1x4 Fiber Optic Fused Coupler 350 – 2400nm

(single mode, PM)

DATASHEET

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This FC Series fiber optic coupler provides monolithically integrated 1x4 function in a compact format. It features good uniformity, low excess loss and very low polarization sensitivity. The device is ideal for splitting or combining light with exceptional performance over a wide wavelength range.

Couplers are highly efficient in splitting light with little loss, about 0.2dB per joint, but incur significant losses when combining lights; for example, a 50/50 coupler produces a 50% loss to each beam when combined. For beam-combining applications, search Combiner.

Features

- Low Excess Loss
- High Power
- Highly Stable & Reliable
- Low Cost

Applications

- Sensor
- Instrument

Specifications

Parameter		Min	Typical	Max	Unit
Center Wavelength		350		2400	nm
Coupling Ratio			1/25		
Polarization Dependent Loss			0.15		dB
Polarization Mode Dispersion (PM)			> 18		dB
Bandwidth [1]			± 40		nm
Excess Loss [2]	1310,1550 nm		≤ 7.0		dB
	980~1060 nm		≤ 7.2		dB
Uniformity			1		dB
Directivity			> 55		dB
Return Loss [3]			> 55		dB
Optical Power Handling [4]			< 1		W
Operating Temperature		-40		85	°C
Storage Temperature		-50		85	°C
Package		(L)98 x (W)16 x (H)9 Box			

Notes:

[1]. For 1310-1550nm. Dual Band 1310/1550 and Triple Band 1310/1490/1550 available

[2]. Without connector. Each connector adds 0.3dB and 0.5dB for short wavelength

[3]. Without connector. Each connector adds 5dB

[4]. 10W version is available

Note: The specifications provided are for general applications with a cost-effective approach. If you need to narrow or expand the tolerance, coverage, limit, or qualifications, please [click this link]:

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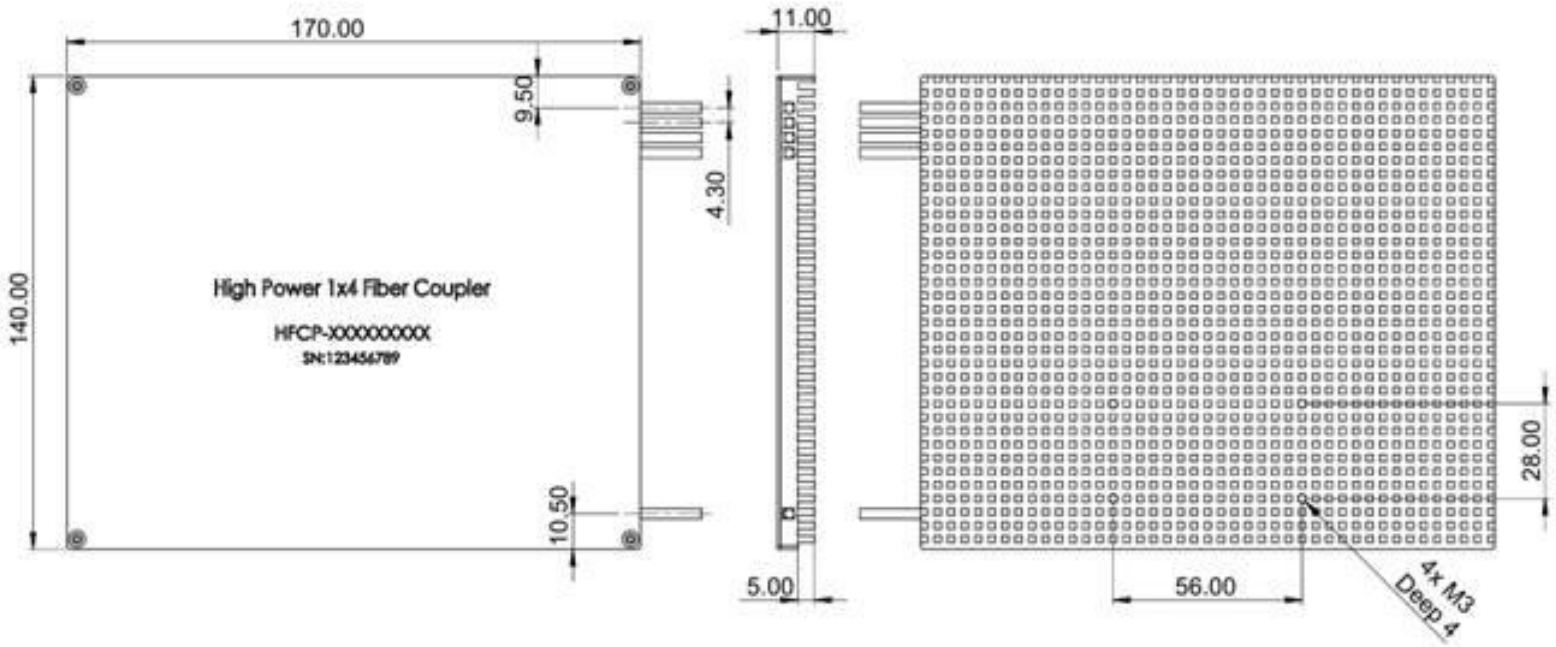
Mechanical Dimensions – inch (mm)



*Product dimensions may change without notice. This is sometimes required for non-standard specifications.

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Ordering Information (Part Number)

	☐	☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Wavelength**	**Grade**	**Package**	**Power**	**Port**	**Fiber Type**	**Fiber Cover**	**Fiber Length**	**Connector [2]**
FCSM-	1060 = 1 1310 = 3 1550 = 5 980 = 9 1310&1550 = D 1310/1410/1550 = T Special = 0	Standard = 1 Aerospace [1] = A Special = 0	Box = 9 Special = 0	1W = 1 10W = 2	1x4 = 1	SM28= 1 SM1950 = 3 PM1550 = 2 PM980 = 9 PM850 = 8 PM400 = 4 Special = 0	900µm = 3 Special = 0	0.5m = 1 0.25m = 2 1m = 3 1.5m = 4 2m = 5 Special = 0	None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 Special = 0

[1]. Aerospace-grade package featuring an aluminum metal casing filled with a specially formulated RTV compound that is both vibration-resistant and thermally conductive, specifically designed to endure repeated thermal shock cycles from -45°C to 90°C.
[2]. The default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer may remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SMF-28 fiber and decreases further for smaller-core fibers.

Note:

- **PM1550** fiber works well for **1310nm**

Application Notes

Fiber Core Alignment
Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness
Fibers with smaller core diameters (<5 µm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power
Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.

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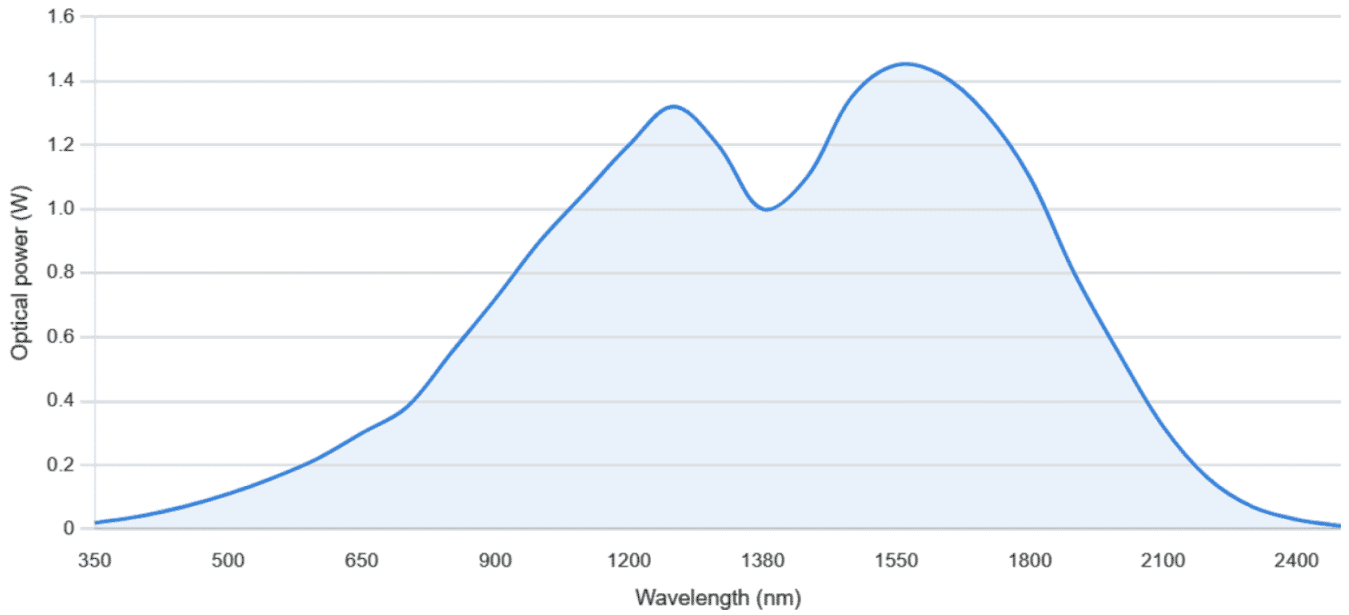
Regular Single Mode / Polarization Maintaining Fiber Optical Power Handing vs Wavelength



Single mode fiber optical power is limited by nonlinear effects in addition to absorption that increase loss and generate heat. The curve shows the approximate safe CW power envelope for standard single-mode fiber. Actual limits depend on fiber design, core size, length, and laser characteristics. Specialty fibers can significantly increase the power limit.

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