

Si free-space balanced photodetector

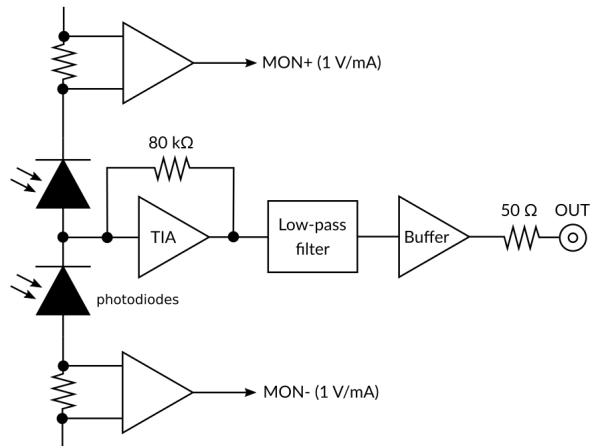


Koheron PDX10B-SI is a Si free-space balanced photodetector with 80 kV/A transimpedance gain and 8 MHz bandwidth. With a noise-equivalent power spectral density of only 1 pW/ $\sqrt{\text{Hz}}$ at 800 nm and the capability to reject laser common mode noise, the photodetector can be shot-noise limited even at a low input signal level. A monitoring input signal is provided for each photodiode to assist with beam alignment and power balancing.

Specifications

	PDX10B-80-DC-SI	PDX10B-3-DC-SI
Detector		
Detector type	Si PIN photodiode	Si PIN photodiode
Active diameter	800 μm	800 μm
Wavelength range	320 nm to 1000 nm	320 nm to 1000 nm
Optical input power	0 mW to 3 mW	0 mW to 3 mW
Photodiode peak responsivity (800 nm)	0.55 A/W	0.55 A/W
Transimpedance amplifier		
Small signal bandwidth	0 Hz to 8 MHz at 3 dB	0 Hz to 50 MHz at 3 dB
Coupling	DC	DC
Transimpedance gain	80 kV/A	3 kV/A
Noise Equivalent Power	1.4 pW/ $\sqrt{\text{Hz}}$ (at 1 MHz)	6 pW/ $\sqrt{\text{Hz}}$ (at 1 MHz)
Output voltage range (high impedance)	-8.0 V to 8.0 V	-8.0 V to 8.0 V
Output voltage range (50 Ω)	-3.8 V to 3.8 V	-3.8 V to 3.8 V
Output impedance	50 Ω	50 Ω
Output	SMA female connector	SMA female connector
Monitoring (MON+ / MON-)		
Gain	1 V/mA	1 V/mA
Bandwidth	4 kHz	4 kHz
Output impedance	1 k Ω	1 k Ω
Power supplies		
Positive supply voltage	5.5 V to 9 V (nominal 6 V)	5.5 V to 9 V (nominal 6 V)
Negative supply voltage	-9 V to -5.5 V (nominal -6 V)	-9 V to -5.5 V (nominal -6 V)
Quiescent current	35 mA per rail	35 mA per rail
Maximum current	100 mA per rail	100 mA per rail
Other		
Outside dimensions	49 mm x 40 mm x 18 mm	49 mm x 40 mm x 18 mm
Operating temperature	0 $^{\circ}\text{C}$ to 50 $^{\circ}\text{C}$	0 $^{\circ}\text{C}$ to 50 $^{\circ}\text{C}$
Weight	29 g	29 g

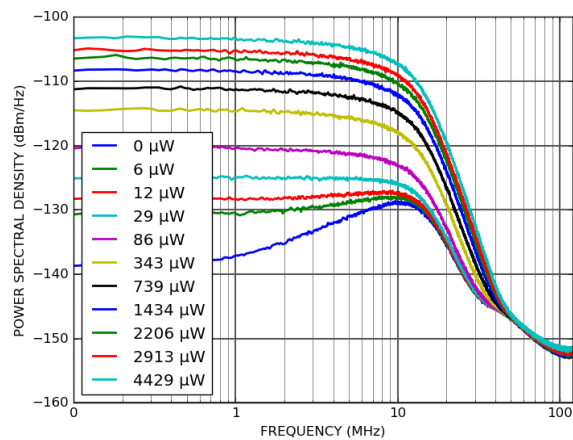
Functional diagram



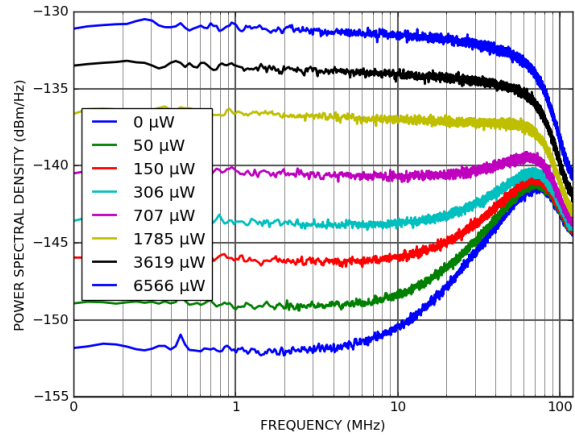
Characterization

Output power spectral density

The power spectral density of the PDX10B-80-DC-SI free-space balanced photodetector output was measured for different incident optical powers. Optical source is a pair of 810 nm LEDs driven by a [Koheron DRV110-A-375 laser driver](#). Power spectrum is measured using the [Koheron ALPHA250](#) FFT analyzer.

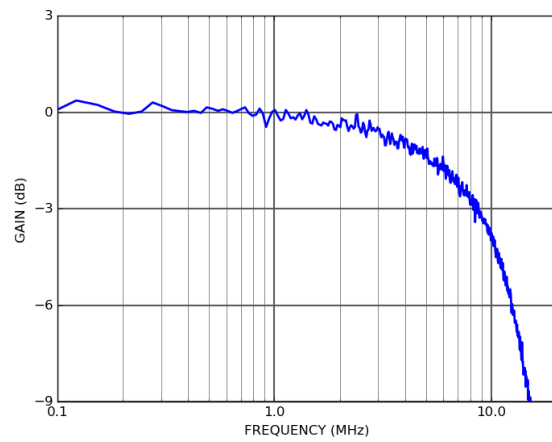


PDX10B-80-DC-SI output power spectral density

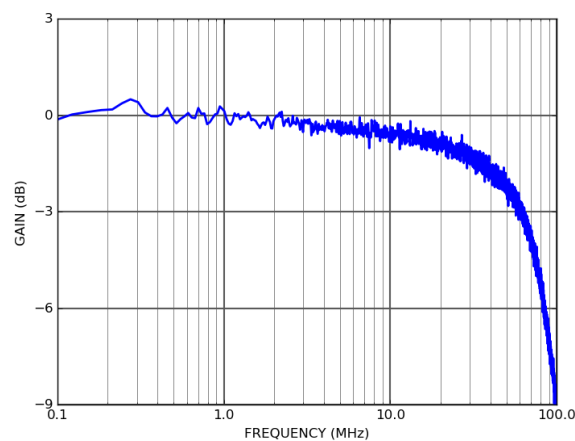


PDX10B-3-DC-SI output power spectral density

Small signal frequency response



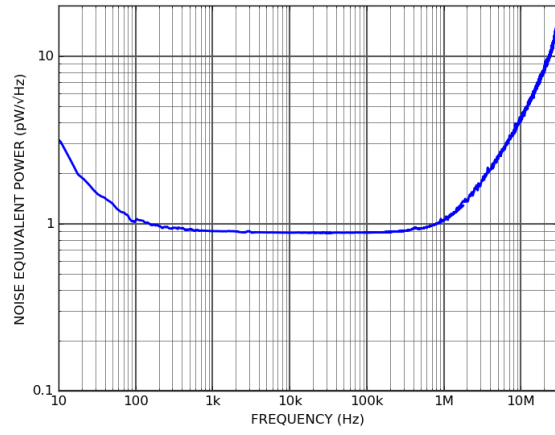
PDC10B-80-DC-SI frequency response



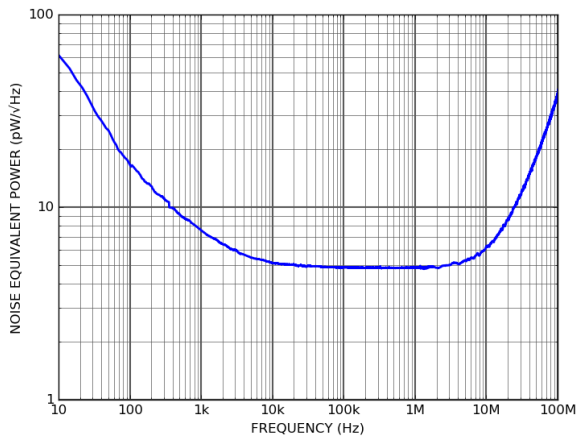
PDX10B-3-DC-SI frequency response

Noise equivalent power

The figure below shows the noise-equivalent power spectral density at a wavelength of 810 nm.



PDX10B-80-DC-SI noise equivalent power



PDX10B-3-DC-SI noise equivalent power

Ordering codes

- PDX10B-80-DC-SI: Transimpedance gain 80 kV/A
- PDX10B-3-DC-SI: Transimpedance gain 3 kV/A