



ELECTRONIC TUBE REFERENCE

117L7

Power - Beam (NOT sweep) electronic tube

CONSOLIDATED TECHNICAL DATA

2 SECTIONS

CONSTRUCTION

BEAMPOWER-RECTIFIER

Combination tube with a high-voltage heater for line-operated equipment, integrating rectifier and beam-power audio-output functions in a single envelope.

GENERAL CHARACTERISTICS

BASE DESIGNATION	8A0	BASE PINS	8
NOMINAL HEATER	117 V / 90 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Rectifier

PEAK INVERSE VOLTAGE	350 V
NOMINAL OUTPUT CURRENT	75 mA
PEAK FORWARD CURRENT	450 mA
FORWARD VOLTAGE DROP	16 V
<i>Published handbook ratings and operating characteristics reviewed.</i>	

SECTION2 Beam Power

PLATE RESISTANCE	17000 Ω
TRANSCONDUCTANCE	0.0053 S
MAXIMUM PLATE VOLTAGE	117 V
MAXIMUM SCREEN VOLTAGE	117 V
<i>Published handbook ratings and operating characteristics reviewed.</i>	

117L7 — Half-Wave Rectifier and Beam Power Amplifier

The **117L7** (also designated as **117L7/M7-GT**) is a multi-unit vacuum tube combining a half-wave high-vacuum rectifier and a beam power amplifier within a single glass envelope. Designed primarily for compact, transformerless receiver applications, the tube features a high-voltage heater that can be operated directly from a standard 117-volt AC or DC power line.

Construction, Heater, and Base Pinout

The 117L7 is constructed with an indirectly heated, coated unipotential cathode system. The heater is designed to operate at a nominal line voltage of 117 V with a current of 0.09 A.

Heater Specifications

- **Heater Voltage:** 117 V
- **Heater Current:** 0.09 A
- **Calculated Heater Power:** 10.53 W (calculated as 117 V * 0.09 A)
- **Cathode Type:** Indirectly heated, unipotential

Base and Pin Connections

The tube utilizes an 8-pin octal base designated as **8AO** and is housed in a glass envelope corresponding to outline drawing **9-15**. The pin connections, viewed from the bottom of the base, are assigned as follows:

Pin Number	Electrode Connection
Pin 1	Cathode (Rectifier Section)
Pin 2	Heater
Pin 3	Plate (Beam Power Amplifier Section)
Pin 4	Screen Grid / Grid 2 (Beam Power Amplifier Section)
Pin 5	Control Grid / Grid 1 (Beam Power Amplifier Section)
Pin 6	Plate / Anode (Rectifier Section)
Pin 7	Heater
Pin 8	Cathode and Beam-Forming Plates / Grid 3 (Beam Power Amplifier Section)

The 8AO base diagram explicitly depicts the beam-forming plates of the amplifier section connected internally to the amplifier's cathode at Pin 8. This construction distinguishes it from the suppressor-grid construction shown in the 8AV base diagram of related types.

Beam Power Amplifier Section

The amplifier portion of the 117L7 is a beam power tetrode designed for Class A audio power amplification. It operates at moderate plate and screen voltages, making it suitable for line-voltage-powered equipment.

Typical Class A Operating Characteristics

Under typical operating conditions, the beam power amplifier section exhibits the following electrical parameters:

- **Plate Voltage:** 105 V
- **Screen Voltage (Grid 2):** 105 V
- **Control Grid Voltage (Grid 1):** -5.2 V
- **Zero-Signal Plate Current:** 43 mA
- **Zero-Signal Screen Current:** 4 mA
- **Plate Resistance (Rp):** Approximately 17,000 Ohms
- **Transconductance (Gm):** 5,300 micromhos
- **Load Resistance for Rated Output:** 4,000 Ohms
- **Rated Power Output:** 0.85 W

Power Dissipation and Efficiency Calculations

At the typical zero-signal operating point, the power dissipation of the amplifier electrodes can be calculated as follows:

- **Zero-Signal Plate Dissipation:** $105\text{ V} * 0.043\text{ A} = 4.515\text{ W}$
- **Zero-Signal Screen Dissipation:** $105\text{ V} * 0.004\text{ A} = 0.42\text{ W}$
- **Total Zero-Signal Electrode Dissipation:** $4.515\text{ W} + 0.42\text{ W} = 4.935\text{ W}$
- **Plate Efficiency at Rated Output:** $0.85\text{ W} / 4.515\text{ W} = 18.8\%$

Half-Wave Rectifier Section

The rectifier portion of the 117L7 is an independent half-wave high-vacuum diode designed to supply DC power to the receiver circuitry.

Rectifier Operating Ratings and Limits

- **Maximum RMS Supply Voltage:** 117 V
- **Maximum DC Output Current:** 75 mA
- **Maximum Peak Inverse Voltage:** 350 V

- **Maximum Peak Current:** 450 mA
- **Tube Voltage Drop:** 16 V measured at a DC current of 150 mA

Comparison with Related Types

The 117L7 belongs to a family of 117-volt combination rectifier-amplifier tubes. It shares close similarities with the **117P7-GT** and **117N7-GT**, though they differ in base designations, internal construction, or electrical performance.

117P7-GT Comparison

The 117P7-GT is electrically identical to the 117L7/M7-GT in both its amplifier and rectifier sections, sharing the same operating points, voltage drop, and output ratings. However, it utilizes the **8AV** base connection instead of the 8AO base. In the 8AV base diagram, the beam-forming plates are represented as a conventional suppressor grid (Grid 3) connected to the cathode at Pin 8, reflecting a minor constructional variation.

117N7-GT Comparison

The 117N7-GT also utilizes the 8AV base and operates with a 117 V, 0.09 A heater. While its rectifier section shares the identical ratings of the 117L7 (75 mA max DC output, 350 V peak inverse, 117 V RMS supply, and a 16 V drop at 150 mA), its beam power amplifier section is designed for higher power output at slightly different operating conditions:

- **Plate and Screen Voltages:** 100 V
- **Control Grid Voltage:** -6.0 V
- **Zero-Signal Plate Current:** 51 mA
- **Zero-Signal Screen Current:** 5 mA
- **Plate Resistance (Rp):** Approximately 16,000 Ohms
- **Transconductance (Gm):** 7,000 micromhos
- **Load Resistance for Rated Output:** 3,000 Ohms
- **Rated Power Output:** 1.2 W (a 41% increase over the 117L7's 0.85 W output)

Technical Summary

The **117L7** is a versatile, space-saving vacuum tube that combines a **half-wave rectifier** and a **beam power amplifier** in a single envelope with an **8AO octal base**. Its high-voltage heater (117 V, 0.09 A) allows direct operation from AC or DC mains, eliminating the need for a power transformer or series dropping resistors. The rectifier section provides up to 75 mA of DC current with a 16 V tube drop at 150 mA, while the beam power amplifier section delivers 0.85 W of audio output into a 4,000 Ohm load under typical Class A conditions. Through its integrated design, the 117L7 served as a foundational component in compact, cost-effective line-powered electronic equipment.

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 2 · Beam Power

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum plate voltage	117 V	Published handbook rating
Maximum screen voltage	117 V	Published handbook rating
Plate voltage	105 V	ClassA
Screen voltage	105 V	ClassA
Control-grid bias	5.2 V	ClassA
Plate current	43 mA	ClassA
Screen current	4 mA	ClassA
Load resistance	4000 ohm	ClassA
Power output	0.85 W	ClassA
DC output current	75 mA	RectifierService
Peak inverse voltage	350 V	RectifierService
RMS supply voltage per plate	117 V	RectifierService
Peak current	450 mA	RectifierService

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	17000 ohm	Published handbook characteristic
Transconductance	5300 μS	Published handbook characteristic
Heater/filament voltage	117 V	Published heater/filament rating
Heater/filament current	90 mA	Published heater/filament rating
Tube voltage drop	16 V	At 150 mA DC

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