



0.95-1.65um InGaAs Avalanche Photodiode in TO-46 Package APD-F13A5

Data Sheet

Description

The APD-F13A5 is a thermoelectric-cooled InGaAs avalanche photodiode (APD) housed in a TO-46 flat window package. It delivers high responsivity across 0.95–1.65 μm , with enhanced performance stability due to integrated TE-cooling. Offering ≥ 800 MHz 3dB bandwidth, low leakage current, and reduced noise, the APD-F13A5 is ideal for demanding short-wave infrared (SWIR) detection applications, including high-speed communication, precision sensing, and imaging systems.

Features

- InGaAs avalanche photodiode (APD)
- Thermoelectric-cooled TO-46 flat window package
- Highly reliable planar device
- High responsivity in 0.95–1.65 μm
- ≥ 800 MHz 3dB bandwidth
- Low leakage current and noise
- Low stray absorption

Applications

- Light Detection and Ranging (LIDAR)
- Fiber optic communication & testing
- Spectral analysis
- Optical coherence tomography (OCT)
- Single-photodiode SWIR cameras
- Covert IR sensing

Specifications

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

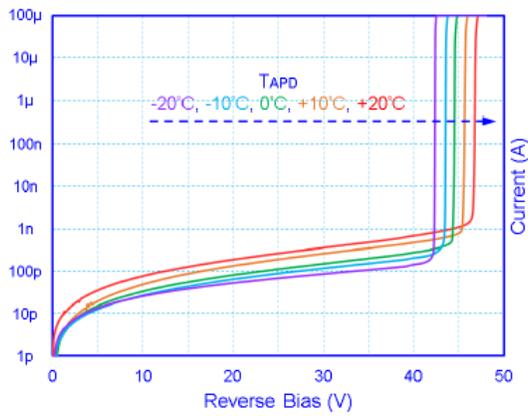
Electro-Optical Characteristics ($T_{\text{photodiode}}=0^{\circ}\text{C}$)						
Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
Wavelength spectral range	λ	0.95		1.65	μm	
Aperture size			200		μm	
Dark current	I_D		2	20	nA	M=10
Operating voltage	V_{op}	30	-	48	V	M=10
Breakdown voltage	V_{BD}	33	-	53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

¹ $T_{\text{photodiode}}=23^{\circ}\text{C}$.

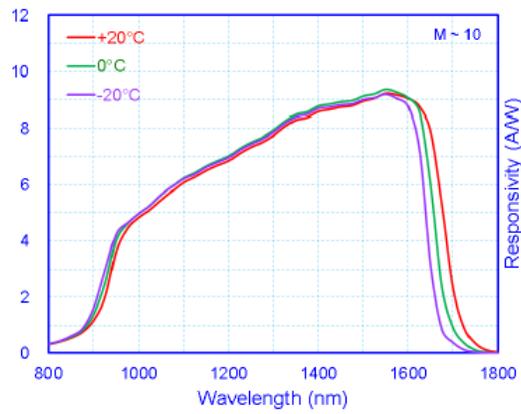
² Adequate heatsink and thermal interface material are prerequisites for stable operation.

Typical Characteristics

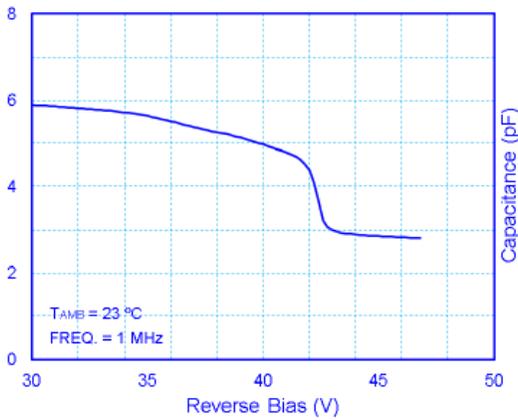
Dark Current



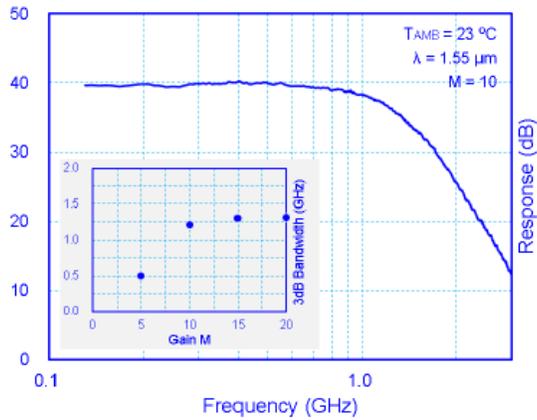
Responsivity Spectrum



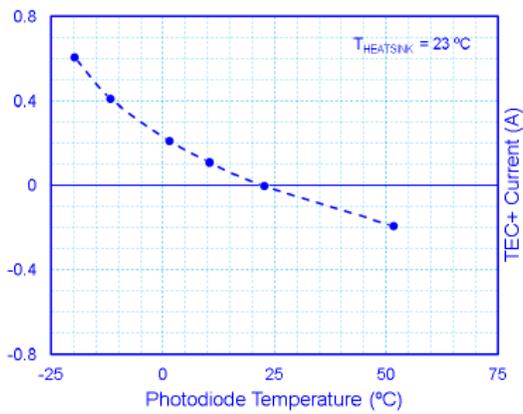
Dark Capacitance



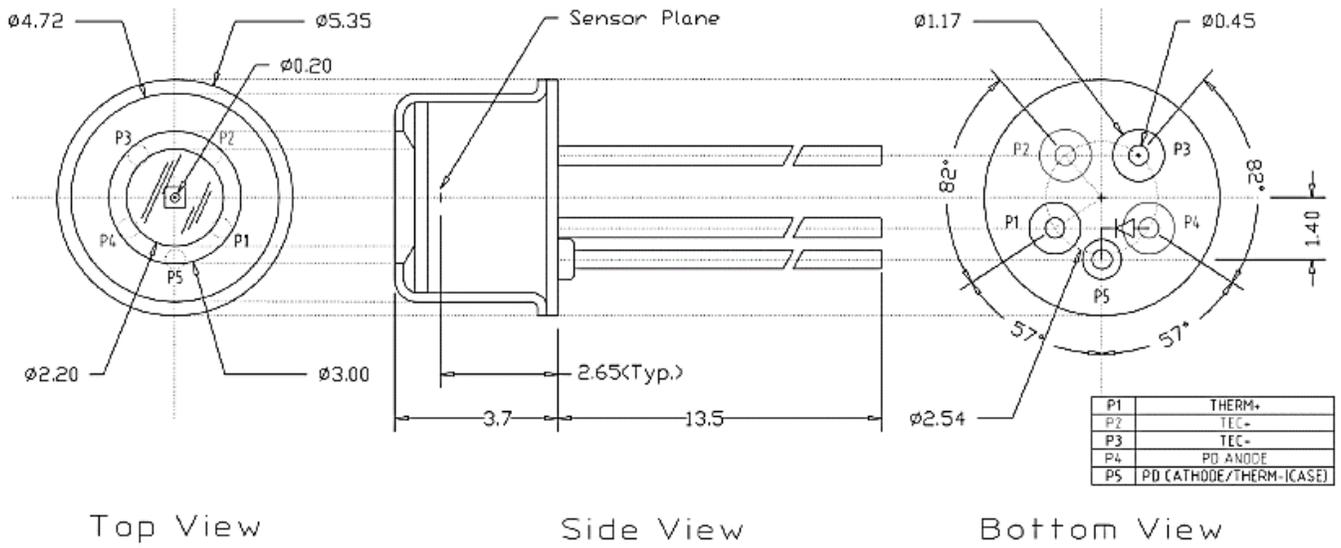
Frequency Response



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.