

ELECTRONIC TUBE REFERENCE

1B67

Specialized - Radiation Counter electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

GEIGERMULLERCOUNTER

Self-quenching Geiger-Müller counter for beta and gamma radiation detection and measurement. The gas-filled tube provides pulse-counting response for general radiation survey and laboratory instrumentation.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	— / —	PARALLEL HEATER	— / —
HEATING	Indirect; cold cathode	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION0	GeigerMullerCounter
No fixed ratings recorded.	

1B67 Beta-Gamma Counter Tube

Overview

The **1B67** (also designated as the **1B67/VG-10A**) is a self-quenching Geiger-Müller counter tube designed for the detection of beta and gamma radiation. Manufactured by The Victoreen Instrument Company, this specialized gas-discharge device is engineered to operate in the Geiger region to detect ionizing radiation events. It features a thin window for admitting beta particles, a robust mechanical flange connection, and a high-voltage coaxial electrode configuration.

Mechanical Construction and Physical Dimensions

The physical design of the 1B67 is optimized for radiation detection and secure mounting. The tube features a cylindrical main body with a thin window at one end and a mounting flange at the other.

Window Specifications

To allow beta particles to enter the active volume of the counter, the tube is constructed with a thin window:

- **Window Diameter:** 1-1/8 inches minimum (1-1/8 inches nominal)
- **Window Thickness:** 2.0 to 2.6 mg/cm²
- **Window Recess:** 3/32 inches deep, featuring a 26° bevel

Physical Dimensions and Connections

The mechanical structure is defined by the following dimensions and electrical connection points:

- **Overall Height:** 4-1/4 inches
- **Main Body Diameter:** 1-3/16 inches
- **Body Length:** 2-1/8 inches (excluding the anode pin and mounting flange)
- **Flange Diameter:** 2.223 inches maximum
- **Flange Thickness:** 7/16 inches

The electrical connections are integrated into the mechanical mounting system:

- **Anode Connection:** A top pin with a maximum diameter of 0.255 inches and a length of 3/4 inches.
- **Cathode Connection:** A mounting flange equipped with two holes tapped for #8-32 screws, positioned on a 1-13/16 inch Bolt Circle (B.C.).

Electrical and Radiation Detection Characteristics

The 1B67 operates as a self-quenching radiation detector. Its electrical parameters define its performance within a Geiger-Müller counter circuit.

Operating Voltages and Plateau

The tube requires a high direct-current (d.c.) potential to establish the electric field necessary for gas multiplication:

- **Geiger Threshold Voltage:** 1100 V d.c. maximum
- **Nominal Operating Voltage:** 1200 V d.c.
- **Plateau Length:** 200 V minimum
- **Relative Plateau Slope:** 5.0% maximum per 100 V

The plateau length of at least 200 V ensures stable operation even if the high-voltage power supply experiences minor fluctuations around the nominal 1200 V operating point. The plateau slope of no more than 5.0% per 100 V indicates that the count rate remains highly consistent across this voltage range.

Performance and Detection Metrics

- **Beta Detection Efficiency:** 99.8%
- **Nominal Background Count:** 45 counts per minute at the nominal operating voltage

- **Nominal Recovery Time:** 300 μ s
- **Static Electrode Capacitance:** 3.3 μ F

The recovery time of 300 μ s represents the period after an ionizing event during which the tube is insensitive to subsequent radiation, which is a critical parameter for calculating dead-time corrections in high-count-rate environments.

Operating Parameters and Environmental Ratings

The 1B67 is rated for operation under specific environmental conditions to ensure stability and prevent damage to the delicate window and gas fill:

- **Ambient Temperature Range:** 0 to 100 °C

The self-quenching gas mixture inside the tube allows it to terminate the ionization discharge internally without requiring external quenching circuitry, simplifying the associated electronic design.

Technical Summary

The **1B67** is a self-quenching beta-gamma Geiger-Müller counter tube designed by The Victoreen Instrument Company. Operating at a nominal voltage of **1200 V d.c.**, it features a threshold voltage of **1100 V d.c. maximum**, a minimum plateau length of **200 V**, and a maximum plateau slope of **5.0% per 100 V**. Mechanically, the tube is characterized by a **1-1/8 inch** thin window (thickness of **2.0 to 2.6 mg/cm²**), a top anode pin, and a cathode flange with two #8-32 holes on a **1-13/16 inch** bolt circle. It provides a beta detection efficiency of **99.8%**, a nominal background of **45 counts/min**, and a recovery time of **300 μ s**, operating safely within an ambient temperature range of **0 to 100 °C**.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Victoreen

Published test conditions and operating points. Values on this page are preserved as reported by this source.

1950 VICTOREEN

Section 0 · GeigerMullerCounter

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
GeigerThresholdVoltage	1100 V	Max
Operating Voltage	1200 V	Nominal

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
PlateauLength	200 V	Minimum
RelativePlateauSlope	5 %/100V	Maximum
Background	205 counts/min	Max

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
ElectrodeCapacitance	2.5 pF	—