

PL382 Power Tetrode



The Penta Laboratories PL382 is a coaxial forced-air cooled metal and ceramic power tetrode specially designed to provide a long life at high power levels with exceptional stability and a very high degree of linearity. When operated according to specifications, this tube can safely dissipate up to 12.5 kilowatts.

The PL382's advanced characteristics and superior design make it especially well suited for use as a grounded-grid radio frequency power amplifier for broadband transmitters and translators. When used in this capacity, the PL382 can sustain a gain of over 16 dB at frequencies up to 1000 MHz. This tube can also be well employed as CW oscillator.

ELECTRICAL CHARACTERISTICS

Cathode - Thoriated Tungsten

Heater: **(WARNING) Before Application of Heater Voltage, See Note on Page 2)**

Voltage	4.2	Volts
Current (Approximate)	125	Amperes
Maximum Heater Surge Current	250	Amperes
Amplification Factor, g1-g2 (Approximate)	8	
Interelectrode Capacitances		
Cathode - Control Grid	72	pF
Cathode - Anode	0.03	pF
Control Grid - Screen Grid	93	pF
Control Grid - Anode	0.37	pF
Screen Grid - Anode	13.2	pF
Transconductance	80	mA/V

MECHANICAL CHARACTERISTICS

Base	See Outline
Maximum Overall Dimensions	
Diameter	170.5 Millimeters
Length	158 Millimeters
Net Weight (average)	7 Kilograms
Mounting Position	Vertical
Cooling	Forced Air
Minimum Required Airflow	13 Cubic Meters per Minute
Maximum Inlet Air Temperature	45 °C
Maximum Outlet Air Temperature	100 °C
Maximum Temperature of Seals and Anode Core	300 °C

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P E N T A L A B O R A T O R I E S

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ELECTRON TUBES FOR INDUSTRY



HEATER VOLTAGE

For proper operation, it is necessary that a blackheating voltage of 1.0 volts ($\pm 5\%$) be permanently applied to the PL382 during stand-by periods. The following order should be observed in voltage application:

1. Ventilation
2. Heater Voltage as previously defined
3. Control-Grid Voltage
4. Anode Voltage
5. Screen-Grid Voltage
6. Radio Frequency Driving Voltage.

When installing a new tube ***it is critical*** to apply the permanent blackheating voltage for no less than 15 minutes prior to application of the other voltages listed above.

WARNING: Failure to properly adhere to blackheating procedures can seriously reduce the useful life of the tube!

While it is not necessary to provide a forced air flow during periods of blackheating, it is still critical that the listed maximum operating temperatures never be exceeded.

The exact operating heater voltage required for maximum performance of the PL382 depends on the conditions under which the tube is to be operated and the application for which it is to be used. This information should be conveyed to Penta Laboratories which will determine the optimum heater voltage to be used.

Once an optimum heater voltage has been determined, it is vital that this value be adhered to as closely as possible. Under no circumstances should heater voltage be allowed to deviate from the stated value by more than 2%.

The heater voltage and current data given under Electrical Characteristics is intended to aid in the design of the power supply only.

COOLING

Forced air cooling of the base, base seals, and other external tube surfaces is required for all classes of operation. It should be noted that maintaining tube surface temperatures below the maximum values listed can substantially prolong the useful life of the tube.

The air flow values listed are for operation at sea level with an ambient air temperature of 25 °C (77 °F). It is necessary to keep in mind that operation at higher altitudes or operation with higher ambient air temperatures will require additional airflow to maintain the desired tube surface temperature.

Care should be taken to insure that the anode cooling surface and cooling fins remain free from any dirt or debris which might interfere with the effective cooling of the tube. It is generally recommended that air used to cool the tube be prefiltered to reduce the likelihood of dirt accumulating on the tube surface.



MAXIMUM RATINGS

DC Anode Voltage	6.5	Kilovolts
DC Screen-Grid (g2) Voltage	800	Volts
DC Control-Grid (g1) Voltage	-200	Volts
Peak Cathode Current	22	Amperes
Direct Anode Current	4.5	Amperes
Anode Dissipation	12.5	Kilowatts
Screen-Grid Dissipation	120	Watts
Control Grid Dissipation	50	Watts
Frequency	1000	MHz

TYPICAL OPERATION

Class B Video Carrier Amplifier □ Negative Modulation, Grounded Grids

Frequency	800	MHz
Bandwidth (@ 1 dB down).....	12	Mhz
Peak of Sync Output Power ¹	11	Kilowatts
Output Power at Black Level	6.3	Kilowatts
Heating Voltage	3.9	Volts
DC Anode Voltage	5.5	Kilovolts
DC Screen-Grid Voltage.....	600	Volts
DC Control-Grid Bias Voltage ²	-60	Volts
Direct Anode Current at Black Level	3.25	Amperes
Direct Screen-Grid Current at Black Level	30	Milliamperes
Direct Control-Grid Current at Black Level	20	Milliamperes
Video Drive Power at Black Level	190	Watts
Anode Dissipation	11	Kilowatts

Notes

- 1. Adjusted for an anode current of 1.2 Amperes.
- 2. Circuit losses taken into consideration.

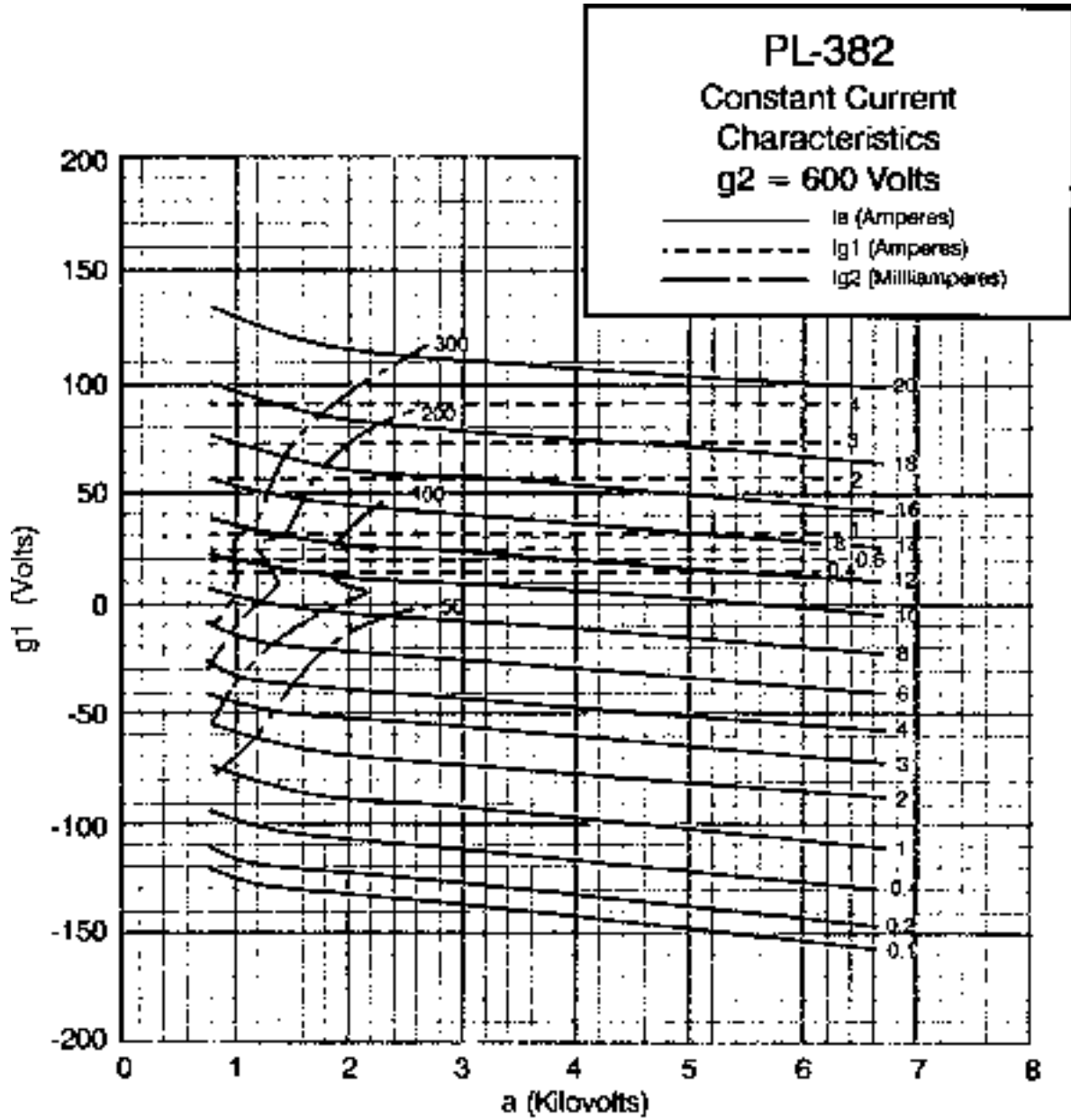
Linear Amplifier, Combined Video/Sound □ Negative Modulation, Grounded Grids

Frequency	800	MHz
Bandwidth (@ 1 dB down).....	12	Mhz
Peak of Sync Output Power	5.25	Kilowatts
Heating Voltage	3.9	Volts
DC Anode Voltage	5.5	Kilovolts
DC Screen-Grid Voltage.....	600	Volts
DC Control-Grid Bias Voltage	-65	Volts
Direct Anode Current.....	2.7	Amperes
Direct Screen-Grid Current.....	30	Milliamperes
Gain	15.5	dB
Anode Dissipation	11	Kilowatts
Intermodulation Distortion Ratio	52	dB



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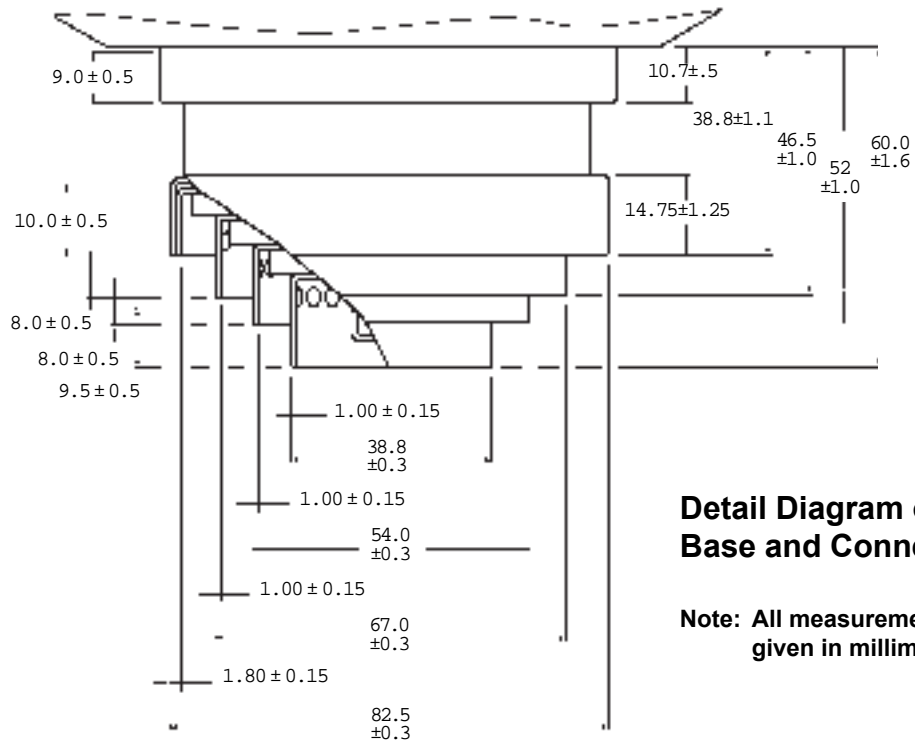
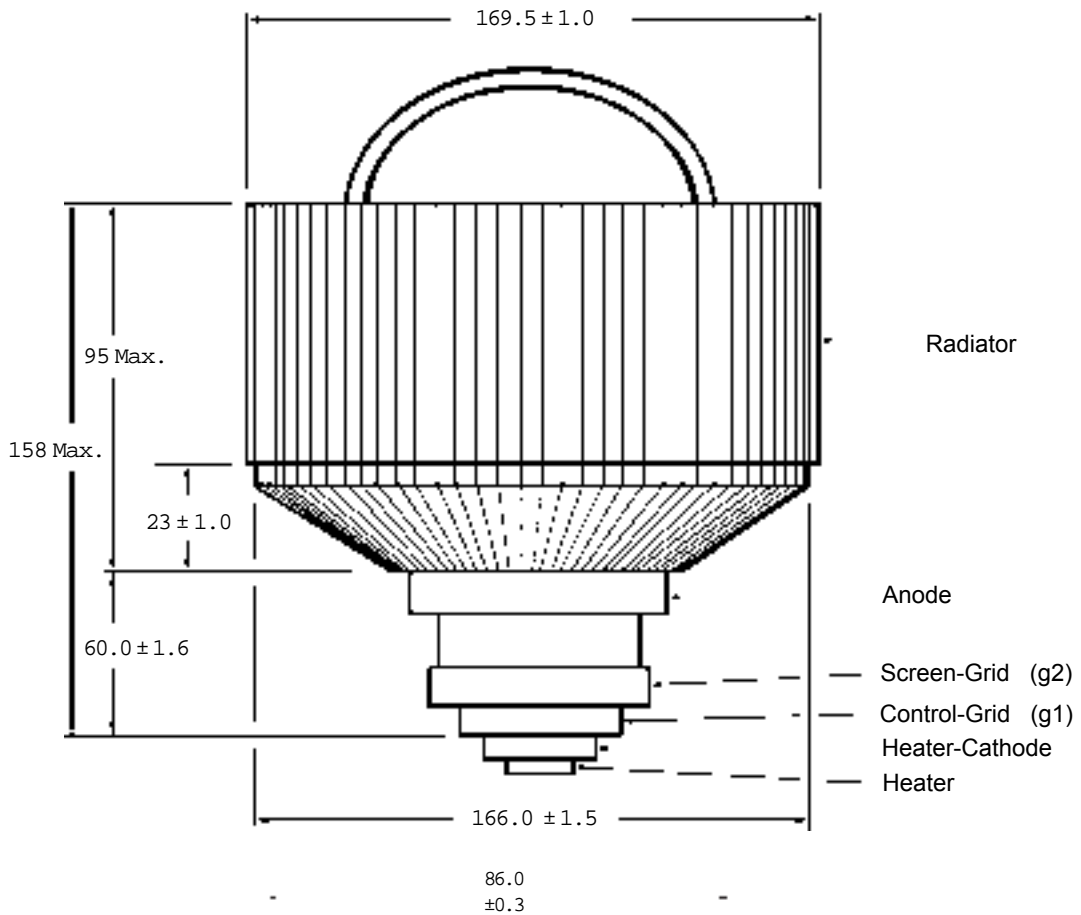




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Outline Diagram



Detail Diagram of Tube Base and Connectors

Note: All measurements are given in millimeters.