High Current, Low-Profile Power Inductors

FLAT-PAC™ FP0705 Series

Description

- 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

RoHS 2002/95/EC

- 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" dia. reel

Product Specifications

Part Number	OCL[1] ± 10% (nH)	FLL[2] Min. (nH)	I_{rms}[3] (Amps)	$I_{sat}1$[4] @ 25°C (Amps)	$I_{sat}2$[5] @ 125°C (Amps)	DCR (mOhm)@20°C	K-factor[6]
R1 Version							
FP0705R1-R07-R	72	51	43	65	50	0.25 ± 10%	826
FP0705R1-R10-R	105	75		44	36		826
FP0705R1-R12-R	120	86		37	30		826
FP0705R1-R15-R	150	108		30	24		826
FP0705R1-R18-R	180	130		25	20		826
FP0705R1-R22-R	220	158		20	16		826
R2 Version							
FP0705R2-R07-R	72	51	38	65	50	0.32 ± 9.4%	826
FP0705R2-R10-R	105	75		44	36		826
FP0705R2-R12-R	120	86		37	30		826
FP0705R2-R15-R	150	108		30	24		826
FP0705R2-R18-R	180	130		25	20		826
FP0705R2-R22-R	220	158		20	16		826
R3 Version							
FP0705R3-R07-R	72	51	32	65	50	0.46 ± 6.5%	826
FP0705R3-R10-R	105	75		44	36		826
FP0705R3-R12-R	120	86		37	30		826
FP0705R3-R15-R	150	108		30	24		826
FP0705R3-R18-R	180	130		25	20		826
FP0705R3-R22-R	220	158		20	16		826

1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.10V_{rms}, 0.0Adc

2 Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1V_{rms}, $I_{sat}1$

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 $I_{sat}1$: Peak current for approximately 20% rolloff at +25°C.

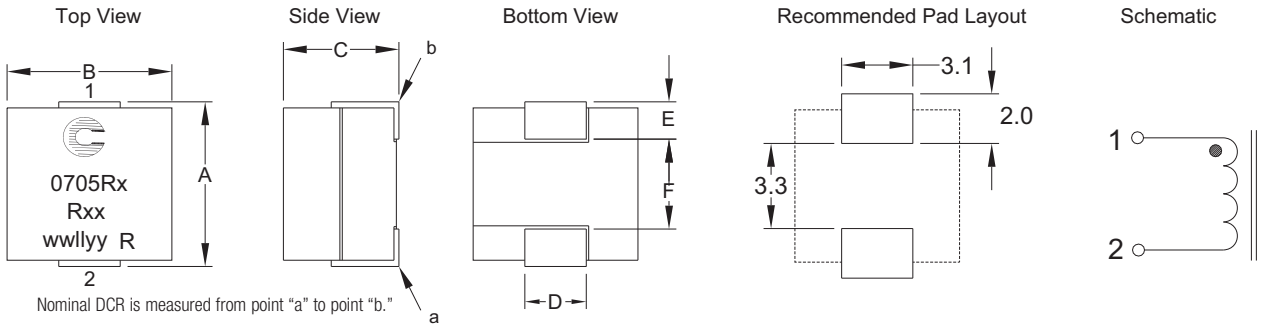
5 $I_{sat}2$: Peak current for approximately 20% rolloff at +125°C.

6 K-factor: Used to determine B_{p-p} for core loss (see graph). $B_{p-p} = K * L * \Delta I * 10^{-3}$, 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: FP0705Rx-Rxx-R
- FP0705 = Product code and size
- Rx= Inductance value in µH, R = decimal point
- Rx is the DCR indicator
- "-R" suffix = RoHS compliant

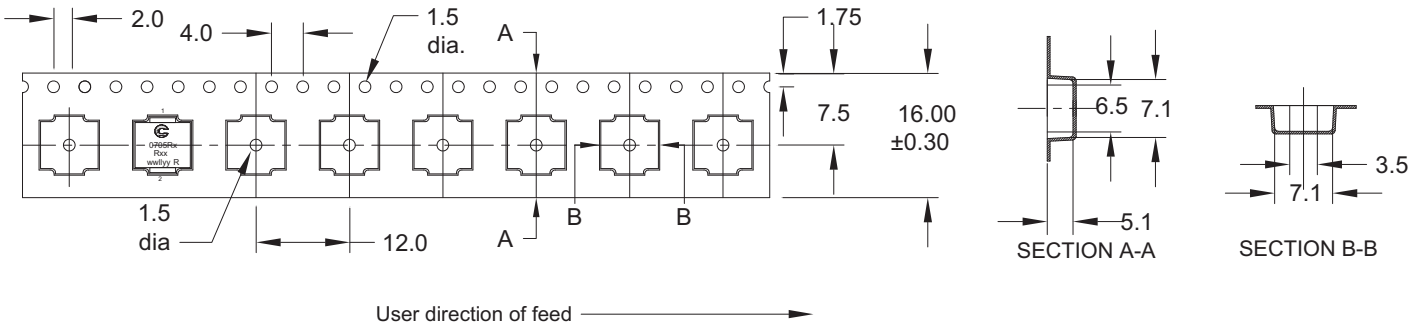
Dimensions - mm

A = 7.0 Max. B = 7.0 Max. C = 4.95 Max. D = 2.45 ± 0.2 E = 1.52 ± 0.2 F = 3.5 Typ.



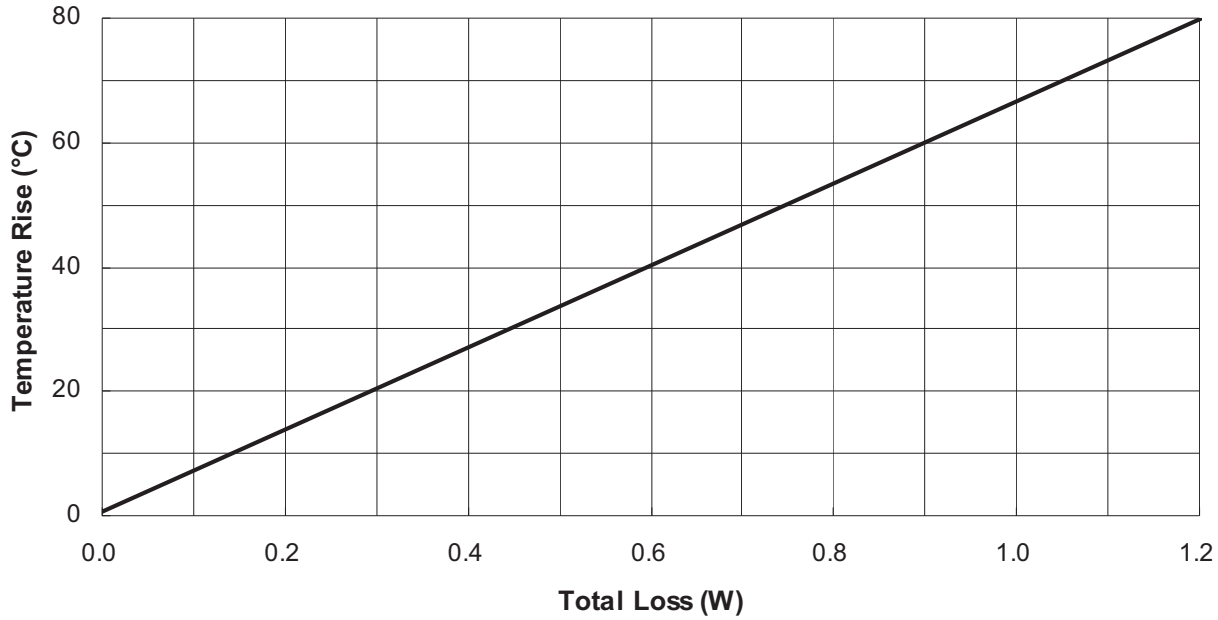
Part Marking: Coiltronics Logo 0705Rx (Rx = DCR indicator) Rxx = inductance value in μH (R = decimal point) wwllyy = date code R = revision level

Packaging Information - mm

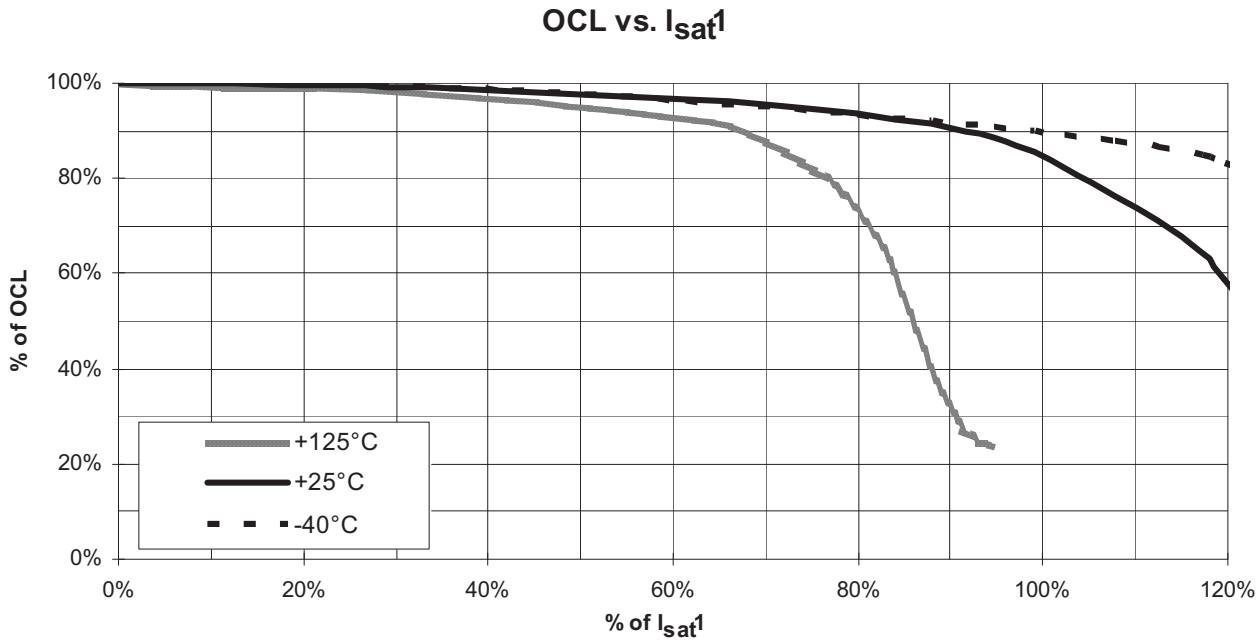


Supplied in tape-and-reel packaging, 950 parts per reel, 13" diameter reel.

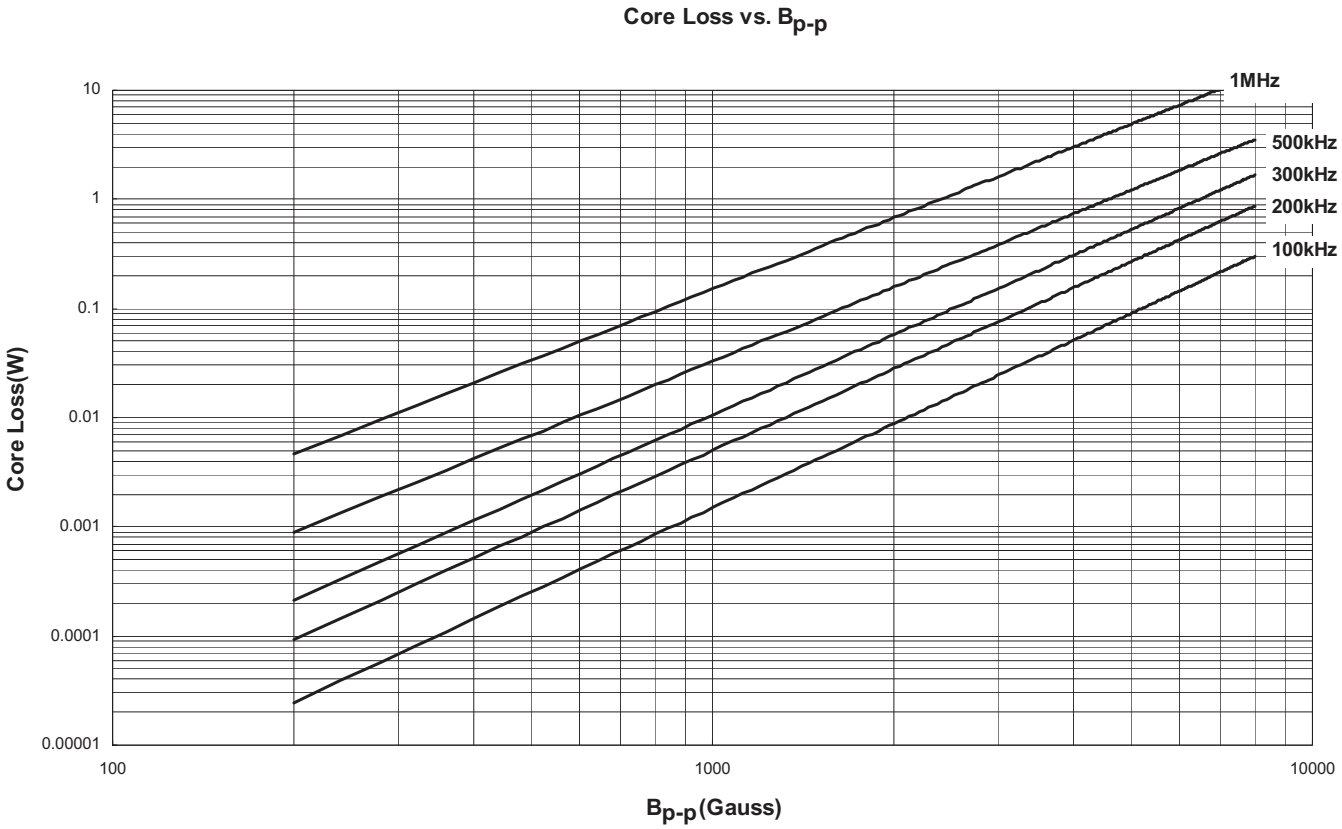
Temperature Rise vs. Total Loss



Inductance Characteristics



Core Loss



Solder Reflow Profile

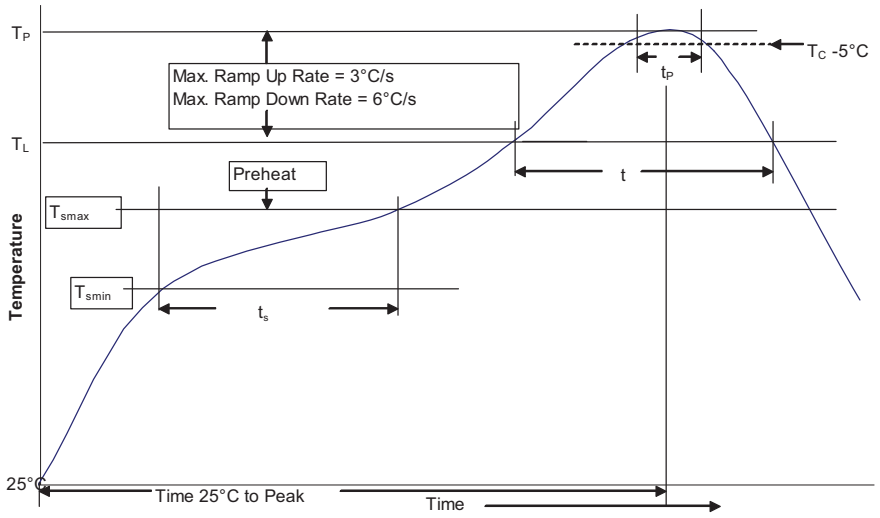


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm^3 <350	Volume mm^3 ≥350
<2.5mm	235°C	220°C
≥2.5mm	220°C	220°C

Table 2 - Lead (Pb) Free Solder (T_C)

Package Thickness	Volume mm^3 <350	Volume mm^3 350 - 2000	Volume 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) Time at liquidous (t_L)		183°C 60-150 Seconds	217°C 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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