Electronic TUBES

807

BEAM PENTODE

FOR POWER AMPLIFIER, OSCILLATOR, AND MODULATOR APPLICATIONS

HIGH-POWER SENSITIVITY
75 WATTS CW INPUT (ICAS) UP TO 60 MEGACYCLES

ST-16
MEDIUM 5-PIN BASE

DESCRIPTION AND RATING

The 807 is a beam pentode for use as a radio-frequency power amplifier and oscillator or as an audio-frequency power amplifier and modulator. Featuring high power-sensitivity and high efficiency, the tube may be operated with full input up to 60 megacycles and with reduced input to 125 megacycles.

GENERAL

ELECTRICAL

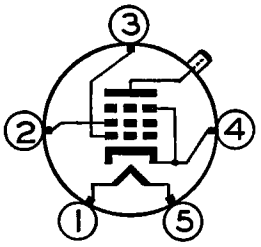
Cathode—Coated Unipotential		
Heater Voltage, AC or DC	6.3 ± 10%	Volts
Heater Current	0.9	Amperes
Direct Interelectrode Capacitances		
Grid-Number 1 to Plate, maximum*	0.2	μμf
Input	12	μμf
Output	7.0	μμf

*With external shield (RETMA 312) connected to cathode.

MECHANICAL

Mounting Position—Any
Envelope—ST-16, Glass
Base—A5-11, Medium 5-Pin Micanol
Top Cap—C1-1, Small

BASING DIAGRAM

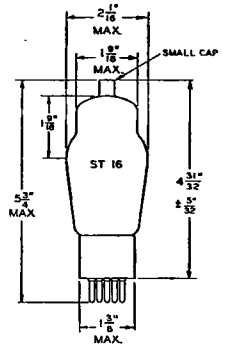


RETMA 5AW

TERMINAL CONNECTIONS

Pin 1—Heater
Pin 2—Grid Number 2 (Screen)
Pin 3—Grid Number 1
Pin 4—Cathode and Beam Plates
Pin 5—Heater
Cap—Plate

PHYSICAL DIMENSIONS



RETMA 16-2

GENERAL ELECTRIC

CHARACTERISTICS, MAXIMUM RATINGS, AND TYPICAL OPERATION

Average Characteristics

Plate Voltage	250	250	600	Volts
Screen Voltage	250	250	300	Volts
Grid-Number 1 Voltage	−20	−14	−29	Volts
Transconductance, approximate	....	6000	.....	Micromhos
Plate Current	....	.....	36	Milliamperes
Screen Current	....	.....	1.0	Milliamperes
Amplification Factor (Grid-Number 1 to Grid-Number 2)	8.0	.....	.....	

AUDIO-FREQUENCY POWER AMPLIFIER AND MODULATOR—CLASS AB_1†
Triode Connection—Screen Tied to Plate

Maximum Ratings, Absolute Values	**CCS‡**	**ICAS§**	
DC Plate Voltage	400	400	Volts
Maximum-Signal DC Plate Current¶	125	125	Milliamperes
Maximum-Signal Plate Input¶	50	50	Watts
Plate Dissipation¶	25	30	Watts
Peak Heater-Cathode Voltage			
Heater Positive with Respect to Cathode	135	135	Volts
Heater Negative with Respect to Cathode	135	135	Volts
Grid-Number 1 Circuit Resistanceϕ			
With Fixed Bias	0.1	0.1	Megohms
With Cathode Bias	0.5	0.5	Megohms

Typical Operation♥—Values for Two Tubes	**CCS‡**	**ICAS§**	
DC Plate Voltage	400	400	Volts
DC Grid-Number 1 Voltage	−45	−45	Volts
Peak AF Grid-Number 1-to-Grid-Number 1 Voltage▲	90	90	Volts
Zero-Signal DC Plate Current	60	60	Milliamperes
Maximum-Signal DC Plate Current	140	140	Milliamperes
Effective Plate-to-Plate Load Resistance	3000	3000	Ohms
Maximum-Signal Driving Power, approximate	0	0	Watts
Maximum-Signal Power Output, approximate	15	15	Watts

AUDIO-FREQUENCY POWER AMPLIFIER AND MODULATOR—CLASS AB_1†

Maximum Ratings, Absolute Values	**CCS‡**	**ICAS§**	
DC Plate Voltage	600	750	Volts
DC Screen Voltage	300	300	Volts
Maximum-Signal DC Plate Current¶	120	120	Milliamperes
Maximum-Signal Plate Input¶	60	90	Watts
Maximum-Signal Screen Input¶	3.5	3.5	Watts
Plate Dissipation¶	25	30	Watts
Peak Heater-Cathode Voltage			
Heater Positive with Respect to Cathode	135	135	Volts
Heater Negative with Respect to Cathode	135	135	Volts
Grid-Number 1 Circuit Resistance			
With Fixed Bias	0.1	0.1	Megohms
With Cathode Bias	Not Recommended	Not Recommended	

Typical Operation, Values for Two Tubes		**CCS‡**		**ICAS§**	
DC Plate Voltage	400	500	600	750	Volts
DC Screen Voltage♠	300	300	300	300	Volts
DC Grid-Number 1 Voltage					
From Fixed Bias Source	−30	−32	−34	−35	Volts
Peak AF Grid-Number 1-to-Grid-Number 1 Voltage	60	64	68	70	Volts
Zero-Signal DC Plate Current	56	44	36	30	Milliamperes
Maximum-Signal DC Plate Current	143	141	139	139	Milliamperes
Zero-Signal DC Screen Current	2.0	1.0	0.6	0.5	Milliamperes
Maximum-Signal DC Screen Current	16	15	15	16	Milliamperes
Effective Plate-to-Plate Load Resistance	6800	8200	10,000	12,000	Ohms
Maximum-Signal Driving Power, approximate	0	0	0	0	Watts
Maximum-Signal Power Output, approximate	36	46	56	72	Watts

CHARACTERISTICS, MAXIMUM RATINGS, AND TYPICAL OPERATION (Continued)

AUDIO-FREQUENCY POWER AMPLIFIER AND MODULATOR—CLASS AB_2**

Maximum Ratings, Absolute Values	CCS‡	ICAS§	
DC Plate Voltage	600	750	Volts
DC Screen Voltage	300	300	Volts
Maximum-Signal DC Plate Current¶	120	120	Milliamperes
Maximum-Signal Plate Input¶	60	90	Watts
Maximum-Signal Screen Input¶	3.5	3.5	Watts
Plate Dissipation¶	25	30	Watts
Peak Heater-Cathode Voltage			
Heater Positive with Respect to Cathode	135	135	Volts
Heater Negative with Respect to Cathode	135	135	Volts
Grid-Number 1 Circuit Resistanceϕ			
With Fixed Bias	30,000	30,000	Ohms
With Cathode Bias	Not Recommended	Not Recommended	

Typical Operation, Values for Two Tubes		CCS‡		ICAS§	
DC Plate Voltage	400	500	600	750	Volts
DC Screen Voltage ♠	300	300	300	300	Volts
DC Grid-Number 1 Voltage					
From Fixed Bias Source	−28	−30	−32	−35	Volts
Peak AF Grid-Number 1-to-Grid-Number 1 Voltage	80	86	90	96	Volts
Zero-Signal DC Plate Current	72	60	48	30	Milliamperes
Maximum-Signal DC Plate Current	240	240	200	240	Milliamperes
Zero-Signal DC Screen Current	2.0	0.9	0.7	0.5	Milliamperes
Maximum-Signal DC Screen Current	20	20	18	20	Milliamperes
Effective Plate-to-Plate Load Resistance	3700	4600	6900	7300	Ohms
Maximum-Signal Driving Power, approximate††	0.2	0.2	0.1	0.2	Watts
Maximum-Signal Power Output, approximate‡‡	55	75	80	120	Watts

RADIO-FREQUENCY POWER AMPLIFIER—CLASS B TELEPHONY

Carrier Conditions per Tube for Use with a Maximum Modulation Factor of 1.0

Maximum Ratings, Absolute Values	CCS‡	ICAS§	
DC Plate Voltage	600	750	Volts
DC Screen Voltage	300	300	Volts
DC Plate Current	80	90	Milliamperes
Plate Input	37.5	45	Watts
Screen Input	2.5	2.5	Watts
Plate Dissipation	25	30	Watts
Peak Heater-Cathode Voltage			
Heater Positive with Respect to Cathode	135	135	Volts
Heater Negative with Respect to Cathode	135	135	Volts
Grid-Number 1 Circuit Resistanceϕ	30,000	30,000	Ohms

Typical Operation		CCS‡		ICAS§	
DC Plate Voltage	400	500	600	750	Volts
DC Screen Voltage	300	300	300	300	Volts
DC Grid-Number 1 Voltage§§	−40	−40	−40	−40	Volts
Peak RF Grid-Number 1 Voltage	40	38	36	35	Volts
DC Plate Current	75	70	62.5	60	Milliamperes
DC Screen Current	5.0	4.0	4.0	3.0	Milliamperes
DC Grid-Number 1 Current, approximate	0	0	0	0	Milliamperes
Driving Power, approximate¶¶	0.4	0.3	0.2	0.2	Watts
Power Output, approximate	9.0	11	12.5	15	Watts

CHARACTERISTICS, MAXIMUM RATINGS, AND TYPICAL OPERATION (Continued)

PLATE-MODULATED RADIO-FREQUENCY POWER AMPLIFIER—CLASS C TELEPHONY

Carrier Conditions per Tube for Use with a Maximum Modulation Factor of 1.0

Maximum Ratings, Absolute Values	CCS‡	ICAS§	
DC Plate Voltage	475	600	Volts
DC Screen Voltage	300	300	Volts
DC Grid-Number 1 Voltage	−200	−200	Volts
DC Plate Current	83	100	Milliamperes
DC Grid-Number 1 Current	5.0	5.0	Milliamperes
Plate Input	40	60	Watts
Screen Input	2.5	2.5	Watts
Plate Dissipation	16.5	25	Watts
Peak Heater-Cathode Voltage			
Heater Positive with Respect to Cathode	135	135	Volts
Heater Negative with Respect to Cathode	135	135	Volts
Grid-Number 1 Circuit Resistance$\phi\phi$	30,000	30,000	Ohms

Typical Operation		CCS‡		ICAS§	
DC Plate Voltage	325	400	475	600	Volts
DC Screen Voltage▼▼	250	250	250	300	Volts
From a Series Resistor of	12,500	25,000	28,000	37,500	Ohms
DC Grid-Number 1 Voltage ▲▲	−75	−75	−85	−85	Volts
From a Grid Resistor of	21,400	21,400	21,200	21,200	Ohms
Peak RF Grid-Number 1 Voltage	95	95	108	107	Volts
DC Plate Current	80	80	83	100	Milliamperes
DC Screen Current	6.0	6.0	8.0	8.0	Milliamperes
DC Grid-Number 1 Current, approximate	3.5	3.5	4.0	4.0	Milliamperes
Driving Power, approximate	0.3	0.3	0.4	0.4	Watts
Power Output, approximate	17	22	28	44	Watts

RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR—CLASS C TELEGRAPHY## AND RADIO-FREQUENCY POWER AMPLIFIER—CLASS C FM TELEPHONY

Maximum Ratings, Absolute Values	CCS‡	ICAS§	
DC Plate Voltage	600	750	Volts
DC Screen Voltage	300	300	Volts
DC Grid-Number 1 Voltage	−200	−200	Volts
DC Plate Current	100	100	Milliamperes
DC Grid-Number 1 Current	5.0	5.0	Milliamperes
Plate Input	60	75	Watts
Screen Input	3.5	3.5	Watts
Plate Dissipation	25	30	Watts
Peak Heater-Cathode Voltage			
Heater Positive with Respect to Cathode	135	135	Volts
Heater Negative with Respect to Cathode	135	135	Volts
Grid-Number 1 Circuit Resistance$\phi\phi$	30,000	30,000	Ohms

Typical Operation		CCS‡		ICAS§	
DC Plate Voltage	400	500	600	750	Volts
DC Screen Voltage***	250	250	250	250	Volts
From a Series Resistor of	19,000	31,000	44,000	62,000	Ohms
DC Grid-Number 1 Voltage†††	−45	−45	−45	−45	Volts
From a Grid Resistor of	11,200	11,200	11,200	11,200	Ohms
From a Cathode Resistor of	400	400	400	400	Ohms
Peak RF Grid-Number 1 Voltage	65	65	65	65	Volts
DC Plate Current	100	100	100	100	Milliamperes
DC Screen Current	8.0	8.0	8.0	8.0	Milliamperes
DC Grid-Number 1 Current, approximate	4.0	4.0	4.0	4.0	Milliamperes
Driving Power, approximate	0.3	0.3	0.3	0.3	Watts
Power Output, approximate	25	32	40	54	Watts

Maximum Ratings, Operating Frequency

Maximum ratings apply up to 60 megacycles. The tube may be operated at higher frequencies provided the maximum values of plate voltage and power input are reduced according to the tabulation below (other maximum ratings are the same as shown above). Special attention should be given to adequate ventilation of the bulb at these frequencies.

Frequency	60	80	125	Megacycles
Percentage of Maximum Rated Plate Voltage and Plate Input				
Class B	100	90	75	Percent
Class C, plate modulated	100	80	55	Percent
Class C, unmodulated	100	80	55	Percent

† Subscript 1 indicates that grid-number 1 current does not flow during any part of the input cycle.
‡ Continuous Commercial Service.
§ Intermittent Commercial and Amateur Service.
¶ Averaged over any audio-frequency cycle of sine-wave form.
ϕ The type of input-coupling network used should not introduce too much resistance in the grid-number 1 circuit. Transformer or impedance coupling devices are recommended.
♥ In class AB_1 service, the normal design limitation is the requirement that grid-number 1 current should not flow. For this reason, the typical operating values shown for both CCS and ICAS conditions are the same.
▲ The driver stage should be capable of supplying the number 1 grids of the class AB_1 stage with the specified driving voltage at low distortion.
♠ Preferably obtained from a separate source or from the plate-voltage supply with a voltage divider.
** Subscript 2 indicates that grid-number 1 current flows during some part of the input cycle.
†† Driver stage should be capable of supplying the specified driving power at low distortion to the number 1 grids of the class AB_2 stage. The effective resistance per grid-number 1 circuit of the class AB_2 stage should be kept below 500 ohms and the effective impedance should not exceed 700 ohms at the highest response frequency.
‡‡ With zero-impedance driver and perfect regulation, plate-circuit distortion does not exceed 2 percent. In practice, the regulation of the plate voltage, screen voltage, and grid-number 1 voltage should not be greater than 5 percent, 5 percent, and 3 percent, respectively.
§§ Use of a fixed supply or bypassed cathode resistor is recommended.
¶¶ At crest of audio-frequency cycle with a modulation factor of 1.0.
$\phi\phi$ When grid-number 1 is driven positive, the total d-c grid-number 1 circuit resistance should not exceed 30,000 ohms. If this value is insufficient to provide adequate bias, the additional required bias must be supplied by a cathode resistor or fixed supply.
♥♥ Obtained preferably from a separate source modulated along with the plate supply, or from the modulated plate supply through a series resistor as indicated.
▲▲ Obtained from a grid-number 1 resistor as indicated or from a combination of grid-number 1 resistor with either fixed supply or cathode resistor.
Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 percent of the carrier conditions.
*** Obtained preferably from a separate source, or from the plate-supply voltage with a voltage divider, or through a series resistor. A series grid-number 2 resistor should be used only when the 807 is used in a circuit which is not keyed. Grid-number 2 voltage must not exceed 400 volts under key-up conditions.
††† Obtained from fixed supply, by grid-number 1 resistor, by cathode resistor, or by combination methods.

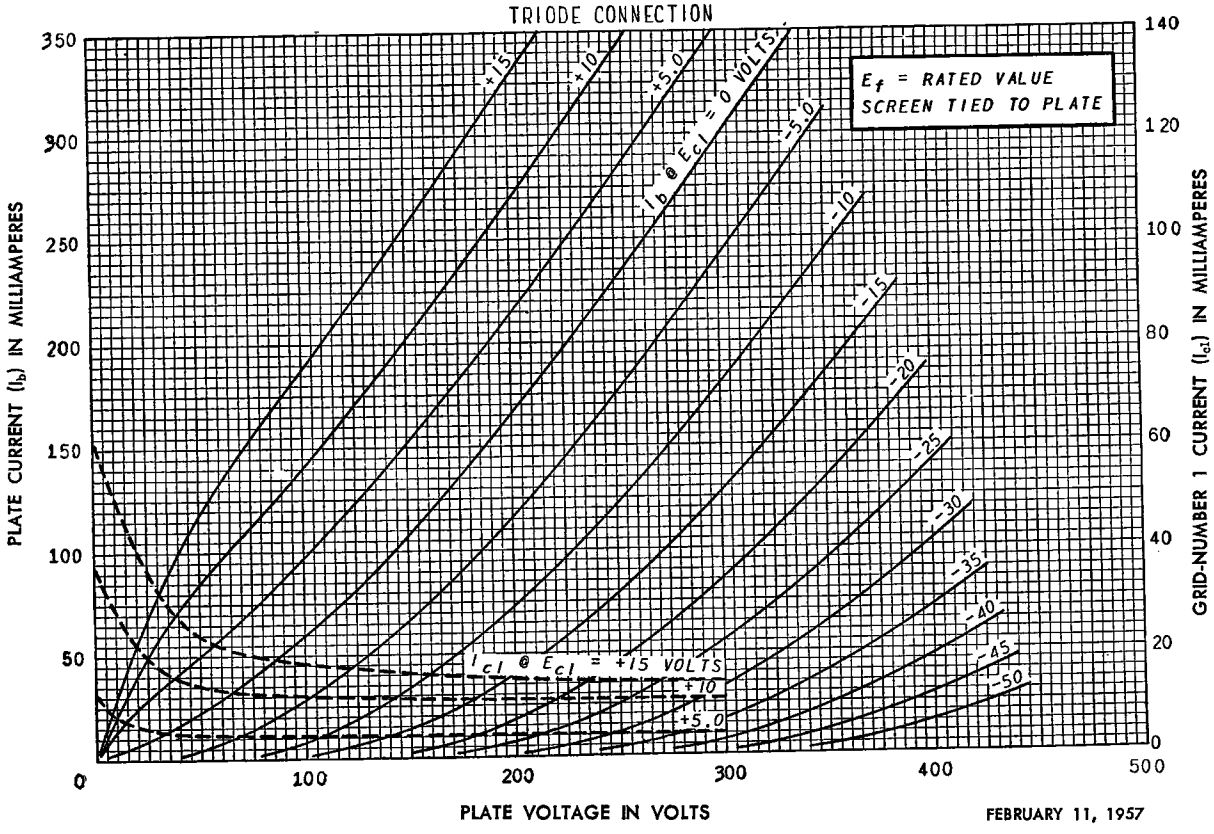
INITIAL CHARACTERISTICS LIMITS

	Minimum	Maximum	
Heater Current			
Ef = 6.3 volts	810	990	Milliamperes
Plate Current			
Ef = 6.3 volts, Eb = 600 volts, Ec2 = 300 volts, Ec1 = −29 volts	24	48	Milliamperes
Screen Current			
Ef = 6.3 volts, Eb = 600 volts, Ec2 = 300 volts, Ec1 = −29 volts	....	4.0	Milliamperes
RF Power Output			
Ef = 6.3 volts, Eb = 600 volts, Ec2 = 300 volts, Ib = 100 ma maximum, Ic1 = 5 to 7 ma, Rg1 = 10,000 ohms, Frequency = 15 mc	33	....	Watts
Plate Current Cutoff			
Ef = 6.3 volts, Eb = 600 volts, Ec2 = 300 volts, Ec1 = −100 volts ..... Initial	....	0.5	Milliamperes
Interelectrode Capacitances			
Grid-Number 1 to Plate (g1 to p) ..... Initial	....	0.2	$\mu\mu$f
Input (g1 to h, k, g2) ..... Initial	10	14	$\mu\mu$f
Output (p to h, k, g2) ..... Initial	5.3	8.7	$\mu\mu$f

Measured without external shield except g1 to p which is measured with external shield (RETMA 312) connected to cathode.

AVERAGE PLATE CHARACTERISTICS

TRIODE CONNECTION



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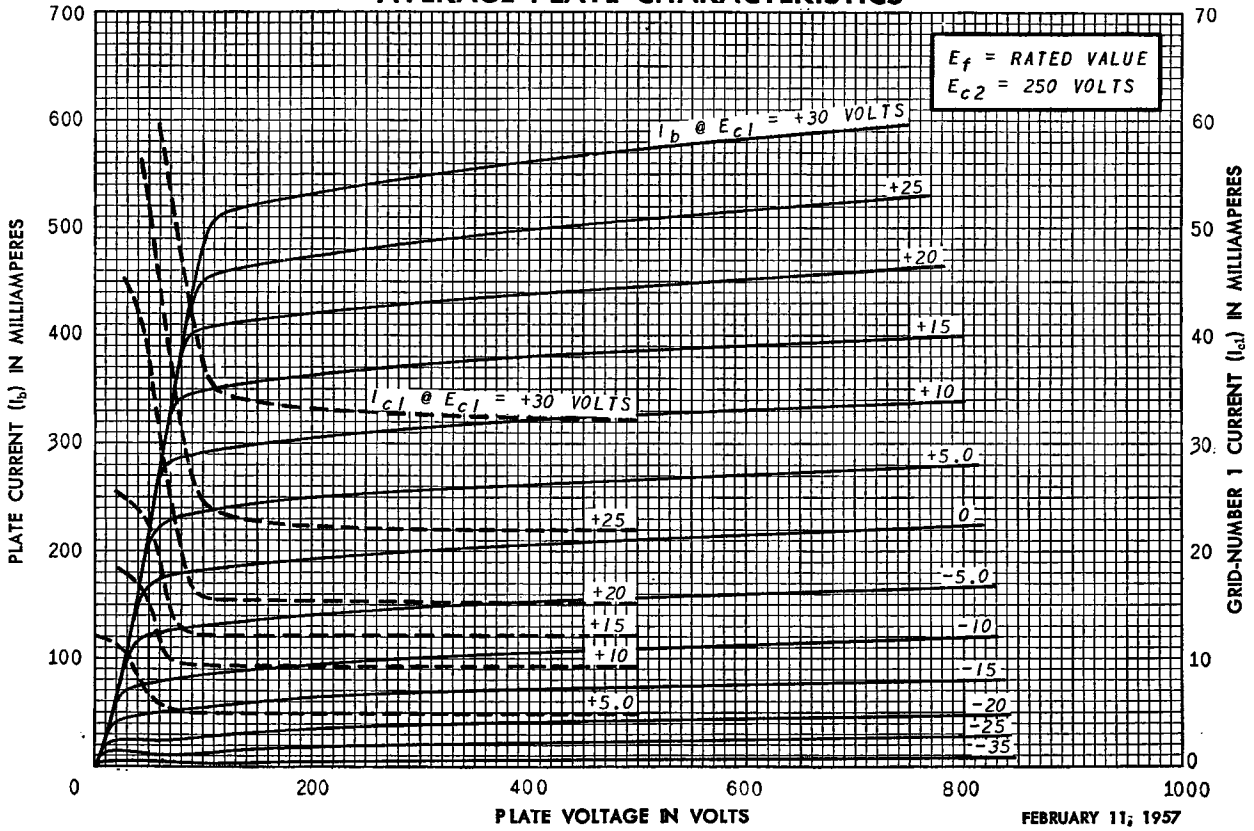
AVERAGE PLATE CHARACTERISTICS



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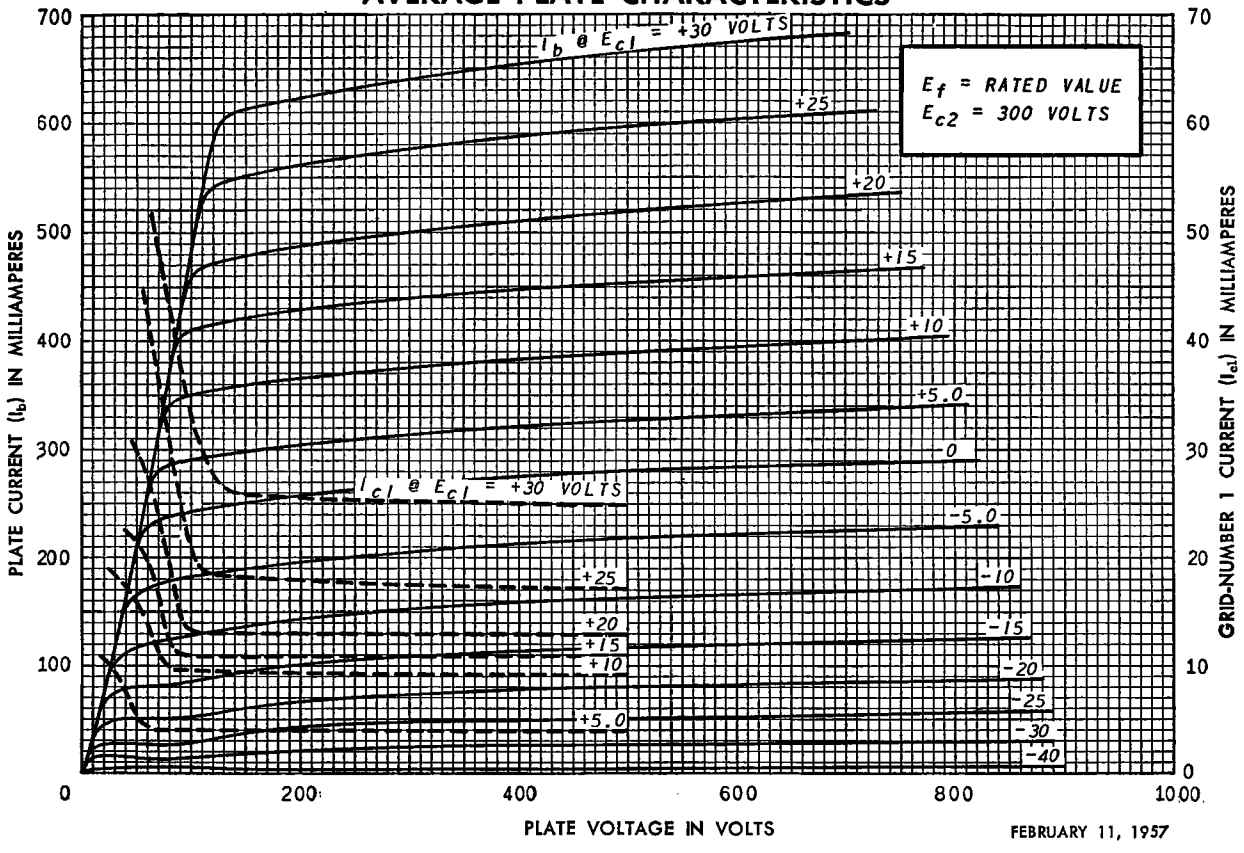

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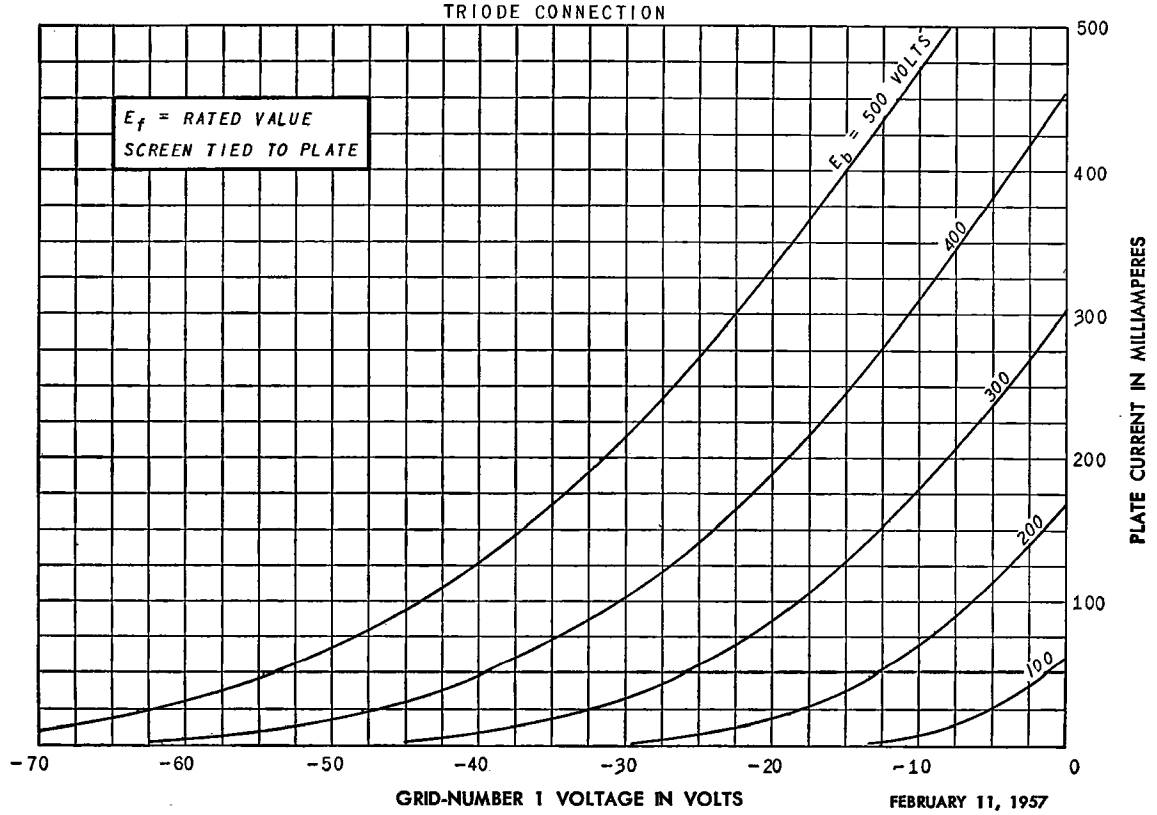
AVERAGE TRANSFER CHARACTERISTICS

TRIODE CONNECTION



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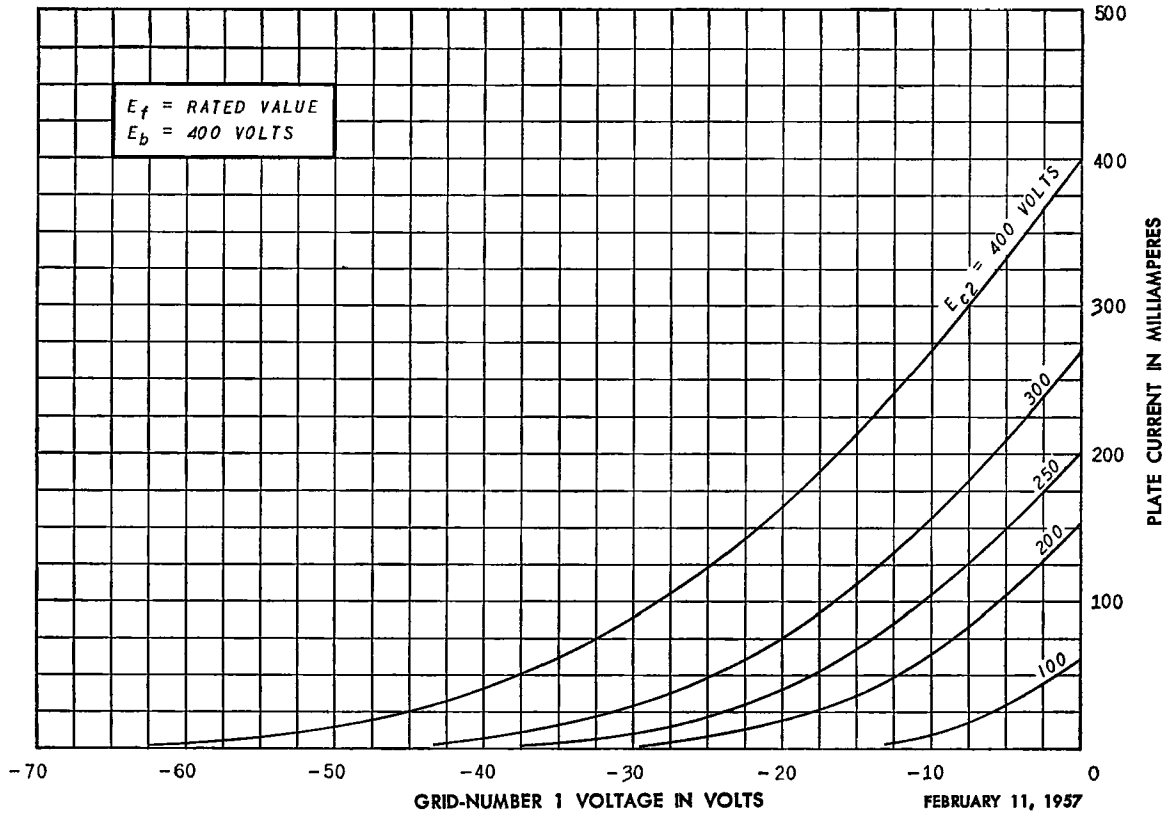

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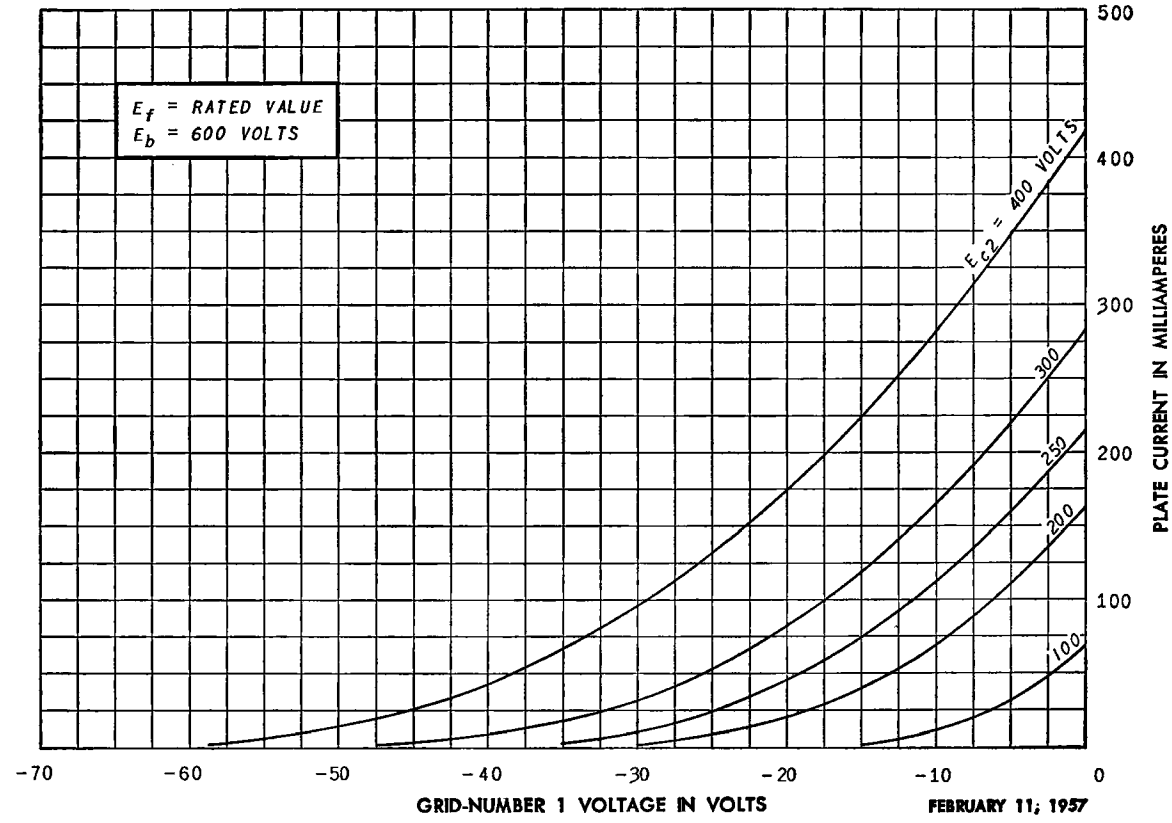

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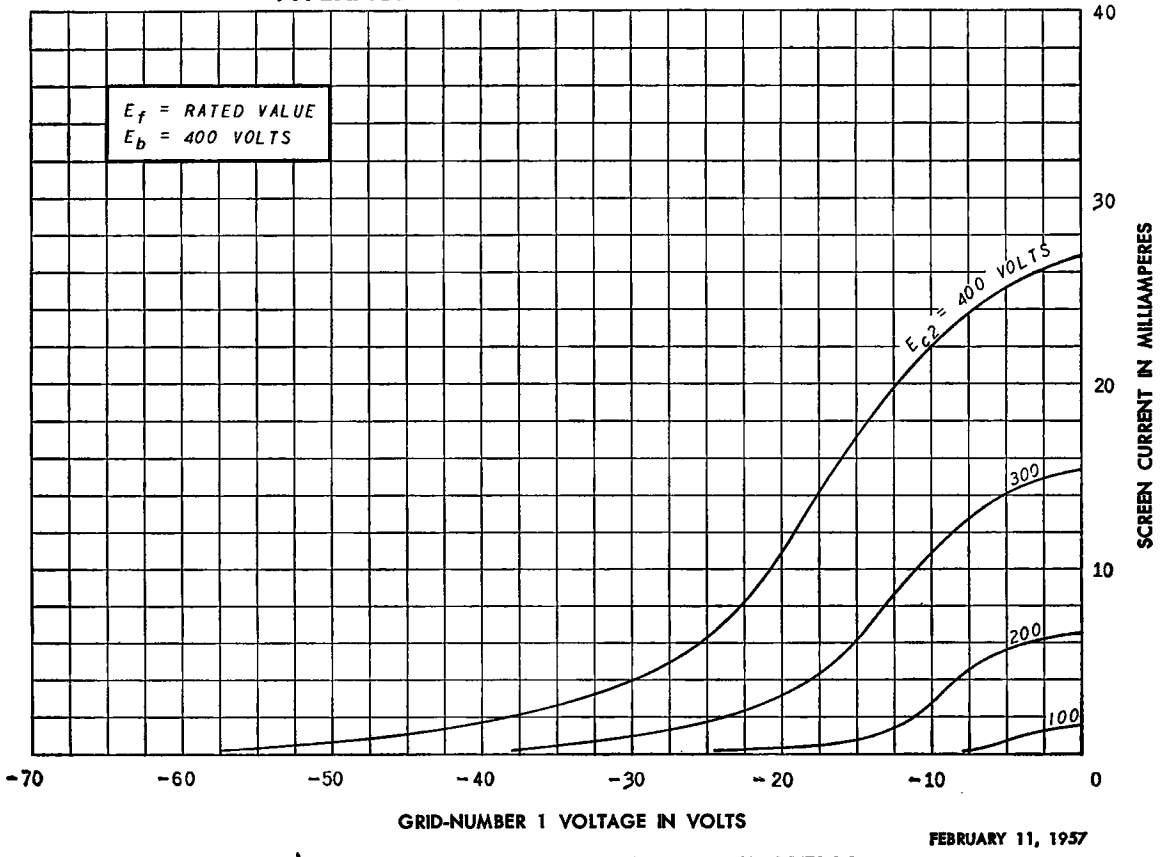

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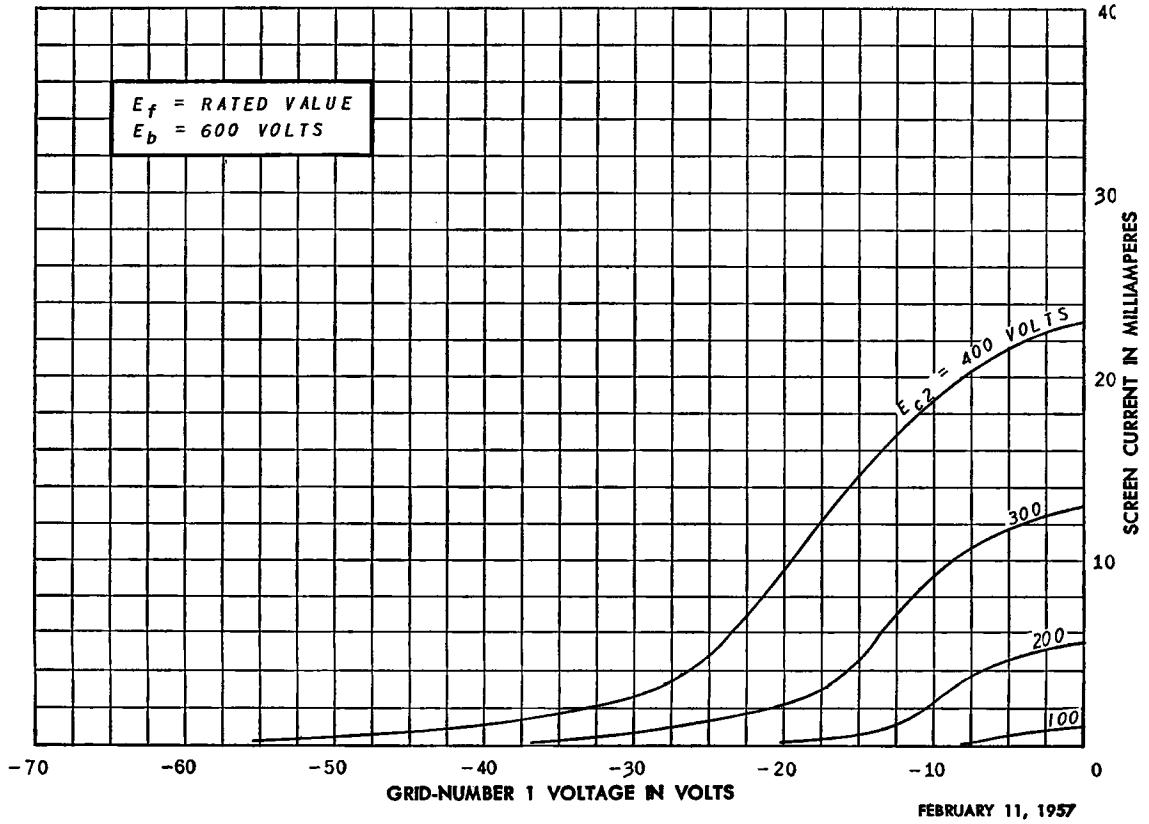

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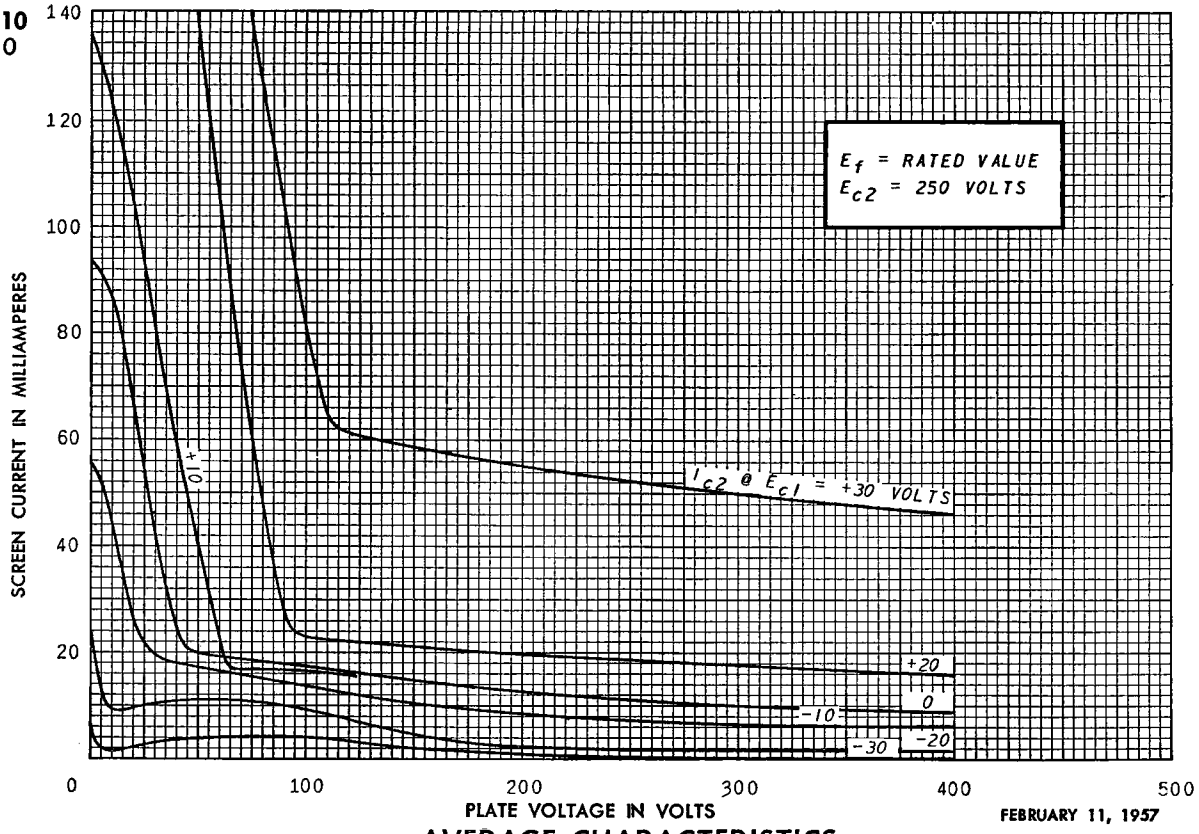

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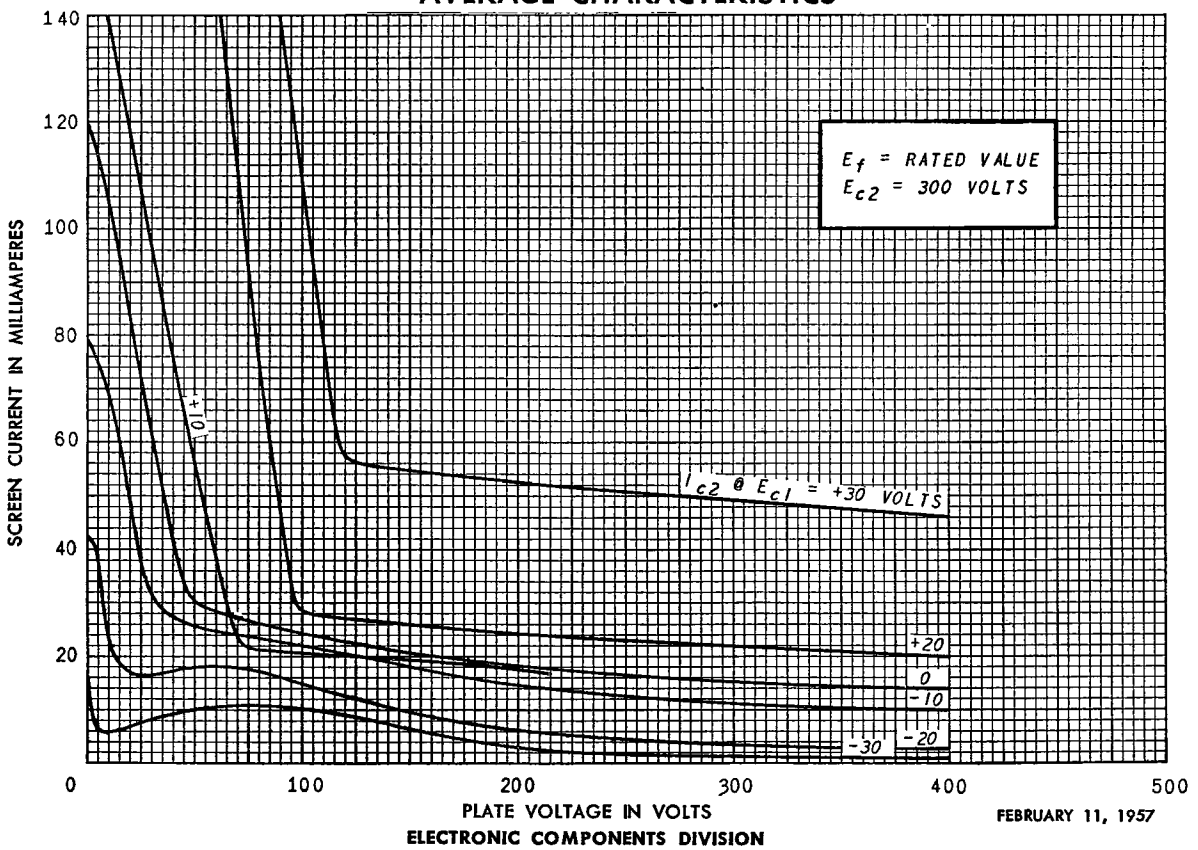

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ELECTRONIC COMPONENTS DIVISION

GENERAL ELECTRIC

Schenectady 5, N. Y.