



## APD-F13A5

### 0.95-1.65um InGaAs Avalanche Photodiode (APD) in TO-46 Package, 5-pin

#### Overview

The Lasermate APD-F13A5 is a high-speed, large-area InGaAs avalanche photodiode (APD) in 5-pin TO-46 package that provides high responsivity in the spectral range between 950nm and 1650nm.

#### Features

- InGaAs Avalanche photodiode (APD)
- Thermoelectric-cooled TO-46 flat window package
- Highly reliable planar device
- High responsivity in 0.95-1.65um
- Low leakage current and noise
- $\geq 800$ MHz 3dB bandwidth
- Low stray absorption

#### Applications

- Light detection and ranging (LIDAR)
- Fiber optic communication / testing
- Spectral analysis
- Optical coherence tomography
- Single-photodiode SWIR camera
- Covert IR sensing

#### Specifications

| Absolute Maximum Ratings |           |           |      |            |
|--------------------------|-----------|-----------|------|------------|
| Parameters               | Symbol    | Rating    | Unit | Conditions |
| Reverse current          | $I_R$     | 1         | mA   |            |
| Forward current          | $I_F$     | 5         | um   |            |
| TEC current              |           | 0.65      | A    |            |
| Operation temperature    | $T_{op}$  | -40 to 85 | °C   |            |
| Storage temperature      | $T_{stg}$ | -45 to 90 | °C   |            |

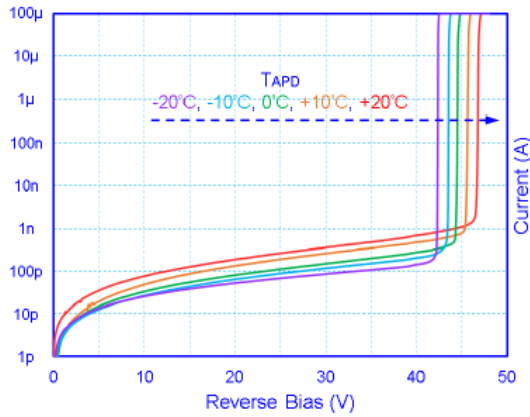
| Electro-Optical Characteristics ( $T_{photodiode}=0^{\circ}C$ ) |           |      |      |      |                 |                            |
|---|-----------|------|------|------|-----------------|----------------------------|
| Parameters  | Symbol    | Min. | Typ. | Max. | Unit            | Conditions                 |
| Wavelength spectral range                                       | $\lambda$ | 0.95 |      | 1.65 | um              |                            |
| Aperture size   |           |      | 200  |      | um              |                            |
| Dark current  | $I_D$     |      | 2    | 20   | nA              | M=10                       |
| Operating voltage   | $V_{op}$  | 30   | -    | 48   | V               | M=10                       |
| Breakdown voltage   | $V_{BD}$  | 33   | -    | 53   | V               | $I_{BD}=100\mu A$          |
| Capacitance <sup>1</sup>  | $C_J$     | -    | 2.5  | 3.0  | pF              | M=10, f=1MHz               |
| Responsivity  | $I_L$     | 8    | 9    |      | A/W             | M=10, $\lambda=1.55\mu m$  |
|   |           | 0.8  | 0.9  |      |                 | M=1, $\lambda=1.55\mu m$   |
| Useable gain  |           | 10   | 20   | -    |                 | $\lambda=1.55\mu m$        |
| 3dB bandwidth ( $f_{3dB}$ ) <sup>1</sup>                        |           | 0.8  | 1    |      | GHz             | M=10, $\lambda=1.55\mu m$  |
| Spectral noise current  |           | -    | 0.5  | 1.5  | pA/ $\sqrt{Hz}$ | M=10, $\Delta f=1kHz$      |
| Max cooling capability ( $\Delta T_{MAX}$ ) <sup>2</sup>        |           | 35   | 40   | -    | °C              | $T_{heatsink}=23^{\circ}C$ |

<sup>1</sup>  $T_{photodiode}=23^{\circ}C$ .

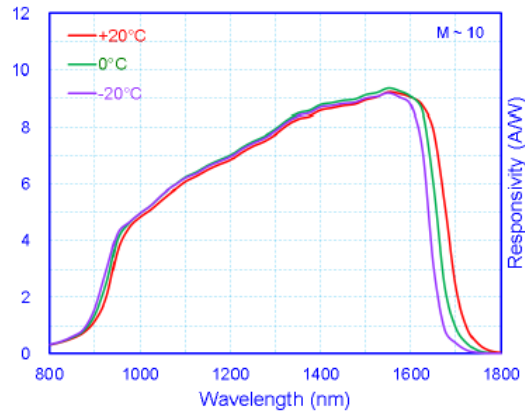
<sup>2</sup> Adequate heatsink and thermal interface material are prerequisites for stable operation.

## Typical Characteristics

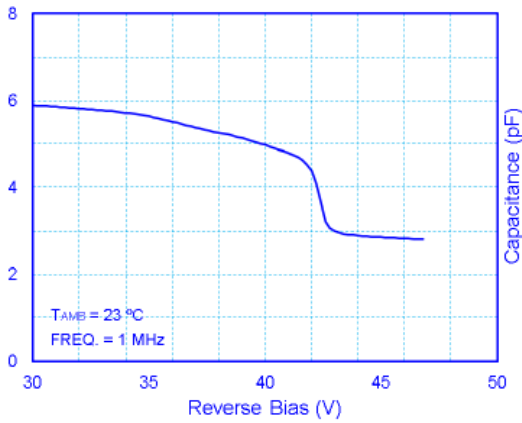
Dark Current



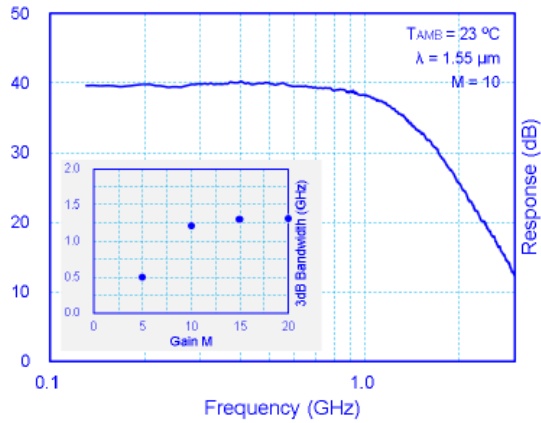
Responsivity Spectrum



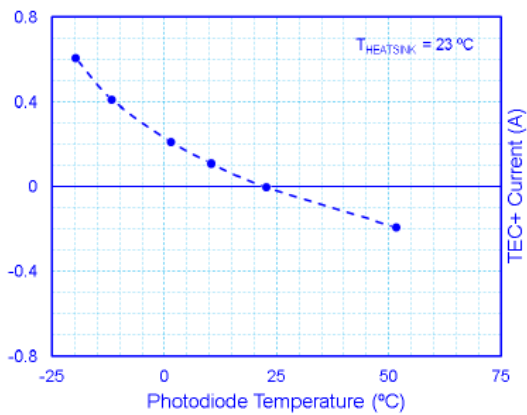
Dark Capacitance



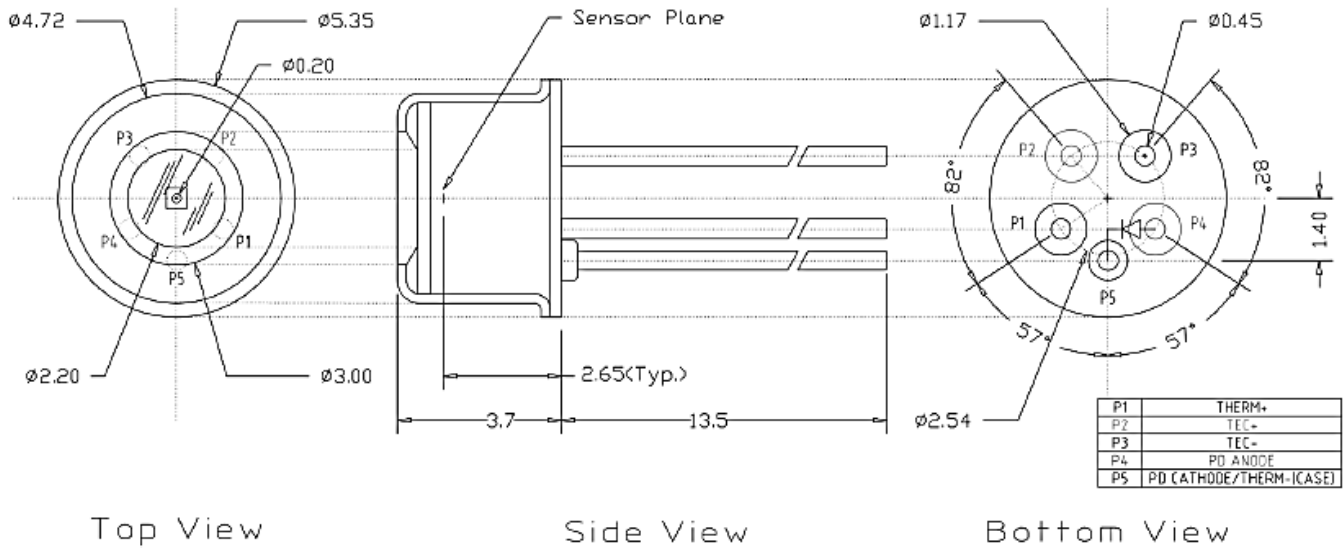
Frequency Response



TEC Performance



**Outline Dimensions (unit: mm)**



**Notes:**

- Make sure correct polarity is observed before powering on the device. For instance, from top-view, P2 for applying positive TEC current to cool down the photodiode is on the right-hand side of case pin P5.
- Specifications are subject to change without notice.