

MILITARY SPECIFICATION SHEET
ELECTRON TUBE, NEGATIVE GRID (MICROWAVE)

1/ TYPE DOD-041

This specification is approved for use by Harry Diamond Laboratories, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense.

The complete requirements for procuring the electron tube described herein shall consist of this document and the latest issue of Specification MIL-E-1.

DESCRIPTION: Planar triode
See figure 1
Mounting position: Any
Weight: 0.3 ounce (7.5 grams) nominal

ABSOLUTE RATINGS: Pulsed oscillator service

Parameter	F	Ef	Eb	Ec	Ehk	Rk	Ib	fb	fc	tp	Du	Pp	TE
Unit:	GHz	V	Vdc	Vdc	V	Ohms	mAdc	a	a	us	---	W	°C
Maximum:	6.0	6.6	1,200	-75	+50	---	60	5.0	1.5	1.0	0.02	50	250
Minimum:	---	6.0	---	---	& -50	---	---	---	---	---	---	---	---
												(Note 6)	(Note 7)
TEST CONDITIONS:	---	6.3	300	---	---	82	---	---	---	---	---	---	---

GENERAL:

Qualification - Required

1/ Replaces General Electric Company Type Y-2113-2

METHOD	REQUIREMENT OR TEST	NOTES	CONDITIONS	AQL (PERCENT DEFECTIVE)	INSPECTION LEVEL OR CODE	SYMBOL	LIMITS		UNIT
							MIN	MAX	
	<u>Quality conformance inspection, part 1</u>								
1301	Heater current	---		0.65	II	I _f	730	830	mA
1336	Heater-cathode leakage	---		0.65	II	I _{hk}	---	50	μAdc
1266	Total grid current	---	R _g = 100 K	0.65	II	I _c	---	1.0	μA
1261	Electrode voltage (grid)	---	E _b = 1150 Vdc R _p = 47 K; R _g = 100 K; R _k = 0; E _c /I _b = 1.0 mAdc	0.65	II	E _c	---	-40	Vdc
1356	Grid-pulse operation (1)	---	E _b = 400 Vdc; E _c = -30 v; t _p = 1 μs; prr = 1,000; e _{gy} /I _b = 5.0 a	0.65	II	e _{gy}	---	80	v
1356	Grid-pulse operation (2)	1	E _b = 400 Vdc; E _c = -30 v; t _p = 1 μs; prr = 1,000; e _{gy} /I _b = 6.0 a	0.65	II	Δe _{gy}	---	20	v
1211	Insulation of electrodes	---		0.65	II	R	50	---	Meg
	<u>Quality conformance inspection, part 2</u>								
4303	Cathode warmup time	2,3	E _b = 400 Vdc; E _c = -30 v; t _p = 1 μs; prr = 1,000; e _{gy} /I _b = 5.0 a	6.5	code F	t	---	6.0	sec
1316	Amplification factor	---	C _k = 1,000 μF	6.5	code F	M _u	40	60	---
1256	Electrode current (anode)	---		6.5	code F	I _b	31	57	mAdc
1306	Transconductance	---	C _k = 1,000 μF	6.5	code F	S _m	22,000	36,000	μmhos
1331	Direct-interelectrode capacitance	---		6.5	code F	C _{gp} C _{in} C _{out}	2.10 5.7 ---	2.60 8.2 .08	pF pF pF
1031	Low-frequency vibration	4	E _{bb} = 300 Vdc E _c = 0; C _k = 1,000 μF; R _p = 2,000 ohms; 15 G; F = 40 Hz	6.5	code F	E _p	---	75	m/sec
	<u>Quality conformance inspection, part 3</u>								
1506	Heater-cycling life	5	E _f = 7.0 V; E _{hk} = +70 Vdc; no other voltages applied	---	---	Cycles	2,000	---	---
---	Heater-cycling life-test end point:	---		---	---	I _{hk}	---	100	μAdc
1336	Heater-cathode leakage	---		---	---				

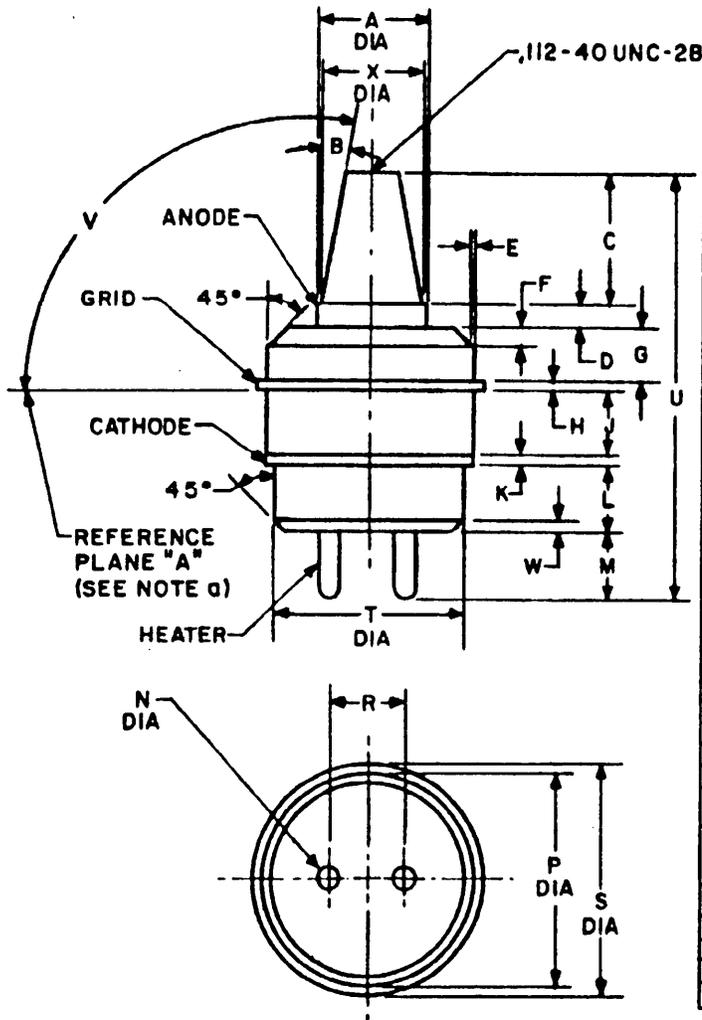
NOTES:

1. Test limit Δ egy applies to individual tubes and is defined as the net difference between the grid pulse voltages necessary to obtain 5.0a and 6.0a.
2. Prior to cathode warmup test, establish for individual TUT's the grid drive necessary to obtain an ip of 5.0 amp. No voltages shall be applied to the TUT for 5 minutes (minimum) immediately prior to the cathode warmup test.
3. Cathode warmup is defined as the time in seconds required for the cathode current to reach 2.5 amp.
4. The TUT shall be vibrated with simple harmonic motion in each of two planes, (1) parallel to the cylindrical axis and (2) perpendicular to the cylindrical axis and parallel to a plane through the heater pins.
5. Sampling procedure and acceptance criteria for this test shall be as follows: Sample (n1) shall consist of 4 tubes with an acceptance number (c1) of zero. Second sample (n2), if necessary, shall be 4 tubes with an acceptance number of one for the combined samples. Electrical rejects other than inoperatives and heater-cathode defectives may be used in performance of this test.
6. Up to 50 watts dissipation is allowable provided there is adequate heat sink at the anode.
7. In addition to the specified maximum envelope temperature rating of 250°C, appropriate conduction, convection, or forced-air cooling should be provided to limit the temperature gradient across individual ceramic insulator sections to a maximum of 100°C.

Preparing activity:
Army - ER

Agent:
DLA - ES

(Project 5960-A158)



Dimensions in inches with metric equivalents (mm) in parentheses		
Ltr.	Minimum	Maximum
Quality conformance inspection, Part 2		
H	.025 (.635)	.031 (.787)
J	.166 (4.216)	.176 (4.470)
R	.186 (4.724)	.214 (5.436)
S	.598 (15.19)	.608 (15.44)
T	.485 (12.32)	.313 (13.08)
Quality conformance inspection, Part 3 See note b		
A	.288 (7.135)	.297 (7.544)
C	.323 (8.204)	.363 (9.220)
D	.048 (1.219)	.068 (1.727)
F	.040 (1.016)	.060 (1.524)
G	.145 (3.683)	.155 (3.937)
K	.025 (.635)	.031 (.787)
L	.170 (4.318)	.180 (4.572)
M	.170 (4.318)	.180 (4.572)
N	.047 (1.194)	.053 (1.346)
P	.535 (13.59)	.565 (14.35)
W	.020 (.508)	.040 (1.016)
Reference dimensions (note c)		
B	10 ⁰	
E	.005 (.125)	
U	1.128 (28.65)	
V	100 ⁰	
X	.272 (6.909)	

NOTES:

- a. Tube concentricity shall be measured by chucking in test fixture arbor - Fig. 2 which is fastened to the anode terminal.
 - (1) The axis of the grid flange shall be coincident with the axis of the anode terminal within .013 (.33 mm).
 - (2) The plane of the annular surface "A" (cathode side of the grid flange) shall be perpendicular to the axis of the anode terminal within $\pm 1/4$ degree.
 - (3) The above concentricity measurements shall be quality conformance inspection, part I (1.0% AQL, Insp. Lev. I).
- b. Dimensions shall be checked during the initial production and once each succeeding 12-calendar months during which there is production. A regular double sampling plan shall be used, with the first sample of three tubes with an acceptance number of zero, and a second sample of three tubes with a combined acceptance number of one. In the event of failure, the test will be made as a part of quality conformance inspection, part 2, code level D, with an AQL of 6.5. The regular "12-calendar month" double sampling plan shall be reinstated after three consecutive samples have been accepted.
- c. Dimensions without tolerances are for information and are not required for inspection.

FIGURE 1. Outline drawing of electron tube type D0D-041.

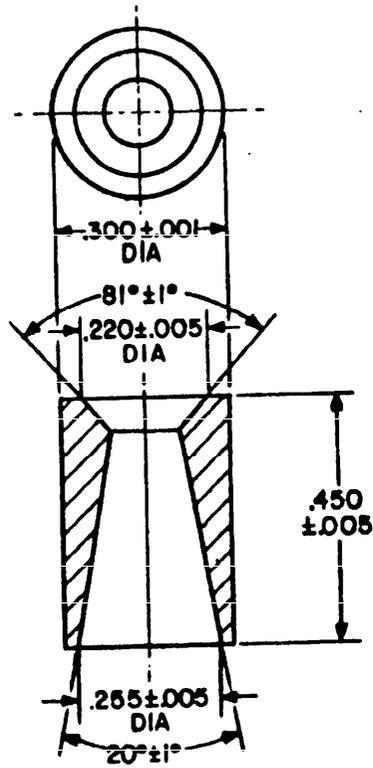


FIGURE 2. Test fixture arbor.

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