

# 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



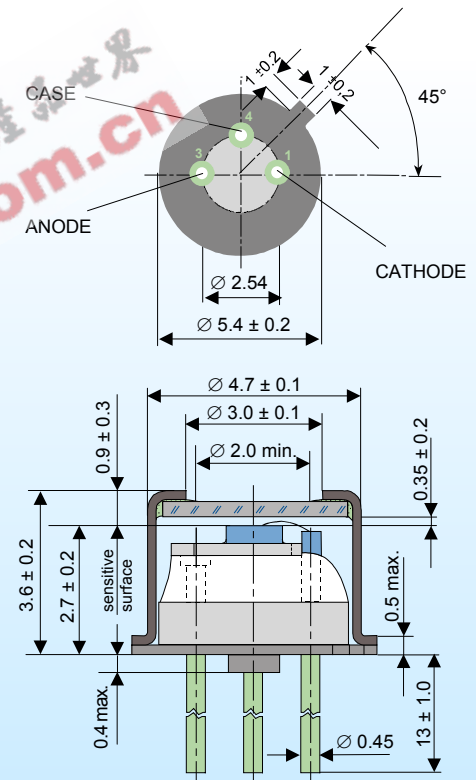
| Parameters:  | AD500-9 TO52S1                                |
|--|---|
| Active Area  | 0.196 mm <sup>2</sup><br>Ø 500 $\mu$ m        |
| Dark Current <sup>1)</sup><br>(M = 100)                              | max. 5 nA<br>typ. 0.5 - 1 nA                  |
| Total Capacitance <sup>1)</sup><br>(M =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

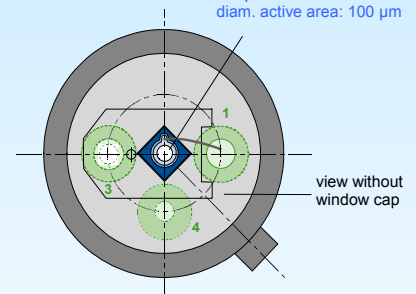
Setup of photo current 10 nA at M = 1 and irradiation by an IRED  
 (880 nm, 80 nm bandwidth).

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

### Package (TO52S1):

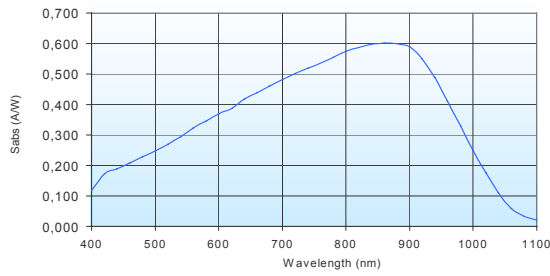


Chip: AD500-9  
 diam. active area: 100  $\mu$ m



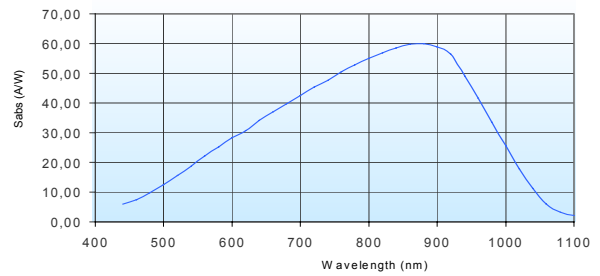
### Spectral Responsivity at M = 1

series - 9



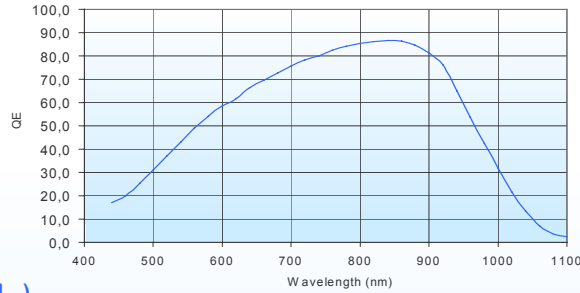
### Spectral Responsivity at M = 100

series - 9



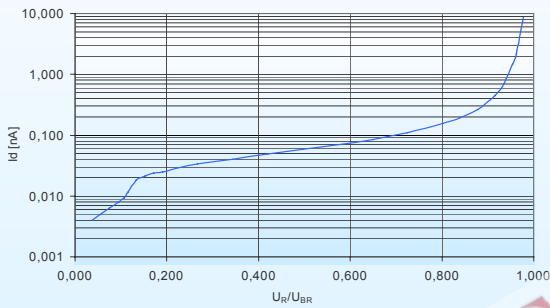
### QE for M = 1

series - 9



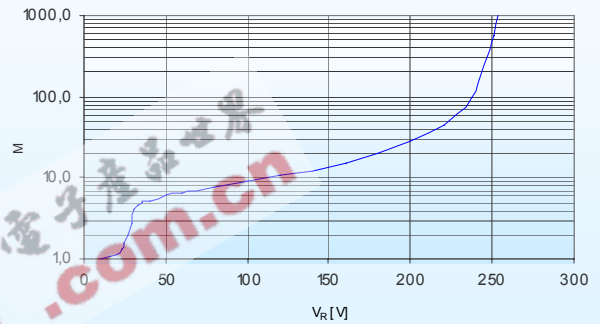
### $I_D = f(U_R/U_{BR})$

AD500-9



### Gain = f(V\_R)

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### Maximum Ratings:

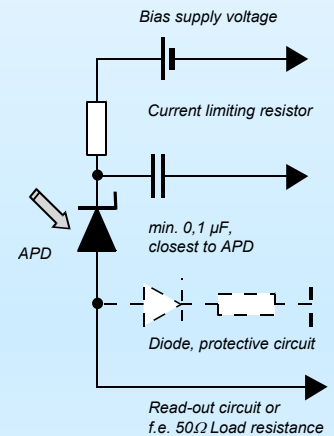
- max. electrical power dissipation 100 mW at 22°C
- max. optical peak value, once 200 mW for 1 s
- max. continuous optical operation  $I_{Ph} (DC) \leq 250 \mu A$   
 $\leq 1 \text{ mA}$  for signal 50  $\mu s$  "on" / 1 ms "off"
- $(P_{electr.} = P_{opt.} * S_{abs} * M * U_R)$

### 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.



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