

PSD Array

High Linearity Position Sensing Detector Array

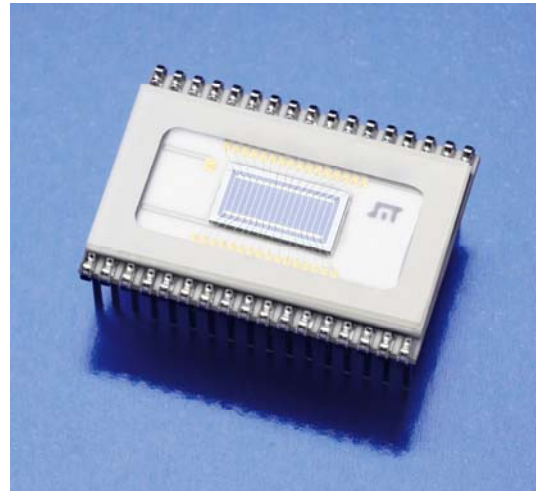
Part number: SA-0039

Description: 1LA16-2,5_SU89

The SiTek 1LA16-2,5_SU89 is a PSD array with 16 parallel 1-dimensional PSDs placed on the same chip. This enables simultaneous position read-out from the 16 segments and high speed 3D contour measurements with low cross talk between the segments. Each segment has the same high linearity and high speed as SiTek's standard 1-dimensional PSDs.

The PSD array has SiTek's unique built-in stray light elimination, a patented design which eliminates the decrease in speed and linearity due to stray light.

The PSD array can be used together with either a line laser or multiple laser beams.



Mechanical specification

| Parameter | Value | Unit |
|-----------------------------|------------|-----------------|
| Number of segments | 16 | |
| Active area of each segment | 2,5 x 0,39 | mm ² |
| Gap between segments | 10 | μm |

Electrical specification

| Parameter | Symbol | Min. | Typ. | Max. | Unit |
|------------------------|-------------|------|------|------|--------|
| Position non-linearity | | | 0,1 | 0,2 | % |
| Detector resistance | R_{det} | 15 | 25 | 35 | kΩ |
| Leakage current | I_d | | 2 | 10 | nA |
| Noise current | I_{noise} | | 0,8 | 1,1 | pA/√Hz |
| Responsivity | r | | 0,63 | | A/W |
| Capacitance | C_i | | 4 | 4,4 | pF |
| Rise time (10% - 90%) | t_r | | 70 | 100 | ns |
| Cross talk | | | 0,5 | 1,0 | % |
| Bias voltage (reverse) | V_R | 5 | 15 | 20 | V |
| Thermal drift | | | 20 | 100 | ppm/°C |

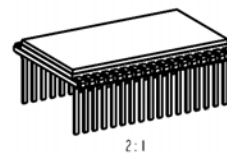
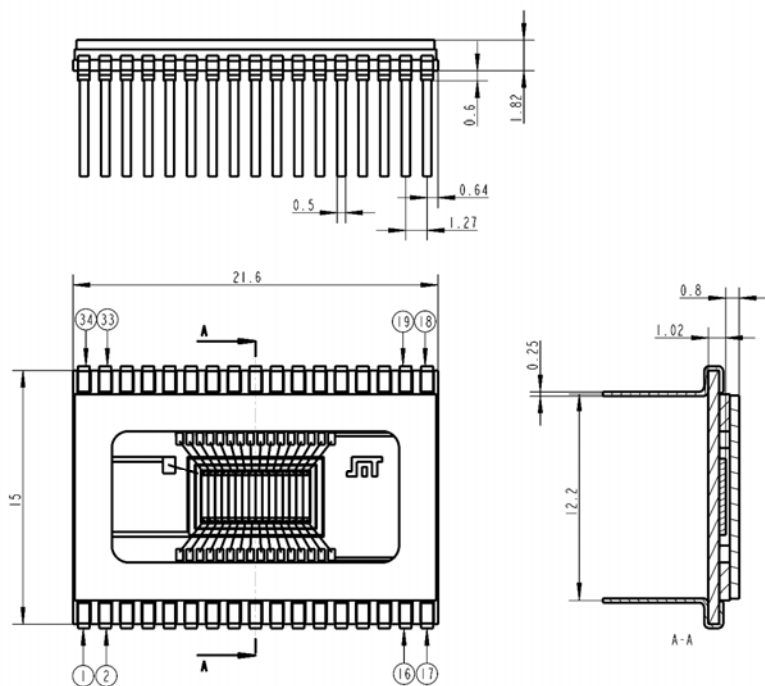
Absolute maximum ratings

| Parameter | Symbol | Value | Unit |
|-----------------------|-------------|-------|------|
| Reverse voltage | V_{R-max} | 30 | V |
| Operating temperature | T_{oper} | 70 | °C |
| Storage temperature | T_{stg} | 100 | °C |

Test conditions: Room temperature 23 °C, Bias voltage 15 V, Light source wavelength 940 nm. Position non-linearity and thermal drift is valid within 80 % of the detector length.

Package: 34 pin DIP ceramic substrate, 21,6 x 15,0 mm², with protective window.



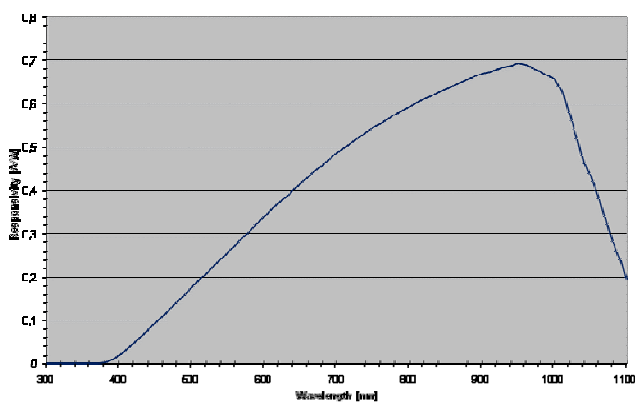


| Pin | Input/Output | Pin | Input/Output |
|-----|---------------|-----|------------------|
| 1 | Bias | 18 | Y2 Segment 16 |
| 2 | Y1 Segment 1 | 19 | Y2 Segment 15 |
| 3 | Y1 Segment 2 | 20 | Y2 Segment 14 |
| 4 | Y1 Segment 3 | 21 | Y2 Segment 13 |
| 5 | Y1 Segment 4 | 22 | Y2 Segment 12 |
| 6 | Y1 Segment 5 | 23 | Y2 Segment 11 |
| 7 | Y1 Segment 6 | 24 | Y2 Segment 10 |
| 8 | Y1 Segment 7 | 25 | Y2 Segment 9 |
| 9 | Y1 Segment 8 | 26 | Y2 Segment 8 |
| 10 | Y1 Segment 9 | 27 | Y2 Segment 7 |
| 11 | Y1 Segment 10 | 28 | Y2 Segment 6 |
| 12 | Y1 Segment 11 | 29 | Y2 Segment 5 |
| 13 | Y1 Segment 12 | 30 | Y2 Segment 4 |
| 14 | Y1 Segment 13 | 31 | Y2 Segment 3 |
| 15 | Y1 Segment 14 | 32 | Y2 Segment 2 |
| 16 | Y1 Segment 15 | 33 | Y2 Segment 1 |
| 17 | Y1 Segment 16 | 34 | Stray light area |

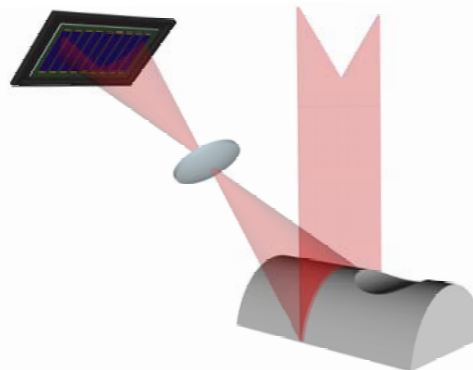
Note:

Outputs Y1, Y2 are interchangeable. The anodes Y1, Y2 must be at negative potential compared to the cathode (bias pin). The stray-light area should be connected to the same potential as the anodes.

Spectral responsivity



Application example



Application information

The inherent resolution of a PSD is very good. It is proven to be better than one part in one million. The performance of a PSD measurement system is thus limited by its mechanical, optical and electrical components. To get the best performance you have to consider:

- Modulated light source. Modulation makes it possible to avoid influence of other light sources
- Stable temperature
- Mechanical stable system
- High optical resolution
- High resolution in division of the sum- and difference signals.

Resolution, optical sensitivity and measurement speed are related to each other in the PSD measurement system and you have to make the proper choices and tradeoffs for your system.

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