Peak Alignment		GHz	ITU, or customer specific					ITU, or customer specific				
Channel Center Frequency Error (CCFE)	CCFE	GHz	+/-1.0	+/-1.0	+/-0.75	+/-0.5	+/-0.5	+/-1.0	+/-1.0	+/-0.75	+/-0.5	+/-0.5
Peak Insertion Loss	IL	dB	2	2.2	2.2	2.5	2.5	4	4.2	4.2	4.5	4.5
IL Uniformity	dIL	dB	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Peak-to-Valley Isolation	ISO	dB	>20	>20	>20	>20	>20	>40	>40	>40	>40	>40
PDL	PDL	dB	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Return Loss	ORL	dB	>40	>40	>40	>40	>40	>40	>40	>40	>40	>40

Parameter	Symbol	Unit	Type-A: Special Design				
			200GHz	100GHz	50GHz	25GHz	12.5GHz
Operating Wavelength Range		nm	C-B, L, C+L, or O-Band				
Free-Spectral Range	FSR	GHz	200	100	50	25	12.5
Passband Width @0.5dB	BW ₁	GHz	20	10	4.5	2	1
Passband Width @ 1.0 dB	BW ₁	GHz	25	12	6.0	3	1.5
Passband Width @ 3.0 dB	BW ₃	GHz	43	21	10	5	2.5
Passband Width @ 10 dB	BW ₁₀	GHz	60	30	15	8	4
Passband Width @ 20 dB	BW ₂₀	GHz	90	45	22	12	7
Passband Width @ 30 dB	BW ₂₀	GHz	N/A	N/A	N/A	N/A	N/A
Passband Width @ 40 dB	BW ₂₀	GHz	N/A	N/A	N/A	N/A	N/A
Spectral Peak Alignment		GHz	ITU, or customer specific				
Channel Center Frequency Error (CCFE)	CCFE	GHz	+/-1.0	+/-1.0	+/-0.75	+/-0.5	+/-0.5
Peak Insertion Loss	IL	dB	4.0	4.0	4.0	4.5	4.5
IL Uniformity	dIL	dB	0.7	0.7	0.7	0.7	0.7
Peak-to-Valley Isolation	ISO	dB	>20	>20	>20	>20	>20
PDL ¹	PDL	dB	<0.3	<0.3	<0.3	<0.3	<0.3
Return Loss ¹		dB	>40	>40	>40	>40	>40

Fomb Filter Device



Comb Filter Module



Comb Filter vs. F-P Etalon Filter

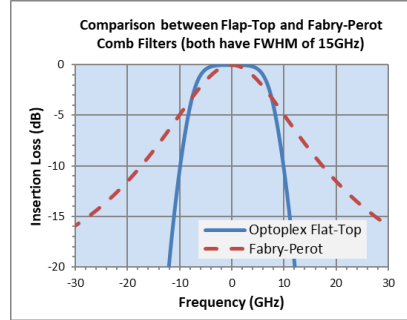
Both filters are periodic optical filters. The periodicity is defined by the channel spacing or called free-spectral-range (FSR). Etalon has a gaussian-like spectral top, while Optoplex's comb filter has a flat-top and much-square-like spectral shape that offers much better peak-to-valley isolation (or contrast ratio, or side-band rejection ratio). See the Figure at the right.

Types of Comb Filter Designs

- Type-S: A standard design offers about 20 ~ 25dB isolation
- Type-D: A Dual-Stage design of the standard one (Type-S), offers almost 2X isolation. Due to dual-stage design, the package form is only in Module.
- Type-A: A special design (Optoplex's proprietary technology) that offers 2X narrower 3dB Bandwidth of the standard one.

Custom Design

- Bandwidth: based on Type-A design, Optoplex's has the special expertise to custom design and make the comb filter to tailor the bandwidth to meet customer specific requirement.
- Slope: Optoplex has special expertise to design the comb filter with very steep slope and/or very high isolation. This is particularly useful in application such as optical sensing (Rayleigh, Raman or Stokes) where the signal is very weak (compared to the excitation laser) and very close to the excitation laser.



Type-S: Standard	Type-D: Dual Stage	Type-A: Special Design
<p>50GHz Comb Filter: Type-S</p>	<p>50GHz Comb Filter: Type-D</p>	<p>50GHz Comb Filter: Type-A</p>
<p>50GHz Comb Filter: Type-S</p>	<p>50GHz Comb Filter: Type-D</p>	<p>50GHz Comb Filter: Type-A</p>
<p>Optoplex can custom design special comb filter with very steep slope to separate two signals very close to each other, and/or with very high rejection ratio (60 ~ 80dB) such that very weak signal can be detected easily.</p>	<p>Super Rayleigh Filter, C034</p>	<p>Super Rayleigh Filter, C036</p>
<p>Product Ordering Information:</p> <p>CF - </p> <p>Band C = C-Band L = L-Band T = C+L Band Q = O-Band</p> <p>Channel Spacing 0 = 25 GHz 1 = 50 GHz 2 = 100 GHz 3 = 200 GHz A = 12.5 GHz B = 37.5 GHz T = 33.3 GHz U = 66.7 GHz</p> <p>Design S = Standard D = Std., Dual-Stage A = Special</p> <p>Package Type C = Compact B = Box</p> <p>Specification S = SM Fiber P = PM Fiber</p> <p>Connector Type FC = FC/UPC FA = FC/APC LC = LC/UPC SC = SC/UPC MU = MU/UPC XX = No connector</p>	<p>Super Slope Filter</p> <p>Slope (-10dB ~ -60dB): 79048/nm or 6.2548/GHz</p>	<p>Super Comb Filter</p>

For special requirements on comb filter, please contact Optoplex at sales@optoplex.com.

Or call + 1 (510) 490-9930