

# Technical Information

## CK1055

SUBMINIATURE  
GAS DIODE

The CK1055 is a cold cathode, gas-filled diode of subminiature construction, designed for service as a voltage regulator tube. It has an operating current range of 75 to 300 microamperes over which it maintains a substantially constant operating voltage of approximately 150 volts. The flexible terminal leads may be soldered or welded directly to the terminals of circuit components without the use of sockets. Standard inline subminiature sockets may be used by cutting the leads to a suitable length.

### MECHANICAL RATINGS:

Maximum Bulb Temperature ..... +85°C  
Altitude ..... 60,000 ft.

### ELECTRICAL DATA

Ratings and Normal Operation	MIL-E-1 Symbol	Test Limit or Absolute Minimum	Normal Test Conditions	Test Limit or Absolute Maximum	MIL-E-1 Units
Ratings					
Plate Voltage	Ebb:	250	250 (Note A)	---	Vdc
Ionization Voltage (Total Darkness)	Ez:	---	---	225	Vdc
Operating Voltage	Ez:	143	---	157	Vdc
Operating Current	Ib:	0.075	---	0.300	mAdc
Plate Resistance	Rp:	---	0.75	---	Meg.
Temperature	T:	-55	25 ± 5	+85	°C
Tests					
Ionization Voltage (1) Ebb/Ib = 0.075 - 0.3 mAdc Illumination = 5-50 ft. candles	Ez:	---	---	200	Vdc
Tube Voltage Drop (1) Etd (1): Ebb/Ib = 0.3 mAdc	Etd (1):	145	---	155	Vdc
Tube Voltage Drop (2) Ebb/Ib = 0.075 mAdc	Etd (2):	145	---	155	Vdc
Regulation (1) Ebb/Ib = 0.075 to 0.3 mAdc	Reg.	---	---	4.0	Vdc
Regulation (2) Ebb/Ib = 0.075 to 0.15 mAdc	Reg:	---	---	2.5	Vdc

### APPLICATION NOTES

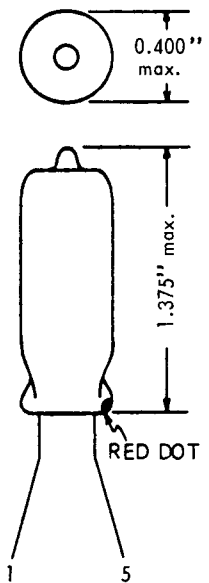
**CAUTION** — — — To Electronic Equipment Design Engineers. Special attention should be given to the temperature of the tubes. Reliability will be seriously impaired if maximum bulb temperature is exceeded. The life expectancy may be reduced if conditions more severe than those specified for life are imposed on the tube and will be reduced appreciably if absolute ratings are exceeded. Attention should be given to the specified minimum supply voltage to insure operation in total darkness. Tube characteristics may deteriorate markedly if the tubes are stored at elevated ambient temperatures without drawing current.

NOTE A: Fixed resistor may be used and Ebb varied to obtain the desired current.

### MECHANICAL DATA

ENVELOPE ..... T-3 Glass  
BASE ..... None (0.016" tinned flexible leads.  
Length: 1.5" min  
Spacing: 0.192" center to-center  
CATHODE ..... Glow Discharge  
MOUNTING POSITION ..... Any

### PHYSICAL DIMENSIONS



### TERMINAL CONNECTIONS:

Lead 1 Cathode  
Lead 5 Anode



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### ACCEPTANCE CRITERIA

The following tests shall be performed:

For the purpose of inspection, use applicable paragraphs of Specification MIL-E-1.

For miscellaneous requirements, see 3.6.

Par. No.:	Test	Conditions	AQL (Percent Defective)	Inspection Level or Code	Symbol	LIMITS		Units
						Min.	Max.	
<b>GENERAL</b>								
3.1	Qualification:	Required for JAN Marking	---	---	---	---	---	---
3.6	Performance:		---	---	---	---	---	---
<b>QUALIFICATION (see note 8)</b>								
---	Cathode:	Glow discharge	---	---	---	---	---	---
3.4.3	Base Connections:		---	---	---	---	---	---
4.13.1	Ionization Voltage (2)	Note 1	---	---	Ez:	---	200	Vdc
4.9.20.3	Vibration:	No Voltage	---	---	---	---	---	---
---	Altitude:	Note 5	---	---	---	---	---	---
<b>MEASUREMENT ACCEPTANCE TEST, PART 1 (see note 2)</b>								
4.13.1	Ionization Voltage (1):	Ebb/Ib = 0.075 - 0.3 mAdc; Illumination = 5-50 Ft. Candles	0.65	II	Ez:	---	200	Vdc
4.13.2	Tube Voltage Drop (1):	Ebb/Ib = 0.3 mAdc	0.65	II	Etd (1):	145	155	Vdc
4.13.2	Tube Voltage Drop (2):	Ebb/Ib = 0.075 mAdc	0.65	II	Etd (2):	145	155	Vdc
4.13.2.1	Regulation (1):	Ebb/Ib = 0.075 to 0.3 mAdc	0.65	II	Reg:	---	4.0	Vdc
4.13.2.1	Regulation (2):	Ebb/Ib = 0.075 to 0.15 mAdc	0.65	II	Reg.	---	2.5	Vdc
4.7	Continuity and Shorts: (Inoperatives)		0.4	II	---	---	---	---
4.9.1	Mechanical:	Seated height 1.375 in. max. Bulb diameter 0.400 in. max. Lead Length 1.5 in. max.	---	---	---	---	---	---
<b>MEASUREMENTS ACCEPTANCE TEST, PART 2</b>								
---	Noise and Oscillation:	Ebb/Ib = 0.075 thru 0.3 mAdc (Note 4)	6.5	L 6	Eb:	---	50	mVp/p
4.9.15	Low - Temperature Operation:	Ebb/Ib = 0.1 mAdc; T Ambient = 55°C; (Note 3)	1.0	L 6	ΔErd:	-3.0	+3.0	Vdc.
4.9.16	High - Temperature Operation:	Ebb/Ib = 0.1 mAdc; T Ambient = +85°C; (Note 3)	1.0	L 6	ΔEtd:	-3.0	+4.0	Vdc.
4.13.3	Leakage:	Eb = - 50 Vdc; Rp = 3000 ohms	6.5	L 6	Llb	---	2	μAdc
<b>DEGRADATION RATE ACCEPTANCE TESTS</b>								
4.9.5.3	Lead Fatigue:	Note 6	2.5	Code G	---	4.0	---	arcs

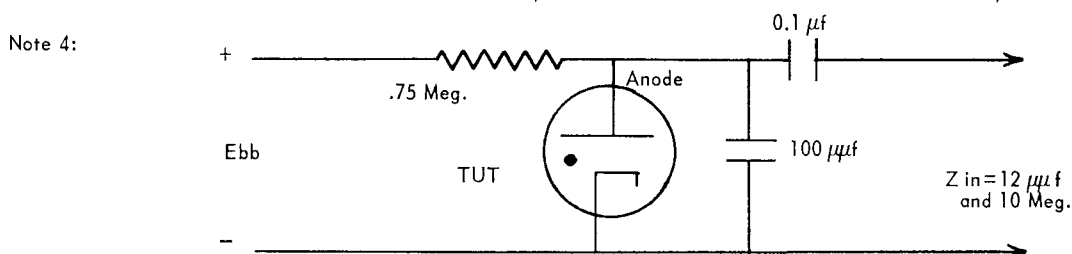
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Par No.:	Test	Conditions	AQL (Percent Defective)	Inspection Level or Code	Symbol	LIMITS		Units
						Min.	Max.	
<b>ACCEPTANCE LIFE TESTS</b>								
4.11	Life - test:	Group A Ebb/Ib = 0.1 mAdc TA = room. (Note 7)	---	---	---	---	---	---
4.11.4	Life - test end points: (500 hours)	Ionization Voltage (1) Tube Voltage Drop (1) Tube Voltage Drop (2) Regulation (2)	---	---	Ez: Etd (1): Etd (2): Reg:	---	225 157 157 6.0	Vdc Vdc Vdc Vdc
4.11.4	Life - test end points: (1000 hours)	Ionization Voltage (1) Tube Voltage Drop (1) Tube Voltage Drop (2) Regulation (2)	---	---	Ez: Etd (1): Etd (2): Reg:	---	225 157 157 6.0	Vdc Vdc Vdc Vdc
<b>PACKAGING INFORMATION</b>								
4.9.18.1.4	Carton Drop:	(A) Package Group 1; Carton Size C	---	---	---	---	---	---

Note 1: Conditions for this test shall be those of Ionization Voltage (1) except testing shall be done in total darkness and the tube shall not have conducted or have been exposed to light for at least 24 hours prior to testing.

Note 2: The AQL for the combined defectives for attributes in Measurements Acceptance Test, Part 1, excluding Inoperatives and Mechanical, shall be one (1) percent. A tube having one (1) or more defects shall be counted as one (1) **defective**. MIL-STD-105, Inspection Level II shall apply.

Note 3: The tube voltage drop shall be measured under the specified conditions. The change in tube voltage drop from that value measured at TA = 25 ± 5°C shall not exceed the value specified. This test shall be made at least once per month.



Note 5: There shall be no evidence of flashover or corona at the leads of these tubes at the absolute maximum current.

Note 6: When a manufacturer submits tubes for qualification approval, five extra tubes shall be submitted for lead fatigue testing. These may be electrical rejects.

Note 7: Intermittent Life Test.

(a) **Regular Life Test:** (1) Regular life test shall be conducted for 1000 hours. (2) Regular life test acceptance shall be on the basis of the 500 and 1000 hour requirements as indicated on the specification sheet. (3) Regular life test shall be in effect initially and shall continue in effect until the eligibility criteria for the Reduced hours life test have been met.

(b) **Reduced Hours Life Test** (1) Reduced hours life test shall be conducted for 500 hours and acceptance shall be based on the 500 hour end point limits. (2) Eligibility for Reduced hours life test: No lot failure due to the 1000 hour life test has occurred in the preceding three consecutive lots. (3) Loss of eligibility for Reduced hours life test: Two or more 500 hour life test lot failures occurring in the last three consecutive lots.



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NOTES (cont'd)

Note 7: (cont'd)

(f) The Life Test sample shall be read at the following times.

0 hours

500 hours (plus 48 hours; minus 24 hours)

1000 hours (plus 48 hours; minus 24 hours; when in force)

Additional **reading** periods may be used.

Note 8: All Tests listed herein shall be performed during qualification; however these 5 tests are normally performed during qualification inspection only.