**Transformer Resistance Calculations**

First of all, the skin effect should be calculated at the switching frequency of our design.

The diameter of the wire should be chosen regarding the skin effect on the current capability of the wire. When the AWG table is examined, AWG-21 is found suitable for the wire of the transformer which has a diameter of 0.723 mm.

Both the primary and the secondary windings are winded on the middle of the E- Core. From the datasheet of the chosen magnetic core, the following figure, which illustrates the dimensions of the core, is obtained.

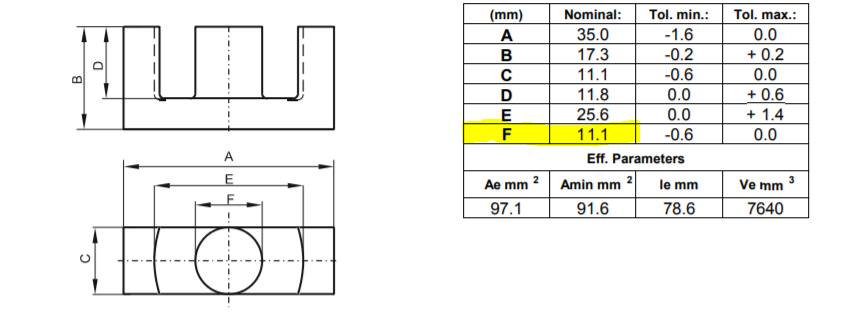


Figure x – The dimensions of the E – Core 0P43434EC

Considering that the primary winding is winded first on the middle part of the E – Core, the circumference of the part F must be calculated first.

The circumference is equal to : π \* R , where R = 11.1 mm as highlighted in Figure X.

= 34.87 mm.

For the primary winding, Np = 15. Thus, the total wire length at the primary winding is equal to 15 \* 34.87 = 0.523 m. At the AWG table, the resistance/length constant is given as 42 mΩ/m . Resistance of the wire in the primary winding is calculated as :

Rp = 0.523 \* 42 \* = 0.0219 Ω.

The secondary winding will be winded on the primary winding which increases the circumference of the surface. New circumference can be found as :

= π \* R , where R = 11.1 + 0.723\*2 = 12.54 mm

= 39.41 mm.

For the secondary winding, Ns = 20. Thus, the total wire length at the secondaru winding is equal to 20 \* 39.41 = 0.788 m. At the AWG table, the resistance/length constant is given as 42 mΩ/m . Resistance of the wire in the secondary winding is calculated as :

Rp = 0.788 \* 42 \* = 0.033 Ω.