



ELECTRONIC TUBE REFERENCE

117Z6GT

Rectifier - Full Wave electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

RECTIFIER-RECTIFIER

High-vacuum dual rectifier for conventional full-wave and voltage-doubler power supplies. Its 117 V low-current heater makes it particularly useful in transformerless mains-operated equipment.

GENERAL CHARACTERISTICS

BASE DESIGNATION	1Q	BASE PINS	8
NOMINAL HEATER	117 V / 75 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Rectifier	
PEAK INVERSE VOLTAGE	700 V
NOMINAL OUTPUT CURRENT	60 mA
PEAK FORWARD CURRENT	360 mA
FORWARD VOLTAGE DROP	15.5 V
MAXIMUM HEATER-CATHODE VOLTAGE	350 V
<i>Published ratings/characteristics promoted where semantically applicable.</i>	

SECTION2 Rectifier	
PEAK INVERSE VOLTAGE	700 V
NOMINAL OUTPUT CURRENT	60 mA
PEAK FORWARD CURRENT	360 mA
FORWARD VOLTAGE DROP	15.5 V
MAXIMUM HEATER-CATHODE VOLTAGE	350 V
<i>Physical rectifier section 2; electrical properties populated from the same published ratings applicable to the identical rectifier path.</i>	

117Z6GT — High-Vacuum Rectifier and Voltage Doubler

An indirectly heated, dual-section high-vacuum rectifier and voltage doubler designed for transformerless power supply applications operating directly from AC power lines.

Overview

The **117Z6GT** (also designated as **117Z6-GT**) is an indirectly heated, high-vacuum twin rectifier and voltage doubler tube. It features a heater rated at the full nominal line voltage of 117 volts, allowing the tube to be operated directly from standard AC mains without the need for a power transformer or a series dropping resistor. This design is highly advantageous for compact, lightweight, and cost-effective power supply circuits in radio receivers and electronic instruments.

The tube contains two independent rectifier sections within a single glass envelope. While they share a common heater, their cathodes and plates are electrically isolated from one another and connected to separate base pins. This independent dual-diode construction allows the 117Z6GT to be configured in several ways, including as a half-wave voltage doubler, a full-wave rectifier, or a half-wave rectifier with parallel-connected sections.

Heater and Electrical Characteristics

The heater of the 117Z6GT is designed for direct line-voltage operation. Its primary electrical characteristics and ratings are:

- **Heater Voltage:** 117 V
- **Heater Current:** 0.075 A (75 mA)
- **Calculated Heater Power:** $117\text{ V} \times 0.075\text{ A} = 8.775\text{ W}$ (calculated from nominal ratings)
- **Cathode Type:** Coated unipotential (indirectly heated)

Under typical operating conditions, the tube exhibits a low internal voltage drop. Specifically, the tube voltage drop is **15.5 V per section** when conducting a direct current of 120 mA. This low internal resistance helps maintain efficient power conversion and stable output voltage regulation under load.

Base Configuration and Physical Outline

The 117Z6GT is housed in a glass envelope designated by the **9-11** outline drawing and utilizes an octal base with a **7Q** pinout configuration. The 7Q base diagram provides independent connections for the two diode sections, arranged as follows (viewed from the bottom of the base):

Pin	Connection	Function
Pin 1	NC	No Connection
Pin 2	Htr	Heater
Pin 3	<u>P2</u>	Plate (Section 2)
Pin 4	K2	Cathode (Section 2)
Pin 5	P1	Plate (Section 1)
Pin 6	NC	No Connection
Pin 7	Htr	Heater
Pin 8	K1	Cathode (Section 1)

This physical layout ensures adequate electrical isolation between the high-voltage plates and cathodes. The independent cathode connections are essential for voltage doubler applications, where the two cathodes must operate at different DC potentials relative to each other and the heater.

Operating Ratings and Rectifier/Doubler Service

The 117Z6GT is rated for service as a rectifier or voltage doubler. To ensure reliable operation and prevent premature tube failure, circuit designs must respect the maximum electrical ratings established for each individual diode section:

Parameter	Maximum Rating (Per Plate / Section)
Max. RMS Supply Voltage per Plate	235 V
Max. Peak Inverse Voltage	700 V
Max. D-C Output Current per Plate	60 mA
Max. Peak Current per Plate	360 mA

In a standard half-wave voltage doubler circuit, the two sections operate in series-like configurations across the AC line to deliver a DC output voltage approximately double the peak value of the input AC voltage. The maximum RMS supply voltage rating of 235 V per plate provides a substantial safety margin when operating from standard 117 V mains. When the two sections are operated in parallel for half-wave rectifier service, the total maximum D-C output current can be calculated as $2 \times 60 \text{ mA} = 120 \text{ mA}$, provided the current is equally shared between the sections.

Technical Comparison with Related 117-Volt Tubes

The 117Z6GT belongs to a family of tubes designed with 117-volt heaters, but it occupies a unique position due to its dual-section rectifier-only construction. Comparing its characteristics with other 117-volt tubes highlights these design differences:

- **Heater Current and Power:** The 117Z6GT draws 0.075 A, which is higher than the single-section half-wave rectifiers [117Z3](#) and **117Z4-GT** (both drawing 0.04 A), but lower than the multi-unit rectifier/beam power amplifier tubes such as the [117L7/M7-GT](#), **117N7-GT**, and **117P7-GT** (all drawing 0.09 A).
- **Voltage Drop:** The 117Z6GT has a tube voltage drop of 15.5 V at 120 mA per section. In comparison, the single-section [117Z3](#) and **117Z4-GT** exhibit a higher drop of 22.5 V at 180 mA, while the rectifier sections of the [117L7/M7-GT](#), **117N7-GT**, and **117P7-GT** have a drop of 16 V at 150 mA.
- **Rectifier Capabilities:** Unlike the [117Z3](#) and **117Z4-GT**, which are dedicated single-section half-wave rectifiers with a maximum D-C output current of 90 mA and a peak inverse voltage of 330 V or 350 V, the 117Z6GT provides two independent sections. This dual-section design allows for a much higher peak inverse voltage rating of 700 V per section and enables voltage doubling, which is not possible with a single-section rectifier.

Technical Summary

The **117Z6GT** is a versatile, **high-vacuum rectifier and voltage doubler** featuring a **117 V, 0.075 A heater** and an **octal 7Q base**. With its two independent diode sections, it offers a maximum peak inverse voltage of **700 V**, a maximum RMS supply voltage of **235 V per plate**, and a maximum D-C output current of **60 mA per plate** (with a peak current limit of **360 mA per plate**). Its low internal voltage drop of **15.5 V at 120 mA** per section makes it an efficient choice for transformerless power supplies, voltage doublers, and full-wave rectifiers in line-operated consumer and industrial electronics.

SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

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
RMS supply voltage per plate	235 V	RectifierOrDoubler

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Forward current at published voltage drop	120 mA	VoltageDrop=5.5V

195X GENERAL ELECTRIC ESSENTIAL CHARACTERISTICS

Section 2 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
RMS supply voltage per plate	235 V	RectifierOrDoubler

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Forward current at published voltage drop	120 mA	VoltageDrop=5.5V

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