

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



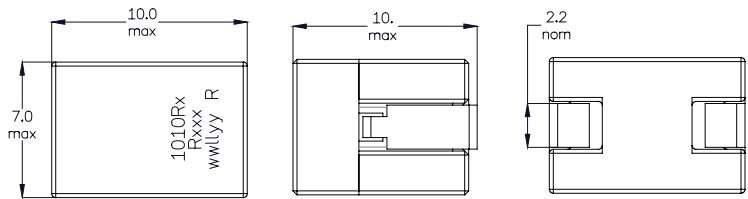
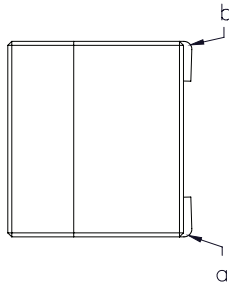
Product Specifications

Part Number ⁸	OCL ¹ (nH) ± 15%	FLL ² (nH) minimum	I _{rms} ³ (A)	I _{sat} 1 ⁴ (A)	I _{sat} 2 ⁵ (A)	I _{sat} 3 ⁶ (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

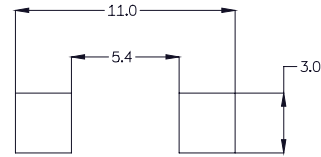
- Open Circuit Inductance (OCL) Test Parameters: 100 kHz, 0.1 Vrms, 0.0 Adc, +25 °C
- Full Load Inductance (FLL) Test Parameters: 100 kHz, 0.1 Vrms, Isat1, +25 °C
- I_{rms}: DC current for an approximate temperature rise of 40 °C without core loss. Derating is necessary for AC currents. PCB layout, trace 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 application.

- I_{sat}1: Peak current for approximately 20% rolloff @ +25 °C
- I_{sat}2: Peak current for approximately 20% rolloff @ +100 °C
- I_{sat}3: Peak current for approximately 20% rolloff @ +125 °C
- 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).
- 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

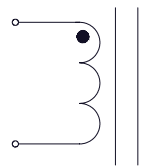
Dimensions (mm)



Recommended Pad Layout



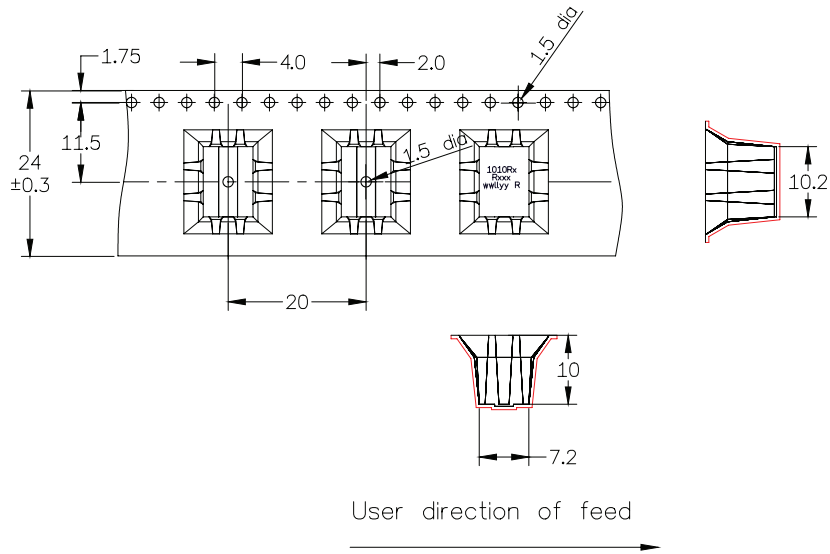
Schematic



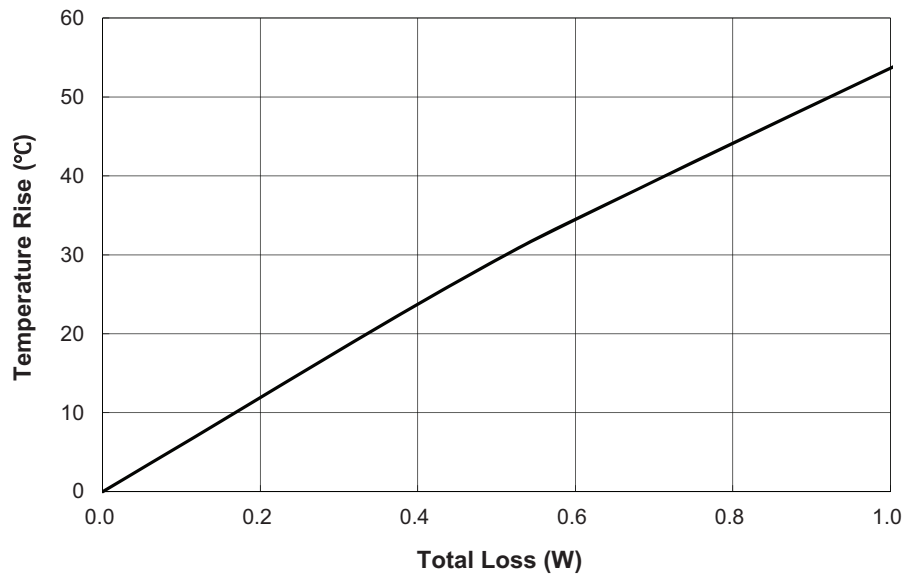
Part marking: 1010Rx (x = Version Indicator), Rxxx = Inductance value in μH (R= decimal point)
wwlyy = date code, R = revision level
Tolerances are ±0.15 millimeters unless stated otherwise
All soldering surfaces to be coplanar within 0.1 millimeters
PCB tolerances are ±0.1 millimeters unless stated otherwise
DCR measured from point "a" to point "b"
Do not route traces or vias underneath the inductor

Packaging information (mm)

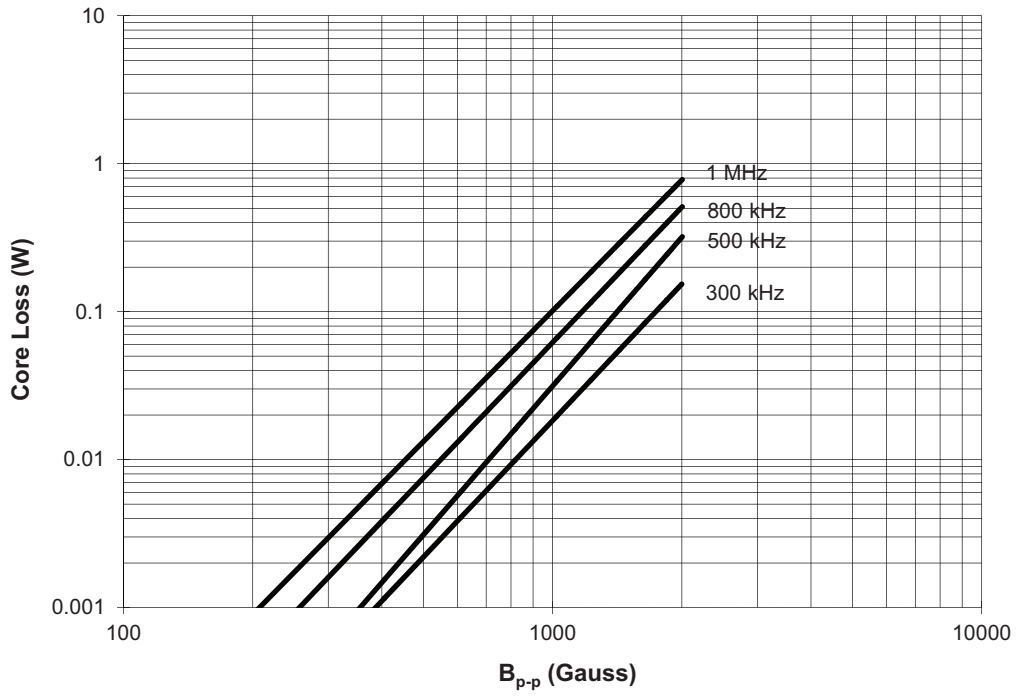
Supplied in tape and reel packaging , 300 parts per 13" diameter reel



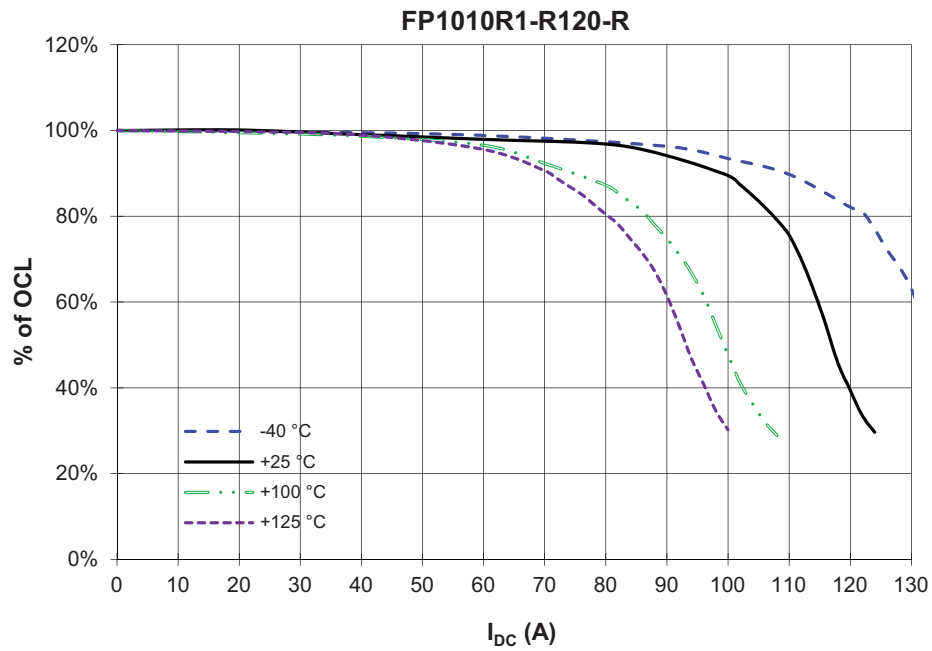
Temperature rise vs. total loss



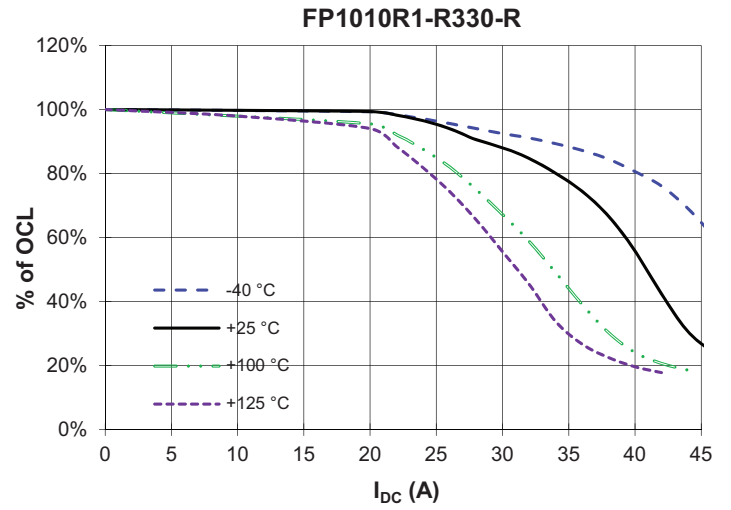
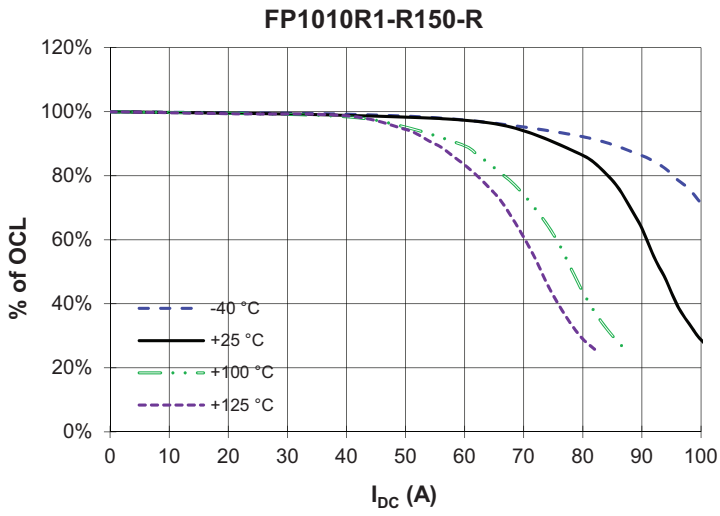
Core loss vs. B_{p-p}



Inductance characteristics



Inductance characteristics



Solder reflow profile

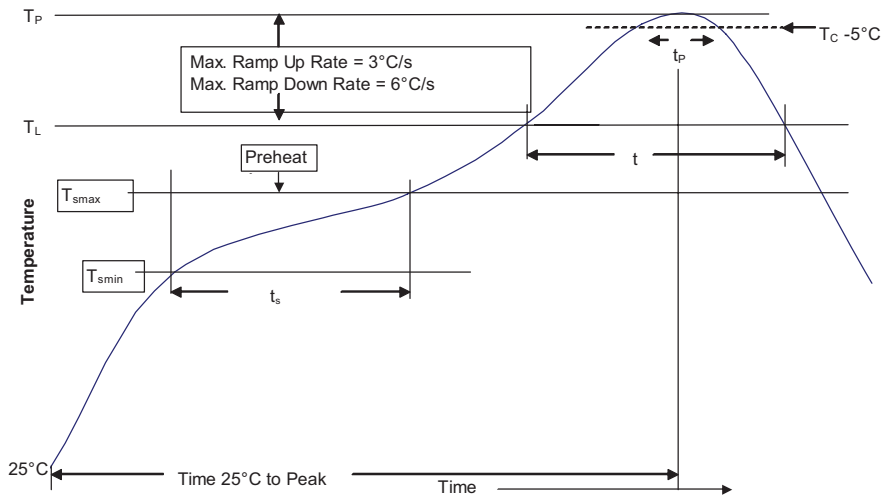


Table 1 - Standard SnPb Solder (T_c)

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 JDEC 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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Eaton
Electronics Division
1000 Eaton Boulevard
Cleveland, OH 44122
United States
www.eaton.com/elx

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