



ELECTRONIC TUBE REFERENCE

19G3

Rectifier - Half Wave electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
RECTIFIER

High-voltage industrial half-wave rectifier for demanding power-supply service. Its multi-kilovolt inverse-voltage capability and moderate current rating suit professional and industrial DC supplies.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	4 V / 1.4 A	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Rectifier	
MAXIMUM CATHODE CURRENT	75 mA
PEAK INVERSE VOLTAGE	7500 V
NOMINAL OUTPUT CURRENT	75 mA
PEAK FORWARD CURRENT	375 mA

19G3 — High-Vacuum Half-Wave Rectifier

The **19G3** is a high-vacuum, half-wave rectifier tube designed for high-voltage rectification applications. It features an indirectly heated cathode and is housed in a glass envelope with an International Octal base and a top-cap anode connection.

Heater and Pre-Heating Requirements

The 19G3 is equipped with an indirectly heated cathode. The heater is designed for AC or DC operation with the following nominal ratings:

- **Heater Voltage:** 4.0 V
- **Heater Current:** 1.4 A

A calculation of the nominal heater power consumption yields: $\text{Heater Power} = 4.0 \text{ V} \times 1.4 \text{ A} = 5.6 \text{ W}$

To ensure the longevity and proper operation of the indirectly heated cathode, a strict pre-heating schedule must be observed: the heater must be switched on for a minimum of 15 seconds before any anode voltage is applied to the tube.

Physical and Mechanical Specifications

The 19G3 is constructed with a clear glass bulb and a miniature top cap. It is designed to be mounted in any position without restriction.

Dimensions and Weight

- **Maximum Overall Length:** 100 mm
- **Maximum Seated Height:** 87 mm
- **Maximum Diameter:** 32 mm
- **Maximum Bulb Diameter:** 29 mm
- **Approximate Net Weight:** 1-3/4 ozs
- **Approximate Packed Weight:** 2-1/4 ozs

Base and Pin Configuration

The tube utilizes an International Octal (IO8) base. When viewed from the free end of the pins, the connections are assigned as follows:

Pin Number	Connection
Pin 1	Blank (Must be left free)
Pin 2	Heater / Cathode (hk)
Pin 3	Blank (Must be left free)
Pin 4	Blank (Must be left free)
Pin 5	Blank (Must be left free)
Pin 6	Blank (Must be left free)
Pin 7	Heater (h)
Pin 8	Blank (Must be left free)
Top Cap	Anode (a)

Unused socket contacts (blank pins) must not be used as tie points and must be left entirely free.

Absolute Maximum Ratings

The ratings for the 19G3 are specified as absolute maximum values, rather than design-center values. These limits must not be exceeded under any operating conditions. The maximum ratings vary depending on the operating frequency of the supply voltage, with specific limits defined for high-frequency (1,500 c.p.s.) and standard power-frequency (50 c.p.s.) operation:

Parameter	1,500 c.p.s. Limit	50 c.p.s. Limit
Maximum Peak Inverse Voltage (No Load)	7,500 V	7,000 V
Maximum Peak Inverse Voltage (On Load)	6,500 V	6,300 V
Maximum Mean Anode Current (I_{av})	75 mA	50 mA
Maximum Peak Anode Current (I_{pk})	375 mA	375 mA
Minimum Surge Limiting Resistance	1,800 Ω	1,900 Ω

The minimum surge limiting resistance specified in the table is required to protect the tube from excessive transient currents. This resistance value does not need to be a discrete resistor; it can be obtained from the distributed resistance of the power transformer windings.

Electrical Characteristics and Anode Current Behavior

The average characteristic curve of the 19G3, representing anode current as a function of anode voltage, exhibits a smooth, non-linear upward sweep. This behavior is characteristic of space-charge-limited conduction in a high-vacuum diode.

Typical operating points along this characteristic curve include:

- At an anode potential of **10 V**, the anode current is approximately **20 mA**.
- At an anode potential of **20 V**, the anode current rises to approximately **55 mA**.
- At an anode potential of **40 V**, the anode current reaches approximately **150 mA**.
- At an anode potential of **60 V**, the anode current is approximately **275 mA**.
- At an anode potential of **80 V**, the anode current increases to approximately **410 mA**.

These points illustrate the low internal voltage drop of the tube when conducting significant currents, which contributes to its efficiency as a high-voltage rectifier.

Technical Summary

The **19G3** is an indirectly heated, high-vacuum half-wave rectifier featuring a 4.0 V, 1.4 A heater (5.6 W calculated power) and requiring a 15-second pre-heating period. It is housed in a clear glass envelope with an International Octal base and a miniature top cap for the anode, allowing for unrestricted mounting. The tube is rated for high-voltage operation up to 7,500 V peak inverse voltage (no load) at 1,500 c.p.s. or 7,000 V at 50 c.p.s., with maximum mean currents of 75 mA and 50 mA respectively. Its electrical characteristics show a typical non-linear diode conduction curve, reaching approximately 410 mA of anode current at an anode potential of 80 V.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1960 Mazda

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

1960 MAZDA

Section 1 · Rectifier

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
No-load peak inverse voltage	7500 V	—
Alternate no-load peak inverse voltage	7000 V	—
Alternate on-load peak inverse voltage	6300 V	—
Alternate maximum mean current	50 mA	—
Warmup time	185 s	—

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