**Shielded Coupled Inductors LPD4012**

- Only 1.1 mm high and 4 mm square
- Ideal for use in flyback, multi-output buck and SEPIC applications.
- High inductance, high efficiency and excellent current handling
- Can also be used as two single inductors connected in series or parallel or as a common mode choke.

### Core material
- Ferrite

### Core and winding loss
- Go to online calculator

### Weight
- 54 – 64 mg

### Environmental
- RoHS compliant, halogen free

### Terminations
- RoHS compliant matte tin over nickel over silver. Other terminations available at additional cost.

### Ambient temperature
- –40°C to +85°C with (40°C rise) Irms current.

### Maximum part temperature
- +125°C (ambient + temp rise).

### Storage temperature
- Component: –40°C to +125°C.
- Tape and reel packaging: –40°C to +80°C

### Winding to winding isolation
- 100 Vrms, one minute

### Resistance to soldering heat
- Max three 40 second reflows at +260°C, parts cooled to room temperature between cycles

### Moisture Sensitivity Level (MSL)
- 1 (unlimited floor life at <30°C / 85% relative humidity)

### Failures in Time (FIT) / Mean Time Between Failures (MTBF)
- 38 per billion hours / 26,315,789 hours, calculated per Telcordia SR-332

### PCB washing
- Tested to MIL-STD-202 Method 215 plus an additional aqueous wash. See Doc787_PCB_Washing.pdf.

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**Typical Flyback Converter**

**Typical Buck Converter with auxiliary output**

**Typical SEPIC schematic**

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- **Recommended Land Pattern**

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- **Dimensions are in inches**

- **Recommended pick and place nozzle OD: 4 mm; ID: ≤2 mm**

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**Packaging**
- 1000/7” reel; 3500/13” reel
- Plastic tape: 12 mm wide, 0.25 mm thick, 8 mm pocket spacing, 1.45 mm pocket depth

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- **Core material**: Ferrite
- **Core and winding loss**: Go to online calculator
- **Weight**: 54 – 64 mg
- **Environmental**: RoHS compliant, halogen free
- **Terminations**: RoHS compliant matte tin over nickel over silver. Other terminations available at additional cost.
- **Ambient temperature**: –40°C to +85°C with (40°C rise) Irms current.
- **Maximum part temperature**: +125°C (ambient + temp rise).
- **Storage temperature**: Component: –40°C to +125°C.
- **Winding to winding isolation**: 100 Vrms, one minute
- **Resistance to soldering heat**: Max three 40 second reflows at +260°C, parts cooled to room temperature between cycles
- **Moisture Sensitivity Level (MSL)**: 1 (unlimited floor life at <30°C / 85% relative humidity)
- **Failures in Time (FIT) / Mean Time Between Failures (MTBF)**: 38 per billion hours / 26,315,789 hours, calculated per Telcordia SR-332
- **PCB washing**: Tested to MIL-STD-202 Method 215 plus an additional aqueous wash. See Doc787_PCB_Washing.pdf.

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Specification subject to change without notice.
Please check web site for latest information.
### Coupled Inductors for SEPIC Applications – LPD4012 Series

<table>
<thead>
<tr>
<th>Part number</th>
<th>Inductance (µH)</th>
<th>DCR max (Ohms)</th>
<th>SRF typ (MHz)</th>
<th>Coupling coefficient typ</th>
<th>Leakage L typ (µH)</th>
<th>10% drop</th>
<th>20% drop</th>
<th>30% drop</th>
<th>Isat (A)</th>
<th>Irms (A)</th>
<th>both windings</th>
<th>one winding</th>
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<tbody>
<tr>
<td>LPD4012-331NR</td>
<td>0.33 ±30%</td>
<td>0.042</td>
<td>255</td>
<td>0.94</td>
<td>0.06</td>
<td>5.2</td>
<td>5.4</td>
<td>5.6</td>
<td>1.87</td>
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<td>185</td>
<td>0.95</td>
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<td>0.09</td>
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<td>0.97</td>
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<td>2.81</td>
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<td>48</td>
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<tr>
<td>LPD4012-472MR</td>
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<td>39</td>
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<td>0.18</td>
<td>1.70</td>
<td>1.80</td>
<td>1.90</td>
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<td>LPD4012-562MR</td>
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<td>32</td>
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<td>LPD4012-103MR</td>
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<td>LPD4012-153MR</td>
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<td>21</td>
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<td>0.30</td>
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<td>0.92</td>
<td>0.94</td>
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<td>LPD4012-223MR</td>
<td>22 ±20%</td>
<td>1.63</td>
<td>15</td>
<td>0.99</td>
<td>0.34</td>
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<td>1.83</td>
<td>12</td>
<td>&gt;0.99</td>
<td>0.41</td>
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<td>LPD4012-473MR</td>
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<td>2.52</td>
<td>8.8</td>
<td>&gt;0.99</td>
<td>0.51</td>
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<tr>
<td>LPD4012-683MR</td>
<td>68 ±20%</td>
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<td>7.8</td>
<td>&gt;0.99</td>
<td>0.66</td>
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<td>0.37</td>
<td>0.25</td>
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<td>LPD4012-104MR</td>
<td>100 ±20%</td>
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<td>LPD4012-124MR</td>
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<td>5.54</td>
<td>5.3</td>
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<td>0.19</td>
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<tr>
<td>LPD4012-154MR</td>
<td>150 ±20%</td>
<td>6.90</td>
<td>4.6</td>
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<td>1.19</td>
<td>0.18</td>
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<td>0.27</td>
<td>0.17</td>
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<tr>
<td>LPD4012-184MR</td>
<td>180 ±20%</td>
<td>8.75</td>
<td>4.1</td>
<td>&gt;0.99</td>
<td>1.40</td>
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<td>0.23</td>
<td>0.14</td>
<td>0.18</td>
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<tr>
<td>LPD4012-224MR</td>
<td>220 ±20%</td>
<td>11.24</td>
<td>3.3</td>
<td>&gt;0.99</td>
<td>1.66</td>
<td>0.15</td>
<td>0.16</td>
<td>0.17</td>
<td>0.12</td>
<td>0.17</td>
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</tr>
<tr>
<td>LPD4012-334MR</td>
<td>330 ±20%</td>
<td>17.00</td>
<td>2.8</td>
<td>&gt;0.99</td>
<td>2.45</td>
<td>0.13</td>
<td>0.16</td>
<td>0.16</td>
<td>0.10</td>
<td>0.14</td>
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</tr>
</tbody>
</table>

1. Please specify termination and packaging codes:
   - LPD4012-334MRC

   **Termination:**
   - R = RoHS compliant, matte tin over nickel over silver. Special order:
   - Q = RoHS tin-silver-copper (95.5/4/0.5) or P = non-RoHS tin-lead (63/37).

   **Packaging:**
   - C = 7” machine-ready reel. EIA-481 embossed plastic tape (1000 parts per full reel). Quantities less than full reel available: in tape (not machine ready) or with leader and trailer ($25 charge).
   - B = Less than full reel. In an effort to simplify our part numbering system, Coilcraft is eliminating the need for multiple packaging codes. When ordering, simply change the last letter of your part number from B to C.
   - D = 13” machine-ready reel. EIA-481 embossed plastic tape. Factory order only, not stocked (3500 parts per full reel).

2. Inductance shown for each winding, measured at 100 kHz, 0.1 Vrms, 0 Adc on an Agilent/HP 4284A LCR meter or equivalent. When leads are connected in parallel, inductance is the same value. When leads are connected in series, inductance is four times the value.

3. DCR is for each winding. When leads are connected in parallel, DCR is half the value. When leads are connected in parallel, inductance is the same value. When leads are connected in series, DCR is twice the value.

4. SRF measured using an Agilent/HP 4191A or equivalent. When leads are connected in parallel, SRF is the same value.

5. Leakage Inductance is for L1 and is measured with L2 shorted.

6. DC current at 25°C that causes the specified inductance drop from its value without current. It is the sum of the current flowing in both windings.

7. Equal current when applied to each winding simultaneously that causes a 40°C temperature rise from 25°C ambient. This information is for reference only and does not represent absolute maximum ratings.

8. Maximum current when applied to one winding that causes a 40°C temperature rise from 25°C ambient. This information is for reference only and does not represent absolute maximum ratings.

9. Electrical specifications at 25°C.

Refer to Doc 58-3 “Selecting Coupled Inductors for SEPIC Applications.” Refer to Doc 58-2 “Soldering Surface Mount Components” before soldering.

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**Coupled Inductor Core and Winding Loss Calculator**

This web-based utility allows you to enter frequency, peak-to-peak (ripple) current, and Irms current to predict temperature rise and overall losses, including core loss. Go to online calculator.
Coupled Inductors for SEPIC Applications – LPD4012 Series

Typical L vs Current

Typical L vs Frequency

<table>
<thead>
<tr>
<th>Inductance (µH)</th>
<th>Current (A)</th>
<th>Frequency (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>0.01</td>
<td>0.1</td>
</tr>
<tr>
<td>100</td>
<td>0.1</td>
<td>1</td>
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<tr>
<td>10</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>0.1</td>
<td>100</td>
<td>1000</td>
</tr>
</tbody>
</table>

330 µH
100 µH
33 µH
10 µH
3.3 µH
1.5 µH
0.33 µH