

## C Band Klystron

- Gang Tuned Cavities
- Air Cooled
- High Efficiency
- High Power Gain
- Compact
- Sturdy

Frequency . . . . . 4.4 to 5.0 GHz

**ELECTRICAL**

Cathode . . . . . Indirectly-heated Tungsten  
Dispenser Cathode

Filament:

Voltage . . . . .	6.5 ± 0.5	V
Current at 6.5 V . . . . .	7.6	A
Maximum current . . . . .	8.2	A
Warmup time (min.) . . . . .	180	s

**MECHANICAL**

Mounting Position . . . . .		Any
Length (max.) . . . . .	(393 mm)	15.5 in
Width (max.) . . . . .	(267 mm)	10.5 in
Weight (approx.) . . . . .	(17.2 kg)	38 lb
In commercial pack . . . . .	(18.1 kg)	40 lb
In military pack . . . . .	(22.5 kg)	50 lb

**THERMAL**

Collector Temperature (max.) . . . . .	260	°C
Body Temperature (max.) . . . . .	150	°C
Tuner Fin Temperature (max.) . . . . .	150	°C

Electron Gun Potting

Insulation temperature (max.) . . . . .	250	°C
Storage temperature (min.) . . . . .	-65	°C

Cooling

Forced air flow across the collector, body, and tuner, is required.

Typical air requirements for operation with 20° C ambient air temperature at sea level are:

	Min Req Air Flow		Max Press-Drop	
	lb/min	kg/min	in H <sub>2</sub> O	cm H <sub>2</sub> O
Collector . . . . .	7.5	3.4	2.0	5.1
Body & Tuners . . . . .	0.85	0.38	0.75	1.9

## PERFORMANCE

## Maximum CW Ratings, Absolute-Maximum Values:

DC Beam Voltage	8.5	kV
DC Beam Current	600	mA
DC Body Current	60	mA
Surge Current	25	A
Load VSWR	2.0:1	
Input VSWR	2.0:1	

## Typical CW Operation:

## High Efficiency Tuned

Frequency	4.4 GHz	5.0 GHz	
DC Beam Voltage	7.5	7.5	kV
DC Beam Current	490	490	mA

## High Efficiency Tuned

Frequency	4.4 GHz	5.0 GHz	
DC Body Current	10.0	10.0	mA
RF Power Output	1.45	1.30	kW
Bandwidth (3 dB)	8.0	10.0	MHz
Efficiency	39.0	35.0	%
Gain	44.0	44.0	dB
Drive	50.0	50.0	mW
Load VSWR	1.05:1	1.05:1	—
Input VSWR	1.3:1	1.3:1	—

## High Gain Tuned

Frequency	4.4 GHz	5.0 GHz	
DC Beam Voltage	7.5	7.5	kV
DC Beam Current	490	490	mA
DC Body Current	10.0	10.0	mA
RF Power Output	1.30	1.15	kW
Bandwidth (3 dB)	6.0	8.0	MHz
Efficiency	35.0	31.0	%
Gain	51.0	51.0	dB
Drive	10.0	10.0	mW
Load VSWR	1.05:1	1.05:1	—
Input VSWR	1.3:1	1.3:1	—

**Broadband Tuned**

<b>Frequency</b>	<b>4.4 GHz</b>	<b>5.0 GHz</b>	
DC Beam Voltage . . . . .	7.5	7.5	kV
DC Beam Current . . . . .	490	490	mA
DC Body Current . . . . .	10.0	10.0	mA
RF Power Output . . . . .	1.35	1.25	kW
Bandwidth (3 dB) . . . . .	13.0	19.0	MHz
Efficiency . . . . .	36.0	33.0	%
Gain . . . . .	41.0	41.0	dB
Drive . . . . .	100.0	100.0	mW
Load VSWR . . . . .	1.05:1	1.05:1	—
Input VSWR . . . . .	1.3:1	1.3:1	—

**GENERAL INFORMATION****Installation and Operation**

No installation or operation should be attempted without first consulting the Installation and Operating Instructions shipped with each tube or available on request from Super Power Marketing, RCA, Lancaster, PA.

RCA reference publications required for the installation and operation of this device include the following:

- Data Sheet — RCA-4658
- Application Note AN 4213
- Application Guide 1CE-279A

These publications are available as a complete packet — request PWR 543 "Applications Information for the RCA-4658 klystron."

**Personnel Safety**

The high voltages and microwave radiations from this device can be dangerous to life. High voltage shielding and interlock precautions must be taken and all rf connections must be tightly closed and rf terminals shielded.

**Packaging**

Two types of packaging are available with these tubes; Commercial Pack and Military Pack. The customer specifies the desired type.

The Commercial Pack is made of nesting cardboard cartons with the inner carton shock-mounted. The Military Pack complies with MIL-S-4473C for air shipment. It uses a hermetically-sealed metal container which protects the tube and serves to shield the area surrounding the pack from stray magnetic fields set up by the klystron focusing magnet.

In shipment, the tube is enclosed in a polyethylene bag to prevent dust and other particles from collecting in the waveguide or tuning system. It is recommended that the tube be stored in the bag and in the shipping container when not in use. Dust or other unwanted particles in the waveguide can cause arcing during operation and subsequent tube destruction.

### **Cooling**

Air ducts must be provided to connect to the top of the collector and the tuner cooling duct. See Outline Drawing.

### **Mounting**

Four holes are provided in the gun-end of the focusing magnet for mounting purposes. Only non-magnetic studs should be used.

### **Thermocouple**

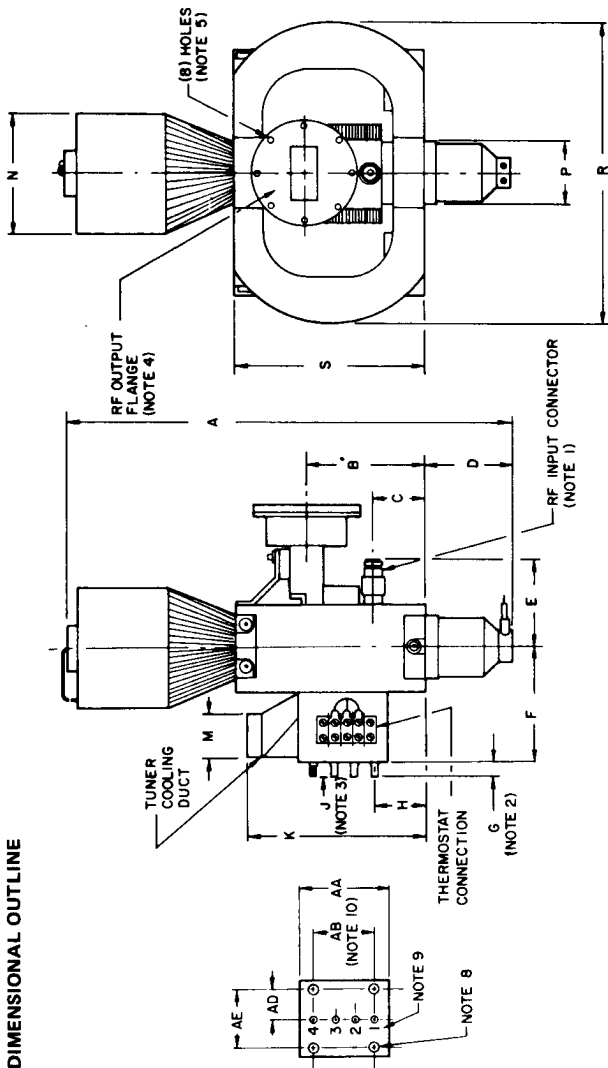
A thermocouple mounted on the collector provides a signal output for excessive collector temperature. This output is used to operate protective circuitry.

### **Tuning**

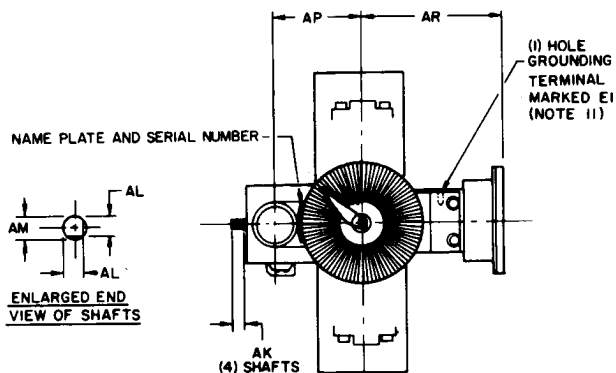
Tuning is accomplished by a single knob which "gang-tunes" all four cavities simultaneously. The second, third and output cavities may be individually trimmed for optimizing the tube performance at any frequency within the tube operating band. See Outline Drawing.

### **Protection Circuits**

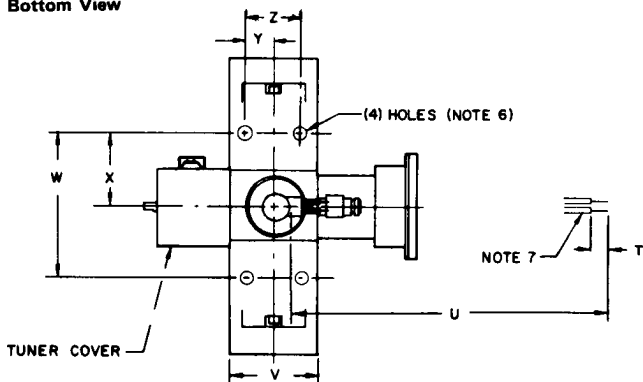
Protection circuits serve a threefold purpose: safety of personnel, protection of the tube and protection of tube circuits. Consult Application Guide 1CE-279A for complete information on protection circuits.



## DIMENSIONAL OUTLINE (Top View)



## Bottom View



## TABULATED DIMENSIONS for the Outline Drawing

Dimension Reference	Specified Values	
	Inches	Millimeters
A	15.5 max.	393.7 max.
B	4.06 $\pm$ .12	103.1 $\pm$ 3.0
C	1.80 $\pm$ .12	45.7 $\pm$ 3.0
D	3.5 max.	88.9 max.
E	3.00 $\pm$ .06	76.2 $\pm$ 1.5
F	3.80 $\pm$ .12	96.5 $\pm$ 3.0

## TABULATED DIMENSIONS (Cont'd)

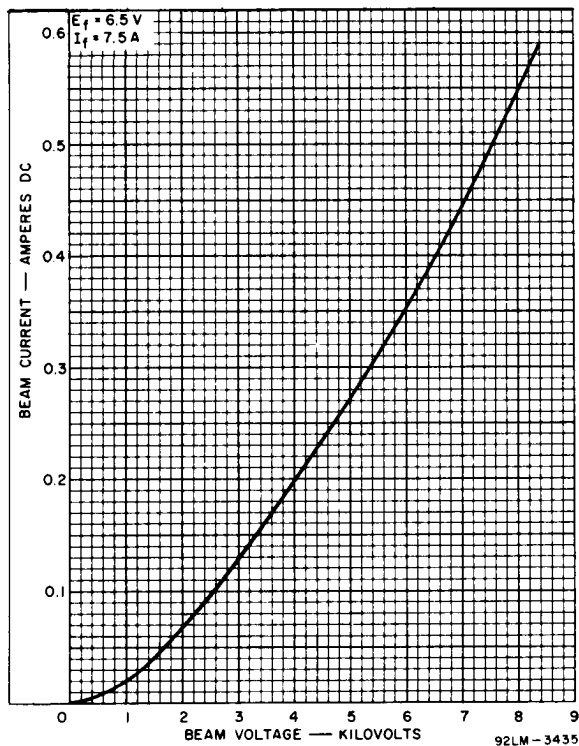
G	0.68 ± .05	17.3 ± 1.3
H	1.80 ± .09	45.7 ± 2.3
J	0.68 + .15 - .10	17.3 +3.8 - 2.5
K	6.25 max.	158.8 max.
M	1.50 ± .03	38.1 ± .8
N Dia.	4.12 ± .03	101.6 ± .8
P Dia.	2.130 ± .015	54.10 ± .38
R	10.5 max.	266.7 max.
S	6.5 ± .5	165.0 ± 13.0
T	0.50 ± .12	12.7 ± 3.0
U	15.00 ± .25	381.0 ± 6.0
V	3.25 max.	82.55 max.
W	5.00 ± .06	127.0 ± 1.5
X	2.50 ± .06	63.5 ± 1.5
Y	1.00 ± .06	25.4 ± 1.5
Z	2.00 ± .06	50.8 ± 1.5
AA	3.00 ± .06	76.2 ± 1.5
AB	2.10 ± .02	53.34 ± .51
AD	1.00 ± .03	25.4 ± .8
AE	2.00 ± .03	50.8 ± .8
AK	0.440 ± .010	11.18 ± .25
AL	0.230 ± .005	5.84 ± .13
AM Dia.	0.249 ± .002	6.325 ± .051
AP	3.00 ± .06	76.2 ± 1.5
AR	4.75 ± .12	120.6 ± 3.0

## NOTES FOR OUTLINE DRAWINGS

1. Mates with Type "N" Connector UG-21 B/U or equivalent.
2. Dimension applies to Shaft No.1 only.
3. Dimension applies to Shafts No.'s 2, 3, and 4 only.
4. Mates with UG-149 A/U or equivalent.
5. Holes 10-32 UNF-2B equally spaced on 3.250" ± .032" (82.6 ± .8 mm) dia. circle.
6. Holes 0.437" ± .062" (11.1 ± 1.6 mm) thru (One side only).

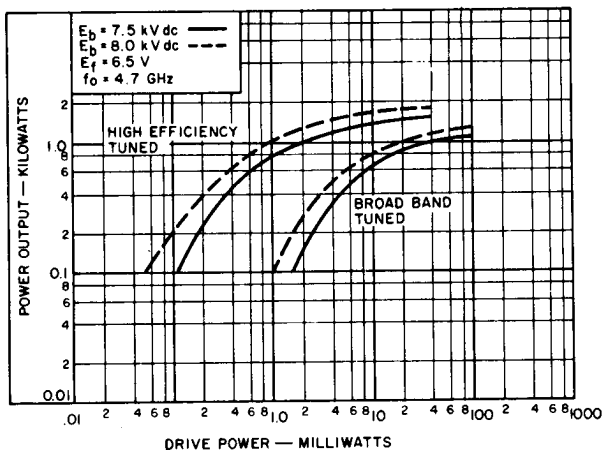
7. High-Voltage Lead Designation  
Heater Lead — Yellow  
Heater-Cathode Lead — White
8. Thru-holes checked with gauge.
9. Three spaces between shafts are  $0.70'' \pm .03''$  ( $17.8 \pm .8$  mm) and add to  $2.100''$  (53.34 mm). Shafts are numbered as shown.
10. Tolerance for this dimension applies to location of four  $0.201''$  (5.11 mm) holes.
11. Hole #6-32 UNC-2B,  $0.25''$  (6.35 mm) minimum depth.

### BEAM CURRENT CHARACTERISTIC CURVE

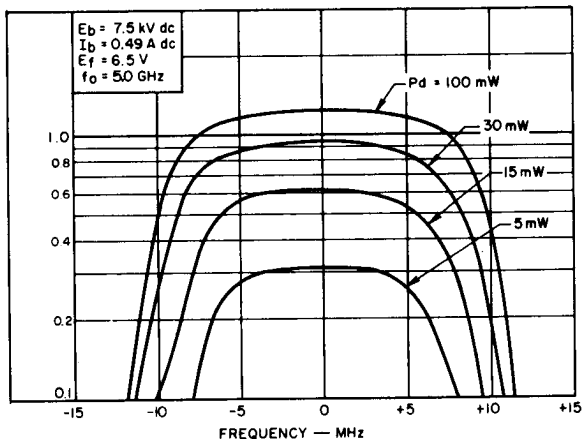




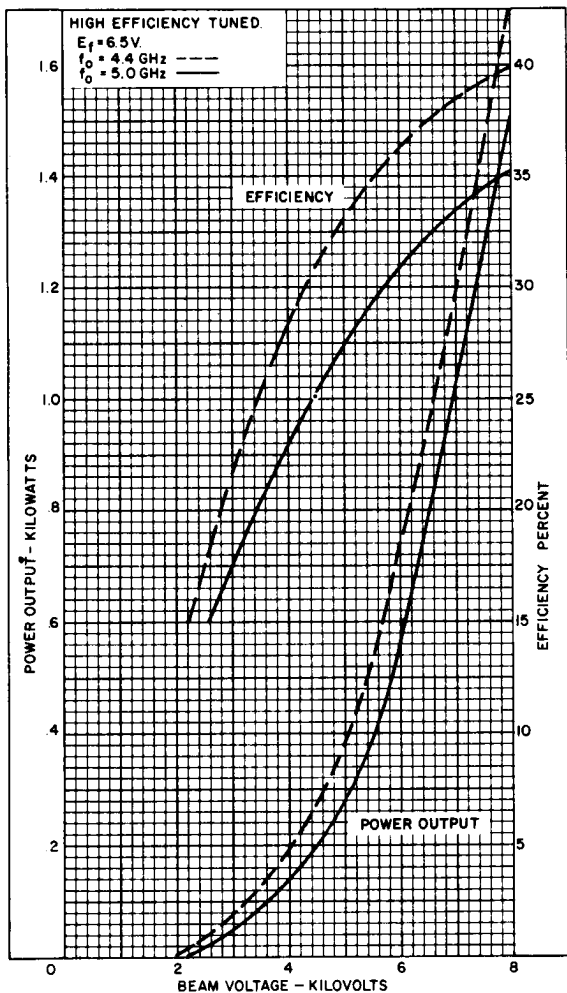
## GAIN CHARACTERISTIC CURVE



## BANDWIDTH CHARACTERISTIC CURVE



## OUTPUT CHARACTERISTIC CURVE



92 LM - 3357