

THYRATRON

FOR RELAY AND GRID-CONTROLLED RECTIFIER APPLICATIONS

**7-PIN MINIATURE
FOUR ELECTRODES**

**INERT-GAS TUBE
NEGATIVE CONTROL CHARACTERISTICS**

DESCRIPTION AND RATING

The 2D21 is a miniature, four-electrode, inert-gas-filled thyatron with negative control characteristics for use in relay and grid-controlled rectifier applications. Operating characteristics of the tube include a high-control ratio essentially independent of temperature over a wide range, low grid-anode capacitance, and very low grid current.

GENERAL

ELECTRICAL

Cathode—Coated Unipotential

Heater Characteristics and Ratings

Heater Voltage, AC or DC* 6.3 $\pm$ 0.6 Volts

Heater Current† 0.6 Amperes

Cathode Heating Time, minimum 10 Seconds

Direct Interelectrode Capacitances, approximate‡

Grid-Number 1 to Anode 0.026 pf

Grid-Number 1 to Cathode and Grid-Number 2 2.4 pf

MECHANICAL

Mounting Position—Any

Type of Cooling—Air

Envelope—T-5½, Glass

Base—E7-1, Miniature Button 7-Pin

MAXIMUM RATINGS

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

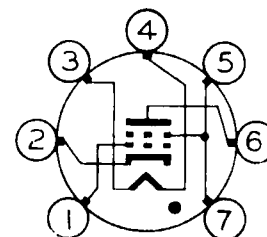
The tube manufacturer chooses these values to provide acceptable serviceability of the tube, making no allowance for equipment variations, environmental variations, and the effects of changes in operating conditions due to variations in the characteristics of the tube under consideration and of all other electron devices in the equipment.

The equipment manufacturer should design so that initially and throughout life no absolute-maximum value for the intended service is exceeded with any 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 the tube under consideration and of all other electron devices in the equipment.

The tubes and arrangements disclosed herein may be covered by patents of General Electric Company or others. Neither the disclosure of any information herein nor the sale of tubes by General Electric Company conveys any license under patent claims covering combinations of tubes with other devices or elements. In the absence of an express written agreement to the contrary, General Electric Company assumes no liability for patent infringement arising out of any use of the tubes with other devices or elements by any purchaser of tubes or others.

GENERAL ELECTRIC

BASING DIAGRAM



EIA 7BN

TERMINAL CONNECTIONS

Pin 1—Grid Number 1
(Control Grid)

Pin 2—Cathode

Pin 3—Heater

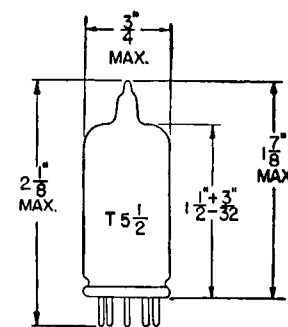
Pin 4—Heater

Pin 5—Grid Number 2
(Shield Grid)

Pin 6—Anode

Pin 7—Grid Number 2
(Shield Grid)

PHYSICAL DIMENSIONS



EIA 5-2

MAXIMUM RATINGS (Continued)

ABSOLUTE MAXIMUM VALUES

Peak Anode Voltage		
Inverse	1300	Volts
Forward	650	Volts
Cathode Current		
Peak	0.5	Amperes
Average	0.1	Amperes
Maximum Averaging Time	30	Seconds
Fault	10	Amperes
Maximum Duration	0.1	Seconds
Negative Control-Grid Voltage		
Before Conduction	100	Volts
During Conduction	10	Volts
Positive Control-Grid Current		
Anode Positive	10	Milliamperes
Anode Negative	10	Milliamperes
Negative Shield-Grid Voltage		
Before Conduction	100	Volts
During Conduction	10	Volts
Positive Shield-Grid Current		
Anode Positive	10	Milliamperes
Anode Negative	10	Milliamperes
Heater-Cathode Voltage		
Heater Positive with Respect to Cathode	25	Volts
Heater Negative with Respect to Cathode	100	Volts
Control-Grid Circuit Resistance	10	Megohms
Ambient Temperature Limits	-75 to +90	C

CHARACTERISTICS AND TYPICAL OPERATION

AVERAGE CHARACTERISTICS

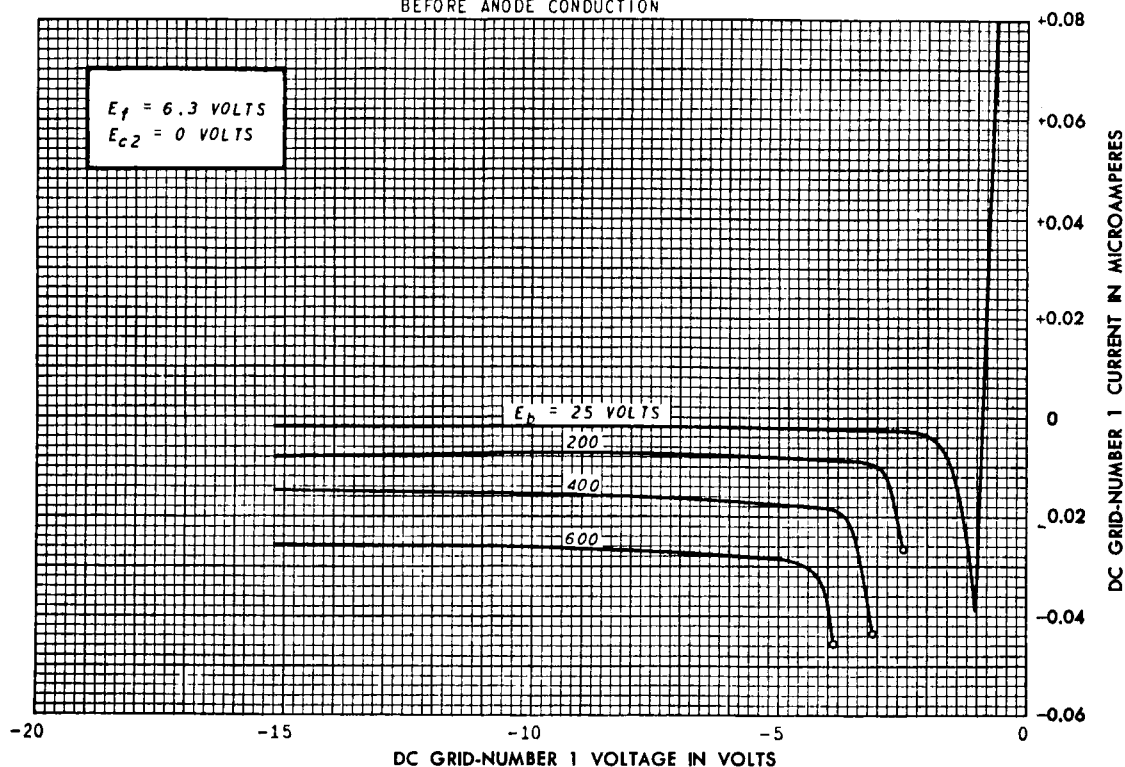
Ionization Time, approximate	0.5	Microseconds
Deionization Time, approximate		
Ebb = 125 volts d-c, Ib = 0.1 ampere d-c, Rg = 1000 ohms		
Ecc1 = -100 Volts DC.	35	Microseconds
Ecc1 = -11 Volts DC.	75	Microseconds
Anode Voltage Drop	8	Volts
Critical Grid Current, maximum		
Ebb = 460 Volts RMS	0.5	Microamperes

FOOTNOTES

- * The equipment designer should design the equipment so that heater voltage is centered at the specified bogey value, with heater supply variations restricted to maintain heater voltage within the specified tolerance.
- † Heater current of a bogey tube at Ef = 6.3 volts.
- ‡ Without external shield.

AVERAGE CHARACTERISTICS

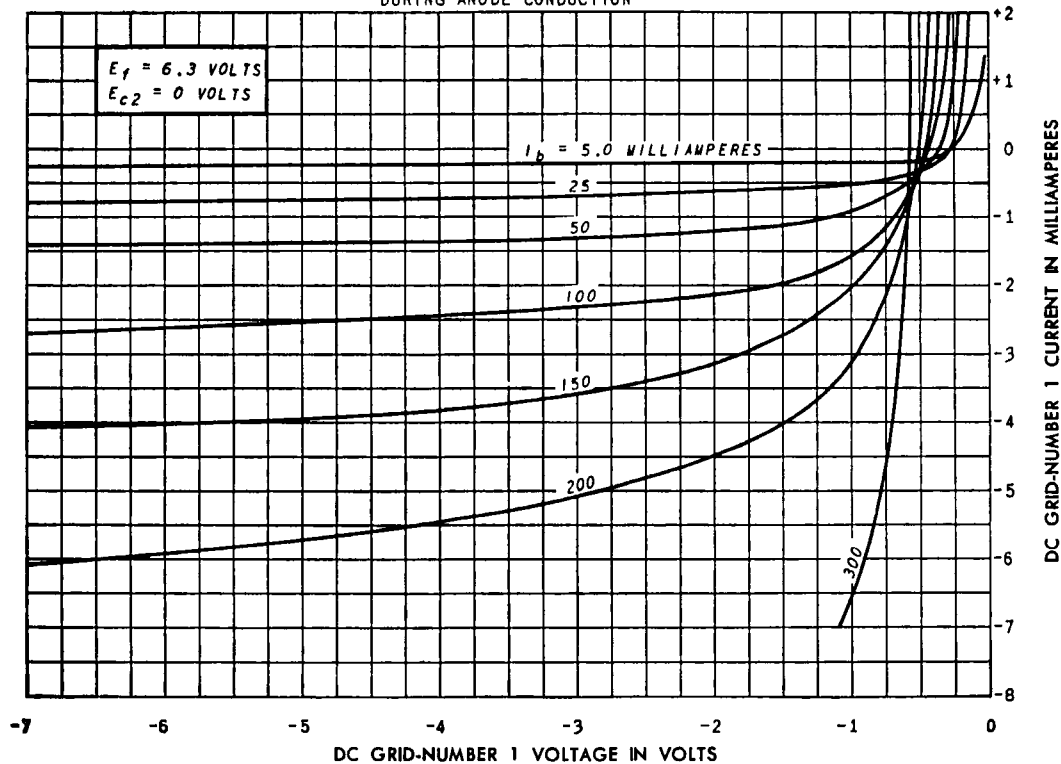
BEFORE ANODE CONDUCTION



OCTOBER 17, 1953

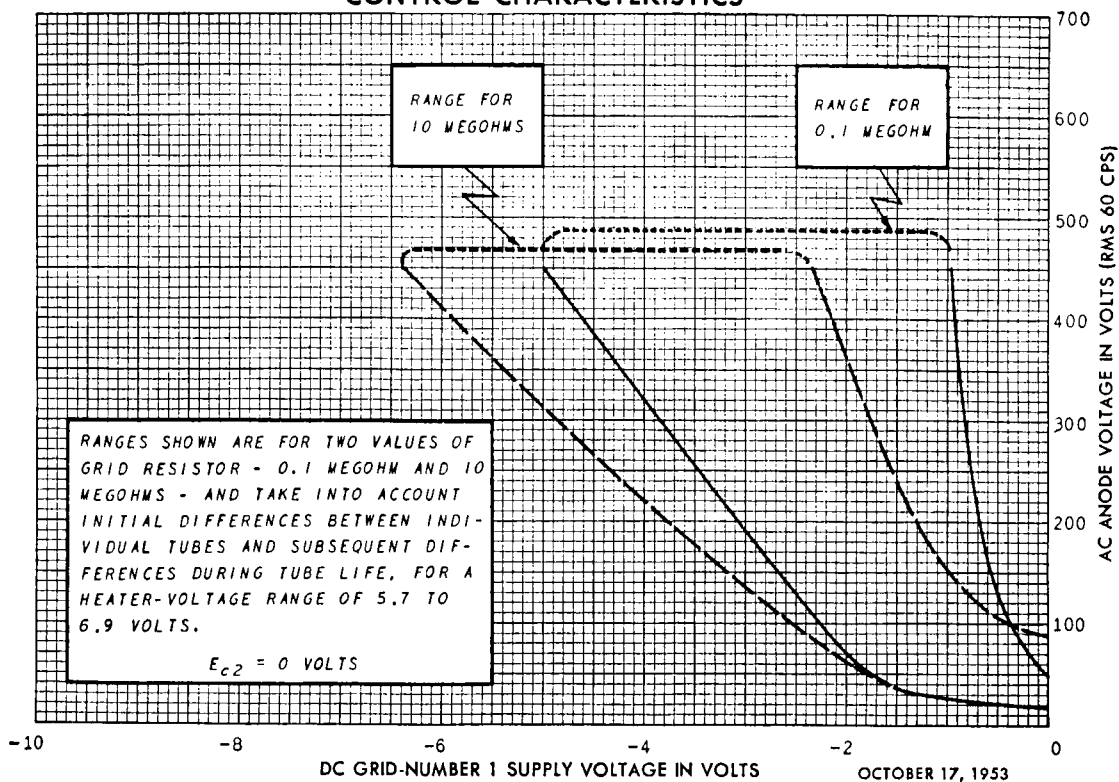
AVERAGE CHARACTERISTICS

DURING ANODE CONDUCTION

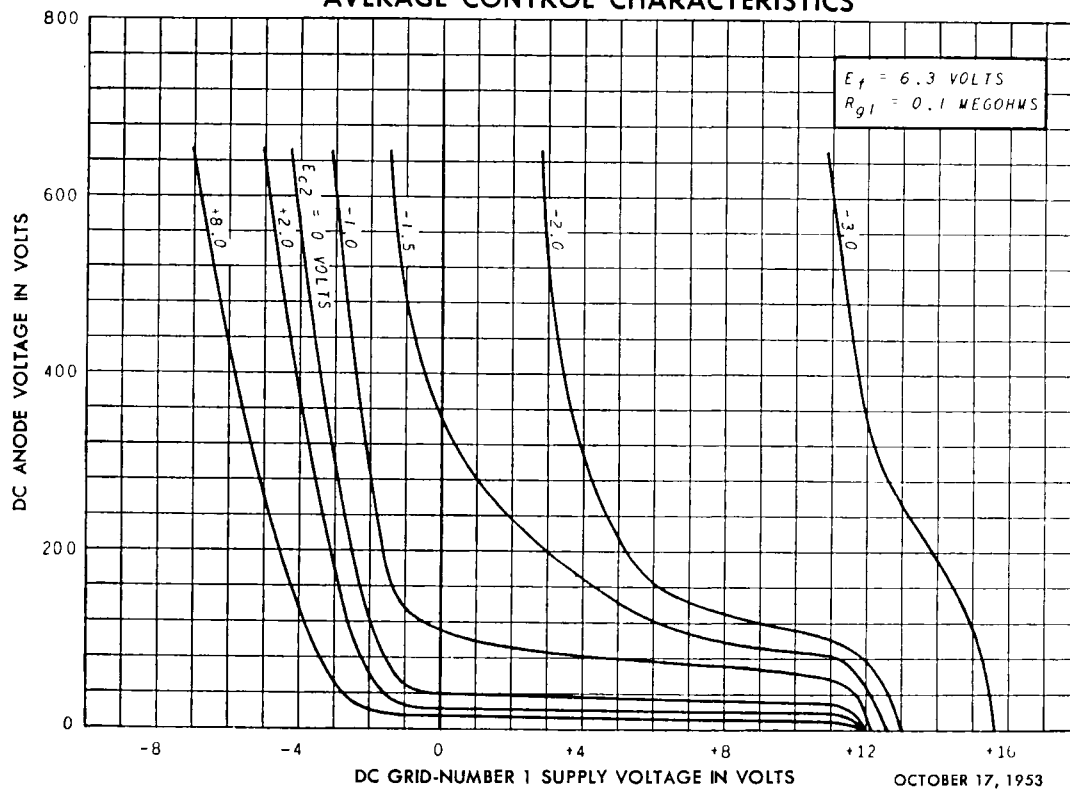


OCTOBER 17, 1953

CONTROL CHARACTERISTICS



AVERAGE CONTROL CHARACTERISTICS



RECEIVING TUBE DEPARTMENT

GENERAL ELECTRIC

Owensboro, Kentucky

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