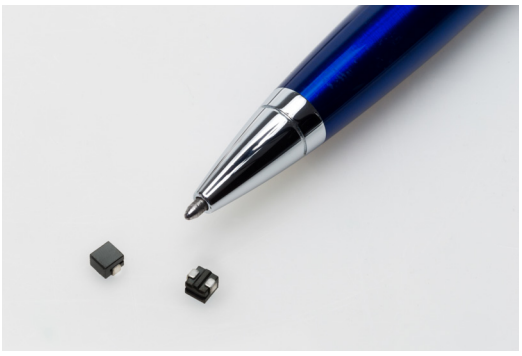
Coiltronics FP0404 Family

High frequency, high current power inductors



Description

- High current carrying capacity
- Low core loss
- Frequency range up to 2MHz
- Inductance Range from 22nH to 110nH
- Current range from 14 amps to 40 amps
- 4.0x4.0mm footprint surface mount package in 3.0 and 4.0mm heights
- Ferrite core material
- Halogen free, lead free, RoHS compliant

Applications

- Multi-phase and Vcore regulators
- Voltage Regulator Modules (VRMs)
- Server and desktop VRMs and EVRDs
- Laptop and notebook regulators
- Data networking and storage systems
- Graphics cards and battery power systems
- Point-of-Load modules

Environmental Data

- Storage temperature range (component): -40°C to +125°C
- Operating temperature range: -40°C to +125°C (ambient plus self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant

Pb HALOGEN HF FREE RoHS

Powering Business Worldwide

The Coiltronics brand of magnetics (formerly of the Bussmann Division of Cooper Industries) is now part of Eaton's Electrical Group, Electronics Division.

Coiltronics is now part of Eaton
Same great products plus even more.

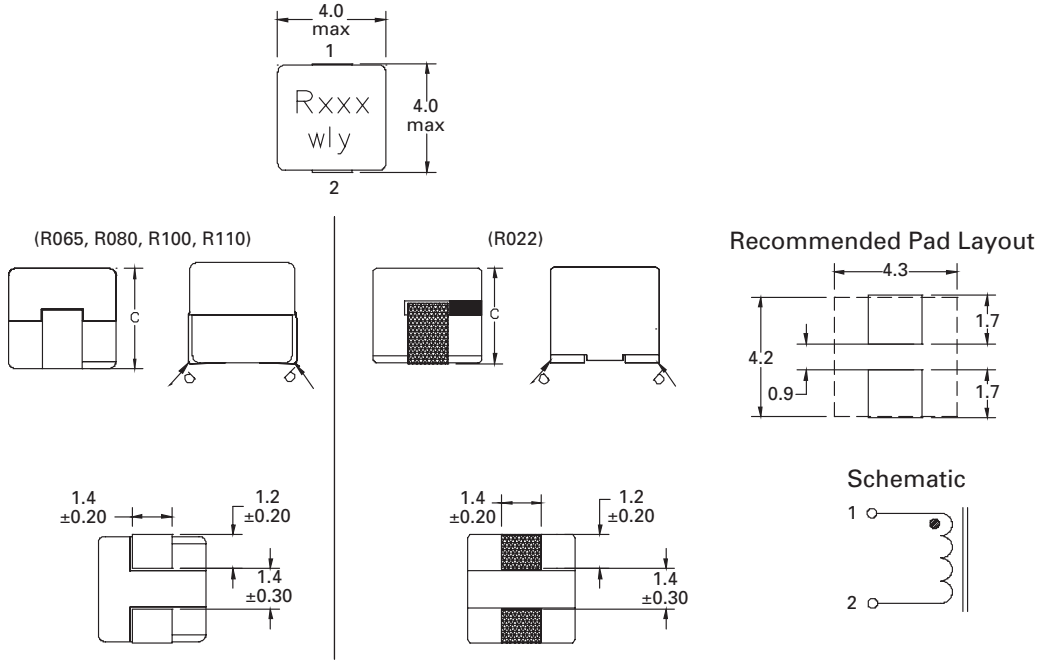
Product Specifications

Part Number[5]	OCL[1] (nH) ±15%	FLL[2] (nH) minimum	I_{rms}[3] (amps)	$I_{sat}1$[4] (amps)	$I_{sat}2$[5] (amps)	$I_{sat}3$[6] (amps)	DCR (mΩ) @ 20°C ±25%	K-factor[7]
FP0404R1-R022-R	22 ±20%	15	19	40	34	32	0.32 ± 15%	2351
FP0404R1-R065-R	65	44	19	24	22	20	0.32	2248
FP0404R1-R080-R	80	54	19	20	18	16	0.32	2248
FP0404R1-R100-R	100	68	19	16	14	13	0.32	2248
FP0404R1-R110-R	110	74	19	14	13	12	0.32	2248

1. Open Circuit Inductance (OCL) Test Parameters: 100kHz (1MHz for R022), 0.1Vrms, 0.0Adc, 25°C
2. Full Load Inductance (FLL) Test Parameters: 100kHz (1MHz for R022), 0.1Vrms, $I_{sat}1$, 25°C
3. I_{rms}: DC current for an approximate temperature rise 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 125°C underworst case operating conditions verified in the end application.
4. $I_{sat}1$: Peak current for approximately 20% rolloff @ +25°C
5. $I_{sat}2$: Peak current for approximately 20% rolloff @ +100°C
6. $I_{sat}3$: Peak current for approximately 20% rolloff @ +125°C
7. K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K * L * ΔI * 10^{-3}. Bp-p:(Gauss), K: (K-factor from table), L: (Inductance in nH), ΔI (Peak to peak ripple current in Amps).
8. Part Number Definition: FP0404-Rxxx-R
   FP0404 = Product code and size
   Rx= DCR indicator
   Rxxx=Inductance value in µH, R=decimal point
   -R suffix = RoHS compliant

Dimensions (mm)

Part Number	C max
R022-R	3.0
R065-R	4.0
R080-R	4.0
R100-R	4.0
R110-R	4.0

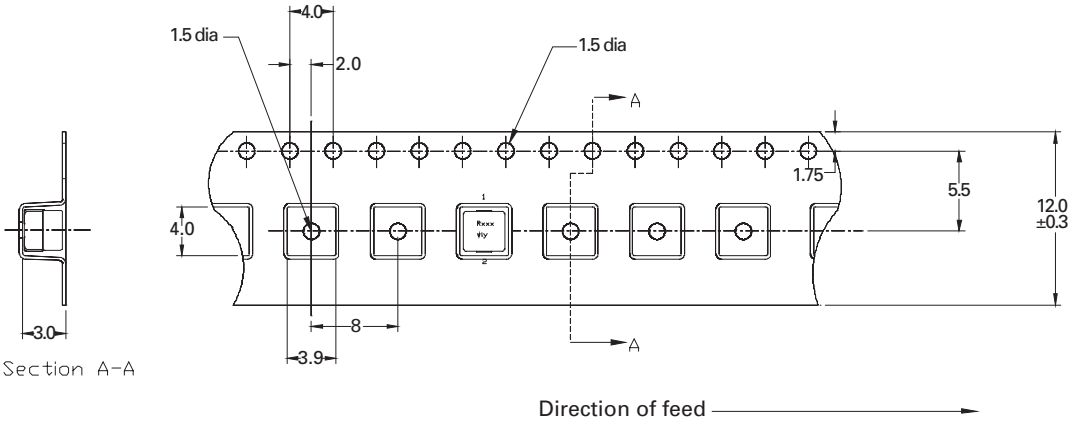


Part marking: Rxxx xxx=inductance value in uH, R=decimal point, wly= date code
All soldering surfaces to be coplanar within 0.1 millimeters
DCR is measured from paoint "a" to point "b"
Do not route traces or vias underneath the inductor

Packaging information (mm)

FP0404R1-R022-R

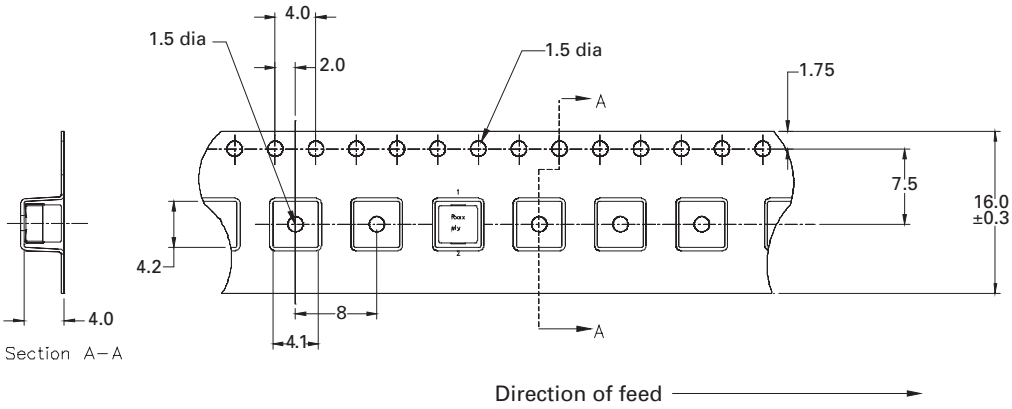
Supplied in tape and reel packaging, 1,800 parts per 13" diameter reel



Packaging information (mm)

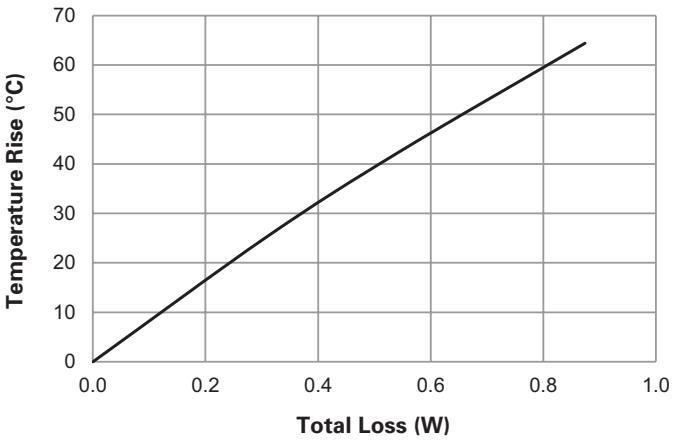
FP0404R1-R065-R, R080-R, R100-R, R110-R

Supplied in tape and reel packaging, 1,800 parts per 13" diameter reel

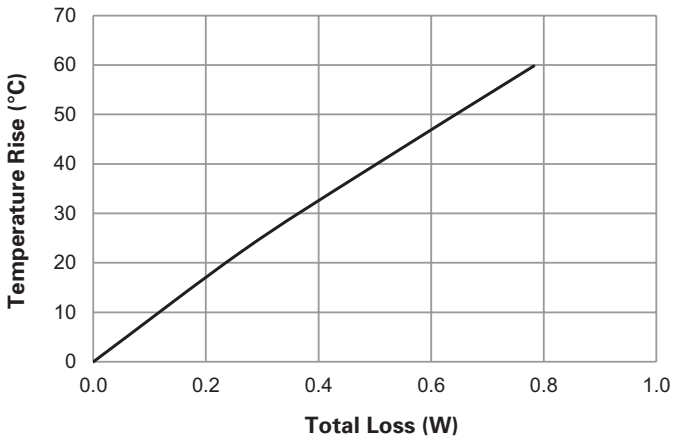


Temperature rise vs. total loss

FP0404R1-R022-R

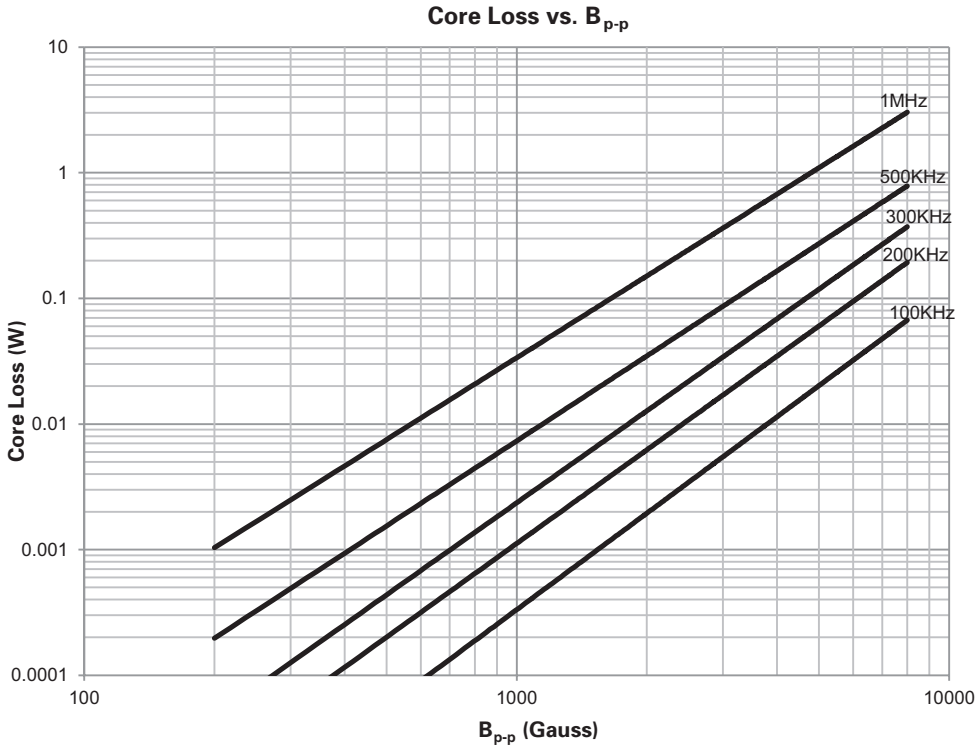


FP0404R1-R065-R, R080, R100-R, R110-R

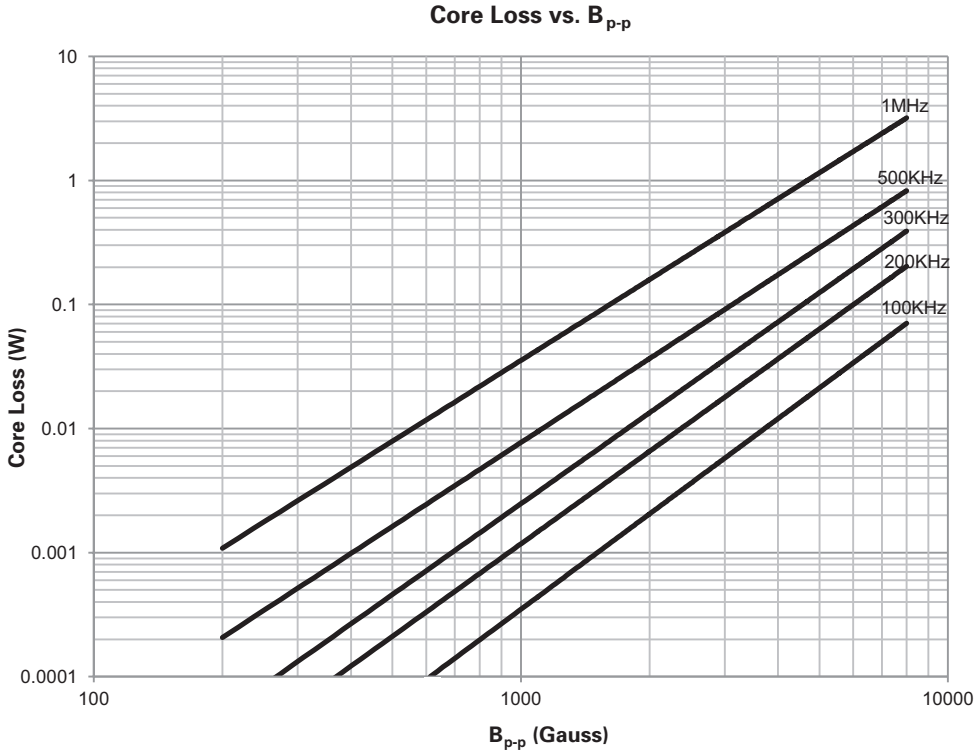


Core loss

FP0404R1-R022-R

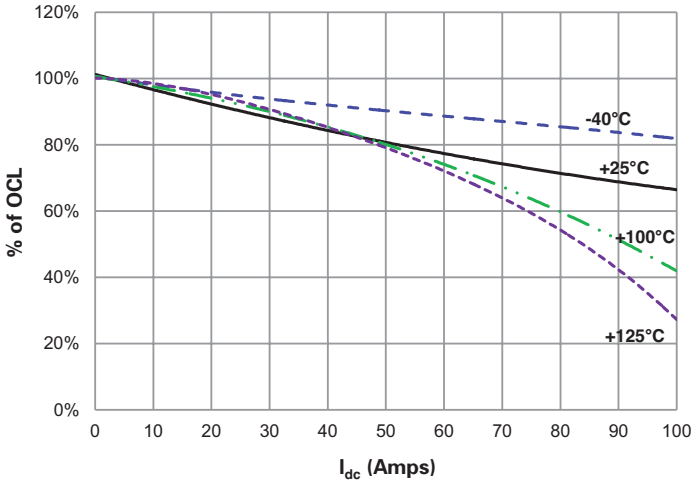


FP0404R1-R065-R, R080-R, R100-R, R110-R

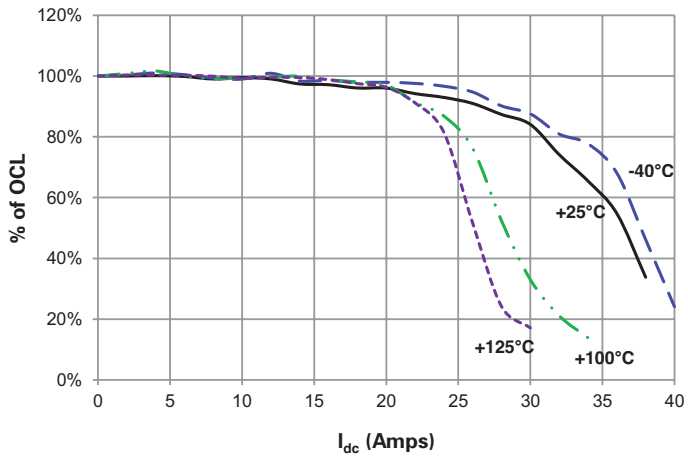


Inductance characteristics

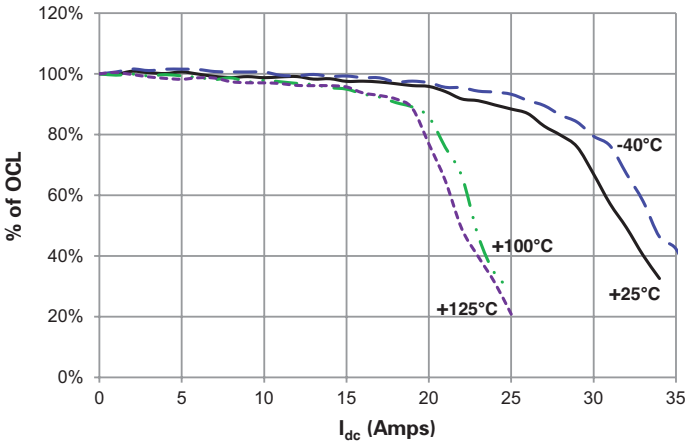
FP0404R1-R022-R



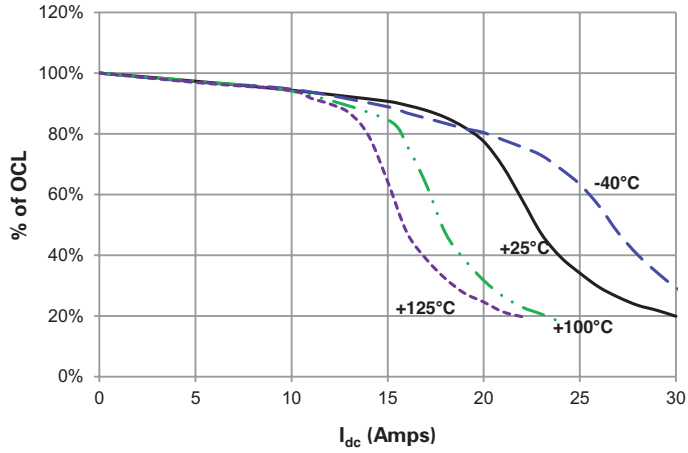
FP0404R1-R065-R



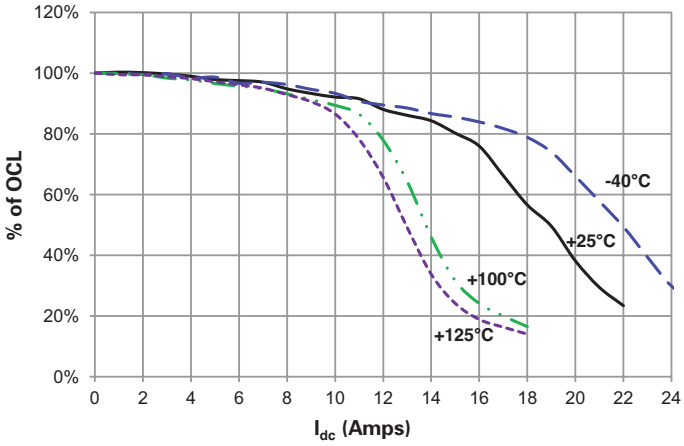
FP0404R1-R080-R



FP0404R1-R100-R



FP0404R1-R110-R



Solder reflow profile

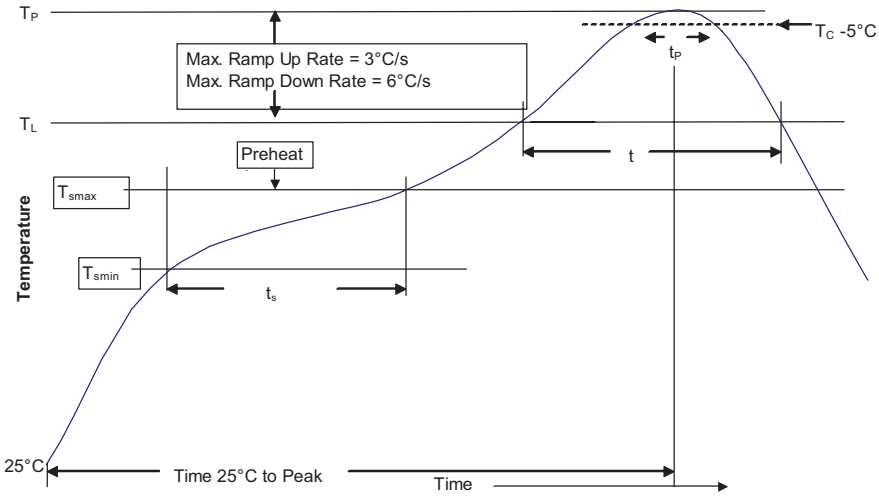


Table 1 - Standard SnPb Solder (T_C)

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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