



5693

5693
SPECIAL
TUBE RED**SHARP-CUTOFF PENTODE**

Intended for critical industrial applications where 10,000-hour life, extreme uniformity, rigid construction, and exceptional stability are paramount. Within its ratings, the 5693 may be used to replace its receiving-tube counterpart, type 6SJ7.

GENERAL DATA**Electrical:**

Heater, for Unipotential Cathode:

Voltage. $6.3 \pm 5\%$ * . . . ac or dc volts

Current. 0.3 amp

Direct Interelectrode Capacitances:^o

	<u>Min.</u>	<u>Av.</u>	<u>Max.</u>	
Grid to Plate.	—	—	0.005	μf
Input.	4.8	5.3	5.8	μf
Output	5.6	6.2	6.8	μf

* May deviate $\pm 10\%$ from rated value provided such deviation occurs for less than 2% of the operating time.

^o With shell connected to cathode.

Mechanical:

Mounting Position. Any

Maximum Overall Length 2-5/8"

Seated Length. $1-31/32" \pm 3/32"$ Maximum Diameter $1-5/16"$

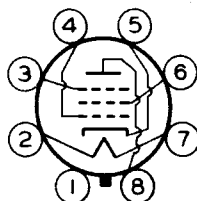
Bulb Metal Shell MT-8

Base Small-Wafer Octal 8-Pin,

Non-Hygroscopic

Basing Designation for BOTTOM VIEW 8N

Pin 1—Shell
Pin 2—Heater
Pin 3—Grid No.3
Pin 4—Grid No.1



Pin 5—Cathode
Pin 6—Grid No.2
Pin 7—Heater
Pin 8—Plate

INDUSTRIAL SERVICE

Includes applications such as dc and resistance-coupled amplifiers

Maximum Ratings, Absolute Values:

DC PLATE VOLTAGE 300 max. volts

DC PLATE-SUPPLY VOLTAGE. 330 max. volts

DC GRID-No.3 (SUPPRESSOR) VOLTAGE:

Negative bias value. $\left\{ \begin{array}{l} 0 \text{ min. volts} \\ -100 \text{ max. volts} \end{array} \right.$

DC GRID-No.2 (SCREEN) VOLTAGE[▲] 125 max. volts

DC GRID-No.2-SUPPLY VOLTAGE. 330 max. volts

[▲]: See next page.

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TENTATIVE DATA

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GRID-No.1 (CONTROL-GRID) VOLTAGE:

Negative bias range.	-1 [■] min. to -50 max.	volts
Negative peak value.	-50 max.	volts
DC CATHODE CURRENT	10 max.	ma
PLATE DISSIPATION.	2 max.	watts
GRID-No.2 DISSIPATION.	0.3 max.	watt

PEAK HEATER-CATHODE VOLTAGE:

Heater negative with respect to cathode.	100 max.	volts
Heater positive with respect to cathode.	100 max.	volts
AMBIENT TEMPERATURE RANGE.	-55 to +90	°C

Maximum Circuit Value:

See curve on a following page giving maximum values of the grid-No.1 resistor.

Characteristics and Range Values:

Heater volts, 6.3; Plate Volts, 250; Grid-No.3 Volts, 0;
Grid-No.2 Volts, 100; Grid-No.1 Volts, -3.

	<u>Min.</u>	<u>Av.</u>	<u>Max.</u>	
Heater Current	0.275	0.300	0.325	amp
Heater-Cathode Current with heater-cathode voltage of ± 100 volts	-	-	5	μ amp
Plate Current.	2.3	3.0	3.7	ma
Plate Current for grid-No.1 voltage of -7.5 volts. . .	2	30	80	μ amp
Plate Current for grid-No.3 voltage of -70 volts . . .	150	450	750	μ amp
Grid-No.2 Current.	0.60	0.85	1.10	ma
Reverse Grid-No.1 Current. .	-	-	0.1	μ amp
Plate Resistance	1.0	-	-	megohm
Transconductance	1400	1650	1900	μ mhos

Typical Operation as Resistance-Coupled Amplifier:

See RESISTANCE-COUPLED AMPLIFIER CHART No.20 at front
of Receiving Tube Section.

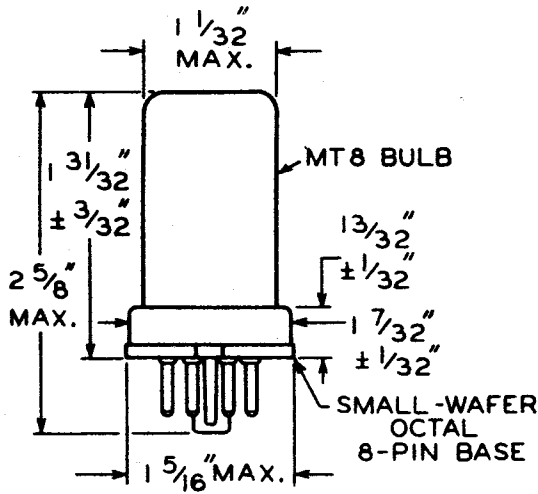
- ▲ The 5693 may be operated at a grid-No.2 voltage as high as the rated grid-No.2 supply voltage when the grid-No.2 dissipation rating is not exceeded for any signal condition and when a resistor is used in series with grid-No.2 and its supply voltage.
- For resistance-coupled amplifier applications, the grid-No.1 negative bias may be as low as -0.5 volt.



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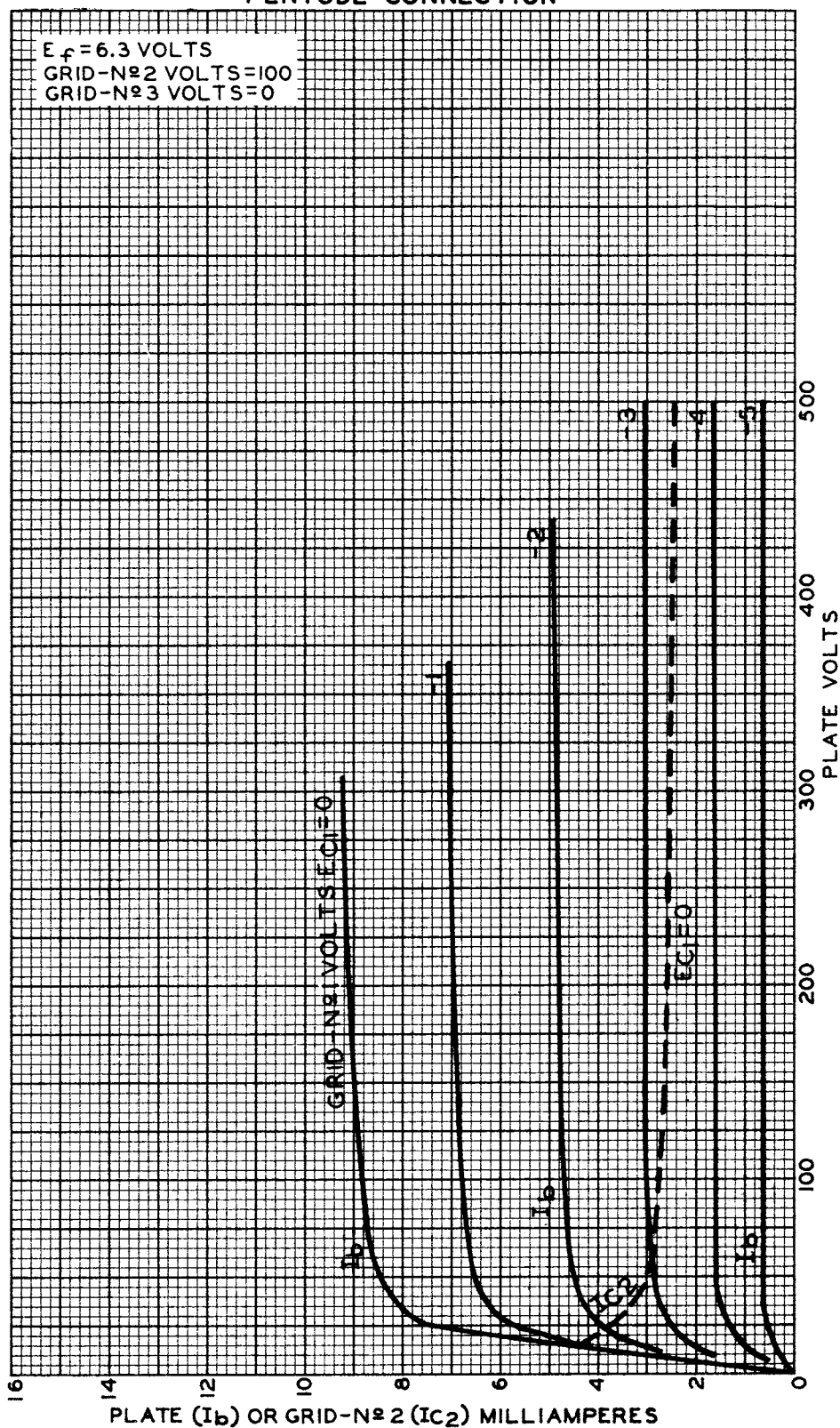
OUTLINE

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AVERAGE PLATE CHARACTERISTICS PENTODE CONNECTION



OCT. 16, 1947

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92CM-4939R1



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OPERATION CHARACTERISTICS

 $E_f = 6.3$ VOLTS

PLATE VOLTS = 300

GRID-Nº 3 VOLTS = 0

CURVE	GRID-Nº 2 RESISTOR	GRID-Nº 2 SUPPLY VOLTS
1	0 MEG.	100
2	0.25 MEG.	300
3	0.5 MEG.	300
4	0.75 MEG.	300

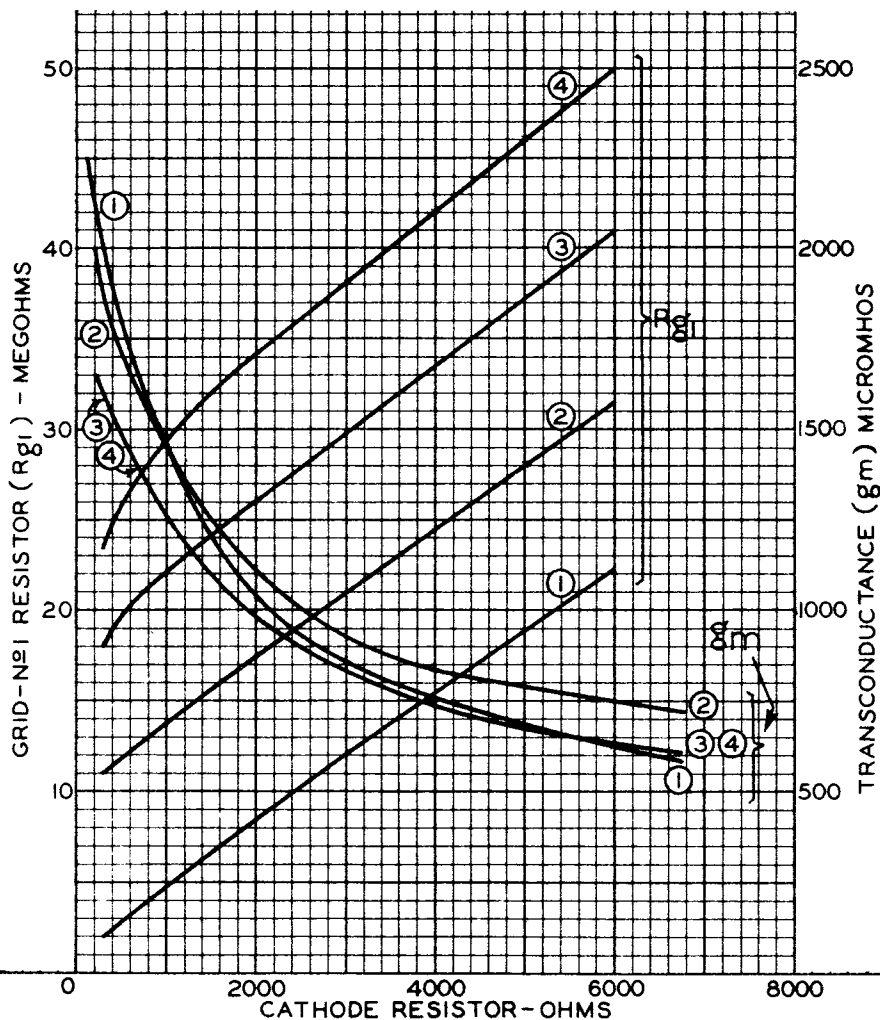
THESE CURVES ARE BASED ON THE FOLLOWING VALUES:
 $\Delta I_K = 300 \mu\text{AMP}$, $\Delta I_{g_1} = 0.1 \mu\text{AMP}$

EXPRESSING THESE VALUES AS A RATIO, WE HAVE:

$$\frac{\Delta I_K}{\Delta I_{g_1}} = \frac{300}{0.1} \text{ OR } 3000$$

FOR THOSE APPLICATIONS PERMITTING OTHER VALUES OF ΔI_K , A NEW RATIO OF $\Delta I_K / \Delta I_{g_1}$ CAN BE CALCULATED. THE VALUES OF R_{g_1} AS READ FROM THE CURVE MUST BE MULTIPLIED BY A FACTOR WHICH IS THE QUOTIENT OF THE NEW RATIO DIVIDED BY THE OLD RATIO. FOR EXAMPLE, IF THE NEW RATIO IS 6000 THE MULTIPLYING FACTOR IS $6000/3000$, OR 2, AND VALUES OF R_{g_1} AS READ FROM THE CURVE ARE THEREFORE MULTIPLIED BY 2.

NOTE: TRANSCONDUCTANCE CURVES WERE OBTAINED WITH GRID-Nº 2 RESISTOR AND CATHODE RESISTOR SUITABLY BYPASSED.



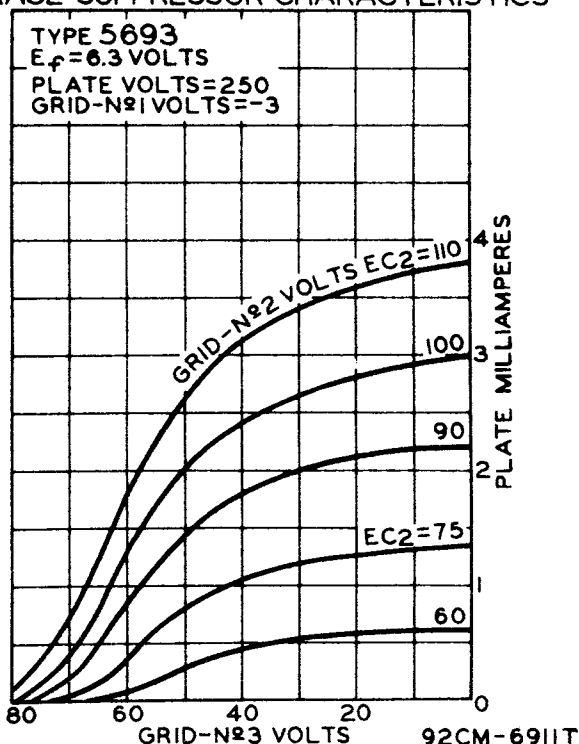
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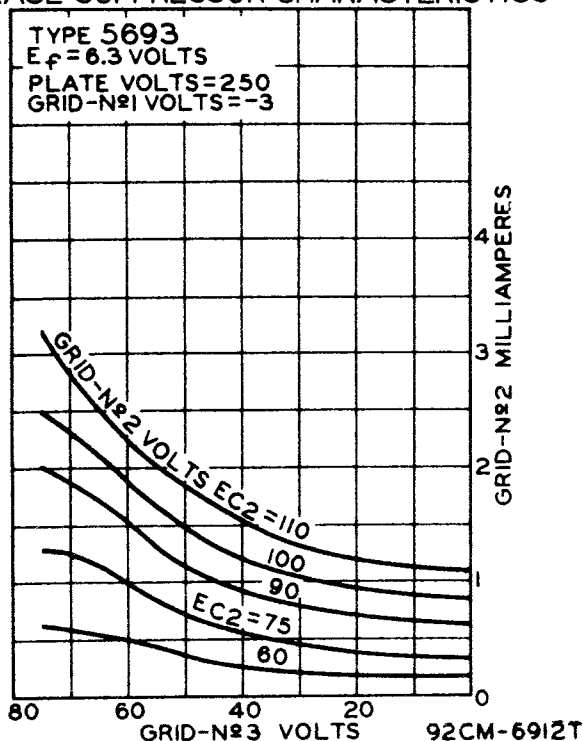
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SHARP-CUTOFF PENTODE

AVERAGE SUPPRESSOR CHARACTERISTICS



AVERAGE SUPPRESSOR CHARACTERISTICS



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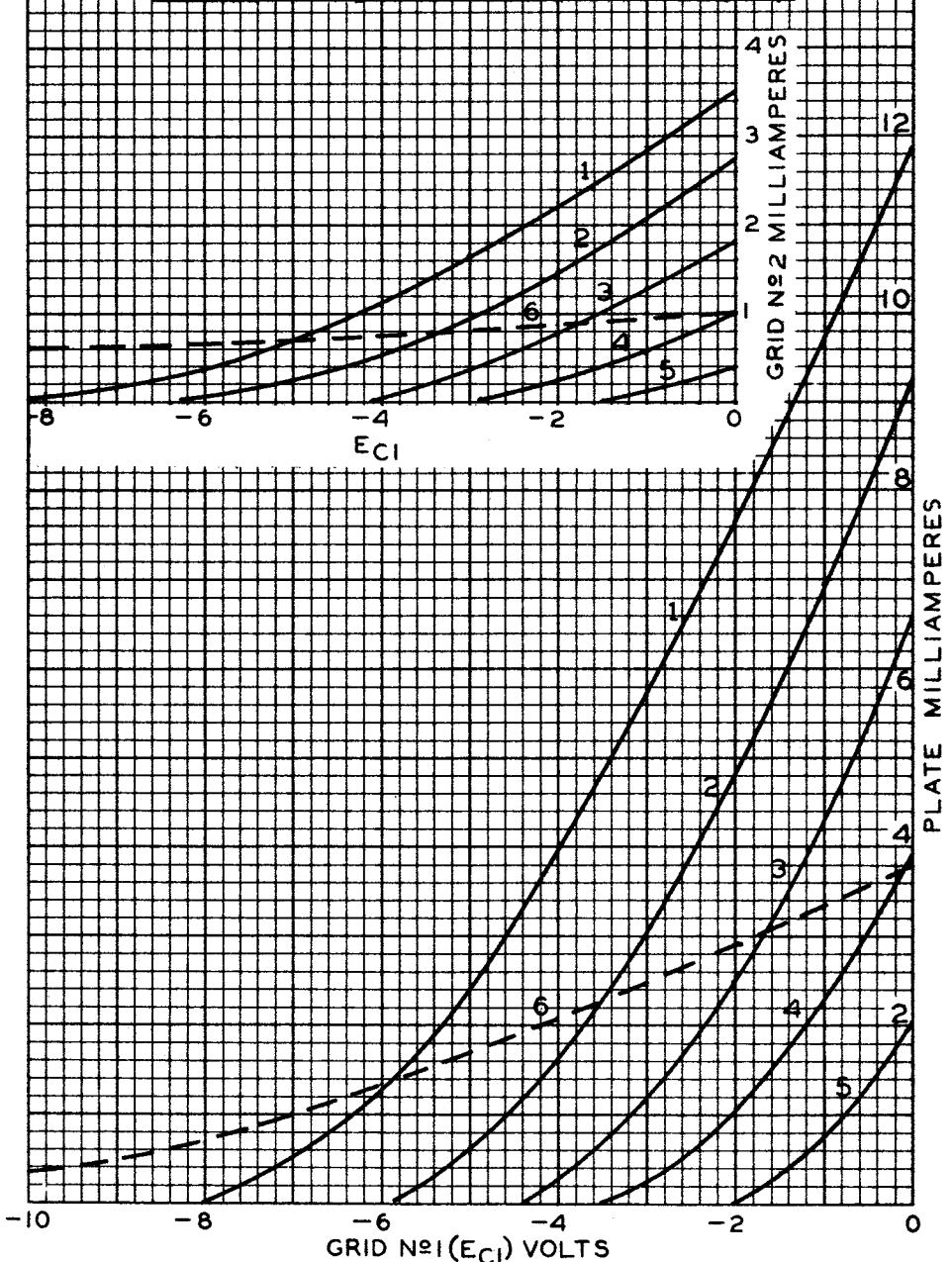
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AVERAGE CHARACTERISTICS
PENTODE CONNECTION $E_f = 6.3$ VOLTS

PLATE VOLTS = 300

GRID-Nº3 VOLTS = 0

CURVE	GRID-Nº2-SUPPLY VOLTS	SERIES GRID-Nº2 RESISTOR-OHMS
1	125	—
2	100	—
3	75	—
4	50	—
5	25	—
6	300	250000



MARCH 5, 1948

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92CM-6443RI

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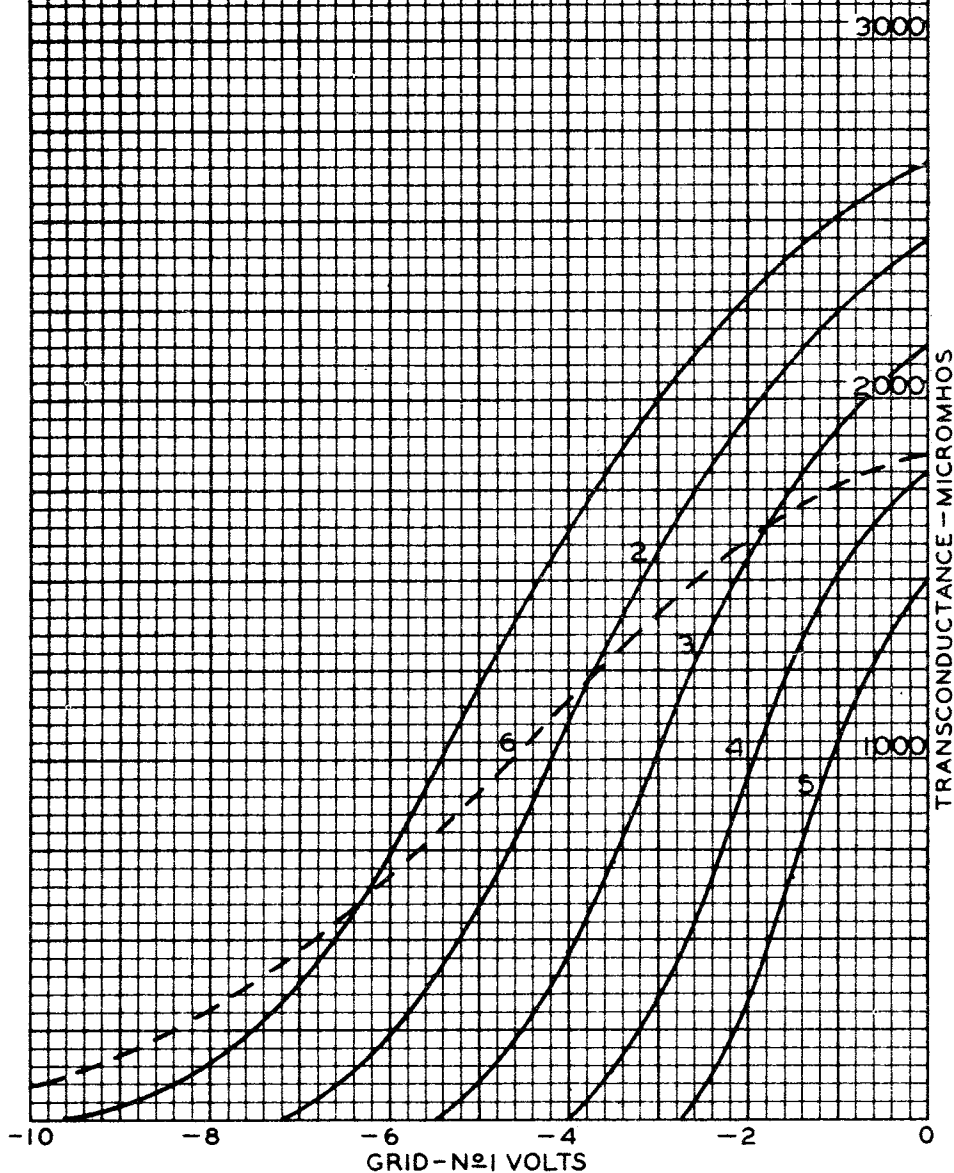
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AVERAGE CHARACTERISTICS
PENTODE CONNECTION $E_f = 6.3$ VOLTS

PLATE VOLTS = 300

GRID-Nº 3 VOLTS = 0

CURVE	GRID-Nº2-SUPPLY VOLTS	SERIES GRID-Nº2 RESISTOR-OHMS
1	125	—
2	100	—
3	75	—
4	50	—
5	25	—
6	300	250000



MARCH 5, 1948

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92CM-6444RI



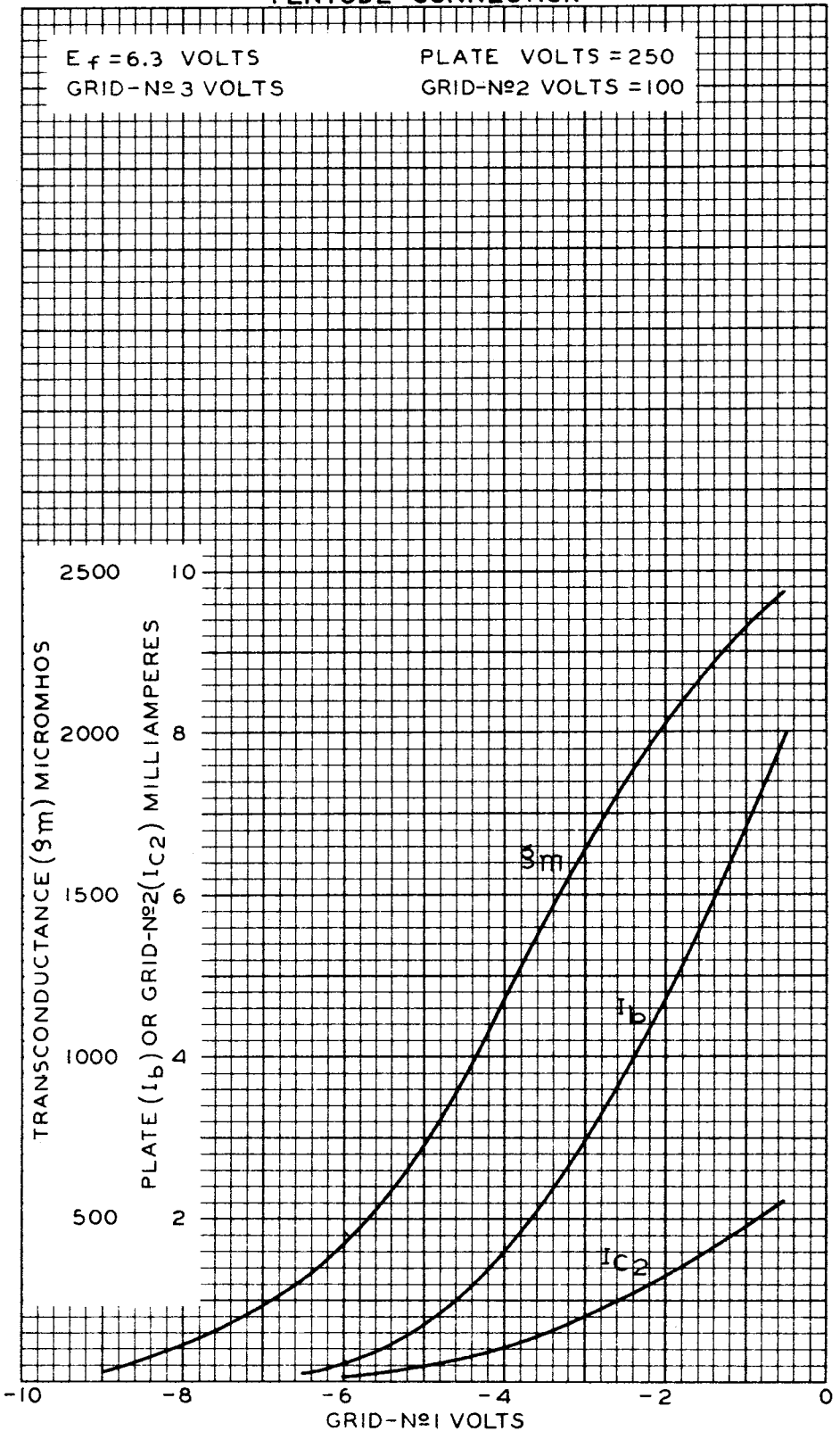
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AVERAGE CHARACTERISTICS PENTODE CONNECTION

$E_f = 6.3$ VOLTS
GRID-Nº3 VOLTS

PLATE VOLTS = 250
GRID-Nº2 VOLTS = 100



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