

Design a Series Laser Triggering transformer

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Abstract

An integrated prototype of a trigger transformer of high voltage (16kV) has been designed with a pulse width of (1 μ sec) and a maximum pulse rate of (PPS = 50).

The designed transformer is the main part of a serial triggering circuit in a pulse laser switched-mode power supply (Yag Laser). The average discharge current is (7.8A). The transformer core is a Ferrite ring, the transformer's secondary bobbin is isolated with Teflon with a (100 μ m) thickness. The secondary bobbin was toured on four layers where each layer has 40 tours. Between each two layers a Teflon layer exists for isolation with a thickness of (200 μ m). The primary bobbin consists of only one tour.

We've used a ATMEGA32 microcontroller to control all the laser system parts and also to generate the trigger transformer input pulses which have a (1 μ sec) width and a maximum amplitude of (50V). At the output trigger transformer, we got pulses which have a (1 μ sec) width and a maximum amplitude of (16kV) and with wanted pulse rate. The designed output trigger transformer pulses were used to trig the flash lamp type 2X125F which is in the serial discharge circuit.

Keywords: External Trigger, Series Trigger, Solid State Laser, Isolation Materials, Ferrite Materials, Pulse transformer, HV transformers.

For the abstract in Arabic see pages (271-282).

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