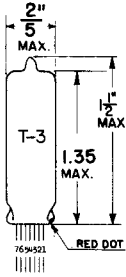


**TUNG-SOL**

**PENTODE**

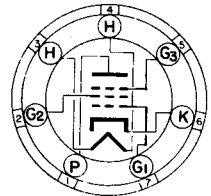
SUBMINIATURE TYPE



**GLASS BULB**

HEATER

ANY MOUNTING POSITION



**BOTTOM VIEW**

0.016" TINNED  
FLEXIBLE LEADS  
0.048" CENTER-TO-CENTER

THE 6245 IS A HEATER-CATHODE TYPE SHARP-CUTOFF PENTODE OF SUBMINIATURE CONSTRUCTION CAPABLE OF OPERATION IN THE UHF REGION. THE CONTROLLED CHARACTERISTICS GIVE UNIFORM PERFORMANCE AT LOW VOLTAGES. IT IS DESIGNED FOR SERVICE WHERE SEVERE CONDITIONS OF HIGH TEMPERATURE AND MECHANICAL SHOCK OR VIBRATION ARE ENCOUNTERED. A SEPARATE TERMINAL CONNECTION IS PROVIDED FOR GRID #3, WHICH UNDER SELF-BIAS CONDITIONS CAN BE CONNECTED DIRECTLY TO GROUND, PERMITTING THE CATHODE BY-PASS CAPACITOR TO BE OMITTED FOR LOWER GRID LOADING. THE FLEXIBLE LEADS MAY BE SOLDERED OR WELDED DIRECTLY TO CIRCUIT COMPONENTS WITHOUT THE USE OF SOCKETS. STANDARD SUBMINIATURE SOCKETS MAY BE USED BY CUTTING THE LEADS TO 0.20" LENGTH.

**RATINGS**

MECHANICAL

MAXIMUM IMPACT ACCELERATION (SHOCK TEST-NOTE 3)	450	G
MAXIMUM UNIFORM ACCELERATION (CENTRIFUGE TEST-NOTE 4)	1000	G
MAXIMUM VIBRATIONAL ACCELERATION (96 HOUR FATIGUE TEST -NOTE 5)	2.5	G
MAXIMUM BULB TEMPERATURE	265	°C

**RATINGS**

AND NORMAL OPERATION

MIL-E-1B SYMBOL	ABS MIN.	NORM. TEST CONDITIONS (NOTE 7)	NORMAL OPERATION (NOTE 6)	ABS MAX	MIL-E-1B UNITS	
HEATER VOLTAGE (NOTE 8)	Ef	5.7	6.3	6.9	V	
PLATE VOLTAGE	Eb:		120	200	Vdc	
GRID #1 VOLTAGE	Ec1:	-55	0	0	Vdc	
GRID #2 VOLTAGE	Ec2:		120	30	155	Vdc
GRID #3 VOLTAGE	Ec3:		0	0	Vdc	
PLATE DISSIPATION	Pp:			0.05	1.85	W
GRID #2 DISSIPATION	Pg2:			0.03	0.55	W
GRID #1 CIRCUIT RESISTANCE	Rg1:			1.0		MEG.
HEATER-CATHODE VOLTAGE	Ehk:	-200		100	+200	Vdc
CATHODE CURRENT	Ik:	0.5			20	mAcd
CATHODE RESISTANCE	Rk:		200	0		OHMS

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## TUNG-SOL

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

TEST	AQL %	MIL-E-1B SYMBOL	MIN.	LAL	BOG	UAL	MAX	ALD	MIL-E-1B UNITS
CONTINUITY & TAP SHORTS:	0.4								
ACCEPTANCE TESTS GROUP A.									
		COMBINED AQL=2.5%							
HEATER CURRENT:	0.65	lf:	183		200		217		mA
HEATER-CATHODE LEAKAGE (1): Ehk=+100 Vdc	0.65	lhk(1):					7		$\mu$ Adc
HEATER-CATHODE LEAKAGE (2): Ehk=-100 Vdc	0.65	lhk(2):					-7		$\mu$ Adc
GRID CURRENT (1)	0.65	lc1(1):					-0.1		$\mu$ Adc
PLATE CURRENT (1):	0.65	lb(1):	5.5	6.9	7.5	8.1	9.5	2.3	mAdc
PLATE CURRENT (2): Ec1 =-9.0 Vdc	0.65	lb(2):					50		$\mu$ Adc
TRANSCONDUCTANCE (1):	0.65	Sm(1):	4200	4775	5000	5225	5800	860	$\mu$ MHOS
TRANSCONDUCTANCE (3): Eb =20 Vdc; Ec2=30 Vdc; Ec1=Ec3 =0; Rg1 = 500 OHMS MAX; Rk = 0	0.65	Sm(3):	2250		3275		4300		$\mu$ MHOS
PLATE CURRENT (3): Eb =20 Vdc; Ec2=30 Vdc; Ec1 = Ec3 = 0; Rg1 = 500 OHMS MAX. Rk =0.	0.65	lb(3):	1.0		2.5		4.0		mAdc
SCREEN CURRENT (2): Eb = 20 Vdc; Ec2 =30 Vdc; Ec1=Ec3 =0; Rg1 = 500 OHMS MAX. Rk =0.	0.65	lc2(2):					1.5		mAdc
ACCEPTANCE TEST GROUP B									
INSULATION OF ELECTRODES: Ef =6.3 V									
Eg-all=-100 Vdc	2.5	Rg1-all:	100						MEG.
Ep-all=-300 Vdc	2.5	Rp-all:	100						MEG.
SCREEN CURRENT:	2.5	lc2(1):	1.7	2.4	2.6	2.8	3.5	0.8	mAdc
TRANSCONDUCTANCE (2): Ef=5.5 V (NOTE 9)	2.5	$\Delta$ Sm(2):					10		PERCENT
AF NOISE: Esig=50 mVac; Rg1 =0.1 MEG; Ec2 =19 Vdc; Rg2 = 1000 OHMS; Rp =0.2 MEG.	2.5	EB:					17		VU
VIBRATION: F = 40 cps; G= 15; Rp = 10,000 OHMS	2.5	Ep:					50		mVac
SUBMINIATURE LEAD FATIGUE TEST:	2.5		4.0						arcs
ACCEPTANCE TEST GROUP C									
GRID CURRENT (2): AFTER 5 MINUTES AT Ef=7.0 V; MEASURE GRID CURRENT AT Ef =7.0 V; 3 MINUTE TEST NOT PERMITTED.	6.5	lc1(2):					-0.1		$\mu$ Adc

**TUNG-SOL**

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

TEST	AQL %	MIL-E-1B SYMBOL	MIN	LAL	BOG	UAL	MAX	ALD	MIL-E-1B UNITS
ACCEPTANCE TESTS GROUP C - cont'd.									
PLATE RESISTANCE:	6.5	Rp:	0.15						MEG.
CAPACITANCE:		Cg1p:				0.03			μμf
CAPACITANCE: (NOTE 2)	6.5	Cin:	3.6	4.35		5.1			μμf
CAPACITANCE:		Cout:	2.6	3.15		3.7			μμf

TEST	AQL %	MIL-E-1B SYMBOL	MIN.	MAX.	MIL-E-1B UNITS
ACCEPTANCE TESTS GROUP D					
SHOCK HAMMER ANGLE =30° NOTE 3					
POST SHOCK LIMITS:					
VIBRATION: F=40 cps; G=15; Rp=10,000 OHMS					
HEATER-CATHODE LEAKAGE (1): Ehk=±100 Vdc		Ep:		100	mVac
HEATER-CATHODE LEAKAGE (2): Ehk=-100 Vdc		lhk(1):		20	μAdc
TRANSC. (1) CHANGE OF INDIVIDUAL TUBES FROM INITIAL: Ef = 6.3 V.		lhk(2):		-20	μAdc
		ΔSm(1):		20	%
FATIGUE: 96 HOURS; NOTE 5					
POST FATIGUE LIMITS:					
VIBRATION: F=40 cps; G=15; Rp=10,000 OHMS					
HEATER-CATHODE LEAKAGE (1): Ehk =± 100 Vdc		Ep:		100	mVac
HEATER-CATHODE LEAKAGE (2): Ehk=-100 Vdc		lhk(1):		10	μAdc
TRANSC. (1) CHANGE OF INDIVIDUAL TUBES FROM INITIAL: Ef = 6.3 V		lhk(2):		-10	μAdc
		ΔSm(1):		15	%
ACCEPTANCE TESTS GROUP E					
GLASS STRAIN (THERMAL SHOCK):			10		
VISUAL AND MECHANICAL INSPECTION:					
MAJOR COMBINED			0.4		
MINOR A COMBINED			2.5		
MINOR B PER ITEM			6.5		

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

TEST	AQL %	MIL-E-1B SYMBOL	MIN.	MAX.	MIL-E-1B UNITS
ACCEPTANCE LIFE TESTS					
HEATER CYCLE: E <sub>f</sub> = 7.5 V; E <sub>b</sub> = E <sub>c1</sub> = E <sub>c2</sub> = E <sub>c3</sub> = 0V; E <sub>hk</sub> = 140 Vac; 1 MIN ON, 1 MIN. OF F					
1 HOUR STABILITY LIFE TEST: TA = ROOM: E <sub>hk</sub> = +200 Vdc; R <sub>g1</sub> = 1.0 MEG.			2000		CYCLES
1 HOUR STABILITY LIFE TEST END POINTS: TRANSC. (1) CHANGE OF INDIVIDUAL TUBES TUBES FROM INITIAL: (TYPICAL SAMPLE SIZE = 25 TUBES)					
	10	ΔS <sub>m</sub> (1):		8.0	PERCENT
100 HOUR SURVIVAL RATE LIFE TEST: TA = ROOM: E <sub>hk</sub> = +200 Vdc; R <sub>g1</sub> = 1.0 MEG.					
100 HOUR SURVIVAL RATE LIFE TEST END POINTS: INOPERATIVES: (TYPICAL SAMPLES SIZE = 200 TUBES)					
			0.4		
TRANSCOND. (1): (TYPICAL SAMPLE SIZE = 25 TUBES)					
	1.0	S <sub>m</sub> (1):	3250		μMHOS

TEST	MAX. DEFECTS PER CHARACTERISTICS	MIL-E-1B SYMBOL	MIN.	MAX.	MIL-E-1B UNITS
500 HOUR INTERMITTENT HIGH TEMPERATURE LIFE TEST (1): TA = 200°C; E <sub>hk</sub> = +200 Vdc; R <sub>g1</sub> = 1.0 MEG.					
500 HOUR INTERMITTENT HIGH TEMPERATURE LIFE TEST (1) END POINTS: (TYPICAL SAMPLE SIZE = 20 TUBES) (TOTAL ALLOWABLE COMBINED DEFECTS = 4 TUBES)					
INOPERATIVES: 1					
HEATER CURRENT:	4	I <sub>f</sub> :	183	217	mA
HEATER CATHODE LEAKAGE (1):	2	I <sub>hk</sub> (1):	0	10	μAdc
HEATER CATHODE LEAKAGE (2):	2	I <sub>hk</sub> (2):	0	~10	μAdc
GRID CURRENT (1):	2	I <sub>c1</sub> (1):	0	-0.3	μAdc
GRID CURRENT (2):	2	I <sub>c1</sub> (2):	0	-0.3	μAdc
TRANSC. (1) CHANGE OF INDIVIDUAL TUBES FROM INITIAL:					
	1	ΔS <sub>m</sub> (1):		25	PERCENT
TRANSC. (2) CHANGE OF INDIVIDUAL TUBES FROM					
E <sub>f</sub> = 6.3 TO 5.5 V:	4	ΔS <sub>m</sub> (2):		15	PERCENT
INSULATION OF ELECTRODES:	4	R <sub>g1-all</sub> :	50		MEG.
INSULATION OF ELECTRODES:	4	R <sub>p-all</sub> :	50		MEG.

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

## TEST

5000 HOUR INTERMITTENT LIFE TEST (2):

TA = ROOM; E<sub>bk</sub>=+200 Vdc; R<sub>g1</sub> =1.0 MEG.

5000 HOUR INTERMITTENT LIFE TEST (2)

END POINTS:

READ FOR SAME CHARACTERISTICS AS FOR LIFE

TEST (1): LIMITS NOT ESTABLISHED.

## NOTES

- NOTE 1: CHARACTERISTICS, QUALITY CONTROL TEST PROCEDURES, AND INSPECTION LEVELS ARE MADE ACCORDING TO THE APPROPRIATE PARAGRAPHS OF MIL-E-1B, "INSPECTION INSTRUCTIONS FOR ELECTRON TUBES" AND MIL-STD-105A.
- NOTE 2: WITH A CYLINDRICAL SHIELD ( 0.405" I.D.-1 7/8" LONG ) CONNECTED TO LEAD 6.
- NOTE 3: TEST CONDITIONS AND ACCEPTANCE CRITERIA PER SHOCK TEST PROCEDURES OF MIL-E-1B BASIC SPECIFICATION.
- NOTE 4: CENTRIFUGE TEST WITH FORCES APPLIED IN ANY DIRECTION.
- NOTE 5: TEST CONDITIONS AND ACCEPTANCE CRITERIA PER FATIGUE TEST PROCEDURES OF MIL-E-1B BASIC SPECIFICATIONS.
- NOTE 6: THESE NORMAL VALUES REPRESENT CONDITIONS AT WHICH CONTROL OF RELIABILITY MAY BE EXPECTED.
- NOTE 7: THESE NORMAL TEST CONDITIONS ARE USED FOR ALL CHARACTERISTIC TESTS UNLESS OTHERWISE STATED UNDER THE INDIVIDUAL TEST ITEM.
- NOTE 8: 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.
- NOTE 9: CHANGE OF TRANSCONDUCTANCE FOR INDIVIDUAL TUBES FROM THAT VALUE MEASURED AT  $E_f = 6.3$  V TO THAT VALUE MEASURED AT  $E_f = 5.5$  V.

