

3CX3000A7

High-Mu Power Triode



The Penta 3CX3000A7 is a high-mu metal/ceramic external anode power triode. Maximum plate dissipation for this tube is 4000 watts, and cooling is forced-air. At moderate plate voltages, relatively high power output can be obtained from the 3CX3000A7 as an amplifier, oscillator, or modulator.

For grounded-grid operation, excellent shielding between the input and output circuits is provided by the grid, handily terminated between the filament and plate terminals. A power gain of approximately 20 times can be obtained under operation with zero grid bias. The 3CX3000A7 is designed using a rugged, low-inductance cylindrical filament stem, making it especially well suited for use in the linear filament tank circuit under VHF operation.

ELECTRICAL CHARACTERISTICS

Filament - Thoriated Tungsten	
Voltage	7.5 Volts
Current	51.5 Amperes
Amplification Factor	160
Frequency of Maximum Rating	110 MHz
Interelectrode Capacitances (For a cold tube in a shielded fixture)	
Grounded Filament Configuration	
Input	38.1 pF
Output	0.6 pF
Grid-Plate	24.0 pF
Grounded Grid Configuration	
Input	38.1 pF
Output	24.0 pF
Plate-Cathode	0.6 pF
Zero Bias Plate Current ($E_b=5000$ volts)44 ± .08 Amperes
Cut-Off Bias ($E_b=5000$ volts, $I_b=1.0$ mA dc)	-45.0 Volts Max.

Revised 22 Nov 2022

	<p>P E N T A L A B O R A T O R I E S</p> <p>14399 PRINCETON AVENUE * MOORPARK * CALIFORNIA 93021</p> <p>(800) 421-4219 * (818) 882-3872 * FAX: (818) 882-3968</p>
---	--

ELECTRON TUBES FOR INDUSTRY



3CX3000A7

High-Mu Power Triode

MECHANICAL CHARACTERISTICS

Base	Special Coaxial
Maximum Overall Dimensions	
Length	9.0 inches
Diameter	4.16 inches
Net Weight	6.25 pounds
Mounting Position	Vertical, Base Up or Down
Cooling	Forced Air
Maximum Operating Temperature (Anode Core and Seals)	250°C

COOLING

Forced-air cooling of the 3CX3000A7 is required for all classes of operation. Although the maximum temperature rating for the anode and ceramic/metal seals is 250°C, the useful life of the tube can usually be prolonged substantially by maintaining tube temperature below this rated maximum.

The air flow required to maintain the tube surface temperature at 225°C under various conditions has been tabulated below. It is necessary to keep in mind that high altitude operation, operation at frequencies exceeding 30 MHz, or operation where ambient air temperatures exceed 40°C will require additional air flow to maintain the desired tube surface temperature.

When there is uncertainty regarding the required air flow, it should be noted that the sole criterion which can be reliably used for judging cooling effectiveness is tube surface temperature. Tube surface temperature can usually be determined by using any number of temperature sensitive paints currently available.

Recommended Cooling Conditions - Air Flow From Base to Anode				
	Sea Level		10,000 Feet	
Dissipation (Watts)	Air Flow (CFM)	Pressure Drop (Inches of H ₂ O)	Air Flow (CFM)	Pressure Drop (Inches of H ₂ O)
2000	50	0.32	72	0.47
3000	87	0.74	125	1.41
4000	129	1.43	187	2.57
Recommended Cooling Conditions - Air Flow From Anode to Base				
2000	55	0.38	80	0.70
3000	106	1.10	156	1.92
4000	179	2.52	262	4.52

FILAMENT VOLTAGE

The 3CX3000A7 is designed to operate with 7.5 volts applied to the filament. Under no circumstances should the filament voltage be allowed to deviate from this value by more than 5%. The useful life of the tube can be extended by adhering to this value as closely as possible.



3CX3000A7

High-Mu Power Triode

GROUNDING GRID OPERATION

The use of a matching network in the cathode circuit is recommended when the PL3CX3000A7 is operated as a grounded grid RF amplifier. A "Q" of five or higher is recommended for in the network of a single ended amplifier.

NOTE ON TYPICAL OPERATION DATA

The data shown in the following Typical Operation section is calculated or measured based on industry standard published characteristic curves. It is assumed that RF grid voltage is adjusted in order to obtain the the specified plate current, plate voltage, and bias. Under this procedure, little variation in power output will occur when the tube is changed or replaced. Although grid current may vary slightly from tube to tube, it is relevant only in-so-far as it results in the appropriate plate current, and should pose no problem given that the circuit voltage is not allowed to vary with current. If a grid resistor is used as the source of grid bias, it is crucial that this resistor be adjustable so that the required bias voltage may be obtained when the correct RF grid voltage is applied. All data is subject to change without notice

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

AF Power Amplifier or Modulator-Class AB₂, Grid Driven

Maximum Ratings (Per Tube)

DC Plate Voltage 5000 Volts
DC Plate Current 2.5 Amperes
Plate Dissipation 4000 Watts
Grid Dissipation 225 Watts

Typical Operation (Two Tubes Unless Noted, Sinusoidal Wave)

DC Plate Voltage 4000 Volts
Approx. Zero-Signal DC Plate Current 0.50 Amperes
Maximum-Signal DC Plate Current 3.58 Amperes
Approx. Maximum-Signal DC Grid Current 0.58 Amperes
Effective Plate to Plate Load 2720 Ω
Peak AF Grid Input Voltage (per tube) 190 Volts
Peak Driving Power 115 Watts
Maximum-Signal Plate Dissipation 1850 Watts
Maximum-Signal Plate Output Power 10,500 Watts

RF Amplifier - Class C Telegraphy or FM, Cathode Driven

Maximum Ratings

DC Plate Voltage 5000 Volts
DC Plate Current 2.5 Amperes
Plate Dissipation 4000 Watts
Grid Dissipation 225 Watts

Typical Operation (Frequencies Below 110 MHz)

DC Plate Voltage 3500 4800 Volts
DC Plate Current 1.30 1.54 Amperes
DC Grid Voltage -50 -60 Volts
Approx. DC Grid Current 0.42 0.48 Ampere
Approx. Peak RF Cathode Voltage 220 267 Volts
Approx. Driving Power 310 435 Watts
Plate Dissipation 985 1480 Watts
Useful Output Power (10% loss assumed) 3300 5500 Watts



3CX3000A7

High-Mu Power Triode

RF Linear Amplifier - Class AB₂, Grid Driven

Maximum Ratings

DC Plate Voltage	5000	Volts
DC Plate Current	2.5	Amperes
Plate Dissipation	4000	Watts
Grid Dissipation	225	Watts

Typical Operation (Frequencies Below 30 MHz, Carrier Conditions)

DC Plate Voltage	4000	Volts
Approx. Zero-Signal DC Plate Current	0.25	Ampere
DC Plate Current	0.74	Ampere
Approx. DC Grid Current	0.13	Ampere
Approx. Peak RF Grid Voltage	85.0	Volts
Approx. Peak Driving Power	11.5	Watts
Plate Dissipation	1830	Watts
Single Tone Plate Output Power	1130	Watts
Resonant Load Impedance	1750	Ω
Peak RF Plate Voltage	2000	Volts

RF Linear Amplifier - Class AB₂, Cathode Driven

Maximum Ratings

DC Plate Voltage	5000	Volts
DC Plate Current	2.5	Amperes
Plate Dissipation	4000	Watts
Grid Dissipation	225	Watts

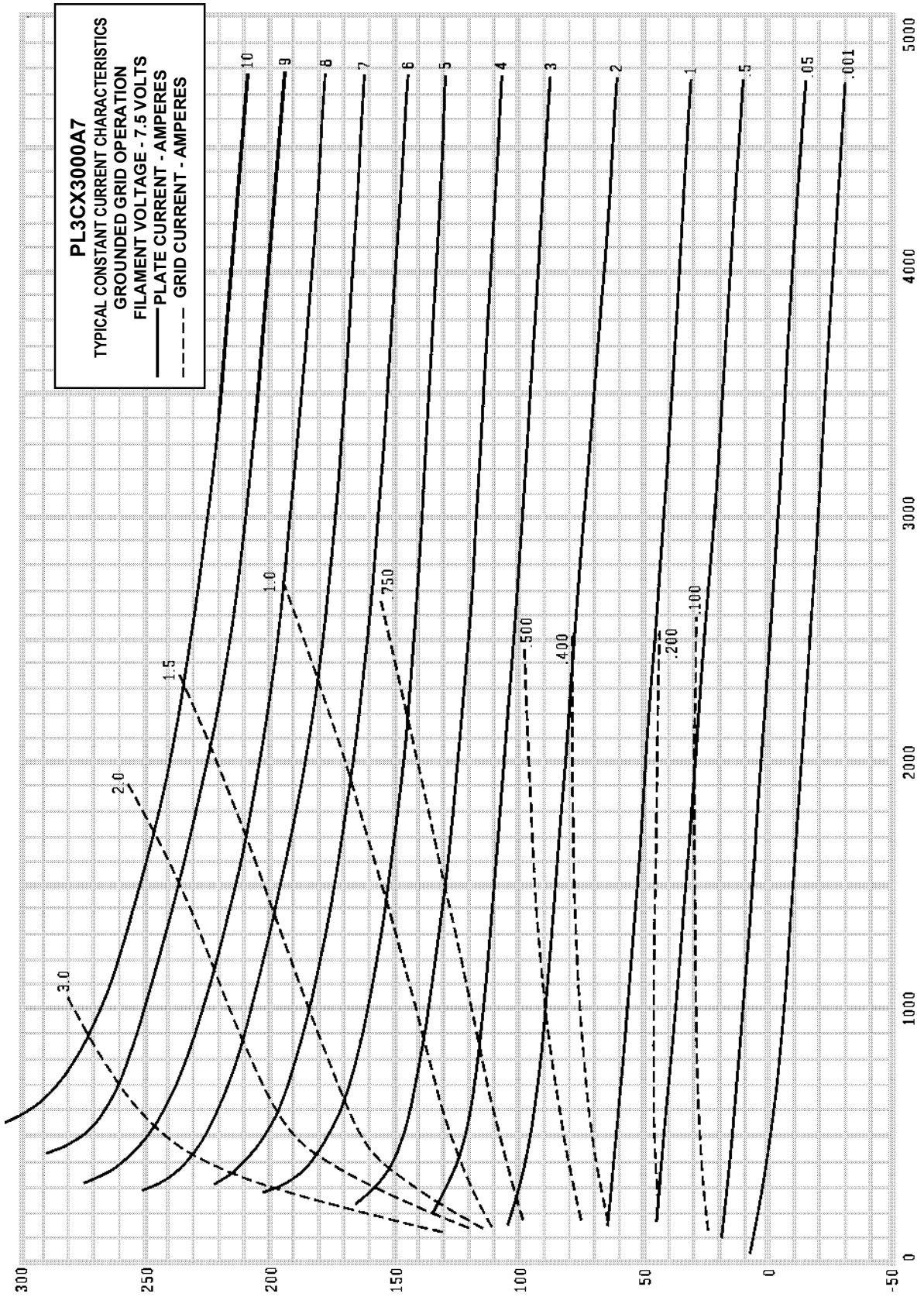
Typical Operation (Frequencies Below 30 MHz, Peak Envelope or Modulation Crest Conditions)

DC Plate Voltage	4000	4800	4800	Volts
Approx. Zero-Signal DC Plate Current	0.25	0.35	0.35	Ampere
Single Tone DC Plate Current	2.00	1.68	2.00	Amperes
Approx. Single Tone DC Grid Current	0.61	0.46	0.60	Ampere
Plate Dissipation	2285	2275	2775	Watts
Peak Driving Power	420	293	410	Watts
Single Tone Plate Output Power	6030	6000	7266	Watts
Resonant Load Impedance	1210	1720	1425	Ω
Driving Impedance	47.5	50.0	46.3	Ω



3CX3000A7

High-Mu Power Triode





3CX3000A7

High-Mu Power Triode

