

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 VRM's and EVRD's
- 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 ⁷	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 (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		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_{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 · ΔI · 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: FP1005Rx-Rxx-R

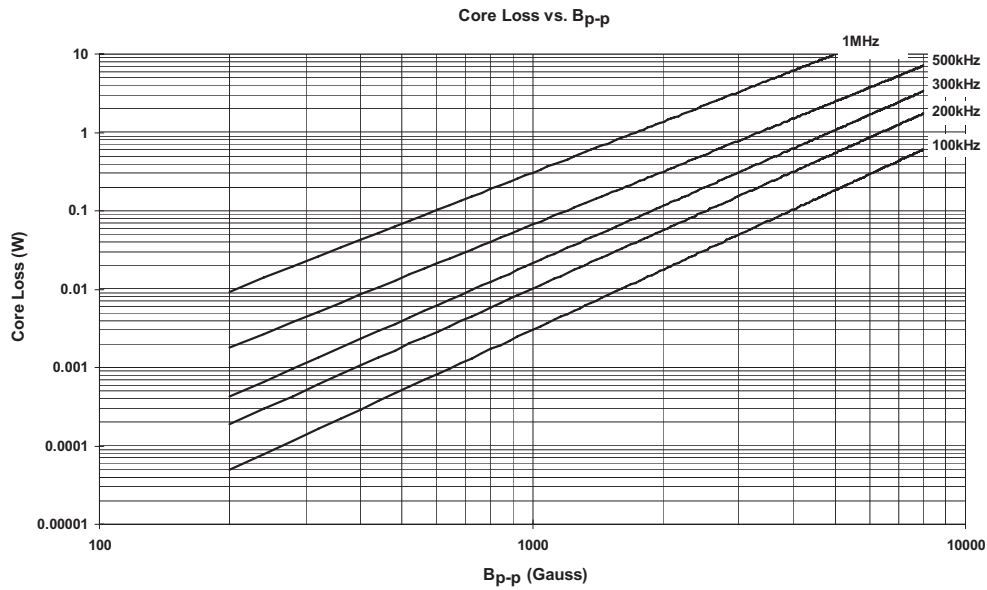
• FP1005 = Product code and size

• Rx is the DCR indicator

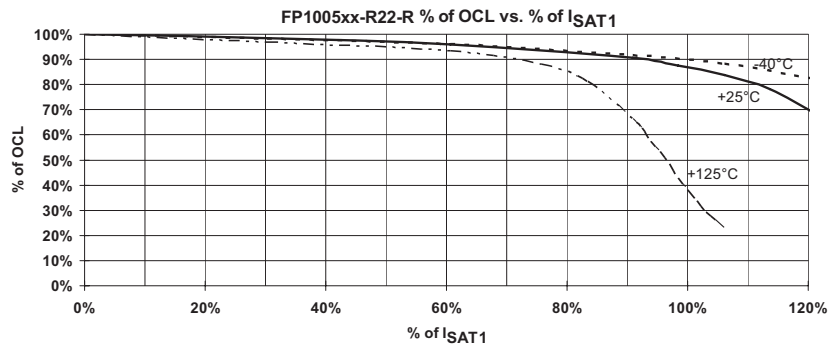
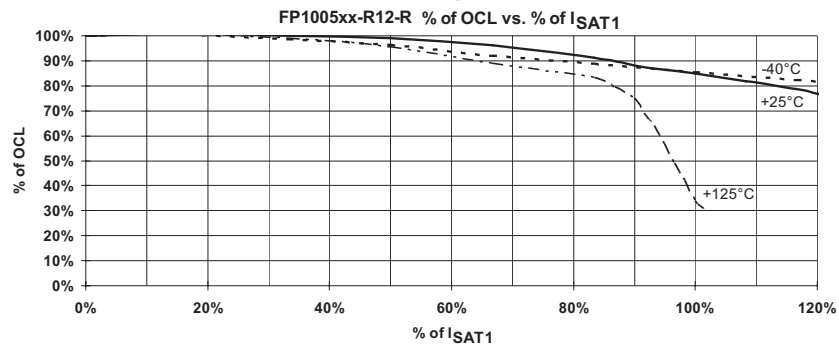
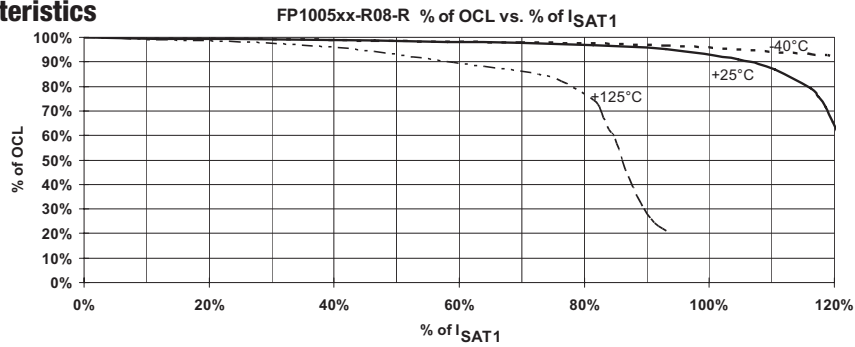
• Rxx= Inductance value in μH, R = decimal point

• "-R" suffix = RoHS compliant

Core Loss



Inductance Characteristics



Solder Reflow Profile

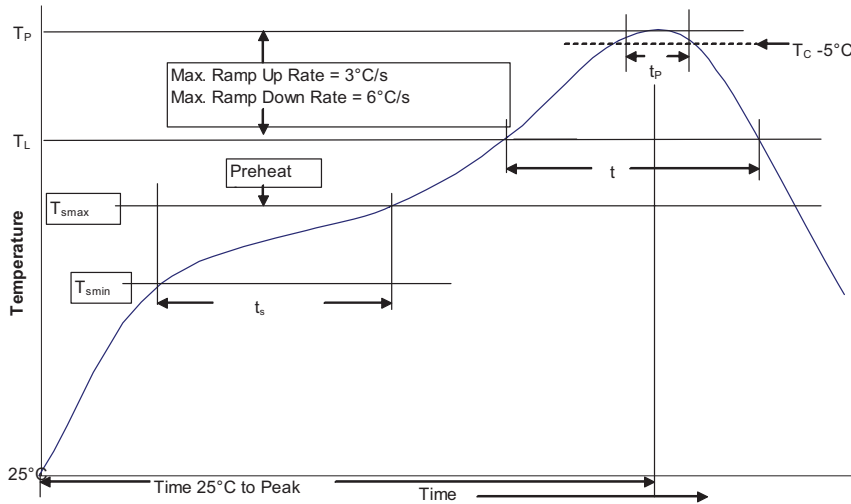


Table 1 - Standard SnPb Solder (T_c)

Package Thickness	Volume mm^3 <350	Volume mm^3 ≥ 350
<2.5mm	235°C	220°C
$\geq 2.5mm$	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)	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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