# Contents

1 RF MEMS Process of Fraunhofer ISiT .......................... 1  
1.1 Handling the Problem of Inversion Channels ................. 1  
1.1.1 Measurement Results .................................. 2  
1.1.2 Simulating with ADS Software .......................... 4  

2 Designing Inductors ........................................... 7  
2.1 The Underlying Theory ...................................... 7  
2.2 Accurate Formula for the Q-factor in Two-Port  
Configuration .................................................. 11  
2.3 Labeling Method of the Inductor Structures .................. 11  
2.4 Design Parameters ......................................... 12  
2.4.1 Inner Diameter ........................................... 12  
2.4.2 Turn-to-Turn Spacing .................................... 13  
2.4.3 Conductor Metal Width ................................... 14  
2.4.4 The Material Used ....................................... 14  
2.5 The Strategy for Inductor Library Design .................... 15  
2.6 Inductor Libraries ......................................... 17  
2.7 Measurement Results ....................................... 18  

3 Modeling the Coplanar Line ................................... 19  
3.1 The Theoretical Approach ................................... 19  
3.1.1 Calculating $C_{OXGND}$ .................................. 26  
3.2 Simulations for Coplanar Lines .............................. 27  
3.3 Measurement Results and Conclusion ......................... 33  

4 DC-Block Modeling .............................................. 35  
4.1 Modeling Procedure ......................................... 35  
4.1.1 Calculation of $C_S$ ....................................... 37  
4.1.2 Calculation of $C_{P1}$ and $C_{P2}$ ......................... 39
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1.3 Series Inductance Calculation</td>
<td>41</td>
</tr>
<tr>
<td>4.1.4 Calculation of $R_S$</td>
<td>42</td>
</tr>
<tr>
<td>4.2 DC-Block in the Design-Kit</td>
<td>46</td>
</tr>
<tr>
<td>5 Design-Kit Programming</td>
<td>51</td>
</tr>
<tr>
<td>5.1 The Building Blocks of the Design-Kit</td>
<td>52</td>
</tr>
<tr>
<td>5.1.1 Circuit/Artwork</td>
<td>52</td>
</tr>
<tr>
<td>5.1.2 Circuit/Data</td>
<td>53</td>
</tr>
<tr>
<td>5.1.3 de/Defaults</td>
<td>53</td>
</tr>
<tr>
<td>5.2 Conclusion</td>
<td>54</td>
</tr>
<tr>
<td>6 Summary</td>
<td>59</td>
</tr>
<tr>
<td>Appendix: Design-Kit Codes</td>
<td>61</td>
</tr>
<tr>
<td>References</td>
<td>81</td>
</tr>
</tbody>
</table>
Design and Modeling of Inductors, Capacitors and Coplanar Waveguides at Tens of GHz Frequencies
Pour Aryan, N.
2015, XI, 81 p. 70 illus., 38 illus. in color., Softcover
ISBN: 978-3-319-10186-6