

EITEL-McCULLOUGH, INC.
SAN CARLOS, CALIFORNIA

7815
3CPN10A5
UHF
PULSE
TRIODE

The Eimac 7815/3CPN10A5 is a low duty pulse rated version of the 3CX100A5 with the anode cooler removed. A longer grid-anode ceramic insulator is incorporated, making the tube useful at high altitude. The nominal plate dissipation rating is 10 watts but may be increased if sufficient cooling is provided. Cooling is accomplished by conduction through a suitable heat sink or convection. Where greater plate dissipation is required, the 7815R/3CPX100A5 should be used.

The tube is usable in pulse applications to 3000 Megacycles. Electrical characteristics except for plate dissipation 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 | | | |
| Grid-Cathode | | | Min. 5.6 Max. 7.0 uuf |
| Grid-Plate | | | 1.86 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 | | | Conduction and Convection |
| Maximum Overall Dimensions: | | | |
| Length | | | 2.701 inches |
| Diameter | | | 1.195 inches |
| Net Weight | | | 2.0 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) | 10 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) | - | - | - | - | 10 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 3CPN10A5 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 applications 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.

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 3CPX10A5 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 3CPN10A5 is 6.0 volts. The heater voltage for the 3CPN10A5 should be maintained within plus or minus 5% of its intended value to minimize variations in circuit performance and to obtain maximum tube life.

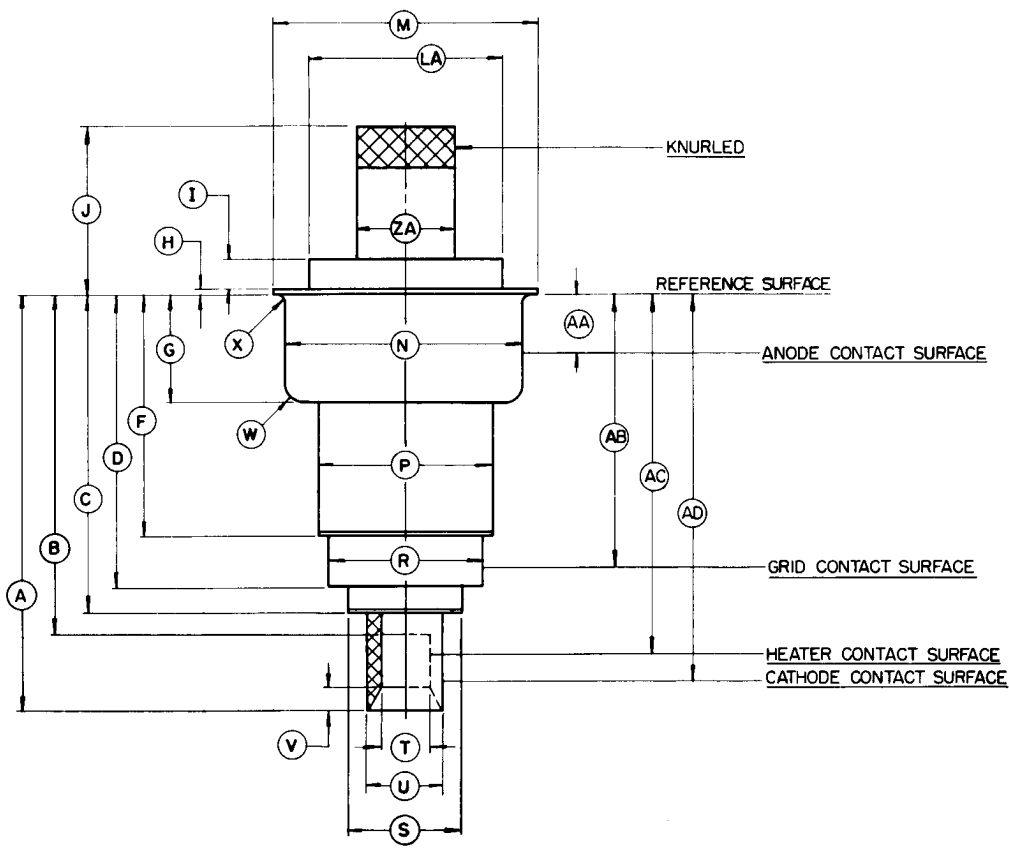
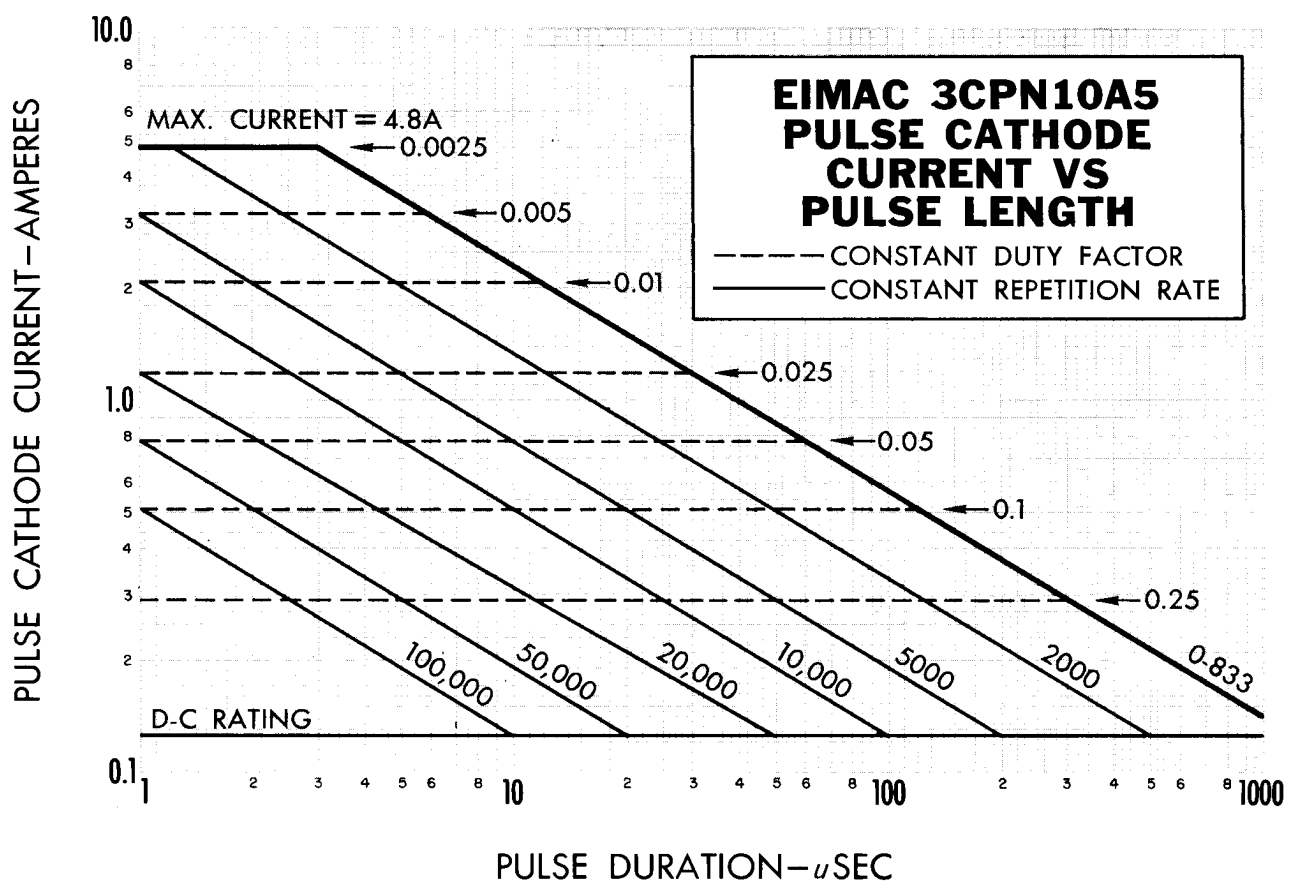
At frequencies above approximately 1000 megacycles, transit time effects begin to influence cathode temperature. The amount of driving power diverted to heating the cathode by back-bombardment will depend upon the frequency, the plate current, driving power, and duty factor. If the conditions of operation 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 3CPX10A5 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 | | .185 | |
| J | .766 | .826 | |

| | | | |
|----|-------|-------|------|
| M | 1.180 | 1.195 | |
| N | 1.025 | 1.035 | |
| P | .772 | .792 | |
| R | .655 | .665 | |
| S | | .545 | |
| T | .213 | .223 | |
| U | .315 | .325 | |
| V | | .086 | |
| W | | .100 | |
| X | | .035 | |
| LA | | | .850 |
| ZA | .427 | .447 | |

| ELECTRODE CONTACT AREA | | |
|------------------------|--------------|---------|
| REF | | |
| AA | .198 ± .163 | ANODE |
| AB | 1.225 ± .040 | GRID |
| AC | 1.631 ± .097 | HEATER |
| AD | 1.645 ± .170 | CATHODE |



3CPN10A5

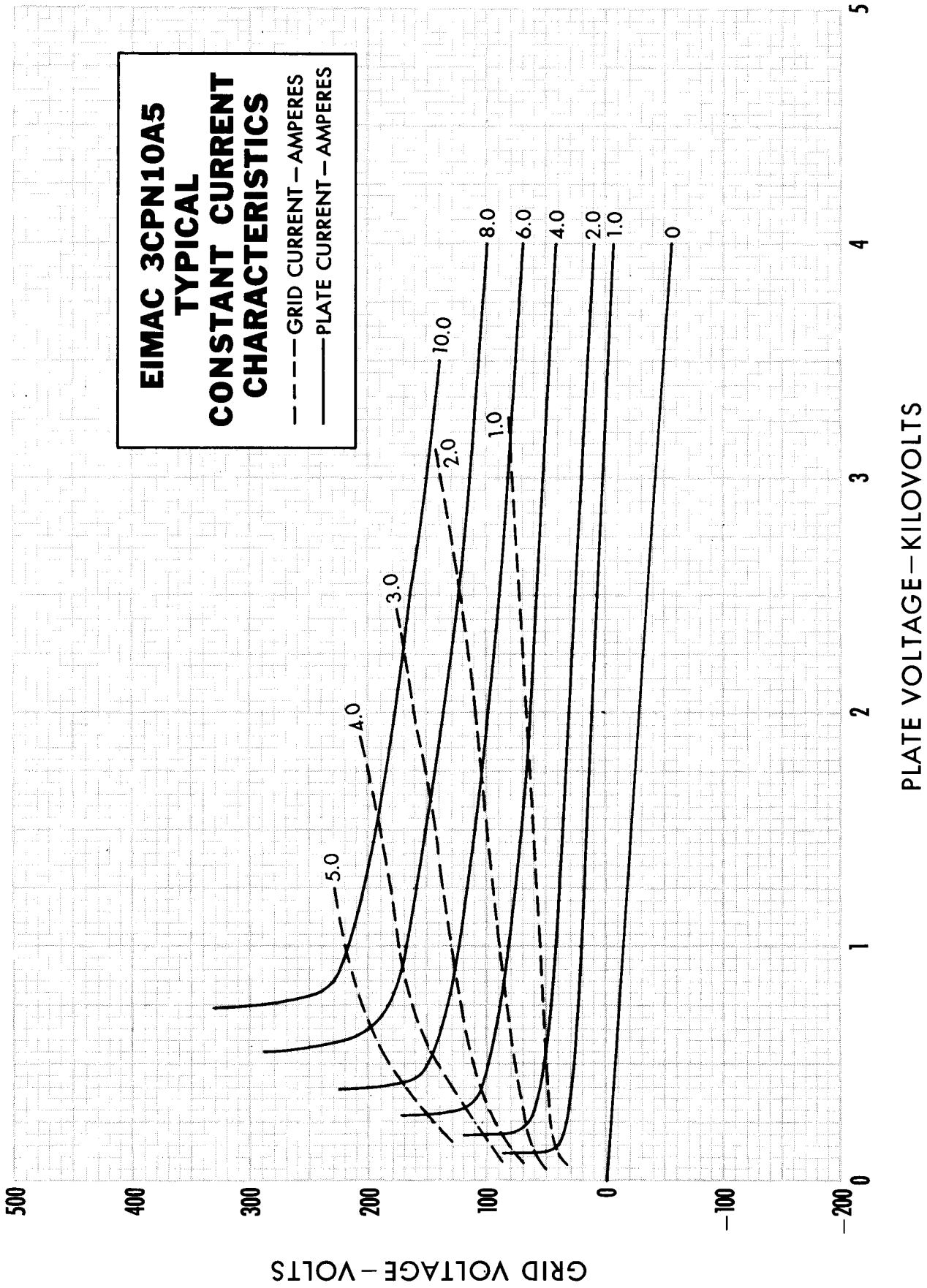


PLATE VOLTAGE — KILOVOLTS