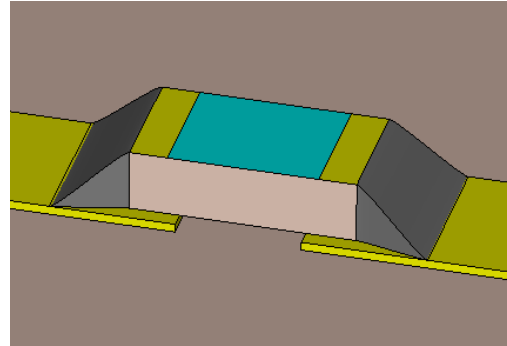
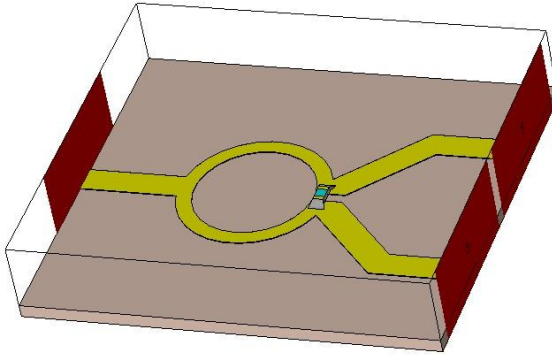
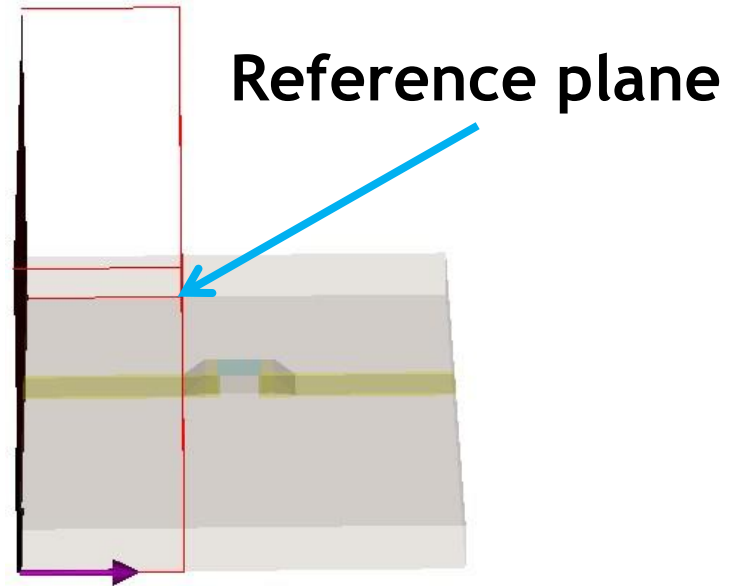
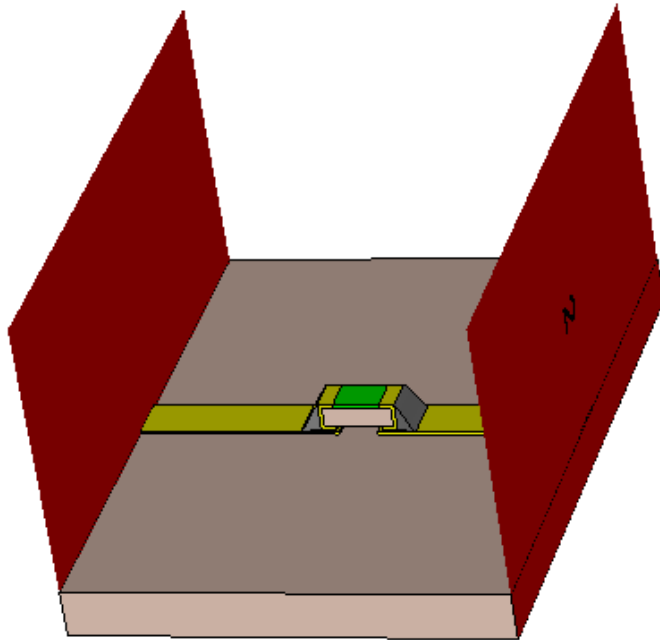


SMD Resistor Simulation

Modeling, Material Setting, Mesh



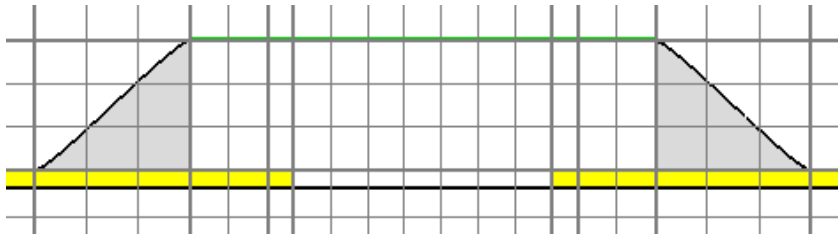
How to Simulate an SMD Resistor?



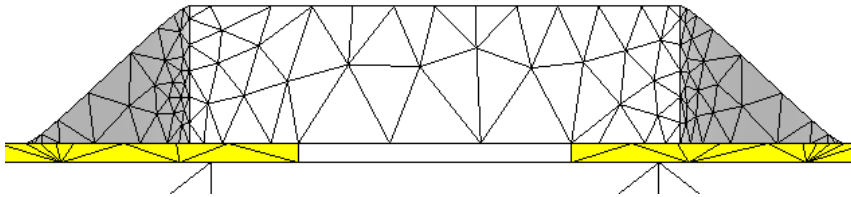
Ports constructed by macro:
“Macros/Solver/Ports/Calculate port extension coefficient”

Recommended Approach

Thin resistive layer



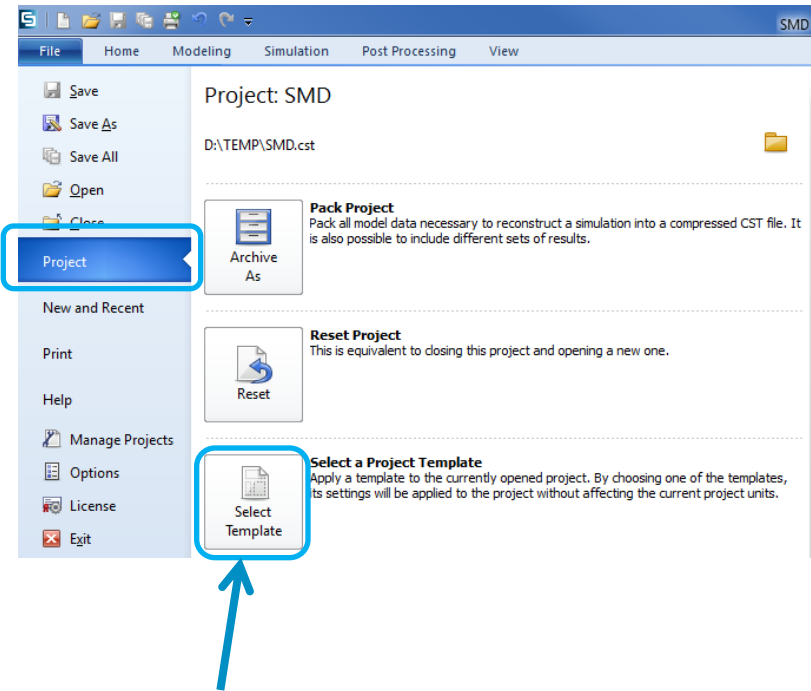
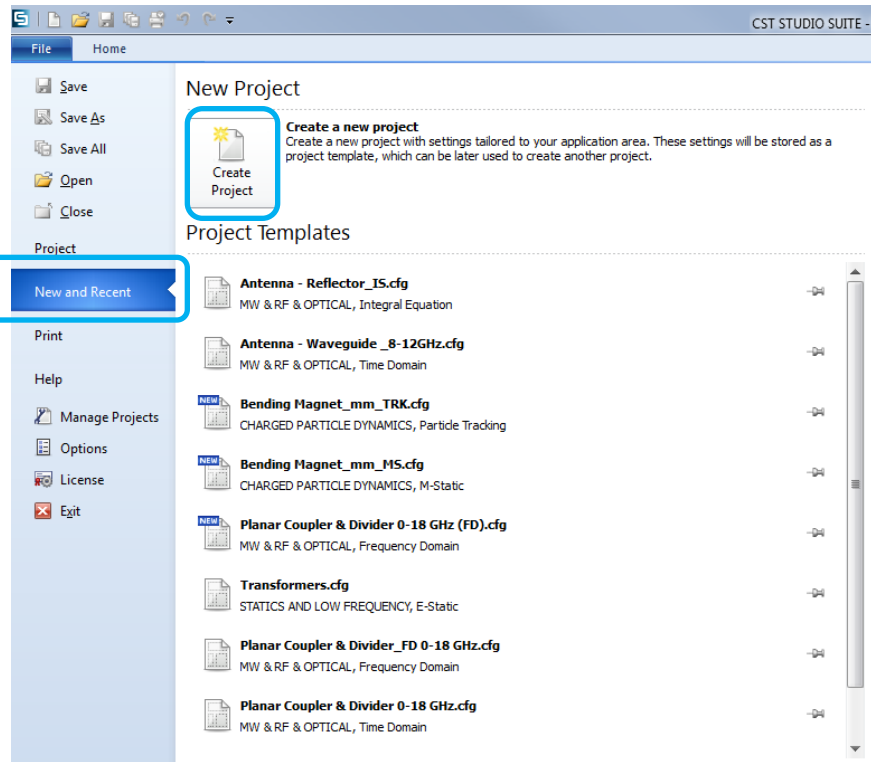
+ Hexahedral mesh



+ Tetrahedral mesh

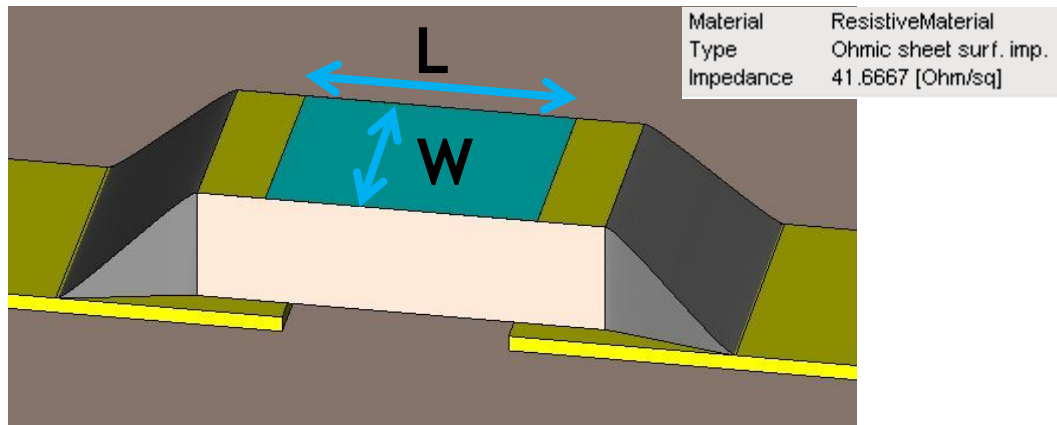
Projects including SMD + microstrip line are included in a zip archive.

Select Appropriate Template



Apply template to existing projects

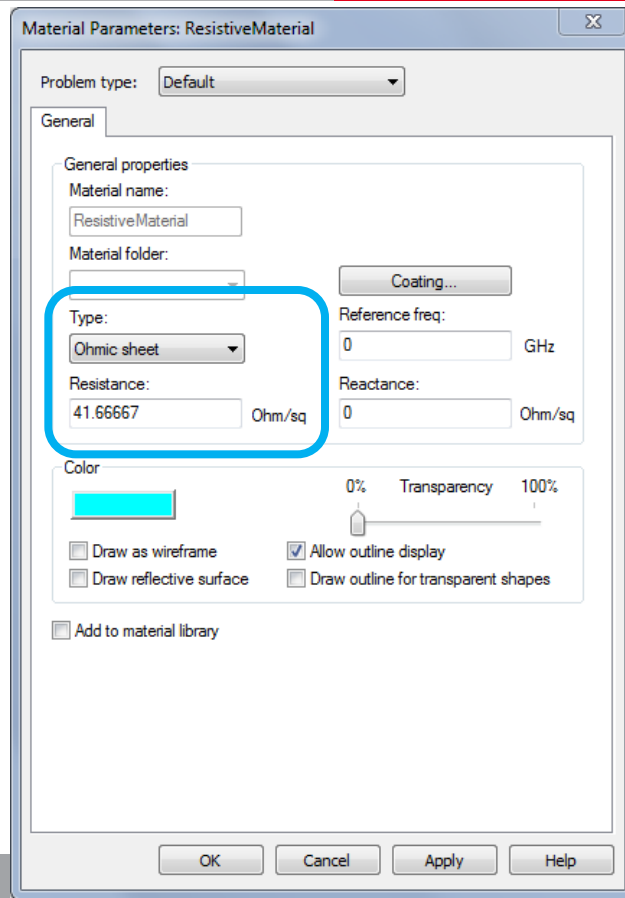
Material Setting - Thin Resistive Layer



Resistance [Ohm]

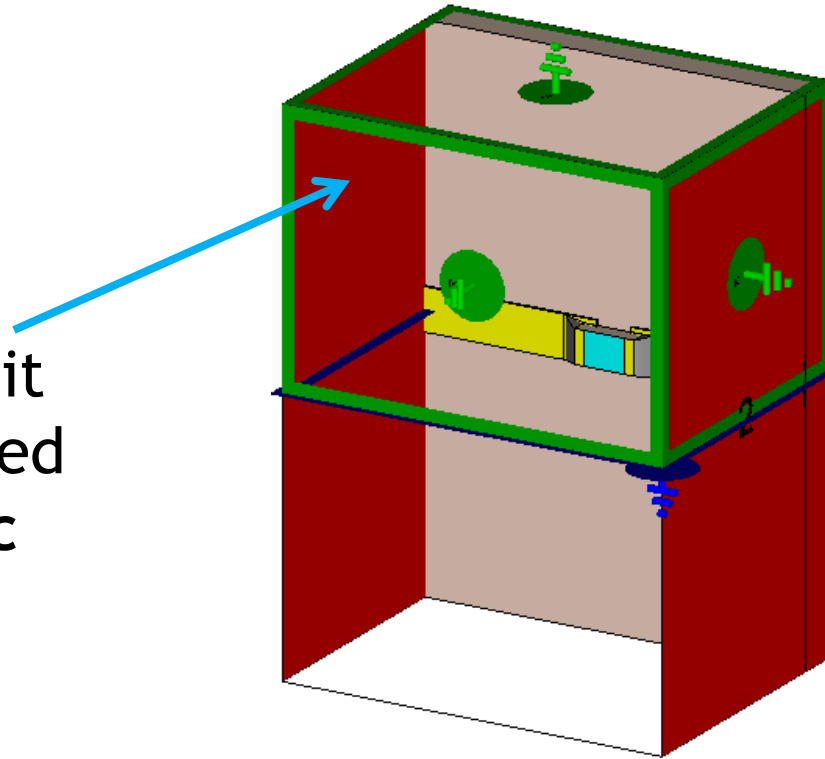
$$R_{\square} = \frac{RW}{L}$$

Surface Resistance [Ohm/sq]



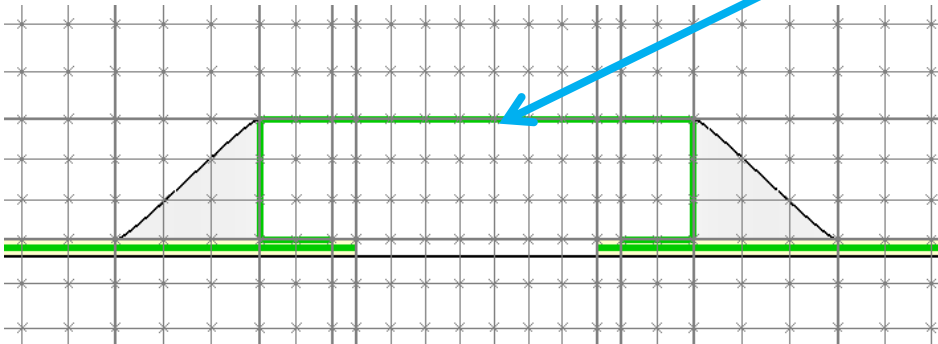
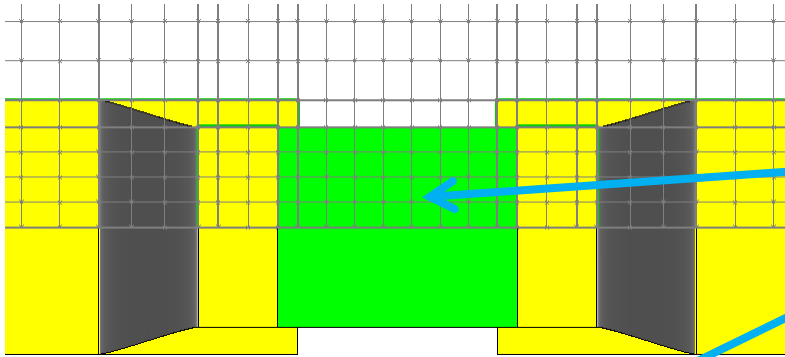
Boundary Conditions

If the port covers the whole plane, it is recommended to use **electric boundaries**.



Hexahedral Mesh

Local Mesh Properties for Resistive Layer



Local Mesh Properties - Hexahedral

Name: Resistive_layer_refinement

Automesh and simulation settings

- ☒ Consider for refinement
- ☒ Material based refinement

Snapping settings

- ☒ Consider for snapping

Intervals in x, y, z:

0 0 0

Mesh refinement settings

- ☐ Use edge refinement factor 1
- ☐ Use volume refinement factor 1

Maximum mesh step width settings

- ☒ Use step width and extend range

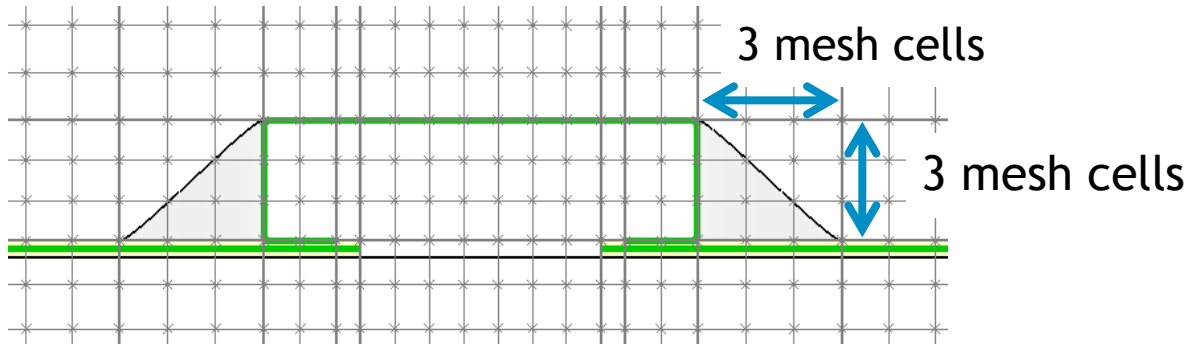
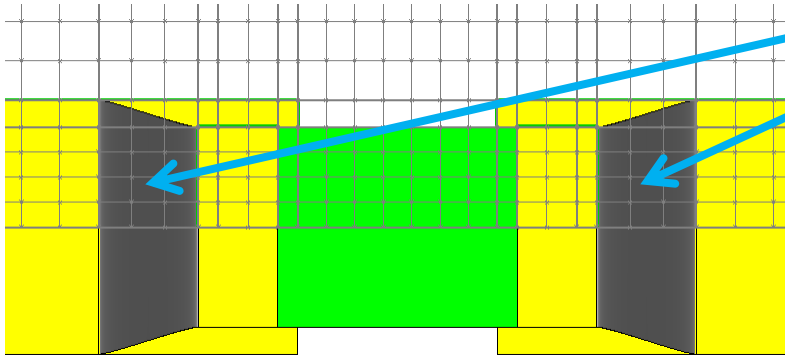
Dx: L/8 Extend x range by: 0

Dy: W/8 Extend y range by: 0

Dz: 0 Extend z range by: 0

Hexahedral Mesh

Local Mesh Properties for Solder



Local Mesh Properties - Hexahedral

Name: Tinr_refinement

OK Cancel Help

Automesh and simulation settings

- ☒ Consider for refinement
- ☒ Material based refinement

Snapping settings

- ☒ Consider for snapping

Intervals in x, y, z:

0 0 0

Mesh refinement settings

- ☐ Use edge refinement factor 1
- ☐ Use volume refinement factor 1

Maximum mesh step width settings

- ☒ Use step width and extend range

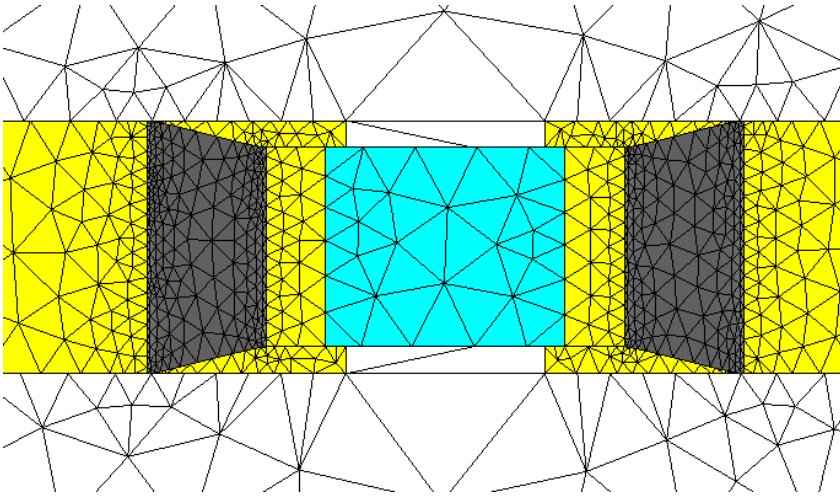
Dx: L_solder/3 Extend x range by: L_solder*2/3

Dy: 0 Extend y range by: 0

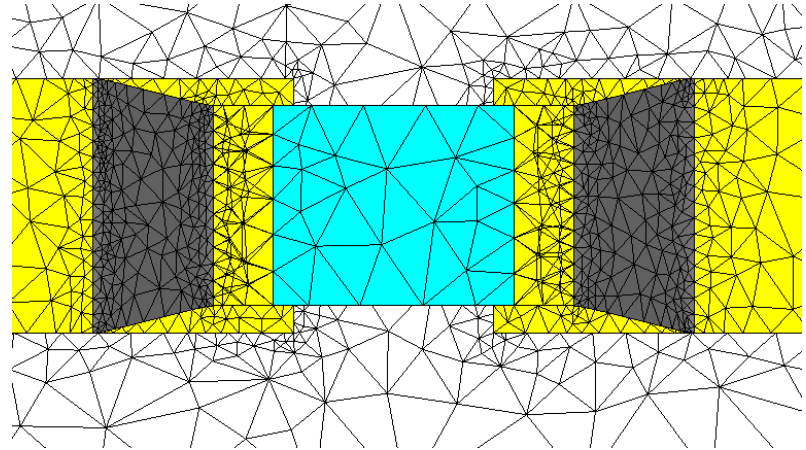
Dz: L_solder/3 Extend z range by: L_solder*2/3

Tetrahedral Mesh

Initial mesh

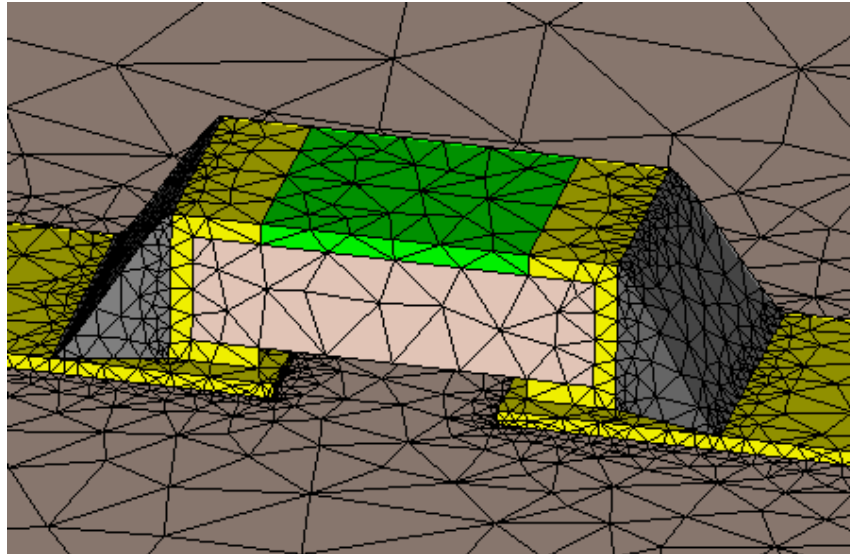


After Adaptive mesh refinement

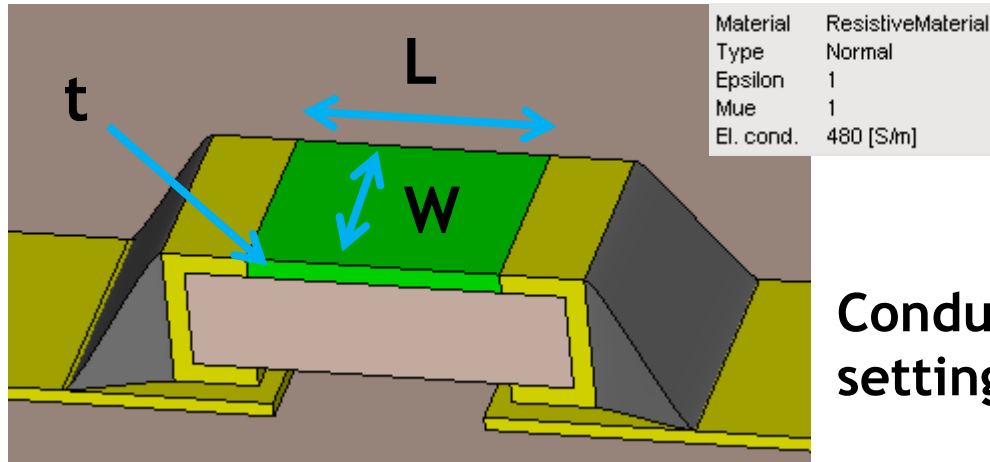


It is recommended to use [Adaptive mesh refinement](#),
manual refinement is not necessary

Comparison to Thick Resistive Layer



Material Setting - Thick Resistive Layer

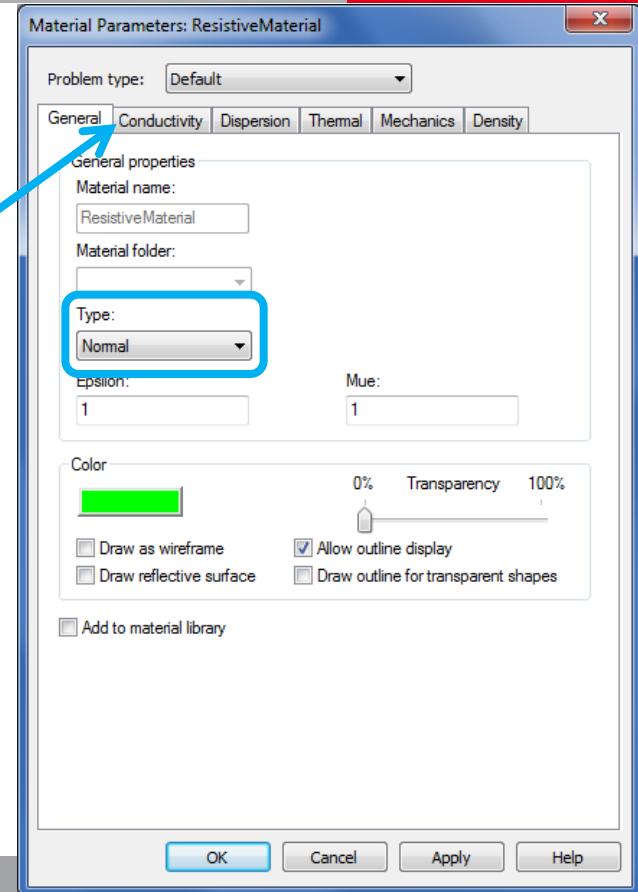


Conductivity
settings

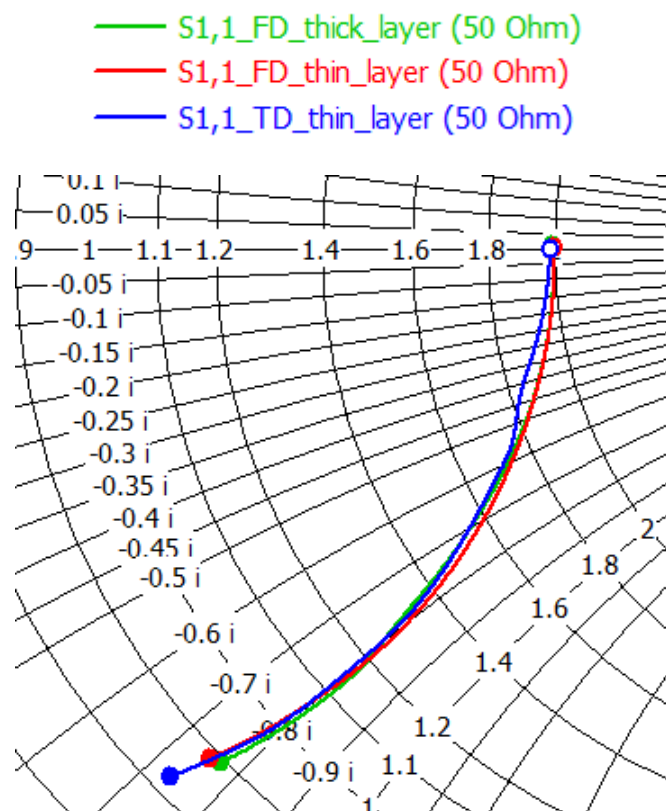
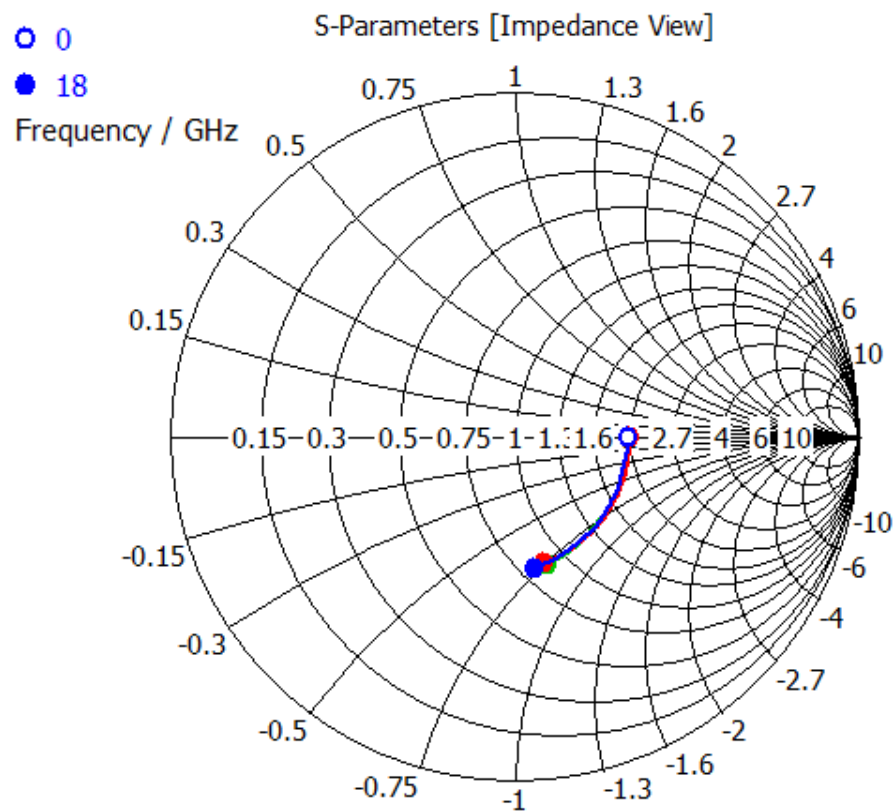
Conductivity [S/m]

Resistance [Ohm]

$$\sigma = \frac{L}{RWt}$$



Results

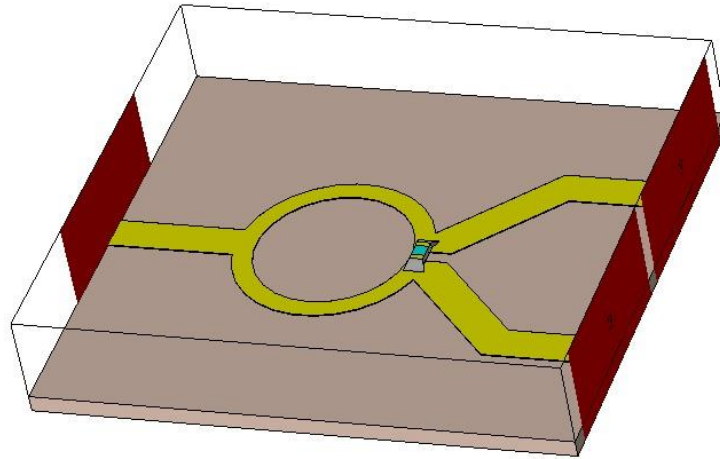


Conclusion

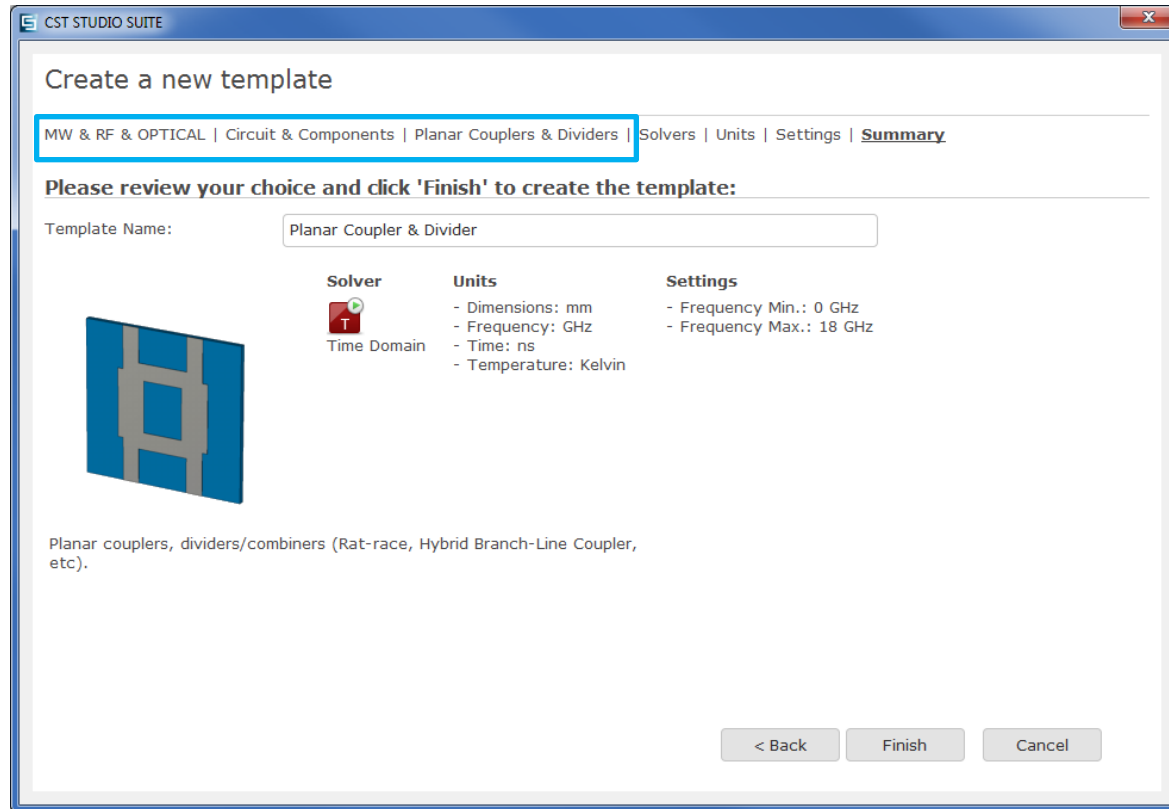
- To obtain accurate results adjust local mesh properties of the resistive layer.
- A thin layer modeling is preferred both in the time domain and frequency domain.
- For extraction of SMD equivalent circuit PEC boundary conditions are recommended.

All projects can be found in [zip archive](#).

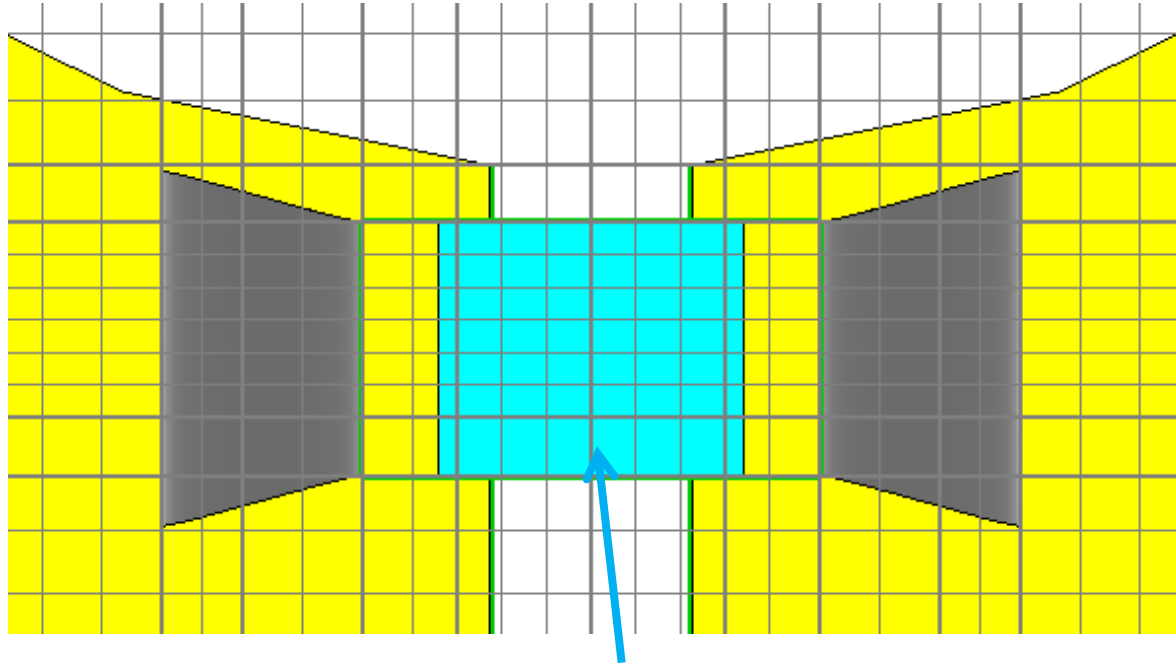
Wilkinson Power Divider with SMD Resistor



Selected Template

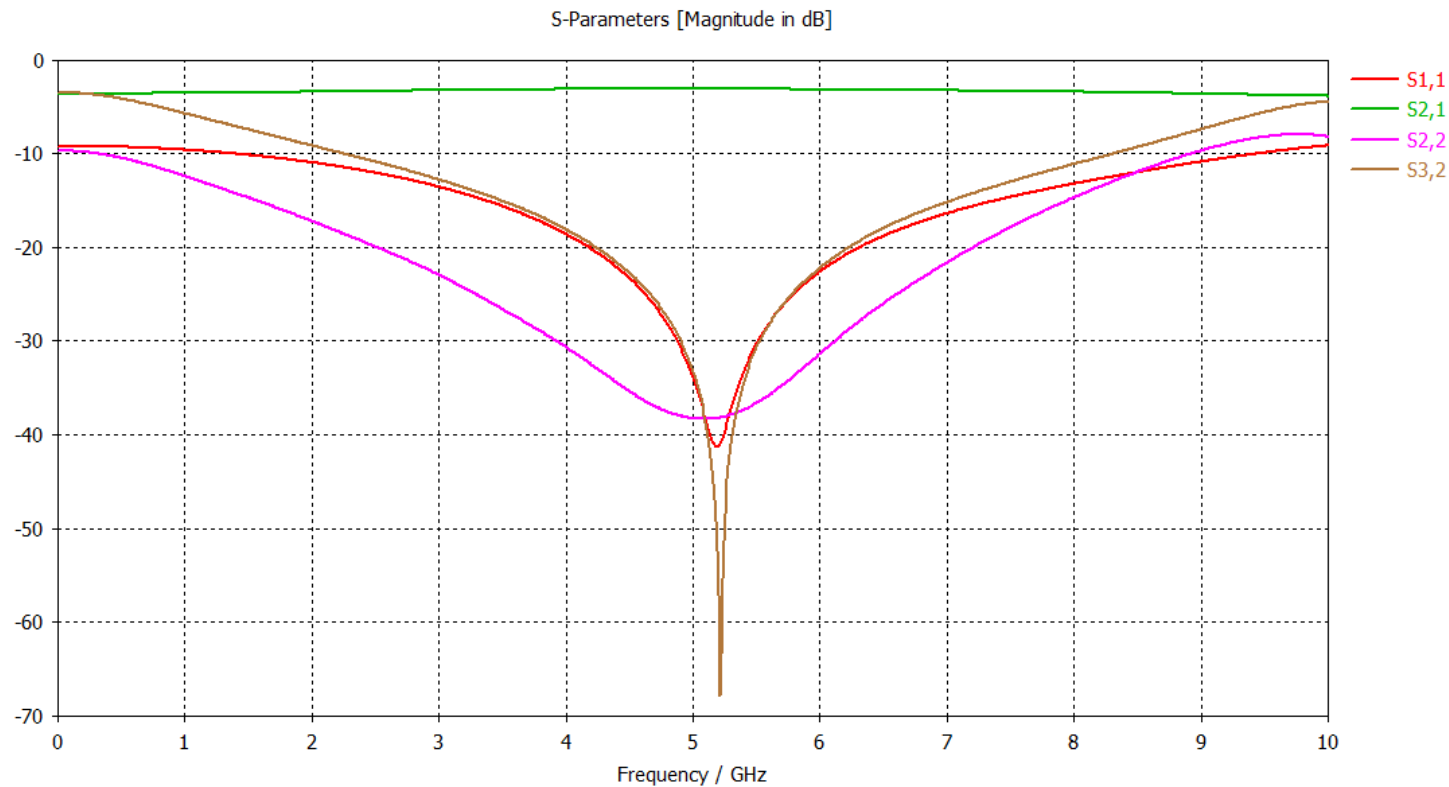


Hexahedral Mesh



**Use the local mesh properties to refine the mesh.
(See previous section of this document)**

Results



HFSS 视频培训课程推荐

HFSS 软件是当前最流行的微波无源器件和天线设计软件, 易迪拓培训(www.edatop.com)是国内最专业的微波、射频和天线设计培训机构。

为帮助工程师能够更好、更快地学习掌握 HFSS 的设计应用, 易迪拓培训特邀李明洋老师主讲了多套 HFSS 视频培训课程。李明洋老师具有丰富的工程设计经验, 曾编著出版了《HFSS 电磁仿真设计应用详解》、《HFSS 天线设计》等多本 HFSS 专业图书。视频课程, 专家讲解, 直观易学, 是您学习 HFSS 的最佳选择。



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该套课程套装包含了本站全部 HFSS 培训课程, 是迄今国内最全面、最专业的 HFSS 培训教程套装, 可以帮助您从零开始, 全面深入学习 HFSS 的各项功能和在多个方面的工程应用。购买套装, 更可超值赠送 3 个月免费学习答疑, 随时解答您学习过程中遇到的棘手问题, 让您的 HFSS 学习更加轻松顺畅...

课程网址: <http://www.edatop.com/peixun/hfss/11.html>

HFSS 天线设计培训课程套装

套装包含 6 门视频课程和 1 本图书, 课程从基础讲起, 内容由浅入深, 理论介绍和实际操作讲解相结合, 全面系统的讲解了 HFSS 天线设计的全过程。是国内最全面、最专业的 HFSS 天线设计课程, 可以帮助您快速学习掌握如何使用 HFSS 设计天线, 让天线设计不再难...

课程网址: <http://www.edatop.com/peixun/hfss/122.html>



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- **HFSS 微波器件仿真设计实例 —— 中文视频教程**

HFSS 进阶培训课程, 通过十个 HFSS 仿真设计实例, 带您更深入学习 HFSS 的实际应用, 掌握 HFSS 高级设置和应用技巧, 网址: <http://www.edatop.com/peixun/hfss/3.html>

- **HFSS 天线设计入门 —— 中文视频教程**

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- ※ 视频课程、既能达到现场培训的效果,又能免除您舟车劳顿的辛苦,学习工作两不误
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