



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 (25 μ A)
- Detector sensitivity: 5 cpm/ μ Sv/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

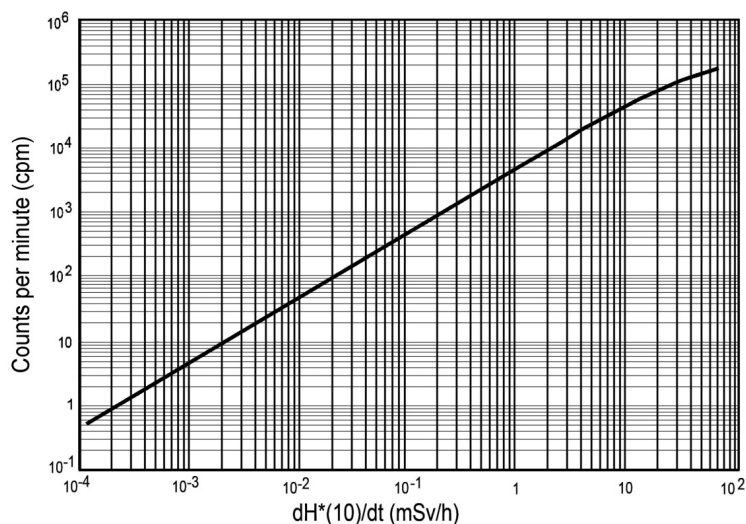
Supply voltage, V_{CC} to GND	18.0V
Output short-circuit current	continuous
Storage temperature range	-65°C to 100°C

Electrical characteristics

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

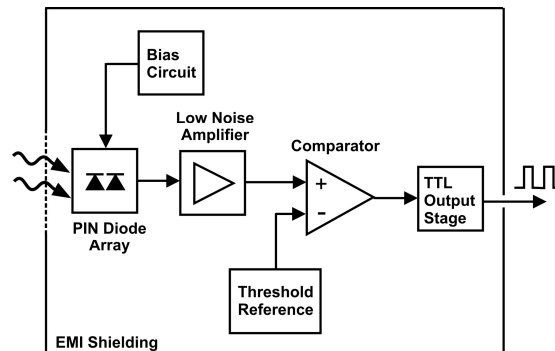
Measurement range of dose rate	0.1 $\mu Sv/h$ to 100 mSv/h
Pulse count rate	5 cpm $\pm 15\%$ for 1 $\mu Sv/h$ radiation dose rate
Energy response	50 KeV to above 2 MeV
Output pulse level	Equal to supply voltage (positive going)
Output pulse width	50 μs to 200 μs (LOW→HIGH→LOW)
Supply voltage range, V_{CC}	2.5V to 15.0V
Supply current, I_S	25 μA TYP
Operating temperature range	-30°C to 60°C

BG51 Sensor Linearity

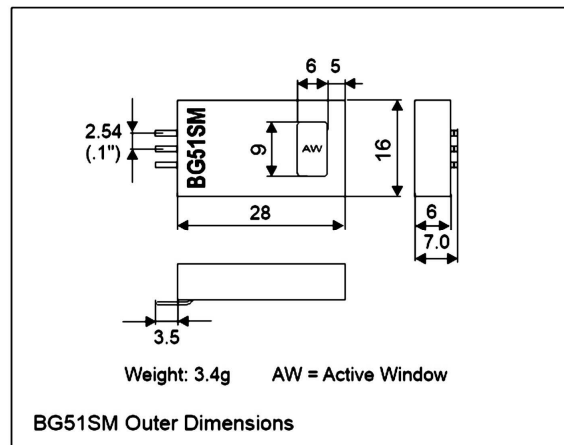


$dH^*(10) / dt$ = Radiation dose equivalent rate for Cs-137 and Co-60 (mSv/h)

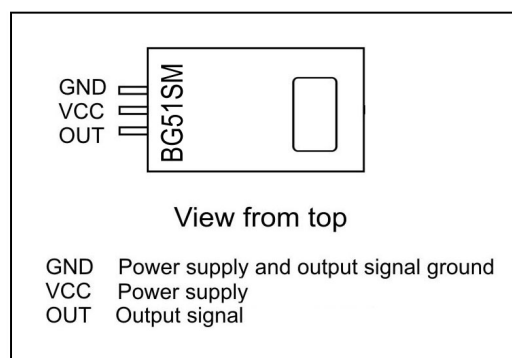
BG51 Functional Block Diagram



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

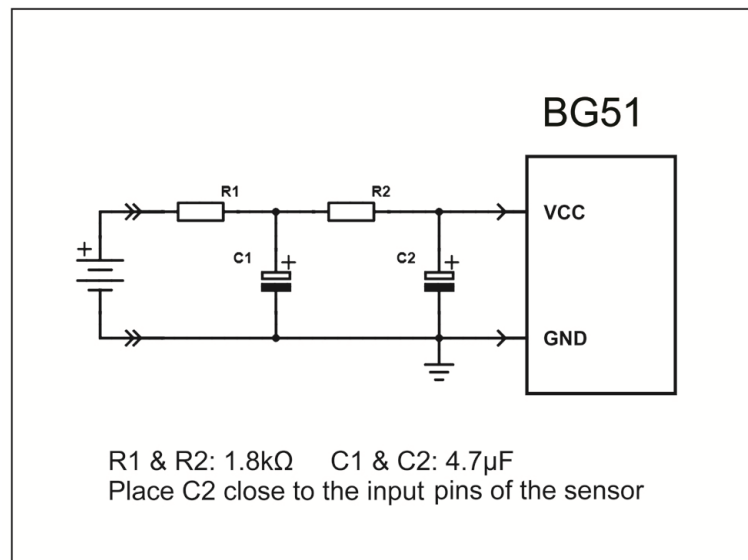
Susceptibility to Strong Microwave Signals

In order to prevent generation of false output pulses by strong microwave signals

- 1) connect a $0.01\mu\text{F}$ capacitor as close as possible to the sensor between the pins GND and VCC,
- 2) wrap aluminum foil $10\mu\text{m}$ (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.



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