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 mSv/h  
Pulse count rate $5 \text{ cpm} \pm 15\% \text{ for } 1 \mu\text{Sv/h radiation dose rate}$  
Energy response $50 \text{ KeV to above } 2 \text{ MeV}$  
Output pulse level Equal to supply voltage (positive going)  
Output pulse width $50 \mu\text{s to } 200 \mu\text{s (LOW→HIGH→LOW)}$  
Supply voltage range, $V_{CC}$ 2.5V to 15.0V  
Supply current, $I_S$ 25µA TYP  
Operating temperature range -30°C to 60°C

BG51 Sensor Linearity

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

Counts per minute (cpm) vs. $dH^*(10)/dt$ (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 connect a 0.01µF capacitor as close as possible to the sensor between the pins GND and VCC.

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]

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

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