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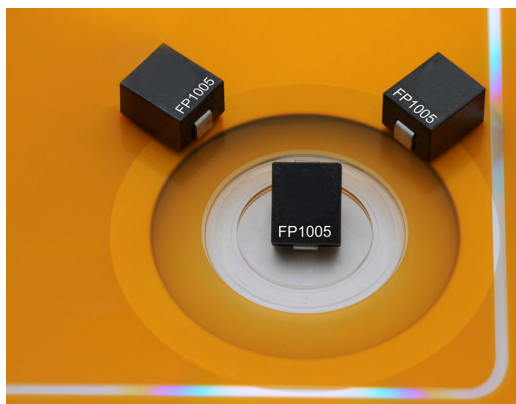
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FP1005R

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 ⁷	OCL ¹ (nH) ±10%	FLL ² (nH) minimum	I _{rms} ³ (A)	I _{sat1} ⁴ (A)	I _{sat2} ⁵ (A)	DCR (mΩ) @ 20°C	K-factor ⁶
R1 Version							
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
R2 Version							
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
R3 Version							
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
R4 Version							
FP1005R4-R12-R	120	86	45	60	48	0.70 ±10%	536

1. Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.1 Vrms, 0.0 Adc, +25 °C

2. Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.1 Vrms, I_{sat1}, +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 under worst case operating conditions verified in the end application.

4. I_{sat1}: Peak current for approximately 20% rolloff @ +25 °C

5. I_{sat2}: Peak current for approximately 20% rolloff @ +125 °C

6. 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), Symbol ΔI (Peak to peak ripple current in Amps).

7. Part Number Definition: FP1005Rx-Rxx-R

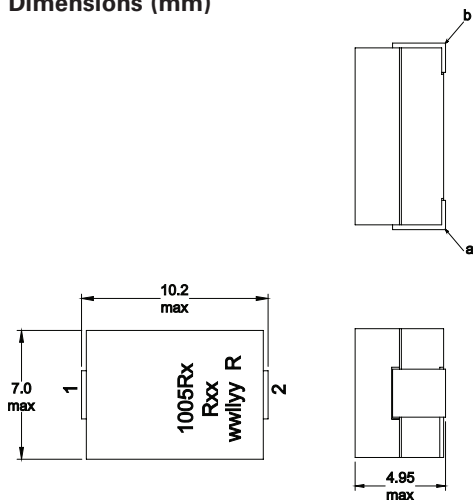
FP1005R= Product code and size

x= Version indicator

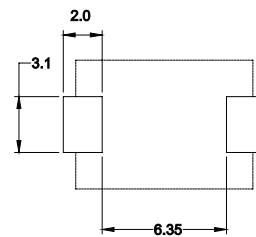
-Rxx= Inductance value in μH, R= decimal point

-R suffix = RoHS compliant

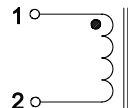
Dimensions (mm)



Recommended Pad Layout



Schematic



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.

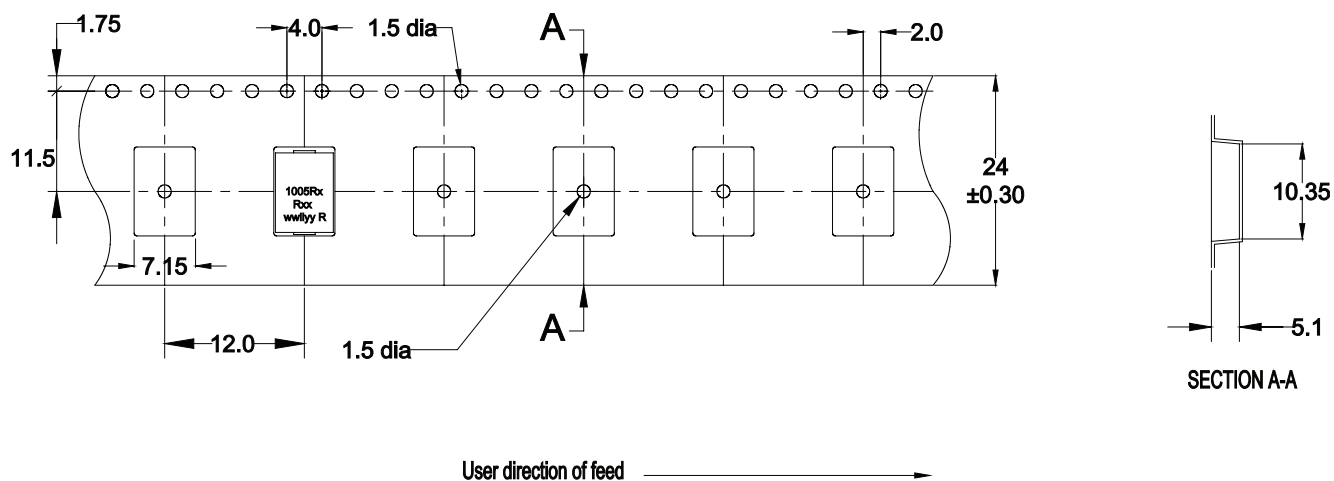
PCB tolerances are ±0.1 millimeters unless stated otherwise.

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

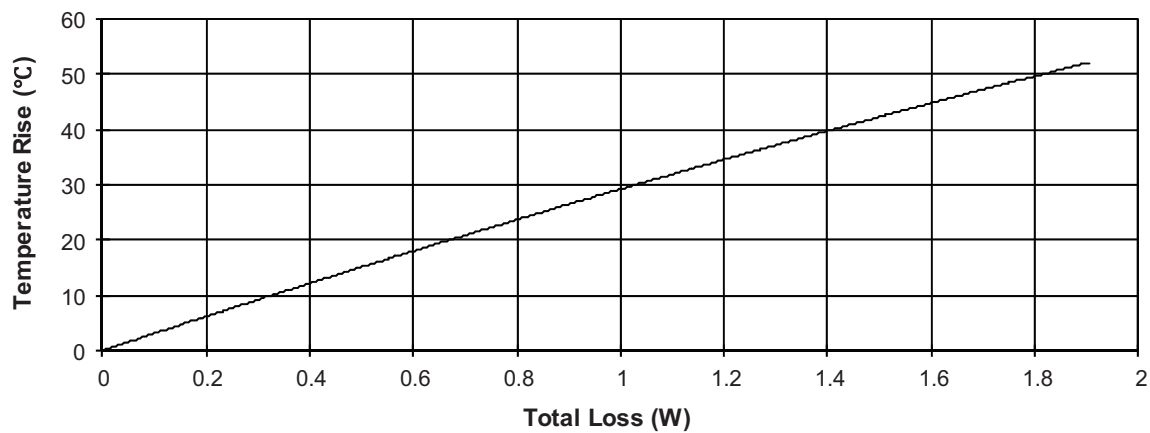
Do not route traces or vias underneath the inductor.

Packaging information (mm)

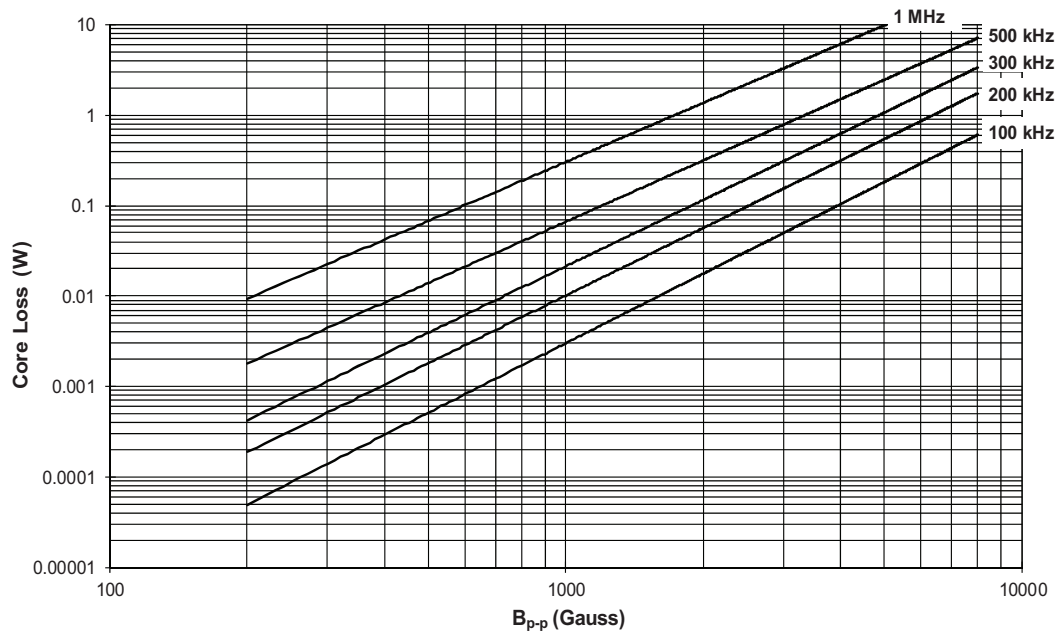
Supplied in tape and reel packaging , 950 parts per 13" diameter reel



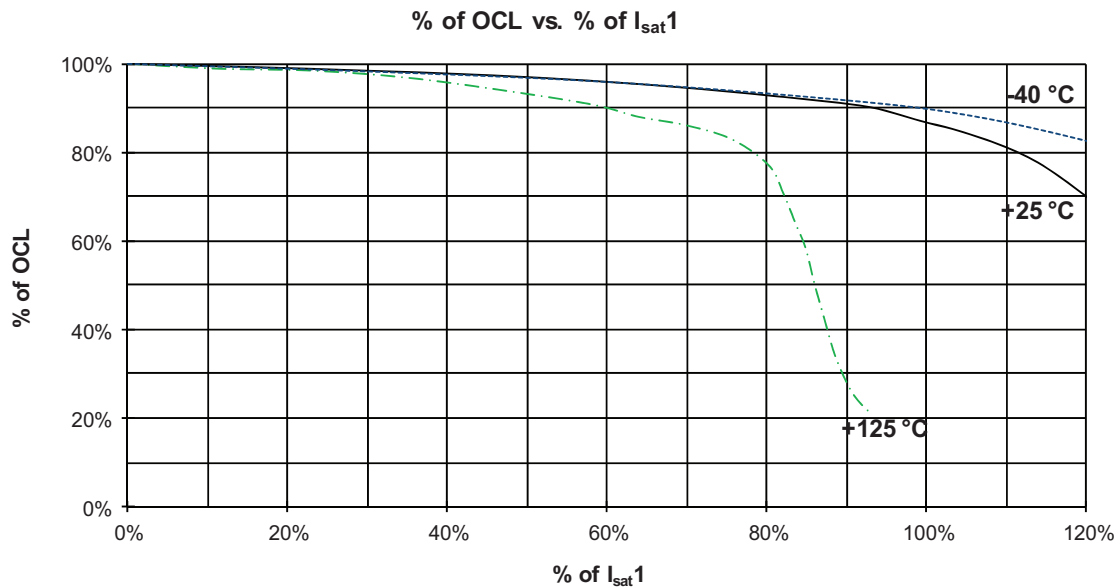
Temperature rise vs. total loss



Core loss vs. B_{p-p}



Inductance characteristics



Solder reflow profile

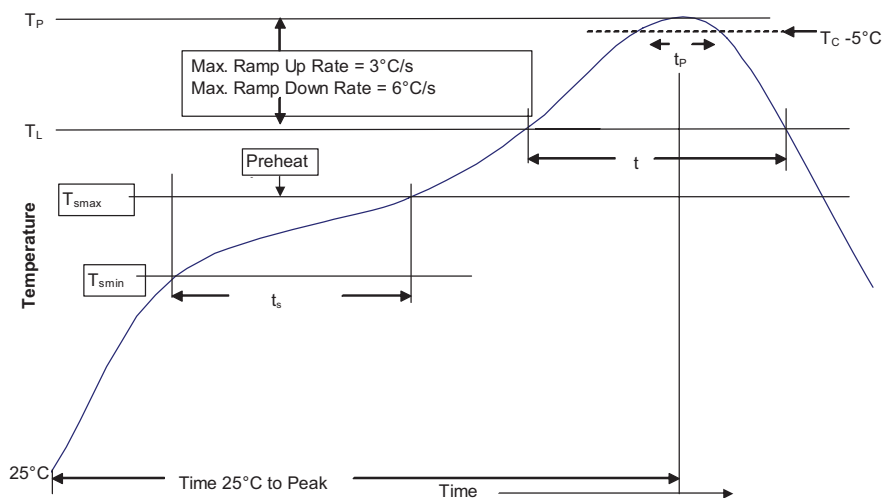


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm^3 <350	Volume mm^3 ≥ 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 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 JEDEC 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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