

# EYP-TPA-0670-00500-3006-BTU02-0000

Revision 0.50

2023-10-24

## 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
Storage Temperature	$T_S$	°C	-40		85
Operational Temperature at Case	$T_C$	°C	-20		75
Forward Current	$I_F$	A			2.0
Reverse Voltage	$V_R$	V			2
Output Power	$P_{opt}$	W			1.0
TEC Current	$I_{TEC}$	A			5
TEC Voltage	$V_{TEC}$	V			7

### Measurement Conditions / Comments

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.

### Recommended Operational Conditions

Parameter	Symbol	Unit	min	typ	max
Operational Temperature at Case	$T_{case}$	°C	0		50
Operational Temperature at Chip	$T_{chip}$	°C	10	20	30
Forward Current	$I_F$	A			1.8
Input Power	$P_{opt}$	mW	10		50
Output Power	$P_{opt}$	W			0.8

### Measurement Conditions / Comments

measured with integrated thermistor  
seeding required above 1 A  
Insertion loss  $\leq$  0.3 dB  
with proper injection from a seed laser

### Characteristics

Parameter	Symbol	Unit	min	typ	max
Wavelength	$\lambda$	nm		670	
Gain Width (FWHM)	$\Delta\lambda$	nm		10	
Operational Current	$I_{Op Gain}$	A			1.8
Output Power	$P_{opt}$	W	0.8		
Polarization				TE	
Amplification	G	dB		15	
Temp. Coefficient of Wavelength	$d\lambda / dT$	nm/K		0.25	

### Measurement Conditions / Comments

$P_{opt} = 1 W$

E fieldparallel to base plate  
at recommended maximum forward current

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### Characteristics

Parameter	Symbol	Unit	min	typ	max
Beam Diameter horizontal	$d_{  }$	mm		1	
Output Divergence parallel	$\Theta_{out  }$	mrad		3	
Output Divergence perpendicular	$\Theta_{out\perp}$	mrad		3	

### Measurement Conditions / Comments

1/e<sup>2</sup>  
1/e<sup>2</sup> (full angle)  
1/e<sup>2</sup> (full angle)

### Thermoelectric Cooler

Parameter	Symbol	Unit	min	typ	max
Current	$I_{TEC}$	A			1.2
Voltage	$U_{TEC}$	V			2
Power Dissipation (total loss at case)	$P_{loss}$	W			8
Temperature Difference	$\Delta T$	K			40

### Measurement Conditions / Comments

P<sub>opt</sub> = 0.5 W;  $\Delta T$  = 20 K  
P<sub>opt</sub> = 0.5 W;  $\Delta T$  = 20 K  
P<sub>opt</sub> = 0.5 W

### Thermistor (Standard NTC Type)

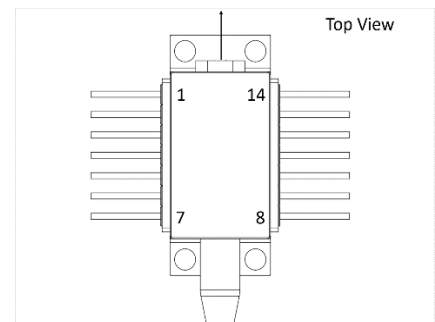
Parameter	Symbol	Unit	min	typ	max
Resistance	R	kOhm		10	
Beta Coefficient	$\beta$			3892	
Steinhart & Hart Coefficient A	A			$1.1293 \times 10^{-3}$	
Steinhart & Hart Coefficient B	B			$2.3410 \times 10^{-4}$	
Steinhart & Hart Coefficient C	C			$8.7755 \times 10^{-8}$	

### Measurement Conditions / Comments

25°C  
0°C ... 50°C

### 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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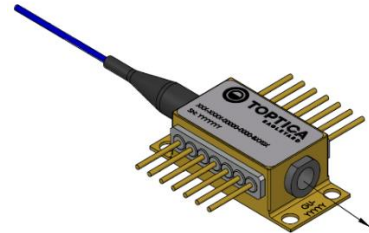
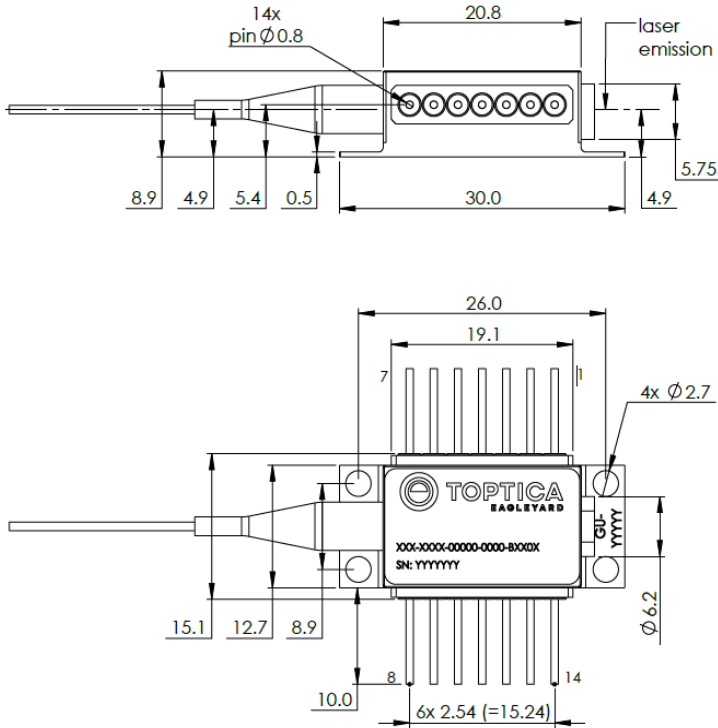
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## TAPERED AMPLIFIER Semiconductor Optical Amplifier



### Package Drawings



SWZ-23-0117-1237

### Fiber and Connector Type (Input)

Parameter

PM Fiber	900 / 125 / 4.5 $\mu\text{m}$ , UV/Polyester-elastomer Coating length: 1 +/-0.1 m
Connector	FC/APC narrow key / 2 mm

Measurement Conditions / Comments

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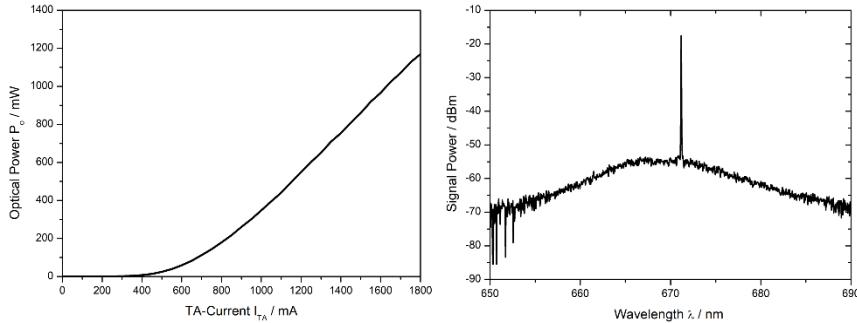
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### Typical Measurement Results



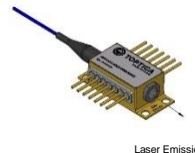
### Unpacking, Installation and Laser Safety

Unpacking the tapered 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.

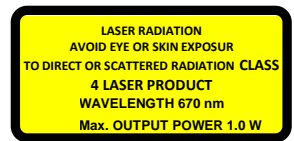
The TPA diode type is known to be sensitive against thermal stress. It should not be operated without appropriate injection from a seed laser. Operating at moderate temperatures on proper heat sinks will contribute to a long lifetime of the diode.

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



Laser Emission



IEC-60825-1



Complies with 21 CFR 1040.10 and 1040.40