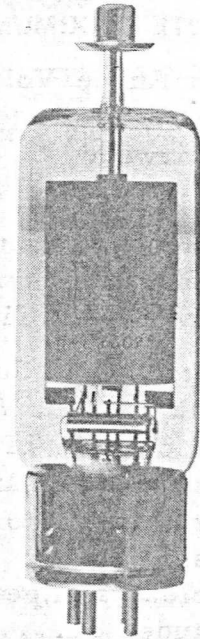


Toshiba 2G22P is a hydrogen thyatron for switching service in radar modulators and in other pulse applications.

It is capable of switching a peak power of 2.5 MW at an average power level of 1600 watts.

2G22P is interchangeable with the 5C22.



### GENERAL DATA

#### ELECTRICAL:

Cathode: Oxide-Coated	Minimum	Bogie	Maximum	
Heater Voltage .....	5.9	6.3	6.7	V
Heater Current (Ef=6.3V) .....	9.6	10.6	11.6	A
Heating Time .....	300	-	-	sec
Anode Voltage Drop .....	-	100	175	V
Anode Delay Time .....	-	-	0.6	μs
Anode Current Time Jitter .....	-	0.002	0.005	μs

#### MECHANICAL:

Dimensions: .....	See Outline Drawing
Overall Length .....	216 ± 6 mm
Max. Diameter .....	65 mm
Base Number:	
Cap .....	A14S, Medium (JEDEC No. C1-5)
Base.. D25PA-1, Large-Metal-Shell Super-Jumbo 4-pin with Bayonet (JEDEC No. A4-18)	
Recommended Socket:	
Cap .....	Toshiba VT-29057
Base .....	Toshiba VT-21026
Base Connections .....	See Outline Drawing
Cooling .....	Natural
Mounting Position .....	Any
Net Weight (Approx.) .....	300 g

\* The information contained herein is presented only as a guide for the applications of our products. No responsibility is assumed by TOSHIBA for any infringements of patents or other rights of the third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of TOSHIBA or others.

\* The information contained herein may be changed without prior notice. It is therefore advisable to contact TOSHIBA before proceeding with the design of equipment incorporating this product.

## RATINGS

### ABSOLUTE MAXIMUM:

Peak Anode Voltage:		
Inverse <sup>(1)</sup> .....	16,000	V
Forward <sup>(2)</sup> .....	5% epy ~ 16,000	V
Anode Current:		
Peak Current .....	325	A
Average Current .....	0.2	A
Averaging Time .....	1	cycle
Minimum DC Supply Voltage .....	4,500	V
Negative Grid Voltage (Before Conduction) .....	200	V
Rate of Rise of Cathode Current .....	1,500	A/ $\mu$ s
Pulse Repetition Rate (prf) .....	1,000	pps
Operation Factor <sup>(3)</sup> .....	$3.2 \times 10^9$	
Pulse Duration .....	6	$\mu$ s
Ambient Temperature .....	-50 ~ +90	$^{\circ}$ C
Altitude .....	3,000	m

### GRID DRIVE <sup>(4)</sup>:

Peak Grid Voltage (Min.) .....	150	V
Time of Rise (Max.) .....	0.5	$\mu$ s
Grid Pulse Duration (Min.)(70.7% Amplitude) .....	2	$\mu$ s
Grid Drive Circuit Impedance (Max.) .....	500	$\Omega$

### TYPICAL OPERATION (Pulse Modulator):

DC Anode Supply Voltage .....	16,000	V
Pulse Repetition Rate (prf) .....	1,000	pps
Pulse Width .....	1	$\mu$ s
Pulse Forming Network Impedance .....	50	$\Omega$
Grid Drive Voltage .....	220	V
Peak Power Output .....	1,280	kW
Average Power Output .....	1,280	W
DC Anode Current .....	175	mA
Time Jitter .....	0.01	$\mu$ s

Note <sup>(1)</sup> In pulsed operation, the peak inverse anode voltage exclusive of a spike of 0.05 microsecond maximum duration should not exceed 5000 volts during the first 25 microsecond after the pulse.

<sup>(2)</sup> Where the anode supply voltage is applied instantaneously, the maximum value of the anode voltage shall not reach 13,500 volts in less than 0.04 microsecond.

<sup>(3)</sup>  $\text{prf}(\text{pulse repetition rate, pps}) \times e_{\text{py}}$  (peak forward anode voltage, V)  $\times i_{\text{b}}$  (peak anode current, A)

<sup>(4)</sup> Measurements are at the tube socket with the thyatron grid disconnected.

## GENERAL OPERATIONAL RECOMMENDATION

### 1. High Voltage

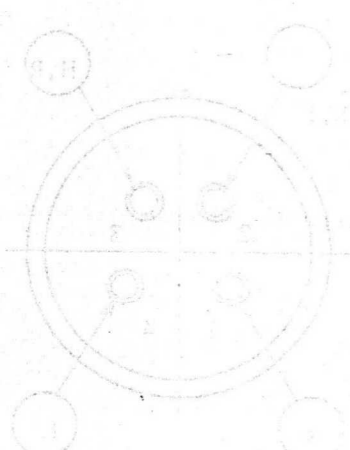
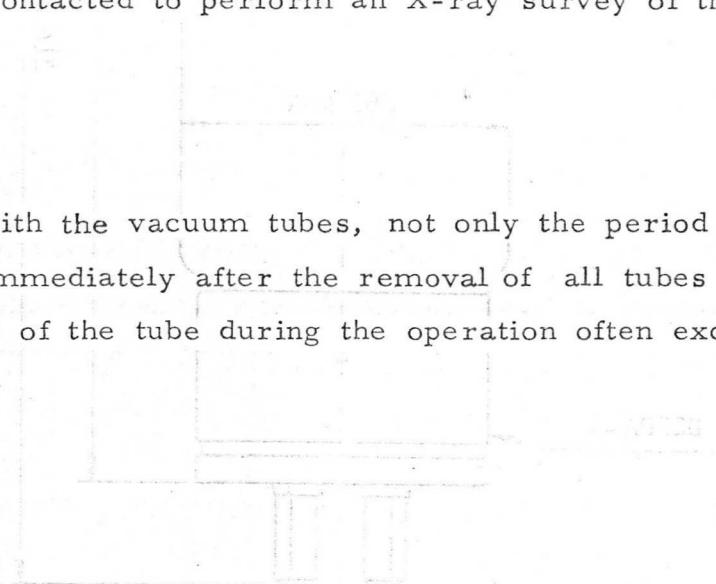
Operating voltages for power tubes range from several hundred volts to higher than 50,000 volts. Since these voltage can be deadly, equipment must be designed so that one can not come in contact with high voltage.

### 2. X-RAY Radiation

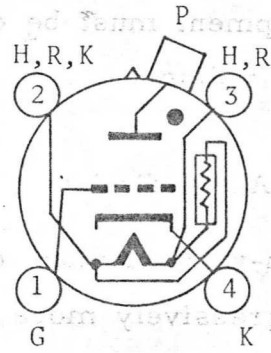
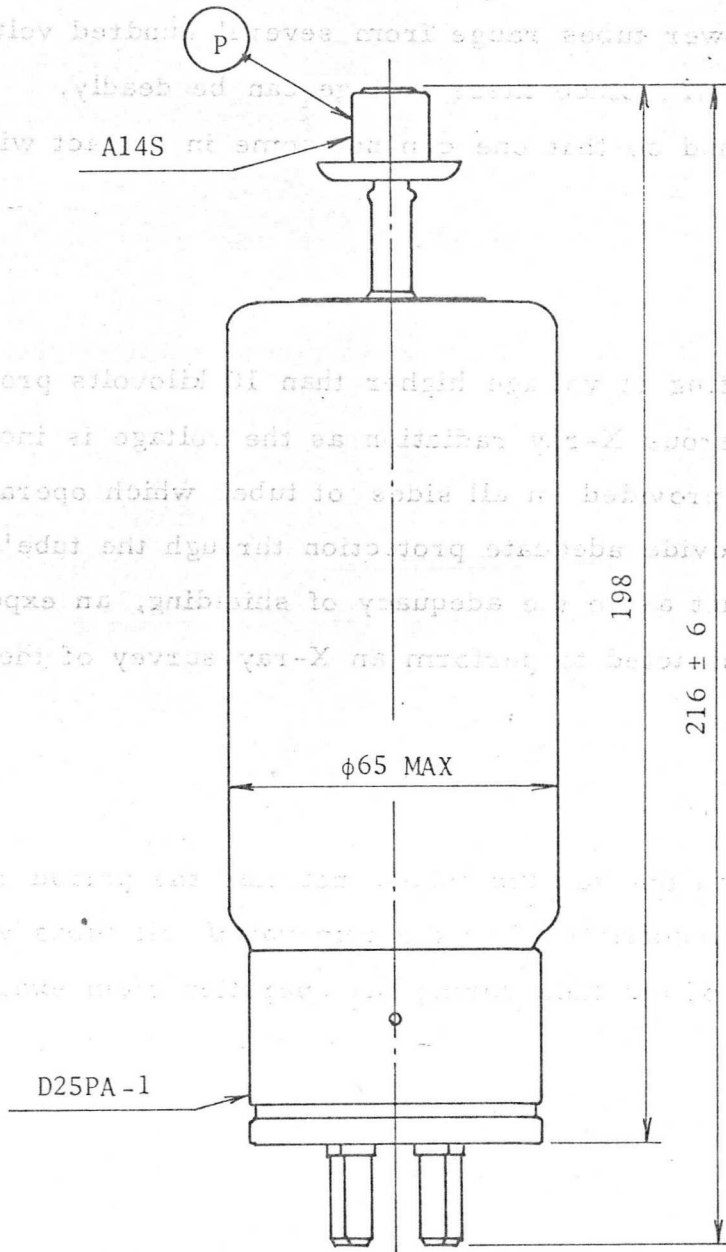
High-vacuum tubes operating at voltage higher than 10 kilovolts produce progressively more dangerous X-ray radiation as the voltage is increased. X-ray shielding must be provided on all sides of tubes which operate above 10 kilovolts, to provide adequate protection through the tube's life. If there is any doubt as to the adequacy of shielding, an expert in this field should be contacted to perform an X-ray survey of the equipment.

### 3. High Temperature

Don't come in contact with the vacuum tubes, not only the period of the operation but also immediately after the removal of all tubes voltages because the temperature of the tube during the operation often exceeds 200°C.



GENERAL OPERATIONAL RECOMMENDATION  
 DIMENSIONAL OUTLINE  
 Unit : mm  
 2G22P/5C22



- P: Anode
- G: Grid
- K: Cathode
- H: Heater
- R: Reservoir

