Coiltronics® High Frequency Inductor Catalog

Magnetics Products for Power Management

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<th>Page</th>
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<td>HCP0704</td>
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<td>HCP0805</td>
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Leading-Edge Technology

The Cooper Bussmann Coiltronics® brand specializes in standard and custom solutions offering the latest in state-of-the-art low-profile high power density magnetic components. In working closely with the industry leaders in chipset and core development, we remain at the forefront of innovation and new technology to deliver the optimal mix of packaging, high efficiency and unbeatable reliability. Our designs utilize high frequency, low core loss materials, new and custom core shapes in combination with innovative construction and packaging to provide designers with the highest performance parts available on the market.

Market-Driven Products

The Coiltronics brand is the first choice in power inductor and transformer solutions to the ever-changing digital home, office and mobile electronics world. In support of this market, we specialize in inductors and transformers for DC-DC power conversion and switch-mode applications requiring high frequency. Our component solutions can be found in many products requiring power conversion including cellular telephones, digital cameras, MP3 players, notebook and desktop computers and peripherals and LCD displays across the consumer, communication, computer, industrial and automotive markets.

Standard Products

The Coiltronics brand product line of power magnetics continually expands to satisfy shifts in technology and related market needs. Categories of Standard Products include:

- High frequency, high current inductors
- Shielded drum inductors
- Unshielded drum inductors
- Common-mode inductors
- Transformers
- Low-profile shielded drum inductors
- High current inductors
- Toroidal inductors
- Custom magnetics

Custom-Engineered Capabilities

- Inductors and transformers for DC-DC converters and off-line switch mode power supplies (to 200 Watts at voltages up to 450Vac [640Vdc] and frequencies from 20kHz to 10MHz)
- Custom SMT inductors and transformers

Coiltronics products can provide you with custom designs from print through manufacture. Our design engineers can take your designated specifications or help you determine what the specifications should be. Either way, we’ll get you the right power magnetic solution to your design challenge.

Halogen Free

Cooper Bussmann is committed to meeting the anticipated requirements on the use of halogens. Currently in place is a Halogen Free Initiative for all Coiltronics® branded inductors and transformers. We are committed to phasing out the use of halogenated materials by the end of calendar year 2009. “Halogen free” is defined by homogeneous material per industry standard IPC (IEC 61249-2-21) with the following threshold limits: Chlorine (Cl) <500ppm, Bromine (Br) <900ppm and Chlorine (Cl) + Bromine (Br) <1500ppm.

NEW High Frequency Inductors for Core Power Applications

New in this catalog are 12 Coiltronics® high frequency inductor series with a wide range of sizes, current range and DCR tolerance options. They utilize controlled DCR tolerance needed for DCR sensing circuits and are well suited for capturing the demands of core power and DCR current sensing applications. Their high saturation, low loss and wide temperature range core material make them ideally suited for the demands of core power purposes.

Features:

- Halogen free
- Large variety of shapes and sizes
- Ferrite and powder iron core material models available
- Controlled DCR for DCR sensing circuits
- High current carrying capacity, low core losses
- RoHS compliant

Standard Product Families:

FP0705, FP0708, FP0805, FP0807, FP1005, FP1006, FP1007, FP1105, FP1107, FP1109, HCP0704, HCP0805

Cooper Bussmann circuit protection solutions comply with major industrial standards and agency requirements such as: BS, IEC, DIN, UL, NEMA, SAE, CSA, CE, C-UL, etc. and are manufactured at facilities that are ISO 9000 certified. This catalog is intended to present product data and provide technical information that will help the end user with design application. Cooper Bussmann reserves the right, without notice, to change design or construction of any products and to discontinue or limit distribution of any products. Cooper Bussmann also reserves the right to change or update, without notice, any technical information contained in this catalog. Once a product has been selected, it should be tested by the manufacturer. Our design engineers can take your designated specifications or help you determine what the specifications should be. Either way, we’ll get you the right power magnetic solution to your design challenge.

Halogen Free

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For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
Magnetics Products for Power Management

Shielded Drum Inductors and Low-Profile Shielded Drum Inductors

The Coiltronics brand has one of the largest variety of shielded drum core inductors that utilize a magnetic shield reducing EMI effects and have the best power density versus size ratio on the market.

Features:
- Large variety of shapes and sizes
- Maximum power density
- Ultra-low-profile (as low as 1.0mm in height)
- Dual winding: coupled inductor, SEPIC, flyback transformer, 1:1 isolation transformer
- High current
- Magnetic shielding, reduced EMI
- Compact footprint

Standard Product Families:
Shielded Drum: DR, DRA, DRQ, DR124, DR1030, DR1040, DR1050, LDS0705.

Low-Profile Shielded Drum:
SD, SDQ, SD3110, SD3112, SD3114, SD3118, SD52, SD53, SD38, SDH3812, SD6020, SD6030, SD7030, SD8328, SD8350.

High Current Inductors

The Coiltronics high current inductor product lines provide an optimal mix of innovative packaging, high efficiency and unbeatable reliability.

Features:
- Large variety of shapes and sizes
- Low-profile (as low as 3mm)
- Low DCR, high efficiency
- Designed for high current, low voltage applications
- Foil construction adds higher reliability factor than traditional magnet wire used for higher frequency circuits
- Gapped ferrite: maximum efficiency, low core loss
- High temperature powder iron: 155°C maximum temperature operation, organic binder eliminates thermal aging

Standard Product Families:
HC1, HC2LP, HC3, HC7, HC8, HC8LP, HC9, HCP0703, HCP1104, HCP1305, HCP1109, HCF1305, FLAT-PAC™ (FP2), FLAT-PAC™ (FP3), FLAT-PAC™ (FP4), FLAT-PAC™ (FP1308), CPL.

Unshielded Drum Core Inductors

Coiltronics magnetics offer a wide variety of unshielded drum core inductors in different shapes and sizes to fit all board space constraints.

Features:
- Multiple sizes available
- Miniature surface mount design
- Low-profile
- Small footprint
- Ferrite core material

Standard Product Families:
UNI-PAC™ (UP1B, 2B, 3B, 4B), UNI-PAC™ 0.4C (UP0.4C), UNI-PAC™ 2.8B (UP2.8B), UNI-PAC™ 2C (UP2C), LD.

Toroid Inductors

Coiltronics magnetics also offer a mixture of toroid constructed inductors available in surface mount, through hole, and dual winding platforms.

Features:
- Surface mount and through-hole mounting
- Maximum power density
- Dual winding: coupled inductor, SEPIC, flyback transformer, 1:1 isolation transformer
- Low EMI
- Variety of core materials: powder iron, MPP, gapped ferrite, amorphous

Standard Product Families:
ECONO-PAC™, OCTA-PAC®, OCTA-PAC® Plus, MICRO-PAC™, MICRO-PAC™ Plus, low cost power inductors (LCPI), current sense (CS).

Common-Mode Inductors

Coiltronics magnetics offers a variety of surface mount and through hole inductors specifically for common-mode circuits.

Features:
- Variety of sizes
- Surface mount and through hole packages
- Wide inductance offering
- Ferrite core material

Standard Product Families:
Common mode inductor SMT (CMS), common mode inductor THT (CMT)

Transformers

Coiltronics magnetics also offers a variety of standard transformers that increase versatility in design needs.

Features:
- Multi-configurable transformer/inductors
- Variety of sizes
- Multi-configurable power-over-ethernet/PD flyback and forward transformers
- Cold Cathode Fluorescent Lamp (CCFL) Transformers

Standard Product Families:
VERSA-PAC® (VP), VERSA-PAC® high inductance (VPH), Power-over-Ethernet/ PD configurable transformer (PoE) flyback and forward, Cold Cathode Fluorescent Lamp (CCFL)

Custom Magnetics

Coiltronics magnetics can be customized to meet your application needs. We specialize in designing product to specific requirements and new technology, as well as modifying our standard product platforms to meet your requirements.

Modifications to standard products are available.
All surface mount components are available in tape-and-reel packaging for pick-and-place utilization.

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
## FLAT-PAC™ FP0705 Series

### Description
- Halogen free
- 125°C maximum total temperature operation
- 7.0 x 7.0 x 4.95mm surface mount package
- Ferrite core material, high current carrying capacity
- Low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 72nH to 220nH
- Current range from 20 to 65 amps, frequency range up to 2MHz
- RoHS compliant

### Applications
- Portable electronics
- Servers and workstations
- Data networking and storage systems
- Notebook and desktop computers
- Graphics cards and battery power systems
- Multi-phase regulators
- Voltage Regulator Module (VRM)
- DCR sensing

### Environmental Data
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

### Packaging
- Supplied in tape-and-reel packaging, 950 parts per reel, 13" diameter reel

### Product Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>OCL ± 10% (nH)</th>
<th>FLL Min. (nH)</th>
<th>( I_{rms}^1 ) (Amps)</th>
<th>( I_{sat1}^1 @ 25°C ) (Amps)</th>
<th>( I_{sat2}^1 @ 125°C ) (Amps)</th>
<th>DCR (mΩ) @ 20°C</th>
<th>K-factor( ^6 )</th>
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<tr>
<td>FP0705R1-R07-R</td>
<td>72</td>
<td>51</td>
<td>43</td>
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<td>50</td>
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<td>FP0705R1-R10-R</td>
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<td>826</td>
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<tr>
<td>FP0705R1-R12-R</td>
<td>120</td>
<td>86</td>
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<td>37</td>
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<tr>
<td>FP0705R1-R15-R</td>
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<tr>
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<td>25</td>
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<td>220</td>
<td>158</td>
<td></td>
<td>20</td>
<td>16</td>
<td></td>
<td>826</td>
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</tbody>
</table>

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10\( V_{rms} \), 0.0Adc
2 Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1\( V_{rms} \), \( I_{rms} \)
3 \( I_{rms} \) DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
4 \( I_{sat1} \) Peak current for approximately 20% rolloff at +25°C.
5 \( I_{sat2} \) Peak current for approximately 20% rolloff at +125°C.
6 K-factor: Used to determine \( B_{p-p} \) for core loss (see graph). \( B_{p-p} = K \times L \times \Delta I \times 10^{-3} \), \( B_{p-p} \) (Gauss), K: K-factor from table, L: (inductance in nH), \( \Delta I \) (peak-to-peak ripple current in amps).
7 Part Number Definition: FP0705Rx-Rxx-R
   - FP0705 = Product code and size
   - Rx = Inductance value in μH
   - Rxx = decimal point
   - “-R” suffix = RoHS compliant

### Notes
- For product information and data sheets, visit [www.cooperbussmann.com/datasheets/elx](http://www.cooperbussmann.com/datasheets/elx)
**FLAT-PAC™ FP0705 Series**

**Dimensions - mm**

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>7.0 Max.</td>
</tr>
<tr>
<td>B</td>
<td>7.0 Max.</td>
</tr>
<tr>
<td>C</td>
<td>4.95 Max.</td>
</tr>
<tr>
<td>D</td>
<td>2.45 ± 0.2</td>
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<tr>
<td>E</td>
<td>1.52 ± 0.2</td>
</tr>
<tr>
<td>F</td>
<td>3.5 Typ.</td>
</tr>
</tbody>
</table>

**Top View**

**Side View**

**Bottom View**

**Recommended Pad Layout**

**Schematic**

Nominal DCR is measured from point "a" to point "b."

Part Marking: Coiltronics Logo 0705Rx (Rx = DCR indicator) Rxx = inductance value in μH (R = decimal point) wwllyy = date code R = revision level

**Packaging Information - mm**

Supplied in tape-and-reel packaging, 950 parts per reel, 13" diameter reel.

**Temperature Rise vs. Total Loss**

For product information and data sheets, visit [www.cooperbussmann.com/datasheets/elx](http://www.cooperbussmann.com/datasheets/elx)
FLAT-PAC™ FP0705 Series

Inductance Characteristics

Core Loss
FLAT-PAC™ FP0708 Series

Applications
- Multi-phase regulators
- Voltage Regulator Module (VRM)
- Point of load modules
- Servers and workstations
- Data networking and storage systems
- Notebook and desktop computers
- Graphics cards and battery power systems
- DCR sensing

Environmental Data
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

Packaging
- Supplied in tape-and-reel packaging, 640 parts per reel, 13" diameter reel

Description
- Halogen free
- 125°C maximum total temperature operation
- 8.5 x 7.0 x 7.2mm surface mount package
- Ferrite core material
- High current carrying capacity
- Low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 72nH to 190nH
- Current range from 37 to 90 amps
- Frequency range up to 2MHz
- RoHS compliant

Product Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>OCL ± 10% (nH)</th>
<th>FLL Min. (nH)</th>
<th>(I_{\text{rms}}) @ 25°C (Amps)</th>
<th>(I_{\text{sat1}}) @ 25°C (Amps)</th>
<th>(I_{\text{sat2}}) @ 125°C (Amps)</th>
<th>DCR (mΩ) @ 20°C</th>
<th>K-factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP0708R1-R07-R</td>
<td>72</td>
<td>52</td>
<td>90</td>
<td>72</td>
<td>72</td>
<td>0.35 ± 8.6%</td>
<td>557</td>
</tr>
<tr>
<td>FP0708R1-R09-R</td>
<td>90</td>
<td>64</td>
<td>75</td>
<td>72</td>
<td>60</td>
<td>0.35 ± 8.6%</td>
<td>557</td>
</tr>
<tr>
<td>FP0708R1-R10-R</td>
<td>105</td>
<td>75</td>
<td>68</td>
<td>54</td>
<td>54</td>
<td>0.35 ± 8.6%</td>
<td>557</td>
</tr>
<tr>
<td>FP0708R1-R12-R</td>
<td>120</td>
<td>86</td>
<td>68</td>
<td>54</td>
<td>54</td>
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<td>557</td>
</tr>
<tr>
<td>FP0708R1-R15-R</td>
<td>150</td>
<td>108</td>
<td>59</td>
<td>47</td>
<td>47</td>
<td>0.35 ± 8.6%</td>
<td>557</td>
</tr>
<tr>
<td>FP0708R1-R20-R</td>
<td>190</td>
<td>13</td>
<td>59</td>
<td>47</td>
<td>47</td>
<td>0.35 ± 8.6%</td>
<td>557</td>
</tr>
</tbody>
</table>

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10V rms, 0.0A dc
2 Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1V rms, \(I_{\text{sat1}}\)
3 \(I_{\text{rms}}\): DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
4 \(I_{\text{sat1}}\): Peak current for approximately 20% rolloff at +25°C.
5 \(I_{\text{sat2}}\): Peak current for approximately 20% rolloff at +125°C.
6 K-factor: Used to determine \(B_{p-p}\) for core loss (see graph). \(B_{p-p} = K \times L \times \Delta I \times 10^{-3}\), \(B_{p-p}\) \(=\) (Gauss), \(K\) (K-factor from table), \(L\) (inductance in nH), \(\Delta I\) (peak-to-peak ripple current in amps).
7 Part Number Definition: FP0708Rx-Rxx-R
   - FP0708 = Product code and size
   - Rx = Inductance value in μH, R = decimal point
   - “R” suffix = RoHS compliant

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
FLAT-PACTM FP0708 Series

Dimensions - mm

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>7.0 Max.</td>
</tr>
<tr>
<td>B</td>
<td>8.5 Max.</td>
</tr>
<tr>
<td>C</td>
<td>7.2 Max.</td>
</tr>
<tr>
<td>D</td>
<td>2.1 ± 0.15</td>
</tr>
<tr>
<td>E</td>
<td>1.52 ± 0.2</td>
</tr>
<tr>
<td>F</td>
<td>3.6 Typ.</td>
</tr>
</tbody>
</table>

Top View

Side View

Bottom View

Recommended Pad Layout

Schematic

Nominal DCR is measured from point “a” to point “b.”

Part Marking: Coiltronics Logo 0705Rx (Rx = DCR indicator) Rxx = inductance value in μH (R = decimal point) wwllyy = date code R = revision level

Packaging Information - mm

Supplied in tape-and-reel packaging, 640 parts per reel, 13” diameter reel.

Temperature Rise vs. Total Loss

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
Inductance Characteristics

% of OCL vs. % of $I_{sat}$

-40°C

+25°C

+125°C

Core Loss

Core Loss vs. $B_{p-p}$

1MHz

500kHz

300kHz

200kHz

100kHz

Inductance Characteristics
FLAT-PACT™ FP0805 Series

Applications
- Multi-phase regulators
- Voltage Regulator Module (VRM)
- Point-of-load modules
- Desktop and server VRMs and EVRDs
- Data networking and storage systems
- Notebook regulators
- Graphics cards and battery power systems
- DCR sensing

Environmental Data
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

Packaging
- Supplied in tape-and-reel packaging, 950 parts per reel, 13" diameter reel

Description
- Halogen free
- 125°C maximum total temperature operation
- 7.5 x 7.6 x 5mm surface mount package
- Ferrite core material
- High current carrying capacity, low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 32nH to 200nH
- Current range from 20 to 110 amps
- Frequency range up to 2MHz
- RoHS compliant

Product Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>OCL ± 10% (nH)</th>
<th>FLL Min. (nH)</th>
<th>$I_{rms}$ (Amps)</th>
<th>$I_{sat1}$ @ 25°C (Amps)</th>
<th>$I_{sat2}$ @ 125°C (Amps)</th>
<th>DCR (mΩ) @ 20°C</th>
<th>K-factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP0805R1-R03-R</td>
<td>32</td>
<td>23</td>
<td>65</td>
<td>110</td>
<td>95</td>
<td>0.17 ± 17%</td>
<td>823.6</td>
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</table>

1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10Vmp, 0.0Amp
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vmp, $I_{sat1}$
3. $I_{spec}$: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.

For product information and data sheets, visit [www.cooperbussmann.com/datasheets/elx](http://www.cooperbussmann.com/datasheets/elx)
FLAT-PAC™ FP0805 Series

Dimensions - mm

![Dimensions Diagram]

The nominal DCR is measured from point “a” to point “b.”

Part Marking: Coiltronics Logo 0805Rx (Rx = DCR Indicator) Rxx = Inductance value in μH (R = Decimal point) wwllyy = Date code R = Revision level

Packaging Information - mm

![Packaging Diagram]

Supplied in tape-and-reel packaging, 950 parts per reel, 13” diameter reel.

Temperature Rise vs. Total Loss

![Temperature Rise vs. Total Loss Graph]

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
FLAT-PAC™ FP0805 Series

Core Loss

Core Loss vs. B_{p-p}

Inductance Characteristics

% of OCL vs. % of I_{Sat1}
Coiltronics® High Frequency Inductor Catalog

FLAT-PAC™ FP0807 Series

Applications:
- Multi-phase regulators
- Voltage Regulator Module (VRM)
- Desktop and server VRMs and EVRDs
- Notebook regulators
- Data networking and storage systems
- Graphics cards and battery power systems
- Point-of-load modules
- DCR sensing

Environmental Data:
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

Packaging:
- Supplied in tape-and-reel packaging, 600 parts per reel, 13” diameter reel

Description:
- Halogen free
- 125°C maximum total temperature operation
- 7.4 x 7.6 x 7.0mm surface mount package
- Ferrite core material
- High current carrying capacity, low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 70nH to 220nH
- Current range from 35 amps to 108 amps
- Frequency range up to 2MHz
- RoHS compliant

Product Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>OCL ± 10% (nH)</th>
<th>FLL Min. (nH)</th>
<th>(I_{\text{rms}}) @ 25°C (Amps)</th>
<th>(I_{\text{sat1}}) @ 25°C (Amps)</th>
<th>(I_{\text{sat2}}) @ 125°C (Amps)</th>
<th>DCR (mΩ) @ 20°C</th>
<th>K-factor$^a$</th>
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<tbody>
<tr>
<td>FP0807R1-R07-R</td>
<td>70</td>
<td>50</td>
<td>108</td>
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<tr>
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<td>77</td>
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<td>FP0807R1-R12-R</td>
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<td>FP0807R1-R16-R</td>
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<td>FP0807R1-R20-R</td>
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<td>520</td>
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</tr>
<tr>
<td>FP0807R1-R22-R</td>
<td>220</td>
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<td>35</td>
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<td>520</td>
<td>520</td>
<td>520</td>
</tr>
</tbody>
</table>

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10\(V_{\text{rms}}\), 0.04Adc
2 Full Load Inductance (FLL) Test Parameters: 1000kHz, 0.1Vrms, \(I_{\text{sat1}}\)
3 \(I_{\text{rms}}\): DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
4 \(I_{\text{sat1}}\): Peak current for approximately 20% rolloff at +25°C.
5 \(I_{\text{sat2}}\): Peak current for approximately 20% rolloff at +125°C.
6 K-factor: Used to determine \(B_{p-p}\) for core loss (see graph). \(B_{p-p} = K \cdot L \cdot \Delta I \cdot 10^{-3}\), \(B_{p-p}\) (Gauss), K (K-factor from table), L (inductance in nH), \(\Delta I\) (peak-to-peak ripple current in amps).
7 Part Number Definition: FP0807Rx-Rxx-R
   - FP0807 = Product code and size
   - Rx is the DCR indicator
   - Rxx= Inductance value in \(\mu\)H, R = decimal point
   - “-R” suffix = RoHS compliant

For product information and data sheets, visit [www.cooperbussmann.com/datasheets/elx](http://www.cooperbussmann.com/datasheets/elx)
FLAT-PAC™ FP0807 Series

Dimensions - mm

The nominal DCR is measured from point “a” to point “b.”

Part Marking: Coiltronics Logo 0807Rx (Rx = DCR Indicator) Rxx = Inductance value in μH, (R = Decimal point) wwllyy = Date code R = Revision level

Packaging Information - mm

Supplied in tape-and-reel packaging, 600 parts per reel, 13” diameter reel.

Temperature Rise vs. Total Loss

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
FLAT-PAC™ FP0807 Series

Core Loss

Core Loss vs. $B_{p-p}$

Inductance Characteristics

% of OCL vs. % of $I_{sat1}$

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
Coiltronics® High Frequency Inductor Catalog

FLAT-PAC™ FP1005 Series

Applications
- Multi-phase regulators
- Voltage Regulator Module (VRM)
- Point-of-load modules
- Desktop and server VRMs and EVRDs
- Data networking and storage systems
- Notebook regulators
- Graphics cards and battery power systems
- DCR sensing

Environmental Data
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C
  (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

Packaging
- Supplied in tape-and-reel packaging, 950 parts per reel, 13” diameter reel

Description
- Halogen free
- 125°C maximum total temperature operation
- 10.2 x 7.0 x 4.95mm surface mount package
- Ferrite core material
- High current carrying capacity, low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 85nH to 220nH
- Current range from 33 to 90 amps
- Frequency range up to 2MHz
- RoHS compliant

SMD Device

Product Specifications

<table>
<thead>
<tr>
<th>Part Number7</th>
<th>OCL1 ± 10% (nH)</th>
<th>FLL2 Min. (nH)</th>
<th>I rms3 (Amps)</th>
<th>( I_{\text{sat}1} ) @ 25°C (Amps)</th>
<th>( I_{\text{sat}2} ) @ 125°C (Amps)</th>
<th>DCR (mΩ) @ 20°C</th>
<th>K-factor6</th>
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<tbody>
<tr>
<td>R1 Version</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>FP1005R1-R08-R</td>
<td>85</td>
<td>61</td>
<td>53</td>
<td>90</td>
<td>64</td>
<td>0.39 ± 7.7%</td>
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<td>73</td>
<td>57</td>
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<td>86</td>
<td></td>
<td>60</td>
<td>48</td>
<td>536</td>
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<td>73</td>
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<td>FP1005R2-R12-R</td>
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<td>220</td>
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<td>33</td>
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<td>536</td>
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<td>R3 Version</td>
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<td>FP1005R3-R08-R</td>
<td>85</td>
<td>61</td>
<td>45</td>
<td>90</td>
<td>64</td>
<td>0.55 ± 5.4%</td>
<td>536</td>
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<tr>
<td>FP1005R3-R10-R</td>
<td>100</td>
<td>72</td>
<td></td>
<td>73</td>
<td>57</td>
<td>536</td>
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<td>FP1005R3-R12-R</td>
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<td>86</td>
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<td>60</td>
<td>48</td>
<td>536</td>
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<tr>
<td>FP1005R3-R15-R</td>
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<td>108</td>
<td></td>
<td>47</td>
<td>37</td>
<td>536</td>
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<tr>
<td>FP1005R3-R22-R</td>
<td>220</td>
<td>158</td>
<td></td>
<td>33</td>
<td>26</td>
<td>536</td>
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</tbody>
</table>

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.1Vrms, 0.0Adc.
2 Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vrms, I_{\text{sat}1}.
3 I rms: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat-generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
4 I_{\text{sat}1}: Peak current for approximately 20% rolloff at +25°C.
5 I_{\text{sat}2}: Peak current for approximately 20% rolloff at +125°C.
6 K-factor: Used to determine \( B_p-p \) for core loss (see graph). \( B_p-p = K \times L \times |\Delta I| \times 10^{-3}, B_p-p (\text{Gauss}) \).
7 Part Number Definition: FP1005Rx-Rox-R
  - FP1005 = Product code and size
  - Rox = Inductance value in μH, R = decimal point
  - “R” suffix = RoHS compliant

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
FLAT-PAC™ FP1005 Series

Dimensions - mm

The nominal DCR is measured from point “a” to point “b.”

Part Marking: Coiltronics Logo 1005Rx (Rx = DCR indicator) Rxx = Inductance value in μH (R = Decimal point) wwllyy = Date code R = Revision level

Packaging Information - mm

Supplied in tape-and-reel packaging, 950 parts per reel, 13” diameter reel.

Temperature Rise vs. Total Loss
FLAT-PAC™ FP1005 Series

Core Loss

Core Loss vs. B_{p-p}

<table>
<thead>
<tr>
<th>B_{p-p} (Gauss)</th>
<th>1MHz</th>
<th>500kHz</th>
<th>300kHz</th>
<th>200kHz</th>
<th>100kHz</th>
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<tr>
<td>Core Loss (W)</td>
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<td>0.0001</td>
<td>0.001</td>
<td>0.01</td>
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</table>

Inductance Characteristics

% of OCL vs. % of I_{sat1}

<table>
<thead>
<tr>
<th>% of I_{sat1}</th>
<th>0%</th>
<th>20%</th>
<th>40%</th>
<th>60%</th>
<th>80%</th>
<th>100%</th>
<th>120%</th>
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<tbody>
<tr>
<td>% of OCL</td>
<td>100%</td>
<td>80%</td>
<td>60%</td>
<td>40%</td>
<td>20%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

-40°C, +25°C, +125°C
Coiltronics® High Frequency Inductor Catalog

FLAT-PAC™ FP1006 Series

Applications
- Multi-phase regulators
- Voltage Regulator Module (VRM)
- Point-of-load modules
- Desktop and server VRMs and EVRDs
- Data networking and storage systems
- Notebook regulators
- Graphics cards and battery power systems
- DCR sensing

Environmental Data
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: J-STD-020D compliant

Packaging
- Supplied in tape-and-reel packaging, 850 parts per reel, 13” diameter reel

Description
- Halogen free
- 125°C maximum total temperature operation
- 10.2 x 8.0 x 6.0mm surface mount package
- Ferrite core material
- High current carrying capacity, low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 85nH to 220nH
- Current range from 38 to 100 amps
- Frequency range up to 2MHz
- RoHS compliant

**Product Specifications**

<table>
<thead>
<tr>
<th>Part Number*</th>
<th>OCL' ± 10% (nH)</th>
<th>FLL' Min. (nH)</th>
<th>( \text{I}_{\text{rms}} ) (Amps)</th>
<th>( \text{I}_{\text{sat1}} ) @ 25°C (Amps)</th>
<th>( \text{I}_{\text{sat2}} ) @ 125°C (Amps)</th>
<th>DCR (mΩ) @ 20°C</th>
<th>K-factor*a</th>
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<tbody>
<tr>
<td>R1 Version</td>
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<td>FP1006R1-R22-R</td>
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<td>FP1006R2-R08-R</td>
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<td>45</td>
<td>100</td>
<td>70</td>
<td>0.36 ± 8.6%</td>
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<tr>
<td>FP1006R2-R12-R</td>
<td>120</td>
<td>86</td>
<td></td>
<td>71</td>
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<td>FP1006R2-R22-R</td>
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<td>38</td>
<td>28</td>
<td>454</td>
<td></td>
</tr>
</tbody>
</table>

1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.1Vrms, 0.0Aac
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vrms, \( \text{I}_{\text{sat1}} \)
3. \( \text{I}_{\text{rms}} \): DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
4. \( \text{I}_{\text{sat1}} \): Peak current for approximately 20% rolloff at +25°C.
5. \( \text{I}_{\text{sat2}} \): Peak current for approximately 20% rolloff at +125°C.
6. K-factor: Used to determine \( \text{B}_{\text{p-p}} \) for core loss (see graph). \( \text{B}_{\text{p-p}} = K \times \text{L} \times \Delta \text{I} \times 10^{-3} \) (Gauss), \( K \) (K-factor from table), \( \text{L} \) (inductance in nH), \( \Delta \text{I} \) (peak-to-peak ripple current in amps).
7. Part Number Definition: FP1006Rn-Rx-R
   - FP1006 = Product code and size
   - Rx= Inductance value in μH, R = decimal point
   - “R” suffix = RoHS compliant

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
FLAT-PAC™ FP1006 Series

Dimensions - mm

Part Number: FP1006R1-R 10.2
FP1006R2-R 10

Part Marking: Coiltronics Logo 1006Rx (Rx = DCR Indicator) Rox = Inductance value in μH (R = Decimal point) wwllyy = Date code R = Revision level

The nominal DCR is measured from point “a” to point “b.”

Packaging Information - mm

Supplied in tape-and-reel packaging, 850 parts per reel, 13” diameter reel.

Temperature Rise vs. Total Loss

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
Coiltronics® High Frequency Inductor Catalog

FLAT-PAC™ FP1006 Series

Core Loss

Core Loss vs. $B_{p-p}$

Inductance Characteristics

% of OCL vs. % of $I_{sat}$

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
**FLAT-PAC™ FP1007 Series**

**Coiltronics® High Frequency Inductor Catalog**

**SMD Device**

**Description:**
- Halogen free
- 125°C maximum total temperature operation
- 8.0 x 10.41 x 7.0mm surface mount package
- Ferrite core material
- High current carrying capacity, low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 120nH to 300nH
- Current range from 32 to 81 amps
- Frequency range up to 2MHz
- RoHS compliant

**Applications:**
- Multi-phase regulators
- Voltage Regulator Module (VRM)
- Desktop and server VRMs and EVRDs
- Notebook regulators
- Data networking and storage systems
- Graphics cards and battery power systems
- Point-of-load modules
- DCR sensing

**Environmental Data:**
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C  
  (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

**Packaging:**
- Supplied in tape-and-reel packaging on 13” diameter reel
- FP1007R1 700 parts per reel
- FP1007R2 750 parts per reel

**Product Specifications**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>OCL ± 10% (nH)</th>
<th>FLL Min. (nH)</th>
<th>I_{rms}^2 (Amps)</th>
<th>I_{sat1}^2 @ 25°C (Amps)</th>
<th>I_{sat2}^2 @ 125°C (Amps)</th>
<th>DCR (mΩ) @ 20°C</th>
<th>K-factor</th>
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<tbody>
<tr>
<td>R1 Version</td>
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<td>FP1007R1-R12-R</td>
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1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10V_{rms}, 0.01A_{dc}
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1V_{rms}, I_{sat1}^1
3. I_{rms}: DC current for an approximate temperature rise of 40°C without core loss. Derating necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
4. I_{sat1}^1: Peak current for approximately 20% rolloff at +25°C.
5. I_{sat2}^2: Peak current for approximately 20% rolloff at +125°C.
6. K-factor: Used to determine B_{p-p} for core loss (see graph): B_{p-p} = K * L * ΔI * 10^{-3}, B_{p-p}: (Gauss), K: (K-factor from table), L: (Inductance in nH), ΔI (peak-to-peak ripple current in amps).
7. Part Number Definition: FP1007Rx-Rox-R

- FP1007 = Product code and size
- Rox= Inductance value in μH, R = decimal point
- “R” suffix = RoHS compliant

For product information and data sheets, visit [www.cooperbussmann.com/datasheets/elx](http://www.cooperbussmann.com/datasheets/elx)
**FLAT-PAC™ FP1007 Series**

**Dimensions - mm**

<table>
<thead>
<tr>
<th>Side View</th>
<th>Top View</th>
<th>Bottom View</th>
<th>Recommended Pad Layout</th>
<th>Schematic</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP1007R1 = 7.1 max</td>
<td>FP1007R2 = 6.6 max</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The nominal DCR is measured from point "a" to point "b."

**Part Marking:**
- Coiltronics Logo
- 1007Rx (Rx = DCR Indicator)
- Rxx = Inductance value in μH (R = Decimal point)
- wwllyy = Date code
- R = Revision level

**Packaging Information - mm**

- Supplied in tape-and-reel packaging, on 13" diameter reel; FP1007R1 700 parts, FP1007R2 750 parts

**Temperature Rise vs. Total Loss**

*For product information and data sheets, visit [www.cooperbussmann.com/datasheets/elx](http://www.cooperbussmann.com/datasheets/elx)*
FLAT-PAC™ FP1007 Series

Core Loss

Core Loss vs. $B_{p-p}$

Inductance Characteristics

% of OCL vs. % of $I_{sat}$
## FLAT-PAC™ FP1105 Series

### Description
- Halogen free
- 125°C maximum total temperature operation
- 11.0 x 8.0 x 4.90mm surface mount package
- Ferrite core material
- High current carrying capacity
- Low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 101nH to 226nH
- Current range from 39 to 81 amps
- Frequency range up to 2MHz
- RoHS compliant

### Applications
- Multi-phase regulators
- Voltage Regulator Module (VRM)
- Portable electronics
- Servers and workstations
- Data networking and storage systems
- Notebook and desktop computers
- Graphics cards and battery power systems
- DCR sensing

### Environmental Data
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C
- (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

### Packaging
- Supplied in tape-and-reel packaging, 900 parts per reel, 13” diameter reel

### SMD Device
- Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10V rms, 0.0Adc
- Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1V rms, \( I_{sat1} \)
- \( I_{rms} \): DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
- Part Number Definition: FP1105Rx-Rxx-R
  - FP1105 = Product code and size
  - Rx is the DCR indicator
  - Rxx= Inductance value in \( \mu \text{H} \), R = decimal point
  - “-R” suffix = RoHS compliant

### Product Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>OCL1 ± 10% (nH)</th>
<th>FLL1 Min. (nH)</th>
<th>( I_{rms} ) (Amps)</th>
<th>( I_{sat1} ) @ 25°C (Amps)</th>
<th>( I_{sat2} ) @ 125°C (Amps)</th>
<th>DCR (mΩ) @ 20°C</th>
<th>K-factor*</th>
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</thead>
<tbody>
<tr>
<td>FP1105R1-R10-R</td>
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<td>72</td>
<td>81</td>
<td>63</td>
<td>50</td>
<td>467</td>
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<tr>
<td>FP1105R1-R12-R</td>
<td>120</td>
<td>86</td>
<td>66</td>
<td>50</td>
<td>42</td>
<td>467</td>
<td>0.35 ± 8.6%</td>
</tr>
<tr>
<td>FP1105R1-R15-R</td>
<td>150</td>
<td>109</td>
<td>54</td>
<td>42</td>
<td>34</td>
<td>467</td>
<td>0.35 ± 8.6%</td>
</tr>
<tr>
<td>FP1105R1-R20-R</td>
<td>192</td>
<td>138</td>
<td>42</td>
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<td>28</td>
<td>467</td>
<td>0.35 ± 8.6%</td>
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<tr>
<td>FP1105R1-R22-R</td>
<td>226</td>
<td>163</td>
<td>39</td>
<td>28</td>
<td>20</td>
<td>467</td>
<td>0.35 ± 8.6%</td>
</tr>
</tbody>
</table>

1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10Vrms, 0.0Adc
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vrms, \( I_{sat1} \)
3. \( I_{rms} \): DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
4. \( I_{sat1} \): Peak current for approximately 20% rolloff at +25°C.
5. \( I_{sat2} \): Peak current for approximately 20% rolloff at +125°C.
6. K-factor: Used to determine \( B_{p-p} \) for core loss (see graph). \( B_{p-p} = K \cdot L \cdot \Delta I \cdot 10^{-3} \), \( B_{p-p} \) (Gauss), K: (K-factor from table), L: (inductance in nH), \( \Delta I \) (peak-to-peak ripple current in amperes).
7. Part Number Definition: FP1105Rx-Rxx-R
   - FP1105 = Product code and size
   - Rx= Inductance value in \( \mu \text{H} \), R = decimal point
   - “-R” suffix = RoHS compliant

For product information and data sheets, visit [www.cooperbussmann.com/datasheets/elx](http://www.cooperbussmann.com/datasheets/elx)
### FLAT-PACT™ FP1105 Series

#### Dimensions - mm

<table>
<thead>
<tr>
<th></th>
<th>A = 11.0 Max.</th>
<th>B = 8.0 Max.</th>
<th>C = 4.9 Max.</th>
<th>D = 2.4 ± 0.2</th>
<th>E = 2.3 ± 0.3</th>
<th>F = 6.2 Typ.</th>
</tr>
</thead>
</table>

- Top View
- Left View
- Bottom View
- Recommended Pad Layout
- Schematic

Nominal DCR is measured from point “a” to point “b.”

**Part Marking:**
- Coiltronics Logo
- 1105Rx (Rx = DCR indicator)
- Rox = inductance value in μH (R = decimal point)
- wwllyy = date code
- R = revision level

#### Packaging Information - mm

Supplied in tape-and-reel packaging, 900 parts per reel, 13” diameter reel.

**Temperature Rise vs. Total Loss**

![Graph showing temperature rise vs. total loss](image-url)
FLAT-PAC™ FP1105 Series

Core Loss

Core Loss vs. B \( p-p \)

![Core Loss vs. B \( p-p \)](image)

Inductance Characteristics

OCL vs. \( I_{\text{sat}} \)

![OCL vs. \( I_{\text{sat}} \)](image)
Coiltronics® High Frequency Inductor Catalog

FLAT-PAC™ FP1107 Series

Description:
- Halogen free
- 125°C maximum total temperature operation
- 7.2 x 11.0 x 7.5mm surface mount package
- Ferrite core material
- High current carrying capacity, low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 70nH to 510nH
- Current range from 18 to 140 amps
- Frequency range up to 2MHz
- RoHS compliant

Applications:
- Multi-phase regulators
- Voltage Regulator Module (VRM)
- Desktop and server VRMs and EVRDs
- Data networking and storage systems
- Notebook regulators
- Graphics cards and battery power systems
- Point-of-load modules
- DCR sensing

Environmental Data:
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C
- (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

Packaging:
- Supplied in tape-and-reel packaging, 640 parts per reel, 13" diameter reel

SMD Device

Product Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>OCL1 ± 10% (nH)</th>
<th>FLL2 Min. (nH)</th>
<th>( \frac{\text{I}<em>{\text{rms}}}{\text{I}</em>{\text{rms}}} ) @ 25°C (Amps)</th>
<th>( \frac{\text{I}<em>{\text{sat1}}}{\text{I}</em>{\text{sat1}}} @ 25°C ) (Amps)</th>
<th>DCR (mΩ) @ 20°C</th>
<th>K-factor6</th>
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<tr>
<td>R1 Version</td>
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<td>FP1107R1-R07-R</td>
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<td>363.3</td>
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</table>

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10Vrms, 0.0Adc
2 Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vrms, \( \text{I}_{\text{rms}} \)
3 \( \text{I}_{\text{rms}} \): DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
4 \( \text{I}_{\text{sat1}} \): Peak current for approximately 20% rolloff at +25°C.
5 \( \text{I}_{\text{sat2}} \): Peak current for approximately 20% rolloff at +125°C.
6 K-factor: Used to determine \( B_{p-p} \) for core loss (see graph). \( B_{p-p} = K \cdot L \cdot \Delta I \cdot 10^{-3} \cdot \text{B}_{p-p} \) (Gauss), \( K \): K-factor from table), \( L \) (inductance in nH), \( \Delta I \) (peak-to-peak ripple current in amps).
7 Part Number Definition: FP1107/Rx-Rox-R
- FP1107 = Product code and size
- Rx = Inductance value in μH, R = decimal point
- Rox = DCR indicator
- "-R" suffix = RoHS compliant

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
Coiltronics® High Frequency Inductor Catalog

FLAT-PAC™ FP1107 Series

Dimensions - mm

Part Marking: Coiltronics Logo 1107Rx (Rx = DCR Indicator) Rx = Inductance value in μH. (R = Decimal point) wwllyy = Date code R = Revision level

Packaging Information - mm

Supplied in tape-and-reel packaging, 640 parts per reel, 13” diameter reel.

Temperature Rise vs. Total Loss

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
FLAT-PAC™ FP1107 Series

Core Loss

![Core Loss vs. B_{p-p}](chart)

Inductance Characteristics

![% of OCL vs % of I_{sat1}](chart)
FLAT-PAC™ FP1109 Series

Description:
- Halogen free
- 125°C maximum total temperature operation
- 11.2 x 11.2 x 9.0mm surface mount package
- Ferrite core material
- High current carrying capacity, low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 205nH to 950nH
- Current range from 11.5 to 69 amps
- Frequency range up to 2MHz
- RoHS compliant

Applications:
- Multi-phase regulators
- Voltage Regulator Module (VRM)
- Desktop and server VRMs and EVRDs
- Data networking and storage systems
- Notebook regulators
- Graphics cards and battery power systems
- Point-of-load modules
- DCR sensing

Environmental Data:
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C
  (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

Packaging:
- Supplied in tape-and-reel packaging, 350 parts per reel, 13" diameter reel

Product Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>OCL 1 ± 10% (nH)</th>
<th>FLL 2 Min. (nH)</th>
<th>$I_{rms}$ 3 (Amps)</th>
<th>$I_{sat 1}$ 4 @ 25°C (Amps)</th>
<th>$I_{sat 2}$ 5 @ 125°C (Amps)</th>
<th>DCR (mΩ) 6 @ 20°C</th>
<th>K-factor 6</th>
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<td>FP1109-R20-R</td>
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<td>8.5</td>
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</tbody>
</table>

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10Vrms, 0.0Adc
2 Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vrms, 1.0A
3 $I_{rms}$: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
4 $I_{sat 1}$: Peak current for approximately 30% rolloff at +25°C.
5 $I_{sat 2}$: Peak current for approximately 30% rolloff at +125°C.
6 K-factor: Used to determine $B_{p-p}$ for core loss (see graph). $B_{p-p} = K \times L + \Delta I \times 10^{-3}$, $B_{p-p}$: (Gauss), $K$: (K-factor from table), $L$: (Inductance in nH), $\Delta I$ (peak-to-peak ripple current in amps).
7 Part Number Definition: FP1109-xxx-R
  - FP1109 = Product code and size
  - xxx = Inductance value in μH, R = decimal point, if no “R” is present, then third character = # of zeros
  - “-R” suffix = RoHS compliant

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
**FLAT-PAC™ FP1109 Series**

**Dimensions - mm**

<table>
<thead>
<tr>
<th>View</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front View</td>
<td>2.03 ref</td>
</tr>
<tr>
<td>Top View</td>
<td>1.5 dia. min, 4.10 ref (2x)</td>
</tr>
<tr>
<td>Side View</td>
<td>11.2 max, 2.03 ref (2x)</td>
</tr>
<tr>
<td>Recommended Pad Layout</td>
<td>11.2 max, 2.03 ref (2x)</td>
</tr>
</tbody>
</table>

**Part Marking:** FP1109 xxx = Inductance value in μH, (R = Decimal point). If no "R" is present, then last character is # of zeros. wwllyy = Date code R = Revision level

**Packaging Information - mm**

<table>
<thead>
<tr>
<th>Section A-A</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.5 dia. min, 4.00</td>
</tr>
<tr>
<td></td>
<td>17.5, 14.5, 4.00</td>
</tr>
<tr>
<td></td>
<td>11.4, 11.4, 2.00</td>
</tr>
</tbody>
</table>

**Supplied in tape-and-reel packaging, 350 parts per reel, 13" diameter reel.**

**Temperature Rise vs. Total Loss**

- **Temperature Rise (°C)**
- **Total Loss (W)**

For product information and data sheets, visit [www.cooperbussmann.com/datasheets/elx](http://www.cooperbussmann.com/datasheets/elx)
FLAT-PAC™ FP1109 Series

Core Loss

Inductance Characteristics
**Applications**
- Voltage regulator modules (VRMs) for servers and microprocessors
- Multi-phase buck inductors
- High frequency, high current switching power supplies

**Environmental Data**
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds maximum

**Packaging**
- Supplied in tape-and-reel packaging, 400 parts per 13” diameter reel

**Description**
- 125°C maximum total operating temperature
- 12.9 x 13.7 x 8.0mm surface mount package
- High current handling capability, compact footprint
- Ferrite core material
- Inductance range from 0.110μH to 0.440μH
- Current range from 32 to 120 amps
- Frequency range up to 2MHz

**Product Specifications**

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Rated Inductance (μH)</th>
<th>OCL</th>
<th>I_{rms}</th>
<th>I_{sat}</th>
<th>DCR (mΩ) @ 25°C Typical</th>
<th>DCR (mΩ) @ 25°C Max</th>
<th>K-factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP1308-R11-R</td>
<td>0.110</td>
<td>0.110</td>
<td>68</td>
<td>120</td>
<td>0.20</td>
<td>0.24</td>
<td>21.330</td>
</tr>
<tr>
<td>FP1308-R21-R</td>
<td>0.210</td>
<td>0.210</td>
<td>68</td>
<td>72</td>
<td>0.20</td>
<td>0.24</td>
<td>21.333</td>
</tr>
<tr>
<td>FP1308-R26-R</td>
<td>0.260</td>
<td>0.260</td>
<td>68</td>
<td>60</td>
<td>0.20</td>
<td>0.24</td>
<td>21.335</td>
</tr>
<tr>
<td>FP1308-R32-R</td>
<td>0.320</td>
<td>0.320</td>
<td>68</td>
<td>45</td>
<td>0.20</td>
<td>0.24</td>
<td>21.340</td>
</tr>
<tr>
<td>FP1308-R44-R</td>
<td>0.440</td>
<td>0.440</td>
<td>68</td>
<td>32</td>
<td>0.20</td>
<td>0.24</td>
<td>21.366</td>
</tr>
</tbody>
</table>

1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10Vrms, 0.0Adc
2. I_{rms}: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
3. I_{sat}: Peak current for approximately 20% rolloff at +25°C.
4. K-factor: Used to determine B_{p-p} for core loss (see graph). B_{p-p} = K * L * ΔI. B_{p-p} (mT):
   - K (K-factor from table), L (Inductance in μH), ΔI (peak-to-peak ripple current in amps).
5. Part Number Definition: FP1308-xxx-R
   - FP1308 = Product code and size
   - xxx = Inductance value in μH, R = decimal point. If no “R” is present, then third character = # of zeros.
   - “-R” suffix = RoHS compliant
Coiltronics® High Frequency Inductor Catalog

FLAT-PAC™ FP1308 Series

Dimensions - mm

Part Marking: FP1308 xxx = Inductance value in μH, (R = Decimal point), if no “R” is present, then last character is # of zeros wwllyy = Date code R = Revision level

Packaging Information - mm

Supplied in tape-and-reel packaging, 400 parts per reel, 13" diameter reel.

Temperature Rise vs. Total Loss

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
FLAT-PAC™ FP1308 Series

Core Loss

![Core Loss vs B_{p-p}](image)

Inductance Characteristics

![OCL vs I_{sat}](image)
Coiltronics® High Frequency Inductor Catalog

FLAT-PAC™ FP3 Series

Description
- 155°C maximum total temperature operation
- Low-profile high current inductors
- Inductance range 0.1μH to 15μH
- Design utilizes high temperature powder iron material with a non-organic binder to eliminate thermal aging
- Current rating up to 34.7Adc (higher peak currents may be attained with a greater rolloff, see rolloff curve)
- Frequency range up to 2MHz

Applications
- Computers and portable power devices
- Energy storage applications
- DC-DC converters
- Input - output filter application

Environmental Data
- Storage temperature range: -40°C to +155°C
- Operating ambient temperature range: -40°C to +155°C (Range is application specific)
- Solder reflow temperature: +260°C max. for 10 seconds max.

Packaging
- Units supplied in tape-and-reel packaging, 1700 parts per reel, 13" diameter reel

Product Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Rated Inductance μH</th>
<th>OCL μH ± 15%</th>
<th>f rms Amps</th>
<th>I sat 1 Amps Approx. 10%</th>
<th>I sat 2 Amps Approx. 15%</th>
<th>DCR (mΩ) @ 20°C (Max.)</th>
<th>K-factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP3-R10-R</td>
<td>0.10</td>
<td>0.10</td>
<td>19.0</td>
<td>27</td>
<td>34.7</td>
<td>1.21</td>
<td>803</td>
</tr>
<tr>
<td>FP3-R20-R</td>
<td>0.20</td>
<td>0.22</td>
<td>15.3</td>
<td>16</td>
<td>20.8</td>
<td>1.88</td>
<td>482</td>
</tr>
<tr>
<td>FP3-R47-R</td>
<td>0.47</td>
<td>0.44</td>
<td>10.9</td>
<td>11.6</td>
<td>14.9</td>
<td>3.67</td>
<td>344</td>
</tr>
<tr>
<td>FP3-R68-R</td>
<td>0.68</td>
<td>0.72</td>
<td>9.72</td>
<td>9.0</td>
<td>11.6</td>
<td>4.63</td>
<td>268</td>
</tr>
<tr>
<td>FP3-1R0-R</td>
<td>1.00</td>
<td>1.10</td>
<td>6.26</td>
<td>7.4</td>
<td>9.5</td>
<td>11.2</td>
<td>219</td>
</tr>
<tr>
<td>FP3-1R5-R</td>
<td>1.50</td>
<td>1.50</td>
<td>5.78</td>
<td>6.2</td>
<td>8.0</td>
<td>13.1</td>
<td>185</td>
</tr>
<tr>
<td>FP3-2R0-R</td>
<td>2.00</td>
<td>2.00</td>
<td>5.40</td>
<td>5.4</td>
<td>6.9</td>
<td>15.0</td>
<td>161</td>
</tr>
<tr>
<td>FP3-3R3-R</td>
<td>3.30</td>
<td>3.20</td>
<td>3.63</td>
<td>4.3</td>
<td>5.5</td>
<td>30.0</td>
<td>127</td>
</tr>
<tr>
<td>FP3-4R7-R</td>
<td>4.70</td>
<td>4.70</td>
<td>3.23</td>
<td>3.5</td>
<td>4.2</td>
<td>40.0</td>
<td>105</td>
</tr>
<tr>
<td>FP3-8R2-R</td>
<td>8.20</td>
<td>8.5</td>
<td>2.91</td>
<td>2.6</td>
<td>3.4</td>
<td>74.0</td>
<td>78</td>
</tr>
<tr>
<td>FP3-100-R</td>
<td>10.0</td>
<td>10.9</td>
<td>2.30</td>
<td>2.3</td>
<td>3.0</td>
<td>101</td>
<td>69</td>
</tr>
<tr>
<td>FP3-150-R</td>
<td>15.0</td>
<td>14.9</td>
<td>2.22</td>
<td>2.0</td>
<td>2.5</td>
<td>127</td>
<td>59</td>
</tr>
</tbody>
</table>

1 OCL (Open Circuit Inductance) Test parameters: 100kHz, 0.1V rms, 0.0Adc
2 DC current for an approximate ΔT of 40°C without core loss. Derating is necessary for AC currents. PCB layout, trace thickness and width, air-flow, and proximity of other heat generating components will affect the temperature rise. It is recommended that the temperature of the part not exceed 155°C under worst case operating conditions verified in the end application.
3 I sat 1 Amps Peak for approximately 10% rolloff @ 20°C
4 I sat 2 Amps Peak for approximately 15% rolloff @ 20°C
5 K-factor: Used to determine B p-p for core loss (see graph). B p-p = K*L*ΔI p-p (Gauss), K: (K factor from table), L: (Inductance in μH), ΔI (Peak to peak ripple current in Amps).

Dimensions - mm

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
Coiltronics® High Frequency Inductor Catalog

FLAT-PACTM FP3 Series

Packaging Information - mm

xxx = Inductance value  yww = Date code

Temperature Rise vs. Total Loss

Core Loss

Inductance Characteristics

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
Coiltronics® High Frequency Inductor Catalog

HCP0704 Series

Applications:
- Voltage Regulator Module (VRM)
- Multi-phase regulators
- Desktop and servers
- Base station equipment
- Notebook regulators
- Data networking and storage systems
- Point-of-load modules
- Battery power systems
- DCR sensing

Environmental Data:
- Storage temperature range: -40°C to +155°C
- Operating temperature range: -40°C to +155°C
  (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

Packaging:
- Supplied in tape-and-reel packaging, 1000 parts per reel, 13” diameter reel

Description:
- Halogen free
- 155°C maximum total temperature operation
- 6.8 x 6.8 x 4.2mm surface mount package
- Powder iron core material
- Magnetically shielded, low EMI
- High temperature core material eliminates thermal aging issues
- High current carrying capacity, low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 0.40μH to 4.7μH
- Current range from 5.0 to 27 amps
- Frequency range up to 2MHz
- RoHS compliant

Product Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>OCL ± 25% (μH)</th>
<th>FLL Min. (μH)</th>
<th>I_{rms} (Amps)</th>
<th>I_{sat} @ 25°C (Amps)</th>
<th>DCR (mΩ) @ 20°C</th>
<th>K-factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCP0704-R40-R</td>
<td>0.40</td>
<td>0.28</td>
<td>17</td>
<td>27</td>
<td>3.2 ±10%</td>
<td>383.1</td>
</tr>
<tr>
<td>HCP0704-R60-R</td>
<td>0.50</td>
<td>0.42</td>
<td>14</td>
<td>21</td>
<td>4.5 ±10%</td>
<td>313.5</td>
</tr>
<tr>
<td>HCP0704-1R0-R</td>
<td>1.00</td>
<td>0.7</td>
<td>12</td>
<td>17</td>
<td>6.2 ±10%</td>
<td>265.3</td>
</tr>
<tr>
<td>HCP0704-1R8-R</td>
<td>1.80</td>
<td>1.26</td>
<td>8.5</td>
<td>13</td>
<td>11.0 ±10%</td>
<td>202.8</td>
</tr>
<tr>
<td>HCP0704-2R3-R</td>
<td>2.30</td>
<td>1.56</td>
<td>7.5</td>
<td>11.5</td>
<td>16.5 ±10%</td>
<td>164.2</td>
</tr>
<tr>
<td>HCP0704-3R3-R</td>
<td>3.30</td>
<td>2.31</td>
<td>6.0</td>
<td>9.5</td>
<td>25.0 ±10%</td>
<td>149.9</td>
</tr>
<tr>
<td>HCP0704-4R7-R</td>
<td>4.70</td>
<td>3.29</td>
<td>5.0</td>
<td>8.0</td>
<td>29.5 ±10%</td>
<td>127.7</td>
</tr>
</tbody>
</table>

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10Vrms, 0.0ADC
2 Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vrms, I_{sat}1
3 I_{rms}: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
4 I_{sat}: Peak current for approximately 20% rolloff at +25°C.
5 K-factor: Used to determine B_{p-p} for core loss (see graph). B_{p-p} = K • \Delta B \times I_{peak} (Amps), K: (K-factor from table), L: (Inductance in μH), \Delta I: (peak-to-peak ripple current in amps).
6 Part Number Definition: HCP0704-xxx-R
   - HCP0704 = Product code and size
   - xxx= Inductance value in μH, R = decimal point. If no “R” is present, then third character = # of zeros
   - “R” suffix = RoHS compliant
HCP0704 Series

Dimensions - mm

Top View

- 6.80 Max
- HCP0704
- wwllyy = Date code
- R = Revision level

Side View

- HCP0704-R40 to 1R0 = 4.20 max
- HCP0704-1R8 to 4R7 = 4.00 max

Bottom View

- 3.3±0.3
- 2
- 2

Recommended Pad Layout

- 7.60
- 2.50(2x)
- 4.00(2x)

Schematic

- 7.50
- 4.0
- 2.0
- 1.5 Dia.
- +0.1/-0.0

The nominal DCR test point is in the middle of the terminal.

Part Marking: HCP0704

- xxx = Inductance value in μH (R = Decimal point). If no “R” is present, then last character is number of zeros
- wwllyy = Date code
- R = Revision level

Packaging Information - mm

Section A-A

- 1.5 Dia min.
- 4.0
- 2.0
- 1.5 Dia.
- +0.1/-0.0

HCP0704-R40 to 1R0 = 4.2
HCP0704-1R8 to 4R7 = 4.0

User direction of feed

Supplied in tape-and-reel packaging, 1000 parts per reel, 13” diameter reel.

Temperature Rise vs. Total Loss

- Temperature Rise (°C)
- Total Loss (W)

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
HCP0704 Series

Core Loss

Core Loss vs. Bp-p

Inductance Characteristics

% of OCL vs % of I_{sat}
Coiltronics® High Frequency Inductor Catalog

HCP0805 Series

Applications:
- Voltage Regulator Module (VRM)
- Multi-phase regulators
- Desktop and servers
- Base station equipment
- Notebook regulators
- Data networking and storage systems
- Point-of-load modules
- Battery power systems
- DCR sensing

Environmental Data:
- Storage temperature range: -40°C to +125°C
- Operating temperature range: -40°C to +125°C (Range is application specific)
- Solder reflow temperature: J-STD-020D compliant

Packaging:
- Supplied in tape-and-reel packaging, 700 parts per 13” diameter reel

Description:
- Halogen free
- 125°C maximum total temperature operation
- 7.6 x 7.9 x 5.0mm surface mount package
- Powder iron core material
- Magnetically shielded, low EMI
- High current carrying capacity, low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 0.40μH to 2.2μH
- Current range from 10.0 to 32 amps
- Frequency range up to 2MHz
- RoHS compliant

Product Specifications

<table>
<thead>
<tr>
<th>Part Number</th>
<th>OCL ± 20% (μH)</th>
<th>FLL Min. (μH)</th>
<th>I rms (Amps)</th>
<th>I sat @ 25°C (Amps)</th>
<th>DCR (mΩ) @ 20°C</th>
<th>K-factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCP0805-R40-R</td>
<td>0.40</td>
<td>0.26</td>
<td>20</td>
<td>32</td>
<td>3.1 ±6.0%</td>
<td>376.0</td>
</tr>
<tr>
<td>HCP0805-R68-R</td>
<td>0.68</td>
<td>0.44</td>
<td>17.5</td>
<td>25</td>
<td>4.5 ±6.0%</td>
<td>292.0</td>
</tr>
<tr>
<td>HCP0805-1R0-R</td>
<td>1.00</td>
<td>0.64</td>
<td>14.5</td>
<td>22</td>
<td>5.8 ±6.0%</td>
<td>239.0</td>
</tr>
<tr>
<td>HCP0805-1R5-R</td>
<td>1.50</td>
<td>0.96</td>
<td>13.3</td>
<td>18</td>
<td>6.8 ±6.0%</td>
<td>202.0</td>
</tr>
<tr>
<td>HCP0805-2R2-R</td>
<td>2.20</td>
<td>1.41</td>
<td>10</td>
<td>14</td>
<td>11.2 ±6.0%</td>
<td>175.0</td>
</tr>
</tbody>
</table>

1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10V rms, 0.0A dc
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1V rms, I sat
3. I sat: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
4. I sat: Peak current for approximately 20% rolloff at +25°C.
6. Part Number Definition: HCP0805-xxx-R
   - HCP0805 = Product code and size
   - xxx = Inductance value in μH, R = decimal point. If no “R” is present, then third character = # of zeros.
   - “-R” suffix = RoHS compliant
Coiltronics® High Frequency Inductor Catalog

HCP0805 Series

Dimensions - mm

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Part width E (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCP0805-R40-R</td>
<td>1.3 ±0.2</td>
</tr>
<tr>
<td>HCP0805-R68-R</td>
<td>1.1 ±0.2</td>
</tr>
<tr>
<td>HCP0805-1R0-R</td>
<td>1.1 ±0.2</td>
</tr>
<tr>
<td>HCP0805-1R5-R</td>
<td>1.1 ±0.2</td>
</tr>
<tr>
<td>HCP0805-2R2-R</td>
<td>0.8 ±0.2</td>
</tr>
</tbody>
</table>

The nominal DCR is measured from point "a" to point "b."

Part Marking: HCP0805

xxx = Inductance value in μH. (R = Decimal point). If no "R" is present, then last character is # of zeros

wwllyy = Date code

R = Revision level

Packaging Information - mm

Supplied in tape-and-reel packaging, 700 parts per reel, 13" diameter reel.

Temperature Rise vs. Total Loss

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
HCP0805 Series

Core Loss

Core Loss vs. $B_{p-p}$

Inductance Characteristics

% of OCL vs. % of $I_{sat}$
Solder Reflow Profile for FLAT-PAC™ FP Series and HCP Series Inductors

Solder Reflow Profile

Reference JDEC J-STD-020D

<table>
<thead>
<tr>
<th>Profile Feature</th>
<th>Standard SnPb Solder</th>
<th>Lead (Pb) Free Solder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preheat and Soak</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Temperature min. (T_{Smin})</td>
<td>100°C</td>
<td>150°C</td>
</tr>
<tr>
<td>• Temperature max. (T_{Smax})</td>
<td>150°C</td>
<td>200°C</td>
</tr>
<tr>
<td>• Time (T_{Smin} to T_{Smax}) (t_s)</td>
<td>60-120 Seconds</td>
<td>60-120 Seconds</td>
</tr>
<tr>
<td>Average ramp up rate T_{Smax} to T_P</td>
<td>3°C/ Second Max.</td>
<td>3°C/ Second Max.</td>
</tr>
<tr>
<td>Liquidous temperature (T_L)</td>
<td>183°C</td>
<td>217°C</td>
</tr>
<tr>
<td>Time at liquidous (t_L)</td>
<td>60-150 Seconds</td>
<td>60-150 Seconds</td>
</tr>
<tr>
<td>Peak package body temperature (T_P)*</td>
<td>Table 1</td>
<td>Table 2</td>
</tr>
<tr>
<td>Time (t_P)** within 5 °C of the specified classification temperature (T_c)</td>
<td>20 Seconds**</td>
<td>30 Seconds**</td>
</tr>
<tr>
<td>Average ramp-down rate (T_P to T_{Smax})</td>
<td>6°C/ Second Max.</td>
<td>6°C/ Second Max.</td>
</tr>
<tr>
<td>Time 25°C to Peak Temperature</td>
<td>6 Minutes Max.</td>
<td>8 Minutes Max.</td>
</tr>
</tbody>
</table>

* Tolerance for peak profile temperature (T_P) is defined as a supplier minimum and a user maximum.

** Tolerance for time at peak profile temperature (t_P) is defined as a supplier minimum and a user maximum.
High Frequency Inductors for Core Power Applications

The trend in modern power conversion is for high power density, reduced volume and increased efficiency. The drive for smaller, more efficient solutions presents a number of challenges for circuit design and component selection.

Inductor selection in high current core power applications is based on a need for high peak current ratings and low high frequency losses. These two requirements lead designers in different directions resulting in a compromise solution. Designers are forced to select low inductance values to reduce inductor size (and ensure fast transient responses which results in high ripple currents needing to be absorbed by the inductor increasing losses) or select higher inductance values to reduce the ripple current and losses - but at a sacrifice of inductor size, efficiency and transient responses.

The material of choice for core power multi-phase uncoupled inductors is ferrite. Core power applications require a high saturation, high frequency, low loss, wide temperature range ferrite material to be selected. The reduced core loss at high frequency (coupled with a very low Direct Current Resistance - DCR - single turn rectangular conductor) ensures high efficiency (see Figure 1).

The trend in modern power conversion is for high power density, reduced volume and increased efficiency. The drive for smaller, more efficient solutions presents a number of challenges for circuit design and component selection.

Figure 1 - Typical Three-Phase Voltage Regulator Module (VRM)

Current Sensing

When accurate current sensing is required, a low value resistor is commonly used to generate a voltage proportional to the output current. The introduction of such a current sense resistor increases the circuit losses along with overall converter size and cost. Using an output inductor with a tight DCR tolerance will eliminate the need for the current sense resistor.

Figure 2 – Inductor Current Sensing Circuit

Comparing the performance of traditional ferrite inductors (such as the FP2 with the new DCR current sense inductors from Cooper Bussmann) it can be seen that the benefits go beyond the elimination of sensing resistors.

For product information and data sheets, visit www.cooperbussmann.com/datasheets/elx
High Frequency Indicators for Core Power Applications

From Table 1 it can be seen that in addition to offering three different DCR values and tolerances the FP0705 has better performance over the traditional FP2 inductor. The FP0705 also has greater core loss stability over a wide temperature range, which is a consideration that is often overlooked during converter design. Almost all inductor specifications show room temperature values. However, the effects of increased temperature need to be accounted for as peak current ratings are reduced and losses increased at elevated temperatures.

The Cooper Bussmann Coiltronics® Flat-Pac™ Series of DCR current sensing inductors is available in footprints of 7 x 7mm, 7 x 8mm, 10 x 7mm, 10 x 8mm and 11 x 8mm with many inductance value ranges and DCR tolerances. All parts exhibit low DCR, high peak current ratings and very low high frequency core losses that remain stable over a wide temperature range. The Flat-Pac™ inductors are also RoHS compliant and Halogen Free. The combination of these characteristics make the new Flat-Pac™ inductors ideal for high frequency, high efficiency voltage regulation modules used in computer core power applications.

See Table 2 for a detailed reference of the new core power inductor solutions available from Cooper Bussmann.

### Table 1 – DCR Current Sense Inductor Performance

<table>
<thead>
<tr>
<th>Coiltronics Part No.</th>
<th>Core Material</th>
<th>Nominal Inductance (mH)</th>
<th>DCR (mΩ)</th>
<th>Core Loss (mW)</th>
<th>Height (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP2-V150-R</td>
<td>Ferrite</td>
<td>150nH</td>
<td>0.28</td>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>FP0705R1-R15-R</td>
<td>Ferrite</td>
<td>150nH</td>
<td>0.25 ± 10%</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>FP0705R2-R15-R</td>
<td>Ferrite</td>
<td>150nH</td>
<td>0.32 ± 9.4%</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>FP0705R3-R15-R</td>
<td>Ferrite</td>
<td>150nH</td>
<td>0.46 ± 6.5%</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

1. DC current for an approximate ΔT of 40°C
2. Peak current for approximately 20% roll off at 25°C
3. Losses at 500kHz, applied volt-second of 0.75V-μs

### Table 2 - High Frequency Inductor Selection Matrix

<table>
<thead>
<tr>
<th>Inductor Series</th>
<th>Part Number</th>
<th>Dimension (mm)</th>
<th>OCL (nH)</th>
<th>Ipq(A)@25°C</th>
<th>Irms(A)x1=mΩ</th>
<th>DCR(mΩ)x1=mΩ</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP0705</td>
<td>FP0705x-R07-R</td>
<td>7 x 7 x 4.95</td>
<td>72</td>
<td>65</td>
<td>50</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>FP0705x-R10-R</td>
<td>7 x 7 x 4.95</td>
<td>105</td>
<td>44</td>
<td>36</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>FP0705x-R12-R</td>
<td>7 x 7 x 4.95</td>
<td>120</td>
<td>37</td>
<td>30</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>FP0705x-R15-R</td>
<td>7 x 7 x 4.95</td>
<td>150</td>
<td>30</td>
<td>24</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>FP0705x-R18-R</td>
<td>7 x 7 x 4.95</td>
<td>180</td>
<td>25</td>
<td>20</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>FP0705x-R22-R</td>
<td>7 x 7 x 4.95</td>
<td>220</td>
<td>20</td>
<td>16</td>
<td>38</td>
</tr>
<tr>
<td>FP0708</td>
<td>FP0708x-R07-R</td>
<td>8.5 x 7.0 x 7.2</td>
<td>72</td>
<td>90</td>
<td>72</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>FP0708x-R09-R</td>
<td>8.5 x 7.0 x 7.2</td>
<td>90</td>
<td>75</td>
<td>60</td>
<td>44</td>
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<tr>
<td></td>
<td>FP0708x-R10-R</td>
<td>8.5 x 7.0 x 7.2</td>
<td>105</td>
<td>68</td>
<td>54</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>FP0708x-R12-R</td>
<td>8.5 x 7.0 x 7.2</td>
<td>120</td>
<td>59</td>
<td>47</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>FP0708x-R15-R</td>
<td>8.5 x 7.0 x 7.2</td>
<td>150</td>
<td>47</td>
<td>37</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>FP0708x-R19-R</td>
<td>8.5 x 7.0 x 7.2</td>
<td>190</td>
<td>37</td>
<td>29</td>
<td>44</td>
</tr>
<tr>
<td>FP0805</td>
<td>FP0805x-R03-R</td>
<td>7.49 x 7.62 x 4.96</td>
<td>32</td>
<td>110</td>
<td>95</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>FP0805x-R06-R</td>
<td>7.49 x 7.62 x 4.96</td>
<td>58</td>
<td>83</td>
<td>61</td>
<td>65</td>
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<tr>
<td></td>
<td>FP0805x-R07-R</td>
<td>7.49 x 7.62 x 4.96</td>
<td>72</td>
<td>67</td>
<td>49</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>FP0805x-R10-R</td>
<td>7.49 x 7.62 x 4.96</td>
<td>100</td>
<td>50</td>
<td>35</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>FP0805x-R20-R</td>
<td>7.49 x 7.62 x 4.96</td>
<td>200</td>
<td>20</td>
<td>16</td>
<td>65</td>
</tr>
<tr>
<td>FP0807</td>
<td>FP0807x-R07-R</td>
<td>7.4 x 7.6 x 7.0</td>
<td>70</td>
<td>108</td>
<td>79</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>FP0807x-R10-R</td>
<td>7.4 x 7.6 x 7.0</td>
<td>100</td>
<td>77</td>
<td>55</td>
<td>49</td>
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<tr>
<td></td>
<td>FP0807x-R12-R</td>
<td>7.4 x 7.6 x 7.0</td>
<td>120</td>
<td>66</td>
<td>48</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>FP0807x-R16-R</td>
<td>7.4 x 7.6 x 7.0</td>
<td>160</td>
<td>48</td>
<td>36</td>
<td>49</td>
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<tr>
<td></td>
<td>FP0807x-R18-R</td>
<td>7.4 x 7.6 x 7.0</td>
<td>180</td>
<td>42</td>
<td>32</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>FP0807x-R20-R</td>
<td>7.4 x 7.6 x 7.0</td>
<td>200</td>
<td>38</td>
<td>28</td>
<td>49</td>
</tr>
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</table>

1. DCR Indicator.
## Table 2 - High Frequency Inductor Selection Matrix (Continued)

<table>
<thead>
<tr>
<th>Inductor Series</th>
<th>Coiltronics Part Number</th>
<th>Dimension (mm)</th>
<th>OCL (nH)</th>
<th>$I_{sat}(A)$@25°C</th>
<th>$I_{rms}(A)$ xx°C</th>
<th>DCR(mΩ) xx°C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>R1</td>
<td>R2</td>
</tr>
<tr>
<td>FP1105</td>
<td>FP0705xx-R07-R</td>
<td>7 x 7 x 4.95</td>
<td>72</td>
<td>65 50 43 38 32</td>
<td>0.25±10%</td>
<td>0.32±9.4%</td>
</tr>
<tr>
<td></td>
<td>FP1105xx-R10-R</td>
<td>8 x 11 x 4.9</td>
<td>100</td>
<td>81 63 46 - -</td>
<td>0.35 ± 8.6%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>FP1105xx-R12-R</td>
<td>8 x 11 x 4.9</td>
<td>120</td>
<td>66 50 46 - -</td>
<td>0.35 ± 8.6%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>FP1105xx-R15-R</td>
<td>8 x 11 x 4.9</td>
<td>150</td>
<td>54 42 46 - -</td>
<td>0.35 ± 8.6%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>FP1105xx-R20-R</td>
<td>8 x 11 x 4.9</td>
<td>192</td>
<td>42 34 46 - -</td>
<td>0.35 ± 8.6%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>FP1105xx-R22-R</td>
<td>8 x 11 x 4.9</td>
<td>226</td>
<td>39 28 46 - -</td>
<td>0.35 ± 8.6%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>FP1107xx-R07-R</td>
<td>7.2 x 11 x 7.2</td>
<td>70</td>
<td>140 123 55 42</td>
<td>0.29 ± 10%</td>
<td>0.47 ± 6.4%</td>
</tr>
<tr>
<td></td>
<td>FP1107xx-R12-R</td>
<td>7.2 x 11 x 7.2</td>
<td>120</td>
<td>90 72 55 42</td>
<td>0.29 ± 10%</td>
<td>0.47 ± 6.4%</td>
</tr>
<tr>
<td></td>
<td>FP1107xx-R15-R</td>
<td>7.2 x 11 x 7.2</td>
<td>150</td>
<td>70 56 55 42</td>
<td>0.29 ± 10%</td>
<td>0.47 ± 6.4%</td>
</tr>
<tr>
<td></td>
<td>FP1107xx-R23-R</td>
<td>7.2 x 11 x 7.2</td>
<td>230</td>
<td>45 36 55 42</td>
<td>0.29 ± 10%</td>
<td>0.47 ± 6.4%</td>
</tr>
<tr>
<td></td>
<td>FP1107xx-R30-R</td>
<td>7.2 x 11 x 7.2</td>
<td>300</td>
<td>35 28 55 42</td>
<td>0.29 ± 10%</td>
<td>0.47 ± 6.4%</td>
</tr>
<tr>
<td></td>
<td>FP1107xx-R40-R</td>
<td>7.2 x 11 x 7.2</td>
<td>400</td>
<td>25 20 55 42</td>
<td>0.29 ± 10%</td>
<td>0.47 ± 6.4%</td>
</tr>
<tr>
<td></td>
<td>FP1107xx-R51-R</td>
<td>7.2 x 11 x 7.2</td>
<td>510</td>
<td>18 14.5 55 42</td>
<td>0.29 ± 10%</td>
<td>0.47 ± 6.4%</td>
</tr>
<tr>
<td></td>
<td>FP1005xx-R08-R</td>
<td>7 x 10.2 x 4.95</td>
<td>85</td>
<td>90 64 53 50 45</td>
<td>0.39±7.7%</td>
<td>0.47±6.7%</td>
</tr>
<tr>
<td></td>
<td>FP1005xx-R10-R</td>
<td>7 x 10.2 x 4.95</td>
<td>100</td>
<td>73 57 53 50 45</td>
<td>0.39±7.7%</td>
<td>0.47±6.7%</td>
</tr>
<tr>
<td></td>
<td>FP1005xx-R12-R</td>
<td>7 x 10.2 x 4.95</td>
<td>120</td>
<td>60 48 53 50 45</td>
<td>0.39±7.7%</td>
<td>0.47±6.7%</td>
</tr>
<tr>
<td></td>
<td>FP1005xx-R15-R</td>
<td>7 x 10.2 x 4.95</td>
<td>150</td>
<td>47 37 53 50 45</td>
<td>0.39±7.7%</td>
<td>0.47±6.7%</td>
</tr>
<tr>
<td></td>
<td>FP1005xx-R22-R</td>
<td>7 x 10.2 x 4.95</td>
<td>220</td>
<td>33 26 53 50 45</td>
<td>0.39±7.7%</td>
<td>0.47±6.7%</td>
</tr>
<tr>
<td></td>
<td>FP1006xx-R08-R</td>
<td>8 x 10.2 x 6</td>
<td>85</td>
<td>100 70 53 45</td>
<td>0.27 ± 12%</td>
<td>0.36 ± 8.6%</td>
</tr>
<tr>
<td></td>
<td>FP1006xx-R10-R</td>
<td>8 x 10.2 x 6</td>
<td>100</td>
<td>85 64 53 45</td>
<td>0.27 ± 12%</td>
<td>0.36 ± 8.6%</td>
</tr>
<tr>
<td></td>
<td>FP1006xx-R12-R</td>
<td>8 x 10.2 x 6</td>
<td>120</td>
<td>71 53 53 45</td>
<td>0.27 ± 12%</td>
<td>0.36 ± 8.6%</td>
</tr>
<tr>
<td></td>
<td>FP1006xx-R16-R</td>
<td>8 x 10.2 x 6</td>
<td>160</td>
<td>55 40 53 45</td>
<td>0.27 ± 12%</td>
<td>0.36 ± 8.6%</td>
</tr>
<tr>
<td></td>
<td>FP1006xx-R22-R</td>
<td>8 x 10.2 x 6</td>
<td>220</td>
<td>38 28 53 45</td>
<td>0.27 ± 12%</td>
<td>0.36 ± 8.6%</td>
</tr>
<tr>
<td></td>
<td>FP1007xx-R12-R</td>
<td>10.41 x 8 x 7.0</td>
<td>120</td>
<td>81 65 60 51 -</td>
<td>0.29±10%</td>
<td>0.48±8%</td>
</tr>
<tr>
<td></td>
<td>FP1007xx-R14-R</td>
<td>10.41 x 8 x 7.0</td>
<td>140</td>
<td>72 56 60 51 -</td>
<td>0.29±10%</td>
<td>0.48±8%</td>
</tr>
<tr>
<td></td>
<td>FP1007xx-R17-R</td>
<td>10.41 x 8 x 7.0</td>
<td>170</td>
<td>58 46 60 51 -</td>
<td>0.29±10%</td>
<td>0.48±8%</td>
</tr>
<tr>
<td></td>
<td>FP1007xx-R22-R</td>
<td>10.41 x 8 x 7.0</td>
<td>215</td>
<td>50 36 60 51 -</td>
<td>0.29±10%</td>
<td>0.48±8%</td>
</tr>
<tr>
<td></td>
<td>FP1007xx-R30-R</td>
<td>10.41 x 8 x 7.0</td>
<td>300</td>
<td>32 26 60 51 -</td>
<td>0.29±10%</td>
<td>0.48±8%</td>
</tr>
</tbody>
</table>

1. DCR Indicator.
Coiltronics® High Frequency Inductor Catalog

Power Inductors Improve Reliability in High Temperature Designs

Cooper Bussmann Coiltronics® high current FP3™ power inductors are designed for high density, medium current applications using a high temperature iron powder core material. These inductors do not exhibit the thermal aging issue frequently associated with iron powder core inductors. In fact the FP3 core is rated for 200°C without thermal degradation. The FP3 family is rated for 155°C operation. The calculations below will allow users to take advantage of this high temperature capability.

In this example, a buck regulator will be used to convert a 12V input to a 5V output with a load current of 4.5A. The operating frequency was chosen to be 600 kHz to reduce the size of the filter components, while still maintaining good efficiency. The converter is designed to have 20% ripple current, so a relatively low ESR output filter capacitor will be used, as is typical in switching power supplies.

First calculate the needed inductance value $V = L \cdot \frac{dI}{dt}$ where:

$V = V_{in} - V_{out}$ (voltage across the inductor)

$\frac{dT}{t} =$ On time of drive $= \frac{V_{out}}{V_{in}} /$ frequency

$\Delta I =$ Chosen above to be 20%

Calculate the required inductance:

$L = \frac{V \cdot dt}{\Delta I} = \frac{(12-5) \cdot (12/5/600k)}{0.2 \cdot 4.5}$

$L = 4.8 \mu H$

Choose 4.7 $\mu H$, the nearest standard value.

Recalculate ripple current at 23% using 4.7 $\mu H$.

Second determine peak to peak flux density, $B_{p-p}$:

$B_{p-p} = K \cdot L \cdot \Delta I$ where:

$K$: K-factor from the adjacent table

$L$: Inductance $\mu H$

$\Delta I$: Peak to peak ripple current (Amps)

$B_{p-p} = 105 \cdot 4.7 \cdot 0.23 \cdot 4.5 = 510$ Gauss

Next determine the total losses in the inductor:

Total losses $= DC$ loss $+ AC$ loss

DC loss $= I^2 \cdot DCR = 4.52 \cdot 0.040 = 0.81 W$

(DCR from FP3 data sheet)

AC loss from table at $B_{p-p}$ of 510 $= 0.15 W$

Total Loss $= DC$ loss $+ AC$ loss $= 0.96 W$

Finally determine the temperature rise.

• Total loss $= 0.96 W$, using the table,

• Temperature rise is $80^\circ C$

• Assuming an ambient temperature of $70^\circ C$,

The temperature of the inductor is $T = 70 + 75 = 150^\circ C$. 

<table>
<thead>
<tr>
<th>Part Number</th>
<th>K-factor</th>
<th>Part Number</th>
<th>K-factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>FP3-R10-R</td>
<td>803</td>
<td>FP3-2R0-R</td>
<td>161</td>
</tr>
<tr>
<td>FP3-R20-R</td>
<td>482</td>
<td>FP3-3R3-R</td>
<td>127</td>
</tr>
<tr>
<td>FP3-R47-R</td>
<td>344</td>
<td>FP3-4R7-R</td>
<td>105</td>
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<td>FP3-R68-R</td>
<td>268</td>
<td>FP3-8R2-R</td>
<td>78</td>
</tr>
<tr>
<td>FP3-1R0-R</td>
<td>219</td>
<td>FP3-150-R</td>
<td>59</td>
</tr>
<tr>
<td>FP3-1R5-R</td>
<td>185</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Power Inductors Improve Reliability in High Temperature Designs

**Note:** The data assumes no cooling airflow. Cooling will reduce the temperature of the inductor. The FP3 is rated for 155°C operation.

---

**FP3 AC Loss at Frequency, kHz**

Core Loss vs. Flux Density

- **Bp-p (Gauss)**
- **Core Loss (W)**

---

**Temperature Rise vs. Total Loss**

- **Temperature Rise (°C)**
- **Total Loss (W)**
Inductor Selection for Switching Regulators

Introduction/Basic Operation

In switching regulator applications the inductor is used as an energy storage device. When the semiconductor switch is ON, the current in the inductor ramps up and energy is stored. When the switch turns OFF, energy is released into the load. The amount of energy stored is calculated by the formula \( \text{Energy} = \frac{1}{2}LI^2 \) (Joules), where:

- \( L \) is the inductance in Henrys
- \( I \) is the peak value of inductor current

The amount by which the current changes during a switching cycle is known as the ripple current. Ripple current is defined as \( V_l = L\frac{di}{dt} \):

- \( V_l \) is the voltage across the inductor
- \( di \) is the ripple current
- \( dt \) is the duration for which the voltage is applied

The following parameters need to be defined or calculated to select an inductor:

- Maximum input voltage
- Output voltage
- Switching frequency
- Maximum ripple current
- Duty cycle

Inductor current is made up of AC and DC components (Figure 1). The AC component is high frequency and will flow through the output capacitor because it has a low HF impedance. A ripple voltage is produced due to the capacitor Equivalent Series Resistance (ESR) that will appear at the output of the switching regulator. This ripple voltage needs to be sufficiently low as not to effect the operation of the circuit the regulator is supplying, normally in the order of 10-500mVpk-pk.

Selecting the correct ripple current impacts the size of the inductor and output capacitor. The capacitor needs to have a sufficiently high ripple current rating or it will overheat and dry out. To achieve a good compromise between inductor and capacitor size a ripple current value of 10-30% of maximum inductor current should be chosen. The current in the inductor will be continuous for output currents greater that 5-15% of full load.
Inductor Selection for Switching Regulators

Inductor Selection: Buck Converters

**Figure 2 Application Parameters:**
- Switching frequency = 250kHz
- Input voltage range = 12V±10%
- Max ripple current = 220mA
- Output Voltage = 5.0V

**Step 1. Calculate the duty cycle**
- \( V_o = \text{output voltage} \)
- \( V_i = \text{Max input voltage} \)
- \( D = \frac{V_o}{V_i} \)
- \( D = \frac{5}{13.2} = 0.379 \)

**Step 2. Calculate the voltage across the inductance**
- \( V_1 = V_i - V_o \) (Switch on)
- \( V_1 = 13.2 - 5 = 8.2V \)
- \( V_1 = -V_o \) (Switch off)
- \( V_1 = -5V \)

**Step 3. Calculate the required inductance**
- \( L = \frac{V_1 \cdot dt}{di} \)
- \( L = \frac{(8.2 \times 0.379/250 \times 10^3)}{0.22} \)
- \( L = 56\mu H \)

**Inductor Selection: Boost Converters**

**Figure 3 Application Parameters:**
- Switching frequency = 100kHz
- Input voltage range = 4.5-5.5V
- Max ripple current = 100mA
- Output Voltage = 12.0V

**Step 1. Calculate the duty cycle:**
- \( V_o = \text{output voltage} \)
- \( V_i = \text{Max input voltage} \)
- \( D = 1 - \frac{V_i}{V_o} \)
- \( D = 1 - \frac{5.5}{12.0} = 0.542 \)

**Step 2. Calculating the voltage across the inductance**
- \( V_1 = V_i \) (Switch on)
- \( V_1 = 5.5V \)
- \( V_1 = V_o - V_i \) (Switch off)
- \( V_1 = 12 - 5.5 = 6.5V \)

**Step 3. Calculating the required inductance**
- \( L = \frac{V_1 \cdot dt}{di} \)
- \( L = \frac{(5.5 \times 0.542/100 \times 10^3)}{0.1} \)
- \( L = 298\mu H \)

**Typical Applications Using Inductors for Switching Regulators**

- Media Players
- Backlight Displays
- Laptop Computers
- Industrial Test Equipment
- Digital Cameras
- Mobile Phones
### Inductor Selection for Switching Regulators

#### SDH3812

<table>
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<tr>
<th>Part Number</th>
<th>Rated Inductance (μH)</th>
<th>OCL</th>
<th>Part Marking Designator</th>
<th>I_{rms}</th>
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Note: For full product information and a listing of all available inductor values, see [www.cooperbussmann.com/datasheets/elx](http://www.cooperbussmann.com/datasheets/elx), Data Sheet number SDH3812 Series.

#### SDH3812 Dimensions - mm

**Top View**

- Pin #1 indicator
- Pin #1 marking (see note A)
- 3.8 ±0.1
- 3.8 ±0.1
- 0.415 Min
- 0.9 Max

**Side View**

- 1.25 Max
- 2.03 ±0.1
- 3.65 Typ
- 4.8 Max

**Bottom View**

- 1.0 Max
- 2.03 ±0.1
- 3.65 Typ

**Recommended Pad Layout**

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Note: For full product information and a listing of all available inductor values, see [www.cooperbussmann.com/datasheets/elx](http://www.cooperbussmann.com/datasheets/elx), Data Sheet number SD38 Series.

#### SD3814 Dimensions - mm

**Top View**

- Pin #1 indicator
- Pin #1 marking (see note A)
- 8.0 Max
- 4.0 Max

**Side View**

- 1.76 Max
- 3.13 Min
- 2.03 ±0.1
- 4.0 Max
- 0.08 Max

**Bottom View**

- 2.5 Max
- 4.0 Max
- 0.415 Min

**Recommended Pad Layout**

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For product information and data sheets, visit [www.cooperbussmann.com/datasheets/elx](http://www.cooperbussmann.com/datasheets/elx)
Inductor Selection for Switching Regulators

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**Note:** SD10, 12, 18 and 20 not shown. For full product information and a listing of all available inductor values, see [http://www.cooperbussmann.com/datasheets/elx](http://www.cooperbussmann.com/datasheets/elx), Data sheet number SD Series

**SD14 & SD25 Dimensions - mm**

**Top View**
- Pin 1 identifier
- Part marking (Note A)

**Side View**
- HT
- SD14 = 1.45mm Max
- SD25 = 2.5mm Max

**Bottom View**
- 1.5 Typ. Ref.

**Recommended Pad Layout**
- 2 Pad Layout
- 4 Pad Layout

**SD Inductor Series**

- **Typical SD Series Applications**
  - Mobile phones
  - Digital cameras
  - Industrial test equipment
  - Computers
  - Uninterruptible power supplies
  - Televisions

- **Typical SD Series Uses**
  - Buck and boost converters
  - LED drivers
  - EL panel drivers
  - Backlighting
  - Noise filtering chokes
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