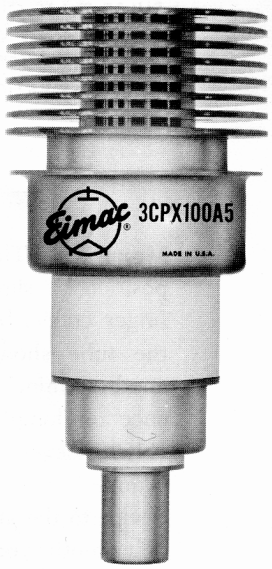
EITEL-McCULLOUGH, INC.
SAN CARLOS, CALIFORNIA

7815R
3CPX100A5

UHF PULSE TRIODE



The Eimac 7815R/3CPX100A5 is a pulse rated version of the 3CX100A5. A longer grid-anode ceramic insulator is incorporated, making the tube useful at high altitude. The nominal plate dissipation rating is 100 watts.

The tube is usable in pulse applications to 3000 Megacycles. Electrical characteristics are similar to the 3CX100A5.

GENERAL CHARACTERISTICS

ELECTRICAL

	Min.	Nom.	Max.
Cathode: Oxide-coated, Unipotential			
Heating time	60		seconds
Heater:			
Voltage		6.0	volts
Current	0.90		1.05 amperes
Amplification Factor		100	
Transconductance (I b = 70 milliamperes)		25,000	Micromhos

Direct Interelectrode Capacitances	Min.	Max.
Grid-Cathode	5.7	7.0 uuf
Grid-Plate	1.85	2.10 uuf
Plate-Cathode	-	0.035 uuf
Frequency for Maximum Ratings		3000 Megacycles

MECHANICAL

Terminals	Graduated Cylindrical Surfaces
Maximum Operating Temperatures:	
Ceramic-to-Metal Seals	250°C
Anode Core	250°C
Operating Position	Any
Cooling	Forced Air
Maximum Overall Dimensions:	
Length	2.701 inches
Diameter	1.264 inches
Net Weight	2.5 ounces
Shipping Weight (approx.)	7.0 ounces

PLATE PULSED OSCILLATOR OR AMPLIFIER CLASS-C

MAXIMUM RATINGS

PEAK PULSE PLATE VOLTAGE	3500	MAX. VOLTS
DC GRID VOLTAGE	-150	MAX. VOLTS
PULSE PLATE CURRENT	3.0	MAX. VOLTS
DC CATHODE CURRENT	125	MAX. MA
PULSE GRID CURRENT	1.8	MAX. AMPS
PLATE DISSIPATION (AVG)	100	MAX. WATTS
GRID DISSIPATION (AVG)	2	MAX. WATTS

TYPICAL OPERATION

Pulse Plate Voltage	3500	3500	volts
Pulse Plate Current	3.0	3.0	amps
DC Plate Current (avg)	7.5	9	mA
DC Grid Current (avg)	4.5	3	mA
Pulse Power Output	1600	2000	watts
Frequency	3000	2500	Mc
Pulse Length	3	5	usec
Duty Factor	0.0025	0.003	

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GRID PULSED OSCILLATOR OR AMPLIFIER CLASS-C

MAXIMUM RATINGS

DC PLATE VOLTAGE	2000 MAX. VOLTS
DC GRID VOLTAGE	-150 MAX. VOLTS
PULSE PLATE CURRENT	3.0 MAX. AMPS
DC CATHODE CURRENT	125 MAX. MA.
PLATE DISSIPATION (AVG)	100 MAX. WATTS
GRID DISSIPATION (AVG)	2 MAX. WATTS

TYPICAL OPERATION

DC Plate Voltage	1600	1700	volts
DC Grid Voltage	-45	-45	volts
Pulse Plate Current	3.0	1.9	amps
Pulse Grid Current	1.8	1.1	amps
Pulse Power Output	1000	1500	watts
Frequency	3000	1100	Mc
Pulse Length	3	3.5	usec
Duty Factor	0.0025	0.001	

APPLICATION

MECHANICAL

Mounting—The 3CPX100A5 may be operated in any position. It should be firmly held in place by spring-finger collets bearing on the terminal surfaces. In use the tube should seat against the underside of the anode-terminal flange which is on the plane of reference for longitudinal dimensions. In appplications involving severe shock and vibration, the tube may be clamped in place by applying a suitable clamping device to the anode-terminal flange. It is recommended that no other portion of the tube be subjected to clamping forces.

Connections—The terminals are in the form of concentric cylinders of graduated diameters conveniently used with coaxial tuning devices. Spring-fingered collets should be used to make contact with the anode, grid, cathode and heater terminals. Adequate contact area and spring pressure should be provided to minimize heating and to prevent erratic circuit performance at the higher frequencies. Non-contacting or intermittently-contacting collet fingers will cause troublesome circuit behavior, especially at very-high and ultra-high frequencies. Electrode contact surfaces should be kept clean and free of oxide coatings.

Cooling—Sufficient cooling air must be provided for the anode and body seals to maintain operating temperatures below the rated maximum value of 250°C. At sea level, with 20°C air, approximately 12.5 CFM of cooling air directed across the anode through a suitale cowling will maintain safe anode temperature. In pulse applications requiring low plate dissipation and/or small size, the coolerless 3CPN10A5 should be considered.

The nominal plate dissipation rating is 10 watts and is dependent on convection cooling to a heat sink. Where adequate cooling is provided this value may be extended. Where greater plate dissipation is required use of the 3CPX100A5 is recommended.

It should be borne in mind that operating temperature is the sole criterion of cooling effectiveness, regardless of the coolant type, flow rate or coolant temperature. One method of measuring the surface temperatures is the use of temperature sensitive lacquer, such as "Tempilaq."

ELECTRICAL

Heater Operation—The rated heater voltage for the 3CPX100A5 is 6.0 volts. The heater voltage for the 3CPX100A5 should be maintained within plus or minus 5% of its intended value to minimize variations in circuit performance and to obtain maximum tube life.

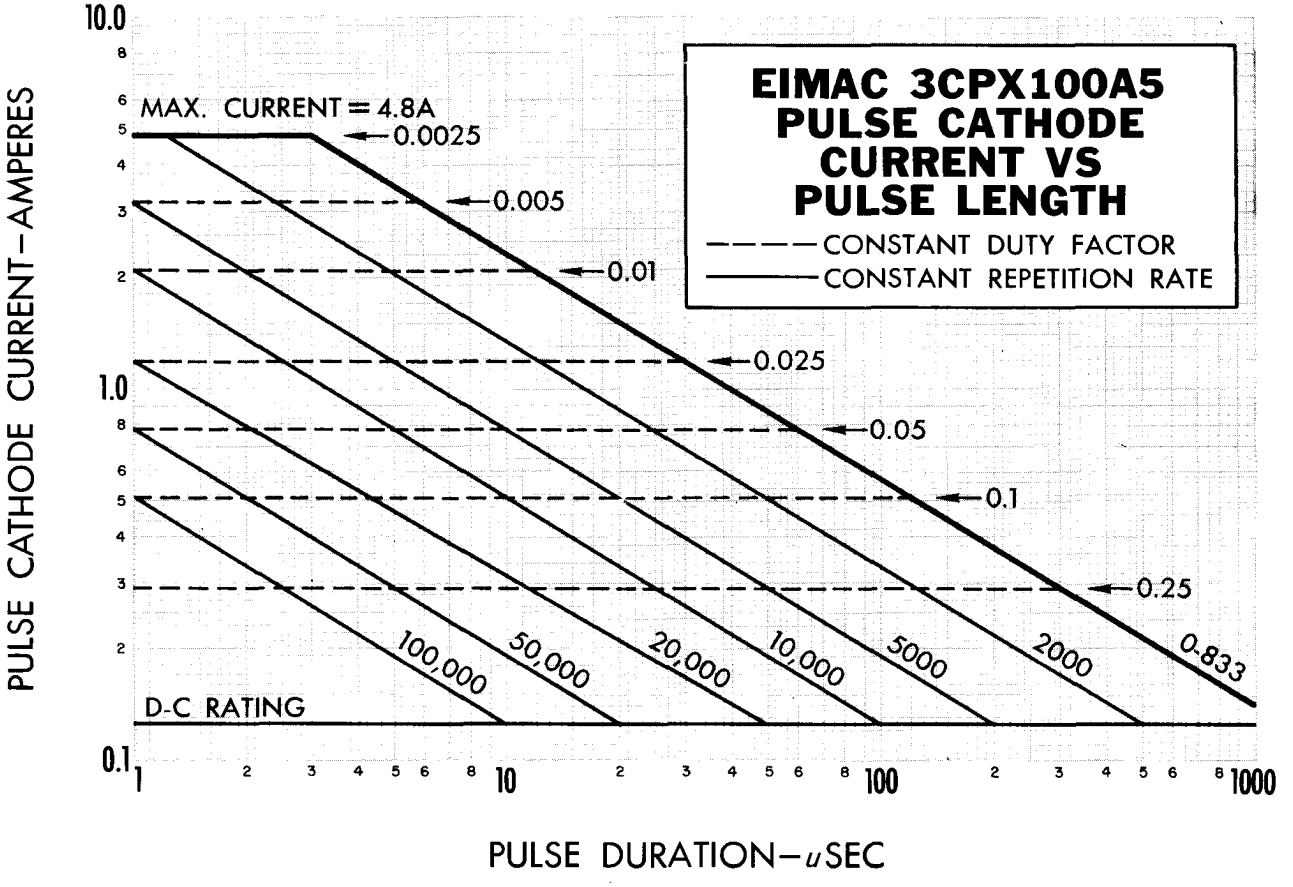
At frequencies above approximately 1000 megacycles, transit time effects begin to influence cathode temperature. The amount of driving power diverted to heating the cathode by back-bombardment will depend upon the frequency, the plate current, driving power, and duty factor. If the conditions of operation result in appreciable cathode back-heating, it may be necessary to start dynamic tube operation at normal heater voltage followed by a reduction of heater voltage to a lower value. The heater of the 3CPX100A5 must not be operated at less than 4.5 volts in any case.

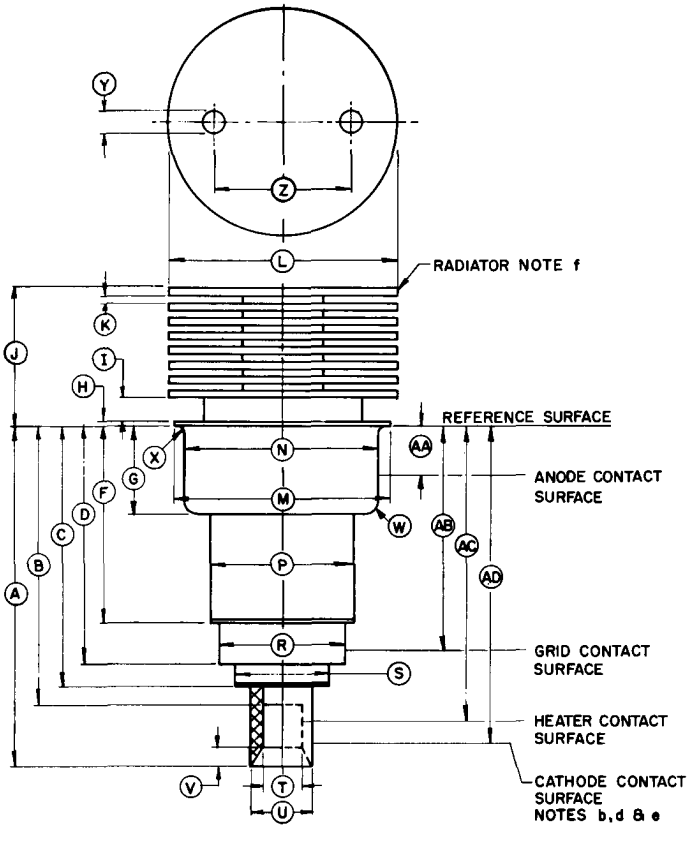
Cathode Operation—The oxide-coated unipotential cathode in this tube must be protected against excessively high emission currents. For all types of operation the maximum rated dc current is 125 milliamperes. In pulse service, current must be limited according to the curve on page 3.

It is recommended that the rated heater voltage be applied for a minimum of 60 seconds before other operating voltages are applied.

Control Grid Operation—Grid dissipation must not exceed the rated maximum 2.0 watts grid dissipation power. In pulse applications the instantaneous peak grid-to-cathode voltage must be limited to +250 to −750 volts.

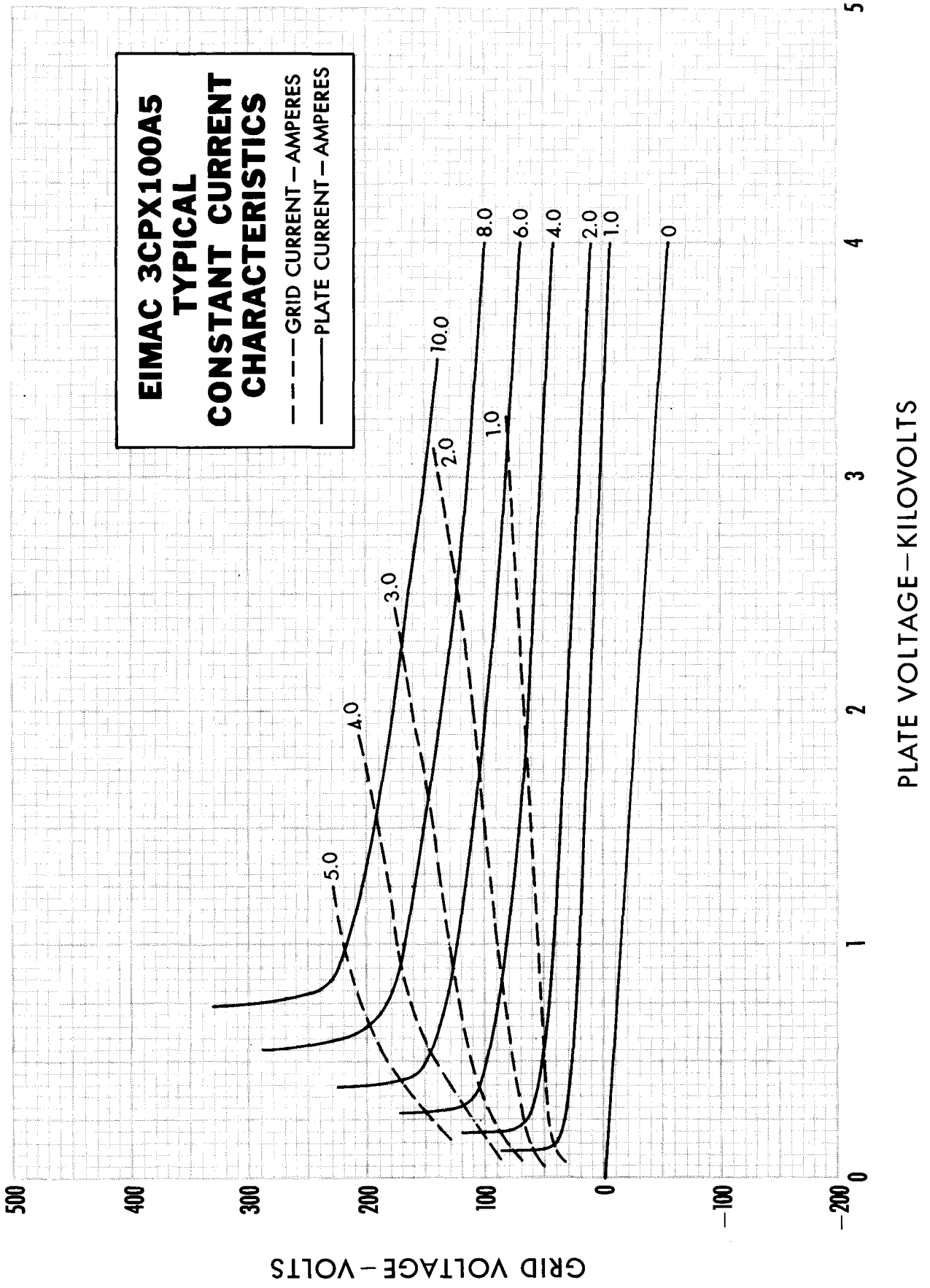
Special Applications—If it is desired to operate this tube under conditions widely different from those given here, write to Power Grid Tube Marketing, Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, California for information and recommendations.





DIMENSIONS IN INCHES

DIMENSIONAL DATA			
REF.	MIN.	MAX.	NOM.
A	1.815	1.875	
B		1.534	
C		1.475	
D	1.289	1.329	
F	.970	1.010	
G	.462	.477	
H		.040	
I	.125	.185	
J	.766	.826	
K	.025	.045	
L	1.234	1.264	
M	1.180	1.195	
N	1.025	1.035	
P	.772	.792	
R	.555	.565	
S		.545	
T	.213	.223	
U	.315	.325	
V		.086	
W		.100	
X		.035	
Y	.105	.145	
Z	.650	.850	
AA	.035	.361	
AB	1.185	1.265	
AC	1.534	1.726	
AD	1.475	1.615	


EIMAC 3CPX100A5
TYPICAL
CONSTANT CURRENT
CHARACTERISTICS
GRID CURRENT—AMPERES
PLATE CURRENT—AMPERES
10.0
8.0
6.0
4.0
2.0
1.0
0
5.0
4.0
3.0
2.0
1.0
500
400
300
200
100
0
−100
−200
0
1
2
3
4
5
PLATE VOLTAGE—KILOVOLTS
GRID VOLTAGE—VOLTS