The 3DG4 is a twin diode with directly heated cathode designed for use as a full-wave rectifier in the power supply of television receivers.

**GENERAL**

**ELECTRICAL**
- Cathode—Coated Directly Heated
- Cathode-Heating Voltage, AC or DC: 3.3 ± 10% Volts
- Cathode-Heating Current: 3.8 Amperes

**MECHANICAL**
- Mounting Position—Any
- Envelope—T-12, Glass
- Base—Short Medium-Shell Octal 5-Pin

**MAXIMUM RATINGS**

**RECTIFIER SERVICE—DESIGN-MAXIMUM VALUES**
- Peak Inverse Plate Voltage: 1050 Volts
- AC Plate-Supply Voltage per Plate—See Rating Chart 1
- Steady-State Peak Plate Current per Plate: 1200 Milliamperes
- Transient Peak Plate Current per Plate,
  - Maximum Duration 0.2 Second: 6.5 Amperes
- DC Output Current—See Rating Chart 1
- Bulb Temperature at Hottest Point: 200 °C

Design-Maximum ratings are limiting values of operating and environmental conditions applicable to a bogey tube of a specified type as defined by its published data, and should not be exceeded under the worst probable conditions.

These values are chosen by the tube manufacturer to provide acceptable serviceability of the tube, taking responsibility for the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration.

The equipment manufacturer should design so that initially and throughout life no design-maximum value for the intended service is exceeded with a bogey tube under the worst probable operating conditions with respect to supply-voltage variation, equipment component variation, variation in characteristics of all other tubes in the equipment, equipment control adjustment, load variation, signal variation, and environmental conditions.

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

AC Plate-Supply Voltage per Plate, RMS. ........................................ 275 Volts
Filter Input Capacitor ........................................................................ .40 Microfarads
Total Plate-Supply Resistance per Plate .......................................... .32 Ohms
DC Output Current ............................................................................ 350 Milliamperes
DC Output Voltage at Filter Input ..................................................... 300 Volts

Tube Voltage Drop
Ib = 350 Milliamperes DC per Plate .................................................... .25 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 bogy 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 (Rₚ) required to remain within the transient peak-plate-current rating. The value of Rₚ 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

DESIGN-MAXIMUM RATINGS

FOR CAPACITOR-INPUT FILTER

THE BOUNDARY CURVE IS BASED ON A STEADY-STATE PEAK PLATE CURRENT OF 1.2 AMPERES MAXIMUM PER PLATE.

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

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

\( E_s = \) RMS SUPPLY VOLTAGE PER PLATE

MAXIMUM PROBABLE DC OUTPUT CURRENT PER PLATE IN MILLIAMPERES

RECTIFICATION EFFICIENCY

AREA OF PERMISSIBLE OPERATION

K-55611-TD99-2

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RATING CHART III

FOR CAPACITOR-INPUT FILTER

THE VALUES OF \( R_s \) ARE BASED ON A TRANSIENT (HOT SWITCHING) PEAK PLATE CURRENT OF 6.5 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

MINIMUM PLATE SUPPLY RESISTANCE PER PLATE \( [R_s] \) IN OHMS

MAXIMUM PROBABLE AC PLATE SUPPLY VOLTAGE PER PLATE (RMS) IN VOLTS

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.

K-55611-TD99-3

FEBRUARY 10, 1960
AVERAGE PLATE CHARACTERISTICS

EACH SECTION

PLATE CURRENT IN MILLIAMPERES

PLATE VOLTAGE IN VOLTS

$E_f = \text{RATED VALUE}$

K-55611-TD99-4

FEBRUARY 10, 1960

OPERATION CHARACTERISTICS

FULL-WAVE RECTIFIER WITH CAPACITOR-INPUT FILTER

$E_f = \text{RATED VALUE}$

$C = 40 \mu f$

$R_s \text{ IN OHMS}$

$1$ $2$ $3$ $4$ $5$

$16$ $26$ $37$ $48$ $53$

(BOUNDARY LINE DEA IS SAME AS SHOWN ON RATING CHART I)

DC OUTPUT VOLTAGE AT INPUT TO FILTER IN VOLTS

DC OUTPUT CURRENT IN MILLIAMPERES

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OPERATION CHARACTERISTICS
FULL-WAVE RECTIFIER WITH CHOKE-INPUT FILTER

$E_f = \text{RATED VALUE}$

(BOUNDARY LINE CBA IS SAME AS SHOWN ON RATING CHART 1)

DC OUTPUT VOLTAGE AT INPUT TO FILTER IN VOLTS

375 VOLTS (RMS) PER PLATE
350
300
250
200
100
0

DC OUTPUT CURRENT IN MILLIAMPERES

0 100 200 300 400 500 600 700

FEBRUARY 10, 1960