



ELECTRONIC TUBE REFERENCE

19AU4GTA

Rectifier - Damper Diode electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
RECTIFIER

Higher-current television horizontal-frequency damper diode designed for direct-drive circuits with substantial peak inverse voltage and pulse-current requirements.

GENERAL CHARACTERISTICS

BASE DESIGNATION	43CG	BASE PINS	6
NOMINAL HEATER	18.9 V / 600 mA	PARALLEL HEATER	– / –
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Rectifier	
MAXIMUM PLATE DISSIPATION	6 W
PEAK INVERSE VOLTAGE	4500 V
NOMINAL OUTPUT CURRENT	190 mA
PEAK FORWARD CURRENT	1.15 A
FORWARD VOLTAGE DROP	25 V
MAXIMUM HEATER-CATHODE VOLTAGE	4500 V
WARM-UP TIME	11 s
<i>Published source values promoted where applicable; additional published data retained as parameters.</i>	

19AU4GTA — Half-Wave Damper Diode

The **19AU4GTA** (also designated as **19AU4-GTA**) is an indirectly heated, half-wave rectifier diode designed specifically for damper service in the horizontal deflection circuits of television receivers. It is engineered to operate in both black-and-white and color television systems, withstanding high-voltage

pulses of line frequency between its cathode and both its heater and plate elements. This makes it highly suitable for "direct drive" horizontal deflection topologies.

Relationship to Other Types

The 19AU4GTA belongs to the [19AU4](#) family of tubes. It is electrically identical to the standard [19AU4](#) except for its current-handling capabilities: the 19AU4GTA features a higher maximum DC output current of 190 mA (compared to 175 mA for the [19AU4](#)) and a higher peak plate current of 1150 mA (compared to 1050 mA).

Additionally, the 19AU4GTA is identical to the **6AU4-GTA** except for its heater ratings and the inclusion of a controlled heater warm-up characteristic.

Construction, Heater, and Base Connection

The 19AU4GTA is constructed with a coated unipotential cathode housed in a T-9 glass envelope. It features a short intermediate shell octal base, which can be either a 5-pin (B5-85) or 6-pin (B6-60) configuration. The tube can be mounted and operated in any position.

Physical Dimensions

- **Maximum Bulb Diameter:** 1-3/16 inches (1.188 inches)
- **Maximum Base Diameter:** 1-9/32 inches
- **Maximum Seated Height:** 3-1/4 inches (3.250 inches)
- **Maximum Overall Length:** 3-13/16 inches (3.813 inches)

Heater Specifications

The heater is designed for series-connected heater strings drawing a nominal current of 600 mA. It features a controlled warm-up characteristic to minimize voltage surges across other tubes in the series string.

- **Heater Voltage (AC or DC):** 18.9 V
- **Heater Current:** 0.6 A (600 mA) $\pm$ 6%
- **Heater Warm-up Time:** Approximately 11.0 seconds

The warm-up time is defined as the time required to reach 80% of the rated heater voltage when four times the rated voltage is applied in series with an external resistance equal to three times the nominal heater operating resistance (or three times the rated voltage divided by the rated current).

Pinout and Wiring Constraints

The tube utilizes the **4CG** basing diagram. Viewed from the bottom of the base, the pin connections are as follows:

Pin Number	Connection
Pin 1	Omitted on 5-pin base, or Internal Connection (IC) / No Connection (NC)
Pin 2	Internal Connection (IC) / No Connection (NC)
Pin 3	Cathode (K)
Pin 4	Internal Connection (IC) / No Connection (NC)
Pin 5	Plate (P)
Pin 6	Internal Connection (IC) / No Connection (NC)
Pin 7	Heater (H)
Pin 8	Heater (H)

Important Installation Note: Socket terminals for pins 1 (if present), 2, 4, and 6 must not be used as circuit tie points. Unused pins on the socket should be tied directly to the heater.

Interelectrode Capacitances

The direct interelectrode capacitances of the 19AU4GTA vary slightly depending on the measurement conditions. These values are measured without an external shield:

Standard Unshielded Conditions

- **Heater to Cathode (H to K):** 4.0 pF
- **Plate to Cathode and Heater (P to H+K):** 8.5 pF
- **Cathode to Plate and Heater (K to P+H):** 11.5 pF

Alternative Conditions (Unused Pins Tied to Heater)

- **Heater to Cathode (H to K):** 3.2 pF
- **Plate to Cathode and Heater (P to H+K):** 7.0 pF
- **Cathode to Plate and Heater (K to P+H):** 10.0 pF

Maximum Ratings

The maximum ratings for the 19AU4GTA are established under the Design Center and Design Maximum systems. These ratings are critical for ensuring reliable operation in high-stress television deflection environments.

Parameter	Rating	System / Condition
Peak Inverse Plate Voltage	4500 V	Absolute Maximum

Parameter	Rating	System / Condition
DC Plate Current	190 mA	Maximum
Steady State Peak Plate Current	1100 to 1150 mA	Maximum
Plate Dissipation	6.0 W	Maximum
Heater-Cathode Voltage (Heater Negative)	900 V	DC Component
	4500 V	Total DC and Peak (Absolute Maximum)
Heater-Cathode Voltage (Heater Positive)	100 V	DC Component
	300 V	Total DC and Peak

Operating Conditions for Damper Ratings

The maximum ratings for damper service are specified for operation in a standard 525-line, 30-frame television system. Under these conditions, the duty cycle of the horizontal voltage pulse must not exceed 15% of one horizontal scanning cycle. Power rectification service is explicitly not recommended for this tube.

Typical Characteristics and Operating Points

Under typical operating conditions, the 19AU4GTA exhibits a low internal voltage drop when conducting.

- **Average Tube Voltage Drop:** 25 Volts (measured with the tube conducting a plate current of 350 mA)

90° Deflection Scan System Example

In a typical application within a 90° deflection scan system, the tube operates under the following conditions:

- **Peak Inverse Plate Voltage:** 3.65 kV
- **Peak Heater-Cathode Voltage:** 3.9 kV
- **Average Cathode Current:** 120 mA
- **Peak Cathode Current:** 500 mA
- **Boosted B+ Voltage:** 640 V
- **Plate Dissipation:** 2.8 W
- **Average Tube Voltage Drop (at 350 mA):** 25 V

Plate Characteristics and Curves

The plate characteristics of the 19AU4GTA describe the relationship between plate current and plate voltage at the rated heater voltage of 18.9 V.

The average characteristic curve is non-linear, starting at 0 V and 0 mA. The conduction profile shows the following qualitative and quantitative points:

- At a plate potential of approximately 10 V, the plate current reaches 100 mA (the curve is solid up to approximately 125 mA at 10 V).
- At a plate potential of 30 V, the plate current rises to approximately 480 mA.
- Above 125 mA, the characteristic curve is typically represented as dashed, indicating peak or pulsed operation regions.
- At 50 V plate potential, the current reaches 1000 mA.
- At 55 V plate potential, the current reaches approximately 1160 mA.

Technical Summary

The **19AU4GTA** is a specialized, indirectly heated half-wave diode designed for television horizontal damper service. Operating with an 18.9 V, 600 mA heater with controlled warm-up, it is optimized for series-connected heater strings. The tube features a T-9 glass envelope with a 5-pin or 6-pin octal base and is rated for a peak inverse plate voltage of 4500 V, a maximum DC plate current of 190 mA, and a plate dissipation of 6.0 W. Its high heater-to-cathode voltage rating (up to 4500 V peak) allows it to withstand the severe pulse stresses typical of horizontal deflection circuits in color and monochrome television receivers.



SOURCE OPERATING CONDITIONS

1950 Sylvania

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

1950 SYLVANIA

Section 1 · Rectifier

APPLICATION

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Service	Television damping diode	—



SOURCE OPERATING CONDITIONS

1961 Tung Sol

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

1961 TUNG SOL

Section 1 · Rectifier

OTHER

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater Warmup Time	11 s	—
Steady State Peak Plate Current	1150 mA	—

CHARACTERISTIC

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Average Tube Voltage Drop	25 V	TubeConducting350mA



1965 Sylvania Electronic Tubes Vol3

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

1965 SYLVANIA ELECTRONIC TUBES VOL3

Section 1 · Rectifier

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater voltage	18.9 V	—
Heater current	600 mA	—
Peak inverse voltage	4500 V	—
Peak plate current	1100 mA	—
DC plate current	190 mA	—
Plate dissipation	6 W	—

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Voltage drop at 350 mA	25 V	—
Warm-up time	11 s	—



SOURCE DATA APPENDIX

1966 Tung Sol Electronic Tubes 3 of 4

SOURCE PDF

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

1966 TUNG SOL ELECTRONIC TUBES 3 OF 4

Section 1 · Rectifier

CHARACTERISTIC		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Heater-to-cathode capacitance	4 pF	WholeTube
Plate-to-cathode-and-heater capacitance	8.5 pF	WholeTube

PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Cathode-to-plate-and-heater capacitance	11.5 pF	WholeTube
Average tube voltage drop at 350 mA	25 V	WholeTube
Heater warm-up time	11 s	WholeTube

OTHER		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Maximum peak inverse plate voltage	4500 V	WholeTube
Maximum DC plate current	175 mA	WholeTube
Maximum steady-state peak plate current	1150 mA	WholeTube
Maximum plate dissipation	6.5 W	WholeTube
Maximum heater-cathode voltage total negative DC and peak	4500 V	WholeTube