

FP1 109B

High frequency, high current power inductors



Product features

- High current carrying capacity
- Low core loss
- Tight tolerated DCR for sensing circuits
- Inductance Range from 150 nH to 300 nH
- Current range from 38 A to 80 A
- 11.0 mm x 8.2 mm footprint surface mount package in 9.0 mm height
- Ferrite core material

Applications

- Compatible with Infineon® DrBlade™ digital voltage regulator controller
- 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

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



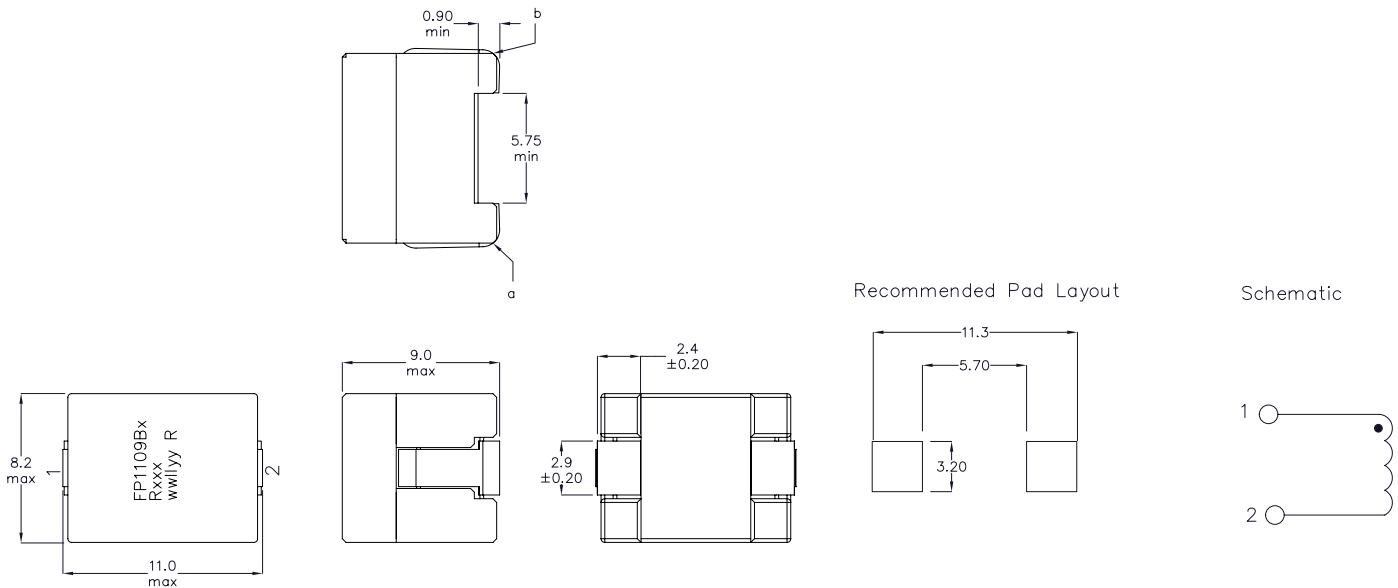
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Product specifications

| Part Number ⁷ | OCL ¹ (nH)±10% | FLL ² (nH) minimum | I _{rms} ³ (A) | I _{sat} 1 ⁴ (A) | I _{sat} 2 ⁵ (A) | DCR (mΩ) @ +20 °C ±5% | K-factor ⁸ |
|--------------------------|------------------------------|----------------------------------|--------------------------------------|--|--|--------------------------|-----------------------|
| FP1109B1-R150-R | 150 | 108 | 55 | 80 | 64 | 0.19 | 339 |
| FP1109B1-R180-R | 180 | 130 | 55 | 62 | 49 | 0.19 | 339 |
| FP1109B1-R220-R | 220 | 158 | 55 | 50 | 40 | 0.19 | 339 |
| FP1109B1-R300-R | 300 | 216 | 55 | 38 | 30 | 0.19 | 339 |

- Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.1 Vrms, 0.0 Adc, +25 °C
- Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.1 Vrms, I_{sat}1, +25 °C
- 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 applicat ion.
- I_{sat}1: Peak current for approximately 20% rolloff @ +25 °C
- I_{sat}2: Peak current for approximately 20% rolloff @ +125 °C
- K-factor: Used to determine B_{pp} for core loss (see graph).
 $B_{pp} = K * L * \Delta I * 10^{-3}$; B_{pp} (Gauss), K: (K-factor from table),
 L: (Inductance in nH), ΔI (Peak-to-peak ripple current in Amps).
- Part Number Definition: FP1109Bx-Rxxx-R
 FP1109B= Product code and size
 x= version indicator
 Rxxx= Inductance value in μH, R= decimal point
 -R suffix = RoHS compliant

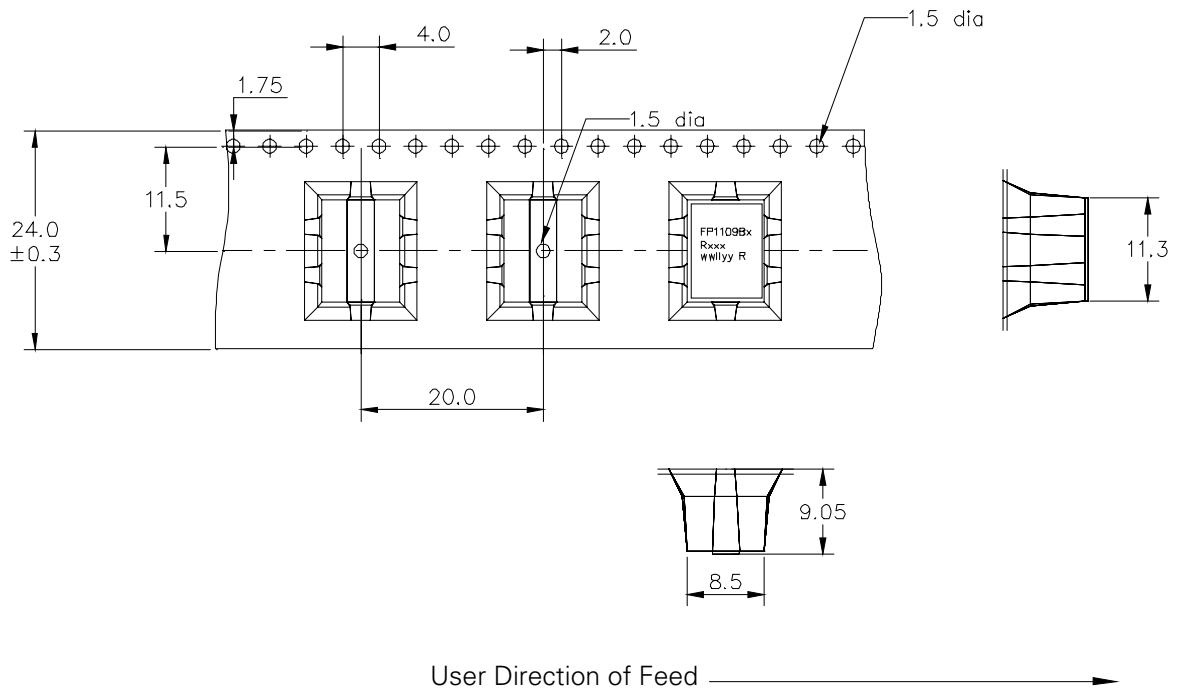
Dimensions (mm)



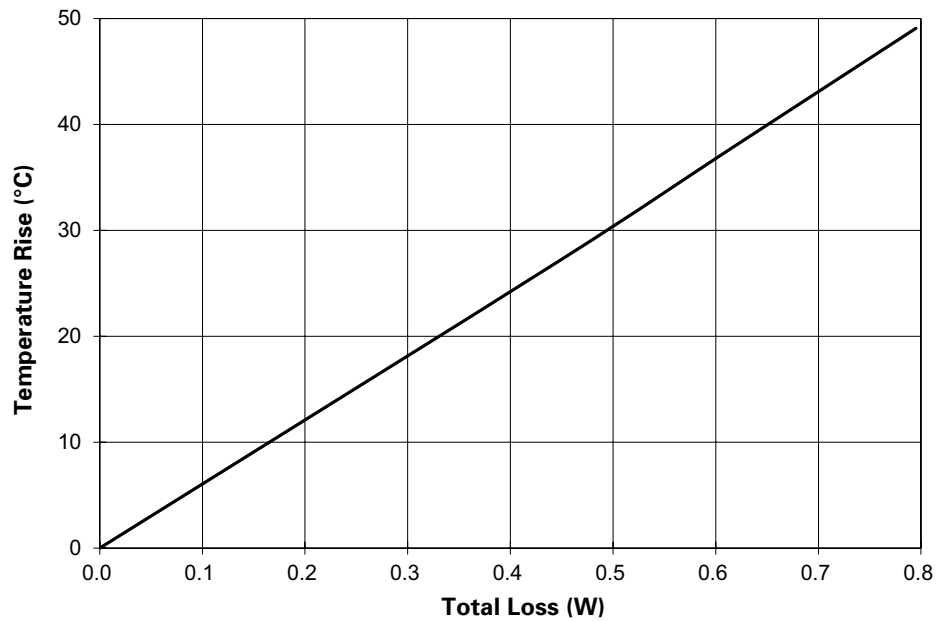
Part marking: FP1109Bx (Product code and size, x = version indicator),
 Rxxx = Inductance value in μh, R = decimal point
 wwlly = date code, R = revision level
 All soldering surface to be coplanar within 0.10 mm
 Pad layout tolerances are ±0.1 millimeters unless stated otherwise
 DCR measured between point "a" and point "b"

Packaging information (mm)

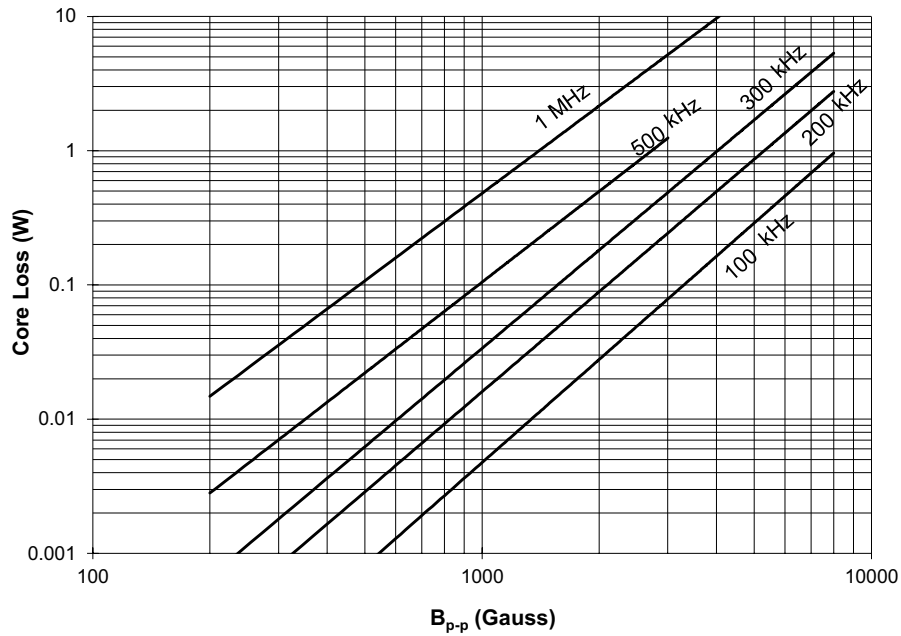
Supplied in tape and reel packaging 300 parts per 1 3 " diameter reel



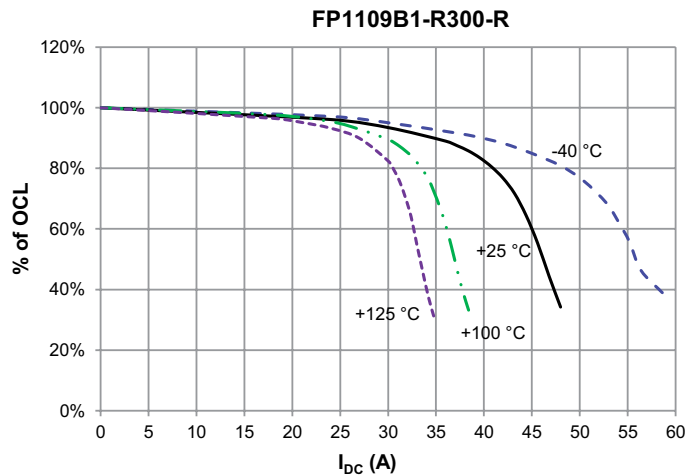
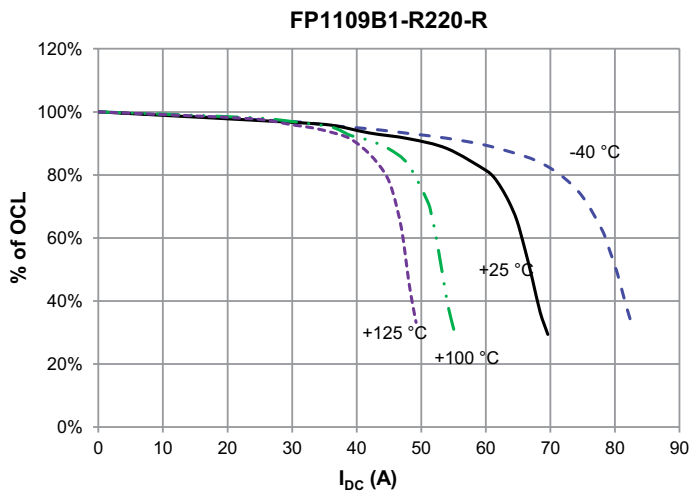
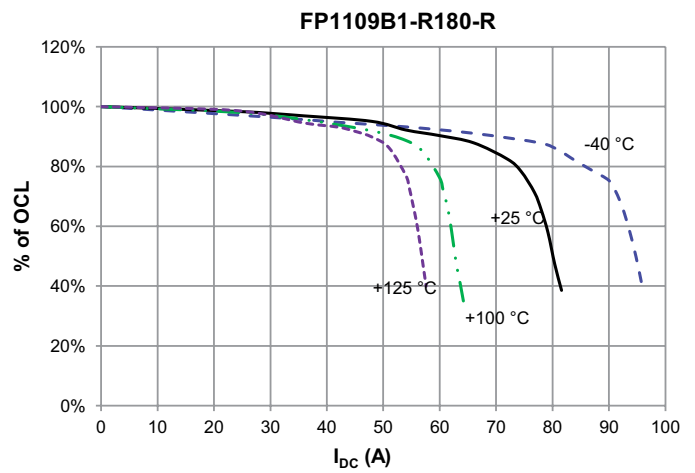
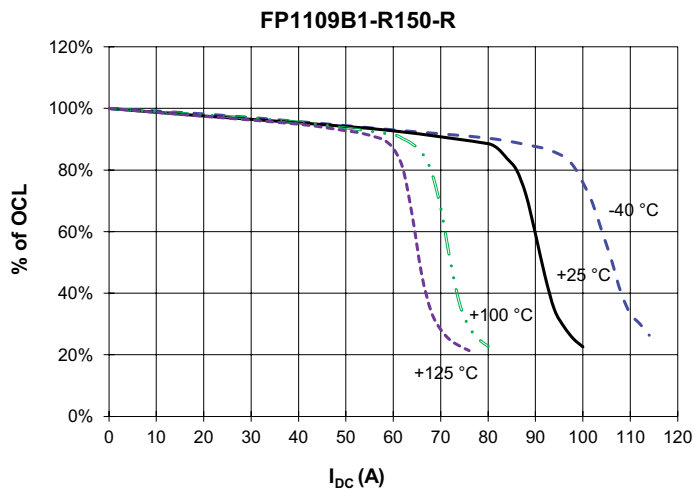
Temperature rise vs. total loss



Core loss vs. B_{p-p}



Inductance characteristics



Solder reflow profile

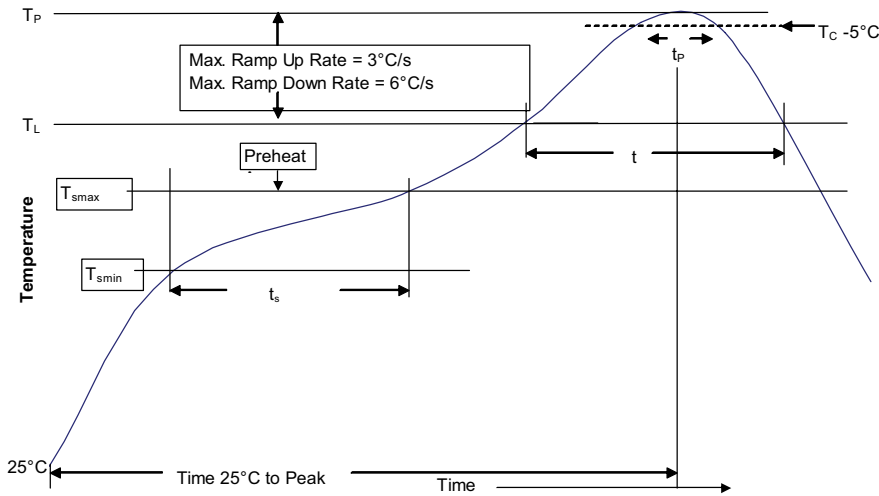


Table 1 - Standard SnPb Solder (T_C)

| Package Thickness | Volume mm ³ <350 | Volume mm ³ ≥350 |
|-------------------|-----------------------------|-----------------------------|
| <2.5 mm | 235 °C | 220 °C |
| ≥2.5 mm | 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 |
|-------------------|-----------------------------|-----------------------------------|------------------------------|
| <1.6 mm | 260 °C | 260 °C | 260 °C |
| 1.6 - 2.5 mm | 260 °C | 250 °C | 245 °C |
| >2.5 mm | 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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