



ELECTRONIC TUBE REFERENCE

12X3

Rectifier - Half Wave electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION

CONSTRUCTION

RECTIFIER

Indirectly heated high-vacuum half-wave rectifier for conventional electronic power supplies, providing modest current with approximately 1 kV peak inverse-voltage capability.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	12.6 V / 650 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Rectifier	
PEAK INVERSE VOLTAGE	1000 V
NOMINAL OUTPUT CURRENT	70 mA
PEAK FORWARD CURRENT	210 mA
MAXIMUM HEATER-CATHODE VOLTAGE	450 V
<i>Published ratings and characteristics promoted from the supplied Rogers/Rogers Majestic source.</i>	

12X3 — High-Vacuum Half-Wave Rectifier

A high-vacuum, half-wave rectifier tube designed for high-voltage, low-current power supply applications.

Overview

The **12X3** is a high-vacuum, half-wave rectifier tube featuring a unipotential cathode and a top-cap plate connection. Registered in January 1944 under Registration No. 361 and sponsored by Rogers Radio Tubes, Ltd. of Toronto, Ontario, Canada, this tube is designed to handle high peak inverse voltages. It is

housed in a T9 glass bulb with a small 4-pin base and a small metal top cap, allowing for safe isolation of high-voltage anode potentials from the heater and cathode connections.

Physical Specifications and Basing

The 12X3 utilizes a T9 glass bulb envelope and a small 4-pin base. To prevent voltage breakdown and arc-over at high potentials, the plate (anode) is terminated at a small metal top cap at the top of the envelope. The remaining electrodes are connected to the base pins according to the **4AO** basing designation.

The pin connections, viewed from the bottom of the base, are:

Pin	Connection
Pin 1	Heater
Pin 2	Cathode
Pin 3	No Connection (N.C.)
Pin 4	Heater
Top Cap	Plate

Physical dimensions of the tube include:

- **Maximum Overall Length:** 4-1/4 inches
- **Maximum Seated Height (including top cap):** 3-3/4 inches
- **Maximum Diameter:** 1-3/16 inches

The device is rated for operation in any mounting position, allowing for flexible mechanical integration within a chassis.

Heater and Electrical Ratings

The 12X3 features an indirectly heated, unipotential cathode. The heater is designed to operate from either an alternating current (AC) or direct current (DC) supply.

Heater Parameter	Value
Heater Voltage (AC or DC)	12.6 V
Heater Current	0.65 A
Calculated Heater Power	8.19 W

The calculated heater power is derived from the nominal heater voltage of 12.6 V and heater current of 0.65 A ($12.6\text{ V} \times 0.65\text{ A} = 8.19\text{ W}$).

The electrical design of the 12X3 is governed by the following maximum ratings:

- **Maximum DC Heater-to-Cathode Potential:** 50 V
- **Maximum Peak Inverse Voltage:** 7000 V
- **Maximum Peak Plate Current:** 200 mA (measured at a plate voltage, EB, of 270 V)

Typical Rectifier Operation

The 12X3 is typically operated as a half-wave rectifier in circuits employing a condenser-input filter (capacitor-input filter). Under these conditions, the operating limits are defined as:

- **Maximum AC Plate Voltage per Plate (RMS):** 2500 V
- **Maximum DC Output Current:** 10 mA

These ratings indicate that the 12X3 is optimized for high-voltage, low-current applications where high peak inverse voltage capability is critical.

Technical Summary

The **12X3** is an indirectly heated, high-vacuum half-wave rectifier tube featuring a unipotential cathode, a 12.6 V / 0.65 A heater, and a 4AO basing configuration. With its plate connection isolated on a small metal top cap, the tube is rated for a maximum peak inverse voltage of 7000 V and a maximum peak plate current of 200 mA. In typical half-wave rectifier service with a condenser-input filter, it safely delivers up to 10 mA of DC output current from an RMS AC plate voltage of up to 2500 V.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1959 Rogers

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

1959 ROGERS

Section 1 · Rectifier

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
HeaterOrFilamentVoltage	12.6 V	—
HeaterOrFilamentCurrent	650 mA	—

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