EIMAC
Division of Varian
SAN CARLOS
CALIFORNIA

8757

HIGH-MU PLANAR TRIODE

The 8757 is a miniature, frequency-stable, ceramic/metal, rugged planar triode for advanced airborne and space applications up to 3.5 GHz.

The 8757 may be used as an amplifier, oscillator, or frequency multiplier in the CW, grid- or plate-pulsed mode, as well as a modulator or regulator tube. In addition to low interelectrode capacitances, high transconductance and amplification factor, the 8757 has an anode designed to produce exceptional frequency stability and an arc-resistant cathode, both assuring stable, reliable and long-life operation under adverse conditions.

The 8757 is supplied without radiator and may be conduction, convection, heat sink, or liquid cooled. Radiators for forced-air cooling permitting an anode dissipation up to 150 watts, can be furnished on separate order.

GENERAL CHARACTERISTICS[1]

ELECTRICAL

Cathode: Oxide Coated, Unipotential		
Heater: Voltage	6.3 ± 0.3	V
Current, at 6.3 volts	1.30	A
Transconductance (Average):		
I_b = 160 mA (200 mA/cm^2)	38	mmhos
Amplification Factor (Average):	75	
Direct Interelectrode Capacitances (Grounded Cathode)[2]		
Grid-Cathode	9.0	pF
Plate-Cathode	0.06	pF
Grid-Plate	1.65	pF
Cut-off Bias[3]	-30	V max.

1. Characteristics and operating values are based upon performance tests. These figures may change without notice as the results of additional data or product refinement. EIMAC Division of Varian should be consulted before using this information for final equipment design.

2. 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.

3. Measured with one milliampere plate current and a plate voltage of 1 kVdc.

(Effective 3-3-70) Printed in U.S.A.

MECHANICAL

Maximum Overall Dimensions:

Length	1.30 in; 33.02 mm
Diameter	0.785 in; 19.94 mm
Net Weight	0.56 oz; 16 gm
Operating Position	Any

Maximum Operating Temperature:

Ceramic/Metal Seals	250 °C
Anode Core	250 °C
Cooling	Conduction, convection, forced-air[1] or liquid
Terminals	Coaxial, special

1. Using one of the EIMAC radiators shown on the cooling curves.

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

MAXIMUM RATINGS/ABSOLUTE VALUES

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	250	MILLIAMPERES
DC GRID CURRENT	45	MILLIAMPERES
PLATE DISSIPATION[1]	150	WATTS
GRID DISSIPATION	1.5	WATTS
FREQUENCY	3.0	GIGAHERTZ

1. Using one of the EIMAC radiators shown on the cooling curves.

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

GRID PULSED OR PLATE PULSED AMPLIFIER OR OSCILLATOR

MAXIMUM RATINGS/ABSOLUTE VALUES

DC PLATE VOLTAGE (GRID PULSED)	3000	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	175	VOLTS
PULSE PLATE CURRENT	5.0	AMPERES
PULSE GRID CURRENT	2.5	AMPERES
PLATE DISSIPATION[1]	150	WATTS
GRID DISSIPATION	1.5	WATTS
FREQUENCY	3.5	GIGAHERTZ
PULSE DURATION[2]	6	μsec
DUTY FACTOR[2]	.0033	

TYPICAL OPERATION

Grid-Pulsed r-f Power Oscillator (3.5 GHz)

DC Plate Voltage	2500	Vdc
Peak Plate Current	5.0	a
DC Grid Voltage Approx.	-70	V
Peak Grid Current	1.7	a
Filament Voltage	6.0	V
Useful Power Output Approx.	3000	w
Plate Efficiency	25%	

PULSE MODULATOR OR PULSE AMPLIFIER SERVICE

MAXIMUM RATINGS/ABSOLUTE VALUES

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
PLATE DISSIPATION[1]	150	WATTS
GRID DISSIPATION	1.5	WATTS
PULSE DURATION[2]	6	μs
DUTY FACTOR[2]	.0033	
CUT-OFF MU	60	

1. Using one of the EIMAC radiators shown on the cooling curves.

2. For application requiring longer pulse duration and/or higher duty cycle consult the nearest Varian Electron Tube and Device 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	8.5	9.5	pF
Plate-Cathode	---	0.06	pF
Grid-Plate	1.5	1.8	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

COOLING - The 8757 can be cooled by conduction, convection, forced-air or liquid cooling. The tube is designed to permit high-temperature operation up to the limit indicated. However, if long life is the prime objective, tube terminal and seal temperatures should be kept well below 250°C. If forced-air cooling is provided, auxiliary air flow, apart from the air flowing through the radiator, should be provided to cool the tube envelope and other tube terminals. Some conduction cooling is always provided through the contact terminals. However, these terminals usually exhibit poor heat transfer, often having a temperature gradient across them as high as 50° C. Cooling curves are given for the three radiators which are suitable for use with the 8757.

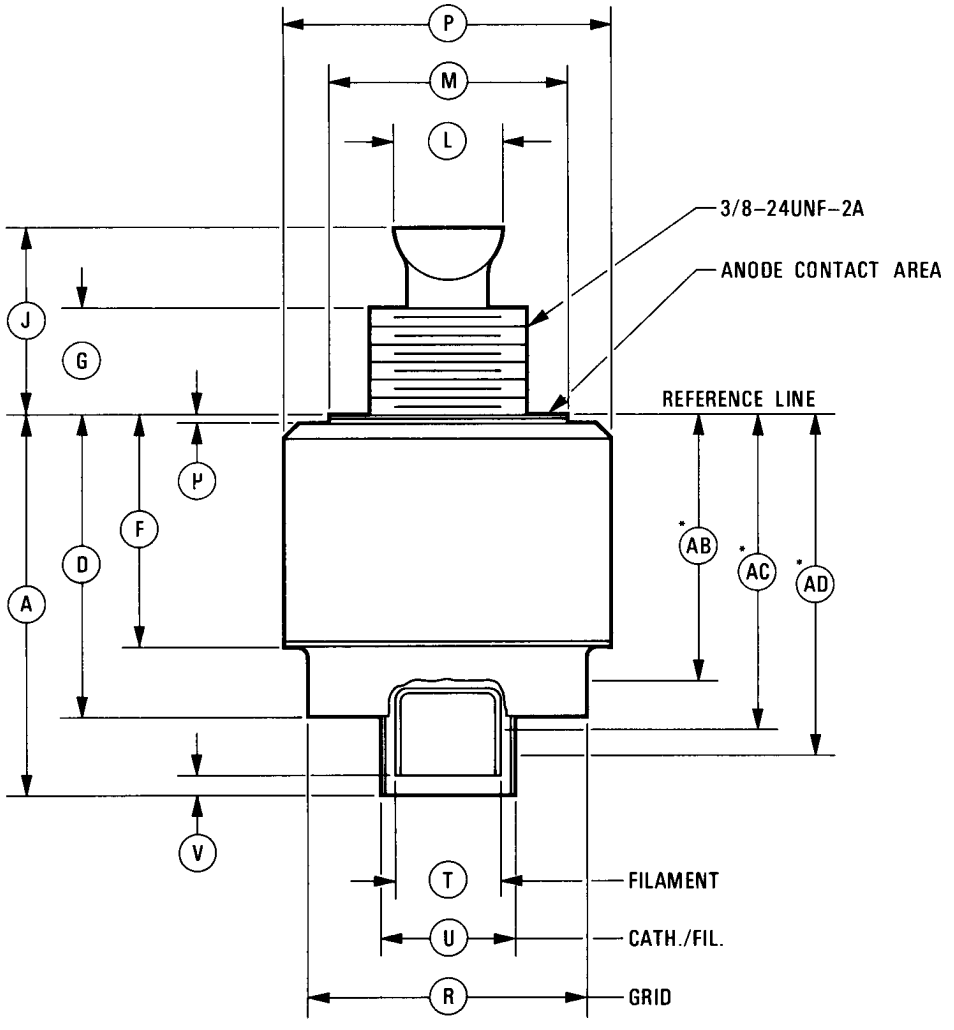
For operating information refer to EIMAC bulletin #15, "Operating Data for Planar Triodes."

DIMENSIONAL DATA				
DIM.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A		.950		24.13
D	.690	.730	17.53	18.54
F		.500		12.70
G	.150	.170	3.81	4.32
H		.040		1.02
J		.350		8.89
L		.260		6.04
M	.545	.570	13.84	14.48
P	.775	.785	19.69	19.94
R	.650	.670	16.51	17.02
T	.210	.225	5.33	5.72
U	.310	.330	7.87	8.38
V		.040		1.02
(*) CONTACT SURFACES				
AB	.595* ±.075		15.11* ±1.91	
AC	.752* ±.062		19.10* ±1.57	
AD	.817* ±.087		20.75* ±2.21	

NOTES:

1. ANODE FLANGE IS ELECTRICAL CONTACT. STUD IS FOR HEAT TRANSFER.
2. (*) DISTANCE FROM REFERENCE SURFACE TO THE CENTER OF CONTACT AREA.
3. METRIC EQUIVALENTS ARE TO THE NEAREST .01 mm, ARE GIVEN FOR GENERAL INFORMATION ONLY, AND ARE BASED ON 1 INCH = 25.4 mm.
4. CONCENTRICITY BETWEEN GRID TERMINAL AND CATHODE/HEATER TERMINAL RESPECTIVELY TO THE ANODE STUD TO BE 0.020 TIR MAX. MEASUREMENT TO BE MADE WITH EIMAC GAGE JA-21685G WHICH MUST SEAT AGAINST THE ANODE FLANGE.

FIGURE 1



EIMAC RADIATORS

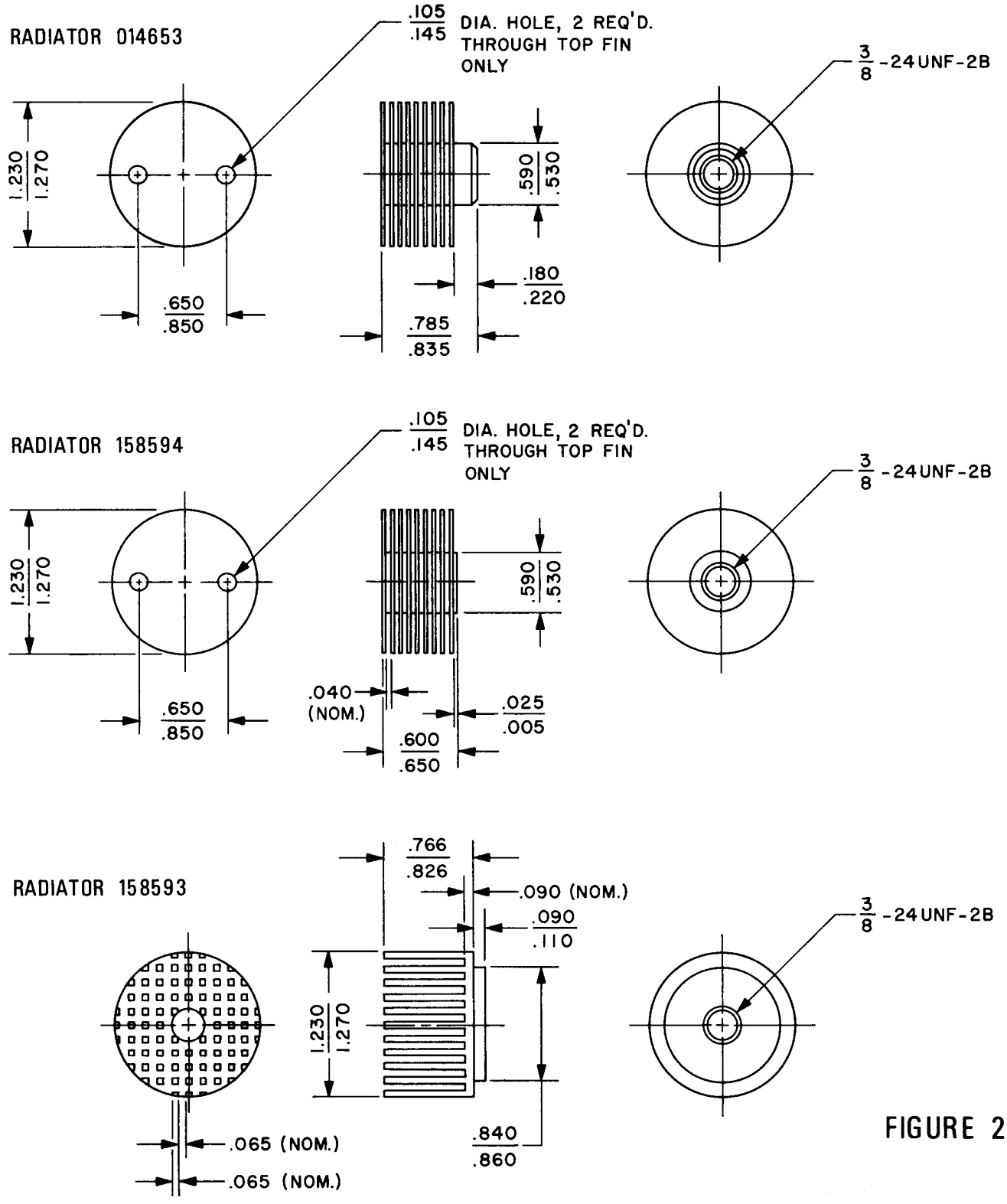


FIGURE 2

FIGURE 3

COMBINED CORRECTION FACTORS FOR INLET AIR TEMPERATURE AND ALTITUDE

(RELATIVE TO 25°C AND SEA LEVEL)

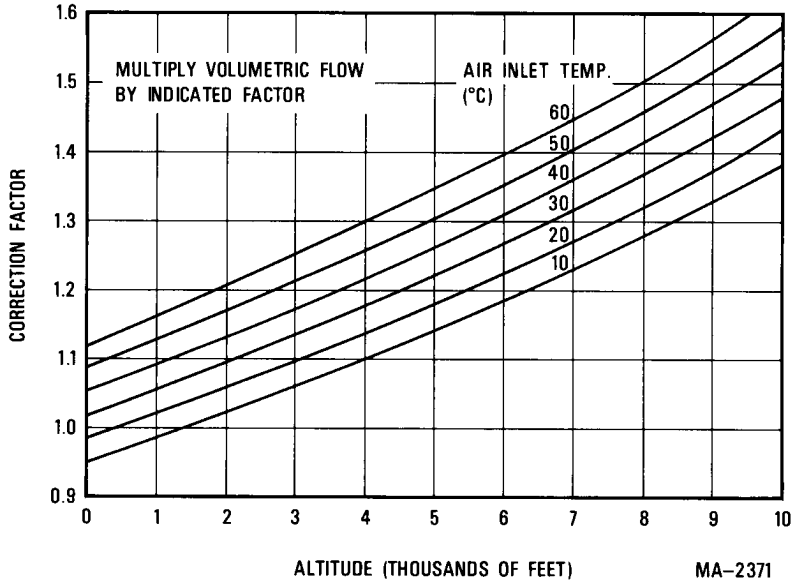
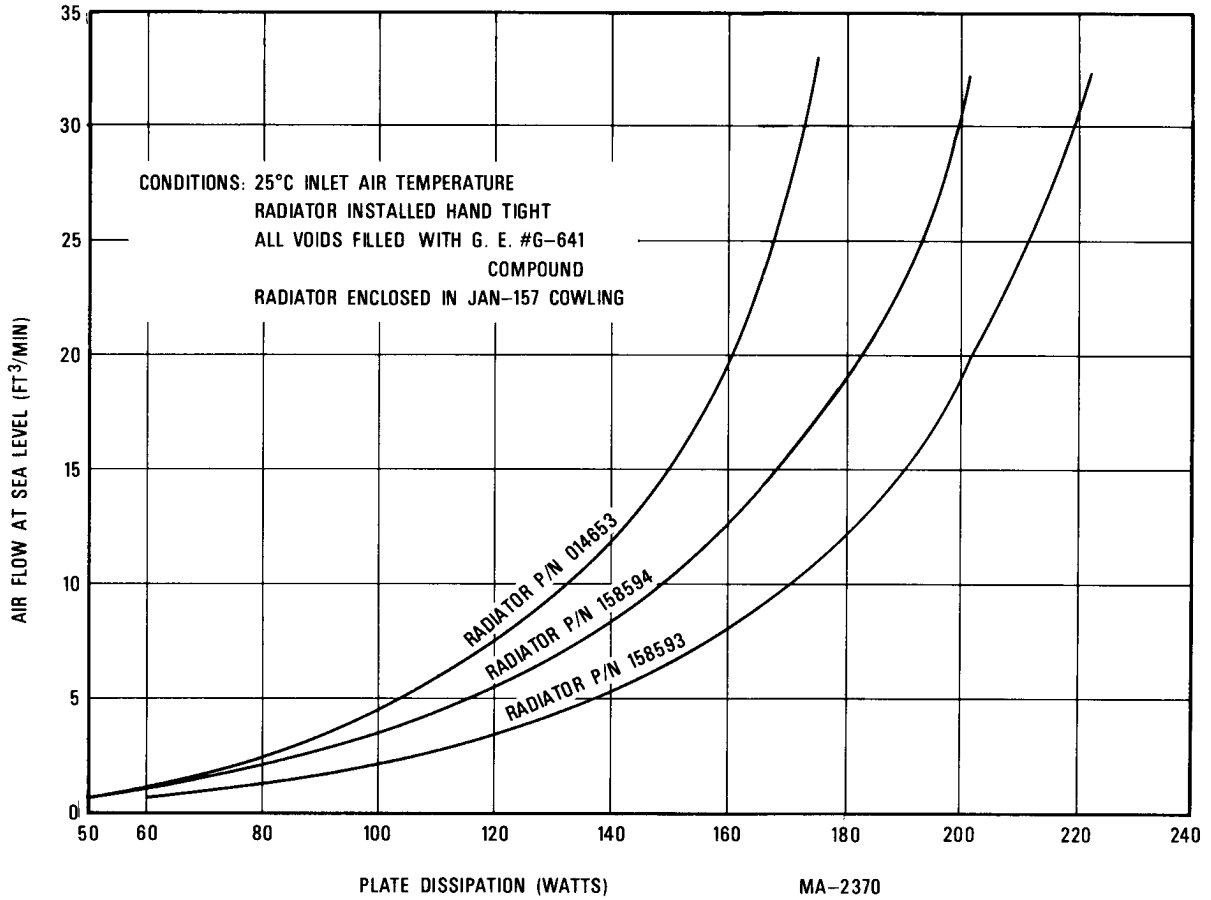
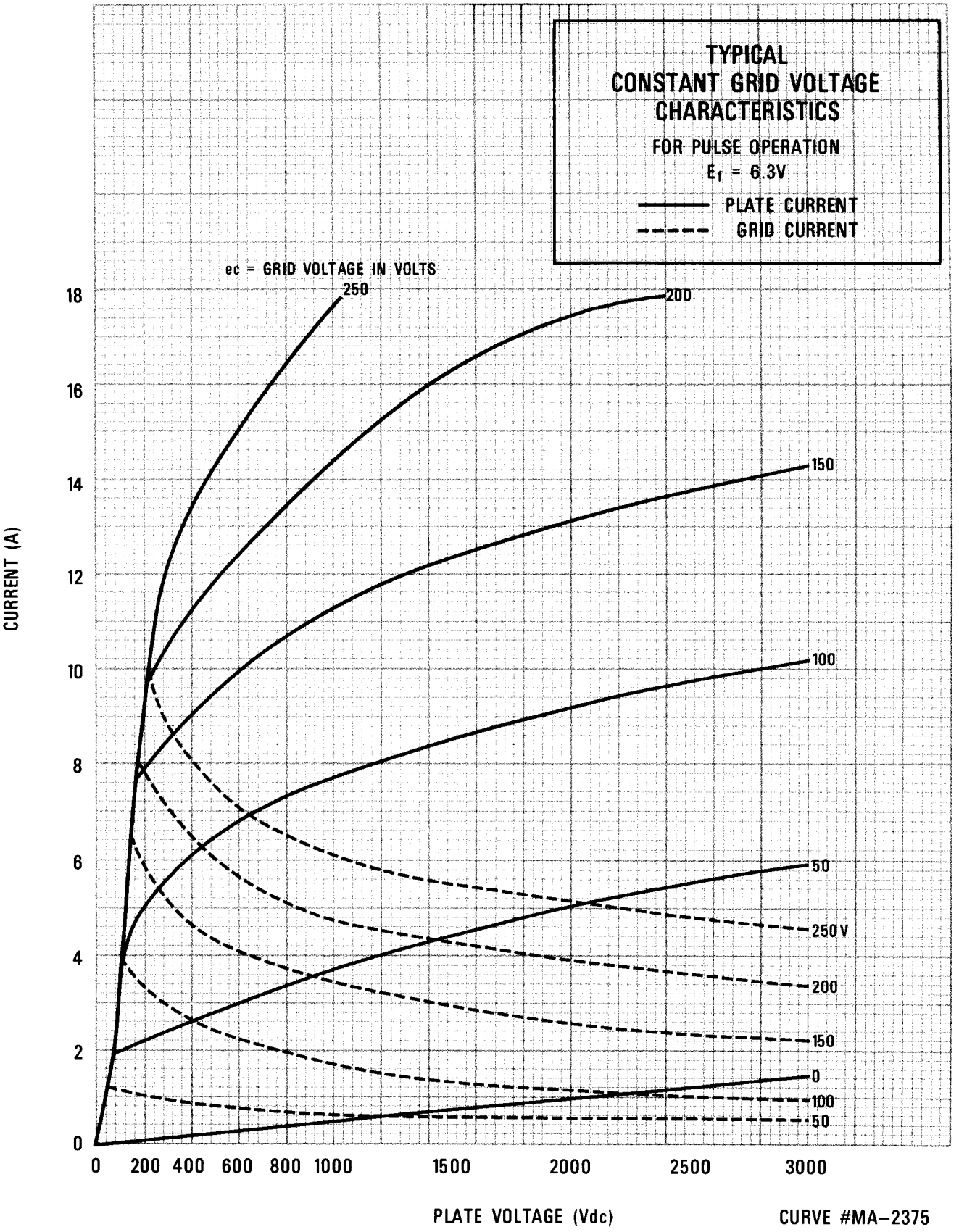
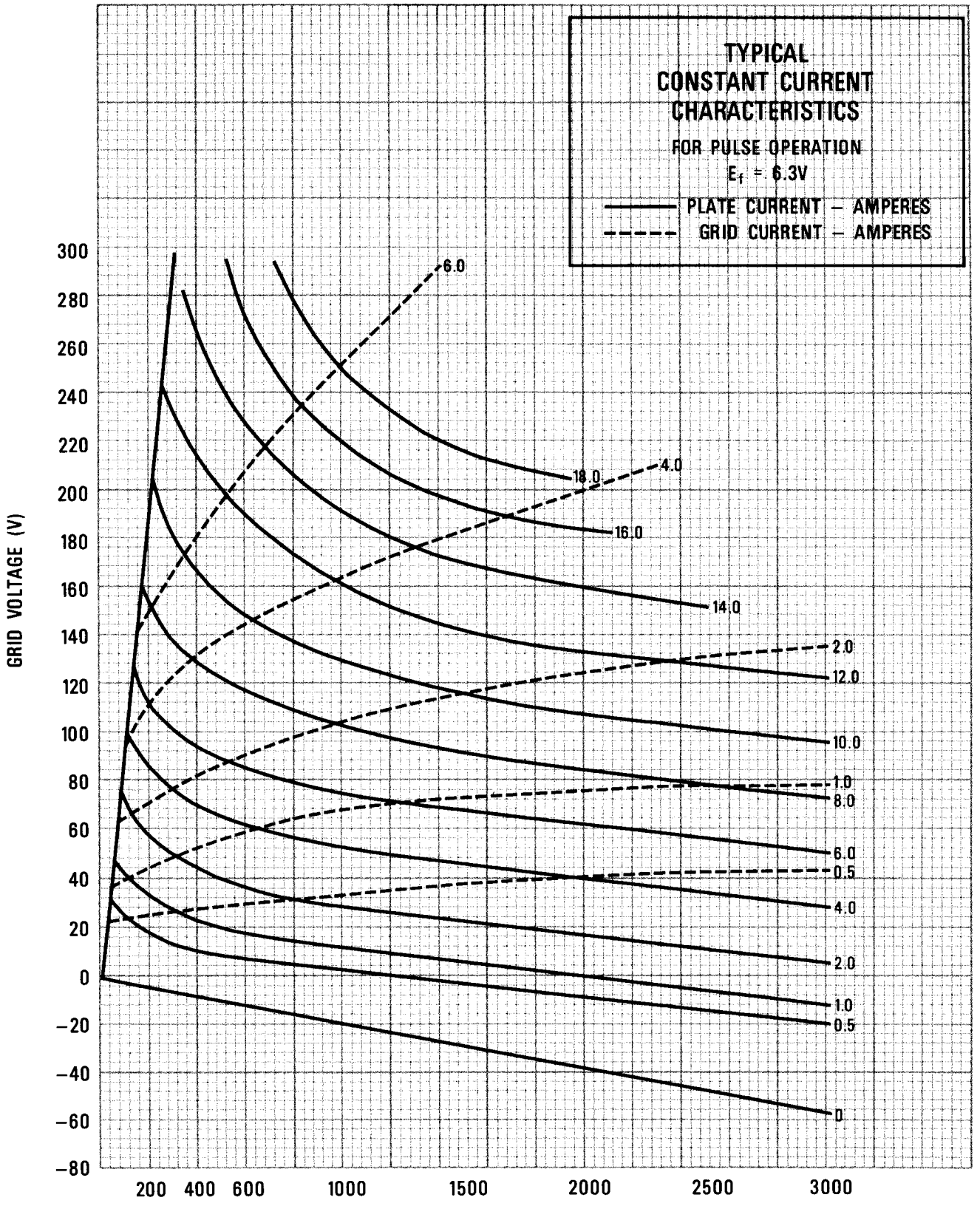


FIGURE 4

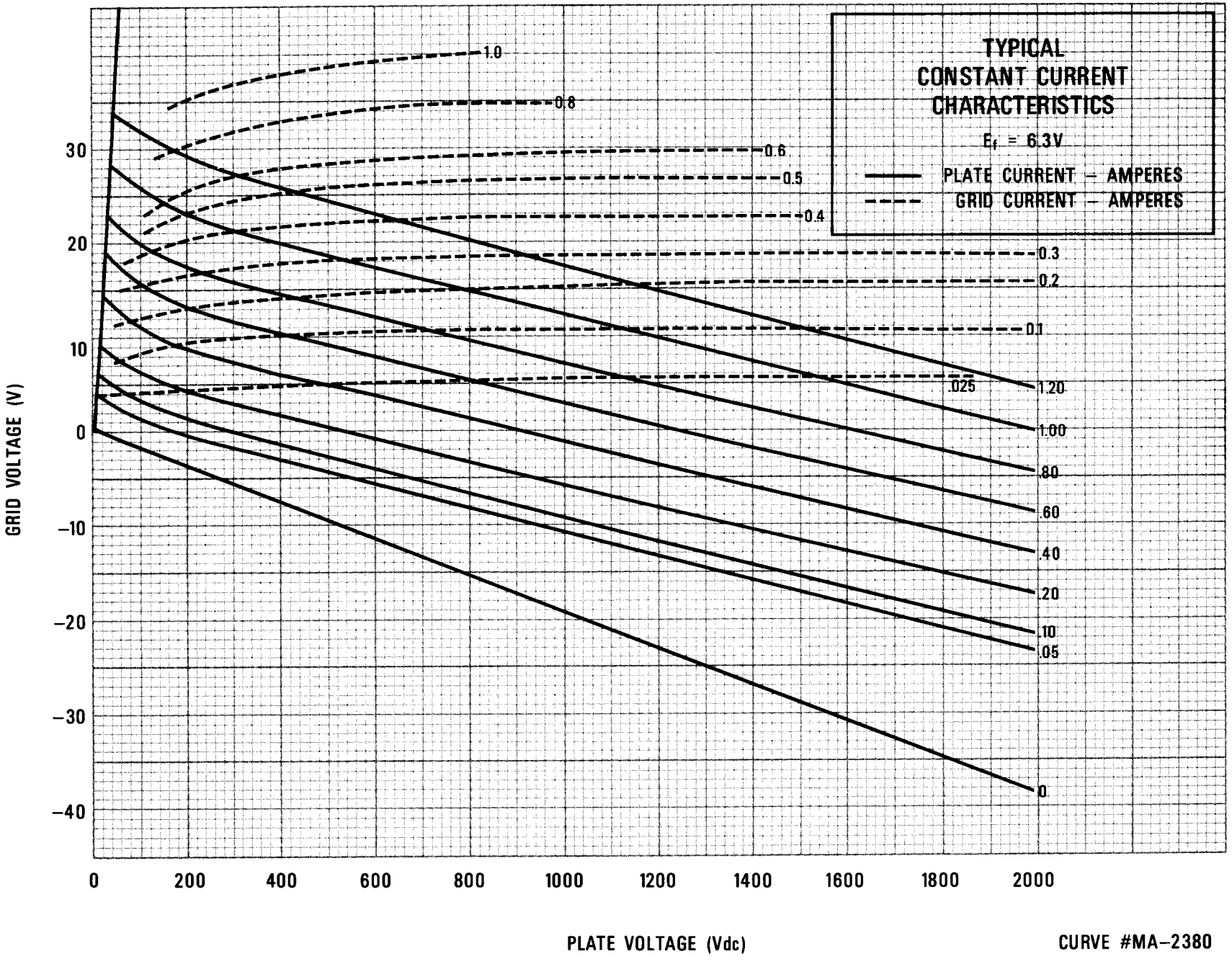
PLATE DISSIPATION VARIATION WITH COOLING AIR FLOW




TYPICAL
CONSTANT GRID VOLTAGE
CHARACTERISTICS
FOR PULSE OPERATION
E_f = 6.3V
PLATE CURRENT
GRID CURRENT
ec = GRID VOLTAGE IN VOLTS
250
200
150
100
50
250V
200
150
100
50
0
CURRENT (A)
0
2
4
6
8
10
12
14
16
18
0
200
400
600
800
1000
1500
2000
2500
3000
PLATE VOLTAGE (Vdc)
CURVE #MA-2375



CURVE #MA–2374


TYPICAL
CONSTANT CURRENT
CHARACTERISTICS
E_f = 6.3V
PLATE CURRENT – AMPERES
GRID CURRENT – AMPERES
1.0
0.8
0.6
0.5
0.4
0.3
0.2
0.1
.025
1.20
1.00
.80
.60
.40
.20
.10
.05
0
GRID VOLTAGE (V)
30
20
10
0
−10
−20
−30
−40
0
200
400
600
800
1000
1200
1400
1600
1800
2000
PLATE VOLTAGE (Vdc)
CURVE #MA–2380