



BEAM POWER TUBE

DESCRIPTION

The GL-1619 is a beam power transmitting tube of the metal type utilizing a coated filament to provide fast heating. The high power sensitivity and the quick-heating feature of this tube make it especially suited as an a-f or r-f amplifier, modulator, frequency multiplier, or oscillator in equipment where quick off-on operation is essential.

Operation of the 1619 at maximum ratings is practical at frequencies up to 45 megacycles. Neutralization of the tube is generally unnecessary in adequately shielded circuits. In push-pull class AB₂ amplifier service, the 1619 will deliver over 35 watts of audio power with low distortion. Its maximum plate dissipation is 15 watts.

TECHNICAL INFORMATION

These data are for reference only. For design information refer to specifications.

GENERAL CHARACTERISTICS

Number of electrodes.....	5
Electrical	
Cathode—Filamentary	
Filament voltage (a-c or d-c).....	2.5 volts
Filament current.....	2 amperes
Transconductance, for plate current of 50 ma.....	4500 approx micromhos
Direct interelectrode capacitances:*	
Grid-plate.....	0.29 micromicrofarads
Input.....	9.6 micromicrofarads
Output.....	12.5 micromicrofarads
Frequency for maximum ratings.....	45 megacycles

*With shell connected to cathode

GENERAL ELECTRIC

Supersedes ETI-194 dated 5-46

Electronic
TUBE

TECHNICAL INFORMATION (CONT'D)

Mechanical

Base.....	small wafer octal, 7-pin
Net weight, approx.....	3 ounces
Shipping weight, approx.....	1 pound
Mounting position.....	vertical or horizontal

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

AS SINGLE-TUBE CLASS A₁ AMPLIFIER

D-c plate voltage.....	400 max	volts
D-c screen voltage (grid No. 2).....	300 max	volts
Screen input.....	3.5 max	watts
Plate dissipation.....	15 max	watts
Typical operation with fixed bias:		
D-c plate voltage.....	300	volts
D-c screen voltage.....	250	volts
D-c grid voltage (grid No. 1)††°.....	—10	volts
Peak a-f grid voltage.....	10	volts
Zero-signal d-c plate current.....	44	milliamperes
Max-signal d-c plate current.....	46	milliamperes
Zero-signal d-c screen current.....	4	milliamperes
Max-signal d-c screen current.....	6	milliamperes
Load resistance.....	8800	ohms
Total harmonic distortion.....	7	per cent
Max-signal power output, approx.....	3	watts

AS PUSH-PULL CLASS AB₁ AMPLIFIER

D-c plate voltage.....	400 max	volts
D-c screen voltage (grid No. 2).....	300 max	volts
Screen input*.....	3.5 max	watts
Plate dissipation*.....	15 max	watts
Typical operation with fixed bias:		
Unless otherwise specified, values are for 2 tubes.		
D-c plate voltage.....	400	volts
D-c screen voltage.....	300	volts
D-c grid voltage (grid No. 1)††°.....	—20	volts
Peak a-f grid-to-grid voltage.....	40	volts
Zero-signal d-c plate current.....	52	milliamperes
Max-signal d-c plate current.....	80	milliamperes
Zero-signal d-c screen current.....	3.5	milliamperes
Max-signal d-c screen current.....	10	milliamperes
Load resistance (per tube).....	3500	ohms
Effective load resistance (plate-to-plate).....	14000	ohms
Total harmonic distortion.....	3	per cent
Max-signal power output, approx.....	17.5	watts

AS PUSH-PULL CLASS AB₂ AMPLIFIER

D-c plate voltage.....	400 max	volts
D-c screen voltage (grid No. 2).....	300 max	volts
Max-signal d-c plate current*.....	75 max	milliamperes
Max-signal plate input*.....	30 max	watts
Screen input*.....	3.5 max	watts
Plate dissipation*.....	15 max	watts

TECHNICAL INFORMATION (CONT'D)

AS PUSH-PULL CLASS AB₂ AMPLIFIER

Typical operation with fixed bias:

Unless otherwise specified, values are for 2 tubes

D-c plate voltage.....	400	volts
D-c screen voltage.....	300	volts
D-c grid voltage (grid No. 1) ^o	-16.5	volts
Peak a-f grid-to-grid voltage***.....	77	volts
Zero-signal d-c plate current.....	75	milliamperes
Max-signal d-c plate current.....	150	milliamperes
Zero-signal d-c screen current.....	6.5	milliamperes
Max-signal d-c screen current.....	11.5	milliamperes
Load resistance (per tube).....	1500	ohms
Effective load resistance (plate-to-plate).....	6000	ohms
Peak grid input power ^{oo}	0.4	watt
Total harmonic distortion.....	2.5	per cent
Max-signal power output, approx [§]	36	watts

AS GRID-MODULATED RADIO-FREQUENCY POWER AMPLIFIER—CLASS C TELEPHONY

Carrier conditions per tube for use with a maximum modulation factor of 1.0

D-c plate voltage.....	400 max	volts
D-c screen voltage (grid No. 2).....	300 max	volts
D-c grid voltage (grid No. 1).....	-125 max	volts
D-c plate current.....	37.5	milliamperes
Plate input.....	15 max	watts
Screen input.....	2.5 max	watts
Plate dissipation.....	15 max	watts
Typical operation:		
D-c plate voltage.....	400	volts
D-c screen voltage.....	250	volts
D-c grid voltage◆.....	-50	volts
Peak r-f grid voltage.....	58	volts
Peak a-f grid voltage.....	30	volts
D-c plate current.....	31	milliamperes
D-c screen current.....	1.5	milliamperes
D-c grid current, approx.....	1.2	milliamperes
Cathode resistor.....	1500	ohms
Driving power, approx ^{oo}	0.25	watt
Power output, approx.....	3.8	watts

AS PLATE-MODULATED RADIO-FREQUENCY POWER AMPLIFIER—CLASS C TELEPHONY

Carrier conditions per tube for use with a maximum modulation factor of 1.0

D-c plate voltage.....	325 max	volts
D-c screen voltage (grid No. 2).....	300 max	volts
D-c grid voltage (grid No. 1).....	-125 max	volts
D-c plate current.....	62 max	milliamperes
D-c grid current.....	5 max	milliamperes
Plate input.....	20 max	watts
Screen input.....	2.5 max	watts
Plate dissipation.....	10 max	watts
Typical operation:		
D-c plate voltage.....	325	volts
D-c screen voltage.....	285	volts
D-c grid voltage◆.....	-50	volts
Peak r-f grid voltage.....	70	volts
D-c plate current.....	62	milliamperes
D-c screen current.....	7.5	milliamperes
D-c grid current, approx.....	2.8	milliamperes
Screen resistor x.....	5000	ohms
Grid resistor.....	18000	ohms
Driving power, approx.....	0.18	watt
Power output, approx.....	13	watts

TECHNICAL INFORMATION (CONT'D)

AS RADIO-FREQUENCY POWER AMPLIFIER AND OSCILLATOR—CLASS C TELEGRAPHY

Key-down conditions per tube without modulation Δ

D-c plate voltage.....	400 max	volts
D-c screen voltage (grid No. 2).....	300 max	volts
D-c grid voltage (grid No. 1).....	-125 max	volts
D-c plate current.....	75 max	milliamperes
D-c grid current.....	5 max	milliamperes
Plate input.....	30 max	watts
Screen input.....	3.5 max	watts
Plate dissipation.....	15 max	watts

Typical operation:

D-c plate voltage.....	400	volts
D-c screen voltage.....	300	volts
D-c grid voltage ♦.....	-55	volts
Peak r-f grid voltage.....	80	volts
D-c plate current.....	75	milliamperes
D-c screen current.....	10.5	milliamperes
D-c grid current, approx.....	5	milliamperes
Screen resistor.....	9500	ohms
Grid resistor.....	11000	ohms
Driving power, approx.....	0.36	watt
Power output, approx.....	19.5	watts

*Averaged over any audio-frequency cycle of sine-wave form.

***The driver stage should be capable of supplying the grids of the class AB₂ stage with the specified peak grid voltage at low distortion. The effective resistance per grid circuit should not exceed 500 ohms and the effective impedance at the highest desired response frequency should not exceed 700 ohms.

°Grid voltages are given with respect to the mid-point of the filament operated on a-c. If d-c is used, each stated value of grid voltage should be decreased by 1.75 volts.

°°At crest of a-f cycle with a modulation factor of 1.0.

†The total effective grid-circuit resistance should not exceed 50,000 ohms.

♦ The effective grid-circuit resistance should not exceed 25,000 ohms.

§With zero-impedance driver and perfect regulation, plate-circuit distortion does not exceed 2 per cent. In practice, plate-voltage regulation, screen-voltage regulation, and grid-bias regulation, should not be greater than 5 per cent, 5 per cent, and 3 per cent respectively.

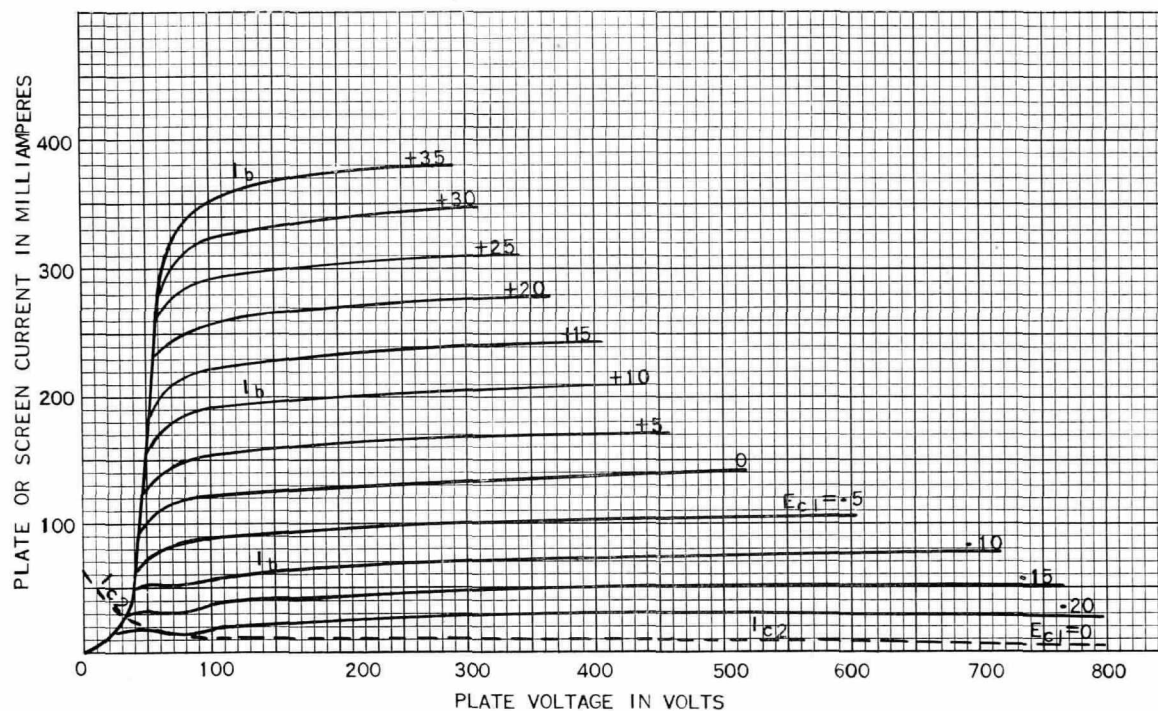
xConnected to *modulated* plate-voltage supply. Δ Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier condition.

APPLICATION NOTES

The maximum ratings apply only at frequencies below 45 megacycles. For operation at higher frequencies adequate ventilation and normal ambient temperatures must be maintained, and the plate voltage must be reduced as indicated.

Frequency.....	45	60	90 megacycles
Percentage of maximum rated plate voltage and plate input:			
Class C, grid-modulated.....	100	93	85 per cent
Class C, plate-modulated.....	100	90	77 per cent
Class C, unmodulated.....	100	90	77 per cent

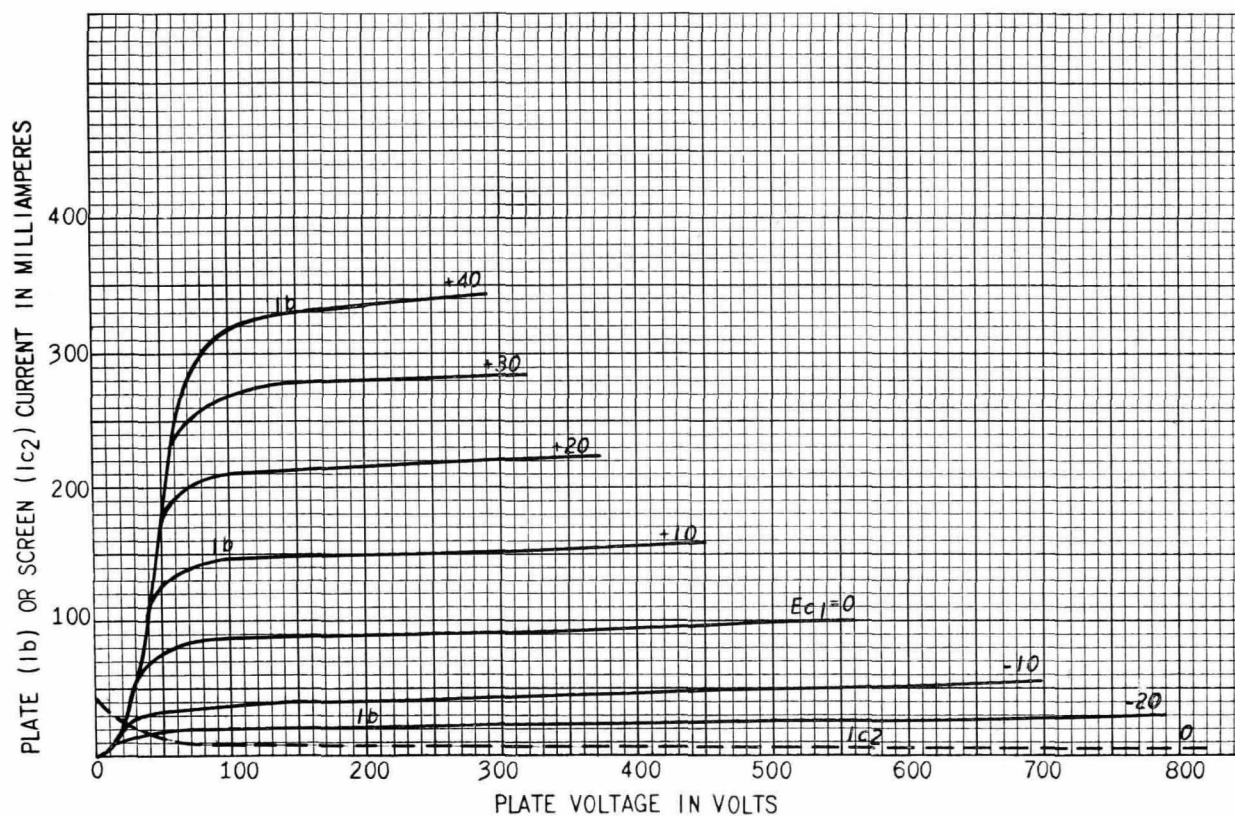
GL-1619 AVERAGE PLATE CHARACTERISTICS

 $E_i = 2.5$ VOLTS, SCREEN VOLTS = 300

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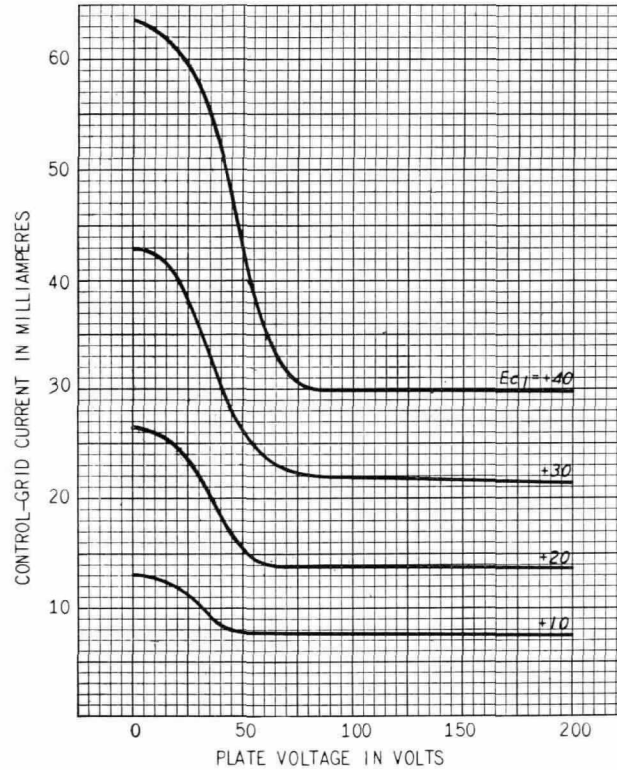
GL-1619 AVERAGE PLATE CHARACTERISTICS

 $E_i = 2.5$ VOLTS, SCREEN VOLTS = 250

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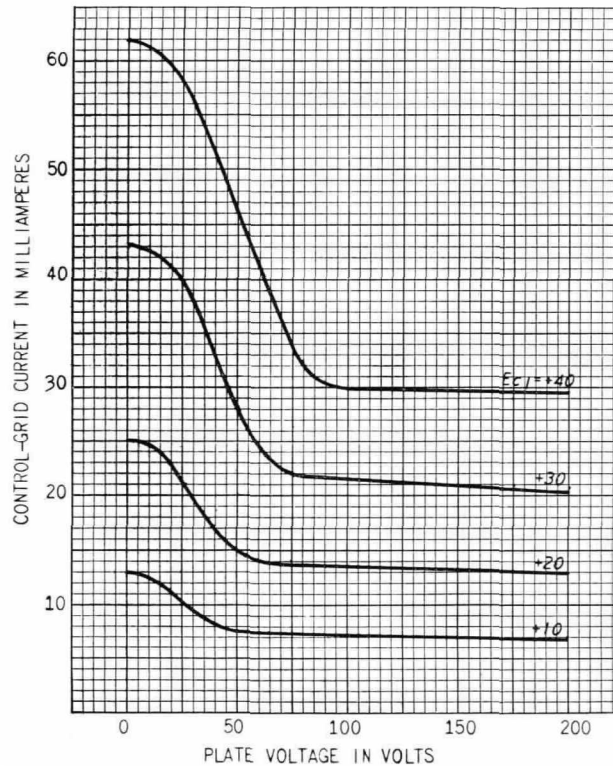
GL-1619 TYPICAL CHARACTERISTICS
 $E_i = 2.5$ VOLTS, SCREEN VOLTS = 250



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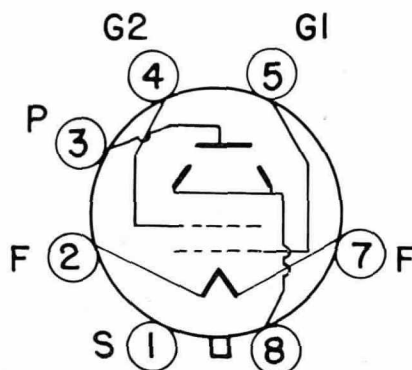
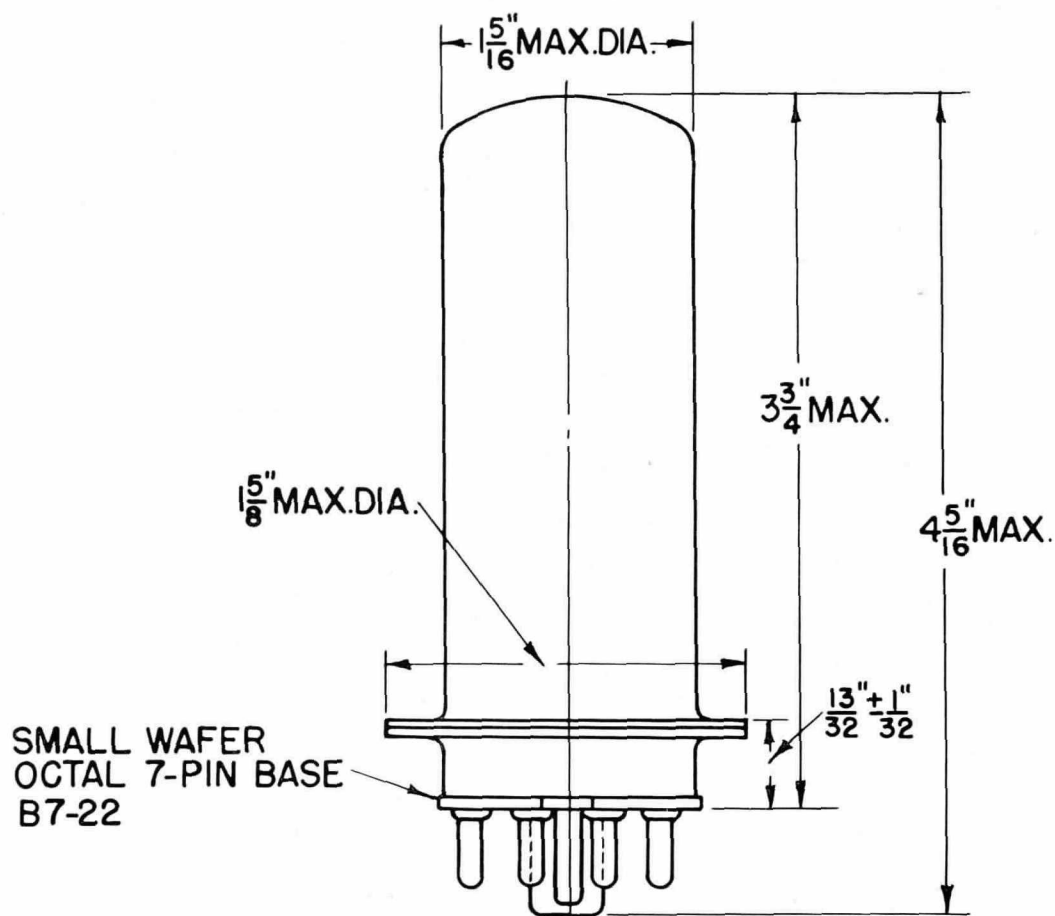
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GL-1619 TYPICAL CHARACTERISTICS
 $E_i = 2.5$ VOLTS, SCREEN VOLTS = 300



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BOTTOM VIEW
BASING DIAGRAM

GL-1619 OUTLINE

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