



ELECTRONIC
INNOVATIONS
IN ACTION

TUBES

OBJECTIVE TECHNICAL INFORMATION

These ratings represent the design objective for this product. Refer to the Preliminary Technical Information sheet for ratings currently achieved in the progression towards design objectives. If PTI sheets do not exist, consult your local Tube Department Regional Sales Office.

DEVELOPMENTAL
TYPE

ZR-7512
OTI-99D
Page 1
12-68

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ZR-7512

TRIGGERED VACUUM GAP

45 Kilovolts
50,000 Amperes
15,000 Joules

Fires at 300 Volts
Ceramic Envelope

The ZR-7512 is a cold-cathode, vacuum, triggered spark gap capable of switching 15,000 joules at high voltage. Unique design combines the desirable features of vacuum and gas devices. These include extremely wide voltage range, ease of triggering, high voltage capability, rapid recovery time, stability of characteristics and reliability.

Although capable of withstanding a hold-off voltage of 55 kilovolts indefinitely, the ZR-7512 will fire reliably at voltages as low as 300 volts. It will reliably switch non-repetitive high-current pulses with minimum delay and jitter in high-voltage circuits. Applications include "crowbars"* and switching stored electrical energy systems into low-impedance loads, or energy-storage capacitors into resistive or inductive loads.

ELECTRICAL

Heater Voltage None Required

MECHANICAL

Mounting Position - Any

Net Weight Approx. 4 lbs.

MAXIMUM RATINGS

Interelectrode Leakage Resistance	10,000	Megohms
Main Gap		
Operating Voltage	300V to 45	Kilovolts
Hold-Off Voltage, Indefinite Time, minimum	55	Kilovolts
Peak Current		
Unidirectional Pulse, maximum	50,000	Amperes
Charge Conducted Through Gap per Operation**, maximum	0.7	Coulombs
Discharge Rate, maximum	2	Per Minute
Delay Time †, V app. = 45 KV, maximum	0.1	Microseconds
Jitter †, V app. = 45 KV, maximum	0.1	Microseconds
Trigger Gap		
Typical Trigger Firing Circuit:		
Peak Voltage ‡, typical	5	Kilovolts
Short-Circuit Current ¶, typical	40	Amperes

* In a "crowbar" application the gap acts as a short-circuiting switch to protect vulnerable high-voltage equipment by removing the direct-current supply voltage within tenths of a microsecond after initiation of the trigger-pulse. Unless the fault is self-clearing, the circuit must subsequently be opened in the usual manner.

** This rating refers to the charge originating from the capacitor bank. For further information concerning "follow-thru" current from the power supply in a given application consult the General Electric Microwave Tube Business Section.

† From trigger-gap breakdown to main-gap breakdown.

‡ The voltage rise time should be as fast as is consistent with the firing speed and accuracy required. The trigger will fire typically at 1 to 3 kilovolts on the leading edge of the pulse but may fire at lower trigger voltages. Only pulse voltage shall be applied to the trigger.

¶ Delay time and jitter may be decreased and gap life increased by increasing trigger short-circuit current. Currents up to 100 amperes may be used. The pulse width should preferably not exceed 2 microseconds.

The specifications of this type are subject to change. This device is now under development and is made available for experimental purposes only. For the most recent information concerning the status of this development, please consult your local Tube Department Regional Sales Office, or current Preliminary Technical Information for the same catalog number.

OPERATING NOTES

When discharging or crowbaring energy-storage capacitors, repetitive firing for short periods may be necessary to maintain sufficiently low voltage to protect electrical equipment until circuit is cleared. Restoration of power-supply voltage to maintain service continuity without circuit-breaker action after a self-clearing fault is feasible in a typical circuit by blocking the trigger pulse. This is due to the rapid deionization time and excellent voltage recovery capability of the ZR-7512. For further information consult the Microwave Tube Business Section, Bldg. 269, Schenectady, New York, FRanklin 4-2211, Extension 5-2507.

