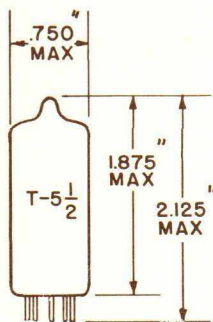


## TUNG-SOL

## HEPTODE

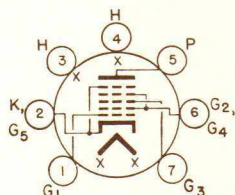
## MINIATURE TYPE



COATED UNIPOTENTIAL CATHODE

FOR  
AUTOMOTIVE RADIO  
RECEIVER SERVICE

ANY MOUNTING POSITION



BOTTOM VIEW

BASING DIAGRAM

JEDEC 7CH

GLASS BULB  
MINIATURE BUTTON  
7 PIN BASE E7-1  
OUTLINE DRAWING  
JEDEC 5-2

THE 12AD6 IS A PENTAGRID CONVERTER WITH A UNIPOTENTIAL CATHODE IN THE 7-PIN MINIATURE CONSTRUCTION. IT IS INTENDED AS A COMBINED OSCILLATOR AND MIXER IN SUPERHETERODYNE RECEIVERS WHERE THE HEATER, PLATE AND SCREEN GRID POTENTIALS ARE OBTAINED DIRECTLY FROM AN AUTOMOTIVE BATTERY.

## → DIRECT INTERELECTRODE CAPACITANCES

|                                                        | WITH <sup>A</sup><br>SHIELD | WITHOUT<br>SHIELD |    |
|--------------------------------------------------------|-----------------------------|-------------------|----|
| MIXER GRID TO PLATE: G3 TO P MAXIMUM                   | 0.26                        | 0.30              | pf |
| MIXER GRID TO OSCILLATOR GRID: G3 TO G1 MAX.           | 0.15                        | 0.15              | pf |
| RF INPUT: G3 TO (H+K+G1+G2 & 4+G5+P)                   | 7.0                         | 7.0               | pf |
| OSCILLATOR INPUT: G1 TO (H+K+P+G3+G5)                  | 3.2                         | 3.2               | pf |
| MIXER OUTPUT: P TO (H+K+G1+G2 & 4+G3+G5)               | 12                          | 7.0               | pf |
| OSCILLATOR OUTPUT: G2 & 4 TO (H+K+G3+P+G5)             | 11                          | 11                | pf |
| OSCILLATOR GRID TO OSCILLATOR PLATE:<br>G1 TO G2 AND 4 | 2.2                         | 2.2               | pf |

## HEATER CHARACTERISTICS AND RATINGS

DESIGN MAXIMUM VALUES - SEE EIA STANDARD RS-239

|                                                                                                 |             |     |       |
|-------------------------------------------------------------------------------------------------|-------------|-----|-------|
| AVERAGE CHARACTERISTICS                                                                         | 12.6 VOLTS  | 150 | MA.   |
| HEATER SUPPLY LIMITS:<br>VOLTAGE OPERATION <sup>B</sup>                                         | 10.0 - 15.9 |     | VOLTS |
| MAXIMUM HEATER CATHODE VOLTAGE:<br>HEATER NEGATIVE WITH RESPECT TO CATHODE<br>TOTAL DC AND PEAK |             | 16  | VOLTS |
| HEATER POSITIVE WITH RESPECT TO CATHODE<br>TOTAL DC AND PEAK                                    |             | 16  | VOLTS |

<sup>A</sup>EXTERNAL SHIELD #316 CONNECTED TO CATHODE.

CONTINUED ON FOLLOWING PAGE

## TUNG-SOL

CONTINUED FROM PRECEDING PAGE

## MAXIMUM RATINGS

DESIGN MAXIMUM VALUES - SEE EIA STANDARD RS-239

|                             |      |         |
|-----------------------------|------|---------|
| PLATE VOLTAGE               | → 16 | VOLTS   |
| GRID #2 & #4 VOLTAGE        | → 16 | VOLTS   |
| GRID #2 & #4 SUPPLY VOLTAGE | → 16 | VOLTS   |
| NEGATIVE DC GRID #3 VOLTAGE | → 16 | VOLTS   |
| POSITIVE DC GRID #3 VOLTAGE | 0    | VOLTS   |
| CATHODE CURRENT             | 20   | MA.     |
| GRID #3 CIRCUIT RESISTANCE  | 10   | MEGOHMS |

→ TYPICAL OPERATING CHARACTERISTICS  
CONVERTER - SEPARATE EXCITATION

|                                                              |       |       |       |         |
|--------------------------------------------------------------|-------|-------|-------|---------|
| PLATE VOLTAGE                                                | 10.6  | 12.6  | 14.6  | VOLTS   |
| GRID #3 VOLTAGE                                              | 0     | 0     | 0     | VOLTS   |
| GRID #2 & #4 VOLTAGE                                         | 10.6  | 12.6  | 14.6  | VOLTS   |
| GRID #1 VOLTAGE PEAK TO PEAK                                 | 4.5   | 4.5   | 4.5   | VOLTS   |
| GRID #1 RESISTANCE                                           | 33000 | 33000 | 33000 | OHMS    |
| GRID #3 RESISTANCE                                           | 2.2   | 2.2   | 2.2   | MEGOHMS |
| PLATE RESISTANCE (APPROX.)                                   | 0.50  | 0.40  | 0.20  | MEGOHMS |
| GRID #1 CURRENT (APPROX.)                                    |       | 60    |       | μA.     |
| CONVERSION TRANSCONDUCTANCE                                  |       | 320   |       | μMHOS   |
| PLATE CURRENT                                                |       | 350   |       | μA      |
| CATHODE CURRENT                                              |       | 1600  |       | μA      |
| GRID #3 VOLTAGE FOR $G_c = 5\mu\text{MHOS}$ (APPROX.)        |       | -3.0  |       | VOLTS   |
| GRID #3 VOLTAGE<br>FOR $G_c = 0.5\ \mu\text{MHOS}$ (APPROX.) |       | -4.0  |       | VOLTS   |

## → OSCILLATOR CHARACTERISTICS - NOT OSCILLATING

|                                                                      |      |       |
|----------------------------------------------------------------------|------|-------|
| GRID #3 VOLTAGE                                                      | 0    | VOLTS |
| GRID #1 VOLTAGE (OSCILLATOR GRID)                                    | 0    | VOLTS |
| GRID #2 & #4 CONNECTED TO PLATE                                      | 12.6 | VOLTS |
| TRANSCONDUCTANCE BETWEEN GRID #1, #2 & #4<br>CONNECTED TO PLATE      | 3600 | μMHOS |
| AMPLIFICATION FACTOR BETWEEN GRID #1, #2<br>AND 4 CONNECTED TO PLATE | 9.4  |       |
| CATHODE CURRENT                                                      | 4.5  | MA.   |
| GRID #1 VOLTAGE (APPROX.) FOR $I_b = 10\ \mu\text{A}$ .              | -3.7 | VOLTS |

A  
EXTERNAL SHIELD #316 CONNECTED TO CATHODE.B  
THE EQUIPMENT DESIGNER SHALL SO DESIGN THE EQUIPMENT THAT THE FILAMENT VOLTAGE IS CENTERED AT THE SPECIFIED BOGEY VALUE. FILAMENT SUPPLY VARIATIONS SHALL BE RESTRICTED TO MAINTAIN FILAMENT VOLTAGE WITHIN THE SPECIFIED TOLERANCE. FOR LONGEST LIFE IT IS RECOMMENDED THAT THE HEATER BE OPERATED WITHIN THE RANGE OF 11 TO 14 VOLTS.

→ INDICATES A CHANGE.

