# engineering TUBE DATA

Kuthe

ITT Components Division

## TYPE 6587 HYDROGEN THYRATRON

### GENERAL DATA

**DESCRIPTION:**

The 6587 is a unipotential cathode, three element hydrogen filled thyratron designed for network discharge service. In such service it is suitable for producing pulse outputs of more than 2 megawatts at an average power level of more than 1.6 KW.

The special features of the 6587 include an internal hydrogen reservoir connected across the filament and capable of producing and maintaining the hydrogen pressure throughout the useful life of the tube. Further features are the high peak voltage and current ratings and the ruggedized construction.

| **Electrical Data, General** | **Nom.** | **Min.** | **Max.** |
|---|---|---|---|
| Heater voltage | 6.3 | 5.9 | 6.7 Volts a.c. |
| Heater current. $E_h$=6.3 volts | | 9.6 | 11.6 Amperes |
| Minimum heating time | 3 Minutes | | |

**Mechanical Data, General**

| | |
|---|---|
| Mounting position | Any |
| Base | Super Jumbo 4-pin with Bayonet A4-18 with ceramic insert |
| Anode Cap | Medium Metal, C1-5 with corona flare |
| Cooling | Note 1 |
| Net Weight | 10 Ounces |

**Dimensions**

See outline drawing

**Ratings**

| | |
|---|---|
| Max. peak anode voltage, forward | 16.0 Kilovolts |
| Max. peak anode voltage, inverse (Note 2) | 16.0 Kilovolts |
| Min. anode supply voltage | 3.5 Kilovolts d.c. |
| Max. peak average anode current | 325 Amperes |
| Max. average anode current | 225 Milliamperes |
| Max. RMS anode current (Note 3) | 6.3 Amperes a.c. |
| Max. epy x ib x prr | $3.9 \times 10^9$ |
| Max. anode current rate of rise | 1500 Amperes/$\mu$second |
| Peak trigger voltage | Note 4 |
| Max. peak inverse trigger voltage | 200 Volts |

| | **Initial Limit** | **End of Life Limit** |
|---|---|---|
| Max. anode delay time (Note 5) | 0.6 | 0.6 Microsecond |
| Max. anode delay time drift | 0.1 | 0.1 Microsecond |
| Max. time jitter (Note 6) | 0.005 | 0.01 Microsecond |

| | |
|---|---|
| Ambient temperature | —50° to +90° Cent. |
| Shock rating | 24° Navy (Flyweight) Shock machine |

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*(continued)*

ITT COMPONENTS DIVISION
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**Typical Operation as Pulse Modulator,**

**DC Resonant Charging**

| | | |
|---|---|---|
| Peak network voltage | 16.0 | 12.0 Kilovolts |
| Pulse repetition rate | 1000 | 2500 Pulses/second |
| Pulse length | 1.0 | 0.4 Microsecond |
| Pulse forming network impedance | 48 | 48 Ohms |
| Trigger voltage | 200 | 200 Volts |
| Peak power output (Resistive load 92% Zn) | 1.31 | .736 Megawatt |
| Peak anode current | 175 | 130 Amperes |
| Average anode current | 0.175 | 0.13 Amperes d.c. |

**Note 1**

Cooling permitted. However, there shall be no air blast directly on the bulb.

**Note 2**

The peak inverse anode voltage shall not exceed 5.0 kv during the first 25 microseconds after the pulse.

**Note 3**

The root mean square anode current shall be computed as the square root of the product of the peak current and the average current.

**Note 4**

The Driver pulse, measured at the tube socket with the thyratron grid disconnected, shall have the following characteristics:

| | | |
|---|---|---|
| A. | Voltage | 200-300 Volts |
| B. | Duration | 2 Microseconds (at 70% points) |
| C. | Rate of rise | 200 Volts/microsecond (min.) |
| D. | Impedance | 50-500 Ohms |

The limits of anode time delay and anode time jitter are based on the minimum trigger. Using the highest permissible trigger voltage and lowest trigger source impedance materially reduces these values below the limits specified.

**Note 5**

The time of anode delay is measured between the 26 percent point on the rising portion of the unloaded grid voltage pulse and the point at which evidence of anode conduction first appears on the loaded grid pulse.

**Note 6**

Time jitter is measured at the 50 percent point on the anode current pulse.