



TECHNICAL DATA

7211
7698

PLANAR TRIODES

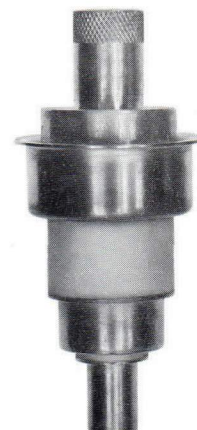
The EIMAC 7211 and 7698 are rugged ceramic/metal planar triodes designed for use in CW, grid- or plate-pulsed oscillator, amplifier or frequency multiplier service up to 3 GHz. The tubes may also be used in pulse modulator or voltage regulator service. The 7211 is normally supplied with an air cooled radiator for forced air cooling, while the 7698 is supplied without radiator and is intended for conduction-convection cooling as found in many pulsed type applications. Except for the plate dissipation ratings and outline, the characteristics of both tube types are identical.

The 7211 and 7698 feature high μ , high transconductance, great mechanical strength and low interelectrode capacitances, as well as high current capability and increased grid-anode insulator length. Both tubes have an arc-resistant, extended interface cathode, well proven in airline applications, assuring reliable and long life operation under adverse conditions.

Note: The data for the 7211 also applies to the EIMAC 7698R in all respects.



7211



7698

GENERAL CHARACTERISTICS¹

ELECTRICAL

Cathode: Oxide Coated, Unipotential

Heater: Voltage	6.3 $\pm$ 0.3 V
Current, at 6.3 volts	1.30 A

Transconductance (Average):

$I_b = 160$ mAdc, (200mA/cm ²)	38 mmhos
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Amplification Factor (Average)	80
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Direct Interelectrode Capacitance (grounded cathode)², without heater voltage:

Grid-Cathode	8.0 pF
Grid-Plate	2.25 pF
Plate-Cathode (maximum)	0.06 pF

Cut-off Bias ³ (maximum)	-30 V
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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. 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 milliampere plate current and a plate voltage of 1 kVdc.

MECHANICAL

Maximum Overall Dimensions:

Length	2.701 in; 68.60 mm
Diameter (7698)	1.195 in; 30.35 mm
Diameter (7211)	1.264 in; 32.11 mm
Net Weight (7698)	1.8 oz; 48 gm
Net Weight (7211)	2.2 oz; 63 gm
Operating Position	Any
Maximum Operating Temperature:	
Ceramic/Metal Seals	250°C
Anode Core	250°C
Cooling (7698)	Conduction and Convection
Cooling (7211)	Forced Air
Terminals	Coaxial, special

ENVIRONMENTAL

Shock, 11 ms, non-operating	60 G
Vibration, operating, all axes 55 to 500 Hz	10 G
Altitude, max (in a suitably designed circuit)	70,000 ft.

CW RF POWER AMPLIFIER OR OSCILLATOR

ABSOLUTE MAXIMUM RATINGS

DC PLATE VOLTAGE	2500 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	150 MILLIAMPERES
DC GRID CURRENT	45 MILLIAMPERES
AVERAGE PLATE DISSIPATION	
Conduction and Convection (7698)	10 WATTS
Forced Air Cooling ¹ (7211)	100 WATTS
GRID DISSIPATION (Average)	2 WATTS
FREQUENCY	2.5 GHz

1. Using EIMAC radiator PN 014224.

OPERATING CONDITIONS FOR 7211 AND 7698 IN REPRESENTATIVE APPLICATION

Grounded Grid CW Power Amplifier

Frequency	700 MHz
Heater Voltage	6.3 V
DC Plate Voltage	630 Vdc
DC Grid Voltage (approx)	-5 Vdc
DC Cathode Current	140 mAdc
DC Grid Current	25 mAdc
Drive Power (approx)	4 W
Useful CW Power Output	45 W

Grounded Grid CW Oscillator

Frequency	2.5 GHz
Heater Voltage	5.0 V
DC Plate Voltage	1000 Vdc
DC Grid Voltage (approx)	-20 Vdc
DC Plate Current	140 mAdc
DC Grid Current	30 mAdc
Useful CW Power Output	30 W

GRID PULSED OR PLATE PULSED AMPLIFIER OR OSCILLATOR

ABSOLUTE MAXIMUM RATINGS

DC PLATE VOLTAGE (GRID PULSED)	2500 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	5.0 AMPERES
PULSE GRID CURRENT	2.5 AMPERES
AVERAGE PLATE DISSIPATION	
Conduction and Convection (7698)	10 WATTS
Forced Air Cooling ¹ (7211)	100 WATTS
GRID DISSIPATION (Average)	2 WATTS
FREQUENCY	3.0 GHz
PULSE DURATION 2	6 μ s
DUTY FACTOR 2	.0033

OPERATING CONDITIONS FOR 7211 AND 7698 IN REPRESENTATIVE APPLICATION

Grid Pulsed Amplifier

Frequency	1.1 GHz
Heater Voltage	6.3 V
DC Plate Voltage	2200 Vdc
DC Grid Voltage	-50 Vdc
Peak Video Plate Current	2.5 a
Peak Video Grid Current	1.0 a
Pulse Drive Power (approx)	400 w
Useful Power Output (approx)	2500 w
Pulse Duration	3 μ s
Duty Factor	.002

Plate Pulsed Oscillator

Frequency	3.0 GHz
Heater Voltage	5.8 V
Peak Plate Voltage	3500 v
Peak Video Plate Current	4.8 a
Peak Video Grid Current	1.5 a
Useful Power Output (approx)	3000 w
Pulse Duration	3 μ s
Duty Factor	.0025

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

PULSE MODULATOR OR PULSE AMPLIFIER SERVICE

ABSOLUTE MAXIMUM RATINGS

DC PLATE VOLTAGE	2500 VOLTS
PEAK PLATE VOLTAGE	3500 VOLTS
DC GRID VOLTAGE	-150 VOLTS
INSTANTANEOUS PEAK GRID-CATHODE VOLTAGE	
Grid negative to cathode	-700 VOLTS
Grid positive to cathode	150 VOLTS

1. Using EIMAC radiator PN 014224.

PULSE CATHODE CURRENT	7.5 AMPERES
DC PLATE CURRENT	150 MILLIAMPERES
AVERAGE PLATE DISSIPATION	
Conduction and Convection (7698)	10 WATTS
Forced Air Cooling ¹ (7211)	100 WATTS
GRID DISSIPATION (Average)	2 WATTS
PULSE DURATION ²	6 μ s
DUTY FACTOR ²	.0033
CUT-OFF MU	60

2. For application requiring long pulse duration and/or higher duty cycle consult the nearest Varian Electron Tube & Devices Field Office, or the Product Manager, EIMAC Division of Varian, Salt Lake City, Utah.

RANGE VALUES FOR EQUIPMENT DESIGN

	Min.	Max.
Heater: Current at 6.3 volts	1.20	1.40 A
Cathode Heating Time	60	--- sec.
Interelectrode Capacitances ¹ (grounded cathode connection)		
Grid-Cathode	7.0	9.0 pF
Plate-Cathode	---	0.06 pF
Grid-Plate	2.10	2.40 pF

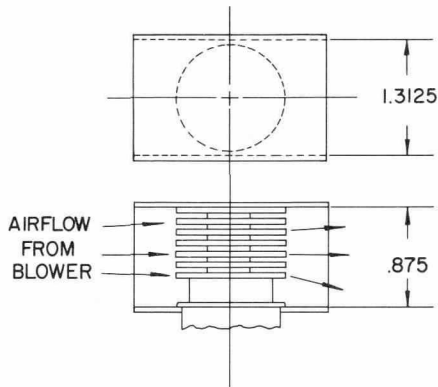
1. Capacitance values for a cold tube as measured in a special shielded fixture. When the cathode is heated to the proper temperature, the grid-cathode capacitance will increase from the cold value by approximately 1 pF due to thermal expansion of the cathode.

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 types. Plate dissipation of up to 150 watts is possible with the 7211/7698 tube

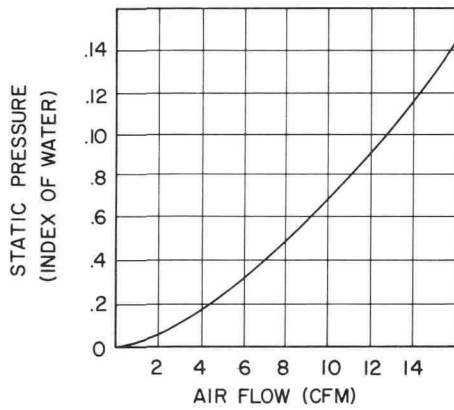
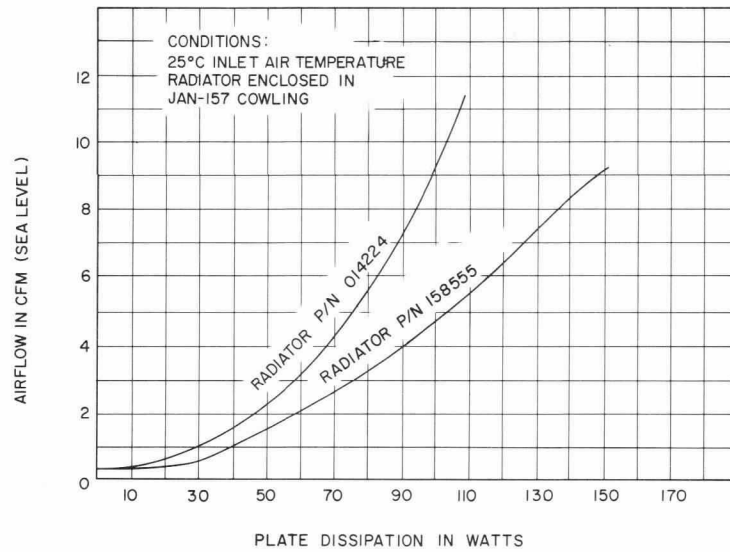
type when using radiator P/N 158555. If this is required the tube order should include a reference to the different radiator part number. For unusual and special application consult the nearest Varian Electron Tube and Device Field Office, or the Product Manager, EIMAC Division of Varian, Salt Lake, City, Utah.

AIRFLOW vs STATIC PRESSURE WITH STANDARD COWLING JAN-157

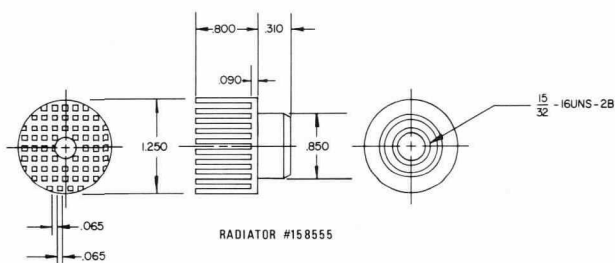
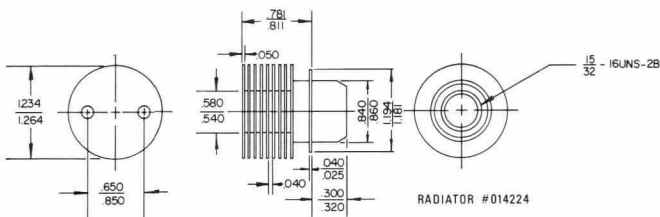
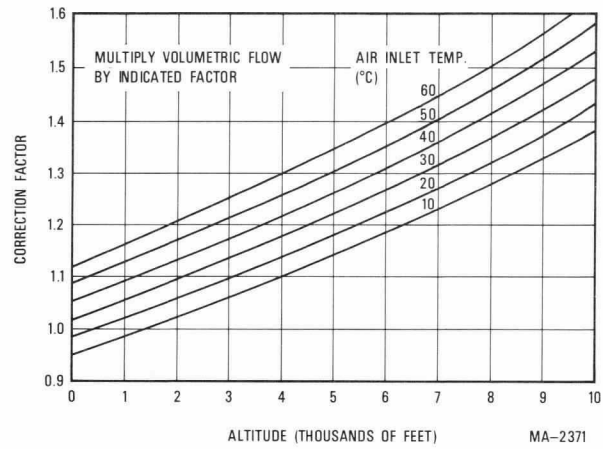


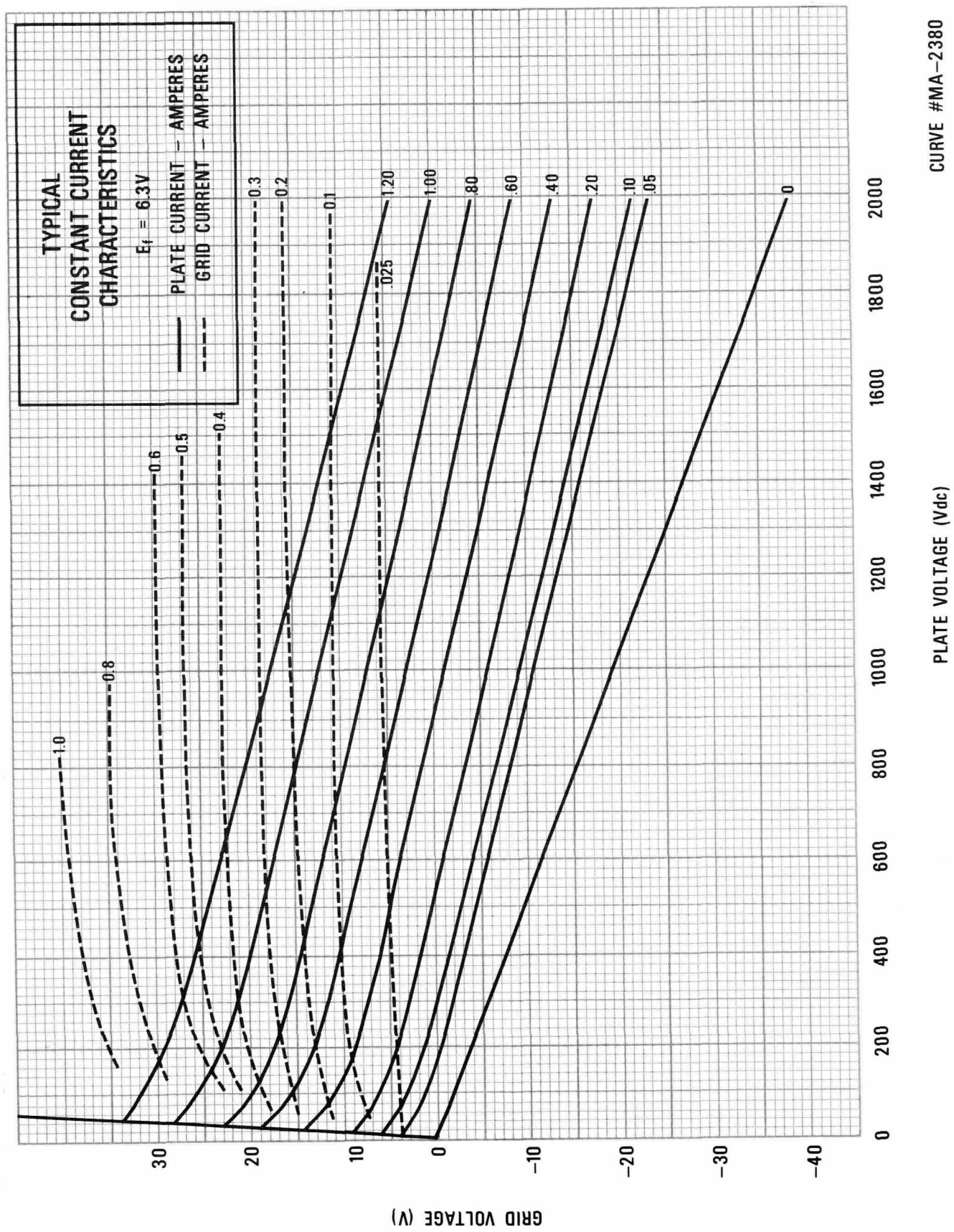
- STANDARD COWLING -

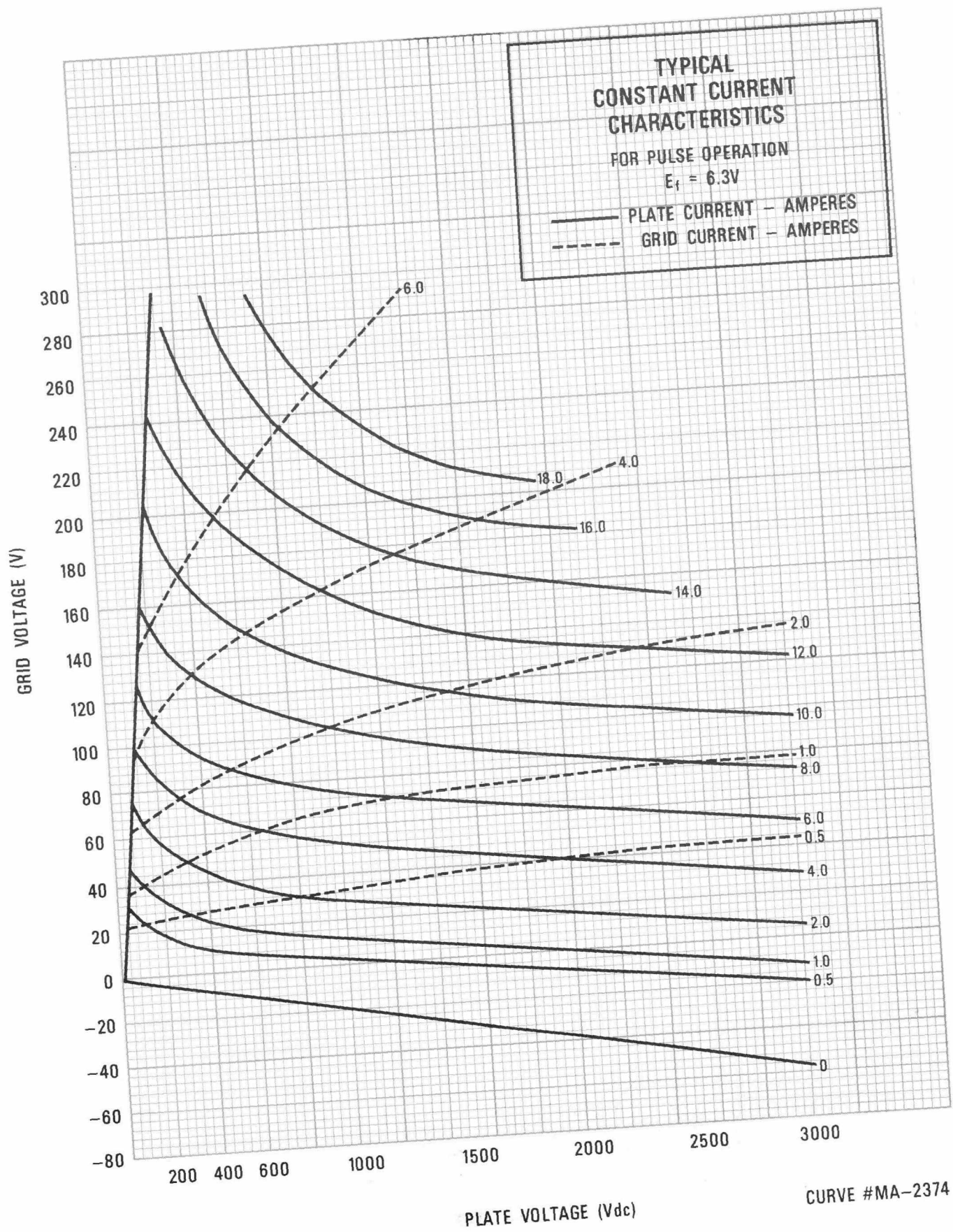
MAXIMUM PLATE DISSIPATION vs COOLING AIRFLOW

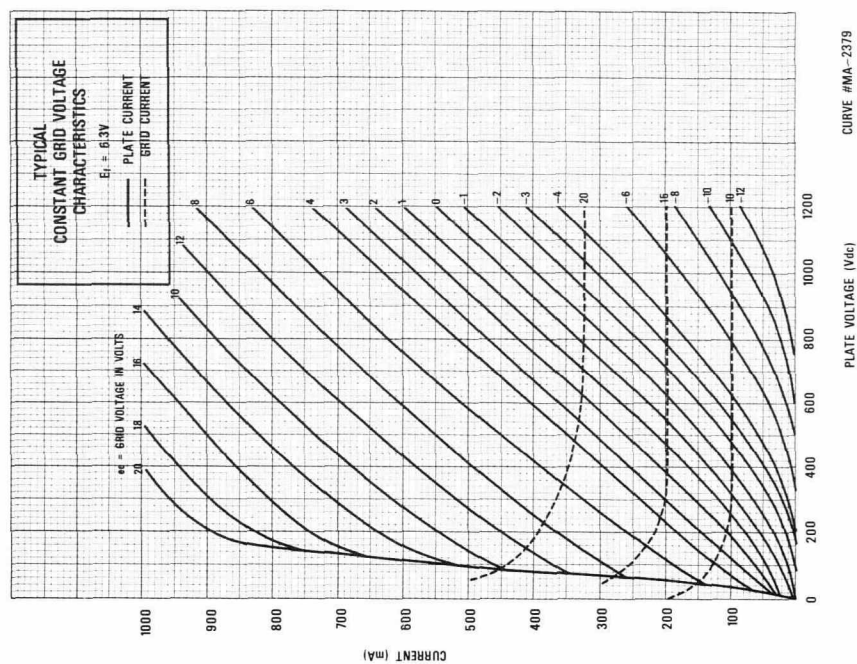
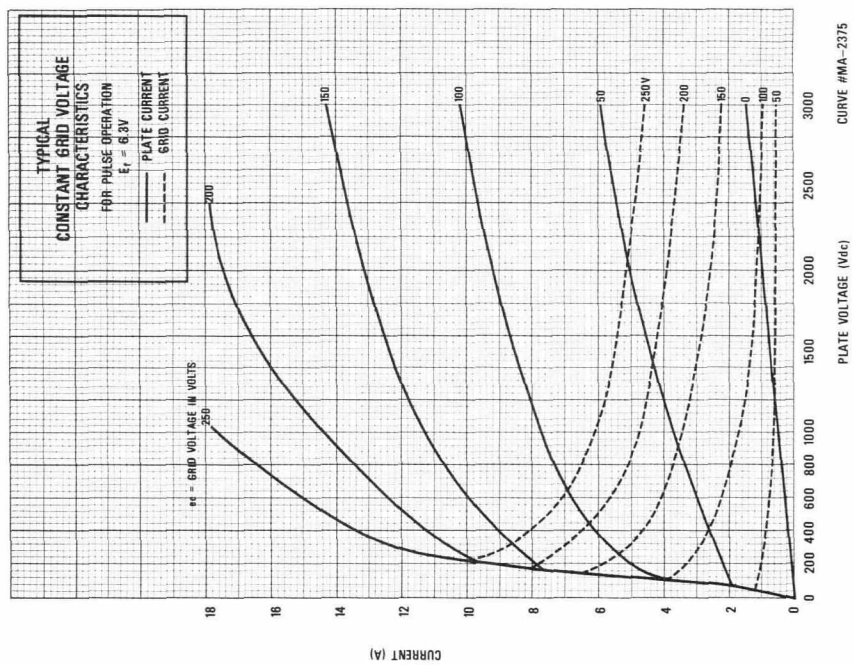


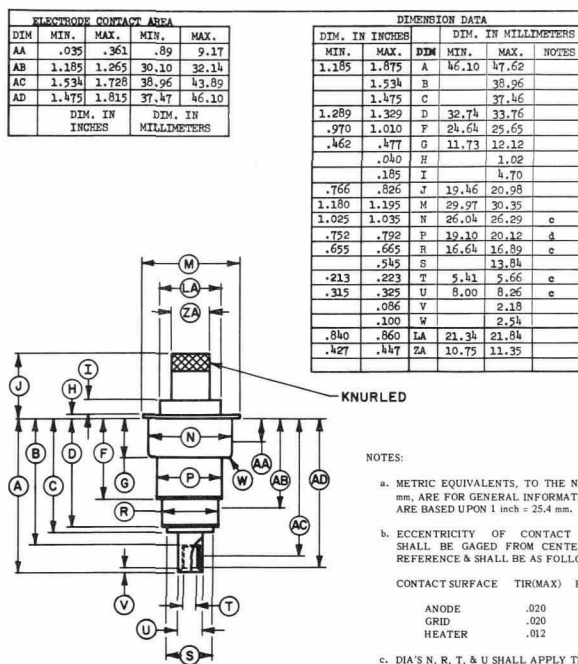
COMBINED CORRECTION FACTORS FOR INLET AIR TEMPERATURE AND ALTITUDE (RELATIVE TO 25°C AND SEA LEVEL)



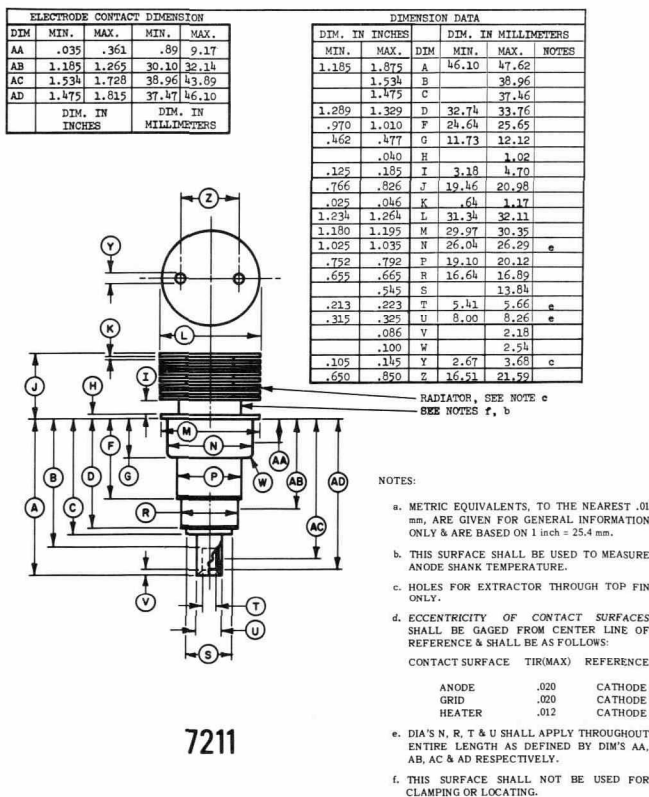








7698



7211