

Gas-filled tunable TR protective tube for microwave receiver protection across approximately 23.83-24.58 GHz.

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 1 MicrowaveTRSwitch	
MAXIMUM PLATE VOLTAGE	1000 V
MAXIMUM CATHODE CURRENT	0.2 mA
<i>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.</i>	

1B26 — Tunable TR (Transmit-Receive) Tube

Overview

The **1B26** is a gas-filled, tunable Transmit-Receive (TR) tube designed for high-frequency microwave applications. Operating in the super-high frequency (SHF) band, specifically from 23,630 to 24,580 megacycles (MC), this specialized gas-discharge device protects sensitive receiver circuitry from high-power transmitter pulses while allowing received signals to pass with minimal attenuation. The tube features a dual-electrode configuration that establishes both a radio-frequency (RF) gap and a direct-current (DC) ionization gap.

Construction and Mechanical Design

The 1B26 is constructed with a glass reservoir containing an ionizable gas medium. It is designed to be mounted in any physical position. The physical envelope has a maximum overall length of 2-3/4 inches and a maximum reservoir diameter of 1-1/4 inches.

The electrode structure consists of two primary active regions:

- **RF Gap:** Formed by two points located at the center of the tube.
- **DC Gap:** Formed between the ignitor electrode, located at the extreme end of the reservoir (biased negative), and the tube body. This gap produces a continuous localized DC ionization that lowers the breakdown threshold of the RF gap, ensuring rapid triggering when high-power RF energy is present.

For electrical connectivity, the ignitor electrode is terminated at a Cap # C1-2 on the glass reservoir. Tuning is accomplished via a dedicated mechanical tuner mechanism located on the side of the tube body, which allows the resonant frequency of the RF gap to be adjusted across its operating band.

Electrical Characteristics and RF Performance

The 1B26 operates as an electronic switch with specific RF transmission and recovery parameters:

- **Frequency Tuning Range:** 23,630 to 24,580 MC.
- **Insertion Loss:** The maximum insertion loss is rated at 1.75 decibels (dB), representing the signal attenuation introduced by the tube in its non-ionized (receive) state.
- **Peak Leakage Power:** When the tube is ionized to protect the receiver, the maximum peak leakage power passing through the RF gap is limited to 25 milliwatts (mW).
- **Ignitor Interaction:** The maximum ignitor interaction is 0.2 dB, which represents the minor insertion loss variation caused by the presence of the keep-alive DC discharge.
- **Recovery Time:** The recovery characteristic determines how quickly the tube deionizes and returns to a low-loss state after a transmitter pulse. The loss of signal in the tube 4 microseconds following the pulse is specified to be not more than 3 dB in excess of the loss measured at 100 microseconds following the pulse.

Operating Ratings and Ignitor Specifications

To maintain the continuous DC ionization required for reliable RF triggering, the ignitor circuit must be operated within strict electrical limits. The ignitor is operated with a negative DC voltage relative to the tube body.

Parameter	Minimum	Maximum
Ignitor Open Circuit Voltage (DC)	-750 V	-1000 V
Ignitor Current	100 µA	200 µA
Ignitor Voltage Drop (at 100 µA)	235 V	450 V

Parameter	Minimum	Maximum
Ignitor Ignition Time	—	5 Seconds
Ambient Operating Temperature	-50°C	+100°C

The ignitor voltage drop across the DC gap is typically between 235 and 450 volts when drawing a current of 100 microamperes. Upon application of the open-circuit voltage, the maximum time required for the ignitor to initiate a stable discharge (ignition time) is 5 seconds. The tube is rated to operate reliably across a wide environmental temperature range from -50°C to +100°C.

Technical Summary

The **1B26** is a gas-filled, tunable TR tube designed for receiver protection in microwave systems operating between 23,630 and 24,580 MC. Featuring a mechanical side tuner, a glass reservoir with a Cap # C1-2 ignitor connection, and an omnidirectional mounting capability, the tube utilizes a dual-gap design. A continuous DC discharge established by a negative ignitor electrode (operating at 100 to 200 μ A) pre-ionizes the gas, enabling the central RF gap to trigger rapidly and limit peak leakage power to 25 mW. With a maximum insertion loss of 1.75 dB, a recovery time constraint of 3 dB difference between 4 and 100 microseconds, and an operating temperature range of -50°C to +100°C, the 1B26 provides robust, fast-acting RF switching in the millimeter-wave spectrum.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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

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Section 1 · Microwave TR Switch

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
MaximumElectrodeOrAnodeVoltage	1000 V	—
MaximumCurrent	0.2 mA	—
PeakLeakagePowerMaximum	0.025 W	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
FrequencyTuningRange	—	23.83 to 24.58 GHz
Ignitor Voltage Drop	—	235 to 450 V at 100 uA