



ELECTRONIC TUBE REFERENCE

12Q7GT

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

CONSOLIDATED TECHNICAL
DATA

3 SECTIONS

CONSTRUCTION

DIODE-DIODE-TRIODE

GT-envelope double-diode high-mu triode for detector, AVC, and audio voltage-amplifier service. Two diode sections handle signal and control rectification while the triode provides substantial subsequent gain.

GENERAL CHARACTERISTICS

BASE DESIGNATION	7V	BASE PINS	8
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 Triode

PLATE RESISTANCE	58000 Ω
TRANSCONDUCTANCE	0.0012 S
AMPLIFICATION FACTOR	70
MAXIMUM PLATE VOLTAGE	300 V
<i>Published section data promoted where applicable; additional operating values retained as parameters.</i>	

SECTION2 Diode

No fixed ratings recorded.

Published section data promoted where applicable; additional operating values retained as parameters.

No fixed ratings recorded.

12Q7GT — Duplex-Diode High-Mu Triode

The **12Q7GT** is an indirectly heated, multi-unit vacuum tube containing two diode plates and a single high-mu triode system sharing a common unipotential cathode. Designed primarily for series-string heater operation in AC/DC radio receivers, the tube functions as a combined diode detector, automatic volume control (AVC) rectifier, and low-frequency (L.F.) or high-gain resistance-coupled amplifier.

Construction, Heater, and Base Pinout

The 12Q7GT is constructed in a glass envelope (typically a T-9 bulb) with a small wafer 7-pin octal base featuring a metal shell. The internal structure utilizes a unipotential cathode that is common to both the triode and the two diode units.

The heater is designed for series-string operation, drawing a low current to minimize overall power consumption and eliminate the need for bulky series drop resistors or specialized line cords in AC/DC receiver designs.

Heater Parameter	Value
Heater Voltage	12.6 V (or 12.5 V in early registrations)
Heater Current	0.15 A (150 mA)
Heater Supply	AC or DC

Pin Connection Configuration

Viewed from the bottom of the base, the 12Q7GT utilizes the following pinout (basing arrangement 7V):

- **Pin 1:** No Connection (NC) — internally connected to the metal shell
- **Pin 2:** Heater (H)
- **Pin 3:** Triode Anode / Plate (A)
- **Pin 4:** Diode Plate 2 (D2)
- **Pin 5:** Diode Plate 1 (D1)
- **Pin 6:** No Pin (NP)
- **Pin 7:** Heater (H)
- **Pin 8:** Cathode (K)
- **Top Cap:** Triode Control Grid (G)

Physical Dimensions

- **Maximum Diameter:** 1 5/16 inches

- **Maximum Seated Height:** 2 3/8 inches
- **Maximum Overall Height:** 2 7/8 to 3 5/16 inches (including pins and top cap)

Electrical Characteristics and Class A Operation

The triode section of the 12Q7GT is characterized by a high amplification factor, making it highly effective for voltage amplification. The typical operating parameters vary depending on the applied plate voltage and grid bias:

Parameter	Operating Point A	Operating Point B	Operating Point C
Plate Voltage	100 V	100 V	250 V
Control Grid Voltage	0 V	-1 V	-3 V
Plate Current	2.3 mA	0.8 mA	1.0 to 1.1 mA
Plate Resistance	43,000 Ω	58,000 Ω	58,000 Ω
Transconductance	1,400 μ mhos	1,200 μ mhos	1,200 μ mhos (1.2 mA/V)
Amplification Factor	60	70	70

Maximum Ratings

- **Maximum Plate Voltage:** 300 Volts
- **Minimum Diode Current:** 0.8 mA per plate with 10 Volts DC applied

Resistance-Coupled Amplifier Service

In typical receiver applications, the triode section of the 12Q7GT is operated as a zero-bias, resistance-coupled Class A1 amplifier. Under these conditions, the tube delivers high voltage gain with minimal distortion.

Circuit Parameter	100 V Supply	300 V Supply
Plate Supply Voltage	100 V	300 V
Plate Load Resistor	0.25 M Ω	0.25 M Ω
Grid Resistor	10 M Ω	10 M Ω
Coupling Condenser	0.01 to 0.005 μ f	0.01 to 0.005 μ f
Following Stage Grid Resistor	0.5 to 1.0 M Ω	0.5 to 1.0 M Ω
External Grid Circuit Impedance	0 Ω	0 Ω

Circuit Parameter	100 V Supply	300 V Supply
Voltage Gain	40 to 42	50 to 56
Voltage Output (RMS) *	11 to 13 V	51 to 58 V

Interelectrode Capacitances

The direct interelectrode capacitances of the 12Q7GT are documented both with and without an external shield. Standard registrations list the following typical values without an external shield:

- **Grid to Plate:** 1.6 to 1.7 μf
- **Input (Grid to Cathode + Heater):** 1.7 to 2.2 μf
- **Output (Plate to Cathode + Heater):** 3.5 to 5.0 μf

To prevent unwanted coupling between the triode and diode sections, reregistration specifications establish the following maximum limits:

- **Triode Grid to Diode Plate 2 (Max):** 0.001 μf
- **Triode Grid to Diode Plate 1 (Max):** 0.001 μf
- **Diode Plate 2 to Heater + Cathode + Pin 1:** 1.7 μf
- **Diode Plate 1 to Heater + Cathode + Pin 1:** 2.2 μf

Relationship to Other Tubes

The electrical characteristics, ratings, and physical dimensions of the 12Q7GT are identical to those of the [6Q7GT](#), with the sole exception of the heater rating. The [6Q7GT](#) operates on a 6.3 V, 0.3 A heater supply, whereas the 12Q7GT is optimized for 12.6 V, 0.15 A series-string operation. Consequently, technical references and characteristic curves published for the [6Q7GT](#) are directly applicable to the triode and diode units of the 12Q7GT.

Technical Summary

The **12Q7GT** is an octal-based, duplex-diode high-mu triode designed for detection, AVC, and audio-frequency voltage amplification in AC/DC series-heater receivers. Operating with a **12.6 V, 0.15 A** heater, it features a common unipotential cathode and a 7-pin octal base with an internal connection between Pin 1 and its metal shell. The triode section provides an amplification factor of **70**, a plate resistance of **58,000 Ω** , and a transconductance of **1,200 μmhos** under typical 250 V Class A operating conditions. When configured as a resistance-coupled amplifier, it achieves a voltage gain of up to **56**, making it a highly efficient single-tube solution for the detector and preamplifier stages of superheterodyne receivers.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1939 Arcturus

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

1939 ARCTURUS

Section 1 · Triode

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	—
Control-grid voltage	-3 V	—
Plate current	1.7 mA	—



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1948 Brimar Radio Valve Manual

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

1948 BRIMAR RADIO VALVE MANUAL

Section 1 · Triode

CHARACTERISTICS		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Anode Voltage	250 V	—
Anode Current	1.1 mA	—
Grid Voltage	-3 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 · Triode

CAPACITANCE		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Input capacitance	2.2 pF	Section1
Output capacitance	5 pF	Section1
Grid-to-plate capacitance	1.6 pF	Section1

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate voltage	250 V	ClassA
Control-grid voltage	-3 V	ClassA
Plate current	1 mA	ClassA

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Plate resistance	58000 Ω	Section1
Transconductance	1200 μS	Section1
Amplification factor	70	Section1



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ELECTRON TUBE DATABASE

SOURCE DATA APPENDIX

1961 Ferranti Technical Handbook

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

1961 FERRANTI TECHNICAL HANDBOOK

Section 1 · Triode

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	AF amplifier	—

1961 FERRANTI TECHNICAL HANDBOOK

Section 2 · Diode

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	Detector / AVC	—

TUBE TINKER

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