**6130/3C45 HYDROGEN THYRATRON**

**POSITIVE-CONTROL TRIODE TYPE**

### GENERAL DATA

**Electrical:**
- **Heater, for Unipotential Cathode:**
  - Voltage: 6.3 V (±10% ac or dc volts)
  - Current at 6.3 volts:
    - Minimum: 2 amp
    - Average: 2.3 amp
    - Maximum: 2.5 amp
  - Minimum heating time: 2 minutes

**Direct Interelectrode Capacitances (Approx.):**
- Grid to anode: 3.9 μf
- Grid to cathode: 8.6 μf
- Ionization Time (Approx.): 0.6 μsec
- Deionization Time (Approx.): 25 μsec
- Anode-Cathode Voltage Drop (Approx.): 150 volts
- Maximum Variation in Fir Time (Jitter): 0.06 μsec

**Mechanical:**
- Operating Position: Any
- Maximum Overall Length: 5–3/16" ± 3/16"
- Seat Length: 4–3/8" ± 3/16"
- Maximum Diameter: 1–9/16"
- Weight (Approx.): 3 oz
- Cooling: Natural
- Bulb: T12
- Cap.: Small (JEDEC No.C1-1)
- Base: Medium-Shell 4-Pin, Micanol (JEDEC No.A4-9)
- Basing Designation for Bottom View: 4BL

**Pulse-Modulator Service**

**Maximum and Minimum CCS® Ratings, Absolute Values:**

**DC ANODE-SUPPLY VOLTAGE:**
- 800 min. volts

**PEAK ANODE VOLTAGE:**
- Forward (E_bmf) ≥ 3000 max. volts
- Inverse, ≤ 5% of E_bmf min. volts
- After anode-current pulse:
  - During first 25 μsec: 1500 max. volts
  - After first 25 μsec: 3000 max. volts

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GRID VOLTAGE:
- Negative (DC or Peak), before conduction: 200 max. volts
- Peak positive-pulse: 175 min. volts

ANODE CURRENT:
- Peak: 35 max. amp
- Average: 0.045 max. amp
- Rate of rise: 750 max. amp/μsec

OPERATION FACTOR:
- 3 x 10^8 max.

PULSE DURATION:
- 6 max. μsec

AMBIENT-TEMPERATURE RANGE:
- -50 to +90 °C

Typical Operation:
- At 2000 pps in accompanying circuit with pulse duration of 0.5 μsec

DC Anode-Supply Voltage: 1250 volts
Peak Anode Voltage:
- Forward: 3000 volts
- Inverse: Immediately after anode-current pulse: 530 volts

GRID VOLTAGE:
- Negative, before conduction: 0 volts
- Peak positive-pulse (Unloaded): 175 volts

Effective Grid-Circuit Resistance: 1000 ohms

ANODE CURRENT:
- Peak: 35 amp
- Average: 0.035 amp
- Operation Factor: 2.1 x 10^8

Peak Power Output to Pulse Transformer (T):
- 43000 watts

Maximum Circuit Values:
- Effective Grid-Circuit Resistance: 1500 max. ohms

* Defined as the time interval between the point on the rising portion of the grid pulse which is 26 per cent of the peak unloaded-pulse amplitude and the point on the anode-current pulse which is 26 per cent of its peak amplitude. The anode-current pulse has a maximum time rise of 0.05 μsec. The grid pulse has a minimum peak amplitude of 130 volts, a maximum rise time of 0.5 μsec, and is supplied by a driver having a maximum internal impedance of 1500 ohms.
* Continuous Commercial Service.
* Corresponds to altitude of about 50,000 feet.
* In applications where the anode voltage is applied instantaneously, the power-supply filter should be designed so that the peak forward anode voltage is applied at a rate not to exceed 75,000 volts per second.
* Exclusive of spike not having more than 0.05 μsec duration.
* Averaged over any cycle.
* Defined as Peak Forward Anode Volts x Pulse-Repetition Rate (pps) x Peak Anode Amperes (excluding spike).

See next page.

ELECTRON TUBE DIVISION
RADIO CORPORATION OF AMERICA, HARRISON, NEW JERSEY

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- Pulse duration is defined as the time interval between points on the pulse envelope at which instantaneous amplitudes are equal to 70.7 percent of the maximum amplitude excluding spike.
- Operation with a bulb temperature within the approximate range of 60° to 90° C measured on the bulb directly opposite the anode is recommended for longest life. To attain this temperature under operating conditions involving low ambient temperature, the use of a heat-conserving enclosure for the tube may be necessary.

**OPERATING CONSIDERATIONS**

The anode is brought out of the tube to a Small cap. The connector for this cap should be of the heat-radiating type and the connector lead should have ample current-carrying capability for the operating requirements.

*Shielding* of the 6130/3C45 should be provided if it is operated in the presence of strong electric fields which will ionize the gas within the tube. Any such ionization will cause erratic performance.

Cooling of the 6130/3C45 is accomplished by natural circulation of air around it. Under no circumstances should a stream of cooling air be applied to the glass envelope.

**TYPICAL PULSE-MODULATOR CIRCUIT**

![Circuit Diagram](image)

- **C**: Blocking Capacitor, 0.001 µf
- **egg**: Pulse Generator supplying peak positive-pulse grid voltage of 175 volts (unloaded)
- **L**: Charging Choke, 5 henries
- **PFN**: Pulse-Forming Network with iterative impedance of 50 ohms, and a two-way transmission time of 0.5 µsec
- **R1**: Grid Resistor, 30,000 ohms
- **R2**: Effective Resistance of grid circuit, 1000 ohms
- **RL**: Load Resistance. Value reflected into primary of transformer (T) is 35 ohms.
- **T**: Matching Pulse Transformer
HYDROGEN THYRATRON

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