



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

Data Sheet

## 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
- $\geq 800\text{MHz}$  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	

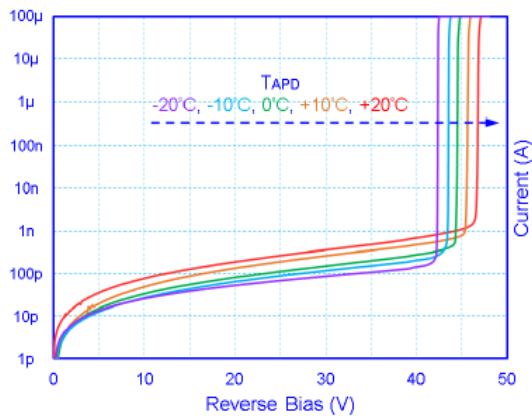
Electro-Optical Characteristics ( $T_{photodiode}=0^\circ\text{C}$ )						
Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
Wavelength spectral range	$\lambda$	0.95		1.65	um	
Aperture size			200		um	
Dark current	$I_D$	2		20	nA	M=10
Operating voltage	$V_{op}$	30	-	48	V	M=10
Breakdown voltage	$V_{BD}$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

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

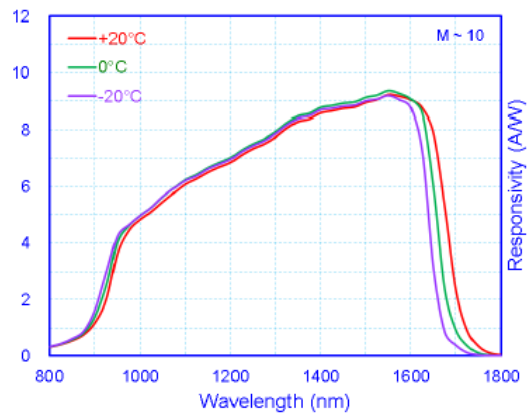
<sup>2</sup> Adequate heatsink and thermal interface material are prerequisites for stable operation.

Typical Characteristics

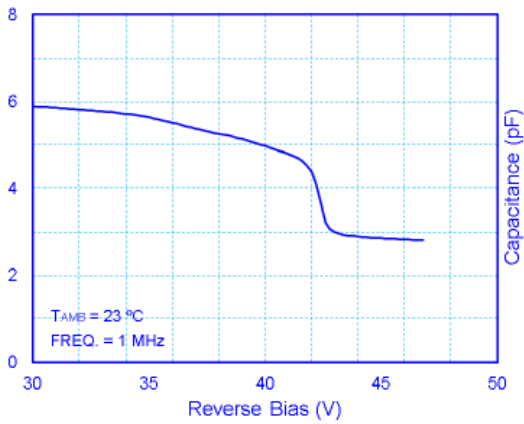
Dark Current



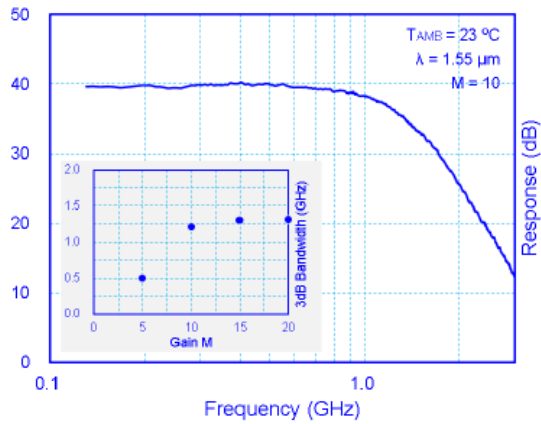
Responsivity Spectrum



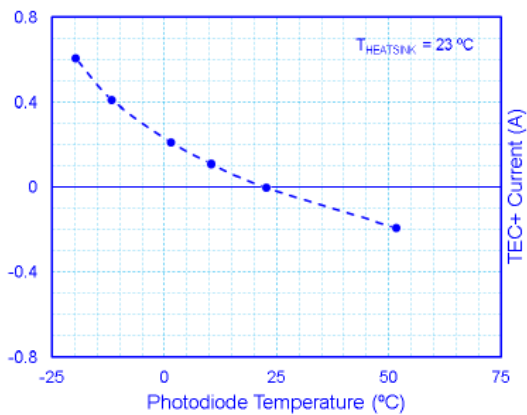
Dark Capacitance



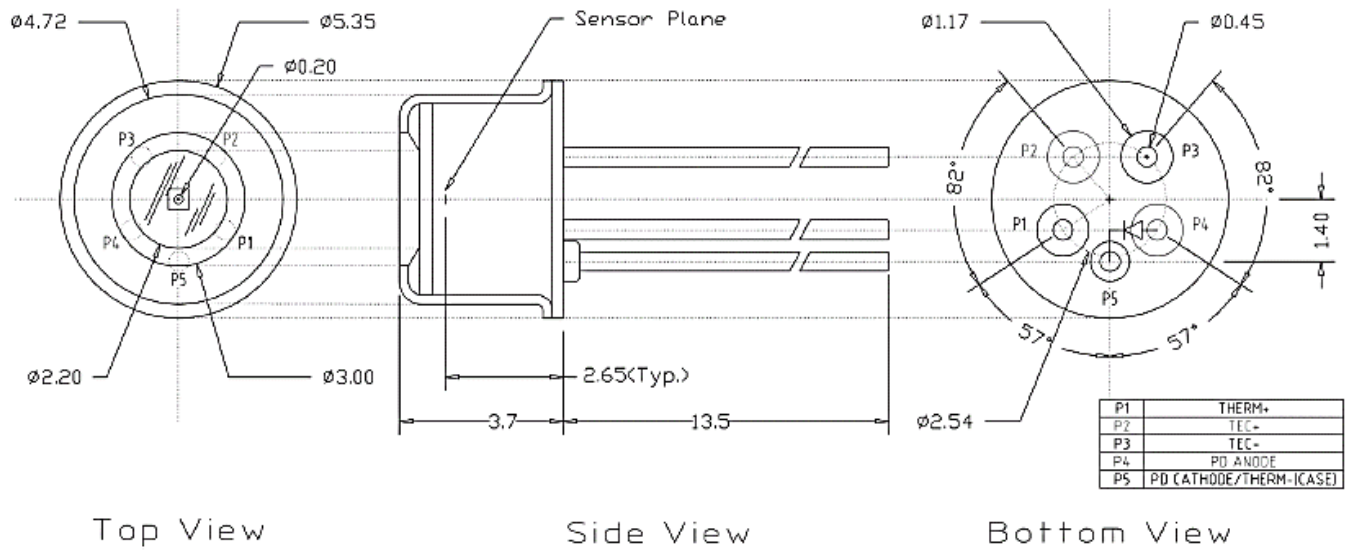
Frequency Response



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.