5787 WA
Bendix Type TD-63

RELIABLE SUB-MINIATURE VOLTAGE REGULATOR

DESCRIPTION

This tube is a gas filled, cold cathode, subminiature voltage regulator, Type 5787 WA. The construction of this tube is such that it will withstand conditions of severe shock and vibration. The tube is characterized by long life and is designed to operate under conditions of high temperature. This tube may be soldered directly into any circuit and is particularly adaptable where space is of prime importance.

ELECTRICAL RATINGS

Anode Supply Voltage	140 Vdc min.
Ionization Voltage	135 Vdc max.
(For Ionization Voltage Distributions, See Fig. 2)	
Operating Voltage Range	95 - 103 Vdc
(For Operating Voltage Distributions, See Fig. 1)	
Operating Current Range	5 - 25 mAdc
Vibration Output (40 cps, 15G)	50 mVac max.
Shock (30° Hammer Angle)	
Fatigue (96 hrs., 2.5G, 25-60 cps)	
Ambient Temperature Range	−55°C to +150°C
Maximum Bulb Temperature	+225°C

OPERATING NOTES

Attention should be given to the bulb temperature at which the tubes are to be operated. Reliability will be impaired if the maximum bulb temperature is exceeded. There are several requirements in the operation of a glow discharge tube, like the 5787 WA/TD-63, which must be adhered to carefully. The first is that the supply voltage must always be greater than the anode breakdown voltage. The second condition is that sufficient resistance must always be in series with the tube to limit the current to the minimum and maximum values specified in the ratings.

PHYSICAL CHARACTERISTICS

- *Envelope:* T-3.
- *Base:* Pressed Stem: (.016" tinned flexible leads. Spacing 0.096" center to center. Length 1.5" minimum)
- *Terminal Connections:* Lead 1, Cathode; Lead 3, anode, Lead 5, cathode.
- *Maximum Bulb Dia.:* 0.400".
- *Maximum Sealed Bulb Height:* 2.063".
- *Mounting Position:* Any.

THE Bendix CORPORATION
Red Bank DIVISION, EATONTOWN, NEW JERSEY

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ELECTRICAL CHARACTERISTICS & TEST CONDITIONS

RATINGS	Total Darkness Ionization Voltage	Ambient Light Ionization Voltage	Operating Voltage	Operating Current	T Envelope	Alt	TA
Absolute	Vdc	Vdc	Vdc	mAdc	°C	ft	°C
Maximum	—	—	98	25	+225	60,000	+150
Minimum:	141	141	—	5	—	—	−55
Test Cond.:	—	—	—	—	—	—	—

Cathode: Glow Discharge
Base: Subminiature 5 Pin with Long Leads

Pin No.:	1	2	3	4	5
Element:	k	nc	p	nc	k

The following tests shall be performed:

MEASUREMENTS ACCEPTANCE TESTS PART 1 NOTE 1

Ref.	Test	Conditions	AQL (%)	Insp. Level or Code	Sym.	LIMITS Min.				LIMITS Max.		Units
4.13.1	†Ionization Voltage(1):	Ebb/Ib = 5 — 25 mAdc: Illumination = 5 — 50 ft. candles	0.65	II	Ez:	—	—	—	—	135	—	Vdc
4.13.2	Tube Voltage Drop(1):	Ebb/Ib = 25 mAdc	0.65	II	Etd:	95	—	—	—	103	—	Vdc
4.13.2	Tube Voltage Drop(2):	Ebb/Ib = 5 mAdc	0.65	II	Etd:	95	—	—	—	103	—	Vdc
4.13.2.1	Regulation:	(1)Etd — (2)Etd	0.65	II	Reg:	—	—	—	—	±3	—	Vdc
4.7.5	Continuity and Shorts: (Inoperatives)		0.4	II		—	—	—	—	—	—	
4.9.1	Mechanical:	Envelope Outline No. 8-7 Except Dimension A = 2.063 max. Dimension B = 1.813 ± 0.100				—	—	—	—	—	—	

MEASUREMENTS ACCEPTANCE TESTS PART 2

4.13.4.3	Noise:	Ebb/Ib = 25 mAdc	1.0	I	Eb:	—	—	—	—	20	—	mVac
4.13.4.2	Oscillation:	Esig = 100 mVac; RL = 500 Ω Ebb/Ib = 5 — 25 mAdc	1.0	I		—	—	—	—	—	—	
4.13.1	Ionization Voltage(2):	Note 2	6.5	Code G	Ez:	—	—	—	—	141	—	Vdc
4.13.3	Leakage:	Eb = 50 Vdc; Rp = 3000 Ω	6.5	Code G	Ilb:	—	—	—	—	5	—	uAdc
—	Repeatability:	Ebb/Ib = 10 mAdc; Note 3	6.5	Code E	△Etd:	—	—	—	—	1.0	—	Vdc
4.9.19.1	Vibration(2):	Rp = 10,000 Ω; Ebb/Ib = 25 mAdc; F = 40 cps; G = 15	6.5	Code G	Ep:	—	—	—	—	50	—	mVac

DEGRADATION RATE ACCEPTANCE TESTS

4.9.5.3	Subminiature Lead Fatigue		2.5	Code G		4	—	—	—	—	—	arcs
4.9.20.5	Shock:	Hammer Angle = 30°;	—	—	—	—	—	—	—	—	—	
4.9.20.6	Fatigue:	G = 2.5; Fixed Frequency; F = 25 min., 60 max.	6.5			—	—	—	—	—	—	
—	Post Shock and Fatigue Test End Points:	Vibration(2)	—	—	Ep:	—	—	—	—	100	—	mVac
		Ionization Voltage(1)	—	—	Ez:	—	—	—	—	141	—	Vdc
		Tube Voltage Drop(1)	—	—	Etd:	95	—	—	—	105	—	Vdc
		Tube Voltage Drop(2)	—	—	Etd:	95	—	—	—	105	—	Vdc
		Regulation	—	—	Reg.	—	—	—	—	±4.0	—	Vdc
—	Glass Strain		2.5	I		—	—	—	—	—	—	

ACCEPTANCE LIFE TESTS

Ref.	Test	Conditions	AQL (%)	Insp. Level or Code	Allowable Defective per Characteristic		Sym.	LIMITS		Units
					1st Sample	Combined Samples		Min.	Max.	
—	Stability Life Test (1 hour)	Ebb/Ib = 25 mAdc; TA = Room	6.5	Code I	—	—		—	—	
4.11.4	Stability Life Test End Points:	Change in Tube Voltage Drop(1) of individual tubes	—	—	—	—	△Etd: t	—	1.0	Vdc
		Change in Tube Voltage Drop(2) of individual tubes	—	—	—	—	△Etd: t	—	1.0	Vdc
—	Survival Rate Life Test: (100 hours)	Stability Life Test Conditions or equivalent	—	II	—	—		—	—	
4.11.4	Survival Rate Life Test End Points:	Continuity and Shorts (Inoperatives)	0.65	—	—	—		—	—	
		Change in Tube Voltage Drop(1) of individual tubes	6.5	—	—	—	△Etd: t	—	1.0	Vdc
		Change in Tube Voltage Drop(2) of individual tubes	6.5	—	—	—	△Etd: t	—	1.0	Vdc
4.11.5	Intermittent Life Test:	Stability Life Test Conditions; T Envelope = 225°C min.	—	—	—	—		—	—	
4.11.4	Intermittent Life Test End Points: (500 hours)	Inoperatives	—	—	1	3		—	—	
		Regulation	—	—	1	3	Reg:	—	±5.0	Vdc
		Tube Voltage Drop(1)	—	—	1	3	Etd:	95	105	Vdc
		Tube Voltage Drop(2)	—	—	1	3	Etd:	95	105	Vdc
		Change in Tube Voltage Drop(1) of individual tubes	—	—	1	3	△Etd: t	—	3	%
		Change in Tube Voltage Drop(2) of Individual tubes	—	—	1	3	△Etd: t	—	3	%
		Ionization Voltage(1)	—	—	1	3	Ez:	—	141	Vdc
		Total Defectives	—	—	4	8		—	—	
4.11.4	Intermittent Life Test End Points: (1000 hours)	Inoperatives	—	—	2	5		—	—	
		Regulation	—	—	2	5	Reg:	—	±6.0	Vdc
		Tube Voltage Drop(1)	—	—	2	5	Etd:	95	105	Vdc
		Tube Voltage Drop(2)	—	—	2	5	Etd:	95	105	Vdc
		Change in Tube Voltage Drop(1) of individual tubes	—	—	2	5	△Etd: t	—	4	%
		Change in Tube Voltage Drop(2) of individual tubes	—	—	2	5	△Etd: t	—	4	%
		Ionization Voltage(1)	—	—	2	5	Ez:	—	141	Vdc
		Total Defectives	—	—	5	10		—	—	

Note 1: Characteristic Quality Control Test Procedures, Inspection Levels, and Inspection Instructions are made according to the appropriate paragraphs of MIL-E-1, and MIL-STD-105A.

Note 2: Conditions for this test shall be those of Ionization Voltage (1) except testing shall be done in total darkness and the tube shall not have conducted or have been exposed to light for at least 24 hours prior to testing.

Note 3: Repeatability shall be defined as the maximum shift in tube voltage drop between successive firings of the tube. The tube shall be tested in the following manner.

a. Etd shall be read at 10 mAdc drain.
b. The tube shall be turned off for one (1) minute.
c. The tube shall be re-started and operated at the same current.
d. Etd shall be read after one (1) minute of operation.
e. The on-off cycle shall be repeated a minimum of five times. The range of Etd shall be taken as the measure of repeatability.

AVERAGE CHARACTERISTICS

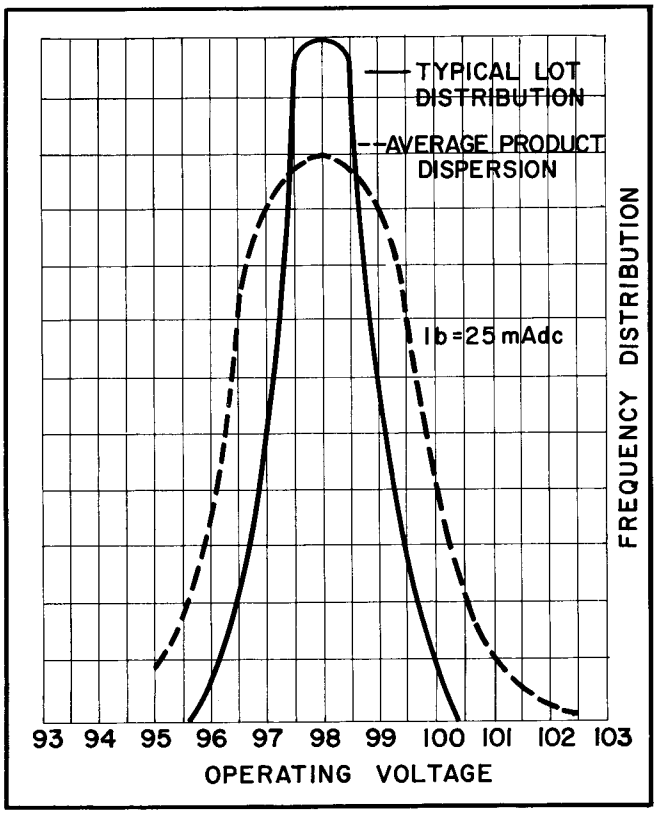


FIG. 1

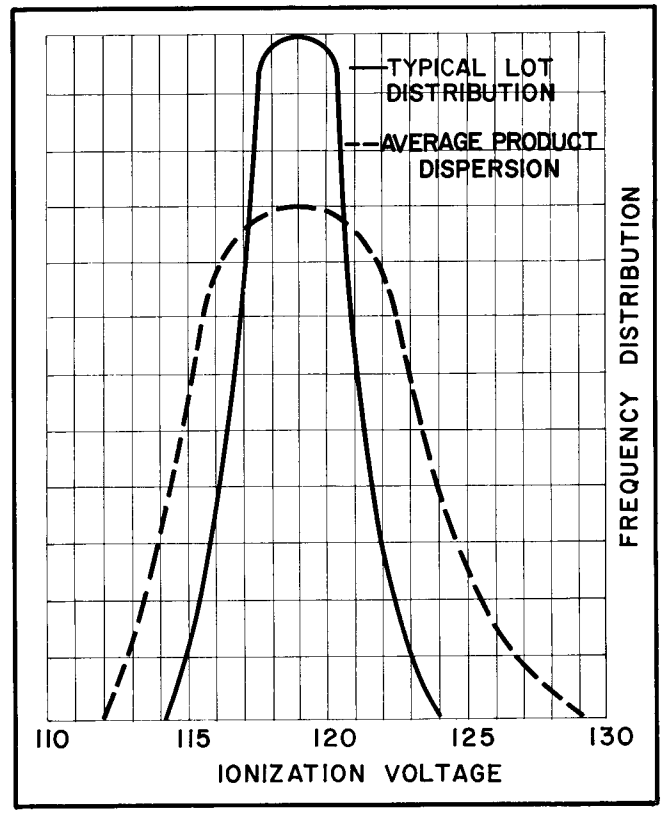


FIG. 2

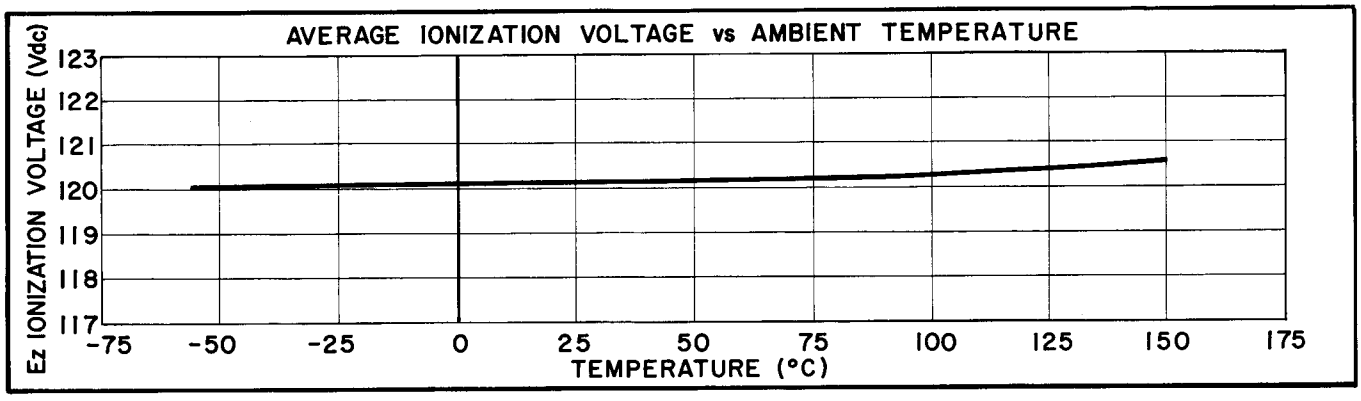


FIG. 3

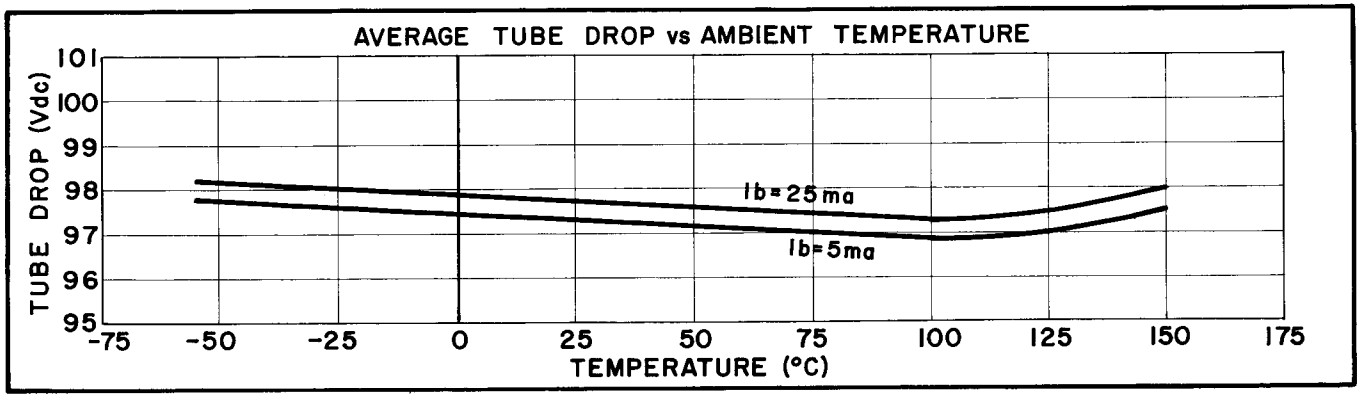


FIG. 4

AVERAGE CHARACTERISTICS

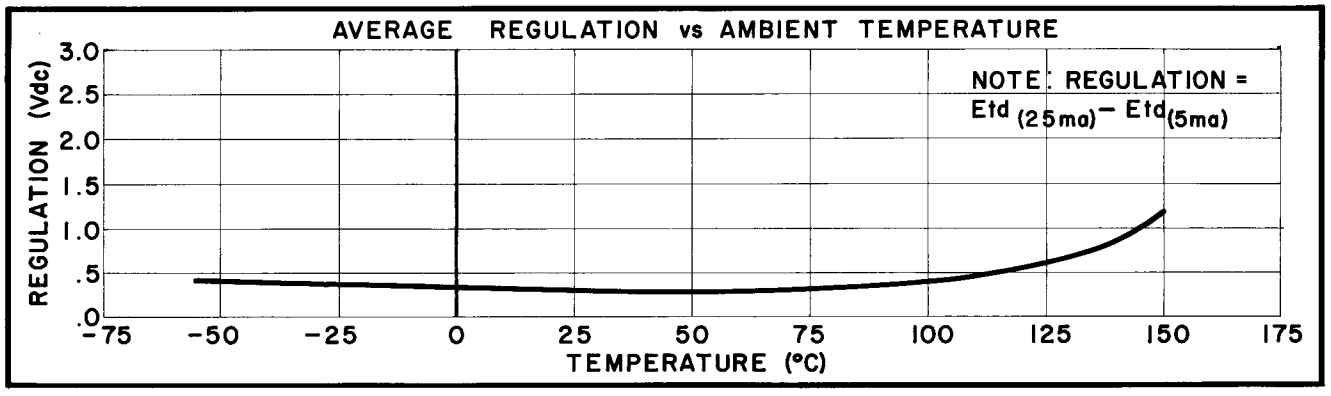
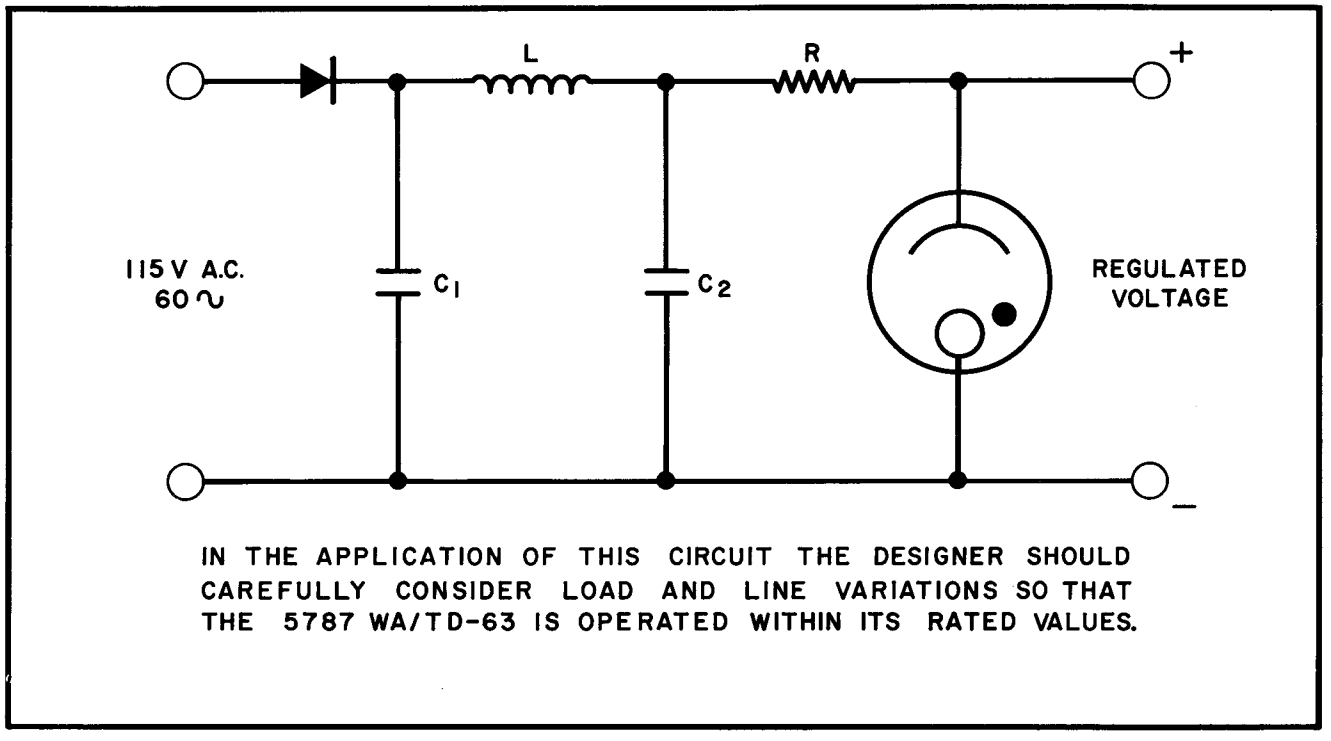


FIG.5



TYPICAL APPLICATION CIRCUIT FOR USE DIRECTLY FROM 110V AC LINE.
FIG.6

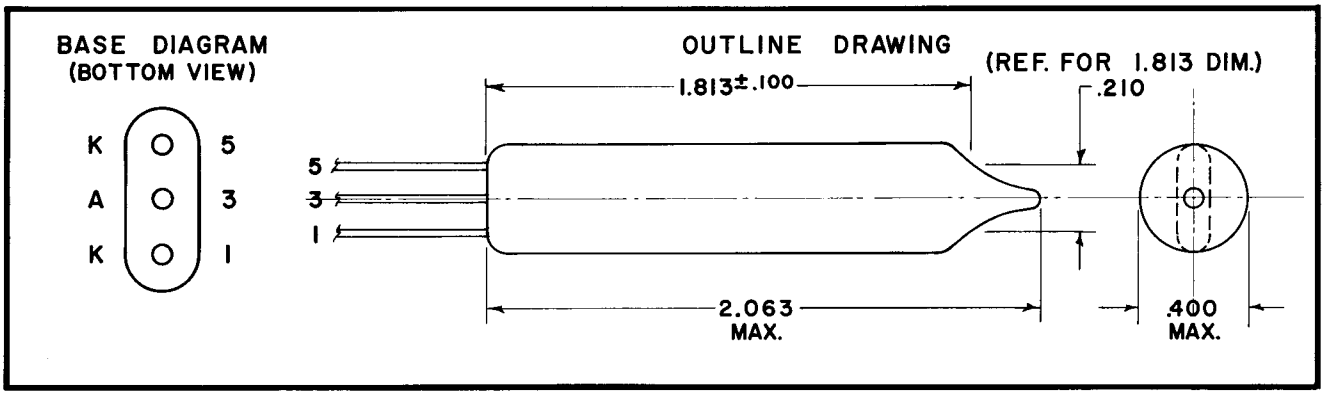


FIG. 7

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