Design of Boost Inductor

Required Inductance, L = 0.9mH

Required Specifications are:

I_{peak} = 13.94A; I_{rms} = 5.6A

Winding factor, K_w = 0.6

Max Flux density, B_m = (Ferrite core)

Current density, J = 3A/mm^2 (Copper)

Using Area product method for Design:

Area Product

$$A_p = A_c.A_w = \frac{L \times I_{peak} \times I_{rms}}{J \times K_w \times B_m}$$

, A_c = Core Area

, A_w = Window Area

Substituting values we get:

A_p = 19.516 x 10^4 mm^2

We have selected EE65/32/26 based on area product from the standard core table available

Specifications of EE 65/32/26 are:

A_c = 532 mm^2

No. of Turns ,

$$N = \frac{L \times I_m}{A_c \times B_m}$$

Substituting values we get :

N = 117.9 ≈ 118 turns

Gauge of Wire ,

Gauge , $\alpha = \frac{I}{J} = \frac{6}{3} = 2\ mm^2$

SWG based on value of 2 mm^2 is SWG 16

Air Gap Length ,

$l_g = \frac{\mu_0 \times N^2 \times A_c}{L} = 5mm$