Compactor Diode-Pentode

The 32HQ7 is a multifunction compactron containing a high-perveance diode and a beam power pentode. The diode is intended for service as the damping diode and the pentode as the horizontal-deflection amplifier in television receivers.

The diode of the 32HQ7 features a diffusion bonded cathode coating. This coating practically eliminates one of the failure mechanisms in damper diodes, which is back-emission from the anode due to emissive particles being pulled from the cathode by the high electrostatic field.

**GENERAL**

**ELECTRICAL**
- Cathode - Coated Unipotential
- Heater Characteristics and Ratings
  - Heater Voltage, AC or DC*: 32.6 Volts
  - Heater Current*: 0.315 + 0.02 Amperes
  - Heater Warm-up Time, average*: 11 Seconds
  - Direct Interelectrode Capacitances, approximate:
    - Pentode Section
      - Grid-Number 1 to Plate: (P1 to Pp) 0.3 pf
      - Input: P1 to (h + Pk + P2 + Pb.p.) 14 pf
      - Output: Pp to (h + Pk + P2 + Pb.p.) 6.9 pf
    - Diode Section
      - Cathode to Plate and Heater: Dk to (h + Dp) 8.2 pf
      - Plate to Cathode and Heater: Dp to (h + Dk) 6.1 pf
      - Heater to Cathode: (h to Dk) 2.5 pf

**MECHANICAL**
- Operating Position - Any
- Envelope - T-12, Glass
- Base - E12-74, Button 12-Pin
- Outline Drawing - EIA 12-56
  - Maximum Diameter: 1.563 Inches
  - Minimum Diameter: 1.437 Inches
  - Maximum Over-all Length: 2.875 Inches
  - Maximum Seated Height: 2.500 Inches
  - Minimum Seated Height: 2.250 Inches

**MAXIMUM RATINGS**

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

The tube manufacturer chooses these values to provide acceptable serviceability of the tube, making allowance 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, equipment control adjustment, load variation, signal variation, environmental conditions, and variations in the characteristics of all other electron devices in the equipment.

**PHYSICAL DIMENSIONS**

**TERMINAL CONNECTIONS**
- Pin 1 - Heater
- Pin 2 - Diode Plate
- Pin 3 - No Connection
- Pin 4 - Diode Cathode
- Pin 5 - Pentode Plate
- Pin 6 - No Connection
- Pin 7 - Internal Connection - Do Not Use
- Pin 8 - Pentode Cathode and Beam Plates
- Pin 9 - Pentode Grid Number 1
- Pin 10 - No Connection
- Pin 11 - Pentode Grid Number 2 (Screen)
- Pin 12 - Heater

**BASING DIAGRAM**

EIA 12HT
MAXIMUM RATINGS (Cont’d)

DESIGN-MAXIMUM VALUES

Horizontal-Deflection Amplifier Service — Pentode Section
DC Plate-Supply Voltage (Boost + DC Power Supply) ........................................ 400 Volts
Peak Positive Pulse Plate Voltage ................................................................. 4000 Volts
Peak Negative Pulse Plate Voltage ............................................................... 0 Volts
Screen Voltage ............................................................................................... 150 Volts
Negative DC Grid-Number 1 Voltage ............................................................. 55 Volts
Peak Negative Grid-Number 1 Voltage ............................................................ 330 Volts
Plate Dissipation† ............................................................................................ 7.0 Watts
Screen Dissipation .......................................................................................... 3.0 Watts
DC Cathode Current ....................................................................................... 125 Milliamperes
Peak Cathode Current .................................................................................... 440 Milliamperes

Heater-Cathode Voltage

Heater Positive with respect to Cathode
DC Component ............................................................................................... 100 Volts
Total DC and Peak .......................................................................................... 200 Volts
Heater Negative with respect to Cathode
Total DC and Peak .......................................................................................... 200 Volts

Grid-Number 1 Circuit Resistance ................................................................. 1.0 Megohms

TV Damper Service — Diode Section
Peak Inverse Plate Voltage ............................................................................. 3300 Volts
Plate Dissipation ............................................................................................. 3.8 Watts
Steady-State Peak Plate Current ..................................................................... 600 Milliamperes
DC Output Current .......................................................................................... 120 Milliamperes

Heater-Cathode Voltage

Heater Positive with respect to Cathode
DC Component ............................................................................................... 100 Volts
Total DC and Peak .......................................................................................... 200 Volts
Heater Negative with respect to Cathode
DC Component ............................................................................................... 400 Volts
Total DC and Peak .......................................................................................... 3300 Volts
Bulb Temperature at Hottest Point ................................................................. 200 °C

CHARACTERISTICS AND TYPICAL OPERATION

AVERAGE CHARACTERISTICS

Pentode Section
Plate Voltage ................................................................................................... 3500 Volts
Screen Voltage ............................................................................................... 110 Volts
Grid-Number 1 Voltage .................................................................................. 110 Volts
Plate Resistance, approximate ..................................................................... 0 Ohms
Transconductance ........................................................................................... 8400 Ohms
Plate Current ................................................................................................. 4500 Ohms
Screen Current .............................................................................................. 240 Milliamperes
Grid-Number 1 Voltage, approximate
Ib = 1.0 Milliamperes ..................................................................................... -90 Volts
Triode Amplification Factors ........................................................................ 3.2

Diode Section
Tube Voltage Drop, approximate
Ib = 200 Milliamperes DC ............................................................................. 16 Volts
NOTES

- Heater voltage for a bogey tube at If = 0.315 amperes.
- The equipment designer should design the equipment so that heater current is centered at the specified bogey value, with heater supply variations restricted to maintain heater current within the specified tolerance.
- The time required for the voltage across the heater to reach 80 percent of the bogey value after applying 4 times the bogey heater voltage to a circuit consisting of the tube heater in series with a resistance equal to 3 times the bogey heater voltage divided by the bogey heater current.
- Without external shield.
- Socket terminals 3, 6, 7, and 10 should not be used as tie points.

For operation in a 525-line, 30-frame television system as described in "Standards of Good Engineering Practice Concerning Television Broadcast Stations", Federal Communications Commission. The duty cycle of the voltage pulse must not exceed 15 percent of one scanning cycle.

† In stages operating with grid-leak bias, an adequate cathode bias resistor or other suitable means is required to protect the tube in the absence of excitation.

‡ Applied for short interval (two seconds maximum) so as not to damage tube.

§ Triode connection (screen tied to plate) with Eb = Ec2 = 130 volts and Ec1 = -22.5 volts.

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