
ELECTRON TUBE DATA SHEET
WESTERN ELECTRIC 451A ELECTRON TUBE



DESCRIPTION

The 451A is a four-electrode, inert-gas filled cold cathode tube for use as a relay device. The tube is provided with an anode-cathode gap and a starter anode-starter cathode gap such that isolation of the control (starter gap) and controlled (main gap) portions of a circuit may be obtained.

This tube is designed for socket mounting. It is identical, electrically and mechanically, to the 425A except that it is not attached to a plastic angle mounting bracket assembly.

CHARACTERISTICS

Peak Anode Voltage	180	180	volts
Average Starter Cathode Current	0.7	7.0	milliamperes
Average Main Cathode Current	5.0	50	milliamperes
Average Life, Approximate	10000	10	hours

FILE: COLD CATHODE SECTION

MAXIMUM RATINGS, Absolute System (Note 1)

Peak Voltage, Forward or Inverse		
Anode to all Other Electrodes	180	volts
Cathode to all Other Electrodes	180	volts
Cathode Current (Note 2)		
Peak	50	milliamperes
Average	20	milliamperes
Averaging Time	2	seconds
Starter Cathode Current (Note 2)		
Peak	7	milliamperes
Average	2.5	milliamperes
Averaging Time	2	seconds
Peak Inverse Current (Note 2)		
Anode	5	milliamperes
Starter Anode.	1	milliamperes
Ambient Temperature Limits.	-55° to +85°	centigrade

ELECTRICAL DATA, Throughout Life

	<u>Min.</u>	<u>Bogey</u>	<u>Max.</u>	
Starter Breakdown Voltage (Note 3).	67	80	90	volts
Starter Voltage Drop at 2.5 Milliamperes.	55	70	75	volts
Anode Voltage Drop at 10 Milliamperes	58	70	80	volts
Transfer Current (Note 4).	See Curve, Figure 3, Page 4			
Negative Cathode Transfer Voltage (Note 5).	-	-25	-40	volts
Ionization Time, Starter Gap (Approx.) (Note 6).	-	5	-	milliseconds
Deionization Time, Main Gap (Approx.)	-	1	-	millisecond

MECHANICAL DATA

Mounting	Any position
New Weight, Approximate	0.3 ounce
Dimensions and Connections.	See outline drawing on page 4

HANDLING

This tube contains a small amount of krypton-85 gas which is a by-product radioactive material. The amount of krypton-85 is less than five microcuries, which is too small an amount to require any special care in use.

Atomic Energy Commission regulations require that the individual tube carton for tubes containing by-product radioactive material be appropriately marked. The marking includes the statement that tube disposal should be in approved manner.

Approved instructions for disposal of tubes containing krypton-85 are as follows;

Tubes to be disposed of should be broken or crushed in a well ventilated place releasing any resulting vapors to the outside atmosphere. The residual broken or crushed tubes should be disposed of in a normal public trash disposal system. Tubes should be disposed of at a rate of not more than 100 each week from any one location. Avoid breathing vapors from broken tubes.

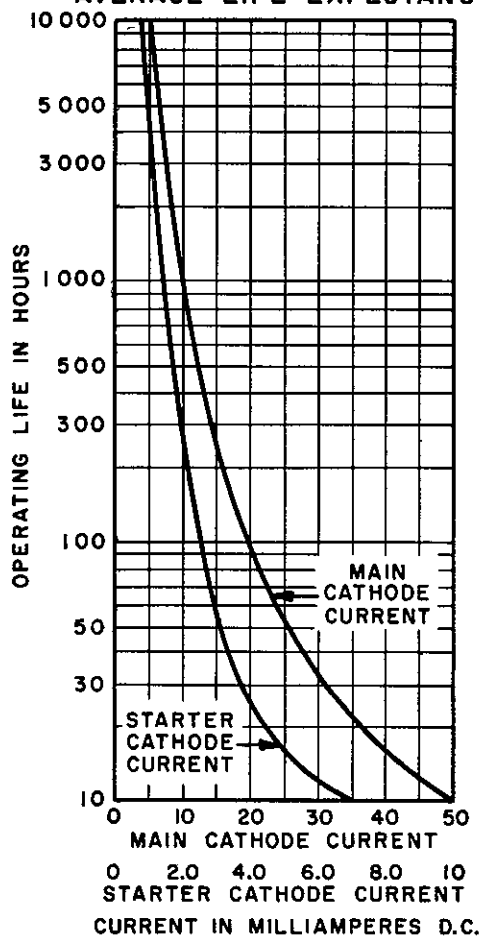
CURRENT-LIFE CHARACTERISTICS
AVERAGE LIFE EXPECTANCY

FIG. 1

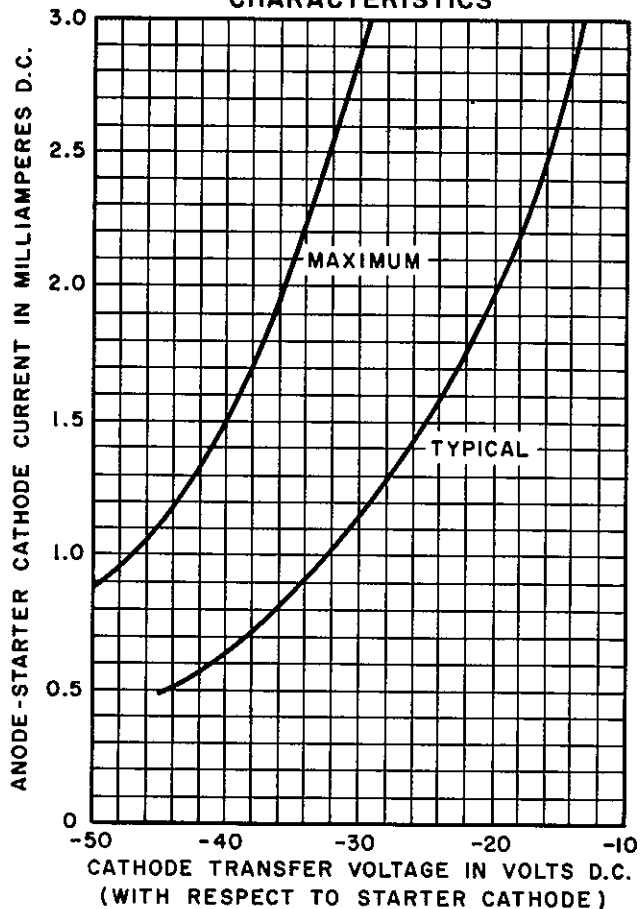
CATHODE TRANSFER VOLTAGE
CHARACTERISTICS

FIG. 2

- Note 1: In the "Absolute System" the maximum ratings specified are limiting values above which the serviceability of the device may be impaired from the viewpoint of life and satisfactory performance. Maximum ratings, as such, do not constitute a set of operating conditions and all values may not, therefore, be attained simultaneously.
- Note 2: Sufficient resistance must be used in series with the tube discharge paths to assure that the electrode currents do not exceed their maximum rated values.
- Note 3: Limits apply immediately after the tube has conducted current. These values may be initially as much as 3 volts higher or lower if the tube has been idle.
- Note 4: To assure transfer of conduction from the starter anode-starter cathode gap to the anode-starter cathode gap.
- Note 5: To assure transfer of conduction from the anode-starter gap to the anode-cathode gap with 1.5 milliamperes flowing from anode to starter cathode. Cathode voltage is measured with respect to starter cathode.
- Note 6: With 15 volts starter overvoltage (15 volts above Starter Breakdown Voltage) and with the tube in total darkness.

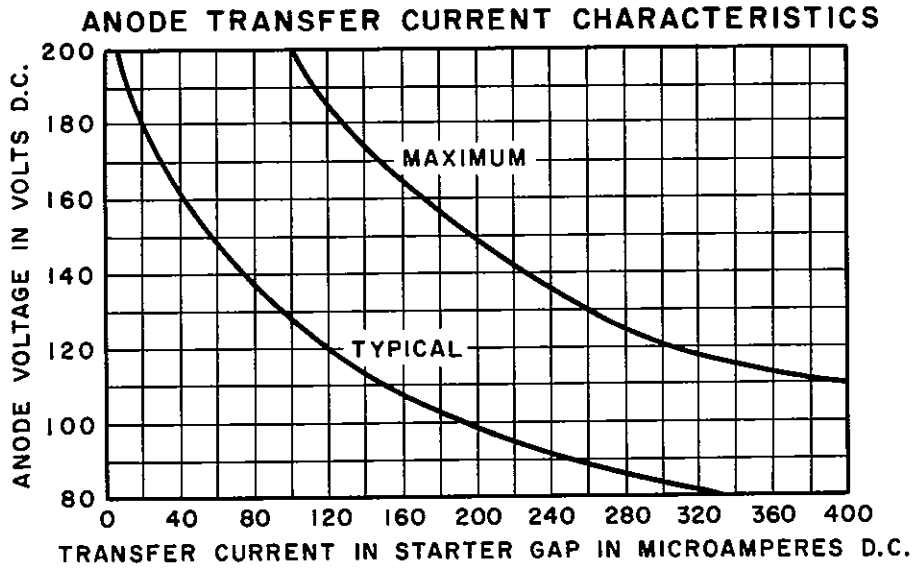
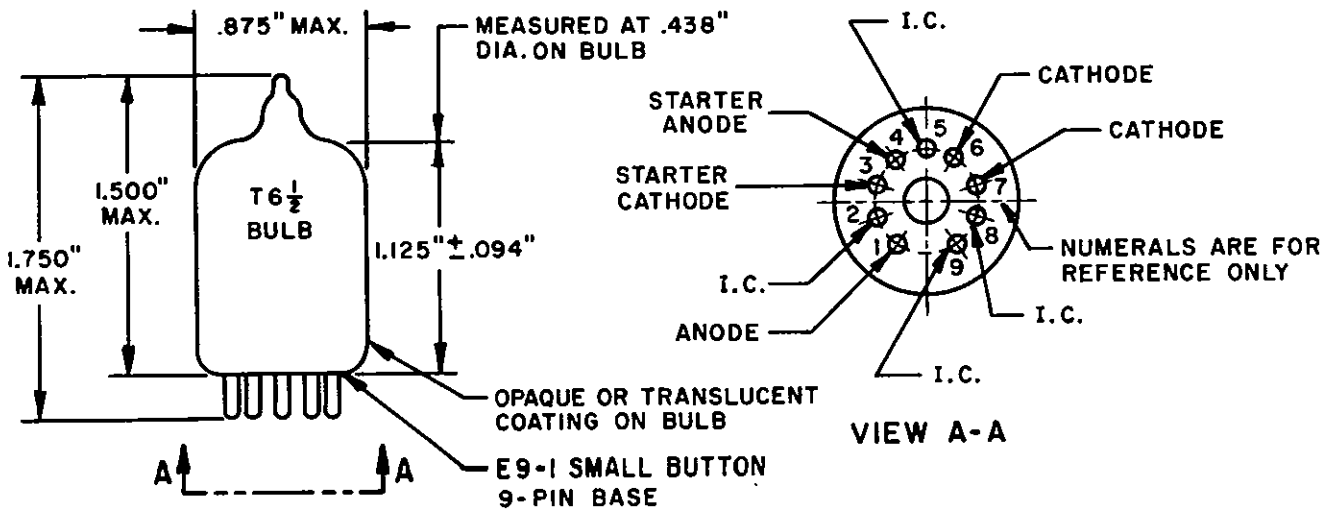


FIG. 3



NOTE: PINS MARKED I.C. (INTERNAL CONNECTION) SHOULD NOT BE CONNECTED TO ANY PORTION OF AN EXTERNAL CIRCUIT. FAILURE TO OBSERVE THIS PRECAUTION MAY RESULT IN IMPROPER OPERATION OF THE TUBE.

A development of Bell Telephone Laboratories, the research laboratories of the American Telephone and Telegraph Company and the Western Electric Company.