

ELECTRONIC TUBE REFERENCE

CONSOLIDATED TECHNICAL DATA
1 SECTION
CONSTRUCTION
MICROWAVETR SWITCH

1835A

Specialized - Switching Tube electronic tube

Broadband integral-cavity gas ATR switch for pulsed microwave duplexers, isolating transmitter and receiver paths across approximately 9.0–9.6 GHz.

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
<i>No fixed ratings recorded.</i>
<i>Representative electrical section; promoted values mapped from published ratings and characteristics where applicable.</i>

1835A — Gas Switching ATR Tube

The **1835A** (also designated as the GL-1B35-A or GL-1835-A) is a broadband, integral-cavity gas switching tube designed for use as an Anti-Transmit-Receive (ATR) tube in pulsed microwave circuits. Its primary function is to decouple the transmitter from a common transmitting and receiving antenna during non-transmitting periods, thereby protecting receiver circuitry and optimizing signal routing.

Technical Function and Microwave Characteristics

The 1835A operates as a gas discharge switch within a microwave transmission line. During the high-power transmit pulse, the gas within the tube ionizes, presenting a low-impedance path that effectively reflects the transmitter's power toward the antenna and prevents it from reaching the receiver. During

non-transmitting periods, the tube remains un-ionized, decoupling the transmitter from the antenna system to allow received signals to pass to the receiver with minimal attenuation.

Frequency and Bandwidth

The tube is designed for operation in the X-band microwave spectrum, centered at a nominal frequency of **9300 Megacycles**.

- **Operational Band:** 9000 to 9600 Megacycles, evaluated at a minimum Voltage Standing Wave Ratio (VSWR) of 5.
- **Loaded Q:** 6.5 maximum, ensuring a relatively broadband response suitable for pulsed radar applications.
- **Center Frequency Normalized Conductance:** 0.1 maximum.
- **Center Frequency Normalized Susceptance:** Within the range of ± 0.06 .

Power Handling and Loss Characteristics

The electrical performance of the 1835A is characterized by low insertion loss during high-power operation and rapid recovery times to ensure high receiver sensitivity immediately following a transmitter pulse.

- **Transmitter Peak Power (Minimum):** 5 Kilowatts.
- **Maximum Transmitter Peak Power Rating:** 250 Kilowatts, rated at a maximum duty cycle of 0.001.
- **Arc Power Loss:** 0.8 Decibels maximum. This limit is specified under the operating conditions of 4 kW peak power, a pulse repetition rate of 1000 pulses per second (pps), a pulse width of 0.5 microseconds, and an operating frequency of 9025 Megacycles.
- **High Level Voltage Standing Wave Ratio (VSWR):** 1.10 maximum.
- **Initial Firing Time:** 10 Seconds maximum when subjected to a peak line power of 4 kW.
- **Recovery Time:** 8 Microseconds maximum. This recovery period is defined under test conditions of 50 kW peak power, a pulse repetition rate of 1000 pps, a pulse width of 1.0 microsecond, and an operating frequency of 9300 Megacycles.

Mechanical, Environmental, and Physical Specifications

The 1835A features a robust mechanical design with an integral cavity and precise physical tolerances to ensure stable electrical coupling to standard waveguide systems.

Environmental and Mounting Limits

- **Mounting Position:** The tube can be mounted in any physical orientation.
- **Ambient Temperature Range (Non-operating):** -40 to +100 °C.
- **Net Weight:** Approximately 0.25 pound.

Physical Dimensions and Tolerances

The physical envelope and coupling windows of the 1835A are manufactured to tight tolerances to maintain impedance matching and structural integrity:

Dimension Parameter	Value / Tolerance
Flange Dimensions	1.300" $\pm$ 0.003" x 0.800" $\pm$ 0.003"
Body Height	1.299" $\pm$ 0.003"
Total Height (including tubulation)	1-13/16" maximum
Tubulation Cap Diameter	1/4" maximum
Window Dimensions	1.000" $\pm$ 0.010" x 0.500" $\pm$ 0.010"

The tubulation cap must fall within a 3/8" diameter circle located from the center lines of the flange. Additionally, the center lines of the coupling window must coincide with the box center lines within 0.015" in the plane of the window.

Technical Summary

The **1835A** is a specialized gas switching ATR tube designed for pulsed microwave systems operating in the 9000 to 9600 Megacycles band. With a center frequency of 9300 Megacycles, a maximum loaded Q of 6.5, and a peak power rating of up to 250 Kilowatts at a 0.001 duty cycle, the tube provides reliable decoupling of the transmitter from a shared antenna. Its rapid recovery time of 8 microseconds maximum and low arc power loss of 0.8 decibels ensure efficient signal routing and receiver protection in high-performance radar and communication systems.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1950 General Electric Transmitting Types

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

1950 GENERAL ELECTRIC TRANSMITTING TYPES

Section 1 · Microwave TR Switch

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Center frequency	9300 MHz	Published datasheet value
Operational band minimum	9000 MHz	Published datasheet value
Operational band maximum	9600 MHz	Published datasheet value
Recovery time maximum	8 us	50 kW peak

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Transmitter peak power maximum	250 kW	0.001 duty cycle

TUBE TINKER

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