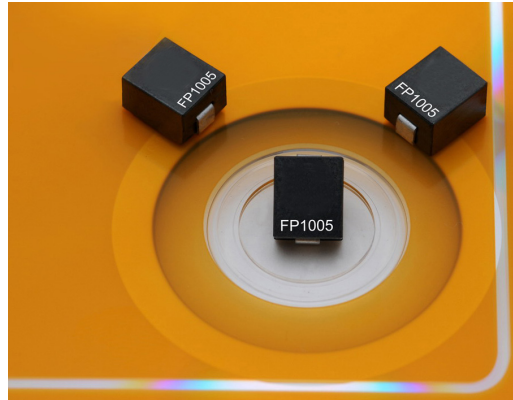


# FP1005R

## High frequency, high current power inductors



### Applications

- Multi-phase and Vcore regulators
- Voltage Regulator Modules (VRMs)
  - Server and desktop
  - Central processing unit (CPU)
  - Graphics processing unit (GPU)
  - Application specific integrated circuit (ASIC)
  - High power density
- Data networking and storage systems
- Graphics cards and battery power systems
- Portable electronics
- Point-of-Load modules

### Description

- High current carrying capacity
- Low core loss
- Magnetically shielded
- Frequency range up to 2 MHz
- Inductance range 85 nH to 220 nH
- Current range 33 A to 90 A
- 10.2 mm x 7.0 mm footprint surface mount package in a 4.95 mm height
- Ferrite core material
- Halogen free, lead free, RoHS compliant

### 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



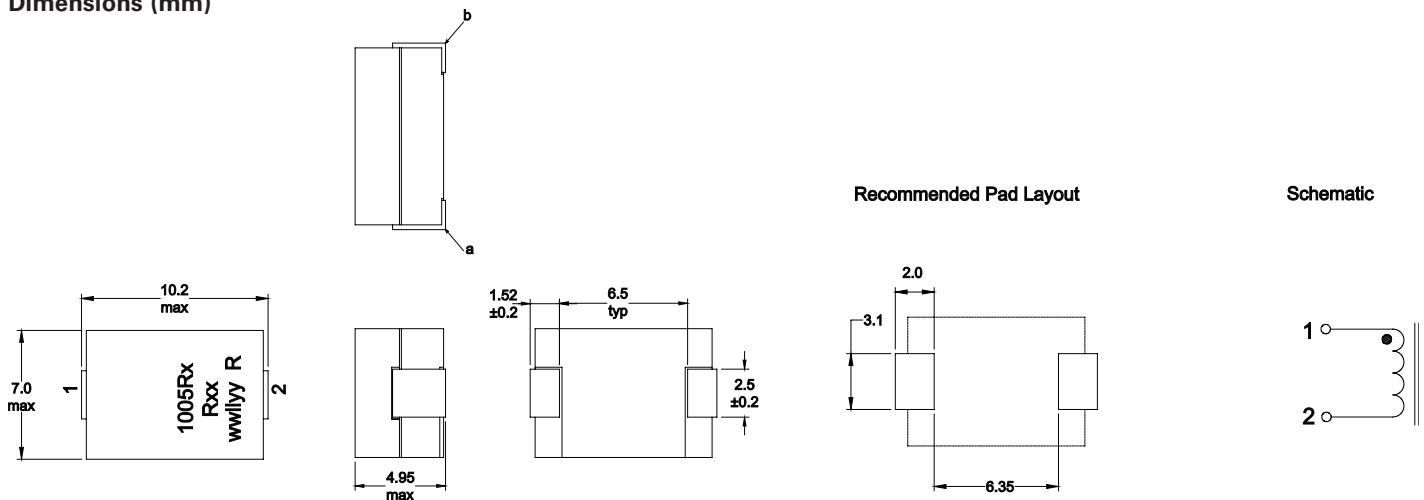
Product Specifications

Part Number <sup>7</sup>	OCL <sup>1</sup> (nH) ±10%	FLL <sup>2</sup> (nH) minimum	I <sub>rms</sub> <sup>3</sup> (A)	I <sub>sat1</sub> <sup>4</sup> (A)	I <sub>sat2</sub> <sup>5</sup> (A)	DCR (mΩ) @ 20°C	K-factor <sup>6</sup>
<b>R1 Version</b>							
FP1005R1-R08-R	85	61	53	90	64	0.39 ±7.7%	536
FP1005R1-R10-R	100	72	53	73	57	0.39 ±7.7%	536
FP1005R1-R12-R	120	86	53	60	48	0.39 ±7.7%	536
FP1005R1-R15-R	150	108	53	47	37	0.39 ±7.7%	536
FP1005R1-R22-R	220	158	53	33	26	0.39 ±7.7%	536
<b>R2 Version</b>							
FP1005R2-R08-R	85	61	50	90	64	0.47 ±6.7%	536
FP1005R2-R10-R	100	72	50	73	57	0.47 ±6.7%	536
FP1005R2-R12-R	120	86	50	60	48	0.47 ±6.7%	536
FP1005R2-R15-R	150	108	50	47	37	0.47 ±6.7%	536
FP1005R2-R22-R	220	158	50	33	26	0.47 ±6.7%	536
<b>R3 Version</b>							
FP1005R3-R08-R	85	61	45	90	64	0.55 ±5.4%	536
FP1005R3-R10-R	100	72	45	73	57	0.55 ±5.4%	536
FP1005R3-R12-R	120	86	45	60	48	0.55 ±5.4%	536
FP1005R3-R15-R	150	108	45	47	37	0.55 ±5.4%	536
FP1005R3-R22-R	220	158	45	33	26	0.55 ±5.4%	536
<b>R4 Version</b>							
FP1005R4-R12-R	120	86	45	60	48	0.70 ±10%	536

- Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.1 Vrms, 0.0 Adc, +25 °C
- Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.1 Vrms, Isat1, +25 °C
- I<sub>DC</sub>: 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 under worst case operating conditions verified in the end application.

- I<sub>sat1</sub>: Peak current for approximately 20% rolloff @ +25 °C
- I<sub>sat2</sub>: Peak current for approximately 20% rolloff @ +125 °C
- K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K \* L \* ΔI \* 10<sup>3</sup>. Bp-p(Gauss), K: (K-factor from table), L: (Inductance in nH), Symbol ΔI (Peak to peak ripple current in Amps).
- Part Number Definition: FP1005Rx-Rxx-R  
FP1005R= Product code and size  
x= Version indicator  
-Rxx= Inductance value in μH, R= decimal point  
-R suffix = RoHS compliant

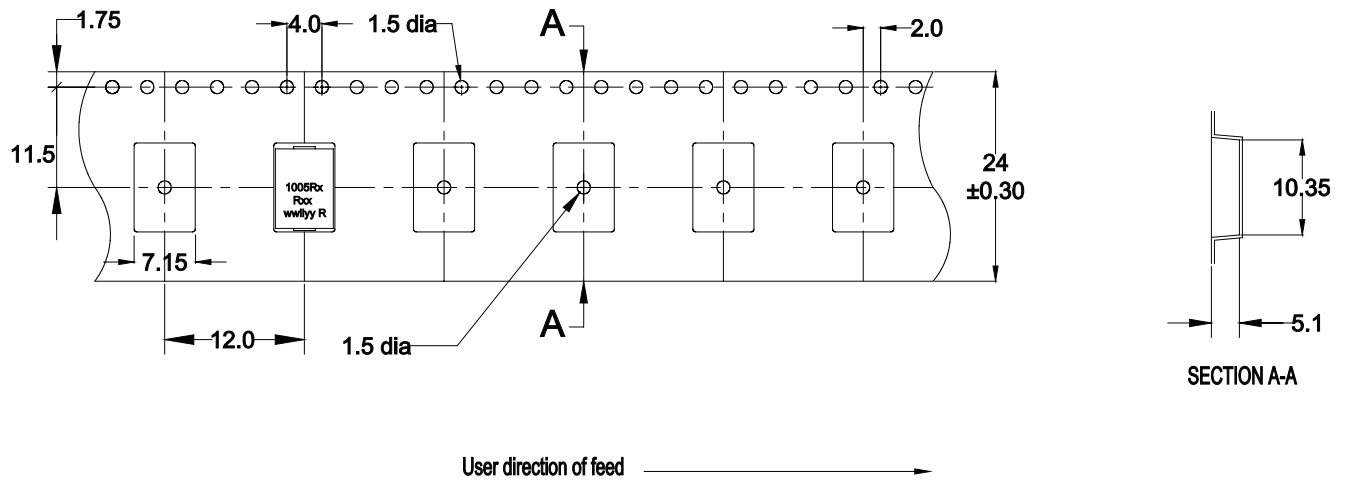
Dimensions (mm)



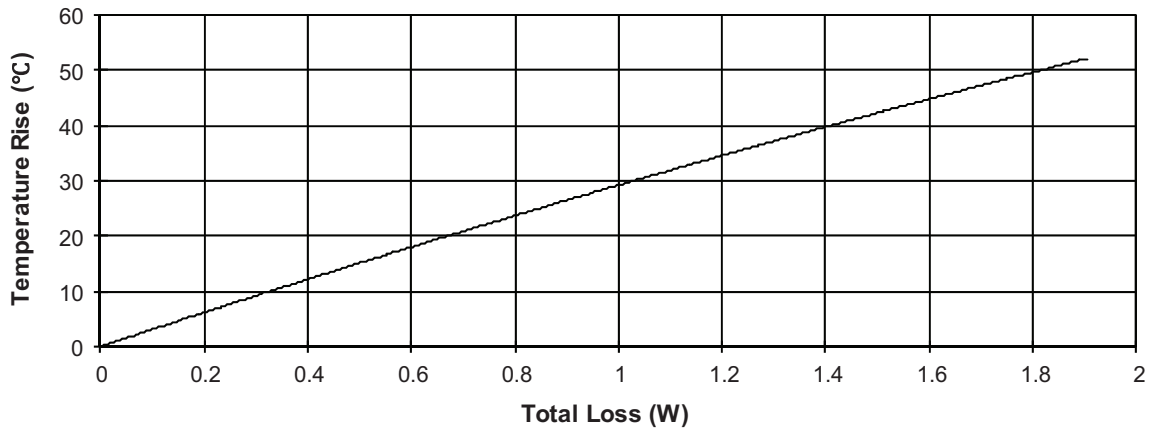
Part marking: FPT1005Rx = (x=version indicator), Rxx=inductance value in μH, (R=decimal point) wwlyy=date code, R=revision level.  
Tolerances are ±0.25 millimeters unless stated otherwise.  
All soldering surfaces must be coplanar within 0.1016 millimeters.  
PCB tolerances are ±0.1 millimeters unless stated otherwise.  
DCR is measured from point "a" to point "b."  
Do not route traces or vias underneath the inductor.

**Packaging information (mm)**

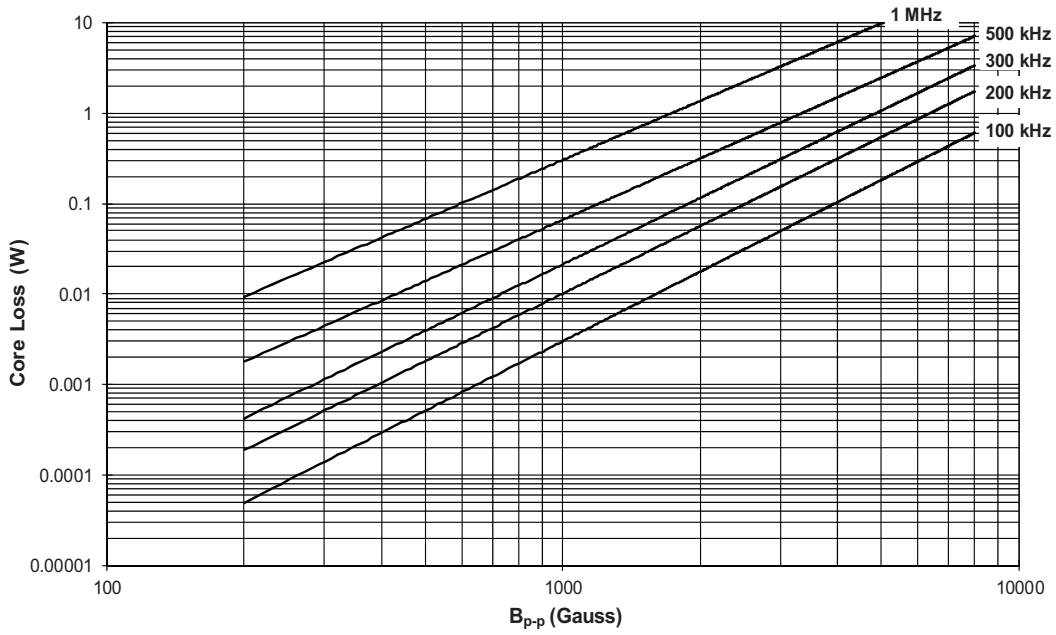
Supplied in tape and reel packaging , 950 parts per 13" diameter reel



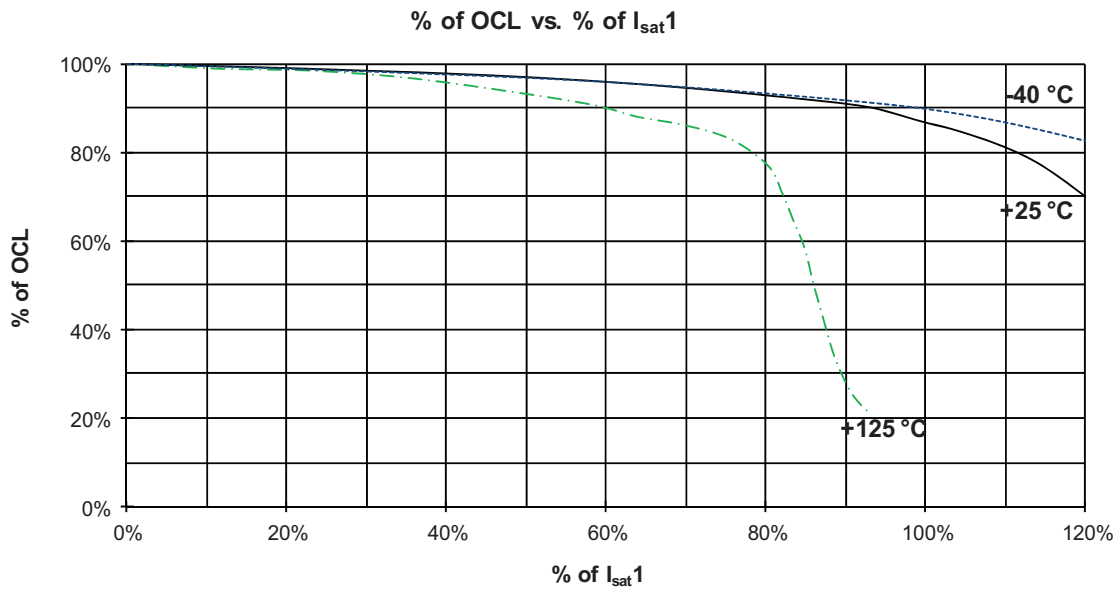
**Temperature rise vs. total loss**



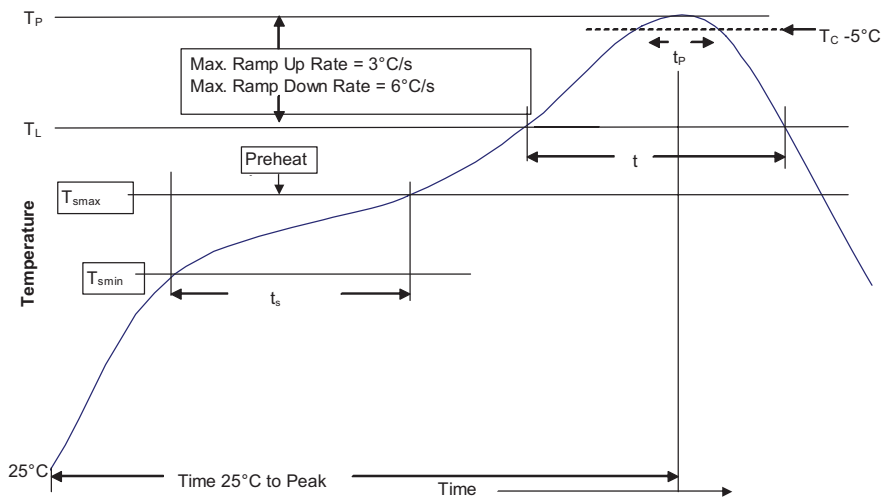
Core loss vs.  $B_{p-p}$



Inductance characteristics



**Solder reflow profile**



**Table 1 - Standard SnPb Solder (T<sub>C</sub>)**

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> ≥350
<2.5mm)	235°C	220°C
≥2.5mm	220°C	220°C

**Table 2 - Lead (Pb) Free Solder (T<sub>C</sub>)**

Package Thickness	Volume mm <sup>3</sup> <350	Volume mm <sup>3</sup> 350 - 2000	Volume mm <sup>3</sup> >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 JEDEC J-STD-020D**

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and Soak		
• Temperature min. (T <sub>smin</sub> )	100°C	150°C
• Temperature max. (T <sub>smax</sub> )	150°C	200°C
• Time (T <sub>smin</sub> to T <sub>smax</sub> ) (t <sub>s</sub> )	60-120 Seconds	60-120 Seconds
Average ramp up rate T <sub>smax</sub> to T <sub>p</sub>	3°C/ Second Max.	3°C/ Second Max.
Liquidous temperature (T <sub>L</sub> )	183°C	217°C
Time at liquidous (t <sub>L</sub> )	60-150 Seconds	60-150 Seconds
Peak package body temperature (T <sub>p</sub> )*	Table 1	Table 2
Time (t <sub>p</sub> )** within 5 °C of the specified classification temperature (T <sub>C</sub> )	20 Seconds**	30 Seconds**
Average ramp-down rate (T <sub>p</sub> to T <sub>smax</sub> )	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<sub>p</sub>) is defined as a supplier minimum and a user maximum.  
 \*\* Tolerance for time at peak profile temperature (t<sub>p</sub>) is defined as a supplier minimum and a user maximum.

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**Eaton**  
**Electronics Division**  
 1000 Eaton Boulevard  
 Cleveland, OH 44122  
 United States  
 www.eaton.com/elx

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 Publication No. 4337 BU-SB08860  
 April 2016

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