

# Voltage Booster Block Validation

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## Design Details

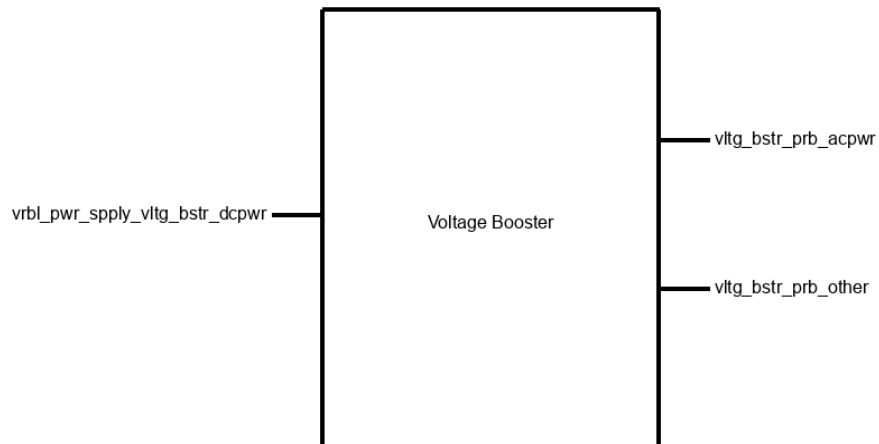
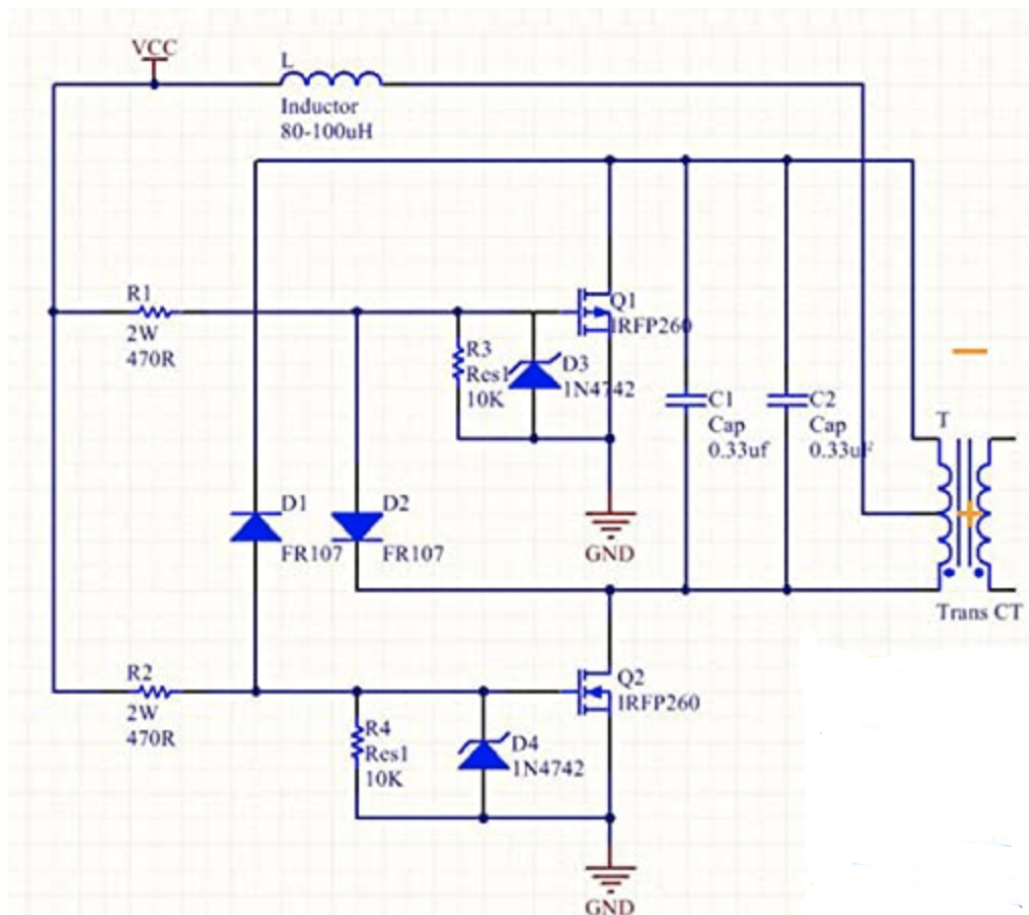


Image 1: Black box for Voltage Booster block.



**Image 2: Schematic for Zero Voltage Switch circuit connected to flyback transformer**

## Design Validation Overview

This block is based on a module bought from amazon. The [Flyback transformer module](#) takes in a DC input, driven by the zero voltage switch circuit. According to a [wikipedia page](#), “When the switch is switched on, the primary inductance causes the current to build up in a ramp. An integral diode connected in series with the secondary winding prevents the formation of secondary current that would eventually oppose the primary current ramp.”

This block will accept an input of 12V-30V, and 5A-20A from a DC power supply, but because of the capabilities of our power supply, we will be limiting the voltage and current supplied.

The recommended voltage on the [website](#) is 12-24V with a 5-10A current supply.

A Lower current supply is possible, but would risk blowing one of the components.

## Design Validation Interface Table

### Interface Property

### Why is this interface this value?

### Why do you know that your design details for this block above meet or exceed each property?

**vrbl\_pwr\_spply\_vltg\_bstr\_dcpwr : Input**

Inominal: 1A	The nominal current specified is the current that is supplied most of the time when the power supply is on but not connected to the power supply.	The power supply that my group mate has built, supplies 1A and that has been proven by his tests.
Ipeak: 5A	This is the highest current that can be supplied from the variable power supply.	The power supply was proven to supply 5A after testing and measuring 5A coming out of the output of the power supply.
Vmax: 28VDC	This is the highest voltage that can be supplied because the voltage booster module's recommended power is less than that.	The power supply shows what voltage is being supplied, and has shown 28VDC to be the max.

Vmin: 1VDC	This is the lowest voltage that can be supplied because we will be adjusting the voltage and we need a big range of voltages.	The power supply has shown that it can supply at least 1V and that has been measured to verify
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#### **vltg\_bstr\_prb\_acpwr : Output**

Vmax: 90,000V	The maximum arc length on the website is 3cm. Each 1cm = almost 30kV	On the <a href="#">Website</a> the module was bought from, it is specified that 4cm is the max arc length. But we will be supplying less power to the module than specified, so the max would be 3cm because of the values that are supplied.
Vnominal: 30,000V (+-10%)	The nominal current and voltage we will be supplying is 12V at 5A. This will result in a 1-2cm arc. Each 1cm of arc = almost 30kV	On the <a href="#">website</a> , it says that at 12V and 5A, the arc length will be 1-2cm.

## **References**

Delete Me: References should be in IEEE format and should when possible have links graders can easily follow. Do not leave this section blank.

1. "Icstation DC 12-30V High Voltage Arc Generator ZVS Flyback Driver Kit for SGTC Marx Generator," *Amazon*, 2011. [Online]. Available: [https://www.amazon.com/gp/product/B06WD3WD6P/ref=ppx\\_yo\\_dt\\_b\\_asin\\_title\\_o05\\_s00?ie=UTF8&psc=1](https://www.amazon.com/gp/product/B06WD3WD6P/ref=ppx_yo_dt_b_asin_title_o05_s00?ie=UTF8&psc=1). [Accessed: 01-Mar-2021].
2. "Flyback transformer," *Wikipedia*, 28-Oct-2020. [Online]. Available: [https://en.wikipedia.org/wiki/Flyback\\_transformer](https://en.wikipedia.org/wiki/Flyback_transformer). [Accessed: 01-Mar-2021].