Radiation Sensor BG51
- Nuclear Beta and Gamma Radiation Sensor
- Ultra Low Power Requirement

Description
The function of the BG51 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 BG51 is capable of detecting beta radiation (electrons), gamma radiation (photons) and X-rays.

The performance of the BG51 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
- Detects beta and gamma radiation and X-rays
- New: Ultra low power requirement (25µA)
- Detector sensitivity: 5 cpm/µSv/h
- High immunity to RF and electrostatic fields
- Linear response over wide temperature range (-30°C to 60°C)
- Swiss made

Application Areas
- Equipment for detecting radioactivity in medical environment
- Radiation monitors for nuclear safeguards and security
- Gamma detector to detect illicit nuclear material
- Natural sciences courses and practical lab experiments
**Absolute Maximum Ratings**

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

**Electrical characteristics**

Unless otherwise indicated specified at:
\( V_{CC} = 4.0V, \; T_A = 25°C \)
Measurement range of dose rate \( 0.1 \mu Sv/h \) to \( 100 \mu Sv/h \)

Pulse count rate \( 5 \text{ cpm} \pm 15\% \) for \( 1 \mu Sv/h \) radiation dose rate

Energy response \( 50 \text{ KeV} \) to above \( 2 \text{ MeV} \)

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, \( V_{CC} \) \( 2.5V \) to \( 15.0V \)
Supply current, \( I_S \) \( 25\mu A \) TYP

Operating temperature range \( -30°C \) to \( 60°C \)

**BG51 Sensor Linearity**

\[
\frac{dH^*(10)}{dt} = \text{Radiation dose equivalent rate for Cs-137 and Co-60 (mSv/h)}
\]
BG51 Functional Block Diagram

BG51-SM Outline Dimensions (in millimeters)

BG51-SM Connection Descriptions  (View from the top side)

Soldering Recommendations

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

Susceptibility to Strong Microwave Signals
In order to prevent generation of false output pulses by strong microwave signals
1) connect a 0.01µF capacitor as close as possible to the sensor between the pins GND and VCC,
2) wrap aluminum foil 10µm (0.01mm) around the entire sensor, including the active window.

Susceptibility to Noise on Power Source
In situations where a high noise level on the power source could create undesired output pulses,
an RC filter as shown below is recommended.

![RC Filter Diagram]

**BG51**

R1 & R2: 1.8kΩ  C1 & C2: 4.7µF
Place C2 close to the input pins of the sensor

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