

ELECTRONIC TUBE REFERENCE

0Z4G

Rectifier - Full Wave electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

RECTIFIER-RECTIFIER

Gas-filled full-wave rectifier with an ionically heated common cathode, requiring no separate heater supply. Its dual rectifier sections provide full-wave power conversion with low gas-discharge forward voltage.

GENERAL CHARACTERISTICS

BASE DESIGNATION	4R	BASE PINS	4
NOMINAL HEATER	– / –	PARALLEL HEATER	– / –
HEATING	Indirect; cold cathode	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Common cathode	SECTION CONSTRUCTION	Similar

4R - TERMINAL PINOUT

TERMINAL	SECTION	ELEMENT	STATUS
PIN3 – P1	A	P – Plate (Anode)	CONNECTED
PIN5 – P2	A	P – Plate (Anode)	CONNECTED
PIN8 – K	A	K – Cathode	CONNECTED

SECTION RATINGS

SECTION1 Rectifier	
MAXIMUM CATHODE CURRENT	75 mA
PEAK INVERSE VOLTAGE	1000 V
NOMINAL OUTPUT CURRENT	75 mA
PEAK FORWARD CURRENT	200 mA
FORWARD VOLTAGE DROP	24 V
Published handbook ratings and operating characteristics reviewed.	

SECTION2 Rectifier	
PEAK INVERSE VOLTAGE	1000 V
NOMINAL OUTPUT CURRENT	75 mA
PEAK FORWARD CURRENT	200 mA
FORWARD VOLTAGE DROP	24 V
Physical rectifier section 2; electrical properties populated from the same published ratings applicable to the identical rectifier path.	

0Z4G — Full-Wave Gas-Filled Cold-Cathode Rectifier

A gas-filled, twin-diode rectifier featuring an ionic-heated cold cathode, designed for high-efficiency power rectification in vibrator-type power supplies without requiring a heater voltage source.

Overview

The **0Z4G** is a full-wave, gas-filled twin diode rectifier tube utilizing an ionic-heated cathode. Unlike conventional vacuum rectifiers, the 0Z4G requires no heater or filament supply voltage, which significantly enhances overall system efficiency. The tube was developed primarily for use in vibrator-type "B" power supply units for automobile radio receivers.

The 0Z4G is the glass-bulb version of the [0Z4](#) family, housed in a T-7 glass envelope, whereas the standard [0Z4](#) utilizes a metal envelope. Because it is filled with a permanent gas rather than a vapor, its electrical characteristics are highly stable and independent of the surrounding ambient temperature.

Construction and Basing

The 0Z4G features a compact physical construction designed to withstand the mobile environment of automobile installations.

Physical Dimensions

Depending on the specification system, the physical dimensions of the T-7 glass bulb configuration are defined as follows:

- **Maximum Diameter:** 1.031 inches (also specified as 1-5/16 inches maximum)
- **Maximum Seated Height:** 2.063 inches
- **Maximum Overall Height:** 2.625 inches (also specified as 2-5/8 inches maximum)

Base and Pin Connections

The tube is equipped with an octal base utilizing the **4R** basing arrangement. The bottom view of the socket reveals the following pinout configuration:

Pin Number	Connection	Description
Pin 1	NC	No Connection
Pin 2	—	Omitted
Pin 3	P (Plate 1)	Anode for the first rectifier section
Pin 4	—	Omitted
Pin 5	P (Plate 2)	Anode for the second rectifier section
Pin 6	—	Omitted
Pin 7	—	Omitted
Pin 8	K (Cathode)	Common ionic-heated cathode

In the 0Z4G, Pin 1 has no internal connection, and Pin 2 is omitted from the base structure. The two anode plates are connected to Pin 3 and Pin 5, while the common cathode is connected to Pin 8.

Electrical Ratings

The electrical ratings of the 0Z4G are established under both general specifications and the Design Center Rating System. Because the cathode is ionic-heated, the tube requires a minimum starting voltage to initiate gas ionization before conduction can begin.

Parameter	General Specification	Design Center System
Heater Voltage	None Required	None Required
Minimum Peak Starting Plate Supply Voltage	300 V	300 V
Maximum Peak Inverse Plate Voltage	—	880 V
Maximum Peak Plate Current	200 mA	270 mA
Maximum DC Output Current	75 mA	90 mA
Minimum DC Output Current	30 mA	30 mA
Average Dynamic Voltage Drop	24 V	24 V

The minimum DC output current rating of 30 mA is a critical operating limit. If the current drawn from the tube falls below this threshold, the gas ionization may not be sustained, leading to unstable operation or extinction of the discharge.

Typical Operation and Circuit Integration

In typical applications, the 0Z4G operates as a full-wave rectifier in a vibrator-driven power supply. The typical operating parameters per plate are outlined below:

Parameter	Typical Value
Peak Plate Voltage (Per Plate)	380 V
Filter Input Condenser	8 μ F
Total Effective Plate Supply Impedance (Per Plate)	800 Ω
DC Output Current	65 mA
DC Output Voltage	275 V
Voltage Drop (at $I_b = 90$ mA)	24 V

R-F Noise Mitigation

Due to the nature of gas-filled discharge devices, the 0Z4G has a natural tendency to generate radio-frequency (r-f) noise during the transition into and out of conduction. In practical receiver circuits, this r-f noise is mitigated through:

- Proper Filtering:** Incorporating appropriate low-pass filtering in the output and input networks of the rectifier.
- Electrostatic Shielding:** In the metal-envelope [0Z4](#), the outer metal shell serves as an electrostatic shield and container, which must be connected to the point in the circuit that provides the most effective shielding (typically ground). For the glass-bulb 0Z4G, external shielding may be required to achieve equivalent noise suppression. The standard shielding and filtering networks designed to eliminate vibrator buzz are generally sufficient to suppress the tube's r-f noise.

Vibrator Eliminator Performance

The operating characteristics of the 0Z4G in a typical vibrator eliminator circuit vary based on the primary battery supply voltage (E_g).

- At $E_g = 6.2$ V:** As the DC output current (I_{op}) increases from the minimum limit of 30 mA to the maximum of 75 mA, the DC output voltage (E_{op}) decreases from approximately 300 V to 225 V. Concurrently, the DC input current drawn by the vibrator system rises from approximately 2.5 A to 4.5 A.

- **Dynamic Voltage Drop:** Across this entire active operating range, the dynamic voltage drop across the tube remains remarkably constant, hovering closely around the nominal 24-volt mark. This flat voltage-drop characteristic is typical of gas-filled rectifiers and ensures stable internal power dissipation.

Comparison with Related Designations

The 0Z4G belongs to a family of cold-cathode rectifiers with closely related designations, though they differ in envelope construction and maximum ratings:

- **0Z4 (Metal Bulb):** The 0Z4 is electrically identical to the 0Z4G but is housed in a metal MT8 envelope. In the metal version, the outer shell acts as an electrostatic shield for the internal glass bulb. The internal glass bulb is necessary to insulate the ionized gas from the grounded metal shell.
- **0Z4A (High-Power Variant):** The 0Z4A is a higher-rated version of the design, housed in a metal MT8 envelope. It offers expanded electrical capabilities compared to the 0Z4 and 0Z4G:
 - **Maximum Peak Plate Current:** Increased to 330 mA (compared to 270 mA).
 - **Maximum DC Output Current:** Increased to 110 mA (compared to 90 mA).
 - **Typical Operating Peak Plate Voltage:** 440 V (compared to 380 V).
 - **Total Effective Plate Supply Impedance:** Reduced to 600 Ω (compared to 800 Ω).
 - **Typical DC Output:** Delivers 110 mA at 310 V (compared to 65 mA at 275 V).
 - **Voltage Drop:** Maintains a 24 V drop at an elevated plate current of $I_b = 110$ mA.

Technical Summary

The **0Z4G** is an octal-based, gas-filled, cold-cathode twin diode designed for full-wave rectification. By utilizing an ionic-heated cathode, it eliminates the need for a heater supply, making it highly efficient for automotive vibrator power supplies. Housed in a T-7 glass envelope with a 4R pinout configuration, it operates with a constant dynamic voltage drop of approximately 24 V. The tube requires a minimum starting peak voltage of 300 V to initiate conduction and must be operated within a DC output current range of 30 mA to 75–90 mA to maintain stable gas ionization.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1937 Raytheon Radio Receiving Tubes

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

1937 RAYTHEON RADIO RECEIVING TUBES

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum DC output voltage	300 V	FullWave
DC output current	30–75 mA	FullWave
Maximum peak plate current	200 mA	PerPlate
Minimum starting peak voltage	300 V	FullWave

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Average dynamic voltage drop	24 V	—

1937 RAYTHEON RADIO RECEIVING TUBES

Section 2 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum DC output voltage	300 V	FullWave
DC output current	30–75 mA	FullWave
Maximum peak plate current	200 mA	PerPlate
Minimum starting peak voltage	300 V	FullWave

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Average dynamic voltage drop	24 V	—

195X General Electric Essential Characteristics

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

195X GENERAL ELECTRIC ESSENTIAL CHARACTERISTICS

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DC output current	75 mA	RectifierService
RMS supply voltage per plate	300 V	RectifierService
Peak current	200 mA	RectifierService

195X GENERAL ELECTRIC ESSENTIAL CHARACTERISTICS

Section 2 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
DC output current	75 mA	RectifierService
RMS supply voltage per plate	300 V	RectifierService
Peak current	200 mA	RectifierService

TUBE TINKER

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