

### Transformer ETD39. Input values :

$P \approx 200$  W Transferred power  
 $R_{fet} \approx 1.5 \Omega \cdot 1.5$  Primary fet on resistance (when hot)  
 $min V_i \approx 250$  V Minimum DC input voltage  
 $max V_i \approx 370$  V Maximum DC input voltage  
 $V_o \approx 24$  V Output voltage  
 $V_d \approx 1$  V Output diode voltage drop  
 $A \approx 123 \cdot 10^{-6} m^2$  Minimum cross section of ferrite core  
 $n_p \approx 66$  Primary number of turns  
 $n \approx 6$  Turns ratio P/S  
 $A_L \approx 3 \cdot 10^{-6} H$  Transformer core constant  
 $L \approx 100 \cdot 10^{-6} H$  Output choke inductance  
 $f \approx 67$  kHz Switching frequency

$t \approx 100$  Transformer temperature [°C]  
 $\varnothing_{prim} \approx 17$  mm diameter primary  
 $\varnothing_{sek} \approx 17$  mm diameter secondary  
 $\varnothing_{primtråd} \approx .355$  mm diameter primary wire  
 $\varnothing_{sektråd} \approx .5$  mm diameter secondary wire  
 $par_{prim} \approx 2$  parallel primary wires  
 $par_{sek} \approx 3$  parallel secondary wires  
 $\rho_{cu} \approx 17 \cdot 10^{-6} \Omega \cdot mm$  Specific resistivity of copper

Primary inductance :  $L_p = 0.013$  H

Wire resistances :  $R_{prim} = 0.39 \Omega$   
 $R_{sek} = 0.02 \Omega$

Transformer core volume :  $vol \approx 11.5$  [cm<sup>3</sup>]  
 B-flux swing (lower plot) :  $B_{pp} \approx 276$  [mT]  
 @ switching frequency :  $F \approx 67$  [kHz]

**Estimated core loss :**  $P_{3C85} = 1820$  mW  
 $P_{3C90} = 1091$  mW  
 $P_{3F3} = 690$  mW

Total loss in windings + 3C90 core : 1,3W + 1,1 W = 3W including some eddy current loss.

Self heating @  $R_{th} = 16^\circ/W$  :  $\Delta T = 48^\circ C$

