HIGH POWER DFB LASERS

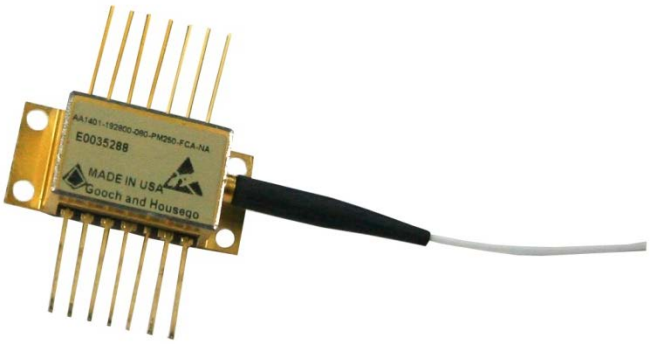
40mW in 14-pin butterfly package

PRODUCT DATASHEET

The EM4 high power distributed feedback laser (DFB) is a CW InGaAs/InP multi-quantum well (MQW) laser diode.

The module is ideal in applications where low relative intensity noise (RIN) and stable polarization-maintaining properties are needed.

The module contains a high efficiency cooler, high performance isolator, thermistor, and monitor detector and is designed and built using EM4's high reliability platform for defense applications.



Key Characteristics

- C-band (1537-1565 nm) wavelengths
- 40 mW ex-fiber output power

Features

- ITU grid wavelengths, 50 or 100 GHz spacing
- Low RIN
- High isolation
- High efficiency TEC
- Polarization-maintaining or single-mode fiber
- Laser welded, hermetically sealed
- Built in thermistor and monitor photodiode
- Tested to Telcordia GR-468 Core/MIL-STD-883

Applications

- Long haul WDM transmission
- RF links
- Seeding
- Pulsing
- Sensing
- CATV

Performance Characteristics

TC=25°C, continuous wave and beginning of life unless otherwise specified

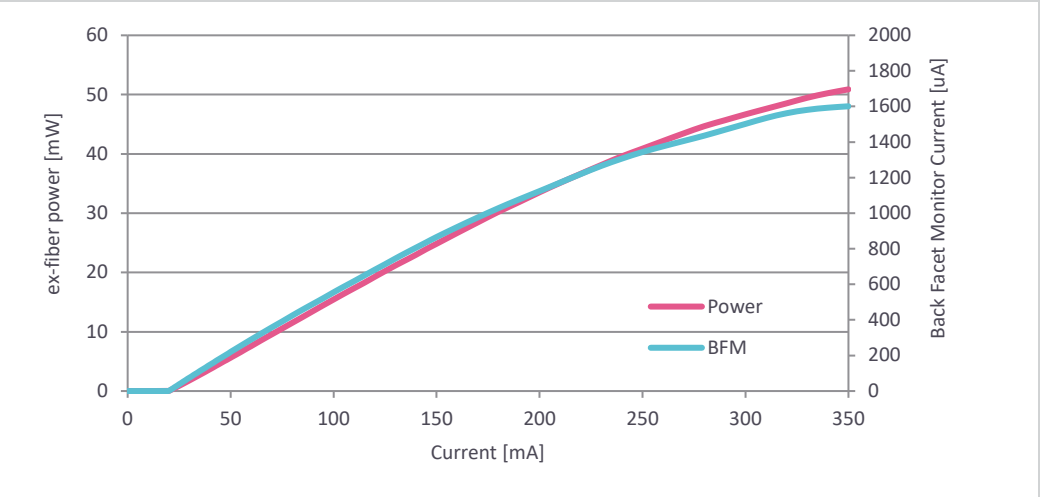
Optical characteristics	Sym	Condition	Min	Typ	Max	Unit
Operating chip temperature	T_{CHIP}		20		35	°C
Output power	P_{op}		40			mW
Center frequency	F_{opt}	P=Pop	See ordering information			THz
Linewidth	A	source dependent		2	5	MHz
Relative intensity noise	RIN	P=Pop, peak value			-140	dBc/Hz
Side mode suppression	SMSR	P=Pop	35			dB
Optical isolation	ISO	Fopt within C-band	50	55		dB
Polarization extinction ratio	PER		20			dB
Temperature tuning coefficient	Δν/ΔT °C	chip temperature		-11		GHz/°C
Kink screening		No kinks* *Kink defined as >40% change in 1st derivative linearity	Ith + 50		1.1 x Iop	mA

Electrical characteristics	Sym	Condition	Min	Typ	Max	Unit
Threshold current	I_{TH}				30	mA
Laser drive current	I_{op}	Note[1]		240	350	mW
Laser forward voltage	V_F	I=Iop, Max			3	V
Monitor photo diode current	I_{PD}	P=POP	100			μA
Monitor photo diode dark current	I_D	Vbias=-5 V			100	nA
TEC current		Tamb=25°C for type Tamb=65°C for max P=Pop, TCHIP=25°C		0.1	2.2	A
TEC voltage				0.1	6	V
Thermistor resistance	R_{TH}	T = 25°C	9500	10000	10500	Ω
Thermistor β coefficient	β	0 / 50°C		3892		
Thermistor Steinhart-Hart coefficients		A = 1.1291e-3 B = 2.3413e-4 C = 8.7674e-8				

[1] I_{op} and T_{op} defined on device specific test sheet supplied with each unit.

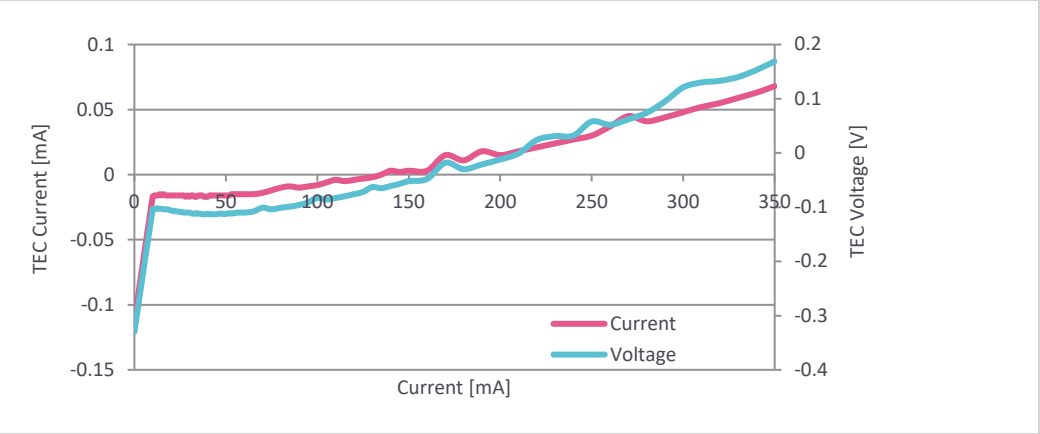
Data Tables

Typical output power and back facet monitor current vs input current



Typical TEC performance

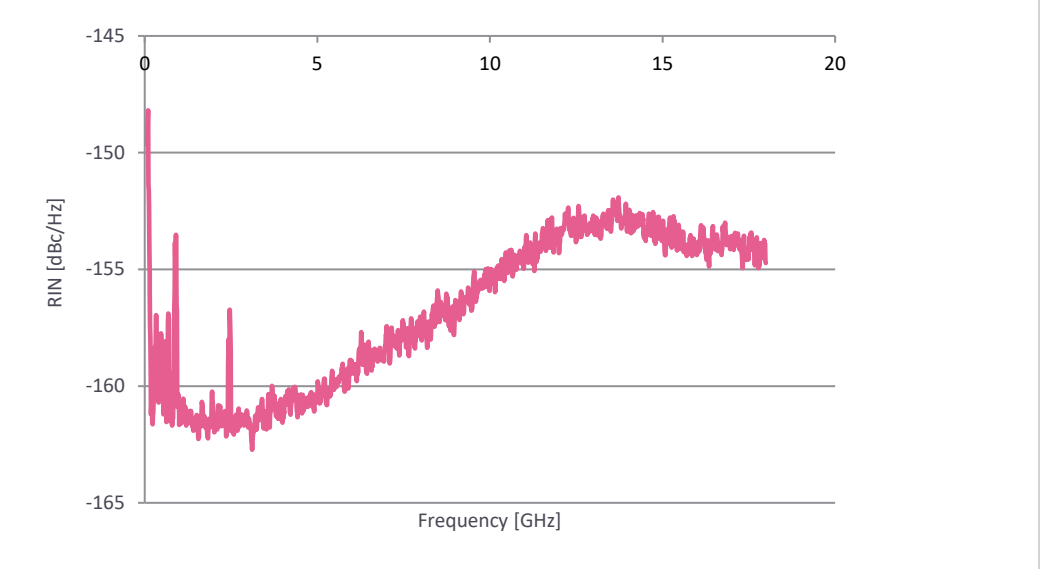
Tc=25°C



Typical RIN

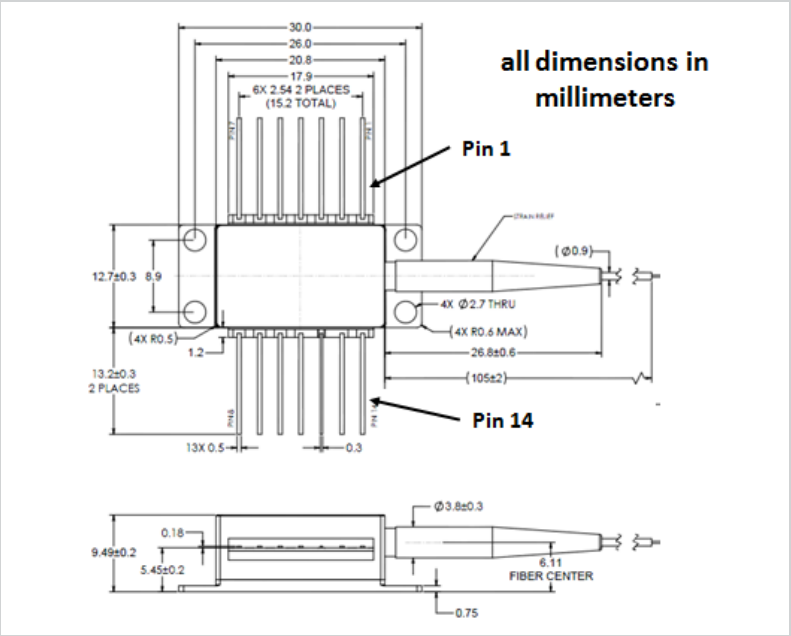
(Relative Intensity Noise)

By design, not tested per part



Pinout and Mechanical Drawing

Pin	Description	Pin	Description
1	Thermistor	14	Case
2	Thermistor	13	Laser anode
3	Laser cathode (Bias)	12	NC
4	Monitor PD anode	11	Laser anode
5	Monitor PD cathode	10	Case
6	TEC+	9	Case
7	TEC-	8	Case



Fiber Characteristics	
Fiber type, jacket material[2]	PM or non-PM single-mode fiber, acrylate
Core / outer / buffer2 diameters	8 µm / 125 µm / 250 µm
Minimum fiber length	1 m
Minimum bend radius	35 mm
Proof strength	100 kPSI
Connector[3], output polarization	FC/APC, polarization parallel to slow axis

[2] Optional 900 µm loose-tube PVDF buffer recommended for laboratory use.

[3] Other connector options available, contact sales for more information.

Absolute Maximum Ratings

Parameter	Sym	Min	Max	Unit
Storage temperature	TSTG	-40	+85	°C
Operating case temperature	TOP	-20	+65	°C
Laser forward current	IF		500	mA
Laser reverse voltage	VR		2	V
Photo diode photo current	IPD		10	mA
Photo diode reverse voltage	VPD		20	V
TEC current	ITEC		2.2	A
TEC voltage	VTEC		6	V
Thermistor current			2	mA
Thermistor voltage			5	V
Lead soldering time			10	S
Lead soldering temperature			250	°C
ESD (human body model)			500	V

* 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 or beyond these conditions is not implied. Exposure to absolute maximum ratings for extended periods of time may affect device reliability.

Ordering Information

Example part number: AA1418-193500-040-PM250-FCA-NA

Order code	①						②						③			④					⑤				⑥	
A	A	1	4	1	8	-						-	0	4	0	-	P	M				-	F	C	A	-	N	A

①	Model	Standard	
	Code	AA1418	
②	Wavelength	1540 through 1564	
	Code	XXXXXX (Wavelength: based on desired frequency, see next page)	
③	Power	40 mW	
	Code	040	
④	Fiber	PM fiber, 250 um tight buffer	PM fiber, 900 um loose buffer
	Code	PM250	PM900
⑤	Connector[1]	FC/APC	
	Code	FCA	
⑥	Bias T	None	None	None
	Code	NA	NA	NA

[1] Other connector options available, contact sales for more information.

AA1418 available frequencies (wavelengths)

Frequency	Wavelength
194.600 THz	1540.56 nm
194.400 THz	1542.14 nm
194.000 THz	1545.32 nm
193.950 THz	1545.72 nm
193.600 THz	1548.51 nm
193.400 THz	1550.12 nm
193.300 THz	1550.92 nm
193.200 THz	1551.72 nm
193.000 THz	1553.33 nm
192.950 THz	1553.73 nm
192.700 THz	1555.75 nm
192.600 THz	1556.55 nm
192.500 THz	1557.36 nm
191.700 THz	1563.86 nm
191.600 THz	1564.68 nm

For further information

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