DATA SHEET

EYP-TPA-0650-00250-2007-CMT02-0000

Revision 1.00

TAPERED AMPLIFIERS
Semiconductor Optical Amplifier

General Product Information

Product	Application
650 nm Tapered Amplifier	Spectroscopy
C-Mount Package	

Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Storage Temperature (non condensing)	T_S	°C	-40		85	Stress in excess of one of the Absolute Maximum Ratings may damage the laser. Please note that a damaging optical power level may occur although the maximum current is not reached. These are stress ratings only, and functional operation at these or any other conditions beyond those indicated under Recommended Operational Conditions is not implied.
Operational Temperature at Case (non cond.)	T_C	°C	0		30	
Forward Current	I_F	A			1	
Reverse Voltage	V_R	V			0	
Output Power	P_{opt}	W			0.3	

Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Operational Temperature at Case	T_C	°C	5	15	20	non condensing
Forward Current	I_F	A			0.75	
Input Power	P_{input}	mW	10		50	
Output Power	P_{opt}	W			0.25	with proper injection from a seed laser

Characteristics at T_{LD} = 15 °C at BOL

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Design Wavelength	λ_C	nm		650		see images on page 4
Gain Width (FWHM)	$\Delta\lambda$	nm		10		
Temperature Coefficient of Wavelength	$d\lambda / dT$	nm / K		0.25		
Operational Current @ P_{opt} = 0.25 W	$I_{op\ Gain}$	A			0.75	with proper injection from a seed laser
Output Power	P_{opt}	W	0.25			
Amplification	G	dB		12		with proper injection from a seed laser
Cavity length	L_C	µm		2000		

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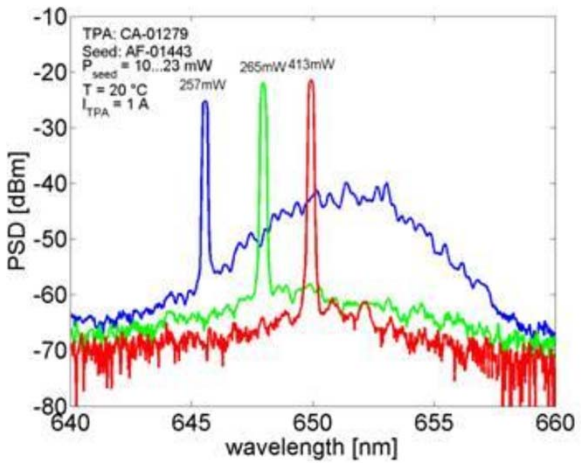
2011-12-08

TAPERED AMPLIFIERS
Semiconductor Optical Amplifier

Characteristics at T_{LD} = 15 °C at BOL cont'd

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Reflectivity at Front Facet	R_{ff}			3·10-4	1·10-3	
Reflectivity at Rear Facet	R_{rf}			3·10-4	1·10-3	
Input Aperture (at rear side)	d_{in}	µm		7.5		
Output Aperture (at front side)	d_{out}	µm		70		
Astigmatism	A	µm		tbd		estimated at recommended maximum forward current
Input Divergence parallel ($1/e^2$)	$\Theta_{in\,\|\|}$	°		tbd		
Input Divergence perpendicular ($1/e^2$)	$\Theta_{in\perp}$	°		tbd		
Output Divergence parallel ($1/e^2$)	$\Theta_{out\,\|\|}$	°		tbd	full angle	
Output Divergence perpendicular ($1/e^2$)	$\Theta_{out\perp}$	°		tbd		full angle
Beam quality factor	M^2					
Polarization				TE		E field parallel to junction plane

Typical Measurement Results



Performance figures, data and any illustrative material provided in this specification are typical and must be specifically confirmed in writing by eagleyard Photonics before they become applicable to any particular order or contract. In accordance with the eagleyard Photonics policy of continuous improvement specifications may change without notice.

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Revision 1.00

2011-12-08

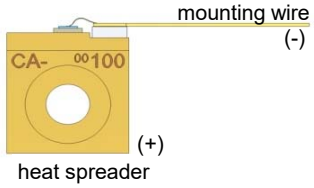
TAPERED AMPLIFIERS
Semiconductor Optical Amplifier

Package Dimensions

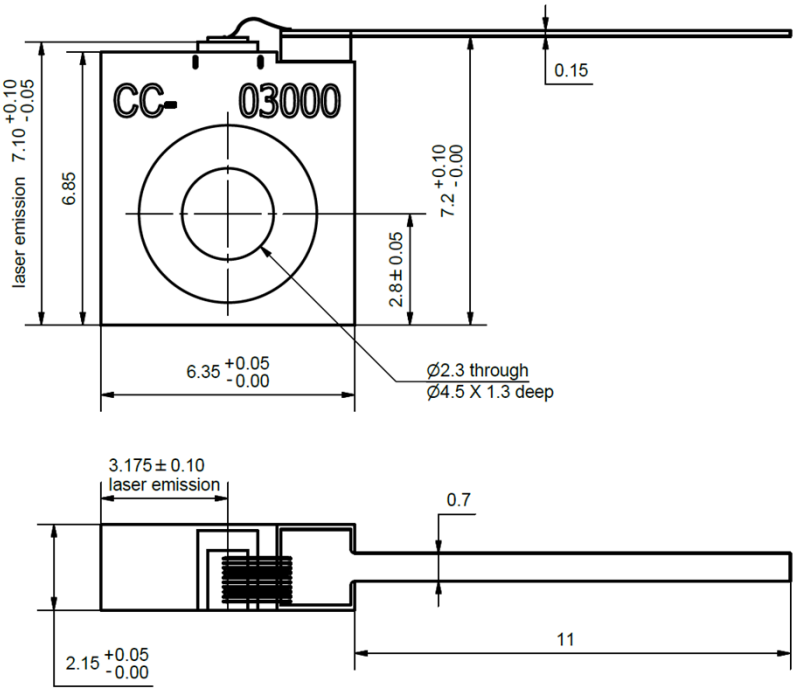
Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Height of Emission Plane	h	mm	7.05	7.10	7.20	
C-Mount Thickness	t	mm		2.15		

Package Pinout

Mounting Wire	Cathode (-)
Housing	Anode (+)



Package Drawings



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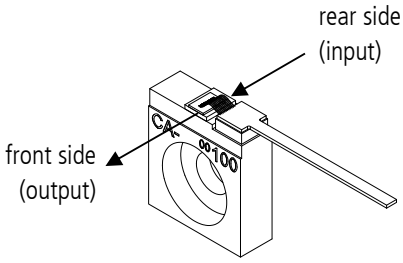


EYP-TPA-0650-00250-2007-CMT02-0000

Revision 1.00

2011-12-08

TAPERED AMPLIFIERS
Semiconductor Optical Amplifier

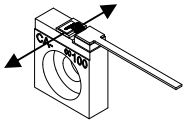
Unpacking, Installation and Laser Safety

Unpacking the laser diodes should only be done at electrostatic safe workstations (EPA). Though protection against electro static discharge (ESD) is implemented in the laser package, charges may occur at surfaces. Please store this product in its original package at a dry, clean place until final use. During device installation, ESD protection has to be maintained.

The TPA diode type is known to be sensitive against thermal stress. It should not be operated without appropriate injection from a seed laser. Operating at moderate temperatures on proper heat sinks willl contribute to a long lifetime of the diode. The chip should be protected against moisture. A water vapor content below 5000 ppm is recommended for applications with high reliability requirements.

The laser emission from this diode is close to the invisible infrared region of the electromagnetic spectrum. Avoid direct and/or indirect exposure to the free running beam. Collimating the free running beam with optics as common in optical instruments will increase threat to the human eye.

Each laser diode will come with an individual test protocol verifying the parameters given in this document.



Laser Emission

IEC-60825-0

Complies with 21 CFR 1040.10 and 1040.40

Datasheet

EYP-TPA-0670-00500-2004-CMT02-0000

Revision 0.90

2023-01-05

TAPERED AMPLIFIER
Semiconductor Optical Amplifier

General Product Information

Product	Application
670 nm Tapered Amplifier	Spectroscopy
C-Mount Package	

Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Storage Temperature	T_S	°C	-40		85	Stress in excess of one of the Absolute Maximum Ratings may damage the laser. Please note that a damaging optical power level may occur although the maximum current is not reached. These are stress ratings only, and functional operation at these or any other conditions beyond those indicated under Recommended Operational Conditions is not implied.
Operational Temperature at Case	T_C	°C	0		30	
Forward Current	I_F	A			1.3	
Reverse Voltage	V_R	V			2	
Output Power	P_{opt}	W			0.6	

Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Operational Temperature at Case	T_{case}	°C		20		non condensing
Forward Current	I_F	A			1.2	seeding required above 0.6 A
Input Power	P_{opt}	mW	10		50	
Output Power	P_{opt}	W			0.5	with proper injection from a seed laser

Characteristics Tcase'= 20° C at BOL

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Wavelength	λ	nm		670		
Gain Width (FWHM)	$\Delta\lambda$	nm		10		
Operational Current	$I_{Op\ Gain}$	A			1.2	with proper injection from a seed laser
Output Power	P_{opt}	W	0.5			
Polarization				TE		E field parallel to junction plane
Amplification	G	dB		13		with proper injection from a seed laser
Temp. Coefficient of Wavelength	$d\lambda$ / dT	nm/K		0.3		
Cavity Length	L	µm		2000		
Reflectivity at Front Facet	R_{ff}			$3{\cdot}10^{-4}$	$1{\cdot}10^{-3}$	
Reflectivity at Rear Facet	R_{ff}			$3{\cdot}10^{-4}$	$1{\cdot}10^{-3}$	

Datasheet

EYP-TPA-0670-00500-2004-CMT02-0000

Revision 0.90

2023-01-05

TAPERED AMPLIFIER
Semiconductor Optical Amplifier

Characteristics Tcase'= 20° C at BOL cont'd

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Input Divergence parallel	$\Theta_{out\|\|}$	°		10		1/e² (full angle)
Input Divergence perpendicular	$\Theta_{out\perp}$	°		50		1/e² (full angle)
Output Divergence parallel	$\Theta_{out\|\|}$	°		10		1/e² (full angle)
Output Divergence perpendicular	$\Theta_{out\perp}$	°		45		1/e² (full angle)

Package Dimensions

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Height of Emission Plane	d_{EP}		7.05	7.1	7.2	

Datasheet

EYP-TPA-0670-00500-2004-CMT02-0000

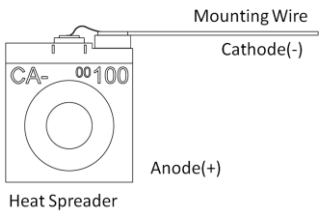
Revision 0.90

2023-01-05

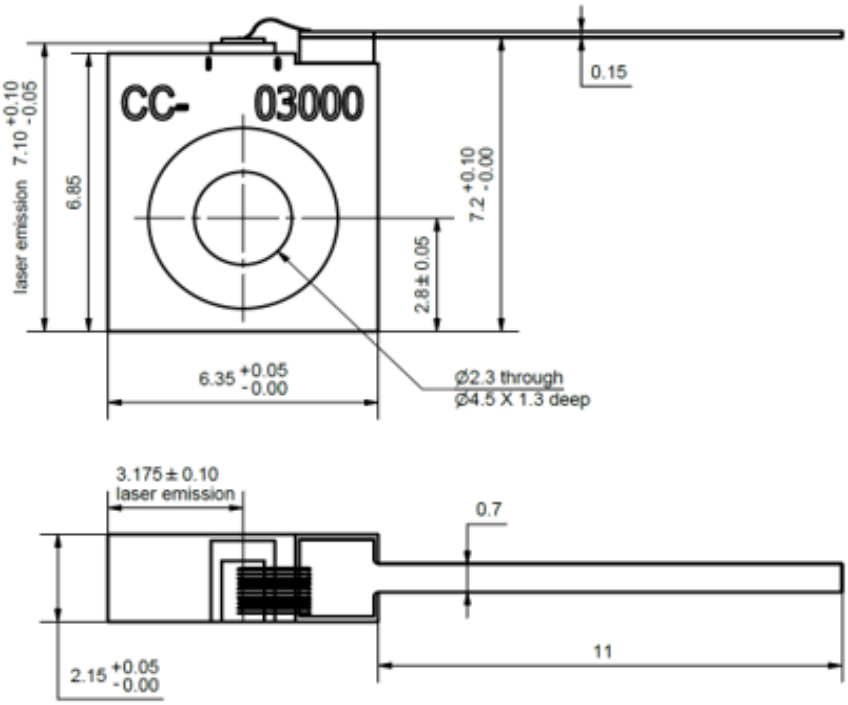
TAPERED AMPLIFIER
Semiconductor Optical Amplifier

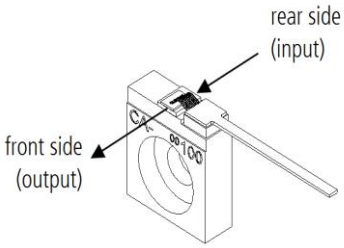
Pin Assignment

Laser Diode Cathode (-)	Mounting Wire
Laser Diode Anode (+)	Housing



Package Drawings





AIZ-18-0413-1250

Datasheet

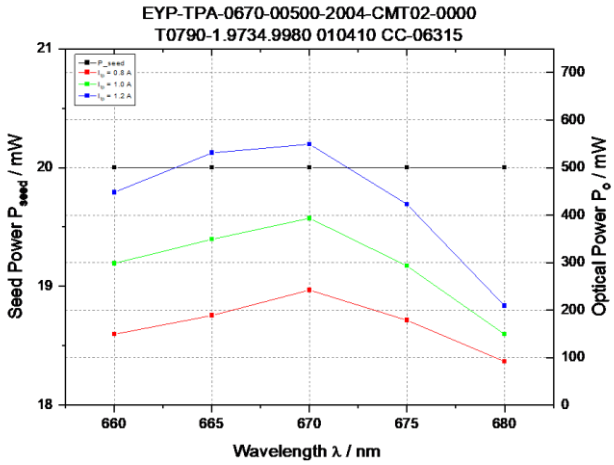
EYP-TPA-0670-00500-2004-CMT02-0000

Revision 0.90

2023-01-05

TAPERED AMPLIFIER
Semiconductor Optical Amplifier

Typical Measurement Results



Measurement results and other illustrative material provided in this specification are typical and must be specifically confirmed in writing by eagleyard Photonics before they become applicable to any particular order or contract.

Unpacking, Installation and Laser Safety

Unpacking the taperd amplifier should only be done at electrostatic safe workstations (EPA). Though protection against electro static discharge (ESD) is implemented in the laser package, charges may occur at surfaces. Please store this product in its original package at a dry, clean place until final use. During device installation, ESD protection has to be maintained.

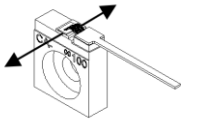
The TPA diode type is known to be sensitive against thermal stress. It should not be operated without appropriate injection from a seed laser. Operating at moderate temperatures on proper heat sinks willl contribute to a long lifetime of the diode.

This amplifier is designed for the setup of MOPA systems. An optical isolator should be used between seed laser and amplifier in order to suppress backreflections that may disturb the emission spectrum of the seed laser and may cause mode-hops in case of wavelength tuning.

Each tapered amplifier will come with an individual test protocol verifying the parameters given in this document.

Avoid direct and/or indirect exposure to the free running beam. Collimating the free running beam with optics as common in optical instruments will increase threat to the human eye.

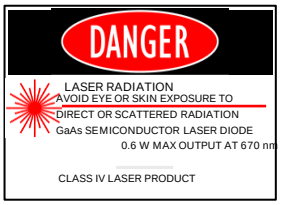
In accordance with the eagleyard Photonics policy of continuous improvement specifications may change without notice.



Laser Emission

LASER RADIATION
TO DIRECT OR SCATTERED RADIATION
CLASS 4 LASER PRODUCT
AVOID EYE OR SKIN EXPOSUR
WAVELENGTH 670 nm
MAX. OUTPUT POWER 0.6 W

IEC-60825-1



Complies with 21 CFR 1040.10 and 1040.40

EYP-TPA-0670-01000-3004-BTU02-0000

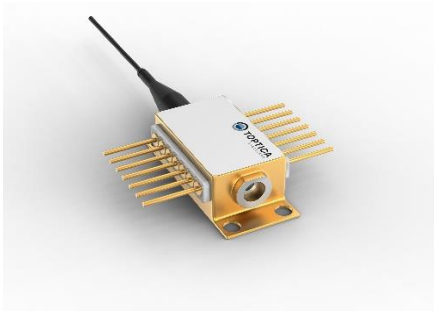
Revision 0.50

2024-04-03

TAPERED AMPLIFIER
Semiconductor Optical Amplifier

General Product Information

Product	Application
670 nm Tapered Amplifier	Spectroscopy
14 Pin Butterfly Package	
with PM Fiber and FC/APC Connector (Input)	
and collimated Output Beam	



Absolute Maximum Ratings

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Storage Temperature	T_S	°C	-40		85	Stress in excess of one of the Absolute Maximum Ratings may damage the laser. Please note that a damaging optical power level may occur although the maximum current is not reached. These are stress ratings only, and functional operation at these or any other conditions beyond those indicated under Recommended Operational Conditions is not implied.
Operational Temperature at Case	T_C	°C	-20		75	
Forward Current	I_F	A			2.2	
Reverse Voltage	V_R	V			2	
Output Power	P_{opt}	W			1.2	
TEC Current	I_{TEC}	A			5	
TEC Voltage	V_{TEC}	V			7	

Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Operational Temperature at Case	T_{case}	°C	0		50	
Operational Temperature at Chip	T_{chip}	°C	10	20	30	measured with integrated thermistor
Forward Current	I_F	A			2	seeding required above 1 A
Input Power	P_{opt}	mW	10		50	Insertion loss ≤ 0.3 dB
Output Power	P_{opt}	W		0.8	1.0	with proper injection from a seed laser

Characteristics Tcase = 20° C at BOL

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Wavelength	λ	nm		670		
Gain Width (FWHM)	$\Delta\lambda$	nm		10		
Operational Current	$I_{Op\ Gain}$	A			1.8	Popt = 0.8 W
Output Power	P_{opt}	W		0.8		
Polarization				TE		E fieldparallel to base plate
Amplification	G	dB		15		at recommended maximum forward current
Temp. Coefficient of Wavelength	$d\lambda$ / dT	nm/K		0.25		
Beam Diameter	d	mm		1		1/e², at Popt
Input Divergence parallel	$\Theta_{out\,\|\|}$	mrad		3		1/e² (full angle), at Popt

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Revision 0.50

2024-04-03

TAPERED AMPLIFIER
Semiconductor Optical Amplifier

Thermoelectric Cooler

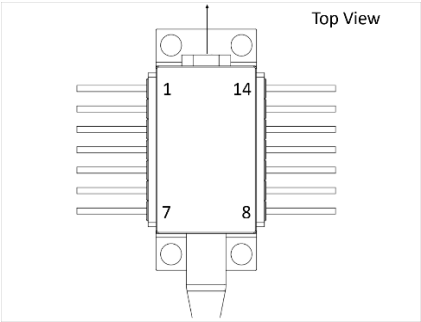
Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Current	I_{TEC}	A		1.2		Popt = 0.8 W; ΔT = 20 K
Voltage	U_{TEC}	V		2.0		Popt = 0.8 W; ΔT = 20 K
Power Dissipation (total loss at case)	P_{loss}	W		8		Popt = 0.8 W; ΔT = 20 K
Temperature Difference	ΔT	K			40	Popt = 0.8 W

Thermistor (Standard NTC Type)

Parameter	Symbol	Unit	min	typ	max	Measurement Conditions / Comments
Resistance	R	kOhm		10		25°C
Beta Coefficient	b			3892		0°C ... 50°C
Steinhart & Hart Coefficient A	A			1.1293×10^{-3}		
Steinhart & Hart Coefficient B	B			2.3410×10^{-4}		
Steinhart & Hart Coefficient C	C			8.7755×10^{-8}		

Pin Assignment

1	Thermoelectric Cooler (+)	14	Thermoelectric Cooler (-)
2	Thermistor	13	not connected
3	not connected	12	not connected
4	not connected	11	Amplifier (Cathode)
5	Thermistor	10	Amplifier (Anode)
6	not connected	9	not connected
7	not connected	8	not connected



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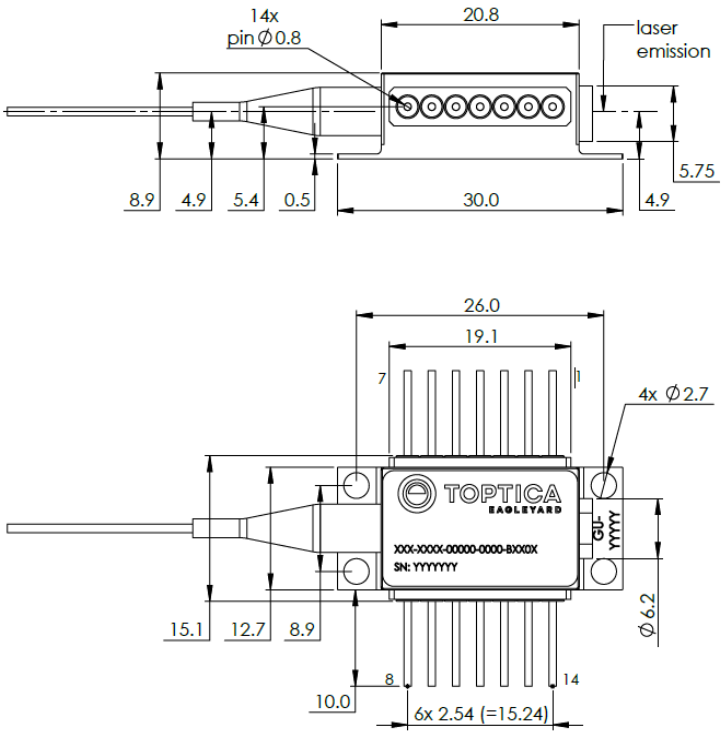
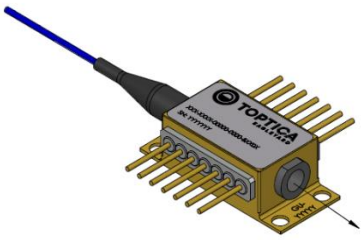
Revision 0.50

2024-04-03

TAPERED AMPLIFIER
Semiconductor Optical Amplifier

Package Drawings



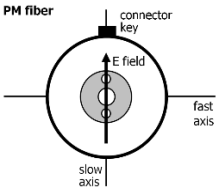


SWZ-23-0117-1237

Fiber and Connector Type (Input)

Parameter	
PM Fiber	900 / 125 / 4.5 µm, UV/Polyester-elastomer Coating
	length: 1 +/-0.1 m
Connector	FC/APC narrow key / 2 mm

Measurement Conditions / Comments



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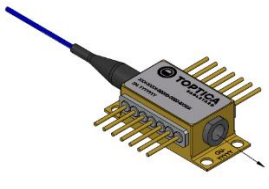
Revision 0.50

2024-04-03

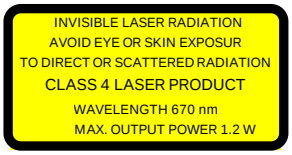
TAPERED AMPLIFIER
Semiconductor Optical Amplifier

Unpacking, Installation and Laser Safety

Unpacking the taperd amplifier should only be done at electrostatic safe workstations (EPA). Though protection against electro static discharge (ESD) is implemented in the laser package, charges may occur at surfaces. Please store this product in its original package at a dry, clean place until final use. During device installation, ESD protection has to be maintained.



The TPA diode type is known to be sensitive against thermal stress. It should not be operated without appropriate injection from a seed laser. Operating at moderate temperatures on proper heat sinks willl contribute to a long lifetime of the diode.



IEC-60825-1

This amplifier is designed for the setup of MOPA systems. Appropriate seed lasers are DFB lasers of the type EYP-DFB-xxxx-xxxxx-1500-BFY12-000x with matching wavelengths. An external fiber isolator should be used between seed laser and amplifier in order to suppress backreflections that may disturb the emission spectrum of the seed laser and may cause mode-hops in case of wavelength tuning.

The laser emission from this diode is close to the invisible infrared region of the electromagnetic spectrum. Avoid direct and/or indirect exposure to the free running beam. Collimating the free running

Complies with 21 CFR 1040.10 and 1040.40

Each tapered amplifier will come with an individual test protocol verifying the parameters given in this document.