

# AL53

Teviso Sensor Technologies



## Radiation Sensor AL53

- Detects Alpha and Beta Particles and Gamma Ray
- Ultra Low Power Requirement

### Description

The heart of the AL53 radiation sensor is a customized PIN diode, covered with a thin aluminum foil to make it insensitive to light. An integrated pulse discriminator with a temperature compensated threshold level provides true TTL signal output. The AL53 is capable of detecting alpha and beta particles and gamma ray.

The performance of the AL53 solid state sensor, in combination with ultra low power requirements make it a good choice for new state-of-the-art designs as well as for upgrading existing designs.

### Features and Benefits

- Detects alpha (Am-241), beta (C-14) and gamma radiation
- Ultra low power requirement (25  $\mu$ A)
- Detector sensitivity: 5 cpm/ $\mu$ Sv/h
- High immunity to RF and electrostatic fields
- Linear response over wide temperature range (-30  $^{\circ}$ C to 60  $^{\circ}$ C)
- Swiss made

### Application Areas

- Equipment for detecting radioactivity in medical environment
- Radiation monitors for nuclear safeguards and security
- Detection of illicit substances
- Natural sciences courses and practical lab experiments

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## Absolute Maximum Ratings

|                                 |                  |
|---------------------------------|------------------|
| Supply voltage, $V_{CC}$ to GND | 18.0 V           |
| Output short-circuit current    | continuous       |
| Storage temperature range       | -65 °C to 100 °C |

## Electrical Characteristics

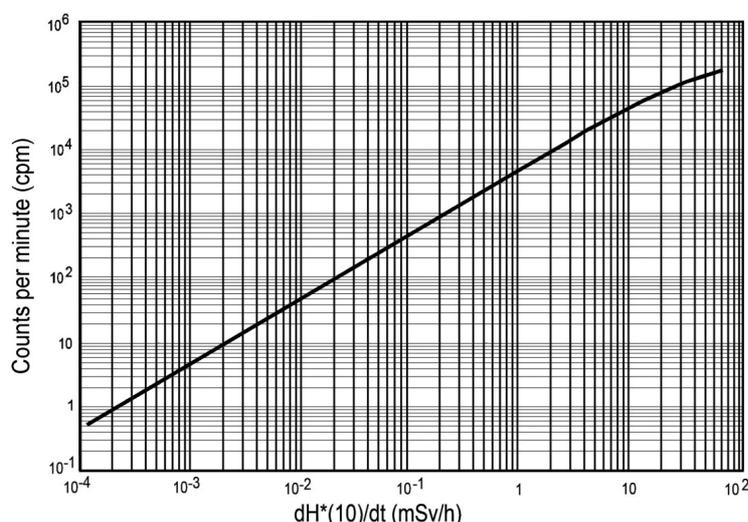
Unless otherwise indicated specified at:  
 $V_{CC} = 4.0$  V,  $T_A = 25$  °C

|                                |  |
|--------------------------------|--|
| Measurement range of dose rate | 0.1 $\mu$ Sv/h to 100 mSv/h                          |
| Pulse count rate               | 5 cpm $\pm$ 15% for 1 $\mu$ Sv/h radiation dose rate |
| Energy response                | 50 keV to above 10 MeV                               |
| Output pulse level             | Equal to supply voltage (positive going)             |
| Output pulse width             | 50 $\mu$ s to 200 $\mu$ s (LOW→HIGH→LOW)             |
| Supply voltage range, $V_{CC}$ | 2.5 V to 12.0 V                                      |
| Supply current, $I_S$          | 25 $\mu$ A TYP                                       |
| Operating temperature range    | -30 °C to 60 °C                                      |

## Sensor Characteristics

|                       |                              |
|-----------------------|------------------------------|
| PIN diode active area | 13 mm <sup>2</sup>           |
| Window                | Aluminum 9.5 x 9.5 x 0.01 mm |

## AL53 Sensor Linearity



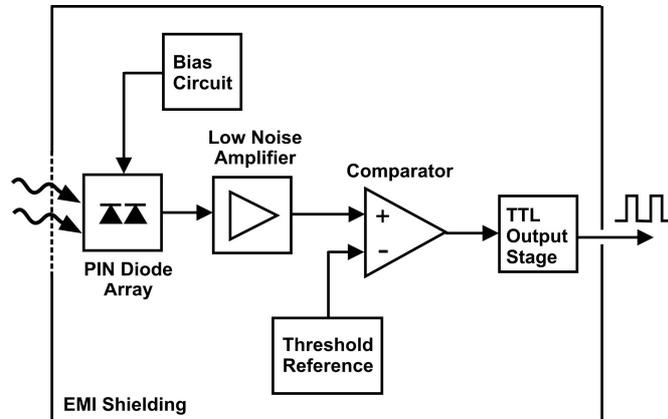
$dH^*(10) / dt =$  Radiation dose equivalent rate for Cs-137 and Co-60 (mSv/h)

# AL53

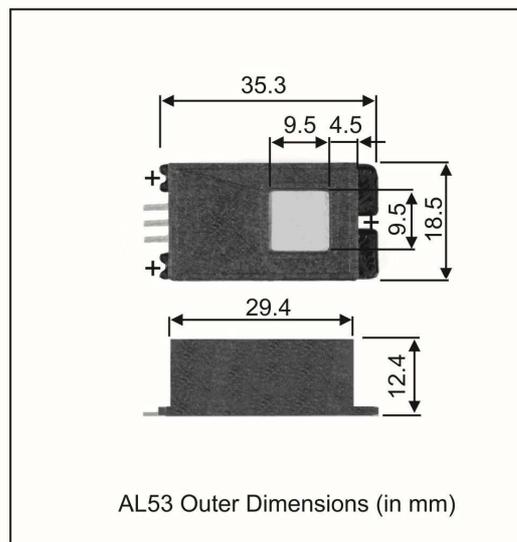
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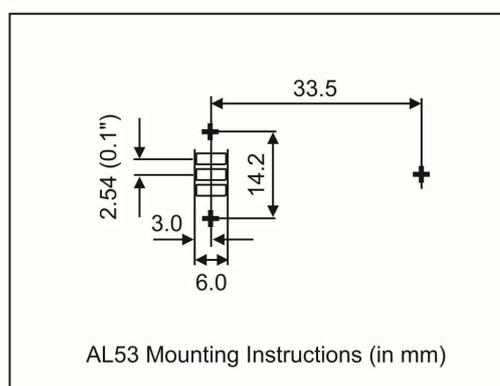
## AL53 Functional Block Diagram



## AL53 Outer Dimensions



## AL53 Mounting Instructions



# AL53

## AL53 Connection Descriptions



## AL53 Soldering Recommendations

Hand soldering is recommended. 360°C max., 5 seconds max.

## Application Information

### Window

Do not touch or clean the window! A scratched or bruised window impairs the function of the PIN diode or could even destroy it.

### Susceptibility to Strong Microwave Signals and Noise on Power Source

Please refer to the "Download" page on our website:

<https://www.teviso.com/file/pdf/bg51-preventing-undesired-pulses.pdf>

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