

# SSO-AD-500 NIR-TO52

## Avalanche Photodiode NIR

### Special characteristics:

quantum efficiency >80% at  $\lambda$  760-910 nm

high speed, low noise

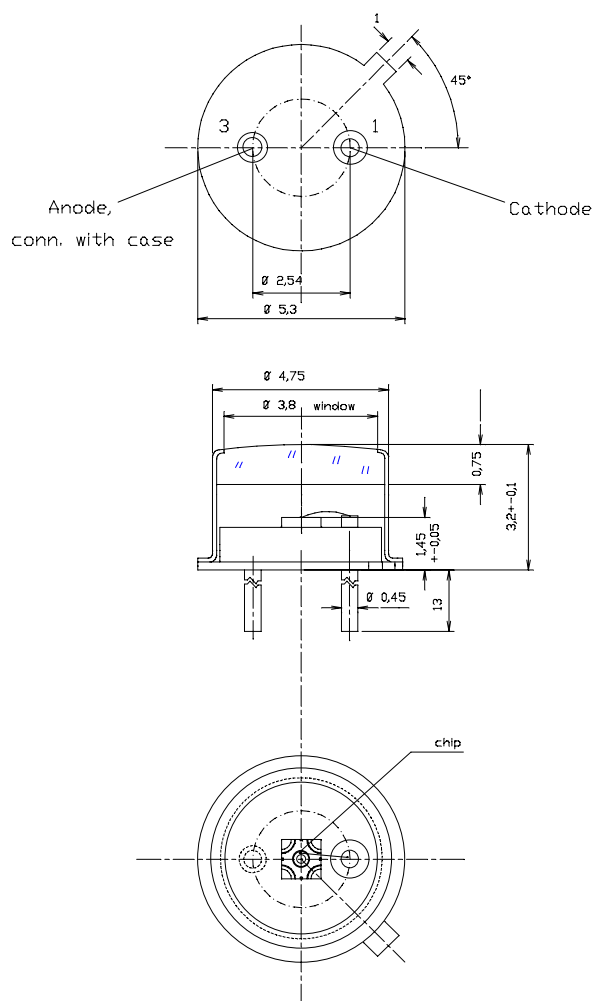
500  $\mu\text{m}$  diameter active area

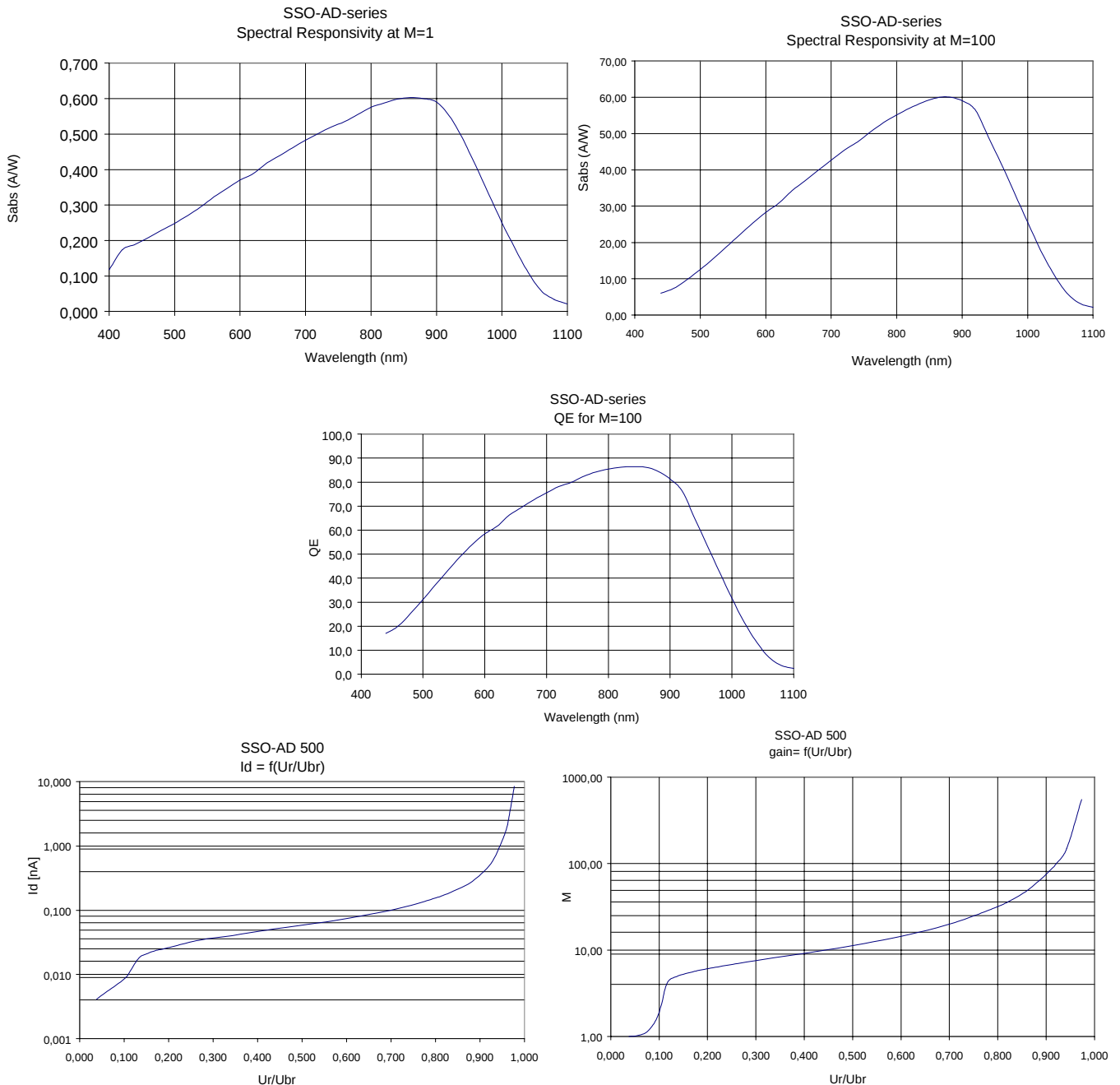
low slope multiplication curve



| <b>Parameters:</b>                                                                                                                                                                                                                                            |                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Active area                                                                                                                                                                                                                                                   | 0,196 mm <sup>2</sup><br>Ø 500 $\mu\text{m}$ |
| 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                                  |
| Break-down voltage $U_{BR}$<br>(at $I_D=2\mu\text{A}$ )                                                                                                                                                                                                       | 120 - 300 V                                  |
| Temperature coefficient of $U_{BR}$                                                                                                                                                                                                                           | typ. 0,55 %/°C                               |
| Spectral responsivity<br>(at 905 nm)                                                                                                                                                                                                                          | min. 0,55 A/W<br>typ. 0,60 A/W               |
| Cut-off frequency<br>(-3dB)                                                                                                                                                                                                                                   | 905 nm 400 MHz                               |
|                                                                                                                                                                                                                                                               | 655 nm 550 MHz                               |
| Rise time                                                                                                                                                                                                                                                     | 905 nm 550 ps                                |
|                                                                                                                                                                                                                                                               | 655 nm 300 ps                                |
| Optimum gain                                                                                                                                                                                                                                                  | 50 - 60                                      |
| Gain M                                                                                                                                                                                                                                                        | min 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, 880 nm)                                                                                                                                                                                                                                     | typ. $2 \cdot 10^{-14}$ W/Hz <sup>1/2</sup>  |
| Operating temperature                                                                                                                                                                                                                                         | -20 ... +70°C                                |
| Storage temperature                                                                                                                                                                                                                                           | -60 ... +100°C                               |
| <b>1) measurement conditions:</b><br>Setup of photo current 10nA at M=1 and irradiation by a NIR-LED (880 nm, 80 nm bandwidth).<br><br>Rise of the photo current up to 1 $\mu\text{A}$ , (M=100) by internal multiplication due to an increasing bias voltage |                                              |

### Package 2 (TO52) :





### 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  $I_{ph} (DC) \leq 250 \mu A$   
 $\leq 1 \text{ mA for signal } 50 \mu s \text{ "on" / } 1 \text{ ms "out"}$
- $(P_{electr.} = P_{opt.} * S_{abs} * M * U_R)$

### Application hints:

- Current limit is to be realized via protecting resistor or current limiting - IC inside the supply voltage.
- Use of low noise read-out - IC.
- For higher gain a regulation of bias voltage due to the temperature is to be realized.
- For very small signals stray light (noise source) is to be excluded by filters in order to improve the signal-noise relation.
- Avoid touching the window with fingers!
- Careful cleaning with Ethyl alcohol possible.
- Avoid use of pointed and scratching tools!

### Handling precautions:

- Soldering temperature 260°C for max. 10 s. The device must be protected against solder flux vapour!
- min. Pin - length 2mm
- ESD - protection Only small danger for the device. Standard precautionary measures are sufficient.
- Storage Store devices in conductive foam.

