



ELECTRONIC TUBE REFERENCE

1B106

Specialized - Radiation Counter electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

GEIGERMULLERCOUNTER

Mica-window Geiger-Müller beta counter designed for reduced operating voltage, high sensitivity, and long counting life. Its windowed construction suits laboratory and field measurement of beta-emitting sources.

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

SECTION 0 GeigerMullerCounter*No fixed ratings recorded.*

1B106 — Halogen-Quenched Beta Counter Tube

The **1B106** (also designated as a Thyrode) is a halogen-quenched, mica-window beta counter tube designed for laboratory and field beta radiation detection and measurement. Engineered for high reliability under demanding conditions, the tube features robust construction and is specifically designed for easy replacement in water-tight installations.

Construction and Physical Design

The 1B106 is constructed with a thin mica window having a density of 2 mg/cm² to allow the entry of beta particles into the active volume. The active length of the tube is 1.7 inches.

A key design feature of the 1B106 is its halogen quenching gas. The use of a halogen quencher eliminates both photosensitivity and static charge effects on the mica window, ensuring stable operation.

Mechanically, the tube is built to withstand rugged environments, offering a high resistance to vibration and shock that is much greater than that of the [1B67](#) tube.

Physical Dimensions and Base Connections

The tube utilizes a coaxial base configuration designed to fit a Thyrode Socket No. 380 or Probe No. 263-232. The physical dimensions and connection details are as follows:

- **Base Diameter:** 1.352 inches
- **Overall Length:** 4-9/64 inches to 4-23/32 inches
- **Pin Diameter:** 1/16 inch
- **Anode Contact:** Located at the top terminal, featuring a 1-20 thread that is 1/4 inch deep
- **Cathode Contact:** Formed by the bottom coaxial shell and pin

Electrical and Operating Characteristics

The electrical parameters of the 1B106 define its performance as a Geiger-Mueller detector. The tube operates with a maximum threshold voltage of 825 V. It features a minimum plateau length of 150 V, with a maximum plateau slope of 10% per 100 V evaluated over an operating voltage range of 800 V to 1000 V.

The key electrical and performance specifications include:

Parameter	Value
Maximum Threshold Voltage	825 V
Minimum Plateau Length	150 V
Maximum Plateau Slope	10% / 100 V (from 800 V to 1000 V)
Recovery Time	200 μsec
Electrode Capacitance	2.5 pF (μμF)
Background Count Rate	40 c/m (at Vo = 900 V)
Useful Life	10 [^] 10 counts (at 6000 c/m and Vo = 900 V)

Environmental Ratings and Operating Limits

The 1B106 is rated to operate reliably under a wide range of environmental conditions, making it suitable for field instruments as well as laboratory setups.

- **Operating Voltage Range:** 850 V to 950 V
- **Ambient Temperature Range:** -55 °C to 70 °C
- **Maximum Relative Humidity:** 100%

Performance Curves and Pulse Characteristics

The operational behavior of the 1B106 is characterized by specific relationships between the operating voltage (V_o), the counting rate, and the charge generated per pulse.

- **Counting Rate vs. Operating Voltage:** The counting rate curve exhibits a distinct plateau that begins near 800 V and extends past 1000 V. Within this plateau region, the counting rate levels off at approximately 6000 counts per minute.
- **Charge Per Pulse vs. Operating Voltage:** The charge delivered per pulse increases linearly with the operating voltage. At an operating voltage of 800 V, the charge per pulse is approximately 4×10^{-10} Coulombs, rising linearly to approximately 13×10^{-10} Coulombs at 1000 V.

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
ThresholdVoltage	825 V	Max
Operating Voltage	850–950 V	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
PlateauLength	150 V	Minimum
PlateauSlope	10 %/100V	Maximum
RecoveryTime	200 us	—
Background	40 counts/min	—
Life	10000000000 counts	—
WindowMass	2 mg/cm2	—

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
ElectrodeCapacitance	2.5 pF	—