

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

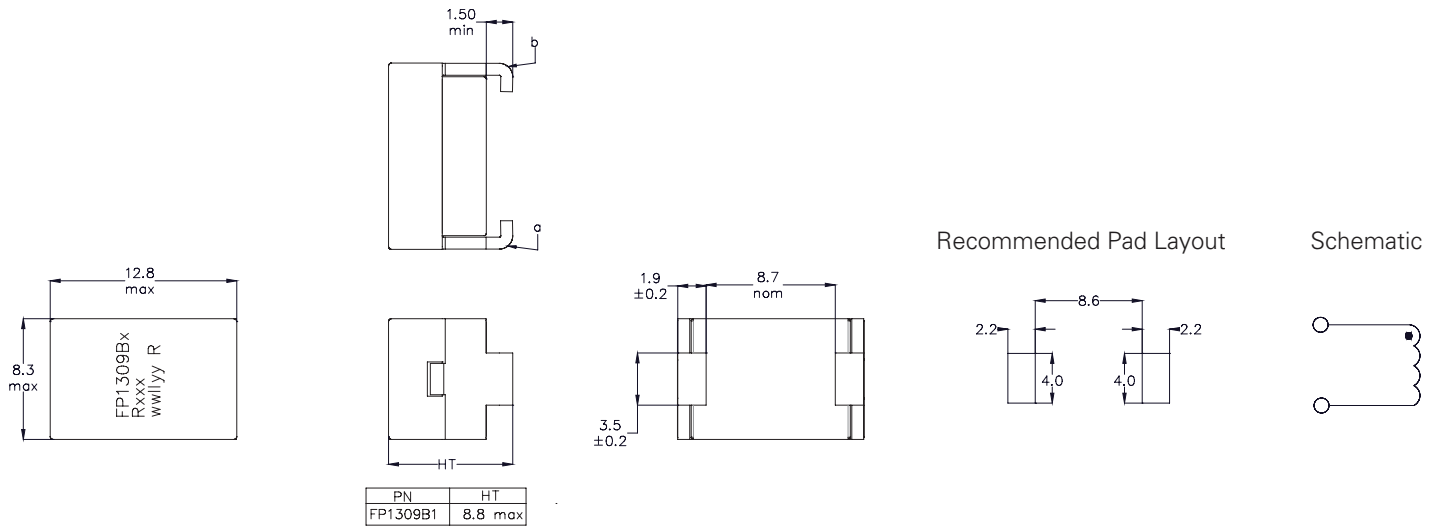


Product specifications

| Part Number ⁷ | OCL ¹ (nH)±10% | FLL ² (nH) minimum | I _{rms} ³ (amps) | I _{sat} 1 ⁴ (amps) | I _{sat} 2 ⁵ (amps) | DCR (mΩ) ±5% @ 20°C | K-factor ⁶ |
|--------------------------|------------------------------|----------------------------------|---|---|---|------------------------|-----------------------|
| B1 version | | | | | | | |
| 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 |

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}1, +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 @ +125°C
6. K-factor: Used to determine Bp-p for core loss (see graph). Bp-p = K * L * ΔI * 10⁻³. Bp-p:(Gauss), K: (K-factor from table), L: (Inductance in nH), ΔI (Peak to peak ripple current in Amps).
7. 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)



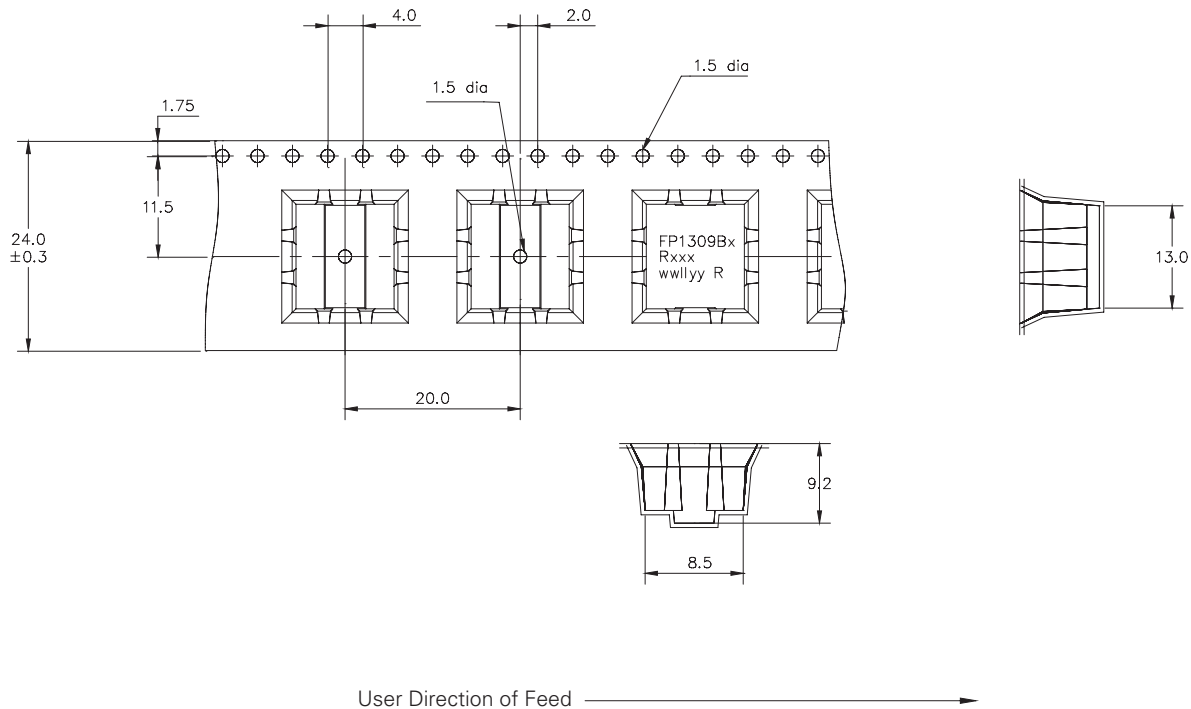
Part marking: FP1309Bx (Product code and size, x = version indicator),
Rxxx = Inductance value in uH, R = decimal point
wwlllyy = date code, R = revision level

All soldering surface to be coplanar within 0.10mm

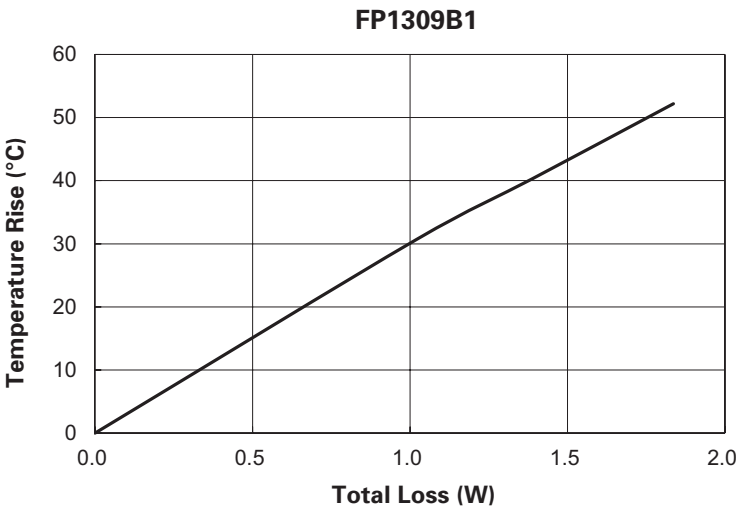
DCR measured between point "a" and point "b"

Packaging information (mm)

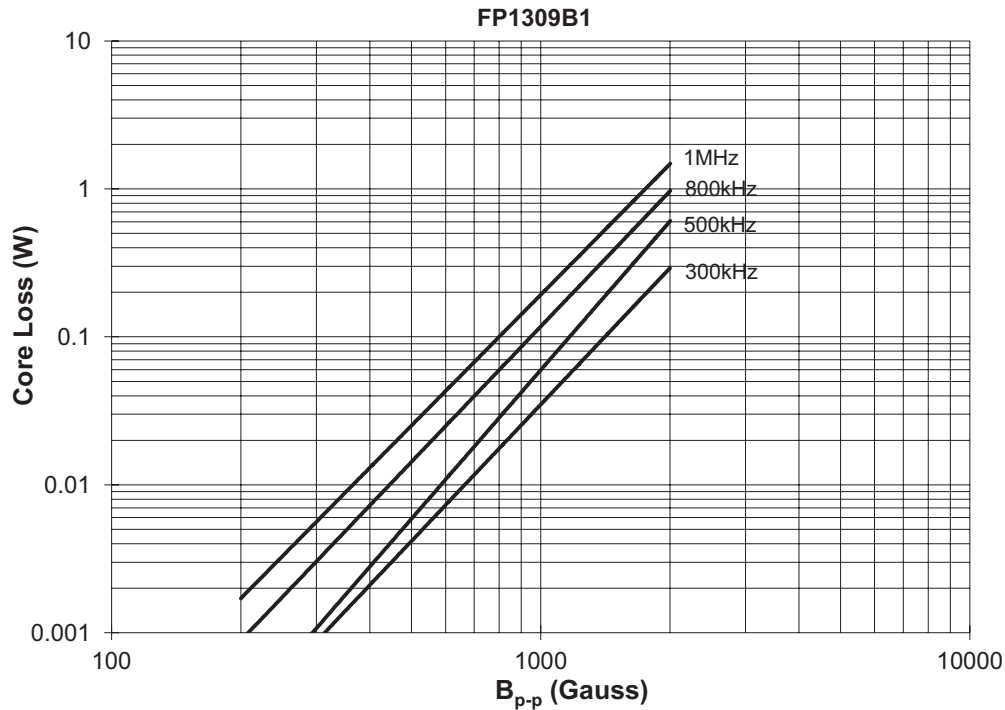
Supplied in tape and reel packaging, 330 parts per 13" diameter reel



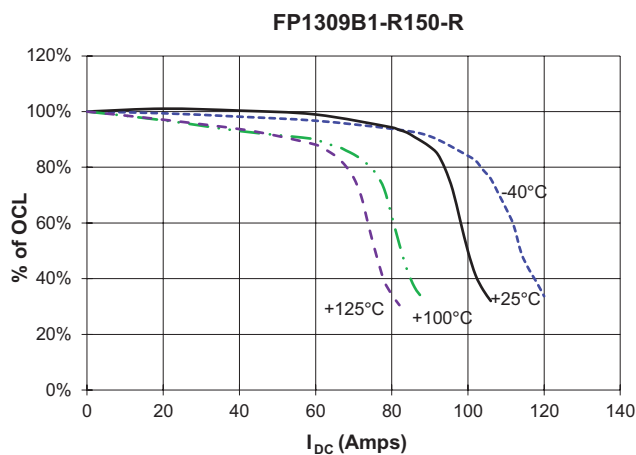
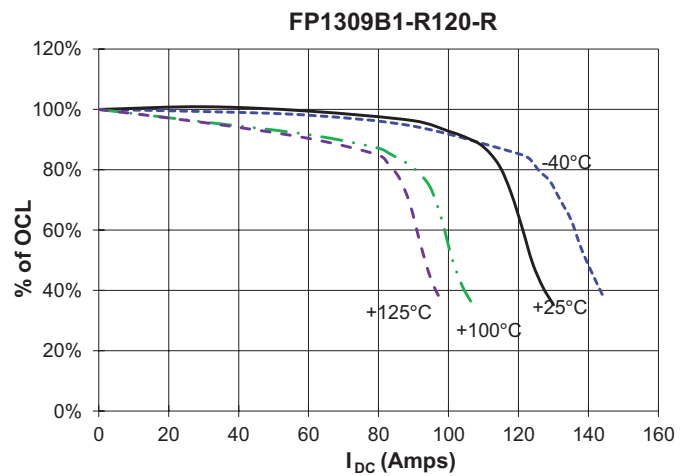
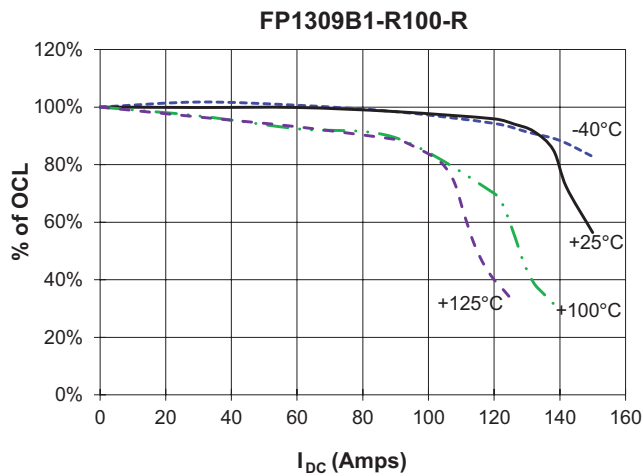
Temperature rise vs. total loss



Core loss vs. B_{p-p}



Inductance characteristics



Solder reflow profile

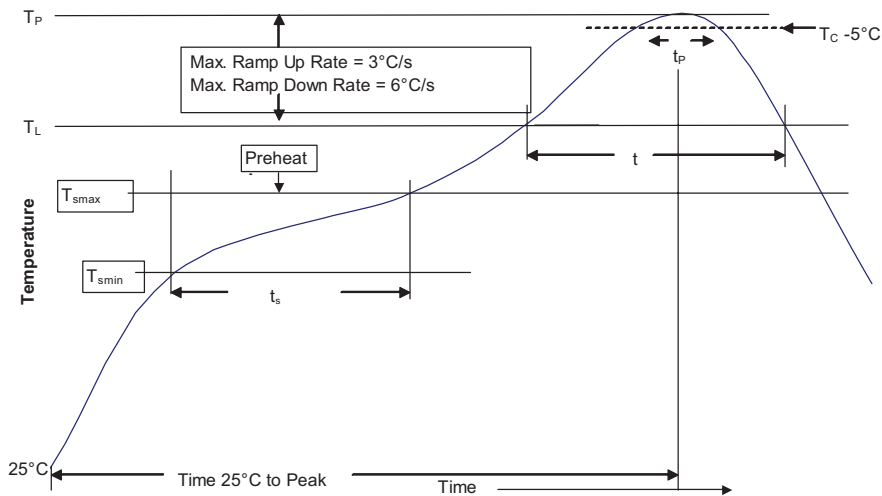


Table 1 - Standard SnPb Solder (T_C)

| Package Thickness | Volume mm ³ <350 | Volume mm ³ ≥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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Printed in USA
Publication No. 10477 BU-MC15049
November 2015