

FP1010R

High frequency, high current power inductors



Applications

- 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 networking and storage systems
- Graphics cards and battery power systems
- Portable electronics
- Point-of-Load modules
- DCR Sensing circuits

Description

- High current carrying capacity
- Low core loss
- Magnetically shielded
- Tight tolerance DCR for sensing circuits
- 10 mm x 7.0 mm footprint surface mount package in a 10 mm height
- Ferrite core material
- Halogen free, lead free, RoHS compliant

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-020D compliant



Product Specifications

Part Number ⁸	OCL ¹ (nH) ± 15%	FLL ² (nH) minimum	I _{rms} ³ (A)	I _{sat} ¹⁴ (A)	I _{sat} ²⁵ (A)	I _{sat} ³⁶ (A)	DCR (mΩ) ±5% @ 20°C	K-factor ⁷
FP1010R1-R120-R	120	84	50	94	80	75	0.185	371
FP1010R1-R150-R	150	105	50	80	68	64	0.185	371
FP1010R1-R330-R	330	230	50	30	25	23	0.185	371

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, Isat1, +25 °C

3. 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 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), Symbol I (Peak to peak ripple current in Amps).

8. Part Number Definition: FP1010Rx-Rxxx-R

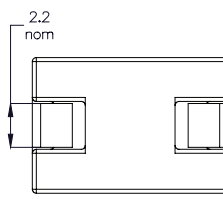
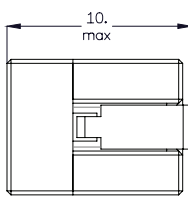
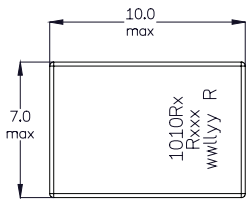
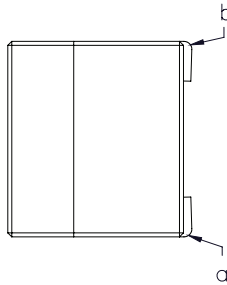
FP1010R= Product code and size

x= Version indicator

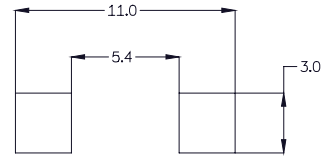
-Rxxx= Inductance value in μH, R= decimal point

-R suffix = RoHS compliant

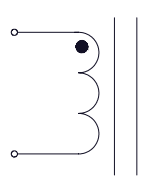
Dimensions (mm)



Recommended Pad Layout



Schematic



Part marking: 1010Rx (x = Version Indicator), Rxxx = Inductance value in μH (R = decimal point)

wwlyy = date code, R = revision level

Tolerances are ±0.15 millimeters unless stated otherwise

All soldering surfaces to be coplanar within 0.1 millimeters

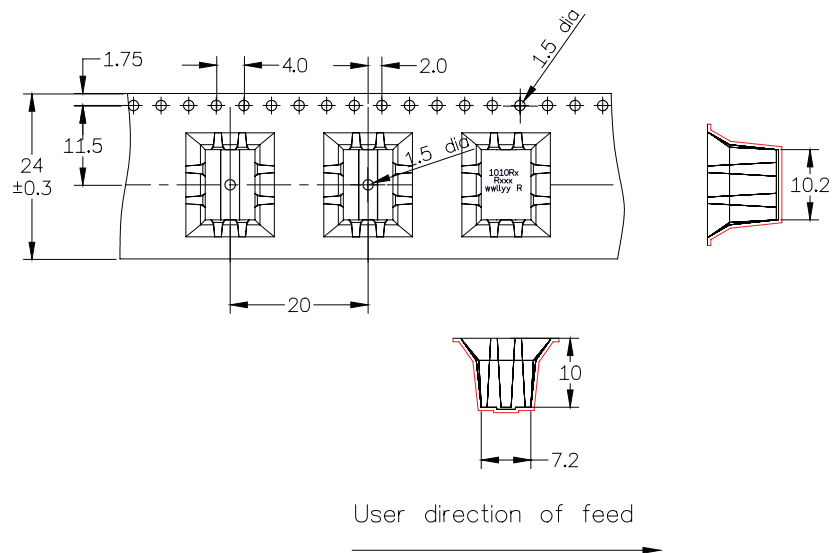
PCB tolerances are ±0.1 millimeters unless stated otherwise

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

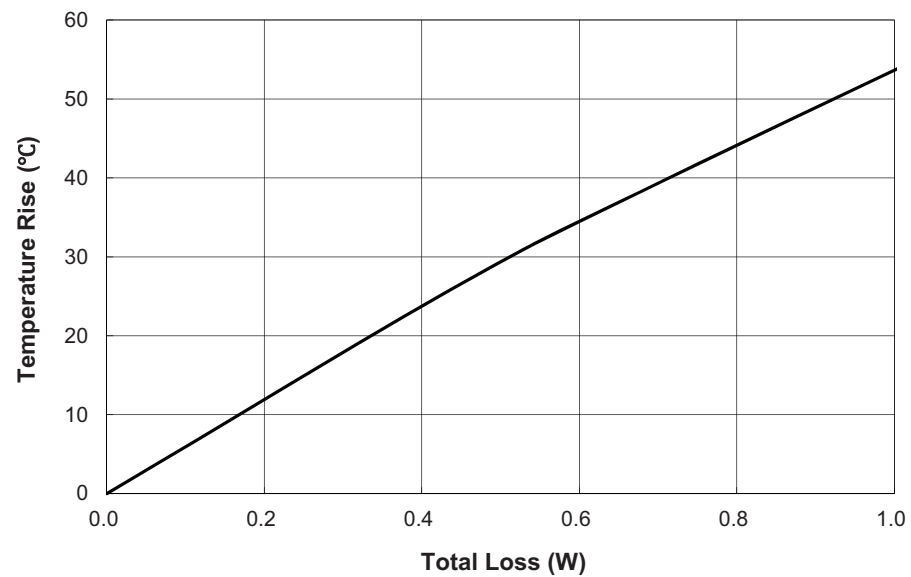
Do not route traces or vias underneath the inductor

Packaging information (mm)

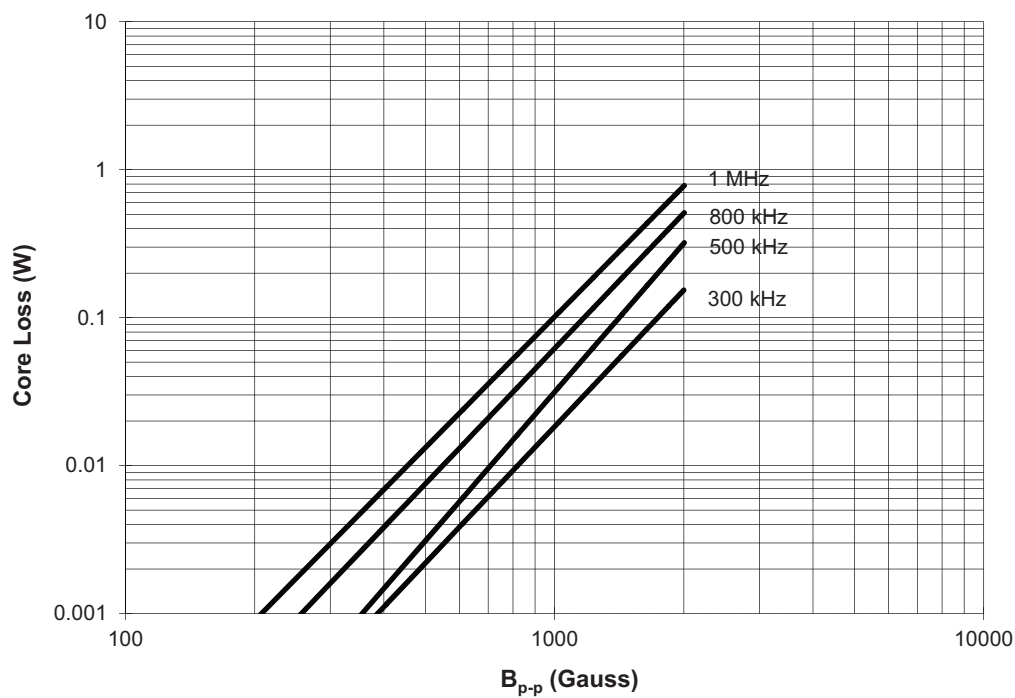
Supplied in tape and reel packaging , 300 parts per 13" diameter reel



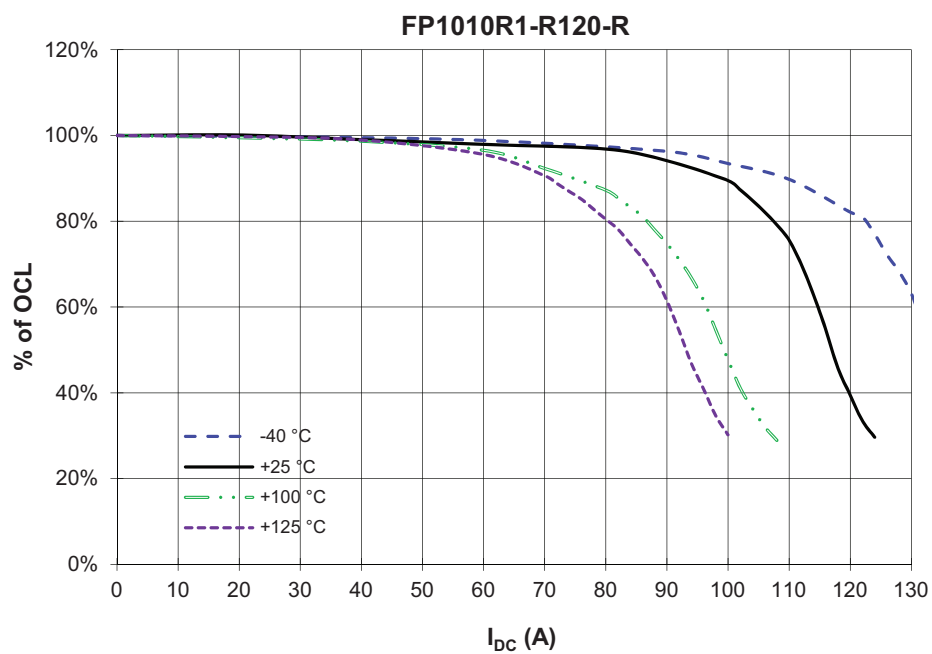
Temperature rise vs. total loss



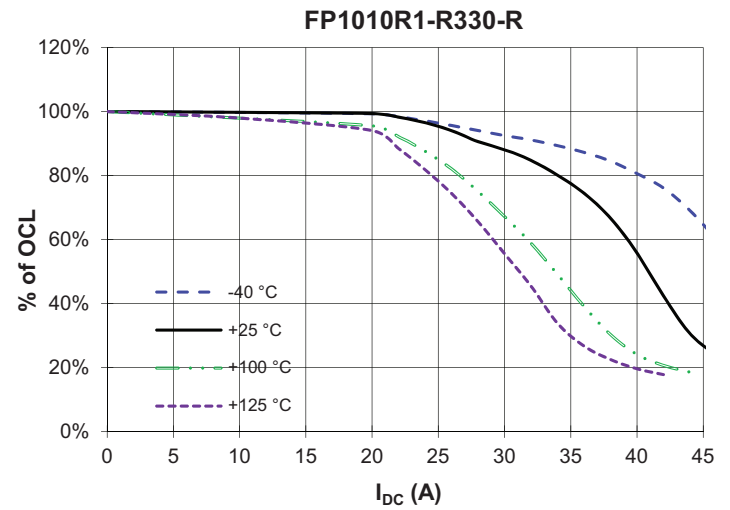
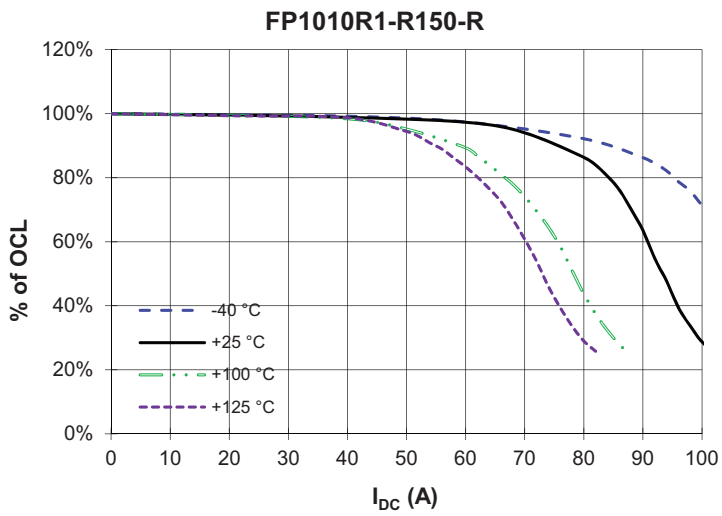
Core loss vs. B_{p-p}



Inductance characteristics



Inductance characteristics



Solder reflow profile

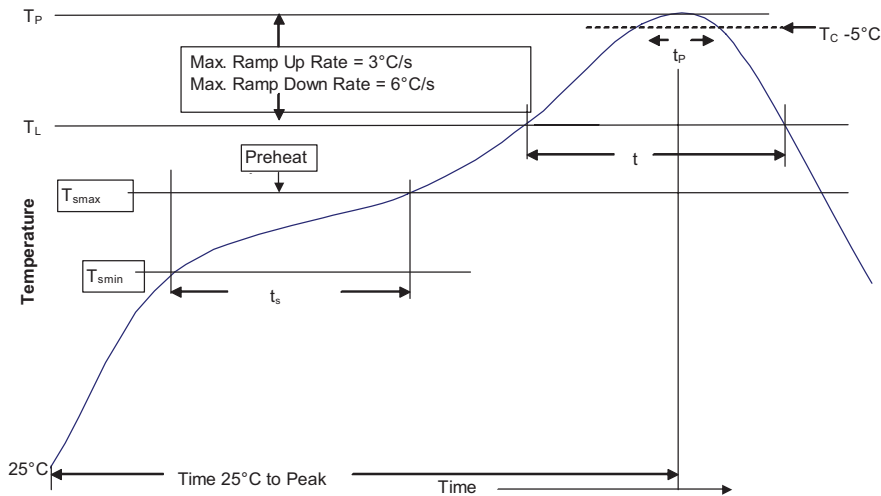


Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm ³ <350	Volume mm ³ ≥350
<2.5mm)	235°C	220°C
≥2.5mm	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
<1.6mm	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 JEDEC J-STD-020D

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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