



**PL-6549**  
 RADIATION-COOLED  
 75 WATTS PLATE  
 DISSIPATION  
 Beam Pentode



**DESCRIPTION**

The Penta PL-6549 is a 75-watt dissipation aligned-grid pentode featuring good performance at low plate voltage, but also capable of good performance at relatively high voltage, for medium-power applications. The improved current-division characteristics resulting from the use of a

suppressor grid permit the use of screen voltages approaching the plate voltage in low power applications. This feature of the PL-6549 results in excellent power gain and output characteristics, both as an audio and radio-frequency amplifier.

**ELECTRICAL CHARACTERISTICS**

Filament — Thoriated Tungsten (Quick Heating)

Voltage	6.0 volts
Current	3.5 amperes
Grid-Screen mu Factor	5.0
Transconductance (500 v. $E_b$ , 400 v. $E_{c2}$ , 0 v. $E_{c1}$ , 150 ma. $I_b$ )	4500 $\mu$ mhos
Interelectrode Capacitances	
Grid-Plate	0.09 $\mu$ $\mu$ f
Input	7.5 $\mu$ $\mu$ f
Output	3.4 $\mu$ $\mu$ f

**MECHANICAL CHARACTERISTICS**

Base <sup>1</sup>	7-pin Septar, RTMA E7-2
Basing	See base diagram
Maximum Overall Dimensions	
Length	4.5 inches
Diameter	2.38 inches

<sup>1</sup> Fits Johnson No. 122-101 or 122-247 or National No. HX-29 sockets.

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**RADIO FREQUENCY OPERATION**

The PL-6549 may be operated at full ratings at frequencies up to 175 Mc. At frequencies above 175 Mc., the plate voltage should be reduced below the maximum rating.

For maximum power gain and efficiency, the screen voltage applied to the PL-6549 in r-f amplifier applications should be approximately 400 volts, and a positive voltage of approximately 70 volts should be applied to the suppressor grid. Good performance will be obtained with screen voltages as low as 250 volts, however, with some increase in driving power requirements. Good performance is likewise possible with the suppressor grid grounded, but with an increase in driving power requirements and a sacrifice in efficiency at low plate voltages.

For low-power applications, where the plate voltage does not exceed 600 volts, the screen grid and plate may be operated at the same voltage, provided the bias, driving power, and loading are properly adjusted to limit the screen-grid input to 10 watts, maximum.

High level plate modulation of the PL-6549 is possible with any of the systems commonly used for screen-grid tubes. The necessary modulated screen voltage may be obtained automatically by supplying the screen grid through a series resistor from either the modulated or unmodulated plate supply or through an audio-frequency reactor from a separate low-voltage source.

Where maximum extended upward modulation above 100 per cent is desired it is recommended that modulated voltage be applied to the screen grid. This may be accomplished by taking the screen voltage from the modulated plate supply through a series resistor or, if a low-voltage supply and series screen reactor are used, by connecting a low-capacitance audio coupling capacitor between the screen grid and the modulated plate supply.

The suppressor grid voltage required by the PL-6549 for best performance may be obtained

from any source capable of supplying a few milliamperes at about 70 volts. The suppressor grid voltage requirements are not critical, but for best utilization of the suppressor grid action the voltage should be between 50 and 100 volts. A high-resistance voltage divider between screen grid and ground makes a convenient source of suppressor voltage. In high-level modulated applications, modulation of the suppressor grid voltage is not necessary. If, however, it is more convenient to obtain suppressor grid voltage from the modulated screen voltage, there will be no detrimental effects on either the tube or the performance.

**AUDIO FREQUENCY OPERATION**

The high power sensitivity of the PL-6549 makes it particularly well suited for use as an audio frequency amplifier or modulator in push-pull Class AB<sub>1</sub> or Class AB<sub>2</sub> service. Typical performance data and maximum ratings for both classes of service are given in the tabulated data.

Under Class AB<sub>2</sub> operating conditions both grid bias and screen voltage must be obtained from a source having relatively good regulation. A series-connected string of voltage regulator tubes connected so as to regulate the output voltage of the screen-voltage supply normally will prove adequate. Grid bias voltage may be obtained from batteries or from a power supply having a low resistance bleeder.

Under Class AB<sub>1</sub> operating conditions, the d-c screen voltage must be obtained from a supply having good regulation, but the internal impedance of the grid-bias supply is not of critical importance. However, the effective grid-circuit resistance per tube must not exceed 250,000 ohms.

Regulation of the suppressor grid voltage is not ordinarily required, since variations in suppressor voltage of from 50 to 100 volts have little effect on tube characteristics. In many cases, however, a convenient source of suppressor voltage is a 75-volt regulator tube at the ground end of the screen-voltage regulator string.

**MAXIMUM RATINGS — C C 5 (Continuous Commercial Service)**

(Frequencies below 175 Mc.)

	Class-C FM or CW	Class-C Plate Mod.	Class AB <sub>1</sub> Audio Ampl.	Class AB <sub>2</sub> Audio Ampl.
D-C Plate Voltage	2000	2000	2000	2000 volts
D-C Screen-Grid Voltage	600	600	600	600 volts
D-C Suppressor-Grid Voltage	100	100	100	100 volts
D-C Plate Current	150	125	175	175 ma.
Plate Dissipation	75	50	75	75 watts
Screen-Grid Input	10	10	10	10 watts

**TYPICAL OPERATION — Class-C CW or FM Amplifier***Frequencies below 175 Mc.*

D-C Plate Voltage	600	750	1000	1500	2000	volts
D-C Screen-Grid Voltage	400	400	400	400	400	volts
D-C Suppressor-Grid Voltage	70	70	70	70	70	volts
D-C Control-Grid Voltage	-90	-90	-105	-115	-125	volts
D-C Plate Current	150	150	150	150	150	ma.
D-C Screen-Grid Current	18	17	16	14	12	ma.
D-C Suppressor-Grid Current	7	6.5	5.5	5	5	ma.
D-C Control-Grid Current	6	6	5	5	5	ma.
Peak R-F Grid Voltage (approx.)	130	125	140	155	165	volts
Driving Power (approx.)	0.75	0.75	0.70	0.75	0.80	watts
Screen-Grid Power Input	7.2	6.8	6.8	6.4	4.8	watts
Plate Power Input	90	112	150	225	300	watts
Plate Dissipation	30	38	40	45	50	watts
Plate Power Output	60	74	110	180	250	watts

**TYPICAL OPERATION — Class-C Amplitude-Modulated Amplifier, Carrier Conditions***Frequencies below 175 Mc.*

D-C Plate Voltage	600	750	1000	1500	2000	volts
D-C Screen-Grid Voltage	400	400	400	400	400	volts
D-C Suppressor-Grid Voltage	70	70	70	70	70	volts
D-C Control-Grid Voltage	-110	-130	-130	-140	-140	volts
D-C Plate Current	125	125	125	125	125	ma.
D-C Screen-Grid Current	20	20	17	15	15	ma.
D-C Suppressor-Grid Current	9	8	7	5	5	ma.
D-C Control-Grid Current	5	5	4	4	4	ma.
Peak R-F Grid Voltage (approx.)	145	165	165	175	175	volts
Driving Power (approx.)	0.60	0.65	0.65	0.70	0.70	watts
Screen-Grid Power Input	8.0	8.0	6.8	6.0	6.0	watts
Plate Power Input	75	94	125	187	250	watts
Plate Dissipation	29	29	35	47	50	watts
Plate Power Output	46	65	90	140	200	watts

**TYPICAL OPERATION — Class-AB<sub>1</sub> A.F. Power Amplifier or Modulator (Sine Wave, Two Tubes)**

D-C Plate Voltage	600	1000	1500	2000	volts
D-C Screen-Grid Voltage	600	600	600	600	volts
D-C Suppressor-Grid Voltage	70	70	70	70	volts
D-C Control-Grid Voltage*	-100	-108	-115	-120	volts
Zero-Sig. D-C Plate Current	70	50	40	30	ma.
Max.-Sig. D-C Plate Current	350	320	240	210	ma.
Zero-Sig. D-C Screen-Grid Current	1.5	0.5	0.3	0.1	ma.
Max.-Sig. D-C Screen-Grid Current	28	20	14	9	ma.
Peak A-F Grid-to-Grid Voltage	195	200	180	170	volts
Plate-to-Plate Load Resistance	2550	5800	11,700	19,800	ohms
Max.-Sig. Plate Dissipation (per tube)	59	68	73	73	watts
Max.-Sig. Plate Power Output	92	185	220	275	watts

**TYPICAL OPERATION — Class-AB<sub>2</sub> A.F. Power Amplifier or Modulator (Sine Wave, Two Tubes)**

D-C Plate Voltage	600	1000	1500	2000	volts
D-C Screen-Grid Voltage	400	400	400	400	volts
D-C Suppressor-Grid Voltage	70	70	70	70	volts
D-C Control-Grid Voltage*	-65	-72	-78	-85	volts
Zero-Sig. D-C Plate Current	70	50	40	30	ma.
Max.-Sig. D-C Plate Current	350	350	285	225	ma.
Zero-Sig. D-C Screen-Grid Current	1.4	0.5	0.2	0.1	ma.
Max.-Sig. D-C Screen-Grid Current	40	34	18	10	ma.
Peak A-F Grid-to-Grid Voltage	210	230	190	180	volts
Driving Power (Max. Sig.)	2.3	1.8	0.9	0.05	watts
Plate-to-Plate Load Resistance	2700	5500	11,100	19,000	ohms
Max.-Sig. Plate Dissipation (per tube)	50	73	74	70	watts
Max.-Sig. Plate Power Output	110	205	280	325	watts

\*Approximate value. Adjust to give stated value of zero-signal plate current.

