

# High Current, High Frequency, Low-Profile Power Inductors

## FLAT-PAC™ FP1005 Series



### 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



### 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" dia. reel

### Product Specifications

Part Number <sup>7</sup>	OCL <sup>1</sup> ± 10% (nH)	FLL <sup>2</sup> Min. (nH)	I <sub>rms</sub> <sup>3</sup> (Amps)	I <sub>sat</sub> <sup>1,4</sup> @ 25°C (Amps)	I <sub>sat</sub> <sup>2,5</sup> @ 125°C (Amps)	DCR (mΩ) @ 20°C	K-factor <sup>6</sup>
R1 Version							
FP1005R1-R08-R	85	61	53	90	64	0.39 ± 7.7%	536
FP1005R1-R10-R	100	72		73	57		536
FP1005R1-R12-R	120	86		60	48		536
FP1005R1-R15-R	150	108		47	37		536
FP1005R1-R22-R	220	158		33	26		536
R2 Version							
FP1005R2-R08-R	85	61	50	90	64	0.47 ± 6.7%	536
FP1005R2-R10-R	100	72		73	57		536
FP1005R2-R12-R	120	86		60	48		536
FP1005R2-R15-R	150	108		47	37		536
FP1005R2-R22-R	220	158		33	26		536
R3 Version							
FP1005R3-R08-R	85	61	45	90	64	0.55 ± 5.4%	536
FP1005R3-R10-R	100	72		73	57		536
FP1005R3-R12-R	120	86		60	48		536
FP1005R3-R15-R	150	108		47	37		536
FP1005R3-R22-R	220	158		33	26		536

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10V<sub>rms</sub>, 0.0Adc

2 Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1V<sub>rms</sub>, I<sub>sat</sub><sup>1</sup>

3 I<sub>rms</sub>: 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<sub>sat</sub><sup>1</sup>: Peak current for approximately 20% rolloff at +25°C.

5 I<sub>sat</sub><sup>2</sup>: Peak current for approximately 20% rolloff at +125°C.

6 K-factor: Used to determine B<sub>p-p</sub> for core loss (see graph). B<sub>p-p</sub> = K · L · ΔI · 10<sup>-3</sup>, B<sub>p-p</sub>: (Gauss), K: (K-factor from table), L: (inductance in nH), ΔI (peak-to-peak ripple current in amps).

7 Part Number Definition: FP1005Rx-Rxx-R

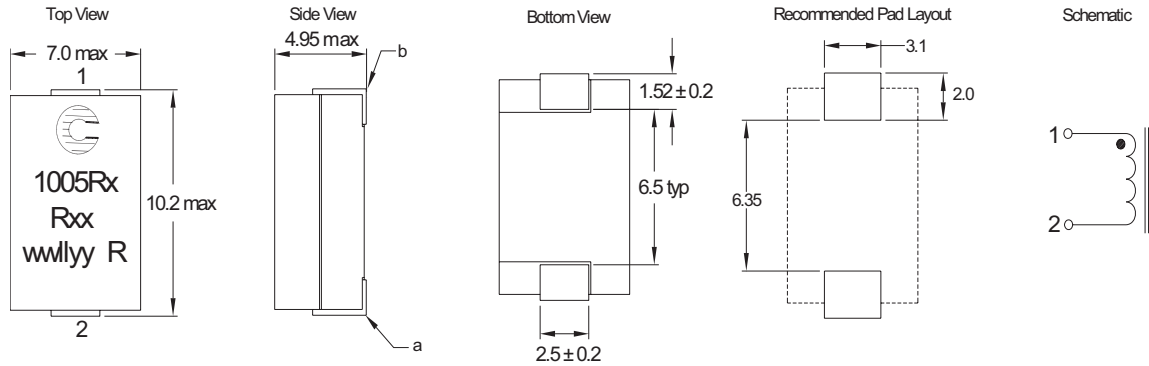
• FP1005 = Product code and size

• Rxx= Inductance value in μH, R = decimal point

• Rx is the DCR indicator

• "-R" suffix = RoHS compliant

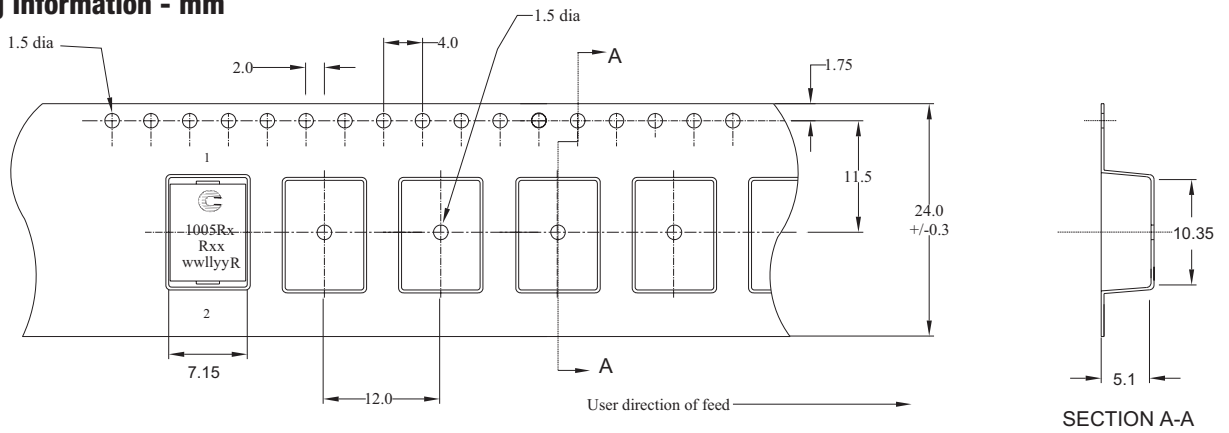
### Dimensions - mm



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

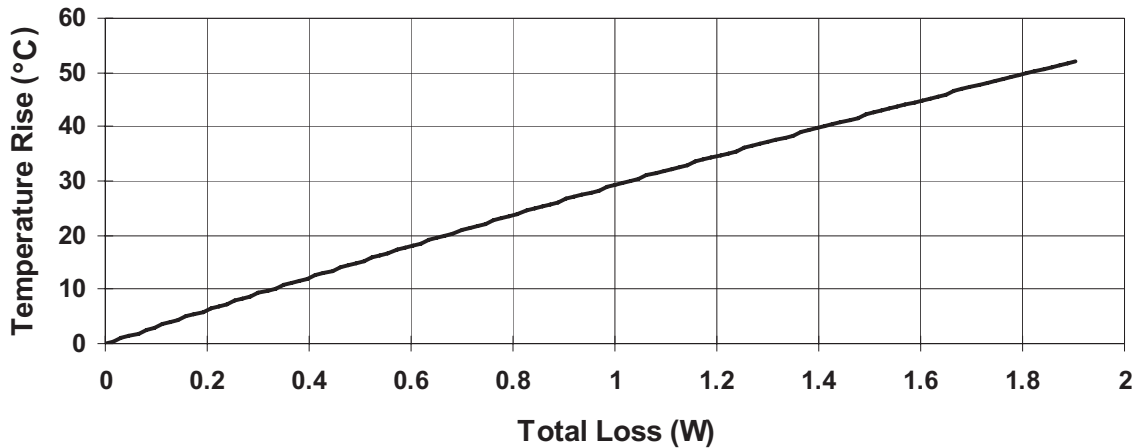
Part Marking: Coiltronics Logo    1005Rx (Rx = DCR indicator)    Rxx = Inductance value in  $\mu\text{H}$  (R = Decimal point)    wwllyy = Date code    R = Revision level

### Packaging Information - mm

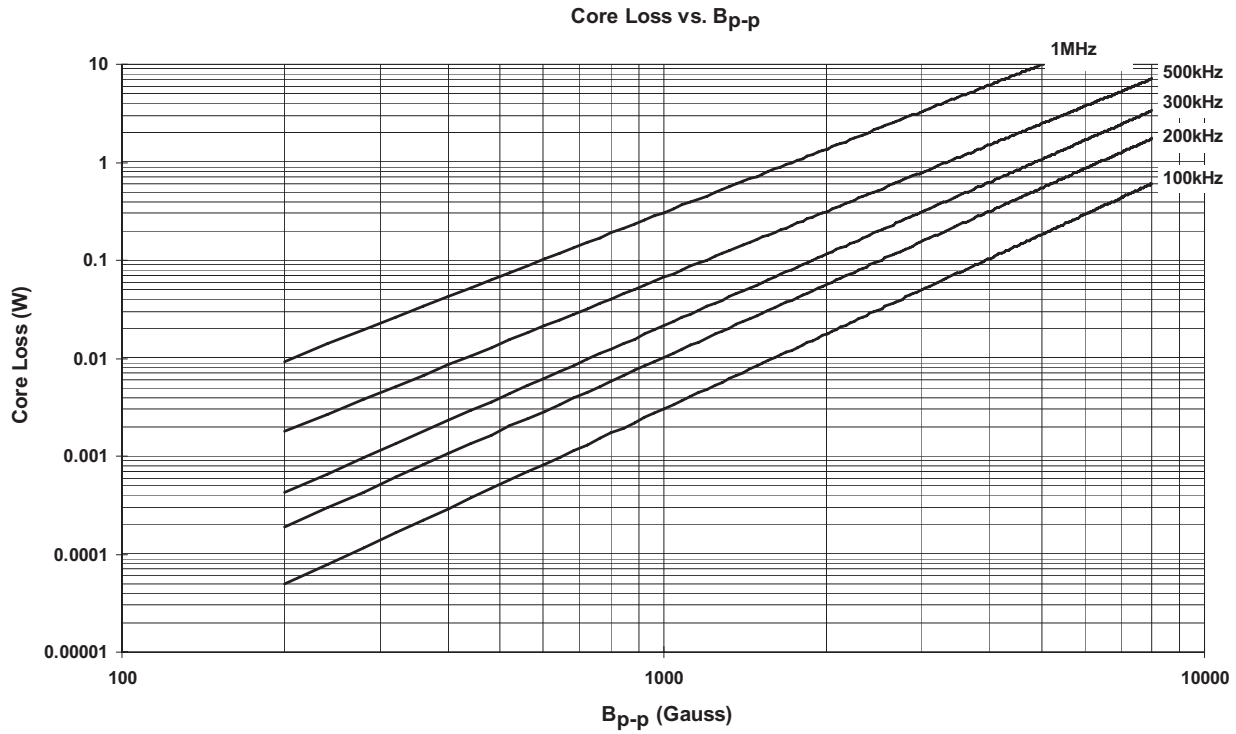


Supplied in tape-and-reel packaging, 950 parts per reel, 13" diameter reel.

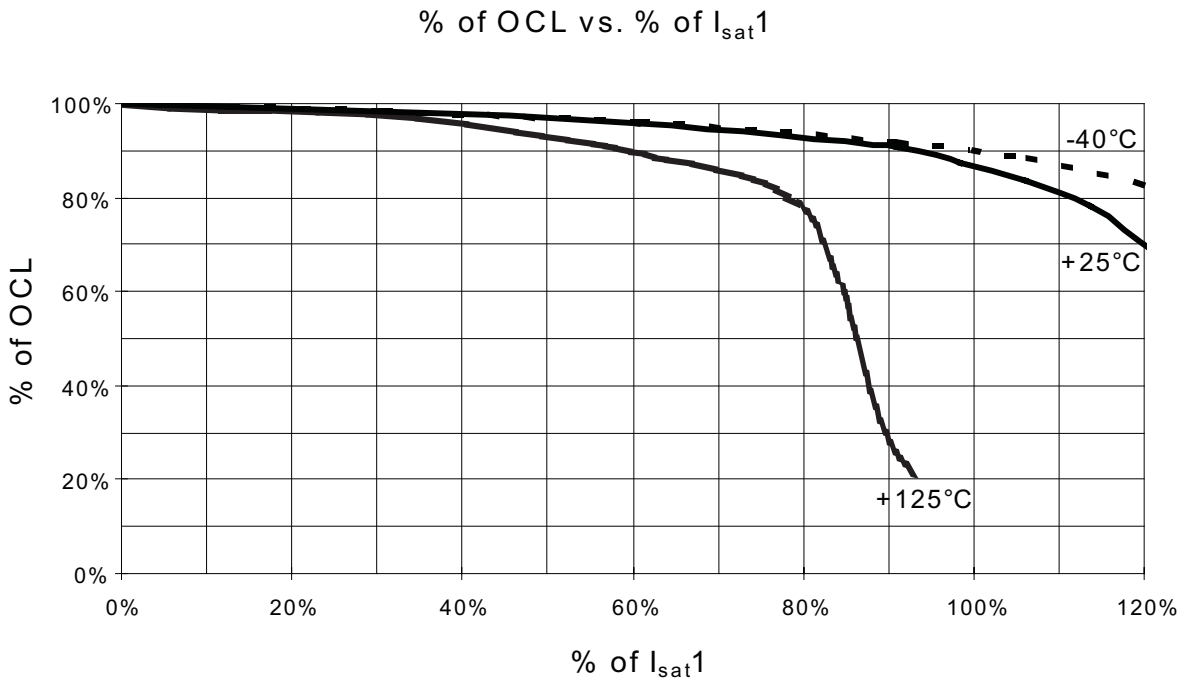
### Temperature Rise vs.Total Loss



### Core Loss



### Inductance Characteristics



## Solder Reflow Profile

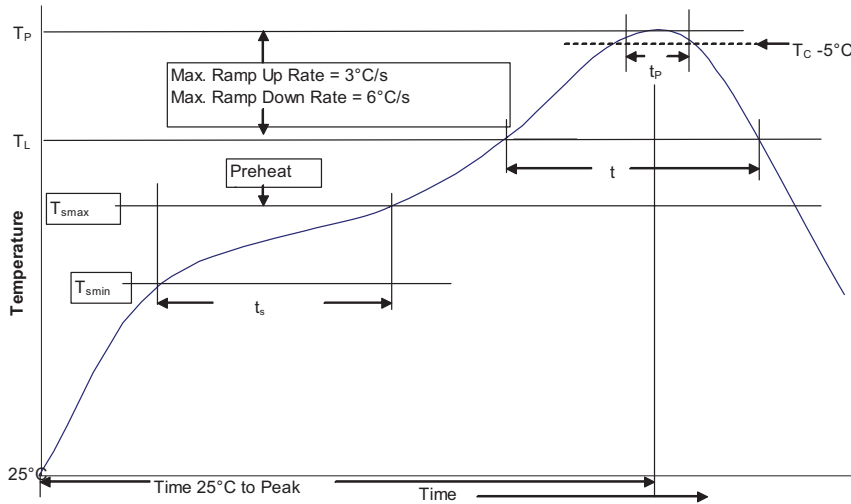


Table 1 - Standard SnPb Solder ( $T_c$ )

Package Thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ $\geq 350$
<2.5mm	235°C	220°C
$\geq 2.5\text{mm}$	220°C	220°C

Table 2 - Lead (Pb) Free Solder ( $T_c$ )

Package Thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ 350 - 2000	Volume $\text{mm}^3$ >2000
<1.6mm	260°C	260°C	260°C
1.6 - 2.5mm	260°C	250°C	245°C
>2.5mm	250°C	245°C	245°C

## Reference JDEC J-STD-020D

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

\* 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.

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