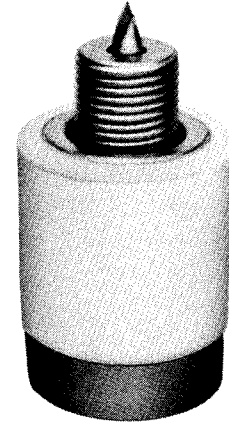




TECHNICAL DATA

PLANAR TRIODE

The Y820 tube has been specifically designed for high voltage series/shunt regulator or switch tube (modulator) service. The compact, rugged design is provided with solder tabs to minimize the input capacitance and improve the rise and fall times that can be achieved with this tube. The Y820 can be mounted in optional operating positions and is capable of sustaining vibration and shock.



GENERAL CHARACTERISTICS<sup>1</sup>

ELECTRICAL

Cathode: Oxide Coated, Unipotential

Heater: Voltage.....	6.3 ±5% V
Current, at 6.3 Volts.....	2.25 A
Cathode Heating Time.....	300 Sec

Amplification Factor (average): .....	650
(Cut-off) <sup>3</sup> .....	400

Direct Interelectrode Capacitance (grounded cathode)<sup>2</sup>

C <sub>in</sub> .....	16 pF
C <sub>out</sub> (max) .....	0.03 pF
C <sub>gp</sub> .....	1.7 pF

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

<sup>2</sup> Capacitance values are for a cold tube. 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.

<sup>3</sup> Measured with one milliampere plate current and a plate voltage of 20 kVdc.

The Y820 was formerly known as X2172F.



### MECHANICAL

Maximum Overall Dimensions:

Length .....	2.825 in. 71.76 mm
Diameter .....	1.330 in. 33.78 mm
Net Weight .....	4.59 oz. 130 gm
Operating Position .....	Any
Maximum Operating Temperature:	
Ceramic/Metal Seals .....	90°C <sup>1</sup>
Anode Core .....	90°C
Cooling .....	Conduction, in oil with appropriate heat sink.

### RANGE VALUES FOR EQUIPMENT DESIGN

	Min.	Max.	
Heater: Current at 6.3 volts .....	2.05	2.50	Vac
Cathode Warmup Time .....	300	—	sec.
Interelectrode Capacitance <sup>2</sup> (grounded cathode connection)			
C <sub>in</sub> .....	—	18	pF
C <sub>out</sub> .....	—	0.03	pF
C <sub>gp</sub> .....	—	2.0	pF

### ENVIRONMENTAL

Shock, 11 ms, non-operating .....	60 G
Vibration, operating, all axes 55 to 500 Hz .....	10 G

### PULSE MODULATOR AND PULSE AMPLIFIER SERVICE

#### ABSOLUTE MAXIMUM RATINGS

DC PLATE VOLTAGE .....	25 KILOVOLTS <sup>3</sup>
PEAK PLATE VOLTAGE .....	30 KILOVOLTS
DC GRID VOLTAGE .....	-150 VOLTS
INSTANTANEOUS PEAK GRID-CATHODE VOLTAGE	
Grid negative to cathode .....	-500 VOLTS
Grid positive to cathode .....	100 VOLTS
PULSE CATHODE CURRENT .....	12 AMPERES
DC PLATE CURRENT .....	150 MILLIAMPERES
DC GRID CURRENT .....	45 MILLIAMPERES
AVERAGE PLATE DISSIPATION	
Conduction and Convection Cooling .....	400 WATTS <sup>4</sup>
GRID DISSIPATION .....	2 WATTS
PULSE DURATION .....	6.0 μs <sup>5</sup>
CUT-OFF MU .....	400
DUTY .....	0.0033

<sup>1</sup> The maximum operating temperature shown is for standard transformer oil and avoids boiling of the oil. If other insulating media with high boiling temperatures are used, higher temperatures are possible to a maximum of 250°C.

<sup>2</sup> Capacitance values are for a cold tube.

<sup>3</sup> 25 kV in oil. In air, without any insulating medium, maximum plate voltage is 15 kV. Higher voltages up to 20 kV may be permissible in specially designed circuits.

<sup>4</sup> When using the tube without special heat sink or cooling arrangement the anode dissipation in oil is 85 watts maximum. The maximum plate dissipation of 400 watts can be achieved in oil when using EIMAC cooling adapter No. 164084.

<sup>5</sup> For applications using longer pulse duration and/or higher duty cycle consult the nearest Varian Electron Device Group Sales Office, or the Product Manager, Varian EIMAC, 1678 Pioneer Road, Salt Lake City, Utah 84104; Tel: (801) 972-5000.

## GENERAL INFORMATION

### HIGH VOLTAGE

Normal operating voltages used with the Y820 are deadly. Equipment must be designed properly and operating precautions must be followed. Design all equipment so that no one can come in contact with the voltages. All equipment must include safety enclosures or high voltage circuits and terminals with interlock switches to open primary circuits of the power supply and to discharge high voltage condensers whenever access doors are opened. Always remember that high voltage can kill.

### X-RAY RADIATION

High voltage tubes operating at voltages higher than 15kV produce progressively more dangerous x-ray radiation as the voltages increase. The Y820 operating at its rated voltages and currents is a potential x-ray hazard. Only limited shielding is afforded by the tube envelope. Moreover, the x-ray radiation level can increase significantly with age and gradual deterioration due to leakage path or emission characteristics as they are affected by the high voltage. X-ray shielding must be provided on all sides of the tubes operating at these voltages to provide adequate protection throughout the life of the tubes. Periodic checks on the x-ray level should be made and the tube should never be operated without adequate shielding in place at voltages above 15kV. When voltages above 15kV are in use, lead glass (which attenuates x-rays) is available for viewing windows. If there is any doubt as to the requirement or the adequacy of shielding, an expert in this field should be contacted to perform an x-ray survey of the equipment. Operation of high voltage equipment with interlock switches cheated, and cabinet doors open in order to better locate an equipment malfunction can result in serious x-ray exposure.

### HOT SURFACES

When the tube is used in air and air cooled, external surfaces of the tube may reach temperatures up to 200°C and higher. Aside from the anode, surfaces may reach the high temperatures, especially the cathode insulator and the cathode/heater. All hot surfaces may remain hot for an extended time after the tube is shut off. To prevent serious burns, take care to avoid any bodily contact with these surfaces both during and for a reasonable cool down period after tube operations.

### SPECIAL REQUIREMENTS

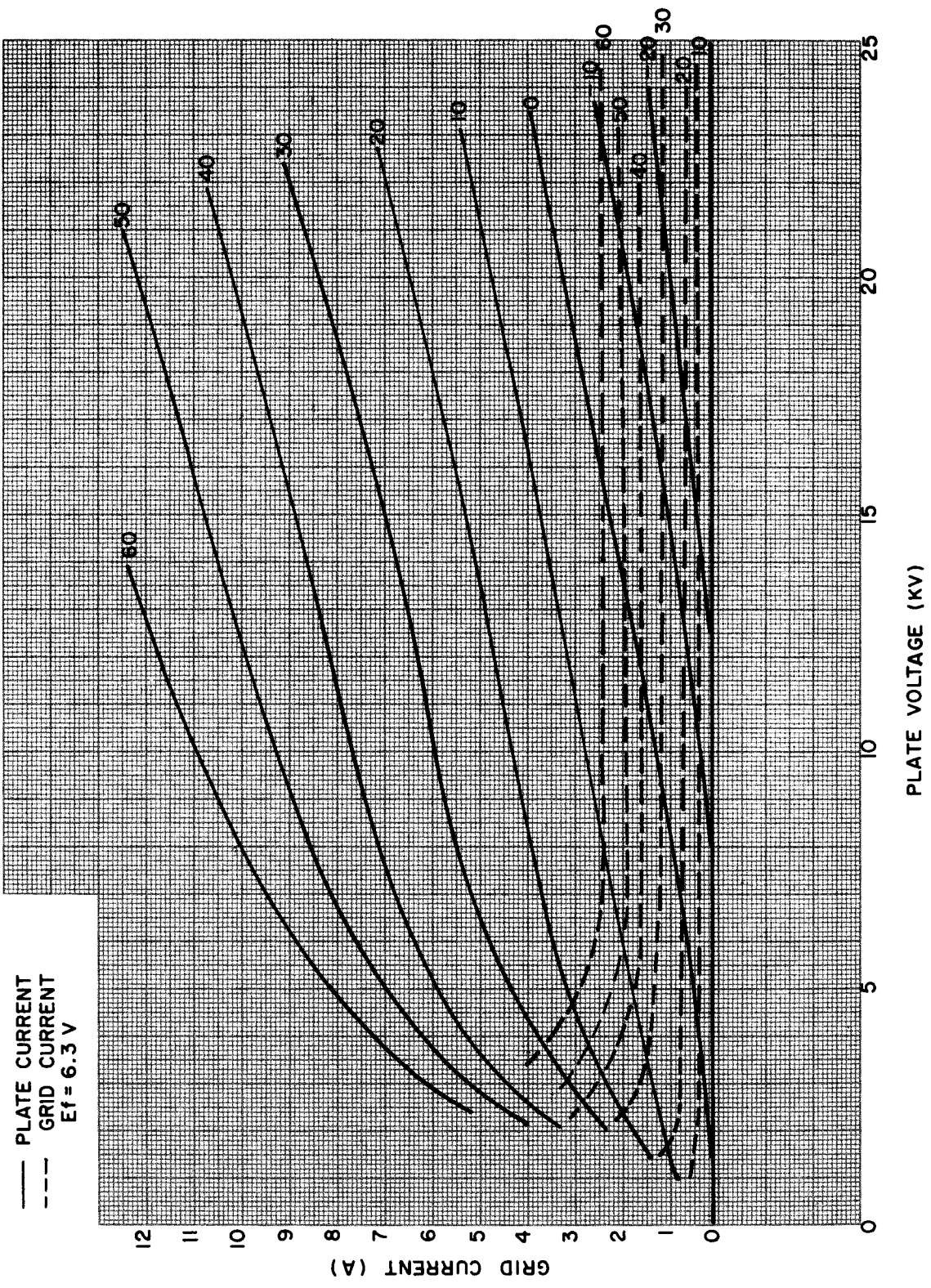
For application information please refer to the Planar Triode Operating Instruction Booklet. The operating instructions should be consulted prior to the designing of new requirements around this tube type. For unusual and special applications consult the nearest Varian Electron Device Group Sales Office, or the Product Manager, Varian EIMAC, Salt Lake City, Utah 84104, (801) 972-5000, TLX 3789474 slcevaras.



MA-2836

Y-820

CONSTANT GRID VOLTAGE CHARACTERISTICS





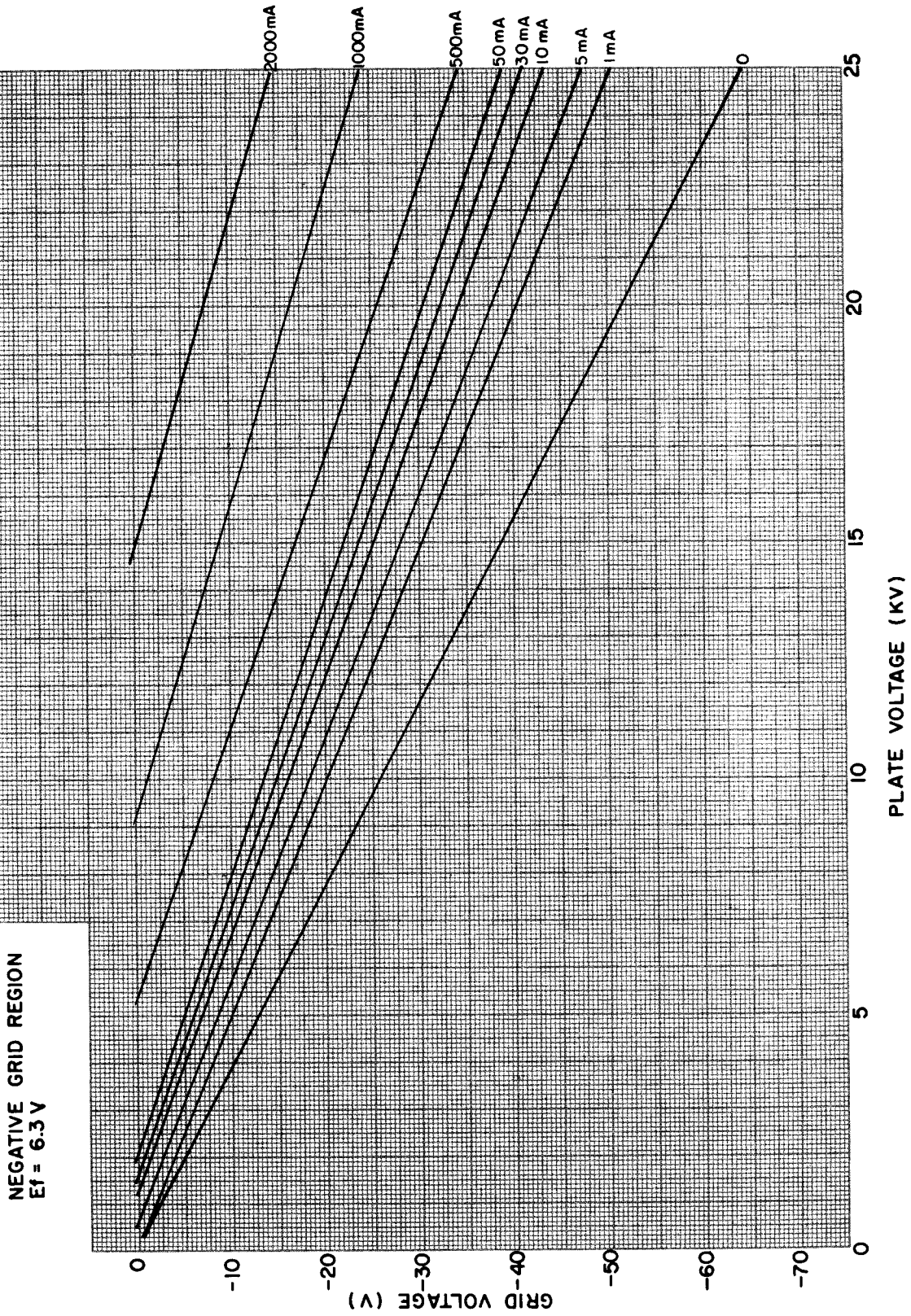


Y820

MA-2837

Y-820

CONSTANT PLATE CURRENT CHARACTERISTICS



DIMENSIONAL DATA				
REF.	INCHES		MILLIMETERS	
	MIN.	MAX.	MIN.	MAX.
A	1.275	1.330	32.385	33.782
B	.100	.250	2.54	6.35
C	.450	.600	11.43	15.24
D	1.225	1.325	31.115	33.655
E	.375	.450	9.525	11.43
F	.100	.200	2.54	5.08
G	.640	.725	16.256	18.415
H	1.200	1.300	30.48	33.02
J	.090	.100	2.286	2.54
K	70°	110°		

