

# FP1309B

## High frequency, high current power inductors



### Applications

- Servers
- 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 centers, networking and storage systems
- Point-of-Load modules
- DCR Sensing circuits

### Product description

- High current carrying capacity
- Low core loss
- Tight tolerance DCR for sensing circuits
- Inductance Range from 100nH to 150nH
- Current range from 60 to 100 amps
- 12.8 x 8.3mm footprint surface mount package in an 8.8mm 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 + self-temperature rise)
- Solder reflow temperature: J-STD-020D compliant

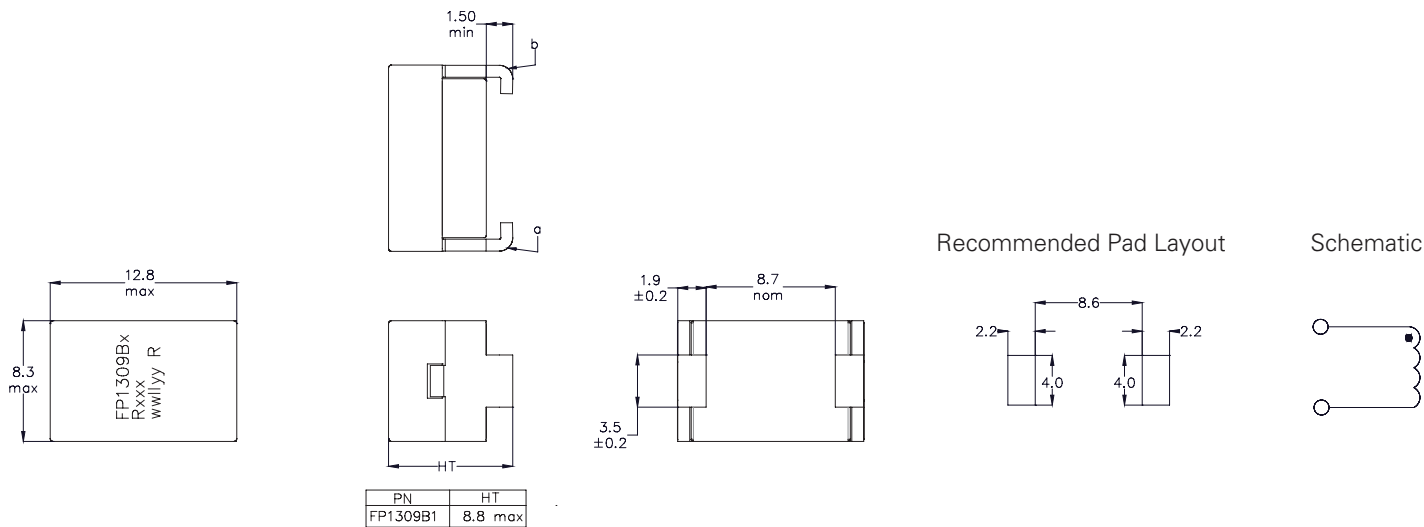


Product specifications

Part Number <sup>7</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> 1 <sup>4</sup> (amps)	I <sub>sat</sub> 2 <sup>5</sup> (amps)	DCR (mΩ) ±5% @ 20°C	K-factor <sup>6</sup>
<b>B1 version</b>							
FP1309B1-R100-R	100	72	60	100	80	0.19	296
FP1309B1-R120-R	120	87	60	90	72	0.19	296
FP1309B1-R150-R	150	108	60	80	64	0.19	296

- Open Circuit Inductance (OCL) Test Parameters: 100kHz, 0.1Vrms, 0.0Adc, +25°C
- Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1Vrms, I<sub>sat</sub>1, +25°C
- 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>sat</sub>1: Peak current for approximately 20% rolloff @ +25°C
- I<sub>sat</sub>2: Peak current for approximately 20% rolloff @ +125°C
- K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K \* L \* ΔI \* 10<sup>-3</sup>. Bp-p:(Gauss), K: (K-factor from table), L: (Inductance in nH), ΔI (Peak to peak ripple current in Amps).
- Part Number Definition: FP1309Bx-Rxxx-R  
FP1309B= Product code and size  
x= Version indicator  
Rxxx= Inductance value in μH, R= decimal point  
-R suffix = RoHS compliant

Dimensions (mm)



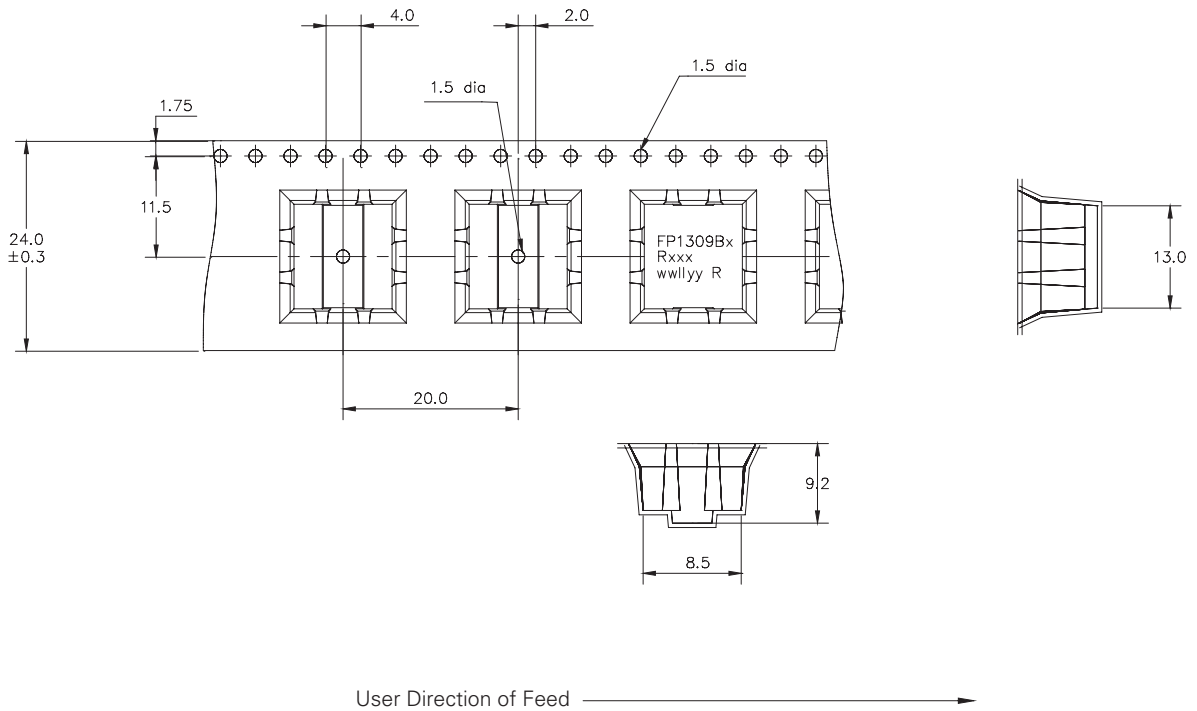
Part marking: FP1309Bx (Product code and size, x = version indicator),  
Rxxx = Inductance value in μH, R = decimal point  
wwlllyy = date code, R = revision level

All soldering surface to be coplanar within 0.10mm

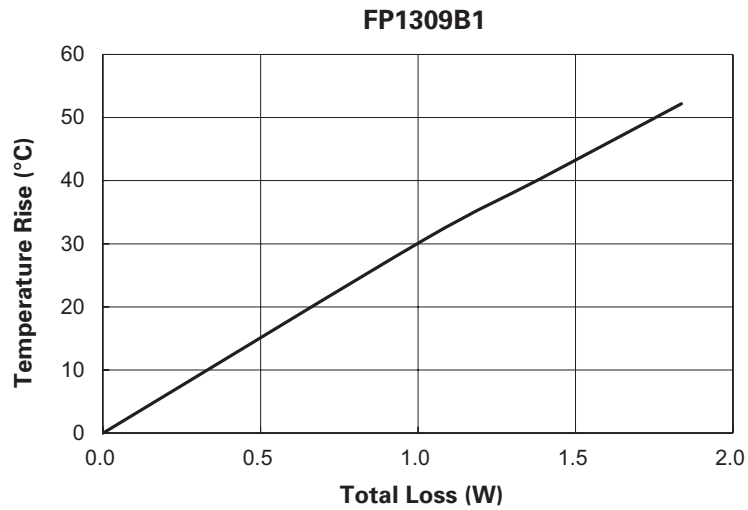
DCR measured between point "a" and point "b"

**Packaging information (mm)**

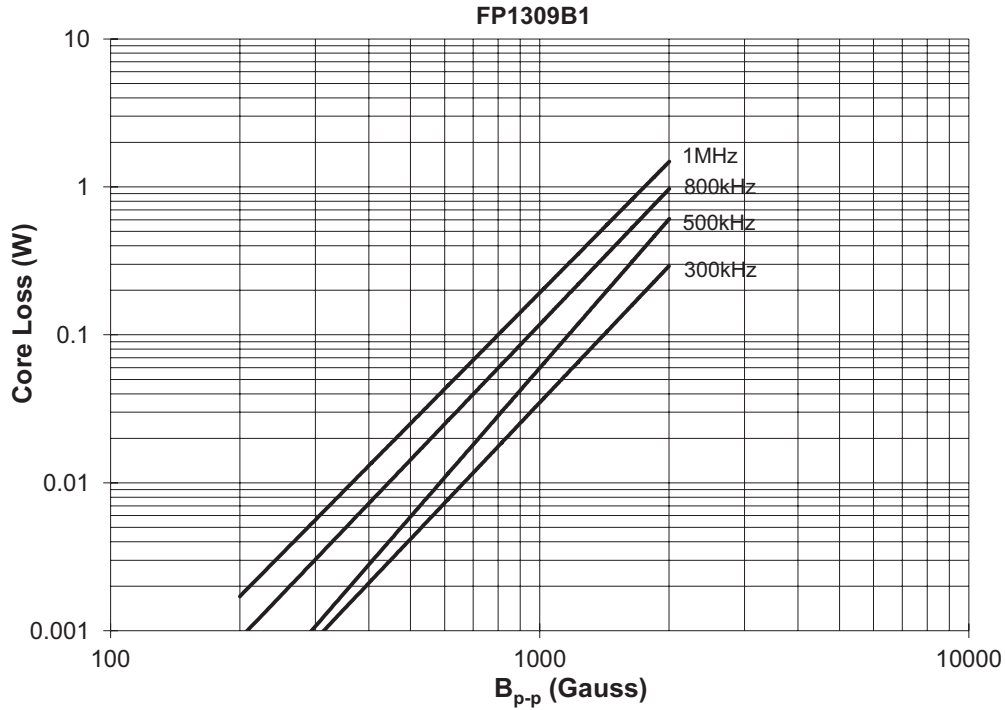
Supplied in tape and reel packaging, 330 parts per 13" diameter reel



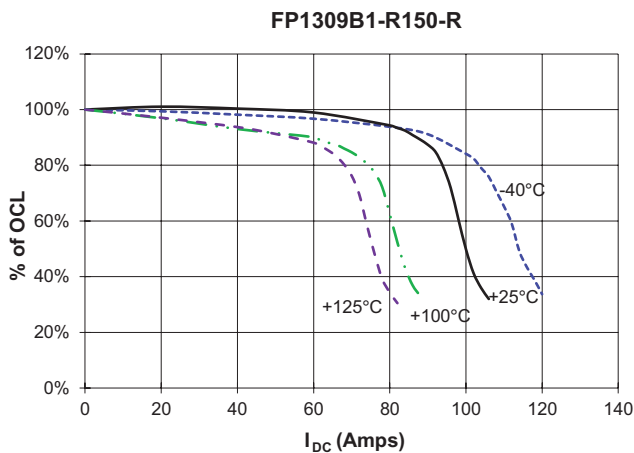
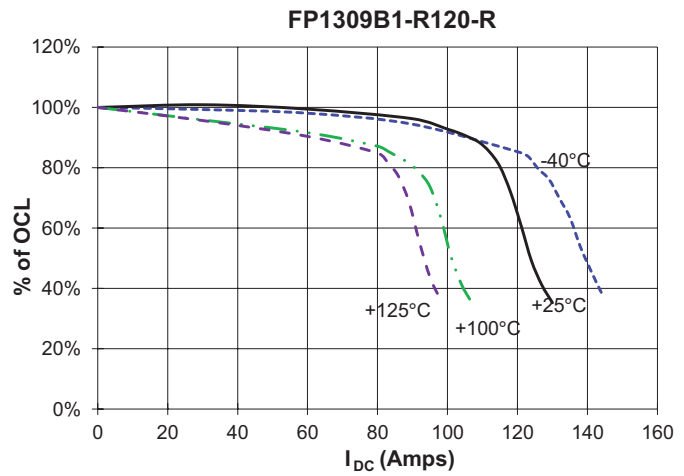
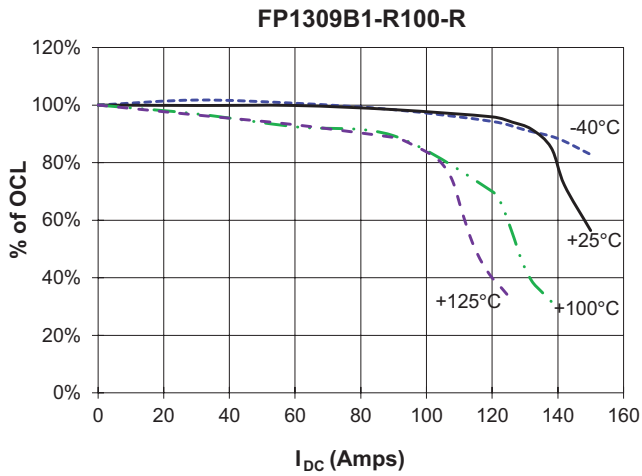
**Temperature rise vs. total loss**



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 $mm^3$ $\geq$ 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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