6350
MEDIUM-MU TWIN TRIODE
For Computer Service and Other "On-Off" Control Applications
TENTATIVE DATA

RCA-6350 is a medium-mu twin triode of the 9-pin miniature type designed for use in electronic computers and other "on-off" control applications involving long periods of operation under cutoff conditions. It is particularly useful in pulse-amplifier, inverter, frequency-divider, cathode-follower, and multivibrator circuits of high-speed digital-type electronic computers.

In such service, the 6350 maintains its emission capabilities even after long standby periods and will supply a high minimum value of plate current during its "on" cycles. Furthermore, consistency of cutoff bias is maintained because of the stable cutoff characteristic of the 6350 and its freedom from grid emission.

The design of the 6350 includes a cathode made of special alloy material to minimize cathode interface, a protective shield to prevent deposition of getter material on micas and electrodes to minimize interelectrode leakage, radiating fins on the grids to increase the tubes dissipation capabilities, and a carbonized pure-nickel plate to minimize gas evolution. In addition, the 6350 utilizes a pure-tungsten, mid-tapped heater to permit operation from a 6.3-volt or 12.6-volt supply, and separate cathodes with individual base-pin connections to permit flexibility of circuit connections.

The 6350 is manufactured under rigid controls and undergoes rigorous tests as follows: (1) extreme care in the selection and inspection of materials, and close gauging of parts, (2) factory controls and design tests under typical computer operating conditions, (3) tests for cathode interface, interelectrode leakage, high resistance and intermittent shorts, and (4) conduction and standby life performance tests in addition to those for stability and survival rate. These tests and controls insure dependable performance for the 6350 both initially and throughout life.

GENERAL DATA

Electrical:
Heater, for Unipotential Cathodes:

<table>
<thead>
<tr>
<th>Series</th>
<th>Parallel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage (AC or DC)</td>
<td>12.6 ± 5%</td>
</tr>
<tr>
<td>Current</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Direct Interelectrode Capacitances (Approx., without external shield):

| Grid to plate (Each Unit) | 3.2 µuf |
| Grid to cathode and heater (Each Unit) | 3.6 µuf |
| Plate to cathode and heater (Each Unit) | 0.6 µuf |
| Grid to grid | 0.042 max. µuf |
| Plate to plate | 1 max. µuf |
| Heater to cathode (Each Unit) | 4.6 µuf |

Mechanical:
Mounting Position: Vertical preferred, or horizontal with pins 1 and 4 in vertical plane, but any permissible.
Maximum Overall Length: 2-3/8" |
Maximum Seated Length: 2-3/8" |
Length from Base Seat to Bulb Top (Excluding tip): 2" ± 3/32" |
Maximum Diameter: 7/8" |
Bulb: Small-Button Nodal 9-Pin (JEETC No.E9-1) |

Characteristics, Class A1 Amplifier (Each Unit):

| Plate voltage | 150 volts |
| Grid Voltage | -5 volts |
| Plate Current | 11 ma |
| Transconductance | 4600 µhos |
| Amplification Factor | 18 |
| Plate Resistance (Approx.) | 3900 ohms |
| Grid Voltage (Approx.) for plate voltage of 150 volts and plate current of 100 microamperes | -11 volts |
| Grid Voltage (Approx.) for plate voltage of 200 volts and plate current of 1 milliamperes | -12 volts |

COMPUTER SERVICE AND "ON-OFF" CONTROL SERVICE

Maximum Ratings, Absolute Values:

PLATE VOLTAGE:
DC | 330 max. volts |
Peak positive pulse* | 1000 max. volts |

GRID VOLTAGE:
DC negative | 82 max. volts |
DC positive | 3.8 max. volts |
Peak negative pulse* | 440 max. volts |
Peak positive pulse* | 13.3 max. volts |

GRID CURRENT:
DC | 5.5 max. ma |
Peak* | 110 max. ma |

CATHODE CURRENT:
DC | 27.5 max. ma |
Peak* | 333 max. ma |
PLATE DISSIPATION:
For either plate alone .......... 3.85 max. watts
For both plates with both units operating .......... 7.7 max. watts

PEAK HEATER-CATHODE VOLTAGE:
Heater negative with respect to cathode .......... 220 max. volts
Heater positive with respect to cathode .......... 220 max. volts

BULB TEMPERATURE (At hottest point on bulb surface) .......... 120 max. °C

Maximum Circuit Values:
Grid-No. 1-Circuit Resistance:
For cathode-bias operation ......... 0.6 max. megohm
For fixed-bias operation ........... 0.1 max. megohm

* Under the following conditions: Rectangular pulse; pulse duration, 0.08 microsecond; pulse repetition rate, 1 x 10⁻⁶ pps; and duty factor, 0.08.
† The dc component must not exceed 110 volts.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN
Values are For Each Unit, Unless Otherwise Specified
Each unit is tested separately. Electrodes of unit not under test are grounded.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Min.</th>
<th>Max.</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heater Current .................</td>
<td>1</td>
<td>0.275</td>
<td>0.325 amp</td>
</tr>
<tr>
<td>Plate Current (1) ..............</td>
<td>1.3</td>
<td>6</td>
<td>16 ma</td>
</tr>
<tr>
<td>Plate Current (2) ..............</td>
<td>1.4</td>
<td>1</td>
<td>1 ma</td>
</tr>
<tr>
<td>Plate Current (3) ..............</td>
<td>1.5</td>
<td>100</td>
<td>μamp</td>
</tr>
<tr>
<td>Transconductance ..............</td>
<td>1.3</td>
<td>3200</td>
<td>6000 μmhos</td>
</tr>
<tr>
<td>Amplification Factor ..........</td>
<td>1.3</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td>Reverse Grid Current ..........</td>
<td>1.6</td>
<td>2.5</td>
<td>μamp</td>
</tr>
<tr>
<td>Heater-Cathode Leakage Current:</td>
<td>Heater negative with respect to cathode</td>
<td>1.7</td>
<td>15 μamp</td>
</tr>
<tr>
<td>Heater positive with respect to cathode</td>
<td>1.7</td>
<td>15 μamp</td>
<td></td>
</tr>
<tr>
<td>Grid-Voltage Difference:</td>
<td>Between units For Plate Current of 1 milliampere</td>
<td>1.8</td>
<td>2.5 volts</td>
</tr>
<tr>
<td>Leakage Resistance:</td>
<td>Between plate and all other electrodes tied together</td>
<td>1.9</td>
<td>100 - megohms</td>
</tr>
</tbody>
</table>

Note 1: With 12.6 volts ac or dc on heater (series connection).
Note 2: Without external shield.
Note 3: With plate voltage of 150 volts and grid voltage of -5 volts.
Note 4: With plate voltage of 200 volts and grid voltage of -15 volts.
Note 5: With plate voltage of 150 volts and grid voltage of -15 volts.
Note 6: With plate voltage of 180 volts, grid voltage of -5 volts, and grid resistor of 0.1 megohm. Both units connected in parallel.
Note 7: With 100 volts dc between heater and cathode.
Note 8: With plate voltage of 200 volts and grid voltage varied for plate current of 1 milliampere.
Note 9: With plate 300 volts negative with respect to all other electrodes tied together.
Note 10: With grid 100 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS AND PERFORMANCE DATA
Heater-Cycling Life Performance:
Cycles of intermittent operation. 2000 min. cycles
Under the following conditions: Heater voltage of 7.5 volts cycled one minute on-four minutes off, heater 180 volts rms with respect to cathode, and all other elements grounded.

OPERATING CONSIDERATIONS
The maximum ratings in the tabulated data for the 6350 are limiting values above which the serviceability of the 6350 may be impaired from the viewpoint of life and satisfactory performance. Therefore, in order not to exceed these absolute ratings, the equipment designer has the responsibility of determining an average design value below each absolute rating by an amount such that the absolute values wih never be exceeded under any usual conditions of supply-voltage variation, load variation, or manufacturing variation in the equipment itself.

Devices and arrangements shown or described herein may use patents of RCA or others. Information contained herein is furnished without responsibility by RCA for its use and without prejudice to RCA's patent rights.
Fig. 1 – Average Characteristics for Each Unit of Type 6350.

Fig. 2 – Average Characteristics for Each Unit of Type 6350.
Fig. 3 - Average Characteristics for Each Unit of Type 6350.

92CM-9271

**DIMENSIONAL OUTLINE**

- SMALL-BUTTON NOVAL
- 9-PIN BASE
- JETEC N89-1

\[ \text{MEASURED FROM BASE SEAT TO BULB TOP LINE AS DETERMINED BY RING GAUGE OF } 7/16" +1/0. \]

**SOCKET CONNECTIONS**

Bottom View

9CZ

PIN 1: PLATE OF TRIODE UNIT NO.2
PIN 2: CATHODE OF TRIODE UNIT NO.2
PIN 3: GRID OF TRIODE UNIT NO.2
PINS 4 & 9: HEATER OF UNIT NO.2
PINS 5 & 9: HEATER OF UNIT NO.1
PIN 6: PLATE OF TRIODE UNIT NO.1
PIN 7: CATHODE OF TRIODE UNIT NO.1
PIN 8: GRID OF TRIODE UNIT NO.1
PIN 9: HEATER MID-TAP