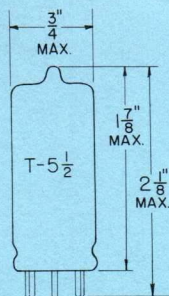


## TUNG-SOL

## DIODE PENTODE

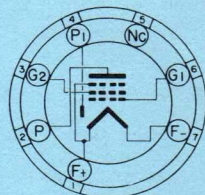
## MINIATURE TYPE



GLASS BULB

HEATER

ANY MOUNTING POSITION



BOTTOM VIEW

MINIATURE BUTTON

7 PIN BASE

6BW

THE 1U5WA IS A FILAMENT TYPE, SHARP CUT-OFF, DIODE PENTODE IN THE 7 PIN MINIATURE CONSTRUCTION. ITS PRINCIPAL APPLICATION IS AS A DIODE DETECTOR, AVC RECTIFIER, AUDIO FREQUENCY AMPLIFIER IN PORTABLE RECEIVERS. THE 1U5WA IS PARTICULARLY USEFUL IN DETECTOR AMPLIFIER CIRCUITS WHERE ITS LOW MICROPHONIC NOISE AND VIBRATION OUTPUT ARE ESSENTIAL FOR SPECIALIZED MILITARY ELECTRONIC EQUIPMENT.

## RATINGS

## MECHANICAL

|                                                               |     |   |
|---------------------------------------------------------------|-----|---|
| MAXIMUM IMPACT ACCELERATION (SHOCK TEST - NOTE 2)             | 450 | G |
| MAXIMUM VIBRATIONAL ACCELERATION (96 HR. FATIGUE TEST-NOTE 3) | 2.5 | G |

## RATINGS

## AND NORMAL OPERATION

|                          | MIL-E-1<br>SYMBOL | DES.<br>MIN. | NORM.<br>TEST<br>CONDI-<br>TIONS<br>NOTE 5 | NORM.<br>OPER-<br>ATION<br>NOTE 4 | DES.<br>MAX. | MIL-E-1<br>UNITS |
|--------------------------|-------------------|--------------|--------------------------------------------|-----------------------------------|--------------|------------------|
| HEATER VOLTAGE (NOTE 6)  | Ef:               | 1.00         | 1.25                                       | 1.25                              | 1.50         | Vdc              |
| PLATE VOLTAGE (NOTE 7)   | Eb:               | ---          | 67.5                                       | 67.5                              | 100          | Vdc              |
| GRID VOLTAGE             | Ec1:              | ---          | 0                                          | 0                                 | 0            | Vdc              |
| GRID VOLTAGE #2 (NOTE 7) | Ec2:              | ---          | 67.5                                       | 67.5                              | 100          | Vdc              |
| PLATE DISSIPATION        | Pp:               | ---          | ---                                        | ---                               | 0.13         | WATTS            |
| GRID #2 DISSIPATION      | Pg2:              | ---          | ---                                        | ---                               | 0.035        | WATTS            |
| GRID RESISTANCE          | Rg(1):            | ---          | ---                                        | ---                               | 2.0          | MEG.             |
| TRANSCONDUCTANCE         | Sm:               | ---          | ---                                        | 650                               | ---          | μMHOS            |
| PLATE CURRENT            | Ib1:              | ---          | ---                                        | 1.6                               | ---          | mA dc            |
| CATHODE CURRENT          | Ik:               | ---          | ---                                        | ---                               | 5.0          | mA dc            |
| DIODE CURRENT            | Iib:              | ---          | ---                                        | ---                               | 250          | μA dc            |

CONTINUED ON FOLLOWING PAGE

## TUNG-SOL

CONTINUED FROM PRECEDING PAGE

CHARACTERISTICS AND QUALITY CONTROL<sup>1</sup>

| TEST                                                                                                                                                                                                                                                                  | AQL<br>% | MIL-E-1<br>SYMBOL  | MIN.       | LAL | BOG | UAL | MAX  | ALD | MIL-E-1<br>UNITS |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|--------------------|------------|-----|-----|-----|------|-----|------------------|
| MEASUREMENTS ACCEPTANCE<br>TESTS PART 1                                                                                                                                                                                                                               |          |                    |            |     |     |     |      |     |                  |
| COMBINED AQL=1.0% EXCLUDING MECH. AND INOPERATIVES.                                                                                                                                                                                                                   |          |                    |            |     |     |     |      |     |                  |
| GRID CURRENT (1):<br>Eb=Ecc2=90Vdc;<br>Ec1=-2.5 Vdc                                                                                                                                                                                                                   | 0.65     | Ic1:               | 0          | --- | --- | --- | -0.5 | --- | $\mu$ Adc        |
| PLATE CURRENT (1):                                                                                                                                                                                                                                                    | 0.65     | Ib1:               | 1.05       | --- | --- | --- | 2.15 | --- | mAdc             |
| SCREEN GRID CURRENT:                                                                                                                                                                                                                                                  | 0.65     | Ic(2):             | 0.24       | --- | --- | --- | 0.56 | --- | mAdc             |
| TRANSCONDUCTANCE (1):<br>Ef=1.0 Vdc                                                                                                                                                                                                                                   | 0.65     | Sm(1):             | 380        | --- | --- | --- | 775  | --- | $\mu$ MHOS       |
| AC AMPLIFICATION:<br>Ebb=Ecc2=45 Vdc;<br>Rg2=2.0 MEG.; Rg1=<br>10 MEG.; Rp=0.5 MEG.;<br>Esig=0.2 Vac; 0.1 $\mu$ f<br>BETWEEN G2 &-F                                                                                                                                   | 0.65     | Ep:                | 6.5        | --- | --- | --- | ---  | --- | Vac              |
| EMISSION (DIODE)<br>Eib=10 Vdc                                                                                                                                                                                                                                        | 0.65     | Lis:               | 0.5        | --- | --- | --- | ---  | --- | mAdc             |
| NOISE AND MICROPHONICS:<br>Ebb=Ecc2=135 Vdc;<br>Ecal=10.0 mVac; Rp=<br>1.0 MEG.; Cg2=0.1 $\mu$ f;<br>Ec1=0; Rp OF DIODE =<br>2 MEG. TO GROUND.<br>COUPLE PLATE OF<br>DIODE TO G1 THROUGH<br>A 0.1 $\mu$ f CAPACITOR;<br>Rg1=1.5 MEG.; Rg2=0.1 $\mu$ f<br>(NOTE 9, 10) | 0.65     | ---                | ---        | --- | --- | --- | ---  | --- | ---              |
| CONTINUITY AND SHORTS:<br>(INOPERATIVES)                                                                                                                                                                                                                              | 0.4      | ---                | ---        | --- | --- | --- | ---  | --- | ---              |
| MECHANICAL:<br>ENVELOPE OUTLINE<br>(6-2)                                                                                                                                                                                                                              | ---      | ---                | ---        | --- | --- | --- | ---  | --- | ---              |
| MEASUREMENTS ACCEPTANCE<br>TESTS, PART 2                                                                                                                                                                                                                              |          |                    |            |     |     |     |      |     |                  |
| INSULATION OF ELEC-<br>TRODES:<br>g1-all=-100 Vdc<br>p-all=-100 Vdc                                                                                                                                                                                                   | 4.0      | Rg-all:<br>Rp-all: | 100<br>100 | --- | --- | --- | ---  | --- | MEG.<br>MEG.     |
| TRANSCONDUCTANCE (2):                                                                                                                                                                                                                                                 | 6.5      | Sm:                | 525        | --- | --- | --- | 775  | --- | $\mu$ MHOS       |
| FILAMENT CURRENT:                                                                                                                                                                                                                                                     | 6.5      | If:                | 44         | --- | --- | --- | 56   | --- | mA               |
| VIBRATION (1):<br>Rp=10,000 OHMS; F =<br>40 cps; G=15                                                                                                                                                                                                                 | 6.5      | Ep(1):             | ---        | --- | --- | --- | 10   | --- | mVac             |
| VIBRATION (2):<br>F=50 cps-3500 cps;<br>Rp=10,000 OHMS<br>(NOTE 8)                                                                                                                                                                                                    | 6.5      | Ep(2):             | ---        | --- | --- | --- | 25   | --- | mVac             |

CONTINUED ON FOLLOWING PAGE

## TUNG-SOL

CONTINUED FROM PRECEDING PAGE

CHARACTERISTICS AND QUALITY CONTROL TESTS<sup>1</sup> - cont'd.

| TEST                        | AQL<br>%                                             | MIL-E-1<br>SYMBOL          | MIN      | LAL               | BOG | UAL | MAX  | ALD | MIL-E-1<br>UNITS |
|-----------------------------|------------------------------------------------------|----------------------------|----------|-------------------|-----|-----|------|-----|------------------|
| DEGRADATION RATE            |                                                      |                            |          |                   |     |     |      |     |                  |
| ACCEPTANCE TESTS            | COMBINED AQL = 1.0% EXCLUDING MECH. AND INOPERATIVES |                            |          |                   |     |     |      |     |                  |
| SHOCK:                      |                                                      |                            |          |                   |     |     |      |     |                  |
| HAMMER ANGLE=30°            |                                                      |                            |          |                   |     |     |      |     |                  |
| (NOTE 2)                    | ---                                                  | ---                        | ---      | ---               | --- | --- | ---  | --- | ---              |
| FATIGUE:                    |                                                      |                            |          |                   |     |     |      |     |                  |
| G=2.5; F=25cps MIN.,        |                                                      |                            |          |                   |     |     |      |     |                  |
| 60 cps MAX., FIXED          |                                                      |                            |          |                   |     |     |      |     |                  |
| FREQUENCY (NOTE 3)          | 6.5                                                  | ---                        | ---      | ---               | --- | --- | ---  | --- | ---              |
| POST SHOCK AND FATIGUE      |                                                      |                            |          |                   |     |     |      |     |                  |
| TEST END POINTS:            |                                                      |                            |          |                   |     |     |      |     |                  |
| TRANSCONDUCTANCE (2):       | ---                                                  | Sm:                        | 450      | ---               | --- | --- | ---  | --- | μMHOS            |
| VIBRATION (1):              | ---                                                  | Ep:                        | ---      | ---               | --- | --- | 15   | --- | mVac             |
| DIODE EMISSION              | ---                                                  | Iis:                       | 0.2      | ---               | --- | --- | ---  | --- | mAdc             |
| MINIATURE TUBE BASE STRAIN: | ---                                                  | ---                        | ---      | ---               | --- | --- | ---  | --- | ---              |
| GLASS STRAIN                |                                                      |                            |          |                   |     |     |      |     |                  |
| (THERMAL SHOCK):            | 2.5                                                  | ---                        | ---      | ---               | --- | --- | ---  | --- | ---              |
|                             |                                                      | ALLOW. DEF.<br>PER CHARAC. |          |                   |     |     |      |     |                  |
| TEST                        | 1st<br>SAMP.                                         | COMB.<br>SAMP.             | AQL<br>% | MIL-E-1<br>SYMBOL | MIN |     | MAX. |     | MIL-E-1<br>UNITS |
| ACCEPTANCE LIFE TESTS       |                                                      |                            |          |                   |     |     |      |     |                  |
| INTERMITTENT LIFE<br>TEST:  |                                                      |                            |          |                   |     |     |      |     |                  |
| Ef=1.25 Vdc OR Vac          |                                                      |                            |          |                   |     |     |      |     |                  |
| WITH EQUIVALENT             |                                                      |                            |          |                   |     |     |      |     |                  |
| BIAS, GROUP A               | ---                                                  | ---                        | ---      | t:                | 500 | --- |      |     | HOURS            |
| INTERMITTENT LIFE TEST      |                                                      |                            |          |                   |     |     |      |     |                  |
| END POINTS:                 |                                                      |                            |          |                   |     |     |      |     |                  |
| TRANSCONDUCTANCE (2)        | ---                                                  | ---                        | ---      | Sm(2):            | 450 | --- |      |     | μMHOS            |
| OR AC AMPLIFICATION         | ---                                                  | ---                        | ---      | Ep:               | 5.0 | --- |      |     | Vac              |
| EMISSION (DIODE)            | ---                                                  | ---                        | ---      | Iis:              | 0.2 | --- |      |     | mAdc             |

## NOTES

1. CHARACTERISTICS, QUALITY CONTROL PROCEDURES, AND INSPECTION LEVELS ARE MADE ACCORDING TO THE APPROPRIATE PARAGRAPH OF MIL-E-1, AND MIL-STD-105A.
2. TEST CONDITIONS AND ACCEPTANCE CRITERIA PER SHOCK TEST PROCEDURES OF MIL-E-1 BASIC SPECIFICATIONS.
3. TEST CONDITIONS AND ACCEPTANCE CRITERIA PER FATIGUE TEST PROCEDURES OF MIL-E-1 BASIC SPECIFICATIONS.
4. THESE NORMAL VALUES REPRESENT CONDITIONS AT WHICH CONTROL OF RELIABILITY MAY BE EXPECTED.

CONTINUED ON FOLLOWING PAGE

## TUNG-SOL

CONTINUED FROM PRECEDING PAGE

## NOTES

CONT'D.

5. THESE NORMAL TEST CONDITIONS ARE USED FOR ALL CHARACTERISTICS UNLESS OTHERWISE STATED UNDER THE INDIVIDUAL TEST ITEM.
6. FOR MOST APPLICATIONS THE PERFORMANCE WILL NOT BE ADVERSELY AFFECTED BY  $\pm 10\%$  HEATER VOLTAGE VARIATION, BUT WHEN THE APPLICATION CAN PROVIDE A CLOSER CONTROL OF HEATER VOLTAGE, AN IMPROVEMENT IN RELIABILITY WILL BE REALIZED.
7. PLATE AND SCREEN VOLTAGES SHOULD NOT EXCEED THESE VALUES UNDER ANY CIRCUMSTANCES.
8. THE TUBE UNDER TEST SHALL BE RIGIDLY MOUNTED ON A VIBRATION TABLE VIBRATING WITH SIMPLE HARMONIC MOTION. THE TEST CONDITIONS OF PARAGRAPH 4.9.19.1 OF MIL-E-1 SHALL BE APPLIED AND  $E_p$  MONITORED WHILE THE FREQUENCY OF VIBRATION IS CONTINUOUSLY SWEPT FROM 50-3500 CPS AND THE PEAK ACCELERATION CONTROLLED CONSTANT AT 2G. A LOW PASS FILTER WHICH FOLLOWS THE LOAD RESISTOR OF THE TUBE UNDER TEST SHALL HAVE A CUT-OFF FREQUENCY OF 3500 CPS. THE TOTAL TIME OF SWEEP SHALL NOT BE LESS THAN ONE (1) MINUTE.
9. TUBES SHALL BE SO SHIELDED THAT OPERATOR PROXIMITY OR MOVEMENT WILL NOT AFFECT OUTPUT READINGS.
10. THE REJECTION LEVEL SHALL BE SET AT THE VU METER READING OBTAINED DURING CALIBRATION.

