

FP0505R

High frequency, high current power inductors



Description

- High current carrying capacity
- Low core loss
- 5.0 x 5.0mm footprint surface mount package in an 4.8mm height
- Ferrite core material
- Halogen free, lead free, RoHS compliant

Applications

- Servers
- Multi-phase and Vcore regulators
- Voltage Regulator Modules (VRMs)
- Desktop VRMs and EVRDs
- 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 + self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant



Product Specifications

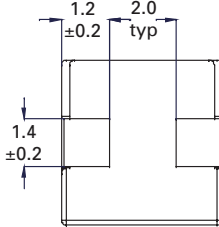
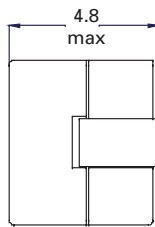
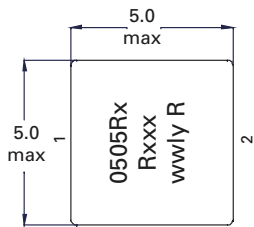
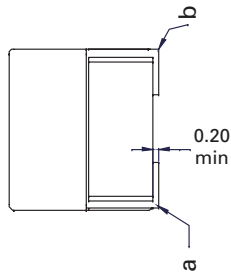
Part Number ⁸	OCL ¹ (nH) ±10%	FLL ² (nH) minimum	I _{rms} ³ (amps)	I _{sat} ¹ ⁴ (amps)	I _{sat} ² ⁵ (amps)	I _{sat} ³ ⁶ (amps)	DCR (mΩ) ±25% @ 20°C	K-factor ⁷
FP0505R1-R100-R	100	68	30	34	26	24	0.38	1279

R1 Version

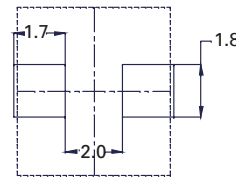
1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.1Vrms, 0.0Adc, @ +25°C
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vrms, @ I_{sat} @ +25°C
3. I_{rms}: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB layout, 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_{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 B_{pp} for core loss (see graph). B_{pp} = K * L * ΔI * 10³ B_{pp}: (Gauss), K: (K-factor from table), L: (Inductance in nH), ΔI (Peak to peak ripple current in Amps).
8. Part Number Definition: FP0505Rx-Rxxx-R
FP0505R = Product code and size
x = Version indicator
Rxxx = inductance value in μH, R = decimal point,
-R suffix = RoHS compliant

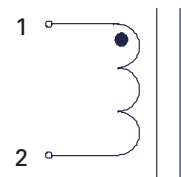
Dimensions (mm)



Recommended Pad Layout



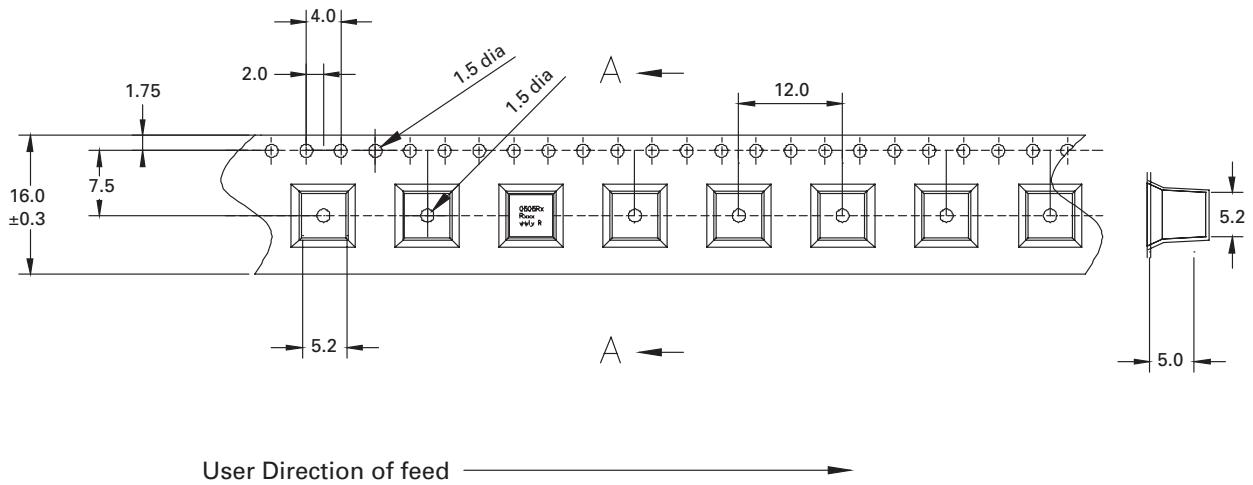
Schematic



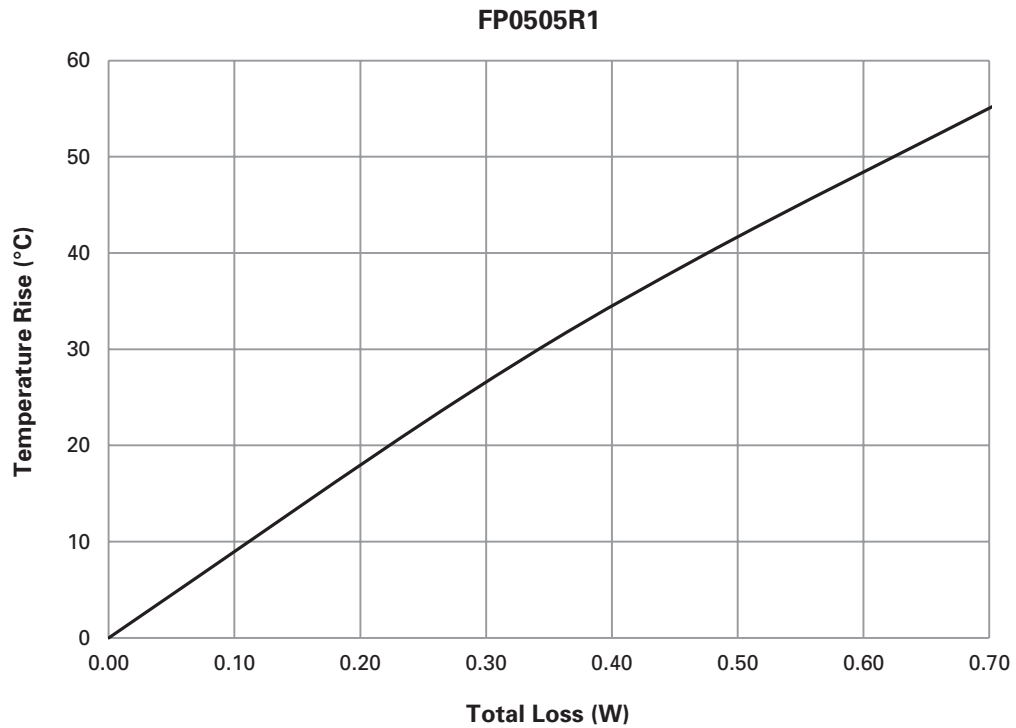
Part marking: 0505Rx (x = Version Indicator), Rxxx = Inductance value in μH (R= decimal point)
wwly = date code, R = revision level
Tolerances are ±0.15 millimeters unless stated otherwise
All soldering surfaces to be coplanar within 0.1 millimeters
PCB tolerances are ±0.1 millimeters unless stated otherwise
DCR measured from point "a" to point "b"
Do not route traces or vias underneath the inductor

Packaging information (mm)

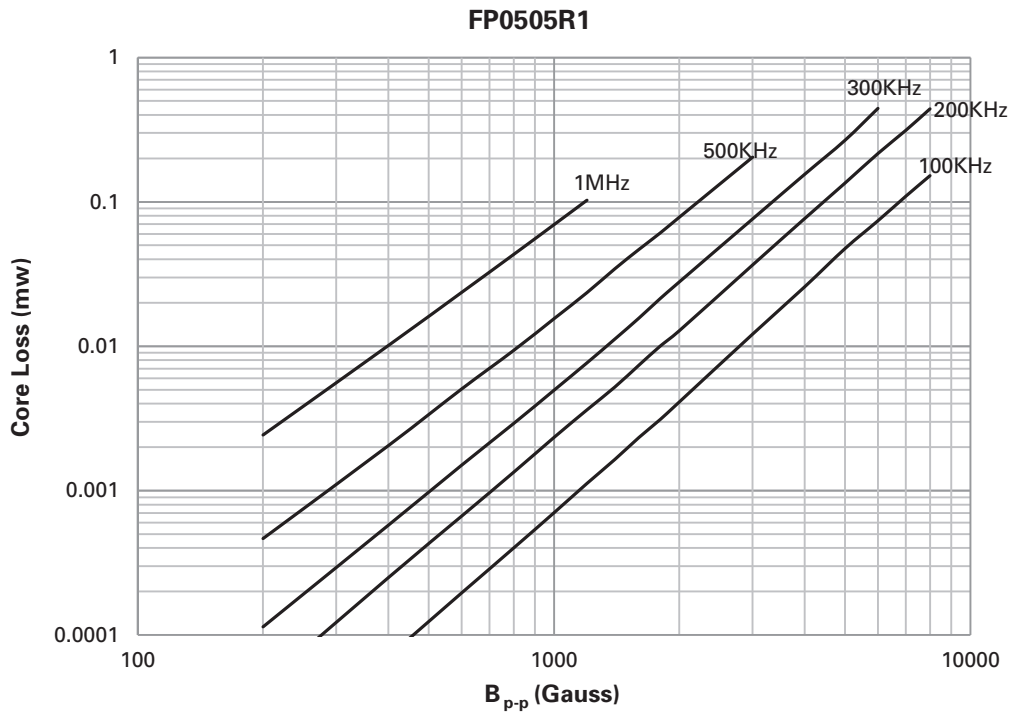
Supplied in tape and reel packaging, 1,000 parts per 13" diameter reel



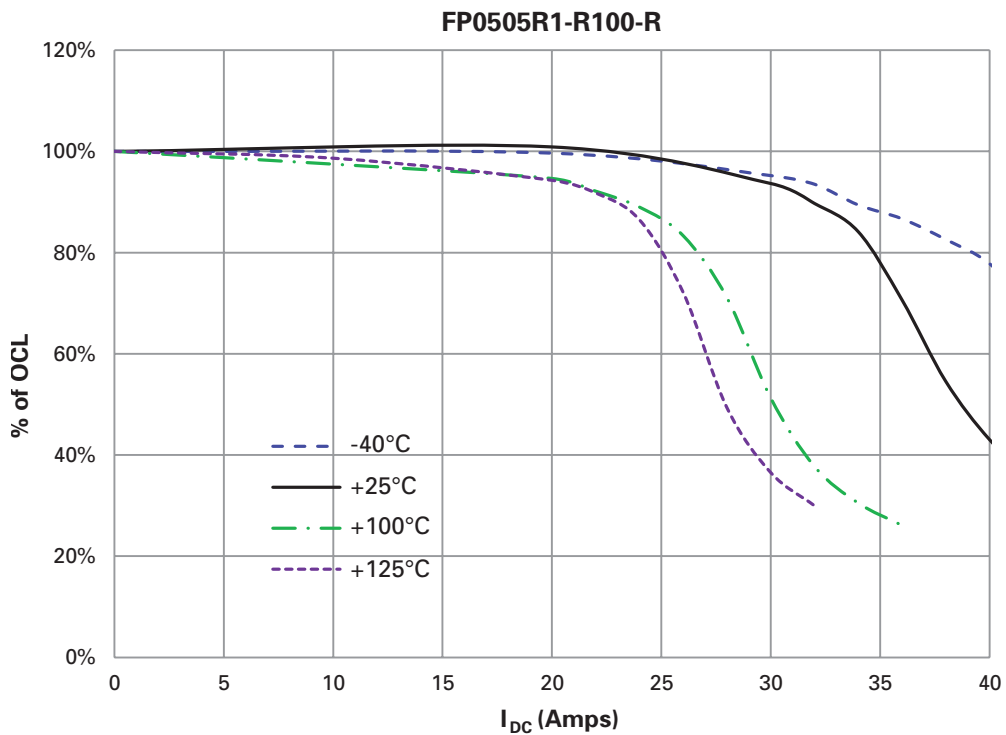
Temperature rise vs. total loss



Core loss vs. B_{p-p}



Inductance characteristics



Solder reflow profile

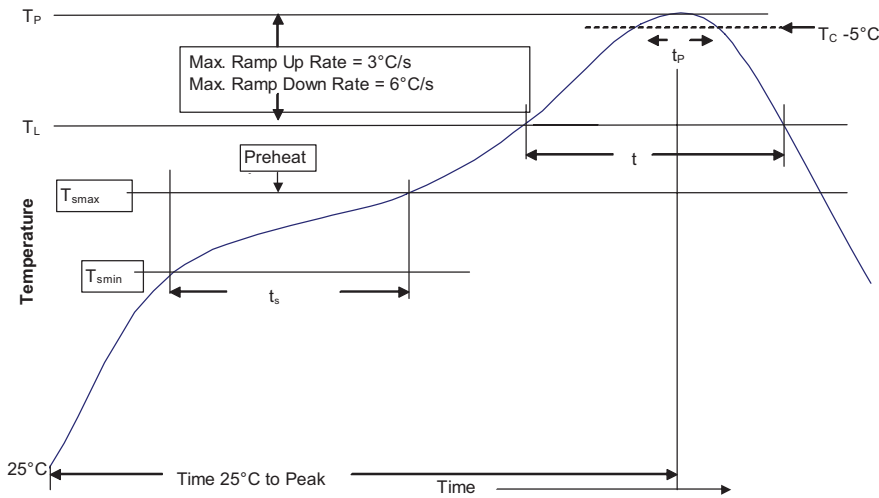


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5mm)	235°C	220°C
≥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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Eaton
Electronics Division
1000 Eaton Boulevard
Cleveland, OH 44122
United States
www.eaton.com/elx

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