The 5AR4 is a heater-cathode twin diode designed for full-wave rectifier operation. High output current and small size make this tube especially suitable for compact amplifier designs.

**GENERAL**

**ELECTRICAL**
- Cathode—Coated Unipotential
- Heater Voltage, AC or DC: 5.0 ± 10% Volts
- Heater Current: 1.9 Amperes

**MECHANICAL**
- Mounting Position—Any
- Envelope—T-9, Glass
- Base—BS-10, Intermediate-Shell Octal 5-Pin

**MAXIMUM RATINGS**

**RECTIFIER SERVICE—DESIGN-MAXIMUM VALUES**
- Peak Inverse Plate Voltage: 1700 Volts
- AC Plate-Supply Voltage per Plate—See Rating Chart 1
- Steady-State Peak Plate Current per Plate: 825 Milliamperes
- Transient Peak Plate Current per Plate:
  - Maximum Duration 0.2 Second: 3.7 Amperes
- DC Output Current—See Rating Chart 1

**BASING DIAGRAM**

**TERMINAL CONNECTIONS**
- Pin 1—Internal Connection
- Pin 2—Heater
- Pin 4—Plate Number 2
- Pin 6—Plate Number 1
- Pin 8—Heater and Cathode

**PHYSICAL DIMENSIONS**

The tubes and arrangements disclosed herein may be covered by patents of General Electric Company or others. Neither the disclosure of any information herein nor the sale of tubes by General Electric Company conveys any license under patent claims covering combinations of tubes with other devices or elements. In the absence of an express written agreement to the contrary, General Electric Company assumes no liability for patent infringement arising out of any use of the tubes with other devices or elements by any purchaser of tubes or others.
CHARACTERISTICS AND TYPICAL OPERATION

FULL-WAVE RECTIFIER WITH CAPACITOR-INPUT FILTER
AC Plate-Supply Voltage per Plate, RMS. ............................. 450 Volts
Total Plate-Supply Resistance per Plate ................................ 160 Ohms
DC Output Current ........................................... 225 Milliamperes
DC Output Voltage at Filter Input .......................... 475 Volts

FULL-WAVE RECTIFIER WITH CHOKE-INPUT FILTER
AC Plate-Supply Voltage per Plate, RMS. ............................. 450 Volts
Filter Input Choke ............................................... 10 Henrys
DC Output Current ........................................... 225 Milliamperes
DC Output Voltage at Filter Input .......................... 465 Volts
Tube Voltage Drop
\[ I_b = 225 \text{ Milliamperes DC per Plate} \] ............................. 17 Volts

To simplify the application of the maximum ratings to circuit design, the Design-Maximum ratings are presented in chart form as Rating Charts I, II, and III. Rating Chart I presents the maximum ratings for a-c plate supply voltage and d-c output current. Rating Chart II provides a convenient method for checking conformance with the maximum steady-state peak-plate-current rating. Rating Chart III offers a convenient method for checking conformance with the maximum transient peak-plate-current rating. Rating Chart I applies to both capacitor-input and choke-input filters, while Rating Charts II and III apply to capacitor-input filters only.

Operating points should be so selected that the boundary limits of a-c plate supply voltage and d-c output current on Rating Chart I, and maximum d-c output current per plate and rectification efficiency on Rating Chart II, are not exceeded with a bogey tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, equipment control adjustment, and environmental conditions. On Rating Chart I the boundary FAEDG defines the limits for capacitor-input filter operation, and the boundary FABCDG defines the limits for choke-input filter operation.

Rating Chart III shows the minimum value of plate supply resistance \( R_e \) required to remain within the transient peak-plate-current rating. The value of \( R_e \) should be such that it lies to the left of the line on Rating Chart III at the highest probable value of line voltage.
**RATING CHART II**

FOR CAPACITOR-INPUT FILTER

THE BOUNDARY CURVE IS BASED ON A STEADY-STATE PEAK PLATE CURRENT OF 0.825 AMPERE MAXIMUM PER PLATE.

RECTIFICATION EFFICIENCY = \( \frac{\bar{E}}{1.41 \cdot E_s} \)

WHERE \( \bar{E} \) = DC OUTPUT VOLTAGE AT FILTER INPUT

\( E_s \) = RMS SUPPLY VOLTAGE PER PLATE

**AREA OF PERMISSIBLE OPERATION**

**RATING CHART III**

FOR CAPACITOR-INPUT FILTER

THE VALUES OF \( R_s \) ARE BASED ON A TRANSIENT (NOT SWITCHING) PEAK PLATE CURRENT OF 3.7 AMPERES MAXIMUM PER PLATE.

\[ R_s = R_{sec} + N^2 R_{pri} + R_A \]

WHERE

\( R_s \) = PLATE SUPPLY RESISTANCE PER PLATE

\( R_{sec} \) = DC RESISTANCE OF TRANSFORMER SECONDARY PER SECTION

\( R_{pri} \) = DC RESISTANCE OF TRANSFORMER PRIMARY

\( R_A \) = DC RESISTANCE OF ADDED SERIES RESISTANCE PER PLATE

\( N \) = TRANSFORMER VOLTAGE STEP-UP RATIO PER SECTION

IF SERIES INDUCTANCE IS PRESENT IN THE PLATE SUPPLY, IT IS PERMISSIBLE TO USE A SMALLER-THAN-INDICATED VALUE OF \( R_s \) PROVIDING THE RATED MAXIMUM VALUE OF TRANSIENT PEAK PLATE CURRENT IS NEVER EXCEEDED.
OPERATION CHARACTERISTICS
FULL-WAVE RECTIFIER WITH CHOKE-INPUT FILTER

$E_t = 5.0$ VOLTS
(BOUNDARY LINE CBA IS DRAWN AS SHOWN ON RATING CHART 1)

DC OUTPUT VOLTAGE AT INPUT TO FILTER IN VOLS

DC OUTPUT CURRENT IN MILLIAMPERES

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