

# InGaAs 80 and 200 $\mu\text{m}$ Avalanche Photodiode

MICROELECTRONICS

264-339767-VAR

## Description

Based on an industry proven design and improved for fast overload recovery, the 264-339767 InGaAs APDs have a high QE (Quantum Efficiency) over the band of 1000 to 1600 nm. The APD's junction offers more than 1dB optical sensitivity improvement over classical InP multiplication APDs. With low leakage current the high temperature NEP is maintained, even with reduced cooling requirements.

Temperature compensation for constant responsivity is eased by the large  $\Delta V$  (defined as  $V_{BD} - V_{M=10}$ ) of these APDs. This large  $\Delta V$  is more significant if the APDs are to be operated at gains greater than 10.



## Features

- Low k of 0.17
- $V_{BD} - V_{M=10} > 5V$
- Low NEP
- Fast Overload Recovery
- Wide Operating Temp Range
- Hermetic TO-46/TO-18 Case

## Applications

- Range Finding / LIDAR
- Instrumentation
- Laser Profiling
- Free-Space Communications
- Industrial, Medical
- Photometry

# InGaAs

## 80 and 200 $\mu\text{m}$

### Avalanche Photodiode

### Electro-Optical Characteristics

Conditions:  $T_A=25^\circ\text{C}$ ,  $M=10$  unless otherwise specified

Parameter	200 $\mu\text{m}$ DIA VAR -001 & -501			80 $\mu\text{m}$ DIA VAR -002 & -502			Unit
	Min.	Typ.	Max.	Min.	Typ.	Max.	
$V_R$ for specified responsivity.....	25	NOTE 1	80	25	NOTE 1	80	V
Temperature Coefficient of $V_R$ .....	-	0.070	-	-	0.070	-	V/ $^\circ\text{C}$
$I_d$ APD dark current		15	50		10	30	nA
$V_{BR} - V_{OP}$ (Delta-V)	5	8	-	5	8	-	V
Quantum Efficiency (1064-1550nm)	75	83	-	75	83	-	%
Responsivity (R) 1550 nm, $M=10$	9.4	-	-	9.4	-	-	A/W
Capacitance	-	2.0	2.4	-	0.65	0.7	pF
Spectral Noise Current ( $I_n$ ) @ 25 $^\circ\text{C}$	-	0.3	0.9	-	0.1	0.4	pA/ $\sqrt{\text{Hz}}$
Excess Noise Factor (F) at $M = 10$		3.2			3.2		
Bandwidth, $f_{3dB}$ .....	-	1.0	-	-	2.0	-	GHz
Maximum Useable Gain (Note 2)	10	20	-	10	20	-	A/W
Recovery Time 1mW, $I_d < 0.5\mu\text{A}$	-	<100	-	-	<100	-	ns
(Note 3) 10W, $I_d < 5.0\mu\text{A}$	-	<200	-	-	-	-	ns
Operating Temperature	-45		+85	-45		+85	$^\circ\text{C}$
Storage Temperature	-55		+125	-55		+125	$^\circ\text{C}$

Note : 1 -  $V_R$  as specified on datasheet of each device.

2 - Noise increases with gain and depends on bulk and surface currents.

3 - When tested with a CMC TIA such as a 264-339730 or 264-339757 device.

### Absolute-Maximum Ratings, Limiting Values

Forward Current	5	mA
Total Power Dissipation	20	mW
Overload Pulse Power Density 20ns FWHM, < 100 pulses/s	500	kW/cm <sup>2</sup>
Soldering Temperature (10 seconds)	260	$^\circ\text{C}$

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## Figures

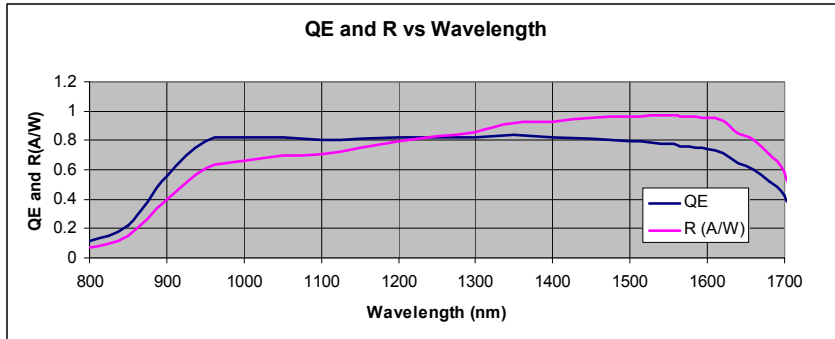


Figure 1: Responsivity and Quantum Efficiency

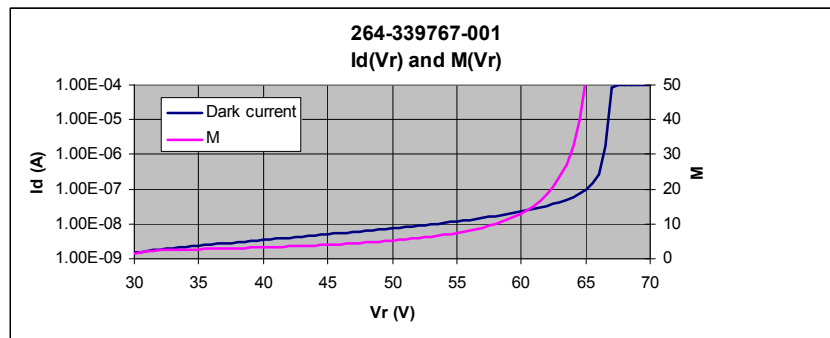


Figure 2: Dark Current and Gain

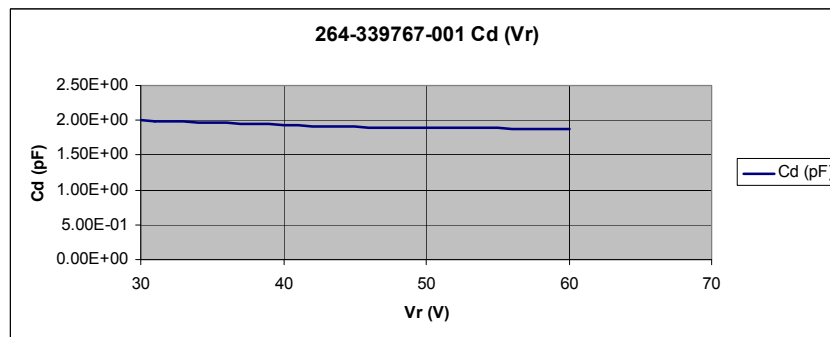


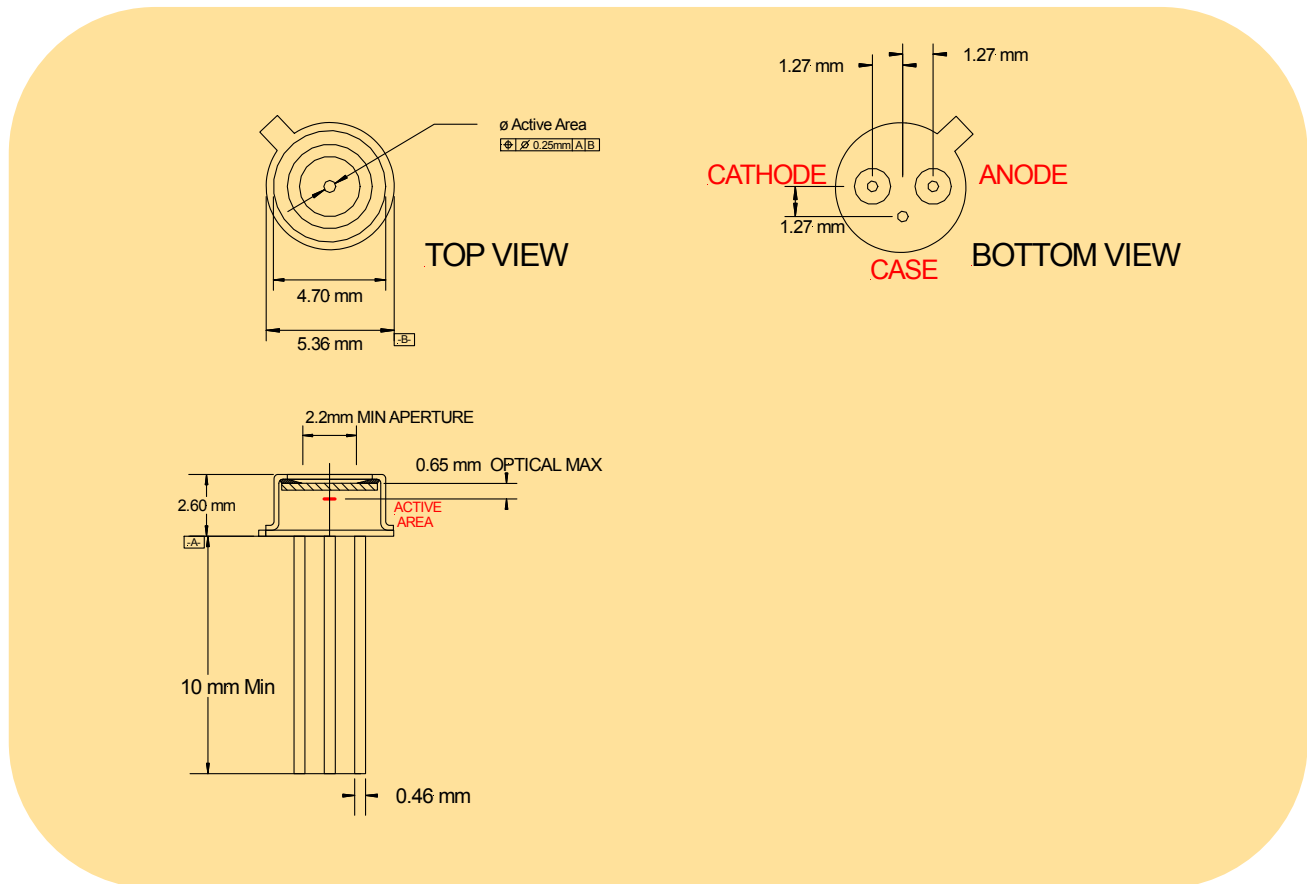
Figure 3: Detector Capacitance

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## Package Outline and Pinout



## VAR Options

-001	200 $\mu\text{m}$ TO-46, Industrial Grade
-002	80 $\mu\text{m}$ TO-46, Industrial Grade
-501	-001 plus screening to MIL-PRF-38534
-502	-002 plus screening to MIL-PRF-38534

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