

Project: Electronic Ballast for Fluorescent Lamps

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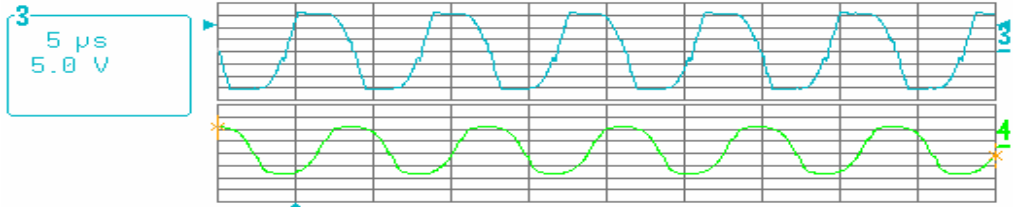
Abstract

High frequency electronic ballasts for fluorescent lamps are widely used because of their small size, light weight, high light luminous efficiency, lack of flicker and audible noise, long life, and dimming capabilities. Dimming operation is crucial today in energy-saving lighting systems and they can also provide functional flexibility, increase lamp life, and give aesthetic effects. Self-oscillating electronic ballast has been chosen in this project as being one of the simplest and most cost-effective ballasts for driving fluorescent lamps.

In this project we refer to two dimming control methods. The first one is controlling the switching frequency, which regulates the lamp's power and dims the lamp. The second one is the current-controlled variable-inductor, which regulates the lamp's current and dims the lamp as well. A self-oscillating electronic ballast with a variable inductor dimming control has been designed and constructed, its operation is verified by experimental results.



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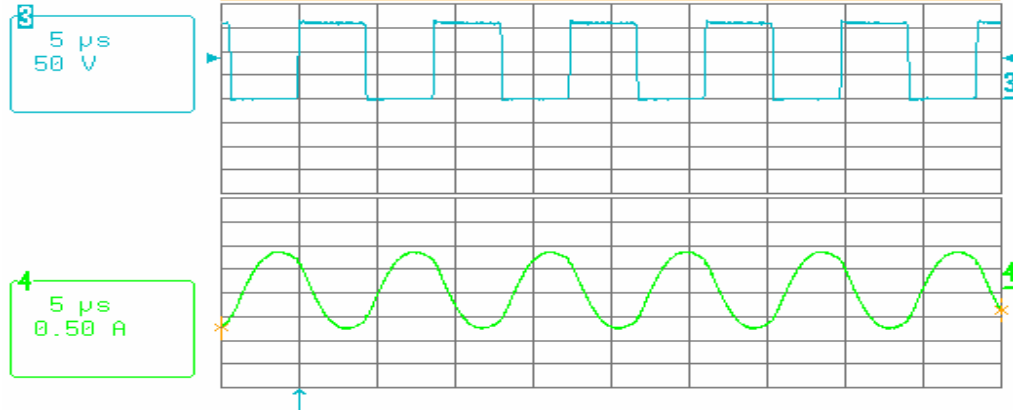
5 µs
200 mA

pkpk(4)	794 mA	Freq(4)	114.727 kHz
sdev(4)	304.2 mA	period(4)	8.7164 µs
rms(4)	312.4 mA	width(4)	4.3531 µs
cmean(4)	-58.9 mA	rise(4)	1.8308 µs
csdev(4)	304.1 mA	Fall(4)	1.7065 µs
crms(4)	309.7 mA	r20-80%(4)	1.2521 µs
top(4)	320 mA	F80-20%(4)	1.1535 µs
base(4)	-434 mA	over+(4)	2.05 %
ampl(4)	754 mA	over-(4)	3.23 %
mean(4)	-71.1 mA	xamn(4)	-734.61 ns
minimum(4)	-459 mA	xamx(4)	3.70978 µs
maximum(4)	335 mA	delay(4)	-2.7986 µs
area(4)	-3.55251 µC	cycles(4)	5

5 µs

Gate voltage and lamp current

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5 µs
0.50 A

pkpk(4)	1.641 A
mean(4)	-36.2 mA
sdev(4)	593.9 mA
rms(4)	595.0 mA
ampl(4)	1.565 A

5 µs

: resonant current and inverter output voltage