



ELECTRONIC TUBE REFERENCE

0Z4A

Rectifier - Full Wave electronic tube

CONSOLIDATED TECHNICAL DATA
2 SECTIONS
CONSTRUCTION
RECTIFIER-RECTIFIER

Gas-filled full-wave rectifier with an ionically heated cathode, intended particularly for vibrator-type power supplies. It requires no separate heater supply and provides substantial current from a compact dual-rectifier structure.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8XD	BASE PINS	8
NOMINAL HEATER	– / –	PARALLEL HEATER	– / –
HEATING	Indirect; cold cathode	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Common cathode	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION1 Rectifier	
PEAK INVERSE VOLTAGE	880 V
NOMINAL OUTPUT CURRENT	110 mA
PEAK FORWARD CURRENT	330 mA
FORWARD VOLTAGE DROP	24 V
Full-wave gas rectifier; identical diode paths represented once under repeated-section compression.	

SECTION2 Rectifier	
PEAK INVERSE VOLTAGE	880 V
NOMINAL OUTPUT CURRENT	110 mA
PEAK FORWARD CURRENT	330 mA
FORWARD VOLTAGE DROP	24 V
<i>Physical rectifier section 2; electrical properties populated from the same published ratings applicable to the identical rectifier path.</i>	

0Z4A — Full-Wave Gas Rectifier Tube

Overview

The **0Z4A** (also designated as **0Z4A/1003** or **0Z4A/CK1003**) is a gas-filled, full-wave double diode employing an ionic-heated, cold cathode. It is designed primarily for use as a full-wave power rectifier in electronic equipment operating with vibrator-type power supplies. Because it utilizes a cold cathode, the 0Z4A requires no heater or filament voltage, eliminating the power consumption and circuitry associated with a heater supply.

The 0Z4A represents an upgraded version of the standard [0Z4](#) and [0Z4G](#) rectifiers, offering higher peak plate current, increased maximum DC output current, and improved output voltage characteristics under typical operating conditions. Like other power-handling tubes, the 0Z4A requires adequate ventilation during operation to ensure reliable performance.

Mechanical Design, Cold Cathode, and Physical Dimensions

The 0Z4A is constructed with a metal envelope (MT-8 Metal) and a small wafer octal base. The tube is designed to be mounted in any position.

The physical dimensions of the 0Z4A are as follows:

- **Maximum Overall Height:** 2-5/8 inches (2.625 inches)
- **Maximum Seated Height:** 2.063 inches
- **Maximum Diameter:** 1-5/16 inches (1.3125 inches) or 1.031 inches depending on the specific manufacturing outline
- **Envelope Body Height:** 2-1/16 inches maximum

Because the cathode is ionic-heated, the tube does not contain a filament or heater. The cathode is heated solely by the ionic bombardment resulting from the gas discharge within the tube during conduction. This cold-cathode construction means that the tube remains completely inactive until the applied plate voltage reaches the minimum starting threshold.

Basing and Terminal Connections

The 0Z4A utilizes an octal base and is associated with the **4R** and **8XA** basing configurations. The tube requires a standard octal socket. The terminal connections, viewed from the bottom of the tube, are assigned as follows:

Pin Number	Connection	Description
Pin 1	Shell (S)	Metal envelope shielding
Pin 3	Plate #2 (PD2)	Anode for the second rectifier section
Pin 5	Plate #1 (PD1)	Anode for the first rectifier section
Pin 6 or Pin 7	No Connection (NC)	Unused pin (varies by manufacturer layout)
Pin 8	Cathode (K)	Common ionic-heated cathode

Note: Some technical layouts designate Pin 6 as having no connection, while others designate Pin 7 as having no connection; both configurations maintain compatibility with standard octal sockets.

Electrical Ratings and Operating Limits

The electrical limits of the 0Z4A are defined under the Design-Center Rating System. These ratings establish the maximum and minimum boundaries within which the tube must be operated to prevent damage or premature failure.

Parameter	Rating	Unit
Maximum Peak Inverse Plate Voltage	880	Volts
Minimum Peak Starting-Supply Voltage (Per Plate)	300	Volts (Absolute Minimum)
Maximum Peak Plate Current (Per Plate)	330	mA
Maximum DC Output Current	110	mA
Minimum DC Output Current	30	mA (Absolute Minimum)
Minimum Total Effective Plate Supply Impedance (Per Plate)	300	Ohms

The minimum ratings are critical operational constraints:

- **Minimum Starting Voltage:** An absolute minimum peak starting voltage of **300 V** per plate is required to initiate the gas discharge and establish conduction. Under no circumstances should the starting voltage fall below this value.
- **Minimum DC Output Current:** The tube must not be operated with less than **30 mA** of cathode current. Operating below this minimum threshold fails to maintain the ionic heating of the cathode, which can cause the gas discharge to extinguish or become unstable.
- **Minimum Plate Supply Impedance:** A minimum of **300 ohms** of total effective plate supply impedance (including the vibrator, transformer, and wiring) must be present in the circuit per plate to limit peak currents and protect the tube from excessive ion bombardment.

Typical Operation and Performance Characteristics

In typical full-wave vibrator-type power supply applications with a capacitor-input filter, the 0Z4A operates under the following conditions:

- **Peak Plate Supply Voltage (Per Plate):** 440 Volts (measured as the open-circuit voltage on the flat portion of the transformer voltage wave)
- **Filter-Input Capacitor:** 8 μ F
- **Total Effective Plate Supply Impedance (Per Plate):** 600 Ohms (including the vibrator, transformer, and wiring)
- **DC Output Current:** 100 mA to 110 mA
- **DC Output Voltage:** 310 Volts (at the input to the filter)
- **Average Dynamic Voltage Drop:** 24 Volts (measured per plate at a current of 110 mA)

The low average dynamic voltage drop of **24 V** is a characteristic of gas-filled rectifiers, providing high efficiency and relatively stable voltage regulation compared to high-vacuum rectifiers.

Comparison with Related Designations

The 0Z4A is part of a family of cold-cathode gas rectifiers that includes the standard [0Z4](#) and the glass-envelope [0Z4G](#). While they share the same basic operating principles and basing configurations, the 0Z4A features significantly higher performance ratings:

- **Envelope Material:** The [0Z4](#) and 0Z4A utilize a metal MT8 envelope, whereas the [0Z4G](#) is housed in a glass T-7 envelope.
- **Current Handling:** The 0Z4A supports a maximum peak plate current of **330 mA** and a maximum DC output current of **110 mA**, compared to **270 mA** peak plate current and **90 mA** maximum DC output current for the standard [0Z4](#) and [0Z4G](#).
- **Typical Output:** Under typical operating conditions, the 0Z4A delivers a DC output of **310 V** at **100-110 mA** (with a 600-ohm plate supply impedance), whereas the [0Z4](#) and [0Z4G](#) typically deliver **275 V** at **65 mA** (with an 800-ohm plate supply impedance).
- **Voltage Drop Reference:** The 24-volt tube drop is achieved at a full **110 mA** plate current in the 0Z4A, whereas the standard [0Z4](#) and [0Z4G](#) exhibit the same 24-volt drop at a lower plate current of **90 mA**.

Technical Summary

The **0Z4A** is an octal-based, cold-cathode, gas-filled double diode designed for full-wave rectification in vibrator-type power supplies. By utilizing an ionic-heated cathode, it eliminates the need for a heater supply, making it highly efficient for mobile or portable equipment. The tube features a maximum peak inverse voltage of **880 V**, a maximum peak plate current of **330 mA**, and a maximum DC output current of **110 mA**. To ensure stable gas conduction, the circuit must maintain a minimum starting voltage of **300 V** per plate, a minimum DC output current of **30 mA**, and a minimum plate supply impedance of **300 ohms**.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1938 Raytheon

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

1938 RAYTHEON

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Mox. Peak Inverse Plate Voltage	880 volts	Mox. Peak Inverse Plate Voltage 880 volts
Max. Peak Plate Current	330 ma	Max. Peak Plate Current 330 ma.
(Full-Wave)	300 volts	(Full-Wave) 300 volts
Absolute Min, DC Output Current @	30 ma	Absolute Min, DC Output Current @ 30 ma.
per Plate ϕ	300 ohms	per Plate ϕ 300 ohms

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak Plate Voltage, per Plate A	440 volts	Peak Plate Voltage, per Plate A 440 volts
Total Effective Plate Supply Impedance, per Plate ϕ	600 ohms	Total Effective Plate Supply Impedance, per Plate ϕ 600 ohms
Average Dynamic Voltage Drop	24 volts	Average Dynamic Voltage Drop 24 volts
DC Output Voltage	310 volts	DC Output Voltage 310 volts
® Under no circumstances should the tube be operated with less than	30 ma	® Under no circumstances should the tube be operated with less than 30 ma. of cathode current.

1938 RAYTHEON

Section 2 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Mox. Peak Inverse Plate Voltage	880 volts	Mox. Peak Inverse Plate Voltage 880 volts
Max. Peak Plate Current	330 ma	Max. Peak Plate Current 330 ma.

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
(Full-Wave)	300 volts	(Full-Wave) 300 volts
Absolute Min, DC Output Current @	30 ma	Absolute Min, DC Output Current @ 30 ma.
per Plate ϕ	300 ohms	per Plate ϕ 300 ohms

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Peak Plate Voltage, per Plate A	440 volts	Peak Plate Voltage, per Plate A 440 volts
Total Effective Plate Supply Impedance, per Plate ϕ	600 ohms	Total Effective Plate Supply Impedance, per Plate ϕ 600 ohms
Average Dynamic Voltage Drop	24 volts	Average Dynamic Voltage Drop 24 volts
DC Output Voltage	310 volts	DC Output Voltage 310 volts
® Under no circumstances should the tube be operated with less than	30 ma	® Under no circumstances should the tube be operated with less than 30 ma. of cathode current.


SOURCE DATA APPENDIX

SOURCE OPERATING CONDITIONS

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195X Raytheon Special Purpose Tubes

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195X RAYTHEON SPECIAL PURPOSE TUBES

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum peak inverse voltage	880 V	FullWave
Maximum peak plate current per plate	330 mA	FullWave
Maximum DC output current	110 mA	FullWave

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Average tube drop	24 V	FullWave

195X RAYTHEON SPECIAL PURPOSE TUBES

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum peak inverse voltage	880 V	FullWave
Maximum peak plate current per plate	330 mA	FullWave
Maximum DC output current	110 mA	FullWave

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Average tube drop	24 V	FullWave

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