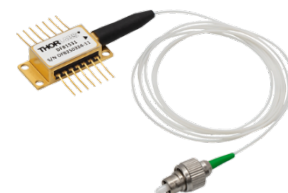


1531 nm, 10 mW (Min) DFB Butterfly Laser with Isolator, SM Fiber

DFB1531



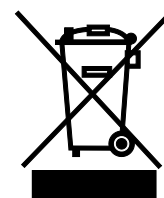
Description

Thorlabs' DFB1531 Distributed Feedback (DFB) laser is a single-frequency laser diode that is well-suited as a low-noise pump source for near infrared spectroscopy (NIRS), specifically ammonia and acetylene sensing. The DFB1531 laser includes an integrated optical isolator, thermoelectric cooler (TEC), thermistor, and monitor photodiode. It is packaged in a 14-pin butterfly package with SM-G652D optical fiber and an FC/APC connector.

Specifications

DFB1531 ^a				
	Symbol	Min	Typical	Max
Center Wavelength	λ_C	1530 nm	1531 nm	1532 nm
Laser Linewidth	$\Delta\nu$	-	2 MHz	-
Output Power CW @ I_{OP}	P_{OP}	10 mW	-	-
Forward Voltage	V_F	-	-	3.0 V
Operating Current	I_{OP}	-	-	100 mA
Mode-Hop-Free Operating Current ^b	$\Delta I_{\text{Mode-Hop-Free}}$	20 mA	-	-
SMSR in Mode-Hop-Free Range ^c	SMSR	30 dB	50 dB	-
Threshold Current	I_{TH}	-	6 mA	-
Slope Efficiency	$\Delta P / \Delta I$	-	0.20 W/A	-
Current Tuning	$\Delta \lambda / \Delta I$	-	0.01 nm/mA	-
Temperature Tuning	$\Delta \lambda / \Delta T$	-	0.1 nm/°C	-
Monitor Diode Responsivity	I_{MON} / P	-	3.7 $\mu\text{A/mW}$	-
Internal Isolation	ISO	40 dB	-	-
TEC Operation (Typical / Max @ $T_{CASE} = 25^\circ\text{C} / 75^\circ\text{C}$)				
TEC Current	I_{TEC}	-	0.06 A	2.0 A
TEC Voltage	V_{TEC}	-	0.20 V	4.0 V
Thermistor Resistance @ 25°C	R_{TH}	-	10 k Ω	-

- $T_{CASE} = 25^\circ\text{C}$; $T_{CHIP} = 15 - 35^\circ\text{C}$.
- The current range where mode-hops are not observed, allowing for continuous tuning.
- As measured with an optical spectrum analyzer (OSA) with spectral resolution of 0.02 nm to empirically determine single frequency range. Laser 30 dB bandwidth and SMSR are subject to monochromator settings and OSA internal algorithms and will differ from instrument to instrument.



Absolute Maximum Ratings

Laser Current ^a	See Serialized Datasheet
Laser Power ^a	See Serialized Datasheet
LD Reverse Voltage	2 V
TEC Current	2.6 A
TEC Voltage	4.7 V
PD Reverse Voltage	5 V
Operating Case Temperature	-5 to 75 °C
Operating Chip Temperature	15 to 35 °C
Storage Temperature	-40 to 85 °C

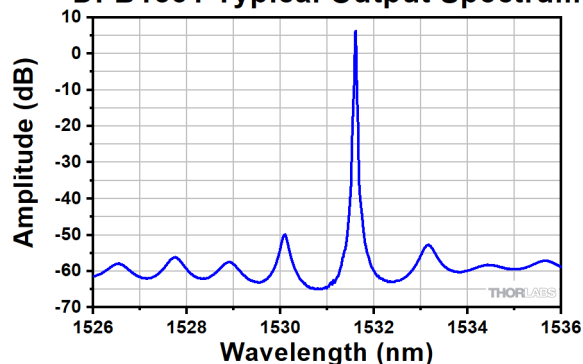
- a. Some devices will produce the max laser power before reaching the max operating current. Do not drive the laser diode beyond the absolute max laser current or power. Operating in this regime can cause damage to the device.

Fiber Specifications

Fiber Type	SM-G652D
Numerical Aperture	0.14
Core Diameter	8.2 μm
Mode Field Diameter	10.4 $\pm$ 0.5 μm at 1550 nm
Fiber Length	1.0 m $\pm$ 0.1 m
Connector	FC/APC, 2.0 mm Narrow Key
Jacket	$\varnothing$ 900 μm , Tight Tube

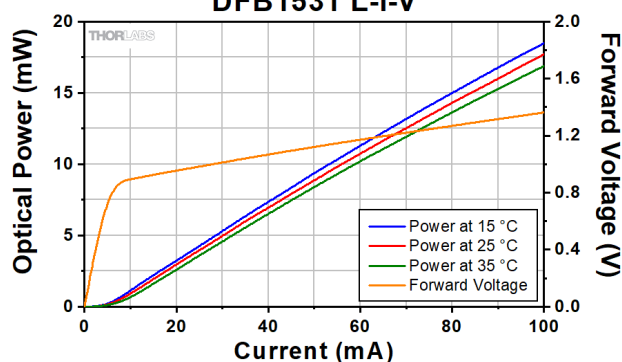
Typical Performance Plots

DFB1531 Typical Output Spectrum

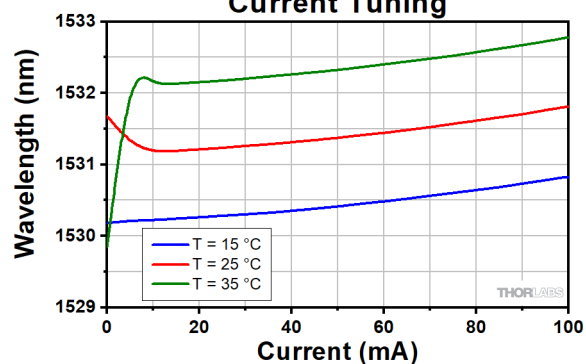


The spectrum was measured using an optical spectrum analyzer with a spectral resolution of 0.02 nm.

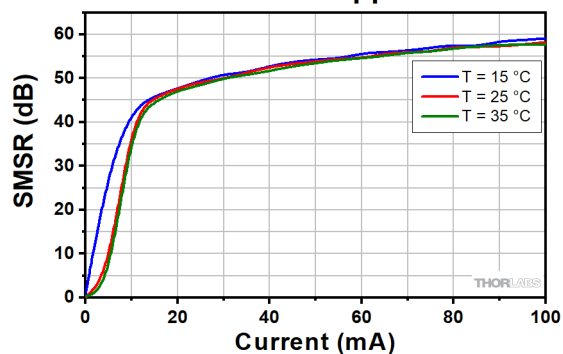
DFB1531 L-I-V



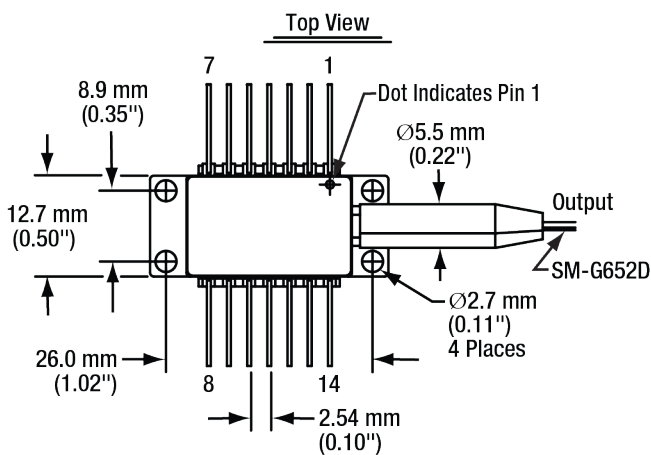
DFB1531 Temperature and Current Tuning



DFB1531 Side Mode Suppression Ratio



Drawings



PIN IDENTIFICATION

- | | |
|---------------|----------------|
| 1. TEC + | 14. TEC - |
| 2. Thermistor | 13. Case |
| 3. PD Anode | 12. NC |
| 4. PD Cathode | 11. LD Cathode |
| 5. Thermistor | 10. LD Anode |
| 6. NC | 9. NC |
| 7. NC | 8. NC |

