DATA SHEET

Semiconductor Laser Module

ORTEL® CORPORATION

1541A 10 GHz DFB LASER MODULE WITH OPTICAL ISOLATOR

- **Distributed feedback (DFB) laser**
- **Built-in optical isolator**
- **Designed for analog transmission**
- **Reduced sensitivity to optical reflections**
- **Low link loss**
- **1310 nm, singlemode fiber pigtail**

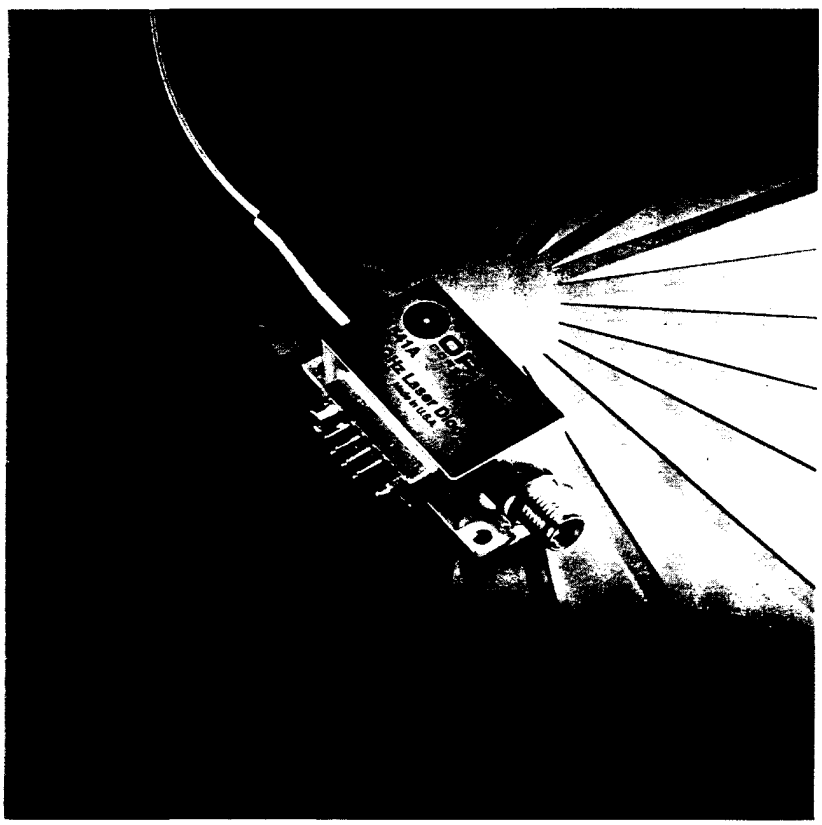
Product Advantages

The Ortel Model 1541A 10 GHz Laser Module transmits analog microwave signals over singlemode fiber at 1310 nm optical wavelength.

The DFB (distributed feedback) laser has a single optical line so that dispersive effects are virtually non-existent allowing higher quality transmission over much longer distances.

With the built-in optical isolator, the effects of optical reflections are greatly reduced, which permits considerably higher laser to fiber coupling efficiency without excess noise generation. This reduces the overall electrical loss in the fiberoptic link by about 10 dB compared to a standard non-isolated laser and reduces the fiberoptic receiver noise for long links. The inclusion of the optical isolator also minimizes laser noise due to bulk fiber backscattering. It also permits the use of a wider range of optical connectors.

The above advantages, combined with the intrinsically higher performance of DFB lasers results in a product that can serve a wide variety of high dynamic range, long distance applications. Some of these applications include telemetry/tracking links, microwave delay lines, satellite antenna remoting, and two-way communications.



Product Specifications		1541A
RF Parameters[1,2]		
Frequency Range		0.1 to 10.0 GHz
Option −001		0.01 to 10.0 GHz
Amplitude Flatness		±2.5 dB
Option -001 (>10 MHz)		±3.0 dB
Input Impedance		50 Ω
Input VSWR		<1.5:1 (return loss >14 dB)
Input 1 dB Compression Point (typ.)		> +13 dBm
Input Third Order Intercept (Two Carrier Test)	0.01 to 2.0 GHz	> +35 dBm
	2.0 to 4.0 GHz	> +30 dBm
	4.0 to 10.0 GHz	> +25 dBm
Equivalent Input Noise (No Input Signal)	0.01 to 3.0 GHz	<−130 dBm/Hz
	3.0 to 6.0 GHz	<−125 dBm/Hz
	6.0 to 10.0 GHz	<−120 dBm/Hz
Signal to Noise Ratio[3]	0.01 to 3.0 GHz	>80 dB
	3.0 to 6.0 GHz	>75 dB
	6.0 to 10.0 GHz	>70 dB
Optical Parameters[1, 2]		
Wavelength		1310 ± 30 nm
Spectral Width (FWHM - no rf input) (typ.)		<10 MHz
Output Power (at operating bias)		2.4 mW (min.)
DC Modulation Gain		0.06 to 0.2 W/A
Relative Intensity Noise (typ.) (laser bias 40 mA above threshold)	0.01 to 3.0 GHz	<−149 dB/Hz
	3.0 to 6.0 GHz	<−144 dB/Hz
	6.0 to 10.0 GHz	<−139 dB/Hz
Optical Power Stability (constant monitor photodiode current)		±15%
Fiber		Singlemode (9/125)
DC Parameters		
Laser Bias Threshold		<35 mA
Laser Bias		100 mA (max.), 70 mA (typ.)
Laser Bias Voltage		6 V @ 50 mA above threshold
Monitor Photodiode Current		200 μA (min.)
TE Cooler Current (substrate @ 25° C)		≥−1.1 A @ −40° C
		≤ +1.4 A @ +55° C
Thermistor Resistance		10 kΩ ± 1 kΩ @ +25° C
Thermistor Temperature Coefficient (typ.)		−4.4%/° C

1 Specifications guaranteed when unit is connected to an optical path with return loss >35 dB.

2 Specifications are for laser bias at operating current.

3 +10 dBm rf input, measured in 1 MHz bandwidth.

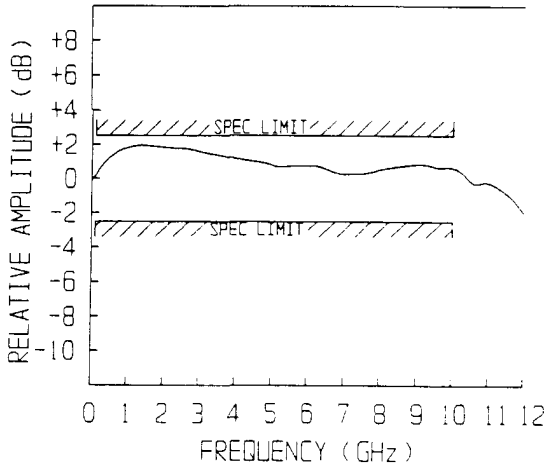
Specifications describe warranted performance. Typical values, indicated by (typ.), provide expected levels of performance, but are not guaranteed.

Maximum Ratings	
Operating Case Temperature	−40 to +65° C
Storage Temperature	−55 to +85° C
RF Input Power	+20 dBm/60 sec.
Laser Reverse Bias Voltage	1 V, dc bias or rf input
Laser Bias Forward Current	120 mA (60 sec. duration)
Monitor Photodiode Reverse Voltage	15 V

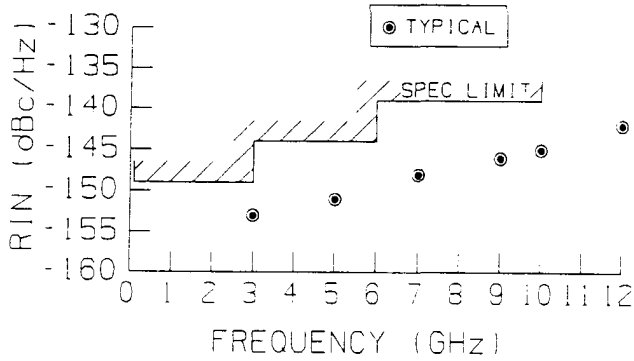
Specifications describe warranted performance. Typical values, indicated by (typ.), provide expected levels of performance, but are not guaranteed.

The following operating characteristics are useful for estimating the performance that can be obtained from a typical unit.

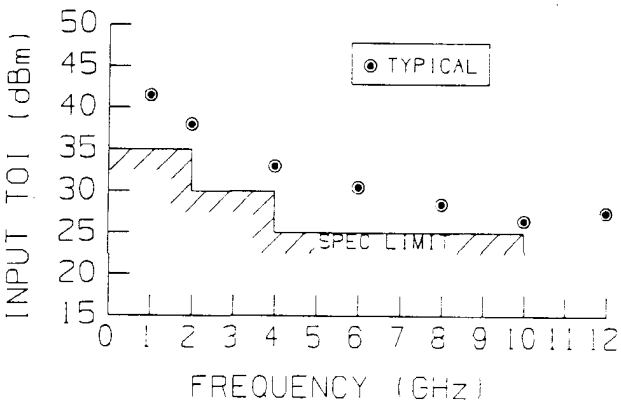
1541A Amplitude Response



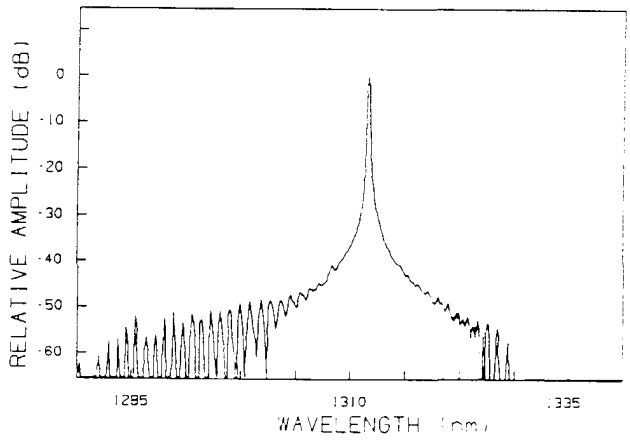
Relative Intensity Noise (RIN) vs. Frequency



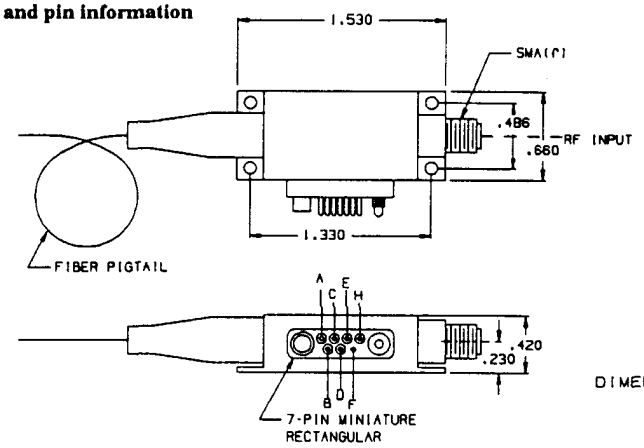
Input Third Order Intercept vs. Frequency



Optical Spectrum



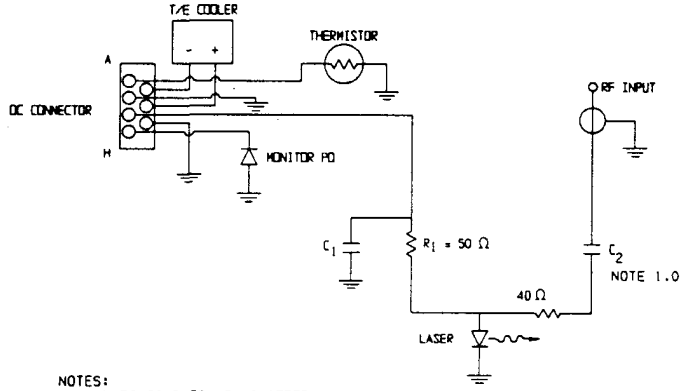
Outline drawing and pin information



PIN	FUNCTION
A	THERMISTOR
B	T/E COOLER (-)
C	THERMISTOR
D	T/E COOLER (+)
E	LASER BIAS
F	GROUND
H	MONITOR PHOTODIODE

DIMENSIONS ARE IN INCHES

Schematic



NOTES:
1.0 DC COUPLED, C_2 OMITTED

Safety Considerations

The light emitted from this laser diode is invisible and may be harmful to the human eye. Avoid looking directly into the fiber pigtail or into the collimated beam along its axis when the device is in operation. Operating the laser diode outside of its maximum ratings may cause device failure or a safety hazard.

Ordering Information

Contact your Ortel sales representative for information on price and delivery.

Model Numbers

1541A – 10 GHz Laser Module with Optical Isolator

Options:

– 001: dc coupled input - extends frequency response to < 10 MHz

– 032: add FC/APC optical connector to fiber

Making Light *Work* For You

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