

Features

- High power: up to 200 mW
- Low power dissipation
- Mini-DIL form factor
- PM fiber

Applications

- FOGs
- SDH/Single Channel EDFAs
- Small form factor amplifiers
- Gain Blocks

Ordering Information

Part	λ_c [nm]	Fiber	Boot
EM278	976	PM	No
EM278-B	976	PM	Yes

General Description

The EM4 278 single mode, uncooled 976 nm pump lasers simplifies next generation erbium doped fiber amplifier (EDFA) designs by eliminating the need for large, less efficient, and costlier electric supplies. It is wavelength stabilized by a fiber Bragg grating (FBG) which maintains stable performance over temperature ranges of 10 to 75 °C and power ranges of 50 to 200 mW.

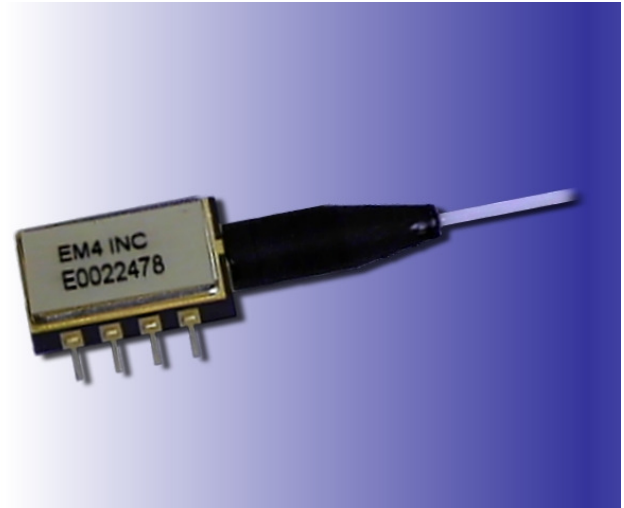
The hermetically sealed 8 pin mini-DIL package includes thermistor, monitor photodiode and UniDry™ getter. The fiber Bragg grating precisely locks the center wavelength over extended power and temperature range. By eliminating the thermoelectric cooler, next generation EDFA designs, particularly the thermal and control circuitry, benefit from the pump modules smaller size

Absolute Maximum Ratings

Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only and operation of the device at these or conditions beyond these are not implied. Exposure to absolute maximum ratings for extended periods of time may affect device reliability.

Parameter	Sym	Condition	Min	Max	Unit
Storage Temperature	T _{STG}		-40	85	°C
Operating Case Temperature	T _{OP}		-5	75	°C
Laser Forward Current	I _F			780	mA
Laser Reverse Voltage	V _R			2.0	V
Photo Diode Forward Current	I _{PD}			10	mA
Photo diode Reverse Voltage	V _{PD}			20	V
Thermistor Current				2	mA
Thermistor Voltage				5	V
Lead Soldering Time				10	s
Lead Soldering temperature				250	°C
Fiber Pull Force				5	N
Fiber Bend Radius			25		mm
ESD		HBM		500	V

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Optical And Electrical Characteristics

$T_{OP}=25^{\circ}\text{C}$, $T_{\text{grating}} = 23\pm 3^{\circ}\text{C}$ and beginning of life unless otherwise specified.

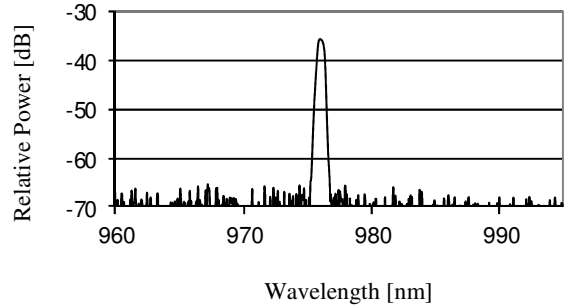
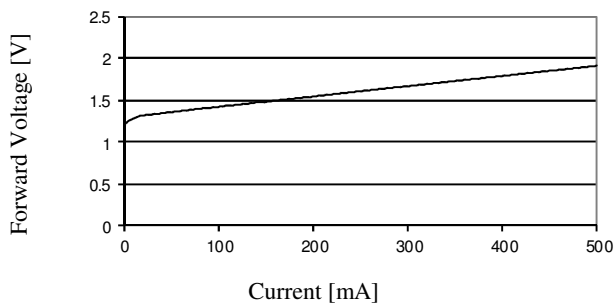
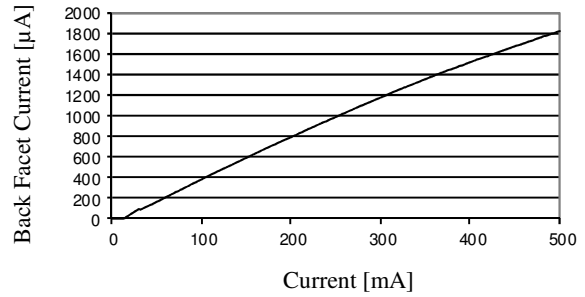
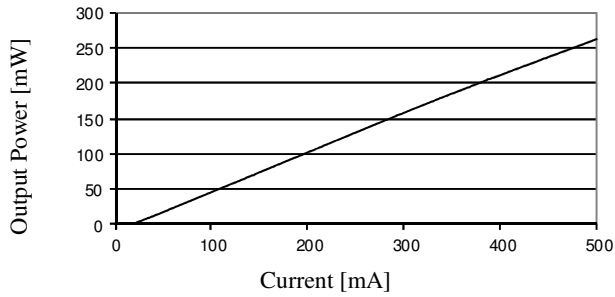
Parameter	Sym.	Condition	Min	Typ.	Max	Unit
Operating Package Temperature	T_{CHIP}		10		75	$^{\circ}\text{C}$
External Return Reflection					-50	dB
Minimum Operating Power	P_{MIN}		50			mW
Operating Power	P_{OP}				200	mW
Threshold Current	I_{TH}				55	mA
Laser Operating Drive Current	I_{OP}	$P=P_{\text{OP}}=200\text{mW}$		500	600	mA
Laser Forward Voltage	V_{F}	$I=I_{\text{MAX}}$			2.1	V
KINK Power	P_{KINK}	$I=I_{\text{KINK}}$	200			mW
KINK Current	I_{KINK}	$P=P_{\text{KINK}}$	600			mA
Center Wavelength	λ_{C}	$P=P_{\text{OP}}$	975	976	977	nm
Spectral Shift With Temperature	$\Delta\lambda/\Delta T$				0.02	nm/ $^{\circ}\text{C}$
Power In Band		@ $\lambda_{\text{C}} \pm 1\text{nm}$, $P>50\text{mW}$	90			%
Side Mode Suppression	SMSR	$P=P_{\text{OP}}$	30			dB
Monitor Photo Diode Current	I_{PD}	$P=P_{\text{OP}}$	0.1		6.0	mA
Monitor Photo Diode Dark Current	I_{D}				100	nA
Thermistor Resistance	R_{TH}	$T=25^{\circ}\text{C}$	9500	10000	10500	Ω
Thermistor β coefficient	β	0 / 50°C		3892		

Fiber Specification

Parameter	Sym	Condition	Min	Typ.	Max	Unit
Fiber Type			PM			
Jacket Material			Hytrel Acrylate			
Core Diameter			5.6	6.6	7.6	μm
Cladding Diameter			123	125	127	μm
Buffer Diameter			230	245	260	μm
Pigtail Length With Grating			1.5	3		m
Proof Strength			100			kpsi

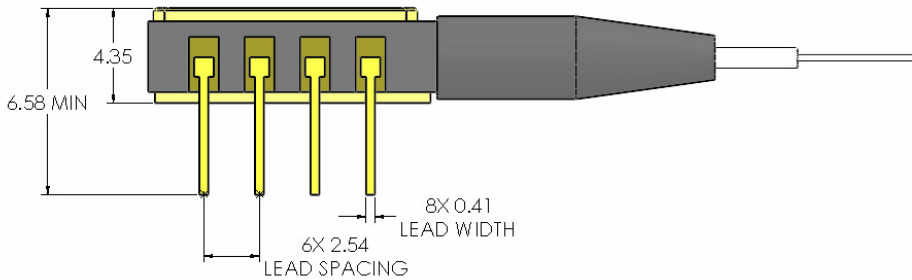
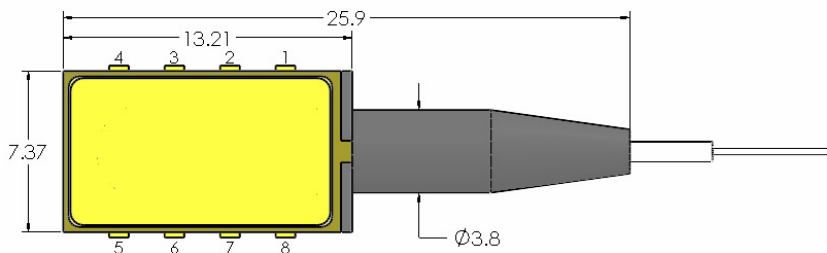
Typical Operating Characteristics

T_c=25°C



Mechanical Drawing

All units in mm



Pinning

Pin	Description
1	Thermistor
2	Case GND
3	Thermistor
4	Monitor PD Cathode
5	Monitor PD Anode
6	Laser Cathode
7	Laser Anode
8	NC

