

Technical Information

CK6213

SUBMINIATURE GAS DIODE

The CK6213 is a cold cathode, glow-discharge diode of subminiature construction designed for use as a voltage reference tube in electronically regulated DC power supplies. It has an operating current range of 1.0 to 2.5 milliamperes over which it maintains a substantially constant operating voltage of 130 volts. Two cathode leads are provided which may be used to disconnect the load when the tube is removed from the socket. 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.

ELECTRICAL DATA

MECHANICAL RATINGS: (Absolute Maximum)

| | |
|------------------|---------------|
| Bulb Temperature | -55 to +90 °C |
| Altitude | 60,000 ft. |

RATINGS: (Absolute Maximum Values)

| | |
|---|---------|
| Minimum DC Anode Supply Voltage (Note A) | 200 Vdc |
| DC Operating Current (continuous, Note B) | 2.5 mA |

CHARACTERISTICS AND TYPICAL OPERATION

| | |
|-----------------------------------|---------|
| Starting Voltage (approx.) | 170 Vdc |
| Operating Voltage (approx.) | 130 Vdc |
| Regulation (1.0 to 2.5 ma) (max.) | 1.0 Vdc |

APPLICATION NOTES

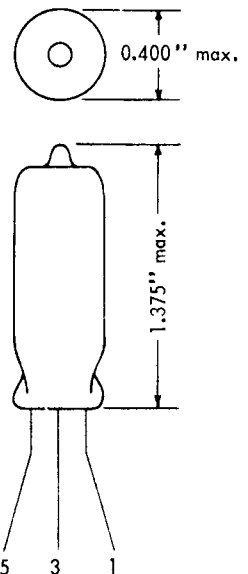
- Note A Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.
- Note B Sufficient resistance must always be used in series with the CK6213 to limit the current through the tube. The value of the series resistor is dependent on the maximum anode supply voltage and the ratio of the current through the load to the operating current of the CK6213, and should be chosen to limit the operating current through the tube to 2.5 ma. at all times after the starting period.

CAUTION—To Electronic Equipment Design Engineers: Special attention should be given to the temperature at which the tubes are to be operated. Reliability will be seriously impaired if maximum bulb temperature is exceeded. The life expectancy may be reduced if conditions other than those specified for life test are imposed on the tube and will be reduced appreciably if absolute maximum ratings are exceeded.

MECHANICAL DATA

| | |
|-------------------|----------------------------------|
| ENVELOPE | T3 |
| BASE | Subminiature 3 Pin Flat Press |
| CATHODE | Glow Discharge |
| MOUNTING POSITION | Any |

PHYSICAL DIMENSIONS



TERMINAL CONNECTIONS:

- Lead 1 Cathode
- Lead 3 Anode
- Lead 5 Cathode



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ACCEPTANCE CRITERIA

For the purpose of inspection, use applicable paragraphs of specification MIL-E-1.
 For miscellaneous requirements, see 3.6.
 The following tests shall be performed with an Ebb of 200 Vdc unless otherwise specified. (Note 2)

| Ref. | Test | Conditions | AQL (percent defective) | Insp. Level or Code | SYM | Min | LAL | LIMITS | | | Max | ALD | Units |
|--|--|---|-------------------------------|---------------------------|---------------------------|-----|-----|--------|-----|-------------------|-----|-------------------|-------|
| | | | | | | | | Bogie | UAL | | | | |
| QUALIFICATION APPROVAL TESTS | | | | | | | | | | | | | |
| 3.1 | Qualification Approval: | Required Note 7 | --- | --- | | | | | | | | | |
| | Cathode: | Glow Discharge | --- | --- | | | | | | | | | |
| 3.4.3 | Base Connections: | | --- | --- | | | | | | | | | |
| 3.7 | Marking: | Note 3 | --- | --- | | | | | | | | | |
| MEASUREMENTS ACCEPTANCE TESTS, PART 1, NOTE 1 | | | | | | | | | | | | | |
| 4.13.1.1 | Ionization Voltage (1): | Ebb/Ib=1-2.5 mA; RL=30,000 ohms; Illu- mination=5-50 ft. Candles | 0.65 | II | Ez(1): | 160 | --- | --- | --- | 180 | --- | Vdc | |
| 4.13.2 | Tube Voltage Drop (1): | Ebb/Ib=1.0 mA; RL=30,000 ohms | 0.65 | II | Etd(1): | 127 | --- | --- | --- | 133 | --- | Vdc | |
| 4.13.2 | Tube Voltage Drop (2): | Ebb/Ib=2.5 mA; RL=30,000 ohms | 0.65 | II | Etd(2): | 127 | --- | --- | --- | 133 | --- | Vdc | |
| 4.13.2.1 | Regulation: | Etd(1)-Etd(2) | 0.65 | II | Reg: | --- | --- | --- | --- | 1.0 | --- | Vdc | |
| 4.13.4.3 | Noise: | Ebb/Ib=2.5 mA RL=5,000 ohms | 0.65 | II | Eb: | --- | --- | --- | --- | 20 | --- | mVac | |
| 4.13.4.2 | Oscillation: | Ebb/Ib=1-2.5 mA RL=5,000 ohms Esig=50 mVac | 0.65 | II | --- | --- | --- | --- | --- | --- | --- | --- | |
| 4.7.5 | Continuity and Shorts: (Inoperatives) | | 0.4 | II | --- | --- | --- | --- | --- | --- | --- | --- | |
| 4.9.1 | Mechanical Production Test: | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |
| MEASUREMENTS ACCEPTANCE TESTS, PART 2 | | | | | | | | | | | | | |
| 4.13.1.2 | Ionization Voltage (2): | Ebb/Ib=1-2.5 mA; RL=30,000 ohms Total Darkness | 6.5 | L6 | Ez(2): | --- | --- | --- | --- | 200 | --- | Vdc | |
| 4.13.3 | Leakage: | Ebb=50 Vdc; RL=3,000 ohms | 6.5 | L6 | Lib: | --- | --- | --- | --- | 20 | --- | μAdc | |
| 4.9.19.1 | Vibration (2): | Ebb/Ib=2 mA Rb=10,000 ohms F=25 cps; G=2.5 | 6.5 | L6 | Ep: | --- | --- | --- | --- | 50 | --- | mVac | |
| DEGRADATION RATE ACCEPTANCE TEST, NOTE 4 | | | | | | | | | | | | | |
| 4.9.5.3 | Lead Fatigue: | | 4.0 | L6 | --- | 4.0 | --- | --- | --- | --- | --- | Arcs | |
| ACCEPTANCE LIFE TESTS | | | | | | | | | | | | | |
| 4.11 | Intermittent Life Test Operation: | Ebb/Ib=2.5 mA Group A | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |
| 4.11.4 | Intermittent Life Test End Points (500 hrs.): | Ionization Voltage (1) Tube Voltage Drop (2) Regulation | --- | --- | Ez(1): Etd(2): Reg: | --- | --- | --- | --- | 180 133 1.5 | --- | Vdc Vdc Vdc | |
| 4.9.18 | Container Drop: | Note 5 | | | | | | | | | | | |
| 5.1 | Preparation for Delivery | Note 6 | | | | | | | | | | | |

Note 1: The AQL for the combined defectives for attributes in measurements acceptance test, part 1 excluding mechanical and Inoperatives shall be 1 percent. A tube having one or more defectives shall be counted as one defective. Stand MIL-STD-105, inspection level II shall apply.

Note 2: A fixed resistor may be used and Ebb varied to give desired current.

Note 3: Tubes shall be marked "USN-6213".

Note 4: Tubes subjected to the Intermittent Life Test (this is a Destructive Test) are not to be accepted under this specification.

Note 5: Not required for Qualification Approval of the tube.

Note 6: Tubes shall be prepared for domestic or overseas shipment as specified in the contract or order in accordance with Specification MIL-E-75/1. Rough handling (container drop) test (d) and container size C shall apply.