



10G DFB 1310 nm Laser TOSA Package

Description

A 10 Gb/s edge-emitting laser diode in a TO-can package. The multi-quantum well distributed feedback (DFB) laser is directly modulated (DML) with an RF signal. This device includes a built-in photodiode monitor to enable auto-bias operation. Various build configurations allow users to customize the optical connector as well as the mounting brackets. The optical sub-assembly includes an isolator.

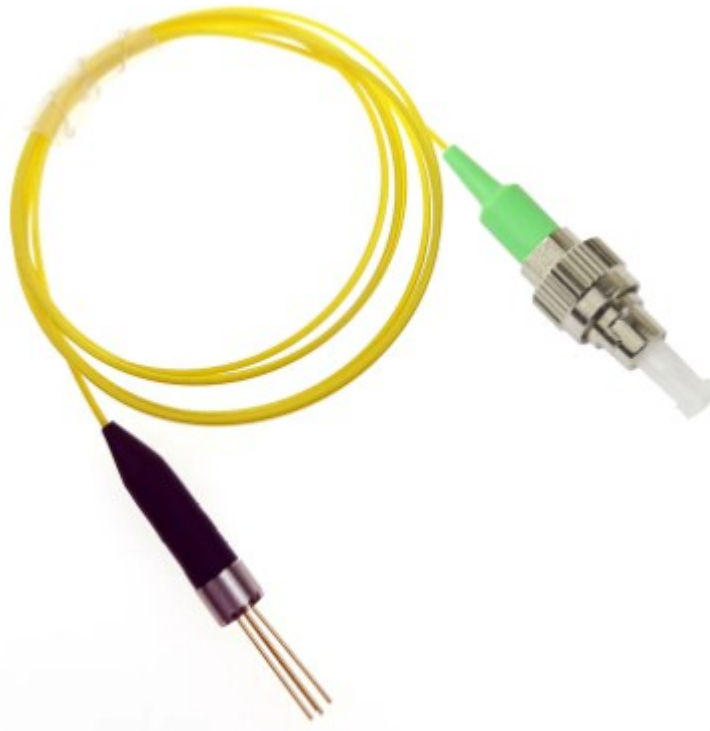
Features

- TO-can package
- Single mode optical cable
- 1310 nm CW
- High SFDR
- Built-in InGaAs monitor photodiode
- Wide temperature operating range
- Built-in optical Isolator



Applications

- Test and Measurement
- Datacenters
- RF over Fiber (RFoF)



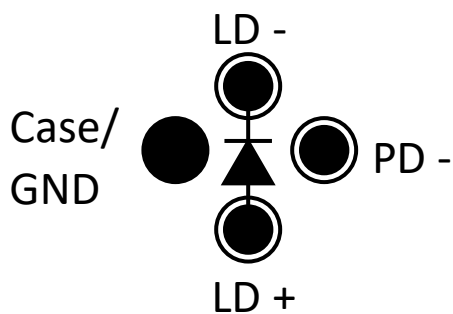
Electro-Optical Characteristics (T = 25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Peak Wavelength	λ	1305	1310	1315	nm	T=25 °C
Threshold Current	I_{th}	-	5	15	mA	T=25 °C
Front Power	P_o	-	3	-	mW	$I_f = I_{th} + 20$ mA
Slope Efficiency	η	0.15	-	-	W/A	$I_f = I_{th} + 20$ mA
Series Resistance	R	-	8	-	Ohms	$P_o = 3$ mW
Forward Voltage	V_f	-	1.1	1.5	V	$I_f = I_{th} + 20$ mA
Spectral Wavelength Width (RMS)	$\Delta\lambda$	-	0.5	-	nm	$P_o = 5$ mW at -20 dB
Frequency Bandwidth	BW	8	-	-	GHz	Designed RF board.
Side Mode Suppression Ratio	SMSR	30	-	-	dB	
Monitor Current	I_m	0.4	0.5	1.0	mA	$I_{op} = 30$ mA
Optical Return Loss	ORL	-	-	-30	dB	CW = 1310 nm
Tracking Error	T_e	-1.5	-	1.5	dB	-40 – 80 °C
Rise/Fall Time	T_r/T_f	-	0.2	-	ns	20-80%, $I_f = I_{th}$
Optical Isolation	ISO	30	-	-	dB	
Relative Intensity Noise	RIN	-	-	-130	dB/Hz	

Absolute Maximum Rating (T = 25°C)

Parameter	Symbol	Condition	Min.	Max.	Unit
Reverse Voltage	V_r	Laser	-	2	V
		Photodiode	-	10	
Forward Current	I_F	-	-	100	mA
Reverse Current	I_R	Photodiode	-	2	mA
Fiber Bend Radius	R	SMF28	30	-	mm
Storage Temperature	T_{stg}	-	-25	90	°C
Storage Humidity	H_{stg}	-	-	85	% r.H.
Operating Temperature	T_{op}	-	-25	80	°C
Soldering Temperature	T_{st}	60 sec	-	200	°C
ESD Susceptibility		HBM	100	-	V

Device Pin Configuration (Bottom View)

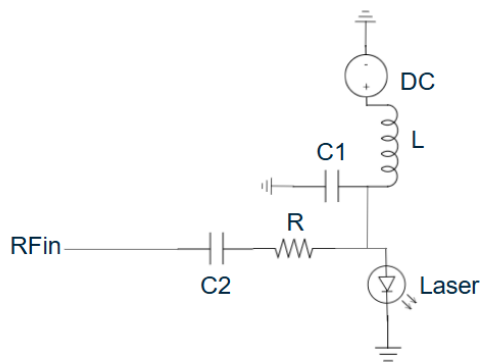


Build A: Standard Configuration

Pin Function:

- 1) Laser Anode
- 2) Photodiode Anode Tied to Case Ground
- 3) Laser Cathode
- 4) Monitor PD Cathode





Test Circuit Configuration

L – 1.7 μ H Coil inductor (Rated 26 GHz)

C1 – 47 nF 0201 RF Capacitor

C2 – 2.2 μ F 0402 RF Capacitor

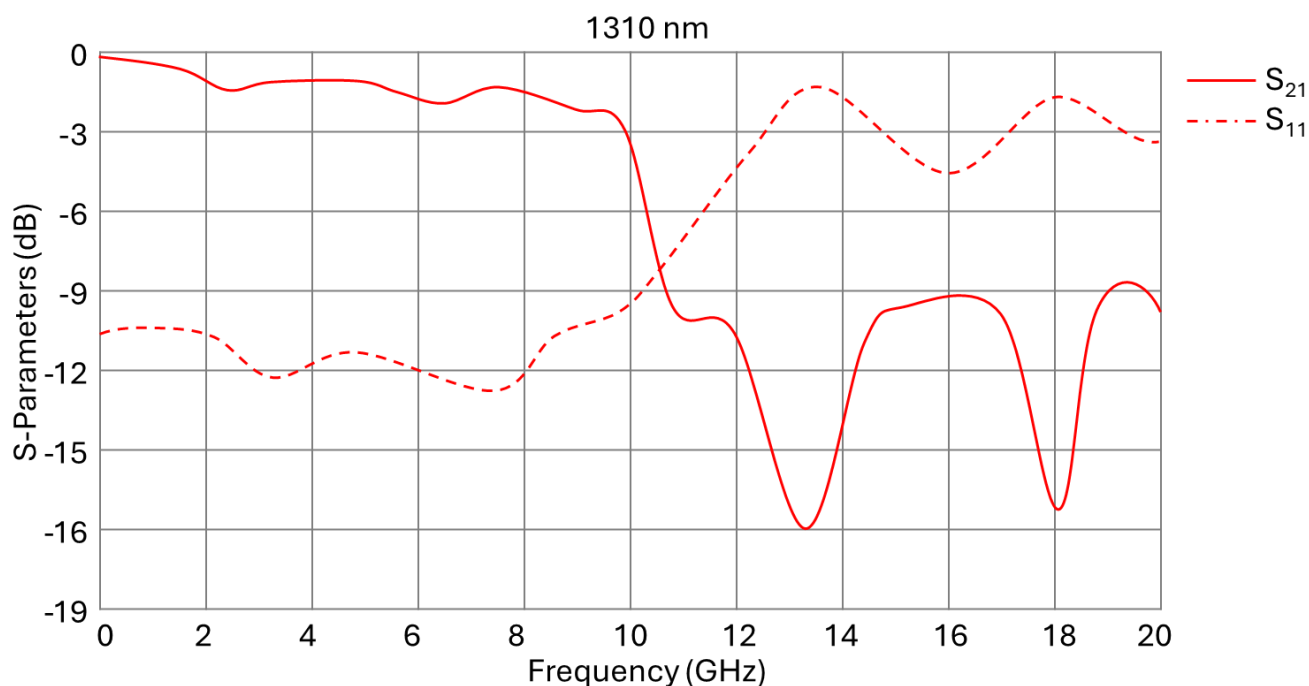
R – 4 Ω 0402 RF Resistor

Microstrip traces - 50 Ω ground backed coplanar waveguide (GB-CPW)

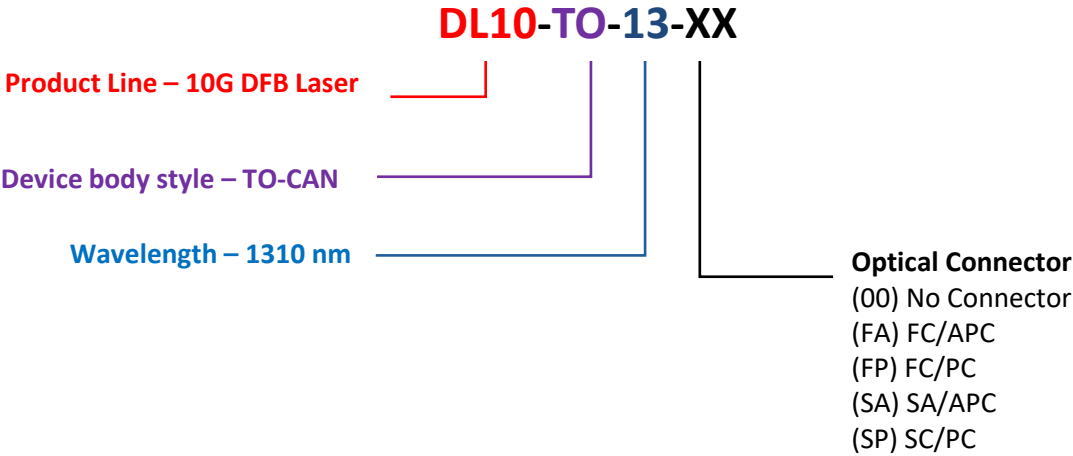
Engineering Notes:

The DFB laser diode is an 8 Ω series device. Impedance matching can be challenging over wide bandwidths. To improve S11 impedance matching, a series SMD resistor (R) may be added to reduce S11 below -10 dB. Limiting R to less than 5 Ω helps minimize additional S21 losses. If a flatter S21 response is desired, capacitor C1 can be incorporated into the matching network. Optimizing the balance between R and C1 will result in improved S11 matching and a flatter S21 response.

Typical Performance Curves (Top = 25oC $\pm$ 3oC, 401 Pts, 16 Avgs, 1.5% Smoothing)



Device Nomenclature



Example – DL10-TO-13-FA
10G DFB 1310 nm Laser TO-CAN FC/APC



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Obsolete – Device is no longer in production and is not supported.

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Revision History

1.1 – March 2026 – Grammatical and spelling error correction. Updated Disclaimer section

1.0 – August 2024 – Initial Release