

ELECTRONIC TUBE REFERENCE

1B50

Specialized - Switching Tube electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

MICROWAVETR SWITCH

Tunable transmit-receive gas-switching tube with integral microwave cavity. It isolates and protects the radar receiver during transmitter pulses while permitting received signals between pulses.

GENERAL CHARACTERISTICS

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

SECTION RATINGS

SECTION1	MicrowaveTRSwitch
No fixed ratings recorded.	
Physical section extracted from supplied datasheet.	

1B50 Tunable TR Gas Switching Tube

Overview

The **1B50** is a tunable transmit-receive (TR) gas switching tube of the integral cavity type. It is designed for microwave applications in the 6550 Mc range, where it functions to protect sensitive receiver components from high-power transmitter pulses. The device features a tuning range of 6000 to 7100 Mc and utilizes a single keep-alive electrode to ensure rapid ionization and reliable switching performance.

Mechanical Construction and Waveguide Mounting

The 1B50 is designed as an integral cavity tube with a net weight of approximately 13 ounces. It can be mounted in any physical position. The tube is designed to be installed between standard R.F. choke flanges in a standard waveguide with outer dimensions of 3/4" x 1 1/2" and a wall thickness of 0.064".

Physical Dimensions and Mounting Interface

The physical envelope and mounting interface conform to the following maximum and typical dimensions:

- **Overall Height (Centerline to Top Cap):** 3-7/8" maximum
- **Body Height (Centerline to Collar):** 3-3/8" maximum
- **Flange Diameter:** 2-5/8"
- **Waveguide Flange Thickness:** 0.927" $\pm$ 0.010"
- **Mounting Holes:** Four holes of 0.196" diameter located on a 2.250" Bolt Circle (B.C.), spaced 90° apart and oriented at 45° $\pm$ 1/2° relative to the vertical axis.
- **Top Cap Diameter:** 0.250"
- **Tuning Mechanism / Side Arm Extension:** 2-1/4" maximum from the centerline.

The tube features a single keep-alive electrode, which is accessed via the top cap connector.

Electrical and Keep-Alive Characteristics

The 1B50 operates as a resonant cavity switch with a wide tuning range and highly controlled electrical parameters.

RF Performance

- **Tuning Range:** 6000 to 7100 Mc
- **Insertion Loss:** 1.5 dB maximum when measured at the design frequency of 6550 Mc.
- **Loaded Q:** 350 maximum at zero keep-alive current.
- **Recovery Time:** 12 μ sec maximum at 200 kW peak transmitter power (measured at 3 dB down).
- **Leakage Power:** 60 mW maximum at 200 kW peak transmitter power, representing the total power averaged over the pulse duration.

Keep-Alive Electrode Operation

The keep-alive electrode maintains a continuous localized weak discharge to minimize the ionization time when the main RF pulse occurs.

- **Keep-Alive Starting Voltage:** -750 Vdc maximum is required to initiate the discharge.
- **Keep-Alive Ignition Time:** 5.0 seconds maximum.
- **Keep-Alive Voltage Drop:** 300 to 450 Vdc when operating at a keep-alive current of 100 μ Adc.
- **Keep-Alive Interaction:** The presence of the keep-alive discharge introduces a maximum insertion loss interaction of 0.2 dB at 100 μ Adc.

Temperature Stability

The resonant frequency of the integral cavity exhibits a negative temperature coefficient. Over an ambient temperature range of 0 to 100°C, the frequency change is limited to a range of 0 to -40 Mc.

Absolute Maximum Ratings

To ensure reliable operation and prevent damage to the tube or the protected receiver, the 1B50 must be operated within the following absolute limits:

Parameter	Minimum	Maximum
Transmitter Peak Power	—	300 kW
Keep-Alive Supply Voltage (Open Circuit)	-750 Vdc	-1000 Vdc
Keep-Alive Current	100 μ Adc	200 μ Adc
Ambient Temperature Range	-40 °C	+100 °C

Technical Summary

The **1B50** is a specialized, tunable integral-cavity TR gas switching tube designed for microwave receiver protection in the 6000 to 7100 Mc range (centered around 6550 Mc). It features a single keep-alive electrode to facilitate rapid ignition within 5.0 seconds and a recovery time of 12 μ sec maximum at 200 kW. Housed in a robust mechanical assembly weighing approximately 13 ounces, it mounts directly between standard R.F. choke flanges in a 3/4" x 1 1/2" waveguide. With a maximum peak transmitter power rating of 300 kW and stable operation across a wide temperature range of -40 to +100 °C, the 1B50 provides critical high-power switching and isolation in microwave systems.

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