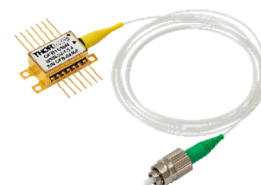


1654 nm, 80 mW (Typ.) DFB Butterfly Laser with Isolator, SM Fiber

DFB1654



Description

Thorlabs' DFB1654 Distributed Feedback (DFB) laser is a single-frequency laser diode that is well-suited as a low-noise pump source for Methane gas sensing, near infrared spectroscopy (NIRS), and general sensing. The DFB1654 laser includes an integrated dual-stage optical isolator, thermoelectric cooler (TEC), thermistor, and monitor photodiode. It is packaged in a 14-pin butterfly package with SMF28e optical fiber and an FC/APC connector with the connector key aligned to the slow axis of the fiber.

Specifications

DFB1654 ^a				
	Symbol	Min	Typical	Max
Center Wavelength	λ_c	1649 nm	1654 nm	1659 nm
Laser Linewidth	$\Delta\nu$	-	50 kHz	-
Output Power CW @ I_{OP}	P_{OP}	70 mW	80 mW	-
Operating Current	I_{OP}	-	-	900 mA
Mode-Hop-Free Operating Current ^b	$\Delta I_{\text{Mode-Hop-Free}}$	350 mA	-	-
SMSR in Mode-Hop-Free Range ^c	SMSR	30 dB	50 dB	-
Threshold Current	I_{TH}	-	50 mA	-
Forward Voltage	V_F	-	-	3.0 V
Slope Efficiency	$\Delta P / \Delta I$	-	0.11 W/A	-
Current Tuning	$\Delta \lambda / \Delta I$	-	0.005 nm/mA	-
Temperature Tuning	$\Delta \lambda / \Delta T$	-	0.11 nm/°C	-
Monitor Diode Responsivity	I_{MON} / P	-	5 $\mu\text{A/mW}$	-
Internal Isolation	ISO	-	50 dB	-
TEC Operation (Typical / Max @ $T_{CASE} = 25^\circ\text{C} / 50^\circ\text{C}$)				
TEC Current	I_{TEC}	-	0.45 A	2.3 A
TEC Voltage	V_{TEC}	-	0.60 V	3.8 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

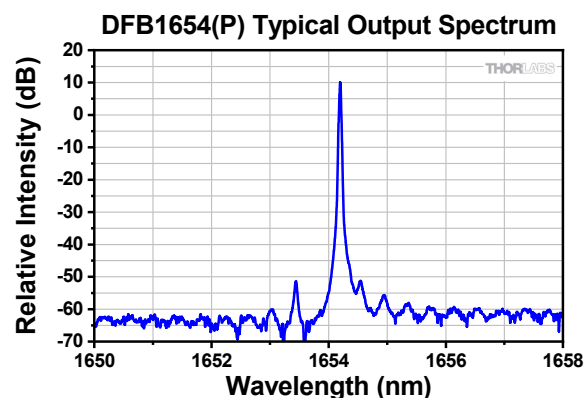
Laser Current ^a	See Serialized Datasheet
Laser Power ^a	See Serialized Datasheet
LD Reverse Voltage	2 V
TEC Current	2.5 A
TEC Voltage	4.0 V
PD Reverse Voltage	15 V
Operating Case Temperature	0 to 50 °C
Operating Chip Temperature	15 to 35 °C
Storage Temperature	-10 to 65 °C

- a. Some devices will produce the max laser power before exceeding the typical 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.

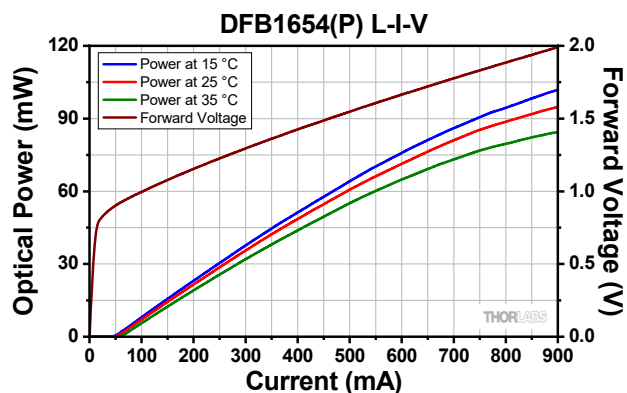
Fiber Specifications

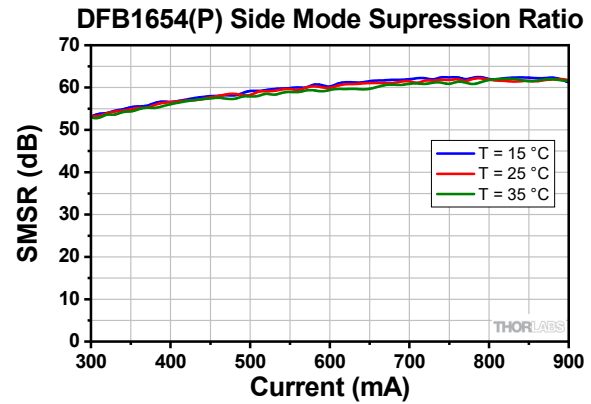
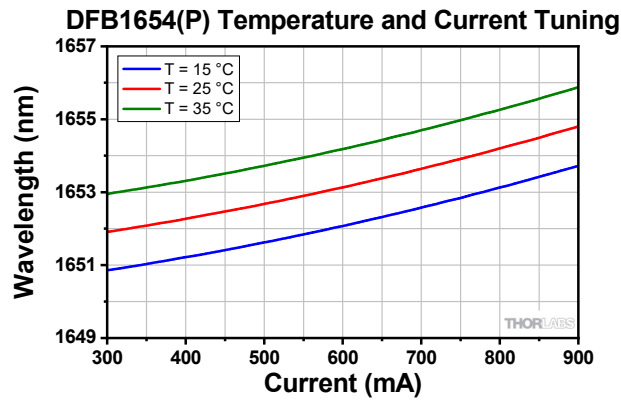
Fiber Type	SMF-28e
Numerical Aperture	0.14
Core Diameter	8.2 μm
Mode Field Diameter	10.4 $\pm$ 0.5 μm at 1550 nm
Fiber Length	1.5 m
Connector	FC/APC, 2.0 mm Narrow Key
Jacket	$\varnothing$ 900 μm , Loose Tube

Typical Performance Plots

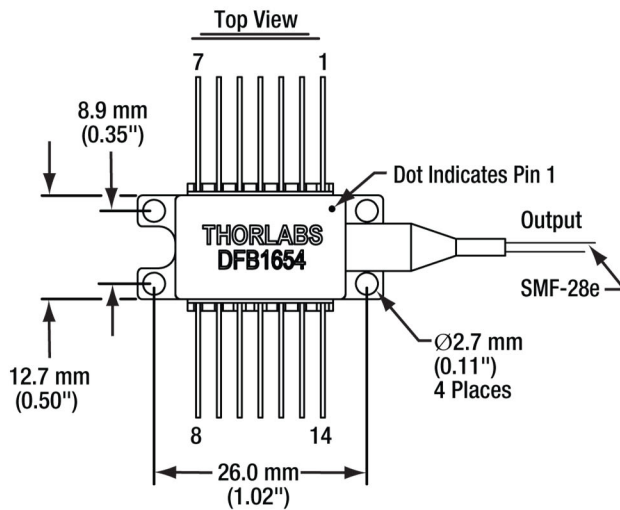


The spectrum was measured using an optical spectrum analyzer with a spectral resolution of 0.02 nm.





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

