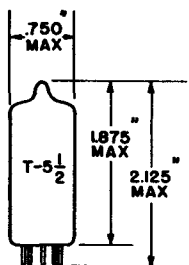


TUNG-SOL

→ TWIN TRIODE

MINIATURE TYPE



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

UNIPOTENTIAL CATHODE

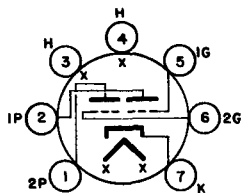
HEATER

6.3±10% VOLTS 0.45 AMP.

AC OR DC

OPERATING POSITION²²

²² ANY, BUT FOR UTMOST IN SERVICE, THE TUBE SHOULD BE OPERATED IN A VERTICAL POSITION WITH BASE UP OR DOWN, OR IN A HORIZONTAL POSITION WITH BASE PINS 1 & 6 IN A VERTICAL PLANE.



BOTTOM VIEW
BASING DIAGRAM
JEDEC 78F

THE 5964 IS A MEDIUM-MU TWIN TRIODE IN THE 7 PIN MINIATURE CONSTRUCTION. IT IS ESPECIALLY DESIGNED FOR FREQUENCY-DIVIDER CIRCUITS IN ELECTRONIC COMPUTERS AND OTHER 'ON-OFF' CONTROL APPLICATIONS REQUIRING LONG PERIODS OF OPERATION UNDER CUT-OFF CONDITIONS.

DIRECT INTERELECTRODE CAPACITANCES - APPROX.
WITHOUT EXTERNAL SHIELD

EACH UNIT

GRID TO PLATE	1.3	pf
GRID TO CATHODE AND HEATER	2.1	pf
PLATE TO CATHODE AND HEATER	0.4	pf
GRID OF UNIT #1 TO GRID OF UNIT #2 (MAX.)	0.5	pf

RATINGS

MAXIMUM ABSOLUTE VALUES

EACH UNIT

FREQUENCY DIVIDER IN COMPUTER SERVICE

AND

'ON-OFF' CONTROL SERVICE

MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM GRID VOLTAGE:		
NEGATIVE BIAS VALUE	100	VOLTS
POSITIVE BIAS VALUE	0	VOLTS
PEAK NEGATIVE VALUE	200	VOLTS
MAXIMUM PLATE DISSIPATION	1.5	WATTS
MAXIMUM GRID INPUT	0.1	WATT
MAXIMUM DC CATHODE CURRENT ^A	15	MA.
MAXIMUM PEAK CATHODE CURRENT ^A	75	MA.
MAXIMUM PEAK HEATER-CATHODE VOLTAGE:		
HEATER NEGATIVE WITH RESPECT TO CATHODE	90	VOLTS
HEATER POSITIVE WITH RESPECT TO CATHODE	90	VOLTS
MAXIMUM BULB TEMPERATURE (AT HOTTEST POINT ON BULB SURFACE)	150	°C

→ INDICATES A CHANGE.

CONTINUED ON FOLLOWING PAGE

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICSCLASS A AMPLIFIER - EACH UNIT
WITH BOTH UNITS OPERATING

PLATE VOLTAGE	100	VOLTS
CATHODE-BIAS RESISTOR	50	OHMS
AMPLIFICATION FACTOR	39	
PLATE RESISTANCE	6500	OHMS
TRANSCONDUCTANCE	6000	μ MHOS
PLATE CURRENT	9.5	MA.

FREQUENCY DIVIDER IN COMPUTER SERVICE
AND
'ON-OFF' CONTROL SERVICETYPICAL OPERATION AS FREQUENCY HALFER
EACH UNIT

	CUTOFF CONDITION	ZERO-BIAS CONDITION	
PLATE-SUPPLY VOLTAGE	150	150	VOLTS
PLATE-CIRCUIT RESISTANCE	20000	20000	OHMS
GRID-SUPPLY VOLTAGE	-10	0	VOLTS
GRID-CIRCUIT RESISTANCE	47000	47000	OHMS
PLATE CURRENT	0	5	MA.

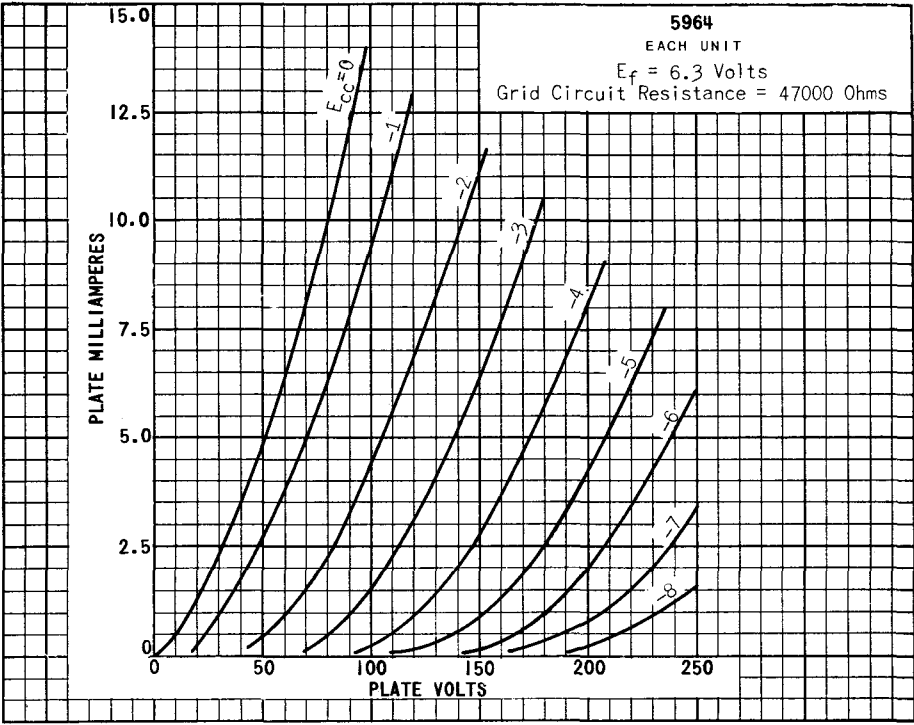
CIRCUIT VALUES

GRID-CIRCUIT RESISTANCE: (MAX.)		
FOR FIXED-BIAS OPERATION	0.5	MEGOHM
FOR CATHODE-BIAS OPERATION	1.0	MEGOHM

RANGE VALUES FOR EQUIPMENT DESIGN

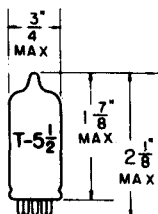
CUTOFF CONDITION	MIN.	MAX.	
PLATE CURRENT (EACH UNIT) ^B	---	0.075	MA.
DIFFERENCE IN PLATE CURRENT BETWEEN UNITS	---	0.2	MA.
ZERO-BIAS CONDITION			
PLATE CURRENT (EACH UNIT) ^C	4.3	5.7	MA.
DIFFERENCE IN PLATE CURRENT BETWEEN UNITS	---	1.4	MA.

^A WITH BOTH UNITS OPERATING, THE DC CATHODE CURRENT SHOULD NOT EXCEED 30 MILLIAMPERES,
AND THE PEAK CATHODE CURRENT SHOULD NOT EXCEED 150 MILLIAMPERES.^B FOR CONDITIONS WITH 6.3 VOLTS ON HEATER, PLATE-SUPPLY VOLTS = 150, PLATE-CIRCUIT RESISTANCE (OHMS) = 20000, GRID-SUPPLY VOLTS = -10, AND GRID-CIRCUIT RESISTANCE (OHMS) = 47000.^C CONDITIONS ARE SAME AS FOR NOTE 1 EXCEPT THAT GRID-SUPPLY VOLTS = 0.^{*} COMMON TO BOTH UNITS.



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TUNG-SOL

TRIODE
MINIATURE TYPE

GLASS BULB

UNIPOTENTIAL CATHODE

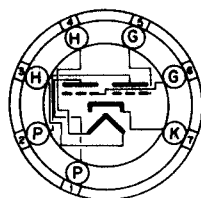
HEATER

6.3±10% VOLTS 0.45 AMP.

AC OR DC

OPERATING POSITION¹

¹ ANY, BUT FOR UTMOST IN SERVICE, THE TUBE SHOULD BE OPERATED IN A VERTICAL POSITION WITH BASE UP OR DOWN, OR IN A HORIZONTAL POSITION WITH BASE PINS 1 & 6 IN A VERTICAL PLANE.



BOTTOM VIEW
SMALL-BUT TON MINIATURE
7 PIN BASE
7 BF

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DIRECT INTERELECTRODE CAPACITANCES - APPROX.
WITHOUT EXTERNAL SHIELD

EACH UNIT

GRID TO PLATE	1.3	μμf
GRID TO CATHODE AND HEATER	2.1	μμf
PLATE TO CATHODE AND HEATER	0.4	μμf
GRID OF UNIT #1 TO GRID OF UNIT #2 (MAX.)	0.5	μμf

RATINGS

MAXIMUM ABSOLUTE VALUES

EACH UNIT

FREQUENCY DIVIDER IN COMPUTER SERVICE
AND
'ON-OFF' CONTROL SERVICE

HEATER VOLTAGE	6.3±10%	VOLTS
MAXIMUM PLATE VOLTAGE	250	VOLTS
MAXIMUM GRID VOLTAGE:		
NEGATIVE BIAS VALUE	100	VOLTS
POSITIVE BIAS VALUE	0	VOLTS
PEAK NEGATIVE VALUE	200	VOLTS
MAXIMUM PLATE DISSIPATION	1.5	WATTS
MAXIMUM GRID INPUT	0.1	WATT
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→ INDICATES A CHANGE.

CONTINUED ON FOLLOWING PAGE

TUNG-SOL

CONTINUED FROM PRECEDING PAGE

TYPICAL OPERATING CONDITIONS AND CHARACTERISTICSCLASS A AMPLIFIER - EACH UNIT
WITH BOTH UNITS OPERATING

HEATER VOLTAGE	6.3±10%	VOLTS
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AND
'ON-OFF' CONTROL SERVICETYPICAL OPERATION AS FREQUENCY HALFER
EACH UNIT

	CUTOFF CONDITION	ZERO-BIAS CONDITION	
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GRID-CIRCUIT RESISTANCE	47000	47000	OHMS
PLATE CURRENT	0	5	MA.

CIRCUIT VALUES

GRID-CIRCUIT RESISTANCE: (MAX.) FOR FIXED-BIAS OPERATION	0.5	MEGOHM
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RANGE VALUES FOR EQUIPMENT DESIGN

CUTOFF CONDITION	MIN.	MAX.	
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→ INDICATES A CHANGE