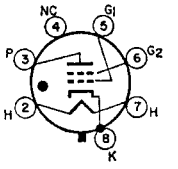
2050

INDUSTRIAL TYPE

GAS THYRATRON



6BS

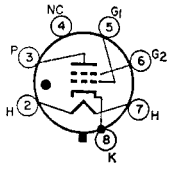
Glass octal type gas tetrode thyratron for use in relay and grid-controlled-rectifier service. **Outlines section,** 22; requires octal socket. For maximum ratings and typical operating conditions refer to type 2050A.

	Min.	Av.	Max.	
Heater Voltage (ac/dc)	5.7	6.3	6.9	volts
Heater Current	0.54	0.60	0.66	ampere
Cathode:				
Heating Time, prior to tube conduction	10	—	—	sec
Direct Interelectrode Capictances (Approx.):				
Grid No. 1 to Anode			0.26	pF
Input			4.2	pF
Output			3.6	pF

2050A

INDUSTRIAL TYPE

GAS THYRATRON



6BS

Glass octal type gas tetrode thyratron for use in relay and grid-controlled-rectifier service. **Outlines section,** 13C; requires octal socket.

Heater Voltage (ac/dc)	6.3 ±10%	volts
Heater Current	0.6	ampere
Peak Heater-Cathode Voltage:		
Heater negative with respect to cathode	100 max	volts
Heater positive with respect to cathode	25 max	volts
Cathode:		
Minimum heating time prior to tube conduction	10	seconds
Direct Interelectrode Capacitances (Approx.):		
Grid No. 1 to anode	0.15	pF
Grid No. 1 to cathode and grid No. 2	2.2	pF
Ionization Time (Approx.):		
For dc anode volts = 100, grid-No. 1 volts (square-wave pulse) = 50, peak anode amperes during conduction = 1	0.5	μs
Deionization Time (Approx.):		
With dc anode volts = 125, grid-No. 1 volts = −250, grid-No. 1 resistor (ohms) = 1000, dc anode amperes = 0.1	50	μs
With dc anode volts = 125, grid-No. 1 volts = −10, grid-No. 1 resistor (ohms) = 1000, dc anode amperes = 0.1	100	μs
Maximum Critical Grid-No. 1 Current for dc anode supply volts (rms) = 460, average anode amperes = 0.1	0.5	μA
Anode Voltage Drop (Approx.)	8	volts
Grid-No. 1 Control Ratio (Approx.) for grid-No. 1 resistor (ohms) = 0, grid No. 2 connected to cathode at socket	250	
Grid-No. 2 Control Ratio (Approx.) for grid-No. 1 resistor (ohms) = 0, grid-No. 2 resistor (ohms) = 0, grid No. 1 connected to cathode at socket	800	

Relay and Grid-Controlled Rectifier Service

For anode supply frequency of 60 Hz

MAXIMUM RATINGS (Absolute-Maximum Values)

Peak Anode Voltage:			
Forward	180	650	volts
Inverse	360	1300	volts
Grid-No. 2 (Shield-Grid) Voltage:			
Peak, before tube conduction	−100	−100	volts
Average*, during tube conduction	−10	−10	volts
Grid-No. 1 (Control-Grid) Voltage:			
Peak, before tube conduction	−250	−250	volts
Average*, during tube conduction	−10	−10	volts
Cathode Current:			
Peak	1	1	ampere
Average*	0.2	0.1	ampere
Fault, for duration of 0.1 second maximum	10	10	amperes

Grid-No. 2 Current:			
Average*	+0.01	+0.01	ampere
Grid-No. 1 Current:			
Average*	+0.01	+0.01	ampere
Ambient-Temperature Range	−75 to +90	−75 to +90	°C

TYPICAL OPERATION FOR RELAY SERVICE

RMS Anode Voltage	117	400	volts
Grid No. 2	Connected to cathode at socket		
RMS Grid-No. 1 Bias Voltage▲	5	—	volts
DC Grid-No. 1 Voltage	—	−6	volts
Peak Grid-No. 1 Signal Voltage	5	6	volts
Grid-No. 1 Circuit Resistance	1	1	megohm
Anode-Circuit Resistance†	1200	2000	ohms

MAXIMUM CIRCUIT VALUES

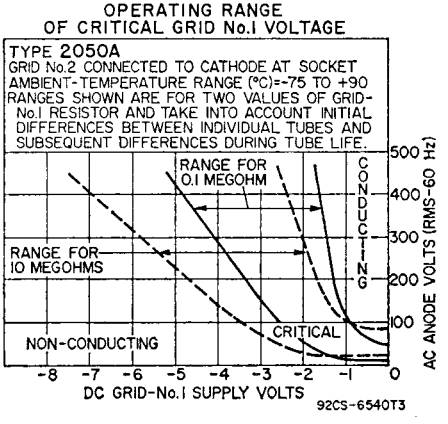
Grid-No. 1-Circuit Resistance:		
For average anode current below 0.1 ampere	10	megohms
For average anode current above 0.1 ampere	2	megohms

* Averaged over any interval of 30 seconds maximum.
▲ Approximately 180° out of phase with the anode voltage.
† Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.

Operating Considerations

The **heater** is designed to operate on either ac or dc at 6.3 volts. Regardless of the heater-voltage supply used **the heater voltage must never be allowed to deviate from its rated range.** Heater operation outside of this voltage range will impair tube performance and may cause tube failure. Low heater voltage causes low cathode temperature with resultant cathode sputtering and consequent destruction of the cathode; high heater voltage causes high cathode temperature with resultant heating of the grid and consequent grid emission which produces unpredictable shifts in the critical grid-No. 1 voltage for conduction.

The **cathode** should be allowed to reach normal operating temperature before anode current is drawn. **The delay period should not be less than 10 seconds after application of heater voltage.** Unless this recommendation is followed, the cathode will be damaged.



The **shield grid** (grid No. 2) is normally connected to the cathode at socket. It may, however, be used as a control electrode because the control characteristic of grid No. 1 may be shifted by varying the potential of grid

No. 2. As grid No. 2 is made negative, the grid-No. 1 characteristic is shifted in the positive direction. The use of grid No. 2 as the control electrode (with grid No. 1 connected to cathode at socket) has the advantage of increased sensitivity but consideration must be given to the higher preconduction current, higher capacitance to anode, and less stability of operation.

A **grid-No. 1 resistor** having a value as high as 10 megohms to give circuit sensitivity can be used with the 2050-A because its control-grid current is very low. However, when a high value of grid resistor is used, care should be taken to keep the tube base and socket clean and dry in order to make the effect of leakage currents between the control-grid base pin and anode base pin very small.

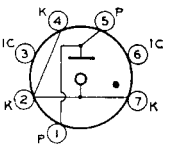
Sufficient anode-circuit resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings of the tube.

2076/5R4GB	Refer to chart at end of section.
2076/5R4GYB	For replacement use type 2076/5R4GB.
2081/6AW8A	Refer to chart at end of section.
2082/12AY7	Refer to chart at end of section.
5636	Refer to chart at end of section.
5639	Refer to chart at end of section.
5642	Refer to chart at end of section.

5651A

INDUSTRIAL TYPE

VOLTAGE-REFERENCE TUBE



5BO

Miniature type cold-cathode, glow-discharge voltage-reference tube for use in dc power supplies. **Outlines section,** 5C; requires miniature 7-contact socket.

MAXIMUM RATINGS (Absolute-Maximum Values)

DC Operating Current (Continuous)	3.5	mA
DC Operating Current (Continuous)	1.5	mA
Ambient Temperature Range	—55 to 90	°C

CHARACTERISTICS AND OPERATION RANGE VALUES

	Min.	Av.	Max.	
DC Starting Voltage	—	107	115*	volts
DC Operating Voltage (Variation from tube to tube):				
At 1.5 mA	83	85	87	volts
At 2.5 mA	83.5	85.5	87.5	volts
At 3.5 mA	84.5	86.5	88.5	volts
Regulation (1.5 mA to 3.5 mA)	—	—	3	volts
Temperature coefficient of Operating Voltage (over ambient temperature range of —55 to 90°C)	—	—4	—	mV/°C
Percentage Variation of Operating Voltage:■				
During first 300 hours of life●	—	—	0.1	per cent
During subsequent 1000 hours of life	—	—	0.1	per cent
Short-term (100 hours) Variation of Operating Voltage after first 300 hours of life■	—	—	0.05	per cent
Instantaneous Voltage Fluctuation (Voltage jump)†	—	—	0.1	volt

CIRCUIT VALUES

Shunt Capacitor	—	—	0.02	μF
Series Resistor		‡		

* A dc supply voltage of 115 volts minimum should be provided to insure "starting" throughout tube life.
■ DC operating current = 2.5 mA.
● After initial 3-minute warm-up period.
† Defined as the maximum instantaneous voltage fluctuation at any current level within the operating current range.
‡ A series resistor must always be used with the 5651A. The resistance value must be chosen so that (1) the maximum current rating of 3.5 mA is not exceeded at the highest anode-supply voltage employed, and (2) the minimum current rating of 1.5 mA is always exceeded when the anode-supply voltage is at its lowest value.

Installation and Application

Make no connection to pins 3 and 6. Any potentials applied to these pins may cause erratic tube performance. The three pin terminals for the cathode (pins 2, 4, and 7) and the two for the anode (pins 1 and 5) offer the equipment designer several different possibilities for connection of the 5651A. Any pair of interconnected pins can be used as a jumper connection to a circuit common to either the cathode or to the anode. The use of such a jumper connection provides a means for opening the circuit to protect circuit components when the 5651A is removed from its socket. **Under no circumstances should the current through any pair of interconnected pins exceed one ampere.**

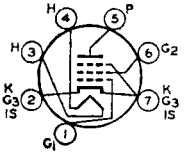
If the load for the regulated power supply is disconnected either directly or by removing the 5651A from its socket, the rectifier capacitors will charge to the rectifier peak voltage. It is important, therefore, that these capacitors be rated to withstand such voltage.

A warm-up period of 3 minutes should be allowed each time the equipment is turned on to insure minimum voltage drift of the 5651A.

When a shunt capacitor is used with the 5651A, its value should be limited to 0.02 μF. A large value of capacitance may cause the tube to oscillate and thus give unstable performance.

Shielding should be utilized for the 5651A to insure maximum stability when the tube is operated in the presence of strong rf or magnetic fields.

Refer to chart at end of section. **5651WA**



7BD

SHARP-CUTOFF PENTODE

5654

INDUSTRIAL TYPE

Miniature type sharp-cutoff pentode used in RF and IF broad-band applications at frequencies up to 400 mHz. **Outlines section,** 5B; requires miniature 7-contact socket.

Heater Voltage (ac/dc)	6.3 ±10%	volts
Heater Current	0.175	ampere
Heater-Cathode Voltage:		
Peak value	±100	volts
Direct Interelectrode Capacitances:▲		
Grid No.1 to Plate	0.020 max.	pF
Input	4.0	pF
Output	2.85	pF

▲ With external shield.

Class A_1 Amplifier

MAXIMUM RATINGS (Absolute-Maximum Values)

Plate Voltage	200	volts
Grid-No.2 (Screen) Voltage	155	volts

Plate Dissipation		1.85	watts
Grid-No.2 Input		0.55	watt
Cathode Current		20	mA

TYPICAL OPERATION AND CHARACTERISTICS

Plate Voltage	120	180	volts
Grid-No.2 Voltage	120	120	volts
Cathode-Bias Resistor	180	180	ohms
Plate Resistance (Approx.)	0.30	0.50	megohm
Transconductance	5000	5100	μmhos
Plate Current	7.5	7.7	mA
Grid-No.2 Current	2.5	2.4	mA
Grid-No.1 Voltage (Approx.) for plate current of 10 μA	—8.5	—8.5	volts

MAXIMUM CIRCUIT VALUE

Grid-No.1-Circuit Resistance	0.5	megohm

Special Ratings & Performance Data

SHOCK RATING

Impact Acceleration	500 max.	g

FATIGUE RATING

Vibrational Acceleration	2.5 max.	g

HEATER CYCLING LIFE PERFORMANCE

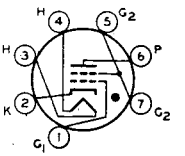
Cycles of Intermittent Operation	2000 min.	cycles

5654W	Refer to chart at end of section.
5654/6AK5W/ 6096	Refer to chart at end of section.
5663	Refer to chart at end of section.
5670	Refer to chart at end of section.
5670WA	Refer to chart at end of section.
5672	Refer to chart at end of section.
5678	Refer to chart at end of section.
5686	Refer to chart at end of section.
5687	Refer to chart at end of section.
5691	Refer to chart at end of section.
5692	Refer to chart at end of section.
5693	Refer to chart at end of section.

5696

INDUSTRIAL TYPE

THYRATRON



7BN

Miniature type gas-tetrode thyratron for use in counter-circuit relay applications. **Outlines section,** 5B; requires miniature 7-contact socket.

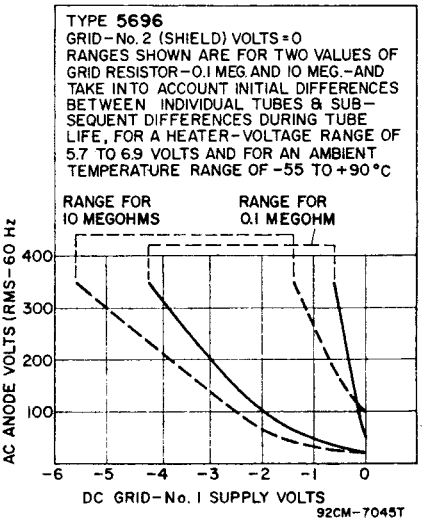
Heater Voltage (ac/dc)	6.3	volts
Heater Current	0.150	ampere
Heater-Cathode Voltage:		
Peak	+25, —100	volts

Cathode:		
Minimum Heating Time, prior to tube conduction	10	seconds
Direct Interelectrode Capacitances (Approx.):		
Grid No.1 to Anode	0.03	pF
Input	1.8	pF
Output	0.54	pF
Ionization Time (Approx.):		
For conditions: dc anode volts = 100; grid-No.1 square-pulse volts = +50; peak cathode amperes during conduction = 0.150	0.5	μs
Deionization Time (Approx.):		
For conditions: dc anode volts = 500; grid-No.1 volts = −100, grid-No.1 resistor (ohms) = 1000; dc cathode amperes = 0.025	25	μs
For conditions: dc anode volts = 500; grid-No.1 volts = −13; grid-No.1 resistor (ohms) = 1000; dc cathode amperes = 0.025	40	μs
Maximum Critical Grid-No.1 Current, with ac anode-supply volts (rms) = 350, and average cathode amperes = 0.025	0.5	μA
Anode Voltage Drop (Approx.)	10	volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0; grid-No.2 volts = 0	250	
Grid-No.2 Control Ratio (Approx.) with grid-No.1 volts = 0, grid-No.2 resistor (ohms) = 0	15	

Relay and Grid-Controlled Rectifier Service

MAXIMUM RATINGS (Absolute-Maximum Values)

Peak Anode Voltage:		
Forward	500	volts
Inverse	500	volts
Grid-No.2 (Shield-Grid) Voltage:		
Peak, before anode conduction	−50	volts
Average, during anode conduction■	−10	volts
Grid-No.1 (Control-Grid) Voltage:		
Peak, before anode conduction	−100	volts
Average, during anode conduction■	−10	volts
Cathode Current:		
Peak	100	mA
Average■	25	mA
Surge, for duration of 0.1 sec. max.	2	amperes
Grid-No.2 Current:		
Average■	5	mA
Grid-No.1 Current:		
Average■	5	mA
Ambient Temperature Range	−55 to +90	°C



TYPICAL OPERATING CONDITIONS FOR RELAY SERVICE

RMS Anode Voltage	117	volts
Grid No.2	Connected to cathode at socket	
RMS Grid-No.1 Bias Voltage□	5	volts
Peak Grid-No.1 Signal Voltage	5	volts
Grid-No.1-Circuit Resistance	0.1	megohm
Anode-Circuit Resistance#	5000	ohms

MAXIMUM CIRCUIT VALUE

Grid-No.1-Circuit Resistance	10	megohms

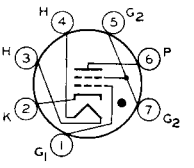
■ Averaged over any interval of 30 sec. max.
□ Approximately 180° out of phase with the anode voltage.
Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.

5696A	Refer to chart at end of section.
5718	Refer to chart at end of section.
5719	Refer to chart at end of section.
5725	Refer to chart at end of section.
5725/6AS6W	Refer to chart at end of section.
5726	Refer to chart at end of section.
5726/6AL5W	Refer to chart at end of section.
5726/6AL5W/ 6097	Refer to chart at end of section.

5727

INDUSTRIAL TYPE

GAS THYRATRON



7BN

Miniature type "Premium" gas-tetrode thyratron for use in relay, grid-controlled rectifier and pulse-modulator applications. **Outlines section,** 5C; requires miniature 7-contact socket.

Heater Voltage (ac/dc)	6.3 ±10%	volts
Heater Current	0.6	ampere
Cathode:		
Minimum heating time prior to tube conduction	20	seconds
Direct Interelectrode Capacitances (Approx.):		
Grid No.1 to anode	0.026	pF
Grid No.1 to cathode, grid No.2, and heater	2.4	pF
Anode to cathode, grid No.2, and heater	1.6	pF
Ionization Time (Approx.):		
For dc anode volts = 100, grid-No.1 volts (square-wave pulse) = 50, peak anode amperes during conduction = 0.5	0.5	μs
Deionization Time (Approx.):		
For dc anode volts = 125, dc anode amperes = 0.1, grid-No.1 resistor (ohms) = 1000, and grid-No.1 volts = −100	35	μs
For dc anode volts = 125, dc anode amperes = 0.1, grid-No.1 resistor (ohms) = 1000, and grid-No.1 volts = −100	75	μs
Maximum Critical Grid-No.1 Current:		
For anode-supply volts (rms) = 460, and average anode amperes = 0.1	0.5	μA
Anode Voltage Drop (Approx.)	8	volts
Grid-No.1 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0, grid-No.2 volts = 0	250	
Grid-No.2 Control Ratio (Approx.) with grid-No.1 resistor (megohms) = 0, grid-No.2 resistor (megohms) = 0, grid-No.1 volts = 0	1000	

Relay and Grid-Controlled Rectifier Service

MAXIMUM RATINGS (Absolute-Maximum Values)

For anode-supply frequency of 60 Hz

Peak Anode Voltage:		
Forward	650	volts
Inverse	1300	volts
Grid-No.2 (Shield-Grid) Voltage:		
Peak, before tube conduction	—100	volts
Average■, during tube conduction	—10	volts
Grid-No.1 (Control-Grid) Voltage:		
Peak, before tube conduction	—100	volts
Average■, during tube conduction	—10	volts
Cathode Current:		
Peak	0.5	ampere
Average■	0.1	ampere
Fault, for duration of 0.1 second max.	10	amperes
Grid-No.2 Current:		
Average■	10	mA
Grid-No.1 Current:		
Average■	10	mA
Heater-Cathode Voltage:		
Peak	+25, —100	volts
Bulb Temperature (At hottest point on bulb surface)	150	°C
Ambient Temperature	—75	°C

TYPICAL OPERATION FOR RELAY SERVICE

RMS Anode Voltage	117	400	volts
Grid-No.2 Voltage	0	0	volts
RMS Grid-No.1 Bias Voltage□	5	—	volts
DC Grid-No.1 Bias Voltage	—	—6	volts
Peak Grid-No.1 Signal Voltage	5	6	volts
Grid-No.1-Circuit Resistance	1	1	megohm
Anode-Circuit Resistance#	1200	2000	ohms

MAXIMUM CIRCUIT VALUE

Grid-No.1-Circuit Resistance	10	megohms

Pulse-Modulated Service

For rectangular-wave shapes, duty cycle of 0.001 max., pulse duration of 5 μs max., and pulse-repetition rate of 500 pps max.

MAXIMUM RATINGS (Absolute-Maximum Values)

Peak Anode Voltage:		
Forward	500	volts
Inverse	100	volts
Grid-No.2 (Shield-Grid) Voltage:		
Peak, before tube conduction	—50	volts
Average, during tube conduction	—10	volts
Grid-No.1 (Control-Grid) Voltage:		
Peak, before tube conduction	—100	volts
Average, during tube conduction	—10	volts
Cathode Current:		
Peak	10	amperes
Average	10	mA
Rate of change	100	A/μs
Peak Grid-No.2 Current	20	mA
Peak Grid-No.1 Current	20	mA
Heater-Cathode Voltage:		
Peak	±0	volt
Bulb Temperature (At hottest point on bulb surface)	150	°C
Ambient Temperature	—75	°C

MAXIMUM CIRCUIT VALUES

Grid-No.1-Circuit Resistance	0.5	megohm
Grid-No.2-Circuit Resistance	25000 max. 2000 min.	ohms ohms

* For pulse-modulator service, tolerance is +10%, —5%.
■ Averaged over any interval of 30 seconds maximum.
□ Approximately 180° out of phase with the anode voltage.
Sufficient resistance, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings.

Special Ratings and Performance Data

SHOCK RATING

Impact Acceleration	750 max.	g

FATIGUE RATING

Vibrational Acceleration	2.5 max.	g

HEATER-CYCLING LIFE PERFORMANCE

Cycles of Intermittent Operation	2000 min.	cycles

Operating Considerations

Sufficient **anode-circuit resistance**, including the tube load, must be used under any conditions of operation to prevent exceeding the current ratings of the tube.

Curve shown under type 2D21 also applies to type 5727

5734 Refer to chart at end of section.

5749 Refer to chart at end of section.

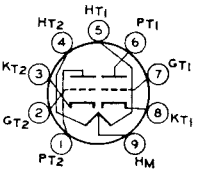
5749/6BA6W Refer to chart at end of section.

5750 Refer to chart at end of section.

5751

INDUSTRIAL TYPE

HIGH-MU TWIN TRIODE



9A

Miniature type "Premium" high-mu twin triode used as a phase inverter and as a high gain amplifier in industrial control devices. **Outlines section,** 6B; requires miniature 9-contact socket.

	Series	Parallel	
Heater Arrangement:			
Heater Voltage (ac/dc)	12.6 ±10%	6.3 ±10%	volts
Heater Current	0.175	0.350	ampere
Heater-Cathode Voltage:			
Peak		±100 max.	volts

Class A_1 Amplifier (Each Unit)

MAXIMUM RATINGS (Design-Maximum Values)

Plate Voltage	330	volts
Grid Voltage:		
Negative-bias value	55	volts
Positive-bias value	0	volt
Plate Dissipation	0.8	watt
Bulb Temperature (At hottest point on bulb surface)	165	°C

CHARACTERISTICS

Plate Voltage	100	250	volts
Grid Voltage	−1	−3	volts
Amplification Factor	70	70	
Plate Resistance	58000	58000	ohms
Transconductance	1200	1200	μmhos
Plate Current	0.9	1.0	mA

Special Ratings & Performance Data

SHOCK RATING

Impact Acceleration	600 max.	g

FATIGUE RATING

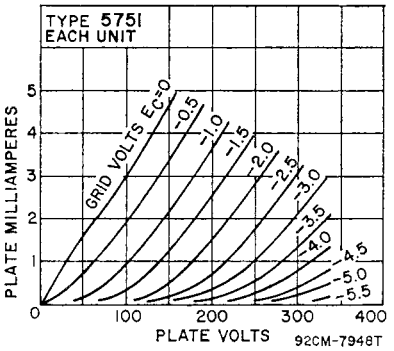
Vibrational Acceleration	2.5 max.	g

LOW-FREQUENCY VIBRATION PERFORMANCE

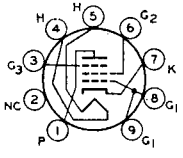
RMS Output Voltage	100 max.	mV

HEATER-CYCLING LIFE PERFORMANCE

Cycles of Intermittent Operation	2000 min.	cycles



Refer to chart at end of section. **5751WA**



9K

VHF BEAM POWER TUBE

5763

INDUSTRIAL TYPE

Miniature type VHF beam power amplifier for use in low-power mobile transmitters and the low-power stages of larger fixed station transmitters. **Outlines section,** 6E; requires miniature 9-contact socket.

Heater Voltage (ac/dc)	6.0 ±10%	volts
Heater Current	0.75	ampere
Heater-Cathode Voltage:		
Peak	±100 max.	volts
Transconductance for plate current of 45 mA	7000	μmhos
Mu-Factor, Grid No.2 to Grid No.1	16	
Direct Interelectrode Capacitances:		
Grid No.1 to Plate	0.3 max	pF
Input	9.5	pF
Output	4.5	pF

Plate-Modulated RF Power Amplifier—Class C Telephony

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

	CCS●	ICAS●●	
MAXIMUM RATINGS (Absolute-Maximum Values)			
DC Plate Voltage	250	300	volts
DC Grid-No.3 (Suppressor) Voltage	0	0	volts
DC Grid-No.2 (Screen) Voltage	250	250	volts
DC Grid-No.1 (Control-Grid) Voltage	—125	—125	volts
DC Plate Current	40	50	mA
DC Grid-No.2 Current	15	15	mA
DC Grid-No.1 Current	5	5	mA
Plate Input	10	15	watts
Grid-No.2 Input	1.5	1.5	watts
Plate Dissipaton	8	12	watts
Bulb Temperature (At hottest point on bulb surface)	250	250	°C

TYPICAL OPERATION UP TO 30 MHz

DC Plate Voltage	250	300	
Grid No.3	Connected to cathode at socket		
DC Grid-No.2 Voltage‡	250	250	volts
DC Grid-No.1 Voltage★	—39	—42.5	volts
From a grid resistor of	39000	18000	ohms
Peak RF Grid-No.1 Voltage	46.5	53.5	volts
DC Plate Current	40	50	mA
DC Grid-No.2 Current	5.6	6	mA
DC Grid-No.1 Current (Approx.)	1	2.4	mA
Driving Power (Approx.)	0.05	0.15	watt
Useful Power Output (Approx.)	6.4■	10■	watts

MAXIMUM CIRCUIT VALUE

Grid-No.1-Circuit Resistance	0.1	0.1	megohm

RF Power Amplifier & Oscillator—Class C Telegraphy□ and RF Power Amplifier—Class C FM Telephony

MAXIMUM RATINGS (Absolute-Maximum Values)

	CCS●	ICAS●●	
DC Plate Voltage	300	350	volts
DC Grid-No.3 (Suppressor) Voltage	0	0	volts
DC Grid-No.2 (Screen) Voltage	250	250	volts
DC Grid-No.1 (Control-Grid) Voltage	—125	—125	volts
DC Plate Current	50	50	mA
DC Grid-No.2 Current	15	15	mA
DC Grid-No.1 Current	5	5	mA
Plate Input	15	17	watts
Grid-No.2 Input	2	2	watts
Plate Dissipation	12	13.5	watts
Bulb Temperature (At hottest point on bulb surface)	250	250	°C

TYPICAL OPERATION UP TO 30 MHz

DC Plate Voltage	300	350	volts
Grid No.3	Connected to cathode at socket		
DC Grid-No.2 Voltage	250	250	volts
DC Grid-No.1 Voltage⊕	—28.5	—28.5	volts
From a grid resistor of	18000	18000	ohms
Peak RF Grid-No.1 Voltage	37.5	37	volts
DC Plate Current	50	48.5	mA
DC Grid-No.2 Current	6.6	6.2	mA
DC Grid-No.1 Current (Approx.)	1.6	1.6	mA
Driving Power (Approx.)	0.1	0.1	watts
Useful Power Output (Approx.)	10.3■	12■	watts

TYPICAL OPERATION AT 50 MHz

DC Plate Voltage	300	—	volts
Grid No.3	Connected to cathode at socket		
DC Grid-No.2 Voltage	250	—	volts
DC Grid-No.1 Voltage⊕	—60	—	volts
From a grid resistor of	22000	—	ohms
Peak RF Grid-No.1 Voltage	80	—	volts
DC Plate Current	50	—	mA
DC Grid-No.2 Current	5	—	mA
DC Grid-No.1 Current (Approx.)	3	—	mA
Driving Power (Approx.)	0.35	—	watt
Useful Power Output (Approx.)	7■	—	watts

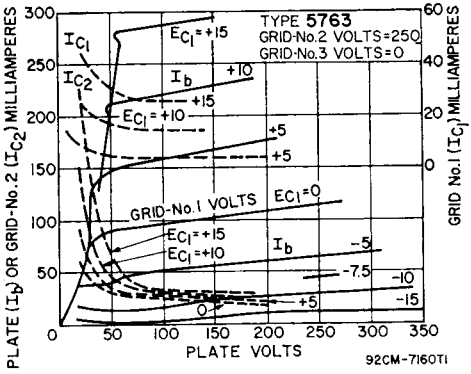
MAXIMUM CIRCUIT VALUE

Grid-No.1-Circuit Resistance	0.1	0.1	megohm

Frequency Multiplier

MAXIMUM CCS● RATINGS (Absolute-Maximum Values)

DC Plate Voltage	300	volts
DC Grid-No.3 (Suppressor) Voltage	0	volts
DC Grid-No.2 (Screen) Voltage	250	volts
DC Grid-No.1 (Control-Grid) Voltage	—125	volts
DC Plate Current	50	mA
DC Grid-No.2 Current	15	mA
DC Grid-No.1 Current	5	mA
Plate Input	15	watts
Grid-No.2 Input	2	watts
Plate Dissipation	12	watts
Bulb Temperature (At hottest point on bulb surface)	250	°C



TYPICAL OPERATION

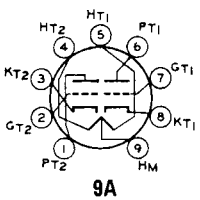
	Doubler to 175 MHz	Tripler to 175 MHz	
DC Plate Voltage	300	300	volts
Grid No.3	Connected to cathode at socket		
DC Grid-No.2 Voltage	*	*	volts
DC Grid-No.1 Voltage⊕	—75	—100	volts
From grid resistor of	75000	100000	ohms
Peak RF Grid-No.1 Voltage	95	120	volts
DC Plate Current	40	35	mA
DC Grid-No.2 Current	4	5	mA
DC Grid-No.1 Current (Approx.)	1	1	mA
Driving Power (Approx.)	0.6	0.6	watt
Useful Power Output (Approx.)	2.1■	1.3■	watts

MAXIMUM CIRCUIT VALUE (For maximum rated conditions)

Grid-No.1-Circuit Resistance	0.1	0.1	megohm

‡ Obtained preferably from a separate source modulated with the plate supply, or from the modulated plate supply through a series resistor.
★ Obtained from grid-No.1 resistor or from a combination of grid-No.1 resistor with either fixed supply or cathode resistor.
□ Key down conditions per tube without amplitude modulation. Modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.
⊕ Obtained from a fixed supply, or by a grid-No.1 resistor of value shown.
■ This value of useful power is measured at load of output circuit.
● Continuous Commercial Service.
●● Intermittent Commercial and Amateur Service.
* Obtained from plate supply of 300 volts through a series resistor of 12500 ohms.

Refer to chart at end of section. **5783**



9A

MEDIUM-MU TWIN TRIODE

5814A

INDUSTRIAL TYPE

Miniature type "Premium" medium-mu twin triode used in a wide variety of applications including mixers, oscillators, multivibrators and synchronizing amplifiers in industrial control equipment. **Outlines section,** 6B; requires miniature 9-contact socket.

	Series	Parallel	
Heater Arrangement			
Heater Voltage (ac/dc)	12.6 ±10%	6.3 ±10%	volts
Heater Current	0.175	0.350	ampere
Heater-Cathode Voltage:			
Peak value	±100 max	±100 max	volts
Direct Interelectrode Capacitances (Approx.)	Unit No. 1	Unit No. 2	
Grid to Plate	1.5	1.5	pF
Grid to Cathode and Heater	1.6	1.6	pF
Plate to Cathode and Heater	0.5	0.4	pF

Class A_1 Amplifier (Each Unit Unless Otherwise Specified)

MAXIMUM RATINGS (Design-Maximum Values)

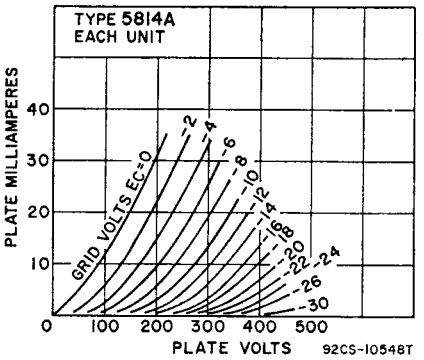
Plate Voltage	330	volts
Cathode Current	22	mA
Plate Dissipation:		
Each Plate	3.0	watts
Both Plates (Both units operating)	6.0	watts
Bulb Temperature (At hottest point on bulb surface)	165	°C

CHARACTERISTICS

Plate Voltage	100	250	volts
Grid Voltage	0	−8.5	volts
Amplification Factor	19.5	17	
Plate Resistance (Approx.)	6250	7700	ohms
Transconductance	3100	2200	μmhos
Plate Current	11.8	10.5	mA
Grid Voltage (Approx.) for plate current of 10 μA	—	−22	volts

MAXIMUM CIRCUIT VALUES

Grid-Circuit Resistance:		
For fixed-bias operation	0.25	megohm
For cathode-bias operation	1	megohm



TYPICAL OPERATION AS RESISTANCE-COUPLED AMPLIFIER

See RESISTANCE-COUPLED AMPLIFIER CHART type 12AU7A conditions

Special Ratings & Performance Data

SHOCK RATING		
Impact Acceleration	600 max.	g
FATIGUE RATING		
Vibrational Acceleration	2.5 max.	g
LOW-FREQUENCY VIBRATION PERFORMANCE		
RMS Output Voltage	100 max.	mV
HEATER-CYCLING LIFE PERFORMANCE		
Cycles of Intermittent Operation	2000 min.	cycles
AUDIO-FREQUENCY NOISE AND MICROPHONIC PERFORMANCE		
RMS Output Voltage	100 max.	mV

5814WA Refer to chart at end of section.