

MECHANICAL DATA

Bulb ¹	T-26
Cap	Special — See Outline
Base	Super Jumbo 5 Pin
Mounting Position ²	Vertical or Horizontal
Ambient Temperature Range	-55 to 75°C

ELECTRICAL DATA

RATINGS (Absolute Values)

Heater Voltage ($\pm 5\%$)	6.3 Volts	
Peak Anode Voltage (epy) ³	25.0 Kv	Max.
Peak Inverse Anode Voltage (epx) ⁴	25.0 Kv	Max.
	5% epy	Min.
Rate of Rise of Cathode Current	2500 A/ μ sec.	Max.
Peak Anode Current (I_b)	500 Amperes	Max.
Peak Inverse Grid Voltage (egx)	450 Volts	Max.

CHARACTERISTICS AND OPERATING CONDITIONS

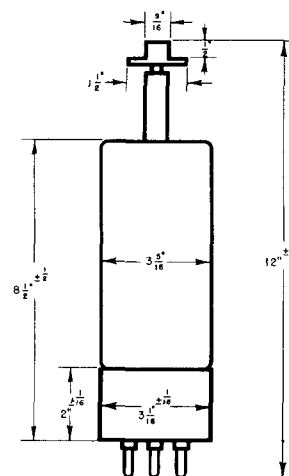
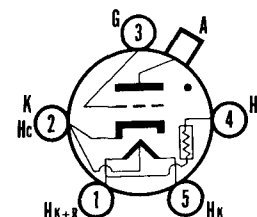
Heater Current at 6.3 Volts	15.0-22.0 A	
Reservoir Voltage ⁵	3.0-5.5 Volts	
Reservoir Current at 4.5 Volts	2.0-5.0 Amperes	
Cathode Heating Time	15 Minutes	
Starting Anode Voltage	5 Kv dc	
Average Anode Current (I_b)	5 A dc	
Dissipation Factor ⁶	6.25×10^9	Max.
Duty Cycle ⁶	.001	
Grid Drive ⁷		
A. Peak Grid Voltage (egy)	550 Volts	Min.
B. Rate of Rise	1800 V/ μ sec.	Min.
C. Grid Pulse Duration	2.0 μ sec.	Min.
D. Driver Impedance	50-200 Ohms	
Peak Inverse Grid Voltage (egx)	450 Volts	
Operation (1)	(Note 8)	

NOTES:

1. No cooling stream of air should be directly applied to the tube envelope.
2. Tube should be kept away from strong fields which could ionize the gas in the tube. Clamping is permissible by the base only.
3. Instantaneous starting is not recommended. However, when it is absolutely necessary, the maximum permissible epy is 18.0 Kv and should be attained in no less than .04 μ sec.
4. The peak inverse voltage should not exceed 5 Kv during the first 25 μ sec. following the anode pulse.
5. The optimum reservoir voltage for operation (1) conditions is printed on the base of the tube and must be held to within $\pm 5\%$. Applications involving other operating conditions will necessitate redetermination of the optimum reservoir setting.
6. The maximum dissipation factor will depend upon the peak forward anode voltage, peak anode current and pulse repetition according to the formula $epy \times I_b \times prr = 6.25 \times 10^9$ max. This formula is applicable for pulse repetition rates up to 1200 pps. Special caution should be exercised in applying rates in excess of this value. The duty cycle will depend upon the pulse repetition rate and anode pulse width (tp in μ sec.) according to the formula $prr \times tp = .001$.

QUICK REFERENCE DATA

The Sylvania Type 1907 is a heavy duty thyatron with a hydrogen reservoir. The 1907 hot-cathode, grid controlled, gas rectifier is especially designed for pulsing service at high repetition rates, high currents, and high voltages.



**SYLVANIA ELECTRIC
PRODUCTS INC.**

**ELECTRONICS DIVISION
WOBBURN, MASS.**

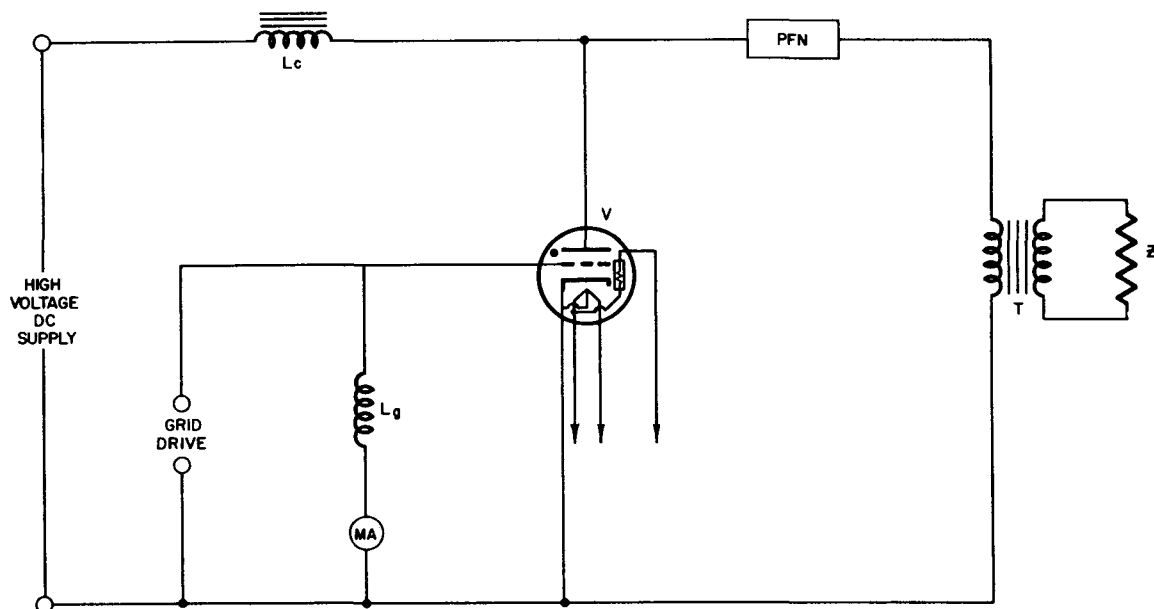
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NOTES (Continued)

7. Measurements are made at the tube socket with the thyatron grid disconnected.
8. Circuit constants for operation (1) should be so chosen that the peak anode voltage (epy) is 25 Kv under resonant charging conditions; rate of rise of cathode current is 2500 A/ μ sec.; peak anode current is 500 A; anode pulse duration is 2 μ sec.; and pulse repetition rate is 500.

APPLICATION DATA

The outstanding feature of the Type 1907 thyatron is the built-in hydrogen reservoir. A change in the low voltage impressed across this reservoir will change the gas pressure in the tube; an increase will cause the capsule to emit hydrogen, a decrease will cause hydrogen to be absorbed from the tube. By adjusting this reservoir voltage, the equipment designer can effectively use the 1907 over a wider range of parameters than would otherwise be possible. For each specific application, optimum pressure settings provide minimum deionization time, minimum arc-back, and minimum anode heating, with consequent improvement in life potential. The high repetition rates permitted with the 1907 are due to the short deionization time — the time required to convert gaseous ions to neutral molecules when the anode voltage is removed.



Lg: Grid Choke
Lc: Charging Choke

PFN: Pulse Forming Network
V: 1907 Thyatron

T: Pulse Transformer
Z: Load

FIG. 1 — CIRCUIT UTILIZING THE 1907 THYRATRON

APPLICATION DATA (Continued)

The circuit for which this tube was especially developed is shown in Figure 1. The output, in this case, consists of periodic rectangular pulses developed when the thyatron fires and releases electrical charges stored in the capacitance of the pulse forming network (PFN). This network determines the duration and shape of the pulses. Between pulses, when the thyatron is not conducting, the PFN capacitance charges up through the charging choke L_c in a transient which swings the instantaneous plate voltage of the 1907 above the power supply voltage. The value reached is about double the power supply voltage and must be taken into consideration when applying the peak anode voltage rating of the tube. The peak voltage of the pulse supplied to the pulse transformer is about equal to that of the power supply. By means of the pulse transformer the output to the load may be stepped up to a higher level. This results in a saving in the size and cost of the supply by permitting the use of components with lower voltage ratings. The Sylvania 1907 is well adapted to such voltage step-up by virtue of the very high peak currents it can furnish. Many varieties of short duration pulses may be produced by different PFN designs.

The Type 1907 thyatron may be used in a wide variety of applications which take advantage of such features as:

1. Low deionization time, hence, rapid switching rates
2. High peak currents
3. High plate voltages (but may be used at lower voltages)
4. Moderate trigger requirements
5. Ability to operate at zero bias
6. Operation over a wide ambient temperature range without appreciable effect on the electrical characteristics
7. High efficiency because of low tube voltage drop
8. Reliability and general flexibility of operation

Several specific applications are listed below:

1. Switching in radar modulators
2. As a clipper in radar modulators
3. Switching in welding circuits
4. High power pulse generators
5. Magnetron aging