



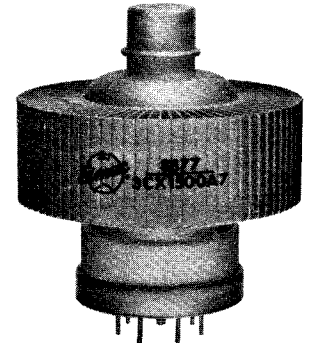
TECHNICAL DATA

8877  
3CX1500A7

HIGH-MU  
POWER TRIODE

The EIMAC 8877/3CX1500A7 is a rugged ceramic/metal power triode designed for use as a cathode driven Class AB<sub>2</sub> amplifier in audio or radio frequency applications. The tube is recommended for linear amplifier service since high power gain may be obtained without sacrifice of low intermodulation distortion characteristics.

Low grid interception and high amplification factor combine to make the 8877/3CX1500A7 drive requirements exceptionally low for a tube of this power capacity.



GENERAL CHARACTERISTICS<sup>1</sup>

ELECTRICAL

Cathode: Oxide Coated, Unipotential

Heater: Voltage	5.0 ± 0.25 V
Current, at 5.0 volts	10 A

Transconductance (Average):

I <sub>b</sub> = 1.0 Adc	55,000 μmhos
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Amplification Factor (Average)	200
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Direct Interelectrode Capacitance (grounded cathode)<sup>2</sup>

C <sub>in</sub>	42 pF
C <sub>out</sub>	0.1 pF
C <sub>gp</sub>	10 pF

Direct Interelectrode Capacitance (grounded grid)<sup>2</sup>

C <sub>in</sub>	42 pF
C <sub>out</sub>	10 pF
C <sub>pk</sub>	0.1 pF

Frequency of Maximum Rating:

CW	250 MHz
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1. Characteristics and operating values are based upon performance tests. These figures may change without notice as the result of additional data or product refinement. EIMAC Division of Varian should be consulted before using this information for final equipment design.

2. Capacitance values are for a cold tube as measured in a special shielded fixture in accordance with Electronic Industries Association Standard RS-191.

**MECHANICAL**

**Maximum Overall Dimensions:**

Length	3.51 in; 89.15 mm
Diameter	3.38 in; 85.85 mm
Net Weight	25.0 oz; 708.8 gm
Operating Position	Any
<b>Maximum Operating Temperature:</b>	
Ceramic/Metal Seals, Anode Core	250°C
Cooling	Forced Air
Base	Special 7-pin

**Recommended Air System Socket**

(Grounded Grid)	SK-2210
(Grounded Cathode)	SK-2200

**Recommended Air Chimney**

(Fiberglass)	SK-2206
(Teflon)	SK-2216

**RANGE VALUES FOR EQUIPMENT DESIGN**

	<u>Min.</u>	<u>Max.</u>
Heater: Current at 5.0 volts	9.5	10.5 A
Cathode Warmup Time	90	--- sec

**RADIO FREQUENCY LINEAR AMPLIFIER  
CATHODE DRIVEN Class AB<sub>2</sub>**

**ABSOLUTE MAXIMUM RATINGS**

DC PLATE VOLTAGE	4000	VOLTS
DC PLATE CURRENT	1.0	AMPERE
PLATE DISSIPATION	1500	WATTS
GRID DISSIPATION	25	WATTS

**TYPICAL OPERATION (Frequencies to 30 MHz)  
Class AB<sub>2</sub> Cathode Driven, Peak Envelope or  
Modulation Crest Conditions**

Plate Voltage	2700	3500	Vdc
Grid Voltage <sup>1</sup>	-8.2	-8.2	Vdc
Zero-Signal Plate Current	92	182	mAdc
Single-Tone Plate Current	740	1000	mAdc
Two-Tone Plate Current	480	675	mAdc
Single-Tone Grid Current <sup>3</sup>	40	74	mAdc
Two-Tone Grid Current <sup>3</sup>	16	25	mAdc
Peak rf Cathode Voltage <sup>3</sup>	68	81	v
Peak Driving Power <sup>3</sup>	40	64	w

Single-Tone Useful Output Power	1085	2075	W
Resonant Load Impedance	1820	2000	Ω
<b>Intermodulation Distortion Products<sup>2</sup></b>			
3rd Order	-40	-38	db
5th Order	-41	-41	db

1. Positive cathode bias provided by zener diode.
2. The intermodulation distortion products are referenced against one tone of a two equal tone signal.
3. Approximate values.

**TYPICAL OPERATION (220 MHz)  
Class AB<sub>2</sub> Cathode Driven**

Plate Voltage	2500	Vdc
Grid Voltage <sup>1</sup>	-8.2	Vdc
Plate Current	1000	mAdc
Grid Current	10	mAdc
Useful Output Power	1520	W
Driving Power <sup>2</sup>	57	W
Power Gain	14	db

1. Positive cathode bias provided by zener diode.
2. Approximate value.

## APPLICATION

### MECHANICAL

**MOUNTING** - The 8877/3CX1500A7 may be mounted in any position.

**SOCKET** - The grid of the 8877/3CX1500A7 terminates in the cylindrical grid ring about the base of the tube. This may be contacted by multiple clips or flexible finger stock. Connections to the heater and cathode are made via the 7-pin base.

**COOLING** - The maximum temperature limit for external tube surfaces and the anode core is 250°C. Tube life is prolonged if these areas are maintained at lower temperatures. For full 1500 watt anode dissipation 38.0 cfm of air is required at a back pressure of 0.60 inches to hold tube temperature below 225°C with 50°C ambient temperature at sea level. At frequencies higher than 30 MHz, or at high altitudes, the air quantity must be increased.

Base-to-Anode Air Flow (sea level)		
Anode Dissipation (watts)	Air Flow (CFM)	Pressure Drop In./H <sub>2</sub> O
500	7.7	0.10
1000	20.3	0.23
1500	38.0	0.60
Base-to-Anode Air Flow (10,000 ft.)		
Anode Dissipation (watts)	Air Flow (CFM)	Pressure Drop In./H <sub>2</sub> O
500	11.2	0.15
1000	29.5	0.34
1500	55.5	0.88

- Note: 1) Tube mounted in SK-2200 Socket with SK-2216 Chimney.  
 2) An allowance of 25 watts has been made for grid dissipation and 50 watts for filament power .

### ELECTRICAL

**FILAMENT OPERATION** - Rated filament voltage for the 8877/3CX1500A7 is 5.0 volts. Filament voltage, as measured at the socket should be maintained at this value to obtain

optimum performance and maximum tube life. In no case should it be allowed to deviate from 5.0 volts by more than plus or minus five per cent.

**INPUT CIRCUIT** - When the 8877/3CX1500A7 is operated as a cathode driven rf amplifier, the use of a resonant circuit in the cathode is recommended. For best results with a single-ended amplifier it is suggested that the cathode tank circuit operate at a Q of two or more.

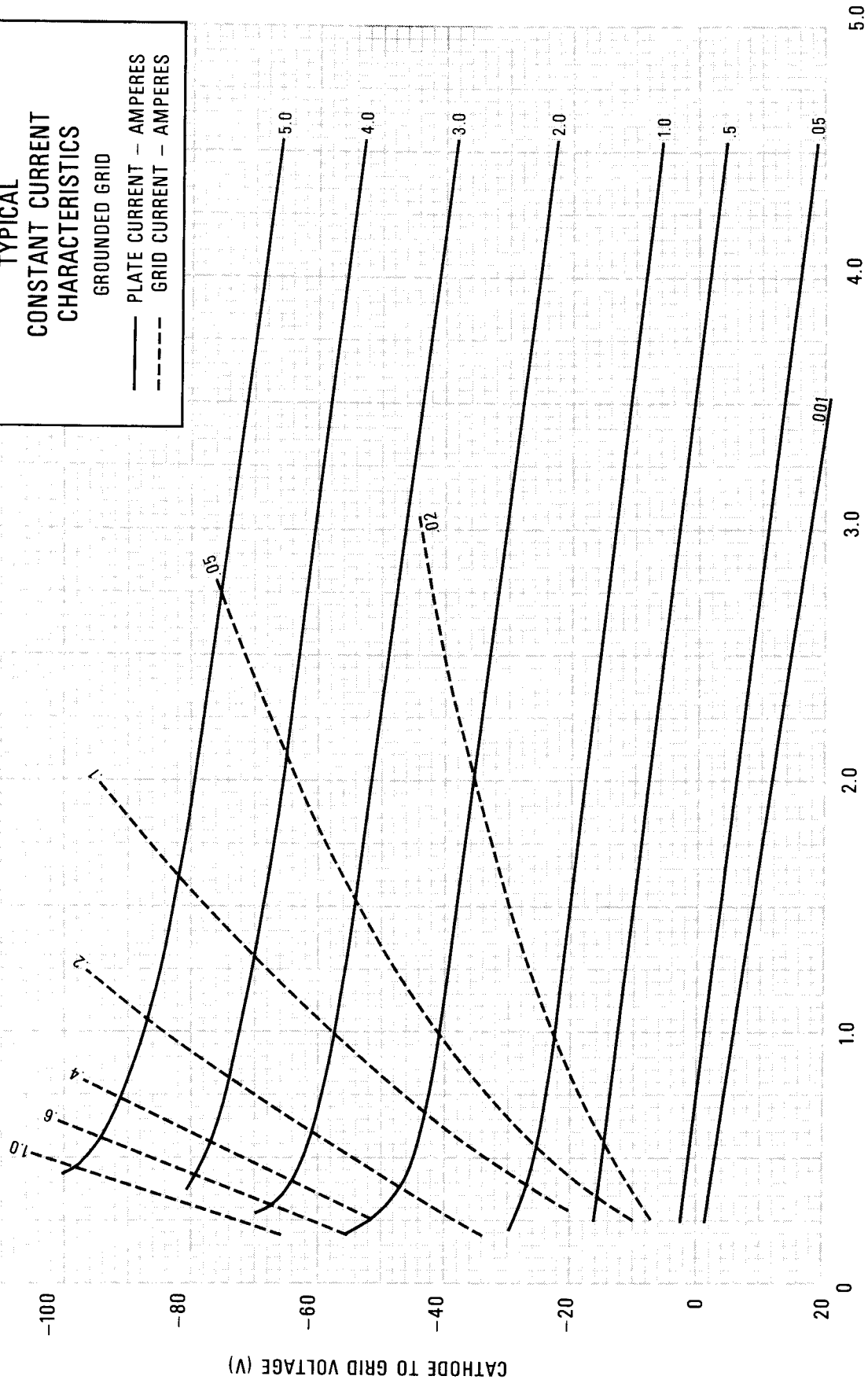
**CLASS C OPERATION** - Although designed for Class AB<sub>2</sub> service, the 8877/3CX1500A7 may be operated as a Class C power amplifier or oscillator or as a plate modulated rf amplifier. The zero-bias characteristic can be used to advantage in Class C amplifiers by employing only grid resistor bias. If driving power fails, plate dissipation will be held to a safe level since the tube will operate within all ratings with zero-bias up to a plate potential of 3000 volts.

**ZERO-BIAS OPERATION** - Operation at zero-bias is not recommended with plate potentials over 3000 volts, since plate dissipation may be exceeded. Higher plate voltage may be used with the proper protective bias.

**HIGH VOLTAGE** - The 3CX1500A7 operates at voltages which can be deadly, and the equipment must be designed properly and operating precautions must be followed. Equipment must be designed so that no one can come in contact with high voltages. All equipment must include safety enclosures for high-voltage circuits and terminals, with interlock switches to open the primary circuits of the power supplies and to discharge high voltage condensers whenever access doors are opened. Interlock switches must not be bypassed or "cheated" to allow operation with access doors open. Always remember that HIGH VOLTAGE CAN KILL.

**SPECIAL APPLICATIONS** - If it is desired to operate this tube under conditions widely different from those given here, write to Power Grid Tube Division, EIMAC, Division of Varian, 301 Industrial Way, San Carlos, California 94070 for information and recommendations.

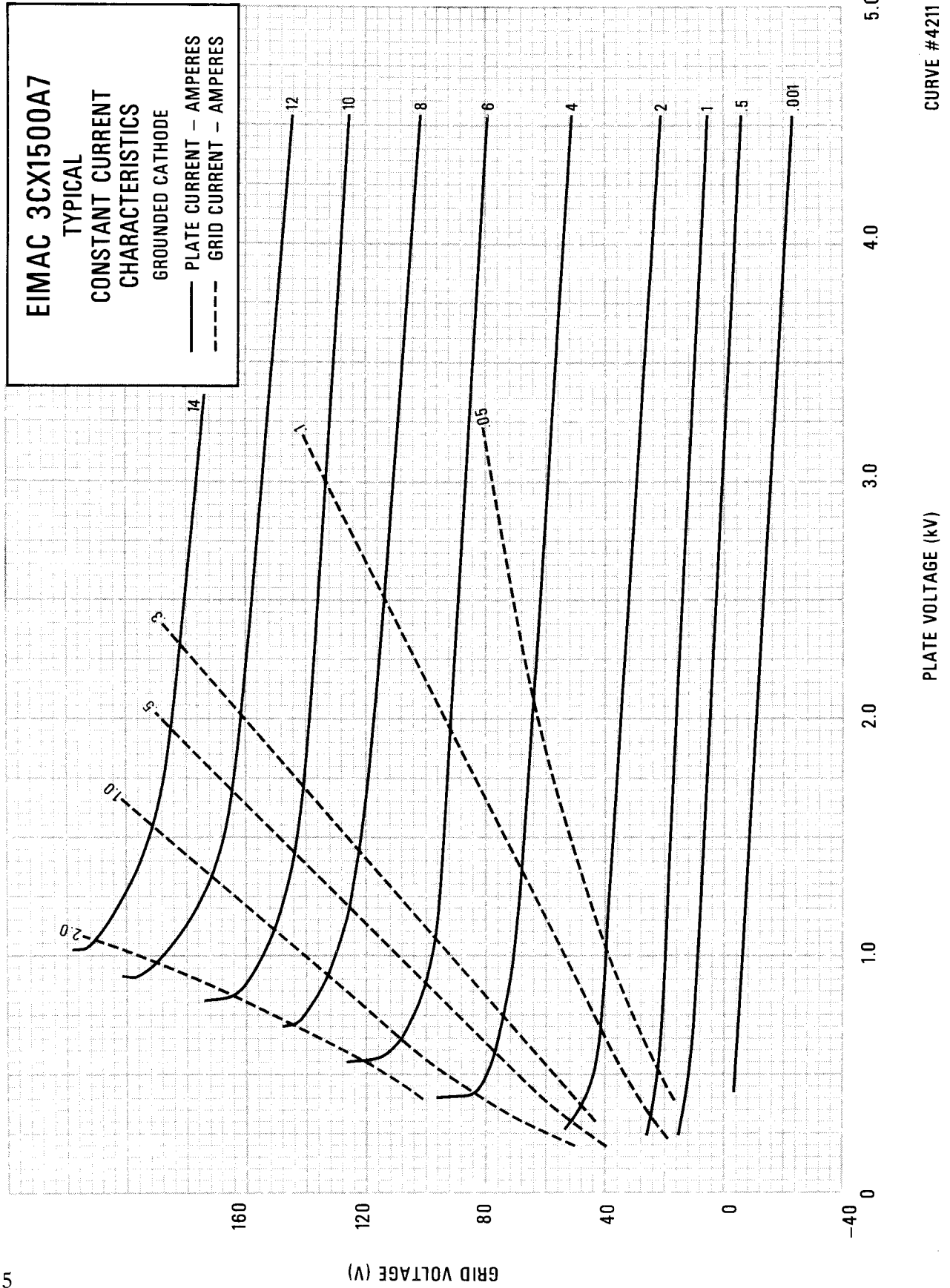
**EIMAC 3CX1500A7**  
**TYPICAL**  
**CONSTANT CURRENT**  
**CHARACTERISTICS**  
 GROUNDED GRID  
 — PLATE CURRENT — AMPERES  
 - - - GRID CURRENT — AMPERES



CURVE #4250

PLATE TO GRID VOLTAGE (kV)

CATHODE TO GRID VOLTAGE (V)

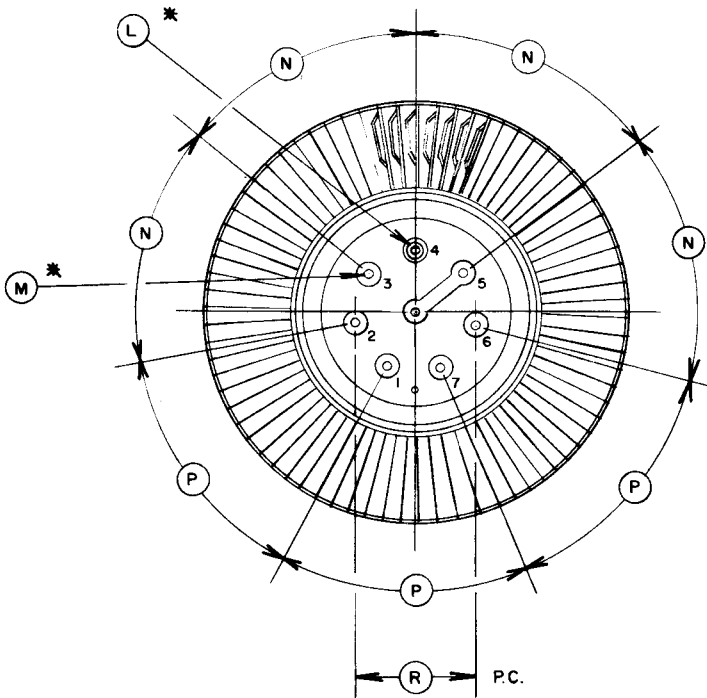
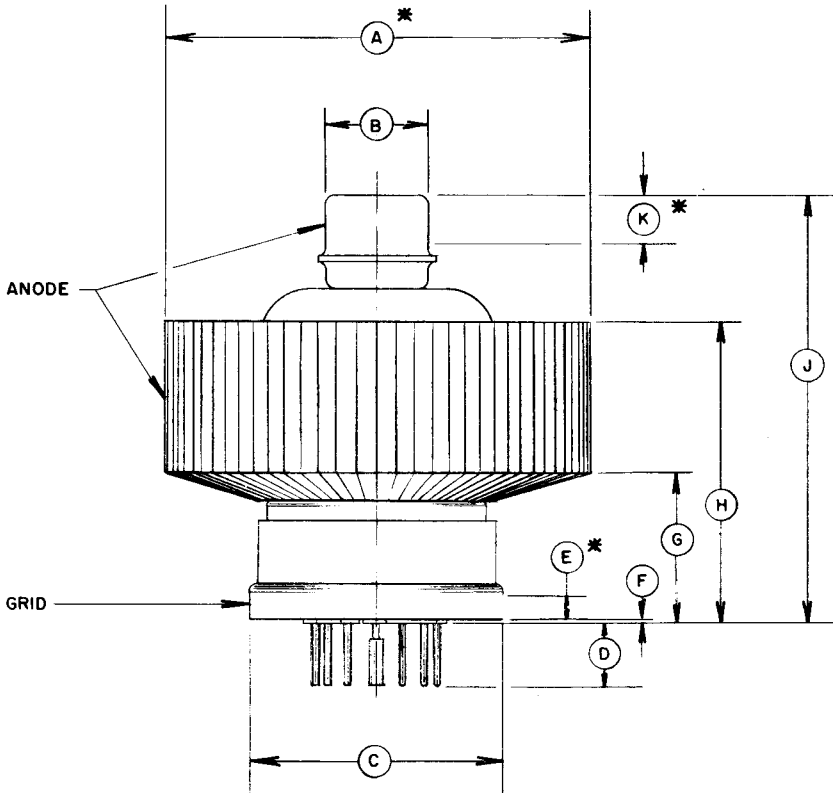


CURVE #4211

8877/3CX1500A7

DIM.	INCHES			MILLIMETERS		
	MIN.	MAX.	REF.	MIN.	MAX.	REF.
	A	3.350	3.380	---	85.09	85.85
B	0.810	0.820	---	20.57	20.83	---
C	1.995	2.015	---	50.67	51.18	---
D	0.438	0.562	---	11.13	14.27	---
E	0.235	---	---	5.97	---	---
F	0.000	0.040	---	0.00	1.02	---
G	1.100	1.225	---	27.94	31.12	---
H	2.300	2.425	---	58.42	61.60	---
J	3.370	3.510	---	85.60	89.15	---
K	0.470	0.530	---	11.94	13.46	---
L	0.120	0.127	---	3.05	3.23	---
M	0.056	0.062	---	1.42	1.57	---
N	---	---	51°	---	---	51°
P	---	---	52°	---	---	52°
R	---	---	1.000	---	---	25.40

NOTES:  
 1. REF DIMENSIONS ARE FOR INFO.  
 ONLY & ARE NOT REQUIRED FOR  
 INSPECTION PURPOSES.



PIN CONNECTIONS

- 1 - HEATER
- 5 - HEATER
- 2 - 3 - 4 - 6 - 7 CATHODE