



TECHNICAL DATA

8403

PLANAR TRIODE

The EIMAC Type 8403 is a planar triode featuring frequency stability and an arc resistant cathode of high emission capability assuring stable operation under adverse conditions involving a wide ambient temperature range and varying plate dissipation. This construction, in combination with the proper plate series impedance, reduces to a minimum the possibility of cathode failures due to voltage surges. Other features of this type include high transconductance, high μ , and low interelectrode capacitances coupled with the great mechanical strength of metal/ceramic construction. The cathode is an indirectly heated disc requiring only minimal heater power. The design of the tube permits operation from low frequencies up to 3.0 GHz as a grid-pulsed, plate-pulsed, or CW oscillator, amplifier, or frequency multiplier.



GENERAL CHARACTERISTICS¹

ELECTRICAL

Cathode: Oxide Coated, Unipotential

Heater: Voltage	6.3 $\pm$ 0.3 V
Current, at 6.3 volts	1.3 A

Transconductance (Average):

$I_b = 160$ mA (200 mA/cm ²)	30 mmhos
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Amplification Factor (Average):	80
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Direct Interelectrode Capacitance (grounded cathode) ²

C_{in}	8.0 pF
C_{out} (maximum)	0.065 pF
C_{gp}	3.1 pF

Cut-off Bias (maximum) ³	-30 V max
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Frequency of Maximum Rating:

CW	2500 MHz
Plate or Grid-Pulsed	3000 MHz

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.

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MECHANICAL

Maximum Overall Dimensions:

Length	2.386 in; 60.60 mm
Diameter	1.264 in; 32.11 mm
Net Weight	2.04oz; 58 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	10 G
Altitude	60,000 ft.

RANGE VALUES FOR EQUIPMENT DESIGN

	<u>Min.</u>	<u>Max.</u>
Heater: Current at 6.3 volts	1.20	1.40 A
Cathode Warmup Time	60	--- sec.
Interelectrode Capacitance ¹		
Cin	7.5	9.0 pF
Cout	---	0.065 pF
Cgp	2.95	3.25 pF

1. Capacitance value 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.

**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	-750 VOLTS
Grid positive to cathode	250 VOLTS
PULSE PLATE CURRENT	5.0 AMPERES
PULSE GRID CURRENT	2.0 AMPERES
AVERAGE PLATE DISSIPATION	
Forced Air Cooling ¹	100 WATTS
GRID DISSIPATION (Average)	2.0 WATTS
FREQUENCY	3.0 GHz
PULSE DURATION ²	6.0 μ s
DUTY FACTOR ²	.0033

OPERATING CONDITIONS for 8403 in Representative
Application

GRID PULSED OSCILLATOR

Frequency	1.09 GHz
Heater Voltage	6.3 V
DC Plate Voltage	2000 Vdc
DC Grid Voltage	-150 Vdc
Peak Video Plate Current	4.0 a
Peak Video Grid Current	1.0 a
Useful Power Output (Approx.)	1000 w
Pulse Duration	0.5 μ s
Duty Factor	.005

1. Using EIMAC radiator PN 158601.
2. For applications using 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.

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	
Forced air cooling ¹	100 WATTS
GRID DISSIPATION (Average). .	2 WATTS
FREQUENCY	2.5 GHz

OPERATING CONDITIONS for 8403 in Representative Application

GROUNDING GRID CW OSCILLATOR

Frequency	2500 GHz
Heater Voltage	6.0 V
⌒C Plate Voltage	900 Vdc
⌒C Grid Voltage (Approx.)	-20 Vdc
DC Plate Current	140 mAdc
DC Grid Current	15 mAdc
Useful CW Power Output	25 W

1. Using EIMAC radiator PN 158601.

PULSE MODULATOR AND PULSE AMPLIFIER SERVICE

ABSOLUTE MAXIMUM RATINGS:

DC PLATE VOLTAGE	3000 VOLTS
PEAK PLATE VOLTAGE	3500 VOLTS
DC GRID VOLTAGE	-150 VOLTS
INSTANTANEOUS PEAK GRID-CATHODE VOLTAGE	
Grid negative to cathode . . .	-750 VOLTS
Grid positive to cathode . . .	+150 VOLTS
PULSE CATHODE CURRENT . . .	7.5 AMPERES
DC PLATE CURRENT	150 MILLIAMPERES

AVERAGE PLATE DISSIPATION

Forced Air Cooling ¹	100 WATTS
GRID DISSIPATION (average).	1.5 WATTS
PULSE DURATION ²	6.0 μ s
CUT-OFF MU	60
DUTY	.0033

1. Using EIMAC radiator PN 158601.

2. For applications using 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.

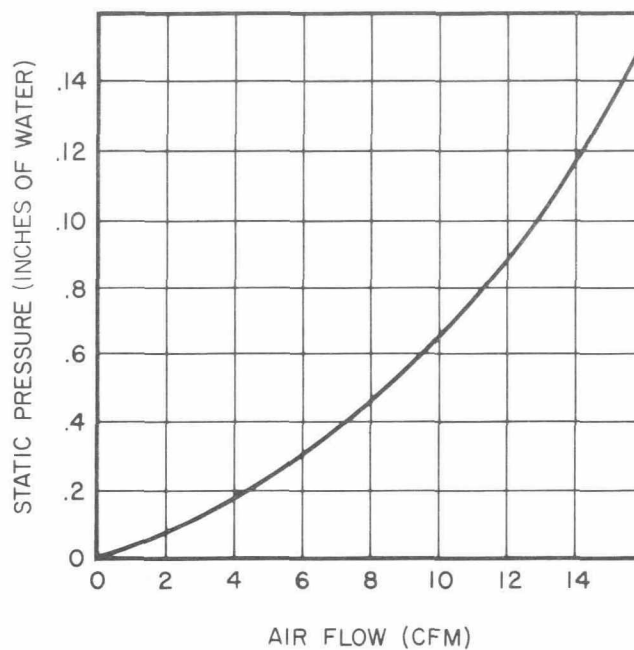
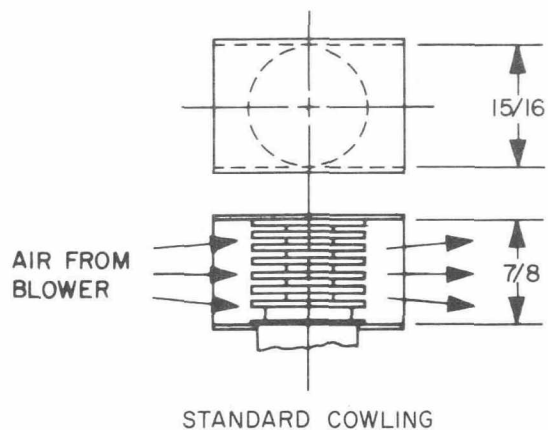
APPLICATION

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

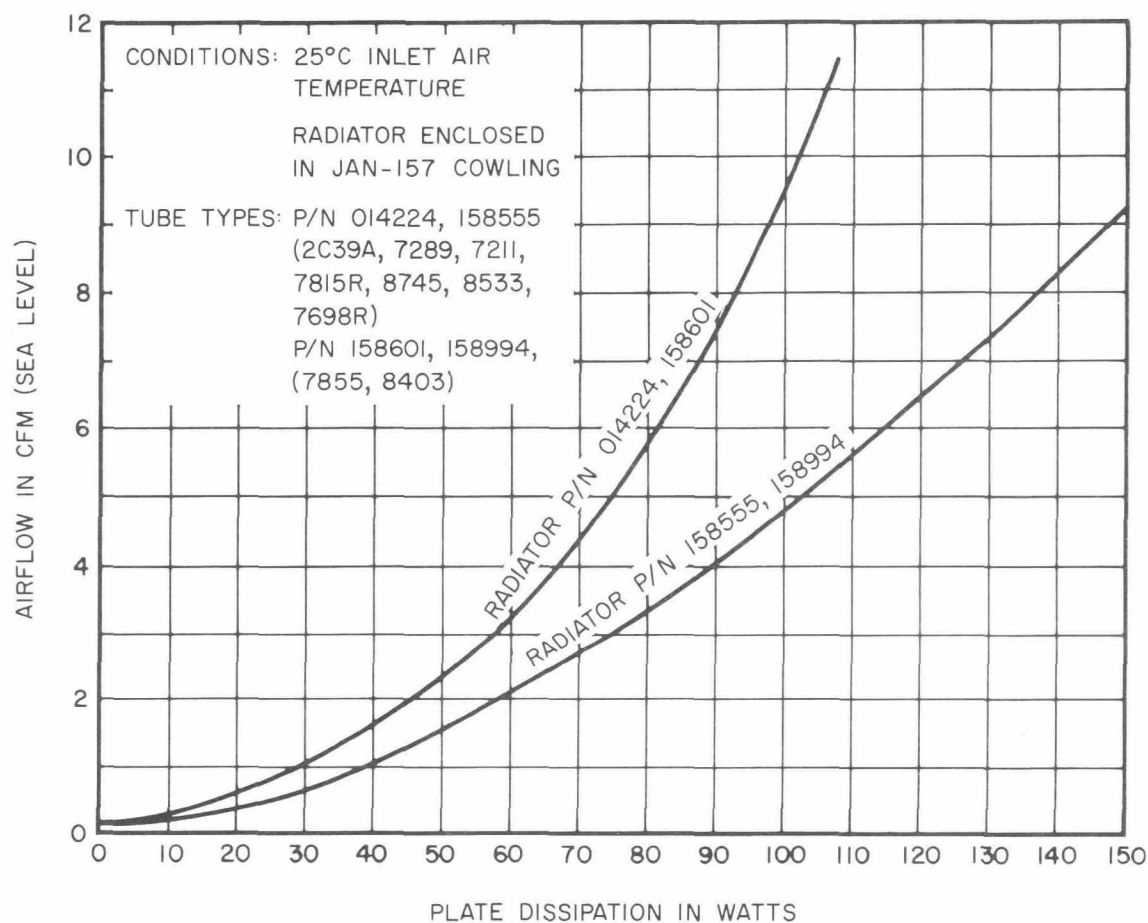
the above tube type. For unusual and special applications consult the nearest Varian Electron Tube Field Office, or the Product Manager, EIMAC Division of Varian, Salt Lake City, Utah.

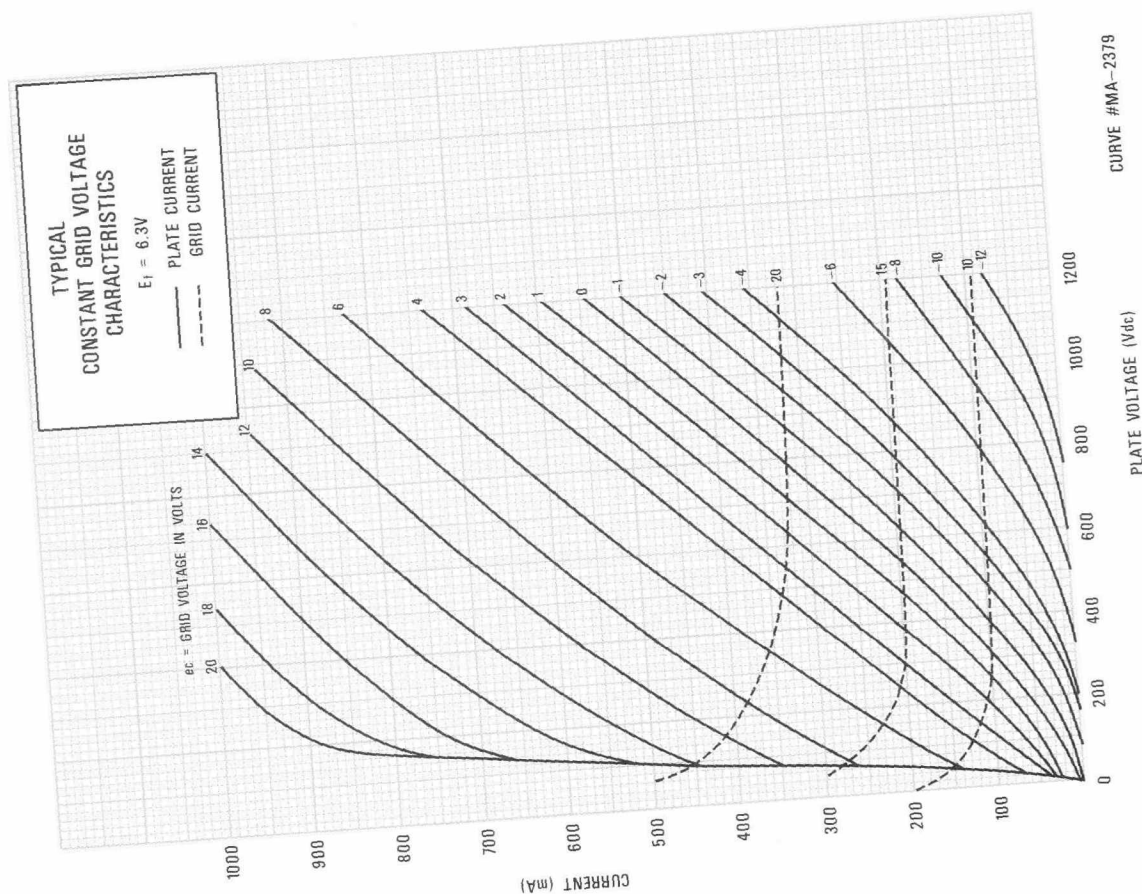
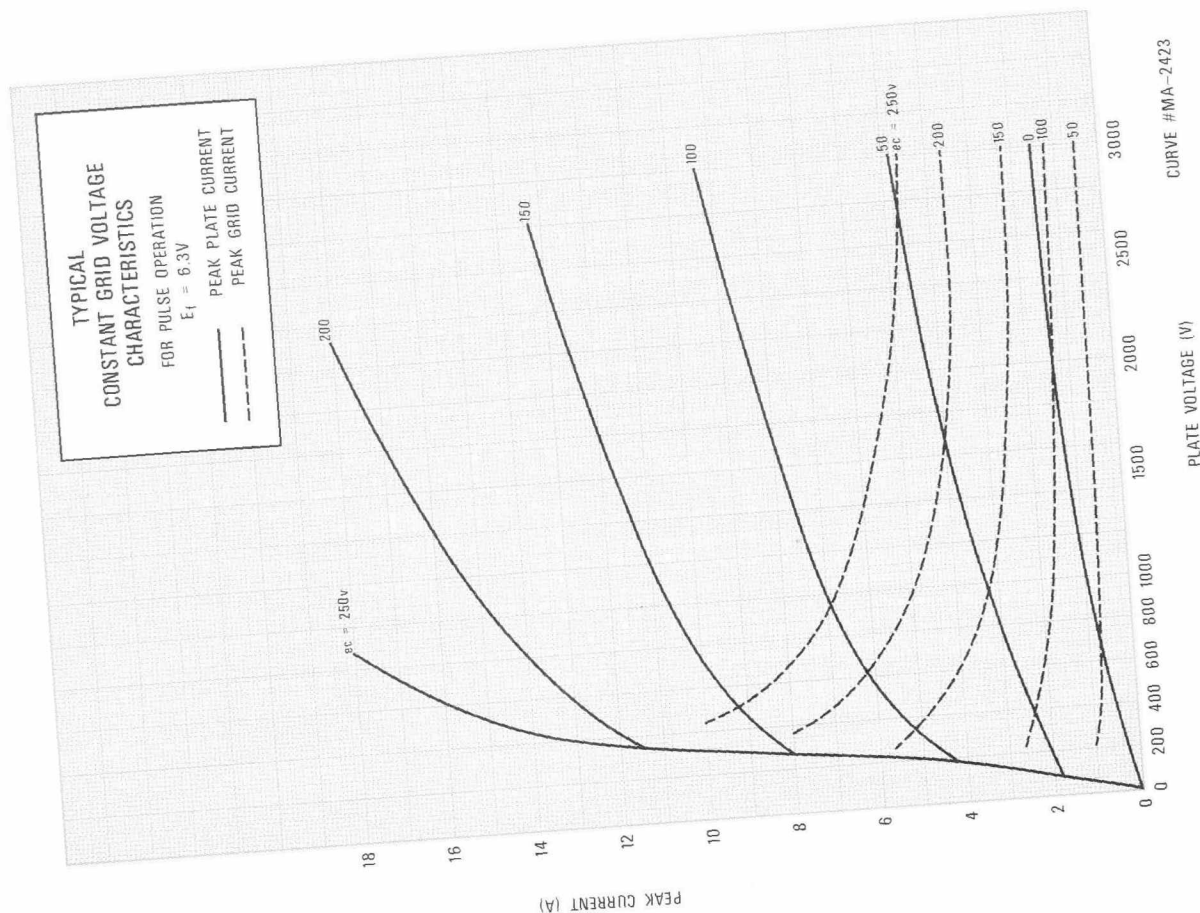
STANDARD COWLING (JAN-157)

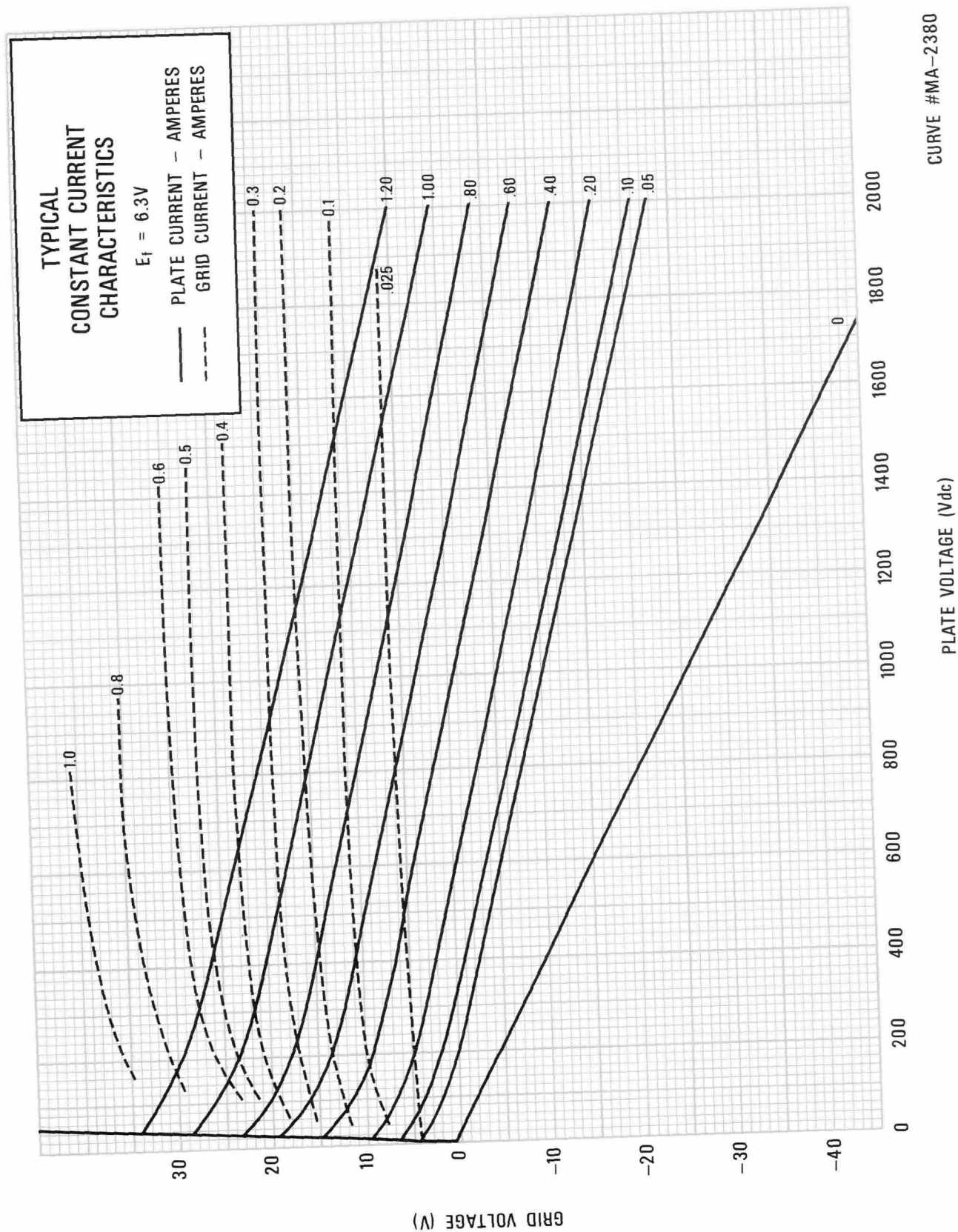
AIRFLOW VS STATIC PRESSURE WITH STANDARD COWLING JAN-157

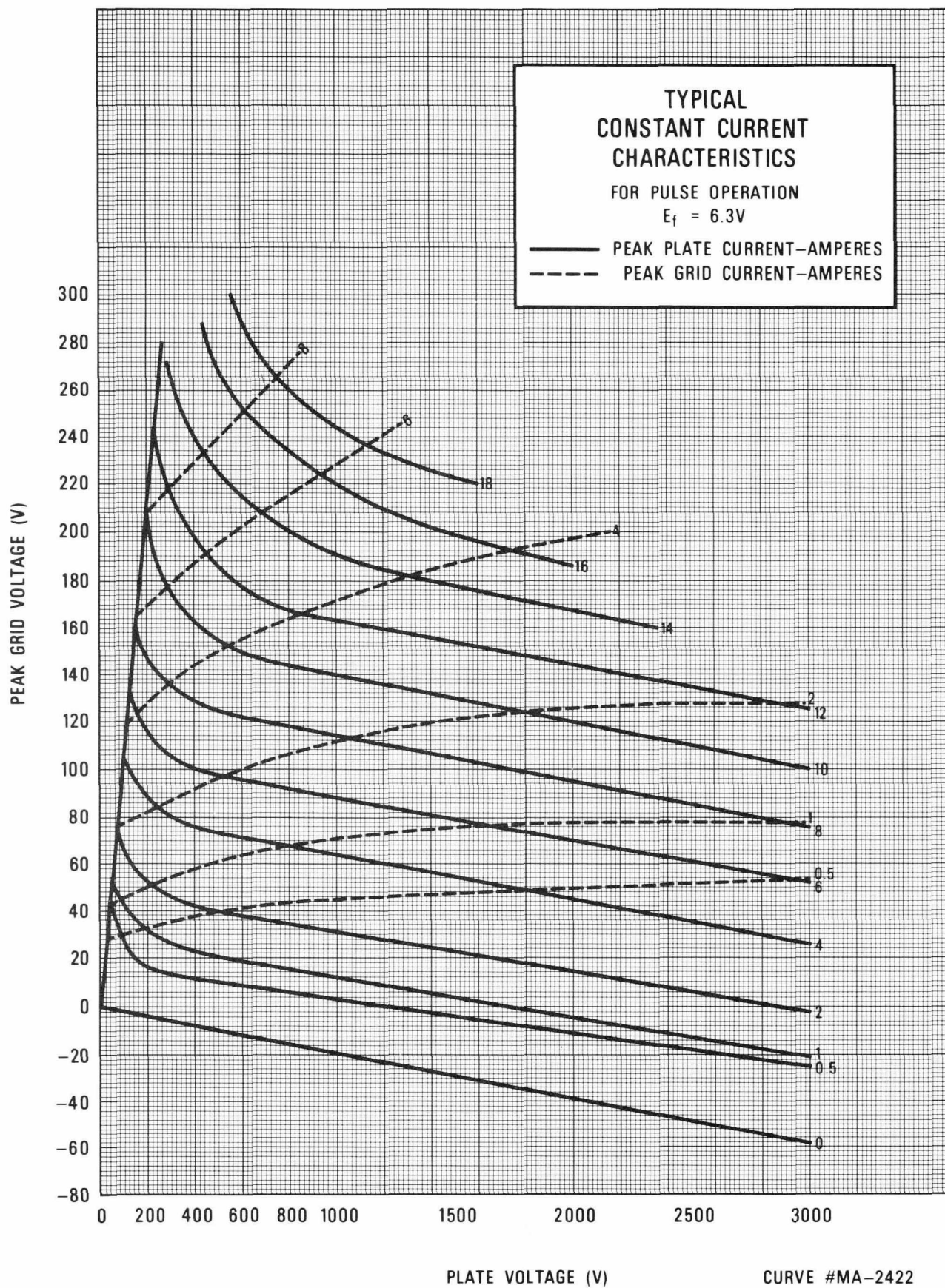


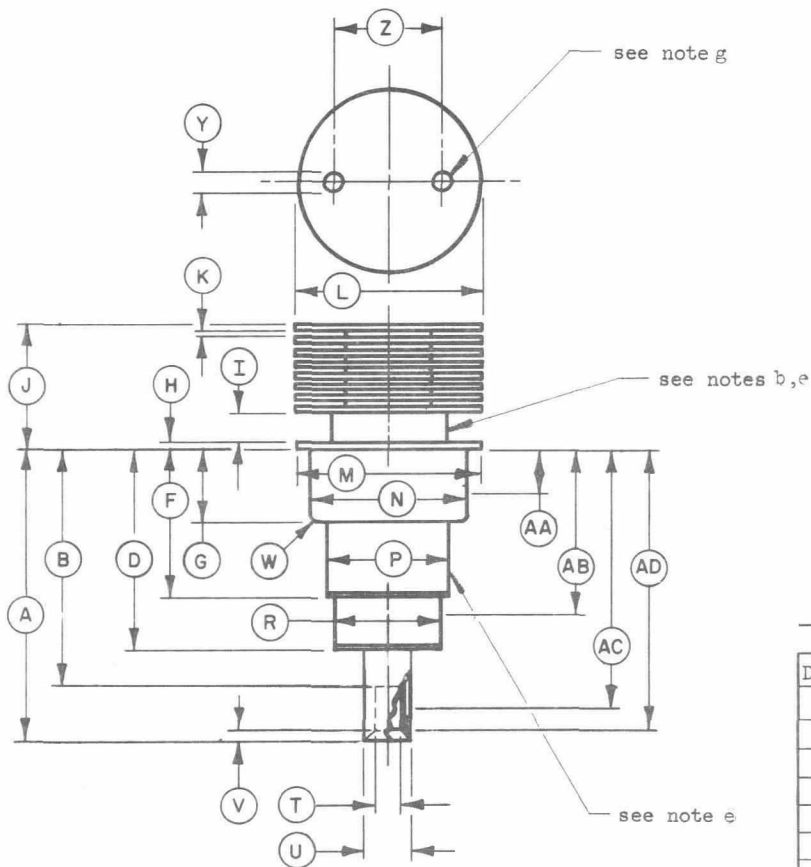
MAXIMUM PLATE DISSIPATION VS COOLING AIRFLOW











ELECTRODE CONTACT DIMS. (see note a,f)				
Dim. in Inches		Dim. in Millim.		
Min.	Max.		Min.	Max.
.035	.361	AA	.89	9.17
1.021	1.101	AB	25.93	27.97
1.219	1.413	AC	30.96	35.89
1.160	1.500	AD	29.46	38.10

DIMENSIONAL DATA (Note a)					
Dim. in Inches		Dim. in Millimeters			
Min.	Max.	Dim.	MIN.	MAX.	
1.500	1.560	A	38.10	39.62	
	1.214	B		30.84	
1.125	1.165	D	28.58	29.59	
.800	.840	F	20.32	21.34	
.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	19.10	20.12	
.655	.665	R	16.64	16.89	
.213	.223	T	5.41	5.66	
.315	.325	U	8.00	8.26	
	.086	V		2.18	
	.100	W		2.54	
.105	.145	Y	2.67	3.68	
.650	.850	Z	16.51	21.59	

NOTES:

a. Metric equivalents, to the nearest .01 mm, are given for general information only & are based on 1 inch = 25.4 mm.

b. This surface to be used to measure anode shank temperature.

c. 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

d. Dims. N,R,T & U shall apply throughout entire length as defined by dims. AA,AB,AC,AD respectively.

e. This surface shall not be used for clamping or locating.

f. Electrode Contact dims. are for socket design purposes & are not intended for inspection purposes.

g. Holes for tube extractor thru top fin only