

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA
1 SECTION
CONSTRUCTION
MICROWAVETR SWITCH

1B58A

Specialized - Switching Tube electronic tube

Special-purpose microwave TR switching tube of the 1B58 family. Its gas-discharge structure provides rapid transmit-receive isolation and receiver protection.

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

SECTION 1 MicrowaveTRSwitch
No fixed ratings recorded.
Electrical ratings/characteristics audited; additional published numeric data retained in parameter table.

1B58A — Broad-Band Fixed-Tuned TR Tube

The **1B58A** is a broad-band, fixed-tuned Transmit-Receive (TR) tube and gaseous switch designed for S-band microwave systems. Its primary application is to provide waveguide section protection for sensitive receiver components against high-power transmitter pulses.

Mechanical Design and Installation

The 1B58A is a robust microwave component weighing approximately 1000 grams. It is designed to operate in any physical orientation, allowing flexibility in system layout.

Mounting and Assembly

Proper installation is critical to prevent mechanical distortion and ensure reliable electrical contact:

- **Mounting Position:** The tube is mounted on the ignitor low-level side.
- **Fastening:** The installation requires four mounting screws utilizing 10-32 UNF 1/4" tapped holes. These screws must be tightened progressively to avoid deforming the flange and the window base.
- **Electrical Contact:** The flange and the base are not joined directly when mounted. Instead, electrical continuity is established and maintained through a metallic gasket.
- **Socket Material:** The socket is constructed of brass.

Environmental Limits

The device is rated for storage within a temperature range of -40 °C to +100 °C.

Electrical Ratings and Operating Limits

The 1B58A operates as a gaseous switch with specific electrical limits that must be maintained. The absolute ratings, which represent non-simultaneous values, define the safe operating envelope for the ignitor circuit and the applied RF power:

Parameter	Minimum	Maximum
Ignitor Current	100 μ A	200 μ A
Ignitor Voltage (D.C. Supply)	-500 V	-700 V
Peak Applied Power	10 kW	750 kW

During operation, the ignitor voltage drop across the tube typically ranges from a minimum of 250 V to a maximum of 400 V.

RF Performance and Microwave Characteristics

The 1B58A is designed to operate across a defined S-band frequency range from 2664 to 2964 MHz. Its performance within this band is characterized by low insertion loss and rapid recovery times to ensure optimal receiver sensitivity and protection.

Leakage and Insertion Loss

When subjected to high-power RF pulses, the tube limits the energy reaching the receiver. The leakage characteristics are defined by two components:

- **Spike Leakage Energy:** Typically 0.3 erg.
- **Flat Leakage Energy:** Typically 0.4 erg.

In the low-power (receive) state, the insertion loss is kept to a maximum of 0.5 dB, ensuring minimal attenuation of incoming signals. At an ignitor current of 200 μ A, the ignitor interaction contributes an

additional 0.3 dB of loss.

Impedance Matching (VSWR)

The Voltage Standing Wave Ratio (VSWR) indicates the quality of the impedance match within the waveguide system:

- **In-Band VSWR:** The maximum VSWR across the main bandwidth is 1.3:1.
- **Band-Edge VSWR:** At the frequency limits of 2664 MHz and 2964 MHz, the maximum VSWR rises to 1.65:1.

Recovery Time

Following a high-power transmit pulse, the tube must rapidly return to its low-loss receive state. The maximum recovery time to reach the 3 dB attenuation point is 15 μ s.

Technical Summary

The **1B58A** is a specialized S-band gaseous TR switch operating in the 2664 to 2964 MHz frequency range. Weighing approximately 1000 g and featuring a brass socket interface, it provides robust receiver protection in microwave systems. It handles peak applied powers from 10 kW up to 750 kW while maintaining a low insertion loss of 0.5 dB and a maximum recovery time of 15 μ s. With a maximum in-band VSWR of 1.3:1 and low leakage energy (0.3 erg spike and 0.4 erg flat), the 1B58A ensures efficient signal transmission and reliable receiver isolation.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1972 Thomson CSF

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

1972 THOMSON CSF

Section 1 · MicrowaveTRSwitch

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Storage temperature . . . v v -40 v v v s o o e o o e e [1]		Storage temperature . . . v v v v v s o o e o o e e -40°C to + 100 °C
Storage temperature . . . v v 100 v v v s o o e o o e e [2]		Storage temperature . . . v v v v v s o o e o o e e -40°C to + 100 °C
Ignitor Current e 100 A [1]		Ignitor Current e 100 200 HA
Ignitor Current e 200 A [2]		Ignitor Current e 100 200 HA
Peak applied power 10 kW i [1]		Peak applied power i 10 750 kW
Peak applied power 750 kW i [2]		Peak applied power i 10 750 kW
Flat leakage energy 0.4 oot it ittt e e e e e e e e e		Flat leakage energy oot it ittt e e e e e e e e e 0.4 erg
Spike leakage energy . . . e 0.3 e e e		Spike leakage energy . . . e e e e 0.3 erg
Ignitor interaction (ignitor current [1]) 200 A		Ignitor interaction (ignitor current : 200 A} e e e e e e e 0.3 dB
Ignitor interaction (ignitor current [2]) 300 mA		Ignitor interaction (ignitor current : 200 A} e e e e e e e 0.3 dB
Recovery time ([1]) 3 us		Recovery time (3dB), maximum 15 us
Recovery time ([2]) 15 us		Recovery time (3dB), maximum 15 us
Ignitor voltage drop, MiNiMUM e 250 V		Ignitor voltage drop, MiNiMUM e 250 V

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
VSWR in the bandwidth, maximum e [1]	1.3	VSWR in the bandwidth, maximum e 1.3:1
VSWR in the bandwidth, maximum e [2]	1	VSWR in the bandwidth, maximum e 1.3:1
VSWR at the frequency range limits ([1]	1	VSWR at the frequency range limits (1) 1.65:1
VSWR at the frequency range limits ([2]	1.65	VSWR at the frequency range limits (1) 1.65:1
VSWR at the frequency range limits ([3]	1	VSWR at the frequency range limits (1) 1.65:1

TUBE TINKER

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