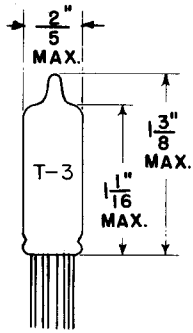
**TUNG-SOL**

# TWIN DIODE

SUBMINIATURE TYPE




GLASS BULB

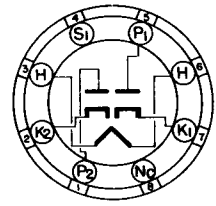
COATED UNIPOTENTIAL CATHODE

HEATER

6.3±5% VOLTS 0.3 AMP.

AC OR DC

ANY MOUNTING POSITION




BOTTOM VIEW

SUBMINIATURE BUTTON
8 LEAD BASE
8DJ

THE 5896 IS A SUBMINIATURE TWIN DIODE IN WHICH SEPARATE CATHODES ARE PROVIDED FOR THE TWO SECTIONS. EACH DIODE CAN BE USED INDEPENDENTLY OF THE OTHER OR COMBINED IN PARALLEL OR FULL-WAVE ARRANGEMENTS. IT IS SUITED FOR A WIDE VARIETY OF APPLICATIONS INCLUDING SERVICE AS A DETECTOR, AN AUTOMATIC-GAIN-CONTROL RECTIFIER, OR A LOW-CURRENT POWER RECTIFIER. THE RESONANT FREQUENCY OF EACH UNIT IS GREATER THAN 900 MEGACYCLES.

## DIRECT INTERELECTRODE CAPACITANCES

| | WITH SHIELD[A] | WITHOUT SHIELD | |
|---|---|---|---|
| PLATE #1 TO CATHODE #1, HEATER AND INTERNAL SHIELD | 3.0 | 2.4 | μμf |
| PLATE #2 TO CATHODE #2, HEATER, AND INTERNAL SHIELD | 3.0 | 2.4 | μμf |
| CATHODE #1 TO PLATE #1, HEATER AND INTERNAL SHIELD | 4.2 | 4.0 | μμf |
| CATHODE #2 TO PLATE #2, HEATER AND INTERNAL SHIELD | 4.2 | 4.0 | μμf |
| PLATE #1 TO PLATE #2, MAXIMUM | 0.026 | 0.15 | μμf |

[A] WITH EXTERNAL SHIELD OF 0.405 INCH INSIDE DIAMETER CONNECTED TO LEAD 3.

## RATINGS
ABSOLUTE MAXIMUM VALUES

| | | |
|---|---|---|
| HEATER VOLTAGE | 6.3±5% | VOLTS |
| MAXIMUM PEAK INVERSE PLATE VOLTAGE | 460 | VOLTS |
| MAXIMUM AC PLATE-SUPPLY VOLTAGE PER PLATE, RMS | 165 | VOLTS |
| MAXIMUM STEADY-STATE PEAK PLATE CURRENT PER PLATE | 60 | MA. |
| MAXIMUM TRANSIENT PEAK PLATE CURRENT PER PLATE, MAXIMUM DURATION 0.2 SECOND | 350 | MA. |
| MAXIMUM DC OUTPUT CURRENT PER PLATE | 10 | MA. |
| MAXIMUM HEATER-CATHODE VOLTAGE: | | |
| HEATER POSITIVE WITH RESPECT TO CATHODE | 360 | VOLTS |
| HEATER NEGATIVE WITH RESPECT TO CATHODE | 360 | VOLTS |
| MAXIMUM BULB TEMPERATURE AT HOTTEST POINT | 250 | C |

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## TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

FULL-WAVE RECTIFIER WITH CAPACITOR-INPUT FILTER

| | | |
|---|---|---|
| HEATER VOLTAGE | 6.3±5% | VOLTS |
| HEATER CURRENT | 0.3 | AMPS. |
| AC PLATE-SUPPLY VOLTAGE PER PLATE, RMS | 150 | VOLTS |
| FILTER INPUT CAPACITOR | 8 | μFARADS |
| TOTAL EFFECTIVE PLATE-SUPPLY IMPEDANCE PER PLATE | 300 | OHMS |
| LOAD RESISTANCE | 11000 | OHMS |
| DC OUTPUT CURRENT | 18 | MA. |
| TUBE VOLTAGE DROP | | |
| Ib=18 MA. DC PER PLATE | 4.5 | VOLTS |
| RESONANT FREQUENCY (WITH SHORT AT TUBE BASE), MIN. | 900 | MEGACY. |

## CHARACTERISTICS LIMITS

| | | MIN | MAX | |
|---|---|---|---|---|
| HEATER CURRENT: | | | | |
| Ef = 6.3 VOLTS | INITIAL | 275 | 325 | MA. |
| OPERATION CURRENT: | | | | |
| (DC OUTPUT CURRENT FROM FW RECTIFIER) Ef = 6.3 VOLTS, Ebb PER PLATE = 165 VOLTS RMS, $C_L$ = 8 μf., $R_L$ = AND Rs PER PLATE ADJUSTED WITH A TUBE HAVING A 10-VOLT DROP AT 50 ma. PER PLATE FOR Io = 18 ma. AND PEAK ib = 50 ma APPROXIMATELY | INITIAL | 16 | --- | MA. |
| | 500 HR.[A] | 14 | --- | MA. |
| EMISSION CURRENT, EACH SECTION Ef =6.3 VOLTS Eb =10 VOLTS | INITIAL | 30 | --- | MA. |
| PLATE CURRENT, EACH SECTION: Ef = 6.3 VOLTS, Ebb = 0 VOLTS $R_L$ = 40000 OHMS (INCLUDING METER RESISTANCE) | INITIAL | 5 | 25 | μAMPS. |
| PLATE CURRENT DIFFERENCE BETWEEN SECTIONS: DIFFERENCE BETWEEN PLATE CURRENTS FOR EACH SECTION AT Ef =6.3 VOLTS, Ebb= 0 VOLTS, $R_L$= 40000 OHMS (INCLUDING METER RESISTANCE) | INITIAL | --- | 5 | μAMPS. |
| INTERELECTRODE CAPACITANCES: | | | | |
| PLATE INPUT (P TO K,H, I.S.) EA. SECTION | INITIAL | 2.5 | 3.5 | μμf |
| CATHODE INPUT (K TO P,H,I.S.) EA. SECT. | INITIAL | 3.5 | 4.9 | μμf |
| PLATE TO PLATE (P TO P) | INITIAL | --- | 0.026 | μμf |
| (MEASURED WITH EXTERNAL SHIELD OF 0.405 INCH INSIDE DIAMETER CONNECTED TO LEAD 3.) | | | | |
| HEATER-CATHODE LEAKAGE CURRENT, EA. SEC. Ef =6.3 VOLTS, Ehk= 360 VOLTS | | | | |
| HEATER POSITIVE WITH RESPECT TO CATHODE | INITIAL | --- | 40 | μAMPS. |
| | 500 HR.[A] | --- | 120 | μAMPS. |
| HEATER NEGATIVE WITH RESPECT TO CATHODE | INITIAL | --- | 40 | μAMPS. |
| | 500 HR.[A] | --- | 120 | μAMPS. |

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## CHARACTERISTICS LIMITS - cont'd.

| | | MIN | MAX | |
|---|---|---|---|---|
| INTERELECTRODE LEAKAGE RESISTANCE: Ef = 6.3 VOLTS, POLARITY OF APPLIED DC INTERELECTRODE VOLTAGE IS SUCH THAT NO CATHODE EMISSION RESULTS. PLATE (EACH SECTION) TO ALL AT 300 VOLTS DC | INITIAL | 100 | --- | MEGOHMS |

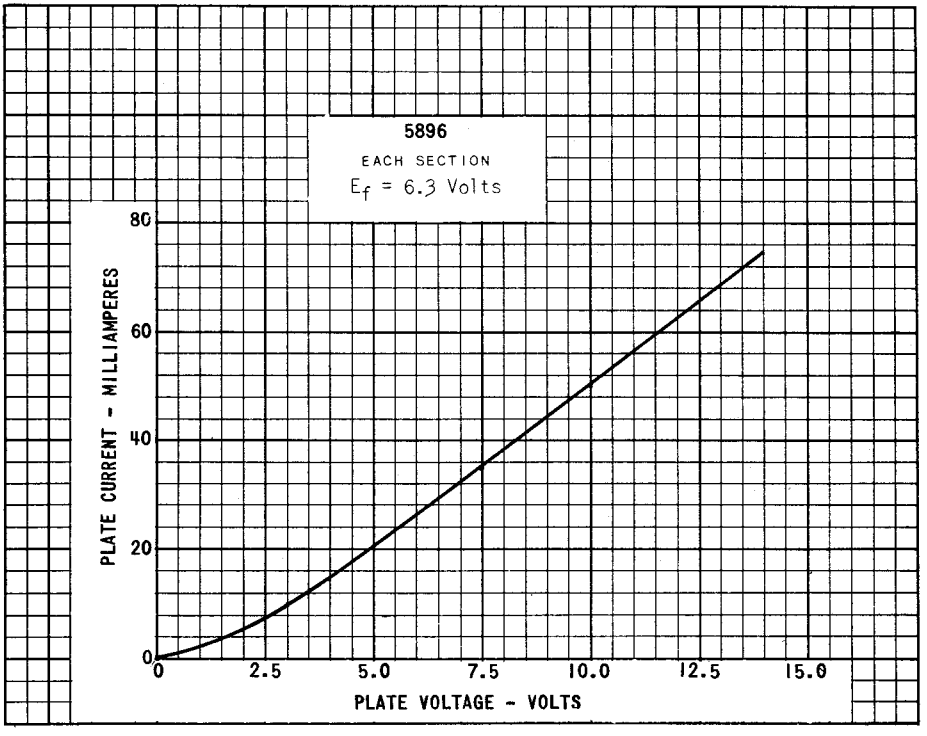
A. CONDITIONS OF LIFE-TEST OPERATION AS A FULL-WAVE RECTIFIER ARE Ef = 6.3 VOLTS, Ebb PER PLATE = 165 VOLTS RMS, $C_i$ = 8 μf, $R_i$ AND Rs PER PLATE ADJUSTED WITH A TUBE HAVING A 10-VOLT DROP AT 50 MA PER PLATE FOR Io = 18 MA AND PEAK IB = 50 MA APPROXIMATELY, Ehk = Eo + 117 VOLTS RMS SO PHASED THAT THE 117 VOLTS AND Ef SUBTRACT, AND AMBIENT TEMPERATURE=175°C.

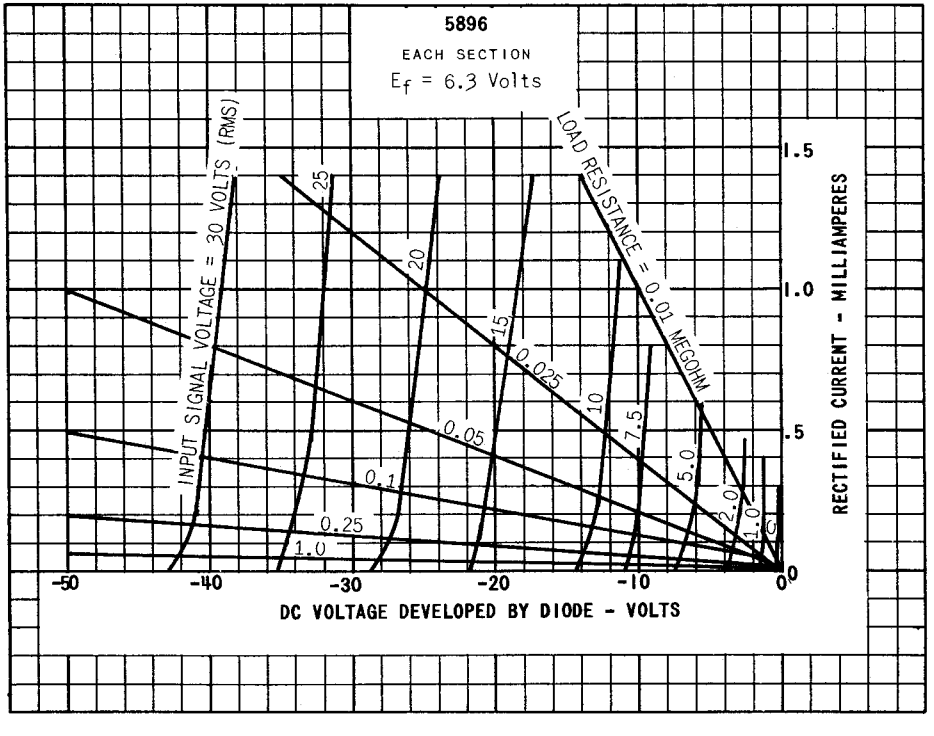
## SPECIAL TESTS AND RATINGS

| | | |
|---|---|---|
| INOPERATIVES CONTROL: MINIMUM CONTINUOUS OPERATING TIME UNDER LIFE-TEST CONDITIONS OR EQUIVALENT FOR ALL TUBES PRIOR TO CHARACTERISTICS TESTING | 46 | HOURS |
| HEATER-CYCLING RATING: CYCLES OF INTERMITTENT OPERATION, MINIMUM Ef =7.0 VOLTS CYCLED FOR ONE MINUTE ON AND FOUR MINUTES OFF. Eb = 0 VOLTS. Ehk =140 VOLTS RMS. | 2500 | CYCLES |
| SHOCK RATING: IMPACT ACCELERATION IN ANY DIRECTION FORCES AS APPLIED BY THE NAVY-TYPE, HIGH IMPACT (FLYWEIGHT) SHOCK MACHINE FOR ELECTRONIC DEVICES OR ITS EQUIVALENT | 450 | G |
| FATIGUE RATING: VIBRATIONAL ACCELERATION IN ANY DIRECTION VIBRATIONAL FORCES FOR A PERIOD OF AT LEAST 100 HOURS AT A FREQUENCY OF 60 CYCLES PER SECOND. | 2.5 | G |
| UNIFORM ACCELERATION RATING UNIFORM ACCELERATION IN ANY DIRECTION FORCES APPLIED GRADUALLY AS IN A CENTRIFUGE | 1000 | G |

NOTE:
THE CONDITIONS FOR SOME OF THE INDICATED TESTS HAVE DELIBERATELY BEEN SELECTED TO AGGRAVATE TUBE FAILURES FOR TEST AND EVALUATION PURPOSES. IN NO SENSE SHOULD THESE CONDITIONS BE INTERPRETED AS SUITABLE CIRCUIT OPERATING CONDITIONS.

IN THE DESIGN OF MILITARY EQUIPMENT EMPLOYING THIS TUBE, REFERENCE SHOULD BE MADE TO APPROPRIATE MIL-E-1 SPECIFICATION.


5896
EACH SECTION
$E_f$ = 6.3 Volts
PLATE CURRENT - MILLIAMPERES
80
60
40
20
0
0
2.5
5.0
7.5
10.0
12.5
15.0
PLATE VOLTAGE - VOLTS


5896
EACH SECTION
$E_f$ = 6.3 Volts
INPUT SIGNAL VOLTAGE = 30 VOLTS (RMS)
LOAD RESISTANCE = 0.01 MEGOHM
25
20
15
10
7.5
5.0
2.0
1.0
0.5
0.25
0.1
0.05
0.025
1.5
1.0
.5
0
RECTIFIED CURRENT - MILLIAMPERES
-50
-40
-30
-20
-10
0
DC VOLTAGE DEVELOPED BY DIODE - VOLTS