TUNG-SOL

PENTODE

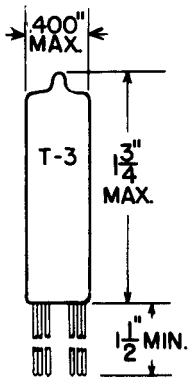
SUBMINIATURE TYPE

COATED UNIPOTENTIAL CATHODE

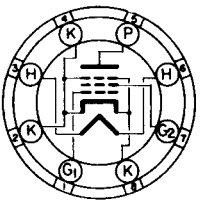
HEATER
6.3 VOLTS 0.45 AMP.

AC OR DC

ANY MOUNTING POSITION



GLASS BULB



BOTTOM VIEW
SUBMINIATURE BUTTON
8 FLEXIBLE LEADS
8DL

THE 5639 IS A RUGGEDIZED PENTODE IN THE 8 LEAD BUTTON SUBMINIATURE CONSTRUCTION. IT IS DESIGNED FOR USE IN BROAD BAND AMPLIFIER APPLICATIONS SUCH AS IN RADAR AND VIDEO AMPLIFIER SERVICE. CONTROLS ON THE PRODUCT AVERAGE FOR HEATER CURRENT ASSURE THAT THIS CHARACTERISTIC WILL REMAIN WELL CENTERED. SINCE IT MUST BE ABLE TO WITHSTAND SEVERE MECHANICAL TESTS TO MEET TEST SPECIFICATIONS, THE 5639 IS ESPECIALLY SUITED FOR USE IN INDUSTRIAL AND MILITARY AIRBORNE EQUIPMENT WHICH MAY BE SUBJECTED TO SEVERE SHOCK AND VIBRATION.

DIRECT INTERELECTRODE CAPACITANCES

	WITHOUT SHIELD	WITH SHIELD[A]	
MAXIMUM GRID #1 TO PLATE (RATED)	0.18	0.13	μμf
INPUT: (RATED)	9.0	9.0	μμf
MAXIMUM	---	10.0	μμf
MINIMUM	---	8.0	μμf
OUTPUT: (RATED)	4.6	8.0	μμf
MAXIMUM	---	9.0	μμf
MINIMUM	---	7.0	μμf

RATINGS
ABSOLUTE MAXIMUM VALUES

HEATER VOLTAGE	6.3±5%	VOLTS
MAXIMUM DC PLATE VOLTAGE	165	VOLTS
MAXIMUM DC GRID #1 VOLTAGE	0	VOLTS
MAXIMUM DC GRID #2 VOLTAGE	155	VOLTS
MAXIMUM HEATER-CATHODE VOLTAGE	±200	VOLTS
MAXIMUM GRID #1 RESISTANCE	0.5	MEG
MAXIMUM DC CATHODE CURRENT	40	mA
MAXIMUM PLATE DISSIPATION	3.5	WATTS
MAXIMUM GRID #2 DISSIPATION	1.0	WATT
MAXIMUM BULB TEMPERATURE	+220	°C
MAXIMUM ALTITUDE	60 000	FEET
LIFE EXPECTANCY (30°C AMBIENT TEMPERATURE)	5 000	HOURS

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TUNG-SOL

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TYPICAL OPERATING CONDITIONS AND CHARACTERISTICS

HEATER VOLTAGE	6.3	VOLTS
DC PLATE VOLTAGE	150	VOLTS
DC GRID #2 VOLTAGE	100	VOLTS
CATHODE BIAS RESISTOR	100	OHMS
PLATE CURRENT	21	mA
GRID #2 CURRENT	4.0	mA
TRANSCONDUCTANCE	9 000	μMHOS
PLATE RESISTANCE	50 000	OHMS
GRID #1 VOLTAGE FOR 10μa PLATE CURRENT	-14	VOLTS
NOISE OUTPUT VOLTAGE (MAXIMUM) [B]	200	mV

CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

R_k = 100 OHMS, E_f = 6.3V, E_b = 150Vdc, E_{c1} = 0Vdc, E_{c2} = 100Vdc, E_{hk} = 0V
EXCEPT AS MODIFIED BELOW

	INITIAL				500 HOUR LIFE TEST		
	INDIVIDUAL MIN.	INDIVIDUAL MAX.	PROD. MIN.	AVG. MAX.	INDIVIDUAL MIN.	INDIVIDUAL MAX.	
HEATER CURRENT	420	480	432	468	414	492	mA
HEATER-CATHODE LEAKAGE (E_{hk} = ± 100Vdc)	---	15	---	---	---	60	μAdc
GRID #1 CURRENT (R_{g1}=1.0 MEG.)	0	-1.0	---	---	0	-2.0	μAdc
PLATE CURRENT (1)	14.0	28.0	---	---	---	---	mAdc
PLATE CURRENT (2) (E_{c1}=-14.0Vdc, R_k=0)	---	75	---	---	---	---	μAdc
TRANSCONDUCTANCE (1)	7500	10 500	---	---	μMHOS---	20[C]	PERCENT
ΔAVG. TRANSCONDUCTANCE (1)	---	---	---	---	---	15	PERCENT
INSULATION OF ELECTRODES [E] R(g1-all)	100	---	---	---	50	---	MEGOHMS
R(p-all)	100	---	---	---	50	---	MEGOHMS
POWER OUTPUT [F] (E_{sig}=2.0Vac, R_p=9000)	0.75	---	---	---	---	---	WATT
SCREEN GRID CURRENT	2.0	6.0	---	---	---	---	mAdc
TRANSCONDUCTANCE (2) (E_f =5.7V)	---	10	---	---	---	15	PERCENT
GRID EMISSION [H] (E_f =7.5V, E_{c1}=14Vdc, R_{g1}=1.0 meg., R_k=0)	0	-2.0	---	---	---	---	μAdc
PLATE RESISTANCE	0.040	---	---	---	---	---	MEGOHM

SPECIAL REQUIREMENTS

	MIN.	MAX.	
CONTINUITY AND SHORTS [J]	---	---	
AF NOISE [K] (E_{sig} = 200mVac, E_{c2}=-100Vdc, E_{c1}=-2.5Vdc, R_{g1}=0.5 meg., R_{g2}=0.01 meg., R_p=2000, R_k=0, C_{g2}=4μf)	---	17	VU
LOW PRESSURE VOLTAGE BREAKDOWN (PRESSURE =55±5mm mercury, VOLTAGE =300Vac)	---	---	
VARIABLE FREQUENCY VIBRATION [M] (NO VOLTAGES: POST SHOCK AND VIBRATIONAL FATIGUE TEST END POINTS APPLY)	---	---	
LOW FREQUENCY VIBRATION [NP] (R_p=2000, C_k=1000μf, G=15, F=40 cps)	---	100	mVac
SUBMINIATURE LEAD FATIGUE [Q]	4	---	ARCS
SHOCK [R] (HAMMER ANGLE=30°, E_{hk}= 100Vdc, R_{g1}=0.1 meg.)	---	---	
VIBRATIONAL FATIGUE [S] (G=2.5; FIXED FREQUENCY; F=25 min., 60 max.)	---	---	

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SPECIAL REQUIREMENTS — CONT'D.

	MIN.	MAX.	
POST SHOCK AND VIBRATIONAL FATIGUE TEST END POINTS			
LOW FREQUENCY VIBRATION	---	350	mVac
HEATER CATHODE LEAKAGE (E_{hk}=±100Vdc)	---	±40	μAdc
Δ TRANSCONDUCTANCE (1) OF INDIVIDUAL TUBES	---	20	PERCENT
1 HOUR STABILITY LIFE TEST			
(E_{hk}= 200Vdc, R_{g1}=0.5 meg., TA=Room)	---	---	
STABILITY LIFE TEST END POINTS			
ΔTRANSCONDUCTANCE (1) INDIVIDUAL TUBES	---	10	PERCENT
100 HOUR SURVIVAL RATE LIFE TEST			
STABILITY LIFE TEST CONDITIONS OR EQUIVALENT	---	---	
SURVIVAL RATE LIFE TEST END POINTS			
CONTINUITY AND SHORTS	---	---	
TRANSCONDUCTANCE (1)	6750	---	μMHOS
HEATER CYCLING LIFE TEST			
(E_f=7.0V, 1 min. on, 4 min. off, E_{hk}=140Vac, E_{c1}=E_{c2}=E_b=0)	---	---	
INTERMITTENT LIFE TEST			
STABILITY LIFE TEST CONDITIONS			
(T-BULB=+220°C min.)	---	---	

NOTES

A WITH SHIELD OF 0.405" INSIDE DIAMETER CONNECTED TO CATHODE.

B ACROSS A PLATE RESISTOR OF 2,000 OHMS WITH APPLIED VIBRATIONAL ACCELERATION OF 15g AT 40 CYCLES PER SECOND.

C CHANGE IN TRANSCONDUCTANCE (1) OF INDIVIDUAL TUBES.

E SEE MIL-E-1C 4.8.2

F SEE MIL-E-1C 4.10.16.1

G TRANSCONDUCTANCE (2) IS THE PERCENT CHANGE IN TRANSCONDUCTANCE (1) OF AN INDIVIDUAL TUBE TYPE RESULTING FROM THE CHANGE IN Ef.

H PRIOR TO THIS TEST TUBES SHALL BE PREHEATED 5 MINUTES AT CONDITIONS INDICATED. TEST WITHIN 3 SECONDS AFTER PREHEATING. THREE MINUTE TEST IS NOT PERMITTED. GRID EMISSION SHALL BE THE LAST TEST PERFORMED ON THE SAMPLE SELECTED FOR THE GRID EMISSION TEST. CONDITIONS FOR TEST ARE AS FOLLOWS: Ef=7.5V, Ec1=0Vdc, Ec2=100Vdc, Ec3=0Vdc, Eb=150Vdc, Rk=100 OHMS, Rg1=0.5 MEG.

J SEE MIL-E-1C 4.7.5

K SEE MIL-E-1C 4.10.3.2

L THERE SHALL BE NO EVIDENCE OF ARCING OR CORONA BETWEEN ANODE PINS AND ADJACENT PINS WITH NO OTHER VOLTAGE APPLIED.

M SEE MIL-E-1C 4.9.20.3

N SEE MIL-E-1C 4.9.19.1

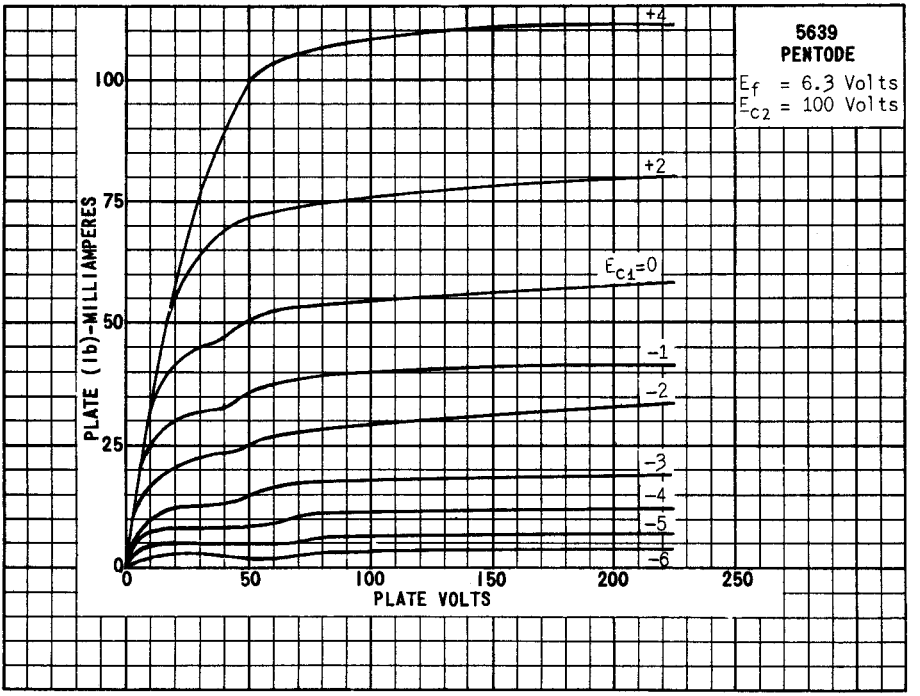
P FOR VIBRATION TESTS, THE IMPEDANCE OF THE PLATE VOLTAGE SUPPLY (AND SCREEN VOLTAGE SUPPLY IF ONE IS INDICATED) SHALL NOT EXCEED THAT OF A 40μf CAPACITOR AT 10 CPS.

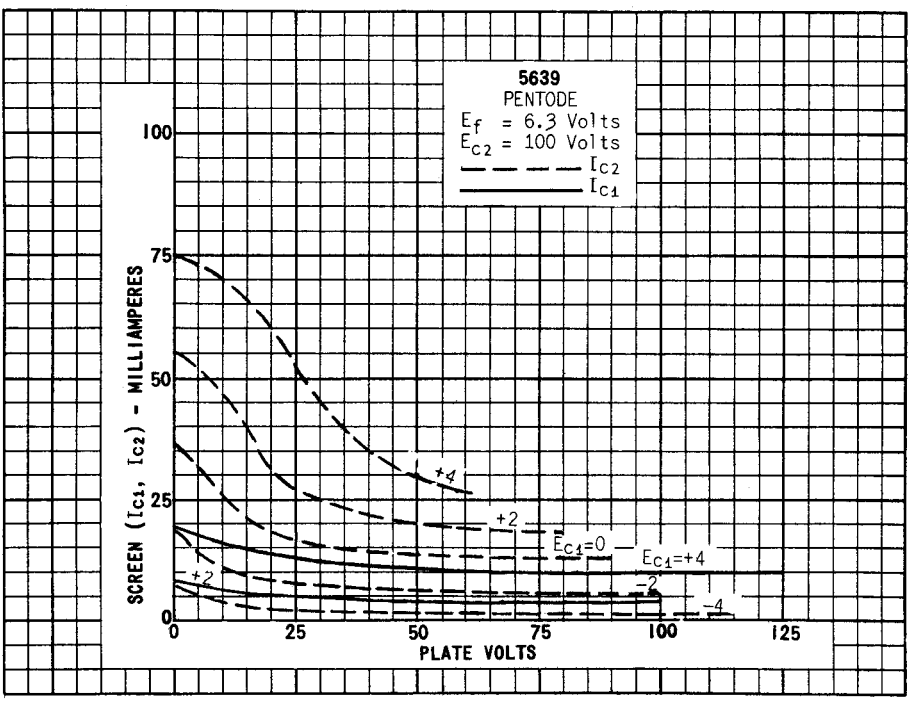
Q SEE MIL-E-1C 4.9.5.3

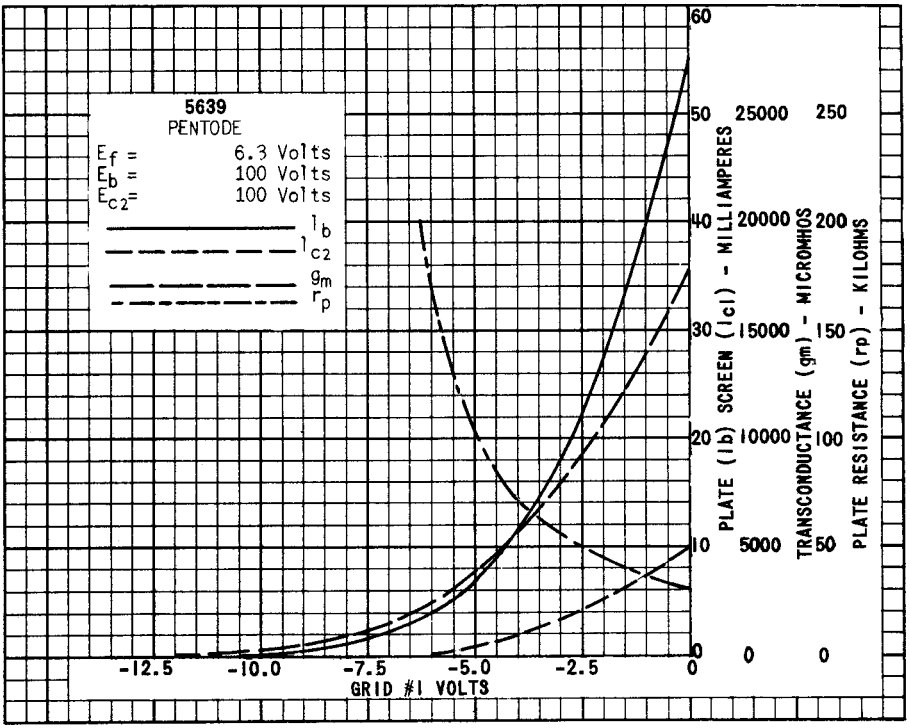
R SEE MIL-E-1C 4.9.20.5

S SEE MIL-E-1C 4.9.20.6

5639
PREMIUM TUBE






5639
PENTODE
Ef = 6.3 Volts
Eb = 100 Volts
Ec2= 100 Volts
Ib
Ic2
gm
rp
60
50
40
30
20
10
0
25000
20000
15000
10000
5000
0
250
200
150
100
50
0
PLATE (Ib) SCREEN (Ic1) - MILLIAMPERES
TRANSCONDUCTANCE (gm) - MICROMHOS
PLATE RESISTANCE (rp) - KILOHMS
-12.5
-10.0
-7.5
-5.0
-2.5
0
GRID #1 VOLTS