DX21AF: 21 GHz Photodetector Module

Features

- DC - 21 GHz Bandwidth
- 20 ps Impulse Response
- 780 nm - 1650 nm Sensitivity
- SMF-28 Input Fiber
- 2.92 mm Coaxial Output Connector
- 50 Ω Reverse Termination

Applications

- Test and Measurement
- High-Speed Communications
- Microwave Photonics
- OEM Integration



DX21AF

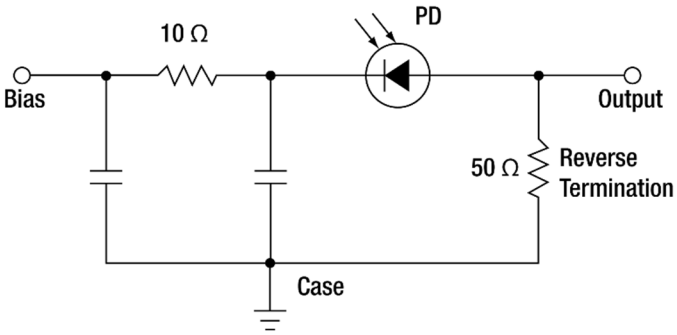
Description of Models

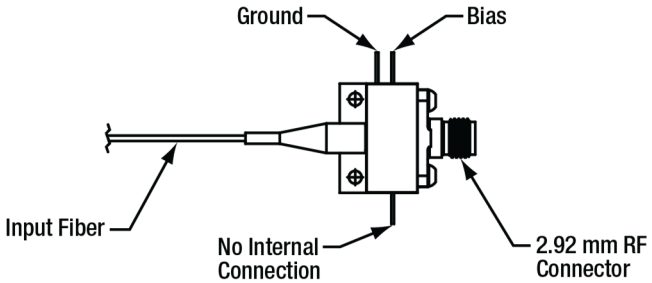
The DX21AF Photodetector is a hermetically sealed detector module with a 21 GHz bandwidth that uses an InGaAs-based photodetector for applications in the 780 nm to 1650 nm wavelength range. The module is supplied with an SM fiber optic input with a narrow key (2.0 mm) FC/PC connector. Signal output is provided via a field-replaceable, female, 2.92 mm RF connector, which may be connected to a measurement instrument with suitable adapters or cables. Order using the following model number:

- **DX21AF** DX21 Series Module with SM Input Fiber (SMF-28), Yellow Buffer, and FC/PC Connector

A version with FC/APC connectors is available upon request by contacting techsales@thorlabs.com (Item # DX21AA). Specifications are identical to the FC/PC version.

Block Diagram





Absolute Maximum Ratings

Parameter	Min	Typical	Max	Unit	Note
Optical Input Power, Average	-	-	10	dBm	-
Optical Input Power, Peak	-	-	13	dBm	50% Duty Cycle
Photodiode Bias Voltage	-	-	5	V	-
Fiber Bend Radius	15	-	-	mm	Breakage

Operating Conditions

Parameter	Min	Typical	Max	Unit	Note
Operating Temperature	0	-	70	°C	-
Storage Temperature	-40	-	75	°C	-
Relative Humidity	-	-	85	%	Non-Condensing
Photodiode Bias Voltage	3	4	5	V	-

O-E Specifications

All specifications are at 25 °C and at 1550 nm unless noted.

Parameter	Min	Typical	Max	Unit	Note
Wavelength Range	780	-	1650	nm	See Performance Graphs for Full Spectral Response
-3 dB Bandwidth	-	21	-	GHz	-
Low Frequency Cutoff	-	DC	-	-	-
Impulse Response	-	20	-	ps	FWHM at 1560 nm
Impulse Undershoot	-	<15	-	%	At 1560 nm
Responsivity	-	0.9	-	A/W	-
Conversion Gain	-	22.5	-	V/W	Across External 50 Ω Load
Noise-Equivalent Power (NEP)	-	28	-	pW/√Hz	The NEP is limited by the thermal noise of the combined internal and external load resistors (25 Ω).
Optical Return Loss	-	-	-25	dB	-
Dark Current	-	-	50	nA	-
Reverse Termination Impedance	45	50	55	Ω	RF Output
Electrical Return Loss	-	-10	-	dB	To 10 GHz
	-	-4.5	-	dB	To 21 GHz

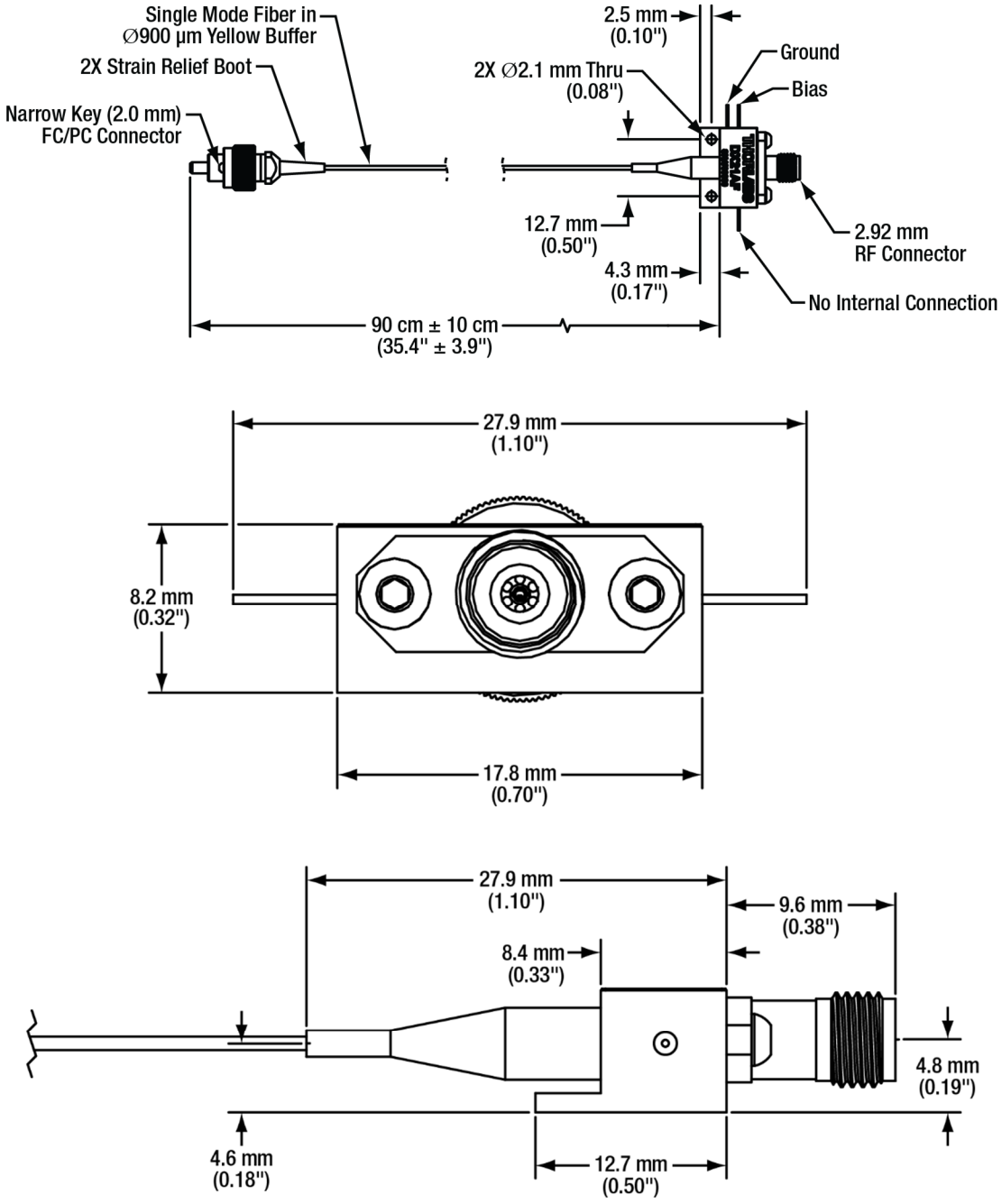
Qualification Testing

Parameter	Conditions
Mechanical Shock	500 g, Six Axes, 5 Times
Thermal Cycling	100 Cycles, 0 °C to 70 °C
Temperature Storage	100 hours at -40 °C
Fiber Pull	Straight Pull: 0.5 kg, 60 s Side Pull: 0.25 kg, 10 s, 4 Directions

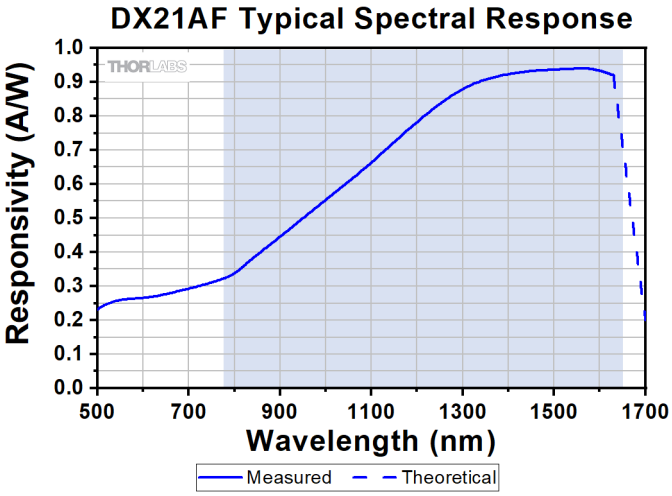
MECHANICAL & PIN-OUT

Parameter	Value
Fiber Connector	2.0 mm Narrow Key FC/PC
Fiber Type	SMF-28
Fiber Length	90 cm ± 10 cm
Fiber Buffer	Ø900 µm, Yellow
RF Output Connector	Female 2.92 mm, 50 Ω, Field Replaceable
Lead Soldering	Max 10 s at 250 °C per Lead

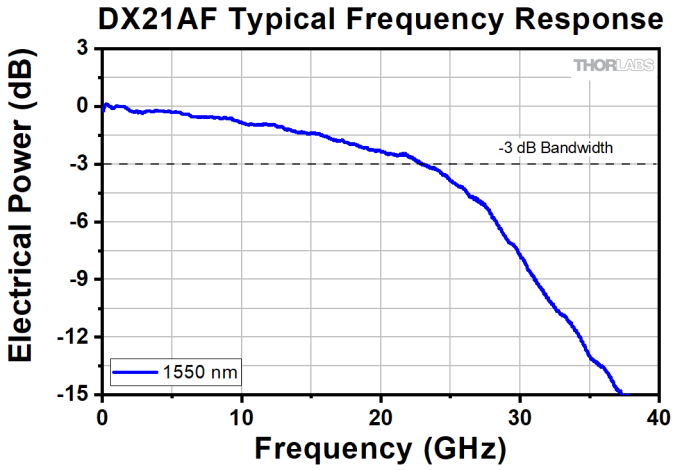
MECHANICAL DRAWINGS

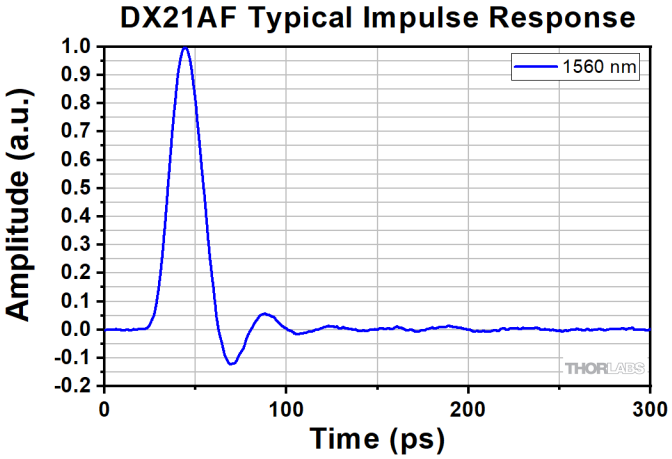


Typical Performance Graphs

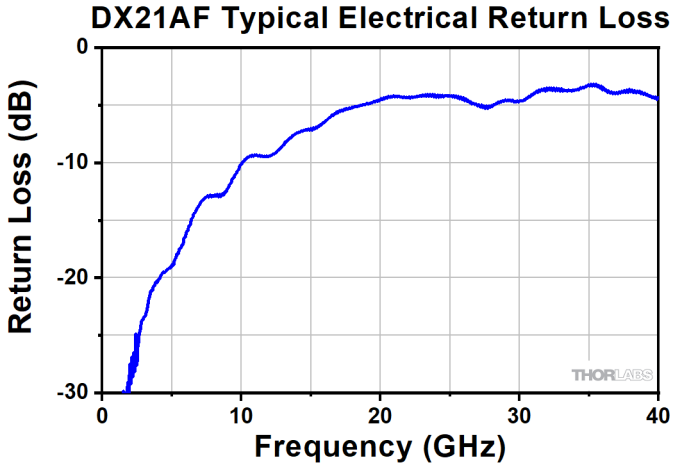


The blue-shaded region indicates the wavelength range.





Pulse measured on a 70 GHz sampling scope.
Scope response not deconvolved.



Precautions



The components inside this module are ESD sensitive. Take all appropriate precautions to discharge personnel and equipment before making any electrical connections to the unit. This also applies to coaxial cables that easily accumulate capacitive change.

Manufacturing and Compliance

Manufactured by: Thorlabs Inc., Ann Arbor, MI 48103 USA

All specifications are subject to change without notice.

