

## **Light Analysis**

CHAPTERS

**Power Meters** 

# 2.0 – 5.4 µm HgCdTe TE-Cooled Amplified Photodetector

### Features

- Mid to Far IR Operation (2.0 5.4 µm)
- Built-in TEC Controller
- Variable Gain Amplifier (0.8 to 100 V/V)
- Variable Lowpass Filter (1.25 to 160 kHz)
- Internal SM1 (1.035"-40) Threading

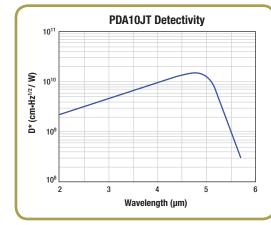
The PDA10JT uses an HgCdTe detector, making it suitable for detection of light in the 2.0  $\mu m$  – 5.4  $\mu m$  spectral range. The detector includes a built-in TEC element and thermistor, which stabilizes the temperature at -30 °C. The detector's D\* (detectivity), spectral response, and noise characteristics are temperature sensitive; therefore, cooling and temperature stabilization can allow for significantly larger gains and lower DC offsets.

The PDA10JT has an eight-position gain switch, allowing the user to set the gain from 0.8 V/V to 100 V/V; an additional eight-position switch adjusts the circuit bandwidth from 1.25 kHz to 160 kHz (40 dB) for improved noise performance. A constant 2.5 mA bias current is provided to the detector via a Howland current pump for improved stability and low noise operation.

The PDA10JT offers many of the same features as our switchable-gain PDA Series detectors featured on page 1572, including an aperture compatible with our SM1 lens tubes, mounting holes for 8-32 (M4) posts, and 50  $\Omega$  drive capability using a BNC output.







Detectors Beam Characterization Polarimetry Electronics Accessories

#### SECTIONS 🔻

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### Specifications

- Detector Material: HgCdTe
- Active Diameter: 1 mm<sup>2</sup>
- Wavelength Range: 2.0 5.4 µm
- Peak Responsivity: 300 V/W
- Rise Time: 4.5 μs
- Fall Time: 5.1 μs
- Number of Gain Steps: 8
- Gain Range: 40 dB or 0.8 V/V to 100 V/V
- Lowpass Filter Bandwidth Range: 1.25 kHz to 160 kHz

- **Output Voltage:** 0 5 V at 50 Ω, 0 10 V at Hi-Z
- **Output Impedance**: 50 Ω
- **Output Current:** 100 mA
- Output Offset: 20 mV Typical, 45 mV Max @ 10 dB Gain
- **Detector Temperature:** -30 °C
- **TEC Current:** 0.6 A Typical (1 A Max)
- **Thermistor:** 10 kΩ

| GAIN AND LOWPASS FILTER SPECIFICATIONS |   |   |  |  |  |  |  |  |  |
|--|---|---|--|--|--|--|--|--|--|
| Gain (Hi-Z)*                           |   | Filter Bandwidth  | NEP Values (@ 160 kHz, 50 Ω)   |  |  |  |  |  |  |
| 0.8 V/V                                | 160 k   | 160 kHz   | 0 dB   | 1.90 x 10 <sup>-9</sup> W/Hz <sup>-1/2</sup>   |  |  |  |  |  |
| 1.6 V/V                                | 80 k  | 80 kHz  | 4 dB   | 1.19 x 10 <sup>-9</sup> W/Hz <sup>-1/2</sup>   |  |  |  |  |  |
| 3.2 V/V                                | 40 k  | 40 kHz  | 10 dB  | 5.94 x 10 <sup>-10</sup> W/Hz <sup>-1/2</sup>  |  |  |  |  |  |
| 6.3 V/V                                | 20 k  | 20 kHz  | 16 dB  | 3.02 x 10 <sup>-10</sup> W/Hz <sup>-1/2</sup>  |  |  |  |  |  |
| 12.6 V/V                               | 10 k  | 10 kHz  | 22 dB  | 1.51 x 10 <sup>-10</sup> W/Hz <sup>-1/2</sup>  |  |  |  |  |  |
| 25.2 V/V                               | 5 k   | 5 kHz   | 28 dB  | 7.61 x 10 <sup>-11</sup> W/Hz <sup>-1/2</sup>  |  |  |  |  |  |
| 50.1 V/V                               | 2.5 k   | 2.5 kHz   | 34 dB  | 3.86 x 10 <sup>-11</sup> W/Hz <sup>-1/2</sup>  |  |  |  |  |  |
| 100 V/V                                | 1.25 k  | 1.25 kHz  | 40 dB  | 2.08 x 10 <sup>-11</sup> W/Hz <sup>-1/2</sup>  |  |  |  |  |  |
|  | Sain (Hi-Z)*   0.8 V/V   1.6 V/V   3.2 V/V   6.3 V/V   12.6 V/V   25.2 V/V   50.1 V/V | Sain (Hi-Z)* Lowpass I   0.8 V/V 160 k   1.6 V/V 80 k   3.2 V/V 40 k   6.3 V/V 20 k   12.6 V/V 10 k   25.2 V/V 5 k   50.1 V/V 2.5 k | Sain (Hi-Z)* Lowpass Filter Bandwidth   0.8 V/V 160 k 160 kHz   1.6 V/V 80 k 80 kHz   3.2 V/V 40 k 40 kHz   6.3 V/V 20 k 20 kHz   12.6 V/V 10 k 10 kHz   5.2 V/V 5 k 5 kHz | Sain (Hi-Z)* Lowpass Filter Bandwidth NEP Value   0.8 V/V 160 k 160 kHz 0 dB   1.6 V/V 80 k 80 kHz 4 dB   3.2 V/V 40 k 40 kHz 10 dB   6.3 V/V 20 k 20 kHz 16 dB   12.6 V/V 10 k 10 kHz 22 dB   25.2 V/V 5 k 5 kHz 28 dB   50.1 V/V 2.5 k 2.5 kHz 34 dB |  |  |  |  |  |

Tine (ms)

PDA10JT Rise/Fall Time\*

\*Gain with a 50  $\Omega$  load is one-half the Hi-Z gain.

| ITEM #  | <b>METRIC ITEM #</b> | \$          | £          | €          | RMB         | DESCRIPTION  |
|---------|----------------------|-------------|------------|------------|-------------|--|
| PDA10JT | PDA10JT-EC           | \$ 3,897.00 | £ 2,805.84 | € 3.390,39 | ¥ 31,059.09 | HgCdTe Amplified Photodetector with Temperature Controller |