

# HIGH POWER DFB LASERS

Single frequency lasers in 14-pin butterfly package

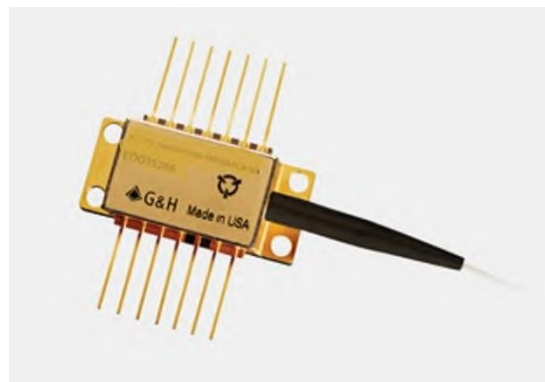
## PRODUCT DATASHEET

---

The Gooch & Housego high power distributed feedback laser (DFB) is an 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 thermo-electric cooler, thermistor, and monitor detector and is designed and built using G&H's high reliability platform for commercial and defense applications.



### Key Characteristics

- 1530-1570 nm 100mW ex-fiber
- 1530-1570 nm 80mW ex-fiber

### Features

- Low RIN
- PM250 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

LM-1530-1570-100 and LM-1530-1570-080

## Performance Characteristics

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

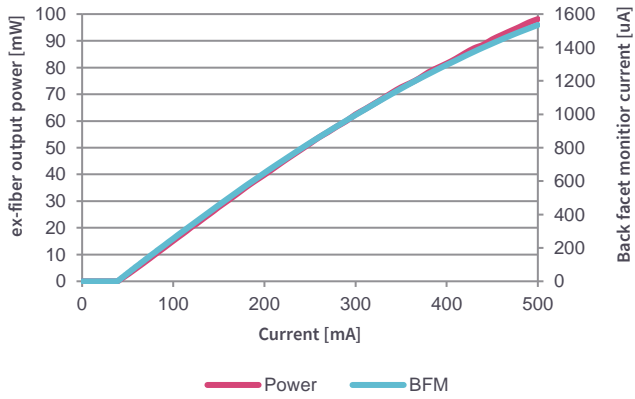
Optical characteristics	Sym	Condition	Min	Typ	Max	Unit
Operating chip temperature	$T_{\text{CHIP}}$		20		40	$^\circ\text{C}$
Output power	$P_{\text{op}}$		See ordering information			mW
Center frequency/wavelength	$F_{\text{opt}}$	$P=P_{\text{op}}$	191.0 to 191.9/(1530 to 1570)			THz/(nm)
Linewidth	$\Delta\nu$	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	$F_{\text{opt}}$ within C-band	30	35		dB
Polarization extinction ratio	PER		17	21		dB
Temperature tuning coefficient	$\Delta\lambda / \Delta T$	Chip temperature		-12.5		GHz/ $^\circ\text{C}$
Current tuning coefficient	$\Delta\lambda / \Delta I$	For reference only	400		800	MHz/mA
Relaxation oscillation frequency	$F_{\text{relax}}$	For reference only		6		GHz
Kink screening		No kinks	$0.9 \cdot I_{\text{op}}$		$1.1 \cdot I_{\text{op}}$	

Electrical characteristics	Sym	Condition	Min	Typ	Max	Unit
Threshold current	$I_{\text{TH}}$			50		mA
Laser drive current <sup>1</sup>	$I_{\text{op}}$	80-100 mW models		375	500	mA
Laser forward voltage	$V_F$	$I=I_{\text{op}}$ , Max			3	V
Monitor photo diode current	$I_{\text{PD}}$	$P=P_{\text{OP}}$	100			$\mu\text{A}$
Monitor photo diode dark current	$I_D$	$V_{\text{bias}}=-5\text{ V}$			100	nA
TEC current		$T_{\text{amb}}=25^\circ\text{C}$ for typ		0.1	4.0	A
TEC voltage		$T_{\text{amb}}=70^\circ\text{C}$ for max $P=P_{\text{op}}$ , $T_{\text{CHIP}}=25^\circ\text{C}$		0.1	4.0	V
Thermistor resistance	$R_{\text{TH}}$	$T = 25^\circ\text{C}$	9500	10000	10500	$\Omega$
Thermistor $\beta$ coefficient	$\beta$	$0 / 50^\circ\text{C}$		3892		
Thermistor Steinhart-Hart coefficients		$A = 1.1291\text{e}^{-3}$ $B = 2.3413\text{e}^{-4}$ $C = 8.7674\text{e}^{-8}$				

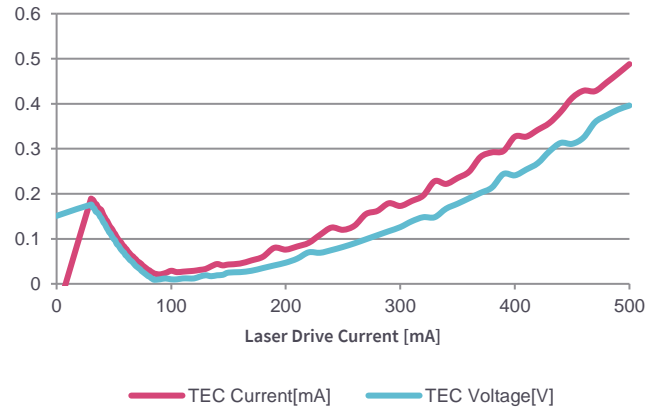
<sup>1</sup>  $I_{\text{op}}$  and  $T_{\text{op}}$  to achieve rated power and frequency at factory test defined on device specific test sheet supplied with each unit.

## Data Tables (80 mW laser shown)

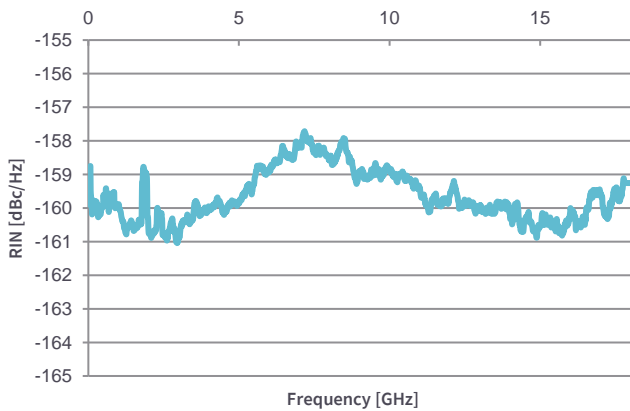
Typical output power and back facet monitor current vs input current



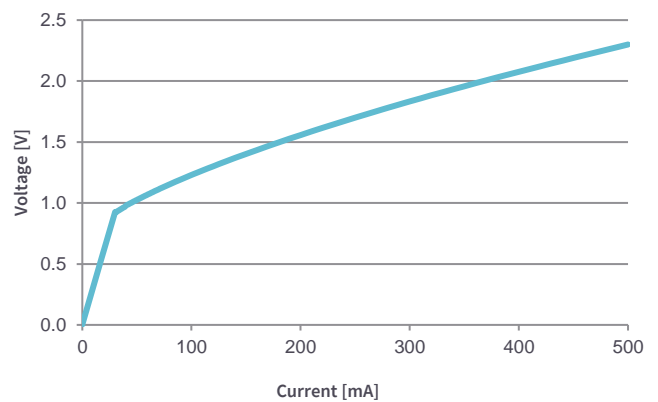
Typical TEC performance  
 $T_c=25^\circ\text{C}$



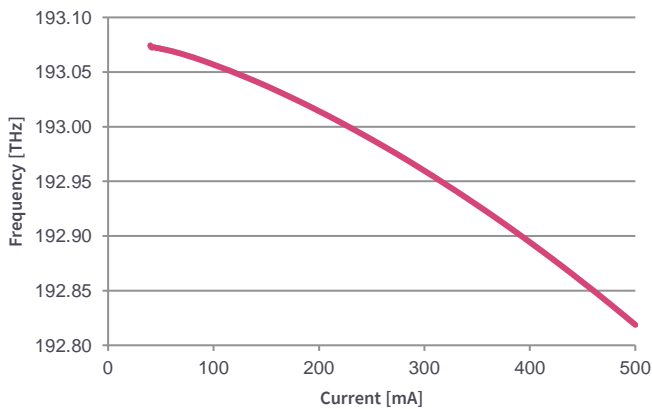
Typical RIN  
(Relative Intensity Noise)



Typical voltage vs current



Typical current tuning

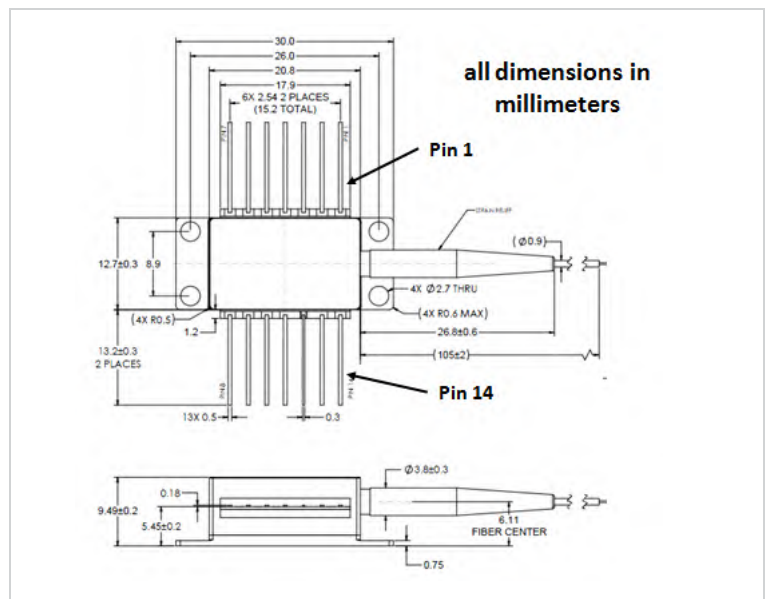


## Fiber Characteristics

Fiber type	PM single mode fiber
Jacket material	Acrylate
Core / outer / buffer diameters	8 $\mu\text{m}$ / 125 $\mu\text{m}$ / 250 $\mu\text{m}$
Minimum fiber length	1.0 m
Minimum bend radius	35 mm
Proof strength	100 kpsi
Connector, output polarization	FC/APC, polarization parallel to slow axis

## Pinout and Mechanical Drawing

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



Absolute Maximum Ratings	Sym	Min	Max	Unit
Storage temperature	T <sub>STG</sub>	-40	+85	°C
Operating case temperature	T <sub>OP</sub>	-20	+70	°C
Laser forward current, 80-100 mW models	I <sub>F</sub>		500	mA
Laser reverse voltage	V <sub>R</sub>		2	V
Photo diode photo current	I <sub>PD</sub>		10	mA
Photo diode reverse voltage	V <sub>PD</sub>		20	V
TEC current	I <sub>TEC</sub>		4	A
TEC voltage	V <sub>TEC</sub>		4	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 may affect device reliability.

## Ordering information

Contact Digikey to inquire about the selection of parts in stock.

Available parts have PM250 fiber and all have an FC/APC connector

LM-1530-1570-100      100mW DFBs in the range 1530nm to 1570nm wavelength (191.0 to 191.9 THz frequency) with polarization maintaining 250-micron tight fiber

LM-1530-1570-080      80mW DFBs in the range 1530nm to 1570nm wavelength (191.0 to 191.9 THz frequency) with polarization maintaining 250-micron tight fiber