

# 5868 Power Triode



The Penta Laboratories 5868 is a radiation cooled, medium-mu power triode designed for use as an audio frequency power amplifier, grounded grid rf power amplifier and oscillator, or industrial oscillator.

## General Characteristics

### Electrical

Filament.....	Thoriated Tungsten	
Filament Voltage.....	10	Volts
Filament Current.....	9.9	Amperes
Amplification Factor.....	28	
Transconductance (I <sub>b</sub> =0.125 Amps).....	4500	micromhos
Peak Cathode Current <sup>1</sup> .....	5	Amperes
Direct Interelectrode Capacitances		
Input.....	8.0	pF
Output.....	0.17	pF
Grid to Plate.....	7.0	pF

### Mechanical

Maximum Overall Dimensions		
Length.....	213.12	millimeters
Diameter.....	118.3	millimeters
Mounting Position.....	Any	
Maximum Temperatures		
Bottom Seals.....	180°	C
Plate Seal.....	220°	C
Bulb.....	250°	C
Cooling Air-Flow to Base <sup>2</sup> .....	25	cfm
Net Weight.....	420	grams
Socket.....	PSK5868	
Plate Connector.....	PSK350C	

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**P E N T A   L A B O R A T O R I E S**  
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ELECTRON TUBES FOR INDUSTRY



# 5868 Power Triode

## Maximum Ratings and Typical Operating Conditions

### Audio Frequency Power Amplifier or Modulator Class B

#### Absolute Maximum Ratings

DC Plate Voltage .....	4000	Volts
DC Cathode Current <sup>3</sup> .....	0.7	Amperes
Plate Dissipation <sup>3</sup> .....	450	Watts
Grid Dissipation .....	50	Watts
Grid Current.....	0.13	Amperes
Grid Resistance.....	50,000	Ohms

#### Typical Operation

Values for two tubes unless stated otherwise

DC Plate Voltage .....	4000	3500	3000	2500	Volts
DC Grid Voltage.....	-135	-114	-94	-75	Volts
Peak AF Grid to Grid Voltage .....	566	563	560	530	Volts
Zero Signal DC Plate Current (per tube) .....	70	70	70	70	milliamperes
Maximum Signal DC Plate Current.....	0.74	0.88	1.00	1.11	Amperes
Maximum Signal DC Grid Current (per tube) .....	93	115	130	126	milliamperes
Effective Load Resistance, Plate to Plate.....	14,500	10,200	7500	5200	Ohms
Maximum Signal Driving Power.....	49	58	66	60	Watts
Harmonic Distortion .....	5.0	5.0	5.0	3.5	Percent
Maximum Signal Power Output.....	2290	2440	2310	2000	Watts
Zero Signal Plate Input (per tube) .....	280	245	210	175	Watts
Maximum Signal Plate Input (per tube) .....	1474	1550	1500	1387	Watts
Zero Signal Plate Dissipation (per tube).....	280	245	210	175	Watts
Maximum Signal Plate Dissipation (per tube).....	329	330	345	387	Watts
Efficiency .....	78	79	77	72	Percent

#### Plate Modulated RF Power Amplifier

Class C - Telephony

Carrier conditions per tube for use with a maximum modulation factor of 1.0

#### Absolute Maximum Ratings

Frequency.....	100	MHz
DC Plate Voltage .....	3000	Volts
DC Grid Voltage.....	-500	Volts
DC Plate Current .....	0.45	Amperes
DC Grid Current.....	115	milliamperes
Plate Input .....	1400	Watts
Plate Dissipation.....	300	Watts
Grid Dissipation .....	50	Watts
Cathode Current.....	0.55	Amperes



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## Typical Operating Conditions

DC Plate Voltage .....	3000	Volts
DC Grid Voltage.....	-375	Volts
Peak RF Grid Voltage.....	580	Volts
DC Plate Current .....	0.45	Amperes
DC Grid Current.....	85	milliamperes
Driving Power .....	42	Watts
Plate Power Output .....	1050	Watts
Plate Input .....	1350	Watts
Plate Dissipation.....	300	Watts
Efficiency .....	78	Percent
Modulation Factor.....	100	Percent
Modulation Power.....	675	Watts

## RF Power Amplifier and Oscillator

Class C - Telegraphy

Key-down conditions per tube without modulation<sup>4</sup>

## Absolute Maximum Ratings

Frequency.....	100	MHz
DC Plate Voltage .....	4000	Volts
DC Grid Voltage.....	-500	Volts
DC Cathode Current.....	0.65	Amperes
DC Grid Current.....	115	milliamperes
Grid Dissipation .....	50	Watts
Plate Dissipation.....	450	Watts

## Typical Operation Amplifier

DC Plate Voltage .....	4000	3500	3000	2500	Volts
DC Grid Voltage.....	-350	-300	-250	-200	Volts
DC Plate Current .....	0.54	0.54	0.54	0.54	Amperes
DC Grid Current.....	115	115	115	115	milliamperes
Peak RF Grid Voltage.....	580	520	460	405	Volts
Driving Power .....	60	54	48	42	Watts
Plate Input Power .....	2140	1880	1600	1340	Watts
Plate Dissipation.....	450	450	425	390	Watts
Plate Power Output .....	1690	1430	1175	950	Watts
Efficiency .....	79	76	74	71	Percent



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## Oscillator

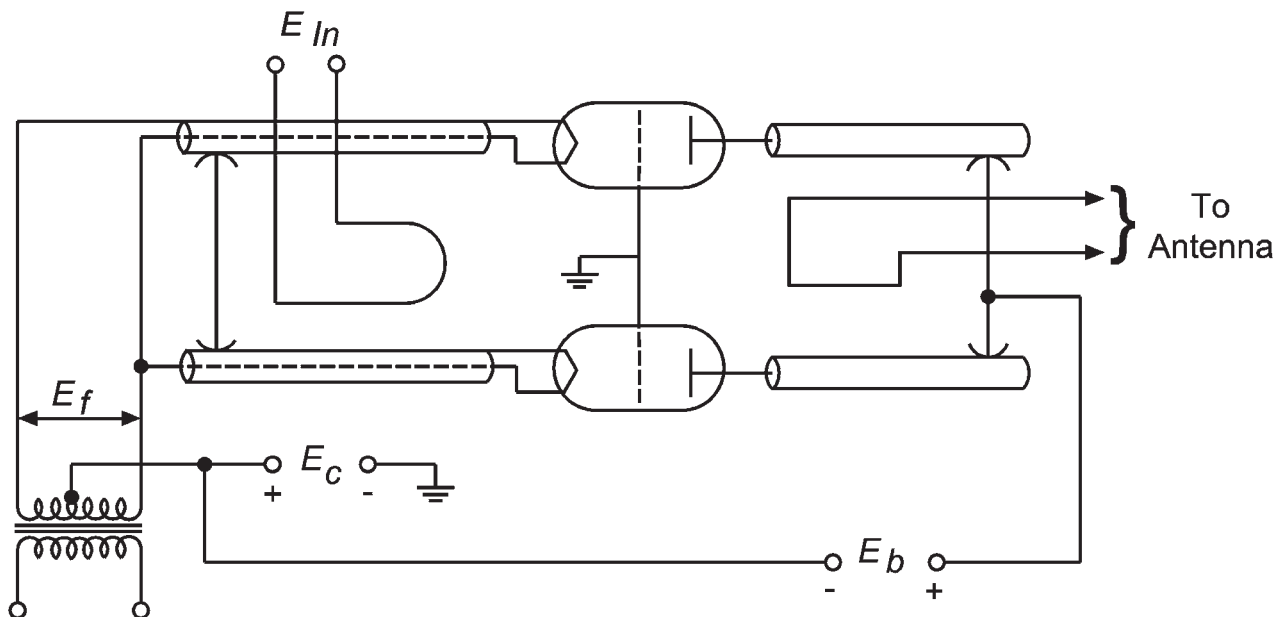
DC Plate Voltage .....	4000	3500	3000	2500	Volts
DC Grid Voltage.....	-350	-300	-250	-200	Volts
DC Plate Current .....	0.54	0.54	0.54	0.54	Amperes
DC Grid Current.....	115	115	115	115	milliamperes
Peak RF Grid Voltage.....	580	520	460	405	Volts
Driving Power .....	60	54	48	42	Watts
Grid Resistor.....	3000	2600	2200	1800	Ohms
Plate Input Power .....	2140	1880	1600	1340	Watts
Plate Dissipation.....	450	450	425	390	Watts
Plate Power Output .....	1630	1376	1127	908	Watts
Efficiency .....	77	73	71	68	Percent

## HF Class C Telephony

Ground Grid Circuit

For frequencies up to 100 MHz, two tubes in push-pull

Plate Voltage .....	4000	3500	3000	2500	Volts
Grid Voltage.....	-350	-300	-250	-200	Volts
Plate Current (per tube).....	0.535	0.535	0.535	0.535	Amperes
Grid Current.....	115	115	115	115	milliamperes
Peak RF Grid Voltage.....	580	520	460	405	Volts
Driving Power (per tube).....	320	274	248	212	Watts
Power Input (per tube).....	2140	1880	1600	1340	Watts
Plate Dissipation (per tube) .....	450	450	425	390	Watts
Power Output <sup>5</sup> .....	3900	3300	2750	2240	Watts
Plate Efficiency .....	79	76	74	71	Percent





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## Class C Oscillator Self-Rectified, Industrial Application

### Absolute Maximum Ratings

For Frequencies up to 100 MHz

Transformer Secondary Voltage (RMS) .....	4500	Volts
Grid Voltage <sup>6</sup> .....	-500	Volts
Plate Current <sup>6</sup> .....	0.28	Amperes
Grid Current <sup>6</sup> .....	55	milliamperes
Plate Power Input .....	1450	Watts
Plate Dissipation .....	450	Watts
Grid Dissipation .....	50	Watts

### Typical Operation

Transformer Secondary Voltage (RMS) .....	4500 <sup>7</sup>	3800 <sup>8</sup>	Volts
Plate Current <sup>6</sup> .....	0.28	0.24	Amperes
Grid Current .....	55	47	milliamperes
Grid Leak Resistance .....	3400	3400	Ohms
Plate Power Input .....	1400	1010	Watts
Plate Dissipation .....	350	295	Watts
Plate Power Output .....	1000	670	Watts
Efficiency .....	72	66	Percent

## Class C Oscillator

Rectified, Unfiltered, Single Phase, Full-Wave Plate Supply

### Absolute Maximum Ratings

For Frequencies up to 100 MHz

Plate Voltage <sup>6</sup> .....	3600	Volts
Grid Voltage <sup>6</sup> .....	-320	Volts
Plate Current <sup>6</sup> .....	0.48	Amperes
Grid Current .....	100	milliamperes
Plate Power Input .....	2200	Watts
Plate Dissipation .....	450	Watts
Grid Dissipation .....	50	Watts

### Typical Operation

Transformer Secondary Voltage (RMS) .....	4500 <sup>7</sup>	3500 <sup>8</sup>	Volts
Plate Voltage <sup>6</sup> .....	3600	3000	Volts
Plate Current .....	0.45	0.4	Amperes
Grid Current .....	100	85	milliamperes
Grid Leak Resistance .....	3000	3000	Ohms
Plate Power Input .....	2000	1480	Watts
Plate Dissipation .....	450	400	Watts
Plate Power Output .....	1500	1040	Watts
Efficiency .....	75	70	Percent



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## Class C Oscillator

Rectified, Unfiltered, Three Phase, Half-Wave Plate Supply

### Absolute Maximum Ratings

For Frequencies to 100 MHz

Plate Voltage <sup>6</sup> .....	4000	Volts
Grid Voltage <sup>6</sup> .....	-500	Volts
Plate Current <sup>6</sup> .....	0.54	Amperes
Grid Current.....	115	milliamperes
Plate Power Input .....	2200	Watts
Plate Dissipation.....	450	Watts
Grid Dissipation .....	50	Watts

### Typical Operation

Transformer Secondary Voltage (RMS) .....	3400 <sup>7</sup>	2900 <sup>8</sup>	Volts
Plate Voltage <sup>6</sup> .....	4000	3400	Volts
Plate Current <sup>6</sup> .....	0.535	0.45	Amperes
Grid Current <sup>6</sup> .....	115	100	milliamperes
Grid Leak Resistance .....	3000	3000	Ohms
Plate Power Input .....	2140	1530	Watts
Plate Dissipation.....	450	390	Watts
Plate Power Output .....	1630	1090	Watts
Efficiency .....	77	71	Percent

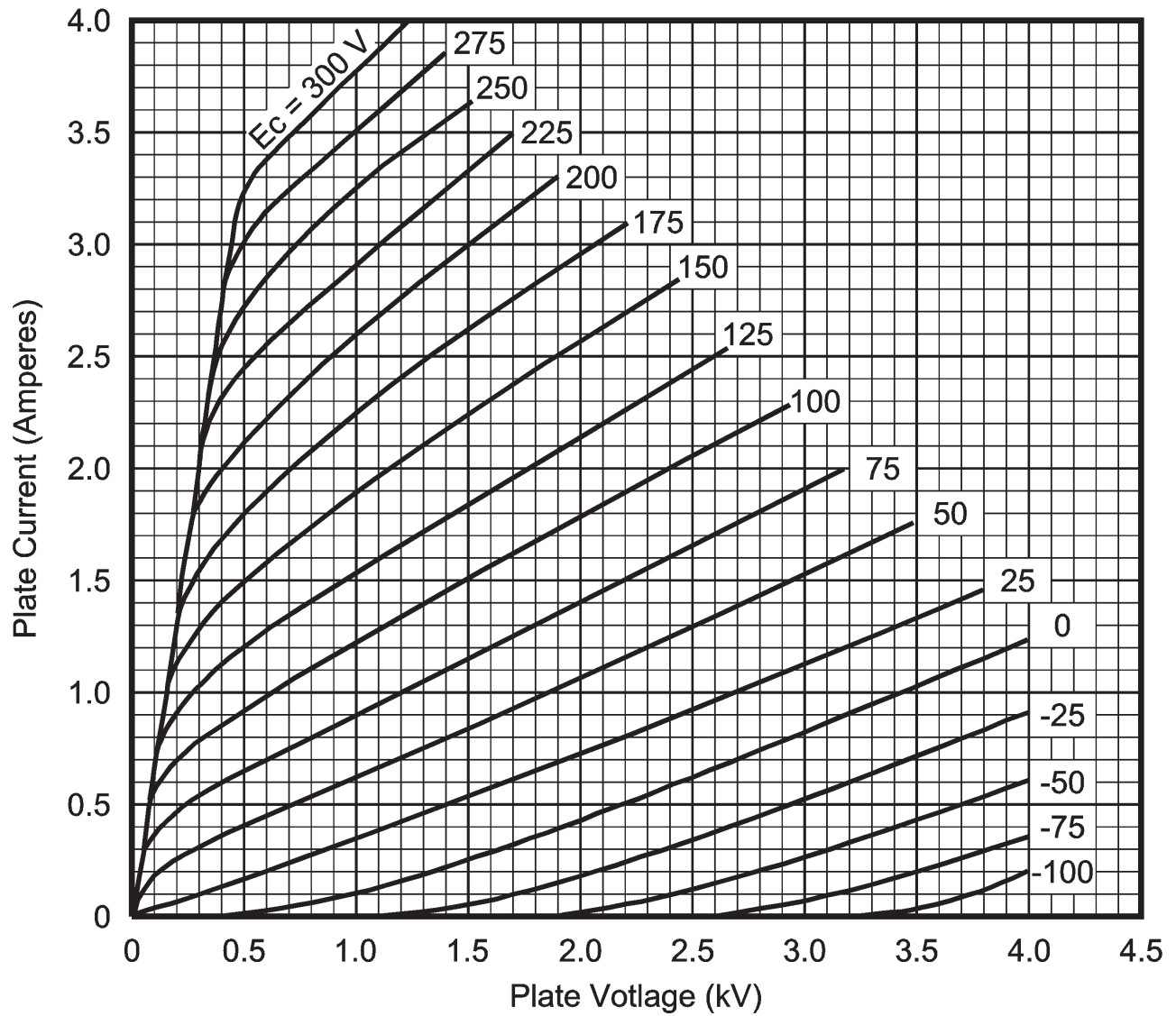
### Notes:

1. Represents the maximum usable cathode current (plate current plus grid current) for any condition of operation.
2. At or near maximum ratings, or at frequencies above 50 MHz, or in confined areas, forced-air cooling of the envelope is required. It will be necessary to direct a low velocity air flow toward the plate seal and the bottom of the envelope.
3. Averaged over any audio-frequency cycle of sine-wave form.
4. Modulation essentially negative may be used if the positive peak of the envelope does not exceed 115 percent of the carrier conditions.
5. Includes power transferred from the driver stage.
6. D.C. average values.
7. Under these conditions, care must be taken not to exceed the maximum values shown either by variations in the supply voltage and the load or by tolerances in the circuit elements.
8. Under these conditions, normal deviations and load are permissible. The maximum ratings of the tube must not be exceeded, however.



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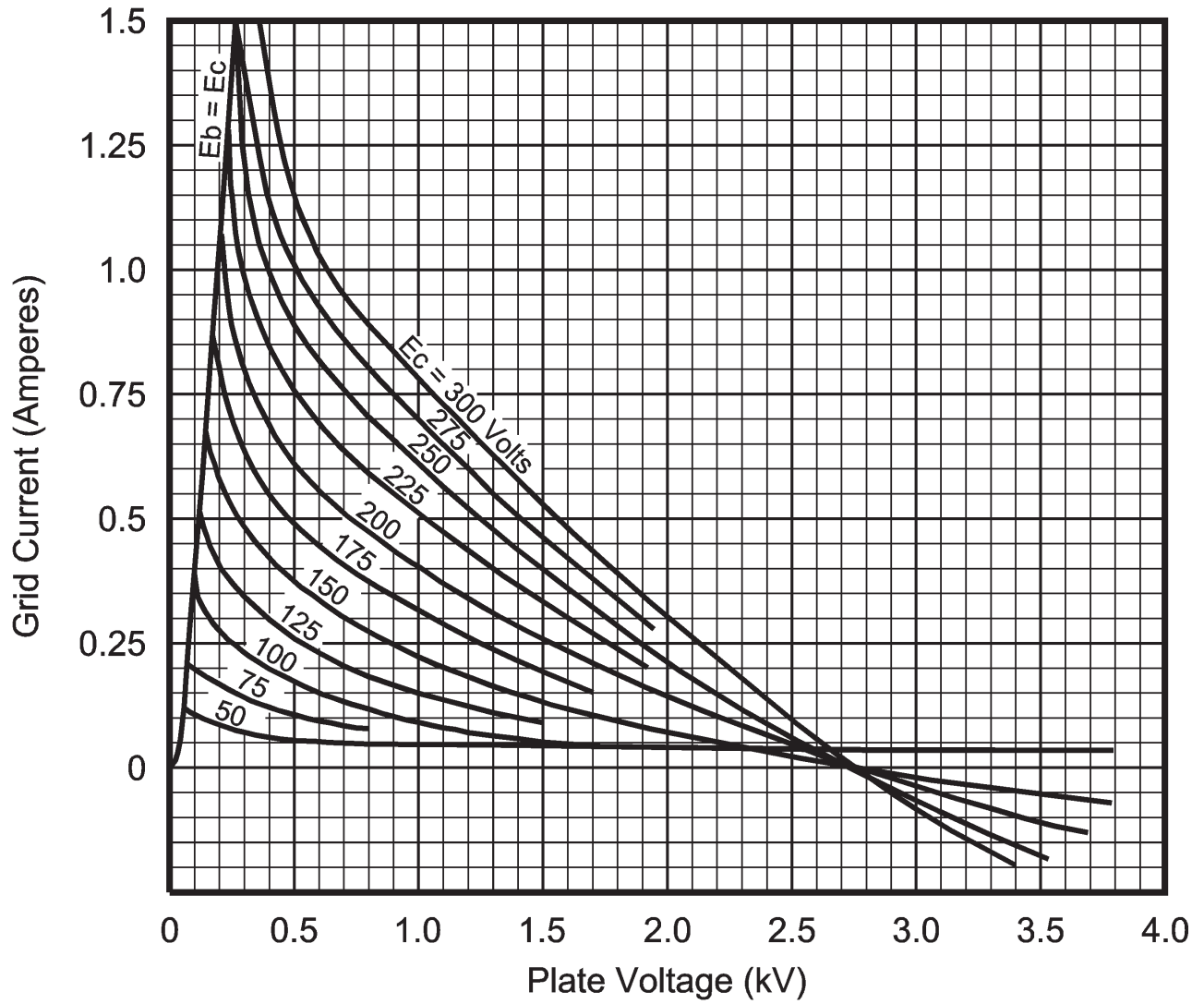
Typical Plate Current Characteristics  
Constant Grid Voltage Conditions





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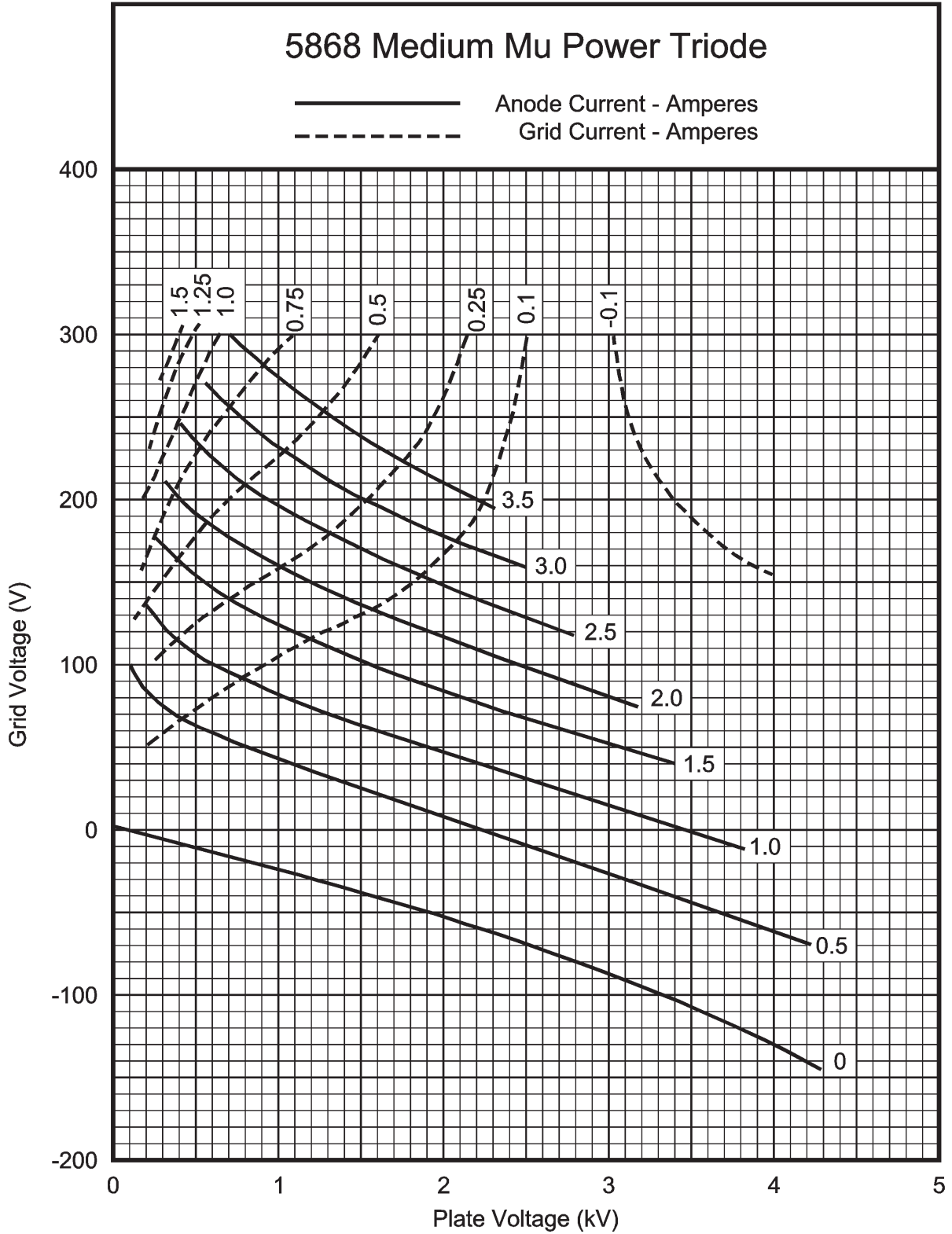
## Typical Grid Current Characteristics Constant Grid Voltage Conditions





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Typical Plate Current Characteristics  
Constant Plate Current Conditions





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## Dimensional Data

All dimensions in millimeters

