# FX227

## HYDROGEN THYRATRON

**Service Type CV372**

**The data to be read in conjunction with the Hydrogen Thyratron Preamble.**

### ABRIDGED DATA

Hydrogen-filled triode thyratron, positive grid, for pulse operation. A hydrogen reservoir is incorporated.

| | | |
|---|---|---|
| Peak forward anode voltage | 3.0 | kV max |
| Peak anode current | 40 | A max |
| Average anode current | 50 | mA max |
| Anode heating factor | $0.36 \times 10^9$ | V.A.p.p.s. max |
| Peak output power | 60 | kW max |

### GENERAL

#### Electrical

| | | |
|---|---|---|
| Cathode (connected internally to one end of heater) | | oxide coated |
| Heater voltage | $6.3^{+5\%}_{-10\%}$ | V |
| Heater current | 2.7 | A |
| Tube heating time (minimum) | 2.0 | min |

#### Mechanical

| | |
|---|---|
| Overall length | 5.000 inches (127.0mm) max |
| Overall diameter | 1.532 inches (38.9mm) max |
| Net weight | 2 ounces (60g) approx |
| Mounting position (see note 1) | any |
| Base | medium UX4 |
| Top cap | B.S.448-CT2 |

**Cooling** natural

## PULSE MODULATOR SERVICE

### MAXIMUM AND MINIMUM RATINGS (Absolute values)

| | Min | Max | |
|---|---|---|---|
| **Anode** | | | |
| Peak forward anode voltage (see note 2) | – | 3.0 | kV |
| Peak inverse anode voltage (see note 3) | – | 3.0 | kV |
| Peak anode current | – | 40 | A |
| Average anode current | – | 50 | mA |
| Rate of rise of anode current (see note 4) | – | 750 | A/μs |
| Anode heating factor | – | $0.36 \times 10^9$ | V.A.p.p.s. |
| **Grid** | | | |
| Unloaded grid drive pulse voltage (see note 5) | 175 | – | V |
| Grid pulse duration | 2.0 | – | μs |
| Rate of rise of grid pulse (see note 4) | 160 | – | V/μs |
| Peak inverse grid voltage | – | 200 | V |
| Loaded grid bias voltage | 0 | –120 | V |
| Forward impedance of grid drive circuit | – | 1500 | Ω |
| **Cathode** | | | |
| Heater voltage | $6.3^{+5\%}_{-10\%}$ | | V |
| Tube heating time | 2.0 | – | min |
| **Environmental** | | | |
| Ambient temperature | –50 | +90 | °C |
| Altitude | – | 10 000 | ft |
| | – | 3 | km |

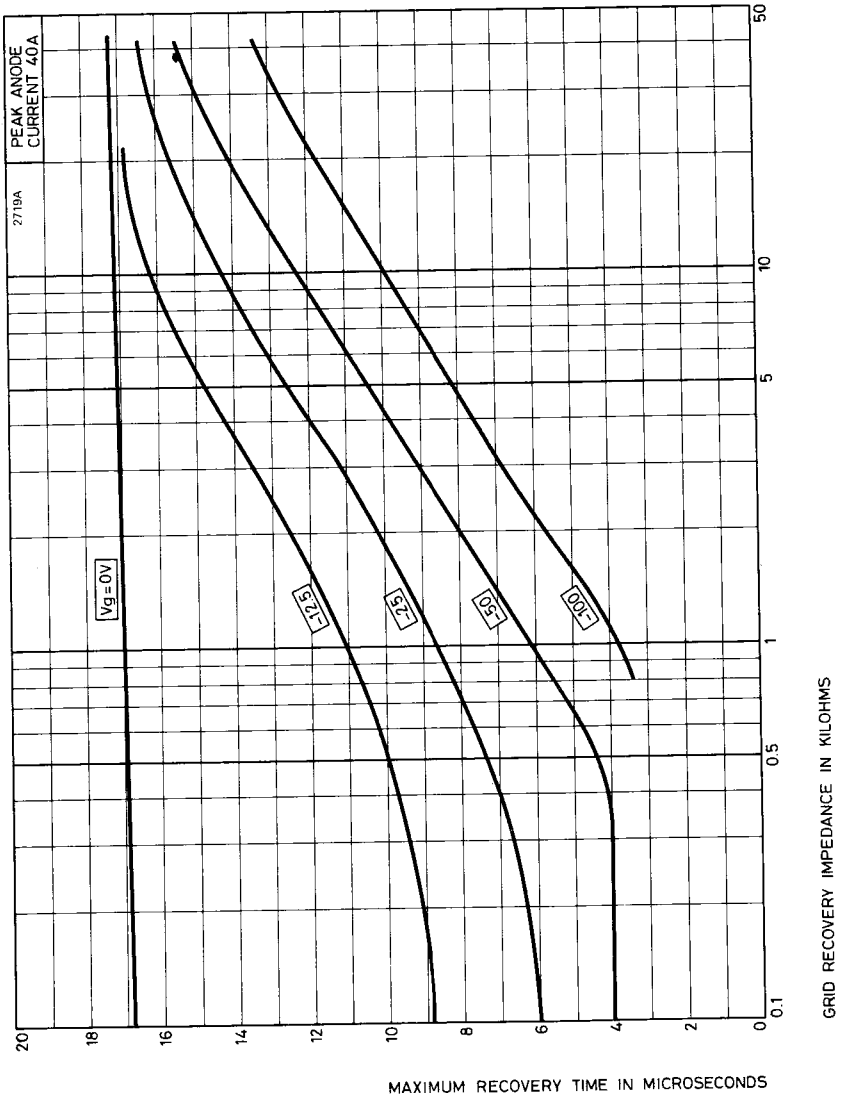
### CHARACTERISTICS

| | Min | Typical | Max | |
|---|---|---|---|---|
| Critical d.c. anode voltage for conduction (see note 6) | – | 200 | 800 | V |
| Anode delay time (see notes 6 and 7) | – | 0.3 | 0.6 | μs |
| Anode delay time drift (see notes 6 and 8) | – | 0.05 | 0.15 | μs |
| Time jitter (see notes 6 and 9) | – | 3.0 | 20 | ns |
| Recovery time | | | see note 10 and curves | |
| Heater current (at 6.3V) | 2.35 | 2.7 | 3.0 | A |

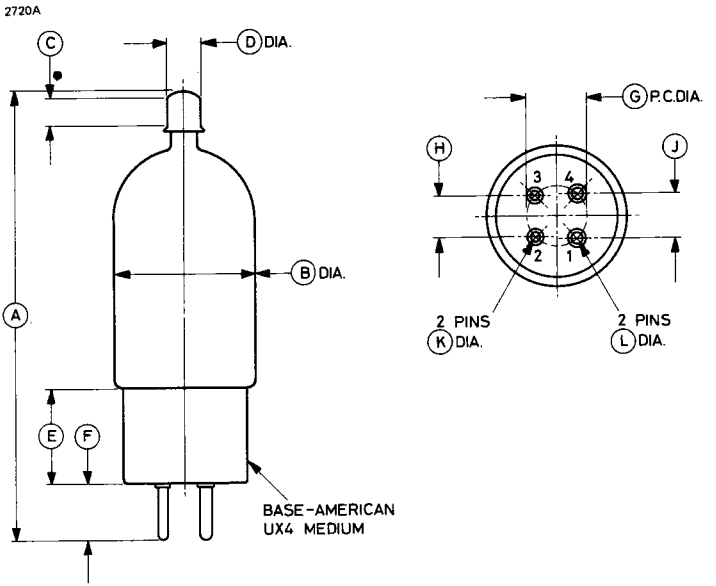
**NOTES**

1. The tube should preferably be clamped by the base only. Any clamps used on the bulb must not extend beyond 2 inches (50mm approx) above the top of the base and should be made from material of low thermal conductivity.
2. For instantaneous starting applications the maximum permissible peak forward voltage is 3.0kV. This must not be reached in less than 0.04 second and there must be no overshoot.
3. In pulsed operation the peak inverse anode voltage, exclusive of a spike of 0.05 microsecond duration, must not exceed 1.5kV during the first 25 microseconds after the pulse.
4. This rate of rise refers to that part of the leading edge of the pulse between 25% and 75% of the pulse amplitude.
5. Measured with respect to cathode potential.
6. The typical figures are obtained on test using conditions of minimum grid drive. Improved performance can be expected by increasing the grid drive.
7. The time interval between a point on the leading edge of the unloaded grid pulse at 25% of the pulse amplitude and the point where anode conduction takes place.
8. Normally taken as the drift in delay time over a 5-minute run at full ratings between the second and seventh minutes of operation.
9. The variation of firing time measured at 50% of current pulse amplitude.
10. The recovery characteristics are controlled on a sampling basis.

## MAXIMUM RECOVERY CHARACTERISTICS



## OUTLINE (All dimensions without limits are nominal)




| Ref | Inches | Millimetres |
|---|---|---|
| A | 4.750 ± 0.250 | 120.7 ± 6.4 |
| B | 1.535 max | 39.00 max |
| C | 0.268 min | 6.81 min |
| D | 0.359 ± 0.003 | 9.119 ± 0.076 |
| E | 1.087 max | 27.61 max |
| F | 0.629 max | 15.98 max |
| G | 0.640 | 16.26 |
| H | 0.437 | 11.10 |
| J | 0.468 | 11.89 |
| K | 0.125 ± 0.005 | 3.18 ± 0.13 |
| L | 0.156 ± 0.003 | 3.962 ± 0.076 |

Millimetre dimensions have been derived from inches except dimension B.

| Pin | Element |
|---|---|
| 1 | Heater |
| 2 | Cathode |
| 3 | Grid |
| 4 | Heater, cathode |
| Top cap | Anode |