

FP1 109B

High frequency, high current power inductors



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

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

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



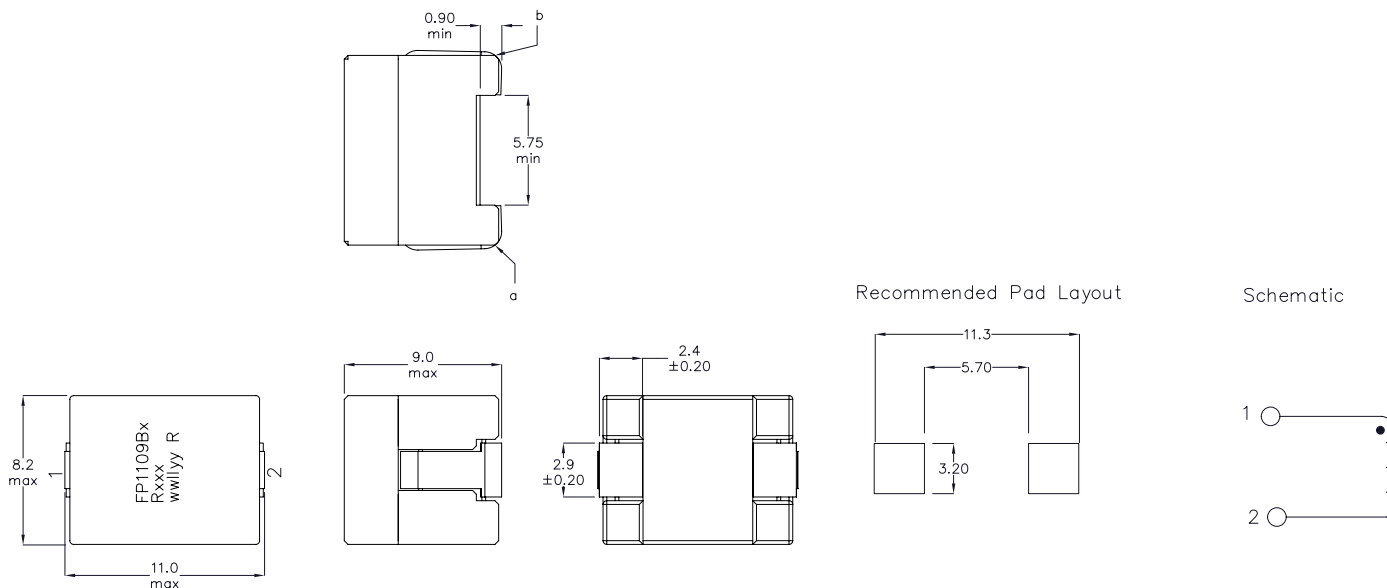
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Product specifications

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

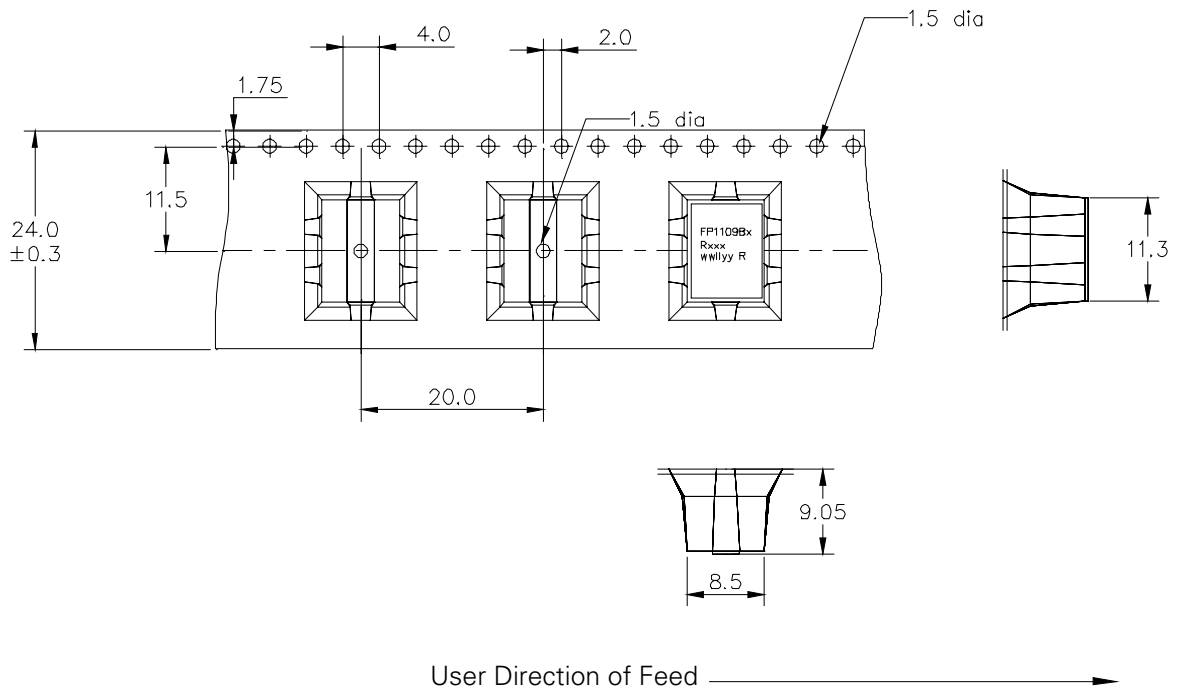
Dimensions (mm)



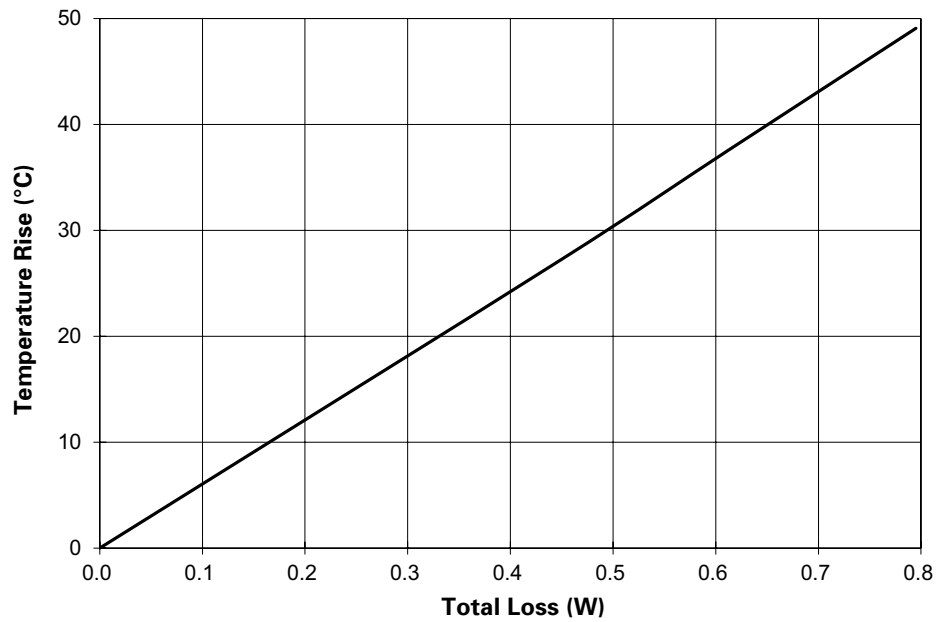
Part marking: FP1109Bx (Product code and size, x = version indicator),
 Rxxx = Inductance value in μh, R = decimal point
 wwlly = date code, R = revision level
 All soldering surface to be coplanar within 0.10 mm
 Pad layout tolerances are ±0.1 millimeters unless stated otherwise
 DCR measured between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

Packaging information (mm)

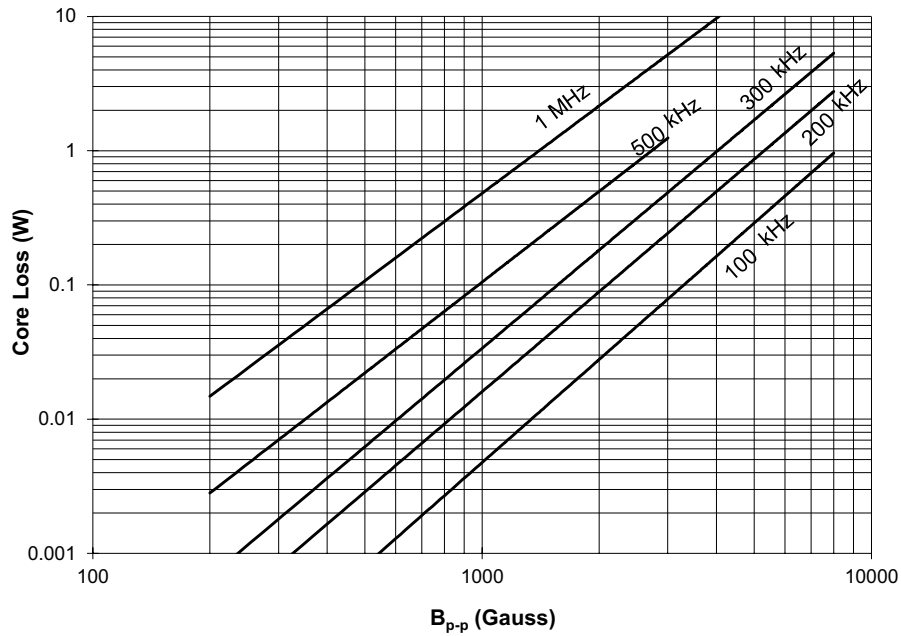
Supplied in tape and reel packaging 300 parts per 1 3 " diameter reel



Temperature rise vs. total loss

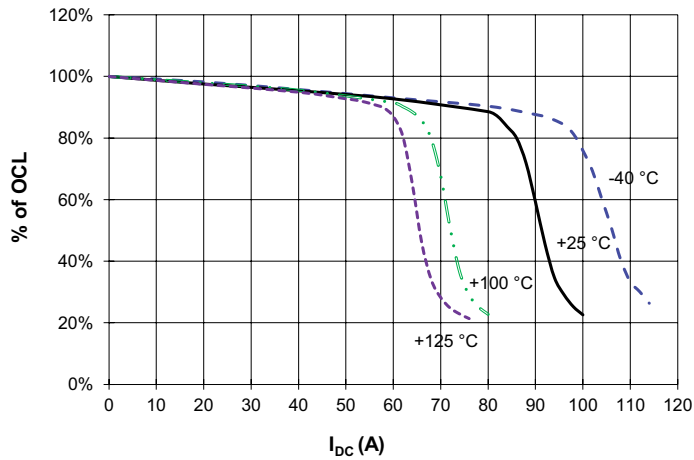


Core loss vs. B_{p-p}

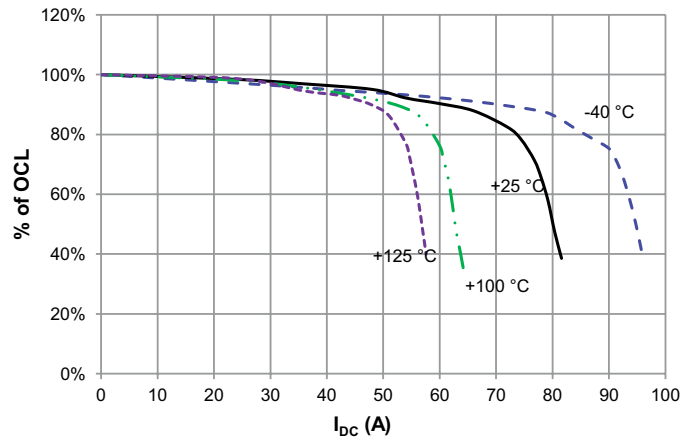


Inductance characteristics

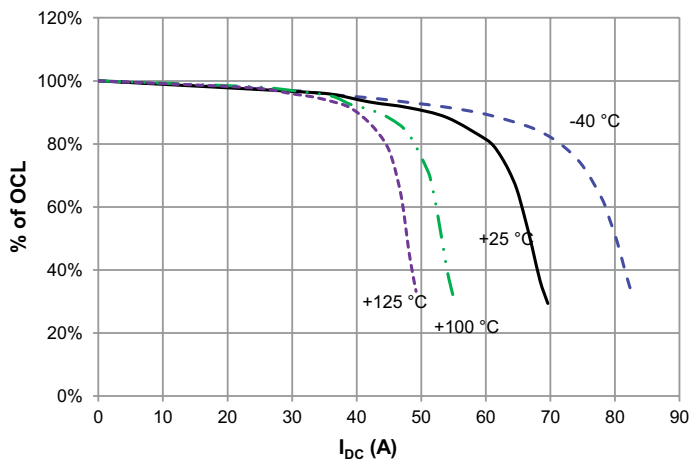
FP1109B1-R150-R



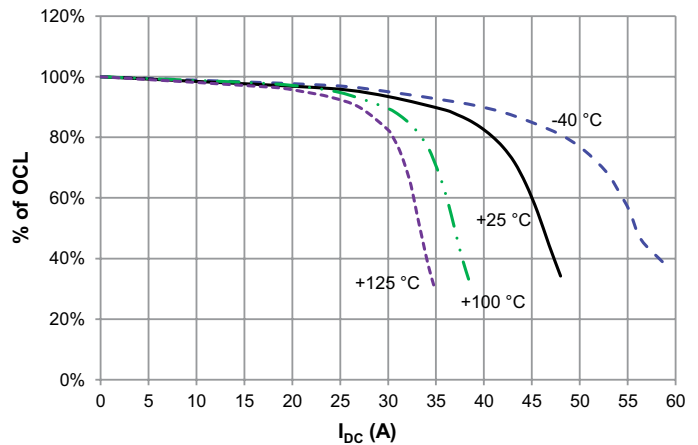
FP1109B1-R180-R



FP1109B1-R220-R



FP1109B1-R300-R



Solder reflow profile

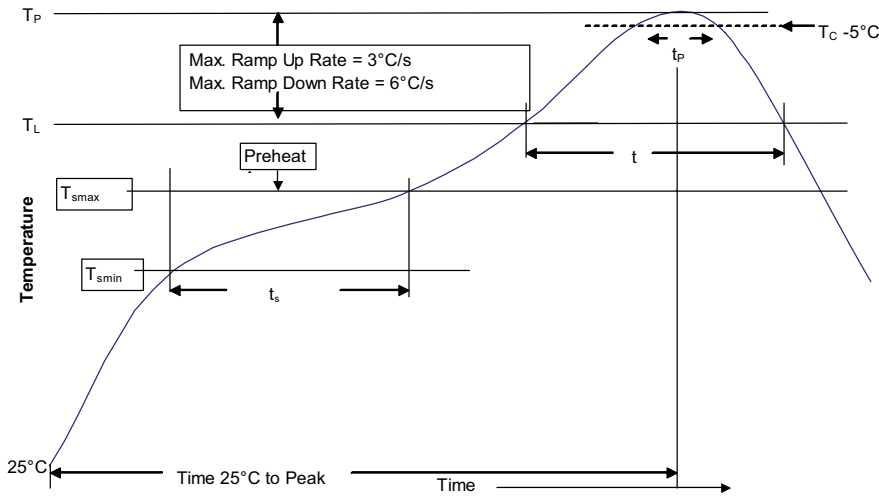


Table 1 - Standard SnPb Solder (T_C)

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	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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Printed in USA
Publication No. 10465 PCN17047
January 2018



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