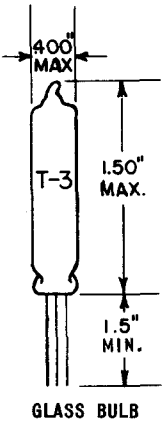


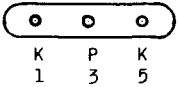
TUNG-SOL

DIODE
SUBMINIATURE TYPE



COLD-CATHODE GLOW DISCHARGE

ANY MOUNTING POSITION



BOTTOM VIEW

0.046" TINNED
FLEXIBLE LEADS

0.1" CENTER TO CENTER

THE 5783WA IS A SUB-MINIATURE TWO ELECTRODE INERT-GAS-FILLED, COLD CATHODE GLOW DISCHARGE DIODE FOR USE AS A VOLTAGE REFERENCE TUBE IN ELECTRONIC REGULATED SUPPLIES. IT HAS AN OPERATING VOLTAGE OF APPROXIMATELY 86 VOLTS OVER A CURRENT RANGE OF 1.5 TO 3.5 MILLIAMPERES. THIS TUBE IS IDEALLY SUITED FOR APPLICATIONS IN WHICH SUDDEN FLUCTUATIONS MUST BE KEPT BELOW 5 MILLIVOLTS OVER THE ENTIRE RANGE AND WHICH REQUIRE VERY LOW OPERATING VOLTAGE DRIFT AND LONG LIFE.

THE 5783WA FEATURES HIGH SHOCK AND VIBRATION RATINGS. IT IS PARTICULARLY SUITABLE FOR APPLICATIONS REQUIRING SMALL SIZE AND LIGHT WEIGHT COMPONENTS.

ELECTRICAL DATA

CATHODE

COLD

MECHANICAL DATA

MOUNTING POSITION	ANY	
MAXIMUM OVERALL LENGTH EXCLUDING LEADS	1 1/2	INCHES
MAXIMUM DIAMETER	0.40	INCHES
BULB	T-3	
BASE	SUBMINIATURE FLAT PRESS WITH THREE FLYING LEADS	
NET WEIGHT (APPROX.)	0.1	OUNCES
MAXIMUM SHOCK RATING	450	G/1MS
MAXIMUM VIBRATION RATING D= .08"@50CPS	10	G

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RATINGS
ABSOLUTE VALUES

MAXIMUM DC OPERATING CURRENT	3.5	MA.
MINIMUM DC OPERATING CURRENT	1.5	MA.
MAXIMUM INVERSE VOLTAGE	-50	VOLTS
AMBIENT TEMPERATURE RANGE	-55 TO +155	°C
ALTITUDE	60 000	FEET

ADDITIONAL TESTS TO INSURE RELIABILITY

RANDOMLY SELECTED SAMPLES ARE SUBJECTED TO THE FOLLOWING TESTS

SHOCK: 30° HAMMER ANGLE IN NAVY, FLYWEIGHT,
HIGH IMPACT MACHINE (450G/MSEC)FATIGUE: 25° CPS, 0.08" TOTAL DISPLACEMENT, FOR 32 HOURS IN EACH OF
3 MUTUALLY PERPENDICULAR PLANES (2.5 G).

POST SHOCK AND FATIGUE LIMITS:

IONIZATION VOLTAGE (MAX.)	120	VDC
TUBE VOLTAGE DROP (1.5 AND 3.5 MA)	81 TO 91	VDC
REGULATION (1.5 TO 3.5 MA) (MAX.)	4.0	VDC

STABILITY LIFE TEST (1 HOUR):

END POINT: CHANGE IN TUBE VOLTAGE DROP FROM INITIAL VALUE (MAX.)	200	mVDC
---	-----	------

SURVIVAL RATE LIFE TEST (100 HOURS):

END POINT: CHANGE IN TUBE VOLTAGE DROP FROM INITIAL VALUE (MAX.)	1.0	VDC
---	-----	-----

INTERMITTENT LIFE TEST: END POINTS (500 HOURS):

CHANGE IN TUBE VOLTAGE DROP FROM INITIAL VALUE (MAX)	4.0	VDC
TUBE VOLTAGE DROP	81 TO 91	VDC
REGULATION (MAX.)	4.0	VDC
IONIZATION VOLTAGE (MAX.)	120	VDC

EQUIPMENT DESIGN AND RANGE VALUES

	MIN.	AVERAGE	MAX.	
DC ANODE SUPPLY VOLTAGE IN DARKNESS	140 ^A	---	---	VOLTS
DC ANODE SUPPLY VOLTAGE IN LIGHT	120 ^A	---	---	VOLTS
ANODE BREAKDOWN VOLTAGE	---	106	120	VOLTS
TUBE VOLTAGE DROP (1) AT 1.5 MA	81	84.5	---	VOLTS
TUBE VOLTAGE DROP (2) AT 3.5 MA	---	86.0	91	VOLTS
REGULATION	---	0.8	2.0	VOLTS/MA.
VOLTAGE JUMP ^B	---	0	5.0	MV
VOLTAGE REPEATABILITY ^C	---	0.01	0.1	VOLTS
OSCILLATION (AURAL CHECK)	---	---	---	
NOISE	---	0	20	MV.
LEAKAGE CURRENT ($E_b = 50V, R_p = 3000\Omega$)	---	0	20	μ AMPS
GENERATED PLATE VOLTAGE (WHEN VIBRATED AT 40 CPS, 15G, $R_p = 10,000\Omega, I_b = 2.5\text{MADC}$)	---	---	50	MV.
MAXIMUM SHUNT CAPACITOR	---	---	0.02	μ FARADS
SERIES RESISTOR	D	---	---	
MAXIMUM CURRENT THROUGH INTER- CONNECTED LEADS	---	---	0.2	AMP.

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NOTES

- A TO ASSURE STARTING THROUGHOUT TUBE LIFE, THE SUPPLY VOLTAGE SHOULD NOT BE LESS THAN THIS VALUE.
- B THE MAXIMUM VOLTAGE FLUCTUATION AT ANY CURRENT LEVEL WITHIN THE CURRENT OPERATING CURRENT RANGE.
- C TUBE IS CYCLED ONE MINUTE ON AND ONE MINUTE OFF FOR FIVE CYCLES. READINGS ARE TAKEN INITIALLY AND AT THE END OF EACH "ON" PERIOD.
- D SUFFICIENT SERIES RESISTANCE MUST BE USED TO LIMIT THE CURRENT TO A MAXIMUM OF 3.5 MA. AT THE HIGHEST ANODE SUPPLY VOLTAGE AND TO LIMIT THE CURRENT TO A MINIMUM OF 1.5 MA AT THE LOWEST ANODE SUPPLY VOLTAGE.

APPLICATION NOTES

VOLTAGE REFERENCE TUBES ARE OFTEN CONFUSED WITH VOLTAGE REGULATOR TUBES. WHILE A REFERENCE TUBE IS A REGULATOR TUBE, IT IS A SPECIAL FORM OF REGULATOR TUBE, IN WHICH CURRENT RANGE AND REGULATION IS SACRIFICED TO PROVIDE VOLTAGE REPEATABILITY AND TEMPERATURE STABILITY AND TO MINIMIZE VOLTAGE JUMP AND LONG TERM DRIFT.

THE VOLTAGE REGULATION CHARACTERISTIC OF A REFERENCE TUBE IS NOT INDEPENDENT OF THE TUBE CURRENT. THEREFORE THE 5783WA SHOULD BE RUN FROM A CONSTANT SOURCE SUCH AS A VR TUBE, A PENTODE, OR A SIMPLE SERIES REGULATOR. PRACTICAL CIRCUITS ARE GIVEN IN FIGURES 1, 2, AND 3.

IF SO DESIRED, "INPUT AND OUTPUT" CONNECTIONS TO THE CATHODE CAN BE MADE TO DIFFERENT INTERNALLY CONNECTED LEADS, SO THAT THE CIRCUIT WILL BE BROKEN UPON THE REMOVAL OF THE TUBE FROM ITS SOCKET. THE TUBE SHOULD BE SHIELDED IF IT IS TO BE USED IN STRONG RF OR MAGNETIC FIELDS.

THE PRINCIPAL USE OF THE 5783WA IS TO SUPPLY A REFERENCE VOLTAGE IN AN ELECTRONICALLY REGULATED POWER SUPPLY. THIS USE IS ILLUSTRATED IN FIGURE 4. THE 5783WA MAY ALSO BE SUBSTITUTED FOR THE MINIATURE TYPE 5651WA IN MANY CIRCUITS FOUND IN THE HANDBOOK, PREFERRED CIRCUITS, Navy Aeronautical Electronic Equipment (NAVAER 16-4-519). THIS IS AVAILABLE FROM THE SUPERINTENDENT OF DOCUMENTS, US GOVT. PRINTING OFFICE, WASHINGTON 25, D.C. AT \$4.75.

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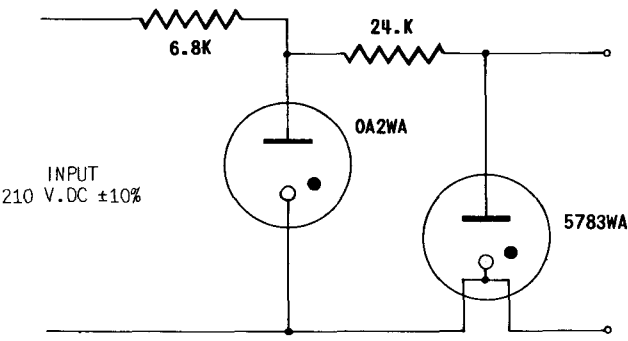


FIGURE 1

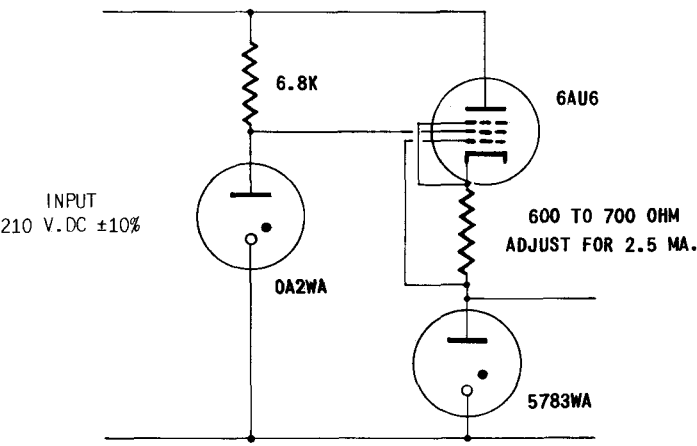


FIGURE 2

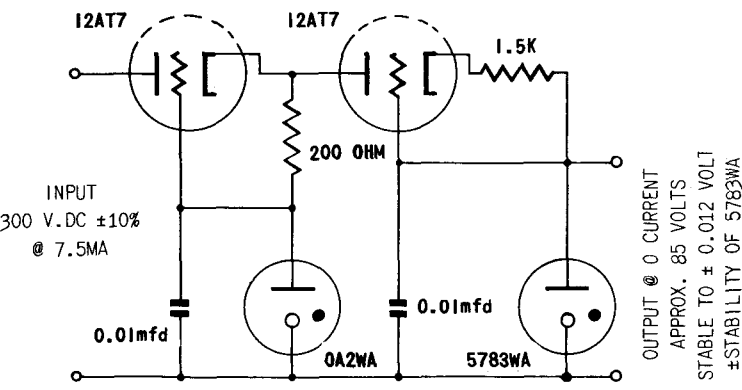


FIGURE 3

