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 Power electronic (EE3410E)  
  
  
  
Design converter with the parameters as following:**

* Input : 9.6 – 15.2 VDC
* Output : 12V ±1%, 5A
* Switching frequency: 100 kHz  
  Ω

|  |  |
| --- | --- |
| Input voltage source | 9.6-15.2 VDC |
| Output voltage, current | 12±1%, 5A |
| Switching frequency | 100kHz |
| Current ripple | 30% |
| Voltage ripple | 2% |

Consider range of input voltage [ 9.6 – 12 ]  
=> Choose *Boost zone  
A diagram of a duty cycle

Description automatically generated*  
 Consider input voltage:   
 *\* Basic Calculation* - We have Duty   
 - =>   
 +   
 +   
 +   
 - Current ripple on Inductor:  
 +   
 - Voltage ripple on Capacitor:  
 +   
 +   
 +   
  
  
 - MOSFET:A picture containing sketch, line, diagram, design

Description automatically generated

- DIODE:   
 +   
 + A  
 +   
*\*Choose devices*  
 - Capacitor   
 + C   
 +   
 - Inductor  
 +   
 +   
 - MOSFET and DIODE depend on cooling  
 + Since is so small => Choose natural cooling   
 +   
 +   
  
 Consider range of input voltage [ 12 – 15.2 ]  
=> Choose *Buck zone*  
A diagram of a duty cycle

Description automatically generated  
Consider input voltage   
*\* Basic Calculation* - We have Duty 0.44  
 - =>   
 +   
 +   
 +   
 - Current ripple on Inductor:  
 +   
  
 - Voltage ripple on Capacitor:  
 +   
 + +   
  
  
 - MOSFET:A picture containing sketch, line, diagram, design

Description automatically generated

- DIODE:   
 +   
 + A  
 +   
*\*Choose devices*  
 - Capacitor   
 + C   
 +   
 - Inductor  
 +   
 +   
 - MOSFET and DIODE depend on cooling  
 + Since is so small => Choose natural cooling   
 +   
 +