Super-Power Triode

10 MW SHORT-PULSE POWER, 5 MW LONG-PULSE POWER

CERAMIC-METAL SEALS	INTEGRAL WATER DUCTS
DOUBLE-ENDED CONSTRUCTION	17.00 INCHES MAX. LENGTH
COAXIAL-ELECTRODE STRUCTURE	24.00 INCHES MAX. DIAMETER

WATER COOLED

For Use as a Plate-Pulsed Amplifier at Frequencies up to 300 MHz, for Long Range Search Radar, Pulsed Transmission in Communications Service, and Particle Accelerator Service.

ELECTRICAL

Filamentary Cathode Multistrand Thoriated Tungsten[m]—

Current (DC):		
Typical operating value	6600[a]	A
Maximum value	7000[a]	A
Maximum value for starting even momentarily	2000	A
Minimum time to reach operating current	30	s
Minimum time at normal operating current before plate voltage is supplied	60	s
Voltage (DC):[b]		
Typical range value for prescribed operating current	3.1 to 4.2	V
Maximum value under any condition	4.65	V
Direct Interelectrode Capacitances		
Grid to plate	150	pF
Grid to cathode	1600	pF
Plate to cathode	less than 1.0	pF

MECHANICAL

Operating Position	Tube axis vertical, either end up	
Overall Length	17.00 max	in
Maximum Diameter	24.00 max	in
Terminal Connections	See *Dimensional Outline*	
Weight		
Uncrated	190	lb
Crated	355	lb

THERMAL[n,p]

Ceramic-Bushing Temperature	150 max	°C
Metal-Surface Temperature	150 max	°C
Minimum Storage Temperature	-65 min	°C

Water Flow

	Typ. Flow g/m	*Absolute Min. Flow* g/m	*Pressure Differential for Typ. Flow*[c] psi
To plate, total flow for two parallel input and output coolant courses:			
For plate dissipation up to 50 kW (Average)	40	35	5
For plate dissipation of 150 kW (Average)	100	90	30

Water Flow (cont'd)

	Typ. Flow g/m	Absolute Min. Flow g/m	Pressure Differential for Typ. Flow[c] psi
For plate dissipation of 300 kW (Average)	160	150	45
To upper grid coolant course	3	2	25 max
To lower grid coolant course	3	2	25 max
To grid-cathode coolant course	35	30	30 max

Resistivity of water at 25° C:		
Plate and grid water	1 min	MΩ-cm
Grid-cathode water	5 min	MΩ-cm
Water temperature from any outlet	70 max	°C
External gas pressure[d]	65 max	psig
Gauge pressure at an inlet[d]	90 max	psig

TERMINAL DIAGRAM (Bottom View)

GUORF – Upper RF Grid Output Terminal
GLIRF – Lower RF Grid Input Terminal
GLORF – Lower RF Grid Output Terminal
PLRF – Lower RF Plate Terminal
PURF – Upper RF Plate Terminal
FI – Filament Terminal (Inner)
FO – Filament Terminal (Outer)
KURF – Upper RF Cathode Terminal
KLRF – Lower RF Cathode Terminal
GUIRF – Upper RF Grid Input Terminal

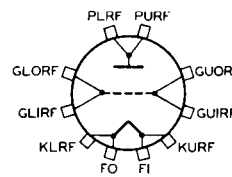

PLATE-PULSED AMPLIFIER—Class B[g]

For frequencies up to 300 MHz, and a maximum "ON" time[e] of 2200 microseconds in any 34000-microsecond interval

Absolute-Maximum Ratings

Peak Positive-Pulse Plate Voltage[f]	40	kV
Peak Negative Grid Voltage	250	V
Peak Plate Current	300	A
Peak Cathode Current[g]	600	A
DC Plate Current	19.5	A
DC Cathode Current[g]	39	A
Plate Input (Average)	487	kW
Plate Dissipation (Average)	300	kW

Typical Operation

In a cathode drive circuit, with rectangular-waveshape pulses, with duty factor[h] of 0.06 pulse duration of 2000 microseconds, and at a frequency of 250 MHz

Peak Positive-Pulse Plate-to-Grid Voltage[f]	34	kV
Peak Cathode-to-Grid Voltage[j]	100	V
Peak Plate Current	265	A

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Electronic Components and Devices Harrison, N. J.

Peak Cathode Current[g]	400	A
DC Plate Current	15.6	A
DC Cathode Current[g]	25	A
Peak Driver Power Output[k]	150	kW
Useful Power Output at Peak of Pulse (Approx.)	5	MW

Absolute-Maximum Ratings

For frequencies up to 300 MHz and a maximum "ON" time[e] of 25 microseconds in any 2500-microsecond interval

Peak Positive-Pulse Plate Voltage[f]	65	kV
Peak Negative Grid Voltage	500	V
Peak Plate Current	325	A
Peak Cathode Current[g]	500	A
DC Plate Current	3.25	A
DC Cathode Current[g]	5.5	A
Plate Input (Average)	212	kW
Plate Dissipation (Average)	150	kW

Typical Operation

In a cathode-drive circuit, with rectangular-waveshape pulses, at 250 MHz with duty factor[h] of 0.006, and pulse of 25 microseconds

Peak Positive-Pulse Plate-to-Grid Voltage[f]	60	34	kV
Peak Cathode-to-Grid Voltage[j]	300	100	V
Peak Plate Current	280	260	A
Peak Cathode Current[g]	430	400	A
DC Plate Current	2.8	2.6	A
DC Cathode Current[g]	5	4.5	A
Peak Driver Power Output[k]	200	150	kW
Useful Power Output at Peak of Pulse (Approx.)	10	5	MW

CHARACTERISTICS RANGE VALUES

	Min	*Max*	
Input Strap-Resonant Frequency	90	140	MHz
Output Strap-Resonant Frequency	240	280	MHz

[a] The specified maximum filament current is a maximum rating which should not be exceeded, even momentarily, during operation of the tube. The life of the tube can be conserved by operating the filament at the lowest current which will enable the tube to provide the desired power output. Because the filament when operated near the maximum value usually provides emission in excess of any requirements within the tube ratings, the filament current should be reduced to a value that will give adequate but not excessive emission for any particular application. Good regulation of the filament current is, in general, economically advantageous from the viewpoint of the tube life.

[b] Measured between KLRF and KURF (See *Terminal Diagram*).

[c] Measured directly across cooled element for the indicated typical flow.

[d] With the gauge located in an area where the maximum pressure external to the gauge is one atmosphere absolute.

[e] "ON" time is defined as the sum of the duration of all individual pulses which occur during the indicated interval. *Pulse duration* is defined as the time interval between the two points on the pulse at which the instantaneous value is 50% of the peak power value. The *peak value* is defined as the maximum value of a smooth curve through the average of the fluctuations over the top portion of the pulse.

[f] The magnitude of any spike on the plate voltage pulse should not exceed its peak value by more than 10%, and the duration of any spike when measured at the peak-value level should not exceed 5% of the pulse duration as defined in note(e). The peak value is defined as the maximum value of a smooth curve through the average of the fluctuations over the top portion of the pulse.

[g] Peak or average cathode current is the total of the peak or average plate current and the peak or average rectified grid current. (Pulses are not coincident, hence they cannot be added arithmetically).

[h] Duty factor is the product of the pulse duration and repetition rate.

[j] Preferably obtained from a cathode bias resistor.

[k] The driver stage is required to supply tube losses, rf circuit losses, and rf power added to the plate circuit. The driver stage should be designed to provide an excess of power above the indicated value to take care of variations in line voltage, in components, in initial tube characteristics, and in tube characteristics during life.

The following footnotes apply to the *RCA Transmitting Tube Operating Considerations* given at the front of this section.

[m] See *Electrical Considerations* - Filament or Heater.

[n] See *Cooling Considerations* - Forced-Air Cooling.

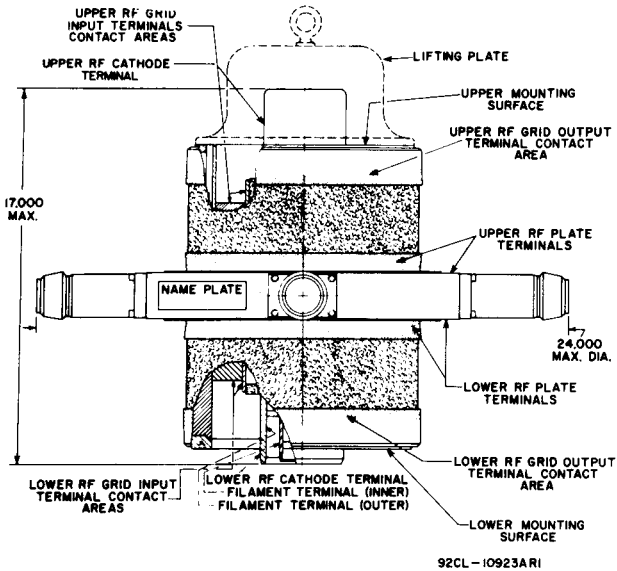
[p] See *Cooling Considerations* - Liquid Cooling.

[q] See *Classes of Service*.

FOR ADDITIONAL INFORMATION ON THIS TYPE, WRITE FOR TECHNICAL BULLETIN AND APPLICATION GUIDE FOR RCA SUPER POWER TUBES, ICE-279A AVAILABLE FROM:

Commercial Engineering
Electronic Components and Devices
Radio Corporation of America
Harrison, New Jersey

SIMPLIFIED DIMENSIONAL OUTLINE



DIMENSIONS IN INCHES

A detailed Dimensional Outline and associated Gauge Drawings are given in the Technical Bulletin available upon request.