



ADVANCE DATA

MECHANICAL DATA

Bulb	T-3
Base	E8-10, Subminiature Button
Outline	See Drawing
Basing	8LT
Cathode	Coated Unipotential
Mounting Position	Any

RATINGS¹

Bulb Temperature (Measured per JEDEC pub. J0-H1)	+180 °C
Operational Altitude	80,000 Ft.
Radiation Environment	
Total Dosage - (Neutrons/Sq. Cm)	10 ¹⁶ nvt
Dose Rate - (Neutrons/Sq. Cm/Sec.)	10 ¹² nv

DURABILITY CHARACTERISTICS²

Impact Acceleration ³	500 G
Vibration Acceleration for an Extended Period ⁴	10 G
On - Off Heater Cycles ⁵	2000

ELECTRICAL DATA

HEATER CHARACTERISTICS

	Parallel ¹⁴	Series ¹⁵
Heater Voltage	6.3	12.6 Volts
Heater Current	380	190 mA
Maximum Heater-Cathode Voltage (Peak)		200 Volts

CONTROLLED DETRIMENTS

Minimum Interelectrode Insulation ⁶	100 Megohms
Maximum Total Grid Current ⁷	-0.5 μ A _{dc}
Maximum Vibration Output as Equivalent Grid Voltage ⁸	5.3 mVac
Maximum Heater-Cathode Leakage ⁹	10.0 μ A _{dc}

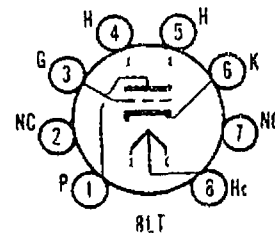
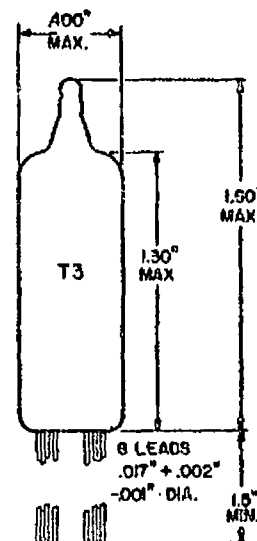
DIRECT INTERELECTRODE CAPACITANCES

Shielded¹⁰

Grid to Plate	1.9 pf
Input: g to (h+k)	7.0 pf
Output: p to (h+k)	3.2 pf

QUICK REFERENCE DATA

The Type 8213 is a sub-miniature medium mu triode intended primarily for cathode follower applications. It is characterized by long life and stable performance under conditions of high altitude, severe shock, vibration, and high temperature. The 8213 is manufactured and inspected to meet the applicable MIL-E 1 specifications.

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ELECTRONIC TUBESA Division of
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OPERATIONS
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RATINGS¹ (Absolute Values)

Maximum Heater Voltage Variation	±10% Volts
Maximum Plate Voltage	300 Vdc
Maximum Cathode Current	50 mA _{dc}
Maximum Negative Grid Voltage	-40 Volts
Maximum Plate Dissipation	5.0 Watts
Maximum Grid Circuit Resistance	0.5 Meg

Pulse Service (See Chart)

	+5.0
Maximum Heater Voltage Variation	-0 Percent
Maximum Negative Grid Voltage	-40 Vdc
Maximum Plate Dissipation	5.0 W
Maximum Average Plate Voltage	150 Vdc
Maximum Instantaneous Forward Plate Voltage ¹³	300 v
Maximum Instantaneous Heater to Cathode Voltage	100 v
Maximum Grid Dissipation	0.3 W
Maximum Instantaneous Grid to Cathode Voltage	±50 v

AVERAGE CHARACTERISTICS

Heater Voltage	12.6 V
Plate Voltage	105 Vdc
Grid Voltage	0 Vdc
Cathode Resistor	75 Ohms
Plate Current	23 mA _{dc}
Transconductance	23,000 μ mhos
Amplification Factor	31
Grid Voltage for $I_b = 10 \mu A$ (Max.)	-6.0 Vdc
Plate Resistance (Approx.)	1348 Ohms
Plate Current ¹¹ : With $E_f = 12.6 V$; $E_b = 105 Vdc$; $E_c = -20 Vdc$; $P_{rr} = 10,000 pps$; $t_p = 10 \mu sec.$; $egk = 0 V$.	80 mA _{dc}
Pulse Cathode Current: With $E_f = 12.6 V$; $E_b = 150 Vdc$; $E_c = -30 Vdc$; $egk = +40 V$ (Measured between grid and cathode pins); $t_p = 10 \mu sec.$; $prf = 1,000 pps$; duty cycle = 1.0%.	1700 ma
Minimum Pulse Plate to Cathode Currents Ratio ¹²	0.7
Equivalent Noise Resistance (at 50 Mc)	250 Ohms
Hot Input Capacitance (at 50 Mc)	12 pf

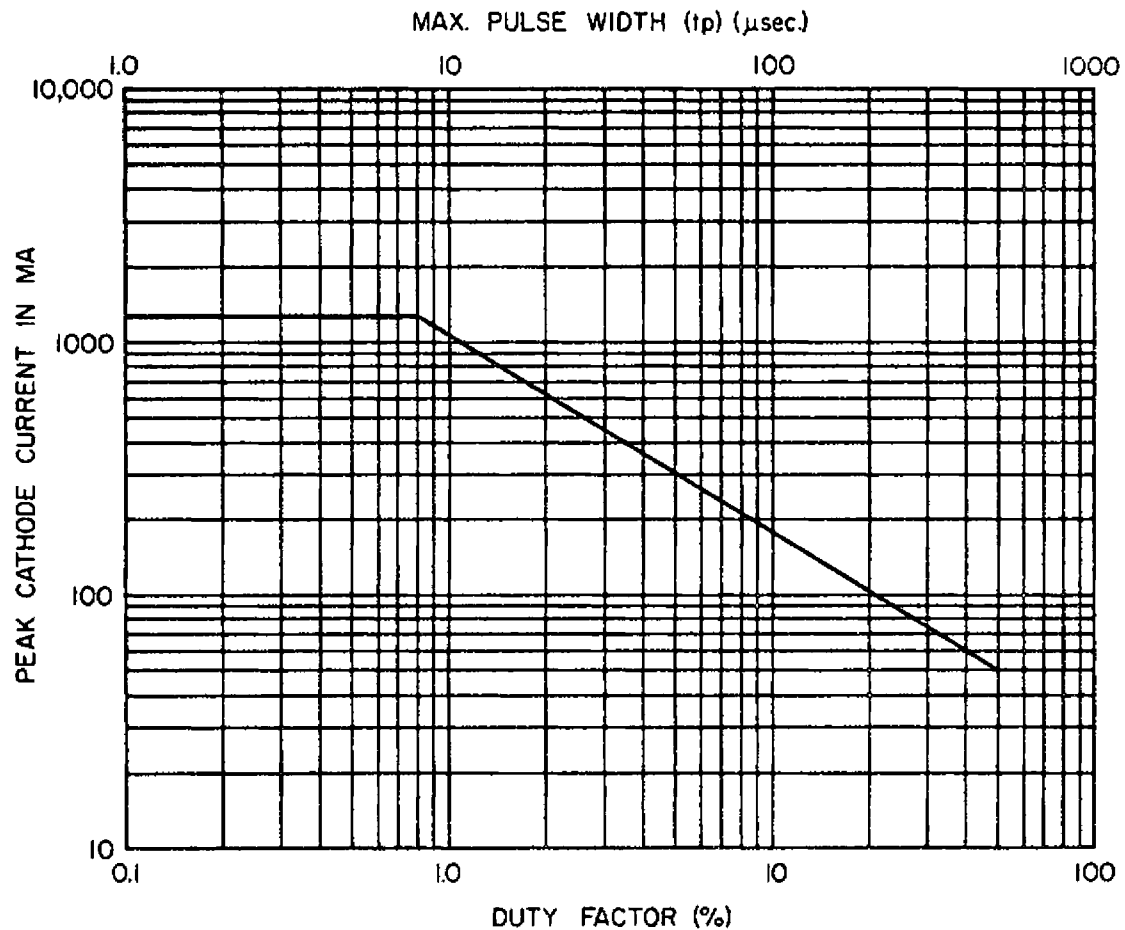
NOTES:

1. Limiting values beyond which normal tube life and normal tube performance may be impaired.
2. Tests performed as a measure of the mechanical durability of the tube structure.
3. Force as applied in any direction by the Navy Type High Impact (Flyweight) Shock Machine for Electronic Devices. Shock duration = $3/4$ milliseconds.

NOTES: (Cont.)

4. Vibrational forces applied in any direction for a period of 6 hours over the range 30 cps to 3000 cps.
5. One cycle consists of the application of $E_f = 15$ V for one minute and interruption of the filament voltage for four minutes. A voltage of $E_{hk} = 140$ Vac is applied continuously.
6. Measure with $E_f = 12.6$ V; $E_g\text{-all} = -100$ Vdc; $E_p\text{-all} = -300$ Vdc; Cathode is positive so that no cathode emission occurs.
7. Measure with $E_f = 12.6$ V; $E_c = 0$ Vdc; $E_b = 105$ Vdc; $R_k = 75$ Ohms.
8. Test with $E_f = 12.6$ V; $E_b = 150$ Vdc; $E_c = 0$ Vdc; $R_k = 75$ Ohms; $R_p = 2000$ Ohms; $F = 40$ cps; $Acc = 15$ g; $C_k = 1000$ μ f.
9. Measure with $E_f = 12.6$ V; $E_{hk} = \pm 100$ Vdc.
10. Capacitances are measured with external shield No. 318.
11. Measured by method using recurrent wave form. Grid pulse is square wave producing specified egk directly at grid terminal with respect to cathode. Plate current is measured by high impedance oscilloscope or equivalent device connected across 1 ohm resistor in plate circuit.
12. Grid pulse is square wave. Peak currents measured using high impedance oscilloscope or equivalent device connected across a cathode or plate resistor of 1.0 ohms.
13. Applies only to the spike occurring at the leading edge of the plate waveform. The spike duration must be limited to 0.1 of t_p .
14. Heater parallel connected, tie pins 4 and 5 together, use center tap pin 8.
15. Heater series connected, use pins 4 and 5.

RATING CHART



C63004

RATING CHART INTERPRETATION

The area below and to the left of the line establishes permissible peak cathode current for duty factors up to 50 percent. At duty factors greater than 50 percent the maximum average DC current of 50 milliamperes shall be the rating. One thousand two hundred fifty milliamperes is the maximum peak cathode current rating at any duty factor below 0.8 percent. Duty factor is defined as the ratio of the average current to the maximum peak current occurring in any 1000 microsecond period.