

MECHANICAL DATA

Bulb	T-3
Base	E8-10, Subminiature Button Flexible Leads
Outline	JETEC 3-1
Basing	8EX
Cathode	Cold
Mounting Position	Any

RATINGS¹ (Absolute Maximum)

Impact Acceleration	450 G	
Uniform Acceleration	1000 G	
Fatigue (Vibrational Acceleration for Extended Periods)	2.5 G	
Bulb Temperature	150° C	Max.
	-55° C	Min.
Altitude	80000 Ft.	

ELECTRICAL DATA

RATINGS¹ & ² (Absolute Values)

Ambient Light Ionization Voltage	115 Vdc	Min.
Total Darkness Ionization Voltage	140 Vdc	Min.
Operating Current	3.5 mAdc	Max.
Operating Current	1.5 mAdc	Min.
Shunting Capacitance	0.02 μ f	Max.

CHARACTERISTICS

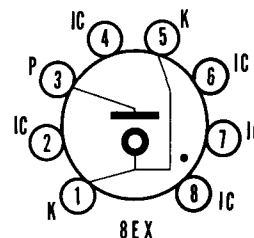
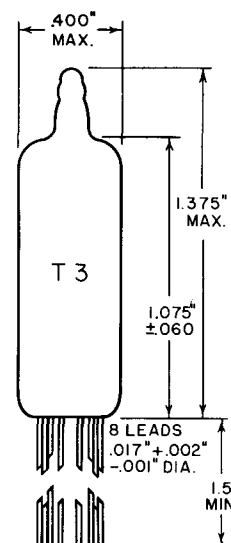
Operating Voltage ³ (Approx.)	86 Vdc	
Voltage Regulation	3 Vdc	Max.
Drift ⁴	200 mVdc	
Stability ⁵	5 mv pk-pk Max.	
Repeatability ⁶	150 mVdc	
Voltage Jump ⁷	5.0 mv pk-pk Max.	
Average Temperature Coefficient of Operating Voltage		
-20°C to +25°C Ambient	-15 mVdc/°C Max.	
+25°C to +60°C Ambient	-5 mVdc/°C Max.	

NOTES:

1. Limitations beyond which normal tube performance and tube life may be impaired.
2. Values shown are as registered with RETMA.
3. The anode voltage drop may range between 83 and 89 volts for any single tube.
4. The maximum operating voltage change during one hour of operation, at any specific value of current within the operating range.
5. The maximum operating voltage fluctuation having a frequency of 10 cps or greater, at any specific value of current within the operating range.
6. The maximum shift in operating voltage between successive firings of the tube.
7. The maximum sudden jump in operating voltage when operating current is varied slowly over the specified operating range.
8. Internal connection. DO NOT USE.

QUICK REFERENCE DATA

The Premium Subminiature Type 6308 is a cold cathode, gas filled, glow discharge tube designed for use as a voltage reference tube in electronically regulated power supplies. It is capable of operation under conditions of severe shock, vibration, high temperature and high altitude. The Sylvania Type 6308 is manufactured and inspected to meet the applicable specification for reliable operation.



SYLVANIA ELECTRIC
PRODUCTS INC.,

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EMPORIUM, PA.

Prepared and Released By The
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ACCEPTANCE CRITERIA

Test Conditions

Plate Supply Voltage Note 1 150 Vdc

For the purposes of inspection, use applicable reliable paragraphs of MIL-E-1 and Inspection Instructions for Electron Tubes.

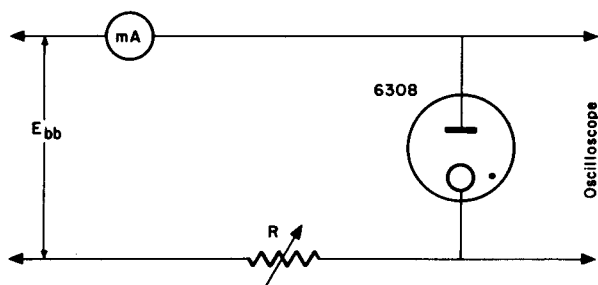
MIL-E-1 Ref.	Test	AQL (%)	Limits					Units
			Min.	LAL	Bogey	UAL	Max.	
Acceptance Tests—Group A								
4.9.20.6	Fatigue: Note 6	6.5	—	—	—	—	—	
4.9.20.5	Shock: Hammer Angle = 30°; No Voltages.....	—	—	—	—	—	—	
— — —	Post Shock and Fatigue Test End Points:							
	Ionization Voltage (1) (1) Ez	—	—	—	—	—	115	Vdc
	Tube Voltage Drop (1) (1) Etd	—	81	—	—	—	91	Vdc
	Tube Voltage Drop (2) (2) Etd	—	81	—	—	—	91	Vdc
	Regulation (1) Reg	—	—	—	—	—	4.0	Vdc
Acceptance Tests—Group B								
4.9.5.3	Subminiature Lead Fatigue:.....	2.5	4	—	—	—	—	arcs
4.9.6.3	Glass Strain:.....	6.5	—	—	—	—	—	
Acceptance Tests—Group C								
4.7.5	Continuity and Short:.....	0.4	—	—	—	—	—	
Acceptance Tests—Group D—Note 2								
4.13.1	Ionization Voltage (1): Ez Rp/Ib = 1.5 to 3.5 mAdc; Illumination = 5 to 50 foot candles.....	0.65	—	—	—	—	115	Vdc
4.13.2	Tube Voltage Drop (1): Etd Rp/Ib = 1.5 mAdc.....	0.65	83	—	—	—	—	Vdc
4.13.2	Tube Voltage Drop (2): Etd Rp/Ib = 3.5 mAdc.....	0.65	—	—	—	—	89	Vdc
4.13.2.1	Regulation (1): Reg (2) Etd — (1) Etd.....	0.65	1.5	—	—	—	3.0	Vdc
— — —	Voltage Jump: Note 3.....	0.65	—	—	—	—	5.0	mv pk-pk
Acceptance Tests—Group E								
4.13.4.3	Noise: RL = 500 Ohms; Ebb/Ib = 3.5 mAdc.....	1.0	—	—	—	—	20	mVac
4.13.4.2	Oscillation: RL = 500 Ohms; Esig = 100 mVac.....	1.0	—	—	—	—	—	
4.9.19.1	Vibration (2): Rp = 10,000 Ohms; Ebb/Ib = 3.5 mAdc.....	2.5	—	—	—	—	50	mVac
Acceptance Tests—Group F								
4.13.1	Ionization Voltage (2): Note 4 Ez Rp/Ib = 1.5 to 3.5 Vdc.....	6.5	—	—	—	—	140	Vdc
4.13.3	Leakage Current: LIb Eb = 50 Vdc; Rp = 3000 Ohms.....	6.5	—	—	—	—	20	μAdc
4.13.2	Tube Voltage Drop (3): Etd Rp/Ib = 2.5 mAdc.....	6.5	84	—	—	—	88	Vdc
Acceptance Tests—Group G								
4.9.1	Visual Inspection:.....	—	—	—	—	—	—	

ACCEPTANCE CRITERIA (Continued)

MIL-E-I Ref.	Test	AQL (%)	Allowable Defectives per Characteristic		Limits		Units
			1st Sample	Combined Samples	Min.	Max.	
Acceptance Life Tests							
4.11.3.1	Stability Life Test: (1 Hour) Rp = 24,000 Ohms; Ebb = 135 Vdc; TA = Room.....	—	—	—	—	—	mVdc
4.11.3.1	Stability Life Test End Points: Δ Tube Voltage Drop (3) Δ Etd(3).....	6.5	—	—	—	200	
4.11.3.1 4.11.3.1.1	Survival Rate Life Test: (100 Hours) Stability Life Test Conditions or Equivalent; TA = Room.....	—	—	—	—	—	
— — — —	Survival Rate Test End Points: Inoperatives.....	0.65	—	—	—	—	Vdc
4.11.3.1 4.11.5	Δ Tube Voltage Drop (3) Δ Etd(3).....	6.5	—	—	—	1.0	
4.11.3.1 4.11.5	Intermittent Life Test (1): Note 5 Stability Life Test Conditions; T Envelope = +150°C min.....	—	—	—	—	—	
4.11.3.1 4.11.4	Intermittent Life Test (1) End Points: (500 Hours)	—	—	—	—	—	Vdc
	Inoperatives.....	—	1	3	—	—	
	Regulation (1).....	—	1	3	—	4.0	
	Tube Voltage Drop (1) Etd.....	—	1	3	81	91	
	Tube Voltage Drop (2) Etd.....	—	1	3	81	91	
	Tube Voltage Drop (3) Etd.....	—	1	3	84	89	
	Δ Tube Voltage Drop (3) Change of Individual Tubes from Initial Δ Etd.....	—	1	3	—	4	
	Ionization Voltage (5) Ez.....	—	1	3	—	115	
	Total Defectives.....	—	4	8	—	—	

ACCEPTANCE CRITERIA NOTES:

- 1: A fixed resistor may be used with Ebb being varied to give the desired current.
- 2: The AQL for the combined defectives for attributes in Group D shall be one (1) percent. A tube having one (1) or more defects shall be counted as one (1) defective.
- 3: Voltage jump test:



The current shall be varied slowly (by adjusting R) from 1.5 mA to 3.5 mA and back to 1.5 mA at least three times. Sudden voltage jumps as registered on the oscilloscope shall be no greater than the maximum limit specified herein.

- 4: Testing shall be done with the tubes in total darkness and the tubes shall not have conducted or been exposed to light for at least twenty-four hours prior to testing.
- 5: Envelope temperature is defined as the highest temperature indicated when using a thermocouple of #40 BS or smaller diameter elements welded to a ring of 0.025 inch diameter phosphor bronze placed in contact with the bulb. Envelope temperature requirement will be satisfied if a tube, having bogey Ib ($\pm 5\%$) under normal test conditions, is determined to operate at maximum specified temperature at any position on the life test rack.
- 6: This shall be considered a destructive test.

APPLICATION DATA

The Premium Subminiature Type 6308 is a cold cathode, gas filled, glow discharge tube designed for service as a voltage reference tube in electronically regulated power supplies. It has an operating current range of 1.5 to 3.5 ma over which a substantially constant operating voltage of 87 volts is maintained. The anode voltage drop from tube to tube, however, may range between 82 and 92 volts. The maximum sudden voltage jump, when the current is varied slowly over the specified operating range, is 50 mv.

Two cathode leads are provided which may be used to disconnect the load when the tube is removed from its socket. Pins 2, 4, 6, 7, and 8 should not be used as external circuit tie points. These leads extend through the base into the bulb and may, therefore, influence tube operation if connected to a voltage source.

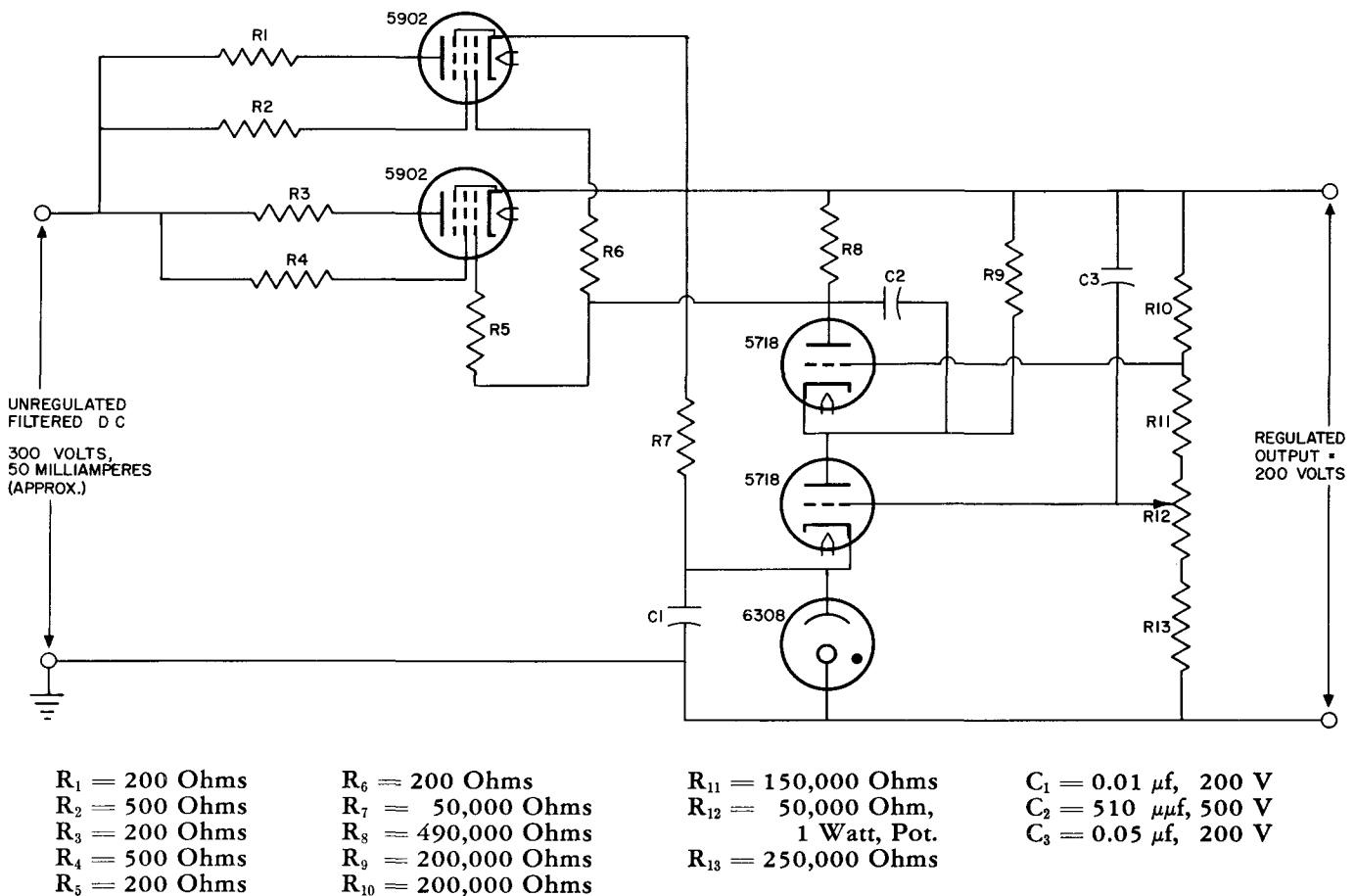
A typical electronic voltage regulator circuit, employing the 6308 as a reference tube, is shown in the accom-

panying diagram. This circuit also employs Sylvania subminiature Types 5902 and 5718.

The 6308 is manufactured and inspected to meet the applicable MIL-E-1 specification for reliability and is characterized by long life and stable operation under conditions of severe shock, vibration, high altitude and high temperature.

Life expectancy is described by the life tests, specified on the attached pages and/or individual MIL-E-1 specifications. The actual life expectancy of the tubes in an operating circuit is affected by both the operating and environmental conditions involved. Likewise, the life tests specified indicate performance under certain operating criteria to a set of specified end points. Performance at conditions other than those specified can usually be estimated only roughly as giving better or poorer life expectancy. For further discussion of life expectancy, reference should be made to the frontal section of this manual.

ELECTRONIC VOLTAGE REGULATOR EMPLOYING THE TYPE 6308.



All resistors are 0.5 watt, except the potentiometer.

The information presented on this data sheet is furnished without assuming any obligation.

AVERAGE PLATE CHARACTERISTICS

