Solid State Radiation Sensor

Description
The function of the RD2014 radiation sensor is based on an array of customized PIN diodes. The integrated pulse discriminator with a temperature compensated threshold level provides true TTL signal output. The RD2014 is capable of detecting beta radiation (electrons), gamma radiation (photons) and X-rays.

The performance of the RD2014 solid state sensor, in combination with high immunity to electrostatic fields make it a good choice for new state-of-the-art designs as well as for upgrading existing designs.

Features and Benefits
- **Integrated pulse discriminator with TTL output**
- Detects beta and gamma radiation and X-rays
- High immunity to electrostatic fields
- Calibrated sensitivity to gamma radiation (±10%)
- Linear sensitivity over wide temperature range (-30°C to 50°C)
- Low power requirement (400µA) is ideal for battery powered applications
- 4.5V to 5.5V supply voltage
- Large radiation sensitive window: 60 mm²
- Swiss made

Application Areas
- Precision test equipment for nuclear radiation
- Portable nuclear radiation detectors
- Student projects
Absolute Maximum Ratings

Supply voltage, $V_{CC}$ 6.5 V
Output short-circuit current continuous
Storage temperature range -65°C to 110°C

Electrical characteristics
at $V_{CC} = 5.0V$, $T_A = 25°C$ (unless otherwise noted)

Measurement range of radiation dose equivalent rate (Cs-137 & Co-60) 0.1 µSv/h to 100 mSv/h

Sensitivity 6 cpm TYP for 1 µSv/h radiation dose
Output pulse level TTL (positive going)
Output pulse width 40 μs to 150 μs, depending on pulse energy level
Supply voltage, $V_{CC}$ 4.5 V to 5.5 V
Supply current, $I_S$ 400 µA TYP, 600 µA MAX
Linear temperature range -30°C to 50°C

RD2014 Typical Sensor Energy Response
**RD2014 Sensor Linearity**

\[ dH^*(10) / dt = \text{Radiation dose equivalent rate for Cs-137 and Co-60 (mSv/h)} \]

**RD2014 Typical Sensor Sensitivity vs. Temperature**

**Noise Level allowed on Power Source**

See Fig. 1 for test conditions
RD2014 Functional Block Diagram

Application Information

**Power Source Noise Filter**

A RC-filter is recommended when working with noisy power sources (Fig. 1).

**Radiation Detection Survey Meter**

Simple battery-powered monitoring device with a LED diode to indicate beta and gamma radiation, and x-rays
Dimensions and Wiring Connections

![Diagram of RD2014 with dimensions and connections](attachment:image.png)

AW = Active Window

Connection Descriptions

View from connector side

<table>
<thead>
<tr>
<th>Pin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>OUT</td>
<td>TTL output signal</td>
</tr>
<tr>
<td>VCC</td>
<td>+4.5V to 5.5V power supply</td>
</tr>
<tr>
<td>GND</td>
<td>Power supply &amp; output signal ground</td>
</tr>
</tbody>
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