**6X4 FULL-WAVE VACUUM RECTIFIER MINIATURE TYPE**

**GENERAL DATA**

**Electrical:**
Heater, for Unipotential Cathode:
- Voltage: 6.3 ac or dc volts
- Current: 0.6 amp

**Mechanical:**
- Mounting Position: Any
- Maximum Overall Length: 2-5/8"
- Maximum Seated Length: 2-3/8"
- Length from Base Seat to Bulb Top (Excluding tip): 2" ± 3/32"
- Maximum Diameter: 3/4"
- Bulb: T-5-1/2
- Base: Small-Button Miniature 7-Pin (JETEC No. E7-1)
- Basing Designation for BOTTOM VIEW: 7CF

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**RECTIFIER SERVICE**

**Maximum Ratings, Design-Center Values:**
- PEAK INVERSE PLATE VOLTAGE: 1250 max. volts
- PEAK PLATE CURRENT PER PLATE: 210 max. ma
- AC PLATE SUPPLY VOLTAGE (RMS) PER PLATE: See Rating Chart I
- DC OUTPUT CURRENT PER PLATE: See Rating Chart I

**HOT-SWITCHING CURRENT:**
If hot-switching is regularly required in operation, the use of choke-input circuits is recommended. Such circuits limit the hot-switching current to a value no higher than that of the peak plate current. When capacitor-input circuits are used, a maximum peak current value per plate of 1 ampere during the initial cycles of the hot-switching transient should not be exceeded.

**PEAK HEATER-CATHODE VOLTAGE:**
- Heater negative with respect to cathode: 450 max. volts
- Heater positive with respect to cathode: 450 max. volts

**Typical Operation as Full-Wave Rectifier with Capacitor-Input to Filter:**
- AC Plate-to-Plate Supply Voltage (RMS): 650 volts
- Filter Input Capacitor: 10 μF
- Effective Plate-Supply Impedance per Plate*: 520 ohms

*Higher values of capacitance than indicated may be used but the effective plate-supply impedance should be increased to prevent exceeding the maximum rating for peak plate current.

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DC Output Voltage at Input to Filter (Approx.):
- At half-load current of 35 ma: 360 volts
- At full-load current of 70 ma: 300 volts

Voltage Regulation (Approx.):
- Half-load to full-load current: 60 volts

Typical Operation as Full-Wave Rectifier with Choke-Input to Filter:
- AC Plate-to-Plate Supply Voltage (RMS): 900 volts
- Minimum Filter Input Choke: 10 henries
- DC Output Voltage at Input to Filter (Approx.):
  - At half-load current of 35 ma: 385 volts
  - At full-load current of 70 ma: 370 volts
- Voltage Regulation (Approx.):
  - Half-load to full-load current: 15 volts

**TYPE 6X4**

\[ E_f = 6.3 \text{ VOLTS} \]

**PLATE MILLIAMPERES**

**PLATE VOLTS DC**

**RATING CHARTS AND OPERATION CHARACTERISTICS**

_Rating Chart I_ represents graphically the relationships between maximum ac voltage input and maximum dc output current derived from the fundamental ratings for conditions of capacitor-input and choke-input filters. This graphical presentation gives the equipment designer considerable latitude in choice of operating conditions.

_Rating Chart II_ represents graphically the relationship between maximum rectification efficiency and maximum dc output current per plate for conditions of capacitor input to filter.
FULL-WAVE VACUUM RECTIFIER

Rating Chart III represents graphically the relationships between minimum plate-supply resistance per plate and maximum ac plate-supply voltage per plate under no-load conditions for conditions of capacitor input to filter when occasional hot-switching is employed.

The Operation Characteristics for Full-Wave Circuit with Capacitor-Input Filter show not only the typical operating curves for such a circuit, but also show by means of boundary-lines "DEA" the limiting current and voltage relationships presented on Rating Chart I.

The Operation Characteristics for Full-Wave Circuit with Choke-Input Filter show the typical operating curves for such a circuit. They not only show by means of boundary line "ABC" the limiting current and voltage relationships presented on Rating Chart I, but also give information as to the effect on regulation of various sizes of chokes. The solid-line curves show the dc voltage outputs which would be obtained if the filter chokes had infinite inductance. The long-dash lines radiating from the zero position are boundary lines for various sizes of chokes as indicated. The intersection of one of these lines with a solid-line curve indicates the point on the curve at which the choke no longer behaves as though it had infinite inductance. To the left of the choke boundary line, the regulation curves depart from the solid-line curves as shown by the representative short-dash regulation curves.
$E_p = 6.3$ VOLTS
MAX. PEAK PLATE CURRENT PER PLATE = 210 MA.
RECTIFICATION EFFICIENCY = $\frac{E}{\sqrt{2}E_S}$
WHERE $E =$ DC OUTPUT VOLTS AT INPUT TO FILTER
$E_S =$ AC PLATE SUPPLY VOLTS (RMS) PER PLATE
RATING CHART III
CAPACITOR INPUT TO FILTER

E_f = 6.3 VOLTS
MAX. HOT SWITCHING CURR. = 1 AMP.
PLATE-SUPPLY RESISTANCE PER PLATE = R_{sec} + N^2 R_{pri} + R_A

WHERE
- \( R_{sec} \) = 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-ohms

AC PLATE SUPPLY VOLTS (RMS) PER PLATE—NO LOAD

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92CM-8026
OPERATION CHARACTERISTICS
FULL-WAVE CIRCUIT, CAPACITOR INPUT TO FILTER

$E_F = 6.3$ VOLTS
CAPACITOR (C) INPUT TO FILTER: $C = 10 \mu F$
TOTAL EFFECTIVE PLATE-SUPPLY RESISTANCE
PER PLATE (520 OHMS FOR CURVES 1-5
400 OHMS FOR CURVES 6-8
SUPPLY FREQUENCY = 60 CPS

CURRENT-AND VOLTAGE-
BOUNDARY LINE 'DEA' IS
THE SAME AS SHOWN ON
RATING CHART I

DC OUTPUT VOLTS AT INPUT TO FILTER

DC LOAD MILLIAMPERES

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92CM-8031
OPERATION CHARACTERISTICS
FULL-WAVE CIRCUIT, CHOKE INPUT TO FILTER

E_f = 8.3 VOLTS
SUPPLY FREQ. = 60 CPS

SOLID-LINE CURVE = CHOKEs OF INFINITE
INDUCTANCE

LONG-DASH LINES = BOUNDARY LINES FOR:
CHOKE SIZES AS SHOWN

SHORT-DASH CURVES = REGULATION CURVES
FOR REPRESENTATIVE
CHOKE SIZES

CURRENT-AND-VOLTAGE BOUNDARY LINE 'CBA'
IS THE SAME AS SHOWN ON RATING
CHART I

[Graph with various lines and annotations]

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92CM-8030