



ELECTRONIC TUBE REFERENCE

19CS4

Rectifier - Damper Diode electronic tube

CONSOLIDATED TECHNICAL DATA

1 SECTION
CONSTRUCTION
RECTIFIER

Efficiency/damper diode designed for television horizontal-deflection circuits in receivers using series-connected heater strings.

GENERAL CHARACTERISTICS

BASE DESIGNATION	—	BASE PINS	—
NOMINAL HEATER	19 V / 300 mA	PARALLEL HEATER	— / —
HEATING	Indirect	SERIES OPERATION	Not specified
CATHODE ARRANGEMENT	Separate cathodes	SECTION CONSTRUCTION	Similar

SECTION RATINGS

SECTION 1 Rectifier	
PEAK INVERSE VOLTAGE	4500 V
<i>Published source ratings and characteristics promoted where applicable; additional data retained as parameters.</i>	

19CS4 — Efficiency Diode

The **19CS4** is an indirectly heated efficiency diode designed primarily for series-heater operation in AC/DC television receivers. It is electrically equivalent to the [U191](#) and is engineered to withstand the high-voltage pulses typical of television line-scan circuits.

Physical Characteristics and Base Connections

The 19CS4 features a clear glass bulb with a top cap connection and is mounted on an International Octal (IO5) base. The tube can be operated in any mounting position.

Physical Dimensions and Weight

- **Maximum Overall Length:** 90 mm
- **Maximum Seated Height:** 77 mm
- **Maximum Diameter:** 32 mm
- **Approximate Net Weight:** 1.25 oz
- **Approximate Packed Weight:** 2.25 oz

Pin Configuration

The base connections utilize the International Octal configuration, with the cathode brought out to a top cap (CT1) to maximize insulation against high-voltage pulses.

Pin Number	Connection
Pin 1	No Pin (NP)
Pin 2	Internal Connection (IC)
Pin 3	Internal Connection (IC)
Pin 4	No Pin (NP)
Pin 5	Anode (a)
Pin 6	No Pin (NP)
Pin 7	Heater (h)
Pin 8	Heater (h)
Top Cap	Cathode (k)

Note: When the anode is subjected to pulsed operation, it is recommended to remove contacts 1 and 6 from the valve holder to prevent voltage breakdown or unwanted coupling.

Heater and Interelectrode Capacitances

The heater is designed for series-string operation in television receivers, drawing a constant current.

- **Heater Voltage (V_h):** 19.0 V
- **Heater Current (I_h):** 0.3 A

Interelectrode Capacitances

The capacitive coupling between electrodes is kept low to ensure stable operation in high-frequency scanning environments:

- **Anode to Heater plus Cathode ($C_{a-h,k}$):** 7.7 pF

- **Cathode to Heater plus Anode ($C_{k-h,a}$):** 9.0 pF

Operating Ratings and Limits

The 19CS4 is rated under the Design Centre System, with specific absolute maximum limits defined for television line-scan service (defined by a duty cycle of 15% or less and a pulse duration not exceeding 15 μ s).

Voltage Ratings

- **Maximum Peak Inverse Anode Voltage (P.I.V. max):** 4.5 kV (Design Centre Rating) / 5.3 kV (Absolute Maximum Limit under TV Line Scan conditions).
- **Maximum Heater-Cathode Voltage ($V_{h-k(max)}$) (heater negative, DC + Peak AC):** 900 V, measured with respect to the higher potential heater pin. The DC component of this voltage must not exceed 600 V.
- **Maximum Heater-Cathode Voltage ($V_{h-k(pk) max}$) (heater negative, pulse):** 4.5 kV (Design Centre Rating) / 5.3 kV (Absolute Maximum Limit under TV Line Scan conditions).
- **Maximum Heater to Anode Voltage ($V_{a-h(max)}$) (heater positive pulse):** 3 kV (Absolute Maximum Limit under TV Line Scan conditions).

Current Ratings

The tube's current-carrying capacity is specified in paired combinations of mean and peak anode currents:

- **Option 1:** Maximum mean anode current of **120 mA** paired with a maximum peak anode current of **600 mA**.
- **Option 2:** Maximum mean anode current of **150 mA** paired with a maximum peak anode current of **450 mA**.

Electrical Characteristics and Curves

The forward conduction characteristics of the 19CS4 show low internal resistance, allowing high current flow with minimal anode voltage drop. The relationship between anode voltage (V_a) and anode current (I_a) is characterized by the following typical operating points:

- At an anode voltage of **10 V**, the anode current is approximately **150 mA**.
- At an anode voltage of **20 V**, the anode current rises to approximately **380 mA**.
- At an anode voltage of **30 V**, the anode current reaches approximately **640 mA**.
- At an anode voltage of **40 V**, the anode current is approximately **920 mA**.

Technical Summary

The **19CS4** is a specialized efficiency diode (equivalent to the **U191**) designed for series-string television receivers. Operating with a **19.0 V, 0.3 A** heater, it features an International Octal base with a top-cap cathode connection to handle high pulse voltages. It supports peak inverse voltages up to **5.3 kV** and

peak anode currents up to **600 mA** under pulsed line-scan conditions. Its low forward impedance ensures highly efficient operation in television horizontal deflection circuits.



SOURCE OPERATING CONDITIONS

[SOURCE PDF](#)

1959 Ediswan

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

1959 EDISWAN

Section 1 · Rectifier

APPLICATION		
PARAMETER	PUBLISHED VALUE	CONDITION / NOTE
Application	Television efficiency / damper diode	—

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