

Gas-filled cold-cathode series spark-gap diode designed specifically for line-type pulser switching.

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 SparkGapPulseSwitch	
MAXIMUM CATHODE CURRENT	450 mA
STARTING VOLTAGE	9500 V
Published electrical limits promoted from the source. Passive microwave reference cavities have their electrical frequency/Q values in TUBE_SECTION_PARAMETER because no applicable promoted frequency field exists in the fixed section schema.	

1B41 — Gas-Filled Cold-Cathode Series Spark Gap Diode

Overview

The **1B41** is a gas-filled, cold-cathode diode designed specifically for high-power switching applications. Operating as a series spark gap device, it features two electrodes within a gas-ionized medium. The tube is engineered to function as a switching device in line-type pulsers, typically deployed in series configurations of two or more tubes to handle high-voltage pulse generation.

Construction and Mechanical Specifications

The 1B41 is constructed with a robust physical envelope designed to withstand high-voltage breakdown and thermal stress. It is a two-electrode device containing a specialized gas mixture that serves as the ionized medium during conduction.

To ensure proper operation and gas distribution, the tube must be mounted in a specific orientation: **cathode end up**, and maintained **within 60° of vertical**.

The physical dimensions of the 1B41 are characterized by the following specifications:

- **Overall Length:** 5" ± 1/8"
- **Maximum Diameter:** 2-3/8" Max. Dia.
- **Top Terminal Diameter:** 0.566" ± 0.015"
- **Top Terminal Height:** 9/16" ± 1/32"
- **Bottom Terminal Diameter:** 1.238" (+0.025" / -0.015")
- **Bottom Terminal Height:** 21/32" ± 1/32"

These distinct top and bottom terminal dimensions facilitate secure electrical connections capable of handling high peak currents.

Electrical Characteristics and Operating Parameters

The 1B41 operates over a specified frequency range of **120 to 2000 cps** (cycles per second). As a spark gap device, its primary electrical characteristic is its breakdown voltage. The nominal **instantaneous breakdown voltage** for the 1B41 is **9.5 kV**.

The internal structure exhibits a low interelectrode capacitance, measured at **7 µµF** (or uuf), which minimizes capacitive loading and leakage before breakdown occurs.

Maximum Ratings and Environmental Limits

The 1B41 is rated for demanding pulse-switching service. To prevent premature degradation or catastrophic failure, operation must be kept within the following absolute maximum limits:

Parameter	Maximum Rating
Peak Current	450 max. Amperes
Average Current	210 max. Ma.
Average Power Dissipation	25 max. Watts
Operating Frequency	2000 max. cps
Duty Cycle	0.001 max.
Ambient Temperature Range	-50 to 100 max. °C

The extremely low maximum duty cycle of **0.001** reflects the tube's design as an intense, short-duration pulse switch rather than a continuous-duty conductor. This duty cycle allows the tube to safely dissipate heat between pulses, keeping the average power dissipation below the 25-watt limit despite the massive 450-ampere peak current capability.

Applications and Switching Behavior

The primary application of the 1B41 is as a switching device in **line-type pulsers**. In these circuits, two or more 1B41 tubes are typically connected in series. This series arrangement allows the combined spark gaps to hold off higher voltages than a single tube could withstand, triggering conduction simultaneously when the pulse network is discharged. The rapid ionization of the gas medium enables the transition from a non-conducting state to a highly conductive state, delivering high-energy pulses to the load at repetition rates up to 2000 cps.

Technical Summary

The **1B41** is a specialized **gas-filled, cold-cathode series spark gap diode** designed for high-power pulse-switching applications. Featuring a nominal instantaneous breakdown voltage of **9.5 kV** and an interelectrode capacitance of **7 μF** , it is optimized for line-type pulsers where multiple units are operated in series. The tube supports peak currents up to **450 A** and operates across a frequency range of **120 to 2000 cps** under a maximum duty cycle of **0.001**. Proper installation requires mounting the tube cathode end up, within 60° of vertical, to ensure reliable ionization and operation within an ambient temperature range of **-50 to 100 °C**.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1947 Westinghouse

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

1947 WESTINGHOUSE

Section 1 · SparkGapPulseSwitch

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MaximumCurrent	450 mA	—
BreakdownOrStartingVoltage	9500 V	—
AveragePowerDissipationMaximum	25 W	—
Duty Cycle Maximum	0.001	Pulse
FrequencyMaximum	2000 Hz	—

TUBE TINKER

An independent reference for electronic tubes, vacuum tubes,
and their source documents.

[Catalog](#) [Tube types](#) [Full books](#) [Blog](#) [Feedback & corrections](#)

© 2026 Tube Tinker