Half-Wave Vacuum Rectifier

T-9 Duodecar Type

Designed to minimize X-Radiation

\[-e_{bm} = 38,000 \text{ max. V} \quad i_{bm} = 110 \text{ mA}\]

**ELECTRICAL CHARACTERISTICS – Bogey Values**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Voltage, ac or dc</td>
<td>(E_h) 3.15 ± 0.5 V</td>
</tr>
<tr>
<td>Heater Current at (E_h = 3.15 \text{ V})</td>
<td>(I_h) 0.48 A</td>
</tr>
<tr>
<td>Direct Interelectrode Capacitance: (P) to ((K + IS + H))</td>
<td>(C_{p-all}) 1.6 pF</td>
</tr>
</tbody>
</table>

**Instantaneous Tube Voltage**

- Plate Current \((i_b) = 7 \text{ mA}\)
- \(e_b\) 70 V

**MECHANICAL CHARACTERISTICS**

- Maximum Overall Length: 3.625 in (92.07 mm)
- Maximum Seated Length: 3.250 in (82.55 mm)
- Maximum Bulb Diameter: 1.188 in (30.17 mm)
- Envelope: JEDEC T9
- Top Cap: Small embossed (JEDEC C1-50)
- Base: Small-Button Duodecar 12-pin (JEDEC E12-70)
- Terminal Diagram: JEDEC 12-HY
- Type of Cathode: Coated Unipotential
- Operating Position: Any

**MAXIMUM RATINGS\(^b\) – High Voltage Rectifier**

*For operation as a pulsed rectifier tube in a 525-line, 30-frame system\(^c*"

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inverse Plate Voltage</td>
<td>(-e_{bm}) 38,000 V</td>
</tr>
<tr>
<td>Total DC and Peak (absolute max.)</td>
<td>(E_{b(avg)}) 30,000 V</td>
</tr>
<tr>
<td>Plate Current:</td>
<td>(i_{bm}) 110 mA</td>
</tr>
<tr>
<td>Peak (design max.)</td>
<td>(I_{b(avg)}) 2.2 mA</td>
</tr>
<tr>
<td>Average (design max.)</td>
<td>(E_h) 3.65 V</td>
</tr>
<tr>
<td>Heater Voltage (absolute max.)</td>
<td>(E_h) 2.65 V</td>
</tr>
</tbody>
</table>

\(^a\) Measured without external shield in accordance with the current issue of EIA Standard RS-191.

\(^b\) As defined in the current issue of EIA Standard RS-239A.
As described in “Standards of Good Engineering Practice Concerning Television Broadcast Stations”, Federal Communications Commission.

This rating is applicable when the duration of the voltage pulse does not exceed 15% of one horizontal scanning cycle. In a 525-line, 30-frame system, 15% of one horizontal scanning cycle is 10μs.

OPERATING CONSIDERATIONS

Socket Connections. The base pins of the 3BW2 fit the standard duodecar socket. Socket terminals 2, 3, 4, 5, 6, 7, 9, 10 and 11 may be connected to terminal 1 or to a corona shield which connects to terminal 1. Terminals 4 and 10 may be used as tie points at or near cathode potential. Otherwise, do not use.

Measurement of Heater Voltage. It is recommended that a thermocouple rms voltmeter be used to measure heater voltage. The meter and its leads must be insulated to withstand 38,000 V. To minimize loading of the rectifier circuit during this measurement, stray capacitances to ground should be kept as low as possible.

X-Radiation Characteristic

X-Radiation, Maximum 25 mR/hr

Operation of the 3BW2 outside of the absolute values indicated above may result in either temporary or permanent changes in the X-radiation characteristic of the tube. Equipment design must be such that these absolute values are not exceeded.

X-Radiation is measured in accordance with JEDEC Publication No. 67A, “Recommended Practice for Measurement of X-Radiation from Receiving Tubes”, and controlled in accordance with JEDEC Publication No. 73A, “Recommended Practice for Quality Control of X-Radiation Emitted from High Voltage Rectifier and Shunt Regulator Receiving Tubes”.

Warning

X-Radiation

The high voltages associated with the 3BW2 result in production of X-Radiation which may constitute a health
hazard on prolonged exposure at close range unless the tube is adequately shielded. Equipment design must provide for this shielding.

Precautions must be exercised during the servicing of equipment employing the 3BW2 to assure that the high voltage is adjusted to the recommended value and that any shielding components are replaced to their intended positions before the equipment is operated.

**Shock Hazard**

The high voltages at which the 3BW2 is operated can be extremely dangerous to the user or serviceman. Extreme care should be taken in the use of, and for the servicing and adjustment of, any high voltage circuit.

Precautions must be exercised during the replacement or servicing of the 3BW2 in equipment to assure that the high voltage output terminal is properly grounded while inserting or removing the tube from its socket or while disconnecting the top cap connector.

THE EQUIPMENT MANUFACTURER SHOULD PROVIDE A WARNING LABEL IN AN APPROPRIATE POSITION ON THE EQUIPMENT TO ADVISE THE SERVICEMAN OF ALL PRECAUTIONS HEREIN.

**TERMINAL DIAGRAM – JEDEC 12 HY – Bottom View**

Pin 1 - Heater, Cathode, Internal Shield
Pin 2 - Heater, Cathode, Internal Shield
Pin 3 - Do Not Use
Pin 4 - No Connection
Pin 5 - Heater, Cathode, Internal Shield
Pin 6 - Do Not Use
Pin 7 - Do Not Use
Pin 8 - Heater
Pin 9 - Heater, Cathode, Internal Shield
Pin 10 - No Connection
Pin 11 - Do Not Use
Pin 12 - Heater
Cap - Plate
# DIMENSIONAL OUTLINE

![Diagram of component dimensions](image)

<table>
<thead>
<tr>
<th>DIMENSION</th>
<th>INCHES</th>
<th>MILLIMETERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min.</td>
<td>Max.</td>
</tr>
<tr>
<td>A</td>
<td>1.062*</td>
<td>1.188</td>
</tr>
<tr>
<td>C</td>
<td>–</td>
<td>3.625</td>
</tr>
<tr>
<td>D</td>
<td>3.000</td>
<td>3.250</td>
</tr>
</tbody>
</table>

**MILLIMETER DIMENSION DERIVED FROM INCH DIMENSION**

* Applies to the minimum diameter except in the area of the seal.