

Model N60008 Small Field Diode Detector

The Model N60008 Small Field Diode Detector is a p-type silicon diode designed to measure relative dose distributions in high-energy photon beams. It features a small sensitive volume on the order of $1 \text{ mm}^2 \times 2.5 \text{ }\mu\text{m}$, allowing a measurement of dose distributions with very good spatial resolution. Additional features include low energy and temperature dependence, high sensitivity, high resistance to radiation damage and nearly no rotational directional dependence.

The intended use of the detector is the relative measurement of dose distributions. Absolute dose measurements for photons and electrons are possible after daily calibration against an ion chamber at the radiation quality and measuring depth used. When measuring depth dose curves the detector must be irradiated from the front (flat end). The nominal reference point from the front is 2 mm. The effective measuring point in the axial direction must be determined experimentally. The energy dependence must be checked regularly by comparison with depth dose curves, determined using an ion chamber, since this can change with radiation damage to the semiconductor material.

The 7 mm diameter stem of the small field diode detector allows convenient mounting in a water phantom. Although the detector assembly is watertight, it is recommended that it be removed from the water and kept in a dry environment when not in use, to prevent longterm penetration of moisture through the plastic housing.



Features:

- ▶ Small detector volume – $1 \text{ mm}^2 \times 0.0025 \text{ mm}$ thick
- ▶ High signal-to-noise ratio
- ▶ Water resistant

Specifications

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| Energy range: | ^{60}Co to 25 MV photons |
| Detector type: | p-type silicon |
| Detector orientation: | axis parallel to beam |
| Sensitivity: | 0.7 nC/Gy |
| Leakage: | 100 fA typical |
| Active area thickness: | 1 mm^2 , circular, 0.0025 mm |
| Window thickness: | 220 mg/cm^2 |
| Reference point: | 2 mm from end surface |
| Dose stability: | 1% per 1.5 megarad, ^{60}Co |
| Pre-irradiation: | 200 R |
| Pre-irradiation dose: | 500 - 1000 R |
| Temperature dependence: | 0.24% per $^{\circ}\text{C}$ |
| Temperature equilibrium: | 2 - 3 minutes per $^{\circ}\text{C}$ |
| Rotational dependence: | <0.2% |
| Operating bias: | 0 V |
| Encapsulation length/diameter: | 17.5 mm/6.95 mm |
| Stem length/diameter: | 29.5 mm/6.95 mm |
| Cable length: | 1 m |
| Connector: | triaxial BNC (TNC or PTW-M optional) |