

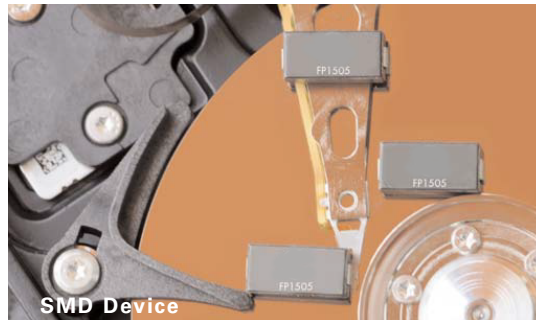


**THE DATASHEET OF  
FP1505R1-R12-R**



# FP1505

## High frequency, high current power inductors



### Product features

- 7.0 x 15.0 x 5.0mm surface mount package
- Ferrite core material
- High current handling capability, low core loss
- Designed for high speed, high current switch mode applications
- Tight DCR tolerance for sensing circuits
- Inductance range from 100 nH to 400 nH
- Current range from 24 A to 105 A
- Frequency range up to 1 MHz

### Applications

- Multi-phase regulators
- Voltage Regulator Module (VRM)
- Desktop and server VRMs and EVRDs
- Data networking and storage systems
- Notebook regulators
- Graphics cards and battery power systems
- Point of load modules
- DCR current sensing

### 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-020 (latest revision) compliant

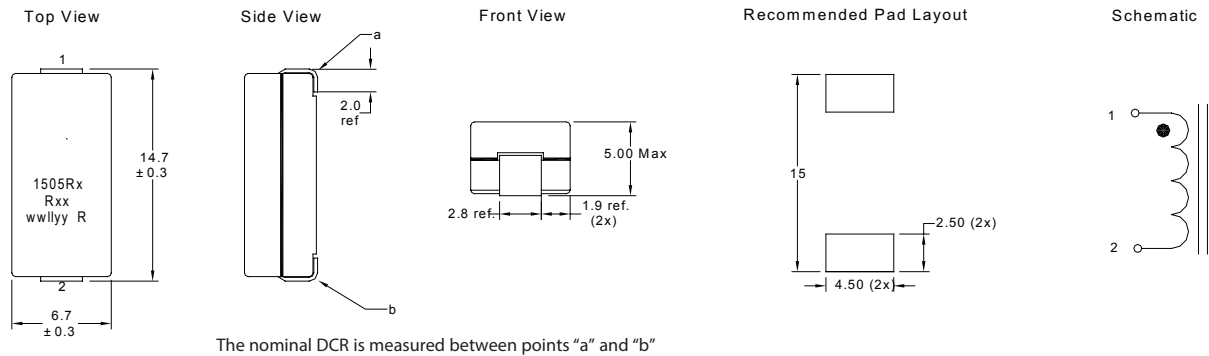


**Product specifications**

Part Number <sup>7</sup>	OCL <sup>1</sup> ± 10% (nH)	FLL <sup>2</sup> Min. (nH)	I <sub>rms</sub> <sup>3</sup> (A)	I <sub>sat1</sub> <sup>4</sup> (A) @+25 °C	I <sub>sat2</sub> <sup>5</sup> (Amps) @+125 °C	DCR (mΩ) @+20 °C	K-factor <sup>6</sup>
FP1505R1-R10-R	100	72	53	105	90	0.47 ± 7%	356.3
FP1505R1-R12-R	120	86		87	75		356.3
FP1505R1-R15-R	150	108		72	60		356.3
FP1505R1-R25-R	250	180		42	32		356.3
FP1505R1-R30-R	300	217		35	26		356.3
FP1505R1-R40-R	400	288		24	19.5		356.3

- Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 1.0 V<sub>rms</sub>, 0.0 Adc
- Full Load Inductance (FLL) Test Parameters: 100 kHz, 1.0 V<sub>rms</sub>, I<sub>sat1</sub>
- 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.
- I<sub>sat1</sub>: Peak current for approximately 20% rolloff at +25 °C.
- I<sub>sat2</sub>: Peak current for approximately 20% rolloff at +125 °C.
- K-factor: Used to determine B<sub>p-p</sub> for core loss (see graph). B<sub>p-p</sub> = K \* L \* ΔI \* 10<sup>-3</sup>. B<sub>p-p</sub>:(Gauss), K: (K-factor from table), L: (Inductance in nH), ΔI (Peak-to-peak ripple current in amps).
- Part Number Definition: FP1505Rx-Rxx-R
  - FP1505 = Product code and size
  - Rx= DCR indicator
  - Rxx= Inductance value in uH, R = decimal point
  - R suffix = RoHS compliant

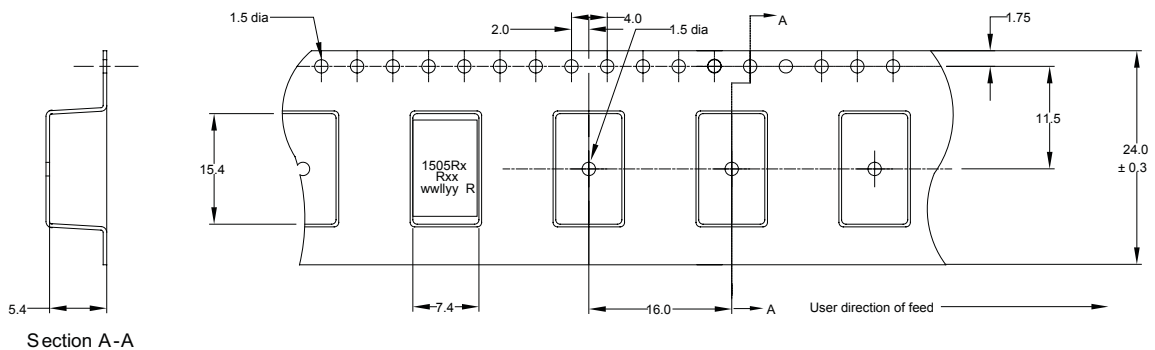
**Dimensions- mm**



Part Marking: 1505Rx Rx = DCR indicator Rxx = Inductance value in μH. (R = Decimal point). wwllly = Date code R = Revision level

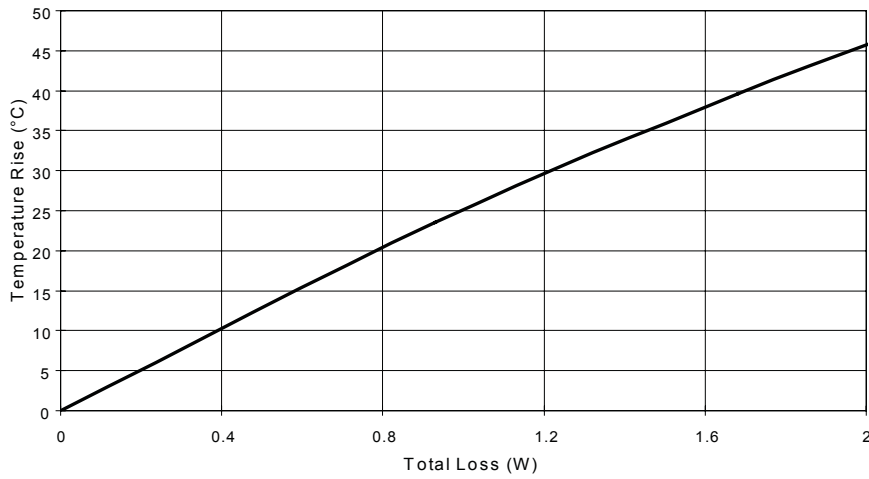
Do not route traces or vias underneath the inductor

**Packaging information - mm**

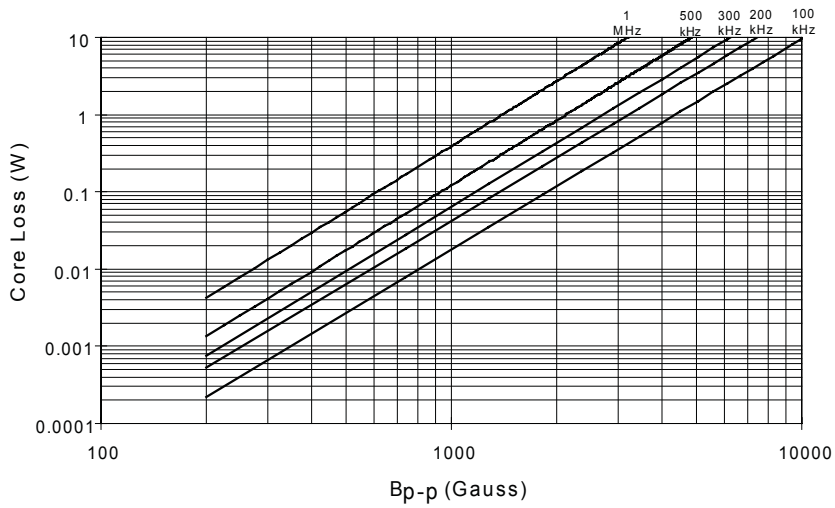


Supplied in tape-and-reel packaging, 744 parts per reel, 13" diameter reel.

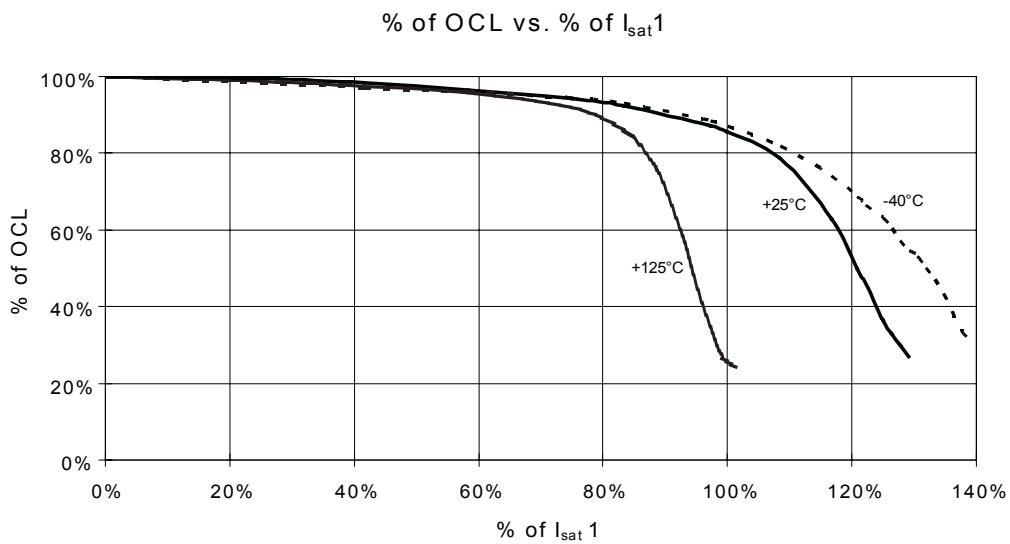
**Temperature rise vs total loss**



**Core loss vs Bp-p**



**Inductance characteristics**



### Solder Reflow Profile

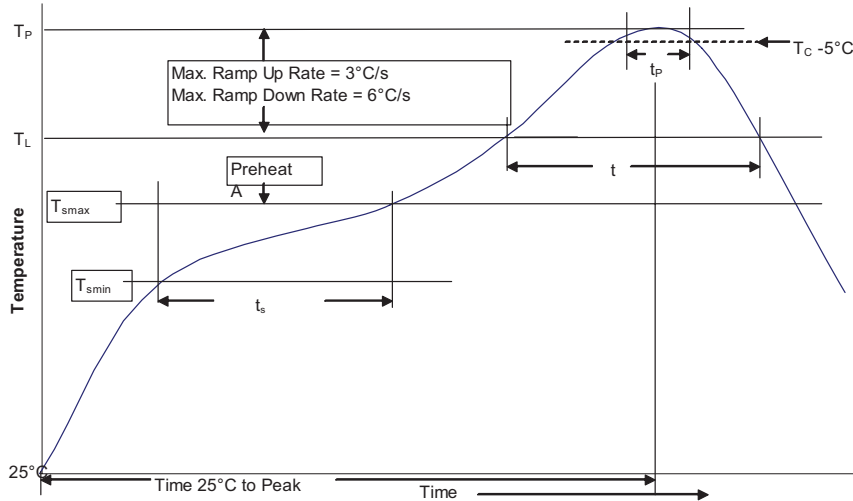


Table 1 - Standard SnPb Solder ( $T_c$ )

Package Thickness	Volume $\text{mm}^3$ <350	Volume $\text{mm}^3$ $\geq 350$
<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 $\text{mm}^3$ <350	Volume $\text{mm}^3$ 350 - 2000	Volume $\text{mm}^3$ >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-020

Profile Feature	Standard SnPb Solder	Lead (Pb) Free Solder
Preheat and Soak	• Temperature min. ( $T_{smin}$ )	100°C
	• Temperature max. ( $T_{smax}$ )	150°C
	• Time ( $T_{smin}$ to $T_{smax}$ ) ( $t_s$ )	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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