



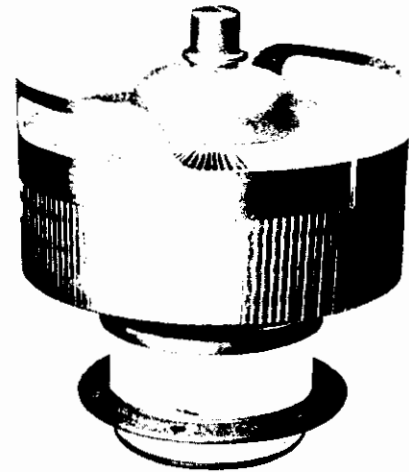
ADVANCE PRODUCT ANNOUNCEMENT

3CX10,000B7
VHF
HIGH-MU
TRIODE

The EIMAC 3CX10,000B7 is a ceramic/metal high-mu power triode designed especially for use as a cathode-driven Class AB rf amplifier or Class C power amplifier. It is forced-air cooled, with an anode dissipation rating of 10 kilowatts.

The 3CX10,000B7 makes use of a beam-forming cathode and control grid geometry to produce high gain, low grid interception, and outstanding intermodulation performance in linear amplifier service. These attributes make the tube well suited for cathode-driven circuitry, which reduces equipment cost and complexity.

The tube does not require a socket. It is designed to be bolted directly to the chassis by the grid flange. Cathode and heater connections are also made by bolting directly to the amplifier circuitry. This feature further reduces equipment cost and complexity.



GENERAL CHARACTERISTICS ¹

ELECTRICAL

Cathode: Oxide-coated Unipotential

Heater Voltage	15.0 ± 0.75	V
Heater Current, at 15.0 Volts	13.5	A
Minimum Cathode Warmup Time (in Minutes) at 15.0 Volts ²	5	Min
Amplification Factor (Average)	200	
Maximum Frequency For Full Ratings	110	MHz
Direct Interelectrode Capacitance (grounded grid connection) ³		
Cin	82.4	pF
Cout	37.7	pF
Cpk	0.60	pF

1. Characteristics and operating values are estimated. These figures may change without notice as the result of additional data or product refinement. Varian EIMAC should be consulted before using this information for final equipment design.
2. Before high voltage and rf drive voltage are applied.
3. Capacitance values are for a cold tube as measured in accordance with EIA Standard RS-191 except no special shielding is used.

MECHANICAL

Overall Dimensions:

Length	9.0 In; 23.0 cm
Diameter	7.0 In; 17.9 cm
Cooling	Forced Air
Net Weight (approximate)	10.8 lb; 4.9 kg
Recommended Air-System Chimney	EIMAC SK-1306
Base	Designed for Direct Chassis Mounting
Available Anode Connector Clip	EIMAC ACC-3

RADIO FREQUENCY POWER AMPLIFIER
CATHODE DRIVEN - Class AB Service

ABSOLUTE MAXIMUM RATINGS:

DC PLATE VOLTAGE	6500	VOLTS
DC PLATE CURRENT	3.5	AMPERES
PLATE DISSIPATION	10	KILOWATTS
GRID DISSIPATION	50	WATTS

* Will vary from tube to tube
Delivered to the load

TYPICAL PERFORMANCE, to 30 MHz (measured data)

Plate Voltage	6.0	kVdc
Zero Sig. Plate Current	0.5	Adc
Max. Sig. Plate Current	2.6	Adc
Cathode Bias *	+41	Vdc
Grid Current *	35	mAdc
Driving Power *	250	W
Useful Power Output #	10	kW
Power Gain *	16	dB
Cathode Input Impedance	25	Ohms
Resonant Load Impedance	1100	Ohms

359050(Effective August 1985)
VA4865

Printed in U.S.A.



RADIO FREQUENCY POWER AMPLIFIER
Class B Telegraphy or FM - Cathode Driven
(Key-down Conditions)

ABSOLUTE MAXIMUM RATINGS:

DC PLATE VOLTAGE . . .	6500	VOLTS
DC PLATE CURRENT . . .	3.5	AMPERES
PLATE DISSIPATION . .	10	KILOWATTS
GRID DISSIPATION . . .	50	WATTS

* Approximate value; will vary with tube, frequency and installation.
Does not include output circuit losses.

TYPICAL OPERATION - Frequencies to 110 MHz
Grounded Grid (Cathode Driven) Amplifier
(Calculated Data)

Plate Voltage	5.0	6.0	kVdc
Bias Voltage (cathode to grid) *	+55	+65	Vdc
Plate Current	3.1	2.5	Adc
Grid Current *	0.1	0.05	Adc
Peak rf Cathode (driving) Voltage	185	175	v
Calculated Driving Power *	490	375	W
Power Gain	13.5	14.6	dB
Plate Dissipation *	4400	4100	W
Plate Output Power #	11.5	10.8	kW

TYPICAL OPERATION values are obtained by calculation from published characteristic curves. Adjustment of the rf grid voltage to obtain the specified plate current at the specified bias and plate voltage is assumed. If this procedure is followed, there will be little variation in output power when the tube is replaced, even though there may be some variation in grid current. The grid current which occurs when the desired plate current is obtained is incidental and may vary from tube to tube. This current variation causes no performance degradation providing the circuit maintains the correct voltage in the presence of the current variation.

A P P L I C A T I O N

MECHANICAL

MOUNTING - The 3CX10,000B7 may be mounted in any position and should be protected from shock and vibration. The tube is designed to be bolted directly to the chassis in equipment designed for dc and rf grounded grid circuit configuration. The mounting may be insulated for other circuitry. A flange with threaded holes is provided for a low-inductance cathode connection. Similar provisions are made for the heater connections.

COOLING - The maximum temperature rating for the external surfaces of the tube is 250°C and sufficient forced-air cooling must be used in all applications to keep the temperature of the anode (at the base of the cooling fins) and the temperature of the ceramic/metal seals comfortably below this rated maximum.

Cooling data shown is for sea level with air at 50°C maximum with air flow in a base-to-anode direction, and represents minimum anode cooling requirements. The values shown are estimates and should not be used for final design purposes.

Plate Diss. Watts	Flow Rate CFM	Pressure Drop In. Water
7500	290	0.9
10000	390	1.5

It is considered good engineering practice to design for a maximum anode core temperature of 225°C and temperature-sensitive paints are available for checking base and seal temperatures before any design is finalized. It is also considered good practice to allow for variables such as dirty air filters, rf seal heating, and the fact that the anode cooling fins may not be clean if the tube has been in service for some length of time.

Forced air cooling of the base is also required, with air directed past the seal areas. Special attention may be required in cooling the center of the stem (base), by means of special directors or some other provision. An air interlock system

should be incorporated in the design to automatically remove all voltages from the tube in case of even partial failure of the tube cooling air.

Air flow must be applied before or simultaneously with the application of power, including the tube heater, and should normally be maintained for a short period of time after all power is removed.

ELECTRICAL

ABSOLUTE MAXIMUM RATINGS - Values shown for each type of service are based on the "absolute system" and are not to be exceeded under any service conditions. These ratings are limiting values outside which the serviceability of the tube may be impaired. In order not to exceed absolute ratings the equipment designer has the responsibility of determining an average design value for each rating below the absolute value of that rating by a safety factor so that the absolute values will never be exceeded under any usual conditions of supply-voltage variation, load variation, or manufacturing variation in the equipment itself. It does not necessarily follow that combinations of absolute maximum ratings can be attained simultaneously.

HIGH VOLTAGE - Normal operating voltages used with this tube are deadly, and the equipment must be designed properly and operating precautions must be followed. Design all equipment 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 primary circuits of the power supply and to discharge high-voltage capacitors 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.

HEATER-CATHODE OPERATION - Rated heater voltage for the tube is 15.0 volts and should be maintained within plus or minus 0.75 volt when good life and consistent performance are factors. Volt-



age should be measured with a known-accurate (plus or minus one percent) rms-responding voltmeter.

Heater voltage should be applied for five minutes (minimum) before high voltage is applied to the tube and any operation is attempted, to allow for cathode warmup to full temperature.

INPUT CIRCUIT - When this tube is operated as a grounded-grid rf amplifier, the use of a resonant tank in the cathode circuit is recommended in order to obtain greatest linearity and power output. For best results with a single-ended amplifier it is suggested that the cathode tank circuit operate at a "Q" of five or more.

FAULT PROTECTION - All power tubes operate at voltages which can cause severe damage in the event of an internal arc, especially in those cases where large amounts of stored energy or follow-on current are involved. Some means of protection is advised in all cases, and it is recommended that a series resistor be used in the anode circuit to limit peak current and help dissipate the energy in the event of a tube or circuit arc. A resistance of 10 ohms in the positive plate power supply

lead, together with a protective spark gap such as the Siemens #B1-C145 connected between the cathode and grid will help protect the tube in the event of an internal arc. A maximum of 4 joules total energy may be permitted to dissipate into a grid-to-cathode arc. Amounts in excess of this will permanently damage the cathode or grid structure.

RADIO-FREQUENCY RADIATION - Avoid exposure to strong rf fields even at relatively low frequency. Absorption of rf energy by human tissue is dependent on frequency. Under 300 MHz most of the energy will pass completely through the human body with little attenuation or heating affect. Public health agencies are concerned with the hazard even at these frequencies. OSHA (Occupational Safety and Health Administration) recommends that prolonged exposure to rf radiation should be limited to 10 milliwatts per square centimeter.

SPECIAL APPLICATIONS - When it is desired to operate this tube under conditions widely different from those listed here, write to Varian EIMAC; attn: Product Manager; 301 Industrial Way; San Carlos, CA 94070 U.S.A.

OPERATING HAZARDS

PROPER USE AND SAFE OPERATING PRACTICES WITH RESPECT TO POWER TUBES ARE THE RESPONSIBILITY OF EQUIPMENT MANUFACTURERS AND USERS OF SUCH TUBES. ALL PERSONS WHO WORK WITH OR ARE EXPOSED TO POWER TUBES OR EQUIPMENT WHICH UTILIZES SUCH TUBES MUST TAKE PRECAUTIONS TO PROTECT THEMSELVES AGAINST POSSIBLE SERIOUS BODILY INJURY. DO NOT BE CARELESS AROUND SUCH PRODUCTS.

The operation of this tube may involve the following hazards, any one of which, in the absence of safe operating practices and precautions, could result in serious harm to personnel:

- a. **HIGH VOLTAGE** - Normal operating voltages can be deadly. Remember that HIGH VOLTAGE CAN KILL.
- b. **LOW-VOLTAGE HIGH-CURRENT CIRCUITS** - Personal jewelry, such as rings, should not be worn when working with filament contacts or connectors as a short circuit can produce very high current and melting, resulting in severe burns.
- c. **RF RADIATION** - Avoid exposure to strong rf fields even at relatively low frequencies. The danger is more severe at UHF and microwave frequencies and can cause serious bodily and eye injuries. **CARDIAC PACEMAKERS MAY BE EFFECTED.**
- d. **HOT SURFACES** - Surfaces of tubes can reach temperatures of several hundred °C and cause serious burns if touched for several minutes after all power is removed.

Please review the detailed operating hazards sheet enclosed with each tube, or request a copy from: Varian EIMAC, Power Grid Application Engineering, 301 Industrial Way, San Carlos CA 94070.



3CX10,000B7

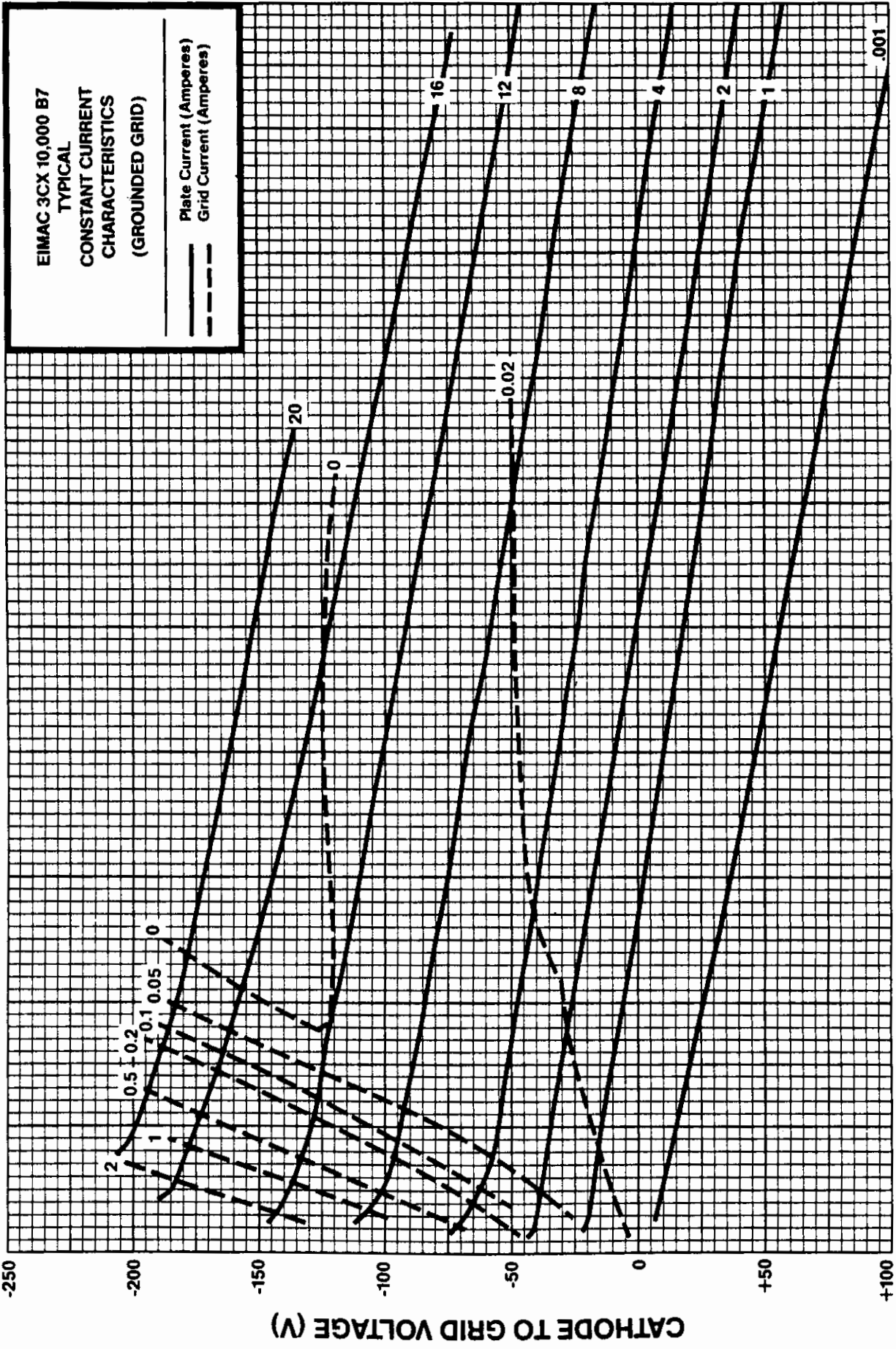


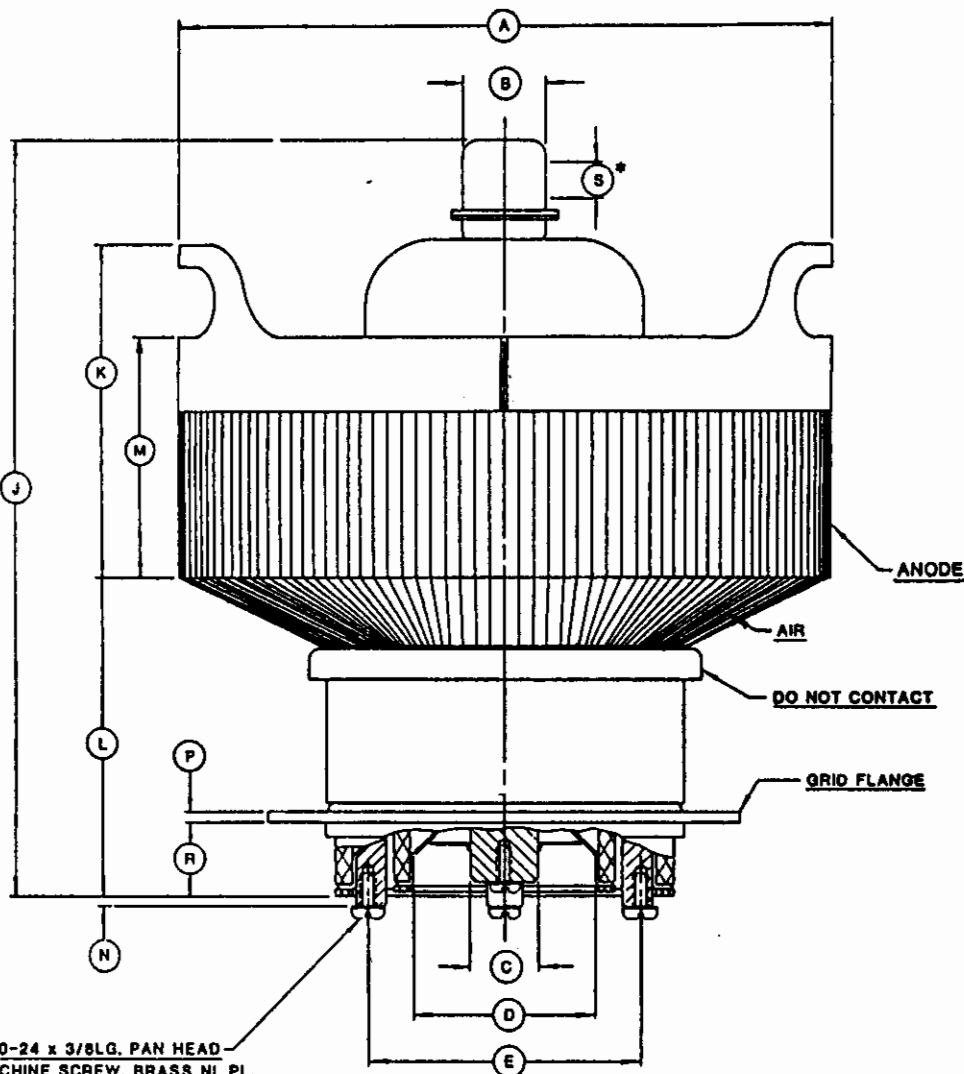
PLATE TO GRID VOLTAGE (KV)

CURVE #5440

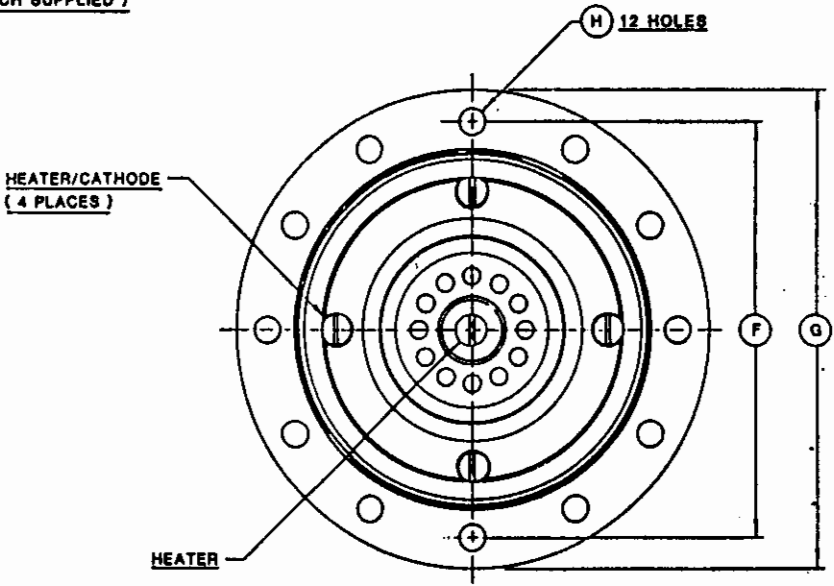
CATHODE TO GRID VOLTAGE (V)

DIM.	INCHES			MILLIMETERS		
	MIN.	MAX.	REF.	MIN.	MAX.	REF.
A	8.828	9.000		224.83	228.63	
B	.888	.888		22.73	22.73	
C	.600	.700		15.24	17.80	
D	1.888	1.888		48.18	48.17	
E	2.888	2.938		73.83	74.68	
F	4.428	4.448		112.40	113.00	
G	8.030	8.000		203.78	203.20	
H			.288			7.3
J	8.017	8.287		203.63	209.88	
K	3.412	3.788		86.60	96.31	
L	3.218	3.894		81.99	98.84	
M	2.412	2.788		61.28	70.81	
N	.083	.108		2.10	2.74	
P			.128			3.18
R	.721	.848		18.31	21.48	
S	.378			9.63		
T						
U						
V						
W						
X						
Y						
Z						

NOTES:
 1. REF DIMENSIONS ARE FOR INFO ONLY & ARE NOT REQUIRED FOR INSPECTION PURPOSES.
 2. (S) CONTACT SURFACE



φ10-24 x 3/8 LG. PAN HEAD MACHINE SCREW, BRASS NI. PL. & φ10 LOCKWASHER INTERNAL TOOTH BR. NI. PL. (5 EACH SUPPLIED)





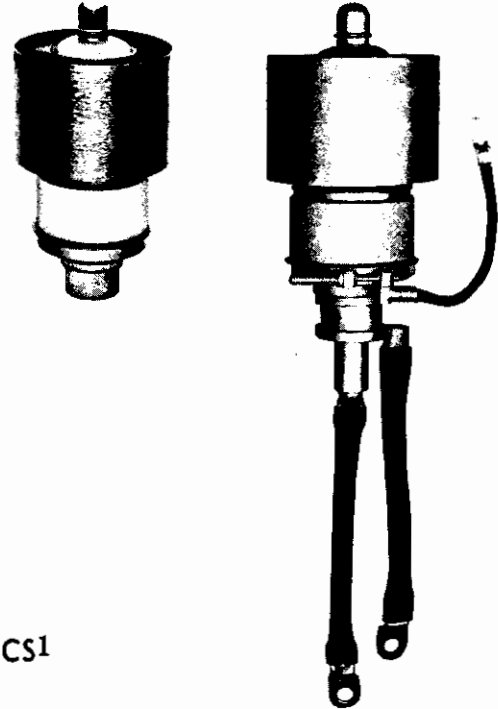
TECHNICAL DATA

3CX3000A7
8162
3CX3000F7
 HIGH-MU
 AIR COOLED
 POWER TRIODES

The EIMAC 3CX3000A7 high-mu forced-air cooled power triode provides relatively high power output as an amplifier, oscillator, or modulator at low plate voltages. The tube has a low inductance cylindrical filament-stem structure which readily becomes part of a linear filament tank circuit for VHF operation. The grid provides good shielding between the input and output circuits for grounded-grid applications and conveniently terminates in a ring between the plate and filament terminals.

Operation with zero grid bias in many applications offers circuit simplicity by eliminating the bias supply. Grounded-grid operation is attractive, since a power gain of over 20 times can be obtained.

The 8162/3CX3000F7 tube is identical except for the addition of flexible leads on the base for grid and filament connections which can simplify socketing in low-frequency applications.



GENERAL CHARACTERISTICS¹

ELECTRICAL

Filament: Thoriated-tungsten

Voltage	7.5 V
Current @ 7.5 V (3CX3000A7)	51.5 A
(3CX3000F7)	50.5 A
Amplification Factor (Average)	160
Direct Interelectrode Capacitances (grounded filament) ²	
C _{in}	38.0 pF
C _{out}	0.6 pF
C _{gp}	24.0 pF
Direct Interelectrode Capacitances (grounded grid) ²	
C _{in}	38.0 pF
C _{out}	24.0 pF
C _{pk}	0.6 pF

1. Characteristics and operating values are based on 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.

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Printed in U.S.A.



3CX3000A7/F7

Frequency of Maximum Rating: 3CX3000A7	110 MHz
3CX3000F7	30 MHz

MECHANICAL

Maximum Overall Dimensions:

Length (3CX3000A7)	9.000 in; 227.60 mm
(3CX3000F7, incl. fil. leads)	18.437 in; 468.30 mm
Diameter (both types)	4.156 in; 105.56 mm
Operating Position	Vertical, base up or down
Net Weight: (3CX3000A7) (Approx.)	6.2 lb; 2.8 kg
(3CX3000F7) (Approx.)	7.0 lb; 3.2 kg
Cooling	Forced Air
Base (3CX3000A7)	Special Coaxial
(3CX3000F7)	Special with Flying Leads

Maximum Operating Temperature:

Anode Core and Ceramic/Metal Seals	250°C
3CX3000F7 Filament Lead/Tube Base Junctions	150°C

RADIO FREQUENCY LINEAR AMPLIFIER CATHODE DRIVEN

Class AB₂

TYPICAL OPERATION (Frequencies to 30 MHz)
Class AB₂, Peak Envelope or Modulation
Crest Conditions

ABSOLUTE MAXIMUM RATINGS:

DC PLATE VOLTAGE	5000 VOLTS
DC PLATE CURRENT	2.5 AMPERES
PLATE DISSIPATION	4000 WATTS
GRID DISSIPATION	225 WATTS

Plate Voltage	4000	4800	4800	Vdc
Zero-Signal Plate Current ¹	0.25	0.35	0.35	Adc
Single-Tone Plate Current	2.00	1.68	2.00	Adc
Single-Tone Grid Current ¹	0.61	0.46	0.60	Adc
Peak Driving Power	420	293	410	w
Plate Dissipation	2285	2275	2775	W
Single-Tone Plate Output Power	6030	6000	7266	W
Resonant Load Impedance	1210	1720	1425	Ω
Driving Impedance	47.5	50.0	46.3	Ω

1. Approximate value.

RADIO FREQUENCY LINEAR AMPLIFIER GRID DRIVEN

Class AB₂

TYPICAL OPERATION (Frequencies to 30 MHz)
Class AB₂, Grid Driven, Carrier Conditions

ABSOLUTE MAXIMUM RATINGS:

DC PLATE VOLTAGE	5000 VOLTS
DC PLATE CURRENT	2.5 AMPERES
PLATE DISSIPATION	4000 WATTS
GRID DISSIPATION	225 WATTS

Plate Voltage	4000	Vdc
Zero-Signal Plate Current ¹	0.25	Adc
DC Plate Current	0.74	Adc
DC Grid Current ¹	0.13	Adc
Peak rf Grid Voltage ¹	85.0	v
Peak Driving Power ¹	11.5	w
Plate Dissipation	1830	W
Single-Tone Plate Output Power	1130	W
Resonant Load Impedance	1750	Ω
Peak rf Plate Voltage	2000	v

1. Approximate value.

RADIO FREQUENCY POWER AMPLIFIER

Class C Telegraphy or FM, Cathode Driven
(Key-Down Conditions)

TYPICAL OPERATION (Frequencies to 110 MHz for
3CX3000A7, to 30 MHz for 3CX3000F7)

ABSOLUTE MAXIMUM RATINGS:

DC PLATE VOLTAGE	5000 VOLTS
DC PLATE CURRENT	2.5 AMPERES
PLATE DISSIPATION	4000 WATTS
GRID DISSIPATION	225 WATTS

Plate Voltage	3500	4800	Vdc
Grid Voltage	-50	-60	Vdc
Plate Current	1.30	1.54	Adc
Grid Current ¹	0.42	0.48	Adc
Peak rf Cathode Voltage ¹	220	267	v
Calculated Driving Power ¹	310	435	W
Plate Dissipation	985	1480	W
Useful Output Power ²	3300	5500	W

1. Approximate value.

2. Output circuit and filter loss of 10% assumed.



AUDIO FREQUENCY POWER AMPLIFIER OR MODULATOR

Class AB₂, Grid Driven (Sinusoidal Wave)

ABSOLUTE MAXIMUM RATINGS (per tube)

DC PLATE VOLTAGE	5000 VOLTS
DC PLATE CURRENT	2.5 AMPERES
PLATE DISSIPATION	4000 WATTS
GRID DISSIPATION	225 WATTS

1. Approximate value.

2. Per tube.

TYPICAL OPERATION (Two Tubes)

Plate Voltage	4000 Vdc
Zero-Signal Plate Current ¹	0.50 Adc
Max. Signal Plate Current	3.58 Adc
Max. Signal Grid Current ¹	0.58 Adc
Peak af Grid Voltage ²	190 v
Peak Driving Power ³	115 w
Max. Signal Plate Dissipation	1850 W
Plate Output Power	10,500 W
Load Resistance (plate to plate)	2720 Ω

3. Nominal drive power is one-half peak power.

NOTE: TYPICAL OPERATION data are obtained by measurement or calculation from published characteristic curves. Adjustment of the rf grid voltage to obtain the specified plate current at the specified bias, and plate voltages is assumed. If this procedure is followed, there will be little variation in output power when the tube is changed, even though there may be some variation in grid current. The grid current which results when the desired plate current is obtained is incidental and varies from tube to tube. These current variations cause no difficulty so long as the circuit maintains the correct voltage in the presence of the variations in current. If grid bias is obtained principally by means of a grid resistor, the resistor must be adjustable to obtain the required bias voltage when the correct rf grid voltage is applied.

RANGE VALUES FOR EQUIPMENT DESIGN

	Min.	Max.
Filament: Current @ 7.5 volts (3CX3000A7)	49.0	54.0 A
(3CX3000F7)	48.0	53.0 A
Interelectrode Capacitances ¹ (grounded filament connection)		
Cin	30.0	45.0 pF
Cout	---	1.0 pF
Cgp	20.0	28.0 pF
Interelectrode Capacitances ¹ (grounded grid connection)		
Cin	30.0	45.0 pF
Cout	20.0	28.0 pF
Cpk	---	1.0 pF
Zero Bias Plate Current ($E_b = 5000$ volts)	0.36	0.52 A
Cut-off Bias ($E_b = 5000$ volts, $I_b = 1.0$ mAdc)	---	-45.0 V

1. Capacitance values are for a cold tube as measured in a shielded fixture.

APPLICATION

MECHANICAL

MOUNTING - The 3CX3000A7 and 3CX3000F7 must be mounted vertically, base down or up at the convenience of the circuit designer. The filament connections to the 3CX3000A7 should be made through spring collets. These are available from EIMAC with the following part numbers:

- 149575 Inner line collet
- 149576 Outer line collet

Reasonable care should be taken that these collets do not impart undue strain to the terminals or the base of the tube.

COOLING - The maximum temperature rating for the anode core and the ceramic/metal seal areas of either tube is 250°C, and sufficient forced-air cooling must be provided to assure operation at safe tube temperatures. Tube life is usually prolonged if cooling in excess of absolute minimum requirements is provided for cooler tube temperatures.

The filament leads of the 3CX3000F7 are attached to the tube with soft solder, and care must therefore be taken to supply sufficient



cooling to this area of the tube to maintain temperatures below 150°C to avoid melting or loosening of these leads.

Minimum air flow requirements to maintain anode core and ceramic/metal seal areas below 225°C at sea level with an inlet-air temperature of 50°C are tabulated for air-flow in the base-to-anode and anode-to-base directions. At higher ambient temperatures, frequencies above 30 MHz, or at higher altitudes, a greater quantity of air will be required.

With air flowing in a base-to-anode direction, and with the specified air also flowing past the base section of the tube, no additional base cooling of either type is normally required. With air flowing in an anode-to-base direction, both types require additional cooling air directed into the filament stem structure, between the inner and outer filament terminals, in the amount of 5 cfm minimum, directed by an appropriate air nozzle or pipe.

It is suggested that temperatures, especially in the base area of the tube, be monitored in any new installation to insure proper cooling. Temperatures may be measured with any of the available temperature-sensing paint or crayon materials.

Base-to-Anode Air Flow				
Anode Dissipa- tion watts	Sea Level		10,000 Feet	
	Air Flow CFM	Pressure Drop Inches water	Air Flow CFM	Pressure Drop Inches water
2000	49	0.31	71	0.45
3000	85	0.72	124	1.40
4000	127	1.40	185	2.55
Anode-to-Base Air Flow				
2000	54	0.37	79	0.68
3000	106	1.1	155	1.90
4000	178	2.50	260	4.50

ELECTRICAL

FILAMENT OPERATION - The filament voltage, as measured at the filament terminals, should be 7.5 volts, with maximum allowable variations due to line fluctuations of from 7.12 to 7.87 volts.

INTERLOCKS - An interlock device should be provided to insure that cooling air flow is established before application of electrical power, including the heater. The circuit should be so arranged that rf drive cannot be applied in the absence of normal plate voltage.

INPUT CIRCUIT - When operated as a grounded-grid rf amplifier, the use of a matching network in the cathode circuit is recommended. For best results with a single-ended amplifier, and depending on the application, it is suggested the network have a "Q" of at least 2, and higher if possible.

RADIO FREQUENCY RADIATION - Avoid exposure to strong rf fields even at relatively low frequency. Absorption of rf energy by human tissue is dependent on frequency. Under 30 MHz, most of the energy will pass completely through the human body with little attenuation or heating effect. Public health agencies are concerned with the hazard, however, even at these frequencies, and it is worth noting that some commercial dielectric heating units actually operate at frequencies as low as the 13 and 27 MHz bands.

Many EIMAC power tubes, such as these, are specifically designed to generate or amplify radio frequency power. There may be a relatively strong rf field in the general proximity of the power tube and its associated circuitry--the more power involved, the stronger the rf field. Proper enclosure design and efficient coupling of rf energy to the load will minimize the rf field in the vicinity of the power amplifier unit itself.

FAULT PROTECTION - In addition to normal cooling airflow interlock and plate over-current interlock it is good practice to protect the tube from internal damage which could result from occasional plate arcing at high plate voltage.

In all cases some protective resistance, at least 10 ohms, should be used in series with the tube anode to absorb power supply stored energy in case a plate arc should occur.

HIGH VOLTAGE - Normal operating voltages used with these tubes are deadly, and the equipment must be designed properly and operating precautions must be followed. Design all equipment 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 primary circuits of the power supply 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.

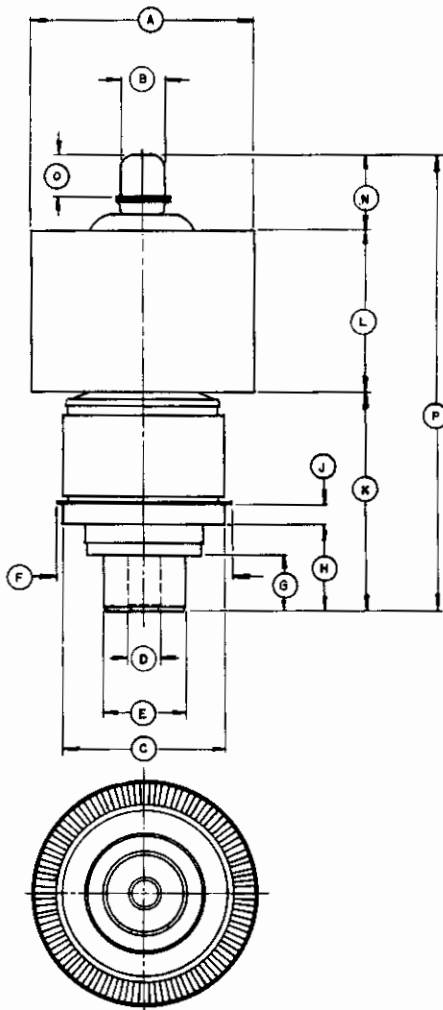


INTERELECTRODE CAPACITANCE - The actual internal interelectrode capacitance of a tube is influenced by many variables in most applications, such as stray capacitance to the chassis, capacitance added by the socket used, stray capacitance between tube terminals, and wiring effects. To control the actual capacitance values within the tube, as the key component involved, the industry and the Military Services use a standard test procedure as described in Electronic Industries Association Standard RS-191. This requires the use of specially constructed test fixtures which effectively shield all external tube leads from each other and eliminates any capacitance reading to "ground". The test is performed on a cold tube. Other factors being equal, controlling internal tube capacitance in this way normally assures good interchangeability of tubes over a period of time, even when the tube may be made by different manufacturers.

The capacitance values shown in the manufacturer's technical data, or test specifications, normally are taken in accordance with Standard RS-191.

The equipment designer is therefore cautioned to make allowance for the actual capacitance values which will exist in any normal application. Measurements should be taken with the socket and mounting which represent approximate final layout if capacitance values are highly significant in the design.

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

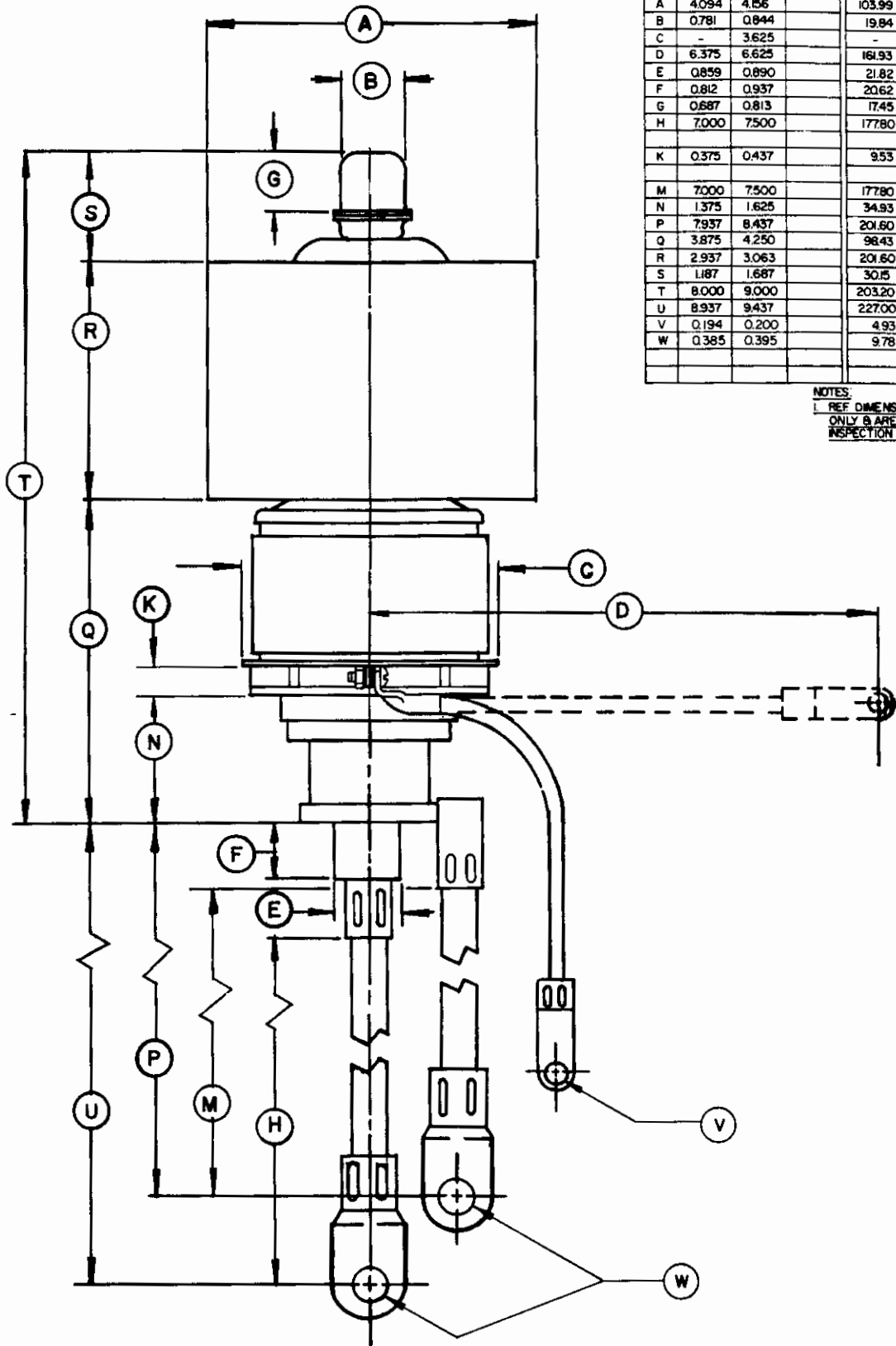


DIM.	INCHES			MILLIMETERS		
	MIN.	MAX.	REF.	MIN.	MAX.	REF.
A	4.094	4.156	--	103.99	105.56	--
B	0.781	0.844	--	19.83	21.44	--
C	2.990	3.010	--	75.95	76.45	--
D	0.615	0.635	--	15.62	16.13	--
E	1.490	1.510	--	37.85	38.35	--
F	--	3.625	--	--	92.08	--
G	0.913	0.937	--	20.65	23.80	--
H	1.375	1.625	--	34.92	41.28	--
J	0.391	0.422	--	9.93	10.72	--
K	3.875	4.250	--	98.43	107.95	--
L	2.937	3.063	--	74.60	77.80	--
N	1.187	1.687	--	30.15	42.85	--
P	8.000	9.000	--	203.20	228.60	--
Q	0.687	0.913	--	17.45	20.65	--

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

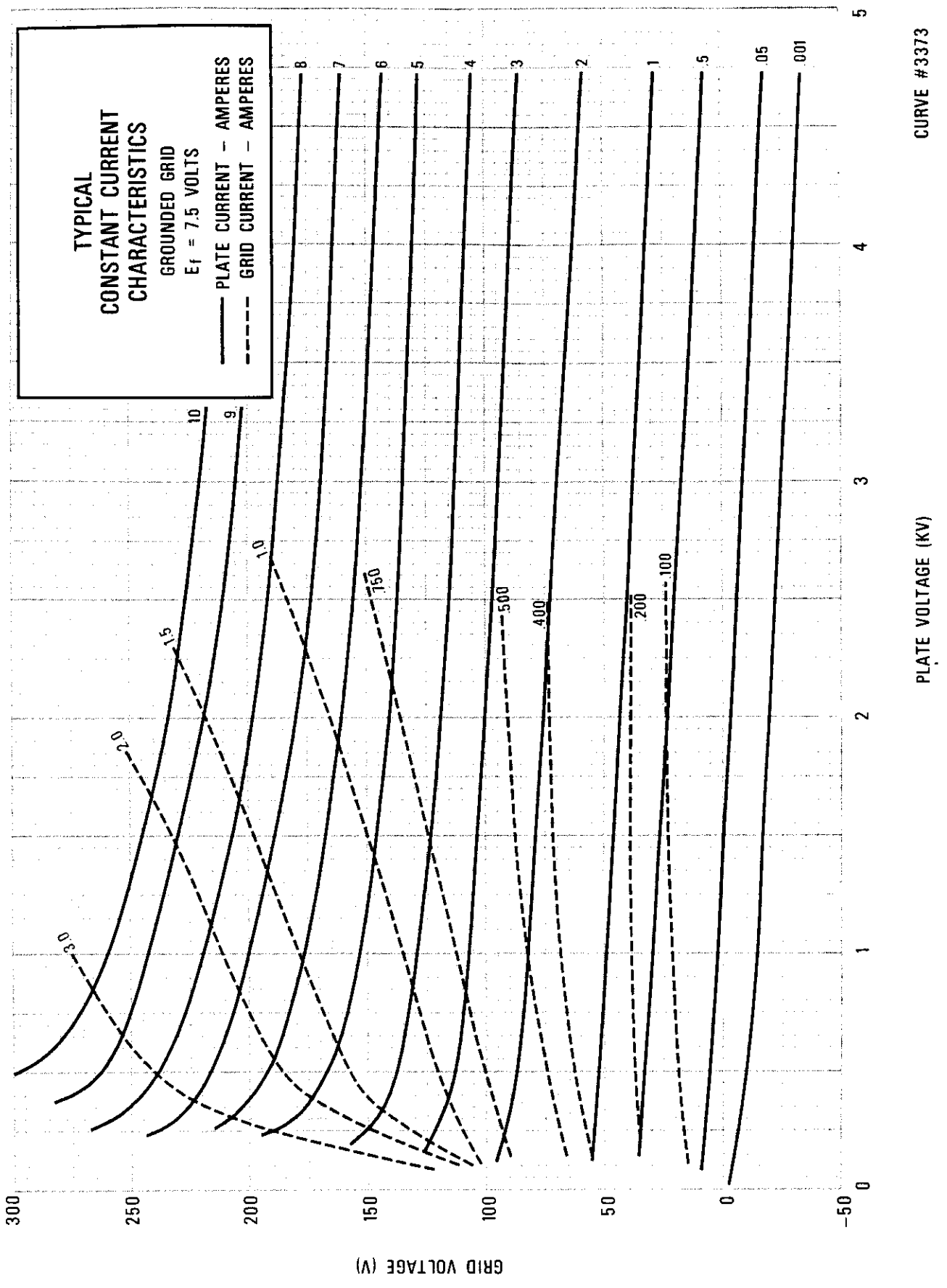


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DIM.	DIMENSIONAL DATA					
	INCHES			MILLIMETERS		
	MIN.	MAX.	REF.	MIN.	MAX.	REF.
A	4.094	4.156		103.99	105.56	
B	0.781	0.844		19.84	21.44	
C	-	3.625		-	92.08	
D	6.375	6.625		161.93	168.28	
E	0.859	0.890		21.82	22.61	
F	0.812	0.937		20.62	23.80	
G	0.687	0.813		17.45	20.65	
H	7.000	7.500		177.80	190.50	
K	0.375	0.437		9.53	11.10	
M	7.000	7.500		177.80	190.50	
N	1.375	1.625		34.93	41.28	
P	7.937	8.437		201.60	214.30	
Q	3.875	4.250		98.43	107.95	
R	2.937	3.063		201.60	214.30	
S	1.187	1.687		30.15	42.85	
T	8.000	9.000		203.20	228.60	
U	8.937	9.437		227.00	239.70	
V	0.194	0.200		4.93	5.08	
W	0.385	0.395		9.78	10.03	

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



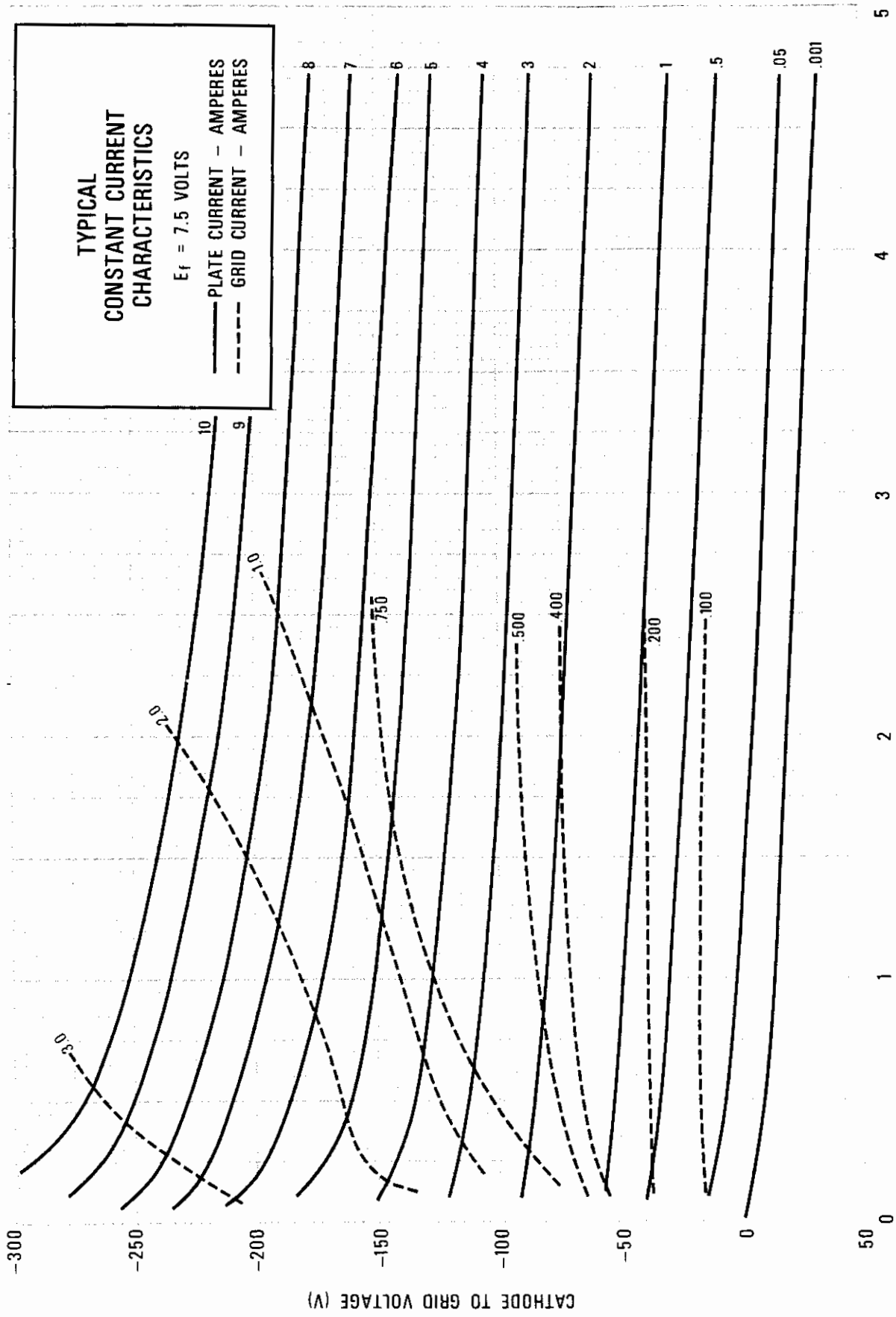
CURVE #3373

PLATE VOLTAGE (KV)

GRID VOLTAGE (V)



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CURVE #3375

PLATE TO GRID VOLTAGE (KV)