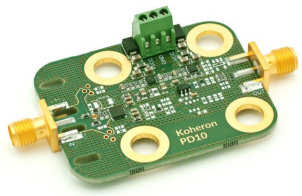
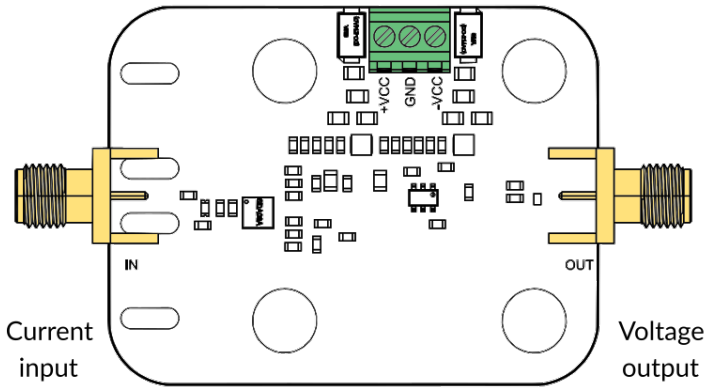
PD10TIA User Guide



Quickstart



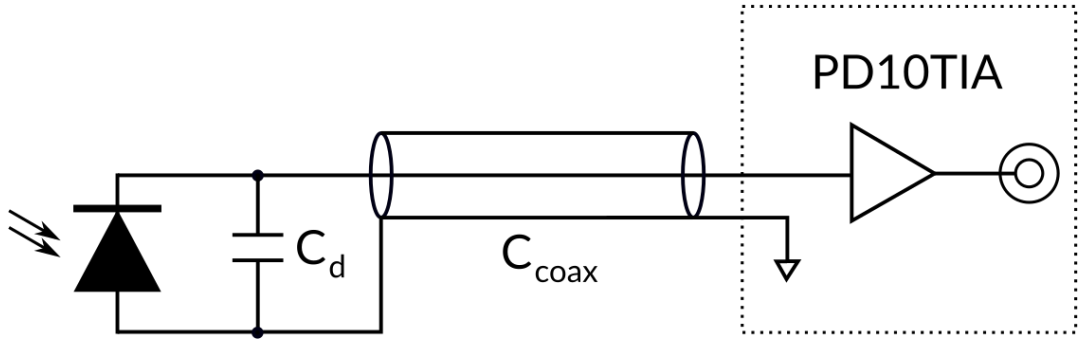
1. Supply +VCC pin with a voltage between 5.5 V and 9 V. Supply -VCC pin with a voltage between -5.5 V and -9 V. The board is regulated to ±5 V internally. Using more than ±6 V supplies increases power consumption without any significant improvement in supply noise rejection.
2. Feed the SMA input with a maximum of 50 µA. The linear output voltage range of the transimpedance amplifier is between -3.7 V and +3.7 V.
3. The output is available on the SMA connector (50 Ω impedance).

Interfacing photodiodes to the PD10TIA

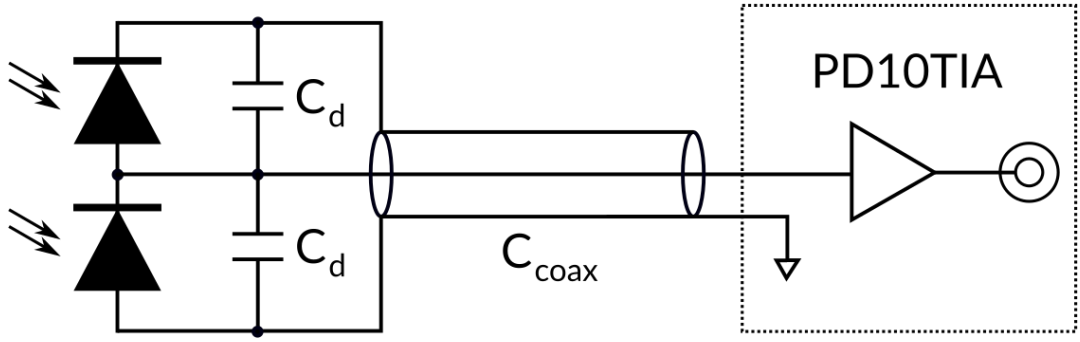
The PD10TIA is designed to be used with external photodiodes. Here is the recommended way to interface the photodiodes with the PD10TIA using a coaxial cable.

On the diagrams C_d and C_{coax} represent the parasitic capacitance of the photodiode and the coaxial cable, respectively.

Single-ended detector



Balanced detector

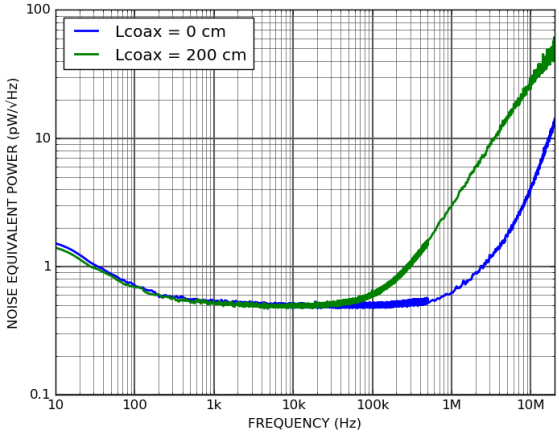


Coaxial cable length and input capacitance

The input capacitance is $C_{in} = C_d + C_{coax}$ for a single-ended detector and $C_{in} = 2\ C_d + C_{coax}$ for a balanced one. The PD10TIA-80-DC is stable with input capacitances up to 2 nF.

For a typical 50 Ω coaxial cable, the capacitance per unit of length is 1 pF / cm. Note that no specific characteristic impedance is required for the input coaxial cable.

The input capacitance mostly influences the noise performance of the amplifier. For example, we built a balanced detector using a pair of photodiodes with 0.9 A / W sensitivity and C_d = 5 pF. We measured the noise equivalent power without and with a 2 meter-long coaxial cable (C_{coax} = 1 pF / cm x 200 cm = 200 pF):


Lcoax = 0 cm
Lcoax = 200 cm
NOISE EQUIVALENT POWER (pW/√Hz)
100
10
1
0.1
10
100
1k
10k
100k
1M
10M
FREQUENCY (Hz)