



TECHNICAL DATA

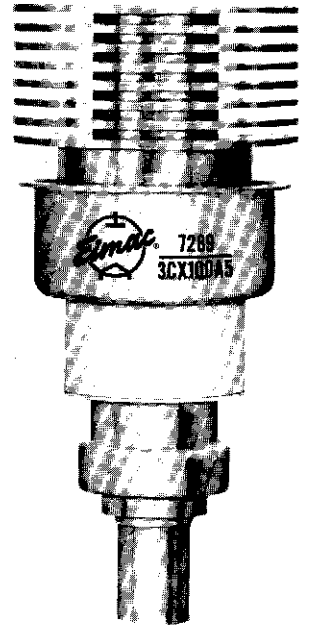
7289
3CX100A5

PLANAR TRIODE

The EIMAC Type 7289/3CX100A5 is a rugged ceramic/metal planar triode designed for use in CW, grid- or plate-pulsed oscillator, amplifier or frequency multiplier service up to 3 GHz. The tube may also be used in pulse modulator or voltage regulator service. The 7289 is supplied with an air cooled radiator for forced air cooling.

The 7289 features high mu, high transconductance, great mechanical strength and low interelectrode capacitance.

Note: The data for the 7289/3CX100A5 also apply to the 2C39A and 2C39WA in all respects, except that filament voltage for 2C39A is 6.3 volts.



GENERAL CHARACTERISTICS¹

ELECTRICAL

Cathode: Oxide Coated, Unipotential

| | |
|---|-------------|
| Heater: Voltage | 6.0 ± 0.3 V |
| Current, at 6.0 volts | 1.0 A |
| Transconductance (Average): | |
| I _b = 70 mA, E _b = 600 Vdc | 25 mmhos |
| Amplification Factor (Average) | 100 |
| Direct Interelectrode Capacitance (grounded cathode) ² | |
| C _{in} | 6.30 pF |
| C _{out} | .035 pF |
| C _{gp} | 2.00 pF |
| Cut-off bias ³ | -25 V max |

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. When the cathode is heated to the proper temperature, the grid-cathode capacitance will increase from the cold value by approximately 1 pF due to thermal expansion of the cathode.
3. Measured with one milliamperes plate current and a plate voltage of 1 kVdc.

(Revision 11-1-71) © by Varian

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MECHANICAL

Maximum Overall Dimensions

| | |
|--------------------------------|--------------------|
| Length | 2.701 in; 68.60 mm |
| Diameter | 1.264 in; 32.11 mm |
| Net Weight | 2.2 oz; 63 gm |
| Operating Position | Any |
| Maximum Operating Temperature: | |
| Ceramic/Metal Seals | 250°C |
| Anode Core | 250°C |
| Cooling | Forced Air |
| Terminals | Coaxial, special |

ENVIRONMENTAL

| | |
|--|------------|
| Shock, 11 ms, non-operating | 60 G |
| Vibration, operating, all axis, 55 to 500 Hz | 10 G |
| Altitude, max (in suitably designed circuit) | 60,000 ft. |

RANGE VALUES FOR EQUIPMENT DESIGN

| | <u>Min.</u> | <u>Max.</u> |
|---|-------------|-------------|
| Heater: Current at 6.0 volts | 0.90 | 1.05 A |
| Cathode Warmup Time | 60 | --- sec. |
| Interelectrode Capacitance ¹ (grounded cathode connection) | | |
| C _{in} | 5.60 | 7.00 pF |
| C _{out} | --- | 0.95 pF |
| C _{gp} | 1.95 | 2.15 pF |

1. Capacitance values for a cold tube as measured in a special shielded fixture. When the cathode is heated to the proper temperature, the grid-cathode capacitance will increase from the cold value by approximately 1 pF due to thermal expansion of the cathode.

CW RF POWER AMPLIFIER OR OSCILLATOR

ABSOLUTE MAXIMUM RATINGS

| | |
|---|------------------|
| DC PLATE VOLTAGE | 1000 VOLTS |
| DC GRID VOLTAGE | -150 VOLTS |
| INSTANTANEOUS PEAK GRID-CATHODE VOLTAGE | |
| Grid negative to cathode | -400 VOLTS |
| Grid positive to cathode | 30 VOLTS |
| DC PLATE CURRENT | 100 MILLIAMPERES |
| DC GRID CURRENT | 50 MILLIAMPERES |
| AVERAGE PLATE DISSIPATION | |
| Forced air cooling ¹ | 100 WATTS |
| GRID DISSIPATION (Average) | 2 WATTS |
| FREQUENCY | 2.5 GHz |

1. Using EIMAC radiator PN 014224.

OPERATING CONDITIONS FOR 7289 IN REPRESENTATIVE APPLICATION

GROUNDED GRID CW POWER AMPLIFIER

| | |
|-------------------------------------|---------|
| Frequency | 500 MHz |
| Heater Voltage | 6.0 V |
| DC Plate Voltage | 900 Vdc |
| DC Grid Voltage (approx.) | -40 Vdc |
| DC Cathode Current | 90 mAdc |
| DC Grid Current | 25 mAdc |
| Drive Power (approx.) | 6 W |
| Useful CW Power Output | 40 W |

GROUNDED GRID CW OSCILLATOR

| | |
|-------------------------------------|---------|
| Frequency | 2.5 GHz |
| Heater Voltage | 5.0 V |
| DC Plate Voltage | 900 Vdc |
| DC Grid Voltage (approx.) | -20 Vdc |
| DC Plate Current | 90 mAdc |
| DC Grid Current | 10 mAdc |
| Useful CW Power Output | 17 W |

GRID PULSED OR PLATE PULSED AMPLIFIER OR OSCILLATOR

ABSOLUTE MAXIMUM RATINGS

| | |
|--|-------------|
| DC PLATE VOLTAGE (grid pulsed) | 1000 VOLTS |
| PEAK PULSE PLATE VOLTAGE (plate pulsed) | 3500 VOLTS |
| DC GRID VOLTAGE | -150 VOLTS |
| INSTANTANEOUS PEAK GRID-CATHODE VOLTAGE | |
| Grid negative to cathode | -700 VOLTS |
| Grid positive to cathode | 250 VOLTS |
| PULSE PLATE CURRENT | 3.0 AMPERES |
| PULSE GRID CURRENT | 1.8 AMPERES |
| AVERAGE PLATE DISSIPATION | |
| Forced Air Cooling ¹ | 100 WATTS |
| GRID DISSIPATION (Average) | 2 WATTS |
| FREQUENCY | 3.0 GHZ |
| PULSE DURATION ² | 3 μ s |
| DUTY FACTOR ² | .0025 |

PULSE MODULATOR AND PULSE AMPLIFIER SERVICE

ABSOLUTE MAXIMUM RATINGS

| | |
|---|------------------|
| DC PLATE VOLTAGE | 1000 VOLTS |
| PEAK PLATE VOLTAGE | 1200 VOLTS |
| DC GRID VOLTAGE | -150 VOLTS |
| INSTANTANEOUS PEAK GRID-CATHODE VOLTAGE | |
| Grid negative to cathode | -700 VOLTS |
| Grid positive to cathode | 150 VOLTS |
| PULSE CATHODE CURRENT | 4.8 AMPERES |
| DC PLATE CURRENT | 100 MILLIAMPERES |

Operating Conditions for 7289 in Representative Application.

PLATE PULSED OSCILLATOR

| | |
|---|-----------|
| Frequency | 3.0 GHZ |
| Heater Voltage | 5.8 V |
| Peak Plate Voltage | 3500 v |
| Peak Video Plate Current | 3.0 a |
| Peak Video Grid Current | 1.8 a |
| Useful Power output (approx.) | 1600 w |
| Pulse Duration | 3 μ s |
| Duty Factor | .0025 |

1. Using EIMAC radiator PN 014224.
2. For applications using longer pulse duration and/or higher duty cycle consult the nearest Varian Electron Tube & Device Field Office, or the Product Manager, EIMAC Division of Varian, Salt Lake City, Utah.

AVERAGE PLATE DISSIPATION

| | |
|---|-------------|
| Forced Air Cooling ¹ | 100 WATTS |
| GRID DISSIPATION (Average) | 2 WATTS |
| PULSE DURATION ² | 3.0 μ s |
| CUT-OFF Mu | 70 |
| DUTY FACTOR | .0025 |

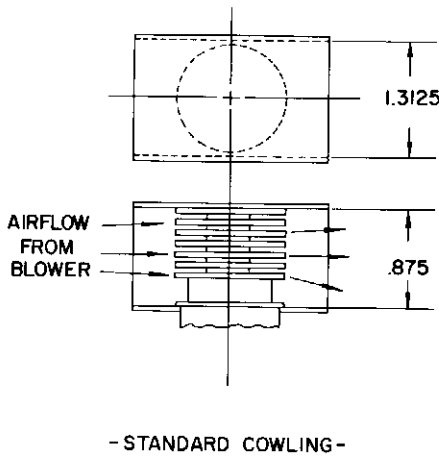
1. Using EIMAC radiator PN 014224.
2. For applications using longer pulse duration and/or higher duty cycle consult the nearest Varian Electron Tube & Device Field Office, or the Product Manager, EIMAC Division of Varian, Salt Lake City, Utah.

APPLICATION

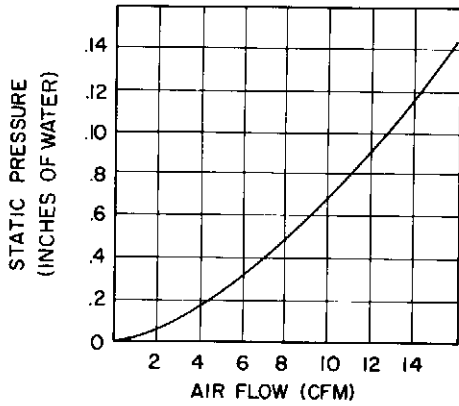
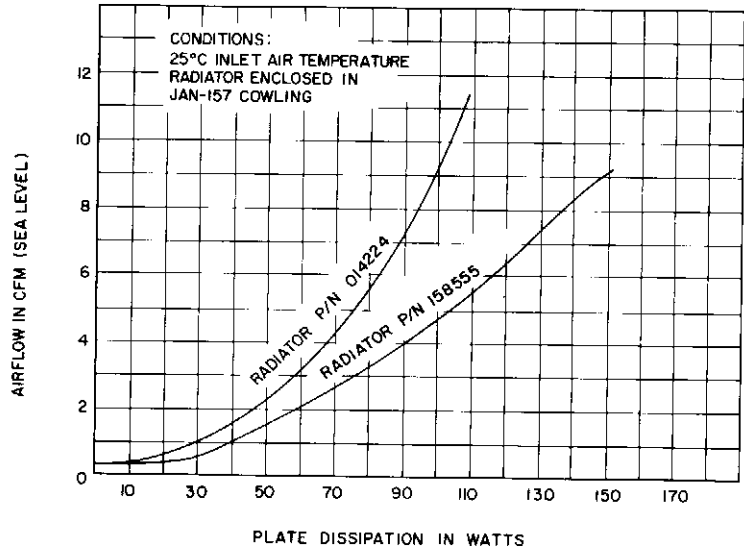
For general application information please refer to the Planar Triode Operating Instruction Sheet. The operating instructions should be consulted prior to the designing of new requirements around the above tube type. Plate dissipation of up to 150 watts is possible with the 7289 tube type when using radiator P/N 158555. If this is re-

quired the tube order should include reference to the different radiator part number. For unusual and special application consult the nearest Varian Electron Tube and Device Field Office, or the Product Manager, EIMAC Division of Varian, Salt Lake City, Utah.

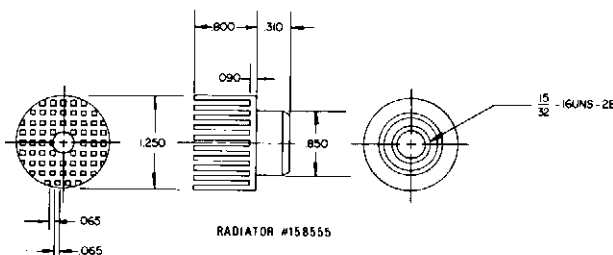
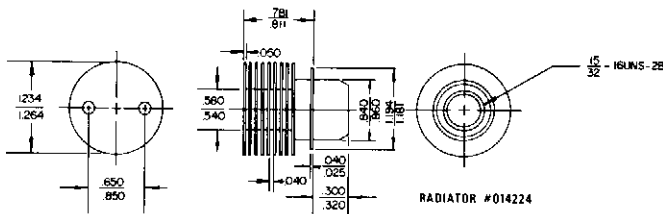
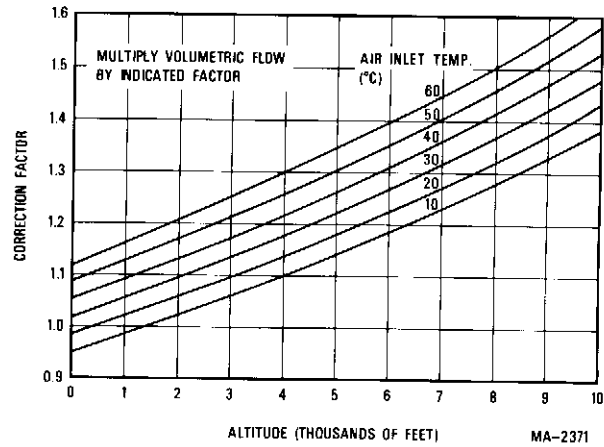
AIRFLOW vs STATIC PRESSURE WITH STANDARD COWLING JAN-157

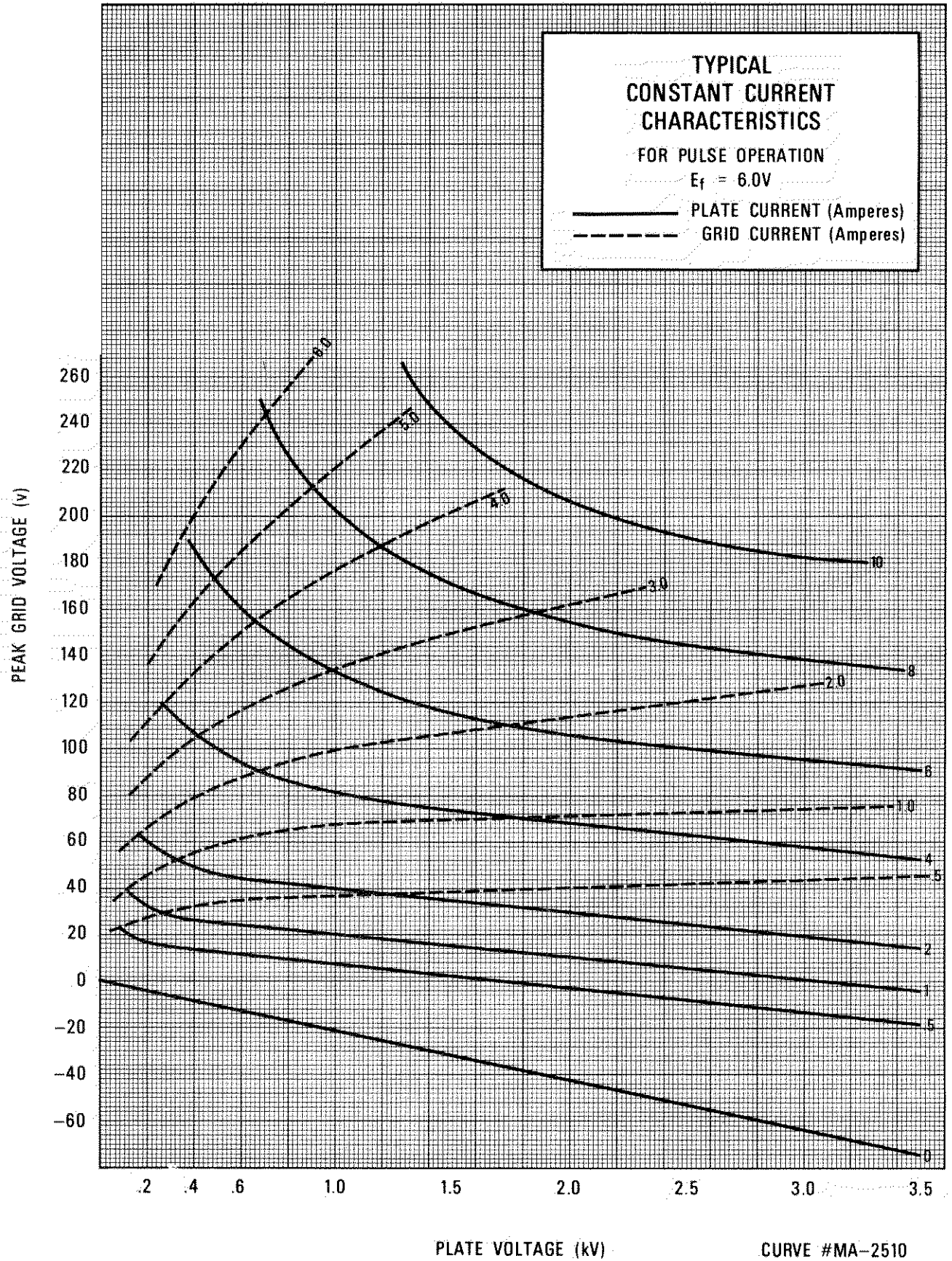


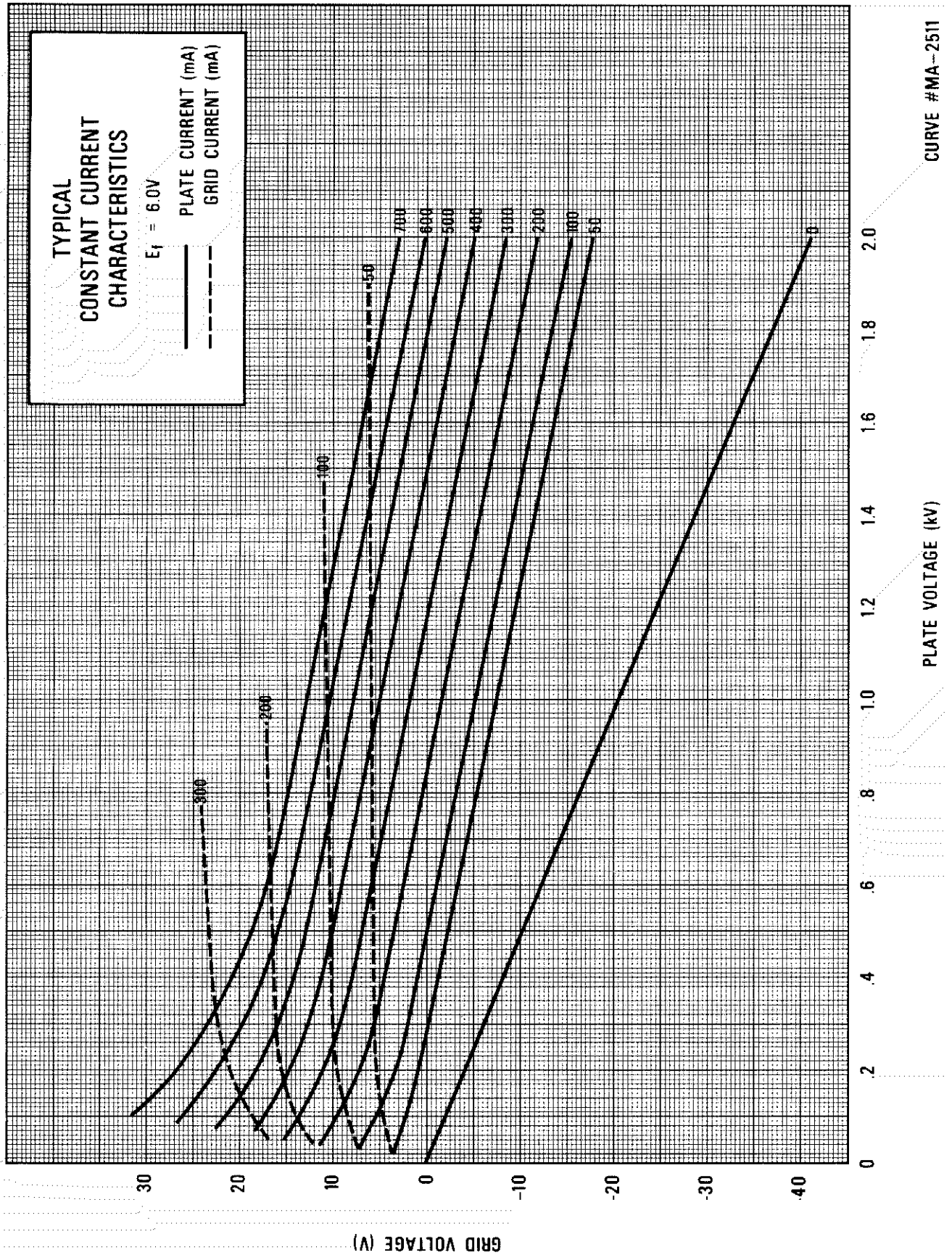
MAXIMUM PLATE DISSIPATION vs COOLING AIRFLOW

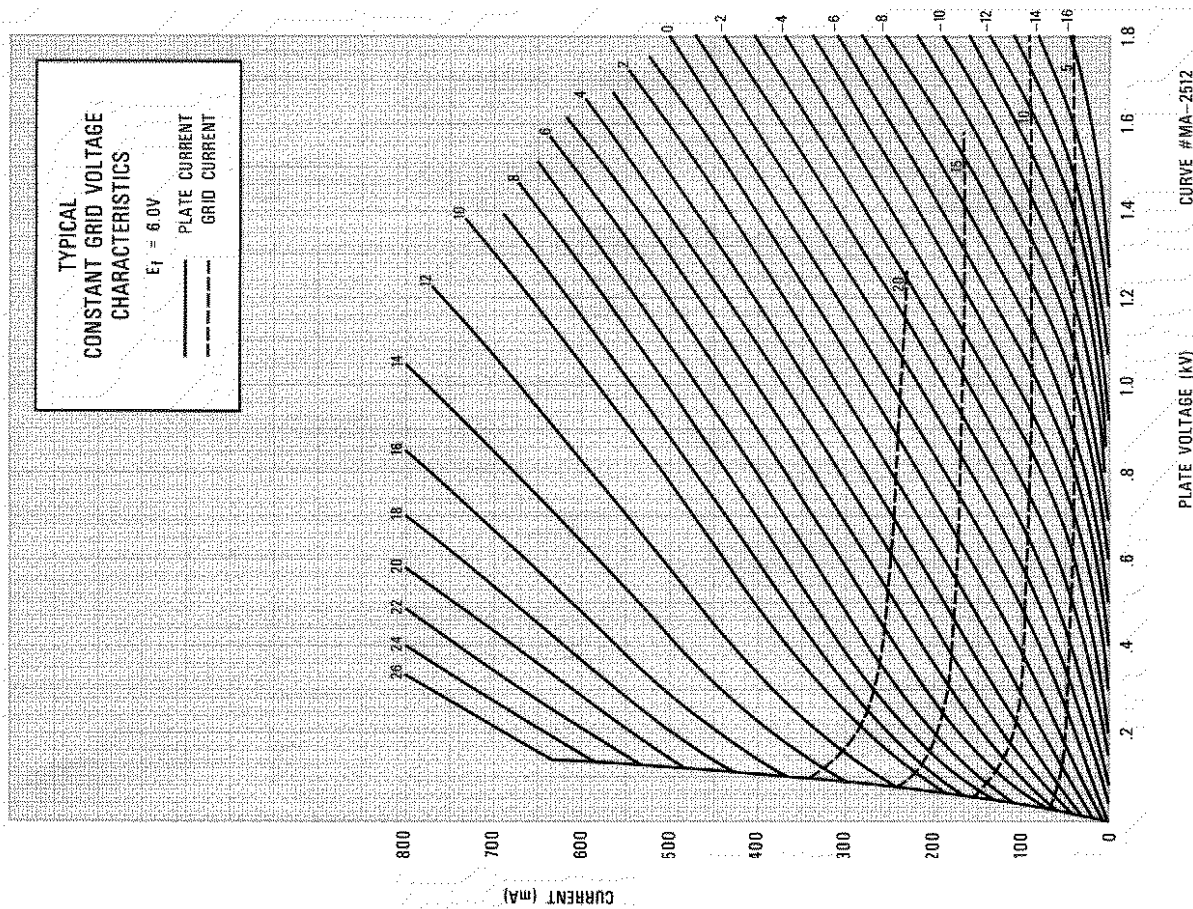
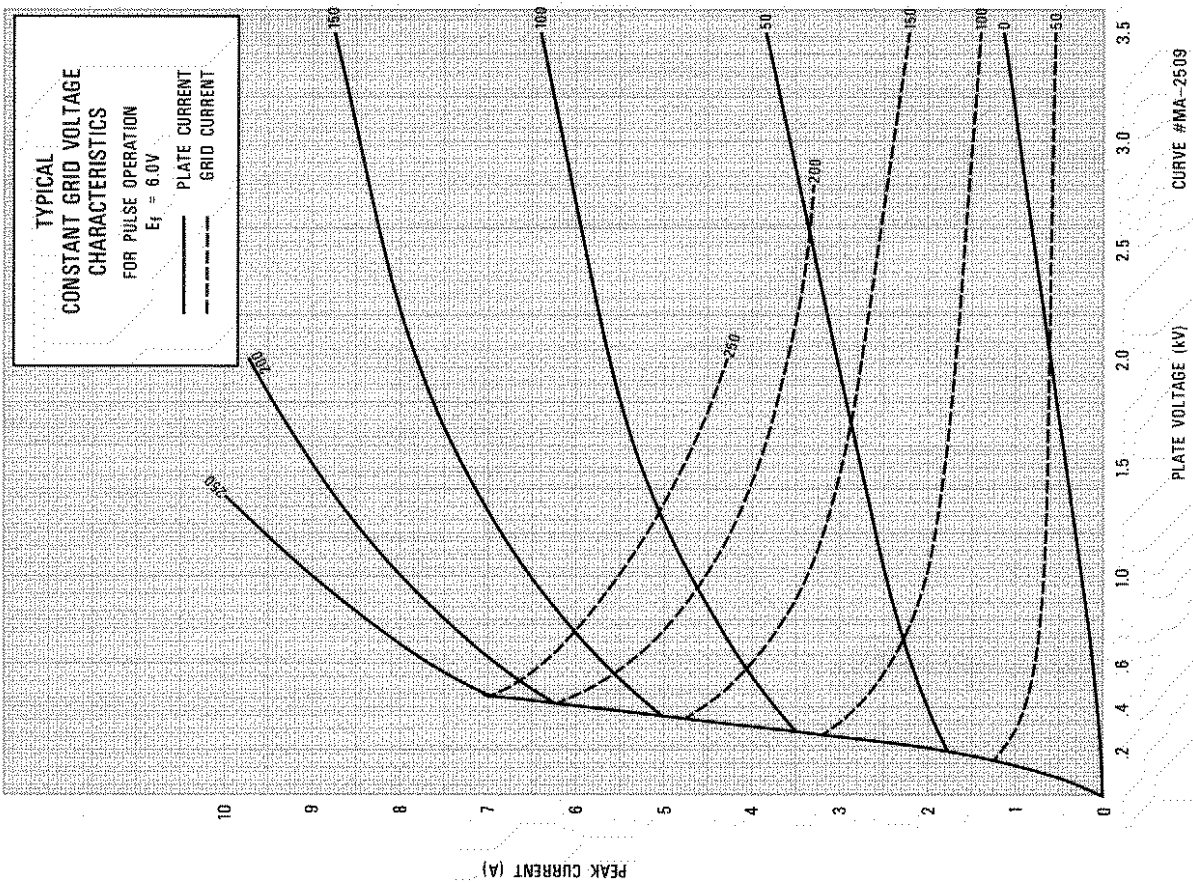


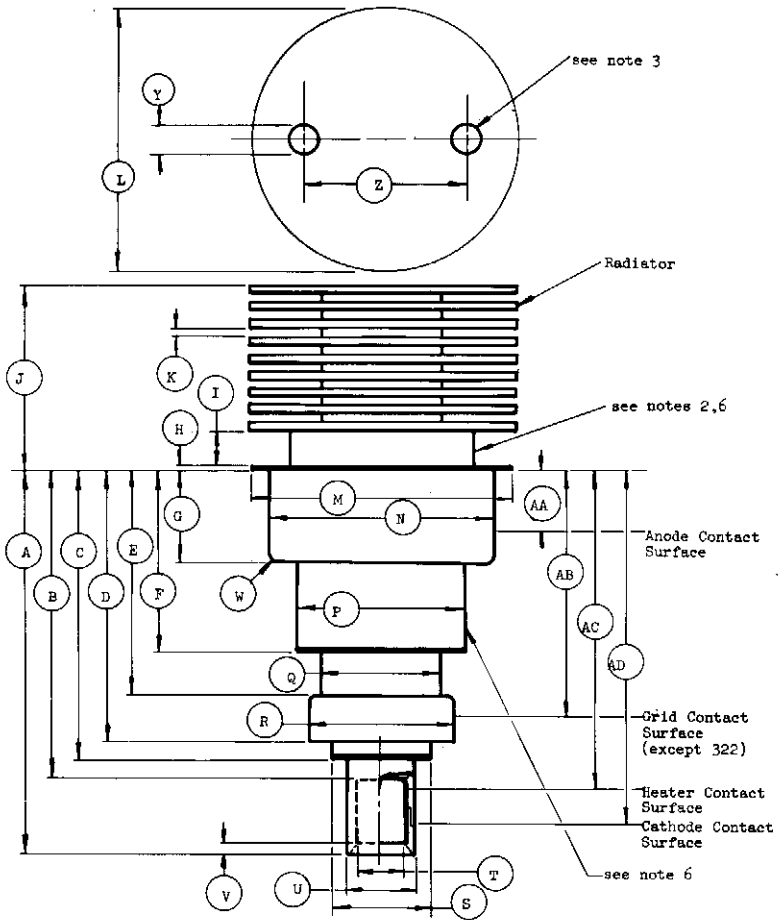
COMBINED CORRECTION FACTORS FOR INLET AIR TEMPERATURE AND ALTITUDE
(RELATIVE TO 25°C AND SEA LEVEL)











| ELECTRODE CONTACT AREA | | | | DIMENSIONAL DATA | | | | | | |
|------------------------|-------|-----------------|-------|------------------|-------|---------------------|------|-------|-------|------|
| Dim. in Inches | | Dim. in Millim. | | Dim. in Inches | | Dim. in Millimeters | | | | |
| Min. | Max. | Min. | Max. | Min. | Max. | Ref. | Dim. | MIN. | MAX. | Ref. |
| .035 | .361 | AA | .89 | 9.17 | 1.815 | 1.875 | A | 46.10 | 47.62 | |
| 1.185 | 1.265 | AB | 30.10 | 32.14 | | 1.534 | B | | 38.96 | |
| 1.534 | 1.728 | AC | 38.96 | 43.89 | | 1.475 | C | | 37.46 | |
| 1.475 | 1.815 | AD | 37.47 | 46.10 | 1.289 | 1.329 | D | 32.74 | 33.76 | |
| | | | | | 1.085 | 1.135 | E | 27.56 | 28.83 | |
| | | | | | .880 | .920 | F | 22.35 | 23.37 | |
| | | | | | .462 | .477 | G | 11.73 | 12.12 | |
| | | | | | | .040 | H | | 1.02 | |
| | | | | | .125 | .185 | I | 3.18 | 4.70 | |
| | | | | | .766 | .826 | J | 19.46 | 20.98 | |
| | | | | | .025 | .046 | K | .64 | 1.17 | |
| | | | | | 1.234 | 1.264 | L | 31.34 | 32.11 | |
| | | | | | 1.180 | 1.195 | M | 29.97 | 30.35 | |
| | | | | | 1.025 | 1.035 | N | 26.04 | 26.29 | |
| | | | | | .752 | .792 | P | 19.20 | 20.12 | |
| | | | | | .541 | .561 | Q | 13.74 | 14.25 | |
| | | | | | .655 | .665 | R | 16.64 | 16.89 | |
| | | | | | | .545 | S | | 13.84 | |
| | | | | | .213 | .223 | T | 5.41 | 5.66 | |
| | | | | | .315 | .325 | U | 8.00 | 8.26 | |
| | | | | | | .100 | W | | 2.54 | |
| | | | | | .105 | .145 | Y | 2.67 | 3.68 | |
| | | | | | .650 | .850 | Z | 16.51 | 21.59 | |
| | | | | | | .086 | V | | 2.18 | |

- NOTES:
- Metric equivalents to the nearest .01 mm, are given for general information only & are based on 1 inch = 25.4 mm.
 - This surface shall be used to measure Anode shank temperature.
 - Holes for extractor thru top fin only.
 - Eccentricity of contact surfaces shall be gaged from center line of reference & shall be as follows:
- | Contact Surface | TIR Max. | Reference |
|-----------------|----------|-----------|
| Anode | .020 | Cathode |
| Grid | .020 | Cathode |
| Heater | .012 | Cathode |
- Dias. N,R,T & U shall apply throughout entire length as defined by dims. AA,AB,AC & AD respectively.
 - This surface shall not be used for clamping or locating.
 - Electrode Contact dims. are given for socket design purposes & are not intended for inspection purposes.