

PRELIMINARY TECHNICAL INFORMATION

These ratings represent those of current samples of this type. Refer to the Objective Technical Information sheet for design-objective ratings.

DEVELOPMENTAL
TYPE

ZP-1070
PTI-164
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This technical information is proprietary and is furnished only as a service to customers.

ZP-1070

Radio-Frequency Amplifier
CW Service
Grounded-Grid Operation

TETRODE

Forced-Air Cooled
Metal and Ceramic
Integral Radiator

The ZP-1070 is a reliable power tetrode that delivers useful output to 1250 megacycles or higher. This tube is particularly suitable for application in the final output or driver stage of military-communications systems.

As a Class B linear amplifier in the 225-400-megacycle range, the tube will deliver 110 watts of carrier power modulated up to 100 percent. Since a power gain of 20 may be realized, drive requirements are low - approximately 5 watts at carrier level.

Operating as a Class C CW amplifier at 900 megacycles, the gain is approximately 15 at the 200-watt level.

Features of the ZP-1070 include long life and reliability, high gain, high linearity, and resistance to shock and vibration.

These together with such design factors as an oxide-coated cathode, coaxial elements, and metal-ceramic construction make the tube well adapted to application in modern systems where performance and reliability are important.

ELECTRICAL

Minimum Bogey Maximum

Heater Voltage *	-	6.3	6.8	Volts
Heater Current	-	3.8	-	Amperes
Cathode Heating Time	1	-	-	Minutes
Amplification Factor, G_2 to G_1 , $E_b = 1000$ Volts DC; $E_{g2} = 275$ Volts DC; $I_b = 0.2$ A DC	-	14	-	
Direct Interelectrode Capacitances				
Cathode to Plate ‡	-	0.006	-	$\mu\mu f$
Input, G_2 tied to G_1	-	20	-	$\mu\mu f$
Output, G_2 tied to G_1 ◊	-	7.5	-	$\mu\mu f$

MECHANICAL

Mounting Position - Any
Net Weight, approximate 13 Ounces

THERMAL

Cooling - Forced Air § Through Radiator, at Sea Level **				
Plate Dissipation	600	400		Watts
Air Flow, 45 C Incoming Air Temperature, minimum	9	4.5		Cubic Feet per Minute
Static Pressure, approximate	0.5	0.2		Inches-Water
Radiator Hub Temperature at Point Adjacent to Anode Seal	-	-	250	C

THERMAL (CONT'D)

Seals			
Screen-Grid to Control-Grid, approximate	-	-	1 Cubic Foot per Minute
Heater to Cathode, approximate	-	-	1 Cubic Foot per Minute
Ceramic Temperature at Any Point, maximum	-	-	200 C

RADIO-FREQUENCY POWER AMPLIFIER - CLASS B LINEAR

Carrier conditions per tube for use with a maximum modulation factor of 1.0

Maximum Ratings

DC Plate Voltage	2000	Volts
DC Grid-No. 2 Voltage	320	Volts
DC Plate Current	0.250	Ampere
Plate Input	500	Watts
Grid-No. 2 Input	5	Watts
Plate Dissipation	600	Watts

Typical Operation

Grounded-Grid Circuit at 225-400 Megacycles

DC Plate Voltage	1750	Volts
DC Grid-No. 2 Voltage	250	Volts
DC Grid-No. 1 Voltage, approximate	-20	Volts
Peak RF Plate Voltage #, approximate	1250	Volts
Peak RF Grid-No. 1 Voltage #, approximate	40	Volts
DC Plate Current	0.200	Ampere
Zero Signal DC Plate Current (E_{c1} adjusted)	0.020	Ampere
DC Grid-No. 2 Current	0.005	Ampere
DC Grid-No. 1 Current	0.010	Ampere
Driving Power, approximate	5	Watts
Power Output ♡	110	Watts

RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR - CLASS C TELEGRAPHY

Key-down conditions per tube without amplitude modulation Δ

Maximum Ratings

	900 Megacycles	400 Megacycles	
DC Plate Voltage	1600	2000	Volts
DC Grid-No. 2 Voltage	320	320	Volts
DC Grid-No. 1 Voltage	-100	-100	Volts
DC Plate Current	0.300	0.300	Ampere
DC Grid-No. 1 Current	0.050	0.050	Ampere
Plate Input	480	600	Watts
Grid-No. 2 Input	15	15	Watts
Plate Dissipation	600	600	Watts
Grid-No. 1 Dissipation	2	2	Watts

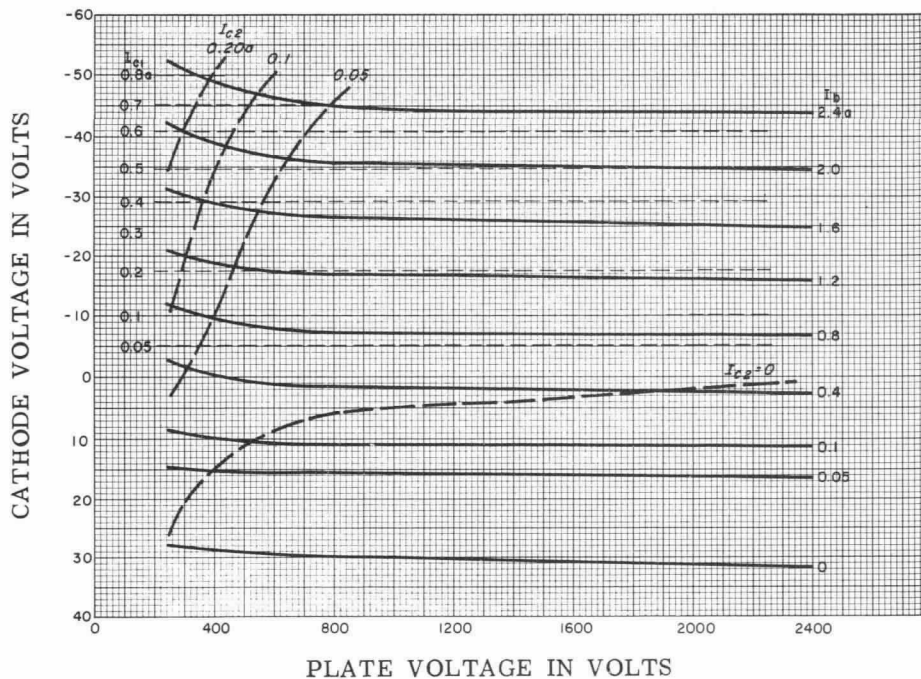
Typical Operation

Grounded-Grid Circuit at 900 Megacycles

DC Plate Voltage	1500	2000	Volts
DC Grid-No. 2 Voltage	210	225	Volts
DC Grid-No. 1 Voltage	-40	-40	Volts
DC Plate Current	0.300	0.250	Ampere
DC Grid-No. 2 Current, approximate	0.010	0.010	Ampere
DC Grid-No. 1 Current, approximate	0.020	0.020	Ampere
Driving Power, approximate	14	15	Watts
Power Output, approximate ¶	205	300	Watts

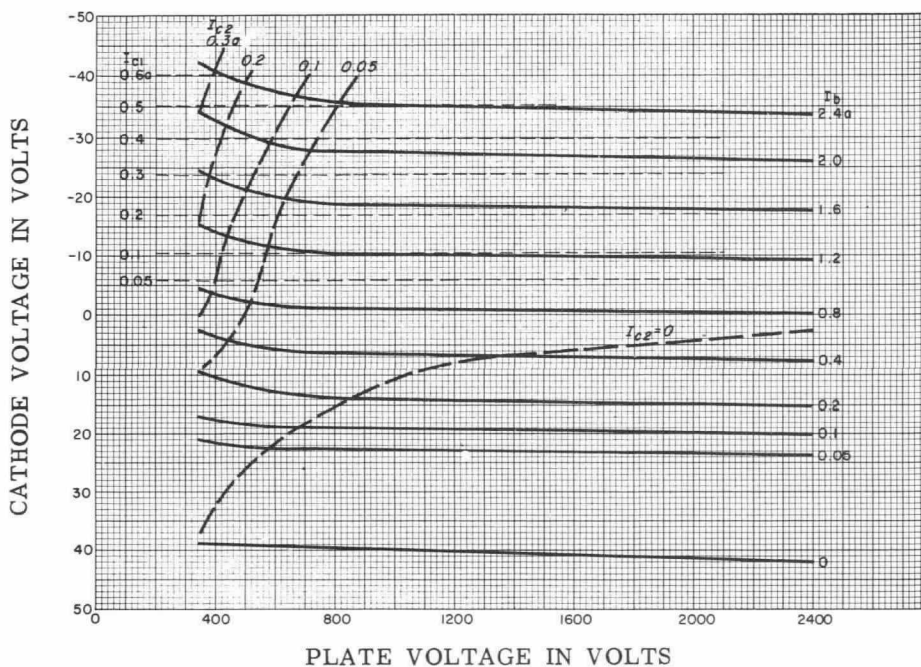
- * Because the temperature of the cathode is increased by back bombardment of electrons at UHF, required heater voltage for optimum life decreases with increasing frequency. The amount of heater-voltage reduction is dependent on operating conditions. However, this voltage should not be less than 5.5 volts.
- ‡ Measured with a 6-inch minimum diameter flat metal disk attached to the screen-grid ring. Control grid connected to the screen grid.
- ◇ Output capacitances measured between anode and screen grid. Control grid connected directly to screen grid.
- § Forced-air cooling to be applied before and during the application of any voltages.
- ** Provision must be made for unobstructed passage of cooling air between radiator fins and between the anode terminal and adjacent radiator fin.
- ♥ Useful power output as measured in output-circuit load.
- ¶ Useful power output including power transferred from driver stage. Output circuit efficiency approximately 80 percent.
- Δ Modulation essentially negative may be used if the positive peak of the envelope does not exceed 115 percent of the carrier conditions.
- # Measured at the crest of the audio-frequency cycle with a modulation factor of 1.0.

CONSTANT CURRENT CHARACTERISTIC
SCREEN VOLTAGE = 250 VOLTS
ALL VOLTAGES REFERENCED TO CONTROL GRID

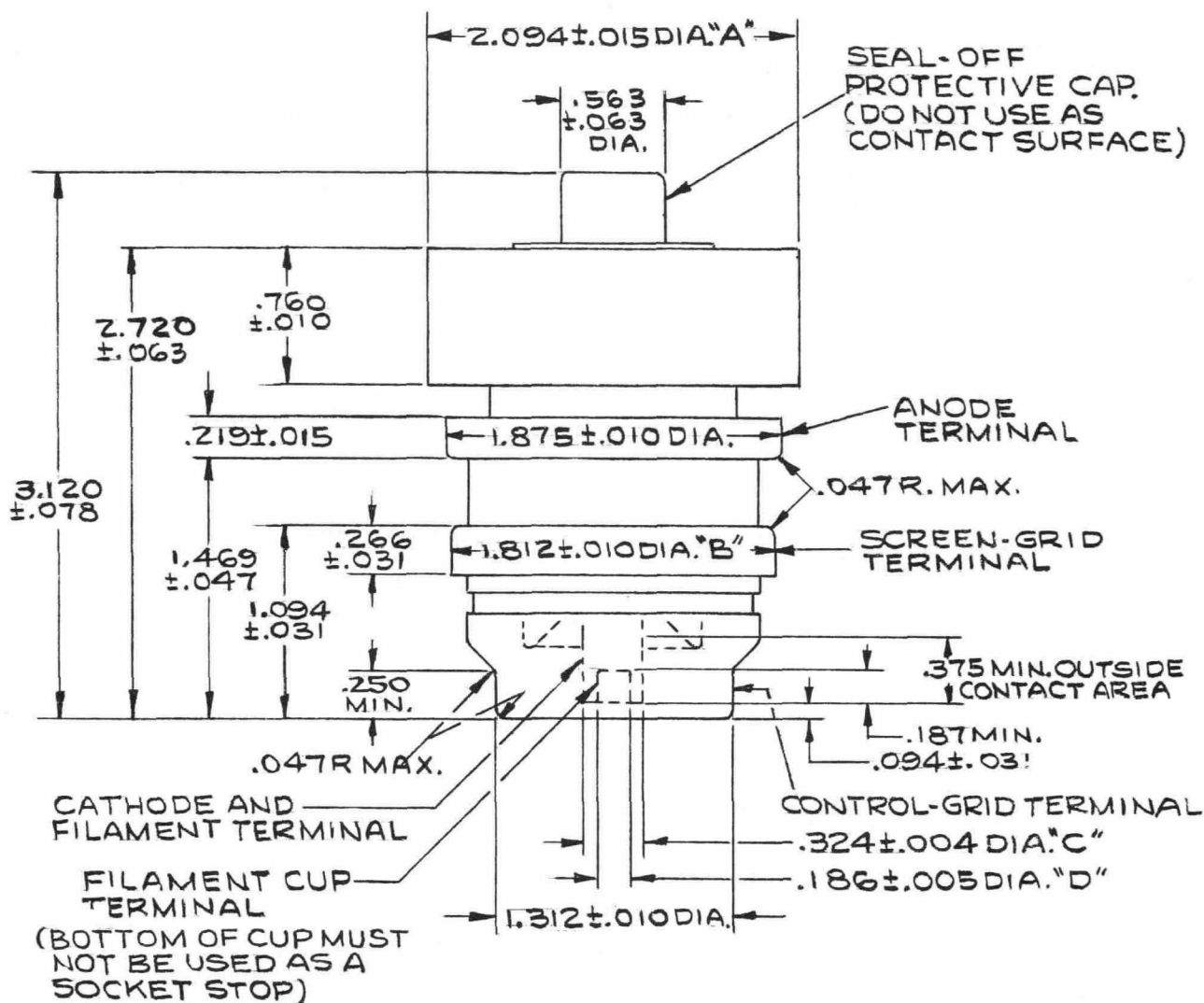


A69087 - 72B67 (1-30-62)

CONSTANT CURRENT CHARACTERISTIC
SCREEN VOLTAGE = 350 VOLTS
ALL VOLTAGES REFERENCED TO CONTROL GRID



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CONCENTRICITIES:

The following total indicator readings are measured with respect to a centerline determined by the centers of the anode terminal and control grid terminal.

Diameter A - 0.030 inches
 Diameter B - 0.016 inches
 Diameter C - 0.036 inches
 Diameter D - 0.042 inches

Total indicator reading of filament cup terminal diameter (D) measured with respect to center of cathode and filament terminal diameter (C) - 0.016 inches.

