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THORLABS

TFP780A - September 25, 2018

Item # TFP780A was discontinued on September 25, 2018. For informational purposes, this is a copy of the website content at that time and is valid only for the stated product.

TUNABLE LASER GAIN CHIPS WITH THERMOELECTRIC COOLERS

- **Wavelength Ranges Centered at 770, 1050, 1220, 1320, 1450, 1550, or 1900 nm**
- **Broadband Tunability**
- **Thermoelectrically Cooled Half-Butterfly Assembly**

SAF1550S2
Gain Chip in Subassembly

TFP780A
Gain Chip in a Half-Butterfly Assembly

Hide Overview

OVERVIEW

Features

- Gain Chips Mounted for Easy Integration into External Cavity Lasers
- Half-Butterfly Assembly with Thermoelectric Cooler
- AR Coating Eliminates Unwanted Reflections, Increasing Laser Stability, Output Power, and Spectral Quality
- FP Chip Designed for Use in a Free-Space Littman Cavity
- SAF Chips Feature 1.0 m Long (Min), SM or PM Tight Jacket Pigtail with FC/APC Connector

Item #	ASE Center Wavelength	ASE 3 dB Bandwidth	Peak Gain	Gain Ripple
TFP780A	780 nm	30 nm	-	3 dB
SAF1171S	1050 nm	60 nm	30 dB	2.5 dB (Max)
SAF1175S	1220 nm	80 nm	17 dB	0.5 dB
SAF1174S	1320 nm	80 nm	35 dB	0.35 dB
SAF1450S2	1450 nm	100 nm	20 dB	0.4 dB (Max)
SAF1550S2	1550 nm	80 nm	17 dB	0.6 dB (Max)
SAF1550P2	1550 nm	80 nm	17 dB	0.6 dB (Max)
SAF1900S	1900 nm	150 nm	18 dB	1.5 dB

All values are typical, unless otherwise indicated. Please refer to the *Specs* tab for more information. The *Graphs* tab describes the typical performance obtained in an external cavity laser configuration.

Fabry-Perot Gain Chip
Thorlabs' Fabry-Perot Gain Chip (TFP780A) provides a gain medium for light in the 740 - 800 nm spectral range. Optimized for high gain, high power, broad tunability, and minimal mode hopping, this gain chip is mounted in a half-butterfly package that exposes both ends of the gain medium to free space. A thermoelectric cooler (TEC) and thermistor, incorporated into the half-butterfly package and controlled with the easily accessible supplied pins (see the *Graphs* tab), enable tuning and optimization of the operating temperature. Both exposed surfaces of the gain medium are AR coated, virtually eliminating unwanted reflections.

Webpage Features
Clicking this info icon below will open a window that contains item specifications and graphs.

The TFP780A is designed for use in a free-space Littman cavity (see the *Graphs* tab for a schematic). The input and output both couple into free space. This device can also be coupled with a semiconductor optical amplifier to increase its output power. Please contact Tech Support for more information.

SAF Gain Chips
Thorlabs' family of Single-Angled-Facet (SAF) Gain Chips provides a gain medium for light in wavelength ranges centered at 1050, 1220, 1320, 1450, 1550, or 1900 nm. These gain chips feature AR coatings, an angled waveguide, and a proven SOA structure, which gives designers of external cavity lasers (ECLs)

the highest power and widest tuning range available on the market. The gain chip is mounted in a half-butterfly package that collimates the output of the normal facet and couples it into an FC/APC connectorized fiber. A thermoelectric cooler (TEC) and thermistor, incorporated into the package and controlled with the easily accessible supplied pins (see the *Graphs* tab), enable tuning and optimization of the operating temperature.

On certain models, we can optionally provide a PM fiber or an optical isolator for the free-space input. Please contact Tech Support for a quote.

Other SAF Gain Chips: Chip on Submount or Heatsink				
1220 nm	1320 nm	1450 nm	1550 / 1590 nm	1650 nm

Hide Specs

SPECS

All quoted values are typical, unless otherwise indicated. Please see the gain chip's Spec Sheet (linked below) for the most detailed information on performance. The *Graphs* tab describes the typical performace obtained in an external cavity laser configuration.

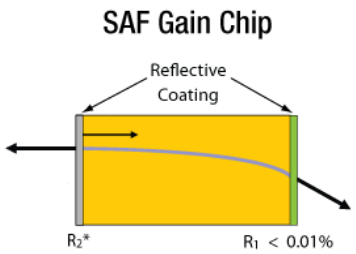
This link opens a document that contains a comprehensive list of performance specifications and performance plots.

General Specifications										
Item #	Spec Sheet	Reference Cavity	CWL[a]	Tuning Range[a, b]	Peak Power[a]	Chip Gain[c]	Gain Ripple	R_1	R_2	Chip Length
TFP780A		TLK-L780M[d]	770 nm	30 nm	50 mW	-	3 dB	0.01%	90%[e]	0.75 mm
SAF1174S		TLK-L1300R[d]	1310 nm	100 nm	50 mW	35 dB	0.35 dB	0.005%	10%[f]	2 mm
SAF1550S2		TLK-L1550R[d]	1550 nm	120 nm	40 mW	17 dB	0.6 dB (Max)	0.005%	10%[f]	1 mm
SAF1550P2		TLK-L1550R[d]	1550 nm	120 nm	40 mW	17 dB	0.6 dB (Max)	0.005%	10%[f]	1 mm

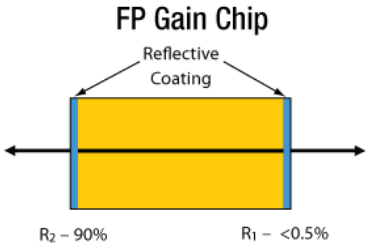
- The values given in the highlighted columns were measured in the specified reference cavity. Different external cavities will produce different performance specifications.
- 10 dB point.
- Single-pass optical gain at center of gain curve.
- This item is no longer available for individual purchase.
- Refer to the FP chip reflectivity diagram below.
- Refer to the SAF chip reflectivity diagram below.

ASE Specifications					
Item #	Center Wavelength (Typ.)	3 dB Bandwidth (Typ.)	ASE Current	Operating Current (Typ.)	Operating Current (Max)
TFP780A	780 nm	30 nm	80 mA (Typ.)	140 mA	180 mA
SAF1174S	1320 nm	80 nm	600 mA (Typ.)	500 mA	800 mA
SAF1550S2	1550 nm	80 nm	300 mA (Typ.)	300 mA	600 mA
SAF1550P2	1550 nm	80 nm	300 mA (Typ.)	300 mA	600 mA

Note: The light polarization is vertical inside the Fabry-Perot Gain Chip, while the light polarization is horizontal inside the SAF Gain Chips.



*R_2 = 10% for all models in the SAF series except the SAF1900S, for which R_2 = 20%.



Hide Graphs

GRAPHS

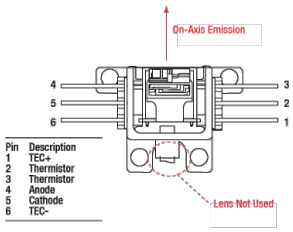
Fabry-Perot Gain Chip Lasing Performance Using Littman Tunable Laser Kit*

The Fabry-Perot (FP) laser diode has the two parallel ends of the semiconductor cleaved atomically flat to produce an oscillating cavity. Laser light is typically emitted through one of these highly reflective edges, using the semiconductor as the gain medium. FP lasers typically lase in a single longitudinal mode and exhibit temperature-dependent tunability over a small range. Since the end facets of the chip form the laser cavity, different longitudinal modes also appear in the emission, broadening the linewidth (100 - 1000 GHz). Given below are the typical TFP780A spectra and details on the packaged devices.

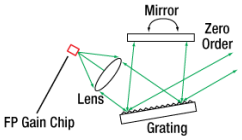
*Our Littman Tunable Laser Kit has been discontinued.

Item #	Center Wavelength	Power vs. Current	Power Spectrum
TFP780A	770 nm		

Fabry-Perot Gain Chip Drawing



Basic Littman Configuration



SAF Gain Chip Lasing Performance Using Littrow Tunable Laser Kit*

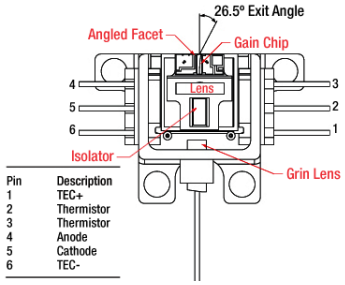
The innovative design of an SAF gain chip is ideal for use in external cavity lasers because it virtually eliminates unwanted feedback from the intracavity facet of the gain chip. These devices offer superior performance in a wide variety of external cavity configurations. Given below are typical spectra and details on the packaged devices.

*Our Littrow Tunable Laser Kit has been discontinued.

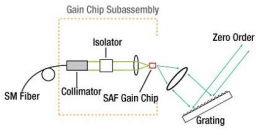
Item #	Center Wavelength	Power vs. Current	Power Spectrum
SAF1171S	1050 nm		
SAF1175S	1220 nm		
SAF1174S[a]	1320 nm		
SAF1450S2	1450 nm		
SAF1550S2	1550 nm		
SAF1550P2	1550 nm		
SAF1900S	1900 nm		

- Please note that the fluctuations in the power spectrum between 1350 and 1380 nm are associated with water vapor absorption.

Fiber-Coupled SAF Gain Chip Drawing



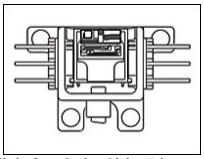
Basic Littrow Configuration



Hide Fabry-Perot Gain Chip

Fabry-Perot Gain Chip

- Designed for Use in a Free-Space Littman Cavity
- Ideal for Broadly Tunable External Cavity Lasers


Click for Gain Chip Diagram

Each Fabry-Perot Gain Chip is individually burned in and rigorously tested to ensure long-term stability and compliance with our specifications. For typical performance characteristics, please see the *Specs* tab. A complete test report will come with each serialized gain chip package.

Click the icon below for more detailed performance specifications.

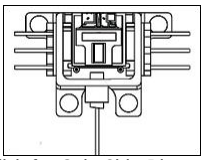
ASE Specifications					
Item #	Info	Center Wavelength (Typ.)	3 dB Bandwidth (Typ.)	ASE Current	Operating Current (Typ./Max)
TFP780A		780 nm	30 nm	80 mA (Typ.)	140 mA/180 mA

Part Number	Description	Price	Availability
TFP780A	**Mounted FP Gain Chip, Half Butterfly Pkg, CWL = 780 nm**	**$2,378.64**	**Lead Time**

Hide SAF Gain Chips

SAF Gain Chips

- Designed for Use in a Littrow Cavity
- 1.0 m Long (Min), SM or PM Tight Jacket Pigtail with FC/APC Connector


Click for Gain Chip Diagram

Thorlabs' SAF Gain Chips are designed for use in wavelength ranges centered at 1050, 1220, 1320, 1450, 1550, or 1900 nm. The models designed for 1220, 1320, 1450, or 1550 nm (SAF1175S, SAF1174S, SAF1450S2, SAF1550S2, and SAF1550P2) feature an optical isolator on the fiber output, protecting the chip against back reflections and increasing laser stability.

Each SAF Gain Chip is individually burned in and rigorously tested to ensure long-term stability and compliance with our specifications. For typical performance characteristics, please see the *Specs* tab. A complete test report will come with each serialized gain chip package.

Click the icon below for more detailed performance specifications.

ASE Specifications					
Item #	Info	Center Wavelength (Typ.)	3 dB Bandwidth (Typ.)	ASE Current	Operating Current (Typ./Max)
SAF1171S		1050 nm	60 nm	150 mA (Max)	- /150 mA
SAF1175S		1220 nm	80 nm	200 mA (Typ.)	200 mA/ -
SAF1174S		1320 nm	80 nm	600 mA (Typ.)	500 mA/800 mA
SAF1450S2		1450 nm	100 nm	500 mA (Max)	-/500 mA
SAF1550S2		1550 nm	80 nm	300 mA (Typ.)	300 mA/600 mA
SAF1550P2		1550 nm	80 nm	300 mA (Typ.)	300 mA/600 mA
SAF1900S		1930 nm	150 nm	400 mA (Typ.)	500 mA/800 mA

Part Number	Description	Price	Availability
SAF1171S	**Mounted SAF Gain Chip, Half Butterfly Pkg, CWL = 1050 nm, SM Fiber**	**$3,233.40**	**3-5 Days**