10G DFB 1550 nm Laser TOSA Package

Description

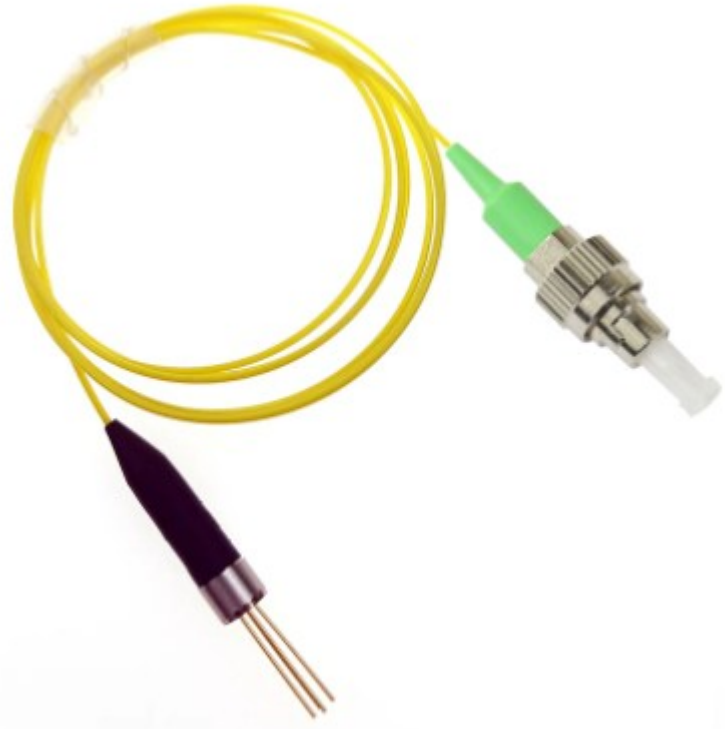
A 10 Gb/s edge-emitting laser diode in a TO-can package. The multi-quantum well distributed feedback (DFB) laser is directly modulated (DML) with an RF signal. This device includes a built-in photodiode monitor to enable auto-bias operation. Various build configurations allow users to customize the optical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

Features

- TO-Can package
- Single mode Pigtail cable
- 1550 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)



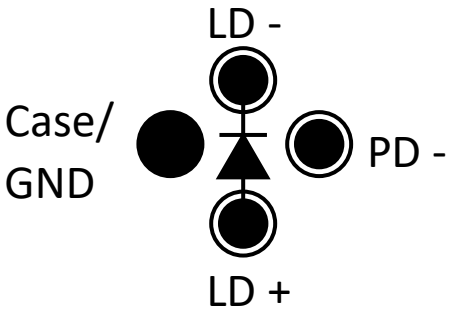
Electro-Optical Characteristics (T = 25°C**)**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Test Conditions
Peak Wavelength	λ	1542	1550	1558	nm	
Threshold Current	I_{th}		5	15	mA	T=25 °C
Front Power	P_o		10		mW	$I_f = I_{th}$ + 20 mA
Slope Efficiency	η	0.15			W/A	$I_f = I_{th}$ + 20 mA
Series Resistance	R		12		Ohms	P_o = 8 mW
Forward Voltage	V_f		1.1	1.5	V	$I_f = I_{th}$ + 20 mA
Spectral Wavelength Width (RMS)	Δλ		0.5		nm	P_O = 5mW at -20 dB
Frequency Bandwidth	BW	8			GHz	Designed RF board.
Side Mode Suppression Ratio	SMSR	30			dB	
Monitor Current	Im	0.4	0.5	1.0	mA	Iop = 30 mA
Optical Return Loss	ORL			-30	dB	CW = 1310 nm
Tracking Error	Te	-1.5		1.5	dB	-40 – 80 °C
Rise/Fall Time	Tr/Tf		0.2		ns	20-80%, If = Ith
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 Photodiode	-	2 10	V
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)

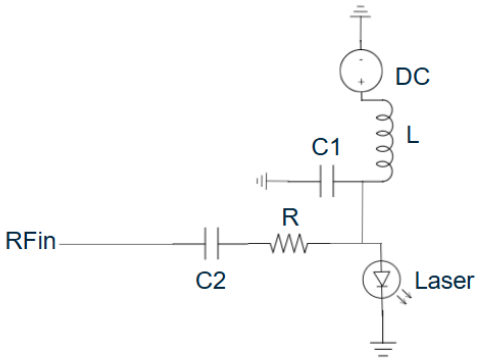


Build A: Standard Configuration

Pin Function:

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

Recommended RF Circuit (Dielectric material - Rogers RO3003® ξ_r – 3.00 Tan-δ - 0.001)



Test Circuit Configuration

L – 1.7 µH Coil inductor (Rated 26 GHz)

C1 – 47 nF 0201 RF Capacitor

C2 – 2.2 µF 0402 RF Capacitor

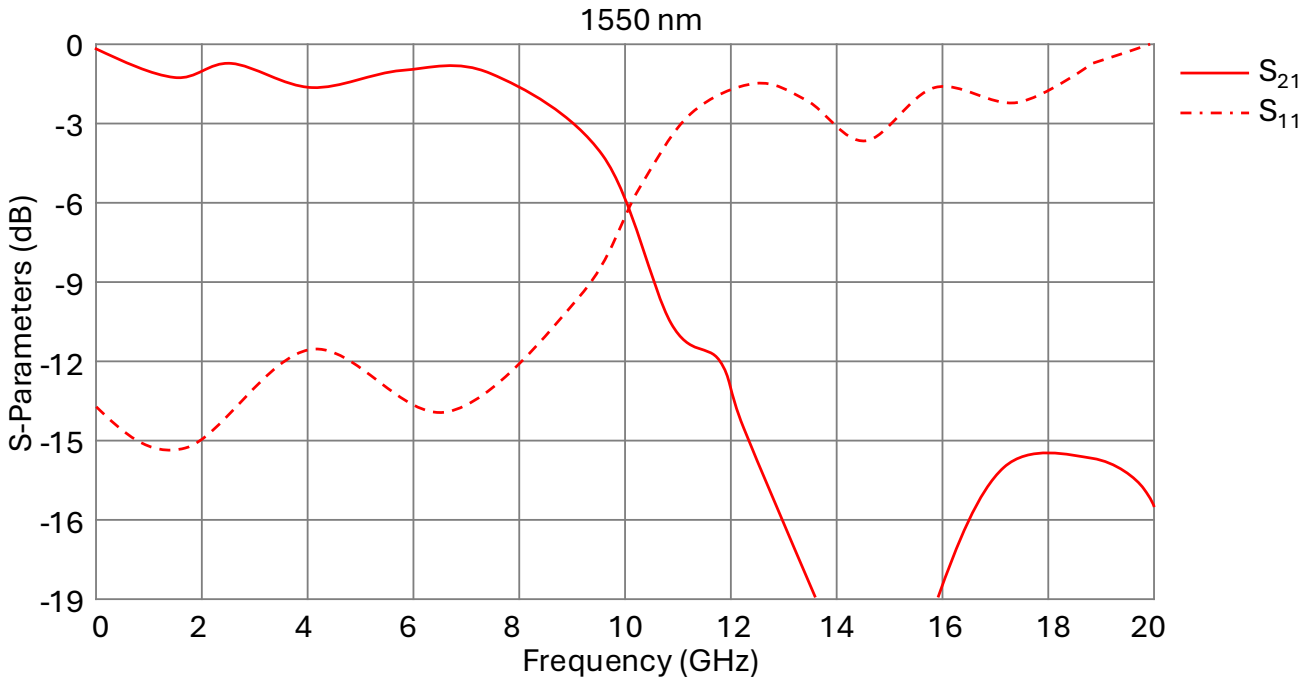
R – 2 Ω 0402 RF Resistor

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

Engineering Notes:

The DFB laser diode is a 12 Ω series device. Impedance matching the device can be difficult for large bandwidths. To improve S11 impedance matching, a series SMD resistor **R** can be placed which will help lower the S11 < -10 dB. Limiting **R** < 5 Ω will help minimize S21 additional losses. If a flatter S21 is more desirable, **C1** can be added to the impedance matching structure. Balancing **R** and **C1** will yield a flatter S21 response with better S11 matching.

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



Device Nomenclature

DL10-15-TO-X-XX-X

Product Line – 10G DFB Laser

Wavelength – 1550 nm

Device body style – TO-CAN

Device Mounting Support
A) No Mount
B) Horizontal Mount
C) Vertical Mount
D) Horizontal threaded

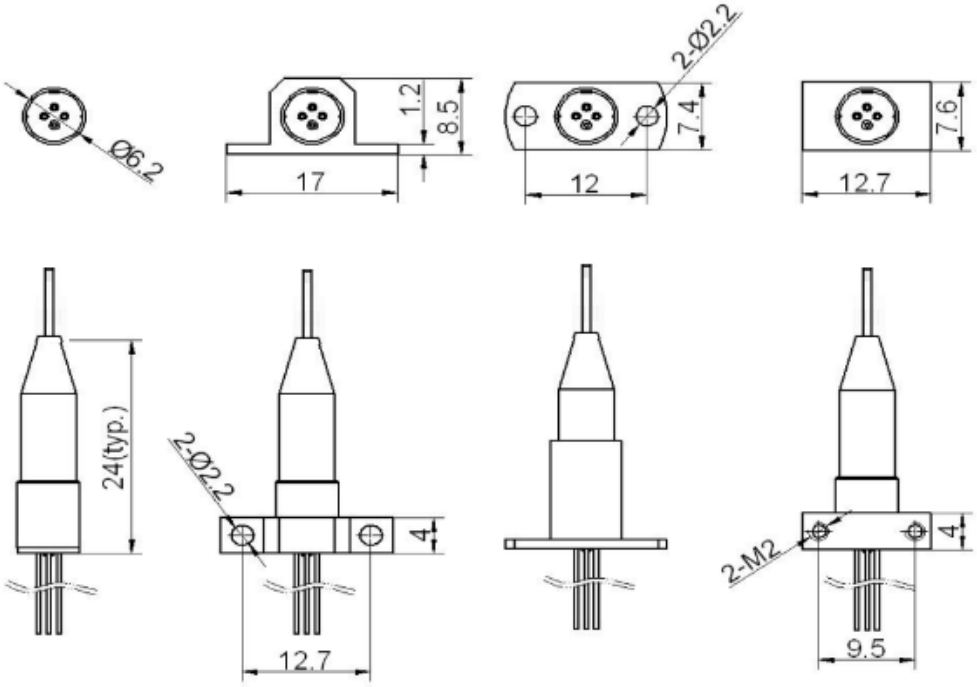
Pin Configuration
A) Standard Pinout
B) Custom Pinout

Optical Connector
(00) No Connector
(FA) FC/APC
(FP) FC/PC
(SA) SA/APC
(SP) SC/PC

Example – DL10-15-TO-A-FA-A

10G DFB 1550 nm Laser TO-CAN No Mount FC/APC standard pinout

Build Configuration - Mounting



(a) (b) (c) (d)

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Revision History

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

1.0 – August 2024 – Initial Release