

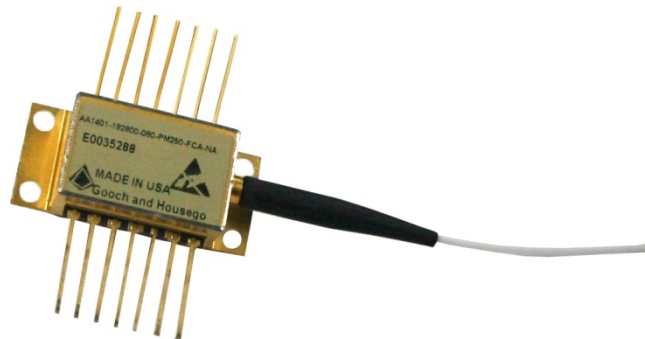
High-Power 14-Pin DFB Laser

Features

- ITU grid wavelengths 50 or 100 GHz Spacing
- Up to 100mW of output power
- Low RIN
- PM or SM Fiber
- Laser welded and hermetically sealed
- Built in thermistor, TEC, and monitor detector
- Optional Bias-T
- Telcordia GR-468 Core / MIL-Std 883 compliant

Applications

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



General Description

The EM4 high power distributed feedback laser (DFB) is a CW InGaAsP/InP multi-quantum well (MQW) laser diode. The module is ideal in applications where high power, low RIN and stable PM properties are needed. The module contains a cooler, thermistor and monitor detector and module is designed and built using EM4s high reliability platform for defense components.

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 is 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}		-20	+70	°C
Laser Forward Current	I_F			350 500	mA@40-63mW mA@80-100mW
Laser Reverse Voltage	V_R			2	V
Photo Diode Photo Current	I_{PD}			10	mA
Photo Diode Reverse Voltage	V_{PD}			20	V
TEC Current	I_{TEC}			4	A
TEC Voltage	V_{TEC}			4	V
Thermistor Current				2	mA
Thermistor Voltage				5	V
Lead Soldering Time				10	s
Lead Soldering Temperature				250	°C
ESD		HBM		500	V

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Optical Characteristics

$T_{\text{chip}}=25^{\circ}\text{C}$, continuous wave and beginning of life unless otherwise specified.

Parameter	Sym.	Condition	Min	Typ	Max	Unit
Operating Chip Temperature	T_{CHIP}		20		40	$^{\circ}\text{C}$
Output Power	P_{op}	100mW Version, $I=I_{\text{OP}}$	100			mW
		80mW Version, $I=I_{\text{OP}}$	80			
		63mW Version, $I=I_{\text{OP}}$	63			
		50mW Version, $I=I_{\text{OP}}$	50			
		40mW Version, $I=I_{\text{OP}}$	40			
Center Frequency	F_{opt}	$P=P_{\text{op}}$		See ordering information		THz
Linewidth	$\Delta\nu$	source dependent			1	MHz
Relative Intensity Noise	RIN	$P=P_{\text{op}}$, peak value			-150	dBc/Hz
Side Mode Suppression	SMSR	$P=P_{\text{op}}$	30			dB
Optical Isolation	ISO	F_{opt} within C-Band	30	35		dB
Polarization Extinction Ratio	PER		17	21		dB
Temperature Tuning Coeff.	$d\lambda/dT$	chip temperature		-12.5		GHz/ $^{\circ}\text{C}$
Current Tuning Coeff.	$d\lambda/dI$	for reference only	400		800	MHz/mA
Relaxation Oscillation Frequency	f_{relax}	for reference only		6		GHz
Kink screening		No kinks	$0.9xI_{\text{op}}$		$1.1xI_{\text{op}}$	

Electrical Characteristics

Parameter	Sym.	Condition	Min	Typ	Max	Unit
Threshold Current	I_{TH}			50		mA
Laser Drive Current	I_{op}	$P_{\text{op}} \leq \text{rated}^1$		300	350	40-63mW
				375	500	80-100mW
Laser Forward Voltage	V_{F}	$I=I_{\text{op}}$, MAX			3	V
Monitor Photo Diode Current	I_{PD}	$P=P_{\text{OP}}$	100			μA
Monitor Photo Diode Dark Current	I_{D}	$V_{\text{bias}}=-5\text{V}$			100	nA
TEC Current		$T_{\text{OP}}=70^{\circ}\text{C}$, $T_{\text{CHIP}}=25^{\circ}\text{C}$		$P=P_{\text{op}}$	4.0	A
TEC Voltage		$T_{\text{OP}}=70^{\circ}\text{C}$, $T_{\text{CHIP}}=25^{\circ}\text{C}$		$P=P_{\text{op}}$	4.0	V
Thermistor Resistance	R_{TH}	$T=25^{\circ}\text{C}$	9500	10000	10500	Ω
Thermistor β Coefficient	β	0 / 50°C		3892		
Thermistor Steinhart-Hart Coeff.	A			$1.1291\text{e-}3$		
	B			$2.3413\text{e-}4$		
	C			$8.7674\text{e-}8$		

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

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Fiber Specification Single-mode Polarization Maintaining

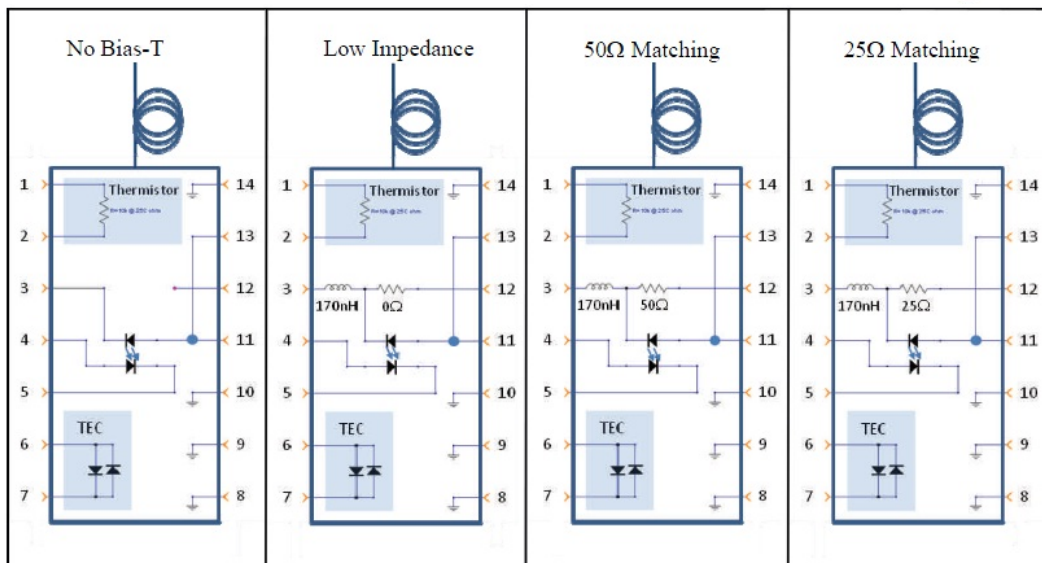
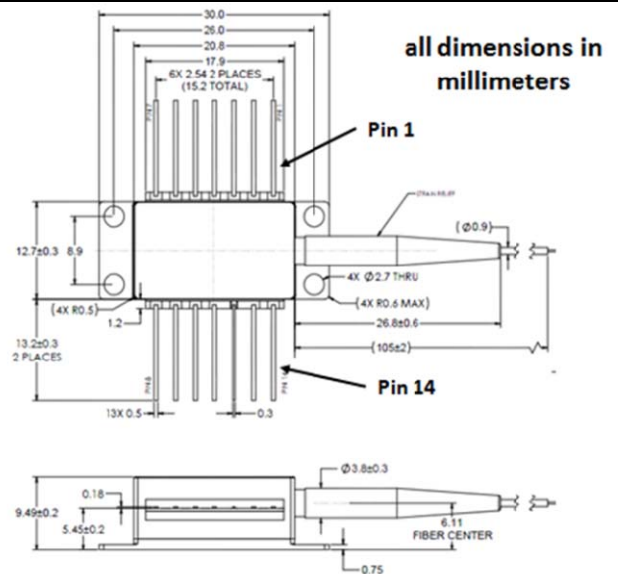
Parameter	Typ.	Unit
Fiber Type	PM	-
Core Diameter	8	μm
Outer Diameter	125	μm
Buffer Material 250um	Acrylate	
Loose Buffer 900um (full length buffer optional)	PVDF	
Minimum Pigtail Length	1.5	m
Minimum Bend Radius	35	mm
Proof Strength	200	KPSI

Fiber Specification Single-mode Non-Polarization Maintaining

Parameter	Typ.	Unit
Fiber Type	SM	-
Core Diameter	8	μm
Outer Diameter	125	μm
Buffer Material 250um	Acrylate	
Tight Buffer 900um (optional)	Hytel	
Minimum Pigtail Length	1	m
Minimum Bend Radius	35	mm
Proof Strength	100	KPSI

Pinout and Mechanical Drawing

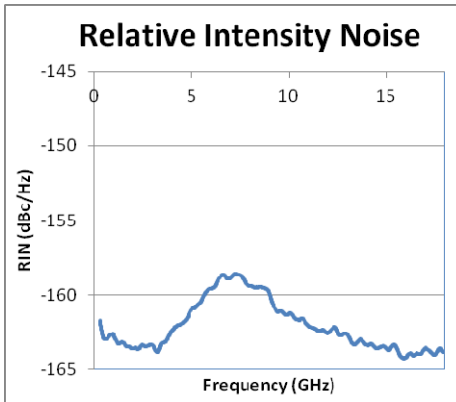
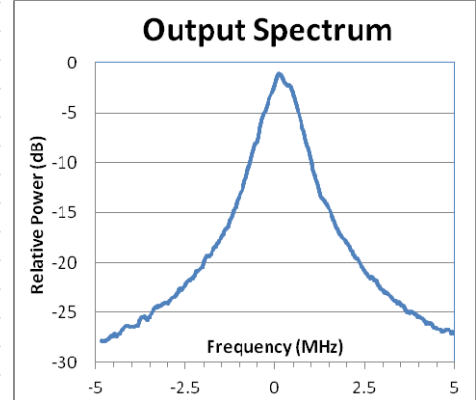
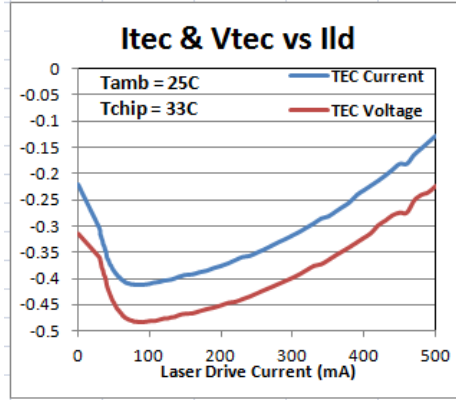
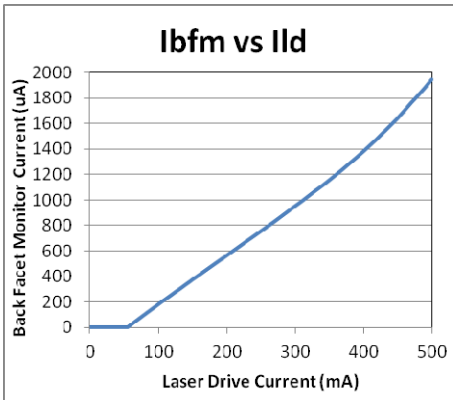
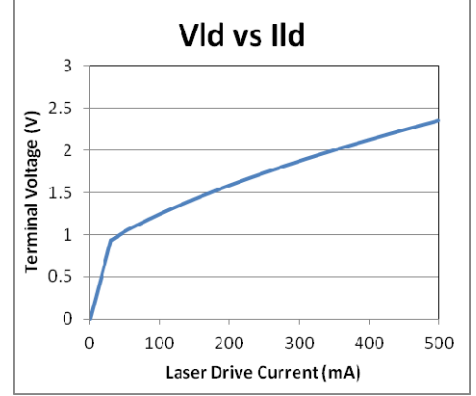
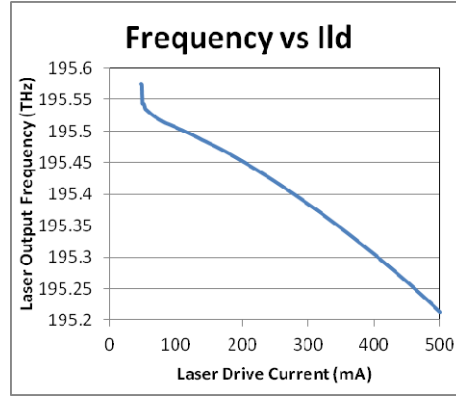
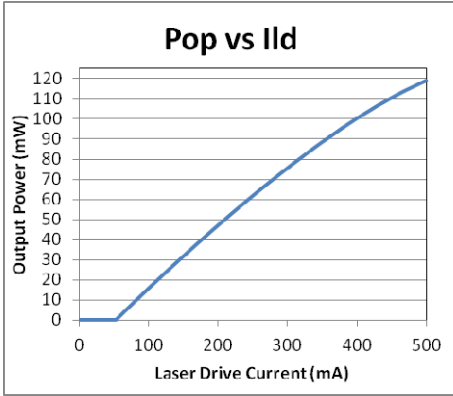
Pin	Description	Pin	Description
1	Thermistor	14	Case
2	Thermistor	13	Laser Anode
3	Laser Cathode (Bias)	12	Laser Cathode (optional bias t)
4	Monitor PD Anode	11	Laser Anode
5	Monitor PD Cathode	10	Case
6	TEC+	9	Case
7	TEC-	8	Case



High-Power 14-Pin DFB Laser

Typical Operating Characteristics

$T_{chip}=25^{\circ}C$, continuous wave and beginning of life unless otherwise specified.



High-Power 14-Pin DFB Laser

Ordering Information

AA1401- AA1406- AA1408-	FREQUE-	POW-	FIBuM-	CON-	BT	Parameter	Option	Description					
↑ ↑ ↑ ↑ ↑ ↑	↑	↑	↑	↑	↑	Bias T	NA	No Bias Tee					
							00	Low Z (pulsed applications)					
							25	25 Ohm					
							50	50 Ohm					
						Connector						NOC	No Connector
												FCA	FC/APC
												SCA	SC/APC
												LCA*	See note below
						Fiber & Buffer						SM250	SM Fiber, 250um Buffer
												SM900**	SM Fiber, 900um Loose Buffer
												PM250	PM Fiber, 250um Buffer
												PM900**	PM Fiber, 900um Loose Buffer
						Rated Output Power						040	40mW Output
												050	50mW Output
												063	63mW Output
												080	80mW Output
												100	100mW Output
						Optical Frequency						FFFFFF	Frequency in GHz leave as XXXXXX for don't care. Standard frequencies range between 192000 and 196000 other frequencies available upon request
						Product Family						AA1401 AA1406 AA1408	40-80mW High-Power 14-pin DFB Laser 100mW High-Power 14-pin DFB Laser 40-100mW High-Power 14-pin DFB Laser, NO Isolator***

*LCA connector only offered with SM900 fiber. Fiber length 530 +/- 20mm as measured from outside wall of package (snout end) to tip of ferrule on LCA connector.

**Optional 900 μm full-length loose-tube PVDF buffer recommended for laboratory use. Adds approximately one week to device lead time. All parts include approximately 9 cm of 900 μm loose PVDF strain relief.

***Parts ordered without an optical isolator may exhibit sensitivity to optical feedback and anomalous spectral behavior. SMSR is not guaranteed.

The component complies with all applicable portions of 21 CFR 1040.10, 21 CFR 1010.2 and 21 CFR 1010.3. Since this is a component, it does not comply with all of the requirements contained in 21 CFR 1040.10 and 21 CFR 1040.11 for complete laser products.

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