

FP0707R

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

Product description

- High current carrying capacity
- Low core loss
- Tight tolerance DCR for sensing circuits
- 7.2 mm x 7.2 mm footprint surface mount package in a 7.0 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

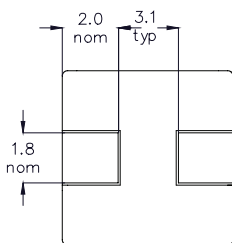
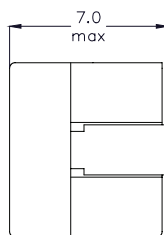
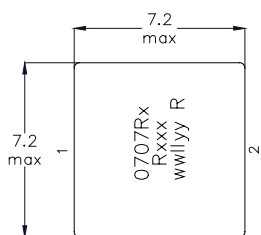
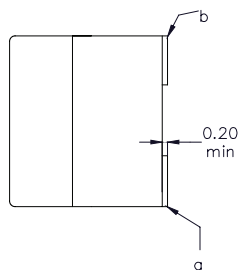


Product specifications

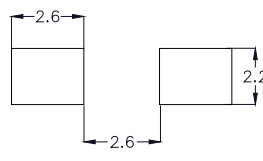
Part Number ⁸	OCL ¹ (nH) ±10%	FLL ² (nH) minimum	I _{rms} ³ (A)	I _{sat} 1 ⁴ (A)	I _{sat} 2 ⁵ (A)	I _{sat} 3 ⁶ (A)	DCR (mΩ) ±5% @ 20 °C	K-factor ⁷
FP0707R1-R110-R	110	79	45	67	55	51	0.30	542

- 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, I_{sat}1, +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 B_{pp} for core loss (see graph).
 $B_{pp} = K * L * \Delta I * 10^{-3}$; B_{pp} (Gauss), K: (K-factor from table),
 L: (Inductance in nH), ΔI (Peak to peak ripple current in Amps).
- Part Number Definition: FP0707Rx-Rxxx-R
 FP0707R= Product code and size
 x= Version indicator
 -Rxxx= Inductance value in μH, R= decimal point
 -R suffix = RoHS compliant

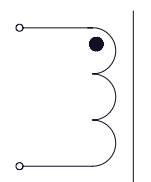
Dimensions (mm)



Recommended Pad Layout



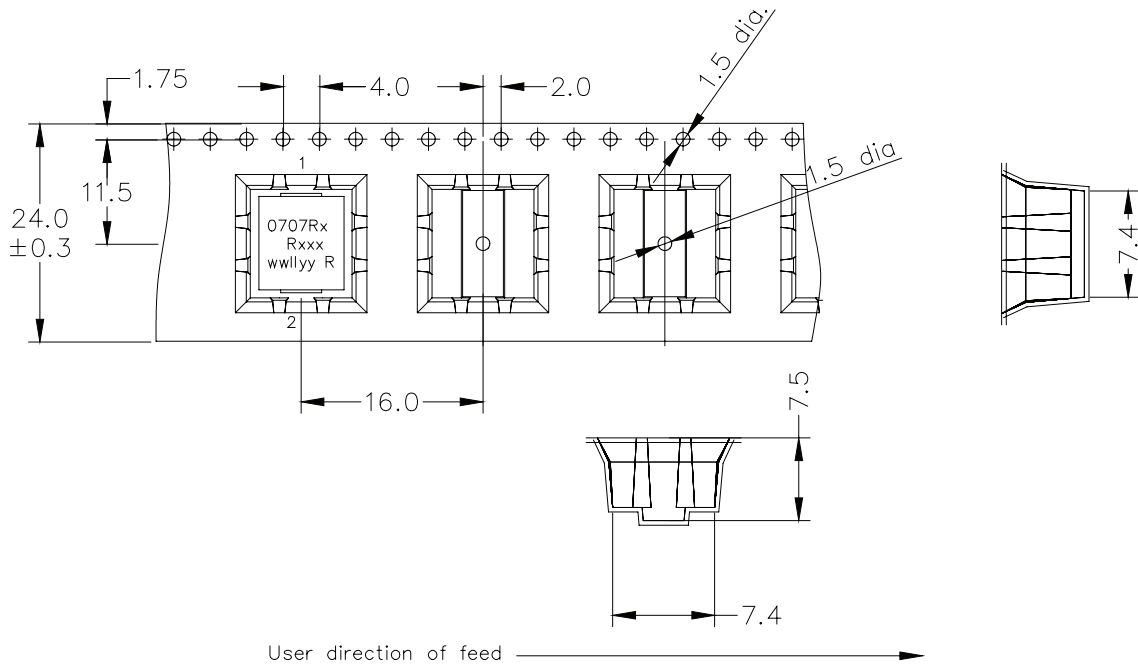
Schematic



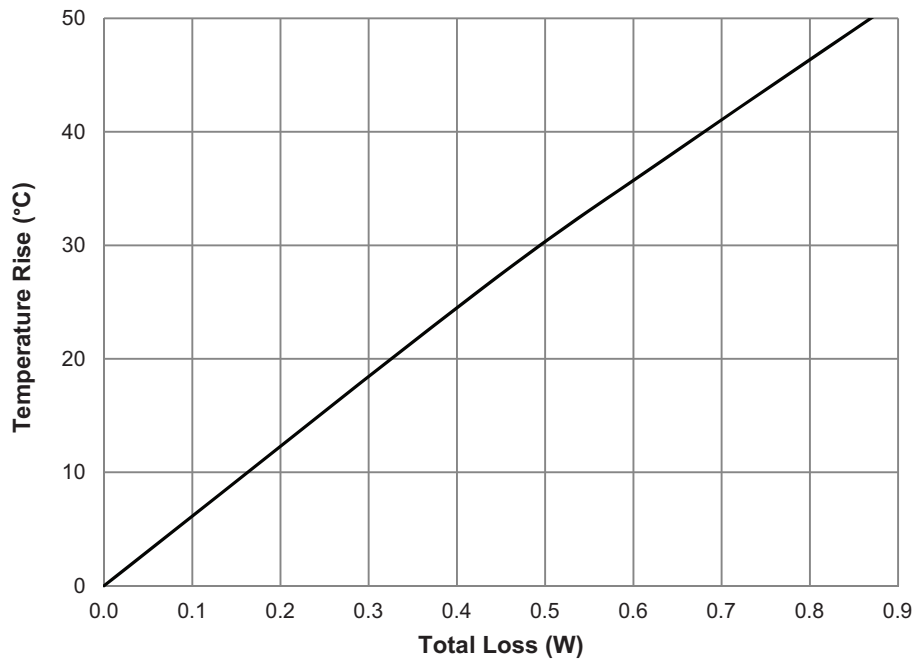
Part marking: 0707Rx (x = Version indicator), Rxxx = Inductance value in μH (R = decimal point), wwlllyy = date code, R = revision level
 Tolerances are ±0.15 millimeters unless stated otherwise.
 All soldering surfaces to be coplanar within 0.1 millimeter
 DCR measured from point "a" to point "b"
 Do not route traces or vias underneath the inductor

Packaging information (mm)

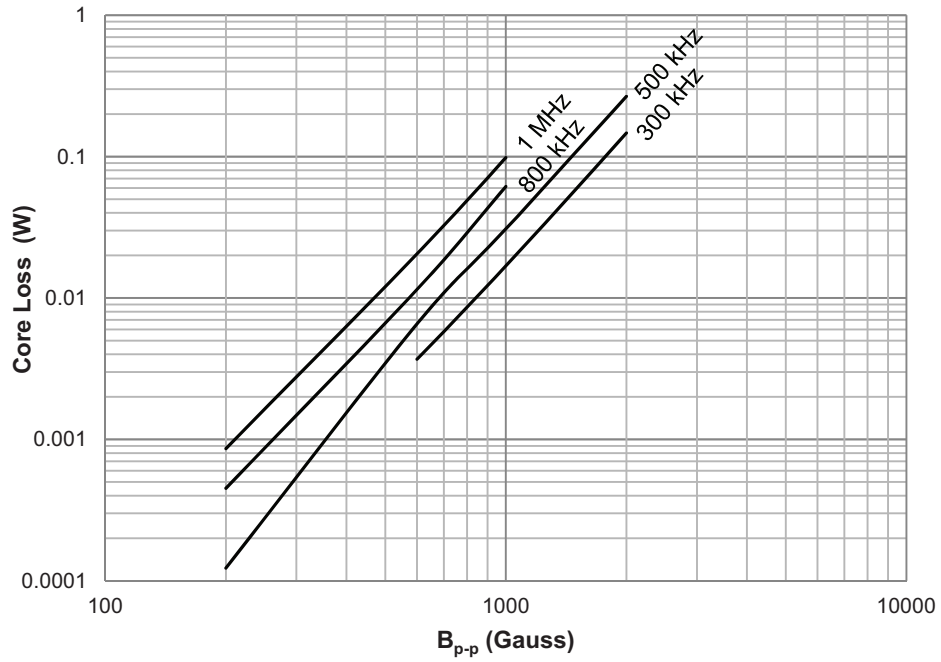
Supplied in tape-and-reel packaging, 550 parts on a 13" diameter reel.



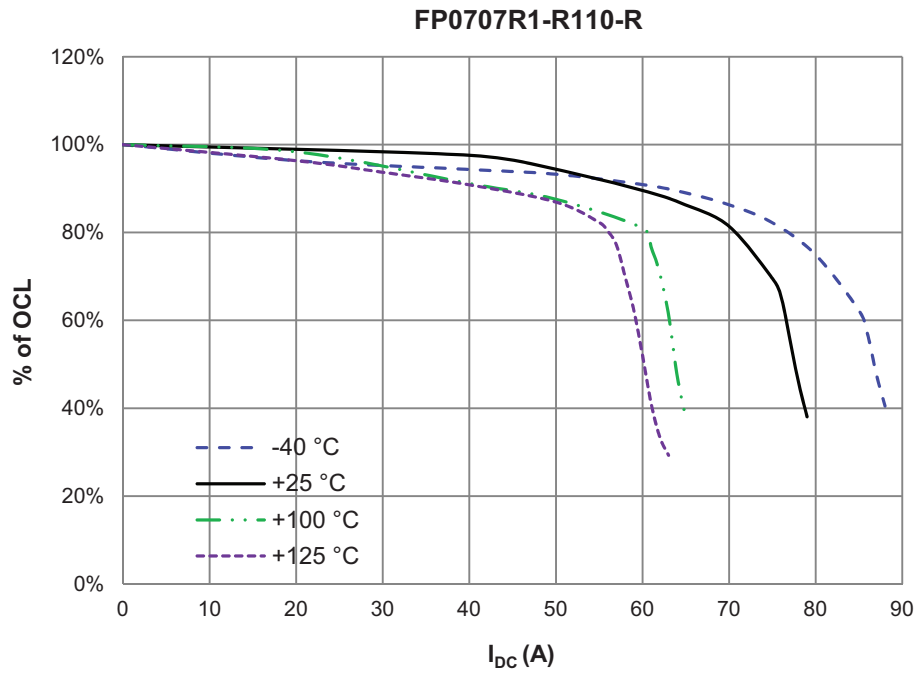
Temperature rise vs. total loss



Core loss vs. B_{p-p}



Inductance characteristics



Solder reflow profile



Table 1 - Standard SnPb Solder (T_C)

Package Thickness	Volume mm^3 <350	Volume mm^3 \geq 350
<2.5mm)	235°C	220°C
\geq 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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