

Koheron PD10R is a dual logarithmic photodetector for general purpose optical power measurements. In addition to two analog outputs  $\log(A)$  and  $\log(B)$ , the PD10R gives the log-ratio  $\log(A/B)$  with an adjustable offset and two gain settings (x1 and x10). The PD10R provides a fully-analog solution for direct absorption measurement in spectroscopy setups. For free-space measurements, see [Koheron PDX10R free-space logarithmic photodetector](#).

## Specifications

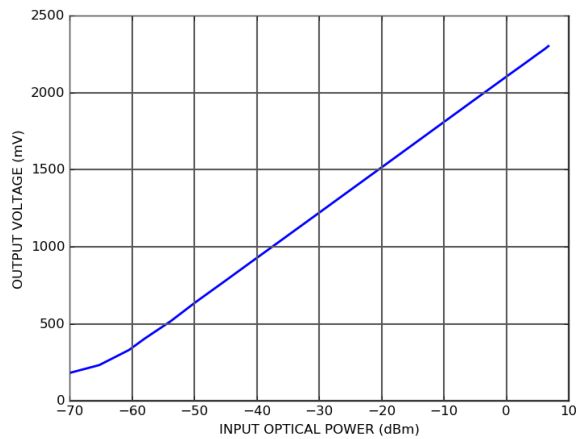
### PD10R

Detector	
Detector type	Dual InGaAs photodiodes
Active diameter	300 $\mu\text{m}$
Wavelength range	900 nm to 1700 nm
Optical input power (0 dBm = 1 mW)	-67 dBm to 7 dBm
Peak responsivity (1550 nm)	0.9 A/W
Photodiode connector	FC
Logarithmic amplifier	
Small signal bandwidth (at 3 dB, input current > 100 $\mu\text{A}$ )	1.2 MHz
Logarithmic slope	300 mV/decade
Intercept photocurrent	100 pA
Output impedance	1 k $\Omega$
Power supplies	
Supply voltage	3.3 V to 13 V
Quiescent current	11 mA
Maximum current	40 mA
Other	
Outside dimensions	38 mm x 53 mm x 12 mm
Operating temperature	0 °C to 50 °C
Weight	24 g

## Characterization

### Output voltage vs Optical power

Optical source is a [Koheron LD101](#) 1550 nm DFB laser followed by a variable optical attenuator and measured with a Thorlabs PM100D / S155C power meter.

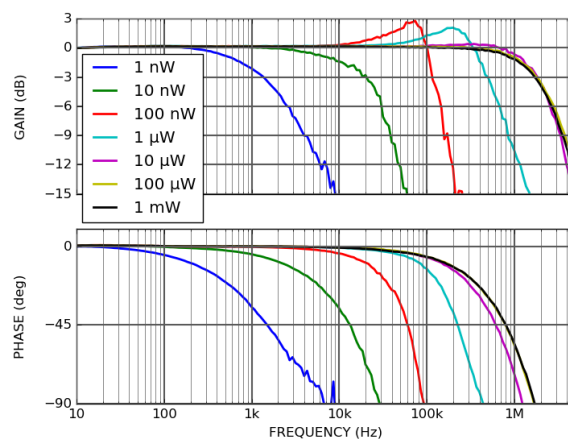


PD10R output voltage vs optical power

We observe a linear behavior between -50 dBm (10 nW) and 7 dBm (5 mW).

### Frequency response

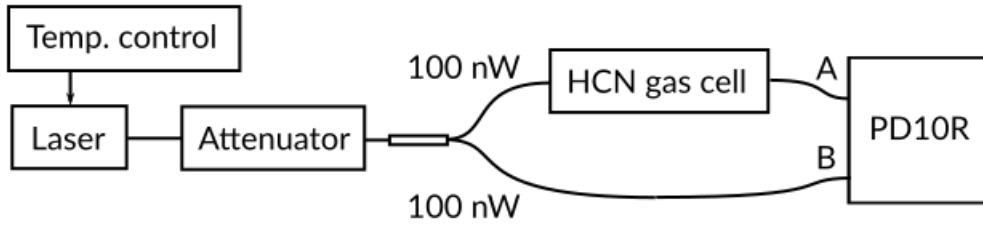
Frequency response of the logarithmic amplifier for several input optical powers:



PD10R frequency response

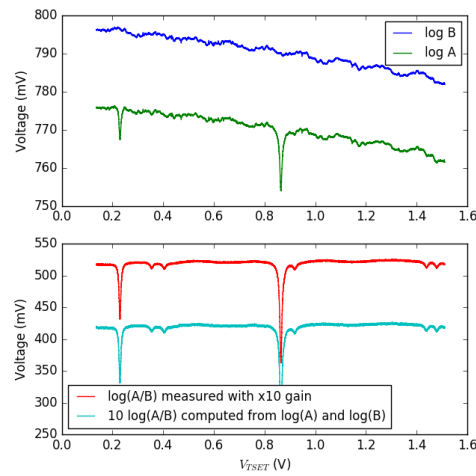
### Absorption measurement

The PD10R can perform accurate absorption measurements with small amounts of optical power. We used the setup below to observe the absorption lines of a HCN gas cell with 200 nW of total optical power. Optical source is a DFB laser whose temperature is increased linearly from 10 to 25 °C in 60 s. The absorption path and the reference path are connected respectively to the A and B inputs of the PD10R.



PD10R absorption measurement setup

The three outputs  $\log(A)$ ,  $\log(B)$  and  $\log(A/B)$  have been recorded simultaneously during the 60 s temperature sweep. Intensity variation observed on the  $\log(A)$  and  $\log(B)$  channels are nicely rejected on the  $\log(A/B)$  output. Numerical computation of  $\log(A/B)$  from  $\log(A)$  and  $\log(B)$  is represented in the cyan curve.



PD10R gas cell absorption

## Ordering codes

PRODUCT NUMBER	ATTRIBUTE
PD10R	InGaAs photodiodes mounted
PD10R-NOP	No photodiodes