

FP1010V14

High frequency, high current power inductors



Product features

- Vertical design utilizes less board space
- High current carrying capacity
- Tight tolerance DCR for sensing circuits
- Operating frequency up to 3 MHz
- Inductance range from 70 nH to 100 nH
- Current range 68 A to 150 A
- 9.6 mm x 6.4 mm footprint surface mount package in 10 mm height
- Moisture sensitivity level (MSL): 1
- Ferrite core material

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 compliance and general specifications

- 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 ⁸	OCL ¹ (nH) ±10%	FLL ² (nH) minimum	I _{avg} ³ (A)	I _{sat} ¹ ⁴ (A)	I _{avg} ² ⁵ (A)	I _{sat} ³ ⁶ (A)	DCR (mΩ) @ +20 °C ±5%	K-factor ⁷
FP1010V14-R070-R	70	55	68	150+	127	120	0.15	339
FP1010V14-R090-R	90	65	68	134	114	107	0.15	339
FP1010V14-R100-R	100	72	68	124	102	94	0.15	339

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_{sat}1 : Peak current for approximately 20% rolloff @ +25 °C

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

6. I_{sat}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 * ΔI * 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: FP1010Vx-Rxxx-R

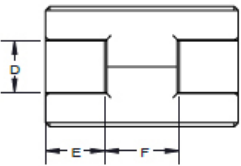
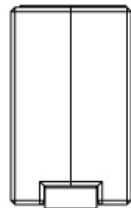
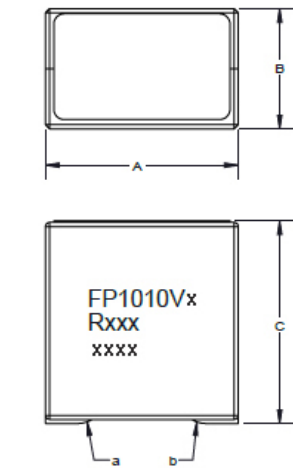
FP1010 = Product code and size

Vx= Version indicator

Rxxx=Inductance value in μH, R=decimal point

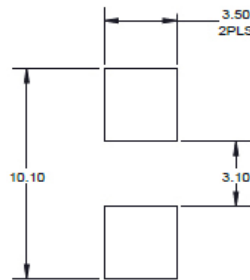
-R suffix = RoHS compliant

Dimensions-mm

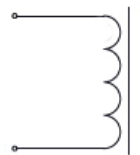


Dimension	FP1010V14
A	9.6 maximum
B	6.4 maximum
C	10 maximum
D	2.5 reference
E	2.9 reference
F	3.6 reference

Recommended pad layout



Schematic



Part marking: FP1010=Product code and size, Vx=Version indicator, Rxxx= inductance value in uH, R=decimal point, xxxx= lot code

Tolerances are ±0.15 millimeters unless stated otherwise

All soldering surfaces to be coplanar within 0.1 millimeters

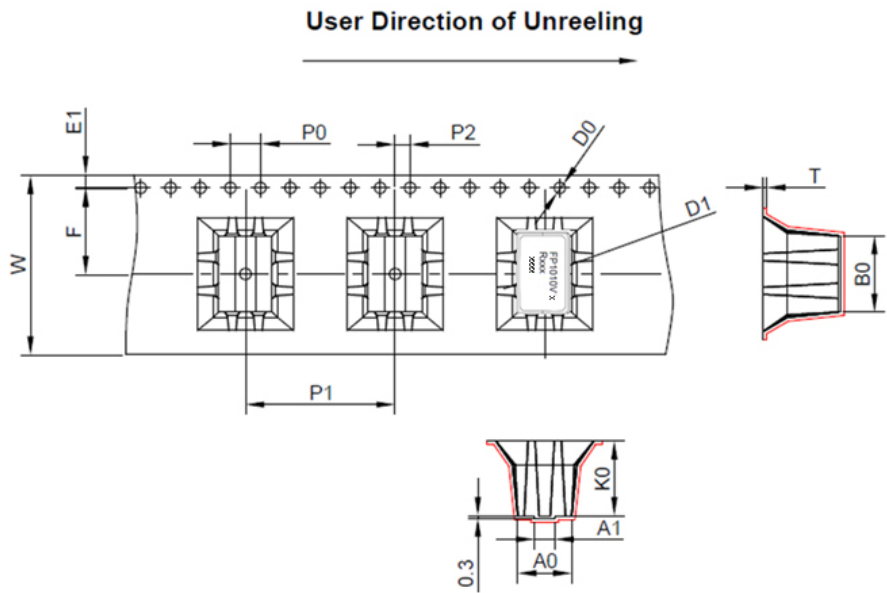
Pad layout tolerances are ±0.1 millimeters unless stated otherwise

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

Traces or vias underneath the inductor is not recommended

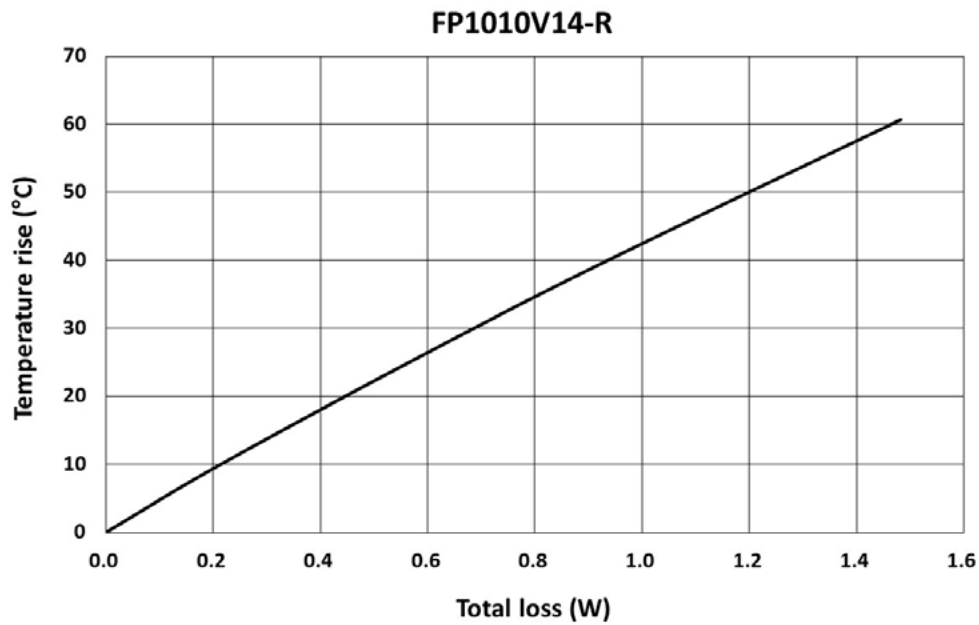
Packaging information- mm

Supplied in tape and reel packaging, 300 parts per 13" diameter reel (EIA-481 compliant)

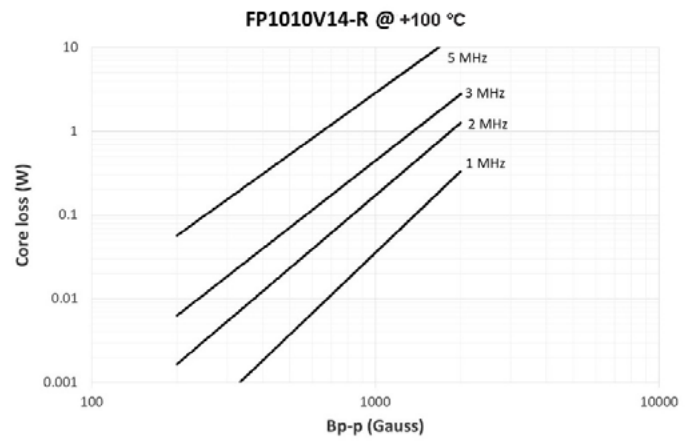
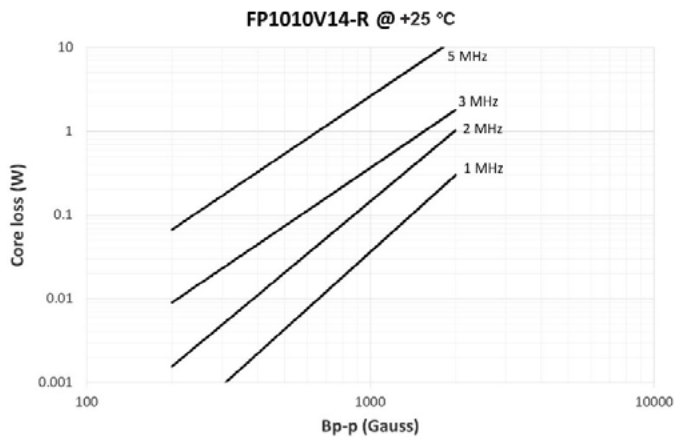


W ±0.3	24.00
F ±0.1	11.50
E1 ±0.10	1.75
P0 ±0.10	4.00
P1 ±0.10	20.00
P2 ±0.1	2.00
D0 +0.10/-0	1.50
D1 +min	1.50
A0	6.6 ±0.10
A1	3.1 ±0.20
B0	9.8 ±0.10
K0	10.3 ±0.10
T ±0.05	0.5

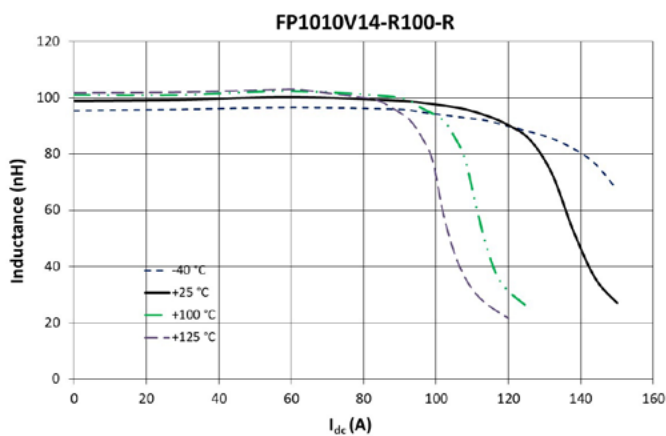
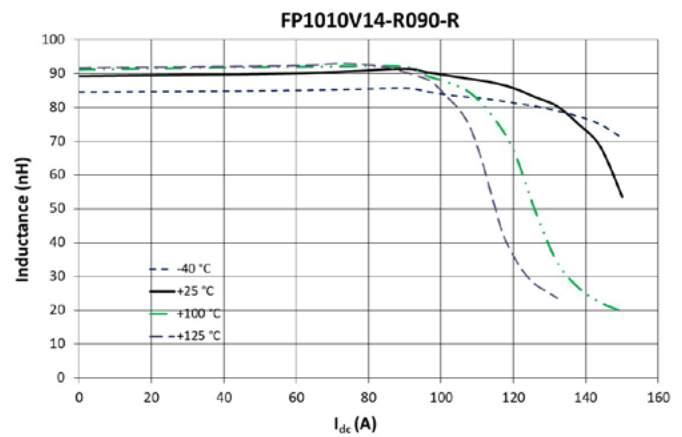
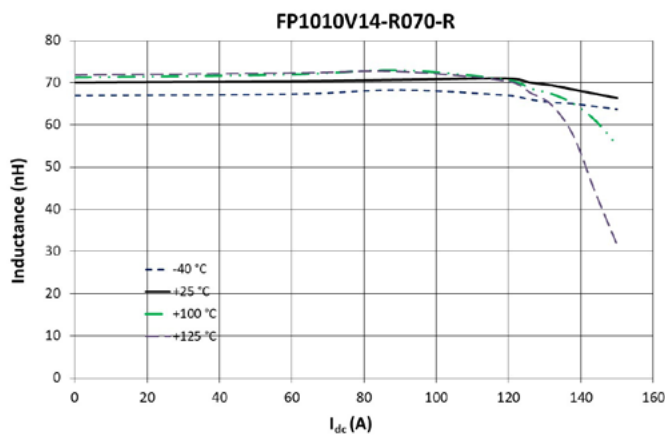
Temperature rise vs. total loss



Core loss vs Bp-p



Inductance characteristics



Solder reflow profile



Table 1 - Standard SnPb solder (T_c)

Package thickness	Volume 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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