



CMOS090 MODEL FOR SYMETRICAL INDUCTORS WITH PATTERNED GROUND SHIELD (ind_sym_nw)

Developer:
RF Team, June 2010

Maturity:
Tentative data

I Measurement and Parameter **Extraction/Estimation of Typical Model Parameters:**

Cmos090 model is derived from HCMOS9 preliminary model.
Parameter extraction was performed on HCMOS9 silicon in the following conditions:

Test structure reference:
ZSS1 to ZSS18

Device Selection:
Lot: J220BYN
Wafer: 17

Characterization domain:
High frequency measurements from 80 MHz to 18 GHz

II. Best/Worst Case:

Statistical and Best/Worst case simulations available
The criteria is the quality factor
Some approximations have been made for the definition of Min and Max:
Min defined with: Ls min, Rs max, Cox max
Max defined with: Ls max, Rs min, Cox min
FOR ANY FREQUENCY (approximation)
Some uniform laws have been used to described process spread

III. Simulation with temperature:

Available from -35 to 125 Celcius Degre

IV. Model Application guidelines:

Layout & Model:

- Octagonal shape
- M61T option : Coil in Alucap+M6//M5, underpass in M4
- M72T option : Coil in Alucap+M7//M6//M5, underpass in M4
- Patterned ground shield: patterned in Poly fingers (salicided)
2 pi cells model
- The model takes into account the proximity effects by the use of frequency dependent Resistances
 - for simulator which can cope with frequency use M2 Model
=> M2 model give the good value of serial resistance at each frequency point.
 - for time domain simulator which can not cope with frequency a configuration providing the frequency f_q as input parameter has been chosen
=> use M1 model. M1 model give the serial resistance value accurate only at the frequency point f_q . The value of this resistance will remain constant with frequency of simulation

Model Call:

- Scalable inductor model
- Input parameters:
 - d**: internal diameter in μm from 90 to 250 μm
=> the inductance value is calculated
 - or **ls**: inductance value in H from 0.691e-9 to 17.264E-9
=> the internal diameter is calculated
 - nbtturns**: number of turns
from 2 to 6
 - w**: width of coils
from 8E-6 to 11.99E-6
 - fq**: frequency of use in Hz (only for M1 model)

Frequency validity:

From DC to cut-off frequency F_{max} of quality factor, but in any case the model validity is limited to 10 GHz
(F_{max} is the frequency where the quality factor reaches a null value)