

# AD500-9 TO52S1

## Avalanche Photodiode NIR

### Special characteristics:

quantum efficiency > 80 % at  $\lambda$  760 - 910 nm  
 high speed, low noise  
 500  $\mu$ m diameter active area  
 low slope multiplication curve



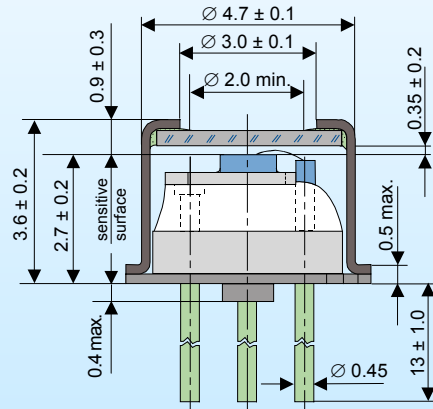
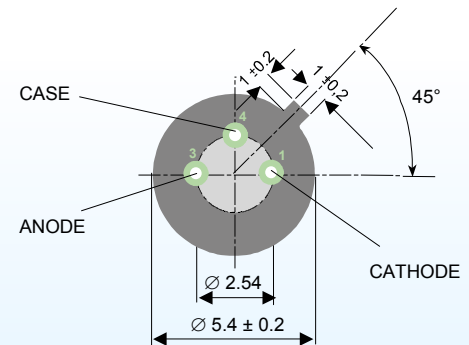
Parameters:	AD500-9 TO52S1
Active Area	0.196 mm <sup>2</sup> Ø 500 $\mu$ m
Dark Current <sup>1)</sup> (M = 100)	max. 5 nA typ. 0.5 - 1 nA
Total Capacitance <sup>1)</sup> (M = 100)	typ. 1.2 pF
Breakdown Voltage U <sub>BR</sub> (at I <sub>D</sub> = 2 $\mu$ A)	120 ... 300 V typ. > 200 V
Temperature Coefficient of U <sub>BR</sub>	typ. 1.55 V/K
Spectral Responsivity <sup>1)</sup> (at 905 nm, M = 100)	min. 55 A/W typ. 60 A/W
Cut-off Frequency (-3dB)	typ. 0.5 GHz
Rise Time	typ. 550 ps
Optimum Gain	50 - 60
Max. Gain	> 200
"Excess Noise" factor (M = 100)	typ. 2.5
"Excess Noise" index (M = 100)	typ. 0.2
Noise Current (M = 100)	typ. 1 pA/Hz <sup>1/2</sup>
N.E.P. (M = 100, 905 nm)	typ. 2* 10 <sup>-14</sup> W/Hz <sup>1/2</sup>
Operating Temperature	-20 ... +70 °C
Storage Temperature	-60 ... +100 °C

#### 1) measurement conditions:

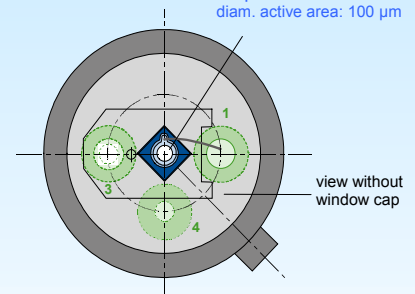
Setup of photo current 10 nA at M = 1 and irradiation by an IRED (880 nm, 80 nm bandwidth).

Increase the photo current up to 1  $\mu$ A, (M = 100) by internal multiplication due to an increasing bias voltage.

### Package (TO52S1):

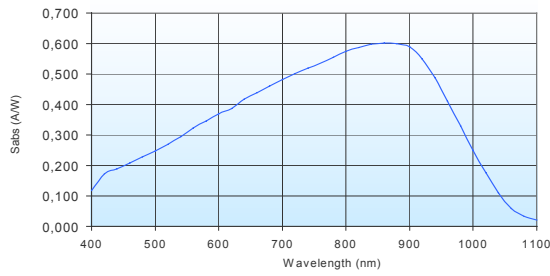


Chip: AD500-9  
 diam. active area: 100  $\mu$ m



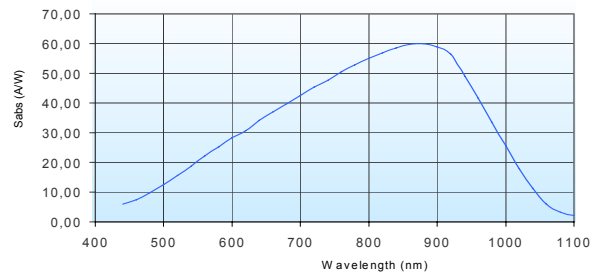
### Spectral Responsivity at M = 1

series - 9



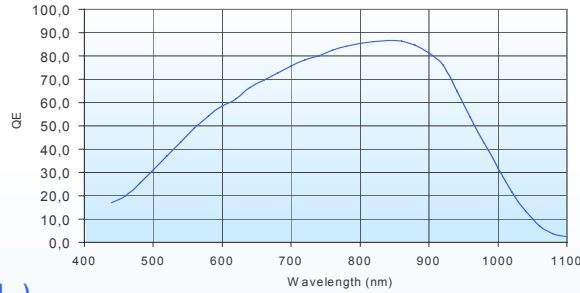
### Spectral Responsivity at M = 100

series - 9



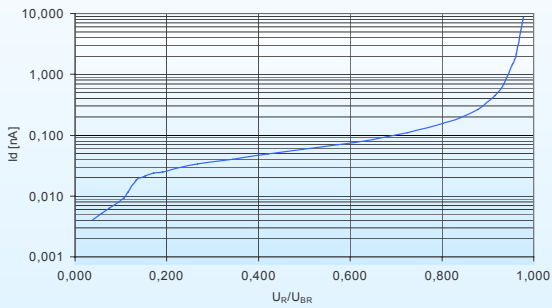
### QE for M = 1

series - 9



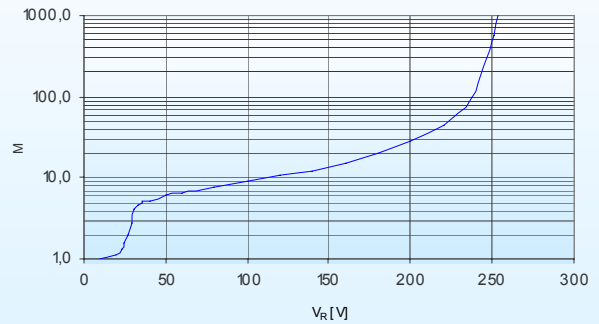
### $I_D = f(U_R/U_{BR})$

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### Gain = f(V\_R)

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### Maximum Ratings:

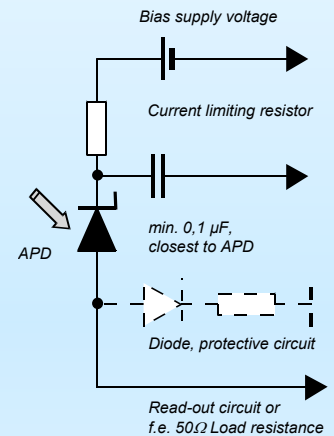
- max. electrical power dissipation 100 mW at 22°C
- max. optical peak value, once 200 mW for 1 s
- max. continuous optical operation  $I_{Ph} (DC) \leq 250 \mu A$   
 $\leq 1 \text{ mA}$  for signal 50  $\mu s$  "on" / 1 ms "off"
- $(P_{electr.} = P_{opt.} * S_{abs} * M * U_R)$

### Application Hints:

- Current should be limited by a protecting resistor or current limiting - IC inside the power supply.
- Use of low noise read-out - IC.
- For high gain applications bias voltage should be temperature compensated.
- For low light level applications, blocking of ambient light should be used.

### Handling Precautions:

- Soldering temperature 260 °C for max. 10 s. The device must be protected against solder flux vapour!
- min. Pin - length 2 mm
- ESD - protection Standard precautionary measures are sufficient.
- Storage Store devices in conductive foam.
- Avoid skin contact with window!
- Clean window with Ethyl alcohol if necessary.
- Do not scratch or abrade window.



### Germany :

#### Silicon Sensor GmbH

Ostendstr. 1  
12459 Berlin  
Germany  
Phone: +49 (0)30-63 99 23 10  
Fax: +49 (0)30-63 99 23 33  
E-Mail: [sales@silicon-sensor.de](mailto:sales@silicon-sensor.de)

### International Sales:

#### Silicon Sensor GmbH

U.K. Office  
35 Orchard Close  
Stanstead Abbots, Ware  
Hertfordshire SG 12 8 AH  
Phone/Fax: +44 (0)1920/87 20 90  
E-Mail: [pnslsensuk@btconnect.com](mailto:pnslsensuk@btconnect.com)  
[p.nash@silicon-sensor.com](mailto:p.nash@silicon-sensor.com)

### U.S.A. :

#### Pacific Silicon Sensor, Inc.

5700 Corsa Avenue #105  
Westlake Village  
CA 91362 USA  
Phone: +1-818-706-3400  
Fax: +1-818-889-7053  
E-Mail: : [sales@pacific-sensor.com](mailto:sales@pacific-sensor.com)