

FP0910V

High frequency, high current power inductors



Product features

- Vertical design utilizes less board space
- High current carrying capacity
- Tight toleranced DCR for sensing circuits
- Inductance Range from 100 nH to 470 nH
- Current range 17 A to 80 A
- 9.0 mm x 5.0 mm, 5.2 mm footprint surface mount package in 9.5 mm height
- Moisture sensitivity level (MSL): 1
- Ferrite core material
- Weight: FP0910V2 1.9 grams typical, FP0910V3 2.48 grams typical
- Termination finish: matte tin over nickel

Applications

- Multi-phase and Vcore regulators
- Voltage Regulator Modules (VRMs) and high-power density VRMs
 - Server and desktop
 - Central processing unit (CPU)
 - Graphics processing unit (GPU)
 - Application specific integrated circuit (ASIC)
- Data networking and storage systems
- Graphics cards and battery power 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



Product specifications

Part number ⁵	OCL ¹ (nH) ±10%	FLL ² (nH) minimum	I_{avg}^3 (A)	I_{pk}^1 (A)	I_{pk}^2 (A)	I_{pk}^3 (A)	DCR (mΩ) @ +20 °C ±5%	K-factor ⁷	Dimension B
FP0910V2-R100-R	100	72	63	80	70	64	0.125	455	5.2 maximum
FP0910V2-R120-R	120	84	63	70	60	56	0.125	455	5.0 maximum
FP0910V2-R150-R	150	108	63	56	48	45	0.125	455	5.0 maximum
FP0910V2-R330-R	330	230	63	17	14	13	0.125	455	5.0 maximum
FP0910V3-R150-R	150	105	44	68	58	54	0.40	340	5.0 maximum
FP0910V3-R330-R	330	231	44	23	19	17	0.40	340	5.0 maximum
FP0910V3-R470-R	470	329	44	17	14	13	0.40	340	5.0 maximum

1. Open Circuit Inductance (OCL) Test parameters: 100 kHz, 0.1 Vrms, 0.0 Adc, +25 °C

2. Full Load Inductance (FLL) Test parameters: 100 kHz, 0.1 Vrms, $I_{avg}1$, +25 °C

3. I_{avg} : 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. $I_{pk}1$: Peak current for approximately 20% rolloff @ +25 °C

5. $I_{pk}2$: Peak current for approximately 20% rolloff @ +100 °C

6. $I_{pk}3$: Peak current for approximately 20% rolloff @ +125 °C

7. K-factor: Used to determine Bp-p for core loss (see graph). $Bp-p = K * L * \Delta I * 10^{-3}$. Bp-p (Gauss), K: (K-factor from table), L: (Inductance in nH), ΔI (Peak to peak ripple current in Amps).

8. Part Number Definition: FP0910Vx-Rxxx-R

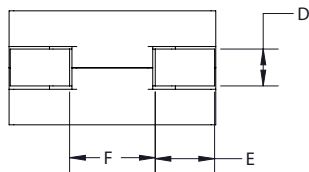
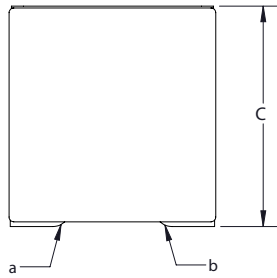
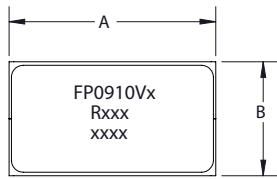
FP0910 = Product code and size

Vx = Version indicator

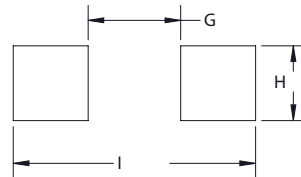
Rxxx = Inductance value in μH, R = decimal point

-R suffix = RoHS compliant

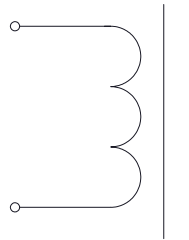
Dimensions- mm



Recommended pad layout



Schematic



Dimension	A	B	C	D	E	F	G	H	I
FP0910V2-R	9.0 maximum	See product specification table	9.5 maximum	2.35 nominal	2.80 nominal	3.1 nominal	3.0 typical	2.6 typical	9.6 typical
FP0910V3-R	9.0 maximum	See product specification table	9.5 maximum	1.55 nominal	2.5 nominal	4.0 nominal	3.9 typical	2.9 typical	10.2 typical

Part marking: FP0910=Product code and size, Vx=Version indicator, Rxxx= inductance value in μH,

R=decimal point, xxxx= lot code

Tolerances are ±0.15 millimeters unless stated otherwise

All soldering surfaces to be coplanar within 0.1 millimeters

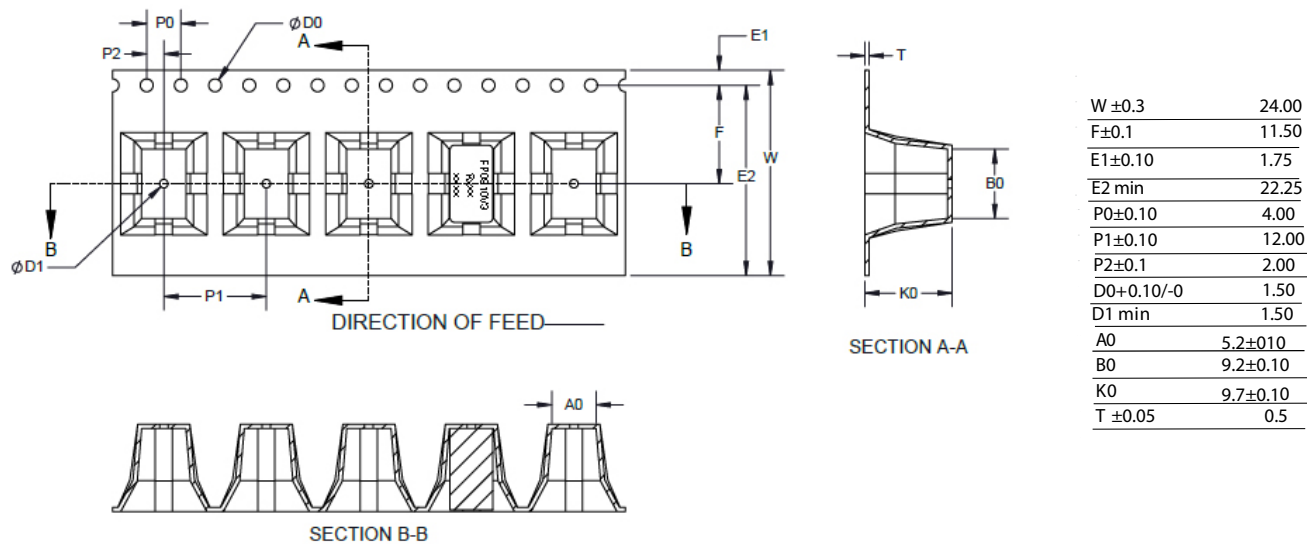
Pad layout tolerances are ±0.1 millimeters unless stated otherwise

DCR is measured from point "a" to point "b"

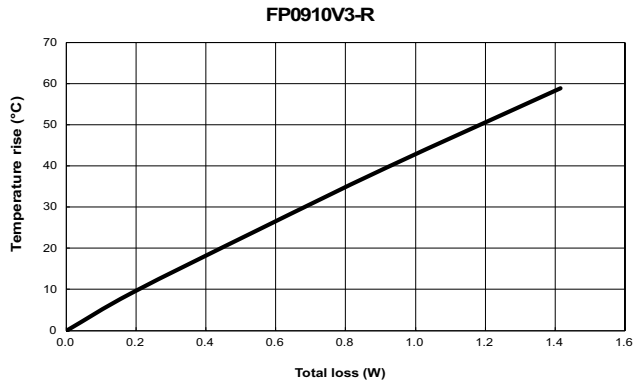
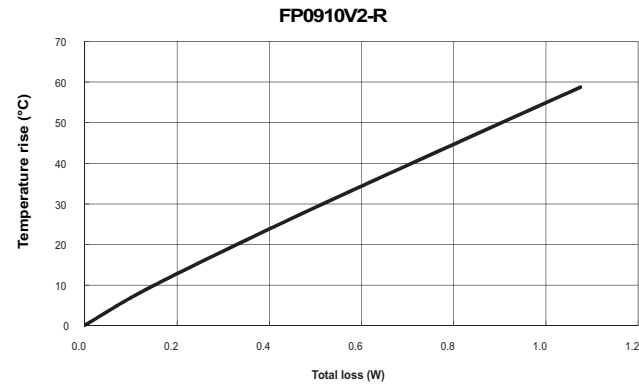
Traces or vias underneath the inductor is not recommended

Packaging information- mm

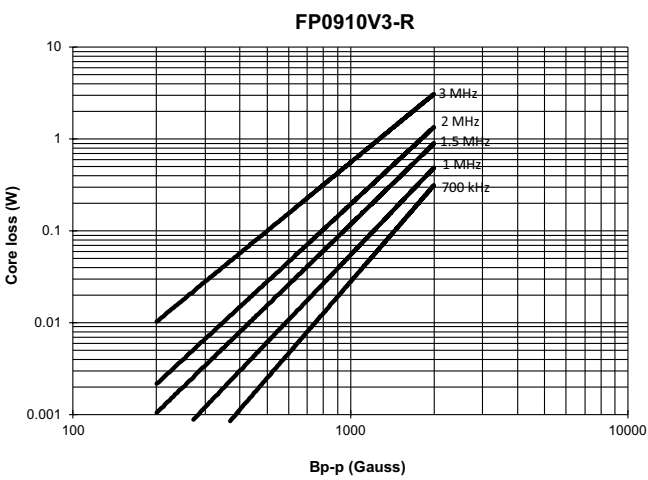
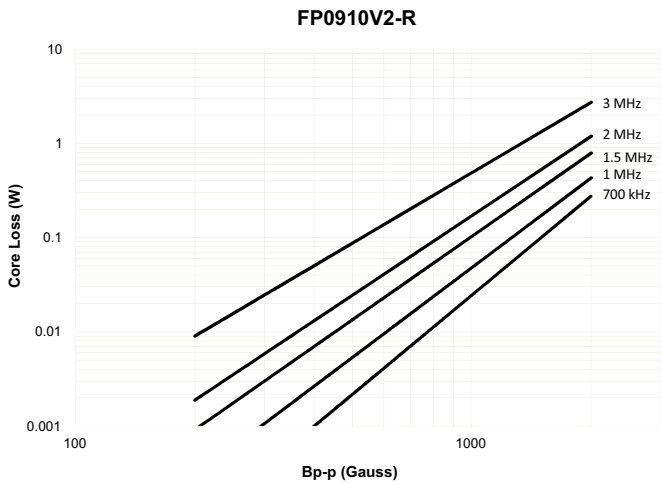
Supplied in tape and reel packaging, 500 parts per 13" diameter reel



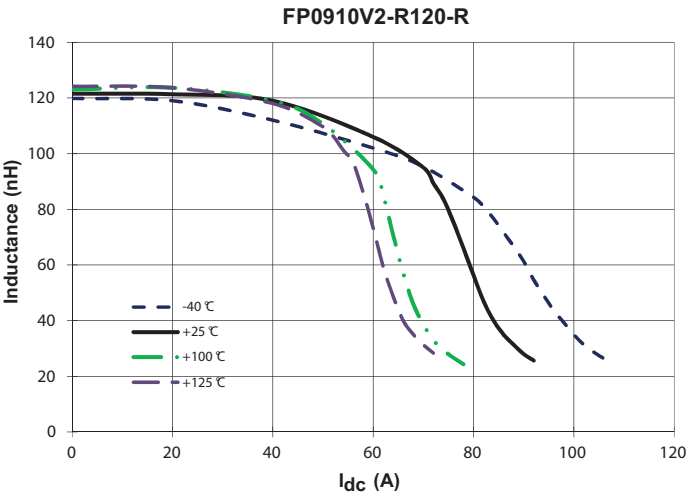
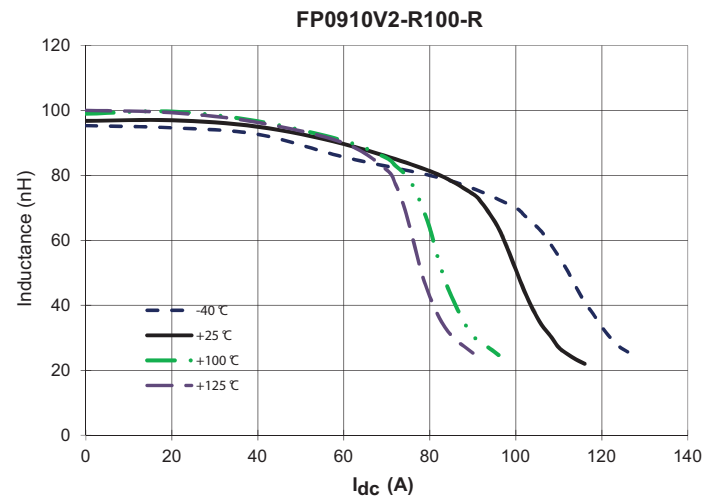
Temperature rise vs. total loss



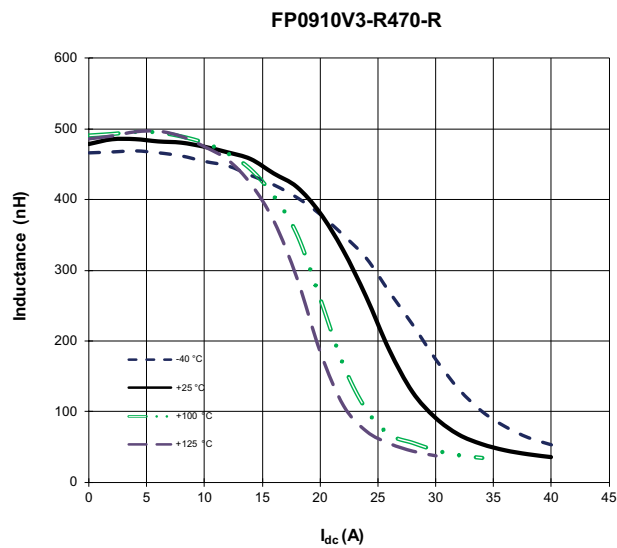
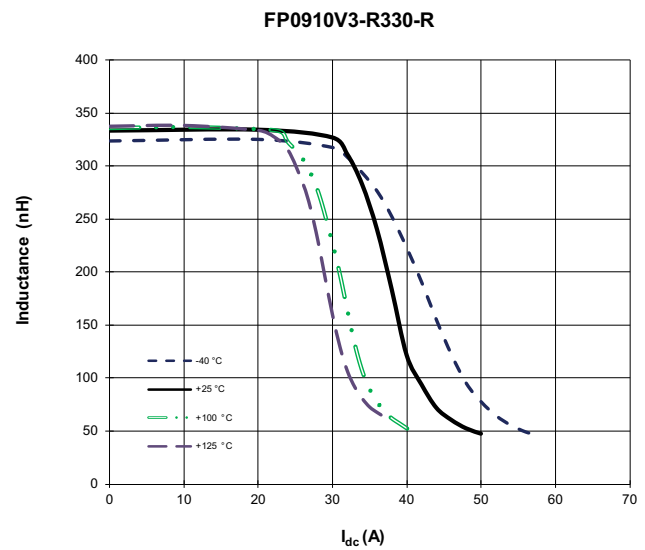
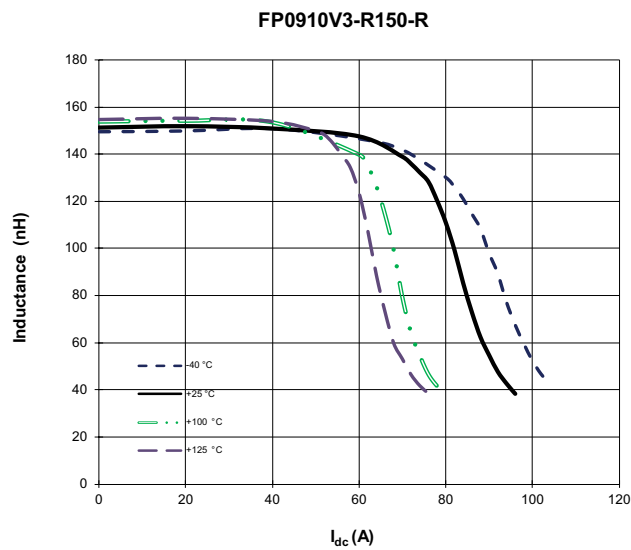
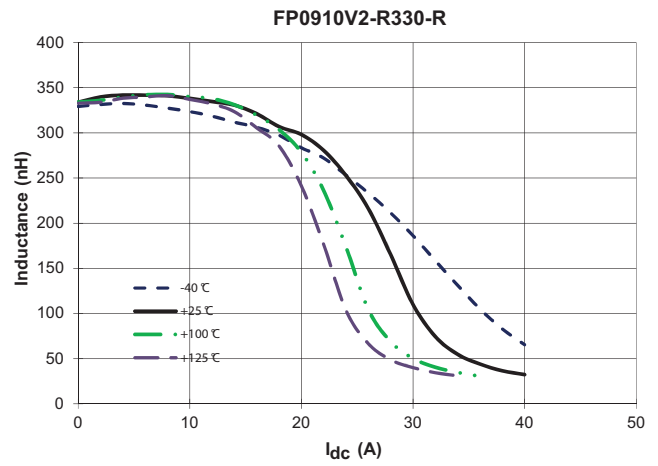
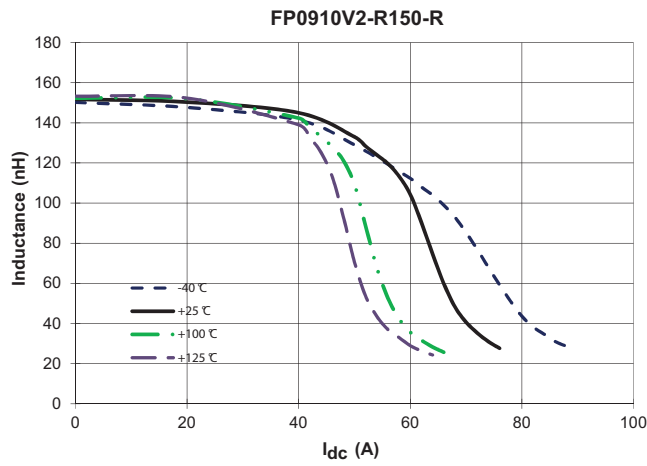
Core loss vs Bp-p



Inductance characteristics



Inductance characteristics



Solder reflow profile

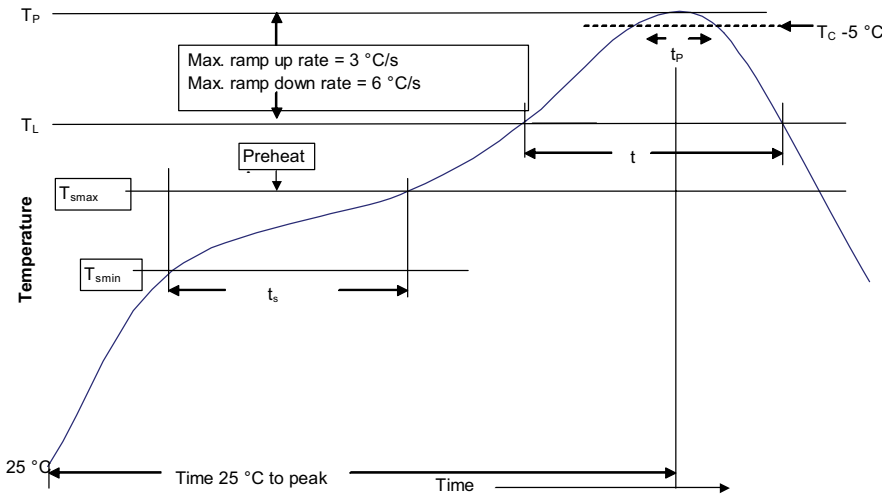


Table 1 - Standard SnPb solder (T_C)

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 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
Ramp up rate T_L to T_p	3 °C/ second max.	3 °C/ second max.
Liquidous temperature (T_L)	183 °C	217 °C
Time (t_L) maintained above 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*
Ramp-down rate (T_p to T_L)	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.

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