

MILITARY SPECIFICATION SHEET

ELECTRON TUBE, NEGATIVE GRID (MICROWAVE)

TYPE 6299

This specification is approved 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, metal-ceramic

See figure 1

Mounting position: Any

Weight: 0.16 ounce nominal (4.54 grams)

ABSOLUTE RATINGS:

Parameter:	F	E _f	E _b	E _c	I _b	P _p	t _k	Cooling	T(seal)
Unit:	MHz	V	V _{dc}	V _{dc}	mAdc	W	sec	---	°C
Maximum:	3,000	6.6	200	0, -10	12	2.0	---	Conduction	150
Minimum:	---	6.0	---	---	---	---	---	---	---

TEST CONDITIONS: --- 6.3 175 Adj 10 --- 18C Conduction ---

GENERAL:

Qualification - Required

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>									
1211	Insulation of electrodes	-	Ebb = -500 Vdc; Ekk = +45 Vdc (see figure 2)	0.65 0.65	II II	Rgp Rgk	5.0 0.25	--- ---	Meg Meg
1231	Pulsing emission	1	Ef = 5.5 V; Eb = 0; Ec = -18 Vdc; eb = 390 v (peak- to-peak); ec = 46 v (peak-to-peak); Rg = 470 ohms; Rk = 10 ohms	0.65	II	Is	3.5	---	mAdc
1261	Electrode voltage (anode)	-	Ec = 0; Eb/Is = 10 mAdc	0.65	II	Eb	75	175	Vdc
1301	Heater current	-		0.65	II	If	280	320	mA
1306	Transconductance	-		0.65	II	Sm	11,500	---	umhos
---	Power gain (1)	2	Ec = 0; Eb/Is = 10 mAdc; F = 1,200 -5 MHz; bandwidth = 10 MHz (min); Drawing 271-JAN	0.65	II	Gain	15.0	---	dB
---	Noise figure (1)	2	Ec = 0; Eb/Is = 10 mAdc; F = 1,200 -5 MHz; Drawing 271-JAN	0.65	II	NF	---	8.5	dB
<u>Quality conformance inspection, part 2</u>									
---	Power gain (2)	2	Ec = 0; Eb/Is = 10 mAdc; F = 3,000 -5 MHz; Drawing 272-JAN	---	---	Gain	10.0	---	dB
---	Noise figure (2)	2	Ec = 0; Eb/Is = 10 mAdc; F = 3,000 -5 MHz; Drawing 272-JAN	---	---	NF	---	13.5	dB
1316	Amplification factor	-		---	---	Mu	85	140	---
1331	Direct-interelectrode capacitance	-	No voltages; Drawing 270-JAN	---	---	Cin Cgp Cout	3.0 1.5 ---	5.0 2.0 0.025	pF pF pF
2126	Envelope strain	3		---	---	---	---	---	---
<u>Quality conformance inspection, part 3</u>									
---	Life test	-	Group B: Eb = 200 Vdc; Rk/Is = 10 mAdc; t = 1,000 hours	---	---	---	---	---	---
---	Life-test end points:								
1306	Transconductance	-		---	---	ΔSm t	---	25	% de- crease
---	Noise figure (1)	-		---	---	ΔNF t	---	1.0	dB in- crease
1031	Low-frequency vibration	4	Ec = 0; Eb/Is = 10 mAdc; Rp = 10,000 ohms; Drawing 273-JAN	---	---	Ep	---	100	mVac

METHOD	REQUIREMENT OR TEST	NOTES	CONDITIONS	AQL (PERCENT DEFECTIVE)	INSPECTION LEVEL OR CODE	SYMBOL	LIMITS		UNIT
							MIN	MAX	
	<u>Quality conformance inspection, part 3</u> -Continued								
① 1041	Shock	5	No voltages; hammer angle = 20°; Drawing 274-JAN	---	---	---	---	---	---
---	Shock-test end points:								
1306	Transconductance	-		---	---	Sm	11,500	---	μmhos
1211	Insulation of electrodes	-		---	---	Rgp	5.0	---	Meg
1211	Insulation of electrodes	-		---	---	Rgk	0.25	---	Meg

NOTES:

- The 60 Hz voltages eb and ec shall be in phase, and the sinusoidal waveform should not be distorted. Read average cathode current.
- An approved noise source shall be used for noise figure measurements. Power input level shall be about -75 dBm for power gain (1), noise figure (1), power gain (2), and noise figure (2).
- Envelope strain procedure. Tubes shall be tested as specified in method 2126, except that they shall first be immersed in water at not more than 5°C for 15 seconds, and immediately thereafter subjected to the standard temperature cycle specified in method 2126. The criteria for air leaks shall be heater current of 330 mA, or more.
- Vibrate in plane perpendicular to the plane of the grid. Test 10 tubes selected at random from the first production lot of each calendar year, and approximately every 90 days of production during the year. If more than one tube fails to pass the specified end points, the test shall become a part of quality conformance inspection, part 2, AQL of 6.5, inspection level S3 on all lots in process. After three consecutive successful submissions, the test shall revert back to the 10-tube quarterly test.
- Apply the force perpendicular to the plane of the grid from the cathode end. Test 10 tubes selected at random from the first production lot of each calendar year. If more than one tube fails to pass the specified end points, the test shall become a part of quality conformance inspection, part 2, AQL of 6.5, inspection level S3 on all lots in process. After three consecutive successful submissions, the test shall revert back to a 10-tube annual test.

Custodians:

Army - EL
Navy - EC
Air Force - 85

Review activities:

Air Force - 17, 80
DSA - ES

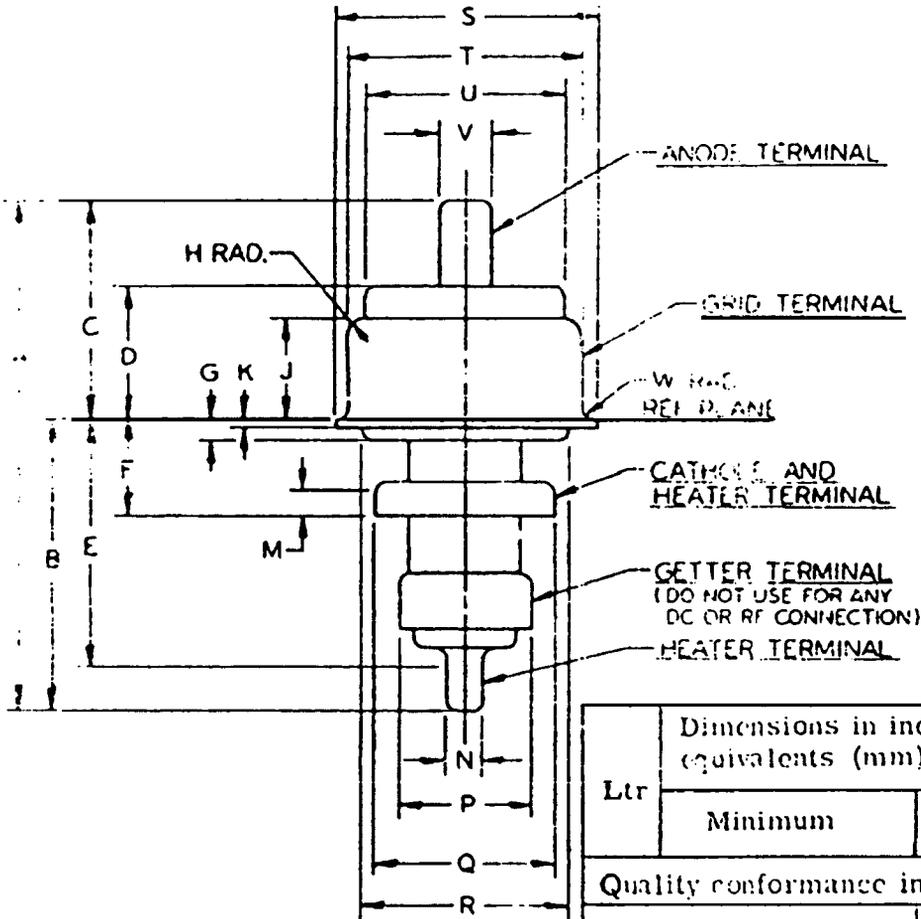
User activities:

Army - MU
Navy - AS, OS, MC, CG, SH
Air Force - 11

Preparing activity:
Navy - EC

Agent:
DSA - ES

(Project 5960-2898)



Ltr	Dimensions in inches with metric equivalents (mm) in parentheses		Notes
	Minimum	Maximum	
Quality conformance inspection, part 2			a
A	.960 (24.38)	1.040 (26.42)	
B	.530 (13.46)	.590 (14.99)	
C	.410 (10.41)	.470 (11.94)	
D		.272 (6.91)	
E		.475 (12.07)	
F	.163 (4.14)	.193 (4.90)	
Quality conformance inspection, part 3			b
G		.060 (1.52)	
H		.030 (.76)	
J	.190 (4.83)	.210 (5.33)	
K	.009 (.23)	.015 (.38)	
M	.040 (1.02)	.070 (1.78)	
N	.059 (1.50)	.065 (1.65)	
P		.257 (6.53)	
Q	.326 (8.28)	.334 (8.48)	
R		.385 (9.78)	
S	.483 (12.27)	.497 (12.62)	
T	.435 (11.05)	.445 (11.30)	e
U		.385 (9.78)	
V	.088 (2.24)	.094 (2.39)	f
W		.008 (.20)	

FIGURE 1. Outline drawing of electron tube type 6299

NOTES:

- Ⓐ a. These dimensions shall be checked on a lot-to-lot basis under quality conformance inspection (QCI), part 2 to an AQL of 6.5, inspection level S3. The AQL is applied to each dimension separately and is not combined.
- Ⓐ b. These dimensions shall be inspected at the start of production and periodically every 3 months during production. The sample size shall be six tubes and the acceptance number shall be zero defects for each dimension. Failure of any dimension to meet QCI, part 3 requirements shall cause the nonconforming dimension to be inspected on a lot-to-lot basis to a 6.5 AQL, inspection level S3. After three consecutive successful submissions, the inspection shall revert to 3-month intervals.
- c. All tubes are to be 100 percent tested for concentricity in gage (see figure 3). Tube shall be rotated 360° in gage without binding.
- d. Grid shell seal shall be completely filled to cathode ceramic shell.
- e. 'T' dimension shall be measured other than across tube designation etch, and approximately .100 (2.54 mm) from the reference plane.
- f. 'V' dimension shall be measured approximately .100 (2.54 mm) from the end of the anode terminal.

FIGURE 1. Outline drawing of electron tube type 6299 - Continued.

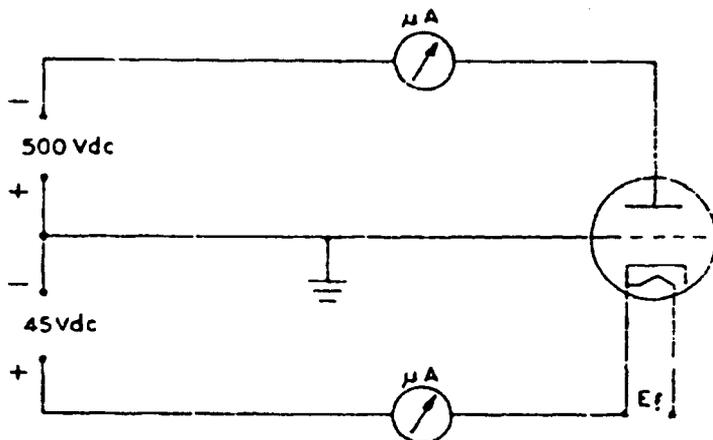
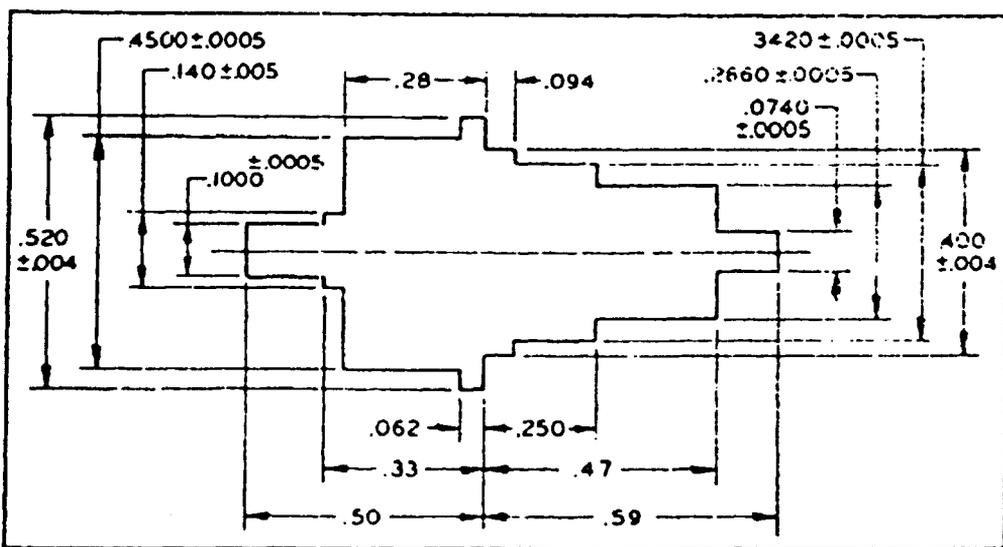


FIGURE 2. Insulation of electrodes test.



NOTE:

Unless otherwise specified, tolerance for dimension .250 or less $\pm .008$; over .25 $\pm .02$.

FIGURE 3. Gage.