

EIMAC

A Division of Varian Associates

8251 3CX2500F3

MEDIUM MU TRIODE

The EIMAC 3CX2500F3 is an all ceramic and metal, medium-mu, forced-air cooled, external anode transmitting triode with a maximum plate dissipation rating of 2500 watts. Relatively high power output as an amplifier, oscillator, or modulator may be obtained from this tube at low plate voltages. The 3CX2500F3 is an exact replacement for the EIMAC 3X2500F3 and is suggested for use where higher ambient temperatures are to be expected or greater reliability is required. The all ceramic and metal construction allows a greater margin of safety with respect to tube operating temperatures while permitting higher processing temperatures to insure longer life.

The tube is equipped with flexible filament and grid leads which simplify socketing and equipment design for industrial and communication

frequencies below 30 megahertz.

GENERAL CHARACTERISTICS

ELECTRICAL											
Filament: Thoriat	ed Tu	ngster	1				Min.	Nom.	Max.		
Voltage -			-	•	-	-		7.5		volts	
Current -			-	-	-	-	48		53	amperes	
Amplification Fac	tor -		-		-	-	19		26		
Direct Interelectro	de Ca	pacita	nces								
Grid-Plate			-	-	-	-	16.8		23.2	pF	
Grid-Filamen	t -		-	-	-	-	29.2		40.2	pF	
Plate-Filamer	nt .	-	-	-	-	-	0.6		1.2	pF	
Tranconductance	(Ib=8)	30 ma	., Eb	=30	00 v	.) -		20,000		umhos	
Highest Frequency	y for I	laxim	um I	Ratir	ngs	-			30	MHz	
MECHANICAL											
Base			-	-	-	-	-		- '		



Base	_	_	-	-	-	-	-	-	-	-	-	-	-	-	-	-	Se	ee ou	tline drawing
Mounting		-	-	-	-	-	-	-	-	-	_	-	-	-	-	Ve	rtica	l, bas	se down or up
Maximum		ode	Core	e an	d Sea	al Te	empe	eratu	res	-	-	-	-	_	-	-	-	-	- 250°C
Cooling	-	_	-	-		-		-	-	-	-	-	-	-	-	-		-	Forced Air
Maximum	10	er-a	ll Di	men	sion	s:													
Leng	th (Doe	s not	incl	ude :	filan	nent	conr	necto	rs)	-	-		-	-	-	-	-	8.6 inches
Dian			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.16 inches
Length of	fila	mer	it Co	nne	ctors	(A)	pro	xima	ite)	-	-	-	-	-	-	-	-	-	9.5 inches
Net Weig	ht	_	-	_	-	-	_	-	_	-	-	-	-	-	-	_	_	~	7.5 pounds
Shipping	We	ight	(Ap	prox	imat	te)	-	-	-	-	-	-	_	-	-	-	-	-	17 pounds

RADIO-FREQUENCY POWER	TYPICAL OPERATIO	N (F	requ	enci	es b	elow	30	MHz)		
AMPLIFIER OR OSCILLATOR	DC Plate Voltage	-	-	-	-	-	-	4000	5000	6000 volts
Conventional Neutralized Amplifier,	DC Plate Current	-	-	-	-	-	-	2.5	2.5	2.08 amp
T) (12 Per 12 Pe	DC Grid Voltage		-	-	-	-	-	300	-450	-500 volt
Class-C FM or Telegraphy	DC Grid Current	-	-	-	-	-	-	245	265	.180 ma
(Key-down Conditions)	Peak RF Grid Input	Vo	tage	*	~	-		580	750	765 volt
MAXIMUM RATINGS	Driving Power*	-	-		-	+	-	142	197	136 wat
OC PLATE VOLTAGE - 6000 VOLTS	Grid Dissipation*	-	-	-	-	-	-	68	78	46 wat
	Plate Input Power		-	-	*	-	-	10,000	12,500	12,500 wat
DC PLATE CURRENT - 2.5 AMPS	Plate Dissipation	-	-	-	-	-	-	2500	2500	2500 wat
PLATE DISSIPATION - 2500 WATTS	Plate Output Power	-	-	-	-	-	-	7500	10,000	10,000 wat



PLATE-MODULATED RADIO-FREQUENCY AMPLIFIER

Conventional Neutralized Amplifier, Class-C Telephony (Carrier Conditions)

MAXIMUM RATINGS

DC PLATE VOLTAGE	~	5500	VOLTS
DC PLATE CURRENT	•	2.0	AMPS
PLATE DISSIPATION		1670	VOLTS
GRID DISSIPATION		150	WATTS

TYPICAL OPERATION (Frequencies below 30 MHz) DC Plate Voltage - - - - 4000

DC Plate Current	-	-	-	-	-	-	1.67	1.47	1.25	amps
DC Grid Voltage	-	-	-	-	-	-	-450	500	550	
DC Grid Current*	-	-	-	-	-	-	180	140	150	ma
Peak RF Grid Input	Vol	tage'	4	-	-	~	685	715		volts
Driving Power*	~	-	-	-	-	-	125	100	115	watts
Grid Dissipation*	-	-	-	-	-	-	43	30	32	watts
Plate Input Power	-	-	-	-	-	-	6670	6615	6250	watts
Plate Dissipation	-	-	-	-	-	-	1670	1315	950	watts
Plate Output Power	~	-	-	-	-	-	5000	5300	5300	watts
*Approximate values.										

4500

5000 volts

AUDIO-FREQUENCY POWER AMPLIFIER OR MODULATOR

Class-AB or B

MAXIMUM RATINGS

DC PLATE VOLTAGE - 6000 VOLTS
DC PLATE CURRENT - 2.5 AMPS
PLATE DISSIPATION - 2500 WATTS
GRID DISSIPATION - 150 WATTS

TYPICAL OPERATION (Sinusoidal wave, two tubes unless noted)

DC Plate Voltage		-	-	-	-	4000	5000	8000	VOITS
DC Grid Voltage ¹		-	-	-	-	150	-190	-240	volts
Zero-Signal DC Plate	Curre	ent -	-	-	*	0.6	0.5	0.4	amps
Max-Signal DC Plate	Curre	nt -	-	-		4.0	3.2	3.0	amps
Effective Load, Plate	to Pla	te -	-	-	-	2200	3600	4650	ohms
Peak AF Grid Input	Voltag	e (per	tube)*	-	340	360	390	volts
Max-Signal Peak Driv	ing P	ower*		-		340	230	225	watts
Max-Signal Nominal	Drivir	ng Pow	er*	-	-	170	115	113	watts
Max-Signal Plate Ou	tput F	ower	-	-	-	11,000	11,000	13,000	watts

^{*}Approximate values.

IF IT IS DESIRED TO OPERATE THIS TUBE UNDER CONDITIONS WIDELY DIFFERENT FROM THOSE GIVEN UNDER "TYPICAL OPERATION," POSSIBLY EXCEEDING THE MAXIMUM RATINGS GIVEN FOR CW SERVICE, WRITE EIMAC DIVISION OF VARIAN, FOR INFORMATION AND RECOMMENDATIONS.

APPLICATION

Cooling—Forced-air cooling must be provided to hold the ceramic-to-metal seals and anode core temperature below the maximum rating of 250°C. At ambient temperatures above 50°C, at higher altitudes and at operating temperatures above 30 MHz, additional air flow must be provided. Sea level and 10,000 foot altitude air-flow requirements to maintain seal temperatures below 200°C in 50°C ambient air are tabulated below (for operation below 30 MHz).

	-	e-to-Base Ai				
	Se	10,000 Feet				
Anode Dissipation Watts	Air Flow CFM	Pressure Drop Inches Water	Air Flow CFM	Pressure Drop Inches Water		
1500 2500	33 66	.6 1.25	48 96	.9 1.82		

	Base-	to-Anode A	ir Flow					
Sea Level 10,000 Feet								
Anode Dissipation Watts	Air Flow CFM	Pressure Drop Inches Water	Air Flow CFM	Pressure Drop Inches Water				
1500 2500	32 57	.6 1.0	47 83	.9 1.5				

^{*}Since the power dissipated by the filament represents about 400 watts and since grid dissipation can, under some conditions represent another 150 watts, allowance has been made in preparing this tabulation for an additional 550 watts.

Filament Voltage — The filament voltage, as measured directly at the tube, should be 7.5 volts with maximum allowable variations due to line fluctuation of from 7.12 to 7.87 volts. Tube life may be extended by operation at the lower end of this range.

Bias Voltage — There is little advantage in using bias voltages in excess of those given under "TYPICAL OPERATION" except in certain very specialized applications. Where bias is obtained from a grid resistor, suitable protective means must be provided to prevent excessive plate dissipation in the event of loss of excitation.

Plate Voltage — The plate-supply voltage for the 3CX2500F3 should not exceed 6000 volts. In most cases there is little advantage in using plate-supply voltages higher than those given under "TYPICAL OPERATION" for the power output desired.

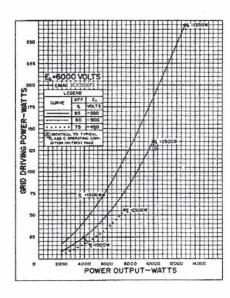
Grid Dissipation — The power dissipated by the grid of the 3CX2500F3 must never exceed 150 watts. Grid dissipation is the product of dc current and peak positive grid voltage.

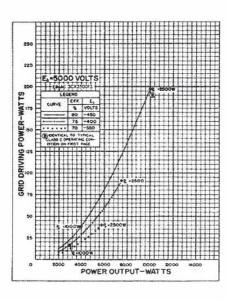
In equipment in which the plate loading varies widely, such as oscillators used for radio-frequency heating, care should be taken to make certain that the grid dissipation does not exceed the maximum rating under any condition of loading. With lightly loaded conditions the grid driving power should be reduced so that the grid current does not exceed one-tenth of the plate current.

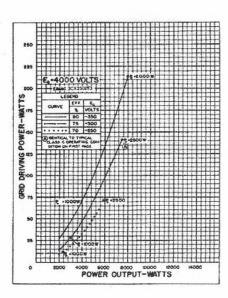
¹Adjust to give listed zero-signal plate current.

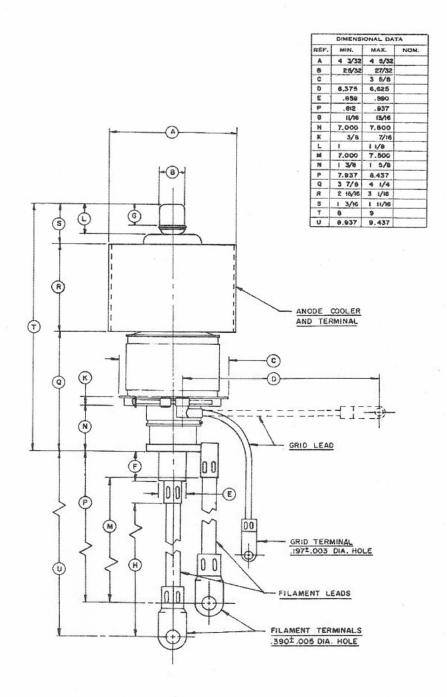
¹ When air is supplied in the anode-to-base direction, a minimum of 3 cfm must be directed into the filament-stem structure between the inner and outer filament terminals to maintain the base seals below 250°C. No separate air is required with base-to-anode airflow.











DRIVING POWER vs. POWER OUTPUT

The three charts on this page show the relationship of plate efficiency, power output and approximate grid driving power at plate voltages of 4000, 5000 and 6000 volts. These charts show combined grid and bias losses only. The driving-power and power-output figures do not include circuit losses. The plate dissipation in watts is indicated by Pp. Points A, B, and C are identical to the typical Class C operating conditions shown on the first page under 4,000, 5000 and 6000 volts respectively.

