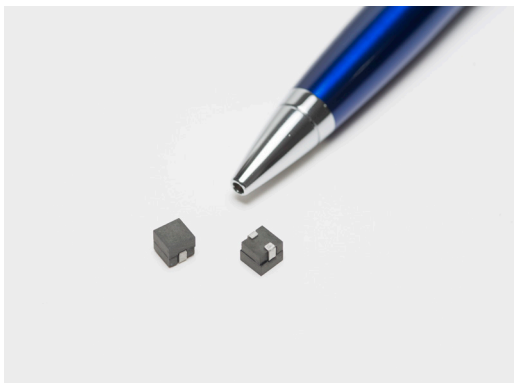


# FP0505R

## 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



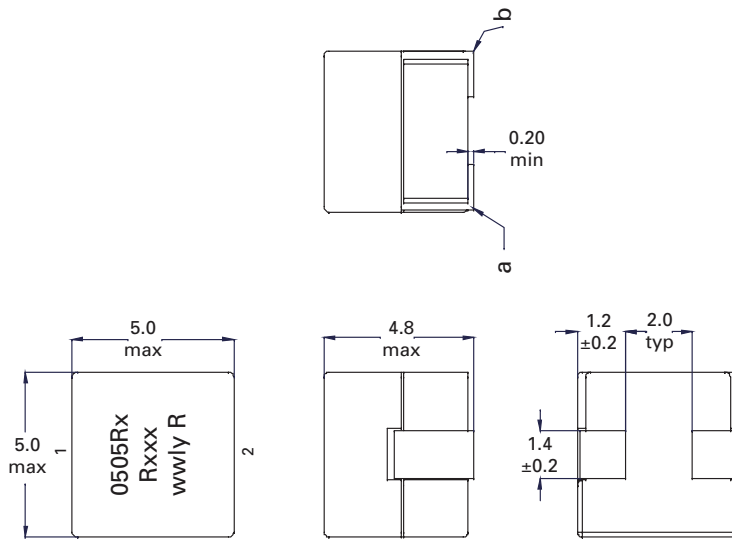
## Product Specifications

Part Number <sup>a</sup>	OCL <sup>1</sup> (nH) ±10%	FLL <sup>2</sup> (nH) minimum	I <sub>rms</sub> <sup>3</sup> (amps)	I <sub>sat</sub> <sup>14</sup> (amps)	I <sub>sat</sub> <sup>25</sup> (amps)	I <sub>sat</sub> <sup>36</sup> (amps)	DCR (mΩ) ±25% @ 20°C	K-factor <sup>7</sup>
<b>R1 Version</b>								
FP0505R1-R100-R	100	68	30	34	26	24	0.38	1279

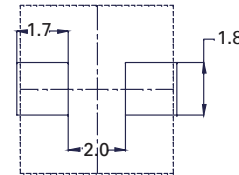
1. Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.1Vrms, 0.0Adc, @ +25°C
2. Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vrms, @ I<sub>sat</sub> @ +25°C
3. I<sub>rms</sub>: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. 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.

4. I<sub>sat</sub><sup>1</sup>: Peak current for approximately 20% rolloff @ +25°C
5. I<sub>sat</sub><sup>2</sup>: Peak current for approximately 20% rolloff @ +100°C
6. I<sub>sat</sub><sup>3</sup>: Peak current for approximately 20% rolloff @ +125°C
7. K-factor: Used to determine B<sub>pp</sub> for core loss (see graph). Bp-p = K \* L \* ΔI \* 10<sup>-3</sup> B<sub>pp</sub>: (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

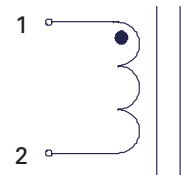
## Dimensions (mm)



## Recommended Pad Layout



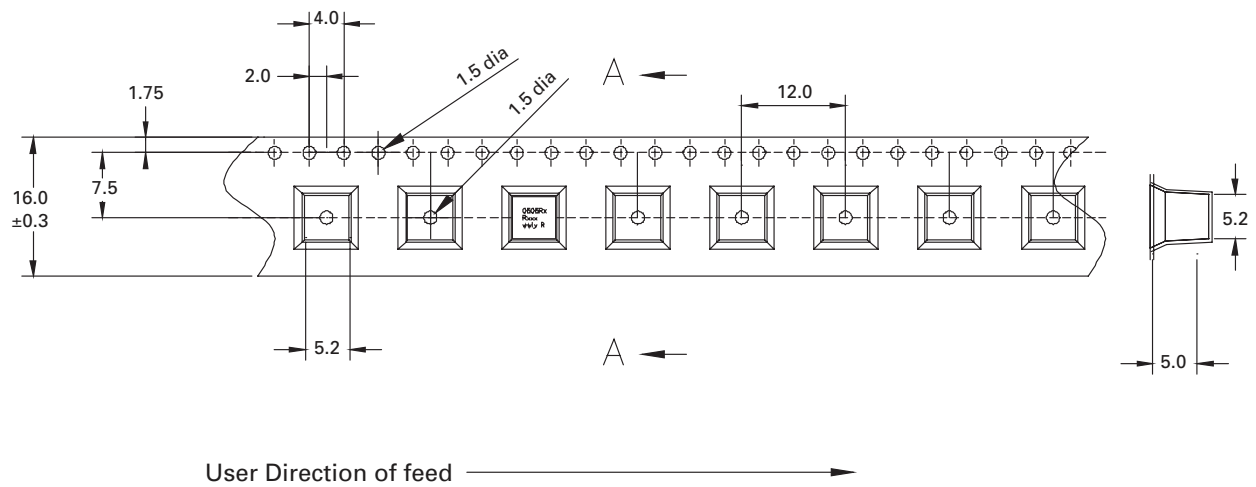
## Schematic



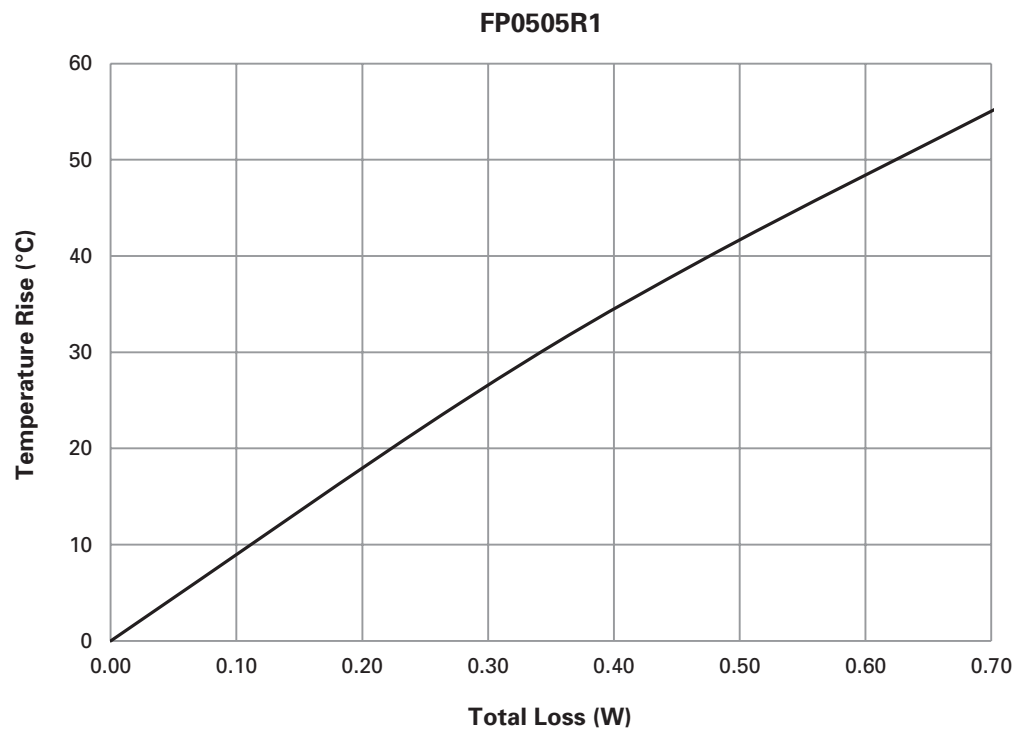
Part marking: 0505Rx (x = Version Indicator), Rxxx = Inductance value in μH (R= decimal point)  
wwly = date code, R = revision level  
Tolerances are ±0.15 millimeters unless stated otherwise  
All soldering surfaces to be coplanar within 0.1 millimeters  
PCB tolerances are ±0.1 millimeters unless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

### Packaging information (mm)

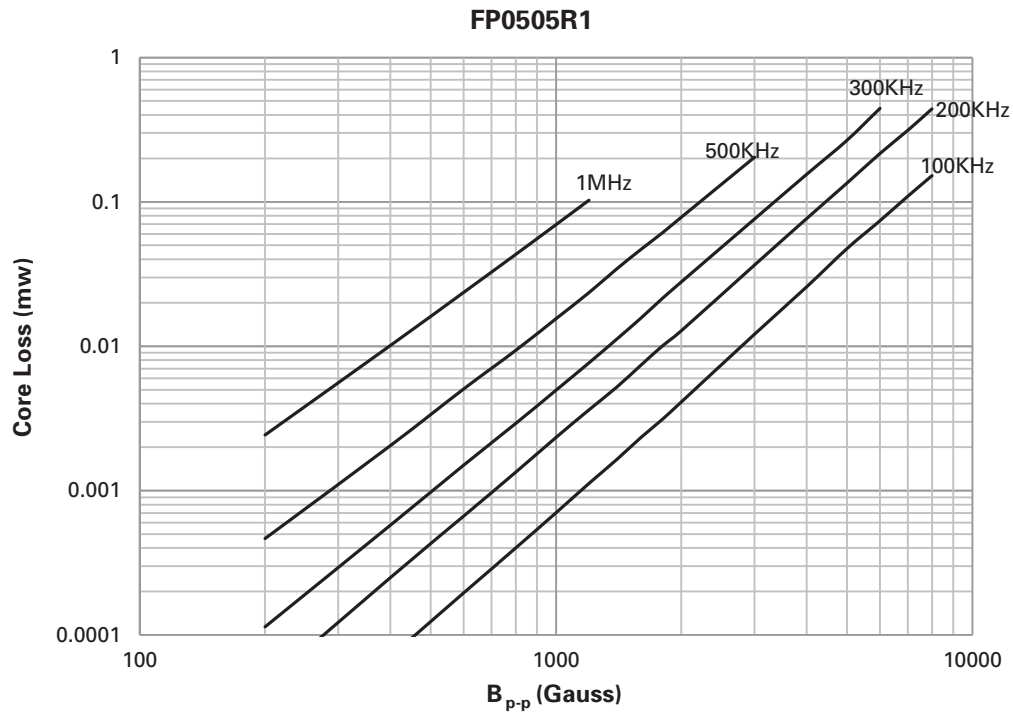
Supplied in tape and reel packaging, 1,000 parts per 13" diameter reel



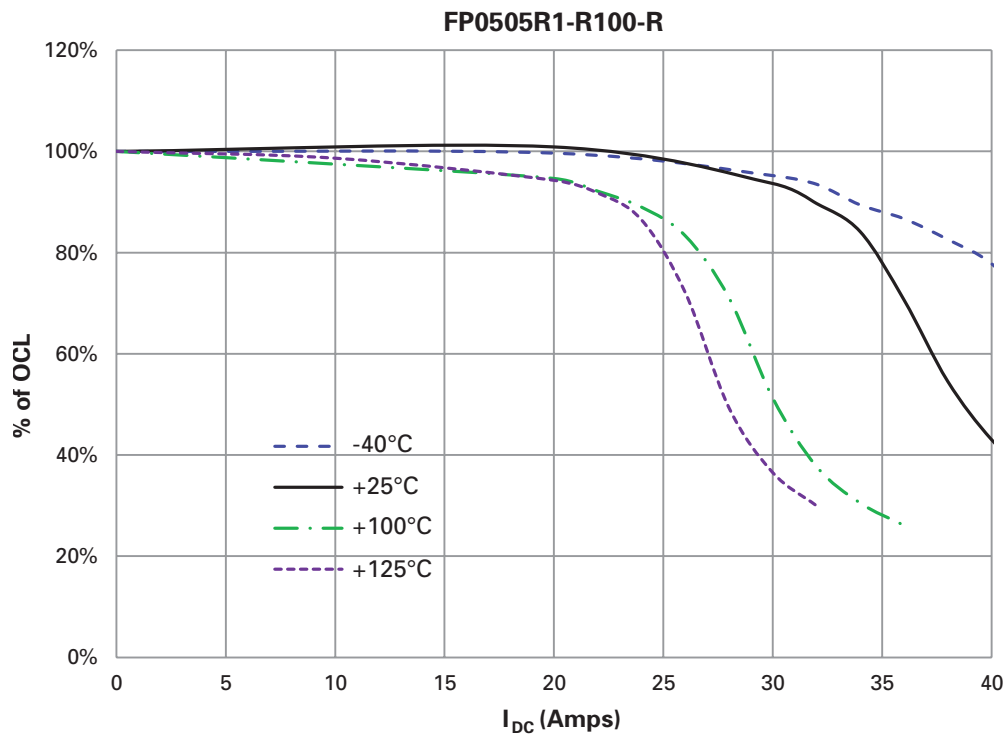
### Temperature rise vs. total loss



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



### Inductance characteristics



## Solder reflow profile

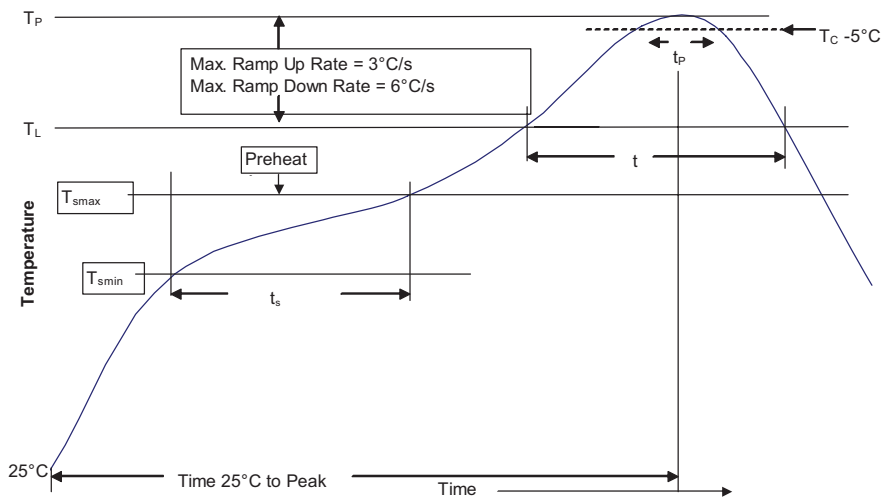


Table 1 - Standard SnPb Solder ( $T_C$ )

Package Thickness	Volume mm <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 ( $T_C$ )

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. ( $T_{smin}$ )	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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