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ONE-STOP SHOP FOR FIBER LASER COMPONENTS





NO.1 CHOICE OF 600
LASER COMPANIES AND INSTITUTES

COMPANY

Advanced Fiber Resources (AFR), established in 2000, is one of the industry's leading suppliers of optical passive components. With its strong R&D and design capabilities, high efficient manufacturing process and strict quality control, AFR designs and manufactures both standard and custom components, and provide contract manufacturing solutions to our customers. Our customer base includes fiber laser, telecom, data center, fiber sensing, autonomy, biomedical equipment manufacturers, as well as research institutes and universities around the globe. AFR's products have been sold to customers in more than 40 countries and regions worldwide.



20
Years History



2017
IPO in China



1000+
Employees



325,000
Sq-ft Floor Space



68
Patents



40+
Countries and Regions

QUALITY

At AFR, quality is our top priority and an integral part of everything we do. The product quality management covers from product development, supply chain management, manufacturing to after-sales. AFR's quality management system fulfills the requirements of ISO9001: 2015, and most products are certified with Telcordia GR-1221-CORE reliability test.

The company currently has 6 professional laboratories and equipped with many high precision instruments, to ensure excellent reliability of our products. We have built an optical surface processing center and a machining center, producing crystals, mirrors, PBS, other flat surface optics and mechanical components in-house, the key material production capability makes us more competitive.

We strive to continuously improve our products with proactive, data driven, quality first systems and processes.



ONE-STOP SHOP
FOR FIBER LASER COMPONENTS

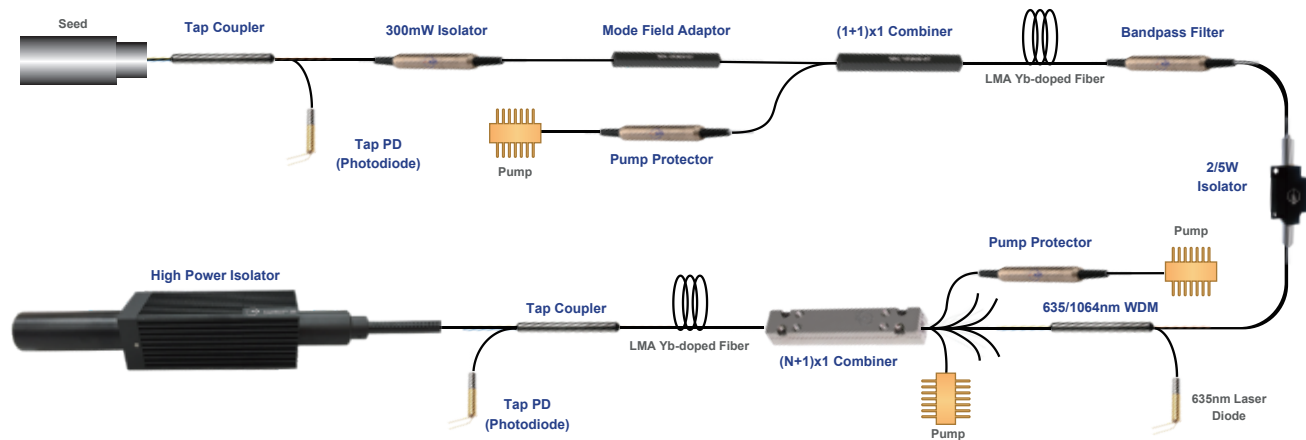
With an extensive range of products in its portfolio, AFR provides one-stop shop of passive optical components with superior performance at reasonable cost.

AFR has more than 20 years of product customization experience, resulting in around 20,000 subdivided products. With our customization and design experience, we can customize wavelength, power handling, fiber type, beam diameter, aperture, package size and any other parameters to suit your specific needs.

Isolator Series	Combiner Series	FBG and Laser Cable	MFA and CPS	Others
 In-line Isolator	 Pump Combiner	 Fiber Bragg Grating	 Mode Field Adaptor	 Coupler
 Fiber to Free Space Isolator	 Pump & Signal Combiner	 Dragon™ Fiber Laser Cable	 Cladding Power Stripper	 WDM
 Free Space Isolator	 Laser Combiner Module			 Bandpass Filter
				 Collimator
				 Photodiode



PULSED LASERS APPLICATION



AFR Components for Pulsed Lasers

- Isolators

In-line Isolator	Typ. Isolation	Typ. Insertion Loss	
1030/1064nm 300mW-200W	35dB	0.5dB	
2000nm 300mW-20W	35dB	0.8dB	
Fiber to Free Space Isolator	Beam Diameter	Typ. Isolation	Typ. Insertion Loss
1030/1064nm 20W-500W	7mm (standard) specified	35dB	0.4dB
2000nm 20/30W	7mm (standard) specified	35dB	0.6dB

- (N+1)x1 Pump & Signal Combiner
- 635/1064nm Fused WDM
- Photodiode
- Mode Field Adaptor
- Bandpass Filter

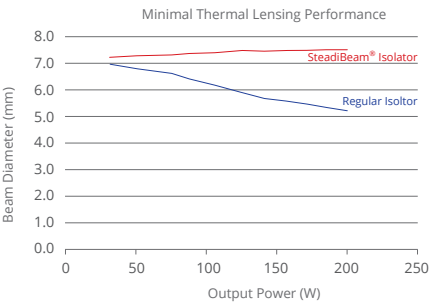
We can customize wavelength, power handling, fiber type, beam diameter, aperture, package size and any other parameters to suit your specific needs.



FEATURED PRODUCTS FOR PULSED LASERS

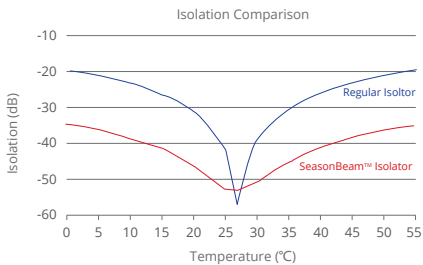
200W SteadiBeam® Fiber Laser Isolator

Parameter	Unit	Value
Center wavelength (λc)	nm	1064, specified
Max. insertion loss at 30 °C, at λc	dB	0.5
Typ. isolation at 30 °C, at λc	dB	38
Min. isolation at 30 °C, at λc	dB	30
Min. isolation at all temperature, at λc	dB	20
Min. return loss	dB	50
Nominal output beam diameter (1/e²)	mm	6.5 ± 0.5
Beam diameter change with power	µm/W	< 3
Storage temperature (non-condensing condition)	°C	-10 to +60
Beam circularity	%	> 90
M² degradation	%	< 10
Max. average optical power	W	200
Max. peak power for ns pulse	kW	30
Reverse power handling	W	50W (3 min Max.)
Fiber types		Specified by ordering info
Operating temperature	°C	10 to +50



100W SeasonBeam™ - Temperature Insensitive Fiber Laser Isolator

Parameter	Unit	Value
Center wavelength (λc)	nm	1064, specified
Max. insertion loss at 23 °C, at λc	dB	0.5
Max. insertion loss at all temperature	dB	0.5
Typ. Isolation, λc, 23 °C	dB	40
Min. isolation at 23 °C, all polarization states, at λc	dB	35
Min. isolation at all temperature, λc all polarization states	dB	30
Min. return loss	dB	50
Nominal output beam diameter (1/e²)	mm	7.0 ± 0.5
Beam circularity	%	> 90
M² degradation	%	< 10
Max. average optical power	W	20-100
Max. peak power for ns pulse	kW	35
Fiber type (input port)		Specified by ordering info
Operating temperature	°C	0 to +55
Storage temperature	°C	-20 to +70



1064nm 100/200W In-line Isolator

Parameter	Unit	Value	
Center wavelength (λ_c)	nm	1064, specified	
Min. isolation, λ_c , 23 °C, all polarization states	dB	28	
Typ. insertion Loss, 23 °C	dB	0.4	0.6
Max. insertion Loss, 23 °C	dB	0.5	0.8
Min. return loss	dB	50	
Max. average optical power	W	200	50 or 100
Max. peak power for ns pulse	kW	30	20
Fiber type		Specified by ordering info	
Operating temperature	°C	10 to +50	
Storage temperature	°C	0 to +60	



1064nm 20W Fiber to Free Space Isolator

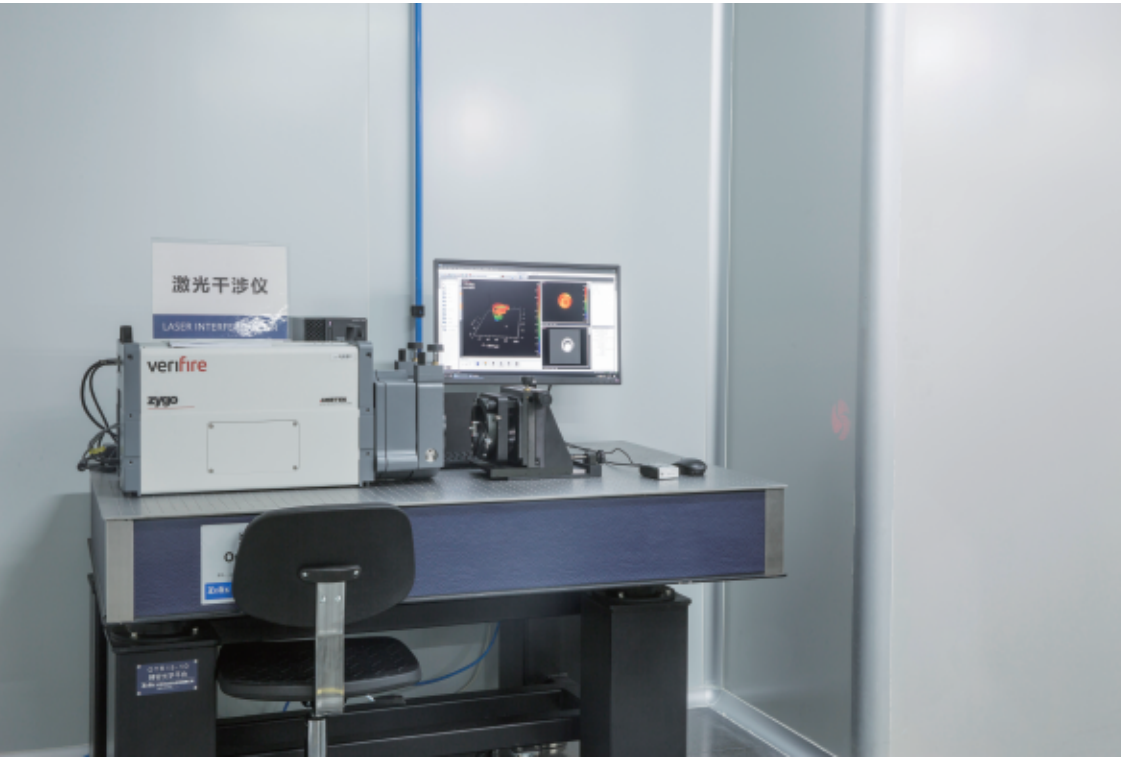
Parameter	Unit	Value
Center wavelength (λc)	nm	1064, specified
Typ. peak isolation	dB	35
Min. isolation at 23 °C, λc all polarization states	dB	28
Max. insertion loss at 23 °C, λc	dB	0.4
Max. polarization dependent loss	dB	0.1
M² degradation	%	< 10
Beam roundness	%	> 90
Min. return loss	dB	55
Max. average optical power	W	20
Max. peak power for ns pulse	kW	10
Fiber type (input port)		Specified by ordering info
Fiber type (output port)		Free Space
Nominal output beam diameter (1/e²)	mm	6.0 ± 0.5
Operating temperature	°C	10 to +50
Storage temperature	°C	0 to +60



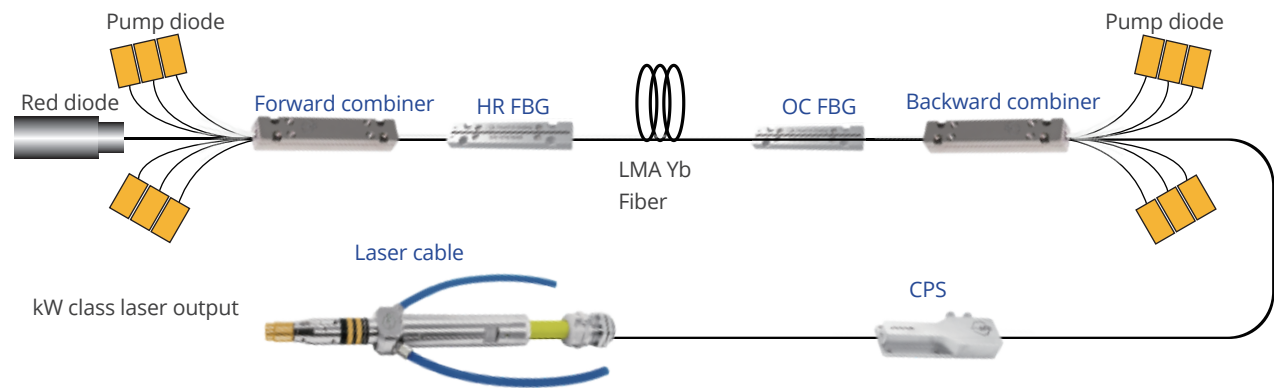
2kW (N+1)×1 Pump & Signal Combiner



Parameter	Unit	Value	
Product type		(2+1) × 1	(6+1) × 1
Fiber type for input (pump channel)		220/242,NA 0.22	105/125,NA 0.22
Fiber type for input (signal channel)		Nufern LMA-GDF 30/250	HI 1060
Fiber type for output		Nufern LMA-GDF-30/250	Nufern LMA-GDF-20/400
Pump wavelength range	nm	915-980	
Signal wavelength	nm	650, 1064 or 1080	
Max. combined power	W	2000	
Max. signal channel insertion loss	dB	0.8	
Typ. pump efficiency	%	98	
Min. pump efficiency	%	96	
Package dimensions	mm	100 (L) × 15 (W) × 10 (H)	
Heatsink temperature	℃	5 to 40	
Storage temperature	℃	-40 to +85	



CONTINUOUS WAVE LASERS APPLICATION



AFR Components for CW Lasers

Combiner Series

Product	Handling Power	Pump Efficiency	Pump/Laser Number
(N+1)×1 Forward Pump Combiner	Up to 3kW	>98%	≤36, specified
(N+1)×1 Backward Pump Combiner	Up to 3kW	>98%	6, specified
Nx1 Laser Combiner	Up to 10kW	>98%	≤19, specified

Others

Product	Handling Power	Center Wavelength
High Power Laser Cable	Up to 10kW	1080nm, specified
Cladding Power Stripper	Up to 800W	
High Power Fiber Bragg Grating	Up to 3kW	1018, 1080, 1917, 1030, 1064, 1070, 1925,1939nm, specified

We can customize wavelength, power handling, fiber type, beam diameter, aperture, package size and any other parameters to suit your specific needs.

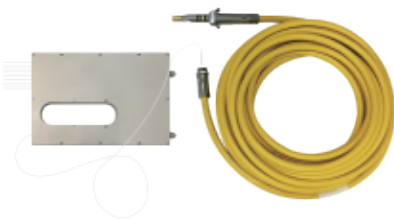
FEATURED PRODUCTS FOR CONTINUOUS WAVE LASERS

10kW (N+1)x1 Laser Combiner Module

Parameter	Unit	Value
Product type		(N+1)×1/Nx1
Operation wavelength range	nm	1060-1080
Input fiber type		LMA-GDF-14/250-M or LMA GDF 20/400-M
Red beam fiber type		HI 1060 or LMA-GDF-10/125-M
Output fiber type*		100/120/360, 50/70/360
Max. input power handling per port	W	3000
Backward power handing	W	1000
Output fiber length**	m	2
Armor cable length	m	20
Min. combining efficiency	%	97
Typ. combining efficiency	%	98
Package dimensions	mm	303 (L) × 203 (W) × 27 (H)

* Other fiber options available

* For Dragon™ output option, it is the fiber length between the combiner package and the armor cable.



6kW N×1 Pump Combiner with Dragon™ Laser Cable

Parameter	Unit	Value
Product type*		N × 1
Fiber type for input*		105/125 or 135/155, NA=0.22
Fiber type for output*		MM-S400/480-22FA, MM-S600/660-22FA
Pump wavelength range	nm	915 or 976
Max. combined power	W	6000
Output fiber length** tolerance	m	± 0.3
Typ. pump efficiency	%	98
Min. pump efficiency	%	96
Package dimensions	mm	160 (L) × 30 (W) × 12 (H)
Operating temperature	℃	required attachment to water cooling plate
Storage temperature	℃	-20 to +70

* Typically, the combiner should be designed with a brightness ratio smaller than 1.

** The fiber length between the combiner package and the armor cable



Dragon™ 10kW Laser Cable

Optical Parameter	Unit	Value		
Operation wavelength	nm	900 - 1100, specified		
Fiber core diameter	μm	20 - 400		
Numerical aperture (NA)	-	≤ 0.22		
Max. transmission loss	%	2		
Max. power handling	kW	3	6	10
Max. stripping cladding power	W	500		
Backward power handling	W	500		
Max. Z-position tolerance	μm	50		
Fiber concentricity	μm	≤ 50		
Max. angular deviation	mrad	20		

Cooling Water Requirements	Unit	Value
Max. water pressure	L/min	1.5-3.0
Water temperature	Mpa	0.8
Flow rate	℃	10-25
Water PH value	-	5.6-7.9
Water hose diameter	mm	ID/OD=4/6

Others	Unit	Value
Mechanical interface	-	Compatible with the Standard QBH Interface
Armor cable diameter	mm	13.3
Storage Temperature	℃	-20 to +70



19XXnm ClearCut™ Fiber Bragg Grating

Parameter	Unit	Value	
Center wavelength	nm	1917, 1925, 1939	
Tolerance on center wavelength	nm	1.0	
Max. wavelength mismatch (OC relative HR)	nm	0.2	
High reflector (HR) / output coupler (OC)		HR	OC
Peak reflectivity	%	≥99.0	(5.0 - 30.0) ± 2.0
Reflection bandwidth at 95%	nm	1.5~3.0	
Reflection bandwidth at 50%	nm		0.5~1.0
Tolerance on reflection bandwidth	nm	0.1~0.3	0.1
Min. side mode suppression ratio	dB	20	10
Min. core signal power handling	W	100	
Min. clad pump power handling	W	200	
Fiber type		PM or Non-PM	
Package dimensions	mm	60 (L) × 12 (W) × 5 (H)	
Cooling bottom plate temperature	℃	≤25	
Storage temperature	℃	-40 to +85	



High Power ClearCut™ Fiber Bragg Grating



Parameter	Unit	Value			
Center wavelength	nm	1030,1064,1070,1080			
Tolerance on center wavelength	nm	1.0			
Max. wavelength mismatch (OC Relative HR)	nm	0.2			
High reflector (HR) / output coupler (OC)		HR		OC	
Peak reflectivity	%	≥99.5		(5.0 - 30.0) ± 2.0	
Reflection bandwidth at 95%	nm	1.5~4.0		/	
Reflection bandwidth at 50%	nm	/		0.2~2.0	
Tolerance on reflection bandwidth	nm	0.1~0.4		0.1~0.2	
Min. side mode suppression ratio	dB	20		10	
Fiber core/cladding dimension	μm	10/125	14/250	20/400	25/400
Min. core signal power handling	W	300	800	1500	2000
Min. clad pump power handling	W	450	1200	2000	
Fiber type		PM or Non-PM			
Package dimensions	mm	60 (L) × 12 (W) × 5 (H)			
Cooling bottom plate temperature	℃	≤25			
Storage temperature	℃	-40 to +85			



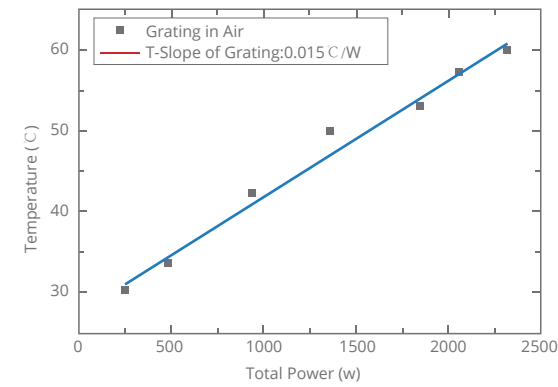
ClearCut™ kW Package-free Fiber Bragg Grating



Parameter	Unit	Value			
Center wavelength	nm	1030,1064,1070,1080			
Tolerance on center wavelength	nm	1.0			
Max. wavelength mismatch (OC relative HR)	nm	0.2			
Temperature slope suspended in air *	℃/W	≤0.02			
High reflector (HR) / output coupler (OC)	/	HR		OC	
Peak reflectivity	%	≥99.0		(5.0 - 30.0) ± 2.0	
Reflection bandwidth at 95%	nm	1.5~4.0		/	
Reflection bandwidth at 50%	nm	/		0.2~2.0	
Tolerance on reflection bandwidth	nm	0.1~0.4		0.1~0.2	
Min. side mode suppression ratio	dB	20		10	
Fiber core/cladding dimension	μm	10/125	14/250	20/400	25/400
Min. core signal power handling **	W	300	800	1500	2000
Min. clad pump power handling	W	450	1200	2000	
Fiber type	/	PM or Non-PM			
Recoating length	mm	40~60			
Storage temperature	℃	-40 to +85			

* Defined by the total power of the signal power in the core and the pump power in the cladding.

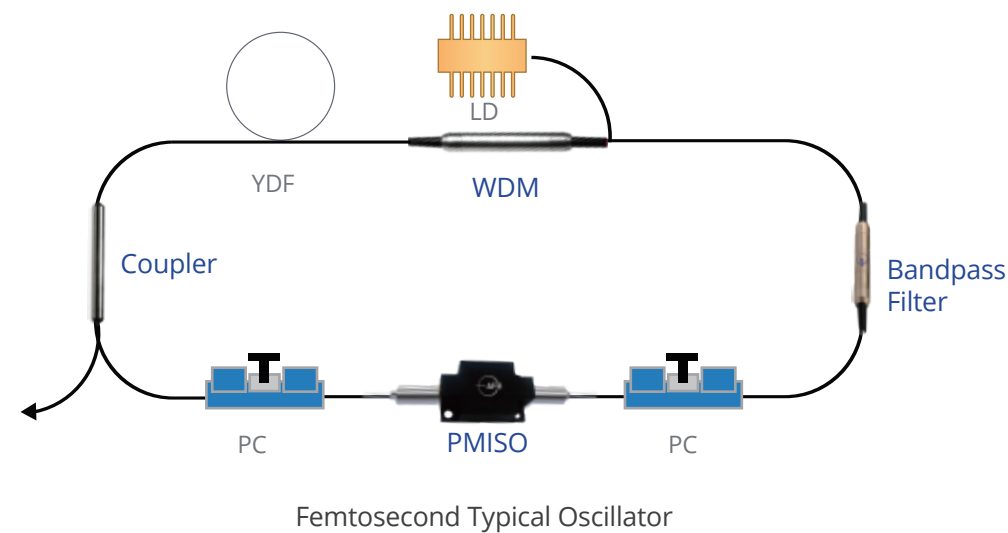
** The grating area should be kept on active cooling plates of ≤25 ℃.



Total power: the signal power in the core and the pump power in the cladding. The output slope efficiency is about 70%.

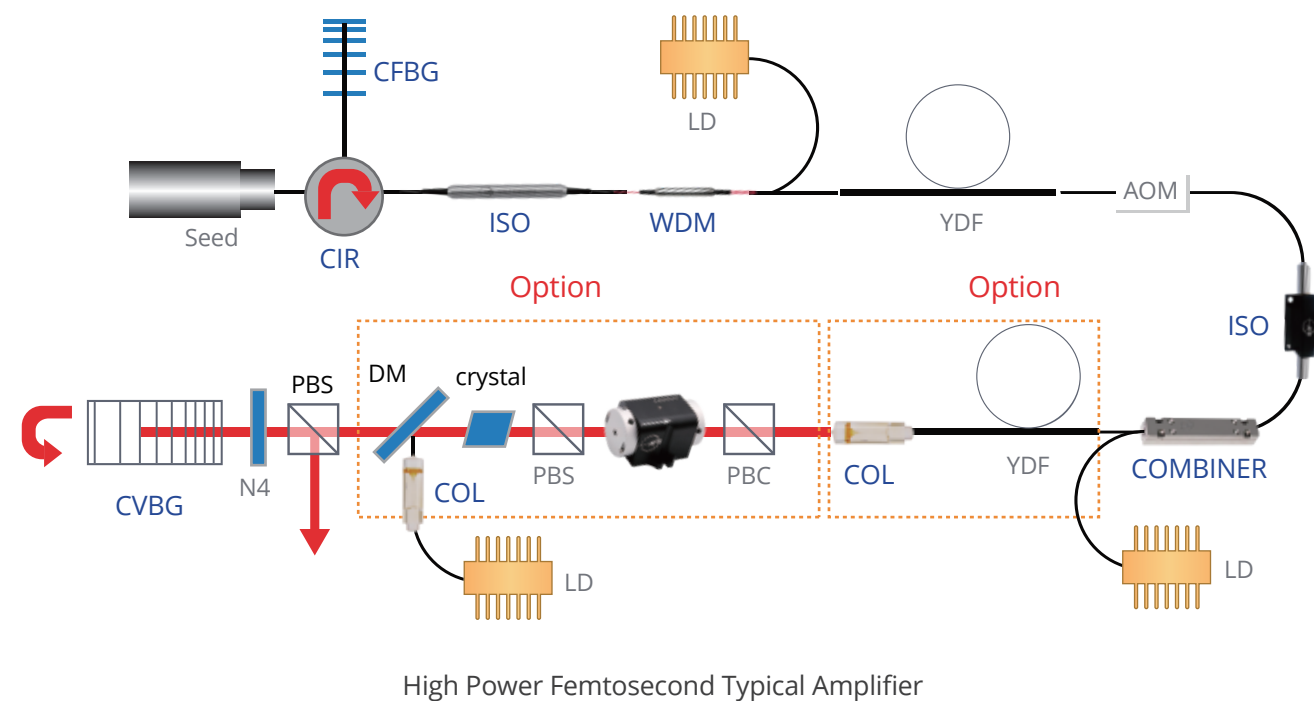
Measurement condition: the grating in the cavity is recoated only and suspended in the air without any active cooling. The environment tempeature is 22-24 ℃.

ULTRA-FAST LASERS APPLICATION



AFR 1030/1064nm Low Power Polarization Maintaining Components for Ultra-Fast Lasers

- WDM • Bandpass Filter • In-line Isolator • Collimator • Coupler
- Fiber Bragg Grating Reflector • Package Ability for SESAM



AFR 1030/1064nm Polarization Maintaining Components for Ultra-Fast Lasers

- 300mW-30W In-line Isolator
- 200W Free Space Isolator
- 300mW-30W Circulator
- 200W Collimator
- 5-10W WDM
- 200W Pump Combiner
- Chirped Fiber Bragg Gratings
- Components with Active Fiber

We can customize wavelength, power handling, fiber type, beam diameter, aperture, package size and any other parameters to suit your specific needs.

FEATURED PRODUCTS FOR ULTRA-FAST LASERS

ClearCut™ Chirped Fiber Bragg Gratings



Parameter	Unit	Value
Center wavelength	nm	1030
Tolerance on center wavelength	nm	0.5
Peak reflectivity	%	> 60
Reflection bandwidth (FWHM)*	nm	1-10
Tolerance on reflection bandwidth	nm	0.1-1.0
D ₂ parameter	ps/nm	112.1, specified
Fiber type		PM 980, specified
Package dimensions	mm	Recoated or Packaged
Storage temperature	°C	-40 to +85

*The FWHM depends on the peak reflectivity

ClearCut™ Fiber Bragg Grating Reflector for Ultrafast Lasers



Parameter	Unit	Value
Center wavelength	nm	1030.0, 1064.3
Tolerance on center wavelength	nm	0.1
Peak reflectivity	%	5~99%
Reflection bandwidth (FWHM)*	nm	0.2~0.7
Tolerance on reflection bandwidth	nm	0.1
Min. core signal power handling	mW	500
Fiber type		PM 980, PM 1060, PM10/125, specified
Package dimensions	mm	Recoated
Storage temperature	°C	-40 to +85

*The FWHM depends on the peak reflectivity

LaseGuard™ Free Space Isolator Series

Parameter	Unit	Value
Center wavelength (λ_c)	nm	Specified by ordering info
Peak transmission	%	> 95
Peak isolation	dB	> 30
Input polarization		Specified by ordering info
Output polarization		Specified by ordering info
Aperture	mm	2.8, 5, 8, 10
Damage threshold		10J / cm2@10ns, 1J / cm2@8ps
Operating temperature	C	10 to 30
Storage temperature	C	-40 to 70



Brochure version: 2020

Every effort has been made to ensure the accuracy of the information contained in this catalog at the time of publication. As part of our policy of continuous product improvement, we reserve the right to change specifications at any time. For the most up-to-date information, please refer to our website.
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