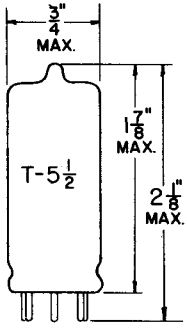
TUNG-SOL

HEPTODE CONVERTER

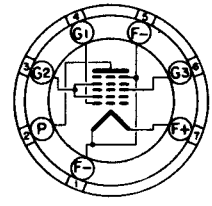
MINIATURE TYPE



GLASS BULB

HEATER

ANY MOUNTING POSITION



BOTTOM VIEW
MINIATURE BUTTON
7AT

THE 1R5WA IS A FILAMENT TYPE HEPTODE CONVERTER IN THE 7 PIN MINIATURE CONSTRUCTION. IT IS DESIGNED FOR USE AS A COMBINED OSCILLATOR AND MIXER IN BATTERY OPERATED EQUIPMENT. ITS PRINCIPAL APPLICATION IS AS A MIXER IN OSCILLATOR SECTIONS OF PORTABLE RECEIVERS. THE 1R5WA IS PARTICULARLY USEFUL IN CIRCUITS WHERE ITS LOW MICROPHONIC NOISE AND VIBRATION OUTPUT ARE ESSENTIAL FOR SPECIALIZED MILITARY EQUIPMENT.

RATINGS

MECHANICAL

MAXIMUM IMPACT ACCELERATION (SHOCK TEST-NOTE 2)	450	G
MAXIMUM VIBRATIONAL ACCELERATION (96 HR. FATIGUE TEST-NOTE 3)	2.5	G

RATINGS

AND NORMAL OPERATION

	MIL-E-1 SYMBOL	DES. MIN.	NORM. TEST CONDITIONS NOTE 5	NORM. OPERATION NOTE 4	DES. MAX.	MIL-E-1 UNITS
HEATER VOLTAGE (NOTE 6)	Ef:	1.00	1.25	1.25	1.50	Vdc
PLATE VOLTAGE (NOTE 7)	Eb:	---	90	90	100	Vdc
GRID VOLTAGE	Ec1:	---	0	0	---	Vdc
GRID VOLTAGE #2 (NOTE 7)	Ec2	---	45	45	75	Vdc
PLATE DISSIPATION	Pp:	---	---	---	0.1	WATTS
GRID #2 DISSIPATION	Pg(2&4):	---	---	---	0.19	WATTS
GRID RESISTANCE	Rg(1):	---	0.1	0.1	---	MEG.
CONVERSION TRANSCON.	Sc:	---	---	235	---	μMHOS
PLATE CURRENT	Ib1:	---	---	0.90	---	mAdc
GRID VOLTAGE #3	Ec3:	---	0	0	0	Vdc
CATHODE CURRENT	Ik:	---	---	---	6.5	mAdc

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CHARACTERISTICS AND QUALITY CONTROL[1]

TEST	AQL %	MIL-E-1 SYMBOL	MIN.	LAL	BOG	UAL	MAX	ALD	MIL-E-1 UNITS
MEASUREMENTS ACCEPTANCE TESTS PART 1		COMBINED AQL=1.0% EXCLUDING MECH. AND INOPERATIVES							
GRID CURRENT (1): Ec3=-1 Vdc Eg1=15 Vac (NOTE 9)	0.65	Ic3:	0	---	---	---	-0.6	---	μAdc
PLATE CURRENT (1): Eg1=15 Vac (NOTE 9)	0.65	Ib:	0.55	---	---	---	1.25	---	mAdc
CATHODE CURRENT: Eg1=15 Vac; (NOTE 9)	0.65	Ik:	2.25	---	---	---	4.75	---	mAdc
CONVERSION TRANS-CONDUCTANCE (1): Eg1=15Vac; Ef = 1.0 Vdc (NOTE 9)	0.65	Sc:	130	---	---	---	340	---	μMHOS
OSCILLATOR GRID CURRENT: Ef=1.0 Vdc; PLATE FLOATING (NOTE 10)	0.65	Ic1:	125	---	---	---	---	---	μAdc
NOISE AND MICROPHONICS: Ebb=Ecc2&4 =Ecc3=135 Vdc; Ecal=10.0 mVac Rp=2.2 MEG; Rg2&4 =4MEG; Cg2&4=0.01 μf TO F-; Rg3=8 MEG.	0.65	Eb:	---	---	---	---	17	---	VU
CONTINUITY AND SHORTS: (INOPERATIVES)	0.4	---	---	---	---	---	---	---	---
MECHANICAL: ENVELOPE OUTLINE (6-2)	---	---	---	---	---	---	---	---	---
MEASUREMENTS ACCEPTANCE TESTS, PART 2									
INSULATION OF ELECTRODES: g1-all		Rg-all:	100	---	---	---	---	---	MEG.
p-all	4.0	Rp-all:	100	---	---	---	---	---	MEG.
g3-all		Rg3-all:	100	---	---	---	---	---	MEG.
CONVERSION TRANSCON DUCTANCE (2): Eg1=15 Vac (NOTE 9)	6.5	Sc:	160	---	---	---	340	---	μMHOS
FILAMENT CURRENT:	6.5	If:	44	---	---	---	56	---	mA
CAPACITANCE: WITHOUT SHIELD		Cg3-all:	4.7	---	---	---	6.9	---	μμf
WITHOUT SHIELD	6.5	Cp-all:	5.0	---	---	---	7.5	---	μμf
WITHOUT SHIELD		Cg3-p:	---	---	---	---	0.45	---	μμf
VIBRATION (1): Rp=10,000 OHMS; Ec1=-5 Vdc; 40 cps; 15g; Rg1=0	6.5	Ep(1):	---	---	---	---	10	---	mVac
VIBRATION (2): F=50cps-3500 cps; Rp= 10,000 OHMS; Ec1=-5Vdc; Rg1=0; (NOTE 8)	6.5	Ep(1):	---	---	---	---	25	---	mVac

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CHARACTERISTICS AND QUALITY CONTROL[1] - cont'd.

TEST	AQL %	MIL-E-1 SYMBOL	MIN	LAL	BOG	UAL	MAX.	ALD	MIL-E-1 UNITS
DEGRADATION RATE ACCEPTANCE TESTS	COMBINED AQL=1.0% EXCLUDING MECH. AND INOPERATIVES								
SHOCK: HAMMER ANGLE= 30°	---	---	---	---	---	---	---	---	---
FATIGUE: G=2.5; F=25 MIN; 60 MAX. FIXED FREQUENCY	6.5	---	---	---	---	---	---	---	---
POST SHOCK AND FATIGUE TEST END POINTS: CONVERSION TRANS-CONDUCTANCE (2):	---	Sc:	125	---	---	---	---	---	μMHOS
VIBRATION (1):	---	Ep:	---	---	---	---	15	---	mVac
MINIATURE TUBE BASE STRAIN:	---	---	---	---	---	---	---	---	---
GLASS STRAIN:	2.5	---	---	---	---	---	---	---	---

	ALLOWABLE DEF. PER CHARACTER. 1st SAMP.	COMB. SAMP.	AQL %	MIL-E-1 SYMBOL	LIMITS MIN	MAX	MIL-E-1 UNITS
ACCEPTANCE LIFE TESTS							
INTERMITTENT LIFE TEST: Ef=1.25 Vdc; OR Vac WITH EQUIVALENT BIAS: GROUP A; Ecal=-16.0 Vdc; Esig=17.5 Vac; Ec 2&4=67.5 Vac; (NOTE 12)	---	---	---	t:	500	---	HOURS
INTERMITTENT LIFE TEST END POINTS: CONVERSION TRANS-CONDUCTANCE (2):	---	---	---	Sc:	125	---	μMHOS
OSCILLATOR GRID CURRENT	---	---	---	Ic1:	100	---	μAdc

NOTES

1. CHARACTERISTICS, QUALITY CONTROL PROCEDURES, AND INSPECTION LEVELS ARE MADE ACCORDING TO THE APPROPRIATE PARAGRAPH OF MIL-E-1, AND MIL-STD-105A.
2. TEST CONDITIONS AND ACCEPTANCE CRITERIA PER SHOCK TEST PROCEDURES OF MIL-E-1 BASIC SPECIFICATIONS.

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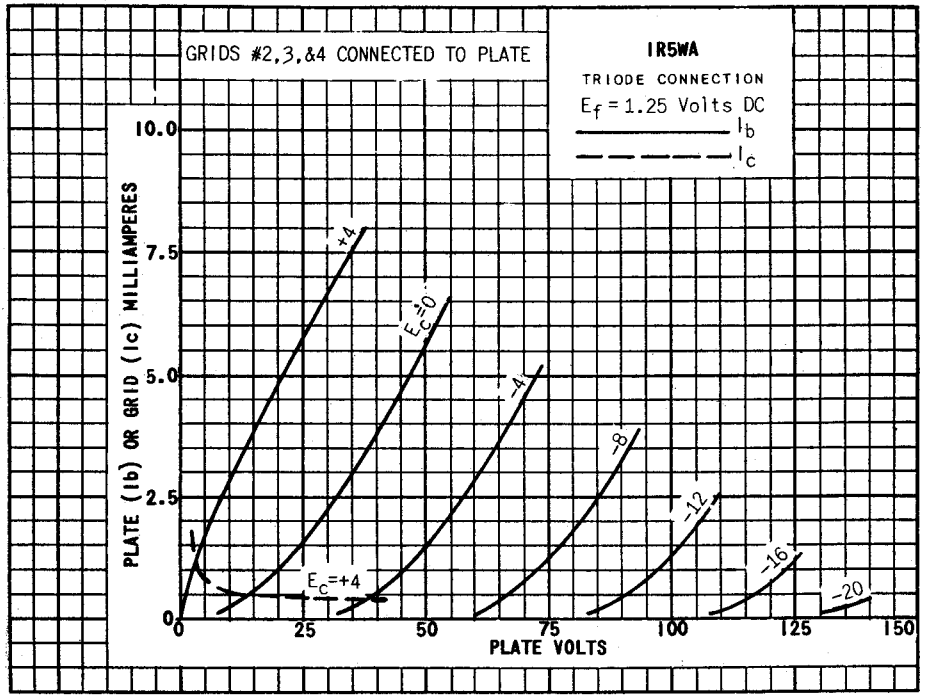
NOTES - CONT'D.

3. TEST CONDITIONS AND ACCEPTANCE CRITERIA PER FATIGUE TEST PROCEDURES OF MIL-E-1 BASIC SPECIFICATIONS.
4. THESE NORMAL VALUES REPRESENT CONDITIONS AT WHICH CONTROL OF RELIABILITY MAY BE EXPECTED.
5. THESE NORMAL TEST CONDITIONS ARE USED FOR ALL CHARACTERISTICS UNLESS OTHERWISE STATED UNDER THE INDIVIDUAL TEST ITEM.
6. FOR MOST APPLICATIONS THE PERFORMANCE WILL NOT BE ADVERSELY AFFECTED BY ±10% HEATER VOLTAGE VARIATION, BUT WHEN THE APPLICATION CAN PROVIDE A CLOSER CONTROL OF HEATER VOLTAGE, AN IMPROVEMENT IN RELIABILITY WILL BE REALIZED.
7. PLATE AND SCREEN VOLTAGES SHOULD NOT EXCEED THESE VALUES UNDER ANY CIRCUMSTANCES.
8. THE TUBE UNDER TEST SHALL BE RIGIDLY MOUNTED ON A VIBRATION TABLE VIBRATING WITH SIMPLE HARMONIC MOTION. THE TEST CONDITIONS OF PARAGRAPH 4.9.19.1 OF MIL-E-1 SHALL BE APPLIED AND E_p MONITORED WHILE THE FREQUENCY OF VIBRATION IS CONTINUOUSLY SWEPT FROM 50-3500 CPS AND THE PEAK ACCELERATION CONTROLLED CONSTANT AT 2G. A LOW PASS FILTER WHICH FOLLOWS THE LOAD RESISTOR OF THE TUBE UNDER TEST SHALL HAVE A CUT-OFF FREQUENCY OF 3500 CPS. THE TOTAL TIME OF SWEEP SHALL NOT BE LESS THAN ONE (1) MINUTE.
9. FOR RAPID TESTING USE EQUIPMENT WHICH CORRELATES WITH MIL-E-1 PARAGRAPH 4.10.12.
10. WITH CONVERTER OSCILLATOR TEST SET (DRAWING 195-JAN) HAVING R_{gl}=50,000 OHMS AND WITH GRID TO FILAMENT RESONANT IMPEDANCE ADJUSTED TO 9500 OHMS.
11. TUBES SHALL BE SO SHIELDED THAT OPERATOR PROXIMITY OR MOVEMENT WILL NOT AFFECT OUTPUT READINGS.
12. BIAS OF GRID #1 MAY BE OBTAINED FROM A DC SOURCE OF SELF BIAS.



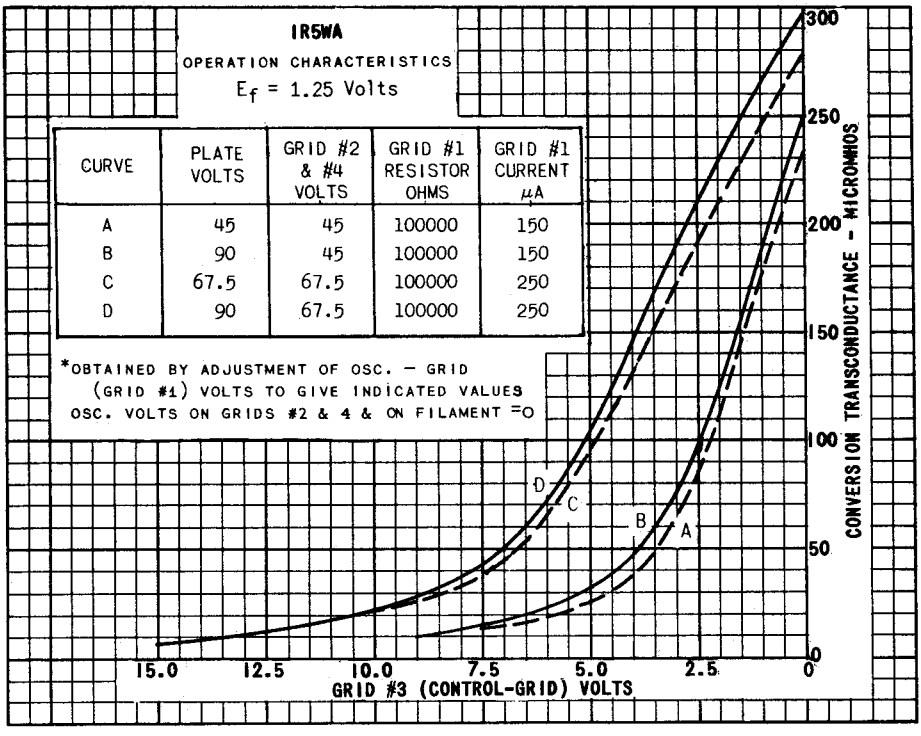
IR5WA

OPERATION CHARACTERISTICS

E_f = 1.25 Volts

CURVE	PLATE VOLTS	GRID #2 & #4 VOLTS	GRID #1 RESISTOR OHMS	GRID #1 CURRENT μA
A	45	45	100000	150
B	90	45	100000	150
C	67.5	67.5	100000	250
D	90	67.5	100000	250

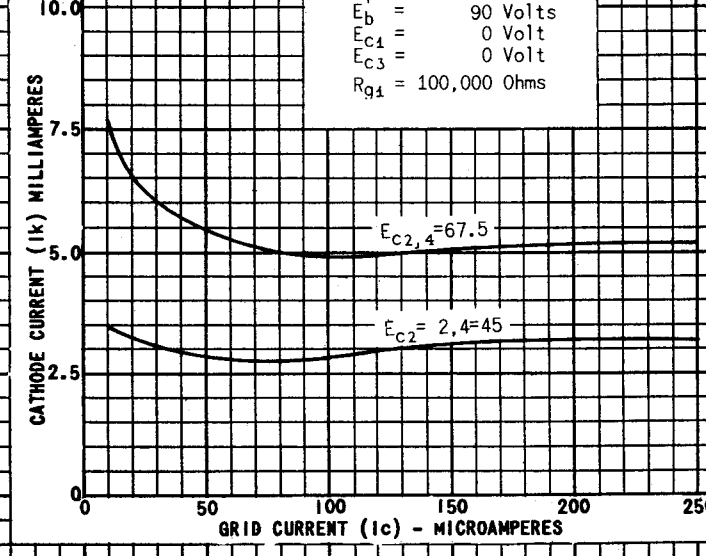
*OBTAINED BY ADJUSTMENT OF OSC. — GRID (GRID #1) VOLTS TO GIVE INDICATED VALUES OSC. VOLTS ON GRIDS #2 & 4 & ON FILAMENT =0



IR5WA

OPERATION CHARACTERISTICS

E_f = 1.25 Volts
E_b = 90 Volts
E_{c1} = 0 Volt
E_{c3} = 0 Volt
R_{g1} = 100,000 Ohms



TENTATIVE DATA