



ELECTRONIC TUBE REFERENCE

12Q7G

Voltage - Triode (with diode, heptode or hexode) electronic tube

CONSOLIDATED TECHNICAL
DATA

3 SECTIONS

CONSTRUCTION

DIODE-DIODE-TRIODE

Double-diode high-mu triode combining radio detection, control-voltage rectification, and subsequent voltage amplification. Two diodes provide detector functions while the triode supplies useful receiver gain.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	12.6 V / 150 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Dissimilar

SECTION RATINGS

SECTION1 Diode

No fixed ratings recorded.

Promoted ratings/characteristics read from the approved National Union datasheet.

SECTION2 Diode

No fixed ratings recorded.

Promoted ratings/characteristics read from the approved National Union datasheet.

SECTION3 Triode

TRANSCONDUCTANCE	0.0012 S
AMPLIFICATION FACTOR	70
MAXIMUM PLATE VOLTAGE	250 V

Promoted ratings/characteristics read from the approved National Union datasheet.

12Q7G — Twin Diode-Triode Amplifier

Overview

The **12Q7G** is an indirectly heated twin diode-triode vacuum tube designed for use as an amplifier and detector. It combines a high-mu triode section with two independent diode units in a single envelope, sharing a common indirectly heated cathode. This tube is typically applied in receiver circuits where it can perform simultaneous functions such as signal detection, automatic volume control (AVC), and audio-frequency voltage amplification.

Mechanical Specifications and Basing

The 12Q7G is constructed in an **ST-12** glass bulb and utilizes a **Small Octal 7-Pin** base. It features a top-mounted **Miniature** cap, which provides the connection for the triode control grid.

The physical dimensions of the tube are:

- **Maximum Overall Length:** 4-15/32 inches
- **Maximum Seated Height:** 3-29/32 inches
- **Maximum Diameter:** 1-9/16 inches

The electrical connections are arranged according to the **7V** basing diagram, viewed from the bottom of the base:

- **Pin 1:** No Connection
- **Pin 2:** Heater
- **Pin 3:** Triode Plate
- **Pin 4:** Diode Plate
- **Pin 5:** Diode Plate
- **Pin 7:** Heater
- **Pin 8:** Cathode
- **Top Cap:** Triode Grid

Heater and Electrical Characteristics

The 12Q7G features an indirectly heated cathode designed for series or parallel heater string operation. The nominal heater ratings are:

- **Heater Voltage:** 12.5 V
- **Heater Current:** 0.150 A
- **Calculated Heater Power:** 1.875 W (calculated as 12.5 V multiplied by 0.150 A)

Triode Section Characteristics

Under typical operating conditions as a Class A amplifier, the triode section exhibits the following electrical characteristics:

- **Plate Voltage:** 250 V (maximum)
- **Grid Voltage:** -3 V
- **Plate Current:** 1.1 mA
- **Mutual Conductance (Transconductance):** 1200 μmhos
- **Amplification Factor (μ):** 70
- **Plate Resistance:** 58,000 Ω

Resistance-Coupled Amplifier Operation

The 12Q7G is frequently operated as a resistance-coupled voltage amplifier. A typical operating point for this service is defined with the following circuit parameters:

- **Plate Supply Voltage:** 250 V (maximum)
- **Plate Load Resistor:** 0.25 M Ω (megohm)
- **Grid Resistor of Following Stage:** 0.5 M Ω (megohm)
- **Grid Bias:** -2 V
- **Cathode Biasing Resistor:** 4500 Ω
- **Approximate Voltage Gain:** 45

Diode Units and Capacitances

The 12Q7G contains two diode units intended for detection and automatic volume control. These diode units are characterized by:

- **Maximum Peak Plate Current:** 8 mA per diode
- **Approximate Plate Resistance:** 6500 Ω (measured at a diode current of 0.25 mA)

Interelectrode Capacitances

The direct interelectrode capacitances of the triode section are specified as follows:

- **Grid-to-Cathode Capacitance:** 1.6 μF

- **Grid-to-Plate Capacitance:** 2.0 μF
- **Plate-to-Cathode Capacitance:** 4 μF

Technical Summary

The **12Q7G** is an **ST-12** glass envelope, **Small Octal 7-Pin** twin diode-triode vacuum tube. Operating with a **12.5 V, 0.150 A** heater, it integrates a high-mu triode (amplification factor of 70, transconductance of 1200 μmhos) and two independent diode units sharing a common cathode. It is optimized for combined detection, automatic volume control, and voltage amplification, delivering a practical stage gain of approximately 45 in typical resistance-coupled amplifier configurations.

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