



E I M A C
Division of Varian
SAN CARLOS
CALIFORNIA

3CX15,000A3
MEDIUM-MU
AIR-COOLED
POWER TRIODE

The EIMAC 3CX15,000A3 is an air-cooled, ceramic/metal power triode designed primarily for use as a power oscillator in industrial radio frequency heating applications. It is also recommended for use as a grounded grid FM amplifier, as a conventional plate-modulated amplifier, or as a linear amplifier. The one kilowatt filament and rugged 500 watt grid structure make this tube especially suitable for heavy duty service.

GENERAL CHARACTERISTICS¹

ELECTRICAL

Filament: Thoriated-Tungsten

Voltage	- - - - -	6.3V $\pm$ 0.3	V
Current, at 6.3 volts	- - - - -	160	A
Amplification Factor	- - - - -	20	

Interelectrode Capacitance (Grounded Cathode)²

Grid-Filament	- - - - -	55	pF
Plate-Filament, max.	- - - - -	1.4	pF
Grid-Plate	- - - - -	34	pF
Frequency for Maximum Ratings	- - - - -	100	MHz

MECHANICAL

Dimensions

Height	- - - - -	8.5 in (216 mm)
Diameter	- - - - -	7.0 in (178 mm)
Net Weight	- - - - -	12 lb (5.54 kg)
Operating Position	- - - - -	Vertical, base up or down
Recommended Socket	- - - - -	EIMAC SK-1300
Recommended Chimney	- - - - -	EIMAC SK-1306

Maximum Operating Temperatures

Ceramic-to-Metal Seals	- - - - -	250° C
Anode Core	- - - - -	250° C
Cooling	- - - - -	Forced Air
Base	- - - - -	Coaxial





1. Characteristics and operating values are based on 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 for a cold tube as measured in a special shielded fixture.
3. Adjust to give specified zero-signal DC plate current.

APPLICATION

FILAMENT - The rated filament voltage for the 3CX15,000A3 is 6.3 volts. Filament voltage, as measured at the socket, should be maintained at 6.3 volts plus or minus 0.3 volts for long tube life and consistent performance.

GRID OPERATION - A recommended maximum grid current is 1.0 Adc. This value should not be exceeded for more than very short periods such as during tuning. Over-current protection in the grid circuit should be provided. Ordinarily it will not be necessary to operate with more than 0.4 to 0.6 A grid current to obtain reasonable efficiency. In industrial heating service with varying loads, grid current should be monitored continuously with a DC current meter. The absolute maximum grid dissipation rating is 500 watts.

PLATE OPERATION - Absolute maximum plate voltage rating of 8 kV and maximum plate current of 6.0 A should not be applied simultaneously as rated plate dissipation may be exceeded. When used as a plate modulated RF amplifier, absolute maximum input is reduced to 6500 V at 5.0 Adc. Plate over-current protection should be provided to remove plate voltage quickly in the event of an over-load or an arc-over at the load. In addition, current limiting power supply resistors should be used. These precautions are especially important in industrial service having wide variations in plate current loading.

Spark gaps from plate to ground should be used to prevent transient voltages from flashing across the tube envelope during any fault conditions.

HIGH FREQUENCY OPERATION - The 3CX15,000-A3 is usable to 140 MHz. At this frequency, absolute maximum plate voltage must be reduced to 7000 Vdc A, B, or C service. For plate-modulated application at 140 MHz, absolute maximum plate voltage is reduced to 5500 Vdc.

COOLING - Forced-air cooling is required to adequately maintain the rated ceramic/metal seal and anode temperature at 250° C or below. The table lists minimum air-flow requirements to maintain tube temperatures at 225° C in 40° C ambient air using the EIMAC SK-1300 socket and SK-1306 chimney. Air-flow in the base-to-anode direction is recommended; reverse air-flow may be used, but users should contact the nearest Varian Field Office or EIMAC Division of Varian, San Carlos, California 94070, for specific recommendations.

MINIMUM AIR-FLOW REQUIREMENTS

*Plate Dissipation (kW)	Air-Flow (CFM)	Pressure Drop (Inches water)
5.0	85	0.2
7.5	195	0.7
10.0	360	2.0
12.5	590	4.9
15.0	970	10.5

*An additional 1500 watts has been included in preparing this tabulation to compensate for grid and filament power.



RF POWER AMPLIFIER OR OSILLATOR INDUSTRIAL

Class C Telephony or FM Telephony
(Key Down Conditions)

ABSOLUTE MAXIMUM RATINGS

DC PLATE VOLTAGE	— — — — —	8000	V
DC PLATE CURRENT	— — — — —	6.0	A
PLATE DISSIPATION	— — — — —	15	kW
GRID DISSIPATION	— — — — —	500	W

TYPICAL OPERATING CONDITIONS

DC Plate Voltage	— — — — —	7000	Vdc
DC Plate Current	— — — — —	6.0	A
DC Grid Voltage	— — — — —	-600	Vdc
DC Grid Current	— — — — —	660	mAdc
Peak RF Grid Voltage	— — — — —	1040	V
Driving Power	— — — — —	660	W
Plate Input Power	— — — — —	42	kW
Plate Dissipation	— — — — —	12	kW
Plate Output Power	— — — — —	30	kW
Resonant Load Impedance	— — — — —	600	ohms

RF POWER AMPLIFIER PLATE-MODULATED

Class C

ABSOLUTE MAXIMUM RATINGS

DC PLATE VOLTAGE	— — — — —	6500	V
DC PLATE CURRENT	— — — — —	5.0	A
PLATE DISSIPATION	— — — — —	10	kW
GRID DISSIPATION	— — — — —	500	W

TYPICAL OPERATING CONDITIONS

DC Plate Voltage	— — — — —	5000	6000	Vdc
DC Plate Current	— — — — —	2.9	3.9	A
DC Grid Voltage	— — — — —	550	600	Vdc
DC Grid Current	— — — — —	450	520	mAdc
Driving Power	— — — — —	375	490	W
Plate Output Power	— — — — —	13.0	18.0	kW

RF LINEAR AMPLIFIER

Class AB or B

ABSOLUTE MAXIMUM RATINGS

DC PLATE VOLTAGE	— — — — —	8000	V
DC PLATE CURRENT	— — — — —	6.0	A
PLATE DISSIPATION	— — — — —	15	kW
GRID DISSIPATION	— — — — —	500	W

TYPICAL OPERATING CONDITIONS

Class AB₂

DC Plate Voltage	— — — — —	7000	Vdc
DC Grid Voltage	— — — — —	-270	Vdc
Zero-Sig Plate Current ³	— — — — —	1.5	A
Max-Sig DC Plate Current	— — — — —	4.8	A
Max-Sig DC Grid Current	— — — — —	400	mAdc
Peak RF Grid Voltage	— — — — —	540	V
Driving Power	— — — — —	215	W
Plate Output Power	— — — — —	23	kW
Resonant Load Impedance	— — — — —	730	ohms

RANGE VALUES FOR EQUIPMENT DESIGN

	Min.	Max.	
Filament: Current, at 6.3 volts	152	168	A
Interelectrode Capacitances ²			
Grid-Filament	50	60	pF
Plate-Filament	1.3	1.6	pF
Grid-Plate	30	38	pF



ANODE

