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# PULSED TECHNOLOGIES LTD



THYRATRON

## TD11-50k/16 THYRATRON

Low pressure hydrogen-filled thyatron TD11-50k/16 (grounded-grid thyatron) with self-maintained arc discharge in copper-vapours is designed to switch energy stored in a capacitor bank or pulse-forming network with pulse width from tens of nanoseconds to hundred of microseconds.

### Description. General Data

The thyatron is enclosed into a brazed metal/ceramic envelope, features patented sandwich-like cathode. Cathode (trigger) assembly is fitted with specially developed semiconductor discharge initiator (igniter). Patented dielectric coating protects ceramic insulator from destruction in cases when inverse anode voltage reaches 100% of direct value. **Mercury-free and environmentally safe product.** The tube with zero warm-up time (TD11-50k/16SN without cathode and permanent reservoir heating) is available upon your special request.

The design of the thyatron is protected by RF patents NN 1792207, 1807798, 20201, 28283.

### Typical characteristics

Peak forward anode voltage, kV	3÷10
Peak forward anode current (I <sub>b</sub> ), kA	50
Peak Reverse anode current (oscillated mode, second half-wave), kA	20
Anode current 1st half-wave width, μs*	3.0
Pulse repetition rate, Hz	0.5
Tube warm-up time (Readiness time), minutes	5.0
Reservoir heater voltage, V, (not less/not more)	3.0/6.6
Reservoir heater current (at U <sub>heat</sub> = 6,6 V), A	< 1.0

\* - oscillation mode with three half-waves max.

### Maximum and minimum ratings (Absolute values)

Peak forward anode voltage, kV (Notes 1, 2, 3)	1÷20
Peak forward anode current, kA	0.5÷70
Maximum anode current rise rate, A/s	5x10 <sup>11</sup>
Anode current pulse duration, μs	0,1÷100,0
Switched energy, J	2 000
Anode Dissipation Factor (V <sub>x</sub> A <sub>x</sub> p <sub>ps</sub> )	7x10 <sup>8</sup>
Root mean square current RMS = $\sqrt{I_b \times i_b}$ (Note 4)	40
Pulse repetition rate, Hz (Note 5)	100
Time Jitter, ns	3.0
Rate of rise of trigger voltage pulse, kV/μs, not less	5.0
Peak open circuit trigger voltage, kV, (not less/not more)	1.5/6.0
Peak trigger current, A, (not less/not more)	80/150
Trigger current pulse duration, μs	1÷5

Operation of the thyatron when two or more parameters are exceeded simultaneously may be permitted only upon agreement with the Manufacturer

(Notes 1,2) The dwell time at the peak anode voltage should be minimised in order to minimise pre-firing. For operation at the rated peak forward anode current, the dwell time less 0.5 of pulse period, but must not exceed 1 millisecond.

(Note 3) After thyatron anode current stops flowing and before voltage is reapplied to the anode, the anode voltage must stay between 0 and -500 Volts for at least 250 ms to allow the gas to deionize.

(Note 4) i<sub>b</sub> - average current

(Note 5) Low-energy, high-rate of rise of ignition voltage pulse trigger system by a cable pulse generator.

The thyatron operating resource in terms of total switched charge - 2x10<sup>5</sup> C.

Maximum overall dimensions

(∅<sub>cathode flange</sub> x H<sub>max</sub>), mm - 65x100.

Mass - not more than 0.4 kg.

Mounting position - any.

**For reliable operation in compliance with the above ratings the trigger unit (driver) TU-2D is recommended.**

TD11-50k/16