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PULSED TECHNOLOGIES LTD



THYRATRON

TD11-50k/35 THYRATRON

Low pressure hydrogen-filled thyatron TD11-50k/35 (grounded grid thyatron, copper arc thyatron) with self-maintained arc discharge 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 2 HV gaps and patented sandwich-like cathode. Cathode (trigger) assembly is fitted with 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/35SN 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÷30
Peak forward anode current, kA	50
Pulse repetition rate, pps	0,5
Anode current pulse 1-st half-wave duration, μ s*	2÷3
Switching capacity, μ F	5
Heating voltage, V min/max	3,5/6,5
Heating current at $U_{h.v.} = 6.0$ V, A, max	1,0
Warm-up time, minutes	3

* - oscillation mode with three half-waves max.

Maximum and minimum ratings (Absolute values)

Peak forward anode voltage, ($U_a \max$), kV ^(1,2,3)	40
Peak forward anode current (I_b), kA	70
Rate of rise of anode current, A/s	$5 \cdot 10^{11}$
Anode current pulse duration, μ s	0.1÷100.0
Pulse repetition rate (f), pps ^(4,5)	100
Energy per shot, J	10000
Anode heating factor $P_b = (U_a \times I_b \times f)$, V*A*pps	$10 \cdot 10^9$
RMS current $rms \sqrt{I_b \times I_b}$ ($I_b = CUF$) ⁽⁶⁾	100
Jitter, ns ⁽⁵⁾	2÷3
Peak trigger voltage, kV, (min/max)	2.0/6.0
Peak trigger current, A, (min/max)	80/150
Trigger pulse width, μ s	1÷5
Rate of rise of trigger voltage pulse, kV/ μ s	5

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

^(Note 1) The dwell time at the peak anode voltage should be minimised in order to minimise pre-firing.

^(Note 2) At the end of the current pulse and before voltage is reapplied to anode, the anode voltage must stay at -100 to -500 Volts for at least 250 ms for thyatron recovery.

^(Note 3) Inverse anode voltage applies for a previously non-conducting tube. Exclusive only of a spike not longer than 25 nanoseconds, the peak inverse anode voltage must not exceed 5 kV during the first 50 microseconds after conduction.

^(Note 4) The maximum-allowed temperature of cathode, anode and grid flanges is +100. Use forced air or oil cooling if exceeded.

^(Note 5) For circuits, based on low-energy, high trigger pulse rise rate cable generator.

^(Note 6) At values $P_b > 10^9$ and $RMS > 50$ thyatrons can be used only in a burst-pulse mode. Duration of pulse packet and the pause should be submitted to the Manufacturers approval.

Life in terms of cumulative charge transfer, C (min) - 1×10^5
 Maximum overall dimensions ($\varnothing_{\text{cathode flange}} \times H_{\text{max}}$), mm - 65x150.
 Net weight - not more than 0,5kg.

For reliable operation in compliance with the ratings listed we recommend to use specially designed high performance thyatron driver (thyatron trigger system) TU-2D.

TD11-50k/35