Specifications

1. **Verification of PINOUT**

A diagram of a circuit

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**Design parameters**

|  |  |
| --- | --- |
| Parameter | Value |
|  | 8.8V - 15.2V |
|  | 7V – must be above 6.5V |
|  | 250mA – (assuming MOSFET is not switched at 1KHz) |
| Output overshoot, undershoot | Does not matter due to LDO |
| Output voltage ripple | Does not matter due to LDO |
| Operating frequency | 400KHz |

1. **How do you set the output voltage? (PRIORITY HIGH)**

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**Defining variables**

Choose (Ensure is above 6.5V for stable operation of LDO)

Plugging that into eq we get

77.5K ~= 76.8K

1. **How to choose output inductor (PRIORITY MEDIUM)**

Overall, I chose parameters that limited EMI, at the cost of being less energy efficient.

is a coefficient that represents the amount of inductor ripple current relative to the maximum output current of the device. must be 0.2-0.6 of maximum IOUT supported by converter.

**= 0.3 –** low EMI, less energy efficient

- lower switching frequency variant chosen for less EMI

\*Note this has since been changed to

**\***Note this has been changed to 250mA

Plugging the **old** parameters in we get

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Figure 1 Formula used for inductance

Resulting in

With our changing parameter that means K= 0.42

for K=0.3

Now we can calculate the ripple across the input of the inductor using

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Figure 2 ripple current(PG 19 datasheet)

A screenshot of a math formula

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**Note\*** This inductor has been routed away from analog signals to reduce EMI.

1. **Choosing OUTPUT capacitors (PRIORITY: LOW)**

Affects output voltage ripple, since we are feeding this into an LDO it does not matter that much.

Chosen 0.1uF and 10uF capacitors to filter high and lower frequencies. **Can be changed. And will be changed.**

The LMR51610 device requires a high frequency input decoupling capacitor or capacitor. The typical recommended value for the high frequency decoupling capacitor is 2.2 µF or higher

The voltage rating must be greater than the maximum input voltage. To compensate the derating of ceramic capacitors, TI recommends a voltage rating of twice the maximum input voltage.

8.2.2.7 Bootstrap Capacitor Every LMR516xx design requires a bootstrap capacitor, CBOOT. The recommended bootstrap capacitor is 0.1 µF and rated at 16 V or higher.