FP1109

High frequency, high current power inductors



Product features

- 11.2 x 11.2 x 9.0mm maximum surface mount package
- Ferrite core material
- High current carrying capacity, low core losses
- Controlled DCR tolerance for sensing circuits
- Inductance range from 205nH to 950nH
- Current range from 11.5 to 69 amps
- Frequency range up to 2MHz

Applications

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





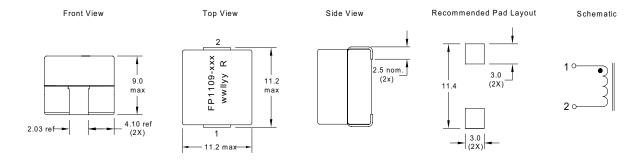




	Product Specifications						
Part Number ⁷	OCL1 ± 20% (nH)	FLL ² Min. (nH)	I _{rms} ³ (Amps)	I _{sat} 1 ⁴ @ 25°C (Amps)	I _{sat} 2 ⁵ @ 125°C (Amps)	DCR (mΩ) @ 20°C	K-factor ⁶
FP1109-R20-R	205	122		69	52		233
FP1109-R23-R	247	147		55	41		233
FP1109-R27-R	270	160		51	38		233
FP1109-R33-R	311	185	35	44	33	0.42 ±10%	233
FP1109-R47-R	463	275	1	27	20		233
FP1109-R58-R	548	325]	22.5	17		233
FP1109-1R0-R	950	565		11.5	8.5		233

- 1 Open Circuit Inductance (OCL) Test Parameters: 100kHz, $0.10V_{\mbox{rms}}$, $0.0\mbox{Adc}$
- $^{\circ}$ Full Load Inductance (FLL) Test Parameters: 100kHz, 0.1V $_{rms}$, I_{sat}
- 3 I_{rms}: DC current for an approximate temperature rise of 40°C without core loss. Derating is necessary for AC currents. PCB pad layout, trace thickness and width, air-flow and proximity of other heat generating components will affect the temperature rise. It is recommended the part temperature not exceed 125°C under worst case operating conditions verified in the end application.
- 4 I_{sat}1: Peak current for approximately 30% rolloff at +25°C.
- 5 I_{sat}2: Peak current for approximately 30% rolloff at +125°C.
- 6 K-factor: Used to determine B_{p-p} for core loss (see graph). B_{p-p} = K * L * △I * 10⁻³, B_{p-p} : (Gauss), K: (K-factor from table), L: (inductance in nH), △I (peak-to-peak ripple current in amps).
- 7 Part Number Definition: FP1109-xxx-R
 - FP1109 = Product code and size
 - xxx= Inductance value in µH, R = decimal point. If no "R" is present, then third character = # of zeros
 - "-R" suffix = RoHS compliant

Dimensions- mm



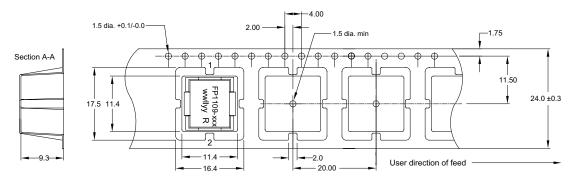
Part Marking: FP1109

xxx = Inductance value in $\mu\text{H}.$ (R = Decimal point). If no "R" is present, then last character is # of zeros

wwllyy = Date code

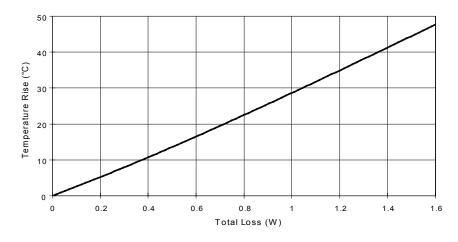
 $\mathsf{R} = \mathsf{Revision} \; \mathsf{level}$

Packaging information - mm

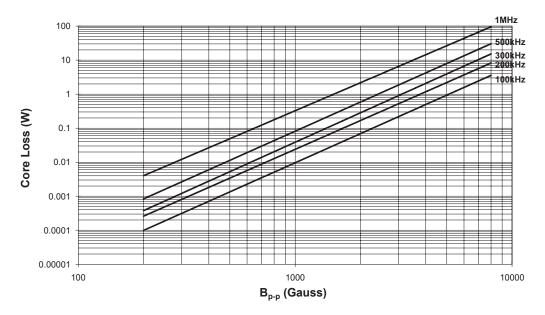


Supplied in tape-and-reel packaging, 350 parts per reel, 13" diameter reel.

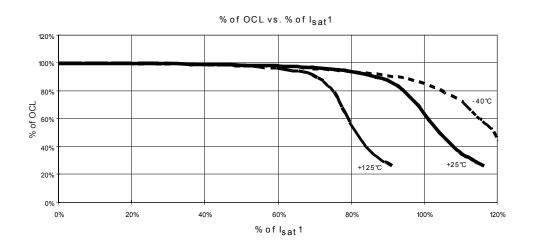
Temperature rise vs total loss



Core loss vs Bp-p



Inductance characteristics



Solder Reflow Profile

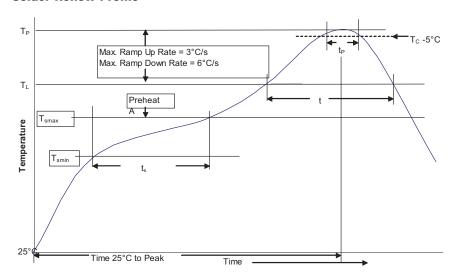


Table 1 - Standard SnPb Solder (T_c)

Package Thickness	Volume mm³ <350	Volume mm³ ≥350
<2.5mm	235°C	220°C
≥2.5mm	220°C	220°C

Table 2 - Lead (Pb) Free Solder (Tc)

	Volume	Volume	Volume
Package	mm³	mm³	mm ³
Thickness	<350	350 - 2000	>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	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 rat	te T _{smax} to T _p	3°C/ Second Max.	3°C/ Second Max.	
Liquidous temperature (TL)		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.	

 $^{^{\}star}$ Tolerance for peak profile temperature (Tp) 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/electronics

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^{**} Tolerance for time at peak profile temperature (t_p) is defined as a supplier minimum and a user maximum.