

GL-7085

TRIODE

The GL-7085 is a three-electrode tube designed for induction and dielectric heating as well as broadcast use. A thoriated-tungsten-filament version of the GL-880, the tube features a free-hung or self-supporting filament and a glass envelope incorporating rugged fernico-to-glass seals throughout. The anode is water cooled and is capable of dissipating 22.5 kilowatts with a water flow of approximately 12 gallons per minute. Maximum ratings of 12.5 kilovolts d-c plate voltage and 60 kilowatts plate input apply at frequencies up to 25 megacycles; operation at 50 megacycles is permissible with voltage and input reduced to three-quarters maximum ratings.

TECHNICAL INFORMATION

GENERAL

Electrical

Filament Voltage.	7.5	Volts
Filament Current at 7.5 Volts	170	Amperes
Filament Starting Current, maximum.	800	Amperes
Filament Cold Resistance.	0.0056	Ohms
Amplification Factor.	20	
Interelectrode Capacitances		
Grid-to-Plate	24.5	μpf
Grid-to-Filament.	35	μpf
Plate-to-Filament	2.5	μpf

Mechanical

Mounting Position - Vertical, Anode Down	
Net Weight, approximate	7 Pounds

Thermal

Type of Cooling - Water and Forced Air		
Water Flow on Anode		
Minimum for 22.5 Kilowatts Dissipation.	12	Gallons per Minute *
Maximum Outgoing Water Temperature.	70	C
Air Flow on Dish from 3-Inch Nozzle	50	Cubic Feet per Minute /
Air flow should be directed vertically downward to provide uniform distribution over the dish with nozzle as close as free air circulation permits.		
Maximum Glass Temperature	165	C

Air and water cooling should continue for a minimum of 5 minutes after removal of power.

MAXIMUM RATINGS AND TYPICAL OPERATING CONDITIONS

Audio-Frequency Power Amplifier and Modulator - Class B

Maximum Ratings, Absolute Values

DC Plate Voltage.	12,500	Volts
Maximum Signal DC Plate Current $\bar{I}$	5	Amperes
Maximum Signal Plate Input $\bar{P}$	45	Kilowatts
Plate Dissipation	22.5	Kilowatts

Typical Operation, values are for two tubes

DC Plate Voltage.	12,500	Volts
DC Grid Voltage	-600	Volts
Peak AF Grid-to-Grid Voltage.	1900	Volts
Zero-Signal DC Plate Current.	1	Amperes
Maximum Signal DC Plate Current	6.4	Amperes
Effective Load Resistance, plate to plate	4400	Ohms
Maximum Signal Driving Power, approximate $\bar{P}$	430	Watts
Maximum Signal Power Output, approximate.	55	Kilowatts

Radio-Frequency Power Amplifier - Class B

Carrier Conditions per Tube for Use With a Maximum Modulation Factor of 1.0

Maximum Ratings, Absolute Values

DC Plate Voltage.	12,500	Volts
DC Plate Current.	4	Amperes
Plate Input	33	Kilowatts
Plate Dissipation	22.5	Kilowatts

Typical Operation

DC Plate Voltage.	12,500	Volts
DC Grid Voltage	-625	Volts
Peak RF Grid Voltage.	625	Volts
DC Plate Current.	2.4	Amperes
DC Grid Current $\bar{I}$	0	Amperes
Driving Power, approximate $\Delta \bar{P}$	1070	Watts
Power Output, approximate	12	Kilowatts

Plate Modulated Radio-Frequency Power Amplifier - Class C Telephony

Carrier Conditions per Tube for Use With a Maximum Modulation Factor of 1.0

Maximum Ratings, Absolute Values

DC Plate Voltage.	10,000	Volts
DC Grid Voltage	-2000	Volts
DC Plate Current.	4	Amperes
DC Grid Current	0.8	Amperes
Plate Input	40	Kilowatts
Plate Dissipation	15	Kilowatts

Typical Operation

DC Plate Voltage.	10,000	Volts
DC Grid Voltage **.	-840	Volts
Peak RF Grid Voltage.	1440	Volts
DC Plate Current.	3.8	Amperes
DC Grid Current, approximate $\bar{I}$	0.78	Amperes
Driving Power, approximate $\bar{P}$	1010	Watts
Power Output, approximate	29	Kilowatts

Radio-Frequency Power Amplifier and Oscillator - Class C Telegraphy
Key-Down Conditions per Tube Without Modulation ***

	Frequency 25 Megacycles			Frequency 2 Megacycles	
Maximum Ratings, Absolute Values					
DC Plate Voltage.		12,500		15,000	Volts
DC Grid Voltage		-2000		-2000	Volts
DC Plate Current.		6		6	Amperes
DC Grid Current		0.8		0.8	Amperes
Plate Input		60		67.5	Kilowatts
Plate Dissipation		22.5		22.5	Kilowatts
Typical Operation					
DC Plate Voltage.	10,000	10,000	12,500	15,000	Volts
DC Grid Voltage	-1150	-1300	-1400	-1500	Volts
Peak RF Grid Voltage.	1810	2080	2060	2130	Volts
Peak RF Plate Voltage	7900	7600	9900	12,500	Volts
DC Plate Current.	4.5	5.6	4.7	4.4	Amperes
DC Grid Current, approximate ϕ	0.55	0.72	0.42	0.37	Amperes
Driving Power, approximate ϕ	960	1440	850	770	Watts
Power Output, approximate	32	38	42	51	Kilowatts

- * This flow for jackets with spiral water deflector. Older straight-wall jackets will require 16.2 gallons per minute at 22.5 kilowatts.
- / At frequencies above 10 megacycles special attention should be given to adequate ventilation of the dish and seals to keep the temperature at the hottest point below 165 C. Heat-radiating connectors for grid and filament posts are recommended when tube operation is at frequencies greater than 10 megacycles.
- † Averaged over any audio-frequency cycle of sine-wave form.
- § The driving stage should have good regulation and should be capable of supplying considerably more than the specified driving power.
- ∅ Subject to wide variations depending on the impedance of the load circuit. High-impedance load circuits require more grid current and driving power to obtain the desired output. Low-impedance circuits require less grid current and driving power but sacrifice plate-circuit efficiency. The driving stage should have a tank circuit with good regulation and should be capable of supplying considerably more than the required driving power.
- Δ At crest of audio-frequency cycle with modulation factor of 1.0.
- ** Obtained by grid resistor of 1075 ohms or by partial self-bias methods.
- *** Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115 percent of the carrier conditions.

MAXIMUM FREQUENCY VS RATINGS

The GL-7085 will operate at maximum ratings in all classes of service at frequencies as high as 25 megacycles. The tube will operate at higher frequencies provided the maximum values of plate voltage and plate input are reduced according to the tabulation below. In Class C Telephony service at frequencies below 2 megacycles, the plate voltage and input can be increased as indicated over the maximum values permissible at 25 megacycles.

Frequency Megacycles	Class of Service	Percentage of Maximum Rated Plate Voltage and Plate Input	
		Plate Voltage	Plate Current
25	B, C - Telephony, C - Telephony	100	100
50	B	80	94
	C - Telephony	75	75
	C - Telephony	75	75
2	C - Telephony	120	112.5

CHARACTERISTIC RANGE VALUES FOR EQUIPMENT DESIGN

Characteristics	Conditions	Minimum	Limits		Maximum	
			Bogey			
Grid Voltage	ib=28 Amp; eb=1800 Volts	ec:	--	--	1100	Volts
Grid Current	ib=28 Amp; eb=1800 Volts	ic:	--	--	10.0	Amperes
Plate Voltage	Ib=2.0 Amp d-c; Ec=0	Eb:	2.5	3.2	3.6	KV d-c
Plate Voltage	Ib=2.0 Amp d-c; Ec=200 Volts d-c	Eb:	6.2	7.2	8.2	KV d-c
Grid Voltage	Eb=10 KV d-c; Ib=0.020 Amp d-c	Ec:	-460	-530	-600	Volts d-c
Plate Power Output	Eb=12.5 KV d-c; Ib=4.8 Amp d-c	Po:	34	--	--	KW
	Ic=0.8 Amp d-c; Ec=140 Volts d-c;					
	F=25 Mc					

Electronic Components Division

GENERAL ELECTRIC COMPANY

Schenectady 5, N. Y.

OUTLINE

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