

## PENTODE

### DESCRIPTION

The GL-837 is a pentode transmitting tube for use as a radio-frequency amplifier, frequency-multiplier, oscillator, and suppressor-, grid-, or plate-modulated amplifier. The plate connection is brought out through a separate seal at the top of the bulb to maintain low grid-plate capacitance.

Neutralization is generally unnecessary in adequately shielded circuits. The suppressor and the special internal shield are connected to individual base pins. The 837 may be operated at maximum ratings at frequencies as high as 20 megacycles. The maximum plate dissipation is 12 watts.

### TECHNICAL INFORMATION

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

#### GENERAL CHARACTERISTICS

Number of electrodes . . . . . 5

#### Electrical

Cathode-Heater type

Heater voltage, a-c or d-c . . . . . 12.6 volts

Heater current . . . . . 0.7 ampere

Transconductance, for plate current of 24 ma . . . . . 3400 micromhos

Direct interelectrode capacitances

Grid-plate, with external shielding . . . . . 0.20 micromicrofarad

Input . . . . . 16 micromicrofarads

Output . . . . . 10 micromicrofarads

Frequency for maximum ratings . . . . . 20 megacycles



**GENERAL  ELECTRIC**

## TECHNICAL INFORMATION (CONT'D)

## Mechanical

Cap.....	small metal
Base.....	medium 7-pin bayonet
Net weight, approximate.....	5 ounces
Shipping weight.....	3 pounds
Mounting position.....	vertical or horizontal

## MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

	Typical Operation			Maximum Ratings
<b>AS RADIO-FREQUENCY POWER AMPLIFIER PENTODE—CLASS B TELEPHONY</b>				
<i>Carrier conditions per tube for use with a maximum modulation factor of 1.0</i>				
D-c plate voltage.....	400	500	500	500 volts
D-c suppressor voltage, Grid No. 3.....	0	0	40	200 volts
D-c screen voltage, Grid No. 2.....	200	200	200	200 volts
D-c grid voltage, Grid No. 1.....	-25	-25	-25	volts
D-c plate current.....	35	30	30	40 milliamperes
D-c screen current.....	10	15	12	milliamperes
D-c grid current, approximate.....	1	0	0	milliamperes
Peak r-f grid voltage.....	28	25	24	volts
Internal shield.....	connected to cathode at socket			
Plate input.....	16 watts			
Suppressor input.....	5 watts			
Screen input.....	5 watts			
Plate dissipation.....	12 watts			
Driving power, approximate*.....	0.4	0.2	0.1	watt
Power output, approximate.....	4	5	5.5	watts

## AS SUPPRESSOR-MODULATED RADIO-FREQUENCY POWER AMPLIFIER—CLASS C TELEPHONY

<i>Carrier conditions per tube for use with a maximum modulation factor of 1.0</i>				
D-c plate voltage.....	400	500	500	500 volts
D-c suppressor voltage, Grid No. 3.....	-55	-65		volts
D-c grid voltage**.....	-20	-20	-200	volts
D-c screen voltage, Grid No. 2.....			200	volts
Peak r-f grid voltage.....	45	32		volts
Peak a-f suppressor voltage.....	55	65		volts
Internal shield.....	connected to cathode at socket			
D-c plate current.....	35	30		40 milliamperes
D-c screen current.....	37	23		milliamperes
D-c grid current, approximate.....	8	3.5		8 milliamperes
Plate input.....	16 watts			
Screen input.....	8 watts			
Plate dissipation.....	12 watts			
Screen resistor.....	6500	14000		ohms
Grid resistor.....	2500	5700		ohms
Driving power, approximate.....	0.4	0.1		watt
Power output, approximate.....	4	5		watts

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

<i>Carrier conditions per tube for use with a maximum modulation factor of 1.0</i>				
D-c plate voltage.....	400	500	500	500 volts
D-c suppressor voltage.....	0	0	40	200 volts
D-c screen voltage.....	200	200	200	200 volts
D-c grid voltage**.....	-50	-45	-43	-200 volts
Peak r-f grid voltage.....	58	48	44	volts
Peak a-f grid voltage.....	25	20	18	volts
Internal shield.....	connected to cathode at socket			
D-c plate current.....	35	30	30	40 milliamperes
D-c screen current.....	9	7	6	milliamperes
D-c grid current, approximate.....	1	0	0	milliampere
Plate input.....	16 watts			
Suppressor input.....	5 watts			
Screen input.....	5 watts			
Plate dissipation.....	12 watts			
Driving power, approximate*.....	0.5	0.2	0.15	watt
Power output, approximate.....	4	5	5.5	watts

## TECHNICAL INFORMATION (CONT'D)

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

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

D-c plate voltage.....	400	400	volts
D-c suppressor voltage.....	40	200	volts
D-c screen voltage.....	140	200	volts
D-c grid voltage**.....	-40	-200	volts
Peak r-f grid voltage.....	60		volts
Internal shield.....	connected to cathode at socket		
D-c plate current.....	45	50	milliamperes
D-c screen current.....	20		milliamperes
D-c grid current, approximate.....	5	8	milliamperes
Plate input.....		20	watts
Suppressor input.....		5	watts
Screen input.....		5	watts
Plate dissipation.....		8	watts
Screen resistor #.....	13000		ohms
Grid resistor.....	8000		ohms
Driving power, approximate.....	0.3		watt
Power output, approximate.....	11		watts

AS PLATE-MODULATED RADIO-FREQUENCY POWER AMPLIFIER TETRODE—CLASS C TELEPHONY  
(Grids No. 2 and 3 connected together)

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

D-c plate voltage.....	400	400	volts
D-c screen voltage.....	100	200	volts
D-c grid voltage**.....	-70	-200	volts
Peak r-f grid voltage.....	100		volts
Internal shield.....	connected to cathode at socket		
D-c plate current.....	45	50	milliamperes
D-c screen current.....	30		milliamperes
D-c grid current, approximate.....	7	8	milliamperes
Plate input.....		20	watts
Screen input, Grids No. 2 and 3.....		7.5	watts
Plate dissipation.....		8	watts
Screen resistor ##.....	10000		ohms
Grid resistor.....	10000		ohms
Driving power, approximate.....	0.7		watt
Power output, approximate.....	11		watts

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

Key-down conditions per tube without modulation‡

D-c plate voltage.....	400	500	500	500	volts
D-c suppressor voltage.....	0	0	40	200	volts
D-c screen voltage.....	200	200	200	200	volts
D-c grid voltage**.....	-40	-85	-75	-200	volts
Peak r-f grid voltage.....	70	120	100		volts
Internal shield.....	connected to cathode at socket				
D-c plate current.....	70	60	60	80	milliamperes
D-c screen current.....	32	30	15		milliamperes
D-c grid current, approximate.....	8	8	4	8	milliamperes
Plate input.....				32	watts
Suppressor input.....				5	watts
Screen input.....				8	watts
Plate dissipation.....				12	watts
Screen resistor.....	6300	10000	20000		ohms
Grid resistor.....	5000	10600	18700		ohms
Driving power, approximate.....	0.5	0.8	0.4		watt
Power output, approximate.....	16	20	22		watts

TECHNICAL INFORMATION (CONT'D)

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

(Grids No. 2 and 3 connected together)

D-c plate voltage.....	400	500	500 volts
D-c screen voltage.....	110	80	200 volts
D-c grid voltage**.....	-70	-70	-200 volts
Peak r-f grid voltage.....	115	110	volts
Internal shield.....	connected to cathode at socket		
D-c plate current.....	70	60	80 milliamperes
D-c screen current.....	25	15	milliamperes
D-c grid current, approximate.....	8	8	8 milliamperes
Plate input.....			32 watts
Screen input, Grids No. 2 and 3.....			8 watts
Plate dissipation.....			12 watts
Screen resistor.....	11600	28000	ohms
Grid resistor.....	8700	8700	ohms
Driving power, approximate.....	0.75	0.7	watt
Power output, approximate.....	18	20	watts

\* At crest of audio-frequency cycle with modulation factor of 1.0.

\*\* The total effective grid-circuit resistance should not exceed 25000 ohms.

‡ Modulation, essentially negative, may be used if the positive peak of the audio-frequency envelope does not exceed 115 per cent of the carrier conditions.

#Connected to modulated plate-voltage supply.

##Connected to unmodulated plate-voltage supply.

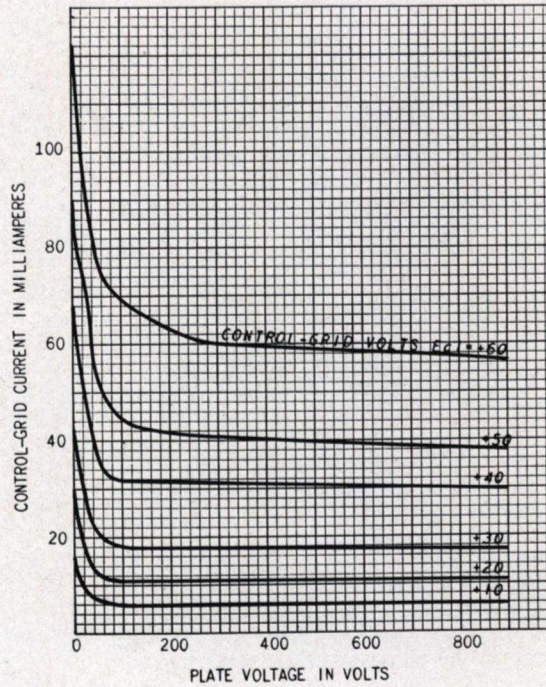
APPLICATION NOTES

The maximum ratings apply only at frequencies below 20 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.....	20	40	60 megacycles
Percentage of maximum rated plate voltage and plate input			
Class B, Class C grid- or suppressor-modulated.....	100	90	84 per cent
Class C, plate-modulated.....	100	76	62 per cent
Class C, telegraphy.....	100	76	62 per cent

GL-837 AVERAGE CHARACTERISTICS

( $E_f = 12.6$  VOLTS, SCREEN VOLTS = 200, SUPPRESSOR VOLTS = +40)

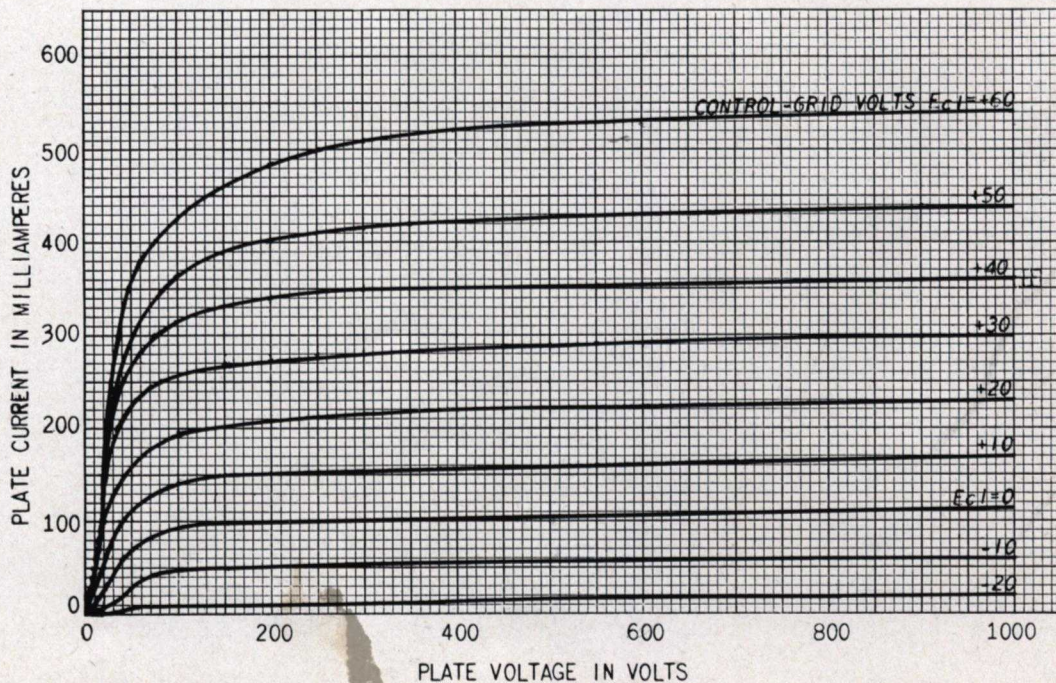


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GL-837 AVERAGE PLATE CHARACTERISTICS

( $E_f = 12.6$  VOLTS, D-C SUPPRESSOR VOLTS = +40, D-C SCREEN VOLTS = 200)

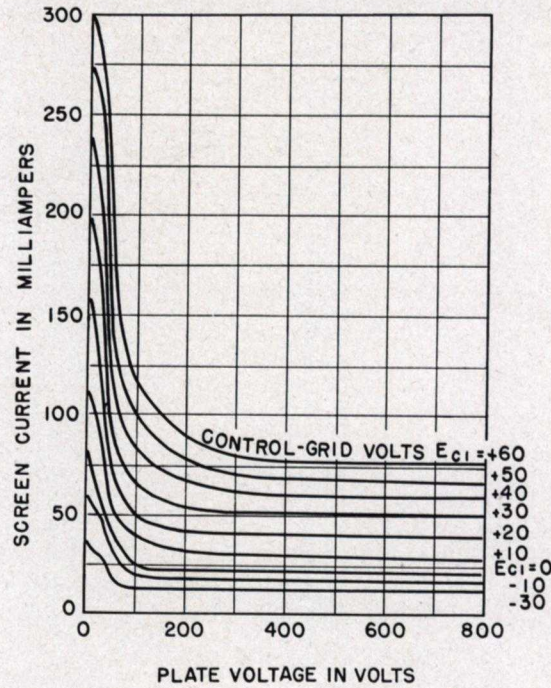


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GL-837 AVERAGE CHARACTERISTICS

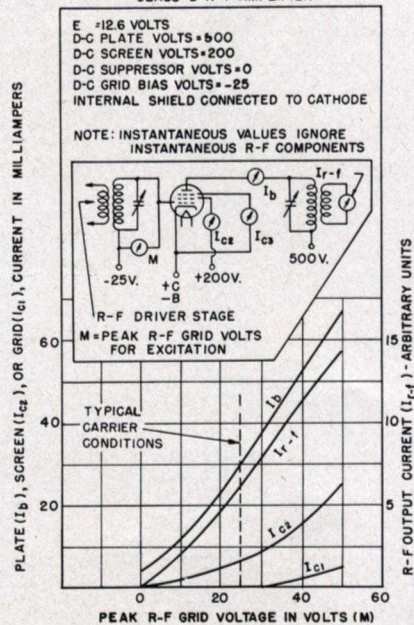
( $E_f = 12.6$  VOLTS, SCREEN VOLTS = 200, SUPPRESSOR VOLTS = +40)



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GL-837  
OPERATION CHARACTERISTICS  
CLASS B R-F AMPLIFIER

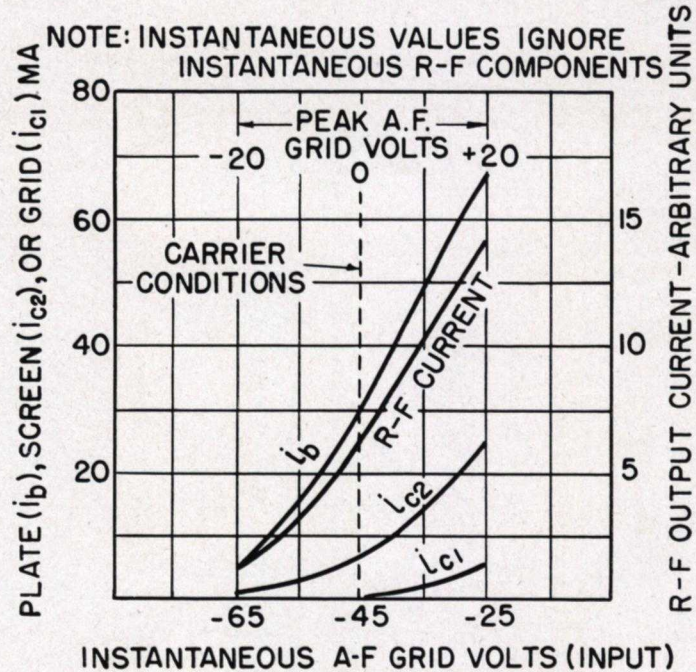


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GL-837 GRID MODULATION CHARACTERISTICS

( $E_r=12.6$  VOLTS, D-C PLATE VOLTS=500, D-C SCREEN VOLTS=200, D-C SUPPRESSOR VOLTS=0)  
 (D-C GRID BIAS VOLTS=-45, PEAK R-F GRID VOLTS=50, INTERNAL SHIELD CONNECTOR TO CATHODE)

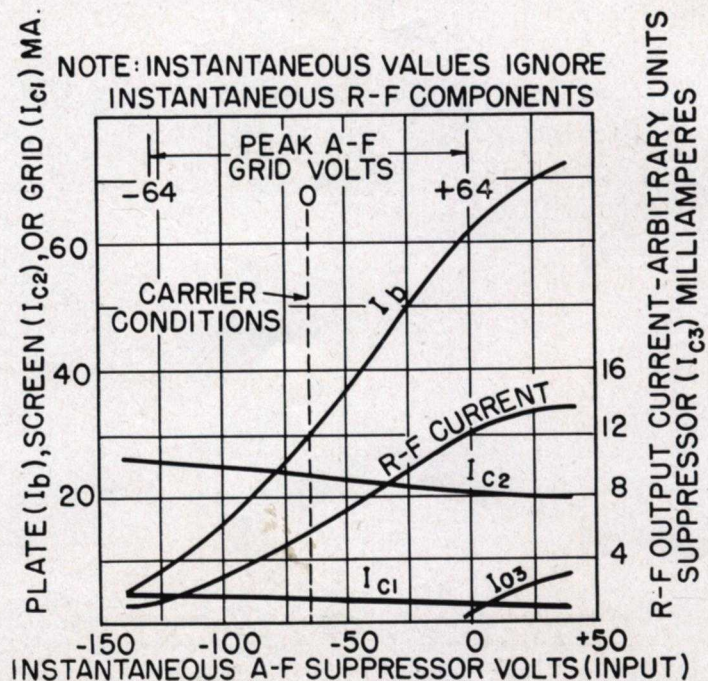


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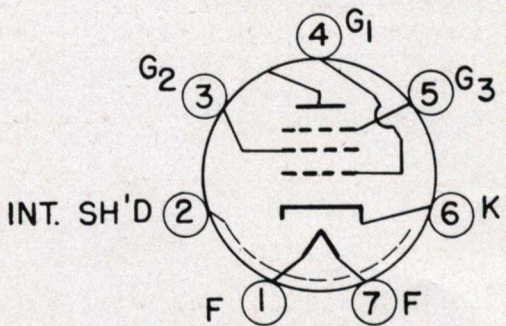
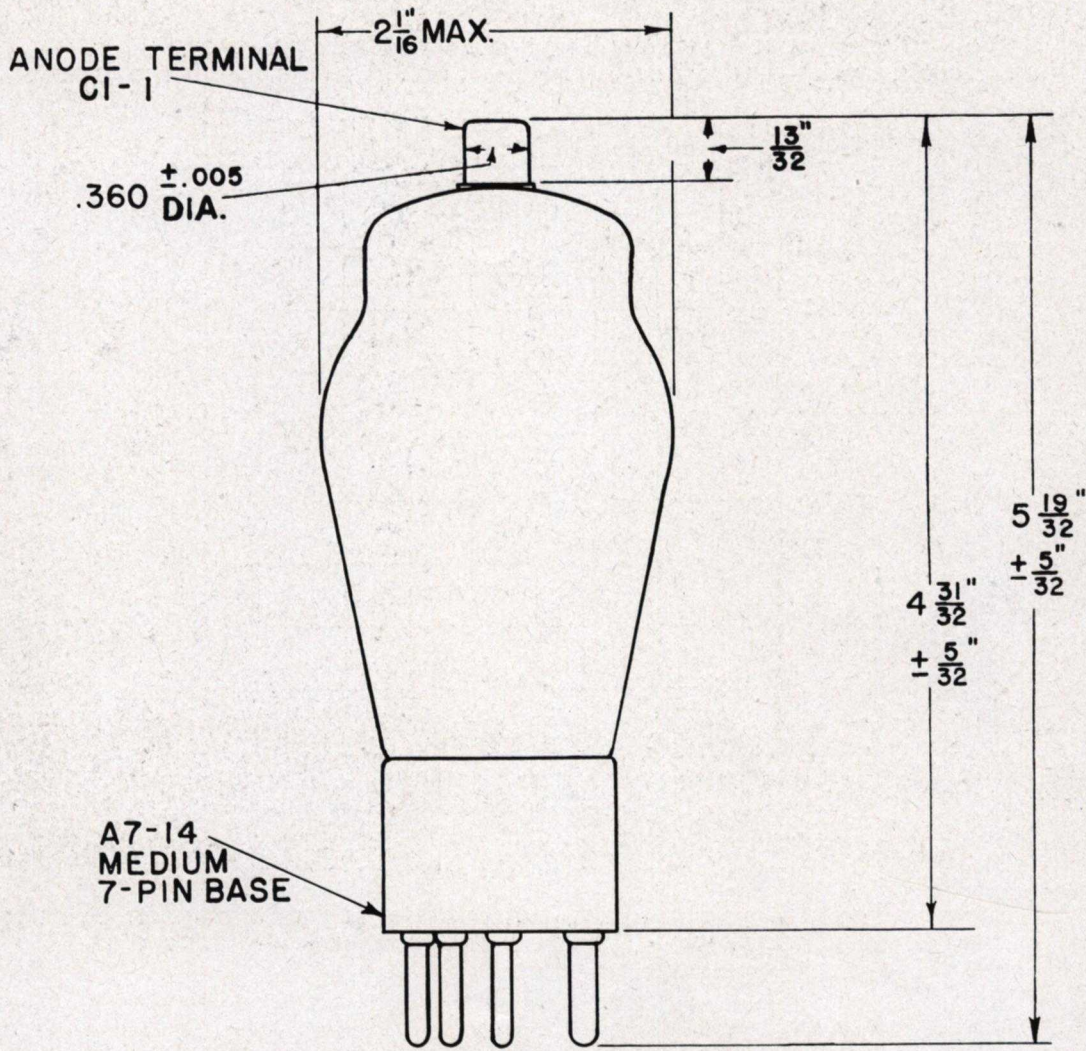
GL-837 SUPPRESSOR MODULATION CHARACTERISTICS

( $E_r=12.6$  VOLTS, D-C PLATE VOLTS=500, D-C SCREEN VOLTS=500 MINUS DROP IN SERIES SCREEN RESISTOR OF 1400 OHMS)  
 (D-C SUPPRESSOR VOLTS=-64, D-C GRID BIAS VOLTS=-20, PEAK R-F GRID VOLTS=140)  
 INTERNAL SHIELD CONNECTED TO CATHODE



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BOTTOM VIEW  
BASING DIAGRAM

GL-837 OUTLINE

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