

Anti-TR gas-switching tube for microwave radar duplexing. Its ionized discharge controls RF paths between transmitter, antenna, and receiver during pulsed operation.

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.

1B51 Anti-TR Gas Switching Tube

The **1B51** is a tentative-type, two-electrode, metal-envelope anti-transmit-receive (anti-TR) gas switching tube. Designed for high-frequency microwave applications, the tube utilizes argon as its ionizable medium to facilitate RF switching. It is designed to operate over a specific super-high frequency band, providing low arc loss and controlled electrical characteristics under high-power transmitter conditions.

Physical Construction and Dimensions

The 1B51 features a robust metal envelope construction containing two electrodes. The tube is designed to be mounted in any position, offering flexibility in waveguide and system layouts.

The physical dimensions of the device are tightly controlled to ensure proper integration into microwave plumbing:

- **Overall Height:** 2.50 inches maximum.
- **Flange Dimensions:** The mounting flange measures 1.800 inches by 1.050 inches, with a tolerance of ± 0.003 inches on both dimensions.
- **Tubulation:** The tubulation is depressed by a maximum of 0.078 inches and must fall entirely within a circle of 1/2-inch maximum diameter located about the center of the flange.
- **Window Centerline:** To ensure proper alignment with the waveguide or resonant cavity, the centerline of the window must coincide with the corresponding centerlines of the box within 0.015 inches, measured directly in the plane of the window.
- **Top Plate:** The bottom of the top plate features a knurled finish.

Microwave and Electrical Characteristics

The 1B51 is engineered for operation in the microwave spectrum, with electrical parameters specified relative to its center frequency and waveguide admittance (Y_0):

- **Center Frequency:** 6425 Mc (Megacycles per second)
- **Operating Frequency Range:** 6225 to 6625 Mc
- **Minimum Voltage Standing Wave Ratio (VSWR):** 11 at the center frequency of 6425 Mc
- **Tuning Susceptance (B/Y_0):** ± 0.06
- **Maximum Equivalent Conductance (G/Y_0):** 0.1
- **Maximum Loaded Q (Q_L):** 6.5
- **Arc Loss:** 0.5 dB
- **Firing Time:** 10 seconds

The tube is designed to handle high-power signals, requiring a minimum transmitter peak power of 100 kW.

Environmental Ratings

The 1B51 is rated to operate reliably across a wide range of environmental conditions. The specified ambient temperature range for the device is from -50°C to $+100^{\circ}\text{C}$. This wide thermal tolerance allows the tube to function in demanding military or industrial installations where extreme temperatures are encountered.

Technical Summary

The **1B51** is a tentative-type, two-electrode, metal-envelope anti-TR gas switching tube utilizing an argon ionizable medium. It is designed for operation in the 6225 to 6625 Mc frequency range, with a center frequency of 6425 Mc. The tube features a maximum overall height of 2.50 inches, a knurled top plate, and precise flange dimensions of 1.800 by 1.050 inches. Its electrical characteristics include a minimum transmitter peak power of 100 kW, a minimum VSWR of 11 at the center frequency, a maximum loaded Q

of 6.5, and an arc loss of 0.5 dB. It is rated for operation across an ambient temperature range of -50°C to $+100^{\circ}\text{C}$ in any mounting position.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Microwave TR Switch

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Center Frequency 6425 Mc	6425 MHz	Center Frequency 6425 Mc

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Operating Frequency Range 6225-6625 Mc	-6625 MHz	Operating Frequency Range 6225-6625 Mc