

Beam Power Tube

9-PIN MINIATURE TYPE

For Use in Communications Equipment Operating from 6-Cell Storage-Battery Systems

GENERAL DATA

Electrical:

Heater Characteristics and Ratings:

Voltage range	12 to 15	volts
Current at heater volts = 13.5	0.360	amp
Peak heater-cathode voltage:		
Heater negative with respect to cathode	100 max.	volts
Heater positive with respect to cathode	100 max.	volts

Direct Interelectrode Capacitances:⁰

Grid No.1 to plate	0.15 max.	pf
Grid No.1 to cathode, grid No.3, grid No.2, and heater	10.0	pf
Plate to cathode, grid No.3, grid No.2, and heater	5.5	pf

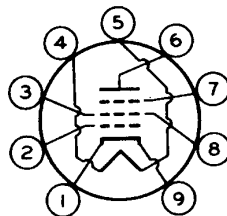
Characteristics, Class A₁ Amplifier:

Heater Voltage	13.5	volts
Plate Voltage	250	volts
Grid No.3	<i>Connected to cathode at socket</i>	
Grid-No.2 Voltage	250	volts
Grid-No.1 Voltage	-18	volts
Mu-Factor, Grid No.2 to Grid No.1	8.7	
Transconductance	5300	μmhos
Plate Current	40	ma
Grid-No.2 Current	3	ma

Mechanical:

Operating Position	Any
Type of Cathode	Coated Unipotential
Maximum Overall Length	2-5/8"
Maximum Seated Length	2-3/8"
Length, Base Seat to Bulb Top (Excluding tip)	2" ± 3/32"
Diameter	0.750" to 0.875"
Dimensional Outline	See <i>General Section</i>
Bulb	T6-1/2
Base	Small-Button Noval 9-Pin (JEDEC No. E9-1)
Basing Designation for BOTTOM VIEW	9LK

- Pin 1 - Cathode
- Pin 2 - Grid No.1
- Pin 3 - Grid No.2
- Pin 4 - Heater
- Pin 5 - Heater



- Pin 6 - Plate
- Pin 7 - Grid No.3
- Pin 8 - Grid No.2
- Pin 9 - Cathode



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Bulb Temperature (At hottest point on bulb surface) 225 max. °C

→ **AF POWER AMPLIFIER & MODULATOR — Class AB₁**♦

Maximum CCS[•] Ratings, Absolute-Maximum Values:

DC PLATE VOLTAGE	375 max.	volts
GRID No.3 (SUPPRESSOR GRID)	0 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	300 max.	volts
MAX.-SIGNAL DC PLATE CURRENT [■]	70 max.	ma
MAX.-SIGNAL PLATE INPUT [■]	21 max.	watts
MAX.-SIGNAL GRID-No.2 INPUT [■]	2 max.	watts
PLATE DISSIPATION [■]	10 max.	watts

Typical CCS Push-Pull Operation:

Values are for 2 tubes

Heater Voltage	13.5	volts
DC Plate Voltage	300	volts
Grid No.3	<i>Connected to cathode at socket</i>	
DC Grid-No.2 Voltage§	250	volts
DC Grid-No.1 Voltage§	-21	volts
Peak AF Grid-No.1-to-Grid-No.1 Voltage	40	volts
Zero-Signal DC Plate Current	40	ma
Max.-Signal DC Plate Current	125	ma
Zero-Signal DC Grid-No.2 Current	2	ma
Max.-Signal DC Grid-No.2 Current	14	ma
Effective Load Resistance (Plate to plate)	5000	ohms
Max.-Signal Driving Power	0	watts
Total Harmonic Distortion	5	%
Max.-Signal Power Output (Approx.)	20.5	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance 0.1 max. megohm

→ **RF POWER AMPLIFIER & OSCILLATOR — Class C Telegraphy†**
and
RF POWER AMPLIFIER — Class C FM Telephony

Maximum Ratings, Absolute-Maximum Values:

	<i>U[†] to 175 Mc</i>		
	CCS [•]	ICAS ^{••}	
DC PLATE VOLTAGE	375 max.	375 max.	volts
GRID No.3 (SUPPRESSOR GRID)	0 max.	0 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	300 max.	300 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-125 max.	-125 max.	volts
DC PLATE CURRENT	70 max.	80 max.	ma
DC GRID-No.2 CURRENT	15 max.	15 max.	ma
DC GRID-No.1 CURRENT	5 max.	5 max.	ma
PLATE INPUT	21 max.	24 max.	watts
GRID-No.2 INPUT	2 max.	2 max.	watts
PLATE DISSIPATION	10 max.	12 max.	watts

→ Indicates a change.



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Typical Operation:

As amplifier at 175 Mc
CCS ICAS

Heater Voltage.	13.5	13.5	13.5	volts
DC Plate Voltage.	250	300	300	volts
Grid No.3	Connected to cathode at socket			
DC Grid-No.2 Voltage ^{□□}	200	200	250	volts
DC Grid-No.1 Voltage ^{⊕⊕}	-40	-42	-55	volts
Peak RF Grid-No.1 Voltage	47	52	62	volts
DC Plate Current.	60	70	80	ma
DC Grid-No.2 Current.	3.7	3.7	5.1	ma
DC Grid-No.1 Current (Approx.).	1.5	2.1	1.6	ma
Driver Power Output (Approx.) ^{▲▲}	1	1	1.5	watts
Useful Power Output (Approx.) [*]	6.5	8.5	10	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance.	0.1 max.	0.1 max.	megohm
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PLATE-MODULATED RF POWER AMPLIFIER — Class C Telephony ←

Carrier conditions per tube for use
with a maximum modulation factor of 1

Maximum Ratings, Absolute-Maximum Values:

Up to 175 Mc

	CCS	ICAS	
DC PLATE VOLTAGE.	300 max.	300 max.	volts
GRID No.3 (SUPPRESSOR GRID)	0 max.	0 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	300 max.	300 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-125 max.	-125 max.	volts
DC PLATE CURRENT.	60 max.	70 max.	ma
DC GRID-No.2 CURRENT.	10 max.	10 max.	ma
DC GRID-No.1 CURRENT.	5 max.	5 max.	ma
PLATE INPUT	15 max.	17.5 max.	watts
GRID-No.2 INPUT	1.4 max.	1.4 max.	watts
PLATE DISSIPATION	7 max.	8 max.	watts

Typical Operation:

At 175 Mc

Heater Voltage.	13.5	13.5	volts
DC Plate Voltage.	250	250	volts
Grid No.3	Connected to cathode at socket		
DC Grid-No.2 Voltage [▲]	250	250	volts
DC Grid-No.1 Voltage [★]	-70	-75	volts
From a grid-No.1 resistor of	33000	33000	ohms
RF Grid-No.1 Voltage.	75	80	volts
DC Plate Current.	60	70	ma
DC Grid-No.2 Current.	2.5	3	ma
DC Grid-No.1 Current (Approx.).	2.1	2.3	ma
Driving Power (Approx.) ^{▲▲}	1	1	watt
Useful Power Output [*]	6.5	7.5	watts

← Indicates a change.



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	CCS	ICAS	
Maximum Circuit Values:			
Grid-No.1-Circuit Resistance. . .	0.1 max.	0.1 max.	megohm

→ **FREQUENCY MULTIPLIER**

Maximum Ratings, Absolute-Maximum Values:

	CCS	ICAS	
DC PLATE VOLTAGE.	375 max.	375 max.	volts
GRID No.3 (SUPPRESSOR GRID) . .	0 max.	0 max.	volts
DC GRID-No.2 (SCREEN-GRID) VOLTAGE	300 max.	300 max.	volts
DC GRID-No.1 (CONTROL-GRID) VOLTAGE	-125 max.	-125 max.	volts
DC PLATE CURRENT.	50 max.	60 max.	ma
DC GRID-No.2 CURRENT.	15 max.	15 max.	ma
DC GRID-No.1 CURRENT.	5 max.	5 max.	ma
PLATE INPUT	13 max.	15 max.	watts
GRID-No.2 INPUT	2 max.	2 max.	watts
PLATE DISSIPATION	10 max.	12 max.	watts

Typical Operation:

As doubler to 175 Mc

Heater Voltage.	13.5	13.5	volts
DC Plate Voltage.	250	250	volts
Grid No.3	<i>Connected to cathode at socket</i>		
DC Grid-No.2 Voltage.	200	250	volts

→ Indicates a change.





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DC Grid-No.1 Voltage [Ⓢ]	-53	-66	volts
From a grid-No.1 resistor of	53000	44000	ohms
Peak RF Grid-No.1 Voltage	60	74	volts
DC Plate Current	50	60	ma
DC Grid-No.2 Current	2.6	3.5	ma
DC Grid-No.1 Current (Approx.)	1	1.5	ma
Driving Power (Approx.) ^{▲▲}	0.4	0.6	watt
Useful Power Output*	3	4.5	watts

As tripler to 175 Mc

Heater Voltage	13.5	13.5	volts
DC Plate Voltage	200	250	volts
Grid No.3	<i>Connected to cathode at socket</i>		
DC Grid-No.2 Voltage	200	250	volts
DC Grid-No.1 Voltage [Ⓢ]	-90	-120	volts
From a grid-No.1 resistor of	50000	70000	ohms
Peak RF Grid-No.1 Voltage	105	130	volts
DC Plate Current	50	60	ma
DC Grid-No.2 Current	3	3.9	ma
DC Grid-No.1 Current (Approx.)	1.85	1.7	ma
Driving Power (Approx.) ^{▲▲}	0.4	0.6	watt
Useful Power Output*	1.4	2.3	watts

Maximum Circuit Values:

Grid-No.1-Circuit Resistance. 0.1 max. 0.1 max. megohm

- Without external shield.
- ◆ Subscript 1 indicates that grid-No.1 current does not flow during any part of the input cycle.
- Continuous Commercial Service.
- Averaged over any audio-frequency cycle of sine-wave form.
- § Obtained preferably from a fixed supply.
- † Key-down conditions per tube without amplitude modulation. Amplitude modulation essentially negative may be used if the positive peak of the audio-frequency envelope does not exceed 115% of the carrier conditions.
- Ⓢ Intermittent Commercial and Amateur Service.
- Obtained preferably from a separate source or from the plate-voltage supply with a voltage divider. If a series resistor is used, it should be adjustable to obtain the desired operating plate current after initial tuning adjustments are completed.
- Ⓢ Obtained from a grid-No.1 resistor or from a combination of grid-No.1 resistor with either fixed supply or cathode resistor.
- ▲▲ Driver stage is required to supply tube losses and rf-circuit losses. The driver stage should be designed to provide an excess of power above the indicated values to take care of variations in line voltage, components, initial tube characteristics, and tube characteristics during life.
- * Measured at load.
- ▲ Obtained preferably from a separate source modulated along with the plate supply, or from the modulated plate supply through a series resistor. It is recommended that this resistor be adjustable to obtain the desired operating plate current after initial tuning adjustments are made.

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* Obtained from a grid-No.1 resistor or from a combination of grid-No.1 resistor with either fixed supply or cathode resistor. The combination of grid-No.1 resistor and fixed supply has the advantage of not only protecting the tube from damage through loss of excitation but also of minimizing distortion by bias-supply compensation.

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

	Note	Min.	Max.	
Heater Current.	1	0.33	0.39	amp
Transconductance.	1,2	4200	6400	μ mhos
Plate Current	1,2	30	50	ma
Plate Current	1,3	-	50	μ a
Grid-No.2 Current	1,2	-	7.5	ma
Reverse Grid-No.1 Current	1,4	-	2	μ a
Heater-Cathode Leakage Current:				
Heater negative with				
respect to cathode.	1,5	-	20	μ a
Heater positive with				
respect to cathode.	1,5	-	20	μ a
Leakage Resistance:				
Between grid No.1 and all other				
electrodes tied together.	1,6	100	-	megohms
Between plate and all other				
electrodes tied together.	1,7	100	-	megohms

Note 1: With 13.5 volts ac or dc on heater.

Note 2: With plate voltage of 250 volts, grid No.3 connected to cathode, grid-No.2 voltage of 250 volts, and grid-No.1 voltage of -18 volts.

Note 3: With plate voltage of 250 volts, grid No.3 connected to cathode, grid-No.2 voltage of 250 volts, and grid-No.1 voltage of -48 volts.

Note 4: With plate voltage of 180 volts, grid No.3 connected to cathode, grid-No.2 voltage of 250 volts, grid-No.1 resistor of 0.1 megohm, and cathode resistor of 170 ohms.

Note 5: With 100 volts dc between heater and cathode.

Note 6: With grid No.1 100 volts negative with respect to all other electrodes tied together.

Note 7: With plate 300 volts negative with respect to all other electrodes tied together.

SPECIAL RATINGS & PERFORMANCE DATA

Heater-Cycling Life Performance:

This test is performed on a sample lot of tubes from each production run. A minimum of 2000 cycles of intermittent operation is applied under the following conditions: Heater voltage of 17 volts cycled one minute on and two minutes off, heater = 135 volts negative with respect to cathode, and all other elements connected to ground. At the end of this test, tubes are checked for heater-cathode shorts and open circuits.

Low-Frequency Vibration Performance:

This test is performed on a sample lot of tubes from each production run under the following conditions: Heater



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voltage of 13.5 volts, plate voltage of 250 volts, grid-No.2 voltage of 250 volts, grid-No.1 voltage of -18 volts, plate load resistor of 2000 ohms, and vibrational acceleration of 2.5 g at 25 cps. In this test, the rms output voltage must not exceed 200 millivolts.

500-Hour Intermittent Life Performance:

This test is performed on a sample lot of tubes from each production run to insure high quality of the individual tube and to guard against epidemic failures. Life testing is conducted under the following conditions: Heater voltage of 15 volts and at maximum rated plate dissipation and grid-No.2 input.

CURVES

shown under Type 7558 also apply for the 7551
with the exception that $E_f = 13.5$ volts