ELECTRONIC TUBE REFERENCE

1961

Specialized - Switching Tube electronic tube

CONSOLIDATED TECHNICAL DATA
1 SECTION
CONSTRUCTION
SURGEPROTECTOR

RCA protective breakdown tube for higher-voltage AC circuits, conducting at a defined threshold to protect associated equipment from excessive voltage.

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

SECTION1 SurgeProtector

No fixed ratings recorded.

Source-derived section; promoted fields populated where applicable.

1961 — Protective Tube

A voltage-sensitive protective device designed to safeguard electrical circuits under specified voltage thresholds.

Overview

The **1961** (also designated as the **RCA-1961**) is a specialized protective tube. Unlike standard amplifying or rectifying thermionic valves, this device is engineered specifically to function as a voltage-sensitive protective element. It features a unique physical construction with a cap and flange terminal arrangement, and its electrical behavior is characterized by specific breakdown voltage thresholds and a defined tube voltage drop under load.

Physical and Mechanical Design

The 1961 is constructed within a **T10 1/2** glass bulb envelope. Its terminal configuration utilizes a **cap and flange** design rather than a standard pin-based base. This physical layout provides robust electrical and mechanical connections suitable for its protective role.

The physical dimensions and alignment tolerances of the tube are precisely specified:

- **Overall Height:** 2-15/16" ± 1/8"
- **Maximum Flange Diameter:** 1.920"
- **Cap Diameter:** 0.360" ± 0.005"
- **Alignment:** The maximum variation between the centerline of the terminal and the centerline of the flange in any direction is restricted to 1/32".

The tube is designed for maximum installation flexibility and can be mounted in **any position** without affecting its operation or mechanical stability.

Electrical Characteristics and Breakdown Voltages

The electrical parameters of the 1961 are defined primarily by its capacitance and its breakdown behavior when subjected to an alternating current supply. The interelectrode capacitance of the device is **1.35 µµF**.

The primary voltage characteristics of the tube are measured using a **60-cycle sine-wave supply**. Under these specific operating conditions, the tube exhibits the following electrical properties:

- **Minimum Peak Supply Voltage:** 770 Volts. This represents the minimum peak voltage required in the supply circuit to ensure proper operation.
- **Maximum Peak Initial Breakdown Voltage (Cold Tube):** 770 Volts. When the tube is cold, it is guaranteed to break down and initiate conduction at or below this peak voltage.
- **Maximum Peak Recurrent Breakdown Voltage:** 670 Volts. Once the tube has been in operation and is carrying a current of 30 mA, the recurrent breakdown voltage decreases to a maximum of 670 peak Volts.
- **Tube Voltage Drop:** 220 Volts. During conduction at a tube current of 30 mA, the voltage drop across the tube stabilizes at 220 Volts.

Operating Considerations and Waveform Dependency

When integrating the 1961 into protective circuitry, several environmental and electrical constraints must be observed:

- **Ambient Temperature:** Normal variations in ambient temperature have a negligible effect on the performance of the tube, ensuring stable protective thresholds across a wide range of operating environments.
- **Waveform Dependency:** The specified voltage characteristics—including the breakdown and supply limits—apply strictly to **60-cycle sine-wave operation**. Circuits utilizing other frequencies or non-sinusoidal waveforms may exhibit different breakdown and conduction behaviors.

- **Dissipation and Arc Prevention:** To prevent permanent damage to the tube, the energy dissipated during conduction must be carefully controlled. The external circuit must limit the energy so that it is insufficient to establish a sustained arc within the device.

Technical Summary

The **1961** is a specialized **T10 1/2 protective tube** featuring a cap-and-flange terminal configuration and an interelectrode capacitance of **1.35 µµF**. It is designed to provide voltage-sensitive protection with a cold-tube peak breakdown voltage of no more than **770 V** and a recurrent breakdown voltage of **670 V** at **30 mA** under a **60-cycle sine-wave supply**. With an operating voltage drop of **220 V** at **30 mA** and performance that is highly stable across normal ambient temperature variations, the tube offers reliable protection provided that external circuitry prevents the formation of a sustained arc.

SOURCE OPERATING CONDITIONS

1940 RCA

SOURCE PDF

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

1940 RCA

Section 1 · SurgeProtector

OTHER		
PARAMETER	**PUBLISHED VALUE**	**CONDITION / NOTE**
The RCA	**196**	The RCA-196| is designed for use as a protective tube. The voltage
PEAK SUPPLY VOLTAGE	**770 V**	PEAK SUPPLY VOLTAGE 770 min., Volts
PEAK INITIAL BREAKDOWN VOLTAGE (Tube cold)	**770 V**	PEAK INITIAL BREAKDOWN VOLTAGE (Tube cold) 770 max. Volts
PEAK RECURRENT BREAKDOWN VOLTAGEx	**670 V**	PEAK RECURRENT BREAKDOWN VOLTAGEx 670 max. Volts
TUBE VOLTAGE DROPx	**220 V**	TUBE VOLTAGE DROPx 220 Volts
With tube current of	**30 mA**	With tube current of 30 ma.

CHARACTERISTIC		
PARAMETER	**PUBLISHED VALUE**	**CONDITION / NOTE**
characteristics shown under TENTAT{VE DATA apply only for6	**0**	characteristics shown under TENTAT{VE DATA apply only for60-cycle sine-wave
Characteristics Measured on S5	**0**	Characteristics Measured on S50-Cycle Sine-Wave Supply

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