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 SUITABLE 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: 4 1/2 INCHES
- MAXIMUM DIAMETER: 0.4 INCHES
- BULB: T-3
- BASE: SUBMINIATURE FLAT PRESS WITH THREE FLYING LEADS
- NET WEIGHT (APPROX.): 0.1 OUNCES
- MAXIMUM SHOCK RATING: 450 G/MS
- MAXIMUM VIBRATION RATING: 10 G

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TUNB-SOL

CONTINUED FROM PRECEDING PAGE

RATINGS

ABSOLUTE VALUES

MAXIMUM DC OPERATING CURRENT
MINIMUM DC OPERATING CURRENT
MAXIMUM INVERSE VOLTAGE
AMBIENT TEMPERATURE RANGE
ALTITUDE

3.5 MA.
1.5 MA.
-50 VOLTS
-55 TO +155 °C
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/SEC)

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.)
TUBE VOLTAGE DROP (4.5 AND 3.5 MA)
REGULATION (4.5 TO 3.5 MA) (MAX.)

120 VDC
81 TO 91 VDC
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 (500 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)
TUBE VOLTAGE DROP
REGULATION (MAX.)
IONIZATION VOLTAGE (MAX.)

4.0 VDC
81 TO 91 VDC
4.0 VDC
120 VDC

EQUIPMENT DESIGN AND RANGE VALUES

<table>
<thead>
<tr>
<th>MIN.</th>
<th>AVERAGE</th>
<th>MAX.</th>
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<tbody>
<tr>
<td>DC ANODE SUPPLY VOLTAGE IN DARKNESS</td>
<td>140A</td>
<td>---</td>
</tr>
<tr>
<td>DC ANODE SUPPLY VOLTAGE IN LIGHT</td>
<td>120A</td>
<td>---</td>
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<tr>
<td>ANODE BREAKDOWN VOLTAGE</td>
<td>106</td>
<td>120</td>
</tr>
<tr>
<td>TUBE VOLTAGE DROP (1) AT 4.5 MA</td>
<td>81</td>
<td>84.5</td>
</tr>
<tr>
<td>TUBE VOLTAGE DROP (2) AT 3.5 MA</td>
<td>86.0</td>
<td>91</td>
</tr>
</tbody>
</table>
| REGULATION | 0.8 | 2.0 | VOLTS/MA.
| VOLTAGE JUMP | 0 | 5.0 | MV |
| VOLTAGE REPEATABILITY | 0.01 | 0.1 | VOLTS |
| OSCILLATION (AURAL CHECK) | --- | --- | --- |
| NOISE | 0 | 20 | MV |
| LEAKAGE CURRENT (E_p=50V, R_p=3000Ω) | 0 | 20 | µAMPS |
| GENERATED PLATE VOLTAGE (WHEN VIBRATED AT 40 CPS, ISNG, R_p=10,000Ω, 1_b=2.5MADC) | --- | 50 | MV |
| MAXIMUM SHUNT CAPACITOR | --- | 0.02 | µFARADS |
| SERIES RESISTOR | 0 | --- | --- |
| MAXIMUM CURRENT THROUGH INTERCONNECTED LEADS | --- | 0.2 | AMP |

CONTINUED ON FOLLOWING PAGE
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 DESIGNED, "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.
