Figure 10-1  Basic oscillator configuration.
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Negative slope (negative resistance)
Figure 10-3  Series resonance circuit with voltage-controlled source term.
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Figure 10-5  Feedback circuits with Pi- and T-type feedback loops.
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<table>
<thead>
<tr>
<th></th>
<th>(x_1, x_2)</th>
<th>Hartley</th>
<th>Clapp</th>
</tr>
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<tbody>
<tr>
<td>(x_3)</td>
<td></td>
<td></td>
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</table>

Table 10-1  Various feedback configurations for oscillator designs based on Figure 10-5(a)
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Table 10-2  Dimensions of the transmission lines in the FET oscillator

<table>
<thead>
<tr>
<th>Transmission line</th>
<th>Electrical length, deg.</th>
<th>Width, mil</th>
<th>Length, mil</th>
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<tbody>
<tr>
<td>TL1</td>
<td>80</td>
<td>74</td>
<td>141</td>
</tr>
<tr>
<td>TL2</td>
<td>48.5</td>
<td>74</td>
<td>86</td>
</tr>
<tr>
<td>TL3</td>
<td>67</td>
<td>74</td>
<td>118</td>
</tr>
<tr>
<td>TL4</td>
<td>66</td>
<td>74</td>
<td>116</td>
</tr>
</tbody>
</table>
Figure 10-19  Dielectric resonator (DR) placed in proximity to a microstrip line.
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Figure 10-21  Input stability circle of the FET in the DRO design example.
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Figure 10-30  Basic mixer concept: two input frequencies are used to create new frequencies at the output of the system.
Figure 10-31  Spectral representation of mixing process.

(a) RF signal

(b) LO signal

(c) Down- and upconverted spectral products
Figure 10-32  Problem of image frequency mapping.
Figure 10-33  Two single-ended mixer types.
Figure 10-34  Conversion compression and intermodulation product of a mixer.
**Figure 10-35** General single-ended mixer design approach.
Figure 10-36  DC-biasing network for BJT mixer design.

\[ Z_{\text{in}}(f_{RF}) = (77.9 - j130.6) \Omega \]

\[ Z_{\text{out}}(f_{IF}) = (677.7 - j2324) \Omega \]
Figure 10-37  Connection of RF and LO sources to the BJT.
Figure 10-38  Input matching network for a single-ended BJT mixer.
Figure 10-39  Modified input matching network.
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Figure 10-43  Double-balanced mixer design.